HAIVISION

Haivision Gateway 3.2

User's Guide

HVS-ID-UG-MGW-3.2

Edition Notice

About Haivision

Founded in 2004, Haivision is now a market leader in enterprise video and video streaming technologies. We help the world's top organizations communicate, collaborate and educate. Recognized as one of the most influential companies in video by Streaming Media and one of the fastest growing companies by Deloitte's Technology Fast 500, organizations big and small rely on Haivision solutions to deliver video. Headquartered in Montreal, Canada, and Chicago, USA, we support our global customers with regional offices located throughout the United States, Europe, Asia and South America.

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Contents

About This Document

Conventions

The following conventions are used to help clarify the content.

Typographic Conventions and Elements

Italics	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**.

Touring the Interface

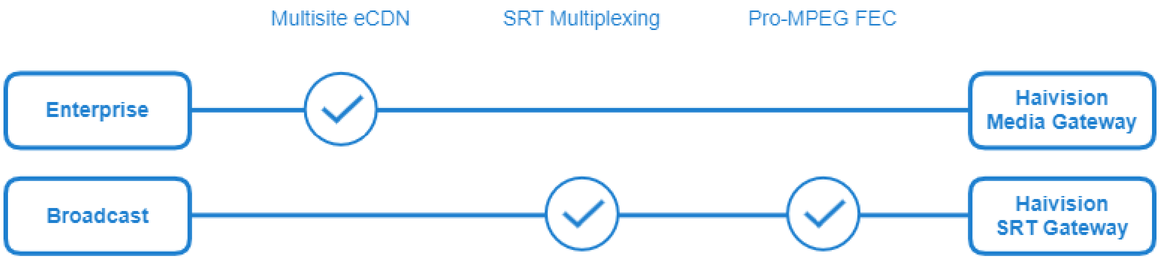
Note

To install a VM or cloud server or connect a hardware appliance, please refer to the appropriate Quick Start Guide.

Topics Discussed

Product Editions

With the version 3.2 release, Haivision Media Gateway is now available for broadcast workflows as Haivision SRT Gateway. Haivision SRT Gateway gives you access to expanded functionality with SRT and RTP streams, while Haivision Media Gateway is geared toward HMP enterprise workflows, as explained in the following diagram and sections.



Haivision Media Gateway

The Haivision Media Gateway enables low latency live video streaming and conversion between protocols including RTP, RTMP, RTSP, HLS, TS over UDP, and the open-source SRT protocol for bridging between networks and distributing streams across multiple destinations. The Haivision Media Gateway helps enterprise customers leverage eCDN functionality for Haivision Media Platform workflows including all-hands meetings and IPTV delivery.

Haivision SRT Gateway

Note

Licenses are available to convert your Haivision Media Gateway to Haivision SRT Gateway. Contact your Haivision representative for more details.

Features

Haivision's Media Gateway and SRT Gateway are networking infrastructure products for configuring, monitoring, and managing streaming routes between encoding and decoding devices. They are designed to allow network administrators to quickly and easily configure source-to-destination and source-to-multiple-destination streaming routes, which can then be monitored and tuned for optimal performance.

This section summarizes product features of Haivision Media Gateway (HMG) and Haivision SRT Gateway (HSG).

Transport High Quality Video Over Any Network

Haivision Media Gateway and Haivision SRT Gateway support Haivision's open-source SRT (Secure Reliable Transport) protocol - a technology that optimizes live video distribution across unpredictable networks, like the Internet, by assuring quality-of-service when faced with packet loss, congestion, jitter, latency, and fluctuating bandwidth. Leveraging SRT, the Haivision Media Gateway/SRT Gateway is ideal for transporting high-quality, low latency, and secure live video across public and private networks, and offers significant operational flexibility and cost savings compared to satellite or custom network infrastructures.

Network Bridging

Haivision Media Gateway and SRT Gateway help take video streams from one network environment to another. Whether bridging between LANs, MPLS, satellite IP, public internet, or any combination of these networks, the Haivision Media Gateway/SRT Gateway is the perfect element thanks to its advanced network interface configuration, native SRT protocol support, and friendly firewall traversal. In addition, it is codec agnostic and provides support for any standard MPEG stream – future proofing every solution.

Video Ecosystem Compatibility

Note

The re-distribution of HLS streams originating from non-Haivision sources is not supported at this time.

Firewall Friendliness

IP firewalls block external access to a network and prevent video streams from being delivered from one location to another. A Haivision Media Gateway/SRT Gateway can be configured anywhere so that behind-the-firewall devices can reach streams without breaching network security policies and minimizing the need for IT intervention.

Encryption

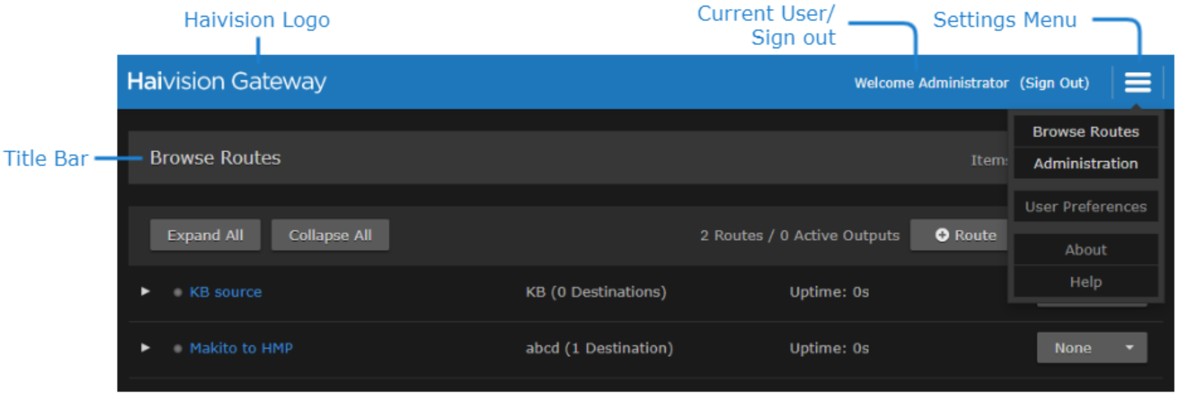
End-to-end stream encryption (AES 128/256) is available to prevent unauthorized viewing, recording, and redistribution of private content.

Multi-site Live Streaming Support

Seamlessly integrated with Haivision's enterprise video platform, the Haivision Media Gateway creates a secure enterprise content delivery network (eCDN) extending internal broadcasts, all hands meetings, and on-demand video libraries to remote locations and scales video delivery to thousands of employees.

Basic Layout and Elements

The Web interface groups device management into the following main screens: Browse Routes (home) and Administration. These screens use a consistent layout with common screen elements to simplify your experience.



Persistent Screen Elements

The following elements are constant and available from any screen.

Haivision Logo (Home Screen/Quick Access)

Clicking the Haivision logo at the top left of any screen takes you to the Browse Routes (Home) screen.

Settings Menu

You access the Settings menu by clicking the ☰ icon on the toolbar at the top right of every screen. The Settings menu provides access to:

- Browse Routes screen — Allows you create and manage routes and their source/destination nodes.
- Administration screen — Provides access to system configuration tasks (e.g., status, licensing, updating, and network configuration) and user administration.
- User Preferences dialog — Opens a dialog to configure user preferences including user interface brightness and contrast control and browser cache reset.
- ✓ **Tip**

  When requesting assistance, be sure to provide the build number displayed in the About dialog to the support representative.

- > **Note**
  >
  > If no external internet connection is available, a local documentation file is opened in your web browser. Always refer to the Haivision InfoCenter for the latest documentation.

Current User/Sign out

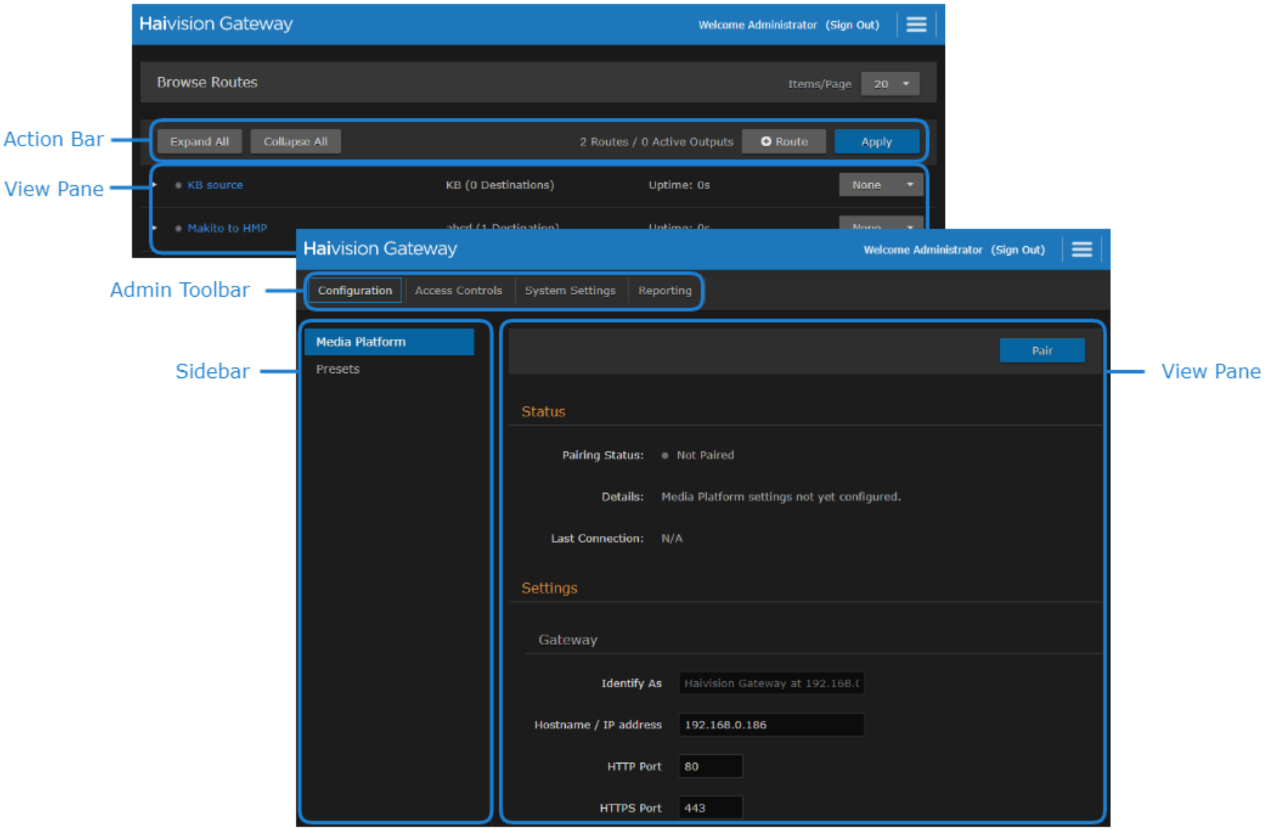
Identifies the user who is currently signed into the system. The Sign Out action link allows you to exit out of the system and return to the Sign In screen.

Title Bar

Identifies the name of the current screen.

Variable Screen Elements

The actual content and/or context for the following elements varies, or is contingent upon, the currently displayed screen.



Pairing Status: Not Paired

Details: Media Platform settings not yet configured.

Last Connection: N/A

Identify As Haivision Gateway at 192.168.(

Hostname / IP address 192.168.0.186

HTTP Port 80

HTTPS Port 443

Action Bar

Depending upon the current screen, the action bar provides quick action buttons for the tasks available. Tasks are performed on all items listed in the view pane.

Admin Toolbar

Selects the category of the displayed administration options shown in the sidebar.

Sidebar

Depending upon the current administration screen as selected in the admin toolbar, the sidebar provides a means to navigate various administrator options.

View Pane

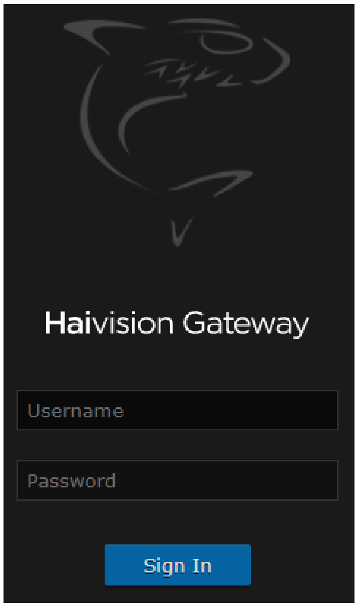
The view pane, depending on the current screen, displays the appropriate items, fields, or status information.

Interface Screens

There are several main screens that you use when working with Media Gateway/SRT Gateway.

Sign In Screen

When you first browse to the web interface, a Sign In screen appears prompting you to sign into the system.



After you sign in, the Browse Routes screen is displayed.

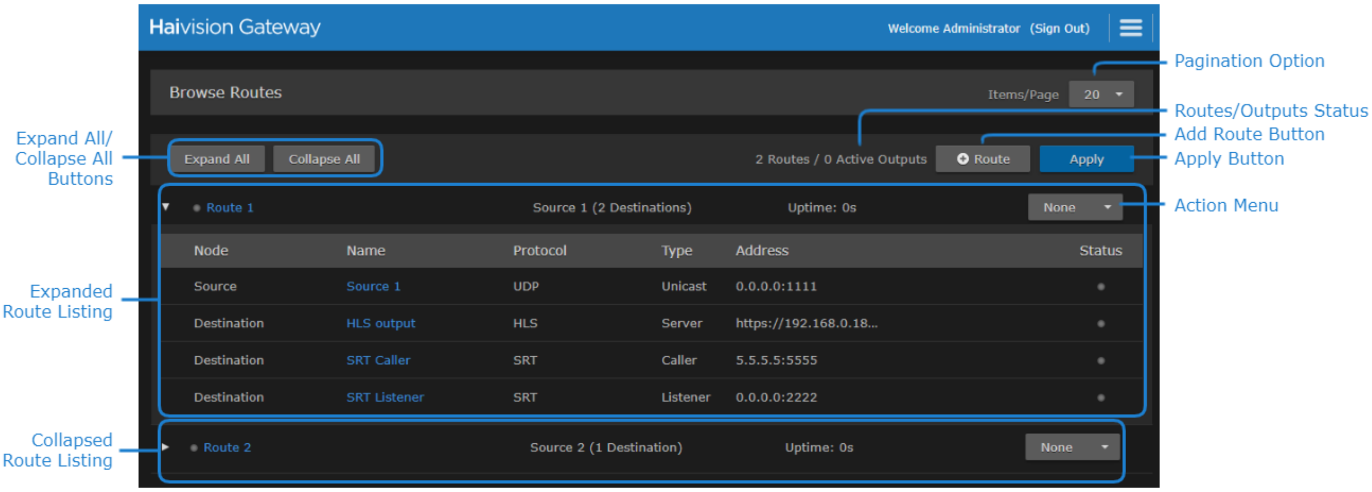
Related Topics

- **Signing into the Web Interface**

Browse Routes Screen

The Browse Routes screen gives you a quick overview of the routes currently defined. The View Pane lists the available routes. You can expand/collapse the routes to list more detailed information regarding their source and destinations.

Various elements appear on the Browse Routes Screen as shown in the following figure. They are each described below.



▼ ● Route 1	Source 1 (2 Destinations)	Uptime: 0s	None

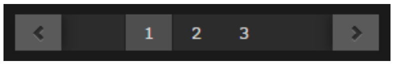
Node	Name	Protocol	Type	Address	Status
Source	Source 1	UDP	Unicast	0.0.0.0:1111	●
Destination	HLS output	HLS	Server	https://192.168.0.18...	●
Destination	SRT Caller	SRT	Caller	5.5.5.5:5555	●
Destination	SRT Listener	SRT	Listener	0.0.0.0:2222	●

▶ ● Route 2	Source 2 (1 Destination)	Uptime: 0s	None

Pagination Option
Routes/Outputs Status
Add Route Button
Apply Button
Action Menu
Expand All/
Collapse All
Buttons
Expanded
Route Listing
Collapsed
Route Listing

Title Bar

The Title Bar includes a drop-down menu to select how many routes to show per page. If the number of defined routes is greater than this setting, then page controls are available below the route listing. For example:



Action Bar

The Action Bar contains the following buttons:

- **Expand All / Collapse All —** Expands/Collapses the details of all routes, including: node, name, protocol, address, type, and status.
- **+Route —** Click to add a new route. See **Creating a Route**.
- **Apply —** Used to apply multiple routes' drop-down menu selections at one time.

The Action Bar also lists the number of existing routes and currently active outputs. For Haivision SRT Gateway, hovering over the number of active outputs displays the number of licensed outputs available.

View Pane

The view pane includes a listing of all configured routes. It includes the following for each route when the routes are either expanded or collapsed:

- ▼ / ▶ — Click to expand or collapse the route details.
- **Status**
  - 🟢 — Active with data flow

  - 🟡 — Active with no data flow
  - 🔴 — Error
  - ⚫ — Inactive
- **Route Name —** Provides the route's name (limited to 128 characters). Click to open the Edit Route screen.
- **Source Name —** (Only shown when route is collapsed.) Provides the name of the route's source (limited to 128 characters). The number of destinations is also shown in parantheses next to the source name. Click to open the Edit Route screen.
- **Route Uptime —** Displays how long the route has been active. Click to open the Edit Route screen.
- **Action Menu —** Drop-down menu that offers selections for None, Start, Stop, and Delete. A spinning icon is displayed next to the route name if the route has pending updates. While the update is pending, you cannot edit the route or any of its source/destinations.

View Pane (Expanded)

Lists the routes along with source and destination information in the view pane. Information provided includes:

- **Node —** Indicates whether the listing is a source or destination for the route.
- **Name —** Provides the node's name (limited to 128 characters).
- **Protocol —** Indicates the streaming protocol being used by the node.
- **Type —** Identifies the stream type, such as Multicast or Unicast.
- **Address —** Displays the address for the node.
- **Stream ID —** If applicable, displays the Stream ID for SRT Caller outputs.
- **Status —** Provides a status indicator for each device and the length of time since the device has been actively connected. Connection status indicator states include:
  - 🟢 — Active with data flow
  - 🟡 — Active with no data flow
  - 🔴 — Error
  - ⚫ — Inactive

Note

Hovering over the indicator in the Status column opens a tooltip with more details (for example, recent connection information, various thresholds being met, or errors, such as "stream stops" and "video feed gets disconnected").

Administration Screen

If logged in as an administrator, the Administration screen allows you to configure various options for your Haivision Media Gateway/SRT Gateway. Each option is grouped in categories listed in the admin toolbar. Each option within its category is listed on the sidebar at the left of the screen. The currently selected action and category is indicated with a blue outline around its text. The view pane displays the appropriate fields or items for your chosen action. Likewise, selections made in the view pane may also alter the available fields or options in the view pane.

To navigate to the Administration screen, click the ☰ icon on the toolbar and click **Administration** from the drop-down menu.

Admin Toolbar and Sidebar

The admin toolbar groups the available administrator options into categories, while the sidebar lists the available options within the current category selected in the admin toolbar:

- **Configuration**
  - **Media Platform —** Provides the status and settings pane for pairing the Media Gateway with a Haivision Media Platform server.
  - **Presets —** Allows you to export the current configuration as a preset file and import a preset file and apply it to the device.
- **Access Controls**
  - **Accounts —** Identifies the current roles (administrator, operator, and observer) on the system and the members for each. Allows you to change the user passwords.
- **System Settings**
  - **Certificates —** Allows you to install an TLS security certificate.
  - **Licensing —** Allows you to add/update licenses and view their limits and status.
  - **Network —** Provides access to the network configuration settings, as well as information on the interfaces.
  - **Network Storage —** (Optional licensed feature) Enables you to move video cache from your Media Gateway/SRT Gateway to Network-Attached Storage (NAS) through a Network File System (NFS) connection.
  - **Security —** Allows you to enable FIPS compliance, high-security environment, and an advisory banner.
  - **Update —** Identifies the currently installed bundle and allows you to update to a new version of software.
- **Reporting**
- **Reports —** Offers access to a number of different logs providing system, application, and diagnostic messages.
- **System Activity —** Provides quick statistics on the system (CPU/memory usage and system uptime), the current version of the software, Video-on-Demand (VOD) bandwidth graph (if connected to a Media Platform server), and disk space statistics.

View Pane

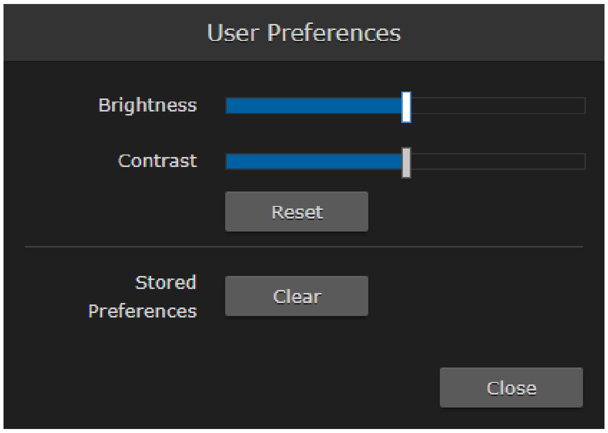
Displays the appropriate content based on the current selection in the sidebar.

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.



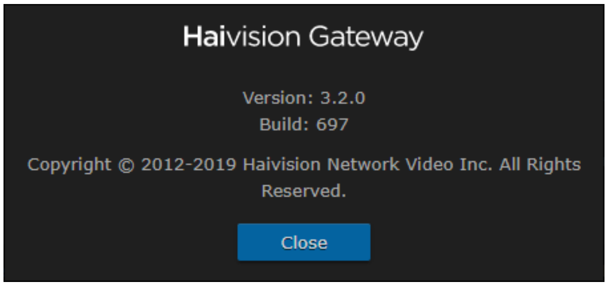
3. Click the **Close** button to dismiss the dialog.

About Dialog

The About dialog provides you with information regarding the current version and build of the installed product and the copyright information. To open the About dialog:

1. Click the ≡ icon on the toolbar.
2. Click **About** from the drop-down menu.

To dismiss the About dialog, click the **Close** button.



Version: 3.2.0
Build: 697

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Getting Started

Note

Before proceeding, ensure that the system is set up correctly and a network connection is established as detailed in the appropriate ***Quick Start Guide***. Contact your system administrator for assistance with network configuration.

Topics Discussed

Accessing the Web Interface

Note

Refer to the *Important Notice* document or contact your system administrator for sign-in credentials.

Signing into the Web Interface

Note

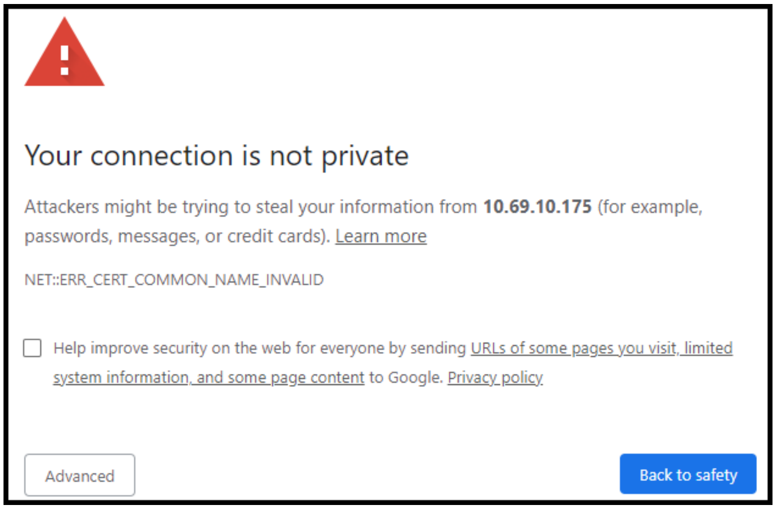
To sign into web interface, ensure that you have enabled cookies in your browser.

To access the web interface:

1. Open a web browser and enter the URL or IP address of the Media Gateway/SRT Gateway server in the address bar. For instance:
   `http://<ipaddress>` or `http://<systemurl>` where
   - `<ipaddress>` is the IP address of the system where server is installed. For example, http://10.69.12.152 .
   - `<systemurl>` is the system's URL, such as http://gateway.haivision.com.

   See the appropriate Quick Start Guide for details on obtaining the IP address of the server.

2. When the browser accesses the web interface, it requests the security certificate to confirm that the site is trusted. If a security certificate is not available or is self-signed, a message similar to the following appears. (Responses vary depending upon the browser used.) See TLS Encryption for more details.



Your connection is not private

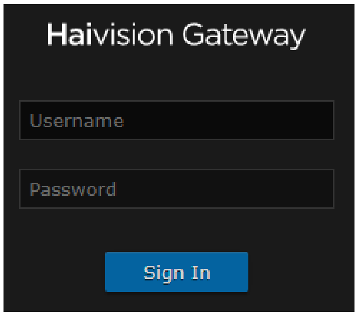
Attackers might be trying to steal your information from **10.69.10.175** (for example, passwords, messages, or credit cards). Learn more

NET::ERR_CERT_COMMON_NAME_INVALID

□ Help improve security on the web for everyone by sending URLs of some pages you visit, limited system information, and some page content to Google. Privacy policy

> **Important**
>
> Before proceeding or adding an exception for the site, check with your administrator on the correct response.

3. At the Sign In screen, enter your username and password. See the *Important Notice* document for the default credentials.



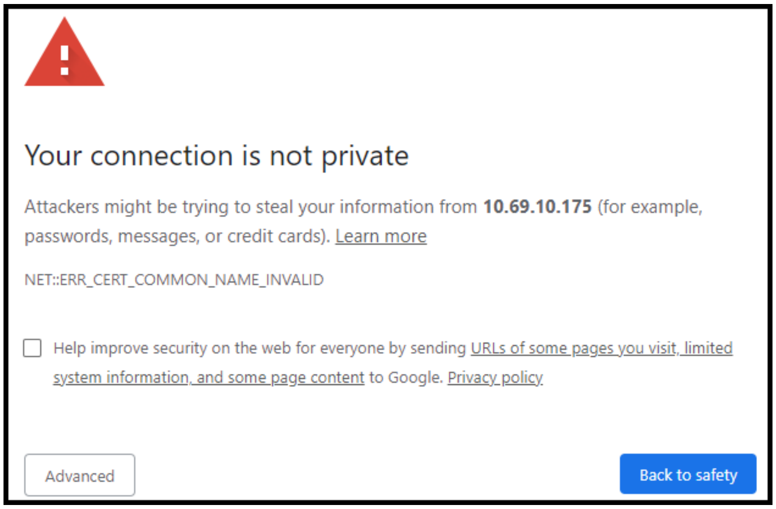
4. Click the **Sign In** button. The Web interface opens to the Browse Routes screen.

Related Topics

- Sign In Screen
- Signing Out of the Web Interface
- TLS Encryption
- Changing an Account's Password

TLS Encryption

The Media Gateway/SRT Gateway web interface is encrypted to provide secure interactions with your devices. When you access the web interface, you are automatically redirected to use HTTPS on port 443. As a result, your web browser requests the security certificate to confirm that the site is trusted. Media Gateway/SRT Gateway ships with a self-signed TLS 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 like shown below.



