Cisco Virtual Media Packager User Guide

Software Version 2.15.0

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Preface

This preface describes who should read this guide, how it is organized, and its document conventions. It contains the following sections:

- Audience, page 13
- Document Organization, page 13
- Document Conventions, page 13
- Related Publications, page 14

Audience

This guide is for the networking professional managing the Virtual Media Packager (VMP) software product. Before using this guide, you should have experience working with the Cisco IOS software and be familiar with the concepts and terminology of Ethernet, local area networking, and Internet streaming.

Document Organization

This guide includes the following content:

Chapter or Appendix	Description
VMP Overview, page 15	Describes the VMP and its components, features, and prerequisites.
Deploying VMP, page 45	Describes how to deploy the VMP components.
VMP Software Upgrade, page 95	Provides upgrade procedures for VMP components.
VMP Service Manager GUI Reference, page 101	Describes how to use the VMP Service Manager GUI (sometimes referred to as VMP-M) to configure the VMP.
Troubleshooting VMP, page 159	Provides information and procedures for troubleshooting VMP problems.
FairPlay Streaming (FPS), page 223	Provides instructions and procedures for using Cisco Custom Keystore FairPlay Streaming (FPS).
MCE and MPE Alarms and Events, page 227	Lists alarms and events associated with the MCE and MPE.

Document Conventions

This guide uses basic conventions to represent text and table information.

Convention	Description
boldface font	Commands, keywords, and button names are in **boldface**.
italic font	Variables for which you supply values are in *italics*. Directory names and filenames are also in italics.
`screen` font	Terminal sessions and information the system displays are printed in `screen` font.
`boldface screen` font	Information you must enter is in **`boldface screen`** font.
`italic screen` font	Variables you enter are printed in *`italic screen`* font.
string	Defined as a nonquoted set of characters. For example, when setting a community string for SNMP to “public,” do not use quotation marks around the string, or the string will include the quotation marks.
vertical bars (|)	Vertical bars separate alternative, mutually exclusive, elements.
< >	Variable for which you supply a value.
{ }	Elements in braces are required elements.
[ ]	Elements in square brackets are optional.
{**x** | **y** | **z**}	Required keywords are grouped in braces and separated by vertical bars.
[**x** | **y** | **z**]	Optional keywords are grouped in brackets and separated by vertical bars.
[{ }]	Braces within square brackets indicate a required choice within an optional element.

Note: Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in the manual.

Note: Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Time-saver.

Related Publications

Refer to the following documents for additional information about *VMP*:

- *Release Notes for Virtual Media Packager 2.15.0*
- *Cisco Virtual Media Packager 2.10 API Guide*
- *Open Source Used in VMP 2.11.4*

VMP Overview

This chapter provides the following information:

- What's New, page 15
- Product Description, page 16
- Features, page 22
- System Requirements, page 41
- Restrictions and Limitations, page 43

What's New

This release of VMP incorporates feature enhancements and introduces support for:

- Support for transferring HSS manifests containing Ad Insertion information for Live and VOD use cases
- Support for using a sparse track with HSS content for on-the-fly ad insertion
- Support for transferring HLS playlist and WebVTT segment text files with GZIP encoding

In addition, this VMP release continues support for the following features found in previous VMP releases:

- Support for configuring audio groups and assigning them to ABR profiles - refer to Support for Audio Groups and ABR Profile Assignments, page 38.
- Support for profile naming or ordering - refer to Support for Profile Naming for HLS and DASH, page 38.
- Support for configuring a maximum number of audio profiles per ATS channel - refer to Support for Configuring Maximum Audio Profiles, page 39.
- Enhanced support for SCTE 35 Ad Insertion for Live, VOD, and cDVR - refer to Enhanced SCTE 35 Ad Insertion Support, page 40.
- Support for repackaging of HEVC (h.265) convent to DASH-MP4 for Live, VOD, and cDVR - refer to HEVC (h.265) to DASH-MP4 Support with Videvine Encryption, page 40.
- Support for HLS manifest renaming through the V2PC or VMP Service Manager GUI - refer to Validated HLS Manifest Renaming, page 40.
- Support for configurable I-frame segment duration - refer to Configurable I-Frame Segment Duration, page 39.
- Support for Content Protection Information Exchange Format (CPIXF) for key exchange between packagers and key servers - refer to Configuring CPIXF Content Protection, page 131
- Pass-through of DASH CEA-608 and CEA-708 data streams - refer to Closed Captioning and Subtitles, page 25
- Defining multiple periods for DASH Live workflows - refer to Features Supported for Live Streaming Only, page 27
- Converting CEA-608 and CEA-708 data streams to WebVTT format - refer to Closed Captioning and Subtitles, page 25

- Selective publishing of variants for DASH content – refer to Variant Playlists for HLS, HSS, and DASH-MP4, page 29.
- Up to 10 Audio Tracks for HLS and DASH – refer to Advanced Audio Coding for HLS, HSS, and DASH-MP4, page 28
- Up to 5 Multiple Language Audio Tracks – refer to Advanced Audio Coding for HLS, HSS, and DASH-MP4, page 28
- Multiple Audio Codes (AAC-HEV1, AAC-HEV2, and AC3) – refer to Advanced Audio Coding for HLS, HSS, and DASH-MP4, page 28
- New DASH and HLS Features – refer to Key Acquisition for HLS, HSS, and DASH-MP4, page 28
- I-Frame and Subtitle Enabling and Disabling – refer to Closed Captioning and Subtitles, page 25
- Support for HLS H.265 (HEVC) (TS format) Main feature

Product Description

Cisco Virtual Media Packager (VMP) is an application component of the Cisco Virtualized Video Processing (V2P) solution. V2P provides an open, programmable, scalable, and extensible platform for rapid innovation. VMP allows you to support video processing applications in your headend and data centers without being tied to the operational features of the underlying infrastructure.

As a component of V2P, VMP provides the linear and just-in-time packaging capabilities required by OTT services such as live streaming, VOD, and cloud DVR (cDVR). VMP uses the latest virtualization and cloud orchestration technology to let you elastically instantiate and scale critical media functions independently for deployment flexibility. You can prepare and originate media for distribution to the latest HTTP ABR streaming clients on mobile devices, set-top boxes (STBs), PCs, and laptops.

System Components

VMP incorporates the following components:

- Networks, page 16
- Platform and Applications Manager (PAM), page 20
- Media Capture Engine Worker (MCE-Worker), page 21
- Media Playback Engine Worker (MPE-Worker), page 22
- Centralized Logging System (CLS), page 22
- AppEngine, page 22

Networks

The following VMP networks connect VMP components to each other and with external appliances and services:

- Management – The primary VMP network that connects all of the components.

  AppEngine – A minimum of 6 app engines (2 Redis, 2 HAProxy, and 2 IPVS) are required to enable Media Service.

- Data In – Ingest network that connects the MCE-Workers and MPE-Workers.

  For MCE-Workers, the Data In network serves as the Live or VOD ingest interface, and can be shared with other components.

  For MPE-Workers, the Data In interface corresponds to the input from the MCE-Worker Data Out interface, and is shared only with other MCE-Workers and MPE-Workers.

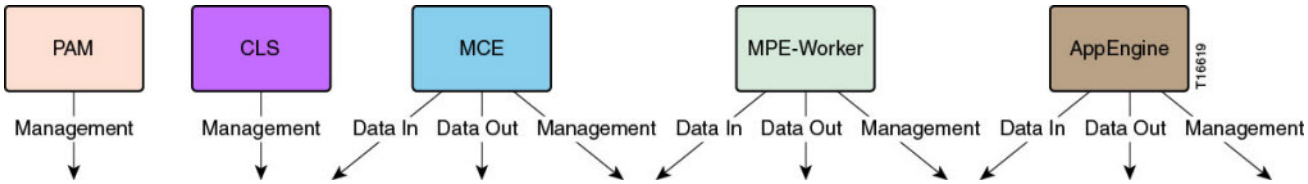
- Data Out – Streaming network that connects the MCE-Workers and MPE-Workers.

  For the MPE-Workers, the Data Out network provides the external Apple HTTP Live Streaming (HLS) or Microsoft HTTP Smooth Streaming (HSS) or Dynamic Adaptive Streaming over HTTP (DASH-MP4) stream feeds to clients.

The following table shows the component-to-network mapping.

Component	Network Connections
PAM	Management
CLS	Management
MCE Worker	Management, Data In, Data Out
AppEngine	Management, Data In, Data Out
MPE Worker	Management, Data In, Data Out

Figure 1 VMP Device-to-Network Mapping

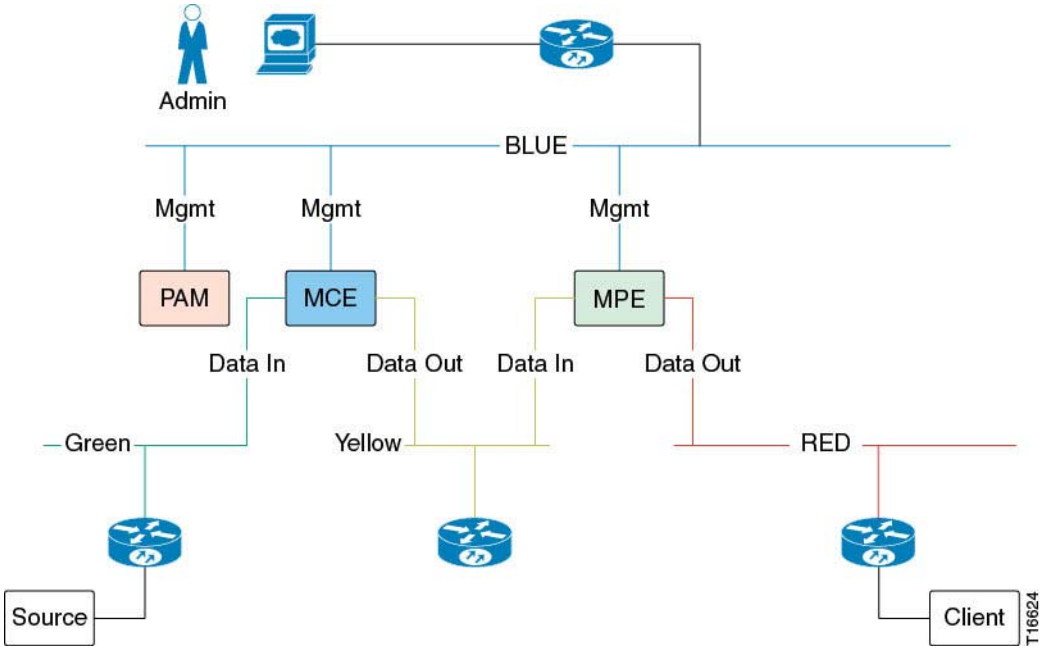


Based on the device-to-network mapping, the administrator can choose to combine or separate the networks in different ways. For example, you might want to keep multicast Live streams separate, or keep unencrypted content separate from the ingest network or the MCE output streams.

The following network topologies are some of the possible configurations.

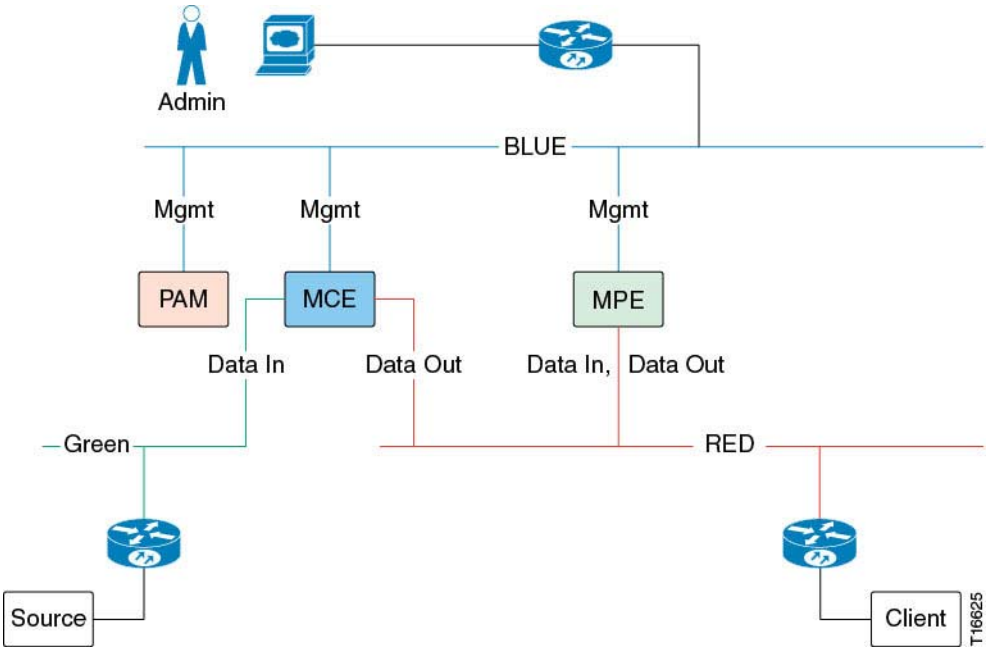
- Four separate and distinct networks, here labeled Blue, Green, Yellow, and Red. The devices are interconnected by switches or routers.

Figure 2 Four Networks



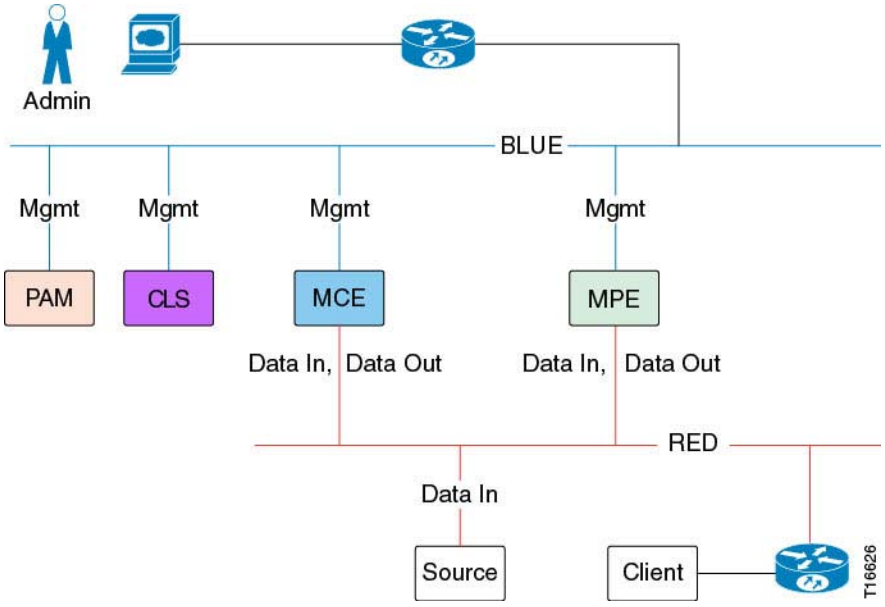
- Three separate and distinct networks, one for Management (Blue), one for Data In (Green), and one for Data Out (Red). The devices are interconnected by switches or routers.

Figure 3 Three Networks



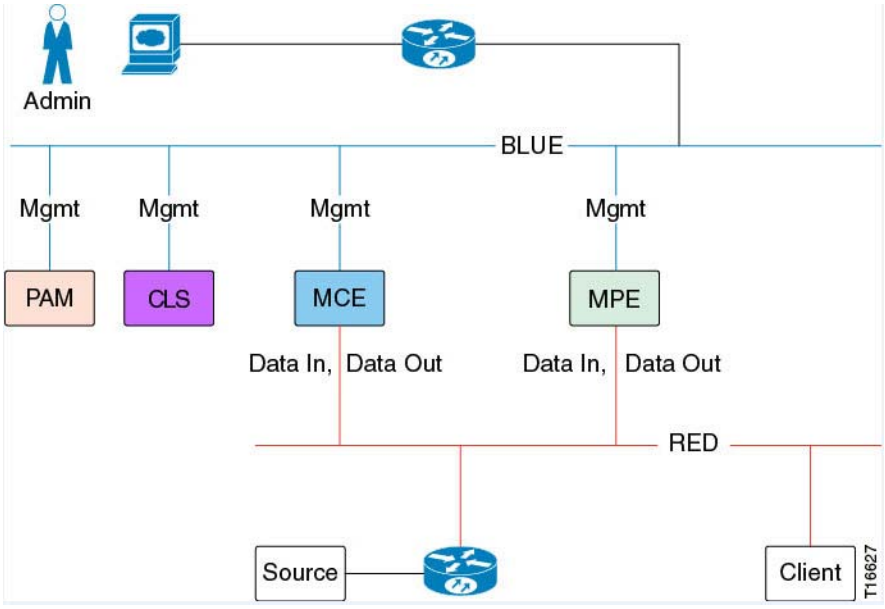
- Two separate and distinct networks, one for Management (Blue), one for Data In and Data Out (Red). The devices, including the client, are interconnected by switches or routers.

Figure 4 Two Networks: Management and Data In/Out, Client Connected via Switch or Router



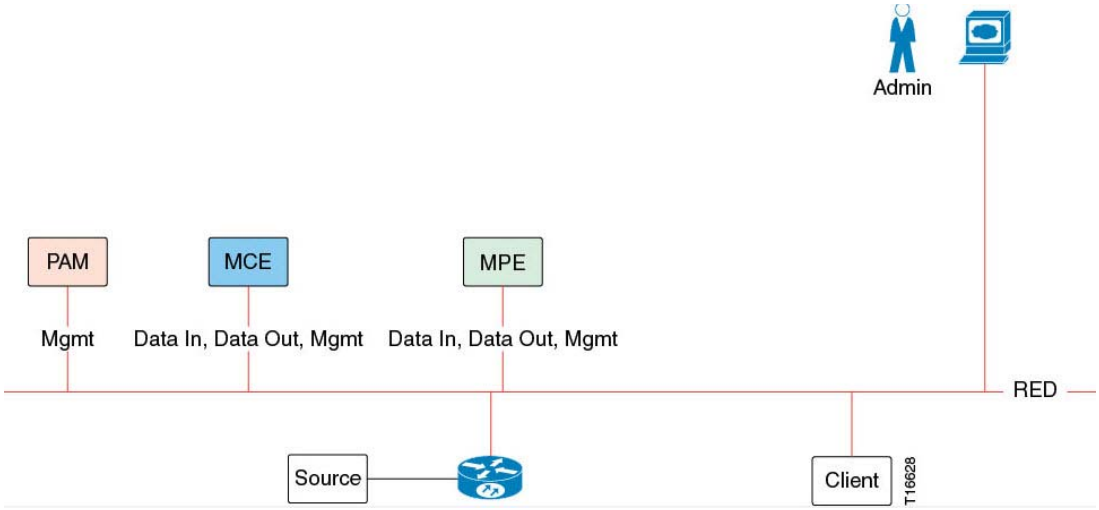
- Two separate and distinct networks, one for Management (Blue), one for Data In and Data Out (Red). The devices, including the source, are interconnected by switches or routers.

Figure 5 Two Networks: Management and Data In/Out, Source Connected via Switch or Router



- One combined network. The devices are all connected to the same switch or router.

Figure 6 One Network



Platform and Applications Manager (PAM)

VMP uses the PAM to install, configure, monitor, and recover the other VMP components. The PAM also orchestrates load-balancing and security functions, ensures secure connectivity, and provides low-level network services such as DNS and NTP.

VMP requires three (3) PAMs.

Note: If you need to release a PAM VM for any reason, do not power it off from the VMware console. Instead, to maintain failover of ongoing Live and VOD tasks, you must shut down and restart the PAM VM.

The PAM VM contains the following applications.

Platform Manager

The Platform Manager maintains the details of all of the VMP virtual machines (VMs) and reports the VMs and other configured appliances to the Service Manager.

The Platform Manager also hosts the following elements:

- The Domain Name System (DNS) server
- The Network Time Protocol (NTP) server

Service Manager

The Service Manager provides the following services for the VMP:

- Applies the appropriate configuration to the MPE.
- Monitors the entire VMP.
- Initializes and starts the HTTPS user interface into the VMP.
- Uses node information provided by the Platform Manager, as well as its own default settings, to discover and configure the available nodes.
- Provides a set of REST APIs to create and manage Live-to-VOD and cDVR service instances.
- Reports the status of managed nodes to users when queried.

Document Server (DocServer)

The DocServer provides a persistent data store for VMP configuration and monitoring data (other than error and transaction logs).

MongoDB Database

MongoDB provides a persistent store for configuration and other operational data.

Redis

Redis provides an in-memory non-persistent store for runtime data.

Apache ZooKeeper

The Apache ZooKeeper provides coordination and light state maintenance and notification for the VMP.

Service Instance Controller (SIC)

The SIC obtains service-specific input from the configuration and creates the application instances required for the service.

Application Instance Controller (AIC)

The AIC installs all of the components required for an MCE or MPE application instance.

Note: In the VMP, the AIC is unbundled for the MCE and MPE components.

Media Capture Engine Task Controller (MCE-TC)

The MCE-TC allocates and load-balances capture tasks among the MCE-Workers. The MCE-TC also manages the lifecycle (start, stop, update, and monitor) of each capture task and session; provides resiliency and redundancy for the tasks; and tracks, handles, and reports any task failures.

Asset Workflow Manager (AWM)

The AWM configures asset workflows that span multiple applications.

Key Management Server (KMS) Proxy

The KMS proxy acts as a proxy to external KMS systems, such as Key Store, Verimatrix, and Irdeto. The KMS proxy helps synchronize keys among multiple MPE-Workers, avoiding redundant calls to external systems, and provides the support functions required for internal content protection, such as key generation and key rotation.

Media Capture Engine Worker (MCE-Worker)

The MCE-Workers performs the capture tasks for Live-to-VOD. The MCE-Workers acquire, prepare, index, and store media content from various sources. The MCE-Worker also converts those contents to Common Intermediate Format (CIF) assets that can then be transformed into different end-client formats by the Media Playback Engine (MPE).

The following table lists the inputs, storage formats, and output formats supported by the MCE for services.

Service	Function	Input	Storage Formats	Output Formats (From the MCE)
Live	Linear Stream Acquisition–Time-Shift Recording	ATS (UDP Multicast, UDP Unicast)	ATS with CIF Indexing	CIF
VOD	VOD Acquisition	CIF ATS VOD	CIF ATS VOD	CIF
Live-to VOD	Live-to-VOD	ATS (UDP Multicast)	CIF ATS VOD with CIF Indexing	CIF ATS VOD with CIF Indexing

Media Playback Engine Worker (MPE-Worker)

The MPE-Worker is the VMP just-in-time packager (JITP), used for Live and VOD video playout. The MPE processes incoming requests for manifests, segments, fragments, and other related resources, and plays recorded content to multi-screen IP-connected ABR endpoints, such as smart phones, tablets, smart TVs and set-top boxes (STBs) with ABR playout capability.

Centralized Logging System (CLS)

The CLS provides a central location for the aggregation, analysis, and display of VMP error logs and events.

AppEngine

A minimum of 6 app engines (2 Redis, 2 HAProxy, and 2 IPVS) are required to enable Media Service.

Features

- Overview, page 22
- VMP Service Manager GUI, page 24
- High Availability (HA), page 24
- Features Supported for Live Streaming Only, page 27
- Features Supported for Live and VOD Streaming, page 27
- Features Supported for VOD Only, page 39

Overview

Feature Set	Features
Components	The following VMP software components are required for a MPE setup: ■ Platform and Applications Manager (PAM) VMP requires three (3) PAMs. ■ Virtualized Video Platform Controller () ■ Media Playback Engine (MPE) ■ Media Capture Engine Worker (MCE-Worker) ■ AppEngines (6) ■ CLS
VMware Virtualization	■ Deployment of the VMP as a set of virtual machines (VMs) via an Open Virtual Appliance (OVA) image
Management	■ Configuration of platform services (DNS, NTP) ■ Mapping of virtual networks (Management, Data In, Data Out) ■ Configuration of the VMP system ■ System health monitoring ■ Unified management for COS

Feature Set	Features
Application Programming Interfaces	■ Provisioning of resources, such as channels ■ Provisioning of recording services and policies ■ Provisioning of recordings ■ Providing recorded asset information ■ Provisioning of playout services ■ Provisioning of content protection ■ Provisioning of HTTP media sources ■ Monitoring VMP health ■ Displaying system diagnostics ■ Displaying service diagnostics ■ Displaying logs ■ Displaying events
Service Routing	■ DNS service routing ■ Load-based routing ■ Application failure detection
Ingest and Recording	■ Ingest and recording of content with the following formats: – Adaptive transport stream (ATS) ■ Ingest and recording of content with the following codecs: – H.264 (AVC) – H.265 (HEVC) **Note:** H.264 supports HLS and HSS publish. H.265 only supports HLS publish.
On-Demand Encapsulation (ODE) of Adaptive Bitrate (ABR) Content for Live and VOD Origination with CIF Indexing	■ ODE Playout for HLS, HSS and DASH-MP4 formats ■ Trick-mode support for ODE-HLS and ODE-HSS ■ PlayReady DRM and AES-128-CTR encryption for ODE-HSS
Key Management Server (KMS) Support for ODE	■ Advanced Encryption Standard (AES)—Standard HLS only ■ Key acquisition from Adobe License Server—Adobe Access HLS, VG DRM and Insys DRM ■ Key acquisition from Cisco Key Store 1.1—Standard HLS only ■ Key acquisition support with Irdeto—Standard HLS and PlayReady HSS ■ Key acquisition support with Verimatrix Video Content Authority System (VCAS) 3.3—Standard HLS and PlayReady HSS ■ Key acquisition support for DASH

Feature Set	Features
Cache-Control	■ Cache-control header support for VOD service origination (HLS, HSS and DASH-MP4) ■ If-Modified-Since (IMS) support for VOD and Live services (HLS, HSS and DASH)-MP4
High Availability (HA)	■ Redundancy of PAM VMs ■ Basic load-balancing of MCE-Workers and MPE-Workers ■ Redundancy for Asset Capture Sessions for Live and Live-to-VOD
VMP Service Manager GUI	■ Configuration of Live, VOD, and Live-to-VOD workflows within the same service instance
Logging, Status Reporting, and Troubleshooting	■ Monitoring, system and service diagnostics, and display of logs and events in the VMP Service Manager GUI ■ Error and transaction logs ■ Node status ■ Detailed troubleshooting procedures

VMP Service Manager GUI

The VMP Manager GUI (VMP Service Manager GUI) enables you to quickly and easily configure the VMP infrastructure, service domain objects, and Live and VOD services. The GUI also provides valuable monitoring functions, including AWM statistics, system diagnostics, service diagnostics, log display and analysis, and event display.

For more information about the GUI, including how to launch it, see Working with the VMP Service Manager GUI, page 103.

For more information about enabling logging, see the Setting Up the CLS, page 53.

High Availability (HA)

The PAM has two classes of components for HA:

- Third party components, such as ZooKeeper, MongoDB, and Redis, use their own proprietary clustering and redundancy schemes.
- Cisco components, such as the VMP Service Manager GUI and DocServer, use ZooKeeper for leader selection.

In an HA environment, multiple PAM VMs provide redundancy for the applications that run on the PAM.

HA requires at least three PAM VMs because applications such as ZooKeeper, MongoDB, and Redis require at least three components to form a working cluster.

Many of these applications also require a majority in order to form a quorum. That is, a cluster of three components can recover from the failure of a single component, because there are still two components to form a majority. But if two components fail, the single remaining component is not a majority, and the cluster cannot recover until one of the failed components recovers.

Therefore, we must configure three PAM VMs, to ensure recovery in the event of multiple failures, and to support high performance, especially the sharing of databases and other applications.

Note: If you need to release a PAM VM for any reason, do not power it off from the VMware console. Instead, to maintain failover of ongoing Live and VOD tasks, you must shut down and restart the PAM VM.

For information about deploying PAM VMs for HA, see the Configuring the VMP Using the VMP Manager GUI, page 78.

Monitoring with the VMP Service Manager GUI

The VMP Service Manager GUI provides valuable monitoring functions, including system diagnostics, service diagnostics, logging, and events. For more information, see the following sections:

- Displaying High-Level Overview Information for the VMP, page 106
- Monitoring the VMP, page 104
- Service Diagnostics, page 154
- Log Analysis, page 157
- Events, page 156

Closed Captioning and Subtitles

VMP supports the conversion of multiple CEA-608 and CEA-708 subtitle data streams to WebVTT file format for Live, VOD, and cDVR workflows.

For HLS and DASH:

- CEA-608 conversion to WebVTT is supported in VOD for CC1, CC2, CCE3, and CC4.
- CEA-608 conversion to WebVTT is supported in Live and cDVR for CC1.
- CEA-708 conversion to WebVTT is supported in VOD for svc1, svc2, svc3, and svc4.
- CEA-708 conversion to WebVTT is supported in Live and cDVR for svc1 and svc2.

Note: For DASH, only ISO base media file format (BMFF) encapsulated WebVTT is supported.

In addition:

- For HLS, DVB bitmap is either pass-through or is encapsulated into ID3 (PNG/SMPTE-TT).

  Note: This option is only supported on the V2PC platform. For details, see the *Cisco Virtualized Video Processing Controller User Guide*.

- For HSS, CEA-608 and TELETEXT are converted to TTML.
- For DASH, CEA-608, CEA-708, and TELETEXT can be converted to either SMPTE-TT or WebVTT. Alternatively, beginning with VMP 2.11.2, CEA-608 and CEA-708 can be passed through without conversion. The DASH publish template variant configuration controls whether to enable SMPTE-TT, WebVTT, or pass-through.

  Beginning with VMP Release 2.11.2, DASH CEA-608 and CEA-708 can also be passed through without conversion. This option is only supported on the V2PC platform. For details, see the *Cisco Virtualized Video Processing Controller User Guide*.

  Note: If both CEA-608/CEA-708 and TELETEXT are included in the source, only TELETEXT is converted in the output. Multiple CEA-608 (up to 4 channels) and multiple CEA-708 are supported.

  Caution: Support for pass-through of CEA-608 or CEA-708 data streams in VMP 2.11.2 and later adds a new tag to the CIF MPD file. MPE images generated using earlier VMP releases will not recognize this tag, and as a result, will fail client requests.

Event Signaling and Management (ESAM)

The VMP supports CableLabs ESAM for real-time dynamic ad insertion for VOD HLS. There are two methods for Ad insertion, ESAM POIS Callout and ESAM Template. Currently, the SCTE 35 time signal_ command is supported.

ESAM Template

The MCE uses the ESAM Template format to embed scte35 tag information in the Media Presentation Description (MPD) file, along with the segment's presentation timestamp (PTS) and the duration of the event. The MPE then obtains the MPD file and generates an HLS or HSS client manifest with the corresponding tags inserted. The template is then provisioned on the system by the service provider based on the ADS vendor.

ESAM Placement Opportunity Information System (POIS) Callout

The VMP processes real-time signals, such as SCTE 35, and generates real-time manifests. A real-time transcoder submits an SCTE 35 time_signal command message to a Placement Opportunity Information System (POIS). The POIS confirms the validity of the signal and returns information that enables the transcoder to identify and update the start and end times of a signal region. The returned information can also include signal region durations, which can be used for conditioning the stream that is being encoded, and auxiliary data to be inserted into the video stream for use by downstream systems.

The MCE communicates with the POIS server through an internal ESAM proxy using HTTP POST requests. The POIS responds with tag information which the MCE embeds in the Media Presentation Description (MPD) file, along with the segment's presentation timestamp (PTS) and the duration of the event. The MPE then obtains the MPD file and generates an HLS client manifest with the corresponding tags inserted.

For information about configuring ESAM profiles, see the Configuring ESAM Profiles, page 127.

Support for Envivio Encoders

For ABR publishing, the VMP requires adaptive transport stream (ATS) input data that complies with the CableLabs OpenCable OC-SP-ATS-I01-140214 and OC-SP-EBP-I01-130118 specifications. The minimum requirement for input data is an ATS with video fragment Encoder Boundary Point (EBP) markers, synced across all ABR profiles.

VMP supports the Envivio encoder, which fulfills this requirement; VMP provides any missing audio EBP and video segment EBP markers. Transcoders like CMP and DCM provide additional information in the input ATS data, such as audio EBP, video segment EBP, and video fragment EBP markers.

There is no configuration required to enable this support.

Support for MPE-Worker IP Address with FQDN

VMP supports IP addresses with FQDNs for MPE-Workers.

For example, the following URL format is supported for HLS client requests:

```
http://AssetWorkFlow-name.FQDN/AssetWorkFlow-name/Content-ID/Content-ID.m3u8
http:///AssetWorkFlow-name/Content-ID/Content-ID.m3u8
```

The following URL format is supported for HSS client requests:

```
http://AssetWorkFlow-name.FQDN/AssetWorkFlow-name/Content-ID/Content-ID.ism/Manifest
http://DATAOUT_IPAddressOfMPE/AssetWorkFlow-name/Content-ID/Content-ID.ism/Manifest
```

The following URL format is supported for DASH

```
http://dash.edgesuite.net/akamai/bbb_30fps/bbb_30fps.mpd
http://dash.edgesuite.net/akamai/test/caption_test/ElephantsDream/elephants_dream_480p_heaac5_1.mpd
```

There is no configuration required to enable this support.

Support for PID Pass Through (cDVR)

VMP supports HLS PID Pass Through, which passes data stored in the packet payload through the VMP for the purpose of downstream processing. HLS PID Pass Through can be based on stream types SCTE-35, DVB-Bitmap, ID3 tags, or others.

MCE

- Parse new supported stream type from input source
- Publish stream type information into MPD

MPE

- Parse MPD to match all the PIDs that need to be pass through
- Update PMT to contain pass through PIDs in service stream
- Make sure no packets of pass through PIDs are lost or overlapped compared to the original source

Configuring PID Pass Through

To enable this support, PID Pass Through parameters must be configured using the Virtualized Video Processing Controller () Publish Template. For details, see **Configuring Templates** in the *Cisco Virtualized Video Processing Controller User Guide.*

Support for DVB Bitmap Subtitles

VMP supports transforming or Pass Through of DVB bitmap subtitles from ATS to HLS. When Transform mode is configured, VMP converts the DVB bitmap subtitle to an SMPTE-TT formatted subtitle, encapsulates them into ID3 tags and muxes them with .ts files of HLS. When Pass Through mode is configured, VMP preserves the DVB bitmap subtitles in ATS and keeps them intact in the .ts files of HLS.

Note: The DVB Bitmap Subtitles feature is configured using the V2PC. Refer to the *Cisco Virtualized Video Processing Controller User Guide* for your release.

Features Supported for Live Streaming Only

For Live streaming only, VMP supports the ability to include multiple period information in a DASH MPD output file. For an example of such a file containing multiple period information, see Sample DASH-MP4 manifest file (.mpd), page 30.

Features Supported for Live and VOD Streaming

VMP supports the following features for Live and VOD streaming:

- ATS Input with EBP for HLS, HSS, and DASH-MP4, page 28
- Advanced Audio Coding for HLS, HSS, and DASH-MP4, page 28
- Key Rotation for HLS, page 28
- Key Acquisition for HLS, HSS, and DASH-MP4, page 28
- Multi-Language Audio for HLS, HSS, and DASH-MP4, page 29
- Trick Mode for HLS, HSS, and DASH, page 29
- Variant Playlists for HLS, HSS, and DASH-MP4, page 29

- DVR Window for HLS, HSS, and DASH-MP4, page 38
- Support for Content ID Mapping for Irdeto for HLS and HSS, page 38
- Support HLSv7: EXT-X-Start, page 38

ATS Input with EBP for HLS, HSS, and DASH-MP4

The process of capturing, transferring, or otherwise importing Live content is known as Live ingest. VMP supports the ingest and storage of Live content delivered by adaptive bit rate (ABR) streaming over HTTP, and the delivery of the content to the end clients. VMP ingests Live content in ATR format with EBP. The formats required by the end clients, such as HLS, HSS, and DASH-MP4, are produced on-demand by the MPE-Workers.

VMP uses the Alliance for Telecommunication Industry Solutions () index format specification for MPEG-2 TS media files.

There is no configuration required to enable this support.

Advanced Audio Coding for HLS, HSS, and DASH-MP4

VMP supports AAC-LC (low complexity), AAC-HEv1 (High Efficiency v1), and AAC-HEv2 (High-Efficiency v2) audio compression for HLS, HSS, and DASH-MP4 Live capture of MPEG-2 TS media files. High Efficiency Advanced Audio Encoding is a compression system for digital audio. The second revision makes use of more enhanced features and is more standardized than the first version (HE-AAC).

There is no configuration required to enable this support. However, there is an ATT player or client requirement.

Multi-Audio for HLS (cDVR)

On the MCE, VMP now supports up to 10 audio tracks for Live or VOD HLS for cDVR. This feature is expanded to include closed caption and other PIDS such as ID3 tags.

Key Rotation for HLS

VMP supports internal key generation with key rotation for Live HLS playout. VMP provides KMS proxy and key generation as a single task for each Live service. VMP maintains an internal cache of key encryption information for each Live stream and for each rotation point within each stream. Key generation is triggered on the first client request for a Live playout and at each subsequent rotation point in the playout. VMP generates the encryption keys algorithmically using a key seed and then caches the keys. The presentation time stamp (PTS) values are used as an index to mark rotation points.

For information about configuring variant playlists, see the Configuring Publish Templates, page 140.

Key Acquisition for HLS, HSS, and DASH-MP4

VMP supports the following KMS types:

- Content Protection Information Exchange Format (CPIXF)
- Adobe License Server—Adobe Access HLS, Insys, VGC & DRM
- Advanced Encryption Standard (AES)—Standard HLS only
- Cisco Key Store 1.1—Standard HLS, VG DRM & Insys DRM
- Irdeto PlayReady—Standard HLS and PlayReady HSS only
- Verimatrix Video Content Authority System (VCAS) 3.3—Standard HLS and PlayReady HSS
- EZDRM—Common Encryption DASH: Playready & Widevine
- BUYDRM—Common Encryption DASH: Playready & Widevine

- Insys–Widevine Encryption DASH

For information about enabling key acquisition, see Configuring Key Profiles, page 129.

Multi-Language Audio for HLS, HSS, and DASH-MP4

VMP supports multi-language audio for Live HLS, HSS, and DASH-MP4 playout.

There is no configuration required to enable this support.

Trick Mode for HLS, HSS, and DASH

Trick mode, also known as trick play, provides functions such as fast-forward and rewind for digital video systems. VMP supports trick mode with I-frame playlists for HLS, HSS, and DASH Live playout and VOD.

There is no configuration required to enable this support.

Variant Playlists for HLS, HSS, and DASH-MP4

Variant playlist support enables you to select the video streams to include in a manifest by configuring a list of video and audio bitrates in the VMP Service Manager GUI. VMP supports video bitrate selection (HLS, HSS and DASH-MP4) and audio bitrate selection (HSS and DASH-MP4).

Beginning with Release 2.11.1, VMP supports selective publishing of DASH-MP4 assets configured for different video frame rates and resolutions and with different audio profiles.

For more information about configuring variant playlists, see Configuring Publish Templates, page 140.

Sample HLS Playlist (.m3u8)

```
#EXTM3U
#EXT-X-TARGETDURATION:10
#EXT-X-VERSION:4
#EXT-X-MEDIA-SEQUENCE:1
#EXT-X-PLAYLIST-TYPE:EVENT
#EXTINF:10
12345/0.ts
#EXTINF:10
12345/900000.ts
#EXT-X-DISCONTINUITY
#EXT-X-SIGNAL-START:SignalID=Start Ad 1
#EXTINF:10
12345/1800000.ts
#EXT-X-SIGNAL-SPAN:SignalID=Start Ad 1,TimeFromSignalStart=10
#EXTINF:10
12345/2700000.ts
#EXT-X-SIGNAL-END:SignalID=End of avail
#EXT-X-DISCONTINUITY
#EXTINF:10
12345/3600000.ts
#EXTINF:10
12345/4500000.ts
#EXTINF:10
12345/5400000.ts
#EXTINF:10
12345/6300000.ts
#EXTINF:10
12345/7200000.ts
#EXTINF:10
12345/8100000.ts
#EXTINF:10
```

```
12345/9000000.ts
```

Sample HSS Playlist (.ismc)

```
<StreamIndex Type=”text” Name=”scte35” SubType=”SCTE35” Chunks=”0” Timescale=”10000000”
Url=”QualityLevels({bitrate})/Fragments(scte35
<QualityLevel Index=”0” Bitrate=”100” CodecPrivateData=”” FourCC=”text”/>
<c t=”200000000” d=”100000000”>
<f>
PEFjcXVpcmVkU2lnbmFsCiAgICAgICAgICAgIHhtbG5zOmNvcmU9Imh0dHA6Ly93d3cuY2FibGVsYWJzLmNvbS9uYW1lc3BhY2VzL21
ldGFkYXRhL3hzZC9jb3JlLzIiCgkgIC
</f>
</c>
<c t=”400000000” d=”100000000”>
<f>
PEFjcXVpcmVkU2lnbmFsCiAgICAgICAgICAgIHhtbG5zOmNvcmU9Imh0dHA6Ly93d3cuY2FibGVsYWJzLmNvbS9uYW1lc3BhY2VzL21
ldGFkYXRhL3hzZC9jb3JlLzIiCgkgIC
</f>
</c>
</StreamIndex>
```

Sample DASH-MP4 manifest file (.mpd)

```
<?xml version="1.0" encoding="UTF-8"?>
<MPD
    availabilityStartTime="2017-10-12T08:41:01.651Z"
    minBufferTime="PT4S"
    minimumUpdatePeriod="PT2S"
    profiles="urn:mpeg:dash:profile:isoff-live:2011"
    publishTime="2017-10-13T02:30:03.000000Z"
    timeShiftBufferDepth="PT5M0S"
    type="dynamic"
    xmlns="urn:mpeg:dash:schema:mpd:2011"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:mpeg:dash:schema:mpd:2011
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-DASH_schema_files/DASH-MPD.xsd">
    <Period
        id="1507800857"
        start="PT53M30.128S">
        <AdaptationSet
            id="1"
            lang="cc1"
            mimeType="application/mp4"
            segmentAlignment="true">
            <SegmentTemplate
                initialization="$RepresentationID$/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                presentationTimeOffset="288911486"
                startNumber="1611"
                timescale="90000">
                <SegmentTimeline>
                    <S
                        d="180000"
                        r="48"
                        t="290171484"/>
                </SegmentTimeline>
            </SegmentTemplate>
            <Representation
                bandwidth="200"
                codecs="stpp"
                id="CC_160_cc1_CEA-608"/>
        </AdaptationSet>
        <AdaptationSet
            id="2"
            lang="cc1"
```

```
        mimeType="application/mp4"
        segmentAlignment="true">
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="288911486"
            startNumber="1611"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="180000"
                    r="48"
                    t="290171484"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            bandwidth="200"
            codecs="wvtt"
            id="CC_160_cc1_CEA-608_wvtt"/>
    </AdaptationSet>
    <AdaptationSet
        bitstreamSwitching="false"
        contentType="video"
        id="3"
        mimeType="video/mp4"
        segmentAlignment="true">
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="288911486"
            startNumber="1609"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="180000"
                    r="51"
                    t="289631484"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            bandwidth="3000000"
            codecs="avc1.4D401F"
            height="720"
            id="3000000_video_seg_auto_video_160"
            width="1280"/>
    </AdaptationSet>
    <AdaptationSet
        bitstreamSwitching="false"
        contentType="audio"
        id="4"
        lang="pol"
        mimeType="audio/mp4"
        segmentAlignment="true">
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="288911486"
            startNumber="1609"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="180000"
                    r="51"
```

```
                    t="289631484"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            audioSamplingRate="48000"
            bandwidth="128000"
            codecs="mp4a.40.2"
            id="3000000_video_seg_auto_audio_80_mp4a.40.2_128000"/>
    </AdaptationSet>
    <AdaptationSet
        bitstreamSwitching="false"
        contentType="video"
        id="5"
        mimeType="video/mp4"
        segmentAlignment="true">
        <EssentialProperty
            schemeIdUri="http://dashif.org/guidelines/trickmode"
            value="3"/>
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="288911486"
            startNumber="1610"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="180000"
                    r="50"
                    t="289811484"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            bandwidth="3000000"
            codecs="avc1.4D401F"
            height="720"
            id="3000000_i-frame_video_160"
            maxPlayoutRate="10"
            width="1280"/>
    </AdaptationSet>
</Period>
<Period
    id="1507800969"
    start="PT55M22.128S">
    <AdaptationSet
        id="1"
        lang="cc1"
        mimeType="application/mp4"
        segmentAlignment="true">
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="298991486"
            startNumber="1661"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="179998"
                    r="0"
                    t="298991486"/>
                <S
                    d="180000"
                    r="57"
                    t="299171484"/>
            </SegmentTimeline>
        </SegmentTemplate>
```

```
    <Representation
        bandwidth="200"
        codecs="stpp"
        id="CC_160_cc1_CEA-608"/>
</AdaptationSet>
<AdaptationSet
    id="2"
    lang="cc1"
    mimeType="application/mp4"
    segmentAlignment="true">
    <SegmentTemplate
        initialization="$RepresentationID$/init.mp4"
        media="$RepresentationID$/$Time$.m4f"
        presentationTimeOffset="298991486"
        startNumber="1661"
        timescale="90000">
        <SegmentTimeline>
            <S
                d="179998"
                r="0"
                t="298991486"/>
            <S
                d="180000"
                r="57"
                t="299171484"/>
        </SegmentTimeline>
    </SegmentTemplate>
    <Representation
        bandwidth="200"
        codecs="wvtt"
        id="CC_160_cc1_CEA-608_wvtt"/>
</AdaptationSet>
<AdaptationSet
    bitstreamSwitching="false"
    contentType="video"
    id="3"
    mimeType="video/mp4"
    segmentAlignment="true">
    <SegmentTemplate
        initialization="$RepresentationID$/init.mp4"
        media="$RepresentationID$/$Time$.m4f"
        presentationTimeOffset="298991486"
        startNumber="1662"
        timescale="90000">
        <SegmentTimeline>
            <S
                d="179998"
                r="0"
                t="298991486"/>
            <S
                d="180000"
                r="57"
                t="299171484"/>
        </SegmentTimeline>
    </SegmentTemplate>
    <Representation
        bandwidth="3000000"
        codecs="avc1.4D401F"
        height="720"
        id="3000000_video_seg_auto_video_160"
        width="1280"/>
</AdaptationSet>
<AdaptationSet
```

```
            bitstreamSwitching="false"
            contentType="audio"
            id="4"
            lang="pol"
            mimeType="audio/mp4"
            segmentAlignment="true">
            <SegmentTemplate
                initialization="$RepresentationID$/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                presentationTimeOffset="298991486"
                startNumber="1662"
                timescale="90000">
                <SegmentTimeline>
                    <S
                        d="179998"
                        r="0"
                        t="298991486"/>
                    <S
                        d="180000"
                        r="57"
                        t="299171484"/>
                </SegmentTimeline>
            </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="3000000_video_seg_auto_audio_80_mp4a.40.2_128000"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            contentType="video"
            id="5"
            mimeType="video/mp4"
            segmentAlignment="true">
            <EssentialProperty
                schemeIdUri="http://dashif.org/guidelines/trickmode"
                value="3"/>
            <SegmentTemplate
                initialization="$RepresentationID$/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                presentationTimeOffset="298991486"
                startNumber="1662"
                timescale="90000">
                <SegmentTimeline>
                    <S
                        d="179998"
                        r="0"
                        t="298991486"/>
                    <S
                        d="180000"
                        r="57"
                        t="299171484"/>
                </SegmentTimeline>
            </SegmentTemplate>
            <Representation
                bandwidth="3000000"
                codecs="avc1.4D401F"
                height="720"
                id="3000000_i-frame_video_160"
                maxPlayoutRate="10"
                width="1280"/>
        </AdaptationSet>
    </Period>
    <Period
```

```
id="1507801087"
start="PT57M20.128S">
<AdaptationSet
    id="1"
    lang="cc1"
    mimeType="application/mp4"
    segmentAlignment="true">
    <SegmentTemplate
        initialization="$RepresentationID$/init.mp4"
        media="$RepresentationID$/$Time$.m4f"
        presentationTimeOffset="309611486"
        startNumber="1721"
        timescale="90000">
        <SegmentTimeline>
            <S
                d="182746"
                r="0"
                t="309611486"/>
            <S
                d="180000"
                r="40"
                t="309794232"/>
        </SegmentTimeline>
    </SegmentTemplate>
    <Representation
        bandwidth="200"
        codecs="stpp"
        id="CC_160_cc1_CEA-608"/>
</AdaptationSet>
<AdaptationSet
    id="2"
    lang="cc1"
    mimeType="application/mp4"
    segmentAlignment="true">
    <SegmentTemplate
        initialization="$RepresentationID$/init.mp4"
        media="$RepresentationID$/$Time$.m4f"
        presentationTimeOffset="309611486"
        startNumber="1721"
        timescale="90000">
        <SegmentTimeline>
            <S
                d="182746"
                r="0"
                t="309611486"/>
            <S
                d="180000"
                r="40"
                t="309794232"/>
        </SegmentTimeline>
    </SegmentTemplate>
    <Representation
        bandwidth="200"
        codecs="wvtt"
        id="CC_160_cc1_CEA-608_wvtt"/>
</AdaptationSet>
<AdaptationSet
    bitstreamSwitching="false"
    contentType="video"
    id="3"
    mimeType="video/mp4"
    segmentAlignment="true">
    <SegmentTemplate
```

```
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="309611486"
            startNumber="1722"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="182746"
                    r="0"
                    t="309611486"/>
                <S
                    d="180000"
                    r="37"
                    t="309794232"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            bandwidth="3000000"
            codecs="avc1.4D401F"
            height="720"
            id="3000000_video_seg_auto_video_160"
            width="1280"/>
    </AdaptationSet>
    <AdaptationSet
        bitstreamSwitching="false"
        contentType="audio"
        id="4"
        lang="pol"
        mimeType="audio/mp4"
        segmentAlignment="true">
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
            presentationTimeOffset="309611486"
            startNumber="1722"
            timescale="90000">
            <SegmentTimeline>
                <S
                    d="182746"
                    r="0"
                    t="309611486"/>
                <S
                    d="180000"
                    r="37"
                    t="309794232"/>
            </SegmentTimeline>
        </SegmentTemplate>
        <Representation
            audioSamplingRate="48000"
            bandwidth="128000"
            codecs="mp4a.40.2"
            id="3000000_video_seg_auto_audio_80_mp4a.40.2_128000"/>
    </AdaptationSet>
    <AdaptationSet
        bitstreamSwitching="false"
        contentType="video"
        id="5"
        mimeType="video/mp4"
        segmentAlignment="true">
        <EssentialProperty
            schemeIdUri="http://dashif.org/guidelines/trickmode"
            value="3"/>
        <SegmentTemplate
            initialization="$RepresentationID$/init.mp4"
            media="$RepresentationID$/$Time$.m4f"
```

```
                presentationTimeOffset="309611486"
                startNumber="1722"
                timescale="90000">
                <SegmentTimeline>
                    <S
                        d="182746"
                        r="0"
                        t="309611486"/>
                    <S
                        d="180000"
                        r="38"
                        t="309794232"/>
                </SegmentTimeline>
            </SegmentTemplate>
            <Representation
                bandwidth="3000000"
                codecs="avc1.4D401F"
                height="720"
                id="3000000_i-frame_video_160"
                maxPlayoutRate="10"
                width="1280"/>
        </AdaptationSet>
    </Period>
</MPD>
```

DVR Window for HLS, HSS, and DASH-MP4

VMP supports a DVR window feature, also called a time-shift buffer, for Live HLS, HSS, and DASH-MP4 capture.

The DVR window, also called the time-shift buffer, is the length of time in seconds that Live content is stored with respect to the current Live point. The DVR window enables an end client to rewind to a previous point in a Live capture, as long as it does not exceed the configured duration of the DVR window (or the beginning of the capture). As the current Live point moves, content older than the DVR window is deleted, maintaining a constant DVR window for the Live service.

For a Live service, the MCE captures the Live multicast or unicast feed, indexes it, and stores the metadata, transport stream files, and TTML files. VMP provides support for two types of storage, COS and NAS, and both can be used for TSTV/DVR window usage.

For information about configuring the DVR window, see Configuring Asset Lifecycle Policies, page 133.

Support for Content ID Mapping for Irdeto for HLS and HSS

The Irdeto Control API requires unique content IDs for HLS and HSS key acquisition.

For example, given content ID **CiscoTest1**, the HLS key must be retrieved from Irdeto Control with **CiscoHLSTest1**, and the HSS key with **CiscoHSSTest1**. This results in over-provisioning of content in the VMP: one Live or VOD asset for HLS, and another for HSS. Content ID mapping for Irdeto avoids this over-provisioning.

To enable content ID mapping for Irdeto for a Live service, add one or more sets of acquisition details to the Acquisition table for a channel in a channel lineup. For more information, see the description of the Acquisition table in Asset Lineups, page 122.

Support HLSv7: EXT-X-Start

This feature allows the user to specify a start time (VOD) or delay time (LIVE) for the player within the Live or VOD asset. The time is indicated by the “#EXT-X-START” tag in the stream manifests.

VOD Application:

If the user wants to start play from an arbitrary point in an asset, multiple URLs (variants) can be created for various playback times from a single ingested asset.

LIVE Application:

If the user wants to delay time in live playback sessions. Delays are often used on live streaming sites such as twitch.tv. and is required for live online gaming tournaments to prevent spectators from relaying stream information to competitors.

Support for Profile Naming for HLS and DASH

Beginning with Release 2.13, VMP supports naming channel profiles for HLS and DASH content and selecting and ordering them in device-specific variant manifests. In earlier releases, variant manifests are named based on the bit rates detected by the Linear Packager. By naming profiles explicitly, VMP ensures that profiles are always included in the prescribed order in the variant manifest file.

Profile naming is configured through the ABR Profiles dialog of the V2PC GUI. For details, see the *Cisco Virtualized Video Processing Controller User Guide*.

Support for Audio Groups and ABR Profile Assignments

When used with Cisco Virtual Media Recorder (VMR) Release 1.4 or later, VMP Release 2.13 and later support configuring audio groups for different bandwidths and assigning these audio groups to specific ABR profiles.

These selections, made through the V2PC GUI, result in new GROUP-ID parameters defined in the manifest that specify:

- Whether the audio group is the default

- Whether auto-selection is enabled
- The language and name of the audio file
- The URI for the audio group

Earlier VMP releases also allowed for selection of six audio streams in the manifest, but these streams did not adapt to bandwidth changes, and remained the same as the selected option throughout streaming.

Audio profiles are configured in the Stream Configuration section of the Publishing Templates dialog, and are assigned to specific ABR profiles in the ABR Profiles dialog of the V2PC GUI. For details, see the *Cisco Virtualized Video Processing Controller User Guide*.

Support for Configuring Maximum Audio Profiles

Beginning with VMP Release 2.13 and V2PC Release 3.3.5, VMP supports user configuration of the maximum number of audio profiles for an ATS channel from 1-32 through the V2PC GUI. This value was fixed at 10 in earlier releases. For additional information, see the *Cisco Virtualized Video Processing Controller User Guide*.

Features Supported for VOD Only

Note: For information about Live services, see Enabling Services, page 78.

Ingest and Storage of the ATS Package for HLS, HSS, and DASH-MP4

Video-on-demand (VOD) enables service providers to syndicate contents from various content providers and distribute the content to their subscribers. The process of capturing, transferring, or otherwise importing VOD content is known as VOD ingest.

VMP supports the ingest and storage of VOD content delivered by ABR streaming over HTTP, and the delivery of the content to the end clients. VMP ingests VOD content in ATS format and stores it in a NAS store. The formats required by the end clients, such as HLS, HSS, and DASH MP4, are produced on-demand by the MPE-Workers.

VMP uses the DASH index format and the specification for MPEG-2 TS media files.

Performance Enhancements

VMP supports the ingest of up to 20 VOD packages at the same time.

There is no configuration required to enable this support.

Features Supported for Live and cDVR Only

Configurable I-Frame Segment Duration

Beginning with release 2.12.1, VMP supports specification of the duration of I-frames for an ATS Channel through the V2PC GUI. For details, see the *Cisco Virtualized Video Processing Controller User Guide* for your V2PC release.

Features Supported for Live, VOD, and cDVR

Enhanced SCTE 35 Ad Insertion Support

VMP supports SCTE 35 ad insertions using an Event Signaling and Management (ESAM) Placement Opportunity Information System (POIS) callout and ESAM template. The ESAM system submits an SCTE 35 splice insert message to the POIS, which confirms the validity of the signal and returns information allowing the system to identify and update the start or end times of a signal region.

In earlier VMP releases, SCTE 35 support was limited to HLS VOD and Live use cases, and included only the time_signal command and two segmentation types:

- 0x34 " Provider Placement Opportunity Start"
- 0x35 " Provider Placement Opportunity End"

Beginning with VMP Release 2.12.1, SCTE 35 support is expanded to include Live, VOD, and cDVR use cases, and adds support for the splice_insert command and the following segmentation types:

- 0x10 " Program Start"
- 0x11 " Program End"
- 0x20 " Chapter Start"
- 0x21 " Chapter End"
- 0x30 " Provider Advertisement Start"
- 0x31 " Provider Advertisement End"
- 0x32 " Distributor Advertisement Start"
- 0x33 " Distributor Advertisement End"
- 0x36 " Distributor Placement Opportunity Start"
- 0x37 " Distributor Placement Opportunity End"

Note: In VMP 2.15.0, SCTE 35 support for the cDVR use case requires Cisco Virtual Media Recorder (VMR).

Enhanced SCTE 35 support is only configurable through the V2PC GUI. For details, see the *Cisco Virtualized Video Processing Controller User Guide*.

HEVC (h.265) to DASH-MP4 Support with Videvine Encryption

Beginning with Release 2.12.1, VMP enables playback of HEVC video content by parsing HEVC transport streams from the MCE component by the MPE component, and repackaging of these streams in MP4 format, together with the option of Videvine encryption. Widevine encryption is enabled in the same way as in earlier releases.

Note: This feature is supported on V2PC platform deployments only.

Validated HLS Manifest Renaming

Beginning with Release 2.12.1, VMP offers validated support of HLS manifest renaming for Live, VOD, and cDVR use cases. Support is provided through either the V2PC GUI, as described in the *Cisco Virtualized Video Processing Controller User Guide* for V2PC Release 3.3.4, or the VMP Service Manager GUI, as described in Configuring HLS Manifest Renaming, page 146.

System Requirements

External Servers

Configuring external DNS, NTP servers is mandatory for all VMP components (MCE, AppEngines, CLS and MPE).

Cisco UCS

All of the VMP components run on top of VMware on Cisco Unified Computing System (UCS) B200 M3 Blade Servers. For information about running the VMP components on other types of servers, contact your Cisco representative.

The following table shows the minimum UCS hardware requirements for VMP:

Part Number	Description	Quantity
UCSB-B200-M3-U	UCS B200 M3 Blade Server w/o CPU, mem, HDD, mLOM/mezz (UPG)	4
UCS-CPU-E52680B	2.80 GHz E5-2680 v2/115W 10C/25MB Cache/DDR3 1866MHz	2 (Total 40 CPUs)
UCS-MR-1X082RY-A	8GB DDR3-1600-MHz RDIMM/PC3-12800/dual rank/1.35v	16 (Total 128 GB)
A03-D600GA2	600GB 6Gb SAS 10K RPM SFF HDD/hot plug/drive sled mounted	2 (1200 GB total disk space available)
UCSB-MLOM-40G-01	VIC 1240 modular LOM for M3 blade servers	2
UCSB-HS-01-EP	Heat Sink for UCS B200 M3 server	2

VMware, vCenter, vSphere

VMP support for VMs requires the following virtualization software programs and releases:

- VMware ESXi hypervisor, running on the server
- VMware vCenter
- VMware vSphere

Note: VMware EXSi version and patch level requirements may vary by VMP release. Be sure to check the release notes for your VMP release for specific EXSi version and patch level requirements.

The following table shows the minimum DL380 hardware requirements for VMP:

Part Number	Description	Quantity
653200-B21	HP DL380p Gen8 8-SFF CTO Chassis	1
715224-L21	HP DL380p Gen8 E5-2697v2 FIO Kit	1
■ HA839A1	HP Factory Express Server System Custom SVC	1
■ HA867A1	HP Data Express Standard Server SVC	1
715224-B21	HP DL380p Gen8 E5-2697v2 Kit	1
708641-B21	HP 16GB 2Rx4 PC3-14900R-13 Kit	16
652605-B21	HP 146GB 6G SAS 15K 2.5in SC ENT HDD	2
665249-B21	HP HP560SFP+ 10GbE 2P Server Adapter	1
661069-B21	HP 512MB FBWC for P-Series Smart Array	1
656363-B21	HP 750W CS Platinum Plus Hot Plug Power Supply Kit	2
684208-B21	HP 1GbE 4-port 331FLR Adapter FIO Kit	1
AF556A	PWR CRD KT 1.83m 10A C13-NA/JPN	2
512485-B21	HP iLO Advanced including 1yr TS U E-LTU	1
U4545E	HP 3y 4h 24x7 ProLiant DL38x HW Support	1
663478-B21	HP 2U SFF BB Rail Kit Gen8	1

Resource Sizing

The following table lists the VM and hardware sizing recommended for each VMP component.

Component	Flavor Name	vCPUs	RAM	Hard Drive Partition 1	Hard Drive Partition 2	Network Interfaces
V2PC Masters (3)	2X-Large	8	32 GB	40 GB	–	1 X 10 GE
MCE	2X-Large	8	32 GB	40 GB	–	3 X 10 GE
MPE	2X-Large	8	32 GB	40 GB	–	3 X 10 GE
Repository	2X-Large	8	32 GB	40 GB	–	1 X 10 GE
IPVS Nodes (2) *	X-Large	8	16 GB	40 GB	–	2 X 10 GE
REDIS Nodes (2) **	X-Large	8	16 GB	40 GB	–	2 X 10 GE
HAProxy Nodes (2) **	X-Large	8	16 GB	40 GB	–	2 X 10 GE
AM (2)	X-Large	8	16 GB	40 GB	–	1 X 10 GE
ELK Node	2X-Large	8	32 GB	40 GB	512 GB	1 X 10 GE

* Two required *per service*: one pair for MCE and another pair for MPE.

** Two required *per device type*: one set for SCE-StateCacheEndpoint and one set for VOD service.

Note: Legacy deployments using Cisco Media Origination System (MOS) do not require V2PC Masters or an ELK node, but instead, require VMs for the Platform and Application Manager (PAM) and Centralized Logging Server (CLS). See the *User Guide* for your MOS release for complete deployment information for these nodes.

These recommended minimum system resource numbers are based on the following assumptions:

- Hyper-threading is enabled in the ESXi compute nodes.
- There is no virtual CPU oversubscription. That is, the recommended number of virtual CPUs is the same as the number of actual physical cores.

These numbers include VMware overhead. You might need to adjust these numbers, based on your specific deployment.

VMP Service Manager GUI Requirements

The VMP Service Manager GUI can run on the following operating systems and browsers:

- Windows Internet Explorer 9 (IE9) or later for Windows 7
- Mozilla Firefox 20 or later for Windows 7
- Google Chrome 30.x for Windows 7
- Apple Safari 7.x for Windows 7 or MAC OS Version 10.9 or later

The VMP Service Manager GUI requires a display resolution of 1600 x 900 or better.

Restrictions and Limitations

- VMP does not support IPv6.
- The image version for a node must match the image version configured in the associated software image manifest. For more information, see Configuring VMP Nodes, page 108 and Configuring Software Image Manifests, page 119.
- When configuring your network for HA redundancy, take the following considerations into account:
  - Place the redundant VMs and other appliances such that they are not fate-shared in terms of the availability of the ESXi server, the hardware, or the network.
  - Deploy the members of a given HA group on different blades, and ideally on different chassis.
  - Back up your databases at regular intervals.
- During streaming, do not use the **transaction-logs format** command to change the transaction log format (for example, from Extended Squid to Apache, or to a custom format).

Deploying VMP

To deploy VMP, perform the following tasks in order:

- Pre-Deployment Tasks, page 45
- Setting Up the External DNS Server, page 46
- Setting up the External Radius Server, page 49
- Deploying the VMP System, page 53
- Configuring the VMP Using the VMP Manager GUI, page 78

Pre-Deployment Tasks

Before deploying the VMP configuration, you must complete the following preliminary tasks:

Note: Virtual machine migration or cloning using the VMware infrastructure is not currently supported for any of the VMP nodes.

1. Prepare your VMP VMware data center topologies and networks. For more information, see Networks, page 16.
2. Download all of the VMP Open Virtual Appliance (OVA) files for local access.
3. Determine the blade and VM layout that you will use, and your IP address allocation scheme for the network interfaces.
4. Gather information related to Live feeds and multicast and unicast video sources and channels from the Cisco Digital Content Manager (DCM) or other sources. You will need this information when you create the channels and channel lineups in the VMP Service Manager GUI.
5. Install the external DNS and NTP servers for the playout clients.

   a. Determine the origin service FQDN and prepare the downstream client (client-facing) DNS servers to point to the IPVS data plane (primary interface) IP addresses.

