



HAIVISION

Connect DVR 4.6
User's Guide

HVS-ID-UG-CDVR-4.6

Edition Notice

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About This Document

Conventions


The following conventions are used to help clarify the content.

Typographic Conventions and Elements


<i>Italics</i>	Used for the introduction of new terminology, for words being used in a different context, and for placeholder or variable text.
bold	Used for strong emphasis and items that you click, such as buttons.
Monospaced	Used for code examples, command names, options, responses, error messages, and to indicate text that you enter.
>	In addition to a math symbol, it is used to indicate a submenu. For instance, File > New where you would select the New option from the File menu.
...	Indicates that text is being omitted for brevity.

Action Alerts


The following alerts are used to advise and counsel that special actions should be taken.

 **Tip**

Indicates highlights, suggestions, or helpful hints.

 **Note**

Indicates a note containing special instructions or information that may apply only in special cases.

 **Important**

Indicates an emphasized note. It provides information that you should be particularly aware of in order to complete a task and that should not be disregarded. This alert is typically used to prevent loss of data.

⚠ Caution

Indicates a potentially hazardous situation which, if not avoided, may result in damage to data or equipment. It may also be used to alert against unsafe practices.

⚠ Warning

Indicates a potentially hazardous situation that may result in physical harm to the user.

Obtaining Documentation

This document was generated from the Haivision InfoCenter. To ensure you are reading the most up-to-date version of this content, access the documentation online at <https://doc.haivision.com>. You may generate a PDF at any time of the current content. See the footer of the page for the date it was generated.

Getting Service Support

For more information regarding service programs, training courses, or for assistance with your support requirements, contact Haivision Technical Support using our Support Portal at: <https://support.haivision.com>.

Getting Started

Please reference the appropriate [Quick Start Guide](#) for instructions on connecting the DVR appliance and accessing the Connect DVR interface.

This section describes how to access and navigate the Connect DVR web interface.

Topics Discussed

- [Prerequisites](#)
- [Setup Scenarios](#)
- [Signing in to the Interface](#)
- [Signing out of the Interface](#)

Prerequisites

Depending upon your Connect DVR solution, you might have specialty equipment needs. The following outlines the typical hardware for the most common scenarios (see [Setup Scenarios](#) for further examples).

Hardware (by Location)

Due to the fact that the Connect DVR solution can encompass a number of physical sites, these equipment options have been grouped together by the locations where they are generally used.

Broadcast Site — Recording Location

Equipment at this location might include:

- Camera/Video source
- KB Encoder server and software
- AJA FS2 Dual Channel Frame Synchronizer/ Converter - *(optional)*

Cloud

- Haivision Video Cloud with Connect DVR Service - Allows you to play to two synchronized displays when configured with dual-screen Connect DVR.
- Broadband Internet Service Provider.

Playback Site — Viewing Location (up to 25)

Hardware at the viewing location might include:

- Connect DVR Display Engine appliance
- Up to two displays with HDMI or SDI cables (depending on appliance model used)
- A Mac/PC with:
 - Monitor
 - Keyboard
 - Mouse
 - Internet connection
 - Latest version of either Google Chrome, Microsoft Edge, Apple Safari, or Mozilla Firefox

! Important

To accurately schedule, record, and play streams across timezones, use www.pool.ntp.org to synchronize the system clocks on the KB Encoder, Display Engine appliance, and the remote Mac/PC used to access the KB and Connect DVR user interfaces. This ensures that all of your peripherals match the Haivision Video Cloud clock. See the [Configuring the Network](#) topic for more information.

Supported Monitor Resolutions/Framerates

Supported resolutions/frame rates for the Connect DVR appliances are listed below:

NTSC	PAL
1080p60	1080p50
1080i60	1080i50
1080p59.94	1080p25
1080i59.94 (Default, if supported)	720p50
1080p30	576i50
1080p29.97	
1080p24 (SDI appliances only)	
1080p23.976 (SDI appliances only)	
720p60	
720p59.94	
480i59.94	

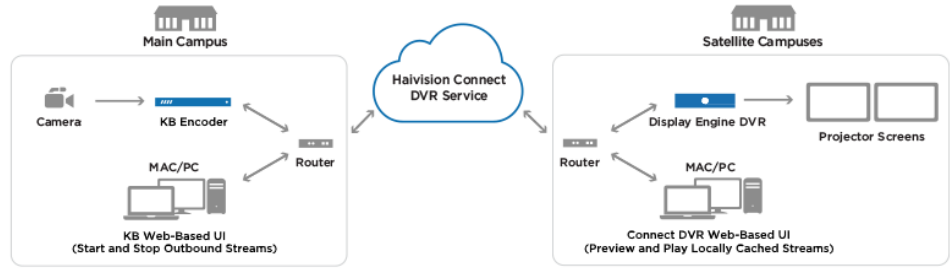
Setup Scenarios

The Connect DVR multi-site solution allows you coordinate recording a live event and playing it at a remote venue on one or more large displays. This solution allows you to manage multi-site venues seamlessly.

Whenever you start streaming a live event, the Connect DVR appliance automatically starts recording. Once the recording has started, you can point a browser to the IP address of the appliance to pull down the recording and cue it into position for playback. When ready, display the recording on the screens attached to the appliance with a click of a button.

Single-Stream Scenario

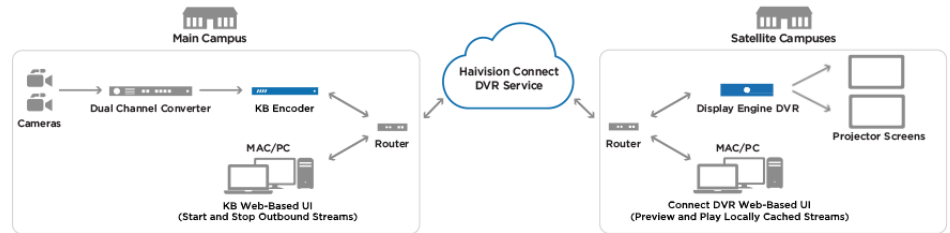
With one camera/video input, all attached screens display the same recording.



Dual-Stream Scenario

Note

Dual-screen output not supported on DVR SDI Mini.



Signing in to the Interface

After choosing the appropriate setup scenario and connecting the hardware as per the *Quick Start Guide* you are ready to begin using the Connect DVR interface. The first step is to sign into the interface. You can do this from another PC or laptop. For DVR SDI devices, you can attach a monitor, mouse, and keyboard directly to the device (see [Using Local Management](#)).

1. In a browser on your PC/laptop, enter the appropriate URL for the Connect DVR device. For instance,

`https://<ipaddress>` or `https://<hostname>`

Where:

- `<ipaddress>` is the address of the device where the software is installed.
- `<hostname>` is the device's hostname.

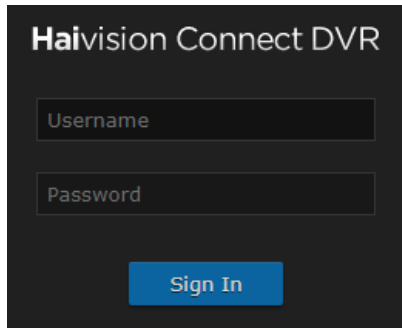
Note

To determine the assigned IP address, refer to the appropriate *Quick Start Guide*.

2. If you encounter a Security Certificate warning, check with your system administrator before clicking **Proceed anyway** (or equivalent) to accept the certificate and continue to the Welcome screen.
3. At the Welcome screen, sign in with your credentials. See [Viewing User Accounts](#) for a list of available usernames.

Note

The factory-set credentials are provided in the *Important Notice* document along with the passwords. If the credentials have changed, check with your system administrator.



4. Click the **Sign In** button.

After you successfully sign in, you are taken to the Production Center screen. Please see [Touring the Interface](#) for details of this screen.

Related Topics

- [Signing out of the Interface](#)
- [Viewing User Accounts](#)
- [Touring the Interface](#)

Signing out of the Interface

To sign out of the interface:

1. When signed in to the interface, click the **Sign Out** link at the top right corner of any screen.




After you click the **Sign Out** link, the Welcome screen re-appears.

Related Topics

- [Signing in to the Interface](#)

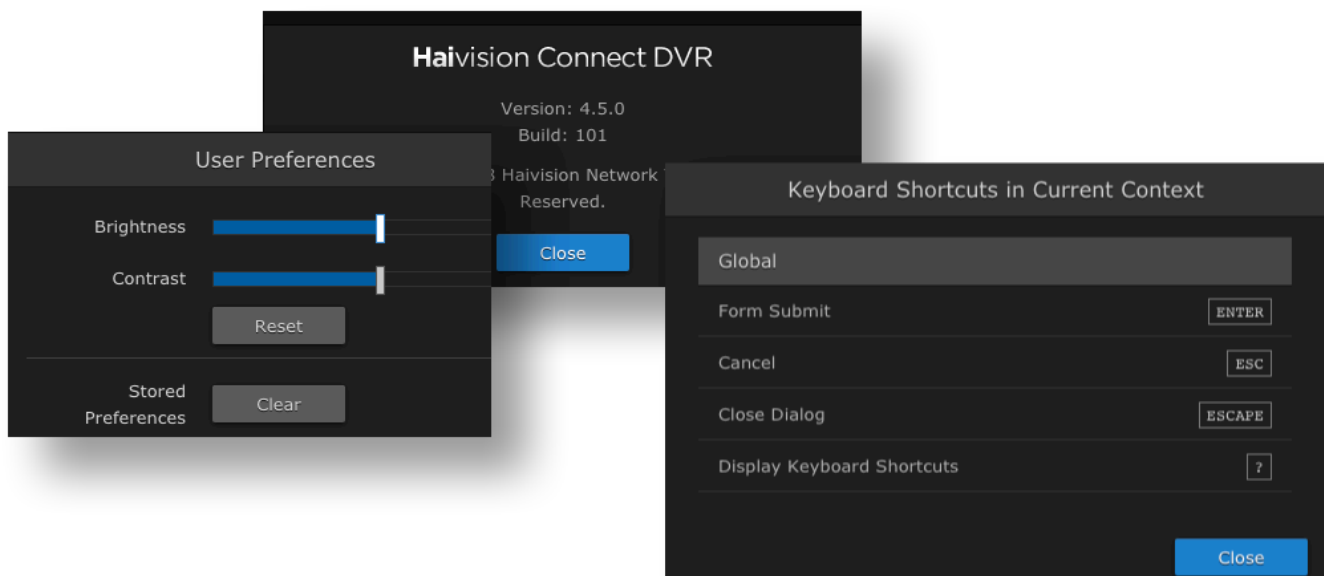
Touring the Interface

After logging in, the Production Center screen is displayed. By clicking on the  icon, you can access the following screens:

- [Production Center](#)
- [Channel Configuration](#)
- [Administration](#)

You also can view the following dialog screens:

- Keyboard Shortcuts - Offers the common keyboard shortcuts.
- User Preferences - Allows adjusting the brightness and contrast.
- About Connect DVR - Provides version and build information for the current installation.
- Help - Link to the Haivision InfoCenter or packaged help file, if no internet connection is present.



Topics Discussed

The following topics provide a quick tour of these items.

- [Introducing the Interface](#)
- [Production Center Screen](#)
- [Channel Configuration Screen](#)
- [Administration Screen](#)
- [Keyboard Shortcuts Dialog](#)
- [User Preferences Dialog](#)


- [About Connect DVR Dialog](#)

Introducing the Interface


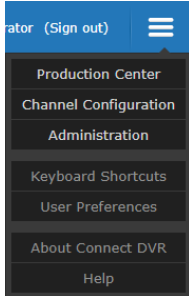
The interface is an intuitive graphical user interface that puts all Connect DVR tasks at your fingertips. With a click of a button, you switch easily between adding video streams, publishing video output, and administering the system. The interface groups management tasks into the following screens: [Production Center](#), [Channel Configuration](#), and [Administration](#). These screens use a consistent layout with common screen elements to simplify your experience. The following sections describe these common elements.

- [Title Bar](#)
- [Website Notifications](#)

Title Bar

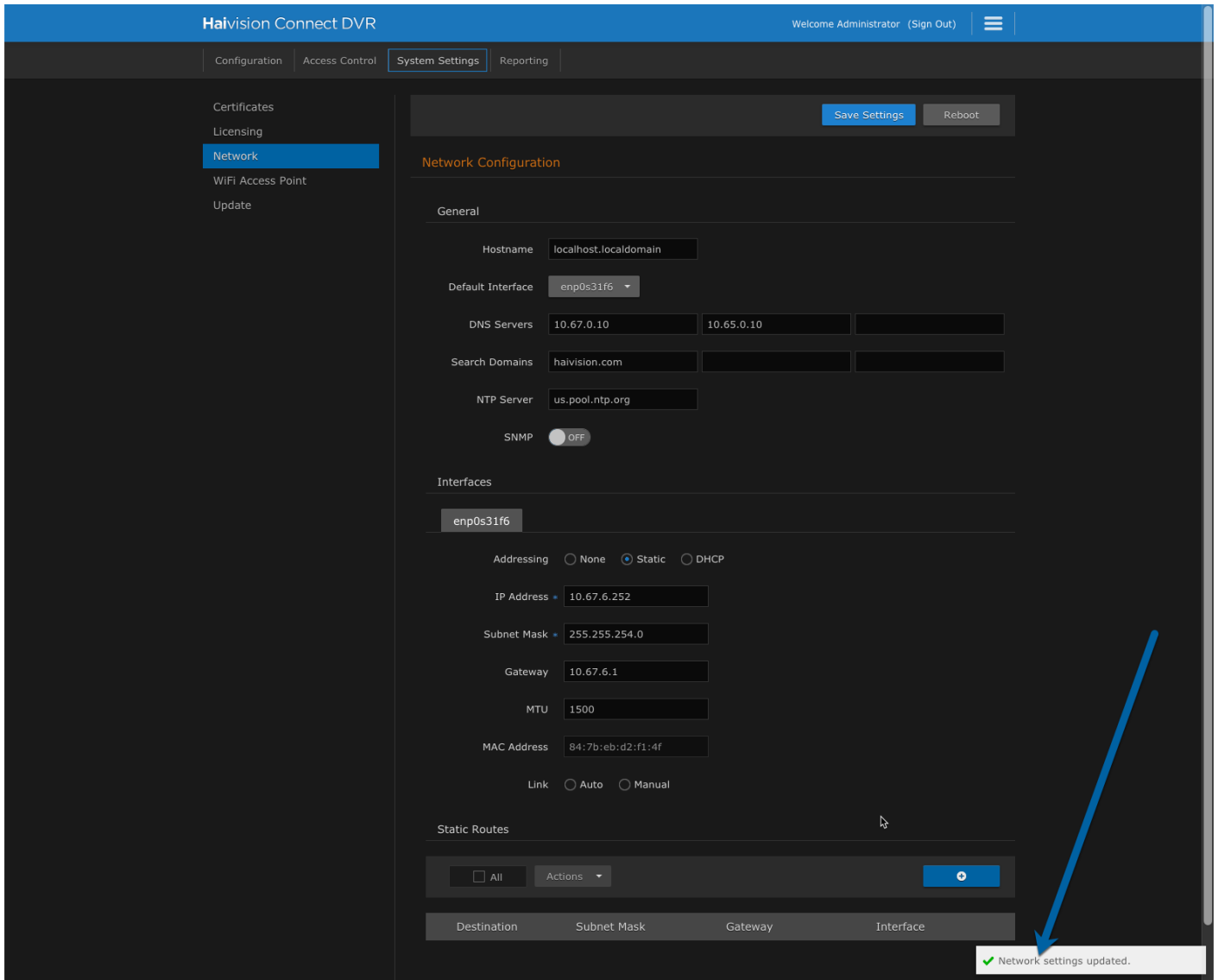
The Title bar is available on every screen and displays the current logged-in user, a Sign Out link, and the more menu  button.



Icon	Name	Description
—	Product Logo	Clicking the logo returns you to the Production Center (home screen).
—	Current User	Indicates the current signed-in user.
—	Sign Out Link	Clicking this link signs you out of the interface. See Signing out of the Interface for more details.
	Menu Button	Clicking the icon provides access to the main Connect DVR screens: Production Center , Channel Configuration , Administration . It also allows you to view the interface's keyboard shortcuts, user preferences, information About Connect DVR , and help. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  </div>

Website Notifications

Website notifications are shown in the bottom right of the screen when various alerts are triggered on the system. For example, when saving the Network settings in the Administration page:



The notifications include an icon to indicate the severity of the issue:

Icon	Description
✓	Informational
!	Warning
✗	Error

The website notification automatically disappear after 5 seconds. If a popup occurs prior to the previous one disappearing, the popups are stacked.

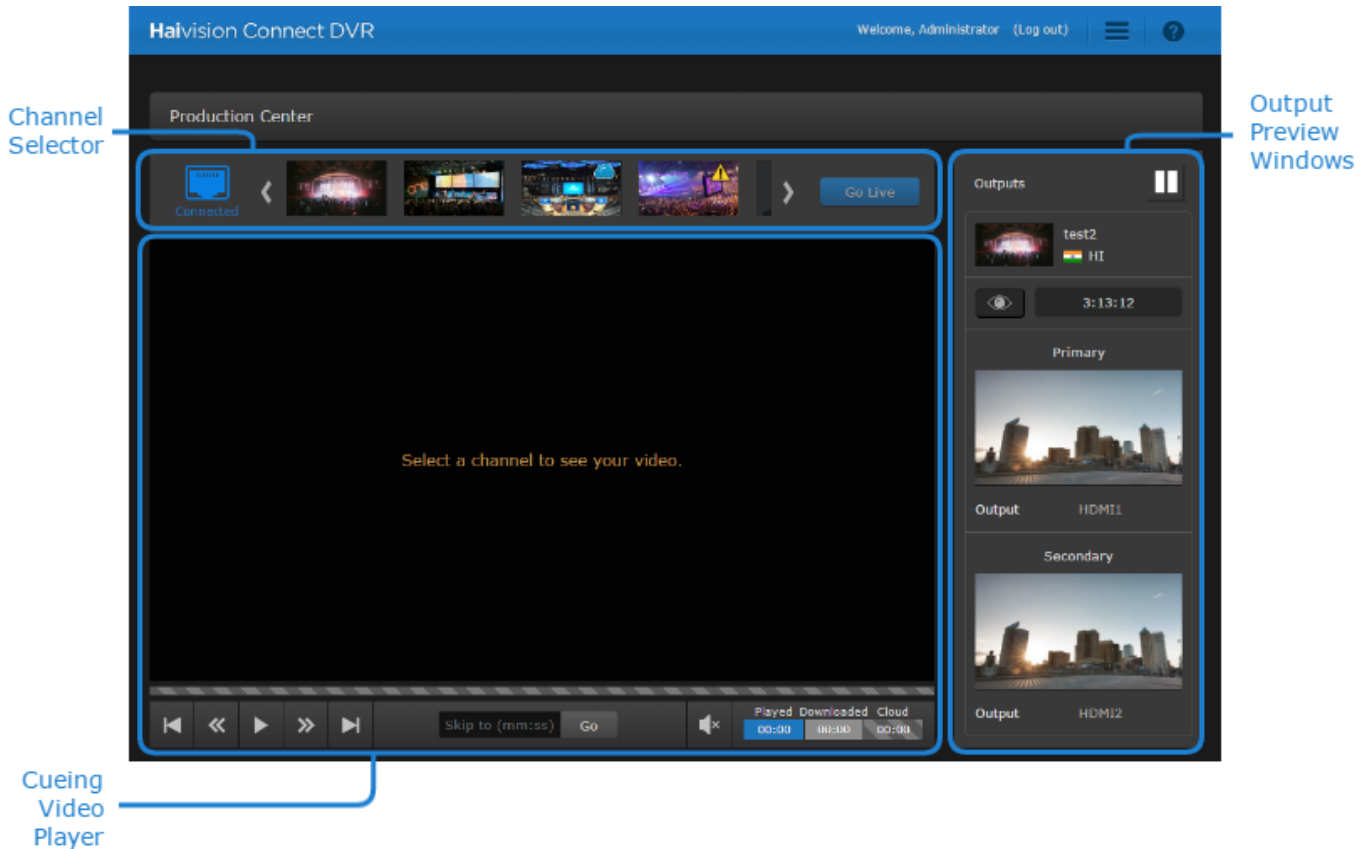
Production Center Screen

The Production Center screen allows you to manage which channel is output from the Connect DVR device. As shown in the following figure, it contains:

- **Channel Selector** pane — Lists all channels that were created on the Channel Configuration screen and contains the Go Live button for outputting the selected channel.
- **Cueing Video Player** pane — Provides the controls used to select the start of the video stream prior to sending it to the outputs.
- **Output Preview Windows** pane — Displays Preview Windows of what is being sent to the output video ports.

Note

The Secondary output preview window is not available on the DVR SDI Mini appliance.



See [Connecting and Cueing the Stream](#) for details on using this screen to cue a stream.


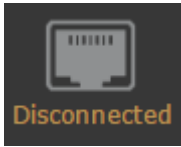
Channel Selector

The Channel Selector pane of the Production Center screen provides a list of configured channels and their current status. It also shows the current network connection status.



Network Status

This icon shows the Connect DVR network connection status.



Status Icon	Description
	Network connection detected.
	Network connection not detected.

Channel List

The channel list contains all channels that were added on the [Channel Configuration Screen](#). The channel thumbnails help you quickly distinguish each channel. You may also hover over the channel thumbnail to see the channel name.

Channel Status Icons

Icon overlays on the channel thumbnails indicate if there are any issues with the channel. The supported overlays are listed in the following table:

Status Icon	Description
	Indicates that the video cache is building. The Connect DVR device must download one minute of video data before it can be previewed in the Cueing Video Player. This icon typically only appears immediately following channel creation.
	Indicates there is a connection issue with the channel. Hover your mouse over the channel icon to view details of the error.

