



Creating and Managing Programs

This chapter explains how to create and manage live, rebroadcast, TV-out, and export programs (for export to set top boxes). It contains the following sections:

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About Programs

A *program* in ACNS software is defined as a scheduled event in which the content is presented to the end user. Attributes of the program include the start and end time of the program (whether the content is pre-positioned or live) the set of Content Engines assigned to the program, and the streaming server to be used for content delivery.

Program types determine the hardware or software component involved in delivering content to the user. Different program types are:

- Cisco Streaming Engine live
- Cisco Streaming Engine rebroadcast
- Windows Media live
- Windows Media rebroadcast
- TV-out
- Export (meant for a third-party device such as a set top box)

The Content Distribution Manager GUI allows you to create a program, schedule it, and deliver it over your multicast-enabled ACNS network. Programs can consist of prerecorded video or live events. In the case of live events, ACNS software interoperates with third-party encoders and IP/TV Broadcast Servers to transmit the live stream across the ACNS network.

Retention of m4e File Extensions for Envivio-Based Programs

ACNS software supports streaming media that is generated by Envivio-based programs and IP/TV programs. For IP/TV-ACNS programs, the program description is generated as a Session Description Protocol (SDP) file by the IP/TV Program Manager. ACNS software uses this SDP file to distribute the program specifications to the appropriate Content Engines.

Envivio generates the program description as an .m4e file. In ACNS 5.3.3 software and later releases, m4e extensions in the reference URLs are retained. This new functionality allows you to use the Envivio TV plugin to render streams that are encoded by the Envivio encoder using specific codecs, such as H.264. For CLI-based programs, you can now publish `broadcast_id.m4e` files if the source is an .m4e file.

Content Engine Support for Publishing of Multicast SDP Files for Cisco Streaming Engine Live Programs

In previous releases of ACNS software, multicast SDP files were not published for Cisco Streaming Engine programs that were created through the Content Distribution Manager or the Content Engine CLI. In previous releases, you could publish the SDP files from any HTTP or FTP server.

ACNS 5.3.3 software and later releases support multicast reference URLs (Announce URLs) for programs that are created through the Content Distribution Manager or the CLI. The multicast reference URL, which is in the form of `http//Content Engine-IP address/ProgramID.sdp`, is resolved by Content Engines that are serving the live program.

Program Prerequisites

When creating a program in the Content Distribution Manager GUI, the administrator specifies the following information:

- Streaming server—How the program will be streamed or delivered to the end user
 - Cisco Streaming Engine—The event is played from a PC using the Apple QuickTime application or using the IP/TV Viewer application.
 - WMT server—The event is played using a Windows Media Technologies player.
 - TV-out device—The event is displayed over a television monitor that is directly connected to the Content Engine.
 - Exported—The program is exported over HTTP to a set top box.
- Media source
 - Live stream transmitted from a third-party encoder or an IP/TV Broadcast Server.
 - Pre-positioned content stored on Content Engines.
- Destination
 - A set of Content Engines or device groups.
 - A set of Content Engines or device groups assigned to a channel (live or export).
- Delivery method
 - Unicast or multicast live events.
 - Multicast scheduled rebroadcasts.
 - TV-out or export playlists.
- Schedule
 - Start time and duration.

- Looping forever (enabled or disabled).
- Multiple playback times.
- Repeating playback times.
- Publishing URL—The URL used to view the program

Playing Hinted and Nonhinted IP/TV Programs over an ACNS Network



Note

Hinted files contain hint tracks, which store packetization information that tells the streaming server how to package the media data. The streaming server uses the packetization information in the hint tracks to stream the media data to the network.

The Cisco Streaming Engine supports only hinted files (MOV and hinted MP4 files) for streaming. If you are creating a file-based IP/TV program for streaming over an ACNS network, make sure that you use only hinted files such as those with .mov or .mp4 extensions.

However, you can pre-position IP/TV on-demand programs based on nonhinted files such as .mpg files on Content Engines when IP/TV is integrated with an ACNS network by using the TV-out feature. (See the [“Creating a TV-Out Program”](#) section on page 7-31.)

Configuring Multicast IP Addresses for IP/TV Programs

If an IP/TV program that you want to deliver over an ACNS network uses live multicast mode, you must use the same multicast IP address for the audio, video, and SlideCast streams.

This requirement does not apply if the Content Engine used for live splitting is running ACNS 5.1.5 or later software. However, this requirement still applies if the Content Engine is running ACNS 5.1.1 software, even if you are running IP/TV 5.1.5 or later software on IP/TV Program Manager.

About Live Events

Live events are streamed from third-party encoders (such as the Windows Media encoder Version 9 and the QuickTime encoder) or from streaming servers (such as Windows Media Server). The live stream is acquired by the root Content Engine and transmitted to edge Content Engines using unicast. From the edge Content Engines, the live stream is transmitted to end users using either multicast or unicast and unicast live splitting. The live program is available to viewers only during its scheduled times.

Before setting up a live event in the Content Distribution Manager GUI, the administrator must complete the following tasks:

1. Set up the live event on the encoder or streaming server. This task is done externally to the Content Distribution Manager GUI.
2. In the Content Distribution Manager GUI, accept the streaming server’s license agreement (WMT or RTSP) on the Content Engines designated to acquire and distribute the stream. (See the [“Licensing and Enabling Streaming Servers”](#) section on page 9-6.)
3. Create a live channel (or designate an existing channel as a live channel), assign Content Engines to the live channel, and designate a root Content Engine to acquire the stream. (See the [“Creating and Modifying Channels”](#) section on page 5-10.)

After you have completed the preceding tasks, you are ready to define the program and configure the program settings in the Content Distribution Manager GUI. See the [“Defining a Program” section on page 7-11](#). The Content Distribution Manager allows you to define two types of live events based on the streaming server being used:

- Windows Media live
- Cisco Streaming Engine live

See the [“Creating a Live Program” section on page 7-13](#).

Configuration Requirements for Managed Live Events

If you have configured channels for live programs in your ACNS network, make sure that there are no external proxy servers physically located between your receiver Content Engines and your root Content Engine that require proxy authentication. Also, make sure that proxy authentication is not enabled on any receiver Content Engines that might be in the logical, hierarchical path between the root Content Engine and the receiver Content Engine that is going to serve the live stream to the requesting clients. If a live stream encounters any device that requires proxy authentication, the stream will be dropped before it reaches its destination.

If your network is set up with intermediary devices that require proxy authentication, you can work around the problem by configuring rules to bypass authentication on these devices.

For example, to enable the formation of the unicast splitting tree and, in turn, enable live broadcasting from all receiver Content Engines, you can specify the following rule on all of the parent Content Engines in the channel:

```
ContentEngine(config)# rule pattern-list 1 downstream-CE-ipaddress
ContentEngine(config)# rule no-auth pattern-list 1
```

In ACNS 5.4 and releases prior to ACNS 5.5, you must make sure that MMST is not disabled on the root Content Engine or on any receiver Content Engines that might be in the logical, hierarchical path between the root Content Engine and the receiver Content Engine that is going to serve the Windows Media managed live program stream to the requesting clients. If a Windows Media live stream encounters any device that has MMST disabled, the stream fails on that Content Engine and all its down-level devices.

In ACNS 5.5 software, the MMS protocol is no longer supported. Therefore, when you configure a Windows Media managed live program using ACNS 5.5, all Content Engines in the channel must be using ACNS 5.5. You cannot deliver a Windows Media managed live program in a mixed-version environment.



Note

Furthermore, all Content Engines in the live channel must have RTSPT enabled because Content Engines must use the RTSPT protocol to communicate with each other.

Live Stream Interruptions

During a Windows Media live broadcast, any interruption of the live stream that lasts five minutes or longer causes the multicast broadcast to cease for the duration of the currently scheduled period. If the live stream is interrupted for less than five minutes, the broadcast resumes.

Live stream interruptions can be caused by unexpected encoder failures or by an operational restart. If you have early trials scheduled prior to the live event, we recommend that you configure multiple schedules, one for each trial. We also recommend that you start the encoder prior to the scheduled time.

If the live stream stops for more than five minutes and resumes later while the program is still scheduled, you can modify the schedule or any other attribute of the program (such as the description) to trigger a restart of the multicast broadcast. Restarting might take up to five minutes under these circumstances.

This note does not apply to unicast delivery of a Windows Media live event or to Cisco Streaming Engine live programs.

About Root Content Engine Failover and Fallback Support for Cisco Streaming Engine Live Programs

Cisco IP/TV Program Manager Release 5.x and ACNS software Release 5.5 support failover and fallback mechanisms for the root Content Engine to ensure seamless streaming of a Cisco Streaming Engine live program in an IP/TV-integrated ACNS network. In the event of a primary root Content Engine failure, the failover mechanism supports the election of a backup root Content Engine. Fallback occurs when the primary root Content Engine regains its primary position. (See also the [“About the Root Content Engine Failover and Fallback Grace Period Setting”](#) section on page 5-14.)

Root Content Engine failover requires that both the primary and the backup Content Engine be located in the root location and be multicast-enabled to receive multicast streams from the Cisco IP/TV Broadcast Server. When the primary root Content Engine fails, the backup root Content Engine assumes control of the live program streaming, and the live program continues without interruption. The Content Engine that is elected as the location leader in the child location continues to receive the live stream from the backup root Content Engine. This process is transparent to the person viewing the program on IP/TV Viewer or on Apple QuickTime Player.

**Note**

If the root Content Engine receives the program as a unicast stream from the IP/TV Broadcast Server, the failover mechanism is not supported. If the primary root Content Engine fails while a program is playing, the person viewing the program must re-request the program.

Root Content Engines can fail for any of the following reasons:

- The Content Engine is switched off.
- The Content Engine is rebooted.
- The Cisco Streaming Engine is accidentally disabled in the Content Engine.
- A process running on the Content Engine fails.
- The Content Engine is disconnected from the rest of the network.

**Note**

For failover to work correctly, make sure that the Cisco IP/TV Broadcast Server, the root Content Engine, and at least one additional backup Content Engine in the root location are in the same multicast cloud.

Fallback occurs when the primary root Content Engine regains its primary position. When the primary root Content Engine resumes functioning after a failure, it receives the live stream from the active secondary root Content Engine and does not try to regain its primary position. The fallback mechanism occurs in the following circumstances:

- No other Content Engine in the location has been elected as a location leader.
- A program running on the Content Engine is restarted.
- The current program schedule ends and a new program schedule begins.

Configuring Root Content Engine Failover for Incoming Multicast Streams

To configure root Content Engine failover using the Content Distribution Manager GUI, choose the multicast mode of delivery to the root Content Engine by checking the **Enable Multicast Delivery to Client** check box when you configure the live stream settings for a new live program. Alternatively, you can check the **Enable Multicast Delivery to Client** check box when you edit an existing Cisco Streaming Engine live program.

In addition, when you create or edit a live streaming program, you must enter **0** (zero) for the root Content Engine port. (For more information about configuring live stream settings, see [“Configuring Live Stream Settings for a Cisco Streaming Engine Live Program”](#) section on page 7-20.)



Note

If the program is created using the IP/TV Program Manager, and Multicast is chosen as the stream delivery mode, the IP/TV program Manager automatically assigns a zero to the port setting. (For more information, see the *Cisco IP/TV Program Manager Guide, Release 5.x* publication.)

To disable failover to the root Content Engine, choose the unicast mode of stream delivery to the root Content Engine.

About Root Content Engine Failover and Fallback Support for a Windows Media Live Program

ACNS 5.5 software supports root Content Engine failover and fallback for a Windows Media live program. This feature is configured in the same manner as described for a Cisco Streaming Engine live program except that in a Windows Media setup, an encoder replaces the IP/TV Broadcast Server. (See the [“About Root Content Engine Failover and Fallback Support for Cisco Streaming Engine Live Programs”](#) section on page 7-5.)



Note

For failover to work correctly during a Windows Media live program, the root location must contain a primary root Content Engine and at least one additional backup Content Engine. The encoder is not required to be in the root location, and the encoder is not required to be in the multicast cloud.

About ACNS 5.5 Support for Windows Media Server-Side Playlists

The ACNS 5.5 software release supports server-side playlists for Windows Media live streams. A playlist is an ordered list of media items, such as media files, live streams, and so on, that the server can stream to a client. Cisco ACNS software Release 5.5 supports two types of server-side playlists for Windows Media files: broadcast server-side playlists and on-demand server-side playlists. The only protocol supported for ACNS 5.5 server-side playlists is RTSP.

For broadcast server-side playlists, ACNS 5.5 software supports live splitting of the broadcast stream so that multiple clients can view the program simultaneously, while the Content Engine maintains just a single connection to the Windows Media server fetching the data.

For on-demand server-side playlists, ACNS 5.5 software supports pass through delivery of the program, which can be viewed in the same manner as video on demand (VoD).

ACNS software supports the following features of Windows Media server-side playlist:

- Multiple files and Windows Media encoders
- Looping of playlists
- Managed live events (multicast and unicast)
- Stream splitting for unicast streams
- Encoder redundancy
- Custom scripts



Note For custom scripts, you must use the player as a plug-in.

However, ACNS software does not support the following protocols and features for Windows Media server-side playlists:

- MMS (live, on-demand playlist, and proxy caching)
- Text and URL events
- Multiple bit rate files

ACNS software supports only those server-side playlists that are created using the publishing point feature of Windows Media Server. From the Windows Media Server GUI, you can create a broadcast publishing point that contains all media items that you want to be part of the playlist. If you want to use the playlist for multicast, you must create an .nsc file that contains all media items that are included in the playlist. (For information about creating a broadcast publishing point and .nsc file, refer to the Microsoft Windows Media Services documentation.)