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NET::ERR_CERT_COMMON_NAME_INVALID

□ Help improve security on the web for everyone by sending URLs of some pages you visit, limited system information, and some page content to Google. Privacy policy

Advanced

Back to safety

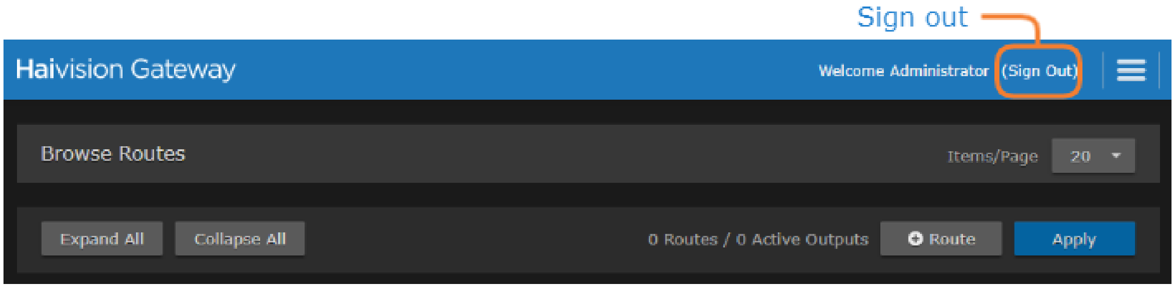
Note

Recent OS updates (particularly macOS 10.15 and iOS 13, see https://support.apple.com/en-us/HT210176) block access to websites with TLS certificates that have a validity window of more than 825 days. Previous versions of Haivision Media Gateway ship with a self-signed certificate with a 10-year expiration, while Haivision Media Gateway/SRT Gateway version 3.2 ships with a self-signed certificate with a 2-year expiration. Therefore, new installs are not affected by this issue. However, if you have upgraded from a previous version to version 3.2 or later, you must generate a new certificate to allow access. From a computer that can access the server, use an administrator account to regenerate a new self-signed certificate. See Generating a New Self-Signed Certificate for details on how to do this.

Supplying the Media Gateway/SRT Gateway with an TLS security certificate eliminates the security warning, provides a means for users to verify a website, and ensures that the connection is secure. See Certificates for more details.

Signing Out of the Web Interface

When signed into the Web interface, click the **Sign Out** action link at the top right corner of any screen to sign out.



Note

If there is no activity over a period of ~2 minutes, the system automatically signs you out of the session.

Related Topics

- Persistent Screen Elements
- Signing into the Web Interface

Changing Passwords

Important

For security purposes, change the default password for each of the available accounts. Information regarding user/password credentials should be safe-guarded. See Changing an Account’s Password for details of changing passwords.
Factory-set passwords are provided in the *Important Notice* document.

Setting Up a Test Route

Media Gateway/SRT Gateway allows you to create and manage "routes", which consist of a *source* and a *destination* (along with other parameters, such as the incoming and outgoing transport protocols). You can verify that your server is operating normally by setting up a test route. To do this, you need to:

1. Set up a **source** (e.g., configure a video stream output on a Makito X encoder).
2. Set up a **destination** (e.g., configure a Makito X Decoder to play back the source stream).
3. Create a **route** on the Media Gateway/SRT Gateway server (receive the stream from the source and then relay it to the destination).

Note

To get you started, the following instructions show you how to set up simple unicast stream to and from the Media Gateway/SRT Gateway. For information on how to set up other stream types and combinations, including multicast and SRT, please refer to Creating a Route.

Setting Up a Source Stream

Tip

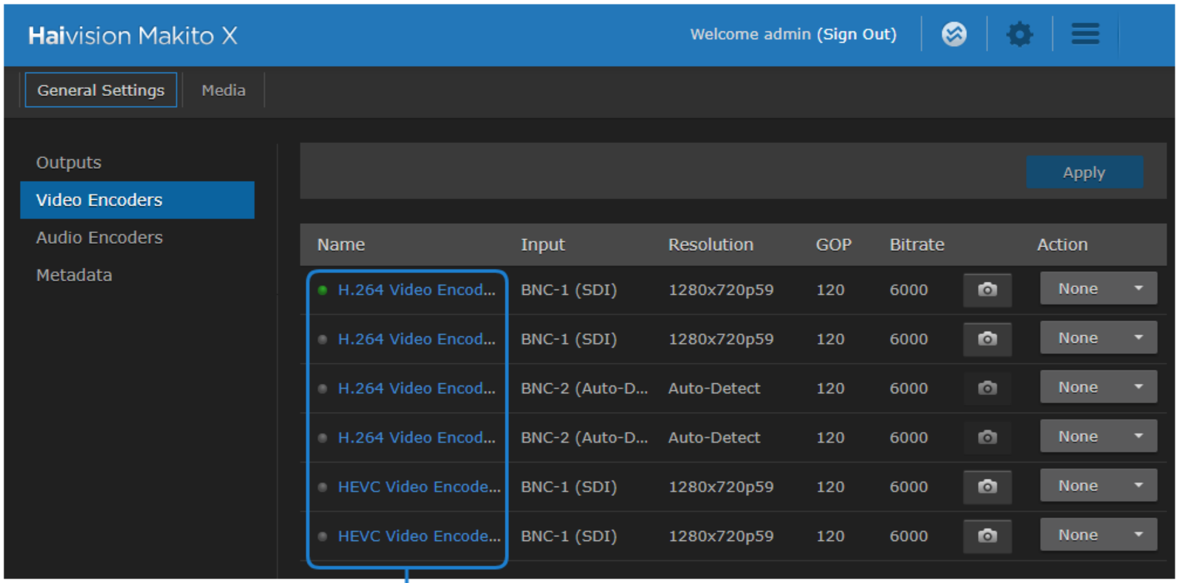
As you set up the test stream, you may wish to refer to the *Makito X User's Guide*, available from the Haivision InfoCenter.

Important

The IP address of your computer must be in the same subnet.

1. If you have not already done so, power up the Makito X Encoder.

2. Open a Web browser to the IP Address for the Makito X and log in.
   The Web interface opens to the Outputs List View.
3. Click **Video Encoders** in the sidebar to configure the video encoders.
4. On the Video Encoders List View, click a link in the table to select an encoder.

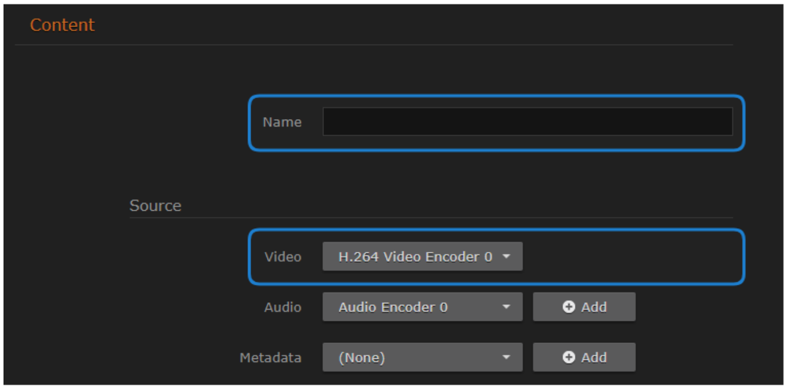


Name	Input	Resolution	GOP	Bitrate		Action
H.264 Video Encod...	BNC-1 (SDI)	1280x720p59	120	6000		None
H.264 Video Encod...	BNC-1 (SDI)	1280x720p59	120	6000		None
H.264 Video Encod...	BNC-2 (Auto-D...	Auto-Detect	120	6000		None
H.264 Video Encod...	BNC-2 (Auto-D...	Auto-Detect	120	6000		None
HEVC Video Encode...	BNC-1 (SDI)	1280x720p59	120	6000		None
HEVC Video Encode...	BNC-1 (SDI)	1280x720p59	120	6000		None

Click to open
Detail View

The Video Encoder Detail View opens, displaying the settings for the selected video encoder.

5. Select or enter the new values in the appropriate fields.
6. Click the **Start** button, and then click **Apply**.
7. To set up streaming, click **Outputs** in the sidebar.
8. To add an output stream, click the **+Add** button.
9. On the New Stream page, type a Name for the stream and select the encoder you started in Step #6.



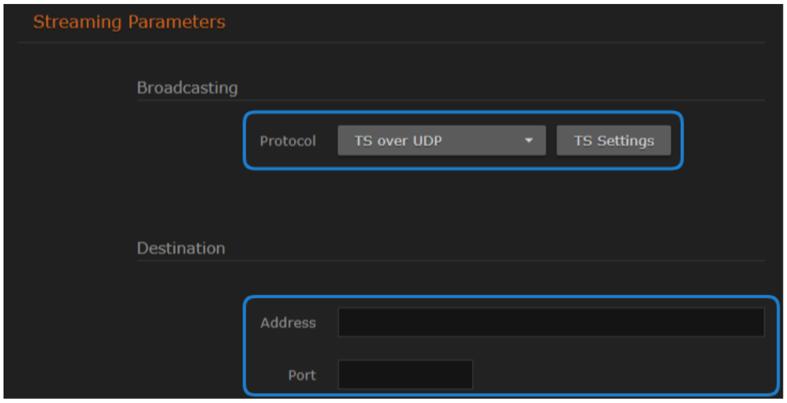
Name:

Video: H.264 Video Encoder 0

Audio: Audio Encoder 0

Metadata: (None)

10. To set up streaming:
    - In the Broadcasting section, select TS over UDP for the Protocol.
    - In the Destination section, type in the IP Address of the Media Gateway/SRT Gateway, and specify a port number. (Remember this number for a future step in Creating a Route.)



Streaming Parameters

Broadcasting

Protocol: TS over UDP

Destination

Address:

Port:

11. To apply your changes and start streaming, click the **Apply** button. The new stream appears in the list of output streams.

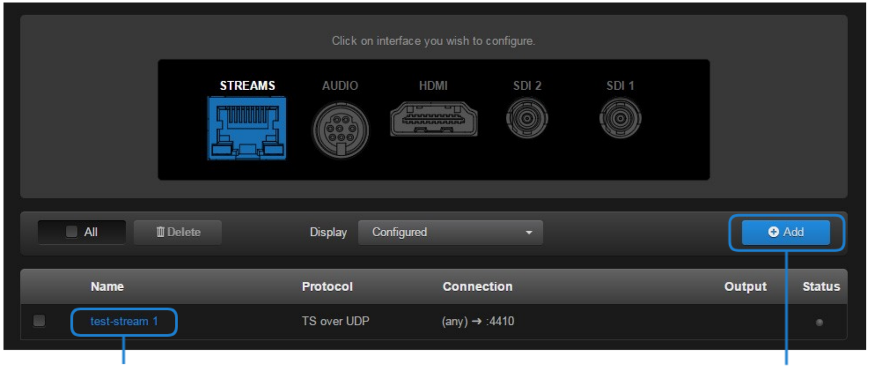
For more details, refer to the *Makito X User's Guide*.

Setting Up a Destination

> **Tip**
>
> As you configure the stream input, you may wish to refer to the *Makito X Decoder User's Guide*, available from the Haivision InfoCenter.

1. > **Note**
   >
   > For the purpose of this test, you should have a monitor connected to the SD1 output.

2. Open a Web browser to the IP Address for the Makito X Decoder and log in. The Web interface opens to the Streams List View, displaying the defined streams for the decoder.



Click on interface you wish to configure.

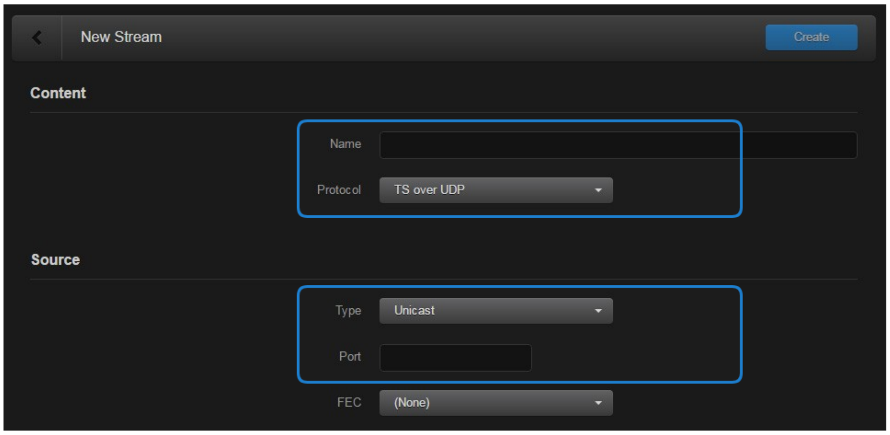
Display: Configured

	Name	Protocol	Connection	Output	Status
□	test-stream 1	TS over UDP	(any) → :4410		●

Click to open Detail View

Click to add a stream

3. To add an incoming stream, click **+Add**.
4. On the New Stream page:
   - In the Content section, type a Name for the stream and select **TS over UDP** for the Protocol.
   - In the Source section, select Unicast and enter a port number that is different from the port number used in Step #10 in Setting Up a Source Stream. (Remember this number for a future step in Creating a Route.) Click **Create**.



Content

Name

Protocol: TS over UDP

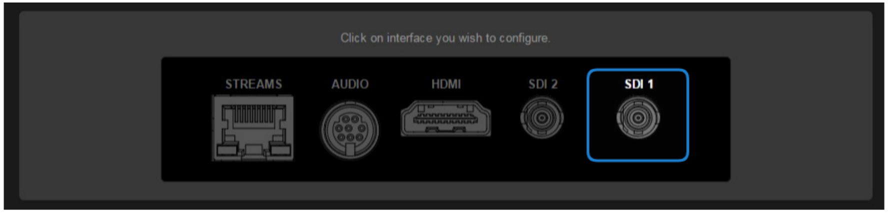
Source

Type: Unicast

Port

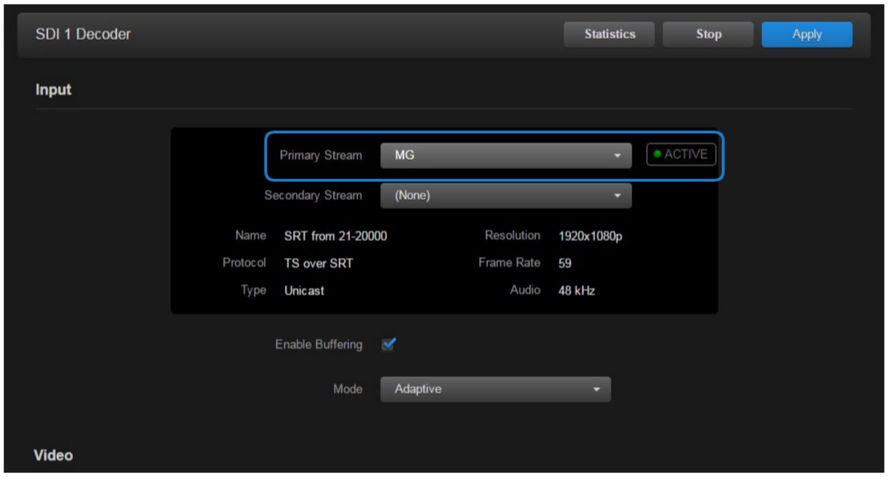
FEC: (None)

5. To configure the video output, click **SDI1** from the output interface bar.



The SDI1 Decoder page opens, displaying the current video decoding settings.

6. Under Input, select the input stream you just created from the Primary Stream drop-down list.



Input

Primary Stream: MG ● ACTIVE

Secondary Stream: (None)

Name: SRT from 21-20000
Resolution: 1920x1080p
Protocol: TS over SRT
Frame Rate: 59
Type: Unicast
Audio: 48 kHz

Enable Buffering: ☑

Mode: Adaptive

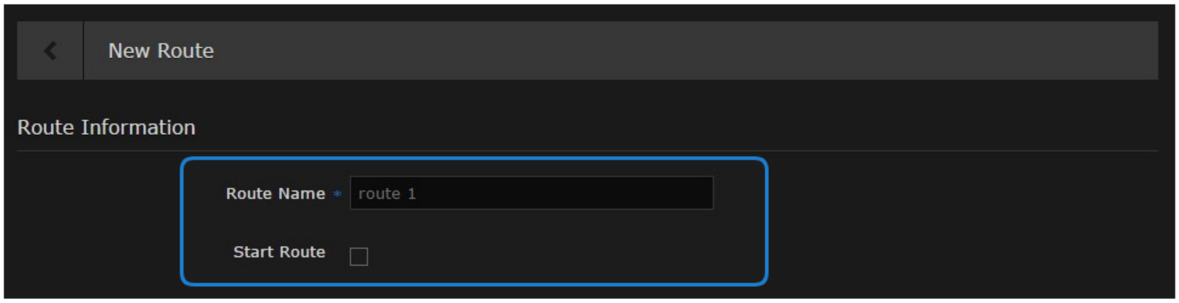
Video

7. To apply your changes, click **Apply**.

For more details, refer to the *Makito X Decoder User's Guide*.

Creating a Route

1. If you have not already done so, sign in to the Media Gateway/SRT Gateway Web interface.
2. On the Browse Routes screen, click the **+Route** button.
3. Supply a Route Name and check the **Start Route** checkbox so that the stream is started upon creation.



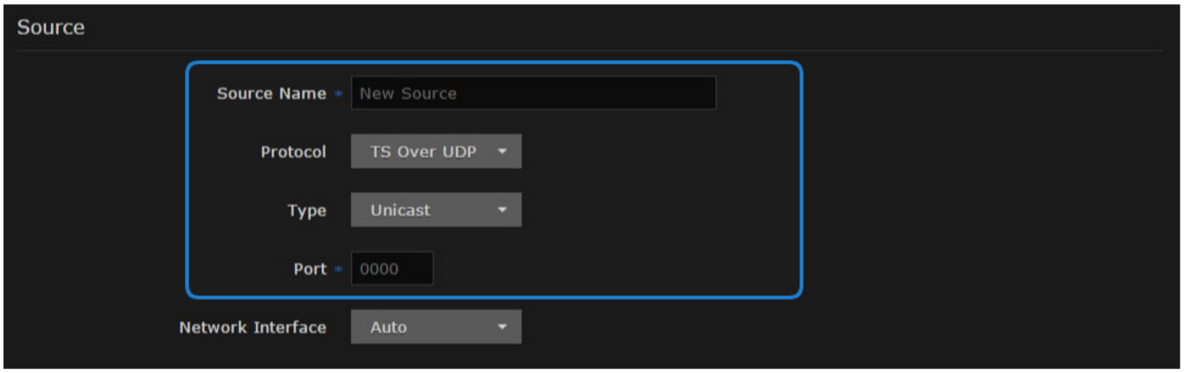
New Route

Route Information

Route Name * route 1

Start Route □

4. In the Source section, provide a Source Name, select **TS over UDP** for the Protocol (for this example), and enter the port number of the source Makito X Encoder (see Step #10 in Setting Up a Source Stream).



Source

Source Name * New Source

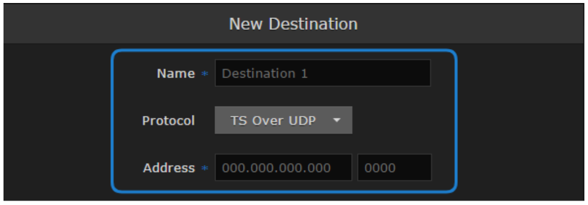
Protocol TS Over UDP

Type Unicast

Port * 0000

Network Interface Auto

5. Click the **+Destination** button.
6. Under New Destination, provide a destination Name, select **TS over UDP** for the Protocol, and enter IP Address and port number of the destination Makito X Decoder (see Step #4 in Setting Up a Destination).



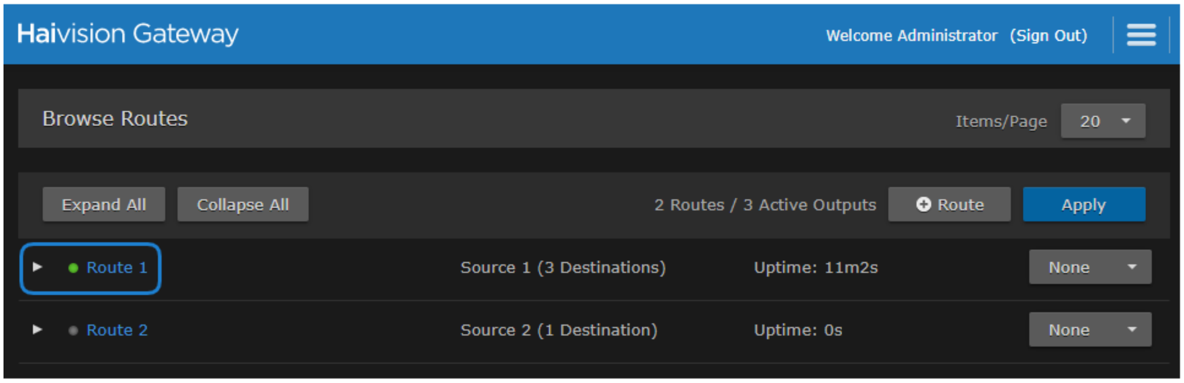
New Destination

Name * Destination 1

Protocol TS Over UDP

Address * 000.000.000.000 0000

7. When finished, click **Add**. The new route appears in the Destination list.
8. Click **Create**.
9. On the Browse Routes screen, verify that the status light is green.



Browse Routes

2 Routes / 3 Active Outputs

▶ ● Route 1	Source 1 (3 Destinations)	Uptime: 11m2s	None
▶ ● Route 2	Source 2 (1 Destination)	Uptime: 0s	None

You should now see the video from the source Makito X Encoder relayed via Media Gateway/SRT Gateway to the monitor connected to the destination Makito X Decoder.

Working with Media Gateway and SRT Gateway

The following content discusses how to work with routes in detail on your Haivision Media Gateway/SRT Gateway server.

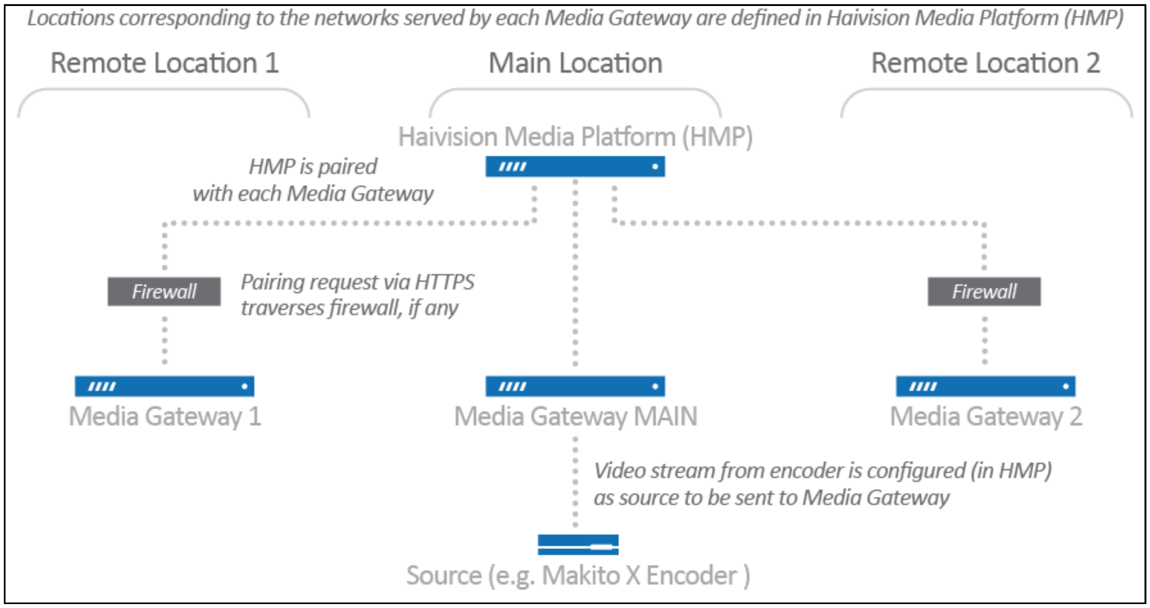
Topics Discussed

Multi-site Live Workflow

> **Important**
>
> Haivision SRT Gateway is not meant for multi-site Haivision Media Platform workflows. The following sections apply to Haivision Media Gateway only.

Pairing the Gateways with Media Platform

The first step in establishing a multi-site live configuration is to pair the Media Gateways with the Media Platform that is driving the session. In Media Platform, you also need to establish a connection between the video source (for example, a Makito X Encoder) and one of the paired Media Gateways:


Locations corresponding to the networks served by each Media Gateway are defined in Haivision Media Platform (HMP)
Remote Location 1
Main Location
Remote Location 2
Haivision Media Platform (HMP)
HMP is paired with each Media Gateway
Firewall
Pairing request via HTTPS traverses firewall, if any
Firewall
Media Gateway 1
Media Gateway MAIN
Media Gateway 2
Video stream from encoder is configured (in HMP) as source to be sent to Media Gateway
Source (e.g. Makito X Encoder)

Note

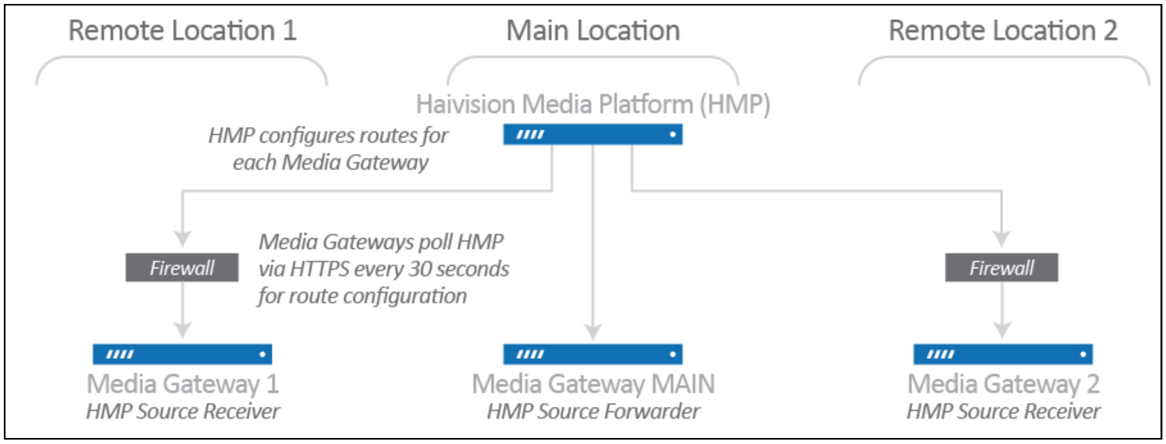
The video source can be connected to the Media Gateway at any of the locations. It does not have to be co-located with the Media Platform. The Media Gateway to which the source is connected must, however, be identified as such on the Media Platform.

Defining the Locations (Media Platform)

After the pairings are complete, you define "locations" in the Media Platform corresponding to the networks served by the various Media Gateways (i.e., the networks on which the users watch the live video). The Media Gateway serving as the ingest point for the live video is considered to be the **source forwarder** in this context. The other Media Gateways are identified as **source receivers**. Based on these locations and the forwarder/receiver designations, Media Platform generates routing configurations for each of the locations. The respective Media Gateways poll the Media Platform at intervals of approximately 30 seconds, and download the routing configuration files.