Go Live Button

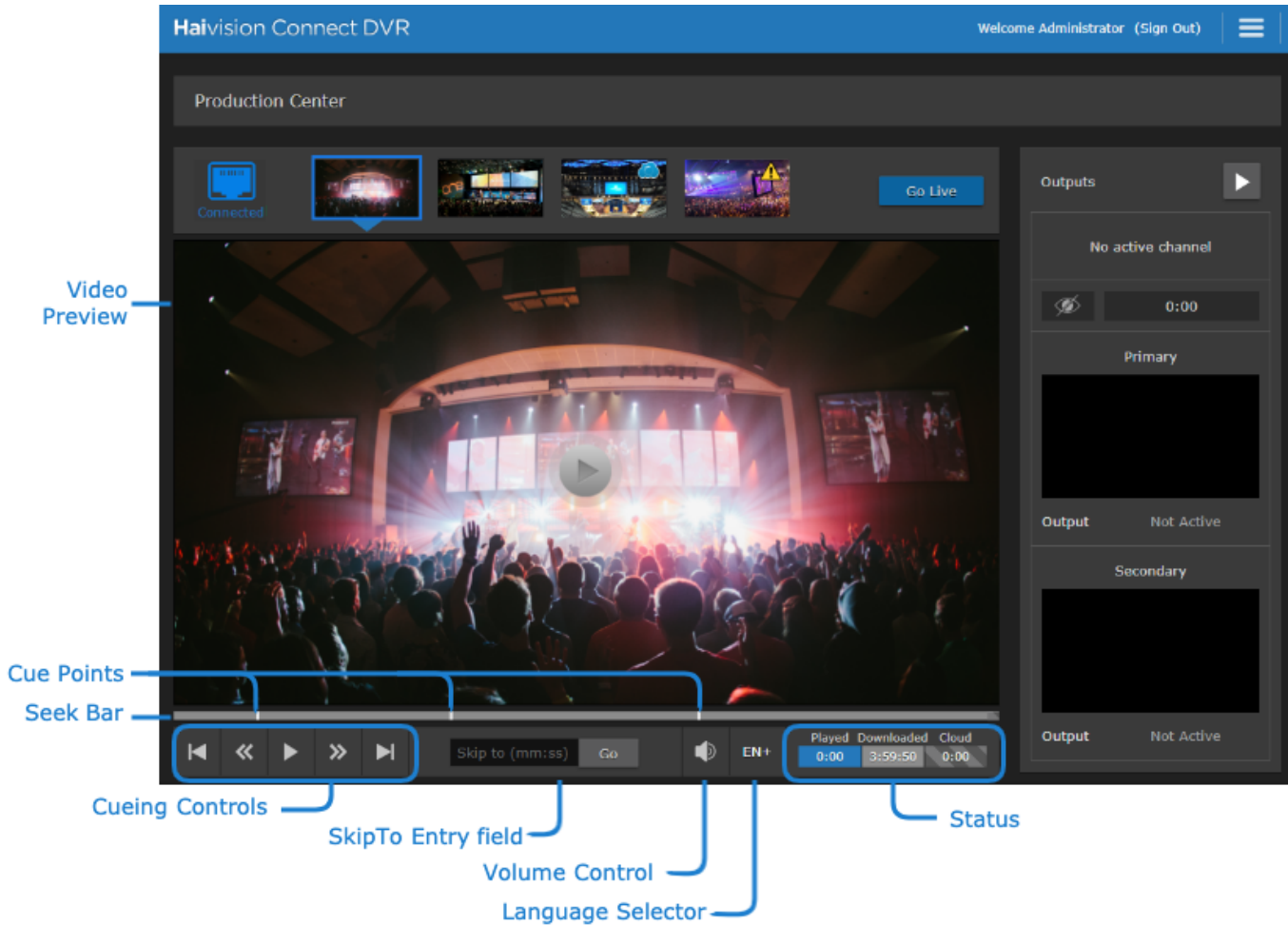
After cueing a channel in the preview player, clicking the **Go Live** button sends the selected video stream to the connected outputs. See [Streaming with Connect DVR](#) for more details.

Related Topics

- [Connecting and Cueing the Stream](#)

Cueing Video Player

The Cueing Video Player pane contains a preview of the selected channel and the controls for cueing the video prior to sending it to the outputs.



Video Preview

Note





On certain browsers, the preview player does not support HEVC-encoded streams. See [System Requirements](#) for more details.

Seek Bar and Cue Points

Seek Bar

A seek bar is available to manually cue the video. Clicking in the seek bar moves the current player position to that point. You can also *scrub*, or click the slider and drag it, to a new position.




The color of the seek bar indicates:

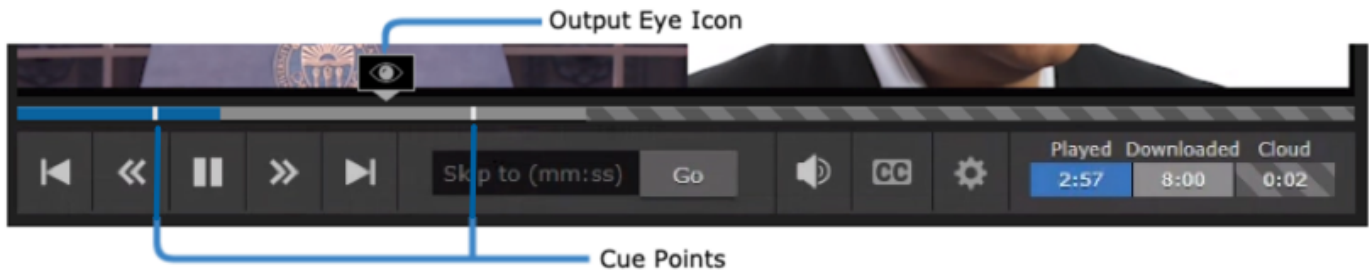
-  Viewed content.
-  Buffered content.
-  Content being downloaded.
-  Video discontinuities.

See the description of the Status fields below for more details.

Cue Points





Cue points allow you to cue to specific positions in the video stream that the stream creator deemed important. For example, cue points may indicate the desired starting point for playback. Click a cue point in the seek bar to move the current player position to that point.





In addition to cue points, there is the output video's current position locator (). If the video being output to the displays is selected in the channel selector, the seek bar displays the  locator to indicate the video's current output position. Scrubbing the  icon moves the player's position to the specified location. This allows you to watch in the Video Preview exactly what is being shown on the attached displays.



Cueing Controls

Use the following cueing controls and their corresponding keyboard shortcuts to assist you in cueing the stream as desired.

Button	Keyboard Shortcut	Description
	←	Skip Backward 5 seconds.
	↓	<p>Note</p> <p>If your channel contains cue points, also goes to previous cue point.</p>
	←	<p>Note</p> <p>Holding either button repeats the skip action until you release the button.</p>
	Spacebar	Play/Pause. This button toggles between the play and pause states.

Button	Keyboard Shortcut	Description
	→	<p>Note</p> <p>Holding either button repeats the skip action until you release the button.</p>
	↑	<p>Note</p> <p>If your channel contains cue points, also goes to previous and next cue point.</p>
	-	<p>Output video's current position. Scrubbing the  icon moves the player's position accordingly.</p> <p>Note</p> <p>Only visible if the video being output to the displays is selected in the channel selector.</p>

SkipTo Entry



The SkipTo entry field allows you to jump to a specified location (indicated in minutes and seconds) in the video. To do so, enter the time coordinates in the entry field and click the **Go** button.

Note

If your channel contains cue points, their time stamps are shown when clicking into this field. Click on a timestamp to skip to this time or enter a time coordinate manually.

Volume Control

Use the  Volume Control icon to adjust the volume of the Video Preview video.

- Hover over  - to adjust volume via a volume slider.
- Click  - to toggle between mute/unmute.

Note

This volume setting does not affect the volume level of the output stream at the viewing location.

Closed Captioning (CC)

Only available if the selected video stream contains closed captioning. If the video stream includes closed captioning, the **CC** icon appear below the seek bar.

Important


By default, closed captioning is disabled on the screen. Click the **CC** icon to enable closed captioning to be displayed. Click the **CC** icon again to disable closed captioning so that it no longer appears on the screen.

Note

The settings are made on a channel-basis. Consequently, you can switch between channels and the individual settings are remembered.

Once the **Go Live** button is clicked, the closed captioning will also be visible in the output previews in the right pane.




Settings

When a selected video stream contains multiple audio tracks, a language selector appears below the seek bar. Click the Settings  icon to pop open a menu:

- **Audio Language** - displays the available audio tracks that can be played in the preview player. The language selected in the preview player when the **Go Live** button is clicked is the audio language that is output to the attached monitors and headphone jack.
- **Caption Language** - (Only available if the selected stream includes closed captioning). Lists the available closed captioning languages that can be displayed in the preview player. The language selected in the preview player when the **Go Live** button is clicked is the closed captioning that is output to the attached monitors.
- **Caption Screen** - (Only available if the selected stream includes closed captioning and the Dual Screen option has been selected for the channel). Enables you to specify on which of the dual screens you want the captions to appear: primary or secondary.
- **Caption Options** - (Only available if the selected stream includes closed captioning). allows you to specify the color and screen positioning of the closed captions.
 - **Font Color** - Available options for font color include: white (default), yellow, green, cyan, blue, magenta, red, and black.
 - **Vertical Position** - Available options for the vertical positioning of the closed captions which includes: low (default), normal, medium, and high). To give you some perspective, "high" is roughly just above the center of the screen.

Status

The Status fields contain the following time-based information:

-  **Played:** Current position of the seek bar in the preview video.
-  **Downloaded:** Amount of video content stored within the appliance and available for seeking in the preview player.
-  **Cloud:** Amount of video content stored in the ConnectDVR Cloud service that is waiting to be downloaded.

Depending on the quality of your Internet connection, the amount indicated by this field may fluctuate.

Tip

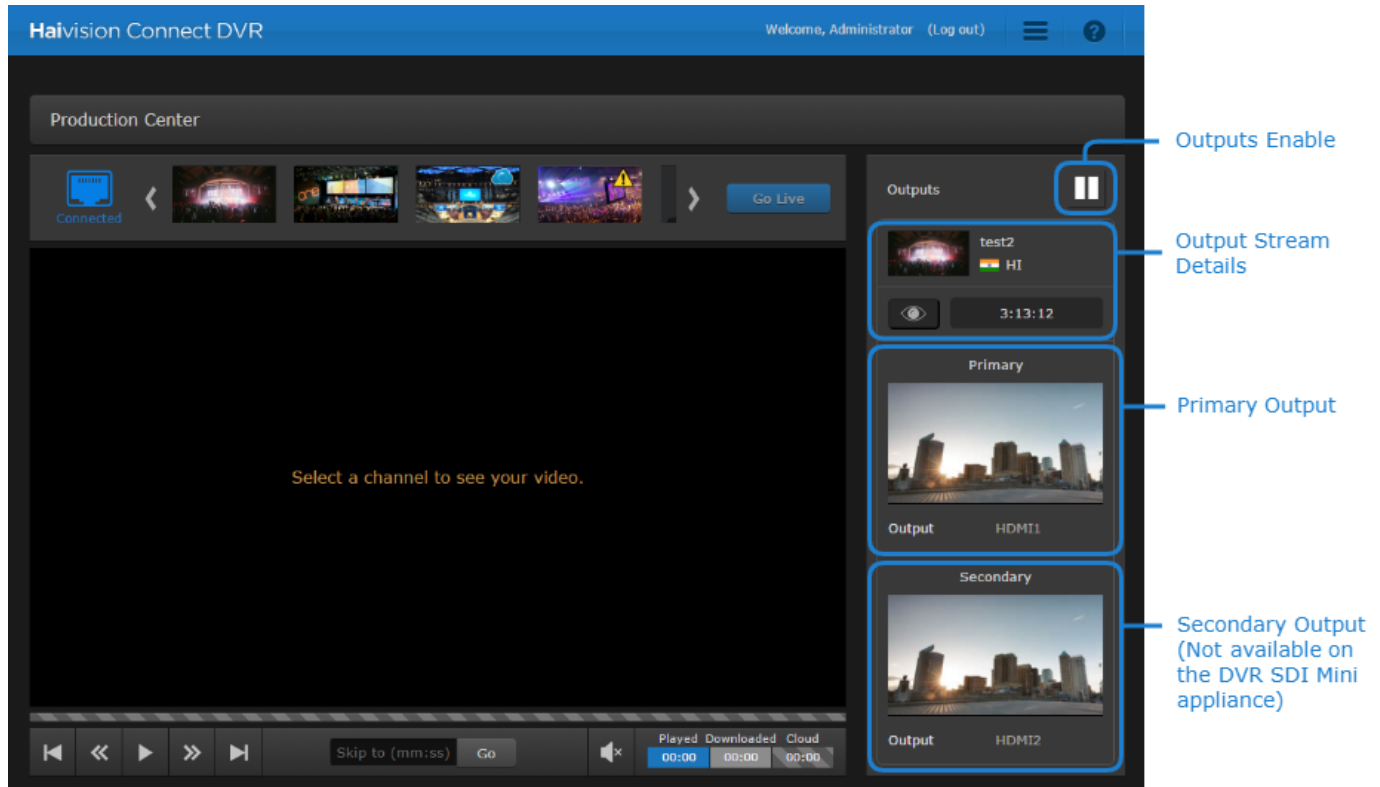
The seek bar also indicates if there are any video discontinuities, which are colored yellow in the seek bar.

Related Topics

- [Connecting and Cueing the Stream](#)

Output Preview Windows

The Outputs pane contain an **Outputs Enable** button, details about the output stream, and previews of the primary and secondary outputs.



Outputs Enable

Clicking this button toggles the output stream ON or OFF. When the outputs are ON, the button is represented with a icon. Conversely, when the outputs are OFF, the button is represented with a icon. The behavior of the output stream when it is OFF is configurable (freeze frame or black screen). See [Changing the Video Output Options](#) for details.

Output Stream Details

Details of the current output stream are shown in this section of the Product Center screen. It includes the following information:


- Channel name currently being output. If truncated, hover over the name to see full channel name.
- Audio language currently being output.
- Output Eye button. Clicking the button enables/disables the visibility of the Output Eye in the seek bar of the preview player. See [Cueing Video Player](#) for details of the Seek Bar.
- Current time coordinates of the stream being outputted.

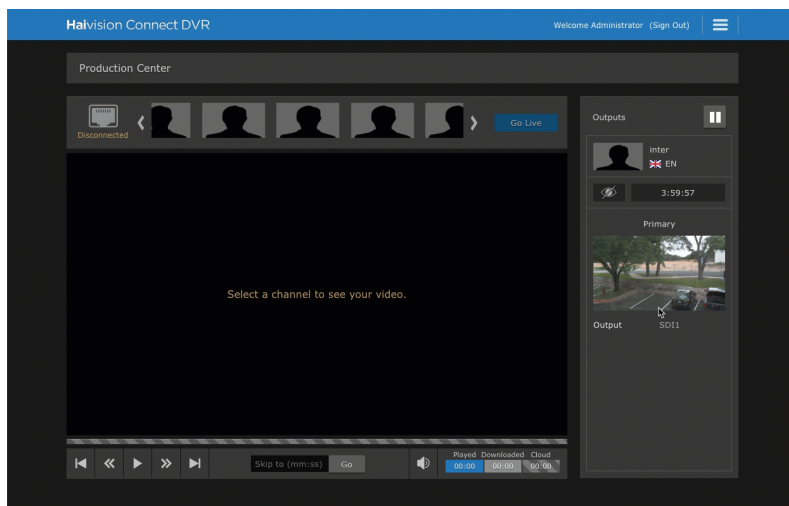
Primary and Secondary Outputs

Note

On the DVR SDI Mini appliance only one output preview window is displayed, since it does not support dual screen mode.

The primary and secondary outputs each contain a preview window of what is being output to the corresponding video port, as well as the following connection information:

- Output — Output port label assigned to the corresponding primary or secondary output. If "Not Active" is listed, no monitor is detected on that port.
- Hovering over the  icon in the output windows displays the resolutions and frame rates of the source stream and output.



Note

Content is only displayed in the preview windows if the **Go Live** button has been pressed and the outputs are enabled.

Related Topics

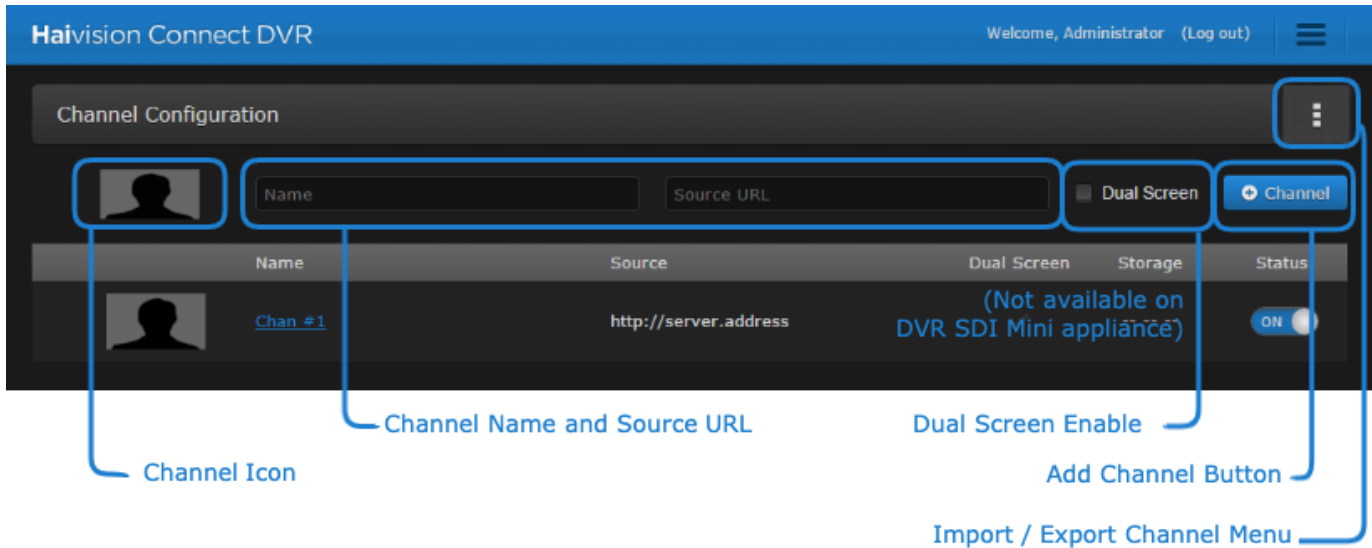
- [Outputting the Stream](#)

Channel Configuration Screen

Note

You must be logged into the haioperator or haiadmin account to access the Channel Configuration screen.

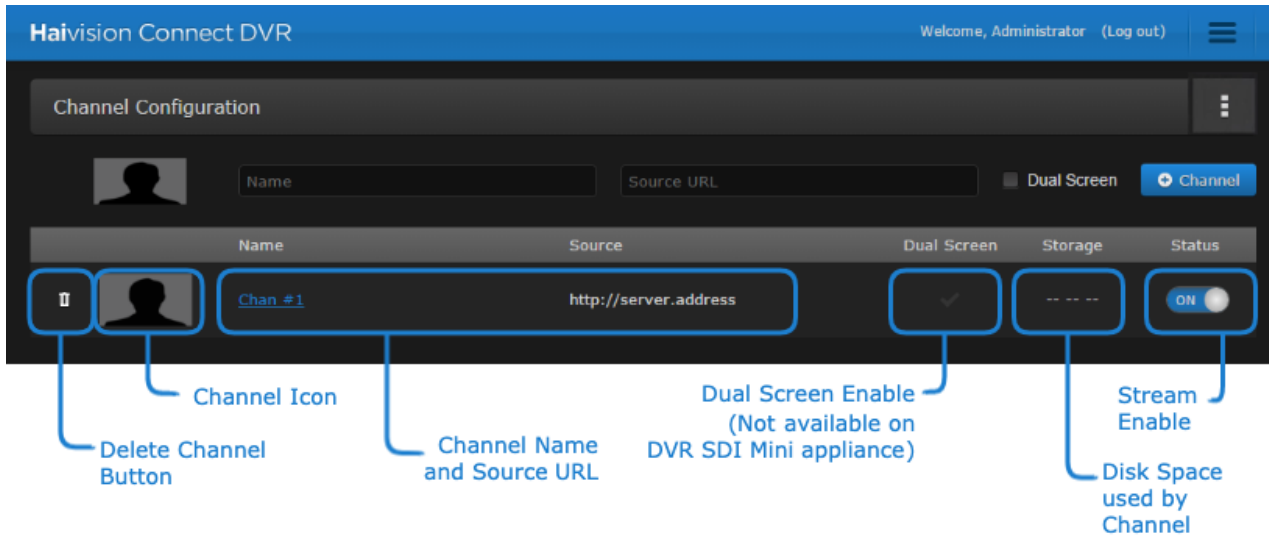
The Channel Configuration screen allows you to add input streams to the Connect DVR device.



Field Name	Description
⋮ Menu	Allows you to import and export channels.
Channel Name and Source URL	<p>! Important Only HLS streams are supported.</p> <p>To rename the channel, click in this field to edit the existing entry. The source URL can not be changed.</p>
Dual Screen Enable	<p>i Note Option not available on the DVR SDI Mini appliance.</p>
+ Add Channel Button	Adds channel with the specified values to the channel list.
Channel Icon	Click the current icon to choose a new image to use as the channel icon. See Creating a Channel Icon .

See [Creating a Streaming Channel](#) for details on adding a channel.

The Channel Configuration Screen also contains a list of already added streams to edit, delete, and turn on/off caching for the channel.



Field Name	Description
Delete Channel Button	The icon appears when hovering your mouse over the channel. Clicking the icon opens a confirmation dialog box to delete the channel.
Channel Icon	Click the current icon to choose a new image to use as the channel icon. See Creating a Channel Icon .
Channel Name and Source URL	Click the Channel Name to edit it. The Source URL cannot be edited.
Dual Screen Enable	When checked, the dual screen option is enabled. See Streaming a Dual Screen Channel for details. <div style="border: 1px solid #ccc; padding: 5px; background-color: #fff9c4;"> <p>Note Option not available on the DVR SDI Mini appliance.</p> </div>
Disk Space used by Channel	Indicates the amount of disk space on the appliance used by the channel.
Stream Enable	Slider button to enable/disable caching of the input stream on the DVR appliance. A confirmation dialog box opens when the slider is turned to OFF.

Related Topics

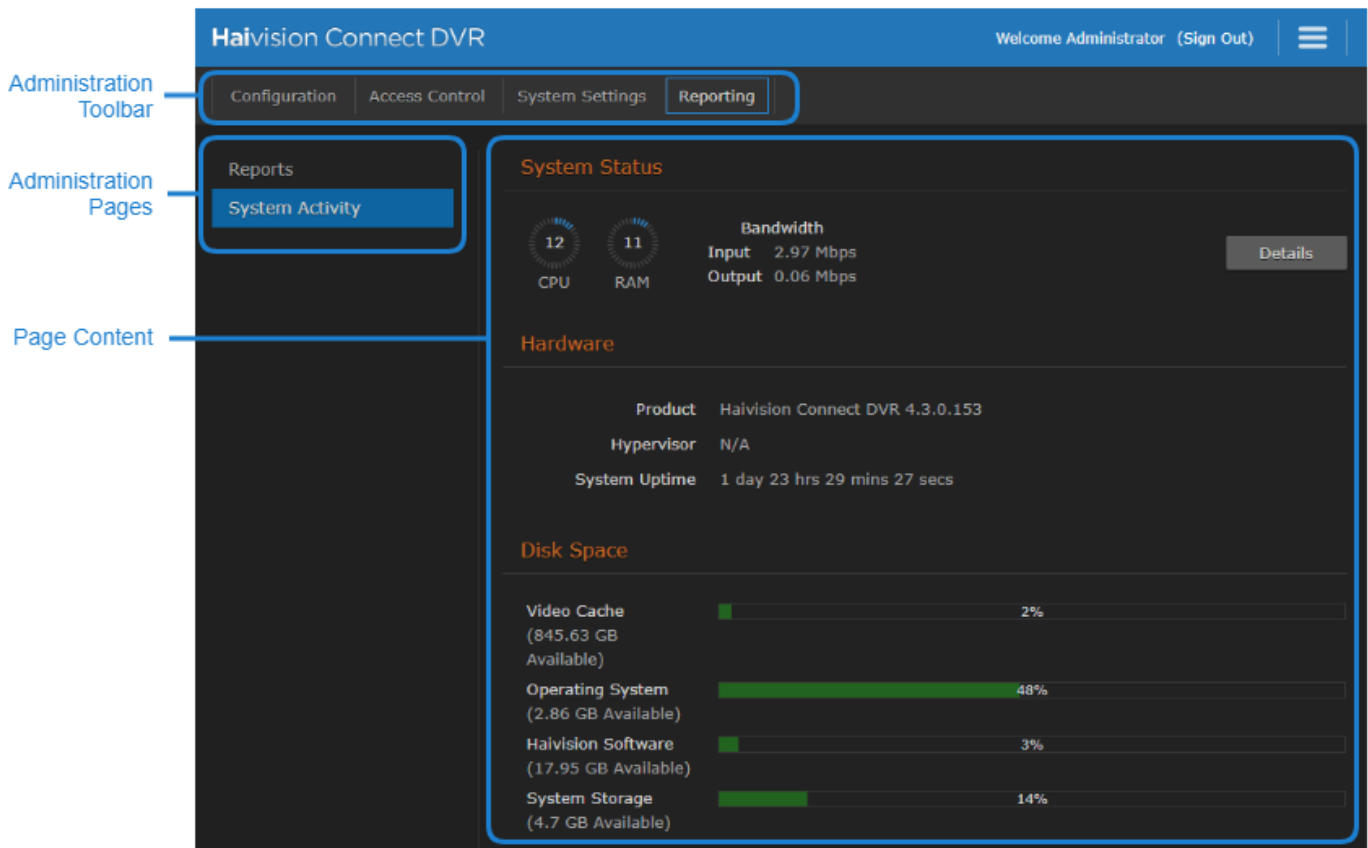
- [Creating a Streaming Channel](#)
- [Creating a Channel Icon](#)

Administration Screen

Note

You must be logged into the haiadmin account to access the Administration screen.