An .nsc file is a Windows Media metafile that contains multicast information, such as the multicast IP address, multicast port, time-to-live value, stream formats of media content, and so forth. You must make sure that all media items mentioned in the playlist are also included in the .nsc file. If you made any changes to the publishing point, you should re-create your .nsc file, as well.

You must enter an HTTP URL for the .nsc file in the Streaming Settings window of the Windows Media live program if you want that program to use the server-side playlist for multicast. (See the [“Configuring Live Stream Settings for a Windows Media Live Program”](#) section on page 7-18 and the [“About NSC Files for Multicasting Windows Media Server-Side Playlists”](#) section on page 7-23.)

About Scheduled Rebroadcasts

In a scheduled rebroadcast, pre-positioned content is scheduled to be streamed from edge Content Engines using multicast. To define a program for a rebroadcast event, the administrator must complete the following tasks:

1. Create a content acquisition channel and pre-position the content.
2. Assign media files to the program.
3. Specify the multicast address and port or define a program address pool.
4. Specify the days and times for the rebroadcast.



Note

For rebroadcast programs, media can only be selected from one channel. The Content Engines and device groups assigned to the channel are selected automatically when you choose the media files for the program.

The Content Distribution Manager allows you to define a program as a Windows Media rebroadcast or as a Cisco Streaming Engine rebroadcast. (See the [“Creating a Scheduled Rebroadcast Program”](#) section on page 7-25.)

About TV-Out Programs

A TV-out program is a scheduled program that is based on a playlist. A *playlist* is list of media files and their associated attributes. When you define a TV-out program, you set up a schedule called a *playtime*. A playlist can have between one and ten different playtimes.

To define a program for TV-out, the administrator must complete the following tasks:

1. Create a content acquisition channel and pre-position the content.
2. Select a content channel to be associated with the program.
3. Specify the days and times for the program to play.

(See the [“Creating a TV-Out Program”](#) section on page 7-31.)



Note

For TV-out programs, Content Engines are assigned directly to the program. Content can be acquired from one channel and distributed through a different channel. In other words, the program distribution channel does not have to be the same as the content acquisition channel or channels. To ensure a successful playback, however, the administrator must verify that the media files are pre-positioned on all Content Engines assigned to the program distribution channel.

(For information about Content Engine software driver support for the TV-out feature, see the *Cisco ACNS Software Upgrade and Maintenance Guide, Release 5.x.*)

About Export Programs

An export program is a program that is played across one or more set top boxes (STBs). The administrator selects the media files and image overlays, selects an export channel, and assigns devices to the export channel. The schedule for the playtimes is controlled by the set top box.

(See the [“Creating an Export Program”](#) section on page 7-40.)

Viewing Programs

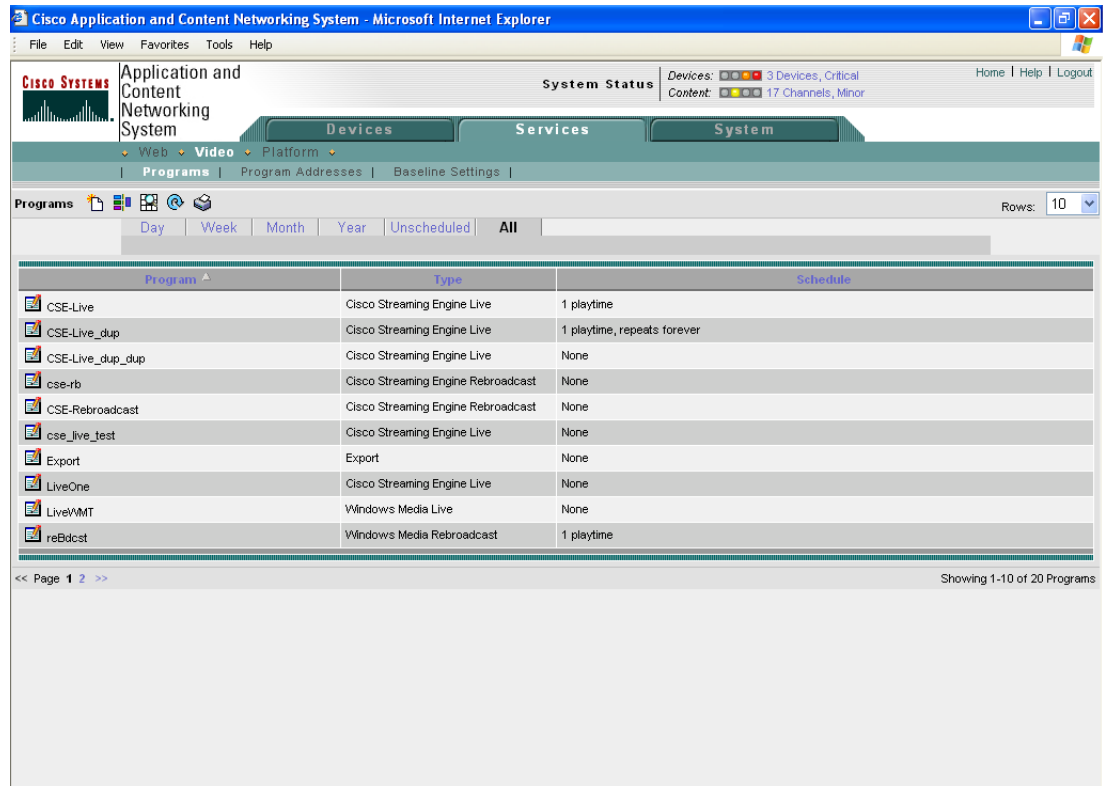
The Programs window of the Content Distribution Manager GUI lists all of the programs defined in your ACNS network. Programs can be defined through the Content Distribution Manager GUI or through an API.

The Programs window allows you to view scheduled programs by day, week, month, or year. You can sort and filter programs by name, type, or schedule. You can also preview live programs while they are playing.

To view all the programs defined in your ACNS network, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**. The Programs window appears listing all the programs that have been defined through either the Content Distribution Manager GUI or the Program API. (See [Figure 7-1](#).)

Figure 7-1 Viewing Programs Defined in the Network



Step 2 Choose the **Day**, **Week**, **Month**, or **Year** tab to view the playback schedules. Scheduled playlists are listed by start time (initial start time plus any repeat intervals). Times begin with the current device time (current system time plus device time zone offset).

The **Unscheduled** tab displays all unscheduled programs defined in your ACNS network. The **All** tab displays all the programs defined in your ACNS network. The Programs window opens to this view by default.

Step 3 Sort columns by clicking the column heading. You can also combine filtering conditions. For example, you can filter only Windows Media live programs and then choose the **Week** tab to view the week of November 23 to November 29, 2003. [Table 7-1](#) describes the information that is displayed in this window.

Table 7-1 Programs Window Information

Item	Description
Tabs	
Day/Week/Month/Year	Lists programs based on their schedule. The current day, week, month, or year is displayed by default. You can navigate to the next or previous day, week, month, or year by clicking the back or forward arrows in the date field.
Unscheduled	Lists only programs with no schedule defined.
All	Lists all programs. This is the default view.

Table 7-1 Programs Window Information

Item	Description
Program Listing Table	
Program	Program name, which must be unique to the Content Distribution Manager.
Type	Program type. Program types are: <ul style="list-style-type: none"> • Cisco Streaming Engine live • Cisco Streaming Engine rebroadcast • Export • TV-out • Windows Media live • Windows Media rebroadcast
Schedule	Describes the schedule. Options are: <ul style="list-style-type: none"> • None (the program has no schedule) • Loop continuously • Number of playtimes (the number of times that the program is scheduled to be shown)
Start Time	Program start time in a scheduled view (Day, Week, Month, or Year tab). Lists up to 3 start times if repeat broadcasts are configured.
Duration	Duration of the program or the looping time in a scheduled view (Day, Week, Month, or Year tab).

Viewing and Modifying API Programs

Programs created through APIs are based on a program file. A *program file* contains the elements that define the schedule, content, and presentation parameters. It is a text file written in XML format, similar to the manifest file. The program file contains most of the program settings and resides on an external server. The Content Distribution Manager obtains the program file, parses it, and saves the program file to the database. The program is automatically updated at intervals by refetching the program file and reparsing it. ACNS 5.5 software supports RTSP in the program file.

In contrast, programs defined using the Content Distribution Manager GUI are not based on a program file; the settings entered in the Content Distribution Manager GUI are saved directly to the database.

Programs created using an API can be viewed in the Content Distribution Manager as read only, and modifications to API programs can be done through the API. You can also edit the API program using the Content Distribution Manager GUI; however, if you choose this option, the information about the API program file is deleted and the program can no longer be modified through the API. A third option is to copy the API program using the Content Distribution Manager copy program feature. The new copy will not contain the program file information and will be treated as a Content Distribution Manager GUI-generated program for the purposes of editing. (See the [“Copying a Program”](#) section on page 7-45.)

You can delete any program from the list (whether created through the Content Distribution Manager GUI or through an API) in the Programs window of the Content Distribution Manager GUI.

Previewing a Program

You can preview live programs by live split or by joining a multicast broadcast. Live programs can only be viewed during the scheduled playtime. You can preview a rebroadcast program by joining the multicast broadcast during the scheduled playtime.

To preview a live Cisco Streaming Engine or Windows Media program or scheduled rebroadcast, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**. The Programs window appears.
- Step 2** Click the **Play** icon next to the name of a program. A program preview window pops up, displaying the program information with links to view the program.



Note The **Play** icon only appears while the live program is playing. If a program is not currently playing, you cannot view it.

- Step 3** Click the URL reference link for the program. You have the option to choose a multicast or unicast URL reference, if such are defined for the program. A new window with the URL reference opens.

To successfully view the program, you must meet these conditions:

- You must be able to access the client network.
 - You must have a WMT plug-in installed to view Windows Media live programs.
 - You must have a QuickTime or IP/TV plug-in installed to view Cisco Streaming Engine live programs.
-

Defining a Program

When you define a new program, you must choose one of the following program types:

- Cisco Streaming Engine live
- Cisco Streaming Engine rebroadcast
- Export
- TV-out
- Windows Media live
- Windows Media rebroadcast

After you have completed the following initial configuration, proceed to the section corresponding to the specific program type you are defining.

To define a program, follow these steps:

- Step 1** In the Content Distribution Manager GUI, choose **Services > Video > Programs**. The Programs window appears.
- Step 2** Click the **Create a new Program** icon in the taskbar. The Adding New Program window appears. (See [Figure 7-2](#).)

Figure 7-2 Adding New Program Window

The screenshot shows the 'Adding New Program' window in the Cisco Application and Content Networking System GUI. The window is titled 'Adding New Program' and contains a 'Program Information' section with the following fields and options:

- Name:** A text input field with an asterisk (*) indicating it is a required field.
- Type:** A drop-down menu with the text 'Please make a choice' and a downward arrow.
- Auto Deletion:** A checkbox that is currently unchecked, with the text '(automatically deletes the program about 24 hours after its end-time)' next to it.
- Description:** A text area for entering a description.
- Shuffle:** A checkbox that is currently unchecked, with the text '(plays media in a random order)' next to it.
- Graceful Exit:** A checkbox that is currently unchecked, with the text '(avoids schedule exit in the middle of a media file)' next to it.

At the bottom of the window, there is a note: 'Note: * - Required Field'. The window also has 'Submit' and 'Cancel' buttons at the bottom right.

- Step 3** Enter a unique name for the program in the Name field.
- Step 4** Choose the type of program you are creating from the Type drop-down list.
- Step 5** If you wish the program to be automatically deleted from the Content Manager GUI 24 hours after its scheduled end time, check the **Auto Deletion** check box. This option only applies to live programs.
- Step 6** If you wish, enter a description of the program in the Description field.
- Step 7** For TV-out programs, check the **Shuffle** check box if you want media files to be played in random order. If left unchecked, media files are played in the order listed.
- Step 8** For TV-out programs, check the **Graceful Exit** check box if you want the program to continue playing to the end of the current media file when the program schedule ends. This avoids ending the program in the middle of a media file.
- Step 9** To save your program definition, click **Submit**.

You have defined the type of program that you want to configure. Proceed to the section for configuring that type of program:

- To configure Cisco Streaming Engine live and Windows Media live programs, see the next section, “[Creating a Live Program](#).”
 - To configure Windows Media-rebroadcast and Cisco Streaming Engine rebroadcast programs, see the “[Creating a Scheduled Rebroadcast Program](#)” section on page 7-25.
 - To configure TV-out programs, see the “[Creating a TV-Out Program](#)” section on page 7-31.
 - To configure set top box programs, see the “[Creating an Export Program](#)” section on page 7-40.
-

Creating a Live Program

A live event can be defined as a Windows Media live program or it can be defined as a Cisco Streaming Engine live program. The Cisco Streaming Engine is an open standards-based streaming server that sends hinted MP1, MP2, MP4, and streaming MOV files to clients across the Internet using the industry standard RTP and RTSP protocols.