Note

If you modify a multi-site live route on any of the associated Media Gateways, it is eventually overwritten by the original configuration from Media Platform.



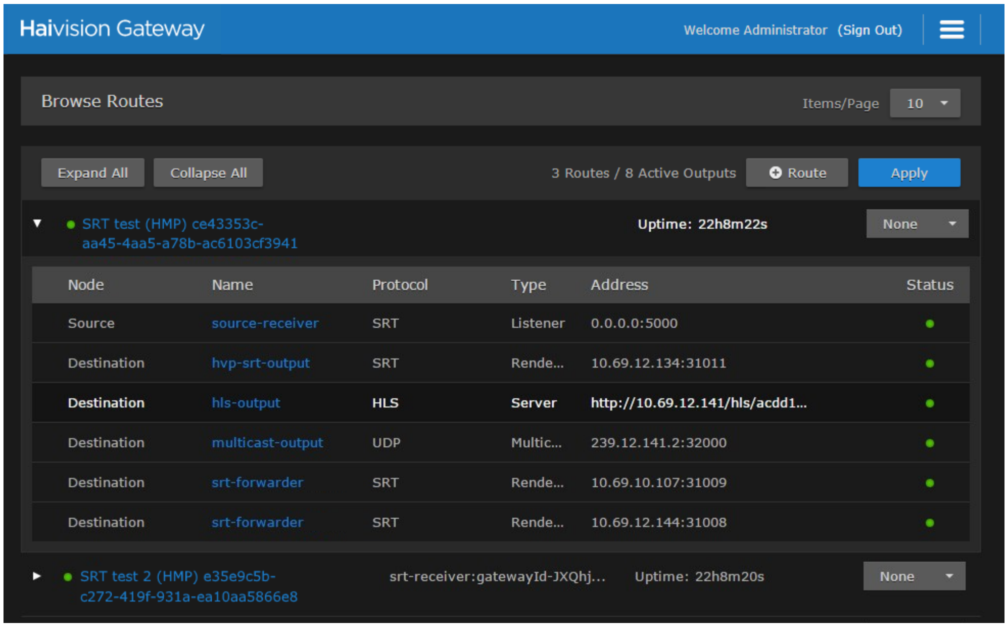
Source Forwarder

For the Media Gateway to which the video source is connected (the forwarder), Media Platform creates a route consisting of one source and multiple destinations. The route is identified by a name with the following syntax:

```
[source_name] (HMP) [source_ID]
```

A route with this name indicates that the Media Gateway is receiving traffic from a source (e.g., a Makito X Encoder) and forwarding it to Media Platform. The `source_name` corresponds to the name of the live video source, and the `source_ID` corresponds to the ID of the live video source.

In the following sample screenshot, the route shows the Media Gateway (forwarder) propagates the source to four destinations: one corresponding to an HLS stream for the local audience, two for "forwarding" the live video to remote Media Gateways via SRT, and one SRT Listener. The SRT Listener destination allows Media Platform to connect as an SRT Caller to access the video for recording:



3 Routes / 8 Active Outputs

▼ ● SRT test (HMP) ce43353c-aa45-4aa5-a78b-ac6103cf3941 Uptime: 22h8m22s None

Node	Name	Protocol	Type	Address	Status
Source	source-receiver	SRT	Listener	0.0.0.0:5000	●
Destination	hvp-srt-output	SRT	Rende...	10.69.12.134:31011	●
Destination	hls-output	HLS	Server	http://10.69.12.141/hls/acdd1...	●
Destination	multicast-output	UDP	Multic...	239.12.141.2:32000	●
Destination	srt-forwarder	SRT	Rende...	10.69.10.107:31009	●
Destination	srt-forwarder	SRT	Rende...	10.69.12.144:31008	●

▶ ● SRT test 2 (HMP) e35e9c5b-c272-419f-931a-ea10aa5866e8 srt-receiver:gatewayId-JXQhj... Uptime: 22h8m20s None

Note

The status of the SRT Listener destination may intermittently change from green to yellow and back, because the Media Platform only establishes a connection as needed.

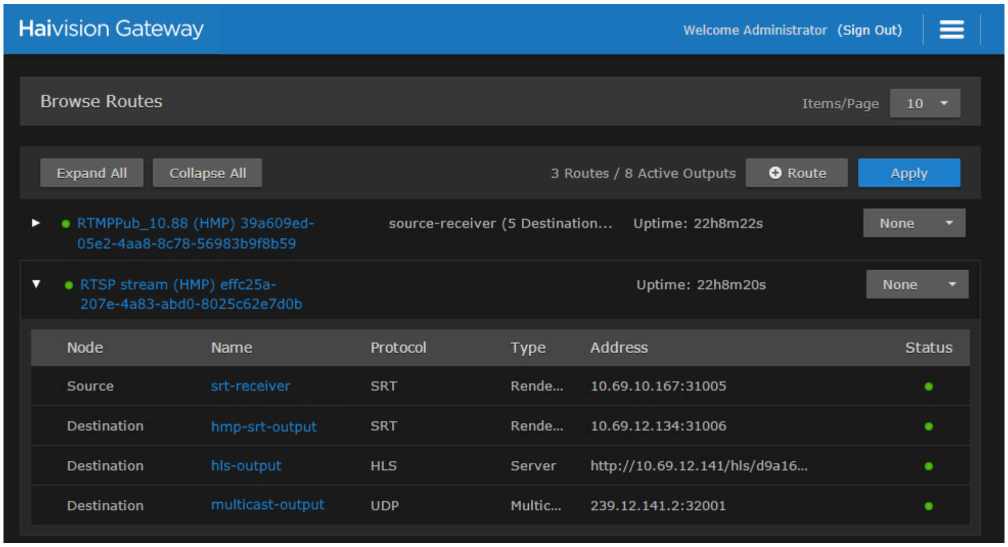
Source Receivers

For each Media Gateway (receiver) to which the live video is being sent, Media Platform creates a route consisting of one source and one destination. The route is identified by a name with the following syntax:

```
[source_name] (HMP) [source_ID]
```

A route with this name indicates that the Media Gateway is receiving traffic from another Media Gateway (the forwarder) for local output. The `source_name` corresponds to the name of the live video source, and the `source_ID` corresponds to the ID of the live video source.

In the following sample screenshot, the route shows the Media Gateway (receiver) propagates the source to a single destination, corresponding to an HLS stream for the local audience:



▸ ● RTMPPub_10.88 (HMP) 39a609ed-05e2-4aa8-8c78-56983b9f8b59 source-receiver (5 Destination... Uptime: 22h8m22s

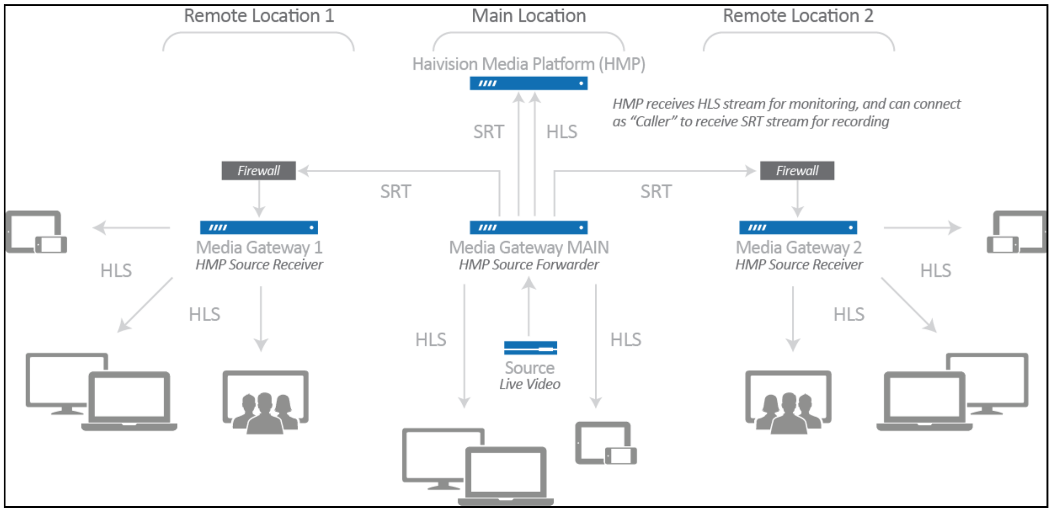
▾ ● RTSP stream (HMP) effc25a-207e-4a83-abd0-8025c62e7d0b Uptime: 22h8m20s

Node	Name	Protocol	Type	Address	Status
Source	srt-receiver	SRT	Rende...	10.69.10.167:31005	●
Destination	hmp-srt-output	SRT	Rende...	10.69.12.134:31006	●
Destination	hls-output	HLS	Server	http://10.69.12.141/hls/d9a16...	●
Destination	multicast-output	UDP	Multic...	239.12.141.2:32001	●

Note

If someone copies the HLS Destination URL and tries to view the video in a browser, they get an authentication error. Viewers must be authorized through Media Platform.

After the live session is initiated, the video automatically streams to and is viewable by the audience at all locations (as shown in the following diagram):

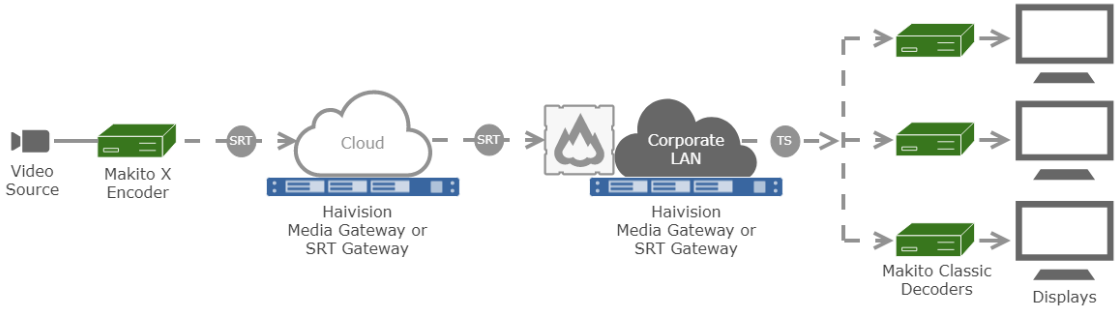


For more information, including complete instructions on how to configure a multi-site live session, please refer to the *Haivision Media Platform Administrator's Guide*.

Multicast Workflow

The following workflow steps you through an encoder sending an SRT stream to a hosted instance of Media Gateway/SRT Gateway on the cloud, which routes each destination segment. At the remote sites, a Media Gateway/SRT Gateway (on the corporate LAN) converts the SRT protocol to a format compatible with the local viewing devices.

A general overview of this workflow is provided in the following diagram:



In the above diagram, the cloud-based Media Gateway/SRT Gateway (located on the Public Internet or as a Haivision Video Cloud (HVC) hosted option) is *optional* and only recommended for individuals who want to "own" the distribution or have concerns about low latency. A Media Gateway/SRT Gateway can also be hosted on the LAN to allow multi-sites distribution.

Note

The various receivers are not always SRT-capable, but Media Gateway/SRT Gateway can accept inbound SRT streams and flip these streams into a format compatible with internal receivers.

Run-Through Example

Tip

You'll find some helpful videos on our website that show you how this is done. Check out https://www.haivision.com for more information.

Before stepping through this example, the two Media Gateway/SRT Gateway installations must be available in the cloud and on your local area network.

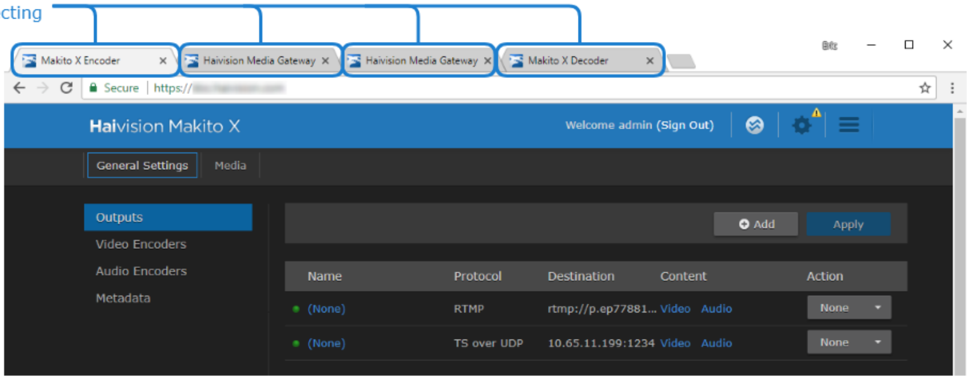
Creating your Workspace (Optional)

Tip

Use the tabs in one browser to point to the URL of each workflow element to create a workspace. For example, access the Makito X web interface of your source on one tab, the cloud Media Gateway/SRT Gateway on another, and so forth. This way, you can switch back and forth between them.

1. In your web browser, open a tab, enter the Makito X Encoder web interface URL, and log in when prompted.
2. Open another new tab, enter the cloud-based Media Gateway/SRT Gateway web interface URL, and sign in when prompted.
3. Open another new tab, enter the remote site's LAN-based Media Gateway/SRT Gateway web interface URL, and sign in when prompted.
4. Open another new tab, enter the Makito X Decoder web interface URL, and log in when prompted.

Open a tab for each device you are connecting



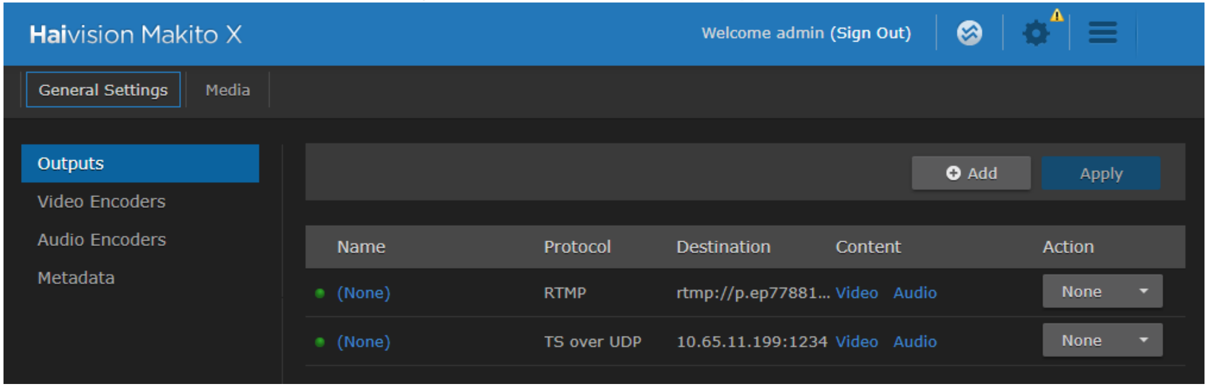
https://[redacted]

Name	Protocol	Destination	Content	Action
● (None)	RTMP	rtmp://p.ep77881...	Video Audio	None
● (None)	TS over UDP	10.65.11.199:1234	Video Audio	None

Establishing the Source

1. If you followed the steps in Creating your Workspace (Optional), switch to the Makito X Encoder's browser tab. Else, enter the URL for the Makito X encoder web interface and log in when prompted.

2. On the Makito X Encoder's navigation sidebar, click **Outputs**.

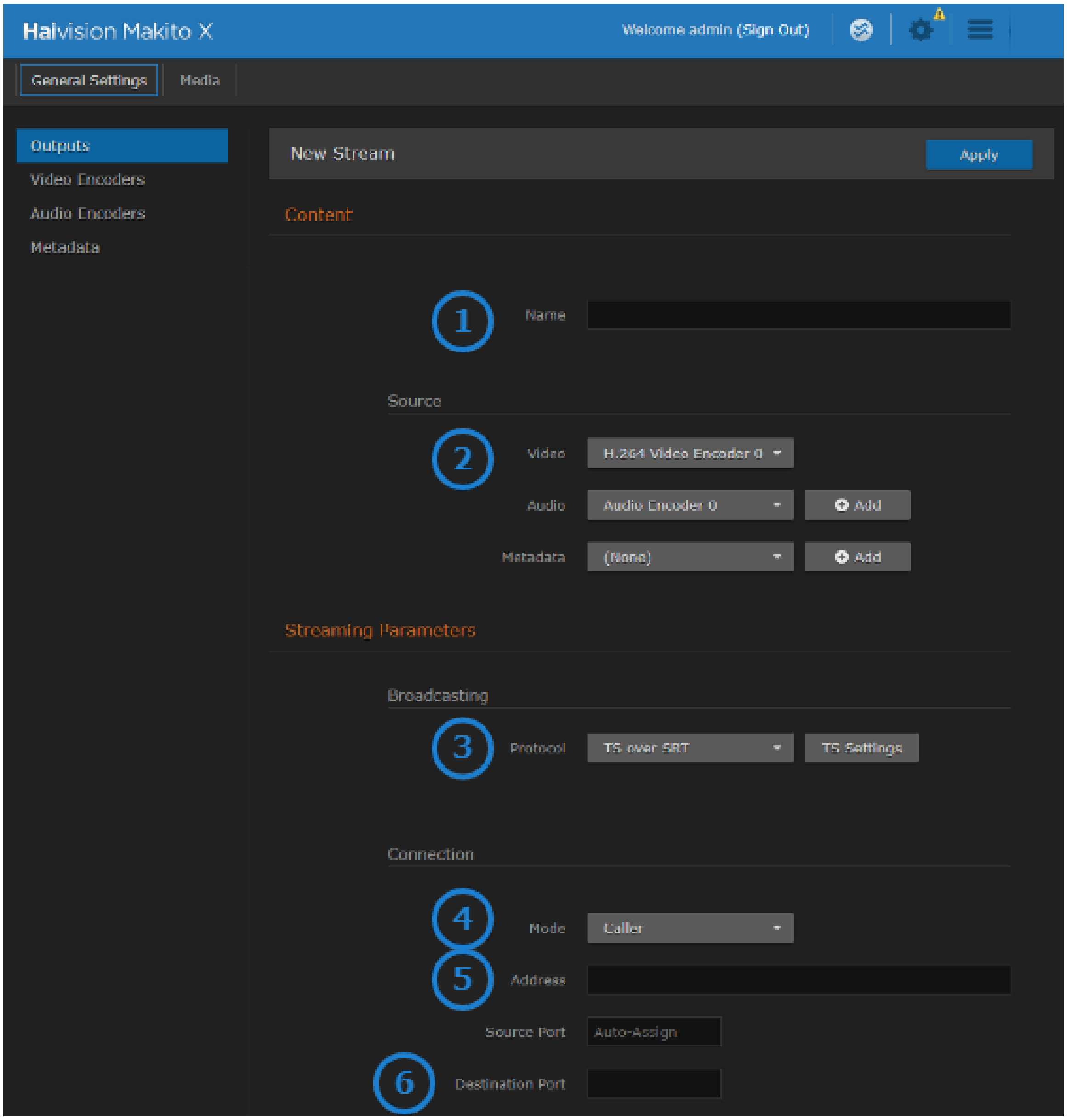


Name	Protocol	Destination	Content	Action
(None)	RTMP	rtmp://p.ep77881...	Video Audio	None
(None)	TS over UDP	10.65.11.199:1234	Video Audio	None

3. The view pane lists the available streams. For this example, we are going to add a stream that uses TS over SRT. Click the **+Add** button. If you have an existing SRT stream, you can modify it instead.

> **Note**
>
> Refer to your Makito X documentation for more information on adding streams if you are new to this process.

4. When the New Stream screen opens:
   - In the Content section, provide a (1) stream name. For (2) video, select an active video encoder.
   - In the Streaming Parameters section, specify the (3) TS Over SRT protocol, the (4) mode as "Caller," enter the (5) address for the Media Gateway/SRT Gateway (in the Cloud) and a (6) destination port.



Name

Video: H.264 Video Encoder 0

Audio: Audio Encoder 0

Metadata: (None)

Protocol: TS over SRT

Mode: Caller

Address

Source Port: Auto-Assign

Destination Port

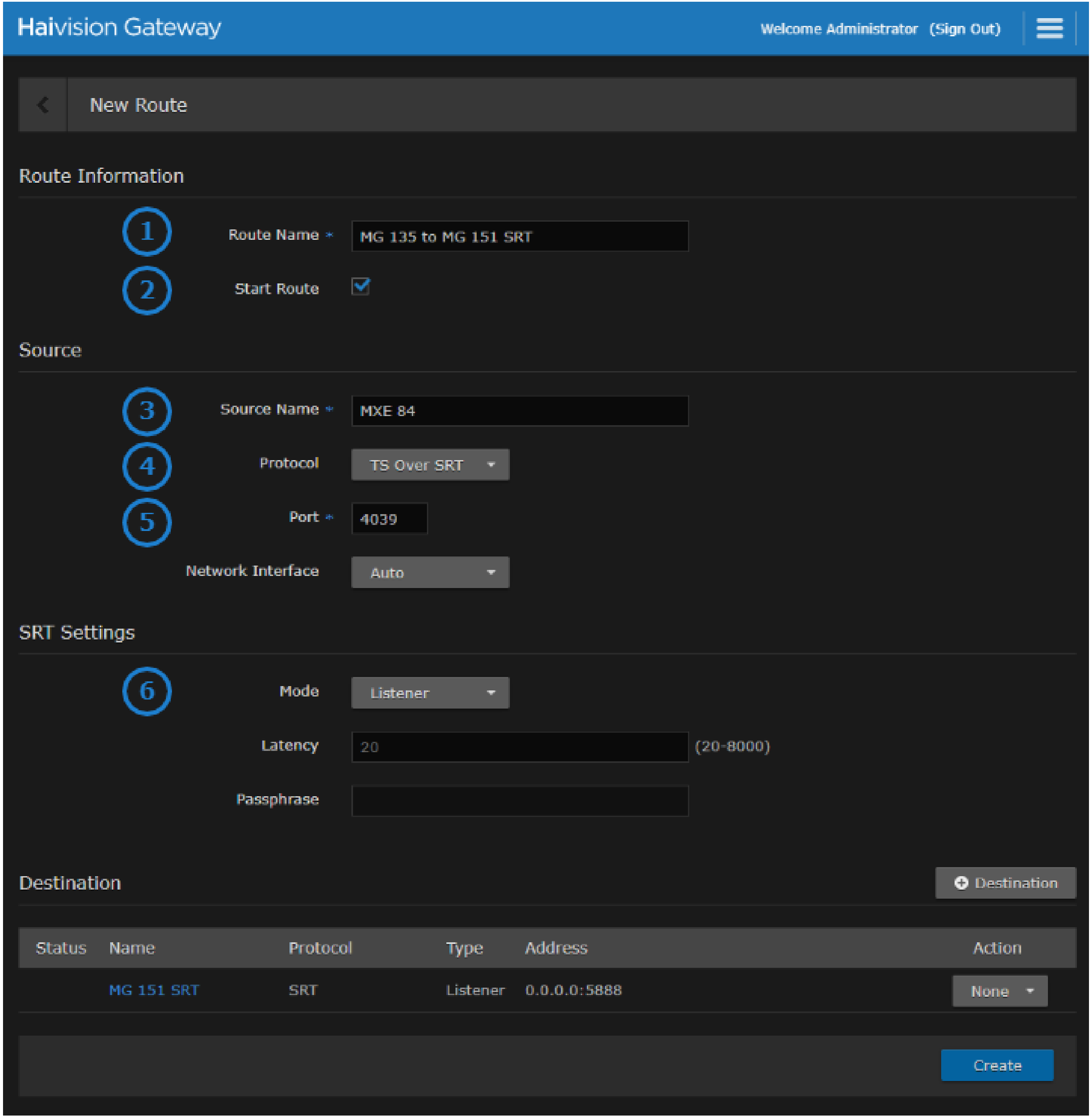
> **Tip**
>
> If needed, switch to the appropriate browser tab or enter the URL for the cloud-hosted gateway to acquire this information.

5. Click **Apply**.

Connecting the Source to the Cloud-Hosted Gateway

1. If you followed the steps in Creating your Workspace (Optional), switch to theGateway's browser tab. Else, enter the URL for the Media Gateway/SRT Gateway encoder web interface and sign in when prompted.
2. On the Browse Routes screen, click the **+Route** button.
3. When the New Route screen opens:
   - In the Route Information section, supply a (1) route name and click the (2) Start Route checkbox so that the stream is started after creation.

- In the Source section, provide a (3) source name, specify the (4) protocol as TS Over SRT (for this example), and enter the (5) port from the source encoder.
- In the SRT Settings section set the (6) mode to Listener.



Route Information

Route Name * MG 135 to MG 151 SRT

Start Route ☑

Source

Source Name * MXE 84

Protocol TS Over SRT

Port * 4039

Network Interface Auto

SRT Settings

Mode Listener

Latency 20 (20-8000)

Passphrase

Destination

+ Destination

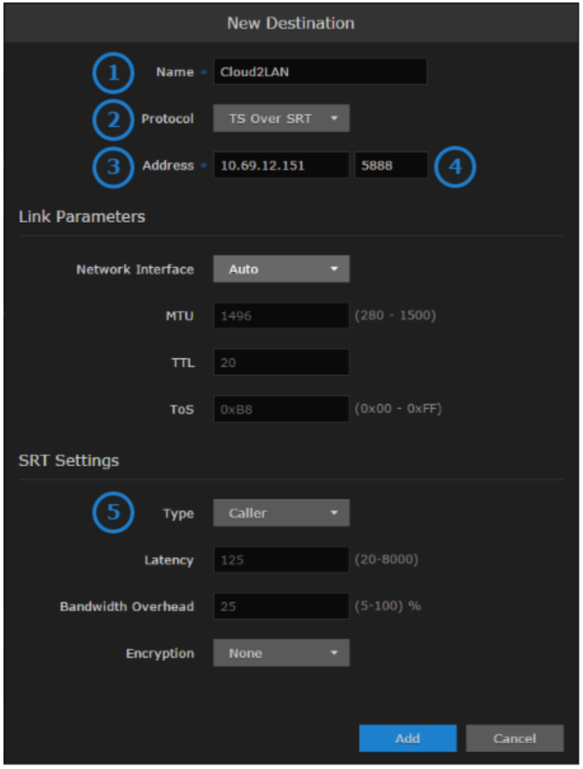
Status	Name	Protocol	Type	Address	Action
	MG 151 SRT	SRT	Listener	0.0.0.0:5888	None

Tip

If needed, switch to the Makito X Encoder browser tab or enter the URL for the Makito X Encoder to acquire this information.

4. Click the **+Destination** button.
5. In the New Destination dialog:
   - Enter the information for the LAN-based Gateway. Provide a (1) name, the (3) address, and the (4) port information.

- Change the (2) protocol to "TS over SRT."
- Under the SRT Settings section, change the (5) type to "Caller."



New Destination

Name * Cloud2LAN
Protocol TS Over SRT
Address * 10.69.12.151 5888

Link Parameters

Network Interface Auto
MTU 1496 (280 - 1500)
TTL 20
ToS 0xB8 (0x00 - 0xFF)

SRT Settings

Type Caller
Latency 125 (20-8000)
Bandwidth Overhead 25 (5-100) %
Encryption None

Note

Protocols and types can have different configuration requirements. Data fields will appear or disappear depending upon your choices. As just demonstrated, SRT protocols require an address, in addition to a port, when they are running in Caller type.