As shown in the following figure, the administration pages are grouped into the sections listed in the administration toolbar. When clicking on one of the pages, the page content is displayed on the right portion of the screen.

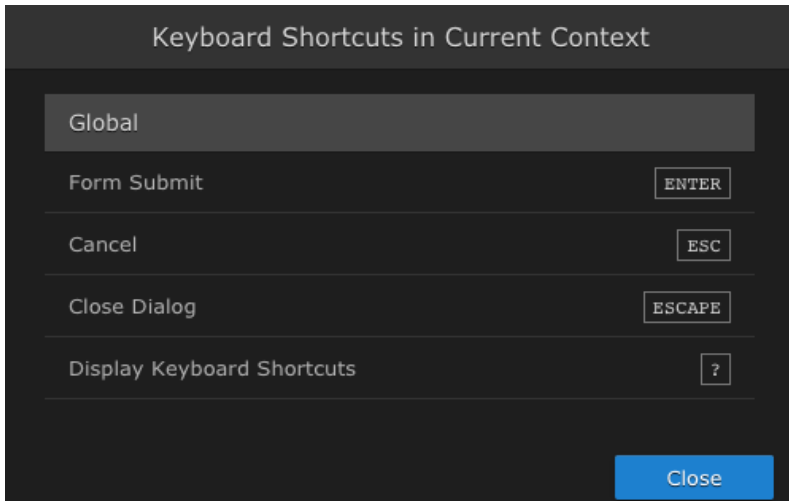


See [Administering Connect DVR](#) for details about each available administration task.

Keyboard Shortcuts Dialog

To view available keyboards shortcuts for the current screen:


1. Click the  icon on the toolbar, and click **Keyboard Shortcuts** in the drop-down menu.
2. The Keyboard Shortcuts dialog opens.
3. Click the **Close** button to dismiss the dialog.

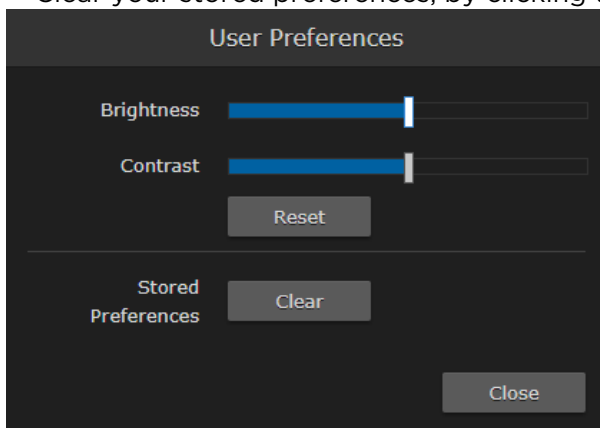


User Preferences Dialog

The User Preferences dialog allows you to set the brightness and contrast of the UI and clear your locally stored preferences.

To adjust user preferences:

1. Click the  icon on the toolbar, and click **User Preferences** in the drop-down menu.
2. The User Preferences dialog opens:
 - Adjust the sliders to the desired brightness and contrast settings.
 - Reset to the default brightness and contrast by clicking the **Reset** button under the sliders.
 - Clear your stored preferences, by clicking the **Clear** button next to Stored Preferences.

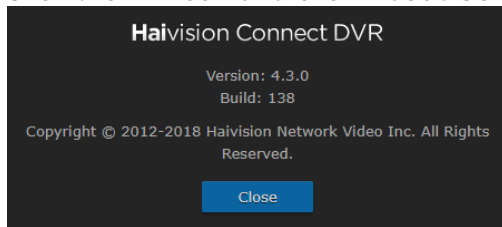


3. Click the **Close** button to dismiss the dialog.

About Connect DVR Dialog

To access the About Connect DVR screen, which shows you the current version/build number and copyright information:

1. Click the ☰ icon and click **About Connect DVR** from the dropdown menu.



2. Click **Close** to dismiss the dialog.

✔ **Tip**

When requesting assistance, provide the version and build number displayed on this screen to the support representative.

Streaming with Connect DVR

This section provides instructions for streaming live and time-delayed video from the main (broadcast) site to remote venues.

Topics Discussed

- [Outputting a KB Video Stream from Connect DVR](#)
 - [Setting Up the Broadcast Site](#)
 - [Starting the KB Source Stream](#)
 - [Creating a Streaming Channel](#)
 - [Connecting and Cueing the Stream](#)
 - [Outputting the Stream](#)
- [Using Cue Points to Indicate Playback Start](#)
- [Streaming a Dual Screen Channel](#)
- [Stopping the Stream](#)
- [Outputting Multiple Audio Channels](#)
- [Exporting Channels](#)
- [Importing Channels](#)

Outputting a KB Video Stream from Connect DVR

After the Connect DVR appliance has been properly installed and connected as described in the appropriate [Quick Start Guide](#), you may begin outputting HLS video streams from the device.

Note

The following procedure assumes a KB Encoder/Transcoder is used to supply this stream, and that the stream is properly configured in the KB interface. See the Haivision [InfoCenter](#) for details on setting up the KB Encoder/Transcoder.

The streaming process has been broken down into smaller procedures or steps. To avoid complications, perform these steps in order. Click the table links below to navigate between steps.

Outputting a KB Video Stream from Connect DVR	
Step	Description
1	Setting Up the Broadcast Site
2	Starting the KB Source Stream
3	Creating a Streaming Channel
4	Connecting and Cueing the Stream
5	Outputting the Stream

Setting Up the Broadcast Site

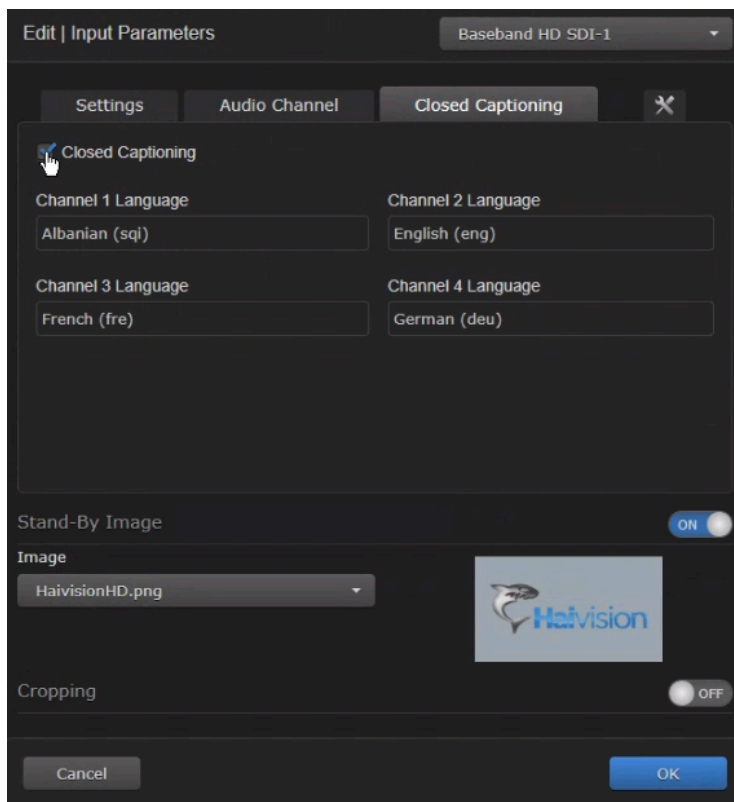
Prior to setting up the Connect DVR appliance, the broadcast site must be configured. At the broadcast site, you should have:

- KB Encoder installed and connected to a video source.
- Access to the Haivision Connect DVR service at cloud.haivision.com.
- Optionally, if you are planning synchronized dual-streaming, you must have a dual-channel converter installed.

Refer to the documentation that accompanied these products for information on how to perform this setup.

Perform the following on the KB Encoder:

1. Log into the KB Encoder's interface and create a channel with the desired input source as described in the [KB User's Guide](#).
2. If appropriate for your baseband input, click the **Closed Captioning** checkbox to enable for the input: **Channel Configuration > Input Parameters > Closed Captioning tab > Closed Captioning checkbox** checked and then set the language for each channel.



3. **Note**
Use the highest-quality stream for projecting onto large screens at a remote venue. See [Bandwidth Guidance](#).

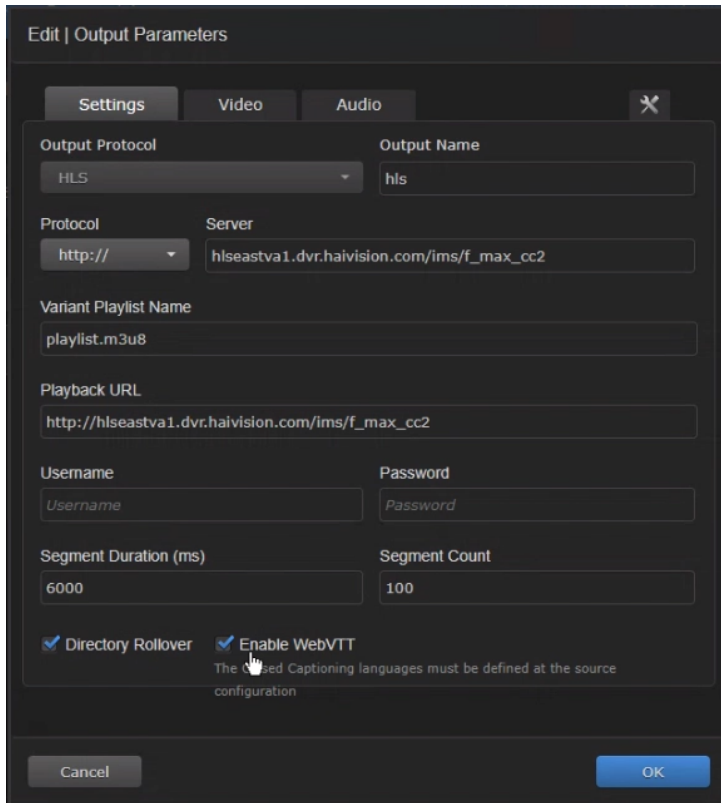
4. **Important**

RTMP streams to Akamai HLS packaging workflows are not supported, and may not be stable.

Tab	Setting	Sample Values/Notes
Settings	Output Protocol	HLS
Settings	Server	<code>http://post.imsclientdvr-i.akamaihd.net/568036/mychurchdvr1</code>
Settings	Variant Playlist Name	master.m3u8
Settings	Playback URL	<code>http://imsclientdvr-i.akamaihd.net/hls/live/568036/mychurchdvr1</code>
Settings	Segment Duration	10000
Settings	Segment Count	1440
Settings	Directory Rollover	Checked
Settings	WebVTT	Checked (if appropriate, such as when you checked Closed Captioning)
Video	Video Encoder(s)	1080p (3808 Kbps)
Audio	Encoder(s)	English 192 Kbps

 **Tip**



If you have multiple events or service times (each with their own stream), create unique channels for each with the appropriate "Stream Name" value, so that you can quickly begin streaming.



Continue to [Starting the KB Source Stream](#) on the KB Encoder.

Starting the KB Source Stream

At the broadcast site, ensure that the source video is playing:

1. Log into the KB Encoder's interface.
2. Click the  icon and click **Channel Control Center**.
3. Locate the channel for this event and click the  button under the channel to start it.
4. Ensure the channel starts successfully with no errors.


The Connect DVR appliance begins to cache the video stream, if the channel's Stream Enable slider is ON (default). See the [Channel Configuration Screen](#) for information on this slider.

Continue to [Creating a Streaming Channel](#) on the Connect DVR appliance at the playback site.

Creating a Streaming Channel

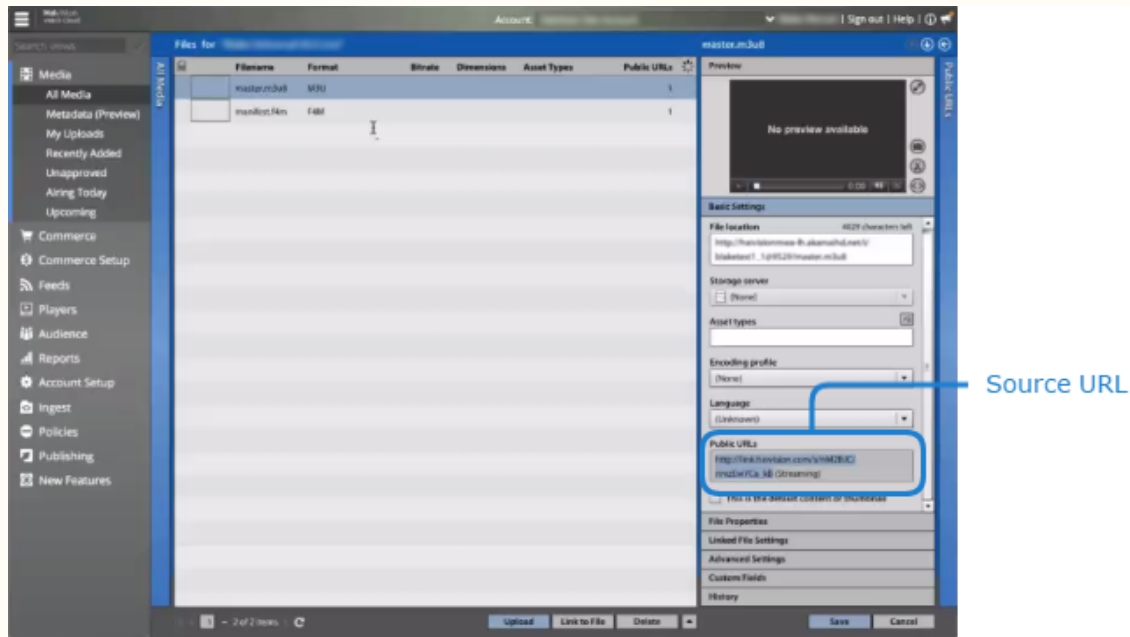
Before outputting video from the Connect DVR appliance, you need to create a channel which points to the source video.

To create a channel:

1. Log into the Connect DVR's interface.
2. Click the  icon and select **Channel Configuration**.
3. Enter a user-defined name for the channel in the Name field.

4. **Note**

In the **Haivision Video Cloud** service, the proper video URL to use is defined in the "Public URL" field as shown below:



Important

Only HLS streams are supported.

5. Optionally, enable Dual Screen mode if the source video and appliance supports it. See [Streaming a Dual Screen Channel](#) for details on dual-screen requirements.
6. Optionally, add an icon for the channel by hovering over the icon and clicking **Browse**. The supported file types are JPG and PNG, and the selected file must be less than 5 MB. The chosen image is resized to 100 x 56 pixels to create the channel icon.
7. Click **+ Channel**.

The specified channel is added to the list of created channels. The Connect DVR appliance begins to cache the video stream, if the channel's Stream Enable slider is ON (default). See the [Channel Configuration Screen](#) for information on this slider.

Note

Connect DVR reports an error if there is no stream content available in the cloud. After the stream is started on the KB Encoder, it takes up to two minutes before the DVR starts downloading the content.

Continue to [Connecting and Cueing the Stream on the Connect DVR appliance](#).


Related Topics

- [Signing in to the Interface](#)
- [Channel Configuration Screen](#)

Connecting and Cueing the Stream

Prior to sending the video stream to the Connect DVR appliance outputs, the starting point of the stream can be cued.

To cue the video stream:

1. In the Connect DVR interface, click the  icon and select **Production Center**.
2. At the top of the interface in the Channel Selector, click the icon of the channel you created in [Creating a Streaming Channel](#).

3.

 **Tip**

It may take up to two minutes from the time the video source is started on the KB Encoder to the time it is available to play from the Connect DVR appliance.

4. If using a stream with multiple audio tracks, select the desired audio language to output using the Language Selector next to the volume control.
5. Use the seek bar and the cue controls below the preview player to locate the desired starting point. See [Cueing Video Player](#) for a description of each of the cue controls.

 **Tip**

If cue points are used in the video stream, click on the desired starting cue point.

The video stream is now cued and ready for output from the Connect DVR device. Continue to [Outputting the Stream](#).

Related Topics

- [Production Center Screen](#)
- [Channel Selector](#)
- [Cueing Video Player](#)

Outputting the Stream

After cueing the stream and locating the proper starting point, you are ready to output the stream from the Connect DVR appliance:

1. Click the **Go Live** button to enable the video outputs and begin the playback on the player's attached displays.

 **Tip**

If the DE3 attached monitors are showing the Console UI screen, press **Ctrl + Alt + F3** to switch to the video stream output. **Note:** This applies to only the DE3 devices and does not apply to the DE-SDI and DE-SDI Mini devices.

2. The output preview windows show previews of the content sent to the output ports on the device.
3. Visually verify that the output displays are receiving the stream.

You have now successfully used the Connect DVR solution to stream live or time-delayed content at a remote site. When you are ready to stop the stream, refer to [Stopping the Stream](#).

Related Topics

- [Output Preview Windows](#)

Using Cue Points to Indicate Playback Start

Note

KB 5.3 or later is needed for inserting cue points into the source stream.

Insert a Cue Point into the KB Stream

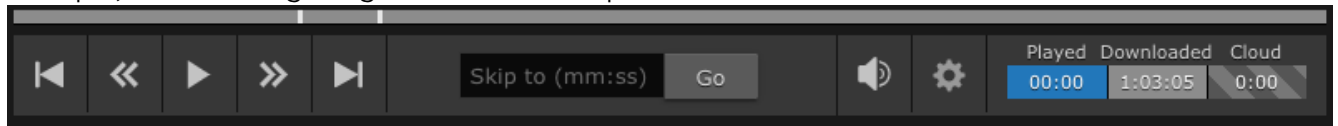
1. Follow the steps in [Setting Up the Broadcast Site](#) and [Starting the KB Source Stream](#) to begin outputting a stream from KB.
2. In the KB interface, double click on the running channel to access the Channel Details screen.
3. Click the ► icon to expand the Input section.
4. Using the video preview, at the appropriate time you wish to insert a cue point, click the **Send AdCue** button.

Note

The value entered in the Duration field has no effect on the cue point in Connect DVR.

Start Playback on Connect DVR Using the Cue Point

1. Follow the steps in [Creating a Streaming Channel](#) to configure the channel in Connect DVR.
2. In the Connect DVR Production Center screen, click the icon of the channel you created in step 1.
3. As the video stream downloads, the seek bar fills, and any inserted cue points are shown. For example, the following image shows two cue points available in the seek bar:



4. Move the preview player to a cue point, by either:
 - Clicking the cue point in the seek bar.
 - Clicking the ◀ and ▶ buttons to skip through the available cue points.
 - Clicking inside the Skip to text box to see a list of time stamps for each cue point, and clicking on a time stamp to skip to that cue point.
5. Click the **Go Live** button as described in [Outputting the Stream](#) to view the stream on the attached monitors.

Streaming a Dual Screen Channel

Note

Due to only having one display output, the Connect DVR SDI Mini appliance does not support dual screen mode.

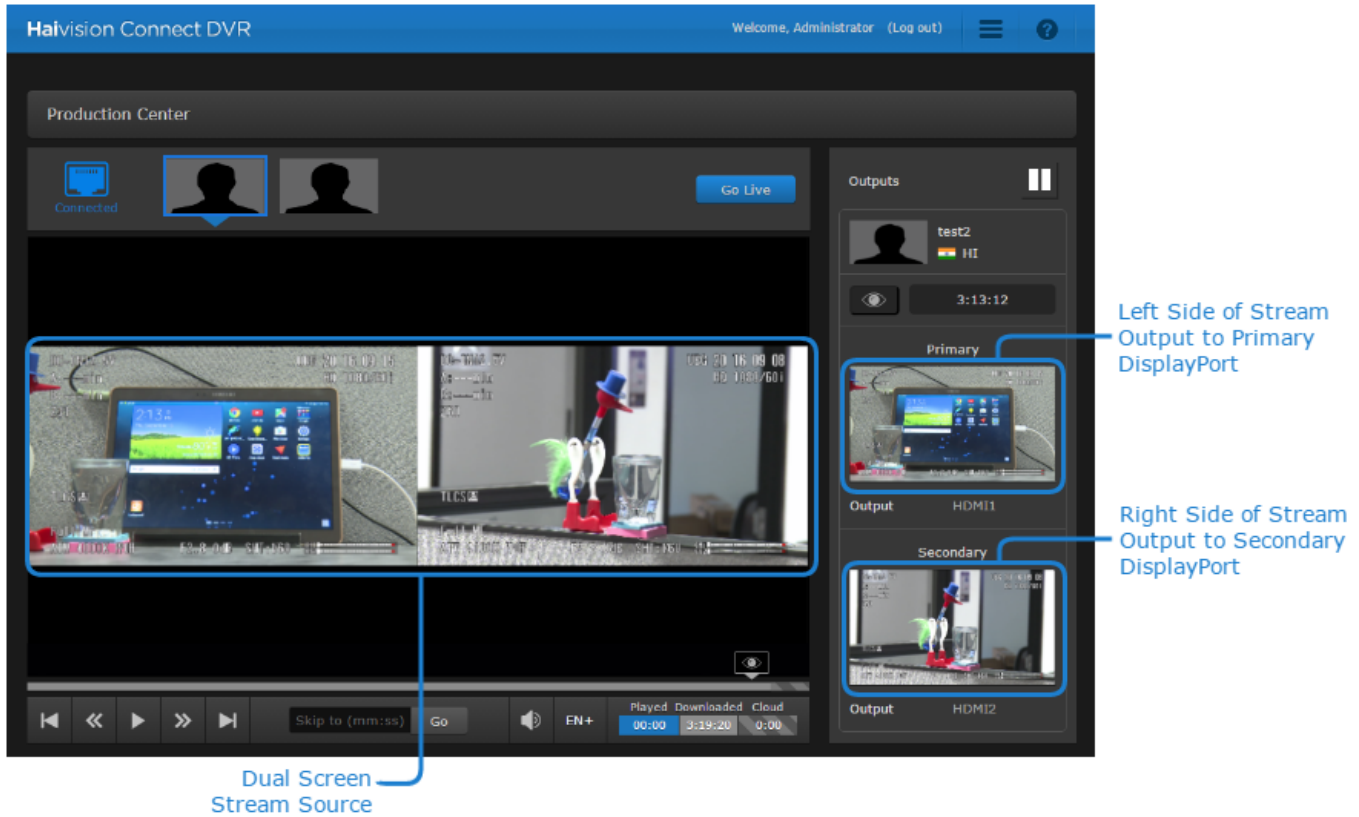
To stream different outputs to two different screens on the appliance:

1. Ensure the source video from the KB Encoder supports the expected dual screen format. That is, the AJA FS2 Dual Channel Frame Synchronizer/Converter is used at the streaming site as input to the KB Encoder.
2. Follow the instructions in [Creating a Streaming Channel](#) and enable Dual Screen for the channel.
3. Connect two monitors to the Connect DVR appliance. Both monitors must support the same valid resolution and framerate. See [Prerequisites](#) for a list of supported resolutions/framerates.

4. Follow the instructions in [Connecting and Cueing the Stream](#) and [Outputting the Stream](#).

Note

If only one monitor is connected, that monitor receives both outputs, i.e. the actual output is similar to what is shown in the cueing video player, not the output preview windows.