   Note: Wait until the MPE application comes up, and then add the entries to the external DNS.

   b. Prepare the CDN-facing firewall. Load balancing for ODE playout is handled by the IPVS.

   Note: Determine whether you require separate firewalls and DNS settings for origin services for Live and VOD playout. The administrator must ensure that the DNS zones are configured in the external DNS server and that the DNS server accepts TCP and UDP ports 53. Otherwise, the **nslookup** for **mgmt-docserver.***domain* fails and the PAM processes cannot begin. This problem can occur if you deploy a DNS server using CentOS Linux distribution, which by default does not add a rule for UDP port 53. You can use the **iptables** command to set the correct firewall settings.

   The TTL for the DNS proxy requests is 1 second.
6. Prepare the NTP and key management servers on the Management network.
7. Prepare the NAS/COS stores and note the mount point, IP addresses, etc.

Setting Up the External DNS Server

VMP requires Linux DDNS. Dynamic entries are created and registered by the PAM. NTP on the DNS server must be synchronized with other VMP components.

Note: For VMP to work properly, the DNS setup should be redundant and protected from single point of failure.

Note: The following configuration is required if the DNS server starts automatically at boot-up.

```
In case of Centos 6 based OVA:
# chkconfig named on
In case of Centos 7 based OVA:
  # systemctl enable named
```

1. On the external DNS server, generate a TSIG key in one of the following algorithm formats: hmac-md5, hmac-sha1, hmac-sha224, hmac-sha256, hmac-sha384, and hmac-sha512.
2. Enter the following command:

```
dnssec-keygen -a HMAC-MD5 -b 128 -n HOST testdns.com.
```

where:

- **HMAC-MD5** is the TSIG algorithm.
- **128** is the number of bits in the key.
- **testdns.com.** is the name of the key. The name of the key, the domain name of the VMP, and the DNS zone in the external DNS server should all be the same (in this example, **testdns.com**).
- The command must end with a period (.), which is required when generating the key.

This command creates a .key file and a .private key file.

- Sample .key file:

```
Ktestdns.com.+157+05519.key
testdns.com. IN KEY 512 3 157 ujLdXfCZenQZQKZlFy42fw==
```

- Sample private key file:

```
Ktestdns.com.+157+05519.private
\Private-key-format: v1.3
Algorithm: 157 (HMAC_MD5)
Key: ujLdXfCZenQZQKZlFy42fw==
Bits: AAA=
Created: 20140325141250
Publish: 20140325141250
Activate: 20140325141250
```

3. Create a new file called **domain.key** in the /etc/ directory and copy the TSIG key value from the .key file created previously.
4. Press **i** to insert the following lines:

```
algorithm hmac-md5;
        secret "ujLdXfCZenQZQKZlFy42fw==";
};
```

where:

- **hmac-md5** is the TSIG algorithm.
- **ujLdXfCZenQZQKZlFy42fw==** is the TSIG key.

5. Press **Ctrl-C** then :**wq** to save the file and exit.
6. Add the PAM IP address(es) to the allow transfer line in /etc/named.conf.
7. Press **i** to insert the following line:

```
allow-transfer /etc/testdns.com.key
```

8. Add the key file path to the file /etc/named.conf file.
9. Press **i** to insert the following lines then press **Ctrl-C** followed by **:wq** to save the file and exit.

```
include "/etc/testdns.com.key";
```

10. Add the forward and reverse zone names and file paths to the file /etc/named.conf. (These files will be created in /var/named/slaves/.)
    - The DNS zone is related to the 172.20.216.xx subnet, which can be the Management interface.
    - For the Data In and Data Out interfaces, similar information related to the reverse zone must be added.
    - Data In is related to the 15.1.1.x subnet.
    - Data Out is related to the 25.1.1.x subnet.
    - **testdns.com.** is the key name.

```
DNS Zone Details
zone testdns.com IN {
type master;
file "slaves/db.testdns.com";
```

11. Press **i** to insert the following lines then press **Ctrl-C** followed by **:wq** to save the file and exit.

```
allow-update { key "testdns.com."; };
notify yes;
};
Reverse Zone Details (Management Interface)
zone 216.20.172.IN-ADDR.ARPA IN {
type master;
file "slaves/db.216.20.172";
allow-update { key "testdns.com."; };
notify yes;
};
Reverse Zone Details (Data In Interface)
zone 1.1.15.IN-ADDR.ARPA IN {
type master;
file "slaves/db.1.1.15";
allow-update { key "testdns.com."; };
notify yes;
};
Reverse Zone Details (Data Out Interface)
zone 1.1.25.IN-ADDR.ARPA IN {
type master;
file "slaves/db.1.1.25";
allow-update { key "testdns.com."; };
notify yes;
};
```

12. Create db.* files in the /var/named/slaves directory.

a. A forward zone file and up to 4 reverse zone files must be created depending on the number of networks being deployed.

b. The filenames should match what was entered in the /etc/named.conf file.

Sample db File for DNS Zone (db.testdns.com)

```
$ORIGIN.
$TTL 86400 ; 1 day
testdns.com    IN SOA     dns.testdns.com. pam.testdns.com. (
               2014031009;serial
               3600;      refresh (1 hour)
               1800;      retry (30 minutes)
               604800;    expire (1 week)
               86400;     minimum (1 day)
           )
       NS  dns.testdns.com.
$ORIGIN testdns.com.
$TTL 1  ;1 second
$TTL 86400 ; 1 day
dhcp       CNAME   dns
dns        A   <IP address of your DNS server>
$TTL 86400 ; 1 day
ntp        CNAME   dns
```

Sample db File for Reverse Zone of Management Interface (db.216.20.172)

```
$ORIGIN .
$TTL 86400      ; 1 day
216.20.172.IN-ADDR.ARPA   IN SOA dns.testdns.com. pam.testdns.com. (
                               2012071021 ; serial
                               3600       ; refresh (1 hour)
                               1800       ; retry (30 minutes)
                               604800     ; expire (1 week)
                               86400      ; minimum (1 day)
                               )
                        NS     dns.testdns.com.
$ORIGIN 216.20.172.IN-ADDR.ARPA.
$TTL 7200       ; 2 hours
xx                     PTR     dns.testdns.com. //xx = last octet of the PAM IP
```

Sample db File for Reverse Zone for Data In Interface (db.1.1.15)

```
$ORIGIN .
$TTL 86400      ; 1 day
1.1.15.IN-ADDR.ARPA   IN SOA dns.testdns.com. pam.testdns.com. (
                               2012071021 ; serial
                               3600       ; refresh (1 hour)
                               1800       ; retry (30 minutes)
                               604800     ; expire (1 week)
                               86400      ; minimum (1 day)
                               )
                        NS     dns.testdns.com.
$ORIGIN 1.1.15.IN-ADDR.ARPA.
$TTL 7200       ; 2 hours
1                      PTR     dns.testdns.com.
```

Sample db File for Reverse Zone for Data Out Interface (db.1.1.25)

```
$ORIGIN .
$TTL 86400      ; 1 day
1.1.25.IN-ADDR.ARPA   IN SOA dns.testdns.com. pam.testdns.com. (
                               2012071021 ; serial
                               3600       ; refresh (1 hour)
                               1800       ; retry (30 minutes)
                               604800     ; expire (1 week)
                               86400      ; minimum (1 day)
                               )
```

```
                        NS      dns.testdns.com.
$ORIGIN 1.1.25.IN-ADDR.ARPA.
$TTL 7200       ; 2 hours
1                       PTR     dns.testdns.com.
```

13. Verify the DNS server is synchronized with NTP.
14. Restart DNS.

```
service named restart
```

Setting up the External Radius Server

The following procedure shows how to set the External Radius Server, using FreeRADIUS as an example.

1. Install FreeRadius and MYSQL:

```
# yum install mysql mysql-server
# yum install freeradius freeradius-mysql freeradius-utils
```

2. Start mysql:

```
# service mysqld start
```

3. Create radius database:

```
# mysqladmin -u root create radius
```

4. Import radius schema to MYSQL:

```
# mysql -u root radius < /etc/raddb/sql/mysql/admin.sql
# mysql -u root radius < /etc/raddb/sql/mysql/schema.sql
```

5. Update radius configuration with SQL option:

```
# vi /etc/raddb/radius.conf
Uncomment line
$INCLUDE sql.conf
# vi /etc/raddb/sites-enabled/default
Uncomment sql for authorize, accounting, session, and post-auth sections.
# vi /etc/raddb/sites-enabled/inner-tunnel
Uncomment sql for authorize, session, and post-auth sections.
```

6. Configure incoming clients:

```
# vi /etc/raddb/clients.conf

Add network configuration for the clients:
client 172.20.216.0/24 {
        secret = radius_secret
        shortname = test-network
}
```

7. Start radius:

```
# service radiusd restart
For throubleshooting radius can be started in debug mode with following command:
# radiusd -X
```

8. Add a test user:

```
# mysql –u radius radius
mysql>INSERT INTO radcheck(username, attribute, value, op) VALUES (‘testuser’, ‘Password’,
‘testuserpassword’, ’:=’);
mysql> exit;
```

9. Test the radius service:

```
# radtest testuser testuserpassword localhost 1812 radius_secret
```

VMP Deployment Methodologies

VMP supports two deployment methodologies:

1. Cisco VMP OVA (referred to as the SuperOVA). The SuperOVA bundles all VM types into a single OVA. During SuperOVA deployment, the VM type personality is chosen.
2. RPM-based installation from a CentOS 7 minimal OVA. RPM only requires the user to deploy a minimal CentOS 7 OVA. Afterwards, a VMP installer script dynamically installs the desired VM type personality from an external YUM Repository VM.

Cisco VMP SuperOVA

The Cisco VMP SuperOVA provides multiple service options (see list below) that can be chosen during the process of virtual machine deployment. The selection must be made during the SuperOVA deployment process.

- PAM service
- Common Logging Server (CLS) service
- Media Capture Engine (MCE) service
- App Engine (AE) service
- Media Playback Engine (MPE)

For the Common Logging Server (CLS), three storage sizes are available.

- 128 GB
- 256 GB
- 512 GB

The SuperOVA VM Types are listed below:

- VMP PAM
- VMP MCE
- VMP MPE
- VMP AE
- VMP Logger (Small VM)
- VMP Logger (Medium VM)
- VMP Logger (Large VM)

Note: To retrieve the version information for SuperOVA, execute the following command.

```
rpm -q --info cisco-VMP-release
```

When deploying using the SuperOVA, all the VM types follow a common deployment flow (see list below). The only exception is the MPE OVA type, which still uses the dedicated MPE OVA file.

- Deployment Configuration
- Map Networks
- Set up DNS/NTP Servers
- Authenticate Settings
- Set DNS/HA Credentials
- Set up Network Information

RPM-Based Deployment

The following section define the process to install the VMP App-group from a 2.6.0-centos7 (minimal) OVA.

Software Images Required

1. 2.8.xxx-centos7-latest/2.8.xxx-cisco-VMP-centos7-mendocino.<buildNo>.ova
   Caution: Do not use the CentOS 7 OVA.
2. VMP Minimal Bootstrap RPM:
   2.8.xxx-cisco-VMP-mendocino-latest/cisco-VMP-minimal-bootstrap-2.8.xxx-<buildNo>.x86_64.rpm
3. REPO Bootstrap RPM:
   2.8.xxx-cisco-VMP-mendocino-latest/cisco-VMP-repo-bootstrap-2.8.xxx-<buildNo>.x86_64.rpm
4. REPO ISO: 2.8.xxx-cisco-VMP-mendocino-latest/2.8.xxx-cisco-VMP-mendocino.<buildNo>.iso

OVF Properties Required

This is a sample script used to deploy and configure the 2.8.xxx-centos7 OVA using the OVF properties.

The OVF property values differ for each test bed deployment. This script is only given for reference.

```
#!/bin/bash -x
ovftool --noSSLVerify --powerOn --overwrite \
--name="pam1" \
--prop:"hostname=pam1" \
--prop:"domain=test1.com" \
--prop:"ip0=192.2.0.155" \
--prop:"subnet0=255.255.0.0" \
--prop:"gateway0=192.2.0.86"  \
--prop:"dns0=" \
--prop:"dns1=" \
--prop:"dns2=" \
--prop:"ntp0=192.2.0.86" \
--prop:"ntp1=1.1.1.1" \
--prop:"ntp2=2.2.2.2" \
--prop:ext-dns-ip=192.2.0.25 \
--prop:ext-dns-key=EA07/q61zERW7tziZupaUw== \
--prop:ext-dns-algo=hmac-md5 \
--datastore="datastore1" \
--acceptAllEulas \
--diskMode=thin \
```

```
--net:"Network for adapter 1"="net192" \
/sw/tools/2.8.xxx-cisco-VMP-centos7-mendocino.<buildNo>.ova \
vi://vCenterUser:vCenterPasswd@<vCenter-IP>/<DATACENTER/host/<HOST-IP>/
```

Test Bed Setup Instructions

Setup a VMP Repository VM

In addition to the VMP setup requirements, the REPO VM is also needed.

1. Deploy the 2.8.xxx-centos7 OVA with the relevant OVF properties as shown above.
2. Copy the REPO ISO to /home/admin/.
3. Copy the REPO Bootstrap RPM to /home/admin/.
4. Install the VMP repo bootstrap rpm:

```
rpm -ivh cisco-VMP-repo-bootstrap-2.8.xxx-<buildnum>.x86_64.rpm
```

5. After installing the cisco-VMP-repo-bootstrap-2.8.xxx-<buildnum>.x86_64.rpm, the following file will exist:

```
etc/opt/cisco/VMP/repo/config.txt
```

6. Edit the config.txt file as follows:

```
# vi /etc/opt/cisco/VMP/repo/config.txt
domain:<domain>
hostname:VMP-repo
hostIp:<VMPRepoHostIp>
dnsServerIp:<dnsServerIp>
ntpServerIp:<ntpServerIp>
tsigKey:<dnsTsigKey>
tsigAlgo:<dnsTsigAlgo
```

7. Run the VMP Repo VM setup process:

```
/opt/cisco/VMP/repo/bin/VMP-repo-setup.sh /etc/opt/cisco/VMP/repo/config.txt
All initialization progress is logged to: /var/log/VMP-repo-setup.log.
```

8. Verify that the VMP-repo is set up correctly.
   - All initialization progress is logged to /var/log/VMP-repo-setup.log. When completed, VMP-repo-setup.sh will display the following messages:
   - (example shown for DNS server = 11.0.0.103, domain = test.com, hostIp = 11.0.0.51)
   - VMP DNS CONFIGURATION RESULTS:

     DNS server (11.0.0.103)

     Successfully updated with VMP-repo.test.com (11.0.0.51)

     Cisco VMP repo server setup complete!

```
Hosted repo URL: http://VMP-repo/VMP/repo/2.8.xxx/yumrepo
```

Deploying/Installing an App Group

1. Deploy the 2.8.xxx-centos7 OVA with the relevant OVF properties as shown above.
2. Copy the VMP minimal Bootstrap RPM to /home/admin/.

3. Install the VMP minimal bootstrap rpm:

```
rpm -ivh cisco-VMP-minimal-bootstrap-2.8.xxx-<buildnum>.x86_64.rpm
```

4. Execute the following command:

```
/opt/cisco/VMP/bootstrap/bin/VMP_install.sh <pam-app | logger-app | appengine | mpe-app | mce-app>
```

Note: If installing the PAM, use the **pam-app** option. This is a blocking command, and will not return until pam-app is installed.

Output from the command is logged in the log file shown below:

```
/var/log/VMP-app-install.log
```

5. Verify that the application is installed correctly:

```
#service pam-app status
#supervisorctl status
```

Deploying the VMP System

To fully deploy the PAM and VMP, perform the following tasks in order:

- Setting Up the CLS, page 53
- Deploying the PAM HA, page 55
- UCS Configuration, page 57
- Setting Up the MCE, page 59
- Setting Up the MPE, page 61
- Setting Up the App Engine, page 71

When deploying the PAM and VMP system, keep the following considerations in mind:

- Deployment requires VMware vCenter version 5.1 or later.
- If you must upgrade the PAM to a new OVA, you must first disable or deactivate all services configured in the PAM before performing the upgrade.

Setting Up the CLS

Before setting up the CLS, refer to Cisco VMP SuperOVA, page 50.

Deploy the Centralized Log Server (CLS) from vCenter.

1. Log into the vCenter.
2. From the **File** menu, select **Deploy OVF Template**, then select the Cisco VMP OVA file.
3. Choose the required CLS OVA type with the appropriate disk size from the drop-down menu.
4. Accept the license agreement.
5. Select **Network Mapping** and map **Network Adapter 1** to the Management network.

Note: Network Adapter 1 must always map to the Management network, and CLS VM applications use only Network Adapter 1. The other network adapters are ignored regardless of how they are mapped.

6. Select **Properties** to customize the VM deployment.
7. In the Networking section, enter the following information to customize:
   - Domain—Domain name used by the CLS (required). Enter the same domain name used by the PAM.
   - IP Address—IP address for Network Adapter 1 (required).
   - Subnet Mask—Subnet mask for Network Adapter 1 (required).
   - Gateway—Gateway IP address for Network Adapter 1 (required).
   - Primary DNS Server—Name or IP address of the DNS server used by the CLS to forward queries that it could not resolve (that is, the DNS forwarder). Enter names for all of the DNS servers used by the CLS.
   - You must enter at least one DNS server.
   - Primary NTP Server—Name or IP address of the external Network Time Protocol (NTP) server used by the CLS to synchronize its clock. Enter names for all of the NTP servers used by the CLS.
   - You must enter at least one NTP server.
   - Hostname—Enter **log-server** exactly as shown. Do not specify the fully qualified domain name (FQDN).
8. In the External DNS Credentials section, enter the following information:
   - DNS Server—Name or IP address of the external DNS server used by the CLS to forward queries that it could not resolve.
   - Transaction Signature Key—Transaction Signature (TSIG) key that is configured on the external DNS server.
   - Transaction Signature Algorithm—Name of the TSIG algorithm that is configured on the external DNS server.

Note: The administrator must ensure that the DNS zones are configured in the external DNS server and ensure that the DNS server accepts TCP and UDP ports 53. Otherwise, the **nslookup** for **mgmt-docserver.***domain* fails and the CLS processes cannot begin. This problem can occur if you deploy a DNS server using CentOS Linux distribution, which by default does not add a rule for UDP port 53. You can use the **iptables** command to set the correct firewall settings.

9. Click **Finish** to deploy the OVA and create the CLS VM. Allow up to 15 minutes to create the VM.
10. After mapping the adapter to the correct network, power on the CLS VM.
11. Verify connectivity and open an SSH into the CLS VM.

Logging into the CLS VM

After deployment, if you need to log in to the CLS VM, log in as user **admin** (default password: **default**).

Changing the OVF Properties After Deployment

If you need to change any of the OVF properties after deploying the CLS VM, use the following procedure:

1. Power off the CLS VM.
2. Change the properties in vCenter.
3. Power on the CLS VM.

Note: An **admin** user cannot directly change the guest OS configuration files that are driven by any of the OVF properties upon boot up.

Deploying the PAM HA

To deploy the PAM HA, perform the following tasks in order:

- Pre-Deployment Tasks for PAM HA, page 55
- Setting Up the PAMs for HA, page 55

Pre-Deployment Tasks for PAM HA

Note: These HA-specific pre-deployment tasks must be performed *in addition to* the tasks specified in Pre-Deployment Tasks, page 45. These tasks supplement those tasks and do not replace them.

Before deploying the VMP configuration, you must complete the following preliminary tasks:

1. Determine the IP addresses for each of the PAM HA nodes. You will need these IP addresses when you configure the High-Availability section of the OVF properties. (See Step 6 in Setting Up the PAMs for HA, page 55.)
2. Set up a DNS server for the PAM HA domain. You will need the name or IP address of this DNS server when you configure the External DNS Credentials section of the OVF properties. (See Step 9 in Setting Up the PAMs for HA, page 55.)

Make sure the DNS zones are configured in the DNS server.

Setting Up the PAMs for HA

Deploy each of the PAM HA nodes from vCenter.

1. Log into the vCenter.
2. From the **File** menu, select **Deploy OVF Template**, then select the Cisco VMP OVA file.
3. Choose the required PAM OVA type (VMP PAM) from the drop-down menu.
4. Accept the license agreement.
5. In the Deploy OVF Template field, select Network Mapping and map **Network Adapter 1** to the Management network. **Network Adapter 1** must always map to the Management network, and PAM VM applications use only **Network Adapter 1**.
6. Select Properties to customize the VM deployment.
7. In the Networking section, enter the following information to customize:
   - Hostname—Local hostname of the PAM. Do not enter the fully qualified domain name (FQDN). For example, if the FQDN is pam.cisco.com, enter only **pam**.
   - Domain—Domain name used by the PAM, such as **testdns.com** (required).
   - IP Address—Primary management IP address to which the VMP can SSH (required). This is the IP address for the Management network for the PAM and for configuring Ethernet port eth0. The management IP address must be accessible from a management PC (for example, from a PC that is running vSphere).
   - Subnet Mask—Default subnet mask for the PAM (required).
   - Gateway—Default gateway IP address for the PAM (required).
8. In the High-Availability section, enter the following information:
   - High-Availability Peer—Enter the IP addresses of the peer PAM HA nodes.

For example, given three PAM HA nodes with IP addresses 35.1.2.50, 35.1.2.51, and 35.1.2.52, if this PAM HA node uses IP address **35.1.2.50**, enter **35.1.2.51** in the first High-Availability Peer field and enter **35.1.2.52** in the second High-Availability Peer field.

9. In the Additional Domain Name Servers section, enter the following information:
   - DNS Server—Name or IP address of the DNS server used by the PAM to forward queries that it could not resolve (that is, the DNS forwarder). Enter names for all of the DNS servers used by the PAM.
10. In the Additional Network Time Protocol Servers section, enter the following information:
    - NTP Server—Name or IP address of the external Network Time Protocol (NTP) server used by the PAM to synchronize its clock. Enter names for all of the NTP servers used by the PAM.

    You must enter at least one NTP server.
11. If you choose to use Radius as your authentication point, you must set your authentication settings, ie server IP name and server secret password. If not set, the server will use the local authentication only. You can also specify the password (default) for the local admin user.
12. In the External DNS Credentials section, enter or select the following information:

- DNS Server—Name or IP address of the external DNS server used by the PAM to forward queries that it could not resolve. This is the DNS server for the PAM HA domain that you set up in Step 2 of the Pre-Deployment Tasks for PAM HA, page 55.)

  Note: The administrator must ensure that the DNS zones are configured in the external DNS server.
- Transaction Signature Key—Transaction Signature (TSIG) key that is configured on the external DNS server.
- Transaction Signature Algorithm—Name of the TSIG algorithm that is configured on the external DNS server. Valid TSIG algorithms are:
  - hmac-md5
  - hmac-sha1
  - hmac-sha224
  - hmac-sha256
  - hmac-sha384
  - hmac-sha512

13. Click **Finish** to deploy the OVA and create the PAM VM. It can take up to 15 minutes to create the VM.
14. After mapping the adapter to the correct network, power on the PAM VM.
15. Verify connectivity and open an SSH into the PAM VM.
16. Repeat this entire procedure for each of the peer PAM HA nodes.

When all of the PAM HA nodes are fully deployed, HA is set up and is running.

Logging into the PAM VM

After deployment, if you use Radius authentication, you can log in to the PAM VM using the default username **admin** and the password you specified on the Radius server. If you use non-Radius authentication, use the password **default or your local admin user password.**

To prevent unauthorized access to your information, it is recommended that you change your password immediately. You will receive a message prompt until the password is changed. The linux command can be used to change the password. The password policy is as follows:

- Minimum length - 8 characters
- Minimum number of lower case letters - 1
- Minimum number of upper case letters - 1
- Minimum number of digits - 1
- Minimum number of other characters -1

If you need to upgrade the PAM CLI, log in as **admin**, upgrade the software, and either reboot the PAM VM or use the **supervisorctl** command to restart all of the processes.

If you need to troubleshoot a problem because the PAM CLI is not operating normally, log in as the **admin** and examine all relevant logs to determine the problem. If needed, you can **scp** the log files from the PAM VM and send them to Cisco support for further analysis.

Changing the OVF Properties After Deployment

If you need to change any of the OVF properties after deploying the PAM VM, use the following procedure:

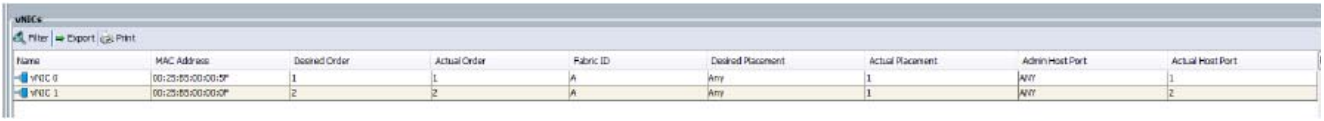
1. Power off the PAM VM.
2. Change the properties in vCenter.
3. Power on the PAM VM.

An **admin** user cannot directly change the guest OS configuration files that are driven by any of the OVF properties upon boot up.

UCS Configuration

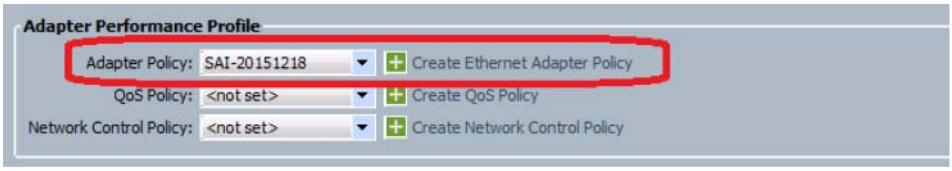
To optimize the traffic flow through the MCE Workers, changes are required at the UCS and ESXi infrastructure level. The lowest level, UCS, must be configured first. Follow the instructions below.

1. Create two vNICs on the UCS Server.

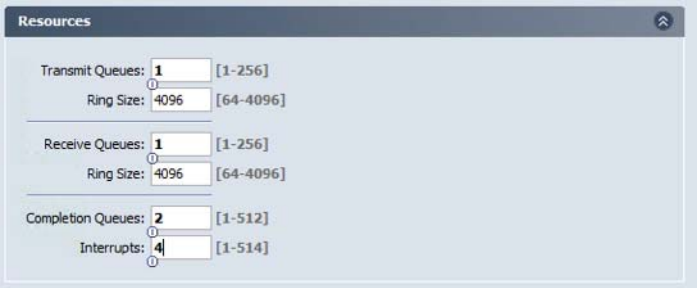


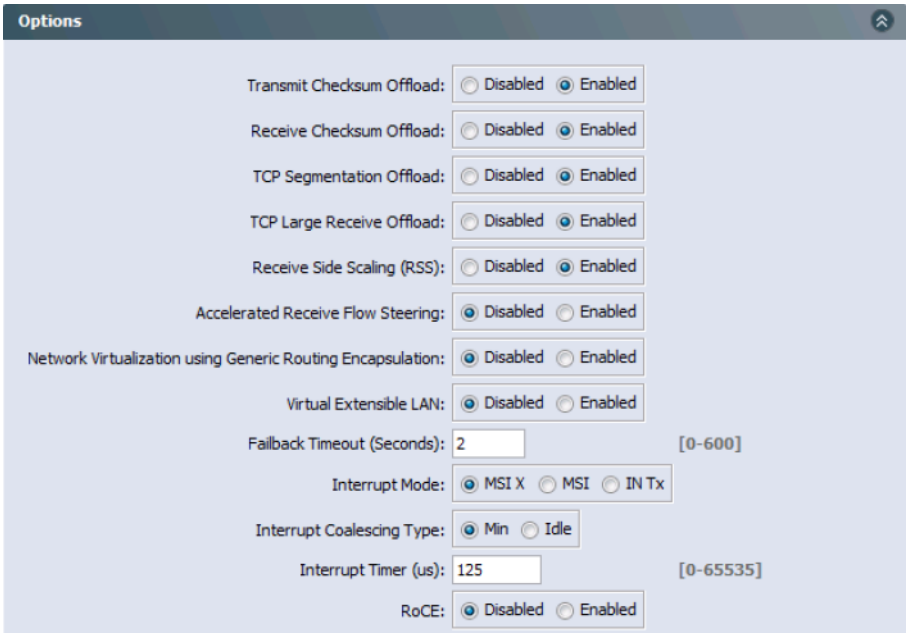
If you have an HA system with dual UCS fabric interconnects, configure the fabric failover in the Fabric ID field. In this example, it is a non-HA configuration. Configure each vNIC as you normally would but be sure to enable the Management and Data-In VLANS on vNIC0 and Data-Out VLAN on VNIC1. You can enable all VLANs on both, as the ESXi settings will route to the appropriate VLAN.

2. On the Adapter Performance Profile menu, click **Create Ethernet Adapter Policy**.



3. Configure the policy as shown in the screens below.





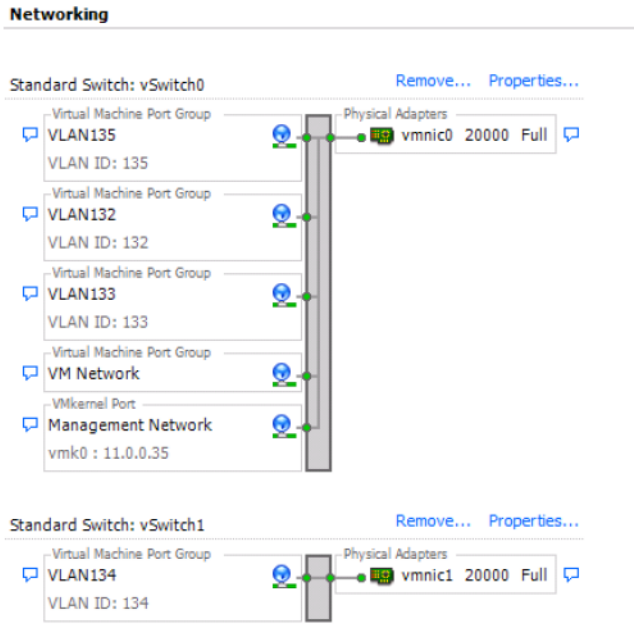
4. Assign the policy to both adapters. This will cause the blade to reboot. After the blade comes back up, configure the Security profile to enable ESXi Shell and SSH. When complete, start an SSH session to the ESXi server IP address and execute the following commands:

   - esxcli system settings advanced set-o “Net/MaxPktRxListQueue” -i 15000
   - esxcli system settings advanced set-o “Net/MaxNetifTxQueueLen” -i 10000
   - esxcli system settings advanced set-o “Net/MaxNetifRxQueueLen” -i 1000
   - esxcli system settings advanced list -d

Note: The last command is used to show that the previous commands were set properly. Reboot the server for these changes to take place.

5. During OVA deployment, the vNICs should be allocated as follows: In this case, the Management and Data-In VLANs should be configured to vNIC0 and Data-Out VLAN configured to vNIC1. Add a second vSwitch (a running ESXi node typically has a vSwitch0 already configured). If you have previously assigned the Data-Out VLAN to vSwitch0, remove this setting. Add the second vSwitch (vSwitch1) and assign the Data-Out VLAN to that vSwitch.

6. Deploy your OVA as before and ensure the allocations are correctly mapped to the right vNICs. It should look something like this:



Setting Up the MCE

Deploy each Media Capture Engine (MCE) from the Cisco VMP OVA file.

Note: The MCE does not support changing a storage location during capturing and playback for Live, VOD, and cDVR use cases.

1. Log in to vCenter.
2. From the **File** menu, select **Deploy OVF Template**, then select the MCE OVA file.
3. Accept the license agreement.
4. In the Deploy OVF Template field, select **Network Mapping** to map the source networks to the destination networks.

   MCE VM applications use up to three network adapters, but **Network Adapter 1** must always map to the Management network.

   If you are using only one network adapter, map **Network Adapter 1** to the Management network.

   If you are using two network adapters, use *one* of the following connection schemes, depending on your preferred topology:

   - Connect **Network Adapter 1** to the Management network and **Network Adapter 2** to the Data In and Data Out networks.
   - Connect **Network Adapter 1** to the Management and Data In networks and **Network Adapter 2** to the Data Out networks.

- Connect **Network Adapter 1** to the Management and Data Out networks and **Network Adapter 2** to the Data In networks.

If you are using three network adapters:

- Connect **Network Adapter 1** to the Management network.
- Connect **Network Adapter 2** to the Data In network.
- Connect **Network Adapter 3** to the Data Out network.

5. Select **Properties** to customize the VM deployment.
6. In the Network Parameters section, enter the following information to customize:
   - Hostname—Local hostname of the MCE. Do not enter the fully qualified domain name (FQDN). For example, if the FQDN is mce.cisco.com, enter only **mce**.
   - Domain—Domain name used by the MCE (required). Enter the same domain name used by the PAM.
   - IP Address—IP address for Network Adapter 1 (required).
   - Subnet Mask—Subnet mask for Network Adapter 1 (required).
   - Gateway—Gateway IP address for Network Adapter 1 (required).
7. In the Additional Domain Name Servers section, enter the following information:
   - DNS Server—Use the external DNS
8. In the Additional Network Time Protocol Servers section, enter the following information:
   - NTP Server— Use the external NTP
9. Click **Finish** to deploy the OVA and create the MCE VM. Allow up to 15 minutes to create the VM.
10. Power on the MCE VM.
11. Verify connectivity and open an SSH into the MCE VM.
12. To manually add a second Ethernet interface, as dictated by your network topology, log in as **admin** (see Logging into the MCE VM, page 61), then create and save the /etc/sysconfig/network-scripts/ifcfg-eth1 file with contents like those in the following example:

```
TYPE=Ethernet
NAME=eth1
DEVICE=eth1
BROADCAST=11.0.0.255       < Broadcast address of your interface
IPADDR=11.0.0.xx           < IP address of your interface
NETMASK=255.255.255.0      < Netmask of your interface
NETWORK=11.0.0.0           < Network address of your interface
USERCTL=no
BOOTPROTO=none
ONBOOT=yes
HWADDR=00:50:56:AC:7D:4C
```

Do not include a GATEWAY for this interface.

Note: All MCE and MPE nodes in a region that use the same Image Type, Image Version, and Personality must have identical route configurations. For more information, see Configuring VMP Nodes, page 108.

13. If you need to route specific traffic to and from this interface, you must add one or more static routes. To do so, create and save the /etc/sysconfig/network-scripts/route-eth1 file with contents like those in the following example:

```
ADDRESS0=10.1.2.44          < Routed IP address
GATEWAY0=10.1.1.1           < Gateway to the route to and from this interface
NETMASK0=255.255.255.0      < Netmask for routed IP address
```

You can add as many additional static routes as you need. To do so, add additional lines for ADDRESS1/GATEWAY1/NETMASK1; ADDRESS2/GATEWAY2/NETMASK2; and so on.

14. Bring up eth1 using the **`sudo ifup eth1`** command.

15. To manually add a third Ethernet interface, create and save the /etc/sysconfig/network-scripts/ifcfg-eth2 file, and repeat step 11 through 13. Remember to specify **eth2** as the Name and Device, specify the IP addresses of the eth2 interface, and use the **`sudo ifup eth2`** command to bring up eth2.

Logging into the MCE VM

After deployment, you can log in to the MCE VM using the default username **admin** and the default password **default**. After logging in, you can change the password as you would any other Linux password.

This default user account can perform the normal Linux user functions, and it also provides the following limited root privileges, so that you can perform necessary maintenance and troubleshooting on the MCE VM:

- Networking commands, such as **/sbin/iptables**, **/sbin/route**, and **/sbin/dhclient**, that enable you to troubleshoot problems, maintain networking functionality, and keep the MCE operating normally.
- Software maintenance commands, such as **/bin/rpm**, **/usr/bin/up2date**, and **/usr/bin/yum**, that enable you to upgrade the MCE software as needed.
- Commands for rebooting and shutting down the MCE VM, such as **reboot** and **shutdown now**.

If you need to upgrade the MCE CLI, log in as **admin**, upgrade the software, and either reboot the MCE VM or use the **supervisorctl** command to restart all of the processes.

If you need to troubleshoot a problem because the MCE CLI is not operating normally, log in as the **admin** and examine all relevant logs to determine the problem. If needed, you can **scp** the log files from the MCE VM and send them to Cisco support for further analysis.

Changing the OVF Properties After Deployment

If you need to change any of the OVF properties after deploying the MCE VM, use the following procedure:

1. Power off the MCE VM.
2. Change the properties in vCenter.
3. Power on the MCE VM.

An **admin** user cannot directly change the guest OS configuration files that are driven by any of the OVF properties upon boot up.

Setting Up the MPE

Deploy each MPE from the Cisco VMP OVA file as follows:

1. From the **File** menu, select **Deploy OVF Template**, then select the VMP MPE OVA file.
2. Accept the license agreement.
3. In the Deployment Configuration, choose the VMP MPE type.
4. In the Deploy OVF Template field, select **Network Mapping** to map the source networks to the destination networks.

MPE VM applications use up to three network adapters, but Network Adapter 1 must always map to the Management network.

If you are using only one network adapter, map **Network Adapter 1** to the Management network.

If you are using two network adapters, use *one* of the following connection schemes, depending on your preferred topology:

- Connect **Network Adapter 1** to the Management network and **Network Adapter 2** to the Data In and Data Out networks.
- Connect **Network Adapter 1** to the Management and Data In networks and **Network Adapter 2** to the Data Out networks.
- Connect **Network Adapter 1** to the Management and Data Out networks and **Network Adapter 2** to the Data In networks.

If you are using three network adapters:

- Connect **Network Adapter 1** to the Management network.
- Connect **Network Adapter 2** to the Data In network.
- Connect **Network Adapter 3** to the Data Out network.

5. Select **Properties** to customize the VM deployment.
6. In the Network Parameters section, enter the following information:
   - Hostname—Local hostname of the MCE. Do not enter the fully qualified domain name (FQDN). For example, if the FQDN is mce.cisco.com, enter only mce.
   - Domain—Domain name used by the MCE (required). Enter the same domain name used by the PAM.
   - IP Address—IP address for Network Adapter 1 (required).
   - Subnet Mask—Subnet mask for Network Adapter 1 (required).
   - Gateway—Gateway IP address for Network Adapter 1 (required).
7. In the Additional Domain Name Servers section, enter the following information:
   - DNS Server—Use the external DNS
8. In the Additional Network Time Protocol Servers section, enter the following information:
   - NTP Server— Use the external NTP
9. Click **Finish** to deploy the OVA and create the MPE VM. Allow up to 15 minutes to create the VM.
10. Power on the MPE VM.
11. Verify connectivity and open an SSH into the MPE VM.
12. To manually add a second Ethernet interface, as dictated by your network topology, log in as **admin** (see Logging into the MCE VM, page 61), then create and save the /etc/sysconfig/network-scripts/ifcfg-eth1 file with contents like those in the following example:

```
TYPE=Ethernet
NAME=eth1
DEVICE=eth1
BROADCAST=11.0.0.255
IPADDR=11.0.0.xx
NETMASK=255.255.255.0
```

```
NETWORK=11.0.0.0
USERCTL=no
BOOTPROTO=none
ONBOOT=yes
HWADDR=00:50:56:AC:7D:4C
< Broadcast address of your interface
< IP address of your interface
ADDRESS0=10.1.2.44
GATEWAY0=10.1.1.1
NETMASK0=255.255.255.0
< Routed IP address
< Gateway to the route to and from this interface
< Netmask for routed IP address
< Netmask
< Network
of your interface
address of your interface
```

Do not include a GATEWAY for this interface.

Note: All MCE and MPE nodes in a region that use the same Image Type, Image Version, and Personality must have identical route configurations. For more information, see Configuring VMP Nodes, page 108.

13. If you need to route specific traffic to and from this interface, you must add one or more static routes. To do so, create and save the /etc/sysconfig/network-scripts/route-eth1 file with contents like those in the following example: You can add as many additional static routes as you need. To do so, add additional lines for ADDRESS1/GATEWAY1/NETMASK1; ADDRESS2/GATEWAY2/NETMASK2; and so on.

14. Bring up eth1 using the **sudo ifup eth1** command.

15. To manually add a third Ethernet interface, create and save the /etc/sysconfig/network-scripts/ifcfg-eth2 file, and then repeat steps 11-13 above. Remember to specify eth2 as the Name and Device, specify the IP addresses of the eth2 interface, and use the **sudo ifup eth2** command to bring up eth2.

Logging into the MPE VM

After deployment, you can log in to the MPE VM using the default username **admin** and the default password **default**. After logging in, you can change the password as you would any other Linux password.

This default user account can perform the normal Linux user functions, and it also provides the following limited root privileges, so that you can perform necessary maintenance and troubleshooting on the MPE VM:

- Networking commands, such as **/sbin/iptables**, **/sbin/route**, and **/sbin/dhclient**, that enable you to troubleshoot problems, maintain networking functionality, and keep the MCE operating normally.
- Software maintenance commands, such as **/bin/rpm**, **/usr/bin/up2date**, and **/usr/bin/yum**, that enable you to upgrade the MCE software as needed.
- Commands for rebooting and shutting down the MCE VM, such as **reboot** and **shutdown now**. If you need to upgrade the MCE CLI, log in as **admin**, upgrade the software, and either reboot the MCE VM or use the **supervisorctl** command to restart all of the processes.

If you need to troubleshoot a problem because the MPE CLI is not operating normally, log in as the **admin** and examine all relevant logs to determine the problem. If needed, you can **scp** the log files from the MCE VM and send them to Cisco support for further analysis.

Changing the OVF Properties After Deployment

If you need to change any of the OVF properties after deploying the MCE VM, use the following procedure:

a. Power off the MCE VM.

b. Change the properties in vCenter.

c. Power on the MCE VM. An **admin** user cannot directly change the guest OS configuration files that are driven by any of the OVF properties upon boot up.

16. Log in to the MPE and run the **supervisorctl status** command. Check to make sure that the ServiceAgent and trafficserver are RUNNING. See below command sample.

```
[admin@mpe-138 ~]$ supervisorctl status
ServiceAgent                     RUNNING   pid 10681, uptime 2 days, 1:06:45
StorageMain                      RUNNING   pid 3006, uptime 14 days, 11:52:04
mpe-initscript                   STOPPED Not started
trafficserver                    RUNNING   pid 27068, uptime 10:24:43

StorageMain: stopped
ServiceAgent: stopped
trafficserver: stopped
mpe-initscript: started
StorageMain: started
ServiceAgent: started
trafficserver: started
```

MPE Logs

The following log files specific to MPE are available in **/var/log/opt/cisco/VMP/cts**:

- diags.log
- ingest.log
- error.log
- squild.log
- traffic.out

MPE Worker Interface Configuration

The following configuration settings are recommended for MPE workers:

```
[root@mpe1 v2pc]# ethtool -g eth0
Ring parameters for eth0:
Pre-set maximums:
RX:  4096
RX Mini: 0
RX Jumbo: 2048
TX:  4096
Current hardware settings:
RX: 4096
RX Mini: 0
RX Jumbo: 128
TX: 4096
[root@mpe1 v2pc]#
```

Use the command **ethtool -G eth0 rx 4096 tx 4096** command to set these values.

Configuring Multiple MPE Workers in V2PC Deployments

In V2PC deployments, you can use a salt command from the V2PC master node to update the configuration for multiple MPE workers, as shown in the following example:

```
[root@v2p-master-0 v2pc]# salt 'worker-zone1-13[1,3,4]*' cmd.run 'ethtool -G eth0 rx 4096 tx 4096'
```

In this example, the **ethtool -G eth0 rx 4096 tx 4096** configuration is applied to **worker-zone1-131**, **worker-zone1-133** and & **worker-zone1-134** workers. You can customize this command for your own deployment based on the **salt-key** output on the V2PC Master node.

Configuring Audio for HLS and DASH

Note: This section applies for V2PC deployments only.

When used as a managed service of V2PC, VMP supports configuration of HLS and DASH audio on the MPE node. For HLS, the configuration is contained in a plain-text m3u8 audio playlist file. For DASH, the configuration is contained in an MPEG-DASH Media Presentation Description (MPD) XML document.

After audio settings are configured through the V2PC GUI, the MPE receives an **assetresolver.xml** file describing a configuration similar to the following:

```
<HLSPublishInfo contentID="AssetID" assetUrl="DomainName/live1-unmuxdisableupdatepid80/AssetID"
mediaManifestUrl="DomainName/live1-unmuxdisableupdatepid80/AssetID/AssetID.m3u8" segmentDuration="10"
hlsMuxedStream="false" serviceType="live" dvbBitmapPassThrough="false" dvbBitmapToId3="false">
. . .
<Audio>
<AudioInfo name="null" lang="null" pid="80" codec="null" bitrate="-1" action="disable" />
<AudioInfo name="audio_name" lang="audio_lang" pid="-1" codec="ACC" bitrate="-1" action="update" />
</Audio>
</HLSPublishInfo>
```

The <Audio> and <AudioInfo> elements are added to PublishInfo, and the MPE updates the m3u8 file (for HLS) or the MPD file (for DASH) accordingly. Specifically:

- For HLS—In response to the configuration from V2PC, removes the audio track or updates the LANGUAGE and NAME settings in the m3u8 file.
- For DASH—In response to the configuration from V2PC, removes audio track or updates the lang setting in the Audio Adaptation Set in the DASH MPD file.

For default audio, after settings are configured through the V2PC GUI, the MPE receives an **assetresolver.xml** file describing a configuration similar to the following:

```
<PublishInfo>
<DASHPublishInfo contentID="AssetID" assetUrl="DomainName/live1-dashactiondisable80/AssetID"
mediaManifestUrl="DomainName/live1-dashactiondisable80/AssetID/AssetID.mpd" segmentDuration="8"
serviceType="live">
<Variant
VariantName="def1"variantManifestUrl="DomainName/live1-dashactiondisable80/AssetID/VariantName.mpd"
defaultAudioStream="81" />
</DASHPublishInfo>
```

The defaultAudioStream attribute is added to the <Variant> element, and the MPE updates the M3u8 file (for HLS) or the MPD file (for DASH) accordingly. Specifically:

- For HLS—Configures the selected audio tracks as default audio. Only supports the HLS unmuxed case. Moves the selected audio to the front and sets AUTOSELECT=YES,DEFAULT=YES in the selected audio tag #EXT-X-MEDIA.
- DASH—Configures the selected audio tracks as default audio. Moves the selected audio track to the front in the DASH MPD file and adds <Role schemeIdUri=" urn:mpeg:dash:role:2011" value=" main" /> in the selected Audio AdaptationSet.

Supported Actions

- Disable—Removes the selected audio track from the HLS m3u8 or DASH MPD file.

- Update—Updates the selected audio track LANGUAGE and NAME settings in the HLS m3u8 file; or updates the lang setting in the selected Audio AdapatationSet in the DASH MPD file.

Configuring an Audio Publishing Template

To configure an audio publishing template in V2PC, do the following as described in the *Cisco Virtualized Video Processing Controller User Guide*:

1. Create a new publishing template that includes the audio configuration or configurations required (multiple configurations are supported).
2. Create an audio media workflow (or edit an existing one) that includes the publishing template just created.

Use the following information for guidance when configuring publishing templates.

Default Audio

In the publishing template, use the Variants fields to configure default audio. The Default Audio Stream(PID) field provides two options for configuration:

- Packaging format is HLS and muxed is false.
- Packaging format is DASH.

Matching Criteria

- PID—Higher priority; when chosen, disregards the codec and bitrate and matches based on PID.
- Codec—Supports the audio codec list: AAC, DD/AC-3, and DD+/EC-3.
- Bitrate—Matches based on bitrate; a match is a value within 5% or 1000 bps (plus or minus) of the target value.

Note: In condition that one PID has different codec or Bitrate, Matching criteria only support PID.

Input and Output Examples

Consider the example of an input stream having two audio tracks configured as follows:

```
PID 80
format mp4a40.2
bitrate 128000
language pol
languageRole m
sampleRate 48000
bitsPersample 16
channelCount 2

PID 81
format mp4a40.2
bitrate 128000
language qaa
languageRole a
sampleRate 48000
bitsPersample 16
channelCount 2
```

- **For HLS Output**—The HLS m3u8 file removes audio PID 80 and updates the NAME and LANGUAGE settings for PID 81 (whose codec is AAC) in the m3u8 file to audio_name and audio_lang.

  Before these two audio actions are applied, the HLS output in the m3u8 file appears as follows:

```
#EXTM3U
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUPID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="pol_Subt",NAME="pol_S
ubt",URI="subtitles_pol_Subt_20000.m3u8"
```

```
#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="pol",NAME="pol",AUTOSELECT=YES,DEFAULT=YES,URI="a
udio_pol_3600000.m3u8"
#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="qaa",NAME="qaa",URI="audio_qaa_3600000.m3u8"
#EXT-X-STREAM-INF:PROGRAMID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,AUDIO="aud
io",SUBTITLES="subs"3600000.m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAMID=1,BANDWIDTH=2499968,CODECS="avc1.64001F",RESOLUTION=1280x720,UR
I="iframe_2499968.m3u8"
```

After these two audio actions are applied, the HLS output in the m3u8 file appears as follows:

```
#EXTM3U
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUP-ID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="pol_Subt",NAME="pol_
Subt",URI="subtitles_pol_Subt_20000.m
#EXT-X-MEDIA:TYPE=AUDIO,GROUP-ID="audio",LANGUAGE="audio_lang",NAME="audio_name",AUTOSELECT=YES,DEF
AULT=YES,URI="audio_qaa_3600000.m
#EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,AUDIO="au
dio",SUBTITLES="subs"3600000.m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=2499968,CODECS="avc1.64001F",RESOLUTION=1280x720,U
RI="iframe_2499968.m3u8"
```

- **For DASH MPD Output**—If the package format is DASH, the MPD file removes audio PID 80 and updates the lang setting of PID 81 (whose codec is AAC) in the AdapatationSet of the DASH MPD file to audio_lang.

  Before these two audio actions are applied, the DASH MPD output appears as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<MPD
    mediaPresentationDuration="PT41M16S"
    minBufferTime="PT4S"
    profiles="urn:mpeg:dash:profile:isoff-on-demand:2011"
    type="static"
    xmlns="urn:mpeg:dash:schema:mpd:2011"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemalocation="urn:mpeg:dash:schema:mpd:2011
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-DASH_schema_files/DASH-MPD.xsd">
    <Period
        id="1"
        start="PT0S">
        <AdaptationSet
            bitstreamSwitching="false"
            id="video_frag_auto
           "mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="1"> . . . </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            id="audio_frag_80_128000"
            lang="pol"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$Representation IDS/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000"> . . . </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_80_128000_28615_1"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
```

```
            id="audio_frag_81_128000"
            lang="qaa"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$RepresentationIDS/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000"> . . . </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_81_128000_28615_1"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            id="i-frame"
            mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="1"> . . . </AdaptationSet>
    </Period>
</MPD>
```

After these two audio actions are applied, the DASH MPD output appears as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<MPD
    mediaPresentation Durat ion="PT41M16S"
    minBufferTime=" PT4S"
    profiles="urn:mpeg:dash:profile:isoff-on-demand:2011"
    type="static"
    xmlns="urn:mpeg:dash:schema:mpd:2011"
    xrnlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemalocation="urn:mpeg:dash:schema:mpd:2011
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-DASH_schema_files/DASH-MPD.xsd">
    <Period
        id="1"
        start="PT0S">
        <AdaptationSet
            bitstreamSWitching="false"
            id="video_frag_auto"
            mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="1"> . . . </AdaptationSet>
        <AdaptationSet
            bitstreamSWitching="false"
            id="audio_frag_81_128000"
            lang="audio_tang"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$Representationl0S/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000"> . . . </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_81_128000_28615_1"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSWitching="false"
            id="i-frame"
```

```
            mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="l "> . . . </AdaptationSet>
    </Period>
</MPD>
```

Default Audio Output

- **For HLS Output**—The HLS m3u8 file removes audio PID 80 and updates the NAME and LANGUAGE settings for PID 81 (whose codec is AAC) in the m3u8 file to audio_name and audio_lang.

  Before these two audio actions are applied, the HLS output in the m3u8 file appears as follows:

```
#EXTM3U
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUPID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="pol",NAME="pol",URI="
subtitles_pol_20000.m3u8"
#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="pol",NAME="pol",AUTOSELECT=YES,DEFAULT=YES,URI="a
udio_pol_3600000.m3u8"
#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="qaa",NAME="qaa",URI="audio_qaa_3600000.m3u8"
#EXT-X-STREAM-INF:PROGRAMID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,AUDIO="aud
io",SUBTITLES="subs"3600000.m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAMID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,UR
I="iframe_3600000.m3u8"
```

  After these two audio actions are applied, the HLS output in the m3u8 file appears as follows:

```
#EXTM3U
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUPID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="pol_Subt",NAME="pol_S
ubt",URI="def81_Variant_subtitles_pol_#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="qaa",NAME="
qaa",AUTOSELECT=YES,DEFAULT=YES,URI="def81_Variant_audio_qaa_3600000.m3u8"
#EXT-X-MEDIA:TYPE=AUDIO,GROUPID="audio",LANGUAGE="pol",NAME="pol",URI="def81_Variant_audio_pol_3600
000.m3u8"
#EXT-X-STREAM-INF:PROGRAMID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,AUDIO="aud
io",SUBTITLES="subs"def81_Variant_3600000.m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAMID=1,BANDWIDTH=3600000,CODECS="avc1.64001F",RESOLUTION=1280x720,UR
I="def81_Variant_iframe_3600000.m3u8"
```

- **For DASH MPD Output**—If the package format is DASH, the MPD file removes audio PID 80 and updates the lang setting of PID 81 (whose codec is AAC) in the AdapatationSet of the DASH MPD file to audio_lang.

  Before these two audio actions are applied, the DASH MPD output appears as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<MPD
    mediaPresentationDuration="PT41M16S"
    minBufferTime="PT4S"
    profiles="urn:mpeg:dash:profile:isoff-on-demand:2011"
    type="static"
    xmlns="urn:mpeg:dash:schema:mpd:2011"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemalocation="urn:mpeg:dash:schema:mpd:2011
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-DASH_schema_files/DASH-MPD.xsd">
    <Period
        id="1"
        start="PT0S">
        <AdaptationSet
            bitstreamSwitching="false"
            id="video_frag_auto
           "mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="l"> . . . </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
```

```
            id="i-frame"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
        <AdaptationSet
            bitstreamSwitching="false"
            id="audio_frag_80_128000"
            lang="pol"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$Representation IDS/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000">
                <SegmentTimeLine> . . . </SegmentTimeLine>
            </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_80_128000_8508_1"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            id="audio_frag_81_128000"
            lang="qaa"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$RepresentationIDS/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000">
                <SegmentTimeLine>. . . </SegmentTimeLine>
            </SegmentTemplate>
            <Role
                SchemeIdUri="run:mpeg:dash:role:2011"
                value="main"/>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_81_128000_8501_1"/>
        </AdaptationSet>
    </Period>
</MPD>
```

The PID 81 AdaptationSet is placed ahead of other audio tracks, and <Role schemeIdUri=”urn:mpeg:dash:role:2011 value =”main”/> is added to this AdaptationSet. After these two actions are applied, the DASH MPD output appears as follows (changes in **bold**):

```
<?xml version="1.0" encoding="UTF-8"?>
<MPD
    mediaPresentationDuration="PT41M16S"
    minBufferTime="PT4S"
    profiles="urn:mpeg:dash:profile:isoff-on-demand:2011"
    type="static"
    xmlns="urn:mpeg:dash:schema:mpd:2011"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemalocation="urn:mpeg:dash:schema:mpd:2011
http://standards.iso.org/ittf/PubliclyAvailableStandards/MPEG-DASH_schema_files/DASH-MPD.xsd">
    <Period
        id="1"
```

```
        start="PT0S">
        <AdaptationSet
            bitstreamSwitching="false"
            id="video_frag_auto
           "mimeType="video/mp4"
            segmentAlignment="false"
            startWithSAP="1"> . . . </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            id="audio_frag_80_128000"
            lang="qaa"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <Role
                SchemeIdUri="run:mpeg:dash:role:2011"
                value="main"/>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_81_128000_8501_1"/>
        </AdaptationSet>
        <AdaptationSet
            bitstreamSwitching="false"
            id="i-frame"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
        <AdaptationSet
            bitstreamSwitching="false"
            id="audio_frag_80_128000"
            lang="pol"
            mimeType="audio/mp4"
            segmentAlignment="false"
            startWithSAP="1">
            <SegmentTemplate
                initialization="$RepresentationIDS/init.mp4"
                media="$RepresentationID$/$Time$.m4f"
                timescale="90000">
                <SegmentTimeLine> . . . </SegmentTimeLine>
            </SegmentTemplate>
            <Representation
                audioSamplingRate="48000"
                bandwidth="128000"
                codecs="mp4a.40.2"
                id="128000_audio_frag_80_128000_8508_1"/>
        </AdaptationSet>
    </Period>
</MPD>
```

Setting Up the App Engine

Introduction

The AppEngine nodes serve as the IPVS node for MCE/MPE to implement load balance. By default, the DR (direct routing) mode is used for forwarding. The DR mode requires all machines (the director and real servers) to be on the same segment. There must be no forwarding devices between them.

In some deployment scenarios, App Engine nodes may be deployed in a different network from the MCE/MPE network. If these App Engine nodes serve as IPVS director for MCE/MPE, the DR forwarding will not work.

To solve this issue, these App Engine nodes can be tagged and assigned a node allocation mechanism based on the tag. For example, the App Engine nodes within the MPE network can be tagged with the **smplaybackep** attribute. Only tagged App Engine nodes are candidates for IPVS node for MPE nodes.

Follow the configuration instructions below.

1. Tag the AppEngine Nodes.

   Users should tag the AppEngine node to restrict its assignment:

   - smcaptureep : to restrict its assignment to MCE
   - smplaybackep : to restrict its assignment to MPE

Note: Tagging can be done through the RESTful API or from the GUI. If tagging from the GUI, select the AIC type for playback as MPE and capture as MCE.

   a. Register the node through the RESTful API:

```
 #>vi nodex.json
            {
                "name":"VMPa-ae-27",
                "properties":{
                    "image":{"imgTag":"appengine","personality":"worker","version":"2.4"},
                    "description":"",
                    "adminState":"maintenance",
                    "zoneRef":"smtenant_system.smzone.zone-1",
                    "aic":"smplaybackep",
                    "interfaces":[
                        {"type":"data-in","inet":"192.168.1.27"},
                        {"type":"data-out","inet":"192.168.1.27"},
                        {"type":"mgmt","inet":"192.168.1.27"}
                    ]
                }
            }
            // "aic":"smplaybackep",  the AppEngine node is supposed to be assigned as IPVS node for
MPE


            #>curl -k -u admin:default -X POST -d @nodex.json -H "Accept: application/json" -H
"Content-Type: application/json"

https://10.74.14.113:8043/v2/regions/region-0/nodes/VMPa-ae-27
```

   b. Modify the node through the RESTful API:

```
 #>vi nodex.json
            {
                "name":"VMPa-ae-27",
                "properties":{
                    "image":{"imgTag":"appengine","personality":"worker","version":"2.4"},
                    "description":"",
                    "adminState":"maintenance",
                    "zoneRef":"smtenant_system.smzone.zone-1",
                    "aic":"smplaybackep",
                    "interfaces":[
                        {"type":"data-in","inet":"192.168.1.27"},
                        {"type":"data-out","inet":"192.168.1.27"},
                        {"type":"mgmt","inet":"192.168.1.27"}
                    ]
```

   c. Put the node in Maintenance mode:

```
            #>curl -k -u admin:default -X PUT -d @nodex.json -H "Accept: application/json" -H
"Content-Type: application/json"
```

```
https://10.74.14.113:8043/v2/regions/region-0/nodes/VMPa-ae-27
```

d. Put the node in Inservice mode.

2. Configure the Node Allocation Strategy.

Note: All operations are supposed to be done at the PAM node.

a. Create the following config file:

```
#>vi /etc/opt/cisco/VMP/VMP.cfg
            {
                "node": {
                    "allocator": "insVmAllocator.NodeAllocator4IPVS"
                }
            }
```

b. If you want to allocate node regardless of the tag, you can revert allocator attribute to:

```
"insVmAllocator.NodeAllocator";
```

c. To keep backward compatibility, you can simply remove the following file to use the default node allocation mechanism.

```
#>vi etc/opt/cisco/VMP/VMP.cfg
            {
                "node": {
                    "allocator": "insVmAllocator.NodeAllocator"
                }
            }
```

3. After modifing the VMP.cfg file, restart pam-installedVm process to apply the configuration.