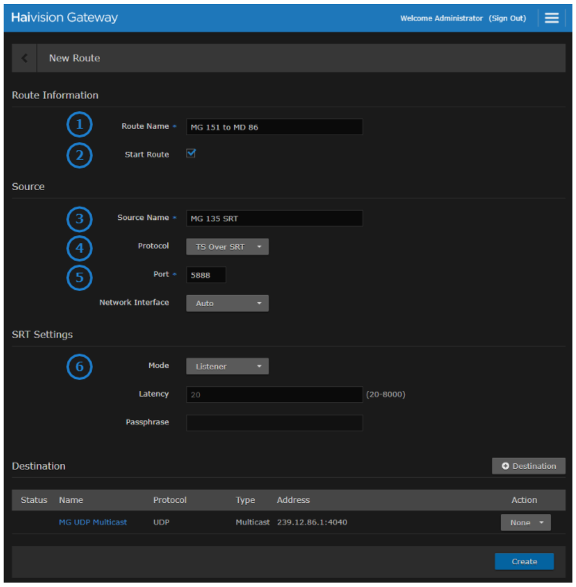
Tip

If needed, switch to the LAN-based Gateway browser tab or enter the URL for the LAN-based Gateway to acquire this information.

6. When finished, click **Add**.
7. On the New Route screen, when finished, click **Create**.
8. On the Browse Routes screen, expand the route to verify that the status lights change to green.

Connecting the Gateway to the Remote Site's Makito X Decoder

1. Switch to the LAN-based Gateway browser tab or enter the URL for the LAN-based Gateway web interface.
2. Click **+Route** button to add a new route.
3. In the New Route screen:
   - Supply a (1) route name and click the (2) Start Route checkbox so that the stream will be started upon creation.
   - In the Source section, provide a (3) source name, the (4) protocol, and (5) port.
   - Set the (6) mode to "Listener" under the SRT Settings section.



Route Information

Route Name * MG 151 to MD 86

Start Route ☑

Source

Source Name * MG 135 SRT

Protocol TS Over SRT

Port * 5888

Network Interface Auto

SRT Settings

Mode Listener

Latency 20 (20-8000)

Passphrase

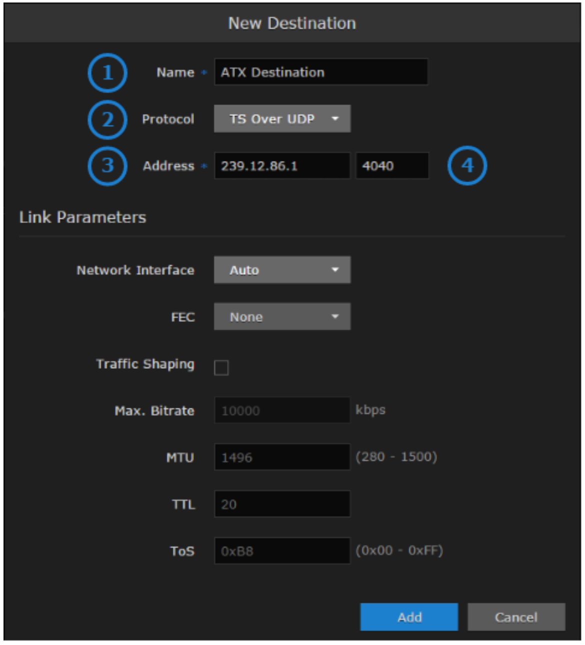
Destination

Status	Name	Protocol	Type	Address	Action
	MG UDP Multicast	UDP	Multicast	239.12.86.1:4040	None

Tip

If needed, switch to the appropriate browser tab or enter the URL for the LAN-based Gateway to acquire this information.

4. Click **+Destination**.
5. In the New Destination dialog:
   - Enter the information for the Decoder. Provide a (1) name and the (2) protocol.
   - In this example, we are using a protocol of TS over UDP so you also add the (3) Multicast address and (4) port information.



Name * ATX Destination

Protocol TS Over UDP

Address * 239.12.86.1 4040

Link Parameters

Network Interface Auto

FEC None

Traffic Shaping □

Max. Bitrate 10000 kbps

MTU 1496 (280 - 1500)

TTL 20

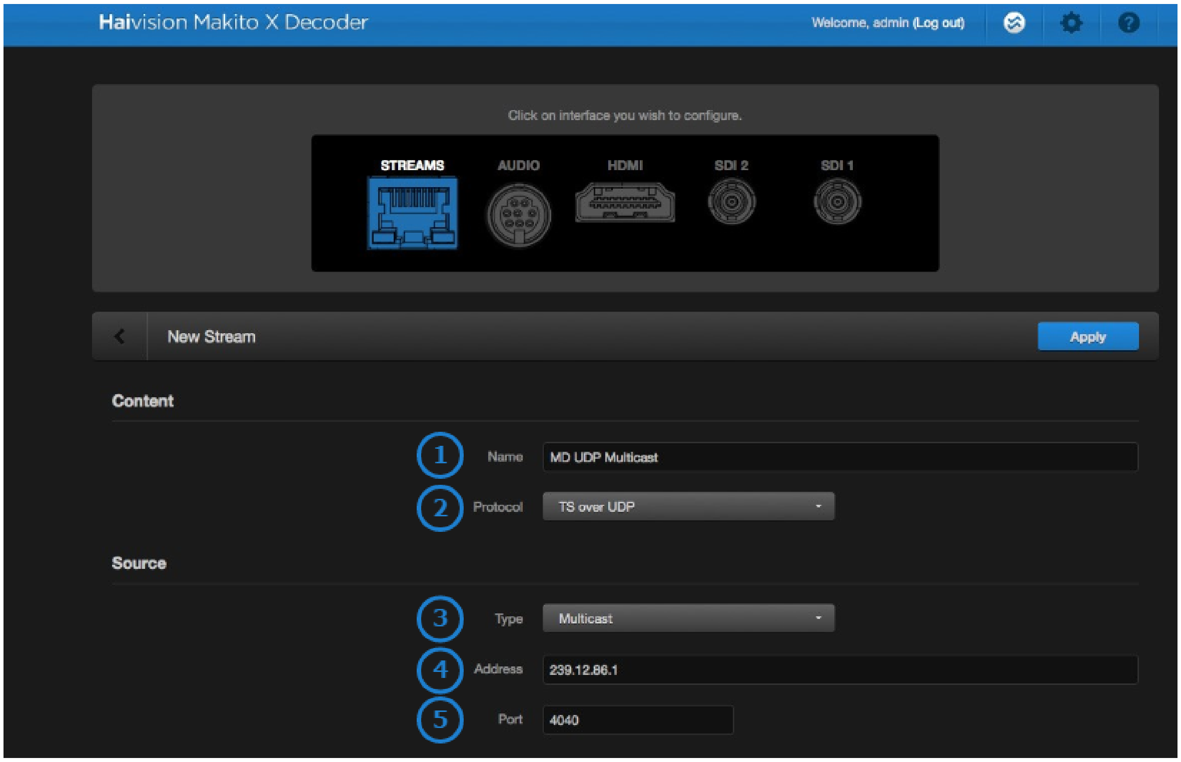
ToS 0xB8 (0x00 - 0xFF)

6. When finished, click **Add**.
7. In the New Route screen, click **Create**.

Connecting the Makito X Decoder

1. Switch to the Makito X Decoder tab or enter the URL for the Makito X Decoder web interface.
2. Click **+Add** to add the stream to the Makito X Decoder.
3. On the New Stream screen:
   - Enter a (1) name and the (2) protocol.
   - **Note**

     Multicast addresses are in the range of 224.0.0.0 to 239.255.255.255.



Content

Name: MD UDP Multicast

Protocol: TS over UDP

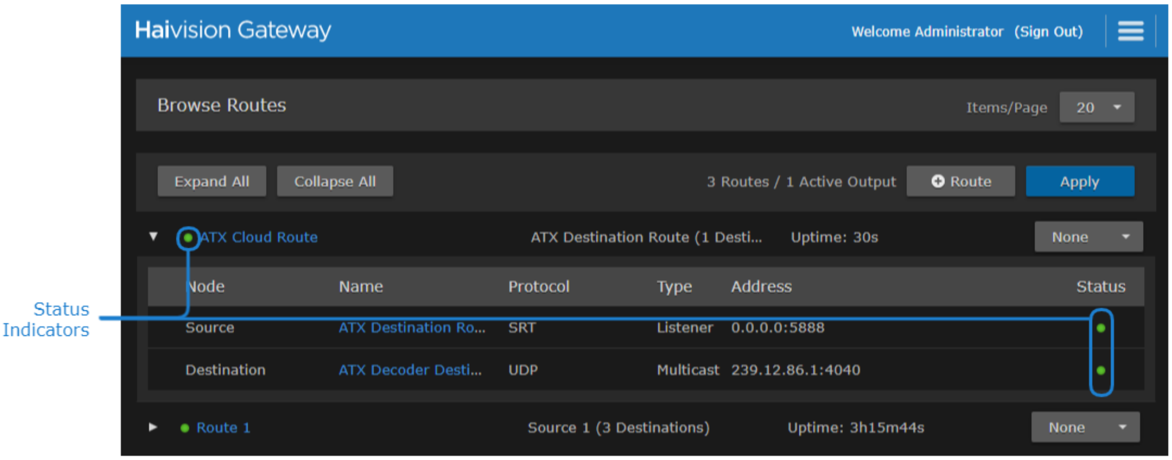
Source

Type: Multicast

Address: 239.12.86.1

Port: 4040

4. Click **Apply**.
5. Repeat steps #2 and #3 as needed to define additional streams.
6. To ensure that everything is set up properly, verify that the stream(s) have green status indicators.



▼ ● ATX Cloud Route — ATX Destination Route (1 Desti... — Uptime: 30s

Node	Name	Protocol	Type	Address	Status
Source	ATX Destination Ro...	SRT	Listener	0.0.0.0:5888	●
Destination	ATX Decoder Desti...	UDP	Multicast	239.12.86.1:4040	●

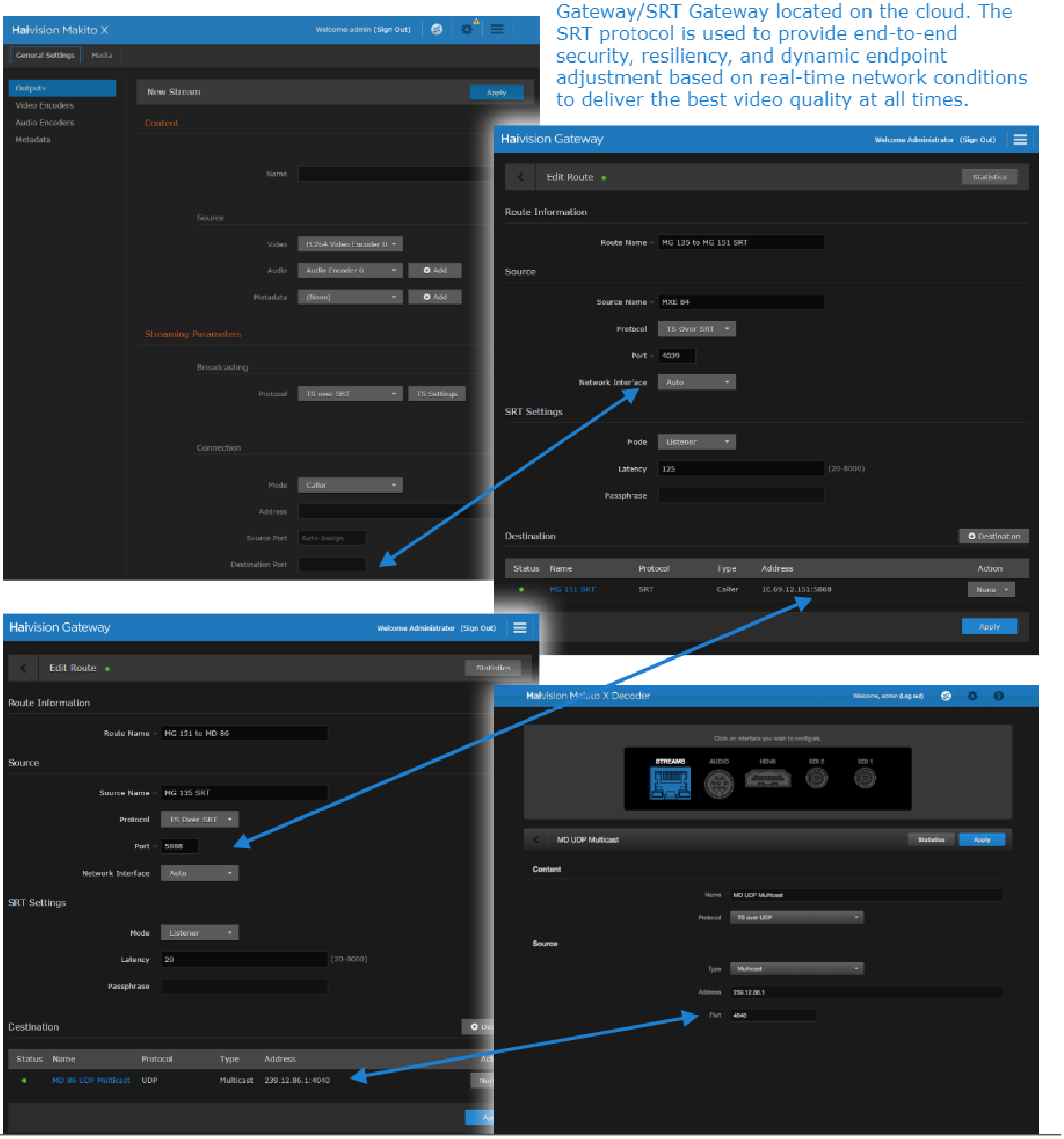
► ● Route 1 — Source 1 (3 Destinations) — Uptime: 3h15m44s

Note

Refer to your Makito X Decoder documentation for more information on displaying streams.

Run-Through Example Recap

The meeting is streamed live at the corporate office in Montreal and then routed to a Media Gateway/SRT Gateway located on the cloud. The SRT protocol is used to provide end-to-end security, resiliency, and dynamic endpoint adjustment based on real-time network conditions to deliver the best video quality at all times.



Haivision Makito X — New Stream

Content

Name:

Source

Video: H.264 Video Encoder 0

Audio: Audio Encoder 0

Metadata: (None)

Streaming Parameters

Broadcasting

Protocol: TS over SRT

Connection

Mode: Caller

Address:

Source Port: Auto-Assign

Destination Port:

Haivision Gateway — Edit Route

Route Information

Route Name: MG 135 to MG 151 SRT

Source

Source Name: MXE 84

Protocol: TS Over SRT

Port: 4039

Network Interface: Auto

SRT Settings

Mode: Listener

Latency: 125 (20-8000)

Passphrase:

Destination

Status	Name	Protocol	Type	Address	Action
●	MG 151 SRT	SRT	Caller	10.69.12.151:5888	None

Haivision Gateway — Edit Route

Route Information

Route Name: MG 151 to MD 86

Source

Source Name: MG 135 SRT

Protocol: TS Over SRT

Port: 5888

Network Interface: Auto

SRT Settings

Mode: Listener

Latency: 20 (20-8000)

Passphrase:

Destination

Status	Name	Protocol	Type	Address
●	MD 86 UDP Multicast	UDP	Multicast	239.12.86.1:4040

Haivision Makito X Decoder

Click on interface you wish to configure.

MD UDP Multicast

Content

Name: MD UDP Multicast

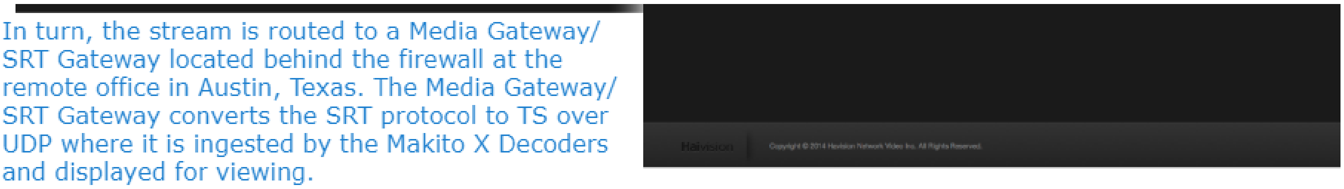
Protocol: TS over UDP

Source

Type: Multicast

Address: 239.12.86.1

Port: 4040



In turn, the stream is routed to a Media Gateway/SRT Gateway located behind the firewall at the remote office in Austin, Texas. The Media Gateway/SRT Gateway converts the SRT protocol to TS over UDP where it is ingested by the Makito X Decoders and displayed for viewing.

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Working with Routes

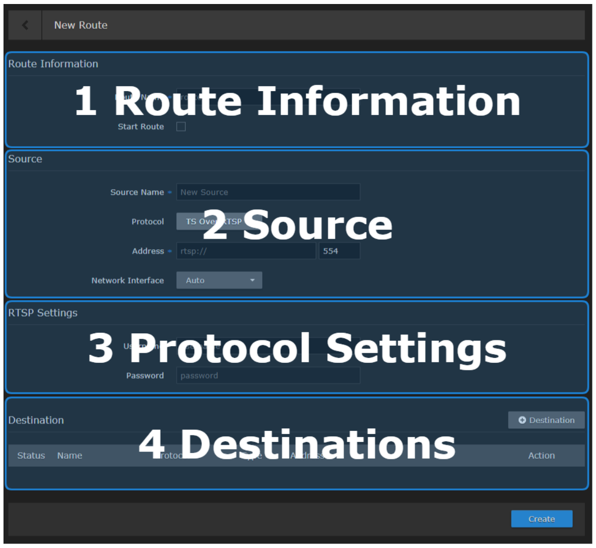
Note

Be careful with running routes. Any of the following actions, when applied, override all the destination states.

Creating a Route

To create a route:

1. Click the ☰ icon and click **Browse Routes**.
2. On the Actions bar, click the **+Route** button.
3. A New Route screen opens for entering the desired settings for the route. The screen is divided into four sections as shown below.



New Route

Route Information

Start Route □

Source

Source Name * New Source

Protocol TS Over RTSP

Address * rtsp:// 554

Network Interface Auto

RTSP Settings

Password password

Destination

Status	Name	Protocol	Type	Address	Action

Further instructions and detailed descriptions for each setting are provided for each section, accessible in the following table

Section	Description
1	Route Information
2	Source
3	Protocol Settings (SRT, RTMP, and RTSP only)
4	Destinations

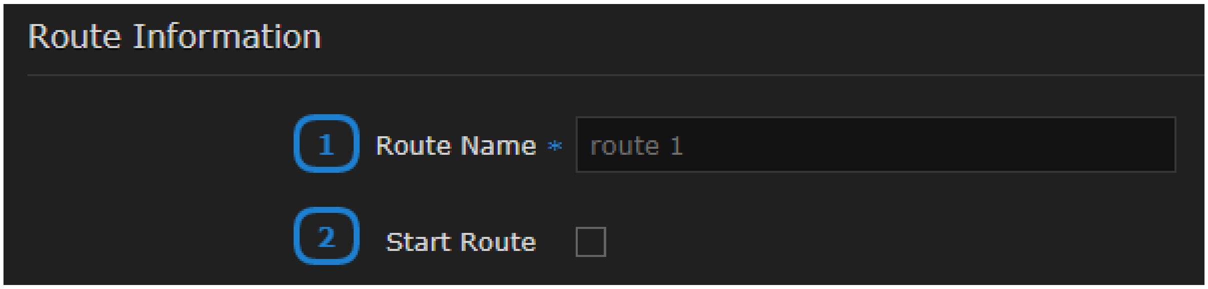
4. When you have finished entering the required data, click the **Create** button to create the route.

You are returned to the Browse Routes screen, and after a few seconds the new route appears. Click the ▶ button next to the new route to view specific source and destination details.

Section 1 Route Information

Creating a Channel	
Step	**Description**
1	Name and Description
2	Source
3	Protocol Settings (SRT, RTP, and RTMP only)
4	Destinations

The following figure shows the Route Information section of the Route screen. The numbered callouts in the figure indicate the step number in this procedure.



Route Name * route 1

1. Enter the desired name for the route.
2. **Tip**

   If this checkbox is disabled, when subsequently starting the route, its destinations must be manually started.

Continue to Section 2 Source.

Section 2 Source

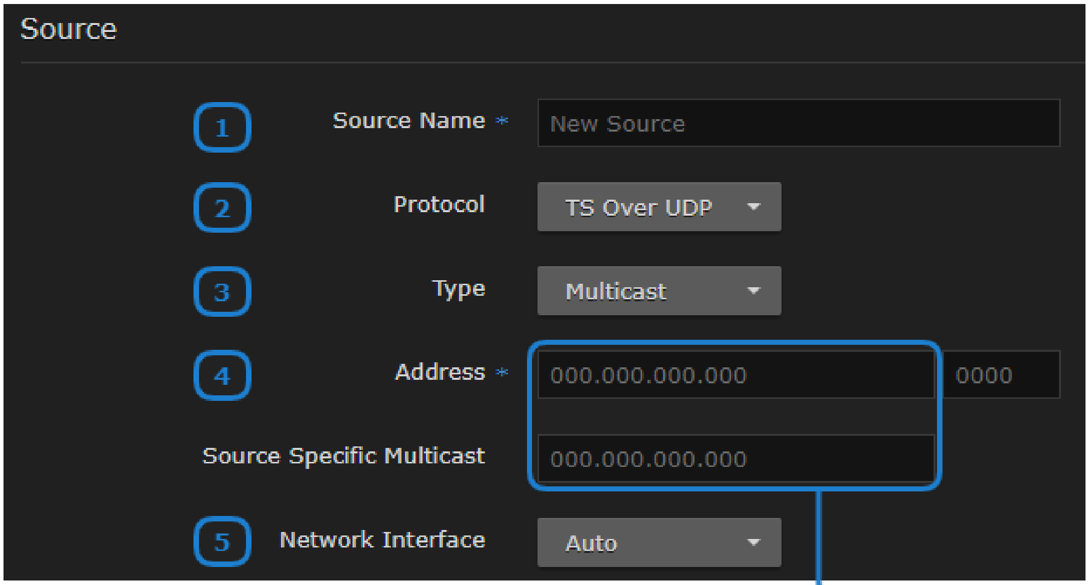
Creating a Channel	
Step	**Description**
1	Route Information
2	Source
3	Protocol Settings (SRT, RTMP, and RTSP only)
4	Destinations

The available configuration options depend on the selected source streaming protocol.

TS over UDP TS over SRT TS over RTP RTMP RTSP

TS over UDP

The following figure shows the Source section of the Route screen for a TS over UDP route. The numbered callouts in the figure indicate the step number in this procedure.



Source

1 Source Name * New Source

2 Protocol TS Over UDP

3 Type Multicast

4 Address * 000.000.000.000 0000

Source Specific Multicast 000.000.000.000

5 Network Interface Auto

Does not appear for Unicast type

1. > **Tip**
   >
   > Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.
2. In the Protocol dropdown, select **TS over UDP**.
3. Select **Unicast** or **Multicast** in the Type dropdown.
4. If you chose Unicast in the previous step, enter the listening port number.
   If you chose Multicast in the previous step, enter the multicast IP address and listening port number. Also, optionally, enter the IGMP v3 source address in the Source Specific Multicast field.

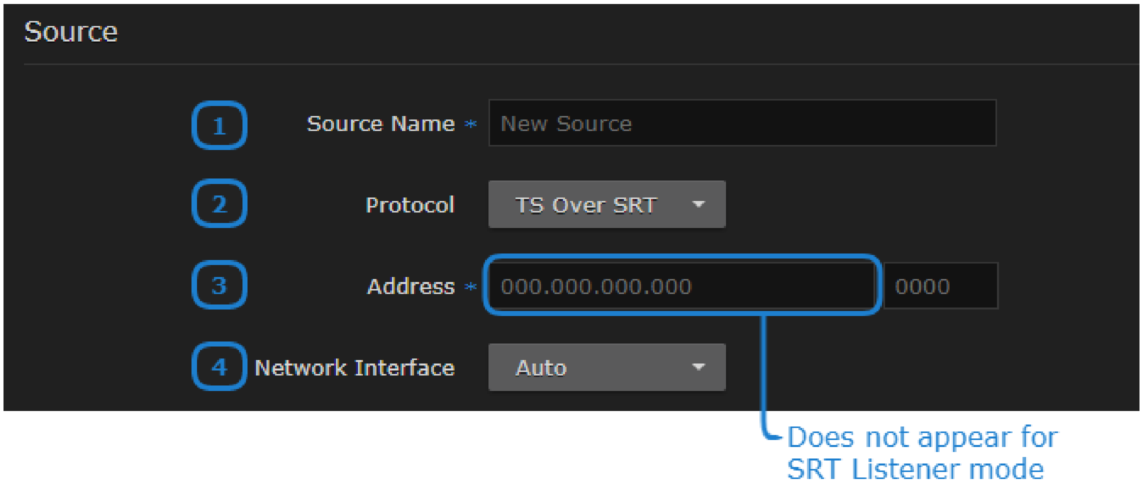
   > **Note**
   >
   > IGMPv3 Source Specific Multicast reception allows input streams to join a multicast group and filter the input streams based on a specific source IP address. Only streams originating from the specified source IP are forwarded to HMG/HSG, which allows HMG/HSG to quickly and easily select an input stream in environments with many sources sharing a common multicast IP. See IETF RFC 3376 for more details.
5. Choose the desired network interface to use for this route in the dropdown. Available options depend on the hardware configuration.

As there are no additional protocol settings to configure, continue to **Section 4 Destinations**.

TS over UDP TS over SRT TS over RTP RTMP RTSP

TS over SRT

The following figure shows the Source section of the Route screen for a TS over SRT route. The numbered callouts in the figure indicate the step number in this procedure.