Related Topics



- [Channel Configuration Screen](#)

Stopping the Stream

From the broadcast site:

1. Open your web browser and log into the KB interface.
2. On the Channel Control Center screen, locate the channel for this event or service and click the  button.

Optionally, from the playback site disable the video output:

1. Open your web browser and log into the Connect DVR interface.
2. Click the  icon and click **Production Center**.
3. Click the  button in the Output Preview Windows to disable the video outputs from the appliance.

After stopping a stream, a maximum of the last four hours is saved on the Connect DVR appliance. It may be replayed from the appliance at any time. The content is overwritten only when the stream is restarted from the KB Encoder and a new stream name is used. Overwriting can also be prevented by disabling caching of the stream in the Channel Configuration page. See [Channel Configuration Screen](#) for details.

Note

If you would like to preserve the recording on the Cloud DVR server for use in a video on demand system or local playback, Haivision can provide FTP access to the Cloud DVR server. Contact your service representative for more details.

Outputting Multiple Audio Channels



The Connect DVR SDI appliances support passing through 5.1 and 7.1 audio from the HLS stream to the SDI outputs. There are no necessary steps to enable this in the Connect DVR UI. However, the source KB encoder must set two Advanced Parameters in the audio encoder. The following explains the details.

On the KB Encoder, perform the following:

1. On the KB Encoder (version 5.2 or later), create the stream as you would normally, ensuring that you:
 - Select an SDI source that contains up to eight audio channels.
 - Set the audio encoder bitrate to the total desired bitrate of all audio channels. (For example, for 192 kbps per channel, set the encoder bitrate to 768 kbps for 7.1 audio passthrough.)

Note

In Step 2 of the Create Channel Wizard, you do not need to configure the Audio Inputs, as those are currently bypassed and unused in this use case.

2. Click the  icon next to the channel you created, and click **Channel Details**.
3. Double click on the audio encoder to open the Audio Encoder Parameters window.
4. Click the  icon and add the following two parameters:

Name	Value
audio_config_set	<ul style="list-style-type: none"> • 7.1 • 5.1
channel_order	<ul style="list-style-type: none"> • mpeg (default) <ul style="list-style-type: none"> • If audio_config_set = 5.1, the channel order is: FC, FL, FR, SL, SR, LFE • If audio_config_set = 7.1, the channel order is: FC, FL, FR, SL, SR, RL, RR, LFE • wave <ul style="list-style-type: none"> • If audio_config_set = 5.1, the channel order is: FL, FR, FC, LFE, SL, SR • If audio_config_set = 7.1, the channel order is: FL, FR, FC, LFE, SL, SR, RL, RR

Tip

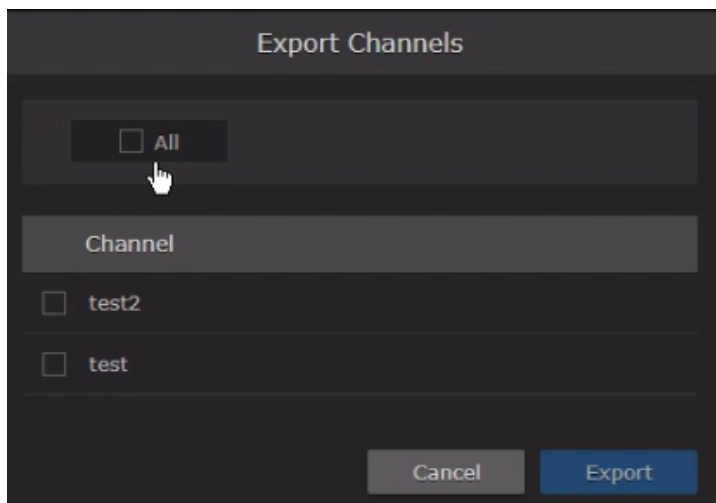
On the Connect DVR UI, there is no indication that multiple audio channels are sent to the SDI outputs.

Exporting Channels

To export channels:

1. If necessary, switch to the Channel Configuration screen.


2. Click the  menu and select the **Export Channels** option.

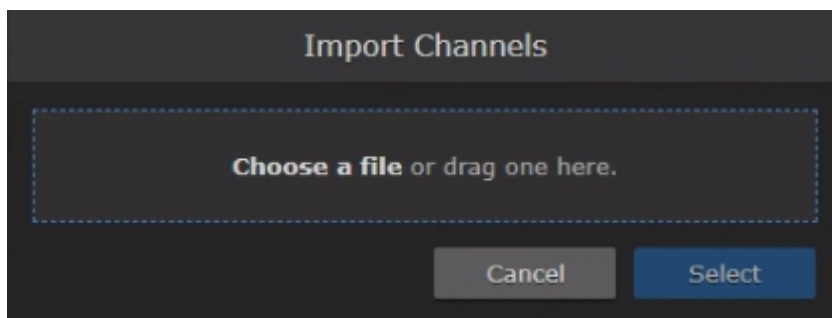


3. Click the **All** checkbox or select the channels you want to export individually.
4. When finished making your selections, click the **Export** button. A `dvrConnect_export.json` file is saved to your system.

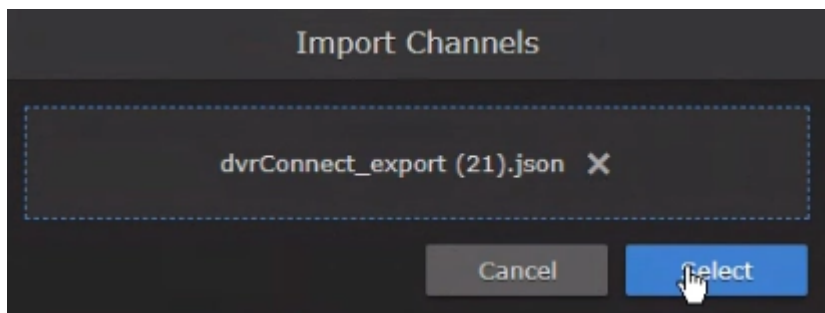
Importing Channels

To import channels:

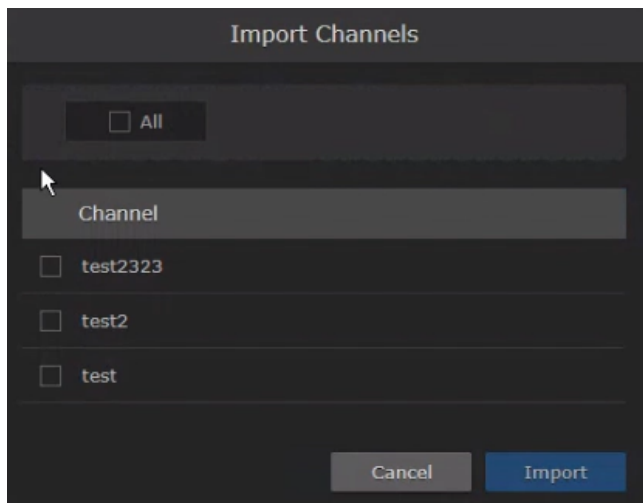
1. If necessary, switch to the Channel Configuration screen.
2. Click the  menu and select the **Import Channels** option.



3. Either drag a json file and drop it on the dialog window or click the **Choose a file** link to browse to the desired file.



4. With the json file selected, click **Select** to confirm your selection or click the **x** at the end of the filename to remove the currently selected file so that you can choose another.



5. Either click the **All** checkbox or select the channels you want to import individually.
6. When finished making your channel selections, click the **Import** button.

The selected channels are added to the Channel Configuration screen listings and begin caching.

Administering Connect DVR

The following content explains how to administer the system and manage users.

Topics Discussed

- [Accessing Reports \(Logs\)](#)
- [Viewing System Activity](#)
- [Supplying a Security Certificate](#)
 - [Generating a Certificate Signing Request](#)
 - [Importing and Activating a Certificate](#)
 - [Generating and Importing a Private Key](#)
 - [Certificate Settings](#)
- [Licensing Connect DVR](#)
- [Configuring the Network](#)
 - [Adding a Static Route](#)
 - [Editing a Static Route](#)
 - [Deleting a Static Route](#)
 - [Creating a Bonded Interface](#)
 - [Removing a Bonded Interface](#)
- [Configuring the WiFi Access Point](#)
- [Updating Connect DVR](#)
- [Managing Users](#)
 - [Viewing User Accounts](#)
 - [Changing Account Passwords](#)
- [Acquiring the Remote Assistance ID](#)
- [Changing the Video Output Options](#)
 - [Selecting the Output Pause Behavior](#)
 - [Specifying the Output Video Resolution](#)
- [Enabling Local Management](#)
- [Using Local Management](#)
- [Creating a Channel Icon](#)

Accessing Reports (Logs)

! Important



Log files can contain sensitive data and should be appropriately protected. Follow appropriate security guidelines for user logins and passwords.

The following log files are available:

Log Name	Description
All Logs	All system and application logs.

Log Name	Description
System Messages	Operating system messages. Includes /var/log/messages.
Application	Log data from the Connect DVR processes. Includes /opt/haivision/var/log/.

To access the logs:

1. Click the  icon and select **Administration**.
2. Click **Reporting** in the admin toolbar, and click **Reports** in the sidebar.
3. Click the  button next to the log file type you wish to download.
4. The chosen log file downloads according to your browser settings.

The compressed .zip file consists of a number of text log files with descriptive filenames to assist you in identifying the appropriate file for the information you seek.

Related Topics


- [Administration Screen](#)

Viewing System Activity




The following system statistics can be monitored in the System Activity dashboard:

- System status
 - CPU usage
 - Memory usage
 - Network bandwidth
 - System uptime
 - Connect DVR version
- Disk space
 - Video cache
 - Operating system
 - Haivision software
 - System storage

To view the system activity dashboard:

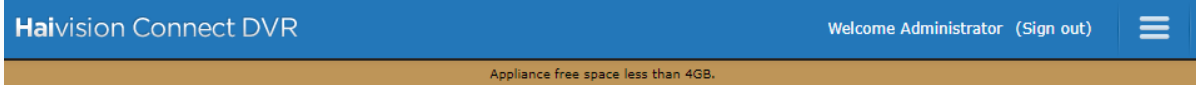
1. Click the  icon and select **Administration**.
2. Click **Reporting** in the admin toolbar, and click **System Activity** in the sidebar.

In addition to numerical values, the dashboard provides color-coded bars to alert you when disk space is reaching usage thresholds:

Bar Color	Disk Space Used
	0-74%
	75-90%
	90-100%

Important

When the system's available video cache is less than 4 GB, a notification is shown below the interface's title bar.

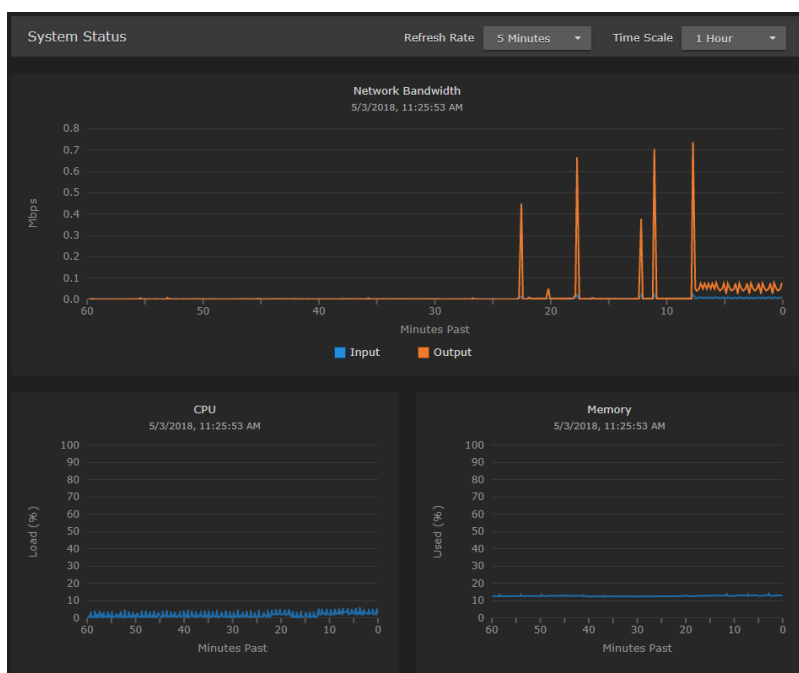


Always ensure there is at least 4GB available on the hard drive.

Viewing System Status Details

Clicking the **Details** button under System Status, opens a new browser window that includes graphs of the network bandwidth, CPU usage, and memory usage.

You may customize these graphs by altering the refresh rate and time scale of the graphs.

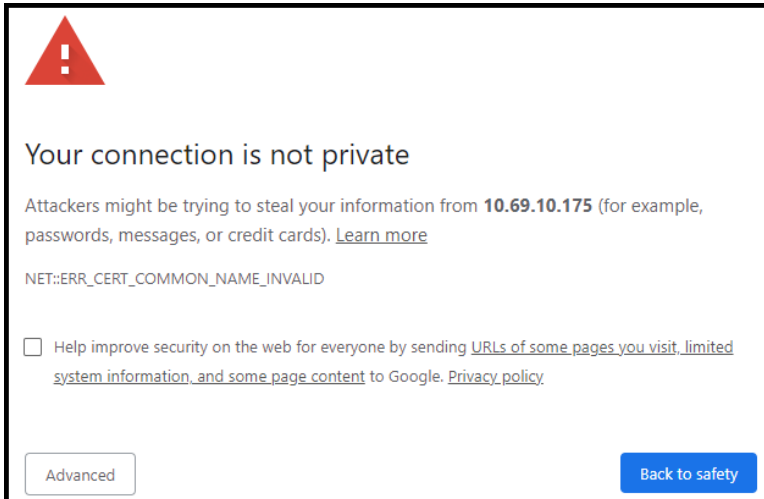


Related Topics

- [Administration Screen](#)

Supplying a Security Certificate

The Connect DVR interface is encrypted to provide secure interactions with your devices. When you log into the web interface, you are automatically redirected to the secure HTTP (HTTPS) site. When a browser accesses the website, it requests a security certificate to confirm that the site is trusted. Connect DVR ships with a self-signed SSL certificate key set which works with any configured server hostname. However, web browsers do not consider self-signed certificates to be trusted, because they are not signed by a Certificate Authority. Consequently, when accessing the website with a self-signed certificate, users see a security warning and are prompted for authorization as shown below. Responses may vary depending upon the browser used.



Important

Before adding an exception for the site, check with your administrator on the correct response.


Supplying Connect DVR with a TLS/SSL security certificate eliminates the security warning, provides a means for users to verify a website, and ensures that the connection is secure.

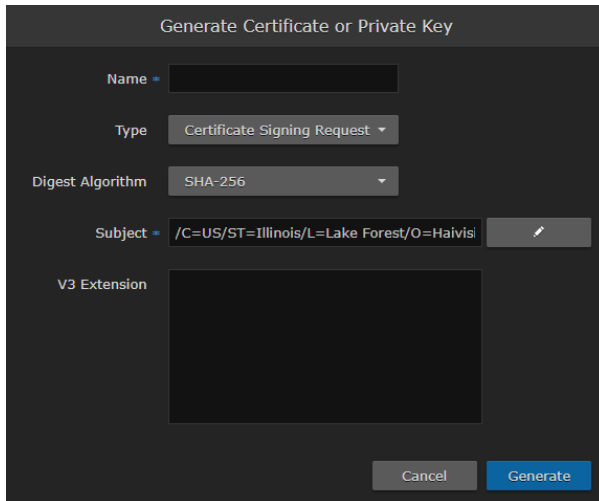
Note

Haivision recommends that site administrators install a signed SSL certificate key set. Please contact your Network Administrator to obtain an SSL certificate and key appropriate for your use.

Generating a Certificate Signing Request

To generate a Certificate Signing Request (CSR):

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Certificates** in the sidebar. The Certificates page lists any certificate signing requests generated by the device. The active certificate is indicated with a blue check.
3. Click the **Generate** button.
4. On the Generate Certificate or Private Key dialog:
 - a. Type in a name for the certificate.
 - b. Make sure the Type is Certificate Signing Request and fill in the remaining fields. See [Certificate Settings](#).
 - c. For the subject, type in information about the device that the Identity Certificate represents. For more information, see the Subject entry in [Certificate Settings](#).



5. Click the **Generate** button.

Note

The generated CSR file needs to be sent to a Certification Authority to be signed. A copy of it is saved in the current administrator's home directory, or it can be copied and pasted from the CSR view. You can import the signed certificate back later by clicking on the **Import** button (using the same name as the CSR file).

6. Returning to the Certificates list, click the link for the generated CSR to open the file in another tab. Copy the contents (including both beginning and ending delimiters) and paste it into your Certificate Authority (CA) application.

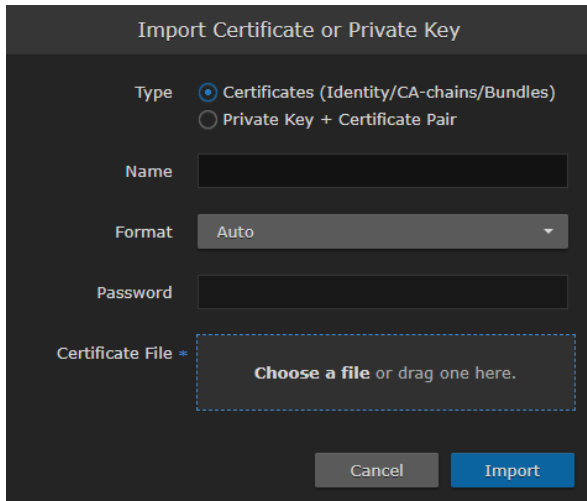
Tip

Keep in mind that there is a difference between importing a new certificate (that was generated externally) and importing a newly signed certificate whose request was previously generated on the device and exported for signing.

Importing and Activating a Certificate

To import and activate a certificate:


1. Click the **☰** icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Certificates** in the sidebar.
3. Click the **Import** button.
4. On the Generate Certificate or Private Key dialog:
 - a. Keep the default Type: Certificates (Identity/CA-chains/Bundles).
 - b. Type in the certificate name and fill in the remaining fields. See [Certificate Settings](#).
 - c. If your certificate is encrypted, type in the password.
 - d. Click **Choose a file** and select the CA-signed certificate (.crt extension) returned from the certificate request generated in the previous section.

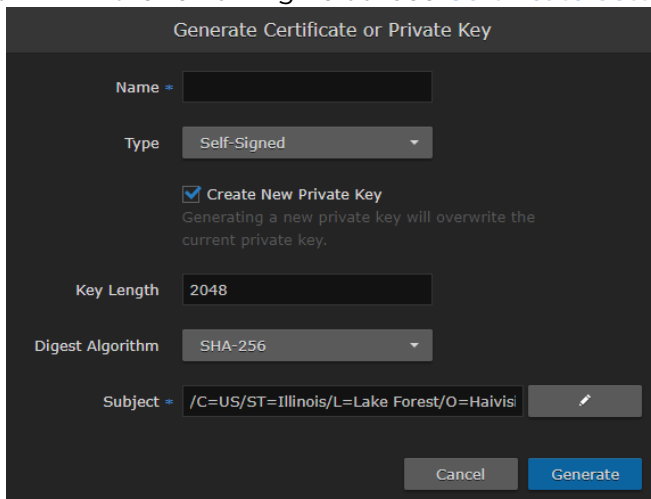


5. Click **Import**.
6. On the Certificates page, the newly imported certificate is added to the list and should have a green status LED. Click in the Active column to activate the certificate.
7. Click **Reboot** if you have changed the active certificate.

Generating and Importing a Private Key

To generate a private key:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Certificates** in the sidebar.
3. Click the **Generate** button.
4. On the Generate Certificate or Private Key dialog:
 - a. Type in a name for the certificate.
 - b. For the Type, select **Self-Signed**.
 - c. Check the **Create New Private Key** checkbox.
 - d. Fill in the remaining fields. See [Certificate Settings](#).




5. Click **Generate**.

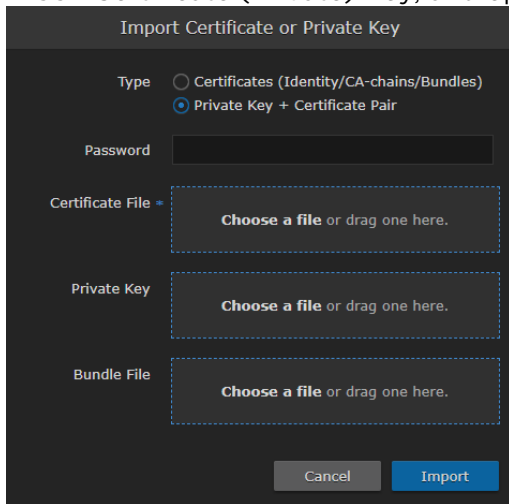
 **Caution**

Clicking **Generate** overwrites the current private key and renders unusable any certificates based on that key.

6. The new certificate is added to the Certificates list, and becomes the active certificate.
7. Click **Reboot**.

To import a Private Key:

1. Click the  icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Certificates** in the sidebar.
3. Click the **Import** button.
4. On the Import Certificate or Private Key dialog:
 - a. For the Type, select **Private Key + Certificate Pair**.
 - b. Type in the password for the private key.
 - c. To update your security certificate, click **Choose a file** and select the new SSL Certificate and SSL Certificate (Private) Key, and optionally an SSL Intermediate Certificate Bundle file.




5. Click **Import**.
On the Certificates page, the newly imported files are added to the list.
6. Click **Reboot**.

Certificate Settings

 **Note**

Please contact your Network Administrator if you are unsure what to put in any of these fields or if you are unsure whether the setting is required on your network.

Certificate Setting	Description
Generate Certificate or Private Key	
Name	Type in a unique name under which the certificate is stored on the device as well as listed on the Certificate page.

Certificate Setting	Description
Type	<p>Select the Signature Type:</p> <ul style="list-style-type: none"> Self-signed: The certificate will be generated and signed by the system, and the name will be added to the list of Identity Certificates. Certificate Signing Request: A request will be generated, and its name will be added to the list of Identity Certificates. The request will be located in your home directory (accessible through the CLI), or you may export it by clicking on the View button and copying the content into a new file in a text editor. <p>In its generated form, this certificate is still a request and cannot be used as an Identity Certificate before it is signed by a CA, and imported back.</p>
Digest Algorithm	<p>Select the digest algorithm (Secure Hash Algorithm):</p> <ul style="list-style-type: none"> SHA-256 SHA-384 SHA-512
Subject	<p>The Subject identifies the device being secured. The special value "auto" used with Generate sets the Subject Common Name to the device's FQDN if DNS is set, or the IP address otherwise. Also, for self-signed certificates, the Subject Alternative Name extension is also set to FQDN, hostname, and IP Address of the device (there is no other method to set the Subject Alternative Name).</p> <p>Type in the subject in the form: <code>"/C=US/ST=Maine..."</code> where the most common attributes are:</p> <ul style="list-style-type: none"> /C Two Letter Country Name /ST State or Province Name /L Locality Name /O Organization Name /OU Organizational Unit Name /CN Common Name <div style="border: 1px solid green; padding: 5px; margin-top: 10px;"> <p> Tip For successful authentication, the Common Name in the certificate should be the IP address (by default) or domain name of the device.</p> </div>
V3 Extension	<p>V3 extensions allow more configuration options to be inserted in the Code Signing Request, such as alternative subject names and usage restrictions to certificates.</p>
Import Certificate	
Type	<p>Select the certificate type:</p> <ul style="list-style-type: none"> Certificates: (Identify/CA-chains/Bundles) Private Key + Certificate Pair
Name	Name of the certificate.
Format	<p>Select the file format for the Certificate (the formats differ in the way the file is encrypted):</p> <ul style="list-style-type: none"> Auto: detected from the file extension der: Distinguish Encoding Rules pkcs #7 pkcs #12
Password	<p>If the imported certificate contains a password protected private key, type its password in this field. Leave this field empty if the file is not password-protected.</p>
Certificate File	Select the file to upload

Licensing Connect DVR

Obtaining a License Key

! Important

When requesting a license key, you need the MAC address of the network interface. See [Configuring the Network](#) for retrieving the MAC address.