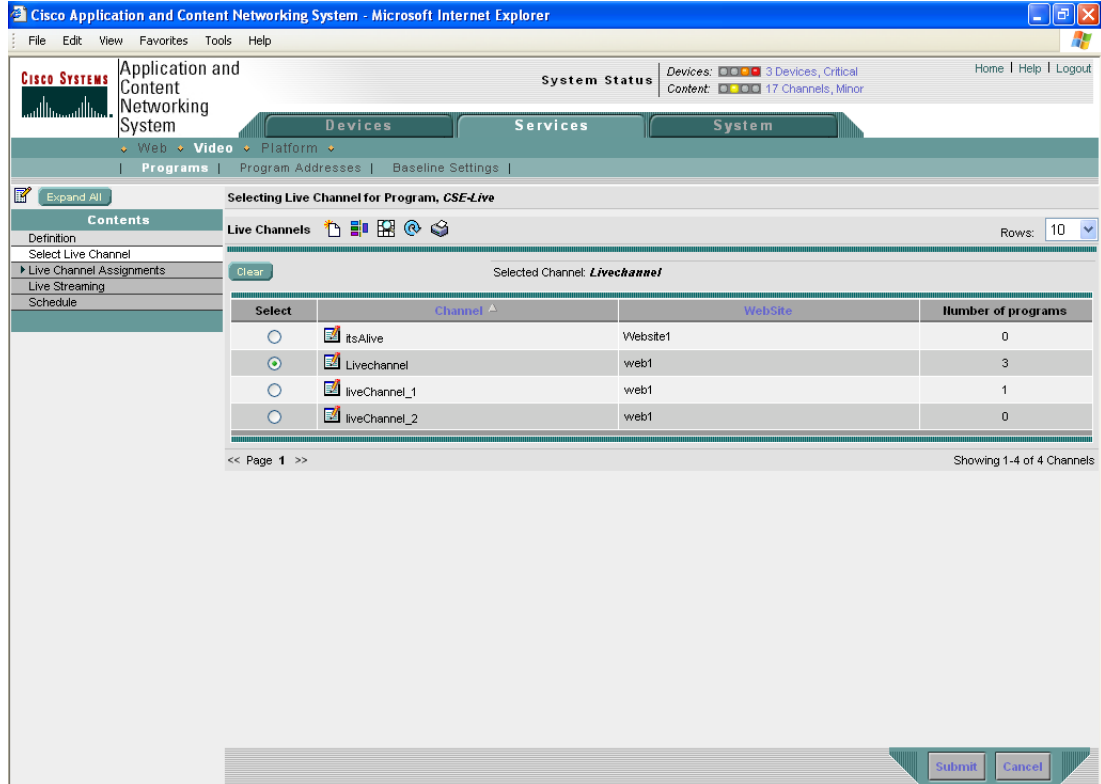
To program a live event, define the program by following the steps in the previous section (“[Defining a Program](#)”) and choose **Cisco Streaming Engine Live** or **Windows Media Live** from the Type drop-down list. Now you must choose a live channel. Proceed to the next section, “[Choosing a Live Channel](#).”

Choosing a Live Channel

To choose a live channel, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon of the program for which you want to select a live channel. The Modifying Program window appears.
- Step 3** In the Contents pane, choose **Select Live Channel**. The Selecting Live Channel for Program window appears. (See [Figure 7-3](#).)

Figure 7-3 Selecting Live Channel for Program Window



This window lists all the live channels in the system.

- Step 4** Click the radio button next to the name of the live channel that you want to associate with the program. Only one live channel can be associated per program.
- Step 5** To save this setting, click **Submit**.

Adding a New Live Channel

If you wish to add a new live channel to associate with your live programs, follow these steps:

- Step 1** From the Selecting Live Channel for Program window (see [Figure 7-3](#)), click the **Create a new Live Channel** icon in the taskbar. The Adding New Live Channel window appears. (See [Figure 7-4](#).)

Figure 7-4 Adding New Live Channel Window

The screenshot shows the Cisco Application and Content Networking System web interface. The main navigation bar includes 'Devices', 'Services', and 'System'. The 'Programs' section is active, and the 'Adding New Live Channel' window is open. The window contains a 'Live Channel Information' section with the following fields:

- Name: liveChannel_3
- Content Provider: None
- WebSite: Please make a choice

A note at the bottom of the form states: "Note: * - Required Field". The interface also shows a 'Contents' pane on the left and 'Submit' and 'Cancel' buttons at the bottom right.

- Step 2** The Name field is automatically populated with a unique channel name. If you wish to change the name given by default, enter a unique name for the channel in this field.
- Step 3** Choose a predefined content provider from the Content Provider drop-down list or choose **None**, which is the default. (See the “[Creating and Modifying Content Providers](#)” section on page 5-6.)
- Step 4** Choose a predefined website from the WebSite drop-down list. (See the “[Creating and Modifying Websites](#)” section on page 5-8.)



Note For Windows Media live programs, the origin server for the live channel’s website should be the root Content Engine DNS name or IP address.

- Step 5** To save the live channel settings, click **Submit**.
- Step 6** To deselect a channel, click the **Clear** button.

After you have associated a live channel with the program, you need to assign Content Engines, device groups, or both to the associated live channel and choose a root Content Engine. Proceed to the next section, “[Assigning Content Engines and Device Groups](#).”

Assigning Content Engines and Device Groups

The Content Engine and device group assignment windows are only available from the Contents pane *after* you have associated a live channel with a program.

To assign Content Engines to the live channel, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon next to the name of a live Windows Media or Cisco Streaming Engine program. If this program is associated with a live channel, the **Live Channels Assignments** option appears in the Contents pane.
 - Step 3** Choose **Live Channels Assignments > Assign Content Engine**. The Content Engine Assignments for Live Channel window appears.
 - Step 4** To make batch Content Engine assignments, click the **Assign all Content Engines** icon in the taskbar, or click the **Remove all Content Engines** icon.
 - Step 5** To make individual assignments, click the **Assign** icon (blue cross mark) next to the name of an individual Content Engine.
 - Step 6** Choose a root Content Engine from the Root CE drop-down list in the task bar.
 - Step 7** To save the assignments, click **Submit**.
-

To assign device groups to the live channel, follow these steps:

-
- Step 1** From Content Distribution Manager GUI, choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon next to the name of a live Windows Media or Cisco Streaming Engine program. If this program is associated with a live channel, the **Live Channels Assignments** option appears in the Contents pane.
 - Step 3** Choose **Live Channels Assignments > Assign Device Groups**. The Device Group Assignments for Live Channel window appears.
 - Step 4** To make batch device group assignments, click the **Assign all Device Groups** icon in the taskbar, or click the **Remove all Device Groups**.
 - Step 5** To make individual assignments, click the **Assign** icon (blue cross mark) next to the name of an individual device group.



Note For information about creating device groups, see the [“Creating a Device Group”](#) section on page 13-26.

- Step 6** Choose a root Content Engine from the Root CE drop-down list in the taskbar.
- Step 7** To save the assignments, click **Submit**.

You are now ready to configure the source URL for the live event as well as the unicast and multicast publishing URLs for the event. Proceed to the next section, [“Configuring Live Stream Settings.”](#)

Priming a Live Channel Using the Programs Interface

The first client requesting a program often experiences the longest wait time for the program to begin playing. Users can experience long wait times because of the full RTSP negotiation that is required to pull the live stream from the source. Delays can also occur if the edge Content Engine has not buffered

enough stream data to fill the media player's buffer at the time that the program is requested. When the buffer is not filled, some data to the client might be sent at the suboptimal line rate instead of at the Fast Start rate. (For information about the Fast Start feature, see the [“About Fast Start” section on page 9-24.](#))

The ACNS 5.5 software release allows channels for unicast managed live programs to be primed for faster startup times. When a live channel is primed, a unicast-out stream is pulled from the origin server to a Content Engine before a client ever requests the stream. When the first request for the stream goes out, the stream is already in the channel.

To view the status of a primed channel, use the **show programs EXEC** command. Live unicast programs that have been configured to play forever will display current status as “Scheduled” when the channel is unprimed, whereas in previous releases that do not support channel priming, the status is displayed as “Playing.” The status output has been changed to differentiate primed and unprimed channel programs in the ACNS 5.5 software release.

You can enable priming for each Content Engine or each device group that is assigned to a live channel on a per-channel basis. A particular program is primed on a Content Engine when the following conditions exist:

1. The Content Engine is assigned to the program's corresponding channel either as a standalone device or as part of a device group.
2. Either the Content Engine itself or any of the device groups in (1) are marked as primed for the program's corresponding channel.

Because Content Engines and device groups are assigned to channels (and not programs) with a many-to-one relationship between programs and channels, enabling primed devices and device groups on a per-channel basis follows the same structure. Given that a live channel exists to which Content Engines or device groups are assigned, the following two cases are possible:

1. A program is assigned to the channel, whereby none of the Content Engines in the channel should prime the program.
2. A program is assigned to the channel, and some subset of the channel's Content Engines should prime the program. This subset can be different for different programs assigned to the channel.

Priming for these cases can be satisfied if the following rules are observed:

- If you want to prime a program on a subset of the Content Engines assigned to an existing channel, where the desired subset differs from the subset that is priming the existing channel, you must create a new channel with the same membership, publishing point, and website information as the existing channel and assign the program to new channel.
- If the desired subset can be formed by using priming granularity at the device group level, that is what you should do. If the granularity is not sufficient because some Content Engines in the device group are to be primed while others are not, then do one of the following:
 - Create a new device group which results in the desired granularity.
 - Assign the Content Engines on which priming should be enabled directly to the channel; they will remain assigned as part of the device group. Priming can then be enabled on the individual Content Engines and disabled at the device group level.

To configure channel priming, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon next to the name of a live Windows Media program. If this program is associated with a live channel, the Live Channels Assignments option appears in the Contents pane. (To assign a live channel, see the [“Choosing a Live Channel” section on page 7-13.](#))

- Step 3** Choose **Live Channels Assignments > Assign Content Engines**. The Content Engine Assignments for Live Channel window appears.
- Step 4** Alternatively, choose **Live Channels Assignments > Assign Device Groups**. The Device Group Assignments for Live Channel window appears.
- Step 5** If you have not already done so, choose a root Content Engine from the Root CE drop-down list in the taskbar.
- Step 6** Under the column heading Primed, check the check box. The check box is only active after a device or device group has been assigned.
- Step 7** To save the assignments, click **Submit**.

To complete the configuration, configure the live stream settings for a Windows Media program and schedule the event. (See the [“Configuring Live Stream Settings for a Windows Media Live Program”](#) section on page 7-18 and the [“Scheduling Live Programs”](#) section on page 7-23.)

**Note**

You can also configure this feature using the Channels interface. See the [Priming a Live Channel Using the Channels Interface](#), page 5-18.

Configuring Live Stream Settings

In this section, you will configure the source URL as well as the unicast and multicast publishing URLs for the live event.

**Note**

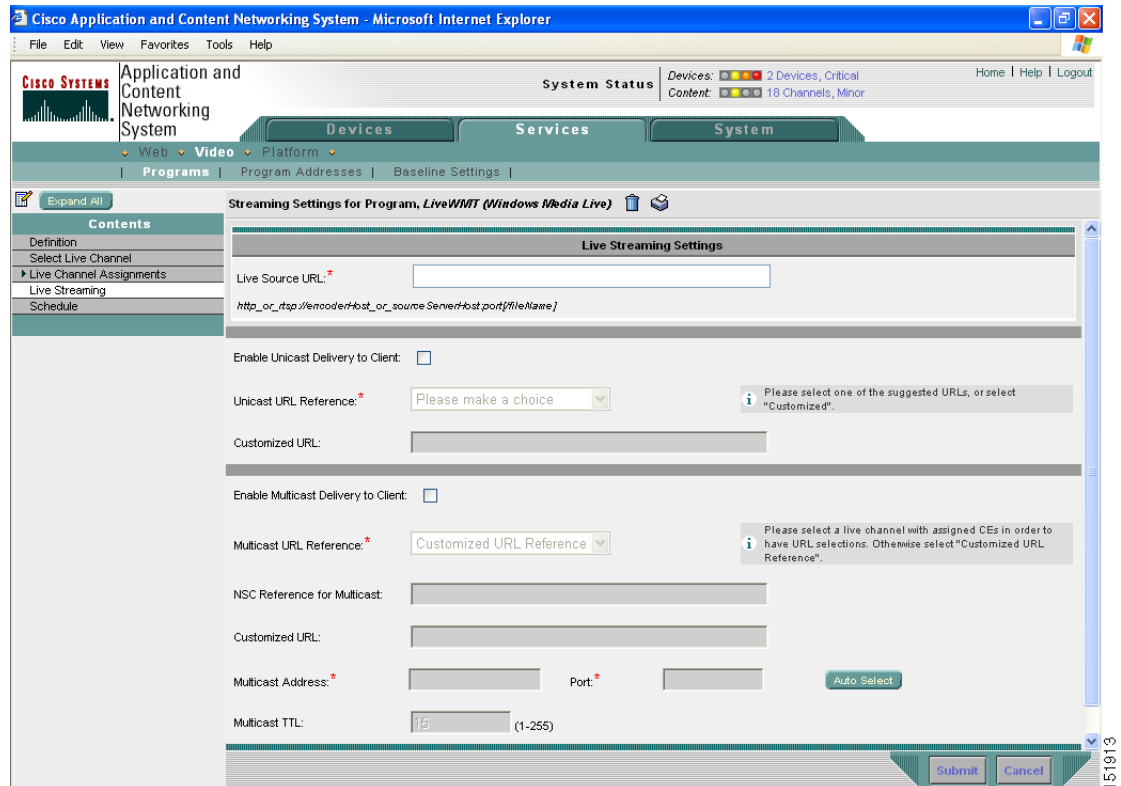
The monitoring interval for a live program is 30 seconds. The retry interval for a live program is 60 seconds. Retries will be done forever. These values are applicable for both CSE and WMT live programs.