Source

1 Source Name * New Source

2 Protocol TS Over SRT

3 Address * 000.000.000.000 0000

4 Network Interface Auto

Does not appear for SRT Listener mode

1. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

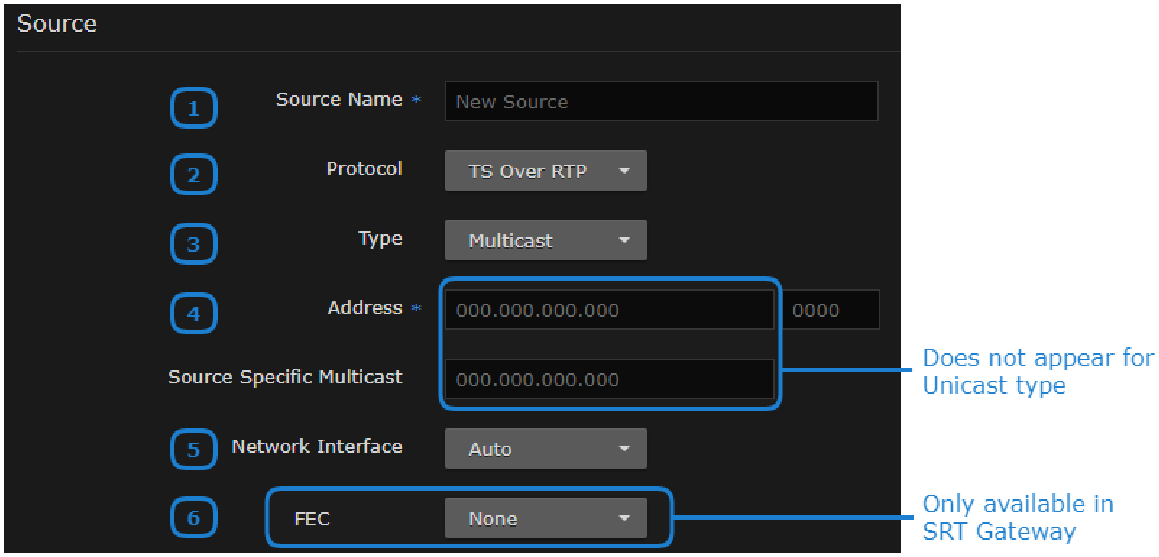
2. In the Protocol dropdown, select **TS over SRT**.
3. An SRT Settings section appears below this section. By default SRT Listener mode is selected; therefore, only a Port text field appears.
   If using SRT Listener mode, enter the listening port.
   If using SRT Caller or Rendezvous mode, select either mode in the SRT Settings section (See **Section 3 Protocol Settings** for details) and enter the source stream address and port.
4. Choose the desired Network Interface to use in the dropdown. Available settings depend on the hardware configuration.

Continue to **Section 3 Protocol Settings**.

TS over UDP TS over SRT TS over RTP RTMP RTSP

TS over RTP

The following figure shows the Source section of the Route screen for a TS over RTP route. The numbered callouts in the figure indicate the step number in this procedure.



Does not appear for Unicast type

Only available in SRT Gateway

1. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

2. In the Protocol dropdown, select **TS over RTP**.
3. Select **Unicast** or **Multicast** in the Type dropdown.
4. If you chose Unicast in the previous step, enter the listening port number.
   If you chose Multicast in the previous step, enter the multicast IP address and listening port number. Also, optionally, enter the IGMP v3 source address in the Source Specific Multicast field.

   Tip

   An even-numbered port is required for RTP, as recommended in RFC 3550. (The next odd-numbered port is typically reserved for RTCP messages.)

   Note

   IGMPv3 Source Specific Multicast reception allows input streams to join a multicast group and filter the input streams based on a specific source IP address. Only streams originating from the specified source IP are forwarded to HMG/HSG, which allows HMG/HSG to quickly and easily select an input stream in environments with many sources sharing a common multicast IP. See IETF RFC 3376 for more details.

5. Choose the desired network interface to use for this route in the dropdown. Available options depend on the hardware configuration.
6. **Note**

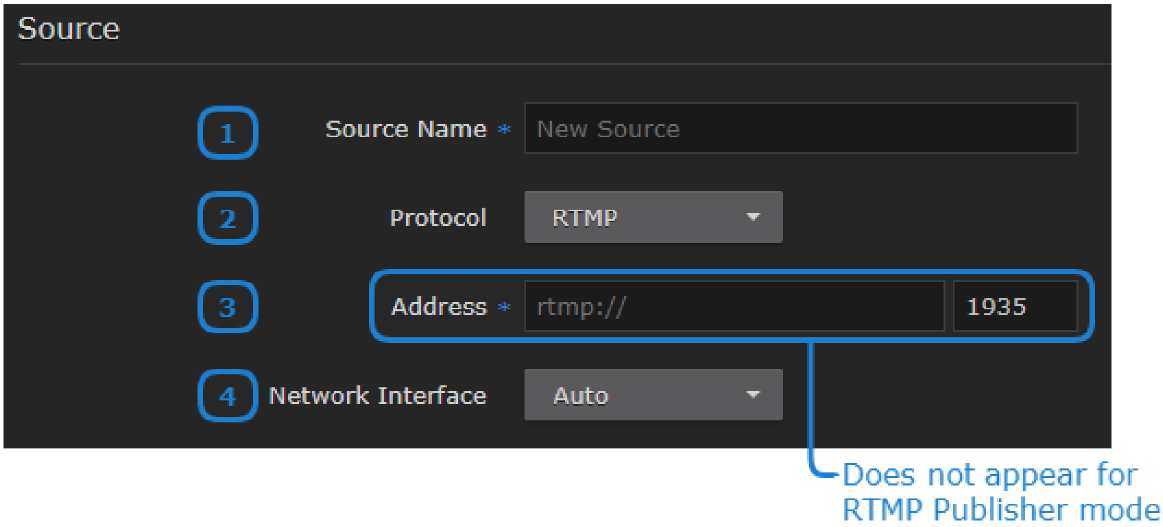
   PRO-MPEG FEC is available only on Haivision SRT Gateway.

As there are no additional protocol settings to configure, continue to **Section 4 Destinations**.

TS over UDP TS over SRT TS over RTP **RTMP** RTSP

RTMP

The following figure shows the Source section of the Route screen for an RTMP route. The numbered callouts in the figure indicate the step number in this procedure.



1. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.
2. In the Protocol dropdown, select **RTMP**.
3. If using RTMP Consumer mode, enter the source stream address and port.
   If using RTMP Publisher mode, ignore these textboxes as they are not used when Publisher mode is selected.

   Tip

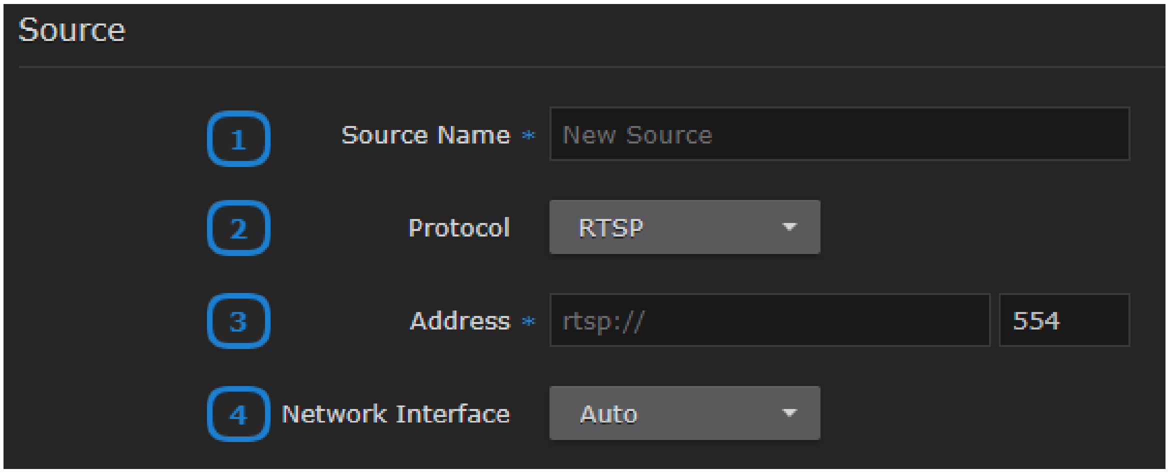
   Select Consumer or Publisher mode in Section 3 Protocol Settings.
4. Choose the desired network interface to use for this route in the dropdown. Available options depend on the hardware configuration.

Continue to Section 3 Protocol Settings.

TS over UDP   TS over SRT   TS over RTP   RTMP   **RTSP**

RTSP

The following figure shows the Source section of the Route screen for an RTSP route. The numbered callouts in the figure indicate the step number in this procedure.


Source

1 Source Name * New Source

2 Protocol RTSP

3 Address * rtsp:// 554

4 Network Interface Auto

1. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.
2. In the Protocol dropdown, select **RTSP**.
3. Enter the source stream address and port.
4. Choose the desired network interface to use for this route in the dropdown. Available options depend on the hardware configuration.

Continue to Section 3 Protocol Settings.

Section 3 Protocol Settings

Creating a Channel	
Step	**Description**
1	Route Information
2	Source
3	Protocol Settings (SRT, RTMP, and RTSP only)
4	Destinations

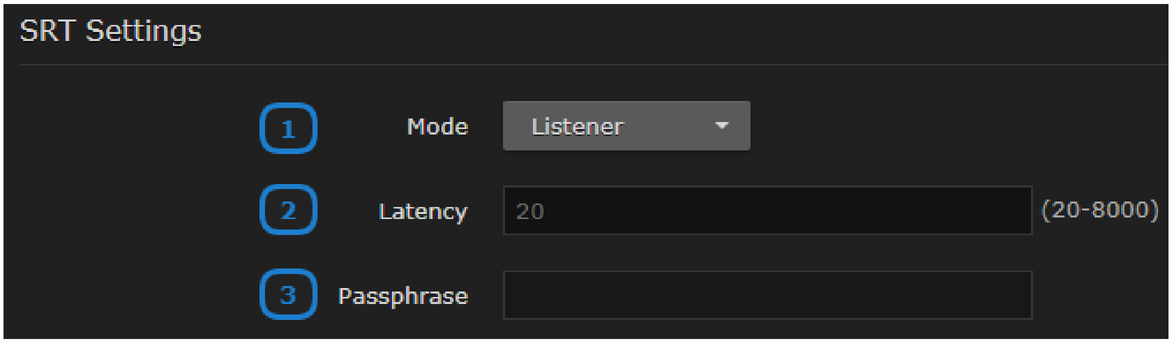
If TS over SRT, RTMP, or RTSP is chosen in Section 2 Source, follow the instructions below for your chosen stream protocol.

If TS over UDP or RTP is chosen in Section 2 Source, continue to Section 4 Destinations as there are no additional protocol settings.

TS over SRT TS over RTMP TS over RTSP

SRT Settings

The following figure shows the SRT Settings section of the Route screen. The numbered callouts in the figure indicate the step number in this procedure.


SRT Settings

1 Mode: Listener

2 Latency: 20 (20-8000)

3 Passphrase

1. Specify the SRT connection mode in the dropdown:
   - Caller: The SRT stream acts like a client and connects to a server listening and waiting for an incoming call.
   - Listener: The SRT stream acts like a server and listens and waits for clients to connect to it.
   -

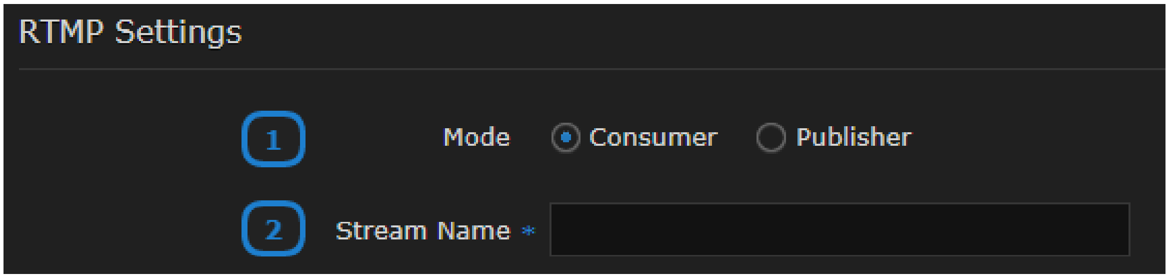
     > **Tip**
     >
     > To simplify firewall traversal, Rendezvous mode allows the encoder and decoder to traverse some firewall configurations without the need for IT to open a port.
2.

   > **Note**
   >
   > Latency is for the SRT protocol only and does not include the capture, encoding, decoding and display processes of the end-point devices.
3. If using Encryption on any destinations, enter the desired passphrase to protect the stream. Range = 10–79 UTF8 characters.

TS over SRT | **TS over RTMP** | TS over RTSP

RTMP Settings

The following figure shows the RTMP Settings section of the Route screen. The numbered callouts in the figure indicate the step number in this procedure.


RTMP Settings

1 Mode: ● Consumer ○ Publisher

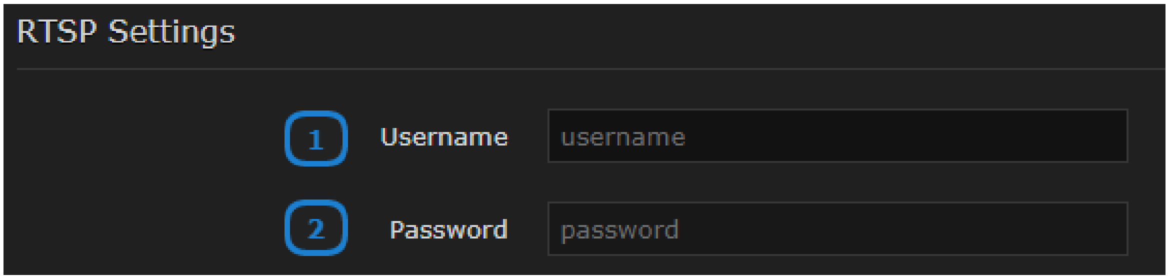
2 Stream Name *

1. Select the mode for connection to the RTMP stream:
   - Publisher — Stream sent directly to the Media Gateway/SRT Gateways's IP address. See Example: Connecting an RTMP Publisher Source for further details regarding RTMP Publisher mode.
   - Consumer — Stream available for Media Gateway/SRT Gateway to access on an RTMP server.
2. Enter the RTMP stream name.

TS over SRT TS over RTMP **TS over RTSP**

RTSP Settings

The following figure shows the RTSP Settings section of the Route screen. The numbered callouts in the figure indicate the step number in this procedure.



1. Specify the username for the RTSP stream.
2. Specify the password for the RTSP stream.

Note

Depending on the stream, the username/password may not be required.

Continue to Section 4 Destinations.

Section 4 Destinations

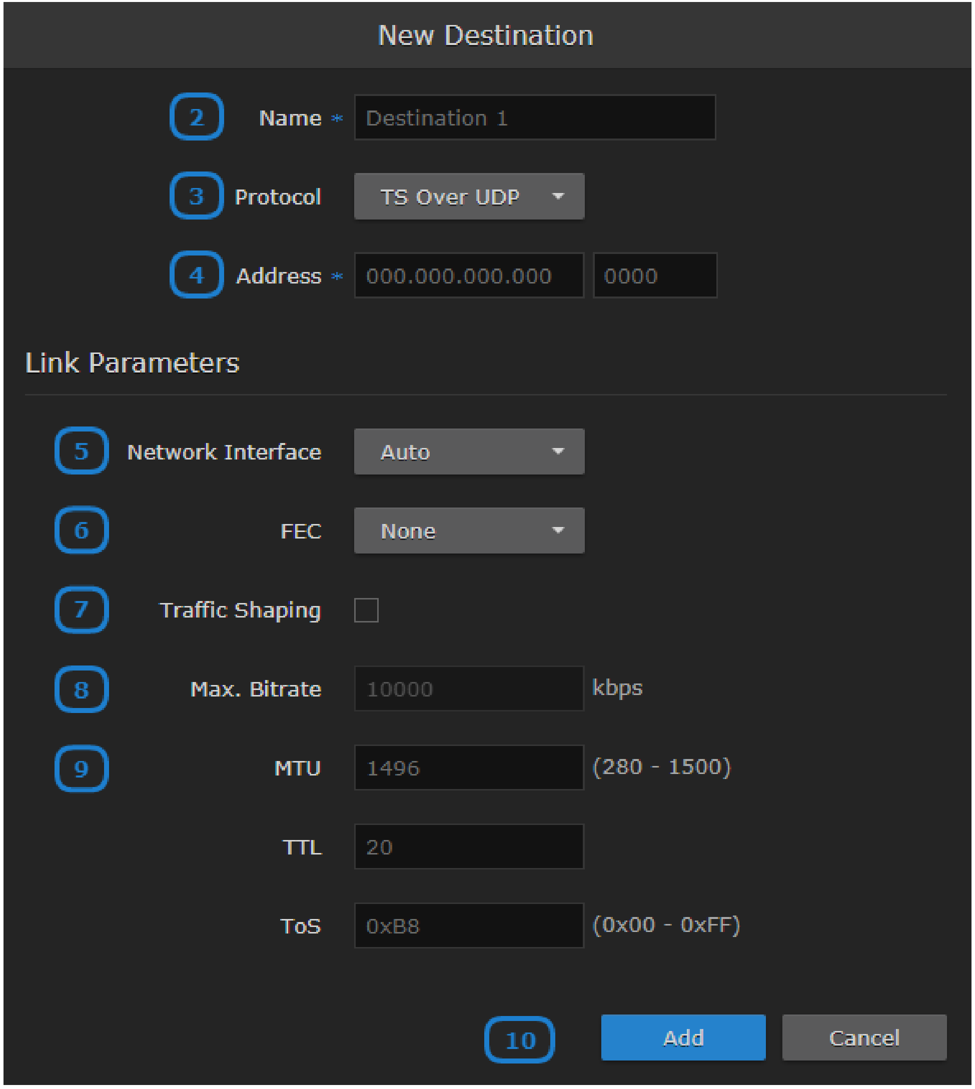
Creating a Channel	
Step	**Description**
1	Route Information
2	Source
3	Protocol Settings (SRT, RTMP, and RTSP only)
4	Destinations

Depending on the desired protocol for the destination, follow the steps below.

TS over UDP TS over SRT TS over RTP HLS

TS over UDP

1. On the Route screen click the **+Destination** button. The following dialog appears, with required fields identified with a blue asterisk. The numbered callouts in the figure indicate the step number in this procedure.



New Destination

Name * Destination 1

Protocol TS Over UDP

Address * 000.000.000.000 0000

Link Parameters

Network Interface Auto

FEC None

Traffic Shaping □

Max. Bitrate 10000 kbps

MTU 1496 (280 - 1500)

TTL 20

ToS 0xB8 (0x00 - 0xFF)

2. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

3. Select **TS over UDP** from the Protocol drop-down menu.
4. Enter the destination address and port number.
5. Choose the desired network interface to use for the destination in the dropdown. Available options depend on the hardware configuration.

6. **Note**

   VF FEC is a proprietary FEC and is not inter-operable with devices outside of the Haivision family.

7. **Tip**

   Enabling Traffic Shaping does *not* dynamically modify the video encoder bitrate.

8. If traffic shaping is enabled in the previous step, enter the Maximum Bitrate in kbps.
9. Enter values for MTU, TTL, ToS, and Latency:
   - MTU (Maximum Transmission Unit) — The maximum allowed size of IP packets for the outgoing data stream.
   - TTL (Time-to Live for stream packets) — The number of router hops the stream packet is allowed to travel/pass before it must be discarded. Value must be greater than or equal to 1.
   - ToS (Type of Service) — This value will be assigned to the Type of Service field of the IP Header for the outgoing streams. Value must be greater than or equal to 0.
10. Click the **Add** button.

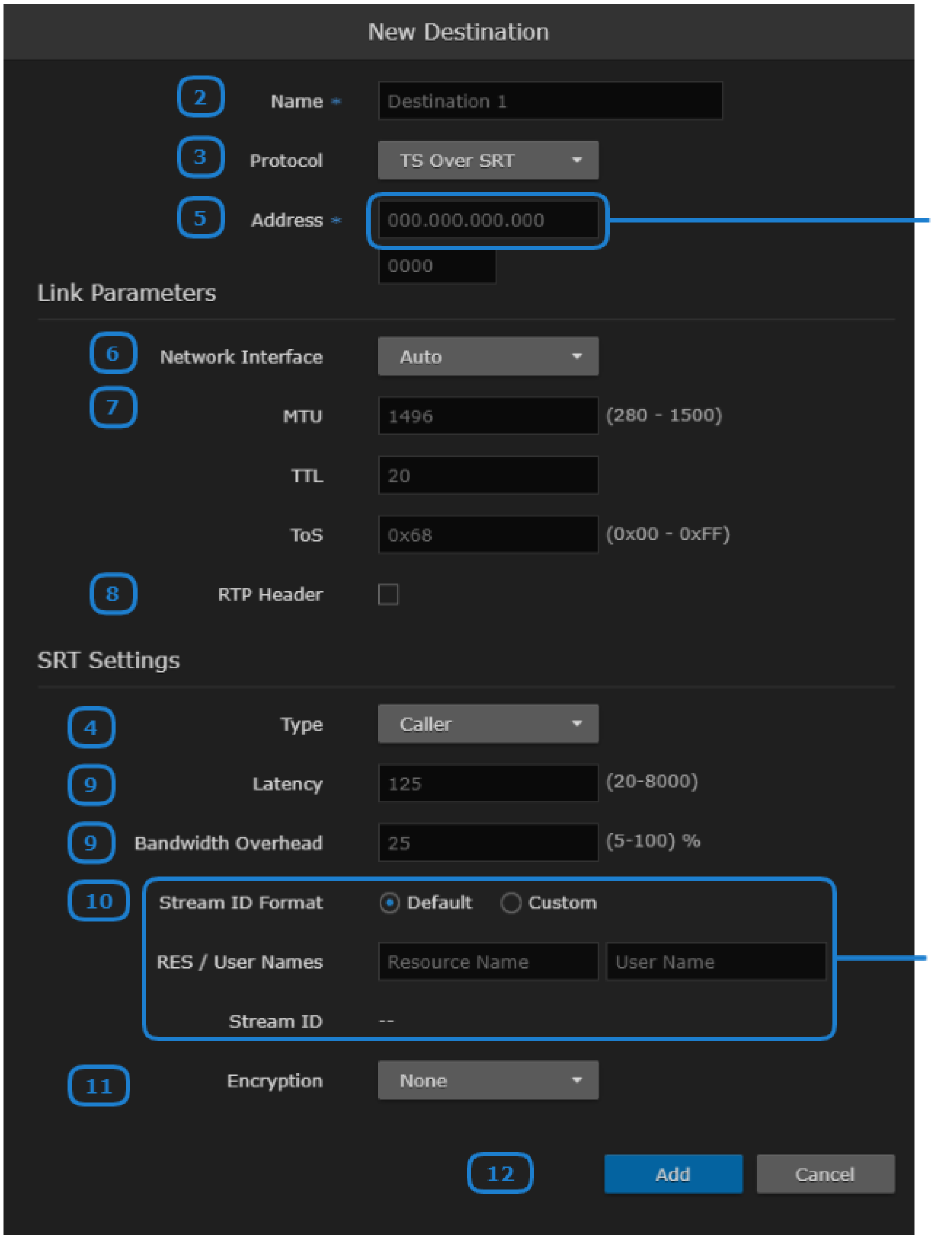
TS over UDP TS over SRT TS over RTP HLS

TS over SRT

Important

The System 100 Generation 2 appliance is not capable of sending a single 50-Mbps MPEG-TS source to two SRT destinations simultaneously (i.e., two 50-Mbps streams for 100-Mbps total output).

1. On the Route screen click the **+Destination** button. The following dialog appears, with required fields identified with a blue asterisk. The numbered callouts in the figure indicate the step number in this procedure.



New Destination

Name * Destination 1

Protocol TS Over SRT

Address * 000.000.000.000 0000

Link Parameters

Network Interface Auto

MTU 1496 (280 - 1500)

TTL 20

ToS 0x68 (0x00 - 0xFF)

RTP Header □

SRT Settings

Type Caller

Latency 125 (20-8000)

Bandwidth Overhead 25 (5-100) %

Stream ID Format ● Default ○ Custom

RES / User Names Resource Name User Name

Stream ID --

Encryption None

Does not appear for SRT Listener mode

Only available in SRT Gateway in Caller mode

2. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

3. Select **TS over SRT** from the Protocol drop-down menu.
4. In the SRT Settings section that appears, select the SRT mode: **Listener**, **Caller**, or **Rendezvous**.
5. If you selected Listener in the previous step, enter the listening port number.
   If you selected Caller or Rendezvous in the previous step, enter the destination address and port number.
6. Choose the desired network interface to use for the destination in the dropdown. Available options depend on the hardware configuration.
7. Enter values for MTU, TTL, and ToS:

- MTU (Maximum Transmission Unit) — The maximum allowed size of IP packets for the outgoing data stream.
- TTL (Time-to Live for stream packets) — The number of router hops the stream packet is allowed to travel/pass before it must be discarded. Value must be greater than or equal to 1.
- ToS (Type of Service) — This value will be assigned to the Type of Service field of the IP Header for the outgoing streams. Value must be greater than or equal to 0.

8. In the SRT settings, enter the values for Latency and Bandwidth Overhead:
   - **Note**

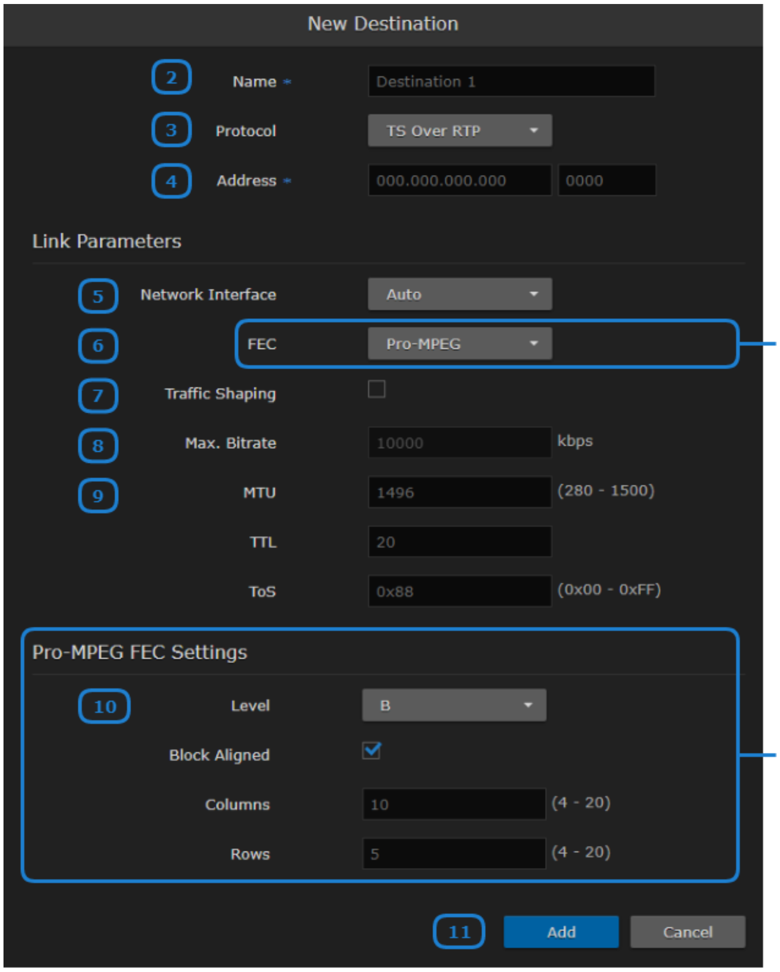
     Latency applies to the SRT protocol only and does not include the capture, encoding, decoding and display processes of the end-point devices.
   - **Note**

     SRT streams may temporarily overshoot the defined bandwidth overhead limit.
9. If you have a Haivision SRT Gateway, for SRT Caller mode:
   - Select the desired Stream ID format.
   - If Default Stream ID format is selected, enter the Resource Name and User Name. The resulting Stream ID appears below.
   - If Custom Stream ID format is selected, enter the desired text string for the Stream ID.
10. Enable or disable AE128 or AE256 encryption.
11. Click the **Add** button.

TS over UDP | TS over SRT | TS over RTP | HLS

TS over RTP

1. On the Route screen click the **+Destination** button. The following dialog appears, with required fields identified with a blue asterisk. The numbered callouts in the figure indicate the step number in this procedure.


