Cisco VDS-TV ISA Configuration Guide
Release 3.9

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Cisco Systems, Inc.
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Preface

This preface describes the audience, objective of the Cisco VDS-TV ISA Configuration Guide. It also references related documentation and describes how to obtain documentation and submit a service request.

- Document Revision History, page xvii
- Audience, page xvii
- Objective, page xvii
- Document Organization, page xviii
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<th>Date</th>
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<tr>
<td>October 2015</td>
<td>Initial release.</td>
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Audience

This guide is for the networking professional managing the Cisco Videoscape Distribution Suite TV system, hereafter referred to as VDS-TV. Before using this guide, you should have experience working with Cisco IOS software and be familiar with the concepts and terminology of Ethernet, local area networking, and TV streaming.

Objective

This guide provides the information that you need to configure and monitor the Cisco TV VDS. This guide provides procedures for using the commands that have been created or changed for use with the Cisco TV VDS. It does not provide detailed information about these commands.
This guide does not describe system messages that you might encounter or how to install your VDS. For information on installing the hardware, see the Cisco Content Delivery Engine 100/200/300/400 Hardware Installation Guide, the Cisco Content Delivery Engine 110 Hardware Installation Guide, or the Cisco Content Delivery Engine 205/220/250/420/460 Hardware Installation Guide or Cisco UCS C220 M4 Server Installation and Service Guide. See the “Related Documentation” section on page xx for links to documentation online.

For documentation updates, see the release notes for this release.

**Document Organization**

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<td>Provides an overview of the Content Delivery System.</td>
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<td>Chapter 2, “Network Design”</td>
<td>Describes the possible network topologies for the Content Delivery System.</td>
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<tr>
<td>Chapter 3, “Getting Started”</td>
<td>Describes accessing and navigating the Content Delivery System Manager (CDSM).</td>
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<td>Chapter 4, “Configuring the VDS”</td>
<td>Describes how to configure the VDS using the CDSM web-based user interface.</td>
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<td>Chapter 5, “System Monitoring”</td>
<td>Explains how to monitor the VDS components using the CDSM.</td>
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<td>Chapter 6, “System Reporting”</td>
<td>Explains the different reports available through the CDSM.</td>
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<td>Chapter 7, “System Maintenance”</td>
<td>Explains how to install software updates, restart services, add administrator users, and shut down and reboot the servers.</td>
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<td>Presents troubleshooting procedures for the VDS, including the symptoms, probable causes, and recommended actions for a variety of problems.</td>
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<td>Provides information on creating Bulk Import/Export Configuration XML files.</td>
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<td>Appendix C, “BMS Communication”</td>
<td>Describes the mandatory values between the Business Management System (BMS) and the VDS to ensure communication between them.</td>
</tr>
<tr>
<td>Appendix D, “SNMP MIB and Trap Information”</td>
<td>Provides information on SNMP and the Cisco TV VDS proprietary SNMP informational events and traps.</td>
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<tr>
<td>Appendix E, “Using the TV VDS Streamer Application Monitoring Tool”</td>
<td>Describes the TV VDS Streamer Application Monitoring Tool (AMT) that can be used to monitor the VOD Error Repair feature.</td>
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<td>Describes the CDSM pages visible with the Engineering access level.</td>
</tr>
<tr>
<td>Appendix J, “Software Licensing Information”</td>
<td>Provides information on open-source licenses and Cisco’s software licensing agreement.</td>
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## Document Conventions

This guide uses the following conventions for command syntax descriptions and textual emphasis:

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<td>Commands and keywords are in <strong>boldface</strong>.</td>
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<td>Elements in square brackets are optional.</td>
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<td>Terminal sessions and information the system displays are in <strong>screen</strong> font.</td>
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<td><strong>boldface screen</strong> font</td>
<td>Information you must enter is in <strong>boldface screen</strong> font.</td>
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<td>^</td>
<td>The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.</td>
</tr>
<tr>
<td>&lt; &gt;</td>
<td>Nonprinting characters, such as passwords, are in angle brackets in contexts where italics are not available.</td>
</tr>
<tr>
<td>!, #</td>
<td>An exclamation point ( ! ) or a pound sign ( # ) at the beginning of a line of code indicates a comment line.</td>
</tr>
</tbody>
</table>

### Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

### Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this publication.

### Tip

Means the following information might help you solve a problem.
Related Documentation

These documents provide complete information about the VDS and are available from Cisco.com:

- Cisco VDS-TV RTSP Software Configuration Guide, Release 3.9
- Cisco VDS-TV ISA Software Configuration Guide, Release 3.9
- Cisco VDS-TV API Guide, Release 3.9
- Release Notes for the Cisco VDS-TV 3.9
- Cisco Content Delivery Engine 110 Hardware Installation Guide
- Cisco Content Delivery Engine 205/220/250/420/460 Hardware Installation Guide
- Cisco UCS C220 M4 Server Installation and Service Guide
- Regulatory Compliance and Safety Information for Cisco Content Delivery Engines

You can access the software documents at the following URL:

You can access the hardware documents at the following URL:

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly What’s New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:

Subscribe to the What’s New in Cisco Product Documentation as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.
Product Overview

This chapter provides a brief introduction to the Cisco TV Content Delivery System for an Interactive Services Architecture (ISA) environment.

- Overview, page 1-1
- Content Delivery System Architecture, page 1-16

Overview

The Cisco TV Content Delivery System (VDS) is a distributed network of Content Delivery Engines (CDEs) running Content Delivery Applications (CDAs) that collaborate with each other to deliver personalized entertainment and interactive media to subscribers.

The Cisco TV VDS has a variety of mechanisms to accelerate the distribution and delivery of content. The VDS interoperates with electronic program guides (EPGs), set-tops and back office applications, offering an end-to-end solution for video delivery systems.

The Cisco TV VDS functionality can be separated into five areas:

- Ingest
- Storage
- Caching
- Streaming
- Management

Each CDE in the VDS contributes to one or more of these functions as determined by the CDAs running on it. Table 1-1 describes the relationship between the CDA names and the names the TV Content Delivery System Manager (CDSM) uses.

<table>
<thead>
<tr>
<th>CDA Name</th>
<th>Functionalities</th>
<th>CDSM Device Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault</td>
<td>Ingest and storage</td>
<td>Vault</td>
</tr>
<tr>
<td>Content Cache</td>
<td>Content distribution between Vaults and Streamers</td>
<td>Caching Node</td>
</tr>
<tr>
<td>TV Streamer</td>
<td>Content caching, personalization, and streaming to set-tops</td>
<td>Streamer</td>
</tr>
</tbody>
</table>
Overview

Figure 1-1 illustrates how a TV VDS network can be deployed. A business management system (BMS), commonly called a backoffice, enables service providers to deploy on-demand services using video on demand (VOD) servers, networks, billing systems and other system components. The asset management system (AMS) manages the content on headend and node servers, while the BMS handles functions related to pitching and catching. Sometimes there is some overlap of functionality between the BMS and the AMS.

In Cisco VDS-TV 3.7 Release, Cisco video back office (VBO) is introduced in the VDS-TV network replacing Ericsson’s ISA based backoffice OpenStream. To enable communication with VBO, VDS-TV supports HTTP based interfaces for stream setup and content acquisitions. For detailed information on VBO Configuration Workflow, see VBO Configuration Workflow, page 4-151.

There are two types of systems available with the TV VDS: a VDS with an array of Vaults and Streamers, and a Virtual Video Infrastructure (VVI) with an array of Vaults, Caching Nodes, and Streamers. The CDSM manages the Vaults and Streamers in a VDS. The VVIM manages the Vaults, Caching Nodes, and Streamers in a VVI with centralized management. For more information about network design and VVI management, see the “TV VDS and VVI Topologies” section on page 2-2. Figure 1-1 shows a high-level view of both a VDS and a VVI.

**Figure 1-1**  High-Level System View of Content Delivery System and Virtual Video Infrastructure

---

### Table 1-1  CDA Mapping to Functionality and CDSM (continued)

<table>
<thead>
<tr>
<th>CDA Name</th>
<th>Functionalities</th>
<th>CDSM Device Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV MediaX Suite</td>
<td>Aids content ingest workflow and scheduling tasks for both asset-based and real-time content</td>
<td>CDSM</td>
</tr>
<tr>
<td>TV Content Delivery System Manager</td>
<td>Management</td>
<td>CDSM</td>
</tr>
</tbody>
</table>
The Cisco TV VDS solution has three major elements:

- One or more Vault Groups consisting of one or more Vaults. The Vaults are responsible for ingest and reliable storage of VOD content. The number of Vaults in the Vault Group, and the number of Vault Groups is driven by the amount of content that the system offers and the degree of redundancy.

- One or more Stream Groups each consisting of one or more Streamers. The Stream Group is responsible for the personalization and streaming of content in response to user requests. The number of Streamers and Stream Groups is determined by the number of streams deployed and by the topology that best suits your individual network and redundancy requirements.

- The CDSM is used to manage the Vaults, Streamers, and Caching Nodes in the same array, collects event logs, and provides reporting tools.

In smaller systems, the Integrated Streamer-Vault (ISV) server can be used, where the Vault and Streamer functionalities exist in one ISV server.

The Cisco TV VVI solution has four major elements:

- One or more Vault Groups consisting of one or more Vaults. The Vaults are responsible for ingest and reliable storage of VOD content. The number of Vaults in the Vault Group, and the number of Vault Groups is driven by the amount of content that the system offers and the degree of redundancy.

- One or more Cache Groups, consisting of one or more Caching Nodes. The Caching Nodes provide more flexibility in designing a multi-tiered Virtual Video Infrastructure (VVI) by acting as a tier between the Vaults and the Streamers. The Caching Nodes facilitate content distribution and remove distribution traffic from the network backbone.

- One or more Stream Groups each consisting of one or more Streamers. The Stream Group is responsible for the personalization and streaming of content in response to user requests. The number of Streamers and Stream Groups is determined by the number of streams deployed and by the topology that best suits your individual network and redundancy requirements.

- The CDSM is used to manage the Vaults, Streamers, and Caching Nodes in the same array, collect event logs, and provide reporting tools. In a split-domain management system configuration, there is a Stream Manager that manages all the Streamers, and a Virtual Video Infrastructure Manager (VVIM) that manages all the Vaults and Caching Nodes.

**TV VDS Software**

The Cisco TV VDS kernel software, known as the CServer, creates a logical network that pools, load balances, and coordinates the physical resources of the CDEs, so that the whole network operates and is managed as if it is a single resource.

The CServer facilitates the rapid movement of content between Vaults and Streamers while keeping required bandwidth to a minimum. To accomplish this, the Cisco TV VDS software uses a proprietary protocol, the Cache Control Protocol (CCP), across the gigabit Ethernet networks. All content is held reliably on the Vault servers and a large amount, but not all, of the content is also contained on the Streamer servers. Cisco CCP, a multilayered caching architecture, along with associated software algorithms ensures that content segments are delivered only to the Streamers where there is demand for that content. The TV VDS software monitors the frequency of subscriber demand and places content appropriately in either the dynamic random access memory (DRAM) or disk cache of the serving Streamer.
Content is delivered across the network in response to cache-fill calls from the Streamers in an opportunistic manner, depending on the availability of bandwidth; delivery can be faster than real-time delivery where bandwidth allows. The TV VDS software ensures content on the Streamer servers is always the most popular content; that is, the content requested by the largest number of subscribers. User requests are generally served from the cache on the Streamer. Requests for content that are not already in the local cache of the Streamer are pulled from the Vault, cached on the Streamer, and streamed to the subscriber. Wherever the content is stored relative to the point of playout, all content appears as if it is local to the Streamer and the streaming of any content is nearly instantaneous.

Caching Nodes

A Caching Node is an intermediary fill source for the Streamers. Caching Nodes are deployed in Virtual Video Infrastructures (VVIs). The VVI is a deployment type of the TV VDS. In a VDS, servers cannot communicate with servers in other groups. In a VVI, servers in other groups can communicate with each other on an as needed basis. Streamers and Caching Nodes dynamically discover fill sources within other groups. Streamers send cache-fill calls to remote servers (Streamers in other Stream Groups and Caching Nodes) for content that is not found locally (DRAM, disk cache, or peer Streamers). In a VVI, the Caching Nodes can communicate with the Streamers by using CCP or HTTP. For more information on how a Caching Node interfaces with a CCP Streamer and an HTTP Streamer, see the “Caching Node Workflow” section on page 2-12.

Streamer Load Balancing

To ensure that new streams are distributed to the best Streamer in the group, each Stream Group runs a load distribution protocol among its members. The best Streamer is the Streamer that has the requested content in the highest-performing cache resource (DRAM or disk) or that has the most unused capacity. In this way, new Streamers are brought into operation hitlessly—because after a new server is in service, fresh streams are automatically allocated to it. Furthermore, the cache capacity of the group is the sum of the caches of all Streamers in the group, which provides the most optimal system operation and the highest cache-hit rate.

CServer Functionality

The CServer is responsible for the following:

- Storing content
- Streaming content
- Managing bandwidth usage for ingests
- Managing bandwidth usage for streaming
- Mirroring content among Vault servers
- Making decisions on content retention on Streamer servers

Streamer Content Delivery Applications

On top of the CServer, and taking advantage of the services it offers, a variety of applications deliver individual personalized entertainment services. Cisco currently offers the following applications:

- TV Streamer delivering VOD and network personal video recorder (nPVR) services
TV MediaX Suite for simplifying ingest and workflow scheduling tasks for asset-based and real-time content

In a full TV VDS network, the Vault, TV Streamer, and CDSM are required. The TV MediaX Suite is an optional CDA. In a smaller TV VDS network, the ISV can be used in place of the Vault and TV Streamer.

**TV Streamer CDA**

The TV Streamer CDA is used for VOD delivery systems. TV Streamers are responsible for personalizing content and playing that content out under subscriber control.

**TV MediaX Suite CDA**

The TV MediaX Suite CDA offers a set of tools that simplify content ingest workflow and scheduling tasks for both asset-based and real-time content. The TV MediaX Suite CDA consists of the following features:

- **Publisher**—Coordinates the ingest of pre-encrypted content.
- **Scheduler**—Schedules real-time content or imports the schedule from an electronic program guide (EPG).

For information on configuring TV MediaX, see the “TV MediaX Configuration Workflow” section on page 3-11.

**TV Playout CDA**

The TV Playout feature is for ISA environments and includes Public, Education, and Government (PEG) channels and Barker Streams. PEG channels differ from traditional broadcast channels in that the service provider itself must ingest and stream the content rather than receiving and forwarding a satellite feed.

For information on configuring TV Playout, see the “TV Playout Configuration Workflow” section on page 3-12.

**Content Delivery**

The VDS delivers real-time, time-shifted, and on-demand video content to set-top boxes, personal computers, or any other device accessible through a Service Provider network.

The Cisco VVI allows service providers to support a broad range of services. For example, with the ability to distribute content from anywhere to anywhere, operators can provide user-generated and online video just as easily as any other on-demand title. The ability to deliver content with sub-second latency also lets service providers dramatically expand the video library that can be made immediately accessible to customers, allowing them to access content that resides in a different state or country virtually instantly.

Operators can also support popular real-time and time-shifted services, such as letting viewers tuning into a program in progress and restart it from the beginning, or providing network-based personal video recorder (nPVR) functions such as the ability to pause, fast forward, and rewind live TV. The Cisco VVI's centralized storage and localized streaming architecture also distributes screen-formattting processes to the network edge.

The key content delivery capabilities include the following:

- Supports multiple content formats (high-definition and standard-definition content, multiple video codec formats, multiple media file types, and so on)
• Supports ingest and streaming of real-time video services, VOD services, and Internet video
• Supports advertising content distribution and streaming
• Supports npVVR capabilities to provide a digital video recorder (DVR)-like experience with the network
• Provides a single content delivery network for serving set-tops, PCs, and mobile devices
• Supports content security and encryption
• Supports narrowcast service such as VOD, time-shifted TV, and switched digital video (SDV) sharing the same infrastructure
• Supports both traditional and next-generation set-topset-tops and headends

In addition to supporting MPEG2-TS, H.264 (also known as MPEG-4 Part 10 or Advanced Video CODEC [AVC]) ingests, trick-mode file generation, and streaming is also supported.

Real-Time Splicing of MPEG-2 Transport Streams

The ISA Stream Extensions feature allows real-time splicing of MPEG-2 transport streams as identified by the Society of Telecommunications Engineers (SCTE) 35 standard. The embedded SCTE 35 cue messages contain information for digital program insertion (including advertisement insertion) in live content as well as content recorded for the purpose of enabling time-shifted on-demand services.

Pre-roll, post-roll, and mid-roll placements of digital program insertion, that is based on a playlist structure, is supported on a VDS in an ISA environment. The Vault detects the SCTE-35 cues and processes them at the time of ingest. The StreamExtChannel event channel on the CORBA NotificationService is used to send ContentSignalingEvents that contain the SCTE-35 cue information to the backoffice.

**Note**

The SCTE-35 cue message cannot be greater than 400 bytes.

**CDSM Configuration**

To configure this feature set the TME/SCE field to Enable for MystroMDN.

The TME/SCE field is located on different CDSM pages, depending on the type of system configured (VVI or VDS).

• In a VVI with split-domain management, on the VVIM GUI, choose **Configure > System Level > Distributed ISA Setup** or **Configure > System Level > Shared ISA Setup**
• In a VVI with split-domain management, on the Stream Manager, choose **Configure > Array Level > VHO ISA Setup**
• In a VVI with central management or a legacy VDS, choose the **Configure > Array Level > Streamer BMS**

**Note**

The configuration change for the ISA Stream Extensions feature requires that the ISA service is restarted on both the master Vault and the Master Streamer. To identify the master Streamer and master Vault, use the CDSM Monitor Services page to find the Streamer running the master stream service and the Vault running the Content Store master. See the “Services Monitor” section on page 5-46 for more information. To restart the ISA service, choose **Maintain > Services**, select the check box for ISA, and click **Submit**.
ISA Reason Code Extension

ISA Reason Code Extension provides extensions of ISA DSM-CC reason codes used in server-initiated tear down for sessions. This feature includes event codes leading up to stream destroy in the communication between VDS and backoffice.

ISA Reason Code Extension has the following behaviors:

- Stream control application (LSCP Service) terminates the session using the ISA call “session.destroyWithReason(reasonCode)” when a stream is errored out while playing out at normal speed (1X). The event is “LSCP 1X read failure.”
- Extended reason code is used for sessions depending upon a number of events.
- CDSM GUI provides configuration of LSCP timeouts for different events that invoke destroyWithReason.
- No LSC DONE message with a bad LSC status response code is generated because of the inability of servicing a trick-mode play request. Any bad LSC status response code is conveyed in the LSC PLAY REPLY.

Note
Reason codes for read and get failures for local and remote and multiple tiers are not support in this release. Reason codes for digital watermarking failures are not supported in this release.

Configuring the LSCP Timeouts and Reason Codes

The following CDSM pages provide the ability to configure the LSCP timeout and LSCP reason code values:

- In a VVI with split-domain management, on the Stream Manager, choose Configure > Array Level > VHO ISA Setup
- In a VVI with central management or a legacy VDS, choose the Configure > Array Level > Streamer BMS

Content Chunking

For DVD on Demand solutions and long recordings, Cisco TV VDS software supports ingest and streaming of assets up to 120 GB in size and recordings that last longer than 12 hours. This is accomplished by dividing the asset into multiple chunks of approximately 16 GB each.

To enable content chunking, set the following tunable in all the vaults:
```bash
echo 2 > /proc/calypso/internal/cm_defaultGoidType
```

To disable content chunking, set the following tunable to default value 0 in all the vaults:
```bash
echo 0 > /proc/calypso/internal/cm_defaultGoidType
```

Also, the above mentioned command must be added in the /arroyo/test/configrun script of each VDS server so that the tunable is set automatically after every reboot.

Playlist Enhancements

The VDS has the following playlist features:

- Dynamic Modification of Playlists
- Mid-Roll Advertisement Placement Accuracy
Overview

- Trick-Mode Restriction
- Relax Forward Trick-Mode Restriction After Initial Playback
- Enforce Trick-Mode Restriction for Jump Play Commands

Dynamic Modification of Playlists

The following dynamic playlists modifications can be performed on playlists that have been defined and created:
- Delete_Segment—Remove a segment from the playlist
- Replace_Segment—Replace a segment in the playlist with one or more segments
- Splice_Segment—Insert one or more segments at a specified NPT start value or NPT end value within an existing playlist segment
- Add_Segment—Add one or more segments after a segment in the playlist

Note

Each playlist can have up to 64 content elements.

The CDSM provides augmentations to the Stream Play History report. The Stream Play History report first displays the Session ID Summary. When a session ID is clicked, if a playlist was streamed for the session, the Session Playlist History report is displayed.

Note

The Trick Mode Capture feature must be enabled to access the Stream Play History reports.

Mid-Roll Advertisement Placement Accuracy

When playlist elements use normal play times (NPTs) for the element start and end times, the Cisco TV VDS software converts the NPT values to file offsets for mid-roll placement of advertisements. The conversion from NPT values to file offsets is accomplished by using a straight-line rate-based computation, which is adjusted to the nearest I-Frame offset.

There is the option to use the presentation time stamp (PTS) values to convert the NPT values for mid-roll placement of advertisements, instead of using the file offsets. PTSs are included in the MPEG-TS and are used by the set-top decoder to synchronize separate elementary streams (video, audio, subtitles, and so on). Using PTS values to insert advertisement playlist elements is preferable to converting NPT values to file offsets, because PTS values more closely match the user-observed playback time.

When the file offsets are used, the NPT values are used to identify the starting and ending frames of the playlist content segment and are based on the order of the content segments in the content file.

When the PTS is used, the NPT values are used to identify the starting and ending frames of the playlist content segment and are based on the PTS, which is the display order of the content segments in the file. The display order may not be the same as the file order. Some frames have to be processed or decoded before other frames, because subsequent frame decodings depend on previously decoded frames, even though the previously decoded frames are meant to be displayed at a later time.

Configuring Conversion Mode for Playlist Ranges

By default, the VDS is configured to use the file offsets for mid-roll placement of advertisements. To use PTS values, use the Conversion Mode field on the Configure > System Level > MPEG Tuning page.
**Trick-Mode Restriction**

Restriction of trick-mode controls (pause, rewind, fast-forward) per playlist segment is supported.

If a client issues a trick-mode command for a locked-out playlist segment or attempts to bypass a trick-mode restricted segment by jumping to the next segment, an LSC_NOT_PERMITTED response is sent to the set-top box. If a client has sent a fast-forward trick-mode command and a restricted segment is reached, the stream continues at normal play speed and an LSC_DONE response is sent to the set-top box with the NPT of the beginning locked out segment. An LSC_NOT_PERMITTED response is also sent to indicate that the LSC_DONE is due to a locked out trick-mode segment.

The CDSM GUI provides the ability to configure these settings on the MPEG Tuning page (Configure > System Level > MPEG Tuning).

**Relax Forward Trick-Mode Restriction After Initial Playback**

Previously, if trick-mode restriction is configured on a playlist element and a fast-forward command is issued, the restricted element ignores the fast-forward command and plays the content at normal speed.

If the restricted element has been played once from beginning to end at normal speed in a specific session, then the fast-forward trick-mode restriction is relaxed for that element in that session and any further fast-forward commands on the restricted element are honored. This relaxation only applies for that session. Other sessions using the same playlist must play the restricted playlist element at least once at normal speed before the fast-forward command is honored for the restricted element.

**Enforce Trick-Mode Restriction for Jump Play Commands**

Trick-mode restricted play elements are enforced and the viewer is not allowed to skip over restricted play elements by using chaptering, dragging, or jumping. Jumping and dragging playback commands move the current NPT to a new location in the forward direction.

Forward jumps are not allowed if they are initiated from within a fast-forward-restricted playlist segment. If the forward jump is initiated from within a playlist segment that permits fast-forward tricks, but jumps across, or into, one or more fast-forward-restricted segments, the jump is abbreviated to the point where the nearest (relative to the current playback position) fast-forward-restricted segment begins. Playback resumes at normal speed at that point. If no further play commands are issued, and if the Fast Forward Resume option has been configured, when the end of the fast-forward-restricted segment is reached, the original jump command resumes as though the jump had been initiated from that point.

If the first playback command of a session is a for normal speed with a starting NPT other than the beginning of the content (NPT = zero), it is assumed that the session is resuming playback after previously playing through the preceding playlist elements, and the command is not considered a jump and is honored.

**Note**

Jump backward in NPT is never restricted even if rewind-restriction is on for the segment.

**Digital Video Watermarking**

The Digital Watermarking feature, also called digital video fingerprinting, provides the ability to track the source of unauthorized content copying. A watermark is embedded into the content for each end-user. If a copy of the content is found, then the watermark can be retrieved from the copy and the source is identified. The watermark is undetectable by the person viewing the content.
At the time of ingesting the content into the Vault, the portion of the MPEG-2 Transport Stream containing the watermarked data is repeated back to back in the asset to be ingested. The asset also has a special entry in the PMT that points to a stream containing location and identification of the duplicate watermarked frames. When the Vault ingests this content, it captures all information identifying the watermarking data in a special file and removes it from the content. It also captures special metadata related to that content which is used by the Streamer to create a watermarked content that is unique to the requesting user.

When a user requests a session containing a watermarked asset, the Streamer fetches this content along with the special file identifying the location of the duplicate watermarked frames and the content metadata. The content metadata along with the client ID is provided to the watermarking library through the Watermark Application Server, which returns a decision bitmap. This bitmap is used by the Streamer to decide whether to send an original non-reference frame or its watermarked counterpart. The Streamer only sends one or the other, but never both the original and the watermarked frames.

Should a user captures this video and makes it available illegally, the video can be analyzed to reverse engineer the decision bitmap and the source of the video can then be identified.

**Enabling Digital Watermarking**

To enable Digital Watermarking, enable the Watermarking Support option on the CDSM Setup page. For more information, see the “Watermarking Support” section on page F-6.

To manually disable the watermarking application on the Streamer, log in as user *isa* and enter the following commands:

```
cd /home/isa/WatermarkServer/server
run: ./stop_wmsrv
```

To re-enable the watermarking application on the Streamer, log in as user *isa* and enter the following commands:

```
cd /home/isa/WatermarkServer/server
run: ./run_wmsrv
```

To check the status of the watermarking application on the Streamer, log in as user *isa* and enter the following commands:

```
cd /home/isa/WatermarkServer/server
run: ./status_wmsrv
```

**VOD Error Repair**

The VOD Error Repair feature retransmits lost packets to improve the quality of the end-user video experience. The VOD Error Repair feature uses negative acknowledgement (NACK) retransmission methods to implement retransmission-based error repair.

**Note**

VOD Error Repair is supported on ISA environments that use the Cisco (RTSP) setting as the LSCP Client Protocol, and RTSP environments that use the Cisco RTSP deployment type.

In addition to UDP streaming, unicast Realtime Transport Protocol (RTP) with Realtime Transport Control Protocol (RTCP) streaming, as well as Error Repair (ER) are supported.
The client dictates which streaming protocol is used by way of the RTSP SETUP message. The following streaming protocols are supported in the same system with simultaneous streams of each type:

- UDP
- RTP
- UDP with NAT traversal (Interactive Connectivity Establishment [ICE])
- RTP with NAT traversal (ICE)
- RTP with retransmission-based error repair
- RTP with NAT traversal (ICE) and retransmission-based error repair

For sessions that use UDP, aside from RTSP messages, only the media server sends packets.

For sessions that use RTP, RTCP packets may be sent from the server to the client or from the client to the server. The client must be aware of the server’s IP address and ports for receiving these packets.

For sessions that use NAT, the server sends its own IP address and ports as ICE candidates.

For sessions that do not use NAT, the transport header must include a “server ports” parameter.

For sessions that use RTP retransmission-based error repair, a client sends a second SETUP request to the VDS Control server, which requires a total of four open ports. The first SETUP message has two ports (one for RTP and one for RTCP), and the second SETUP message has two ports that carry two ICE candidates. The URLs used for the retransmission stream are appended with the “/rtx” ending.

Following is an example of the first setup message:

```
SETUP rtsp://192.0.2.100/movie.mpg RTSP/1.0<CRLF>
CSeq: 2 <CRLF>
Transport: RTP/AVPF/UDP; unicast; destination=54.0.1.1; client_port=8998-7123,<CRLF>
          MP2T/DVBC/UDP; unicast; destination=54.0.1.1; client_port=8998<CRLF>
RTSP/1.0 200 OK<CRLF>
CSeq: 2<CRLF>
Session: 12345678<CRLF>
Transport: RTP/AVPF/UDP; unicast; destination=54.0.1.1; client_port=8998-7123;<CRLF>
          source=101.1.2.3; server_port=50236-50237<CRLF>
```

Following is an example of the second setup message:

```
SETUP rtsp://192.0.2.100/movie.mpg/rtx RTSP/1.0<CRLF>
CSeq: 2 <CRLF>
Session: 12345678 <CRLF>
CSeq: 2 <CRLF>
Transport: RTP/AVPF/UDP; unicast; destination=54.0.1.1; client_port=8999-7124<CRLF>
          source=101.1.2.3; server_port=50238-50239<CRLF>
```

Note
Retransmission-based Error Repair is only available with RTP streaming.
Background
RTP packets include sequence numbers that are used to detect missing packets and reorder out-of-order packets. RTCP is the control protocol for RTP and is used to send receiver reports from the client to the server that include monitoring information, to send sender reports from the server to the client, and to request retransmission, which is the RTCP NACK packet that includes the RTP sequence number.

The Streamer receives the retransmission RTCP NACK request. Each NACK request identifies one or more missing RTP packets. The Streamer keeps a small buffer of recently transmitted packets and the missing packets are retransmitted based on how many packets the buffer maintains.

Error Repair Client on set-top-box

VOD Error Repair feature requires that the set-top have the Cisco Visual Quality Experience Client (VQE-C) software running on it. The VQE-C is the error-repair client software, which has the following capabilities:

- Receives RTP video packets
- Detects missing packets
- Requests retransmission of missing packets
- Merges retransmitted packets with original stream
- Collects statistics and counters for monitoring

The VQE-C is a software development kit (SDK) that is available for download through the open-source program. Additionally, the set-top must comply with the Cisco RTSP syntax for VOD Error Repair.

Monitoring

The play management application (PMA) log file, vqe.log, is located in the /arroyo/log directory. To check for PMA errors, enable the PMA debug flag for the vqe_cp facility on the Logging page in the CDSM.

AMT

Application Monitoring Tool (AMT) runs a web application on each Streamer and provides several troubleshooting tools. For more information, see Appendix E, “Using the TV VDS Streamer Application Monitoring Tool.”

TV On Demand

The TV On Demand (TVOD) feature enables broadcast recording of live content for a Virtual Video Infrastructure (VVI) system in an ISA environment VDS and interacting with the Ericsson OpenStream backoffice.

The Ericsson Recording Control System (RCS) located at the super headend (SHE) is used to schedule recordings on different channels. Each channel is assigned a call sign ID and is marked as a central channel or a local channel. Central channels are handled by the central Vault and local channels are handled by the local Vaults located at each video hub office (VHO).

Note
In Release 3.4, only local Vaults are supported in a legacy VDS system configuration. A VVI system configuration is not supported for TVOD.

The Ericsson Recording Manager (RM) located at each VHO, gets the recording schedule from the RCS and sends it to the TVOD server process on the Vault.
The TVOD server processes the schedule recording requests from the RM by sending the request to the Content Store to start the recording and sending status updates (recording started, recording ended) of each recording to the RM. The TVOD server acts as the C5++ interface (an extension of the ATIS-IIF C5 specification) for real-time captures. In the C5++ interface, content is acquired by capturing a linear multicast stream.

**Multicultural-VOD (MVOD)**

Starting from release 3.5, Cisco VDS-TV supports MVOD feature that enables scheduling, acquiring, packaging and publishing linear programs as subscription based VOD assets to Asset Management System (AMS).

**Content Ingest from Dual Locations**

Starting from Release 3.9, Cisco VDS-TV supports content ingest from dual locations. The upstream components can connect to the vault group of both the locations to export the packages. To enable content ingest from dual locations, refer Content Ingest from Dual Locations, page 4-161.

**ATIS C2 Support**

Starting from Release 3.4, VDS and third-party streamers can access VDS Vault content using the Alliance for Telecommunications Industry Solutions (ATIS) C2 interface. This feature adds to the capabilities of VDS Streamers, which can also stream content from third-party servers. The ATIS C2 enabled Vaults will serve as national Vaults controlled by VVIM. These Vaults will act as ATIS C2 servers that can ingest content (ATIS indexing) and serve content to streamers via ATIS C2.

The behavior of local market Vaults remains unchanged from what is supported in Release 3.2. These vaults are controlled by CDSM. Once the content is provisioned and ingested in ATIS index format in the national Vault, the local market vault will provision the same content.

The VDS Streamers support ATIS C2 interface for the cache fill of content from the Cisco VDS Origin Server (VDS-OS) and third-party CDNs. If the content requested during a session setup is based on a CDN HTTP URI, the content is not ingested by the VDS Vaults but is instead pulled directly by the Streamers. VDS Streamers directly contact the VOD library of the third-party CDN or Cisco VDS-OS by using the ATIS C2 protocol.

**Note**

When a cache fill/streaming of the content ingested into the VDS-OS is initiated for the first time via the server’s ATIS C2 interface, the AVSDB service on the primary HTTP Locate server must be running. Else, the cache fill/streaming operation will fail because the VDS-OS cannot fetch the metadata for the content.

Alternatively, the primary HTTP Locate server can be manually failed over so that a backup HTTP Locate server assumes the primary role, and the metadata can be fetched from this new primary server.

To failover the primary HTTP Locate server, reboot the server, or disable the network adapter hosting the HTTP Locate port using the following command:

```
Echo 1 > /proc/calypso/internal/disableNetworkAdapterX
```

To enable the network adapter, use the following command:

```
Echo 0 > /proc/calypso/internal/disableNetworkAdapterX
```
Short-tail content (content that is requested often) continues to be provisioned, ingested, and streamed normally for a Cisco ISA VDS or VVI using ftp://url.

Long-tail content (content that is not requested often) are provisioned by BMS using http://url to the content store in regional/edge division in ISA system and is pulled on demand by the VDS streamers.

**Note**

If the HTTP URI has a domain name instead of an IP address, static mapping between domain names and IP addresses is required in the VDS. Static mapping of domain names and IP addresses can be configured in the /etc/hosts file or through the **Configure > System Level > Host Service** page. Depending on when this configuration is added, it may be necessary to force the CServer to get this change by entering the `echo 1 > /proc/calypso/tunables/read_etc_hosts` command on each Streamer.

Long-tail content (ATIS C2 content) from third-party CDNs or Cisco VVDS-OS are listed in green on the Completed Ingests page (**Monitor > System Level > Completed Ingests**). The information listed on the Completed Ingests page consists of information received from the ATIS MediaResourceSet. ATIS content cannot be deleted through the CDSM GUI.

**Note**

The ATIS C2 support does not include support for Digital Video Watermarking, dynamic trick modes, and live content.

**ATIS Media Resource Requirements**

Each media resource in an ATIS environment has a MediaResourceSet consisting of the following:

- Base media file, also called the IX file
- Media Resource Metadata (MRM) file in XML format, which has information about the presence and location (URI) of trick-mode files and index files
- Index file (ATIS standard index file), which has information about the IX file, properties of MPEG TS, index data for entry/exit points in the IX file and associated trick-mode file

On request from the streamer, VDS Vault will serve this MRM file that is generated dynamically from the metadata.

**HTTP support on ATIS C2 enabled Vault**

ATIS server supports the following in addition to Generic HTTP/TCP support.

1. Vault supports HEAD / GET request with identity transfer encoding.
2. For HEAD request, Vault responds with Link Header if the content is available else Vault returns 404 NOT FOUND.
3. For GET request to locate port for MRM file, Vault responds with dynamically generated MRM file.
4. For GET request to locate port for Index file, Vault responds with 302 re-direct with the best port with in the Vault group to handle the transfer.
5. For GET request to locate port for any media file, Vault responds with 302 re-direct with the best port with in the Vault group to handle the transfer.
6. GET requests for media files / index files to transfer port will start serving contents
7. All GET responses from transfer port will include Link header. Client can use the Link header data to request MRM file.
Streamers Workflow for ATIS C2 HTTP

On the Streamer designated as the Setup server, the following occurs in initiating a session:

1. The Streamer sends a HEAD request for the Origin URI (1X file URI) to the ATIS enabled Vault to learn the link header.
2. The MetadataFile URL is retrieved from the link header in the response from the ATIS enabled Vault.
3. The Streamer sends a GET request for the asset metadata file.
4. The Streamer receives the asset metadata file from the Vault and gets information about the trick-mode files and IndexFile. If more metadata is required from the IndexFile, the Streamer fetches the index file from the Vault and parses it as necessary.

The Streamer designated as the Control server chooses a Streamer to act as the Play server for the request. On the Streamer acting as the Play server, the following occurs:

1. Send a GET request for the IndexFile and parse it to get the information required to stream the 1X file and trick-mode files.
2. Send a GET request for the 1X file to the Vault and streams it to the set-top.

If the Control server sends a request for a trick-mode file and the MediaResourceSet has pre-generated trick-mode files, the Play server gets the byte range associated with the requested play time (the index information is used to find the mapping) and plays the stream.

DNS Support

Currently VDS-TV supports host name resolution based on the /etc/hosts file. Starting with Release 3.4, as a more dynamic way to resolve host name, VDS-TV supports DNS lookup based host name resolution.

Asset Ingress Manager (AIM) Support

Starting with release 3.4, VDS-TV supports provisioning and publishing of ATIS packages in their corresponding VOD Market sites. This functionality is provided by AIM with support from management components like VVIM and Database.

AIM supports auto publish mode. On enabling this mode via GUI, AIM automatically publishes the packages to the configured VOD Market Site at the end of each successful package ingest.

The following sequence of actions will be carried out by AIM when ‘publish mode’ is on.

- After successful ingest of each package, AIM creates an HTTP URL for the ingested content.
- This HTTP URL is part of an ADLXML which is exposed to the configured VOD Market Sites.
- A retry mechanism is deployed by AIM to reattempt package publish failures until either the package is successfully published to the configured VOD market sites or the license window of the package is expired.

The following sequence of actions will be carried out by AIM when ‘publish mode’ is off.

- After successful ingest of each package, AIM creates an HTTP URL for the ingested content.
- To publish the ingested package, user has to manually do so by clicking appropriate buttons from GUI.
- In case of package publish failures, AIM will not reattempt to publish the package.
Starting from release 3.7, VDS-TV supports automatic ingest of packages from VVIM/Watch-folder to AIM. The Watch-Folder exists either on VVIM or on a mounted directory on the VVIM. When a new package is copied into it, the auto ingest utility ingests the package to AIM and deletes it from watch folder on successful ingestion.

For detailed information on configuring auto ingest of packages, see Auto Ingest Configuration Workflow, page 4-154

AIM also supports defining a set of content distribution rules to publish packages to the corresponding VOD market sites. For detailed information on configuring content distribution rules, see Configuring Content Distribution Rules, page 4-6

Starting from release 3.9, VDS-TV supports retry mechanism for package publish to FTP folder for both NAS and CIFS mount types. VDS-TV attempts package publishing to FTP folder (local or mounted) for a configured retry count in the following scenarios:

- Login failures (mounted NAS not reachable, invalid login credentials).
- Package creation failed because of duplicate package in Publish folder.
- Mount failure.

However retry mechanism is not supported for partial content publish to the FTP folder. MSA events are triggered if package publish fails after retrying for a configured number of times.

Starting from release 3.9, VDS-TV supports the following to achieve increased publish scalability:

- Concurrent publishing of packages to the markets where multiple threads are spawned to service each market.
- A publish time out value configured via GUI is used to avoid any publishing blockage due to network latency, backoffice errors and publishing errors. If the market does not respond within this timeout value, the package publish fails.
- FTP load balancing support to allow usage of capacity across vault group for content transfer to markets.
- Prioritizing the packages for publishing in case there is a backlog of packages to be published to the corresponding VOD market site(s).

Content Delivery System Architecture

Vaults and Streamers have different but important functions that are required for the TV VDS software to run efficiently. The Integrated Streamer-Vault (ISV) server combines the functionality of both the Vault and Streamer for smaller networks. The Content Delivery System Manager provides a browser-based user interface for configuration, monitoring, maintenance, and reports of the TV Content Delivery System solution. In a VVI, the Caching Nodes provide a pure caching layer for a multi-tiered VVI. Figure 1-2 shows the different elements of the TV Content Delivery System and the TV Virtual Video Infrastructure with the addition of the Caching Nodes.
Figure 1-2  High-Level View of the Content Delivery System and Virtual Video Infrastructure

Table 1-2 describes the system elements shown in Figure 1-2.

Table 1-2  High-Level Description of the TV VDS and TV VVI

<table>
<thead>
<tr>
<th>Content Delivery System Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CServer</td>
<td>The CServer is the kernel software that handles bandwidth management, storage decisions, Real Time Streaming Protocol (RTSP) and Lightweight Stream Control Protocol (LSCP) and stream processing on the TV Content Delivery System.</td>
</tr>
<tr>
<td>Database</td>
<td>The database stores information about the system, including current states of all ingests and streams, configuration settings, and system statistics. Some database elements are global among all servers and some are local. For example, statistics are stored on the local server and the Content Delivery System Manager only. States about stream objects are replicated on all Streamer servers. The Content Delivery System Manager stores a superset of all database elements.</td>
</tr>
<tr>
<td>Management</td>
<td>There are two types of management:</td>
</tr>
<tr>
<td></td>
<td>• Content Delivery System Manager—Browser-based user interface</td>
</tr>
<tr>
<td></td>
<td>• SNMP agent—Network Management System (NMS) interface</td>
</tr>
<tr>
<td>Storage</td>
<td>There are four levels of storage (or cache):</td>
</tr>
<tr>
<td></td>
<td>• All content is stored on the Vault server, as well as mirrored to other Vaults.</td>
</tr>
<tr>
<td></td>
<td>• Requested content is stored on the Caching Nodes.</td>
</tr>
<tr>
<td></td>
<td>• Recently requested content, or popular content is stored on the hard drive of the Streamer.</td>
</tr>
<tr>
<td></td>
<td>• Currently requested content, or popular content, is stored in the random access memory (RAM) of the Streamer.</td>
</tr>
</tbody>
</table>
Vault

The Vault ingests content delivered over a standard interface (for example, using FTP to receive content from a catcher), performs whatever processing is required (for example, generating trick-play files), and stores the processed content reliably on disk. A Vault Group consists of a scalable number of Vaults that divide the responsibility for ingest and storage among the members of the group. Vault servers can be collocated or distributed to multiple locations across an IP or Ethernet network. Each Vault can simultaneously ingest up to 160 channels of MPEG-2 transport stream (TS) content and store up to 6000 hours of MPEG-2 TS standard definition content with two mirrored copies of the content and one or two trick files.

Streamer

A Streamer server receives content from the Vault and delivers that content to subscribers. Streamers can be of different capacity, depending on the needs of the network, and have different applications, depending on the type of content being delivered. Currently, the highest-capacity Streamer can simultaneously stream approximately 2500 streams of MPEG-2 TS standard definition VOD. Streamers can be colocated with Vaults or distributed to remote locations. The Stream Group is responsible for the personalization and streaming of content in response to user requests.

Caching Node

The Caching Node provides a 10-Gbps throughput to facilitate the distribution of content from the Vaults to the Streamers. The Caching Nodes allow for the ability to create a tier-based hierarchy in the VDS. Caching Nodes are deployed in VVIs. Vaults can be strategically located for storing content on a national network, while the Streamers are located in a regional network. The Caching Node can be colocated with the Vaults or distributed closer to regional locations across an IP or Ethernet network. A Cache Group consists of several Caching Nodes that divide the responsibility for distribution among the members of the group.

The Caching Nodes use CCP to communicate with the Vaults and Streamers. Alternatively, the Caching Nodes can use HTTP instead of CCP to communicate with Streamers.

<table>
<thead>
<tr>
<th>Content Delivery System Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Collection</td>
<td>The Content Delivery System Manager collects logged events for reporting purposes as well as for third-party applications</td>
</tr>
<tr>
<td>Reports</td>
<td>The Content Delivery System Manager provides a reporting tool to aid performance trending and analysis of streams, popular content, bandwidth usage, and more.</td>
</tr>
</tbody>
</table>
Integrated Streamer-Vault

The Integrated Streamer-Vault (ISV) server offers the functionality of both a Vault and Streamer in one server.

The ISV server ingests content delivered over a standard interface, performs whatever processing is required, and stores the processed content reliably on disk. An ISV array consists of a scalable number of ISV servers that divide the responsibility for ingest, storage, and streaming among the members of the array.

Content Delivery System Manager and Virtual Video Infrastructure Manager

The Content Delivery System Manager (CDSM) and the Virtual Video Infrastructure Manager (VVIM) are each a browser-based user interface accessible by a web browser program and designed to manage a TV VDS or a TV VVI network.

The CDSM provides centralized management functions for the TV VDS, including configuration, monitoring, troubleshooting, reporting, and maintenance.

The VVIM provides centralized management function for the TV VVI, including configuration, monitoring, troubleshooting, reporting, and maintenance. The VVIM in a centralized domain management configuration manages the Vaults, Caching Nodes, and Streamers, The VVIM in a split-domain management configuration manages the Vaults and Caching Nodes, while the Streamers are managed by the Stream Manager. For more information about split-domain management, see the “TV VVI Management” section on page 2-6.

In both the VDS and VVI, all Vaults and Streamers are identified by an array ID, a group ID, and a server ID. The array ID identifies servers that are part of the same system. The group ID identifies servers that are part of the same group (Vault Group or Stream Group), and the server ID is a unique number that identifies the server. Table 1-3 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arrayorc files.

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>

In a VVI with CCP Streamers, similar to a VDS, all Vaults, Streamers, and Caching Nodes are identified by an array ID, a group ID, and a server ID. The group ID and server ID in a VVI with CCP Streamers must be unique among other groups and servers in the same system.

In a VVI with HTTP Streamers, the Vaults, Streamers, and Caching Nodes still use an array ID, a group ID, and a server ID for identification, but there is additional functionality that allows the Vaults and Caching Nodes to communicate using CCP, while the Caching Nodes communicate with the Streamers using HTTP. It is not required that the group ID and server ID be unique, but it is recommended.
The CDSM and VVIM (as well as the Stream Manager) have three configuration and monitoring levels: system, array, and server. System-wide configuration affects all servers managed by that manager. The array-level configuration affects all the servers of the specified array or group, and the server-level configuration applies changes to a specific server.

The CDSM and VVIM offer a drill-down approach to show the status of any stream or ingest point, or the physical status of any piece of hardware.

The CDSM reporting helps operators manage all aspects of the TV VDS. Information on stream traffic, content statistics, and server data are gathered from all servers in the network and correlated automatically, showing at a glance the status of the network and reporting on statistics such as content popularity, stream usage, and bandwidth usage for each service group.

The VVIM monitoring and reporting helps operators manage all aspects of the TV VVI in either a centralized management capacity or a split-domain management capacity. In a split-domain capacity, the VVIM monitors the ingests and the Stream Manager monitors the streams of the Streamers in its domain.

Figure 1-3 shows the system monitoring page of the CDSM.

**Figure 1-3  Content Delivery System Manager User Interface**

Resiliency and Redundancy

The TV Content Delivery System is designed to have no single point of failure. The TV Content Delivery System incorporates redundancy at several levels within the architecture. These levels of redundancy eliminate any customer impact from potential failures of Vault disks, Vault servers, Streamer disks, Streamer servers, ISV servers, Ethernet connections, processors, and power supplies.

Each server constantly monitors the state of its peers. The TV VDS unique resource pooling and auto-failover techniques allow all servers in the network to actively contribute to satisfying storage and streaming demand at all times. If a server fails, the load is instantaneously redistributed among the surviving servers, ensuring continuity of service.
Vault Disk Redundancy

The Vault server protects content through full 1:N redundancy. If a disk fails, the data is available from a redundant server, spreading the load and optimizing the bandwidth. Additionally, the regeneration of the redundant content utilizes the bandwidth of the whole Vault array rather than just the disk bandwidth available inside a particular server, significantly reducing the rebuild time. The need to replace the failed drive is not time critical in the least, making quarterly replacement of any failed Vault drives feasible.

Mirroring

The primary method to protect the content against loss because of hardware failure is mirroring. Content is stored on a Vault and, based on the policy, it is mirrored to other locations in the Vault array. The number of mirrored copies is configurable. There are three types of mirroring:

- Local mirroring
- Mirroring within an array
- Array mirroring (from Vault Group to Vault Group)

Local Mirroring

Local mirroring defines the number of copies of each content object to maintain on the unique drives of a single Vault. Local mirroring allows resiliency for a small installation (for example one Vault). Local mirroring guards against a single drive failure, but does not protect against service interruption or potential data loss in the event of a complete server failure.

Local mirroring is not configured by default, and is generally only used when there is a single Vault in a system. Local mirroring is configured in the Configure > Server Level > Server Setup page with the Vault Local Copies field, which corresponds to the tunable “vault local copy count” in CServer. Up to four local copies are supported.

Mirroring within an Array

Mirroring within an array defines the number of copies of each content object in an array to maintain across the Vaults within that array or site. Mirroring within an array guards against a single drive failure or the failure of an entire server. The number of copies to maintain within that array is configurable in the Configure > Server Level > Server Setup page with the Vault Mirror Copies field, which corresponds to the tunable “vault mirror copies” in CServer. Up to 10 copies within an array are supported.

Array Mirroring

Array Mirroring (from Vault Group to Vault Group) specifies that each content object on all of the Vaults in one group has at least one copy on a Vault in the mirrored Vault Group. Array Mirroring is only responsible for ensuring that a single copy of each content exists in the mirrored Vault Group. If more than one copy of each content object is required within an array, Mirroring within an Array (not Array Mirroring) is responsible for this task. Array Mirroring is configured in the Configure > Array Level > Vault Redundancy Map page, which corresponds to the tunables “allow vault array mirroring” and “vault array mirror” in CServer. Each Vault Group can have up to 3 mirrored Vault Groups configured.

Note

Array Mirroring is part of the Vault Groups feature and is only available if Vault Groups is enabled on the CDSM Setup page. For more information, see the “Vault Groups” section on page F-6.
Vault Server Resiliency

The Cisco TV VDS can handle the loss of an entire Vault server without impacting the subscriber. The communication with the backoffice suite is performed by a Vault server that is designated as the Vault master. If the Vault master fails, one of the remaining slave Vault servers in the Vault array transparently takes over as the master. The remaining Vaults detect the loss of a Vault server, run a check of all stored content, and regenerate redundant content that was affected by the lost Vault server. This regeneration runs in the background, utilizing spare system bandwidth that is not consumed by subscriber load, resulting in the shortest possible regeneration window possible without compromising performance to the subscriber.

Vault Master

The Vault master, designated by a virtual IP address on its management interface, is used as the representative of the Vault array to the backoffice and handles the ingest of new content.

Vault Group Redundancy

In addition to the Vault server redundancy, the Cisco TV VDS offers redundancy for Vault Groups. When the VDS is configured with Vault Group redundancy and at least two Vault Groups are configured, the system handles the loss of an entire Vault Group without impacting the subscriber experience. Content is mirrored among as many as four Vault Groups (one Vault Group ingests the content and up to three Vault Groups mirror the content), which may be in different geographic regions. If the primary Vault Group becomes unavailable, because of network, power, or other catastrophic problems, any Streamer or Caching Node that was requesting content from that Vault Group would fail over to the other Vault Group until the primary Vault Group came back online and could again respond to cache-fill requests for content.

With Vault redundancy, at least one copy of each content within a group is mirrored to a configured peer group. Vault Group mirroring runs as a low-priority process, so as not to impact the performance of the guaranteed streaming delivery.

Note

The maximum number of Vault Groups is 20.

Streamer Disk Redundancy

The disks in the Streamer are not used for full content storage as in most VOD implementations. Rather, the Streamer disks are part of the TV VDS multilevel caching architecture. If a disk is lost on a Streamer, the only impact is a marginal loss of caching capability for the system. Any content that was cached on that Streamer disk is retrieved again from the Vault. The RAM on the Streamer has enough content cached for streaming to the subscriber, so that this refetch of content from the Vault occurs without impacting the subscribers. For example, for a Streamer array of five Streamers with sixteen hard drives each, a lost drive only reduces the total caching capability by less than 1.25 percent. The need to replace the failed drive is not time critical in the least, making quarterly replacement of any failed Streamer drives feasible.
Stream Server Resiliency

The Cisco TV VDS architecture allows for failed Streamer servers as well. If any Streamer server fails, the communication to the backoffice is transparently handed off to another Streamer. With the TV VDS software, if a Streamer server fails, the other Streamers recognize that failure and continue streaming to that subscriber.

Caching Node Disk Redundancy

The disks in the Caching Node are not used for full content storage like most VOD implementations. Rather, the Caching Node disks are part of the TV VDS multilevel caching architecture. If a disk is lost on a Caching Node, the only impact is a marginal loss of caching capability for the system. Any content that was cached on that Caching Node disk is retrieved again from the Vault.

Caching Node Resiliency

The Cisco VDS-TV architecture allows resiliency for failed Caching Nodes as well. If a Caching Node fails, any cache-fill transmissions that were in process at the time of the failure are re-requested by the Streamer, and any new requests are responded to by the remaining Cache Nodes in the Cache Group. However, for RTSP-NGOD deployments, a caching node internally retries to locate the content before notifying the failure to the streamer. By default, a caching node retries twice. This retry count can be configured using a tunable

```
# cat /proc/calypso/tunables/paidretrycount
00000002
```

To set the retry count to 3, set the following tunable:

```
# echo 3 > /proc/calypso/tunables/paidretrycount
```

On setting the above tunable, the cache gateway retries three time to locate the content before sending a failure response to the streamer.

CDSM Redundancy

The Cisco TV VDS offers 1+1 redundancy for CDSMs. The primary CDSM, designated by a virtual IP address on the management interface, is used as the representative of the CDSMs to the web browser and northbound integrations, such as HTML API calls and SNMP calls.

All VDS servers keep track of a controller IP address in the .arroyorc file. With CDSM redundancy, both management IP addresses are specified in the .arroyorc file on each VDS server, except the CDSM, which only has the other CDSM IP address.

The statsd process is configured with a virtual IP address that can move from one CDSM to the other. If the primary CDSM becomes unavailable, because of network, power, or other catastrophic problems, the secondary CDSM takes over the virtual IP address and the administrator can connect to the secondary CDSM within 15 seconds.

Login information is not shared between CDSMs. If the administrator is logged in and a failover occurs, the administrator has to log in again to the other CDSM.

The VDS servers (Vault, Caching Node, Streamer, and ISV) participate in replication with both the primary and secondary CDSM in the same manner as occurred without redundancy, including synchronization of tables. However, the VDS servers can only retain up to one hour of reporting data, so if a CDSM is down for over an hour, when the CDSM recovers, it only is able to get the last hour of
reporting data from each VDS server, which means the reporting data is not synchronized between the primary and secondary CDSMs. Reporting data is archived in comma-separated value (CSV) files every 24 hours and these CSV files are deleted when they are older than 30 days.

**Ethernet Link Resiliency**

All Ethernet links used within the Cisco TV VDS architecture incorporate link failure detection with automatic failover. This includes the interconnections between the Vault array and the Streamer array for cache-fill, and the Ethernet links that carry the subscriber streams to the transport networks.

**Collectd Application**

Starting from Release 3.9, Cisco VDS-TV supports a maximum of 512 replication VDS servers hence the volume of status and statistical data received at Controller (CDSM/VVIM) through DB replication is very high. To avoid this load, a new application collectd runs on each node/server and performs the following functionalities:

- Collects status and statistical data in each node.
- Directly uploads data from each node on to the Controller (CDSM/VVIM) over a TCP connection.
- The collectd application running in controller acts as a receiver and receives that data from each node via TCP. This data is stored in the memory cache and is predominantly used for real-time monitoring.

The Controller (CDSM/VVIM) which earlier connected to AVSDB to obtain the statistical and monitoring data will now connect to collectd to obtain the same data.

**Scalability**

The Cisco TV VDS has separated streaming and storage, which enables a cable operator to add storage without affecting streaming counts, to add streaming without affecting storage, and in VVIs, to add distribution nodes without directly affecting storage or streaming. This flexibility allows cable operators to grow according to the needs of customers and to scale the system on an as-needed basis. For example, if more storage is required, the cable operator adds a Vault server without taking the system offline, and in Layer 2 networks, the new device is automatically discovered within the architecture and the new resources are automatically utilized by the system. If additional streaming is required, the content provider either purchases more streaming licenses within the current servers, or a Streamer server is added to the system without the need to take the system offline.

**Server Scalability**

Starting from Release 3.9, AVSDB application in VDS-TV supports 512 replication servers (including vaults, streamers, cache nodes and controllers). The CServer replication is restricted to only 512 servers. For example, the number of VDS servers supported in streaming domain (streamers + cache) is 512.

**Asset Scalability**

Starting from Release 3.9, Cisco VDS-TV is certified to support up to one million assets in the overall system.
Network Design

This chapter describes the different network topologies for the Cisco TV VDS, the different network connections of the VDS servers, the VDS workflow, and network configuration considerations. The topics covered in this chapter include:

- Overview, page 2-1
- TV VDS and VVI Topologies, page 2-2
- VDS Workflow, page 2-7
- Vault Virtualization, page 2-13
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Overview

The TV VDS enables cable operators and multiple service operators (MSOs) to offer VOD and MediaX services to consumer customers over their existing hybrid fiber coaxial (HFC) network, with existing next-generation digital set-tops. The TV VDS solution uses a gigabit Ethernet (GE) transport network from the headend to the distribution hub, where the HFC network terminates.

TV VDS grows seamlessly from a single server implementation to multiple servers. As growth continues, TV VDS allows operators to install distributed servers to address concentrations of subscribers while leaving content ingest and management centralized.

Stream Groups can be distributed close to the subscriber and linked back to the central Vault locations by way of the Cisco Cache Control Protocol (CCP). Cisco CCP automatically ensures that any new content that is required by a customer edge device is transferred within a maximum of a 250-millisecond delay to the appropriate edge location; as a result, all content appears local to each edge site, even though most content is stored at the central Vault location.

The TV VDS offers different configurations with regards to network topology, business management systems (BMSs), and streaming modes.
VDS with Vaults and Streamers
In a TV VDS with Vaults and Streamers, MPEG-2 transport stream (TS) video is stored on the Vaults with the associated trick-mode files. Content is transported from the Vaults to the Streamers as needed, by using CCP over gigabit Ethernet networks. Content is sent unicast from the Streamers and delivered to the quadrature amplitude modulation (QAM) devices over gigabit Ethernet or asynchronous serial interface (ASI), and then is modulated onto the HFC plant to the subscriber set-top box for viewing.

VDS with ISVs
For the smallest networks, Cisco packages the VDS in a single server, the Integrated Streamer-Vault (ISV), offering a solution for VOD services with large content libraries but small stream counts.
In a TV VDS with ISVs, MPEG-2 TS video is stored on the ISVs with the associated trick-mode files. Content is sent unicast from the ISVs and delivered to the QAM devices over a gigabit Ethernet network, and then is modulated onto the HFC plant to the subscriber set-top for viewing.

VDS with Caching Nodes
For larger networks, Cisco offers the VDS with Caching Nodes in the Virtual Video Infrastructure (VVI). In a VVI, Caching Nodes are the intermediary fill source for Streamers, which removes a large portion of the distribution traffic from the Vaults.
In a TV VVI, MPEG-2 TS video is stored on the Vaults with the associated trick-mode files. Content is transported from the Vaults to the Caching Nodes as needed, by using CCP over gigabit Ethernet networks. Content is distributed from the Caching Nodes to the Streamers as needed, by using CCP over gigabit Ethernet networks, or by using HTTP over gigabit Ethernet networks. Content is sent unicast from the Streamers and delivered to the QAM devices over a gigabit Ethernet network, and then is modulated onto the HFC plant to the subscriber set-top for viewing.

TV VDS and VVI Topologies
The TV VDS (using Vaults and Streamers, or ISVs) and the TV VVI (using Vaults, Caching Nodes, and Streamers), supports centralized, decentralized, and hybrid gigabit Ethernet network designs. Because the use of Vaults and Streamers separates storage from streaming, streaming requirements can be satisfied on an as-needed basis and the streaming can be centralized or distributed among multiple locations. Caching Nodes separate the ingest and storage of content from the distribution of content, offering greater flexibility and network efficiency.
The TV VDS topology and TV VVI topology can change with the evolving needs of the system operator. If the need to decentralize becomes evident, you can move the Streamers or Vaults to remote hubs without disrupting service. The VVI offers additional flexibility in designing your network. Vaults can be centrally located at a national network, and content may be classified by market (city, state, or a broader region) depending on the AMS or BMS used. Caching Nodes can be located centrally, or distributed closer to the regional networks where the Streamers are located. Using Caching Nodes in the network design takes the distribution traffic off the network backbone.
Caution

All Cisco servers are connected through a switch. Because all Vaults, CCP Streamers, and Caching Nodes in the same array exchange heartbeat messages through the cache interfaces, it is important to ensure there is enough bandwidth among switches involved in delivering cache traffic, as well as to support the same aggregated amount of traffic on all cache interfaces.

Note

When using ISVs, with the Vault and Streamer functions contained in one server, the only topology possible is centralized.

Centralized Topology

In a centralized topology, all VDS servers are located in either a single video headend or a remote hub. This is the right solution for certain situations, for instance, very small starting systems or where a large amount of bandwidth is available. A centralized topology has advantages in reducing operational cost by placing equipment in one physical location. Figure 2-1 illustrates the centralized topology for Vaults and Streamers.

Figure 2-1 Centralized Topology with Vaults and Streamers

Figure 2-2 illustrates the centralized topology for ISVs.

Figure 2-2 Centralized Topology with ISVs
Figure 2-3 illustrates the centralized topology for a VVI.

**Figure 2-3 Centralized Topology with Caching Nodes**

The decentralized topology is a hub-and-spoke topology between the headend site and multiple hub sites, where the Vaults are located at the headend and the Streamers are in the hub sites. For a VVI, a decentralized topology provides a three-tiered approach by having the Vaults located in the headend, the Caching Nodes in intermediary sites, and the Streamers in the hub sites. The decentralized topology works well for distributing Stream Groups close to subscribers. A decentralized topology has advantages in reducing the amount of long-haul fiber transport bandwidth needed—typically by a factor of ten or better. Figure 2-4 illustrates the decentralized topology.

**Figure 2-4 Decentralized Topology**

Figure 2-5 illustrates the decentralized topology with Caching Nodes.

**Figure 2-5   Decentralized Topology with Caching Nodes**

**Hybrid Topology**

In a hybrid topology, the Vault servers and backup Streamer servers are located at the headend, with the active Streamers at a remote hub site. If the remote hub site goes down, the Streamers at the headend take over. A hybrid topology blends the advantages of centralized and decentralized topologies that is based on needs of the system implemented. Figure 2-6 illustrates the hybrid topology.

**Figure 2-6   Hybrid Topology**
Figure 2-7 illustrates the hybrid topology with Caching Nodes.

Figure 2-7  Hybrid Topology with Caching Nodes

TV VVI Management

The TV VVI offers two types of management, centralized and split-domain.

In a VDS, Streamers cannot communicate with Streamers in other groups. In a VVI, Streamers in other groups can communicate with each other on an as-needed basis.

All Vaults, Streamers, and Caching Nodes are identified by an array ID, a group ID, and a server ID. In the CDSM GUI, the array ID identifies servers that are part of the same system, the group ID identifies servers that are part of the same group (Vault Group, Cache Group, and Stream Group), and the server ID is a unique number that identifies the server. Table 2-1 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arroyorc files.

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>
Centralized Management

Centralized management uses one Virtual Video Infrastructure Manager (VVIM) to manage the Vaults, Caching Nodes, and Streamers in a VVI.

Split-Domain Management

Split-domain management uses one VVIM to manage the domain of Vaults and Caching Nodes, and separate managers, the Stream Managers, to manage each domain of Streamers.

In a split-domain VVI that uses HTTP for communication between the Caching Nodes and Streamers, the databases for each domain are separate. The information stored in each database is not shared with the servers in the other domains. The Stream Managers communicate with the VVIM over port 80. If port 80 is not open for communication, the managers cannot communicate with each other and configuration settings need to be uploaded to the Stream Managers from information downloaded from the VVIM.

In a split-domain VVI that uses CCP for communication between the Caching Nodes and Streamers, the database is replicated among all servers in the Vault/Cache domain and the Stream domains. Because the VVI allows intercommunication among different Cache Groups and Stream Groups when CCP Streamers are used, the server ID and group ID must be unique across the system. The Stream Managers communicate with the VVIM by using the database replication.

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**Note**

Split-domain management is supported in an RTSP environment, and an ISA environment with the Content Storage feature and CCP Streamers.

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VDS Workflow

Content is ingested and stored in the Vault array. The Vault array can consist of two Vault Groups, which in turn consists of two or more Vaults that are either colocated or distributed to multiple locations across an Ethernet network. Content ingest is initiated by the backoffice based on a subscriber request, and based on schedule or Barker channel content. Manual ingest, which is operator initiated, is also offered as an optional feature.

---

**Note**

The ability to differentiate between a DVD asset and a video asset to support ingest, trick-play creation, and streaming of content files as large as 120 GB is supported. The content files could span multiple days.

As the content is ingested into the Vault, any necessary trick-mode files are created. The content and trick-mode files are then mirrored within the same Vault or across the Vault array. The replication of content allows for data recovery should a Vault undergo a failure.

Content is delivered from the Vault array to the Stream Group in response to cache-fill calls from the Streamers. Content is also distributed across the network in response to scheduled or Barker stream content fulfillment.

As Streamers need to fill content, they issue locate requests to the Vaults for the specific content. The Streamer makes a decision on which Vault to pull content from based on the responses. The process of determining where to pull content from includes memory capacity and disk capacity of the Vault, as well as network capacity.
If a VVI is deployed, content is delivered from the Vault Group to the Cache Group in response to cache-fill calls from the Streamers. The Caching Nodes are explained in more detail in the “Caching Node Workflow” section on page 2-12.

Within the Streamer array are one or more Stream Groups. The following section describes how the Stream Groups deliver streams to the subscriber set-tops.

Note

All servers can be on different subnetworks. However, because of backoffice restrictions, the externalized IP address is constrained to migrate among servers on the same subnetwork. This means the Content Store server in an Interactive Services Architecture (ISA) environment can migrate only among Vaults that are on the same subnet, and the Setup and Control servers can migrate only among Streamers on the same subnet.

### Popularity-Based Caching

Popularity-based caching reduces the write rate to the storage devices on the Streamer and Caching Node while maintaining the best possible cache-hit rate on the available storage.

To control peak and average write rates to cache (flash or disk storage), the algorithm that determines when content is written to cache is changed so that only content that is likely to be accessed most often is cached. Content is only cached if it is more popular than the least popular content that is currently cached. Otherwise, the content is transmitted from the Vaults to the end-users by way of the cut-through mode, where content is temporarily stored in the Streamer and Caching Node RAM without ever writing it to disk or flash storage, and then streamed directly from the Streamer’s RAM to the end-user. When cache space is needed, the least popular content is evicted from cache first.

The write rate for caching content is determined by the rate at which previously popular content becomes less popular to the point where it no longer makes sense to keep it in cache, and previously unpopular content becomes more popular to the point where it does make sense to keep it in cache. Content popularity is measured by the time-decaying average of the number of play requests on each Global Object Identifier (GOID).

Previously, all content was written to cache (except when overloaded) and the Least Recently Used (LRU) content was evicted first.

With the Popularity-Based Caching feature, only popular content is written to cache and the least popular content is evicted first.

### Bandwidth Manager for Thin Pipe

The bandwidth manager controls the traffic leaving the site to any other site and queries all the VDS servers in the site for the thin pipe mapping configuration of each VDS server. One server in the site is elected as the bandwidth manager for all servers in the site. A site is defined by the Site Setup page, which associates groups with a site. Initially, the bandwidth manager allocates bandwidths of whatever the VDS servers have already committed, provided the committed bandwidths are within the pipe bandwidth limits; otherwise, the bandwidth manager allocates a percentage of what is committed. After the initial allocation, the bandwidth manager distributes the bandwidth equally among all the remaining VDS servers in the site.

Each VDS server in each group reports the bandwidth each one is using to the bandwidth manager every ten seconds. The bandwidth threshold for each server has an upper limit of 90 percent and a lower limit of 5 percent. If a server reaches either limit, the server reports this to the bandwidth manager.
immediately, and does not wait for the ten-second report interval. For example, if the server is given 100 Mbps and the streams that were just started uses 90 Mbps, the upper threshold limit has been reached and the server asks the bandwidth manager for more bandwidth.

A separate entry is maintained for each thin pipe with a list of servers that have the same thin pipe configuration. Servers that belong to the same thin pipe are added and removed as they become reachable or unreachable.

The bandwidth manager service runs on each server in either the primary mode or the passive mode. The one server at the site that is running the primary mode is selected through a discovery mechanism. The primary bandwidth manager maintains all the thin pipes and associated server structures. If the server running the primary bandwidth manager fails or loses connectivity, the newly elected bandwidth manager takes over and when the old primary bandwidth manager becomes available again and connectivity is restored, the thin pipe information and structures are deleted from the old primary.

All bandwidth manager messages are logged in the bwm.log file. The following logging levels are defined (default level is Information):

- Critical
- Error
- Warning
- Information
- Debug
- Debug Verbose

### Streamer Workflow

A Stream Group is a configurable group of Streamers that are designated to serve specified QAM devices, and subsequently, specific service groups. From a session setup and control perspective, there are three logical types of servers in a Stream Group:

- Setup server
- Control server
- Play server
- Remote Setup and Control server

The Setup and Control servers have both a primary and a backup server. The primary server services all messages, while the backup server simply maintains states. If a primary server is unreachable, the backup server takes over control and creates another backup server. Thus, there is always a primary and backup pair of servers for setup and control. The Play server does not have a backup server. However, the Control server selects a new Play server in the event of a failure of the existing Play server.

**Note**

The ability to have both a primary and backup server depends on the number of Streamers in the Stream Group.

The Setup and Control server IP addresses are configurable. For an ISA environment, the Setup IP address is the same as the Stream Master IP address. For RTSP, the Setup server and Control server must be the same server. For both ISA and RTSP environments, the Stream Service selects a Streamer in the Stream Group to be the Setup server, and another Streamer (sometimes the same Streamer) to be the Control server.
Setup Server

A Streamer designated as the Setup server interfaces with the backoffice and forwards the setup messages to the appropriate Stream Group that is assigned to the destination service group. One Streamer in the Stream Group that is colocated with the backoffice server is assigned as the primary Setup server. The Setup server receives the setup request from the backoffice and maps the service group. The Setup server returns the IP address of the Control server, and the set-top issues subsequent control messages to this IP address.

Control Server

The Control server assigns requests to specific Streamers and dynamically migrates streams between Streamers based upon changes in stream states (for example, content splice boundaries, maintenance trickle down, or server failures). One server in the Stream Group is assigned as the primary Control server. The Control server runs the Lightweight Stream Control Protocol (LSCP) proxy in an ISA environment and the Real-Time Streaming Protocol (RTSP) proxy in an RTSP environment.

For each and every setup message received from the backoffice, a CCP message is generated and sent to the Control server. In the initial setup request, the Control server receives the setup parameters but does not choose a Play server. After a control message is received from the set-top, the Control server gets performance information (for example, server load) from the potential Play servers within the Stream Group and sends a CCP message to the best candidate. Subsequent control messages, whether from the set-top or from the Setup server, are forwarded to the chosen Play server.

Play Server

The Play server is the Streamer that is assigned to play the stream. This Streamer acquires the content, whether in RAM, a local disk, or a Vault, and ensures guaranteed service delivery of the stream. Every Streamer in a Stream Group is a possible candidate to be the Play server.

Remote Setup and Control Server

The Remote Setup and Control Server Support feature allows the Setup and Control servers of the Streamers to be placed in a different location than the Play servers of the Streamers. All control traffic (setup and control) goes to one Streamer (Setup and Control server), and all video data traffic is served from the Streamers designated as the Play servers.

As part of this feature, there is never just one stream transmitted on a single Ethernet interface. There is always at least two active streams transmitted on an interface.

Note

The Remote Setup and Control Server Support feature is supported on a Virtual Video Infrastructure (VVI) with split-domain management in an ISA environment and Content Storage configured as either Shared or Distributed.

The VOD Error Repair feature is not supported with the Remote Setup and Control Server Support feature.
Remote Setup and Control

The setup and control traffic between the set-tops and VDS is sent to a location that is separate from the location where the video data streams originate. The Session Traversal Utilities for NAT (STUN) traffic is structured so that it is sent to the Setup server instead of the Play server. The data path through the end-user’s NAT device complies with RFC-5389.

Stream to Interface Relationship

The Remote Setup and Control Server Support feature requires at least two stream requests before sending the first data stream, and makes sure there are at least two data streams on an active Streamer interface at all times. The Control server makes sure there are at least two streams on an active Streamer, and the active Streamer makes sure there are at least two streams on an active stream interface.

If the first play request on a Play server reaches the session timeout period before a second play request is received on that Play server, the first session fails and the stream is sent back to the Control server for relocation. If there are only two sessions created on the VDS and one session is destroyed or completes, the remaining session is destroyed.

Global Source Address

The Remote Setup and Control Server Support feature introduces the **Global Source Address**, which is the IP address and associated port number that is used by all Play servers for transmitting stream data. The Global Source Address is defined on all Streamers (Setup, Control, and Play).

The Global Source Address is defined in the setup file on all Streamers (Setup and Control servers, and Play servers). This address is hosted on the primary Setup server and is managed in a fault-tolerant manner; that is, it moves from interface to interface as needed if an interface fails, and it transitions to a new primary Setup server if the original primary Setup server becomes unreachable.

Each stream interface on the Streamers continues to have a unique IP address so that diagnostic packets (and cache-fill traffic if configured as a stream/cache interface) can be sent and received on those interfaces. However, all stream data packets are sent using the Global Source Address as the source.

The Control server uses the Global Source Address as the stream source address in the reply to the NAT Setup request from the set-top. This occurs whenever the Streamer Play server indicates that a remote STUN handshake is needed.

The Global Source Address has the following benefits:

- Mid-session STUN handshakes are not needed, which eliminates the overhead and associated temporary black-screens that occur on set-tops when STUN handshakes happen mid-session.
- Streams can be moved more easily for load-balancing purposes. A Streamer can move a stream from one interface to another without involving the Control server, Setup server, or set-top. A Control server can move a stream from one Play server to another without involving the Setup server or set-top.
- Address management on the Setup server and on the network is simplified. There is only one stream source address that needs to be hosted on the Setup server, and there is only one routing setup in the network configuration.

The following additional information should be considered when configuring the Remote Setup and Control Server Support feature:

- To trace the source of a stream, use the stream session ID along with the associated log files on the Streamers acting as the Play server, as well as the Streamers acting as the primary Setup server and primary Control server. Other diagnostics such as the **ping** command can still use the unique IP address of each stream interface.
• Additional router configuration may be necessary to ensure that the Global Source Address is hosted on the Setup server is used for inbound traffic and that packets sent to that address are never sent to the Play servers.

Caching Node Workflow

A Cache Group is a configurable group of Caching Nodes that serve content to specified Stream Groups. When a content request is received by a Streamer, the Streamer first checks to see if the content is stored locally, which includes DRAM, disk cache, and Streamers in the same Stream Group. Content on the Streamers is always the most popular content, so user requests are generally served from local storage.

Streamers send cache-fill calls to remote servers for content that is not found locally. The remote servers can be Streamers in other Stream Groups, Caching Nodes in Cache Groups, or Vaults in Vault Groups (Vault Groups must be enabled). The cache-fill source selected, whether another Streamer, Caching Node, or Vault, is based on the network capacity and fill-source capacity (disk and memory), as well as on the preference configured for that group of servers. Caching Nodes could respond to the request with a message stating the content is not currently cached, but there are other fill sources the Caching Nodes can contact (Caching Nodes in other Cache groups, and Vaults).

The Caching Nodes use CCP to communicate with the Vaults, and use either CCP or HTTP to communicate with Streamers.

Note
ISA environments support only CCP, while RTSP environments support only HTTP for VVI.

HTTP Streamers

HTTP can be used for communication between the Caching Nodes and the Streamers. The HTTP Streamer communicates with a proxy for locating a fill source and pulling content.

A locate service serves as a proxy for a group of Caching Nodes and Vaults. The service is accessed through a highly available virtual IP address hosted by the Caching Node. The virtual IP address is bound to a fill port (Locate Port).

HTTP Streamers request content by HTTP GET requests to the proxy service (the server with the locate service). The proxy server checks its own storage and peer fill sources (servers in the same group) for the content using extended-CCP. If the content is found, the best source is chosen based on capacity and a redirect response is sent to the chosen server. If the content is not found, a cache-fill request is sent to the remote servers.

After the best server is chosen to send the content to the HTTP Streamer, a single cache-fill port on that server is chosen for the HTTP transfer of the content. This is different from CCP transfers, which could potentially use all cache-fill ports to deliver the content.

HTTP Locate Port

With respect to resiliency, the Locate Port service is similar to the Setup and Control servers. The primary server of the Locate Port service has the locate port IP address bound to an interface. The backup server becomes the primary if the primary fails.

Peer Caching Nodes advertise among themselves about the ability to host the HTTP Locate Port service; this includes primary, backup, available, and not usable states. Available means the Caching Node can be either a primary or backup if needed. Not usable means that the server cannot host the service; for the HTTP Locate Port, this typically means that there are no usable network ports for the service.
A dedicated network port on the Caching Node is used solely for the HTTP Locate Port service. The primary server determines service availability based on the link status of the dedicated network port. Failover of the service occurs if the network port loses link status. A reestablished link results in the server becoming available.

**CCP Streamers**

The CCP Streamers use CCP to communicate with the Caching Nodes. They do not use the proxy address. CCP Streamers load-balance locate requests across fill sources.

The Streamer or Caching Node sends a locate-and-request message from the proxy server. The Proxy server sends a message to the best source to fill the request.

Streamers or Caching Nodes needing content first query peer sources (servers within the same group). Streamers also query local Streamers, if the content is not found, then a request to the remote sources is sent. Remote sources are queried based on a preference list. Sources are grouped and preferences are assigned for each group.

**Vault Workflow**

The Vaults ingest content using three different methods:
- FTP pull
- FTP push
- Live capture of MPEG-2 transport streams over UDP

With FTP pull, the original content is kept on an FTP server (catcher), for a period of time and mechanisms are in place to restart ingests until they have successfully completed.

With FTP push, only a window of data is buffered by a device that grooms the live (broadcast) feed and pushes the data to the Vault.

With live capture over UDP, the Vault captures the live multicast feed directly.

**Vault Virtualization**

Vault Virtualization provides the following three types of configuration:
- ISA Regionalization
- Shared Content Store
- Virtual Content Store

Note: Virtual Content Store provides enhanced features to Shared Content Store.

**ISA Regionalization**

The ISA Regionalization feature is a combination of the Virtual Video Infrastructure (VVI) and legacy Content Delivery System (VDS). This feature provides the ability to centrally store content on Vaults located in a centralized storage facility and allow remote sites to have a record of inventory of this content and access it by way of the Caching Nodes or directly on the central Vaults. The remote sites
still operate as independent entities with their own local Vault Group, local Content Store, and local Streamers; managed by their own CDSMs and possibly accessing their own local BMS and AMS. The Streamers at each remote site can stream both locally stored content and centrally stored content.

The ISA Regionalization feature allows the use of a centralized storage facility containing both Vaults and Caching Nodes in a Virtual Video Infrastructure (VVI), while maintaining a localized or remote VDS at each headend.

For information on configuring ISA Regionalization, see the "ISA Regionalization Configuration Workflow" section on page 3-10.

**Centralized Storage**

The Virtual Video Infrastructure Manager (VVIM) manages the Vaults and Caching Nodes allocated in the centralized domain. The centralized domain can be distributed across multiple geographic locations; for example, the Vaults could be located in one location and the Caching Nodes could be located in another. The VVIM typically resides in one of these locations.

Each VDS has a virtual view of the VOD content stored on the central Vaults. The centralized content is ingested once, the first time it is requested; any subsequent ingest requests for that same content increments a reference counter.

**Remote Site**

Each remote VDS has a local Vault Group and communicates with a local BMS and local AMS located at the headend or at another headend nearby. Each remote VDS is able to ingest local content through the local Vaults and is able to access content stored in the central storage facility by way of the Caching Nodes and Vaults in the VVI. The centrally stored content is abstracted from the BMS by means of the local Content Store providing a virtual view of that content to the BMS. Both local and central content are available to fulfill streaming requests received by the Streamers in a remote VDS.

The ISA Regionalization feature uses the existing ISA architecture, but extends the ISA content component to support new behaviors associated with where content is physically located. Each VDS operates with a local ISA Content Store, which is extended to manage both centrally and locally stored content.

Real-time asset (RTA) content is not centralized, and is stored on local Vaults in each headend. The VDS determines if content should be ingested centrally or locally based upon the type of content (VOD or RTA) that is being requested.

---

**Note**

If the local Vaults are not available because they are down or have lost connectivity, then the master Streamer in the headend automatically takes over as the Ingest Driver client. If this occurs, when the local Vaults have been recovered and regained connectivity, the Ingest Driver client must be migrated back to the local Vaults before RTA ingests can be restored.

To move the Ingest Driver client from the master Streamer back to the local Vaults, restart the avsdb process on the master Streamer by entering the following commands:

```
service avsdb stop
service avsdb start
```
Ingest Driver

The ISA Regionalization feature introduces the Ingest Driver, which has a server-side and a client-side. The Ingest Driver server is located at the central location, on the master Vault, and is responsible for managing the content ingestion and deletion requests from the Ingest Driver clients located at the remote sites.

Ingest Driver Server

The centralized Vaults run an internal Naming Service, Notification Service, and Content Store. This Content Store is not associated with a remote BMS, and acts independently of all remote sites. The Ingest Driver gets the Content Store factory from the internal Naming Service, ingests content using the createServant and provision methods, and deletes content using destroy and removeServant.

The Ingest Driver server is started and stopped on the master Vault and is automatically restarted like other ISA processes. When the server is started, it binds to a TCP socket and waits for requests. To handle the requests quickly, there are several threads created to parse the requests and fulfill them. When the server processes the request for each content, only one request is handled; that is, other simultaneous requests for the same content are blocked.

The Ingest Driver server reads the isa.cfg file and incorporates the following Ingest Driver configuration parameters set on the CDSM GUI:

- IngestDriverEnabled=1
- IngestDriverRole=1 (for server)
- IngestDriverHost
- IngestDriverPort
- IngestDriverNoOfThreads

The Ingest Driver server logs events to the IngestDriver.log file located in the /arroyo/log directory.

Ingest Driver Client

The Ingest Driver client is used by the local Content Store to send requests to the Ingest Driver server and receive responses from the server. When a provision call from the local Content Store is received from the backoffice, the Ingest Driver client establishes a TCP connection with the Ingest Driver server, sends the request, and closes the connection once the response is received.

The local Content Store reads the isa.cfg file and incorporates the following Ingest Driver configuration parameters for the Ingest Driver client set on the CDSM GUI:

- IngestDriverEnabled=1
- IngestDriverRole=0 (for client)
- IngestDriverHost
- IngestDriverPort
- IngestDriverTimeout
- MarketId

Ingest Driver Content Management

The local Content Stores at the remote sites perform content management of the content at the central facility by interfacing with the Ingest Driver. The Ingest Driver compares the requested content identifier of each content ingestion and deletion request to the VDS repository to determine if the content exists.
If the content does not exist, it is ingested using FTP and the FTP URL provided by the remote site. If the content already exists, the repository is updated to maintain the reference between the requesting site and the content. The Ingest Driver returns the VDS internal representation of the content bundle and associated content information, such as file size and bit rate.

When the Ingest Driver receives a deletion request, it determines if the request is for the last reference to the content. If it is the last reference, the Ingest Driver requests that the central Content Store delete the content and associated MPEG files. If it is not the last reference for the content, the Ingest Driver just removes the reference of the requesting site for that content in the repository.

Remote Ingests

At each headend, the external ISA interfaces to the backoffice do not change, and call flows remain the same. The remote CDSM is extended to identify a site as part of a regionalization grouping, and specify the communication information of the Ingest Driver. Internally, the local Content Store application is modified to check for this setting. If regionalization is turned on, the local Content Store application directs VOD (provision) requests to the Ingest Driver and RTA (provisionForPush) requests are directed to the local Vaults.

The local Content Store performs the createServant call locally, thus ensuring that each remote site has its own IOR representing the content object. If the request is distributed, the local repository is updated with the content-specific information, such as the content bundle, file size, and bit rate returned by the Ingest Driver. This allows the remote site to have local representation of centrally stored content.

For RTA content, the process is same as it has always been for the VDS. The local Content Store processes the provision call (provisionForPush for RTA) and directs the local Vaults to perform the ingest of the content.

Remote Streaming

Local streaming is accomplished by way of the Cache Control Protocol (CCP) locate capability. Each remote site is configured to communicate to a specific set of storage devices which could include local Vaults, central Vaults, and Caching Nodes. The locate feature broadcasts a request for a specific content, and the system performs a cost analysis to determine which storage device can best provide service. For VOD content, if the content is not already cached on the local Streamers, it is acquired from either the central Vaults or Caching Nodes. For RTA content, if the content is not cached on the Streamers, it is acquired from the local Vaults. However, knowledge of the content type is not required as the locate capability is able to determine its location.

Shared Content Store

Shared Content Storage, also known as Shared Content Store (SCS), works with a single, centralized AMS and catcher, through which all initiation for content ingest and content deletion is sent. The SCS handles ingest and deletion requests from multiple back offices by way of the central AMS. The scenario of back offices independently ingesting and deleting content through their local AMS is not supported.

---

**Note**

The Content Storage feature requires the Virtual Video Infrastructure feature with Caching Nodes.
Figure 2-8 shows a high-level view of the SCS and a single, centralized AMS for multiple video hub offices (VHOs). A VHO is a local deployment that includes the video backoffice, Streamers, application servers, QAM devices, and other headend equipment.

The DNS server typically runs on the BMS server. The Naming Service is part of the video backoffice (VBO). All CORBA components, including the AMS, Stream Service, and Content Store, need to register with the Naming Service. The catcher receives or “catches” new content assets from an external communication device such as a satellite transmission or FTP server. After the package is received completely by the catcher, it sends the package by way of FTP to the AMS. The package consists of video and image content assets, as well as ADI metadata.

Following are the requirements for the SCS feature:

- Single, shared DNS server with all devices registering their hostnames to it. A central, shared DNS is required to resolve multiple Naming Services belonging to the different VHOs.
- Hostnames must be unique for all devices. This is required for the Naming Service discovery.
- Each VHO has its own Naming Service to which the ISA components of the VHO register.
- AMS controls the ingest and deletion of content.
- The Vault array has one SCS.
- SCS registers with each Naming Service.

A VVI with SCS must be initialized in the following order:

1. The shared DNS server must be up and running before starting up the shared AMS, SCS, and VHO devices.
2. SCS successfully registers with the Naming Service for each VBO.
3. Each VHO Stream Service registers with its respective Naming Service.
Ingesting Content with the Shared Content Store

Upon receiving the content package, the AMS schedules it for ingest by informing the Package Factory in each participating VBO of the content package, and passing the pertinent information (the ADI metadata, the URL where the content package can be accessed in the AMS, and the verb ingest).

The SCS creates one interoperable object reference (IOR) for each content package. The IOR is returned to all VBO Package Factories that request it, including any that requested it at the time the IOR was being created.

Deleting Content with the Shared Content Store

To delete content that was ingested for more than one VBO, the AMS is used to send the export package delete request to each VBO. The content is deleted from the Vault array only when all VBOs have requested the deletion. If one or more VBOs have not requested that the content be deleted, the content remains in the Vault array.

Virtual Content Store

The Virtual Content Store feature in an ISA environment replaces the Shared Content Store feature. The Shared Content Store (SCS) feature is the ability of several local sites (video hub offices [VHOs]) to ingest content at a central location and share that content with the other VHOs. The SCS feature eliminated ingesting multiple copies of the same content.

Vault Virtualization replaces the SCS with the Virtual Content Store (VCS). No content is ingested at the local VHO. All ingests and deletions of content occur at the central location, and both ingests and deletions are initiated by the local BMS at each local VHO, just as they were in the SCS. However, the VHOs do not need to communicate with the super headend (SHE) as they did with the SCS feature. With VCS, communication of ingestions and deletions is handled by the Ingest Driver client residing on a Streamer in each VHO and the Ingest Driver server residing on the master Vault in the SHE. Vault Virtualization requires that Vault Groups be disabled.

The Virtual Content Store (VCS) component runs on a Streamer in the Stream Group, and if a failover occurs, the VCS fails over to another Streamer in the Stream Group.

Only one copy of the centrally located asset is ingested and shared by the system, and the asset is only deleted when all VHOs have requested the deletion.

For information on configuring Virtual Content Store, see the “Virtual Content Store Configuration Workflow” section on page 3-10.
BMS Considerations for ISA Environments

The TV VDS integrates with Interactive Services Architecture (ISA) used in business management systems (BMSs) such as the Tandberg OpenStream and the RTSP used in BMSs such as ARRIS nABLE, as well as in environments that are a combination of both ISA and RTSP. The BMS determines the roles and responsibilities of the TV VDS.

OpenStream ISA Integration

The OpenStream BMS is built on Common Object Request Broker Architecture (CORBA) and provides naming and notification services. The Naming Service allows the TV VDS to locate objects in the system such as content, equipment, assets, and so on. The Notification Service allows the TV VDS to listen for important events in the system as well as to send events to the OpenStream BMS and other components in the system.

Note

Dual conditional access systems (CAS) for ISA environments, Cisco/Scientific Atlanta Power Key Encryption System (PKES) and the Motorola OffLine Encryption Station (OLES), is supported. A field on the Monitor Completed Ingests page indicates whether the ingested content is encrypted or not. Both clear and encrypted content can be ingested.

For more information on the configuration parameters required to facilitate communication between the OpenStream BMS and the TV VDS, see Appendix C, “BMS Communication.”

Figure 2-9 illustrates how the TV VDS integrates with the OpenStream BMS.

Figure 2-9  TV VDS Integration into the OpenStream BMS
Streaming Mode

OpenStream uses a session-based approach to handle resource requirements and allocation. In the course of setting up a session, a QAM device is specified that has available capacity and connectivity to the Streamer and the set-top requesting the service. Typically, the Session and Resource Manager (SRM) is responsible for the allocation of network resources. OpenStream uses the Digital Storage Media-Command and Control (DSM-CC) session management protocol to request resources from the SRM.

When using gigabit Ethernet for streaming, OpenStream communicates with the SRM to negotiate network resources and allocation for sessions.

When using Asynchronous Serial Interface (ASI) for streaming, the Streamer performs the role of the SRM by managing and allocating the access network resources and providing this information to the OpenStream BMS.

Steering Inggests

The Ingest Steering feature offers the ability to have one BMS send ingest information to the master Vault, and depending on the product ID in the content name, the content is either ingested by one of the Vaults in the national Vault Groups, or it is ingested by a specific local Vault Group.

For the Ingest Steering to function correctly, the content name must be in the following format: ProviderId::AssetId::contentName.

The Ingest Steering feature requires that VVI with central management and Vault Groups be enabled. Figure 2-10 shows a high-level view of Ingest Steering for a single, centralized BMS and multiple VHOs. Each VHO has a local Vault Group through which all local live content is ingested. Each Stream Group streams local live content as well as national live and VOD content. The BMS sends messages to the master Vault Group (Vault Group 1), and depending on the product ID and the ingest steering configured, the content is ingested by either the local Vault Group or the national Vault Group.

Content objects on the national Vault Groups are mirrored among each other, while the content on the local Vault Groups are copied to separate hard drives on each Vault.
Network Connections

The network connections for a TV VDS with Vaults and Streamers, a TV VDS with ISVs, and a TV VVI with Caching Nodes all have different network connections. Table 2-2 lists the different required interfaces for each VDS server. The interfaces are described in the following sections. Figure 2-11 illustrates a TV VDS with Vaults and Streamers. Figure 2-12 illustrates a TV VDS with ISVs. Figure 2-13 illustrates a TV VVI with Caching Nodes.

Table 2-2 VDS Required Interfaces

<table>
<thead>
<tr>
<th>Interface</th>
<th>Vault</th>
<th>Streamer</th>
<th>ISV</th>
<th>Caching Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ingest</td>
<td>1</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Cache</td>
<td>1 to 8</td>
<td>1 to 13</td>
<td>1 to 4(^1)</td>
<td>1 to 12</td>
</tr>
<tr>
<td>Stream</td>
<td>—</td>
<td>1 to 13</td>
<td>1 to 4</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^1\) The cache interfaces on an ISV are used for content mirroring among ISVs.

**Note**

Table 2-2 lists the mandatory interfaces for each VDS server. If HTTP Streamers are used in a VVI, each Caching Node must have one interface designated as the Locate interface. Stream Control is an optional interface function. For more information, see the “Configuring the Interfaces” section on page 4-123.
Figure 2-11 shows the different logical networks of a VDS consisting of Vaults and Streamers. The ingest network receives content from the content source by way of an FTP staging server or FTP catcher and the content is ingested by the Vaults. The management network consists of communication between the CDSM and the BMS, as well as communication with the Vaults, Streamers QAM devices, and set-tops. The cache network consists of Vaults and Streamers.

Figure 2-11  Vault and Streamer Network Connections

Figure 2-12 shows the different logical networks of a VDS consisting of ISVs. The ingest network receives content from the content source by way of an FTP staging server or FTP catcher and the content is ingested by the ISVs. The management network consists of communication between the CDSM and BMS, as well as communication with the ISVs, QAM devices, and set-tops.

Figure 2-12 shows the different logical networks of a VDS consisting of ISVs. The ingest network receives content from the content source by way of an FTP staging server or FTP catcher and the content is ingested by the ISVs. The management network consists of communication between the CDSM and BMS, as well as communication with the ISVs, QAM devices, and set-tops.
Figure 2-12 ISV Network Connections

[Diagram of ISV Network Connections showing various network connections and data flows between different components such as Content Source, FTP Staging Server, Ingest Network, ISV, Cable STIS, QAM Device, and HPC Network.]
Figure 2-13 shows the different logical networks of a VVI. The ingest network receives content from the content source by way of an FTP staging server or FTP catcher where it is ingested by the Vaults. The management network consists of communication between the CDSM and BMS, as well as communication with the Vaults, Streamers, Caching Nodes, QAM devices, and set-tops.

**Figure 2-13** VVI Network Connections

Ingest Interface

The ingest interface takes in FTP traffic from the content provider at a maximum rate of one gigabit per second. After the Vault server receives URL information about the content from the BMS by using the management interface, the ingest interface either (1) receives FTP traffic by acting as an FTP client, or (2) receives live data upon receiving a request to act as the FTP server.

When using Layer 2 packet forwarding, to segregate all ingest traffic through the switching fabric, we recommend the use of a port-based VLAN.
Management Interface

The management interface communicates with the network management system (NMS) by way of SNMP, the BMS by way of ISA commands and also RTSP, and with all Vaults, Caching Nodes, and Streamers in the same array. Information shared among servers in the same array includes the following:

- Host service information
- Domain Name System (DNS) service information
- QAM gateway information
- All ISA information

Management traffic is low volume; however, when using Layer 2 packet forwarding, we recommend using a port-based VLAN to ensure delivery of critical management communications.

Starting from Cisco VDS-TV Release 3.7, network interface bonding is supported on all types of VDS servers including VDS Controller. For additional information on configuring network interface bond, see the “Configuring the Interfaces” section on page 4-123.

Cache Interfaces

The CCP uses the cache interfaces on the Vaults, Caching Nodes, and Streamers to send the following data to the servers in the same array:

- Content sent to the Streamers
- Content mirrored among the Vaults
- Messages containing information used for performance optimization exchanged among all the VDS servers

Note

All Cisco VDS servers are connected through a switch fabric. Because all Vaults, Caching Nodes, and Streamers in the same array exchange heartbeat messages through the cache interfaces, it is important to ensure there is enough bandwidth among switches involved in delivering cache traffic and to support the same aggregated amount of traffic on all cache interfaces.

When using Layer 2 packet forwarding for cache traffic, we recommend the use of a port-based VLAN.

Cache/Stream Interfaces

The cache/stream interfaces on the Streamer server can be used for both cache and streaming traffic. The number of interfaces designated for each traffic type is configurable. If an interface is configured for both cache and streaming traffic, priority is given to the higher-bandwidth stream traffic, provided cache traffic is able to transmit on other interfaces.

When using Layer 2 packet forwarding for cache and stream traffic, we recommend the use of a port-based VLAN.

Streaming Interface

The streaming interface delivers streaming traffic consisting of MPEG-2 transport streams to set-tops by way of QAM devices.
If an interface is configured for both stream and cache traffic, and the jumbo frames feature is not enabled for stream traffic while jumbo frames is enabled for cache traffic, stream traffic uses 1500-byte packets while cache traffic uses jumbo frames.
Getting Started

This chapter provides information on configuring the TV VDS servers. The topics covered in this chapter include:

- Initially Configuring the Devices, page 3-1
- Browser Recommendation, page 3-1
- Logging In to the TV CDSM, page 3-2
- Initializing the VDS and Activating the Optional Features, page 3-3
- Navigating the CDSM, page 3-4
- Configuration Workflows, page 3-6

This chapter assumes the VDS servers are already installed and takes you through the next steps toward configuring and monitoring the VDS.

Initially Configuring the Devices

You must initially configure the Content Delivery Engines (CDEs) before they can participate in the VDS network. The CDE that runs the TV Content Delivery System Manager (CDSM) must be initialized first so that the CDEs running the Streamers, Vaults, and optionally Caching Nodes, or the ISVs can communicate with it. For more information about initially configuring the CDEs, see the Cisco Content Delivery Engine 205/220/250/420 Hardware Installation Guide, the Cisco Content Delivery Engine 110 Hardware Installation Guide, Cisco UCS C220 M4 Server Installation and Service Guide, or the Cisco TV VDS Installation, Upgrade, and Maintenance Guide, Release 3.9.

Initial configuration of your CDEs includes basic network configuration settings to provide connectivity to the CDSM. After the CDEs are configured with these settings, you can use the CDSM to configure and manage all the servers in the VDS.

After you have initially configured your CDEs, you must initially set up your VDS and activate any optional features. See the “Initializing the VDS and Activating the Optional Features” section on page 3-3 for more information.

Browser Recommendation

Cisco recommends Mozilla Firefox 36 and above as the primary browser to access the CDSM GUI. Internet Explorer 11.0 can also be used as a secondary browser to access the GUI.
Logging In to the TV CDSM

To log in to the TV CDSM, do the following:

**Step 1**
Using your web browser, enter the IP address or hostname of your CDSM.

For example, if the IP address of your CDSM is 192.168.0.236, you can access it by entering http://192.168.0.236 in the address or location text box of your browser program.

**Note** Consult your as-built documentation for the IP address of the CDSM. If you have redundant CDSMs, use the virtual IP address, not the IP addresses of the physical Ethernet interfaces.

The CDSM GUI now supports HyperText Transport Protocol Secure (HTTPS) as a secure way to access the browser-based interface. The `vdsconfig` script offers the following choices to access the CDSM GUI:

- HTTP
- HTTPS
- HTTP and HTTPS

**Note** VVIM/CDSM uses a self-signed SSL certificate for secure access to GUI via HTTPS. As the domain name/IP address of VVIM/CDSM will vary for each installation, web browsers present a security warning when launching the GUI. This is an expected behavior and you could either choose to ignore the warning and proceed to launching the GUI or add the certificate as a trusted certificate in the web browser.

The System Login page is displayed, as shown in Figure 3-1.

![Figure 3-1 System Login Page](image)

**Step 2**
Enter your user name and password and click **Log In**.

The built-in user name is `admin` and the initial password is `admin`.
Initializing the VDS and Activating the Optional Features

Initial configuration of your VDS includes selecting the CServer version, the installation type, and other parameters that must be configured before you can continue the configuration process.

If the Media Scheduler or Ingest Manager are part of your deployment, you need to activate these features by entering an activation key.

To initialize your VDS or activate the Media Scheduler and Ingest Manager, do the following:

Step 1 Log in to the CDSM as admin, or use another user account that has master access.

Step 2 Add a user with engineering access.
   a. Choose Maintain > User > Add Users. The Add Users page is displayed.
   b. In the New User and Password fields, enter the user name and password for this account.
   c. From the Access drop-down list, choose Engineering.
   d. Click Add User.

Step 3 Log out of the CDSM, and log in as the user with the Engineering access level that you specified in Step 2. The CDSM Setup page is displayed.

Step 4 Choose the options for your deployment and click Submit. For more information about the fields on this page, see the “CDSM or VVIM Setup” section on page F-3.
Step 5 To activate the Media Scheduler, scroll down to the Media Scheduler section, and click the ON radio button next to the Media Scheduler field.
   a. In the Activation Key field, enter the software access key from your Right to Use Notification for the Content Delivery Application Media Scheduler (CDAMS) product.
   b. In the Importer/Transformer Type field, choose either OCN or SA Tribune. The Importer/Transformer Type specifies the expected EPG format, the fields for the Input Channels page, and the expected ADI metadata.

Step 6 To activate the Ingest Manager, scroll down to the Ingest Manager section, and click the ON radio button next to the Ingest Manager field.
   a. In the Activation Key field, enter the software access key from your Right to Use Notification for the Content Delivery Application Stream Resiliency, VOD ER for Gen 1 & Gen 2 Streamers (CDATSTR2-EN) product or for the Content Delivery Application Stream Resiliency, VOD ER for Gen 3 Streamers (CDATSTR3-EN) product.

Step 7 To activate the VOD Error Repair, scroll down to the VOD Error Repair section, and click the Enabled radio button next to the VOD Error Repair field.
   a. In the Activation Key field, enter the software access key from your Right to Use Notification for the Content Delivery Application VOD Error Repair (CDAVER) product.

Step 8 Click Submit.
Step 9 Log out of the CDSM.

Navigating the CDSM

Note Cisco strongly recommends that the user does not use the browser back or refresh buttons and instead use the CDSM GUI navigation elements.

The CDSM pages consist of the elements illustrated in Figure 3-3.
The tabs are accessible from any page in the CDSM.

The tab options are used to choose the applicable level. In the Configure and Monitor pages, the tab option selected determines whether the configuration or monitoring applies to the system as a whole, to the array level, or to a specific server.

Using Online Help

Online help is available in the CDSM. You can use it by clicking on the Help button in the upper-right corner of any of the pages.

Context-sensitive help is provided for the page you are viewing.

The CDSM offers several levels of help:

- Each page of the CDSM includes some basic help, normally displayed in the main panel.
- The Help button displays context-sensitive help presented in a separate browser window. The content of this page is different depending on the page of the CDSM you are viewing when you click Help. After you are inside the help system, you can move around to view different topics by using a variety of navigation tools:
  - Back/forward page buttons
  - Links within the page contents
- Table of Contents, accessed through the navigation panel at the left of the page.
- Contents icon shows and hides the Table of Contents.
- Print icon prints the page you are viewing.
- From the Help window, you can display the full Cisco VDS-TV ISA Software Configuration Guide by clicking the View PDF button.

## Configuration Workflows

After you have completed the initial installation and configuration of the CDEs for the VDS and you have verified connectivity to the CDSM, you are ready to configure the VDS for content delivery. The configuration workflow consists of one or more of the following:

- VDS Configuration Workflow
- VVI Configuration Workflow
- Vault Virtualization Configuration Workflow
- TV MediaX Configuration Workflow
- TV Playout Configuration Workflow
- MVOD Configuration Overflow

### VDS Configuration Workflow

Table 3-1 lists the basic tasks, in the recommended order, for configuring the VDS for content delivery with references to the associated sections in each chapter.

**Table 3-1 Configuration Workflow**

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change administrator password</td>
<td>Change the administrator password for the CDSM.</td>
<td>Editing User Settings, page 7-5</td>
</tr>
<tr>
<td>Interface setup</td>
<td>Configure the different interfaces on the VDS servers.</td>
<td>Configuring the Interfaces, page 4-123</td>
</tr>
<tr>
<td>Server setup</td>
<td>Configure the IP addresses and ports for the interfaces, as well as other settings such as quality of service (QoS).</td>
<td>Configuring the Servers, page 4-128</td>
</tr>
<tr>
<td>Route table</td>
<td>Route Table identifies destination subnetworks for cache, stream, and stream control interfaces. Route Table is optional.</td>
<td>Configuring the Recorder, page 4-135</td>
</tr>
<tr>
<td>Stream groups setup</td>
<td>A Stream Group consists of one or more Streamers. Stream Groups relate to QAM gateways or destination subnetwork by the Stream Group preference.</td>
<td>Configuring Stream Groups, page 4-75</td>
</tr>
<tr>
<td>Control and setup IPs</td>
<td>Configure the Control server and Setup server IP address for the Stream Groups.</td>
<td>Configuring the Control and Setup IPs, page 4-88</td>
</tr>
</tbody>
</table>

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The other configuration settings, barker streams, parent/child service groups, DNS settings, and so on, can be configured in any order.

### VVI Configuration Workflow

The Virtual Video Infrastructure can be centrally managed or can use split-domain management.

#### Central Management Configuration Workflow

Table 3-2 lists the basic tasks, in the recommended order, for configuring the VVI with central management for content delivery with references to the associated sections in each chapter.

#### Table 3-2    VVI Configuration Workflow

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change administrator password</td>
<td>Change the administrator password for the CDSM.</td>
<td>Editing User Settings, page 7-5</td>
</tr>
<tr>
<td>Interface setup</td>
<td>Configure the different interfaces on the VDS servers.</td>
<td>Configuring the Interfaces, page 4-123</td>
</tr>
<tr>
<td>Server setup</td>
<td>Configure the IP addresses and ports for the interfaces, as well as other settings such as quality of service (QoS).</td>
<td>Configuring the Servers, page 4-128</td>
</tr>
<tr>
<td>Route table</td>
<td>Route Table identifies destination subnetworks for cache, stream, and stream control interfaces; Route Table is optional.</td>
<td>Configuring the Recorder, page 4-135</td>
</tr>
<tr>
<td>Stream Groups setup</td>
<td>A Stream Group consists of one or more Streamers. Stream Groups relate to QAM gateways or destination subnetwork by the Stream Group preference.</td>
<td>Configuring Stream Groups, page 4-75</td>
</tr>
</tbody>
</table>

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Table 3-1 Configuration Workflow (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS settings for the Streamers</td>
<td>Configure the settings for the Streamers to communicate with the BMS.</td>
<td>Configuring the Streamer for BMS Connectivity, page 4-59</td>
</tr>
<tr>
<td>BMS settings for the Vaults</td>
<td>Configure the settings for the Vaults to communicate with the BMS.</td>
<td>Configuring the Vault for BMS Connectivity, page 4-65</td>
</tr>
<tr>
<td>QAM gateways¹</td>
<td>Configure the QAM Gateways for the VDS.</td>
<td>Configuring QAM Gateways, page 4-9</td>
</tr>
<tr>
<td>Headend setup¹</td>
<td>Configure service groups for gigabit Ethernet streaming, ASI streaming, and barker streams.</td>
<td>Configuring the Headend Setup, page 4-14</td>
</tr>
<tr>
<td>Ingest tuning</td>
<td>Configure the trick-mode speeds for ingested content.</td>
<td>Configuring Ingest Tuning, page 4-33</td>
</tr>
</tbody>
</table>

¹. If the Stream Destination feature is set to IPTV, the QAM Gateway page and Headend Setup page are replaced with the Stream Destination page. A setting of Mixed for Stream Destination displays all three pages. For more information, see the “Configuring Stream Destinations” section on page 4-22.

The other configuration settings, barker streams, parent/child service groups, DNS settings, and so on, can be configured in any order.
### Table 3-2  VVI Configuration Workflow (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control and Setup IP addresses</td>
<td>Configure the Control server and Setup server IP address for the Stream Groups.</td>
<td>Configuring the Control and Setup IPs, page 4-88</td>
</tr>
<tr>
<td>BMS settings for the Streamers</td>
<td>Configure the settings for the Streamers to communicate with the BMS.</td>
<td>Configuring the Streamer for BMS Connectivity, page 4-59</td>
</tr>
<tr>
<td>BMS settings for the Vaults</td>
<td>Configure the settings for the Vaults to communicate with the BMS.</td>
<td>Configuring the Vault for BMS Connectivity, page 4-65</td>
</tr>
<tr>
<td>Cache Groups setup</td>
<td>A Cache Group consists of one or more Caching Nodes.</td>
<td>Configuring Cache Groups, page 4-81</td>
</tr>
<tr>
<td>Stream to Cache map</td>
<td>Cache Groups are mapped to Stream Groups and given a preference.</td>
<td>Mapping Stream Groups to Cache-Fill Sources, page 4-84</td>
</tr>
<tr>
<td>QAM gateways¹</td>
<td>Configure the QAM Gateways for the VDS.</td>
<td>Configuring QAM Gateways, page 4-9</td>
</tr>
<tr>
<td>Headend setup¹</td>
<td>Associate service groups with Stream Groups.</td>
<td>Configuring the Headend Setup, page 4-14</td>
</tr>
<tr>
<td>Ingest tuning</td>
<td>Configure the trick-mode speeds for ingested content.</td>
<td>Configuring Ingest Tuning, page 4-33</td>
</tr>
</tbody>
</table>

¹. If the Stream Destination feature is set to IPTV, the QAM Gateway page and Headend Setup page are replaced with the Stream Destination page. A setting of Mixed for Stream Destination displays all three pages. For more information, see the “Configuring Stream Destinations” section on page 4-22.

### Split-Domain Management Configuration Workflow

Table 3-3 lists the basic tasks, in the recommended order, for configuring the VVI with split-domain management (VVIM and Stream Manager) for content delivery with references to the associated sections in each chapter. For more information, see Chapter 2, “Network Design,” and the “CDSM or VVIM Setup” section on page F-3.

### Table 3-3  VVI Split-Domain Configuration Workflow

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change administrator password</td>
<td>VVIM and Stream Manager</td>
<td>Change the administrator password for the CDSM.</td>
<td>Editing User Settings, page 7-5</td>
</tr>
<tr>
<td>Interface setup</td>
<td>VVIM and Stream Manager</td>
<td>Configure the different interfaces on the VDS servers.</td>
<td>Configuring the Interfaces, page 4-123</td>
</tr>
<tr>
<td>Server setup</td>
<td>VVIM and Stream Manager</td>
<td>Configure the IP addresses and ports for the interfaces, as well as other settings such as quality of service (QoS).</td>
<td>Configuring the Servers, page 4-128</td>
</tr>
<tr>
<td>Route table</td>
<td>VVIM and Stream Manager</td>
<td>Route Table identifies destination subnetworks for cache, stream, and stream control interfaces. Route Table is optional.</td>
<td>Configuring the Recorder, page 4-135</td>
</tr>
<tr>
<td>Stream groups setup</td>
<td>Stream Manager</td>
<td>A Stream Group consists of one or more Streamers. Stream Groups relate to QAM gateways or destination subnetwork by the Stream Group preference.</td>
<td>Configuring Stream Groups, page 4-75</td>
</tr>
</tbody>
</table>
Table 3-3  VVI Split-Domain Configuration Workflow (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control and setup IPs</td>
<td>Stream Manager</td>
<td>Configure the Control server and Setup server IP address for the Stream Groups.</td>
<td>Configuring the Control and Setup IPs, page 4-88</td>
</tr>
<tr>
<td>Shared or distributed ISA settings</td>
<td>VVIM</td>
<td>Configure the ISA settings for the Vaults, and the settings that is shared with the Streamers.</td>
<td>Configuring Distributed/Shared ISA Settings, page 4-25</td>
</tr>
<tr>
<td>Cache Groups setup</td>
<td>VVIM</td>
<td>A Cache Group consists of one or more Caching Nodes.</td>
<td>Configuring Cache Groups, page 4-81</td>
</tr>
<tr>
<td>VHO setup</td>
<td>Stream Manager</td>
<td>Group Stream Groups into video hub offices (VHOs) that have the same ISA settings</td>
<td>Grouping Stream Groups into VHOs, page 4-70</td>
</tr>
<tr>
<td>VHO ISA settings</td>
<td>Stream Manager</td>
<td>Configure the ISA settings for each VHO.</td>
<td>Configuring VHO ISA Settings, page 4-71</td>
</tr>
<tr>
<td>Stream to cache mapping</td>
<td>Stream Manager</td>
<td>Cache Groups are mapped to Stream Groups and given a preference.</td>
<td>Mapping Stream Groups to Cache-Fill Sources, page 4-84</td>
</tr>
<tr>
<td>QAM gateways¹</td>
<td>Stream Manager</td>
<td>Configure the QAM Gateways for the VDS.</td>
<td>Configuring QAM Gateways, page 4-9</td>
</tr>
<tr>
<td>Headend setup¹</td>
<td>Stream Manager</td>
<td>Configure service groups for gigabit Ethernet streaming, ASI streaming, and Barker streams.</td>
<td>Configuring the Headend Setup, page 4-14</td>
</tr>
<tr>
<td>Ingest tuning</td>
<td>VVIM</td>
<td>Configure the trick-mode speeds for ingested content.</td>
<td>Configuring Ingest Tuning, page 4-33</td>
</tr>
</tbody>
</table>

1. If the Stream Destination feature is set to IPTV, the QAM Gateway page and Headend Setup page are replaced with the Stream Destination page. A setting of Mixed for Stream Destination displays all three pages. For more information, see the “Configuring Stream Destinations” section on page 4-22.

**Note**

Before configuring the VHO ISA Settings on the Stream Manager, resubmit the Shared ISA settings on the VVIM. If the CDSM or VVIM GUI pages are not updated with respect to the ISA settings, resubmit the Shared ISA Settings page on the VVIM and the VHO ISA Setup page on the Stream Manager.

The other configuration settings, Vault Groups, Master Vault Group, Vault Redundancy Map, Barker streams, parent/child service groups, DNS settings, and so on, can be configured in any order.

**Vault Virtualization Configuration Workflow**

The Vault Virtualization can be configured as follows:

- ISA Regionalization (with local Vaults in headend)
- Virtual Content Store (without local Vaults in headend)
- Shared Content Store (pre-Release 2.5.2 version of Virtual Content Store)

This section consists of the configuration workflow for the following:

- ISA Regionalization Configuration Workflow
- Virtual Content Store Configuration Workflow
**ISA Regionalization Configuration Workflow**

In addition to the configuration workflow for split-domain management, Table 3-4 lists the basic tasks, in the recommended order, for configuring ISA Regionalization with references to the associated sections in each chapter. For more information, see the “ISA Regionalization” section on page 2-13 and the “CDSM or VVIM Setup” section on page F-3.