Configuring Live Stream Settings for a Windows Media Live Program

To configure live stream settings for a Windows Media live program, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon next to the name of a live Windows Media program.
- Step 3** In the Contents pane, choose **Live Streaming**. The Streaming Settings for Program window appears. (See [Figure 7-5](#).)

Figure 7-5 Streaming Settings for a Windows Media Live Program



Step 4 In the Live Source URL field, enter the URL of the origin Windows Media encoder or Windows Media Server using the following format:

- **http:// WMTencoder:port**
- **rtsp://wmStreamingServer:port/publishPoint**

For encoder failover, you can specify more than one encoder. Separate live source URLs in the list by using a semicolon (;), as in this example:

http://encoder_1:8080;http://encoder_2:8080

Step 5 If the program requires unicast transmission, check the **Enable Unicast Delivery to Client** check box. If a live channel has been associated with the program, a unicast URL is automatically generated and appears in the Unicast URL Reference field.



Note The Unicast URL Reference field is auto-populated from the Origin Server field and the Request Routed FQDN field that you configured when you created the website for the live channel. For more information about creating websites and channels, see the [“Creating and Modifying Websites”](#) section on page 5-8 and the [“Creating and Modifying Channels”](#) section on page 5-10.



Note For Windows Media managed live streaming, HTTP unicast delivery (Unicast in- Unicast out) to the client is not supported. Only RTSP URLs are supported. In the Live Source URL field in the Content Distribution Manager GUI, you can have an HTTP or RTSP URL, but in the Unicast URL Reference field only RTSP URLs are allowed.

Alternatively, if you want to enter a new URL, choose the **Customized Reference URL** option from the Unicast URL Reference drop-down list, and enter a unicast publishing URL in the Customized URL field. Use one of the following formats for a customized URL for unicast:

rtsp://livechannelOriginFQDN/customized-name

http://livechannelOriginFQDN/customized-name



Note Customized URLs can use HTTP; however, they must use an origin server FQDN and not a Content Router FQDN.



Note For Windows Media live programs, URLs of the format `rtsp://rootContentEngine/programName` (used to enable unicast delivery to end clients) must be intercepted transparently using WCCP or explicitly configured to use an RTSP proxy before they can be served by a Content Engine.

Step 6 To enable multicast delivery, check the **Enable Multicast Delivery to Client** check box. If a live channel has been associated with the program, a multicast URL is automatically generated and appears in the Multicast URL Reference field.

If there is no URL listed, or if you want to enter a new URL, choose the **Customized Reference URL** option from the Multicast URL Reference drop-down list, and enter a multicast publishing URL in the Customized URL field. Use the following format for a customized URL for multicast:

http://anyCEinLiveChannellcustomized-name.nsc

Step 7 If you want to use a server-side playlist as the media source for a multicast program, enter the URL for the NSC file in the NSC Reference for Multicast field. (See the [“About NSC Files for Multicasting Windows Media Server-Side Playlists”](#) section on page 7-23.)



Note ACNS software supports the HTTP protocol for fetching the NSC file only. Make sure that the NSC file is saved in a location from where it can be accessed using the HTTP protocol. You must use a URL with a format similar to the following: `http://<hostIP>/<filename>.nsc`.

Step 8 If you enabled multicasting, you must enter the multicast address and the port number. The address range is 224.0.0.0 to 239.255.255.255. The port number range is 1 to 65535. These values must be unique within the system.

Alternatively, the multicast address and port can be automatically selected from the program address pool, if a pool has been defined. (See the [“Managing Multicast Addresses for Programs”](#) section on page 7-46.) To automatically choose the multicast address and port, click the **Auto Select** button.

Step 9 In the Multicast TTL field, specify the multicast Time To Live (number of hops). The default is 15 hops.

Step 10 To save the settings, click **Submit**.

Configuring Live Stream Settings for a Cisco Streaming Engine Live Program

There are two major differences between Cisco Streaming Engine live program streaming settings and Windows Media live program streaming settings:

- Cisco Streaming Engine live programs can have more than one live stream (audio, video, and slides). Each stream requires a unique multicast address and port.

- Publishing multicast and unicast URLs for Cisco Streaming Engine Live programs cannot be autogenerated. The URLs point to meta files (sdp) that are generated and reside on an external server controlled by the administrator.

To configure live stream settings for a Cisco Streaming Engine Live program, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon next to the name of a live Cisco Streaming Engine program.
- Step 3** In the Contents pane, choose **Live Streaming**. The Streaming Settings for Program window appears. (See [Figure 7-6](#).)

Figure 7-6 Streaming Settings for a Cisco Streaming Engine Live Program

The screenshot shows the Cisco Application and Content Networking System GUI. The main content area is titled "Streaming Settings for Program, CSE-Live (CSE Live)". It contains the following configuration fields:

- Origin Server SDP File URL:**
- Unicast URL Reference:** (with a dropdown arrow and an information icon)
- Customized URL:**
- Enable Multicast Delivery to Client:**
- Multicast URL Reference:** (with a tooltip: *http://sourceHost_or_Fqdn/path/file*)
- Multicast TTL:** (range: 1-255)

Below these fields is a section titled "Live Streams" with an "Add New Live Stream" button. It contains a table with the following data:

Live Source		Multicast Address and Port	
Source Server	Root CE Port	Multicast Address	Multicast Port
1 * streamserver	8080	224.1.1.1	1096

At the bottom of the form, there is a "Note: * - Required Field" and "Submit" and "Cancel" buttons.

- Step 4** In the Origin Server SDP File URL field, enter the URL for the SDP file generated on the encoder.
- Step 5** If the program requires unicast transmission, check the **Enable Unicast Delivery to Client** check box, and choose one of the suggested publishing URLs from the Unicast URL Reference drop-down list.



Note

The list of suggested URLs is auto-populated from the Origin Server field and the Request Routed FQDN field that you configured when you created the website for the live channel. For more information about creating websites and channels, see the [“Creating and Modifying Websites”](#) section on page 5-8 and the [“Creating and Modifying Channels”](#) section on page 5-10.

Alternatively, choose **Customized Reference URL** from the Unicast URL Reference drop-down list, and enter a unicast publishing URL in the Customized URL field using one of the formats described in the [“About Unicast Publishing URLs”](#) section on page 7-22.

- Step 6** To enable multicast delivery, check the **Enable Multicast Delivery to Client** check box. If a live channel has been associated with the program, a multicast URL is automatically generated and appears in the Multicast URL Reference field.



Note If you wish to enable support for root Content Engine failover, you must check this check box. Root Content Engine failover for a live program works only when the incoming stream is a multicast stream. (See the [“About Root Content Engine Failover and Fallback Support for Cisco Streaming Engine Live Programs”](#) section on page 7-5.)

- Step 7** In the Multicast TTL field, specify the multicast Time To Live (number of hops). The default is 15 hops.

- Step 8** Define at least one live stream.

- a. Enter the stream source server IP address in the Source Server field.
- b. Enter the root Content Engine port number in the Root CE Port field.



Note To activate failover support for the root Content Engine, you must enter **0** (zero) in the Root CE Port field. (See the [“About Root Content Engine Failover and Fallback Support for Cisco Streaming Engine Live Programs”](#) section on page 7-5.)

You can define up to 10 different live streams for each program.

- Step 9** To add a new live stream, click the **Add New Live Stream** button.

- Step 10** Enter the multicast address and port for each live stream defined. The address range is 224.0.0.0 to 239.255.255.255. The port number range is 1 to 65535. These values must be unique within the system.

Alternatively, the multicast address and port can be automatically chosen for each stream from the program address pool, if one has been defined. (See the [“Managing Multicast Addresses for Programs”](#) section on page 7-46.) To automatically choose the multicast address and port, click the **Auto Select** button.

- Step 11** To save the settings, click **Submit**.

You have completed live stream configuration. You must now set the playtimes for the program. Proceed to the next section, [“Scheduling Live Programs.”](#)

About Unicast Publishing URLs

The unicast publishing URL can use one of the following formats:

- For proxy or WCCP, use one of these formats:
 - `rtsp://liveChannelOriginFqdn/programName`
 - `http://liveChannelOriginFqdn/programName`
- For Content Router routing, use one of these formats:
 - `rtsp://liveChannelCrFqdn/programName)`
 - `http://liveChannelCrFqdn/programName.asx`

- For Global Site Selector (GSS), use one of these formats:
 - **rtsp://liveChannelCrFqdn/programName**
 - **http://liveChannelCrFqdn/programName**

About Multicast Publishing URLs

The multicast publishing URL can use one of the following formats:

- For proxy or WCCP, use one of these formats:
http://anyCEinLiveChannel/programName.nsc
- For Content Router routing, use one of these formats:
http://liveChannelCrFqdn/programName.nsc.asx
- For GSS, use one of these formats:
http://liveChannelCrFqdn/programName.nsc



Note

ACNS 5.2 software supported the multicast publishing URL format, `http://liveChannelOsFqdn/programName.nsc`. However, the live channel origin server FQDN had to be the live channel's root Content Engine. This requirement no longer applies to ACNS 5.3 software and later releases.

About NSC Files for Multicasting Windows Media Server-Side Playlists

Windows Media Station (NSC) files are essentially playlists that contain information to allow Windows Media Player to connect to and play streaming media. Windows Media Player uses NSC (.nsc file extension) files to get the information it needs to receive multicast content over the Internet. These files can contain information such as stream location and rollover URL, as well as descriptive information about the station. Whereas standard streaming multimedia sends a single media stream to a single recipient, multicasting allows a single media stream to be received by more than one person, much like a television or radio broadcast. NSC files contain the information necessary to allow multicast streams to be processed correctly by Windows Media.

For proper multicast delivery of a Windows Media live program, provide the URL of the web server that is hosting the program NSC file in the Stream Settings window for Windows Media live program. (See the “[Configuring Live Stream Settings for a Windows Media Live Program](#)” section on page 7-18.)

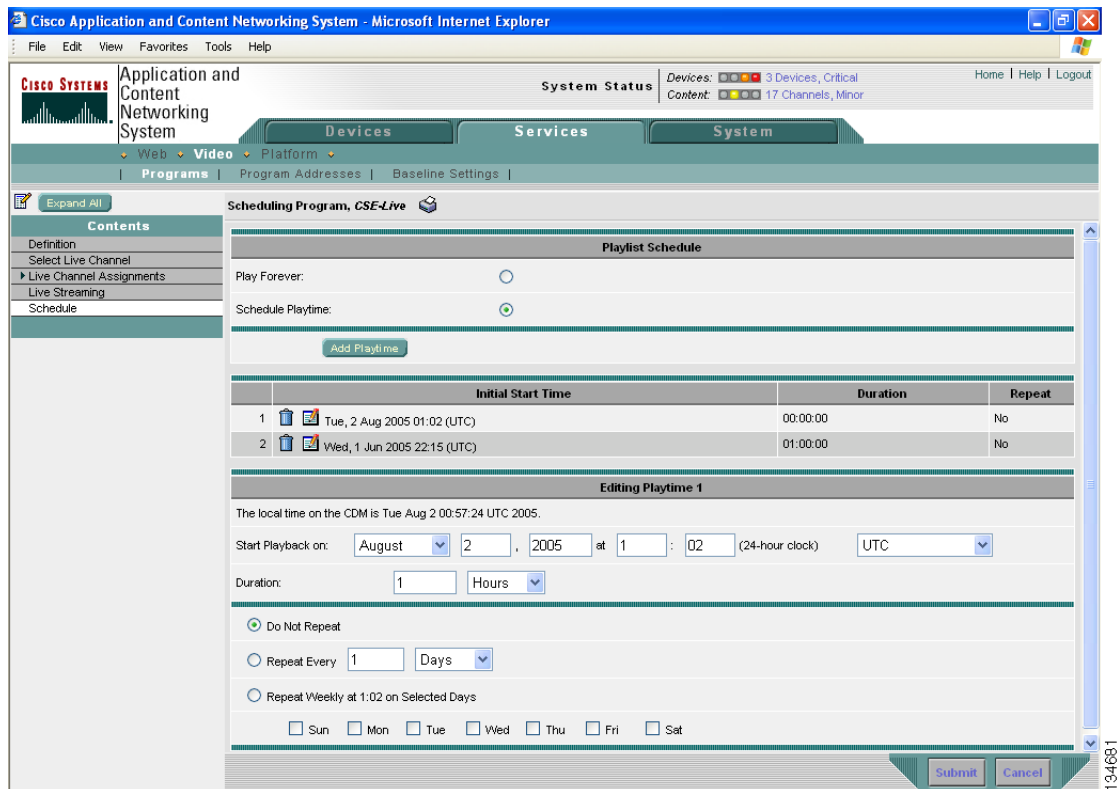
Scheduling Live Programs

Each live program can have up to 10 different playtimes scheduled. The program start time can be specified in Universal Coordinated Time (UTC), which is the same as Greenwich mean time (GMT), or in the Content Engine local time. The program is broadcast from all Content Engines simultaneously; local Content Engine time may differ based on the time zone settings of the device.