New Destination

Name * Destination 1

Protocol TS Over RTP

Address * 000.000.000.000 0000

Link Parameters

Network Interface Auto

FEC Pro-MPEG

Traffic Shaping □

Max. Bitrate 10000 kbps

MTU 1496 (280 - 1500)

TTL 20

ToS 0x88 (0x00 - 0xFF)

Pro-MPEG FEC Settings

Level B

Block Aligned ☑

Columns 10 (4 - 20)

Rows 5 (4 - 20)

Only available in SRT Gateway

Only available in SRT Gateway

2. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

3. Select **TS over RTP** from the Protocol drop-down menu.
4. **Tip**

   An even-numbered port is required for RTP, as recommended in RFC 3550. (The next odd-numbered port is typically reserved for RTCP messages.)

5. Choose the desired network interface to use for the destination in the dropdown. Available options depend on the hardware configuration.
6. **Note**

   PRO-MPEG FEC is available only on Haivision SRT Gateway.

   Important

- When PRO-MPEG is selected and Level A is selected in step 10, the next even numbered port following the port specified in Step 4 is allocated to the column FEC packets.
- When PRO-MPEG is selected and Level B is selected in step 10, the two even numbered ports following the port specified in Step 4 are allocated to the column and row FEC packets, respectively.

7. **Tip**

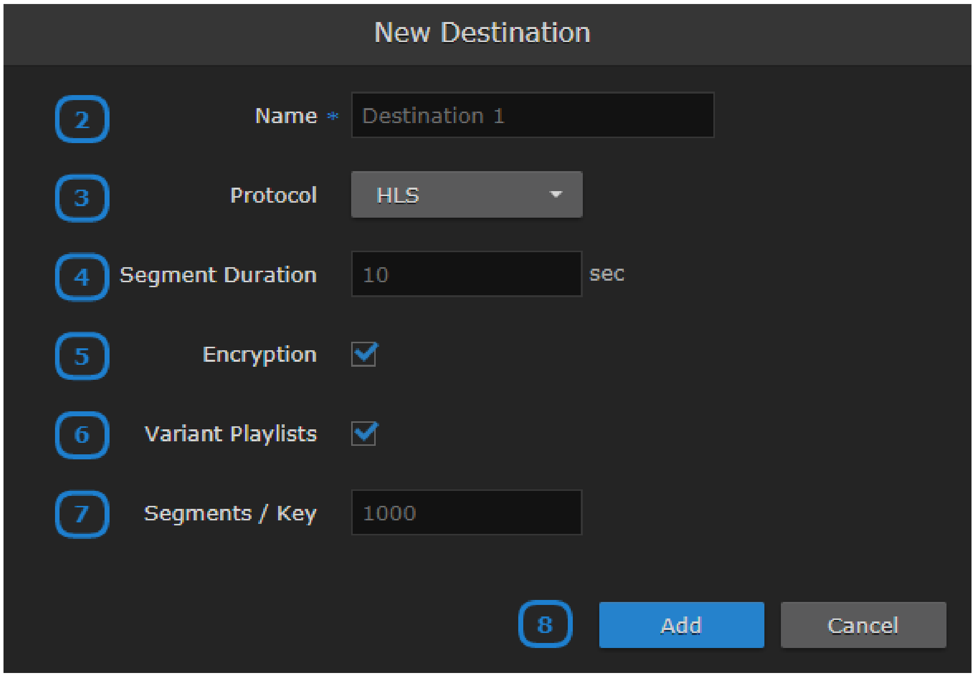
   Enabling Traffic Shaping does *not* dynamically modify the video encoder bitrate.

8. If traffic shaping is enabled in the previous step, enter the Maximum Bitrate in kbps.
9. Enter values for MTU, TTL, and ToS:
   - MTU (Maximum Transmission Unit) — The maximum allowed size of IP packets for the outgoing data stream.
   - TTL (Time-to Live for stream packets) — The number of router hops the stream packet is allowed to travel/pass before it must be discarded. Value must be greater than or equal to 1.
   - ToS (Type of Service) — This value will be assigned to the Type of Service field of the IP Header for the outgoing streams. Value must be greater than or equal to 0.
10. For Haivision SRT Gateway, if PRO-MPEG FEC is enabled in step 6, enter the PRO-MPEG values:
    - Level — The level of FEC protection: A (Column only) uses the column FEC stream, or B (Row and Column) uses both column and row FEC streams.
    - Block Aligned — Specifies the type of FEC matrix scheme.Check this checkbox to align the FEC blocks in the matrix structure (i.e., sequential columns within a group start on the same row), see Annex C of SMPTE 2022-1. If left unchecked, the blocks are a staggered series of FEC packets (i.e., each column starts on the row below the row on which the previous column started), see Annex B of SMPTE 2022-1.
    - Columns — The number of columns in the FEC matrix.
    - Rows — The number of rows in the FEC matrix.
11. Click the **Add** button.

TS over UDP TS over SRT TS over RTP **HLS**

HLS

1. On the Route screen click the **+Destination** button. The following dialog appears, with required fields identified with a blue asterisk. The numbered callouts in the figure indicate the step number in this procedure.



Name * Destination 1

Protocol HLS

Segment Duration 10 sec

Encryption ☑

Variant Playlists ☑

Segments / Key 1000

2. **Tip**

   Keep the name under 18 characters to have the entire name displayed in the Browse Routes screen. Longer names are still visible, but you must hover your cursor over the name for a popup to appear displaying the entire name.

3. Select **HLS** from the Protocol drop-down menu.
4. **Note**

   Apple strongly recommends a 10 second target duration (See **this link**). If you use a smaller target duration, you increase the likelihood of a stall. If you've got live content being delivered through a CDN, there will be propagation delays, and for this content to make it all the way out to the edge nodes on the CDN it will be variable. In addition, if the client is fetching the data over a cellular network there will be higher latencies. Both of these factors make it much more likely you'll encounter a stall if you use a small target duration.

5. Enable or disable HLS Encryption (AES-128 using 16-octet keys).
6. Enable or disable HLS v4 Variant Playlists. If the destination does not support variant playlists, deselect this checkbox.
7. If HLS encryption is enabled, in Segments/Keys enter how often a new random key file is inserted. That is, a new random key file is inserted every *n* media segments (key rotation). Each group of *n* segments is encrypted using a different key.
8. Click the **Add** button.

Return to Step #4 in **Creating a Route**.

Example: Connecting an RTMP Publisher Source

Media Gateway/SRT Gateway supports either publisher or consumer RTMP input streams:

- Publisher — Stream sent directly to the HMG/HSG's IP address

- Consumer — Stream available for HMG/HSG to access on an RTMP server

There are a few requirements when connecting Media Gateway/SRT Gateway as an RTMP publisher. Therefore, the procedure for creating an RTMP route as publisher is shown below:

1. On your source streaming device, output an RTMP stream with the following URL format:
   `rtmp://<IP>:1935/live/<stream_name>`
   where, `<IP>` is the IP address of the Media Gateway/SRT Gateway and `<stream_name>` is the desired name of the stream.

   > **Note**
   >
   > For RTMP Publisher mode, the port must be 1935 and the Application Name must be 'live'. Currently, neither of these options are configurable.

2. On the Media Gateway/SRT Gateway, create a new route. See Creating a Route for more details. In the New Route screen:
   a. Populate desired route and source names.
   b. In Protocol, select **RTMP**.
   c. Under the RTMP Settings section for Mode, click **Publisher**.
   d. In Stream name, enter the stream name as defined in step 1.
   e. Click the **+Destination** button and enter the desired output streaming parameters to send a UDP, SRT, RTP, or HLS stream to your destination device.
3. On the Media Gateway/SRT Gateway, start the stream. See Starting, Stopping, and Deleting a Route for details.

In the Browse Routes screen, the status indicators notify you if there are any issues receiving the incoming RTMP stream. See Browse Routes Screen for a description of the status indicators.

Related Topics

- Creating a Route
- Starting, Stopping, and Deleting a Route

Editing a Route

To edit a route:

1. On the Browse Routes screen, click the **Route Name** for the listing you want to edit.
2. In the the Edit Route screen, adjust the settings as desired.
3. Click the **Apply** button to save the new settings.

Related Topics

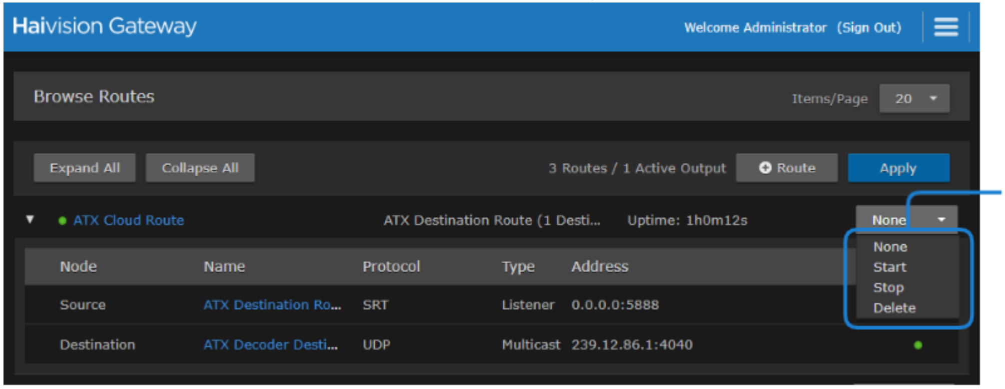
- Creating a Route
- Starting, Stopping, and Deleting a Route

Starting, Stopping, and Deleting a Route

> **Note**
>
> When stopping a route, the current state of the destinations is preserved. For example, if a destination is stopped prior to its route being stopped and the route is restarted, the destination stays stopped.

To start a route:

1. On the Browse Routes screen, locate the desired route listing and select **Start**, **Stop**, or **Delete** from the drop-down menu at the end of the listing.



ATX Cloud Route   ATX Destination Route (1 Desti...   Uptime: 1h0m12s

Node	Name	Protocol	Type	Address
Source	ATX Destination Ro...	SRT	Listener	0.0.0.0:5888
Destination	ATX Decoder Desti...	UDP	Multicast	239.12.86.1:4040

Route drop-down menu

2. Click **Apply**.

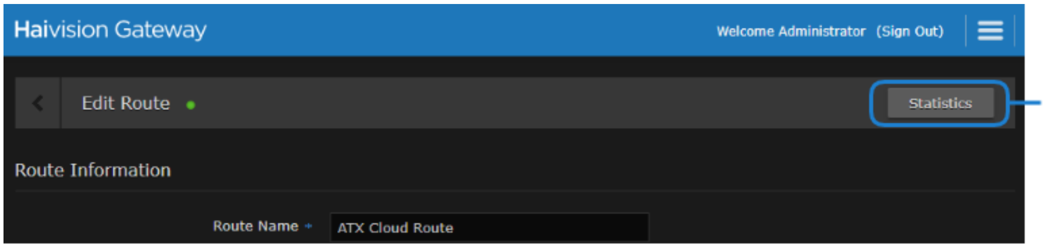
Related Topics

- Creating a Route
- Editing a Route
- Viewing a Route’s Statistics

Viewing a Route’s Statistics

A route's statistics gives you access to real-time data regarding the route's source and destinations. To view statistics for a route:

1. On the Browse Routes screen, click on the the desired route listing to open the Edit Route page.
2. Click the **Statistics** button in the title bar.



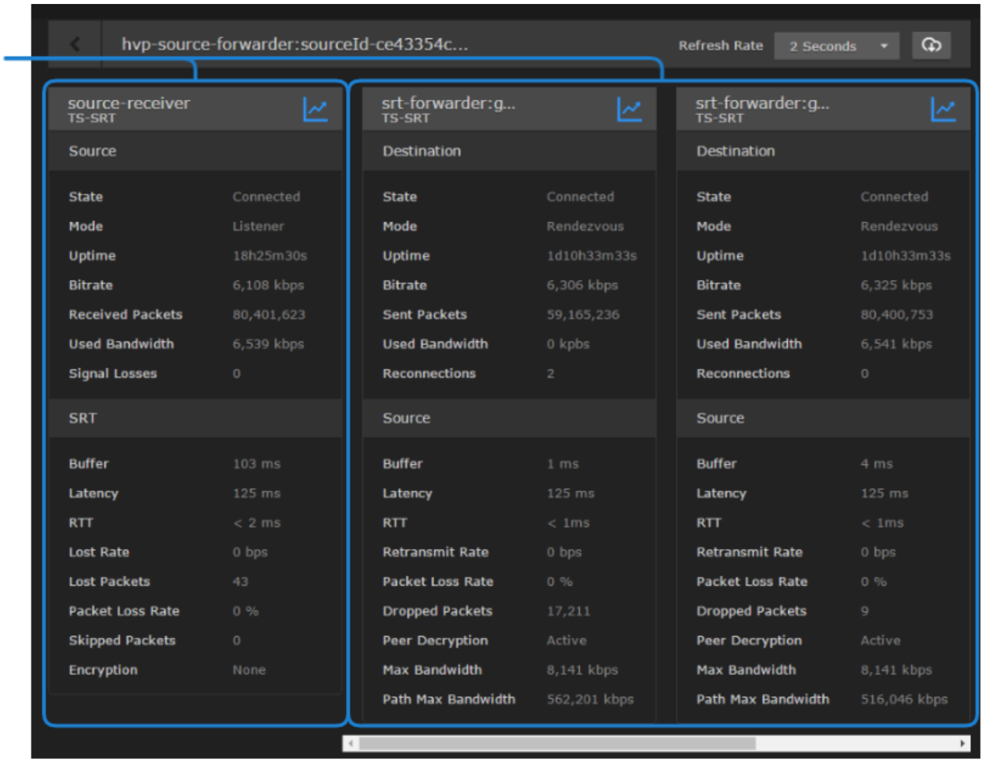
Route Name * ATX Cloud Route

Statistics button

3. When the Statistics Overview page appears, you can view the pertinent data for the routes' source and destinations. See **Stream Statistics Field Descriptions** for detailed descriptions of each statistic.

The information for the source and destination(s) appears in a column identified by the name and protocol in the heading.

The column sections are organized by Type.



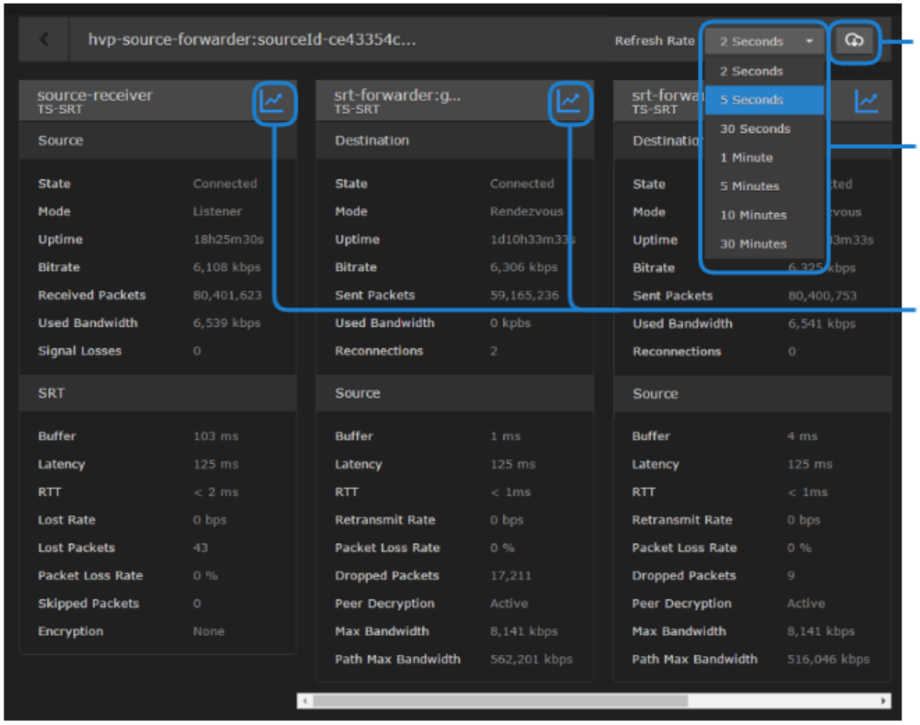
hvp-source-forwarder:sourceId-ce43354c... Refresh Rate 2 Seconds

source-receiver TS-SRT	
Source	
State	Connected
Mode	Listener
Uptime	18h25m30s
Bitrate	6,108 kbps
Received Packets	80,401,623
Used Bandwidth	6,539 kbps
Signal Losses	0
SRT	
Buffer	103 ms
Latency	125 ms
RTT	< 2 ms
Lost Rate	0 bps
Lost Packets	43
Packet Loss Rate	0 %
Skipped Packets	0
Encryption	None

srt-forwarder:g... TS-SRT	
Destination	
State	Connected
Mode	Rendezvous
Uptime	1d10h33m33s
Bitrate	6,306 kbps
Sent Packets	59,165,236
Used Bandwidth	0 kpbs
Reconnections	2
Source	
Buffer	1 ms
Latency	125 ms
RTT	< 1ms
Retransmit Rate	0 bps
Packet Loss Rate	0 %
Dropped Packets	17,211
Peer Decryption	Active
Max Bandwidth	8,141 kbps
Path Max Bandwidth	562,201 kbps

srt-forwarder:g... TS-SRT	
Destination	
State	Connected
Mode	Rendezvous
Uptime	1d10h33m33s
Bitrate	6,325 kbps
Sent Packets	80,400,753
Used Bandwidth	6,541 kbps
Reconnections	0
Source	
Buffer	4 ms
Latency	125 ms
RTT	< 1ms
Retransmit Rate	0 bps
Packet Loss Rate	0 %
Dropped Packets	9
Peer Decryption	Active
Max Bandwidth	8,141 kbps
Path Max Bandwidth	516,046 kbps

4. To change the refresh rate, click the associated drop-down menu.



hvp-source-forwarder:sourceId-ce43354c... Refresh Rate 2 Seconds

source-receiver TS-SRT	
Source	
State	Connected
Mode	Listener
Uptime	18h25m30s
Bitrate	6,108 kbps
Received Packets	80,401,623
Used Bandwidth	6,539 kbps
Signal Losses	0
SRT	
Buffer	103 ms
Latency	125 ms
RTT	< 2 ms
Lost Rate	0 bps
Lost Packets	43
Packet Loss Rate	0 %
Skipped Packets	0
Encryption	None

srt-forwarder:g... TS-SRT	
Destination	
State	Connected
Mode	Rendezvous
Uptime	1d10h33m33s
Bitrate	6,306 kbps
Sent Packets	59,165,236
Used Bandwidth	0 kpbs
Reconnections	2
Source	
Buffer	1 ms
Latency	125 ms
RTT	< 1ms
Retransmit Rate	0 bps
Packet Loss Rate	0 %
Dropped Packets	17,211
Peer Decryption	Active
Max Bandwidth	8,141 kbps
Path Max Bandwidth	562,201 kbps

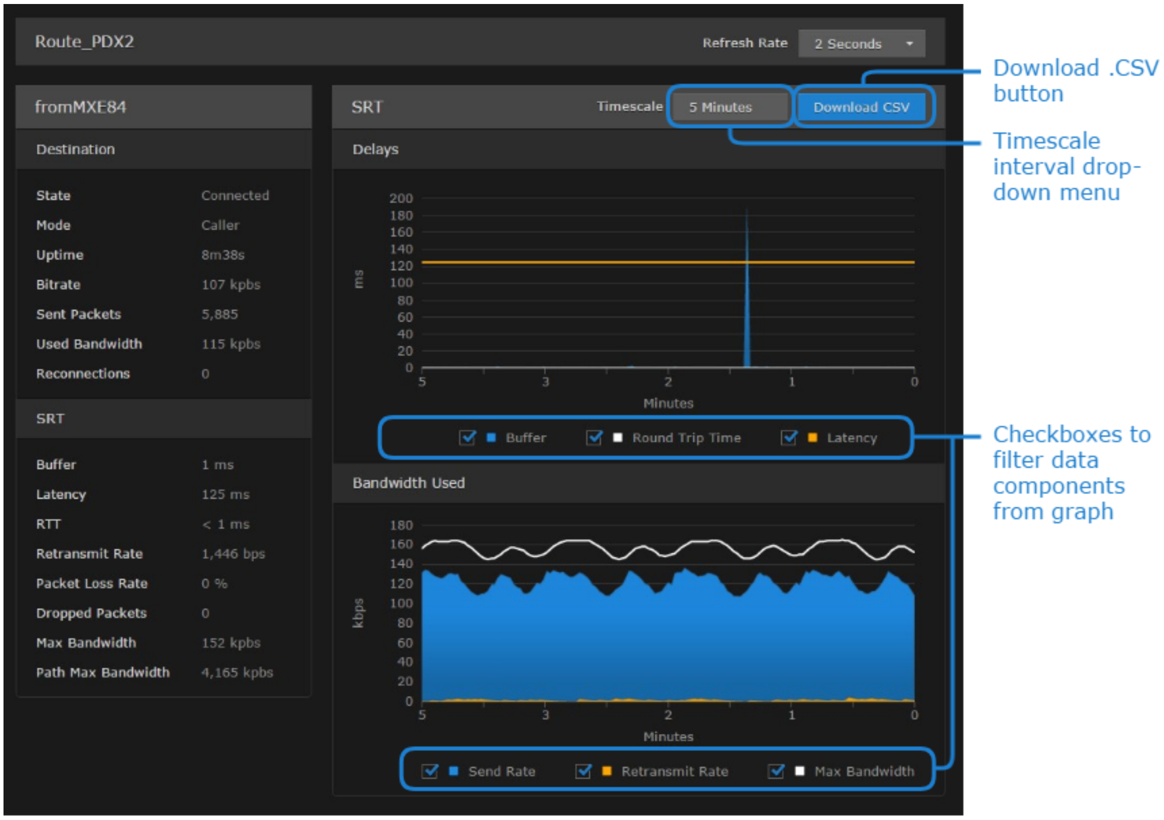
srt-forwa TS-SRT	
Destinatio	
State	ted
Mode	vous
Uptime	3m33s
Bitrate	6,325 kbps
Sent Packets	80,400,753
Used Bandwidth	6,541 kbps
Reconnections	0
Source	
Buffer	4 ms
Latency	125 ms
RTT	< 1ms
Retransmit Rate	0 bps
Packet Loss Rate	0 %
Dropped Packets	9
Peer Decryption	Active
Max Bandwidth	8,141 kbps
Path Max Bandwidth	516,046 kbps

Download statistics button

Refresh rate drop-down menu

Graph icon opens a real-time chart of the data. Only available for SRT sources/ destinations.

5. To view the data graphically, click the 📈 icon for the desired route. A separate Statistics Graph View window opens, displaying the data numerically and graphically for that route. This window remains open until you manually close it.



Route_PDX2 Refresh Rate: 2 Seconds

fromMXE84

Destination

State	Connected
Mode	Caller
Uptime	8m38s
Bitrate	107 kpbs
Sent Packets	5,885
Used Bandwidth	115 kpbs
Reconnections	0

SRT

Buffer	1 ms
Latency	125 ms
RTT	< 1 ms
Retransmit Rate	1,446 bps
Packet Loss Rate	0 %
Dropped Packets	0
Max Bandwidth	152 kpbs
Path Max Bandwidth	4,165 kpbs

SRT Timescale: 5 Minutes

Download .CSV button

Timescale interval drop-down menu

Checkboxes to filter data components from graph

6. To save the data for use with another application (such as a spreadsheet), click the **Download CSV** button. Typically, this downloads the data in a comma-separated values text file. For Safari browsers, this displays the file in a new window. Right-click the browser window and select "Save Page as..." to download the file.
7. You can adjust the real-time graph by:
   - Setting the Refresh Rate with the drop-down menu in the title bar.
   - Changing the scale interval using Timescale drop-down menu. This adjusts the x-axis in the graphs. Options include: 5 minutes, 1 hour, and 24 hours.
   - Checking/unchecking the checkboxes of each legend to display/hide data components.
   - Hovering your mouse cursor over the graph to reveal the time and value of the selected data point.

> **Tip**
>
> With the version 3.2 release, HMG/HSG supports client-level status and statistics on SRT listener outputs via the REST API. See **Get SRT Client Statistics** for more details. Access to this data in the web interface will be available in a future release.

Related Topics

- Creating a Route
- Starting, Stopping, and Deleting a Route
- Reports (Logs)

Stream Statistics Field Descriptions

The following tables list the available stream statistics fields.

General SRT Pro-MPEG FEC

General

Statistic	Description/Values
State	The current operating status of the stream, either: • Disconnected • Connecting • Connection established • Connected
Mode	• For UDP or RTP: Unicast or Multicast • For HLS: HLS • For SRT: Caller, Listener, or Rendezvous
Uptime	The elapsed running time of the stream.
Bitrate	The stream bitrate (in kbps).
Received Packets (Source) Sent Packets (Destination)	Number of packets received/sent for that stream.
Used Bandwidth	Bandwidth used.
Signal Losses	Number of signal losses.

General SRT Pro-MPEG FEC

SRT

Statistic	Description/Values
Buffer	**Tip** If the buffer goes to 0 often, then there is most likely insufficient BW to support the desired bitrate. In this case, decrease your bitrate. If the Buffer occasionally goes to 0, then the SRT Latency should be increased.
Latency	Maximum of the decoder and encoder configured Latency. For example: • Encoder Configured SRT Latency = 750 ms • Decoder Configured SRT Latency = 20 ms • The SRT Stats Latency (which is the current SRT connection applied Buffering Latency) = 750 (largest of the two). At startup, handshake exchanges the value configured on both sides and the largest one is selected. The decoder default is set to the minimum (20ms), so the latency value can be completely controlled from the encoder side.
RTT	Measured round-trip time. Round Trip Time (RTT) is the time it would take for a packet to travel from a specific source to a specific destination and back again. In SRT, this is measured as the time it takes for the destination device to send an acknowledgment (ACK) packet, and then receive a corresponding confirmation (ACKACK) packet.

Other SRT statistics are available depending on whether the route is a source route or a destination route, as described below.

SRT Source SRT Destination

SRT Source

Statistic	Description/Values
Lost Rate	Rate at which the source route is receiving lost packets in bits/s. See the following Lost Packets description for more details.
Lost Packets	Number of SRT packets reported missing on the UDP connection. For each "hole" detected in the packet sequence, a request to re-transmit the lost packet is sent to the sender. This lost packet may (or may not) be re-covered by the re-transmit request. ⚠ **Note** This is the raw number of packets dropped by the network. Most are recovered by retransmission at the source and so do not necessarily result in any artifacts.
Packet Loss Rate	SRT packet loss rate, expressed as a percentage of packets lost with respect to packets sent. The SRT on the sender side cannot deliver the packets within the defined latency time and dropped the packet. This occurs when the packets cannot be transmitted fast enough due to low latency, not enough bandwidth overhead, etc.
Skipped Packets	Packets that have arrived too late, or that never arrive at all from the receiver. If the "time to play" for a packet has passed, and it has either not arrived or arrives after the content it is associated with has already played, that packet is reported as "skipped". Usually this results in some type of video artifact (a replayed frame or video blocking). This is the raw number of packets skipped and are not recoverable by the SRT protocol. • If this statistic increments slowly, the best thing to do is increase the SRT latency. • If this statistic increments in large jumps, the best thing to do is lower your video bitrate or increase your overhead if you have available bandwidth. ⚠ **Note** The skipped packets value from the receiver does not correlate to the dropped packets value from the sender, as they count different types of irrecoverable packets.
Encryption	SRT encryption type: None, AES128, or AES256.
Decryption	SRT decryption state: Active, Initializing, Inactive (no passphrase), Inactive (invalid passphrase).