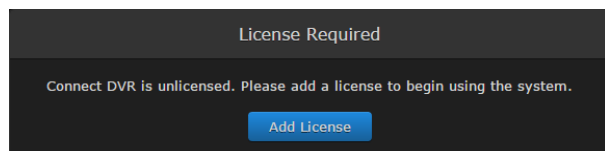
To request a license for your product:

1. Log in to the [Haivision Support Portal](https://support.haivision.com) (<https://support.haivision.com>).
2. After logging in, click **License Requests**.
3. Click the **New** button.
4. Select the appropriate device type and click the **Next** button.
5. Fill in the form with the appropriate information, and click **Save**.

Your license request is submitted and you will be contacted by a Haivision representative shortly with a license key for your product.

Adding a License


When upgrading major versions of Connect DVR software, you are prompted to add a license.



To add a license:

1. Click the **Add License** button in this dialog box.
2. Paste the license key in the License field and click **Save Settings**.

Alternatively,

1. Click the  icon and select Administration.
2. Click **System Settings** in the admin toolbar, and click **Licensing** in the sidebar.
3. Paste the license key in the License field.
4. Click **Save Settings**.

i Note

After adding a license, you may need to refresh your browser for the License Required dialog box to close.


Related Topics

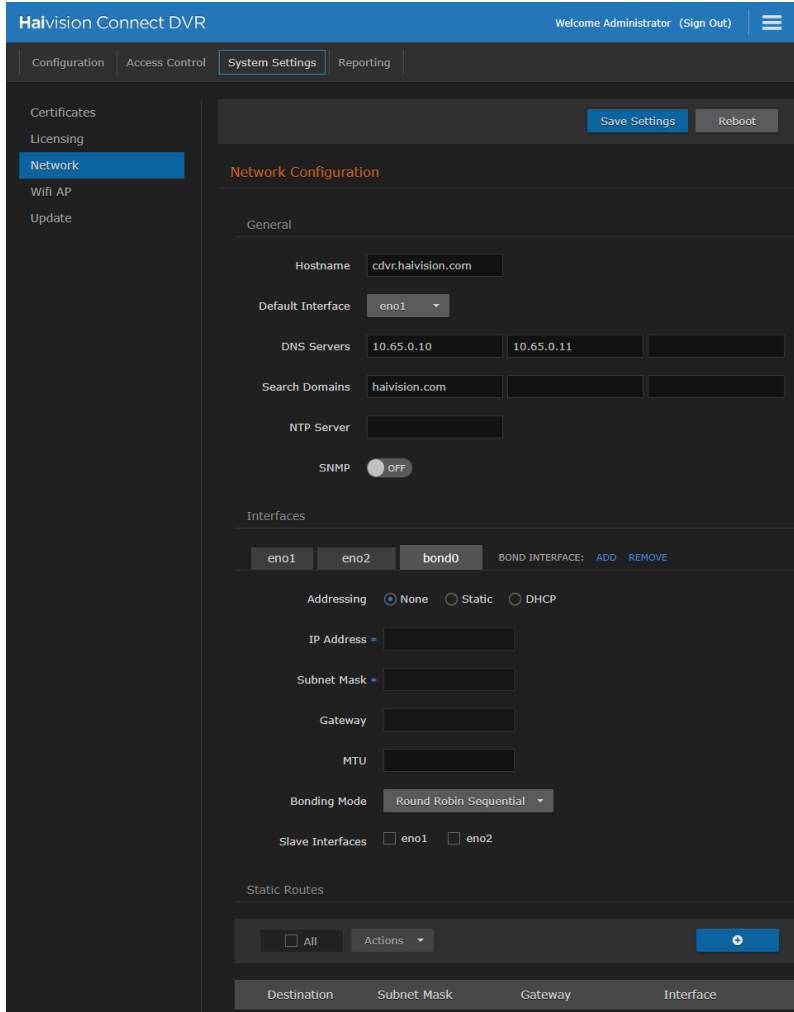
- [Touring the Interface](#)

Configuring the Network

The Network Configuration settings allow you to specify the server hostname, DNS servers, NTP server, search domains, and the default interface. You can also configure advanced settings, such as multiple network interfaces, NIC bonding, and static routes.

To configure the network:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.
3. Fill in the fields as appropriate. See the table below for more information.



4. To add a Static Route, see [Adding a Static Route](#).
5. To add a Bonded Interface, see [Creating a Bonded Interface](#).
6. Click **Save Settings**.
7. Click **Reboot** to have your network configuration changes take effect.

The following table lists the configurable network settings.

Setting	Description
General	

Setting	Description
Hostname	The hostname to be assigned to the device. Specify the hostname as a FQDN, for example: <code>myserver.mycompany.com</code>
Default Interface	The default Ethernet interface is the first one.
DNS Servers	<p>(Optional) The Internet Protocol version 4 (IPv4) addresses of the Domain Name Servers to use. If possible, we recommend using Google's public DNS servers (8.8.8.8 and 8.8.4.4).</p> <div style="border: 1px solid #ccc; padding: 5px;"> <p>! Important</p> <p>If you want the DNS Servers values populated by a DHCP server, you should delete any entries in these fields <i>before</i> clicking the Saved Settings button.</p> </div>
Search Domains	<p>(Optional) The search strings to use when attempting to resolve domain names.</p> <div style="border: 1px solid #ccc; padding: 5px;"> <p>! Important</p> <p>If you want the Search Domains values populated by a DHCP server, you should delete any entries in these fields <i>before</i> clicking the Saved Settings button.</p> </div>
NTP Server	<p>(Optional) If the Network Time Protocol (NTP) is enabled, enter the address of the NTP server. For example, <code>www.pool.ntp.org</code></p> <div style="border: 1px solid #ccc; padding: 5px;"> <p>! Important</p> <p>To accurately schedule, record, and play streams, use www.pool.ntp.org to synchronize the system clocks on the KB Encoder, Display Engine appliance, and the remote Mac/PC used to access the KB and Connect DVR user interfaces. This ensures that all of your peripherals match the Haivision Cloud DVR clock.</p> </div>
SNMP	Enable/Disable Simple Network Management Protocol (SNMP).
Read-Only Community	SNMP string to be used when making read-only information requests.
SNMP Trap Servers	IPv4 or FQDN of a server to send SNMP traps to.
Interfaces	
<interface_name>	<div style="border: 1px solid #ccc; padding: 5px;"> <p>i Note</p> <p>Network interface names vary depending on system configuration, such as <code>enp3s0/enp4s0</code>.</p> </div>
Bond Interface	<i>SDI appliances only.</i> Bonding enables an administrator to use more than one physical network port as a single connection. This can be used to increase performance or redundancy of a server.
Addressing	<p>Choose whether the interface uses a static or dynamic IP address:</p> <ul style="list-style-type: none"> • None — Select to disable the interface. • Static — Select to disable DHCP. When DHCP is disabled, you must manually enter the IP address, DNS server, subnet mask, and gateway. • DHCP — Select to enable DHCP. When DHCP is enabled, the device receives an IP address from a DHCP server on the network. The DNS server, subnet mask, and gateway are also populated by the DHCP server.

Setting	Description
IP Address*	<p>Note</p> <p>If DHCP is disabled, you may enter an IP address in dotted-decimal format (e.g., 127.0.0.1).</p>
Subnet Mask*	<p>Note</p> <p>If DHCP is disabled, you may enter the Network Mask in dotted-decimal format (e.g., 255.255.0.0).</p>
Gateway*	<p>Note</p> <p>If DHCP is disabled, you may enter the gateway address in dotted-decimal format (e.g., 192.168.0.1).</p>
MTU	Maximum Transmission Unit. Specifies the maximum allowed size of IP packets for the outgoing data stream. Valid values are 228 to 1500.
MAC Address	(Read-only) The MAC address assigned to the interface. This is the physical address of the network interface and cannot be changed.
Link	Select the link negotiation settings for the interface, either Auto or Manual. If you select Manual, you can select the Speed and Duplex settings as described below.
Speed	If manual is chosen in the link negotiation settings, select the Ethernet speed (in Mbps): 10, 100, or 1000.
Duplex	If manual is chosen in the link negotiation settings, select the duplex mode: full or half.

Setting	Description
Bonding Mode	<p>(Bond Interface only) Modes for the Linux bonding driver determine the way in which traffic sent out of the bonded interface is actually dispersed over the real interfaces. Modes 0, 1, and 2 are by far the most commonly used among them.</p> <ul style="list-style-type: none"> • Round Robin Sequential: Transmits packets in first available network interface (NIC) slave through the last. This mode provides load balancing and fault tolerance. • Active Backup: Only one NIC slave in the bond is active at a time. A different slave becomes active only when the active slave fails. This mode provides fault tolerance. • XOR Sequential: Transmits based on XOR formula. (Source MAC address is XOR'd with destination MAC address). This mode selects the same NIC slave for each destination MAC address and provides load balancing and fault tolerance. • Broadcast - Fault Tolerance: Transmits network packets on all slave interfaces. This mode is least used (only for specific purpose) and provides only fault tolerance. • IEEE 802.3ad Dynamic Link Aggregation: Creates aggregation groups that share the same speed and duplex settings. Utilizes all slave network interfaces in the active aggregator group according to the 802.3ad specification. This mode is similar to the XOR mode above and supports the same balancing policies. The link is set up dynamically between two LACP-supporting peers. • (Adaptive) Transmit Load Balancing (TLB): The outgoing traffic is distributed according to the current load and queue on each slave interface. Incoming traffic is received by one currently designated slave network interface. If this receiving slave fails, another slave takes over the MAC address of the failed receiving slave. • (Adaptive) Active Load Balancing (ALB): This includes <code>balance-tlb + receive load balancing (rlb)</code> for IPV4 traffic. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the server on their way out and overwrites the source hardware address with the unique hardware address of one of the slaves in the bond such that different clients use different hardware addresses for the server.
Slave Interfaces	(Bond Interface only) Select the checkboxes next to the interfaces to enslave it to the bond interface.
Static Routes	
Destination	Each static route requires a destination.
Subnet Mask	<div style="border: 1px solid #ccc; padding: 5px; background-color: #fff9c4;"> <p>Note</p> <p>A static route cannot be created with a subnet mask of either 0.0.0.0 or 255.255.255.255.</p> </div>
Gateway	See above definition.
Interface	The interface associated with the static route. Use the drop-down menu to make your selection.



- These values are automatically populated.

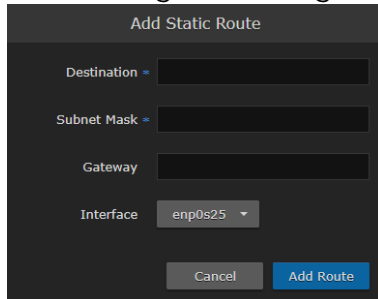
Related Topics

- [Administration Screen](#)

Adding a Static Route

To add a static route:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.
3. Under the Static Routes pane, click the  button and provide the necessary data in the Add Static Route dialog. For setting descriptions, see the table in [Configuring the Network](#).




4. Click the **Add Route** button. The static route is added to the listings in the Network Configuration screen.
5. Click **Save Settings**.
6. Click **Reboot** to have your network configuration changes take effect.

Related Topics

- [Administration Screen](#)
- [Editing a Static Route](#)
- [Deleting a Static Route](#)

Editing a Static Route

To edit an existing static route:


1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.
3. Under the Static Routes pane, click the row of the route you want to edit. Alternatively, you can click the checkbox next to the route and then click **Actions/Edit**.
4. In the Edit Static Route dialog, edit the fields as necessary. For setting descriptions, see the table in [Configuring the Network](#).
5. Click **Save Route**.
6. Click **Save Settings**.
7. Click **Reboot** to have your network configuration changes take effect.

Related Topics

- [Administration Screen](#)
- [Adding a Static Route](#)
- [Deleting a Static Route](#)

Deleting a Static Route

To delete a static route:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.

3. Under the Static Routes pane, click the checkbox next to the route you want to delete. You can select multiple routes to be deleted.
4. Click **Actions/Delete**.
5. Click **Confirm** to confirm deleting the route.
6. Click **Save Settings**.
7. Click **Reboot** to have your network configuration changes take effect.

Related Topics

- [Administration Screen](#)
- [Adding a Static Route](#)
- [Editing a Static Route](#)


Creating a Bonded Interface

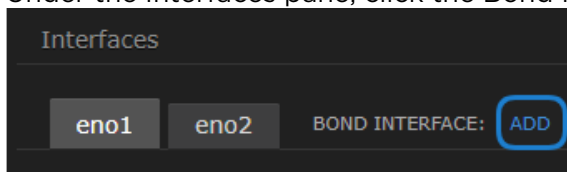
Note

Since the Connect DVR Display Engine appliance only contains one network interface, bonded interfaces are only supported on the Display Engine SDI appliance.

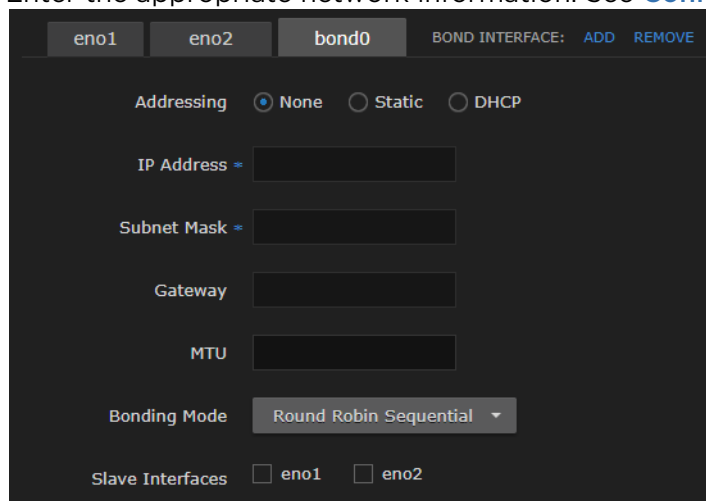
Bonded interfaces provide a method for aggregating multiple network interfaces into a single logical interface. This increases throughput and ensures redundancy if one of the links should fail.

To create a bonded interface:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.
3. Under the Interfaces pane, click the Bond Interface: **Add** action link.



4. A bond0 tab appears. Click the **bond0** tab to reveal the bonding-specific fields (such as Bonding Mode and Slave Interface).
5. Enter the appropriate network information. See [Configuring the Network](#) for setting descriptions.



6. Click **Save Settings**.
7. Click **Reboot** to have your network configuration changes take effect.

Related Topics


- [Administration Screen](#)
- [Removing a Bonded Interface](#)

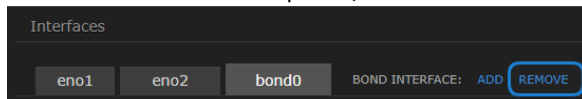
Removing a Bonded Interface

Note

Since the Connect DVR Display Engine appliance only contains one network interface, bonded interfaces are only supported on the Display Engine SDI appliance.

To remove a bonded interface:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar.
3. Under the Interfaces pane, click the Bond Interface: **Remove** action link.



4. The bond interface is removed. Click **Save Settings**.
5. Click **Reboot** to have your network configuration changes take effect.

Related Topics


- [Administration Screen](#)
- [Creating a Bonded Interface](#)

Configuring the WiFi Access Point


A USB wireless adapter is shipped with your Connect DVR appliance. The WiFi Access Point page allows you to:

- Enable/disable the access point
- Configure the name (SSID) of the WiFi network
- Enable/disable authentication and set an encryption key

To configure the WiFi access point:

1. Click the  icon and select **Administration**.
2. Click **System Settings** in the admin toolbar, and click **WiFi Access Point** in the sidebar.
3. To enable/disable the access point, toggle the slider next to WiFi Access Point to on or off, as desired.

When enabled, you can also configure:

-  **Note**
The default SSID is "Haivision" followed by a product identifier and a random number. To avoid future support issues, make note of this number and safeguard it before changing the SSID.

- WiFi authentication. Toggle the Authentication slider to on or off as desired. When enabled, enter the desired password for the wireless network in the Encryption Key field.
4. Click **Save Settings**.

Important

Any changes take effect the next time you plug in the WiFi adapter.

Updating Connect DVR

Due to the necessary upgrade steps and prerequisites required to upgrade to the latest version of Connect DVR, please contact the Haivision Tech Support. See [Getting Help](#) for contact information.

Note

For minor and major releases, a new license key is required. Your Haivision representative applies this during the upgrade process.

Managing Users

To simplify setup and security, there are three built-in user accounts available: haiadmin, haioperator, and haiobserver. Each account is assigned to the following roles:

Name	Role	Description
haiadmin	Administrator	All access rights and administrator privileges.
haioperator	Operator	Access to the Channel Configuration page. Does not include rights to the Administration page.
haiobserver	Observer	Read-only access to the system. Does not include rights to the Channel Configuration or Administration pages.

Important


For security purposes, change the password for these accounts as described in [Changing Account Passwords](#). Information regarding user/password credentials should be safe-guarded. Factory-set passwords are provided in the *Important Notice* document.

Related Topics

- [Administration Screen](#)

Viewing User Accounts

To view the available user accounts:

1. Ensure you are logged into an administrator account.
2. Click the  icon and select **Administration**.
3. Click **Access Control** in the admin toolbar.

All available accounts are listed along with their current roles according to the following table:

Field	Value
Account Name	The user name for the account. Built-in accounts set up at the factory include: <ul style="list-style-type: none"> • haiadmin • haioperator • haiobserver
Role	The role assigned to the account. Roles for built-in accounts cannot be changed. Available roles include: <ul style="list-style-type: none"> • Administrator • Operator • Observer See Managing Users for definitions of these roles.

Related Topics

- [Changing Account Passwords](#)


Changing Account Passwords

Note

Any password changes that you make to an account are persistent and are not overwritten during an update.

Only the haiadmin administrator account can change passwords using the web interface. You can also change the hvroot password via the Console UI. See [Using the Console UI](#) for details.

To change user passwords using the web interface:

1. Click the  icon and select **Administration**.
2. Click **Access Control** in the admin toolbar.
3. Click the name of the account whose password you want to change.
4. In the Change Password dialog window, enter the current password, and create and confirm the new password in the available fields.
5. Click **Apply**.

The new password takes effect at the next login session.

Important

When changing the haiadmin administrator account password, make note of it for future reference.

Related Topics

- [Viewing User Accounts](#)
- [Using the Console UI](#)

Acquiring the Remote Assistance ID

Remote assistance allows Haivision Tech Support to assist with any setup issues you may have with your Connect DVR. In order to do this, you must provide the support person with your Remote Assistance ID.

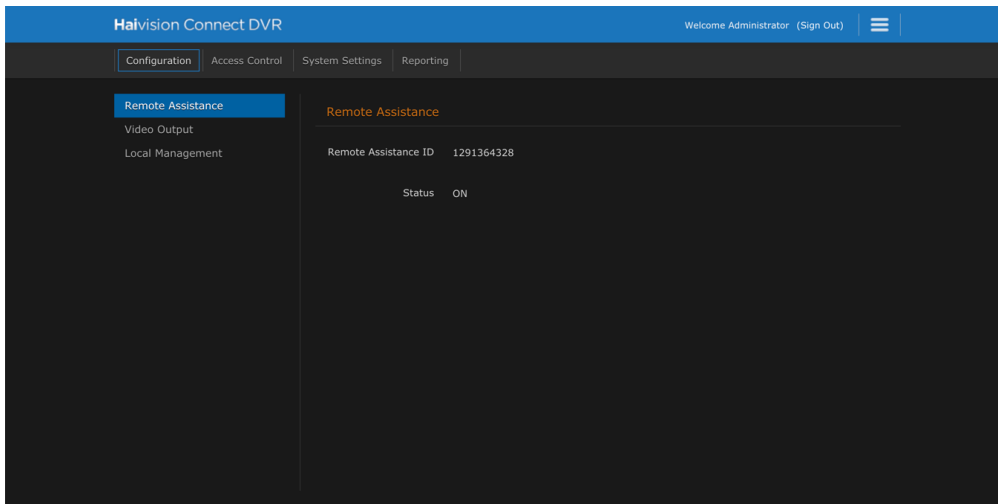
To get your Remote Assistance ID:

1. Click the  icon and select **Administration**.

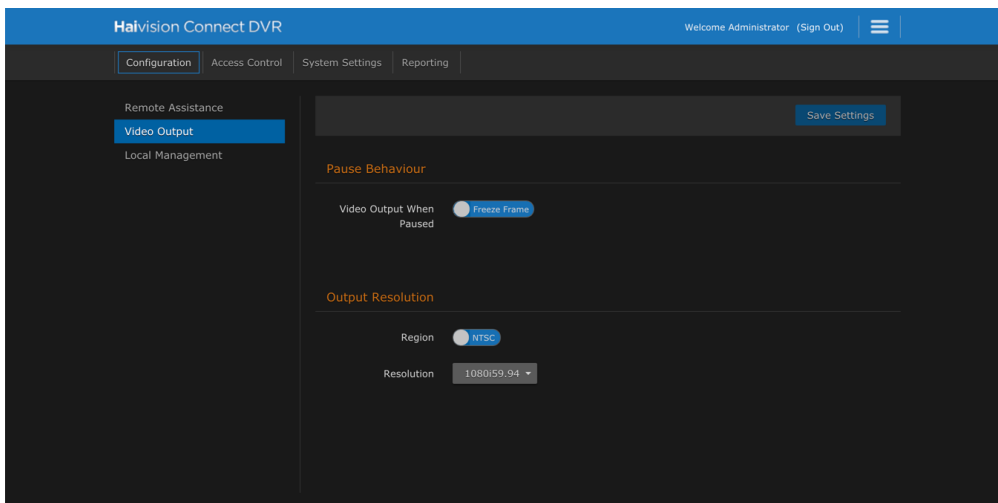
2. Click **Configuration** in the admin toolbar, and click **Remote Assistance** in the sidebar.
3. The ID used for the remote assistance application is displayed above the Status indicator. If contacting Haivision Tech Support, notify the representative of this number.

! Important

To streamline getting assistance, the Remote Assistance is automatically enabled by default. To disable Remote Assistance, open a ticket in the [Support portal](#) or contact your representative.



Changing the Video Output Options



On the Administration screen, the Video Output page allows you to set:

- **Pause Behavior** – Slide the toggle switch to select the response of the attached monitors when the video is paused within the interface.
 - Black Frame
 - Freeze Frame
- **Output Resolution** – Slide the toggle switch or choose from the menu options to specify the output resolution to use for the attached monitors in regards to the Region and Resolution.
 - Region – offers a selection between NTSC and PAL. PAL has roughly a 20% higher resolution.


- NTSC - (National Television Standards Committee) color encoding system.
- PAL - (Phase Alternating Line) color encoding system for for analog televisions in broadcasting.
- Resolution - offers a number of selections including progressive scanned and interlaced options. While interlaced resolutions were once the standard in HDTVs, progressive scan that can provide a picture with a full 2.07 million pixels are now the preferred.

! Important

Only the supported resolutions of the attached monitors are shown.


Selecting the Output Pause Behavior

To choose the behavior of the attached monitors when the output is paused within the UI:

1. Click the  icon and select **Administration**.
2. Click **Configuration** in the admin toolbar, and click **Video Output** in the sidebar.
3. In the toggle for "Video output when paused", select either:
 - Freeze frame — The last frame output is frozen on the attached monitors.
 - Black frame — Outputs are disabled and no video is shown.
4. Click **Save Settings**.