To schedule a live program, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon next to the name of a live program.
- Step 3** In the Contents pane, choose **Schedule**. The Scheduling Program window appears. (See Figure 7-7.)
- If you have not previously scheduled or added a playtime, you must choose one of the following two options:
- To schedule a playtime, add a new playtime, or edit a playtime, choose the **Schedule Playtime** radio button. The window refreshes and displays the playtime editor.
 - Alternatively, you can choose the **Play Forever** radio button. If you chose this option, the schedule is preset to play continuously, and the playtime editor not displayed.

Figure 7-7 Scheduling Program Window—Adding a New Playtime



- Step 4** In the playtime editor, enter a start date and time for the program. The playtime editor displays the current time and a duration of one hour as the default. You can edit these fields as you want.
- Step 5** From the drop-down list, choose either **UTC** or **CE(s) Local Time**. The default is UTC.
- In general, a live event should be based on UTC time for successful delivery across time zones. However, if all Content Engines are located in the same time zone, the program can use local Content Engine time.
- Step 6** To configure the duration of the program, in the Duration field, enter a number, and from the drop-down list, choose minutes, hours, or days as the unit of time.

- Step 7** Choose whether or not to repeat the program. If you choose to repeat the program, choose how often to repeat it.
- Do Not Repeat—Configures a one-time live event.
 - Repeat Every—Configures the program to repeat every so many days, hours, or minutes.
 - Repeat Weekly—Configures the program to repeat at the same hour on the days that you choose.
- Step 8** To save the settings, click **Submit**.
- Step 9** To add a new playtime, click the **Add Playtime** button and repeat the above steps. You can have up to 10 different playtimes scheduled for a program.
-

Creating a Scheduled Rebroadcast Program

You can define a scheduled rebroadcast program in the Content Distribution Manager GUI by choosing **Window Media Rebroadcast** or **Cisco Streaming Engine Rebroadcast** as the program type. (See the [“Defining a Program”](#) section on page 7-11.) After you define the program as a rebroadcast program, you are ready to choose the media files that you want to include in the program. Proceed to the next section, [“Choosing the Media Files.”](#)

Choosing the Media Files

In this section you can define a series of media files to be played during your scheduled rebroadcast program. You can define the media file playlist by performing the following tasks in the Content Distribution Manger GUI:

1. Choose the content channel.
2. Perform a content query based on search criteria.
3. Select media that has replicated on the root Content Engine.
4. Define an ordered list of the selected media files.

To choose media files for playback, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon next to the name of a rebroadcast program.
- Step 3** In the Contents pane, choose **Select Media**. The Selecting Media Files for Program window appears. (See [Figure 7-8](#).)

Figure 7-8 Selecting Media Files for Rebroadcast Program

The screenshot shows the Cisco Application and Content Networking System interface. The main window is titled "Selecting Media Files for program, GuestLecture". It features a sidebar on the left with a "Contents" menu. The main area is divided into two sections: "Channels" and "Media Files in Program, GuestLecture".

Channels Table:

Channel	WebSite
<input type="radio"/> BadManifest_new	upgradeServer
<input type="radio"/> ManifestGUI	harvard
<input type="radio"/> SignalProcessing	rpi
<input type="radio"/> test	haskins
<input type="radio"/> test3	foobar
<input type="radio"/> testchannel	foobar
<input type="radio"/> TooSmall	upgradeServer
<input type="radio"/> upgrade	upgradeServer
<input type="radio"/> Video	haskins
<input type="radio"/> videos	haskins

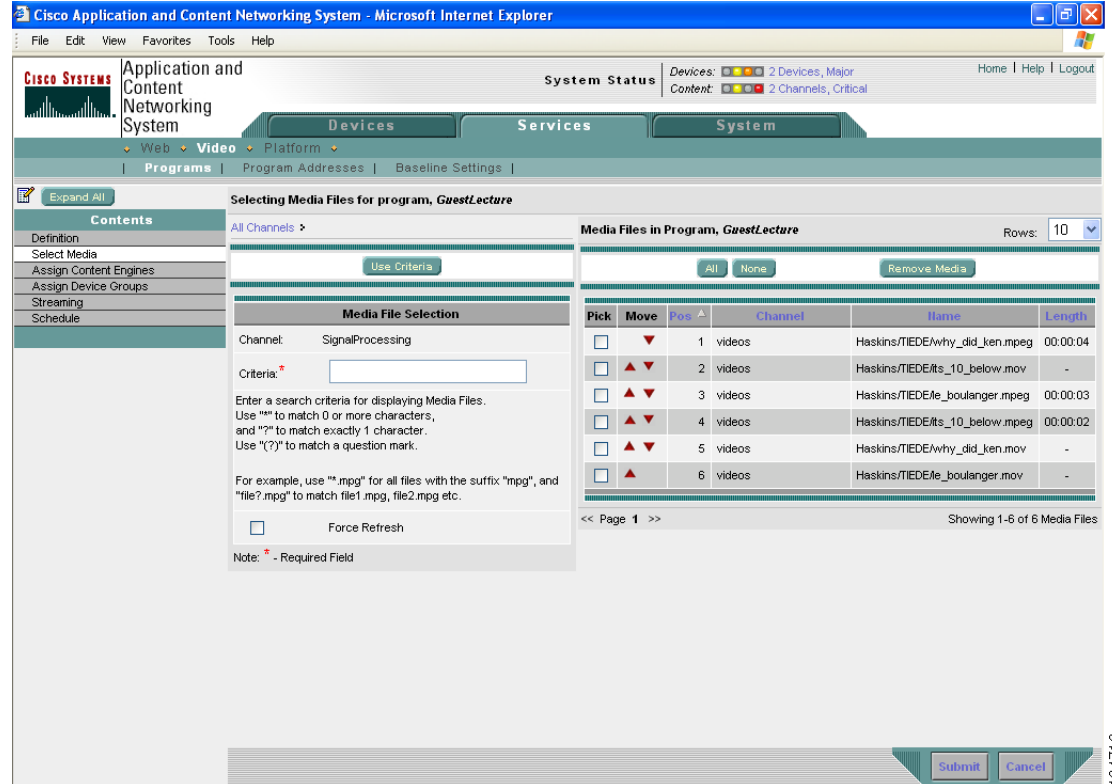
Media Files in Program, GuestLecture Table:

Pick	Move	Pos	Channel	Name	Length
<input type="checkbox"/>	▼	1	videos	Haskins/TIEDE/why_did_ken.mpeg	00:00:04
<input type="checkbox"/>	▲	2	videos	Haskins/TIEDE/ts_10_below.mov	-
<input type="checkbox"/>	▲	3	videos	Haskins/TIEDE/le_boulangier.mpeg	00:00:03
<input type="checkbox"/>	▲	4	videos	Haskins/TIEDE/ts_10_below.mpeg	00:00:02
<input type="checkbox"/>	▲	5	videos	Haskins/TIEDE/why_did_ken.mov	-
<input type="checkbox"/>	▲	6	videos	Haskins/TIEDE/le_boulangier.mov	-

At the bottom right of the interface, there are "Submit" and "Cancel" buttons. The page number "134708" is visible on the right edge.

- Step 4** To choose a content channel from the list, click the radio button next to the name of the channel.
- Step 5** Click the **Show Media in Selected Channel** button. The Media File Selection pane appears. (See [Figure 7-9](#).)

Figure 7-9 Media File Selection Pane



- Step 6** You can search the channel for the media files that you want to add to the playlist by entering the search criteria in the Criteria field. Use an asterisk (*) to match zero or more characters, or a question mark (?) to match exactly one character. For example, use "*.mpg" for all files with the suffix "mpg," and "file?.mpg" to match file1.mpg, file2.mpg, and so on. Click **Use Criteria**. All media files in the selected channel that match the criteria appear.
- Step 7** Check the **Pick** check box next to each media file that you want to add to the playlist and click the **Add Media** button. The media file is added to the bottom of the list in the Media Files in Program pane on the right.
- Step 8** In the right pane, use the **Up Arrow** and **Down Arrow** keys to move a media file up or down one position in the list. Unless you check the **Shuffle** check box in the Playlist Information window, files are played in the order in which they are listed.
- Note that the Up Arrow and Down Arrow are only displayed if the list of media files in the playlist is sorted by position. If you sort the media files alphabetically, for example, then the arrows do not appear.
- Step 9** To remove a media file from the list, check the **Pick** check box next to the file, and click the **Remove Media** button.



Note Media for a Windows Media rebroadcast program can only be chosen from a single channel. If you choose media files from different channels, a warning message appears, and all previously chosen media files are erased.

- Step 10** To save the playlist, click **Submit**.

You have chosen a content channel for the program, and you have also chosen the media files from that channel that you want to add to the program playlist. You are now ready to assign Content Engines or device groups from the channel to the program. Proceed to the next section, “[Assigning Content Engines](#).”

Assigning Content Engines

For rebroadcast programs, media can only be selected from one channel. The Content Engines and device groups assigned to that channel are selected automatically when you choose the media files for the program. If at a later time you add new Content Engines or device groups to the channel, you must manually add the new Content Engines (individually, or as a device group, or both) to the program.

To assign new Content Engines to the rebroadcast program that you are creating, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon for the rebroadcast program that you want to modify. The Modifying Program window for the rebroadcast program that you are working on appears.
 - Step 3** In the Contents pane, choose **Assign Content Engines**. The Assignment of Content Engine of Channel to Program window appears.



Note If you have not chosen a channel and added media files to the program from the channel, this window does not appear. Instead, you see the Content Engine Assignments for Program window, which directs you choose your media files first.

- Step 4** Click the **Assign** icon (blue cross mark) next to as many Content Engines as you want to assign to the program, and click **Submit**. A green tick mark appears next to the assigned Content Engine.
 - Step 5** To unassign a Content Engine that has been assigned to the program, click the **Unassign** icon (green tick mark) next to the assigned Content Engine, and click **Submit**.
-

Assigning Device Groups

To assign a new device group to the rebroadcast program that you are creating, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon for the rebroadcast program that you want to modify. The Modifying Program window for the rebroadcast program that you are working on appears.
 - Step 3** In the Contents pane, choose **Assign Device Groups**. The Assignment of Device Groups of Channel to Program window appears.



Note If you have not chosen a channel and added media files to the program from the channel, this window does not appear. Instead, you see the Device Group Assignments for Program window, which directs you choose your media files first.

- Step 4** Click the **Assign** icon (blue cross mark) next to as many device groups as you want to assign to the program, and click **Submit**. A green tick mark appears next to the assigned device group.

- Step 5** To unassign a device group that has been assigned to the program, click the **Unassign** icon (green tick mark) next to the assigned device group, and click **Submit**.
-

Configuring Streaming Settings

To configure streaming settings for a scheduled rebroadcast program, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon for the rebroadcast program that you want to modify. The Modifying Program window for the rebroadcast program that you are working on appears.
- Step 3** In the Contents pane, choose **Streaming**. The Streaming Settings for Program window appears.
- Step 4** Choose one of the suggested publishing URLs from the Multicast URL Reference drop-down list.



Note The list of suggested URLs that appears in the drop-down menu is based on the pre-positioned channel that you chose when making your media file selection. URLs are auto-generated according to a pre-defined pattern that is derived from the Origin Server field and the Request Routed FQDN field that you configured when you created the website for the pre-positioned channel. For more information about creating websites and channels, see the [“Creating and Modifying Websites”](#) section on page 5-8 and the [“Creating and Modifying Channels”](#) section on page 5-10.

Alternatively, choose **Customized URL Reference**, and enter a publishing URL in the field provided using the following format:

- For Windows Media: **http://ce_ipaddress/programName.nsc**
- For Cisco Streaming Engine: **http://OS-FQDN/programName.sdp** or **http://CR-FQDN/programName.sdp**

- Step 5** In the Multicast TTL field, specify the multicast Time To Live (number of hops). The default is 15 hops.
- Step 6** Enter up to three multicast addresses and port numbers. The address range is 224.0.0.0 to 239.255.255.255. The port number range is 1 to 65535. These values must be unique within the system.

Alternatively, the multicast address and port can be automatically chosen from the program address pool, if one has been defined. (See the [“Managing Multicast Addresses for Programs”](#) section on page 7-46.) To automatically choose the multicast address and port, click the **Auto Select** button.



Note Because Cisco Streaming Engine rebroadcast files can contain multiple tracks (1–3), you can define up to three multicast addresses and ports for each track in the file. At least one multicast address and port must be specified, even if a program address pool is defined; otherwise, program creation fails. Click the **Add Multicast Address/Port** button to define a new track. The GUI displays a track number, which corresponds to the tracks in the stream.

- Step 7** To save the settings, click **Submit**.
-

Scheduling Rebroadcast Programs

To schedule a rebroadcast program, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
- Step 2** Click the **Edit** icon for the rebroadcast program that you want to schedule. The Modifying Program window for the rebroadcast program that you are working on appears.
- Step 3** In the Contents pane, choose **Schedule**. The Scheduling Program window appears.
- Step 4** If you want the playlist to play in a continuous loop, click the **Loop Playback Continuously** radio button, and click **Submit**.



Note The **Loop Playback Continuously** radio button toggles with the **Schedule Playback** radio button. These options are mutually exclusive; you can choose one option or the other.

- Step 5** To schedule playback times for the playlist, click the **Schedule Playback** radio button. The window refreshes, and the Playtimes control window appears. You can schedule up to ten playback times per playlist.



Note No two playback times for a single playlist can have the same start time.