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSM Setup</td>
<td>Stream Manager (CDSM) Configure each Stream Manager for ISA Regionalization.</td>
<td>Configuring ISA Regionalization, page F-11</td>
</tr>
<tr>
<td>VVIM Setup</td>
<td>VVIM Configure the VVIM for ISA Regionalization</td>
<td>Configuring ISA Regionalization, page F-11</td>
</tr>
<tr>
<td>Ingest Driver server</td>
<td>VVIM Configure the Ingest Driver server.</td>
<td>Configuring the Ingest Driver Server, page 4-39</td>
</tr>
<tr>
<td>VHO ISA Setup</td>
<td>Stream Manager Assign local Vault Groups, configure Vault redundancy, and assign the master Vault.</td>
<td>Configuring VHO ISA Settings,” page 4-71</td>
</tr>
</tbody>
</table>

**Note**

Trick-mode settings on the VVIM and Stream Managers must be the same. To configure trick-mode settings in the CDSM GUI, choose **Configure > System Level > Ingest Tuning**.

**Virtual Content Store Configuration Workflow**

In addition to the configuration workflow for split-domain management, Table 3-5 lists the basic tasks, in the recommended order, for configuring Virtual Content Store with references to the associated sections in each chapter. For more information, see the “Virtual Content Store” section on page 2-18 and the “CDSM or VVIM Setup” section on page F-3.

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSM Setup</td>
<td>Stream Manager (CDSM) Configure each Stream Manager for Virtual Content Store.</td>
<td>Configuring Virtual Content Store, page F-12</td>
</tr>
<tr>
<td>VVIM Setup</td>
<td>VVIM Configure the VVIM for Virtual Content Store.</td>
<td>Configuring Virtual Content Store, page F-12</td>
</tr>
<tr>
<td>Ingest Driver server</td>
<td>VVIM Configure the Ingest Driver server.</td>
<td>Configuring the Ingest Driver Server, page 4-39</td>
</tr>
</tbody>
</table>
Note: Trick-mode settings on the VVIM and Stream Managers must be the same. To configure trick-mode settings in the CDSM GUI, choose **Configure > System Level > Ingest Tuning**.

When Content Storage is set to **Distributed** and the VVI is set to centralized management (VVI & Stream Manager), the following configuration pages are affected:

- Configure > System Level > Distributed ISA Setup page
- Configure > Array Level > VHO ISA Settings page

Both the above pages require configuration.

### TV MediaX Configuration Workflow

Table 3-6 lists the basic tasks for configuring the TV MediaX Suite CDA with references to the associated sections in each chapter.

Note: TV MediaX is an optional feature and requires a software activation key to enable it. For more information, see the “Initializing the VDS and Activating the Optional Features” section on page 3-3.

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingest Driver client</td>
<td>Stream Manager (CDSM)</td>
<td>Configure the Ingest Driver client.</td>
<td>Configuring the Ingest Driver Client, page 4-94</td>
</tr>
<tr>
<td>VHO ISA Setup</td>
<td>Stream Manager</td>
<td>Configure the Virtual Content Store settings for the central Vault Group</td>
<td>“Configuring VHO ISA Settings,” page 4-71</td>
</tr>
</tbody>
</table>

**Table 3-6**  
**TV MediaX Configuration Workflow**

<table>
<thead>
<tr>
<th>Task</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the data feed import type used to populate the Media Scheduler, and the transformer type used to process the ADI metadata.</td>
<td>Configuring the Media Importer/Exporter, page 4-40</td>
</tr>
<tr>
<td>Map each channel to a multicast group IP address and port, and specify the settings for every program in the channel.</td>
<td>Configuring Input Channels, page 4-46</td>
</tr>
</tbody>
</table>
Table 3-6  TV MediaX Configuration Workflow (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upload an EPG file. During the upload process, the EPG file is</td>
<td>Uploading an EPG File, page 7-21</td>
</tr>
<tr>
<td>parsed into database records that in turn populates the Media</td>
<td></td>
</tr>
<tr>
<td>Scheduler.</td>
<td></td>
</tr>
<tr>
<td>Schedule the ingest of content.</td>
<td></td>
</tr>
<tr>
<td>The Media Scheduler does the following:</td>
<td></td>
</tr>
<tr>
<td>1. Values from the EPG file are combined with the values</td>
<td></td>
</tr>
<tr>
<td>from the Input Channels page, and the ADI metadata XML file is</td>
<td></td>
</tr>
<tr>
<td>created.</td>
<td></td>
</tr>
<tr>
<td>2. The database records are marked according to the Media</td>
<td></td>
</tr>
<tr>
<td>Scheduler settings (scheduled, unscheduled, marked for</td>
<td></td>
</tr>
<tr>
<td>scheduling, and so on).</td>
<td></td>
</tr>
<tr>
<td>3. The ADI metadata is published to the backoffice.</td>
<td></td>
</tr>
</tbody>
</table>

TV Playout Configuration Workflow

Table 3-7 lists the basic tasks for configuring the TV Playout CDA with references to the associated sections in each chapter.

TV Playout is an optional feature and is only displayed if the TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

Table 3-7  TV Playout Configuration Workflow

<table>
<thead>
<tr>
<th>Task</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specify the streaming mode (active-active or active-standby)</td>
<td>“Configuring the TV Playout Application” section on</td>
</tr>
<tr>
<td>for the Barker Stream/Playlist and Playout Scheduler.</td>
<td>page 7-18</td>
</tr>
<tr>
<td>Map each channel to a multicast group IP address and port, and</td>
<td>“Configuring Input Channels” section on page 4-46</td>
</tr>
<tr>
<td>specify the settings for every program in the channel.</td>
<td></td>
</tr>
<tr>
<td>Upload an TV Playout file. During the upload process, the file</td>
<td>Importing a TV Playout Schedule, page 7-20</td>
</tr>
<tr>
<td>is parsed into database records that in turn populates the TV</td>
<td></td>
</tr>
<tr>
<td>Playout Scheduler.</td>
<td></td>
</tr>
<tr>
<td>Add content annually.</td>
<td>Configuring Manual Ingests, page 4-105</td>
</tr>
<tr>
<td>Create playlists that will be scheduled and barker streams for</td>
<td>Configuring Barker Stream/Playlists, page 4-108</td>
</tr>
<tr>
<td>barker channels.</td>
<td></td>
</tr>
<tr>
<td>Schedule the content for playout.</td>
<td>“Configuring Playout Scheduler” section on page 4-112</td>
</tr>
</tbody>
</table>

The following CDSM pages are part of TV Playout CDA:
- Configure > System Level > Output Channels
- Configure > Array Level > Manual Ingest
- Configure > Array Level > Barker Stream/Playlist
- Configure > Array Level > Playout Scheduler
- Configure > Array Level > Playout Exporter
- Configure > Array Level > EPG Exporter
- Monitor > Array Level > Barker Monitor
- Monitor > Array Level > Playout Monitor
- Reports > System Level > Playout/Barker Reports (Only report available for TV Playout)
- Maintain > Users > User Default Settings
- Maintain > Services > Content Manager
- Maintain > Software > Application Configuration
- Maintain > Software > Playout Importer
- Maintain > Software > Playout Upgrade Status

### MVOD Configuration Overflow

Table 3-8 lists the basic tasks, in the recommended order, for configuring the MVOD with references to the associated sections in each chapter. For more information, see Chapter 2, “Network Design,” and the “CDSM or VVIM Setup” section on page F-3.

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change administrator password</td>
<td>VVIM</td>
<td>Change the administrator password for the CDSM.</td>
<td>Editing User Settings, page 7-5</td>
</tr>
<tr>
<td>CDSM or VVIM setup</td>
<td>VVIM</td>
<td>Configure the VVIM with ISA 3.x, media scheduler-on, transformer type-SA tribune.</td>
<td>CDSM or VVIM Setup, page F-3</td>
</tr>
<tr>
<td>AMS setup</td>
<td>VVIM</td>
<td>Configure the domain name, naming service IP and port.</td>
<td>Configuring External AMS Setup, page 4-6</td>
</tr>
<tr>
<td>Ingest manager</td>
<td>VVIM</td>
<td>Configure the ingest manager general settings, Ingest settings, Content store settings, and Encryption settings.</td>
<td>Configuring the Ingest Manager, page 4-29</td>
</tr>
<tr>
<td>MPEG tuning</td>
<td>VVIM</td>
<td>Configure ingest MPEG settings (MD5 checksum - enabled) and dual cas settings.</td>
<td>Configuring MPEG Tuning, page 4-36</td>
</tr>
<tr>
<td>Media importer</td>
<td>VVIM</td>
<td>Configure the Importer server settings.</td>
<td>Configuring the Media Importer/Exporter, page 4-40</td>
</tr>
<tr>
<td>Input channels</td>
<td>VVIM</td>
<td>Configure the Channels for recording.</td>
<td>Configuring Input Channels, page 4-46</td>
</tr>
<tr>
<td>Vault BMS</td>
<td>VVIM</td>
<td>Configure the Naming and notify service settings.</td>
<td>Configuring the Vault for BMS Connectivity, page 4-65</td>
</tr>
</tbody>
</table>
### Table 3-8 MVOD Configuration Workflow (continued)

<table>
<thead>
<tr>
<th>Task</th>
<th>Manager</th>
<th>Description</th>
<th>Where to Find More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault group</td>
<td>Vault</td>
<td>Assign local Vault Groups, configure Vault redundancy, and assign the master Vault.</td>
<td>Configuring Vault Groups, page 4-77</td>
</tr>
<tr>
<td>Server setup</td>
<td>Vault</td>
<td>Configure the IP addresses and ports for the interfaces, as well as other settings such as quality of service (QoS).</td>
<td>Configuring the Servers, page 4-128</td>
</tr>
<tr>
<td>NTP server</td>
<td>Vault</td>
<td>Configure NTP servers.</td>
<td>Configuring System Level NTP Services, page 4-3</td>
</tr>
</tbody>
</table>
Configuring the VDS

This chapter provides information on configuring the VDS servers.

- System Level Configuration, page 4-1
- Array Level Configuration, page 4-56
- Server Level Configuration, page 4-123
- Configuration Workflows, page 4-151

**Note**
If Virtual Video Infrastructure (VVI) with split-domain management is enabled, the CDSM pages associated with the Vaults and Caching Nodes display only on the VVI Manager (VVIM), and the CDSM pages associated with the Streamers display only on the Stream Manager. For more information, see the “Virtual Video Infrastructure” section on page F-10.

**System Level Configuration**

The System Level tab has the following configuration options:

- Configuring System Level DNS Services, page 4-2
- Configuring System Level NTP Services, page 4-3
- Configuring the Hosts Service, page 4-4
- Configuring the Array Name, page 4-4
- Configuring VOD Market Site(s), page 4-5
- Configuring External AMS Setup, page 4-6
- Configuring Content Distribution Rules, page 4-6
- Configuring Package Priority Rules, page 4-7
- Configuring QAM Gateways, page 4-9
- Configuring the Headend Setup, page 4-14
- Configuring Stream Destinations, page 4-22
- Configuring Parent/Child Service Groups, page 4-24
- Configuring Distributed/ Shared ISA Settings, page 4-25
- Configuring the Ingest Manager, page 4-29
System Level Configuration

Chapter 4  Configuring the VDS

- Configuring Ingest Tuning, page 4-33
- Configuring MPEG Tuning, page 4-36
- Configuring IP Nicknames, page 4-38
- Configuring the Ingest Driver Server, page 4-39
- Configuring the Media Importer/Exporter, page 4-40
- Configuring Call Signs, page 4-44
- Configuring Input Channels, page 4-46
- Configuring Output Channels, page 4-50
- Configuring the System Level Logging, page 4-51
- Configuring the System Level Syslog, page 4-52
- Configuring System Level Error Repair, page 4-53
- Configuring VBO Setup, page 4-54

**Note**
The System Level configuration settings are distributed to all arrays and servers in the VDS.

### Configuring System Level DNS Services

The System DNS page is used to up to 16 domain suffixes and 16 DNS servers.

To view the current DNS System Level settings, choose **Configure > System Level > System DNS**.

**Note**
If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure the DNS service settings, do the following:

**Step 1**  Choose **Configure > System Level > System DNS**. The System DNS page is displayed.

**Step 2**  Enter the DNS system level settings as appropriate. See **Table 4-1** for descriptions of the fields.
### Table 4-1 DNS Service Field

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Domain Suffix</td>
<td>Specify, if applicable, the internal domain that is used to fully qualify an unqualified hostname. For example, if you are using OpenStream as the BMS, specify a subdomain consistent with what OpenStream is using, for example, bms.n2bb.com. Accordingly, unqualified hostnames used in CORBA transactions, such as contentstore, resolve correctly to contentstore.bms.n2bb.com.</td>
</tr>
<tr>
<td>New DNS Server</td>
<td>IP address of the DNS server.</td>
</tr>
</tbody>
</table>

#### Step 3
Click **Submit**.
To clear the fields and start over, click **Reset**.

To delete the DNS settings, check the **Delete** check box and click **Delete Entry**.

### Configuring System Level NTP Services

The System NTP Server page is used to configure up to 16 NTP servers. The clocks on all VDS servers (Vault, Streamer, and Caching Node) and the CDSM and VVIM in a VDS must be synchronized in order to retrieve the statistics on to the CDSM and VVIM.

**Note**
If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To view the current NTP System Level settings, choose **Configure > System Level > System NTP Server**.
To configure the NTP service settings, do the following:

#### Step 1
Choose **Configure > System Level > System NTP Server**. The System NTP Server page is displayed.

#### Step 2
In the **New NTP Server** field, enter the IP address of the NTP server.

#### Step 3
Click **Submit**.
To clear the fields and start over, click **Reset**.

To delete the NTP settings, check the **Delete** check box and click **Delete Entry**.

For information on setting the time zone on a VDS server or configuring NTP on a CDSM or VVIM, see “Other NTP Configurations” section on page 4-145.
Configuring the Hosts Service

The Host Service page offers the option to enter a hostname and associated IP address as an alternative or backup to the DNS service. The system searches the host service table before searching the DNS services. The host service settings are considered an alternative or backup to the DNS service.

**Note**

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files."

To view the current host service settings, choose Configure > System Level > Host Service. The hostnames currently configured are listed at the bottom of the page.

To configure the host service settings, do the following:

**Step 1** Choose Configure > System Level > Host Service. The Host Service page is displayed.

**Step 2** Enter the host service settings as appropriate. See Table 4-2 for descriptions of the fields.

**Table 4-2 Host Service Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostname</td>
<td>Hostname of no more than 64 characters. Assigning hostnames is optional. The hostname does not have to be a fully-qualified domain name.</td>
</tr>
<tr>
<td>Host IP Address</td>
<td>IP address associated with the hostname.</td>
</tr>
</tbody>
</table>

**Step 3** Click Submit. The new entry is added to the host table located at the bottom of the page.

To clear the fields and start over, click Reset.

**Step 4** To add more hostnames to the host table, repeat Step 2 and Step 3.

To delete a host table entry, check the Delete check box associated with the entry and click Delete. To clear the Delete check boxes, click Reset.

Configuring the Array Name

The Array Name page is used to define Vault arrays, Streamer arrays, or ISV arrays. For more information about arrays, see the “Content Delivery System Architecture” section on page 1-16.

**Note**

Currently, the CDSM allows only for the creation of one Vault array.
Note

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To view the current Array Name listings, choose Configure > System Level > Array Name. The array names currently configured are listed.

To configure an array name setting, do the following:

1. Choose Configure > System Level > Array Name. The Array Name page is displayed.
2. Enter the array name used to identify the group of servers. To reset the field, click Reset.
3. Click Submit.

Configuring VOD Market Site(s)

The VOD Market Site page is used to enter a new or edit the existing VOD Market Site.

To register a new VOD Market site, do the following:

1. Choose Configure > System Level > VOD Market Site. The VOD Market Site page is displayed.
2. Enter the VOD Market settings as appropriate. See Table 4-4 for descriptions of the fields.
3. Click Submit. To reset the fields, click Reset. The list of configured VOD Market Site(s) in the system are listed on the same page.
4. To set a VOD Market Site to maintenance mode or delete a configured VOD Market Site, select the corresponding check box and click Submit.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain Name</td>
<td>Unique identifier for VOD Market site</td>
</tr>
<tr>
<td>Naming Service IP</td>
<td>IP address of the CORBA Naming Service used by the VOD Market Site</td>
</tr>
<tr>
<td>Naming Service Port</td>
<td>Port Number of the CORBA Naming Service used by the VOD Market Site</td>
</tr>
<tr>
<td>Division Name</td>
<td>Name of the division to which the VOD Market site belongs to.</td>
</tr>
<tr>
<td>Note</td>
<td>This field is applicable only for ATIS deployment.</td>
</tr>
</tbody>
</table>
Note When a VOD market site is in maintenance mode, all package publishing activities are paused and the packages to be published are queued. The queued packages are then published to the market site when the market is put into operational mode.

Note If a VOD Market already exists in the system, information submitted here will overwrite the existing entry.

**Configuring External AMS Setup**

The AMS Setup page is used to enter a new or edit the existing AMS Setup.

*Note* AMS Setup page is available only for MVOD deployment.

To register a new AMS Setup, do the following:

**Step 1** Choose **Configure > System Level > AMS Setup**. The AMS Setup page is displayed.

**Step 2** Enter the AMS settings as appropriate. See Table 4-4 for descriptions of the fields.

**Step 3** Click **Submit**. To reset the fields, click **Reset**. To remove a configured AMS Setup, select the check box next to the item(s) to be removed and click **Delete**.

*Note* If an AMS already exists in the system, information submitted here will overwrite the existing entry.

**Configuring Content Distribution Rules**

*Note* Configuring Content Distribution Rules option is listed on the Configure System Level left-panel menu only for the ATIS C2 server deployment.

The Content Distribution Rules page is used to define a set of publishing rules to publish the packages to the corresponding VOD market site(s).

To add a new content distribution rule, do the following
Chapter 4      Configuring the VDS

System Level Configuration

Step 1  Choose Configure > System Level > Content Distribution Rules. The Content Distribution Rules page is displayed.

Step 2  Enter the content distribution rule as appropriate. See Table 4-5 for description of the fields.

Table 4-5  Content Distribution Rule Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider</td>
<td>Name of the content provider.</td>
</tr>
<tr>
<td>Product</td>
<td>Name of the product of the content provider.</td>
</tr>
<tr>
<td>Market/Division</td>
<td>From the drop-down list, choose the market site to publish the package.</td>
</tr>
<tr>
<td></td>
<td>Choose ALL to publish the package to all market sites.</td>
</tr>
<tr>
<td></td>
<td>Note If a division name is chosen the content distribution rule is applied to all markets of that division.</td>
</tr>
<tr>
<td>Protocol</td>
<td>From the drop-down list, choose the distribution protocol to be used to publish the package to the market site.</td>
</tr>
<tr>
<td>Exclude</td>
<td>From the drop-down list, choose the market site to be excluded from package publishing. This criterion is applicable only when Market/Division is set to ALL</td>
</tr>
<tr>
<td></td>
<td>Note If a division name is chosen then all market sites in that division are excluded from package publishing.</td>
</tr>
</tbody>
</table>

Step 3  Click Submit. To reset the fields, click Reset. The configured content distribution rules in the system are listed on the same page. To edit a content distribution rule, modify the fields accordingly. To delete content distribution rules, select the check box next to the item(s) to be deleted and click Delete.

Note  Duplicate content distribution rules are not permitted in the system.

Configuring Package Priority Rules

Note  Configuring Package Priority Rules option is listed on the Configure System Level left-panel menu only for the ATIS C2 server deployment.

The Package Priority Rules page is used to define a set of priority rules for package publishing in case there is a backlog of packages to be published to the corresponding VOD market site(s).

To add a package priority rule, do the following

Step 1  Choose Configure > System Level > Package Priority Rules. The Package Priority Rules page is displayed.
Step 2 | Enter the package priority rule as appropriate, See Table 4-6 for description of the fields

Table 4-6 | Package Priority Rule Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset ID</td>
<td>A string containing the identifying name of the asset. An Asset_ID shall uniquely identify an asset within a provider’s namespace defined by the Provider_ID attribute. All Asset_IDS will have a fixed length of 20, with the first 4 characters alpha and the last 16 characters numeric.</td>
</tr>
<tr>
<td>Title</td>
<td>A string containing the identifying name of the title.</td>
</tr>
<tr>
<td>Provider ID</td>
<td>Name of the content provider.</td>
</tr>
<tr>
<td>Product</td>
<td>Name of the product of the content provider.</td>
</tr>
<tr>
<td>2 Day Window</td>
<td>Choose YES if a priority is to be assigned to a package with license window start less than two days from the current date otherwise choose NO.</td>
</tr>
<tr>
<td>Rule Expiration</td>
<td>Choose the duration for package rule expiration.</td>
</tr>
</tbody>
</table>

Step 3 | Click Submit. To reset the fields, click Reset. The configured package priority rules in the system are listed on the same page. To edit a package priority rule, modify the fields accordingly. To delete package priority rules, select the check box next to the item(s) to be deleted and click Delete.

Note | Duplicate package priority rules are not permitted in the system.

Calculating the Package Priority

A package with a matching Asset ID in package priority rule is always given the highest priority. For fields such as Title, Provider ID, Product and 2 Day Window a priority weight is assigned for each field based on which the package priority is calculated. Initially the overall default priority value is set at 250. The algorithm for calculating the package priority is depicted in the flowchart below.

There are 3 different priorities assigned to packages associated with publishing to markets.

- Priority value – 0 (HIGH)
- Priority value – 100 (MEDIUM)
- Priority value – 250 (LOW)

The default priority is MEDIUM. Any package with the highest priority is published first irrespective of when the package was queued up. Packages with the same priority are published based on first in first out policy.
Chapter 4 Configuring the VDS

System Level Configuration

Configuring QAM Gateways

The QAM Gateway page is used to define associations between the Streamers and QAM gateways and to define the QAM gateway type when using the Asynchronous Serial Interface (ASI) streaming mode.

Note

The QAM Gateway page is not available if the Stream Destination is set to IPTV. For more information, see the “Stream Destination” section on page F-4.

A QAM gateway is a device that sits between a Streamer and a QAM modulator. Depending on the streaming mode and design of your network, a QAM gateway is a Layer 3 routing device, gigabit Quadrature Amplitude Modulation (GQAM), Harmonic Narrowcast Services Gateway (NSG), Path1, or a similar device. If you are using gigabit Ethernet as the streaming mode, the QAM gateway and the QAM modulator are the same device—a GQAM.

Stream Steering

Stream steering determines which Streamers serve streams to a QAM device. There are two types of stream steering:

- Single site
- Multi-site

Single-site steering uses only one Stream Group to serve streams to a QAM device. Multi-site steering can use more than one Stream Group to serve streams to a QAM device.
Single-site steering assumes all Streamers in a Stream Group are located at the same geographical location.

Multi-site steering is available for ASI streaming and gigabit Ethernet streaming. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 for information about configuring the streaming mode.

The Stream Group preference options in the QAM Gateway page differ based on the steering used in your deployment.

With single-site steering, you are given the option to set a Stream Group to **High** or **None**. Only one Stream Group can be set to **High**, all others are set to **None**. In a VDS network with single-site steering, if one Streamer in the Stream Group that is serving streams to a QAM device fails, another Streamer in the same group takes over.

With multi-site steering, there are four Stream Group preferences: high, medium, low, and none. In a VDS network with multi-site steering, if one Streamer in the Stream Group with a preference of **High** fails, the scenario is the same as single-site steering; another Streamer in the Stream Group takes over. If network connectivity is lost to the entire Stream Group with **High** preference, the Stream Group with equal or next highest preference takes over.

The Address Resolution Protocol (ARP) is the method for finding a host MAC address when only its IP address is known. The QAM Gateway page allows you to specify the MAC address of an IP gateway. There are three reasons you may want to do this:

1. To statically configure the MAC address of an IP gateway.
2. ARP is disabled on the QAM gateway.
3. To statically configure all devices on the network to have all packets go to a specific IP gateway.

For single-site steering, the QAM Gateway page allows you to specify the MAC address of the IP gateway when you enter the IP address of the QAM gateway. All streams from the Stream Group with a high preference are routed to the IP gateway specified.

For multi-site steering, the QAM Gateway page allows you to specify the MAC address of the IP gateway for the QAM gateway, as well as for each Stream Group and for each Streamer in a Stream Group.

We recommend you leave all QAM MAC settings blank and allow ARP to determine the MAC address of the next Layer 3 device connected to the Streamer. To specify the next Layer 3 device, see the “Configuring the Recorder” section on page 4-135.

Figure 4-1 shows a possible network design using multi-site steering with three Streamers, two gateway devices, and three QAM devices. In this example, all QAM gateways communicate with all Streamers. Because Streamer 3 is connected to the QAM gateway by way of a different router or switch, it was placed under a different Stream Group. For more information about Stream Groups, see the “Configuring Stream Groups” section on page 4-75.

The Streamers in “Stream Group 1” have the highest preference for streaming to the three QAM devices. Streamer 3 (Stream Group 2) has a medium preference. The Stream Groups and preference levels are configurable and are typically based on the destination IP address and the topology of the network.
To configure the example shown in Figure 4-1, you would enter the information listed in Table 4-7.

**Table 4-7 QAM Gateway Configuration Example**

<table>
<thead>
<tr>
<th>QAM IP Address</th>
<th>QAM MAC Address</th>
<th>QAM Type</th>
<th>Stream Group</th>
<th>Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.31.253.32</td>
<td>MAC Addr1(^1)</td>
<td>GQAM</td>
<td>Stream Group 1</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>MAC Addr2(^1)</td>
<td>GQAM</td>
<td>Stream Group 2</td>
<td>Medium</td>
</tr>
<tr>
<td>172.31.253.128</td>
<td>MAC Addr1(^1)</td>
<td>GQAM</td>
<td>Stream Group 1</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>MAC Addr2(^1)</td>
<td>GQAM</td>
<td>Stream Group 2</td>
<td>Medium</td>
</tr>
<tr>
<td>172.31.253.192</td>
<td>MAC Addr1(^1)</td>
<td>GQAM</td>
<td>Stream Group 1</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>MAC Addr2(^1)</td>
<td>GQAM</td>
<td>Stream Group 2</td>
<td>Medium</td>
</tr>
</tbody>
</table>

1. This setting is optional and it is recommended that you leave it blank.
2. Used in ASI streaming only.

In ASI streaming, the Streamers perform the session and resource bandwidth management. In gigabit Ethernet streaming, the Session and Resource Manager (SRM) performs the bandwidth management.

An exception is when ASI streaming mode is configured (see the “Configuring the Streamer for BMS Connectivity” section on page 4-59) and a GQAM Shared is specified as the QAM gateway. In this case the SRM controls the bandwidth management for the GQAM Shared, while the Streamers control the bandwidth for all other QAM types.

To view the current configuration for a QAM gateway, choose **Configure > System Level > QAM Gateway**, choose the QAM IP address from the drop-down list, and click **Next**.

You must first configure the Streaming mode and Stream Groups before you can configure the QAM Gateway page. For more information, see the “Configuring the Streamer for BMS Connectivity” section on page 4-59 and the “Configuring Stream Groups” section on page 4-75.
To configure a QAM gateway, do the following:

**Step 1**  
Choose **Configure > System Level > QAM Gateway**. The QAM Gateway page is displayed (Figure 4-2).

**Note**  
If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2**  
From the drop-down list, choose **enter new** and click **Next**.

**Figure 4-2  QAM Gateway Page with ASI Streaming for Multi-Site**

**Step 3**  
Enter the QAM gateway settings as appropriate. See Table 4-8 for descriptions of the fields.
Step 4  
Click **Submit**. To reset the fields, click **Reset**.

Step 5  
If the Content Storage feature is not enabled, you must reload the service groups.  

a. Choose **Maintain > Services**. The Services Restart page is displayed.  
b. From the drop-down list, choose the IP address or nickname of the server and click **Display**.  
c. Check the **Reload Service Groups** check box and click **Submit**. To clear the fields and start over, click **Reset**.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QAM IP</td>
<td>IP address of the QAM gateway.</td>
</tr>
<tr>
<td>QAM MAC</td>
<td>MAC address of the next Layer 3 device connected to the Streamer in the path to the QAM device. The MAC address can be entered with or without the colon separators. The MAC address is used to determine the MAC address of the next Layer 3 device. To specify the next Layer 3 device, see the “Configuring the Recorder” section on page 4-135.</td>
</tr>
</tbody>
</table>

**Note**  
Any changes (this includes adding, deleting, or editing) to the QAM gateway require a reload of the service groups. See **Step 5**. For more information, see the “Restarting the Services” section on page 7-16. If the Content Storage feature is enabled, you do not need to reload service groups.

To edit a QAM gateway, choose the QAM IP address and click **Next**. Enter the new settings and click **Submit**.
To delete a QAM gateway, choose the QAM IP address, click **Next**, and then click **Delete QAM**.

### Configuring the Headend Setup

The Headend Setup page is used to configure service groups for gigabit Ethernet streaming, Service groups and transport stream mapping for ASI streaming, and fake service groups for Barker streams.

**Note**

The Headend Setup page is not available if the Stream Destination is set to IPTV. For more information, see the “Stream Destination” section on page F-4.

The Headend Setup page differs depending on the streaming mode configured.

**Note**

The Streaming Mode is set at the Array Level on the Streamer ISA page. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59.

**Note**

You must first add the QAM gateway through the QAM Gateway page before you can configure the headend setup for a specific QAM device. See the “Configuring QAM Gateways” section on page 4-9.

This section covers configuration for:

- Service Groups for Barker Streams
- Gigabit Ethernet Streaming
- ASI Streaming

### Service Groups for Barker Streams

**Note**

The Barker Stream feature is optional and is listed only on the Array Level left-panel menu if it is included in your deployment.

One way to broadcast Barker streams is to configure a fake service group on the broadcasting QAM device. **Figure 4-3** shows an example of a fake service group.

**Figure 4-3**  
**Fake Service Group Example**
To configure a fake service group for a barker stream, do the following:

**Step 1** Configure the broadcast QAM on the QAM Gateway page. See the “Configuring QAM Gateways” section on page 4-9.

**Step 2** Configure the fake service group, and input transport stream ID (TSID in) and output transport stream ID (TSID out) as appropriate for the barker stream broadcast.

**Caution** The service group, TSID In, and TSID Out for barker stream broadcasting should not be known to the Digital Network Control System (DNCS).

**Step 3** Configure the barker stream using the fake service group you just configured. See the “Configuring Barker Stream/Playlists” section on page 4-108.

**Note** Any changes (this includes additions, deletions, or modifications) to the headend setup require a reload of the service groups. See the “Restarting the Services” section on page 7-16 for more information. If the Content Storage feature is enabled, you do not need to reload the service groups.

---

### Gigabit Ethernet Streaming

To configure the headend setup for gigabit Ethernet streaming, do the following:

**Step 1** Choose Configure > System Level > Headend Setup. The Headend Setup page is displayed.

**Note** If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2** Enter the service group number in the Service Group Number field. After the number has been submitted, the new service group is added to the Remove Existing Service Group list.

**Step 3** From the Stream Group drop-down list, choose the stream group that will stream to this service group. For more information on creating Stream Groups, see the “Configuring Stream Groups” section on page 4-75.

**Step 4** Click Submit.

**Step 5** If the Content Storage feature is not enabled, you must reload the service groups.

a. Choose Maintain > Services. The Services Restart page is displayed.

b. From the drop-down list, choose the IP address or nickname of the server and click Display.
c. Check the **Reload Service Groups** check box and click **Submit**.

To clear the fields and start over, click **Reset**.

---

**Note**

Any changes (this includes additions, deletions, or modifications) to the headend setup require a reload of the service groups. See the “**Restarting the Services**” section on page 7-16 for more information. If the Content Storage feature is enabled, you do not need to reload service groups.

---

You can view the list of configured service groups from the **Select Service Group** drop-down list in the Remove Existing Service Group section of the page.

To delete a service group, choose it from the **Select Service Group** drop-down list and click **Delete**.

---

**ASI Streaming**

To begin configuring the headend setup for ASI streaming, choose the IP address and associated QAM type. If the IP address is not listed, then you have not added the device in the QAM Gateway page. See the “**Configuring QAM Gateways**” section on page 4-9 for more information.

---

**Note**

If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “**Bulk Import/Export Configuration**” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

If there are many QAM devices (for example, 100), the import may take a few minutes. This is because the TSID Ins and the TSID Outs must be checked against all the QAM TSID Ins and TSID Outs to ensure uniqueness.

---

Figure 4-4 shows the QAM IP drop-down list expanded.

---

**Figure 4-4**  **Headend Setup Page**
The headend setup settings differ depending on which QAM device type you choose. The ASI streaming QAM devices supported are:

- NSG—Harmonic Narrowcast Services Gateway 8104, 8204, and 9000
- Path1—IP Video Networks Path 1 ASI/IP Gateway
- Prisma IP—Scientific Atlanta Prisma IP GigE to ASI Gateway (The Prisma IP device has three possible UDP port numbering configuration selections: sequential, even, and odd.)
- GQAM—All gigabit QAM devices that use the SSP 2.1 protocol
- GQAM Shared—All gigabit QAM devices that use the SSP 2.3 protocol
- SA xDQA—Scientific Atlanta eXtra Dense QAM Array
- MOTO Sem8—Motorola SmartStream Encryptor Modulator with 8 ASI interfaces
- MOTO Sem12—Motorola SmartStream Encryptor Modulator with 12 ASI interfaces
- GigE Gen—Generic GQAM device that supports up to 24 service groups and RF ports

Note
For the GQAM, we recommend you use the GQAM Shared for VOD networks that support other services (for example, digital video broadcast).

NSG-8204, Prisma, or Path1 Headend Setup

To configure a Narrowcast Services Gateway (NSG), a Prisma IP, or a Path1 for ASI streaming, do the following:

Step 1  After selecting the IP address and associated QAM type (Figure 4-4), enter the headend setup settings for each ASI port as appropriate. See Table 4-9 for descriptions of the fields. Figure 4-5 shows the Headend Setup page for an NSG.
Figure 4-5 Headend Setup for NSG

Note

You can use the **Tab** key to cycle through the fields. The tab order steps through all the fields in the column on the left before moving on to the next column.

**Table 4-9 NSG, Prisma, Path1 Headend Setup Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSID in</td>
<td>Input transport stream ID (TSID in) is the identifier of a transport stream on the QAM gateway that sends streams to the QAM device.</td>
</tr>
<tr>
<td>link (TSID in)</td>
<td>Enable or disable the link to the associated TSID in, TSID outs, and service groups.</td>
</tr>
<tr>
<td>TSID out</td>
<td>Output transport stream ID (TSID out) is the identifier of a downstream transport stream port on the QAM device that supplies streams to the specified service group.</td>
</tr>
<tr>
<td>link (TSID out)</td>
<td>Enable or disable the link to the associated TSID out and service group.</td>
</tr>
<tr>
<td>svc. group</td>
<td>Service group that maps to the specified TSID out on this QAM device.</td>
</tr>
</tbody>
</table>

**Step 2** Check the information you entered, correct any errors, and click **Submit**. The new entry is added.
To reset the fields, click **Reset**.
Step 3  If the Content Storage feature is not enabled, you must reload the service groups.
   a. Choose Maintain > Services. The Services Restart page is displayed.
   b. From the drop-down list, choose the IP address or nickname of the server and click Display.
   c. Check the Reload Service Groups check box and click Submit.
      To clear the fields and start over, click Reset.

Note  Any changes (this includes additions, deletions, or modifications) to the headend setup require a reload of the service groups. See the “Restarting the Services” section on page 7-16 for more information. If the Content Storage feature is enabled, you do not need to reload service groups.

To view the settings, choose the IP address and associated QAM type.
To edit the settings, choose the IP address and associated QAM type, enter the new settings, and click Submit.
To delete the headend setup for a specific QAM, choose the IP address and associated QAM type and click Delete.

GQAM Headend Setup

To configure a gigabit Quadrature Amplitude Modulation (GQAM) device for ASI streaming, do the following:

Step 1  After selecting the IP address and associated QAM type (Figure 4-4), enter the GQAM port number in the GQAM port number field. The GQAM port is the UDP port number the QAM device uses to receive streams. Figure 4-6 shows the Headend Setup page for a GQAM with ASI streaming.
Step 2 Enter the settings as appropriate. See Table 4-10 for descriptions of the fields.

Note You can use the Tab key to cycle through the fields. The tab order starts with the RF service group, and then cycles through the TSIDs for that RF.

Table 4-10 GQAM Headend Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSID out</td>
<td>Output transport stream ID (TSID out) is the identifier of a downstream transport stream port on the GQAM device that supplies streams to the specified service group.</td>
</tr>
<tr>
<td>link (TSID out)</td>
<td>Enable or disable the link to the associated TSID out and service group.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Service group that maps to the specified TSID out on this GQAM device.</td>
</tr>
</tbody>
</table>

Step 3 Check the information you entered, correct any errors, and click Submit. The new entry is added. To reset the fields, click Reset.
Step 4
If the Content Storage feature is not enabled, you must reload the service groups.

a. Choose **Maintain > Services**. The Services Restart page is displayed.

b. From the drop-down list, choose the IP address or nickname of the server and click **Display**.

c. Check the **Reload Service Groups** check box and click **Submit**.

To clear the fields and start over, click **Reset**.

**Note**
Any changes (this includes additions, deletions, or modifications) to the headend setup require a reload of the service groups. See the “**Restarting the Services**” section on page 7-16 for more information. If the Content Storage feature is enabled, you do not need to reload service groups.

To view the settings, choose the IP address and associated QAM type.

To edit the settings, choose the IP address and associated QAM type, enter the new settings, and click **Submit**.

To delete the headend setup for a specific QAM, choose the IP address and associated QAM type and click **Delete**.

**Headend Setup for All Other ASI QAM Types**

To configure a GQAM Shared, NSG-8108, NSG-9000, SA xDQA, MOTO Sem8, MOTO Sem12, or GigE Gen device for ASI streaming, do the following:

Step 1
After selecting the IP address and associated GQAM Shared (Figure 4-4), enter the headend setup settings as appropriate. See Table 4-11 for descriptions of the fields. Figure 4-7 shows the Headend Setup page for a GQAM Shared.

**Figure 4-7  **Headend Setup—GQAM Shared with ASI Streaming Mode
You can use the Tab key to cycle through the fields.

Table 4-11  GQAM Shared Headend Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>link</td>
<td>Enable or disable the link to the associated service group.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Service group that maps to the specified RF port on this GQAM device.</td>
</tr>
<tr>
<td>Note</td>
<td>The GigE Gen QAM type supports up to 24 service groups and RF ports.</td>
</tr>
</tbody>
</table>

Step 2  Check the information you entered, correct any errors, and click Submit. The new entry is added. To reset the fields, click Reset.

Step 3  If the Content Storage feature is not enabled, you must reload Service Groups.
   a. Choose Maintain > Services. The Services Restart page is displayed.
   b. From the drop-down list, choose the IP address or nickname of the server and click Display.
   c. Check the Reload Service Groups check box and click Submit.
      To clear the fields and start over, click Reset.

Note  Any changes (this includes additions, deletions, or modifications) to the headend setup require a reload of the service groups. See the “Restarting the Services” section on page 7-16 for more information. If the Content Storage feature is enabled, you do not need to reload service groups.

To view the settings, choose the IP address and associated QAM type.
To edit the settings, choose the IP address and associated QAM type, enter the new settings, and click Submit.
To delete the headend setup for a specific QAM, choose the IP address and associated QAM type and click Delete.

Configuring Stream Destinations

The Stream Destination page provides a way to associate subnetworks with Stream Groups. The Stream Destination page is an alternative to the QAM Gateway page and Headend Setup page where you associate a Stream Group with a specific QAM device and any applicable service groups. Mapping Stream Groups to specified subnets is appropriate for IPTV networks, where each end-user device has its own IP address.

Note  The Stream Destination page is not available if the Stream Destination is set to Cable. The Stream Destination feature is available only for single-site steering and in ISA environments that use gigabit Ethernet streaming as the streaming mode. For more information, see the “Stream Destination” section on page F-4.
To configure the Stream Destination, do the following:

**Step 1** Choose **Configure > System Level > Stream Destination**. The Stream Destination page is displayed (Figure 4-8).

*Note* If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

To delete the configurations defined in the Bulk Import/Export Configuration XML file, click **Browse** to locate the file, select **Delete** for the **Action on Import**, then **Import**. All the subnets defined in the Bulk Import/Export Configuration XML file are deleted and the status is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2** From the **Subnet** drop-down list, choose **enter new**.

To edit a subnet, choose the subnet from the **Subnet** drop-down list.

**Figure 4-8 Stream Destination Page**

**Step 3** Enter the subnet address and subnet mask and click **Submit**.

*Note* If network address translation (NAT) is used for the set-tops, be sure the IP subnet reflects the public, routeable IP address for the NAT device, not the internal private IP address of the set-top.

**Step 4** Choose the preference for each Stream Group. The preferences are:
Configuring Parent/Child Service Groups

The Parent/Child Service Groups page allows for finer granularity of the service groups created in the Headend Setup page when ASI streaming is configured. Each service group defined in the Headend Setup page, the parent service group, is associated with a QAM device. Each child service group is associated with a parent service group.

**Note** The Parent/Child Service Group page is displayed only if the Parent/Child feature is enabled. For more information, see the “Parent/Child Service Groups” section on page F-5.

For switched digital video (SDV), the parent service group is associated with the Streamer, while the child service group is a subset of subscribers that have set-top boxes with switched digital broadcast (SDB) capability. The set-top sends the child service group in the session setup request.

In ASI (SSP 2.1 QAM devices), there is no specific QAM device assigned to the child service groups. The Stream Service borrows the QAM resources from the parent service group for the child service group during the session setup.

The set-tops without SDV tune to the parent service group and send the parent service group in the session setup request.

**Note** If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”
To configure parent/child service groups, do the following:

**Step 1** Choose Configure > System Level > Parent/Child Service Groups. The Parent/Child Service Group page is displayed.

**Step 2** From the Select Parent Service Group drop-down list, choose a parent service group. The Parent/Child Service Group page refreshes (Figure 4-9).

**Step 3** Enter each child service group.

**Step 4** Click Submit.

To clear the fields and start over, click Reset.

---

### Configuring Distributed/ Shared ISA Settings

The Distributed/Shared ISA Setup page is used to configure the ISA settings for the Vaults in the VVI. The ISA settings are replicated to each video hub office (VHO) in the VVI.

**Note** The Distributed/Shared ISA Setup page is available only on the VVIM when VVI and Content Storage are enabled in an ISA environment. For more information, see the “Content Storage” section on page F-12 and the “Virtual Video Infrastructure” section on page F-10.

**Note** If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.
For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure, edit, or view the shared or distributed ISA settings for the Vaults, do the following:

**Step 1** Choose **Configure > System Level > Shared ISA Setup**. The Shared ISA Setup page is displayed (Figure 4-10).

**Note** If Distributed is selected for the Content Storage feature, the menu option is called Distributed ISA Setup and the page is called the Distributed ISA Setup page.
Step 2  Enter the shared ISA settings as appropriate. See Table 4-12 for descriptions of the fields.

Table 4-12  Shared ISA Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ISA OpenStream Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Vault Master IP</td>
<td>This field defines the master IP address of the Content Service, which is the same for all Vaults in an array, and is used in the creation of the Interoperable Object References (IORs) for content objects. The Vault designated as the master Content Service (determined by a negotiating algorithm) sends multicast heartbeat messages every second to the other Vaults in the array. If the heartbeat message has not been received for more than five seconds, another Vault in the array takes over as master Content Service.</td>
</tr>
</tbody>
</table>
Table 4-12  Shared ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vault Master Port</td>
<td>Port used by the master Content Service for controlling content. The Content Service Master Port is the same for all Vaults in the array. The default is 3200.</td>
</tr>
<tr>
<td>Web Service Port</td>
<td>Port number used by web service processes listening on this server. The default is 8080.</td>
</tr>
<tr>
<td>Streaming Mode</td>
<td>Choose between ASI and GigE</td>
</tr>
<tr>
<td>MSA Support</td>
<td>Enabling Managed Services Architecture (MSA) routes successful events to the ISA event channels and error events to either the Event Posting Agent (EPA) or the Event Log Agent (ELA). Events consist of three basic groups: subsystem-component state, faults, and measurement points. State and faults allow a monitoring tool to verify the current health of the system, while measurement points allow a monitoring tool to view the transactional state of the system and determine how it is performing.</td>
</tr>
<tr>
<td>Pre-Encryption Support</td>
<td>Enable or disable Motorola pre-encryption support. Pre-encryption is disabled by default. Pre-Encryption Support must be enabled for Dual CAS. For more information, see the “Configuring MPEG Tuning” section on page 4-36.</td>
</tr>
<tr>
<td>TME/SCE</td>
<td>From the TME/SCE drop-down list, select Enable for MystroMDN for Stream Control Events (SCE) or Enable for OpenStream for Trick-Mode Events (TME). Enabling TME requires that the stream service and LSCP or RTSP service deliver more CORBA events to the Stream Event Channel. These extra events are triggered during the transitions from one content to another in the playlist of the stream. The CORBA event for stream destroy also carries the history of all transitions of the stream. Enabling SCE allows real-time splicing of MPEG-2 transport streams for digital program insertion (including advertisement insertion) in live content as well as content recorded for the purpose of enabling time-shifted on-demand services. Pre-roll, post-roll, and mid-roll placements of digital program insertion is supported. The Vault detects the SCTE-35 cues and processes them at the time of ingest. The StreamExtChannel event channel on the CORBA NotificationService is used to send ContentSignalingEvents that contain the SCTE-35 cue information to the backoffice. Note The SCTE-35 cue message cannot be greater than 400 bytes. Note The configuration change of the TME/SCE setting requires that the ISA service is restarted on both the VVIM and the Stream Manager (or the legacy VDS). To restart the ISA service, choose Maintain &gt; Services, select the check box for ISA, and click Submit.</td>
</tr>
<tr>
<td>Config File Name</td>
<td>Name of the file that stores the ISA configuration settings. The default is isa.cfg.</td>
</tr>
<tr>
<td>FTP Out Port</td>
<td>Port number used by the ISA 1.5 FTP Out feature.</td>
</tr>
</tbody>
</table>

Content Store Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Store Name</td>
<td>Name of the VDS Content Store object that is registered with the OpenStream system.</td>
</tr>
<tr>
<td>Content Store Kind</td>
<td>Content store ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Content Factory ID</td>
<td>Name of the VDS Content Store Factory that is registered with the OpenStream system. The Content Store Factory allows the creation of Content Store objects, and the Content Store objects act as factories for Content objects.</td>
</tr>
<tr>
<td>Content Factory Kind</td>
<td>Content store factory ID extension. The default is Factory.</td>
</tr>
</tbody>
</table>
Table 4-12  Shared ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content No. of Threads</td>
<td>Content store number of threads. The default is 32, which is also the recommended setting.</td>
</tr>
<tr>
<td>FTP Server Port</td>
<td>Port used when the Vault receives a request from the OpenStream system to act as an FTP server and receives an FTP PUT command from the content provider acting as an FTP client. The default is port 4000. This is a control connection (data transfer process) and is known as an FTP pull process.</td>
</tr>
</tbody>
</table>

**CORBA Event Channels**

<table>
<thead>
<tr>
<th>Event Channel ID</th>
<th>Simple name that identifies the root directory of the Event Channel where all event channels need to register. The default is EventChannels.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Channel Kind</td>
<td>Directory extension of the Event Channel ID. The default is Context.</td>
</tr>
<tr>
<td>Content Channel ID</td>
<td>Simple name that identifies the Content Event Channel where all events concerning content objects are published. The default is ContentChannel.</td>
</tr>
<tr>
<td>Content Channel Kind</td>
<td>Event Channel Content ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Factories ID</td>
<td>Simple name that identifies the root directory of the Factories where all factories need to register. The default is Factories.</td>
</tr>
<tr>
<td>Factories Kind</td>
<td>Factories ID extension. The default is Context.</td>
</tr>
<tr>
<td>Event Channel Factory</td>
<td>Simple name that identifies the Event Channel Factory, which is used to create event channels, and resolves the Notification Service name. The default is NotifyEventChannelFactory.</td>
</tr>
<tr>
<td>Load Query Interval</td>
<td>Time interval (in seconds) between ISA process queries to the VDS database and other internal sources that aid in determining the management and distribution of streams and ingests. The default is 3.</td>
</tr>
</tbody>
</table>

**Step 3**  
Click **Submit** to save the settings.  
To clear the fields and start over, click **Reset**.

---

### Configuring the Ingest Manager

The Ingest Manager takes care of provisioned content objects by collecting the metadata and sending messages to the appropriate subsystem to ingest the content. When the content expiration period has ended, the Ingest Manager deletes the content after the additional license window has expired. The additional license window is the license window end time plus the Additional Package Window.

**Note**  
The Ingest Manager is a licensed feature. The Ingest Manager is not listed on the System Level left-panel menu if it is not included in your deployment. For more information, see the “Ingest Manager” section on page F-15.

**Note**  
If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.
For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure the Ingest Manager, do the following:

**Step 1** Choose **Configure > System Level > Ingest Manager**. The Ingest Manager page is displayed.

**Step 2** Enter the Ingest Manager settings as appropriate. See Table 4-13 for descriptions of the fields.

<table>
<thead>
<tr>
<th>Table 4-13 Ingest Manager Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field</strong></td>
</tr>
<tr>
<td><strong>General Settings</strong></td>
</tr>
<tr>
<td>Ingest Manager Host</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Callback Port</td>
</tr>
<tr>
<td>Additional Package Window</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>FTP Timeout</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Publish Mode</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Max Retries</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Send Delete Request</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Use Asset ID</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Manage CORBA Services</td>
</tr>
<tr>
<td>Require Notify Service</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Publish Time Delay</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table 4-13  Ingest Manager Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| FTP PUSH                     | Choose **Enable** to place the MPEG content on the FTP Server and in this mode ADI XML contains the content value as content name only.  
                             Choose **Disable** to keep the content in the master vault and in this mode ADI XML will contain the content value as ftp URL.  
                             The AMS fetches the content depending on the Content Value specified in the ADI XML.  
                             Choose **Enable** to place the MPEG content on the FTP Server. In this mode ADI XML contains the content value as content name only. FTP Push is enabled by default if AMS is not configured.  
                             **Note** This field is applicable only if the Importer/Transformer Type is SA Tribune. |
| FTP Server Mount Type        | From the FTP Server Mount Type drop-down list, choose the type of FTP Server Mount. The default value is FTP.  
                             **Note** This field is applicable only if the Importer/Transformer Type is SA Tribune. |
| Meta Data Publish            | Choose **Enable** from the drop-down list to publish the content metadata, otherwise choose **Disable**. |
| Meta Publish URL #1          | URL is typically the FTP server on CDSM itself. The example for this FTP server to publish packages by Ingest Manager is:  
                             ftp://aimmgr:aim123@192.168.16.25:21/.  
                             Create softlink on CDSM/VVIM under the publish folder configured under Meta Publish URL #1.  
                             The PUBLISH_FOLDER is configured as " Meta Publish URL #1:" --> ftp://isa:calypso@172.22.99.78/arroyo/packages/  
                             The "/arroyo/packages/" is published folder.  
                             It also can be configured as "/".  
                             $PUBLISH_FOLDER/ftp -> /home/isa/ftp  
                             $PUBLISH_FOLDER/atis -> /home/isa/atis/ |
| Meta Publish URL #2          | URL of the backup server where the metadata is published. |
| Fully Qualified Content Names| Choose **Yes** to enable providing fully qualified content names in the format ProviderID_ContentAssetID_ContentName. The default value is **No**.  
                             **Note** This field is applicable only for ATIS C2 server deployment. |
| Delimiter                    | Enter the delimiter value to separate the ProviderID, Content Asset ID and Content Name. The default value is _  
                             **Note** This field is applicable only if Fully Qualified Content Names is enabled. |
| Enable Load Balancing for FTPOUT | Choose **Yes** to enable load balancing when the markets pull content from the vault array. The default value is **No**.  
                             **Note** This field is applicable only for ATIS C2 server deployment. On enabling load balancing the content transfer to markets is load balanced across all available vaults in the group. |
### System Level Configuration

#### Chapter 4      Configuring the VDS

### Threads Per Market for FTP Publish
The number of threads to be spawned to service each market during publishing. The range is from 1 - 16 and the default value is 1.

**Note**  This field is applicable only for ATIS C2 server deployment.

### Publish Time Out
Maximum period in seconds before which the package is published to a market site. If the market does not respond within this timeout value, the package publish fails. The range is 60 to 36000 seconds and the default value is 14400.

**Note**  This field is applicable only for ATIS C2 server deployment.

### Max Retries
Maximum number of attempts to connect to Ingest Manager Host before considering it unavailable. The default is 10. The range is from 0 to 1000.

### Retry Interval
Interval, in minutes, between retries. The default is 10. The range is from 1 to 10080.

### Backoffice Timeout
Maximum period (in seconds) the Ingest Manager waits before timing out the connection to the backoffice. The default is 300. The range is from 0 to 3600.

### Ingest Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingest Interface</td>
<td>Choose all the ingest interfaces that apply: <strong>ISA, Cisco SOAP, Prodis SOAP</strong>; otherwise choose <strong>Disable</strong> to disable the Ingest Manager.</td>
</tr>
<tr>
<td>Name Service IP and Port</td>
<td>IP address and port of the CORBA Naming Service used by the backoffice. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Notify Service IP and Port</td>
<td>IP address and port of the CORBA Notification Service used by the backoffice. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Notify Service Factory</td>
<td>Name used to locate the Notify Service through corbaloc protocol. The default name used is NotifyEventChannelFactory. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Event Channel ID</td>
<td>Simple name that identifies the root directory of the Event Channel where all event channels need to register. The default is EventChannels. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Event Channel Kind</td>
<td>Directory extension of the Event Channel ID. The default is Context. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Factories ID</td>
<td>Simple name that identifies the root directory of the factories where all factories need to register. The default is Factories. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Factories Kind</td>
<td>Factories ID extension. The default is Context. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Channel ID</td>
<td>Simple name that identifies the Package Event Channel where all events concerning package objects are published. The default is PackageChannel. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Channel Kind</td>
<td>Event Channel Package ID extension. The default is Factory. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Factory ID</td>
<td>Simple name that identifies the root directory of the factories where all factories need to register. The default is PackageFactory. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Factory Kind</td>
<td>Factories ID extension. The default is Factory. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Factory Name</td>
<td>Name of the Package Factory that will be registered with the backoffice. The default is AVS_PackageFactory. <strong>ISA-only field.</strong></td>
</tr>
<tr>
<td>Package Factory Server ID</td>
<td>Numeric value that identifies the Package Factory Server for all ingests. The default is 90. <strong>ISA-only field.</strong></td>
</tr>
</tbody>
</table>
Table 4-13  Ingest Manager Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco SOAP URL</td>
<td>Typically used in RTSP environments. The IP address, port, and directory on the Vault used to receive content using the Cisco SOAP (Simple Object Access Protocol). You can specify the IP address and port number, but the directory must be “CiscoAIM.” An example of the Cisco SOAP URL is <a href="http://10.22.216.251:8793/CiscoAIM">http://10.22.216.251:8793/CiscoAIM</a>.</td>
</tr>
<tr>
<td>Prodis SOAP URL</td>
<td>Typically used in RTSP environments. The IP address, port, and directory on the Vault used to receive content using the Prodis SOAP. You can specify the IP address and port number, but the directory must be “ProdisAIM.” An example of the Prodis SOAP URL is <a href="http://10.22.216.251:8793/ProdisAIM">http://10.22.216.251:8793/ProdisAIM</a>.</td>
</tr>
</tbody>
</table>

**Backoffice Settings**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backoffice</td>
<td>Choose <strong>TotalManage</strong> to use the TotalManage backoffice support, otherwise choose <strong>Disable</strong> to disable backoffice support.</td>
</tr>
<tr>
<td>Backoffice URL</td>
<td>Location of the TotalManage backoffice.</td>
</tr>
</tbody>
</table>

**Content Store Settings**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Store</td>
<td>Choose the type of content store: <strong>ISA</strong>, <strong>FSI</strong>, or <strong>NGOD</strong>. To disable the content store, choose <strong>Disable</strong>.</td>
</tr>
<tr>
<td>Content Store URL</td>
<td>URL where the content store is located.</td>
</tr>
</tbody>
</table>

**Encryption Settings**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encryption</td>
<td>Choose <strong>Verimatrix</strong>, or <strong>Widevine</strong> to use encryption. Choose <strong>Disable</strong> to disable encryption.</td>
</tr>
<tr>
<td>Encryption URL</td>
<td>Location on the encryption server used to send MPEG files for encryption. An example of the Encryption URL is <a href="http://192.168.128.54:7898/files/encrypted">http://192.168.128.54:7898/files/encrypted</a>, where the IP address, port, and directory is specified.</td>
</tr>
<tr>
<td>Encryption FTP URL</td>
<td>Location on the encryption server used to retrieve encrypted MPEG files. An example of the Encryption FTP URL is ftp://192.168.128.54:7899/files/encrypted, where the IP address, port, and directory is specified.</td>
</tr>
</tbody>
</table>

**Step 3**

Click **Submit**.
To clear the settings, click **Reset**.

### Configuring Ingest Tuning

The Ingest Tuning page allows you to set the speeds of the trick-mode files created for each ingested content and configure the ingest error detection settings in the Fail Ingest Settings section.

**Note**

The Fail Ingest Settings section is only displayed if the Fail Ingest Tuning feature is enabled. The Fail Ingest Tuning feature is enabled by default. For more information, see the “Fail Ingest Tuning” section on page F-6.
If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To view the current ingest tuning settings, choose Configure > System Level > Ingest Tuning. To configure the ingest tuning, do the following:

Step 1
Choose Configure > System Level > Ingest Tuning. The Ingest Tuning page is displayed.

Step 2
Enter the ingest tuning settings as appropriate. See Table 4-14 for descriptions of the fields.

Table 4-14  Ingest Tuning Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trick-Mode Settings</td>
<td>You can set eight different trick-mode speeds for each ingested content. A trick-mode file, either fast-forward or rewind (–X), is created for each selected speed. Choose the trick-mode speed from the drop-down list and click Submit. To reset the values and start over, click Reset.</td>
</tr>
<tr>
<td>PSI Errors</td>
<td>When program specific information (PSI) errors setting is enabled and the VDS software cannot find the PAT and PMT, the ingest fails. The default for PSI Errors is Disabled.</td>
</tr>
<tr>
<td>Bit Rate Errors</td>
<td>If Bit Rate Errors is enabled, and the VDS cannot determine the bit rate, cannot find the Program Clock Reference (PCR), or determine the PCR PID; the ingest fails. If the VDS software cannot determine the bit rate, it tries the bit rate of 3.75 Mbps, which may be correct and allows the ingest to continue. This parameter is not applicable when using the nABLE backoffice. The default setting is Disabled.</td>
</tr>
</tbody>
</table>
### Table 4-14  Ingest Tuning Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Error Count Method         | If **Error Count Method** is enabled, the errors are counted every \( n \) minutes, where \( n \) is specified in the **Number of Minutes** field. The error count applies to the following thresholds:  
  * Discontinuity Rate  
  * Number of Picture Gaps  
  * Picture Gap Duration  
  * Continuity Counter Errors  
  * Number of Sync Loss Errors  
  * Sync Loss Duration.  
If a threshold is reached, the ingest fails. The default setting is Disabled. |
| Number of Minutes          | **Number of Minutes** applies to the **Error Count Method**. The default setting is 30. If a threshold is reached within the specified minutes, the ingest fails. |
| Discontinuity Rate         | **Discontinuity Rate** threshold sets the number of discontinuities that constitutes a failure. Discontinuities may appear if content is spliced together before ingest, also many discontinuities appear near the beginning of a sample; therefore, the default setting is **Ignore**. |
| Number of Picture Gaps     | Picture gap is when two pictures appear more than one second apart in a transport stream. The **Number of Picture Gaps** threshold sets the number of picture gaps that constitutes a failure. The default is 3. |
| Picture Gap Duration       | **Picture Gap Duration** allows you to specify the maximum time that defines a picture gap. A picture gap occurs whenever two pictures are more than one second apart. Even if they are 15 minutes apart, it is still only counted as one picture gap.  
If a picture gap exceeds the **Picture Gap Duration**, the ingest fails. The default is 5 seconds. |
| Continuity Counter Errors  | Sets the **Continuity Counter Errors** threshold. The default is **Ignore**.  
Each transport-stream packet header has a 4-bit continuity counter, which increments for each transport-stream packet with the same PID. The continuity counter wraps around to zero when it reaches its maximum value of F (hexadecimal). It is used to determine if any packets are lost, repeated, or out of sequence. The MPEG-2 specification allows the continuity counter to be discontinuous in order to accommodate local insertion of data packets and splicing. As a consequence, the continuity counter can be discontinuous even in an error-free transmission. |
Step 3 Click Submit.

To clear the fields and start over, click Reset.

Table 4-14  Ingest Tuning Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Sync Loss Errors</td>
<td>Sets the Number of Sync Loss Errors threshold. The default is 3.</td>
</tr>
<tr>
<td></td>
<td>The sync byte is a fixed 8-bit field located at the beginning of the</td>
</tr>
<tr>
<td></td>
<td>transport-stream packet header with a value of &quot;0100 0111&quot; (0x47). A sync</td>
</tr>
<tr>
<td></td>
<td>loss is detected when a packet does not have the normal 0x47 value as the</td>
</tr>
<tr>
<td></td>
<td>first byte and ends when a packet has the 0x47 value.</td>
</tr>
<tr>
<td>Sync Loss Duration</td>
<td>Sync Loss Duration allows you to specify the maximum time a sync loss can</td>
</tr>
<tr>
<td></td>
<td>occur. If a sync loss exceeds the Sync Loss Duration, the ingest fails.</td>
</tr>
<tr>
<td></td>
<td>The default is 5 seconds.</td>
</tr>
<tr>
<td></td>
<td>A sync loss occurs whenever a packet does not have the normal 0x47 value</td>
</tr>
<tr>
<td></td>
<td>as the first byte and ends when a packet has the 0x47 value. Even if the</td>
</tr>
<tr>
<td></td>
<td>sync loss lasts 15 minutes it is still only counted as one sync loss.</td>
</tr>
</tbody>
</table>

Configuring MPEG Tuning

The MPEG Tuning page allows you to configure the settings for various aspects of MPEG tuning.

Note If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To view the current settings, choose Configure > System Level > MPEG Tuning.

To configure the settings, do the following:

Step 1 Choose Configure > System Level > MPEG Tuning. The MPEG Tuning page is displayed.

Step 2 Enter the settings as appropriate. See Table 4-15 for descriptions of the fields.
### Table 4-15 MPEG Tuning Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingest MPEG Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Program ID Standardization</td>
<td>If Program Identifier (PID) Standardization is enabled, MPEG-2 video assets have their PIDs standardized at ingest so that most assets use the same PIDs. It may be important that all assets use the same PIDs, for example, if multiple assets are going to be part of a playlist and you cannot guarantee that all assets were created with a consistent set of PIDs. The standard PID assignment follows the CableLabs recommendations (see MD-SP-VOD-CEP2.0-I02-070105). Any changes made to the asset is reversed if an FTP OUT is performed. Only standard audio/video assets that may be used in playlists have their PIDs standardized; data downloads, audio only, carousel files, and such other files are left unmodified. Changing the PIDs does not affect normal VOD playback of the asset.</td>
</tr>
<tr>
<td>PSI</td>
<td>When Program ID Standardization is enabled, you have an option to enable or disable PSI. Enabling Program ID Standardization only standardizes the PIDs, not the Program Specific Information (PSI). If you choose Enabled for PSI, the Program Association Table (PAT) and the Program Map Table (PMT) are standardized so that they do not vary at all between one piece of content and another. Use these settings progressively to try and resolve issues with playlists (black screen or no video after transitions, temporary glitches, and so on). Use Program ID Standardization only first, reingest the content, and play the content. If there are still problems, try both enabling Program ID Standardization and PSI. If there are problems playing the content back that was ingested with both of these options enabled, disable them and reingest the content to see if the issue resolves.</td>
</tr>
<tr>
<td>Sequence End Remove</td>
<td>If Sequence End Remove is enabled, a SEQ END header that is present at the end of the asset (and only at the end) is removed on ingest. Doing this allows fades between assets in a playlist, which can make the playlist appear more seamless. Any changes made to the asset is reversed if an FTP OUT is performed. Removing the SEQ END, if present, makes no difference to the VOD playback of the asset.</td>
</tr>
<tr>
<td>Rate Standardize</td>
<td>If Rate Standardize is enabled, MPEG-2 video assets have their rates standardized at ingest so that most assets use one of two standard rates, 3.75 Mbps for SD assets and 15 Mbps for HD assets. These settings follow CableLabs recommendations. Standardizing the rates can be helpful in certain configurations if playlists are going to be created containing multiple assets and you cannot guarantee that all assets were created with consistent rates. For example, some QAM devices do not handle rate changes during playout. Consult your QAM vendor for guidance on whether to enable Rate Standardize. Any changes to the asset are reversed if an FTP OUT is performed.</td>
</tr>
<tr>
<td>MD5 Checksum</td>
<td>If MD5 checksum is enabled, a unique checksum is generated for each goid of content. Note Enable MD5 checksum if Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td><strong>Playlist Trick-Mode Restrictions</strong></td>
<td></td>
</tr>
<tr>
<td>Fast Forward Resume</td>
<td>When Fast Forward Resume is Disabled (default setting), it means the next segment continues at the same speed as the trick-mode restricted segment (usually this is normal play speed). When Fast Forward Resume is Enabled, it means the next segment is played at the same speed as the previous non-restricted segment. As an example, Segment 1 and Segment 3 are unrestricted and Segment 2 has the fast-forward trick-mode speed restricted. If a fast-forward command is issued during the playing of Segment 1, fast-forwarding of Segment 1 occurs until the beginning of Segment 2 is encountered where the fast-forward trick-mode is restricted. Fast-forwarding stops and Segment 2 is played at normal speed. Fast-forwarding resumes at segment 3.</td>
</tr>
</tbody>
</table>
Table 4-15  MPEG Tuning Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rewind Skip</td>
<td>When Rewind Skip is Enabled, if a rewind trick-mode command is issued and a rewind-restricted segment is encountered, it is skipped and rewinding continues on the next segment.</td>
</tr>
<tr>
<td></td>
<td>When Rewind Skip is Disabled (default setting), if a rewind trick-mode command is issued and a rewind-restricted segment is encountered from an unrestricted segment, the rewinding stops and the unrestricted segment is played at normal play speed.</td>
</tr>
<tr>
<td></td>
<td>As an example, Segment 2 is unrestricted and Segment 1 has the rewind trick-mode speed restricted. If a rewind command is issued during the playing of Segment 2, rewinding of Segment 2 occurs until the end of Segment 1 is encountered where the rewind trick-mode is restricted. Rewinding stops and the unrestricted Segment 2 begins to play at normal speed.</td>
</tr>
<tr>
<td>Forward Jump</td>
<td>If forward-trick restrictions are Enabled AND forward-jump restrictions are Enabled, forward jumps will be disallowed if the jump begins on an forward-trick-restricted playlist segment.</td>
</tr>
<tr>
<td>Skipping Stone Mode</td>
<td>If forward-jump restrictions are enabled, the Skipping-Stone Mode parameter controls the behavior of forward-jump restrictions when the jump begins in an unrestricted playlist segment, but there is one or more forward-trick-restricted playlist segments between the beginning and end of the jump.</td>
</tr>
<tr>
<td></td>
<td>When Skipping-Stone Mode is Enabled, the jump will skip to the beginning of an intervening forward-trick-restricted playlist segment, switch to 1x playback for the duration of the segment, and jump to the jump's original end or the beginning of the next forward-trick-restricted segment, whichever comes first.</td>
</tr>
<tr>
<td></td>
<td>When Skipping Stone Mode is Disabled, a jump will switch to 1x playback at the beginning of the first intervening forward-restricted segment and will remain at 1x until a new play command is received.</td>
</tr>
</tbody>
</table>

Cache to Application Settings

Library Timeout

A network partition could cause the Setup server to wait forever for the remote Stream Groups to respond to the application for setup requests. The Library Timeout sets the time interval (in microseconds) that the SetStreamInfo API should wait before considering the remote Stream Group unavailable.

The range is from 1000 to 5000. The default is 2000 (2 seconds).

Playlist Range Conversion Mode

Conversion Mode

Select Based on Display Order to use the PTS values for mid-roll placement of advertisements. Select Based on File Order to use the file offsets for mid-roll placement of advertisements. For more information, see the “Mid-Roll Advertisement Placement Accuracy” section on page 1-8.

Step 3  Click Submit.

To clear the fields and start over, click Reset.

Configuring IP Nicknames

The IP nicknames are used as an alternative for the IP address in the CDSM drop-down lists.

Note  If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.
For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure an IP nickname for a VDS server or QAM gateway, do the following:

**Step 1** Choose Configure > System Level > IP Nickname. The IP Nicknames page is displayed (Figure 4-11).

**Figure 4-11** IP Nicknames Page

To configure an IP nickname for a VDS server or QAM gateway, do the following:

**Step 1** Choose Configure > System Level > IP Nickname. The IP Nicknames page is displayed (Figure 4-11).

**Step 2** Choose the IP address from the applicable drop-down list, either Cisco CDSM IP Addresses or Configured QAM Gateway IP Addresses, and click Display to view/edit the configured nickname for an IP address. Configuring IP nicknames is optional.

**Step 3** In the IP Nickname field, enter a nickname. The name can be from 5 to 20 characters in length and can consist of uppercase and lowercase letters, numbers, and the underscore (_) or hyphen (-) symbols.

**Step 4** Click Submit.
To reset the field, click Reset.

**Configuring the Ingest Driver Server**

The Ingest Driver Server page is used to configure the settings for the Ingest Driver server, which is associated with the VVIM in a VVI with split-domain management. The Ingest Driver server is used by the central Content Store at the centralized storage facility to receive requests from the Ingest Driver client at the headend and send responses to the Ingest Driver client.

The Ingest Driver server and Ingest Driver client are part of the ISA Regionalization feature and the Virtual Content Store feature. For more information, see the “ISA Regionalization” section on page 2-13 and the “Virtual Content Store” section on page 2-18.
The Ingest Driver Server page is only displayed on the VVIM if the Content Storage is set to Distributed. For more information, see the “Content Storage” section on page F-12.

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure the Ingest Driver server, do the following:

**Step 1**  Choose Configure > System Level > Ingest Driver Server. The Ingest Driver Server page is displayed.

**Step 2**  Enter the Ingest Driver server settings as appropriate. See Table 4-16 for descriptions of the fields.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual IP</td>
<td>Virtual IP address used to receive requests from the Ingest Driver client and send responses to the Ingest Driver client.</td>
</tr>
<tr>
<td>Ingest Server Port</td>
<td>The port number used for communication with the Ingest Driver client. Default is 20000. The port number must be the same for both the Ingest Driver server and the Ingest Driver client.</td>
</tr>
<tr>
<td>Number of threads</td>
<td>Number of threads allowed for the Ingest Driver queue. The default is 50.</td>
</tr>
</tbody>
</table>

**Step 3**  Click Submit to save the settings.

To clear the fields and start over, click Reset.

### Configuring the Media Importer/Exporter

The Media Importer/Exporter is part of the Media Scheduler, which is an optional feature. Depending on the transformer type that was selected when your VDS was initially configured, this page may only show the Media Importer.

The Media Importer/Exporter page has two sections: Media Importer Settings and Media Exporter Settings.
The Media Importer Settings allows you to specify the data feed import type used to populate the Media Scheduler with data from an EPG file, as well as to configure the automatic import of the EPG files from an FTP server. There are two ways to import an EPG file, one is to manually upload the file by using the EPG Upload page (Uploading an EPG File, page 7-21), the other is to automatically import the EPG file using the Media Importer page.

The Media Exporter Settings allow you to specify information for notifying a catalog server, or any other server, when a content program is about to start.

If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To Start the Import Server, do the following:

**Step 1** Choose **Configure > System Level > Media Importer**. The Media Importer page is displayed.

**Step 2** The start button will be displayed when the importer server is running.

**Step 3** Click on Start. It will start the ImporterServer.

To Stop the Importer Server, do the following:

**Step 1** Choose **Configure > System Level > Media Importer**. The Media Importer page is displayed.

**Step 2** The stop button will be displayed when the importer server is not running.

**Step 3** Click on Stop. It will stop the ImporterServer.

To configure the Media Importer/Exporter, do the following:

**Step 1** Choose **Configure > System Level > Media Importer/Exporter** (or **Media Importer**). The Media Importer/Exporter page is displayed (Figure 4-12).
Figure 4-12 Media Importer/Exporter Page

Step 2 Enter the settings as appropriate. See Table 4-17 for descriptions of the fields.

Table 4-17 Media Importer/Exporter Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Media Importer Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Importer Type</td>
<td>To upload the EPG using the CDSM, set the Importer Type to <strong>host</strong>. For information on uploading an EPG file, see the “Uploading an EPG File” section on page 7-21.</td>
</tr>
<tr>
<td>Transformer Type</td>
<td>Transformer Type is configured at the time of initial installation and specifies the EPG format of either OCN or SA Tribune. This is a read-only field.</td>
</tr>
<tr>
<td>Enable Auto Import</td>
<td>To automatically import the EPG information, check the Enable Auto Import check box. The Auto Import fields are displayed.</td>
</tr>
<tr>
<td>FTP Server IP</td>
<td>IP address of the FTP server that is used to send the EPG file.</td>
</tr>
<tr>
<td>FTP Path</td>
<td>Directory path of the location of the EPG files on the FTP server. Enter the relative or absolute path according to the configuration of the FTP server. Mismatches in the configuration could result in failure of Auto Import function.</td>
</tr>
<tr>
<td>Username</td>
<td>Username, if required, to access the FTP server.</td>
</tr>
<tr>
<td>Password</td>
<td>Password, if required, to access the FTP server.</td>
</tr>
<tr>
<td>Retry Count</td>
<td>Number of times to retry connecting to the FTP server, if the connection fails.</td>
</tr>
<tr>
<td>Retry Interval</td>
<td>Number of seconds to wait before retrying the connection to the FTP server.</td>
</tr>
<tr>
<td>Protocol</td>
<td>Choose the type of protocol to be used to access the FTP server.</td>
</tr>
</tbody>
</table>

**Note** This field is applicable only for MVOD deployment.
### Table 4-17  Media Importer/Exporter Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFTP Mode</td>
<td>Choose the type of authentication mechanism to be used for SFTP access. The applicable options are <strong>Password</strong> and <strong>Public Key Based</strong>. For Public Key Based authentication mechanism refer Adding RSA key to Tribune server, page 7-22 for adding the RSA key of the Importer server to the Tribune server. <strong>Note</strong>: This field is applicable only for MVOD deployment. This field is displayed only if the user chooses SFTP as FTP protocol.</td>
</tr>
<tr>
<td>Public Key Path</td>
<td>The absolute path to access the RSA key. <strong>Note</strong>: This field is applicable only for MVOD deployment. This field is displayed only for SFTP access with public key authentication mode.</td>
</tr>
<tr>
<td>Passphrase</td>
<td>The passphrase for SSH access. <strong>Note</strong>: This field is applicable only for MVOD deployment. This field is displayed only for SFTP access with public key authentication mode.</td>
</tr>
</tbody>
</table>

#### Auto Import Schedule

<table>
<thead>
<tr>
<th>Daily</th>
<th>If daily is chosen (the default setting), enter the time of day the EPG file should be imported using the 24-hour clock format.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td>If weekly is chosen, choose the days of the week and the time of day (24-hour clock format) when the EPG file should be imported.</td>
</tr>
</tbody>
</table>

#### Media Exporter Settings

1. Media Exporter settings are available only if the Importer/Transformer Type is set to OCN.

<table>
<thead>
<tr>
<th>Pre-Notification</th>
<th>How much time (in seconds) prior to the start of a content program should the catalog server be notified to advertise the program to the set-top box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notify URL Prefix</td>
<td>Used to notify a catalog server that a real-time program is about to begin and to fetch the offering from the backoffice. An example of the prefix URL follows: <a href="http://10.74.124.131/Notification.asp">http://10.74.124.131/Notification.asp</a>.</td>
</tr>
<tr>
<td>Notify Host IP</td>
<td>IP address of the notify host.</td>
</tr>
<tr>
<td>Notify Host Port</td>
<td>Port number used to communicate with the notify host.</td>
</tr>
</tbody>
</table>

1. Media Exporter settings are available only if the Importer/Transformer Type is set to OCN.

**Note**: If the Media Importer is importing, any configuration changes to the Auto Import feature take effect after current auto import is complete.

**Step 3** Click **Submit**.

To reset the field, click **Reset**.
Configuring Call Signs

The CallSign Setup page is used to configure the call signs of the program channels.

Note

The CallSign Setup is part of the TVOD Setup optional feature and the Real Time Capture Type (non-Media Scheduler) optional feature.

A call sign is a unique identifier for a program channel. The channels, identified by their call signs, are mapped to a multicast IP address and port that a content provider or satellite uses to send content by using the Single-Program Transport Stream (SPTS) IP interface.

Note

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure a CallSign, do the following:

Step 1

Choose Configure > System Level > CallSign Setup. The CallSign Setup page is displayed (Figure 4-13).
Figure 4-13 CallSign Setup Page

Step 2 Enter the call sign settings as appropriate. See Table 4-18 for descriptions of the fields.

Table 4-18 CallSign Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CallSign</td>
<td>CallSign is a unique identifier for a program channel (content source).</td>
</tr>
<tr>
<td>Multicast IP</td>
<td>Multicast IP address of the device sending a Single Program Transport Stream (SPTS).</td>
</tr>
<tr>
<td>Port</td>
<td>Port associated with the CallSign.</td>
</tr>
</tbody>
</table>

Step 3 Click Submit.

To edit a CallSign setting, enter the CallSign, the new settings, and click Submit. The new settings overwrite the previous settings and are displayed in the Configured CallSigns section.

To delete a CallSign setting, check the Delete check box associated with the entry and click Delete.
Configuring Input Channels

Note

The Input Channels page is part of the MediaX Suite, which is an optional feature.

The Input Channels page allows you to define channels mapped to a multicast group IP address and port, where scheduled content is ingested. The Input Channels page also collects a number of values for metadata generation.

If you upload an EPG file, and you want to modify the metadata for all programs for a channel, then add the channel in the Input Channels page and enter the modifications in the fields provided. All scheduling information from the EPG file is listed on the Media Scheduler page. For more information, see the “Uploading an EPG File” section on page 7-21.

Caution

All channel default values specified on the Input Channels page overwrites any metadata information for future ingested assets of the specified channel. The metadata for the assets already ingested are not affected.

Note

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To define a channel and set the metadata information, do the following:

Step 1

Choose Configure > System Level > Input Channels. The Input Channels page is displayed (Figure 4-14).
Step 2  From the Select Channel drop-down list, choose Add New Channel.

**Note**  If the Importer/Transformer type is SA Tribune then the Channel Name is configurable. If the Importer/Transformer Type is OCN then the Channel Name is automatically generated by combining the Provider and Channel ID fields with a hyphen (-) between the values.

Step 3  In the Multicast Group IP field, enter the multicast IP address that the Vault must join (by using IGMP) to ingest content.

Step 4  In the Port field, enter the port number the Vault should listen to for ingesting content.

**Note**  The combination of the IP address and port must be unique for each channel.

Step 5  Enter the channel settings as appropriate. See Table 4-19 for descriptions of the fields.
Table 4-19  Input Channels Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Code</td>
<td>Used to create the asset name and the category in the Asset Distribution Interface (ADI) metadata file.</td>
<td>Maximum length is three characters for OCN transformer type and thirty-two characters for SA Tribune transformer type.</td>
</tr>
<tr>
<td>Channel ID</td>
<td>Identifies the channel in the EPG file.</td>
<td></td>
</tr>
<tr>
<td>Genre Category</td>
<td>Identifies the genre category corresponding to the channel.</td>
<td>This field is applicable only if Importer/transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Network Category</td>
<td>Identifies the network category corresponding to the channel.</td>
<td>This field is applicable only if Importer/transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Product ID</td>
<td>Choose movie on demand (MOD), subscriber video on demand (SVOD), or Real-Time Innovations (RTI) as the product type for this channel.</td>
<td></td>
</tr>
<tr>
<td>Volume Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider ID</td>
<td>Name of the provider.</td>
<td></td>
</tr>
<tr>
<td>Preview Period</td>
<td>Amount of time (in seconds) the subscribers are allowed to preview assets on this channel before they are charged for viewing the asset.</td>
<td></td>
</tr>
<tr>
<td>Licensing Window Start</td>
<td>From the drop-down list, choose the number of days to add to the start date of the license window for all assets in this channel.</td>
<td></td>
</tr>
<tr>
<td>Licensing Window End</td>
<td>From the drop-down list, choose the number of days to add to the end date of the license window for all assets in this channel.</td>
<td>This field is applicable only if the Importer/Transformer Type is OCN.</td>
</tr>
<tr>
<td>Licensing Window Length</td>
<td>Enter the number of days and months to add to the end date of the license window for all assets in this channel.</td>
<td>This field is applicable only if the Importer/Transformer type is SA Tribute.</td>
</tr>
<tr>
<td>Encryption</td>
<td>If the assets on this channel are encrypted, choose Yes. Otherwise, choose No.</td>
<td></td>
</tr>
<tr>
<td>Rating</td>
<td>Motion Picture Association of America (MPAA) rating for all assets on this channel (G, PG, PG13, R, or NC-17).</td>
<td></td>
</tr>
<tr>
<td>Copy Protection</td>
<td>From the drop-down list, choose Yes to enable copy protection. Otherwise, choose No.</td>
<td></td>
</tr>
<tr>
<td>Viewing Can be Resumed</td>
<td>From the drop-down list, choose Yes to enable resume option. Otherwise, choose No.</td>
<td></td>
</tr>
<tr>
<td>Publish Time Adjustment</td>
<td>Amount of time to add to the start time for publishing each program on this channel to the backoffice. The Publish Time Adjustment must be longer than the value set for the Media Importer/Exporter Pre-Notification field.</td>
<td>This field is applicable only if the Importer/Transformer Type is OCN.</td>
</tr>
</tbody>
</table>
Table 4-19  Input Channels Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billing ID</td>
<td>Billing ID for every asset on this channel.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Suggested Price</td>
<td>Suggested price for each asset on this channel. The format is xx.xx.</td>
</tr>
<tr>
<td>Audio Type</td>
<td>Audio types available for all assets on this channel (Dolby ProLogic, Dolby Digital, Stereo, Mono, Mono, Dolby 5.1).</td>
</tr>
<tr>
<td>Content Type</td>
<td>From the <strong>Content Type</strong> drop-down list, choose the content type. The default value is SD.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Show_Type</td>
<td>From the <strong>Show_Type</strong> drop-down list, choose the type of the show.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Closed_Captioning</td>
<td>Indicates closed captioning encoding support.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Maximum_Viewing _Length</td>
<td>Maximum amount of time a show is available for viewing once purchased by the customer.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Provider_OA_Contact</td>
<td>Provider contact details to reach out in case there are any quality issues with the show.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Import Program Schedules</td>
<td>Check the <strong>Import Program Schedules</strong> check-box to enable importing of the program schedules for a channel.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune.</td>
</tr>
<tr>
<td>Tribune Feed Extension</td>
<td>Choose the tribune feed extension for program schedules. The default value is gz.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> This field is applicable only if the Importer/Transformer Type is SA Tribune and Import Program Schedules is enabled.</td>
</tr>
</tbody>
</table>

**Step 6**  
Click **Submit**.  
To reset the field, click **Reset**.  

**Note**  
You cannot delete a channel that has future scheduled events.
To view, edit, or delete a current channel setup, from the Select Channel drop-down list, choose the channel. The Channel Setup page refreshes with the configuration for the channel selected. To delete the channel, click Delete. To edit the channel configuration, edit the fields and click Submit.

**Configuring Output Channels**

The Output Channels page allows you to create nicknames for the destination IP address and port of scheduled content and electronic program guides.

**Note**
The Output Channels page is part of the TV Playout feature and is only displayed if the TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

**Note**
If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To configure channel names, do the following:

**Step 1** Choose Configure > Output Channels. The Output Channels page is displayed.

**Step 2** Enter the channel name, choose the destination IP address, and enter the port in the appropriate text boxes.

The name can be from 5 to 20 characters in length and can consist of upper and lower case letters, numbers, and the underscore (_) or dash (-) symbols.

**Note** The IP address and port must be unique from other channels.

**Step 3** Click Submit.

To reset the field, click Reset.

To view or delete a current channel nickname, scroll down to the “Configured Channel Maps” section on the page. Check the Delete check box of each channel name you want to delete and click Submit.

To edit a channel nickname, enter the channel name and new settings, and click Submit.
Configuring the System Level Logging

All logs are located in the /arroyo/log directory. The log files are rotated at least once a day and time stamps are added to the filenames. Some log files that grow rapidly are rotated more frequently (determined by file size); this rotation may happen up to once an hour. Most log files have the following suffix: .log.<YYYYMMDD.> The time zone for log rotation and filename suffixes is coordinated universal time (UTC). As part of the new log entry format, the log level and facility are included.

All log entries have the following changes:

- Stream handle is represented in decimal format
- IP addresses are represented in dotted-decimal format
- Clear identification of where a stream is going rather than a MAC address
- Time is represented in UTC
- Global Object ID (GOID) is represented in hexadecimal

**Stream Trace**

Log messages currently in the streamevent.log file are converted to a structured message and assigned the “stream trace” facility number. Other messages that record stream creation, routing, or playout are converted to a structured message and assigned the “stream trace” facility number. This enhancement, along with configuring syslog-ng to direct all “stream trace” facility messages to a single, centralized log server, provides a coherent set of log messages that describe stream history.

**Facility Information, and Associated Log File and Debug Flags**

For information on each facility and associated log file and debug flags, use the `loginfo` tool. The `loginfo` tool can run on any VDS server, including the CDSM. Start a Telnet or SSH session, log in to the VDS server, and enter the `loginfo` command without any arguments. Information on each facility is listed.

**Configuring Logging Levels**

All logging is configured at the System Level or Server Level. The configuration of the logging levels at the Server Level overrides the System Level settings.

**Note**

If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To import a Configuration XML file, click **Browse** to locate the file, then **Import** to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click **Export**.

For information on enabling the Bulk Import/Export Configuration feature, see the “**Bulk Import/Export Configuration**” section on page F-5. For information about creating a Bulk Import/Export Configuration file see **Appendix B, “Creating Bulk Import/Export Configuration Files.”**

To set a log level for a facility at the System Level, do the following:

**Step 1** Choose **Configure > System Level > Logging**. The Log page is displayed.

**Step 2** From the **Facility Name** drop-down list, select a facility and click **Display**. The Log Level fields are displayed.

The facilities list is based on the configuration of the system.
Step 3  Enter the Log Level settings as appropriate. See Table 4-20 for descriptions of the fields.

Table 4-20  Log Level Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Log Level</td>
<td>The Local Log Level drop-down list has the following options:</td>
</tr>
<tr>
<td></td>
<td>• Emergency (0)</td>
</tr>
<tr>
<td></td>
<td>• Alert (1)</td>
</tr>
<tr>
<td></td>
<td>• Critical (2)</td>
</tr>
<tr>
<td></td>
<td>• Error (3)</td>
</tr>
<tr>
<td></td>
<td>• Warning (4)</td>
</tr>
<tr>
<td></td>
<td>• Notice (5)</td>
</tr>
<tr>
<td></td>
<td>• Informational (6)</td>
</tr>
<tr>
<td></td>
<td>A log level setting includes all the more urgent levels. For example, if the log level is set to Error (3), then Alert (2), Critical (1), and Emergency (0) log entries are included as well as Error (3).</td>
</tr>
<tr>
<td>Remote Log Level</td>
<td>To enable remote logging for the selected facility, select the appropriate log level from the Remote Log Level drop-down list. The default setting is disable.</td>
</tr>
<tr>
<td>Debug Flags</td>
<td>Debug messages, if applicable, are configured by setting one or more debug flags. To select or unselect debug flags, you have the following options:</td>
</tr>
<tr>
<td></td>
<td>• To select one debug flag, click the flag.</td>
</tr>
<tr>
<td></td>
<td>• To select multiple debug flags, hold down the Ctrl key and click each flag, or hold down the Shift key and click the beginning flag and ending flag.</td>
</tr>
<tr>
<td></td>
<td>• To unselect a debug flag when a group of debug flags are selected, hold down the Ctrl key and click the flag.</td>
</tr>
</tbody>
</table>

Step 4  Click Submit.
To clear the fields and start over, click Reset.

To delete the log level settings for a facility, select the facility from the drop-down list and click Delete.

Configuring the System Level Syslog

The Syslog configuration page at the System Level and Server Level is used to configure the IP address and port of the server that is to receive remote logging. The configuration of the syslog server at the Server Level overrides the System Level settings. For remote logging information to be sent for a facility, the Remote Log Level must be set on the Logging page. See the “Configuring the System Level Logging” section on page 4-51 for more information.

Note  If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import a Configuration XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the configuration to an XML file, click Export.
To configure the remote logging server, do the following:

**Step 1** Choose **Configure > System Level > Syslog**. The Syslog page is displayed.
**Step 2** Check the **Enable Remote Logging** check box.
**Step 3** In the **IP Address** field, enter the IP address of the remote server that is to receive syslog messages.
**Step 4** In the **Port** field, enter the port of the remote server that is to receive syslog messages.
**Step 5** Click **Submit**.

To clear the fields and start over, click **Reset**.

To delete the remote server settings, click **Delete**.

## Configuring System Level Error Repair

The VOD Error Repair settings can be configured on the System Level, Array Level, and the Server Level. Settings configured at the Array Level take precedence over System Level settings, and settings at the Server Level take precedence over Array Level or System Level settings.

**Note**

VOD Error Repair is a licensed feature. VOD Error Repair requires the LSCP Client Protocol be set to Cisco (RTSP) and the set-top have the Cisco Visual Quality Experience Client (VQE-C) software running on it. For more information, see the “VOD Error Repair” section on page F-9.

To configure error repair at the System Level, do the following:

**Step 1** Choose **Configure > System Level > Error Repair**. The Error Repair page is displayed.
**Step 2** Enter the Error Repair settings as appropriate. See Table 4-21 for descriptions of the fields.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Error Repair Mode</strong></td>
<td></td>
</tr>
<tr>
<td>ER Enable</td>
<td>To enable Error Repair, check the <strong>ER Enable</strong> check box.</td>
</tr>
<tr>
<td>RTP Encapsulation Enable</td>
<td>To enable RTP encapsulation, check the <strong>RTP Encapsulation Enable</strong> check box. TV VDS supports both UDP and RTP encapsulation. If the RTP Encapsulation Enable check box is not checked, the VDS is configured to only handle UDP encapsulation.</td>
</tr>
<tr>
<td>Repair Packets DSCP</td>
<td></td>
</tr>
<tr>
<td>DSCP of Repair Packets Sent</td>
<td>DSCP value for the transmitted RTP and RTCP packets sent for error repair. The range is from 0 to 63. The default is 0.</td>
</tr>
</tbody>
</table>
Chapter 4 Configuring the VDS

System Level Configuration

Step 3

Click Submit.

To clear the fields and start over, click Reset.

To return the settings to the factory default values, click Factory.

To monitor the VOD Error Repair feature, use the Application Monitoring Tool (AMT). For more information, see Appendix E, “Using the TV VDS Streamer Application Monitoring Tool.”

Configuring VBO Setup

The VBO setup page in VVIM/CDSM is used to configure the ingest manager /ODRM settings for a VHO.

Note

If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To import VBO setup configuration from a XML file, click Browse to locate the file, then Import to import the file. The status of the import is displayed in the left panel. To export the VBO setup configurations to an XML file, click Export.

For information on enabling the Bulk Import/Export Configuration feature, see the Bulk Import/Export Configuration, page F-5. For information about creating a Bulk Import/Export Configuration file see Appendix B, “Creating Bulk Import/Export Configuration Files.”

To add a new VBO setup or edit an existing VBO setup, do the following:

Step 1 Choose Configure > System Level > VBO Setup. The VBO Setup page is displayed.

Step 2 Select the VHO that supports the Cisco VBO/HTTP interfaces from Select VHO drop-down list.

Step 3 Enter the VBO ingest manager/ODRM settings as appropriate. See Table 4-22 for descriptions for VBO ingest manager setup fields. See Table 4-23 for descriptions for VBO ODRM setup fields.

Table 4-21 VOD Error Repair Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTCP Report Exporting</td>
<td></td>
</tr>
<tr>
<td>Exporting</td>
<td>Click the Enabled radio button to enable exporting of the RTCP reports. The RTCP reports can be exported to a third-party analysis application.</td>
</tr>
<tr>
<td>IP Address</td>
<td>Enter the IP address or the domain name of the server hosting the analysis application.</td>
</tr>
<tr>
<td>TCP Ports</td>
<td>Enter the TCP port number that is used to receive the reports on the server hosting the analysis application.</td>
</tr>
</tbody>
</table>
Table 4-22    VBO Ingest Manager Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Settings</td>
<td></td>
</tr>
<tr>
<td>VBO Ingest Mgr IP</td>
<td>IP address of the VBO Content Ingest Manager.</td>
</tr>
<tr>
<td>VBO Ingest Mgr Port</td>
<td>Port used by the VBO Content Ingest Manager.</td>
</tr>
<tr>
<td>VBO Ingest Mgr Recv Timeout</td>
<td>Maximum period (in seconds) before which the VDS times out on VBO Content Ingest Manager. The default value is 2 seconds.</td>
</tr>
<tr>
<td>HTTP Content Store IP</td>
<td>The IP address of master vault.</td>
</tr>
<tr>
<td>HTTP Content Store Port</td>
<td>Port used by the HTTP Interface.</td>
</tr>
<tr>
<td>Default VBO Ingest Mgr Settings</td>
<td></td>
</tr>
<tr>
<td>VBO Ingest Mgr NameSpace</td>
<td>XML Namespace used in ingest APIs. The default value is urn:com:cisco:vbo:ingest</td>
</tr>
<tr>
<td>VBO Ingest Mgr Request URI</td>
<td>VDS HTTP interface endpoint URI for inests. The default value is /contentserver/</td>
</tr>
</tbody>
</table>

Table 4-23    VBO ODRM Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Settings</td>
<td></td>
</tr>
<tr>
<td>Domain Name</td>
<td>Domain name of the ODRM.</td>
</tr>
<tr>
<td>ODRM IP</td>
<td>IP address of the ODRM.</td>
</tr>
<tr>
<td>Port</td>
<td>Port used by the ODRM.</td>
</tr>
<tr>
<td>Receive Timeout</td>
<td>Maximum period (in seconds) before the VDS times out on ODRM. The default value is 2 seconds.</td>
</tr>
<tr>
<td>Default ODRM IP Settings</td>
<td></td>
</tr>
<tr>
<td>ODRM Notify URL</td>
<td>URL to notify the ODRM of an important session related event. The default value is /odrm/OdrmApiR2/EventNotify</td>
</tr>
<tr>
<td>ODRM Namespace</td>
<td>Namespace associated with ODRM. The default value is urn:net:beaumaris:acR2:xsd:1</td>
</tr>
<tr>
<td>Setup Namespace</td>
<td>XML Namespace used in Setup APIs. The default value is urn:net:beaumaris:common:xsd:1</td>
</tr>
<tr>
<td>Setup Interface URI</td>
<td>VDS HTTP Interface URI for stream setups. The default value is /streamingserver/</td>
</tr>
</tbody>
</table>

Step 4 Click **Submit**. To clear the fields and start over, click **Reset**. To delete the VBO ingest manager/ODRM settings, click **Delete**.
Array Level Configuration

The Array Level tab has the following configuration options:

- Configuring the Array Level DNS, page 4-57
- Configuring the Array Level NTP Server, page 4-57
- Configuring Replication Groups, page 4-58
- Configuring the Streamer for BMS Connectivity, page 4-59
- Configuring the Vault for BMS Connectivity, page 4-65
- Grouping Stream Groups into VHOs, page 4-70
- Configuring VHO ISA Settings, page 4-71
- Configuring Stream Groups, page 4-75
- Configuring Vault Groups, page 4-77
- Configuring Ingest Steering, page 4-79
- Configuring Cache Groups, page 4-81
- Mapping Vault Groups to Cache Groups, page 4-82
- Mapping Cache Groups to Cache Groups, page 4-83
- Mapping Stream Groups to Cache-Fill Sources, page 4-84
- Mapping Vault Groups for Redundancy, page 4-85
- Configuring the Master Vault Group, page 4-87
- Configuring the Control and Setup IPs, page 4-88
- Configuring Sites, page 4-89
- Configuring Cache-Fill Bandwidth Using Thin Pipe Mapping, page 4-90
- Configuring the Ingest Driver Client, page 4-94
- Configuring the Media Scheduler, page 4-95
- Configuring SSV Groups, page 4-104
- Configuring Manual Ingests, page 4-105
- Configuring Barker Stream/Playlists, page 4-108
- Configuring Playout Scheduler, page 4-112
- Exporting a Playout Schedule, page 4-120
- Exporting a Playout Schedule for an EPG, page 4-121
- Configuring Array Level Error Repair, page 4-121

Note

The Array Level configuration settings are distributed to all servers in the specified array.
Configuring the Array Level DNS

The Array DNS page is used to configure up to 16 domain suffixes and 16 DNS servers.

To view the current DNS settings for an Array Level, choose Configure > Array Level > Array DNS, choose an array name from the drop-down list, and click Display.

To configure the DNS settings for an Array Level, do the following:

**Step 1** Choose Configure > Array Level > Array DNS. The Array DNS page is displayed.

**Step 2** From the Array Name drop-down list, choose an array and click Display.

**Step 3** Enter the DNS array level settings as appropriate. See Table 4-24 for descriptions of the fields.

**Step 4** Click Submit.

To clear the fields and start over, click Reset.

To delete the DNS settings, check the Delete check box and click Submit.

**Table 4-24 DNS Service Field**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Domain Suffix</td>
<td>Specify, if applicable, the internal domain that is used to fully qualify an unqualified hostname. For example, if you are using OpenStream as the BMS, specify a subdomain consistent with what OpenStream is using, for example, bms.n2bb.com. Accordingly, unqualified hostnames used in CORBA transactions, such as contentstore, resolve correctly to contentstore.bms.n2bb.com.</td>
</tr>
<tr>
<td>New DNS Server</td>
<td>IP address of the DNS server.</td>
</tr>
</tbody>
</table>

**Configuring the Array Level NTP Server**

The Array NTP Server page is used to configure up to 16 NTP servers. The clocks on all VDS servers (Vault, Streamer, and Caching Node) and the CDSM and VVIM in a VDS must be synchronized in order to retrieve the statistics on to the CDSM and VVIM.

To view the current NTP settings for an Array Level, choose Configure > Array Level > Array NTP Server, choose an array name from the drop-down list, and click Display.

To configure the NTP settings for an Array Level, do the following:

**Step 1** Choose Configure > Array Level > Array NTP Server. The Array NTP Server page is displayed.

**Step 2** From the Array Name drop-down list, choose an array and click Display.

**Step 3** In the New NTP Server field, enter the IP address of the NTP server.

**Step 4** Click Submit.

To clear the fields and start over, click Reset.
To delete the NTP settings, check the **Delete** check box and click **Submit**.
For information on setting the time zone on a VDS server or configuring NTP on a CDSM or VVIM, see “Other NTP Configurations” section on page 4-145.

### Configuring Replication Groups

Starting from Release 3.9, AVSDB application in VDS-TV supports 512 replication servers (including vaults, streamers, cache nodes and controllers). To scale to 512 devices, AVSDB is enhanced to use hierarchical replication. A large replication domain is logically split into smaller replication groups. In each replication group, a node is selected as a replication master, referred to as replication group master.

---

**Note**

CServer replication is limited to only 512 servers. For example, the number of VDS servers supported in streaming domain (streamers + cache) is 512.

A Replication group master acts as a receiver for data replicated from other groups and forwards them to nodes in its group over separate replication sessions. Each node in a group replicates data to other nodes within its group, controller and to replication master of the other replication groups. A controller replicates data only to replication group master.

A server can never be a member of more than one replication group.

When grouping servers, you should consider network costs, bandwidth usage, and geographic locations of Vaults, Caching Nodes, and Streamers.

To configure a Replication Group, do the following:

**Step 1**

Choose **Configure > Array Level > Replication Groups Setup**.

**Step 2**

From the **Select Replication Group to View/Edit** drop-down list, choose **Add New Replication Group** and click **Display**.

To edit a Replication Group, choose the Replication Group from the drop-down list and click **Display**.

**Step 3**

Enter settings as appropriate. See Table 4-25 for description of fields.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Vault/Cache/Streamer Replicate Group Name</td>
<td>Specify the name of the Replicate Group. Use only alphanumeric characters (0–9, a–z, A–Z), the dash (–), and the underscore (_) to create a Replicate Group name.</td>
</tr>
<tr>
<td>IP Address</td>
<td>Specify the IP address of the replicate group.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Specify the subnet mask of the replicate group.</td>
</tr>
</tbody>
</table>

**Step 4**

Click **Submit** to save the settings.

**Step 5**

Add the servers (vaults/streamers/cache node) to the Replication Group depending on the Replication Group Type.
The unassigned servers are listed along with a drop down-list for each that offers the options described in Table 4-26.

**Table 4-26 Server Options**

<table>
<thead>
<tr>
<th>Server Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change</td>
<td>Do not make any changes to the Replication Group assignment. Applicable only to servers assigned to the selected Replication Group.</td>
</tr>
<tr>
<td>Replication Group Name</td>
<td>Add/Modify this server (vault/streamer/cache node) to this Replication Group. Applicable only for unassigned servers.</td>
</tr>
<tr>
<td>None</td>
<td>Remove this server from this Replication Group. Applicable only to servers assigned to the selected Replication Group.</td>
</tr>
<tr>
<td>Don’t Change</td>
<td>Do not assign this server to this Replication Group. Applicable only for unassigned servers.</td>
</tr>
</tbody>
</table>

**Step 6**

Click **Submit**.

To reset the field, click **Reset**.

To view the members of a Replication Group, choose the Replication Group from the drop-down list and click **Display**.

To delete a Replication Group, remove all vault/streamer/cache node from the group, then click **Delete Group**.

**Configuring the Streamer for BMS Connectivity**

The Streamer ISA page provides all the configurable parameters to configure your VDS to communicate stream services with the ISA/OpenStream Business Management System.

**Note**

The Streamer BMS page is only used in non-Content Storage systems.

The Streamer ISA OpenStream settings are used to set the IP address and port of the master Streamer on the VDS for communication with the OpenStream system. In addition, you can change the web service port, and the headend ID used by OpenStream to communicate with the VDS.

The CORBA Services consist of the Naming and Notification Services that are used in the OpenStream system. The Naming Service provides a standard service that clients can use to get object references while maintaining location transparency. The Notification Service (also called the Event Service) provides a framework for sending event messages by way of an event channel, which allows other components to communicate with each other without knowing about each other.

The CORBA Event Channels are used to send event notifications, over the Notification Service framework, about the state of the various components in the VDS to the OpenStream system.

The load query interval sets the time interval used for querying internal sources for ISA processes.

The Streaming Service settings are used to allow the OpenStream system and Streamers to communicate information about stream objects with each other.

The LSCP Service is used by the VDS to provide the client with VCR-like like control.
The Resource Service runs on each Streamer and is used to poll for orphan session objects. Each session object is associated with a stream object, and the Resource Service makes sure each session object is in service. If the session is orphaned, then an event destroy is sent to the Stream Event Channel.

To view the current Streamer ISA settings, choose Configure > Array Level > Streamer BMS. The ISA settings currently configured for the stream services are displayed.

To configure the Streamer ISA settings, do the following:

---

**Step 1** Choose Configure > Array Level > Streamer BMS. The Streamer ISA page is displayed (Figure 4-15).
Figure 4-15  Streamer ISA Page

Stream IS A CONFIGURE

Displayer are the current OpenStream settings for all streamers on your Cisco CDSK. To change a setting overwrite the current value and click Submit.

Streamer ISA OpenStream settings

- Stream Master ID: 172.22.35.19
- Headend ID: 0.0.0.0
- Config File Name: std.cfg
- Stream Source Config: Control IP
- Web Service Port: 8000
- Streaming Mode: 10G
- MSG Support: Disabled
- TNP/SCI: Enable for NMSonly

CORBA Services

- Name Service IP: 172.22.25.81
- Notify Service IP: 172.22.25.83
- Notify Service Factory: Default/Event/出众/Factory

CORBA Event Channels

- Event Channel ID: EventChannels
- Event Channel Kind: Content
- Stream Channel ID: StreamChannel
- Stream Channel Kind: Factory
- Factories ID: Factories
- Factories Kind: Content
- Event Channel Factory: std/EventChannelFactory
- Load Query Interval: 3

LSCP Service

- Stream Service ID: AnonymousStreamService_AVS_6_99
- Stream Service Kind: Factory
- Master No. Of Threads: 14
- Play No. Of Threads: 54
- LSCP Port: 9000
- LSCP Response Pad: Enabled
- LSCP Client Protocol: T/SOnly

OpenStream Resource Services

- Service Name: AnonymousStreamManager_AVS_6_99
- Service Poll Time: 3000 SEC
- Stream Timeout: 3000 SEC
- Stream Source Port: 8990

Session Gateways

- Session Gateway ID #1: NGOSSessionGateway.Factory
- Session Gateway ID #2:
- Session Gateway ID #3:
- Session Gateway ID #4:
- Session Gateway ID #5:

Changes made to these settings will affect all streamer servers on the Cisco CDSK. Please verify your entries prior to submitting.
Step 2 Enter the Streamer ISA settings as appropriate. See Table 4-27 for descriptions of the fields.

Table 4-27 Streamer ISA Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Streamer ISA OpenStream Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Stream Master IP</td>
<td>Master IP address of the Stream Service, which is the same for all Streamers in an array, and is used in the creation of the Interoperable Object References (IORs) for stream objects. The Streamer designated as the master Stream Service (determined by a negotiating algorithm) sends multicast heartbeat messages every second to the other Streamers in the array. If the heartbeat message has not been received for more than five seconds, another Streamer in the array takes over as master Stream Service. To edit the Stream Master IP, see the “Configuring the Control and Setup IPs” section on page 4-88.</td>
</tr>
<tr>
<td>Stream Master Port</td>
<td>Port used by the master Stream Service for controlling streams. The Stream Service Master Port is the same for all Streamers in an array. The default is 3300.</td>
</tr>
<tr>
<td>Headend ID&lt;sup&gt;1&lt;/sup&gt;</td>
<td>This value is passed to the OpenStream system as part of the resource negotiation. The default is 0.0.0.0.</td>
</tr>
<tr>
<td>Config File Name&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Read-only field. Name of the file that stores the ISA configuration settings.</td>
</tr>
<tr>
<td>Stream Source Config</td>
<td>This field determines the source IP address that is included in the session setup header. This field has the following possible values:</td>
</tr>
<tr>
<td></td>
<td>• Control IP—The IP address of the Control server (see the “Configuring the Control and Setup IPs” section on page 4-88).</td>
</tr>
<tr>
<td></td>
<td>• Default Stream Source IP—The default source IP address from the Server Setup page (see the “Configuring the Servers” section on page 4-128).</td>
</tr>
<tr>
<td></td>
<td>• Stream Interface IP—The IP address of the interface that was used to stream the content (see the “Configuring the Servers” section on page 4-128).</td>
</tr>
<tr>
<td></td>
<td>• None—Do not include the source IP address in the session setup header.</td>
</tr>
<tr>
<td>Web Service Port&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Port number used by web service processes listening on this server. The default is 8080.</td>
</tr>
<tr>
<td>Streaming Mode</td>
<td>Mode expected by the next device in the network. The streaming mode determines the required configuration for the headend setup (see the “Configuring the Headend Setup” section on page 4-14 and the “Configuring QAM Gateways” section on page 4-9 for more information).</td>
</tr>
<tr>
<td>MSA Support</td>
<td>Enabling Managed Services Architecture (MSA) routes successful events to the ISA event channels and error events to either the Event Posting Agent (EPA) or the Event Log Agent (ELA). Events consist of three basic groups: subsystem-component state, faults, and measurement points. State and faults allow a monitoring tool to verify the current health of the system, while measurement points allow a monitoring tool to view the transactional state of the system and determine how it is performing.</td>
</tr>
</tbody>
</table>
From the TME/SCE drop-down list, select Enable for MystroMDN for Stream Control Events (SCE) or Enable for OpenStream for Trick-Mode Events (TME).

Enabling TME requires that the stream service and LSCP or RTSP service deliver more CORBA events to the Stream Event Channel. These extra events are triggered during the transitions from one content to another in the playlist of the stream. The CORBA event for stream destroy also carries the history of all transitions of the stream.

Enabling SCE allows real-time splicing of MPEG-2 transport streams for digital program insertion (including advertisement insertion) in live content as well as content recorded for the purpose of enabling time-shifted on-demand services. Pre-roll, post-roll, and mid-roll placements of digital program insertion is supported. The Vault detects the SCTE-35 cues and processes them at the time of ingest. The StreamExtChannel event channel on the CORBA NotificationService is used to send ContentSignalingEvents that contain the SCTE-35 cue information to the backoffice.

Note The SCTE-35 cue message cannot be greater than 400 bytes.

Note The configuration change for the ISA Stream Extensions feature requires that the ISA service is restarted on both the master Vault and the Master Streamer. To identify the master Streamer and master Vault, use the CDSM Monitor Services page to find the Streamer running the master stream service and the Vault running the Content Store master. See the “Services Monitor” section on page 5-46 for more information. To restart the ISA service, choose Maintain > Services, select the check box for ISA, and click Submit.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TME/SCE</td>
<td>From the TME/SCE drop-down list, select Enable for MystroMDN for Stream Control Events (SCE) or Enable for OpenStream for Trick-Mode Events (TME).</td>
</tr>
</tbody>
</table>

### CORBA Services

- **Name Service IP**: IP address of the CORBA Naming Service used by the OpenStream system.
- **Name Service Port**: Port of the Naming Service used by the OpenStream system. The default is 5000.
- **Notify Service IP**: IP address of the CORBA Notification Service used by the OpenStream system.
- **Notify Service Port**: Port of the Notification Service used by the OpenStream system. The default is 5005.
- **Notify Service Factory**: Name used to locate the Notify Service through corbaloc protocol. The default name used by OpenStream is DefaultEventChannelFactory.

### CORBA Event Channels

- **Event Channel ID**: Simple name that identifies the root directory of the Event Channel where all event channels need to register. The default is EventChannels.
- **Event Channel Kind**: Directory extension of the Event Channel ID. The default is Context.
- **Stream Channel ID**: Simple name that identifies the Stream Event Channel where all events concerning stream objects are published. The default is StreamChannel.
- **Stream Channel Kind**: Event Channel Stream ID extension. The default is Factory.
- **Factories ID**: Simple name that identifies the root directory of the Factories where all factories need to register. The default is Factories.
- **Factories Kind**: Factories ID extension. The default is Context.
- **Event Channel Factory**: Simple name that identifies the Event Channel Factory, which is used to create event channels, and resolves the Notification Service name. The default is NotifyEventChannelFactory.
- **Load Query Interval**: Time interval (in seconds) between ISA process queries to the VDS database and other internal sources that aid in determining the management and distribution of streams and ingests. The default is 3.
### Table 4-27  Streamer ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LSCP Service</strong></td>
<td></td>
</tr>
<tr>
<td>Stream Service ID</td>
<td>Name of the Stream Service object that is registered with the OpenStream system.</td>
</tr>
<tr>
<td>Stream Service Kind</td>
<td>Service ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Master No. of Threads</td>
<td>Stream service master number of threads. The default is 16, which is also the recommended setting.</td>
</tr>
<tr>
<td>Play No. of Threads</td>
<td>Lightweight Stream Control (LSC) number of threads. The default is 34, which is also the recommended setting.</td>
</tr>
<tr>
<td>LSCP Port</td>
<td>Port on the Streamer that is listening for LSCP commands from the set-top box. The default is 9000.</td>
</tr>
<tr>
<td>LSCP Response Padding</td>
<td>When LSCP Response Padding is enabled, three blank bytes are added to the end of the LSCP response. The default is enabled.</td>
</tr>
<tr>
<td>LSCP Client Protocol</td>
<td>Choose the way LSCP clients communicate with the Streamers. The options are:</td>
</tr>
<tr>
<td></td>
<td>• TVGuide—For Scientific Atlanta clients–TV Guide</td>
</tr>
<tr>
<td></td>
<td>• RTI—For Tandberg clients</td>
</tr>
<tr>
<td></td>
<td>• VODLink—For SeaChange clients</td>
</tr>
<tr>
<td></td>
<td>• CV—For SeaChange clients with Cablevision</td>
</tr>
<tr>
<td></td>
<td>• Cisco (RTSP)</td>
</tr>
<tr>
<td></td>
<td>• TTV (RTSP)</td>
</tr>
<tr>
<td><strong>Advanced ISA Settings</strong></td>
<td>To enable the ISA Reason Code Extensions, select <strong>Enabled</strong>. The following eight LSCP fields (Timeout and Reason Code fields) are part of the ISA Reason Code Extensions. For more information, see the “ISA Reason Code Extension” section on page 1-7.</td>
</tr>
<tr>
<td>LSCP Open Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to be paused in the LSC Open mode. If the stream does not transition to LSC Transport or TransportPause modes within the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP BOS Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to have reached the BOS (NPT=0) and paused in the LSC Pause mode. If the stream does not transition to LSC Transport or TransportPause modes within the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP Pause Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to be paused in the LSC Pause mode. If the stream does not transition to another modes within the timeout period, the stream is destroyed. The default is 600.</td>
</tr>
<tr>
<td>LSCP EOS Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to have reached the EOS (NPT=EOS) and paused in the LSC EOS mode. If the stream stays in the LSC EOS mode for more than the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP Open Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP Open Timeout is exceeded. The default is 56000.</td>
</tr>
<tr>
<td>LSCP BOS Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP BOS Timeout is exceeded. The default is 56001.</td>
</tr>
<tr>
<td>LSCP Pause Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP Pause Timeout is exceeded. The default is 56002.</td>
</tr>
<tr>
<td>LSCP EOS Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP EOS Timeout is exceeded. The default is 56003.</td>
</tr>
</tbody>
</table>
Table 4-27 Streamer ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSCP 1x Read Failure Reason Code</td>
<td>Reason code included in the session.destroyWithReason if after being in LSC Transport or TransportPause modes, the stream cannot continue to play out, even at the normal (1X) speed. The default is 56032.</td>
</tr>
</tbody>
</table>

**OpenStream Resource Services**

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Name of the VDS Resource Service Manager that monitors orphan sessions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Poll Time</td>
<td>Time interval between polling for orphan sessions. The default is 3600 seconds.</td>
</tr>
<tr>
<td>Stream Timeout</td>
<td>Maximum time allowed before a stream object is played. If the stream object is not played within the timeout period, it is destroyed. The default is 80 seconds.</td>
</tr>
<tr>
<td>Stream Source Port</td>
<td>Streamer port used for streaming. The default is 8999.</td>
</tr>
</tbody>
</table>

**Session Gateways**

<table>
<thead>
<tr>
<th>Session Gateway ID [1-5]</th>
<th>Session Gateway ID is used by the backoffice Session Gateway service for registering with the Name Service. The default is N2BBSession Gateway. The Session Gateway ID is required by the Resource Manager to connect to the Session Gateway for checking the status of all the sessions on a regular basis.</th>
</tr>
</thead>
</table>

1. Changes to this field affect the same field on the Vault ISA page.

---

**Step 3** Click *Submit* to save the settings.

To clear the fields and start over, click *Reset*.