```
            #>supervisorctl restart pam-installedVm
```

Deploy Each App Engine from the Cisco VMP OVA File

1. Log in to the vCenter.
2. From the **File** menu, select **Deploy OVF Template**, then select the App engine OVA file.
3. Accept the license agreement.
4. In the Deploy OVF Template field, select **Network Mapping** to map the source networks to the destination networks. App Engine VM applications use up to three network adapters, but **Network Adapter 1** must always map to the Management network.

   If you are using only one network adapter, map **Network Adapter 1** to the Management network.

   If you are using two network adapters, use *one* of the following connection schemes, depending on your preferred topology:

   - Connect **Network Adapter 1** to the Management network and **Network Adapter 2** to the Data In and Data Out networks.
   - Connect **Network Adapter 1** to the Management and Data In networks and **Network Adapter 2** to the Data Out networks.
   - Connect **Network Adapter 1** to the Management and Data Out networks and **Network Adapter 2** to the Data In networks.

If you are using three network adapters:

- Connect **Network Adapter 1** to the Management network.
- Connect **Network Adapter 2** to the Data In network.
- Connect **Network Adapter 3** to the Data Out network.

5. Select **Properties** to customize the VM deployment.
6. In the Network Parameters section, enter the following information to customize:
   - Hostname—Local hostname of the App Engine. Do not enter the fully qualified domain name (FQDN). For example, if the FQDN is ae.cisco.com, enter only **ae**.
   - Domain—Domain name used by the App Engine (required). Enter the same domain name used by the PAM.
   - IP Address—IP address for Network Adapter 1 (required).
   - Subnet Mask—Subnet mask for Network Adapter 1 (required).
   - Gateway—Gateway IP address for Network Adapter 1 (required).
7. In the Additional Domain Name Servers section, enter the following information:
   - DNS Server—Use the external DNS
8. In the Additional Network Time Protocol Servers section, enter the following information:
   - NTP Server— Use the external NTP
9. Click **Finish** to deploy the OVA and create the App Engine VM. Allow up to 15 minutes to create the VM.
10. Power on the App Engine VM.
11. Verify connectivity and open an SSH into the App Engine VM.
12. To manually add a second Ethernet interface, as dictated by your network topology, log in as **admin** (see Logging into the App Engine VM, page 75), then create and save the /etc/sysconfig/network-scripts/ifcfg-eth1 file with contents like those in the following example:

```
TYPE=Ethernet
NAME=eth1
DEVICE=eth1
BROADCAST=11.0.0.255      < Broadcast address of your interface
IPADDR=11.0.0.xx          < IP address of your interface
NETMASK=255.255.255.0     < Netmask of your interface
NETWORK=11.0.0.0          < Network address of your interface
USERCTL=no
BOOTPROTO=none
ONBOOT=yes
HWADDR=00:50:56:AC:7D:4C
```

Do not include a GATEWAY for this interface.

Note: All App Engine and AE nodes in a region that use the same Image Type, Image Version, and Personality must have identical route configurations. For more information, see Configuring VMP Nodes, page 108.

13. If you need to route specific traffic to and from this interface, you must add one or more static routes. To do so, create and save the /etc/sysconfig/network-scripts/route-eth1 file with contents like those in the following example:

```
ADDRESS0=10.1.2.44        < Routed IP address
GATEWAY0=10.1.1.1         < Gateway to the route to and from this interface
NETMASK0=255.255.255.0    < Netmask for routed IP address
```

You can add as many additional static routes as you need. To do so, add additional lines for ADDRESS1/GATEWAY1/NETMASK1; ADDRESS2/GATEWAY2/NETMASK2; and so on.

14. Bring up eth1 using the **sudo 1fup eth1** command.

15. To manually add a third Ethernet interface, create and save the /etc/sysconfig/network-scripts/ifcfg-eth2 file, and repeat 11-13. Remember to specify **eth2** as the Name and Device, specify the IP addresses of the eth2 interface, and use the **sudo 1fup eth2** command to bring up eth2.

Logging into the App Engine VM

After deployment, you can log in to the App Engine VM using the default username **admin** (default password: **default**). After logging in, you can change the password as you would any other Linux password.

This default user account can perform the normal Linux user functions, and it also provides the following limited root privileges, so that you can perform necessary maintenance and troubleshooting on the App Engine VM:

- Networking commands, such as **/sbin/iptables**, **/sbin/route** and **/sbin/dhclient** that enable you to troubleshoot problems, maintain networking functionality, and keep the App Engine operating normally.
- Software maintenance commands, such as **/bin/rpm**, **/usr/bin/up2date**, and **/usr/bin/yum** that enable you to upgrade the App Engine software as needed.
- Commands for rebooting and shutting down the App engine VM, such as **reboot** and **shutdown now**.

If you need to upgrade the App Engine CLI, log in as **admin**, upgrade the software, and either reboot the App Engine VM or use the **supervisorctl** command to restart all of the processes.

If you need to troubleshoot a problem because the App Engine CLI is not operating normally, log in as the **admin** and examine all relevant logs to determine the problem. If needed, you can **scp** the log files from the App Engine VM and send them to Cisco support for further analysis.

Changing the OVF Properties After Deployment

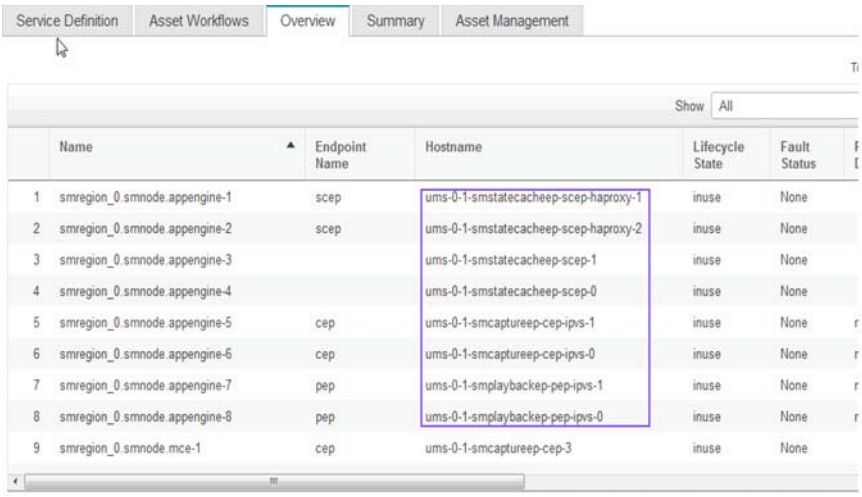
If you need to change any of the OVF properties after deploying the MCE VM, use the following procedure:

1. Power off the App Engine VM.
2. Change the properties in vCenter.
3. Power on the App EngineVM.

An **admin** user cannot directly change the guest OS configuration files that are driven by any of the OVF properties upon boot up.

App Engine Roles/ Descriptions

VMP defines the role of each App Engine (IPVS, HA Proxy, or Redis) after the service has been enabled as shown below. MCE IPVS = cep-ipvs, MPE IPVS = pep-ipvs, and so on.



Backup/Restore User Interface

The following sections define the process to backup configuration from one PAM and restore to the other PAM.

1. Log in to the PAM console and execute the **backup.py backup-dir** command:

```
i.e  "backup.py /root/backup-01"
backup-dir: it is a directory contains sub-directory/file
1: db sub-directiry:  mongo backup data.
2:  node.txt: node(s) information.
```

2. If you are reusing an existing DNS, perform the following cleanup tasks (assume the domain is **cisco.com** and the IP address is **166.0.72.166**):

- Run the following command to sync up:

```
rndc freeze cisco.com
rndc thaw cisco.com

rndc freeze 72.0.166.in-addr.arpa
rndc thaw 72.0.166.in-addr.arpa
```

- In /var/named/slaves, clean up **db.cisco.com**.
- Remove entries containing **CNAME**.
- Remove entries containing **pm-** in the prefix. For example:

```
pam-docserver CNAME   pm-35-1-8-106-VMP
pamds CNAME   pm-35-1-8-102-VMP
```

- Remove entries containing **se-** in the prefix. For example:

```
sr-11-0-0-83            A       11.0.0.83
ums          NS    sr-11-0-0-83
```

- In /var/named/slaves, clean up **db.72.0.166**.
- Keep the following and remove everything else:

```
==================================
$ORIGIN .
```

```
$TTL 86400      ; 1 day
72.0.166.IN-ADDR.ARPA   IN SOA  dns.cisco.com. VMP.cisco.com. (
2012071023 ; serial
3600       ; refresh (1 hour)
1800       ; retry (30 minutes)
604800     ; expire (1 week)
86400      ; minimum (1 day)
)
NS      dns.cisco.com.
$ORIGIN 72.0.166.IN-ADDR.ARPA.
$TTL 30 ; 30 seconds
226                     PTR     dns.cisco.com.
================================================
```

3. Copy **backup-dir** to the new PAM.
4. Execute **restore.py backup-dir** in the new PAM (just deployed from OVA).

   ```
   backup-dir: backup directory in new PAM
   This will also turn off all Life/VOD service.
   ```

   Note: Do not execute on a fully functioning or failing PAM node.
5. Reboot the node. If the nodes are in an HA configuration, reboot each node in the cluster.
6. From the GUI, set the Live or VOD service(s) to **active** state.
7. To exit the GUI at any time, click **Log out** at the top of any page.

Configuring the VMP Using the VMP Manager GUI

We recommend the following sequence of tasks when using the VMP Service Manager GUI to configure the VMP.

- Logging into the VMP GUI, page 102
- Setting Up the VMP Infrastructure, page 78
- Enabling Services, page 78
- Creating Asset Workflows, page 80
- Asset File Download, page 88

For detailed information about the VMP Service Manager GUI, including descriptions of all of the fields on each page, see VMP Service Manager GUI Reference, page 101.

Setting Up the VMP Infrastructure

The Infrastructure tab allows the user access to a list of pages for viewing and configuring various infrastructure components of VMP.

To configure each component, log in to the GUI as described in VMP Service Manager GUI Reference, page 101. Then, select the Infrastructure tab.

1. Configure **Software Image Manifests.** Refer to Configuring Software Image Manifests, page 119.
2. Configure **Regions & Zones.** Refer to Displaying and Configuring Regions and Zones, page 119.
3. Configure VMP **Nodes**. Refer to Configuring VMP Nodes, page 108.
4. Configure COS **Nodes.** Refer to Configuring COS Nodes, page 111.
5. Configure **NAS Stores.** Refer to Configuring Platform Services, page 117.

Enabling Services

Services define the MCE/MPE/AE nodes to be used for capture and playback. When a service is created, the asset workflow defines the content source and how the content should be stored, secured, and transformed, and also defines the content delivery options. Refer to Creating Asset Workflows, page 80

The following are VMP requirements for the NFS server:

- We recommend that you use NFS version 4 with the VMP.
- The VMP must be able to write to the NFS server. Therefore, the NFS server must export a filer or directory with read/write access.
- For VOD service, VMP requires write access to the NFS server that stores the indexed content.
- Disable the **async** export option in the NFS server configuration. That is, the NFS server is to reply to requests only after the changes have been committed to stable storage.

Use the following procedure to enable Media Service.

> **Note:** A minimum of 8 App Engines, including 2 Redis, 2 HA Proxy, and 2 IPVS, are required to enable Media Service. Otherwise, service activation will fail.

1. To create a service, select **Services > Unified Media Service** to display the Service Summary page.
2. From the drop-down list, choose from the 3 available service types to create a new service for **LIVE, VOD** or **CDVR**.

The Service Domain objects available for the chosen service appear at the top. Select and configure each object type to complete service creation. The objects can be created ahead of time so that, as the service is being developed, the objects are already available and only need to be selected.

3. Choose an unused UMS service and specify a name.

Note: The UMS service instance includes a summary that displays real-time status of all associated capture and playback endpoints, nodes, and workflows.

4. Configure state cache endpoints for the service. State cache endpoints are used to cache content metadata used by the capture cluster. State cache endpoints are mandatory for enabling UMS for all services. Click **Save** and **Close.**
   - Name - Make sure the Name conforms to standard hostname specifications, as it is used by the APIs.
   - Region -Can be associated with a geographical region, one or more data centers, or a service area
   - Nodes - In the Desired Nodes field, enter the number of state cache endpoints that have been set up in the system. You can increase the number of desired nodes for SLA upgrade and decrease the number for SLA downgrade. This is supported for MCE, App Engine, and MPE.
   - Virtual IP (used by app engines for load balancing)
5. Configure capture endpoints for the service as follows:
   - Name - Make sure the Name conforms to standard hostname specifications, as it is used by the APIs.
   - Region - Can be associated with a geographical region, one or more data centers, or a service area
   - Nodes - In the Desired Nodes field, enter the number of capture endpoints that have been set up in the system. You can increase the number of desired nodes for SLA upgrade and decrease the number for SLA downgrade. This is supported for MCE, App Engine, and MPE.
   - Virtual IP (used by app engines for load balancing)
   - FQDN (defines the subdomain for capture URLs). For example, **mce.mos.npi.cds.cisco.com**.
6. Click **Save**.
7. Configure playback endpoints for the service as follows:
   - Name - Make sure the Name conforms to standard hostname specifications, as it is used by the APIs.
   - Nodes - In the Desired Nodes field, enter the number of playback endpoints that have been set up in the system. You can increase the number of desired nodes for SLA upgrade and decrease the number for SLA downgrade. This is supported for MCE, App Engine, and MPE.
   - Virtual IP (used by app engines for load balancing)
   - FQDN (defines the subdomain for capture urls) Example: mce.mos.npi.cds.cisco.com.
8. Click **Save**.
9. Verify Capture and Playback endpoint configuration, set the Admin State to **Enable,** and then click **Save**.

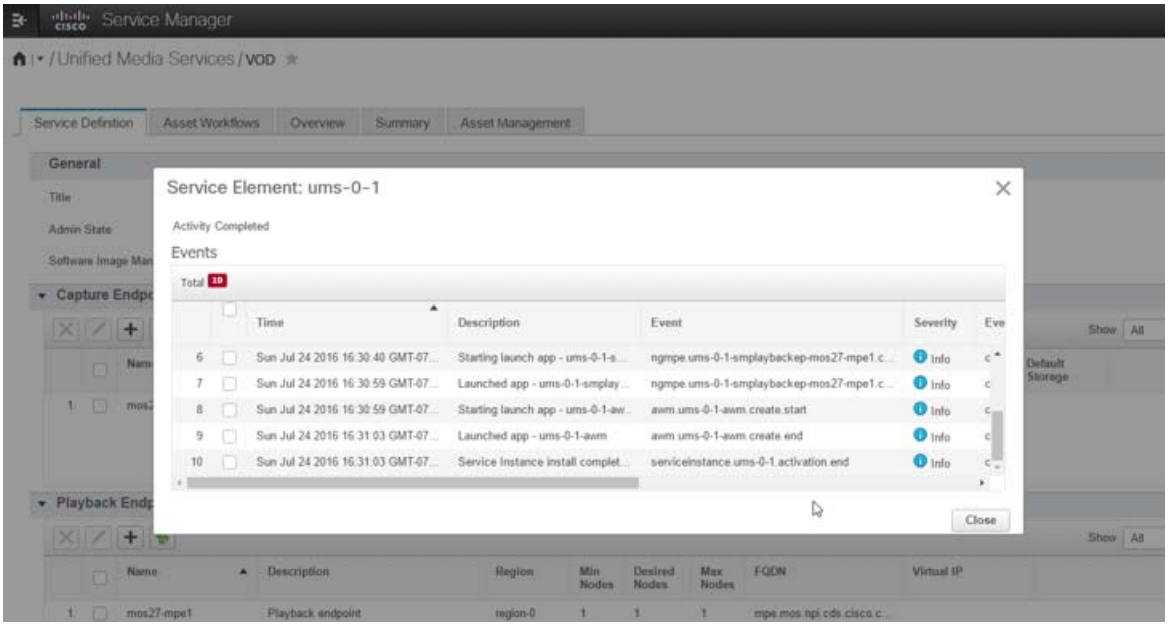
   Enabling a service can take several minutes per node. For example, given a service with the following nodes:
   - 4 MPE-Workers
   - 4 MCE-Workers
   - 8 App Engines

- 2 haproxy
- 2 MPE-ipvs
- 2 MCE-ipvs
- 2 state cache endpoints

It can take up to half an hour to enable the service. (10 nodes x 3 minutes per node = 30 minutes.) While a service is being enabled, the GUI ignores further attempts to perform actions or configuration tasks on that service.

VMP has an internal progress tracking feature to check the activity status. When a service is created or disabled, the progress tracking popup window appears displaying all events associated with the service. VMP polls the events for approximately 15 seconds. If no events display, VMP stops polling.

You can close the window at any time. To again see the progress activity, click the Activation status count bar at the top right corner of the page. When the status window shows Activity Complete, provisioning is done.



Note: You should be able to activate or deactivate a service instance before the previous service instance activation or deactivation is completed. Service instance activation and deactivation takes several minutes to complete. If the user tries to activate or deactivate while a previous activity is in progress, a popup message appears alerting the user that a previous service activation is still in progress, and asks if they want to deactivate the service.

Note: If service activation or deactivation fails, the GUI will time out within 15 minutes.

10. To verify that all MPE/MCE/AE nodes have been successfully allocated to the service, select the **Overview** tab.
11. After the Service Definition is enabled and assets provisioned, choose **Asset Workflows**

Creating Asset Workflows

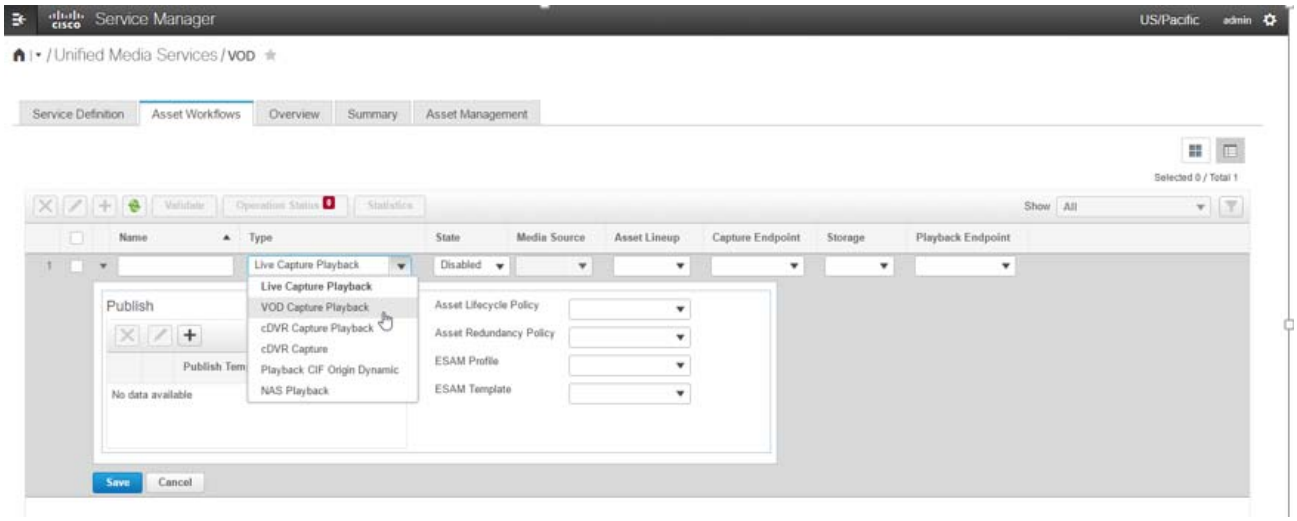
Once the Service Definition is enabled and assets provisioned, asset workflows can be created. Asset workflows define the content source, specify how the content should be stored, secured, and transformed, and also define content delivery and publishing options.

Workflows can be created in table or tile view. Table view is used with the Legacy UI (2.2 version and older) and requires navigating to corresponding object pages to configure. The Tile view allows the user to set up assets all within the same view.

Using Table View

Perform the following steps to create an Asset using the Table view:

1. Select **Services > Unified Media Services.**
2. Click the **Asset Workflows** tab.
3. Select the Table view icon located in the upper right corner of the page.
4. Click the **+ button** then specify the name and type of workflow to create.
   - Live Capture Playback – This provides the user ability to configure an integrated capture and playback work flow for live assets.
   - VOD Capture Playback – This provides the user ability to configure an integrated capture and playback work flow for VOD assets
   - cDVRCapturePlayback – This provides the user ability to configure an integrated capture and playback work flow for cDVR assets.
   - cDVR Capture – This provides the user ability to configure a capture only work flow for cDVR assets.
   - Playback Clf Origin Dynamic – This provides the user the ability to configure a playback only work flow for cDVR assets, where the origin is discovered dynamically.
   - NasPlayback – This provides the user the ability to configure a playback work flow for assets stored in NAS.



5. Enable the asset work flow by changing the State field to **Enabled**, then click **Save**.

For a Live work flow, the asset is created as soon as the service and asset work flows are enabled, which can take up to several minutes.

For a VOD work flow, the service and asset work flow must first be enabled, then the asset must be created using the VMP Asset Management API.

For a NAS Playback work flow, the asset is created and stored directly in NAS by a third party. Once the work flow is enabled, the NAS will be mounted as a media source to MPE workers. The asset published URL looks like: http://<fqdn>/<awf name>-<publish template name>/<asset related path on NAS>.

Enabling an asset work flow can take up to several minutes per node. For example, given a work flow with the following nodes:

- 4 MPE-Workers
- 4 MCE-Workers
- 6 App Engines

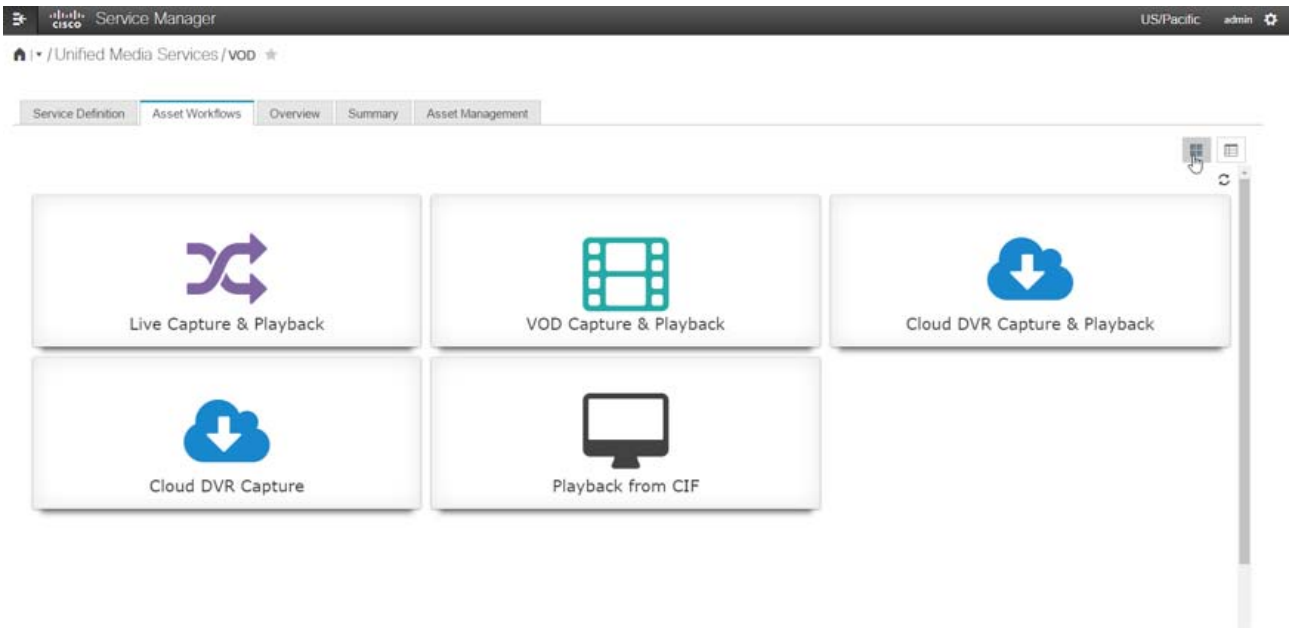
It can take up to half an hour to enable the work flow. (10 nodes x 3 minutes per node = 30 minutes.) While a work flow is being enabled, the GUI ignores further attempts to perform actions or configuration tasks on that work flow.

To determine whether a work flow has been enabled, VMP has an internal progress tracking feature. When a work flow is created/disabled, the progress tracking pop up window appears displaying all events associated with the work flow. VMP will poll the events for approximately 15 seconds. If no events display, VMP will stop polling. You can close the window at any time. To again see the activity, click the Activation status button.

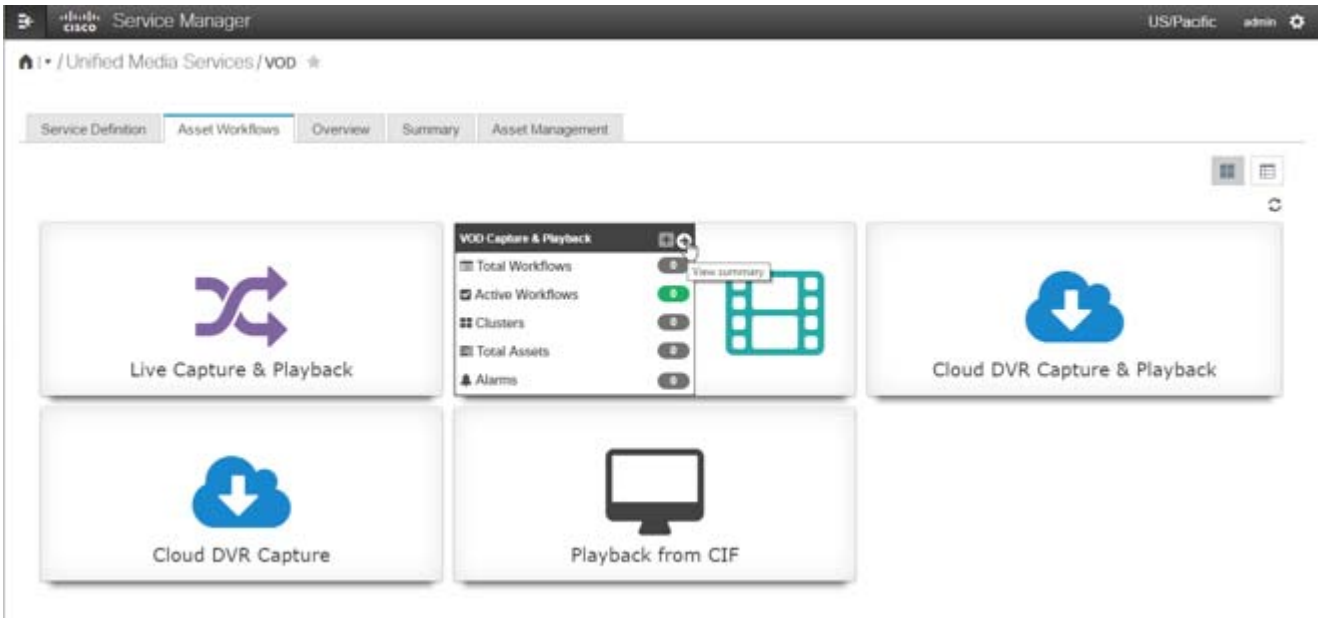
Using Tile View

Perform the following steps to create an Asset using the Tile view (updated menu experience):

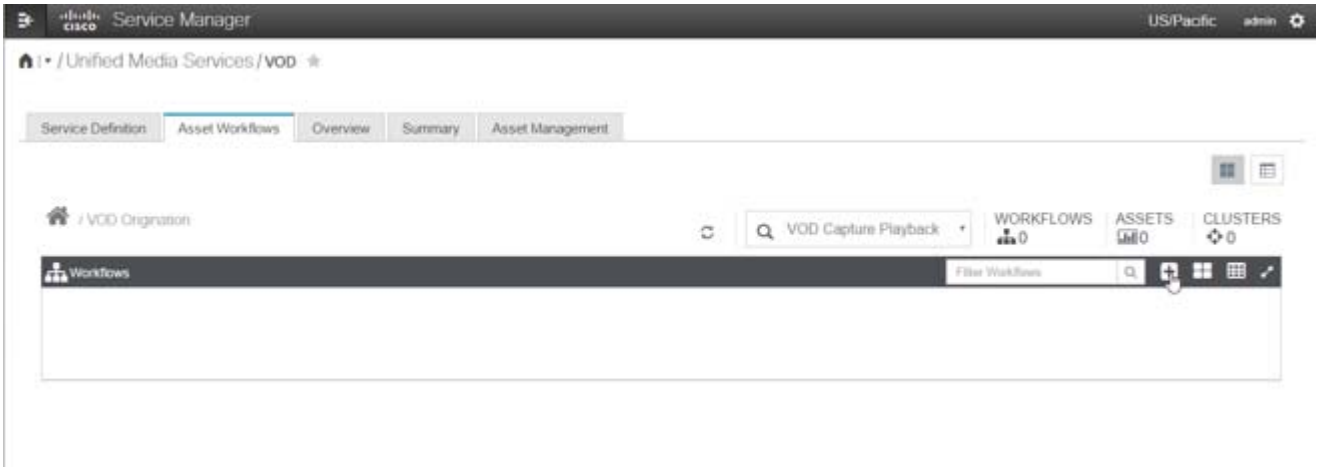
1. Click the **Tile** icon.
2. Select the **workflow type** from the available options:



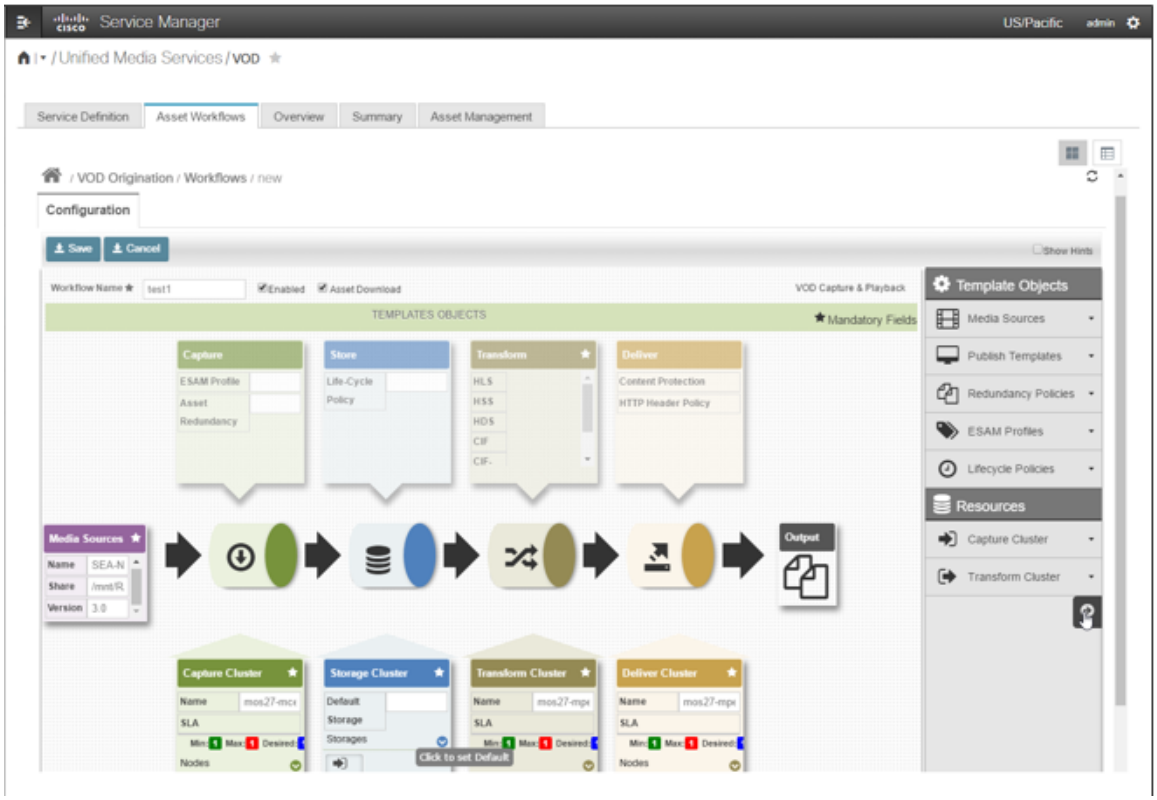
3. Click the view summary arrow icon to see all options for the workflow type selected.



4. Add a workflow.

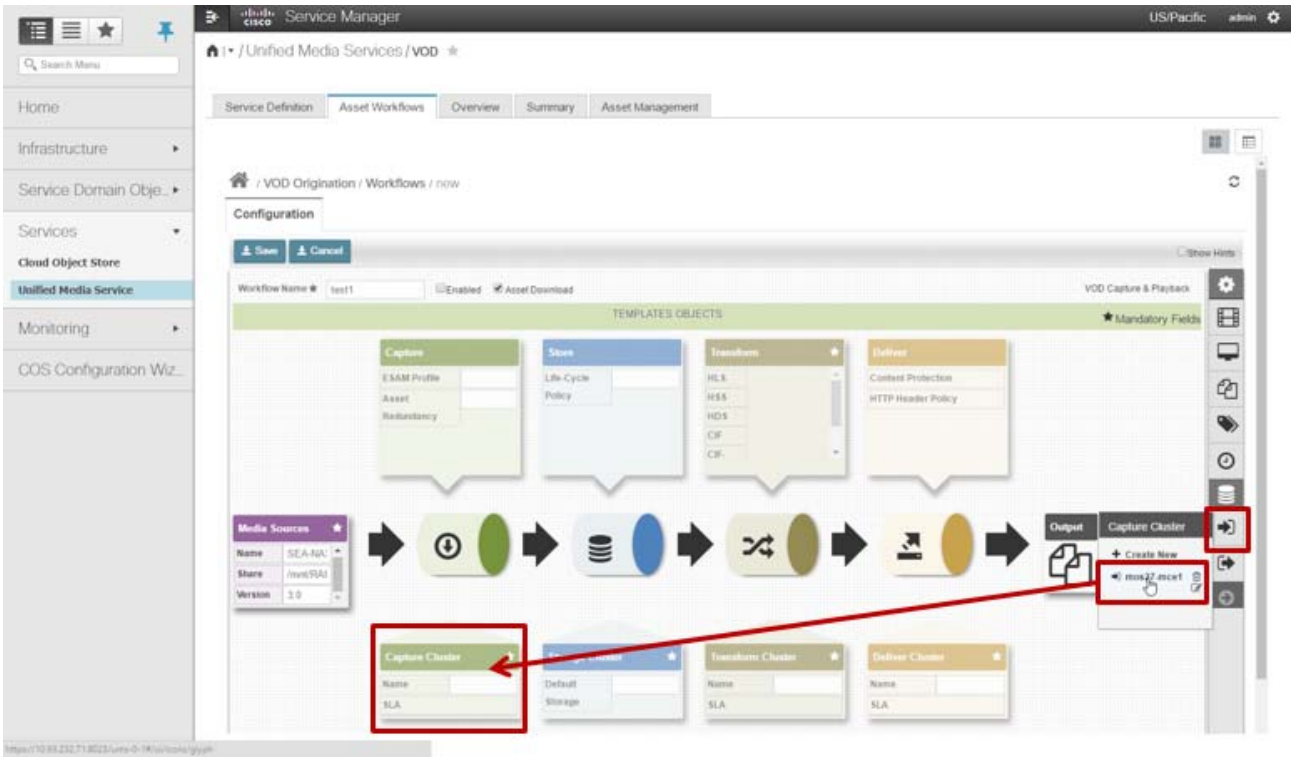


5. The service Domain Objects appear in the right toolbar. Expand the toolbar by selecting the arrow at the bottom.



6. Objects already created may be selected. Select the **Media Sources> Create New** tab for each object type not already defined.
7. Enter necessary details and click **Save**. The newly created media source appears in the workflow.
8. Each field will need to be sequentially selected, working from left to right to complete the asset workflow.
9. Drag and drop each object from the right menu to its bucket on the left.

Note: For help with adding objects, click the **Show Hints** box at the top of the screen.



10. When all required template objects have been added, enter a name for your workflow and click **Enabled** and **Save**.

11. As objects are created in the Asset Workflow, they are added to the Service Domain Objects section of the navigation menu. Items created directly within the Service Domain Objects will appear in the Asset Workflow wizard for assignment.

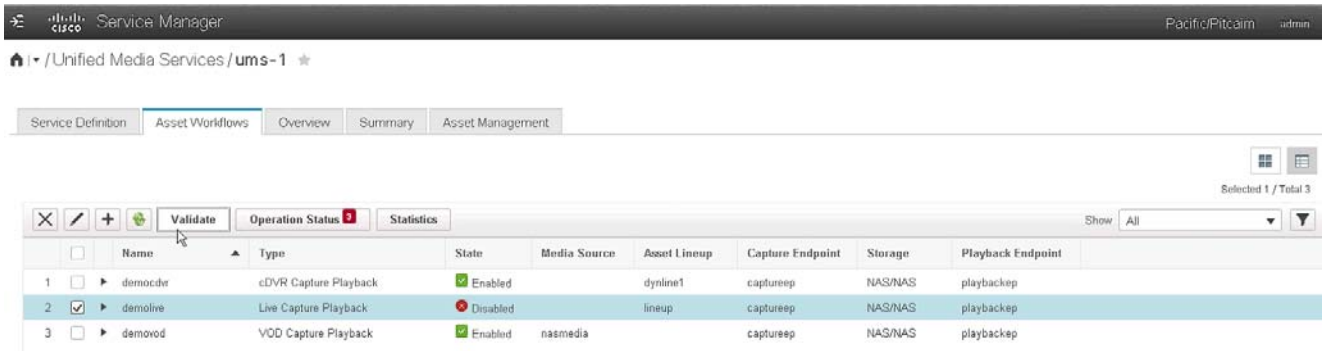
Asset Work Flow Validation

This feature allows the user to validate disabled work flows. Before enabling the service instance and work flow, resources associated with the work flow and service instance can be validated.

1. Select **Services > Unified Media Services-Asset Workflow**

2. Select the disabled work flow.

3. Click the **Validate** button.



4. A polling pop-up window appears to show that VMP is validating the resources. The following resources will be validated:

a. Capture endpoint SLA
b. State cache endpoint
c. Playback end point SLA
d. Validate storage associated with the asset work flow
e. Validate Media source associated with the asset work flow (VOD work flow)
f. Validate if MCE node can receive configured channel, either UDP multi-cast feed or http feed

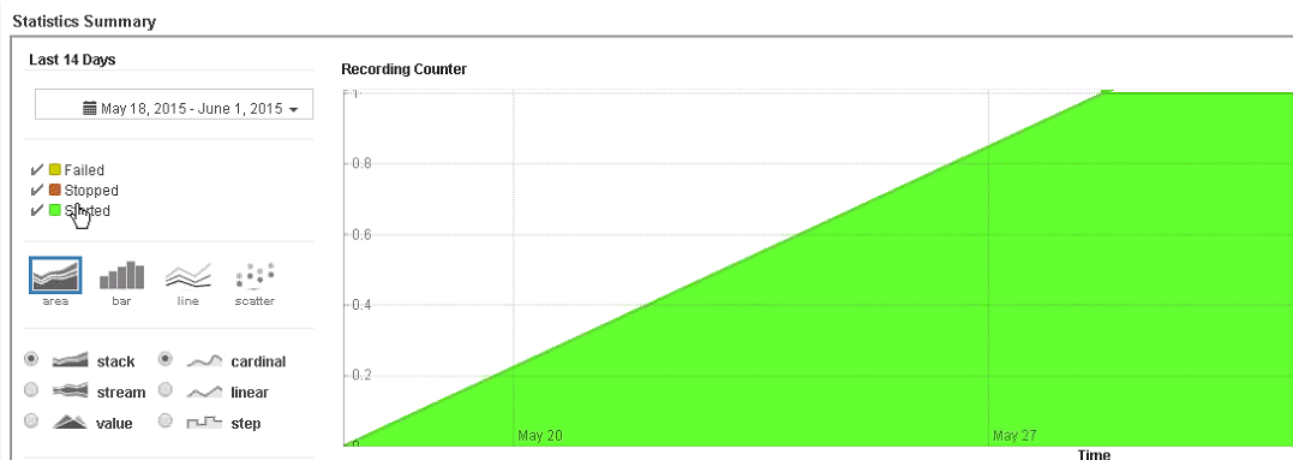
5. Click **Close** to close the window.

Asset Work Flow Management Statistics

This feature allows the user to check the state of each workflow asset. This feature can be used with the cDVR, Live, and VOD workflows.

1. Select the workflow, then click the **Statistics** tab.
2. A Statistics Summary chart will show data collected from the last 24 hours. If there is no data collected within the last 24 hours, the user can select a time frame from the drop-down window or enter a custom time period in the From/To boxes. Data will be shown in a graph indicating the number of resources in the Failed, Stopped, or Started state.

   The following graph display data collected for the last 14 days.



VMP cDVR Scheduler

The VMP cDVR scheduler allows the user to schedule events for cDVR assets. When the first cDVR work flow is created, the AWM starts the scheduling process. Scheduling stops when there is no (enabled) cDVR work flow. The scheduler process is a timer loop which runs periodically in 30 second intervals.

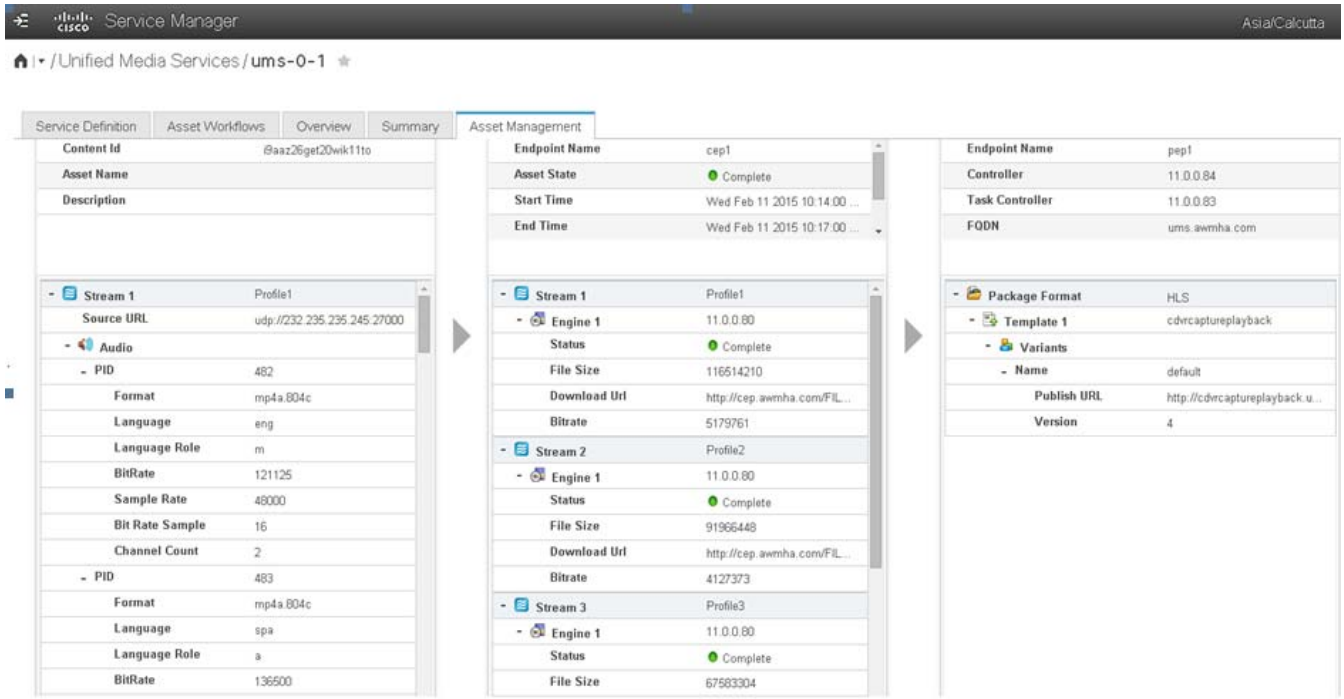
Asset File Download

The Asset file Download feature allows the user to download the source file of completed cDVR recordings. This feature is set by the user while configuring the cDVR work flow. After the cDVR recording is completed, the Asset Management page (see Asset Management tab in screen below) and the AWM API provides a url to download the source file from VMP.

1. Click the **Asset Management** tab.
2. In the work flow Select window, choose the workflow type.

Note: The Asset Download parameter and work flow must be set to **Enabled**.

3. Click **Apply.**
4. All assets for that workflow will be listed, including file size, download URL, and bit rate.



Content Trimming

This feature provides support for users that want to download trimmed content from VMP.

Complete the following steps to enable content trimming in VMP:

1. Configure the channel with the stream type as " TS" for no-EBP content (50 Mbps/4:2:2 profile) instead of ATS.
2. Enable the live asset work flow with tstv/dvr window of 24hrs and set to capture mode.
3. Enable VOD asset work flow with asset download enabled.
4. Get the below resourceMpd url from the live asset status using AWM API
   - " resourceMpd" :" http://100.7.43.161/live/4KCHAN/MPD?
5. Get the Capture start time and Capture end time from the progressiveDownload adaptation set from the live MPD file.
6. A content trim request can then be sent to VMP.

7. VMP Trims the VOD content with the Capture start and Capture end time using VOD ingest son file by POST method.
8. After ingest completes, a download url can be retrieved from the VOD asset status API.

COS Service for VMP

To Configure COS for VMP, refer to Configuring COS Nodes, page 111.

Configuring COS Tunables

To prevent IOM timeout errors and to allow the MCE to conduct capture properly, the tcp keep alive COS tunables must be configured. This is set through an entry in a file on COS.

Filename/Path:

```
/arroyo/test/CalypsoTunables
```

File Entry:

```
tunables/tcp_timeout_ms 60000
```

OpenStack

OpenStack technology consists of a series of interrelated projects that controls a given deployment of hardware providing processing, storage, and networking. Deployments are managed using a simple UI and flexible API which can be used by third party software. As a standard RPM based software application, VMP can easily run as a virtual machine. To run VMP on OpenStack, 4 logical networks are required:

- Management Network
- Video Data In Network (live feed, VOD content repo, storage (COS/NAS)).
- Video Data Out Network (CDN facing, or client facing)
- Data Internal Network

There are 3 network topologies:

1. All-in-one:
   - all 4 logical networks are in one physical network
2. On-premise (recommended)
   - Management Network
   - Video Data In Netoerk
   - Video Data Out and Data Internal Network are in one physical network
3. Public cloud - each logical network maps to one physical network (recommended)

Deploying VMP on OpenStack

OpenStack technology consists of a series of interrelated projects that controls a given deployment of hardware providing processing, storage, and networking. Deployments are managed using a simple UI and flexible API which can be used by third party software. As a standard RPM based software application, VMP can easily run as a virtual machine.

To deploy VMP on OpenStack, 4 logical networks are required:

- Management Network
- Video Data In Network (live feed, VOD content repo, storage (COS/NAS)).
- Video Data Out Network (CDN facing, or client facing)
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There are 3 network topologies:

1. All-in-one:
   - all 4 logical networks are in one physical network
2. On-premise (recommended)
   - Management Network
   - Video Data In Netoerk
   - Video Data Out and Data Internal Network are in one physical network
3. Public cloud - each logical network maps to one physical network (recommended)

Once the OpenStack environment is up and running, you can deploy the VMP clusters and configure the VMP cluster to do Live and VOD services.

Minimum Required OpenStack Version

- Openstack Juno - 2014.2.4
- Openstack Kilo - 2015.2.4
- Openstack Liberty

OpenStack Topology

Controller + (N) Compute nodes with Provider networking

(N) - 1 or more compute nodes

Minimum Required Services on OpenStack

- Identity (Keystone)
- Image (Glance)
- Compute (Nova)
- Networking (Neutron)
- Dashboard (Horizon)
- Orchestration (Heat)

VMP Cluster Deployment

The user can perform two types of VMP cluster OpenStack deployments - RPM and SuperOVA. See instructions below.

RPM-Based Deployment

1. Configure DNS Server.
2. Configure REPO VM.
3. Deploy VMP Cluster using Heat Template for RPM Based Deployment.
4. The following images should be used:
   a. 2.7.0-cisco-VMP-centos7-mendocino.<LATEST VERSION>.ova – base image
   b. 2.7.0-cisco-VMP-mendocino.<VERSION>.iso – To be used to configure REPO
   c. cisco-VMP-minimal-bootstrap-<VERSION>.x86_64.rpm – To be used to configure REPO
   d. cisco-VMP-repo-bootstrap-<VERSION>.x86_64.rpm – To be used to configure REPO
5. The following templates should be used (based on network topology)
   a. VMP_cluster_rpm_1_network.yml
   b. VMP_cluster_rpm_2_network.yml
   c. VMP_cluster_rpm_3_network.yml
   d. VMP_cluster_rpm_4_network.yml

SuperOva-Based Deployment

1. Configure DNS Server
2. Deploy VMP Cluster using Heat Template for SuperOVA based deployment
3. The following image should be used:
   a. 2.7.0-cisco-VMP-mendocino.<VERSION>.ova
4. The following templates should be used (based on network topology):
   a. VMP_cluster_superova_1_network.yml
   b. VMP_cluster_superova_2_network.yml
   c. VMP_cluster_superova_3_network.yml
   d. VMP_cluster_superova_4_network.yml

Template Parameters

The user has to provide real values for the template parameters based on the OpenStack setup when the template is deployed. The following examples provide template parameters with sample values.

admin_password:

default: default

description: Admin Password

hidden: true

label: Admin Password

type: string

cep_vip:

default: 172.20.203.76

description: VIP address for Capture End Point

label: Virtual IP for CEP

type: string

data1_network_id:

default: 219a5a32-0e6c-4903-bc5e-f11f440cfb53

description: Network ID to be used as Data1 Network

label: Data1 Network ID

type: string

data2_network_id:

default: b3b13017-241b-4456-af9a-7e87e5f4956b

description: Network ID to be used as Data2 network

label: Data2 Network ID

type: string

data3_network_id:

default: b3b13017-251b-5456-af9a-7e87e5f4956b

description: Network ID to be used as Data3 network

label: Data3 Network ID

type: string

domain_name:

default: VMP.com

description: Domain Name

label: Domain name

type: string

ext_dns_algo:

default: hmac-md5

description: External DNS Algorithm (Example, HMAC-MD5)

label: External DNS Algorithm

type: string

ext_dns_ip:

default: 172.20.203.70

description: External DNS IP Address

label: External DNS IP

type: string

ext_dns_key:

default: ujLdXfCZenQZQKZlFy42fw==

description: External DNS Key

label: External DNS Key

type: string

flavor_name:

default: m1.medium

description: Name Flavor to use for server

label: Flavor Name

type: string

image_name:

default: Centos7-15604

description: Name of the image to use for PAM, MCE, APP-ENGINE, LOG-SERVER, MPE

(rpm based) nodes

label: Image Name for PAM, MCE, APP-ENGINE, LOG-SERVER, MPE (rpm based)

type: string

logserver_device_mode:

constraints:

- allowed_values:

- VMP_LOG_SMALL_VM

- VMP_LOG_MEDIUM_VM

- VMP_LOG_LARGE_VM

description: Device mode value must be VMP_LOG_SMALL_VM or VMP_LOG_MEDIUM_VM or VMP_LOG_LARGE_VM for LOG-SERVER

default: VMP_LOG_MEDIUM_VM

description: Device Mode for LOG-SERVER

label: Device Mode for LOG-SERVER

type: string

management_network_id:

default: 80a43c40-9940-466d-b276-4ee59e7a0332

description: Network ID to be used as Management Network

label: Management Network ID

type: string

ntp_ip:

default: 10.81.254.202

description: NTP IP Address

label: NTP IP

type: string

pep_vip:

default: 172.20.203.77

description: VIP address for Playback End Point

label: Virtual IP for PEP

type: string

radius_ip:

default: None

description: Radius IP Address

label: Radius IP

type: string

radius_secret:

default: None

description: Radius Secret

label: Radius Secret

type: string

scep_vip:

default: 172.20.203.75

description: VIP address for State Cache End Point

label: Virtual IP for SCEP

type: string

VMP Software Upgrade

This section describes the procedures for upgrading VMP and its components. It includes the following topics:

- Upgrading the Centralized Log Server, page 95
- Upgrading the PAM Nodes, page 96
- Upgrading the MCE or AppEngine OVAs, page 98
- RPM-Based Upgrade, page 99

Although not strictly required, we recommend performing these procedures in the order presented.

Upgrading the Centralized Log Server

This procedure upgrades an existing VMP centralized log server (CLS). We recommend upgrading the CLS and confirming that it is gathering information from all nodes before upgrading the PAM nodes.

Currently, VMP supports a disruptive upgrade, meaning that during an upgrade, a cluster can be rebuilt but some log information on the centralized log server is missing (or stored locally). If this occurs, copy/save/backup the data from an old log server to the NAS or file server, then deploy and start a new log server.

In addition to sending log data to the CLS, all processes save the log data locally. In the event of a network or service outage, check the local log files from the node under question first. Follow the steps below to perform the CLS upgrade.

1. Check functionality.
   a. Execute the **service named status** command to check if it is running on the DNS server.
   b. Each PAM node can resolve log server to the existing log server IP address by running the command: **nslookup log-server**.
   c. Information (events and logs) on the log server is getting updated from all nodes.
2. Back up all data.
   a. FTP server with write permissions for user required.
   b. Before backing up data, stop logger server. Logging will be re-directed locally to each node.
   c. It is recommended that you rename the VM name to keep the old version running until a new node is fully functional. Once the CLS server is functional, it is safe to erase the old VM.
   d. Use the following script to backup data from the log server:

```
log_export FTP_SERVER_REMOTE_HOST USER_NAME PASSWORD
```

   e. Power off the logging server. If there are network disruptions or DNS server failures, logging will continue locally for each node. To recover all logging data during the upgrade, check all nodes, not just logging servers.

3. Deploy a new Version. Deploy a new logger node from the OVA and use the same parameters as in the older logger node and start the newly deployed node. We recommend using the same IP as an old server. As soon as the logger node starts, the A record will be pushed to the DNS server and all nodes will start sending data immediately.

2.33 Example:

```
/usr/bin/ovftool --name=log-server --datastore=datastore1 --powerOffTarget --overwrite --powerOn
--skipManifestCheck --acceptAllEulas --noSSLVerify --deploymentOption="VMP_LOG_SMALL_VM"
--prop:"hostname=log-server" --prop:"domain=testdns.com" --prop:"ip0=11.0.0.208"
--prop:"subnet0=255.255.255.0" --prop:"ntp0=11.0.0.111" --prop:"dns0=11.0.0.111"
--prop:"gateway0=11.0.0.1" --prop:"ext-dns-ip=11.0.0.111"
--prop:"ext-dns-key=ZSKgTDpuRAtG5E8M400BhA==" --prop:"ext-dns-algo=hmac-md5" --net:"Network for
adapter 1=Management" /home/abahel/stf_2/images/2.3.3-cisco-VMP-duncans.14905.ova
vi://root:cisco123@192.2.0.81/abahel-rack-z2-Blade-1/host/172.20.216.17
```

2.4 Example

```
/usr/bin/ovftool --name=log-server --datastore=datastore1 --powerOffTarget --overwrite --powerOn
--skipManifestCheck --acceptAllEulas --noSSLVerify --deploymentOption="VMP_LOG_SMALL_VM"
--prop:"hostname=log-server" --prop:"domain=testdns.com" --prop:"ip0=11.0.0.208"
--prop:"subnet0=255.255.255.0" --prop:"ntp0=11.0.0.111" --prop:"dns0=11.0.0.111"
--prop:"gateway0=11.0.0.1" --prop:"ext-dns-ip=11.0.0.111"
--prop:"ext-dns-key=ZSKgTDpuRAtG5E8M400BhA==" --prop:"ext-dns-algo=hmac-md5" --net:"Network for
adapter 1=Management" /home/abahel/stf_2/images/2.4.0-cisco-VMP-mendocino.15023.ova
vi://root:cisco123@192.2.0.81/abahel-rack-z2-Blade-1/host/172.20.216.17
```

4. Check that all data is coming from all nodes by using the UI console.

Upgrading the PAM Nodes

Follow this procedure to upgrade all PAM nodes in the VMP deployment.

1. Disable all workflows. (Wait until all workflows are disabled).

   Go to the following link, and make sure all workflows are disabled:

   ```
   https://service-mgr:8443/#pageId=com_cisco_VMP_page_services_ums
   ```

2. Disable all services. (Wait until all services are disabled).

   Go to the following link and make sure all services are disabled:

   ```
   https://service-mgr:8443/#pageId=com_cisco_VMP_page_services_ums
   ```

3. Back up all existing VMP PAM nodes.

   We suggest running **backup** commands for all PAM nodes to save unique state.json and nodes information. Replace the word **node** with actual data for the PAM node (domain name or IP) and replace **user/your_server** with the credentials of the place where you want to store the backup files:

   ```
   ssh admin@node
   sudo /opt/cisco/VMP/bin/backup.py backup
   tar czf backup.tar.gz backup
   scp backup.tar.gz user@your_server:backup-VMP.tar.gz
   ```

   Example:

   ```
   Nodes are 11.0.0.211, 11.0.0.212, 11.0.0.213, mongo leader is 11.0.0.211
   ssh admin@11.0.0.211 "sudo /opt/cisco/VMP/bin/backup.py backup;tar czf backup.tar.gz backup"
   scp admin@11.0.0.211:backup.tar.gz backup-VMP.tar.gz
   ssh admin@11.0.0.212 "sudo /opt/cisco/VMP/bin/backup.py backup;tar czf backup.tar.gz backup"
   scp admin@11.0.0.212:backup.tar.gz backup-VMP.tar.gz
   ssh admin@11.0.0.213 "sudo /opt/cisco/VMP/bin/backup.py backup;tar czf backup.tar.gz backup"
   scp admin@11.0.0.213:backup.tar.gz backup-VMP.tar.gz
   ```

4. Power off all 3 PAM nodes.

   Note: It is a good idea to rename VM names and keep them until the entire procedure is complete and confirmed.

5. Deploy a new VMP cluster. Using the VMPt recent OVA image and parameters (same as in the old VM OVA properties for each node), deploy all new nodes.

   Example:

```
Rename ab-pam-01 -> ab-pam-01old, ab-pam-02 -> ab-pam-02old, ab-pam-03 -> ab-pam-03old.
ovftool --noSSLVerify --acceptAllEulas --powerOffSource --overwrite --powerOn --diskMode=thin
--prop:"ext-dns-ip=11.0.0.111" --prop:"ext-dns-key=ZSKgTDpuRAtG5E8M400BhA=="
--prop:"ext-dns-algo=hmac-md5"  --prop:"peer0=11.0.0.212"  --prop:"peer1=11.0.0.213"
--prop:"ip0=11.0.0.211" --net:"Network for adapter 1=Management" --prop:"ntp2=64.104.193.12"
--prop:"dns2=11.0.0.111" --name="ab-pam-01" --datastore="datastore1" --prop:"ntp0=11.0.0.111"
--prop:"dns0=11.0.0.111" --prop:"admin-password=default" --prop:"ntp1=10.81.254.202"
--prop:"domain=testdns.com" --prop:"subnet0=255.255.255.0" --prop:"gateway0=11.0.0.1"
--prop:"dns1=11.0.0.111" --prop:"hostname.cisco=ab-pam-01"
images/2.4.0-cisco-VMP-mendocino.15023.ova
vi://root:cisco123@192.2.0.81/abahel-rack-z2-Blade-1/host/172.20.216.17/

ovftool --noSSLVerify --acceptAllEulas --powerOffSource --overwrite --powerOn --diskMode=thin
--prop:"ext-dns-ip=11.0.0.111" --prop:"ext-dns-key=ZSKgTDpuRAtG5E8M400BhA=="
--prop:"ext-dns-algo=hmac-md5"  --prop:"peer0=11.0.0.211"  --prop:"peer1=11.0.0.212"
--prop:"ip0=11.0.0.213" --net:"Network for adapter 1=Management" --prop:"ntp2=64.104.193.12"
--prop:"dns2=11.0.0.111" --name="ab-pam-03" --datastore="datastore1" --prop:"ntp0=11.0.0.111"
--prop:"dns0=11.0.0.111" --prop:"admin-password=default" --prop:"ntp1=10.81.254.202"
--prop:"domain=testdns.com" --prop:"subnet0=255.255.255.0" --prop:"gateway0=11.0.0.1"
--prop:"dns1=11.0.0.111" --prop:"hostname.cisco=ab-pam-02"
images/2.4.0-cisco-VMP-mendocino.15023.ova
vi://root:cisco123@192.2.0.81/abahel-rack-z2-Blade-1/host/172.20.216.17/
ovftool --noSSLVerify --acceptAllEulas --powerOffSource --overwrite --powerOn --diskMode=thin
--prop:"ext-dns-ip=11.0.0.111" --prop:"ext-dns-key=ZSKgTDpuRAtG5E8M400BhA=="
--prop:"ext-dns-algo=hmac-md5"  --prop:"peer0=11.0.0.211"  --prop:"peer1=11.0.0.213"
--prop:"ip0=11.0.0.212" --net:"Network for adapter 1=Management" --prop:"ntp2=64.104.193.12"
--prop:"dns2=11.0.0.111" --name="ab-pam-02" --datastore="datastore1" --prop:"ntp0=11.0.0.111"
--prop:"dns0=11.0.0.111" --prop:"admin-password=default" --prop:"ntp1=10.81.254.202"
--prop:"domain=testdns.com" --prop:"subnet0=255.255.255.0" --prop:"gateway0=11.0.0.1"
--prop:"dns1=11.0.0.111" --prop:"hostname.cisco=ab-pam-03"
images/2.4.0-cisco-VMP-mendocino.15023.ova
vi://root:cisco123@192.2.0.81/abahel-rack-z2-Blade-1/host/172.20.216.17/
```

6. Check a new VMP cluster and establish a leader.

   a. When reusing existing IP and DNS parameters, some clean up might be required. Refer to Step 2 in Backup/Restore User Interface, page 76.

   b. Check all 3 PAM nodes. tail -f /var/log/opt/cisco/VMP/error/* should not show any recurring errors. If errors occur, refer to Troubleshooting the PAM, page 174 or repeat steps starting from step 5.

   c. Check to make sure the GUI is operational. If errors occur, refer to Troubleshooting the VMP Service Manager GUI (VMP-M), page 159.

7. Restore previous configuration.

   a. For the leader node, run the following command, replacing “nodeIP” with actual data for the node (domain name or IP):

```
scp backup-VMP.tar.gz admin@nodeIP:backup.tar.gz
ssh admin@nodeIP
tar xvf backup.tar.gz
sudo /opt/cisco/VMP/bin/restore.py backup
```

```
sudo /opt/cisco/VMP/bin/nodeRestore.py backup"
```

b. Restart all nodes.

Example:

```
scp backup-VMP.tar.gz admin@11.0.0.211:backup.tar.gz
ssh admin@11.0.0.211 "tar xvf backup.tar.gz;sudo /opt/cisco/VMP/bin/restore.py backup;sudo
/opt/cisco/VMP
/bin/nodeRestore.py backup"
```

8. Check the GUI to make sure you can see all Nodes and all services. If some are missing, refer to Troubleshooting the VMP Service Manager GUI (VMP-M), page 159 or repeat steps 7 onward.
9. Start all services. Go to the following link, and enable all needed services (sometimes it might take up to 5 mins per service, but wait until operation completes:

```
https://service-mgr:8443/#pageId=com_cisco_VMP_page_services_ums
```

10. Start all work flows and check streaming. Go to following link, and make sure all proper work flows are enabled:

```
https://service-mgr:8443/#pageId=com_cisco_VMP_page_services_ums
```

11. Check the browser for streaming.

The VMP PAM cluster should be functional.

Upgrading the MCE or AppEngine OVAs

For this operation to work without causing the service to fail, additional node capacity above the current SLA minimum is required. The additional nodes must be in idle state prior to upgrading other nodes. Upgrading while a service is active may affect end user services, so we recommend disabling all asset workflows and services before upgrading the nodes.

To upgrade a node:

1. Go to **Infrastructure > Compute> Nodes** and set the node Admin state to **Maintenance**.
2. Refresh the screen to make sure that it goes to maintenance operation state and that it is not in alarm.
3. Ensure that one of the additional MCE or AppEngine nodes that was in idle state has replaced the one in maintenance state.
4. Deploy the new OVA for that particular node either manually or using the VMware ovftool command. Perform any necessary post-deployment operations, such as configuring additional interfaces, static routes or additional commands. If possible, watch the VCenter console to ensure the node comes up correctly.
5. When the node is up, return to the node list and ensure there are no alarms shown for that node. Return the node from Admin state back to Inservice and ensure that it goes to idle state.
6. Repeat this process for each node you plan to upgrade.
7. Enable any previously disabled asset workflows and services and make sure that all nodes are used as necessary to meet SLA requirements.

RPM-Based Upgrade

This document outlines the manual steps necessary to do an RPM upgrade of an App-Group. App-Groups can be upgraded on either a SuperOVA-based or a RPM-based VM. The upgrade process only upgrades an App-Group to the latest version of RPMs contained in the Repository VM.

The devices should be upgraded in the following order when the system is in Service:

MPE > MCE> AE > Log Server> PAM1 > PAM 2 > PAM 3

Software Images Required

VMP minimal bootstrap RPM:

```
/auto/VMP2/cdvrbld/published_area/release_builds/2.4.1-cisco-VMP-mendocino.2.4.1-latest/cisco-VMP-minimal-bootstrap-2.4.1-<buildNo>.x86_64.rpm
```

Upgrade Procedure

Follow the steps below to perform the RPM upgrade.

1. Set up and log in to the Repository VM for your test bed.
2. Mount the **new** MOS ISO containing the new version of MOS software (to be upgraded to) as follows:

```
umount /var/www/html/mos/repo/2.8
mount <path/to/new/MOS/ISO> /var/www/html/mos/repo/2.8
systemctl restart httpd
```

3. Log in to the VMP Service Manager GUI and disable the UMS.
4. Place all MCE/MPE/Appengine nodes to Maintenance mode.
5. Install **mosUpgrade** on all nodes, for example:

```
rpm -ivh
http://192.168.106.176/mos/repo/2.8.xxx/yumrepo/cisco-mos-minimal-bootstrap-2.8.xxx-21156.x86_64.rpm
```

6. Run the **mosUpgrade** utility on all nodes to be upgraded and start upgrade procedure (the following can run simultaneously to reduce upgrade time):