- Step 6** To add a playtime (that is, the time a playback is scheduled to occur), click the **Add a New Playtime** icon, which is in the Playtimes header. (See [Figure 7-7](#).) A new playtime selection is added to the list, and the Playtime Editor pane appears. Configure the playtime by entering the necessary information in the appropriate fields. To save the playtime, click **Submit**.
- Step 7** To remove an existing playtime, click the **Delete** icon that is next to the playtime selection you want to remove. The playtime is removed from the schedule.
- Step 8** To edit an existing playtime, click the **Edit** icon next to the scheduled playtime that you want to change. Change the schedule and playback options as necessary. [Table 7-2](#) explains the fields under the Editing Playtime heading.



Note The dates and times that are entered and displayed are observed according to the local times on the Content Engine.

Table 7-2 *Playlist Schedule Settings*

Schedule Setting	Description
Start Playback on	Local time that the playlist starts playing. This field is required.
Playback Once and Stop	Playlist is played only once and is stopped.
Loop for	Playlist repeats for the specified duration.
Do Not Repeat	Playback occurs only once and does not repeat.
Repeat Every	Playback repeats every so many minutes, hours, or days according to the interval specified (for example, every 10 minutes).

Table 7-2 *Playlist Schedule Settings (continued)*

Schedule Setting	Description
Repeat Weekly at <start time> on selected days	Playback repeats weekly at the local time indicated in the Start Playback on fields.
Repeat Forever ¹	Playback schedule runs indefinitely.
Repeat Until ¹	Playback schedule runs until the date and time that you set.

1. This option only appears in the window after you choose the Repeat Every or Repeat Weekly option.

Step 9 Click **Submit**.

Creating a TV-Out Program

A TV-out program uses a Content Engine equipped with an MPEG decoder card to play back the media files. You can combine media from multiple channels in the playlist and add image overlays to media files in TV-out programs. Before you create a TV-out program, you must first enable the TV-out feature on the Content Engine and designate the format of the signal output.

Enabling the TV-Out Feature

Content Engines that are equipped with an integrated Moving Picture Experts Group (MPEG) decoder can convert digital media into analog TV signals. These Content Engines play media files using National Television Standards Committee (NTSC) or Phase Alternation Line (PAL) video signals and can thus play video directly to a TV monitor for applications such as kiosks, cable TV systems, and video walls.

Before you create a TV-out program, you must first enable the TV-out feature on the Content Engine that delivers the program. Enabling the TV-out feature will succeed only if supported audio and video hardware can be detected on the Content Engine. Autodetection of audio and video supported hardware occurs when you enable TV-out. You also need to designate the TV signal output format that is used when delivering content from a TV-out enabled Content Engine to a TV monitor.

To enable the TV-out feature on a Content Engine and designate the format of the signal output, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Devices > Devices**.
 - Step 2** Click the **Edit** icon next to the name of the Content Engine that you want to enable for TV-out.
 - Step 3** In the Contents pane, choose **Applications > Set Top Box > TV-out**. The TV-out Settings for Content Engine window appears. [Table 7-3](#) describes the corresponding global configuration CLI commands.
 - Step 4** To enable the TV-out feature, check the **TV-out Enable** check box.
 - Step 5** Choose a TV signal output format (**ntsc** or **pal**) from the TV-out Signal drop-down list.
 - Step 6** To save the settings, click **Submit**.
 - Step 7** To disable TV-out, uncheck the **TV-out Enable** check box and click **Submit**. Disabling TV-out unloads the TV-out driver and stops all associated software.

Table 7-3 GUI Fields and Corresponding CLI Commands

GUI Field	Command
TV-out Enable (checked)	tvout enable
TV-out Enable (unchecked)	no tvout enable
TV-out Signal	tvout signal { ntsc pal } Where ntsc is the NTSC standard and pal is the PAL standard. NTSC is the default.

Supported MPEG File Specifications

Table 7-4 lists the supported MPEG file specifications for TV-out enabled devices.

Table 7-4 MPEG File Specifications

Specification	Description
MPEG stream type	MPEG-1 system stream MPEG-2 program stream MPEG-2 transport stream
MPEG video	MPEG-1—4:2:0 Constrained Parameter Bitstream MPEG-2—4:2:0 Main Profile (MP) at Main Level (ML)
MPEG audio	Layers 1 and 2 at 32 kHz, 44.1 kHz, 49 kHz
Data rate	Up to 15 Mbps
Video resolution	NTSC 352 x 240 at 30 frames per second (fps) 352 x 480 at 30 fps 480 x 480 at 30 fps 544 x 480 at 30 fps 704 x 480 at 30 fps 720 x 480 at 30 fps PAL 352 x 288 at 24 fps 352 x 576 at 24 fps 480 x 576 at 24 fps 544 x 576 at 24 fps 704 x 576 at 24 fps 720 x 576 at 24 fps

Selecting Media Files and Overlay Images for Playlists

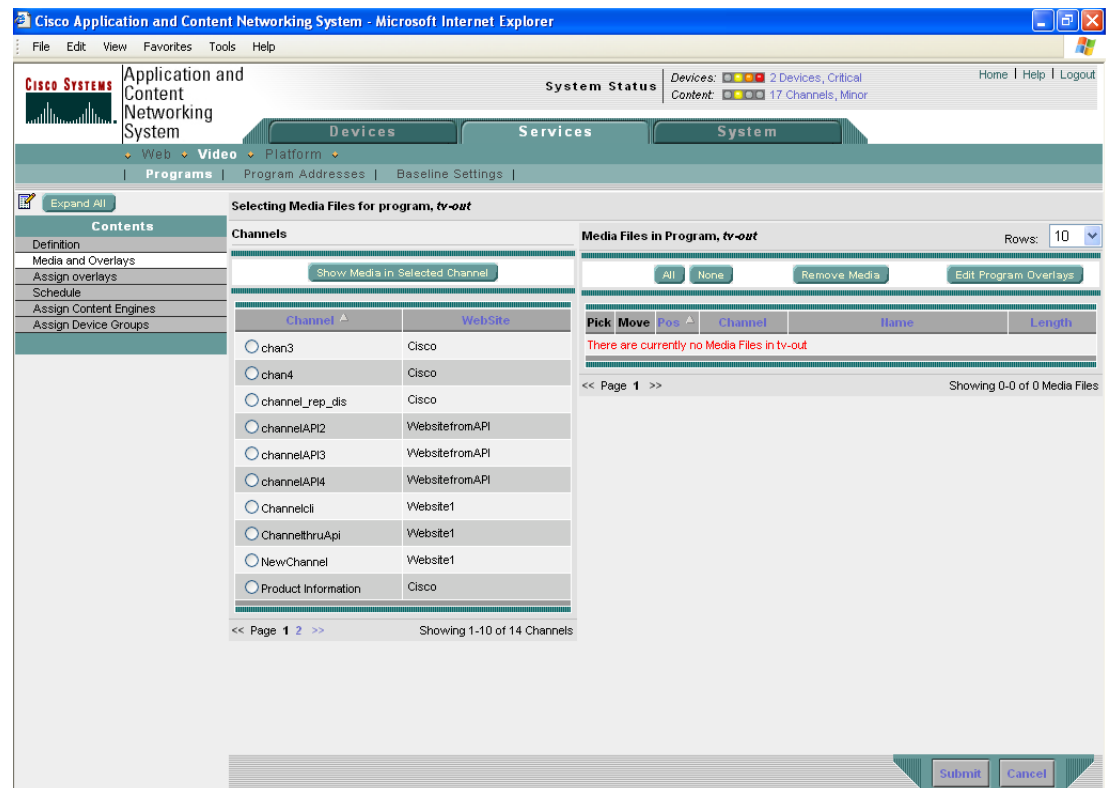
The Content Distribution Manager GUI lets you assemble a series of media files from different channels to create a playlist. The media is then played on any video-out enabled device according to the defined order in the playlist. You can associate one overlay image with each playlist. The user sees this image displayed in a determinable screen location when the playlist it is associated with is playing. Overlay images are useful for displaying logos.

Adding Media Files to a Playlist

To add media files to a playlist, follow these steps:

- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing playlists listed.
- Step 2** Click the **Edit** icon next to the TV-out program to which you want to add media files.
- Step 3** In the Contents pane, choose **Media and Overlays**. The Selecting Media Files for program window appears. (See Figure 7-10.) The left pane displays channels and the right pane displays media files currently in the program playlist. You can add more media files to the playlist.

Figure 7-10 Selecting Media Files for Program Window



- Step 4** In the left pane, choose the channel whose media files you want to display. Click **Show Media in Selected Channel**.

- Step 5** Search for the channel's media files by entering the search criteria in the Criteria field. Use an asterisk (*) to match zero or more characters, or a question mark (?) to match exactly one character. For example, use "*.mpg" for all files with the suffix ".mpg," and "file?.mpg" to match file1.mpg, file2.mpg, and so on. Click **Use Criteria**. All media files in the selected channel that match the criteria appear.
- Step 6** Check the check box next to each media file that you want to add to the playlist. Click **Add**. The media file appears in the right pane at the bottom of the list.
- Step 7** In the right pane, you can use the **Up Arrow** and **Down Arrow** keys to move a media file up or down one position in the list. Unless you check the **Shuffle** check box in the Playlist Information window, files are played in the order in which they are listed.

Note that the Up Arrow and Down Arrow are only displayed if the list of media files in the playlist is sorted by position. If you sort the media files alphabetically, for example, then the arrows do not appear.

Adding an Overlay Image to a Playlist



Note

For CE-507AV and CE-560AV models, overlay images must be Windows bitmap files with 16 colors. They must have 4 bits per pixel and must be less than 64 KB in size. The width of the image (in pixels) must be divisible by 8. Before associating an overlay image, open the image file in an image editor, and view its properties to make sure that it meets the above requirements.



Note

For CE-510 and CE-565 models, overlay images must be bitmap files with either 16 or 256 colors. They must have 4 or 16 bits per pixel, and must be less than 128 KB in size. The width of the image (in pixels) must be divisible by 8. Before associating an overlay image, open the image file in an image editor, and view its properties to make sure that it meets the above requirements.

To add an overlay image to a playlist, follow these steps:

- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing playlists listed.
- Step 2** Click the **Edit** icon next to the TV-out program to which you want to add an overlay image. The Modifying Program window appears.
- Step 3** In the Contents pane, choose **Media and Overlays**. The Selecting Media Files for program window appears. (See [Figure 7-10](#).) The left pane displays channels and the right pane displays media files currently in the program playlist.
- Step 4** In the Channels pane (on the left), choose the channel whose media files you want to display. Click **Show Media in Selected Channel**.
- Step 5** Search for the channel's media files by entering the search criteria in the Criteria field. Use an asterisk (*) to match zero or more characters, or a question mark (?) to match exactly one character. For example, use "*.mpg" for all files with the suffix ".mpg," and "file?.mpg" to match file1.mpg, file2.mpg, and so on. Click **Use Criteria**. All media files in the selected channel that match the criteria appear.
- Step 6** In the left pane, check the **Pick** check box next to the media file that you want to use as an overlay image, and click **Add Overlays**.

The Selecting Media Files for program window becomes the Selecting Overlays for program window. The right pane refreshes and becomes the Overlay Images in Program pane. The media file that you added as an overlay appears in the right pane at the bottom of the list of overlay images.

Step 7 Click **Submit**.

Editing a Overlay Image

To edit an overlay image, follow these steps:

- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing playlists listed.
- Step 2** Click the **Edit** icon next to the TV-out program for which you want to edit an overlay image. The Modifying Program window appears.
- Step 3** In the Contents pane, choose **Media and Overlays**. The Selecting Media Files for program window appears. (See [Figure 7-10](#).) The left pane displays channels and the right pane displays media files currently in the program playlist.
- Step 4** In the Selecting Media Files for program window, click **Edit Program Overlays**. A list of overlay images for the selected media file appears in the Overlay Images in Program pane (on the right).
- Step 5** In the Overlay Images for Program pane, click the **Edit** icon next to the overlay image that you want to edit. The Overlay Settings for Playlist pane appears and contains the image name and the channel from which it was obtained.
- Step 6** You can edit the parameters of the overlay image by specifying and adjusting its location on the TV-out or set top box monitor, specifying the overall opacity of the image, and choosing whether you want one color to be transparent. If desired, you can remove the entire overlay by clicking **Remove Overlay**. (For a description of overlay image parameters, see [Table 7-5](#).)

Table 7-5 Overlay Image Parameters

Image Parameter	Description
Name	Name of the overlay. A default name is given to each overlay. You can change the default name, but you cannot remove the name. The name must be a valid XML name; that is, it can contain alphanumeric characters and underscores, and it must be unique.
Set as Default Overlay	Specifies whether this overlay is the default overlay for this playlist. Each playlist can have only one default overlay.
Placement	Specifies where the overlay image should appear on the TV-out or STB monitor. Your options are upper left, upper right, lower left, lower right, and center.
Height Offset	Adjusts placement along the vertical axis. The valid range is from -40 to 40 pixels. -40 = Moves the image to the lowest possible position on the display. 40 = Moves the image to the uppermost position on the display.
Width Offset	Adjusts placement along the horizontal axis. The valid range is from -60 to 60 pixels. -60 = Moves the image to the left-most possible position on the display. 60 = Moves the image to the right-most possible position on the display.