**Step 4** Restart ISA/OpenStream services.

a. Choose *Maintain > Services*. The Services Restart page is displayed.

b. From the drop-down list, choose the IP address or nickname of the server and click *Display*.

c. Check the *ISA/OpenStream Services* check box and click *Submit*.

To clear the fields and start over, click *Reset*.

---

**Configuring the Vault for BMS Connectivity**

The Vault BMS page provides all the configurable parameters to configure your VDS to communicate content services with the ISA/OpenStream Business Management System.

**Note**

The Vault BMS page is only used in non-Content Storage systems.

The Vault ISA OpenStream settings are used to set the IP address and port of the master content server on the VDS for communication with the OpenStream system. In addition, you can change the following:

- Web service port
- Headend ID used by OpenStream to communicate with the VDS
The Content Services settings are used to allow the OpenStream system and Vaults to communicate information about content objects with each other, and to configure the FTP settings for the ingest of content objects on to the Vault.

The CORBA Services consist of the Naming and Notification Services, which are used in the OpenStream system. The Naming Service provides a standard service that clients can use to get object references while maintaining location transparency. The Notification Service (also called the Event Service) provides a framework for sending event messages by way of an event channel, which allows other components to communicate with each other without knowing about each other.

The CORBA Event Channels are used to send event notifications over the Notification Service framework about the state of the various components in the VDS to the OpenStream system.

To view the current Vault ISA settings, choose Configure > Array Level > Vault BMS. The ISA settings currently configured for content services are displayed.

To configure the Vault ISA settings, do the following:

---

**Step 1** Choose Configure > Array Level > Vault BMS. The Vault ISA page is displayed (Figure 4-16).
Step 2  Enter the Vault ISA settings as appropriate. See Table 4-28 for descriptions of the fields.

### Table 4-28: Descriptions of the Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Svc Master IP</td>
<td>Primary server IP address</td>
</tr>
<tr>
<td>Headend ID</td>
<td>Unique identifier</td>
</tr>
<tr>
<td>Config File Name</td>
<td>Filename of configuration file</td>
</tr>
<tr>
<td>Web Service Port</td>
<td>Port for web service requests</td>
</tr>
<tr>
<td>FTP Dist Port</td>
<td>Port for FTP distribution</td>
</tr>
<tr>
<td>Content Store Name</td>
<td>Name of content store</td>
</tr>
<tr>
<td>Content Store Kind</td>
<td>Kind of content store</td>
</tr>
<tr>
<td>Content Factory ID</td>
<td>Unique identifier for factory</td>
</tr>
<tr>
<td>Content Factory Kind</td>
<td>Kind of content factory</td>
</tr>
<tr>
<td>Content No. Of Threads</td>
<td>Number of threads</td>
</tr>
<tr>
<td>Pre-Encryption Support</td>
<td>Enable or disable encryption</td>
</tr>
<tr>
<td>FTP Client Port</td>
<td>Port for FTP client</td>
</tr>
<tr>
<td>FTP Server Port</td>
<td>Port for FTP server</td>
</tr>
<tr>
<td>FTP No. Of Attempts</td>
<td>Number of attempts</td>
</tr>
<tr>
<td>FTP Timeout</td>
<td>Time to wait for FTP response</td>
</tr>
<tr>
<td>CORBA Services</td>
<td>Name and port for CORBA services</td>
</tr>
<tr>
<td>Event Channel ID</td>
<td>Unique identifier for channel</td>
</tr>
<tr>
<td>Event Channel Kind</td>
<td>Kind of event channel</td>
</tr>
<tr>
<td>Content Channel ID</td>
<td>Unique identifier for content</td>
</tr>
<tr>
<td>Content Channel Kind</td>
<td>Kind of content channel</td>
</tr>
<tr>
<td>Factories ID</td>
<td>Unique identifier for factories</td>
</tr>
<tr>
<td>Factories Kind</td>
<td>Kind of factories</td>
</tr>
</tbody>
</table>

Changes made to these settings will affect all vault servers on the Cisco CDSM. Please verify your entries prior to submitting.
### Table 4-28  Vault ISA Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vault ISA OpenStream Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Content Master IP</td>
<td>This field defines the master IP address of the Content Service, which is the same for all Vault servers in an array, and is used in the creation of the Interoperable Object References (IORs) for content objects. The Vault server designated as the master Content Service (determined by a negotiating algorithm) sends multicast heartbeat messages every second to the other Vaults in the array. If the heartbeat message has not been received for more than five seconds, another Vault in the array takes over as master Content Service.</td>
</tr>
<tr>
<td>Content Master Port</td>
<td>Port used by the master Content Service for controlling content. The Content Service Master Port is the same for all Vaults in the array. The default is 3200.</td>
</tr>
<tr>
<td>Headend ID&lt;sup&gt;1&lt;/sup&gt;</td>
<td>This value is passed to the OpenStream system as part of the resource negotiation. The default is 0.0.0.0.</td>
</tr>
<tr>
<td>Config File Name&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Read-only field. Name of the file that stores the ISA configuration settings. The default is isa.cfg.</td>
</tr>
<tr>
<td>Web Service Port&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Port number used by web service processes listening on this server. The default is 8080.</td>
</tr>
<tr>
<td>FTP Out Port</td>
<td>Port number used by the ISA 1.5 FTP Out feature.</td>
</tr>
<tr>
<td><strong>Content Service</strong></td>
<td></td>
</tr>
<tr>
<td>Content Store Name</td>
<td>Name of the VDS Content Store object that is registered with the OpenStream system.</td>
</tr>
<tr>
<td>Content Store Kind</td>
<td>Content store ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Content Factory ID</td>
<td>Name of the VDS Content Store Factory that is registered with the OpenStream system. The Content Store Factory allows the creation of Content Store objects, and the Content Store objects act as factories for Content objects.</td>
</tr>
<tr>
<td>Content Factory Kind</td>
<td>Content store factory ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Content No. of Threads</td>
<td>Content store number of threads. The default is 32, which is also the recommended setting.</td>
</tr>
<tr>
<td>Pre-Encryption Support</td>
<td><strong>Enable</strong> or <strong>Disable</strong> Motorola pre-encryption support. Pre-encryption is disabled by default. Pre-Encryption Support must be enabled for Dual CAS. For more information, see the “Configuring MPEG Tuning” section on page 4-36.</td>
</tr>
<tr>
<td>FTP Client Port</td>
<td>Port used when the Vault receives a request from the OpenStream system to act as an FTP client and sends an FTP GET command to the content provider acting as an FTP server. The default is port 21. This is a control connection (data transfer process) and is known as an FTP push process.</td>
</tr>
<tr>
<td>FTP Server Port</td>
<td>Port used when the Vault receives a request from the OpenStream system to act as an FTP server and receives an FTP PUT command from the content provider acting as an FTP client. The default is port 4000. This is a control connection (data transfer process) and is known as an FTP pull process.</td>
</tr>
<tr>
<td>FTP No. of Attempts</td>
<td>Number of times the FTP client attempts to transfer the content file. The default is 1.</td>
</tr>
<tr>
<td>FTP Timeout</td>
<td>Idle seconds allowed before an FTP download is disconnected. The default is 360000000.</td>
</tr>
<tr>
<td><strong>CORBA Services</strong></td>
<td></td>
</tr>
<tr>
<td>Name Service IP&lt;sup&gt;1&lt;/sup&gt;</td>
<td>IP address of the CORBA Naming Service used by the OpenStream system.</td>
</tr>
</tbody>
</table>
Table 4-28  Vault ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Service Port$^1$</td>
<td>Port of the Naming Service used by the OpenStream system. The default is 5000.</td>
</tr>
<tr>
<td>Notify Service IP$^1$</td>
<td>IP address of the CORBA Notification Service used by the OpenStream system.</td>
</tr>
<tr>
<td>Notify Service Port$^1$</td>
<td>Port of the Notification Service used by the OpenStream system. The default is 5005.</td>
</tr>
<tr>
<td>Notify Service Factory$^1$</td>
<td>Name used to locate the Notify Service through corbaloc protocol. The default name used by OpenStream is DefaultEventChannelFactory.</td>
</tr>
</tbody>
</table>

**CORBA Event Channels**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Channel ID$^1$</td>
<td>Simple name that identifies the root directory of the Event Channel where all event channels need to register. The default is EventChannels.</td>
</tr>
<tr>
<td>Event Channel Kind$^1$</td>
<td>Directory extension of the Event Channel ID. The default is Context.</td>
</tr>
<tr>
<td>Content Channel ID</td>
<td>Simple name that identifies the Content Event Channel where all events concerning content objects are published. The default is ContentChannel.</td>
</tr>
<tr>
<td>Content Channel Kind</td>
<td>Event Channel Content ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Factories ID$^1$</td>
<td>Simple name that identifies the root directory of the Factories where all factories need to register. The default is Factories.</td>
</tr>
<tr>
<td>Factories Kind$^1$</td>
<td>Factories ID extension. The default is Context.</td>
</tr>
<tr>
<td>Event Channel Factory$^1$</td>
<td>Simple name that identifies the Event Channel Factory, which is used to create event channels, and resolves the Notification Service name. The default is NotifyEventChannelFactory.</td>
</tr>
</tbody>
</table>

1. Changes to this field affect the same field on the Streamer ISA page.

---

**Step 3**  Click **Submit** to save the settings.

To clear the fields and start over, click **Reset**.

**Step 4**  Restart ISA/OpenStream services.

- **a.**  Choose **Maintain > Services**. The Services Restart page is displayed.
- **b.**  From the drop-down list, choose the IP address or nickname of the server and click **Display**.
- **c.**  Check the **ISA/OpenStream Services** check box and click **Submit**.

To clear the fields and start over, click **Reset**.
Grouping Stream Groups into VHOs

The VHO Setup page provides a way to group Stream Groups that have the same ISA settings. After the VHO groups are created, you set the ISA settings for each VHO on the VHO ISA Settings page. See the “Configuring VHO ISA Settings” section on page 4-71 for more information.

Note

The VHO Setup page is available only on a Stream Manager when VVI and Content Storage are enabled in an ISA environment. For more information, see the “Content Storage” section on page F-12 and the “Virtual Video Infrastructure” section on page F-10.

To create VHOs, do the following:

Step 1
Choose Configure > Array Level > VHO Setup. The VHO Setup page is displayed (Figure 4-17).

Figure 4-17 VHO Setup Page

Step 2
From the drop-down list, choose Add New VHO and click Display.

To edit or view an existing VHO, choose the VHO from the drop-down list and click Display.

Step 3
In the New VHO Name field, choose the VHO from the drop-down list and click Display.

The page refreshes and displays the unassigned Stream Groups and Local Vault Groups.

Note

Local Vault Groups are only part of the Regionalization feature, not the Virtual Content Store feature. For more information, see the “Configuring ISA Regionalization” section on page F-11.

Step 4
Add the groups to the VHO.

The unassigned groups are listed along with a drop down-list for each that offers the options described in Table 4-29.
Configuring VHO ISA Settings

The VHO ISA Setup page is used to configure the ISA settings for each video hub office (VHO).

Note: The VHO ISA Setup page is available only on a Stream Manager when VVI and Content Storage are enabled in an ISA environment. For more information, see the “Content Storage” section on page F-12 and the “Virtual Video Infrastructure” section on page F-10.

Note: Before you can configure the ISA settings for a specific VHO, you must first add the VHOs through the VHO Setup page. See the “Grouping Stream Groups into VHOs” section on page 4-70.

To configure, edit, or view the ISA settings for a VHO, do the following:

Step 1: Choose Configure > Array Level > VHO ISA Setup. The VHO ISA Setup page is displayed.

Step 2: From the Configured VHOs drop-down list, choose a VHO and click Select.

The Stream Groups that are members of this VHO are listed, as well as the number of Streamers in each Stream Group.

Step 3: Enter the ISA settings as appropriate. See Table 4-30 for descriptions of the fields.
### Table 4-30  VHO ISA Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Streamer BMS Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Streamer Master IP</td>
<td>This field defines the master IP address of the Stream Service, which is the same for all Streamers in a VHO, and is used in the creation of the Interoperable Object References (IORs) for stream objects. The Streamer designated as the master Stream Service (determined by a negotiating algorithm) sends multicast heartbeat messages every second to the other Streamers in the VHO. If the heartbeat message has not been received for more than five seconds, another Streamer in the VHO takes over as master Stream Service. To edit the Stream Master IP address, see the “Configuring the Control and Setup IPs” section on page 4-88.</td>
</tr>
<tr>
<td>Streamer Master Port</td>
<td>Port used by the master Stream Service for controlling streams. The Stream Service Master Port is the same for all Streamers in a VHO. The default is 3300.</td>
</tr>
<tr>
<td>Headend ID</td>
<td>This value is passed to the OpenStream system as part of the resource negotiation. The default is 0.0.0.0.</td>
</tr>
<tr>
<td>Stream Source Config</td>
<td>This field determines the source IP address that is included in the session setup header. This field has the following possible values: [ \begin{itemize} \item Control IP—The IP address of the Control server (see the “Configuring the Control and Setup IPs” section on page 4-88). \item Default Stream Source IP—The default source IP address from the Server Setup page (see the “Configuring the Servers” section on page 4-128). \item Stream Interface IP—The IP address of the interface that was used to stream the content (see the “Configuring the Servers” section on page 4-128). \item None—Do not include the source IP address in the session setup header. \end{itemize} ]</td>
</tr>
<tr>
<td>Streaming Mode</td>
<td>Mode expected by the next device in the network. The streaming mode determines the required configuration for the headend setup (see the “Configuring the Headend Setup” section on page 4-14 and the “Configuring QAM Gateways” section on page 4-9 for more information).</td>
</tr>
<tr>
<td>MSA Support</td>
<td>Enabling Managed Services Architecture (MSA) routes successful events to the ISA event channels and error events to either the Event Posting Agent (EPA) or the Event Log Agent (ELA). Events consist of three basic groups: subsystem-component state, faults, and measurement points. State and faults allow a monitoring tool to verify the current health of the system, while measurement points allow a monitoring tool to view the transactional state of the system and determine how it is performing.</td>
</tr>
</tbody>
</table>
Enabling TME requires that the stream service and LSCP or RTSP service deliver more CORBA events to the Stream Event Channel. These extra events are triggered during the transitions from one content to another in the playlist of the stream. The CORBA event for stream destroy also carries the history of all transitions of the stream.

Enabling SCE allows real-time splicing of MPEG-2 transport streams for digital program insertion (including advertisement insertion) in live content as well as content recorded for the purpose of enabling time-shifted on-demand services. Pre-roll, post-roll, and mid-roll placements of digital program insertion is supported. The Vault detects the SCTE-35 cues and processes them at the time of ingest. The StreamExtChannel event channel on the CORBA NotificationService is used to send ContentSignalingEvents that contain the SCTE-35 cue information to the backoffice.

**Note** The SCTE-35 cue message cannot be greater than 400 bytes.

**Note** The configuration change for the ISA Stream Extensions feature requires that the ISA service is restarted on both the master Vault and the Master Streamer. To identify the master Streamer and master Vault, use the CDSM Monitor Services page to find the Streamer running the master stream service and the Vault running the Content Store master. See the “Services Monitor” section on page 5-46 for more information. To restart the ISA service, choose Maintain > Services, select the check box for ISA, and click Submit.

### CORBA Services

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Service IP</td>
<td>IP address of the CORBA Naming Service used by the OpenStream system.</td>
</tr>
<tr>
<td>Name Service Port</td>
<td>Port of the Naming Service used by the OpenStream system. The default is 5000.</td>
</tr>
<tr>
<td>Notify Service IP</td>
<td>IP address of the CORBA Notification Service used by the OpenStream system.</td>
</tr>
<tr>
<td>Notify Service Port</td>
<td>Port of the Notification Service used by the OpenStream system. The default is 5005.</td>
</tr>
<tr>
<td>Notify Service Factory</td>
<td>Name used to locate the Notify Service through corbaloc protocol. The default name used by OpenStream is DefaultEventChannelFactory.</td>
</tr>
</tbody>
</table>

### LSCP Service

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream Service ID</td>
<td>Name of the Stream Service object that is registered with the OpenStream system.</td>
</tr>
<tr>
<td>Stream Service Kind</td>
<td>Service ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Stream Channel ID</td>
<td>Simple name that identifies the Stream Event Channel where all events concerning stream objects are published. The default is StreamChannel.</td>
</tr>
<tr>
<td>Stream Channel Kind</td>
<td>Event Channel Stream ID extension. The default is Factory.</td>
</tr>
<tr>
<td>Master No. of Threads</td>
<td>Stream service master number of threads. The default is 16, which is also the recommended setting.</td>
</tr>
<tr>
<td>Play No. of Threads</td>
<td>Lightweight Stream Control (LSC) number of threads. The default is 34, which is also the recommended setting.</td>
</tr>
<tr>
<td>LSCP Port</td>
<td>Port on the Streamer that is listening for LSCP commands from the set-top box. The default is 9000.</td>
</tr>
<tr>
<td>LSCP Response Padding</td>
<td>When LSCP Response Padding is enabled, three blank bytes are added to the end of the LSCP response. The default is enabled.</td>
</tr>
</tbody>
</table>
**Table 4-30  VHO ISA Fields (continued)**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSCP Client Protocol</td>
<td>Choose the way LSCP clients communicate with the Streamers. The options are:</td>
</tr>
<tr>
<td></td>
<td>• TVGuide—For Scientific Atlanta clients–TV Guide</td>
</tr>
<tr>
<td></td>
<td>• RTI—For Tandberg clients</td>
</tr>
<tr>
<td></td>
<td>• VODLink—For SeaChange clients</td>
</tr>
<tr>
<td></td>
<td>• CV—For SeaChange clients with Cablevision</td>
</tr>
<tr>
<td></td>
<td>• Cisco (RTSP)</td>
</tr>
<tr>
<td></td>
<td>• TTV (RTSP)</td>
</tr>
<tr>
<td></td>
<td>• LSCP Pause at EOS</td>
</tr>
<tr>
<td></td>
<td>If NAT is enabled, the LSCP Client Protocol must be Cisco (RTSP) or TTV (RTSP).</td>
</tr>
<tr>
<td>Advanced ISA Settings</td>
<td>To enable the ISA Reason Code Extensions, select <strong>Enabled</strong>.  The following eight LSCP fields (Timeout and Reason Code fields) are part of the ISA Reason Code Extensions. For more information, see the “<strong>ISA Reason Code Extension</strong>” section on page 1-7.</td>
</tr>
<tr>
<td>LSCP Open Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to be paused in the LSC Open mode. If the stream does not transition to LSC Transport or TransportPause modes within the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP BOS Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to have reached the BOS (NPT=0) and paused in the LSC Pause mode. If the stream does not transition to LSC Transport or TransportPause modes within the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP Pause Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to be paused in the LSC Pause mode. If the stream does not transition to another modes within the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP EOS Timeout</td>
<td>Maximum time (in seconds) allowed for a stream to have reached the EOS (NPT=EOS) and paused in the LSC EOS mode. If the stream stays in the LSC EOS mode for more than the timeout period, the stream is destroyed. The default is 60.</td>
</tr>
<tr>
<td>LSCP Open Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP Open Timeout is exceeded. The default is 56000.</td>
</tr>
<tr>
<td>LSCP BOS Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP BOS Timeout is exceeded. The default is 56001.</td>
</tr>
<tr>
<td>LSCP Pause Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP Pause Timeout is exceeded. The default is 56002.</td>
</tr>
<tr>
<td>LSCP EOS Reason Code</td>
<td>Reason code included in the session.destroyWithReason if the LSCP EOS Timeout is exceeded. The default is 56003.</td>
</tr>
<tr>
<td>LSCP 1x Read Failure Reason Code</td>
<td>Reason code included in the session.destroyWithReason if after being in LSC Transport or TransportPause modes, the stream cannot continue to play out, even at the normal (1X) speed. The default is 56032.</td>
</tr>
<tr>
<td>OpenStream Services</td>
<td><strong>Service Name</strong> Name of the VDS Resource Service Manager that monitors orphan sessions.</td>
</tr>
<tr>
<td></td>
<td><strong>Service Poll Time</strong> Time interval between polling for orphan sessions. The default is 3600 seconds.</td>
</tr>
<tr>
<td></td>
<td><strong>Stream Timeout</strong> Maximum time allowed before a stream object is played. If the stream object is not played within the timeout period, it is destroyed. The default is 80 seconds.</td>
</tr>
<tr>
<td></td>
<td><strong>Stream Source Port</strong> Streamer port used for streaming. The default is 8999.</td>
</tr>
</tbody>
</table>
Table 4-30  VHO ISA Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session Gateways</td>
<td></td>
</tr>
<tr>
<td>Session Gateway ID</td>
<td>Session Gateway ID is used by the backoffice Session Gateway service for registering with the Name Service. The default is N2BBSession Gateway. The Session Gateway ID is required by the Resource Manager to connect to the Session Gateway for checking the status of all the sessions on a regular basis.</td>
</tr>
</tbody>
</table>

Virtual Content Store Settings

The Virtual Content Store fields are the same fields as the Shared/Distributed ISA Settings fields. For information about these fields, see the “Configuring Distributed/Shared ISA Settings” section on page 4-25.

Step 4  Click Submit to save the settings.

To clear the fields and start over, click Reset.

Configuring Stream Groups

A Stream Group consists of one or more Streamers. Streamers within a Stream Group work as a team with regard to content caching, load distribution, and bandwidth usage. Stream Groups interact with other Stream Groups by passing streams among each other based on performance qualification and cost considerations. If a Stream Group must give up a stream to another group, Stream Group preferences set on the QAM Gateway page are followed. Stream Groups relate to QAM gateways or destination subnetwork by the Stream Group preference. For more information about Stream Group and QAM gateway associations, see the “Configuring QAM Gateways” section on page 4-9. For more information about destination subnetworks and Stream Groups, see the “Configuring Stream Destinations” section on page 4-22.

A Streamer can never be a member of more than one Stream Group.

When grouping Streamers you should take into account network cost to stream, bandwidth usage, and geographic locations of Streamers and QAM gateways. All Streamers in a group are considered to have the same cost to reach a destination.

VVI with Split-Domain Management and CCP Streamers

A VVI with split-domain management has one manager (VVIM) that manages the Vaults and Caching Nodes, and one manager (Stream Manager) that manages the Streamers.

When you use CCP Streamers in a VVI, all group IDs and server IDs need to be unique among all servers in the VVI. The VVIM manages all the group IDs and server IDs for the VVI with CCP Streamers. The Stream Manager gets an allotment of group IDs from the VVIM in one of two ways:

- During the initial installation, by way of the CDSM Setup page
- In the first-time configuration of Stream Groups

Communication between the VVI Manager and the Stream Manager is accomplished through database replication when CCP is used as the protocol. The communication of groups and servers in a split-domain management, has database replication among all servers. Therefore, the group IDs and server IDs are communicated among all domains.
The CDSM Setup page for the Stream Manager has a field for the VVIM IP address. The VVIM IP address is used to send an HTTP GET request to the VVIM for a range of group IDs. If the Stream Manager is unable to reach the VVIM, either because port 80 is not open for communication or some other connectivity reason, the Stream Group page displays a field for entering the beginning group ID. The administrator of the Stream Manager gets the beginning group ID from the administrator of the VVIM. The VVIM gets the beginning group ID on the Configuration Generator page. For more information, see the “Identifying Server IDs and Group IDs for VVI with Split-Domain Management” section on page 7-23.

For more information about the VVI settings on the CDSM Setup page, see the “Virtual Video Infrastructure” section on page F-10.

**Caution**
The beginning group ID must be generated by the VVIM, and if manually entered, it must be entered correctly. Entering the wrong ID can cause cache-fill failures and other issues.

To configure a Stream Group, do the following:

**Step 1**  
Choose Configure > Array Level > Stream Groups Setup. The Stream Groups page is displayed.

**Step 2**  
From the Select Stream Group to View/Edit drop-down list, choose Add New Stream Group and click Display.

To edit a Stream Group, choose the Stream Group from the drop-down list and click Display.

**Step 3**  
In the New Stream Group Name field, enter the name of the Stream Group and click Submit.

You can use only alphanumeric characters (0–9, a–z, A–Z), the dash (-), and the underscore (_) to create a Stream Group name.

**Step 4**  
If the Remote Setup and Control Server Support feature is enabled, choose one of the following for the Stream Group Role field:
- Stream Delivery—Stream Group is a group of Play servers
- Setup/Control—Stream Group is a group of Setup and Control servers
- None Set—Stream Group is not going to be used

**Note**  
Stream Groups can be used for either streaming data or for control traffic. For more information, see the “Remote Setup and Control Server” section on page 2-10. To enable the Remote Setup and Control Server Support feature, see the “Remote Setup and Control Service Support” section on page F-14.

**Step 5**  
Add the Streamers to the Stream Group.

The unassigned Streamers are listed along with a drop down-list for each that offers the options described in Table 4-31.

**Table 4-31 Streamer Options**

<table>
<thead>
<tr>
<th>Streamer Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change</td>
<td>Do not make any changes to the Stream Group assignment.</td>
</tr>
<tr>
<td>Stream Group Name</td>
<td>Add this Streamer to this Stream Group.</td>
</tr>
</tbody>
</table>
Step 6

Click **Submit**.

To reset the field, click **Reset**.

To view the members of a Stream Group, choose the Stream Group from the drop-down list and click **Display**.

To delete a Stream Group, first remove all Streamers from the group, then click **Delete Group**.

To edit a Stream Group, choose the Stream Group from the drop-down list and click **Display**.

**Caution**

If you delete a Stream Group or edit the members of a Stream Group, and the Stream Destination feature is enabled, you must re-submit each Stream Destination subnet that is associated with the Stream Group that you changed or deleted.

### Configuring Vault Groups

A Vault Group consists of one or more Vaults. Vaults within a Vault Group work as a team with regard to content ingest, cache-fill responses, load distribution, and bandwidth usage. Vault Groups interact with other Vault Groups by passing cache-fill requests among each other based on performance qualification and cost considerations. For more information on Vault Group redundancy, see the “Mapping Vault Groups for Redundancy” section on page 4-85.

**Note**

The Vault Groups Setup page is part of the Vault Groups feature and is displayed only if Vault Groups is enabled. For more information, see the “Vault Groups” section on page F-6. If VVI is enabled, The Vault Groups Setup page is displayed only on the VVIM. For more information, see the “Virtual Video Infrastructure” section on page F-10.

A Vault can never be a member of more than one Vault Group.

When grouping Vaults, you should consider network costs, bandwidth usage, and geographic locations of Vaults, Caching Nodes, and Streamers. All Vaults in a group are considered to have the same cost to reach a destination.

**Note**

The maximum number of Vault Groups is 20.

To configure a Vault Group, do the following:

**Step 1**

Choose **Configure > Array Level > Vault Groups Setup**. The Vault Groups Setup page is displayed (Figure 4-18).
Step 2 From the Select Vault Group to View/Edit drop-down list, choose Add New Vault Group and click Display.

To edit a Vault Group, choose the Vault Group from the drop-down list and click Display.

Step 3 Enter settings as appropriate. See Table 4-32 for description of fields.

Table 4-32 New Vault Group Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Vault Group Name</td>
<td>Specify the name of the Vault Group. Use only alphanumeric characters (0–9, a–z, A–Z), the dash (-), and the underscore (_) to create a Vault Group name.</td>
</tr>
<tr>
<td>Location Virtual IP</td>
<td>Specify the virtual IP address of the vault group used for locate port service. This virtual IP address is bound to the locate IP and port.</td>
</tr>
<tr>
<td>Location Subnet Mask</td>
<td>Specify the subnet mask of the location Virtual IP address.</td>
</tr>
</tbody>
</table>

Step 4 Click Submit to save the settings.

Step 5 If Ingest Steering, VVI, and Vault Groups are enabled, for the Vault Group Location choose either National or Local.

Note For information on enabling Ingest Steering, see the “Ingest Steering” section on page F-16. For information on Ingest Steering, see the “Steering Ingests” section on page 2-20.
### Configuring Ingest Steering

The Ingest Steering page allows you to have specific Vault Groups ingest content with specified product IDs. For example, if you have a local Vault Group that you want to be responsible for ingesting all the local live ingests for that area, you can use the product ID in the content name to direct that content to the local Vault Group.

For more information, see the "Steering Ingests" section on page 2-20.

**Note**

The Ingest Steering page is not available if the Ingest Steering feature is not enabled. For more information, see the “Ingest Steering” section on page F-16. The Ingest Steering feature requires both central-management VVI and Vault Groups be enabled.

To configure Ingest Steering, do the following:

**Step 1**
Choose Configure > Array Level > Ingest Steering. The Ingest Steering page is displayed (Figure 4-19).

**Note**

The content name must be in the following format:
ProviderId::AssetId::contentName. The ProviderId is used to map the ingest policy.
Step 2 In the **New Product ID** field, enter the product ID and click **Add**. The product ID is listed in the Unassigned Products text box.

Repeat for each product ID.

Step 3 From the **Select Vault Group to assign products** drop-down list, choose a Vault Group and click **Display**.

Step 4 To assign the product IDs to the selected Vault Group, click the product ID to highlight it and click the **>** button.

To assign all product IDs, click the **>>** button.

To remove all product IDs from the Assigned Products text box, click the **<<** button.

To remove one product ID from the Assigned Products text box, click the product ID to highlight it and click the **<** button.

To a group of product IDs, click the first product ID, then hold the **Ctrl** key and click the remaining product IDs, then click **Delete**.

To delete one product ID, click the product ID to highlight it and click **Delete**.

Step 5 When you have finished assigning the product IDs for the Vault Group displayed, click **Submit**.
Configuring Cache Groups

A Cache Group consists of one or more Caching Nodes. Caching Nodes within a Cache Group work as a team with regard to content caching, load distribution, and bandwidth usage. Cache Groups interact with other Cache Groups by passing cache-fill requests among each other based on performance qualification and cost considerations. If a Cache Group must give up a cache-fill task to another group, Cache Group preferences set on the Stream to Cache Map page are followed.

### Note

The Cache Groups Setup page is part of the VVI feature and is displayed only on VVIMs.

A Caching Node can never be a member of more than one Cache Group.

When grouping Caching Nodes you should take into account network costs, bandwidth usage, and geographic locations of Vaults, Caching Nodes, and Streamers. All Caching Nodes in a group are considered to have the same cost to reach a destination.

To configure a Cache Group, do the following:

**Step 1** Choose **Configure > Array Level > Cache Groups Setup**. The Cache Groups Setup page is displayed (Figure 4-20).

**Figure 4-20 Cache Groups Setup Page—CCP Streamers**

![Cache Groups Setup Page](Image)

**Step 2** From the **Select Cache Group to View/Edit** drop-down list, choose **Add New Cache Group** and click **Display**.

To edit a Cache Group, choose the Cache Group from the drop-down list and click **Display**.

**Step 3** In the **New Cache Group Name** field, enter the name of the Cache Group and click **Submit**.

You can use only alphanumeric characters (0-9, a-z, A-Z), the dash (-), and the underscore (_) to create a Cache Group name.

**Step 4** Add the Caching Nodes to the Cache Group.
The unassigned Caching Nodes are listed along with a drop down-list for each that offers the options described in Table 4-34.

Table 4-34  Caching Node Options

<table>
<thead>
<tr>
<th>Caching Node Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change</td>
<td>Do not make any changes to the Cache Group assignment.</td>
</tr>
<tr>
<td>Cache Group Name</td>
<td>Add this Caching Node to this Cache Group.</td>
</tr>
<tr>
<td>None</td>
<td>Remove this Caching Node from this Cache Group. Applicable only to Caching Nodes assigned to the selected Cache Group.</td>
</tr>
<tr>
<td>Don’t Change</td>
<td>Do not assign this Caching Node to this Cache Group.</td>
</tr>
</tbody>
</table>

Step 5  Click Submit.

To reset the field, click Reset.

To view the members of a Cache Group, choose the Cache Group from the drop-down list and click Display.

To delete a Cache Group, first remove all Caching Nodes from the group, then click Delete Group.

Mapping Vault Groups to Cache Groups

The Cache To Vault Map page is used to map Vault Groups to Cache Groups in a VVI. Before you can map Vault Groups to Cache Groups, you must create them. For more information, see the “Configuring Cache Groups” section on page 4-81 and the “Configuring Vault Groups” section on page 4-77.

Note  The Cache To Vault Map page only displays on the VVIM and is available only when Vault Groups and VVI are both enabled. For more information, see the “Bulk Import/Export Configuration” section on page F-5 and the “Virtual Video Infrastructure” section on page F-10.

To map Vault Groups to Cache Groups, do the following:

Step 1  Choose Configure > Array Level > Cache To Vault Map. The Cache To Vault Map page is displayed.

Step 2  From the Cache Group drop-down list, choose a Cache Group and click Select. All available Vault Groups are displayed. By default, all preferences are set to None.

Step 3  Choose the preference setting for each Vault Group. Following are the possible preferences:
- High—First preference as a source for cache-fill requests.
- Medium—Second preference as a source for cache-fill requests.
- Low—Lowest preference as a source for cache-fill requests.
- None—Do not use this Vault Group as a cache-fill source.

Groups with the same preference level are considered equally as a cache-fill source. At least one Vault Group must have a preference higher than None.

Step 4  Click Submit.
To reset the field, click **Reset**.

To view the Vault Group mappings of a Cache Group, choose the Cache Group from the drop-down list and click **Display**.

To delete a Cache Group or a Vault Group, see the “Configuring Cache Groups” section on page 4-81 or the “Configuring Vault Groups” section on page 4-77. When a Cache Group is deleted, the mapping for the Cache Group is also deleted, and any mapping to the Cache Group in the Stream To Cache Map page is also deleted. When a Vault Group is deleted, the Vault Group is removed from each Cache Group mapping; any mapping for the Vault Group in the Vault Redundancy Map page is also deleted.

### Mapping Cache Groups to Cache Groups

The Cache To Cache Map page is used to map Cache Groups to Cache Groups in a VVI. Before you can map Cache Groups to Cache Groups, you must create them. For more information, see the “Configuring Cache Groups” section on page 4-81.

**Note**
The Cache To Cache Map page only displays on the VVIM. For more information, see the “Virtual Video Infrastructure” section on page F-10.

To map Cache Groups to Cache Groups, do the following:

**Step 1** Choose **Configure > Array Level > Cache To Cache Map**. The Cache To Cache Map page is displayed.

**Step 2** From the **Cache Group** drop-down list, choose a Cache Group and click **Select**. All available Cache Groups are displayed.

**Step 3** Choose the preference setting for each Cache Group. Following are the possible preferences:
- High—First preference as a source for cache-fill requests.
- Medium—Second preference as a source for cache-fill requests.
- Low—Lowest preference as a source for cache-fill requests.
- None—Do not use this Cache Group as a cache-fill source.

Groups with the same preference level are considered equally as a cache-fill source. At least one Cache Group must have a preference higher than None.

**Step 4** Click **Submit**.

To reset the field, click **Reset**.

To view the Cache Group mappings of a Cache Group, choose the Cache Group from the drop-down list and click **Select**.

To delete a Cache Group, see the “Configuring Cache Groups” section on page 4-81. When a Cache Group is deleted, the mapping for the Cache Group is also deleted, and any other mappings to the Cache Group are also deleted.
Mapping Stream Groups to Cache-Fill Sources

The Stream To Cache Map page is used to map Cache Groups, Vault Groups, and other Stream Groups as cache-fill sources for each Stream Group in a VVI. Before you can map the different groups to Stream Groups, you must create them. See the “Configuring Stream Groups” section on page 4-75, the “Configuring Vault Groups” section on page 4-77, and the “Configuring Cache Groups” section on page 4-81 for more information.

Note

The Stream To Cache Map page is available only on the Stream Manager when VVI is enabled. For more information, see the “Virtual Video Infrastructure” section on page F-10.

Streamers can be used as cache-fill sources when Streamer is Cache is enabled on the Server Setup page (“Configuring the Servers,” page 4-128). A Stream Group is available on the Stream To Cache Map page when at least one Streamer in a Stream Group has Streamer is Cache enabled.

Vaults can be used as cache-fill sources when Vault Groups is enabled. For more information, see the “Bulk Import/Export Configuration” section on page F-5.

To map cache-fill sources to Stream Groups, do the following:

**Step 1** Choose Configure > Array Level > Stream To Cache Map. The Stream To Cache Map page is displayed (Figure 4-21).

**Figure 4-21STREAM TO CACHE MAP PAGE**

<table>
<thead>
<tr>
<th>Stream Group</th>
<th>Cache Group Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>StreamerG1</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

Step 2 From the **Stream Group** drop-down list, choose a Stream Group and click **Select**. All available Cache Groups, Stream Groups, and Vault Groups are displayed. By default, all preferences are set to **None**.

Step 3 Choose the preference setting for each Cache Group and Stream Group. The possible preferences are:
- **High**—First preference as a source for cache-fill requests.
- **Medium**—Second preference as a source for cache-fill requests.
• Low—Lowest preference as a source for cache-fill requests.
• None—Do not use this Cache Group or Stream Group as a cache-fill source.

Groups with the same preference level are considered equally as a cache-fill source. At least one Cache Group must have a preference higher than None.

Step 4

Click **Submit**.

To reset the field, click **Reset**.

---

**Note**

The Stream to Cache Map page is associated with the configuration file FillSourceConfig in /arroyo/test directory. After submitting the Stream to Cache Map page, the FillSourceConfig file is updated.

To view the cache-fill source mapping of a Stream Group, choose the Stream Group from the drop-down list and click **Display**.

To delete a Stream Group, Cache Group, or Vault Group, see the “Configuring Stream Groups” section on page 4-75, the “Configuring Cache Groups” section on page 4-81, or the “Configuring Vault Groups” section on page 4-77. When a Stream Group is deleted, the mapping for the Stream Group is also deleted. When a Cache Group is deleted, the Cache Group is removed from each Stream Group mapping, and any mapping for that Cache Group in the Vault To Cache Map page is also deleted. When a Vault Group is deleted, the Vault Group is removed from each Stream Group mapping, and any mapping for the Vault Group in the Vault Redundancy Map page is also deleted.

**Mapping Vault Groups for Redundancy**

The Vault Redundancy Map page is used to map Vault Groups to each other. Before you can map Vault Groups for redundancy, you must create them. See the “Configuring Vault Groups” section on page 4-77 for more information.

**Note**

The Vault Redundancy Map page is part of the Vault Groups feature and is displayed only if Vault Groups is enabled. If VVI is enabled, the Vault Redundancy Map page is displayed only on the VVIM. For more information, see the “CDSM or VVIM Setup” section on page F-3.

**Note**

The maximum number of Vault Groups is 20.

Vault Groups interact with other Vault Groups by passing cache-fill requests among each other based on performance qualification and cost considerations. If a Vault Group must give up a cache-fill task to another group, Vault Group preferences set on the Vault Redundancy Map page are followed. For more information on Vault Group redundancy, see the “Vault Group Redundancy” section on page 1-22.

To map a Vault Group to another Vault Group, do the following:

**Step 1**

Choose **Configure > Array Level > Vault Redundancy Map**. The Vault Redundancy Map page is displayed (Figure 4-22).
Step 2 From the **Vault Group** drop-down list, choose Vault Group and click **Select**. All available Vault Groups are displayed. By default, all preferences are set to **Ignore**.

*Note* Only national Vault Groups are displayed on the Vault Redundancy Map page. If Ingest Steering is enabled and local Vault Groups are configured, the local Vault Groups are not displayed on the Vault Redundancy Map page. This is because only national Vault Groups can participate in mirroring content of national Vault Groups. Local Vault Groups mirror content among the Vaults in the same group.

Step 3 Choose the preference setting for the Vault Group. The possible preferences are:

- **Mirror**—Content is mirrored to this Vault Group, and this Vault Group becomes the source for content requests from Streamers or Caching Nodes if the primary Vault Group becomes unavailable. You can select up to three Vault Groups to which to mirror content.

*Note* The **Vault Mirror Copies** field in the Server Setup page determines the number of mirrored copies kept in the VDS for the content stored on the specified Vault. See the “Configuring the Servers” section on page 4-128 for more information. The Vault Redundancy Map page specifies which Vault Groups participate in the content mirroring.

If a local Vault Group has only one Vault, to ensure each local Vault Group has redundant copies of the content, set the **Vault Local Copies** field to a number greater than one.

- **Ignore**—Do not use this Vault Group for mirroring or as a backup source of content.
Step 4  Click Submit.  
To reset the field, click Reset.

To view the Vault Group mappings, choose the Vault Group from the drop-down list and click Display.  
To delete a Vault Group, see the “Configuring Vault Groups” section on page 4-77. When a Vault Group is deleted, the mapping for the Vault Group is also deleted.

Configuring the Master Vault Group

The Master Vault Group page allows you to select the Vault Group that has the master Vault and the master IP address. One of the Vaults in the Master Vault Group is designated the master Vault. If the master Vault fails, another Vault in the Master Vault Group takes over as the master Vault.

**Note**  
All Vaults in the Master Vault Group must be in the same network; otherwise, the master Vault failover fails.

The master IP address is configured as the Content Master IP on the Vault BMS page. See the “Configuring the Vault for BMS Connectivity” section on page 4-65 for more information.

To locate the master Vault in the Master Vault Group, go to the System Health page (Monitor > System Health).

**Note**  
The Master Vault Group page is part of the Vault Groups feature and is displayed only if Vault Groups is enabled. If VVI is enabled, The Master Vault Group page is displayed only on the VVIM. For more information, see the “Virtual Video Infrastructure” section on page F-10 and the “Vault Groups” section on page F-6.

To configure the Master Vault Group, do the following:

**Step 1**  Choose Configure > Array Level > Master Vault Group. The Master Vault Group is displayed.

**Step 2**  Check the Master Vault Group check box associated with the Vault Group.

**Note**  
If Ingest Steering is enabled and local Vault Groups are configured, the local Vault Groups are not displayed on the Master Vault Group page. Only national Vault Groups are displayed on the Master Vault Group page. This is because only national Vault Groups can participate as the master Vault Group.

If the Content Storage feature is set to Distributed, local Vault Groups that are added to a VHO, as well as the Stream Groups that are added to the VHO, are displayed on the Master Vault Group page. Within each VHO, at least one Vault Group or Stream Group must be selected as the Master Vault Group.

**Step 3**  Click Submit.
Configuring the Control and Setup IPs

There can only be one IP address designated as the Setup server or Control/Setup server. The Setup server is another name for the Stream Master IP on the Streamer BMS page. Changing the Setup IP address (or Control/Setup IP address) changes the Stream Master IP on the Streamer BMS page. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 for more information on the Stream Master IP.

The Control server is used to communicate with Lightweight Stream Control Protocol (LSCP) sessions or Real Time Streaming Protocol (RTSP) sessions. Each Control server handles up to 10,000 LSCP sessions. You can use the Stream Master IP (Setup IP) as one of your Control server IP addresses. You must configure a Control server for each group of up to 10,000 LSCP sessions. For instance, if you have 11,000 LSCP sessions, you need to configure two Control servers. The Control servers are associated with each Stream Group. There is only one Control server for each Stream Group.

For more information about the Control and Setup servers, see the “Streamer Workflow” section on page 2-9.

To configure a Control/Setup IP, do the following:

**Step 1** Choose **Configure > Array Level > Control/Setup IP.** The Control/Setup IP page is displayed (Figure 4-23).

**Figure 4-23 Control/Setup IP Page**

<table>
<thead>
<tr>
<th>Stream Group</th>
<th>Control/Setup IP</th>
<th>Subnet Mask</th>
<th>IP Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>StreamGroup1</td>
<td>172.22.36.12</td>
<td>255.255.250.0</td>
<td>Setup IP</td>
</tr>
<tr>
<td></td>
<td>172.22.37.199</td>
<td>255.255.255.0</td>
<td>Control IP</td>
</tr>
<tr>
<td>StreamGroup2</td>
<td>172.22.36.22</td>
<td>255.255.250.0</td>
<td>Control IP</td>
</tr>
</tbody>
</table>

**Step 2** If the VDS is configured for VVI in an ISA environment, the Control/Setup IP page first displays the *Configured VHOs* drop-down list. Choose a VHO.
Each VHO must have at least one Stream Group assigned to it and must have one Stream Group configured as the Setup IP or the Control/Setup IP. The other Stream Groups in the VHO must be configured as a Control IP.

**Step 3**
For each Stream Group, enter the IP address and subnet mask of the Control IP, Setup IP, or Control/Setup IP.

**Step 4**
From the **IP Type** drop-down list, choose an IP type. See **Table 4-35** for descriptions of the types.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control IP</td>
<td>IP address used only for LSCP client or RTSP client control.</td>
</tr>
<tr>
<td>Setup IP</td>
<td>Setup IP address is the same as the Stream Master IP. Any change to the Setup IP is reflected in the Stream Master IP field on the Streamer ISA page. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 for information about the Stream Master IP.</td>
</tr>
<tr>
<td>Control/Setup IP</td>
<td>Control/Setup IP address used for LSCP client control and as the Master Stream Service. Only one IP address can be designated as the Setup IP.</td>
</tr>
</tbody>
</table>

**Note**
There can only be one Setup IP or Control/Setup IP address among all the Stream Groups.

**Step 5**
Click **Submit**.

To reset the field, click **Reset**.

**Note**
All currently configured Control/Setup IPs are listed in the Configured Control/Setup IPs section of the Control/Setup IP page.

To edit a Control/Setup IP, make any changes to the Control/Setup IP as necessary and click **Submit**.

To delete a Control/Setup IP, check the **Delete** check box and click **Submit**.

### Configuring Sites

The Site Setup page allows you to create sites and assign Stream Groups, Cache Groups, and Vault Groups to them for configuring thin pipe maps. To configure thin pipe maps, you must first configure the sites.

To configure a site, do the following:

**Step 1**
Choose **Configure > Array Level > Site Setup**. The Site Setup page is displayed.

**Step 2**
From the **Select Site to View/Edit** drop-down list, choose **Add New Site** and click **Display**.

To edit a site, choose the site from the drop-down list and click **Display**.

**Step 3**
In the **New Site Name** field, enter the name of the site and click **Submit**.
You can use only alphanumeric characters (0-9, a-z, A-Z), the dash (-), and the underscore (_) to create a Site name.

**Step 4**

Add the appropriate Stream Groups, Vault Groups, and Cache Groups to the site.

The unassigned groups are listed along with a drop down-list for each that offers the options described in Table 4-34.

### Table 4-36 Group Options

<table>
<thead>
<tr>
<th>Group Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change</td>
<td>Do not make any changes to the site assignment.</td>
</tr>
<tr>
<td>Site Name</td>
<td>Add this group to this site.</td>
</tr>
<tr>
<td>None</td>
<td>Remove this group from this site. Applicable only to groups assigned to the selected site.</td>
</tr>
<tr>
<td>Don’t Change</td>
<td>Do not assign this group to this site.</td>
</tr>
</tbody>
</table>

**Step 5**

Click **Submit**.

To reset the field, click **Reset**.

To view the members of a site, choose the site from the drop-down list and click **Display**.

To delete a site, first remove all groups from the site, then click **Delete Site**.

---

### Configuring Cache-Fill Bandwidth Using Thin Pipe Mapping

The Thin Pipe Map page allows you to configure low-bandwidth connections between local and remote sites. A local site consists of groups of servers in the same site, for example, all the Streamers in a Stream Group are considered part of the same site, or local site. A remote site consists of groups of servers in other Stream Groups, Cache Groups, and Vault Groups. Before you can configure thin pipes, you must define the sites. For more information, see the “Configuring Sites” section on page 4-89.

There can be multiple thin pipes configured for each local site. As an example, a site with Caching Nodes organized into a Cache Group could have one 500-Mbps thin pipe going to a site with a Vault Group, and a second 500-Mbps thin pipe going to a site with a Stream Group. The thin pipes are completely independent of each other. Additionally, thin pipes can be created among servers at the same site by selecting the same site for Local Site and Available Remote Site.

The Thin Pipe Map page also allows for the configuration of thin pipes in a hierarchy, where a remote site must be reached through several pipes. For example, a Cache Group could have a 500 Mbps thin pipe over which it streams to multiple Stream Groups. Each Stream Group could have separate 100 Mbps thin pipes. In this case, the Cache Group traffic on egress to all Stream Groups is limited to 500 Mbps, while ingress traffic to each Stream Group from this Cache Group is limited to 100 Mbps.

---

**Note**

The Thin Pipe Map page is displayed only if Thin Pipe Management is enabled. See the “Thin Pipe Management” section on page F-8 for more information.
For CCP traffic to work properly in the VDS, the following configuration needs to exist:

- Thin pipe mapping must be configured in the VDS.
- DiffServ AF settings must be configured on the VDS servers.
- Routers must support the bandwidths that are configured for the thin pipe mapping on the VDS.

The configured bandwidth for CCP on the Thin Pipe Map page must be the minimum bandwidth reserved for the AF class. The sum of the bandwidths of all physical links configured for CCP among all sites must be less than the bandwidth configured for the AF class reserved for CCP.

CCP is used as the protocol among Vaults and Caching Nodes in a VVI that uses HTTP, and among all servers in a VVI that uses CCP and in all non-VVIs. The AF class is configured on each VDS server. See the “Configuring the Servers” section on page 4-128 for more information.

As an example, Figure 4-24 shows the maximum bandwidth available for the various groups in a Virtual Video Infrastructure (VVI) system with two super headends (SHEs) and three caching sites.

**Figure 4-24 Thin Pipe Example**

The maximum bandwidth available is dictated by the physical link, as well as by any network design constraints placed on bandwidth availability. If a switched network has further restrictions, for example, Super Headend 1 (SHE1) to Super Headend 2 (SHE2) and Cache Site 3 share a 3 Gbps link on the route between SHE1 and the other two sites, then another thin pipe must be configured to specify this 3-Gbps restriction.

Table 4-37 lists the thin pipe mappings that would be configured for the different sites illustrated in Figure 4-24.
The thin pipes configured in Table 4-37 ensures that the bandwidth for SHE1 never exceeds the maximum bandwidth available for SHE1, which is 5 Gbps. This means that even if all remote sites were requesting cache fills from SHE1, which would be a maximum throughput of 9 Gbps, the actual maximum bandwidth of cache-fill traffic coming from SHE1 would never exceed 5 Gbps.

One server in the site is elected as the bandwidth manager for all servers in the site. The bandwidth manager controls the traffic leaving the site to any other site and queries all the VDS servers in the site for the thin pipe mapping configuration of each VDS server. For more information about the bandwidth manager, see the “Bandwidth Manager for Thin Pipe” section on page 2-8.

### Table 4-37 Thin Pipe Mappings for Thin Pipe Example

<table>
<thead>
<tr>
<th>Thin Pipe Map</th>
<th>Remote Site</th>
<th>Bandwidth (Gbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super Headend 1 (SHE1)</td>
<td>SHE1 to All SHE2, Cache Site 1, Cache Site 2, Cache Site 3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>SHE1 to SHE2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>SHE1 to CS1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SHE1 to CS2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SHE1 to CS3</td>
<td>2</td>
</tr>
<tr>
<td>Super Headend 2 (SHE2)</td>
<td>SHE2 to All SHE1, Cache Site 1, Cache Site 2, Cache Site 3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>SHE2 to CS1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SHE2 to CS2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>SHE2 to CS3</td>
<td>2</td>
</tr>
<tr>
<td>Cache Site 1 (CS1)</td>
<td>CS1 to All SHE1, SHE2, Cache Site 2, Cache Site 3</td>
<td>2</td>
</tr>
<tr>
<td>Cache Site 2 (CS2)</td>
<td>CS2 to All SHE1, SHE2, Cache Site 1, Cache Site 3</td>
<td>2</td>
</tr>
<tr>
<td>Cache Site 3 (CS3)</td>
<td>CS3 to All SHE1, SHE2, Cache Site 1, Cache Site 2</td>
<td>2</td>
</tr>
</tbody>
</table>

The thin pipes configured in Table 4-37 ensures that the bandwidth for SHE1 never exceeds the maximum bandwidth available for SHE1, which is 5 Gbps. This means that even if all remote sites were requesting cache fills from SHE1, which would be a maximum throughput of 9 Gbps, the actual maximum bandwidth of cache-fill traffic coming from SHE1 would never exceed 5 Gbps.

One server in the site is elected as the bandwidth manager for all servers in the site. The bandwidth manager controls the traffic leaving the site to any other site and queries all the VDS servers in the site for the thin pipe mapping configuration of each VDS server. For more information about the bandwidth manager, see the “Bandwidth Manager for Thin Pipe” section on page 2-8.

---

Before you can configure thin pipes, you must define the sites. For more information, see the “Configuring Sites” section on page 4-89.

To configure a Thin Pipe Map, do the following:

**Step 1** Choose **Configure > Array Level > Thin Pipe Map**. The Thin Pipe Map page is displayed.

**Step 2** From the **Configured Pipes** drop-down list, choose **Create New Pipe** and click **Select**.

To edit a Pipe Map, choose the Pipe Map from the drop-down list and click **Select**.

**Step 3** From the **Local Site** drop-down list, choose the site you want to use as the local site for this thin pipe map.

**Step 4** In the **Pipe Name** field, enter the name for the pipe map.
Step 5 In the Max Transmit Bandwidth field and the Max Receive Bandwidth field, enter the maximum transmit and receive megabits per second (Mbps) for this pipe.

Note The Max Bandwidth fields represent the throughput for the pipe, which is defined per site (Stream Group, Cache Group, and so on); not each server. For all existing thin pipes, only the Max Transmit Bandwidth and Max Receive Bandwidth fields are allowed to be edited. All other fields are read only.

If Site 1 has 2 Vault Groups with 2 Vaults each and Site 2 has 1 Cache Group with 2 Caching Nodes, and the network design and physical link were such that it could support 500 Mbps throughput (that is, 500 Mbps transmit and 500 Mbps receive), then the maximum of the Transmit Max Bandwidth cannot exceed 500 Mbps and the maximum of the Receive Max Bandwidth cannot exceed 500 Mbps. Further, the sum of the bandwidths of all physical links configured for CCP among all sites must be less than the bandwidth configured for the AF class reserved for CCP.

Note The bandwidth threshold for each server has an upper limit of 90 percent and a lower limit of 5 percent. For more information, see the “Bandwidth Manager for Thin Pipe” section on page 2-8.

Step 6 In the Available Remote Sites area, check the check box next to each remote site that you want to use this maximum bandwidth restriction.

Step 7 Check the Limit traffic to all HTTP subnets check box if this thin pipe with the Max Bandwidth settings configured is created to limit the bandwidth between the selected Local Site and the HTTP Streamers in a VVI represented by the selected remote sites.

Note This field is only applicable if HTTP is the cache-fill protocol. HTTP as the cache-fill protocol is only supported in RTSP environments.

Step 8 Alternatively, to apply the thin pipe settings to specific HTTP Streamer subnets, uncheck the Limit traffic to all HTTP subnets check box and specify the subnets in the Subnet Configuration section. Enter the Network and Subnet Mask for each subnet. To add more HTTP Streamer subnets, click the plus icon in the Subnet Configuration section.

Note The Subnet Configuration section is only applicable if HTTP is the cache-fill protocol.

Step 9 Click Submit
To reset the field, click Reset.

To delete a thin pipe mapping, choose the pipe name from the Configured Pipes drop-down list, click Select, and click Delete.
Configuring the Ingest Driver Client

The Ingest Driver Client page is used to configure the settings for the Ingest Driver client, which is associated with the Stream Manager in a VVI with split-domain management. The Ingest Driver client is used by the local Content Store at the headend to send requests to the Ingest Driver server at the centralized storage facility and receive responses from the Ingest Driver server.

The Ingest Driver client and Ingest Driver server are part of the ISA Regionalization feature and the Virtual Content Store feature. For more information, see the “ISA Regionalization” section on page 2-13 and the “Virtual Content Store” section on page 2-18.

**Note**
The Ingest Driver Client page is only displayed on the Stream Manager if the Content Storage is set to Distributed. For more information, see the “Content Storage” section on page F-12.

**Note**
Before you can configure the Ingest Driver client for a specific VHO, you must first add the VHOs through the VHO Setup page. See the “Grouping Stream Groups into VHOs” section on page 4-70.

To configure the Ingest Driver client, do the following:

**Step 1** Choose **Configure > Array Level > Ingest Driver Client**. The Ingest Driver Client page is displayed.

**Step 2** From the **VHO Name** drop-down list, choose a VHO.

**Step 3** Enter the Ingest Driver client settings as appropriate. See Table 4-38 for descriptions of the fields.

**Step 4** Click **Submit** to save the settings.

To clear the fields and start over, click **Reset**.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingest Server Manager IP</td>
<td>Virtual IP address configured on the VVIM Ingest Driver Server page.</td>
</tr>
<tr>
<td>Ingest Server Manager Port</td>
<td>The port number configured on the VVIM Ingest Driver Server page. Default is 20000. The port number must be the same for both the Ingest Driver server and the Ingest Driver client.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Maximum idle time allowed before the connection between client and server is closed. Default is 7200.</td>
</tr>
<tr>
<td>Market ID</td>
<td>Identifier for the remote site. Market ID is system generated.</td>
</tr>
<tr>
<td>Asset Factory ID</td>
<td>Name of the VDS Asset Factory that is registered with the OpenStream system. The Asset Factory creates and manages all of the assets within the system. The Asset Factory The default is AssetFactory. Default is AssetFactory</td>
</tr>
<tr>
<td>Asset Factory Kind</td>
<td>Asset factory ID extension. Default is Factory.</td>
</tr>
</tbody>
</table>
Configuring the Media Scheduler

Note
The Media Scheduler page is part of the licensed MediaX feature. For more information see the “Playout Scheduler” section on page F-14.

The Media Scheduler page allows you to schedule content for ingest and generate content metadata. The channels available in the Media Scheduler page are determined by the channels included in the uploaded EPG file and those configured on the Input Channels page. See the “Uploading an EPG File” section on page 7-21 and the “Configuring Input Channels” section on page 4-46 for more information.

The ingest time is calculated by adding the value of the ingest schedule start timeslot to the Publish Time Adjustment field from the Input Channels page.

Note
To be able to schedule content, you must add the channels through the Input Channel page, and then either upload an EPG file to populate the cells in the Media Scheduler, or manually enter the metadata using the Media Scheduler Package Metadata window.

From the Media Scheduler page, you can perform the following tasks:

- Choose the channels to schedule content ingest.
- View the content metadata for each selected timeslot.
- Schedule content to be ingested for a particular channel, provided all required ADI metadata values are available.
- Add metadata values if they are not available, or modify the metadata values.
- Resolve any conflicts in the EPG data.

The following procedure walks you through all these tasks.
User Preferences

To schedule content ingest and edit metadata information, do the following:

---

**Step 1** Choose Configure > Array Level > Media Scheduler. The User Preferences for the Media Scheduler page is displayed (Figure 4-25).

*Figure 4-25  Media Scheduler Page—User Preferences*

---

**Step 2** Choose either Hide On Return or Show On Return to display the user preferences each time you go to the Media Scheduler page.

---

**Note** You can change the user preferences at any time by clicking Edit Settings in the main Media Scheduler page or when the calendar is displayed. To have your settings recalled each time you log in to the CDSM, see the “Changing User Default Settings” section on page 7-6.

---

**Step 3** For Action on Recurring Schedules, choose either Preserve Existing Schedules or Overwrite Existing Schedules. This option is only for user-generated schedules; this option is not for uploaded EPG data. For more information, see the “Package Metadata Editor” section on page 4-100.

Preserving Existing Schedules keeps any content that is currently scheduled for the day and channel you selected and fills only the empty timeslots. Overwrite Existing Schedules overwrites any content that is currently scheduled for the day and channel you selected.
Step 4  When you schedule an event that originated from an uploaded EPG file, the Media Scheduler creates a package name combining the channel name, title brief, and the word “package.” For Package Name Auto-Generation, if the package name already exists and you want a new package name auto-generated, choose **Enable** and the start time is added to the package name. If the package name already exists and you want to create the package name using the Metadata Editor, choose **Disable**.

Step 5  Check the check boxes for the channels you want to schedule.

**Note**  To create new channels, see the “**Configuring Input Channels**” section on page 4-46.

Step 6  Click **Save** to save the settings. The calendar is displayed (Figure 4-26).

---

**Figure 4-26  Media Scheduler Page—Calendar**

To clear the fields and start over, click **Reset**.

---

**Scheduling Content for Ingest**

To schedule content ingest and edit metadata information, do the following:

**Step 1**  Choose **Configure > Array Level > Media Scheduler**. If Hide On Return was selected in the User Preferences, the Media Scheduler calendar is displayed (Figure 4-26). If Show On Return was selected in the User Preferences, the User Preferences are displayed (Figure 4-25).

**Step 2**  From the calendar, click the day you want to schedule. If the month you are scheduling is not shown, use the left and right arrows on either side of the calendar to change the month.

**Note**  Today’s date is displayed with a box around it.

The schedule for the day you selected is displayed (Figure 4-27).
Depending on the status of the schedule, the cells of the schedule that contain data (programs) are displayed in different colors. When you first view the Media Scheduler page with uploaded EPG data, all the programs are in the “Not Scheduled” state. The Media Scheduler page displays a legend describing the different colors for the cells in the schedule.

Small timeslots are marked blue. To view the program information on small timeslots, click the timeslot. The page refreshes and the schedule for the small timeslot is displayed at the bottom of the page.

Tip

To view information about a program, move the mouse pointer over a cell. A pop-up displays the program information (Figure 4-28).

Step 3

Click each cell for each program you want to schedule.

If all the required information for metadata creation is available for the channel and the timeslot, the color of the cell changes to green, indicating that the timeslot is “Marked for Scheduling.”
If all the required information for metadata creation is not available, a new window opens and the Package Metadata Editor is displayed. See the “Package Metadata Editor” section on page 4-100.

Tip Alternatively, you can click the channel column heading to schedule all unscheduled events for that channel. If all required metadata information is available, this method automatically submits the changes and refreshes the page with all the timeslots marked “Scheduled.”

Tip The Bulk Schedule option allows you to schedule the events for multiple channels at the same time. To schedule all channels or a group of channels for a whole day, click Bulk Schedule. The Bulk Schedule dialog box is displayed. Check the check box next to each channel and click Submit. If all required metadata information is available, this method schedules all the timeslots for the day. To check all the channels, check Select All. To uncheck all the channels, check Unselect All. The field alternates from Select All to Unselect All fields.

Note You can only schedule current and future timeslots. However, you can view past timeslots.

Step 4 Click Submit. The Media Scheduler page refreshes and all the “Marked for Scheduling” cells are changed to “Scheduled.”

Note Only current and future schedule entries can be edited.

To remove a scheduled ingest, click the scheduled timeslot. The timeslot changes from “Scheduled” to “Marked for Unscheduling.” Click Submit.

Tip You can mark timeslots for unscheduling and mark different timeslots for scheduling, and submit all the changes at one time.
Package Metadata Editor

The Package Metadata Editor allows you to edit or view existing metadata, or to enter new metadata for any future unused timeslot.

To use the Package Metadata Editor, do the following:

**Step 1**
To enter new metadata for any unused timeslot, click the unused timeslot. To edit existing metadata, double-click the scheduled timeslot. A new window opens and the Package Metadata Editor is displayed (Figure 4-29).

**Figure 4-29 Package Metadata Editor—User-Generated Timeslot**

Metadata that originates from an EPG file is created using a combination of channel values (set in the Input Channels page) and data uploaded from the EPG file. If all the data is available, the metadata is generated, the content is scheduled for ingest, and the start time is set for publishing the content.
Step 2  For metadata created from user-generated schedules, there is an option for recurring schedules (Figure 4-30).

**Figure 4-30  Recurring Schedule Options for User-Generated Schedules**

Check the **Recurring Schedules** check box to copy the metadata information to the timeslots specified in the Recurring Schedule fields. See Table 4-39 for descriptions of the Recurring Schedule fields.

**Table 4-39  Recurring Schedule Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence Pattern</td>
<td>Daily</td>
<td>If Daily is selected, the metadata is copied to the same timeslot each day until the Recurrence End Time is reached.</td>
</tr>
<tr>
<td></td>
<td>Weekly</td>
<td>If Weekly is selected, the metadata is copied to the same timeslot on each day of the week selected (Sun, Mon, Tue, Wed, Thu, Fri, Sat) until the Recurrence End Time is reached.</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>If Monthly is selected, the metadata is copied to the same timeslot on the week selected (1st, 2nd, 3rd, 4th, last) and day of the week selected (Sun, Mon, Tue, Wed, Thu, Fri, Sat) until the Recurrence End Time is reached.</td>
</tr>
<tr>
<td>Series ID</td>
<td>On clicking Series ID radio button, <strong>All Episodes</strong> and <strong>New Episodes</strong> radio buttons are available for setting the recurring schedule. On clicking <strong>All Episodes</strong> radio button, the metadata is copied to the same timeslot on the occurrence of every episode. On clicking <strong>New Episodes</strong> radio button, the metadata is copied to the same timeslot on the occurrence of every new episode. <strong>Note</strong> Is available only if the particular event is a series.</td>
<td></td>
</tr>
<tr>
<td>Recurrence End Time</td>
<td>One year from start time</td>
<td>Recurrence Pattern is repeated for one year from the metadata Start Time.</td>
</tr>
<tr>
<td></td>
<td>End After</td>
<td>Recurrence Pattern is repeated the number of times you specify in the occurrences field.</td>
</tr>
<tr>
<td></td>
<td>End By</td>
<td>Recurrence Pattern is repeated until the date you specified in the End By field is reached.</td>
</tr>
</tbody>
</table>

Depending on the setting in the User Preferences settings, any existing metadata is preserved or overwritten. See the “User Preferences” section on page 4-96 for more information.
Fixing Conflicts in the Media Scheduler

Conflicts can occur as a result of the following scenario:

- Information was uploaded from an EPG file and the Media Scheduler is using this information. However, the schedule was modified.
- The schedule information is updated with new entries for the same time and channel, but each entry has different content information.

Starting from Release 3.9, the media scheduler conflict reporting is enhanced to support different conflict scenarios. The table below describes the different conflict scenarios and the corresponding action taken by VDS-TV.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Conflict Scenario</th>
<th>VDS-TV Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Re-ingesting the same tribune feed.</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Schedule with a change in the Title</td>
<td>Report Conflict.</td>
</tr>
<tr>
<td>3</td>
<td>Schedule with a change in the TV Rating</td>
<td>Overwrite the existing schedule.</td>
</tr>
<tr>
<td>4</td>
<td>Schedule with a change in the Genre</td>
<td>Overwrite the existing schedule.</td>
</tr>
<tr>
<td>5</td>
<td>Schedule with a change in the Series ID</td>
<td>Report Conflict</td>
</tr>
<tr>
<td>6</td>
<td>Schedule with a change in the Original Air Date</td>
<td>Overwrite the existing schedule.</td>
</tr>
<tr>
<td>7</td>
<td>Schedule with a change in the event start time</td>
<td>Report Conflict</td>
</tr>
<tr>
<td>8</td>
<td>Schedule with a change in the event end time</td>
<td>Report Conflict</td>
</tr>
<tr>
<td>9</td>
<td>Schedule with a change in both event start time and the end time</td>
<td>Report Conflict</td>
</tr>
</tbody>
</table>

To view these conflicts and schedule the latest information, do the following:

Step 1 Choose Configure > Array Level > Media Scheduler. The Media Scheduler page displays all the conflicts, including those events that have passed (Figure 4-31).

To go to the main Media Scheduler page, click Go To Scheduler.
Step 2  To fix a scheduling conflict, check the corresponding schedules and click either Overwrite or Retain or Discard. On clicking Overwrite, the old schedule is replaced with the new schedule and is marked scheduled for recording. On clicking Retain, the old schedule is retained and is marked scheduled for recording. On clicking Discard, the schedules are discarded and the slot is made empty.

Note  While resolving conflicts, if any overlap event is found, then overwrite/retain of the event should be done for the complete overlap event occurrence. Partial overwrite/retain may lose some event details. For example, if an event is scheduled from 9AM to 10AM and in successive EPG uploads, if there are two events scheduled from 9AM to 9:30AM and 9:30AM to 10AM, the GUI reports two conflicts. The user must resolve both the conflicts in a single attempt by either clicking Overwrite or Retain.
Step 3  To clear a conflict, click the timeslot. The timeslot gets the latest information and is displayed with the color green, indicating “Marked for Scheduling” if all the metadata information is available.

If all the required information for metadata creation is not available, a new window opens and the Package Metadata Editor is displayed (Figure 4-29). Fill in the metadata as required and click Submit. The Package Metadata Editor window closes.

Step 4  After all the conflicts have been cleared on the Media Scheduler page, click Submit to schedule all “Marked for Scheduling” timeslots.

Configuring SSV Groups

An SSV Group consists of one or more ISVs. ISVs within an SSV Group work as a team with regard to content ingest, cache-fill responses, load distribution, and bandwidth usage. SSV Groups interact with other SSV Groups by passing cache-fill requests among each other based on performance qualification and cost considerations.

Note  The SSV Groups Setup page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

An ISV can never be a member of more than one SSV Group.

Note  The term SSV used in the CDSM GUI is the same as the ISV. The terms are interchangeable.

When grouping ISVs, you should consider network costs, bandwidth usage, and the geographic locations of the ISVs. All ISVs in a group are considered to have the same cost to reach a destination.

Note  The maximum number of SSV Groups is 20.

To configure an SSV Group, do the following:

Step 1  Choose Configure > Array Level > SSV Groups Setup. The SSV Groups Setup page is displayed.

Step 2  From the Select SSV Group to View/Edit drop-down list, choose Add New SSV Group and click Display.

To edit an SSV Group, choose the SSV Group from the drop-down list and click Display.

Step 3  In the New SSV Group Name field, enter the name of the SSV Group and click Submit.

You can use only alphanumeric characters (0–9, a–z, A–Z), the dash (-), and the underscore (_) to create an SSV Group name.

Step 4  Add the SSVs (ISVs) to the SSV Group.

The unassigned SSVs are listed along with a drop down-list for each that offers the options described in Table 4-41.
**Table 4-41  SSV Options**

<table>
<thead>
<tr>
<th>SSV Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Change</td>
<td>Do not make any changes to the SSV Group assignment.</td>
</tr>
<tr>
<td>Vault Group Name</td>
<td>Add this Vault to this SSV Group.</td>
</tr>
<tr>
<td>None</td>
<td>Remove this SSV from this SSV Group. Applicable only to SSVs assigned to the selected SSV Group.</td>
</tr>
<tr>
<td>Don’t Change</td>
<td>Do not assign this SSV to this SSV Group.</td>
</tr>
</tbody>
</table>

**Step 5**  
Click **Submit**.
To reset the field, click **Reset**.

To view the members of an SSV Group, choose the SSV Group from the drop-down list and click **Display**.
To delete an SSV Group, first remove all SSVs from the group, then click **Delete Group**.

**Configuring Manual Ingests**

The Manual Ingest page allows you to manually ingest content.

**Note**  
The Manual Ingest page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

To manually ingest content, do the following:

**Step 1**  
Choose **Configure > Array Level > Manual Ingest**. The Manual Ingest page is displayed (Figure 4-32).

**Figure 4-32  Manual Ingest Page**

![Manual Ingest Page]

**Step 2**  
Enter the Ingest settings as appropriate. See Table 4-42 for a description of the fields.
Table 4-42 Manual Ingest Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP username</td>
<td>The username to log into the FTP server.</td>
</tr>
<tr>
<td>FTP password</td>
<td>The password to log into the FTP server.</td>
</tr>
<tr>
<td>FTP host</td>
<td>The IP address or Fully Qualified Domain Name (FQDN) of the FTP server.</td>
</tr>
<tr>
<td>FTP Directory</td>
<td>The directory path where the content files are located. This can be an absolute or virtual path, depending on how the FTP server is configured. Make sure you begin the FTP path with a forward slash (/). The search includes all subdirectories.</td>
</tr>
<tr>
<td>File Extensions</td>
<td>The extensions of the types of content file you want retrieve. Separate multiple file extensions with a semicolon (;), and begin each file extension with a period (.). For example, to retrieve all MPEGs with a .mpg extension and transport streams with a .ts extension, you would enter the following: .mpg;.ts.</td>
</tr>
</tbody>
</table>

Note: To have the settings for the Manual Ingest fields recalled each time you log in to the CDSM, see the “Changing User Default Settings” section on page 7-6.

Step 3 Click Search to search the FTP server. The search results are displayed (Figure 4-33).

To clear the fields and start over, click Reset.

Each content object that meets the search criteria is listed with the size and location of the file, and whether or not the file has been ingested into the VDS already. All content objects previously ingested are listed with “True” in the Ingested column and the row is colored with a green background.
### Step 4

Check the check box next to each content name that you want to ingest and click **Ingest Selected**. Alternatively, you can click **Check All** to select all listed content objects.

To clear the check boxes and start over, click **Uncheck All** or **Reset**.
Step 5  If Localized EPG Extensions is enabled, the Localized Name and Localized Description fields are displayed for each content object that was ingested. You can enter a name and description for each content object that is used by the EPG Exporter when exporting the content object.

Note  The Localized EPG Extensions feature is an option of the TV Playout feature. For more information, see the “Playout Scheduler” section on page F-14.

Configuring Barker Stream/Playlists

The Barker Stream/Playlists settings are used to configure barker streams for ASI streaming and Barker streams and playlists for Gigabit Ethernet streaming.

A barker stream, carrying interactive promotional trailers of available and upcoming movies and programs, is delivered to a selected service group and program number for ASI streaming and selected output channel for Gigabit Ethernet streaming. Barker streams are also used to broadcast instructional videos on consumer equipment.

A playlist is a list of content objects with the number of loops set for each content that is not associated with an output channel and cannot be started or stopped. The playlist can be scheduled by selecting the timeslot in the Playout Scheduler and selecting Playlist as the Content Type in the Playout Creator window.

Starting from VDS-TV Release 3.9, the PEG/Barker server has an option to stagger the starting time of the barker streams to ensure that the aggregate video bit rate of all the streams does not drop below a certain level even during the video clip transitions.

Note  The Barker Stream/Playlists page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

The Barker Stream/Playlist configuration pages differ depending on whether you are using Gigabit Ethernet Streaming or ASI Streaming. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 for more information on streaming mode.

Note  For information on setting up a fake service groups for a barker streams, see the “Service Groups for Barker Streams” section on page 4-14.

To display information on one Barker Stream at a time, see the “Barker Stream Monitor” section on page 5-37. To display information on all Barker Streams, as well as all playout channels, see the “Playout/Barker Reports” section on page 6-41. For application programming interface (API) information on getting the details of Barker Streams and playout channels, see the Cisco TV VDS 2.5 API Guide.

Gigabit Ethernet Streaming

For Gigabit Ethernet streaming, a barker stream consists of up to 65 content objects and is associated with an output channel for broadcasting, and a playlist consists of up to 65 content objects and is associated with a timeslot on the Playout Scheduler page.
To configure barker streams or playlists for Gigabit Ethernet streaming:

---

**Step 1**
Click **Configure > Array Level > Barker Stream/Playlists**. The Barker Stream page is displayed (Figure 4-34).

**Note**
The Barker Stream page displays the delivery service mode (active-active or active-standby) for the Baker Stream application. To change the delivery service mode, see the “Configuring the TV Playout Application” section on page 7-18.

---

**Figure 4-34 Barker Stream/Playlist for Gigabit Ethernet Streaming Page**

---

**Step 2**
Choose **configure new** and click **Next**.

**Step 3**
For Type, select either **Barker** or **Playlist**.

**Step 4**
In the **Number of Contents** drop-down list, select the number of content objects for the barker stream or playlist.

**Step 5**
Enter the settings as appropriate. See **Table 4-43** for a description of the fields.
Table 4-43  Barker Stream—Gigabit Ethernet Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barker Name or Playlist Name</td>
<td>Enter a name for the barker stream. The name can be from 1 to 25 characters in length and can consist of upper and lower case letters, numbers, and the underscore (_) or dash (-) symbols.</td>
</tr>
<tr>
<td>Output Channel</td>
<td>The output channel used to transmit the barker stream. Only applicable to barker streams.</td>
</tr>
<tr>
<td>Content</td>
<td>From the Content drop-down list, choose the content to use for the barker stream. By typing the first few characters of the content name, you can jump to that section of the list. All content that has been ingested through the BMS or manually ingested is listed alphabetically. <strong>Note</strong> The minimum content duration for a PEG/Barker stream should be greater than 30 seconds.</td>
</tr>
<tr>
<td>Loops</td>
<td>Enter the number of times the content object will loop. An entry of 0 means infinite looping.</td>
</tr>
</tbody>
</table>

**Step 6**  Click **Submit**.

To delete a barker stream, click **Delete**. To clear the fields and start over, click **Reset**.

**Step 7**  To play the barker stream, click **Start Barker**.

Playlists can be schedule for play by using the Playout Scheduler.

**Note**  A content object loops the specified number of times before the barker stream continues on to the next content. The barker stream loops indefinitely.

**Note**  You cannot add/replace or delete a content when the barker stream is playing.

**Tip**  To edit a barker stream, choose the barker stream and click **Next**. Enter the new settings and click **Submit**. To add new content, choose the number of content objects to add from the **add content** drop-down list.

If the barker stream is playing at the time changes are submitted, the stream stops. You need to click **Start Barker** to restart the stream.

**Tip**  To view a Barker Stream settings, see the “Barker Stream Monitor” section on page 5-37.

**ASI Streaming**

For ASI streaming, a barker stream consists of up to 65 content objects and is associated with a service group and program number for broadcasting.
To configure Barker Streams for ASI streaming:

**Step 1**
Click **Configure > Array Level > Barker Stream/Playlists**. The Barker Stream page is displayed.

**Note**
The Barker Stream page displays the delivery service mode for the Baker Stream application. To change the delivery service mode (active-active or active-standby), see the “Configuring the TV Playout Application” section on page 7-18.

**Step 2**
Choose **configure new** and click **Next**.

**Step 3**
In the **Number of Contents** drop-down list, select the number of content objects for the barker stream or playlist.

**Step 4**
Enter the Barker Stream settings as appropriate. See Table 4-44 for a description of the fields.

**Table 4-44 Barker Stream—ASI Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barker Name</td>
<td>Enter a name for the barker stream. The name can be from 1 to 25 characters in length and can consist of upper and lower case letters, numbers, and the underscore (_) or dash (-) symbols.</td>
</tr>
<tr>
<td>Service Group</td>
<td>From the Service Group drop-down list, choose a service group that will stream the barker. All service groups currently configured on the VDS are listed.</td>
</tr>
<tr>
<td>Program Number</td>
<td>Enter the program number that identifies this barker stream.</td>
</tr>
<tr>
<td>Content</td>
<td>From the Content drop-down list, choose the content to use for the barker stream. By typing the first few characters of the content name, you can jump to that section of the list. All content that has been ingested through the BMS or manually ingested is listed alphabetically. <strong>Note</strong> The minimum content duration for a PEG/Barker stream should be greater than 30 seconds.</td>
</tr>
<tr>
<td>Loops</td>
<td>Enter the number of times the content object will loop. An entry of 0 means infinite looping.</td>
</tr>
</tbody>
</table>

**Step 5**
Click **Submit**. To delete a barker stream, click **Delete**.

To clear the fields and start over, click **Reset**.

**Step 6**
To play the barker stream, click **Start Barker**.

**Tip**
To edit a Barker stream, choose the Barker stream and click **Next**. Enter the new settings and click **Submit**. To add new content, choose the number of content objects to add from the **add content** drop-down list. If the Barker stream is playing at the time changes are submitted, the stream will stop. You will need to click **Start Barker** to restart the stream.

**Tip**
To view a Barker Stream settings, see the “Barker Stream Monitor” section on page 5-37.
Configuring Playout Scheduler

The Playout Scheduler page allows you to schedule content that is streamed to a broadcast QAM. The playout channels available are determined by the IP address and port of the broadcast QAM and are configured in the Output Channels page. See the “Configuring Output Channels” section on page 4-50 for more information.

Note

The Playout Scheduler page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

To display information on all playout channels, as well as all Barker Streams, see the “Playout/Barker Reports” section on page 6-41. For API information on getting the details of Barker Streams and playout channels, see the Cisco VDS-TV API Guide, Release 3.7.

Note

You can only schedule current and future playout timeslots. Past timeslots are not displayed.

To configure a playout schedule, do the following:

Step 1

Choose Configure > Array Level > Playout Scheduler. The User Preferences for the Playout Schedule page are displayed (Figure 4-35).

Figure 4-35  Playout Scheduler Page—User Preferences

![Playout Scheduler Page—User Preferences](image)
Step 2  For the Preference Editor, choose either Hide On Return or Show On Return to display the User Preferences each time you go to the Playout Scheduler page.

Step 3  For the Action on Recurring Schedules, choose either Preserve Existing Schedules or Overwrite Existing Schedules.

Preserving Existing Schedules keeps any content that is currently scheduled for the day and channel you selected and only fills in the empty timeslots. Overwrite Existing Schedules overwrites any content that is currently scheduled for the day and channel you selected.

Step 4  The Content Selection option determines how the content objects are displayed in the CDSM Playout Creator Window. For the Content Selection, choose either User Suggester or Use Select Box.

Use Suggester displays a text box for selecting content, and Use Select Box displays a drop-down list. If there are a large number of content objects, the Use Suggester is the preferred choice.

- If Use Suggester is selected, as you type in the text box, content matching the text is displayed in a list. If you click Search, The Content List window is displayed with the following options:
  - Quick Lists—Click Most Recent Ingests, and the 25 most recently ingested content objects are listed.
  - Browse Content—Click a character in the Browse Content section, and all content objects beginning with that letter are listed.
  - Content List—Displays the results of the Search, the Quick List, or the Browse Content selection. The content name and ingest time are listed.

You can select a content object from the Content List, or select Close in the upper-right corner of the window and start your search again.

- If Use Select Box is selected, use the down arrow of the drop-down list to display the list and select the content object.

Step 5  In the Channels to Schedule section, check the check boxes for the channels you want to schedule, or check the Select All check box to choose all channels.

Note You can change the user preferences at any time by clicking Edit Settings in the main Playout Scheduler page or when the calendar is displayed. To have your settings recalled each time you log in to the CDSM, see the “Changing User Default Settings” section on page 7-6.

Note To create new channels, see the “Configuring Output Channels” section on page 4-50.

Step 6  Click Save to save the settings. The calendar is displayed (Figure 4-36).

To clear the fields and start over, click Reset.
Step 7  To view the days that have scheduled content for a channel, from the Channel drop-down list, select a channel. The days that have been scheduled for the selected channel are highlighted in the calendar.

For example, in Figure 4-36, CHAN-31 has been selected and October 10, 11, and 12 are highlighted, indicating those days have been scheduled content for CHAN-31.

Step 8  From the calendar, click the day you want to schedule. If the month you are scheduling is not shown, use the left and right arrows on either side of the calendar to change the month.

Note  Today’s date is displayed with a box around it.

If you selected a channel from the Channel drop-down list, then only that channel is displayed in the Playout Scheduler. To have the channels specified in the User Preferences display again, from the Channel drop-down list, select Select a Channel.

The schedule for the day you selected is displayed (Figure 4-37).

Note  The Playout Scheduler page displays the delivery service mode for the Playout Scheduler application. To change the delivery service mode (active-active or active-standby), see the “Configuring the TV Playout Application” section on page 7-18.
Figure 4-37  Playout Scheduler Page–Schedule

Note
If you imported a Playout file that covers the channels and day you selected, the Playout Schedule displays this information. For more information, see the “Importing a TV Playout Schedule” section on page 7-20.

The timeslots have different colors depending on the status of the scheduled content and the type of content. The Playout Scheduler page displays a legend describing the different colors for the timeslots in the schedule.

Small timeslots are marked blue. To view the program information on small timeslots, click the timeslot. The page refreshes and the schedule for the small timeslot is displayed at the bottom of the page. Starting from Release 3.9, the playout scheduler starts listing time slots for scheduling from the current time.

Step 9
To schedule a content, click the time you want to schedule. A new window opens and the Playout Creator is displayed (Figure 4-38).
a. In the Content Type, select either Content or Playlist. Content displays all content ingested. Playlists displays all playlists created by using the Barker Stream/Playlists page.

b. If the Content Selection option was selected in the User Preferences is Use Select Box, use the down arrow of the Content drop-down list to display the list and select the content object.

If Use Suggester was selected, as you type in the text box, content matching the text is displayed in a list. If you click Search, The Content List window is displayed (Figure 4-39) with the following options:

- Quick Lists—Click Most Recent Ingests, and the 25 most recently ingested content objects are listed.
- Browse Content—Click a character in the Browse Content section, and all content objects beginning with that letter are listed.
- Content List—Displays the results of the Search, the Quick List, or the Browse Content selection. The content name and ingest time are listed.

You can select a content object from the Content List, or select Close in the upper-right corner of the window and start your search again.
c. In the **Set Play Length** fields, enter the **Start Date**. The End Date and Time fields are adjusted automatically based on the length of the content you selected. Alternatively, you can choose the number of times the content loops up to a maximum value of 12 hours after the content start time. In this case, the End Date and Time fields are dimmed.

You can edit the End Date and Time fields with a maximum value of 12 hours after the content start time, and the content continues to loop as necessary and terminate at the end time.

d. To set a recurring schedule, check the **Recurring Schedules** check box.

   - **Recurrence Pattern**—Choose either Daily, Weekly, or Monthly
   - **Recurrence End Time**—Choose either **One year from start time**, **End After** and enter the number of occurrences, or **End Day** and enter the date using the drop-down lists for month, day, and year.

e. Click **Submit**.

The next timeslot is adjusted based on the length of the content object you selected. For example, if you selected a 17 minute long content object to run once at midnight, the next time slot available would be 12:17am. The timeslot is marked green, indicating “Scheduled Content.”

**Step 10**  Repeat **Step 9** for each timeslot you want to schedule.

**Step 11**  Adjust the content in the timeslots as necessary.
To unschedule a scheduled content, click the timeslot that has “Scheduled Content.” The timeslot changes from “Scheduled Content” to “Marked for Unscheduling.” Click Schedule/Unschedule. You can mark several timeslots for unscheduling and submit all the changes at one time.

To reschedule content that is “Unscheduled,” click the timeslot. The timeslot changes to “Marked for Scheduling.” Click Schedule/Unschedule. The time slot is scheduled. You can mark several timeslots for scheduling and submit all the changes at one time.

To delete content from a timeslot, select the timeslot and click Delete.

To delete all the content of a specific channel for the day, click the channel column header, a popup menu is displayed (Figure 4-40). Select Delete All Scheduled Events and click Submit.

To copy a schedule for a channel to a different channel over a range of days, click the channel column header, a popup menu is displayed (Figure 4-40). Select Copy All Scheduled Events to, specify the from date/to date and channel, and select either to Preserve existing schedules or Overwrite existing schedules.

Preserving existing schedules keeps any content that is currently scheduled for the day and channel you selected and only fills in the empty timeslots. Overwrite existing schedules overwrites any content that is currently scheduled for the day and channel you selected.

Figure 4-40 Channel Popup Menu

Tip
To view information about a program, move the mouse pointer over a cell. A pop-up displays the program information (Figure 4-41).
Tip
To edit a scheduled content, double-click the timeslot. The Playout Creator window displays the information for editing. Change the information and click Submit. Only current and future schedule entries can be edited. For information about editing current timeslots, see the “Changing Current Timeslots” section on page 4-119.

Step 12
Once you have completed the playout schedule for the selected day, you can fill in the remaining empty timeslots with a content you choose from the Filler Content field at the bottom of the page. See Figure 4-42.

Figure 4-42  Playout Scheduler Page–Filler Content

a. In the Filler Content field, type the first few characters of the content object name, a list of content objects beginning with those letters are displayed. Choose the content object.

b. From the Channel drop-down list, select the channel for the Filler Content, or select “All” for all channels for the selected day.

c. Click Add Fillers.

Alternatively, click Select Multiple Channels. The “Select the channels to add fillers” dialog box is displayed. Check the check box next to each channel that is to receive the filler content, or check the Select All check box. Click Submit. The filler content is propagated to all empty timeslots. To cancel the operation, click Cancel.

Note
Once the filler content is submitted by either method, all timeslots that are populated with filler content display as “Scheduled Content.”

Step 13
Continue to fill any remaining timeslots.

Changing Current Timeslots
A current timeslot is a timeslot that contains the present time. For example, if the time is 13:15, the timeslot from 13:00 to 13:30 is the current timeslot. Following are the rules about changing the current timeslot:

1. If content is playing, you can replace the current content with new content, but you cannot change the start and end times. If the new content is shorter than the remaining time that was allotted for the original content, the new content loops as necessary and terminates at the start time of the next scheduled content. If the new content is longer than the remaining time that was allotted for the original content, the new content will terminate at the start time of the next scheduled content.

2. If no content is playing, content added to the current timeslot will automatically get the current time as the start time, but you can edit the end time. The new content will loop as necessary and terminate at the configured end time.
Exporting a Playout Schedule

The Playout Exporter allows you to create an XML file that contains information from the Playout Scheduler for a specific channel or all channels. The XML file then can be viewed, saved, and imported into another VDS to create program listings.

**Note**
The Playout Exporter page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

To export a playout schedule, do the following:

**Step 1** Choose **Configure > Array Level > Playout Exporter**. The Playout Exporter page is displayed (Figure 4-43).

**Figure 4-43 Playout Exporter Page**

<table>
<thead>
<tr>
<th>From Date</th>
<th>To Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 15, 2008</td>
<td>May 15, 2008</td>
</tr>
</tbody>
</table>

**Output Channel Schedules To Export**

- [ ] channel0
- [ ] channel1
- [ ] channel2
- [ ] channel3
- [ ] channel4
- [ ] channel5
- [ ] channel6
- [ ] channel7
- [ ] channel8
- [ ] channel9
- [ ] channel10
- [ ] channel11
- [ ] channel12
- [ ] channel13
- [ ] channel14
- [ ] channel15
- [ ] channel16

[ ] Select All

[ ] Generate

[ ] Reset

**Step 2** Using the drop-down lists provided, or the calendars, select a From Date and To Date for the export file.

**Step 3** From the Output Channel area, check the check box for each channel you want to include, or “Select All,” and click Generate.

The export file is generated.

To clear the fields and start over, click Reset.

**Step 4** To save the file, right-click **Exporter File** and select “Save Link As,” “Save Link Target As,” or “Save Target As” depending on the web browser you are using. A “Save As” dialog box is displayed.

To open the file, click **Exporter File**.

After an export file is created and saved, it can be imported into a system that displays program listings to the end-user.
Exporting a Playout Schedule for an EPG

**Note**
The EPG Exporter feature is only displayed if the Localized EPG Extensions option is enabled for the TV Playout feature. For more information, see the “Playout Scheduler” section on page F-14.

The EPG Exporter allows you to create an XML file that contains information from the playout schedule for a specified channel or all channels. The XML file then can be viewed, saved, and imported into a system to create program listings.

To create an EPG Schedule, do the following:

**Step 1** Choose **Configure > Array Level > EPG Exporter**. The EPG Exporter page is displayed.

**Step 2** Using the drop-down lists provided, or the calendars, select a **From Date** and **To Date** for the EPG file.

**Step 3** Select the channels, or “Select All,” and click **Generate**.

The EPG file is generated.

To clear the fields and start over, click **Reset**.

**Step 4** To save the file, right-click **EPG File** and select “Save Link As,” “Save Link Target As,” or “Save Target As” depending on the web browser you are using. A “Save As” dialog box will be displayed.

To open the file, click **EPG File**.

Once an EPG file is created and saved, it can be imported into a system that displays program listings to the end-user.

Configuring Array Level Error Repair

The VOD Error Repair settings can be configured on the System Level, Array Level, and the Server Level. Settings configured at the Array Level take precedence over System Level settings, and settings at the Server Level take precedence over Array Level or System Level settings.

**Note**
VOD Error Repair is a licensed feature. VOD Error Repair requires the LSCP Client Protocol be set to Cisco (RTSP) and the set-top have the Cisco Visual Quality Experience Client (VQE-C) software running on it. For more information, see the “VOD Error Repair” section on page F-9.

To configure error repair at the Array Level, do the following:

**Step 1** Choose **Configure > Array Level > Error Repair**. The Error Repair page is displayed.
Step 2  From the Select Stream Group to View/Edit, select a Stream Group and click Display.

Step 3  Enter the Error Repair settings as appropriate. See Table 4-45 for descriptions of the fields.

Table 4-45  VOD Error Repair Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error Repair Mode</td>
<td></td>
</tr>
<tr>
<td>ER Enable</td>
<td>To enable Error Repair, check the ER Enable check box.</td>
</tr>
<tr>
<td>RTP Encapsulation Enable</td>
<td>To enable RTP encapsulation, check the RTP Encapsulation Enable check box.</td>
</tr>
<tr>
<td></td>
<td>TV VDS supports both UDP and RTP encapsulation. If the RTP Encapsulation</td>
</tr>
<tr>
<td></td>
<td>Enable check box is not checked, the VDS is configured to only handle UDP</td>
</tr>
<tr>
<td></td>
<td>encapsulation.</td>
</tr>
<tr>
<td>Repair Packets DSCP</td>
<td></td>
</tr>
<tr>
<td>DSCP of Repair Packets Sent</td>
<td>DSCP value for the transmitted RTP and RTCP packets sent for error repair.</td>
</tr>
<tr>
<td></td>
<td>The range is from 0 to 63. The default is 0.</td>
</tr>
<tr>
<td>RTCP Report Exporting</td>
<td></td>
</tr>
<tr>
<td>Exporting</td>
<td>Click the Enabled radio button to enable exporting of the RTCP reports.</td>
</tr>
<tr>
<td></td>
<td>The RTCP reports can be exported to a third-party analysis application.</td>
</tr>
<tr>
<td>IP Address</td>
<td>Enter the IP address or the domain name of the server hosting the analysis</td>
</tr>
<tr>
<td></td>
<td>application.</td>
</tr>
<tr>
<td>TCP Ports</td>
<td>Enter the TCP port number that is used to receive the reports on the server</td>
</tr>
<tr>
<td></td>
<td>hosting the analysis application.</td>
</tr>
</tbody>
</table>

Step 4  Click Submit.

To clear the fields and start over, click Reset.

To return the settings to the factory default values, click Factory.

To monitor the VOD Error Repair feature, use the Application Monitoring Tool (AMT). For more information, see Appendix E, “Using the TV VDS Streamer Application Monitoring Tool.”
Server Level Configuration

After a server has been initially configured (see the “Initially Configuring the Devices” section on page 3-1), the CDSM detects it and the IP address or nickname of the server is available for selection in the server drop-down lists.

The Server Level tab has the following configuration options:

- Configuring the Interfaces, page 4-123
- Configuring the Servers, page 4-128
- Configuring the Recorder, page 4-135
- Configuring the Route Table, page 4-138
- Configuring the SNMP Agent, page 4-140
- Configuring the Server Level DNS, page 4-143
- Configuring the Server Level NTP, page 4-144
- Configuring the Server Level Logging, page 4-147
- Configuring the Server Level Syslog, page 4-149
- Configuring Server Level Error Repair

Configuring the Interfaces

The Interface Setup page is used to configure the different interfaces on the VDS servers. The functionality of the Ethernet interfaces on the VDS servers is configurable. However, there is an optimal configuration for each server. The interface functions are described in Table 4-47.

Starting from Cisco VDS-TV Release 3.7, network interface bonding is supported on all types of VDS servers such as vaults, cache, streamers and VDS Controllers. Only Linux controlled ethernet ports can support NIC bonding. CServer controlled ports cannot be used for NIC bonding. The Linux interfaces that supports bonding for different VDS-TV hardwares are listed below:

<table>
<thead>
<tr>
<th>VDS-TV Hardware</th>
<th>Linux interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDE 460</td>
<td>eth0, eth1, eth2 and eth3</td>
</tr>
<tr>
<td>CDE 470</td>
<td>eth0, eth1, eth2 and eth3</td>
</tr>
<tr>
<td>CDE 110</td>
<td>eth0, eth1, eth2 and eth3</td>
</tr>
<tr>
<td>CDE 100</td>
<td>eth0, eth1, eth2 and eth3</td>
</tr>
<tr>
<td>CDE 250</td>
<td>eth0 and eth1</td>
</tr>
<tr>
<td>CDE 220</td>
<td>eth0 and eth1</td>
</tr>
<tr>
<td>CDE 420</td>
<td>eth0 and eth1</td>
</tr>
<tr>
<td>UCSC-220M4-2U1</td>
<td>eth0 and eth1</td>
</tr>
</tbody>
</table>

To create a bonding interface, user must specify at least two Ethernet interfaces of same type. When bonding is enabled, the current management IP address is assigned to the bonded interface and the corresponding port is selected as a member. An interface can be assigned to only one bonded interface.
minimum of two slave interfaces and a maximum of four interfaces can be bonded at a time. Only interfaces configured as Management, General and Not Used can be bonded and at least one of the interfaces must be a management interface.

**Warning**

If the interface to be bonded is used for a different purpose such as ingest then re-configuration of interfaces is required and it also may require re-cabling. For example, if eth1 is used as an ingest interface then the ingest interface should be moved to a different port before enabling bonding on eth1. The bonded interface LAN wires should be in the same subnet switch/switches.

<table>
<thead>
<tr>
<th>Table 4-47</th>
<th>VDS Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>General</td>
<td>Reserves an Ethernet interface to allow optimal configuration.</td>
</tr>
<tr>
<td>Management</td>
<td>Communicates with other network devices with regards to condition of the server, stream control, and ISA communications.</td>
</tr>
<tr>
<td>Ingest</td>
<td>Establishes connectivity with a content provider system and to ingest content on to a Vault or an ISV.</td>
</tr>
<tr>
<td>Cache</td>
<td>Transports content between Vaults and Streamers, or in the case of VVI, between Vaults, Caching Nodes, and Streamers.</td>
</tr>
<tr>
<td>Stream/Cache</td>
<td>Used on the Streamer for both cache and streaming traffic. If an interface is configured for both cache and streaming traffic on a Streamer, priority is given to the higher-bandwidth stream traffic provided cache traffic is able to transmit on other interfaces.</td>
</tr>
<tr>
<td>Stream</td>
<td>Transports streams to the QAM devices, or to subnets in the case of IPTV.</td>
</tr>
<tr>
<td>Stream Control</td>
<td>Transmits control messages between the set-tops and the Streamers. Designating an interface as a stream control interface allows for the separation of stream control traffic from stream traffic. For more information about stream control, see the “Configuring the Control and Setup IPs” section on page 4-88. To configure a separate route subnet for stream control traffic, see the “Configuring the Recorder” section on page 4-135.</td>
</tr>
<tr>
<td>Locate</td>
<td>Used on the Caching Nodes to communicate with HTTP Streamers. One interface on the Caching Node must be set to Locate for HTTP Streamers. HTTP Streamers are supported only in a Virtual Video Infrastructure (VVI). The Locate interface and port are used by the Locate Port service for communications with third-party streamers that use HTTP to communicate. CCP Streamers do not use the Locate Port; instead, they load-balance locate requests across fill sources. For more information on HTTP Streamers and CCP Streamers, see the “Caching Node Workflow” section on page 2-12. Starting with VDS-TV Release 3.4, this interface is used on the National Vaults to communicate with Local Market Site. One interface on the National Vault must be set to Locate for HTTP communication between the National and Local Market Sites. The Locate interface and port are used by the Locate Port service for HTTP communications between the National and Local Market Sites.</td>
</tr>
</tbody>
</table>
Chapter 4 Configuring the VDS

Server Level Configuration

Table 4-47 VDS Interfaces (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Control</td>
<td>This interface is used when the user requires a separate interface for control traffic that is delivered on a network not reachable from management interface (eth0). The Default Control interface can be configured only on a single interface, it cannot be configured for multiple interfaces. Although not restricted, ideally the “Default Control” interface should be configured on a 1GigE interface, and not a 10GigE.</td>
</tr>
<tr>
<td>Ingest/Stream/Cache</td>
<td>This interface can be used for ingest, streaming, and caching.</td>
</tr>
<tr>
<td>Ingest/Cache</td>
<td>This interface is used on a Streamer-Recorder for ingest and caching traffic.</td>
</tr>
</tbody>
</table>

**Note**
For all CDE servers, the optimal configuration is:
- eth0 as management
- eth1 as ingest on Vaults and ISVs
- All other interfaces are available for cache, stream, stream/cache, stream control, or locate as appropriate for the server

**Note**
For UCSC-220M4-2U1 hardware use eth0 as management.

To configure the interface settings, do the following:

**Step 1** Choose Configure > Server Level > Interface Setup. The Interface Setup page is displayed (Figure 4-44).

**Step 2** From the Server IP drop-down list, choose the IP address or nickname of the server and click Display.

**Note**
Click Compare Configuration, to compare the interface configuration values in the controller database and the interface configuration values in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.
Step 3 To enable Network Interface Bonding for a server, check the **Enable NIC Bonding** check box and select the slave interfaces for the management interface bond.

**Note** The **Enable NIC Bonding** check-box is displayed only if NIC Bonding is enabled in **Maintain > Server > CDSM/VVIM Setup** page

Step 4 Enter the interface settings as appropriate. See Table 4-48 for descriptions of the fields.
### Table 4-48 Interface Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bond Interface Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Slave Interfaces</td>
<td>Select the slave interfaces for management interface bond</td>
</tr>
<tr>
<td><strong>Interface Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>Choose each interface setting as appropriate. See Table 4-47 for descriptions of the different interface types.</td>
</tr>
<tr>
<td>IP Address</td>
<td>IP address for this interface. The IP address set for this interface overrides the default Source IP setting. If you are using Layer 3 communication among Vaults, Caching Nodes, and Streamers, each cache or stream/cache interface must have an IP address. If you are using Layer 2 communication among Vaults, Caching Nodes, and Streamers, IP addresses for cache and stream/cache interfaces are optional.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Subnet mask for this interface.</td>
</tr>
<tr>
<td>Transport Port</td>
<td>This setting applies only to stream or stream/cache interfaces. This is the UDP port number for stream traffic. The port number set for this interface overrides the default transport port setting.</td>
</tr>
<tr>
<td>Cache Port</td>
<td>UDP port number for cache traffic. The port number set for this interface overrides the default cache port setting.</td>
</tr>
</tbody>
</table>

---

**Note** The **Auto Populate IPs** check box is available when the first applicable interface (for example, the first stream interface) is configured with an IP address. If the **Setting** has been selected for each of the remaining interfaces, checking the **Auto Populate IPs** check box and clicking **Auto Populate Now** automatically enters the next consecutive IP address as the IP Address for the next interface, and continues to populate all IP Address fields until they are all filled. Any preexisting IP addresses in the IP Address fields are overwritten.

---

**Step 5** Click **Submit** to save the settings.

To clear the fields and start over, click **Reset**.

---
### Configuring the Servers

After a server has been initially configured, the CDSM detects it and the IP address or nickname of the server is available for selection in the server drop-down lists.

To configure the server settings, do the following:

**Step 1** Choose **Configure > Server Level > Server Setup**. The Server Setup page is displayed.

- **Note** If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To export the configuration of this page for all VDS servers in the system, click **Export**. To import a Bulk Import/Export Configuration XML file, click **Browse** to locate the file, then click **Import** to import the file. The status of the import is displayed in the left panel.

  For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for the Server Setup page and Interface Setup page, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2** From the **Server IP** drop-down list, choose the IP address or nickname of the server and click **Display**.

- **Note** Click **Compare Configuration**, to compare the server settings in the controller database and the server settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.

**Step 3** The fields differ for a Vault, Streamer, Caching Node, and ISV server. The ISV server setup page has a combination of the Vault and Streamer fields. See Table 4-50 for descriptions of the fields and to which server they apply.

  Table 4-49 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arroyorc files.

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>
### Table 4-50 Server Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Name</td>
<td>Fully qualified hostname for this server. The name can be up to 64 characters long. Assigning a hostname is optional. The hostname must be fully qualified, for example: vault.cisco.com. The DNS must be able to resolve the hostname to the IP address you choose, with both forward and reverse lookups. If you enter a hostname that cannot be resolved, you may not be able to access the server.</td>
<td>All servers: Vault, Caching Node, Streamer, ISV</td>
</tr>
<tr>
<td>TTL</td>
<td>IP time to live (TTL) for data packets. The IP TTL default is 16 hops. Valid entries range from 0 to 255.</td>
<td>All servers</td>
</tr>
<tr>
<td>Null Streaming</td>
<td>From the Null Streaming drop-down list, choose Enabled to allow the streaming of null MPEG files, or Disabled to prevent the streaming of null MPEG files.</td>
<td>Streamers, ISV</td>
</tr>
<tr>
<td>Playlist Trick-mode</td>
<td>Informational only. Displays the settings for the Playlist Trick-mode Restrictions. For information on setting these fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>Playlist Range Conversion</td>
<td>Informational only. Displays the settings for the Playlist Range Conversion Mode. For information on setting these fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>STUN Play Error Delay</td>
<td>Session Traversal Utilities for NAT (STUN) Play Error Delay field is available when NAT is enabled through the CDSM Setup page. The NAT feature is part of the Stream Destination feature. NAT is available only for ISA environments that use the LSCP Client Protocol of Cisco (RTSP) or TTV (RTSP). See the “Configuring VHO ISA Settings” section on page 4-71 for more information. The STUN Play Error Delay is the time allowed to complete the connectivity handshake between each callback to the control application by the CServer. The range is from 1 to 2999 milliseconds. The default is 1000.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>STUN Play Timeout</td>
<td>Session Traversal Utilities for NAT (STUN) Play Timeout field is available when NAT is enabled through the CDSM Setup page. The NAT feature is part of the Stream Destination feature. The STUN Play Timeout is the total time the CServer waits before the connectivity check fails. The range is from 1 to 299 seconds. The default is 10.</td>
<td>Streamer, ISV</td>
</tr>
</tbody>
</table>

### Default Stream/Cache Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source IP</td>
<td>Default source IP address for all stream and cache interfaces. If the source IP address is left blank, the default of 192.168.207.65 is used.</td>
<td>All servers</td>
</tr>
<tr>
<td>Starting Transport Port</td>
<td>Beginning default UDP port number used for stream and stream/cache interfaces. If the starting transport port is left blank, the default of 48879 is used.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>Ending Transport Port</td>
<td>Ending default UDP port number used for stream and stream/cache interfaces. There is no default for the ending transport port number.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>Cache Port</td>
<td>Default UDP port number used for cache traffic between servers. If the cache port is left blank, the default of 48879 is used.</td>
<td>All servers</td>
</tr>
<tr>
<td>Allow TCP Traffic</td>
<td>Default is Enabled. To disable TCP traffic on this server, click Disabled. If the VDS is not using HTTP for cache-fill traffic, you can disable TCP traffic.</td>
<td>All servers</td>
</tr>
</tbody>
</table>
### Table 4-50 Server Setup Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ingest MPEG Settings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PID Standardization</td>
<td>Informational only. If this field is set to enable, then MPEG-2 video assets have their program identifiers (PIDs) standardized at ingest so that most assets use the same PIDs. To change the settings of the Ingest MPEG fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td>PSI</td>
<td>Informational only. If this field is set to Enabled, the Program Association Table (PAT) and the Program Map Table (PMT) are standardized so that they do not vary at all between one piece of content and another. To change the settings of the Ingest MPEG fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td>Sequence End Remove</td>
<td>Informational only. If this field is set to enable, a SEQ END header that is present at the end of the asset (and only at the end) is removed on ingest. To change the settings of the Ingest MPEG fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td>Rate Standardize</td>
<td>Informational only. If this field is set to enable, then MPEG-2 video assets have their rates standardized at ingest so that most assets use one of two standard rates, 3.75 Mbps for SD assets or 15 Mbps for HD assets. To change the settings of the Ingest MPEG fields, see the “Configuring MPEG Tuning” section on page 4-36.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td>ATIS Index Setting</td>
<td>Informational Only, this field is set to <strong>Enable</strong> if ATIS C2 Mode is set as Server in <strong>Maintain &gt; Software &gt; VVIM setup</strong> page. If the ATIS C2 mode is server, then statsd running on the vault server, will decide the Index format as ATIS index and send the ATIS structure to the CServer through the IOCTL.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td><strong>Fail Ingest Settings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail Ingest Settings Status</td>
<td>Informational only. If the server settings are out of synchronization with the Fail Ingest configuration settings, a warning message to resubmit the Ingest Tuning page is displayed.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td><strong>Stream Group Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream Group Name</td>
<td>These fields display the Stream Group Name and Stream Group ID that the ISV or Streamer is a member of. The Stream Group Name and Stream Group ID are informational only. To configure Stream Groups, see the “Configuring Stream Groups” section on page 4-75.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td>Streamer Is Cache</td>
<td>If <strong>Streamer Is Cache</strong> is enabled, the Streamer can be used as a possible cache-fill source by a Streamer in a different Stream Group. All Stream Groups that have at least one Streamer with <strong>Streamer is Cache</strong> enabled are displayed on the Stream to Cache Map page, where the Stream Group can be selected as a possible cache-fill source and given a preference. Only the Streamers with <strong>Streamer Is Cache</strong> enabled are used as possible cache-fill sources. The protocol used for cache-fill responses from Streamers is always CCP. For more information, see the “Mapping Stream Groups to Cache-Fill Sources” section on page 4-84.</td>
<td>Streamer, ISV</td>
</tr>
<tr>
<td><strong>Cache Group Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cache Group Name</td>
<td>These fields display the Cache Group Name and Cache Group ID the Caching Node is a member of. The Cache Group Name is informational only. To configure Cache Groups, see the “Configuring Cache Groups” section on page 4-81.</td>
<td>Caching Node</td>
</tr>
<tr>
<td><strong>Vault Group Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vault Group Name</td>
<td>These fields display the Vault Group Name and Vault Group ID the Vault is a member of. The Vault Group Name is informational only. To configure Vault Groups, see the “Configuring Vault Groups” section on page 4-77.</td>
<td>Vault, ISV</td>
</tr>
</tbody>
</table>
### Jumbo Frames Support

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream Jumbo Frames</td>
<td>By default, jumbo frames are disabled on stream interfaces. In this case, stream traffic adheres to standard frames, which have a maximum frame size of 1500 bytes. If jumbo frames are enabled, you need to make sure that your switch is configured to support jumbo frames. The jumbo frame size must be set, at a minimum, to 8192 bytes.</td>
<td></td>
</tr>
<tr>
<td>Cache Jumbo Frames</td>
<td>By default, jumbo frames are disabled on cache interfaces. In this case, cache traffic adheres to standard frames, which have a maximum frame size of 1500 bytes. If jumbo frames are enabled, you need to make sure that your switch is configured to support jumbo frames to be able to communicate across the cache interfaces. The jumbo frame size must be set, at a minimum, to 8192 bytes.</td>
<td></td>
</tr>
</tbody>
</table>

### Server Status

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server Offload</td>
<td>Server Offload shows the current offload status of the server. When Server Offload is enabled, the server is configured to reject new provisioning. Server offload is typically enabled when system maintenance needs to be performed, or when a server needs to be removed from service. For more information, see the “Offloading a Server” section on page 7-12.</td>
<td>All servers</td>
</tr>
<tr>
<td>Vault Mirror Copies</td>
<td>From the drop-down list, choose the number of copies of content to store in the Vaults in the array or site. <strong>Vault Mirror Copies</strong> defines the number of copies that should be maintained within the array. The range is from 0 to 10.</td>
<td>Vault, ISV</td>
</tr>
<tr>
<td>Vault Local Copies</td>
<td>From the drop-down list, choose the number of copies of content that are stored on this server. The range is from 1 to 4.</td>
<td>Vault, ISV</td>
</tr>
</tbody>
</table>

### IP Packet Priority

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
</table>
| DSCP Marking Method | From the **DSCP Marking Method** drop-down list, select one of the following options:  
  - Simple  
  - AutoAF1x, AutoAF2x, AutoAF3x, or AutoAF4x  
  - Custom  
  For more information about the options and associated fields, see the “Configuring QoS Settings” section on page 4-133.  
  **Note** DSCP can also be set for HTTP Streamers when HTTP is selected as the cache-fill protocol for VVI on the CDSM Setup page. | All servers          |

### FTP Out Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Server Types</th>
</tr>
</thead>
</table>
| FTP Out Interface   | Choose either the **Management** interface or the **Ingest** interface as the FTP out interface.  
  This setting is overridden by the interface the remote FTP client uses to send requests. The response to the FTP client request always uses the same interface the request came in on. | Vault, ISV           |
| FTP Out Bandwidth   | Enter the maximum bandwidth (in Mbps) allowed for FTP functionality. Valid entries are 0 to 1000. | Vault, ISV           |
| FTP Out Sessions    | Enter the maximum number of FTP out sessions allowed. The range is from 1 to 10. | Vault, ISV           |
FTP Listener

Choose either the **Management** interface or the **Ingest** interface as the FTP listener. The FTP listener selected determines which interface is used for FTP pulls, FTP pushes, and UDP live ingests. The data transfer for FTP pull depends on how the FTP server at the remote site is configured. If the FTP server is configured to use eth1 (Ingest), then data transfer is through eth1. The TV VDS is not directly affected by this setting; however, most FTP servers use eth1 to send data; therefore, the FTP listener is used for both FTP pull and FTP push data transfers. With FTP pull ingest, the original title is kept on a FTP server (catcher) for a period of time, and mechanisms are in place to initiate ingests until they have successfully completed. Choose either **Management** (eth0) or **Ingest** (eth1) as the interface for FTP in and configure the data source to use the same interface.

Dual CAS Settings

- **Dual CAS Settings**

  Dual CAS

  For the server can have a different setting than the System Level settings. The options are **Enabled**, **Disabled**, or set to **System Defaults**. The System Default setting is displayed and is the setting configured from the MPEG Tuning page.

  Dual conditional access systems (CAS), Cisco/Scientific Atlanta Power Key Encryption System (PKES) and the Motorola OffLine Encryption Station (OLES), are supported for ISA environments that have Stream Destination set to **IPTV**.

  For information on setting the Stream Destination, see the “Stream Destination” section on page F-4.

Network Settings

- **Gateway**
  IP address of the gateway to the network.