```
mce
/opt/cisco/mos/upgrade/bin/mosUpgrade --repourl http://192.168.106.176/mos/repo/2.8.xxx --appname
mce-app --shutdown
mpe
/opt/cisco/mos/upgrade/bin/mosUpgrade --repourl http://192.168.106.176/mos/repo/2.8.xxx --appname
mpe-app --shutdown
appengine
/opt/cisco/mos/upgrade/bin/mosUpgrade --repourl http://192.168.106.176/mos/repo/2.8.xxx --appname
appengine --shutdown
logger
/opt/cisco/mos/upgrade/bin/mosUpgrade --repourl http://192.168.106.176/mos/repo/2.8.xxx --appname
logger-app --shutdown --nomaintenance
pam
/opt/cisco/mos/upgrade/bin/mosUpgrade --repourl http://192.168.106.176/mos/repo/2.8.xxx --appname
pam-app --shutdown --nomaintenance
```

7. After upgrading all nodes including the PAM, change the image type to MPE, and image version to the latest.

8. Update image manifest version to the latest.
9. Move all nodes from Maintenance Mode to **In Service Now**.
10. Enable UMS.

Limitations

For PAM VM upgrades, limited regression testing has currently been performed.

(Basic PAM upgrade functionality has been verified.)

VMP Service Manager GUI Reference

The VMP Service Manager GUI lets you quickly and easily access many VMP deployment and monitoring functions.

This section provides the following information:

- Before you Begin, page 101
- Logging into the VMP GUI, page 102
- Working with the VMP Service Manager GUI, page 103
- Working with Pages in the VMP Service Manager GUI, page 104
- Setting the Time Zone for Timestamps, page 105
- Update Default System CLI Login, page 106
- Displaying High-Level Overview Information for the VMP, page 106
- Configuring VMP Nodes, page 108
- Configuring Storage, page 110
- Configuring Platform Services, page 117
- Configuring Software Image Manifests, page 119
- Displaying and Configuring Regions and Zones, page 119
- Configuring Service Domain Objects, page 120
- Configuring Services, page 150
- Monitoring Facilities, page 150

Before you Begin

When working with the VMP Service Manager GUI, keep the following considerations in mind:

- The VMP Service Manager GUI can run on the following operating systems and browsers:
  - Windows Internet Explorer 9 (IE9) or later for Windows 7
  - Mozilla Firefox 20 or later for Windows 7
  - Google Chrome 30.x for Windows 7
  - Apple Safari 7.x for Windows 7 or MAC OS Version 10.9 or later
- The VMP Service Manager GUI requires a display resolution of 1600 x 900 or better.
- If the PAM IP address on which you are accessing the Service Manager GUI is NATed, response time can be noticeably slow.

- The GUI times out after one hour (60 minutes) of inactivity. To avoid timeouts, make and save a configuration change, or click a tab or refresh icon, before the one-hour idle timeout expires.
- Configuration changes that you make in any section of the GUI are saved when you click the **Save** button. If you log out or if the GUI times out before you save your changes, all changes made since your last save are lost.
- If you try to delete an object in the GUI that has been associated with another object (for example, a capture endpoint that has been associated with an asset work flow), the GUI prevents the deletion and displays an explanatory error message.
- If you redeploy or upgrade the VMP OVA, you must clear your browser cache for the VMP Service Manager GUI changes to take effect.

Logging into the VMP GUI

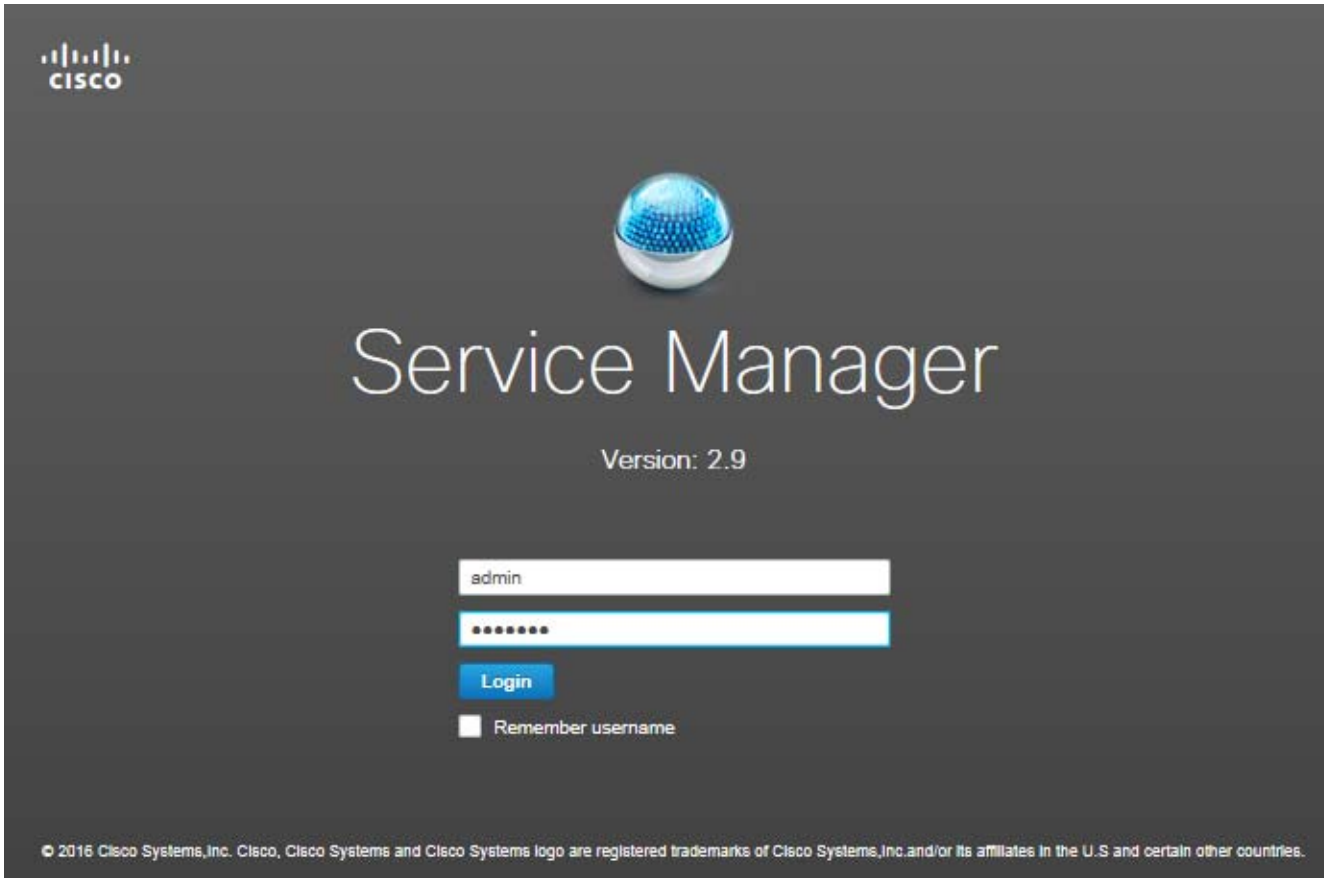
To log in to the VMP GUI, use the following procedure:

1. Access the GUI using the PAM IP address. The URL format is

   `https://`*`pam_dns_entry`***`:8443`**

2. Log in to the GUI with your Username and Password.

   The default username is **admin**. The default password for local authentication is **default**. We recommend that you change these after deployment is complete.



3. The main page of the GUI is displayed. Select a tab at the top of the page to begin working with the GUI.
4. To exit the GUI at any time, click **Logout** at the top of any page.

Working with the VMP Service Manager GUI

Usernames and Passwords

After deployment, the VMP stores the GUI username and password on the PAM VM in the /etc/opt/cisco/VMP/public. Authentication is done using REST APIs.

We recommend that you change the default username and password after installation.

Time Zone

To set the time zone to use for VMP Service Manager GUI timestamps, select **admin > Preferences**. For more information, see Setting the Time Zone for Timestamps, page 105.

Home

To display high-level overview information for the VMP, select **Home**. For more information, see Displaying High-Level Overview Information for the VMP, page 106.

Infrastructure

To configure VMP infrastructure, select **Infrastructure**, then select a configuration option.

To work with	Select	For more information
Nodes	**Compute > Nodes**	Configuring VMP Nodes, page 108
COS Nodes	Storage > COS Nodes	Configuring COS Nodes, page 111
COS Node Initialization Profiles	**Storage > COS Node Initialization Profiles**	Configuring COS Nodes, page 111
File System Gateway	**Storage > File System Gateway (FSG) Tenant**	File System Gateway (FSG) Tenant, page 117
Network Attached Storage (NAS) stores	**Storage > NAS Stores**	Configuring Storage, page 110
IP Address Pools and Networks	**IP Address Pools and Networks**	
Platform services, including NTP servers, DNS servers, and DNS forwarders	**Platform Services**	Configuring Platform Services, page 117
Software Image Manifests	**Software Image Manifests**	Configuring Software Image Manifests, page 119
Regions and Zones	**Regions & Zones**	Displaying and Configuring Regions and Zones, page 119

VMP Service Domain Objects

To configure VMP service domain objects, select **Service Domain Objects**, then select a configuration option.

To work with	Select	For more information
Channels	**Media Sources > Channels**	Configuring Service Domain Objects, page 120
NAS media Sources	**Media Sources > NAS Media Sources**	Configuring NAS Media Sources, page 122
Dynamic Sources	**Media Sources > Dynamic Sources**	Configuring Dynamic Sources, page 122
Channel lineups	**Asset Lineups > Channel Lineups**	Asset Lineups, page 122

To work with	Select	For more information
Dynamic Lineup	**Asset Lineups > Dynamic Lineups**	Configuring Dynamic Lineups, page 125
Auth profiles	**Profiles > Auth Profiles**	Profiles, page 127
ESAM profiles	**Profiles > ESAM Profiles**	Configuring ESAM Profiles, page 127
Key profiles	**Profiles > Key Profiles**	Configuring Key Profiles, page 129
HTTP header policies	**Policies > HTTP Header Policies**	Policies, page 132
Asset Lifecycle policies	**Policies > Asset Lifecycle Policies**	Configuring Asset Lifecycle Policies, page 133
Asset Redundancy policies	**Policies > Asset Redundancy Policies**	Configuring Asset Redundancy Policies, page 134
Subtitle Policies	**Policies > Subtitle Policies**	Configuring Subtitle Policies, page 136
Cross Domain Policies	**Policies > Cross Domain Policies**	Configuring Cross-Domain Policies, page 138
Client Domain Policies	**Policies > Client Domain Policies**	Client Access Policies, page 139
Publish Templates	**Templates > Publish Templates**	Configuring Publish Templates, page 140
ESAM Templates	**Templates > ESAM Templates**	Configuring ESAM Templates, page 144

VMP Services

To configure VMP services, select the Services tab, then select a Service option.

To work with	Select	For more information
COS	**Services > Cloud Object Store**	Configuring COS Nodes, page 111
UMS	**Services > Unified Media Service**	Enabling Services, page 78

Monitoring the VMP

To monitor the VMP, select the **Monitor** tab, then select a monitoring option.

To work with	Select	For more information
System diagnostics	**Diagnostic Settings > System Diagnostics**	System Diagnostics, page 151
Service diagnostics	**Diagnostic Settings > Service Diagnostics**	Service Diagnostics, page 154
Logs	**Logs > Log Viewer**	Log Viewer, page 157
Log analysis	**Logs > Log Analysis**	Log Analysis, page 157
Events	**Events**	Events, page 156

COS Configuration Wizard

To configure Cloud Object Storage parameters, select the COS Configuration Wizard and then configure the parameters.

Working with Pages in the VMP Service Manager GUI

Most of the tables displayed in the VMP Service Manager GUI enable you to add, edit, and delete entries; sort entries by column; change the order of columns; and use filters to control what is displayed.

Add an Entry

To add an entry to a table, click **the + button** at the top of the table. Enter or select values for the new entry, then click **Save** to add it to the table or select **Cancel** to cancel the selection.

Edit an Entry

Use the expand/collapse button to **Edit** an entry. The row becomes read only and the Edit icon is active. Click the **edit (pencil icon)** to edit your entry.

Select an Entry

Single click the row.

Delete an Entry

To delete an entry from a table, select the entry and click **the X button** at the top of the table. When prompted, click **OK**. The entry is removed from the table.

Refresh a Table

To refresh the entries in a table, click the **Refresh** icon at the top of the table.

Sort Entries

To sort entries in a table based on the contents of a column, click the column header. Click once to order the table in alphanumeric ascending order; click twice for descending order.

Change Order of Columns

To change the order of columns in a table, drag-and-drop the column headings.

Filter Contents

To filter the contents of a table, select a filter in the drop-down box at the top-right of the table, or click the **Filter** icon to toggle between the different filters.

- **All**—Display all of the table contents. This is the default display.
- **Quick Filter**—Display only those elements of one or more columns that contain specified text strings.
- **Advanced Filter**—Display only those elements of the table that match a set of one or more rules that you specify.

  For each rule, specify a column; a type of filter, such as **Contains** or **Starts with**; and a text string.

  To add another rule to the filter, click the plus sign (**+**). You can specify more than one rule for a given column.

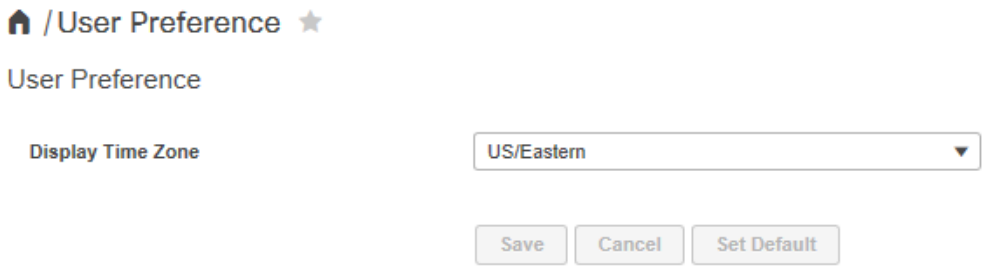
  If you have specified more than one rule, the **Match** drop-down box is displayed.

  - To specify that an element of the table must match all of the specified rules in order to be included in the list, select **Match > All**.
  - To specify that an element of the table need only match one or more of the specified rules in order to be included in the list, select **Match > Any**.
  - To delete a rule from the filter, click the minus sign (**-**).
  - To apply the filter to the elements of the table, click **Go**.
  - To clear the filter and display all elements of the table, click **Clear Filter**.
- **Manage Preset Filters**—Edit or remove Advanced Filters that you have saved.

Note: When you refresh the page in your browser, all saved filters are removed.

Setting the Time Zone for Timestamps

To set the time zone to use for VMP Service Manager GUI timestamps, select **admin > Preferences** in the VMP Service Manager GUI. The User Preference page displays the Time Zone drop-down box.



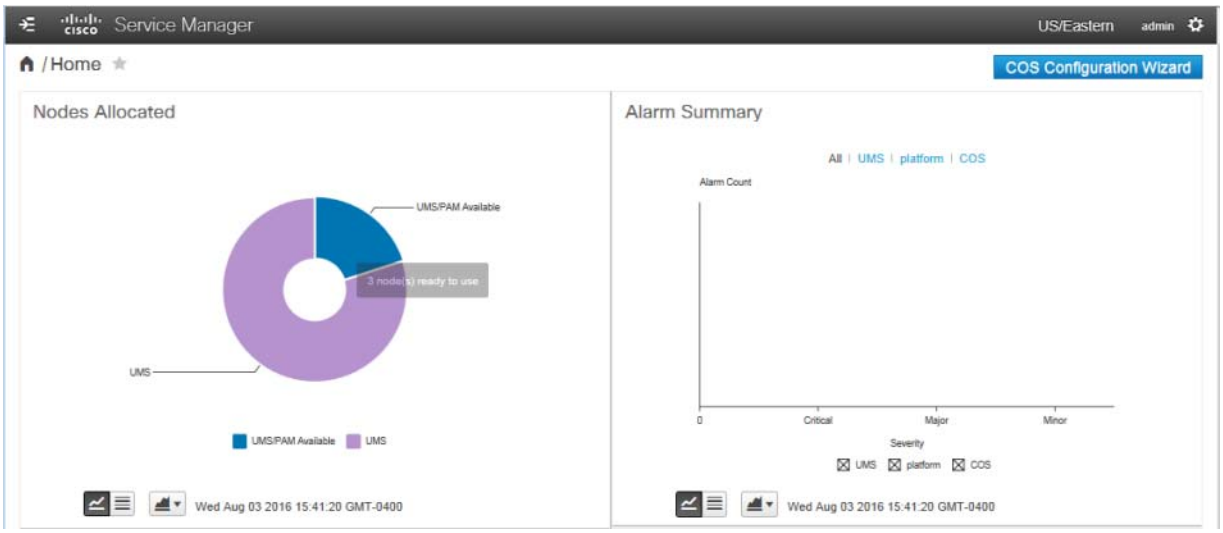
Select your time zone from the Time Zone drop-down box.

Update Default System CLI Login

To update a default user name and cli password, select **admin > Preferences** in the VMP Service Manager GUI. The User Preference page displays the Default drop-down box.

Displaying High-Level Overview Information for the VMP

To display high-level overview information for the VMP, select **Home** in the VMP Service Manager GUI. The Home page displays the following information for the VMP, automatically refreshed every five (5) minutes.



Nodes Allocated

The Nodes Allocated section of the Home page displays the allocation of VMP nodes, broken down by service type (such as Live or VOD), available nodes, and nodes that are in maintenance mode. You can display node allocation in pie chart or tabular format.

Alarm Summary

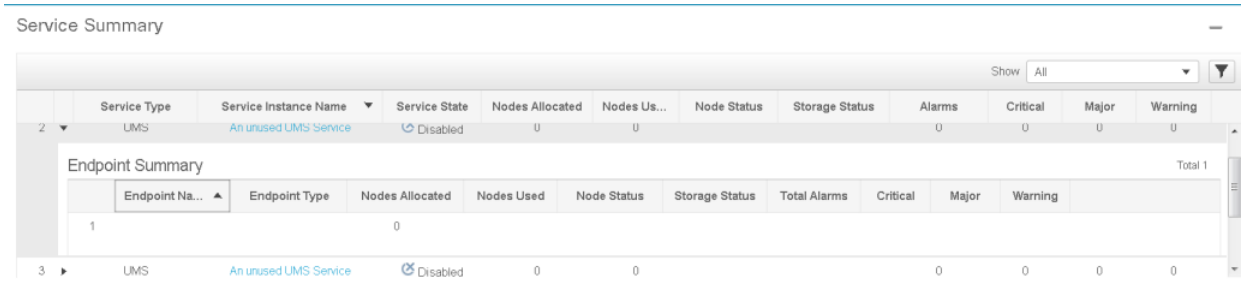
The Alarms Count by Service Type section of the Home page displays the number of alarms logged for each service type, further broken down by severity of the alarms (critical, major, or minor). You can toggle among several types of charts or tabular format.

Service Summary

The Service Summary section of the Home page displays the following information for each VMP node (you cannot edit these fields):

- Service Type—Type of service instance, such as **UMS** or **COS**.
- Service Instance Name—Name of the service instance.
- Service State—Indicates whether the service instance is currently **Enabled** or **Disabled**.
- Nodes Allocated—Number of nodes allocated for use by the service instance.
- Nodes Used—Number of nodes currently being used by the service instance.
- AppStatus—Current status of the node associated with the service instance.
- Storage Status—Current status of the storage associated with the service instance.
- Total Alarms—Total number of alarms logged for the service instance.
- Critical—Number of Critical alarms logged for the service instance.
- Major—Number of Major alarms logged for the service instance.
- Warning—Number of Warning alarms logged for the service instance.

To display the endpoint summary for a service instance, click its **Expand** arrow.



The Endpoint Summary table displays the following information for each endpoint (you cannot edit these fields):

- Endpoint Name—Name of the endpoint.
- Endpoint Type—Type of endpoint. Valid values are **Capture** and **Playback**.
- Nodes Allocated—Number of nodes allocated for use by the endpoint.
- Nodes Used—Number of nodes currently being used by the endpoint.
- Nodes Status—Current status of the node associated with the endpoint.
- Storage Status—Current status of the storage associated with the service instance.
- Total Alarms—Total number of alarms logged for the service instance.
- Critical—Number of Critical alarms logged for the service instance.
- Major—Number of Major alarms logged for the service instance.
- Warning—Number of Warning alarms logged for the service instance.

To collapse the interface information, click the **Collapse** arrow.

Configuring VMP Nodes

Note: Before adding any nodes, verify that there is connectivity between the PAM and the nodes' management IP address.

All MCE, App Engine, and MPE nodes in a region that use the same Image Type, Image Version, and Personality must have identical route configurations.

1. To add, edit, or delete nodes, select **Infrastructure > Compute > Nodes** in the VMP Service Manager GUI.
2. Click the **+** sign to add a node.
3. Enter the node details and click **Save**.

The GUI automatically refreshes the Nodes table every 60 seconds.

The Nodes table displays the following information for each node:

- Name—Name of the node (required). The name is a string of up to 63 characters. Acceptable characters include uppercase and lowercase letters and hyphens (-). The name must begin with a letter, and it is not case-sensitive.
- Description—Description of the node. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
- Zone—Zone with which the node is associated.
- Image Type—Image associated with the node. Valid values are **MCE, App Engine, MPE** and **NG-MPE**.

- Image Version—Description of the version of the image associated with the node. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

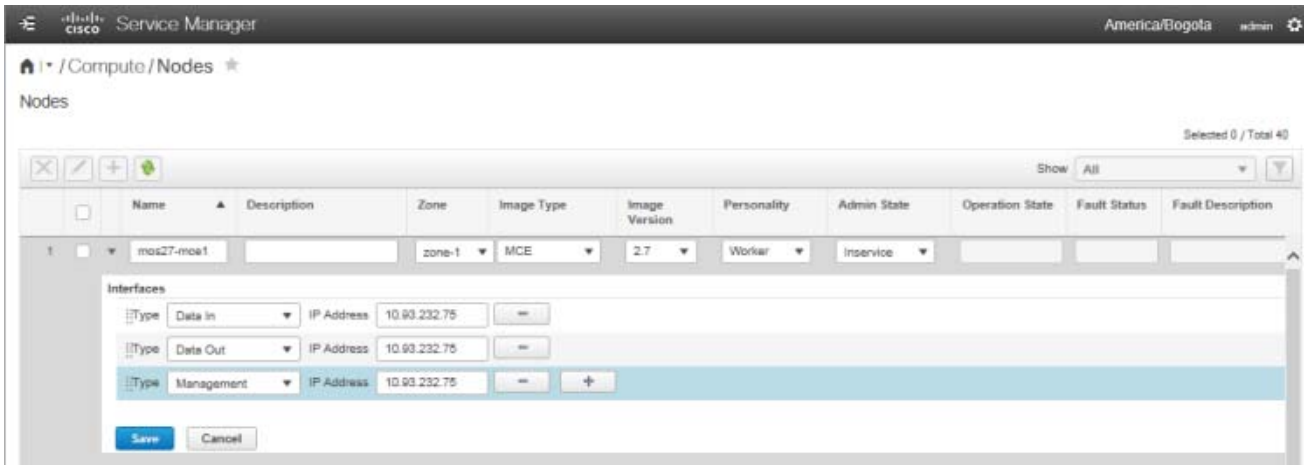
  Note: The image version for a node must match the version configured in the associated software image manifest. For more information, see Configuring Software Image Manifests, page 119.

- Personality—Personality of the image associated with the node.
  - For Image Tag **MCE**, the only valid value is **Worker**.
  - For Image Tag **MPE**, the only valid value is **Worker**.
  - For Image Tag **App Engine,** the only valid value is **Worker**.
- Admin State—Administrative status of the node. Valid values are **Inservice** and **Maintenance**.
- Operation State—Operational status of the node. You cannot edit this field. Valid values are **In-Use**, **Idle**, **Maintenance**, and **Pending**.
- Fault Status—Fault state of the node. You cannot edit this field. Valid states are:
  - **None**—No current fault.
  - **Warning**—Minor fault, node can still be used.
  - **Critical**—Major fault, node cannot be used.
- Fault Description—Description of the fault. You cannot edit this field.

When you first create a node, the Operation State, Fault Status, and Fault Description fields are empty. The GUI automatically populates these fields when you refresh the page by pressing **F5** or clicking the **Refresh** icon.

The following screen example is for the MCE. At least 6 App engine nodes,1 MCE and 1 MPE node must be added for a minimal deployment.

To display/configure the interfaces associated with a node, click its **Expand** arrow. For lab deployments with 1 network design, the Data In/Out/management Interfaces need to be designated and 1 IP address identified.



- The Interfaces table displays the following information for each interface:
  - Type—Type of interface.

  - For MCE-Worker, valid values are **Data In**, **Data Out**, and **Management**.

- For MPE-Worker, valid values are **Data In**, **Data Out**, and **Management**.

  – IP Address—IP address of the interface.

- To add, delete, or edit the interfaces for a node, select the node and click **Edit** at the top of the table.
  - Click the plus sign (**+**) to add an interface.
  - Click the minus sign (**-**) to delete an interface.
  - Enter or select new values for any interfaces that you want to edit.
- Click the **Collapse** arrow to collapse the interface information.

If you want to delete or modify a node in the GUI, and the node is **Inservice**, use the following procedure:

1. Select the node, click **Edit**, set the Admin State to **Maintenance**, and click **Save**.
2. Shut down the actual node, to prevent the VMP from connecting to it. (If the node is a VM, you can use vCenter to shut it down.)
3. When the VMP determines that it can no longer connect to the node (after approximately five minutes), the GUI sets the Operation State of the node to **Maintenance**.
4. Select **Infrastructure > Compute > Nodes** and verify that the Operation State of the node is set to **Maintenance**.
5. You can now delete or modify the node.
   - To delete the node, select it and click **Delete**. The node is removed from the Nodes table.
   - To modify the node, select it and click **Edit**. Make your changes to the node's configuration, then set the Admin State to **Inservice** and click **Save**.
6. Power on the node. When the VMP connects to the node (after approximately five minutes), the GUI sets the Operation State of the node to either **In-Use** or **Idle**, depending on whether the VMP is using the node at the time.

Application Instance Controller (AIC)

Follow the steps below to enable/disable AIC. The default status is disabled.

Note: In the VMP, the AIC is unbundled for the MCE and MPE components.

1. Navigate to the User Preference Page.
2. For the Node Allocation Policy, select IPVS Assignment.
3. Click **Save**. The "Node Allocation saved successfully" message appears.
4. AIC is now enabled. Navigate to the "Nodes" page to verify.

To disable the AIC, follow the steps above. In step number 2, select "Default Assignment". AIC is now disabled.

Configuring Storage

Cisco Cloud Object Storage (COS) can be installed as a service of VMP. COS is designed to integrate transparently with VMP, and can be managed through the VMP Service Manager GUI. COS provides distributed, resilient, high-performance storage and retrieval of binary large object (blob) data called objects. Object storage is distributed across a cluster of hardware systems, or nodes.

COS services are provided by software running on a set of nodes called a COS cluster that is connected by data and management networks. Each COS cluster has a single fully-qualified domain name (FQDN) that is used by client applications to access COS services. The cluster is resilient against hard drive failure within a node and node failure within the cluster. Nodes can be added to or removed from the cluster as needed to provide for changes in cluster capacity.

The primary interface for managing COS content is the OpenStack Swift API with enhancements that improve the quality of service when accessing large media objects. To administer the cluster, COS includes and HTTP-based cluster management API. COS includes an authentication and authorization service that implements the OpenStack Swauth API.

A COS cluster also has a number of configuration parameters that define cluster behavior. Some of these parameters include the Swift and Swauth API constraints, the IP address pools used to assign IP addresses to individual node network adapters, and the IP address of the PAM configuration document server.

Configuring COS Nodes

In COS version 3.8.1, the Configuration Wizard can be created through the user interface so that individual COS Node configuration of the following files is not required:

/arroyo/test/setupfile

/arroyo/test/SubnetTable

/arroyo/test/RemoteServers

/etc/cassandra/conf/cassandra.yaml

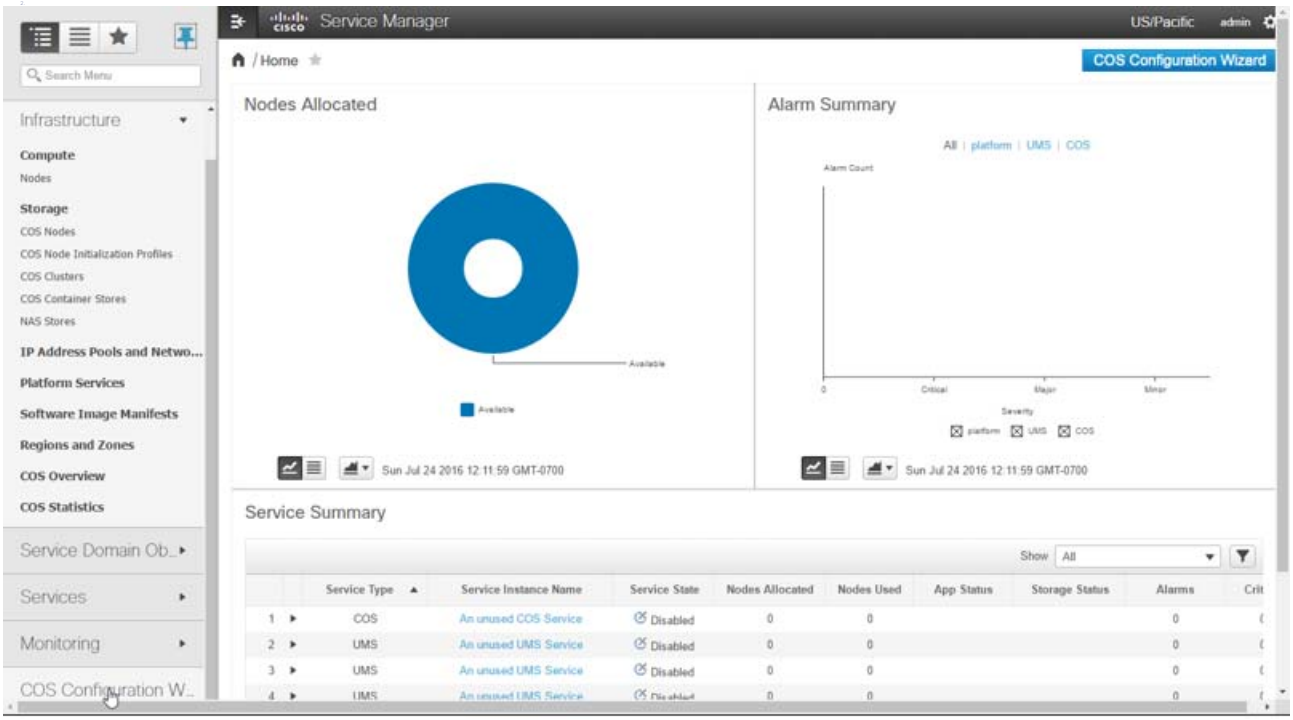
/etc/cosd.conf

/opt/cisco/cos/config/cos.cql

It also guides the user through the required UI configuration steps. The Configuration Wizard is available on the Home Screen and in the Navigation window. The wizard allows sequential creation of the COS configuration items required.

To configure COS nodes, follow the steps below.

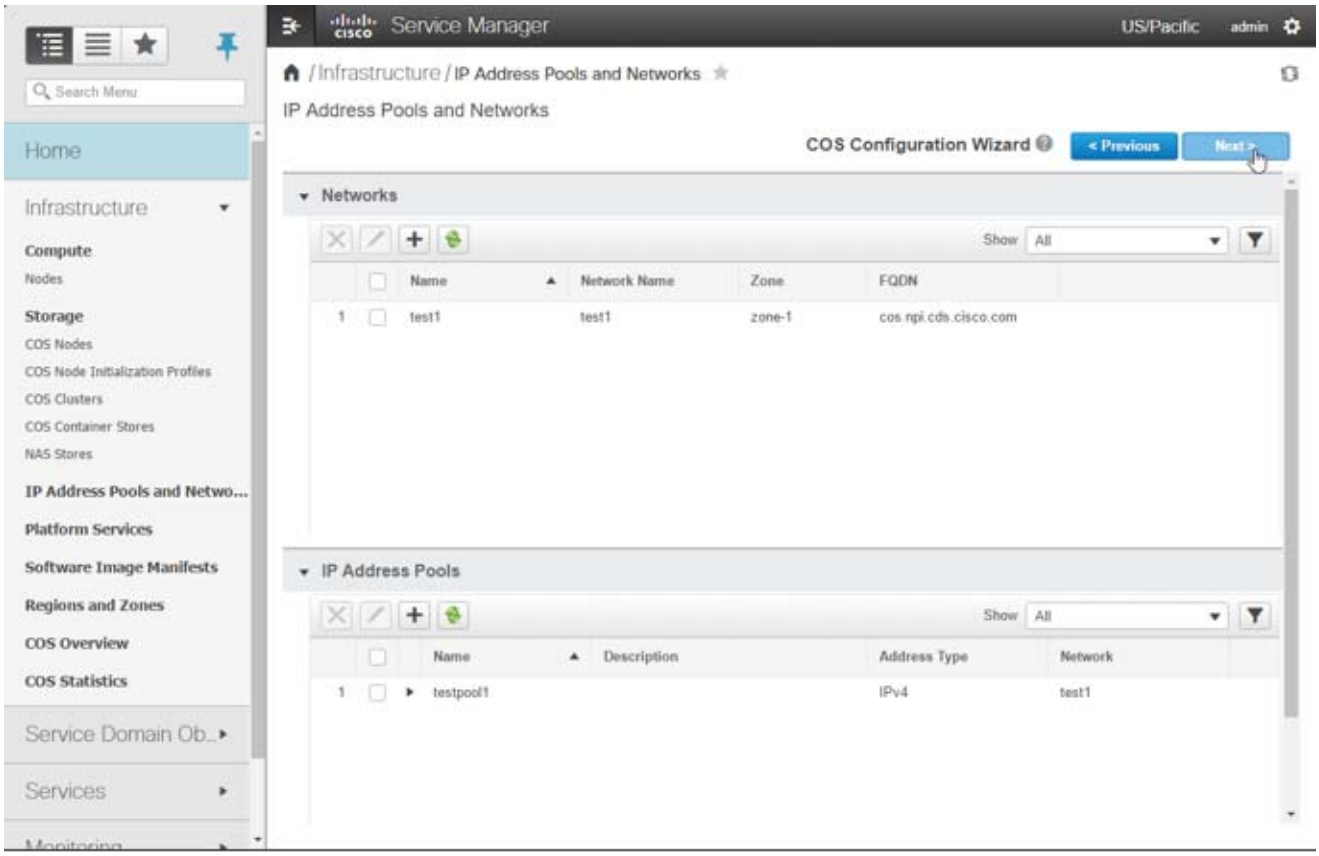
1. Select the COS Configuration tab on the home screen or in the navigation window.



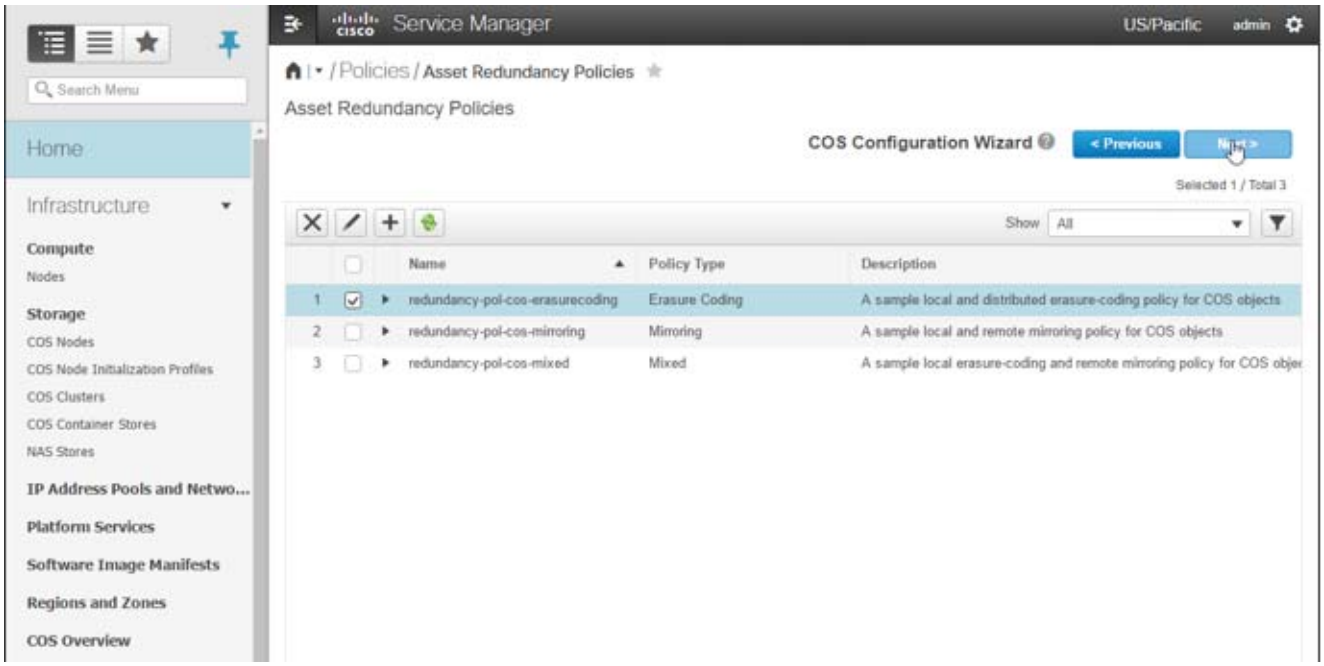
3. The wizard verifies the prerequisites are in place.

4. Click **Next.** The wizard will allow sequential creation of the COS configuration items required. (See items under Storage tab.)

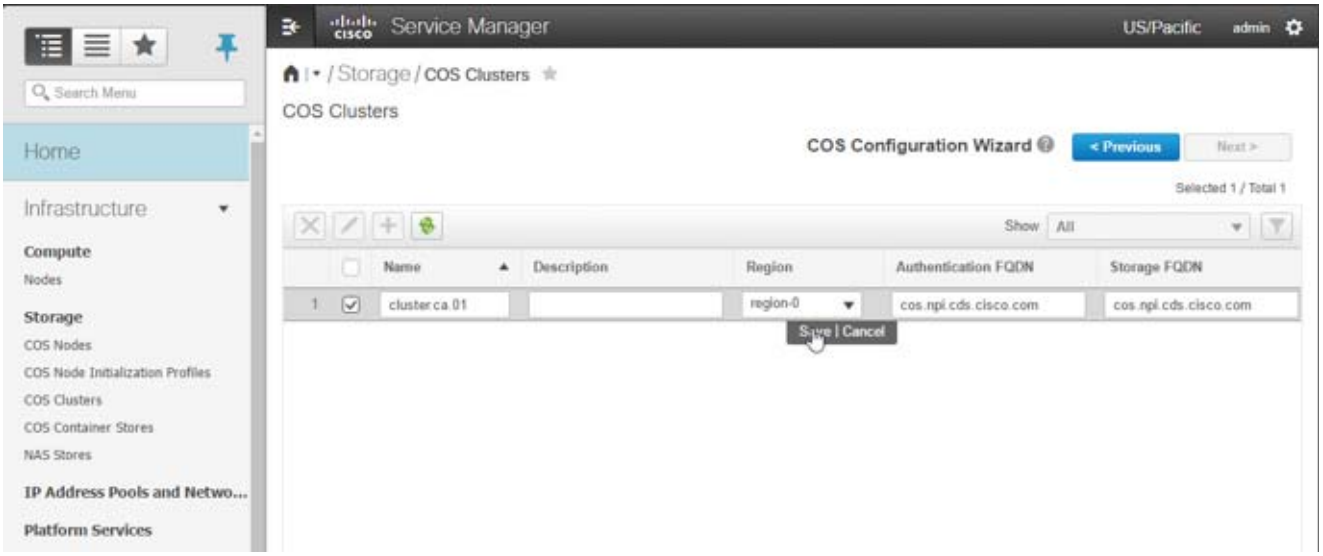
5. Add Networks and IP Address Pools, then click **Next**.



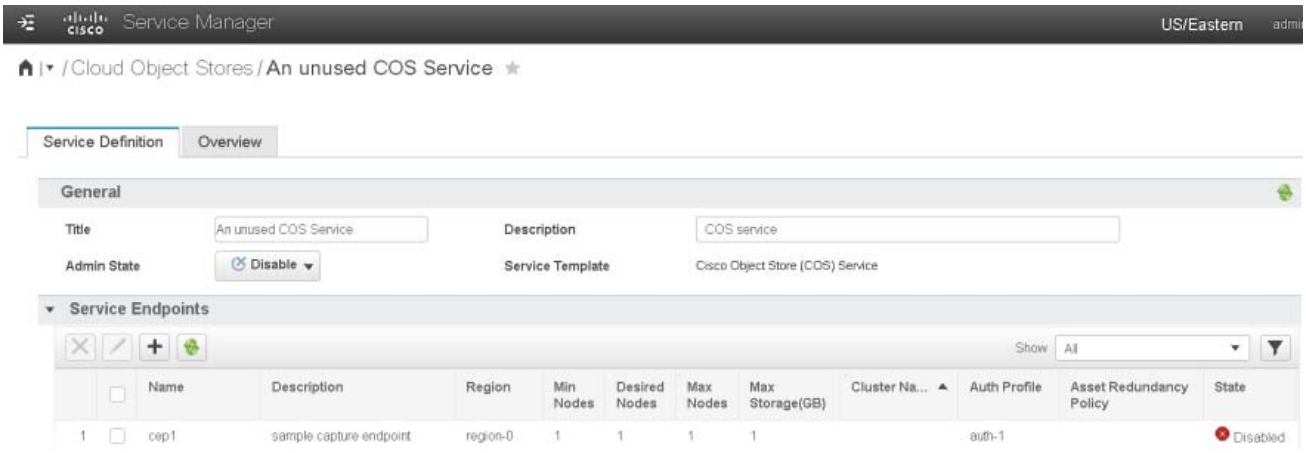
6. Select an Asset Redundancy Policy, then click **Next.**



7. Create a cluster, then click **Next.**

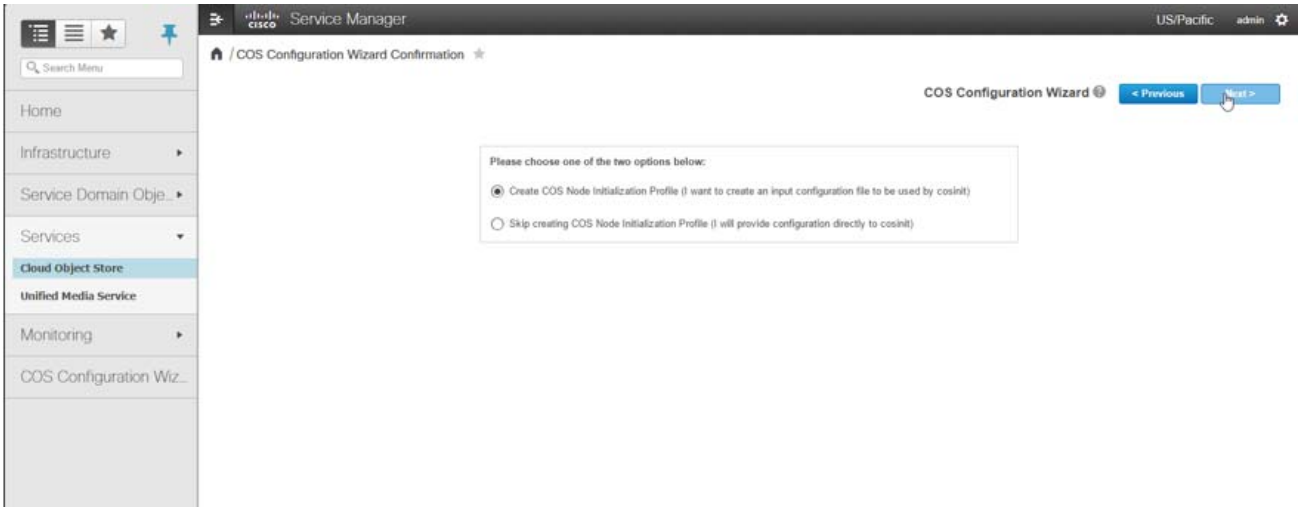


8. Specify Service Endpoint values, then click the **Admin State** drop-down and choose **Enable**. Save your settings then click **Next.**

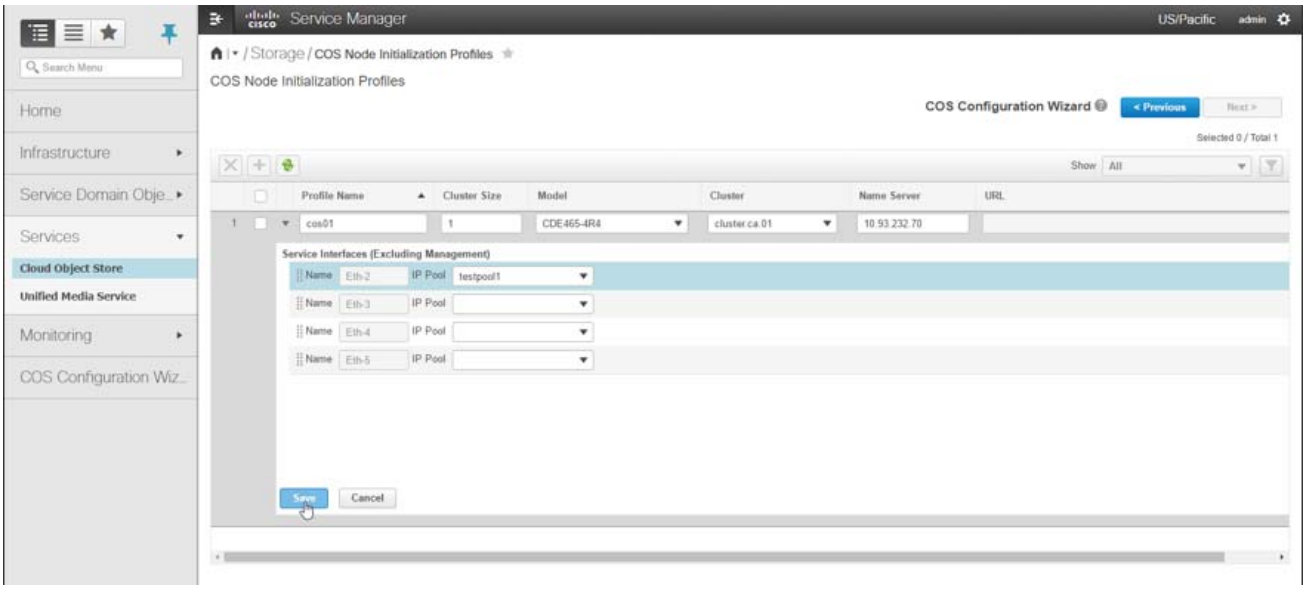


9. The Wizard Confirmation window appears.

10. Choose the option to create a cosinit script, otherwise this will need to be entered manually on the COS nodes during initialization.



11. Add an initialization profile and define the values, including model # and cluster. Interface designations will appear based on the Model selection. Define the IP pools to be used for each data interface (not management interface). Then click **Save.**



12. After clicking **Save,** a popup window will appear with the download URL for the cosinit script. The URL also appears in the Initialization Profiles window.

13. Copy the URL into a browser to download the cosinit script from the PAM.

14. Click **Next** to complete the COS configuration.

15. The final prompt confirms configuration of COS in the VMP GUI is complete. The cosinit script needs to be executed on the COS nodes and the nodes added to the appropriate clusters before COS services will be functional.

16. The COS Node Initialization Profile URL is used in the cosnit script instead of answering individual prompted questions or providing an answer file manually.

File System Gateway (FSG) Tenant

The Cisco Filesystem Gateway (FSGW) for Cisco Cloud Object Storage (COS) is an available option for COS 3.8.1 and later releases. While earlier COS releases allowed access only to object storage, the FSGW option gives COS the ability to access files using Network File System (NFS) or Common Internet File System (CIFS), the two main file systems used by network attached storage (NAS). NFS and CIFS are the client-server file systems used by the Linux and Windows operating systems, respectively. Adding FSGW enables COS to manage storage for existing Linux or Windows NAS media libraries directly, without the need to first convert these libraries to object data, thus improving COS utility and deployment speed.

Configuring Platform Services

To work with NTP servers, DNS servers, DNS forwarders, and the Platform Service Instance, select **Infrastructure > Platform Services** in the VMP Service Manager GUI. The Platform Services page is displayed.

NTP Servers

The NTP Servers table displays the following information for each NTP server:

- Name—Name of the NTP server (required). The name is a string of up to 30 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the NTP server. The description is a string of up to 100 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- Region—Region in which the NTP server resides.

The NTP servers are configured automatically when the PAM is deployed. You can edit the Description, Region, and Servers for an NTP server, but you cannot add or delete NTP servers from this page.

DNS Servers

The DNS Servers table displays the following information for each DNS server:

- Name—Name of the DNS server (required). The name is a string of up to 35 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the DNS server. The description is a string of up to 100 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- Region—Region in which the DNS server resides.
- IPv4 Address—IPv4 address of the DNS server.
- Domain— location of the DNS server.
- TSIG Algorithm—Name of the TSIG algorithm used by the DNS server.

The DNS servers are configured automatically when the PAM is deployed. You cannot add, delete, or edit DNS servers from this page.

DNS Forwarders

The DNS Forwarders table displays the following information for each DNS forwarder:

- Name—Name of the DNS forwarder (required). The name is a string of up to 35 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the DNS forwarder. The description is a string of up to 100 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- Region—Region in which the DNS forwarder resides.
- IPv4 Address—IPv4 address of the DNS forwarder.
- Domain—Domain name of the DNS forwarder.

The DNS forwarders are configured automatically when the PAM is deployed. You can edit the Description, Region, IPv4 Address, and Domain for a DNS forwarder, but you cannot add or delete DNS forwarders from this page.

Platform Service Instance

PAM Endpoints

The PAM Endpoints table displays the following information:

- Name—Name of the PAM endpoint
- Region—The region to which the service endpoint belongs.
- Description—Description of the service endpoint

PAM Nodes

The PAM Nodes table displays the following information:

Note: Only the Edit and Refresh options are available.

- Name—Name of the node (required). You cannot edit this field.
- Description—Description of the node. You cannot edit this field.
- Zone—Zone with which the node is associated. You cannot edit this field.
- Image Version—Image version number. You cannot edit this field.
- Personality—Personality of the image associated with the node. You cannot edit this field.
- Admin State—Administrative status of the node. Valid values are **Inservice** and **Maintenance**. This is the only field that can be edited.
- Operation State— Operational status of the node. You cannot edit this field.
- Fault Status—Fault state of the node. You cannot edit this field.
- Fault Description—Description of the fault. You cannot edit this field.

Logging Endpoints

The logging endpoints table displays the following information:

- Name—Name of the logging endpoint
- Region—The region to which the logging endpoint belongs.

- Description—Description of the logging endpoint

Configuring Software Image Manifests

The VMP software images are used to create the services. You can assign different software image manifests to different services.

Note: Before setting a service instance to **Enabled**, you must configure at least one image manifest and associate it with the service instance.

To add, edit, or delete VMP software image manifests, (images for the service instance), select **Infrastructure > Software Image Manifests** in the VMP Service Manager GUI.

The Software Image Manifests page displays the following information for each manifest:

- Name—Name of the image manifest (required). The name is a string of up to 35 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the manifest. The description is a string of up to 100 characters, and can include uppercase or lowercase letters, numbers, and any special characters.

To display the images in a manifest, click its **Expand** arrow.

- The Images table displays the following information for each image:
  - Application Type—Type of VMP software image. Valid values are **MCE**, **App Engine**, and **MPE**.
  - Version—Version of the image. Default values are **2.5** (for MCE) and **2.5** (for MPE and App Engine).

  The image version for a software image manifest must match the version configured in the associated node. For more information, see Configuring VMP Nodes, page 108.
- To add, delete, or edit the images for a manifest, select the manifest and click **Edit** at the top of the table.
  - Click **the + button** in the Images table to add an image.
  - Select an image and click **X** in the Images table to delete the image.
  - Select an image and click the **Edit** icon in the Images table to edit the image.
- Click the **Collapse** arrow to collapse the image information.

Displaying and Configuring Regions and Zones

A *zone* is a set of cloud platform components (compute, network, storage, and security) that are fate-shared, meaning that they either remain functional or fail together. The zone can be mapped to the underlying cloud platform provider, such as a data center in vCenter, an availability zone, or any other combination of fate-shared cloud resource topologies. Each zone is associated with one cloud controller.

A *region* is made up of one or more zones. It is an abstract representation of the underlying cloud platform. A region can be associated with a geographical region, one or more data centers, or a service area.

To display VMP regions and to add, edit, or delete zones associated with those regions, select **Infrastructure > Regions & Zones** in the VMP Service Manager GUI.

The Regions & Zones table displays the following information for each region:

- Region Name—Name of the region. You cannot edit this field.
- Description—Description of the region. You cannot edit this field.
- Controllers—Controllers associated with the region. You cannot edit this field.

  The controller information defines the location (vCenter server) in which the VMP VMs are to be deployed and administered, and the hosts to be used. After you define the controllers, the VMP discovers the hosts that are administered by the controllers.

To display the zones associated with a region, click its **Expand** arrow.

- Name—Name of the zone (required). The name is a string of up to 63 characters. Acceptable characters include uppercase and lowercase letters and hyphens (-). The name must begin with a letter, and it is not case-sensitive.
- Description—Description of the zone.
- Click the **Collapse** arrow to collapse the Zones table for a region.

Configuring Service Domain Objects

The Service Domain Objects section of the GUI lets you set up or configure media sources such as channels, profiles, and policies on the VMP system.

Media Sources

Configuring Channels

Channel configuration is valid only for Live service instances.

To add, edit, or delete channels, as well as the video streams associated with those channels, select **Service Domain Objects > Media Sources > Channels** in the VMP Service Manager GUI.

The Channels table displays the following information for each configured channel:

- Name—Name of the channel (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Channel ID—ID of the channel (required). The ID is a string of up to 20 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The ID must not begin with a period (.), and it is not case-sensitive.
- Stream Type—Type of stream associated with the channel.

- Description—Description of the channel. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

To display the streams associated with a channel, click its **Expand** arrow.

The Streams table displays the following information for each stream:

- Stream Profile Name—Name of the stream profile associated with the channel.
- Source URL 1 through 4—Multicast and unicast URLs associated with the stream.
- Source URL 2 through 4— Multicast and unicast URLs associated with the stream.

To add a stream to the Streams table:

1. Click **the + button**.
2. Select a video profile from the drop-down box.

- Valid profiles are **SD_2M** and **HD_4M**.
- The encoding type must be **H.264/AAC** (the default).
- The default bitrates are **2000000 bps** for SD_2M and **4000000 bps** for HD_4M. To change the bitrate for a stream profile, in the Stream Profiles popup, select the profile and click **Edit**. (You cannot change the encoding type for a stream profile.)
- To add a profile, click **the + button**. You can add any number of unique profiles to a given channel.

3. Associate one or more multicast or unicast groups with the stream by entering a Source URL (required) and Source IP Address (optional) for each multicast or unicast group.

The following formats are valid Source URLs:

http://*url*
udp://*url*

where *url* is a string of 50 characters, and can include uppercase or lowercase letters, numbers, and any special characters except commas (,) and semicolons (;).

If you enter a Source IP Address, the GUI performs IPv4 validation on it.

For a unicast group, use the following format for the Source URL:

udp://0.0.0.0:*source_port*

Example:

```
udp://0.0.0.0:12000
```

The MCE recognizes IP address **0.0.0.0** as itself and reads the data from all of its interfaces on the *source_port*.

4. To save the new stream, click **Save**.
5. To cancel at any time, click **Cancel**.

Click the **Collapse** arrow to collapse the stream information.

Configuring NAS Media Sources

The VMP uses the NAS media source to read VOD source files for VOD ingest.

NAS media source configuration is valid only for VOD service instances.

To add, edit, or delete NAS media sources, select **Service Domain Objects > Media Sources > NAS Media Sources** in the VMP Service Manager GUI.

The NAS Media Sources table displays the following information for each NAS media source:

- Name—Name of the NAS media source, or content library (required). The name is a string of 30 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the NAS media source. The description is a string of 30 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- Share Path—Share path used by the NAS media source on the network (required).
- NFS Version—Version of the Network File System (NFS) used by the NAS media source. Valid versions are **3.0** and **4.0**.

To display the range of servers available to the NAS media source, click its **Expand** arrow.

- Make sure you specify start and end IP address ranges for the servers.
- The first three bytes of the Start IP Address must match those of the End IP Address. For example, 1.1.1.1 to 1.1.1.2 is valid start and end IP address range, but not 1.1.1.1 to 1.1.2.2.
- For a single server, the Start IP Address and the End IP Address are the same.

Click the **Collapse** arrow to collapse the range of servers.

Configuring Dynamic Sources

Use the following procedure to set up a capture only cDVR capture workflow.

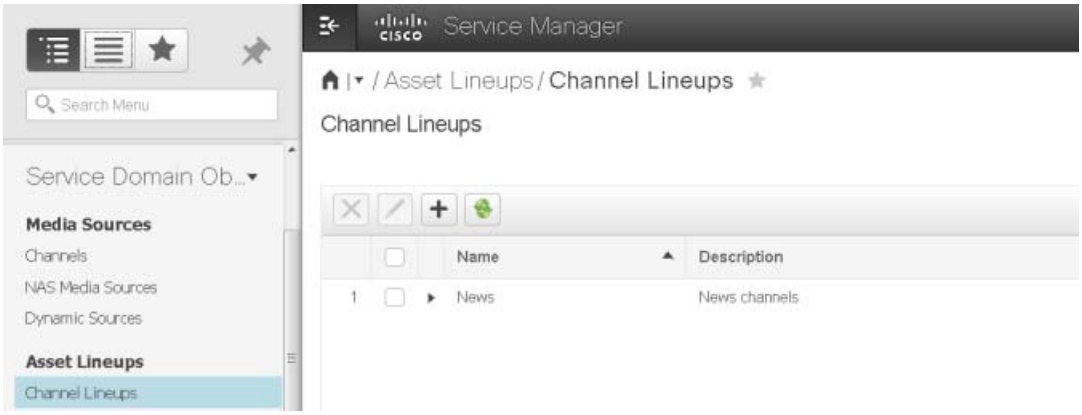
1. Select **Service Domain Objects>Media Sources>Dynamic Sources** to display the Dynamic Sources page.
2. Add a new Dynamic media source by clicking the **+** button, or edit an existing media source by selecting it and clicking the **Edit** icon.

Asset Lineups

Configuring Channel Lineups

Channel lineup configuration is valid only for Live service instances.

To add, edit, or delete channel lineups, select **Service Domain Objects > Asset Lineups > Channel Lineups** in the VMP Service Manager GUI.

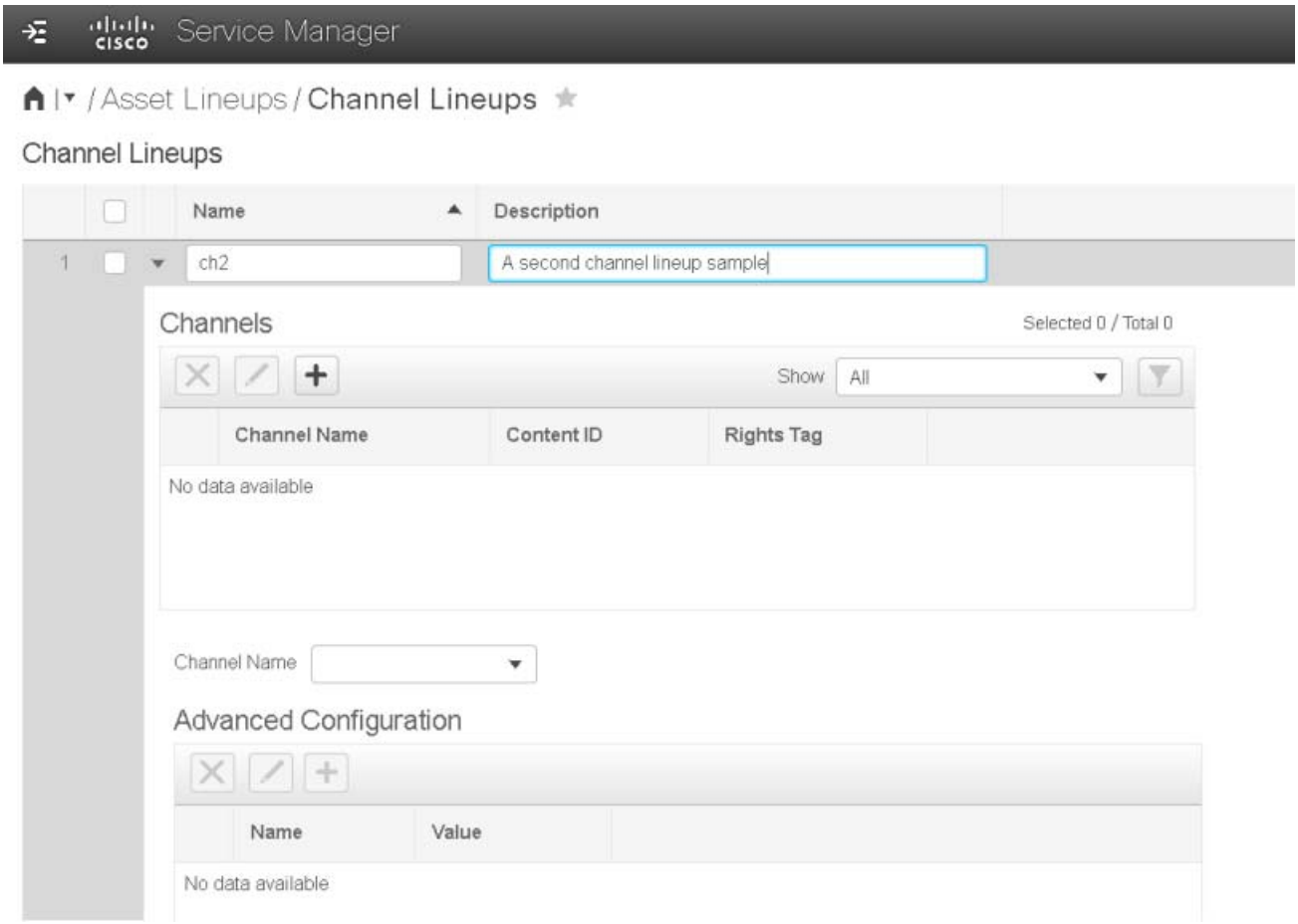


The Channel Lineups table displays the following information for each channel lineup:

- Name—Name of the channel lineup (required). The name is a string of up to 30 characters. Acceptable characters include uppercase and lowercase letters and numbers. No special characters are allowed. The name is not case-sensitive.
- Description—Description of the channel lineup. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

To add a channel lineup to the Channel Lineups table, click **the + button**. To edit a channel lineup, select it and click the **Edit icon**.

To display the channels associated with a channel lineup, click its **Expand** arrow.



- The Channels table displays the following information for each channel associated with the channel lineup:
  - Channel Name—Name of the channel. You cannot edit this field.
  - Content ID—Content ID of the channel. The ID is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, and underscores (_). The user ID must not begin with a period (.), and it is not case-sensitive.
  - Rights Tag—Tag used to drive the asset redundancy policy tag match. The tag is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
  - Advanced Configuration—If there are any configuration details associated with a channel, they are displayed in the Advanced Configuration table when the channel is selected. The table displays the Name, validated by regular expression (regex), and the Value for the channel. A channel can have more than one set of acquisition details.

  To enable content ID mapping (mandatory), add one or more sets of configuration details to the Advanced Configuration table for a channel. To do so, select the channel, click **the + button** and enter the name and value for the channel.
- To collapse the channel information, click the **Collapse** arrow.

To add channels to a new channel lineup, click the double arrows in the Channels table, then click **the + button**. The Add Channel popup displays the following information:

- Available Channels—Channels that are available to be added to the channel lineup. For more information about channels, see Configuring Channels, page 120.

- Selected Channels—Channels that are currently in the channel lineup.

  For each channel, the Selected Channels displays the Channel Name, Content ID, and Rights Tag. To edit these fields, select the channel and click **Edit**.

Add one or more of the available channels to the channel lineup by selecting the channels in the Available Channels list and using the right-arrow to move them into the Selected Channels list. You can associate a channel with more than one channel lineup.

To remove one or more channels from the new channel lineup, select the channels in the Selected Channels list and use the left-arrow to move them back into the Available Channels list.

When you are satisfied with the name, description, and selected channels for the new channel lineup, click **Save**.

To cancel at any time, click **Cancel**.

Changing Channel Lineups Dynamically

New channels can be added and existing channels deleted in a channel lineup associated to an inservice Mediaflow.

The newly added channel will show up in the GUI on the Mediaflow Show Assets page under the mediaflows containing this channel lineup. Asset transit states are: INIT->PENDING->CAPUTRING/FAILED

The newly deleted channel will disapear in the GUI on the Mediaflow Show Assets page also. Asset transit states are: DELETING->gone

Caveat: when doing add channel and delete channel in one step, don't reuse the deleted channel CONTENT ID in the newly added channels. We detect channels by content Id.

If you are sharing the channel lineup in more than 1 live mediaflow, the change in the channel lineup will reflect in all the mediaflows.

The Same AIC instance can be shared across workflows.

Changing Content Protection Dynamically

You can add/delete/replace the "Content Protection" in one of the Publish Templates associated to an inservice Mediaflow.

Live Mediaflow only.

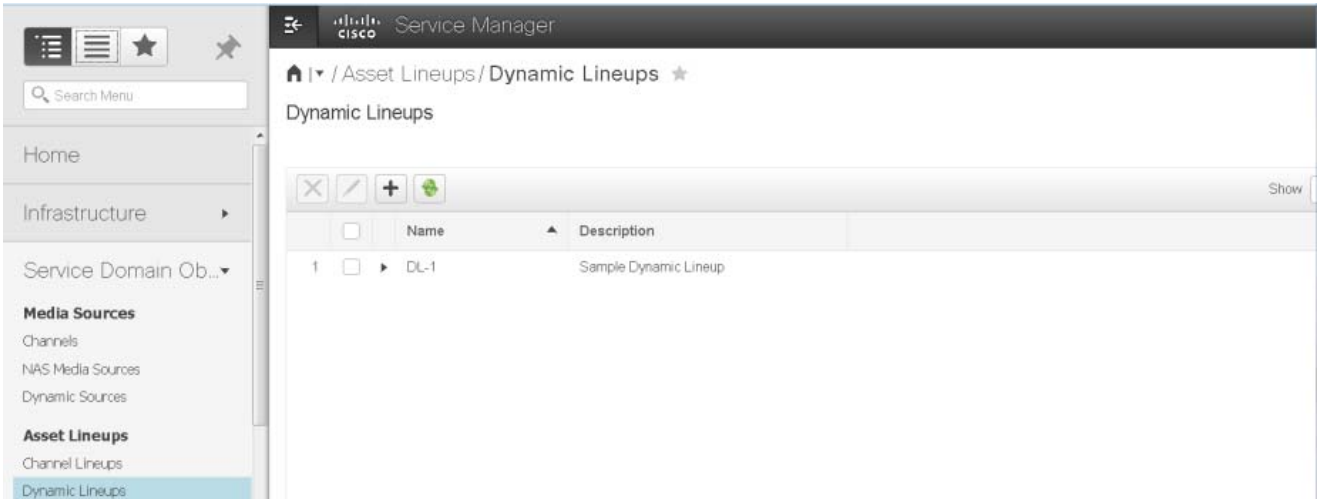
If you are sharing a publish template between multiple medialflows, the change will reflect on all mediaflows that share this publish template.

To add content protection in a publish template, make sure all mediaflows that share the publish template have cisco-sce AIC.

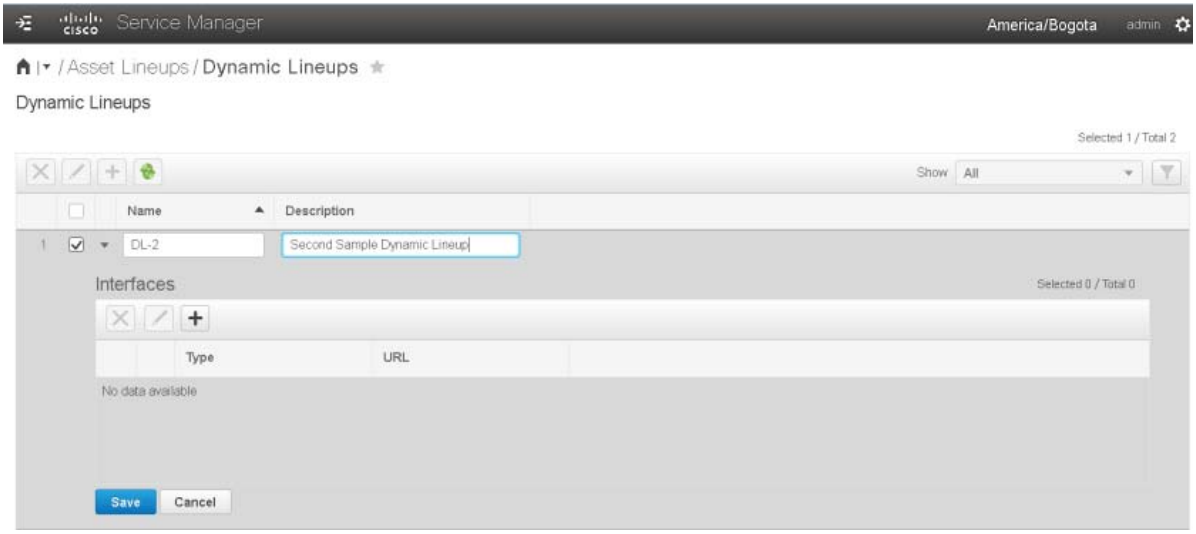
Configuring Dynamic Lineups

Dynamic lineups are the input source for cDVR workflows. Use the following procedure to set up a Dynamic line up.

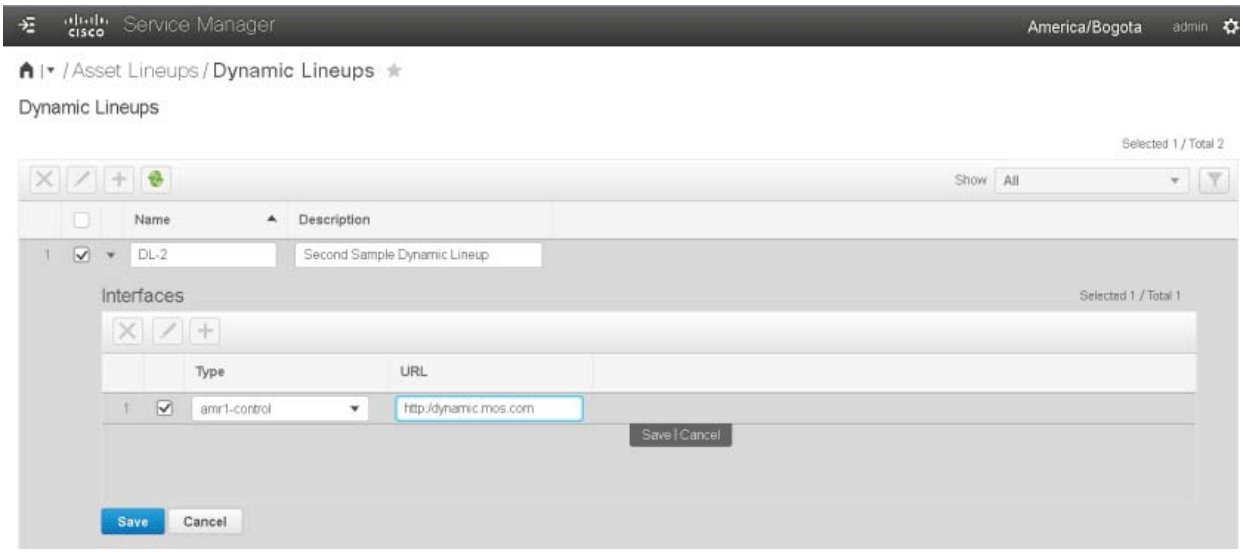
1. To add, delete, or edit Dynamic lineups, select **Service Domain Objects > Asset Lineups > Dynamic Lineups** to display the Dynamics Lineups page.



2. Add a new dynamic lineup by clicking the **+** button, or edit an existing dynamic lineup by selecting it and clicking the **Edit** icon.



3. Add interfaces to a dynamic lineup by clicking the **+** button, or edit an existing interface by selecting and clicking the **Edit** icon. One can configure the recorder manager control interface URL (a.k.a amr1-control interface).

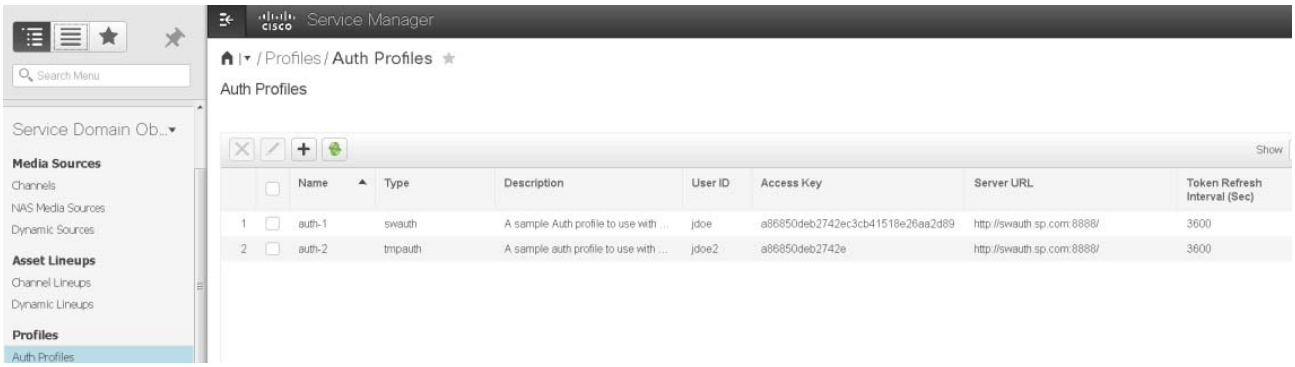


Profiles

Configuring Auth Profiles

Auth Profiles are authorization profiles that point to an auth provider. Use the following procedure to set up Auth profiles.

1. To add, delete, or edit Auth profiles, select **Service Domain Objects > Profiles > Auth Profiles** to display the Auth Profiles page.



2. Click the **+** button to add Auth profiles as needed.

Configuring ESAM Profiles

The Event Signaling and Management (ESAM) profiles define how the VMP is to handle ESAM multi-screen ad insertion.

To add, delete, or edit ESAM profiles, select **Service Domain Objects > Profiles > ESAM Profiles** in the VMP Service Manager GUI.

The ESAM Profiles table displays the following information for each configured key profile:

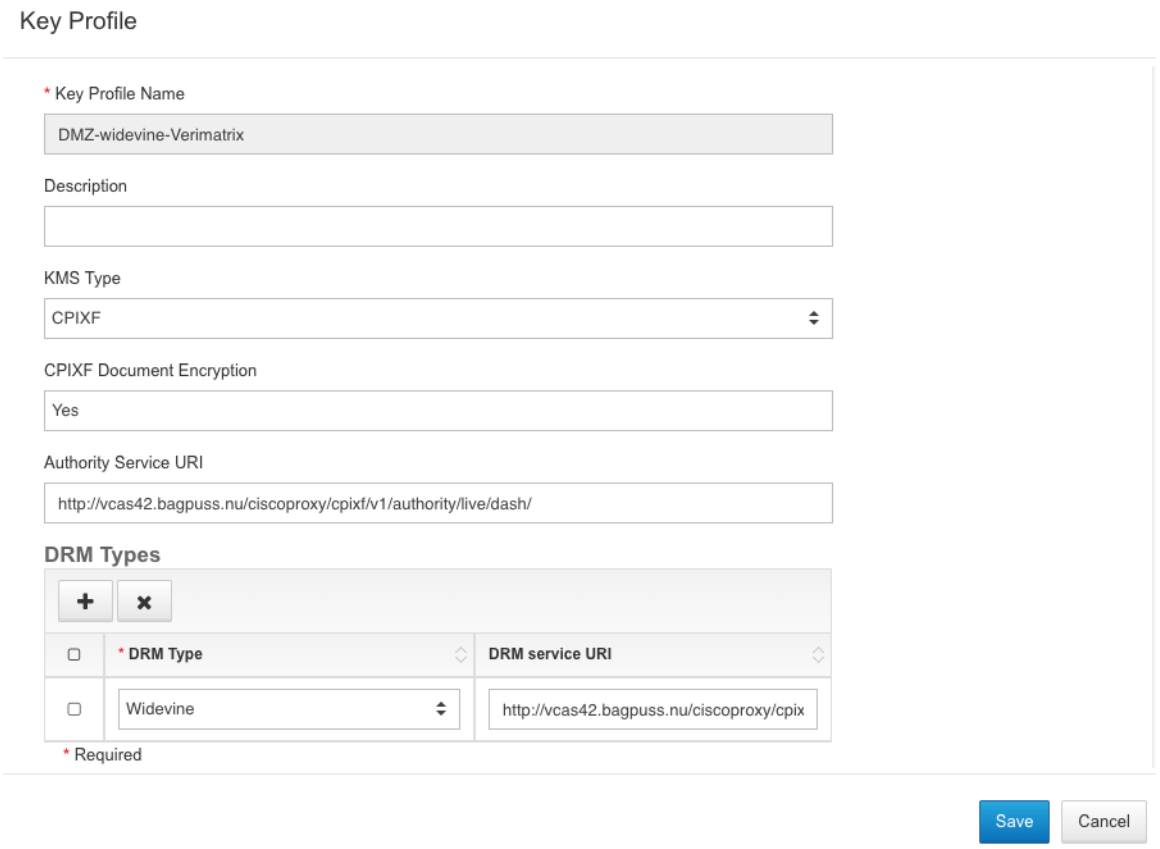
- Name—Name of the ESAM profile (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, and underscores (_). The user ID must not begin with a period (.), and it is not case-sensitive.
- POIS URL—Placement Opportunity Information System (POIS) URL of the ESAM server.(Required field)
- Description—Description of the ESAM profile. The description is a string of up to 235 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- Version—Version of the ESAM profile. Select a version from the drop-down box. Valid versions are **OC-SP-ESAM-API-I01** and **OC-SP-ESAM-API-I03**.

Configuring Key Profiles

Key profiles define how VMP performs encryption. The workflow for playing encrypted content is as follows:

1. The client sends a request for encrypted content to MPE.
2. MPE retrieves the requested TS file from MCE, and then sends a key request to KMSProxy.
3. On behalf of MPE, KMSProxy requests the key from the EZDRM server.
4. MPE receives the key from KMSProxy, uses it to encrypt the content, and then delivers the content to the client.
5. The client asks for a key from the License Server, and when received, uses the key to decrypt the content.

To add, delete, or edit key profiles, select **Service Domain Objects > Profiles > Key Profile** in the Service Manager GUI.



This dialog displays the following information for each configured key profile:

- Key Profile Name—The name (required) is a string of up to 200 characters. Acceptable characters include uppercase and lowercase letters, numbers, and underscores (_). The user ID must not begin with a period (.), and it is not case-sensitive.
- Description—Description of the key profile (optional). The description is a string of up to 235 characters, and can include uppercase or lowercase letters, numbers, and any special characters.
- KMS Type—KMS type used by the key profile. Supported KMS types are:
  - CPIFX; supports Content Protection Information Exchange Format (CPIXF)

  - Adobe License Server; supports DRM type Adobe-Access
  - Advanced Encryption Standard (AES)
  - Irdeto; supports DRM types HLS-AES-128 and PR-AES-128
  - Key Store; supports DRM type HLS-AES-128
  - Verimatrix; supports DRM types HLS-AES-128 and PR-AES-128
  - Insys; supports DRM types PR-AES-128
  - VGC; supports DRM types HLS-AES-128 and PR-AES-128
  - Nagra; supports DRM types HLS-AES-128
  - Fairplay; supports DRM type Fairplay_AES-128

- CPIFX Document Encryption—Indicates (Yes or No) whether the key profile supports CPIFX. If Yes, the Authority Service URI and DRM Types fields open for configuration of CPIXF as described in Configuring CPIXF Content Protection, page 131.
- DRM Types—DRM type used by the key profile. Valid DRM types are:
  - Adobe-Access, valid for KMS type Adobe License Server.
  - HLS-AES-128, valid for KMS types, Irdeto, Key Store, Verimatrix, and VGC
  - PR-AES-128, valid for KMS types Irdeto, Verimatrix, Insys, and VCG
  - CENC-DASH, valid for KMS types EZDRM and BUYDRM
  - VGC-HLS, valid for VGC
  - WV-AES-CTR, valid for Insys

  Note: Other DRM types may be listed, but are not supported in VMP 2.11.3.

To add a key profile to the Key Profiles table, click the **+** button and enter or select values for the profile.

Make sure you also enter values for the following fields:

- Transport Certificate—(Optional) Name of the certificate file used to secure communication between clients and the Adobe license server.

  Valid for the **Adobe License Server** KMS type.
- License Certificate—(Optional) Name of the certificate file used to assign content licenses to clients.

  Valid for the **Adobe License Server** KMS type.
- License Server URL—(Optional) URL of the Adobe license server.

  Valid for the **Adobe License Server** KMS type.
- Policy—(Optional) name of the policy used to package content.

  Valid for the **Adobe License Server** KMS type.
- Packager Certificate—(Optional) Name of the certificate file used to encrypt content.

  Valid for the **Adobe License Server** KMS type.
- Packager Passcode—(Optional) Passcode used with the packager certificate.

Valid for the **Adobe License Server** KMS type.

- DRM Key Provider—Name of the key provider that distributes active keys to clients.

  Valid for the **Adobe License Server** KMS type.

- Key Service URI—Key service URI used to acquire the key profile (optional).

  Valid for the **Verimatrix**, **Key Store**, **Irdeto** and EZDRM KMS types.

- Client Certificate—(Optional) Client authentication certificate used to acquire the key profile. Enter the full path to the client certificate .crt file on the PAM. Do not enter the actual client certificate name.

  Valid for the **Verimatrix**, **Key Store**, and **Irdeto** KMS types.

- CA Certificate—(Optional) CA authentication certificate used to acquire the key profile. Enter the full path to the CA certificate .crt file on the PAM. Do not enter the actual CA certificate name.

  Valid for the **Verimatrix**, **Key Store**, and **Irdeto** KMS types.

- Client Key—(Optional) Client authentication key used to acquire the key profile. Enter the full path to the client key .key file on the PAM. Do not enter the actual client key name.

  Valid for the **Verimatrix**, **Key Store**, and **Irdeto** KMS types.

- Username—Username used to acquire the key profile (optional).

  Valid for the **Irdeto** and EZDRM KMS type.

- Passphrase—Passphrase used to acquire the key profile (optional).

  Valid for the **Irdeto** and EZDRM KMS type.

- Server Key—Server key used to acquire the key profile (optional)

  Valid for the BuyDRM KMS type

- User Key—User key used to acquire the key profile (optional)

  Valid for the BuyDRM KMS type.

- Account—Account ID used to acquire the key profile (optional).

  Valid for the **Irdeto** KMS type.

When finished, click **Save** to add the new profile to the Key Profiles table.

The Client Certificate, CA Certificate, and Client Key fields are optional. If you leave these fields blank, the SSL authorization check by the PAM's DRM system is bypassed when setting up an HTTPS connection to a KMS server.

Configuring CPIXF Content Protection

Content Protection Information Exchange Format (CPIXF) is a standard defined by the DASH Industry Forum that provides a generic interface for key exchange between packagers and key servers. VMP Release 2.11 and later support the CPIFX standard.

When CPIXF is configured, VMP communicates with the CPIXF key server identified in the key profile GUI to get the keys and stream metadata. The keys received from the server are used to encrypt video, and metadata is used to generate video manifest files. Clients use the metadata to fetch the licenses from the license server and use it to decrypt the video.

If the Authority Service and DRM Service URIs are different, the system makes two requests to the two URIs: one to the Authority Service URI to get essential metadata, and a second to the DRM Service URI to get the stream metadata. If the two URIs are the same, the system makes only one request, expecting to receive both the essential metadata and the stream metadata in the response.

To configure a key profile for CPIXF:

1. Choose **CPIXF** as the KMS type for the key profile. Additional fields open to accept related entries.
2. Choose one of the following DRM types compatible with CPIXF: FairPlay, Verimatrix, PlayReady, or WideVine.
3. In the Authority Service URI field that opens after choosing CPIXF, enter the authority service URI.
4. In the DRM Types table, enter the DRM type and associated DRM service URI.

Observe the following guidelines when performing these steps:

- Although the GUI allows entry of multiple DRM Type fields, VMP currently supports only one DRM type per key profile.
- Enter the URIs in the full format recommended by the DASH Industry Forum:
  - Sample Authority URI: http://vcas42.bagpuss.nu/ciscoproxy/cpixf/v1/authority/live/dash/
  - Sample DrmService URI: http://vcas42.bagpuss.nu/ciscoproxy/cpixf/v1/drmservice/live/dash/

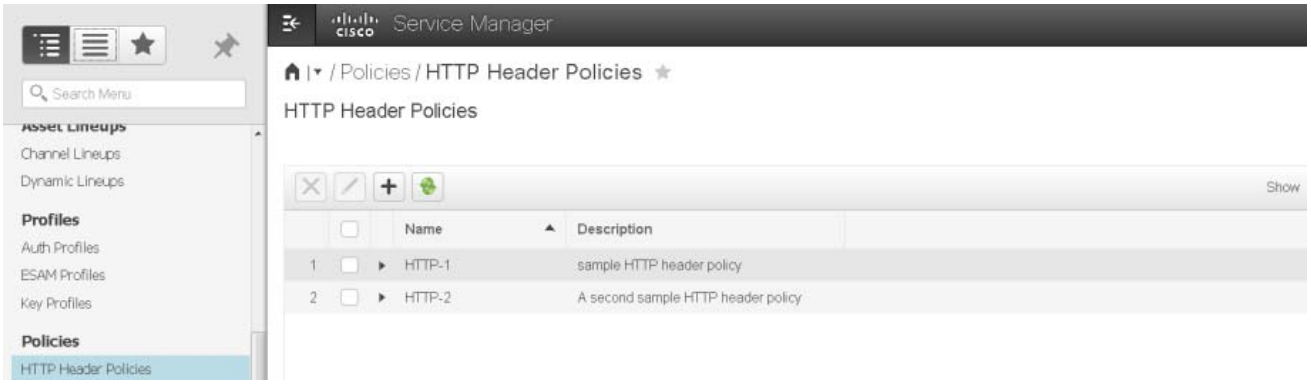
  The system appends the corresponding content ID to the URI before making the request for metadata.
- Key profiles configured for CPIXF must be associated only with publish templates of compatible content type.
- FairPlay and Verimatrix are currently supported only for HLS, PlayReady, and WideVine for DASH. Other DRM types listed are not currently supported in VMP Release 2.11.3.
- ABRE library API support is added for the FairPlay DRM type to handle the unaligned AAC headers in audio streams.
- Key rotation is not currently supported.

Policies

Configuring HTTP Header Policies

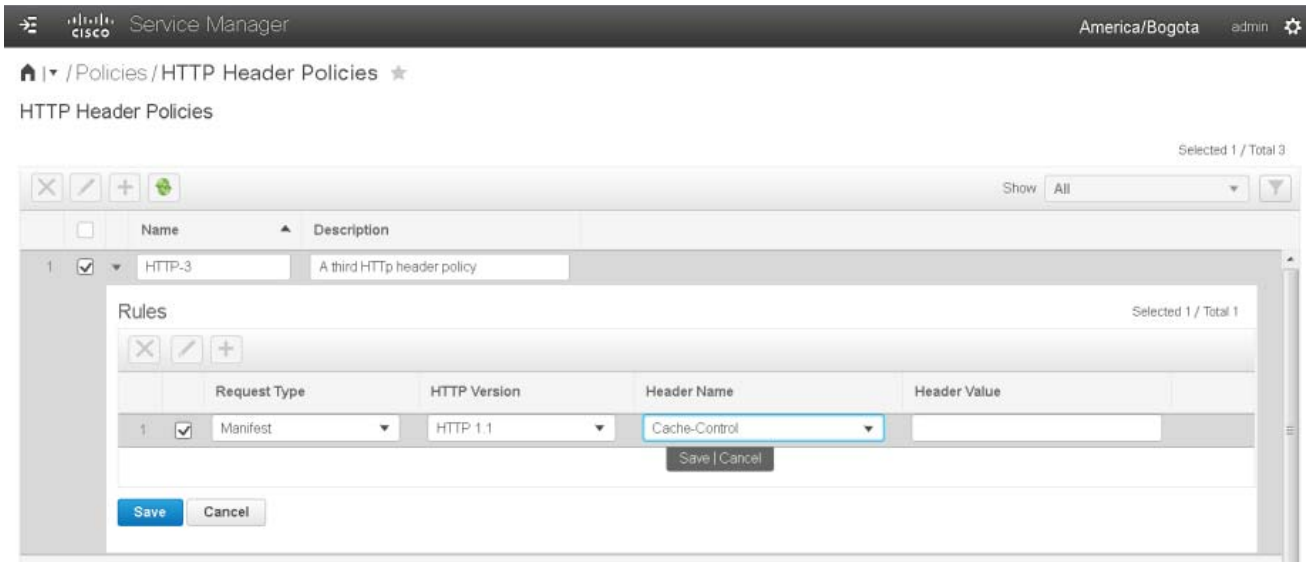
The HTTP header policies control the HTTP headers for publishing content.

To add, edit, or delete HTTP header policies, select **Service Domain Objects > Policies > HTTP Header Policies** in the VMP Service Manager GUI.



The HTTP Header Policies table displays the following information for each HTTP header policy:

- Name—Name of the HTTP header policy (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters and numbers. No special characters are allowed. The name is not case-sensitive.
- Description—Description of the HTTP header policy. The description is a string of 70 characters or more, and can include uppercase or lowercase letters, numbers, and any special characters. To display the rules associated with an HTTP header policy, click its **Expand** arrow.



- The Rules table displays the following columns for each rule:
  - Request Type—Indicates whether the rule is for a **Manifest** or **Chunk**.

    For a Live service, set Request Type to **Manifest**.
  - HTTP Version—Version of HTTP request. Valid value is **HTTP 1.1**.
  - Header Name—HTTP header name. Predefined headers are provided, but can be edited or modified.
  - Header Value—HTTP header value.

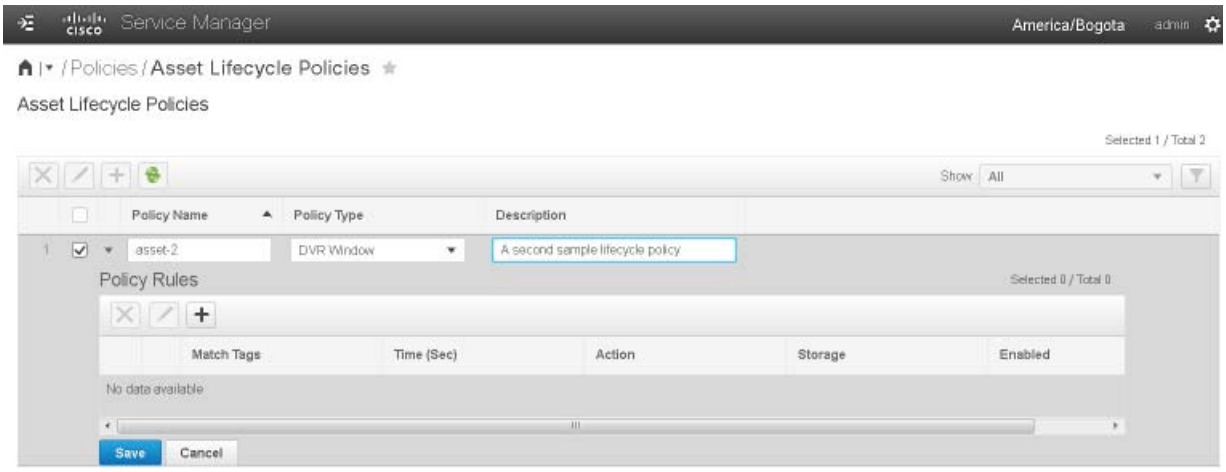
    For a Live service, if Request Type is set to **Manifest** and HTTP Version is set to **HTTP 1.1**, then Header Name must be set to **Cache-Control** and Header Value must be set to **max-age=0**.
- Each HTTP header policy must contain at least one rule.
- Click the **Collapse** arrow to collapse the rule information.

Configuring Asset Lifecycle Policies

The VMP uses asset lifecycle policies to specify the Time-Shift TV (TSTV) window for Live capture.

Asset lifecycle policy configuration is valid only for Live service instances.

To add, edit, or delete asset lifecycle policies, select **Service Domain Objects > Policies > Asset Lifecycle Policies** in the VMP Service Manager GUI.



The Asset Lifecycle Policies table displays the following information for each asset lifecycle policy:

- Policy Name—Name of the asset lifecycle policy (required). The name is a string of 63 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Policy Type—Type of asset lifecycle policy. Valid value is **DVR Window**.
- Description—Description of the asset lifecycle policy. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

To display the rules associated with an asset lifecycle policy, click its **Expand** arrow.

- The Policy Rules table displays the following columns for each rule:
  - Match Tags—Indicates whether the rule applies to the whole asset (**Asset**) or to a segment (**Segment**). **Segment** is required for a Live service.
  - Time—Time, in seconds, after which the specified action is to be taken.
  - Action—Action to apply to the asset or segment. Valid values are **Move** and **Purge.**
  - Storage—NAS store associated with the rule. For more information, see Configuring Storage, page 110.

  If the Action field is set to **Move**, the **Storage** field identifies the target storage.

  If the Action field is set to **Purge**, the **Storage** field is disabled.

  - Enabled—Indicates whether the rule is enabled. Valid values are **True** (enabled) and **False** (disabled).
- Click the **Collapse** arrow to collapse the rule information.

Configuring Asset Redundancy Policies

The VMP uses asset redundancy policies to specify the number of redundant copies of an asset to make. For example, if Number of Copies is set to **3**, the VMP creates copies of the asset on three separate MCE-Workers.

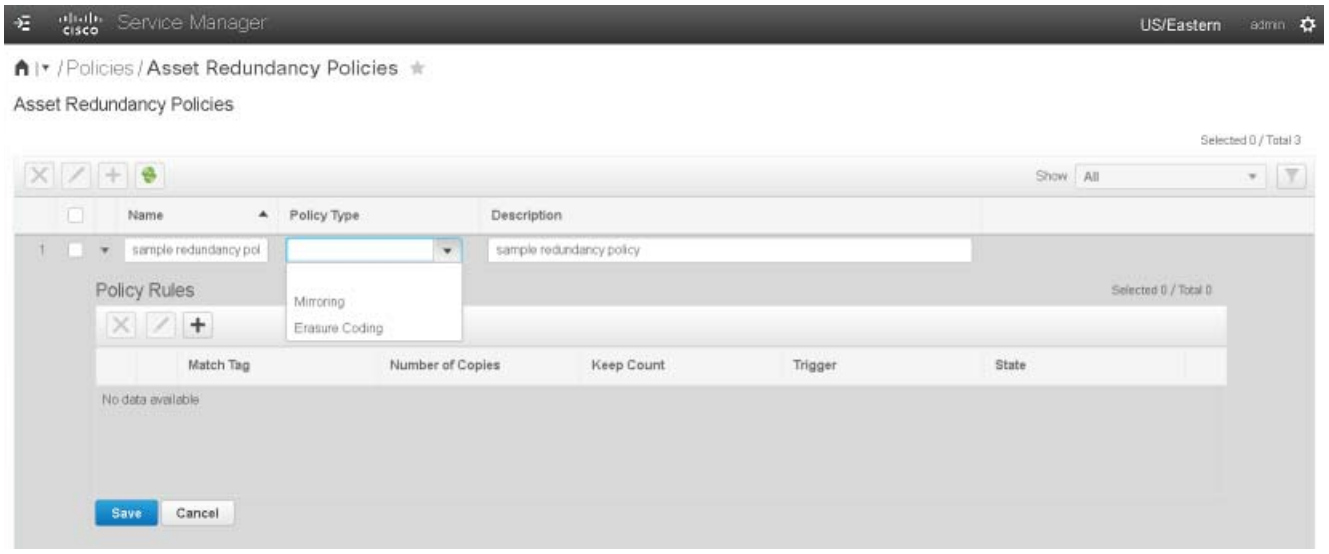
Asset redundancy policy configuration is valid only for Live and cDVR workflows.

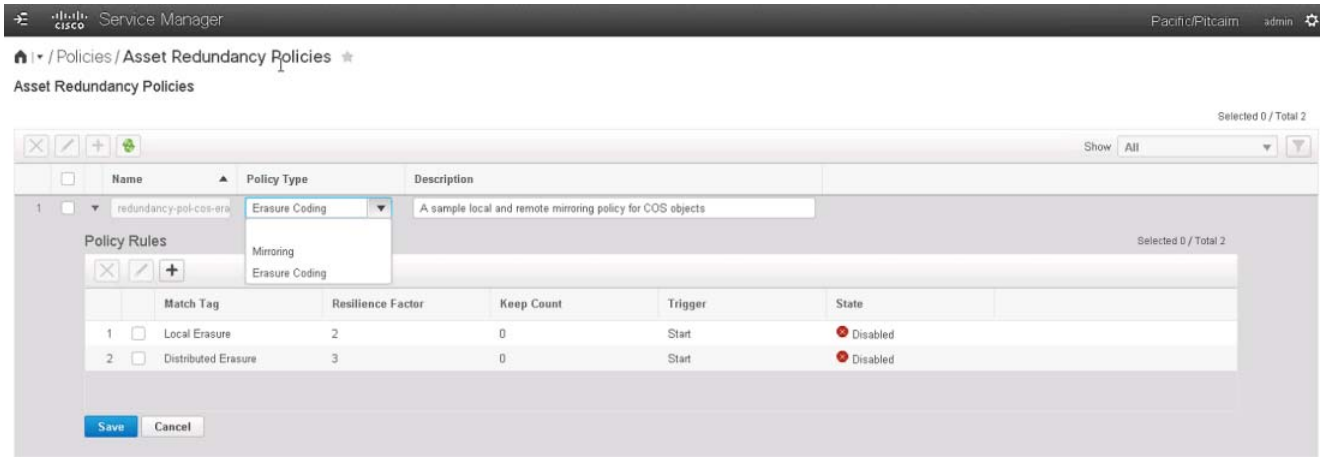
To add, edit, or delete asset redundancy policies, select **Service Domain Objects > Policies > Asset Redundancy Policies** in the VMP Service Manager GUI.

The Asset Redundancy Policies table displays the following information for each asset redundancy policy:

- Name—Name of the asset redundancy policy (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Policy Type—Type of asset redundancy policy. The policy type does not apply to VMP. VMP now supports Mirroring or Erasure Coding policy types for COS objects.
- Description—Description of the asset redundancy policy. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

To display the rules associated with an asset redundancy policy, click its **Expand** arrow. The rules displayed depends on the policy type selected. The below screens shows the rules for a non policy type (VMP) and the erasure coding policy type (COS).





- The Policy Rules table displays the following columns for each rule:
  - Match Tag– Indicates whether the rule applies to the whole asset or to a specific segment (required). Based on the values selected, the match tag changes. The above screen displays the Match tags for the Erasure Coding Policy type.

- Number of Copies—Number of redundant copies to make (required). The valid ranges for Mirroring are Local: 1-4 and Remote: 0-6.
- Resilience Factor—(COS objects only) Specifies the number of simultaneous failures that can occur before data loss. This parameter is specific to the Erasure Coding Policy type. The valid ranges are: Local: 0-4 (0 means local EC disabled), Distributed: 0-4 (0 means Distributed EC disabled).
- Keep Count—Keep accurate count of the assets available.
- Trigger—Indicates whether the rule is started/completed
- State—Indicates whether the rule is **Disabled** (the default setting) or **Enabled**.

- Click the **Collapse** arrow to collapse the rule information.

Configuring Subtitle Policies

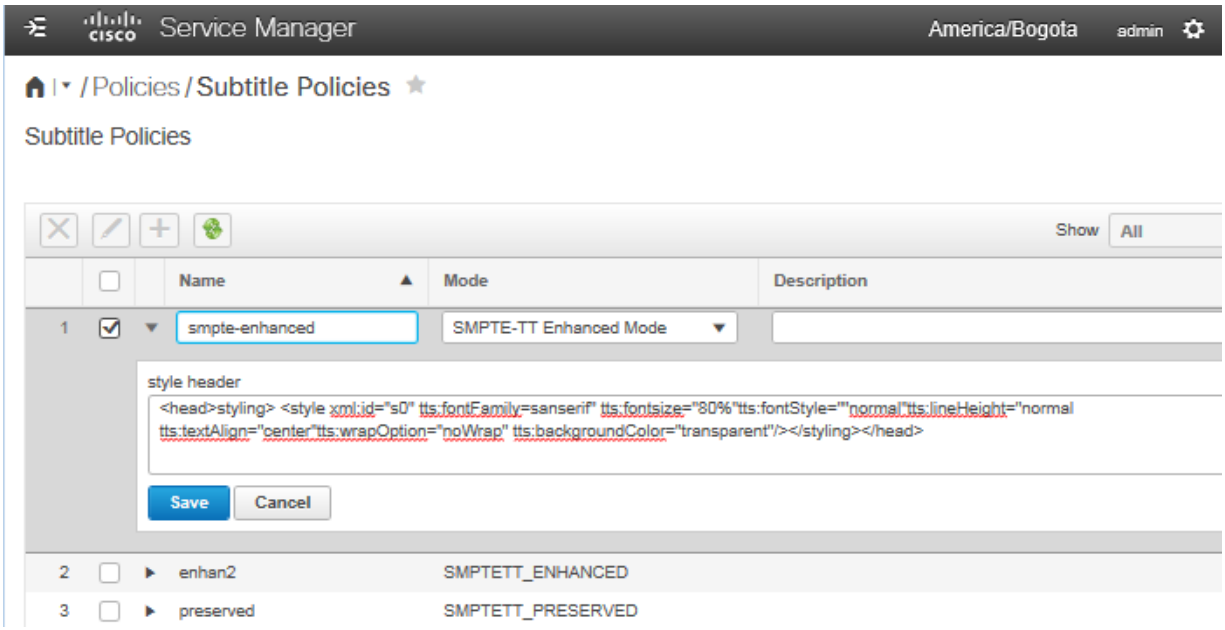
Subtitle policies can be used for DASH playout. When the user creates a publish template for DASH playout, the template can be associated with a subtitle policy.

Note: Subtitle policies are available for DASH only. They are not supported by other ABR formats.

To add, edit or delete subtitle policies, select **Service Domain Objects > Policies > Subtitle Policies** in the VMP Service Manager GUI. The Subtitle Policies displays the following information for each subtitle policy.

- Name—Name of the subtitle policy (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Mode—There are three subtitle policy modes:
  - SMPTE-TT Preserved Mode—In preserved mode, the subtitles from the media source will be correctly converted and rendered in a style of the original rendering as possible given the constraints of the formats. In preserved mode, the user do not need to configure the style header.
  - SMPTE-TT Enhanced Mode—In enhanced mode, the user can configure a customized display style header for DASH playout, e.g. visual effects, typography, coloring. The style header is a string in XML format. The attributes in the style header should conform to the specifications defined in the following document: https://www.smpte.org/sites/default/files/st2052-1-2010.pdf
  - TTML—Timed Text Markup Language (TTML) mode is similar to SMPTE-TT enhanced mode. The user can configure a customized style header, but the namespace in the subtitle XML files are TTML. Therefore, only attributes defined in the document at https://www.w3.org/TR/ttml2 are allowed to be configured in the style header input.
- Description—Description of the subtitle policy. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
- Style Header—Configure for DASH playout, e.g. visual effects, typography, coloring, and so on.

  In the following example, subtitles are configured to be displayed in this style: color is navy(#000080), font is sansSerif, font size is 80%, font style is normal, line height is normal, text align is center, wrap option is noWrap, and background color is transparent.


Service Manager
America/Bogota
admin
/ Policies / Subtitle Policies
Subtitle Policies
Show
All
Name
Mode
Description
1
smpte-enhanced
SMPTE-TT Enhanced Mode
style header
<head>styling> <style xml:id="s0" tts:fontFamily=sanserif" tts:fontsize="80%"tts:fontStyle=""normal"tts:lineHeight="normal
tts:textAlign="center"tts:wrapOption="noWrap" tts:backgroundColor="transparent"/></styling></head>
Save
Cancel
2
enhan2
SMPTETT_ENHANCED
3
preserved
SMPTETT_PRESERVED

Configuring Cross-Domain Policies

A cross-domain policy file is an XML document that grants permission to a web client such as Adobe Flash Player or Adobe Acrobat (though not necessarily limited to these) to handle data across domains. When clients request content hosted on a particular source domain and that content make requests directed to a domain other than its own, the remote domain must host a cross-domain policy file that grants access to the source domain, allowing the client to continue the transaction.

A crossdomain.xml file is required to allow a Flash media player hosted on another web server to access content from the Adobe Media Server web server. A typical use case is HTTP streaming (VOD or Live) to a Flash Player. The crossdomain.xml file grants a web client the required permission to handle data across multiple domains.

The default crosssdomain.xml in VMP is:

```
<?xml version="1.0" ?>
<cross-domain-policy>
<allow-access-from domain="*" />
</cross-domain-policy>
```

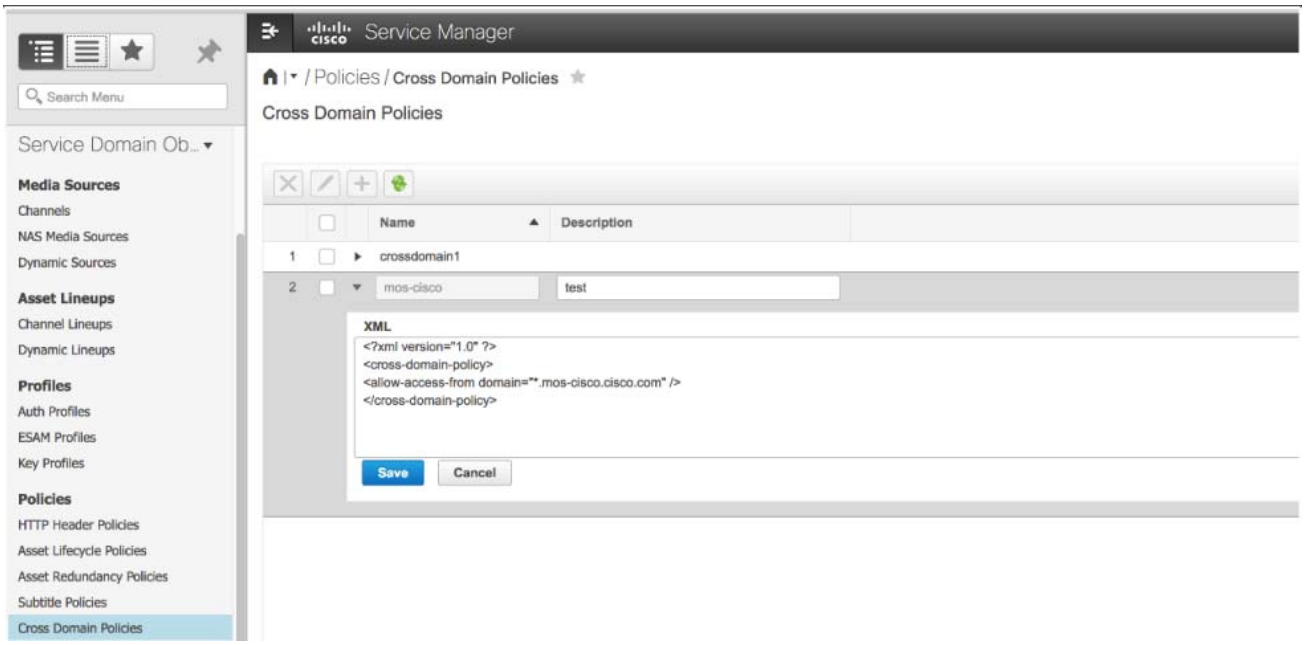
This configuration allows access from any domain.

To configure this feature:

1. To add, edit or delete cross-domain policies, select **Service Domain Objects > Policies > Cross Domain Policies** in the VMP Service Manager GUI.
2. Click the **+** button to add a policy.
3. Enter a name (required) and description for the cross-domain policy.
4. In the XML window, enter the crossdomain.xml file details.

   Note: For element specifications when creating the file, see: http://www.adobe.com/devnet/adobe-media-server/articles/cross-domain-xml-for-streaming.html
5. Click **Save**.

See example policy in the screen below.



Client Access Policies

Silverlight uses services as its primary source of retrieving data across domain boundaries. When you enter the services and web application domain, you expose your content to malicious attacks. One way Silverlight prevents its applications from launching malicious attacks on other sites is through opt-in cross-domain access. This means the site has to say "yes" to receive and respond to requests from a particular domain. The clientaccesspolicy.xml file controls this opt-in feature.

The clientaccesspolicy.xml file is located where the service is being hosted. Silverlight supports the following file types:

- Silverlight client access policy file (clientaccesspolicy.xml)
- A subset of the Adobe Flash cross-domain policy file (crossdomain.xml)

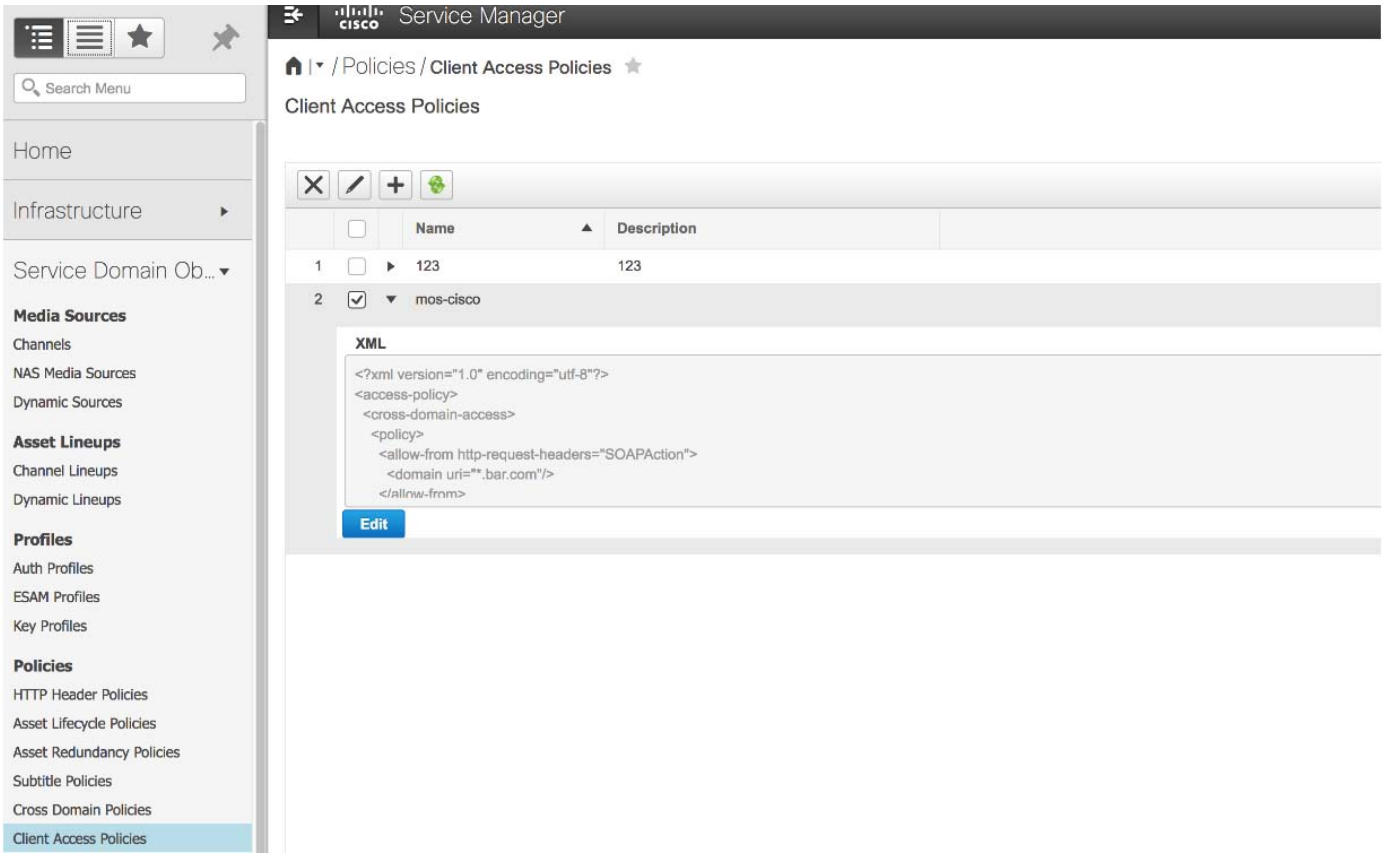
The default clientaccesspolicy.xml in VMP is:

```
<?xml version="1.0" encoding="utf-8"?>
<access-policy>
<cross-domain-access>
<policy>
<allow-from http-request-headers="*">
<domain uri="*."/>
</allow-from>
<grant-to>
<resource path="/" include-subpaths="true"/>
</grant-to>
</policy>
</cross-domain-access>
</access-policy>
```

This configuration allows access from any other domain to all resources on the current domain.

1. To add, edit or delete client-access policies, select **Service Domain Objects > Policies > Client Access Policies** in the VMP Service Manager GUI.
2. Click the **+** button to add a client access policy.

3. Enter a name (required) and description for the client access policy.
4. In the input window, enter the clientaccess.xml file details.
5. Note: For element specifications when creating the file, see: http://www.adobe.com/devnet/adobe-media-server/articles/cross-domain-xml-for-streaming.html
6. See example policy in the screen below.



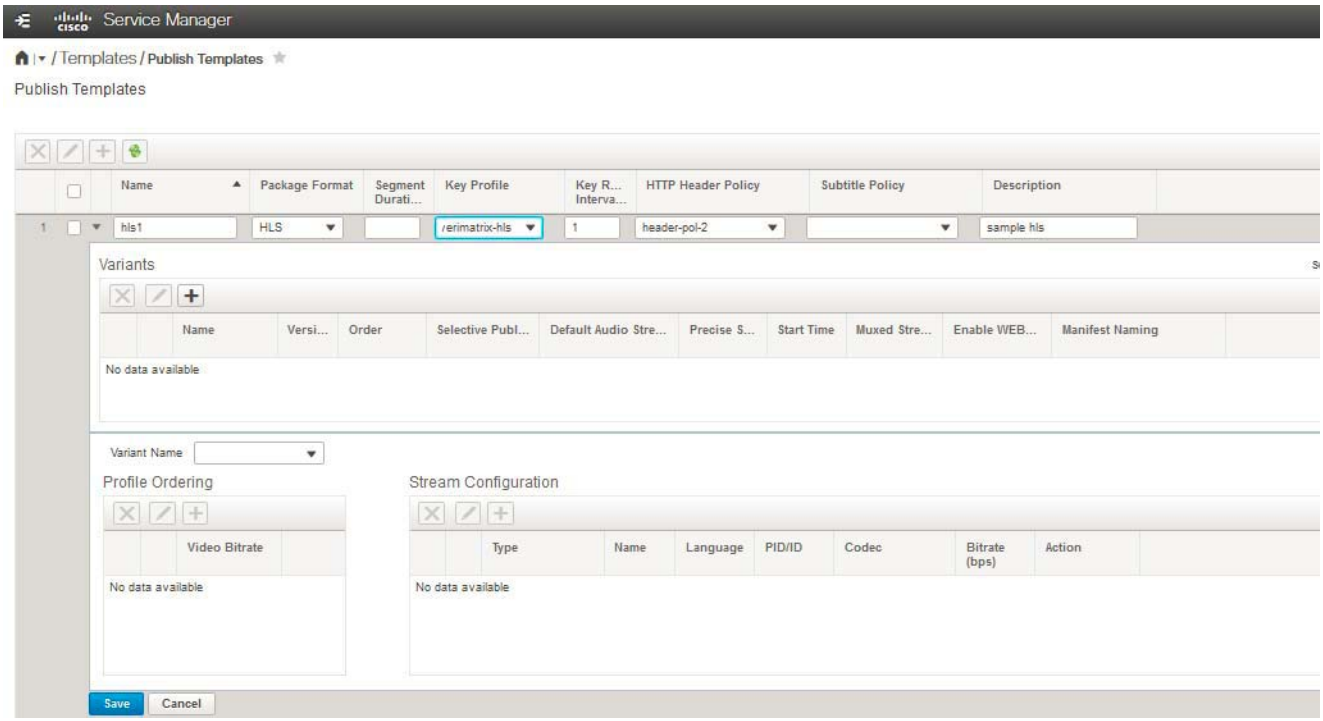
Templates

Configuring Publish Templates

The publish template defines how the content is to be published.

To add, edit, or delete publish templates, select **Service Domain Objects > Templates > Publish Templates** in the VMP Service Manager GUI.

The Publishing Templates dialog opens as shown in the following example.



The Publish Templates table displays the following information for each template:

- Name—Name of the template (required). The name is a string of up to 63 characters. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Package Format – Package format supported by the template. The available options are as follows:
  - DASH – Dynamic Adaptive Streaming over HTTP (DASH), also known as MPEG-DASH or DASH-MP4. An ABR streaming format for high-quality media, MPEG-DASH breaks live or recorded video source content into a sequence of small segments representing several seconds of playback time for streaming over standard web servers.

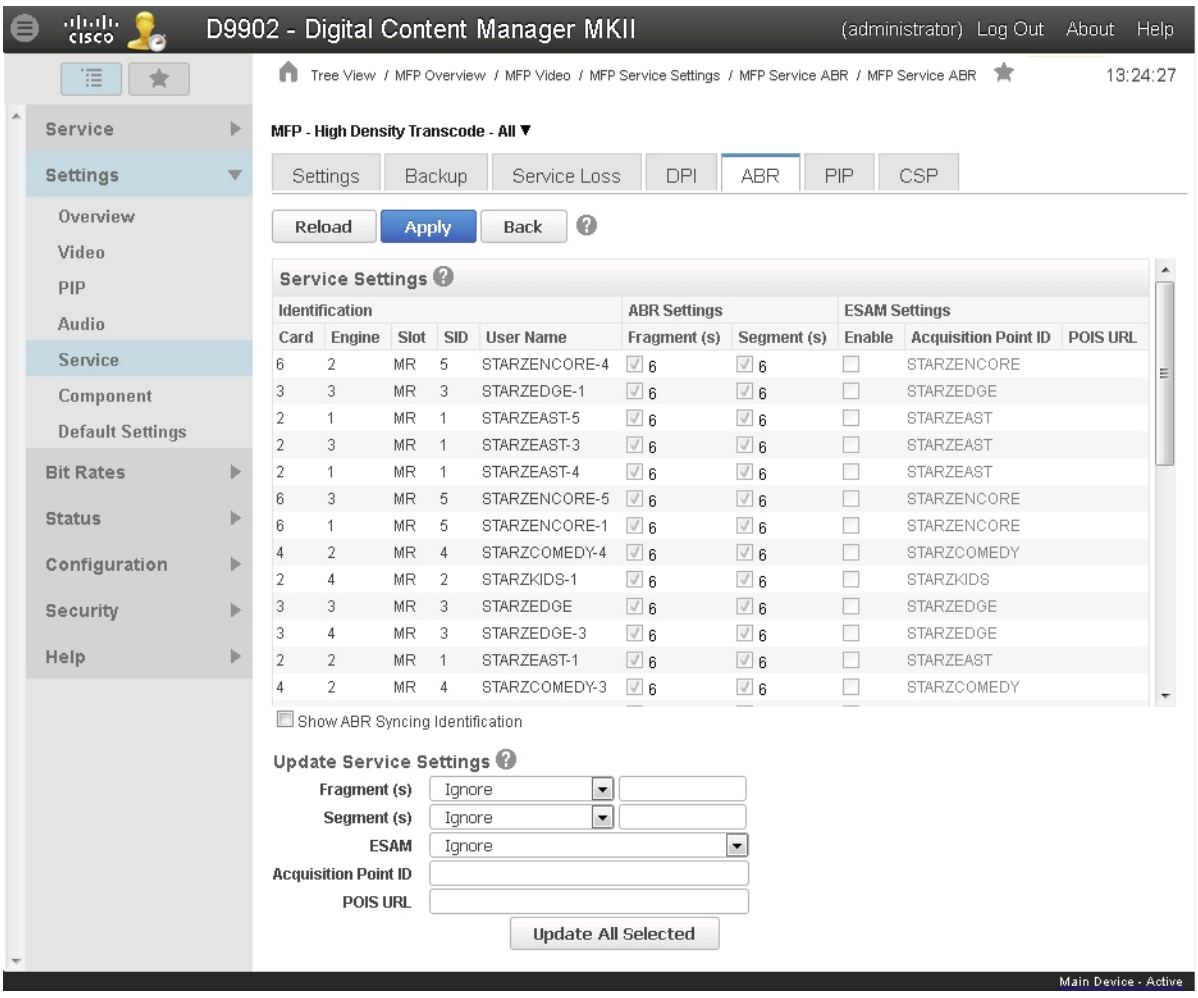
    A DASH asset can include multiple sets of segments representing different resolution and bit rate profiles. The client device can then automatically select the appropriate set to deliver the highest quality possible under current network conditions. Together with the segment files, the DASH asset includes a Media Presentation description (MPD) manifest file.

    The MPD is an XML document containing asset metadata and identifying the segments included in the asset, their available bit rate and resolution profiles, and their order of reassembly for presentation.
  - HLS – HTTP Live Streaming, the default package format, is an Apple streaming solution equivalent to MPEG-DASH, and is intended for native consumption by devices running the Apple iOS operating system.
  - HLS-MP4 – A later version of HLS that supports fragmented MP4 content.
  - HSS – HTTP Smooth Streaming, a Microsoft streaming solution equivalent to MPEG-DASH, intended for native consumption by devices running the Windows operating system.
  - HDS – HTTP Dynamic Streaming, an Adobe streaming solution equivalent to MPEG-DASH, intended for native consumption by devices using Flash media server or Flash media player for playback.

- CIF – Common Intermediate Format, a format for packaging, ingest, storage, and delivery of segmented video assets using ABR video and audio encoding. A CIF asset includes a Media Presentation Document (MPD) manifest file in XML format describing the overall program, the segments included in it, the profiles (bit rates and resolutions) included, and the order of segment presentation.
- CIF-DASH-TS – A CIF format based on MPEG DASH-TS, which is a profile of MPEG DASH that uses MPEG-2 transport stream (TS) segments. This alternative CIF option is required for certain customer deployments.

Note: Current deployments no longer use CIF or CIF-DASH-TS package formats.

- Segment Duration (Sec)—For segmented files, maximum time, in seconds, to write to a file before starting a new segment (required). The segment duration must match the Encoder Boundary Point (EBP) configured on the encoder, or it must be a multiple of the EBP value. In earlier versions of the VMP, the only segment duration supported for the cDVR use case was 2sec. The encoders were set to 2sec Frag EBP. However, in this release, support has been added to enable various segment durations, including 2sec, 4sec, 6sec, and 8 sec. See screen example below showing 6-second configuration for the Digital Content Manager.



- Key Profile—Key profile associated with the template. For more information, see Configuring Key Profiles, page 129.
- Key Rotation Interval (Sec)—specifies the number of seconds to wait before using a new encryption key.
- HTTP Header Policy—HTTP header policy associated with the template. For more information, see Policies, page 132.
- Subtitle Policy—Subtitle policy associated with the template.

- Description—Description of the template. The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
- Variants—The variants table enables you to provide a subset of video and audio bit rates to specific devices. For example, you can create a variant called **mac** and assign the top three bit rates to it, and create another variant called **ipad** and assign three lower bit rates to it. The Variants table displays the following parameters:
  - Name—Name of the variant (required). The name is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
  - Version—Version of the variant (required). Valid versions are **2** through **5**. The default setting is **4**.
  - Order—Order of the variant. Two options are available: BITRATE and RANK. The manifest of this variant will include specified profiles ordered by BITRATE/RANK specified later.
  - Selective Publish—By default, the output manifest will not include profiles that are not specified. If the option is False, no video is filtered, and the system appends these profiles to the manifest. If the option is True but there are no Video Streams specified, no video is filtered.

    Note: Selective Publish is supported for HLS content through the VMP Service Manager GUI. Beginning with Release 2.11.1, VMP also supports selective publishing of DASH content via the V2PC GUI. For details, see the *Cisco Virtualized Video Processing Controller User Guide* for your V2PC release.
  - Default Audio Stream—Name of the default audio stream associated with the variant.

  When the (default) HLS package type is selected, the following fields also appear:
  - Precise (precise start)—The value is an enumerated string; valid strings are YES and NO. If the value is YES, clients SHOULD start playback at the Media Segment containing the TIME-OFFSET, but SHOULD NOT render media samples in that segment whose presentation times are prior to the TIME-OFFSET. If the value is NO, clients SHOULD attempt to render every media sample in that segment.
  - Time Offset (start time)—The value of TIME-OFFSET is a signed-decimal-floating-point number of seconds. A positive number indicates a time offset from the beginning of the Playlist. A negative number indicates a negative time offset from the end of the last Media Segment in the Playlist. The absolute value of TIME-OFFSET SHOULD NOT be larger than the Playlist duration. If the absolute value of TIME-OFFSET exceeds the duration of the Playlist, it indicates either the end of the Playlist (if positive) or the beginning of the Playlist (if negative).
  - Muxed Stream—Multiplexed (muxed) stream associated with the variant. If True, audio and video are muxed together in segments. If False, audio and video are published in separate stream manifests.
  - Enable WebVTT—Provides the option to disable/enable generation of WebVTT subtitles. The default is Enabled.
  - Manifest Naming—When configured for HLS playout, the user can rename sub-stream playlists in the master playlist. Beginning with VMP Release 2.12.1, the master playlist can also be renamed. See Configuring HLS Manifest Renaming, page 146 for additional information.
- The Profile Ordering Table displays the following parameter. Click the appropriate icon to add, edit or delete, then click **Save** to save your settings or **Cancel**.
  - Video Bitrate—The bit rate that you enter must be within 5% of an actual bitrate.
- The Stream Configuration table displays the following parameters for each stream associated with the selected variant: Click the appropriate icon to add, edit or delete, then click **Save** to save your settings or **Cancel.**
  - Type—Type selections are Audio, Subtitle, Video, ID3, UserConfig
  - Name—Name of the stream (required). The name is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.

- Language—Language used for the stream, such as **en** for English (required).
- PID/ID— ID of the PID.
- Codec—Format of the stream such as AAC, DD/AC-3, DD+/EC-3
- Bitrate (bps)—The column is available when the order of the variant is BITRATE. The bit rate that you enter must be within 5% of an actual bit rate. The output manifest will include these profiles with the order user specified.
- Action—Update or Disable Stream Configuration

When configuring bit rates for video and audio streams, keep the following considerations in mind:

- The order in which you configure the bit rates is the order in which they are displayed in the manifest.
- The bit rates must be within 5% of an actual bit rate.
- If a configured bit rate is not within 5% of an actual output stream generated by a source, the VMP excludes that bit rate from the manifest.
- If none of the bit rates in a list is within 5% of an actual bit rate, the VMP generates a 404 error code when you request a manifest.
- If you do not specify a list of bit rates, then the VMP includes all of the bit rates generated by the source in the manifest.

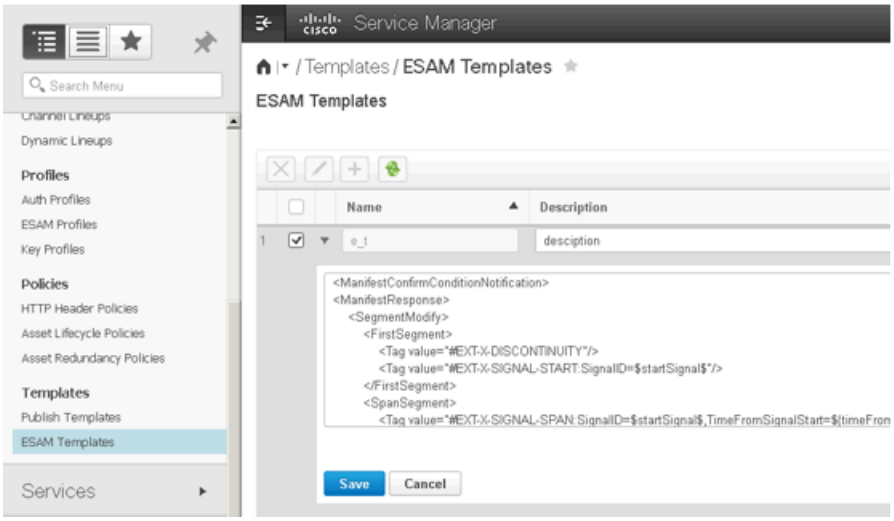
For example, if you have a Digital Content Manager (DCM) that generates video bit rates of 1MB, 2MB, 3MB, 4MB, and 5MB:

- You can configure video bit rates of 1 MB, 4 MB, and 5 MB to display them in the manifest in descending order, or of 5 MB, 4 MB, and 1 MB to display them in ascending order.
- If you configure 1.5 MB and 4 MB, only 4 MB is displayed in the manifest. 1.5 MB is not within 5% of an actual bi trate.
- If you configure 1.5 MB and 3.5 MB, the VMP generates a 404 error code because neither bit rate is within 5% of an actual bit rate.
- If you configure 1.05 MB and 2.9 MB, both 1 MB and 3 MB are displayed in the manifest because both are within 5% of an actual bit rate.

Configuring ESAM Templates

The Event Signaling and Management (ESAM) template define how the VMP is to handle ESAM multi-screen ad insertion.

To add, delete, or edit ESAM templates, select **Service Domain Objects > Templates > ESAM Template** in the VMP Service Manager GUI.



The ESAM Template table displays the following information for each configured key:

- Name—Name of the ESAM template (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, and underscores (_). The user ID must not begin with a period (.), and it is not case-sensitive.
- Content—The content of ESAM template (required) It is provisioned by the service provider. See example below.
- Description—Description of the ESAM template. The description is a string of up to 235 characters, and can include uppercase or lowercase letters, numbers, and any special characters.

  Content example:

```
<ManifestConfirmConditionNotification>
<ManifestResponse>
    <SegmentModify>
        <FirstSegment>
            <Tag value="#EXT-X-DISCONTINUITY"/>
            <Tag value="#EXT-X-SIGNAL-START:SignalID=$startSignal$"/>
        </FirstSegment>
        <SpanSegment>
            <Tag
value="#EXT-X-SIGNAL-SPAN:SignalID=$startSignal$,TimeFromSignalStart=${timeFromSignal}"/>
        </SpanSegment>
        <LastSegment>
            <Tag value="#EXT-X-SIGNAL-END:SignalID=$endSignal$"/>
            <Tag value="#EXT-X-DISCONTINUITY"/>
        </LastSegment>
    </SegmentModify>
</ManifestResponse>
<ManifestConfirmConditionNotification>
```

FirstSegment: The segment in playlist manifest which is the first one after out point.

LastSegment: The segment in playlist manifest which is the last one before in point.

SpanSegment: The segments in playlist manifest which between FirstSegment and LastSegment. (this Tag is optional)

$startSignal$: the signal ID from the out point command

$endSignal$: the signal ID from the in point command

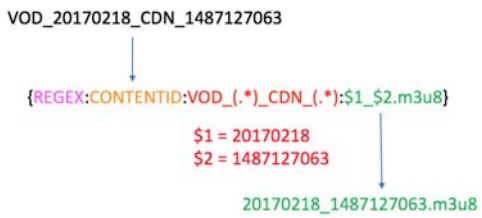
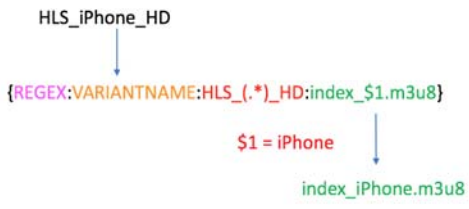
${timeFromSignal}: the time from out point

Configuring HLS Manifest Renaming

The following system macros are used to generate name values for manifest renaming. You combine these macros with literal strings to configure a renaming template for an HLS publish template variant. You then specify this template either using the corresponding publish template in the VMP Service Manager GUI or by editing the MPE configuration file.

Note: System macro values are case-sensitive.

Macro	Description
{Type}	For A/V muxed segment playlist, the value is empty " " . For i-frame playlist, the value is " iframe" . For audio only playlist, the value is " audio" . For WebVTT subtitle playlist, the value is " subtitle" .
{BITRATE}	The peak bit rate value of the stream, equal to the value of the BANDWIDTH attribute in the master manifest for the corresponding sub playlists.
{NUMBER}	Two digits string, range from " 01" to " 99" , this macro applies to the sub playlists by playlist type order: segment, iframe, audio only, subtitle.

Macro	Description
{LANGUAGE}	The language of the audio or subtitle. It only applies to audio only playlist and subtitle playlist.
{REGEX:CONTENTID:XXX:YYY}	Each content or live channel ingested into VMP is specified by a Content ID value. When renaming the manifest, VMP detects the Content ID and replaces CONTENTID with the specified value, as follows: **XXX** is the regex match pattern searched for in the Content ID value. The regex pattern must follow the Perl regex syntax defined at: http://www.boost.org/doc/libs/1_53_0/libs/regex/doc/html/boost_regex/syntax/perl_syntax.html **YYY** is the replacement string of the Content ID value. Use $N to reference the *nth* match value, where N can range from 1 to 9. For example, if Content ID value is " VOD_20170218_CDN_1487127063" , with the renaming template " {REGEX:CONTENTID:VOD_(.*)_CDN_(.*):$1_$2.m3u8}" , the generated string will be " 20170218_1487127063.m3u8" 
{REGEX:VARIANTNAME:XXX:YYY}	Each HLS publish template can have one or more variants configured, each specified by a variant name. When renaming the manifest, VMP detects the variant name value and replaces VARIANTNAME with the specified value, as follows: **XXX** is the regex match pattern which is searched for in the variant name, the regex pattern must follow the Perl regex syntax defined at: http://www.boost.org/doc/libs/1_53_0/libs/regex/doc/html/boost_regex/syntax/perl_syntax.html **YYY** is the replacement string of the variant value, use $N to reference the *nth* match value, N can range from 1 to 9. For example, if variant name is " HLS_iphone_HD" , with the renaming template " {REGEX:VARIANTNAME:HLS_(.*)_HD:index_$1.m3u8}" , the generated string will be " index_iPhone.m3u8" 

For example, for variant **variant_iphone** and content ID **contentid_12345**, the renaming template configuration is:

```
{NUMBER}_{REGEX:CONTENTID:contentid_(.*):$1}_{REGEX:VARIANTNAME:variant_(.*):$1}_{TYPE}_{LANGUAGE}_{BITRATE}.m3u8
```

The resulting master playlist might appear as shown in the following example:

```
#EXTM3U
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUP-ID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="pol",NAME="pol",URI=
"09_12345_iphone_subtitle_pol_0.m3u8"
#EXT-X-MEDIA:TYPE=SUBTITLES,GROUP-ID="subs",FORCED=NO,AUTOSELECT=YES,LANGUAGE="eng",NAME="pol",URI=
"10_12345_iphone_subtitle_pol_0.m3u8"
#EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=761959,CODECS="avc1.4D400C,mp4a.40.2",RESOLUTION=320x180,S
UBTITLES="subs"
01_12345_iphone___761959.m3u8
#EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1015653,CODECS="avc1.4D401F,mp4a.40.2",RESOLUTION=1280x720
,SUBTITLES="subs"
02_12345_iphone___1015653.m3u8
#EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1242684,CODECS="avc1.4D401E,mp4a.40.2",RESOLUTION=800x450,
SUBTITLES="subs"
03_12345_iphone___1246864.m3u8
#EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1696746,CODECS="avc1.4D401F,mp4a.40.2",RESOLUTION=1024x576
,SUBTITLES="subs"
04_12345_iphone___1696746.m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=761959,CODECS="avc1.4D400C",RESOLUTION=320x180,URI
="05_12345_iphone_iframe_761959.m3u8"
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1015653,CODECS="avc1.4D401F",RESOLUTION=1280x720,U
RI="06_12345_iphone_iframe_101563.m3u8"
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1242684,CODECS="avc1.4D401E",RESOLUTION=800x450,UR
I="07_12345_iphone_iframe_1242684.m3u8"
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=1696746,CODECS="avc1.4D401F",RESOLUTION=1024x576,U
RI="08_12345_iphone_iframe_1696746.m3u8"
```

Note: The renaming template must generate unique names for all sub-stream playlists.

Configuration Using the GUI

After configuring the renaming template, you can apply the template via the VMP Service Manager GUI by opening the corresponding publish template and entering the name of the template in the Manifest Naming field.

Note: For users of the V2PC management platform, the Manifest Renaming field in the Publish Templates dialog serves the same purpose. For details, see the *Cisco Virtualized Video Processing Controller User Guide* for your V2PC release.

Configuration Using MPE Configuration File

As an alternative to the GUI, you can edit configuration files on the MPE to perform manifest renaming, as follows:

1. Log in to the MPE node and navigate to the directory

   /etc/opt/cisco/mos/ode/awf-vod-2/pep-1.wanhe02mos.com

   where:

   - **awf-vod-2** is the asset workflow name
   - **pep-1.wanhe02mos.com** is the playback domain

   (Actual names depend on your configuration.)

2. Locate the file **assetresolver.xml**, back up the file, and then format it to a temp file:

   ```
   cp assetresolver.xml assetresolver.xml.backup
   xmllint -format assetresolver.xml > temp.xml
   ```

3. Edit the **temp.xml** file to add the manifest renaming configuration for the HLS publish template variant, and then save the file.

As shown in bold in the following example, the variant **template-1-variant-1** is assigned the manifest renaming template **{NUMBER}_{REGEX:CONTENTID:(.*)_(.*):$2}_{TYPE}.m3u8**:

```
<?xml version="1.0"?>
<AssetResolverRules>
  <Rule_Patterns>
    <PatternlistGrp id="grpl">
      <UrlRegex>(.*)</UrlRegex>
    </PatternlistGrp>
  </Rule_Patterns>
  <Rule_ Templates>
    <TransformResource transformResourceID="awf-vod-2-publishl_hls">
      <Sourceinfo>
        <DASHAdaptiveTSSource mpdUrl="DomainName/awf-vod-2/AssetID/MPD"/>
      </Sourceinfo>
      <Publishinfo>
        <HLSPublishinfo contentID="AssetID" assetUrl="DomainName/awf-vod-2-publishl/AssetID"
                        mediaManifestUrl="DomainName/awf-vod-2-publishl/AssetID/AssetID.m3u8"
                        segmentDuration="10" serviceType="vod">
          <Variant VariantName="template-1-variant-l" preciseStart="true" startTime="0"
                   variantManifestUrl="DomainName/awf-vod-2-publishl/AssetID/VariantName.m3u8">
            <HLSVersion value="4"/>
            <ManifestRenaming value="{NUMBER}_{REGEX:CONTENTID:(.*)_(.*):$2}_{TYPE}.m3u8"/>
          </Variant>
          <Variant VariantName="template-1-variant -2" preciseStart="true" startTime="0"
                   variantManifestUrl="DomainName/awf-vod-2-publishl/AssetID/VariantName.m3u8">
            <HLSVersion value="4"/>
          </Variant>
          <Variant VariantName="mac" preciseStart="true" startTime="0"
                   variantManifestUrl="DomainName/awf-vod-2-publishl/AssetID/VariantName.m3u8">
            <HLSVersion value="4"/>
          </Variant>
          <Variant VariantName="default" preciseStart="true" startTime="0"
                   variantManifestUrl="DomainName/awf-vod- 2- publishl/AssetID/VariantName.m3u8">
            <HLSVersion value="4"/>
          </Variant>
        </HLSPublishinfo>
      </Publishinfo>
    </TransformResource>
. . . . . .
. . . . . .
. . . . . .
```

If the Content ID is CNN_SportsChannel, the resulting master playlist of the variant **template-1-variant-1** for the content might appear as shown in the following example:

```
#EXT-X-MEDIA:TYPE=AUDIO,GROUP-ID="audio",CODECS="mp4a.40.2",LANGUAGE="eng",NAME="eng",AUTOSELECT=YE
S,DEFAULT=YES
#EXT-X-MEDIA:TYPE=AUDIO,GROUP-ID="audio",CODECS="mp4a.40.2",LANGUAGE="spa",NAME="spa",URI="07_Sport
sChannel_audio.m3u8"
#EXT-X-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=1139000,CODECS="avcl.4D401E,mp4a.40.2",RESOLUTION=640x360,
AUDIO="audio",SUBTITLES="subs" 0l_SportsChannel_ .m3u8
#EXT-X-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=1613000,CODECS="avcl.4D401E,mp4a.40.2",RESOLUTION=768x432,
AUDIO="audio",SUBTITLES="subs" 02_SportsChannel_ .m3u8
#EXT-X-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=3349000,CODECS="avcl.4D4028,mp4a.40.2",RESOLUTION=1280x720
,AUDIO="audio",SUBTITLES="subs" 03_SportsChannel_ .m3u8
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=1139000,CODECS="avcl.4D401E",RESOLUTION=640x360,UR
I="04_SportsChannel_iframe.m3u8"
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=1613000,CODECS="avcl.4D401E",RESOLUTION=768x432,UR
I="05_SportsChannel_iframe.m3u8"
#EXT-X-I-FRAME-STREAM-INF:PROGRAM-ID=l,BANDWIDTH=3349000,CODECS="avcl.4D4028",RESOLUTION
=1280x720,URI="06_SportsChannel_iframe.m3u8"
```

4. Replace assetresolver.xml with the new temp.xml and restart trafficserver:

```
cp temp.xml assetresolver.xml
supervisorctl restart trafficserve
```

Note:

- The changes you make manually to assetresolver.xml can be reverted by ServiceAgent when making an MPE service configuration change on the PAM. If you get a 404 request for the renaming manifest URLs, check assetresolver.xml to be sure the changes you made are still in effect. If they have been reverted, you must make the changes again.
- The name of the renamed manifest must not contain any forward slash (/) characters.
- When configuring a renaming template, make sure that all playlists generated for all types are unique in the master playlist. For example, if you configure renaming template as **index_{TYPE}.m3u8** but the content has multiple bit rate streams, the manifest names for all the bit rates will have the same name.

Configuring Services

See Enabling Services, page 78.

Monitoring Facilities

Alarms

Active

To display Active alarms for the VMP, select **Monitoring > Alarms > Active** in the VMP Service Manager GUI.

The Alarms table displays the following information for each alarm:

- Set Time—Time that the alarm occurred, in the format **DAY MONTH DATE YEAR HH:MM:SS GMT-OFFSET** (for example, **Mon Aug 04 2014 01:52:59 GMT-0700**.)
- Alarm—unique name created by the alarm source for the alarm in the format “scope-name.instance.alarmName
- Severity—Severity of the alarm
- Description—Type of alarm
- Node—IP address of the source node
- Image type—type of the source node for the alarm
- Personality—personality of the source node for the alarm
- Location—IP address of the location where the alarm occurred
- Type—Type of the alarm
- Subtype—subtype of the alarm
- Category—category may be used to identify all related alarms, for example, alarms of a particular asset workflow. It should be prefixed with application name to prevent name collision.
- Acknowledged—GUI Operator can acknowledge the alarm by selecting the alarm and clicking on the acknowledge button. This indicates that the operator has noticed the alarm.

- User—ID of the operator who acknowledged the alarm

History

To display History Alarms for the VMP, select **Monitoring > Alarms > History** in the VMP Service Manager GUI.

- Set Time—Time that the alarm occurred, in the format **DAY MONTH DATE YEAR HH:MM:SS GMT-OFFSET** (for example, **Mon Aug 04 2014 01:52:59 GMT-0700**.)
- Alarm—Unique name created by the alarm source for the alarm in the format "scope-name.instance.alarmName
- Cleared Time—Time at which the alarm was moved from raised/active state to cleared state, i.e. issue resolved.
- Severity—Severity of the alarm
- Description—Type of alarm
- Node—IP address of the source node
- Image type—Type of the source node for the alarm
- Personality—personality of the source node for the alarm
- Location—IP address of the location where the alarm occurred
- Type—Type of the alarm
- Subtype—Subtype of the alarm
- Category—Category may be used to identify all related alarms, for example, alarms of a particular asset work flow. It should be prefixed with the application name to prevent name collision.

Diagnostic Settings

System Diagnostics

System Diagnostics allows scheduled adjustment of log level for system level logs.

1. To display system diagnostics for the VMP, select **Monitoring > Diagnostic Settings > System Diagnostics** in the VMP Service Manager GUI.
2. Click the **+** button.
3. Specify the name label and schedule the log level start/stop time.
4. Select **Enabled.**
5. Specify the application and any additional details, then click **OK.**

The System Diagnostics table displays the available parameters.

- Name—Name of the system log (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Log Label—Description of the log (required). The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
- Region—Region for which alarms are being logged (required). The default region is **0**.

- Start Time—Time the log started, or is to start. Specify the time using the following format:

  ```
  MM/DD/YYYY HH:MM:SS
  Instant
  ```

  The Start Time field uses the time zone specified in **admin > Preferences**.

- Log Duration—Time the log is to run. Specify **Indefinite** if the log is to run indefinitely, or specify the time the log is to run using the following format:

  ```
  Number_of_days,HH:MM:SS
  Indefinite
  ```

  The Log Duration field uses the time zone specified in **admin > Preferences**.

- Log Level—Level of alarm to log. Valid levels are **Info** (the default setting), **Warn**, **Minor**, **Major**, **Critical - few logs**, and **Debug**.

- State—Indicates whether the log is **Enabled** or **Disabled**.

To display the conditions associated with a log, click its **Expand** arrow. The Conditions table is displayed.

The Conditions table displays the following information:

- Application Type—Type of application for which alarms are to be logged. Drop-down types are:
  - **AWM**
  - **MCE**
  - **SM**
  - **Controller**
  - **MPE**

  You can also enter any other type in the field.

- Application Function—Function of the application being logged.

  For AWM applications, drop-down functions are:
  - **Asset Lookup**
  - **Asset Management**
  - **Workflow Management**

  For MCE applications, drop-down functions are:
  - **C2Parser**
  - **Capture**
  - **CIF Generator**
  - **Indexer**
  - **Media Chunk**
  - **Storage Interface**
  - **TTML**

  - **Session Controller**

  For SM applications, drop-down functions are:

  - **Authentication**
  - **Config**
  - **HA**

  For Controller applications, drop-down functions are:

  - **SICM**

  You can also enter any other function in the field.

- Flow Type—Type of flow for which alarms are to be logged.

  For AWM applications, the drop-down type is:

  - **Content ID**

  For MCE applications, drop-down types are:

  - **Content ID**
  - **Stream Profile**

  For SM applications, there are no drop-down types.

  For Controller applications, there are no drop-down types.

  You can also enter any other type in the field.

- Flow ID—ID of the flow being logged.
- Path Type—Type of path for which alarms are to be logged.

  For AWM applications, there are no drop-down types.

  For Controller applications, there are no drop-down types.

  For MCE applications, the drop-down type is:

  - **IP Address**

  For SM applications, drop-down types are:

  - **IP Address**
  - **Source IP Address**

  You can also enter any other type in the field.

- IP Address—IP address of the path for which alarms are to be logged.

To delete a condition from a log, edit the log, then click **Delete**.

To edit a condition for a log, edit the log, then select a condition and click the **Edit** icon to display the Edit Condition popup.

To add a condition to a log, edit the log, then click **the + button** to display the Add Condition popup.

Click the **Collapse** arrow to collapse the conditions information.

Service Diagnostics

Service Diagnostics allows scheduled adjustment of log level for service level logs.

1. To display service diagnostics for the VMP, select **Monitoring > Diagnostic Settings > Service Diagnostics** in the VMP Service Manager GUI.
2. Specify name, label and schedule the log level start/stop time, then choose Enabled.

The Service Diagnostics table displays the available system logs:

- Name—Name of the service log (required). The name is a string of any length. Acceptable characters include uppercase and lowercase letters, numbers, periods (.), dashes (-), and underscores (_). The name must not begin with a period (.), and it is not case-sensitive.
- Log Label—Description of the log (required). The description is a string of any length, and can include uppercase or lowercase letters, numbers, and any special characters.
- Service Instance—Service instance for which alarms are being logged (required).
- Start Time—Time the log started, or is to start. Specify the time using the following format:

  ```
  MM/DD/YYYY HH:MM:SS
  Instant
  ```

- Log Duration—Time the log is to run. Specify **Indefinite** if the log is to run indefinitely, or specify the time the log is to run using the following format:

  ```
  Number_of_days,HH:MM:SS
  Indefinite
  ```

- Log Level—Level of alarm to log. Valid levels are **Info** (the default setting), **Warn**, **Minor**, **Major**, **Critical - few logs**, and **Debug**.
- State—Indicates whether the log is **Enabled** or **Disabled**.

To display the conditions associated with a log, click its **Expand** arrow. The Conditions table is displayed.

The Conditions table displays the following information:

- Application Type—Type of application for which alarms are to be logged. Drop-down types are:
  - **AWM**
  - **MCE**
  - **SM**
  - **MPE**

  You can also enter any other type in the field.
- Application Function—Function of the application being logged.

  For AWM applications, drop-down functions are:
  - **Asset Lookup**
  - **Asset Management**
  - **Workflow Management**

For MCE applications, drop-down functions are:

- **C2Parser**
- **Capture**
- **CIF Generator**
- **Indexer**
- **Media Chunk**
- **Storage Interface**
- **TTML**
- **Session Controller**

For SM applications, drop-down functions are:

- **Authentication**
- **Config**
- **HA**

You can also enter any other function in the field.

For Controller applications, the drop-down types are

- **SIC**
- **AIC**
- **Task Controller**
- **Service Agent**

You can also enter any other type in the field.

- Flow Type—Type of flow for which alarms are to be logged.

  For AWM applications, the drop-down type is:

  - **Content ID**

  For MCE applications, drop-down types are:

  - **Content ID**
  - **Stream Profile**

  For SM applications, there are no drop-down types.

- Flow ID—ID of the flow being logged.
- Path Type—Type of path for which alarms are to be logged.

  For AWM applications, there are no drop-down types.

  For Controller applications, there are no drop-down types.

  For MCE applications, the drop-down type is:

  - **IP Address**

  For SM applications, drop-down types are:

  - **IP Address**
  - **Source IP Address**

  You can also enter any other type in the field.

- IP Address—IP address of the path for which alarms are to be logged.

To delete a condition from a log, edit the log, then click **Delete**.

To edit a condition for a log, edit the log, then select a condition and click **Edit** to display the Edit Condition popup.

To add a condition to a log, edit the log, then click **Add Row** to display the Add Condition popup.

Click the **Collapse** arrow to collapse the conditions information.

Events

To display system and service events for the VMP, select **Monitoring > Events** in the VMP Service Manager GUI.

The GUI automatically refreshes the Event Browser table every five (5) minutes.

Select an event range for the Event Browser table:

- **Last 1 hour**
- **Last 24 hours**
- **Last 7 days**

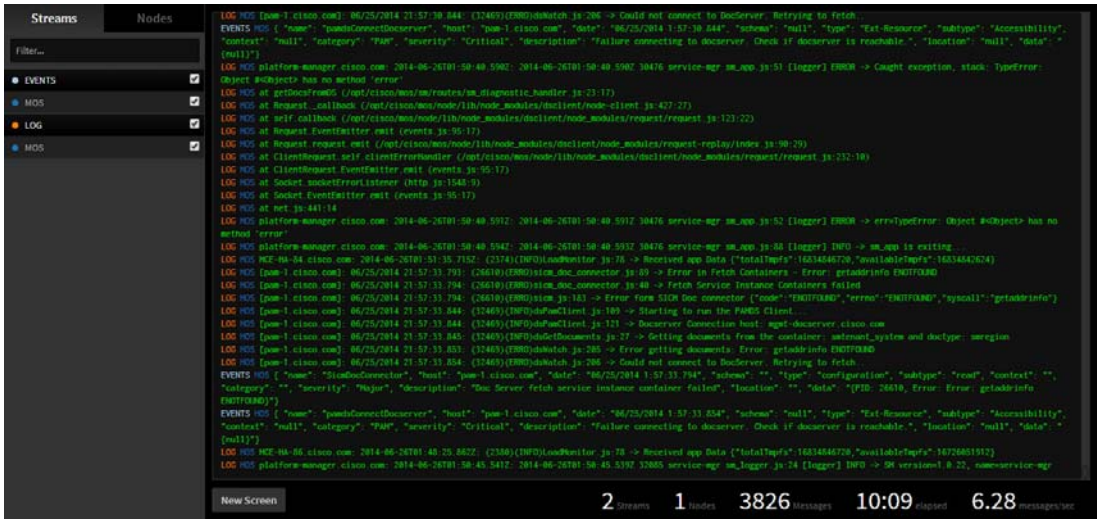
The Event Browser table displays the following information for each event:

- Time—Time that the event occurred, in the format **DAY MONTH DATE YEAR HH:MM:SS GMT-OFFSET** (for example, **Mon Aug 04 2014 01:52:59 GMT-0700**.)
- Entity Scope—Scope of the event, such as a region or service.
- Source Node—IP address of the source node that reported the event.
- Source Image Type—Type of the source node for the event, such as **PAM**.
- Source Personality—Personality of the source node for the event, such as **Control** or **Worker**.
- Location—IP address of the location where the event occurred.
- Severity—Severity of the event: **Info**, **Warning**, **Major**, or **Critical**.
- Event Type—Type of the event, such as **Application** or **Node**.
- Event Subtype—Subtype of the event, such as **Interface** or **Health**.
- Event—Event, such as **DnsUpdate** or **ServiceInstanceUpdate**.
- Description—Description of the event.
- Events Dropped—Number of dropped events.
- Transaction ID—Indicates the specific transaction for which the alarm was generated.

Logs

Log Viewer

To display logs for the VMP, select **Monitoring > Logs > Log Viewer** in the VMP Service Manager GUI. The GUI opens the VMP Log Viewer in a new tab. (The GUI actually invokes the CLS VM's log viewer.)

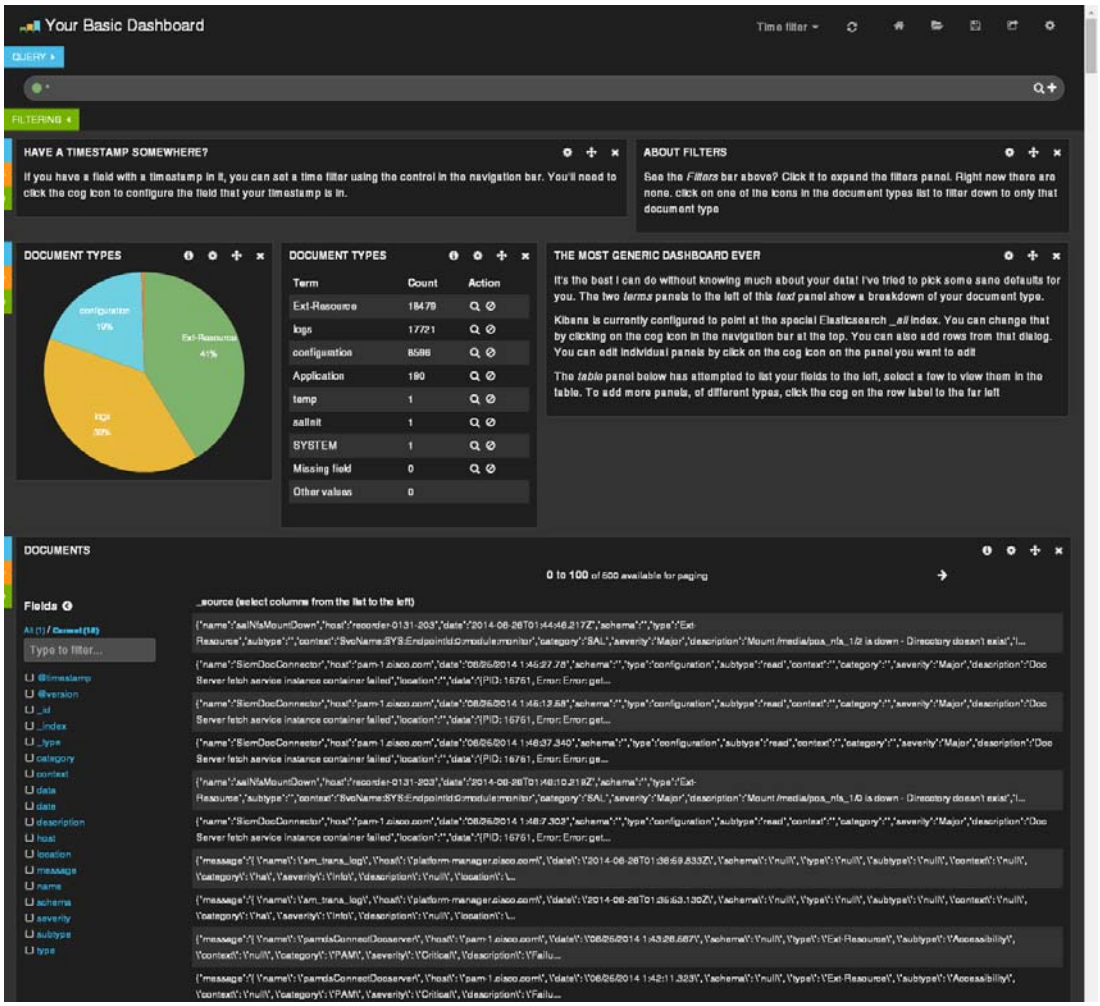


Select the **Streams** tab and the **Events** checkbox to display all of the VMP events; the **Logs** checkbox to display all of the VMP logs; or both.

Select the **Nodes** tab and the **Events** checkbox to display all of the VMP events; the **Logs** checkbox to display all of the VMP logs; or the **VMP** checkbox to display both.

Log Analysis

To display log analysis for the VMP, select **Monitoring > Logs > Log Analysis** in the VMP Service Manager GUI. The GUI opens the VMP Log Analysis Dashboard in a new tab.



Configuration Viewer

Select **Monitoring** > **Configuration Viewer** to launch a separate tab for topology/system visibility.

The Graph view is selected by default but the topology can also be displayed in tree view.

Troubleshooting VMP

The following sections contain information to help you troubleshoot problems when installing, deploying, configuring, and monitoring the VMP.

- Troubleshooting the VMP Service Manager GUI (VMP-M), page 159
- Troubleshooting Deployment, page 160
- Troubleshooting Access/Configuration, page 160
- Troubleshooting Playback Failures, page 164
- Troubleshooting the PAM, page 174
- Troubleshooting the PAM Service Manager, page 178
- Troubleshooting the PAM DocServer, page 181
- Troubleshooting the PAM SICM, page 184
- Troubleshooting the VMP-M GUI, page 184
- Troubleshooting the MCE, page 185
- Troubleshooting the MPE, page 202
- Troubleshooting the SAL, page 208
- Troubleshooting the AWM, page 210
- Troubleshooting the Service Instances, page 221

Troubleshooting the VMP Service Manager GUI (VMP-M)

The VMP Service Manager GUI (VMP-M process) provides valuable troubleshooting functions, including system diagnostics, service diagnostics, logging, and events. For more information, see the following sections:

- Displaying High-Level Overview Information for the VMP, page 106
- System Diagnostics, page 151
- Service Diagnostics, page 154
- Logs, page 157
- Events, page 156

Troubleshooting Deployment

- OVA Does Not Deploy, page 160

If this procedure does not resolve the problem, use the VMware interface to investigate.

OVA Does Not Deploy

Impact on the End User

The OVA did not deploy successfully (failed to start or did not complete).

Possible Reasons for Problem

- Bad MD5 checksum
- VM resources problem

Resolution/Logs: MD5 Checksum

Verify the posted MD5 checksum with the downloaded image.

Resolution/Logs: VM Resources

Check the VMWare logs.

Troubleshooting Access/Configuration

- VMP-M GUI Not Accessible—Network Connectivity, page 160
- VMP-M GUI Not Accessible—PAM Rebooting or Powered Off, page 161
- VMP-M GUI Not Accessible—PAM & External DNS Interaction, page 161
- Problem Logging In to VMP-M GUI, page 162
- Cannot Save Configuration In VMP-M GUI, page 162
- 500 Server Error, page 162
- 400 Bad Request or 404 Not Found, page 163

If the procedures in this section do not resolve the problem, collect the following log from the PAM:

```
tar -cvf logs.tar /var/log/*
```

VMP-M GUI Not Accessible—Network Connectivity

Impact on the End User

The VMP-M process is not accessible.

Possible Reasons for Problem

Network connectivity

Error/Event Messages

Examine the /var/log/tomcat/catalina.out file for error/exception messages like the following:

```
SEVERE: Exception initializing page context
java.lang.IllegalStateException: Cannot create a session after the response has been committed at
org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:102)
```

Examine the /var/log/supervisor/supervisord.log file for the following message:

```
INFO exited: docserver_app (exit status 7; not expected)
```

Resolution/Logs

1. Ping the device to see if it can be reached.
2. If the device cannot be reached, correct the networking issue.
3. If the device can be reached, log in to the PAM and verify the presence of the VMP-M process status using the **supervisorctl status** command.
4. If the VMP-M process is not running, examine the catalina.out logs for more details about the process failure.
5. If any of the processes are not in **RUNNING** state, use the following command to restart the process:

supervisorctl *process_name* **restart**

VMP-M GUI Not Accessible—PAM Rebooting or Powered Off

Impact on the End User

The VMP-M process is not accessible.

Possible Reasons for Problem

PAM is rebooting or powered off

Error/Event Messages

Examine the /var/log/supervisor/supervisord.log file for CRITICAL, WARNING, and ERROR error messages.

Resolution/Logs

Check the power state of the PAM VM in VCenter.

VMP-M GUI Not Accessible—PAM & External DNS Interaction

Impact on the End User

The VMP-M process is not accessible.

Possible Reasons for Problem

Interaction between PAM & External DNS

Error/Event Messages

Examine the /var/named/data/named.run this file for error messages.

Resolution/Logs

a. Need to make sure leadership election is proper and that the interaction with the external DNS is working properly.

b. NTP clock should be present for both PAM nodes and DNS servers.

Even after making sure the DNS interaction is fine, the log_export could be a very useful CLI which collects all required logs and can export to any ftp server. Logs could then be accessed to locate the issue.

```
 [admin@PAMx1-1 ~]$ sudo log_export
Usage: /opt/cisco/VMP/bin/log_export [-d | --delete-exported-logs] <FTP_SERVER> <USER> <PASSWORD>
```

```
Export log files under /var/log to remote FTP server.

FTP_SERVER                      FTP server hostname / IP
USER                            FTP server user name
PASSWORD                        FTP server password
[-d | --delete-exported-logs]     Delete exported log files
[--help]                        Display usage
[admin@PAMx1-1 ~]$
```

Problem Logging In to VMP-M GUI

Impact on the End User

The user cannot log in to the VMP-M GUI.

Possible Reasons for Problem

Incorrect login credentials

Error/Event Messages

If access is denied, the /var/log/tomcat/catalina.out log file provides more details about the problem. Examine the file for error messages like the following:

```
ACCESS_AUDIT_GRANTED: %[ch=wap][mid=1005]: Granted access to user admin with Authorizations
[defaultAccess] is attempting to access FilterInvocation
```

Resolution/Logs

Use the default username/password **admin**/**default**.

Cannot Save Configuration In VMP-M GUI

Impact on the End User

The user is ejected from the GUI when trying to save the VMP configuration.

Possible Reasons for Problem

Idle timeout after one hour (60 minutes)

Error/Event Messages

The user is returned to the GUI login screen.

Examine the var/log/tomcat/catalina.out log file for process errors.

Resolution/Logs

Make and save a configuration change, or click a tab or refresh icon, before the one-hour idle timeout expires.

If the problem persists, try to log in using a different web browser.

500 Server Error

Impact on the End User

The VMP configuration/status APIs return a 500 Server Error error code.

Possible Reasons for Problem

The PAM is powered off or rebooting

Network error

Service Manager/DocServer application error

Error/Event Messages

Examine the /var/log/supervisor/pam-restapi.err.log log file for error messages like the following:

```
error: [Errno 32] Broken pipe
```

Resolution/Logs

Verify that the PAM IP address can be reached.

Verify that all the processes are in **RUNNING** state, using the **supervisorctl status** command.

400 Bad Request or 404 Not Found

Impact on the End User

The VMP configuration/status APIs return a 400 Bad Request or 404 Not Found error code.

Possible Reasons for Problem

There is an incorrect URI or body in the API call.

Error/Event Messages

Examine the /var/log/supervisor/pam-restapi.err.log API error log file and verify that the response is 200 OK.

If the response is anything other than 200 OK, examine the /var/log/opt/cisco/VMP/errorlog/service-mgr-errorlog.current log file for error messages like the following:

```
(ERRO)sm_watcher.js:33 -> Error retrieving documents, containerId = smregion_0, objType=smdiagnostics
```

Resolution/Logs

Verify that the request contains no formatting errors, and that the attempted operation is supported. See the *Cisco Virtual Media Packager Release 2.10 API Guide* for the correct formatting.

Correct the formatting and try the API requests again.

AWM GUI Overview

- The AWM GUI runs within the VMP-M application that runs on top of the node server.
- The AWM GUI runs on each PAM VM and binds to port 8023 for HTTPS access (not for external).
- This GUI is accessible from the VMP-M GUI service instance context.
- The AWM GUI is started by supervisord, and in case of failure, is automatically restarted.

AWM GUI Page Not Found

If you see a Page Not Found error when trying to launch the AWM GUI, take the following steps to resolve the problem.

1. Log in to the PAM VM using the VM address specified in the VMP-M GUI URL.
2. Enter the following command to determine whether the AWM GUI server is running.

   ```
   supervisorctl status awm-ui
   ```

3. If the awm-ui is not running, enter the following command to start it.

   ```
   supervisorctl restart awm-ui
   ```

Troubleshooting Playback Failures

- Playback Failure—DNS Problem, page 164
- Playback Failure—NTP Problem, page 165
- Playback Failure—Network Connectivity Problem, page 165
- Playback Failure—Basic Configuration Problem, page 166
- Playback Failure—Incorrect Bitrate Configuration, page 166
- Playback Failure—Captions/TTML Not Visible, page 166
- Playback Failure—Captions/TTML Out of Sync, page 166
- Playback Failure—Incorrect Symbols in Captions, page 167
- Playback Failure—ESAM Problem, page 167
- Playback Failure—Capture Unsuccessful, page 167
- Playback Failure—Service Instance Not Activated, page 168
- Playback Failure—Asset Workflow Template Not Enabled, page 168
- Playback Failure—Endpoint VIP Config Failure, page 168
- Capture Unsuccessful, page 169
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- Service Instance Not Activated—VM Resources, page 171
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- General Playback Failure/Buffering, page 174

Playback Failure—DNS Problem

Impact on the End User
Playback failed.

Possible Reasons for Problem
DNS problems

Error/Event Messages

Verify that the /var/log/opt/cisco/VMP/errorlog/ pam-dns-errlog.current error log file does not contain any errors.

Verify that the FQDN entry is correct for the playback callout URL.

Resolution/Logs

Verify that the client receives an appropriate redirect to the MPE-IPVS.

Verify that the MPE-IPVS provides the correct redirect information for reaching the MPE-Worker.

Verify that the DNS transaction key is valid and has not expired.

Playback Failure—NTP Problem

Impact on the End User

Playback failed.

Possible Reasons for Problem

NTP configuration or synchronization problem

Error/Event Messages

Verify that the NTP server is running and able to sync up:

Resolution/Logs

Verify that the PAM, DNS servers, MCE-Workers, MPE-Workers are all time-synchronized.

Playback Failure—Network Connectivity Problem

Impact on the End User

Playback failed.

Possible Reasons for Problem

Network connectivity problem

Error/Event Messages

Check the connectivity between the following components:

- Client and PAM
- Client and MPE
- MPE and PAM
- MPE and DRM server
- MPE and MCE
- MCE and PAM

Resolution/Logs

Verify that the client can reach the DNS server.

Verify that the client can reach the MPE-IPVS given by the DNS-server's redirect response.

Verify that the client can reach the MPE-Worker.

Playback Failure—Basic Configuration Problem

Impact on the End User

Playback failed.

Possible Reasons for Problem

Basic configuration problem

Error/Event Messages

Verify that the VMP configuration is intact. See Configuring the VMP Using the VMP Manager GUI, page 78.

Resolution/Logs

Confirm that all settings are set as intended through the VMP-M GUI or API.

Playback Failure—Incorrect Bitrate Configuration

Impact on the End User

Playback failed.

Possible Reasons for Problem

Incorrect configuration of bitrates

Error/Event Messages

Enable trace error logging in the MPE:

Look for bitrate mismatch-related logs to confirm that the problem is a bad bitrate configuration.

Resolution/Logs

Verify that the bitrate settings in the Asset Publish Templates are correct. Deviations exceeding 5% of the actual stream bitrate can cause problems.

Playback Failure—Captions/TTML Not Visible

Impact on the End User

Playback failed.

Possible Reasons for Problem

Captions/TTML not visible

Resolution/Logs

Verify that the required Captions/TTML are present in the source feed.

Examine the logs in the MPE for more information about the problem.

Playback Failure—Captions/TTML Out of Sync

Impact on the End User

Playback failed.

Possible Reasons for Problem

Captions/TTML out of sync between video and audio

Problem with the client

Error/Event Messages

Look for error and event messages at the client.

Resolution/Logs

Verify that the captions/TTML are synced between the video and the audio in the original feed.

Restart the client and verify that the captions/TTML are synced between the video and the audio in the playback.

Playback Failure—Incorrect Symbols in Captions

Impact on the End User

Playback failed.

Possible Reasons for Problem

Escape sequences such as **>** instead of **>** and other symbols in captions

Error/Event Messages

Examine the client player screen for this problem

Resolution/Logs

This is a known player issue that must be addressed by the player vendor or developer.

Playback Failure—ESAM Problem

Impact on the End User

Playback failed.

Possible Reasons for Problem

ESAM advertisement not honored

Error/Event Messages

N/A

Resolution/Logs

Verify that the POIS server is up.

Verify network connectivity between the POIS server and the DCM server.

Verify network connectivity between the POIS server and the MCE-Workers.

Playback Failure—Capture Unsuccessful

Impact on the End User

Playback failed.

Possible Reasons for Problem

Capture was unsuccessful

Error/Event Messages

See Capture Unsuccessful, page 169.

Resolution/Logs

See Capture Unsuccessful, page 169.

Playback Failure—Service Instance Not Activated

Impact on the End User

Playback failed.

Possible Reasons for Problem

Service instance not activated successfully

Error/Event Messages

See Service Instance Not Activated—VM Resources, page 171 and Service Instance Not Activated—Image Version, page 171.

Resolution/Logs

See Service Instance Not Activated—VM Resources, page 171 and Service Instance Not Activated—Image Version, page 171.

Playback Failure—Asset Workflow Template Not Enabled

Impact on the End User

Playback failed.

Error/Event Messages

See AWT Not Enabled—Asset Resolver Problem, page 215 and Bad Playback Quality—Bitrate Settings, page 171.

Resolution/Logs

See AWT Not Enabled—Asset Resolver Problem, page 215 and Bad Playback Quality—Bitrate Settings, page 171.

Playback Failure—Endpoint VIP Config Failure

Impact on the End User

Playback failed.

Possible Reasons for Problem

Playback Endpoint VIP Config Failed

Resolution/Logs

a. zookeeper details is helpful to debug IPVS nodes details.

b. make sure VIP is assigned to IPVS nodes. If assigned, check the service agent logs to see further details about the issue.

```
[zk: localhost:2181(CONNECTED) 1] get /VMP/services/ums-0-5/apps/ums-0-5-smplaybackep-x1pe11/
ipvsConfig    ipvsNodes     status        command       state         awmConfig     workers
script        messages      handler
```

```
[zk: localhost:2181(CONNECTED) 1]
```

c. make sure external DNS server is able to resolve the request domain to the MPE-IPVS to get the MPE-Worker details, nslookup, dig are useful commands to make sure the DNS resolution happens correctly.

Capture Unsuccessful

Impact on the End User

The capture was unsuccessful.

Possible Reasons for Problem

Storage setup problem.

Error/Event Messages

Verify that the cksum of the MPD update in the MCE is updating periodically:

```
cksum MPD
```

Examine the following error log in the MCE for more information about the capture failure:

```
[root@MCE-1 ~]# cd /var/log/opt/cisco/VMP/errorlog/
[root@MCE-1 errorlog]# cat service-agent-log.current | grep ERR
04/15/2014 15:08:57.612: (7089)(ERRO)MceAgent.js:205 -> Invalid SalConfig “”04/15/2014 15:54:41.498:
(7089)(ERRO)CareReceiver.js:316 -> Getting data failed
/VMP/services/live-0-3/apps/live-0-3-smcaptureep-CE1/workers/live03-smcaptureep-CE1-0/command
Exception: NO_NODE[-101]
```

Resolution/Logs

Verify that the storage is of NFS type.

Verify connectivity to the storage device.

Verify the appropriate capacity settings on the storage device.

cDVR Capture Failed to Start

Possible Reasons for Failure

The MCE Task Controller might have passed the wrong configuration:

- The ZooKeeper path is not present.
- The ZooKeeper server is not present.
- The ZooKeeper is not running
- The “instancePath” is not present.
- The “interfaces” is not present or is configured incorrectly.
- The “recordingStart” is not present or start time past the current stream time and duration.
- The “recordingDuration” is not present or configured incorrectly.
- The SourceURL/SourceIP for the profiles is not valid.
- Capture Endpoint VIP Configuration Failure

Correcting the Problem

- Check the configuration on the VMP GUI for any errors
- Disable and enable the asset work flow.
- zookeeper details could be helpful to debug HAProxy nodes details and to make sure VIP is assigned to HAProxy nodes. If assigned, check the service agent logs to see further issues.

```
[zk: localhost:2181(CONNECTED) 1] get /VMP/services/ums-0-5/apps/ums-0-5-smcaptureep-xxx
 ipvsConfig   ipvsNodes    status       command      state        awmConfig    workers
script       messages     handler
```

For more logs, customers can use log_export command to collect all the required logs and export it to any ftp server. From there support/eng team could access the logs to find out the issue.

Impact on the End User

The recording does not start.

Affected Module

cDVR Capture Application

VOD Capture Failed to Start

Possible Reasons for Failure

- The ZooKeeper server is not present.
- The ZooKeeper is not running
- The “instancePath” is not present.
- The “interfaces” is not present or is configured incorrectly.
- The sourceURL for the profiles is not valid or the file location is not accessible or the file is not present/corrupted or not a supported format.

Correcting the Problem

Check the configuration on the VMP GUI for any errors

Disable and enable the asset workflow.

Impact on the End User

The recording does not start.

Affected Module

VOD Capture Application

VOD/cDVR/LIVE Capture Failed with Storage Failure

Possible Reasons for Failure

- COS/NAS storage down or not reachable
- COS/NAS storage writes failed.
- Storage network interface down.

Correcting the Problem

Check for possible errors or alarms on external NAS storage or COS.

Check for storage usage.

Check for network connectivity between MCE nodes and COS/NAS storage.

Impact on the End User

The recording will stop and may relocate to another worker.

Also refer to cDVR Capture Failed to Start, page 169.

Service Instance Not Activated—VM Resources

Impact on the End User

The service instance failed to activate successfully.

Possible Reasons for Problem

Number of available VM resources is less than the minimum SLA

Error/Event Messages

The transaction logs show the node status of the application belonging to the affected service instance as either **critical** or **warning**. For example:

```
2014-04-17 14:10:53 SIC 10366 App Status update - vod_2_default-smcaptureep-0 critical
```

Resolution/Logs

Add the VM resources and re-enable the service instance.

Service Instance Not Activated—Image Version

Impact on the End User

The service instance failed to activate successfully.

Possible Reasons for Problem

Image version does not match the version configured in the image manifest

Error/Event Messages

In the VMP-M GUI, verify that the image version of the installed VM matches the version configured in the image manifest.

Resolution/Logs

Add new VMs with the required version, or change the version of the existing VMs and re-enable the service instance.

Bad Playback Quality—Bitrate Settings

Impact on the End User

Playback video quality is jittery or micro-blocking

Possible Reasons for Problem

Bitrate settings

Error/Event Messages

Examine the transaction logging mpe worker node. The time to serve the fragment indicates whether the network can deliver the fragment to the client with good quality.

Resolution/Logs

Check the bitrate settings in the Asset Publish Template configuration.

Bad Playback Quality—Jittery Network

Impact on the End User

Playback video quality is jittery or micro-blocking

Possible Reasons for Problem

Network is jittery

Error/Event Messages

N/A

Resolution/Logs

Check the network quality statistics, including latency, loss, and jitter.

Bad Playback Quality—Jittery Feed

Impact on the End User

Playback video quality is jittery or micro-blocking

Possible Reasons for Problem

Original feed might be jittery

Error/Event Messages

N/A

Resolution/Logs

View the original feed.

Multi-Language Problems

Impact on the End User

Multi-language does not play.

Possible Reasons for Problem

Source might be having problems sending out multi-language streams

Error/Event Messages

The MPE's transaction log shows the requests for different languages selected from the player. Look for 404/500 error codes in the response.

Resolution/Logs

Fix the source issue and try playback again.

If the issue persists, examine the MPD file generated by the MCE for the list of all available audio/video bitrate details.

In the Asset Publish Template, verify that the multiple audio bitrates are properly configured (per the source).

DVR Window Problems

Impact on the End User

The DVR window not displayed properly in the player.

Possible Reasons for Problem

DVR window configuration not pushed properly to MCE device

NFS mount point problems

Poor NFS storage device performance

Error/Event Messages

The MCE service agent logs error messages like the following:

```
[root@MCE-1 ~]# cd /var/log/opt/cisco/VMP/errorlog/
[root@MCE-1 errorlog]# cat service-agent-log.current | grep ERR
04/15/2014 15:08:57.612: (7089)(ERRO)MceAgent.js:205 -> Invalid SalConfig “”
```

Trickmode Problems

Impact on the End User

Trickmode does not work correctly.

Possible Reasons for Problem

DVR window configuration is incorrect

Performance problems with NFS read/write access

Error/Event Messages

Examine the MPE’s transaction logs for 404/500 error codes in the fragment responses.

Resolution/Logs

Verify that the DVR window configuration is correct and the NFS performance is good.

Variant Playlist Problems

Impact on the End User

The variant playlist is not rendered to the clients

Possible Reasons for Problem

Variant bitrate configuration (video/audio) incorrect

Error/Event Messages

Examine the MPE’s transaction logs for 404 error codes.

Resolution/Logs

Verify that the variant video and audio bitrates are configured correctly (per the source, and within the 5% buffer limit).

General Playback Failure/Buffering

Impact on the End User

There are general playback failures and buffering problems.

Possible Reasons for Problem

For Live playout, HTTP header policies configured incorrectly.

Error/Event Messages

Examine the MPE's transaction logs for 404 error codes that indicate that the header policy is not defined correctly for Live playout.

Error/Event Messages

For Live playout, verify that the manifest expiry header and the cache-control header value are set to zero (0).

Player on buffering mode/404 Error on MCE/MPE During Redundancy Test.

Problem/Impact

There is a small window when the MCE goes down and is detected an updated to all MCEs during which a request is initiated from the client, a 502 error occurs.

Possible Reasons for Problem

During the time that one MCE goes down, it takes approximately 8 seconds before requests can be handled. Based on current behavior and design, this is expected.

Resoulution

Player needs a refresh.

Troubleshooting the PAM

The following sections contain information to help you troubleshoot problems involving the PAM.

- Verifying That All Processes Are Running on a PAM HA Node, page 174
- Installed VM Not Found, page 175
- Rest API (DNS) Returns 500 Internal Server Error, page 175
- Rest API (DNS) Returns 500 Internal Server Error, or Process Not Coming Up, page 175
- Reboot of ZooKeeper Leader Node Returns 500 Internal Server Error, page 177
- When Using the External DNS, nslookup Is Not Working From the PAM, page 177
- PAM Cannot Update the DNS Entry in the External DNS, page 177
- Redis AppEngine Node Failure, page 178

Verifying That All Processes Are Running on a PAM HA Node

To verify that all processes are running on a PAM HA node, issue the following API call:

```
GET http:pam_node:5067/v1/roles/leaders
```

Verify that the response includes the following roles:

```
[rabbitmq, pam-installedVm, pam-docserver, cos-controller, pam-dns, service-mgr, pam-platsrv, pam-zone,
controller, pam-vmLoadBalancer, mgmt-docserver, mongo]
```

Installed VM Not Found

When nodes are added to the VMP-M GUI, an AIC requesting the VM might return a “VM not found” error.

If this error is returned, take the following steps to diagnose the problem:

1. Check the /var/log/opt/cisco/VMP/errorlog/pam-docserver-errorlog.current file.

The cli_pamds-errorlog.current file should contain the node name that was configured and the REST API to the PAM. Look for the REST API response.

- If the REST API response is not present, the pam-docserver has not yet received the watch from the DocServer.
- If the response is present, check the response code. If the code is 400 Bad Request, some of the parameters in the node object might not have passed validation.

2. Check the /var/log/opt/cisco/VMP/errorlog/pam-installedVm-errorlog.current file.

Look for the **update** keyword along with the name of the node. You might see one of the following errors in the logs:

- Interface type not found—A mandatory interface was not provided for the node.
- IP not reachable—The PAM cannot reach the Management interface IP address.
- Interface must be an address—There is a misspelling or other typographical error in the interface field for the node.
- Duplicate IP exists—One of the nodes is using the same IP address as this interface.
- Zone needed for VM—The zone field, which is mandatory for an installed VM, is missing.
- Zone not found—The zone field that was entered is not configured.
- Image Personality needed for VM—The image personality, which is mandatory for the VM, is missing.

Rest API (DNS) Returns 500 Internal Server Error

A REST API call to add a record to the DNS might return a 500 Internal Server Error.

If this error code is returned, one of the following problems might have occurred:

- The DNS process might not have been initialized, resulting in a timeout for the REST API call. Look in the /var/log/opt/cisco/VMP/errorlog/pam-dns-errorlog.current file to see if the REST API call reached the DNS process.
- The DNS process might have crashed. If so, the /var/log/supervisor/pam-*process name*.err.log file shows the error exception.

Rest API (DNS) Returns 500 Internal Server Error, or Process Not Coming Up

A REST API call to add a record to the DNS might return a 500 Internal Server Error.

If this error code is returned, the process might not be up, or a leader might not have been elected for the process. Use the following procedure to analyze the problem:

1. Run **zkCli.sh** and use **ls /roles** to examine the corresponding node.

If the node is present, use **ls /role/leader** to determine whether an entry in /roles has a corresponding entry in /role/leader. If that is the case, that process might be crashing repeatedly.

2. The following table maps the supervisor process name to the ZooKeeper node and associated log files.

Table 0-1

Supervisor Process	ZooKeeper Node Name	Error Log (/var/log/opt/cisco/VMP/errorlog/)	Supervisor Logs (/var/log/supervisor)	Transaction Logs /var/log/opt/cisco/VMP/translogs
pam-installedVm	pam-installedVm	pam-installedVm-errorlog.current	pam-installedVm.log pam-installedVm.err.log	pam-installedVm.log
pam-dns	pam-dns	pam-dns-errorlog.current	pam-dns.log pam-dns.err.log	pam-dns.log
pam-mongoWatch	mongo	pam-mongoWatch-errorlog.current	pam-mongoWatch.log pam-mongoWatch.err.log	mongo.log
pam-docserver	pam-docserver	pam-docserver.log	pam-docserver.log pam-docserver.err.log	pam-docserver.log
pam-platsrv	pam-platsrv	pam-platsrv-errorlog.current	pam-platsrv.log pam-platsrv.err.log	pam-platsrv.log
pam-rabbitMqWatch	rabbitmq	pam-rabbitMqWatch-errorlog.current	pam-rabbitMqWatch.log pam-rabbitMqWatch.err.log	rabbitmq.log
pam-vmLoadBalancer	pam-vmLoadBalancer	pam-vmLoadBalancer-errorlog.current	pam-vmLoadBalancer.log pam-vmLoadBalancer.err.log	pam-vmLoadBalancer.log
pam-restapi		pam-restapi-errorlog.current	pam-restapi.log pam-restapi.err.log	pam-restapi.log
pam-zone_app	pam-zone	pam-zone-errorlog.current	pam-zone.log pam-zone.err.log	pam-zone.log
mgmt-docserver	mgmt-docserver	mgmt-docserver-errorlog.current	docserver_app.log docserver_app.err.log	mgmt-docserver.log
controller	controller	VMPController-errorlog.current	VMP_launcher.log VMP_launcher.err.log	controller.log
cos-controller	cos-controller	COSController-errorlog.current	cos-aic.log cos-aic.err.log	cos-controller.log

Table 0-1

Supervisor Process	ZooKeeper Node Name	Error Log (/var/log/opt/cisco/VMP/errorlog/)	Supervisor Logs (/var/log/supervisor)	Transaction Logs /var/log/opt/cisco/VMP/translogs
service-mgr	service-mgr	service-mgr-errorlog.current	sm_app.log sm_app.err.log	sm
event-aggregator	event-aggregator	event-aggregator.current	event_aggregator.log event_aggregator.err.log	event-aggregator
roleserver	roleserver	roleserver-errorlog.current	roleserver_app.log roleserver_app.err.log	roleserver

Examine the relevant /var/log/opt/cisco/VMP/errorlog/*processName*.current logs to determine whether the Rest API call reached the corresponding process.

3. A 500 internal error can also be returned if the process crashed. Examine the /var/log/supervisor/*cli_process*.err.log to determine the exception of the error.

Reboot of ZooKeeper Leader Node Returns 500 Internal Server Error

If the ZooKeeper leader node is rebooted, a new ZooKeeper leader is elected, which can take up to 15 seconds. After the election of the new ZooKeeper leader, the other applications come up and elect their leaders. Therefore, you might see a 500 internal server error while the applications elect their leaders. This is expected behavior.

When Using the External DNS, nslookup Is Not Working From the PAM

If nslookup for the hostname.domain is not returning the desired IP address, check the external DNS for error indications.

PAM Cannot Update the DNS Entry in the External DNS

If the PAM cannot update the DNS entry in the external DNS, check the /var/log/opt/cisco/VMP/errorlog/pam-dns-errorlog.current file to determine the problem.

- If the file indicates “bad time” error, then there is a significant time difference between the PAM and the external DNS.

  To correct the problem, sync up the time between the PAM and the external DNS, or use the same NTP server for both.

- If the file indicates a “bad transaction key” error, then the transaction key might be expired or no longer valid.

  To correct the problem, regenerate the transaction key, update the external DNS to reflect the new key, and redeploy the PAM using the new key.

- If the file indicates a “bad request” error, then one or more field values might be missing or incorrect.

  To correct the problem, correct the bad field values.

Redis AppEngine Node Failure

Condition: After rebooting master redis, redis appengine is released with a fault state (service config failed). To correct the problem, follow the steps below:

- Clear the alarm by moving the node to maintenance mode and then back to In Service.
- Log into the AppEngine node and restart the Service Agent.

Troubleshooting the PAM Service Manager

- SM Overview, page 178
- SM Logging, page 178
- 400 Bad Request, Invalid JSON body sent in the request, page 179
- 400 Bad Request, Invalid JSON schema, page 179
- Bad Request, Non supported type in requestkeyprofile, page 179
- 400 Bad Request, Non supported operation for this object serviceinstances, page 180
- 400 Bad Request, Non supported type in requestserviceinstance, page 180
- 500 Internal Server Error SM internal error, owner not defined, page 181
- 503 Service Unavailable Error, page 181

SM Overview

The SM provides an interface service to manage the configuration data and monitor vital activities in the VMP. The SM binds to port 8443 for external HTTPS access, and to port 8001 for local HTTP access via loopback address (127.0.0.1).

The SM runs on a PAM VM and supports an active/hot-standby HA model. There can be multiple hot-standby SM instances, with one selected as the leader to service the API. All hot-standby SM instances complete the startup sequence, except any interface request is rejected with HTTP error 503. The leader binds to the SM FQDN via DNS. The SM FQDN has the following format:

`service-mgr.`*`domain_name`*

where:

- **service-mgr** is fixed.
- *domain_name* is derived from the OVA configuration, such as **myvideo.com**.

The SM is started by supervisord, and is automatically restarted in case of failure.

SM Logging

The VMP provides transactional logging for the PAM Service Manager.

The log messages provide the following information:

- Date
- Name and version of the application
- Remote client IP address and port number

- Full URL of the request
- Type of operation (GET, POST, PUT, DELETE)
- Request body for POST and PUT operations
- Any log messages

You can view the log messages on the VM in the /var/log/opt/cisco/VMP/errorlog directory.

The following is a sample log message for INFO:

```
[2014-02-26 15:27:08.426] [INFO] [default] -
{"date":"2014-02-26T23:27:08.425Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/cos_0_default/asset
workflowtemplates/a123","requestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance
_live-0-default.smcaptureep.0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"s
mtenant_system.smnasstore.S1","state":"Enabled"}},"message":"Creation of object assetworkflowtemplates
with Object Id a123 received"}
```

400 Bad Request, Invalid JSON body sent in the request

A REST API call might return a 400 Bad Request, Invalid JSON body sent in the request, with a log message like the following sample:

```
{"date":"2014-02-26T23:34:05.218Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/cos_0_default/asset
workflowtemplates/a123","requestBody":{},"message":"Invalid JSON body sent in the request as no
properties specified"}
```

If you receive this error code, check the Content-Type in the request and make sure that it is set to **application/json**. Do not set the Content-Type to anything else. If you do so, the VMP parses the body of the request as empty properties and returns this error code.

400 Bad Request, Invalid JSON schema

A REST API call might return a 400 Bad Request, Invalid JSON schema, with the following response output:

```
SyntaxError: Unexpected string
    at Object.parse (native)
    at /opt/cisco/service-mgr/node_modules/express/node_modules/connect/lib/middleware/json.js:75:25
    at IncomingMessage.onEnd
(/opt/cisco/service-mgr/node_modules/express/node_modules/connect/node_modules/raw-body/index.js:109:7)
    at IncomingMessage.g (events.js:175:14)
    at IncomingMessage.EventEmitter.emit (events.js:92:17)
    at _stream_readable.js:920:16
    at process._tickCallback (node.js:415:13)
```

If you receive this error code, check the request body to see if any quotation marks (“) or commas (,) are missing, and verify the rest of the schema.

Bad Request, Non supported type in requestkeyprofile

A REST API call might return a 400 Bad Request, Non supported type in requestkeyprofile, with log messages like the following sample:

```
[2014-02-27 11:52:55.120] [INFO] [default] -
{"date":"2014-02-27T19:52:55.120Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/keyprofile/123","requestBody":{"name
```

":"0","properties":{"captureEndpointRef":"smserviceinstance_live-0-default.smcaptureep.0","assetLifecyc
lePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smtenant_system.smnasstore.S1","state":"Enabl
ed"}},"message":"Creation of object keyprofile with Object Id 123 received"}
[2014-02-27 11:52:55.121] [ERROR] [default] -
**{"date":"2014-02-27T19:52:55.121Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/keyprofile/123","requestBody":{"name
":"0","properties":{"captureEndpointRef":"smserviceinstance_live-0-default.smcaptureep.0","assetLifecyc
lePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smtenant_system.smnasstore.S1","state":"Enabl
ed"}},"message":"Bad Request, Invalid Object Type keyprofile"}**

This problem can occur if there is an invalid object name in the URL. Verify the URL and the object name sent in the URL.

400 Bad Request, Invalid URL

A REST API call might return a 400 Bad Request, Invalid URL.

If this error code is returned, verify the URL.

400 Bad Request, Non supported operation for this object serviceinstances

A REST API call might return a 400 Bad Request, Non supported operation for this object serviceinstances, with log messages like the following sample:

[2014-02-27 11:57:54.781] [INFO] [default] -
{"date":"2014-02-27T19:57:54.780Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/vod_1_default","req
uestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_live-0-default.smcaptureep.
0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smtenant_system.smnasstore.S1
","state":"Enabled"}},"message":"Creation of object serviceinstances with Object Id vod_1_default
received"}
[2014-02-27 11:57:54.781] [ERROR] [default] - [The operation create cannot be performed on the object smserviceinstance as it is not supported']
[2014-02-27 11:57:54.781] [ERROR] [default] -
**{"date":"2014-02-27T19:57:54.781Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/vod_1_default","req
uestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_live-0-default.smcaptureep.
0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smtenant_system.smnasstore.S1
","state":"Enabled"}},"message":"The operation create cannot be performed on the object
serviceinstances as it is not supported"}**

This problem indicates that an incorrect operation was performed on the object.

400 Bad Request, Non supported type in requestserviceinstance

A REST API call might return a 400 Bad Request, Non supported type in requestserviceinstance, with log messages like the following sample:

[2014-02-27 12:13:58.532] [INFO] [default] -
{"date":"2014-02-27T20:13:58.532Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstance/vod_1_default/captur
eendpoints/cap_ep1","requestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_liv
e-0-default.smcaptureep.0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smten
ant_system.smnasstore.S1","state":"Enabled"}},"message":"Creation of object captureendpoints with
Object Id cap_ep1 received"}
[2014-02-27 12:13:58.533] [ERROR] [default] -
**{"date":"2014-02-27T20:13:58.533Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstance/vod_1_default/captur
eendpoints/cap_ep1","requestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_liv
e-0-default.smcaptureep.0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smten
ant_system.smnasstore.S1","state":"Enabled"}},"message":"Bad Request, Non supported Type in request
serviceinstance"}**

This problem indicates that an incorrect parent type sent for the object in the request. Verify the parent type.

500 Internal Server Error SM internal error, owner not defined

A REST API call might return a 500 Internal Server Error SM internal error, owner not defined, with log messages like the following sample:

```
[2014-02-27 12:08:07.242] [INFO] [default] -
{"date":"2014-02-27T20:08:07.242Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/vod_3_default/captu
reendpoints/cap_ep1","requestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_li
ve-0-default.smcaptureep.0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smte
nant_system.smnasstore.S1","state":"Enabled"}},"message":"Creation of object captureendpoints with
Object Id cap_ep1 received"}
[2014-02-27 12:08:07.243] [DEBUG] [default] - [ 'smserviceinstance : smtenant' ]
[2014-02-27 12:08:07.265] [ERROR] [default] - [ 'Doc client internal error: Error: 404' ]
[2014-02-27 12:08:07.265] [ERROR] [default] -
{"date":"2014-02-27T20:08:07.265Z","appName":"service-mgr","appVersion":"1.0.17","operation":"create","
remoteClientIp":"127.0.0.1","requestUrl":"http://localhost:3000/v2/serviceinstances/vod_3_default/captu
reendpoints/cap_ep1","requestBody":{"name":"0","properties":{"captureEndpointRef":"smserviceinstance_li
ve-0-default.smcaptureep.0","assetLifecyclePolicyRef":"454545","mediaSourceRef":"ud","storageRef":"smte
nant_system.smnasstore.S1","state":"Enabled"}},"message":"owner is not defined, Error: 404"}
```

This problem indicates that containers and documents were not preloaded in the MongoDB. Verify that the necessary containers and documents were preloaded.

503 Service Unavailable Error

When trying to create a statecache endpoint, using POST Request PAM, the PAM responds with a 503 service unavailable error, with log messages like the following:

```
[root@control-pam1-staging errorlog]# showstatus .. status check running.
.............................
network: status Ok, performance n/a, execution time 32 ms
supervisord: status Failed, performance n/a, execution time 47 ms
   ... test: checking supervisord service => (45 ms) ok, service not running
   ... test: checking server ports [9001] => (4 ms) ok
   ... test: checking non running services => (146 ms) 0 supervisord processes running:!
```

If this problem persists,

- run “showstatus” on the PAM node to make sure everything is okay.
- run “supervisorctl to view the status of all processes and check to see if all is okay. If some or all processes are not coming up, try restarting the process(es).
- If that still fails, reboot or contact Technical Support.

Troubleshooting the PAM DocServer

- DocServer Overview, page 182
- DocServer Logs, page 182
- Dependency Timed Out, page 182
- DNS Update Error, page 182

- ZooKeeper Error, page 183
- DocServer Health Check, page 183

DocServer Overview

The DocServer provides a database API to store and retrieve configuration and runtime data from the MongoDB. It also provides a watcher function, notifying other applications when there are changes to the stored configuration objects.

The DocServer binds to port 5087 for interface access. Access to the database API and watcher function are provided for VMP applications indirectly through a Docclient library module. The Docclient library communicates with the DocServer via the DocServer FQDN.

The DocServer supports an active/standby HA model. There can be multiple standby DocServer instances, with one leader elected to provide the interface service. The DocServer uses RoleWatch to elect a leader at startup. The MongoDB is a prerequisite for electing a DocServer leader.

The IP address of the elected DocServer leader binds to the DocServer FQDN via DNS. The DocServer FQDN has the following format:

`mgmt-docserver.`*`domain_name`*

where:

- **mgmt-docserver** is fixed.
- *domain_name* is derived from the OVA configuration, such as **myvideo.com**.

The DocServer is started by supervisord, and is automatically restarted in case of failure.

DocServer Logs

The DocServer logs are located under /var/log/opt/cisco/VMP/errorlog/mgmt-docserver-errorlog.*.

The VMPt current log is in the /var/log/opt/cisco/VMP/errorlog/mgmt-docserver-errorlog.current file.

Dependency Timed Out

You might see the following entry in the mgmt-docserver logs:

```
... RoleWatch: checkwaitTimeout: Timed out waiting for dependencies.
```

This can occur at startup and might indicate issues with the DocServer's dependencies, if they are the only logs you see in mgmt-docserver. The DocServer is waiting for the cli_VMPdns_app and mongodocserver processes to register with ZooKeeper before starting up. If the two processes do not come up, the DocServer continues to wait indefinitely, periodically logging this entry.

If you see entries like these at the end of the DocServer logs, and you are experiencing issues with DocServer not responding, you must determine whether the two processes are up or down.

DNS Update Error

The DocServer depends on the cli_VMPdns_app to update itself for its leadership election. The following log entries indicate an error while updating the DNS process:

```
04/29/2014 18:06:19.452: (3270)(INFO)dnshelper.js:56 -> DNS uri:
http://172.22.116.86:5000/v1/VMPDns/record
```

```
04/29/2014 18:06:19.452: (3270)(INFO)dnshelper.js:67 -> updateDns: DNS Request Body:
{"domain":"cos.cisco.com","host":"pm-172-22-116-86-VMP","record":"CNAME","cname":"mgmt-docserver"},
start date = Tue Apr 29 2014 18:06:19 GMT-0400 (EDT)
04/29/2014 18:06:19.594: (3270)(DETL)dnshelper.js:87 -> updateDns: error updating dns entries... err =
null
04/29/2014 18:06:19.595: (3270)(DETL)dnshelper.js:88 -> updateDns: Total time for request = 142 msec
04/29/2014 18:06:19.596: (3270)(DETL)dnshelper.js:90 -> updateDns: error response code = 500
04/29/2014 18:06:19.597: (3270)(DETL)dnshelper.js:22 -> updateDnsWithRetry: update dns with retry left
= 0, failed with error: {"error":"response code: 500"}
04/29/2014 18:06:19.598: (3270)(INFO)rolewatch.js:306 -> Error updating DNS entries...
```

If you see the “Error updating DNS entries” message, verify that the cli_VMPdns_app is running properly.

ZooKeeper Error

The DocServer depends on the ZooKeeper to register itself for leadership, member election, and so on. If ZooKeeper issues arise, the DocServer receives an error and must restart. The following log entries indicate that the DocServer has lost its connection to the ZooKeeper:

```
04/25/2014 23:29:12.307: (4627)(TRCE)rologger.js:43 -> Disconnected from ZooKeeper.
04/25/2014 23:29:12.308: (4627)(TRCE)rologger.js:43 -> run: Client got disconnected from ZooKeeper...
waiting for 8000 msec for connect event...
04/25/2014 23:29:20.313: (4627)(INFO)rologger.js:35 -> Client connection is lost...
04/25/2014 23:29:23.362: (4627)(TRCE)rologger.js:43 -> Disconnected from ZooKeeper.
04/25/2014 23:29:23.363: (4627)(TRCE)rologger.js:43 -> run: Client got disconnected from ZooKeeper...
waiting for 8000 msec for connect event...
```

If this entry occurs after a DocServer restart and repeats in the log, there is an issue with the ZooKeeper.

DocServer Health Check

When checking the DocServer, you must not only determine that the DocServer is up, you must also determine that the processes on which the DocServer depends are up. To verify that the required processes are up and running on the node, use the following procedure:

- Enter the **ps -aef | grep zookeeper** command and verify that there is a ZooKeeper running.
- Enter the **ps -aef | grep mongod** command and verify that there is a MongoDB running.
- Enter the **ps -aef | grep redis** command and verify that there is a Redis server running.
- Enter the **supervisorctl status docserver_app** command to check the DocServer process.
- Enter the **supervisorctl status cli_VMPdns_app** to check the cli_VMPdns_app.

If there are multiple nodes, enter these commands on each node.

- DocServer Leadership Dependency, page 183
- MongoDB Sanity Check, page 184

DocServer Leadership Dependency

At startup, both the MongoDB and the cli_VMPdns_app must have a leader elected in the ZooKeeper. If either leader is absent, the DocServer hangs until both the MongoDB and the cli_VMPdns_app have leaders. Therefore, after verifying that the ZooKeeper, MongoDB, and Redis server are running, you must determine whether MongoDB and the cli_VMPdns_app have leaders. To do so, issue the following API call:

```
GET http:a="" host:5067/v1/roles/leaders
```

Verify that the response from the ZooKeeper includes all of the leaders.

If you encounter problems with the request, enter the **supervisorctl status** command to verify that the roleserver_app is up and running on the PAM node. Restart the roleserver_app, if necessary. Verify that the response contains the following entries, with valid host addresses:

```
"dns": {
    "host": "172.19.21.219",
    "port": "5000"
    }

"mongo": {
    "host": "172.19.21.219",
    "port": "5000"
    }
```

If the JSON body is empty, the leaders have not been elected. Refer to the DNS and MongoDB troubleshooting to determine why the leaders are absent.

MongoDB Sanity Check

You should perform a sanity check on the MongoDB periodically to verify that it is working properly, even if all of its processes are up and running. To do so, use the following procedure:

1. Enter the **mongo** command from the local shell.

The command prompt should change to ...PRIMARY or ...SECONDARY. If the command prompt does not change, there is a problem with the MongoDB.

2. Enter the **rs.conf()** command from the local shell and verify that all of the configured MongoDB members are present.

Troubleshooting the PAM SICM

In an HA environment, the SICMs are started by supervisord on all PAM HA nodes.

The SICMs running on the PAM HA nodes use RoleWatch to elect a leader. The DocServer is a prerequisite for electing an SICM leader.

The SICM leader queries the DocServer for all active services, and spawns SICs.

Troubleshooting the VMP-M GUI

- VMP-M GUI Overview, page 184
- VMP-M GUI Page Not Found, page 185

VMP-M GUI Overview

The VMP configuration management is provided through a browser-based GUI application, which runs on top of the Apache Tomcat. The GUI runs on each PAM VM and binds to port 8443 for HTTPS access. One GUI application instance is selected as the leader to provide the configuration service. The GUI leader is accessible externally through DNS resolution. The FQDN for GUI has the following format:

`ui.`*`domain_name`*

where:

- **ui** is fixed.

- *domain_name* is derived from the OVA configuration, such as **myvideo.com**.

The Tomcat is started by supervisord, and is automatically restarted in case of failure.

VMP-M GUI Page Not Found

If you see a “Page Not Found” error when trying to launch the VMP-M GUI, take the following steps to resolve the problem:

1. Log in to the PAM VM using the VM address specified in the VMP-M GUI URL.
2. Enter the following command to determine whether the Apache Tomcat server is running:

```
sudo service tomcat status
```

3. If the Tomcat is not running, enter the following command to start it:

```
sudo service tomcat restart
```

For additional troubleshooting, examine the GUI Tomcat server logs in the /usr/share/tomcat/logs/catalina.out directory.

Troubleshooting the MCE

The following sections contain information to help you troubleshoot problems involving the MCE.

- Configuration Problems, page 185
- Ingest Problems, page 186
- MCE Troubleshooting Tools, page 196

Configuration Problems

- live/cDVRCaptureSessionController failed to start, page 185
- TS Bitrate Profiles Merge to the same Profile in the MPD of MCE and M3U8 of the MPE, page 186

live/cDVRCaptureSessionController failed to start

Possible Reasons for Failure

The MPE might have received the wrong configuration:

- The ZooKeeper path is not present.
- The ZooKeeper server is not present.
- The ZooKeeper did not start.
- The “instancePath” is not present.
- The “interfaces” is not present or is configured incorrectly.
- The “tstvWindow” is not present or is set to a bad value (less than 30).
- The SourceURL for the profiles is not valid.

Correcting the Problem

Check and restart the ZooKeeper on the PAM, if needed.

Impact on the End User

The recording does not start.

Affected Module

Live/cDVR Capture Application

TS Bitrate Profiles Merge to the same Profile in the MPD of MCE and M3U8 of the MPE

Possible Reasons for Problem

Incorrect TS bitrate value configured on the DCM.

Correcting the Problem

Make sure The TS bitrate value is correct and different for every video profile.

Affected Module

DCM, MCE, MPE

Ingest Problems

- Live/cDVR Channel stops right after starting due to no EBP in the input feeds, page 187
- Input transport stream has no IDRs for H264 video, page 187
- Input transport stream is not CBR (bit-rate calculation failure), page 187
- Audio/video codec types in the input transport stream are not supported, page 187
- Input stream received empty packets (no useful data), page 188
- Packet Loss on the Input Feeds, page 188
- No Data In the Feed—Ingest Network Cannot Be Reached, page 188
- No Data In the Feed—No Data From Source Feed, page 189
- No PAT In the Feed, page 189
- No PMT In the Feed, page 190
- PTS Discontinuity, page 191
- No Audio PID In a Feed, page 192
- Same Bitrate on Two Different Profiles, page 192
- Different Profiles Have Different Audio Codecs, page 193
- Profiles In a Channel Are From Different Source Channels, page 193
- Feed is a VBR Feed, page 194
- PTS Discontinuity in the Feed, page 195
- VOD Ingest-Recording Status Fails with one Failed Profile, page 195
- MCE Fail to Capture When the Feed is Changed to 25fps, page 195

Live/cDVR Channel stops right after starting due to no EBP in the input feeds

Possible Reasons for Failure

The feed is configured without EBP on the transcoder.

Correcting the Problem

On the transcoder, check the configuration of all of the feeds for the channel and verify that each of the feed is configured with EBP.

Impact on the End User

The Live/cDVR channel fails to start.

Affected Module

MCE

Input transport stream has no IDRs for H264 video

Possible Reasons for Failure

The transcoder configuration is incorrect.

Correcting the Problem

On the transcoder, check the configuration of all of the feeds for the channel and verify that each of the feed is configured with IDR.

Impact on the End User

The Live/cDVR channel stops right after starting. It fails after detecting that there is no IDP on the feeds.

Affected Module

MCE

Input transport stream is not CBR (bit-rate calculation failure)

Possible Reasons for Failure

The transcoder configuration is incorrect.

Correcting the Problem

Stop the recording for the affected profile.

Remove the recording from the MPD.

Impact on the End User

The affected profile is not available for the playback.

Affected Module

Indexer

Audio/video codec types in the input transport stream are not supported

Possible Reasons for Failure

The transcoder configuration is incorrect.

Correcting the Problem

On the transcoder, examine the configuration of the feeds and verify that the audio for all of the profiles (feeds) comes from the same codec.

Impact on the End User

HLS playback works normally, but HSS playback fails, as there is no audio fragment timeline in the MPD file.

Affected Module

MCE

Input stream received empty packets (no useful data)

Possible Reasons for Failure

The transcoder stops sending out data on the profiles.

The ingest network is down.

Correcting the Problem

Check the transcoder to make sure it is sending data to the defined multicast IP address and port.

Verify that the ingest network is up and that the MCE can receive the data from the feeds.

Impact on the End User

The Live/cDVR channel stops when there is no data coming in.

Affected Module

MCE

Packet Loss on the Input Feeds

Possible Reasons for Failure

A network issue could be causing the packet loss.

The input feeds have the packet loss.

Correcting the Problem

Check the network.

Check the input feeds from the transcoder.

Impact on the End User

The Live/cDVR channel is still running, but there might be some streaming issues on playback, such as jitters, micro-blocking, frozen, and so on.

Affected Module

MCE

No Data In the Feed—Ingest Network Cannot Be Reached

Possible Reasons for Failure

The Ingest network cannot be reached.

The source feeds are not sending any data.

The transcoder/encoder is down.

The channel is down.

Impact on the End User

There is no data in the feed on any profile.

The MPD is no longer updating.

The Live/cDVR channel stops after several minutes.

Error/Event Messages

```
04/16/2014 20:42:23.225: node(24307)ERRO:ICaptureSession.h:45-> IOM: [Read timeout occurred. Closing
session]
04/16/2014 20:42:23.226: node(24307)ERRO:Live/cDVRCaptureSession.cpp:428-> No more data on ingest
interface. Failing CaptureSession
04/16/2014 20:42:23.228: node(24307)ERRO:Live/cDVRCaptureSession.cpp:215-> Received index data of size
1476, offset 0
04/16/2014 20:42:23.228: node(24307)ERRO:indexer.cpp:410->
04/16/2014 20:42:23.228: node(24307)ERRO:indexer.cpp:411-> CIndexer: Problems during ingest!!!!
04/16/2014 20:42:23.228: node(24307)ERRO:indexer.cpp:431-> CIndexer: 3 Packets with Bad CCs
04/16/2014 20:42:23.228: node(24307)ERRO:indexer.cpp:493->
04/16/2014 20:42:23.330: node(24307)ERRO:C2ToDashIndexData.cpp:119->
~C2ToDashIndexData():119: ERROR: Failed to receive AVC-I-Picture or Audio or Gap Tag for last EBP
Record:
C2IndexRecord(EBP) Length(15)
Flags:88
SapType:251
GroupingID:2
Time: 7307491111562289224
SegmentIndex: 32245880
```

No Data In the Feed—No Data From Source Feed

Possible Reasons for Failure

The source feed is not sending any data.

There is a bad configuration on the transcoder/encoder for the affected profile.

Impact on the End User

There is no data in the feed on one of the profiles.

The MPD is no longer updating.

The playback has stopped.

Error/Event Messages

No error messages are sent to the Live/cDVRCaptureApp and live/cDVRSessionController logs.

Examine the LookupService log for error messages like the following:

```
(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel: abc-10p1
```

No PAT In the Feed

Possible Reasons for Failure

There is a bad configuration on the transcoder/encoder for the affected profile.

The source feed to the transcoder failed.

Impact on the End User

There is no PAT in the feed.

The Live/cDVR channel failed to start.

The Live/cDVRCaptureApp and Live/cDVRSessionController started to run but then stopped immediately.

All of the resources for the affected channel were cleaned up.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/21/2014 17:03:55.800: node(29377)ERRO:TrickAll.cpp:2417-> ERROR: PAT not found
04/21/2014 17:03:55.800: node(29377)ERRO:TrickAll.cpp:3075-> ERROR: No PAT found
04/21/2014 17:03:55.808: node(29377)ERRO:TrickAll.cpp:4347-> ERROR: TrickAll::ProcessMpegData Ingest
fails. Check ingest stream and/or adjust Ingest Knobs
04/21/2014 17:03:55.808: node(29377)ERRO:indexer.cpp:244-> ***CIndexer: ERROR: ProcessMpegData failed
due to bad input data msa_status 0***
04/21/2014 17:03:55.809: node(29377)ERRO:Live/cDVRCaptureSession.cpp:298-> Stopping
Live/cDVRCaptureSession because of bad input data
04/21/2014 17:03:55.810: node(29377)ERRO:TrickAll.cpp:1361-> ERROR: TrickAll::Close(goid 1) **Bad
content, Aborting Ingest**
04/21/2014 17:03:55.810: node(29377)ERRO:TrickAll.cpp:1506-> ERROR: TrickAll::Close(goid 1) **Aborting
Ingest**
04/21/2014 17:03:55.810: node(29377)ERRO:TrickAll.cpp:1568-> TrickAll::Close(goid 1): ERROR: IngestOK
failed
```

Examine the live/cDVRSessionController log for error messages like the following:

```
04/21/2014 17:03:55.929: (29369)(INFO)profilesStatusConsolidator.js:146 -> FailedProfiles: 1,
totalProfiles: 1. Failure %: 100
04/21/2014 17:03:55.931: (29369)(INFO)profilesStatusConsolidator.js:296 -> Will continue with Posting
status
04/21/2014 17:03:55.932: (29369)(INFO)profilesStatusConsolidator.js:321 -> updateProfilesCountFromApp:
1 .totalProfiles: 1 .crashedProfilesCount: 0
04/21/2014 17:03:55.933: (29369)(INFO)profilesStatusConsolidator.js:328 -> Post the status available
04/21/2014 17:03:55.936: (29369)(INFO)profilesStatusConsolidator.js:480 -> Will post status to
ZK:{"data":{"recordingStatus":{"profile":[{"profileName":"3profile","status":"failed"}],"contentId":"wr
ap","status":"failed"}},"status":"failed"}
```

No PMT In the Feed

Possible Reasons for Failure

There is a bad configuration on the transcoder/encoder for the affected profile.

The source feed to the transcoder failed.

Impact on the End User

There is no PMT in the feed.

The Live/cDVRCaptureApp and the live/cDVRSessionController started to run, but the MPD and .ts files were not created.

The Live/cDVRCaptureApp and the live/cDVRSessionController did not stop until the feed stopped.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/21/2014 17:09:41.957: node(29985)ERRO:TrickAll.cpp:2826-> ERROR: Defaulting Video PID and type.
04/21/2014 17:09:41.957: node(29985)ERRO:TrickAll.cpp:2837-> ERROR:
TrickAll::ProcessInitialMpegData(goid 1): Bitrate cannot be determined.
```

```
04/21/2014 17:19:49.863: node(29985)ERRO:ICaptureSession.h:45-> IOM: [Read timeout occurred. Closing
session]
04/21/2014 17:19:49.864: node(29985)ERRO:Live/cDVRCaptureSession.cpp:428-> No more data on ingest
interface. Failing CaptureSession
04/21/2014 17:19:49.864: node(29985)ERRO:CIF.cpp:1793-> ERROR: Cif::FlushRecords: Not ready: Index
Header not yet written
04/21/2014 17:19:49.864: node(29985)ERRO:CIF.cpp:1477-> ERROR: Cif::WriteClose: Index file incomplete
at end
04/21/2014 17:19:49.864: node(29985)ERRO:CIF.cpp:6145-> ERROR: Cif::WritebackIndex: No Index Header
data
04/21/2014 17:19:49.864: node(29985)ERRO:indexer.cpp:410->
04/21/2014 17:19:49.864: node(29985)ERRO:indexer.cpp:411-> CIndexer: Problems during ingest!!!!
04/21/2014 17:19:49.864: node(29985)ERRO:indexer.cpp:418-> CIndexer: No PMT Found
04/21/2014 17:19:49.865: node(29985)ERRO:indexer.cpp:422-> CIndexer: No Rate was determined
04/21/2014 17:19:49.865: node(29985)ERRO:indexer.cpp:450-> CIndexer: 1 Picture Gaps for 0 bytes or 0.00
seconds (0.00%)
```

Examine the live/cDVRSessionController log for error messages like the following (generated after the feed stopped):

```
04/21/2014 20:21:57.855: (12524)(INFO)live/cDVRCaptureAppSession.js:61 -> IPC data from CaptureApp:{
   "contentId": "wrap",
   "profileName": "3profile",
   "status": "failed"
}
EOM
04/21/2014 20:21:57.857: (12524)(INFO)profilesStatusConsolidator.js:56 -> Got
processStatusUpdate:3profile
04/21/2014 20:21:57.858: (12524)(INFO)profilesStatusConsolidator.js:62 -> updateProfilesCountFromApp
incremented for profile:3profile
04/21/2014 20:21:57.859: (12524)(INFO)profilesStatusConsolidator.js:74 -> shouldWePostStatusNow
returned true
04/21/2014 20:21:57.860: (12524)(INFO)profilesStatusConsolidator.js:204 -> Preparing to Consolidate
Status
04/21/2014 20:21:57.861: (12524)(INFO)profilesStatusConsolidator.js:223 -> Preparing ProfileName:
3profile
04/21/2014 20:21:57.862: (12524)(INFO)profilesStatusConsolidator.js:239 -> Profile: 3profile, status
from map: [object Object]
04/21/2014 20:21:57.863: (12524)(INFO)profilesStatusConsolidator.js:146 -> FailedProfiles: 1,
totalProfiles: 1. Failure %: 100
```

PTS Discontinuity

Possible Reasons for Failure

There is an outage in the Ingest network.

The transcoder/encoder was restarted or reset.

Impact on the End User

The MPD is no longer updating.

The playback has stopped.

No further .ts or .ttml files are generated.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/17/2014 14:14:06.636: node(3495)ERRO:C2ToDashIndexGenerator.cpp:562->
ProcessVideoFragIndexData():562: Unsupported Fragment Duration (8846 seconds) for PTS (2810627849) for
Rep (1510000_video_frag_)
```

```
04/17/2014 14:14:06.636: node(3495)ERRO:C2ToDashIndexGenerator.cpp:621->
ProcessVideoSegIndexData():621: Unsupported Segment Duration (8854 seconds) for PTS (2809907129) for
Rep (1510000_video_seg_1)
04/17/2014 14:14:06.636: node(3495)ERRO:C2ToDashIndexGenerator.cpp:562->
ProcessVideoFragIndexData():562: Unsupported Fragment Duration (8846 seconds) for PTS (2810627849) for
Rep (1510000_video_seg_2)
04/17/2014 14:14:08.637: node(3495)ERRO:CIFConverter.cpp:437-> CIFConverter::GenerateRedisRecord:437 -
Can not find the SIDX{reference_ID: 49, pts: 7901793929} in the pts map to generate the redis record
for the repID[1510000_video_frag_].
04/17/2014 14:14:08.637: node(3495)ERRO:CIFConverter.cpp:149-> CIFConverter::ProcessSIDXRecords:149 -
No records found to build redis record for {repID[1510000_video_frag_], ref_ID[49], pts[7901793929]},
then DROP it!
```

No Audio PID In a Feed

Possible Reasons for Failure

There is a bad channel configuration on the transcoder.

The channel source to the transcoder is losing its audio PID.

Impact on the End User

There is no Audio PID in a feed for one of the profiles in a channel.

There is no timeline for the audio fragments in the MPD, but the video segments and fragments are updating.

HLS playback works normally, with the exception of the profile that lost its audio PID.

HSS playback does not work for any of the profiles.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/18/2014 20:13:38.478: node(21141)ERRO:C2ToDashIndexGenerator.cpp:248-> WARNING: No EBP Implicit seen
in last 20 Secs
```

Examine the live/cDVRSessionController log for error messages like the following:

```
04/18/2014 20:25:19.214: (21133)(INFO)CIFMpdGenerator.js:1095 -> abc-5p: No segments retrieved for
period 1 and adaptation audio_frag_53_1
04/18/2014 20:25:19.216: (21133)(INFO)CIFMpdGenerator.js:1095 -> abc-5p: No segments retrieved for
period 1 and adaptation audio_frag_52_1
```

Examine the LookupService error log for error messages like the following (generated when starting HLS to play the profile without audio PIDs):

```
04/18/2014 20:19:07.600: (21105)(INFO)PlayOutLookupManager.js:463 -> RepID to lookup is:
710000_video_seg_1_1139639856
04/18/2014 20:19:07.603: (21105)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
And Redis DB doesn't have the map for the video segment:
127.0.0.1:6379> hget abc-5p 710000_video_seg_1_1139639856
(nil)
```

Same Bitrate on Two Different Profiles

Possible Reasons for Failure

There is a bad channel configuration on the transcoder.

Impact on the End User

Playback works normally for both HLS and HSS within the first TSTV window.

After reaching the TSTV window limit, the playback no longer works for HLS, HSS or DASH-MP4.

Only four of the five expected profiles are present in the MPD file.

Live capture is continuing.

Error/Event Messages

No error messages are sent to the Live/cDVRCaptureApp and live/cDVRSessionController logs.

Examine the LookupService error log for error messages like the following:

```
04/18/2014 18:03:50.210: (14101)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
04/18/2014 18:05:07.214: (14101)(INFO)PlayOutLookupManager.js:463 -> RepID to lookup is:
1500000_video_seg_1_416217156
04/18/2014 18:05:07.217: (14101)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
04/18/2014 18:05:45.707: (14101)(INFO)PlayOutLookupManager.js:463 -> RepID to lookup is:
1500000_video_seg_1_419820756
04/18/2014 18:05:45.711: (14101)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
04/18/2014 18:12:46.045: (14099)(INFO)PlayOutLookupManager.js:463 -> RepID to lookup is:
7500000_video_seg_1_407208156
04/18/2014 18:12:46.047: (14099)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
04/18/2014 18:12:46.064: (14102)(INFO)PlayOutLookupManager.js:463 -> RepID to lookup is:
7500000_video_seg_1_409009956
04/18/2014 18:12:46.066: (14102)(ERRO)LookupTable.js:21 -> Lookup failed with error: null for Channel:
abc-5p
```

Different Profiles Have Different Audio Codecs

Possible Reasons for Failure

There is a bad channel configuration on the transcoder.

Impact on the End User

Different profiles in a channel have different audio codecs.

HLS playback works normally.

HSS and DASH-MP4 playback does not work, as there is no timeline in the audio fragments in the MPD file.

Live capture is continuing.

Error/Event Messages

No error messages are sent to the Live/cDVRCaptureApp and Live/cDVRSessionController logs.

When starting an HSS or DASH-MP4 playback, the MPE continuously queries the MPD and the playback freezes.

Profiles In a Channel Are From Different Source Channels

Possible Reasons for Failure

There is a bad channel configuration on the transcoder.

Impact on the End User

The profiles in a channel are from different source channels.

The Live/cDVRCaptureApp and Live/cDVRSessionController processes are running.

The MPD is generated, but there is no timeline for any video or audio segments or fragments.

Playback fails for both HLS, HSS and DASH-MP4.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/18/2014 19:20:50.075: node(18078)ERRO:indexGen.cpp:1456-> IndexGen::NextIndex: TS packet loss for CC
Errors so far 4
```

Examine the Live/cDVRSessionController log for error messages like the following:

```
04/18/2014 19:21:33.522: (18071)(INFO)CIFMpdGenerator.js:1095 -> abc-5p: No segments retrieved for
period 1 and adaptation video_frag_
```

Feed is a VBR Feed

Possible Reasons for Failure

There is a bad channel configuration on the transcoder.

Impact on the End User

The Live/cDVRCaptureApp failed to start the Live channel because it is a VBR feed.

The session controller sent a **Failed** status to the ZooKeeper, but it is still running.

Error/Event Messages

Examine the Live/cDVRCaptureApp log for error messages like the following:

```
04/18/2014 17:09:32.947: node(12029)ERRO:TrickAll.cpp:2331-> TrickAll::ProcessInitialMpegData(goid 1):
ERROR: Appears to be VBR
04/18/2014 17:09:32.947: node(12029)ERRO:indexer.cpp:234-> *** ERROR: NextBlock failed due to bad input
data ***
04/18/2014 17:09:32.947: node(12029)ERRO:LiveCaptureSession.cpp:298-> Stopping LiveCaptureSession
because of bad input data
04/18/2014 17:09:32.947: node(12029)ERRO:TrickAll.cpp:1361-> ERROR: TrickAll::Close(goid 1) **Bad
content, Aborting Ingest**
04/18/2014 17:09:32.947: node(12029)ERRO:TrickAll.cpp:1506-> ERROR: TrickAll::Close(goid 1) **Aborting
Ingest**
04/18/2014 17:09:32.947: node(12029)ERRO:TrickAll.cpp:1568-> TrickAll::Close(goid 1): ERROR: IngestOK
failed
```

Examine the Live/cDVRSessionController log for error messages like the following:

```
04/18/2014 17:09:33.068: (12020)(INFO)profilesStatusConsolidator.js:146 -> FailedProfiles: 1,
totalProfiles: 2. Failure %: 50
04/18/2014 17:09:33.074: (12020)(ERRO)Live/cDVRCaptureAppSession.js:66 -> IPC Channel Error: Error:
write EPIPE, for profile: 1profile
04/18/2014 17:09:33.075: (12020)(ERRO)Live/cDVRCaptureAppSession.js:66 -> IPC Channel Error: Error:
write EPIPE, for profile: 1profile
04/18/2014 17:09:33.078: (12020)(INFO)Live/cDVRCaptureAppSession.js:61 -> IPC data from CaptureApp:{
   "contentId": "abc-10p1",
   "profileName": "2profile",
   "status": "stopped"
}
04/18/2014 17:09:50.871: (12020)(INFO)profilesStatusConsolidator.js:480 -> Will post status to
ZK:{"data":{"recordingStatus":{"profile":[{"profileName":"1profile","status":"failed"},{"profileName":"
2profile","status":"stopped"}],"contentId":"abc-10p1","status":"failed"}},"status":"failed"}
```

PTS Discontinuity in the Feed

Possible Reasons for Failure

There is a presentation timestamp (PTS) discontinuity in the feed. This can occur in rare instances in the Digital Content Manager (DCM).

Impact on the End User

The playback session (HLS by QuickTime/HSS by Silverlight/DASH-MPE by bitdash player) stops, but it resumes playing after a restart.

Resolution

There is no resolution for this problem at this time.

VOD Ingest-Recording Status Fails with one Failed Profile

Possible Reasons for Failure

When more than one profile is configured

Impact on the User

If one profile fails during the ingest for any reason, for example (source file not found or source file format not recognized, the entire asset is considered failed. This triggers a relocation of the ingest task to another worker until the maximum relocation is exhausted. If all the relocation attempts fail to ingest, then the asset is marked as failed.

Resolution

There is no resolution for this problem at this time.

Multicast Encoder does not work between Encoder and MCE

Scenario

IGMPv2 (no source IP), where the MCE and encoder IP addresses are on different subnets but on a single flat VLAN. e.g. MCE: 192.168.2.11, encoder: 10.10.1.1. No routed network here, a single layer 2 domain. Multicast should work between encoder and the MCE.

Possible Reasons for Failure

linux kernel by default filters out packets from different subnets – to protect against sources that it doesn't believe traffic could be coming from (for example, different subnets if there's no route to that subnet). tcpdump shows multicast packets being received because it's a flat VLAN, but they get dumped before reaching the live capture application; MCE reports a data timeout on the channel.

Impact on the User

Multicast encoder does not work between encoder and MCE.

Resolution

Disable the filter for the ethernet interface where multicast is incoming. (add the line net.ipv4.conf.eth1.rp_filter=0 to /etc/sysctl.conf and restart the network.

MCE Fail to Capture When the Feed is Changed to 25fps

Scenario

When the DCM feed configuration is changed from 29.7 fps to 25fps, MCE fail to detect EBP's in feed and capturing fails.

Possible Reasons for Failure

Changing the frame rate in the DCM while the channel is running. Changing the dynamic configuration on the DCM is not supported.

Workaround

If the frame rate is changed in the DCM while the channel is running, restart the channel.

Error/Event Messages

Examine the log for error messages like the following:

```
[admin@MCE-08 errorlog]$ grep CHAN1051 LiveCaptureApp-errorlog.current
2015-10-12T22:00:23.134Z: 19279 CIFGenerator CIFDbStore.cpp:729 [Console] ERROR ->
[liveCaptureApp|livetmp/CHAN1051:HD03] CifDbStore (0x1a98c80), No SIDX arrived for representation
(1700000_audio_frag_101) in last 60 seconds
2015-10-12T22:00:23.135Z: 19279 CIFGenerator CIFDbStore.cpp:729 [Console] ERROR ->
[liveCaptureApp|livetmp/CHAN1051:HD03] CifDbStore (0x1a98c80), No SIDX arrived for representation
(1700000_cc_frag_eng_) in last 60 seconds
2015-10-12T22:00:23.135Z: 19279 CIFGenerator CIFDbStore.cpp:729 [Console] ERROR ->
[liveCaptureApp|livetmp/CHAN1051:HD03] CifDbStore (0x1a98c80), No SIDX arrived for representation
(1700000_i-frame) in last 60 seconds
```

MCE Troubleshooting Tools

The following tools are used for troubleshooting the MCE.

udpCapture

Purpose:

Capture the multicast live feed and writing to udpDataFile, and verify if client can receive multicast packets from source.

Usage:

```
./udpCapture [-t] <ip address> <port number> <eth interface> [<source ip>]
Mandatory arguments:
<ip address>: multicast address
<port number>: multicast port
<eth interface>: the client interface which will receive the feed
Optional arguments:
[source ip]: multicast source ip address
[-t]: a 4-byte header with the packet arrival time in milliseconds since the start of capture will be
prepended to each 188-byte record.
Example-1?
~ admin]#./udpCapture 232.10.1.1 1002 eth1 99.1.1.2
receiving on 232.10.1.1:1002 99.1.1.2 ifindex 3 (eth1) and writing to udpDataFile
received 3934840 bytes in 11 seconds (2861 Kbps)
received 8197364 bytes in 22 seconds (2980 Kbps)
received 12459888 bytes in 33 seconds (3020 Kbps)
received 16722412 bytes in 44 seconds (3040 Kbps)
... ... ...
Example-2:
~ admin]# ./udpCapture -t 232.10.1.1 1002 eth1 99.1.1.2
receiving on 232.10.1.1:1002 99.1.1.2 ifindex 3 (eth1) and writing to udpDataFile
received 4213832 bytes in 11 seconds (3064 Kbps)
received 8477672 bytes in 22 seconds (3082 Kbps)
received 12738880 bytes in 33 seconds (3088 Kbps)
received 17002720 bytes in 44 seconds (3091 Kbps)
... ... ...
```

vInfo

Purpose:

Get information about MPEG-2 transport stream, such as basic PID, codec, bitrate,GOP structure,etc.

Usage:

```
./vInfo [-v] [-a] [-p] tsfile1 tsfile2 tsfile3 ...
Optional arguments:
[-a]: the entire sample will be scanned, not just part of it
[-v]: additional (verbose) information will be given,like the packet number found PAT or PMT
[-p]: check is made for the presence of PowerKey content
Example-1:
~ admin]#./vInfo p10001.ts
Details for p10001.ts:
PAT:
1 Program
PMT:
PMT PID is 33
PCR PID is 32
Program PID Loop, 2 PIDs:
PID 32 (0x020): Type: 27 (0x1B): AVC/h.264 VIDEO
PID 40 (0x028): Type: 15 (0x0F): AAC AUDIO eng
Rate:
4,511,000 bps
Length:
338,339,652 bytes
600.03 seconds or 10:00
Video:
H.264 MAIN L4.0 4:2:0 Progressive 1280x720 Square
GOP Structure:
First 10:
PBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBB
I*PBBPBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBBPBBPBBPBBPBB
IBBPB
I*PBBPBBPBBPBB
IBBPBBPBBPBBPBB
Calculated Frame Rate is 29.97fps
In first 5:00/10 lines:
GOPs: 615 (IDRs: 150)
GOP length: 1 - 32 (Average 15)
All Frames
About 75.9 PCRs/sec
1 Audio:
82: AUDIO id 0: sample rate 48000 bitrate 128250 channels 2 codec info 0x4c80
PID 40 AAC AUDIO sample rate 48kHz bit rate 128250bps channels 2 codec info 0x4c80
Scrambling:
No scrambling in first 5:00 of stream
Example-2:
~ admin]# ./vInfo -v p10001.ts
Details for p10001.ts:
PAT:
Found PAT at packet 296
Version 7
TSID is 1
```

```
1 Program
0: Program Number is 10
0: PMT PID is 33 (0x021)
PMT:
Found PMT at packet 515
PMT PID is 33
Version 7
PCR PID is 32
Program PID Loop, 2 PIDs:
PID 32 (0x020): Type: 27 (0x1B): AVC/h.264 VIDEO
PID 40 (0x028): Type: 15 (0x0F): AAC AUDIO eng
Rate:
4,511,000 bps (at packet 1198 or 219K)
Length:
338,339,652 bytes
600.03 seconds or 10:00
Video:
H.264 MAIN L4.0 4:2:0 Progressive 1280x720 Square
GOP Structure:
First 10:
PBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBB
I*PBBPBBPBBPBB
IBBPBBPBBPBBPBB
IBBPBBPBBPBBPBBPBBPBBPBBPBB
IBBPB
I*PBBPBBPBBPBB
IBBPBBPBBPBBPBB
Calculated Frame Rate is 29.97fps
In first 5:00/10 lines:
GOPs: 615 (IDRs: 150)
GOP length: 1 - 32 (Average 15)
All Frames
About 75.9 PCRs/sec
1 Audio:
82: AUDIO id 0: sample rate 48000 bitrate 128250 channels 2 codec info 0x4c80
PID 40 AAC AUDIO sample rate 48kHz bit rate 128250bps channels 2 codec info 0x4c80
PID 40: About 46.9 PUSIs/sec
Scrambling:
No scrambling in first 5:00 of stream
```

3). checkEbps

```
Introduction: Check if transport stream has video/audio EBPs, as well as the the number of them
Usage:
./checkebps profile1.ts profile2.ts profile3.ts ... ...
```

Example-1:

```
~ admin]# ./checkEbps p10001.ts
Looking for EBPs in the input file p10001.ts
Profile 1 stats
Number of Video EBPs: 299
Number of Audio EBPs: 373
First Video PTS 6337472130
Fragment Delta: 2 seconds
Segment Delta: 10 seconds
Done.
```

Example-2:

```
~ admin]# ./checkEbps p10001.ts p10004.ts
Looking for EBPs in the input file p10001.ts
Profile 1 stats
Number of Video EBPs: 299
Number of Audio EBPs: 373
First Video PTS 6337472130
Fragment Delta: 2 seconds
Segment Delta: 10 seconds
```

```
Looking for EBPs in the input file p10004.ts
Profile 2 stats
Number of Video EBPs: 299
Number of Audio EBPs: 373
First Video PTS 6337472130
Fragment Delta: 2 seconds
Segment Delta: 10 seconds
Done.
```

scte35dump

Purpose:

Dumps out any SCTE-35 information in the specified file, which can be an SPTS or MPTS.

Usage:

```
./scte35dump input_file
Example-1:
~ admin]# ./scte35dump DR_output_2864000.ts
1 Program(s):
ProgNo 02 has SCTE 35 on PID 43
Rate::Compute(goid 0): WARNING: Bit Rate=3208248 Delta Rate=3001253 Diff=6%
Rate::Compute(goid 0): WARNING: PCR(12)=139231 and PCR(41)=531611
Rate::Compute(goid 0): WARNING: PCR sequence changed. Restarting rate calc.
Rate::Compute(goid 0): WARNING: Bit Rate=2972635 Delta Rate=3163053 Diff=6%
Rate::Compute(goid 0): WARNING: PCR(1227)=16733090 and PCR(1297)=17631766
Ignoring.
Rate::Compute(goid 0): WARNING: Bit Rate=2999367 Delta Rate=1656714 Diff=44%
Rate::Compute(goid 0): WARNING: PCR(2037)=27555172 and PCR(2100)=29099375
Rate::Compute(goid 0): WARNING: PCR sequence changed. Using current rate.
WARNING: Sample appears to be VBR. Setting rate to zero.
ProgNo 00 has initial PCR of 37,972 (or 126 PTS-equivalent)
ProgNo 00 has initial PTS of 70,503 (or 0.78 seconds after first PCR)
Searching...
2: SCTE35(2): Not splice_insert!
21,572: SCTE35(2): Not splice_insert!
23,540: SCTE35(2): Not splice_insert!
1,268,665: SCTE35(2): Not splice_insert!
1,328,706: SCTE35(2): Not splice_insert!
1,941,332: SCTE35(2): Not splice_insert!
1,971,375: SCTE35(2): Not splice_insert!
2,908,754: SCTE35(2): Not splice_insert!
2,968,926: SCTE35(2): Not splice_insert!
3,620,494: SCTE35(2): Not splice_insert!
3,680,748: SCTE35(2): Not splice_insert!
4,554,930: SCTE35(2): Not splice_insert!
4,585,017: SCTE35(2): Not splice_insert!
100%
Summary:
ProgNo 02 had 13 splice_inserts for 0 avails: 0 OP, 0 IP, 0 Valid IP
```

IndexCheck

Purpose:

Check the index details for CDN Index data file.

Usage:

```
./IndexCheck [-v|-V|-x|-h|-t] IndexFileName
Optional arguments:
-v: Verbose output
-V: Verbose with NPTs
-x: Quit on first error found
-h: Show header
-t: Show trailer
Example-1:
~ admin]# ./IndexCheck -h content_obj_idx
WARNING: Cannot figure out the 1x filename
GetMetaDataFormat: Identified as CDN Index data
Index writeback HAS been completed
Video Index File
Version: 2.0.1
Creator: Cisco Systems
File Header Checksum : OK
File Header size : 64 bytes, incl. 1 byte post-pad
Index Header size : 8132 bytes, incl. 6764 bytes post-pad
Total Header size : 8196 bytes
=== Index Header ===
AssetInformation:
CreationVendorID : 0x00000C
AssetIngestTime : 2016-05-19 09:58:01.770 UTC
IndexCreationTime : 2016-05-19 09:58:01.770 UTC
ProgramVersion : Software Version 0.0a
SourceFileName : 0x0002f56aaea03618
FileWrapperType : MPEG-2 Transport Stream
TransportPacketSize : 188 bytes
SyncByteOffset : 0
TransportBitRate : 3,599,957 bps
TransportStreamType : H.264 video stream plus zero or more audio streams
MaximumIFrameDistance : 32 frames
VideoHorizontalSize : 1280 pixels
VideoVerticalSize : 720 pixels
VideoFrameRateTicks : 3003 90 KHz clocks
VideoFrameRateTimeScale : 90,000 Hz
TrickPtsDtsDelta : 0 90 KHz clocks
PtsDtsCalculationMethod : Calculated from the end of the frame
InitialDecodingDelay : 0 90 KHz clocks
TrickDelayFromEOF : 30,030 90 KHz clocks
TransportStreamCount : 1
ElementaryStreamCount : 3
SubFileCount : 1
PcrIntervalPacketCount : 89 x 188 byte cells
SCTE35RecordCount : 0
*** SubFileDynamic : YES ***

*** OpenForWrite : NO ***
TransportStreamInformation:
TransportStreamProgramNumber : 3
TransportStreamPmtPID : 048 (0x030)
TransportStreamPcrPID : 049 (0x031)
TransportStreamVideoPID : 049 (0x031)
TransportStreamAudioPID : 052 (0x034)
TransportStreamAudioPID : 053 (0x035)
TransportStreamSCTE35PID : 000 (0x000)
```

```
ElementaryStreamInformation:
ElementaryStreamType : 27
ElementaryStreamPID : 049 (0x031)
ElementaryStreamDescriptor : 06 01 02 28 04 4D 40 1E 3F 0E 03 C0 1C F0 97 00 E9 07 10 83 0A 41 85 02 41
ElementaryStreamSeqParamSet :
ElementaryStreamPicParamSet :
ElementaryStreamID : 0xE0
... ...
... ...
```

Example-2:

```
~ admin]# ./IndexCheck -x content_obj_idx
WARNING: Cannot figure out the 1x filename
GetMetaDataFormat: Identified as CDN Index data
Index writeback HAS been completed
Video Index File
Version: 2.0.1
Creator: Cisco Systems
File Header Checksum : OK
File Header size : 64 bytes, incl. 1 byte post-pad
Index Header size : 8132 bytes, incl. 6764 bytes post-pad
Total Header size : 8196 bytes
*** SubFileDynamic : YES ***
*** OpenForWrite : NO ***

ERROR: Index Header: Unidentified tag
```

vDump4

Purpose:

Used to dump the given stream detailed information such as I/B/P frames, GOP, PTS, DTS, EBP timestamps, etc.

Usage:

```
./vDump4 [-n] [-v] [-i] [-p] [-g] [-s] [-r] input_file [video_pid]
Optional arguments:
[video_pid]: video_pid will be computed if not specified
-v is verbose output: shows NULL pkts with -a
-i uses SCTE35 splice insert commands
-p adds PCR output
-g is GOP short output (use alone or with -s)
-1 is 1-line, PIC only output
-s adds a summary at the end.
-n turns off everything (first, use with -s).
-x don't try and compute rate.
-a adds non-video PID data.
-d show PTS vs PCR deltas.
-r uses reverse trick packet numbering.
-e show EBP timestamps.
```

Example-1:

```
~ admin]# ./vDump4 -s p10008.ts
ERROR(0): PUSI not set on first video
AUDIO(1): PID: 40 PTS: 6302798498
AUDIO(10): PID: 40 PTS: 6302800418
AUDIO(22): PID: 40 PTS: 6302802338
AUDIO(31): PID: 40 PTS: 6302804258
AUDIO(43): PID: 40 PTS: 6302806178
AUDIO(54): PID: 40 PTS: 6302808098
AUDIO(63): PID: 40 PTS: 6302810018
PES(64): len=0 0x84 0xd0 PTS: 6302888081 DTS: 6302879072
AU-DELIM(64): ----- I,P -----
SEI(64)
```

```
SEI(64)
SLICE(64): INVALID PPS ID/NOT SEEN 0
AUDIO(75): PID: 40 PTS: 6302811938
PES(79): len=0 0x84 0x90 PTS: 6302882075 (-6006)
AU-DELIM(79): ----- I,P,B -----
SEI(79)
SEI(79)
SLICE(79): INVALID PPS ID/NOT SEEN 0
PES(82): len=0 0x84 0x90 PTS: 6302885078 (+3003)
AU-DELIM(82): ----- I,P,B -----
SEI(82)
SEI(82)
... ...
... ...
Summary:
Total Frames: 1788
I Frames: 125
P Frames: 505
B Frames: 1158
Min GOP: 1
Max GOP: 27
Average GOP: 14
Packets: 29890
I Packets: 8412680
P Packets: 1358981930
B Packets: 1068935
Bytes: 5619320
I Bytes: 1581583840
P Bytes: 2085532376
B Bytes: 200959780
Avg GOP: 44954 bytes
Avg Frame: 3142 bytes
Avg I-Frame: 12652670 bytes
Avg P-Frame: 4129767 bytes
Avg B-Frame: 173540 bytes

Based on all muxed packets:
Max I-Frame: 27448 bytes at #5566 (0.293s)
Max P-Frame: 11656 bytes at #22583 (0.124s)
Max B-Frame: 3948 bytes at #10871 (0.042s)
Min PTS: 6302882075 at packet 79 with pattern BT
PCR at zero: 1890837823016 or 6302792743 at 90kHz
Lead: 89332 or 0.99 secs
Max PTS: 6308284472 at packet 29841 with pattern BT
PCR at end: 1892458344004 or 6308194480 at 90kHz
Lag: 92995 or 1.03 secs
PCR at end calculations:
From start: 1892458343548 (+1620520532 or 60.02s)
From nearby: 1892458344004 (+1620520988 or 60.02s)
Seconds: 60
Frames/Sec: 29.8
I-Frames/Sec: 2.0
```

Troubleshooting the MPE

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- Playback Failure—Traffic Server Crashes Three Times in One Minute, page 203
- Problems with Captions/TTML, page 204
- Problems with ESAM, page 205

- Problems with DRM, page 205
- Troubleshooting the SAL, page 208

General Playout Problems

If you experience a general problem with playout, take the following steps to diagnose and correct the problem:

1. Using **wget**, verify that the manifests can be retrieved from the MPE-Worker.
2. Examine the transaction log for 404/500 errors for the manifest and segment/fragment requests when attempting the playout.
3. Examine the ingest log for 404/500 errors for the MPD and TS segment requests.
4. Examine the MPD (using **wget** on the URL in the ingest log) and verify that the correct adaptation sets are present:

- **video_seg_2** and **video_seg_1** for HLS playout
- **i-frame** for HSS and HLS sudo ifupmode
- **audio_frag_*** and **video_frag_*** for HSS playout
- **audio_frag_*** and **video_frag_auto*** for Dash-mp4 playout

5. In the adaptation sets, verify that the segment timeline is present:

```
<SegmentTimeline>
    <S t="2205403578" d="900900" r="17"/>
</SegmentTimeline>
```

6. In the adaptation sets, verify that the **t** values within the timelines are all close to each other. For example, if the video_frag_* segment timeline has **t** set to **5000000**, but the audio_frag_* timeline has **t** set to **7000000**, those values are too far out of sync. Change one or both of the *t* values to be more in sync.
7. Examine the MPD and look at the bandwidth of the source feed (the "bandwidth=" value in the appropriate representation for an adaptation set). Verify that the bitrates configured for variant playlists are within 5% of the bandwidth of the source feed.
8. To ensure that the variant configuration is being correctly propagated from the VMP-M GUI to the MPE-Worker, examine the odesdk_log in the /errorlog directory with DETAIL logs set. Verify that the correct configurations for the given manifest URL are present:

```
Apr 15 14:34:10 sjc-xdm-108 encapsulator[10702]: File: src/transforms/TransformMap.cpp Funct: putRoot
Line: 31 TRACE: putRoot /ode/hss/asset3.ismc
Apr 15 14:34:10 sjc-xdm-108 encapsulator[10702]: File: src/AssetTransform.cpp Funct: logMetadata Line:
326 TRACE Metadata:variantUrl=/ode/hss1/asset3.ismc variantId=ipad1 assetId=2000 manifestVersion=2
CifId=asset.mpd parentManifestId=2000 keyId=
Apr 15 14:34:10 sjc-xdm-108 encapsulator[10702]: File: src/AssetTransform.cpp Funct: logMetadata Line:
351 TRACE vidVector:3348998, size=1 audVector:60000, size=1
```

9. Verify that **max-age=0** is set for Manifests in the asset resolver options (not **max-age=3600**; not necessary for Chunks).

Playback Failure—Traffic Server Crashes Three Times in One Minute

Impact on End User

Playback failed three times in one minute.

Possible Reasons for Problem

Software defects caused multiple playback failures.

Error/Even Messages

If the traffic server crashes, traffic_cop restarts immediately. If the traffic server has crashed for the third time in one minute, traffic_cop delays 60 seconds before restarting. The traffic server crash/restart log is recorded in each MPE node /var/log message, as shown in the following example:

```
Jan 12 00:01:21 worker-z2-105 traffic_cop[21318]: cop received child status signal [12762 256]
Jan 12 00:01:21 worker-z2-105 traffic_cop[21318]: traffic_manager not running, making sure
traffic_server is dead
Jan 12 00:01:21 worker-z2-105 traffic_cop[21318]: spawning traffic_manager
Jan 12 00:01:21 worker-z2-105 traffic_manager[12815]: NOTE: --- Manager Starting ---
Jan 12 00:01:21 worker-z2-105 traffic_manager[12815]: NOTE: Manager Version: Apache Traffic Server -
traffic_manager - 5.1.0 - (build # 10622 on Nov  6 2017 at 22:06:11)
Jan 12 00:01:21 worker-z2-105 traffic_manager[12815]: NOTE: RLIMIT_NOFILE(7):cur(360457),max(360457)
Jan 12 00:01:23 worker-z2-105 traffic_server[12823]: NOTE: --- traffic_server Starting ---
Jan 12 00:01:23 worker-z2-105 traffic_server[12823]: NOTE: traffic_server Version: Apache Traffic
Server - traffic_server - 5.1.0 - (build # 10622 on Nov  6 2017 at 22:05:38)
Jan 12 00:01:23 worker-z2-105 traffic_server[12823]: NOTE: RLIMIT_NOFILE(7):cur(360457),max(360457)
Jan 12 00:01:23 worker-z2-105 abr-nge[12823]: {0x2ba003ce3a80} ERROR: s=MPE, component=ats_odesvr,
host=worker-z2-105, pid=12823, fileName=OdeConfigHandler.cc, lineNo=254, funcName=ReadFromFile,
trace-id=, parent-id=, span-id=, msg="Empty data for file
[/etc/opt/cisco/mos/ode/cdvr1/pep1.node.dc1.consul/esam_template.xml]"
Jan 12 00:01:23 worker-z2-105 abr-nge[12823]: {0x2ba003ce3a80} ERROR: s=MPE, component=ats_odesvr,
host=worker-z2-105, pid=12823, fileName=OdeConfigHandler.cc, lineNo=254, funcName=ReadFromFile,
trace-id=, parent-id=, span-id=, msg="Empty data for file
[/etc/opt/cisco/mos/ode/vod4/pep1.node.dc1.consul/esam_template.xml]"
Jan 12 00:01:32 worker-z2-105 traffic_manager[12815]: {0x7f5b20309840} FATAL:
[LocalManager::pollMgmtProcessServer] Error in read (errno: 104)
Jan 12 00:01:33 worker-z2-105 traffic_manager[12815]: {0x7f5b20309840} ERROR:
[LocalManager::sendMgmtMsgToProcesses] Error writing message
Jan 12 00:01:33 worker-z2-105 traffic_manager[12815]: {0x7f5b20309840} ERROR: <MgmtUtils.cc:293
(mgmt_elog)>  (last system error 32: Broken pipe)
Jan 12 00:01:33 worker-z2-105 traffic_cop[21318]: cop received child status signal [12815 256]
Jan 12 00:01:33 worker-z2-105 traffic_cop[21318]: traffic_manager not running, making sure
traffic_server is dead
Jan 12 00:01:33 worker-z2-105 traffic_cop[21318]: unable to start traffic_manager, retrying in 60
second(s)
```

Resolution/Logs

If the traffic server continues crashing three times per minute, there is an obvious impact on playback. Recommended action is to copy the coredump files in the MPE node /var/cores directory and send them to Cisco for analysis.

Problems with Captions/TTML

If captions are not being displayed, take the following steps to diagnose and correct the problem:

1. Verify that the original feed has captions.
2. Verify that the **CC** button is **ON** in the player.

If the captions are not aligned with the audio, check the original feed for the same problem.

If you see escape sequences such as **>** instead of **>** and other symbols, that is a known player issue, and it must be addressed by the player vendor or developer.

Problems with ESAM

If an advertisement is not honored, take the following steps to diagnose and correct the problem:

1. Verify that the POIS server is up.
2. Check the connection between the POIS server and the DCM.
3. Check the connection between the POIS server and the MCE.
4. If you can access the MPD file, determine whether <EventStream> is created with value=”esam_pois”.

- Use **wget** to capture the HLS manifest and look for the “#EXT-X-DISCONTINUITY” and “#EXT-X-SPLICE-EXIT” tags.
- Use **wget** to capture the HSS manifest and look for <StreamIndex> with Name=”scte35”.

Problems with DRM

If playout failed, take the following steps to diagnose and correct the problem:

1. Check the web-engine error logs for any indication of errors.
2. Check web-engine transaction logs to determine whether the client retrieved only the manifest, or if it also retrieved the segments.
3. Check the transaction logs to determine whether the key retrieval was successful.
4. If only the manifest is retrieved, then the problem could be a general playout issue such as error in the manifest file creation, or it could be a content encryption error. Examine the error logs for more information.
5. If a segment is also retrieved, then the problem could be incorrectly encrypted content, or the client might be unable to retrieve the key given the key URI in the manifest. If this is the problem, the player might generate a message like, “Unable to decrypt content.”
6. In each of these cases, you can further diagnose the problem by manually retrieving the manifest files and the corresponding segments, using **wget** or **curl**, and then analyzing the output.
7. When analyzing a PlayReady manifest file:

- Look for the <ProtectionHeader> sample encryption header in the manifest.
- Look for the <ContentProtection> sample encryption header in the DASH-MP4 mpd.

For example:

```
<ContentProtection
    schemeIdUri="urn:uuid:edef8ba9-79d6-4ace-a3c8-27dcd51d21ed">
    <cenc:pssh

xmlns:cenc="urn:mpeg:cenc:2013">AAAAU3Bzc2gAAAAA7e+LqXnWSs6jyCfc1R0h7QAAADMIARIQdXi1QWdbRuS+qFdVM/fqoho
LYnV5ZHJta2V5b3MiEG4pW96+VkgJky3kjhG7RAI=</cenc:pssh>
    </ContentProtection>
```

- For HLS, look for the EXT-X-TAG tag.

For example:

```
<Protection>
    <ProtectionHeader
SystemID=”{9A04F079-9840-4286-AB92-E65BE0885F95}”>hAMAAAEAAQB6AzwAVwBSAE0ASABFAEEARABFAFIAIAB4AG0AbABuA
HMAPQAiAGgAd...
```

```
</Protection>
```

8. When analyzing a segment, compare the retrieved segment to the same content which is retrieved with no encryption, if it is available. If the sizes are the same, then encryption is not occurring. If the sizes are different, encryption is VMPt likely occurring.

9. Verify that the configuration is correct. The Asset Resolver file must use the correct regular expression (regex) matching pattern for the given request. Each Asset Resolver entry must include a <ContentProtectionProfileName> entry with a name that matches the DRM type name assigned within the KmsProxy config.

If the web-engine logs indicate a failure to acquire the key through the proxy, take the following steps to diagnose and correct the problem:

1. Verify that the supervisorctl status shows the drm-system_app is in **RUNNING** state.

2. Examine the /var/log/opt/cisco/VMP/errorlog/kmsproxy-errorlog.current error log for recent errors.

3. Verify that the relevant key profile configurations were pushed to the proxy by examining the /opt/cisco/VMP/node/lib/node_modules/drm-system/kmsproxy/test/ directory: source test.curl and kpAll list the configuration details for the key profile.

4. If the following shows as “initComplete”:false, then connectivity to the Irdeto KMS is not working:

```
irdeto/IrdetoHss/pr-aes-128/keysCached=0
{”name”:”IrdetoHss”,”properties”:{”description”:”Irdeto HSS Mike”,
”drmType”:”pr-aes-128”,”type”:”irdeto”,
”keyAcquisition”:{”uri”:”https://173.36.199.89:8092/livedrmservice/livedrmservice.asmx”,
”userName”:”cisco@twc.com”,”passPhrase”:”ABuB73s05FSR”,
”account”:”twc”,”clientCert”:””,”caCert”:””,”clientKey”:””,”protocol”:”https:”,”basePath”:”/livedrmserv
ice/livedrmservice.asmx”,
”host”:”cld3.man.entriq.net”,”port”:”443”},
”initComplete”:true}}
```

5. If there are errors in the kmsproxy log file that indicate a lack of connectivity, or if the cache in the proxy is empty (with **curl** commands as described in test.curl), then check the connectivity to the KMS. You can also verify the connectivity directly using the **curl** commands in test.curl, such as:

```
curl -k --request POST -H 'Content-type: text/xml' -H 'SOAPAction:
\”\”http://man.entriq.net/livedrmservice/Get\”Settings\”\”' -d @Get\”Settings.xml https://
cld3.man.entriq.net:443/livedrmservice/livedrmservice.asmx
```

Troubleshooting DRM Types

Insys

On the PAM check that the Insys profile has the correct urls for key acquisition uri (“uri”) and the authorization uri (‘authUri’) and other credentials – the curl commands in the test.curl file can be used as a guideline for exercising these rest apis.

```
Example :
keyAcquisition":{"uri":"http://<ipaddr>/Soap/Kms.svc","userName":"user","passPhrase":"pass","serviceId"
:19,"authUri":"<ipaddr>/Soap/Authentication.svc"
```

The redis on the PAM is used for persistence of the mapping of the VMP contentId to the Insys KeyId. In some cases, it may be required to clear this redis entry so that there is no chance of persisting expired keys.

1. From command prompt enter ‘redis-cli’

2. Display the mapping – example:

```
127.0.0.1:6379> hgetall drm:insysHss:CiscoTest2
1) "keyId"
2) "541ea387-6ec6-4a46-92ac-bc47ed336d68"
```

3. Delete the entry – example:

```
127.0.0.1:6379> del drm:insysHss:CiscoTest2
(integer) 1 1
```

4. supervisorctl restart drm-system

VGC

On the PAM, check that the VGC profile has the correct url for key acquisition from the abre REST API – the curl commands in the test.curl file can be used as a guideline for exercising these rest apis.

```
Example : "keyAcquisition":{"uri":http://<restapi-host>:5701/drmapi/package
```

Check the REST api VM to make sure the service has started and that it is configured to point to the correct Keystore host:port and the ECMS host:port. Refer to the ABR Encryptor Installation and Configuration guide for more details.

1. For Live, the redis on the PAM is used for persistence of the reference mapping of the PTS in the playlist to the corresponding UTC rotation point for each Live stream. In some cases, it may be required to clear this redis entry so that the PTS to UTC mapping can be reset properly.
2. From the command prompt, enter 'redis-cli'
3. Display the mapping – example:

```
127.0.0.1:6379> hgetall drm:vgcHls:CiscoTest1
1) "rotationRefPointUTC"
2) "2015-01-14T05:43:44Z"
3) "rotationRefPointPTS"
4) "127909280160000"
5) "refPointOffset"
6) "127909263060000"3) Delete the entry – example :
127.0.0.1:6379> del drm:vgcHls:CiscoTest1
(integer) 1
```

4. supervisorctl restart drm-system

EZDRM

On the PAM, make sure the EZDRM profile has the correct urls for the Key Service URI ("uri"), Username and Passphrase The curl commands in the test.curl file can be used as a guideline for exercising these rest apis.

```
Example :
keyAcquisition":{"uri":"http://<ipaddr>/Soap/Kms.svc","userName":"user","passPhrase":"pass","serviceId"
:19,"authUri":"<ipaddr>/Soap/Authentication.svc"
```

The redis on the PAM is used for persistence of mapping the VMP contentId to the Insys KeyId. In some cases, it may be required to clear this redis entry so that there is no chance of persisting expired keys.

1. From the command prompt, enter 'redis-cli'.
2. Display the mapping – example:

```
127.0.0.1:6379> hgetall drm:ezdrm:vod1
 1) "keyId"
 2) "tTRAsUaUXRaDQ78WNyZBwg=="
```

3. Delete the entry – example:

```
127.0.0.1:6379> del drm:ezdrm:vod1
(integer) 1 1
```

4. supervisorctl restart drm-system

BuyDRM

On the PAM, make sure the BuyDRM profile has the correct urls for Key Service URI ("uri"), Server key and User Key. The curl commands in the test.curl file can be used as a guideline for exercising these rest apis.

```
Example :
keyAcquisition":{"uri":"http://<ipaddr>/Soap/Kms.svc","userName":"user","passPhrase":"pass","serviceId"
:19,"authUri":"<ipaddr>/Soap/Authentication.svc"
```

The redis on the PAM is used for persistence of mapping the VMP contentId to the Insys KeyId. In some cases, it may be required to clear this redis entry so that there is no chance of persisting expired keys.

1. From the command prompt, enter 'redis-cli'
2. Display the mapping – example:

```
127.0.0.1:6379> KEYS drm:buydrm:vod1
 1) "drm:buydrm:vod1"
 127.0.0.1:6379> hgetall drm:buydrm:vod1
 1) "kid"
 2) "7578b541-675b-46e4-bea8-575533f7eaa2"
 3) "cid"
 4) "6e295bde-be56-4809-932d-e48e11bb4402"
 5) "mid"
 6) "93711ffc-a557-43ad-b220-17239d488f98"
```

3. Delete the entry – example:

```
127.0.0.1:6379> del drm:buydrm:vod1
(integer) 1 1
```

4. supervisorctl restart drm-system

Troubleshooting the SAL

- Restarting the SAL, page 208
- The SAL Port, page 208
- The SAL Log File, page 208
- The SAL Storage, page 209

Restarting the SAL

To restart the SAL, enter the following command:

```
supervisorctl restart StorageMain
```

The SAL Port

The SAL runs on port 5123 on the localhost.

The SAL Log File

The SAL log file is located in the /var/log/opt/cisco/VMP/errorlog/StorageMain/ directory.

```
ls -l /var/log/opt/cisco/VMP/errorlog/StorageMain/storage-init.log.*
```

The current log file is the sal-init.log.current file.

To see what is going on within the SAL, enter the following command:

```
tail -F /var/log/opt/cisco/VMP/errorlog/StorageMain/storage-init.log.current
```

Log levels are configured on the “log_level” property in the /etc/opt/cisco/VMP/StorageMain/storage_server_config.json file:

```
{
    "server_port" : 5123,
    "monitor_time_interval" : 2,
    "pid_file_path" : "/var/run/storage-server/storage-server.pid",
    "log_level" : "log_info",
    "log_socket_path" : "/tmp/StorageMain"
}
```

The SAL supports the following log levels:

- log_info–When enabled, prints critical + error + warning + info messages. This is the default log level. If the “log_level” property in the storage_server_config.json file is incorrect or unknown, the SAL uses this log level.
- log_critical–When enabled, prints only critical error messages.
- log_error–When enabled, prints critical + major error messages.
- log_warning–When enabled, prints critical + error + warning messages.
- log_trace–When enabled, prints critical + error + warning + info + trace error messages.
- log_detail–When enabled, prints all messages: critical + error + warning + info + trace error + detail messages.

To change the log level, change the “log_level” property to a different level, then restart the StorageMain process using the **supervisorctl** command.

Supervisor logs for the SAL are located in the /var/log/supervisor/StorageMain.log file. All uncaught exceptions are written to the supervisor file. If something basic is not working, check the supervisor log to see if there are any uncaught exceptions.

The SAL Storage

This release of SAL supports NFS versions 3.0 and 4.0.

There is no default NFS version for the SAL. The version field is mandatory and must be set to 3.0 or 4.0. However, if you ask for a 4.0 NFS mount, and your NFS server does not support version 4.0, the SAL uses the lower version supported by your NFS server.

The SAL maintains state information. That is, if the SAL crashes and comes back up, it remembers the previous mounts and returns to its pre-crash state.

The SAL monitors all of the shares it has mounted. If a mount failure occurs, the SAL sends an HTTP notification to a callback URL. The callback URL is sent to the SAL as a query string in the request POST URL. The SAL sends the notification to the service agent using the callback URL. The service agent in turn writes the notification to the ZooKeeper.

When an NFS server goes down, the SAL monitors the failed mount points and tries to automatically remount them when the NFS server comes back online. The monitoring does no time out; the SAL monitors the failed mount points indefinitely.

This release does not support the reporting of NFS usage statistics.

The SAL uses a REST API to delete and unmount all mount points. To unmount all mount points, enter the following command:

```
curl -i -X DELETE -H Content-Type:application/json /v1/delete_all_storage
```

This command unmounts all mount points and removes entries for those mount points from the SAL configuration.