Table 7-5 Overlay Image Parameters (continued)

Image Parameter	Description
Opacity	Adjusts the opacity of the overlay image. The valid range is from 0 to 15. 0 = Renders the image completely opaque. 15 = Renders the image nearly transparent.
Transparent Color	Enables or disables the use of transparent color. When checked, the color of the pixel in the lower left corner of the image is transparent over the entire image. When a transparency-enabled image is placed over a video, the background color of the overlay image is not visible against the video playing behind it. This feature is useful if you want to use a nonrectangular image as your overlay.

Step 7 Click **Submit**.

Assigning an Overlay Image to a Media File

To assign an overlay image to a media file, follow these steps:

-
- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing playlists listed.
 - Step 2** Click the **Edit** icon next to the TV-out program that you want to edit. The Modifying Program window appears.
 - Step 3** From the Modifying Program window, choose **Assign overlays** from the Contents pane. The Assigning Overlay to Media window appears.

The left pane displays a list of overlay images in the playlist, and the right pane displays media files in the program. The default overlay in the left pane is highlighted. Note that you cannot remove the default overlay.
 - Step 4** Click the radio button next to the overlay that you want to associate with one or more media files.
 - Step 5** In the Media Files in Program pane, check the check box next to the media file or files to which you want to associate the overlay.
 - Step 6** Click **Submit**.
-

Scheduling TV-Out Programs



Note

You can only set playback schedules for playlists that are played over TV-out enabled devices.

To set automatic playback schedules for TV-out playlists, follow these steps:

-
- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing playlists listed.
 - Step 2** Click the **Edit** icon next to the TV-out program that you want to schedule. The Modifying Program window appears.

- Step 3** From the Modifying Program window, follow Step 3 through Step 9 in the “[Scheduling Rebroadcast Programs](#)” section on page 7-30.

Assigning Content Engines to Playlists



Note You can only assign TV-out enabled Content Engines to playlists by using the Content Distribution Manager.

To assign a TV-out enabled Content Engine or a group of Content Engines to a playlist, follow these steps:

- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing programs listed.
- Step 2** Click the **Edit** icon next to the TV-out program to which you want to assign a Content Engine. The Modifying Program window appears.
- Step 3** From the Modifying Program window, choose **Assign Content Engines** in the Contents pane. The Content Engine Assignments for Playlist window appears. (See [Figure 7-11](#).)

Figure 7-11 Content Engine Assignments for Playlist Window

The screenshot shows the Cisco Application and Content Networking System interface. The main window is titled "Content Engine assignments for Playlist, tv-out". It features a table with the following data:

Content Engine	IP Address	Status	Location	Software Version
CONTENTENGINE	10.1.1.21	Online	ContentEngine-location	5.4.0.b.180
stream-dev1	10.77.156.140	Pending	Loc-Root	5.4.0.b.160

The interface also includes a "Contents" pane on the left with options like "Definition", "Media and Overlays", "Assign overlays", "Schedule", "Assign Content Engines", and "Assign Device Groups". The "Assign Content Engines" option is selected. The table has a "Rows: 10" dropdown and "Showing 1-2 of 2 Content Engines" at the bottom right. There are "Submit" and "Cancel" buttons at the bottom of the window.

- Step 4** Click the **Assign** icon (blue cross mark) next to as many Content Engines as you want to assign to the playlist, and click **Submit**. A green tick mark appears next to the assigned Content Engine.

- Step 5** To unassign a Content Engine that has been assigned to the playlist, click the **Unassign** icon (green tick mark) next to the assigned Content Engine, and click **Submit**.
-

Assigning Device Groups to Playlists

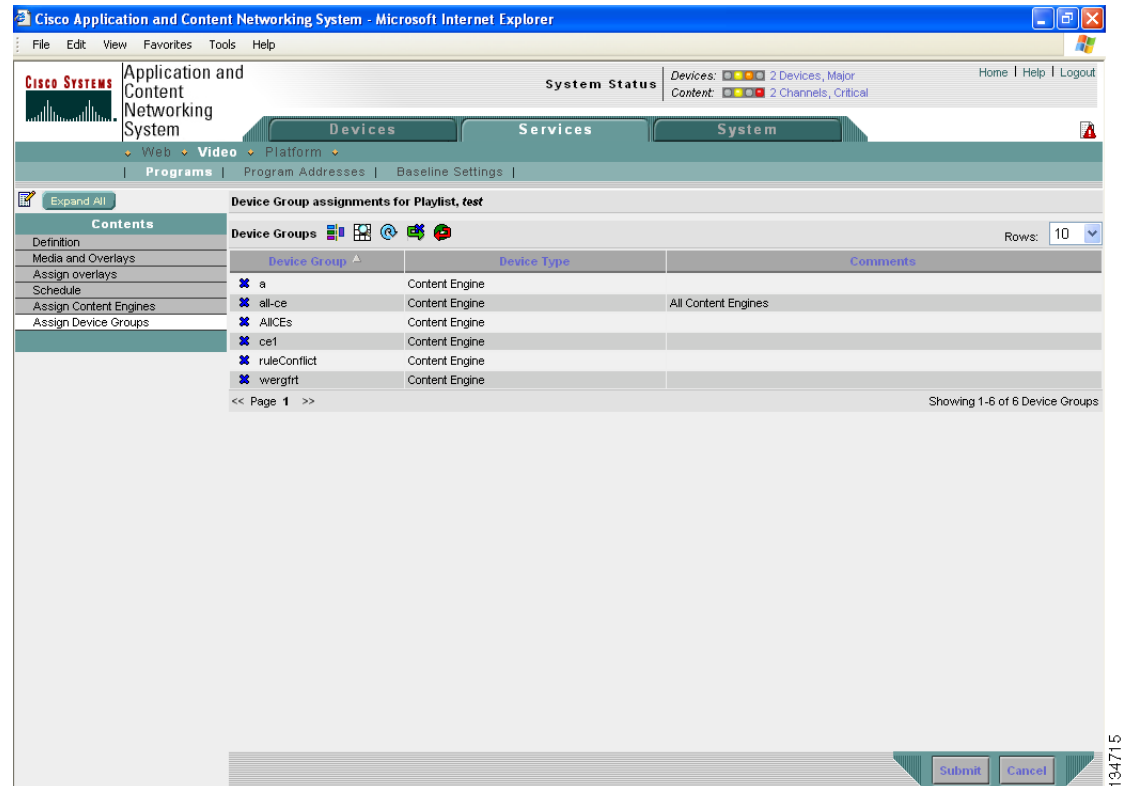
You can assign one or more device groups to a playlist. A device group is a set of devices that share common qualities and capabilities and can be assigned to one or more channels. Some common qualities might include disk capacity, distribution minimum bandwidth, or routing properties. One channel can have many device groups assigned to it.

Device groups are assigned through the Content Distribution Manager GUI. When a channel is created, when additional groups are added, or when a device group assignment changes, the devices in the group are notified of their assignment to the associated channel. Each device can subscribe to more than one channel.

To assign a device group to a playlist, follow these steps:

- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing programs listed.
- Step 2** Click the **Edit** icon next to the program to which you want to assign a device group. The Modifying Program window appears.
- Step 3** From the Modifying Program window, choose **Assign Device Groups** in the Contents pane. The Device Group assignments for Playlist window appears. (See [Figure 7-12](#).)

Figure 7-12 Assigning Device Groups to Playlists Window



- Step 4** Click the **Assign** icon next to as many device groups as you want to assign to the current playlist, and click **Submit**. A green tick mark replaces the blue cross mark.
- Step 5** To remove device groups from the playlist, click the **Unassign** icon (green tick mark) next to the device groups that you want to remove, and click **Submit**.

Viewing the TV-Out Playback Guide

You can view a playback guide that displays playlists by date for a selected Content Engine. Playback schedules can be viewed by day, week, month, or year.

To view the TV-out playback guide, follow these steps:

- Step 1** Choose **Devices > Devices**. The Content Engines window appears with a current list of Content Engines.
- Step 2** Click the **Edit** icon next to the Content Engine with the playback guide you want to view.
- Step 3** Choose **Applications > Set Top Box > TV-out Playback Guide** from the Contents pane. The TV-out Playback Guide for Content Engine window appears. (See [Figure 7-13](#).)

Figure 7-13 Playback Guide for Content Engine Window



Step 4 Choose the **Day**, **Week**, **Month**, or **Year** tab to view the playback schedules. Scheduled playlists are listed by start time (initial start time plus any repeat intervals). Times begin with the current device time (current system time plus device time zone offset).

Creating an Export Program

You create an export program when you want to play the program using a set top box. A set top box is a device capable of taking information from a network interface using IP and displaying it on a monitor attached to a video interface (digital-to-analog conversion).

To play video over a set top box, you must complete the following tasks:

1. Define a program as an export program—[Defining a Program, page 7-11](#)
2. Create a playlist by selecting media files and overlay images—[Selecting Media Files and Overlay Images for Playlists, page 7-33](#)
3. Configure an export channel to export the playlist to the set top box—[Selecting Export Channels for Set Top Box Playback, page 7-41](#)

Selecting Export Channels for Set Top Box Playback


Note

You can create and use export channels only for playlists that are played over set top boxes.

To create an export channel for a playlist to be played over an set top box, follow these steps:

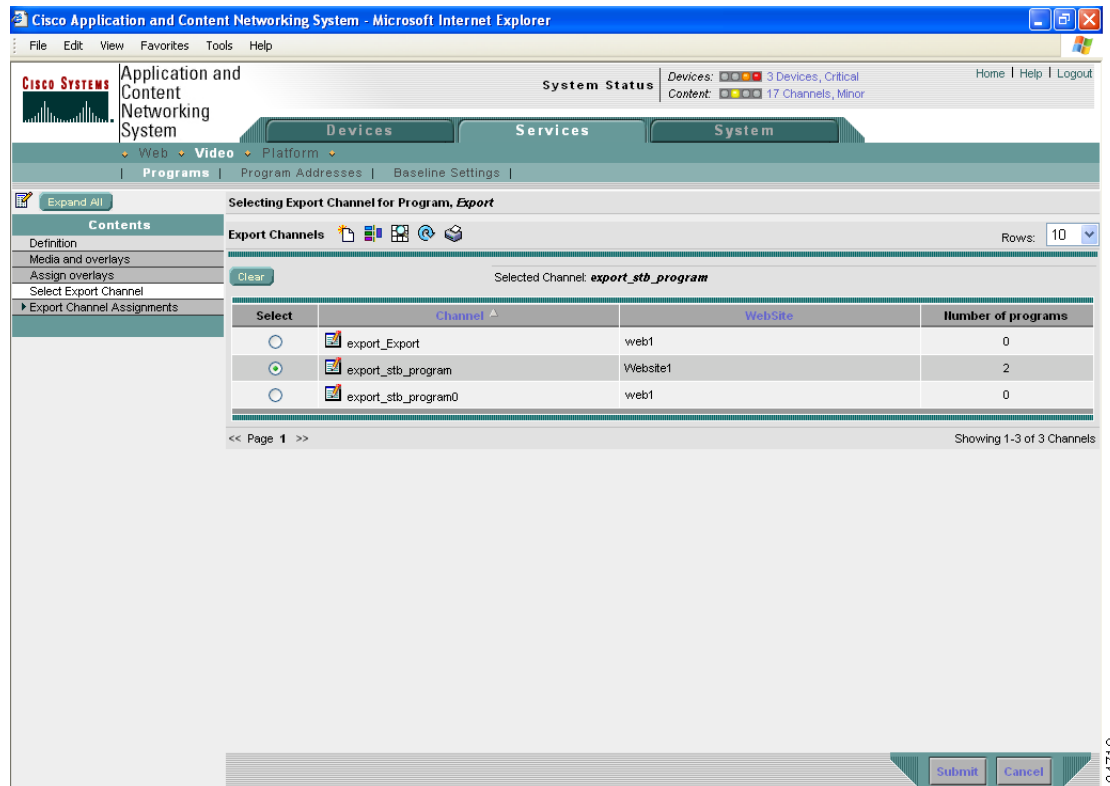
- Step 1** Choose **Services > Video > Programs**. The Programs window appears with existing programs listed.
- Step 2** Click the **Edit** icon next to the export program for which you want to create an export channel. The Modifying Programs window appears.


Note

You must choose a playlist listed as **Export** in the Type column for the **Select Export Channel** link to appear as a choice in the Contents pane.