  **Splunk Support**

  **Note** The Splunk Support pane is visible if Splunk Support is enabled in the VVIM Setup page. For more information, see CDSM or VVIM Setup, page F-3.

  **Enable** or **Disable** the Splunk Support to forward the VDS-TV logs to the Splunk server.

  **Logs**

  Check the Log files to forward to the Splunk Server.

  The supported log files for Vault are:

  - Protocoltiming log
  - ContentStoreMaster log
  - ContentStore log

  The supported log files for Streamer are:

  - C2K log
  - LSCP Log
  - Protocoltiming log
  - StreamService log

  **Forwarder IP**

  The IP address of the Splunk Server to forward the log files.

  **Port**

  The port number of the Splunk Server to forward the log file.
Note

The Streamer can have a maximum of 12 interfaces configured for stream traffic simultaneously, with a maximum of 12 interfaces configured for cache traffic, or any variation of the two (for example, 8 stream interfaces and 6 cache interfaces). If an interface is configured for both cache and streaming traffic on a Streamer, priority is given to the higher-bandwidth stream traffic provided that cache traffic is able to transmit on other interfaces.

Step 4

Click **Submit** to save the settings.

To clear the fields and start over, click **Reset**.

---

**Configuring QoS Settings**

The DSCP Marking Method field allows you to set one of the following marking methods:

- **Simple**
- **AF Class**
- **Custom**

**Simple**

The Simple DSCP Marking Method option allows you to set the DSCP for each of the following types of traffic:

- Control DSCP
- Data DSCP
- Stream DSCP

Differentiated Services Code Point (DSCP) uses six bits of the DiffServ field, which was originally the ToS octet, to mark all outgoing packets with a specific DSCP value. Control, data, or stream traffic may require certain forwarding behavior, known as the per-hop behavior (PHB), which is specified in the DSCP. The network gives priority to marked traffic. Generally, the lower number has lower priority and the higher number has higher priority. The valid entries are 0 to 63.

DSCP is set separately for control, data, and stream traffic.

**Custom**

The Custom DSCP Marking Method option allows you to set the DSCP for each of the following types of traffic:

- Control Traffic
- Stream Traffic
- Highest Priority Retransmit Traffic
- Committed Rate Lost Packet Recovery
- Committed Rate Traffic
- Mirroring Lost Packet Recovery (Vault only)
- Mirroring Live Ingest Traffic
- Drive Failure Repair Traffic (Vault only)
- Mirroring Traffic (Vault only)
- Lowest Priority Data Smoothing Traffic (Vault only)

**AF Class**

There needs to be a dedicated Differentiated Services (DiffServ) Assured Forwarding (AF) class for the CCP traffic. The Assured Forwarding PHB guarantees a certain amount of bandwidth to an AF class and allows access to extra bandwidth, if available. There are four AF classes, AF1x through AF4x. Within each class, there are three drop probabilities (low, medium, and high).

DSCP can also be set for HTTP Streamers when HTTP is selected as the cache-fill protocol for VVI on the CDSM Setup page.

The sum of all bandwidths configured for CCP traffic cannot exceed the bandwidth configured for the AF classes reserved for CCP. CCP is used as the protocol among Vaults and Caching Nodes in a VVI that uses HTTP, and among all servers in a VVI that uses CCP and in all non-VVIs.

**Note**

Table 4-51 lists the four AF classes and the data types for each drop probability. To set the AF class on each server, use the **DSCP Marking Method** drop-down list in the Server Setup page.

**Table 4-51 AF Class Drop Probability Configured on Each VDS Server**

<table>
<thead>
<tr>
<th>AF1x</th>
<th>AF2x</th>
<th>AF3x</th>
<th>AF4x</th>
<th>Data Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF11</td>
<td>AF21</td>
<td>AF31</td>
<td>AF41</td>
<td>The following data types are set to low drop probability:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Lost packet recovery for committed rate traffic (Vault or Caching Node or Streamer to Vault or Caching Node or Streamer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- High-priority lost packet recovery for committed rate traffic (Vault or Caching Node or Streamer to Vault or Caching Node or Streamer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- iGate and index file transmission (Vault or Caching Node to Streamer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- First part of mirror data going to a new Vault (Vault to Vault)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Control traffic</td>
</tr>
<tr>
<td>AF12</td>
<td>AF22</td>
<td>AF32</td>
<td>AF42</td>
<td>Committed rate traffic (Vault or Caching Node or Streamer to Vault or Caching Node or Streamer) is set for medium drop.</td>
</tr>
<tr>
<td>AF13</td>
<td>AF23</td>
<td>AF33</td>
<td>AF43</td>
<td>The following data types are set to high drop probability:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Remote smoothing traffic (Vault to Vault) and prefetched traffic (Vault to Caching Node to Streamer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Mirroring traffic for creating additional mirrored copies (Vault to Vault)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Repair traffic that is recovering striped data lost because of a drive failure (Vault to Vault)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Mirroring of live ingest traffic (Vault to Vault)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Lost packet recovery of mirroring traffic (Vault to Vault)</td>
</tr>
</tbody>
</table>
Configuring the Recorder

The Recorder Setup page is used to set individual settings on a Recorder or a Streamer-Recorder, and consists of parameters specific to each Recorder (for example, Hostname, Gateway, Component Name, and Model Name), and shared parameters that can be individualized (for example, Recorder Manager IP address and port, communication intervals, and thresholds).

When a new Recorder is added to the VDS, the shared Recorder settings are applied to the new Recorder when the new Recorder is selected on the Recorder Setup page. To apply the shared Recorder settings to a new Recorder, choose Configure > Server Level > Recorder Setup, from the Recorder IP drop-down list, select the IP address of the Recorder, and click Display. When the process is complete, a message displays in the left-panel stating that the Shared Recorder Settings have been applied.

To configure individual settings on a Recorder, do the following:

---

**Step 1**
Choose Configure > Server Level > Recorder Setup. The Recorder Setup page is displayed.

*Note* If Bulk Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To export the configuration of this page for all VDS servers in the system, click Export. To import a Bulk Configuration XML file, click Browse to locate the file, then click Import to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for the Server Setup page and Interface Setup page, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2**
From the Recorder IP drop-down list, choose the IP address or host name of the server and click Display. The Recorder Setup fields current settings are displayed with the shared settings displayed where applicable.

*Note* If you change the "Current Setting" for fields marked with a "*" those values will over-ride the Shared Recorder Settings ("Shared Settings" below) set on the Configure > System Level > Shared Recorder Settings page. To overwrite this Recorder's current values with the Shared Recorder Settings click the Sync button below.

Enter the settings as appropriate. See Table 4-52 for descriptions of the fields.

---

**Table 4-52 Recorder Setup Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recorder Management</strong></td>
<td></td>
</tr>
<tr>
<td>Host Name</td>
<td>Fully qualified hostname for this server. The name can be up to 64 characters long. Assigning a hostname is optional.</td>
</tr>
<tr>
<td>Gateway</td>
<td>IP address of the gateway to the network.</td>
</tr>
<tr>
<td>HTTP DSCP</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4-52 Recorder Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder Status</td>
<td>Read-only field. Recorder status is one of the following:</td>
</tr>
<tr>
<td></td>
<td>- Operational</td>
</tr>
<tr>
<td></td>
<td>- Offline</td>
</tr>
<tr>
<td></td>
<td>- Failed</td>
</tr>
<tr>
<td>C2 HTTP Index Setting</td>
<td>Informational only. The C2 HTTP index is enabled or disabled.</td>
</tr>
<tr>
<td>Dynamic Trickmodes</td>
<td>Informational only. Displays the settings for the Dynamic Trickmodes. For more information on setting this field, see the “Configuring MPEG Tuning” section in the “Configuring the VDS” chapter of the Cisco VDS-TV RTSP Software Configuration Guide, Release 3.9.</td>
</tr>
</tbody>
</table>

### Recorder Behaviour

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component Name</td>
<td>Read-only field. The system name given to this Recorder.</td>
</tr>
<tr>
<td>Model Name</td>
<td>Read-only field. The CDE model of this Recorder.</td>
</tr>
<tr>
<td>Recorder Manager IP</td>
<td>IP address of the Recorder Manager. The Recorder Manager port is port number 80.</td>
</tr>
<tr>
<td>NTP Server</td>
<td>IP address of NTP server.</td>
</tr>
<tr>
<td>Heartbeat Interval</td>
<td>Amount of time (in seconds) to wait between sending heartbeat messages to the Recorder Manager. The range is from 2 to 30. The default is 5.</td>
</tr>
<tr>
<td>Recorder Location</td>
<td>Name of the location of the Recorder. The name can be from 1 to 128 characters in length.</td>
</tr>
<tr>
<td>Recorder Modify</td>
<td>Time window (in seconds) before a recording starts in which an operator can modify recording parameters; after which, any changes will be rejected (except end time). The end time can be modified even after the configured time window has passed. If the change to the end time specifies a time that is before the current time, the Recorder stops the recording. The range is from 1 to 60. The default is 5.</td>
</tr>
<tr>
<td>SCTE-35 Ad Markers</td>
<td>Choose either to <strong>Retain</strong> or <strong>Discard</strong> the SCTE-35 Ad markers. If SCTE-35 markers are discarded, both the PID in the PMT and the data are removed. If the SCTE-35 markers are preserved, the Recorder places the SCTE-35 Ad markers in the index file.</td>
</tr>
</tbody>
</table>
Table 4-52  Recorder Setup Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder Port</td>
<td>Port number on the Recorder used for management communications with the Recorder Manager. The range is from 50005 to 65535. The default is 50005.</td>
</tr>
<tr>
<td>Protocol Version</td>
<td>Read-only field. Communication protocol version of the Recorder Manager and the Recorder interface. The default is 1.</td>
</tr>
<tr>
<td>Threadpool Size</td>
<td>Read-only field. Number of message processing threads of the Recorder. The default is 16.</td>
</tr>
<tr>
<td>Status Report Interval</td>
<td>Read-only field. How often (in seconds) the Recorder reports status information to the Recorder Manager. The default is 60.</td>
</tr>
<tr>
<td>HTTP Request Timeout</td>
<td>Read-only field. Time that the Recorder application waits for an HTTP request after it is signaled. The default is 5 seconds.</td>
</tr>
<tr>
<td>HTTP Response Timeout</td>
<td>Read-only field. Time that the Recorder application waits for an HTTP response. The default is 5 seconds.</td>
</tr>
</tbody>
</table>

Manager Notify Thresholds

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording Bandwidth</td>
<td>Threshold, as a percentage, for recording bandwidth. If this threshold is exceeded (that is, if the bandwidth used for ingesting recordings exceeds the configured percentage), the Recorder sends a notification to the Recorder Manager. The range is from 1 to 100. The default is 1.</td>
</tr>
<tr>
<td>Delivery Bandwidth</td>
<td>Threshold, as a percentage, for delivery bandwidth. If threshold is exceeded (that is, if the bandwidth used for delivering recordings exceeds the configured percentage), the Recorder sends a notification to the Recorder Manager. The range is from 1 to 100. The default is 1.</td>
</tr>
<tr>
<td>Storage Capacity</td>
<td>Threshold, as a percentage, for storage capacity. If threshold is exceeded (that is, if the disk storage used on the Recorder exceeds the configured percentage), the Recorder sends a notification to the Recorder Manager. The range is from 1 to 100. The default is 1.</td>
</tr>
</tbody>
</table>

Location Virtual IP
### Configuring the Route Table

The Route Table provides the ability to define multiple subnets on a server that apply equally to stream and cache-fill interfaces. With multiple subnets you have the ability to group interfaces into separate subnets. One of the uses for multiple subnets is to configure half of the interfaces on the server to connect to one switch or router, and the other half of the interfaces to connect to a different switch or router for redundancy. The Route Table page allows for multiple subnets for cache, stream, and stream/cache interfaces.

The Route Table page has three different route types:

- **CServer Source** (written to the SubnetTable file)
- **CServer Destination** (written to the RoutingTable file)
- **Linux Destination**
- **Linux Source**

Each route type has a different function, and each route type is written to a different file on the VDS server.

**Note**

You cannot have intersecting subnets for any defined routes for CServer Source or CServer Destination.

#### CServer Source Route Type

When **CServer Source** is selected from the Route Type drop-down list, a subnet is defined and written to the SubnetTable file. Subnets can only be defined for stream, cache, or stream/cache interfaces. Interfaces are defined on the Interface Setup page (“Configuring the Interfaces,” page 4-123), and IP addresses for the interfaces are set on the Server Setup page (“Configuring the Servers,” page 4-128). Figure 4-45 shows an example of interfaces configured for multiple subnets on a Streamer.
Table 4-53 shows the possible configuration settings to use to define the subnets described in Figure 4-45.

### Table 4-53 Route Table Settings for CServer Source

<table>
<thead>
<tr>
<th>Subnet</th>
<th>Network</th>
<th>Subnet Mask</th>
<th>Gateway</th>
<th>Route Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subnet 1</td>
<td>192.168.1.0</td>
<td>255.255.255.0</td>
<td>192.168.1.1</td>
<td>CServer Source</td>
</tr>
<tr>
<td>Subnet 2</td>
<td>192.168.2.0</td>
<td>255.255.255.0</td>
<td>192.168.2.1</td>
<td>CServer Source</td>
</tr>
</tbody>
</table>

The Route Table entry for the subnet is defined by a network and subnet mask, and also includes a default gateway. ARP is applied for any data packets that have a destination IP address within the defined subnet, and the MAC address is returned. Any data packets outside the subnet are sent to the default gateway.

### CServer Destination Route Type

When **CServer Destination** is selected from the **Route Type** drop-down list, an alternate gateway for a destination subnet (based on the Network and Subnet Mask fields) is defined and written to the RoutingTable file. The alternate gateway is used whenever the destination IP address of the data packet falls within the destination subnet defined with the **Route Type** of **CServer Destination**.

### Linux Destination Route Type

Linux Destination Route is generalization of previously existing Stream Control Route and can be created independently of an interface. When Linux Destination is selected from the Route Type drop-down list, a corresponding Linux Source Route should also be created containing the IP’s of one of the interfaces (e.g. a stream control interface, ethX) defined in the interface setup page, as well as containing the Linux Destination Route Gateway IP. The Linux Destination route is then written to the file route-ethX, which is used to add routes to the routing table when the system reboots.

**Note**

For Linux Destination, if a corresponding Linux Source route and/or corresponding interface is not present, a special route will not be created in the system and Default Gateway will be used. No route-ethX file will be written for such a Linux Destination route.
Linux Source Route Type

When Linux Source is selected from the Route Type drop-down list, a gateway for a Default Control interface whose IP is contained in this network is defined. So, for a Default Control interface ethX with IP <ip3>, a Linux Source route should be defined that contains <ip3>. This route then gets written to the shared_intf_setp. A Linux Destination route is not necessary for the Default Control interface.

Configuring the SNMP Agent

The SNMP Agent sets up SNMP on the VDS. SNMP management features on the servers include:

- SNMPv1, SNMPv2c, and SNMPv3
- Standard MIBs

SNMPv3 adds support for user-password-based authentication and access control. SNMPv3 also optionally allows encryption of all SNMP communications, including objects contained in a response to a GET or inside traps (notifications or INFORMs).

While SNMPv3 provides multiple ways of implementing authentication, access control, and encryption, the TV VDS software has the following implementation:

- **User-Based Security Model**
- **View-Based Access Control Model**

For more information about SNMP on the VDS, see Appendix D, “SNMP MIB and Trap Information.”

User-Based Security Model

The User-based Security Model (USM), which provides SNMP message-level security, is implemented as follows:

- Users are created (configured) in the SNMP agent on a VDS server through the CDSM GUI, as well as on the Network Management Station (NMS).
- Password-based authentication is optional, and if enabled, the user must have an associated authentication key (password) of a minimum length of eight characters, and an authentication protocol of either HMAC-MD5 or HMAC-SHA1.
- Encryption is optional, if enabled, an encryption key (a minimum of eight characters) is required, and an encryption protocol of DES or AES.

View-Based Access Control Model

The View-based Access Control Model (VACM) is used for controlling access to management information. The TV VDS software implements VACM by allowing configuration of each management object (OID) or group of OIDs on a VDS server through the CDSM GUI to be exposed with read-only or read-write access to a configured user.

Note

The SNMPv2c security model that uses community strings for read-only or read-write access is still supported. SNMPv3 USM and VACM are optional.
**Trap Community Enhancements**

The configuration of a per-trap-sink community string or a default community string is supported. The supported notifications are: SNMPv1 TRAPs, SNMPv2 NOTIFICATIONS, and SNMPv2-inform INFORM. Each trap sink, associated with a different trap station, can have optional default community strings that can be used when sending traps. Alternatively, a default trap community string can be configured, which is used if the per-station community string is not configured.

To configure the SNMP Agent settings for a new server, do the following:

---

### Step 1

Choose **Configure > Server Level > SNMP Agent**. The SNMP Agent page is displayed.

**Note**

If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To export the configuration of this page for all VDS servers in the system, click **Export**. To import a Bulk Import/Export Configuration XML file, click **Browse** to locate the file, then click **Import** to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for SNMP settings, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

### Step 2

Choose the IP address of the server from the drop-down list and click **Display**.

**Note**

Click **Compare Configuration**, to compare the SNMP Agent settings in the controller database and the SNMP Agent settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.

### Step 3

Enter the settings as appropriate. The fields are described in **Table 4-54**.

**Table 4-54 SNMP Agent Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNMP Contact</td>
<td>Specify a name used to identify the point of contact for this server. You may specify a name with up to 64 characters.</td>
</tr>
<tr>
<td>SNMP Location</td>
<td>Specify the location of the server. You may enter a name with up to 64 characters.</td>
</tr>
<tr>
<td>Default Trap Community</td>
<td>Default trap community string shared between this SNMP agent and a network management system that might receive traps.</td>
</tr>
</tbody>
</table>

**Community Authentication**

<table>
<thead>
<tr>
<th>Community Name</th>
<th>Enter a community string that will have access to this server through SNMP.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissions</td>
<td>The permissions for the community are:</td>
</tr>
<tr>
<td></td>
<td>• read-only</td>
</tr>
<tr>
<td></td>
<td>• read/write</td>
</tr>
<tr>
<td></td>
<td>The default is read/write.</td>
</tr>
<tr>
<td></td>
<td>If you do not choose a permission setting for a community you are adding, read/write privileges are applied.</td>
</tr>
</tbody>
</table>
### User-based Security Model

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Name</td>
<td>Name of a user defined in this SNMP agent (also known as SNMP engine). The same name is defined and used in a network management station (NMS).</td>
</tr>
<tr>
<td>Authentication Type</td>
<td>Protocol used for user authentication is either MD5 or SHA-1. Both are used in conjunction with HMAC. The default is MD5.</td>
</tr>
<tr>
<td>Authentication Password</td>
<td>Password used for user authentication; the minimum length is eight characters.</td>
</tr>
<tr>
<td>Encryption Type</td>
<td>Protocol used for encryption is either DES or AES.</td>
</tr>
<tr>
<td>Encryption Password</td>
<td>Password used for encryption; the minimum length is eight characters.</td>
</tr>
</tbody>
</table>

**Note** Encryption is not enabled unless Encryption is selected in the VACM Authentication drop-down list.

### View-based Access-Control Model

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Name</td>
<td>Name of user granted access to the specified object or OID sub-tree.</td>
</tr>
<tr>
<td>Access</td>
<td>Permissions granted to this user for this object or OID sub-tree is either read-only (GET) or read-write (GET/SET).</td>
</tr>
<tr>
<td>Authentication</td>
<td>Authentication types available are the following:</td>
</tr>
<tr>
<td></td>
<td>• None—Only user name is matched, no passwords.</td>
</tr>
<tr>
<td></td>
<td>• Authentication—Password-based user authentication is used. Both username and password must match to get access.</td>
</tr>
<tr>
<td></td>
<td>• Encryption—Password-based user-authentication is used; additionally, SNMP traffic is encrypted.</td>
</tr>
<tr>
<td>OID</td>
<td>Specific object or OID sub-tree the user is able to access.</td>
</tr>
<tr>
<td>Note</td>
<td>If OID field is left blank, it means all OIDs are accepted.</td>
</tr>
</tbody>
</table>

### Trap Management

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trap Station</td>
<td>The IP address or Fully Qualified Domain Name (FQDN) of a network management station.</td>
</tr>
<tr>
<td>Version</td>
<td>The SNMP versions supported in the CDSM are:</td>
</tr>
<tr>
<td></td>
<td>• v1 (TRAP)</td>
</tr>
<tr>
<td></td>
<td>• v2 (NOTIFICATION)</td>
</tr>
<tr>
<td></td>
<td>• v2-inform (INFORM)</td>
</tr>
<tr>
<td></td>
<td>SNMP v2-inform sends a message received to the NMS upon receiving an NMS message.</td>
</tr>
<tr>
<td>Note</td>
<td>There is no default for the SNMP version. If you do not choose an SNMP version for a trap station you are adding, SNMP communication is not successful to that station.</td>
</tr>
<tr>
<td>Trap Community</td>
<td>(Optional) Trap community string shared between this SNMP agent and the configured trap station. If empty, the default trap community string is used, if available.</td>
</tr>
</tbody>
</table>
Step 4  Click **Submit** to save the settings.
To clear the fields and start over, click **Reset**.

To edit the SNMP information, choose the IP address of the server from the drop-down list, edit the fields, and click **Submit**.

The SNMP page allows for multiple entries of SNMP communities, USM, VACM, and stations. To add additional entries, click the plus sign in that section. To remove empty entries, click the minus sign. If you want to delete an SNMP community or station, check the **Delete** check box associated with the entry and click **Submit**.

### Configuration Rules and Guidelines for USM and VACM

The following rules and guidelines apply to configuring USM and VACM entries:

- There is a one-to-one relationship between a USM entry and a VACM entry.
- For every username in VACM, there must be a matching username in USM.
- All usernames must be unique for both USM and VACM entries.
- Only one OID per VACM username is allowed.
- If the VACM entry has an Authentication setting of **None**, then the USM password is not verified, which means the user is not required to enter the authentication password when accessing the OID associated with the corresponding VACM entry.
- If the VACM OID field is left blank, it means the user can access all OIDs.

Note  The Cisco TV VDS MIBs, as well as the supporting Cisco MIBs, are available for download at the bottom of the SNMP Agent page.

---

### Configuring the Server Level DNS

The Server DNS page is used to configure up to 16 domain suffixes and 16 DNS servers.

To configure the DNS settings for a server, do the following:

**Step 1**  Choose **Configure > Server Level > Server DNS**. The Server DNS page is displayed.

Note  If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To export the configuration of this page for all VDS servers in the system, click **Export**. To import a Bulk Import/Export Configuration XML file, click **Browse** to locate the file, then click **Import** to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for DNS servers, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2**  Choose the IP address of the server from the drop-down list and click **Display**.
Step 3
Enter the DNS Server Level settings as appropriate. See Table 4-55 for descriptions of the DNS fields.

Table 4-55 DNS Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Domain Suffix</td>
<td>Specify, if applicable, the internal domain that is used to fully qualify an unqualified hostname. For example, if you are using OpenStream as the BMS, specify a subdomain consistent with what OpenStream is using, for example, bms.n2bb.com. Accordingly, unqualified hostnames used in CORBA transactions, such as contentstore, resolve correctly to contentstore.bms.n2bb.com.</td>
</tr>
<tr>
<td>New DNS Server</td>
<td>IP address of the DNS server.</td>
</tr>
</tbody>
</table>

Step 4
Click Submit.
To clear the fields and start over, click Reset.

To delete the DNS settings, check the Delete check box and click Delete Entry.

Configuring the Server Level NTP

The NTP Server page is used to configure up to 16 NTP servers.
To configure the NTP settings for a server, do the following:

Step 1
Choose Configure > Server Level > NTP Server. The NTP Server page is displayed.

Note If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To export the configuration of this page for all VDS servers in the system, click Export. To import a Bulk Import/Export Configuration XML file, click Browse to locate the file, then click Import to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for NTP servers, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

Step 2
Choose the IP address of the server from the drop-down list and click Display.

Note
Click Compare Configuration, to compare the NTP server settings in the controller database and the NTP server settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.
Step 3  In the New NTP Server field, enter the IP address of the NTP server.

Step 4  Click Submit.

To clear the fields and start over, click Reset.

To delete the NTP settings, check the Delete check box and click Delete Entry.

**Other NTP Configurations**

In addition to configuring the IP addresses of the NTP servers, you need to set the time zone on each VDS server, as well as configure the NTP servers for the CDSM and VVIM.

**Setting the Time Zone on a VDS Server**

To set the time zone on a VDS server, log in to the VDS server as root, and use the Linux link command to link the time zone to the /etc/ localtime file.

The following are examples of the command used to set UTC and several different US time zones:

- UTC option:
  
  \[ \text{ln -sf /usr/share/zoneinfo/UTC /etc/ localtime} \]

- EST option:
  
  \[ \text{ln -sf /usr/share/zoneinfo/US/Eastern /etc/localtime} \]

- Central option:
  
  \[ \text{ln -sf /usr/share/zoneinfo/US/Central /etc/localtime} \]

- Mountain option:
  
  \[ \text{ln -sf /usr/share/zoneinfo/US/Mountain /etc/localtime} \]

- Pacific option:
  
  \[ \text{ln -sf /usr/share/zoneinfo/US/Pacific /etc/localtime} \]

Find the time zone for your specific location in the /usr/share/zoneinfo directory.

**Configuring the NTP Server on the CDSM and VVIM**

Configuring the NTP server on the CDSM or VVIM involves the following:

1. Adding the NTP servers to the /etc/ntp.conf file
2. Setting the run levels for the Network Time Protocol daemon (ntpd)
3. Setting the time zone
4. Setting the server date and time
5. Starting the NTP service
6. Synchronizing the server clock with the NTP server
7. Synchronizing the hardware clock on the server

Specific NTP configuration details should be obtained from your system administrator to add the NTP servers to the /etc/ntp.conf file.
To setup the NTP server on the CDSM or VVIM, do the following:

**Step 1**  Log in to the CDSM or VVIM as root.

**Step 2**  Set the run levels for the NTP service.

```
# chkconfig --level 2345 ntpd on
```

To check the run level settings, enter the following command:

```
# chkconfig --list ntpd
```

You will see the following:

```
ntp0        0:off    1:off    2:off    3:off    4:off    5:off    6:off
```

**Step 3**  Stop the ntpd service.

```
# service ntpd stop
```

**Step 4**  Set the time zone by linking the time zone to the /etc/localtime file. The following command shows an example of setting the time zone to UTC.

```
# ln -sf /usr/share/zoneinfo/UTC /etc/localtime
```

Find the time zone for your specific location in the /usr/share/zoneinfo directory.

**Step 5**  Set the system date and time to a date and time close to the NTP server date and time by entering the `date -s` command, for example:

```
# date -s "16:55:30 Nov 7, 2010"
```

**Step 6**  Synchronize the server clock to the NTP server.

```
# ntpd -q
```

**Note**  If the system clock is off by a significant amount, the command takes a considerable amount of time to return.

**Step 7**  Start the ntpd service.

```
# service ntpd start
```

**Step 8**  Synchronize the hardware clock.

```
# /sbin/hwclock --systohc
```

**Step 9**  Check the NTP synchronization.

```
# ntpq -p
```

**Step 10**  Reboot the CDSM or VVIM.

```
# init 6
```
Configuring the Server Level Logging

All logs are located in the /arroyo/log directory. The log files are rotated at least once a day and time stamps are added to the filenames. Some log files that grow rapidly are rotated more frequently (determined by file size); this rotation may happen up to once an hour. Most log files have the following suffix: .log.<YYYYMMDD>. The time zone for log rotation and filename suffixes is coordinated universal time (UTC). As part of the new log entry format, the log level and facility are included.

All log entries have the following changes:
- Stream handle is represented in decimal format
- IP addresses are represented in dotted-decimal format
- Clear identification of where a stream is going rather than a MAC address
- Time is represented in UTC
- Global Object ID (GOID) is represented in hexadecimal

Stream Trace
Log messages currently in the streamevent.log file are converted to a structured message and assigned the “stream trace” facility number. Other messages that record stream creation, routing, or playout are converted to a structured message and assigned the “stream trace” facility number. This enhancement, along with configuring syslog-ng to direct all “stream trace” facility messages to a single, centralized log server, provides a coherent set of log messages that describe stream history.

Facility Information, and Associated Log File and Debug Flags
For information on each facility and associated log file and debug flags, use the loginfo tool. The loginfo tool can run on any VDS server, including the CDSM. Start a Telnet or SSH session, log in to the VDS server, and enter the loginfo command without any arguments. Information on each facility is listed.

Configuring Logging Levels

All logging is configured at the System Level or Server Level. The configuration of the logging levels at the Server Level overrides the System Level settings.

To set a log level for a facility at the Server Level, do the following:

Step 1  Choose Configure > Server Level > Logging. The Log page is displayed.

Note  If Bulk Import/Export Configuration is enabled, the Configuration File Location field is displayed, along with the Browse, Import, and Export buttons. To export the configuration of this page for all VDS servers in the system, click Export. To import a Bulk Import/Export Configuration XML file, click Browse to locate the file, then click Import to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for Logging, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

Step 2  From the Server IP drop-down list, select an IP address.
Step 3  From the Facility Name drop-down list, select a facility and click Display. The Log Level fields are displayed.

The facilities list is based on the configuration of the system.

**Note**  Click Compare Configuration, to compare the log configuration settings in the controller database and the log configuration settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.

Step 4  Enter the Log Level settings as appropriate. See Table 4-56 for descriptions of the fields.

**Table 4-56  Log Level Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| Local Log Level   | The Local Log Level drop-down list has the following options:  
|                   | • Emergency (0)  
|                   | • Alert (1)  
|                   | • Critical (2)  
|                   | • Error (3)  
|                   | • Warning (4)  
|                   | • Notice (5)  
|                   | • Informational (6)  
| Remote Log Level  | To enable remote logging for the selected facility, select the appropriate log level from the Remote Log Level drop-down list. The default setting is disable.  
| Debug Flags       | Debug messages, if applicable, are configured by setting one or more debug flags. To select or unselect debug flags, you have the following options:  
|                   | • To select one debug flag, click the flag.  
|                   | • To select multiple debug flags, hold down the Ctrl key and click each flag, or hold down the Shift key and click the beginning flag and ending flag.  
|                   | • To unselect a debug flag when a group of debug flags are selected, hold down the Ctrl key and click the flag. |

Step 5  Click Submit.

To clear the fields and start over, click Reset.

To delete the log level settings for a facility, select the facility from the drop-down list and click Delete.
Configuring the Server Level Syslog

The Syslog configuration page at the System Level and Server Level is used to configure the IP address and port of the server that is to receive remote logging. The configuration of the syslog server at the Server Level overrides the System Level settings. For remote logging information to be sent for a facility, the **Remote Log Level** must be set on the Logging page. See the “Configuring the Server Level Logging” section on page 4-147 for more information.

To configure the remote logging server, do the following:

---

**Step 1**
Choose Configure > Server Level > Syslog. The Syslog page is displayed.

**Note**
If Bulk Import/Export Configuration is enabled, the **Configuration File Location** field is displayed, along with the **Browse**, **Import**, and **Export** buttons. To export the configuration of this page for all VDS servers in the system, click **Export**. To import a Bulk Import/Export Configuration XML file, click **Browse** to locate the file, then click **Import** to import the file. The status of the import is displayed in the left panel.

For information on enabling the Bulk Import/Export Configuration feature, see the “Bulk Import/Export Configuration” section on page F-5. For information about the Bulk Import/Export Configuration feature and creating a Bulk Import/Export Configuration file for the server syslog settings, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

**Step 2**
From the **Server IP** drop-down list, select an IP address.

**Note**
Click **Compare Configuration**, to compare the server level syslog settings in the controller database and the server level syslog settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.

**Step 3**
Check the **Enable Remote Logging** check box.

**Step 4**
In the **IP Address** field, enter the IP address of the remote server that is to receive syslog messages.

**Step 5**
In the **Port** filed, enter the port of the remote server that is to receive syslog messages.

**Step 6**
Click **Submit**.

To clear the fields and start over, click **Reset**.

---

To delete the remote server settings, click **Delete**.
Configuring Server Level Error Repair

The VOD Error Repair settings can be configured on the System Level, Array Level, and the Server Level. Settings configured at the Array Level take precedence over System Level settings, and settings at the Server Level take precedence over Array Level or System Level settings.

**Note**
VOD Error Repair is a licensed feature. VOD Error Repair requires the LSCP Client Protocol be set to Cisco (RTSP) and the set-top have the Cisco Visual Quality Experience Client (VQE-C) software running on it. For more information, see the “VOD Error Repair” section on page F-9.

To configure error repair at the Server Level, do the following:

**Step 1**
Choose **Configure > Server Level > Error Repair**. The Error Repair page is displayed.

**Step 2**
From the **Server IP** drop-down list, select an IP address and click **Display**.

**Note**
Click **Compare Configuration**, to compare the error repair settings in the controller database and the server level sys log settings in the specified server database. Any discrepancies is highlighted in red. In ideal conditions the values in the specified server and the controller database should be the same.

**Step 3**
Enter the Error Repair settings as appropriate. See **Table 4-57** for descriptions of the fields.

**Table 4-57 VOD Error Repair Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Repair Packets DSCP</strong></td>
<td></td>
</tr>
<tr>
<td>DSCP of Repair Packets Sent</td>
<td>DSCP value for the transmitted RTP and RTCP packets sent for error repair. The range is from 0 to 63. The default is 0.</td>
</tr>
<tr>
<td><strong>RTCP Report Exporting</strong></td>
<td></td>
</tr>
<tr>
<td>Exporting</td>
<td>Click the <strong>Enabled</strong> radio button to enable exporting of the RTCP reports. The RTCP reports can be exported to a third-party analysis application.</td>
</tr>
<tr>
<td>IP Address</td>
<td>Enter the IP address or the domain name of the server hosting the analysis application.</td>
</tr>
<tr>
<td>TCP Ports</td>
<td>Enter the TCP port number that is used to receive the reports on the server hosting the analysis application.</td>
</tr>
</tbody>
</table>

**Step 4**
Click **Submit**.

To clear the fields and start over, click **Reset**.

To return the settings to the factory default values, click **Factory**.

To delete the settings, click **Delete**.

To monitor the VOD Error Repair feature, use the Application Monitoring Tool (AMT). For more information, see Appendix E, “Using the TV VDS Streamer Application Monitoring Tool.”
Configuration Workflows

This section describes the configuration work flows for the following:

- **VBO Configuration Workflow**, page 4-151
- **Auto Ingest Configuration Workflow**, page 4-154
- **Content Ingest from Dual Locations**, page 4-161

### VBO Configuration Workflow

#### Pre-Conditions

**Step 1**
Install VDS Release 3.7 in POP (Setup/Control and CDSM Servers) and SHE (ISA enabled vaults and VVIM Servers)

**Note**
It is not mandatory to upgrade the non-ISA vaults, caching servers and VHO streamers. VDS 3.7 and VBO support is backward compatible with older releases installed on the non-ISA vaults, caching servers and VHO streamers.

#### Process Flow

**Enable VBO Configuration in VVIM**

**Step 1**
Login to VVIM as user with engineering access.

**Step 2**
Choose **Maintain > Software > VVIM Setup**.

**Step 3**
Enable VBO Configuration. For more details on enabling VBO Configuration, see **VBO Support**, page F-5

**Configure VBO Ingest Manager settings for a VHO**

**Step 1**
Choose **Configure > System Level > VBO Setup**.

**Step 2**
Set the VBO Ingest Manager settings. For more details on configuring the VBO Ingest Manager settings see, **Configuring VBO Setup**, page 4-54

**Note**
We recommend not modifying the default settings unless required.

**Verify VBO Settings on all ISA Vaults (SHE1+SHE2)**

**Step 1**
Login to the ISA vault as root or isa.

**Step 2**
Enter the following command.

```
# cat /home/isa/isa.cfg | grep VBO
```
Step 3  Verify that the following two fields are set as configured via VVIM GUI.

# VBO_IM_ENABLED   = 1
# VBO_IM_NAMESPACE = urn:com:cisco:vbo:ingest

Step 4  If not set then copy and paste the init_isa_env line from /etc/rc.local on the root prompt.

# su - isa -c "cd /home/isa/IntegrationTest; ./init_isa_env"

Step 5  Go to Step 3

Rebooting the master vault

Note  The ISA Slave vaults need not be rebooted.

Step 1  Login to the master vault as root and enter the following command:

# ifconfig | more

RESULT:
eth0  Link encap:Ethernet  HWaddr 00:25:90:18:97:FE  
inet addr:10.78.178.14  Bcast:10.78.178.255  Mask:255.255.255.0
inet6 addr: fe80::225:90ff:fe18:97fe/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
  RX packets:8183182 errors:0 dropped:0 overruns:0 frame:0
  TX packets:6266584 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:1000
  RX bytes:1117297671 (1.0 GiB)  TX bytes:1444129574 (1.3 GiB)
eth0:1  Link encap:Ethernet  HWaddr 00:25:90:18:97:FE
inet addr:10.78.178.38  Bcast:10.78.178.255  Mask:255.255.255.0
inet6 addr: fe80::225:90ff:fe18:97fe/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1

Step 2  Ensure ContentStore VIP (eth0:1) is enabled. If yes, reboot the vault by entering the following commands.

- Shut the database by stopping the avsdb process on the vault.

  # service avsdb stop
  # pgrep avsdb (to make sure there is no avsdb process running)

- Reboot the vault

  # reboot

Step 3  Once the server is up, login to VVIM and verify that the server is green in GUI.

Step 4  SSH into the rebooted server.

Step 5  Ensure ContentStore VIP is enabled on ISA Slave vault. If not, contact TAC for technical assistance.

Step 6  Login to master vault as root and enter the following command:

  # tail -f /arroyo/log/ContentStoreMaster.log

Verify that the log file logs the new requests.
## Enable VBO Configuration in CDSM

**Step 1** Login to CDSM as user with engineering access.

**Step 2** Choose Maintain > Software > CDSM Setup.

**Step 3** Enable VBO Configuration. For more details on enabling VBO Configuration, see VBO Support, page F-5

## Configure VBO ODRM settings for a VHO

**Step 1** Choose Configure > System Level > VBO Setup.

**Step 2** Set the VBO ODRM settings. For more details on configuring the VBO ODRM settings, see Configuring VBO Setup, page 4-54

**Note** We recommend not modifying the default settings unless required.

## Verify VBO Settings on all Setup and Control servers

**Step 1** Login as user root or isa to the setup and control server

**Step 2** Type the following command.

```bash
# cat /home/isa/isa.cfg | grep VBO
```

**Step 3** Verify that the following fields are set as configured via CDSM GUI.

```bash
# VBO_ODRM_ENABLED = 1
# VBO_ODRM_IP = 10.75.187.250
# VBO_ODRM_PORT = 8080
# VBO_ODRM_RECV_TIMEOUT = 5
# VBO_ODRM_NOTIFY_URL = /odrm/OdrmApiR2/EventNotify
# VBO_ODRM_NAMESPACE = urn:net:beaumaris:acR2:xsd:1
# VBO_SETUP_NAMESPACE = urn:net:beaumaris:common:xsd:1
```

**Step 4** If not set then copy and paste the init_isa_env line from /etc/rc.local on the root prompt.

```bash
su - isa -c "cd /home/isa/IntegrationTest; ./init_isa_env"
```

**Step 5** Go to Step 3

## Reboot the Primary Setup Server

**Note** The secondary and backup streamers need not be rebooted.

**Step 1** Login to the setup server as root and enter the following command:

```bash
# cat /proc/calypso/status/streamer/resiliencyinfo
```

**RESULT:**

Streamer Resiliency Info:
Service Address: 172.22.97.91
Control Service: Primary
Service Address: 172.22.102.228
Setup Service: Primary

Step 2 If the setup server is the primary setup server then, reboot the server by entering the following commands.
- Shut the database by stopping the avsdb process on the streamer.
  
  ```
  # service avsdb stop
  # pgrep avsdb (to make sure there is no avsdb process running)
  # init6
  ```
- Reboot the streamer
  
  ```
  # reboot
  ```

Step 3 Once the server is up, login to CDSM and verify that the server is green in GUI.

Step 4 SSH into the rebooted server.

Step 5 Ensure Setup VIP is enabled on secondary setup server. If not, contact TAC for technical assistance.

Step 6 Login to primary setup server as root and enter the following command:

```
# tail -f /arroyo/log/StreamService.log
```
Verify that the log files logs the new requests

## Auto Ingest Configuration Workflow

### Pre-Requisites

Step 1 The VVIM and all the CDE460 vaults should be upgraded to CDS 352-AMS-EFT or higher 3.7 (Rushmore) release.

Step 2 The FTP Server (vsftpd) on the VVIM should be enabled by default.

Step 3 The Watch-Folder on the VVIM could be a mounted or physical folder where PMG-Distro will be dropping the normalized packages through ftp.

Step 4 The packages that are FTP’ed to the VVIM by PMG-Distro must be a package folder in the Watch-Folder containing ADI and related mpegs.

```
VVIM:<Watch-Folder>/XYZ_Package/[ADI.DTD, ADI.XML, XYZ.mpg]
```

Step 5 The packages could be FTP’ed to VVIM Watch-Folder as root or user isa.

Step 6 VVIM and all CDE 460 vaults should remain in time sync in order to “Package Delete” functionality working through the GUI.

### Configure Auto Ingest Script

To configure the auto ingest script, do the following:

Step 1 Configure the following parameters in the `/home/isa/AVSIngestMgr/client/ingest_packages.cfg` file:
- CISCO_AMS_IP: It should be set to Master Vault VIP.
- CISCO_AMS_PORT: It should be set to 5000.
Chapter 4  Configuring the VDS

Configuration Workflows

- FTP_SVR_IP: It should be set to VVIM management IP.
- FTP_USR_NAME: It should be set to user isa.
- FTP_USR_PASSWD: It should be set to password calypso.
- FTP_WATCH_FOLDER: It should be set to folder where PMG-Distro is dropping packages. It could be mounted or physical folder on the VVIM.
- PRESERVE_PACKAGES: It should be set to 0 or 1 if successfully ingested packages are to be preserved in the Watch-Folder. The packages are saved in the Watch-Folder/.SUCCEEDED_INGESTS folder after ingesting them.

Step 2  To configure the cronjob enter the following command:

```
#crontab -e

* * * * * cd /home/isa/AVSIngestMgr/client; ./ingest_package_to_ams 2>&1
```

Step 3  To prevent cronjobs from being overwritten by CDS upgrades, execute the following command:

```
#touch /etc/cds_noCrontabOverwrite
```

Step 4  To configure vsftp to support mounted watch folder, do the following:

```
#vi /etc/vsftpd/vsftpd.conf

- Add line to vsftpd.conf file: use_sendfile=NO
- Save and quit

#service vsftpd restart
```

Result:
- Shutting down vsftpd: [ OK ]
- Starting vsftpd for vsftpd: [ OK ]

Step 5  To mount and un-mount the watch folder on the VVIM, do the following:

```
# mount -t cifs //CIFS-STORAGE-IP/<dir being shared> VVIM-Watch-Folder -o username=root,password=vvim-root-passwd,rw,file_mode=0777,dir_mode=0777,noacl

# umount VVIM-Watch-Folder
```

Monitoring the Auto Ingest script

Step 1  This script runs every minute and polls the watch-folder configured in the file /home/isa/AVSIngestMgr/client/ingest_packages.cfg.

Step 2  It creates the logs in the /arroyo/log/ingest_packages.log on the VVIM.

Step 3  If incoming rate of packages is higher than it is ingesting every minutes then the ingest script starts ingesting concurrently up to **FOUR** parallel ingests.
Step 4 If a package ingest is FAILED then the failed package is moved to FAILED_PACKAGES folder in the watch-folder directory.

Step 5 The failed package is re-ingested only if it is moved manually to the parent folder (which is watch-folder). Ensure that the cause of the initial error is fixed before attempting re-ingest.

Step 6 If a package is ingested successfully then it is deleted from the watch-folder.

Starting from Release 3.9, VDS-TV supports timers that are set in /home/isa/AVSIngestMgr/client/ingest_packages.cfg file to do the following:

- Moving incomplete packages to the .INCOMPLETED folder on expiry of a timer.
- Deletion of packages in .INCOMPLETED folder on expiry of a timer.
- Deletion of packages in .FAILED_INGESTS folder on expiry of a timer.
- Deletion of packages in .SUCCEEDED_INGESTS folder on expiry of a timer.
- Allowing ADI updates without MPEG assets.
- Initiating ADI ingest if package existed on the AMS, on expiry of a timer.

See Table 4-58 for description of the timers.

<table>
<thead>
<tr>
<th>Timer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCOMPLETE_PACKAGE_WAIT_TIME</td>
<td>If package transfer to watch-folder is not completed within this time, the package is moved to the Watch-Folder/.INCOMPLETED folder. The default value is 7200 seconds (2 hrs). Setting it to any non-zero (&gt;0) value enables this timer setting it to 0 disables this timer.</td>
</tr>
<tr>
<td>INCOMPLETED_FOLDER_CLEANUP_INTERVAL</td>
<td>Any package in the Watch-Folder/.INCOMPLETED folder older than this duration is removed. Setting it to any non-zero (&gt;0) value enables this timer setting it to 0 disables this timer. The default value is 24 hrs.</td>
</tr>
<tr>
<td>FAILED_INGESTS_FOLDER_CLEANUP_INTERVAL</td>
<td>Any package in the Watch-Folder/.FAILED_INGESTS folder older than this duration is removed. Setting it to any non-zero (&gt;0) value enables this timer setting it to 0 disables this timer. The default value is 24 hrs.</td>
</tr>
<tr>
<td>SUCCEEDED_INGESTS_FOLDER_CLEANUP_INTERVAL</td>
<td>Any package in the Watch-Folder/.SUCCEEDED_INGESTS folder older than this duration is removed. Setting it to any non-zero (&gt;0) value enables this timer setting it to 0 disables this timer. The default value is 0 hrs.</td>
</tr>
</tbody>
</table>
Monitoring the Package Ingest Failures in the GUI

To monitor the package ingest failure via VVIM GUI, do the following:

**Step 1** Choose **Monitor > System Level > System Failures**. The System Failure page is displayed.

**Step 2** The user can view the system failure details.

Monitoring the Package Ingest in the Log File

To monitor the package ingests in the log, go to `/arroyo/log/ingest_packages.log` on the VVIM.

An example and flow of all steps for single package ingest is listed below:

**VVIM: Command line: tail -f /arroyo/log/ingest_packages.log**

```
2014-12-19 13:12:01 ****** Step 1: Started polling Watch-Folder
2014-12-19 13:12:01 ****** Step 1: Parallel Ingests Sessions Count: 0
2014-12-19 13:12:01 ****** Step 1: No packages found in the Watch-Folder
2014-12-19 13:13:01 ****** Step 0: Reading the config file (ingest_packages.cfg).
2014-12-19 13:13:01 ****** Step 1: Started polling Watch-Folder
2014-12-19 13:13:01 ****** Step 1: Parallel Ingests Sessions Count: 0
2014-12-19 13:13:01 ****** Step 1a: Processing package directory Test_8128/
2014-12-19 13:13:01 ****** Step 1b: Found Content_FileSize: 166553900 478854 166553900
2014-12-19 13:13:01 ****** Step 1c: Found content file with size: 166553900 478854
166553900
2014-12-19 13:13:01 ****** Step 1d: Total video found in ADI: AssetsCount: 3
2014-12-19 13:13:01 ****** Step 1e: Total video found in package folder: TransfersCount: 3
2014-12-19 13:13:01 ****** Step 1f: INFO: All the video Assets are found in the package folder.
2014-12-19 13:13:01 ****** Step 1g: Verify for the ADI Asset fileSize: 166553900
2014-12-19 13:13:01 ****** Step 1g: Verify for the ADI Asset fileSize: 478854
```

### Table 4-58 Drop-Box Timers

<table>
<thead>
<tr>
<th>Timer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOW_ADI_UPDATES_WITHOUT_MPEG_ASSETS</td>
<td>On setting this variable to ON, VDS-TV allows MDU updates without the mpeg assets if the package was previously ingested successfully. If the package was never ingested then the package is moved to Watch-Folder/.INCOMPLETED folder if any of the assets referenced by the ADI is not copied within INCOMPLETE_PACKAGE_WAIT_TIME seconds. The values are ON or OFF. The default value is ON.</td>
</tr>
<tr>
<td>ALLOW_ADI_UPDATES_AFTER_TIMER</td>
<td>If ALLOW_ADI_UPDATES_WITHOUT_MPEG_ASSETS is set to ON,VDS-TV allows MDU updates without the mpeg assets if the package was previously ingested successfully. If the package was ingested earlier then VDS-TV waits until this duration to attempt the ADI ingest.The default value is 60 seconds.</td>
</tr>
</tbody>
</table>
Monitoring the Package Ingests Status in the GUI

To monitor the package ingests status via VVIM GUI, do the following:

**Step 1** Choose **Monitor > System Level > Package Status**. The Package Status page is displayed.

**Step 2** The user can view the package status.

Configuring Ingest Interface on VVIM

To configure ingest interface on VVIM, do the following:

**Step 1** SSH to VVIM and create ifcfg-eth1 file under `/etc/sysconfig/network-scripts/`

Sample file: ifcfg-eth1

```bash
DEVICE=eth1
ONBOOT=yes
BOOTPROTO=static
IPADDR=192.168.100.78
NETMASK=255.255.254.0
BROADCAST=192.168.100.255
```

**Step 2** Enter the following command to bring up eth1 interface:

```
ifup eth1
```

**Step 3** SSH to VVIM and change the FTP_SVR_IP in file `/home/isa/AVSIngestMgr/client/ingest_packages.cfg` to eth1 IP of the VVIM.

**Step 4** Remove `/root/.netrc` file on VVIM before reboot.
Configuring Content Distribution Rules for package publish on VVIM

To configure the content distribution rules of package publish on the VVIM, do the following:

---

**Step 1** Choose Configure > System Level > Content Distribution Rules. The Content Distribution Rules page is displayed.

**Step 2** Set Provider, Product, Market/Division to ALL.

**Step 3** Set Protocol to FTP.

**Step 4** Set Exclude to None

**Step 5** Click Submit.

**Note** Any change to Rules page requires AIM restart.

---

Configuring Ingest Interface resiliency on Vault (CDE460)

---

**Step 1** Manually create network scripts for bonded interface and 2 physical 10Gig ingest interface being used for bonding.

The ifcfg-bond0 is using ingest IP.

/etc/sysconfig/network-scripts/ifcfg-bond0:

```
DEVICE=bond0
BOOTPROTO=static
IPADDR=192.168.100.123
NETMASK=255.255.252.0
ONBOOT=yes
USERCTL=no
BONDING_OPTS="miimon=100 mode=1"
```

/etc/sysconfig/network-scripts/ifcfg-eth4

# Generated from CDSM configuration. Do not edit it.
DEVICE=eth4
MASTER=bond0
SLAVE=yes
BOOTPROTO=static
ONBOOT=yes

/etc/sysconfig/network-scripts/ifcfg-eth5

# Generated from CDSM configuration. Do not edit it.
DEVICE=eth5
BOOTPROTO=static
MASTER=bond0
SLAVE=yes
ONBOOT=yes

**Step 2** Add following line to /etc/modprobe.conf file at the end:

```
alias bond0 bonding
```
Step 3  Add following line to /etc/rc.sysinit just below "modprobe avsutil" line:

```
modprobe bonding
```

Step 4  Shutdown database and reboot the vault.

```
# service avsdb stop
# pgrep avsdb (Keep trying until it does not return the PIDs).
# reboot
```

Step 5  Verify the ingest interfaces eth4 and eth5 and bonded with device bond0.

```
bond0  Link encap:Ethernet  HWaddr 90:E2:BA:1E:44:B8
        inet addr:192.168.100.123  Bcast:192.168.103.255  Mask:255.255.252.0
        inet6 addr: fe80::92e2:baff:fe1e:44b8/64 Scope:Link
        UP BROADCAST RUNNING MASTER MULTICAST  MTU:1500  Metric:1
        RX packets:1525174 errors:0 dropped:0 overruns:0 frame:0
        TX packets:2530953 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:1796841197 (1.6 GiB)  TX bytes:3559451219 (3.3 GiB)
eth4  Link encap:Ethernet  HWaddr 90:E2:BA:1E:44:B8
        UP BROADCAST RUNNING ALLMULTI SLAVE MULTICAST  MTU:1500  Metric:1
        RX packets:1525174 errors:0 dropped:0 overruns:0 frame:0
        TX packets:2530953 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:1796841197 (1.6 GiB)  TX bytes:3559451219 (3.3 GiB)
eth5  Link encap:Ethernet  HWaddr 90:E2:BA:1E:44:B8
        UP BROADCAST ALLMULTI SLAVE MULTICAST  MTU:1500  Metric:1
        RX packets:0 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

```
# cat /proc/net/bonding/bond0
Ethernet Channel Bonding Driver: v3.5.0 (November 4, 2008)

Bonding Mode: fault-tolerance (active-backup)
Primary Slave: None
Currently Active Slave: eth4
MII Status: up
MII Polling Interval (ms): 100
Up Delay (ms): 0
Down Delay (ms): 0

Slave Interface: eth4
MII Status: up
Link Failure Count: 0
Permanent HW addr: 90:e2:ba:1e:44:b8
Slave Interface: eth5
MII Status: down
Link Failure Count: 1
Permanent HW addr: 90:e2:ba:1e:44:b9
```
Metadata update on the package

To update the metadata of a package, do the following:

**Step 1** Choose **Monitor > System Level > Package Status**. The Package Status page is displayed.

**Step 2** Select a package and click on the package name.

**Step 3** Click **View/Edit ADI** in package expiration details section.

**Step 4** Modify the ADI.xml and click **Save XML** to save the updates. This increments the minor version number by 1.

**Note** The package should be manually published to desired market sites once the ADI.xml is updated.

Monitoring Metadata update on the package

To monitor the updates of metadata on a package, do the following:

**Step 1** Choose **Report > System Level > VVIM Audit Logs**. The Audit Logs page is displayed.

**Step 2** Select the Filters and click **Display**.

**Step 3** Click the item on the audit log display and view the changes made to ADI.xml.

Content Ingest from Dual Locations

To enable content ingest from dual locations, do the following:

**Step 1** Login to VVIM as root user from both the locations.

**Step 2** Enter the following command and press Enter.

```
# service enableingestpoint start
```

This script initiates the CORBA naming service and registers the AIM’s Package Factory IOR at both the locations.

**Step 3** Point the upstream package export components to the VVIM’s IP.
System Monitoring

The CDSM provides tools that can be used for system monitoring and system diagnostics. The topics covered in this chapter include:

- System Level Monitoring, page 5-1
- Monitoring Content Objects, page 5-18
- Array Level Monitoring, page 5-36
- Server Level Monitoring, page 5-39
- Recommended Monitoring Schedule, page 5-48

Note
If Virtual Video Infrastructure (VVI) with split-domain management is enabled, the CDSM pages associated with the Vaults and Caching Nodes display only on the VVI Manager (VVIM), and the CDSM pages associated with the Streamers display only on the Stream Manager. For more information, see the “Virtual Video Infrastructure” section on page F-10.

System Level Monitoring

The System Level Monitoring pages provide an overall view of the health and activity of the VDS. The System Level links are:

- System Health, page 5-3
- System Snapshot, page 5-5
- System Failures, page 5-6
- System Health Scan, page 5-17

To view the System Level Monitoring pages, click Monitor from any page in the CDSM, and then click System Health or System Snapshot, as appropriate.
Alarms Table

Any time there is an alarmed event, an alarm is displayed in the CDSM banner. The Alarms table is displayed when you roll your mouse over the alarm icon. See Figure 5-1. Clicking the alarmed event in the Alarm table takes you to the CDSM page that has more information. For example, in Figure 5-1, clicking System health problems reported takes you to the System Health page.

Figure 5-1 CDSM Banner—System Health Alarm

The following errors and situations are monitored and registered in the Alarms table if found, and linked to the System Cleanup page:

- Orphaned server IDs
- Multiple or duplicate Cache Locate IP addresses
- Out of range Group IDs
- ServerMap and StatMap inconsistencies
- Extra or incorrect SERVERMAP15 entries

See the “System Cleanup” section on page 7-26 for more information.

In addition to the System Cleanup page links, the following situations are monitored and registered in the Alarms table:

- System clock is out of synchronization
- MSA events exist for the current CDSM day
- Incorrect IDs on the Stream Manager (for ISA environments only)
- Missing or incorrect initial IDs (Group, Server, and Setup)
- Primary VDS server (Vault, Setup, Control) fails over to another VDS server.
- Primary CDSM fails and secondary CDSM becomes the primary
- Primary and secondary CDSM port failures
- Primary and secondary CDSM Linux file system threshold exceeded
- MediaX Media Scheduler - Scheduling conflicts overlap events
- Unconfigured channels found during auto import
- Unconfigured channels found during manual import
- EPG ingestion fail during auto import
- EPG ingestion fail during manual import

System Clock Not Synchronized

If a VDS server system clock is off from that of the CDSM (VVIM or Stream Manager) by more than two minutes, an alert is added to the Alarms table. Clicking the alert takes you to the Configure > System Level > System NTP Server page.
MSA Events
If MSA events exist (System Failures) for the current CDSM day, an alert is added to the Alarms table. Clicking the alert takes you to the Monitor > System Level > System Failures page.

Incorrect IDs on Stream Manager in ISA environment
If VVI is enabled in an ISA environment and you logged in to the Stream Manager, and if there are errors associated with the IDs; an alert is added to the Alarms table. Clicking the alert takes you to the Maintain > Software > ID Manager page.

Missing or Incorrect Initial IDs
If the CDSM is initially configured incorrectly as a legacy VDS or VVI with central management, then reconfigured or reinstalled for a VVIM or Stream Manager, the starting IDs for group IDs, server IDs, and setup IDs need to be changed from the old system to the new system. An alert is added to the Alarms table to inform you of the situation. Clicking the alert takes you to the Maintain > Software ID Management page to correct the situation.

System Health
The System Health page provides a top-level view of the overall health of each group in the VDS and each server in each group.

To view the System Health page, choose Monitor > System Health. See Figure 5-2.

Figure 5-2 System Health Page
The colored boxes for each group on the System Health Monitor page have the following meaning:

- Green—All servers in the group are operating.
- Yellow—One or more servers are not operational, but have not reached any thresholds.
- Red—One or more servers are not operational and have reached a threshold.

To view the VDS servers for each group, click the plus sign (+) for the group. The VDS servers for the group are displayed, along with the IP address or host name, software version, and server role of each VDS server. If a server is currently acting as one of the following server roles, an icon is displayed next to that server indicating the specific role:

- Stream Setup
- Stream Control
- Setup/Control
- Vault Master
- Primary CDSM/VVIM
- Backup CDSM/VVIM
- Setup & VCS
- Control & VCS
- Setup/Control & VCS
- VCS
- Setup & VM
- Control & VM
- Setup/Control & VM

The Server Role legend is displayed in the left-panel.

The colored boxes for each server on the System Health Monitor page have the following meaning:

- Green—All components are operating.
- Yellow—Some components are not operational, but have not reached a threshold.
- Red—Some components are not operational and have reached a threshold.

The servers can have the following states:

- Online—Server is operational.
- Down—Server is down or database is down.
- No Ingest—Vault is offline for ingest (still accepting cache-fill traffic)
- Offline—Vault is offline for all traffic (ingest and cache-fill), Streamer or Caching Node is offline.

You can view the details of a monitored area of a server by clicking the box in the appropriate column.

- When you click the **Network** check box, you are taken to the NIC Monitor page. See the “NIC Monitor” section on page 5-41 for more information.
- When you click the **Disk** check box, you are taken to the Disk Monitor page. See the “Disk Monitor” section on page 5-39 for more information.
- When you click the **Services** check box, you are taken to the Services Monitor page. See the “Services Monitor” section on page 5-46 for more information.
- When you click the **Vitals** check box, you are taken to the Server Vitals Monitor page. See the “Server Vitals” section on page 5-43 for more information.
The Vitals column is displayed only if the CDSM Health Monitor feature is enabled. For more information, see the “CDSM or VVIM Health Monitoring” section on page F-16.

The time shown at the bottom of the left-panel menu is not the current time, but rather the CDSM time that is used for the health status and monitoring the system.

**System Snapshot**

The System Snapshot page provides an overview of the current activity on the VDS. A summary of the state of all streams, content ingests, and disk usage is displayed. See Figure 5-3.

**Figure 5-3  System Snapshot Page**

In a VVI, the Stream Manager only displays the stream-related date and the VVIM only displays the bandwidth and content-related data.

**Table 5-1** describes the information displayed on the System Snapshot page.
To view the details of system failures, do the following:

**Step 1** Choose Monitor > System Level > System Failures. The System Failures page is displayed.

Each system failure is listed by date and time, followed by the session ID.

>Note Stream Failure monitoring displays only the system failures for the current day. To view past system failures, see the “System Failures” section on page 6-27.

**Step 2** From the System Failures drop-down list, choose the time stamp and session ID of the stream object and click Display. The system failure details are displayed. See Figure 5-4.
To delete a system failure, display the object and click Delete.

Figure 5-4 System Failures Page

Table 5-2 describes the stream failure details.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Session ID of the failed stream.</td>
</tr>
<tr>
<td>Failure Date</td>
<td>Date and time the failure occurred.</td>
</tr>
<tr>
<td>QAM IP</td>
<td>IP address of the QAM device associated with the failure.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Service group associated with the failure.</td>
</tr>
<tr>
<td>Server ID</td>
<td>Server responsible for streaming this stream object. To view the IP address associated with the Server ID, see the “Configuring the Servers” section on page 4-128.</td>
</tr>
<tr>
<td>Group ID</td>
<td>All servers that are part of the same VDS system (managed by one CDSM) have the same Group ID. This Group ID corresponds to the CDSM GUI array ID and should be unique across an enterprise. Table 5-3 describes the ID mapping between the CDSM GUI and the CServer.</td>
</tr>
</tbody>
</table>
For MVOD deployment, the System Failure page displays the following fields:

- Package Name
- Channel Name
- Multicast Group IP
- Channel Port
- Event Start Time
- Event End Time in addition to Server ID, Group ID, Failed Operation, Failed Task and Error Code.

Table 5-3 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arroyorc files.

### Table 5-3 ID Names in the CDSM GUI and CServer Files

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>
Table 5-4 lists the Managed Services Architecture (MSA) error codes. Some MSA monitored events are monitored for the VDS as well, and are prefaced by “AVS_” instead of “MSA_.” They are denoted with a footnote in the table. Some MSA monitored events are not errors, but rather information about an event. Not all MSA events trigger an SNMP trap.

Table 5-4 MSA Error Codes

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5001</td>
<td>MSA_INT_ERR</td>
<td>There is an internal error. INT_ERR has a subset of error codes that specifically describe where the error occurred. See Table 5-5.</td>
</tr>
<tr>
<td>5002</td>
<td>MSA_FLOW</td>
<td>Entry or exit of a measured or tracked flow, or some other important check point, and is recorded as non-realtime.</td>
</tr>
<tr>
<td>5003</td>
<td>MSA_CMPT_NOT_EXIST</td>
<td>Component does not exist.</td>
</tr>
<tr>
<td>5004</td>
<td>MSA_REQ_TIMEOUT</td>
<td>Client timed out waiting for a response to a request.</td>
</tr>
<tr>
<td>5005</td>
<td>MSA_CMPT_OUT_OF_SVC</td>
<td>Component is unavailable.</td>
</tr>
<tr>
<td>5006</td>
<td>MSA_REQ_NOT_IMPL</td>
<td>Requested item is not implemented.</td>
</tr>
<tr>
<td>5007</td>
<td>MSA_RES_INVALID</td>
<td>Resource is invalid.</td>
</tr>
<tr>
<td>5008</td>
<td>MSA_RES_DUP</td>
<td>Duplicate resource is being added to the session.</td>
</tr>
<tr>
<td>5009</td>
<td>MSA_CMPT_DUP</td>
<td>It was determined that a component that was being added has the same name as a previously created component.</td>
</tr>
<tr>
<td>5010</td>
<td>MSA_REQ_CREATE</td>
<td>Attempt to create a request failed.</td>
</tr>
<tr>
<td>5011</td>
<td>MSA_UNKNOWN</td>
<td>Unclassified or undetermined error occurred.</td>
</tr>
<tr>
<td>5012</td>
<td>MSA_REAP</td>
<td>Component is destroyed outside of the normal expected flows.</td>
</tr>
<tr>
<td>5013</td>
<td>MSA_VS_LSC_TIMEOUT</td>
<td>Video server timed out waiting for the client to issue a resume or play command after the initial creation of the stream.</td>
</tr>
<tr>
<td>5014</td>
<td>MSA_SVC_GROUPMISSING</td>
<td>Request contains a missing service group.</td>
</tr>
<tr>
<td>5015</td>
<td>MSA_RES_NO_CAPACITY</td>
<td>Resource is currently out of capacity and cannot satisfy the request.</td>
</tr>
<tr>
<td>5016</td>
<td>MSA_RES_NO_BANDWIDTH</td>
<td>Resource does not have the bandwidth to deliver the stream.</td>
</tr>
<tr>
<td>5017</td>
<td>MSA_REQ_FAIL</td>
<td>Request failed.</td>
</tr>
<tr>
<td>5018</td>
<td>MSA_RES_UNAVAIL</td>
<td>Response is not available.</td>
</tr>
<tr>
<td>5019</td>
<td>MSA_FLOW_RT</td>
<td>Entry or exit of a measured or tracked flow, and is recorded in real-time.</td>
</tr>
<tr>
<td>5020</td>
<td>MSA_LSC_SERVER_FAILURE</td>
<td>LSC response; server failed.</td>
</tr>
<tr>
<td>5021</td>
<td>MSA_LSC_NO_MEMORY</td>
<td>LSC response; dynamic memory allocation failure.</td>
</tr>
<tr>
<td>5022</td>
<td>MSA_LSC_IMPL_LIMIT</td>
<td>LSC response; implementation limit exceeded.</td>
</tr>
<tr>
<td>5023</td>
<td>MSA_LSC_NO_RESOURCES</td>
<td>LSC response; no resources.</td>
</tr>
<tr>
<td>5024</td>
<td>MSA_LSC_SERVER_ERROR</td>
<td>LSC response; server error.</td>
</tr>
<tr>
<td>5025</td>
<td>MSA_LSC_MPEG_DELIVERY</td>
<td>LSC response; unable to deliver MPEG stream.</td>
</tr>
<tr>
<td>5026</td>
<td>MSA_LSC_ERR</td>
<td>Generic DSM-CC error event.</td>
</tr>
<tr>
<td>5027</td>
<td>MSA_LSC_BAD_REQUEST</td>
<td>LSC response; invalid request.</td>
</tr>
<tr>
<td>5028</td>
<td>MSA_LSC_BAD_STREAM</td>
<td>LSC response; invalid stream handle.</td>
</tr>
<tr>
<td>5029</td>
<td>MSA_LSC_WRONG_STATE</td>
<td>LSC response; wrong state.</td>
</tr>
</tbody>
</table>
Table 5-4  MSA Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5030</td>
<td>MSA_LSC_UNKNOWN</td>
<td>LSC response; unknown error.</td>
</tr>
<tr>
<td>5031</td>
<td>MSA_LSC_NO_PERMISSION</td>
<td>LSC response; client does not have permission for the request.</td>
</tr>
<tr>
<td>5032</td>
<td>MSA_LSC_BAD_PARAM</td>
<td>LSC response; invalid parameter.</td>
</tr>
<tr>
<td>5033</td>
<td>MSA_LSC_NO_IMPL</td>
<td>LSC response; not implemented.</td>
</tr>
<tr>
<td>5034</td>
<td>MSA_LSC_TRANSIENT</td>
<td>LSC response; transient error.</td>
</tr>
<tr>
<td>5035</td>
<td>MSA_LSC_BAD_SCALE</td>
<td>LSC response; incorrect scale value.</td>
</tr>
<tr>
<td>5036</td>
<td>MSA_LSC_BAD_START</td>
<td>LSC response; stream start time does not exist.</td>
</tr>
<tr>
<td>5037</td>
<td>MSA_LSC_BAD_STOP</td>
<td>LSC response; stream stop time does not exist.</td>
</tr>
<tr>
<td>5038</td>
<td>MSA_AIM_PUBLISH_PACKAGE_ERROR</td>
<td>Package publishing error</td>
</tr>
</tbody>
</table>

1. This event is monitored by the VDS as well as MSA, and is displayed with the prefix “AVS_” instead of “MSA_."

Table 5-5 lists the error codes for internal errors and external errors. Internal errors are errors that occurred in the VDS and specifically describe where the error occurred. External errors are errors that occurred in the network or network components, which includes the ContentStore, StreamService, and so on. The error codes listed in Table 5-5 provide more detail to the MSA_INT_ERR or AVS_INT_ERR error code.

Table 5-5  INT_ERR Error Codes

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>INGEST_THREADS_NOT_RUNNING</td>
<td>Cache server threads are not running.</td>
</tr>
<tr>
<td>1002</td>
<td>INGEST_NIC_DOWN</td>
<td>Ingest interface is disabled.</td>
</tr>
<tr>
<td>1003</td>
<td>INGEST_DATA_BLOCKAGE</td>
<td>Ingest data read is backlogged, causing data socket blockage.</td>
</tr>
<tr>
<td>1004</td>
<td>BAD_CONTENT</td>
<td>Content data is not recoverable.</td>
</tr>
<tr>
<td>1005</td>
<td>NOT_ENOUGH_NIC_BANDWIDTH</td>
<td>Not enough bandwidth left over on NICs to perform the operation.</td>
</tr>
<tr>
<td>1006</td>
<td>NOT_ENOUGH_SYSTEM_RESOURCES</td>
<td>Not enough system resources left to perform the operation.</td>
</tr>
<tr>
<td>1007</td>
<td>NOT_ENOUGH_DISK_SPACE_AVAILABLE</td>
<td>Not enough disk space available.</td>
</tr>
<tr>
<td>1008</td>
<td>STREAMER_MAX_SLOTS_LIMIT_EXCEEDED</td>
<td>No stream slot available to allocate the stream.</td>
</tr>
<tr>
<td>1009</td>
<td>REMOTE_VAULT_DOWN</td>
<td>Remote Vault is not responding.</td>
</tr>
<tr>
<td>1010</td>
<td>REMOTE_STREAMER_DOWN</td>
<td>Remote Streamer is down.</td>
</tr>
<tr>
<td>1011</td>
<td>VAULT_DISK_BAD</td>
<td>Disk is bad on a Vault.</td>
</tr>
<tr>
<td>1012</td>
<td>STREAMER_DISK_BAD</td>
<td>Disk is bad on a Streamer.</td>
</tr>
<tr>
<td>1013</td>
<td>CONTENT_LOCATE_FAILED</td>
<td>Cannot locate the content on any Vault.</td>
</tr>
<tr>
<td>1014</td>
<td>CONTENT_FILL_FAILED</td>
<td>Cannot push content to the Streamer from Vault.</td>
</tr>
</tbody>
</table>
### Table 5-5 INT_ERR Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1015</td>
<td>NOT_ENOUGH_FILL_BANDWIDTH</td>
<td>Not enough fill bandwidth available.</td>
</tr>
<tr>
<td>1016</td>
<td>FILL_LINKS_DOWN</td>
<td>Fill links are down.</td>
</tr>
<tr>
<td>1017</td>
<td>STREAMING_LINKS_DOWN</td>
<td>Stream links are down.</td>
</tr>
<tr>
<td>1018</td>
<td>VAULT_MIRRORING_SITE_DOWN</td>
<td>Mirroring site of the Vault array is down.</td>
</tr>
<tr>
<td>1019</td>
<td>SET_CONTENT_BUNDLE_FAILED</td>
<td>Set content bundle descriptor array failed.</td>
</tr>
<tr>
<td>1020</td>
<td>SET_DESTINATION_FAILED</td>
<td>Set destination of stream failed.</td>
</tr>
<tr>
<td>1021</td>
<td>DESTROY_STREAM_FAILED</td>
<td>Destroy stream failed.</td>
</tr>
<tr>
<td>1022</td>
<td>PLAY_STREAM_FAILED</td>
<td>Play stream failed.</td>
</tr>
<tr>
<td>1023</td>
<td>FILLCB_FAILED</td>
<td>Fill CB failed.</td>
</tr>
<tr>
<td>1024</td>
<td>WAIT_FOR_FTP_DATA_DONE_FAILED</td>
<td>Wait for FTP data done failed.</td>
</tr>
<tr>
<td>1025</td>
<td>GET_CURRENT_NPT_FAILED</td>
<td>Get current NPT for LSCP status failed.</td>
</tr>
<tr>
<td>2001</td>
<td>CAN_NOT_CONNECT_TO_NAME_SERVICE</td>
<td>Cisco ISA cannot connect to the BMS Naming Server.</td>
</tr>
<tr>
<td>2002</td>
<td>CAN_NOT_CONNECT_TO_NOTIFY_SERVICE</td>
<td>Cisco ISA cannot connect to the Notify Server.</td>
</tr>
<tr>
<td>2003</td>
<td>CAN_NOT_CREATE_EVENT_CHANNELS</td>
<td>Cisco ISA cannot create event channels.</td>
</tr>
<tr>
<td>2004</td>
<td>NO_CONTENT_EVENT_CHANNEL_FOUND</td>
<td>Naming server does not have content event channel.</td>
</tr>
<tr>
<td>2005</td>
<td>NO_STREAM_EVENT_CHANNEL_FOUND</td>
<td>Naming server does not have stream event channel.</td>
</tr>
<tr>
<td>2006</td>
<td>EVENT_CHANNEL_OBJECT_NOT_EXISTS</td>
<td>Event channel object does not exist in Notify Server.</td>
</tr>
<tr>
<td>2007</td>
<td>CORBA_CONNECTION_FAILED</td>
<td>CORBA System exception while connecting to other entity.</td>
</tr>
<tr>
<td>2008</td>
<td>CORBA_BROKEN_PIPE</td>
<td>CORBA system exception with broken pipe with other entity.</td>
</tr>
<tr>
<td>2009</td>
<td>CORBA_CONTENT_STORE_BIND_FAILED</td>
<td>CORBA bind exception while starting Cisco ContentStoreFactory.</td>
</tr>
<tr>
<td>2010</td>
<td>CORBA_STREAM_SERVICE_BIND_FAILED</td>
<td>CORBA bind exception while starting Cisco StreamService.</td>
</tr>
<tr>
<td>2011</td>
<td>CORBA_SYSTEM_ERROR</td>
<td>CORBA system exception while connecting to the servant.</td>
</tr>
<tr>
<td>2012</td>
<td>CORBA_TRANSIENT_ERROR</td>
<td>CORBA system exception with object being transient.</td>
</tr>
<tr>
<td>2013</td>
<td>CORBA_TIMEOUT_ERROR</td>
<td>CORBA timeout exception.</td>
</tr>
<tr>
<td>2014</td>
<td>CORBA_IOR NIL</td>
<td>Orb object is nil.</td>
</tr>
<tr>
<td>2015</td>
<td>CORBA_IOR_NIL_AFTER_NARROW</td>
<td>Orb object is nil after narrow.</td>
</tr>
<tr>
<td>2021</td>
<td>SERVICE_GROUP_NOT_SUPPORTED</td>
<td>Service group is not supported.</td>
</tr>
<tr>
<td>2022</td>
<td>REMOTE_CONTENT_STORE_FACTORY_DOWN</td>
<td>Remote Cisco ContentStoreFactory is down.</td>
</tr>
<tr>
<td>2023</td>
<td>VAULT_HAS_FULL_LOAD</td>
<td>Vault is running with full load.</td>
</tr>
<tr>
<td>2024</td>
<td>FTP_CONNECTION_FAILED</td>
<td>Connection to FTP server failed.</td>
</tr>
<tr>
<td>2025</td>
<td>FTP_SERVER_BIND_FAILED</td>
<td>FTP server can not bind to the port.</td>
</tr>
</tbody>
</table>
## Table 5-5  INT_ERR Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2026</td>
<td>FTP_PUSH_TIMEOUT</td>
<td>FTP push timeout (PASV is not served fast enough).</td>
</tr>
<tr>
<td>2027</td>
<td>FTP_QUIT_RECEIVED_DURING_INGEST</td>
<td>FTP server received QUIT request.</td>
</tr>
<tr>
<td>2028</td>
<td>NO_LSCP_SET_TOP_CONNECTION</td>
<td>LSCP server to set-top box connection is down.</td>
</tr>
<tr>
<td>2029</td>
<td>LSCP_SERVER_BIND_FAILED</td>
<td>LSCP server cannot bind to the running port.</td>
</tr>
<tr>
<td>2030</td>
<td>LSCP_PROXY_BIND_FAILED</td>
<td>LSCP proxy cannot bind to the running port.</td>
</tr>
<tr>
<td>2031</td>
<td>STREAMER_GROUP_MAX_LIMIT_EXCEEDED</td>
<td>Stream count is exceeding the limit for the Streamer group.</td>
</tr>
<tr>
<td>2032</td>
<td>STREAMER_MAX_LIMIT_EXCEEDED</td>
<td>Stream count is exceeding the limit for a Streamer.</td>
</tr>
<tr>
<td>2033</td>
<td>REMOTE_STREAMER_NOT_RESPONDING</td>
<td>Remote Streamer is down.</td>
</tr>
<tr>
<td>2034</td>
<td>NOT_ENOUGH_MQAM_BANDWIDTH</td>
<td>Not enough MQAM bandwidth.</td>
</tr>
<tr>
<td>2035</td>
<td>NO_QAM_FOR_SERVER_ID</td>
<td>Server is not connected to any QAM.</td>
</tr>
<tr>
<td>2036</td>
<td>NOT_ENOUGH_QAM_BANDWIDTH</td>
<td>Not enough QAM bandwidth.</td>
</tr>
<tr>
<td>2037</td>
<td>STREAMER_IS_NOT_IN_THE_SERVICE_GROUP</td>
<td>Streamer is not in the service group.</td>
</tr>
<tr>
<td>2038</td>
<td>STREAMER_HAS_FULL_LOAD</td>
<td>Streamer is running with full load.</td>
</tr>
<tr>
<td>2039</td>
<td>STREAMER_IS_NOT_CONNECTED_THAT_QAM</td>
<td>Server is not connected to the QAM.</td>
</tr>
<tr>
<td>2040</td>
<td>INVALID_SERVICE_GROUP</td>
<td>Service group is not returned by session gateway.</td>
</tr>
<tr>
<td>2041</td>
<td>CONTENT_CAN_NOT_BE_LOCATED</td>
<td>Content is not found in the related content stores.</td>
</tr>
<tr>
<td>2042</td>
<td>CONTENT_OBJECT_NOT_YET_PROVISIONED</td>
<td>Content object is not yet provisioned.</td>
</tr>
<tr>
<td>2043</td>
<td>STREAM_OBJECT_NOT_YET_PROVISIONED</td>
<td>Stream object is not yet provisioned.</td>
</tr>
<tr>
<td>2044</td>
<td>STREAM_OBJECT_IS_OUT_OF_SERVICE</td>
<td>Stream object is out of service.</td>
</tr>
<tr>
<td>2045</td>
<td>STREAM_OBJECT_IS_ALREADY_PROVISIONED</td>
<td>Stream object is already in service.</td>
</tr>
<tr>
<td>2046</td>
<td>CONTENT_OBJECT_IS_ALREADY_PROVISIONED</td>
<td>Content object is already in service.</td>
</tr>
<tr>
<td>2047</td>
<td>STREAM_SERVANT_OBJECT_NOT_EXIST</td>
<td>Remote streamer does not have a servant for stream object.</td>
</tr>
<tr>
<td>2048</td>
<td>NO_DESTINATION_QAM_IP_FOUND</td>
<td>No QAM IP Address is received for the stream destination.</td>
</tr>
<tr>
<td>2049</td>
<td>NO_DESTINATION_QAM_PORT_FOUND</td>
<td>No QAM port is received for the stream destination.</td>
</tr>
<tr>
<td>2050</td>
<td>FAILED_TO_SET_STREAM_DESTINATION</td>
<td>Some error occurred while setting the stream destination.</td>
</tr>
<tr>
<td>2051</td>
<td>UNABLE_TO_ACCEPT_CONNECTION</td>
<td>Cannot accept more TCP connections.</td>
</tr>
<tr>
<td>2052</td>
<td>UNABLE_TO_REGISTER_EVENT_HANDLER</td>
<td>Cannot register event handle to serve the TCP connection.</td>
</tr>
<tr>
<td>2053</td>
<td>CAN_NOT_LOCATE_QAM_IP_FOR_TSID_IN</td>
<td>Cannot locate the QAM IP addresses associated with TSID IN.</td>
</tr>
<tr>
<td>2099</td>
<td>NS_LOG_MONITOR_ERROR</td>
<td>Ns_log file is not updating. Restart the ISA service.</td>
</tr>
<tr>
<td>2100</td>
<td>AVS_ISA_GENERIC_ERROR</td>
<td>Some unknown error occurred during execution of the operation.</td>
</tr>
</tbody>
</table>
### Table 5-5  INT_ERR Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2101</td>
<td>ERR_PKG_PUB_CORBA_DUPLICATE_SERVANT</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2102</td>
<td>ERR_PKG_PUB_CORBA_SERVANT_CREATE_FAILED</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2103</td>
<td>ERR_PKG_PUB_CORBA_OUT_OF_SERVICE</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2104</td>
<td>ERR_PKG_PUB_CORBA_INVALID_NAME</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2105</td>
<td>ERR_PKG_PUB_CORBA_PROVISIONING_FAILED</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2106</td>
<td>ERR_PKG_PUB_CORBA_UNSPECIFIED_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2107</td>
<td>ERR_PKG_PUB_CORBA_INVALID_STATE_CHANGE</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2108</td>
<td>ERR_PKG_PUB_CORBA_TRANSFER_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2109</td>
<td>ERR_PKG_PUB_CORBA_VERSION_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2110</td>
<td>ERR_PKG_PUB_CORBA_XML_PROCESSING_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2111</td>
<td>ERR_PKG_PUB_CORBA_UNKNOWN_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2120</td>
<td>ERR_PKG_DEL_CORBA_DESTROY_FAILED</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2121</td>
<td>ERR_PKG_DEL_CORBA_UNSPECIFIED_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2122</td>
<td>ERR_PKG_DEL_CORBA_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2123</td>
<td>ERR_PKG_DEL_CORBA_UNKNOWN_EX</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2124</td>
<td>ERR_PKG_DEL_CORBA_NAME_NOT_FOUND</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2130</td>
<td>ERR_PKG_UPDATE_CORBA_NAME_NOT_FOUND</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2131</td>
<td>ERR_PKG_UPDATE_CORBA_EXCEPTION</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>2132</td>
<td>ERR_PKG_UPDATE_CORBA_UNKNOWN_EX</td>
<td>Error message returned by back-office.</td>
</tr>
<tr>
<td>3001</td>
<td>CACHE2APP_INITIALIZE_ERROR</td>
<td>Failed to initialize Cache2App library.</td>
</tr>
<tr>
<td>3002</td>
<td>FILLCB_FAILED</td>
<td>FILLCB failed during content ingest.</td>
</tr>
<tr>
<td>3003</td>
<td>DESTROYCB_FAILED</td>
<td>Failed while destroying the content bundle descriptor.</td>
</tr>
<tr>
<td>3004</td>
<td>WAIT_FOR_FTP_DATA_DONE_FAILED</td>
<td>API wait for FTP data done has returned an error.</td>
</tr>
<tr>
<td>3005</td>
<td>SET_CONTENT_BUNDLE_DESCRIPTOR_FAILED</td>
<td>Failed while setting content bundle descriptor for a stream.</td>
</tr>
<tr>
<td>3006</td>
<td>SET_DESTINATION_FAILED</td>
<td>Failed while setting destination of the stream.</td>
</tr>
<tr>
<td>3007</td>
<td>SET_ENCRYPTION_KEY_FAILED</td>
<td>Failed while setting ECM keys for the stream.</td>
</tr>
<tr>
<td>3008</td>
<td>CREATE_STREAM_FAILED</td>
<td>AVS cache server cannot allocate the stream handle.</td>
</tr>
<tr>
<td>3009</td>
<td>DESTROY_STREAM_FAILED</td>
<td>AVS cache server cannot tear down the stream.</td>
</tr>
<tr>
<td>3010</td>
<td>DESTROY_REMOTE_STREAM_FAILED</td>
<td>AVS cache server cannot tear down stream on remote server.</td>
</tr>
<tr>
<td>3011</td>
<td>PLAY_STREAM_FAILED</td>
<td>AVS cache server cannot play the stream.</td>
</tr>
</tbody>
</table>
### Table 5-5  INT_ERR Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4001</td>
<td>DATABASE_DOWN</td>
<td>Database is down.</td>
</tr>
<tr>
<td>4002</td>
<td>DATABASE_SYNCHRONIZING_REPLICATION_QUEUE</td>
<td>Database is synchronizing with replication queue.</td>
</tr>
<tr>
<td>4003</td>
<td>DATA_IS_NOT_IN_SYNC</td>
<td>Database is not in sync with master.</td>
</tr>
<tr>
<td>4004</td>
<td>DATABASE_RETURNED_ERROR</td>
<td>Database has returned an error; maybe because there is no record found.</td>
</tr>
<tr>
<td>4005</td>
<td>DATABASE_RECORD_NOT_FOUND</td>
<td>Record is not found in the database.</td>
</tr>
<tr>
<td>4006</td>
<td>DATABASE_CAN_NOT_INSERT_RECORD</td>
<td>Record cannot be inserted into the database.</td>
</tr>
<tr>
<td>4007</td>
<td>DATABASE_CAN_NOT_DELETE_RECORD</td>
<td>Record cannot be deleted from the database.</td>
</tr>
<tr>
<td>4008</td>
<td>DATABASE_CAN_NOT_UPDATE_RECORD</td>
<td>Record cannot be updated.</td>
</tr>
<tr>
<td>4009</td>
<td>DATABASE_QUERY_SEND_ERROR</td>
<td>Failed to make a query to the database.</td>
</tr>
</tbody>
</table>

Table 5-6 lists the error codes for errors that could occur during ingest or during trick-mode file creation, which cause system failures.

### Table 5-6  MPEG Error Codes

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8001</td>
<td>TRICK_INGEST_NO_INGEST_OBJECTS</td>
<td>Ingest fails. Check available system memory.</td>
</tr>
<tr>
<td>8002</td>
<td>TRICK_INGEST_TOO_MANY_SPEEDS</td>
<td>Too many trick speeds. Change trick speed configuration.</td>
</tr>
<tr>
<td>8003</td>
<td>TRICK_INGEST_NULL_INGEST_OBJECTS</td>
<td>Ingest fails. Check available system memory.</td>
</tr>
<tr>
<td>8004</td>
<td>TRICK_INGEST_INVALID_SPEED_DENOMINATOR</td>
<td>Ingest fails. Change trick speed configuration.</td>
</tr>
<tr>
<td>8005</td>
<td>TRICK_INGEST_INVALID_SPEED_LT_2X</td>
<td>Ingest fails. Change trick speed configuration.</td>
</tr>
<tr>
<td>8006</td>
<td>TRICK_INGEST_NULL_DERIVED_INGEST_OBJECTS</td>
<td>Ingest fails. Check available system memory.</td>
</tr>
<tr>
<td>8007</td>
<td>TRICK_RSDVR_DYNAMIC_TRICK_CREATION_FAILS</td>
<td>RS-DVR trick-mode file creation fails. Change trick speed configuration.</td>
</tr>
<tr>
<td>8008</td>
<td>TRICK_INGEST CDN AVC_UNSUPPORTED</td>
<td>Do not attempt to ingest an Advanced Video Coding (AVC) stream on a VVI system.</td>
</tr>
<tr>
<td>8009</td>
<td>TRICK_RSDVR_BAD_STREAM_TYPE</td>
<td>RS-DVR trick-mode file creation fails. Stream should already have failed ingest.</td>
</tr>
<tr>
<td>8010</td>
<td>TRICK_INGEST_ABORTED</td>
<td>General ingest failure. Check ingest feed.</td>
</tr>
<tr>
<td>8011</td>
<td>TRICK_INGEST_INSUFFICIENT_DATA</td>
<td>Ingest fails. Check ingest feed.</td>
</tr>
<tr>
<td>8012</td>
<td>TRICK_INGEST_STREAM_TOO_BIG</td>
<td>Ingest fails. The limit is 162 GB or about 12 hours at a known bitrate.</td>
</tr>
<tr>
<td>8013</td>
<td>TRICK_RSDVR_WRITE_OVERFLOW</td>
<td>RS-DVR trick-mode file creation fails. Check ingest feed.</td>
</tr>
<tr>
<td>8014</td>
<td>TRICK_INGEST_VBR_UNSUPPORTED</td>
<td>Ingest fails. Check ingest feed.</td>
</tr>
</tbody>
</table>
**Table 5-6:** MPEG Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8015</td>
<td>TRICK_INGEST_RATE_FORCED</td>
<td>Streaming rate may be incorrect. Check ingest feed.</td>
</tr>
<tr>
<td>8016</td>
<td>TRICK_INGEST_PAT_NOT_FOUND</td>
<td>Program association table (PAT) not found. Check ingest feed.</td>
</tr>
<tr>
<td>8017</td>
<td>TRICK_INGEST_DEFAULTING_PMT_PID</td>
<td>Program map table (PMT) process ID (PID) not determined. Check ingest feed.</td>
</tr>
<tr>
<td>8018</td>
<td>TRICK_INGEST_DEFAULTING_PROGRAM_NUMBER</td>
<td>Program number not determined. Check ingest feed.</td>
</tr>
<tr>
<td>8019</td>
<td>TRICK_INGEST_DEFAULTING_VIDEO_PID_AND_TYPE</td>
<td>Video PID or type not determined. Check ingest feed.</td>
</tr>
<tr>
<td>8020</td>
<td>TRICK_INGEST_BITRATE_INDETERMINATE</td>
<td>Bitrate cannot be determined. Check ingest feed or adjust ingest configuration parameters or check interface bandwidth limits.</td>
</tr>
<tr>
<td>8021</td>
<td>TRICK_INGEST_FIRST_PTS_NOT_FOUND</td>
<td>First presentation time stamp (PTS) not determined. Check ingest feed.</td>
</tr>
<tr>
<td>8022</td>
<td>TRICK_INGEST_CANNOT DETERMINE_FRAMERATE</td>
<td>Frame rate not determined. Check ingest feed.</td>
</tr>
<tr>
<td>8023</td>
<td>TRICK_INGEST_PMT_NOT_FOUND</td>
<td>PMT not found. Check ingest feed.</td>
</tr>
<tr>
<td>8024</td>
<td>TRICK_INGEST_MULTIPLE_VIDEO_PIDS</td>
<td>Multiple video PIDs found. Check ingest feed.</td>
</tr>
<tr>
<td>8025</td>
<td>TRICK_INGEST_PID_REPLACEMENT_CANCELLED</td>
<td>PIDs could not be standardized. Check ingest feed.</td>
</tr>
<tr>
<td>8026</td>
<td>TRICK_INGEST_OVERFLOW</td>
<td>Ingest fails because of ring buffer overflow. Check ingest feed.</td>
</tr>
<tr>
<td>8027</td>
<td>TRICK_INGEST_WRITE_ERROR</td>
<td>Ingest fails because of a 1x write problem. Check ingest feed.</td>
</tr>
<tr>
<td>8028</td>
<td>TRICK_INGEST_OVERFLOW_ON_RETRY</td>
<td>Ingest fails even after a retry (ring buffer overflow). Check ingest feed.</td>
</tr>
<tr>
<td>8029</td>
<td>TRICK_INGEST_KNOBS_FAILURE</td>
<td>Ingest fails. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8030</td>
<td>TRICK_INGEST_KNOBS_FAILURE_PAT_PMT</td>
<td>Ingest fails. No PAT or PMT found. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8031</td>
<td>TRICK_INGEST_KNOBS_FAILURE_BITRATE</td>
<td>Ingest fails. Bitrate cannot be computed. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8032</td>
<td>TRICK_INGEST_KNOBS_FAILURE_DISCONTINUITIES</td>
<td>Ingest fails. Too many discontinuities. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8033</td>
<td>TRICK_INGEST_KNOBS_FAILURE_CONTINUITY_COUNTERS</td>
<td>Ingest fails. Too many continuity counter errors. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8034</td>
<td>TRICK_INGEST_KNOBS_FAILURE_SYNC</td>
<td>Ingest fails. Too many sync errors. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8035</td>
<td>TRICK_INGEST_KNOBS_FAILURE_SYNC_TIME</td>
<td>Ingest fails. Sync loss too long. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
</tbody>
</table>
Table 5-6  
MPEG Error Codes (continued)

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8036</td>
<td>TRICK_INGEST_KNOBS_FAILURE_PIC_GAPS</td>
<td>Ingest fails. Too many picture gaps. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8037</td>
<td>TRICK_INGEST_KNOBS_FAILURE_PIC_GAP_TIME</td>
<td>Ingest fails. Picture gap too long. Check ingest feed or adjust ingest configuration parameters.</td>
</tr>
<tr>
<td>8038</td>
<td>TRICK_INGEST_SEQUENCE_HEADER_NOT_FOUND</td>
<td>Ingest fails. Could not find a Sequence Header. Check ingest feed.</td>
</tr>
<tr>
<td>8039</td>
<td>TRICK_INGEST_SPS_NOT_FOUND</td>
<td>Ingest fails. Could not find an SPS. Check ingest feed.</td>
</tr>
<tr>
<td>8040</td>
<td>TRICK_INGEST_CDN_SEQ_WRITE_FAILED</td>
<td>Ingest fails because of a Sequence Header write error. Check ingest feed.</td>
</tr>
<tr>
<td>8041</td>
<td>TRICK_INGEST_CDN_NONCONFORMAL_FRAME_START</td>
<td>VVI: Ingest fails. Invalid frame start. Check ingest feed.</td>
</tr>
<tr>
<td>8042</td>
<td>TRICK_INGEST_SPLIT_SEQEND_SEQ_PAIR</td>
<td>Ingest fails. SequenceEnd/SequenceHeader pair not consecutive. Check ingest feed.</td>
</tr>
<tr>
<td>8043</td>
<td>TRICK_INGEST_PIC_SIZE_CHANGED</td>
<td>Ingest fails. Picture size changed. Check ingest feed.</td>
</tr>
<tr>
<td>8044</td>
<td>TRICK_INGEST_PIC_SIZE_H_OR_V_ZERO</td>
<td>Ingest fails. Picture size H or V zero. Check ingest feed.</td>
</tr>
<tr>
<td>8045</td>
<td>TRICK_INGEST_HORIZONTAL_PIC_SIZE_EXCEEDS_MAX</td>
<td>Ingest fails. Horizontal size exceeds max (1920). Check ingest feed.</td>
</tr>
<tr>
<td>8046</td>
<td>TRICK_INGEST_VERTICAL_PIC_SIZE_EXCEEDS_MAX</td>
<td>Ingest fails. Vertical size exceeds max (1088). Check ingest feed.</td>
</tr>
<tr>
<td>8047</td>
<td>TRICK_INGEST_SEQUENCE_HEADER_CHANGED</td>
<td>VVI: Ingest fails. Sequence Header changed. Check ingest feed.</td>
</tr>
<tr>
<td>8048</td>
<td>TRICK_INGEST_SEQUENCE_HEADER_CHANGE_NO_SEQEND</td>
<td>Ingest fails. Sequence Header changed with no preceding Sequence End.</td>
</tr>
<tr>
<td>8049</td>
<td>TRICK_INGEST_SEQUENCE_HEADER_CHANGE_BAD_PRIOR_STARCODE</td>
<td>Ingest fails. Sequence Header changed with no immediately preceding Sequence End.</td>
</tr>
<tr>
<td>8050</td>
<td>TRICK_INGEST_SEQUENCE_HEADER_CHANGE_NO_PRIOR_STARCODE</td>
<td>Ingest fails. Sequence Header changed with no preceding start code.</td>
</tr>
<tr>
<td>8051</td>
<td>TRICK_INGEST_ILLEGAL_FRAMERATE</td>
<td>Illegal frame rate code. Check ingest feed.</td>
</tr>
<tr>
<td>8052</td>
<td>TRICK_INGEST_CDN_ILLEGAL_PES_PACKETISATION</td>
<td>VVI: Ingest fails. Illegal PES packetization. Check ingest feed.</td>
</tr>
<tr>
<td>8053</td>
<td>TRICK_INGEST_CDN_STREAM_STARTS_WITH_P_FRAME</td>
<td>VVI: Ingest fails: Stream begins with a P-frame. Check ingest feed.</td>
</tr>
<tr>
<td>8054</td>
<td>TRICK_INGEST_CDN_STREAM_STARTS_WITH_B_FRAME</td>
<td>VVI: Ingest fails: Stream begins with a B-frame. Check ingest feed.</td>
</tr>
<tr>
<td>8055</td>
<td>TRICK_INGEST_ZERO_BITRATE</td>
<td>Check ingest feed. Bitrate indeterminate.</td>
</tr>
<tr>
<td>8056</td>
<td>TRICK_INGEST_CDN_STREAM_STARTS_WITH_BAD_I_FRAME</td>
<td>VVI: Ingest fails: Stream begins with a malformed I-frame. Check ingest feed.</td>
</tr>
</tbody>
</table>
Table 5-7 lists the Managed Services Architecture (MSA) error codes for the optional Ingest Manager feature.

<table>
<thead>
<tr>
<th>Numeric Error Code</th>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7000</td>
<td>MSA_BAD_XML</td>
<td>There was an XML parsing error. Check the ADI XML for errors.</td>
</tr>
<tr>
<td>7001</td>
<td>MSA_BAD_REQUEST</td>
<td>Request for content was bad. Check the target backoffice URL.</td>
</tr>
<tr>
<td>7002</td>
<td>MSA_UNKNOWN_HOST</td>
<td>Host is unknown. Check the target backoffice URL.</td>
</tr>
<tr>
<td>7003</td>
<td>MSA_CONNECTION_DROP</td>
<td>The connection was dropped. Check the URL. The Ingest Manager possibly misformatted the ADI XML.</td>
</tr>
<tr>
<td>7004</td>
<td>MSA_BACKOFFICE_TIMEOUT</td>
<td>The backoffice did not respond within the allowed time interval.</td>
</tr>
<tr>
<td>7005</td>
<td>MSA_UNKNOWN</td>
<td>Unknown error occurred. Check the /home/isa/bss/log/aim.log.</td>
</tr>
<tr>
<td>7006</td>
<td>MSA_FAILED_POST</td>
<td>Ingest Manager failed to post the ADI to the backoffice.</td>
</tr>
<tr>
<td>7007</td>
<td>MSA_PKG_EXPIRED</td>
<td>Package has expired and the retry record is removed.</td>
</tr>
<tr>
<td>7008</td>
<td>MSA_STORE_FAILED</td>
<td>Ingest Failed because AIM had a problem with the storage server or vault(s) not available for recording.</td>
</tr>
<tr>
<td>7009</td>
<td>MSA_ENCRYPT_FAILED</td>
<td>Ingest Failed because AIM was unable to encrypt the content</td>
</tr>
<tr>
<td>7010</td>
<td>MSA_BACKOFFICE_FAILED</td>
<td>Ingest failed because AIM was unable to contact the back office.</td>
</tr>
<tr>
<td>7011</td>
<td>MSA_INVALID_URL</td>
<td>The URL provided for the ingest is invalid.</td>
</tr>
<tr>
<td>7019</td>
<td>MSA_ERR_FTP_LOGIN</td>
<td>Failed to login to watch folder.</td>
</tr>
<tr>
<td>7021</td>
<td>MSA_PKG_PUBLISH_FAILED</td>
<td>Failed to publish ADI.XML/ADI.DTD to watch folder.</td>
</tr>
<tr>
<td>7022</td>
<td>MSA_MPG_PUBLISH_FAILED</td>
<td>Failed to publish MPG file to watch folder.</td>
</tr>
<tr>
<td>7023</td>
<td>MSA_AMS_PUBLISH_FAILED</td>
<td>Failed to publish package to AMS.</td>
</tr>
<tr>
<td>10003</td>
<td>OUTOFDISKSPACE_INGEST_FAILURE</td>
<td>Ingest failed due to insufficient disk space.</td>
</tr>
</tbody>
</table>

System Health Scan

To view the details of system health, do the following:

**Step 1** Choose Monitor > System Level > System Health Scan. The AVS Monitoring tool page is displayed.

**Step 2** To view the server health details, choose Server Level from the drop-down list and select the corresponding IP address of the server from the Server drop-down list. Click Display.

**Step 3** The corresponding vault/streamer server information and network information is displayed.

**Step 4** To view the system level health details, choose System Level from the drop-down list and click Display.

**Step 5** The vault/streamer server information and network information of all servers in the system is displayed.

**Step 6** To view the group level health details, choose Group Level from the drop-down list and select the group name from the Group Name drop-down list. Click Display.

**Step 7** The corresponding vault/streamer group information and network information is displayed.
Monitoring Content Objects

The content objects links on the Monitor System Level page provides information on the status of content ingests. The following different ingest states are monitored:

<table>
<thead>
<tr>
<th>Ingest Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed Ingests</td>
<td>Lists content objects that have been fully ingested.</td>
</tr>
<tr>
<td>Active Ingests</td>
<td>Lists content objects that are in the process of being ingested.</td>
</tr>
<tr>
<td>Provisioned Ingests</td>
<td>Lists content objects that have been requested for ingestion, by way of the BMS administrator creating an entry, but have not yet begun active ingestion.</td>
</tr>
<tr>
<td>Unprovisioned Ingests</td>
<td>Lists content objects that were terminated by the BMS administrator or have been created but do not yet contain any information (in other words, they are blank shells).</td>
</tr>
<tr>
<td>Failed Ingests</td>
<td>Lists content objects that failed to complete the ingest process. All failed ingests are reported back to the OpenStream system.</td>
</tr>
<tr>
<td>Package Search</td>
<td>Enables to search for packages based on package name and license expiration date. It also provides a mechanism to adjust the license expiration date of a package.</td>
</tr>
<tr>
<td>Package Status</td>
<td>Enables to display the package details of list of packages matching filter criteria and generate a CSV file. It also provides a mechanism to publish/delete individual packages.</td>
</tr>
<tr>
<td>Package Publish</td>
<td>Enables to publish/delete a list of packages from multiple VOD Market Site(s) in a single attempt.</td>
</tr>
<tr>
<td>Unpublished Packages</td>
<td>Lists the packages that were not published to the VOD Market Site(s).</td>
</tr>
</tbody>
</table>

In a VVI with split-domain management, the Stream Manager displays the following completed ingest details: Content Name, File Size, Rate, Create Time, and Last Modified time of the ingested content. For the other completed ingests fields, see the same content asset on the VVIM.

Ingests

Viewing Completed Ingests is a different procedure than viewing the other types of monitored ingests. This section contains the following topics:

- Viewing and Deleting Completed Ingests
- Viewing Other Ingests

Viewing and Deleting Completed Ingests

To view the details of completed ingests, do the following:

**Step 1**  Choose Monitor > System Level > Completed Ingests.

**Step 2**  The following methods can be used to display a list of content objects:
Enter the first character of the content object name in the text box. A drop-down list of content objects is displayed. If there are more than 25 content objects that start with that first character you entered, you are prompted to continue entering the next character of the content object name or click Display. You can continue to enter characters to reduce the list (you can also delete characters to increase the list) and at any point click Display. After you click Display, a list of content objects is displayed that has the same beginning characters that you entered in the text box.

In the Browse Content box, click one of the characters. A list of content objects that begin with that character is displayed.

In the Quick Lists box, the following options are offered:

- **Most Recent Ingests (max 100)**—Lists the 100 most recent completed ingests sorted by ingest date.
- **List All Contents**—Lists all completed ingests sorted by content name. This option is available only if the number of completed ingests is less than 100.

After you perform one of these methods, a list is displayed. The list of content objects can span several pages. To view the next page, click the page number.

Figure 5-5 shows an example of the Completed Ingests list generated. The content name, file size, duration, and date the object was ingested are displayed.

![Completed Ingests List](image)
Table 5-8  Content Status Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Name</td>
<td>Name of the content.</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of the content.</td>
</tr>
<tr>
<td>GOID</td>
<td>Global Object ID for the content object associated with the content.</td>
</tr>
<tr>
<td>Version</td>
<td>Trick-play speed of the content object. The value, IGate, refers to an index file, which allows for the jumps between trick speeds, and so on. The value, redo, is an undo file. When the content is ingested, if there are any changes made during the ingest, the changes are recorded in the redo file. If the content is sent by using FTP Out, the changes are undone and the original file is sent.</td>
</tr>
<tr>
<td>Server ID</td>
<td>Server ID of the Vault that is storing the content object.</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the storing process of the content object, either complete or partial.</td>
</tr>
</tbody>
</table>

Step 3  To view the details of a content object, click the content name. The Ingest Details are displayed (Figure 5-6).
Table 5-9 describes the content object details that are displayed for each type of ingest.
### Table 5-9 Content Object Details

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Name</td>
<td>Name of the content object.</td>
</tr>
<tr>
<td>Asset Name</td>
<td>Name of the asset. An asset has three basic components: metadata, content, other assets (assets are hierarchically arranged to have a parent-child relationship).</td>
</tr>
<tr>
<td>Ingest IP</td>
<td>TIP address for the ingest interface on the Vault used to download the content.</td>
</tr>
<tr>
<td>File Size</td>
<td>File size, in bytes, of this content object.</td>
</tr>
<tr>
<td>Rate</td>
<td>Rate of ingest in bits per second (3750000 = 3.75 Mbps).</td>
</tr>
<tr>
<td>Create Time</td>
<td>Time and date this content object was created.</td>
</tr>
<tr>
<td>Last Modified</td>
<td>Time and date this content object was last modified.</td>
</tr>
<tr>
<td>Op State</td>
<td>Operational state of this content object. The possible operational states are:</td>
</tr>
<tr>
<td></td>
<td>• Created—Content is loading.</td>
</tr>
<tr>
<td></td>
<td>• In Service—Content is available for streaming.</td>
</tr>
<tr>
<td></td>
<td>• Out of Service—Content is not available for streaming.</td>
</tr>
<tr>
<td>Admin State</td>
<td>Administrative state of this content object. The possible administrative states are:</td>
</tr>
<tr>
<td></td>
<td>• Unprovisioned—Content is loading.</td>
</tr>
<tr>
<td></td>
<td>• In Service—Content is available for streaming.</td>
</tr>
<tr>
<td></td>
<td>• Out of Service—Content is not available for streaming.</td>
</tr>
<tr>
<td>Push Provision</td>
<td>Type of FTP provisioned. The provision types are:</td>
</tr>
<tr>
<td></td>
<td>• FTP pull</td>
</tr>
<tr>
<td></td>
<td>• FTP push</td>
</tr>
<tr>
<td></td>
<td>• Live</td>
</tr>
<tr>
<td>Encrypted</td>
<td>Whether the content object is encrypted or not; <strong>Yes</strong> means encrypted and <strong>No</strong> means not encrypted.</td>
</tr>
<tr>
<td>Get GOID Info</td>
<td>Click <strong>Get GOID Info</strong> to retrieve and display the current GOID information from the database.</td>
</tr>
<tr>
<td>Content Copies</td>
<td>These fields display the following information about the copies of the content:</td>
</tr>
<tr>
<td></td>
<td>• GOID—Global object identifier. An internal identifier used by the VDS.</td>
</tr>
<tr>
<td></td>
<td>• Speed/Direction—Trick-mode speed and direction (play, fast forward, rewind, iGate, redo). The iGate value references offsets in the MPEG file, where there are iframes for smoother trick-mode transitions. The redo value indicates the copy of the content when ingested may have changed slightly and is being redone.</td>
</tr>
<tr>
<td></td>
<td>• Server ID—Server ID where the copy is stored.</td>
</tr>
<tr>
<td></td>
<td>• Status—Status of the stored content.</td>
</tr>
<tr>
<td></td>
<td>• Start Date/Time—Date and time the copy was started.</td>
</tr>
</tbody>
</table>
To delete the completed ingest, click **Delete**.

### Viewing Other Ingests

To view the details of active, provisioned, unprovisioned, and failed ingests, do the following:

**Step 1** Choose **Monitor > System Level** from any page in the CDSM, and then click the link for the type of content object you want to view:

- Active Ingests
- Provisioned Ingests
- Unprovisioned Ingests
- Failed Ingests

**Step 2** Choose a content object from the drop-down list and click **Display**. The details of the content object are displayed. *Figure 5-6 on page 5-21* shows an example of the ingest details.

By typing the first character of the content object name, you can jump to that section of the list.

In addition, you can perform a text string search by typing the text string you want to search for in the **Search Ingests** field and clicking **Search**. A list of content objects that contain the text string are listed. To see the content object details, click the content object name listed. To return to the previous page without selecting a content object, click **Back**.

*Table 5-9 on page 5-22* describes the content object details that are displayed for each type of ingest.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Content ID</td>
<td>Full identification of this content object.</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator (URL) address of the content has the following:</td>
</tr>
<tr>
<td></td>
<td>• Protocol used (for example, FTP)</td>
</tr>
<tr>
<td></td>
<td>• Username and password (for example, videolan:mpeg4ftp)</td>
</tr>
<tr>
<td></td>
<td>• IP address of the content provider server (for example, 192.168.100.184)</td>
</tr>
<tr>
<td></td>
<td>• Directory where the content is stored on the provider server (for example, videolan)</td>
</tr>
<tr>
<td></td>
<td>• Name of the file (for example, long_encore_3.75.mpg)</td>
</tr>
</tbody>
</table>

**Note** The Un provisioned Ingests page displays only the content name and the date the content object was considered unprovisioned.
Package Search

The Package Search page lists the packages along with the License Expiration Date and Package Deletion Date.

To view the details, license expiration date, and package deletion date of a package, do the following:

**Table 5-10 Package Search Details**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package Name</td>
<td>Name of the package.</td>
</tr>
<tr>
<td>License Expiration Date</td>
<td>Date the package expires in the format MM-DD-YYYY</td>
</tr>
<tr>
<td>Additional Package Window</td>
<td>Additional time added to the package.</td>
</tr>
<tr>
<td>Package Deletion Date</td>
<td>License Expiration plus the Additional Package Window in the format MM-DD-YYYY</td>
</tr>
</tbody>
</table>

**Step 1** Choose **Monitor > System Level > Package Search**. The Package Search page is displayed.

**Step 2** You can search based on the following:

- **License Expiration Date**—Choose the license expiration date and click **Display** to search for packages with the specified license expiration date. If you wish to search for a package without license expiration date criteria, check the **Skip License Search** check box.

- **Package Name**—Begin typing the package name, then select the package name from the list provided to search for packages with the specified package name.

**Step 3** Click on the Package name to view the following details:

*Table 5-10* describes the package details that are displayed.

**Step 4** To adjust the license expiration date, enter the number of days (positive or negative) in the **Adjust License Expiration** field and click **Update**.

The license expiration is adjusted by the number of days you entered. The Additional Package Window is not affected and is still applied to create the Package Deletion Date.

**Step 5** Click **Delete** to delete a package from the vault.

**Step 6** In the Asset Details section, to view the metadata associated with the package expiration, click the **details** hyperlink next to the metadata you want to view.

**Note** The Recording Details section is applicable only if the Importer/Transformer Type is SA Tribune.

**Step 7** The Recording details section is informational only.

**Step 8** *Table 5-11* describes the Recording details that are displayed for a chosen package.
To view the ADI XML for the chosen package, click the adi.xml hyperlink next to the Title field.

To delete multiple packages, check the Delete check box corresponding to the packages to be deleted and click Delete.

To delete a package, choose the package from the Available Packages list by typing the characters of the package name, click Display, and then click Delete in the Package Expiration Details section.

### Package Status

The Package Status page lists the publishing and deletion status of a particular package in the corresponding VOD market site(s)/AMS. It also enables to download a CSV file containing a list of packages matching filter criteria. Depending on the VOD market status of a package, the user can publish/delete a package to/from a VOD market site/AMS.

To view the publishing or deletion status of a package in the VOD Market Site/AMS, do the following:

**Step 1** Choose Monitor > System Level > Package Status. The Package Status page is displayed.

**Step 2** Choose the filter criteria to display the list of packages. The following are the filter criterion:

- **Package Name**—Displays all packages starting with the specified package name
- **Title Brief**—Displays all packages containing the specified title brief.
- **Title**—Displays all packages containing the specified title.
- **Asset ID**—Displays all packages starting with the specified Asset ID.
- **Content Name**—Displays all packages starting with the specified Content Name.
- **VOD Market Site/AMS**—Displays all packages to be published/published to the specified VOD Market Site/AMS.
- **Status**—Displays all packages with the specified package publish status.
- **Channel Name**—Displays all packages with the specified channel name. This filter criterion is applicable only to MVOD deployment.

**Step 3** Click Advanced Search to display the following additional filter criteria.

- **Provider**—Displays all packages with the specified Provider ID.
- **Product**—Displays all packages with the specified Product ID.

### Table 5-11 Recording Details

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Time</td>
<td>Start time of the recording.</td>
</tr>
<tr>
<td>End Time</td>
<td>End time of the recording.</td>
</tr>
<tr>
<td>Channel Name</td>
<td>Name of the channel for recording.</td>
</tr>
<tr>
<td>Title</td>
<td>Name of the recording event.</td>
</tr>
</tbody>
</table>
• Package Creation Date—Displays all packages created within the specified package creation date range.
• Content Creation Date—Displays all packages with content created within the specified content creation date range.
• Content Last Modified Date—Displays all packages with content last modified within the specified content last modified date range.
• License Expiration Date—Displays all packages with license expiration date within the specified license expiration date range.
• Package Deletion Date—Displays all packages with deletion date within the specified package deletion date range.

Step 4  Click Display to display the list of packages. Click Download CSV to download a csv file containing a list of packages matching filter criteria.

Note  The Download CSV option is available only for ATIS C2 deployment.

Note  Publishing/Deletion of packages are not permitted for read-only users.

Table 5-12 Package Status Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package</td>
<td>Package name.</td>
</tr>
<tr>
<td>FTP Folder</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>Click the all check box to select all packages</td>
</tr>
<tr>
<td>Status</td>
<td>The package publish status is displayed by a colored icon. The publish</td>
</tr>
<tr>
<td></td>
<td>corresponding to the colored icon is specified below:</td>
</tr>
<tr>
<td></td>
<td>• Green icon indicates Published successfully</td>
</tr>
<tr>
<td></td>
<td>• Red icon indicates Failed to publish</td>
</tr>
<tr>
<td></td>
<td>• Blue icon indicates Scheduled to be published</td>
</tr>
<tr>
<td></td>
<td>• Orange icon indicates Publishing in-progress</td>
</tr>
<tr>
<td></td>
<td>• Yellow icon indicates Deletion Failed</td>
</tr>
<tr>
<td></td>
<td>• NA indicates Not available</td>
</tr>
<tr>
<td>Publish</td>
<td>To publish a package to the meta publish URL configured in Ingest Manager,</td>
</tr>
<tr>
<td>Note</td>
<td>check the Publish check box.</td>
</tr>
<tr>
<td></td>
<td>This check-box is disabled</td>
</tr>
<tr>
<td>Delete</td>
<td>To delete a package from the vault, check the Delete check box</td>
</tr>
<tr>
<td>VOD Market Site/AMS</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>Click the all check box to select all packages</td>
</tr>
</tbody>
</table>
Note
The user can see the publish failure message of a package in failed status by hovering around the red icon.

Viewing Package Details

To view the package details along with the Status, do the following:

Step 1
Click on the Package name to view the following details:

Table 5-13 describes the package publish details.
Table 5-14 describes the package expiration details.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP Folder</td>
<td>Package publish status</td>
</tr>
<tr>
<td>Status</td>
<td>Package publish status</td>
</tr>
<tr>
<td>Timestamp</td>
<td>Date and time the package was published to meta publish FTP URL.</td>
</tr>
<tr>
<td>Publish</td>
<td>To publish the package, check the Publish check box.</td>
</tr>
<tr>
<td>VOD Market Site/AMS</td>
<td>Package Publish Status to VOD Market Site/AMS.</td>
</tr>
<tr>
<td>Status</td>
<td>Package Publish Status to VOD Market Site/AMS.</td>
</tr>
<tr>
<td>Timestamp</td>
<td>Date and time the package was published to VOD Market Site/AMS.</td>
</tr>
</tbody>
</table>
Step 3 To view/edit the ADI metadata for a package, click View/Edit ADI. The ADI metadata XML page is displayed.

**Note** Editing of ADI.xml for a package is not supported for MVOD setup.

Step 4 To adjust the license expiration date, enter the number of days (positive or negative) in the Adjust License Expiration field and click Update.

The license expiration is adjusted by the number of days you entered. The Additional Package Window is not affected and is still applied to create the Package Deletion Date.

Step 5 In the Asset Details section, to view the metadata associated with the package expiration, click the details hyperlink next to the metadata you want to view.

**Note** The Recording Details section is applicable only for MVOD deployment.

Step 6 The Recording details section is informational only.

Table 5-15 describes the Recording details that are displayed for a chosen package.

### Table 5-14 Package Expiration Details

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package Name</td>
<td>Name of the package.</td>
</tr>
<tr>
<td>License Expiration Date</td>
<td>Date the package expires in the format MM-DD-YYYY</td>
</tr>
<tr>
<td>Additional Package Window</td>
<td>Additional time added to the package.</td>
</tr>
<tr>
<td>Package Deletion Date</td>
<td>License Expiration plus the Additional Package Window in the format MM-DD-YYYY</td>
</tr>
</tbody>
</table>

### Table 5-15 Recording Details

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish</td>
<td>To publish the package to VOD market site/AMS, check the Publish check box.</td>
</tr>
<tr>
<td>Delete</td>
<td>To delete the package from VOD market site/AMS, check the Delete check box.</td>
</tr>
<tr>
<td>Publish</td>
<td>Click Publish to publish the package to VOD Market Site(s)/AMS or the FTP server.</td>
</tr>
<tr>
<td>Delete</td>
<td>Click Delete to delete the package from VOD Market Site(s)/AMS or from the vault.</td>
</tr>
<tr>
<td>Reset</td>
<td>To clear the fields and start over, click Reset.</td>
</tr>
</tbody>
</table>

Publish

Click Publish to publish the package to VOD Market Site(s)/AMS or the FTP server.

Delete

Click Delete to delete the package from VOD Market Site(s)/AMS or from the vault.

Reset

To clear the fields and start over, click Reset.
To view/edit the ADI XML for the chosen package, click the \texttt{adi.xml} hyperlink next to the Title field.

\textbf{Note} Editing of ADI.xml for a package is not supported for MVOD setup.

### Package History

\textbf{Note} Package History option is listed on the Monitoring System Level left-panel menu only for the ATIS C2 server deployment.

The Package History page enables the user to view the package history when the package is re-ingested with the new metadata. Only the last ten history details are stored for a given package.

To view the package history, do the following

\begin{enumerate}
\item \textbf{Step 1} Choose \texttt{Monitor} > \texttt{System Level} > \texttt{Package History}. The Package History page is displayed.
\item \textbf{Step 2} To view the package history details begin typing the package name and select the package name from the list provided.
\item \textbf{Step 3} Click \texttt{Display}. Table 5-16 describes the Package History details.
\end{enumerate}

\begin{table}
\centering
\caption{Package History Details}
\begin{tabular}{|l|l|}
\hline
\textbf{Field} & \textbf{Description} \\
\hline
Market & Name of the VOD Market site. \\
\hline
Status & The package publish status \\
\hline
Protocol & The package publish protocol. \\
\hline
Publish Duration & The time taken to publish a package. \\
\hline
Publish Rate & The rate at which the package was published to a market site. \\
\hline
Publish Size & The size of the package published. \\
\hline
Publish Start Time & The start time at which the package was published to a market site. \\
\hline
Publish End Time & The end time at which the package was published to a market site. \\
\hline
\end{tabular}
\end{table}
Package Stats

**Note**

Package Stats option is listed on the Monitoring System Level left-panel menu only for the ATIS C2 server deployment.

The Package Stats page enables the user to view the package ingest and package publish statistics for a specified package.

To view the package statistics, do the following

**Step 1** Choose **Monitor > System Level > Package Stats**. The Package Stats page is displayed.

**Step 2** To view the package stats details begin typing the package name and select the package name from the list provided.

**Step 3** Click **Display**. Table 5-17 describes the Package Stats details.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingest Statistics</td>
<td></td>
</tr>
<tr>
<td>Ingest Start Time</td>
<td>The start time of package ingest.</td>
</tr>
<tr>
<td>Ingest End Time</td>
<td>The end time of package ingest.</td>
</tr>
<tr>
<td>Ingest Size</td>
<td>The size of the package ingested.</td>
</tr>
<tr>
<td>Ingest Duration</td>
<td>The time taken to ingest a package.</td>
</tr>
<tr>
<td>Ingest Rate</td>
<td>The rate at which the package was ingested.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Publish Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Name of the VOD market site.</td>
</tr>
<tr>
<td>Status</td>
<td>The package publish status.</td>
</tr>
<tr>
<td>Protocol</td>
<td>The package publish protocol.</td>
</tr>
<tr>
<td>Publish Duration</td>
<td>The time taken to publish a package.</td>
</tr>
<tr>
<td>Publish Rate</td>
<td>The rate at which the package was published to a market site.</td>
</tr>
<tr>
<td>Publish Size</td>
<td>The size of the package published.</td>
</tr>
<tr>
<td>Publish End Time</td>
<td>The time at which the package was published to a market site.</td>
</tr>
</tbody>
</table>

Package Publish/Delete

**Note**

Package Publish/Delete option is listed on the Monitoring System Level left-panel menu only for the ATIS C2 server deployment.

The Package Publish/Delete page enables the user to publish/delete a list of packages specified in the csv file to/from multiple VOD market sites in a single attempt. The user can also delete a list of packages specified in the csv file from the ATIS server.

To publish a list of packages, do the following:
Step 1 Choose Monitor > System Level > Package Publish/Delete. The Package Publish/Delete page is displayed.

Step 2 Click the Publish radio button and to delete a list of packages click the Delete radio button.

Step 3 Click Browse and select the csv file containing the list of packages.

Step 4 Choose the list of VOD market site(s) to publish the packages to from List of VOD Market Site(s) list and move it to Selected VOD Market Site(s) list.

Step 5 Click Publish to publish the packages. To clear the fields and start over, click Reset.

To delete a list of packages, do the following:

Step 1 Choose Monitor > System Level > Package Publish/Delete. The Package Publish/Delete page is displayed.

Step 2 Click the Delete radio button.

Step 3 Click Browse and select the csv file containing the list of packages.

Step 4 Choose the list of VOD market site(s) to delete the packages from List of destination(s) list and move it to Selected destination(s) list.

Note Choose Origin Server and All VODs to delete a list of packages from all VOD Market Sites and Origin server.

Step 5 Click Delete to the packages. To clear the fields and start over, click Reset.

Unpublished Packages

Note Unpublished Packages are part of the optional Ingest Manager feature. This option is listed only on the Monitoring System Level left-panel menu if the Ingest Manager is enabled in your deployment.

The Unpublished Packages page lists the packages that were not able to be published to the backoffice. To view the unpublished packages list, do the following:

Step 1 Choose Monitor > System Level > Unpublished Packages. The Unpublished Packages page is displayed. Table 5-18 describes the Unpublished Packages details.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package Name</td>
<td>Name of the package.</td>
</tr>
<tr>
<td>VOD Market Site</td>
<td>Name of the VOD Market Site</td>
</tr>
<tr>
<td>Retry Count</td>
<td>Number of retries made to publish a package to a VOD Market Site.</td>
</tr>
</tbody>
</table>
Monitoring Stream Objects

The monitored stream objects consist of the Stream Monitor page.

Stream Monitor

To view the details of stream objects, do the following:

Step 1  Choose **Monitor > System Level > Stream Monitor**. The Stream Monitor page is displayed.

Step 2  The following methods can be used to display a stream object or a list of stream objects:

- Enter the first character of the session ID in the text box. A drop-down list of stream objects is displayed. If there are more than 25 objects that start with that first character you entered, you are prompted to continue entering the next character of the object name or choose one that is listed. You can continue to enter characters to reduce the list (you can also delete characters to increase the list) and at any point choose one. After you choose one, the stream details are displayed (Figure 5-8).

- In the Quick Lists box, the following options are offered:
  - **Most Recent 100**—Lists the 100 most recent stream objects.
  - **All Streams**—Lists all streams. This option is available only if the number of streams is less than 100.
  - **Search by Specific Field**—You can perform a text string search by selecting the field you want to search on, entering the complete text string (for example, the full IP address) in the **Search** field, and clicking **Search**. A list of stream objects that match the text string in the field you selected are listed. Click the linked field (session ID as seen in Figure 5-7) to see the stream monitor details for the selected object, or click **Back** to return to the previous page.

After you perform one of the Quick List methods, a list is displayed. The list of stream objects can span several pages. To view the next page, click the page number.

The stream object list is generated by entering a specific value for the selected field (for example, Destination IP) in the Quick List box. The stream object list displays the session ID, stream start time, Destination IP and port (or subnet address if Stream Destination is enabled), service group, and the TSID in and out if applicable.
Figure 5-7 shows an example of the stream object list generated by clicking **Most Recent 100** or **All Streams**. The Session handles and the stream start time are displayed.

**Figure 5-7  Stream Monitor—Stream List**

To view the details for a particular stream begin typing the stream’s session ID in the box below, then select the session ID from the list provided. Alternatively, you can search for a stream based on the available search criteria listed below in the box labeled "Quick Lists". Choose one of the search options, enter your search data, then click Search.