SRT Source SRT Destination

SRT Destination

Statistic	Description/Values
Retransmit Rate	Rate at which the destination route is resending lost packets in bits/s.
Packet Loss Rate	SRT packet loss rate, expressed as a percentage of packets lost with respect to packets sent. The SRT on the sender side cannot deliver the packets within the defined latency time and dropped the packet. This occurs when the packets cannot be transmitted fast enough due to low latency, not enough bandwidth overhead, etc.
Dropped Packets	Number of packets reported missing by the SRT sender, as the output queue has overflowed. The most likely cause for this is the system is overloaded and cannot process the data fast enough. This is the raw number of packets dropped and are not recoverable by the SRT protocol. ⚠ **Note** The skipped packets value from the receiver does not correlate to the dropped packets value from the sender, as they count different types of irrecoverable packets.
Max Bandwidth	Maximum bandwidth used by the source device for this SRT stream (i.e. the current total of audio/video bit rate plus ancillary data plus the SRT bandwidth overhead).
Path Max Bandwidth	An estimate of the maximum path/link bandwidth as viewed from the destination.

General SRT **Pro-MPEG FEC**

Pro-MPEG FEC

> **Note**
>
> PRO-MPEG FEC is available only on Haivision SRT Gateway.

Statistic	**Description/Values**
Lost Packets	Number of lost FEC packets.
Recovered Packets	Number of recovered FEC packets.
Unrecovered Packets	Number of unrecovered FEC packets.
Reordered Packets	Number of reordered FEC packets.
Level	The level of FEC protection: • A (Column only): uses the column FEC stream. • B (Row and Column): uses both column and row FEC streams.
Block Aligned	The type of FEC matrix scheme: • True: Sequential columns within a group start on the same row. • False: Each column starts on the row below the row on which the previous column started.
Columns/Rows	Number of columns and number of rows are the dimensions of the FEC matrix.

Working with Destinations

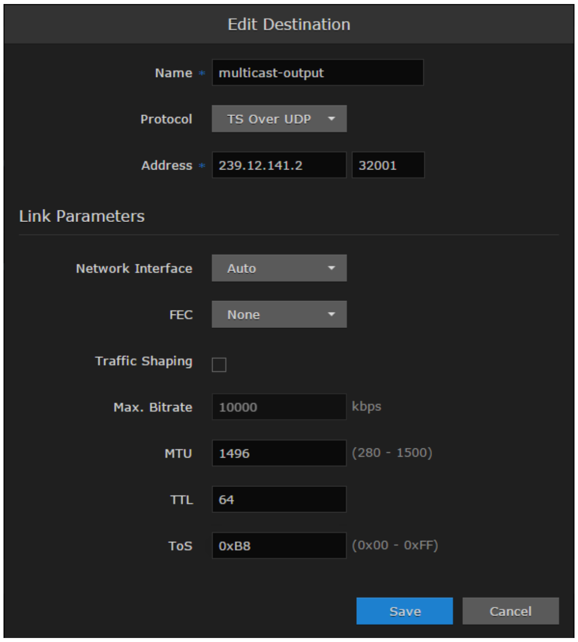
> **Note**
>
> Stopping a route saves the current state of the destinations and stops all destinations for the route. Starting a route resumes the saved state of the destinations.

Editing the Destination

To change the Destination settings:

1. On the Browse Routes screen, click the individual ▶ icon or the **Expand All** button to reveal the destination specifics for the route.
2. Locate the destination you want to configure and click it to open the Edit Destination dialog.

3. On the Edit Destination dialog, adjust the settings as desired. See **Section 4 Destinations** for definitions of the fields.



Edit Destination

Name * multicast-output

Protocol TS Over UDP

Address * 239.12.141.2 32001

Link Parameters

Network Interface Auto

FEC None

Traffic Shaping □

Max. Bitrate 10000 kbps

MTU 1496 (280 - 1500)

TTL 64

ToS 0xB8 (0x00 - 0xFF)

4. Click the **Save** button.

The new settings appear in the Destination section for the route.

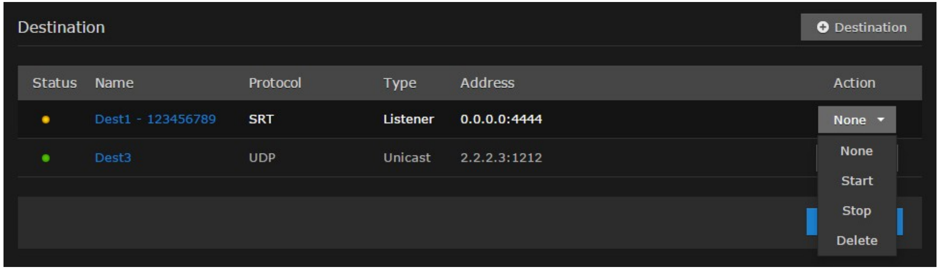
Important

Destination operations (Add, Edit and Actions), are not saved to the server until the **Apply** button is clicked on the Browse Routes screen.

Starting, Stopping, and Deleting a Destination Node

To start, stop, or delete a destination node:

1. On the Browse Routes screen, click on the desired route to open the Edit Route page.
2. On the Edit Route page, locate the desired destination listing.
3. Click the drop-down menu at the end of the listing and select the **Start**, **Stop**, or **Delete** option. If there are other destinations that you want to stop, start, or delete, do so now.



Destination

Status	Name	Protocol	Type	Address	Action
●	Dest1 - 123456789	SRT	Listener	0.0.0.0:4444	None
●	Dest3	UDP	Unicast	2.2.2.3:1212	

4. Click **Apply** for your requested action(s) to take effect.

Note

If the route is stopped, the Start/Stop options are not available.

Performing Admin Tasks

Note

The intended audience for this content is system integrators and administrators with administrative privileges.
For information on options and tasks available to non-administrative users, such as browsing routes, please refer to Working with Media Gateway and SRT Gateway.

Topics Discussed

System Activity

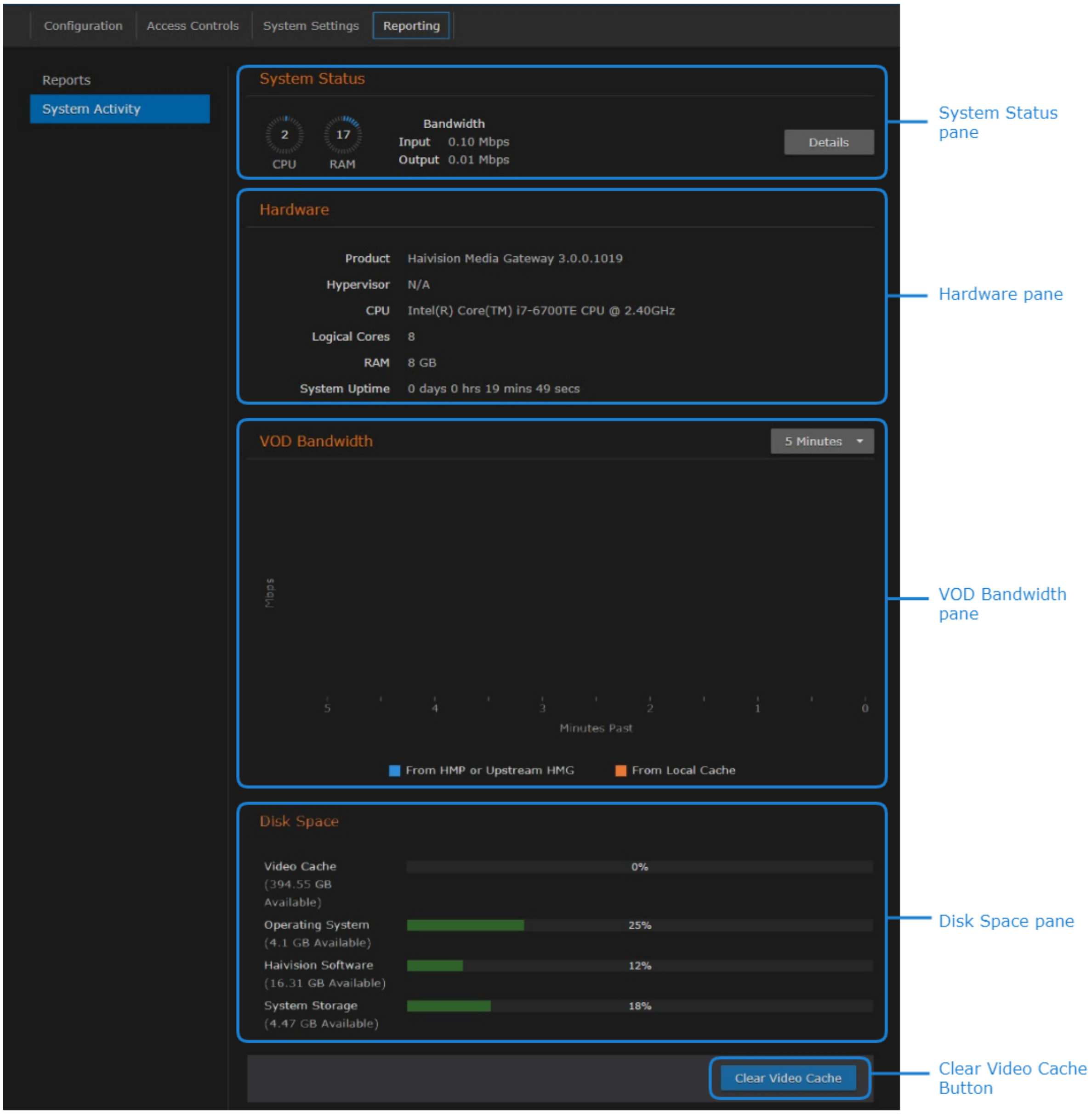
The web interface includes dashboards to provide a quick view of the overall system health.

Viewing the System Activity Dashboard

The System Activity dashboard shows the current status snapshot of your system as a whole, including disk space and Media Platform bandwidth.

To view the system's activity dashboard:

1. Click the ☰ icon and click **Administration**.
2. Click **Reporting** in the admin toolbar and click **System Activity** in the sidebar.
   The System Activity dashboard appears.



System Status

2 CPU

17 RAM

Bandwidth
Input 0.10 Mbps
Output 0.01 Mbps

Hardware

Product	Haivision Media Gateway 3.0.0.1019
Hypervisor	N/A
CPU	Intel(R) Core(TM) i7-6700TE CPU @ 2.40GHz
Logical Cores	8
RAM	8 GB
System Uptime	0 days 0 hrs 19 mins 49 secs

VOD Bandwidth

Disk Space

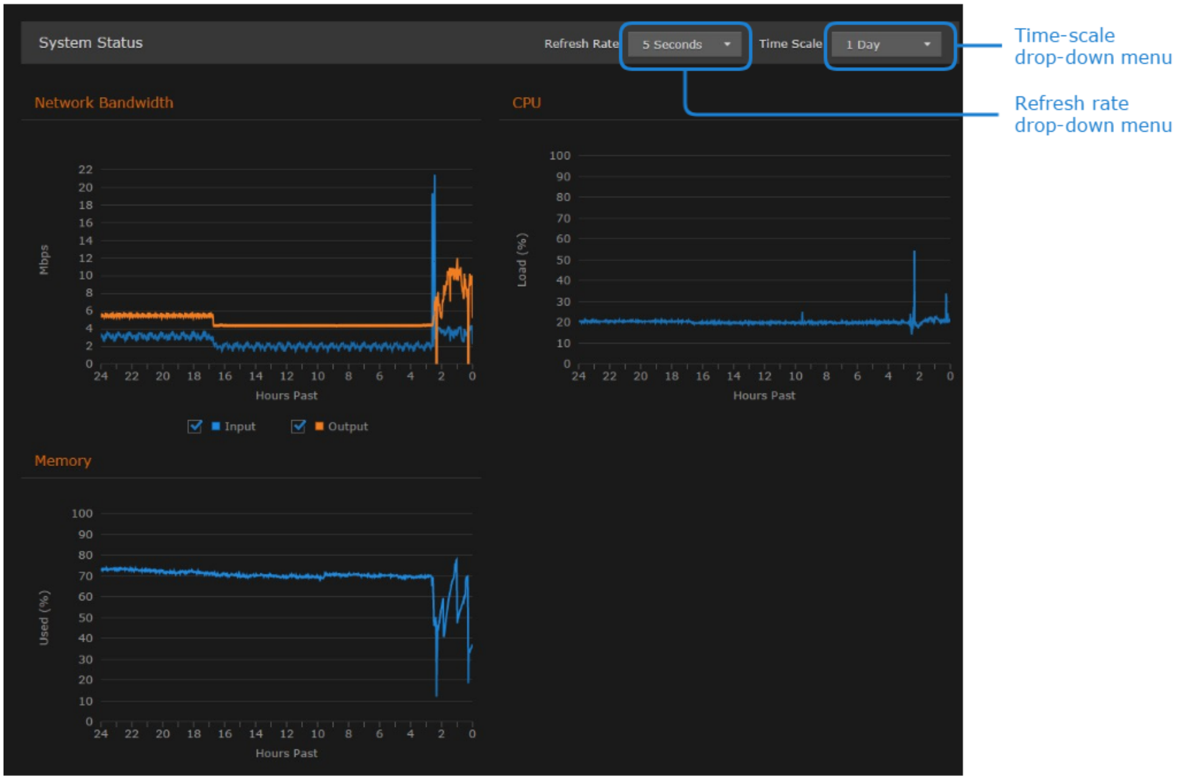
Video Cache (394.55 GB Available)	0%
Operating System (4.1 GB Available)	25%
Haivision Software (16.31 GB Available)	12%
System Storage (4.47 GB Available)	18%

The *System Status* pane provides the following information:

- CPU usage
- Memory usage
- Input/Output network bandwidth

Clicking the **Details** button in the System Status pane opens a new browser window showing graphs of the network bandwidth and CPU and memory usage. Use the drop-down menus at the top of the window to specify the refresh rate and time scale for the graphs.

The refresh rate indicates how often the graph is updated and the time scale indicates the amount of time displayed on the graph. When the actual timeframe exceeds the specified time scale, only the most recent data of the specified length of time is displayed. That is, if 5 Minutes is selected, only the last five minutes of data is displayed. Any data older than five minutes is dropped from the graph.



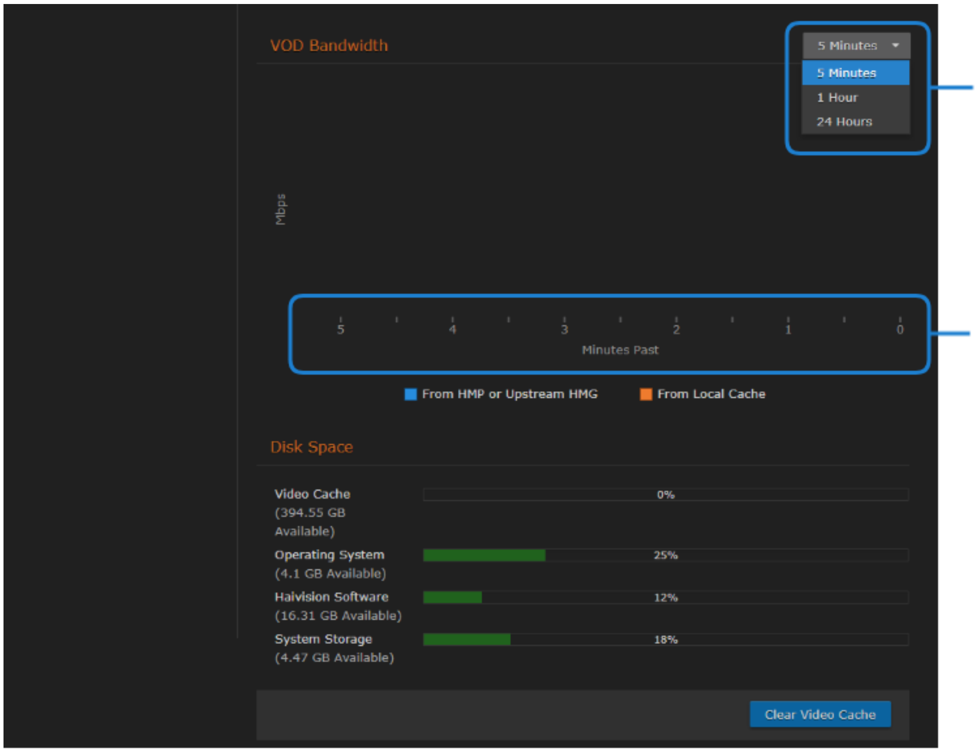
The Hardware pane provides the following information:

- Product edition and version
- VMware information (if applicable)
- System uptime

When paired with a Haivision Media Platform, the VOD Bandwidth pane appears and charts usage in Mbps. The checkboxes below the graph allow you to tailor the display to include information from Media Platform, the cache, or both.

Use the drop-down menu at the top of the chart to specify the display window for the graph starting from now (that is, "0"). When the actual timeframe exceeds the specified display window, only the most recent data of the specified length of time is displayed.

That is, if 5 Minutes is selected, only the last five minutes of data is displayed. Any data older than five minutes is dropped from the graph.



Video Cache (394.55 GB Available)	0%
Operating System (4.1 GB Available)	25%
Haivision Software (16.31 GB Available)	12%
System Storage (4.47 GB Available)	18%

Display window duration drop-down menu

Display window duration along x-axis

In the *Disk Space* pane, you see information regarding disk usage.

Disk Space	Corresponding Directory/Partition Location
Video Cache	If Network Storage is disabled (default), `/assets` . If Network Storage is enabled, NFS mount location.
Operating System	`/`
Haivision Software	`/opt`
System Storage	`/var`

The bars are color-coded to alert you as designated space reaches usage thresholds:

Bar Color	Indicates Usage Threshold
🟢	0–74% of the space is in use. *Only 25% remains available.*
🟡	75–90% of the space is in use. *Only 10% remains available.*
🔴	90–100% of the space is in use.

Click **Clear Video Cache** to delete cached video previously downloaded from HMP. When prompted to confirm, click **Clear**.

Related Topics

- Viewing a Route's Statistics
- Reports (Logs)

- Clearing the Video Cache
- Network Storage
- Viewing the Status of a License
- Downloading System Updates
- Viewing the Version Number

Clearing the Video Cache

When streaming, it may be necessary to clear the cached videos.

To clear the video cache:

1. Click the ☰ icon and click **Administration**.
2. Click **Reporting** in the admin toolbar and click **System Activity** in the sidebar.
3. In the Disk Space pane, click the **Clear Video Cache** button to delete the cached video previously downloaded from Media Platform.
4. When prompted to confirm, click **Clear**.

Related Topics

- Viewing a Route's Statistics
- Network Storage

Reports (Logs)

Media Gateway/SRT Gateway generates a number of different logs providing system, application, and diagnostic messages. These logs are described in the following table:

Log Name	Description
All Logs	All system and application logs. Includes the System messages and Gateway logs.
System Messages	Operating system messages. Includes /var/log/messages.
Haivision Gateway	Log data from the server processes. Including: • `madra_log_query` — logs from the past week. • `/opt/haivision/var/log/kulabyte` — engine logs, if present.

Enabling Diagnostic Logging

From the Reports screen, you can switch on and off diagnostic logging. By default, logging is disabled.

To enable logging:

1. Click the ☰ icon and click **Administration**.
2. Click **Reporting** in the admin toolbar and click **Reports** in the sidebar.
3. Toggle the Enable Diagnostic Logging button to On.
4. Click **Save Settings**.
5. When prompted to confirm, click **Save**.

❗ **Important**

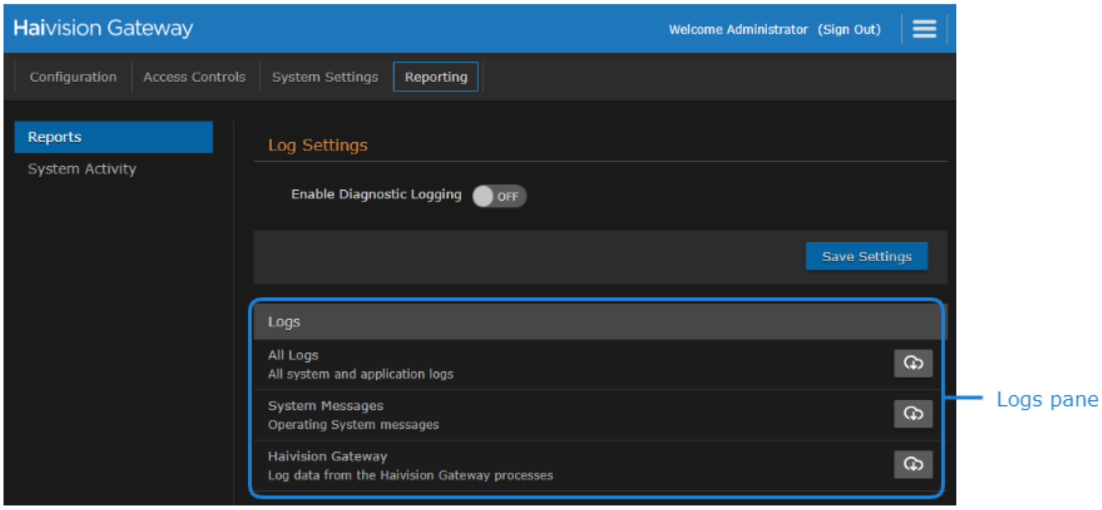
Diagnostic logging impacts system performance and should be enabled only as a temporary troubleshooting measure. Diagnostic files are not deleted automatically and eventually consumes all available disk space if left enabled.

Viewing Reports (Logs)

From the Reports screen, you can also download reports and logs.

To view a log:

1. Click the ≡ icon and click **Administration**.
2. Click **Reporting** in the admin toolbar and click **Reports** in the sidebar.
3. The view pane consists of the Logs pane.



Enable Diagnostic Logging OFF

All Logs
All system and application logs

System Messages
Operating System messages

Haivision Gateway
Log data from the Haivision Gateway processes

Logs pane

4. In the Logs pane, click the desired log's ☁ icon to download a zip file of the log's text files.
5. If you select "All Logs," open the zip file and browse the folder structure:
   `opt > haivision > var > log`

The log folder is populated with text log files with descriptive filenames to assist you in identifying the appropriate file for the information you seek.

Related Topics

- Viewing a Route's Statistics
- Viewing the Status of a License
- Downloading System Updates
- Viewing the Version Number

Media Platform

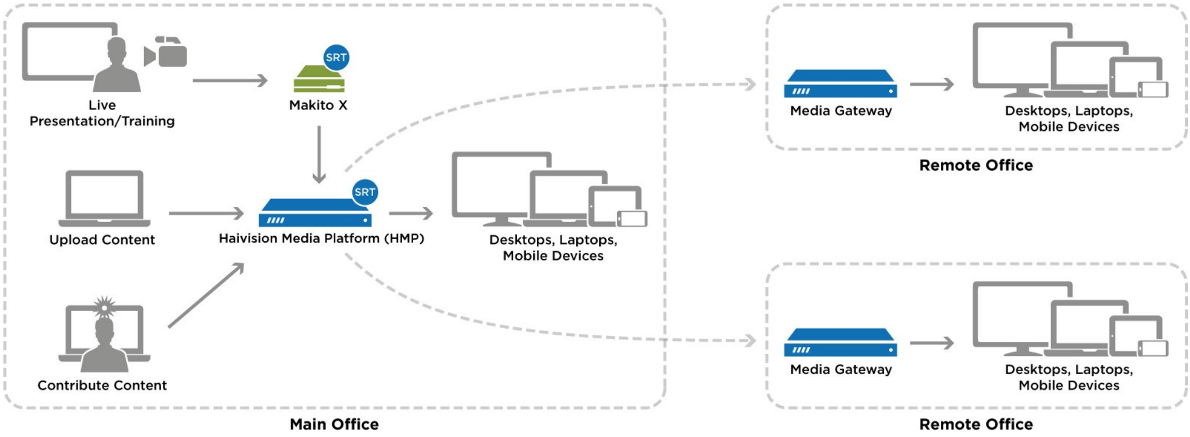
Important

Haivision SRT Gateway is not meant for multi-site Haivision Media Platform workflows. The following sections apply to Haivision Media Gateway only.

Media Platform-Media Gateway integration is used to distribute video to distant site locations, typically pairing a single Haivision Media Platform server with Haivision Media Gateway appliances at each

location. The Media Gateways provide a network of caching for Media Platform on-demand videos. Users at each location can watch video from their local gateway device (although they do not interact directly with the gateway).

Media Gateway integration with Media Platform is illustrated in the following figure:


Live Presentation/Training
SRT
Makito X
Upload Content
SRT
Haivision Media Platform (HMP)
Desktops, Laptops, Mobile Devices
Contribute Content
Main Office
Media Gateway
Desktops, Laptops, Mobile Devices
Remote Office
Media Gateway
Desktops, Laptops, Mobile Devices
Remote Office

Pairing Media Gateway with a Media Platform Server

Media Gateway devices initiate outbound requests to Media Platform to avoid issues with firewall transversal. As a security measure, the Media Platform Pairing Passcode is "Disabled" by default to block any pairing requests. Pairings may be deleted from Media Platform, but are otherwise managed from the Media Gateway web interface. The following procedures step you through the tasks needed to be performed:

- Creating your Ecosystem Workspace
- Acquiring a Pairing Passcode
- Pairing the Devices

Refer to your Haivision Media Platform documentation for information on using Media Gateways and how to set up locations for routing users to the closest Media Gateway for the best streaming experience.

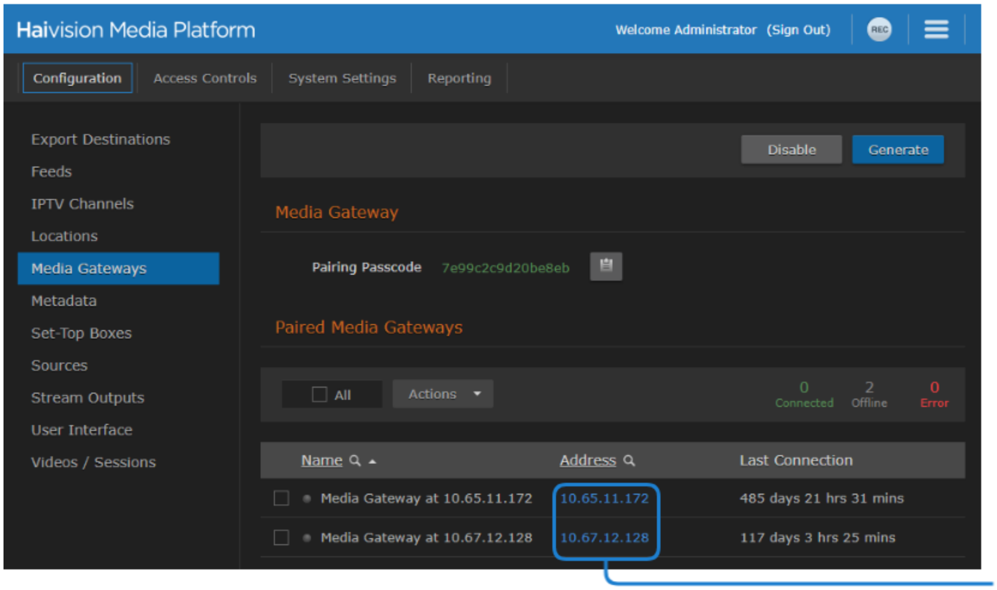
Creating your Ecosystem Workspace

Use browser tabs to switch easily between the Media Platform server and Media Gateway interfaces.