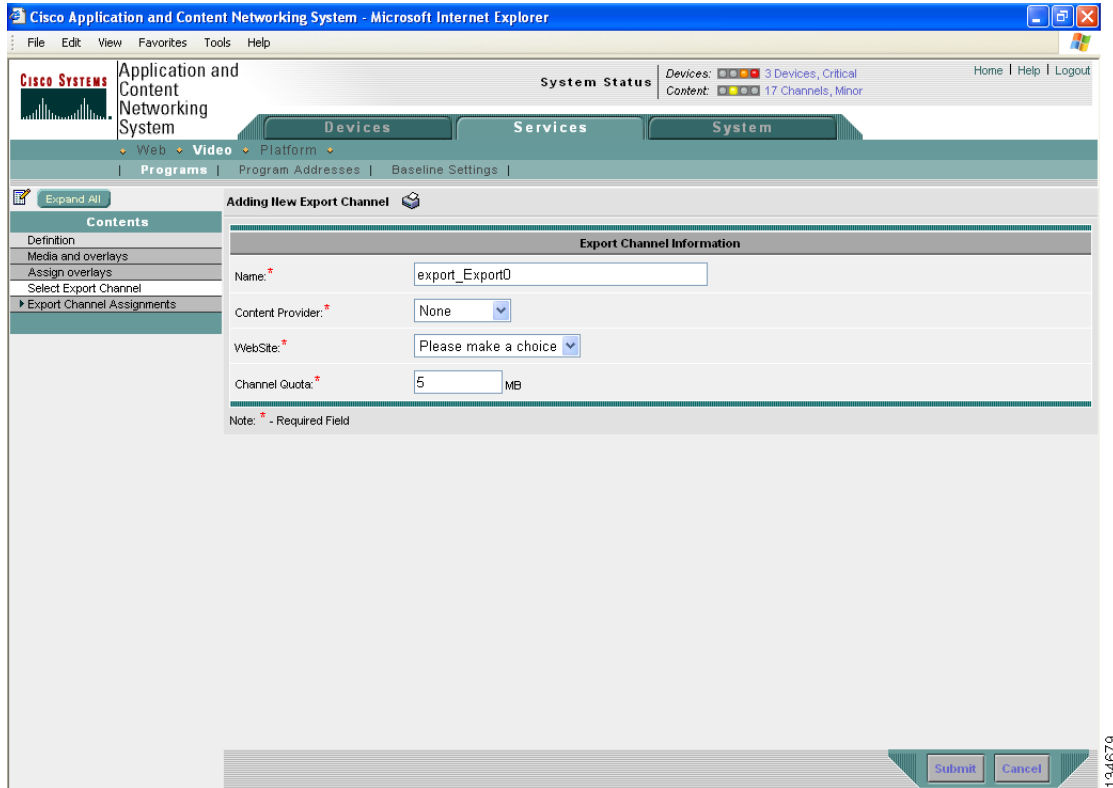
- Step 3** Choose **Select Export Channel** from the Contents pane. The Selecting Export Channel for program window appears. All current export channels already in the system are listed. (See [Figure 7-14](#).) If a channel has already been associated with the current playlist, it appears at the top of the channel column, and its radio button is checked.

Figure 7-14 Selecting Export Channel for Program Window



- Step 4** To add a new export channel, click the **Create a new Export Channel** icon. The Adding New Export Channel window appears. (See [Figure 7-15](#).)

Figure 7-15 Adding New Export Channel Window



- Step 5** Enter the export channel name in the Name field, or use the default channel that is displayed. The export name must follow this naming convention: *export_playlist name*.
- Step 6** Choose a content provider from the Content Provider drop-down list. All previously configured content providers in the system are displayed.
- Step 7** From the Website drop-down list, choose a website that contains the playlist file you want to export. All websites mapped to the content provider chosen in the previous step are displayed.

The playlist file URL should have the following format:
`http://<website_fqdn>/playlists/<playlistName>.xml`

The playlist file does not exist on the origin server and only maps to the routed FQDN.
- Step 8** In the Channel Quota field, enter the amount of disk space (in megabytes) that the export channel will use. The default is 5 megabytes.
- Step 9** Click **Submit**. The Selecting Export Channel for program window appears.
- Step 10** Check the radio button next to the export channel that you wish to associate with the current playlist.
- Step 11** Click **Submit**. The Export Channel Assignments link appears in the Contents pane.
 - Choose **Export Channel Assignments > Assign content engines** to assign Content Engines to the export channel. (See the “Assigning Content Engines to an Export Channel” section on page 7-43.)
 - Choose **Export Channel Assignments > Assign device groups** to assign device groups to the export channel. (See the “Assigning Device Groups to an Export Channel” section on page 7-44.)

- Step 12** To disassociate an export channel from the current playlist, check the radio button next to an associated channel, and click the **Clear** button. Click **Submit** to ensure that the current playlist is no longer distributed with the selected export channel.
-

Assigning Content Engines to an Export Channel

You can assign Content Engines to export channels by using the Content Distribution Manager GUI.

To assign Content Engines to an export channel (which has been associated with export-type playlists), follow these steps:

- Step 1** Complete Step 1 through Step 11 in the previous section. (See the “[Selecting Export Channels for Set Top Box Playback](#)” section on page 7-41.)

If you have exited the Content tab, you can return to the Content Engine assignment window as follows:

- a. From the Content Distribution Manager GUI, choose **Services > Video > Programs**. The Programs window appears.
- b. Click the **Edit** icon next to the name of the export program to which you want to assign a Content Engine. The Modifying Program window appears.
- c. In the Contents pane, choose **Export Channel Assignments > Assign content engines**. The Content Engine Assignments for Export Channel window appears, displaying the unreserved and total disk space in the cdnfs partition. Content Engines can be added to the channel from more than one location. A list of the Content Engines in all locations to which they have been assigned appears.



Note If you have not selected an export channel, the **Export Channel Assignments** link will not appear in the Contents pane.

- Step 2** Click the **Assign** icon (blue cross mark) next to the name of the Content Engine that you wish to associate with the export channel. Alternatively, you can click the **Assign all Content Engines** icon in the taskbar to perform a bulk addition of all Content Engines in various locations to the export channel.
- Step 3** To add the Content Engines to the export channel, click **Submit**. A green tick mark appears next to the assigned Content Engine when you click submit.
- Step 4** You can perform the following additional tasks while in this window (Content Engine Assignments for Export Channel):

- Remove Content Engines

To remove Content Engines, click the **Unassign** icon (green tick mark) next to the name of the Content Engine that you want to remove from the export channel. Alternatively, you can click the **Unassign all Content Engines** icon in the taskbar to perform a bulk removal of all Content Engines from the selected export channel.

To remove the Content Engines from the export channel, click **Submit**. The list of Content Engines in the export channel shows a blue cross mark next to the name of the removed Content Engine.

- Designate a root Content Engine for the export channel

To designate a root Content Engine for an export channel, choose a Content Engine from the Root CE drop-down list in the taskbar. If there are no Content Engines assigned to the channel, no choices appear in the Root CE drop-down list.

Assigning Device Groups to an Export Channel

You can assign device groups to an export channel with which export-type programs have been previously associated. To assign device groups to an export channel, follow these steps:

- Step 1** Complete Step 1 through Step 11 in the [“Selecting Export Channels for Set Top Box Playback”](#) section on page 7-41.

If you have exited the Content tab, you can return to the Device Group assignment window as follows:

- From the Content Distribution Manager GUI, choose **Services > Video > Programs**. The Programs window appears.
- Click the **Edit** icon next to the name of the export program to which you want to assign a device group. The Modifying Program window appears.
- In the Contents pane, choose **Export Channel Assignments > Assign device groups**. The Device Group Assignments for Export Channel window appears, displaying a list of the device groups with their minimum unreserved cdfs disk space.

An asterisk (*) under the Note column denotes that there is no free space available to be assigned to this channel. A double asterisk (**) under the Note column denotes that Content Engines associated with this device group have been already assigned to this channel.



Note If you have not selected an export channel, the **Export Channel Assignments** link will not appear in the Contents pane.

- Step 2** Click the **Assign** icon (blue cross mark) next to the name of the device group that you wish to associate with the export channel. A green tick mark appears next to the assigned device group when you click **Submit**. Alternatively, you can click the **Assign all Device Groups** icon in the taskbar to perform a bulk addition of all device groups in various locations to the export channel.

- Step 3** To add the device groups to the export channel, click **Submit**.

- Step 4** You can perform the following additional tasks while in this window (Device Group Assignments for Export Channel):

- Remove device groups

To remove device groups, click the **Unassign** icon (green tick mark) next to the name of the device group that you want to remove from the export channel. Alternatively, you can click the **Unassign all Device Groups** icon in the taskbar to perform a bulk removal of all device groups from the selected export channel.

To remove the device groups from the export channel, click **Submit**. The list of device groups in the export channel shows a blue cross mark next to the name of the removed device group.

- Designate a root Content Engine for the export channel

To designate a root Content Engine for an export channel, choose a Content Engine from the Root CE drop-down list in the taskbar. If there are no Content Engines assigned to the channel, no choices appear in the Root CE drop-down list.

Viewing Export Playlist Settings

You can view the export-type playlists configured on a Content Engine. Set top boxes (STBs) directly connect to these Content Engines to download the playlists and play the media files added to the playlist. For the STBs to function properly, both the playlist file and the playlist content (media files and overlay images) must be available on the particular Content Engine. The STBs download the playlist file using the URL `http://<website_fqdn>playlists/<playlistName>.xml`.

Export playlists are displayed for a Content Engine only if Content Engines have been assigned to the export channel associated with the export playlist.

To view the export playlists configured on a Content Engine, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Devices > Devices**. The Devices window appears.
- Step 2** Click the **Edit** icon next to the Content Engine for which you want to view the associated export playlists. The Modifying Content Engines window appears.
- Step 3** In the Contents pane, choose **Applications > Set Top Box > Export Playlists**. The Export Playlists for Content Engine window appears.

The playlist name, number of media files, number of overlay images in the playlist, length of the playlists, and playlist file URLs are displayed. [Table 7-6](#) describes the fields in this window.

Table 7-6 Export Playlists for Content Engine—Field Descriptions

Field Name	Description
Playlist	Name of the export playlist associated with the export channel associated with this Content Engine
Titles	Number of media files added to the playlist
Length	Number of overlay images assigned to the media files in the playlist
Overlays	Total playtime of the playlist in hh:mm:ss
Playlist File URL	URL of the playlist file, which is of the syntax <code>http://<website_fqdn>playlists/<playlistName>.xml</code>

Copying a Program

The program copy feature allows you to create a copy of an existing program and then modify a subset of attributes, which eliminates the need to reenter all the program settings each time you create programs with similar characteristics.

When you copy a program, a duplicate of the program is created and saved to the database. Any changes that you make to the new copy of the program do not affect the original program and vice versa. Note, however, that if multicast is configured, the multicast address and port cannot be copied. These parameters must be unique across the system. If a program address pool is configured, these parameters can be automatically selected by the system. A notification message alerts you when a new multicast address and port have been selected for a new copy of an original program.

To create a copy of an existing program, follow these steps:

-
- Step 1** From the Content Distribution Manager GUI, choose **Services > Video > Programs**.
 - Step 2** Click the **Edit** icon next to the name of the program that you want to copy. The Modifying Program window appears.
 - Step 3** In the taskbar, click the **Copy Program** icon. You are prompted to confirm your decision. Click **OK**. The window refreshes, displaying *ProgramName_dup* in the Name field.
 - Step 4** Edit any program information that you want to change. (See the “Defining a Program” section on page 7-11.)



Note You cannot change the program type.

- Step 5** To save your program definition, click **Submit**.
 - Step 6** Edit any of the other program properties found in the Contents pane, such as the program schedule, playlist, or device assignments. (See the appropriate sections in this chapter for configuration information.)
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Managing Multicast Addresses for Programs

The Content Distribution Manager manages multicast addresses used for programs. Each Content Engine assigned to a program uses a multicast address for broadcasting. The Content Engine determines which multicast address to use based on the program data. A set of multicast addresses can be specified either in the Program API or by using the Content Distribution Manager. When a program requires a multicast address, the Content Distribution Manager associates one of the addresses with the program. Addresses are allocated for the life of a program. Programs can be configured with an autodelete feature that frees up program addresses automatically about 24 hours after a program schedule is complete.



Note For more information about the Program API, refer to the *Cisco ACNS Software API Guide, Release 5.x* publication.

Configuring Program Multicast Addresses

When you configure a pool of addresses for programs, ACNS software ensures that none of these addresses are currently in use by any multicast clouds. When the user requests a specific address or a set of addresses to be used for a program, ACNS software issues only those addresses that have not been

configured for multicast clouds and are not used by any existing programs. Users receive an error message if no multicast address is associated with the imported program file, if no addresses are available to be configured from the pool, or if the multicast pool has not been configured.

**Note**

If you create a program and specify a set of multicast addresses in the program file, it is not necessary to configure a pool of addresses using the Content Distribution Manager GUI. The pool of multicast addresses is required only if you have not specified the addresses to be used for multicasting in the program file.

To configure a pool of multicast addresses to be used for programs, follow these steps:

- Step 1** In the Content Distribution Manager GUI, choose **Services > Video > Program Addresses**. The Program Multicast Addresses window appears. (See [Figure 7-16](#).)

Figure 7-16 Program Multicast Addresses Window

The screenshot shows the Cisco Application and Content Networking System GUI. The main navigation bar includes 'Web', 'Video', and 'Platform'. Under 'Video', 'Program Addresses' is selected. The 'Program Multicast Addresses' window is open, showing a 'Multicast Address Pool' configuration form. The form has three input fields: 'Start Address', 'End Address', and 'TTL'. Below these fields is a 'Note' indicating that the asterisk (*) denotes a required field. There are 'Reset' and 'Submit' buttons. Below the form is a table of configured multicast addresses.

Multicast address	User specified
224.1.1.1	true
224.224.0.1	true

At the bottom of the window, it says '<< Page 1 >>' and 'Showing 1-2 of 2 Multicast Addresses'.

- Step 2** In the Start Address field, specify the first multicast IP address in the pool.
- Step 3** In the End Address field, specify the last multicast IP address in the pool.
- Step 4** In the TTL field, specify the Time To Live (number of hops) for all addresses configured in the pool.
- Step 5** To save your settings, click **Submit**. The multicast addresses are included in the database record for the program when it requests an address.

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The list of multicast addresses that have been currently configured for specific programs is displayed in the Multicast Address column. The User Specified column displays *true* if the user has already specified the particular address for a program.