```
Quick Lists
☐ Most Recent 100  ☐ Subnet Address  ☐ 180 vs
☐ All Streams

Browse Streams: Most Recent 100
```

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Start Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0000531143</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531144</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531145</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531146</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531147</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531148</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531149</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531150</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531151</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531152</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531153</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531154</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531155</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531156</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531157</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531158</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531159</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531160</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531161</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531162</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531163</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531164</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531165</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531166</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531167</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531168</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531169</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531170</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531171</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
<tr>
<td>C0000531172</td>
<td>Feb 1, 11:15:25 pm</td>
</tr>
</tbody>
</table>

**Step 3** To view the details of a stream object, click the session ID. The Stream Details are displayed. **Figure 5-8** shows an example of the stream object details.
Table 5-19 describes the stream details.

Table 5-19  Stream Details

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream ID</td>
<td>Internal unique identifier assigned to the stream session by the Streamer.</td>
</tr>
<tr>
<td>Content ID</td>
<td>Content identifier of the stream object.</td>
</tr>
<tr>
<td>LSCP IP</td>
<td>Source IP address of the LSCP transaction (set-top box).</td>
</tr>
<tr>
<td>Session ID</td>
<td>Session ID of the stream object.</td>
</tr>
<tr>
<td>Create Time</td>
<td>Date and time the stream object was created.</td>
</tr>
<tr>
<td>Last Modified</td>
<td>Date and time the stream object was last modified.</td>
</tr>
<tr>
<td>TSID out</td>
<td>The output transport stream identification on the associated MQAM device.</td>
</tr>
<tr>
<td>Note</td>
<td>This field is applicable only when Streaming Mode is set to ASI.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Service group that the stream object is transmitting on.</td>
</tr>
</tbody>
</table>
### Table 5-19 Stream Details (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QAM IP</td>
<td>IP address of the QAM device delivering this stream object.</td>
</tr>
<tr>
<td>Note</td>
<td>If Stream Destination is enabled, this field displays the subnet address.</td>
</tr>
<tr>
<td>QAM Port</td>
<td>Port the QAM device is using to receive the stream object.</td>
</tr>
<tr>
<td>Note</td>
<td>If Stream Destination is enabled, this field does not display.</td>
</tr>
<tr>
<td>Program Number</td>
<td>This field is applicable only when Streaming Mode is set to ASI.</td>
</tr>
<tr>
<td></td>
<td>The numerical MPEG program number for this stream object.</td>
</tr>
<tr>
<td>Bandwidth Used</td>
<td>Transport stream bandwidth, in bytes, required for this stream object.</td>
</tr>
<tr>
<td>Op State</td>
<td>Operational State indicates the state of the object. The possible states are:</td>
</tr>
<tr>
<td></td>
<td>• InService—Stream object is functioning.</td>
</tr>
<tr>
<td></td>
<td>• OutOfService—Occurs when the entity using the object wants to</td>
</tr>
<tr>
<td></td>
<td>temporarily stop the object.</td>
</tr>
<tr>
<td></td>
<td>• Created—Stream object not yet provisioned.</td>
</tr>
<tr>
<td></td>
<td>• Destroyed—Stream object is destroyed.</td>
</tr>
<tr>
<td>Admin State</td>
<td>Administrative state of this stream object. The possible administrative states are:</td>
</tr>
<tr>
<td></td>
<td>• Unprovisioned—Stream is loading.</td>
</tr>
<tr>
<td></td>
<td>• InService—Stream is available for streaming.</td>
</tr>
<tr>
<td></td>
<td>• OutOfService—Stream is not available for streaming.</td>
</tr>
<tr>
<td>Stream State</td>
<td>Stream state originates from the LSCP server and has the following modes:</td>
</tr>
<tr>
<td></td>
<td>• Open—The server is not transporting a media stream.</td>
</tr>
<tr>
<td></td>
<td>• Pause—The server is not transporting a media stream.</td>
</tr>
<tr>
<td></td>
<td>• Search Transport—The server is searching for start normal play time (NPT).</td>
</tr>
<tr>
<td></td>
<td>When at start NPT, it enters Transport mode.</td>
</tr>
<tr>
<td></td>
<td>• Transport—The server is transporting the media stream and pauses at the</td>
</tr>
<tr>
<td></td>
<td>end of the stream. If scale is positive, indicating a forward direction,</td>
</tr>
<tr>
<td></td>
<td>end of stream is the end of media. If scale is negative, indicating a</td>
</tr>
<tr>
<td></td>
<td>reverse direction, end of stream is the beginning of media.</td>
</tr>
<tr>
<td></td>
<td>• Transport Pause—The server is transporting the media stream and pauses</td>
</tr>
<tr>
<td></td>
<td>at stop NPT.</td>
</tr>
<tr>
<td></td>
<td>• Search Transport Pause—The server is searching for start NPT. When at</td>
</tr>
<tr>
<td></td>
<td>start NPT, it enters transport pause mode.</td>
</tr>
<tr>
<td></td>
<td>• Pause Search Transport—The server is transporting the media stream. It</td>
</tr>
<tr>
<td></td>
<td>does so until stop NPT, and then transitions to search transport mode.</td>
</tr>
<tr>
<td></td>
<td>• End of Stream—The server is not transporting a media stream.</td>
</tr>
</tbody>
</table>
Array Level Monitoring

The Array Level Monitoring pages provide an overall view of the health and activity of an specified array, monitoring and deletion of barker streams, and a display of the Playout Schedule if the Playout Scheduler is enabled. The Array Level links are:

- **Array Snapshot**
- **Barker Stream Monitor**
• Playout Monitor

Array Snapshot

The Array Snapshot page provides an overview of the current activity for the specified array of servers on the VDS. A summary of the state of all streams, content ingests, and disk usage is displayed.

The fields displayed on the Array Snapshot page are the same fields that are displayed on the System Snapshot page, with the active stream bandwidth and active fill bandwidth shown for each Stream Group. For descriptions of the fields, see Table 5-1 on page 5-6.

Barker Stream Monitor

**Note**

The Barker Stream feature is optional and is not listed on the Array Level left-panel menu if it is not included in your deployment. The Barker Stream feature is also not available if the Stream Destination is set to IPTV. For more information, see the “Stream Destination” section on page F-4.

The Barker Stream Monitor page lists the barker streams currently configured. Figure 5-10 shows an example of barker streams.

**Figure 5-10 Barker Stream Monitor Page**

Playout Monitor

The Playout Monitor page displays the Playout Schedule that is currently configured for the selected day and channels.
Note

The Playout Monitor page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

To view the Playout Schedule, do the following:

Step 1

Choose Monitor > Array Level > Playout Monitor. The Playout Monitor page displays the calendar. (Figure 5-11).

Figure 5-11   Playout Monitor Page—Calendar

Step 2

To view the days that have scheduled content for a channel, from the Channel drop-down list, select a channel. The days that have been scheduled for the selected channel are highlighted in the calendar.

For example, in Figure 5-11, CHAN-31 has been selected and October 10, 11, and 12 are highlighted, indicating those days have been scheduled content for CHAN-31.

Step 3

From the calendar, click the day you want to schedule. If the month you are scheduling is not shown, use the left and right arrows on either side of the calendar to change the month.

Note

Today’s date is displayed with a box around it.

If you selected a channel from the Channel drop-down list, then only that channel is displayed in the Playout Monitor.

The schedule for the day you selected is displayed.

Note

The Playout Monitor page displays the delivery service mode for the Playout Scheduler application. To change the delivery service mode (active-active or active-standby), see the “Configuring the TV Playout Application” section on page 7-18.

The timeslots have different colors depending on the status of the scheduled content and the type of content. The Playout Scheduler page displays a legend describing the different colors for the timeslots in the schedule.
Small timeslots are marked blue. To view the program information on small timeslots, click the timeslot. The page refreshes and the schedule for the small timeslot is displayed at the bottom of the page.

## Server Level Monitoring

The Server Level Monitoring pages provide detail information on the health and activity of a VDS server or the CDSM (or VVIM).

To view the Server Level Monitoring pages, do the following:

**Step 1** Choose Monitor > Server Level, and then click one of the following as applicable:

- Disk Monitor
- NIC Monitor
- Server Vitals
- Cache/Fill Bandwidth
- Services Monitor

**Step 2** Choose the IP address of the server from the drop-down list and click Display.

## Disk Monitor

The Disk Monitor page provides real-time information on the status of a disk.

To view the current status of a disk, choose the IP address of the server from the drop-down list on the Disk page, click Display, and roll your mouse over one of the disks displayed in the graphic. If the server is a Lindenhurst CDE, click one of the disks displayed in the graphic. Figure 5-12 shows an example of a Streamer server.

To change how often the information is refreshed, enter the number of seconds in the Data Refresh Rate field. The default is 30 seconds. The range is 10 to 300. All field values that are updated, based on the refresh rate, are initially shown in a green font.

**Note**

If the disk is either sick, abandoned or reported sick then a red disk warning is displayed on the GUI though a solid blue LED is illuminated on the disk.
Figure 5-12 Disk Monitor Page—Streamer

For Vault servers, the Disk Availability line graph shows the percentage of disk space available. The gigabytes displayed for “Total Space,” “Available Space,” and “% Used” are the sum of all the disks installed on the Vault server.

The Linux File System Stats table shows the combined total storage space for the partitions of the disk drives, the combined available storage space for the partitions of the disk drives, and the percentage of used storage for each combined partition. In Figure 5-12, the hda2 partition has an alarm indicator because the usage has exceeded the user-defined threshold of 40 percent. There is also an alarm icon for partitions that have changed to read-only. For information on setting thresholds, see the “Setting System Thresholds” section on page 7-14.

Table 5-20 describes the information displayed when a disk is selected.

Table 5-20 Disk Status Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Temp</td>
<td>Current temperature of the hard disk.</td>
</tr>
<tr>
<td>Smart Status</td>
<td>The Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T.) will</td>
</tr>
<tr>
<td></td>
<td>display “Suspended” for a suspended drive.</td>
</tr>
</tbody>
</table>
S.M.A.R.T

The VDS incorporates S.M.A.R.T. to monitor the reliability of a hard drive, predict drive failures, and to carry out different types of drive self-tests. S.M.A.R.T is firmware, native to most disk drives, that monitors disk attributes over time, making it possible to perform predictive failure analysis. Advanced warning of predictive failures allows the operator to perform preventative maintenance.

To view the current read/write activity that has occurred in the last five seconds on the selected disk, click Graph Disks. Figure 5-13 shows an example of the Disk Activity graph.

**Figure 5-13  Disk Monitor—Streamer Disk Activity Graph**

The Disk Activity graph displays an average calculation of the amount of data read (in megabytes per second) and data writes over a five-second period.

NIC Monitor

The NIC Monitor page displays the status of each network interface card (NIC) on the server.

To view the current status of a NIC on a server, choose the IP address of the server from the drop-down list on the NIC Monitor page, click Display, and click one of the NIC ports displayed in the graphic. Figure 5-14 shows an example of the eth4 interface on a Streamer server.

To change how often the information is refreshed, enter the number of seconds in the Data Refresh Rate field. The default is 10 seconds for a VDS server and 30 seconds for a CDSM (or VVIM). The range is 10 to 300. All field values that are updated, based on the refresh rate, are initially shown in a green font.
Table 5-21 describes the information displayed for a NIC port.

**Table 5-21 NIC Port Status Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Speed</td>
<td>Speed of the interface in megabits per second (Mbps).</td>
</tr>
<tr>
<td>Admin State</td>
<td>Administrative state of the port interface. The administrative state is determined at the time the server is booted. The possible administrative states are up or down.</td>
</tr>
<tr>
<td>Op State</td>
<td>Operational state of the port interface. The operational state is either up or down. If the port is not connected to the network or is malfunctioning, the operational state displayed is down.</td>
</tr>
<tr>
<td>Media Type</td>
<td>Physical conduit of the interface. The physical type is either copper or fiber optic.</td>
</tr>
<tr>
<td>Poll Interval</td>
<td>Number of seconds between each disk polling.</td>
</tr>
<tr>
<td>Transmit</td>
<td>Total number of bytes transmitted since this port has been operational and configured as administratively up.</td>
</tr>
<tr>
<td>Received</td>
<td>Total number of bytes received since this port has been operational and configured as administratively up.</td>
</tr>
</tbody>
</table>

To view the average transmit and receive activity that has occurred in the last two seconds for each port on this server, click **Graph Ports**. Figure 5-15 shows an example of the Port Activity graph.
Server Vitals

The Server Vitals page provides current values for monitored system components. Server components are monitored and if a threshold is exceeded, the System Health Monitor page reports the event and an SNMP trap is sent to the Network Management System (NMS).

The Server Vitals page is displayed only if the CDSM Health Monitor feature is enabled. For more information, see the “CDSM or VVIM Health Monitoring” section on page F-16.

To view the current values of the monitored components, as well as the threshold settings, choose the IP address of the server from the drop-down list on the Server Vitals page and click Display.

To change how often the information is refreshed, enter the number of seconds in the Data Refresh Rate field. The default is 10 seconds for a VDS server and 30 seconds for a CDSM (or VVIM). The range is 10 to 300. All field values that are updated, based on the refresh rate, are initially shown in a green colored font.

To change the temperature format to Fahrenheit, choose °F for the Temperature Format. The default is Celsius (°C).

The monitored components are different for each Content Delivery Engine (CDE) model. Figure 5-16 shows an example of the Server Vitals page for a Vault (CDE420).
Cache/Fill Bandwidth

The Cache/Fill Bandwidth page displays details on the content caching activity on a Streamer. To view the caching activity on a server, choose the IP address of the server from the drop-down list on the Cache/Fill Bandwidth page and click Display. Figure 5-17 shows an example.

To change how often the information is refreshed, enter the number of seconds in the Data Refresh Rate field. The default is 10 seconds for a VDS server and 30 seconds for a CDSM (or VVIM). The range is 10 to 300. All field values that are updated, based on the refresh rate, are initially shown in a green font.
Table 5-22 describes the services listed in the Cache/Fill Bandwidth page. The values in the Cache/Fill Bandwidth page are only accurate if the clocks on the VDS servers are synchronized with the CDSM. If the clocks on the VDS servers are out of sync with the CDSM by more than two minutes, no values are displayed.

**Table 5-22**  **Cache/Fill Bandwidth Fields**

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Stream Count</td>
<td>Number of active streams on this Streamer.</td>
</tr>
<tr>
<td>Active Stream Bandwidth</td>
<td>Bandwidth (in Mbps) used for streaming on this Streamer.</td>
</tr>
<tr>
<td>Unique Stream Count</td>
<td>Number of unique streams on this Streamer.</td>
</tr>
<tr>
<td>Unique Stream Bandwidth</td>
<td>Bandwidth (in Mbps) used for serving unique streams on this Streamer.</td>
</tr>
<tr>
<td>Fill Receive Stream Count</td>
<td>Number of streams on this Streamer that are retrieving content from the Vault to fulfill requests for content.</td>
</tr>
<tr>
<td>Actual Fill Stream Bandwidth</td>
<td>Bandwidth (in Mbps) used on this Streamer for retrieving content from the Vault.</td>
</tr>
<tr>
<td>Disk Read Stream Count</td>
<td>Number of streams on this Streamer sending content that was retrieved from the hard drives on the Streamer.</td>
</tr>
<tr>
<td>Disk Read Bandwidth</td>
<td>Bandwidth (in Mbps) used on this Streamer for retrieving locally stored content (content on the Streamer hard drives).</td>
</tr>
</tbody>
</table>
Services Monitor

The Services Monitor page displays whether specific processes are running on a server.

To view the current status of the services running on a server, choose the IP address of the server from the drop-down list on the Services Monitor page and click Display. Figure 5-18 shows an example of a Streamer server.

Figure 5-18 Services Monitor Page—Streamer

Table 5-23 describes the services listed on the Services Monitor page. All services described in Table 5-23 may not be listed on the Services Monitor page. The services listed are determined by the type of VDS deployment.

Table 5-23 VDS Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Server</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Cache Server</td>
<td>All</td>
<td>Cache server runs on all servers. The Cache server is responsible for the core functions of the VDS.</td>
</tr>
<tr>
<td>Cisco Content Store Master</td>
<td>Vault</td>
<td>Content Store Master process is running if you are looking at a master Vault server. The Content Store Master serves as the master Vault process for accepting inbound OpenStream connections.</td>
</tr>
<tr>
<td>Cisco Content Store Slave</td>
<td>Vault</td>
<td>Content Store Slave process is running if you are looking at either a master or a slave Vault server. The Content Store Slave handles requests proxied by the Content Store Master.</td>
</tr>
<tr>
<td>Cisco Stream Service Master</td>
<td>Streamer</td>
<td>Streamer Service Master process is running if you are looking at a master Streamer server. The Stream Service Master serves as the master Streamer process for accepting inbound OpenStream connections.</td>
</tr>
</tbody>
</table>
### Table 5-23  VDS Services (continued)

<table>
<thead>
<tr>
<th>Service</th>
<th>Server</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Primary Stream Setup Service</td>
<td>Streamer</td>
<td>Primary Setup Service is running if you are looking at the Streamer server designated as the primary Setup server. The Setup server handles setting up stream sessions.</td>
</tr>
<tr>
<td>Cisco Stream Control Service</td>
<td>Streamer</td>
<td>Stream Control Service accepts set-top box play stream commands, for example, LSCP.</td>
</tr>
<tr>
<td>Cisco Resource Manager</td>
<td>Streamer</td>
<td>Resource Manager runs on a Streamer server. The Resource Manager handles orphaned streams.</td>
</tr>
<tr>
<td>Cisco AVS Launcher</td>
<td>Streamers</td>
<td>AVS Launcher is responsible for communicating setup and control IP address movement with CServer for the streaming components.</td>
</tr>
<tr>
<td>Cisco DB Server</td>
<td>All</td>
<td>DB (database) server runs on all servers and is responsible for keeping track of all data objects in the VDS.</td>
</tr>
<tr>
<td>DB Synchronization Status</td>
<td>All</td>
<td>Displays the status of the database synchronization among all servers. The states are “OK” and “not OK.”</td>
</tr>
<tr>
<td>Cisco SNMP Server</td>
<td>All</td>
<td>SNMP server shows as running when the SNMP agent is running.</td>
</tr>
<tr>
<td>Cisco System Manager</td>
<td>All</td>
<td>System Manager runs on each server and facilitates communication with the CDSM.</td>
</tr>
<tr>
<td>Cisco Error Repair Server</td>
<td>Streamer</td>
<td>VOD Error Repair server runs on Streamer that has the Application Monitoring Tool (AMT) enabled.</td>
</tr>
<tr>
<td>Cisco Ingest Manager</td>
<td>Vault</td>
<td>Ingest Manager process is running if you are looking at a master Vault server and the optional Ingest Manager feature is part of your deployment.</td>
</tr>
<tr>
<td>Cisco CDSM Web Server</td>
<td>CDSM</td>
<td>The Apache web server on the CDSM.</td>
</tr>
<tr>
<td>Cisco CDSM Importer Server</td>
<td>CDSM</td>
<td>The importer server on the CDSM.</td>
</tr>
<tr>
<td>Cisco CDSM Exporter Server</td>
<td>CDSM</td>
<td>The exporter server on the CDSM.</td>
</tr>
<tr>
<td>Cisco collectd Server</td>
<td>All</td>
<td>The collectd server collect the status and statistical date of the server and directly uploads the data of each server on to the Controller (CDS/VVIM) over a TCP connection.</td>
</tr>
</tbody>
</table>
Recommended Monitoring Schedule

This monitoring schedule is recommended to ensure that the VDS is functioning as expected and identify potential issues that may cause downtime.

⚠️ Caution
Do not attempt to access the Linux command line unless you are familiar with the VDS, the Linux operating system, and the Linux command line.

⚠️ Note
Some error warnings in the logs are only informational and no action is necessary.

Daily Tasks

The following tasks should be performed daily:

- Choose Monitor > System Level > System Health and check the System Health Monitor page for red or yellow states on any of the servers. Click any red or yellow boxes to see detail information on disk, NIC, or services. See the “System Health” section on page 5-3 for more information.
- Choose Monitor > System Level > Failed Ingests to check for any failed ingests. See the “Ingests” section on page 5-18 for more information.
- Choose Monitor > System Level > System Failures to check for any system failures. See the “System Failures” section on page 5-6 for more information. It is also possible to run a report for the previous day. See the “System Failures” section on page 6-27 for more information.

Weekly Tasks

The following tasks should be performed weekly:

- Monitoring Tasks for Streamers and Vaults
- Monitoring Tasks for Vaults
- Monitoring Tasks for Streamers

⚠️ Note
All commands require that you log into each Linux operating system as root. Some tasks have a CDSM option.

Monitoring Tasks for Streamers and Vaults

To monitor the Streamer and Vaults weekly, do the following:

Step 1
Recover used disk space. Log in to each server using the root logon and run the following command:

dh -h

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/hda1</td>
<td>13G</td>
<td>5.2G</td>
<td>7.0G</td>
<td>43%</td>
<td>/</td>
</tr>
<tr>
<td>/dev/hda6</td>
<td>20G</td>
<td>16G</td>
<td>4.3G</td>
<td>78%</td>
<td>/arroyo/log</td>
</tr>
</tbody>
</table>
If the disk usage is greater than 75 percent, recover the disk space using the following methods:

a. Search and remove any core files.
   
   ```
   find /arroyo -name core*
   find /home/isa -name core*
   ```

b. Copy any archived logs to an external device and delete them from the /arroyo/archive directory.

c. Check for the presence of old install or upgrade ISO files in the /root directory and delete them.
   
   ```
   find /root -name *.iso
   find /arroyo -name *.iso
   ```

**Step 2** Verify the services are running. Choose Monitor > Server Level > Services Monitor to check the services for each server, or log in to each server and run the following commands:

```
su - isa
cdint
./show_calypso_services
```

**Step 3** Check the CServer interfaces to verify the status of the Ethernet adapters. Choose Monitor > Server Level NIC Monitor, or log in to each server and use the following commands

a. Use the `grep -i Link` command to verify that all adapters should have a status of “link up,” except those adapters that are not being used.

   ```
   grep -i Link /proc/net/PRO_LAN_Adapters/*.info
   ```

b. Use the `grep -i Speed` command to verify that each adapter that has a “link up” status should have a speed of 1000.

   ```
   grep -i Speed /proc/net/PRO_LAN_Adapters/*.info
   ```

c. Use the `grep -i State` command to verify that all adapters should have an “up” state, except those adapters that are not being used.

   ```
   grep -i State /proc/net/PRO_LAN_Adapters/*.info
   ```

**Step 4** Check the CServer streaming and cache-fill interfaces using the following command:

```
/home/stats/ifstats
```

**Step 5** Check the database thread count using the following command:

```
netstat -an | grep 9999
```

Two connections for each Vault and Streamer should be listed with a status of “ESTABLISHED.”

**Step 6** Check the protocol timing logs for errors or problems. Also, look at the protocol timing logs for packet retransmissions.

```
tail -f /arroyo/log/protocoltiming.log.(date) | grep retransmissions
```

**Step 7** Look for warning messages.

```
grep -i warning /arroyo/log/protocoltiming.log.<date> | more
```

**Note** The “WARNING” messages can sometimes be misleading; for example, “datawait” and “slow disk” messages occur normally and do not indicate a problem.
Recommended Monitoring Schedule

Chapter 5      System Monitoring

Step 8

The number of GOIDs for a particular content object must be the same on all servers (Vaults and Streamers) that are supposed to have the content. The number of Vaults that must have the same number of GOIDs for a particular content object is determined by the mirrored copy configuration (see the “Configuring the Servers” section on page 4-128). The number of GOIDs is also dependent on the trick speeds you configured (see the “Configuring Ingest Tuning” section on page 4-33). If the GOID is different between a Vault and a Streamer, session setup is not created properly because of an issue of “no content available.” This is because there is no content on the Vault that matches the GOID the Streamer has.

Monitoring Tasks for Vaults

In addition to the weekly monitoring tasks for both the Vaults and Streamers, the Vaults can also be monitored in the following ways:

1. Check the available space on the Vault hard drives. Choose Monitor > Server Level > Disk Monitor. The disk availability is shown as a percentage and as a number of gigabytes. Alternatively, view the protocol timing logs by running the following command:

   ```
   tail -f /arroyo/log/protocoltiming.<date> | grep "Capacity Disk:"
   ```

   The number returned indicates the percentage of the disk space available on this server. If the number is 5 or lower, then steps need to be taken to increase storage space by adding more Vaults, replacing drives with higher capacity drives, or removing unused content.

2. Check the /home/isa/ContentStore/server/ContentStore.log for ingest errors on each Vault. The master Vault has an additional log.

Monitoring Tasks for Streamers

In addition to the weekly monitoring tasks for both the Vaults and Streamers, the Streamers can also be monitored in the following ways:

1. In an ISA environment, look for any errors in the /Streaming/lscp_server/LSCPService.log on the primary Control server, and /Streaming/master/StreamService.log on the primary Setup server.

2. Look at the streaming log.

   ```
   tail -f /arroyo/log/streamevent.log.<date>
   ```

Monthly Tasks

The monthly monitoring tasks consist of the following:

1. Choose Monitor > System Level > System Snapshot and check that the “Disk Available” amount meets the requirements for the expected movie storage in the next three to six months.

2. Run the reports for the last month that are suitable for your requirements and save them as comma-separated value (CSV) files.

3. Using the bandwidth and streaming reports, check that the VDS is not exceeding required usage per service area.

4. Run a quick security check.
a. Ensure that the CDSM changes can be attributed to individual users and not to a generic admin account.

b. Reset CDSM passwords if necessary.

c. Reset Linux passwords if necessary.

d. Check that access policies and firewalls are still enforced.

**Other Tasks**

If you have access to an anything on demand (XOD) application, do the following:

1. Check the inspect-live log for excessive errors.

2. Check the inspect-live log for excessive communication times with the BMS or VDS.
System Reporting

The CDSM provides tools that can be used for system monitoring and system diagnostics. The topics covered in this chapter include:

- Stream Activity, page 6-1
- Content Activity, page 6-35
- CDSM Audit Logs, page 6-38
- Playout/Barker Reports, page 6-41
- Archived Data, page 6-42

If Virtual Video Infrastructure (VVI) with split-domain management is enabled, the CDSM pages associated with the Vaults and Caching Nodes display only on the VVI Manager (VVIM), and the CDSM pages associated with the Streamers display only on the Stream Manager. For more information, see the “Virtual Video Infrastructure” section on page F-10.

If TV Playout is enabled, only the CDSM Audit Logs and the Playout/Barker Reports are the only reports displayed. For more information, see the “Playout Scheduler” section on page F-14.

Stream Activity

The Stream Activity reports display information about streams. The available reports are:

- Capacity Planning
- Streams by Array
- Streams by Time
- Streams per STB-MAC
- Stream Play History
- Cache/Fill Bandwidth
- System Failures
- Content Popularity

To access the available Stream Activity reports, choose Report > Stream Activity, and follow the procedure for the specific report described in the following subsections.
Capacity Planning

The Capacity Planning report provides information on high usage of bandwidth and streams for the selected date range and modifier.

Note

If Trick Mode Capture is disabled, the data for the Capacity Planning report is not available. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Step 1

From the Available Reports drop-down list, choose Capacity Planning (Figure 6-1).

Figure 6-1  Available Reports for Stream Activity

Figure 6-2 shows the selection fields for the Capacity Planning report.
Step 2  Choose a modifier. See Table 6-1 for a description of each modifier.

Table 6-1  Capacity Planning Modifiers

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (Date Only)</td>
<td>Filter on date only.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Filters the report by the service group you choose in a later step.</td>
</tr>
<tr>
<td>Streamer</td>
<td>Filters the report by the Streamer or ISV(^1) you specify in a later step.</td>
</tr>
</tbody>
</table>

1. ISV = Integrated Streamer-Vault.

Step 3  Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.

Step 4  Choose a time breakdown. See Table 6-2 for a description of each time breakdown.

Table 6-2  Time Breakdown Options

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per hour</td>
<td>Peak usage of bandwidth and streams per hour within the specified date range.</td>
</tr>
<tr>
<td>Per day</td>
<td>Peak usage of bandwidth and streams per day within the specified date range.</td>
</tr>
</tbody>
</table>
Table 6-2     Time Breakdown Options (continued)

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per week</td>
<td>Peak usage of bandwidth and streams per week within the specified date range. Incomplete weeks are not returned. The start date determines the first day of the week. For example, if you specify Tuesday, the 2nd of November 2010 as the start date, the first week is calculated as spanning from Tuesday, the 2nd of November 2010 to Monday, the 8th of November 2010. The second week is calculated as spanning from Tuesday, the 9th of November 2010 to Monday, the 15th of November 2010.</td>
</tr>
<tr>
<td>Per month</td>
<td>Peak usage of bandwidth and streams per month within the specified date range. The day specified as the start date is ignored. The start month and all months between the start month and the end month are returned. The end month is returned only if a complete month is specified in the end date. Otherwise, it is ignored. For example, if you specify the 5th of January 2010 as the start date and the 31st of March 2010 as the end date, the report returns data for January, February and March. However, if you change the end date to the 29th of March, only data for January and February is returned.</td>
</tr>
<tr>
<td>Daily per min</td>
<td>Peak usage of bandwidth and streams per minute for each standard week within the specified date range. <strong>Note</strong> A standard week is from Sunday through Saturday.</td>
</tr>
<tr>
<td>Daily per 5 min</td>
<td>Peak usage of bandwidth and streams per five minute intervals for each standard week within the specified date range.</td>
</tr>
<tr>
<td>Daily per 15 min</td>
<td>Peak usage of bandwidth and streams per fifteen minute intervals for each standard week within the specified date range.</td>
</tr>
<tr>
<td>Daily per hour</td>
<td>Peak usage of bandwidth and streams per hour for each standard week within the specified date range.</td>
</tr>
</tbody>
</table>

**Step 5** If you selected a modifier that requires a value, choose or specify the value.

**Step 6** Click **Display**.

To clear the fields and start over, click **Reset**.

**Figure 6-3** shows an example of the Capacity Planning report in a chart view displaying peak usage of bandwidth and streams daily covering a 23-day period with no optional modifiers selected.
The report displays:

- Report type (for example, Capacity Planning Report displaying daily peak values)
- From and to dates
- Peak stream count for each time breakdown within the time period selected
- Peak bandwidth in Mbps for each time breakdown within the time period selected

Hover your cursor over a data point to view the time breakdown, peak stream count, and peak bandwidth associated with the data point.

Click the **Grid** button to view the chart information in a table (**Figure 6-4**).
**Figure 6-4  Capacity Planning Report—Grid**

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Peak Stream Count</th>
<th>Peak Bandwidth Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sat 04/30</td>
<td>2023</td>
<td>12150</td>
</tr>
<tr>
<td>Fri 04/29</td>
<td>3758</td>
<td>15109</td>
</tr>
<tr>
<td>Thu 04/28</td>
<td>4066</td>
<td>16264</td>
</tr>
<tr>
<td>Wed 04/27</td>
<td>3856</td>
<td>15424</td>
</tr>
<tr>
<td>Tue 04/26</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Mon 04/25</td>
<td>4018</td>
<td>16940</td>
</tr>
<tr>
<td>Sun 04/24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sat 04/23</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Fri 04/22</td>
<td>7</td>
<td>28</td>
</tr>
</tbody>
</table>

Click the **Chart** button to return to the chart view.

Click **New Report** to return to the report selection page.

**Step 7**  
To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click **Download** and then click **Save** or **Open**. **Save** presents a Save As dialog box. **Open** opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click **Download** and choose **Save Link As**, **Save Link Target As**, or **Save Target As** depending on the web browser you are using. A Save As dialog box is displayed.
Streams by Array

The Streams by Array report lists all streams currently active for a specified group of Streamers. To view the Streams by Array report, do the following:

**Step 1** From the Available Reports drop-down list, choose Streams By Array. Figure 6-5 shows the selection fields for the Streams by Array report.

**Figure 6-5 Streams by Array Report Selection Fields**

<table>
<thead>
<tr>
<th>System Level</th>
<th>Stream Activity</th>
<th>Content Activity</th>
<th>COSM Audit Logs</th>
<th>Archived Data</th>
</tr>
</thead>
</table>

**Available Reports:** Streams By Array

**Stream Array:** Array 14/146

**Modifiers:**
- None (Date Only)
- Service Group
- STB MAC
- QAM IP

**From Date:** Oct 23 2008 **To Date:** Oct 23 2008

**Time Breakdown:**
- Hourly
- Daily
- Weekly
- Monthly

**QAM IP:** Choose One...

*Please only click the 'Display' button once, some large reports take several seconds to process.*

**Step 2** From the Stream Array drop-down list, choose a stream array.

**Step 3** Choose a modifier. See Table 6-3 for a description of each modifier.

**Table 6-3 Streams by Array Modifiers**

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (Date Only)</td>
<td>Displays a list of all streams (Session ID Summary report) filtered by the from and to dates.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Filters the report by the service group you choose in a later step.</td>
</tr>
<tr>
<td>STB MAC</td>
<td>Filters the report by the set-top box MAC address you specify in a later step.</td>
</tr>
<tr>
<td>QAM IP</td>
<td>Filters the report by the IP address of the QAM device you choose in a later step.</td>
</tr>
</tbody>
</table>

1. QAM = quadrature amplitude modulation.

**Step 4** Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.
Step 5  Choose a time breakdown of hourly, daily, weekly, or monthly. The maximum time interval allowed for each breakdown is the following:

- Hourly—31 days
- Daily—2 years
- Weekly—2 years
- Monthly—2 years

Step 6  If you selected a modifier that requires a value, choose or specify the filter value.

Step 7  Click Display.

To clear the fields and start over, click Reset.

Figure 6-6 shows an example of the Streams by Array report in a chart view displaying daily stream activity covering a six-day period with no optional modifiers selected.

**Figure 6-6  Streams by Array Report**

The report displays:

- Report type (for example, Daily Stream Activity Report for streams by array)
- From and to dates
- Number of high-definition (HD) streams, number of standard definition (SD) streams, and total number of streams for each time breakdown within the time period selected

Hover your cursor over a data point to view the time breakdown, number of HD streams, number of SD streams, and total number of streams associated with the data point.
Click the **Grid** button to view the chart information in a table. Click the **Chart** button to return to the chart view.

Click **Previous Report** to return to the report selection page.

**Note** **Previous Report** returns you to the report selection page or the previous report page in a multi-page report. **Next Report** takes you to the next page in the report.

**Step 8** To see more detail, click a bar in the chart. For example, in **Figure 6-6**, click the bar representing the number of streams transmitted on Apr 26, 2011. The Session ID Summary is displayed for this date (**Figure 6-7**).

**Figure 6-7  Session ID Summary**

The report displays:

- Session ID
- Content name
- Start and end date and time

**Step 9** If a content object is associated with a session, do the following to view stream history information:

a. Click a session ID to see the stream play history of a specific session (**Figure 6-8**).

**Note** If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.
The report opens in a chart view and displays:

- Session ID
- Set-top box MAC address
- Termination reason
- Date and time of each play or trick mode action
- Server ID of the Play server that served the trick mode
- Elapsed time of each action

At the bottom of each Stream Play History report is a legend mapping the action to a color.

Hover your cursor over a data point to view detailed action information, including start date and time, status, start of normal play time (nptstart), end of normal play time (nptend), and duration.

Click the **Grid** button to view the chart information in a table. Click the **Chart** button to return to the chart view.

Click **Previous Report** to return to the previous page.

**Note**

**Previous Report** returns you to the report selection page or the previous report page in a multi-page report. **Next Report** takes you to the next page in the report.

b. To see details about the stream associated with this session, click **Show Stream Data** (Figure 6-9).
The Stream Data displays:

- Details about the stream (QAM IP address, QAM port, and, if applicable, service group)
- Details about the content (content name, ingest information, server ID of the server storing the content, and so on)

Click **Hide Stream Data** to hide stream data.

Click **Previous Report** to return to the previous page.

c. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click **Download** and then click **Save** or **Open**. **Save** presents a Save As dialog box. **Open** opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click **Download** and choose **Save Link As**, **Save Link Target As**, or **Save Target As** depending on the web browser you are using. A Save As dialog box is displayed.
Step 10  If a playlist is associated with a session, do the following to view stream history information:

a. Click the Session ID to see the playlist history for the session (Figure 6-10).

![Figure 6-10  Session Playlist History](image)

The report opens in a chart view and displays:
- Session ID
- Start time of each playlist
- Elapsed time of each playlist in minutes

Each content segment in the playlist is represented by a different color. In the example presented in Figure 6-10, the selected playlist began at 18:18:33, it was 240 minutes in duration, and it consisted of four content segments.

Hover your cursor over a content segment to view detailed segment information, including start date and time, segment number, segment duration, and playlist duration.

Click Previous Report to return to the previous page.

b. To see the stream play history for a specific playlist, click a bar in the chart representing a playlist.
Note

If Trick Mode Capture is disabled, clicking a bar in the chart does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Click Previous Report to return to the previous page.

c. To see details about the stream associated with this session, click Show Stream Data.

Click Hide Stream Data to hide the stream data.

Click Previous Report to return to the previous page.

d. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

---

Streams by Time

The Streams by Time report summarizes the number of SD and HD streams by the selected time breakdown in the specified time period. This report can be used to analyze slow times of day and to plan outages.

To view the Streams by Time report, do the following:

---

Step 1

From the Available Reports drop-down list, choose Streams By Time. Figure 6-11 shows the selection fields for the Streams By Time report.
Step 2  Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.

Step 3  Choose a time breakdown of per hour, per half hour, per 15 minute, or per minute.

Step 4  Click Display.

To clear the fields and start over, click Reset.
Figure 6-12 shows an example of the Streams by Time report in a chart view with the **Per Hour** time breakdown selected.

**Figure 6-12    Streams by Time Report**

The report displays:
- Report type (for example, Stream Activity Report for streams by time)
- From and to dates
- Number of HD streams, number of SD streams, and total number of streams for each time breakdown within the time period selected

Hover your cursor over a data point to view the time breakdown, number of HD streams, number of SD streams, and total number of streams associated with the data point.

Click the **Grid** button to view the chart information in a table. Click the **Chart** button to return to the chart view.

Click **Previous Report** to return to the previous page.
Note: Previous Report returns you to the report selection page or the previous report page in a multi-page report. Next Report takes you to the next page in the report.

Step 5 To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

Streams per STB-MAC

The Stream per STB-MAC report lists the number of streams that have been delivered to each set-top box during a specified day.

To view the Streams per STB-MAC report, do the following:

Step 1 From the Available Reports drop-down list, choose Streams Per STB-MAC. Figure 6-13 shows the selection fields for the Streams per STB-MAC report.

Figure 6-13 Streams per STB-MAC Report Selection Fields

Step 2 Using the drop-down lists provided, or the calendar, choose a Start Date for the report.

Note: The report displays streams transmitted from 12:00 am to 11:59 pm on the day specified as the start date.

Step 3 Click Display.

To clear the fields and start over, click Reset.
Figure 6-14 shows an example of the Streams per STB-MAC report in a chart view.

*Figure 6-14  Streams per STB-MAC Report*

The report displays:
- Report type (for example, Stream Activity Report for streams per STB-MAC)
- From and to dates
- MAC address of each set-top box
- Total number of streams for each set-top box on the date selected

Hover your cursor over a data point to view the MAC address of the set-top box and the total number of streams associated with the data point.

Click the Grid button to view the chart information in a table. Click the Chart button to return to the chart view.

Click Previous Report to return to the report selection page.

**Step 4** To see more detail, click a bar in the chart. For example, in Figure 6-14, click the bar representing STB 1303853305. The Session ID Summary is displayed for this STB.

*Note* If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.
Stream Activity

Chapter 6      System Reporting

Step 5 If a content object is associated with a session, do the following to view stream history information:

a. Click a session ID to see the stream play history of a specific session.

Click Previous Report to return to the previous page.

b. To see details about the stream associated with this session, click Show Stream Data.

Click Hide Stream Data to hide stream data.

Click Previous Report to return to the previous page.

Note Previous Report returns you to the report selection page or the previous report page in a multi-page report. Next Report takes you to the next page in the report.

c. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

Step 6 If a playlist is associated with a session, do the following to view stream history information:

a. Click the Session ID to see the playlist history for the session.

Click Previous Report to return to the previous page.

b. To see the stream play history for a specific playlist, click a bar in the chart representing a playlist.

Note If Trick Mode Capture is disabled, clicking a bar in the chart does not launch the Stream Play History report. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Click Previous Report to return to the previous page.

c. To see details about the stream associated with this session, click Show Stream Data.

Click Hide Stream Data to hide the stream data.

Click Previous Report to return to the previous page.

d. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.
Stream Play History

The Stream Play History report lists the trick mode history for specified streams.

To view the Stream Play History report, do the following:

**Step 1** From the Available Reports drop-down list, choose Stream Play History. Figure 6-15 shows the selection fields for the Stream Play History report.

**Figure 6-15 Stream Play History Report Selection Fields**

<table>
<thead>
<tr>
<th>System Level</th>
<th>Stream Activity</th>
<th>Content Activity</th>
<th>COSM Audit Logs</th>
<th>Archived Data</th>
</tr>
</thead>
</table>

**Available Reports:**
- Stream Play History

**Modifiers:**
- None (Date Only)
- Service Group
- Session ID
- STB MAC
- QAM IP

**From Date**
- Feb 5, 2007

**To Date**
- Feb 2, 2007

**Service Group:**
- 1

Please only click the display button once, some large reports take several seconds to process.

**Step 2** Choose a modifier. See Table 6-4 for a description of each modifier.

**Table 6-4 Stream Play History Modifiers**

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (Date Only)</td>
<td>Displays a list of all streams (Session ID Summary) filtered by the from and to dates.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Filters the report by the service group you choose in a later step.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Filters the report by a session ID you specify in a later step.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.</td>
</tr>
<tr>
<td>STB MAC</td>
<td>Filters the report by the set-top box MAC address you specify in a later step.</td>
</tr>
<tr>
<td>QAM IP</td>
<td>Filters the report by the IP address of the QAM device you choose in a later step.</td>
</tr>
</tbody>
</table>

**Step 3** Using the drop-down lists provided, or the calendars, choose a **From Date** and **To Date** for the report.
Stream Activity

Chapter 6      System Reporting

Note Selecting Session ID displays the complete play history for the specified session. The From Date and To Date fields are bypassed.

Note Selecting None (Date Only) displays the Session ID Summary. To see the play history of a specific session, click a Session ID in the Session ID Summary report.

Step 4 If you selected a modifier, choose or specify the filtered value. For example, if you choose Service Group as the modifier, you specify which Service Group.

Step 5 Click Display.

To clear the fields and start over, click Reset.

Figure 6-16 shows an example of the Stream Play History report.

**Figure 6-16 Stream Play History Report**

The report displays:
- Session ID
- Content name
- Start and end date and time

Step 6 If a content object is associated with a session, do the following to view stream history information:
   a. To see the stream play history of a specific session, click a session ID (Figure 6-17).
Note

If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Figure 6-17   Session ID—Stream Play History Drilldown

The report opens in a chart view and displays:

- Session ID
- Set-top box MAC address
- Termination reason
- Server ID of the Play server that served the trick mode
- Date and time of each play or trick mode action
- Elapsed time of each action

At the bottom of each Stream Play History report is a legend mapping the action to a color. Hover your cursor over a data point to view detailed action information, including start date and time, status, nptstart, nptend, and duration.

Click the Grid button to view the chart information in a table. Click the Chart button to return to the chart view.

Click Previous Report to return to the previous page.
b. To see details about the stream associated with this session, click **Show Stream Data** (Figure 6-18).

**Figure 6-18 Stream Play History—Stream Data**

The Stream Data displays:
- Details about the stream (QAM IP address, QAM port, and, if applicable, service group)
- Details about the content (content name, ingest information, server ID of the server storing the content, and so on)

Click **Hide Stream Data** to hide stream data.

Click **Previous Report** to return to the previous page.

**Note** **Previous Report** returns you to the report selection page or the previous report page in a multi-page report. **Next Report** takes you to the next page in the report.
c. To download the report to a comma-separated value (CSV) file, do one of the following:
   a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.
   b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

Step 7  If a playlist is associated with a session, do the following to view stream history information:
   a. Click the Session ID to see the playlist history for the session (Figure 6-19).

Figure 6-19  Session Playlist History

Click Previous Report to return to the previous page.

b. To see the stream play history for a specific playlist, click a bar in the chart representing a playlist.

Note  If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Click Previous Report to return to the previous page.

c. To see details about the stream associated with this session, click Show Stream Data.
Cache/Fill Bandwidth

The Cache/Fill Bandwidth report displays details on the content caching activity on a Streamer. To view the Cache/Fill Bandwidth report, do the following:

**Step 1** From the **Available Reports** drop-down list, choose **Cache/Fill Bandwidth**. Figure 6-20 shows the selection fields for the Cache/Fill Bandwidth report.

**Figure 6-20 Cache/Fill Bandwidth Report Selection Fields**

![Cache/Fill Bandwidth Report Selection Fields](image)

**Step 2** From the **Server Array** drop-down list, choose a server array.

**Step 3** Using the drop-down lists provided, or the calendar, choose a **Start Date** for the report.

**Note** The report displays bandwidth used from 12:00 am to 11:59 pm on the day specified as the start date.

**Step 4** From the **Server IP** drop-down list, choose a Streamer.

**Step 5** Click **Display**.
To clear the fields and start over, click **Reset**.

**Figure 6-21** shows an example of the Cache/Fill Bandwidth report in a chart view.

**Figure 6-21  Cache/Fill Bandwidth Report**

The report displays the minimum, average, and maximum bandwidth used for each timeslot for the selected Streamer. Hover your cursor over a data point to view the same information in a summary view.

Click the **Grid** button to view the chart information in a table. Click the **Chart** button to return to the chart view.

Click **Previous Report** to return to the previous page.
Note  Previous Report returns you to the report selection page or the previous report page in a multi-page report. Next Report takes you to the next page in the report.

Step 6  To download the report to a comma-separated value (CSV) file, do one of the following:

  a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

  b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.
System Failures

The System Failures report lists the number of system failures.

To view the System Failures report, do the following:

**Step 1** From the **Available Reports** drop-down list, choose **System Failures**. Figure 6-22 shows the selection fields for the System Failures report.

![Figure 6-22 System Failures Report Selection Fields](image)

**Step 2** Choose an error code, if applicable. See Table 5-2 in the “System Failures” section on page 5-6 for descriptions of possible error codes.

**Step 3** Choose a modifier. See Table 6-5 for a description of each modifier.
Table 6-5  Stream Failure Modifiers

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Filters the report by date and time and, if specified, error code.</td>
</tr>
<tr>
<td>Service Group</td>
<td>Filters the report by the service group that you choose in a later step.</td>
</tr>
<tr>
<td>Server ID</td>
<td>Filters the report by a server ID that you choose in a later step.</td>
</tr>
</tbody>
</table>

**Step 4** Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.

**Step 5** Choose a time breakdown of hourly, daily, weekly, or monthly. The maximum time interval allowed for each breakdown is the following:
- Hourly—31 days
- Daily—2 years
- Weekly—2 years
- Monthly—2 years

**Note** The time breakdown Monthly is not available when you choose Service Group or Server ID as a modifier or when you choose an error code.

**Step 6** If you selected a modifier, choose the filter value.

**Step 7** Click Display.

To clear the fields and start over, click Reset.
Figure 6-23 shows an example of the System Failures report in a chart view.

**Figure 6-23 System Failures Report**

The report displays:
- Report type
- From and to dates
- Number of HD failures, number of SD failures, and total number of failures for each time breakdown

Hover your cursor over a data point to view the time breakdown, number of HD failures, number of SD failures, and total number of failures associated with the data point.

Click the **Grid** button to view the chart information in a table. Click the **Chart** button to return to the chart view.

Click **Previous Report** to return to the previous page.

**Note**  Previous Report returns you to the report selection page or the previous report page in a multi-page report. **Next Report** takes you to the next page in the report.

**Step 8**  To see more detail, click a bar in the chart. For example, in Figure 6-23, click the bar representing the stream failures occurring on May 4th, 2011.
The Stream Failure Details report is displayed for this date (Figure 6-24).

### Figure 6-24 Stream Failure Details

The report displays:
- Date and time of the failure
- Session ID of the failed stream
- QAM IP address
- Server ID that was sending the stream at the time of the failure
- Service Group
- Error code

For MVOD deployment, the report displays:
- Timestamp
- Package Name
- Channel Name
- Multicast Group IP
- Channel Port
- Event Start Time
- Event End Time

**Step 9** If a content object is associated with a session, do the following to view stream history information:

a. To see the stream play history of a specific session, click a session ID.
Note: If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Click Previous Report to return to the previous page.

b. To see details about the stream associated with this session, click Show Stream Data.

Click Hide Stream Data to hide stream data.

Click Previous Report to return to the previous page.

Note: Previous Report returns you to the report selection page or the previous report page in a multi-page report. Next Report takes you to the next page in the report.

c. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

Step 10 If a playlist is associated with a session, do the following to view stream history information:

a. Click the Session ID to see the playlist history for the session.

Click Previous Report to return to the previous page.

b. To see the stream play history for a specific playlist, click a bar in the chart representing a playlist.

Note: If Trick Mode Capture is disabled, the session ID does not link to the stream play history. For information on enabling the Trick Mode Capture, see the “Trick Mode Capture” section on page F-5.

Click Previous Report to return to the previous page.

c. To see details about the stream associated with this session, click Show Stream Data.

Click Hide Stream Data to hide the stream data.

Click Previous Report to return to the previous page.

d. To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.
Content Popularity

The Content Popularity report lists the content by their filenames and ranks them in order of popularity. To view the Content Popularity report, do the following:

Step 1 From the Available Reports drop-down list, choose Content Popularity. Figure 6-25 shows the selection fields for the Content Popularity report.

![Figure 6-25 Content Popularity Report Selection Fields](image)

Step 2 Using the drop-down lists provided, or the calendars, choose a Start Time and End Time for the report. The end time must be within 24 hours of the start time.

Step 3 Click Display.

To clear the fields and start over, click Reset.
Figure 6-26 shows an example of the Content Popularity report in a chart view.

**Figure 6-26  Content Popularity Report**

The report displays:
- Report type
- From and to dates
- Content filenames
- Number of times each content was streamed within the time period selected

Hover your cursor over a data point to view the content object name and the number of streams associated with the data point.

Click the Grid button to view the chart information in a table. Click the Chart button to return to the chart view.
Step 4  To view content details, click the content object name in a chart view. The Content Detail report is displayed (Figure 6-27).

![Content Popularity Details](image)

**Figure 6-27  Content Popularity Details**

Click Close to close this window.

Click Previous Report to return to the previous page.

Step 5  To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.
Content Activity

The Content Activity reports lists all content stored on all Vaults in the specified group and all unpublished packages. The available reports for content activity are:

- Content by Ingest Date
- Unpublished Package Report

Content by Ingest Date

To view the Content by Ingest Date report, do the following:

**Step 1** Choose Report > Content Activity. The Content Activity selection page is displayed.

**Step 2** From the Available Reports drop-down list, choose Content By Ingest Date (Figure 6-28).

**Step 3** From the Array drop-down list, choose an array.

**Step 4** Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.

**Step 5** Choose Include Deleted to include content that has been deleted from the array; otherwise, choose Exclude Deleted.

**Step 6** Click Display.

To clear the fields and start over, click Reset.
Figure 6-29 shows an example of the Content Activity report.

**Figure 6-29  Content Activity Report**

The report displays:
- Report type
- From and to dates
- Content filenames
- Creation date
- Destroyed date

**Step 7** To view the details of an in-service content object, click the content filename link (Figure 6-30).

**Figure 6-30  Content Detail**

Click **Close** to close this window.

Click **Previous Report** to return to the previous page.
Note

Previous Report returns you to the report selection page or the previous report page in a multi-page report. Next Report takes you to the next page in the report.

Step 8
To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

Unpublished Package Report

Note

The Unpublished Package report is part of the optional Ingest Manager feature. This option is only listed in the Content Activity Available Reports drop-down list if the Ingest Manager is included in your deployment.

To view the Unpublished Package report, do the following:

Step 1
Choose Report > Content Activity. The Content Activity selection page is displayed.

Step 2
From the Available Reports drop-down list, choose Unpublished Package Report (Figure 6-31).

Figure 6-31  Unpublished Package Selection Fields

Step 3
Using the drop-down lists provided, or the calendars, choose a From Date and To Date for the report.

Step 4
Click Display.
To clear the fields and start over, click **Reset**.

**Figure 6-32** shows an example of the Unpublished Package report.

**Figure 6-32  Unpublished Package Report**

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Create Time</th>
<th>Source URL</th>
<th>Target URL</th>
<th>Assets</th>
</tr>
</thead>
</table>

The report displays:
- Report type
- From and to dates
- Package names
- Creation date
- Source URL
- Target URL
- Number of assets associated with the package

**Step 5** Click **New Report** to return to the previous page.

**Step 6** To download the report to a comma-separated value (CSV) file, do one of the following:
- If you are using Internet Explorer as your web browser, click **Download** and then click **Save** or **Open**. **Save** presents a Save As dialog box. **Open** opens the CSV file.
- If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click **Download** and choose **Save Link As**, **Save Link Target As**, or **Save Target As** depending on the web browser you are using. A Save As dialog box is displayed.

**CDSM Audit Logs**

The CDSM Audit log keeps track of every configuration change, deletion of monitored items, and maintenance actions.

To view the CDSM Audit logs, do the following:

**Step 1** Choose **Report > CDSM Audit logs**. **Figure 6-33** shows the selection fields for the CDSM Audit logs.
Figure 6-33  CDSM Audit Log Selection Fields

The CDSM audit logs are available for online viewing to aid in identifying configuration errors. To locate records for a specific area within the CDSM, select the corresponding "Top Level Filter" and "Sub Level Filter" for that area. If you are less sure which "Sub Level Filter" to select, you can leave this set to "All Sub Sections". Once your report is loaded, you will again have options for filtering the result set. After selecting any filters, select the data range you wish to see entries for and then click Display.

Table 6-6  Top-level Filters

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Sections</td>
<td>Filter on date only.</td>
</tr>
<tr>
<td>Configure</td>
<td>Filters the log by actions taken using the Configure tab of the CDSM or VVIM.</td>
</tr>
<tr>
<td>Monitor</td>
<td>Filters the log by actions taken using the Monitor tab of the CDSM or VVIM.</td>
</tr>
<tr>
<td>Maintain</td>
<td>Filters the log by actions taken using the Maintain tab of the CDSM or VVIM.</td>
</tr>
<tr>
<td>Auto System Cleanup</td>
<td>Filters the log by the automatic system cleanup process of the CDSM or VVIM.</td>
</tr>
<tr>
<td>All Other</td>
<td>Filters the log by all other actions that do not relate to the Configure, Monitor, or Maintain tabs of the CDSM or VVIM, or to the automatic system cleanup process.</td>
</tr>
</tbody>
</table>

Step 2  Using the Top Level Filter drop-down list provided, choose a top-level filter from the options presented in Table 6-6.

Table 6-7  Sub-level Filters

<table>
<thead>
<tr>
<th>Top-level Filter</th>
<th>Low-Level Filter Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure</td>
<td>If the log is filtered by the Configure tab, choose to filter the log further by the actions taken using the System Level, Array Level, or Server Level pages of the Configure tab.</td>
</tr>
<tr>
<td>Monitor</td>
<td>If the log is filtered by the Monitor tab, choose to filter the log further by the actions taken using the System Level, Array Level, or Server Level pages of the Monitor tab.</td>
</tr>
</tbody>
</table>

Step 3  Using the Sub Level Filter drop-down list provided, choose a second-level filter from the options presented in Table 6-7.
Table 6-7  **Sub-level Filters (continued)**

<table>
<thead>
<tr>
<th>Top-level Filter</th>
<th>Low-Level Filter Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain</td>
<td>If the log is filtered by the Maintain tab, choose to filter the log further by the actions taken using the Users, Servers, Services, or Software pages of the Maintain tab.</td>
</tr>
<tr>
<td>All Sections, Auto System Cleanup, and All Other</td>
<td>To apply a top-level filter only, choose All Sub Sections from the Sub Level Filter drop-down list.</td>
</tr>
</tbody>
</table>

**Step 4**  Using the drop-down lists provided, or the calendars, choose a **From Date** and **To Date** for the log.

**Step 5**  Click **Display**.

To clear the fields and start over, click **Reset**.

**Figure 6-34** shows an example of the CDSM Audit log.

**Figure 6-34  CDSM Audit Log**

The log displays:
- Top-level (Top category) and secondary-level (Sub Category) filters applied to the log
- From and to dates
- Action taken (Section Descriptor)
- User who took the action
- System used
- Date the action occurred

**Step 6**  Use the **Top Category** and **Sub Category** filters to filter the contents of the CDMS Audit Log within the specified date range.

**Step 7**  To get more information about the action taken, click a section descriptor. The CDSM Audit Log Detail is displayed in a new window. Click **Close** to close the window.

**Step 8**  To download the report to a comma-separated value (CSV) file, do one of the following:
a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.
b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.

---

### Playout/Barker Reports

The Playout/Barker Reports displays information on all the playout channels, as well as all the Barker Streams that are currently playing.

**Note**

For API information on getting the details of Barker Streams, playout channels, and all stream details, see the *Cisco VDS-TV API Guide, Release 3.9*.

To view the Playout/Barker Reports, do the following:

**Step 1** Choose Reports > System Level > Playout/Baker Reports. The Playout/Baker Report page is displayed.

**Step 2** In the Output Channel drop-down list, select a channel or All Channels for the report.

**Step 3** If you selected one channel, specify the From Date and To Date for the report by using the drop-down lists or the calendars.

If you selected All Channels, specify the Start Date by using the drop-down lists or the calendar.

**Step 4** Click Display.

To clear the fields and start over, click Reset.

The report displays:

- Type (PLAYOUT or BARKER)
- Channel streaming the playout or Barker Stream
- Content name
- Start and end dates for the playout or Barker Stream
- Streamer server ID
- Status of the stream

**Step 5** To download the report to a comma-separated value (CSV) file, do one of the following:

a. If you are using Internet Explorer as your web browser, click Download and then click Save or Open. Save presents a Save As dialog box. Open opens the CSV file.

b. If you are using another major web browser (for example, Netscape, Firefox, Opera), right-click Download and choose Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed.
Archived Data

Note

The CSV files are generated every 24 hours and are deleted when they are older than 30 days. The CSV files are accessible by going to the /arroyo/asmrpt directory, or by using an FTP client with the username “asmrpt” and the password “asmrpt.”

Monitoring data is archived in comma-separated value (CSV) format for use in a spreadsheet program, database, or other software. Table 6-8 describes the different archived data.

Table 6-8 Archived Data Types

<table>
<thead>
<tr>
<th>Archive</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSM Audit Log Archives</td>
<td>Log of configuration changes that were made to the system and when the changes were made.</td>
</tr>
<tr>
<td>Content Reports</td>
<td>Archive of content ingested.</td>
</tr>
<tr>
<td>Stream Failure Reports</td>
<td>Archive of streams that have failed.</td>
</tr>
<tr>
<td>Stream Reports</td>
<td>Archive of all streams.</td>
</tr>
<tr>
<td>Stream Activity Reports</td>
<td>Archive of trick mode and play actions that occurred on all streams.</td>
</tr>
</tbody>
</table>

To download an archived data report, do the following:

Step 1 Choose Report > Archived Data. The Archived Data page is displayed.

Step 2 From the Archives drop-down list, choose an archive and click Next.

Step 3 Right-click the HTTP link of the report you want to download and choose Save Target As, Save Link As, Save Link Target As, or Save Target As depending on the web browser you are using. A Save As dialog box is displayed (Figure 6-35).

Figure 6-35 Save As Dialog Box

Step 4 Choose a location and name for the file and click Save.
Step 5  The CSV file is compressed using gzip (extension .gz). Decompress the file using a decompression tool that includes the gzip compression code, such as Winzip, PowerArchiver 6.1, or 7-zip.

CDSM Audit Log Archives

The CDSM Audit log archives contain the same information as the CDSM Audit logs. For more information, see the “CDSM Audit Logs” section on page 6-38.

Content Reports

Table 6-9 describes the fields in the Content Report CSV files.

Table 6-9  Content Report Archive Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mGoid</td>
<td>Global object identifier. Used by the VDS database.</td>
</tr>
<tr>
<td>mName</td>
<td>The name of the content file.</td>
</tr>
<tr>
<td>mProvider</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mCategory</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mFactoryId</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mOpState</td>
<td>Operational state is not used and is always 2 (In Service).</td>
</tr>
<tr>
<td>mAdminState</td>
<td>Administrative state is not used and is always 2 (In Service).</td>
</tr>
<tr>
<td>mProvisionForPush</td>
<td>Type of FTP provisioned. Values are:</td>
</tr>
<tr>
<td></td>
<td>• 0—FTP pull</td>
</tr>
<tr>
<td></td>
<td>• 1—FTP push</td>
</tr>
<tr>
<td></td>
<td>• 3—Live recording</td>
</tr>
<tr>
<td>mURL</td>
<td>URL of the content file. This field is applicable only for FTP pull.</td>
</tr>
<tr>
<td>mIngestIpAddress</td>
<td>IP address of the ingest interface on the Vault used to download the content file.</td>
</tr>
<tr>
<td>mIngestFileSize</td>
<td>Content file size, in bytes.</td>
</tr>
<tr>
<td>mCreateTime</td>
<td>Time and date this content file was created. The time and date is represented in seconds since the start of Unix epoch time.¹</td>
</tr>
<tr>
<td>mLastModifiedTime</td>
<td>Time and date this content file was last modified. The time and date is represented in seconds since the start of Unix epoch time.¹</td>
</tr>
<tr>
<td>mDeleteTime</td>
<td>Time and date this content file was deleted. The time and date is represented in seconds since the start of Unix epoch time.¹</td>
</tr>
<tr>
<td>mServerId</td>
<td>Server ID of the Vault server that is the primary source for this content file.</td>
</tr>
<tr>
<td>mAssetName</td>
<td>Asset name of the content, if populated.</td>
</tr>
<tr>
<td>mEncrypted</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mRate</td>
<td>Transmit rate requirement of the file, in bytes per second.</td>
</tr>
</tbody>
</table>

1. Unix epoch time is 1970-01-01T00:00:00Z
Stream Reports

Table 6-10 describes the fields in the Stream Report CSV files.

**Table 6-10 Stream Report Archive Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mSessionId</td>
<td>Session ID of the stream.</td>
</tr>
<tr>
<td>mGoid</td>
<td>Global object identifier. Used by the VDS database.</td>
</tr>
<tr>
<td>mTsIdOut</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mTsIdIn</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mProgramNumber</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mBandwidthUsed</td>
<td>This field is applicable only when Streaming Mode is set to ASI.</td>
</tr>
<tr>
<td></td>
<td>The transport stream bandwidth, in bytes, required for this stream object.</td>
</tr>
<tr>
<td>mQAMIp</td>
<td>IP address of the QAM device that participated in transmitting the stream.</td>
</tr>
<tr>
<td></td>
<td>The IP address is represented as an integer. For example, 3232235818 decimal</td>
</tr>
<tr>
<td></td>
<td>converts to C0A8012A hexadecimal, which translates to 192.168.1.42.</td>
</tr>
<tr>
<td>mQAMPort</td>
<td>Port the QAM device is using to receive the stream object.</td>
</tr>
<tr>
<td>mSetTopMac</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mServiceGroup</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mStartTime</td>
<td>Timestamp when the stream was created. The timestamp is represented in</td>
</tr>
<tr>
<td></td>
<td>seconds since the start of Unix epoch time.</td>
</tr>
<tr>
<td>mEndTime</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>mName</td>
<td>Name of the asset.</td>
</tr>
</tbody>
</table>

1. Unix epoch time is 1970-01-01T00:00:00Z

Stream Failure Reports

Table 6-11 describes the fields in the Stream Failure Report CSV files.

**Table 6-11 Stream Failure Report Archive Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mSessionId</td>
<td>Session ID of the failed stream.</td>
</tr>
<tr>
<td>mKeyId</td>
<td>VDS database key for this record.</td>
</tr>
<tr>
<td>mServerId</td>
<td>Server ID of the Streamer that participated in transmitting the stream.</td>
</tr>
<tr>
<td>mGroupId</td>
<td>Array ID the Streamer is associated with.</td>
</tr>
<tr>
<td>mServiceGroup</td>
<td>Service group that participated in transmitting the stream.</td>
</tr>
<tr>
<td>mQAMIp</td>
<td>IP address of the QAM device that participated in transmitting the stream.</td>
</tr>
<tr>
<td></td>
<td>The IP address is represented as an integer. For example, 3232235818 decimal</td>
</tr>
<tr>
<td></td>
<td>converts to C0A8012A hexadecimal, which translates to 192.168.1.42.</td>
</tr>
</tbody>
</table>
Stream Activity Reports

The Stream Activity Reports archive contains all trick mode and play actions of all streams within the given 24-hour period. Table 6-12 describes the fields that are exported to the CSV file.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mEventTime</td>
<td>Timestamp when the event occurred. The timestamp is represented in seconds since the start of Unix epoch time.¹</td>
</tr>
<tr>
<td>mOperation</td>
<td>Operation that was taking place when the stream failed. For example: createStream, LSCP Command(), createServant, destroy. These are the measurement points or transactional states of the system at the time of the failure. See Table 5-2 on page 5-7 for more information.</td>
</tr>
<tr>
<td>mErrorCode</td>
<td>Error code provides a description of the event that caused the error. See Table 5-2 on page 5-7 for more information.</td>
</tr>
<tr>
<td>mOperand</td>
<td>Operand that was being operated on at the time of the failure, for example, the StreamID is the operand if a stream was being created or controlled at the time of failure.</td>
</tr>
<tr>
<td>mTask</td>
<td>Failed task is the event category indicating the type of execution sequence that the call stack was currently within at the time of the failure. See Table 5-2 on page 5-7 for more information.</td>
</tr>
</tbody>
</table>

¹. Unix epoch time is 1970-01-01T00:00:00Z
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mNptOffset</td>
<td>Current point in time (milliseconds) where the stream is on the set-top box, based on from NPT and to NPT.</td>
</tr>
</tbody>
</table>
| mDestroyedReason | This field is only populated if the stream is destroyed by the VDS orphan stream handler. The VDS orphan stream handler only destroys a stream for one of the following two reasons:  
  • Orphan session is detected  
  • LSCP timeout maximum has been reached |

1. Unix epoch time is 1970-01-01T00:00:00Z
System Maintenance

This chapter explains how to perform common administrative tasks including updating system software, restarting services, and shutting down the Vault and Streamer servers. This chapter covers the following topics:

- User Access, page 7-2
- Server Maintenance, page 7-11
- Restarting the Services, page 7-16
- Software Maintenance, page 7-18
- Manuals, page 7-27

Note

If Virtual Video Infrastructure (VVI) with split-domain management is enabled, the CDSM pages associated with the Vaults and Caching Nodes display only on the VVI Manager (VVIM), and the CDSM pages associated with the Streamers display only on the Stream Manager. For more information, see the “Virtual Video Infrastructure” section on page F-10.

Note

You must have read/write privileges to perform the functions described in this chapter.

Caution

Many of the functions discussed in this chapter involve rebooting a VDS server. Rebooting a Vault server does not interrupt stream services, but causes current ingest to fail. If your VDS does not have stream failover, rebooting a Streamer without offloading it interrupts all stream services. If possible, you should perform functions that require a system restart during times when the least number of users are actively connected to your system.
User Access

Login authentication is used to control user access and configuration rights to the CDSM. Login authentication is the process by which the CDSM verifies whether the person who is attempting to log in to the CDSM has a valid username and password. If the local database is used, the person logging in must have a user account created on the CDSM. If an external server is used, the user account information is stored in an authentication database, and the CDSM must be configured to access the particular authentication server (or servers) where the database is kept.

Each user is assigned an access level. The VDS provides the following levels of user configuration rights:

- **Read only** access provides access to the monitoring capabilities, reports, and user manuals.
- **Read/write** access provides the ability to change the configuration settings and monitor all aspects of the system. In addition, a user with read/write access can perform software upgrades, restart servers, and restart services in a VDS.
- **Master** access has all the privileges of the read/write level and can add, delete, and change the level of access of the other users.
- **Engineering** access is primarily used for initializing the VDS at the time of installation and for VDS diagnostics. After your VDS has been configured, you should not require a user with engineering access level for day-to-day operations.

There is one built-in user, “admin,” that has master user capabilities. This is the only user that exists on a new system.

⚠️ **Caution**

If you are using RADIUS or TACACS+ for login authentication, make sure the configuration is correct and the server is operating correctly. If RADIUS or TACACS+ is not configured correctly, or if the RADIUS or TACACS+ server is not online, then the users may be unable to log in to the CDSM.

Local Database User Password Encryption

Passwords are not stored as clear text in the local database. They are stored using Secure Hash Algorithm (SHA), which includes a salt that is randomly generated for increased security. When a user logs in to the CDSM, SHA-1 is used to generate the hashed version of the user password, including the randomly generated salt, which is then sent for authentication. If the hashed version stored in the database matches what the user entered, the user is allowed access to CDSM; otherwise, access is denied.
CDSM User Login Checks

System checks are performed on the CDSM during the user login process and during access to the CDSM GUI. If any one of the checks does not pass, access to the CDSM is denied and an error message is displayed with information on which check failed.

Table 7-1 describes the system checks that are performed during the user login process and during user access to the CDSM.

Table 7-1 CDSM Checks for User Login

<table>
<thead>
<tr>
<th>Check</th>
<th>Description</th>
<th>Additional Information</th>
<th>Error Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Space</td>
<td>Verify that all drives have not exceeded 95 percent storage capacity.</td>
<td>Disk space is checked every time an HTTP request is received by the CDSM. If any drive exceeds the threshold, the CDSM access is denied and the user is navigated to the login window where an error message is displayed. The drive names and threshold values can be configured in CDSM.ini file in the /arroyo/www/htdocs/CDSM/VDSTV/conf directory.</td>
<td>CDSM is running out of disk space (/arroyo). Contact the System Administrator for further assistance.</td>
</tr>
<tr>
<td>User Account Locked</td>
<td>Verify that the user attempting to log in does not have this attribute enabled on the account.</td>
<td>The User Account Locked check box is checked on the Edit User page for the account. Only a user with Master-level access can check or uncheck the User Account Locked check box.</td>
<td>User account is locked. Contact the System Administrator for further assistance.</td>
</tr>
<tr>
<td>Concurrent User Sessions</td>
<td>Verify that the number of concurrent user sessions has not been exceeded.</td>
<td>The Concurrent User Sessions field is set on the Edit User page for the account. If the number of sessions the user is concurrently logged in to does not exceed the setting, access is allowed; otherwise, access is denied until the user logs out of one of the other sessions.</td>
<td>Maximum number of concurrent sessions reached. Try again later.</td>
</tr>
<tr>
<td>Password Expiration Interval</td>
<td>Verify that the password has not expired.</td>
<td>The Password Expiration Interval field is set on the System Authentication page. If this field is set, and the password has expired, the user is denied access to the CDSM.</td>
<td>Password has expired. Contact the System Administrator for further assistance.</td>
</tr>
</tbody>
</table>

If the checks described in Table 7-1 all pass, the user is authenticated and if authentication is successful, the following checks are performed:

1. If the Force Password Change check box is checked for the user account, then the user is navigated to the Edit User page and the user is forced to change the password.

2. If the Password Expiration Reminder interval has started, the user is navigated to the Edit User page and notified that the password is about to expire. The user can, however, ignore the reminder and continue without changing the password.
Adding Users

The VDS provides one built-in user, “admin,” that has master level access and cannot be deleted. The master user can add additional users with different levels of access.

To add a user, do the following:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Choose Maintain &gt; Users &gt; Add User. The Add User page is displayed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Fill in the fields as described in Table 7-2.</td>
</tr>
</tbody>
</table>

**Table 7-2 Add User Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New User Login ID</td>
<td>A user name may have up to 25 characters. Any 7-bit characters from the ANSI character set are allowed.</td>
</tr>
<tr>
<td>Password</td>
<td>Password associated with the user login name. The password must be at least 5 characters. The maximum is 20.</td>
</tr>
<tr>
<td>Confirm Password</td>
<td>Confirm the password entered in the Password field.</td>
</tr>
<tr>
<td>Override Password Check</td>
<td>Passwords are validated for complexity; To override the password complexity validation, check the Override Password Check check box.</td>
</tr>
<tr>
<td>Access</td>
<td>Choose the appropriate access level from the drop-down list. See the beginning of the “User Access” section on page 7-2, for descriptions of the access levels.</td>
</tr>
</tbody>
</table>

| Step 3          | Click Add User to add this user. To clear the fields and start over, click Reset. |

Add User—Force Password Change

When a new user is added, the Force Password Change attribute for the user is checked. When the user logs in to the CDSM for the first time, the Edit User page is displayed and the user is forced to change the password.

**Note**

When changing the password, browser-saved passwords may be requested to be changed.

During a password change, the new password is validated for complexity based on the Password Complexity Rules set on the System Authentication page. The password complexity check can be overridden if the change password is performed by a user with Master-level access and the Override Password Check check box is checked. The Override Password Check check box is available on the Add Users page and the Edit Users page if the user has Master-level access.
Editing User Settings

The Edit User page is used to update the user settings.

**Note**

Only users with Master-level access can change the access level, delete a user, and configure the user-level account settings.

To edit the user settings, do the following:

**Step 1** Choose **Maintain > Users > Edit User**. The Edit User page is displayed.

**Step 2** From the **Action** drop-down list, choose one of the following:
- Change Password
- Change Access
- Manage User Account

**Step 3** From the **User Name** drop-down list, choose a user name.

**Step 4** The fields that are available are based on the Action selected. Table 7-3 describes the fields associated with each Action.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Password</td>
<td>Password associated with the user login name. The range is 5 to 20 characters.</td>
<td>Change Password</td>
</tr>
<tr>
<td>Confirm Password</td>
<td>Confirm the password entered in the Password field.</td>
<td>Change Password</td>
</tr>
<tr>
<td>Override Password Check</td>
<td>Passwords are validated for complexity; To override the password complexity validation, check the Override Password Check check box. The Override Password Check is not available when the user password is changed for the currently logged in user.</td>
<td>Change Password</td>
</tr>
<tr>
<td>Access</td>
<td>Choose the appropriate access level from the drop-down list. See the beginning of the “User Access” section on page 7-2, for descriptions of the access levels.</td>
<td>Access</td>
</tr>
<tr>
<td>Lock Account on Failed Login</td>
<td>When the Lock Account on Failed Login check box is checked, the user is locked out of the CDSM GUI if the number of failed login attempts exceeds the allowed number of failed attempts configured in the System Authentication page. This setting overrides the Lock Account on Unsuccessful Login setting on the System Authentication page.</td>
<td>Manage User Account</td>
</tr>
<tr>
<td>User Account Locked</td>
<td>To lock a user out of the CDSM GUI, check the User Account Locked check box.</td>
<td>Manage User Account</td>
</tr>
</tbody>
</table>
Deleting a User

To delete a user from the list of users, do the following:

**Step 1** Choose **Maintain > Users > Edit User**. The Edit User page is displayed (Figure 7-1 on page 7-7).
**Step 2** From the **Action** drop-down list, choose **Delete User**.
**Step 3** From the **User Name** drop-down list, choose a user.
**Step 4** Click **Submit** to delete the user.

To clear the fields and start over, click **Reset**.

Viewing User Settings

To view all user settings, you must log in with master access level. Choose **Maintain > Users > View Users**. The View Users page is displayed.

Changing User Default Settings

The User Default Settings page allows you to specify your settings for the Media Scheduler or Playout Scheduler pages so that each time you log in to the CDSM, your settings are recalled. If you have master level access, you can specify the settings for all users.

For more information about the Media Scheduler, see the “Configuring the Media Scheduler” section on page 4-95. For more information about the Playout Scheduler, see the “Configuring Playout Scheduler” section on page 4-112. For more information about manual ingests, see the “Configuring Manual Ingests” section on page 4-105.

To change the default settings for a user, do the following:

---

**Table 7-3  Edit User Fields (continued)**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force Password Change</td>
<td>To force a password change for the user, at the next login, check the <strong>Force Password Change</strong> check box. If this check box is checked, the user is taken to the Edit User page at the next CDSM GUI login and must initiate a password change.</td>
<td>Manage User Account</td>
</tr>
<tr>
<td>Concurrent User Sessions</td>
<td>Maximum number of concurrent sessions allowed for this user.</td>
<td>Manage User Account</td>
</tr>
</tbody>
</table>

**Step 5** Click **Submit** to save the changes.

To clear the fields and start over, click **Reset**.
**Step 1** Choose **Maintain > Users > User Default Settings**. The User Default Settings page is displayed.

**Step 2** From the **Select User** drop-down list, choose a user. The User Default Settings page refreshes and displays the user settings (Figure 7-1).

**Figure 7-1 User Default Settings Page**

![User Default Settings Page](image)

**Step 3** Enter the settings as appropriate. See **Table 7-4** for descriptions of the fields.

**Table 7-4 User Default Preferences**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Media Scheduler</strong></td>
<td></td>
</tr>
<tr>
<td>Action on Recurring Schedules</td>
<td>Choose either <strong>Preserve Existing Schedules</strong> or <strong>Overwrite Existing Schedules</strong>. This option is only for user-generated schedules; this option is not for uploaded electronic program guide (EPG) data. <strong>Preserving Existing Schedules</strong> keeps any content that is currently scheduled for the day and channel you selected and only fills in the empty timeslots. <strong>Overwrite Existing Schedules</strong> overwrites any content that is currently scheduled for the day and channel you selected.</td>
</tr>
<tr>
<td>Package Name Auto-Generation</td>
<td>When you schedule an event that originated from an uploaded EPG file, the Media Scheduler creates a package name combining the channel name, title brief, and the word “package.” If the package name already exists and you want a new package name auto-generated, choose <strong>Enable</strong> and the start time is added to the package name. If the package name already exists and you want to create the package name using the Metadata Editor, choose <strong>Disable</strong>.</td>
</tr>
</tbody>
</table>
### Table 7-4 User Default Preferences (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Playout Scheduler**        | **Action on Recurring Schedules**
|                              | Choose either **Preserve Exiting Schedules** or **Overwrite Existing Schedules**. This option is only for user-generated schedules; this option is not for imported playout schedules. **Preserve Existing Schedules** keeps any content that is currently scheduled for the day and channel you selected and only fills in the empty timeslots. **Overwrite Existing Schedules** overwrites any content that is currently scheduled for the day and channel you selected. |
| **Content Selection**        | Choose either the **Use Suggester** option or the **Use Select Box** option. **Use Suggester** displays a text box for selecting content, and **Use Select Box** displays a drop-down list. If there are a large number of content objects, the **Use Suggester** is the preferred choice. |
|                              | • If **Use Suggester** is selected, as you type in the text box, content matching the text is displayed in a list. If you click **Search**, The Content List window is displayed with the following options: |
|                              |   - Quick Lists—Click **Most Recent Ingests**, and the 25 most recently ingested content objects are listed. |
|                              |   - Browse Content—Click a character in the Browse Content section, and all content objects beginning with that letter are listed. |
|                              |   - Content List—Displays the results of the Search, the Quick List, or the Browse Content selection. The content name and ingest time are listed. |
|                              | You can select a content object from the Content List, or select Close in the upper-right corner of the window and start your search again. |
|                              | • If **Use Select Box** is selected, use the down arrow of the drop-down list to display the list and select the content object. |
| **Output Channels Displayed**| Check the check boxes for the channels you want displayed, or check the **Select All** check box to chose all channels. |

### Manual Ingest FTP Preferences

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP username</td>
<td>The username to log into the FTP server.</td>
</tr>
<tr>
<td>FTP password</td>
<td>The password to log into the FTP server.</td>
</tr>
<tr>
<td>FTP host</td>
<td>The IP address or Fully Qualified Domain Name (FQDN) of the FTP server.</td>
</tr>
<tr>
<td>FTP Directory</td>
<td>The directory path where the content files are located. This can be an absolute or virtual path, depending on how the FTP server is configured. Make sure you begin the FTP path with a forward slash (/). The search includes all subdirectories.</td>
</tr>
<tr>
<td>File Extensions</td>
<td>The extensions of the types of content file you want retrieve. Separate multiple file extensions with a semicolon (;), and begin each file extension with a period (.). For example, to retrieve all MPEGs with a .mpg extension and transport streams with a .ts extension, you would enter the following: .mpg;.ts.</td>
</tr>
</tbody>
</table>
Step 4 In the Input Channels Displayed on the Media Scheduler section of the page, check the check boxes for the channels you want to schedule, or check the Select All check box to choose all channels.

Step 5 If you have master level access and you want to apply the user default settings of this page to all users, check the Apply To All Users check box.

Step 6 Click Save to save the changes.

To clear the fields and start over, click Reset.

Configuring System Authentication Settings

The System Authentication page is only visible to users with Master-level access. The System Authentication fields apply system wide to all users of the CDSM GUI. Table 7-5 describes the System Authentication fields.

Table 7-5 System Authentication Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lock Account on Unsuccessful Login Attempt Count</td>
<td>If the Lock Account on Unsuccessful Login check box is checked, a user account is locked after the number of Unsuccessful Login Attempt Count has been reached within the Unsuccessful Login Attempt Period. For example, if the Unsuccessful Login Attempt Count is set to 3, the Unsuccessful Login Attempt Period is set to 1 day, and Lock Account on Unsuccessful Login is checked; then after 3 unsuccessful attempts within 1 day, the user account is locked.</td>
</tr>
<tr>
<td>Unsuccessful Login Attempt Count</td>
<td>Number of login attempts to allow the user before the account is locked. If the account is locked, the master-level user can unlock the account by unchecking the User Account Locked check box on the Edit Users page.</td>
</tr>
<tr>
<td>Unsuccessful Login Attempt Period</td>
<td>Time interval for which the number of unsuccessful login attempt count is persisted. When the time interval lapses, and if the account is not locked, the Unsuccessful Login Attempt Count is reset to 0.</td>
</tr>
<tr>
<td>Enable Password History</td>
<td>The history of user passwords is stored in the database if the Enable Password History check box is checked. During a password change, if the Enable Password History check box is checked, the new password is compared with the history of the user’s passwords, and the password change is only successful if the new password is different than the passwords that were previously used.</td>
</tr>
<tr>
<td>Password History Size</td>
<td>Specify the number of old passwords to store for each user in the database. The default is 2.</td>
</tr>
<tr>
<td>Password Change Interval</td>
<td>Minimum interval between non-administrative password changes for a given user. The default is 24 hours.</td>
</tr>
<tr>
<td>Password Expiration Interval</td>
<td>Maximum lifetime of the password. If the password has not been changed within the Password Expiration Interval, then the user account is automatically disabled.</td>
</tr>
</tbody>
</table>
As an example, if the **Password Expiration Interval** is set to 6 months (180 days) and the **Password Expiration Reminder** is set to 15 days; then 15 days before the password expires, the user is taken to the **Edit Users** page where a message is displayed stating the password is soon to expire. The message also includes the number of days the current password is active before it expires. The user has the option to change the password or continue without changing the password.

If the password expires, the user cannot log in to the CDSM. A Master-level user can change the user password and unlock the user account. Anytime the user password is changed by the Master-level user, the **Force Password Change** check box is checked and the next time the user logs in to the CDSM, the user is taken to the **Edit Users** page and is forced to change the password. The user is not able to access any of the other CDSM GUI pages until a password change has occurred.

### Password Complexity Rules

Password Complexity Rules apply to any password change performed by the user. These rules can be overridden by Master-level users when the **Override Password Check** check box is checked on the Add Users page or the **Edit Users** page.

### Configuring User Authentication

The TV VDS software offers the following database options for maintaining user authentication data:

- Local database (located on the CDSM)
- RADIUS server (external database)
- TACACS+ server (external database)

The User Authentication page displays the configuration settings of the Authentication Protocol, which is configured through the `vdsconfig` script. The user authentication settings consist of choosing an external access server (TACACS+ or RADIUS) or the internal (local) CDSM authentication database for user access management, and setting the challenge key and timeout. The default is to use the local database for authentication. The `vdsconfig` script prompts you for the primary and backup external access server configuration. If the CDSM does not get a response from the primary server within the timeout period, the backup server is contacted.

Note: The CDSM does not cache user authentication information. Therefore, if an external server is used, the user is reauthenticated against the Remote Authentication Dial In User Service (RADIUS) server or the Terminal Access Controller Access Control System Plus (TACACS+) server each time a user logs in to the CDSM. If the authentication is successful, a user session is created and is used to grant access to the different pages of the CDSM GUI. The session is destroyed when the user logs out of the CDSM.
prevent performance degradation caused by many authentication requests, install the CDSM in the same location as the RADIUS or TACACS+ server, or as close as possible to it, to ensure that authentication requests can occur as quickly as possible.

Server Maintenance

The Server Maintenance pages provides the ability to offload and shutdown a server for maintenance, and to restart a server without shutting it down. The Server Maintenance pages include the following:

- Restarting a Server, page 7-11
- Shutting Down a Server, page 7-11
- Offloading a Server, page 7-12
- Setting System Thresholds, page 7-14

Restarting a Server

⚠️ Caution

Restarting a Vault or Streamer server while there are still active ingests and streams causes the current ingests and streams to fail.

Restarting a server briefly shuts down the unit, then restarts it using the installed version software image. This action does not power off the unit.

To restart a server, do the following:

Step 1 Choose Maintain > Servers > Server Restart. The Server Restart page is displayed.

Step 2 From the Server IP/Name drop-down list, choose the IP address or nickname of the server and click Display. The server type and ID, as well as the array ID, are displayed.

Step 3 From the Restart drop-down list, choose Yes and click Submit.

Shutting Down a Server

⚠️ Caution

Shutting down a Vault or Streamer server while there are still active ingests and streams causes the current ingests and streams to fail.

Shutting down by simply powering off the unit using the chassis power button is not recommended, as this may result in corruption of the configuration information, including system status when the shutdown occurred.

Shutting down and restarting using the CDSM is the recommended procedure. The Server Shutdown shuts down and powers off the selected unit.

To shut down and power off a server, do the following:
Step 1 Choose Maintain > Servers > Server Shutdown. The Server Shutdown page is displayed.

Step 2 From the Server IP/Name drop-down list, choose the IP address or nickname of the server and click Display. The server type and ID, as well as the array ID, are displayed.

Step 3 From the Shutdown drop-down list, choose Yes and click Submit.

Offloading a Server

The Server Offload page lets you set a server to Online or Offline. When a server is offline, the server is configured to reject new provisioning; that is, new ingests are not allowed on a Vault and new streams are not allowed on a Streamer and existing streams are moved to another Streamer gracefully.

Caching Nodes and Streamers

If HTTP is used as the cache-fill protocol between Caching Nodes and Streamers and the Caching Node hosting the locate port is set to Offline, then a backup or available Caching Node in the same Cache Group becomes the primary host of the locate port. If a backup or available Caching Node is set to Offline, the state is changed from backup or available to not usable. This failover scenario is similar to the Setup and Control server failover scenario for Streamers, in that all servers in the same group advertise their availability to act as the primary with a backup taking over as primary if the primary becomes unavailable because of offline status, losing connectivity, or failure.

Vaults

The Vault or ISV has two options for setting a server to offline:

- Offline (No Ingest)
- Offline (No Ingest & Fill)

The Offline (No Ingest) option enables the Vault or ISV to continue handling cache-fill requests and mirroring activities, but the server does not participate in any new content ingests. The Offline (No Ingest & Fill) option stops all cache-fill requests and any new content ingests, but the server still participates in mirroring activities.

Note

The protocol timing log file only displays the “WARNING: Server is going OFFLINE” message when the Offline (No Ingest & Fill) option is selected for Vaults.

The Offline (No Ingest) option for Vaults does not take the Vault completely offline, the Vault still participates in mirroring and cache-fill traffic; therefore, the server going offline message is not displayed in the protocol timing log. The TRICKLE_DOWN file is used to determine the state of the Vault for the Offline (No Ingest) option.

To set a server to offline, do the following:

Step 1 Choose Maintain > Servers > Server Offload. The Server Offload page is displayed.

Step 2 From the Server IP/Name drop-down list, choose the IP address or nickname of the server and click Display. The server type, server ID, array ID, and current status of the server are displayed.
Step 3  In the New Server Status drop-down list, select the appropriate setting and click Submit.

After setting a server to offline, current traffic activity can be monitored, and when the server offline is complete, the software can be updated. To view activity on a Vault server, see the “Monitoring Content Objects” section on page 5-18. To view activity on a Streamer, see the “Monitoring Stream Objects” section on page 5-32. If the server is an ISV, verify that activity is completed for both content objects and stream objects before updating the software.

Note  The Server Status setting is persistent through a system reboot.

Server Offload—Online

After the software upgrade or maintenance is complete, you need to set the server to online so that the server can again participate in the system.

To set a server to online, do the following:

Step 1  Choose Maintain > Servers > Server Offload. The Server Offload page is displayed.

Step 2  From the Server IP/Name drop-down list, choose the IP address or nickname of the server and click Display. The server type and ID, as well as the array ID, are displayed.

Step 3  In the New Server Status drop-down list, select Online and click Submit.

Vault Decommissioning

The Server Offload page offers the ability to gracefully decommission a Vault from the system. Content on the Vault is moved to other Vaults during the decommission process so that no content is lost. The process of decommissioning a Vault requires that the Vault first be put into Offline (No Ingest & Fill) mode. After the Vault is offline the option to decommission is listed in the Server Offload page.

To decommission a Vault, do the following:

Step 1  Choose Maintain > Servers > Server Offload. The Server Offload page is displayed.

Step 2  From the Server IP drop-down list, select the IP address or nickname of the Vault and click Display.

Step 3  From the New Server Status drop-down list, select Offline (No Ingest & Fill).

Step 4  Click Submit. The Current Server Status displays “Offline For Ingest & Fill.”

Note  Before continuing, make sure the Vault has been offloaded by checking the protocol timing log.

Step 5  From the New Server Status drop-down list, select Decommission. The Decommission option is only displayed when the Vault is in the “Offline For Ingest & Fill” state.

Step 6  Click Submit. The Current Server Status displays “Decommission (Inactive).”

After the decommissioning starts the Current Server Status displays “Decommission (Active).”
When the decommissioning is complete the Current Server Status displays “Decommission (Completed)” and the Shutdown button is displayed.

**Step 7** Click **Shutdown** to shut down the services running within CServer and completely isolate the Vault from the VDS.

After the decommission is complete, the Vault is isolated from the VDS. If the Vault is rebooted, it has the state of “Offline (No Ingest & Fill). The Vault entries in the database and .arroyorc remain intact. To remove the Vault entries from the database and .arroyorc file, the avsdb and statsd processes must be restarted, which impacts the serviceability of the system. Removal of a Vault from the database and .arroyorc file should be performed during a maintenance window.

## Setting System Thresholds

The System Thresholds page allows you to set thresholds for loss and usage of the VDS resources, as well as enable or disable monitoring of the VDS services. The Performance Parameters section of the page has threshold values; the System Services section of the page enables or disables monitoring of the specific services. To view the system services monitored, see the “Services Monitor” section on page 5-46. Table 7-6 lists each threshold in the Performance Parameters section, and where each threshold is monitored.

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Monitoring Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Loss</td>
<td>The Network indicator box on the “System Health” section on page 5-3.</td>
</tr>
<tr>
<td>Disk Loss</td>
<td>The Disk indicator box on the “System Health” section on page 5-3.</td>
</tr>
<tr>
<td>Disk Capacity Notify</td>
<td>The “Disk Monitor” section on page 5-39.</td>
</tr>
<tr>
<td>Disk Capacity Warning</td>
<td>The “Disk Monitor” section on page 5-39.</td>
</tr>
<tr>
<td>Linux File System Usage</td>
<td>The “Disk Monitor” section on page 5-39.</td>
</tr>
</tbody>
</table>
To set the system thresholds and enable or disable the system services, do the following:

**Step 1** Choose **Maintain > Servers > System Thresholds.** The System Thresholds page is displayed (Figure 7-2).

**Figure 7-2 System Thresholds Page**

![System Thresholds Page](image)

**Step 2** Enter the threshold settings for performance parameters

**Step 3** Enter the Attempt(s) and Timeout parameters for DNS settings.

**Note** The DNS settings will be reflected into /etc/resolv.conf file only after clicking **Push Config** in System DNS/Array DNS/ Server DNS page.

**Step 4** Enable or disable the services as appropriate.

**Step 5** Click **Submit** to save the settings.
To clear the fields and start over, click **Reset**.

To restore the default settings, click **Restore**. The default values are shown in a separate column on the page.

---

## Restarting the Services

Each server runs services that allow the server to function with other components in the VDS. Services are not automatically restarted each time there is a configuration change. If you need to restart a service, the Services Restart page provides this option. This action does not power cycle the unit. *Table 7-7* describes the different services.

### Table 7-7 Restart Services Options

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reload Service Groups</td>
<td>Any time there are changes (adding, editing, or deleting) to the QAM Gateway or Headend Setup configuration, it is necessary to reload the service groups. If the Content Storage feature is enabled, the Reload Service Group option is not available. It is not necessary to reload the service groups if the Content Storage feature is enabled.</td>
</tr>
<tr>
<td>ISA/OpenStream</td>
<td>Any time there are changes to the Streamer BMS or Vault BMS pages, it is necessary to restart the ISA/OpenStream service. If the Content Storage feature is enabled, it is not necessary to reload the ISA/OpenStream service, and therefore the option is not available.</td>
</tr>
<tr>
<td>SNMP</td>
<td>Any time there are changes to the SNMP configuration, it is necessary to restart the SNMP service.</td>
</tr>
</tbody>
</table>

To restart a service, do the following:

**Step 1** Choose **Maintain > Services**. The Services Restart page is displayed.

**Step 2** From the **Server IP/Name** drop-down list, choose the IP address or nickname of the server and click **Display**. The server type and ID, as well as the array ID, are displayed.

**Step 3** Select the check box next to each service you want to restart and click **Submit**.

To clear the fields and start over, click **Reset**.

---

## Content Manager

The Content Manager page allows deletion of multiple content objects.

**Note**

The Content Manager page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.
To delete multiple content objects, do the following:

---

**Step 1** Choose **Maintain > Services > Content Manager**. The Content Manager page is displayed with the 100 most recent ingests listed.

The first text box and **Display** button provide access to the details of a completed ingest object and takes you to the **Monitor > System Level > Completed Ingests** page. Enter the first character of the content object name in the text box. A drop-down list of content objects is displayed. If there are more than 25 content objects that start with that first character you entered, you are prompted to continue entering the next character of the content object name or click **Display**. After you click **Display**, the Completed Ingest page is displayed with the details of the selected content object.

**Step 2** To display a list of content objects, use one of the following methods:

- In the Browse Content box, click one of the characters. A list of content objects that begin with that character is displayed.
- In the Quick Lists box, the following options are offered:
  - **Most Recent Ingests (max 100)**—Lists the 100 most recent completed ingests sorted by ingest date.
  - **List All Contents**—Lists all completed ingests sorted by content name. This option is available only if the number of completed ingests is less than 100.

After you perform one of these methods, a list is displayed. The list of content objects can span several pages. To view the next page, click the page number. The content name, file size, duration, and date the object was ingested are displayed.

**Step 3** Check the Delete check box next to each content object you want to delete, and click **Delete**.

---

**Note**

It takes approximately four seconds to ensure the content is deleted from the entire system and the CDSM GUI displays the change before the next delete task is triggered. If a large number of content objects are selected for deletion, the time to complete the operation increases.
Software Maintenance

The Software Maintenance pages provides the ability to view the VDS software, upload an electronic program guide (EPG) file, generate server IDs and group IDs for Video Virtualization Infrastructure (VVI), and perform a clean-up on the system. This section covers the following topics:

- Viewing the Software Version and Server Information, page 7-18
- Configuring the TV Playout Application, page 7-18
- Importing a TV Playout Schedule, page 7-20
- System Cleanup, page 7-26
- Uploading an EPG File, page 7-21
- Viewing EPG Upload Status, page 7-22
- Identifying Server IDs and Group IDs for VVI with Split-Domain Management, page 7-23
- Stream Monitor Scripts Configuration, page 7-26
- System Cleanup, page 7-26

Viewing the Software Version and Server Information

To view the TV VDS software version and server information, choose Maintain > Software > Software Version. The Software Version page is displayed. From the Server IP drop-down list, choose a server IP address or nickname and click Display. The following information is displayed:

- Server type (Vault, Streamer SSV (ISV))
- Software version
- Server ID
- Array ID
- Product ID (PID)—CDE model (for example, CDE220)
- Version ID (VID)—Hardware version (for example, V01)
- Serial number—Serial number of the CDE
- Additional string—Model variation (for example, 4A-C)

Configuring the TV Playout Application

The Application Configuration page allows you to choose the Streamers participating in streaming content for the TV Playout application, and to choose how the Streamers participate. The following applications are configurable:

- Barker Stream/Playlists
- Playout Scheduler

Note

The Application Configuration page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.
The Streamers, or ISVs, chosen for the TV Playout application participate in an **active-standby** relationship, or an **active-active** relationship.

In an **active-standby** relationship, one server acts as the authority and all streams initiate from this server. The other servers participating in streaming for the TV Playout application only take over when the active server goes offline.

In an **active-active** relationship, all servers participating in the TV Playout application, stream the content at the same time.

To configure the Barker Stream and Playout Schedule applications, do the following:

**Step 1** Choose **Maintain > Software > Application Configuration**. The Application Configuration page is displayed (Figure 7-3).

**Figure 7-3 Application Configuration Page**

![Application Configuration Page](image)

**Step 2** Choose the **Stream Delivery Mode**.

**Active-Standby**—All streams initiate from one server (active). The other servers (standby) only take over when the active server goes offline.

**Active-Active**—All servers stream the content at the same time.

**Note** Stream Failover must be disabled if the Stream Delivery Mode is set to Active-Active. Stream Failover must be enabled if the Stream Delivery Mode is set to Active-Standby. For more information on setting Stream Failover, see the “Stream Failover Support” section on page F-3.

**Step 3** For **Active-Active**, check the check box next to each server participating in each application.

**Step 4** Click **Submit** to save the settings.

To clear the fields and start over, click **Reset**.
Importing a TV Playout Schedule

The Playout Importer page can be used to upload a Playout file, containing the Playout Scheduler data from another VDS, into the Playout Scheduler of this VDS. The Playout file is an XML file. For information about exporting a Playout file, see the “Exporting a Playout Schedule” section on page 4-120.

Note

The Playout Importer page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

To import a Playout file, do the following:

Step 1 Choose Maintain > Software > Playout Importer. The Playout Importer page is displayed.
Step 2 In the Playout Export Location text box, enter the full path and filename, or click Browse to locate the file using the Browse window.
Step 3 When importing a Playout file, each channel is checked for an existing playout schedule, if there are conflicts, the setting in the Action on Import field is used to decide how to handle the conflict. Select Preserve existing schedules, to preserve the existing playout schedule when a conflict is identified. Select Overwrite existing schedules, to overwrite the existing playout schedule.
Step 4 Click Import.

To clear the fields and start over, click Reset.

Upgrade Status of the TV Playout Application

After upgrading the TV VDS software from Release 1.5.4.6, there are some steps that must be followed before any configuration changes can occur. The Playout Upgrade Status page tracks the status of these steps. Clicking the Status of each step takes the user to the page that needs to be modified. (For the link to work on the first one, the user needs to have Engineering-level access.)

Additionally, the Alarms table displays an alarm stating the playout upgrade is incomplete.

Note

The Playout Upgrade Status page is part of the TV Playout feature and is displayed only if TV Playout feature is enabled. For more information, see the “Playout Scheduler” section on page F-14.

Uploading an EPG File

The EPG File Upload page can be used to upload an electronic program guide (EPG) file into the VDS for use with the Media Scheduler. The EPG file is an XML file.

Note

The EPG File Upload page is part of the Media Scheduler feature. For more information, see the “Playout Scheduler” section on page F-14.

Before you can upload an EPG file, you need to enter the channel information. See the “Configuring
Input Channels” section on page 4-46 for more information.

**EPG File Upload for MVOD deployment**

To upload an EPG file, do the following:

**Step 1** Choose Maintain > Software > EPG Upload. The EPG File Upload page is displayed.

**Step 2** Enter the fields as described in Table 7-8.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTP Server IP</td>
<td>IP address of the FTP server that is used to send the EPG file.</td>
</tr>
<tr>
<td>FTP Path</td>
<td>Directory path of the location of the EPG files on the FTP server. Enter the relative or absolute path according to the configuration of the FTP server. Mismatching the configuration could result in failure of Auto Import function.</td>
</tr>
<tr>
<td>Username</td>
<td>Username, if required, to access the FTP server.</td>
</tr>
<tr>
<td>Password</td>
<td>Password, if required, to access the FTP server.</td>
</tr>
<tr>
<td>Retry Count</td>
<td>Number of retry attempts to connect to the FTP server when connection fails.</td>
</tr>
<tr>
<td>Retry Interval</td>
<td>Number of seconds between every retry attempt.</td>
</tr>
<tr>
<td>Source XML</td>
<td>Filename of the source XML file on the FTP server.</td>
</tr>
<tr>
<td>Program XML</td>
<td>Filename of the program XML file on the FTP server.</td>
</tr>
<tr>
<td>Schedule XML</td>
<td>Filename of the schedule XML file on the FTP server.</td>
</tr>
<tr>
<td>Protocol</td>
<td>Choose the protocol to use for accessing the FTP server.</td>
</tr>
<tr>
<td>SFTP Mode</td>
<td>Choose the type of authentication mechanism for SFTP access. The applicable options are <strong>Password</strong> and <strong>Public Key Based</strong>. For Public Key Based authentication mechanism refer Adding RSA key to Tribune server, page 7-22 for adding the RSA key of the Importer server to the Tribune server.</td>
</tr>
<tr>
<td>Public Key Path</td>
<td>The absolute path to access the RSA key.</td>
</tr>
<tr>
<td>Passphrase</td>
<td>The passphrase for SSH access.</td>
</tr>
</tbody>
</table>

Note: This field is displayed only if the user chooses SFTP as FTP protocol.

Note: This field is applicable only if the Importer/transformer Type is SA Tribune.
**Viewing EPG Upload Status**

---

**Note**

EPG Upload Status option is listed on the left-panel menu only for the MVOD deployment.

---

The EPG Upload Status page is used to view the status of the recent five EPG ingestions for both auto and manual EPG Upload.

To view the EPG Upload Status, do the following:

1. Choose **Maintain > Software > EPG Upload Status**. The EPG Upload Status page is displayed.
2. If the status of the EPG Upload is red, the Summary column displays the reason for failure and if the status of the EPG Upload is green, the Summary column displays the following:
   - Total Number of Inserted Events
   - Total Number of Skipped Events
   - Total Number of Un-Configured channels
   - Un-Configured Channel IDs
Identifying Server IDs and Group IDs for VVI with Split-Domain Management

When using CCP Streamers in a VVI with split-domain management, it is mandatory that all group IDs and server IDs be unique for each server in the system. To assure this, the VVIM manages all the identifiers, and the Stream Managers get a range of group IDs and server IDs from the VVIM and uses them for the Streamers it manages.

Table 7-9 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arroyorc files.

### Table 7-9 ID Names in the CDSM GUI and CServer Files

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>

Generating Server IDs and Group IDs from the VVIM

The Configuration Generator page is used to generate group IDs and server IDs for the Stream Managers. When the Stream Manager contacts the VVIM during the initial configuration using the vdsconfig script, the VVIM generates the IDs, sends them to the Stream Manager, and populates the table on the Configuration Generator page. This is done by an HTTP GET request over port 80.

If the Stream Manager is unable to contact the VVIM during the initial configuration, the vdsconfig script prompts the Stream Manager administrator to contact the VVIM administrator for the server ID. The VVIM administrator would then go to the Configuration Generator page to generate the IDs for the Stream Manager.

For HTTP streamers, if the Stream Manager is unable to reach the VVIM, either because port 80 is not open for communication or because of some other connectivity reason, the Stream Manager administrator can contact the VVIM administrator for the needed information. This information consists of the following:

- Stream Group IDs
- Cache Group information

Using the Configuration Generator page, the VVIM administrator can look up the group ID and server ID ranges, and if necessary generate them. The VVIM administrator can provide the beginning group ID for the Stream Groups, which the Stream Manager administrator enters on the Stream Groups Setup page, if prompted to do so.

The Cache Group information is contained in an XML file, called CacheGroupsConfig.xml. The VVIM administrator can click the Download link to view the CacheGroupsConfig.xml file, and right-click the Download link to save the XML file locally. This XML file can be sent to the Stream Manager administrator and the Stream Manager can upload it through the Cache Group Locator page.
To generate new IDs or view the existing IDs, do the following:

**Step 1** Choose *Maintain > Software > Configuration Generator*. The Configuration Generator page is displayed (Figure 7-4).

**Figure 7-4 Configuration Generator Page**

Click *Download* link below to save the Cache Groups Configuration File. To save it to the local disk, right click on the *Download* link and select the option to save the target file.

![Configuration Generator Page](image)

A new range start for Stream Group IDs and Server IDs may be generated and issued to the Streamer Domain CSM administrator in order to add Streamers to a Streamer Domain and start configuring Stream Groups. Click *Generate New IDs* button below to generate a new ID.

<table>
<thead>
<tr>
<th>Stream Domain Name</th>
<th>Stream Manager IP</th>
<th>Stream Group ID Range</th>
<th>Server ID Range</th>
<th>Setup ID Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>StreamDomain1</td>
<td>192.22.52.00</td>
<td>10001 - 20000</td>
<td>5001 - 1250</td>
<td>5 - 1</td>
</tr>
<tr>
<td>StreamGroup2</td>
<td>Not Captured</td>
<td>20001 - 30000</td>
<td>5211 - 1700</td>
<td>7 - 1</td>
</tr>
<tr>
<td>Netdomain</td>
<td>192.22.52.23</td>
<td>20001 - 30000</td>
<td>5211 - 1700</td>
<td>13 - 10</td>
</tr>
<tr>
<td>Testdomain1</td>
<td>192.22.52.23</td>
<td>20001 - 30000</td>
<td>2011 - 2250</td>
<td>15 - 16</td>
</tr>
<tr>
<td>VRCASTSTEAMINGDOM</td>
<td>192.22.52.23</td>
<td>20001 - 30000</td>
<td>5211 - 1500</td>
<td>22 - 24</td>
</tr>
<tr>
<td>VRCASTSTREAMINGCOMP</td>
<td>Not Captured</td>
<td>20001 - 30000</td>
<td>5211 - 1500</td>
<td>5 - 1</td>
</tr>
<tr>
<td>VRCASTSTREAMINGCOMP</td>
<td>Not Captured</td>
<td>20001 - 30000</td>
<td>5211 - 1500</td>
<td>7 - 1</td>
</tr>
</tbody>
</table>

**Step 2** In the *Stream Domain Name* field, enter the name of the Stream Manager that you are generating IDs for.

**Step 3** In the *Stream Manager IP* field, enter the IP address of the Stream Manager that you are generating IDs for.

**Step 4** Click *Generate New IDs*.

---

**Configuration Generator Table**

The table on the Configuration Generator page lists the Stream Domain Name, Stream Manager IP address, and the ID ranges assigned for each Stream Manager.

**Stream Group ID Range and Server ID Range**

Sometimes the group IDs and Server IDs show as “not generated” in the table. To generate the IDs, click the *Not Generated* text in the Stream Group ID Range column. A dialog box is displayed asking if you want to generate the IDs now. Click *OK*. 
Stream Manager IP Address

The IP address of the Stream Manager is not included in the table on the Configuration Generator page until the Stream Manager is configured using the CDSM Setup page. It is possible that the Stream Manager IP address failed to be captured, in which case the entry is displayed as “Not Captured.” Click the Not Captured link to enter the IP address manually. A text box is displayed with an Update icon (plus sign) and a Cancel icon (X).

Setup ID Range

Setup IDs are only used in RTSP environments that have split-domain management and are using CCP Streamers. The VVIM only generates two setup IDs for each Stream Domain. A setup ID is used to identify the Setup server in a Stream Group. The Setup and Control servers are configured for each Stream Group on the Control/Setup IP page. See the “Configuring the Control and Setup IPs” section on page 4-88 for more information. If the Stream Manager uses the two allotted setup IDs, it contacts the VVIM for a new set of setup IDs. If the connection between the Stream Manager and VVIM fails, the Stream Manager administrator contacts the VVIM administrator for the IDs. The new setup IDs can be generated by clicking the Generate new Setup ID range icon in the Setup ID Range column.

Note

CCP Streamers are not supported in a VVI split-domain management for RTSP environments.

Generating a Server ID from the Stream Manager

The Server ID Generator page is used to generate a server ID for a Streamer that is being added to the VVI, but is unable to communicate with the Stream Manager. During the initial configuration, the Streamer contacts the Stream Manager and requests a server ID. If the Streamer is unable to contact the Stream Manager, the vdsconfig script displays a prompt to contact the Stream Manager administrator for a server ID. The Stream Manager administrator would then go to the Server ID Generator page to generate a server ID for the Streamer.

Note

The Server ID Generator page is available only on the Stream Manager when VVI and Content Storage are enabled in an ISA environment. For more information, see the “Content Storage” section on page F-12 and the “Virtual Video Infrastructure” section on page F-10.

There is a range of server IDs, 1 to 1000, that are reserved for Vaults and Caching Nodes. It is the responsibility of the VVIM administrator to make sure the server IDs are unique among all Vaults and Caching Nodes in the VVI. The VVIM reserves a group of 250 server IDs for each Stream Domain (for example, 1001-1250, 1251-1500, and so on).

To generate a server ID for a Streamer, do the following:

Step 1

Choose Maintain > Software > ID Management. The Server ID Generator page is displayed; including the System ID Settings, which consist of the following:

- Group ID Range Start—Beginning ID for the Stream Groups, Vault Groups, and Cache Groups
- Server ID Range Start—Beginning ID for the VDS servers in the system
- Setup ID Range Start—Beginning ID for the Streamer Setup server

Step 2

Click Generate New ID. The new server ID is displayed in the Server ID field.
Stream Monitor Scripts Configuration

The Stream Monitor Scripts page allows you to enable the Stream Source Script (deliver_stream_source_ip.py) and Session ID Map Script (deliver_sessionid_map.py) and view/edit the configuration settings. This page is available only for Shared Content Store CDSM with Remote Setup/Control turned ON.

To enable the stream monitor scripts, do the following:

**Step 1** Choose Maintain > Software > Stream Monitor Scripts. The Stream Monitor Scripts page is displayed.

**Step 2** Click Enable to execute the stream source script and session ID map script.

**Step 3** Enter the primary and secondary UDP IP Address/Port details for the stream source script and session ID map script to send the stream information.

**Step 4** Click Submit. The stream source script is executed on the play server and session ID map script is executed on the setup/control servers. The status of these scripts can be monitored using `monit` command.

System Cleanup

The System Cleanup page allows you to clean up any errors that may have accumulated on your system. When errors occur, they are added to the Alarms table. See the “Alarms Table” section on page 5-2 for more information and other alarms and alerts that link to other CDSM pages.

The following errors and situations are monitored and registered in the Alarms table if found and linked to the System Cleanup page:

- Orphaned server IDs
- Multiple or duplicate Cache Locate IP addresses
- Out of range Group IDs
- ServerMap and StatMap inconsistencies
- Extra or incorrect SERVERMAP15 entries

The System Cleanup page displays a **Fix All** option if there are no errors found for the Cache Locate IP addresses (either Multiple or Duplicate). If Multiple or Duplicate Cache Locate IP addresses errors are found, then the **Fix All** option is not displayed until these are resolved, because they require user input as to which entry to keep and which entry to remove.

**Orphaned Server IDs**

Orphaned Server IDs occur when servers are removed from the CDSM without first removing them from the groups they belong to (for example, Vault Group or Stream Group). This leaves a reference in the groupmap table to the server ID that is no longer valid, which means the group can no longer be edited through the CDSM GUI.

**Multiple or Duplicate Cache Locate IP Addresses**

The CDSM GUI checks and validates user input to prevent multiple locate entries in the VDS server setupfile files; this is an additional check for multiple or duplicate Locate IP addresses. The Locate IP address is used in VVIM systems with HTTP as the cache-fill protocol. The procedures are different between multiple and duplicate Locate IP addresses:
• Duplicate Locate IP Addressees—Two or more identical entries in the control IP map table for a single Cache Group, having the same group ID, locate IP, and locate subnet IP. If this has occurred, select any one of the entries for removal, and the CDSM automatically reduces the number of entries to one.

• Multiple Locate IP Addresses—More than the required single-entry for a Cache Group, and the entries are not identical in that they have differing IP addresses or subnets. If this has occurred, select the entries you want removed.

**Out of Range Group IDs**
Sometimes the CDSM is configured as a legacy system with Stream Groups and Vault Groups, only later to find that it was incorrectly configured and needs to be changed to a VVIM or Stream Manager. This creates Stream Group map table entries that use the incorrect group ID range with no method of removing them from the CDSM GUI because the configuration pages for groups correctly filters out the incorrect group IDs from the drop-down lists. The Out of Range Group IDs check cleans up these groups.

**SERVERMAP and STATMAP Inconsistencies**
When adding a large number of VDS servers to a CDSM, mistakes can be made with regard to the .arroyorc file found on each VDS server (for example, incorrect group ID [array ID] or IP address). This can lead to incorrect entries in the server STATMAP table. Additionally, servers that are not removed correctly can also leave an incorrect entry in the server STATMAP table. The server STATMAP table is used to generate the System Monitor content and errors in it can lead to display issues and incorrect states being displayed.

**Extra or Incorrect SERVERMAP Entries**
If the CDSM is reconfigured or reinstalled for a different type of VDS (legacy or VVI) and the CDSM is not properly wiped clean, there could be residual entries in the SERVERMAP15 table and STATMAP table that do not apply to the current configuration.

---

**Manuals**

To view the manual, choose **Maintain > Manuals**. The Manual page is displayed. Click the link to the manual. The manual is displayed by means of the Acrobat Reader plug-in for your browser.

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**Tip**
To download the manual to your computer, right-click the link of the manual and save the manual to a location on your hard drive for later viewing.
Troubleshooting

This appendix presents troubleshooting procedures for the VDS by showing the symptoms, probable causes, and recommended actions for a variety of issues. The topics covered in this appendix include:

- OpenStream Issues, page A-2
- General Information and Issues, page A-3
- Startup Issues, page A-25
- Management and Database Issues, page A-27
- Ingest Issues, page A-30
- Content Processing Issues, page A-32
- Cache-Fill Issues, page A-35
- Streaming and Playout Issues, page A-37
- Session Messaging, page A-40
- Database Issues, page A-40
- Advanced Features and Applications, page A-43
- Frequently Asked Questions, page A-44
- VDS Content Quality Guidelines, page A-49

There are a variety of possible combinations of VDS topologies, backoffice environments, middleware, and so on. The engineers using this troubleshooting appendix are expected to know their system well enough that they can extrapolate the relevant troubleshooting guidelines. With all connectivity issues, physical integrity of cables and ports should be verified, as well as VLAN configuration if applicable.

All Linux commands described in this appendix require console access to the server, or Secure Shell (SSH) access to the server.

Caution

Do not attempt to access the Linux command line unless you are familiar with the VDS, the Linux operating system, and have an understanding of the Linux command line.

Note

It is important to verify at each step that the correct user account is being used. The root and isa user accounts are the only ones required to manipulate the files. The root user account uses the # symbol as a prompt. The isa user account uses the $ symbol as a prompt. We strongly recommend that you change these passwords as soon as possible by using the passwd command.
OpenStream Issues

Following are the common connectivity problems with the OpenStream system:

- VDS Server Cannot Register with OpenStream
- OpenStream Reports Alert Messages

VDS Server Cannot Register with OpenStream

This issue could manifest in the following ways:

- In the ISA Content Store Log file, which is viewable by logging in to the Linux operating system on the server, you do not see the following log entry:
  
  CorbaEventSupplier.cc|158|Event publishing........Done.

- In the OpenStream GUI, go to System Link > System Monitor > Alerts > CORBA Status. The status icon is red next to at least one of the following:
  - ContentStoreFactory
  - VideoContentStoreFactory
  - StreamServiceFactory
- In the ISA Content Store Log file, you see a log entry that states it could not find the ISA naming server.

Cause 1: Configuration mismatch between VDS and OpenStream.

The IP address, port, and ISA names configured on the VDS do not match those configured on the OpenStream system.

Action 1: Verify the VDS configuration.

Verify the following settings on the Streamer BMS page and Vault BMS page:

- The IP address and port of the Content Svc Master are correct and match the settings in the OpenStream system.
- The ContentStore name and Factory ID match the settings in the OpenStream system.
- The IP address and port of the CORBA Name Service and CORBA Notify Service match those of the OpenStream system.

Cause 2: The ISA services are not running.

Action 1: Check the ISA services.

Check that the ISA services are running on the VDS server by going to the Monitor > Server Level > Services Monitor page. If they are not running, restart the services by going to the Maintain > Services > Services Restart page and restarting the ISA-OpenStream service.
OpenStream Reports Alert Messages

OpenStream reports the following alerts:
- Content creation/provisioning failed alert
- Content creation/provisioning failed for ContentStore
- Package partial export alert
- Package provision failed alert
- Provision failed alert

**Cause 1:** VDS is unable to register with OpenStream

**Action 1:** See the “VDS Server Cannot Register with OpenStream” section on page A-2.

**Cause 2:** The Content Store does not have the correct FTP port setting.

**Action 1:** Verify FTP server and client settings.

Verify the FTP server and client port settings are correct by going to the Configure > Array Level > Vault BMS page.

**Cause 3:** The package information is incorrect.

**Action 1:** Verify the URL, hostname, file path, filename, username, and password.

General Information and Issues

This section describes the VDS file system, log files, configuration files, and general troubleshooting methods. This section includes the following:

- File System
- Log Files
- Server Configuration Files
- Identifying the Software Versions or Releases
- Using ifstats to Monitor Traffic
- Kernel Crash
- Disk Drive Issues
- Memory Issues
- Disabling USB Ports and Password-Protecting the BIOS
- Network
File System

The CDSM file system differs from the file system on the VDS servers (Vault, Streamer, Caching Node, ISV).

CDSM

The CDSM has the following directory structures:

- /arroyo/asmrpt—Contains comma-separated values (CSV) files that are created by extracting information from the database every 24 hours. These files are accessible through the Reports > Archived Data page. The asm_archiver job must be installed and added to the crontab for these files to be generated. For more information, see the “Archived Data” section on page 6-42.
- /arroyo/db—Contains the database binaries, this roughly maps to the /home/isa/Berkeley directory on Streamers and Vaults.
- /arroyo/db/DATADIR—Contains the database files and indexes.
- /arroyo/image—The staging area for VDS software image files. This directory also includes backup directories when a software upgrade is performed on the server.
- /arroyo/msa—Contains the Managed Services Architecture (MSA) logs that are created by extracting information from the database. The logs are processed by the iVAST MSA agent.
- /arroyo/www—Contains the HTTP files for the CDSM GUI. The subdirectory arroyo/www/htdocs contains the PHP files for the CDSM GUI.
- /arroyo/www/modules—The link library for htdocs files.
- /home/isa/—Contains configuration files.

Report Archiving

The CSV files are generated every 24 hours and are deleted when they are older than 30 days. The CSV files are stored in the /arroyo/asmrpt directory. For the CSV files to be generated, the report archiver needs to be installed and configured. The CSV files are accessible by going to the /arroyo/asmrpt directory, or by using an FTP client with the username “asmrpt” and the password “asmrpt.”

Vault, Streamer, Caching Node, and ISV

The VDS servers (Vault, Streamer, Caching Node, and ISV) have the following directory structures:

- /arroyo/db
- /arroyo/log
- /arroyo/test/
- /arroyo/archive
- /home/isa/

In addition to the above directories, the VDS servers have the following directories specific to the ISA environment:

- /home/isa/Berkeley
- /home/isa/ContentStore
- /home/isa/IntegrationTest
The log files are located in the /arroyo/log directory. A log file is automatically archived and moved to the /arroyo/archive directory when it reaches close to 100 MB in size.

Log Files

There are three types of log files in an ISA environment:

- **Linux Log Files**
- **CServer Log Files**
- **ISA Log Files**
- **CDSM Log Files**

The log files are rotated at least once a day and time stamps are added to the filenames. Some log files that grow rapidly are rotated more frequently (determined by file size); this rotation may happen up to once an hour. Most log files have the following suffix: .log.<YYYYMMDD>.

The zone for log rotation and filename suffixes is coordinated universal time (UTC).

The CServer log files are automatically archived and moved to the /arroyo/archive directory when the disk storage reaches a certain level. The ISA log files are automatically archived and moved to the /home/isa/bss/log/archive directory whenever the log file reaches close to 40 MB. A total of nine revisions are kept of each log file, with the eight oldest being compressed and moved to the archive directory.

To change the log level or set the debug flags for the log files, use the **Configure > System Level > Logging** and **Configure > Server Level > Logging** pages. For more information, see the “Configuring the System Level Logging” section on page 4-51 and the “Configuring the Server Level Logging” section on page 4-147.

The following log tools are available:

- **loginfo**—Provides information on each facility, associated log file, and debug flags. The loginfo tool can be run on any VDS server, including the CDSM. To view help on loginfo, enter the loginfo -h -v command.
- **logconfig**—Provides log configuration on CDSM. To view help on logconfig, enter the logconfig -h -v command.

Linux Log Files

The Linux operating system has the following useful log files:

- /var/log/debugmessages—Syslog messages
- /var/log/messages—Includes useful bootup status messages

CServer Log Files

The VDS has the following useful log files:

- /arroyo/log/c2k.log.<date>—This log has information about content read issues. The date extension for the log filename has the format of yyyymmdd (for example, 20090115 is January 15, 2009). To increase the verbosity of this log file, use the following command:
  
  ```
  # echo "6" > /proc/calypso/tunables/c2k VERBOSE
  ```

The log files are located in the /arroyo/log directory. A log file is automatically archived and moved to the /arroyo/archive directory when it reaches close to 100 MB in size.
- /arroyo/log/protocoltiming.log.<date>—Provides information about any network interface issues and any disk issues.
- /arroyo/log/avsd.db.<date>—Provides information about any database issues.
- /arroyo/log/avsd.err.log.<date>
- /arroyo/log/statsd.log.<date>—Provides system statistics information.
- /arroyo/log/collectd.log.<date>—Provides logs for monitoring and statistical data collection.
- /arroyo/log/stresstest.log.<date>—Provides CPU uptime information.
- /arroyo/log/avslauncher.log.<date>—Provides information about the startup of the avslauncher module.

Other CServer log files that may be useful are the following:
- /arroyo.log/controlblocktiming.log.<date>
- /arroyo.log/debug.log.<date>
- /arroyo.log/decommissioned.log.<date>
- /arroyo.log/deleted.log.<date>
- /arroyo.log/executiontiming.log.<date>
- /arroyo.log/objectRepair.log.<date>
- /arroyo.log/serverinfo.log.<date>
- /arroyo.log/streamevent.log.<date>
- /arroyo.log/systemstats.log.<date>

**Note**
The files with the extension <date> use the format yyyy-mm-dd. The date is the Coordinated Universal Time (UTC) date.

**CServer Error Codes**

CServer error codes that appear in the c2k.log.<date> file do not necessarily mean an error has occurred. An actual error has “err” listed in the entry, as opposed to “out” or “ntc.” Following is a list of important CServer error and status codes:

**Error Codes**
- 5—Completion of a task.
- 25—Insufficient resources.

**Status Codes**
- 0—Content is okay (cnOK).
- 1—Stream has ended (cnEnd).
- 2—Stream has been paused (cnPaused).
- 3—Error has occurred (cnError).
- 4—Next element is being processed (cnNextElement).
- 5—Live content has resumed (cnResumeLive).
- 6—Next content object is being processed (cnNextContent).
• 7—Next iteration is being processed (cnNextIteration).
• 9—There has been a failover (cnFailover).
• 8—Stream has been destroyed (cnDestroyed).

Protocolltim Warning Messages

Table A-1 describes some of the warning messages that might be seen in the Protocolltim log.

<table>
<thead>
<tr>
<th>Table A-1 Protocolltim Warning Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning Message</strong></td>
</tr>
<tr>
<td>WARNING: Fill transmit bus hold offs</td>
</tr>
<tr>
<td>WARNING: Fill Data Wait</td>
</tr>
<tr>
<td>WARNING Data Low</td>
</tr>
<tr>
<td>WARNING: Disk Refetches</td>
</tr>
<tr>
<td>WARNING: No capacity 5 percent</td>
</tr>
</tbody>
</table>
| WARNING: Cannot stripe disk writes | Indicates one of the following two conditions:
• Some disk drives are completely full and data can no longer be written to them.
• The disk system is under a full-bandwidth load such that some drives are fully committed to reading stream data and are never getting any time to write data to the drive.
The data storage pattern is not efficient when this happens because the data can no longer be spread equally across all the drives. Check other load statistics to determine why the disk system cannot stripe to some drives is useful in determining why these warnings are occurring. |
| WARNING: Mirror Recovery degraded - some remote vaults (0:1) are inaccessible | The configured mirroring has not occurred because 1 or more required Vaults are down, or a partner Vault is up but configured to be in a different Vault Group. |

ISA Log Files

The Linux user *isa* is the owner of the application files in an ISA environment. Logging in as *isa* starts the database. To change from the *root* login use the **su – isa** command.

The following log files provide information on content ingest and mirroring:
• /arroyo/log/ContentStoreMaster.log
The following log files provide information on streaming:
- /arroyo/log/ContentStore.log
- /arroyo/log/StreamService.log
- /arroyo/log/LSCPService.log
- /arroyo/log/OrphanStreams.log

The following log file provides services monitoring and registration to the NameService:
- /arroyo/log/ns_log

CDSM Log Files

The CDSM has the following logs:
- httpd.log.<yyyymmdd>—Apache error log
- httpd_access.log.<yyyymmdd>—Apache access log
- CDSM.log.<yyyymmdd>—CDSM GUI log
- CDSM-ws.log.<yyyymmdd>—Web Services log

All log files use UTC for the log entry time stamps and filenames. All four files are located in /arroyo/log directory.

The default log level for httpd.log is LOG_WARNING and the setting is preserved. The log level for httpd.log (facility is httpd) can be configured by using the /home/isa/logging/logconfig tool. The logconfig tool overwrites the LogLevel value in the httpd.conf file with the new value and the /arroyo/www/bin/apachectl restart command is issued.

The httpd_access.log (facility is httpd_access) is always on and the log level cannot be changed with the logconfig tool.

Following is an example of a log entry in the httpd_access.log file:

```
02-09-2011 15:44:09.937115 UTC vqe-dev-29 161.44.183.124 - - [02/Sep/2011:08:44:09 -0700] "POST /includes/configGrpSubmitAjax.php HTTP/1.1" 200 12
```

Following is an example of a log entry in the httpd.log file:

```
02-09-2011 15:45:07 UTC vqe-dev-29 [notice] Apache/2.2.9 (Unix) PHP/5.2.6 configured -- resuming normal operations
```

Server Configuration Files

The server configuration settings are stored in the .arroyorc file and the setupfile file. This section describes the different parameters for each file.

Note

This section is informational only. All changes to the configuration files should be accomplished through the initial configuration and CDSM GUI.

Table A-2 lists the CDSM GUI ID names and maps them to the CServer names in the setupfile and .arroyorc files.
### Description of the .arroyorc Settings

This section describes the different line entries of the .arroyorc file. The .arroyorc file is located in the /home/isa directory and is created during the initial configuration procedure outlined in the *Cisco Content Delivery Engine 205/220/250/420 Hardware Installation Guide*.

#### self

This number represents what type of server the CDE is:

- 0 = ISV (also known as SSV)
- 1 = Vault
- 2 = Streamer
- 3 = CDSM
- 4 = Cache

#### groupid

All servers that are part of the same VDS system (managed by one CDSM) have the same group ID. This group ID should be unique across an enterprise. The purpose of the group ID is to allow servers in a group to recognize each other as belonging to the same group. If two server groups were on the same VLAN and they had the same group number, they would conflict and cause issues. This is much more likely to be an issue in a lab environment with shared resources than an actual production deployment, but this should still be managed.

#### serverid

Every server in the group has to have a unique ID ranging from 1 to 255. It is a good idea to use a standardized numbering solution; for example, all 1xx serverids are Streamers and all 2xx server IDs are Vaults.

#### vault

This parameter has the IP address of a Vault in the system. Each “vault” line represents an individual Vault. There may be multiple vault lines. Starting from Release 3.9.1, if a replication group is created for vault server type, the replication group ID is also specified in the third column to indicate the replication group to which the vault belongs. If the server is not assigned to any of the replication group, the replication group ID is assigned 0.

### Table A-2  ID Names in the CDSM GUI and CServer Files

<table>
<thead>
<tr>
<th>CDSM GUI ID Name</th>
<th>CServer Files ID Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Array ID on the Array Name page</td>
<td>groupid</td>
</tr>
<tr>
<td>Group ID on the Server-Level pages</td>
<td>groupid</td>
</tr>
<tr>
<td>Stream Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Cache Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Vault Group ID on the Server Setup page</td>
<td>arrayid</td>
</tr>
<tr>
<td>Stream Group ID on the Configuration Generator page</td>
<td>arrayid</td>
</tr>
</tbody>
</table>
streamer
This is the IP address of a Streamer in the system. Each “streamer” line represents an individual Streamer. There may be multiple streamer lines. Starting from Release 3.9.1, if a replication group is created for streamer server type, the replication group ID is also specified in the third column to indicate the replication group to which the server belongs. If the server is not assigned to any of the replication group, the replication group ID is assigned 0.

cache
This is the IP address of a Cache in the system. Each “cache” line represents an individual Cache. There may be multiple cache lines. Starting from Release 3.9.1, if a replication group is created for cache server type, the replication group ID is also specified in the third column to indicate the replication group to which the server belongs. If the server is not assigned to any of the replication group, the replication group ID is assigned 0.

controller
This is the IP address of the CDSM. There is only one controller line. This line is not needed in the file for the CDSM, but is used on Vaults and Streamers to point to the CDSM. The default replication group ID for controller is 0.

mirroring
This controls local mirroring, which is to say this determines the number of copies of a given piece of content that is stored locally.

partno
This allows the server to identify itself properly to the CDSM. The CDSM can then display the appropriate server graphic in the GUI and manage the appropriate number of disks, Ethernet ports, and so on.

mgmtif
This is the name of the management interface. If NIC bonding is enabled on a server, bond0 is displayed.

ingestif
This parameter is only for Vaults. The index of the ingest interface starting at eth0. Typically this remains 0 but may have the value of 1 as well.

dbdomsock
This is the “file handle” where the applications address messages are intended for the database.

dbnetport
This is the port number where the applications address messages are intended for the database.

controlif
The index of the stream control interface starting at eth0. This is an optional configuration that is used when you want to separate the Setup and Control interface.

vproxy
The virtual IP address of replication group master of vault server type. The replication group ID is indicated in the third column.
sproxy
The virtual IP address of replication group master of streamer server type. The replication group ID is indicated the third column.

cproxy
The virtual IP address of replication group master of cache server type. The replication group ID is indicated in the third column.

Sample .arroyorc file of vault after a replication group is created

```
[root@cc_rtsp_v1_190 ~]# cat /home/isa/.arroyorc
self 1
repgpid 1
groupid 250
serverid 190
partno CDE220-2A-C
mgmtif eth0
dbdomsock /tmp/isadb
ingestif 1
controller 10.197.102.179 0 -> Default id for controllers
vault 10.197.102.191 3 -> Replication group id 3
vproxy 10.197.102.196 4 -> Replication group id 4
cproxy 10.197.102.180 5 -> Replication group id 5
```

Description of the replication_config Settings

This section describes the different parameters of the replication config file. The .replication_config file is located in the /home/isa directory and is created once a replication group is configured. This file contains the same fields as .arroyorc file and three additional fields for all replication group masters.

vproxy
The virtual IP address of replication group master of vault server type. The replication group ID is indicated in the third column.

sproxy
The virtual IP address of replication group master of streamer server type. The replication group ID is indicated the third column.

cproxy
The virtual IP address of replication group master of cache server type. The replication group ID is indicated in the third column.

Description of the setupfile Settings

This section describes the different parameters of the setupfile file. The setupfile file is located in the /arroyo/test directory. Some values for the parameters in the setupfile file are set during the initial configuration (serverid, groupid, streamer vault), others are set by using the CDSM.

Note
The localip # line entry has been deprecated. Ignore this line entry.
Required Settings

The following line entries are required in every setupfile file:

**serverid #**

An identifier that uniquely identifies the server within a group of servers identified by the group ID. See the “serverid” section on page A-9 for more information.

**groupid #**

An identifier that identifies the group of servers within the VDS. See the “groupid” section on page A-9 for more information.

**streamer <0 or 1> vault <0 or 1>**

To run the server as a Streamer, set streamer to 1; otherwise, set streamer to 0. To run the server as a Vault, set vault to 1; otherwise, set vault to 0. Setting both streamer and vault to 0 is not a valid option.

**service address <ip in dot notation> setup <setup portno> control <control portno>**

The service address is used to specify whether this server can assume the role of the Setup server, the Control server, or both the Setup and Control servers for the specified IP address. This parameter applies only to Streamers.

- **setup portno**—A value of 0 means the server is not available to assume the role of the Setup server for the specified IP address. A value of 1 means to use the default port number 3300.
- **control portno**—A value of 0 means the server is not available to assume the role of the Control server for the specified IP address. A value of 1 means to use the default port number 9000.

**e1000 <index>: streaming <0 or 1> fill <0 or 1> ip <ip in dot notation> tport <transport portno> cport <cache portno> tgid <transport groupid>**

The e1000 is used to configure the network interfaces for cache-fill and transport/streaming. Each “e1000” line represents an individual Ethernet port. Include one line per interface.

- **index**—Refers to the interface index as known to the e1000 driver. In the case of servers with the Lindenhurst chipset, this matches one for one with the number for the eth# interface.
- **streaming**—For transport/streaming. A value of 1 means this interface is used for streaming; otherwise, set streaming to 0.
- **fill**—For cache fill. A value of 1 means this interface is used for cache fill. Otherwise, set fill to 0.
- **ip**—Each interface requires a source IP address. This assumes Layer 3 networks only.
- **tport**—The transport port number used as the source in transporting (streaming) packets. A value of 0 means to use the default port number 1026 (unless affected by the optional default source IP entry).
- **cport**—The cache port number used as the source in caching (fill) packets. A value of 0 means to use the default port number 48879 (unless affected by the optional default source IP entry).
- **tgid**—The transport group ID for this interface. The transport group ID is used in conjunction with the TransportGroupIdTable file located in the /arroyo/test directory to determine which interface to use to transport the packet. This is based on the IP address or subnet of the destination of the packet. The default value is 0, which means this interface is available to any transport group. Any other value means the interface is dedicated to a particular transport group.
vault mirror copies <number of copies>
The Vault mirror copies is a numeric value representing the number of copies of each content to store on the Vaults.

Note
The transport group ID (tgid) has been deprecated. Use the SubnetTable instead. See the “Network” section on page A-22.

Optional Settings

The following line entries are optional in the setupfile file:

management eth #
Specifies the interface used for management. The default is eth0.

ingest eth #
Specifies the interface used for live ingests (FTP push or UDP capture). By default, the management interface is used. This parameter is applicable only to Vaults.

e1000 adapters: maxrate <rate in Mbps>
Controls the maximum transmit bandwidth on this interface, either for streaming, for caching, or for both. The default is 975 Mbps.

ibg adapters
The maximum transmit bandwidth of the ibg adapters. The default is 975 Mbps.

disks #
Specifies the number of hard drives (disks) installed on a server. The default is 12 disks for a Streamer, and 24 disks for a Vault. If you have a server with 12 disks, you must add this entry and specify 12 disks; otherwise, warning messages stating disks are non-operational are logged to the protocoltiming log file.

test #
Specifies the test mode of the server. The default is 4, which means to run the server in production mode.

cache_dscp #
Used to set the DSCP bits on cache-fill packets. The default value is 0.

cache_ecn #
Used to set the ECN bits on cache-fill packets. The default value is 0. This parameter should not be used.

transport_dscp #
Used to set the DSCP bits on transport/streaming packets. The default value is 0.

transport_ecn #
Used to set the ECN bits on transport/streaming packets. The default value is 0. This parameter should not be used.
trickspeedsv2 # # # # # # # #
Used to specify up to 8 speeds for generating trick objects during ingest. This parameter is applicable only to Vaults. The defaults are 5, –5, 10, –10, 32, and –32. The highest speeds are –127 and 127. An entry larger than 127 defaults to 127. A value of 0 is ignored.

ftpout if eth # max utilization mbps # max sessions #
Used to specify which interface on the Vault is used for FTP Out, the maximum bandwidth utilization for all active sessions (in Mbps), and the maximum number of simultaneous sessions allowed. By default, the maximum sessions is 0, meaning that FTP Out is not allowed. The default for bandwidth utilization is 0, which means unlimited usage. The default interface chosen is the management interface. For FTP Out to function properly, the entire content must exist on the Vault.

arrayid #
Specifies the array this server belongs to. The array ID is used in conjunction with the StreamDestinationMap file located in the /arroyo/test directory to determine which play servers are available for selection. This selection is based on the IP address or subnet of the destination of the packet. The default value is 0.

remote site manager <ip address> for arrayid #
Specifies the IP address of a remote site manager for a specified array. The remote site manager has a list of all the servers that it can connect to that are located at the same site (the servers are listed in the RemoteServers list) on the remote site manager). When this server comes up, it contacts the remote site manager and asks for a referral for a server that is in the specified array. The remote site manager returns the IP address of a server from that array. This server sets up connections with all the referred remote servers, and once every minute, checks to see if there are connections with all remote array servers. If for some reason one is not available, this server contacts the remote site manager for another referral.

Note You must add the allow new L3 remote servers 1 directive to the setupfile for both this server and the server that gets referred. If you do not add this directive, this server cannot establish a connection with the referred remote server.

default source ip <ip in dot notation> tport <minportno> - <maxportno> cport <portno>
Used to affect source packets if no specific information is provided in the individual mandatory e1000 interface entries.

- **ip**—The default source IP address for an interface. This value is overridden by the mandatory e1000 interface entry. This IP address is not meaningful in a Layer 3 network. However, today it must have a non-zero value for the other values to be looked at.

- **tport**—After a stream is started, a random port within the range specified is used as the source port for transport/streaming packets of the stream (assuming no specific port was selected for tport in the mandatory e1000 interface entries).

- **cport**—The source port to use for cache-fill packets (assuming no specific port was selected for cport in the mandatory e1000 interface entries).

Note The default source IP is useful in a Layer 2 network. For Layer 3 networks, an IP address is required for each interface, so the value in the default source IP is superseded by the individual entries for the interfaces. However, the default source IP setting specifies other defaults (transport port and cache port). If you would like to specify a range of transport ports, then the default source IP could have a value of zero.
Note  The default source IP can be used in conjunction with the mandatory e1000 interface entries. For example, the default source IP can be used to specify a range for the source transport port. However, the generation of a random port does not currently work on every stream start. Therefore, it is best not to use this option.

`bms address <ip> <port>`
The IP address and port of the backoffice.

Identifying the Software Versions or Releases

The following sections describe the commands for identifying the software versions on the server.

**Linux OS Version**

To identify the software version of the Linux operating system (OS) on the CDSM, enter the following command:

```bash
# cat /proc/version or "uname -a"
```

Linux version 2.6.18-92.el5 (brewbuilder@ls20-bc2-13.build.redhat.com) (gcc version 4.1.2 20071124 (Red Hat 4.1.2-41)) #1 SMP Tue Apr 29 13:16:15 EDT 2008

To identify the software version of the Linux OS on the Vault, Streamer, or ISV, enter the following commands:

```bash
# cat /proc/version
```

Linux version 2.6.18-53.el5.kernel.2_6_18.2008.10.07.01 (arroyoqa@build-svr) (gcc version 4.1.2 20070626 (Red Hat 4.1.2-14)) #1 SMP Mon Nov 17 18:21:51 PST 2008

```bash
# uname -a
```

Linux stm74 2.6.18-53.el5.kernel.2_6_18.2008.10.07.01 #1 SMP Mon Nov 17 18:21:51 PST 2008 i686 i686 i386 GNU/Linux

**VDS-Related Releases**

The VDS software for ISA is a combination of the ISA overlay, statsd software, and the CServer code. The following sections describe how to identify the software version of each.

**ISA Environment**

To identify the software version of the VDS ISA overlay image, enter the following command:

```bash
# cat /home/isa/IntegrationTest/.build_tag
```

**ISA Tag:** r_2_0v1-isa-e008-2008-10-28-01
Build Time: Mon Nov 17 19:00:38 PST 2008

**statsd Program**

To identify the software version of the statsd program, enter the following command:

```bash
# strings /home/stats/statsd |grep Rel
```

STATSD Release TOP_OF_TREE (arroyoqa@build-svr) (gcc version 4.1.2 20070626 (Red Hat 4.1.2-14)) #1-Nstatsd-2008-11-07-02 Mon Nov 17 18:34:15 PST 2008
CServer Code

To identify the software version of the CServer on the Streamer, Vault, or ISV, enter the following command:

```
# strings avs_cserver.ko | grep CServer
```

Average setup time spent in CServer =
AVS CServer Release #1-Ncserver-e013-2008-11-17-05 Mon Nov 17 18:54:01 PST 2008
ENV_ISA_SR DEBUG
AVS CServer Information ENV_ISA_SR DEBUG (arroyoqa@build-svr) (gcc version 4.1.2 20070626 (Red Hat 4.1.2-14)) #1-Ncserver-e013-2008-11-17-05 Mon Nov 17 18:54:01 PST 2008

To view the CServer settings, status, and version, enter the following command:

```
# cat /proc/calypso/status/server_settings
```

AVS CServer Information ENV_ISA_SR PROD (arroyoqa@build-svr) (gcc version 4.1.2 20070626 (Red Hat 4.1.2-14)) #1-Ncserver-e013-2009-01-20-03 Tue Jan 20 17:54:28 PST 2009

Server Settings:
Server is operational
Cache2App is operational
TSCs Per Second is 2333447000

Network Settings:
Running in L3 Network Mode
Allow Jumbo Frames
Transport/Stream Data Payload: 1316
Cache/Fill Data Payload: 7680
Cache/Fill Control Maximum Packet Size: 8048

Using ifstats to Monitor Traffic

The `ifstats` command shows real-time traffic on each Ethernet interface on the server.

```
#/home/stats/ifstats
```

```
Int# M-R-Mbps X-Mbps R-Bytes X-Bytes
eth0 0.0 0.0 56760511 166307653
eth1 0.0 0.0 0.0 0.0
eth2 4.457 457.0 3439241508 3497139080
eth3 4.457 439172148 3099124288
eth4 4.457 3441836680 2945489644
eth5 4.472 3443060380 2736115618
eth6 4.471 3438423816 2613199736
eth7 5.464 3440066492 2419935662
eth8 4.449 3439982812 2266582156
eth9 4.465 3443251384 2164010982
eth10 5.465 3439982136 1915437726
eth11 4.464 3438935192 397577442
eth12 5.464 3440343164 300903930
eth13 4.465 3439540716 4454799830
```
Kernel Crash

The kernel debugger (KDB) provides information (in the form of a core dump file) when the server processing fails. For the server to enter KDB when the server has crashed, the /proc/sys/kernel/panic parameter must be zero. If the panic parameter is non-zero, the system reboots automatically without entering KDB.

In addition to KDB, there is a kdump service. The kdump service allows you to take a kernel dump of memory. The kdump service runs automatically if the server is configured to reboot automatically after a crash (which means the panic parameter is non-zero). The kdump service stores the kernel memory dump in the /var/arroyo/crash directory. After the kernel memory is dumped, the system reboots into the normal operating system.

If the server is configured to enter KDB (which means the panic parameter is zero), the server enters KDB mode. The kdump command allows you to take a kernel memory dump while the server is in KDB mode. The kdump command reboots the server into kdump mode, takes a kernel memory dump, and reboots the server into the normal operating system.

If a server has crashed after being started automatically from the /etc/rc.local directory, you need to boot in single-user mode. To boot in single-user mode, perform the following steps:

**Step 1**  Reboot the server.
**Step 2**  When a blue screen displays a list of Linux versions, press the E key to edit the kernel entry.
**Step 3**  Multiple lines are displayed. Use the Up Arrow and Down Arrow keys to highlight the second line. You may need to press the E key again to edit the line. A square cursor appears at the end of the line.
**Step 4**  Remove the 115200 from the console parameter (for example, console=ttySO,115200n8).
**Step 5**  Add the word “Single” or the letter “S” to the end of the line.
**Step 6**  Press Enter.
**Step 7**  Press the B key to boot the Linux kernel into single-user mode.
**Step 8**  Wait for the server to finish booting up.
**Step 9**  Edit the /etc/rc.local file and comment out the line /arroyo/test/vault/run.
**Step 10**  Reboot the server.

To view the contents of the core dump file from the Linux prompt, do the following:

**Step 1**  Run the GNU debugger (gdb), and specify the core file and binary file.
```
gdb --core=<core-file> <binary-file>
```

The core-file parameter is the core filename and the binary-file is the binary file that produced the core file.

**Step 2**  After the GNU debugger has started, enter the backtrace command, bt, at the gdb prompt and press Enter.
```
gdb> bt
```

The callback stack is displayed, which shows the history of the current function calls that were made at the time of the crash.
Disk Drive Issues

The disk drive order is irrelevant when reinserting disk drives after transporting a chassis, or transferring disk drives from one chassis to another.

To view the statistics of the internal boot drive, the disk drive that contains the software, enter the `df -k` command.

```
# df -k
```

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>1k-blocks</th>
<th>Used</th>
<th>Available</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/hda1</td>
<td>10317828</td>
<td>3764936</td>
<td>6028776</td>
<td>39%</td>
<td>/</td>
</tr>
<tr>
<td>/dev/hda2</td>
<td>20641788</td>
<td>1711372</td>
<td>17881776</td>
<td>9%</td>
<td>/arroyo</td>
</tr>
<tr>
<td>/dev/hda3</td>
<td>8254272</td>
<td>32828</td>
<td>7802148</td>
<td>1%</td>
<td>/arroyo/db</td>
</tr>
<tr>
<td>/dev/hda6</td>
<td>35641880</td>
<td>1185880</td>
<td>32645480</td>
<td>4%</td>
<td>/arroyo/log</td>
</tr>
<tr>
<td>none</td>
<td>1681200</td>
<td>0</td>
<td>1681200</td>
<td>0%</td>
<td>/dev/shm</td>
</tr>
</tbody>
</table>

To view the statistics of a removable SATA or SCSI disk drive, use the following commands:

```
# cat /proc/calypso/status/streamer/diskinfo
```

Disk Info:
- Disks(12) Op(12)
- Storage: T(804G) A(21%) U(0)
- BW: (99%) w(1.35M/s) r(0/s)
- I/O Util: w(1:0%) e(0) a(0%)
- Disk[2][67.0G] A[20%] B[0x]
- Disk[3][67.0G] A[21%] B[0x]
- Disk[4][66.5G] A[22%] B[0x]
- Disk[5][67.0G] A[20%] B[0x]
- Disk[6][67.0G] A[21%] B[0x]
- Disk[7][67.0G] A[20%] B[0x]
- Disk[8][67.0G] A[20%] B[0x]
- Disk[9][67.0G] A[21%] B[0x]
- Disk[10][67.0G] A[20%] B[0x]
- Disk[12][67.0G] A[20%] B[0x]

CDSM GUI Disk Monitor Page Reports a Disk Warning

If the CDSM GUI Disk Monitor page reports a disk warning, check the disk drive status in the `/arroyo/log/protocoltiming.log.<date>` log file and the `/var/log/debugmessages` log file.

```
# grep drives /arroyo/log/protocoltiming.log.11132007
```

```
WARNING: 5 disk drives are non-operational
WARNING: 5 disk drives are non-operational
... 
WARNING: 5 disk drives are non-operational
WARNING: 5 disk drives are non-operational
```

```
# grep disks /var/log/debugmessages
```

```
Nov 20 19:02:44 vault219 kernel: RAMDISK driver initialized: 16 RAM disks of 16384K size 4096 blocksize
Nov 20 19:03:34 vault219 kernel: Waiting for 2 disks to finish initializing
Nov 20 19:03:34 vault219 kernel: Waiting for 4 disks to finish initializing
Nov 20 19:03:35 vault219 kernel: Waiting for 3 disks to finish initializing
Nov 20 19:03:36 vault219 kernel: Waiting for 2 disks to finish initializing
Nov 20 19:03:36 vault219 kernel: Waiting for 1 disks to finish initializing
```
Nov 20 19:03:36 vault219 kernel: Waiting for 5 disks to finish initializing
Nov 20 19:03:42 vault219 kernel: Waiting for 6 disks to finish initializing
Nov 20 19:03:42 vault219 kernel: Waiting for 5 disks to finish initializing
Nov 20 19:03:43 vault219 kernel: Waiting for 4 disks to finish initializing
Nov 20 19:03:45 vault219 kernel: Waiting for 11 disks to finish initializing
Nov 20 19:03:46 vault219 kernel: Waiting for 10 disks to finish initializing
Nov 20 19:03:46 vault219 kernel: Waiting for 9 disks to finish initializing
Nov 20 19:03:46 vault219 kernel: Waiting for 8 disks to finish initializing
Nov 20 19:03:47 vault219 kernel: Waiting for 7 disks to finish initializing
Nov 20 19:03:47 vault219 kernel: Waiting for 6 disks to finish initializing
Nov 20 19:03:48 vault219 kernel: Waiting for 5 disks to finish initializing
Nov 20 19:03:48 vault219 kernel: Waiting for 4 disks to finish initializing
Nov 20 19:03:48 vault219 kernel: Waiting for 3 disks to finish initializing
Nov 20 19:03:48 vault219 kernel: Waiting for 2 disks to finish initializing
Nov 20 19:03:48 vault219 kernel: Waiting for 1 disks to finish initializing
Nov 20 19:03:50 vault219 kernel: Total disk space = 24.0TB on 24 disk drives (Lost disks = 0)

Note

Sometimes on the CDE400, the bus and host resets are used to reset the SATA driver because the Linux SATA driver, sats_mv.ko, does not provide a device reset vector. If the device is reset when there are no outstanding requests, warning messages are displayed on the console. These warning messages are informational and do not indicate a failure.

## Memory Issues

To slow down the CDSM bootup to see the memory counter, do the following:

### Step 1
Reboot the server.

### Step 2
To enter the BIOS Setup Utility, press the **Delete** key on your keyboard when you see the following text prompt:

**Press DEL to runSetup**

**Note**

In most cases, the **Delete** key is used to invoke the setup screen. There are a few cases where other keys are used, such as **F1**, **F2**, and so on.

### Step 3
Use the **Right Arrow** key to navigate to the Boot menu.

### Step 4
Choose the **Boot Settings** configuration option (**Figure A-1**).

### Step 5
Choose **Quick Boot** and set it to **Disabled**.
Disabling USB Ports and Password-Protecting the BIOS

Step 1 Reboot the server.

Step 2 To enter the BIOS Setup Utility on a VDS server (Vault, Caching Node, Streamer, or ISV), press the Delete key when you see the following text:

Press DEL to runSetup

To enter the BIOS Setup Utility on a CDSM or VVIM, press F2.

The BIOS menu is displayed with the Main tab selected.

Use the Right Arrow and Left Arrow keys to select a menu tab, and the Up Arrow and Down Arrow keys to select a menu item.

Step 3 To set the Administrator password, do the following:

a. Use the Right Arrow key to navigate to the Security menu. The Security options are displayed. The Administrator has read/write permission. The User has read-only permission.
b. Use the **Down Arrow** key to navigate to the **Administrator Password** option and press **Enter**. The Create New Password dialog box is displayed.

c. Enter the password.

To set a user password, use the **Down Arrow** key to highlight the **User Password**, press **Enter**, and enter the password in the Create New Password dialog box.

**Step 4**

To disable the USB ports, do the following:

a. Use the **Left Arrow** key to navigate to the **Advanced** menu. The Advanced options are displayed.

b. Use the **Down Arrow** key to navigate to the **USB Configuration** option and press **Enter**. The USB Configuration options are displayed.

c. Use the **Down Arrow** key to navigate to the **USB Controller** and press **Enter**. The USB Controller dialog box is displayed.

d. Use the **Up Arrow** and **Down Arrow** keys to highlight **Disabled** and press **Enter**. The USB Configuration options show Disabled for all USB options.

**Step 5**

To save your settings, press **F10**. The Save & Reset confirmation dialog box is displayed.

Use the **Right Arrow** and **Left Arrow** keys to highlight **Yes** and press **Enter**.

---

After rebooting the server, to enter the BIOS Setup Utility, you are prompted to enter the BIOS password. To have read/write permission, enter the Administrator password. To have read-only permission, enter the User password.

To enable the USB ports, reboot the server, do the following:

**Step 1**

Reboot the server.

**Step 2**

Enter the BIOS Setup Utility on a VDS server (Vault, Caching Node, Streamer, or ISV) by pressing the **Delete** key when you see the following text:

Press **DEL** to runSetup

To enter the BIOS Setup Utility on a CDSM or VVIM, press **F2**.

The BIOS menu is displayed with the Main tab selected.

**Step 3**

Use the **Left Arrow** key to navigate to the **Advanced** menu. The Advanced options are displayed.

**Step 4**

Use the **Down Arrow** key to navigate to the **USB Configuration** option and press **Enter**. The USB Configuration options are displayed.

**Step 5**

Use the **Down Arrow** key to navigate to the **USB Controller** and press **Enter**. The USB Controller dialog box is displayed.

**Step 6**

Use the **Up Arrow** and **Down Arrow** keys to highlight **Enabled** and press **Enter**. The USB Configuration options show Enabled for all USB options.

**Step 7**

To save your settings, press **F10**. The Save & Reset confirmation dialog box is displayed.

Use the **Right Arrow** and **Left Arrow** keys to highlight **Yes** and press **Enter**.
Network

Following are the some common network problems:

- No Output on the NSG
- Vault Cannot Connect to FTP Server
- Checking Network Configuration

No Output on the NSG

There is no output on the NSG when sending a play command.

**Cause 1:** Cannot communicate with the QAM device or the QAM settings are incorrect.

**Action 1:** Verify the QAM configuration on the VDS.

Verify the IP address, and MAC address if applicable, of the QAM by going to the Configure > System Level > QAM Gateway page.

Vault Cannot Connect to FTP Server

In the ISA Content Store Log file, which is viewable by logging in to the Linux OS on the server, a log entry states it cannot connect to the FTP server.

**Cause 1:** Hostname is not resolving correctly.

**Action 1:** Verify the VDS configuration for DNS.

- Verify the host table lookup by going to the Configure > System Level > Host Service page. The host table is used for DNS lookup before the DNS servers are queried.
- Verify the DNS server settings by going to the Configure > System Level > DNS page.
- Verify the DNS servers are reachable.

Checking Network Configuration

The following commands are useful for checking your network configuration and activity.

To view the ARP table, enter the following command:

```bash
# arp -a
jetsam.v.com (111.0.110.151) at 00:00:0C:07:AC:00 [ether] on eth0
VDS17-m1.v.com (111.0.210.170) at 00:30:48:58:5B:A1 [ether] on eth0
? (111.0.210.175) at 00:30:48:32:0A:5A [ether] on eth0
VDS17-s1.v.com (111.0.210.172) at 00:04:23:D8:89:44 [ether] on eth0
VDS17-s1.v.com (111.0.210.172) at 00:04:23:D8:89:44 [ether] on eth0
```

To view the IP routing table, enter the following command:

```bash
# netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window Irtt Iface
111.0.210.0 0.0.0.0 255.255.255.0 U 0 0 0 eth0
111.0.0.0 0.0.0.0 255.0.0.0 U 0 0 0 eth0
127.0.0.0 0.0.0.0 255.0.0.0 U 0 0 0 lo
0.0.0.0 111.0.210.1 0.0.0.0 UG 0 0 0 eth0
```

To view the VDS subnet table, enter the following command:
The local networks and their gateways are specified in the SubnetTable file. For backward compatibility, the local subnet and gateway in the RoutingTable are still supported and are used if the SubnetTable file does not exist. The Routing Table can still be used to specify static routes.

To view the VDS routing table, enter the following command:

```
# cat /arroyo/test/RoutingTable
```

```
default gateway 111.1.13.1
    network 111.1.13.1 netmask 255.255.255.240 gateway 0.0.0.0
```

To view the VDS remote server table, enter the following command:

```
# cat /arroyo/test/RemoteServers
```

```
remote server
    id 141
    ip 111.1.9.20
    ip 111.1.9.21
    ip 111.1.9.22
    ip 111.1.9.23
    ip 111.1.9.24
end remote server

remote server
    id 143
    ip 111.1.9.25
    ip 111.1.9.26
end remote server

remote server
    id 144
    ip 111.1.9.27
    ip 111.1.9.28
    ip 111.1.9.29
    ip 111.1.9.30
end remote server
```

### Interface Information

To view basic interface information, use the `ifconfig` command.

```
# ifconfig eth0
```

```
et0    Link encap:Ethernet  HWaddr 00:04:23:D8:9A:80
    inet addr:111.0.110.41  Bcast:111.0.110.255  Mask:255.255.255.0
    UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
    RX packets:13946269 errors:0 dropped:0 overruns:0 frame:0
    TX packets:11594110 errors:0 dropped:0 overruns:0 carrier:0
    collisions:0 txqueuelen:1000
    RX bytes:3085199261 (2942.2 Mb)  TX bytes:1317620721 (1256.5 Mb)
```

For detailed interface information, view the interface information file in the `/proc/net/` directory.

```
# cat /proc/net/PRO_LAN_Adapters/eth0.info
```

```
Description                Intel® Gigabit Ethernet Network Connections
Part_Number                fffffff-0ff
Driver_Name                igb
Driver_Version             1.2.22-VDS
```
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI_Vendor</td>
<td>0x8086</td>
</tr>
<tr>
<td>PCI_Device_ID</td>
<td>0x10a7</td>
</tr>
<tr>
<td>PCI_Subsystem_Vendor</td>
<td>0x15d9</td>
</tr>
<tr>
<td>PCI_Subsystem_ID</td>
<td>0x10a7</td>
</tr>
<tr>
<td>PCI_Revision_ID</td>
<td>0x02</td>
</tr>
<tr>
<td>PCI_Bus</td>
<td>14</td>
</tr>
<tr>
<td>PCI_Slot</td>
<td>0</td>
</tr>
<tr>
<td>PCI_Bus_Type</td>
<td>UNKNOWN</td>
</tr>
<tr>
<td>PCI_Bus_Speed</td>
<td>UNKNOWN</td>
</tr>
<tr>
<td>PCI_Bus_Width</td>
<td>UNKNOWN</td>
</tr>
<tr>
<td>IRQ</td>
<td>194</td>
</tr>
<tr>
<td>System_Device_Name</td>
<td>eth0</td>
</tr>
<tr>
<td>Current_HWaddr</td>
<td>00:30:48:C3:26:9E</td>
</tr>
<tr>
<td>Permanent_HWaddr</td>
<td>00:30:48:C3:26:9E</td>
</tr>
<tr>
<td>Link</td>
<td>up</td>
</tr>
<tr>
<td>Speed</td>
<td>1000</td>
</tr>
<tr>
<td>Duplex</td>
<td>Full</td>
</tr>
<tr>
<td>State</td>
<td>up</td>
</tr>
<tr>
<td>Rx_Packets</td>
<td>406625</td>
</tr>
<tr>
<td>Tx_Packets</td>
<td>135553</td>
</tr>
<tr>
<td>Rx_Bytes</td>
<td>41539919</td>
</tr>
<tr>
<td>Tx_Bytes</td>
<td>30390314</td>
</tr>
<tr>
<td>Rx_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Dropped</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Dropped</td>
<td>0</td>
</tr>
<tr>
<td>Multicast</td>
<td>236747</td>
</tr>
<tr>
<td>Collisions</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Length_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Over_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_CRC_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Frame_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_FIFO_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Missed_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Aborted_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Carrier_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_FIFO_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Heartbeat_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Window_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Abort_Late_Coll</td>
<td>0</td>
</tr>
<tr>
<td>TxDeferred_Ok</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Single_Coll_Ok</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Multi_Coll_Ok</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Long_Length_Errors</td>
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</tr>
<tr>
<td>Rx_Short_Length_Errors</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Abort_Late_Coll</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Flow_Control_XON</td>
<td>0</td>
</tr>
<tr>
<td>Rx_Flow_Control_XOFF</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Flow_Control_XON</td>
<td>0</td>
</tr>
<tr>
<td>Tx_Flow_Control_XOFF</td>
<td>0</td>
</tr>
<tr>
<td>Rx_CSum_Offload_Good</td>
<td>406625</td>
</tr>
<tr>
<td>Rx_CSum_Offload_Errors</td>
<td>0</td>
</tr>
<tr>
<td>PHY_Media_Type</td>
<td>Copper</td>
</tr>
<tr>
<td>PHY_Cable_Length</td>
<td>Unknown Meters (+/- 20 Meters)</td>
</tr>
<tr>
<td>PHY_Extended_10Base_T_Distance</td>
<td>Unknown</td>
</tr>
<tr>
<td>PHY_Cable_Polarity</td>
<td>Normal</td>
</tr>
<tr>
<td>PHY_Disable_Polarity_Correction</td>
<td>Enabled</td>
</tr>
<tr>
<td>PHY_Idle_Errors</td>
<td>0</td>
</tr>
<tr>
<td>PHY_Receive_Errors</td>
<td>0</td>
</tr>
<tr>
<td>PHY_MDI_X_Enabled</td>
<td>MDI</td>
</tr>
<tr>
<td>PHY_Local_Receiver_Status</td>
<td>OK</td>
</tr>
</tbody>
</table>
Startup Issues

This section includes the following topics:

- BIOS Settings—Operating System Hangs or Goes into KDB Mode
- Serial Console Port Settings
- Required Services Not Starting or Running Correctly

BIOS Settings—Operating System Hangs or Goes into KDB Mode

When a single bit error occurs in the memory of a server, it causes the Linux OS to lock up, which puts the server into kernel debugger (KDB) mode. This is because of the BIOS Error Correcting Code (ECC) Type being set incorrectly.

To correct the ECC Error Type setting in the BIOS Setup Utility, do the following.

Step 1 During the server bootup, press the Delete key to enter the BIOS Setup Utility.
Step 2 Navigate to the Advanced menu and choose Advanced Chipset Control.
Step 3 Choose ECC Error Type and change the setting to NMI (Figure A-2).
Figure A-2  BIOS Setup Utility—Advanced Chipset Control

Step 4  Press F10 to save and exit.

Serial Console Port Settings

The CDE servers ship with the following serial console settings: 115200 baud rate, no parity, 8 data bits, and 1 stop bit (115200-N-8-1). To verify the serial console settings, check the following:

- BIOS Settings—Determines the speed during the very beginning of the boot process up to and including the GRUB menu. In the BIOS Setup Utility, check that the Console Redirection in the Advanced menu is set to VT100.
- /etc/boot/menu.lst—Determines the speed after the kernel is loaded.
- /etc/inittab—Determines the speed after the OS is loaded. Enter the following:

  ```
  $ cat /etc/inittab | grep S0
  S0:2345:respawn:/sbin/agetty ttyS0 115200 vt100
  ```

  **Note**  The CDE100 may have the following serial console settings: 9600 baud rate, no parity, 8 data bits, and 1 stop bit (9600-N-8-1).
Required Services Not Starting or Running Correctly

From the CDSM GUI, view the Services page for each server by clicking Monitor > Server Level > Services. For more information, see the “Services Monitor” section on page 5-46. If the required services are not started, or they are not running correctly, check that there is two-way database connectivity between the Streamers and Vaults, and the CDSM.

```
$ netstat -an | grep 9999
```

<table>
<thead>
<tr>
<th>Proto</th>
<th>Local Address</th>
<th>Foreign Address</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>tcp</td>
<td>0.0.0.0:9999</td>
<td>0.0.0.0:*</td>
<td>LISTEN</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.197:56998</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:34743</td>
<td>172.22.97.197:9999</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.192:50343</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:39158</td>
<td>172.22.97.196:9999</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.192:9999</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.196:55780</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.191:50950</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:60598</td>
<td>172.22.97.191:9999</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.194:37543</td>
<td>ESTABLISHED</td>
</tr>
<tr>
<td>tcp</td>
<td>172.22.97.193:9999</td>
<td>172.22.97.194:9999</td>
<td>ESTABLISHED</td>
</tr>
</tbody>
</table>

Two connections for each Vault and Streamer should be listed with a status of “ESTABLISHED.”

If the connection states do not say “ESTABLISHED,” check the configuration of /home/isa/.arroyorc file to make sure the settings are correct, then restart the database.

Log in to the server as root and start the database.

```
$ service avsdb start
```

Log into the server as root and start the statsd.

```
$ service statsd start
```

Check that the LSCP listener is running on the correct port.

```
$ arroyo status
$ netstat -an | grep 554
```

Management and Database Issues

This section includes the following topics:

- System Health
- Cannot Access the CDSM GUI
- CDSM GUI Does Not Register the Vaults and Streamers
- VVIM/CDSM GUI not displaying the devices properly
- Database Monitoring

System Health

The colored boxes on the System Health Monitor page have the following meaning:

- Green—All components are operating; occasionally click each check box to verify.
- Yellow—Some components are not operational.
- Red—All components have failed.
Cannot Access the CDSM GUI

If you cannot access the CDSM GUI, log in as root and verify that the Apache server is running on the CDSM.

```bash
# ps -aef | grep http
root  4023     1  0 Aug09 ?       00:01:44 /arroyo/www/bin/httpd
nobody 4033  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4034  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4035  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4036  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4037  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4085  4023  0 Aug09 ?       00:00:52 /arroyo/www/bin/httpd
nobody 4086  4023  0 Aug09 ?       00:00:53 /arroyo/www/bin/httpd
nobody 4572  4023  0 Aug10 ?       00:00:52 /arroyo/www/bin/httpd
root 11598 30692  0 16:12 pts/0    00:00:00 grep http
```

If the Apache server is not running, restart the server.

```bash
# service vds-httpd start
```

CDSM GUI Does Not Register the Vaults and Streamers

If the CDSM GUI is not able to register that the Vaults and Streamers are part of the array or VDS, do the following:

**Step 1** Log in to the Vault or Streamer as root.

**Step 2** Verify two-way database connectivity with the CDSM.

```bash
# netstat -an | grep 9999
```

**Step 3** Verify that statsd is running.

```bash
# ps -aef | grep statsd
```

**Step 4** Verify the correct version and permissions for /home/stats/svrinit or svrinit_15 are being used.

```bash
# ls -l /home/stats/
```

**Step 5** On the Vault and the Streamer, initialize the VDS host in the database by using svrinit_15. Use the following options:

- Option -i for the physical IP address (eth0) of the server
- Option -s for the subnet mask of the network
- Option -h for the hostname
- Option -d to deregister

For example, first deregister the VDS host using the -d option, then initialize the VDS host.

```bash
# ./svrinit_15 -i <ip_address> -s <subnet_mask> -h <host_name> -d
# ./svrinit_15 -i <ip_address> -s <subnet_mask> -h <host_name>
```
VVIM/CDSM GUI not displaying the devices properly

If the VVIM/CDSM GUI dashboard displays junk characters after the upgrade then check if de-registered servers are removed from the VVIM/CDSM database. If not, do the following:

**Step 1** Log in to the Vault or Streamer as root.

**Step 2** Verify two-way database connectivity with the CDSM.

```bash
# netstat -an | grep 9999
```

**Step 3** Verify statsd is running.

```bash
# ps -aef | grep statsd
```

**Step 4** Verify the correct version and permissions for /home/stats/svrinit or svrinit_15 are being used.

```bash
# ls -l /home/stats/
```

**Step 5** Go to /home/stats, run the following command:

```bash
svrinit_15 -i <ip_address> -s <subnet_mask> -h <host_name> -gw <gateway> -d
```

- Option `-i` for the server physical IP address of the device to be de seeded
- Option `-s` for the subnet mask of the device to be de seeded
- Option `-h` for the host name of the device to be de seeded
- Option `-gw` for the gateway of the device to be de seeded

**Step 6** Stop the statsd service running on the device using the following command:

```bash
# service statsd stop
```

**Step 7** Verify if no output is displayed for the following command:

```bash
# service statsd status
```

**Step 8** Reboot the device

Database Monitoring

To monitor a stuck database thread problem, use the following command:

```bash
netstat -an | grep 9999
```

Two connections for each Vault and Streamer should be listed with a status of “ESTABLISHED.” If two-way connection does not exist, run `service avsdb stop` on all servers including the CDSM, then start the database using the following commands:

```bash
# service avsdb start
```

If the database is stuck and `service avsdb stop` does not take effect, use `ps -ef | grep avsdb` to query the process ID (PID), then use the `kill -9 {pid}` command to kill the avsdb process, and lastly restart the database.
Ingest Issues

This section includes the following ingest issues:

- Ingest Interface, page A-30
- Bad Content, page A-31
- Network, page A-31
- Live Recording Issue, page A-31

Ingest Interface

This section includes the following topics on troubleshooting the ingest interface:

- General Tips, page A-30
- Common Ingest Problems, page A-30
- VDS is not registered to the Name Service, page A-30
- Restarting the ISA Services, page A-31
- Troubleshooting collectd, page A-31

General Tips

Following are some general troubleshooting tips for ingest issues:

- Use the `ifstats` command to monitor ingests.
- Ping the FTP device, which is either a catcher or an FTP server.
- Manually FTP to the catcher or FTP server.

Common Ingest Problems

Following are some possible causes of ingest issues:

- FTP server is not reachable (server is down, routes are incorrect, network partition).
- Incorrect URL for the content file.
- ContentStore file system is full.
  - Check the `/arroyo/log/protocoltiming.log.<date>` log file.
  - Verify that the correct trickmode speeds are set.

VDS is not registered to the Name Service

If the VDS is not registering with the CORBA name service, check the information from the following commands:

```bash
$ tail -f /arroyo/log/ns_log
$ /home/isa/IntegrationTest/show_calypso_services
$ /home/isa/IntegrationTest/list_all_content
$ /home/isa/IntegrationTest/list_all_streams
```
Restarting the ISA Services

If it is necessary to restart the ISA services, then enter the following command:

```
$ service isa restart
```

Troubleshooting collectd

To verify if collectd process is running or not, enter the following command:

```
pgrep collectd
```

To verify the collectd TCP connections to and from the Controllers, enter the following command:

```
netstat -an | grep 8999
```

To start the collectd process, enter the following command:

```
service collectd start
```

To stop the collectd process, enter the following command:

```
service collectd stop
```

If health, DDisk, Vitals, NIC and process status information are not shown correctly for a server, verify if collectd is running in the corresponding server and the controller.

Bad Content

Variable bit rate (VBR) encoded content is not currently supported. See the “VDS Content Quality Guidelines” section on page A-49 for constant bit rate (CBR) guidelines.

Network

Ensure that the network maximum transmission unit (MTU) is appropriately set. If jumbo frames are enabled on the VDS, then the network must support jumbo frames. We recommend that the network support jumbo frames even when the jumbo frame option is disabled.

If a Layer 2 network is used for VDS, then appropriate MAC addresses (ARP entries) have to be configured on the switches and routers. Ensure that the VDS Vault and Streamer interfaces are in the same VLAN. If a Layer 3 network is used for the VDS, then ensure that the corresponding default gateways are correctly configured on VDS Vaults and Streamers for the various interfaces and Stream Groups.

Ensure that the content source (catcher, FTP server, and so on) is reachable from the Vaults or ISVs, and that manual content transfer using FTP works correctly.

For more information about the status of the network interfaces, network routing tables, ARP and so on, see the “Network” section on page A-22.

Live Recording Issue

For live recordings, due to delay in joining multicast group, the recordings’ content duration is reported less than actual duration of up to one sec.
Content Processing Issues

This section includes the following content processing issues:

- Listing Content
- Orphan GOID mirroring during reboot of vaults
- Content Mirroring
- Verifying GOIDs
- ATIS Streaming not working for re-ingested content
- ATIS Streaming not working for re-ingested content
- Name and Notify Services
- CORBA Interface

Listing Content

To view the actual stored content versus what the database reports, enter the following commands:

```
$ su - isa
$ cddb
$ ./dumpDB
```

The dumpDB command displays a menu that provides options for populating a list file with the selected information.

```
===============================
** DUMP (VDS) DB TABLES **
** Version: 2.0.0    **
===============================

SELECT A TABLE TO DUMP TO FILE

1: CONTENT(s)                 (ctnobj.lst)
2: STREAM(s)                  (stmobj.lst)
3: SERVICE GROUP(s) & TSID(s) (svcgrp.lst)
4: QAM(s)                     (qam.lst)
5: STREAM SVC LIST            (sslist.lst)
6: LOAD(s)                    (load.lst)
7: ISA ENV                    (isaenv.lst)
8: MSA UNPROCESSED(s)         (unprocessed.lst)
9: MSA PROCESSED(s)           (processed.lst)
0: QUIT

===============================
ENTER CHOICE [1-9,0]: 0
```

To view the list file (for example, ctnobj.lst), go to the /arroyo/db directory and use the `cat` command or the `vi` command.

Orphan GOID mirroring during reboot of vaults

In steady state with no new contents being added or removed, if constant mirroring activity is seen during reboot of any group of vaults system then:
Enter the following command in all the vaults:

```
echo 1 > /proc/calypso/tunables/performisacheck
```

## Content Mirroring

To enable content mirroring locally on one Vault, do the following:

**Step 1** Modify the `/home/isa/.arroyorc` file by adding the following line:

```
cserver_opts 'vault local copy count 2'
```

**Step 2** Verify that the change has propagated to the `/arroyo/test/vault/setupfile` file.

The line “vault local copy count 2” should be added to the setupfile file.

Alternatively, enable local mirroring using the tunables. You can also use the tunables to verify the settings.

```
echo 2 > /proc/calypso/tunables/vaultlocalcopycount
```

**Note** Using the `echo 2` command to enable local mirroring in the tunable file only changes the local copy count temporarily. The local copy count resets to its original value on reboot. To configure the local copy count permanently for any value other than 1, edit the `/arroyo/test/vault/setupfile` or use the CDSM GUI.

To enable content mirroring between two Vaults, do the following:

**Step 1** In the CDSM GUI, choose **Configure > Server Level > Server Setup**. The Server Setup page is displayed.

For more information, see the “Configuring the Servers” section on page 4-128.

**Step 2** From the **Server IP** drop-down list, choose the IP address of the server.

**Step 3** From the **Vault Mirror Copies** drop-down list, choose **2**.

**Step 4** Click **Submit**.

**Step 5** Verify the change has propagated by looking at `/arroyo/test/vault/setupfile` and `/arroyo/log/protocoltiming.log.<date>` files.

```
# grep mirror /arroyo/test/setupfile
  vault mirror copies 2

# grep LocalMirror /arroyo/log/protocoltiming.log.11202007
  -LocalMirror Active=0:0 comp=0% obj=0.0/s read=0b/s write=0b/s copies=1
  -LocalMirror Active=0:0 comp=0% obj=0.0/s read=0b/s write=0b/s copies=1
```
Verifying GOIDs

You cannot verify that the global object identifiers (GOIDs) among Vaults and Streamers are correct by comparing the total number of GOIDs on each server. There are actually multiple chains of GOIDs. If you list the GOID chains you can verify that the GOIDs are correct, because listing the GOIDs provides a summary at the end of the listing that reports any issues.

To list the GOIDs, enter the following command:

```
echo 2 > /proc/calypso/tunables/cm_logserverinfo
```

To list all GOID chains, enter the following command:

```
echo 4 > /proc/calypso/tunables/cm_logserverinfo
```

The `/arroyo/log/serverinfo.log.<date>` log file contains information about the GOIDs.

**Note**

There is no need to identify and delete damaged or orphaned GOIDs. CServer repairs any damaged GOIDs. Orphaned GOIDs are deleted when the server reboots.

ATIS Streaming not working for re-ingested content

If a content is manually deleted and re-ingested into the origin server then the same is not notified to the market site and stream request fails for the content. Hence, if any content is manually deleted in the origin server then, the corresponding database records should be deleted from the market site as well. This creates a new mapping with a new set of GOIDs.

Trick-Mode Issues

Verify the trick-mode settings in the CDSM GUI and the Vault setupfile file.

- From the CDSM GUI, choose **Configure > System Level > Ingest Tuning** to view the trick-mode settings.
- To check the trick-mode setting in the setupfile on the Vault, enter the following command:

```
$ grep trick /arroyo/test/setupfile
```

```
trickspeedsv2    4 10 32 -32 -10 -4
```

Check the `/arroyo/log/c2k.log.<date>` log file and the session message logs during playout to verify that the trick-mode files are being streamed.

Name and Notify Services

Ensure that the Name Service IP address and port, and the Notify Service IP address and port are correct.

- Verify that you are able to telnet to the IP address and port for the NameService (port 5000 or port 2000) and the IP address and port for the Notify Service (port 5005 or port 2010). The port numbers are based on whether they are on the same host (5000/5005 ports) or a different server (2000/2010 ports).
- Use the following commands to verify that the ISA configuration is correct:

```
$ cat /home/isa/isa.cfg
```
CORBA Interface

Ensure that the CORBA-related parameters (including the Name and Notify services) are configured correctly. This includes the Content Service and CORBA Event Channel details such as the Content Store, Kind, Content Factory, Event Channel, Content Channel, Factory, and so on.

See the “CORBA Interface” section on page A-35 for more troubleshooting methods for CORBA. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 and the “Configuring the Vault for BMS Connectivity” section on page 4-65 for more information on configuring the CORBA-related parameters.

Cache-Fill Issues

This section covers the following cache-fill issues:

- Tracking Cache-Fill Source
- Rules for ISV Interoperability with Vaults and Streamers
- Network

Tracking Cache-Fill Source

You can track whether or not a GOID for a stream is filling remotely or locally by enabling and tracking it in the fill.log. Streams can share the same GOID; in which case it is not possible to tell which stream is currently filling the data.

To track the cache-fill source of a stream, do the following:

Step 1 Find the stream that is playing in the c2k.log on the Streamer, along with the content that was requested (GOID number).

Step 2 Enable the fill.log on the Caching Nodes the Streamer is mapped to.

`echo 1 >/proc/calypso/tunables/enableFillLog`

Step 3 On the Caching Nodes, use the `tail` command to follow the log and `grep` for the GOID.

Following is an example fill.log:

```
<omitted content>..
18:30:23  44 DISK 000814a4132455c4 0000c1f7 to 00014e3e 0ea6 FINISHED 0x0000f558
18:30:24  4 NET 000864b26ab0a076 3fde3a14 to 3fe86299 3a98 TRUNCATE 0x3fdeb83c
18:30:24  4 NET 000864b26ab0a076 3fde3a14 to 40000000 3a98 FINISHED 0x3fdeb834
18:30:24  4 NET 000864b26ab0a076 3fde3a14 to 3fdeb83c 3a98 CANCEL 0x3fdeb93e
18:30:25  44 DISK 000884b7c94042f4 3ff3730d to 3ffca5d0 3a98 CANCEL 0x3ff3fcb5
18:30:25  43 DISK 000884b7c94042f4 3ff3730d to 3ffca5d0 3a98 FINISHED 0x3ff3fcb5
18:30:27  43 DISK 000814a4132455c4 0000fadb to 0002d79d 0ea6 START delay 14376
18:30:28  43 DISK 000854b26ab11667 3ffd2b92 to 3ffd4198 0ea6 FINISHED 0x3ffd4198
<omitted content>..`
```

START - fill started from DISK or NET
FINISHED - fill finished
CANCEL - fill cancelled
TRUCATE - fill truncated to new ending sector offset
Burst and delay times are in microseconds. Bursts are sent immediately at a high rate. The delay time specifies when to start sending the data at rate, up to 30 seconds into the future.

If no Caching Nodes are reporting fill for the GOID, then the content is being filled from memory.

**Step 4** Disable the fill logs on the Caching Nodes when finished.

echo 0 >/proc/calypso/tunables/enableFillLog

---

### Rules for ISV Interoperability with Vaults and Streamers

The following rules apply for ISVs to interoperate with Vaults and Streamers:

- An ISV can cache-fill both a colocated Streamer and a dedicated remote Streamer.
- An ISV at one location cannot cache-fill a Streamer associated with an ISV at another location.
- Two ISVs can mirror content with each other, but an ISV and a Vault cannot mirror content with each other.
- A Vault cannot cache-fill an ISV.

### Network

**Note** For more network troubleshooting methods, see the “Network” section on page A-31.

---

### Stream Stops Playing at the Same Place or Does Not Play at All

**Cause 1:** Jumbo frames are not supported or configured on the cache-fill network switch.

**Check 1:** Search the c2k.log file for content read errors.

```shell
>>> /arroyo/log//c2k.log.01152008 <=
15-Jan-2008 20:42:33 UTC :out:c2k_p_setcontentbundle: stream 3 localStreamHandlePtr 00000000 remoteServer 00000000
15-Jan-2008 20:42:33 UTC :out:c2k_p_setcontentbundlecontinue: stream 3 localStreamHandle 0
15-Jan-2008 20:42:33 UTC :out:c2k_p_setdestination: stream 3 localStreamHandle 0 ip 0xe0016401 port 10000
15-Jan-2008 20:42:41 UTC :out:igate goid d346434b982851 finished read 0 length e3 lastbytes b4 retries 0 reqlen 0/e3
15-Jan-2008 20:42:41 UTC :err:IGate::ReadClose(goid 0): ERROR: Never saw header
15-Jan-2008 20:42:41 UTC :err:IGate::ReadClose(goid 0): ERROR: Never saw EOF record
15-Jan-2008 20:42:47 UTC :out:igate goid d346434b982851 finished read 0 length e3 lastbytes b4 retries 2 reqlen 0/e3
15-Jan-2008 20:42:47 UTC :err:IGate::ReadClose(goid 0): ERROR: Never saw header
15-Jan-2008 20:42:47 UTC :err:IGate::ReadClose(goid 0): ERROR: Never saw EOF record
15-Jan-2008 20:42:47 UTC :err:IGate::ReadClose(goid 0): ERROR: Never saw EOF record
```

**Check 2:** Ping between the two devices.

Ping between the two devices on the cache-fill VLAN using a packet size greater than 1500 bytes.

**Action 1:** If the ping fails, verify that jumbo frames and cache-fill interfaces are configured correctly.
Verify that jumbo frames are enabled on the switch ports for the cache-fill VLAN, and verify that the cache-fill interfaces are configured correctly on the Streamers and Vaults. See the “Configuring the Servers” section on page 4-128 for information on configuring the cache-fill interfaces.

Streaming and Playout Issues

This section includes the following streaming and playout issues:

- Listing of Streams
- No Streaming
- Poor Video or Audio Quality

Listing of Streams

To monitor streams based on various criteria, go to the Stream Monitor page in the CDSM GUI by clicking Monitor > System Level > Stream Monitor. For more information, see the “Stream Monitor” section on page 5-32.

No Streaming

Some common causes for streaming problems are the following:

- Server is in the process of being offloaded.
- QAM device has no available bandwidth.
- Tuning failure because of one of the following:
  - Error in the ARP table
  - QAM device is down
  - Network problem
- Backoffice is out of synchronization with the VDS ContentStore, resulting in content not being found.

Following are some general methods for troubleshooting stream and playout issues:

- View the /arroyo/log/streamevent.log.<date> file for stream setup activity.
- Check for GOIDs in the /arroyo/log/c2k.log.<date> file.
- Check if the stream setup is using /home/isa/IntegrationTest/list_all_streams or /home/isa/IntegrationTest/list_a_stream.
- View the /home/isa/Berkeley/dumpDB file and use the vi ctnobj.lst command to check that the Vaults are synchronized.
- Check content integrity by looking at the objectStatus for damaged GOIDs.

Stream Not Playing

**Cause 1:** A piece of content is missing.
In this case, a user can typically stream part of the content, but at some point the stream stops and this error is returned in the ANNOUNCE message. The content needs to be validated at the CServer level.

**Action 1:** Set up a stream to play to a multicast address.

If this is successful, then there is a network issue, which is either a default gateway or unreachable remote client. You can verify whether it is successful by looking at the /home/stats/ifstats information.

**Action 2:** If ifstats information does not detect a problem, try streaming to another multicast IP address.

Repeat streaming to a multicast address with different content and, if possible, ingest known good content. Check the protocoltiming.log.<date> for damaged GOIDs by using the following command:

```
$ tail -f protocoltiming.log.<latest date> | grep Goids
```

**Cause 2:** There is a problem reaching the destination QAM device.

The CServer returns the same completion code, so the same error is returned in the announce message. In this case, the content does not stream at all. The play request and play response are separated by about 10 to 15 seconds, instead of the typical subsecond separation. This is because of the ARP timeout process the CServer is going through to reach the destination. After stream response fails, the CServer calls back with the completion code of 3, which causes the “error reading content data” message.

**Action 1:** Check that the interfaces involved in the streaming are up and operating at the correct speed.

Using the CDSM GUI, choose **Monitor > Server Level > NIC Monitor**, choose the IP address of the server, and verify the participating interfaces are up and operating at gigabit Ethernet speeds. For more information, see the “Configuring the Interfaces” section on page 4-123.

**Action 2:** Set up a stream to play to a multicast address.

If this is successful, then there is a network problem, which is either a default gateway or unreachable remote client. You can verify whether it is successful by looking at the /home/stats/ifstats information.

**Action 3:** If streaming to a multicast address is not successful, check that the Vaults can be reached.

Check the /arroyo/log/protocoltiming.log.<date> log file for the number of reachable remote servers. Additionally, if there is a cache-fill issue, you will see a large megabit value for the re-xmit buffer.

You can also check the /arroyo/log/c2k.log.<date> log file for any unreachable Vaults.

**Tuning Failure**

**Cause 1:** Fail to tune error message (Error 104).

A “fail to tune” error message (Error 104 in the /arroyo/log/streamevent.log file) occurs when the CDSM starts a stream, but the stream fails to reach its destination.

**Action 1:** To verify the ARP table, enter the `arp -a` command.

**Action 2:** Verify there are no network problems; for example, reachability, network partition, and so on.

**Action 3:** Look for timeout intervals.

Look for characteristic 10 to 30 second timeout intervals between the stream setup and the stream destroy event messages in the /arroyo/log/c2k.log.<date> file.
**Restarting the ISA Services**

If it is necessary to restart the ISA services, then enter the following commands:

```
$ service isa restart
```

**Poor Video or Audio Quality**

When content is streamed to a client device, if there is no video picture displayed on the client device and the audio is working fine, use the following troubleshooting methods:

- Verify that the source is working properly and that the original content is of good quality.
  - Verify that the appropriate bit rates are being sent from the server using the following command on all Streamers:
    ```
    /home/stats/ifstats
    ```
  - Verify that the content plays locally, and on a test client device (for example, a VLC client).
  - Test playing the content on an alternate player with an AVC plug-in.

- Verify that the VDS is configured correctly.
  - Check the run script in the /arroyo/test/run directory. There is a tunable set for Telenet to stream null packets when the end of the stream is reached. This should be commented out or removed in a non-Telenet environment.
  - The interface that you are using for real-time ingest needs to be configured for the CServer. There are a couple of settings that define the interrupt for the real-time ingest interface and ensure that a single central processing unit (CPU) is responsible for receiving the packets for the ingest. Without these settings, packets can be out of order, which can cause problems with the video picture.

To fix this, use the `cat /proc/interrupts` command to display the interrupts and find the interrupt value associated with the interface you are using for ingest. After you know this value, add the following lines to the /arroyo/test/run script:

```
echo 1 > /proc/irq/<interrupt value>/smp_affinity
echo <interrupt value> > /proc/calypso/test/bypass_disable_irq
```

You can enter these lines at the Linux command line as well. By doing so you do not have to reboot your system for them to take effect. Any content that you have previously ingested should be considered invalid.

See the “No Streaming” section on page A-37 for troubleshooting methods when there are streaming problems.
Session Messaging

All LSCP message requests and responses have the same format, which includes version, transaction ID, op code, status code, stream handle, and data. The LSCP messages are included in the /arroyo/log/LSCPService.log file. Table A-3 describes the LSCP status codes.

Table A-3  LSCP Status Codes

<table>
<thead>
<tr>
<th>State</th>
<th>Code (hexadecimal)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSC_OK</td>
<td>0</td>
<td>Success</td>
</tr>
<tr>
<td>LSC_BAD_REQUEST</td>
<td>10</td>
<td>Invalid request</td>
</tr>
<tr>
<td>LSC_BAD_STREAM</td>
<td>11</td>
<td>Invalid stream handle</td>
</tr>
<tr>
<td>LSC_Wrong_STATE</td>
<td>12</td>
<td>Wrong state</td>
</tr>
<tr>
<td>LSC_UNKNOWN</td>
<td>13</td>
<td>Unknown error</td>
</tr>
<tr>
<td>LSC_NO_PERMISSION</td>
<td>14</td>
<td>Client does not have permission for request</td>
</tr>
<tr>
<td>LSC_BAD_PARAM</td>
<td>15</td>
<td>Invalid parameter</td>
</tr>
<tr>
<td>LSC_NOIMPLEMENT</td>
<td>16</td>
<td>Not implemented</td>
</tr>
<tr>
<td>LSC_NO_MEMORY</td>
<td>17</td>
<td>Dynamic memory allocation failure</td>
</tr>
<tr>
<td>LSC_IMP_LIMIT</td>
<td>18</td>
<td>Implementation limit exceeded</td>
</tr>
<tr>
<td>LSC_TRANSIENT</td>
<td>19</td>
<td>Transient error - reissue</td>
</tr>
<tr>
<td>LSC_NO_RESOURCES</td>
<td>1a</td>
<td>No resources</td>
</tr>
<tr>
<td>LSC_SERVER_ERROR</td>
<td>20</td>
<td>Server error</td>
</tr>
<tr>
<td>LSC_SERVER_FAILURE</td>
<td>21</td>
<td>Server has failed</td>
</tr>
<tr>
<td>LSC_BAD_SCALE</td>
<td>30</td>
<td>Incorrect scale value</td>
</tr>
<tr>
<td>LSC_BAD_START</td>
<td>31</td>
<td>Stream start time does not exist</td>
</tr>
<tr>
<td>LSC_BAD_STOP</td>
<td>32</td>
<td>Stream stop time does not exist</td>
</tr>
<tr>
<td>LSC_MPEG_DELIVERY</td>
<td>40</td>
<td>Unable to deliver MPEG stream</td>
</tr>
<tr>
<td>User-Defined</td>
<td>80–ff</td>
<td>User-defined</td>
</tr>
</tbody>
</table>

Database Issues

This section covers the following database issues and troubleshooting methods:

- Database Replication
- Corruption Recovery

Database Replication

This section covers the following database issues:

- CDSM GUI Does Not Report All the Ingested Content
- Many Log Files
CDSM GUI Does Not Report All the Ingested Content

First, verify that the package has not already expired.

Second, check for index errors in the CDSM database logs, using the following command:

```
$ grep index /arroyo/log/avsdb.log.20071106
```

The example output indicates that the Vault and CDSM databases are not synchronized, possibly because of the server times not being synchronized, a network connectivity issue, a server failure, or some other similar issue.

To check content among Vaults, use the `/home/isa/Berkeley/dumpDB` command.

For resolution, see the “Corruption Recovery” section on page A-42.

Many Log Files

If one of the following conditions exists, it indicates that there were database replication errors:

- There are many log files with a filename similar to log.00000XXXX in the `/home/isa/Berkeley/DATADIR` directory.
- Database could not be started. See the “Services Monitor” section on page 5-46 for more information.
- Bidirectional connections are lost between servers. See the “Required Services Not Starting or Running Correctly” section on page A-27.
- The following error message is listed in the `/arroyo/log/avsdb-err.log.yyyyMMdd` file:

```
tavsdb: unable to allocate memory for mutex; resize mutex region
```

```
# tail -f avsdb-err.log.20081111
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
tavsdb: unable to allocate memory for mutex; resize mutex region
```

- The `/home/isa/Berkeley/DATADIR/REPLAY.db` file increases to several GB.

```
$ ls -ltr
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002824
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002825
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002826
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002837
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002838
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002839
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002841
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002840
-rw-r----- 1 isa isa 10485760 Nov 11 17:46 log.0000002843
```
For resolution, see the “Corruption Recovery” section on page A-42.

Corruption Recovery

Caution

Escalate to tier-three support before making any intrusive database changes.

If the CDSM database is corrupted and the Vault database is not corrupted, do the following:

Step 1 As user root, stop the CDSM database.

```
$ service avsdb stop
Stopping avsdb: [OK]
```

Step 2 Confirm that the database is shut down.

```
# ps -ef | grep avsdb
isa 2646 1 0 Jan09 ? 00:14:50 /arroyo/db/avsdb
root 26088 26059 0 13:23 pts/1 00:00:00 grep avsdb
```

Make sure there is no avsdb process returned. If the avsdb hangs, use the process ID (2646 in the above example) with the `kill` command.

```
# kill -9 2646
```

Check avsdb status using the following command:

```
# service avsdb status
avsdb dead but subsys locked
```

if "avsdb dead but subsys locked" message appears then remove the file /var/lock/subsys/avsdb and start avsdb

```
# service avsdb status
avsdb is stopped
```

Step 3 Delete all files in the /arroyo/db/DATADIR directory.

Step 4 As user root, stop the Vault database.

```
$ service avsdb stop
Stopping avsdb: [OK]
```

Step 5 Confirm that the database is shut down.

```
# ps -ef | grep avsdb
```

Step 6 Copy all files in /arroyo/db/DATADIR directory from the Vault to the CDSM.

Step 7 As user root, restart the Vault database.

```
$ service avsdb start
Starting avsdb: [OK]
```

Step 8 As user root, restart the CDSM database.
$ service avsdb start
Starting avsdb: [OK]
$

Step 9  Check the configuration on the CDSM and make sure no configuration parameters were lost.

Advanced Features and Applications

This section covers the Media Scheduler feature (live multicast ingest) and the Barker Stream feature.

Live Multicast Ingest

Live multicast ingest is available as part of the Media Scheduler feature or the Real-Time Capture feature.

Ingest with Media Scheduler

Using Media Scheduler for live multicast ingest requires the following procedures:

1. Enable live ingest by setting both the Media Scheduler and the Ingest Manager to ON in the CDSM Setup. See the “Initializing the VDS and Activating the Optional Features” section on page 3-3 for more information.

2. Use the CDSM Input Channels page to configure the input channels. See the “Configuring Input Channels” section on page 4-46 for more information.

3. Upload channel schedules by importing the electronic program guide (EPG). See the “Uploading an EPG File” section on page 7-20 for more information.

Ingest without Media Scheduler

Using Real-Time Capture for live multicast ingest requires the following procedures:

1. Enable live ingest by configuring Ingest Manager ON and setting Real-Time Capture Type to Real-Time Capture (non-Media Scheduler) in the CDSM Setup page. Activate the Ingest Manager. Because the Ingest Manager is an optional feature, an activation key is required. See the “Initializing the VDS and Activating the Optional Features” section on page 3-3 for more information.

2. Use the CDSM CallSign Setup page to configure call signs with multicast IP addresses.
Ingest Troubleshooting

If the message “ERROR: Unable to login to the ftp location,” is present in the /arroyo/log/aim.log file, check the FTP server configured in the Ingest Manager by using the `ps -ef | grep ftp` command. If the FTP service is not running, enter the `service vsftpd start` command to start it.

Barker Stream

If you are having issues setting up a barker stream, use the following troubleshooting method. The barker stream runs only on the master Streamer. To identify the master Streamer, use the CDSM Monitor Services page to find the Streamer running the master stream service. See the “Services Monitor” section on page 5-46 for more information. Verify the following three items are present:

- Valid content
- Valid service group
- Valid channel ID

For more information about barker streams, see the “Configuring Barker Stream/Playlists” section on page 4-108.

Frequently Asked Questions

Many of the frequently asked questions (FAQs) responses were based on an ISV system, but guidelines can be easily extrapolated for a Vault and Streamer. This section covers the following topics:

- Reliability and Availability
- Serviceability and Manageability
- Content
- Other

Reliability and Availability

Q. How do I enable stream resiliency?
A. Log in to the CDSM with engineering access. The CDSM Setup page is displayed. For Stream Failover Support, choose “ON” and click Submit. For more information see the “CDSM or VVIM Setup” section on page F-3.

Q. How do I check and make sure the database is running properly?
A. After starting the database, you should see two sockets (listening and non-listening) connecting to the database on each of the remote servers on port 9999. You can check them by using the `netstat -an | grep 9999` command.

For example, the following output of the netstat command shows that the server (172.22.97.194) has both the listening and non-listening sockets binding on port 9999 to echo the four remote servers (172.22.97.192, 172.22.97.193, 172.22.97.195 and 172.22.97.191).

```
# netstat -an | grep 9999
tcp 0 0 172.22.97.194:9999 172.22.97.195:48652 ESTABLISHED
tcp 0 0 172.22.97.194:9999 172.22.97.191:42732 ESTABLISHED
```
If you can not see both listening and non-listening sockets binding on port 9999 for each of the remote servers, the database is not running properly. Check that you have the correct replication group members in your /home/isa/.arroyorc file.

**Serviceability and Manageability**

**Q.** How do I check the calypso server status?

**A.** Log in to the server as root and enter the **cat /proc/calypso/status/server_settings** command.

**Q.** How do I check central processing unit (CPU)?

**A.** Log in to the server as root and enter the **cat /proc/cpuinfo** command.

**Q.** How do I check the ISA server status?

**A.** Log in to the server as root and enter the **/home/isa/IntegrationTest/show_calypso_services** command.

**Q.** How do I check the kernel network driver version?

**A.** Log in to the server as root and list the e1000.ko file to check the date and time it was created using the following command:

```bash
ls -l /lib/modules/<current running kernel name>/kernel/drivers/net/e1000/e1000.ko
```

The following example shows that the e1000.ko file is based on the kernel 2.5.18-53.el5.kernel.2_6_18.2009.01.08.01.

```bash
# ls -l /lib/modules/2.6.18-53.el5.kernel.2_6_18.2009.01.08.01/kernel/drivers/net/e1000/e1000.ko
```

**Q.** How do I stop, start, and, restart the Apache server on the CDSM?

**A.** Log in to the server as root and enter the following commands:

```bash
# service vds-httpd stop
# service vds-httpd start
# service vds-httpd restart
```

**Q.** How do I check the Streamer static ARP table?

**A.** Log in to the server as root and enter the following command:

```bash
# cat /arroyo/test/ArpTable
ip 192.168.2.42 mac 000000000002
ip 192.168.2.43 mac 000000000002
```

**Q.** How do I view the ARP Table dump file?
A. Log in to the server as root and enter the following command:

```
# echo 1 > /proc/calypso/test/arp_dumpstate
```

Q. How do I recover the system from the kernel debugger (KDB) after a reboot?

A. If the server starts the KDB tool instead of rebooting, modify the /etc/grub.conf file as follows:

```
kdb=off panic=1
kernel /boot/vmlinuz-2.4.32avs ro root=/dev/hda1 console=tty0 console=ttyS0,115200
kdb=off panic=1
```

Q. What do I do if the KDB prompt is displayed when the server restarts after a failure?

A. Boot into single user-mode (see the “Kernel Crash” section on page A-17).

Q. How do I destroy an individual ISA stream?

A. Use the Delete button on the Stream Monitor page. See the “Stream Monitor” section on page 5-32 for more information. Alternatively, you can enter the following commands:

```
# su - isa
# cd ~/IntegrationTest
# ./list_all_streams
# cd ~/Streaming/client
# ./run_client
  2 -> Stream
  <name – as retrieved above>
  24 -> Destroy
```

If this does not work, for example, the stream just restarts, then the problem is not in the ISA subsystem.

Q. How do I identify any holes in the content?

A. Log in to the server as root and enter the following commands:

```
# echo 2 > /proc/calypso/tunables/cm_logserverinfo
# cat /arroyo/log/serverinfo.log.01132009
```

Look at the last two lines of output. If there are no holes, the last two lines should be the following:

```
BeingDeleted=0 HasHoles=0 CopyHoles=0 SectorHoles=0
Object Status Check Complete.
```

Q. How do I clear cached video blocks (data cache) on the Streamer?

A. Log in to the server as root and enter the `echo 1 > /proc/calypso/test/clearcache` command.

Q. How do I clear the data cache in memory?

A. Log in to the server as root and enter the `echo 1 > /proc/calypso/test/clearmem` command.

**Note**

Make sure there are no streams running before you use this command. If there are streams, the data cache in memory is not cleared.

Q. How do I destroy all streams?

A. Log in to the server as root and enter the following commands:

```
# su - isa
```
# cd ~/IntegrationTest
# ./destroy_all_streams

All sessions are removed, and upon restarting the services, all streams that do not have an associated session are stopped.

Q. How do I delete an individual stream from the database?
A. Log in to the server as root and enter the following commands:

```bash
# su - isa
# cd ~/Berkeley
# ./bsql

2 -> Streamer Database
1 -> Stream Object
6 -> Get All
3 -> Delete
1 -> Name
```

After the colon for the Name command, name everything that was listed in the **Get All** command.

Q. How do I destroy all streams when none of the above methods work?
A. Log in to the server as root and enter the following commands:

```bash
[root@ssv3 root]# service avsdb stop
Stopping avsdb: [OK]

[root@ssv3 root]# ps -ef |grep avs

Wait for all avs processes to stop, then reboot the server.
[root@ssv3 root]# reboot
```

Q. How do I check the routing table and gateway?
A. Log in to the server as root and check the file /arroyo/test/RoutingTable.

```bash
# cat /arroyo/test/RoutingTable
default gateway 192.169.131.250
network 192.169.131.0 netmask 255.255.255.0 gateway 0.0.0.0
default cache gateway 192.169.131.250
local cache network 192.169.131.0 netmask 255.255.255.0
```

**Content**

Q. How do I get information on a content stream that seems corrupted; for example, there is macroblocking, the stream stops and restarts, and so on?
A. Log in to the server as root and enter the following commands:

```bash
# echo 2 > /proc/calypso/tunables/cm_logserverinfo
# cat /arroyo/log/serverinfo.log.01132009
```

Check the last set of output lines to see the current content states.

```
Object Count=37708 LengthUnknown=0
CouldNotRepair=0 IsDamaged=0 BeingRepaired=0 BeingCopied=0
needCrcValidate=37708 isFragFlag=0 isFragd=0 Defrag=0 Smooth=0
BeingFilled=0 OutOfService=0 NeedsISACheck=0
BeingDeleted=0 HasHoles=0 CopyHoles=0 SectorHoles=0
```
Object Status Check Complete.

Q. How do I know if a content object has “holes”?
A. Log in to the server as root and view the /var/log/debugmessages. There is a message in the debug messages file about the GOID and the content holes.

Q. How do I delete ingests that are “stuck” in the active ingest state?
A. Log in to the Vault as root and enter the following commands:

```
# su - isa
# cd ~/Berkeley
# ./bsql
```

Choose the following options, one for each menu:

a. VAULT DATABASE  
b. CONTENT OBJECT  
c. DELETE

Enter the content ID of the “stuck” ingest, then choose the exit option for each menu until you are back at the Linux prompt.

Q. How do I manually ingest content from the command line?
A. Log in to the Vault as root and enter the following commands:

```
# su - isa
# cd ~/SDClient
```

Update the SDClient.cfg file with the local IP address.

```
# ./sdClient
```

Follow the SDClient menus.

Other

Q. How do I view the CServer code configuration file?
A. Log in to the server as root and enter the cat /arroyo/test/<server type>/setupfile command. The server type is one of the following: vault, streamer, or ssv.

```
# cat /arroyo/test/<server type>/setupfile
```

# CServer core configuration. Changes to this file require a server reboot.

```
llocal 0 0 2 remote 0 0 2 fill 3 1 maxrate 900000 localip 0c0a80040
localip 0c0a80040
e1000 adapters: maxrate 965
e1000 0: streaming 1 fill 0
e1000 1: streaming 1 fill 0
e1000 3: streaming 0 fill 1

streamer 1 vault 1
serverid  64
groupid  64
maxpacketsize  1316
management  eth0
```
ingest eth0
trickspeedsv2 10 0 0 0 0 0 0
ftpout if eth0 max utilization mbps 0 max sessions 0
test 4

Q. How do I know if a subsystem on a server is overloaded?
A. View the .arroyo.log.protocoltiming.log.<date> file. When you see the “COST REQUEST NO CAPACITY:” message, it means that the server is running out of capacity and it cannot accept new streaming requests.

Also, when you see a line in the /arroyo/log/c2k.log.<date> file that says the following:

01-May-2007 17:40:44 UTC :err:ServeStream::reserveStream: refused streamhandle 4 for goid a445c9780e7f8f due to its load 3750, current load 0

This entry typically means there are no stream ports linked. In the ten-second snapshot of the /arroyo/log/protocoltiming.log.<date> file, there is a line that shows load values for each of the major subsystems (LAN, memory, CPU, and so on). More than likely one of the subsystems is at 100, which is the subsystem that is having the problem.

Q. How do I enable debugging?
A. Log in to the server as root and enter the following commands:

```
# su - isa
# cd ~/StreamsDriver
# touch DEBUGGING_ON
# ~/IntegrationTest/debugging_on_off
# ./stop_driver
# ./run_driver
```

Q. How do I update the remote servers from /arroyo/test/RemoteServers?
A. Log in to the server as root and enter the following commands:

```
# echo 1 > /proc/calypso/test/readremoteservers
```

---

**VDS Content Quality Guidelines**

This section covers the following topics:

- Supported Elementary Stream Types
- Scrambling
- Transport Bit Rate
- Stream Length
- Format Restrictions
- Preferred Formats

---

**Supported Elementary Stream Types**

Video-only, audio-only (as well as audio streams with only a few or occasional video frames) and data-only streams are supported in addition to the customary multiplex of both audio and video.
Scrambling

The transport layer cannot be scrambled, meaning the transport header and any adaptation field must be in the clear. Streams whose Elementary Streams (ESs) are fully scrambled, including all start codes, are capable of being ingested and streamed, but are incapable of trick play.

For trick-play capability, the following cannot be scrambled:

- Packetized Elementary Stream (PES) headers
- Program Association Table (PAT) and Program Map Table (PMT)
- Closed-caption data (if scrambled, the data is incorrectly included in tricks)

Transport Bit Rate

All transport streams are constant bit rate (CBR). Variable bit rate (VBR) is not supported. The maximum bit rate is 30 Mbps. There is no minimum bit rate. The ES video bit rate, as specified in the MPEG-2 sequence header, is ignored. The bit rate of an individual ES is not significant. The aggregate transport stream must have a constant bit rate. An individual ES (particularly, the video ES), however, does not have this bit rate requirement.

Streams containing MPEG-2 or AVC video are expected to conform to the appropriate buffer models spelled out in ISO/IEC 13818-1 and 14496-10.

Stream Length

All content must be at least one second in length. If ingested as a single item, the content must be under 12 hours in duration or under 30 GB in size, whichever occurs first. If the content is chunked, the overall size of the content must be under 120 GB, while there is no restriction on the duration of the content.

Format Restrictions

Following are the format restrictions for Advanced Video Coding (AVC), H.264, and MPEG-4:

- Sequence Parameter Set (SPS) seq_parameter_set_id flag must be zero.
- SPS pic_order_count_type flag must be zero.
- SPS seq_scaling_matrix_present_flag must be zero.
- SPS profile_idc flag must only be Baseline, Main, or High profile.

Preferred Formats

Using the following guidelines improves the performance of the system, the quality of the tricks, and the trick transitions.

1. All content should be encoded as a Single Program Transport Stream (SPTS). If multiple programs must be included (for example, a Picture-in-Picture [PIP] stream), ensure that the “real” program is encoded with the lowest program number.
2. All content should follow the process ID (PID) numbering specified in the Content Encoding Profiles 2.0 Specification (MD-SP-VOD-CEP2.0-I02-070105), section 6.7.5. Regardless, the audio and video PIDs should be above 0x20.

3. All content should be preceded with a Program Association Table (PAT) and then a Program Map Table (PMT), and then a Program Clock Reference (PCR) before the first audio or video frame. Optionally, the discontinuity bit can be set.

4. All content should use the same PID for both PCR and video.

5. All content should begin with a closed Group Of Pictures (GOP) for MPEG-2 or with an Instantaneous Decoder Refresh (IDR) frame for AVC. This first frame is always accompanied by a sequence header for MPEG-2 or by an SPS for AVC.

6. To guarantee relatively smooth looking trick modes, the minimum I/IDR-frame frequency should be eight per second. If the minimum trick speed is 4x or less, the I/IDR-frame frequency should be at least two per second. In no case should two I/IDR frames be more than two seconds apart.

7. Each I-frame should be preceded by a sequence header and GOP header if any exist for an MPEG-2 video. Each I/IDR frame should be preceded by an SPS and Picture Parameter Set (PPS) for H.264 video.

8. Avoid mixing frame data from multiple video frames in the same transport packet. Specifically, no data belonging to the prior frame exists following the Packetized Elementary Stream (PES) packet header for the next frame. Breaking this rule may improve encoding efficiency slightly, but degrades the quality of the tricks on certain set-top boxes (STBs).

9. All content must be encoded as a single sequence, with no changes in horizontal or video resolutions, or changes in encoding parameters in the middle of the content.

10. The GOP size may be variable, but GOPs should generally not exceed two seconds. Using longer GOPs may improve encoding efficiency, but the quality of lower-speed tricks (3x, 4x) may suffer.

11. No more than four B-frames should be used between each pair of I-frames or P-frames.

12. There should be no continuity counter errors in the content.

13. There should be no discontinuities in the content, other than an optional one on the first PCR.

14. The accuracy requirements for PCRs, +/- five parts per million (5 ppm), as stated in ISO/IEC 13818-1, must be adhered to throughout the stream.

15. Audio and video are expected not to overflow the appropriate target buffer model specified.

16. A reasonable bit rate to use when encoding MPEG-2 standard definition (SD) video is 3.75 Mbps.

17. A reasonable bit rate to use when encoding MPEG-2 high definition (HD) video is 15 Mbps.

18. Appropriate bit rates for carriage of AVC are still being established, and while they are expected to be at least half the bit rates of MPEG-2, no specific recommendations can be offered.

19. There may be PIDs in the content that are not specified in the PMT. Such use is beyond the scope of this document.

20. All PATs and PMTs should be identical, with the same version number throughout.

21. The VDS support up to 30 Mbps MPEG-2 video encoding.

22. Content is filtered out if three occurrences of one-second synchronization lost are identified.

23. Content is filtered out if five seconds of null frames are identified.
Creating Bulk Import/Export Configuration Files

This appendix describes the Bulk Import/Export Configuration feature and consists of the following topics:

- Introduction, page B-1
- Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files, page B-8
- Creating Stream Destination Bulk Import/Export Configuration Files, page B-15
- Creating Route Table XML Configuration Files, page B-16
- Creating SNMP Agent XML Configuration Files, page B-17
- Creating DNS Server XML Configuration Files, page B-18
- Creating NTP Server XML Configuration Files, page B-19
- Creating Logging XML Configuration Files, page B-20
- Creating Syslog XML Configuration Files, page B-22
- Creating Server Setup XML Configuration Files, page B-23
- Server-Level Configuration XML Schema, page B-27
- System-Level Configuration XML Schema, page B-45
- Array-Level Configuration XML Schema, page B-67

Introduction

Bulk Import/Export Configuration provides a method of configuring common parameters for all the VDS servers at one time by using an XML file to import or restore system-level or server-level configuration settings.

Note

To enable the optional Bulk Import/Export Configuration feature with the Backup and Restore capabilities, see the “Bulk Import/Export Configuration” section on page F-5.

The Bulk Import/Export Configuration option provides the following features:

- Server-Level Configuration Backup and Restore
- System Level Configuration Backup and Restore
Server-Level Configuration Backup and Restore

The Server-Level Configuration Backup and Restore feature provides exportation of the server-level VDS server configuration parameters, as well as comprehensive import of all server-level configuration settings.

Through the Server-Level Configuration Backup and Restore feature, it is possible to backup (export) the server-level configuration for a VDS server or all VDS servers in a system, modify the parameters as appropriate, and restore (import) the configuration to a new VDS server or all the VDS servers in a new system.

The Server-Level Configuration Backup and Restore feature provides backup and restore functions of all server-level configuration parameters for the following groups:

- All VDS servers
- VDS servers of a certain type (Streamers, Vaults, Caching Nodes, or ISVs)
- Individual VDS servers
- Subset of all VDS servers or VDS servers of a certain type

In addition to complete backup and restore functionality for all server-level configurations for the specified VDS servers, this feature also offers export and import on each server-level configuration page for all VDS servers managed by the CDSM (or VVIM).

**Note**

The restore and import function do not overwrite any pre-existing server-level configuration settings (only new settings are imported or restored) on the following pages:

- Route Table
- Server DNS
- NTP Server

The restore and import function overwrite all pre-existing settings on the following server-level configuration pages:

- Server Setup (and Interface Setup)
- SNMP Agent
- Logging
- Syslog

**Note**

The following System-Level configuration pages that are included in the Server-Level XML schema are obsolete and replaced in the System-Level XML schema:

- QAM Gateway
- Headend Setup (For gigabit Ethernet streaming mode. ASI streaming headend configuration is imported as part of the QAM Gateway page configuration importing.)
- Stream Destination
Appendix B      Creating Bulk Import/Export Configuration Files

Introduction

Adding a New VDS Server into an Existing System

Previously, when adding a new VDS server into an existing system, after running the vdsinit script to install the software, and the vdsconfig script to initially configure some basic settings, the user needed to log in to the CDSM GUI and manually enter the configuration on each server-level page.

With the addition of the Server-Level Configuration Backup and Restore feature, after running the vdsinit and vdsconfig scripts, the user can back up the server-level configuration on a VDS server that has similar configuration, modify the values for the new VDS server, and restore the configuration on the new VDS server. After which, only the System-Level and Array-Level configuration needs to be completed for the new VDS server.

Replacing a VDS Server and Complete Backup and Restore

The Server-Level Configuration Backup and Restore feature can be used in combination with the existing procedures for a complete backup and restore of a VDS server. For a complete backup and restore of the configuration files and database files for a VDS server, continue to use the procedure documented in the Cisco VDS-TV Installation, Upgrade, and Maintenance Guide, Release 3.9 which uses the preupgrade script to back up the entire VDS server and the upgrade script to restore the entire VDS server. These procedures are used to perform a complete backup and restore of the same VDS server, and to replace a VDS server. As a preparation to the backup procedures, you need to write down the following settings:

- Management IP address
- Gateway IP address network mask
- Network mask
- Stream and cache interface IP address
- Streamer ID
- Stream Group ID
- QAM Gateways (System Level configuration)
- Route tables
- Name Service IP address (ISA only) (System and Array Level configuration)
- Ingest IP address
- Service Groups (System Level configuration)

Now, with the Server-Level Configuration Backup and Restore feature and the System-Level Configuration Backup and Restore feature, you can back up all the server-level and system-level configuration settings for the VDS server, and just write down the Array Level settings.

Using the Server-Level Configuration Backup and Restore Feature

Using the Backup and Restore feature involves the following tasks:

- Backup or Restore Specific VDS Servers
- Export or Import Specific Server-Level Configurations
Introduction

Backup or Restore Specific VDS Servers

The Backup & Restore page offers the ability to backup all the server-level configuration parameters of specific VDS servers, modify the configuration parameters as appropriate, and restore all the server-level configuration parameters to new VDS servers.

After the backup XML configuration file has been created, you can edit the values of the configuration parameters as appropriate for the new VDS server or all VDS servers in the new system.

To backup specific VDS servers, do the following:

**Step 1** Choose Maintain > Software > Backup & Restore. The Backup and Restore page is displayed.

**Step 2** From the Select Server type to backup drop-down list, select one of the following:
- All
- SSV (known as ISV)
- Vault
- Streamer
- Cache (known as Caching Node)

All servers of the type selected are listed in the Servers to backup field.

**Step 3** To remove individual servers from the Servers to backup field to the Server List field, do the following:

a. Select the servers by clicking each one while holding down the Ctrl key, or use the Shift key to select a contiguous group of servers, or if only one server needs to be selected, simply click the server,

b. Click the left arrow (<) and all the selected servers are moved to the Server list field.

To move servers from the Server List field to the Servers to backup field, use the same methods to select the servers and click the right arrow (>).

To move all the servers to the Server List field, use the double-left arrow (<<). To move all the servers to the Servers to backup field, use the double-right arrow (>>).

**Step 4** After all the servers to be backed up are in the Servers to backup field, click Backup.

The File Download dialog box is displayed offering you the options to Save, Open, or Cancel the action. Save presents a Save As dialog box, which allows you to select the location and filename used to save the XML file. Open opens the XML file.

To restore a backup, do the following:

**Step 1** Choose Maintain > Software > Backup & Restore. The Backup and Restore page is displayed.

**Step 2** In the Restore Server Configurations section at the bottom of the page, click Browse to navigate to the XML configuration file to restore. The Choose File to Upload dialog box is displayed.

The last location that was accessed to either save a backup or restore a configuration file is remembered.

**Step 3** Navigate to the location where the XML configuration file was saved, select it, and click Open.

The file location and filename are displayed in the Configuration File Location text box.

**Step 4** Click Restore.
The backup configuration XML file is restored to all servers specified in the backup.

Export or Import Specific Server-Level Configurations

The Import/Export Server Configuration option offers the ability to export or import the specific server-level configuration for all the VDS servers. The following Server Level configuration pages have the export and import feature:

- Server Setup (includes the Interface Setup configurations)
- Route Table
- SNMP Agent
- Server DNS
- NTP Server
- Logging
- Syslog
- FSI Setup (RTSP environments)
- RTSP Setup (RTSP environments)

After the export XML configuration file has been created, you can edit the values of the configuration parameters as appropriate for the new VDS server or all VDS servers in the new system.

To export or import the configuration of a specific Server Level page for all VDS servers, do the following:

**Step 1** Display the Server Level configuration page by choosing Configure > Server Level and one of the following:
- Server Setup
- Route Table
- SNMP Agent
- Server DNS
- NTP Server
- Logging
- Syslog
- FSI Setup (RTSP environments only)
- RTSP Setup (RTSP environments only)

**Step 2** To export the configuration to an XML file, click Export.

The File Download dialog box is displayed offering you the options to Save, Open, or Cancel the action. Save presents a Save As dialog box, which allows you to select the location and filename used to save the XML file. Open opens the XML file.

**Step 3** To import a configuration XML file, do the following:

a. Click Browse to navigate to the XML configuration file to restore. The Choose File to Upload dialog box is displayed.
The last location that was accessed to either save a backup or restore a configuration file is remembered.

b. Navigate to the location where the XML configuration file was saved, select it, and click **Open**. The file location and filename are displayed in the Configuration File Location text box.

c. Click **Import**. The backup configuration XML file is restored to all servers specified in the XML configuration file.

---

**System Level Configuration Backup and Restore**

All system-level configuration pages are supported, except Error Repair, Billing Service, and Shared Recorder Setting.

Through the System-Level Configuration Backup and Restore feature, it is possible to backup (export) the system-level configuration for all VDS servers in a system, modify the parameters as appropriate, and restore (import) the configuration to all VDS servers in the existing system or all VDS servers in a new system.

In addition to complete backup and restore functionality for all system-level configurations for the specified VDS servers, this feature also offers export and import on each system-level configuration page for all VDS servers managed by the CDSM (or VVIM).

---

**Note**
The restore and import function does not overwrite the following pre-existing system-level configuration settings:

- System DNS
- System NTP
- Host Service
- QAM Gateway
- Stream Destination
- Parent/Child Service Groups
- Input Channels
- Output Channels
- Source Output Port

All other supported pre-existing system-level configuration settings are overwritten.

---

**Using the System-Level Configuration Backup and Restore Feature**

Using the Backup and Restore feature involves the following tasks:

- **Backup or Restore Specific VDS Servers**
- **Export or Import Specific Server-Level Configurations**
Appendix B      Creating Bulk Import/Export Configuration Files

Introduction

Backup or Restore the System-Level Configuration

The Backup & Restore page offers the ability to backup all the system-level configuration parameters of
the VDS, modify the configuration parameters as appropriate, and restore all the system-level
configuration parameters to a new VDS or the existing VDS.

To backup the system-level configuration, do the following:

Step 1 Choose Maintain > Software > Backup & Restore. The Backup and Restore page is displayed.
Step 2 From the Configuration Level drop-down list, select System Level.
Step 3 Click Backup.
The File Download dialog box is displayed offering you the options to Save, Open, or Cancel the action.
Save presents a Save As dialog box, which allows you to select the location and filename used to save
the XML file. Open opens the XML file.

To restore a backup, do the following:

Step 1 Choose Maintain > Software > Backup & Restore. The Backup and Restore page is displayed.
Step 2 Click Browse to navigate to the XML configuration file to restore. The Choose File to Upload dialog
box is displayed.
The last location that was accessed to either save a backup or restore a configuration file is remembered.
Step 3 Navigate to the location where the XML configuration file was saved, select it, and click Open.
The file location and filename are displayed in the Configuration File Location text box.
Step 4 Click Restore.
The backup configuration XML file is restored to all servers specified in the backup.

Export or Import Specific System-Level Configurations

The Import/Export System Configuration option offers the ability to export or import the specific
system-level configuration for all the VDS servers. All system-level configuration pages are supported,

After the export XML configuration file has been created, you can edit the values of the configuration
parameters as appropriate for the existing VDS or a new VDS.

To export or import the configuration of a specific System Level configuration page for all VDS servers,
do the following:

Step 1 Display the System Level configuration page by choosing Configure > System Level and one of the
supported system-level configuration pages.
Step 2 To export the configuration to an XML file, click Export.
The File Download dialog box is displayed offering you the options to Save, Open, or Cancel the action.
Save presents a Save As dialog box, which allows you to select the location and filename used to save
the XML file. Open opens the XML file.
Step 3  To import a configuration XML file, do the following:

a. Click Browse to navigate to the XML configuration file to restore. The Choose File to Upload dialog box is displayed.

   The last location that was accessed to either save a backup or restore a configuration file is remembered.

b. Navigate to the location where the XML configuration file was saved, select it, and click Open.

   The file location and filename are displayed in the Configuration File Location text box.

c. Click Import.

   The backup configuration XML file is restored to all servers specified in the XML configuration file.

Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files

The QAM Gateway Bulk Import/Export Configuration files differ depending on the type of streaming mode and the type of QAM. The required elements correspond to the fields on the associated CDSM GUI page.

Note  Before you can use the Bulk Import/Export Configuration feature to configure QAM gateways and the headend setup, all Streamers must be associated with a Stream Group and the Streaming Mode must be configured. For more information on Stream Groups, see the “Configuring Stream Groups” section on page 4-75 or the “Grouping Stream Groups into VHOs” section on page 4-70 for VVI. For more information on the Streaming Mode, see the “Configuring the Streamer for BMS Connectivity” section on page 4-59 or the “Configuring VHO ISA Settings” section on page 4-71 for VVI.

QAM Gateway and Headend Setup Bulk Import/Export Configuration for Gigabit Ethernet Streaming

If the streaming mode is set to gigabit Ethernet, the QAM Gateway page is used to identify the QAM device (IP address), and to configure the preference settings for the Stream Groups. For Layer 2 networks, there is an option to specify the MAC address of the next hop for each Stream Group and Streamer.
## QAM Gateway with Gigabit Ethernet Streaming Bulk Import/Export Configuration

Table B-1 describes the Bulk Import/Export Configuration file elements for QAM gateways for gigabit Ethernet streaming.

### Table B-1  Bulk Configuration File Elements for Gigabit Ethernet QAM Gateways

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QAMLList</td>
<td>QAM</td>
<td>—</td>
<td>Marks beginning and end of QAM devices for gigabit Ethernet streaming.</td>
</tr>
<tr>
<td>QAM</td>
<td>QAMStreamGroupPreference</td>
<td>IP</td>
<td>Defines a QAM device.</td>
</tr>
<tr>
<td>QAMStreamGroupPreference</td>
<td>Server</td>
<td>StreamGroupName, QAMMAC, Preference</td>
<td>Maps Stream Groups to the QAM device. The QAMMAC attribute is optional and is only used for Layer 2 networks.</td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID, GroupID, QAMMAC</td>
<td>Optional. Maps the MAC address of the QAM device to a Streamer. Only used in Layer 2 networks.</td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring QAM Gateways” section on page 4-9. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

**Note**

The ServerID and GroupID attributes can have the value **ALL** if the configuration applies to all servers in the VDS. The **ALL** value is case sensitive.

The Preference attribute can have a value of **High** or **None**. These values are case sensitive.

Following is an example of the Bulk Configuration file used to populate the QAM Gateway page when gigabit Ethernet is configured as the streaming mode. The example is for a Layer 2 network and uses the optional QAMMAC attribute for the QAMStreamGroupPreference and the optional Server element to specify the next hop MAC address.