If the SAL is not able to mount an NFS server, take the following steps to diagnose and correct the problem:

1. Examine the sal-init.log.current file for recent ERROR and WARNING messages.
2. Examine the mount command that the SAL is using to mount the NFS server.

- Try to mount the NFS server by entering the SAL mount command manually.
- Try to mount the NFS server by entering the following command:

```
mount -t nfs -o vers=3 nfs_server_ip:/share mount_path
```

3. Examine the StorageMain.log supervisor log for uncaught exceptions in the code.
4. Verify that the share path and NFS version are valid.

The following sample JSON files demonstrates how to create a storage mount using the SAL. Additional sample JSON and test scripts are located in the 2.3/storage/init/test directory.

```
{
    "SALMount": [
        {
            "id": "pos_nfs_1",
            "name": "1",
            "type": "smnasmediasource",
            "owner": "smtenants.smtenant.system",
            "properties": {
                "share": "/data",
                "version": "4.0",
                "servers": [
                    {
                        "rangeStart": "127.0.0.1",
                        "rangeEnd": "127.0.0.1"
                    }
                ],
                "description": "nas storage",
                "numMounts": 2
            }
        },
        {
            "id": "pos_nfs_2",
            "name": "2",
            "type": "smnasstore",
            "owner": "smtenants.smtenant.system",
            "properties": {
                "share": "/Public",
                "version": "3.0",
                "servers": [
                    {
                        "rangeStart": "172.25.137.11",
                        "rangeEnd": "172.25.137.11"
                    }
                ],
                "description": "nas storage",
                "numMounts": 2
            }
        }
                "description": "nas storage",
                "numMounts": 2
```

Troubleshooting the AWM

Use the following tools and procedures to troubleshoot the Asset Workflow Manager (AWM).

- AWM Troubleshooting Tools, page 211
- AWM Troubleshooting Tips, page 214

AWM Troubleshooting Tools

- Asset Management API and Status, page 211
- AWM Statistics, page 212
- AWM Error Log, page 213
- AWM Transaction Log, page 213

Asset Management API and Status

For each Asset Workflow Template (AWT) in a service instance, the AWM publishes an asset management Use-API to the DocServer. The Use-API document includes the following information:

- AssetWorkflow Use-API status: **Ready** or **Failed**
- URL to create assets

AssetWorkflow API Format

`http://am-`*`cepName-serviceInstanceName.base_domain:port/version`*`/assetworkflows/`*`awtName`*`/assets`

Sample AssetWorkflow API Format

```
http://am-cep1-live1.VMP.com:7001/v1/assetworkflows/nationalChGrp/assets
```

Sample Asset API Output

```
[
    {
        "assetMgmtUrl": "http://am-cep1-live1.VMP.com:7001/v1/assetworkflows/live1/assets/CiscoTest1",
        "contentId": "CiscoTest1",
        "output": [
            {
                "type": "hls",
                "url": "http://live-ca.VMP.com/nodvr-live/CiscoTest1/CiscoTest1.m3u8"
            },
            {
                "type": "hls",
                "url": "http://live-ca.VMP.com/nodvr-live/CiscoTest1/appleTv.m3u8",
                "version": "4"
            },
            {
                "type": "hls",
                "url": "http://live-ca.VMP.com/nodvr-live/CiscoTest1/iphone.m3u8",
                "version": "3"
            },
            {
                "type": "hls",
                "url": "http://live-ca.VMP.com/nodvr-live/CiscoTest1/mac.m3u8",
                "version": "2"
            }
        ],
        "status": {
            "captureStatus": [
                {
                    "captureEngineIp": "11.0.0.207",
```

```
                    "state": "CAPTURING"
                }
            ],
            "state": "CAPTURING"
        },
        "statusCallback": {
            "url": "http://am-cep1-live1.VMP.com:7001/v1/dsw/assetNotify"
        },
        "userData": "CiscoTest1"
    }
]
```

AWM Statistics

The AWM provides internal statistics for AssetWorkflow, CaptureEndPoint, and PublishEndPoint. The AWM supports a REST API to get and clear the statistics.

Get Statistics

```
GET /api/awm/stat HTTP/1.1
```

Clear Statistics

```
DELETE /api/awm/stat HTTP/1.1
```

Sample AWM Statistics

```
{
    "assetWfMgr": {
        "awfDeleteAccepted": 0,
        "awfDeleteRejected": 0,
        "awfUpdateAccepted": 1,
        "awfUpdateRejected": 0
    },
    "assetWfs": {
        "nodvr-live": {
            "assetCreateAccepted": 0,
            "assetDeleteAccepted": 0,
            "awfUpdateAccepted": 1,
            "awfUpdateError": 0,
            "awfUpdateSuccess": 1
        }
    },
    "captureEPs": {
        "ce1": {
            "assetCanceled": 0,
            "assetCompleted": 0,
            "assetCreated": 1,
            "assetDeleteFailed": 0,
            "assetDeleted": 0,
            "assetFailed": 0,
            "awfDeleteError": 0,
            "awfDeleteSuccess": 0,
            "awfUpdateError": 0,
            "awfUpdateSuccess": 1
        }
    },
    "memory": {
        "heapTotal": 71590912,
        "heapUsed": 41873128,
        "rss": 86011904
    },
    "playbackEPs": {
        "pe1": {
            "awfDeleteError": 0,
```

```
            "awfDeleteSuccess": 0,
            "awfUpdateError": 0,
            "awfUpdateSuccess": 1
        }
    }
}
```

AWM Error Log

The AWM can log errors and significant events in an error log. You can also use the error log to trace the execution flow when debugging problems. The AWM supports a REST API to set the level of error logging.

Location of the AWM Error Log

```
/var/log/opt/cisco/VMP/errorlog/awm-errorlog.current
```

Control API

```
POST /api/awm/errorlog HTTP/1.1
    { "level": "trace" }
[ errorlog level: "error", "trace", "detail", "default" ]
```

AWM Transaction Log

The AWM provides the following transaction logs:

- AssetWorkflowMgr transaction log—Logs the following:
  - AWM—AWM system events, AssetWorkflow CRUD

  The AssetWorkflowMgr transaction log is located in the /var/log/opt/cisco/VMP/translogs/awm directory.
- Asset transaction log—Logs asset CRUD and asset lookup transactions.

  The Asset transaction log is located in the /var/log/opt/cisco/VMP/translogs/awm-asset directory.

Sample AWM Transaction Log

```
2014-04-22 19:12:32 live-0-1-awm AWM GET /v1/assetWorkflows/undefined 404: not found
2014-04-22 19:12:33 live-0-1-awm AWM espn: asset workflow created, state=INIT
2014-04-22 19:12:33 live-0-1-awm AWM POST /v1/assetWorkflows 202:espn accepted
2014-04-22 19:12:33 live-0-1-awm AWM espn: asset workflow updating, state=UPDATING
2014-04-22 19:12:33 live-0-1-awm AWM espn: asset workflow CEP update done, state=UPDATING,
cepState=UPDATING, pepState=UPDATING
2014-04-22 19:12:34 live-0-1-awm MPEC 11.0.0.221 POST /api/OriginServices/ 201
2014-04-22 19:12:34 live-0-1-awm MPEC 11.0.0.221 POST /api/OriginServices/1184/SEs 204
2014-04-22 19:12:35 live-0-1-awm MPEC 11.0.0.221 POST
/api/OriginServices/1184/ContentProtectKeyProfiles 201
2014-04-22 19:12:35 live-0-1-awm MPEC 11.0.0.221 PUT /api/OriginServices/1184/ODEConfiguration 201
2014-04-22 19:12:36 live-0-1-awm MPEC 11.0.0.221 POST /api/FileMgmt/files;type=302 200
2014-04-22 19:12:36 live-0-1-awm AWM espn: asset workflow PEP update done, state=UPDATING,
cepState=READY, pepState=UPDATING
2014-04-22 19:12:36 live-0-1-awm AWM espn: asset workflow update done, state=READY, cepState=READY,
pepState=READY
2014-04-22 19:12:36 live-0-1-awm AWM GET /v1/assetWorkflows/espn 200
2014-04-22 19:12:36 live-0-1-awm MCTC POST 0.0.0.0:5001/api/mce/task 200 success,
taskId=L21vcy9zZXJ2aWNlcy9saXZlXzBfMS9hcHBzL2xpdmVfMF8xLXNtY2FwdHVyZWVwLWNlMS90YXNrcy90YXNrLTAwMDAwMDAw
MDU=
2014-04-22 19:12:36 live-0-1-awm AWM espn/CiscoTest1:Asset state changed to PENDING
2014-04-22 19:12:57 live-0-1-awm AWM POST /api/awm/cep/captureEvent/espn/CiscoTest1 204 success,
status=inProgress
2014-04-22 19:12:57 live-0-1-awm AWM espn/CiscoTest1:Asset state changed to CAPTURING
2014-04-22 19:14:10 live-0-1-awm AWM DELETE /v1/assetWorkflows/espn 202 accepted
```

```
2014-04-22 19:14:10 live-0-1-awm AWM espn: asset workflow deleting, state=DELETING
2014-04-22 19:14:10 live-0-1-awm AWM espn: delete INIT assets done, count=0, state=DELETING,
cepState=DELETING, pepState=DELETING
2014-04-22 19:14:10 live-0-1-awm MCTC PUT
0.0.0.0:5001/api/mce/task/L21vcy9zZXJ2aWNlcy9saXZlXzBfMS9hcHBzL2xpdmVfMF8xLXNtY2FwdHVyZWVwLWNlMS90YXNrcy90YXNrLTAwMDAwMDAwMDU= 204 success
2014-04-22 19:14:10 live-0-1-awm AWM POST /api/awm/cep/captureEvent/espn/CiscoTest1 204 success,
status=stopped
2014-04-22 19:14:10 live-0-1-awm MCTC DELETE
0.0.0.0:5001/api/mce/task/L21vcy9zZXJ2aWNlcy9saXZlXzBfMS9hcHBzL2xpdmVfMF8xLXNtY2FwdHVyZWVwLWNlMS90YXNrcy90YXNrLTAwMDAwMDAwMDU= 204 success
2014-04-22 19:14:10 live-0-1-awm AWM espn: cancel and delete PENDING/CAPTURING assets done, count: 1,
taskDeleteFailed: 0, assetStoreDeleteCount: 1
2014-04-22 19:14:10 live-0-1-awm AWM espn: asset workflow delete from CEP done, state=DELETING,
cepState=DELETED, pepState=DELETING
2014-04-22 19:14:11 live-0-1-awm MPEC 11.0.0.221 DELETE /api/OriginServices/1184 204
2014-04-22 19:14:11 live-0-1-awm MPEC 11.0.0.221 DELETE /api/FileMgmt/files;type=302/1189 200
2014-04-22 19:14:11 live-0-1-awm AWM espn: asset workflow delete from PEP done, state=DELETING,
cepState=DELETED, pepState=DELETED
2014-04-22 19:14:11 live-0-1-awm AWM espn: asset workflow delete done, state=DELETED, cepState=DELETED,
pepState=DELETED
```

Sample AWM-Asset Transaction Log

```
2014-04-22 19:23:26 live-0-1-awm espn/-: GET /v1/assetWorkflows/espn/assets 200:count=0
2014-04-22 19:23:26 live-0-1-awm espn/CiscoTest1: POST /v1/assetWorkflows/espn/assets 201
2014-04-22 19:23:26 live-0-1-awm espn/CiscoTest1: POST http://11.0.0.200:7001/v1/dsw/assetNotify 204:
Asset state PENDING
2014-04-22 19:23:47 live-0-1-awm espn/CiscoTest1: POST http://11.0.0.200:7001/v1/dsw/assetNotify 204:
Asset state CAPTURING
2014-04-22 19:26:04 live-0-1-awm espn/-: GET /v1/assetWorkflows/espn/assets 200:count=1
2014-04-22 19:26:04 live-0-1-awm espn/CiscoTest1: DELETE /v1/assetWorkflows/espn/assets/CiscoTest1 202
2014-04-22 19:26:04 live-0-1-awm espn/CiscoTest1: POST http://11.0.0.200:7001/v1/dsw/assetNotify 204:
Asset state DELETE_COMPLETE
```

AWM Troubleshooting Tips

- AWT Not Enabled—Asset Resolver Problem, page 215
- AWT Instantiation Failed—Bad AWT Configuration, page 215
- AWT Instantiation Failed—MPE Application Failed, page 216
- AWT Instantiation Failed—MCE Application Failed, page 216
- AWT Configuration Update Failed—Bad Configuration, page 216
- AWT Configuration Update Failed—Update to the MPE Failed, page 217
- AWT Configuration Update Failed—Update to the MCE Failed, page 217
- Live Channel Create Failed—Use-API Interface Failed, page 218
- Live Channel Create Failed—Recording Task Create Failed, page 218
- Live Channel Create Failed—Live Recording Failed, page 218
- Live Channel Failed During Capture, page 218
- Live Channel Delete Failed—Use-API Interface Failed, page 219
- Live Channel Delete Failed—Delete Content Task Failed, page 219
- Live Channel Delete Failed—Channel Delete on MCE Failed, page 219

- VOD Asset Create Failed—Use-API Interface Failed, page 220
- VOD Asset Create Failed—Rejected By the AWM Schema, page 220
- VOD Asset Create Failed—Recording Failed on MCE, page 220
- VOD Asset Delete Failed—Delete Content Task Failed, page 220
- VOD Asset Delete Failed—Asset Not Available, page 221

AWT Not Enabled—Asset Resolver Problem

Impact on the End User

The Asset Workflow Template (AWT) creation failed because the asset resolver file could not be uploaded.

Possible Reasons for Problem

Asset resolver file validation failure because of invalid input to the publish template

Error/Event Messages

Examine the /var/log/opt/cisco/VMP/errorlog/awm-errorlog.current.current error log for the reason that the asset resolver file could not be uploaded:

```
04/23/2014 18:29:23.643: (25348)(ERRO)VosmApi.js:1178 ->
{"fileMgmt":{"$":{"uri":"/api/fileMgmt"},"result":[{"$":{"message":"Invalid
File","status":"fail"}}],"error":[{"$":{"message":" ================ Start validating:
/state/cdsmTemp/tempFile5177776065076908517.xml <AssetResolverRules
========================================================= Displaying Only WARNINGS and ERRORS after
1lines ========================================================= ERROR: Parser Error at (line 1, char
466):Attribute 'keyRotationInterval' is not declared for element 'ContentProtectionProfileName' CDS XML
Configuration File: /state/cdsmTemp/tempFile5177776065076908517.xml Total Number of Errors: 1 Total
Number of Warning: 0 CDS XML Configuration File is NOT CORRECT "}}]}}
```

Examine the /var/log/opt/cisco/VMP/translogs/awm/working.log AWM transaction log for the error response that was received during the file upload:

```
2014-04-23 18:29:23 live-0-1-awm MPEC 11.0.0.201 POST /api/FileMgmt/files;type=302 400
```

Resolution/Logs

- In the Asset Publish Template associated with the Asset Workflow Template, fix the configuration issue reported in the AWM error log file

AWT Instantiation Failed—Bad AWT Configuration

Impact on the End User

Instantiation of the AWT failed.

The AssetMgmt Use-API is not published on the DocServer.

Possible Reasons for Problem

The configuration of the service and the AWT in the DocServer is incorrect and is rejected by the AWM schema.

- Mandatory objects or attributes are missing from the AWT configuration.
- One or more of the AWT attributes is configured with an incorrect value.

Error/Event Messages

Examine the AWM error and transaction logs for detailed information about the configuration errors.

Resolution/Logs

1. Disable the AWT.
2. Correct the service and AWT configuration.
3. Enable the AWT.

AWT Instantiation Failed—MPE Application Failed

Impact on the End User

Instantiation of the AWT failed.

The AssetMgmt Use-API is not published on the DocServer.

Possible Reasons for Problem

The MPE application failed, and the AppStatus.nodeStatus is critical.

- The minimum number of MPE-Workers not available.

Error/Event Messages

Examine the transaction logs, and the MPE-AIC error log.

Resolution/Logs

Verify that the MPE-Controller, and the minimum number of MPE-Workers configured in the SLA are available in the VM pool.

Disable and re-enable the AWT.

AWT Instantiation Failed—MCE Application Failed

Impact on the End User

Instantiation of the AWT failed.

The AssetMgmt Use-API is not published on the DocServer.

Possible Reasons for Problem

The MCE application failed, and the AppStatus.nodeStatus is critical.

- The minimum number of MCE-Workers not available.

Error/Event Messages

Examine the MPE-AIC error log.

Resolution/Logs

Verify that the minimum number of MCE-Workers configured in the SLA are available in the VM pool.

Disable and re-enable the AWT.

AWT Configuration Update Failed—Bad Configuration

Impact on the End User

The AWT configuration update failed.

The AssetMgmt Use-API is in **Failed** state.

Possible Reasons for Problem

The update to the AWT configuration is incorrect and is rejected by the AWM schema.

Error/Event Messages

Examine the AWM error and transaction logs for detailed information about the configuration errors.

Resolution/Logs

1. Disable the AWT.
2. Correct the service and AWT configuration.
3. Enable the AWT.

AWT Configuration Update Failed—Update to the MPE Failed

Impact on the End User

The AWT configuration update failed.

The AssetMgmt Use-API is in **Failed** state.

Possible Reasons for Problem

The AWT configuration update to the MPE failed, and the MPE application status is critical.

Error/Event Messages

Examine the AWM and the MPE-AIC error log.

Resolution/Logs

Verify that the MPE application is functioning normally.

Disable and re-enable the AWT.

AWT Configuration Update Failed—Update to the MCE Failed

Impact on the End User

The AWT configuration update failed.

The AssetMgmt Use-API is in **Failed** state.

Possible Reasons for Problem

The AWT configuration update to the MCE failed.

Error/Event Messages

Examine the AWM and MCE-Controller error and transaction logs, and the MCE-AIC error log.

Resolution/Logs

Verify that the MCE application and ZooKeeper are functioning normally.

Disable and re-enable the AWT.

Live Channel Create Failed—Use-API Interface Failed

Impact on the End User

The attempt to create a Live channel failed.

Possible Reasons for Problem

The Live service AssetMgmt Use-API interface failed.

Error/Event Messages

N/A

Resolution/Logs

See AWT Configuration Update Failed—Bad Configuration, page 216, AWT Configuration Update Failed—Update to the MPE Failed, page 217, and AWT Configuration Update Failed—Update to the MCE Failed, page 217.

Live Channel Create Failed—Recording Task Create Failed

Impact on the End User

The attempt to create a Live channel failed.

Possible Reasons for Problem

The attempt to create a recording task on the MCE-TC failed.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

Live Channel Create Failed—Live Recording Failed

Impact on the End User

The attempt to create a Live channel failed.

Possible Reasons for Problem

A Live recording failed on the MCE.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

Live Channel Failed During Capture

Impact on the End User

A Live channel failed during capture.

Possible Reasons for Problem

A failure occurred at the MCE.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

Live Channel Delete Failed—Use-API Interface Failed

Impact on the End User

An attempt to delete a Live channel from the channel lineup failed.

Possible Reasons for Problem

The Live service AssetMgmt Use-API interface failed.

Error/Event Messages

N/A

Resolution/Logs

See AWT Configuration Update Failed—Bad Configuration, page 216, AWT Configuration Update Failed—Update to the MPE Failed, page 217, and AWT Configuration Update Failed—Update to the MCE Failed, page 217.

Live Channel Delete Failed—Delete Content Task Failed

Impact on the End User

An attempt to delete a Live channel from the channel lineup failed.

Possible Reasons for Problem

The delete content task could not be created on the MCE-TC.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

Live Channel Delete Failed—Channel Delete on MCE Failed

Impact on the End User

An attempt to delete a Live channel from the channel lineup failed.

Possible Reasons for Problem

The attempt to delete the channel on the MCE failed.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

VOD Asset Create Failed—Use-API Interface Failed

Impact on the End User

An attempt to create a VOD asset failed.

Possible Reasons for Problem

The VOD service AssetMgmt Use-API interface failed.

Error/Event Messages

N/A

Resolution/Logs

See AWT Configuration Update Failed—Bad Configuration, page 216, AWT Configuration Update Failed—Update to the MPE Failed, page 217, and AWT Configuration Update Failed—Update to the MCE Failed, page 217.

VOD Asset Create Failed—Rejected By the AWM Schema

Impact on the End User

An attempt to create a VOD asset failed.

Possible Reasons for Problem

The asset create was rejected by the AWM schema.

Error/Event Messages

The API returns a 400 error code with details in the body.

Resolution/Logs

Correct the asset configuration.

VOD Asset Create Failed—Recording Failed on MCE

Impact on the End User

An attempt to create a VOD asset failed.

Possible Reasons for Problem

The VOD recording failed on the MCE.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

VOD Asset Delete Failed—Delete Content Task Failed

Impact on the End User

An attempt to create a VOD asset failed.

Possible Reasons for Problem

The delete content task could not be created on the MCE-TC.

Error/Event Messages

N/A

Resolution/Logs

See Troubleshooting the MCE, page 185.

VOD Asset Delete Failed—Asset Not Available

Impact on the End User

An attempt to create a VOD asset failed.

Possible Reasons for Problem

The asset is not available on the AWM asset store.

Error/Event Messages

The API returns a 404 error code with details in the body.

Resolution/Logs

Examine the workflowId and contentId.

Troubleshooting the Service Instances

- Service Instance Creation, page 221
- Service Instance Update, page 221
- Service Instance Deletion, page 221

Service Instance Creation

The Service Instance Controller (SIC) is spawned by the SICM. The SICs then launch AICs on the same Platform Manager (PM). Processes are not distributed across PMs at startup.

The SICM followers s run on the other PAMs and can take over as leader if the current SICM leader fails. The SICM followers do not launch any SICs or AICs.

Service Instance Update

When there is a VMP configuration change, the DocServer notifies the affected SIC. The SIC then pushes the new configuration to all of its AICs, and each AIC pushes the configuration to its nodes (VMs).

The DocServer notifies the Live or VOD SIC of any configuration changes via callbacks. The SIC then pushes the new configuration to all of its AICs, and each AIC pushes the configuration to its nodes (VMs).

Service Instance Deletion

When a user disables a service via the VMP-M GUI:

1. The DocServer notifies the affected SIC.
2. The SIC posts a **delete** command to each of its AICs.

The **delete** command does not delete ingest VOD assets are not deleted. To delete ingest VOD assets, use the Service Use API.

3. The AICs are deleted serially: First AWM, then MPE, then MCE. All tasks (live channels) are stopped by the AWM, then the other AICs are deleted.
4. The AICs then post **delete** commands to their workers (VM nodes) and release them back to the PM.
5. All SIC and AIC processes are stopped and the ZooKeeper nodes are cleaned up.

FairPlay Streaming (FPS)

Note: VMP supports Cisco Custom Keystore FairPlay Streaming in Release 2.8.1 and later.

FPS enables playback of encrypted video content by delivering keys to Apple mobile devices, Apple TV, and Safari on OS X. FPS also allows mobile devices and Apple TV to stop playback based on expiration information sent with the content key.

Encrypted content is delivered over the Web using HTTP Live Streaming (HLS).

FPS is integrated into the device operating systems, with native support on iOS and Apple TV. Safari on OS X enables FPS using EME interface support.

For an overview of FairPlay Streaming, refer to https://developer.apple.com/streaming/fps/.

Caution: Implementation of FairPlay Streaming in VMP requires that all packetized elementary stream (PES) audio tracks be formatted as PES Frame Aligned. Only Dolby Digital Plus audio streams are set to PES Frame Aligned by default. For all other stream types, you must set PES Frame to Aligned by choosing **Aligned** from the **PES Frame - Mode** drop-down list. Failure to observe this requirement will result in a system crash.

Configuring Key Profiles

Configuring new Key Profiles is required for FPS. The key profiles are configured within the VMP (MPC PAM GUI). The screen shot examples below show key profile configurations.

Fairplay Implementation

The following section provides instructions for setting up FairPlay Streaming.

License Server and Key Requests

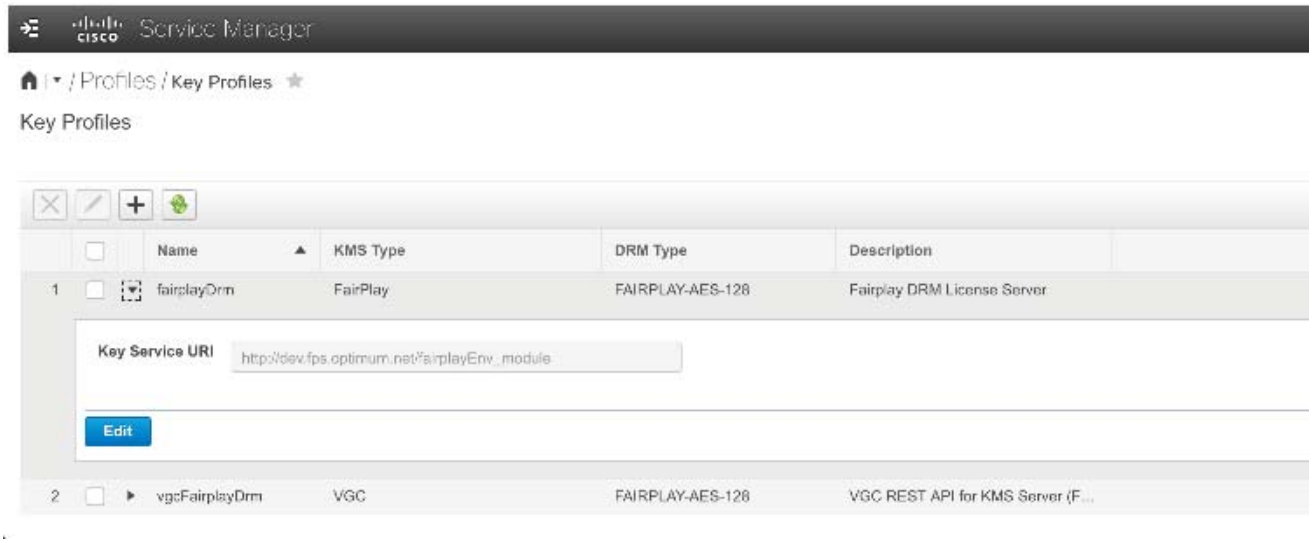
The kmsproxy makes requests for keys and license information through the Rest API.

To integrate with this DRM, the following need to be configured:

- A new keyprofile type 'fairplay'
- A new drmType 'fairplay-aes-128

Sample Fairplay Configuration - MPC/V2P

The key profiles are configured using the SM/V2P GUI



VMP (Packager) Component

The VMP packager adds a special EXT-X-KEY tag to the .m3u8 file. See examples below.

FairPlay DRM Example:

```
#EXTM3U
#EXT-X-TARGETDURATION:3
#EXT-X-VERSION:5
#EXT-X-MEDIA-SEQUENCE:34
#EXT-X-KEY:METHOD=SAMPLE-AES,KEYFORMAT="com.apple.streamingkeydelivery",KEYFORMATVERSIONS="1",URI="skd:
//CHANFPSAAC",IV=0x67598e96f6ed57ad686bc0568cd0b88c
#EXTINF:2.002,
3400000/6306300.ts
#EXTINF:2.002,
3400000/6486480.ts
#EXTINF:2.002,
3400000/6666660.ts
#EXTINF:2.002,
3400000/6846840.ts
```

Playing Fairplay Encrypted Content

To play Fairplay encrypted content, the customer provides an iOS app that can be installed on any iOS device such as an iPad or iPhone.

The following are the steps required to install the App:

- From Safari on iPhone/iPad, download the following using your iTunes account:itms-services:///?action=download-manifest&url=https:/ipa.emedia.cv.net/FPS/FPSTestPlayer.plist
- Go to the IPhone settings for the FPSTestPlayer App. Enable *both* **live** and **vod**.
- Open the FPSTestPlayer app. Click on **Live** and change the default Configuration File location URL to point to your own web host.
- Select from one of the valid entries (ex. Dev) and click **Go**.

- Select Channel to play from the list.

VGC Fairplay Implementation

The following section provides instructions for setting up VGC FairPlay Streaming.

KeyStore

Uses the same Keystore and ABR-E Rest API as used for the already supported generic VGC HLS encryption.

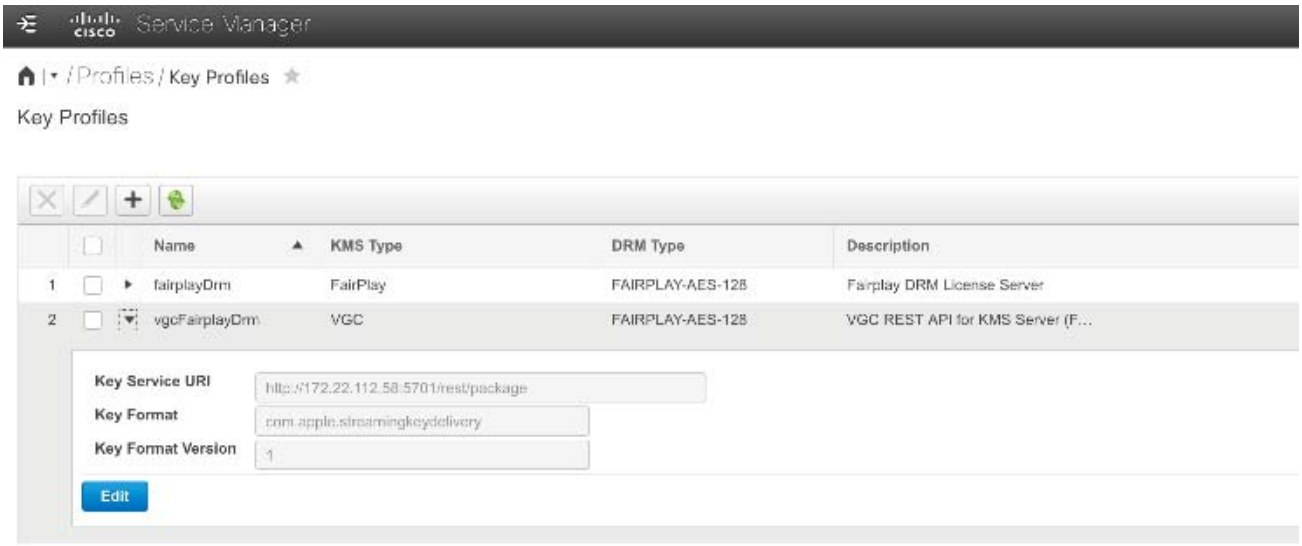
To integrate with this DRM, the following need to be configured:

- A keyprofile of type 'vgc'
- A drmType 'fairplay-aes-128'

Attributes used for encryption are extracted from the Keystore keypackage and taken from the keyprofile configuration:

- key from the keyValue element of the keypackage
- IV for FairPlay must match the IV generation algorithm used by the DRM headend. This defines the IV as the MD5 sum of the binary representation of the keyID
- keyUri is the keyID with prefix and suffix strings set by encryptor local configuration. The Multi-Drm web player requires the skd URL scheme, and the DRM headend expects the hex string format. For 16 byte keyIDs ABR-E uses the prefix “skd://81701500000810” and suffix “00”
- keyFormat and keyFormatVersion defined in the VGC/fairplay-aes-128 keyprofile

Sample VGC Fairplay Configuration



VMP (Packager) Component

The VMP packager adds a special EXT-X-KEY tag to the .m3u8 file. See example below.

```
#EXTM3U
#EXT-X-TARGETDURATION:3
#EXT-X-VERSION:5
#EXT-X-MEDIA-SEQUENCE:0
#EXT-X-PLAYLIST-TYPE:VOD
#EXT-X-KEY:METHOD=SAMPLE-AES,KEYFORMAT="com.apple.streamingkeydelivery",KEYFORMATVERSIONS="1",URI="skd:
//8170150000081041DD2A1DF4119EE03D84859772AC7B1000",IV=0x0913c668a1c7b5d2d0f5b961addf21c8
#EXTINF:2.002,
2100000/4970988298.ts
#EXTINF:2.002,
2100000/4971168478.ts
#EXTINF:2.002,
2100000/4971348658.ts
#EXTINF:2.002,
2100000/4971528838.ts
```

Playing Multi DRM Fairplay Encrypted Content

To play Multi-DRM Fairplay encrypted content, a browser based client is provided

- From Mac Safari browser (Safari version 9.1.1 or above), open the following application: https://vgemultidrm.cisco.com/webapp-eme/?us=fairplaytester
- In the application, click **Click to Activate** to activate your device. When the Deactivate option appears, the device has been activated.
- Set Filter Assets to **FairPlay**.
- Set the asset type to either **Linear** or **VOD**.
- Click the **Play** button to play the content.

This plays content from the catalog. To play content not in the catalog, enter the content ID and full asset URL and then click the **Play** button.

Fairplay DRM Limitations

- Only H.264 video and AAC audio supported
- FairPlay - Live supported
- VGC FairPlay - Live, VOD, and cDVR supported. For Live, the contentId used in the workflow must match the contentId configured on the Keystore.

MCE and MPE Alarms and Events

Alarms and events from MCE and MPE applications are reported to V2PC using the Sensu Infrastructure, and can be viewed through the V2PC GUI. This chapter describes the alarms and events associated with the MCE and MPE.

All alarms and events listed below are applicable to the V2PC environment. However, only CaptureApp alarms and events are applicable to the VMP environment.

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Sample JSON Payload

The following is an example of the JSON payload used in the Sensu client framework to report MCE and MPE alarms and events to V2PC.

```
{
"name":"KMS-Fail-Access",
"severity":"critical",
"type":"Ext-Resource",
"subtype":"Accessibility",
"details":{
"desc":"KMS server connection refused - '10.78.164.33:8260/drmapi/package'"
},
"location":{
"host":"worker-worker-zone-60",
"source":"KMSProxyTestProfile"
},
"time":1489560815,
"status":"raise",
"displayName":"KMS-Fail-Access",
"vendors":{
},
"app":{
"type":"kmsproxy",
"instance":"pe-04",
"role":"mpe"
```

```
}
}
```

Lookup Service Events

This table describes the schema for each of the Lookup Service events.

Event	Event Name	Severity	Type	Subtype	Source	Details	Example
Lookup service URL redirection (302)	Lookup Service - URL Redirect	info	RECORDER	LookupService	serviceType = Live/Vod lookupUrl = <Lookup URL> statusCode = 302	Lookup service URL redirection (302)	lookupUrl= /MyLiveFlow/254/ MPD
Lookup failed due to authentication failure (401)	Lookup Service - Auth Failure	major	RECORDER	LookupService serviceType = Live/Vod	lookupUrl = <Lookup URL> statusCode = 401	Lookup failed due to authentication failure (401)	lookupUrl= /MyLiveFlow/254/ MPD
Lookup failed due to forbidden (403)	Lookup Service - Forbidden	major	RECORDER	LookupService serviceType = Live/Vod	lookupUrl = <Lookup URL> statusCode = 403	Lookup failed due to forbidden (403)	ookupUrl= /MyLiveFlow/254/ MPD
Lookup failed due to internal error (500)	Lookup Service - Internal Error	major	RECORDER	LookupService serviceType = Live/Vod	lookupUrl = <Lookup URL> statusCode = 500	Lookup failed due to internal error (500)	lookupUrl= /MyLiveFlow/254/ MPD

Input/Output Module (IOM) Events

This table describes the schema for each of the IOM events.

Event	Event Name	Severity	Type	Subtype	Source	Details	Example
Event trigger during data timeout in socket during data read from UDP	UDP Read - Data timeout	major	RECORDER	IOM	MulticastIP:<IP address> port:<Port>	Max data timeout retry count reached. Closing session	MulticastIP:232.10. 100.10 port: 5005
Event trigger during socket connection timeout during data write using HTTP	HTTP Write - Connection timeout	major	RECORDER	IOM	UrlHost: <Host name> UrlPath: <Location>	CURL connection timeout occurred	UrlHost: auth01.ds3.tril.com UrlPath: /v1/AUTH_12345/v odcontainer/MyLive Flow/254/instance0 /bd831b59-80b6- 4fb9-bc28-2e2a25 97e89b/0_149578 0586.ts

Event trigger during data timeout during data write using HTTP	HTTP Write - Data timeout	major	RECORDER	IOM	UrlHost: <Host name> UrlPath: <Location>	CURL data timeout occured	UrlHost: auth01.ds3.tril.com UrlPath: /v1/AUTH_12345/vodcontainer/MyLiveFlow/254/instance0/bd831b59-80b6-4fb9-bc28-2e2a2597e89b/0_1495780586.ts
Event trigger during socket connection timeout during data read using HTTP	HTTP Read - CURL error	major	RECORDER	IOM	Uri: <URI path> CURL connection or data timeout occurred	Uri: <URI path> CURL connection or data timeout occurred	Uri:http://auth01.ds3.tril.com/v1/AUTH_12345/vodcontainer?format=json&prefix=MyLiveFlowVmk/47/instance0/bd831b59-80b6-4fb9-bc28-2e2a2597e89b/smptett_eng_/4144140_1495781669.smptett

Task Controller Events

This table describes the schema for each of the Task Controller events.

Event	Event Name	Severity	Type	Subtype	Source	Details	Example
Failed to initialize MCE task controller	TaskCtrlInitFailure	major	RECORDER	TaskController	JSON configuration information	Failed to initialize MCE task controller <error message>	Example JSON source information: " {\" host\" :\" 0.0.0.0\" ,\" port\" :\" 5001\" ,\" workerPath\" :\" /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/workers/worker-dcm-worker-zone-134\" ,\" aicName\" :\" cisco-ce-dcm-ce-sanity\" ,\" tcDomain\" :\" tc-cisco-ce-dcm-ce-sanity\" ,\" Zookeeper\" :{\" servers\" :\" 192.168.126.10:2181,192.168.126.11:2181,192.168.126.12:2181\" ,\" unassignedTaskRoot\" :\" /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/unassigned\" ,\" workerRoot\" :\" /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/workers\" ,\" taskRoot\" :\" /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/tasks\" ,\" taskInstQRoot\" :\" /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/newtaskinstq\" }}" }

Monitoring of "handler" and "status" for zookeeper task instace path failed Task	CtrlMonitoring Failure	major	RECORDER	TaskController	Zookeeper handler path Zookeeper status path	Monitor verification of handler and status node failed. Sending failed response	Zookeeper handler path: /v2p/region-0/apps/cisco-ce-dcm-ce-live/tasks/task-0000000022/instance0/handler Zookeeper status path: /v2p/region-0/apps/cisco-ce-dcm-ce-live/tasks/task-0000000022/instance0/status
Max relocation count exceeded	TaskCtrlMaxRelocationCount Failure	major	RECORDER	TaskController	Instance Path Relocation count	Max relocation count exceeded for task <JSON information containing task details like workflowId, contentId, codec, outputFormat etc....>	Instance Path: /v2p/region-0/apps/cisco-ce-dcm-ce-live/tasks/task-0000000022/instance0 Relocation count: 5
Relocation Success	TaskCtrlRelocationTask Success	major	RECORDER	TaskController	Task Instance Path Worker Path	Relocated task <JSON information containing task details like workflowId, contentId, codec, outputFormat etc....>	Task Instance Path: /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/tasks/task-0000000002/instance0 Worker Path: /v2p/region-0/apps/cisco-ce-dcm-ce-sanity/workers/worker-dcm-worker-zone-134
Failed to relocate task as no worker is available.	TaskCtrlRelocationNoWorkerExist Failure	major	RECORDER	TaskController	Instance Path	Failed to relocate task as no worker is available for task <JSON information containing task details like workflowId, contentId, codec, outputFormat etc....>	Instance Path: /v2p/region-0/apps/cisco-ce-dcm-ce-live/tasks/task-0000000022/instance0

Service Agent Events

This table describes the schema for each of the Service Agent events.

Event	Event Name	Severity	Type	Subtype	Source	Details
Error in init of ServiceAgent	Init failure	major	RECORDER	ServiceAgent	Input JSON	Error in init of ServiceAgent
Unable to start ConfigServer & ConifigApplier	Unable to start ConfigServer & ConifigApplier	major	RECORDER	ServiceAgent	Config data	Unable to start ConfigServer & ConifigApplier
deleting service agent failed	Delete failure	major	RECORDER	ServiceAgent	Config data	deleting service agent failed
Start of Service Agent failed	Start failure	major	RECORDER	ServiceAgent	Config data	Start of Service Agent failed

Error in writing worker settings failed	Worker setting file write failure	major	RECORDER	ServiceAgent	File path	Error in writing worker settings failed
Error in appData writing failed	App data setting file write failure	major	RECORDER	ServiceAgent	File path	Error in appData writing failed
Handling Puppet Config failed	Handling Puppet Config failed	major	RECORDER	ServiceAgent	Config data	Handling Puppet Config failed
Handling Task failed due to error in Child process	TaskHandler failure	major	RECORDER	ServiceAgent	JSON string	Handling Task failed due to error in Child process
Applying SAL config failed due to invalid configuration	Invalid SalConfig	major	RECORDER	ServiceAgent	JSON configuration	Applying SAL config failed
Applying SAL config failed due to invalid response from SAL	Invalid SalResponse	major	RECORDER	ServiceAgent	URL + Config data	Applying SAL config failed
Applying Capture config failed due to invalid configuration	Invalid CaptureConfig	major	RECORDER	ServiceAgent	JSON configuration	Applying Capture config failed
Applying Capture config failed due to write error	Capture Config file write failure	major	RECORDER	ServiceAgent	JSON playout configuration + File Path	Applying Capture config failed
Applying Redis config failed due to invalid configuration	Invalid RedisConfig	major	RECORDER	ServiceAgent	JSON configuration	Applying Redis config failed
Applying Redis config failed due to write error	Redis Config file write failure	major	RECORDER	ServiceAgent	JSON playout configuration + File Path	Applying Redis config failed
SAL Delete failed	SalDelete failure	major	RECORDER	ServiceAgent	URL + Response code	SAL Delete failed
App data delete failed	AppData Delete failure	major	RECORDER	ServiceAgent	File path	App data delete failed
Redis config file reset failed	Redis Config file write failure	major	RECORDER	ServiceAgent	File path	Redis config file reset failed
Worker settings file reset failed	Worker setting file write failure	major	RECORDER	ServiceAgent	File path	Worker settings file reset failed
Unlinking of task controller config failed	TaskController config file delete failure	major	RECORDER	ServiceAgent	File path	Unlinking of task controller config failed
Failed to spawn " nginxListenChangeHelper.js"	SpawnNginxChangeHelper failure	major	RECORDER	ServiceAgent	Script path	Failed to spawn nginxListenChangeHelper.js
Failed to write Task controller config file	TaskController config file write failure	major	RECORDER	ServiceAgent	File path	Failed to write Task controller config file
Failures in receiving input stream	CaptureValidation failure	major	RECORDER	ServiceAgent	Config data	Either of following error messages: 1) Failed to receive one or more channel feed 2) Not able to find interface matching the data-in IP
Validation configuration failed for configuration type is " SAL"	SalValidation failure	major	RECORDER	ServiceAgent	Config data	Validation configuration failed for configuration type is 'SAL'

Session Controller Events

This table describes the schema for Live and VOD Session Controller events.

Event	Event Name	Severity	Type	Subtype	Source	Details
Directory creation failed for given media path	Failed to create directory	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error creating path <path name>
Processing SCTE35 Playout Record failed - Error Fetching SCTE35 event for ESAM value = esam_template (DB Get)	SCTE35Records get event failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Period ID>
Processing SCTE35 Playout Record failed - Error Fetching SCTE35 event for ESAM value = esam_pois (DB Get)	SCTE35Records get event failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID>	profileName= profile name <Error information about requested Period ID>
Processing SCTE35 Playout Record failed - Error Adding SCTE35 event for ESAM value = esam_template (DB add)	SCTE35Records add event failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested PTS>
Processing SCTE35 Playout Record failed - Error Adding SCTE35 event for ESAM value = esam_pois (DB add)	SCTE35Records add event failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested PTS>
Processing SCTE35 Playout Record failed - Error adding SCTE35 segment for ESAM value = 'esam_template' (DB add)	SCTE35Records segment addition failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Period ID>
Checking TSTV for SCTE35 fail - Failed to get segments for adaptationId	CheckTSTVForSCTE35 segment get failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Adaptation ID>
Checking TSTV for SCTE35 fail - Failed to remove segments from adaptationId	CheckTSTVForSCTE35 segment delete failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Adaptation ID>
Error processing ESAM component	Process ESAM Component failure	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error adding ESAM Component
Error processing pass through component	Pass Through Component process failure	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error Adding Pass Through Component
Error processing audio component	Process audio component failure	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error adding audio component

Error processing video component	Process Video component failure	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID>	profileName= profile name Error adding Video component
Process Index Header Record failed - Error adding period for channel & profile	IndexHeaderRecord add period failure	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested period ID>
GetVideoRepresentationBW failed - No components defined in the json	GetVideoRepresentationBW failed	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	No components defined in the json
Failed to write MPD info to file path using IOM	MPDWriteFailure	critical	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID>	<MPD File path>
Failed to adjust SCTE35 TSTV window	adjustSCTE35TSTVWindow failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to adjust SCTE35 TSTV window
Failed to adjust TSTV window	adjustTSTVWindowSync failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to adjust TSTV window
Failed to delete Seg/Frag	PruneSegFragForTSTV failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE Failed to delete Seg/Frag	Failed to delete Seg/Frag
No Segment Timeline. Cannot process segments	Undefined recSegTimeline	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	No Segment Timeline. Cannot process segments
Error adding recovered Segment Timeline	Recovered Segment Timeline addition failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Error adding recovered Segment Timeline
failed ProcessInitialStreamNtpInfo	ProcessInitialStreamNtpInfo failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	failed ProcessInitialStream
Failed to process recovered segments for adaptation	ProcessRecoveredSegments failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to process recovered segments for adaptation
Failed to fetch adaptations of period	GetAdaptationsOfPeriod failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to fetch adaptations of period
Failed to add Adaptation	AddAdaptation failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to add Adaptation

Failed to add EventStreams for period	AddEventStreams failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to add EventStreams for period
Failed to fetch eventStreams of period	GetEventStreamsOf Period failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Failed to fetch eventStreams of period
NO SCTE35 Event	No SCTE35 Event found	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	NO SCTE35 Event
Unable to generate dynamic MPD due to time mismatch	Dynamic MPD generation failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Unable to generate dynamic MPD because actual live start time is unknown
Unable to generate dynamic MPD due to absence of first PTS	Dynamic MPD generation failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Unable to generate dynamic MPD because first PTS is unknown
endTime less than liveStartTime	ConvertTimeToPTS failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	endTime less than liveStartTime
Error in IOM mkdir creation	Media path creation failure	major	RECORDER	CIFController	channelId= <workflowId/ContentID>	<Media path>
Failed to Merge SMPD	Merge SMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	<SMPD path>
Failed to Merge SIDX Meta Data Path	Merge CMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	<sidx Metadata path>
Failed to read SMPD from file	File Read SMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	<SMPD path>
Failed to parse SMPD from file	Parse SMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	<SMPD path>
Failed to generate initial CMPD	Initial CMPD generation failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Failed to generate initial CMPD
Failed to Write X1 cMPD	Write X1 CMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Failed to Write X1 cMPD
Segment Timeline mismatch	ValidateCMPDTimeline failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Segment Timeline mismatch
Failed to Write cMPD	Write CMPD failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Failed to Write cMPD
Failed to generate cMPD Timelines	PopulateSegmentTimeline failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Failed to generate cMPD Timelines
Failed to Parse SIDX Meta Data Path	ParseSIDXSegment Timelines failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	<sidx Metadata path>
Failed to parse meta data files to validate cMPD	ParseSegmentTimelines failure	major	RECORDER	CIFMpdAccumulator	channelId= <workflowId/ContentID>	Failed to parse meta data files to validate cMPD

Failed to parse ttml path	ParseGenericSegmentTimeline failure	major	RECORDER	ClFMpdAccumulator	channelId=<workflowId/ContentID>	<ttml path>
Failed to parse meta data files	ParseSegmentTimelines failure	major	RECORDER	ClFMpdAccumulator	channelId=<workflowId/ContentID>	Failed to parse meta data files
Failed to process SCTEEventMsgPath meta data path	SCTE Msg stream failure	major	RECORDER	ClFMpdAccumulator	channelId=<workflowId/ContentID>	<scteEventMsgPath>
Failed to process metadata stream for SIDX	Meta datastream failure	major	RECORDER	ClFMpdAccumulator	channelId=<workflowId/ContentID>	<sidxMetaDataPath>
Failed to process metadata stream for metadata path	Meta datastream failure	major	RECORDER	ClFMpdAccumulator	channelId=<workflowId/ContentID>	<metaDataPath>
Error in IOM mkdir creation	Directory creation failure	major	RECORDER	C2MpdAccumulator	channelId=<workflowId/ContentID>	<MpdFile Location>
Failed to SetMPDComplete	SetMPDComplete failure	major	RECORDER	C2MpdAccumulator	channelId=<workflowId/ContentID>	Failure information about SetMPDComplete
Failed to read MPD from file	File Read MPD failure	major	RECORDER	C2MpdAccumulator	channelId=<workflowId/ContentID>	<MPD path>
Failed to process adaptation	ProcessPeriod failure	major	RECORDER	C2MpdAccumulator	channelId=<workflowId/ContentID>	<Error information about requested period id>
Failed to process MPD	MPD processing failure	major	RECORDER	C2MpdAccumulator	channelId=<workflowId/ContentID>	<Error information about MPD processing>
IngestFailure: MissingInterfacesInTask - live capture session	IngestFailure - MissingInterfacesInTask	major	RECORDER	LiveCaptureSessionController	channelId=<workflowId/ContentID>	Could not get interfaces from the Handler property. Will quit
Json parsing error due to invalid configuration from Service agent - live capture session	Live session launch failure	major	RECORDER	LiveCaptureSessionController	inputJson: <Incoming JSON task information from Service Agent>	<Json configuration>
delete channelLogPath failed (IOM error) - live capture session	ChannelPathDelete Error	major	RECORDER	LiveCaptureSessionController	channelId=<workflowId/ContentID>	<Log path>
Unknown exception in live session controller - live capture session	UnknownException	major	RECORDER	LiveCaptureSessionController	channelId=<workflowId/ContentID>	unknown exception, stopping all recordings
ipc-error from live capture app - live capture session	Capture IPC Error	major	RECORDER	LiveCaptureSessionController	channelId=<workflowId/ContentID>	<IPC Error>
IOM Delete error during delete of any prexisting content @ contentPath - vod capture session	StorageFailure - StorageDeleteError	major	RECORDER	VodCaptureSessionController	channelId=<workflowId/ContentID>	channelId=<workflowId/ContentID>
IOM mkdir failed during creation of content path - vod capture session	StorageFailure - ContentCreateError	major	RECORDER	VodCaptureSessionController	channelId=<workflowId/ContentID>	<Content path>
IngestFailure: MissingInterfacesInTask - vod capture session	IngestFailure - MissingInterfacesInTask	major	RECORDER	VodCaptureSessionController	channelId=<workflowId/ContentID>	Could not get interfaces from the Handler property. Will quit
Json parsing error due to invalid configuration from Service agent - vod capture session	VOD session launch error	major	RECORDER	VodCaptureSessionController	channelId=<workflowId/ContentID>	<Json config>
Stop failed due to wrong content id - vod capture session	Stop Command failure	major	RECORDER	VodCaptureSessionController	channelId=<workflowId/ContentID>	Stop command failed - wrong content Id

IOM failure due to delete channel log path - vod capture session	ChannelPathDelete Error	major	RECORDER	VodCaptureSession Controller	channelId= <workflowId/ContentID>	<Log path>
resourceMpdDownloadFailed - vod capture session	resourceMpdDownloadFailed	major	RECORDER	VodCaptureSession Controller	channelId= <workflowId/ContentID>	<Mpd Url>
contentTrimmingValidateFailed - vod capture session	contentTrimmingValidateFailed	major	RECORDER	VodCaptureSession Controller	channelId= <workflowId/ContentID>	contentTrimmingValidateFailed
Unknown exception in vod session controller - vod capture session	UnknownException	major	RECORDER	VodCaptureSession Controller	channelId= <workflowId/ContentID>	unknown exception, stopping all applications
ipc-error from vod capture app - vod capture session	Capture IPC Error	major	RECORDER	VodCaptureSession Controller	channelId= <workflowId/ContentID>	<IPC Error>
Error fetching event for Period esValue during ESAM Notification processing	ESAMNotification get event failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Period ID>
Error adding CC component	CC component addition failure	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error adding CC component
Error during video segment representation	UpdateVideoSegRepresentationWithAudio failed	major	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	<Error information about requested Period ID>
Error subscribing to namespace for channel and profile	CIFReceiverInitFailed	critical	RECORDER	CIFReceiver	channelId= <workflowId/ContentID> profileName= profile name	Error subscribing to namespace for any of IndexHeader/SCTE 35/ttmlIndexHeader
Error subscribing to namespace scte35NS	Subscription to namespace failure	major	RECORDER	CIFMpdGenerator	channelId= <workflowId/ContentID> serviceType= LIVE	Error subscribing to namespace scte35NS
SAL returned getMount error	SAL getMount failure	major	RECORDER	DeleteSessionController	channelId= <workflowId/ContentID>	<SAL mount error status>
IOM rm failure	IOM rm() failure	major	RECORDER	DeleteSessionController	channelId= <workflowId/ContentID> IOM rm() failure	IOM rm() failure

CaptureApp Events

This table describes the schema for CaptureApp events for both Live and VOD workflows. These events are applicable to both V2PC and VMP environments.

Event	Event Name	Severity	Type	Subtype	Source	Details	Example
FileHeader record dropped	FileHeader record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains worklfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

Default record dropped	Default record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to no MediaChunk object found	ShutDown - No MediaChunk object found	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Shutting down as no MediaChunk object found	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to Malloc failure detected	ShutDown - Malloc Failure	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Shutting down due to failure in Malloc	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in AddTs Data	ShutDown - Failure in AddTsData	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index record (m_headerRecord)	ShutDown - Failure in AppendIndexRecord (m_headerRecord)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index Record (m_tsRecord)	ShutDown - Failure in AppendIndexRecord (m_tsRecord)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index Record (m_psiRecord)	ShutDown - Failure in AppendIndexRecord (m_psiRecord)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index Record (m_assetInfoRecord)	ShutDown - Failure in AppendIndexRecord (m_assetInfoRecord)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index Record (esRecord)	ShutDown - Failure in AppendIndexRecord (esRecord)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workflowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to failure in Append Index Record (p_Record)	ShutDown - Failure in AppendIndexRecord (p_record)	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to absence of c2-record in transport stream	ShutDown - No transport- stream c2-record found	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to absence of psi-info c2-record	ShutDown - No psi-info c2- record found	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Shut down due to absence of asset-info c2-record	ShutDown - No asset-info c2-record found	major	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

EBP record dropped	EBP record dropped	critical	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
PCR record dropped	PCR record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
IPict (MP2) record dropped	IPict (MP2) record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
IPict (MP2 trick) record dropped	IPict (MP2 trick) record dropped	critical	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
PPict (MP2) record dropped	PPict (MP2) record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
BPict (MP2) record dropped	BPict (MP2) record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Audio record dropped	Audio record dropped	critical	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Gap record dropped	Gap record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
RAP record dropped	RAP record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
IPict (AVC trick) record dropped	IPict (AVC trick) record dropped	critical	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
BPict (AVC) record dropped	BPict (AVC) record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
PPict (AVC) record dropped	PPict (AVC) record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
EndOfGop record dropped	EndOfGop record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
EndOfStream record dropped	EndOfStream record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

Terminator record dropped	Terminator record dropped	warning	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
Scte35 record dropped	Scte35 record dropped	critical	RECORDER	ChunkGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	See CAPPAPP_DETAIL, page 242.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
BadInput	BadInput	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Problems in Ingest stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Cannot allocate memory for objects	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Cannot allocate memory for objects	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Cannot allocate memory for CIF Writeback buffer	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Cannot allocate memory for CIF Writeback buffer	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Ring Buffer related failure due to bad input data	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Ring Buffer related failure due to bad input data	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - No PAT in the input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No PAT in the input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - No PMT in the input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No PMT in the input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Not able to estimate bit-rate for input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Not able to estimate bit-rate for input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Not able to process input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Not able to process input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Audio configured in stream but no audio received. Unable to initialize Indexer	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Audio configured in stream but no audio received. Unable to initialize Indexer	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - No SPS found in the input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No SPS found in the input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Ring buffer error, bad input stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Ring buffer error, bad input stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

StopIndexer - No Video EBPs found in input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No Video EBPs found in input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - Input Transport stream is VBR, un-supported	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Input Transport stream is VBR, un-supported	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopIndexer - No PTS found in the input Transport stream	StopIndexer	critical	RECORDER	Indexer	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No PTS found in the input Transport stream	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
SIDXDropped (No Records Found)	SIDXDropped	major	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Information about RepID, SIDX, PTS, first offset, size etc	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
SIDXDropped (Unknown/Failed status)	SIDXDropped	major	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Information about RepID, SIDX, PTS, first offset, size etc	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
FileWriteDelay	FileWriteDelay	major	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Information about RepID, SIDX, PTS, first offset, size etc.	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
SIDXDelay	SIDXDelay	major	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Information about RepID, SIDX, PTS, first offset, size etc	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopCIFConverter	StopCIFConverter	critical	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workIfowID/ChannelId)	In the past 2 minutes, the number of dropped SIDX record exceeds the threshold!	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
DBConnectionError	DBConnectionError	critical	RECORDER	CIFDbStore	contentId:ProfileName (contentId contains workIfowID/ChannelId)	DBConnectionError - RedisDb Connection failed	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
NoIndexHeaderRecord	NoIndexHeaderRecord	critical	RECORDER	CIFDbStore	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Did not receive index header record for more than <seconds value> seconds	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
NoSIDXRecordsReceivedAny	NoSIDXRecordsReceivedAny	critical	RECORDER	CIFDbStore	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No SIDX arrived for any representations in last <seconds value> seconds	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
NoSIDXRecordsReceived	NoSIDXRecordsReceived	critical	RECORDER	CIFDbStore	contentId:ProfileName (contentId contains workIfowID/ChannelId)	No SIDX arrived for any representations in last <seconds value> seconds	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StopCIFGenerator	StopCIFGenerator	critical	RECORDER	CIFGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	In the past 30 seconds, the number of TS or TTML write failure exceeds the threshold (30)!	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

TTMLStoreWriteFailure	TTMLStoreWriteFailure	critical	RECORDER	CIFGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	<File name>	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
TSStoreWriteFailure	TTMLStoreWriteFailure	critical	RECORDER	CIFGenerator	contentId:ProfileName (contentId contains workIfowID/ChannelId)	<File name>	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
BadIngestData	BadIngestData	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Indexer failed to process packets	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
IngestFailure	IngestFailure	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	String representation of IOM Error codes Eg: IOM_DATA_TIMEOUT	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
MemoryAllocationFailure	MemoryAllocationFailure	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Failed to create Indexer	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
CIFGenerationFailure	CIFGenerationFailure	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	–	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
InternalError	InternalError	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Any one of following: 1. Failed to generate MPD 2. NULL pointer exception with exception details 3. Close() operation timed out. 4. IOM failed with error	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
StorageFailure	StorageFailure	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	File Write Failed	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

RecordingDurationPast	RecordingDurationPast	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Duration of recording in the past	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba
IOMFailure	IOMFailure	critical	RECORDER	CaptureApp	contentId:ProfileName (contentId contains workIfowID/ChannelId)	Any one of the following 1. Failed to create DataReadRequest 2. iom::Read() failed. 3. IOM Read() error. 4. NULL pointer exception. 5. Failed to create DataReadRequest 6. String representation of IOM Error codes	live-flow/200:d1757f44-8226-4de0-af86-2cb7b3f887ba

CAPPAPP_DETAIL

CaptureApp events referencing this section may contain any of the following messages:

- Null pointer detected
- Malloc failure detected.
- IOM error detected.
- Open error detected.
- IO is closed.
- IO is opened.
- Partially written.
- Write failure detected.
- Memory buffer failure detected.
- Usig default implementation.
- Unknown

CaptureApp Alarms

This table describes the schema for the CaptureApp alarm. This alarm is applicable to both V2PC and VMP environments.

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details	Example
No audio present in incoming stream. Presence of audio component in incoming transport stream (raise/clear)	NoAudio	major	RECORDER	CIFConverter	contentId:ProfileName (contentId contains workflowID/ChannelId)	AudioIsNotPresentInStream <Details of Representation ID>	AudioIsNotPresentInStream RepID: video_seg SIDX: {reference_ID: 1192; PTS: 773287526; duration: 78078; timescale: 90000

MPE Events and Alarms

DRM System (KMS Proxy) Alarms

This table describes the schema for each of the DRM System (KMS Proxy) alarms.

Accessibility Alarms

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details	Example
Connection refused as unable to connect to KMS server - RAISE	KMS-Fail- Access	critical	Ext-Resource	Accessibility	<Profile name>	KMS server connection refused - '10.78.164.33:8260/drmapi/package'	DrmProfile
KMS server unreachable due to timeout - RAISE	KMS-Fail- Access	critical	Ext-Resource	Accessibility	<Profile name>	KMS server unreachable - '10.78.164.33:8260/drmapi/package'	DrmProfile
Connection refused (or) KMS server unreachable - CLEAR	KMS-Fail- Access	critical	Ext-Resource	Accessibility	<Profile name>	<Same message as occurred during raise condition>	DrmProfile

Reliability Alarms

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details	Example
Key package mismatch && Failure Count >=2 && Span Duration < 300 seconds - RAISE	KMS-Fail-Acquisition	warning	Ext-Resource	Reliability	<ProfileName: ContentId>	Key Access Failure	DrmProfile:100
Key package mismatch && Failure Count >=5 && Span Duration < 120 seconds - RAISE	KMS-Fail-Acquisition	warning	Ext-Resource	Reliability	<ProfileName: ContentId>	Key Access Failure	DrmProfile:100
Key package mismatch && Init process - CLEAR	KMS-Fail-Acquisition	critical / warning	Ext-Resource	Reliability	<ProfileName: ContentId>	Key Access Failure	DrmProfile:100

Key package mismatch && key access failure exceeds max time between critical error (> 3 minutes) - CLEAR	KMS-Fail-Acquisition	critical	Ext-Resource	Reliability	<ProfileName: ContentId>	Key Access Failure	DrmProfile:100
Key package mismatch && key access failure exceeds max time between warning error (> 10 minutes) - CLEAR	KMS-Fail-Acquisition	warning	Ext-Resource	Reliability	<ProfileName: ContentId>	Key Access Failure	DrmProfile:100

ATS OdeServer Events

This table describes the schema for each of the ATS OdeServer events.

Event	Event Name	Severity	Type	Subtype	Source	Details
ate odeserver instance creation	NewInstanceCreated	major	ats_odesvr	Initialization	ats_odesvr init	New Instance created
ate odeserver plugin deletion	PluginInstanceDeleted	major	ats_odesvr	ats_odeserver	ats_odesvr init	Plugin Instance deleted

ATS OdeServer Alarms

This table describes the schema for each of the ATS OdeServer alarms.

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details
Invalid parameters for ats_odesvr plugin present in configuration	InvalidParameters	major	ats_odesvr	Initialization	ats_odesvr init	Invalid parameters
Asset Rule file init failure - failed to initialize asset rule file data (raise/clear)	AssetRuleFileInitializationFailed	major	ats_odesvr	OdeConfig	ats_odesvr init	AssetRuleFile initialization failed
KMS Proxy Profile file data update failure - failed to update file data (raise/clear)	KMSProxyProfileFileUpdateFailed	major	ats_odesvr	OdeConfig	ats_odesvr init	KMSProxy ProfileFile Update Failed

Process-Level MCE and MPE Alarms

MPE Process Alarms

This table describes the MPE Process alarm schema for the DRM System component.

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details
drm system process init failure - failed during drm-system process init (raise/clear)	InvalidParameters	major	Application	DRM System	drm_app.js	DRM System process failure alarm

Note: Traffic Server process failure alarms are not included here as they are handled as part of Traffic Manager.

MCE Process Alarms

This table describes the MCE Process alarm schema for the Task Controller, Service Agent, Event Subscriber, Storage Main, and Lookup Service components.

Alarm	Alarm Name	Severity	Type	Subtype	Source	Details
Task controller - Process startup Task controller process start failure (raise/clear)	process-status	major	Application	TaskController	MCE	MCE process failure alarm
Service Agent - Process startup Service Agent process start failure	process-status	major	Application	ServiceAgent	MCE	MCE process failure alarm
Event Subscriber - Process startup Event Subscriber process start failure	process-status	major	Application	EventsSubscriber	MCE	MCE process failure alarm
Storage Main - Process startup Storage main process start failure	process-status	major	Application	StorageMain	MCE	MCE process failure alarm
Lookup Service - Process startup Lookup Service process start failure	process-status	major	Application	LookupService	MCE	MCE process failure alarm

Note: Session Controller and Capture App process-related alarms are not included here as they are handled internally by the ServiceAgent process.