Specifying the Output Video Resolution

To choose which resolution to use on the attached monitors:

1. Click the  icon and select **Administration**.
2. Click **Configuration** in the admin toolbar, and click **Video Output** in the sidebar.
3. Slide the toggle to select the video standard:
 - NTSC
 - PAL
- 4.

i Note

Only the supported resolutions of the attached monitors are shown.

5. Click **Save Settings**.


Enabling Local Management

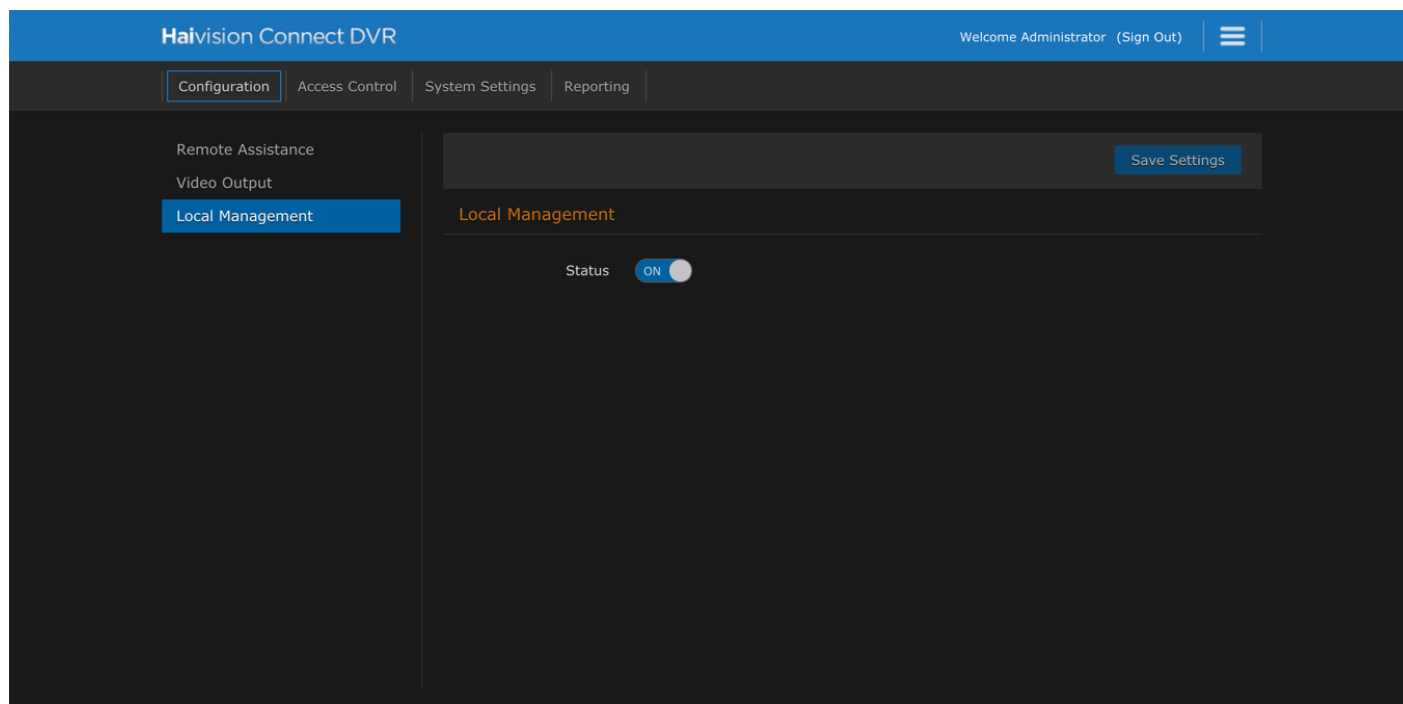
i Note

Local Management is not available for DE appliances.

Once enabled, Local Management allows CDVR SDI appliances to directly access the console UI and web UI using just a monitor, mouse, and keyboard.

To enable Local Management:

1. Click the  menu and select the **Administrator** screen.
2. Select the **Configuration** tab.
3. Click **Local Management** in the left sidebar.
4. Click the Status slider to toggle between:
 - ON - enables this feature.
 - OFF - disables this feature.
5. Click **Save Settings**. Your setting is saved and remembered at the next session.



Using Local Management

Note

Local Management is only available on SDI appliances. Local Management is not available on DE3 appliances.

To use Local Management on a CDVR SDI appliance:

1. If at a remote venue, unpack the CDVR SDI appliance and place on a stable workspace.
2. Attach the desired monitor/display to the SDI output port for viewing the output video.
3. Attach a monitor to the HDMI port for accessing the Console UI and Web UI.
4. Attach a keyboard and mouse to the available USB ports. USB ports are also available on the front of the appliance.
5. Attach the included power cord to the power receptacle and plug the other end into a power outlet.
6. Power on the CDVR SDI appliance. When powered, the HDMI monitor displays the Welcome screen.
7. Sign in to the Welcome screen with your credentials. The Web UI is displayed.
8. You can then use the Web UI to set up video playback, and so forth. See [Streaming with Connect DVR](#).
9. If at a remote venue, you might need to change your IP addressing to connect to the available network. You can reconfigure your network settings using the Web UI. See [Configuring the Network](#).

Or, you can switch to the Console UI and make those changes from it. To switch to the Console UI, press **CTRL+ALT+F1** and sign in using your `hvroot` credentials. See [Editing Network Settings](#).

10. To return to the Web UI, press **CTRL+ALT+F7**.

Switching Context

On DE3 devices the **CTRL+ALT+F3** action switches to the Video Output on the device.

Note

On SDI appliances, the video output comes out of the SDI connectors and doesn't require you to switch back to see the video output.

On SDI devices, **CTRL+ALT+F7** is the Local Management. You can switch between **CTRL+ALT+F1** (Console UI) and **CTRL+ALT+F7** (Local Management (Web UI)) on the SDI appliances.

Creating a Channel Icon

You can use a frame of your channel stream as a channel icon or you can create one. In either case, **16:9** is the *aspect ratio* where it has a width of 16 units and height of 9. This aspect ratio is the most common aspect ratio for televisions and computer monitors.

When creating a 16:9 image keep in mind the following as a rule of thumb:

- Create a file 1920 pixels wide by 1080 high.
- Specify a resolution of 72 pixels per inch.
- Use RGB color space.
- Keep type at 14 pt or above.
- Save the file (File > Save As) as a JPEG.

Adding the Image as a Channel Icon

To add the image as a channel icon:

1. If necessary, switch to the Channel Configuration screen.
2. For your desired channel, click the current icon to choose a new image to use as the channel icon.
3. When the popup window appears, browse to the location of the image you want to use.
4. When you've selected the image, click the **Open** button.

Using the Console UI

The Console UI provides a non-Web interface to perform basic system administration tasks and network tests on your hardware devices. Each device comes pre-configured with login credentials and various settings including Subnet Mask, Gateway, and DNS settings. Refer to your *Important Notice* document for the default factory settings and credentials.

Note

To connect to the Console UI directly, ensure a keyboard and monitor are connected to the device (see your *Quick Start Guide*). You can also access the Console UI remotely using a secure shell (SSH) connection.

The following content explains how to use the console user interface (UI):

Topics Discussed

- [Accessing the Console UI](#)
- [Showing General Information](#)
- [Editing Network Settings](#)
- [Testing the Network Settings](#)
- [Viewing System Logs](#)
- [Changing the Current User's Password](#)
- [Changing the haiadmin Password](#)
- [Opening a Console UI Terminal Window](#)
- [Setting the Clock](#)
- [Setting the Timezone](#)
- [Rebooting or Shutting Down](#)
- [Logging Out of the Console UI](#)

Accessing the Console UI

Note

With a monitor connected to a Display Engine appliance (not the SDI Mini), press **Ctrl + Alt + F1** on the keyboard to switch from the video output stream to the Console UI.

Note

Accessing the Console UI requires administrator privileges and password.

To access the Console UI:

1. Either connect a keyboard and monitor to the appliance, if applicable, and boot the appliance. Or, initiate a secure shell (SSH) connection to the IP address of the server using an SSH client (for example, PuTTY).
2. Log in using the `hvrout` username and password. Refer to the *Important Notice* document that accompanied your device for the default `hvrout` password.

Showing General Information

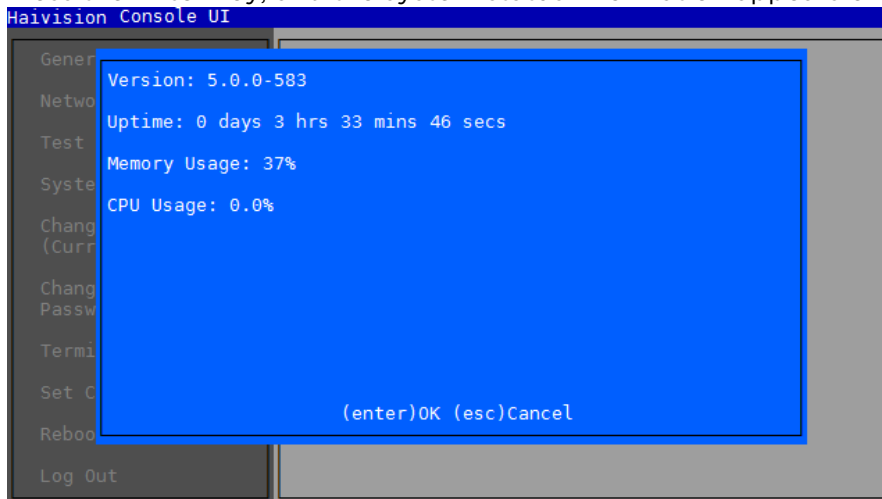
The General Information screen displays system status information about the appliance, such as the firmware version, system uptime, memory usage, and CPU usage.

Note

This is a read-only screen.

To show the current system status:

1. In the navigation sidebar, use the $\uparrow\downarrow$ (up and down arrow) keys to highlight General Information.
2. Press the **Enter** key, and the system status information appears on the screen:



3. When finished reviewing the information, press the **Enter** or **Esc** key to exit to the main screen.

Editing Network Settings

The Network Settings screen allows you to view and edit the device's network configuration.

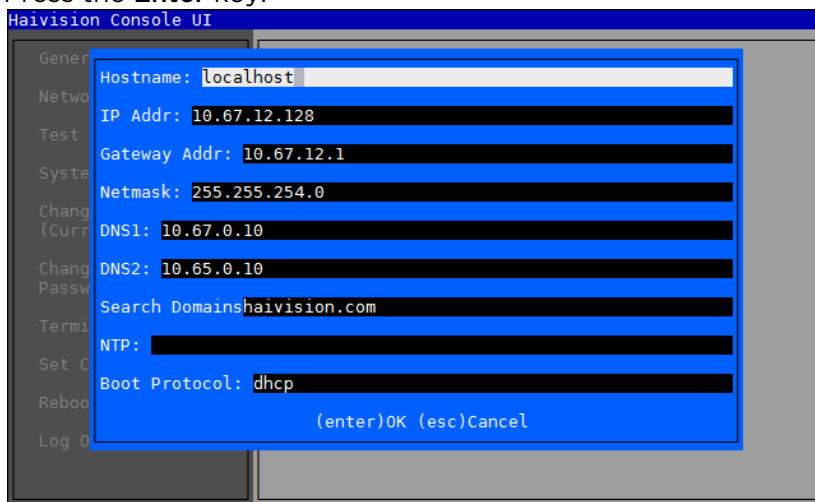
Note

These settings can also be changed in the web interface. See your User's Guide for more information.

To change network settings:

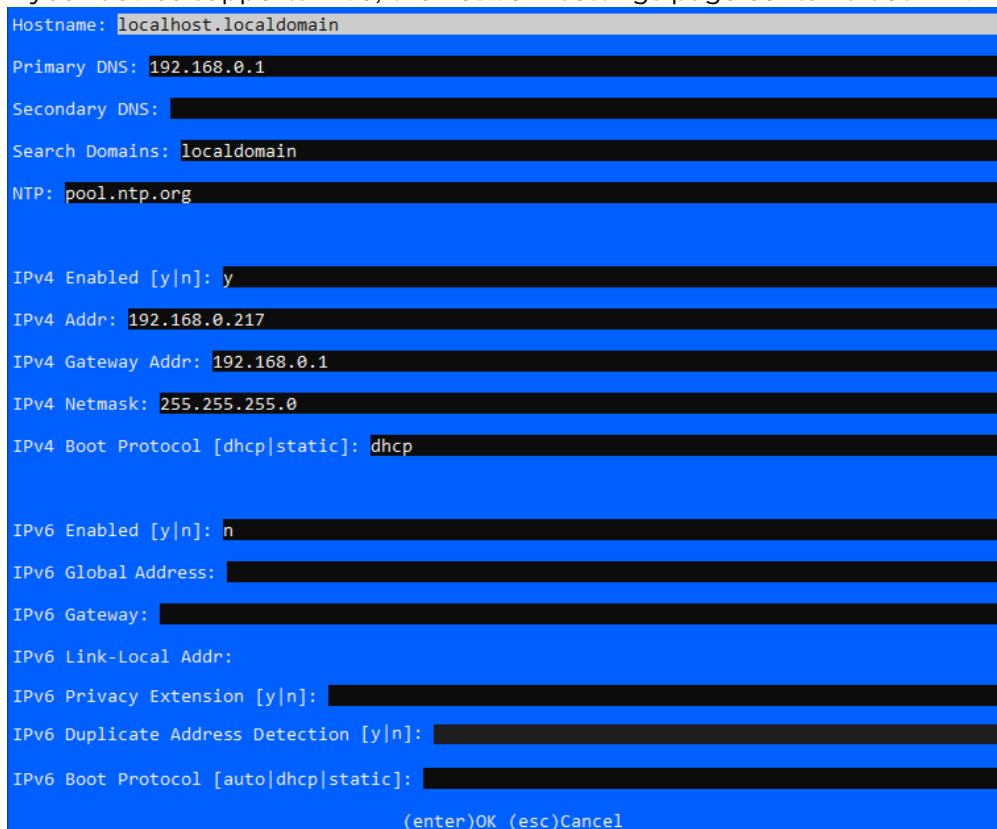
1. In the navigation sidebar, use the $\uparrow\downarrow$ (up and down arrow) keys to highlight **Network Settings**.

2. Press the **Enter** key.



Note

If your device supports IPv6, the network settings page contains both IPv4 and IPv6 settings:



3. To change a setting:

- Use the ↑ (up and down arrow) keys to navigate to the field you want to change.

Important

Use the ↓ (down arrow) to step through all the Network Settings. Depending on your SSH client settings, the console window might not display all the available settings. For instance, "Boot Protocol" may not be visible if your screen height is not large enough.

- Use the **Delete/Backspace** key to delete the existing contents and then type in your modifications.
4. When finished editing the information, press the **Enter** key to save your changes and exit to the main screen. Or, press the **Esc** key to exit without saving any changes.

Note

After pressing **Enter**, it takes a few seconds for the settings to be saved. The system may seem unresponsive during this time.

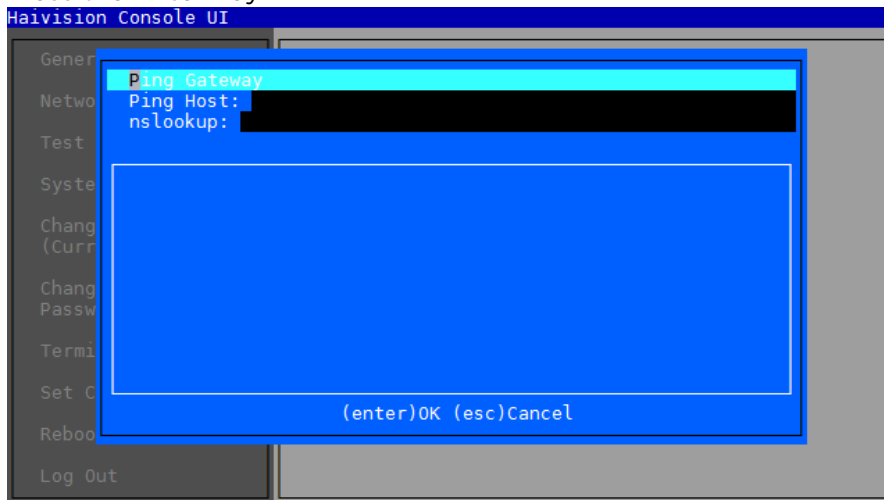
Related Topics

- [Configuring the Network](#)

Testing the Network Settings

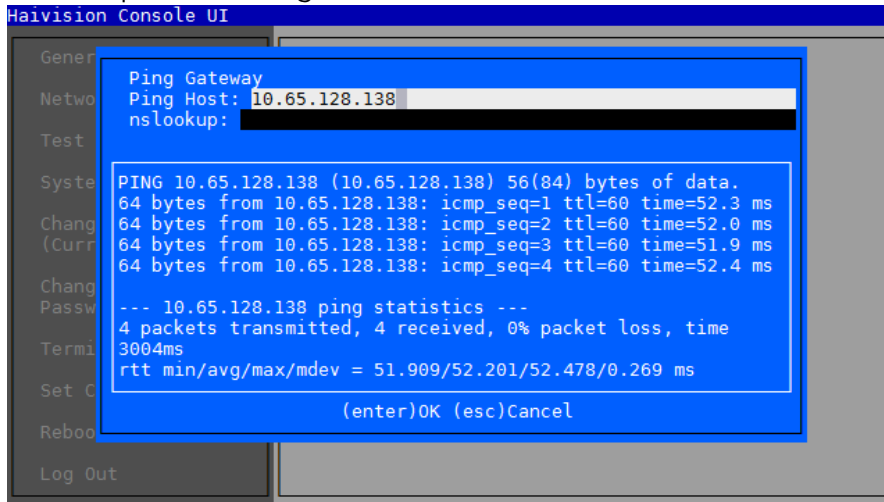
To test the network settings:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Test Network**.
2. Press the **Enter** key.



3. To perform a network test:
 - Use the ↑↓ (up and down arrow) keys to navigate to the test you want to perform.
 - In the text entry field for your selected test, use the **Delete/Backspace** key to delete any existing contents and then type in your modifications and press **Enter**.

An example of the Ping Host test results is shown as follows.



4. When finished, press the **Esc** key to exit to the main screen.

Available Tests

The Test Network screen provides the following possible network setting tests:

- Ping Gateway – Press **Enter** to ping the defined gateway IP (that is, to send echo request packets).
- Ping Host – Type in a host IP address and press **Enter**.
- nslookup – Type in a FQDN and press **Enter**.

Viewing System Logs

The system logs provide useful information regarding installations, packages, plug-ins, console sessions, authentications, kernel messages, and database errors.

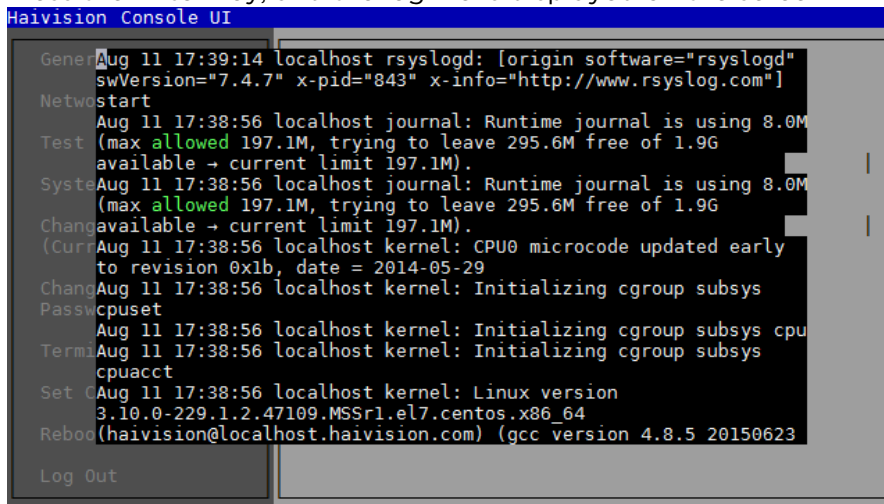
Tip

System logs are also available via the user interface. See your user's guide for details.

To view a system log:

1. In the navigation sidebar, use the **↑↓** (up and down arrow) keys to highlight **System Logs**.
2. Press the **Enter** key. The System Logs screen provides access to various logs.
3. To review a particular log, use the **Tab** or **↑↓** (up and down arrow) keys to navigate to the log you want to view.

4. Press the **Enter** key, and the log file is displayed on the screen.



5. When finished, press the **Esc** key to exit to the main screen.

System Logs

General logs include:

- Haivision Log – Provides Haivision-specific log data. Not used by all Haivision devices.
- Linux Messages – Provides kernel messages regarding initialization, process, commands among other things.
- Upgrade Log – Provides log entries regarding installations, packages, plugins, and so forth.
- Application Startup Log – Provides information regarding application startup.
- Console UI Log – Provides log entries console sessions, authentications, boot protocol, and the like.

Related Topics

- [Accessing Reports \(Logs\)](#) in the web interface

Changing the Current User’s Password

The only user that can remote log into the Console UI is the `hvrroot` user. Use the following procedure to change the password for `hvrroot`.

1. In the Console UI sidebar, use the $\uparrow\downarrow$ (up and down arrow) keys to highlight **Change Password (Current User)**.
2. Press the **Enter** key.
3. Type in the new password.
4. Press **Tab** or the \downarrow (down arrow) key and type the password again in the Confirm new password line.
5. Press **Enter**. Upon success, the prompt confirms that the password has been changed.

Changing the haiadmin Password



Tip

The haiadmin password can also be changed in the user interface. See your *User’s Guide* for details.

To change the haiadmin password:

1. In the Console UI sidebar, use the ↑↓ (up and down arrow) keys to highlight **Change haiadmin Password**.
2. Press the **Enter** key.
3. Type in the new password.
4. Press **Tab** or the ↓ (down arrow) key and type the password again in the Confirm new password field.
5. Press **Enter**. Upon success, the prompt confirms that the password has been changed and then returns to the main screen.

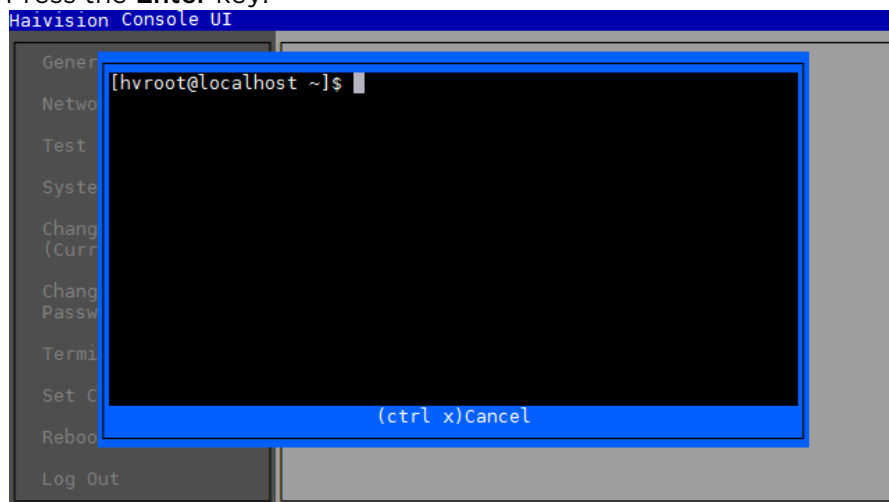
Related Topics

- [Changing Account Passwords](#) in the web interface

Opening a Console UI Terminal Window

To open a terminal window:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Terminal**.
2. Press the **Enter** key.