```xml
<QAMLList xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <QAM IP="1.1.1.1">
    <QAMStreamGroupPreference StreamGroupName="SG1" QAMMAC="00:00:00:00:00:01" Preference="High">
      <Server ServerID="50" GroupID="1" QAMMAC="00:00:00:00:00:11" />
    </QAMStreamGroupPreference>
    <QAMStreamGroupPreference StreamGroupName="SG2" QAMMAC="00:00:00:00:00:02" Preference="None">
      <Server ServerID="55" GroupID="1" QAMMAC="00:00:00:00:00:11" />
    </QAMStreamGroupPreference>
    <QAMStreamGroupPreference StreamGroupName="SG3" QAMMAC="00:00:00:00:00:03" Preference="None"/>
  </QAM>
  <QAM IP="1.1.1.2">
    <QAMStreamGroupPreference StreamGroupName="SG1" QAMMAC="00:00:00:00:00:01" Preference="None"/>
    <QAMStreamGroupPreference StreamGroupName="SG2" QAMMAC="00:00:00:00:00:02" Preference="High"/>
  </QAM>
</QAMLList>
```
Headend Setup with Gigabit Ethernet Streaming Bulk Import/Export Configuration

The Bulk Import/Export Configuration file for the Headend Setup page consist of service groups to Stream Groups mappings. Table B-2 defines the Bulk Configuration file elements for headend setup for gigabit Ethernet streaming.

Table B-2      Bulk Configuration File Elements for Gigabit Ethernet Streaming Headend Setup

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headend</td>
<td>ServiceGroupToStreamGroup</td>
<td>—</td>
<td>Marks beginning and end of mapping of service groups to Stream Groups</td>
</tr>
<tr>
<td>ServiceGroupToStreamGroup</td>
<td>—</td>
<td>ServiceGroup StreamGroup</td>
<td>Maps service groups to Stream Groups</td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring the Headend Setup” section on page 4-14. Following is an example of the Bulk Configuration file used to populate the Headend Setup page when gigabit Ethernet is configured as the streaming mode:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Headend xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <ServiceGroupToStreamGroup ServiceGroup="4666669" StreamGroup="NEWTEST" />
  <ServiceGroupToStreamGroup ServiceGroup="4666668" StreamGroup="s234" />
  <ServiceGroupToStreamGroup ServiceGroup="4666664" StreamGroup="NEWTEST" />
  <ServiceGroupToStreamGroup ServiceGroup="4666663" StreamGroup="s234" />
  <ServiceGroupToStreamGroup ServiceGroup="1666669" StreamGroup="NEWTEST123" />
  <ServiceGroupToStreamGroup ServiceGroup="1666668" StreamGroup="s234" />
  <ServiceGroupToStreamGroup ServiceGroup="1666664" StreamGroup="NEWTEST" />
  <ServiceGroupToStreamGroup ServiceGroup="1666663" StreamGroup="s234" />
</Headend>
```

QAM Gateway and Headend Setup Bulk Import/Export Configuration for ASI Streaming

If the streaming mode is set to ASI, the QAM Gateway page is used to identify the QAM device by the IP address and the QAM type, and configure the preference settings for the Stream Groups. For Layer 2 networks, there is an option to specify the MAC address of the next hop for each Stream Group and Streamer.

Table B-3 defines the Bulk Configuration file elements for QAM gateways and headend setup for ASI streaming.

Table B-3      Bulk Configuration File Elements for ASI QAM Gateways

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headend</td>
<td>QAM</td>
<td>—</td>
<td>Marks beginning and end of ASI QAM devices and the headend setup configuration</td>
</tr>
<tr>
<td>Tag</td>
<td>Elements</td>
<td>Attributes</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>QAM</td>
<td>QAMStreamGroupPreference</td>
<td>IP</td>
<td>Defines an ASI QAM device. The Type attribute must be one of the types listed for the associated element (QAMLink, QAMASILink, or GQAMLink). The GQAMPot attribute is only used for QAM Type GQAM.</td>
</tr>
<tr>
<td></td>
<td>QAMLink</td>
<td>Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GQAMPot</td>
<td></td>
</tr>
<tr>
<td>QAMStreamGroupPreference</td>
<td>Server</td>
<td>StreamGroupName</td>
<td>Maps Stream Groups to the QAM device. The QAMMAC attribute is optional and is only used for Layer 2 networks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAMMAC Preference</td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>Optional. Maps the MAC address of a QAM device to a Streamer. Only used in Layer 2 networks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GroupID</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>QAMMAC</td>
<td></td>
</tr>
<tr>
<td>QAMLink</td>
<td>—</td>
<td>Status</td>
<td>Used for the following ASI QAM devices:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ServiceGroup</td>
<td>• NSG-8108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RFNumber</td>
<td>• NSG-9000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• NSG-9116</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• GQAM Shared</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SA xDQA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MOTO Sem8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MOTO Sem12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• GigE Gen (with up to 24 service groups and RF ports)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The Type attribute value of the QAM element must be one of the above values.</td>
</tr>
<tr>
<td>QAMASILink</td>
<td>TSIDOutLink</td>
<td>Number</td>
<td>Used for the following ASI QAM device types:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSIDIn</td>
<td>• NSG-8204</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSIDInLinkStatus</td>
<td>• Prisma-seq</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Prisma-even</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Prisma-odd</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Path1-CX810</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The Type attribute value of the QAM element must be one of the above values.</td>
</tr>
<tr>
<td>GQAMLink</td>
<td>TSIDOutLink</td>
<td>ServiceGroup</td>
<td>Used for the GQAM ASI QAM device. The Type attribute value of the QAM element must be GQAM.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RFNumber</td>
<td></td>
</tr>
</tbody>
</table>
Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files

Appendix B      Creating Bulk Import/Export Configuration Files

Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files

For information about the values of the attributes, see the “Configuring QAM Gateways” section on page 4-9 and the “Configuring the Headend Setup” section on page 4-14. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

Note

The ServerID and GroupID attributes can have the value **ALL** if the configuration applies to all servers in the VDS. The **ALL** value is case sensitive.

The TSIDInLinkStatus, TSIDOutLinkStatus, and Status attributes have either the **Enable** value or the **Disable** value. The **Enable** and **Disable** values are case sensitive.

The ASI#, RFNumber, and Index attributes have specific numbers that correspond to the Headend Setup page for the QAM Type. They are as follows:

- **ASI#**—Possible value range is 1–4
- **RFNumber**—For QAMLink, the possible value range is 1–18. For GQAMLink, the possible value range for the RFNumber and associated Index attribute are the following:
  - RFNumber 1—Index attribute values of 0–3
  - RFNumber 2—Index 4–7
  - RFNumber 3—Index 8–11
  - RFNumber 4—Index 12–15

The Preference attribute can have a value of **High** or **None** for single-site steering, and a value of **High Medium, Low**, or **None** for multi-site steering. These values are case sensitive.

Following is an example of the Bulk Configuration file used to populate the QAM Gateway page and Headend Setup page when ASI is configured as the streaming mode:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Headend

xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs" >

<QAM IP='191.191.191.191' Type='NSG-8204'>
  <QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC='00:00:00:00:00:01' Preference='High'/>

  <QAMASILink Number='1' TSIDIn='771' TSIDInLinkStatus='Enable'>
    <TSIDOutLink TSIDOut='91' TSIDOutLinkStatus='Enable' ServiceGroup='1'/>
    <TSIDOutLink TSIDOut='92' TSIDOutLinkStatus='Enable' ServiceGroup='2'/>
    <TSIDOutLink TSIDOut='93' TSIDOutLinkStatus='Enable' ServiceGroup='3'/>
    <TSIDOutLink TSIDOut='94' TSIDOutLinkStatus='Enable' ServiceGroup='4'/>
  </QAMASILink>

  <QAMASILink Number='2' TSIDIn='7721' TSIDInLinkStatus='Enable'>
    <TSIDOutLink TSIDOut='9111' TSIDOutLinkStatus='Enable' ServiceGroup='11'/>
  </QAMASILink>

</QAM>
```

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSIDOutLink</td>
<td>—</td>
<td>Index, TSIDOut,</td>
<td>Maps TSID In to TSID Outs for applicable ASI QAM devices.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSIDOutLinkStatus, ServiceGroup, RFNumber</td>
<td></td>
</tr>
</tbody>
</table>

Table B-3      Bulk Configuration File Elements for ASI QAM Gateways (continued)
Appendix B  Creating Bulk Import/Export Configuration Files

Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files

```xml
<TSIDOutLink TSIDOut="9211" TSIDOutLinkStatus="Enable" ServiceGroup="21"/>
<TSIDOutLink TSIDOut="9311" TSIDOutLinkStatus="Enable" ServiceGroup="31"/>
<TSIDOutLink TSIDOut="9411" TSIDOutLinkStatus="Enable" ServiceGroup="41"/>
</QAMASILink>

<QAMASILink Number="3" TSIDIn="7731" TSIDInLinkStatus="Enable">
<TSIDOutLink TSIDOut="9131" TSIDOutLinkStatus="Enable" ServiceGroup="113"/>
<TSIDOutLink TSIDOut="9231" TSIDOutLinkStatus="Enable" ServiceGroup="213"/>
<TSIDOutLink TSIDOut="9331" TSIDOutLinkStatus="Enable" ServiceGroup="313"/>
<TSIDOutLink TSIDOut="9431" TSIDOutLinkStatus="Enable" ServiceGroup="413"/>
</QAMASILink>

<QAMASILink Number="4" TSIDIn="7741" TSIDInLinkStatus="Enable">
<TSIDOutLink TSIDOut="9141" TSIDOutLinkStatus="Enable" ServiceGroup="1134"/>
<TSIDOutLink TSIDOut="9241" TSIDOutLinkStatus="Enable" ServiceGroup="2134"/>
<TSIDOutLink TSIDOut="9341" TSIDOutLinkStatus="Enable" ServiceGroup="3134"/>
<TSIDOutLink TSIDOut="9441" TSIDOutLinkStatus="Enable" ServiceGroup="4134"/>
</QAMASILink>
</QAM>

<QAM IP="191.191.191.192" Type="NSG-8204">
<QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC="00:00:00:00:00:02" Preference="Low"/>
<QAMStreamGroupPreference StreamGroupName="s234" QAMMAC="00:00:00:00:00:02" Preference="High"/>
</QAM>

<QAMASILink Number="1" TSIDIn="772" TSIDInLinkStatus="Enable">
<TSIDOutLink TSIDOut="911" TSIDOutLinkStatus="Enable" ServiceGroup="1"/>
<TSIDOutLink TSIDOut="921" TSIDOutLinkStatus="Enable" ServiceGroup="2"/>
<TSIDOutLink TSIDOut="931" TSIDOutLinkStatus="Enable" ServiceGroup="3"/>
<TSIDOutLink TSIDOut="941" TSIDOutLinkStatus="Enable" ServiceGroup="4"/>
</QAMASILink>
</QAM>

<QAM IP="201.191.191.193" Type="NSG-9000">
<QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC="00:00:00:00:00:03" Preference="None"/>
<QAMStreamGroupPreference StreamGroupName="s234" QAMMAC="00:00:00:00:00:03" Preference="High"/>
</QAM>

<QAMLINK Status="Enable" ServiceGroup="11" RNumber="1"/>
<QAMLINK Status="Enable" ServiceGroup="22" RNumber="2"/>
<QAMLINK Status="Enable" ServiceGroup="33" RNumber="3"/>
<QAMLINK Status="Enable" ServiceGroup="44" RNumber="4"/>
<QAMLINK Status="Enable" ServiceGroup="55" RNumber="5"/>
<QAMLINK Status="Enable" ServiceGroup="66" RNumber="6"/>
<QAMLINK Status="Enable" ServiceGroup="77" RNumber="7"/>
<QAMLINK Status="Enable" ServiceGroup="88" RNumber="8"/>
<QAMLINK Status="Enable" ServiceGroup="99" RNumber="9"/>
<QAMLINK Status="Enable" ServiceGroup="101" RNumber="10"/>
<QAMLINK Status="Enable" ServiceGroup="102" RNumber="11"/>
<QAMLINK Status="Enable" ServiceGroup="103" RNumber="12"/>
<QAMLINK Status="Enable" ServiceGroup="104" RNumber="13"/>
<QAMLINK Status="Enable" ServiceGroup="105" RNumber="14"/>
<QAMLINK Status="Enable" ServiceGroup="106" RNumber="15"/>
<QAMLINK Status="Enable" ServiceGroup="107" RNumber="16"/>
<QAMLINK Status="Enable" ServiceGroup="108" RNumber="17"/>
<QAMLINK Status="Enable" ServiceGroup="109" RNumber="18"/>
</QAM>

<QAM IP="129.12.12.29" Type="GQAM" GQAMPort="1000">
<QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC="00:00:00:00:00:03" Preference="None"/>
<QAMStreamGroupPreference StreamGroupName="s234" QAMMAC="00:00:00:00:00:03" Preference="High"/>
```
Creating QAM Gateway and Headend Setup Bulk Import/Export Configuration Files

```xml
<QAM Link="111" RFNumber="1">
    <TSIDOutLink Index="0" TSIDOut="88" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="1" TSIDOut="881" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="2" TSIDOut="882" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="3" TSIDOut="883" TSIDOutLinkStatus="Enable"/>
</QAMLink>

<QAMLink ServiceGroup="222" RFNumber="2">
    <TSIDOutLink Index="4" TSIDOut="5543" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="5" TSIDOut="5542" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="6" TSIDOut="5567" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="7" TSIDOut="6688" TSIDOutLinkStatus="Enable"/>
</QAMLink>

<QAMLink ServiceGroup="333" RFNumber="3">
    <TSIDOutLink Index="8" TSIDOut="3313" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="9" TSIDOut="3315" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="10" TSIDOut="3316" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="11" TSIDOut="3353" TSIDOutLinkStatus="Enable"/>
</QAMLink>

<QAMLink ServiceGroup="444" RFNumber="4">
    <TSIDOutLink Index="12" TSIDOut="887" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="13" TSIDOut="8883" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="14" TSIDOut="8866" TSIDOutLinkStatus="Enable"/>
    <TSIDOutLink Index="15" TSIDOut="7765" TSIDOutLinkStatus="Enable"/>
</QAMLink>

<QAM IP="191.191.191.191" Type="NSG-8204">
    <QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC="00:00:00:00:00:01" Preference="High"/>

    <QAMASILink Number="1" TSIDIn="771" TSIDInLinkStatus="Enable">
        <TSIDOutLink TSIDOut="91" TSIDOutLinkStatus="Enable" ServiceGroup="1"/>
        <TSIDOutLink TSIDOut="92" TSIDOutLinkStatus="Enable" ServiceGroup="2"/>
        <TSIDOutLink TSIDOut="93" TSIDOutLinkStatus="Enable" ServiceGroup="3"/>
        <TSIDOutLink TSIDOut="94" TSIDOutLinkStatus="Enable" ServiceGroup="4"/>
    </QAMASILink>

    <QAMASILink Number="2" TSIDIn="7721" TSIDInLinkStatus="Enable">
        <TSIDOutLink TSIDOut="9111" TSIDOutLinkStatus="Enable" ServiceGroup="11"/>
        <TSIDOutLink TSIDOut="9211" TSIDOutLinkStatus="Enable" ServiceGroup="21"/>
        <TSIDOutLink TSIDOut="9311" TSIDOutLinkStatus="Enable" ServiceGroup="31"/>
        <TSIDOutLink TSIDOut="9411" TSIDOutLinkStatus="Enable" ServiceGroup="41"/>
    </QAMASILink>

    <QAMASILink Number="3" TSIDIn="7731" TSIDInLinkStatus="Enable">
        <TSIDOutLink TSIDOut="9131" TSIDOutLinkStatus="Enable" ServiceGroup="113"/>
        <TSIDOutLink TSIDOut="9231" TSIDOutLinkStatus="Enable" ServiceGroup="213"/>
        <TSIDOutLink TSIDOut="9331" TSIDOutLinkStatus="Enable" ServiceGroup="313"/>
        <TSIDOutLink TSIDOut="9431" TSIDOutLinkStatus="Enable" ServiceGroup="413"/>
    </QAMASILink>

    <QAMASILink Number="4" TSIDIn="7741" TSIDInLinkStatus="Enable">
        <TSIDOutLink TSIDOut="9141" TSIDOutLinkStatus="Enable" ServiceGroup="1134"/>
        <TSIDOutLink TSIDOut="9241" TSIDOutLinkStatus="Enable" ServiceGroup="2134"/>
        <TSIDOutLink TSIDOut="9341" TSIDOutLinkStatus="Enable" ServiceGroup="3134"/>
        <TSIDOutLink TSIDOut="9441" TSIDOutLinkStatus="Enable" ServiceGroup="4134"/>
    </QAMASILink>

</QAM>

<QAM IP="191.191.191.200" Type="NSG-8204">
    <QAMStreamGroupPreference StreamGroupName="NEWTEST" QAMMAC="00:00:00:00:00:01" Preference="High"/>
    <QAMStreamGroupPreference StreamGroupName="s234" QAMMAC="00:00:00:00:00:03" Preference="Low"/>
</QAM>
</Headend>
```
Creating Stream Destination Bulk Import/Export Configuration Files

If the Stream Destination is set to IPTV, the Stream Destination page is displayed instead of the QAM Gateway and Headend Setup pages. The Stream Destination feature is available only for single-site steering and in ISA environments that use gigabit Ethernet streaming as the streaming mode. For more information, see the “Stream Destination” section on page F-4. The Stream Destination page provides a way to associate subnetworks with Stream Groups.

Table B-4 defines the Bulk Configuration file elements for Stream Destination.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>StreamDestinationList</td>
<td>StreamDestination</td>
<td>—</td>
<td>Marks beginning and end of subnets defined for IPTV.</td>
</tr>
<tr>
<td>StreamDestination</td>
<td>StreamGroupPreference</td>
<td>SubnetAddress</td>
<td>Defines a subnet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SubnetMask</td>
<td></td>
</tr>
<tr>
<td>StreamGroupPreference</td>
<td>—</td>
<td>StreamGroupName</td>
<td>Maps Stream Groups to the subnet address.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preference</td>
<td></td>
</tr>
</tbody>
</table>

Table B-4 Bulk Configuration File Elements for Stream Destination

For information about the values of the attributes, see the “Configuring Stream Destinations” section on page 4-22.

The Preference attribute can have a value of **High** or **None**. These values are case sensitive.

Following is an example of the Bulk Configuration file used to populate the Stream Destination page:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<StreamDestinationList
  xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <StreamDestination SubnetAddress="132.2.2.0" SubnetMask="255.255.255.0">
    <StreamGroupPreference StreamGroupName="NEWTEST" Preference="High"/>
    <StreamGroupPreference StreamGroupName="s234" Preference="None"/>
  </StreamDestination>
  <StreamDestination SubnetAddress="130.10.10.0" SubnetMask="255.255.255.0">
    <StreamGroupPreference StreamGroupName="NEWTEST" Preference="High"/>
    <StreamGroupPreference StreamGroupName="s234" Preference="None"/>
  </StreamDestination>
</StreamDestinationList>
```
Creating Route Table XML Configuration Files

The Route Table page allows you to define multiple subnets on a server. For more information, see the “Configuring the Recorder” section on page 4-135.

Table B-5 defines the XML Configuration file elements for the Route Table page.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RouteTableList</td>
<td>RouteTable</td>
<td>—</td>
<td>Marks beginning and end of defined routes.</td>
</tr>
<tr>
<td>RouteTable</td>
<td>Server</td>
<td>—</td>
<td>Defines a route table.</td>
</tr>
<tr>
<td></td>
<td>Route</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>Identifies the VDS server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GroupID</td>
<td></td>
</tr>
<tr>
<td>Route</td>
<td>—</td>
<td>Network</td>
<td>Defines a route.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SubnetMask</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gateway</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RouteType</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VIP</td>
<td></td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring the Recorder” section on page 4-135. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

Note

- The ServerID and GroupID attributes can have the value ALL if the configuration applies to all servers in the VDS. The ALL value is case sensitive.
- The RouteType attributes possible values are: cServer Source, cServer Destination, or Stream Control. These values are case sensitive.

Following is an example of the XML Configuration file used to populate the Route Table page (VIP is not configured in this example):

```xml
<?xml version="1.0" encoding="UTF-8"?>
<RouteTableList xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <RouteTable>
    <Server ServerID="ALL" GroupID="ALL"/>
    <Route Network="3.4.3.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="3.4.5.0" SubnetMask="255.255.255.0" Gateway="1.1.1.1" RouteType="cServer Source"/>
    <Route Network="3.4.6.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="4.2.7.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="5.2.8.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="2.2.9.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="6.2.10.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
    <Route Network="7.2.21.0" SubnetMask="255.255.255.0" Gateway="1.1.1.10" RouteType="cServer Source"/>
  </RouteTable>
</RouteTableList>
```
Creating SNPMP Agent XML Configuration Files

The SNMP Agent page is used to configure SNMP communication. Table B-6 defines the XML Configuration file elements for the SNMP Agent page.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNMPAgentList</td>
<td>SNMPAgent</td>
<td>—</td>
<td>Marks beginning and end of defined SNMP agents.</td>
</tr>
<tr>
<td>SNMPAgent</td>
<td>Server</td>
<td>—</td>
<td>Defines an SNMP agent.</td>
</tr>
<tr>
<td></td>
<td>SNMPCommunity</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SNMPTrapStation</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SNMPVACM</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SNMPUSM</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID, GroupID</td>
<td>Identifies the VDS server.</td>
</tr>
<tr>
<td>SNMPCommunity</td>
<td>—</td>
<td>Name, Permissions</td>
<td>Defines the community for the SNMP agent.</td>
</tr>
<tr>
<td>SNMPTrapStation</td>
<td>—</td>
<td>TrapStation, Version, TrapCommunity</td>
<td>Defines the trap station for the SNMP agent.</td>
</tr>
<tr>
<td>SNMPVACM</td>
<td>—</td>
<td>User, Access, Authentication, OID</td>
<td>Defines a View-Based Access Control Model (VACM) user.</td>
</tr>
<tr>
<td>SNMPUSM</td>
<td>—</td>
<td>—</td>
<td>Defines a User-Based Security Model (USM) user.</td>
</tr>
</tbody>
</table>
For information about the values of the attributes, see the “Configuring the SNMP Agent” section on page 4-140. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

The ServerID and GroupID attributes can have the value ALL if the configuration applies to all servers in the VDS. The ALL value is case sensitive. The Permission attribute can have the value of Read-Only or Read-Write.

Following is an example of the XML Configuration file used to populate the SNMP Agent page (only SNMPv2c is configured in the example):

```xml
<?xml version="1.0" encoding="UTF-8"?>
<SNMPAgentList
    xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs"
    >
  <SNMPAgent Contact="TestContact" Location="TestLocation">
    <Server ServerID="ALL" GroupID="ALL"/>
    <SNMPCommunity Name="public" Permissions="Read-Only"/>
    <SNMPCommunity Name="public2" Permissions="Read-Only"/>
    <SNMPTrapStation TrapStation="77.77.77.77" Version="v1"/>
    <SNMPTrapStation TrapStation="177.77.77.77" Version="v2"/>
  </SNMPAgent>

  <SNMPAgent Contact="XXXX" Location="YYYY">
    <Server ServerID="71" GroupID="1111"/>
    <Server ServerID="72" GroupID="1111"/>
    <Server ServerID="73" GroupID="1111"/>
    <Server ServerID="74" GroupID="1111"/>
    <Server ServerID="75" GroupID="1111"/>
    <SNMPCommunity Name="XXXX" Permissions="Read-Only"/>
    <SNMPCommunity Name="YYYY" Permissions="Read-Only"/>
    <SNMPTrapStation TrapStation="5.99.99.9" Version="v1"/>
    <SNMPTrapStation TrapStation="55.77.77.77" Version="v2"/>
  </SNMPAgent>
</SNMPAgentList>
```

### Creating DNS Server XML Configuration Files

The Server DNS page is used to configure the DNS servers. Table B-7 defines the XML Configuration file elements for the Server DNS page.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNSList</td>
<td>DNS</td>
<td>—</td>
<td>Marks the beginning and ending of the DNS settings.</td>
</tr>
<tr>
<td>DNS</td>
<td>Server DomainSuffix DNSServer</td>
<td>—</td>
<td>Defines the DNS server settings.</td>
</tr>
<tr>
<td>Server</td>
<td>— ServerID GroupID</td>
<td>Identifies the VDS server.</td>
<td></td>
</tr>
</tbody>
</table>
Creating NTP Server XML Configuration Files

The NTP Server page is used to configure the NTP servers. Table B-8 defines the XML Configuration file elements for the NTP Server page.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTPServerList</td>
<td>NTPServer</td>
<td>—</td>
<td>Marks the beginning and ending of the NTP settings.</td>
</tr>
<tr>
<td>NTPServer</td>
<td>Server</td>
<td>NTPServerIP</td>
<td>—</td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GroupID</td>
<td></td>
</tr>
<tr>
<td>NTPServerIP</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
For information about the values of the attributes, see the “Configuring the Server Level NTP” section on page 4-144. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

The ServerID and GroupID attributes can have the value ALL if the configuration applies to all servers in the VDS. The ALL value is case sensitive.

Following is an example of the XML Configuration file used to populate the NTP Server page:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<NTPServerList
    xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
    <NTPServer>
        <Server ServerID="ALL" GroupID="ALL"/>
        </NTPServer>
    </NTPServerList>
```

Creating Logging XML Configuration Files

The Server-Level Logging page is used to configure the logging. Table B-9 defines the XML Configuration file elements for the Server-Level Logging page.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LogConfigList</td>
<td>LogConfig</td>
<td>—</td>
<td>Marks the beginning and ending of the logging settings.</td>
</tr>
<tr>
<td>LogConfig</td>
<td>Server Facility</td>
<td>—</td>
<td>Defines the logging.</td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>Identifies the VDS server.</td>
</tr>
<tr>
<td>Facility</td>
<td>debug-flags</td>
<td>name</td>
<td>Defines the logging facility.</td>
</tr>
<tr>
<td></td>
<td>debug-flags</td>
<td>local-log</td>
<td></td>
</tr>
<tr>
<td></td>
<td>debug-flags</td>
<td>remote-log</td>
<td></td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring the Server Level Logging” section on page 4-147. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

The ServerID and GroupID attributes can have the value ALL if the configuration applies to all servers in the VDS. The ALL value is case sensitive.
Following is an example of the XML Configuration file used to populate the Server-Level Logging page:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<LogConfigList xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <LogConfig>
    <Server ServerID="11" GroupID="2529"/>
    <Facility name="avs_launch" local-log="" remote-log=""></Facility>
    <Facility name="avsdob" local-log="" remote-log="/"></Facility>
    <Facility name="bwm" local-log="informational" remote-log="DISABLE"></Facility>
    <Facility name="c2k" local-log="" remote-log="/"></Facility>
    <Facility name="ev_auth" local-log="" remote-log="/"></Facility>
    <Facility name="http" local-log="/" remote-log="/"></Facility>
    <Facility name="redir" local-log="/" remote-log="/"></Facility>
    <Facility name="rtsp" local-log="/" remote-log="/"></Facility>
    <Facility name="rtspmonitor" local-log="/" remote-log="/"></Facility>
    <Facility name="statsd" local-log="error" remote-log="DISABLE"></Facility>
    <Facility name="stream_event" local-log="/" remote-log="/"></Facility>
    <Facility name="stream_trace" local-log="/" remote-log="/"></Facility>
    <Facility name="utils" local-log="/" remote-log="/"></Facility>
    <Facility name="vqes_cp" local-log="informational" remote-log="DISABLE"></Facility>
    <Facility name="wmsvr" local-log="/" remote-log="/"></Facility>
  </LogConfig>

  <LogConfig>
    <Server ServerID="13" GroupID="2529"/>
    <Facility name="avs_launch" local-log="" remote-log="/"></Facility>
    <Facility name="avsdob" local-log="/" remote-log="/"></Facility>
    <Facility name="bwm" local-log="/" remote-log="/"></Facility>
    <Facility name="c2k" local-log="/" remote-log="/"></Facility>
    <Facility name="ev_auth" local-log="/" remote-log="/"></Facility>
    <Facility name="http" local-log="/" remote-log="/"></Facility>
    <Facility name="redir" local-log="/" remote-log="/"></Facility>
    <Facility name="rtsp" local-log="/" remote-log="/"></Facility>
    <Facility name="rtspmonitor" local-log="/" remote-log="/"></Facility>
    <Facility name="statsd" local-log="/" remote-log="/"></Facility>
    <Facility name="stream_event" local-log="/" remote-log="/"></Facility>
    <Facility name="stream_trace" local-log="/" remote-log="/"></Facility>
    <Facility name="utils" local-log="/" remote-log="/"></Facility>
    <Facility name="vqes_cp" local-log="/" remote-log="/"></Facility>
    <Facility name="wmsvr" local-log="/" remote-log="/"></Facility>
  </LogConfig>
</LogConfigList>
```
Creating Syslog XML Configuration Files

The Server-Level Syslog page is used to configure the syslog settings. Table B-10 defines the XML Configuration file elements for the Server-Level Syslog page.

Table B-10  XML Configuration File Elements for Server-Level Syslog

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SyslogConfigList</td>
<td>SyslogConfig</td>
<td>—</td>
<td>Marks the beginning and ending of the syslog settings.</td>
</tr>
<tr>
<td>SyslogConfig</td>
<td>Server</td>
<td>RemoteLogging</td>
<td>Defines the logging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IPAddress</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Port</td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>Identifies the VDS server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GroupID</td>
<td></td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring the Server Level Syslog” section on page 4-149. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

Note

The ServerID and GroupID attributes can have the value ALL if the configuration applies to all servers in the VDS. The ALL value is case sensitive.

Following is an example of the XML Configuration file used to populate the Server-Level Syslog page:

```xml
<?xml version="1.0" encoding="utf-8"?>
<SyslogConfigList xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <SyslogConfig RemoteLogging='Enable' IPAddress='10.74.17.82' Port='123'>
    <Server ServerID='13' GroupID='2529' />
  </SyslogConfig>
  <SyslogConfig RemoteLogging='Enable' IPAddress='10.74.17.17' Port='514'>
    <Server ServerID='27' GroupID='2529' />
  </SyslogConfig>
  <SyslogConfig RemoteLogging='Enable' IPAddress='10.74.17.28' Port='514'>
    <Server ServerID='28' GroupID='2529' />
  </SyslogConfig>
</SyslogConfigList>
```
Creating Server Setup XML Configuration Files

The Server Setup page is used to configure the VDS server settings. The elements and attributes vary depending on the type of VDS server (Vault, Caching Node, Streamer, or ISV). The XML Configuration File for the Server Setup also includes the settings on the Interface Setup page. Table B-11 defines the XML Configuration file elements for the Server Setup and Interface Setup page.

Table B-11  XML Configuration File Elements for Server Setup and Interface Setup

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ServerConfigList</td>
<td>VaultServerConfig</td>
<td>PartNumber</td>
<td>Marks the beginning and ending of the server settings.</td>
</tr>
<tr>
<td></td>
<td>StreamerServerConfig</td>
<td>HostName</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CacheServerConfig</td>
<td>ArrayID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SSVServerConfig</td>
<td>JumboCFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSCPMarkingMethod</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DualCAS</td>
<td></td>
</tr>
<tr>
<td>VaultServerConfig</td>
<td>Server</td>
<td>PartNumber</td>
<td>Defines the Vault settings.</td>
</tr>
<tr>
<td></td>
<td>SimpleDSCPMarking</td>
<td>HostName</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CustomDSCPMarking</td>
<td>ArrayID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>InterfaceConfig</td>
<td>JumboCFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSCPMarkingMethod</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DualCAS</td>
<td></td>
</tr>
<tr>
<td>CacheServerConfig</td>
<td>Server</td>
<td>PartNumber</td>
<td>Defines the Caching Node settings.</td>
</tr>
<tr>
<td></td>
<td>SimpleDSCPMarking</td>
<td>HostName</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CustomDSCPMarking</td>
<td>ArrayID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>InterfaceConfig</td>
<td>JumboCFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSCPMarkingMethod</td>
<td></td>
</tr>
<tr>
<td>StreamerServerConfig</td>
<td>Server</td>
<td>PartNumber</td>
<td>Defines the Streamer settings.</td>
</tr>
<tr>
<td></td>
<td>SimpleDSCPMarking</td>
<td>HostName</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CustomDSCPMarking</td>
<td>ArrayID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>InterfaceConfig</td>
<td>JumboCFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSCPMarkingMethod</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DualCAS</td>
<td></td>
</tr>
</tbody>
</table>
Creating Server Setup XML Configuration Files

Table B-11  XML Configuration File Elements for Server Setup and Interface Setup

<table>
<thead>
<tr>
<th>Tag</th>
<th>Elements</th>
<th>Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSVServerConfig</td>
<td>Server</td>
<td>PartNumber</td>
<td>Defines the ISV settings.</td>
</tr>
<tr>
<td></td>
<td>SimpleDSCPMarking</td>
<td>HostName</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CustomDSCPMarking</td>
<td>ArrayID</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>NullStream</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>StunPlayErrorDelay</td>
<td></td>
</tr>
<tr>
<td>InterfaceConfig</td>
<td></td>
<td>StunPlayTimeout</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SourceIP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TransportPortStart</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TransportPortEnd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CachePort</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TCPTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>StreamerIsCache</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>JumboSFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>JumboCFrames</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VaultMirrorCopies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>VaultLocalCopies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DSCPMarkingMethod</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DualCAS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DefaultGateway</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FTPOutInterface</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FTPOutBandwidth</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FTPOutSession</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TTL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MaxNoOfInterfaces</td>
<td></td>
</tr>
<tr>
<td>Server</td>
<td>—</td>
<td>ServerID</td>
<td>Identifies the VDS server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GroupID</td>
<td></td>
</tr>
<tr>
<td>SimpleDSCPMarking</td>
<td>—</td>
<td>ControlDSCP</td>
<td>Defines simple DSCP marking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DataDSCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>StreamDSCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HTTPDSCP</td>
<td></td>
</tr>
<tr>
<td>CustomDSCPMarking</td>
<td>—</td>
<td>ControlTraffic</td>
<td>Defines custom DSCP marking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>StreamTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HTTPTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>HighestPriorityRxTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CommittedRateLostPktRecovery</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CommittedRateTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MirroringLostPktRecovery</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MirroringLiveIngestTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DriveFailureRepairTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MirroringTraffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LowestPriorityDataSmoothingTraffic</td>
<td></td>
</tr>
<tr>
<td>InterfaceConfig</td>
<td>—</td>
<td>Name</td>
<td>Defines interface settings on VDS server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>IPAddress</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SubnetMask</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TransportPort</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CachePort</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FTP</td>
<td></td>
</tr>
</tbody>
</table>

For information about the values of the attributes, see the “Configuring the Servers” section on page 4-128 and the “Configuring the Interfaces” section on page 4-123. The ServerID and GroupID attributes are assigned during the initial configuration of the server and are displayed as server ID and group ID on the Server Setup page. For more information, see the “Configuring the Servers” section on page 4-128.

**Note**

The ServerID and GroupID attributes can have the value **ALL** if the configuration applies to all servers in the VDS. The **ALL** value is case sensitive.

Following is an example of the XML Configuration file used to populate the Server Setup page and Interface Setup page (only Vaults and Streamers are configured in this example):

```xml
<?xml version="1.0" encoding="utf-8"?>
<ServerConfigList xmlns="http://www.cisco.com/schemas/VCPBU/VDS-TV/R0/ciscowebsvcs">
  <VaultServerConfig ArrayID="0" SourceIP="" CachePort="" VaultLocalCopies="0" VaultMirrorCopies="2" TTL="32"
```
Creating Server Setup XML Configuration Files

```xml
<Server ServerID="91" GroupID="9499" />  
<SimpleDSCPMarking ControlDSCP="0" DataDSCP="0" />
<InterfaceConfig Name="eth0" Type="Management" IPAddress="10.78.178.91" SubnetMask="255.255.255.0" TransportPort="" Number="0" FTP="Disable" />
<InterfaceConfig Name="eth1" Type="Ingest" IPAddress="192.168.100.91" SubnetMask="255.255.255.0" TransportPort="" Number="1" FTP="Disable" />
<InterfaceConfig Name="eth2" Type="Cache" IPAddress="192.169.101.2" TransportPort="" Number="2" FTP="Disable" />
<InterfaceConfig Name="eth3" Type="Cache" IPAddress="192.169.101.3" TransportPort="" Number="3" FTP="Disable" />
<InterfaceConfig Name="eth4" Type="Cache" IPAddress="192.169.101.4" TransportPort="" Number="4" FTP="Disable" />
<InterfaceConfig Name="eth5" Type="Cache" IPAddress="192.169.101.5" TransportPort="" Number="5" FTP="Disable" />
<InterfaceConfig Name="eth6" Type="Cache" IPAddress="192.169.101.6" TransportPort="" Number="6" FTP="Disable" />
<InterfaceConfig Name="eth7" Type="Cache" IPAddress="192.169.101.7" TransportPort="" Number="7" FTP="Disable" />
<InterfaceConfig Name="eth8" Type="Cache" IPAddress="192.169.101.8" TransportPort="" Number="8" FTP="Disable" />
<InterfaceConfig Name="eth9" Type="Cache" IPAddress="192.169.101.9" TransportPort="" Number="9" FTP="Disable" />

<Server ServerID="92" GroupID="9499" />  
<SimpleDSCPMarking ControlDSCP="0" DataDSCP="0" />
<InterfaceConfig Name="eth0" Type="Management" IPAddress="10.78.178.92" SubnetMask="255.255.255.0" TransportPort="" Number="0" FTP="Disable" />
<InterfaceConfig Name="eth1" Type="Ingest" IPAddress="192.168.100.92" SubnetMask="255.255.255.0" TransportPort="" Number="1" FTP="Enable" />
<InterfaceConfig Name="eth2" Type="Cache" IPAddress="192.169.101.10" TransportPort="" Number="2" FTP="Disable" />
<InterfaceConfig Name="eth3" Type="Cache" IPAddress="192.169.101.11" TransportPort="" Number="3" FTP="Disable" />
<InterfaceConfig Name="eth4" Type="Cache" IPAddress="192.169.101.12" TransportPort="" Number="4" FTP="Disable" />
<InterfaceConfig Name="eth5" Type="Cache" IPAddress="192.169.101.13" TransportPort="" Number="5" FTP="Disable" />
<InterfaceConfig Name="eth6" Type="Cache" IPAddress="192.169.101.14" TransportPort="" Number="6" FTP="Disable" />
<InterfaceConfig Name="eth7" Type="Cache" IPAddress="192.169.101.15" TransportPort="" Number="7" FTP="Disable" />
<InterfaceConfig Name="eth8" Type="Cache" IPAddress="192.169.101.16" TransportPort="" Number="8" FTP="Disable" />
<InterfaceConfig Name="eth9" Type="Cache" IPAddress="192.169.101.17" TransportPort="" Number="9" FTP="Disable" />
```

Creating Server Setup XML Configuration Files

```xml
<InterfaceConfig Name="eth3" Type="Stream/Cache" IPAddress="192.169.101.31" TransportPort="" CachePort="" Number="3" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth4" Type="Stream/Cache" IPAddress="192.169.101.32" TransportPort="" CachePort="" Number="4" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth5" Type="Stream/Cache" IPAddress="192.169.101.33" TransportPort="" CachePort="" Number="5" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth6" Type="Stream/Cache" IPAddress="192.169.101.34" TransportPort="" CachePort="" Number="6" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth7" Type="Stream/Cache" IPAddress="192.169.101.35" TransportPort="" CachePort="" Number="7" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth8" Type="Stream/Cache" IPAddress="192.169.101.36" TransportPort="" CachePort="" Number="8" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth9" Type="Stream/Cache" IPAddress="192.169.101.37" TransportPort="" CachePort="" Number="9" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth10" Type="Stream/Cache" IPAddress="192.169.101.38" TransportPort="" CachePort="" Number="10" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth11" Type="Stream/Cache" IPAddress="192.169.101.39" TransportPort="" CachePort="" Number="11" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth12" Type="Stream/Cache" IPAddress="192.169.101.40" TransportPort="" CachePort="" Number="12" FTP="Disable" />
```

```xml
<InterfaceConfig Name="eth13" Type="Stream/Cache" IPAddress="192.169.101.41" TransportPort="" CachePort="" Number="13" FTP="Disable" />
```

```xml
</StreamServerConfig>
```

```xml
<StreamServerConfig TTL="32" ArrayID="1" HostName="S2-97" PartNumber="CDE220-2S3-C" NullStream="Enable"
```

```xml
SourceIP="192.168.207.65" TransportPortStart="48879" TransportPortEnd="48879" CachePort="48879"
```

```xml
StreamerIsCache="Disable" JumboSFrames="Disable" JumboCFrames="Disable" DSCPMarkingMethod="Simple"
```

```xml
DualCAS="Disable" DefaultGateway="10.78.178.1" MaxNoOfInterfaces="14"
```

```xml
<Server ServerID="97" GroupID="9499" />
```

```xml
<SimpleDSCPMarking ControlDSCP="0" DataDSCP="0" StreamDSCP="0" HTTPDSCP="0" />
```

```xml
</StreamServerConfig>
```

```xml
<StreamServerConfig TTL="32" ArrayID="1" HostName="S3-98" PartNumber="CDE220-2S3-C" NullStream="Enable"
```

```xml
SourceIP="192.168.207.65" TransportPortStart="48879" TransportPortEnd="48879" CachePort="48879"
```

```xml
StreamerIsCache="Disable" JumboSFrames="Disable" JumboCFrames="Disable" DSCPMarkingMethod="Simple"
```

```xml
DualCAS="Disable" DefaultGateway="10.78.178.1" MaxNoOfInterfaces="14"
```

```xml
<Server ServerID="98" GroupID="9499" />
```

```xml
<SimpleDSCPMarking ControlDSCP="0" DataDSCP="0" StreamDSCP="0" HTTPDSCP="0" />
```

```xml
</StreamServerConfig>
```
Server-Level Configuration XML Schema

The Server-Level Configuration XML schema file describes and dictates the content of the Server-Level Configuration XML file. The ciscowebsvc_bulk_config.xsd file contains the XML schema.

The following System-Level configuration pages that are included in the Server-Level XML schema are obsolete and replaced in the System-Level XML schema:

- QAM Gateway
- Headend Setup (For gigabit Ethernet streaming mode. ASI streaming headend configuration is imported as part of the QAM Gateway page configuration importing.)
- Stream Destination

<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ws="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs"
targetNamespace="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs">
  <!-- Configure/Server/ elements -->
  <xs:element name="Server">
    <xs:complexType>
      <xs:attribute name="ServerID" type="xs:string" use="required" />
      <xs:attribute name="GroupID" type="xs:string" use="required" />
      <xs:attribute name="QAMMAC" type="xs:string" />
    </xs:complexType>
  </xs:element>
  <!-- Configure/Server/RouteTables/ elements -->
</xsd:schema>
<xs:element name="Route">
  <xs:complexType>
    <xs:attribute name="Network" type="xs:string" />
    <xs:attribute name="SubnetMask" type="xs:string" />
    <xs:attribute name="Gateway" type="xs:string" />
    <xs:attribute name="RouteType" type="xs:string" />
    <xs:attribute name="VIP" type="xs:string" />
    <xs:attribute name="VLAN" type="ws:Vlan" />
  </xs:complexType>
</xs:element>

<xs:element name="RouteTable">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:Route" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="RouteTableList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:RouteTable" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/Server/SNMP/ elements -->

<xs:element name="SNMPCommunity">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string" />
    <xs:attribute name="Permissions" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="SNMPTrapStation">
  <xs:complexType>
    <xs:attribute name="TrapStation" type="xs:string" />
    <xs:attribute name="Version" type="xs:string" />
    <xs:attribute name="TrapCommunity" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="SNMPVACM">
  <xs:complexType>
    <xs:attribute name="User" type="xs:string" />
    <xs:attribute name="Access" type="xs:string" />
    <xs:attribute name="Authentication" type="xs:string" />
    <xs:attribute name="OID" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="SNMPUSM">
  <xs:complexType>
    <xs:attribute name="User" type="xs:string" />
    <xs:attribute name="Authentication" type="xs:string" />
    <xs:attribute name="AuthenticationPassword" type="xs:string" />
    <xs:attribute name="Encryption" type="xs:string" />
    <xs:attribute name="EncryptionPassword" type="xs:string" />
  </xs:complexType>
</xs:element>
<xs:element name="SNMPAgent">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SNMPCommunity" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SNMPTrapStation" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SNMPVACM" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SNMPUSM" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="Contact" type="xs:string" />
    <xs:attribute name="Location" type="xs:string" />
    <xs:attribute name="DefaultTrapCommunity" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="SNMPAgentList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:SNMPAgent" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/Server/RTSP/ elements -->

<xs:element name="RTSPClient">
  <xs:complexType>
    <xs:attribute name="ReceivePort" type="ws:NotNullPort" />
    <xs:attribute name="SendPort" type="ws:NotNullPort" />
    <xs:attribute name="ReceiveBuffer" type="ws:EnumReceiveBuffer" />
    <xs:attribute name="Model" type="ws:EnumRTSPDeploymentType" />
    <xs:attribute name="Transport" type="ws:EnumTransport" />
    <xs:attribute name="Transport" type="ws:EnumTransport" />
  </xs:complexType>
</xs:element>

<xs:element name="RTSPSetup">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:RTSPClient" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="MasterStreamingIP" type="ws:IsValidIP" />
    <xs:attribute name="LoopingSessionTimeout" type="xs:nonNegativeInteger" />
    <xs:attribute name="SessionInactivityTimeout" type="xs:nonNegativeInteger" />
    <xs:attribute name="BackofficeTimeout" type="xs:nonNegativeInteger" />
    <xs:attribute name="RTSPServerIP" type="ws:IsValidIP" />
    <xs:attribute name="RTSPServerPort" type="ws:NotNullPort" />
    <xs:attribute name="ReconnectIP" type="xs:string" />
    <xs:attribute name="ReconnectPort" type="ws:NotNullPort" />
    <xs:attribute name="MaxHistory" type="xs:nonNegativeInteger" />
    <xs:attribute name="LogLevel" type="xs:string" />
    <xs:attribute name="LSCPAddress" type="ws:IsValidIP" />
    <xs:attribute name="LSCPPort" type="ws:NotNullPort" />
    <xs:attribute name="LSCPResponsePadding" type="ws:EnumOnOff" />
    <xs:attribute name="ComponentName" type="xs:string" />
    <xs:attribute name="BackupBandwidthManagerIP" type="xs:string" />
    <xs:attribute name="BackupBandwidthManagerPort" type="xs:positiveInteger" />
    <xs:attribute name="AuthenticationManagerIP" type="xs:string" />
    <xs:attribute name="AuthenticationManagerPort" type="xs:positiveInteger" />
  </xs:complexType>
</xs:element>
<xs:complexType>
  <xs:attribute name="CallbackServerIP" type="xs:string" />
  <xs:attribute name="CallbackServerPort" type="ws:NotNullPort" />
  <xs:attribute name="ServerIP" type="xs:string" />
  <xs:attribute name="ServerPort" type="ws:NotNullPort" />
  <xs:attribute name="StreamControlIP" type="xs:string" />
  <xs:attribute name="StreamControlPort" type="ws:NotNullPort" />
  <xs:attribute name="DBConnectSize" type="xs:positiveInteger" />
  <xs:attribute name="UDPPacketSize" type="xs:positiveInteger" />
  <xs:attribute name="ThreadPoolSize" type="xs:positiveInteger" />
  <xs:attribute name="SessionMax" type="xs:positiveInteger" />
</xs:complexType>
</xs:element>

<xs:element name="RTSPSetupList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:RTSPSetup" minOccurs="0" maxOccurs="unbounded" />  
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/Server/FSI Setup elements -->

<xs:element name="FSISetup">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="FSISetupList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:FSISetup" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/Server/DNS elements -->

<xs:element name="DomainSuffix" type="xs:string" />
<xs:element name="DNSServer" type="xs:string" />
<xs:element name="DNS">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
      <xs:element ref="ws:DomainSuffix" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:DNSServer" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="DNSList"/>
<xs:complexType>
    <xs:sequence>
        <xs:element ref="ws:DNS" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>

<!-- Configure/Server/NTPServer elements -->

<xs:element name="NTPServerIP" type="xs:string" />

<xs:element name="NTPServer">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
            <xs:element ref="ws:NTPServerIP" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>

<xs:element name="NTPServerList">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:NTPServer" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>

<!-- SyslogConfig elements -->

<xs:element name="SyslogConfig">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="RemoteLogging" type="ws:EnableDisableEnum" use="required" />
        <xs:attribute name="IPAddress" type="ws:IsValidIP" use="required" />
        <xs:attribute name="Port" type="ws:NotNullPort" use="required" />
    </xs:complexType>
</xs:element>

<xs:element name="SyslogConfigList">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:SyslogConfig" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>

<!-- Configure/Server/LogConfig elements -->

<xs:element name="flag">
    <xs:complexType>
        <xs:attribute name="name" type="xs:string" use="required" />
    </xs:complexType>
</xs:element>

<xs:element name="debug-flags">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:flag" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:element name="ServerLevel">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:Facility" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="LogConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:Facility" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="LogConfigList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:LogConfig" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="RecorderSharedConfig">
  <xs:complexType>
    <xs:attribute name="RecorderManagerIP" type="ws:IsValidIP" use="required" />
    <xs:attribute name="NTPServerIP" type="ws:IsValidIP" use="required" />
    <xs:attribute name="HeartbeatInterval" type="ws:Range2To30" use="required" />
    <xs:attribute name="RecorderLocation" type="xs:string" use="required" />
    <xs:attribute name="RecordingModify" type="ws:ValueIs15" use="required" />
    <xs:attribute name="SCTE35AdMarkers" type="ws:SCTE35AdMarkers" use="required" />
    <xs:attribute name="RecorderManagerPort" type="ws:RecorderPort" use="required" />
    <xs:attribute name="ProtocolVersion" type="ws:ProtocolVersion" use="required" />
    <xs:attribute name="ThreadpoolSize" type="ws:ThreadpoolSize" />
    <xs:attribute name="StatusReportInterval" type="ws:StatusReportInterval" />
    <xs:attribute name="HTTPRequestTimeout" type="ws:HTTPRequestTimeout" />
    <xs:attribute name="HTTPResponseTimeout" type="ws:HTTPResponseTimeout" />
    <xs:attribute name="RecordingBandwidth" type="ws:Range1To100" use="required" />
    <xs:attribute name="DeliveryBandwidth" type="ws:Range1To100" use="required" />
    <xs:attribute name="StorageCapacity" type="ws:Range1To100" use="required" />
    <xs:attribute name="LocationVirtualIP" type="ws:IsValidIP" use="required" />
    <xs:attribute name="LocationSubnetMask" type="ws:IsValidSubNetMask" use="required" />
    <xs:attribute name="HTTPDSCP" type="ws:DSCPLimit" use="required" />
    <xs:attribute name="MceIP" type="ws:MceIP" />
    <xs:attribute name="McePort" type="ws:NotNullPort" use="required" />
    <xs:attribute name="MceUdsDir" type="ws:NotNullstring" use="required" />
    <xs:attribute name="RetryStatusAttempts" type="ws:Range0To100" use="required" />
    <xs:attribute name="RetryStatusInterval" type="ws:Range60To3600" use="required" />
  </xs:attribute>
</xs:element>
<xs:attribute name="RecordingValidationAge" type="ws:Range0To10" use="required"/>
</xs:complexType>
</xs:element>

<!-- Configure/Server/DB Backup elements -->
<xs:element name="DbBackupConfigList">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:DbBackupConfig" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:element name="DbBackupConfig">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded"/>
<xs:attribute name="LiveBackupService" type="ws:EnableDisableEnum" use="required"/>
<xs:attribute name="BackupServerIp" type="ws:IsValidIP" use="required"/>
<xs:attribute name="SecondaryBackupServerIp" type="ws:IsValidIPOrNull"/>
<xs:attribute name="LoggingInterval" type="ws:Range1To3600" use="required"/>
<xs:attribute name="OverallBandwidth" type="ws:Range0To1000" use="required"/>
<xs:attribute name="PerSessionBandwidth" type="ws:Range0To1000" use="required"/>
</xs:sequence>
</xs:complexType>
</xs:element>

<!-- Configure/Server/ServerConfig elements -->
<xs:element name="RecorderServerConfigList">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:RecorderServerConfig" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ws:StreamerRecorderConfig" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:element name="RecorderServerConfig">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded"/>
<xs:choice>
<xs:element ref="ws:InterfaceConfig" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="ws:ComplexInterfaceConfig" minOccurs="0" maxOccurs="unbounded"/>
</xs:choice>
</xs:sequence>
<xs:attribute name="PartNumber" type="xs:string"/>
<xs:attribute name="HostName" type="xs:string" use="required"/>
<xs:attribute name="ArrayID" type="xs:integer"/>
<xs:attribute name="DefaultGateway" type="ws:IsValidIP" use="required"/>
<xs:attribute name="HTTPDSCP" type="ws:DSCPLimit" use="required"/>
<xs:attribute name="Status" type="xs:string"/>
<xs:attribute name="ComponentName" type="xs:string"/>
<xs:attribute name="ModelName" type="xs:string"/>
<xs:attribute name="RecorderManagerIP" type="ws:IsValidIP" use="required"/>
Appendix B  Creating Bulk Import/Export Configuration Files

Server-Level Configuration XML Schema

<xs:complexType name="Server">
  <xs:attribute name="HostAddress" type="ws:IsValidIP" use="required" />
  <xs:attribute name="Username" type="xs:string" use="required" />
  <xs:attribute name="Password" type="xs:string" use="required" />
  <xs:attribute name="Port" type="ws:Port" use="required" />
  <xs:attribute name="ArrayID" type="xs:integer" use="required" />
  <xs:attribute name="NslookupHost" type="xs:string" />
</xs:complexType>

<xs:complexType name="SimpleDSCPMarking">
  <xs:attribute name="Method" type="ws:DSCPMarkingMethod" use="required" />
  <xs:attribute name="DSInformation" type="xs:string" />
</xs:complexType>

<xs:complexType name="CustomDSCPMarking">
  <xs:attribute name="Method" type="ws:DSCPMarkingMethod" use="required" />
  <xs:attribute name="DSInformation" type="xs:string" />
</xs:complexType>

<xs:complexType name="RemoteLocation">
  <xs:attribute name="Name" type="xs:string" use="required" />
  <xs:attribute name="Address" type="ws:IsValidIP" use="required" />
  <xs:attribute name="Port" type="ws:Port" use="required" />
</xs:complexType>

<xs:complexType name="SSVServerConfig">
  <xs:attribute name="PartNumber" type="xs:string" use="required" />
  <xs:attribute name="HostName" type="xs:string" />
  <xs:attribute name="ArrayID" type="xs:integer" />
  <xs:attribute name="NullStream" type="xs:string" />
  <xs:attribute name="StunPlayErrorDelay" type="ws:StunPlayErrorDelayLimit" />
  <xs:attribute name="StunPlayTimeout" type="ws:StunPlayTimeoutLimit" />
  <xs:attribute name="SourceIP" type="ws:IsValidIPOrNull" />
  <xs:attribute name="TransportPortStart" type="ws:Port" />
  <xs:attribute name="TransportPortEnd" type="ws:Port" />
  <xs:attribute name="CachePort" type="ws:Port" />
  <xs:attribute name="TCPTraffic" type="ws:EnableDisableEnum" />
  <xs:attribute name="StreamerIsCache" type="ws:EnableDisableEnum" />
  <xs:attribute name="JumboSFrames" type="ws:EnableDisableEnum" />
  <xs:attribute name="JumboCFrames" type="ws:EnableDisableEnum" />
  <xs:attribute name="VaultMirrorCopies" type="ws:VaultMirrorCopiesLimit" />
  <xs:attribute name="VaultLocalCopies" type="ws:VaultLocalCopiesLimit" />
  <xs:attribute name="DSCPMarkingMethod" type="ws:DSCPMarkingMethod" />
  <xs:attribute name="DualCAS" type="ws:EnableDisableEnum" />
  <xs:attribute name="DefaultGateway" type="ws:IsValidIPOrNull" />
  <xs:attribute name="FTPOutInterface" type="xs:string" />
</xs:complexType>
<xs:attribute name="FTPOutBandwidth" type="ws:FTPOutBandwidthRange" />
<xs:attribute name="FTPOutSession" type="ws:FTPOutSessionRange" />
<xs:attribute name="TTL" type="xs:positiveInteger" />
<xs:attribute name="MaxNoOfInterfaces" type="xs:integer" />
</xs:complexType>
</xs:element>

<xs:element name="StreamServerConfig">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
<xs:element ref="ws:SimpleDSCPMarking" minOccurs="0"
maxOccurs="1" />
<xs:element ref="ws:CustomDSCPMarking" minOccurs="0"
maxOccurs="1" />
<xs:element ref="ws:InterfaceConfig" minOccurs="0"
maxOccurs="unbounded" />
<xs:element ref="ws:BondInterfaceConfig" minOccurs="0"
maxOccurs="1" />
<xs:attribute name="PartNumber" type="xs:string" use="required" />
<xs:attribute name="TTL" type="xs:positiveInteger" />
<xs:attribute name="TransportDSCP" type="xs:integer" />
<xs:attribute name="CachedDSCP" type="xs:integer" />
<xs:attribute name="NullStream" type="ws:EnableDisableEnum" />
<xs:attribute name="LivePlayback" type="ws:EnableDisableEnum" />
<xs:attribute name="StunPlayErrorDelay" type="ws:StunPlayErrorDelayLimit" />
<xs:attribute name="StunPlayTimeout" type="ws:StunPlayTimeoutLimit" />
<xs:attribute name="HostName" type="xs:string" />
<xs:attribute name="ArrayID" type="xs:integer" />
<xs:attribute name="SourceIP" type="ws:IsValidIPOrNull" />
<xs:attribute name="TransportPortStart" type="ws:Port" />
<xs:attribute name="TransportPortEnd" type="ws:Port" />
<xs:attribute name="CachePort" type="ws:Port" />
<xs:attribute name="TCPTraffic" type="ws:EnableDisableEnum" />
<xs:attribute name="StreamerIsCache" type="ws:EnableDisableEnum" />
<xs:attribute name="JumboSFrames" type="ws:EnableDisableEnum" />
<xs:attribute name="JumboCFrames" type="ws:EnableDisableEnum" />
<xs:attribute name="DSCPMarkingMethod" type="ws:DSCPMarkingMethod" />
<xs:attribute name="DualCAS" type="ws:EnableDisableEnum" />
<xs:attribute name="DefaultGateway" type="ws:IsValidIPOrNull" />
<xs:attribute name="MaxNoOfInterfaces" type="xs:integer" />
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:element name="StreamerRecorderConfig">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
<xs:element ref="ws:SimpleDSCPMarking" minOccurs="0"
maxOccurs="1" />
<xs:element ref="ws:CustomDSCPMarking" minOccurs="0"
maxOccurs="1" />
<xs:attribute name="PartNumber" type="xs:string" use="required" />
<xs:attribute name="TTL" type="xs:positiveInteger" />
<xs:attribute name="TransportDSCP" type="xs:integer" />
<xs:attribute name="CachedDSCP" type="xs:integer" />
<xs:attribute name="NullStream" type="ws:EnableDisableEnum" />
<xs:attribute name="LivePlayback" type="ws:EnableDisableEnum" />
<xs:attribute name="TCPTraffic" type="ws:EnableDisableEnum" />
<xs:attribute name="StunPlayErrorDelay" type="ws:StunPlayErrorDelayLimit" />
<xs:attribute name="StunPlayTimeout" type="ws:StunPlayTimeoutLimit" />
<xs:attribute name="ArrayID" type="xs:integer" />
<xs:attribute name="SourceIP" type="ws:IsValidIPOrNull" />
</xs:sequence>
</xs:complexType>
</xs:element>
Appendix B      Creating Bulk Import/Export Configuration Files

Server-Level Configuration XML Schema

<xs:complexType>
  <xs:attribute name="TransportPortStart" type="ws:Port" />
  <xs:attribute name="TransportPortEnd" type="ws:Port" />
  <xs:attribute name="CachePort" type="ws:Port" />
  <xs:attribute name="StreamerIsCache" type="ws:EnableDisableEnum" />
  <xs:attribute name="JumboSFrames" type="ws:EnableDisableEnum" />
  <xs:attribute name="JumboCFrames" type="ws:EnableDisableEnum" />
  <xs:attribute name="DSCPMarkingMethod" type="ws:DSCPMarkingMethod" />
  <xs:attribute name="DualCAS" type="ws:EnableDisableEnum" />
</xs:complexType>

<xs:element name="VaultServerConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SimpleDSCPMarking" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:CustomDSCPMarking" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:InterfaceConfig" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:BondInterfaceConfig" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
    <xs:attribute name="PartNumber" type="xs:string" use="required" />
    <xs:attribute name="HostName" type="xs:string" />
    <xs:attribute name="ArrayID" type="xs:integer" />
    <xs:attribute name="JumboCFrames" type="xs:string" />
    <xs:attribute name="VaultMirrorCopies" type="xs:nonNegativeInteger" />
    <xs:attribute name="VaultLocalCopies" type="xs:nonNegativeInteger" />
    <xs:attribute name="DSCPMarkingMethod" type="ws:DSCPMarkingMethod" />
    <xs:attribute name="DualCAS" type="xs:string" />
    <xs:attribute name="DefaultGateway" type="ws:IsValidIPOrNull" />
    <xs:attribute name="FTPOutInterface" type="xs:string" />
    <xs:attribute name="FTPOutBandwidth" type="ws:FTPOutBandwidthRange" />
    <xs:attribute name="FTPOutSession" type="ws:FTPOutSessionRange" />
    <xs:attribute name="TTL" type="xs:positiveInteger" />
    <xs:attribute name="SourceIP" type="ws:IsValidIPOrNull" />
    <xs:attribute name="CachePort" type="ws:Port" />
    <xs:attribute name="TCPTraffic" type="ws:EnableDisableEnum" />
    <xs:attribute name="MaxNoOfInterfaces" type="xs:integer" />
  </xs:complexType>
</xs:element>

<xs:element name="CacheServerConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:SimpleDSCPMarking" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:CustomDSCPMarking" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:InterfaceConfig" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:BondInterfaceConfig" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
    <xs:attribute name="PartNumber" type="xs:string" use="required" />
    <xs:attribute name="HostName" type="xs:string" />
    <xs:attribute name="ArrayID" type="xs:integer" />
    <xs:attribute name="JumboCFrames" type="ws:EnableDisableEnum" />
    <xs:attribute name="DSCPMarkingMethod" type="ws:DSCPMarkingMethod" />
    <xs:attribute name="DefaultGateway" type="ws:IsValidIPOrNull" />
    <xs:attribute name="TTL" type="xs:positiveInteger" />
    <xs:attribute name="SourceIP" type="ws:IsValidIPOrNull" />
    <xs:attribute name="CachePort" type="ws:Port" />
  </xs:complexType>
</xs:element>
<xs:attribute name="TCPTraffic" type="ws:EnableDisableEnum" />
<xs:attribute name="MaxNoOfInterfaces" type="xs:integer" />
</xs:complexType>
</xs:element>

<xs:element name="ControllerServerConfig">
<xs:complexType>
<xs:sequence>
<TS:element ref="ws:Server" minOccurs="1" maxOccurs="unbounded" />
<xs:element ref="ws:InterfaceConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:BondInterfaceConfig" minOccurs="0" maxOccurs="1" />
</xs:sequence>
<xs:attribute name="HostName" type="xs:string" />
<xs:attribute name="PartNumber" type="xs:string" use="required" />
<xs:attribute name="DefaultGateway" type="ws:IsValidIPOrNull" />
<xs:attribute name="MaxNoOfInterfaces" type="xs:integer" />
</xs:complexType>
</xs:element>

<xs:simpleType name="InterfaceTypeRange">
<xs:restriction base="xs:positiveInteger">
<xs:minInclusive value="1" />
<xs:maxInclusive value="7" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="FTPOutBandwidthRange">
<xs:restriction base="xs:string">
<xs:pattern value="()|([1-9]\[0-9\]|1[0-9]\[0-9\]|2[0-4]\[0-9\]|25[0-5])" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="FTPOutSessionRange">
<xs:restriction base="xs:string">
<xs:pattern value="()|([0-9]|10)" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="StunPlayErrorDelayLimit">
<xs:restriction base="xs:positiveInteger">
<xs:minInclusive value="1" />
<xs:maxInclusive value="2999" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="StunPlayTimeoutLimit">
<xs:restriction base="xs:positiveInteger">
<xs:minInclusive value="1" />
<xs:maxInclusive value="299" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidIP">
<xs:restriction base="xs:string">
<xs:pattern value="(((\[1-9]\[0-9\]|1[0-9]\[0-9\]|2[0-4]\[0-9\]|25[0-5])\.)\{3}\((1-9)\[0-9\]|1[0-9]\[0-9\]|2[0-4]\[0-9\]|25[0-5])\" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidIPOrNull">
<xs:restriction base="xs:string">
<xs:pattern value="(((\[1-9]\[0-9\]|1[0-9]\[0-9\]|2[0-4]\[0-9\]|25[0-5])\.)\{3}\((1-9)\[0-9\]|1[0-9]\[0-9\]|2[0-4]\[0-9\]|25[0-5])\" />
</xs:restriction>
</xs:simpleType>
value="()|((1-9)[0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.{3}(1-9)[0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidSubNetMaskOrNull">
<xs:restriction base="xs:string">
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidMAC">
<xs:restriction base="xs:string">
<xs:pattern value="([0-9a-fA-F]{2}:-){5}([0-9a-fA-F]{2})" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullstring">
<xs:restriction base="xs:string">
<xs:minLength value="1" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="VaultMirrorCopiesLimit">
<xs:restriction base="xs:integer">
<xs:minInclusive value="0" />
<xs:maxInclusive value="10" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="VaultLocalCopiesLimit">
<xs:restriction base="xs:positiveInteger">
<xs:minInclusive value="1" />
<xs:maxInclusive value="4" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="ValueIs5">
<xs:restriction base="xs:integer">
<xs:minInclusive value="5" />
<xs:maxInclusive value="5" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="ValueIs15">
<xs:restriction base="xs:integer">
<xs:minInclusive value="15" />
<xs:maxInclusive value="15" />
</xs:restriction>
</xs:simpleType>
<xs:simpleType name="Range0To10">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0" />
    <xs:maxInclusive value="10" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range0To100">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0" />
    <xs:maxInclusive value="100" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range60To3600">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="60" />
    <xs:maxInclusive value="3600" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To100">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="100" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To3600">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="3600" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range0To1000">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0" />
    <xs:maxInclusive value="1000" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range2To30">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="2" />
    <xs:maxInclusive value="30" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ProtocolVersion">
  <xs:restriction base="xs:string">
    <xs:enumeration value="I02"/>
    <xs:enumeration value="I04"/>
    <xs:enumeration value="i02"/>
    <xs:enumeration value="i04"/>
    <xs:enumeration value="2"/>
    <xs:enumeration value="4"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ThreadpoolSize">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="16" />
    <xs:maxInclusive value="16" />
  </xs:restriction>
</xs:simpleType>
<xs:element name="SimpleDSCPMarking">
  <xs:complexType>
    <xs:attribute name="ControlDSCP" type="ws:DSCPLimit" use="required"/>
    <xs:attribute name="DataDSCP" type="ws:DSCPLimit" use="required"/>
    <xs:attribute name="StreamDSCP" type="ws:DSCPLimit" use="optional"/>
    <xs:attribute name="HTTPDSCP" type="ws:DSCPLimit" use="optional"/>
  </xs:complexType>
</xs:element>

<xs:element name="CustomDSCPMarking">
  <xs:complexType>
    <xs:attribute name="ControlTraffic" type="ws:DSCPLimit" use="required"/>
    <xs:attribute name="StreamTraffic" type="ws:DSCPLimit" use="optional"/>
    <xs:attribute name="HTTPTraffic" type="ws:DSCPLimit" use="optional"/>
    <xs:attribute name="HighestPriorityRxTraffic" type="ws:DSCPLimit" use="required"/>
    <xs:attribute name="CommittedRateLostPktRecovery" type="ws:DSCPLimit" use="required"/>
    <xs:attribute name="CommittedRateTraffic" type="ws:DSCPLimit" use="required"/>
  </xs:complexType>
</xs:element>
<xs:element name="InterfaceConfig">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string" />
    <xs:attribute name="Type" type="ws:InterfaceType" />
    <xs:attribute name="IPAddress" type="ws:IsValidIPOrNull" />
    <xs:attribute name="SubnetMask" type="ws:IsValidSubNetMaskOrNull" />
    <xs:attribute name="TransportPort" type="ws:Port" />
    <xs:attribute name="CachePort" type="ws:Port" />
    <xs:attribute name="Number" type="xs:integer" />
  </xs:complexType>
</xs:element>

<xs:element name="InterfaceType">
  <xs:complexType>
    <xs:attribute name="Not Used" type="xs:string" />  
    <xs:attribute name="Management" type="xs:string" />
    <xs:attribute name="Ingest" type="xs:string" />
    <xs:attribute name="Stream" type="xs:string" />
    <xs:attribute name="Cache" type="xs:string" />
    <xs:attribute name="Stream/Cache" type="xs:string" />
    <xs:attribute name="General" type="xs:string" />
    <xs:attribute name="Ingest/Stream/Cache" type="xs:string" />
  </xs:complexType>
</xs:element>
Appendix B      Creating Bulk Import/Export Configuration Files

Server-Level Configuration XML Schema

<xs:element name="ServerConfigList">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:SSVServerConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:VaultServerConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:StreamServerConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:CacheServerConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:RecorderServerConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:StreamerRecorderConfig" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:ControllerServerConfig" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:element name="ServerConfiguration">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:RouteTableList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:SNMPAgentList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:DNSList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:NTPServerList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:RTSPSetupList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:FSISetupList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:RecorderServerConfigList" minOccurs="0" maxOccurs="1" />
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element ref="ws:DbBackupConfigList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:ServerConfigList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:LogConfigList" minOccurs="0" maxOccurs="1" />
<xs:element ref="ws:SyslogConfigList" minOccurs="0" maxOccurs="1" />
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:simpleType name="EnumOnOff">
  <xs:restriction base="xs:string">
    <xs:enumeration value="On"/>
    <xs:enumeration value="Off"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="EnumReceiveBuffer">
  <xs:restriction base="xs:positiveInteger">
    <xs:enumeration value="65535"/>
    <xs:enumeration value="512000"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="EnumRTSPDeploymentType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ncube"/>
    <xs:enumeration value="digeo"/>
    <xs:enumeration value="ngod"/>
    <xs:enumeration value="myrio"/>
    <xs:enumeration value="telenet"/>
    <xs:enumeration value="eventis"/>
    <xs:enumeration value="quative"/>
    <xs:enumeration value="voo"/>
    <xs:enumeration value="cisco"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="EnumTransport">
  <xs:restriction base="xs:string">
    <xs:enumeration value="TCP"/>
    <xs:enumeration value="UDP"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="SubInterfaceConfigIdRange">
  <xs:restriction base="xs:positiveInteger">
    <xs:minInclusive value="1" />  
    <xs:maxInclusive value="4095" />
  </xs:restriction>
</xs:simpleType>

<xs:element name="ComplexInterfaceConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:SubInterfaceConfig" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
    <xs:attribute name="Name" type="xs:string" />
    <xs:attribute name="Type" type="ws:InterfaceType" />
    <xs:attribute name="IPAddress" type="ws:IsValidIPOrNull" />
    <xs:attribute name="SubnetMask" type="ws:IsValidSubNetMaskOrNull" />
  </xs:complexType>
</xs:element>
<xs:complexType name="ServerLevelConfig">
  <xs:sequence>
    <xs:element name="ServerConfig">
      <xs:complexType>
        <xs:attribute name="ServerId" type="xs:string"/>
        <xs:attribute name="TransportPort" type="ws:Port"/>
        <xs:attribute name="CachePort" type="ws:Port"/>
        <xs:attribute name="Number" type="xs:integer"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="SubInterfaceConfig">
      <xs:complexType>
        <xs:attribute name="Id" type="ws:SubInterfaceConfigIdRange"/>
        <xs:attribute name="Type" type="ws:SubInterfaceType"/>
        <xs:attribute name="SubType" type="ws:SubInterfaceSubType"/>
        <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
        <xs:attribute name="SubnetMask" type="ws:IsValidSubNetMaskOrNull"/>
      </xs:complexType>
    </xs:element>
    <xs:element name="BondInterfaceConfig">
      <xs:complexType>
        <xs:attribute name="Name" type="xs:string"/>
        <xs:attribute name="SlaveInterfaces" type="xs:string"/>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>

<xs:simpleType name="SubInterfaceSubType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="VLAN"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="SubInterfaceType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Ingest"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="MceIP">
  <xs:restriction base="xs:string">
    <xs:enumeration value="127.0.0.1"/>
  </xs:restriction>
</xs:simpleType>
System-Level Configuration XML Schema

The System-Level Configuration XML schema file describes and dictates the content of the System-Level Configuration XML file.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:ws="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs"
    targetNamespace="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs">
    <!-- Configure/System/DNS elements -->
    <xs:element name="DomainSuffix" type="xs:string"/>
    <xs:element name="DNSServer" type="ws:IsValidIP"/>

    <!-- Configure/System/DNS elements -->
    <xs:element name="DNS">
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="ws:DomainSuffix" minOccurs="0" maxOccurs="unbounded"/>
                <xs:element ref="ws:DNSServer" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <!-- Configure/System/NTP elements -->
    <xs:element name="NTPServer" type="ws:IsValidIP"/>

    <!-- Configure/System/NTP elements -->
    <xs:element name="NTP">
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="ws:NTPServer" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <!-- Configure/System/Host Service elements -->
    <xs:element name="HostService">
        <xs:complexType>
            <xs:attribute name="Name" type="xs:string"/>
            <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
        </xs:complexType>
    </xs:element>

    <!-- Configure/System/ArrayName elements -->
    <xs:element name="HostServiceList">
        <xs:complexType>
            <xs:sequence>
                <xs:element ref="ws:HostService" minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <!-- Configure/System/ArrayName elements -->
    <xs:element name="ArrayName">
        <xs:complexType>
            <xs:attribute name="ArrayID" type="xs:string"/>
            <xs:attribute name="Name" type="xs:string"/>
            <xs:attribute name="Vendor" type="xs:string"/>
        </xs:complexType>
    </xs:element>
    </xs:schema>
```
<xs:element name="ArrayNameConfig">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:ArrayName" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>

<!-- Configure/System/QAMGateway/ elements -->

<xs:element name="Server">
    <xs:complexType>
        <xs:attribute name="ServerID" type="xs:string" use="required" />
        <xs:attribute name="GroupID" type="xs:string" use="required" />
        <xs:attribute name="QAMMAC" type="xs:string" />
    </xs:complexType>
</xs:element>

<xs:element name="QAMStreamGroupPreference">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="StreamGroupName" type="xs:string" />
        <xs:attribute name="QAMMAC" type="xs:string" />
        <xs:attribute name="Preference" type="xs:string" />
    </xs:complexType>
</xs:element>

<xs:element name="TSIDOutLink">
    <xs:complexType>
        <xs:attribute name="Index" type="xs:nonNegativeInteger" />
        <xs:attribute name="TSIDOut" type="xs:string" />
        <xs:attribute name="TSIDOutLinkStatus" type="xs:string" />
        <xs:attribute name="ServiceGroup" type="xs:string" />
        <xs:attribute name="RFNumber" type="xs:string" />
    </xs:complexType>
</xs:element>

<xs:element name="QAMASILink">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:TSIDOutLink" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="Number" type="xs:string" />
        <xs:attribute name="TSIDIn" type="xs:string" />
        <xs:attribute name="TSIDInLinkStatus" type="xs:string" />
    </xs:complexType>
</xs:element>

<xs:element name="QAMLink">
    <xs:complexType>
        <xs:attribute name="Status" type="xs:string" />
        <xs:attribute name="ServiceGroup" type="xs:string" />
        <xs:attribute name="RFNumber" type="xs:string" />
    </xs:complexType>
</xs:element>

<xs:element name="GQAMLink">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:TSIDOutLink" minOccurs="0" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>
</xs:element>
<xs:attribute name="ServiceGroup" type="xs:string" />
<xs:attribute name="RFNumber" type="xs:string" />
</xs:complexType>
</xs:element>

<xs:element name="QAM">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:QAMStreamGroupPreference" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:QAMLink" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:QAMASILink" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:GQAMLink" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="IP" type="xs:string" />
    <xs:attribute name="SubnetMask" type="xs:string" />
    <xs:attribute name="Type" type="xs:string" />
    <xs:attribute name="GQAMPort" type="xs:positiveInteger" />
  </xs:complexType>
</xs:element>

<xs:element name="QAMList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:QAM" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/StreamDestination/ elements -->

<xs:element name="StreamGroupPreference">
  <xs:complexType>
    <xs:attribute name="StreamGroupName" type="xs:string" />
    <xs:attribute name="Preference" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="StreamDestination">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:StreamGroupPreference" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="SubnetAddress" type="xs:string" />
    <xs:attribute name="SubnetMask" type="xs:string" />
  </xs:complexType>
</xs:element>

<xs:element name="StreamDestinationConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:StreamDestinationList" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
System-Level Configuration XML Schema

<!-- Configure/System/Headend/ elements -->
<xsd:element name="StreamDestinationConfig1">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="ws:StreamDestinationList" minOccurs="0" maxOccurs="unbounded" /> 
    </xsd:sequence>
    <xsd:attribute name="ReloadServiceGroup" type="xs:boolean" />
  </xsd:complexType>
</xsd:element>

<!-- Configure/System/Shared or Distributed ISA Setup -->
<xsd:element name="ISA-GeneralSettings">
  <xsd:complexType>
    <xsd:attribute name="VaultMasterIP" type="ws:IsValidIP"/>
    <xsd:attribute name="VaultMasterPort" type="ws:NotNullPort"/>
    <xsd:attribute name="WebServicePort" type="ws:NotNullPort"/>
    <xsd:attribute name="StreamingMode" type="ws:StreamingMode"/>
    <xsd:attribute name="MSASupport" type="ws:EnableDisableEnum"/>
    <xsd:attribute name="Pre-EncryptionSupport" type="ws:EnableDisableEnum"/>
    <xsd:attribute name="TME-SCE" type="ws:TME-SCE"/>
    <xsd:attribute name="FTPOutPort" type="ws:NotNullPort"/>
  </xsd:complexType>
</xsd:element>

<xsd:element name="ISA-ContentStoreSettings">
  <xsd:complexType>
    <xsd:attribute name="Name" type="ws:NotNullstring"/>
    <xsd:attribute name="Kind" type="ws:NotNullstring"/>
    <xsd:attribute name="FactoryID" type="ws:NotNullstring"/>
  </xsd:complexType>
</xsd:element>

<!-- Configure/System/Headend/ elements -->
<xsd:element name="ServiceGroupToStreamGroup">
  <xsd:complexType>
    <xsd:attribute name="ServiceGroup" type="xs:string" />
    <xsd:attribute name="StreamGroup" type="xs:string" />
  </xsd:complexType>
</xsd:element>

<xsd:element name="ServiceGroup">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="ws:StreamGroupPreference" minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
    <xsd:attribute name="Group" type="xs:string" />
  </xsd:complexType>
</xsd:element>

<xsd:element name="Headend">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="ws:ServiceGroup" minOccurs="0" maxOccurs="unbounded" />
      <xsd:element ref="ws:ServiceGroupToStreamGroup" minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>

<!-- Configure/System/Shared or Distributed ISA Setup -->
<xs:attribute name="FactoryKind" type="ws:NotNullstring"/>
<xs:attribute name="NoOfThreads" type="xs:positiveInteger"/>
<xs:attribute name="FTPServerPort" type="ws:NotNullPort"/>
</xs:complexType>
</xs:element>

<xs:element name="CORBAEventChannels">
<xs:complexType>
<xs:attribute name="EventChannelID" type="ws:NotNullstring"/>
<xs:attribute name="EventChannelKind" type="ws:NotNullstring"/>
<xs:attribute name="ContentChannelID" type="ws:NotNullstring"/>
<xs:attribute name="ContentChannelKind" type="ws:NotNullstring"/>
<xs:attribute name="FactoriesID" type="ws:NotNullstring"/>
<xs:attribute name="FactoriesKind" type="ws:NotNullstring"/>
<xs:attribute name="EventChannelFactory" type="ws:NotNullstring"/>
<xs:attribute name="LoadQueryInterval" type="xs:positiveInteger"/>
</xs:complexType>
</xs:element>

<xs:element name="ISASetup">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:ISA-GeneralSettings" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:ISA-ContentStoreSettings" minOccurs="0" maxOccurs="unbounded" />
<xs:element ref="ws:CORBAEventChannels" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>

<!-- Configure/System/Parent/Child Service Group elements -->

<xs:element name="ChildServiceGroup" type="xs:positiveInteger"/>

<xs:element name="ParentService">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:ChildServiceGroup" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
<xs:attribute name="ServiceGroup" type="xs:positiveInteger"/>
</xs:complexType>
</xs:element>

<xs:element name="ParentChildServiceGroups">
<xs:complexType>
<xs:sequence>
<xs:element ref="ws:ParentService" minOccurs="0" maxOccurs="unbounded"/>
</xs:sequence>
<xs:attribute name="ServiceGroup" type="xs:positiveInteger"/>
</xs:complexType>
</xs:element>

<!-- Configure/System/Ingest Tuning elements -->

<xs:element name="TrickModeSettings">
<xs:complexType>
<xs:attribute name="Speed0" type="xs:string"/>
<xs:attribute name="Speed1" type="xs:string"/>
<xs:attribute name="Speed2" type="xs:string"/>
<xs:attribute name="Speed3" type="xs:string"/>
<xs:attribute name="Speed4" type="xs:string"/>
</xs:complexType>
</xs:element>
<xs:attribute name="Speed5" type="xs:string"/>
<xs:attribute name="Speed6" type="xs:string"/>
<xs:attribute name="Speed7" type="xs:string"/>
<xs:attribute name="Speed8" type="xs:string"/>
<xs:attribute name="Speed9" type="xs:string"/>
</xs:complexType>
</xs:element>

<xs:element name="FailIngestSettings">
    <xs:complexType>
        <xs:attribute name="PSIErrors" type="ws:EnableDisableEnum"/>
        <xs:attribute name="BitRateErrors" type="ws:EnableDisableEnum"/>
        <xs:attribute name="ErrorCountMethod" type="ws:ErrorCountMethod"/>
        <xs:attribute name="NumOfMinutes" type="xs:string"/>
        <xs:attribute name="DiscontinuityRate" type="xs:string"/>
        <xs:attribute name="NumOfPictureGaps" type="xs:string"/>
        <xs:attribute name="PictureGapDuration" type="xs:string"/>
        <xs:attribute name="ContinuityCntErrors" type="xs:string"/>
        <xs:attribute name="NumOfSyncLossErrors" type="xs:string"/>
        <xs:attribute name="SyncLossDuration" type="xs:string"/>
    </xs:complexType>
</xs:element>

<xs:element name="IngestTuningSettings">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:TrickModeSettings" minOccurs="0" maxOccurs="1"/>
            <xs:element ref="ws:FailIngestSettings" minOccurs="0" maxOccurs="1"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>

<!-- Configure/System/MPEG Tuning elements -->

<xs:element name="MPEGTuningSettings">
    <xs:complexType>
        <xs:attribute name="PrgIDStdize" type="ws:EnableDisableEnum"/>
        <xs:attribute name="PSI" type="ws:EnableDisableEnum"/>
        <xs:attribute name="SeqEndRemove" type="ws:EnableDisableEnum"/>
        <xs:attribute name="RateStdize" type="ws:EnableDisableEnum"/>
        <xs:attribute name="Md5Checksum" type="ws:EnableDisableEnum"/>
        <xs:attribute name="DynamicTricks" type="ws:EnableDisableEnum"/>
        <xs:attribute name="PTSNPTMode" type="ws:PTSNPTMode"/>
        <xs:attribute name="C2ATimeout" type="ws:C2ATimeOut"/>
        <xs:attribute name="FFResume" type="ws:EnableDisableEnum"/>
        <xs:attribute name="RWSkip" type="ws:EnableDisableEnum"/>
        <xs:attribute name="FwdJump" type="ws:EnableDisableEnum"/>
        <xs:attribute name="SkippingStoneMode" type="ws:EnableDisableEnum"/>
        <xs:attribute name="Relaxation" type="ws:EnableDisableEnum"/>
        <xs:attribute name="FreePassJump" type="ws:EnableDisableEnum"/>
        <xs:attribute name="FreePassFastForward" type="ws:EnableDisableEnum"/>
        <xs:attribute name="DelayedJumpAhead" type="ws:EnableDisableEnum"/>
        <xs:attribute name="FreePassTime" type="xs:nonNegativeInteger"/>
        <xs:attribute name="DualCAS" type="ws:EnableDisableEnum"/>
        <xs:attribute name="MPEGIndexFormat" type="ws:MPEGIndexMode"/>
        <xs:attribute name="EOSForPause" type="ws:EnableDisableEnum"/>
    </xs:complexType>
</xs:element>

<xs:element name="MPEGTuning">
    <xs:complexType>
        <xs:sequence>
            <xs:element ref="ws:MPEGTuningSettings" minOccurs="0" maxOccurs="1"/>
        </xs:sequence>
    </xs:complexType>
</xs:element>
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<!-- Configure/System/VOD Market AMS Setup/Exporter elements -->

<xsl:element name="MBO">
  <xsl:complexType>
    <xsl:attribute name="DomainName" type="ws:NotNullRangedNameString" use="required"/>
    <xsl:attribute name="IPAddress" type="ws:IsValidIP" use="required"/>
    <xsl:attribute name="Port" type="ws:NotNullPort" use="required"/>
    <xsl:attribute name="Division" type="ws:NullRangedNameString" use="optional"/>
    <xsl:attribute name="Maintenance" type="ws:TrueFalse" use="required"/>
  </xsl:complexType>
</xsl:element>

<xsl:element name="MBOList">
  <xsl:complexType>
    <xsl:sequence>
      <xsl:element ref="ws:MBO" minOccurs="0" maxOccurs="unbounded" />
    </xsl:sequence>
  </xsl:complexType>
</xsl:element>

<!-- Configure/System/AMS Setup/Exporter elements -->

<xsl:element name="AMS">
  <xsl:complexType>
    <xsl:attribute name="DomainName" type="xs:string"/>
    <xsl:attribute name="IPAddress" type="ws:IsValidIP"/>
    <xsl:attribute name="Port" type="ws:NotNullPort"/>
  </xsl:complexType>
</xsl:element>

<xsl:element name="AMSList">
  <xsl:complexType>
    <xsl:sequence>
      <xsl:element ref="ws:AMS" minOccurs="0" maxOccurs="unbounded" />
    </xsl:sequence>
  </xsl:complexType>
</xsl:element>

<!-- Configure/System/Content Distribution Rules Setup elements -->

<xsl:element name="ContentRule">
  <xsl:complexType>
    <xsl:attribute name="Provider" type="ws:NotNullRangedNameString32" use="required"/>
    <xsl:attribute name="Product" type="ws:NotNullRangedNameString32" use="required"/>
    <xsl:attribute name="Market" type="ws:NotNullRangedNameString" use="required"/>
    <xsl:attribute name="Protocol" type="ws:ProtocolEnum" use="required"/>
    <xsl:attribute name="Exclude" type="ws:NullRangedNameString" use="optional"/>
    <xsl:attribute name="Status" type="xs:string" use="optional"/>
  </xsl:complexType>
</xsl:element>

<xsl:element name="ContentRuleList">
  <xsl:complexType>
    <xsl:sequence>
      <xsl:element ref="ws:ContentRule" minOccurs="0" maxOccurs="unbounded" />
    </xsl:sequence>
  </xsl:complexType>
</xsl:element>
<!-- Configure/System/Package Priority Rules Setup elements -->

<xsl:element name="PackageRule">
  <xsl:complexType>
    <xsl:attribute name="AssetId" type="ws:NullRangedNameString64" use="optional"/>
    <xsl:attribute name="Key" type="ws:NotNullRangedNameString32" use="optional"/>
    <xsl:attribute name="Title" type="ws:NullRangedNameString64" use="optional"/>
    <xsl:attribute name="ProviderId" type="ws:NullRangedNameString64" use="optional"/>
    <xsl:attribute name="Product" type="ws:NullRangedNameString64" use="optional"/>
    <xsl:attribute name="WindowsDays" type="ws:YesNoEnum" use="optional"/>
    <xsl:attribute name="AdditionalMatch" type="ws:NullRangedNameString64" use="optional"/>
    <xsl:attribute name="RuleExpiration" type="ws:NullRangedNameString64" use="required"/>
  </xsl:complexType>
</xsl:element>

<xsl:element name="PackageRuleList">
  <xsl:complexType>
    <xsl:sequence>
      <xsl:element ref="ws:PackageRule" minOccurs="0" maxOccurs="unbounded"/>
    </xsl:sequence>
  </xsl:complexType>
</xsl:element>

<!-- Configure/System/Ingest Manager elements -->

<xsl:element name="IngestSettings">
  <xsl:complexType>
    <xsl:attribute name="IngestMask" type="xs:nonNegativeInteger"/>
    <xsl:attribute name="NameServiceHost" type="ws:IsValidIP"/>
    <xsl:attribute name="NameServicePort" type="ws:NotNullPort"/>
    <xsl:attribute name="NotifyServiceHost" type="ws:IsValidIP"/>
    <xsl:attribute name="NotifyServicePort" type="ws:NotNullPort"/>
    <xsl:attribute name="NotifyEventChannelFactory" type="ws:NotNullstring"/>
    <xsl:attribute name="EventChannelsID" type="ws:NotNullstring"/>
  </xsl:complexType>
</xsl:element>
<xs:element name="AuthenticationManagerSettings">
  <xs:complexType>
    <xs:attribute name="Protocol" type="ws:AuthProtocol"/>
    <xs:attribute name="IPAddress" type="ws:IsValidIP" use="required"/>
    <xs:attribute name="Port" type="ws:NotNullPort" use="required"/>
    <xs:attribute name="TimeOut" type="xs:positiveInteger"/>
    <xs:attribute name="EventISHostName" type="xs:string"/>
    <xs:attribute name="EventISPort" type="ws:NotNullPort"/>
    <xs:attribute name="TraxisURL" type="xs:string"/>
    <xs:attribute name="TraxisRetryInterval" type="xs:string"/>
    <xs:attribute name="ServerThreadPool" type="xs:positiveInteger" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="AuthenticationManager">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:AuthenticationManagerSettings" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/Ingest Server Manager elements -->
<xs:element name="IngestDriverServer">
  <xs:complexType>
    <xs:attribute name="Port" type="ws:NotNullPort"/>
    <xs:attribute name="NoOfThreads" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="IngestDriverServerSettings">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:IngestDriverServer" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/Shared Recorder Settings elements -->
<xs:element name="RecorderSharedConfig">
  <xs:complexType>
    <xs:attribute name="RecorderManagerIP" type="ws:IsValidIP" use="required"/>
    <xs:attribute name="NTPServerIP" type="ws:IsValidIP" use="required"/>
    <xs:attribute name="HeartbeatInterval" type="ws:Range2To30" use="required"/>
    <xs:attribute name="RecorderLocation" type="xs:string" use="required"/>
    <!-- <xs:attribute name="RecordingModify" type="ws:Range1To60" /> will use this when App is ready for this to be user modified -->
    <xs:attribute name="RecordingModify" type="ws:ValueIs15" use="required"/>
    <xs:attribute name="SCTE35AdMarkers" type="ws:SCTE35AdMarkers" use="required"/>
    <xs:attribute name="RecorderManagerPort" type="ws:RecorderPort" use="required"/>
    <xs:attribute name="ProtocolVersion" type="ws:ProtocolVersion" use="required"/>
    <xs:attribute name="ThreadpoolSize" type="ws:ThreadpoolSize" use="required"/>
    <xs:attribute name="StatusReportInterval" type="ws:StatusReportInterval"/>
    <xs:attribute name="HTTPRequestTimeout" type="ws:HTTPRequestTimeout"/>
    <xs:attribute name="HTTPResponseTimeout" type="ws:HTTPResponseTimeout"/>
<xs:attribute name="RecordingBandwidth" type="ws:Range1To100" use="required"/>
<xs:attribute name="DeliveryBandwidth" type="ws:Range1To100" use="required"/>
<xs:attribute name="StorageCapacity" type="ws:Range1To100" use="required"/>
<xs:attribute name="LocationVirtualIP" type="ws:IsValidIP" use="required"/>
<xs:attribute name="LocationSubnetMask" type="ws:IsValidSubNetMask" use="required"/>
<xs:attribute name="HTTPDSCP" type="ws:DSCPLimit" use="required"/>
<xs:attribute name="MceIP" type="ws:MceIP" />
<xs:attribute name="McePort" type="ws:NotNullPort" use="required"/>
<xs:attribute name="MceUdsDir" type="ws:NotNullstring" use="required"/>
<xs:attribute name="RetryStatusAttempts" type="ws:Range0To100" use="required"/>
<xs:attribute name="RetryStatusInterval" type="ws:Range60To3600" use="required"/>
<xs:attribute name="RecordingValidationAge" type="ws:Range0To10" use="required"/>
</xs:complexType>
</xs:element>

<!-- Configure/System/VBO Setup/Exporter elements -->

<xs:element name="VBO">
  <xs:complexType>
    <xs:attribute name="VHO" type="xs:positiveInteger"/>
    <xs:attribute name="DomainName" type="xs:string"/>
    <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
    <xs:attribute name="Port" type="ws:NotNullPort"/>
    <xs:attribute name="ReceiveTimeOut" type="xs:positiveInteger"/>
    <xs:attribute name="ODRMNotifyUrl" type="xs:string"/>
    <xs:attribute name="ODRMNameSpace" type="xs:string"/>
    <xs:attribute name="SetupNameSpace" type="xs:string"/>
    <xs:attribute name="SetupInterfaceUrl" type="xs:string"/>
    <xs:attribute name="VBOIMNameSpace" type="xs:string"/>
    <xs:attribute name="VBOIMInterfaceURI" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="VBOList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:VBO" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:simpleType name="MceIP">
  <xs:restriction base="xs:string">
    <xs:enumeration value="127.0.0.1"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ValueIs5">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="5" />   
    <xs:maxInclusive value="5" />   
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ValueIs15">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="15" />   
    <xs:maxInclusive value="15" />   
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="Range0To10">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0" />
    <xs:maxInclusive value="10" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range0To100">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="0" />
    <xs:maxInclusive value="100" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To100">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="100" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range60To3600">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="60" />
    <xs:maxInclusive value="3600" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range2To30">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="2" />
    <xs:maxInclusive value="30" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To16">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="16" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To600">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="600" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ProtocolVersion">
  <xs:restriction base="xs:string">
    <xs:enumeration value="I02" />
    <xs:enumeration value="I04" />
    <xs:enumeration value="i02" />
    <xs:enumeration value="i04" />
    <xs:enumeration value="2" />
    <xs:enumeration value="4" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ThreadpoolSize">
  <xs:restriction base="xs:integer">
    <xs:minInclusive value="16" />
  </xs:restriction>
</xs:simpleType>
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<context>
<xs:simpleType name="StatusReportInterval">
<xs:restriction base="xs:integer">
<xs:minInclusive value="60" />
<xs:maxInclusive value="60" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="HTTPRequestTimeout">
<xs:restriction base="xs:integer">
<xs:minInclusive value="5" />
<xs:maxInclusive value="5" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="HTTPResponseTimeout">
<xs:restriction base="xs:integer">
<xs:minInclusive value="5" />
<xs:maxInclusive value="5" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="Range1To60">
<xs:restriction base="xs:integer">
<xs:minInclusive value="1" />
<xs:maxInclusive value="60" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="RecorderPort">
<xs:restriction base="xs:integer">
<xs:minInclusive value="50005" />
<xs:maxInclusive value="65535" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="SCTE35AdMarkers">
<xs:restriction base="xs:string">
<xs:enumeration value="Retain" />
<xs:enumeration value="Discard" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidSubNetMask">
<xs:restriction base="xs:string">
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="DSCPLimit">
<xs:restriction base="xs:integer">
<xs:minInclusive value="0" />
<xs:maxInclusive value="63" />
</xs:restriction>
</xs:simpleType>

<!-- Configure/System/IP Nicknames elements -->
<xs:element name="IPNickName">
  <xs:complexType>
    <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
    <xs:attribute name="NickName" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="QAMIPNickName">
  <xs:complexType>
    <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
    <xs:attribute name="NickName" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="IPNickNames">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:IPNickName" minOccurs="0" maxOccurs="unbounded" />  
      <xs:element ref="ws:QAMIPNickName" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="MediaImporterSettings">
  <xs:complexType>
    <xs:attribute name="ImporterType" type="ws:ImporterType"/>
    <xs:attribute name="TransformerType" type="ws:TransformerType"/>
    <xs:attribute name="AutoImport" type="ws:EnableDisableEnum"/>
    <xs:attribute name="FTPServerIP" type="ws:IsValidIP"/>
    <xs:attribute name="FTPPath" type="ws:NotNullstring"/>
    <xs:attribute name="UserName" type="ws:NotNullstring"/>
    <xs:attribute name="Password" type="xs:string"/>
    <xs:attribute name="RetryCount" type="xs:positiveInteger"/>
    <xs:attribute name="ImportTime" type="ws:IsTime"/>
    <xs:attribute name="ImportDays" type="xs:string"/>
    <xs:attribute name="Protocol" type="ws:ProtocolTypes"/>
    <xs:attribute name="AuthenticationMode" type="ws:AuthModeTypes"/>
    <xs:attribute name="PublicKeyPath" type="ws:NotNullstring"/>
    <xs:attribute name="Passphrase" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="MediaExporterSettings">
  <xs:complexType>
    <xs:attribute name="PreNotification" type="xs:positiveInteger"/>
    <xs:attribute name="NotifyURLPrefix" type="ws:NotNullstring"/>
    <xs:attribute name="NotifyHostIP" type="ws:IsValidIP"/>
    <xs:attribute name="NotifyHostPort" type="ws:NotNullPort"/>
  </xs:complexType>
</xs:element>

<xs:element name="MediaServiceSettings">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:MediaImporterSettings" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:MediaExporterSettings" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
<!-- Configure/System/Input Channels elements -->

<xs:element name="Channel">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string"/>
    <xs:attribute name="MulticastIP" type="ws:IsValidIP"/>
    <xs:attribute name="Port" type="ws:NotNullPort"/>
    <xs:attribute name="ChannelCode" type="ws:NotNullstring"/>
    <xs:attribute name="ChannelID" type="xs:nonNegativeInteger"/>
    <xs:attribute name="CategoryID" type="xs:nonNegativeInteger"/>
    <xs:attribute name="GenreCategory" type="ws:NotNullstring"/>
    <xs:attribute name="NetworkCategory" type="ws:NotNullstring"/>
    <xs:attribute name="CatalogID" type="xs:nonNegativeInteger"/>
    <xs:attribute name="Product" type="ws:NotNullstring"/>
    <xs:attribute name="ProviderName" type="ws:NotNullstring"/>
    <xs:attribute name="ProviderID" type="ws:NotNullstring"/>
    <xs:attribute name="PreviewPeriod" type="xs:nonNegativeInteger"/>
    <xs:attribute name="LWindowStart" type="xs:nonNegativeInteger"/>
    <xs:attribute name="LWindowEnd" type="xs:nonNegativeInteger"/>
    <xs:attribute name="LWindowLengthDay" type="xs:nonNegativeInteger"/>
    <xs:attribute name="LWindowLengthMonth" type="xs:nonNegativeInteger"/>
    <xs:attribute name="Encryption" type="ws:YesNoEnum"/>
    <xs:attribute name="Rating" type="ws:NotNullstring"/>
    <xs:attribute name="PublishTime" type="xs:nonNegativeInteger"/>
    <xs:attribute name="Price" type="ws:NotNullstring"/>
    <xs:attribute name="BillID" type="xs:string"/>
    <xs:attribute name="CopyProtection" type="ws:YesNoEnum"/>
    <xs:attribute name="ViewCanBeResumed" type="ws:YesNoEnum"/>
    <xs:attribute name="AudioType" type="ws:AudioType"/>
    <xs:attribute name="ClosedCaptioning" type="ws:YesNoEnum"/>
    <xs:attribute name="ShowType" type="xs:string"/>
    <xs:attribute name="MaxViewLengthDays" type="xs:nonNegativeInteger"/>
    <xs:attribute name="MaxViewLengthHours" type="xs:nonNegativeInteger"/>
    <xs:attribute name="MaxViewLengthMinutes" type="xs:nonNegativeInteger"/>
    <xs:attribute name="ProviderQAContact" type="xs:string"/>
    <xs:attribute name="ContentType" type="ws:ContentType"/>
  </xs:complexType>
</xs:element>

<xs:element name="ProgramSchedules">
  <xs:complexType>
    <xs:attribute name="Import" type="ws:YesNoEnum"/>
    <xs:attribute name="FileExtension" type="ws:TribuneFeedExtensionEnum"/>
  </xs:complexType>
</xs:element>

<xs:element name="InputChannels">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Channel" minOccurs="0" maxOccurs="unbounded" />
      <xs:element ref="ws:ProgramSchedules" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/Output Channels elements -->

<xs:element name="OutputChannel">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string"/>
    <xs:attribute name="DestIP" type="ws:IsValidIP"/>
  </xs:complexType>
</xs:element>
<xs:attribute name="DestPort" type="ws:NotNullPort"/>
</xs:complexType>

<xs:element name="OutputChannelConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:OutputChannel" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/SOP elements -->

<xs:element name="SOP">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string"/>
    <xs:attribute name="VirtualIP" type="ws:IsValidIP"/>
  </xs:complexType>
</xs:element>

<xs:element name="SourceOutputPort">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:SOP" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/CallSign elements -->

<xs:element name="CallSign">
  <xs:complexType>
    <xs:attribute name="Name" type="xs:string"/>
    <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
    <xs:attribute name="Port" type="ws:NotNullPort"/>
    <xs:attribute name="BitRate" type="xs:string"/>
    <xs:attribute name="PrimarySourceIP" type="xs:string"/>
    <xs:attribute name="BackupSourceIP" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="CallSignSetup">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:CallSign" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- Configure/System/LogConfig elements -->

<xs:element name="flag">
  <xs:complexType>
    <xs:attribute name="name" type="xs:string"/>
  </xs:complexType>
</xs:element>

<xs:element name="debug-flags">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:flag" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
<xs:complexType>
  <xs:sequence>
    <xs:element ref="ws:debug-flags" minOccurs="0" maxOccurs="1" />
  </xs:sequence>
</xs:complexType>

<xs:element name="Facility">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:debug-flags" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="LogConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Facility" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!-- SyslogConfig elements -->
<xs:element name="SyslogConfigDetails">
  <xs:complexType>
    <xs:attribute name="RemoteLogging" type="ws:EnableDisableEnum" />
    <xs:attribute name="IPAddress" type="ws:IsValidIP" />
    <xs:attribute name="Port" type="ws:NotNullPort" />
  </xs:complexType>
</xs:element>

<xs:element name="SyslogConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:SyslogConfigDetails" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="SystemConfiguration">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:DNS" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:NTP" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:HostServiceList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:ArrayNameConfig" minOccurs="0" maxOccurs="1" /> 
      <xs:element ref="ws:MBOList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:ContentRuleList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:PackageRuleList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:AMSList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:QAMList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:VBOList" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:Headend" minOccurs="0" maxOccurs="1" />
      <xs:element ref="ws:StreamDestinationList" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:element>
System-Level Configuration XML Schema

<xs:element ref="ws:ParentChildServiceGroups" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:ISASetup" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:IngestManagerSettings" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:AuthenticationManager" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:IngestTuningSettings" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:MPEGTuning" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:RecorderSharedConfig" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:IPNickNames" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:MediaServiceSettings" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:InputChannels" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:SourceOutputPort" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:OutputChannelConfig" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:CallSignSetup" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:IngestDriverServerSettings" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:LogConfig" minOccurs="0"
    maxOccurs="1" />
<xs:element ref="ws:SyslogConfig" minOccurs="0"
    maxOccurs="1" />
</xs:sequence>
</xs:complexType>
</xs:element>

<xs:simpleType name="AdMarker">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Retain" />
        <xs:enumeration value="Discard" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="EnableDisableEnum">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Enable" />
        <xs:enumeration value="Disable" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ImporterType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Host" />
        <xs:enumeration value="Other" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="TransformerType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="OCN" />
        <xs:enumeration value="Tribune" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="Schedule">
    <xs:restriction base="xs:string">
    </xs:restriction>
</xs:simpleType>
<xs:enumeration value="Daily" />
<xs:enumeration value="Weekly" />
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="StreamingMode">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ASI" />
    <xs:enumeration value="GigE" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="TME-SCE">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Enable for OpenStream" />
    <xs:enumeration value="Enable for MystroMDN" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="YesNoEnum">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Yes" />
    <xs:enumeration value="No" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="TribuneFeedExtensionEnum">
  <xs:restriction base="xs:string">
    <xs:enumeration value="gz" />
    <xs:enumeration value="xml" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidIP">
  <xs:restriction base="xs:string">
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsTime">
  <xs:restriction base="xs:string">
    <xs:pattern values="(((0-1)[0-9]|(2[0-3]))\{2\})\{-{0-5}[0-9]})" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullPort">
  <xs:restriction base="xs:positiveInteger">
    <xs:minInclusive value="1" />
    <xs:maxInclusive value="65535" />
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ErrorCountMethod">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Per Minute(s)" />
    <xs:enumeration value="Per Sample" />
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="AuthProtocol">
    <xs:restriction base="xs:string">
        <xs:enumeration value="EventIS" />
        <xs:enumeration value="Cisco" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="FTPServerMountEnum">
    <xs:restriction base="xs:string">
        <xs:enumeration value="FTP" />
        <xs:enumeration value="CIFS" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ContentStoreType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Disable" />
        <xs:enumeration value="ISA" />
        <xs:enumeration value="FSI" />
        <xs:enumeration value="NGOD" />
        <xs:enumeration value="OpenStream" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="EncryptionType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Disable" />
        <xs:enumeration value="Verimatrix" />
        <xs:enumeration value="WideVine" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="AudioType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="Mono" />
        <xs:enumeration value="Stereo" />
        <xs:enumeration value="Dolby Pro" />
        <xs:enumeration value="Dolby ProLogic" />
        <xs:enumeration value="DD 5.1" />
        <xs:enumeration value="Dolby Digital 5.1" />
        <xs:enumeration value="Dolby 5.1" />
        <xs:enumeration value="DD" />
        <xs:enumeration value="Dolby D" />
        <xs:enumeration value="Dolby Digital" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ContentType">
    <xs:restriction base="xs:string">
        <xs:enumeration value="HD" />
        <xs:enumeration value="SD" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="PTSNPTMode">
    <xs:restriction base="xs:string">
        <xs:enumeration value="File" />
        <xs:enumeration value="Display" />
    </xs:restriction>
</xs:simpleType>

<xs:simpleType name="MPEGIndexMode">
    <xs:restriction base="xs:string">
        <xs:enumeration value="iGate" />
        <xs:enumeration value="NGOD" />
    </xs:restriction>
</xs:simpleType>
<xs:enumeration value="ATIS"/>
</xs:restriction>
</xs:simpleType>

<xs:simpleType name="C2ATimeOut">
  <xs:restriction base="xs:positiveInteger">
    <xs:minInclusive value="1000"/>
    <xs:maxInclusive value="5000"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullstring">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="OnOffEnum">
  <xs:restriction base="xs:string">
    <xs:enumeration value="On"/>
    <xs:enumeration value="Off"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullRangedNameString32">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="32"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullRangedNameString64">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="64"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NotNullRangedNameString">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="63"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NullRangedNameString">
  <xs:restriction base="xs:string">
    <xs:minLength value="0"/>
    <xs:maxLength value="63"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="NullRangedNameString64">
  <xs:restriction base="xs:string">
    <xs:minLength value="0"/>
    <xs:maxLength value="64"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="MaxRange4">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:maxLength value="4"/>
  </xs:restriction>
</xs:simpleType>
</xs:simpleType>

<xs:simpleType name="ProtocolEnum">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ATIS"/>
    <xs:enumeration value="FTP"/>
    <xs:enumeration value="atis"/>
    <xs:enumeration value="ftp"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="TrueFalse">
  <xs:restriction base="xs:string">
    <xs:enumeration value="true"/>
    <xs:enumeration value="True"/>
    <xs:enumeration value="TRUE"/>
    <xs:enumeration value="false"/>
    <xs:enumeration value="False"/>
    <xs:enumeration value="FALSE"/>
    <xs:enumeration value=""/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="ProtocolTypes">
  <xs:restriction base="xs:string">
    <xs:enumeration value="FTP"/>
    <xs:enumeration value="SFTP"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="AuthModeTypes">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Password"/>
    <xs:enumeration value="Public Key"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>
Array-Level Configuration XML Schema

The Array-Level Configuration XML schema file describes and dictates the content of the Array-Level Configuration XML file.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:ws="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs"
  targetNamespace="http://www.cisco.com/schemas/VCPBU/CDS-TV/R0/ciscowebsvcs">

<!-- Configure/Array/Replicate Group Setup/Exporter elements -->

<xs:element name="Server">
  <xs:complexType>
    <xs:attribute name="IPAddress" type="ws:IsValidIP" use="required"/>
    <xs:attribute name="ServerID" type="xs:string" use="required"/>
    <xs:attribute name="GroupID" type="xs:string" use="required"/>
  </xs:complexType>
</xs:element>

<xs:element name="ReplicationGroupMembers">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:Server" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="ReplicationGroupConfig">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:ReplicationGroupMembers" minOccurs="0"
                  maxOccurs="unbounded"/>
      <xs:attribute name="GroupName" type="xs:string"/>
      <xs:attribute name="IPAddress" type="ws:IsValidIP"/>
      <xs:attribute name="SubnetMask" type="ws:IsValidSubNetMask"/>
      <xs:attribute name="Type" type="ws:ReplicateTypeEnum"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="ReplicationGroupConfigList">
  <xs:complexType>
    <xs:sequence>
      <xs:element ref="ws:ReplicationGroupConfig" minOccurs="0"
                  maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:simpleType name="ReplicateTypeEnum">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Cache"/>
    <xs:enumeration value="Vault"/>
    <xs:enumeration value="Streamer"/>
  </xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidIP">
  <xs:restriction base="xs:string">
    <xs:pattern
```
Array-Level Configuration XML Schema

```xml
<xs:schema


</xs:restriction>
</xs:simpleType>

<xs:simpleType name="IsValidSubNetMask">
  <xs:restriction base="xs:string">
    <xs:pattern

value="((255|254|252|248|240|224|192|128)|255).0.0.0|255.(255|254|252|248|240|224|192|128)

</xs:restriction>
</xs:simpleType>

</xs:schema>
```
BMS Communication

This appendix describes the required Business Management System (BMS) configuration settings necessary for communicating with the VDS.

OpenStream/ISA

This section is not meant to replace the OpenStream installation manual. Instead, it is more of a a “cheat sheet” offering a list of values that must be the same on both the OpenStream BMS and the VDS to ensure communication between them. For more information, see the *Open Stream Installation Manual*.

The VDS communicates with the OpenStream BMS through the OpenStream CORBA Naming and Notification Services. Table C-1 describes the IP addresses of the OpenStream CORBA Naming and Notification Services that must be configured on the VDS.

<table>
<thead>
<tr>
<th>Table C-1</th>
<th>OpenStream IP Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content Delivery System Parameter</strong></td>
<td><strong>OpenStream Component</strong></td>
</tr>
<tr>
<td>Name Service IP</td>
<td>The IP address of the CORBA Naming Service used by the OpenStream BMS. Typically, this service resides on the same server as the OpenStream BMS. For more information about this parameter in the VDS, see the “Configuring the Vault for BMS Connectivity” section on page 4-65 or the “Configuring the Streamer for BMS Connectivity” section on page 4-59.</td>
</tr>
<tr>
<td>Notify Service IP</td>
<td>The IP address of the CORBA Notification Service used by the OpenStream BMS. Typically, this service resides on the same server as the OpenStream BMS. For more information about this parameter in the VDS, see the “Configuring the Vault for BMS Connectivity” section on page 4-65 or the “Configuring the Streamer for BMS Connectivity” section on page 4-59.</td>
</tr>
</tbody>
</table>
In addition to the IP addresses of the Naming and Notification Services, the parameters described in Table C-2 must have the same values on both the OpenStream BMS and the VDS.

**Table C-2 OpenStream and Content Delivery System Parameters**

<table>
<thead>
<tr>
<th>OpenStream Parameter</th>
<th>Content Delivery System Field</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name Service Port</td>
<td>Name Service Port</td>
<td>5000</td>
</tr>
<tr>
<td>Notify Service Port</td>
<td>Notify Service Port</td>
<td>5005</td>
</tr>
<tr>
<td>Notify Event Channel Factory</td>
<td>Event Channel Factory</td>
<td>DefaultEventChannelFactory</td>
</tr>
<tr>
<td>Event Channels (Root)</td>
<td>Event Channel ID</td>
<td>EventChannels</td>
</tr>
<tr>
<td>Event Channels Kind</td>
<td>Event Channel Kind</td>
<td>Context</td>
</tr>
<tr>
<td>Content Channel</td>
<td>Event Channel Content ID</td>
<td>ContentChannel</td>
</tr>
<tr>
<td>Event Channel Content Kind</td>
<td>Event Channel Content Kind</td>
<td>Factory</td>
</tr>
<tr>
<td>Stream Channel</td>
<td>Event Channel Stream ID</td>
<td>StreamChannel</td>
</tr>
<tr>
<td>Stream Channel Kind</td>
<td>Event Channel Stream Kind</td>
<td>Factory</td>
</tr>
<tr>
<td>Factories (Root)</td>
<td>Factories ID</td>
<td>Factories</td>
</tr>
<tr>
<td>Factories Kind</td>
<td>Factories Kind</td>
<td>Context</td>
</tr>
<tr>
<td>ContentStoreFactory:</td>
<td>Content Store Factory ID</td>
<td>ArroyoContentStoreFactory_XXXXXXX</td>
</tr>
<tr>
<td>$$$.Factory, where $$$ is a value given by the Cisco installation engineer</td>
<td>Content Store Name</td>
<td>ArroyoContentStore_XXXXXX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Where XXXX is a unique number within the Content Delivery System.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Kind type of Factory is appended to the ID before registering with the CORBA Naming Service.</td>
</tr>
<tr>
<td>ContentStore:</td>
<td>Content Store Name</td>
<td>ArroyoContentStore_XXXXXX</td>
</tr>
<tr>
<td>$$$.Factory, where $$$ is a value given by the Cisco installation engineer</td>
<td></td>
<td>Where XXXX is a unique number within the Content Delivery System.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Kind type of Factory is appended to the ID before registering with the CORBA Naming Service.</td>
</tr>
<tr>
<td>StreamService:</td>
<td>StreamSvc Master ID</td>
<td>ArroyoStreamService_XXXXXX</td>
</tr>
<tr>
<td>$$$.Factory, where $$$ is a value given by the Cisco installation engineer</td>
<td></td>
<td>Where XXXX is a unique number within the Content Delivery System.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Kind type of Factory is appended to the ID before registering with the CORBA Naming Service.</td>
</tr>
<tr>
<td>StreamingMode</td>
<td>Streaming Mode</td>
<td>The default is 1, representing that the streaming mode of the next device is gigabit Ethernet.</td>
</tr>
</tbody>
</table>
Lastly, there are four other parameters that need to be considered when configuring the OpenStream BMS and the VDS. They are:

- Headend ID
- LSC Response Padding
- Sessions Poll Time
- Stream Timeout Time

These four parameters in the VDS with their default values work properly with the OpenStream BMS. For more information about configuring the VDS to communicate with the OpenStream BMS, see the “Configuring the Streamer for BMS Connectivity” section on page 4-59.
SNMP MIB and Trap Information

This appendix describes the Simple Network Management Protocol (SNMP) management objects and traps sent by the VDS. The topics covered in this appendix include:

- Overview, page D-1
- SNMP Management Objects and Traps, page D-2
- RFC Compliance, page D-6

Overview

You can manage the servers by way of SNMP from a Network Management System (NMS). To implement SNMP management, the servers must be configured with a management IP address, SNMP community strings, and contact information.

For information about configuring the server for SNMP communication, see the “Configuring the SNMP Agent” section on page 4-140.

*Note*

We recommend configuring a VLAN for management traffic.

SNMP management features on the servers include:

- SNMPv1, SNMPv2c, and SNMPv3
- Standard MIBs

SNMP Agent

The SNMP agent of the server uses certain variables that are included in a Cisco Management Information Base (MIB) file.

The SNMP agent is controlled by the following commands:

```
# service snmpd start
# service snmpd stop
# service snmpd restart
```

The snmpd service rc script automatically configures the snmpd service to be started in Linux run-levels 5 and 6. To make any changes to this behavior, the `chkconfig` or `ntsysv` commands can be used. The following command configures snmpd to be managed by using the `chkconfig` command:
# chkconfig --add snmpd

The following command configures snmpd to be turned on in run levels 5 and 6:

# chkconfig --level 56 snmpd on

**SNMP Log**

The SNMP log file, snmpd.log, is located in the /arroyo/log directory. All log entries use UTC for the time stamp. All TV VDS-specific SNMP traps are logged in the snmpd.log file.

**SNMP Agent on a CDSM or VVIM**

The SNMP agent on the CDSM must be manually configured, you cannot configure the SNMP settings on the CDSM by using the **Configure > Server Level > SNMP** page. Check that the snmpd.conf file on the CDSM is properly configured by logging in to the CDSM as user `root`, going to the /usr/local/share/snmp directory and viewing the snmpd.conf file. If the SNMP settings are not correct, manually configure them by editing the snmpd.conf file.

**SNMP Management Objects and Traps**

The VDS SNMP agent and Management Information Base (MIB) file are compliant with the Internet Engineering Task Force (IETF) standards for SNMP v1, SNMP v2c, and SNMPv3. For a list of SNMP-associated Request For Comment (RFC) specifications, see the “RFC Compliance” section on page D-6.

The Cisco TV VDS MIBs consist of the following:

- CISCO-CDS-TV-MIB.my
- CISCO-CDSTV-SERVICES-MIB.my
- CISCO-CDSTV-FSI-MIB.my
- CISCO-CDSTV-INGESTMGR-MIB.my
- CISCO-CDSTV-BWMGR-MIB.my
- CISCO-CDSTV-INGEST-TUNING-MIB.my
- CISCO-CDSTV-CS-STATS-MIB.my
- CISCO-CDSTV-AUTHMGR-MIB.my
- CISCO-CDSTV-SERVER-MIB.my
- CISCO-CDSTV-ISA-MIB.my

The Cisco TV VDS MIBs are available through the CDSM, and are dependent on the following MIBs distributed on Cisco.com:

You can download the MIBs by doing the following:

---

**Step 1**  
Choose **Configure > Server Level > SNMP Agent**. The SNMP Agent page is displayed with a list of the MIB files at the bottom of the page.

**Step 2**  
To save the file locally, right-click the MIB filename, and choose **Save As**, **Save Target As**, or a similar save command.

To view the file, click the MIB filename.

---

The CISCO-CDS-TV-MIB.my file has the following MIB nodes:
- `cdstvConfigObjects`—Configuration of servers
- `cdstvMonitorObjects`—Monitoring of cache-fill, streaming, disk states, and services running
- `cdstvNotifyObjects`—Objects specific to traps (notifications), for example, Managed Services Architecture (MSA) event objects

Table D-1 describes the traps in the CISCO-CDS-TV-MIB.

<table>
<thead>
<tr>
<th>Trap</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>cdstvDiskHealthUp</code></td>
<td>Previously inactive disk is now active and ready, that is, the disk has</td>
</tr>
<tr>
<td></td>
<td>returned to the OK (0) state.</td>
</tr>
<tr>
<td><code>cdstvDiskHealthDown</code></td>
<td>Active disk is now inactive, that is, it has left the OK (0) state.</td>
</tr>
<tr>
<td><code>cdstvMSAEvent</code></td>
<td>MSA event (error) has occurred.</td>
</tr>
<tr>
<td><code>cdstvServiceUp</code></td>
<td>Previously stopped service is now running, that is, it has left the not</td>
</tr>
<tr>
<td></td>
<td>running state. The <code>cdstvServiceName</code> object, which contains the name</td>
</tr>
<tr>
<td></td>
<td>of the service, is sent with the trap.</td>
</tr>
<tr>
<td><code>cdstvServiceDown</code></td>
<td>Previously running service is now stopped, that is, it has left the running</td>
</tr>
<tr>
<td></td>
<td>state. The <code>cdstvServiceName</code> object, which contains the name of the</td>
</tr>
<tr>
<td></td>
<td>service, is sent with the trap.</td>
</tr>
<tr>
<td><code>cdstvDiskUsageHigh</code></td>
<td>Disk usage on the system has crossed the maximum usage threshold.</td>
</tr>
<tr>
<td></td>
<td>The <code>cdstvDiskUsagePercent</code> object, which contains the percentage of the</td>
</tr>
<tr>
<td></td>
<td>disk that is used, is sent with the trap.</td>
</tr>
<tr>
<td></td>
<td>This trap corresponds to the Disk Capacity Notify field on the System</td>
</tr>
<tr>
<td></td>
<td>Threshold page. For more information, see the “Setting System</td>
</tr>
<tr>
<td></td>
<td>Thresholds” section on page 7-14.</td>
</tr>
<tr>
<td></td>
<td>When the disk usage exceeds the threshold set for the Disk Capacity Notify</td>
</tr>
<tr>
<td></td>
<td>field, the <code>cdstvDiskUsageHigh</code> trap is sent.</td>
</tr>
<tr>
<td><code>cdstvDiskUsageNormal</code></td>
<td>Disk usage on the system has returned to a value within the usage threshold.</td>
</tr>
<tr>
<td></td>
<td>The <code>cdstvDiskUsagePercent</code> object, which contains the percentage of the</td>
</tr>
<tr>
<td></td>
<td>disk that is used, is sent with the trap.</td>
</tr>
<tr>
<td><code>cdstvLinuxFSUsageHigh</code></td>
<td>Linux file system (FS) usage on the server has crossed the maximum</td>
</tr>
<tr>
<td></td>
<td>usage threshold. The <code>cdstvLinuxFSMountPoint</code> and <code>cdstvLinuxFSUsagePercent</code></td>
</tr>
<tr>
<td></td>
<td>objects, which contain the mount point and the percentage used, are sent</td>
</tr>
<tr>
<td></td>
<td>with the trap.</td>
</tr>
</tbody>
</table>
### SNMP Management Objects and Traps

**cdstvLinuxFSUsageNormal**

Linux file system (FS) usage on the server has returned to a value within the usage threshold. The cdstvLinuxFSMountPoint and cdstvLinuxFSUsagePercent objects, which contain the mount point and the percentage used, are sent with the trap.

**cdstvPortLossHigh**

Port loss on the system has crossed the maximum threshold. The cdstvPortLossPercent object, which contains port loss percentage, is sent with the trap.

**cdstvPortLossNormal**

Port loss on the system has returned to a value within the threshold. The cdstvPortLossPercent object, which contains port loss percentage, is sent with the trap.

**cdstvSysHealthUp**

Previously abnormal system health parameter is now normal, that is, it has left the not OK state. See Table D-2 on page D-6 for the descriptions of the objects sent with this trap.

**cdstvSysHealthDown**

Previously normal system health parameter is now abnormal, that is, it has left the OK state. See Table D-2 on page D-6 for the descriptions of the objects sent with this trap.

**cdstvBrokenAsset**

Signifies that one or more assets on a Vault or ISV are broken. A trap is sent whenever the number of broken assets found changes, whether from 0 to n, n to m, or m to 0. The trap contains one object, cdstvBrokenAssets, which specifies the current number of broken assets.

The broken asset information stays in memory and is not persisted in the database.

**Note** The cdstvBrokenAssets value is only valid if the Vault is the master Vault, which can be verified by the cdstvVaultMasterSlaveStatus object.

**cdstvServerStatusSlave**

This server is now a slave.

The cdstvServerMasterSlaveStatus object is set when the server status changes to master or slave; it has two possible values: master (1) and slave (2). A value of 0 means that the status is not yet available from statsd.

**cdstvServerStatusMaster**

This server is now a master.

The cdstvServerMasterSlaveStatus object is set when the server status changes to master or slave; it has two possible values: master (1) and slave (2). A value of 0 means that the status is not yet available from statsd.

**cdstvSetupIpChanged**

Setup IP address has changed (Streamer and ISV only).

If Setup IP and Control IP are the same (Setup/Control IP) and both change simultaneously, both cdstvSetupIpChanged and cdstvControlIpChanged traps are sent.

**cdstvControlIpChanged**

Control IP address has changed (Streamer and ISV only).

If Setup IP and Control IP are the same (Setup/Control IP) and both change simultaneously, both cdstvSetupIpChanged and cdstvControlIpChanged traps are sent.

---

**Table D-1 Cisco TV VDS Traps (continued)**

<table>
<thead>
<tr>
<th>Trap</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cdstvLinuxFSUsageNormal</td>
<td>Linux file system (FS) usage on the server has returned to a value within the usage threshold. The cdstvLinuxFSMountPoint and cdstvLinuxFSUsagePercent objects, which contain the mount point and the percentage used, are sent with the trap.</td>
</tr>
<tr>
<td>cdstvPortLossHigh</td>
<td>Port loss on the system has crossed the maximum threshold. The cdstvPortLossPercent object, which contains port loss percentage, is sent with the trap.</td>
</tr>
<tr>
<td>cdstvPortLossNormal</td>
<td>Port loss on the system has returned to a value within the threshold. The cdstvPortLossPercent object, which contains port loss percentage, is sent with the trap.</td>
</tr>
<tr>
<td>cdstvSysHealthUp</td>
<td>Previously abnormal system health parameter is now normal, that is, it has left the not OK state. See Table D-2 on page D-6 for the descriptions of the objects sent with this trap.</td>
</tr>
<tr>
<td>cdstvSysHealthDown</td>
<td>Previously normal system health parameter is now abnormal, that is, it has left the OK state. See Table D-2 on page D-6 for the descriptions of the objects sent with this trap.</td>
</tr>
<tr>
<td>cdstvBrokenAsset</td>
<td>Signifies that one or more assets on a Vault or ISV are broken. A trap is sent whenever the number of broken assets found changes, whether from 0 to n, n to m, or m to 0. The trap contains one object, cdstvBrokenAssets, which specifies the current number of broken assets. The broken asset information stays in memory and is not persisted in the database. <strong>Note</strong> The cdstvBrokenAssets value is only valid if the Vault is the master Vault, which can be verified by the cdstvVaultMasterSlaveStatus object.</td>
</tr>
<tr>
<td>cdstvServerStatusSlave</td>
<td>This server is now a slave. The cdstvServerMasterSlaveStatus object is set when the server status changes to master or slave; it has two possible values: master (1) and slave (2). A value of 0 means that the status is not yet available from statsd.</td>
</tr>
<tr>
<td>cdstvServerStatusMaster</td>
<td>This server is now a master. The cdstvServerMasterSlaveStatus object is set when the server status changes to master or slave; it has two possible values: master (1) and slave (2). A value of 0 means that the status is not yet available from statsd.</td>
</tr>
<tr>
<td>cdstvSetupIpChanged</td>
<td>Setup IP address has changed (Streamer and ISV only). If Setup IP and Control IP are the same (Setup/Control IP) and both change simultaneously, both cdstvSetupIpChanged and cdstvControlIpChanged traps are sent.</td>
</tr>
<tr>
<td>cdstvControlIpChanged</td>
<td>Control IP address has changed (Streamer and ISV only). If Setup IP and Control IP are the same (Setup/Control IP) and both change simultaneously, both cdstvSetupIpChanged and cdstvControlIpChanged traps are sent.</td>
</tr>
</tbody>
</table>
Appendix D  SNMP MIB and Trap Information

Cisco VDS-TV ISA Software Configuration Guide

SNMP Management Objects and Traps

Monitored Broken Assets SNMP Traps

After the statsd process is started, it waits 5 minutes (300 seconds) before collecting statistics. If a broken asset occurs within these 5 minutes, it is detected and the cdstvBrokenAsset trap is sent.

After the first cycle of collecting statistics is complete, statsd waits 60 minutes from the beginning of the previous cycle before collecting statistics again. This repeats every 60 minutes.

Note

If at any point mirroring is active, the statistics collection is skipped.

The time delay in receiving the cdstvBrokenAsset trap after a broken asset occurs depends on how much time is left until the next time statsd collects content statistics.

Monitored Services SNMP Traps

The services reported as up or down in SNMP correspond to the services on the Service Monitor page. For more information on the monitored services, see the “Services Monitor” section on page 5-46.

For the cdstvServiceUp and cdstvServiceDown traps in the CISCO-CDTV-SERVICES-MIB, if the database shuts down, a cdstvServiceDown trap is sent for the Cisco DB server, but no other services can be monitored without the database running. No SNMP traps are sent for services until the database is functional again.

If the SNMP agent itself is down, the CDSM shows the Cisco SNMP Server as “Not Running” but no SNMP trap can be sent for this service because the SNMP agent itself is down.

If the VDS server is shut down cleanly, there may be a cdstvServiceDown trap sent for the Cisco SNMP Server before the entire server shuts down. No traps can be sent until the SNMP agent is running.

System Health Threshold Crossing Alerts

The temperature, fans, and power are monitored on the VDS servers and the states and thresholds are displayed on the Server Vitals page. See the “Server Vitals” section on page 5-43. If a threshold is exceeded, an alarmed event is registered on the CDSM and the cdstvSysHealthDown trap is sent with information about the threshold crossing alert (TCA).

Note

The Server Vitals page is displayed only if the CDSM Health Monitor feature is enabled. For more information, see the “CDSM or VVIM Health Monitoring” section on page F-16.

Table D-1  Cisco TV VDS Traps (continued)

<table>
<thead>
<tr>
<th>Trap</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cdstvDbConnectionFailed</td>
<td>Database synchronization connection from this VDS server to another VDS server has failed. The cdstvDbConnectionFailedIp OID contains the IP address of the server to which a database connection failed.</td>
</tr>
<tr>
<td>cdstvLinuxFSReadOnly</td>
<td>Signifies that the Linux partition indicated by cdstvLinuxFSMountPoint is read-only.</td>
</tr>
<tr>
<td>cdstvLinuxFSReadWrite</td>
<td>Signifies that the Linux partition indicated by cdstvLinuxFSMountPoint is now back to normal (read-write).</td>
</tr>
<tr>
<td>cdstvLinkUp</td>
<td>Signifies that Ethernet interface and the Ethernet cable is up and/or connected.</td>
</tr>
<tr>
<td>cdstvLinkDown</td>
<td>Signifies that Ethernet interface and the Ethernet cable is down and/or not connected.</td>
</tr>
</tbody>
</table>

cdstvDbConnectionFailed
Database synchronization connection from this VDS server to another VDS server has failed. The cdstvDbConnectionFailedIp OID contains the IP address of the server to which a database connection failed.

cdstvLinuxFSReadOnly
Signifies that the Linux partition indicated by cdstvLinuxFSMountPoint is read-only.

cdstvLinuxFSReadWrite
Signifies that the Linux partition indicated by cdstvLinuxFSMountPoint is now back to normal (read-write).

cdstvLinkUp
Signifies that Ethernet interface and the Ethernet cable is up and/or connected.

cdstvLinkDown
Signifies that Ethernet interface and the Ethernet cable is down and/or not connected.
Table D-2 describes the objects that are sent with the cdstvSysHealthUp and cdstvSysHealthDown traps.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Possible values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cdstvSysHealthName</td>
<td>String</td>
<td>Name of the system health monitoring parameter, for example, VBAT Voltage.</td>
</tr>
<tr>
<td>cdstvSysHealthType</td>
<td>1—Fan-speed</td>
<td>Type of the system health monitoring parameter.</td>
</tr>
<tr>
<td></td>
<td>2—Voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3—Temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4—Chassis intrusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5—Power supply failure</td>
<td></td>
</tr>
<tr>
<td>cdstvSysHealthReading</td>
<td>Integer</td>
<td>Current reading (value) of the system health parameter; for example, fan speed, voltage, or temperature. Fan speed is expressed in revolutions per minute (rpm), voltage in millivolts (mV) and temperature in degree Celsius. For chassis intrusion and power-supply failure, 1 denotes an error condition, and 0 denotes normal condition.</td>
</tr>
<tr>
<td>cdstvSysHealthHighLimit</td>
<td>Integer</td>
<td>Higher limit (threshold) of the system health parameter. Voltage is expressed in mV and temperature in degree Celsius. Not applicable for other parameters such as fan speed.</td>
</tr>
<tr>
<td>cdstvSysHealthLowLimit</td>
<td>Integer</td>
<td>Lower limit (threshold) of the system health parameter. Fan speed is expressed in rpm and voltage in mV. Not applicable for other parameters such as temperature.</td>
</tr>
<tr>
<td>cdstvSysHealthStatus</td>
<td>1—Normal</td>
<td>Current status of the system health parameter. The not-ok value applies to power supply failure and chassis intrusion, because high and low limits do not apply to these parameters.</td>
</tr>
<tr>
<td></td>
<td>2—Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3—High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4—Not-OK</td>
<td></td>
</tr>
</tbody>
</table>

Table D-3 is a list of SNMP RFC standards.

<table>
<thead>
<tr>
<th>RFC Standard</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFC 1155</td>
<td>Structure and Identification of Management Information for TCP/IP-based Internets</td>
</tr>
<tr>
<td>RFC 1157</td>
<td>Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 1212</td>
<td>Concise MIB Definitions</td>
</tr>
<tr>
<td>RFC Standard</td>
<td>Title</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RFC 1213 (STD0017)</td>
<td>Management Information Base for Network Management of TCP/IP-based internets: MIB-II</td>
</tr>
<tr>
<td>RFC 2790 (Draft Standard)</td>
<td>Host Resources MIB</td>
</tr>
<tr>
<td>RFC 1901 (Historic)</td>
<td>Introduction to Community-based SNMPv2</td>
</tr>
<tr>
<td>RFC 1903 (Draft Standard)</td>
<td>Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2)</td>
</tr>
<tr>
<td>RFC 1910 (Historic)</td>
<td>User-based Security Model for SNMPv2</td>
</tr>
<tr>
<td>RFC 2011 (Proposed Standard - Updates RFC 1213)</td>
<td>SNMPv2 Management Information Base for the Internet Protocol using SMIv2</td>
</tr>
<tr>
<td>RFC 2012 (Proposed Standard)</td>
<td>SNMPv2 Management Information Base for the Transmission Control Protocol using SMIv2</td>
</tr>
<tr>
<td>RFC 2013 (Proposed Standard)</td>
<td>SNMPv2 Management Information Base for the User Datagram Protocol using SMIv2</td>
</tr>
<tr>
<td>RFC 2096 (Proposed Standard)</td>
<td>IP Forwarding Table MIB</td>
</tr>
<tr>
<td>RFC 2863 (Draft Standard)</td>
<td>The Interfaces Group MIB</td>
</tr>
<tr>
<td>RFC 3410 (Informational)</td>
<td>Introduction and Applicability Statements for Internet-Standard Management Framework</td>
</tr>
<tr>
<td>RFC 3412 (STD0062)</td>
<td>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 3413 (STD0062)</td>
<td>Simple Network Management Protocol (SNMP) Applications</td>
</tr>
<tr>
<td>RFC 3414 (STD0062)</td>
<td>User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)</td>
</tr>
<tr>
<td>RFC 3415 (STD0062)</td>
<td>View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 3417 (STD0062)</td>
<td>Transport Mappings for the Simple Network Management Protocol (SNMP)</td>
</tr>
</tbody>
</table>
### Table D-3  SNMP RFC Standards (continued)

<table>
<thead>
<tr>
<th>RFC Standard</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFC 3418 (STD0062)</td>
<td>Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 2570 (Informational)</td>
<td>Introduction to Version 3 of the Internet-standard Network Management Framework</td>
</tr>
<tr>
<td>RFC 2571 (Draft Standard)</td>
<td>An Architecture for Describing SNMP Management Frameworks</td>
</tr>
<tr>
<td>RFC 2572 (Draft Standard)</td>
<td>Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 2573 (Draft Standard)</td>
<td>SNMP Applications</td>
</tr>
<tr>
<td>RFC 2575 (Draft Standard)</td>
<td>View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>RFC 2578 (STD0058)</td>
<td>Structure of Management Information Version 2 (SMIv2)</td>
</tr>
<tr>
<td>RFC 2579 (STD0058)</td>
<td>Textual Conventions for SMIv2</td>
</tr>
<tr>
<td>RFC 2580 (STD0058)</td>
<td>Conformance Statements for SMIv2</td>
</tr>
</tbody>
</table>
Using the TV VDS Streamer Application Monitoring Tool

This appendix describes the TV VDS Streamer Application Monitoring Tool (AMT) that can be used to monitor the VOD Error Repair feature. For more information about VOD Error Repair, see the “VOD Error Repair” section on page 1-10. The topics covered in this appendix include:

- Overview, page E-1
- AMT Statistics, page E-3

Overview

The AMT is a browser-based tool installed on the Streamer and used to display the settings and statistics of the VOD Error Repair feature.

The Error Repair page provides a retransmission overview of the following:
- Incoming RTCP NACK requests
- Retransmission packets sent
- Verification that requested and sent repair packets match

The RTP Session page provides details on each RTP stream. You can use this information to verify that the RTP session configuration is correct.

Initializing AMT on the Streamer

AMT is installed on every Streamer as part of the Cisco TV VDS software. There are some additional steps that are required to complete the installation of AMT.

To initialize the AMT, do the following:

1. Start a Telnet or SSH session to the Streamer, logging in as user root.
2. Run the gen_cert.sh script to create the SSL certificate.
3. Edit the rc.local file. Uncomment the following lines:
   
   ```
   service httpd start
   service tomcat5 start
   ```
Overview

Logging In to AMT

AMT uses HyperText Transport Protocol Secure (HTTPS) to access the browser-based GUI. Any valid Linux username and password can be used to log in to AMT. The username does not have to belong to any special group.

To log in to AMT, do the following:

**Step 1** Using your web browser, enter the IP address or hostname of your Streamer.

For example, if the IP address of your Streamer is 192.168.0.235, you can access it by entering https://192.168.0.235 in the address or location text box of your browser program.

The username and password dialog box is displayed.

**Step 2** Enter a Linux username and password for this Streamer and click **OK**. The AMT System Application Status page is displayed (Figure E-1).

*Figure E-1 AMT System Application Status Page*
AMT Statistics

This section provides general information about the information displayed in AMT. Click Refresh to update the displayed data. The AMT statistical data is not updated automatically. The last refresh date and time are displayed to the right of the Refresh button.

Table E-1 describes the information displayed for each page of AMT.

<table>
<thead>
<tr>
<th>Navigation Tree and Tab</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Tabs</strong></td>
<td></td>
</tr>
<tr>
<td>Application Status</td>
<td>Provides the following information:</td>
</tr>
<tr>
<td></td>
<td>• System Up Time—Length of time the Streamer has been up and running</td>
</tr>
<tr>
<td></td>
<td>• Platform—CDE model hosting the TV Streamer Content Delivery Application (CDA)</td>
</tr>
<tr>
<td></td>
<td>• VDS Version—TV VDS software release number</td>
</tr>
<tr>
<td></td>
<td>• VOD Session Status Summary—Percentage of active and inactive RTP sessions</td>
</tr>
<tr>
<td>Hardware</td>
<td>Provides the following information:</td>
</tr>
<tr>
<td></td>
<td>• Processor—CPU model and speed</td>
</tr>
<tr>
<td></td>
<td>• Memory—Total Random Access Memory (RAM) installed in kilobytes (KB).</td>
</tr>
<tr>
<td>System Info</td>
<td>Provides the following information:</td>
</tr>
<tr>
<td></td>
<td>• Hostname—Hostname of the Streamer</td>
</tr>
<tr>
<td></td>
<td>• OS Version—Linux operating system software version</td>
</tr>
<tr>
<td></td>
<td>• NTP Server—NTP server configured for this Streamer</td>
</tr>
<tr>
<td></td>
<td>• DNS Server—DNS servers configured for this Streamer</td>
</tr>
<tr>
<td>Network</td>
<td>Lists the output of the ifconfig command.</td>
</tr>
<tr>
<td>System Status</td>
<td>Provides the following information:</td>
</tr>
<tr>
<td></td>
<td>• Host Uptime—Length of time the Streamer has been up and running</td>
</tr>
<tr>
<td></td>
<td>• Services—Services running on the Streamer</td>
</tr>
<tr>
<td></td>
<td>• File System Disk Space—Used and available disk space</td>
</tr>
<tr>
<td>CServer</td>
<td>CServer status.</td>
</tr>
</tbody>
</table>
Table E-1  AMT GUI Pages (continued)

<table>
<thead>
<tr>
<th>Navigation Tree and Tab</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTP Sessions</td>
<td>Displays the following information on VOD Sessions that can be filtered by session ID, or session destination and subnet mask:</td>
</tr>
<tr>
<td></td>
<td>• Status</td>
</tr>
<tr>
<td></td>
<td>• Session ID</td>
</tr>
<tr>
<td></td>
<td>• Content name</td>
</tr>
<tr>
<td></td>
<td>• Source IP address and port</td>
</tr>
<tr>
<td></td>
<td>• Destination IP address and port</td>
</tr>
<tr>
<td></td>
<td>• Bit rate (Kbps)</td>
</tr>
<tr>
<td></td>
<td>• Repair Enabled</td>
</tr>
<tr>
<td></td>
<td>If a filter is entered, click <strong>Submit</strong> to see the filtered results. If the number of VOD sessions spans several pages, click the <strong>Prev Page</strong> and <strong>Next Page</strong> to view the other pages.</td>
</tr>
<tr>
<td>Error Repair</td>
<td>Displays the configuration settings for this Streamer that were set on the CDSM GUI. For more information, see Chapter 4, “Configuring the VDS.”</td>
</tr>
<tr>
<td>Configuration</td>
<td>Displays the following information:</td>
</tr>
<tr>
<td></td>
<td>• Generic NACK Messages Received</td>
</tr>
<tr>
<td></td>
<td>– Total Messages</td>
</tr>
<tr>
<td></td>
<td>– Invalid Messages</td>
</tr>
<tr>
<td></td>
<td>• Repair RTP Packets</td>
</tr>
<tr>
<td></td>
<td>– Requested</td>
</tr>
<tr>
<td></td>
<td>– Sent</td>
</tr>
<tr>
<td></td>
<td>– Not Sent</td>
</tr>
<tr>
<td></td>
<td>• Inbound and Outbound Error Repair Request Average Rate (packets per second)</td>
</tr>
<tr>
<td></td>
<td>– 5 Second (interval)</td>
</tr>
<tr>
<td></td>
<td>– 1 Minute (interval)</td>
</tr>
<tr>
<td></td>
<td>– 5 Minute (interval)</td>
</tr>
<tr>
<td></td>
<td>– 15 Minute (interval)</td>
</tr>
<tr>
<td></td>
<td>• Advanced—Displays Advanced Debug Statistics for Error Repair. Click <strong>Advanced</strong> to see these statistics.</td>
</tr>
<tr>
<td>Statistics</td>
<td>For more information about the Error Repair statistics, see the “<strong>Viewing Error Repair Statistics</strong>” section on page E-5.</td>
</tr>
<tr>
<td>Excess BW</td>
<td>Displays histogram for Error Repair e-Factor. For more information, see the “<strong>Viewing Excess Bandwidth</strong>” section on page E-7.</td>
</tr>
</tbody>
</table>
Table E-1 AMT GUI Pages (continued)

<table>
<thead>
<tr>
<th>Navigation Tree and Tab</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTCP Exporter</td>
<td></td>
</tr>
<tr>
<td>Configuration</td>
<td>Displays configuration settings for the VQM CDA.</td>
</tr>
<tr>
<td>Statistics</td>
<td>Displays the following information:</td>
</tr>
<tr>
<td></td>
<td>• VQM CDA configuration settings</td>
</tr>
<tr>
<td></td>
<td>• VQM CDA configuration status</td>
</tr>
<tr>
<td></td>
<td>• VQM CDA operational status</td>
</tr>
<tr>
<td></td>
<td>• RTCP Exporter Packets Exported</td>
</tr>
<tr>
<td></td>
<td>• RTCP Exporter Packets Dropped</td>
</tr>
<tr>
<td></td>
<td>• Advanced—Displays Advanced Debug Statistics for VQM. Click Advanced to see these statistics.</td>
</tr>
</tbody>
</table>

Viewing Error Repair Statistics

When you click Error Repair in the navigation tree and click the Statistics tab, AMT displays the Error Repair statistics tab (see Figure E-2).

Figure E-2 Error Repair Statistics Page
Table E-2 lists the information in the Error Repair Statistics page.

**Table E-2 Error Repair Statistics**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic NACK Messages Received</strong></td>
<td></td>
</tr>
<tr>
<td>Total Messages</td>
<td>Number of NACK messages received by this Streamer.</td>
</tr>
<tr>
<td>Invalid Messages</td>
<td>Number of invalid messages received by this Streamer. Invalid messages are received messages that, for example, cannot be parsed.</td>
</tr>
<tr>
<td><strong>Repaired RTP Packets</strong></td>
<td></td>
</tr>
<tr>
<td>Requested</td>
<td>Number of RTP packets set-tops have requested for ER from this Streamer.</td>
</tr>
<tr>
<td>Sent</td>
<td>Number of RTP packets sent by this Streamer that have succeeded in repairing an error.</td>
</tr>
<tr>
<td>Not Sent</td>
<td>Number of failed RTP packets that were not repaired by the Streamer. The Streamer may not be able to send an ER packet for several reasons, including the following:</td>
</tr>
<tr>
<td></td>
<td>• Most likely cause is that the ER requests were bursty and exceeded the ER rate-policer limit at one point.</td>
</tr>
<tr>
<td></td>
<td>• Requested RTP packets were not found in the Streamer memory cache.</td>
</tr>
<tr>
<td></td>
<td>• Streamer failed to send the RTP packets because of a socket sendto() failure.</td>
</tr>
<tr>
<td><strong>Inbound and Outbound Error Repair Average Rate (packets per second)</strong></td>
<td>For each time period, the average number of packets per second that the Streamer has received (inbound) or sent (outbound) to set-tops to repair errors (Unicast Retransmission).</td>
</tr>
</tbody>
</table>
Viewing Excess Bandwidth

When you click **Error Repair** in the navigation tree and click the **Excess BW** tab, AMT displays the Excess BW page (see Figure E-3).

*Figure E-3  Excess BW Page*

If Error Repair is enabled and active, you can choose to display a client e-factor histogram or table by clicking the icons in the upper-right corner of the page. Use the **Select a histogram** drop-down menu to select Error Repair histograms.

An e-factor is an excess bandwidth fraction that determines the rate at which packets are sent during Error Repair. The data displayed in the histograms and tables include the following:

- E-factor count with the number of times a client e-factor has been calculated. This appears on the vertical axis in the histograms.
- E-factor distribution of the client e-factor percentages that have been used. This appears on the horizontal axis in the histograms. If the distribution is widely dispersed, there can be more than one grouping of percentages.

Move the slider below the histograms to change the way in which the histograms are displayed. The e-factor percentages cannot be negative values.
Engineering Access Level Pages

This appendix describes the VVIM or CDSM pages available through the Engineering access level. The Engineering access level provides the following pages:

- CDSM or VVIM Diagnostics, page F-2
- CDSM or VVIM Setup, page F-3
- System Configs, page F-16

The Engineering access level is primarily used for initializing the VDS at the time of installation and for system diagnostics. After your system has been configured, you should not require an engineering access level user for day-to-day operations.

When you log in to the CDSM with a user account that has Engineering access level, the first page that is displayed is the CDSM Setup page. All the other CDSM pages that are available with the Master access level are still available with the Engineering access level.

In an RTSP environment, the Configure > Server Level > RTSP Setup page displays four additional fields:

- Database Connect Size
- UDP Packet Size
- Threadpool Size
- Max Sessions

These fields are only for diagnostic purposes, and their values should not be changed.

Note

When you configure the CDSM for Virtual Video Infrastructure (VVI), all references to CDSM are changed to Virtual Video Infrastructure Manager (VVIM) for the Vault and Caching Node manager. For example, the CDSM Audit Logs available through the Report > System Level left-panel menu is changed to the VVIM Audit Logs when VVI is configured on the CDSM Setup page, which changes to the VVIM Setup page.
CDSM or VVIM Diagnostics

To access the CDSM or VVIM Diagnostics page, choose Maintain > Software > CDSM Diagnostics or VVIM Diagnostics. The first section of this page provides configuration information that is useful in diagnosing a problem. The following remaining sections of the CDSM or VVIM Diagnostic page are:

- CIDR Calculator
- Stream Trickmode Debugger
- Unix Timestamp Tool
- Server Diagrams

CIDR Calculator

By entering an IP address and network mask, and clicking Submit, the Classless Inter-Domain Routing (CIDR) Calculator provides the following TCP/IP network information:

- Network address
- Broadcast address
- Number of hosts
- Range of IP addresses for the hosts

Stream Trick-Mode Debugger

To view the trick-mode data for a Session ID enter the Session ID and click Submit. The CDSM or VVIM Diagnostic page refreshes and a View Data button is displayed next to the Submit button. Click View Data to see the raw trick-mode data. A new window displays the data. Right-click in that window and choose View Source in the pop-up menu. A formatted version of the raw data is displayed.

Unix Timestamp Tool

Clicking on a day in the calendar displays the Unix start time and end time. The time is represented in seconds since the start of Unix epoch time, which is 1970-01-01T00:00:00.

Server Diagrams

Choose a server from the Server Diagrams drop-down list and a graphic of the server is displayed.
CDSM or VVIM Setup

The CDSM or VVIM Setup page is used to initially configure the VDS. After you have set the CDSM or VVIM Setup fields for your system, click Submit. Configuration and start up messages are displayed in the left panel.

Deployed CServer Version

This field is always set to 3.X.

Stream Failover Support

Stream failover support is available for both the ISA and RTSP environments. If a Streamer fails, another Streamer in the same Stream Group takes over any active stream sessions without loss of state and backoffice independence.

Stream Steering Mode

Stream steering determines which Streamers serve streams to a QAM device. There are two types of stream steering:

- Single site (Silo site steering)
- Multi-site

Single-site steering uses only one Stream Group to serve streams to all QAM devices. Multi-site steering can use more than one Stream Group to serve streams to the QAM devices. The QAM Gateway page reflects whether single-site or multi-site steering is enabled, by the number of preference levels available. Multi-site steering offers four preference levels (high, medium, low, and none). Single-site steering offers two preference levels (high and none).

---

**Note**

Multi-site steering is available for ASI streaming and gigabit Ethernet streaming. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59 for information about configuring the streaming mode.

Deployment Network Configuration

Specify whether your VDS network topology is a Layer 2 or Layer 3 network.

NIC Bonding

Starting from VDS-TV Release 3.7, NIC Bonding is supported on the management interfaces. Check the Enabled checkbox to configure NIC bonding in Configure > Server Level > Interface Setup page. By default, NIC Bonding is disabled.
Installation Type

The only options are ISA 3.X and RTSP 3.X.

Stream Destination

The possible settings for Stream Destination are Cable, IPTV, Mixed, and Auto.

The Cable setting is the existing configuration with the QAM Gateway page and Headend Setup page, which allows you to map Stream Groups to QAM devices and service groups if applicable.

The IPTV setting provides the Stream Destination page in place of the QAM Gateway page and Headend Setup page. The Stream Destination page allows you to map the Stream Groups to specified subnets, which is useful in IPTV networks where each end-user has an IP address.

The Mixed option for Stream Destination allows both cable and IPTV configuration. Previously, only one Stream Destination type was allowed. The Mixed option makes the QAM Gateway page and associated Headend Setup page available, along with the Stream Destination page.

In ISA environments, the Mixed option is only available for gigabit Ethernet streaming. The Streaming Mode is set on the following configuration pages:

- VVI with Content Storage set to Shared—Shared ISA Setup page
- VDS (legacy)—Streamer BMS page
- VVI with centralized management (combined VVIM and Stream Manager)—Streamer BMS page
- VVI with Content Storage set to Distributed—CDSM Setup page under VVI section

The Auto option was added for RTSP environments, where it typically is not necessary to explicitly configure QAM gateways or IPTV subnets. The Auto option removes these configuration pages from the CDSM GUI. The Auto option is not supported for ISA environments.

Note

The Stream Destination feature is available only for single-site steering and in ISA environments that use gigabit Ethernet streaming as the streaming mode.

NAT Support

An option for ISA environments using the IPTV setting for the Stream Destination is the NAT option. The NAT Traversal feature allows streaming to client devices that are behind a NAT device. All session setup messages go through the backoffice before reaching the RTSP server, while all stream control messages go directly to the RTSP server from the set-top for IPTV networks using NAT.

The supported LSCP client protocols for the NAT Traversal feature are the Cisco (RTSP) and TTV (RTSP). The LSCP Client Protocol must be set to one of these two options on the Streamer BMS page. See the “Configuring the Streamer for BMS Connectivity” section on page 4-59.

Splunk Support

The Cisco VDS-TV 3.5 Release supports Splunk Universal Forwarder that forwards the VDS-TV logs to Splunk Enterprise server for indexing and searching. Check the Enable check box and click Submit, to enable the Splunk Support feature. For more information, see “Configuring the Servers” section on page 4-128.
Parent/Child Service Groups

Parent/Child Service Groups is an optional feature and is only for ISA environments that use ASI streaming. The Parent/Child Service Groups page allows finer granularity of the service groups. For more information, see the “Configuring Parent/Child Service Groups” section on page 4-24.

VBO Support

VBO support is available only for ISA environments. When VBO support is enabled in VVIM and CDSM, VDS supports HTTP based interfaces for stream setup and content acquisitions. On enabling VBO support, the following GUI pages are available in VVIM and CDSM for VBO setup configuration.

- Configure > System Level > VBO Setup

For more information see Configuring VBO Setup, page 4-54

Asset Scale Co-Existence Support

Starting from Release 3.9, VDS-TV supports one million assets in the overall system. Choose Enabled, to maintain the asset in old and upgraded database. Choose Disabled, If all servers associated with the controller are upgraded to latest VDS-TV image that supports one million assets. By default, Asset Scale Co-Existence Support is enabled.

Note

Disabling asset co-existence support is an irreversible process and the assets are maintained only in the upgraded database. Disable co-existence support only after upgrading all the servers to version 3.9 or higher.

Bulk Import/Export Configuration

Bulk Import/Export Configuration provides a method of configuring common configuration parameters for all the servers at one time by means of an XML file, and provides export (backup) and import (restore) capabilities to the Server-Level and System-Level configuration pages. For more information, see Appendix B, “Creating Bulk Import/Export Configuration Files.”

Trick Mode Capture

Trick Mode Capture is an optional feature. When Trick Mode Capture is enabled, the applicable Stream Activity reports can drill down to the Stream Play History Drilldown, which displays the trick modes for a session ID. Additionally, the Graph Stream button is displayed on the Stream Monitor page. The Stream Activity reports that can drill down to the Stream Play History Drilldown are the following:

- Stream Play History
- Streams by Array
- Streams per STM-MAC
- Bandwidth per Service Group
- System Failures
When Trick Mode Capture is disabled, the session ID in the Stream Activity reports no longer links to the Stream Play History Drilldown and the **Graph Stream** button is removed from the Stream Monitor page.

### Fail Ingest Tuning

The Fail Ingest Tuning setting is enabled by default and is available for the CDSM, VVI with central management, and VVIM; it is not available for the Stream Manager. When enabled, the Fail Ingest Tuning fields are displayed on the **Configure > System Level > Ingest Tuning** page and provides the ability to configure the ingest error detection settings for all Vaults in the VDS.

### Vault Groups

When Vault Groups is enabled and at least two Vault Groups are configured and mapped to each other, at least one copy of each content within a group is mirrored to the configured peer group. Content is mirrored among as many as four Vault Groups (one Vault Group ingests the content and up to three Vault Groups mirror the content), which may be in different geographic regions. The Vault Groups feature adds the Vault Groups, Master Vault Group, and Vault Redundancy Map configuration pages to the Array Level.

**Note**
The maximum number of Vault Groups is 20.

### Watermarking Support

Enabling Watermarking Support is required for the Digital Watermarking feature and means that the licensing terms of the watermarking vendor has been acknowledged and accepted. For more information about this feature, see the “Digital Video Watermarking” section on page 1-9.

### Manage Recorders

This feature is not activated in this release. This feature is for the nDVR feature for RTSP environments. The CDSM supports the configuration and monitoring of Cisco Recorders. To enable the **Manage Recorder** option in the CDSM, a file named “recEnable.txt” must be placed in the /arroyo/www/htdocs/initial directory. The content of the file is not read by the CDSM, its presence is merely required to enable this feature. When found, the CDSM Setup page displays the **Manage Recorders** option.

When Manage Recorders is enabled, the following new CDSM GUI pages are available:

- **Configure > System Level > Shared Recorder Settings**
- **Configure > Server Level > Recorder Setup**

The **Configure > Server Level** pages applicable to the Recorders are the following:

- Interface Setup
- Recorder Setup
- Route Table


- SNMP Agent

**ATIS C2 Setup**

Starting from VDS-TV Release 3.4, ATIS C2 is supported on the server side (Vault) that enables Cisco Vaults to serve contents to third party streamers in addition to Cisco streamers capability to stream contents from third party servers. The user can specify ATIS C2 Mode as either Client, Server or None from the drop-down list.

If the user chooses the ATIS C2 Mode as Server, then ATIS C2 is supported on the Vault side and by default the following configurations are set to:

- The VVI options is set to enabled
- The System Management Role is set Vault Manager
- The Content Storage is set to None
- The Ingest Manager is set to On
- The Vault Groups is set to Enabled

If the ATIS C2 Mode is Server then the user can specify the **ATIS C2 Domain Name** to specify the domain name used to AIM to frame the HTTP URL for package publishing and generate Media Resource Metadata (MRM) by CServer.

If the user chooses the ATIS C2 Mode as Client, then ATIS C2 is supported on the Streamer side and the configuration remains the same.

If the user chooses ATIS C2 Mode as None, then ATIS C2 is neither supported on the streamer side nor on the client side.

**DNS Resolution Support**

Starting from VDS-TV Release 3.4, DNS Resolution support is provided on the streamers. DNS Resolution support is applicable only for ATIS C2 Client Setup configuration. Check the **Enabled** check box to specify streamers in the sites require DNS Resolution support. By default, DNS Resolution is disabled.

**TCP Window Scaling Support**

Starting from VDS-TV Release 3.7, TCP Window Scaling support is provided on the vaults and streamers. Check the **Enabled** check box to support TCP Window Scaling on vaults/streamers. If the user chooses the ATIS C2 mode as server, then TCP window scaling is supported on the vault and if the user chooses the ATIS C2 mode as client, then TCP window scaling is supported on the streamer. By default, TCP Window Scaling is enabled.

**MVOD Setup**

The "Multicultural-VOD" feature in the product is focused on scheduling, acquiring, packaging and publishing the linear programs as subscription based VOD assets to Asset Management System (AMS).

To configure MVOD setup, set the VVIM Setup fields as follows:
CDSM or VVIM Setup

Installation Type - ISA 3.x
Vault Group—Enabled
Content Storage—None
Media Scheduler - On
Transformer Type - SA Tribune

VVI—Configure with the following settings:
  - VVI: Enabled
  - Management System Role: Vault Manager
  - Cache Fill Protocols: CCP

Ingest Manager - On

CV Account Settings
- Home Id should be '0'
- Setup Box Address should be '0'

TVOD Setup

The TV On Demand (TVOD) feature enables broadcast recording of live content for a Virtual Video Infrastructure (VVI) system in an ISA environment VDS and interacting with the Ericsson OpenStream backoffice. When TVOD Setup is Enabled, the CallSign Setup page is displayed (Configure > System Level > CallSign Setup).

To ensure the TVOD server is running, log in to the Vault as user isa, go to the /home/isa/IntegrationTest directory, and run the ./show_calypso_services script. The TVOD Manager should be listed as running.

For more information, see the “TV On Demand” section on page 1-12.

Thin Pipe Management

Thin Pipe Management allows you to configure low-bandwidth connections between local and remote sites. A local site consists of groups of servers in the same site, for example, all the Streamers in a Stream Group are considered part of the same site, or local site. A remote site consists of groups of servers in other Stream Groups, Cache Groups, and Vault Groups. Use the Thin Pipe Map page to configure this feature.

Ingest Resiliency

The Ingest Resiliency feature allows parallel redundant copy of the active recording. If enabled then a parallel redundant copy should be recorded. When a recording starts, it should be doing two recordings (one with #B#) for this feature. It should delete the backup copy on recording completion if the first recording is completed successfully. The backup copy will be swapped with the original if the first recording is failed. Choose Enabled to activate this feature and click Submit.
VOD Error Repair

The VOD Error Repair is a licensed feature and requires a software activation key to enable it. For more information about activating the VOD Error Repair, see the “Initializing the VDS and Activating the Optional Features” section on page 3-3.

The VOD Error Repair feature retransmits lost packets to improve the quality of the end-user video experience. The VOD Error Repair feature uses negative acknowledgment (NACK) retransmission methods to implement retransmission-based error repair.

The VOD Error Repair settings can be configured on the System Level, Array Level, and the Server Level. Error Repair and RTP Encapsulation can only be enabled at the System Level and Array Level.

Setting the Client Protocol to Cisco RTSP

The client must be set to Cisco RTSP.

For RTSP environments, log in as a user with Engineering access. The CDSM Setup page is displayed. In the RTSP Deployment Type section, set the Deployment Type to Cisco.

For ISA environments, on the Streamer BMS page (Configure > Array Level > Streamer BMS), in the LSCP Services section, set the LSCP Client Protocol to Cisco (RTSP), and click Submit.

For ISA environments with VVIs and Shared Content Store or Virtual Content Store, the LSCP Services section is on the Configure > Array Level > VHO ISA Settings.

Error Repair Client on STB

VOD Error Repair feature requires that the set-top have the Cisco Visual Quality Experience Client (VQE-C) software running on it. The VQE-C is the error-repair client software, which has the following capabilities:

- Receives RTP video packets
- Detects missing packets
- Requests retransmission of missing packets
- Merges retransmitted packets with original stream
- Collects statistics and counters for monitoring
- Complies with the Cisco RTSP syntax for VOD Error Repair

The VQE-C is a software development kit (SDK) that is available for download through the open-source program.

Media Scheduler

The Media Scheduler is an optional feature and requires a software activation key to enable it. For more information about activating the Media Scheduler, see the “Initializing the VDS and Activating the Optional Features” section on page 3-3. The Media Scheduler allows live ingests from multicast IP addresses and uses the Input Channels page to map multicast IP addresses to channels. You can enable either Media Scheduler or Real-Time Capture Type, but not both.

The Media Scheduler has the option to set the Importer/Transformer Type to either OCN or SA Tribune. This setting is determined by your deployment.

For MVOD Configuration the Importer/Transformer type is set to SA Tribune.
The Start Day of Year for Asset ID Generation is either 0 or 1. The setting is determined by what Cisco TV VDS software release you initially started using Media Scheduler in. In Release 2.1 and earlier releases, the Asset ID starts with 0 per design. In Release 2.2 and later releases, the Asset ID starts with 1 per design.

On enabling the Media Scheduler, the following GUI screens are available to the user:

- Configure > System Level > Input Channels
- Configure > System Level > Media Importer
- Configure > Array Level > Media Scheduler
- Maintain > Software > EPG Upload

Real-Time Capture Type

Real-Time Capture allows live ingests from multicast IP addresses and uses the CallSign Setup page to map the multicast IP addresses to call signs. You can enable either Media Scheduler or Real-Time Capture Type, but not both.

To seed the database with the HomeID field for Real-Time Capture (non-Media Scheduler), you must run the `cv-account-add-homeid0` script as user `isa` in the `/home/isa` directory on the Vault (or ISV). See your Cisco customer representative to get the `cv-account-add-homeid0` script.

Virtual Video Infrastructure

The Virtual Video Infrastructure (VVI) provides management of the Caching Nodes in a central management configuration or a split-domain management configuration.

When you enable VVI, you need to choose the Management System Role of the CDSM. The Management System Role has the following options:

- VVI and Stream Manager—Central management of all Vaults, Caching Nodes, and Streamers
- VVI (Vault/Cache) Manager—Management of only the Vaults and Caching Nodes
- Stream Manager—Management of only the Streamers

The Cache Fill Protocol options are for selecting the type of data communication that is used between Caching Nodes and Streamers. Cache Control Protocol (CCP) is used for communication among the Vaults, Caching Nodes, and Streamers in an ISA environment with Shared Content Store. For more information about CCP Streamers and HTTP Streamers, see the “Caching Node Workflow” section on page 2-12.

Note

ISA environments only support CCP, while RTSP environments support both CCP and HTTP for VVI.

The split-domain management is made up of the VVI (Vault/Cache) Manager and the Stream Manager. For the Stream Manager to be able to communicate with the VVI Manager, you need to enter the IP address of the VVI Manager in the VVI (Vault/Cache) Manager VVIM IP field.

If CCP is used as the cache-fill protocol, you must provide a name for the Stream Manager in the Stream Domain Name field so that the VVIM can identify it from other Stream Managers. Communication between the VVI Manager and the Stream Manager is accomplished through database replication when using CCP.
When you configure the CDSM for Virtual Video Infrastructure (VVI), all references to CDSM are changed to Virtual Video Infrastructure Manager (VVIM) for the Vault and Caching Node manager.

The VVIM and Stream Managers display different configuration, monitoring, reports, and maintenance pages based on the servers they manage. For example, when CCP is the cache-fill protocol, the VVIM displays the Configuration Generator page in the Maintenance > Software left-panel menu. The Configuration Generator page is used to generate the group IDs and server IDs for the Stream Managers to use in their domains.

**Configuring Split-Domain Management**

To configure a VVIM that uses split-domain management, set the VVI fields as follows:

- **VVI Options**—Enabled
- **Management System Role**—VVI (Vault/Cache) Manager
- **Cache Fill Protocol**—CCP

**Note** Content Storage must be enabled to use VVI with split-domain management.

To configure a Stream Manager that uses split-domain management, set the VVI fields as follows:

- **VVI Options**—Enabled
- **Management System Role**—Stream Manager
- **Cache Fill Protocol**—CCP
- **VVI (Vault/Cache) Manager VVIM IP**—IP address of the VVIM
- **Stream Domain Name**—Domain name for the Stream Domain
- **Streaming Mode**—ASI or gigE (Must be set to gigE for the Content Storage feature)

**Configuring ISA Regionalization**

To configure ISA Regionalization on a Stream Manager, set the CDSM Setup fields as follows:

- **Vault Group**—Enabled
- **Content Storage**—Distributed
- **VVI**—Configure with the following settings:
  - **VVI**: Enabled
  - **Management System Role**: Stream Manager
  - **Cache Fill Protocols**: CCP
  - **VVIM IP**: IP address of the VVIM
  - **Stream Domain Name**: name of the Stream Manager
  - **Streaming Mode**: GigE

To configure ISA Regionalization on a VVIM, set the VVIM Setup fields as follows:
CDSM or VVIM Setup

- Vault Group—Enabled
- Content Storage—Distributed
- VVI—Configure with the following settings:
  - VVI: Enabled
  - Management System Role: VVI (Vault/Cache) Manager
  - Cache Fill Protocols: CCP

For more information on configuring ISA Regionalization, see the “ISA Regionalization Configuration Workflow” section on page 3-10.

Configuring Virtual Content Store

To configure Virtual Content Store on a Stream Manager, set the CDSM Setup fields as follows:
- Vault Group—Disabled
- Content Storage—Distributed
- VVI—Configure with the following settings:
  - VVI: Enabled
  - Management System Role: Stream Manager
  - Cache Fill Protocols: CCP
  - VVIM IP: IP address of the VVIM
  - Stream Domain Name: name of the Stream Manager
  - Streaming Mode: Gige

To configure Virtual Content Store on a VVIM, set the VVIM Setup fields as follows:
- Vault Group—Enabled
- Content Storage—Distributed
- VVI—Configure with the following settings:
  - VVI: Enabled
  - Management System Role: VVI (Vault/Cache) Manager
  - Cache Fill Protocols: CCP

For more information on configuring Virtual Content Store, see the “Virtual Content Store Configuration Workflow” section on page 3-10.

Content Storage

The Content Storage feature applies to ISA environments and has the following options:
- None
- Shared
- Distributed

Note: Content Storage is required for VVI with split-domain management in an ISA environment.
None

Content Storage should be set to None for M VOD.

Shared

The Shared Content Storage, also known as Shared Content Store (SCS) allows one instance of a Content Store to be shared with many instances of Stream Services, each located in its own video hub office (VHO) with its own video backoffice (VBO). When SCS is enabled, the Shared ISA Setup page is added to the Configure > System Level pages in the VVIM, and the VHO ISA Setup page is added to the Configure > Array Level in the CDSM. The Shared ISA Setup page has all the Content Store information configured on the Vaults that is shared with all the VBOs. The VHO ISA Setup page has the Stream Services information for similar groups of Stream Groups in the same VHO.

Distributed

The Distributed Content Storage option allows for two configurations:

- ISA Regionalization—Allows the use of a centralized storage facility containing both Vaults and Caching Nodes in a Virtual Video Infrastructure (VVI), while maintaining a localized or remote VDS at each headend. For more information, see the “ISA Regionalization” section on page 2-13. ISA Regionalization requires that Vault Groups be enabled on the Stream Manager CDSM.

- Vault Virtualization—Replaces the SCS with the Virtual Content Store (VCS). No content is ingested at the local VHO. All ingests and deletions of content occur at the central location, and both ingests and deletions are initiated by the local BMS at each local VHO, just as they were in the SCS. However, the VHOs do not need to communicate with the super headend (SHE) as they did with the SCS feature. With VCS, communication of ingestions and deletions is handled by the Ingest Driver client residing on the master Streamer in each VHO and the Ingest Driver server residing on the master Vault in the SHE. Vault Virtualization requires that Vault Groups be disabled on the Stream Manager CDSM. For more information, see the “Virtual Content Store” section on page 2-18.

VVI

When Distributed is selected as the Content Storage type, Streaming Mode (ASI or Gige) option is added under VVI. Streaming Mode must be set to Gige for the Content Storage feature, whether Shared or Distributed is selected. For Shared, the streaming mode is configured on the VHO ISA Setup page. For Distributed, the streaming mode is selected on the CDSM Setup page.

Change Notifications

When VVIM or Stream Manager is the role for a Distributed Content Storage, then the Change Notification option is available. When Change Notifications is enabled, notifications are sent and received between the Stream Manager and the VVIM when changes are made to the Vault Groups and Cache Groups.
Remote Setup and Control Service Support

The Remote Setup and Control Server Support feature allows the Setup and Control servers of the Streamers to be placed in a different location than the Play servers of the Streamers. All control traffic (setup and control) goes to one Streamer (Setup and Control server), and all video data traffic is served from the Streamers designated as the Play servers.

As part of this feature, there is never just one stream transmitted on a single Ethernet interface. There is always at least two active streams transmitted on an interface. For more information, see the “Remote Setup and Control Server” section on page 2-10.

Note

The Remote Setup and Control Server Support feature is supported on a Virtual Video Infrastructure (VVI) with split-domain management in an ISA environment and Content Storage configured as either Shared or Distributed.

The VOD Error Repair feature is not supported with the Remote Setup and Control Server Support feature.

Table F-1 describes the Remote Setup and Control Service Support fields. Configure the settings as appropriate.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Support</td>
<td></td>
</tr>
<tr>
<td>Global Source IP</td>
<td>IP address used by the Streamers acting as the Play servers for transmitting streams. The Global Source Address is defined on all Streamers (Setup, Control, and Play), is hosted on the primary Setup server, and is managed in a fault-tolerant manner.</td>
</tr>
<tr>
<td>Global Source Port</td>
<td>Port number used in conjunction with the Global Source IP address for transmitting stream data. The default is 4000.</td>
</tr>
<tr>
<td>Minimum Streams Per Port</td>
<td>Minimum number of streams allowed on each stream interface on the Streamer Play servers. The default is 0. The range is from 0 to 10.</td>
</tr>
<tr>
<td>Single Session Timeout</td>
<td>Amount of time, in seconds, the first play request can be held on a Play server waiting for a second play request. If the timeout is reached, the first play session fails and the stream request is sent back to the Control server for relocation. The default is 10. The range is from 2 to 20.</td>
</tr>
<tr>
<td>Sessions Per Control</td>
<td>Number of sessions allowed per Control server. The default is 1000. The range is from 10 to 2000.</td>
</tr>
</tbody>
</table>

Playout Scheduler

Playout Scheduler is only available in an ISA environment on a VVI with central management or a legacy CDSM.
The TV Playout features incorporates the TV Playout functionality from a previous release and adds enhancements to these features. The TV Playout feature includes Public, Education, and Government (PEG) channels and Barker Streams. PEG channels differ from traditional broadcast channels in that the service provider itself must ingest and stream the content rather than receiving and forwarding a satellite feed.

The Playout Scheduler has the following options:
- Playout Scheduler—On/Off
- Localized EPG Extension—On/Off

For information on the configuration workflow of the Playout Scheduler and the associated CDSM GUI pages, see the “TV Playout Configuration Workflow” section on page 3-12.

**Localized EPG Extensions**

To enable Localized EPG Extensions, the Playout Scheduler must be enabled.

Localized EPG Extensions adds the `Configure > Array Level > EPG Exporter` page. The EPG Exporter allows you to create an XML file that contains information from the Playout Scheduler for viewing, saving, and importing into a system to create program listings.

When content is selected for ingest on the `Configure > Array Level > Manual Ingest` page, there are two additional fields for Localized EPG Extensions:
- Localized Name
- Localized Description

The `Monitor > System Level > Completed Ingest` page displays the Localized Name and Localized Description fields and allows them to be edited.

The `Configure > Array Level > Barker/Stream Playlist` displays the Localized Name in the content selection field.

The `Configure > Array Level > Playout Scheduler` displays the original ingest name of the content object, not the Localized Name.

**Ingest Manager**

The Ingest Manager is an optional feature and requires a software activation key to enable it. For more information about activating the Ingest Manager, see “Initializing the VDS and Activating the Optional Features” section on page 3-3. The Ingest Manager takes care of provisioned content objects by collecting the metadata, sending messages to the appropriate subsystem to ingest the content, and sending messages to expire the content when the expiration period has passed.

**CV Account Settings**

To support live recording, Under CV Account Settings Home ID and Set Top Box Address should be set to ‘0’.
Ingest Steering

The Ingest Steering feature works with the VVI and Vault Groups features. When Ingest Steering is enabled (along with VVI central management and Vault Groups), the Ingest Steering configuration page displays at the Array Level, and the Vault Group Setup page offers the ability to assign a Vault Group to either a local or national location. The Ingest Steering page offers the ability to map the product ID of the content to a Vault Group that ingests the content.

CDSM or VVIM Health Monitoring

The CDSM Health Monitoring optional feature displays the Server Level monitor page, Server Vitals page and a Vitals column in the System Health Monitor page. The Server Vitals page displays the current values of the server, as well as thresholds, for monitored system components. Server components are monitored and when a threshold is exceeded, the System Health Monitor page and Server Vitals page report the event and an SNMP trap is sent.

System Configs

To access the CDSM or VVIM System Configuration page, choose Maintain > Software > System Configs. The System Configs page contains critical VDS parameters that are set at the time of the initial installation of the VDS. Generally, the default settings are appropriate for all environments.

Caution
If these parameters are changed after the VDS is in service, your VDS may not function properly.

Group Map 0

Specifies whether the Group Map 0 parameter is for an ISA or RTSP environment.

Servers Group Map

Specifies whether the Servers Map 0 parameter is for an ISA or RTSP environment.

License Map

Specifies that the License Map is set to 0 and no further configuration of this parameter is required.

Control IP Map

Specifies that the Control IP Map is set to 1 and no further configuration of this parameter is required.
Popularity Based Caching

In most cases, the default setting (12 hours) of the Popularity Half Life field is sufficient, but in cases where a significant fraction of viewed content has a “flash” popularity pattern shorter than the popularity half-life value, changing the setting may result in a better cache-hit rate overall.

AIM Configuration

After enabling the Ingest manager option under the VVIM Setup page, the user can set the default settings for the Ingest Manager by clicking on set defaults button. The user can then proceed to Configure > System Level > Ingest Manager page to do the remaining configuration.
CDDM Management Utility

This appendix describes the management utility for VDS-TV’s Content Delivery Devices. The topics covered in this appendix include:

- Utility Name, page G-1
- Synopsis, page G-1
- Description, page G-1
- Options, page G-2
- Return Codes, page G-4
- Examples, page G-5

Utility Name

cddm - Content Delivery Device Management

Synopsis

cddm [options]  
cddm [devnum]  
cddm [options] [devnum]

Description

cddm is a management utility for CDS-TV’s Content Delivery Devices (CDD). It’s used to report a variety of device information and manage device configuration and events such as device failure and device replacement.

For options that require a device number, devnum can be set to any one value 1..n where n is equal to the number of storage devices. devnum may define a set of device numbers, e.g., ’1,3,5,7’. It may indicate a range of device numbers, e.g., ’13-24’ (the second device number in the range must be greater than the first device number). And it may define sets of ranges, e.g., ’1-8,16-24’. devnum amy also be the word ’all’ to indicate that options is to be applied to all devices. Note that only some options support multiple devices. Options that support multiple devices are indicated by an asterisk following the devnum in the option Portia- type.
Option \texttt{--show=state} is the default option when \textit{options} is not defined.

\section*{Options}

\textbf{-a <attribute>, --attrib=<attribute> <devnum>\*}

Report the value of the specified attribute. If \textit{devnum} is provided then \textit{attribute} must be an attribute of the device. If \textit{devnum} is not provided then \textit{attribute} is considered a global attribute. For example, \texttt{`cddm --attrib=vendor 1’} will return the name of the device vendor of device 1. And, \texttt{`cddm --attrib=max\_error\_rate'} will report the global value for the maximum error rate health threshold applicable to all devices. See the \texttt{--show} option for sets of available attributes.

\textbf{-C <on|off>,--slot\_check=<on|off>}

This option is used to check the proper connection of device cables and the working order of device lights. It will cause the identify light (red LED) of the devices to illuminate in a Johnson Counter fashion; starting with the first slot and progressing to the last slot in \textasciitilde 1/2 second steps. After all lights are on then all lights will be turned off in the same order. This behavior will repeat until this option is turned off.

\textbf{-F, --noformat}

This option is used to remove the default output formatting performed by other options. Only options subsequent to this option on the command line are effected.

\textbf{-I, --interrogate devnum}

Creates a report of events for the specified device. The source of the report may come from a variety of sources that will be identified in the report.

\textbf{-i [on|off], --identify[=on|off] devnum}

Turns on or off the specified device’s identifying indicator. For \textit{identify}, if \textit{on} or \textit{off} is not specified then this option will toggle the state. The identification is typically a slow blinking red light (\textasciitilde 1 seconds period) found at the front of the slot associated with the device. The identifying indicator will remain on until it is turned off or the device fails at which time the indicator will be lit solidly.

\textbf{-R devnum, --remove devnum}

Logically removes the specified device prior to the device being physically removed from the chassis. A logically removed device will be dismounted from the file system and either spun-down or placed on standby (HDD or SSD, respectively).

When the device has completed the logical remove process, a notification will be posted on the console indicating that the device can be pulled. A logically-removed device’s red identifying indicator will be displaying a fast blink (\textasciitilde 1/2 second period or faster).

It is always best to logically remove a device before pulling it from the chassis. A failed device does not need to be logically removed.

Note A logically removed device cannot be place back online until it has been removed from the chassis. \textbf{All contents of a logically removed device will be deleted} when it is reinserted into the chassis.

\textbf{-s value, --show=<set,set...> <devnum>\*}

This is used to show selected sets of global or device information. Note that sets that require a \textit{devnum} cannot be mixed with sets that do not require a \textit{devnum}. 

\hspace{1cm}
The collection of some device information has a negative impact on device performance, therefore, this impactive information is cached and automatically updated periodically usually when the device is idle.

set selects one of the different categories of information defined as follows:

all devnum
   Show all available device information.

dev_spec
   Show device type specific information. This will report various points of information specific to the device technology and is a function of vendor implementation.

errors devnum
   Shows all error counters.

health devnum
   Shows information relative to a device’s health

phys devnum
   Show physical information about the device; make, model, vendor, capacity, serial number, etc.

raw
   This suboption will cause some information sets to be reported in raw data format. For example, this option will cause the SATA S.M.A.R.T. attributes reported in the dev_spec set to be reported as it’s collected from the device as opposed to interpreting it.

smart devnum
   Shows available Self-Monitoring, Analysis and Reporting Technology values. These values are technology specific (SCSI, ATA) and implementation is varied from vendor to vendor.

state devnum
   Show device state information only.

stats devnum
   Show device statistical information

update
   This suboption is not an information set, but instead, will force a refresh of the device information cache possibly momentarily impacting device performance.

-V --versions
   Reports the version of cddm and CDD drivers information.

-v, --version
   Reports the version of cddm.

--VIOLATE_POLICY
   This option is used to disable policy enforced by cddm. It is not recommended that this option be utilized except in extraneous cases. This option must precede other options on the command line for which policy is to violated.

-X, --unsuspend devnum
   This option will unsuspend a not-yet-pulled suspended device. (See the suspend option.)

-x [minutes], --suspend[=minutes] devnum
The **suspend** option prepares a healthy device to be safely removed from the chassis and allowing it to be reinserted later without incurring data loss.

The CDE470 platform has two devices in each tray. When one device in a tray has failed the other device in the tray will need to be suspended before the tray is pulled from the chassis.

The volume on the suspended device is not dismounted from the file system but placed in a quiescent state. The file system will not attempt to access the volume during the suspend period. While a device is suspended, necessary data residing on the device will be reconstructed from data on other devices.

A device cannot remain suspended indefinitely due to a potential performance impact to the system. The default amount of time that a device may remain suspended is 20 minutes. A suspended and removed device that is reinserted before the suspend period expires will automatically and immediately be placed online and its volume returned to full operation.

If the suspend period expires before the device is reinsterted then the device will be considered lost and its volume will be abandoned by the file system. A suspended device reinserted after the suspend period expires will be considered a new device and its current contents will be discarded. If, by chance, a suspended and removed device is replaced with another device then the suspended volume will be discarded by the file system and the replacement device will be considered new and its current contents discarded.

If a suspended device is not pulled from the chassis then it will return to online and normal operation when the suspend period expires. A suspended but not yet removed device can be unsuspended with the **unsuspend** option.

The **minutes** parameter may be provided to override the default suspend period. The **suspend** option with the **minute** parameter may be used on a device already suspended to modify the current suspend period.

---

**Note**

In order to preserve data resilience, cddm will enforce a policy of only one device suspended at a time. This option is valid for the CDE470 platform only.

---

**Return Codes**

cddm will return 0 if the command is successful and non-zero if unsuccessful. A negative return value indicates a system failure. A positive is an error generated within cddm and defines as follows:

- 101 Invalid device
- 102 Invalid option
- 103 Invalid value
- 104 CDD drivers are not loaded
- 105 Incompatible drivers
- 106 Device not found
- 107 Policy violation
- 108 Unsupported option
- 109 System error
Examples

cddm --show=all,dev_spec,smart 3

Produces the following output and indicates all available attributes:

alleged_media_error 0
bytes_read 0
bytes_written 0
companion 4
connection 0.3 d
evice_type SAS HDD
dev_temp 39
direct_submits 0
dubious_LBAs 0
errors 0
errors_reported 0
errors_reported_rate 0
hard_resets 0
location 1.2.1.1
media_error_rate 0
media_errors 0
model ST4000NM0023
name csd3
proc_flags 0x0
reqs_in_cb_queue 0
reqs_in_progress 0
reqs_lost 0
reqs_queued 0
requests 734
reset_rate 0
resets 0
retries 0
rev A001
sector_size 512
serial Z1Z08PQL0000........
slot 2
smart_status OK
state 0x800007;
DEV_ALLOCATED DEV_ATTACHED DEV_READY
timeout_rate 0
timeouts 0
total_sectors 7814037167
vendor SEAGATE
smart_age 00.37.58
smart_glist_count 0
smart_nonmedium_errors 0
smart_rd_corrected_errors_long 0
smart_rd_corrected_errors_short 0
smart_rd_correction_algorithm_use 0
smart_rd_retries 0
smart_rd_total_bytes_processed 0
smart_rd_total_corrected_errors 0
smart_rd_uncorrected_errors 0
smart_startups 87
smart_status OK
smart_wr_corrected_errors_long 0
smart_wr_correction_algorithm_use 0
smart_wr_retries 0
smart_wr_total_bytes_processed 0
smart_wr_total_corrected_errors 0
smart_wr_uncorrected_errors 0
dev_link_rate 6000
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev_max_operating_temp</td>
<td>68</td>
</tr>
<tr>
<td>dev_max_operational_starts</td>
<td>10000</td>
</tr>
<tr>
<td>dev_mfg_wk</td>
<td>34</td>
</tr>
<tr>
<td>dev_mfg_yr</td>
<td>2011</td>
</tr>
<tr>
<td>dev_temp</td>
<td>39</td>
</tr>
</tbody>
</table>

**cddm --attrib=bytes_written 1**

Will report the value of the number of byte written to the device since last system start, for example:

85269151744

**cddm --suspend=30 8**

**cddm --remove 17**

**cddm --identify=on 42**

**cddm --slot_check=on**
VDS-TV Tunables

Tunable is an internal term, tunables are configuration parameters for cserver which is a core component in VDS-TV.

This appendix describes three categories of VDS-TV tunables:

- **Debug Tunables**
- **Info Tunables**
- **Configuration Tunables**

## Debug Tunables

Debug tunables are used in production environment to debug issues. Changes to these tunables affect the behaviour of the system. These tunables are Read and Write (RW) type tunables.

_Table H-1 lists the Debug tunables.

**Table H-1 Debug Tunables**

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/internal/shutdown_adapter_index</td>
<td>Tunable to bring down adapter. Echo X is the input command line used. Eg. Echo 2 to bring down the second adapter. This affects driver code as well. This is equivalent to if down</td>
<td>index</td>
<td>1</td>
</tr>
<tr>
<td>/proc/calypso/internal/skip_resiliency_check</td>
<td>Popular contents are made available in another play streamer in the play group for resiliency. This reduces the cache working set size and thus reducing the cache efficiency. By setting this tunable, popular contents do not get duplicated to the other streamers but the cache working set size increases thus improving the cache efficiency</td>
<td>boolean</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/dbg_verbosedump</td>
<td>To enable verbose level logging about the system onto the /var/log/messages</td>
<td>functionality (enable/disable)</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table H-1 Debug Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/internal/disableControlNetworkAdapter</td>
<td>To simulate the loss of link state on the control adapter. Related tunable: /proc/calypso/internal/disableNetworkAdapter9</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableManagementNetworkAdapter</td>
<td>To simulate the loss of link state on the management adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter0</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter0 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter1</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter1 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter10</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter10 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter11</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter11 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter12</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter12 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter2</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter2 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter3</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter3 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter4</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter4 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter5</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter5 configured in /arroyo/test/setupfile adapter</td>
<td>functionality (enable/disable)</td>
<td>FALSE</td>
</tr>
</tbody>
</table>
### Table H-1 Debug Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter6</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter6 configured in /arroyo/test/setupfile adapter</td>
<td>functionality(enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter7</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter7 configured in /arroyo/test/setupfile adapter</td>
<td>functionality(enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter8</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter8 configured in /arroyo/test/setupfile adapter</td>
<td>functionality(enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/disableNetworkAdapter9</td>
<td>To simulate the loss of link state on the configured cache fill interface adapter9 configured in /arroyo/test/setupfile adapter</td>
<td>functionality(enable/disable)</td>
<td>FALSE</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_dynamic_trick_read_history</td>
<td>To enable dynamic trick related locate and transfer request and response logging onto the readhistory.log.</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_igate_receive_log</td>
<td>To enable logging of the debugigate.log</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_inband_heartbeat</td>
<td>Enables/Initializes inband heartbeat mpeg ts packet at the time of play setup</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_receive_bad_packet_capture</td>
<td>If the receive capture is turned on, then bad packets received will be logged into the receive.log. Related tunable: /proc/calypso/internal/enable_receive_capture</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_receive_capture</td>
<td>To enable logging of the received packets on the server. Related tunable: /proc/calypso/internal/enable_transmit_capture</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/enable_transmit_capture</td>
<td>To enable logging of the transmitted packets from the server. Related tunable: /proc/calypso/internal/enable_receive_capture</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/internal/reset_adapter_index</td>
<td>To force execute the Adapter Reset Logic on a specified adapter index</td>
<td>functionality(enable/disable)</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table H-1 Debug Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
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<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/bwm_logLevel</td>
<td>To enable verbose logging on the bwm.log</td>
<td>LogLevel</td>
<td>DEBUG (DEBUG Builds), INFO (CRITICAL - 0x0001, ERROR - 0x0002, WARNING - 0x0003, INFO - 0x0004, DEBUG - 0x0005, DEBUG_V - 0x0006)</td>
</tr>
<tr>
<td>/proc/calypso/tunables/c2k_log_arp_info</td>
<td>To Log ARP packets/information onto the c2k.log</td>
<td>functionality (enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/c2k_loginusecs</td>
<td>To enable c2k logging in microseconds</td>
<td>functionality (enable/disable)</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/c2k_verbosedump</td>
<td>To enable verbose logging on the c2k.log</td>
<td>LogLevel</td>
<td>C2K_NOTICE_LEVEL - 5</td>
</tr>
<tr>
<td>/proc/calypso/tunables/cm_logserverinfo</td>
<td>To query the server status and enable the cm_logserverinfocommand tunable for avs_rtd to process the debug related request. Information is dumped in /arroyo/log/serverinfo.log</td>
<td>integer</td>
<td>-1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/cm_logserverinfocommand</td>
<td>The avs_rtd script uses this tunable to pass run time debugger command to cserver Related tunable: /proc/calypso/tunables/cm_logserverinfocommand, /proc/calypso/tunables/cm_logserverinfogoid, /proc/calypso/tunables/cm_logserverinfogoidinfo.</td>
<td>String</td>
<td>1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/cm_logserverinfogoid</td>
<td>Goes along with the /proc/calypso/tunables/cm_logserverinf o, Few values specified onto the cm_logserverinfo can take a optional param of GOID which can be specified onto this tunable</td>
<td>GOID</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/cm_logserverinfogoidinfo</td>
<td>To query the detailed status of Goid on all the Vault on the same group</td>
<td>GOID</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table H-1  Debug Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables</td>
<td>To enable verbose level logging for the evaluator framework related logs</td>
<td>LogLevel</td>
<td>All(DEBUG), EVAL_DBG_VERB OSE(OTHERS)</td>
</tr>
<tr>
<td>/debugevaluatemask</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the logging of fillbandwidth.log</td>
<td>functionality</td>
<td>TRUE(DEBUG), FALSE(OTHERS)</td>
</tr>
<tr>
<td>/enableFillBandwidth Log</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the logging of fill.log</td>
<td>functionality</td>
<td>TRUE(DEBUG), FALSE(OTHERS)</td>
</tr>
<tr>
<td>/enableFillLog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the logging of lostpacket.log</td>
<td>functionality</td>
<td>FALSE</td>
</tr>
<tr>
<td>/enableLostPacketLog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the lowprioritystats logging</td>
<td>functionality</td>
<td>TRUE</td>
</tr>
<tr>
<td>/enableLowPriorityStatsLog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable readhistory.log</td>
<td>functionality</td>
<td>TRUE</td>
</tr>
<tr>
<td>/enableReadHistoryLog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable receivepath.log</td>
<td>functionality</td>
<td>TRUE(DEBUG), FALSE(OTHERS)</td>
</tr>
<tr>
<td>/enableReceivePathLog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable verbose level logging on the http.log</td>
<td>LogLevel</td>
<td>LOG_INFO - 6 (range 0-7)</td>
</tr>
<tr>
<td>/http_log_level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>Used by StatsFile Logging, Protocoltiming.log sampling</td>
<td>Seconds</td>
<td>10</td>
</tr>
<tr>
<td>/logsamplinginmsecs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the MSA event dump level</td>
<td>LogLevel</td>
<td>C2K_NOTICE_LEVEL</td>
</tr>
<tr>
<td>/msa_dumplevel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to check the reachability of the destination IP by ICMP packets</td>
<td>IP</td>
<td>1</td>
</tr>
<tr>
<td>/ping_with_icmp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to check the reachability over STUN. Performs stun handshake internally</td>
<td>IP</td>
<td>1</td>
</tr>
<tr>
<td>/ping_with_stun</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to stop all the primary services running on the server and gracefully make backup to be the new primary</td>
<td>functionality</td>
<td>0</td>
</tr>
<tr>
<td>/stop_being_primary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the verbose logging on the streamevent.log</td>
<td>LogLevel</td>
<td>C2K_NOTICE_LEVEL</td>
</tr>
<tr>
<td>/streamevent_verbosed ump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>to enable the verbose logging on the streamtrace.log</td>
<td>LogLevel</td>
<td>LOG_WARNING</td>
</tr>
<tr>
<td>/streamtrace_verbosed ump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables</td>
<td>To write the traceroute information into serverinfo log</td>
<td>IP</td>
<td>1</td>
</tr>
<tr>
<td>/traceroute</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Info Tunables

The Info tunables are used to get a snapshot of various parameters in the system. These tunables are Read only.

Note
The following tunables are old and are not used:
- /proc/calypso/cm/cache2app_operational
- /proc/calypso/cm/cachehits
- /proc/calypso/cm/cachemisses
- /proc/calypso/cm/diskreadsectors
- /proc/calypso/cm/diskreadsegments
- /proc/calypso/cm/freedsegments
- /proc/calypso/cm/memoryhits
- /proc/calypso/cm/romreadsectors
- /proc/calypso/cmm/mapped/availableblocks
- /proc/calypso/cmm/mapped/totalblocks

Table H-2 lists the Info tunables.

Table H-2  Info Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/cm/cach2app_operational</td>
<td>To check whether the cache2app services are operational or not</td>
<td>Status Value</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/cachehits</td>
<td>To validate the number of objects fully present on the server</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/cachemisses</td>
<td>To check the number of objects not being fully present on the server</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/diskreadsectors</td>
<td>The count on the number of sectors read from the disk after starting a stream</td>
<td>Count</td>
<td>0</td>
</tr>
</tbody>
</table>
### Info Tunables (continued)

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/cm/disk readsegments</td>
<td>To count on the number of object segments read from the disk for streaming</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/free dsegments</td>
<td>The total number of free object segments</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/memoryhits</td>
<td>To trace the memory hits of the Object</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/romr eadsectors</td>
<td>Length of the object received from ROM in sectors</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/mapped/availableblocks</td>
<td>The available amount of memory that can be used</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/cm/mapped/totalblocks</td>
<td>The total number of memory blocks on the system</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/bwm_settings</td>
<td>To query the status of BandwidthManager and the thin pipes configured</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/diskbandwidthinfo</td>
<td>Verbose details on the disk bandwidth information</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/diskinfo</td>
<td>Verbose details of the Configured Disks on the server</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/hw_validation</td>
<td>To validate whether the Hardware configured is according to the Model of the device</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/networkbandwidth</td>
<td>Network Bandwidth related information</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/pipe_settings</td>
<td>The connected number of thin pipes</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/resiliencyinfo</td>
<td>To query the configured ServiceAddress Information (Setup or control service, HTTP Redirector Service and Bandwidth Manager Service)</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/resiliencystatus</td>
<td>verbose level details about the configured ServiceAddress</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/server_settings</td>
<td>To query the server configurations and other details related to the server</td>
<td>string</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/activestreamslots</td>
<td>To hold the count of streams which are currently streamed from this server</td>
<td>Count</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table H-2  Info Tunables (continued)

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/status/streamer/allocatedslots</td>
<td>“Allocated streams” is the streams that have been created. The sum of Allocated Stream from this streamer group should be close to the “alloc” field in the “LRR” line present in protocol</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/cutthruinfo</td>
<td>It displays the limitation on the Disk Write allowed for Object based on the PopularityBased Caching design. It gathers the information about CutThruMark which is used in cserver to determine the disk write required</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/fillinfo</td>
<td>To log the CCP Fill status</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/resiliencyinfo</td>
<td>To query the configured ServiceAddress information (Setup or control service, HTTP Redirector Service and Bandwidth Manager Service)</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/resiliencystatus</td>
<td>verbose level details about the configured ServiceAddress</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/streamer/streaminfo</td>
<td>To query the stream related information</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/syslog/last_open_error</td>
<td>Used to store the return value if a file can not be opened through syslog layer</td>
<td>int</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/syslog/last_write_error</td>
<td>Used to store the return value if a write to syslog fails</td>
<td>int</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/syslog/multiple_writes</td>
<td>Number of times a log message required multiple writes to the syslog socket. Generally we should be able to send one full message in one single write to the syslog socket</td>
<td>int</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/syslog/open_errors</td>
<td>Number of times system encountered errors at the time of opening a log file using syslog api</td>
<td>int</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/syslog/write_errors</td>
<td>Number of times log messages have failed to write to syslog layer</td>
<td>int</td>
<td>0</td>
</tr>
<tr>
<td>/proc/calypso/status/vault/fillinfo</td>
<td>To query the CCP Fill status on the vault</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/vault/httpinfo</td>
<td>Display the configured HTTP Adapter information</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/vault/laninfo</td>
<td>display the details of Capacity,Connections,Inbound request and outbound request</td>
<td>String</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Configuration Tunables

The Configuration tunables are used to configure the various parameters in the system. These tunables have a GUI counterpart. Table H-3 lists the Config tunables.

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Description</th>
<th>Units/Type</th>
<th>Default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/status/vault/settings</td>
<td>Display the vault settings like smoothing, mirroring, local copy and remote mirror copy</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/vault/streaminfo</td>
<td>Display the stream related information on the vault</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/cache/fillinfo</td>
<td>To query the CCP Fill status on the cache</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/cache/httpinfo</td>
<td>Display the configured HTTP Adapter information</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/status/cache/streaminfo</td>
<td>Display the stream related information on the cache</td>
<td>String</td>
<td>N/A</td>
</tr>
<tr>
<td>/proc/calypso/tunables/runtimedebbugversion</td>
<td>To provide the information related to the version of runtimedebugger used in the system</td>
<td>Version</td>
<td>1</td>
</tr>
<tr>
<td>/proc/calypso/internal/ingest_vault_max_display_count</td>
<td>Configured number of ingesting vault that needs to display the statistics</td>
<td>Count</td>
<td>10</td>
</tr>
</tbody>
</table>
### Table H-3  Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/cm/active_trickspeed_5</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_6</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_7</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_8</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_9</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_10</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_trickspeed_11</td>
<td>Read</td>
<td>Tunable used to read the configured trick speed, which is configured from CDSM</td>
<td>Speed/Hex</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/test/arp_readroutingtable</td>
<td>Write</td>
<td>Tunable used to read entries from RoutingTable and update. Any change in routing table, we need to do &quot;echo 1 &gt; /proc/calypso/test/arp_readroutingtable&quot; for the new entry to take effect</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/test/readarptable</td>
<td>Write</td>
<td>Tunable used to read the configuration file /arroyo/test/ArpTable entries and update. Any change in Arp table, we need to do &quot;echo 1 &gt; /proc/calypso/test/readarptable&quot; for the new entry to take effect</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/test/readfillsourceconfig</td>
<td>Write</td>
<td>Tunable used to read the configuration file /arroyo/test/FillSourceConfig entries and update. Any change in FillSourceConfig, we need to do &quot;echo 1 &gt; /proc/calypso/test/readfillsourceconfig&quot; for the new entry to take effect</td>
<td>bool</td>
<td>default 0</td>
</tr>
</tbody>
</table>
### Table H-3  Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/test/readrecordingchannelmap</td>
<td>Write Tunable used to read the configuration file /arroyo/test/RecordingChannelMap entries and update. Any change in RecordingChannelMap, we need to do &quot;echo 1 &gt; /proc/calypso/test/readrecordingchannelmap&quot; for the new entry to take effect.</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/test/readremoteservers</td>
<td>Write Tunable used to read the configuration file /arroyo/test/RemoteServers entries and update. Any change in RemoteServers file, we need to do &quot;echo 1 &gt; /proc/calypso/test/readremoteservers&quot; for the new entry to take effect.</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/test/readstreamdestinationmap</td>
<td>Write Tunable used to read the configuration file /arroyo/test/StreamDestinationMap entries and update. Any change in RemoteServers file, we need to do &quot;echo 1 &gt; /proc/calypso/test/readstreamdestinationmap&quot; for the new entry to take effect.</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/test/readsubnettable</td>
<td>Write Tunable used to read the configuration file /arroyo/test/SubnetTable entries and update. Any change in SubnetTable, we need to do &quot;echo 1 &gt; /proc/calypso/test/readsubnettable&quot; for the new entry to take effect.</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/test/readtgidtable</td>
<td>Write Tunable used to read the configuration file /arroyo/test/TransportGroupIdTable entries and update. Any change in TransportGroupIdTable, we need to do &quot;echo 1 &gt; /proc/calypso/test/readsubnettable&quot; for the new entry to take effect. We are not using it now.</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/test/shutdown</td>
<td>Write Tunable used to shut down Cserver module processes</td>
<td>bool</td>
<td>default 0</td>
<td></td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeed_0</td>
<td>Write Tunable used to set both +ve and -ve trick speed as pair. Since this tunable does not have directional information, we can't have different +ve and -ve speed. This is older version tunable.</td>
<td>Speed/Hex</td>
<td>default -1</td>
<td></td>
</tr>
</tbody>
</table>
Table H-3 Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/trickspeed_1</td>
<td>Write</td>
<td>Tunable used to set both +ve and -ve trick speed as pair. Since this tunable does not have directional information, we can't have different +ve and -ve speed. This is older version tunable.</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeed_2</td>
<td>Write</td>
<td>Tunable used to set both +ve and -ve trick speed as pair. Since this tunable does not have directional information, we can't have different +ve and -ve speed. This is older version tunable.</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_0</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_1</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_2</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_3</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_4</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_5</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_6</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_7</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_8</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_9</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_10</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/trickspeedv2_11</td>
<td>Write</td>
<td>Tunable used to set trick speed (+ve or -ve)</td>
<td>Speed/Hex</td>
<td>default -1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/stream_null_packets</td>
<td>Write</td>
<td>Tunable used to enable/disable the stream null packet logic at the remaining length. It fills the remaining length with null packets while adding the stream data in stream slot</td>
<td>bool</td>
<td>default 1</td>
</tr>
</tbody>
</table>
## Table H-3 Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write RW type</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/stream_using_qam</td>
<td>Write</td>
<td>Tuneable used to configure the setup, whether QAM or IP setup. If flag is not set then its IP setup and Motorola PreEncryption use original program number for Encryption data (Inband). If flag is set then its QAM based setup and Motorola Pre Encryption refer program number and data from port (outband).</td>
<td>bool</td>
<td>default 1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/bwm_readConfFile</td>
<td>Write</td>
<td>Tunable used to read the configuration file /arroyo/test/BandwidthManager entries and update. Any change in Bandwidth manager configuration, we need to do &quot;echo 1 /proc/calypso/tunables/bwm_readConfFile&quot; for the new entry to take effect</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/cm_playnowatlivepoint</td>
<td>Write</td>
<td>Tuneable used to enable/disable the play at live point. When the tunable is enabled, it allows to play at live point.</td>
<td>bool</td>
<td>default 1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/convert_npt_using_pts</td>
<td>Write</td>
<td>Usually play npt computation is based on offset information, but using this tunable we could improve the accuracy. With tunable enabled, the npt computation uses actual frame pts information, which improves the accuracy.</td>
<td>bool</td>
<td>default 1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/disable_fade_frame</td>
<td>Write</td>
<td>Tuneable used to enable/disable the frame fading option at the file transition. When it enabled, there is no extra fade frame getting inserted at file transition. But when its disabled, there are 4 fade frames are getting inserted at the splice point.</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/ftpoutmaxrate</td>
<td>Write/Read</td>
<td>Tunable used to configure the ftpmax rate for total active ftp sessions.</td>
<td>Hex/bps</td>
<td>default 1900000</td>
</tr>
<tr>
<td>/proc/calypso/tunables/ftpoutmaxsessions</td>
<td>Write</td>
<td>Tuneable used to configure the number of ftpsessions.</td>
<td>no of session/Hex</td>
<td>default 0</td>
</tr>
</tbody>
</table>
## Table H-3 Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/popularity_half_life</td>
<td>Read</td>
<td>Tunable used to denote how often server play the content. The value set in popularity_half_life will determine the rate of increase of the bump-on-play value. The bump-on-play value is managed by the class BumpOnUse, which resides in cm/PopularityValue. Set via CDSM</td>
<td>Sec/Hex</td>
<td>default A880</td>
</tr>
<tr>
<td>/proc/calypso/tunables/read_etc_hosts</td>
<td>Write</td>
<td>Tunable used to read the etc hosts from /etc/hosts</td>
<td>bool</td>
<td>default 1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/pipe_add</td>
<td>Write</td>
<td>Tunable used to add the new pipe with any reboot</td>
<td>Pipe format</td>
<td>default empty</td>
</tr>
<tr>
<td>/proc/calypso/tunables/pipe_del</td>
<td>Write</td>
<td>Tunable used to delete the existing pipe</td>
<td>Pipe id</td>
<td>default empty</td>
</tr>
<tr>
<td>/proc/calypso/tunables/pipe_modify</td>
<td>Write</td>
<td>Tunable used to modify the existing pipe configuration</td>
<td>Pipe format</td>
<td>default empty</td>
</tr>
<tr>
<td>/proc/calypso/tunables/stream_from_local_array</td>
<td>write</td>
<td>Tunable used to enable to stream the content from local server. This tunable specifically to control server</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/vaultdecommission</td>
<td>write</td>
<td>Tunable used to decommission the vault. Since vault has been removed, it migrate all the information with other vault. Also It logs the status under decommission information</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/vaultmirrorcopies</td>
<td>Read</td>
<td>It will be read from setup file, Used to Make the Number of Mirror Copies needs to be present on the site</td>
<td>Number of copies</td>
<td>default 2</td>
</tr>
<tr>
<td>/proc/calypso/tunables/bwm_updateInterval</td>
<td>Write</td>
<td>It decides the time interval at which the Bandwidth management updates are exchanged by server where servers report their bandwidth usage to primary and primary assigns bandwidth to other servers. When committed bandwidth out of bandwidth also it reports the BWM (happen two levels, first at 90% and then second time at 95%)</td>
<td>in sec</td>
<td>default 10</td>
</tr>
<tr>
<td>/proc/calypso/internal/offline</td>
<td>Write</td>
<td>Tunable used to offline the server, when its set server become offline.</td>
<td>bool</td>
<td>default 0</td>
</tr>
<tr>
<td>/proc/calypso/tunables/bPSIErrErrorFailsIngest</td>
<td>RW</td>
<td>It will make sure that trick code aborts the ingest when bitstream don't have PAT,PMT</td>
<td>Boolean</td>
<td>default TRUE</td>
</tr>
<tr>
<td>/proc/calypso/tunables/bRateErrorFailsIngest</td>
<td>RW</td>
<td>If it is enabled, Ingest fails if Bitrate cannot be computed.</td>
<td>Boolean</td>
<td>default TRUE</td>
</tr>
</tbody>
</table>
### Table H-3 Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/nCCErrorsFailIngest</td>
<td>RW</td>
<td>Controls number of CC errors allowed after which Ingest is marked failed</td>
<td>Number</td>
<td>None</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nDiscErrorsFailIngest</td>
<td>RW</td>
<td>Number of discontinuity errors allowed after which ingest is marked failed</td>
<td>Number</td>
<td>None</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nPicGapsFailIngest</td>
<td>RW</td>
<td>Number of PicGaps after which we fail ingest</td>
<td>Number</td>
<td>3</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nPicGapsinHSFailIngest</td>
<td>RW</td>
<td>Amount of time in Hundredth of second in pic Gap which is considered as ingest failure</td>
<td>Time in hundredth of seconds</td>
<td>5 (seconds)</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nSyncLossesFailIngest</td>
<td>RW</td>
<td>Number of synclosses after which we fail ingest</td>
<td>Number</td>
<td>3</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nSyncLossesinHSFailIngest</td>
<td>RW</td>
<td>Amount of time in Hundredth of second in SyncLoss which is considered as ingest failure</td>
<td>Time in hundredth of seconds</td>
<td>5 (seconds)</td>
</tr>
<tr>
<td>/proc/calypso/tunables/maintenancecopies</td>
<td>RW</td>
<td>No of copies for mirroring during server maintenance</td>
<td>number</td>
<td>2</td>
</tr>
<tr>
<td>/proc/calypso/tunables/enable_rtp_rtx</td>
<td>RW</td>
<td>Enables VOD error repair feature with RTP RTX</td>
<td>Boolean</td>
<td>default 0, Range 0,1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/nEveryNMinutes</td>
<td>RW</td>
<td>to allow ingestion depending on the ingest knob settings such as a check on the error counts of sample based on time specified</td>
<td>Minutes</td>
<td>30</td>
</tr>
<tr>
<td>/proc/calypso/tunables/tm_restrict_enable_ffw_resume</td>
<td>Write</td>
<td>This tunable used to enable/disable the streamer to resume the Fast forward after playing a Fast forward trick restricted content in 1x</td>
<td>bool</td>
<td>default false</td>
</tr>
<tr>
<td>/proc/calypso/tunables/tm_restrict_enable_forward_jump</td>
<td>Write</td>
<td>Tunable used to Disable/Enable the forward jump restriction</td>
<td>bool</td>
<td>default false</td>
</tr>
<tr>
<td>/proc/calypso/tunables/tm_restrict_enable_forward_jump_resume</td>
<td>Write</td>
<td>Tunable used to enable/disable the streamer to resume the forward jump after playing a forward jump restricted content in 1x</td>
<td>bool</td>
<td>default false</td>
</tr>
<tr>
<td>/proc/calypso/tunables/tm_restrict_enable_rewind_jump</td>
<td>Write</td>
<td>Tunable used to enable/disable the rewind jump. If it enable then rewind jump to the beginning of the restricted content and continue rewinding from there</td>
<td>bool</td>
<td>default false</td>
</tr>
</tbody>
</table>
### Table H-3 Config Tunables

<table>
<thead>
<tr>
<th>Tunable name/Location</th>
<th>Read/Write</th>
<th>Description</th>
<th>Units/Type</th>
<th>default Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>/proc/calypso/tunables/vaultarraymirror</td>
<td>Write</td>
<td>This tunable used to Configure mirror partner, array id to which the server is mirroring. To stop the array mirroring we need to echo negative value of the partner array id</td>
<td>array id</td>
<td>default 1</td>
</tr>
<tr>
<td>/proc/calypso/cm/active_maxpacketsize</td>
<td>Read</td>
<td>Active Max packet size to be sent out on their streaming network</td>
<td>Packet Size</td>
<td>7 MPEG Cells for Standard Size packets, 21 MPEG Cells for Jumbo size packets</td>
</tr>
<tr>
<td>/proc/calypso/tunables/vaultlocalcopycount</td>
<td>RW</td>
<td>to configure the number of local mirror copy count on Mirroring Policy</td>
<td>count</td>
<td>1</td>
</tr>
<tr>
<td>/proc/calypso/tunables/maintenancearraymirroringallowed</td>
<td>RW</td>
<td>to enable the array mirroring during the maintenance</td>
<td>functionality (enable/disable)</td>
<td>TRUE</td>
</tr>
<tr>
<td>/proc/calypso/internal/cm_defaultGoidType</td>
<td>RW</td>
<td>To enable chunk GOID support</td>
<td>Number</td>
<td>0 – Default Value 2 – To enable GOID chunking</td>
</tr>
</tbody>
</table>
This appendix lists the ADI XML fields for which the values has been modified from the existing ADI XML specification and these changes are applicable only for MVOD deployment.

**ADI XML fields**

Table I-1 lists the ADI XML fields for which the values has been modified. For additional information on ADI XML fields, refer *Cable Labs Asset Distribution Interface* specification.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset_Name</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;_package</td>
<td>A string containing the identifying name of the asset. Asset names must be unique within a product.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>The maximum length of asset name is 50 characters hence the title string is trimmed accordingly.</td>
</tr>
<tr>
<td>Description</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;</td>
<td>A string containing the identifying name of the asset. Asset names must be unique within a product.</td>
</tr>
<tr>
<td>Title Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset_Name</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;_title</td>
<td>A string containing the identifying name of the asset. Asset names must be unique within a product.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>The maximum length of asset name is 50 characters hence the title string is trimmed accordingly.</td>
</tr>
<tr>
<td>Description</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;</td>
<td>A human-readable string describing the Asset.</td>
</tr>
<tr>
<td>Name</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Title</td>
<td><code>&lt;titlefull&gt;&lt;space&gt;S&lt;season&gt;/EP&lt;number&gt;</code></td>
<td>Movie title for display.</td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>Program XML</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>&lt;title size=&quot;120&quot; type=&quot;full&quot; lang=&quot;en&quot;&gt;CBS Evening News&lt;/title&gt;</td>
<td></td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>&lt;episodeInfo season=&quot;31&quot; number=&quot;189&quot;&gt;</td>
<td></td>
</tr>
<tr>
<td>Title_Inf</td>
<td>CBS Evening News S31/EP189</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>If the <code>&lt;episodeInfo&gt;</code> tag is not available in the program XML, then</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the title string is represented as <code>&lt;titlefull&gt;</code>. The title string</td>
<td></td>
</tr>
<tr>
<td></td>
<td>can be trimmed according to the length of the phrase ‘S&lt;season&gt;/EP&lt;number&gt;’.</td>
<td></td>
</tr>
<tr>
<td>Title_Brief</td>
<td>The value is retrieved from <code>&lt;title&gt;</code> tag in Program XML.</td>
<td>A brief version of the movie title for display.</td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>Program XML</td>
<td></td>
</tr>
<tr>
<td>Title_Brief</td>
<td>&lt;title size=&quot;10&quot; type=&quot;red&quot; lang=&quot;en&quot;&gt;CBS News&lt;/title&gt;</td>
<td></td>
</tr>
<tr>
<td>Title_Brief</td>
<td>Title Brief</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CBS News</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>If the <code>&lt;Title_Brief&gt;</code> tag is not available, then the first ten</td>
<td></td>
</tr>
<tr>
<td></td>
<td>characters of <code>&lt;title&gt;</code> is used for this tag.</td>
<td></td>
</tr>
<tr>
<td>Summary_Short</td>
<td><code>&lt;desc&gt;&lt;mm/dd/yy&gt;&lt;time&gt;&lt;AM/PM&gt;EDT</code></td>
<td>Movie summary: sentence.</td>
</tr>
<tr>
<td></td>
<td>The time is represented in 12 hour format.</td>
<td></td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>Program XML</td>
<td></td>
</tr>
<tr>
<td>Summary_Short</td>
<td>&lt;desc size=&quot;60&quot; type=&quot;plot&quot; lang=&quot;en&quot;&gt;From Muirfield Village</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Golf Club in Dublin, Ohio.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>07/14/2015 10:00 AM EDT</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>If the description tag is not available in the XML then the title</td>
<td></td>
</tr>
<tr>
<td></td>
<td>string is used.</td>
<td></td>
</tr>
</tbody>
</table>
### Table I-1  ADI XML fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary_Medium</td>
<td><code>&lt;desc&gt;&lt;mm/dd/yy&gt;&lt;time&gt;&lt;AM/PM&gt;EDT</code></td>
<td>The time is represented in 12 hour format.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>&lt;desc size=&quot;100&quot; type=&quot;plot&quot; lang=&quot;en&quot;&gt;From Muirfield Village Golf Club in Dublin, Ohio.&lt;/desc&gt;</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Summary Medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>From Muirfield Village Golf Club in Dublin, Ohio.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>If the description tag is not available in the XML then the Summary Medium is left blank.</td>
</tr>
<tr>
<td></td>
<td>07/14/2015 10:00 AM EDT</td>
<td></td>
</tr>
<tr>
<td>Summary_Long</td>
<td><code>&lt;desc&gt;</code></td>
<td>Movie summary in full.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>&lt;desc size=&quot;255&quot; type=&quot;plot&quot; lang=&quot;en&quot;&gt;From Muirfield Village Golf Club in Dublin, Ohio.&lt;/desc&gt;</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Summary Long</td>
<td></td>
</tr>
<tr>
<td></td>
<td>From Muirfield Village Golf Club in Dublin, Ohio.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>If the description tag is not available in the XML then the Summary Long is left blank.</td>
</tr>
<tr>
<td>Year</td>
<td>The value is retrieved from <code>&lt;year&gt;</code> tag in Program XML.</td>
<td>Year of release.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>&lt;year&gt;1993&lt;/year&gt;</code></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td><strong>Note</strong></td>
<td>If the year tag is not available then the current year is used in the ADI XML.</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td></td>
</tr>
</tbody>
</table>
### Table I-1 ADI XML fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genre</td>
<td>The value is retrieved from <code>&lt;genre&gt;</code> tag in Program XML.</td>
<td>Subject-matter classification of the show.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>&lt;genre genreId=&quot;72&quot;&gt;Boxing&lt;/genre&gt;</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Genre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boxing</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>If the genre tag is not available in the program XML then the genre category value from the channel template is used in the ADI XML. If multiple occurrences of genre tag are available in the program XML then only the first genre tag is used in the ADI XML and the rest are ignored.</td>
</tr>
<tr>
<td>Show Type</td>
<td>The value is retrieved from <code>&lt;progtype&gt;</code> in Program XML.</td>
<td>Indicate usage of the release.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>&lt;progType&gt;Sports event&lt;/progType&gt;</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Show Type</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sports event</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td>Space character is allowed for this field in the channel template. If <code>&lt;progtype&gt;</code> tag is not available in the program XML then the default value from the channel template is used in the ADI XML.</td>
</tr>
<tr>
<td>Genre Category</td>
<td>TVShows/ByGenre/&lt;genre&gt;/ChannelName/&lt;titleBrief&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If the genre tag is not available in the program XML then the genre category value from the channel template is used in the ADI XML.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If multiple occurrences of genre tag are available in the program XML then only the first genre tag is used in the ADI XML and the rest are ignored.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If titleBrief tag is not available in the XML then the title is trimmed to 10 characters.</td>
<td></td>
</tr>
</tbody>
</table>
### Table I-1 ADI XML fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Category</td>
<td>TVShows/ByNetwork/&lt;NetworkCategory&gt;/&lt;ChannelName&gt;/&lt;titleBrief&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Network Category is retrieved from the Channel template.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The ChannelName is retrieved from the Channel template.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If titleBrief tag is not available in the XML then the title is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>trimmed to 10 characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Space character is allowed for this field in the channel template.</td>
<td></td>
</tr>
<tr>
<td>Closed_Captioning</td>
<td>Y or N</td>
<td>A &quot;Y&quot; or &quot;N&quot; flag indicating Closed Captioning encoding.</td>
</tr>
<tr>
<td></td>
<td><strong>EXAMPLE</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schedule XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;quals&gt;CC</td>
<td>Stereo</td>
</tr>
<tr>
<td></td>
<td>If the quals tag contains the qualifier CC, then the Closed Captioning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>is set to Y else the value set in the channel template is used.</td>
<td></td>
</tr>
<tr>
<td>Maximum_Viewing_Length</td>
<td>DD:HH:MM</td>
<td>Duration of time defining the maximum amount of time a title can be made</td>
</tr>
<tr>
<td></td>
<td>• The range for Days (DD) is from 00 to 99</td>
<td>available for viewing once selected for purchase by a customer.</td>
</tr>
<tr>
<td></td>
<td>• The range for Hours (HH) is from 00 to 23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The range for Minutes (MM) is from 00 to 59</td>
<td></td>
</tr>
<tr>
<td>Provider_QA_Contact</td>
<td>A string to store the contact details of the provider.</td>
<td>A contact identifier in case there are quality issues relating to this movie</td>
</tr>
<tr>
<td>Movie Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asset_Name</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;_movie</td>
<td>A string containing the identifying name of the asset. Asset names must be</td>
</tr>
<tr>
<td></td>
<td>The maximum length of asset name is 50 characters hence the title is</td>
<td>unique within a product.</td>
</tr>
<tr>
<td></td>
<td>trimmed.</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>&lt;ChannelCode&gt;_&lt;title&gt;</td>
<td>A string containing the identifying name of the asset. Asset names must be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unique within a product.</td>
</tr>
</tbody>
</table>
Table I-1  ADI XML fields

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio_Type</td>
<td>The channel template lists the audio types as:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mono</td>
<td>Audio Types available for this content</td>
</tr>
<tr>
<td></td>
<td>• Stereo</td>
<td>The precedence hierarchy (high to low) is as below:</td>
</tr>
<tr>
<td></td>
<td>• Dolby Pro</td>
<td>• DD 5.1</td>
</tr>
<tr>
<td></td>
<td>• DD 5.1</td>
<td>• Dolby D</td>
</tr>
<tr>
<td></td>
<td>• DolbyD</td>
<td>• Dolby Pro</td>
</tr>
<tr>
<td></td>
<td>The Audio Type is retrieved from the quals tag in</td>
<td>• Stereo</td>
</tr>
<tr>
<td></td>
<td>the Schedule XML.</td>
<td>• Mono.</td>
</tr>
<tr>
<td></td>
<td>EXAMPLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schedule XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;quals&gt;CC</td>
<td>Stereo</td>
</tr>
<tr>
<td>Audio Type</td>
<td>Stereo</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>If there are multiple qualifiers then the higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>precedence audio type is used.If the quals tag does</td>
<td></td>
</tr>
<tr>
<td></td>
<td>not contain any of the audio type then the default</td>
<td></td>
</tr>
<tr>
<td></td>
<td>audio type from channel template is used.</td>
<td></td>
</tr>
<tr>
<td>Languages</td>
<td>The value is retrieved from &lt;origAudioLang&gt; tag in</td>
<td>Available languages.</td>
</tr>
<tr>
<td></td>
<td>Program XML.</td>
<td></td>
</tr>
<tr>
<td>HDContent</td>
<td>Y or N</td>
<td>Indicates whether HD format is available for this content.</td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>Schedule XML:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;quals&gt;CC</td>
<td>Stereo</td>
</tr>
<tr>
<td></td>
<td>If the quals tag contains the qualifier HDTV, then</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HD Content is set to Y else the value set in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input Channel page is used.</td>
<td></td>
</tr>
</tbody>
</table>
Software Licensing Information

This appendix provides software license information related to the TV VDS.

Notices

The document *Open Source Used in Cisco TV Content Delivery System, Release 3.9* contains licenses and related license information for open-source software included in Cisco TV VDS, Release 3.9. The document is located at the following URL:


If you have any questions or problems accessing the link, please contact:

external-opensource-requests@cisco.com

Product Warranties

For product warranty information, refer to the warranty information in the Accessory Kit accompanying the product.