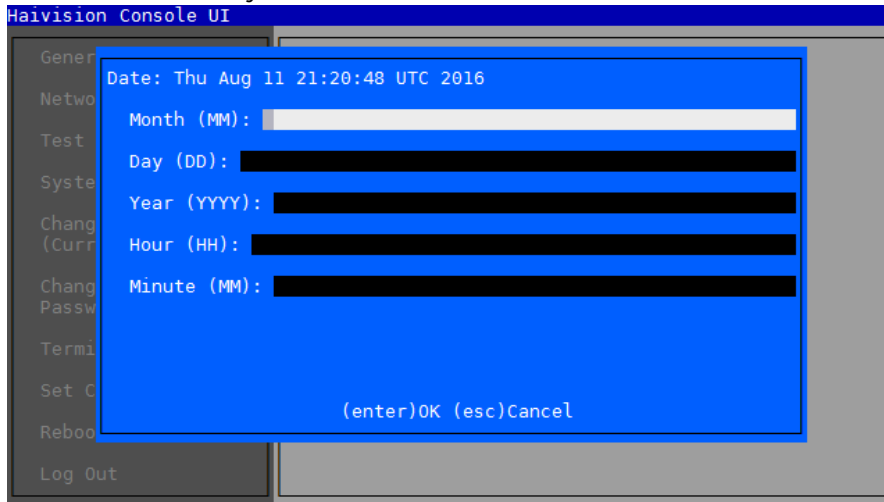
3. When the bash shell window opens, enter your commands.
4. When finished, press the **Ctrl+x** keys to exit to the main screen.

Setting the Clock

To change the time and date:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Set Clock**.
2. Press the **Enter** key.

3. Press the **Enter** key to select Set Clock.

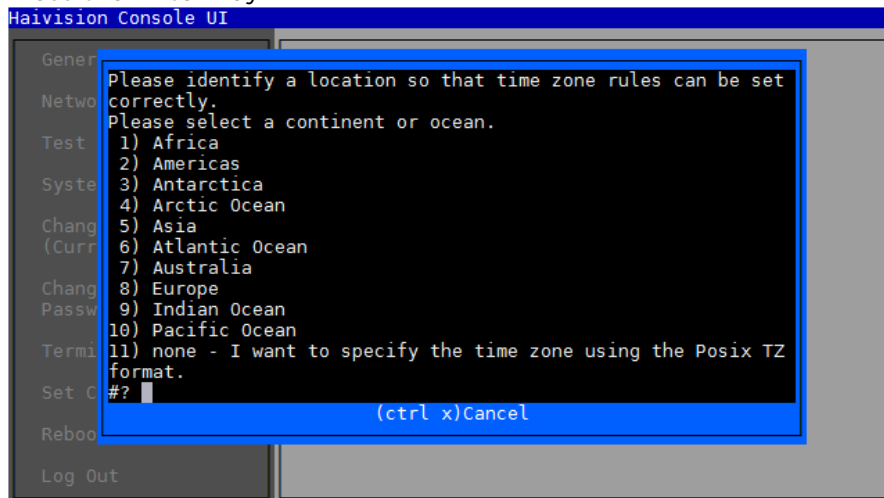


4. Enter the appropriate values. Press **Tab** or the ↓ (down arrow) key to move between the fields.
5. When finished, press **Enter** to set the new time and date.

Setting the Timezone

To change the timezone:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Set Clock**.
2. Press the **Enter** key.
3. Press ↓ (down arrow) to select **Set Timezone**.
4. Press the **Enter** key.



5. Make your timezone selection and press **Enter**.

⚠ Note

If you choose the option to specify the time zone using the POSIX TZ format, the format is:

`TZ = local_timezone +/- hours to UTC.`

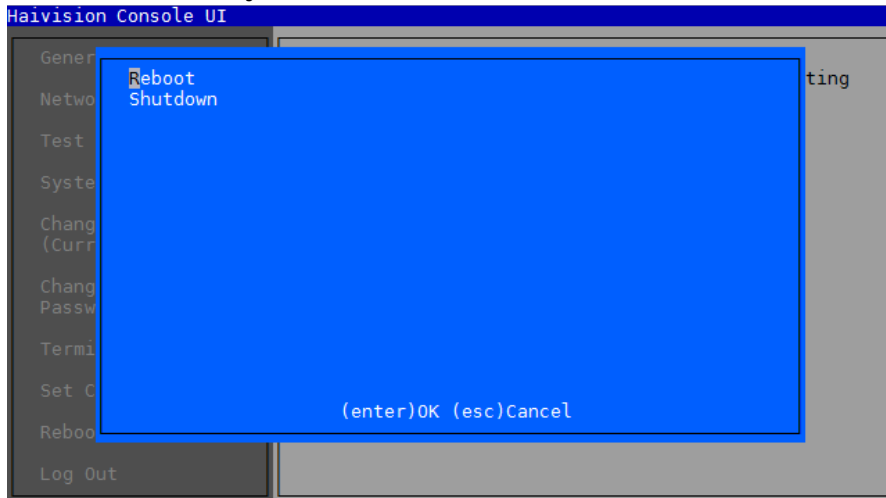
For example, `TZ='CST-6'`

For more information, refer to the following article: https://en.wikipedia.org/wiki/Tz_database#Names_of_time_zones.

Rebooting or Shutting Down

To reboot or shut down:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Reboot/Shutdown**.
2. Press the **Enter** key.



3. Use the ↑↓ (up and down arrow) keys to highlight either **Reboot** or **Shutdown** as appropriate.
4. Press the **Enter** key.
5. When prompted to confirm, press either:
 - **Y** for yes
 - **N** to cancel

After confirming your selection, the system will either shutdown or reboot (as appropriate). You are then automatically logged off and your secure shell (ssh) connection is closed.

Note

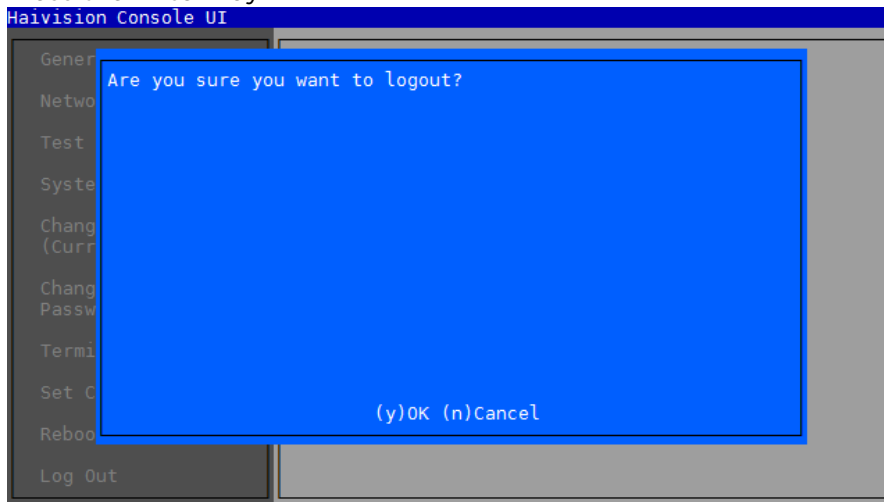
If you selected to reboot, you can reconnect the secure shell (ssh) and log into the device once the system has restarted.

Logging Out of the Console UI

To log out of the Console UI:

1. In the navigation sidebar, use the ↑↓ (up and down arrow) keys to highlight **Log out**.

2. Press the **Enter** key.



3. At the prompt, type **Y** to confirm or **N** to cancel.
4. Press the **Enter** key.

After logging out, you are redirected to the login screen.

Note

If you are connected directly to a DE3 device, to switch back to the output video stream from the appliance, press **Ctrl + Alt + F3** on the attached keyboard. **Note:** This does not apply to the DE-SDI and DE-SDI Mini devices.

Troubleshooting

This section includes various troubleshooting topics for the Connect DVR multi-site solution.

Topics Discussed

- [Bandwidth Guidance](#)
 - [General Considerations](#)
 - [Connect DVR Workflow Considerations](#)
 - [Assessing Stream Performance Using PingPlotter](#)
 - [Assessing Stream Performance with Bandwidth Testing](#)
- [FAQs about Connect DVR](#)
 - [General](#)
 - [Connection Issues](#)
 - [Playback Issues](#)

Bandwidth Guidance

As a general rule, have your Internet Service Provider (ISP) create a commercial/business account for you with a minimum uplink capacity of two (2) times your maximum total bandwidth usage and a minimum downlink capacity of two (2) times your maximum total bandwidth usage.

There are a number of network monitoring tools available on the internet that can help you establish a baseline of your aggregate usage. See [Assessing Stream Performance with Bandwidth Testing](#) and [Assessing Stream Performance Using PingPlotter](#).

Contents

- [General Considerations](#)
- [Connect DVR Workflow Considerations](#)
- [Assessing Stream Performance Using PingPlotter](#)
- [Assessing Stream Performance with Bandwidth Testing](#)

General Considerations

Internet Service Providers usually distinguish their various offerings or levels of service in terms of: downlink (Mbps)/uplink (Mbps).

For instance, let's say that your location has both:

- Fiber optic service at 50Mbps / 50Mbps
- Cable service at 100Mbps / 15Mbps

Note

Bandwidth is impacted by the concurrent usage of all electronic devices. This includes every computer, laptop, and network-connected device — even guests in your lobby using cell phones to update social media will impact it.

Connect DVR Workflow Considerations

The Connect DVR workflow includes:

- **Broadcast site:** where the DVR video capture and encoding originates. The Broadcast site is primarily an uplink load, transferring the DVR content to the cloud.
- **Playback site:** where the digital video recording is cued, buffered, and played. The Playback site is primarily a downlink load, transferring the DVR content from the cloud to the display.

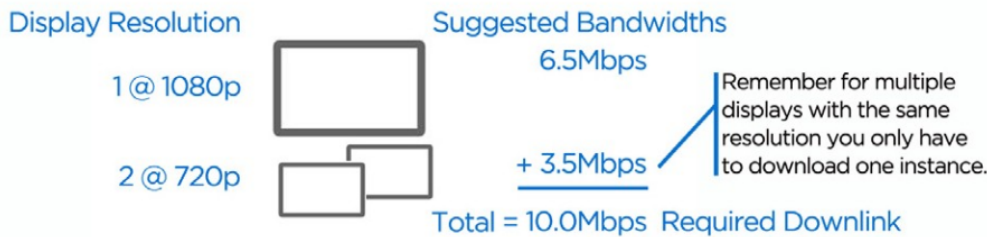
For a real-world example: Suppose you are streaming live, Multi-Bitrate High-Definition (MBR HD) content from an encoder, using a 12-Mbps uplink. You wish to implement a DVR workflow as well. Refer to the following table for the display resolutions you are including at the Playback site.

Display Resolution	Recommended Minimum Bandwidth (Mbps)
480p or 576p	2 or 2.5
576p	2.5
720p	3.5
1080p	6.5

Note

If you have multiple displays with the same resolution, you only need to download that resolution stream once for all of them.

For instance, if at the Playback site you have one 1080p and two 720p displays, the minimum required downlink rate is 10 Mbps:



1080p and Dual-Screen Considerations

Due to the relatively demanding bitrates for Connect DVR workflows when using 1080p and Dual-Screen, we recommend the following best practices:

- *Commercial-class (symmetric) fiber optic service*, with a *minimum* of twice the actual combined streaming bitrates for all Broadcast and Playback sites.
- In all scenarios, we recommend, as a minimum 20Mbps / 20Mbps connectivity.

Assessing Stream Performance Using PingPlotter


Some Internet Service Providers (ISPs) lease lines and may actually receive revenue enhancement to piggyback off other networks. This practice can often cause latency due to the multiple "hops" required for your signal to reach the CDN entry point.

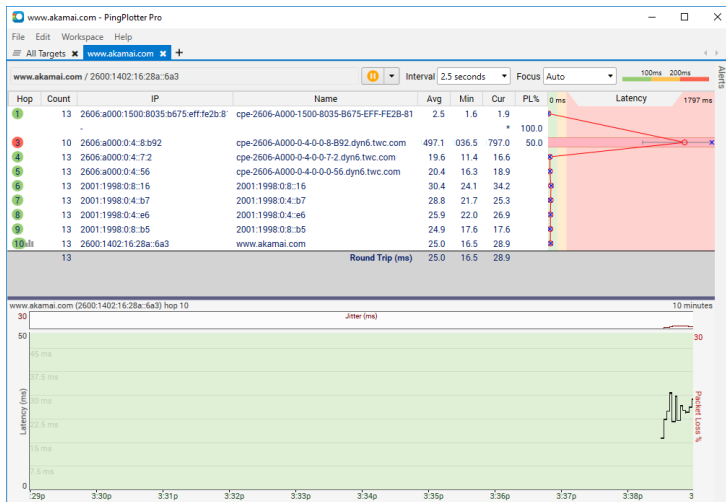
- High latency – Poor ISP quality
- Low latency – Good ISP quality

To assess stream performance from the broadcast site, Haivision highly recommends running a *trace route* to determine the quality and latency of your connection. You can do so utilizing a program such as "PingPlotter."

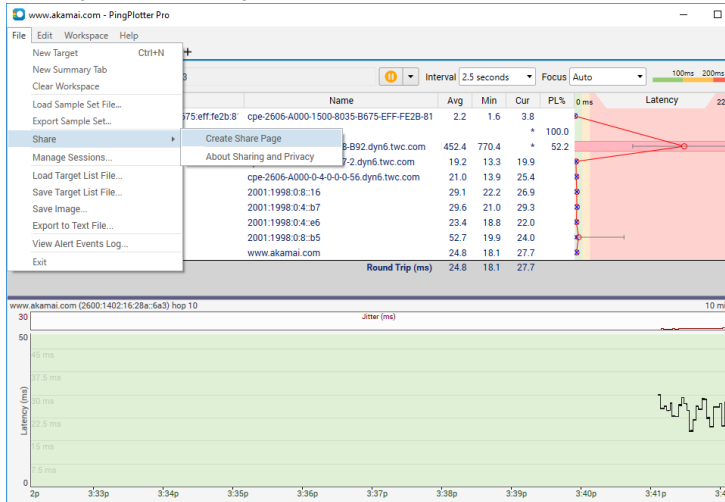
! Important

The trace route analyzer must be run from a Windows PC that is connected to the IP address used for your streaming.

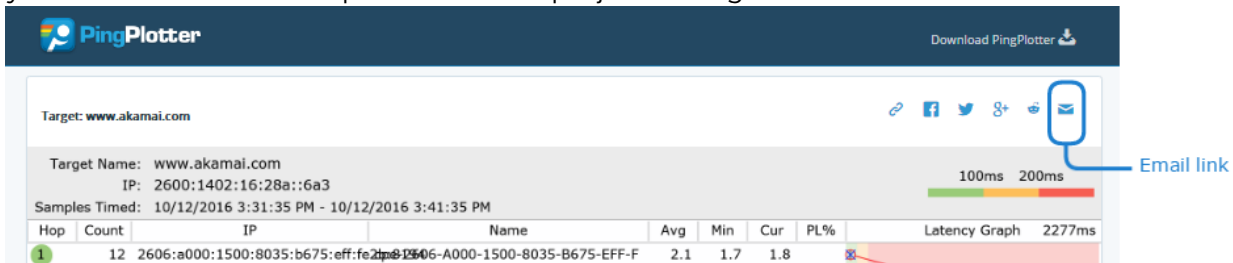
1. In your browser, go to the PingPlotter website (<http://www.pingplotter.com/freeware.html>), download, and install the free program.
2. Next, contact Haivision to acquire your Akamai Entry Point that is used by your KB Encoder at the broadcast site.
3. Open PingPlotter, insert the Akamai Entry point in the target field, and click the  **Start Trace** button.



4. After you receive your results, select **File > Share > Create Share Page**.



5. On the resulting page in your web browser click the email link to send a copy of your results to your Haivision account representative or project manager for review.



Assessing Stream Performance with Bandwidth Testing

Haivision uses the largest CDN infrastructure in the world to deliver your content. Several factors can impact the quality of your outbound stream:

- The ability of your Internet Service Provider (ISP) to push a quality stream to the CDN for distribution is a key factor.
- The greater the upload bandwidth you have contracted for and the type of connection to the Internet you are using (fiber vs. T1 copper, etc.) can also impact your ability to deliver a high-quality outbound stream to the CDN.

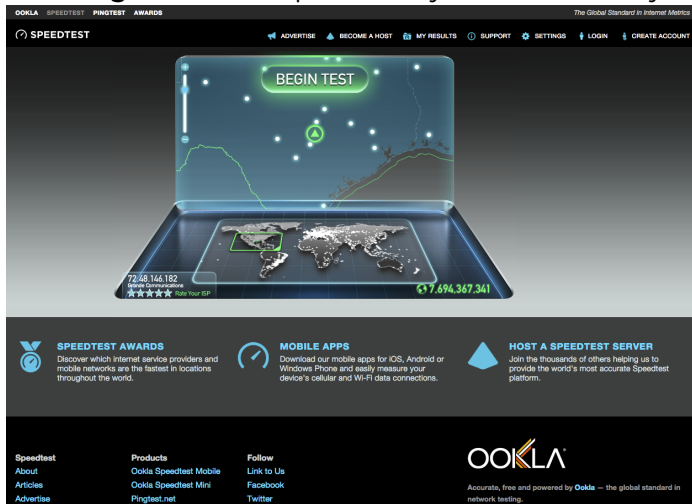
We recommend running a bandwidth speed test program, such as Ookla Speedtest, to determine your upload bandwidth connection speed. There are typically three data metrics of interest:

- Route latency or ping.
- Downlink (or download speed) – pertinent to playback workflows.
- Uplink (or upload speed) – pertinent to encoded stream ingress.

There are two procedures available to assess the stream performance. First, using a third-party website:

1. Open your browser to the Ookla Speedtest website at www.speedtest.net. This is a free site.

2. Click **Begin Test** for a preliminary assessment of your bandwidth allocation.

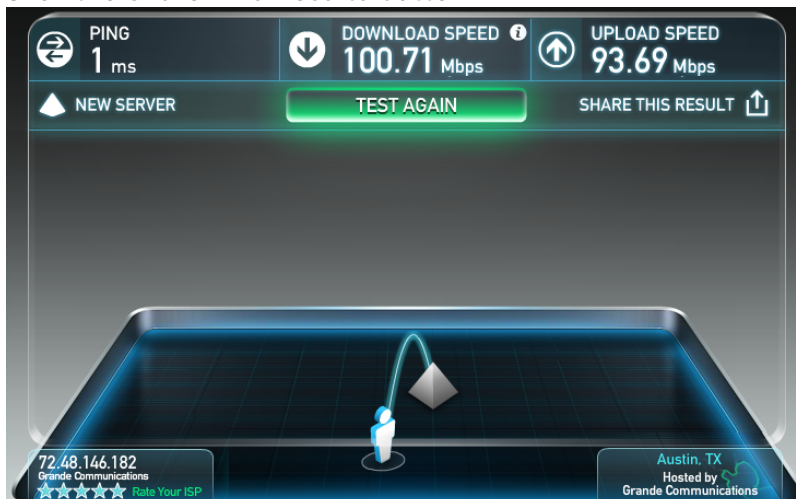


This preliminary test runs a local loop test to the ISP’s Central Office, which will illustrate your “Best Case” Bandwidth (BW) provisioning in a metered sample. As a best practice, we recommend using no more than 50% of the measured bandwidth for the uplink. The saturation index of 50% is a conservative assessment that allows for the natural variation that is expected on most ISP media.

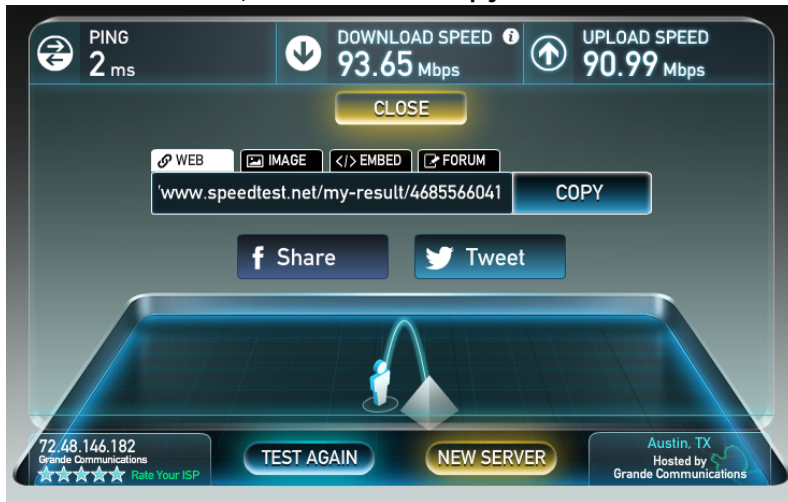
Note

In the case of an ISP media being fiber optic, allow up to 65% saturation for a commercial provisioning of fiber connectivity.

3. *Optional.* To approximate your routing workflow, perform another test, but drag the location selector to designate the infrastructure point relevant to your CDN workflows. Most large cities and metro areas are represented, many with multiple Data Centers for test selection. Select the infrastructure point closest to your CDN entry-point or DVR Cloud server to derive a result more specific to your product workflow.
4. Click the **Share This Results** button.



5. Click the **Web** tab, and click the **Copy** button.



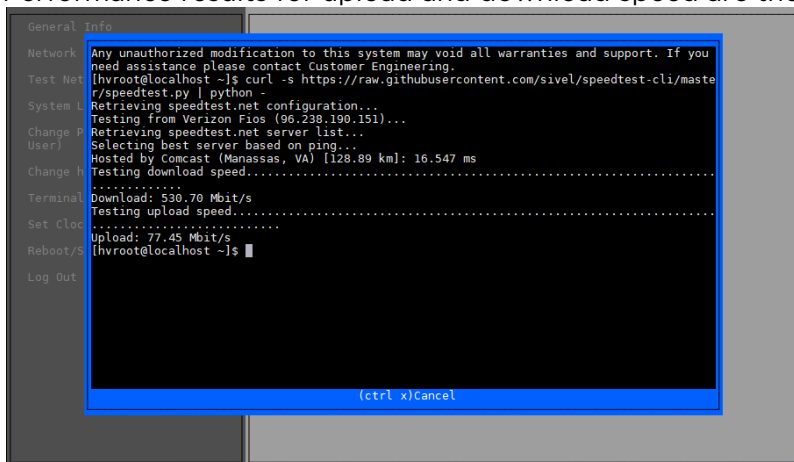
6. Compose an email to your service representative and paste the link in the email.

The other way to assess the stream performance is using a speed test command on the Connect DVR appliance:

1. Login to the Console UI on the Connect DVR appliance. See [Accessing the Console UI](#) for details.
2. Highlight **Terminal** and press the **Enter** key.
3. At the command prompt, type following and press the Enter key:

```
curl -s https://raw.githubusercontent.com/sivel/speedtest-cli/master/speedtest.py | python -
```

4. Performance results for upload and download speed are then shown. For example:



FAQs about Connect DVR

Frequently asked questions (FAQs) are typical questions and their responses.

- **General**
 - **Is the DVR solution scalable?**
 - **Can remote sites choose which stream, such as which worship service, to watch?**
 - **Can the time-delayed video be stored locally at each remote site?**
 - **Is there chat capability between remote site operator and primary site operator?**
 - **How long are the recorded videos available for viewing?**
 - **Can we place markers in the streams from the main site and be able to jump to the markers on playback at the remote site?**

- Is dynamic or adaptive streaming supported from the DVR server to account for bandwidth fluctuations?
- Are there any issues when upgrading Connect DVR?
- How do I switch context on a device?
- Connection Issues
 - What happens if the internet connection at the remote site goes down or the DVR cloud server goes down? Is there redundancy?
 - What if the DVR stream is not available immediately after I click play on the Connect DVR appliance?
 - I started the encoder and hit play on the Connect DVR application, but there is no stream to play back even after several minutes. Why?
 - Why does my buffer get emptied and the playback pause?
 - Why does playback pause when the buffer is not empty?
 - What does the "Connection Lost" error mean?
- Playback Issues
 - Why are no resolutions available to select in the Administration's Video Output page?
 - Why is there a long delay between clicking Go Live and the video appearing on the monitor?
 - What are the possible channel errors in the Production Center and Channel Configuration screens?
 - Why is only one of my two output displays displaying video?

General

- Is the DVR solution scalable?
- Can remote sites choose which stream, such as which worship service, to watch?
- Can the time-delayed video be stored locally at each remote site?
- Is there chat capability between remote site operator and primary site operator?
- How long are the recorded videos available for viewing?
- Can we place markers in the streams from the main site and be able to jump to the markers on playback at the remote site?
- Is dynamic or adaptive streaming supported from the DVR server to account for bandwidth fluctuations?
- Are there any issues when upgrading Connect DVR?
- How do I switch context on a device?

Is the DVR solution scalable?

Yes. Each site can connect directly to the dedicated Cloud DVR server which has a 250+Mbps connection to the internet — more than enough for 25 sites at 3Mbps per stream.

Can remote sites choose which stream, such as which worship service, to watch?

Yes. With the channel selector in the Production Center screen, the remote sites can easily choose which stream to watch, including streams currently being recorded or previously recorded streams.

See [Production Center Screen](#) for details.

Can the time-delayed video be stored locally at each remote site?

Since Connect DVR 4.0, for each configured channel, up to 4 hours of the recorded or time-delayed video is cached on the DVR appliance at the remote site.

Is there chat capability between remote site operator and primary site operator?

Haivision does not offer built-in chat capability. We suggest using the group chat capability in Skype for this purpose.

How long are the recorded videos available for viewing?

The video cache for each channel on the Connect DVR appliance is 4 hours maximum. If a channel streams for more than 4 hours, the oldest content is deleted.

Stopping and restarting the channel using the same configuration appends the new stream to the previous stream. If the Connect DVR appliance's video cache for that channel exceeds four hours, the oldest content is deleted.

However, if a new stream name is used between the KB Encoder and the Cloud DVR service, the channel's video cache is deleted and the new stream is saved to its video cache.

Can we place markers in the streams from the main site and be able to jump to the markers on playback at the remote site?

The Connect DVR software does not currently support placing navigation cue points in the stream and thus it is not possible to seek to those markers during playback. However, the application does allow the operator to cue the stream to the desired start point before enabling the output video to the remote site.

Is dynamic or adaptive streaming supported from the DVR server to account for bandwidth fluctuations?

Not at this time. It is possible to send multiple streams, each with a different bitrate, to the DVR server and then the remote site would have the option to manually switch to a lower bitrate stream if necessary.

Are there any issues when upgrading Connect DVR?

Note

Upgrades are performed by Haivision Tech Support. However, here are some notes regarding the upgrade process.

When upgrading Connect DVR, please note the following:

- First, upgrade to the latest version of Connect DVR. Follow the upgrade path as recommended in the accompanying documentation.

Important

During the 4.4 upgrade process, the device automatically reboots twice. There is no indication that a second reboot is upcoming and the web UI still indicates version 4.3 is installed. Please allow the upgrade adequate time to complete the entire upgrade process, and do not make any changes in the web interface prior to the second reboot.

- Clear your web browser's cache after the upgrade.
- All existing channel cache is cleared following the upgrade.

Related Topics

- [Updating Connect DVR](#)

How do I switch context on a device?

On DE3 devices the **CTRL+ALT+F3** action switches to the Video Output on the device.

Note

On SDI appliances, the video output comes out of the SDI connectors and doesn't require you to switch back to see the video output.

On SDI devices, **CTRL+ALT+F7** is the Local Management. You can switch between **CTRL+ALT+F1** (Console UI) and **CTRL+ALT+F7** (Local Management (Web UI)) on the SDI appliances.

Connection Issues

- [What happens if the internet connection at the remote site goes down or the DVR cloud server goes down? Is there redundancy?](#)
- [What if the DVR stream is not available immediately after I click play on the Connect DVR appliance?](#)
- [I started the encoder and hit play on the Connect DVR application, but there is no stream to play back even after several minutes. Why?](#)
- [Why does my buffer get emptied and the playback pause?](#)
- [Why does playback pause when the buffer is not empty?](#)
- [What does the "Connection Lost" error mean?](#)

What happens if the internet connection at the remote site goes down or the DVR cloud server goes down? Is there redundancy?

If there is sufficient uplink bandwidth at the broadcast site, it is possible to have a secondary encoder that is streaming to a secondary Cloud DVR server. Then, each remote site is able to switch to the secondary Cloud DVR server if necessary. However, this does not protect against an internet connection disruption. The only way to protect against internet disruption at the remote site is to have a redundant internet connection from another provider over different cabling or to download the time-delayed video from an earlier event at the main site so that playback is completely local.

At the broadcast site, the only way to protect against internet connection disruption is to maintain internet connection via two providers over different cabling. If the internet connection at the broadcast site does go down, the encoder automatically reconnects and the recording on the Connect DVR appliance is automatically resumed. Occasionally, you need to click **Go Live** again to continue with playback of a resumed recording.

Tip

Recording is appended on the Cloud DVR server when Akamai Media Services Live is used with an RTMP stream.

What if the DVR stream is not available immediately after I click play on the Connect DVR appliance?

- It could take 1 to 3 minutes between start of the stream from the KB Encoder at the broadcast site to when the stream is available for playback on the Connect DVR appliance.
- There could also be a mismatch in the stream URL on the Connect DVR channel and in Cloud DVR service. Verify that the Source URL is correct. See [Creating a Streaming Channel](#).
- Contact [Haivision](#) if the problem persists.

I started the encoder and hit play on the Connect DVR application, but there is no stream to play back even after several minutes. Why?

If the stream name in the KB Encoder channel configuration does not match the stream name on the Connect DVR channel, an empty file is placed on the server. Since the file exists, the Connect DVR Player does not complain that the stream is missing, but nothing plays. Ensure you are using the correct source URL from the Cloud DVR service. Select the filename with the `.m3u8` extension in the Haivision Video Cloud interface, and use the link in its Public URL text box. See [Creating a Streaming Channel](#) for details.

You also may attempt to playback the stream using the Public URL link on an iOS device or on QuickTime for Mac to ensure that the stream is running.

Why does my buffer get emptied and the playback pause?

If you have insufficient downlink bandwidth and you are attempting to watch a live or psuedo-live stream, the buffer may empty and the playback may pause. Let the Connect DVR appliance download an appropriate amount from the Cloud DVR service before enabling the video outputs (clicking the **Go Live** button). Use the time status fields in the [Cueing Video Player](#) to determine how much content has been downloaded onto the appliance (and is available to be played), and also how much content is still on the Cloud DVR service awaiting download. Up to 4 hours can be buffered on the appliance for each channel.

Why does playback pause when the buffer is not empty?

If the main site has insufficient uplink bandwidth, any remote sites watching live may notice the stream pausing. The KB encoder automatically buffers data locally and then pushes it to the DVR server when enough bandwidth is available so no video is lost - that is, as long as encoder memory is not exceeded.

A way to work around this issue is to make sure playback at the remote sites is several minutes (or more) behind the live stream so, even if the originating stream has some delays, the delays and pauses will not be noticed at the remote site.

What does the "Connection Lost" error mean?

Possible reasons that you may receive this error include:

- If you are using the WiFi adapter, lost WiFi connection between the adapter and your computer.
- A network connection issue of the computer you are using to communicate to the Connect DVR.
- A network connection issue with the Connect DVR. For example: loose network cable or network is down.
- The Connect DVR is rebooting.

The web interface attempts to reconnect automatically. After the connection is reestablished, the error banner is removed (as well as the dialog box, if it was not dismissed by the user).

Playback Issues

- [Why are no resolutions available to select in the Administration's Video Output page?](#)
- [Why is there a long delay between clicking Go Live and the video appearing on the monitor?](#)
- [What are the possible channel errors in the Production Center and Channel Configuration screens?](#)
- [Why is only one of my two output displays displaying video?](#)

Why are no resolutions available to select in the Administration's Video Output page?



There are two reasons this could happen:

1. Your connected monitor does not support any of the Connect DVR-supported resolutions.
2. You have two monitors connected that don't support the same valid resolution and frame rate. It is recommended that both monitors are the same brand and model, so that this issue does not occur.


See [Prerequisites](#) for a list of supported resolutions and frame rates.

Why is there a long delay between clicking Go Live and the video appearing on the monitor?

This issue can cause the attached monitors to not start at the desired cue position. Try the following to alleviate this issue:

- Deactivate any auto-sleep feature of the monitors.
- Pre-load the stream outputs to the monitor prior to starting the stream:
 - a. Use the Freeze Frame (default) option of the Administration's Video Output screen.
 - b. Cue the preview player -5 seconds in advance of the desired position.
 - c. Click **Go Live**.
 - d. After you see the video on the attached monitor, click  in the Output Preview Windows pane at the desired cue position.
 - e. Click  in the Output Preview Windows when you are ready to start the stream.
- Wait until the stream has fully downloaded onto the Connect DVR appliance. Enabling the output stream to the attached monitor is much faster for these on-demand streams.

What are the possible channel errors in the Production Center and Channel Configuration screens?

As described in [Channel Selector](#), channel errors are indicated by a  icon over the channel icon. Hover your mouse over the channel icon to display the error message. Possible errors are:

- Audio channels and/or video streams cannot be downloaded.
- URL cannot be resolved.
- No valid video stream is found.

Errors may occur when creating a new channel (e.g., URL not resolved), which does not allow you to playback the stream in the Preview Player.

Errors may also occur after the stream has been created (e.g., the appliance loses network connectivity while downloading the stream). For these errors, you can playback the stream up until the error occurred.

Why is only one of my two output displays displaying video?

This issue may occur when the following are both true:

- First output display is connected using an HDMI-to-SDI converter.
- Second output display is connected to the Connect DVR appliance only after video is playing.

When this issue occurs, disconnect and reconnect the first display.

Warranties

1-Year Limited Hardware Warranty

Haivision warrants its hardware products against defects in materials and workmanship under normal use for a period of ONE (1) YEAR from the date of equipment shipment ("Warranty Period"). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, Haivision will either (1) repair the hardware defect at no charge, or (2) exchange the product with a product that is new or equivalent to new in performance and reliability and is at least functionally equivalent to the original product. A replacement product or part assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever is longer. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Haivision's property.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for Haivision that can be identified by the "Haivision" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-Haivision hardware products or any software, even if packaged or sold with Haivision hardware. Manufacturers, suppliers, or publishers, other than Haivision, may provide their own warranties to the end user purchaser, but Haivision, in so far as permitted by law, provides their products "as is".

Haivision does not warrant that the operation of the product will be uninterrupted or error-free. Haivision does not guarantee that any error or other non-conformance can or will be corrected or that the product will operate in all environments and with all systems and equipment. Haivision is not responsible for damage arising from failure to follow instructions relating to the product's use.

This warranty does not apply:

- (a) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports;
- (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes;
- (c) to damage caused by operating the product outside the permitted or intended uses described by Haivision;
- (d) to a product or part that has been modified to alter functionality or capability without the written permission of Haivision; or
- (e) if any Haivision serial number has been removed or defaced.

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY AND REMEDIES PROVIDED ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, STATUTORY, EXPRESS OR IMPLIED. AS PERMITTED BY APPLICABLE LAW, HAIVISION SPECIFICALLY DISCLAIMS ANY AND ALL STATUTORY OR IMPLIED WARRANTIES,

INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND WARRANTIES AGAINST HIDDEN OR LATENT DEFECTS. IF HAIVISION CANNOT LAWFULLY DISCLAIM STATUTORY OR IMPLIED WARRANTIES THEN TO THE EXTENT PERMITTED BY LAW, ALL SUCH WARRANTIES SHALL BE LIMITED IN DURATION TO THE DURATION OF THIS EXPRESS WARRANTY AND TO REPAIR OR REPLACEMENT SERVICE AS DETERMINED BY HAIVISION IN ITS SOLE DISCRETION. No Haivision reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty. If any term is held to be illegal or unenforceable, the legality or enforceability of the remaining terms shall not be affected or impaired.

EXCEPT AS PROVIDED IN THIS WARRANTY AND TO THE EXTENT PERMITTED BY LAW, HAIVISION IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOSS OF USE; LOSS OF REVENUE; LOSS OF ACTUAL OR ANTICIPATED PROFITS (INCLUDING LOSS OF PROFITS ON CONTRACTS); LOSS OF THE USE OF MONEY; LOSS OF ANTICIPATED SAVINGS; LOSS OF BUSINESS; LOSS OF OPPORTUNITY; LOSS OF GOODWILL; LOSS OF REPUTATION; LOSS OF, DAMAGE TO OR CORRUPTION OF DATA; OR ANY INDIRECT OR CONSEQUENTIAL LOSS OR DAMAGE HOWSOEVER CAUSED INCLUDING THE REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, PROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED OR USED WITH HAIVISION PRODUCTS AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. THE FOREGOING LIMITATION SHALL NOT APPLY TO DEATH OR PERSONAL INJURY CLAIMS, OR ANY STATUTORY LIABILITY FOR INTENTIONAL AND GROSS NEGLIGENT ACTS AND/OR OMISSIONS.

OBTAINING WARRANTY SERVICE

Before requesting warranty service, please refer to the documentation accompanying this hardware product and the Haivision Support Portal <https://support.haivision.com>. If the product is still not functioning properly after making use of these resources, please contact Haivision or Authorized Reseller using the information provided in the documentation. When calling, Haivision or Authorized Reseller will help determine whether your product requires service and, if it does, will inform you how Haivision will provide it. You must assist in diagnosing issues with your product and follow Haivision's warranty processes.

Haivision may provide warranty service by providing a return material authorization ("RMA") to allow you to return the product in accordance with instructions provided by Haivision or Authorized Reseller. You are fully responsible for delivering the product to Haivision as instructed, and Haivision is responsible for returning the product if it is found to be defective. Your product or a replacement product will be returned to you configured as your product was when originally purchased, subject to applicable updates. Returned products which are found by Haivision to be not defective, out-of-warranty or otherwise ineligible for warranty service will be shipped back to you at your expense. All replaced products and parts, whether under warranty or not, become the property of Haivision. Haivision may require a completed pre-authorized form as security for the retail price of the replacement product. If you fail to return the replaced product as instructed, Haivision will invoice for the pre-authorized amount.

APPLICABLE LAW

This Limited Warranty is governed by and construed under the laws of the Province of Quebec, Canada.

This Limited Hardware Warranty may be subject to Haivision's change at any time without prior notice.

EULA - End User License Agreement

READ BEFORE USING

THE LICENSED SOFTWARE IS PROTECTED BY COPYRIGHT LAWS AND TREATIES. READ THE TERMS OF THE FOLLOWING END USER (SOFTWARE) LICENSE AGREEMENT ("AGREEMENT") CAREFULLY BEFORE ACCESSING THE LICENSED SOFTWARE. BY SCANNING THE QR CODE TO REVIEW THIS AGREEMENT AND/OR ACCESSING THE LICENSED SOFTWARE, YOU CONFIRM YOUR ACCEPTANCE OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THESE TERMS, HAIVISION IS UNWILLING TO LICENSE THE LICENSED SOFTWARE TO YOU AND YOU ARE NOT AUTHORIZED TO ACCESS THE LICENSED SOFTWARE.

Click the following link to view the Software End-User License Agreement: [Haivision EULA.pdf](#)

If you have questions, please contact legal@haivision.com

SLA - Service Level Agreement

1. Introduction

This Service Level and Support supplement forms a part of and is incorporated into the Service Agreement (the "Agreement") between You and Haivision Network Video Inc. ("Haivision"). Capitalized terms used but not otherwise defined in this supplement shall have the meaning ascribed to them in the Agreement. Haivision may, upon prior written notice to You, amend this supplement to incorporate improvements to the service levels and support commitments at no additional cost to You. This supplement applies only to those products and services set forth below.

2. Definitions

- "Audience Member" means an individual or entity that accesses Your Published Media Objects through a public URL.
- "Access Service" means the service provided by Haivision VCMS that verifies an Audience Member's credentials.
- "Digital Media File" means a computer file containing text, audio, video, or other content.
- "Outage" is a 12-minute period of consecutive failed attempts by all six agents to PING the domain on the Haivision Streaming Media network.
- "Published Media Object" means a Digital Media File with a public URL.
- "Transaction" means the creation of a right for an Audience Member to access a Media Object and the completion of an order logged in the order history service.

3. Service Levels for the Video Content Management System

The service levels in this [Section 3](#) apply only to the hosted version of Haivision VCMS and the Haivision VCMS development kit (collectively, the "Standard Hosted Components" of Haivision Video Cloud Services). Subject to the exceptions noted in [Section 4](#) below, the aforementioned components of Haivision Video Cloud Services will be available for use over the course of each calendar month as follows:

Type of Access	Definition	Availability Level
Write Functions	<ul style="list-style-type: none"> • Access to all functions through the administrative user interface. • Ability to add or modify objects and metadata through the application programming interface (“API”) • Ability of ingest service to check for new or updated files or feeds 	99.999%
Read-Only Functions	<ul style="list-style-type: none"> • Ability to retrieve data through the API • Ability for Audience Members to authenticate through the Access Service • Ability for Audience Members to play Published Media Objects • Ability for Audience Members to play Haivision VCMS-authenticated or entitled Published Media Objects • Ability to complete Transactions 	99.999%

4. Exceptions to Availability for the VCMS

The Standard Hosted Components may not be available for use under the following circumstances, and in such case such periods of unavailability shall not be counted against Haivision Video Cloud for purposes of calculating availability:

- a. Normal Maintenance, Urgent Maintenance and Upgrades as defined in the table below;
- b. Breach of the Agreement by You as defined in the Agreement;
- c. The failure, malfunction, or modification of equipment, applications, or systems not controlled by Haivision Video Cloud;
- d. Any third party, public network, or systems unavailability;
- e. Acts of Force Majeure as defined in the Agreement;
- f. Modification of software made available to You as part of Haivision Video Cloud Services by You or a third party acting on Your behalf; and
- g. Any third party product or service not incorporated into Haivision Video Cloud Services or any third party plug-in.

Haivision Video Cloud shall make commercially reasonable efforts to notify, or work with, applicable third parties to repair or restore Haivision VCMS functionality affected by such exceptions.

Type of Maintenance	Purpose	Write Functions Available	Read Functions Available	Maximum Time Per Month	Continuous Time in Mode (Max)	Window (Central Time)	Min Notice
Normal	<ul style="list-style-type: none"> • Preventive maintenance on the software/hardware components of Haivision VCMS • Addition of new features/functions • Repair errors that are not immediately affecting Your use of Haivision VCMS 	No	Yes	10 Hours	6 Hours	10:00p m - 5:00a m	48 Hours
Urgent	<ul style="list-style-type: none"> • Repair errors that are immediately affecting Your use of Haivision VCMS 	No	Yes	30 Minutes	15 Minutes	Any Time	3 Hours

Type of Maintenance	Purpose	Write Functions Available	Read Functions Available	Maximum Time Per Month	Continuous Time in Mode (Max)	Window (Central Time)	Min Notice
Upgrades	<ul style="list-style-type: none"> Perform upgrades on software or hardware elements necessary to the long term health or performance of Haivision VCMS, but which, due to their nature, require that certain components of Haivision VCMS to be shut down such that no access is possible 	No	No	1 Hour	1 Hour	12:00am - 4:00am M-F	5 Days

5. Credits for Downtime for the VCMS

Haivision Video Cloud will grant a credit allowance to You if You experience Downtime in any calendar month and you notify Haivision Video Cloud thereof within ten (10) business days after the end of such calendar month. In the case of any discrepancy between the Downtime as experienced by You and the Downtime as measured by Haivision Video Cloud, the Downtime as measured by Haivision Video Cloud shall be used to calculate any credit allowance set forth in this section. Such credit allowance shall be equal to the pro-rated charges of one-half day of Fees for each hour of Downtime or fraction thereof. The term “Downtime” shall mean the number of minutes that Standard Hosted Components are unavailable to You during a given calendar month below the availability levels thresholds in [Section 3](#), but shall not include any unavailability resulting from any of the exceptions noted in [Section 4](#). Within thirty (30) days after the end of any calendar month in which Downtime occurred below the availability levels thresholds in [Section 3](#), Haivision Video Cloud shall provide You with a written report detailing all instances of Downtime during the previous month. Any credit allowances accrued by You may be offset against any and all Fees owed to Haivision Video Cloud pursuant to the Agreement, provided that a maximum of one month of credit may be accrued per month.

6. Support Services for the VCMS

Support for Haivision Video Cloud Services as well as the Application Software (defined as the VCMS application software components that Haivision licenses for use in conjunction with the Video Cloud Services) can be reached at hvc-techsupport@haivision.com and shall be available for all Your support requests. Haivision Video Cloud will provide 24x7 monitoring of the Standard Hosted Components.

Cases will be opened upon receipt of request or identification of issue, and incidents will be routed and addressed according to the following:

Severity Level	Error State Description	Status Response Within	Incident Resolution within
1 - Critical Priority	Renders Haivision VCMS inoperative or causes Haivision VCMS to fail catastrophically.	15 minutes	4 hours
2 - High Priority	Affects the operation of Haivision VCMS and materially degrades Your use of Haivision VCMS.	30 minutes	6 hours
3 - Medium Priority	Affects the operation of Haivision VCMS, but does not materially degrade Your use of Haivision VCMS.	2 hours	12 hours

Severity Level	Error State Description	Status Response Within	Incident Resolution within
4 - Low Priority	Causes only a minor impact on the operation of Haivision VCMS.	1 business day	3 business days

7. Service Levels for Haivision Streaming Media Service

Haivision agrees to provide a level of service demonstrating 99.9% Uptime. The Haivision Streaming Media Service will have no network Outages.

The following methodology will be employed to measure Streaming Media Service availability:

Agents and Polling Frequency

- a. From six (6) geographically and network-diverse locations in major metropolitan areas, Haivision’s Streaming Media will simultaneously poll the domain identified on the Haivision Streaming Media network.
- b. The polling mechanism will perform a PING operation, sending a packet of data and waiting for a reply. Success of the PING operation is defined as a reply being received.
- c. Polling will occur at approximately 6-minute intervals.
- d. Based on the PING operation described in (b) above, the response will be assessed for the purpose of measuring Outages.

If an Outage is identified by this method, the customer will receive (as its sole remedy) a credit equivalent to the fees for the day in which the failure occurred.

Haivision reserves the right to limit Your use of the Haivision Streaming Media network in excess of Your committed usage in the event that Force Majeure events, defined in the Agreement, such as war, natural disaster or terrorist attack, result in extraordinary levels of traffic on the Haivision Streaming Media network.

8. Credits for Outages of Haivision Streaming Media Service

If the Haivision Streaming Media network fails to meet the above service level, You will receive (as your sole remedy) a credit equal to Your or such domain’s committed monthly service fee for the day in which the failure occurs, not to exceed 30 days of fees.

9. No Secondary End User Support

UNDER NO CIRCUMSTANCES MAY YOU PROVIDE CONTACT INFORMATION FOR HAIVISION SERVICES TO CUSTOMERS OR AUDIENCE MEMBERS OR OTHER THIRD PARTIES WITHOUT HAIVISION’S EXPRESS PRIOR WRITTEN CONSENT.

Getting Help

<p>General Support</p>	<p>North America (Toll-Free) 1 (877) 224-5445</p> <p>International 1 (514) 334-5445</p> <p><i>and choose from the following:</i> Sales - 1, Cloud Services - 3, Support - 4</p>
<p>Managed Services</p>	<p>U.S. and International 1 (512) 220-3463</p>
<p>Fax</p>	<p>1 (514) 334-0088</p>
<p>Support Portal</p>	<p>https://support.haivision.com</p>
<p>Product Information</p>	<p>info@haivision.com</p>