To create your workspace:

1. In your browser, open a tab and enter the URL for the Media Platform server.
2. Open another browser tab and enter the URL to the Media Gateway.

> ✓ **Tip**
>
> Within the Media Platform Administration screen's Media Gateways panel, you can use the action links (blue) in the Paired Media Gateway listing to open a tab to a particular Media Gateway web interface.



Pairing Passcode 7e99c2c9d20be8eb

Name	Address	Last Connection
Media Gateway at 10.65.11.172	10.65.11.172	485 days 21 hrs 31 mins
Media Gateway at 10.67.12.128	10.67.12.128	117 days 3 hrs 25 mins

Action links open a tab to their corresponding Media Gateway

Acquiring a Pairing Passcode

To initiate pairing between the Media Gateway with Media Platform, you must acquire a pairing passcode from the Media Platform server. The passcode is only needed for the initial pairing and not on an ongoing basis.

To acquire the passcode:

1. In your Media Platform browser tab, click the ☰ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar and click **Media Gateways** in the sidebar.
3. If the Pairing Passcode field is empty or disabled, click **Generate** to create a new pairing passcode.
4. Copy the pairing passcode to the clipboard.
5. Make note of the Media Platform address and port. If there is a cross-domain address, make a note of it as well.

Pairing the Devices

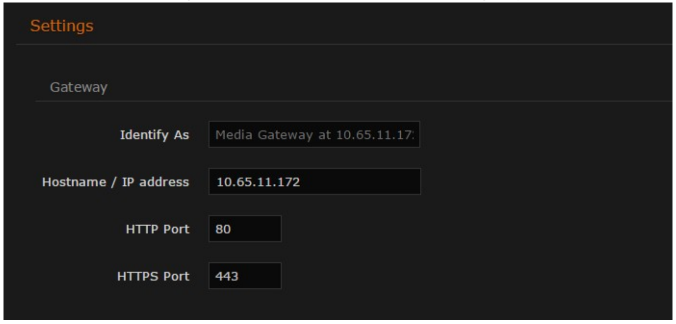
To pair the devices, you need to supply the addresses and ports that are being used, as well as the Media Platform pairing passcode. If you haven't already acquired this information, refer to the previous section, Acquiring a Pairing Passcode.

> ✓ **Tip**
>
> In production environments, Haivision recommends using an FQDN when pairing a Media Gateway to a Media Platform.

In your browser tab of the Media Gateway you wish to pair with the Media Platform:

1. Click the ☰ icon and click **Administration**.To pair the devices.
2. Click **Configuration** in the admin toolbar and click **Media Platform** in the sidebar.

3. In the Gateway section of the Settings pane, enter the Media Gateway information as needed:



Settings

Gateway

Identify As: Media Gateway at 10.65.11.17

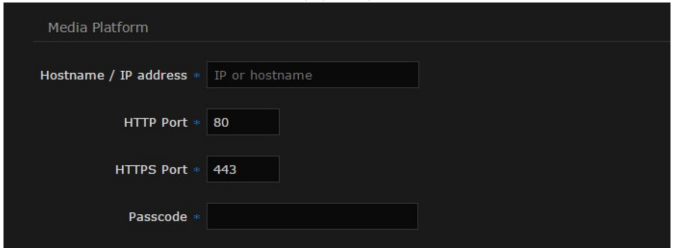
Hostname / IP address: 10.65.11.172

HTTP Port: 80

HTTPS Port: 443

- **Identify As—** a descriptive or more user-friendly name for indicating the Media Gateway.
- **Address —** the FQDN for the Media Gateway.
- **HTTP Port**
- **HTTPS Port**

4. In the Media Platform section of the Settings pane, enter the Media Platform information that you noted earlier into the appropriate data fields:



Media Platform

Hostname / IP address: IP or hostname

HTTP Port: 80

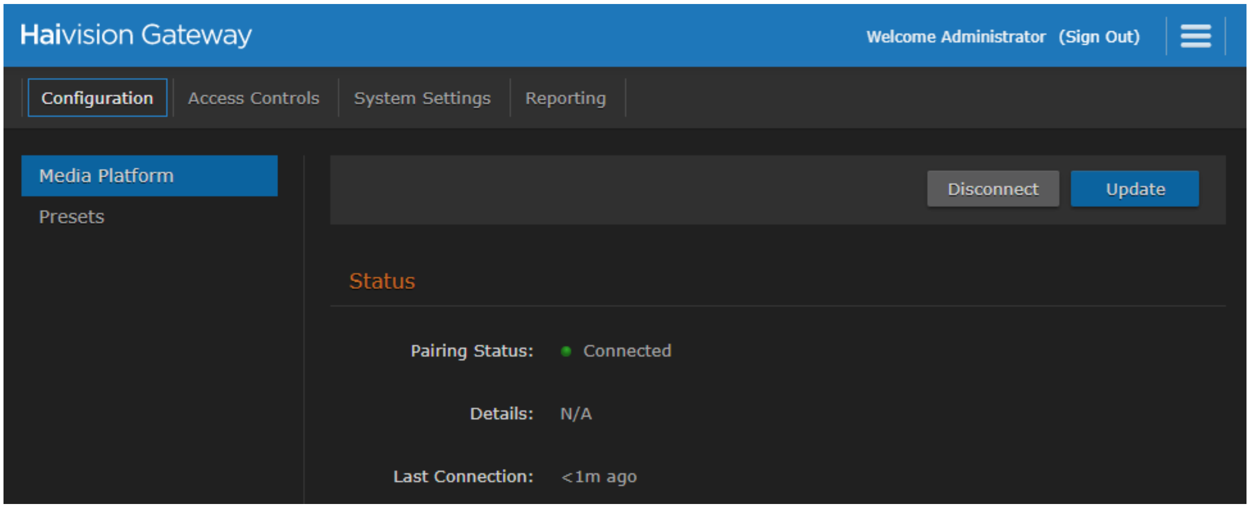
HTTPS Port: 443

Passcode:

- **Hostname/IP Address —** the FQDN that the Media Gateway uses to connect with the Media Platform server; that is, the private (inside the firewall or VPN) IP/hostname for the Media Platform.
- **HTTP Port**
- **HTTPS Port**
- **Passcode —** Paste the passcode from your clipboard into the Passcode field.

5. Click **Pair**.

When the connection is made, the status indicator in Pairing Status turns green.



Status

Pairing Status: ● Connected

Details: N/A

Last Connection: <1m ago

> **Tip**
>
> While the pairing is in progress, you can switch to the browser's Media Platform tab to see the status indicator turn green when the connection is made.

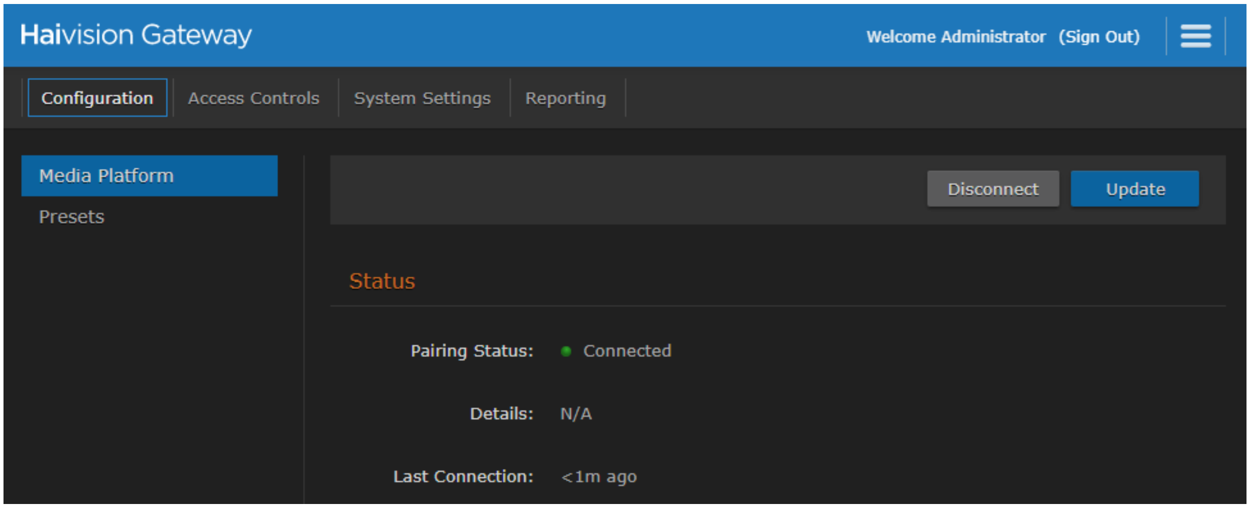
If the Pairing Status on the (Media Gateway) Media Platform screen displays the message "Pairing timeout", this may be an indication the Media Platform server is unavailable. Try the following:

- Check your local network.
- Confirm the availability of the Media Platform with which you are attempting to pair.
- Click the **Clear** button and enter settings for an alternate Media Platform.

Viewing the Status of Media Gateway Connections

To determine the status of a Media Gateway connection:

1. On the (Media Gateway) Media Platform screen, hover your cursor over the status icon or use the following color codes:
   🟢 — Connected (Poll requested succeeded within the last 5 minutes).
   🟡 — Warning (Pairing is pending, or some potentially transient error).
   🔴 — Error (Last poll request failed due to authorization, 404, or pairing timeout).
   ⚫ — Disconnected (Last poll response was received over 5 minutes ago).
2. The Media Platform screen also tracks the connection's duration in the Last Connection field.



Pairing Status: 🟢 Connected

Details: N/A

Last Connection: <1m ago

Blocking New Media Gateway Connections

To block any new Media Gateway connections:

1. In your Media Platform browser tab, click the ☰ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar and click **Media Gateways** in the sidebar.
3. Click the **Disable** button under Pairing Passcode.

Updating the Media Platform Server

To update the Media Platform server:

1. In your Media Gateway browser tab, click the ☰ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar and click **Media Platform** in the sidebar.
3. Change one of the settings, such as update the "Identify As" name to something new.
4. Click **Update** for the new information to update on the Media Platform server.

Clearing the Media Platform Server

When there is a pairing error, the Disconnect button becomes a Clear button to allow you to clear the error record and the pairing status returns to "Not paired".

To clear the Media Platform server:

1. In your Media Gateway browser tab, click the ☰ icon and click Administration.
2. Click **Configuration** in the admin toolbar and click **Media Platform** in the sidebar.
3. Click the **Clear** button.
4. Click **Confirm** to verify that you want to clear the cache of the entries.

Disconnecting from a Media Platform Server

To disconnect from a Media Platform server:

1. In your Media Gateway browser tab, click the ☰ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar and click **Media Platform** in the sidebar.
3. Click the **Disconnect** button.
4. Click **Confirm** to verify that you want to disconnect from Media Platform.

Licensing

> ❗ **Important**
>
> Without a valid license key, you can sign in. However, you won't be able to create or edit routes until you have imported a license.
> Adding a license server requires administrator privileges and a license key.

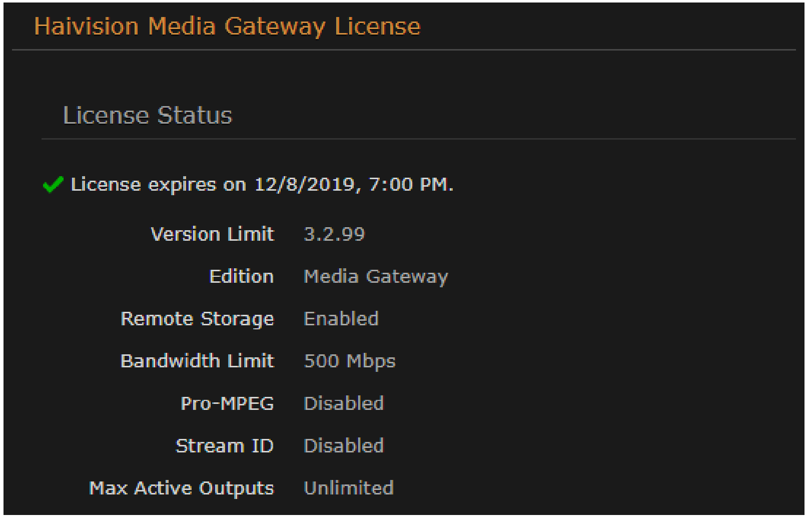
When a system is not licensed, the Browse Routes page displays a License Required warning dialog. If the user's role is administrator, the dialog displays an Add License button.

Adding a License

To add a license:

1. After signing into the web interface, if you see a License Required dialog, click **Add License.**
   -or-
   Click the ☰ icon, click **Administration**, click **System Settings** in the admin toolbar, and click **Licensing** in the sidebar.

   The Licensing view pane shows status information for the installed license, including its expiration date, version limit, product edition, and the status of other licensed options, as shown below:



Haivision Media Gateway License

License Status

✓ License expires on 12/8/2019, 7:00 PM.

Version Limit 3.2.99

Edition Media Gateway

Remote Storage Enabled

Bandwidth Limit 500 Mbps

Pro-MPEG Disabled

Stream ID Disabled

Max Active Outputs Unlimited

2. Click the 📋 icon to copy the current product details to the clipboard.
3. To request a license for your product:
   a. Log in to the Haivision Support Portal (https://support.haivision.com).
   b. After logging in, click **License Requests**.
   c. Click the **New** button.
   d. Select the appropriate device type and click the **Next** button.
   e. 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.
4. After you receive a license key, paste the license string in the License text box.
5. Click **Update** to load the license.

The License Status is updated to show the new license information.

Related Topics

- Viewing the Status of a License

Viewing the Status of a License

The license status screen includes the expiration date, version limit, product edition (Haivision Media Gateway or Haivision SRT Gateway), and other licensed options as shown in the table below.

	Haivision Media Gateway	**Haivision SRT Gateway**
Bandwidth limit (Mbps)	100, 200, 500	100, 200, 500
Maximum number of outputs	—	10, 20, 50
Network storage	Enabled/Disabled	Enabled/Disabled
RTP PRO-MPEG FEC	—	Enabled/Disabled
SRT Stream ID	—	Enabled/Disabled

To view the status of a Media Gateway license:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Licensing** in the sidebar menu.

The license status information is shown in the Licensing view pane.

Related Topics

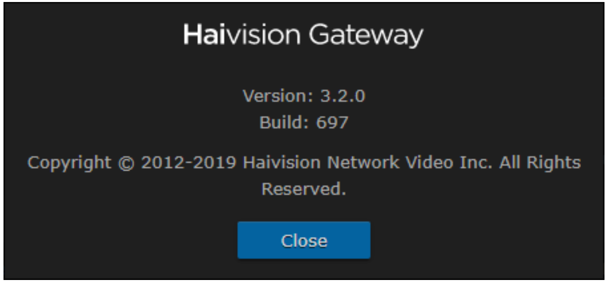
- Adding a License

Viewing the Version Number

There are three different ways to view the current version of your software:

Option 1:

1. Click the ☰ icon and click **About**.
The About dialog opens to display the version information for the current installation.



Haivision Gateway

Version: 3.2.0
Build: 697

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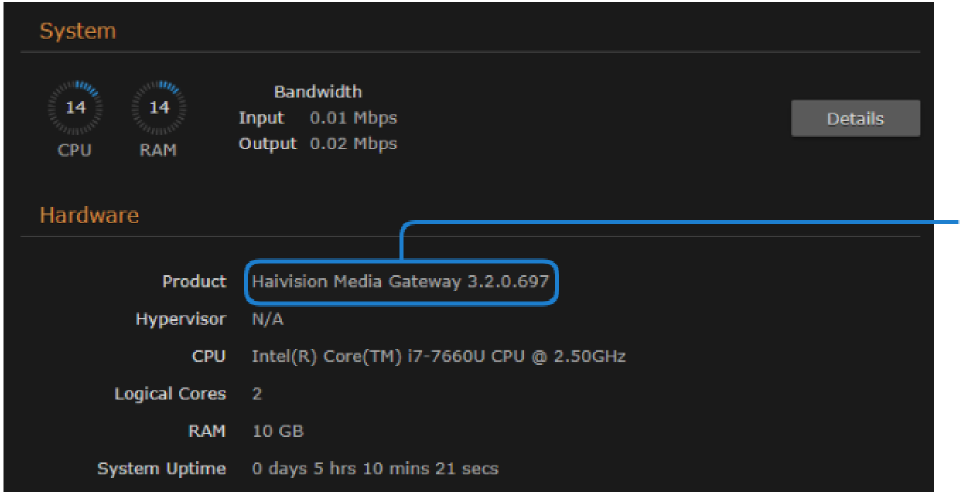
2. When finished, click **Close** to exit the dialog.

Option 2:

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

The version is listed under System Status.



System

Bandwidth
Input 0.01 Mbps
Output 0.02 Mbps

Hardware

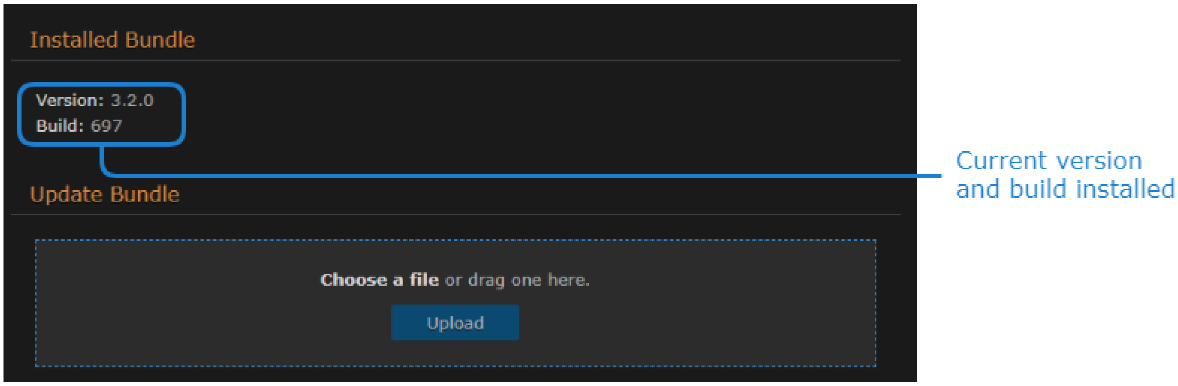
Product	Haivision Media Gateway 3.2.0.697
Hypervisor	N/A
CPU	Intel(R) Core(TM) i7-7660U CPU @ 2.50GHz
Logical Cores	2
RAM	10 GB
System Uptime	0 days 5 hrs 10 mins 21 secs

Current edition and version installed

Option 3:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Update** in the sidebar menu.

The version is listed under Installed Bundle.



Version: 3.2.0
Build: 697

Current version and build installed

Related Topics

- Downloading System Updates
- Installing an Update Package (HaiBundle)

Network

The Network Configuration settings allow you to specify the server hostname, DNS servers, NTP server, search domains, and the default interface. This is also the screen where you configure advanced settings for multiple network interfaces, NIC bonding, and static routes.

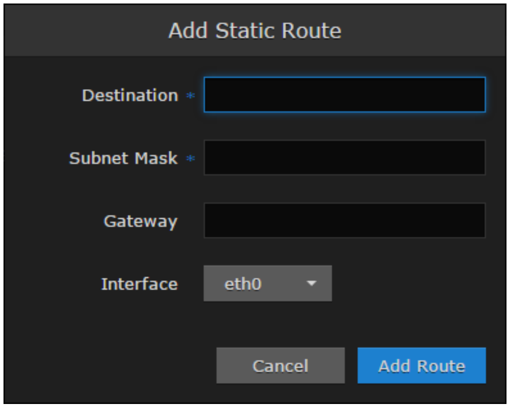
Configuring the Network

To configure the network:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar menu. The available network configuration settings are listed in the view pane along with Interfaces and Static Routes.
3. Fill in the fields as appropriate. See Network Settings for more information.
4.

> **Note**
>
> Depending upon your device, the network interface prefixes may differ.

5. To add a bond interface, see Creating a Bonded Interface for more information.
6. To add a Static Route, click **+Route** and provide the necessary data in the Add Static Route dialog.



Interface: eth0

7. Click **Add Route**. The Static Route is added to the listings on the Network Configuration screen.
8. Click the **Save Settings** button.

9. Click the **Reboot** button to have your network configuration changes take effect.

Network Settings

Network Setting	**Description**
General	
Hostname	The hostname to be assigned to the server. Specify the hostname as a fully-qualified domain name (FQDN). For example: myserver.mycompany.com
Default Interface	Select the default Ethernet interface. For new systems, this setting is unset by default.
DNS Servers	(Optional). The Internet Protocol version 4 (IPv4) addresses of the Domain Name Servers to use.
Search Domains	(Optional). The search strings to use when attempting to resolve domain names.
NTP Server	(Optional). If the Network Time Protocol (NTP) is enabled, enter the IP address of the NTP server.
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	
eth0 | eth1 | eth2 | ...	ⓘ **Note** Depending upon your device, the network interface prefixes may differ.
Bond Interface	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	Choose whether the interface uses a static or dynamic IP address: • None — Select to disable the interface. • Static — Select to disable DHCP. When it is disabled, you must manually enter the IP address and subnet mask. • DHCP — Select to enable the Dynamic Host Configuration Protocol. When DNCP is enabled, the appliance will receive an IP address from a DHCP server on the network.
IP Address	ⓘ **Note** If DHCP is disabled, you may enter an IP address in dotted-decimal format.
Subnet Mask	ⓘ **Note** If DHCP is disabled, you may enter the Network Mask in dotted-decimal format (e.g., 255.255.0.0).

Network Setting	Description
Gateway	**Note** If DHCP is disabled, you may enter the gateway address in dotted-decimal format.
MTU	(Maximum Transmission Unit) Specifies the maximum allowed size of IP packets for the outgoing data stream.
MAC Address	(Read-only) The Media Access Control 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 (10, 100 or 1000) and Duplex setting (Full or Half).
Bonding Mode	(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. • 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 balance-tlb + *receive load balancing* (rlb) 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.

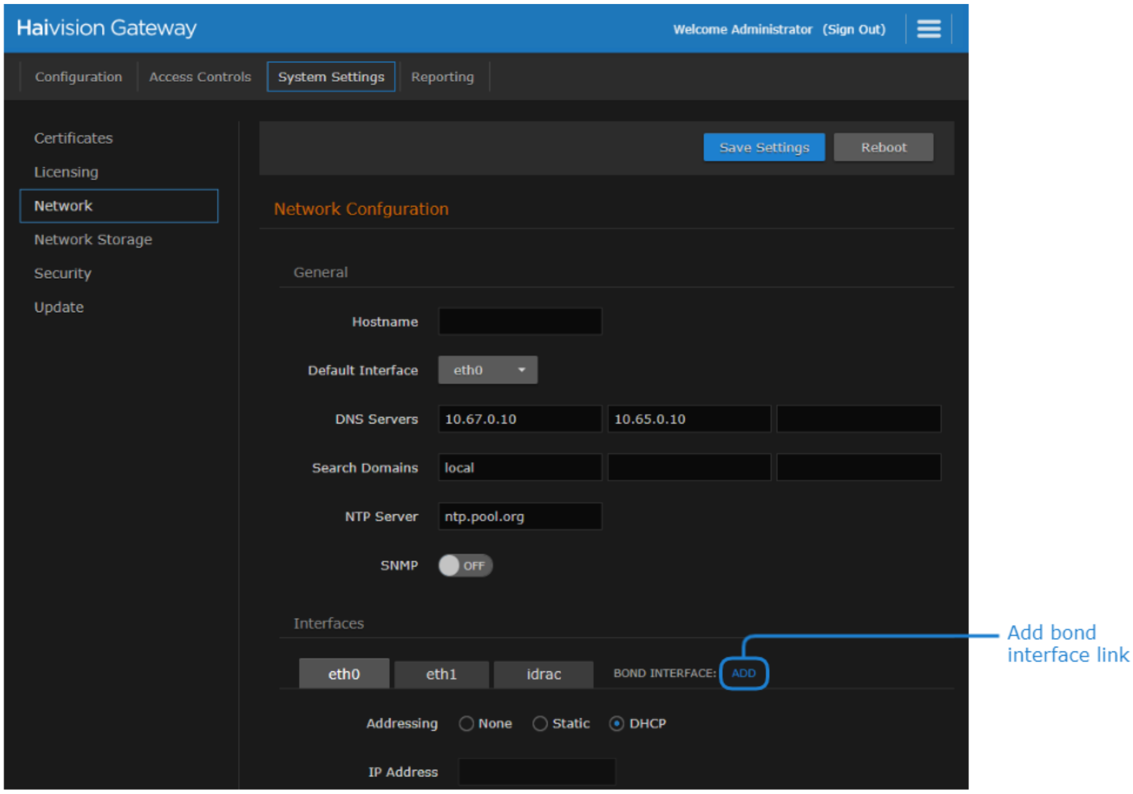
Network Setting	Description
Subnet Mask	**Note** If DHCP is disabled, you may enter the Network Mask in dotted-decimal format (e.g., 255.255.0.0).
Gateway	This is the gateway that is used when no other gateway matches. This address must be reachable on your local subnet. If DHCP is disabled, you may enter the gateway address in dotted-decimal format.
Interface	The interface associated with the static route.Use the drop-down menu to make your selection.

Creating a Bonded Interface

Interface bonding provides a method for aggregating multiple network interfaces into a single logical interface. The goal is to increase throughput and to ensure redundancy in case one of the links fails.

To create a bonded interface:

1. Click the ☰ icon and click Administration.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar menu.
3. Verify that the correct interface (for example, eth0) is currently selected.
4. Click the **Bond Interface: Add** action link.



Hostname:
Default Interface: eth0
DNS Servers: 10.67.0.10 10.65.0.10
Search Domains: local
NTP Server: ntp.pool.org
SNMP: OFF
Addressing: ○ None ○ Static ● DHCP
IP Address:

Add bond interface link

The bond0 tab appears and the **Bond Interface: Remove** action link replaces the **Add** action link.

5. In the Default Interface drop-down menu, select **bond0**.
6. Clink the **bond0** tab to reveal the bonding-specific fields (such as Bonding Mode and Slave Interfaces) and set as appropriate. See Network Settings for more information.

7. Click the **Save Settings** button.
8. Click **Reboot** to have your changes take effect.

Removing a Bonded Interface

To remove a bonded interface:

1. Click the ≡ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network** in the sidebar menu.
3. Verify that the correct bonded interface you wish to remove (for example, bond0) is currently selected.
4. Click the **Bond Interface: Remove** action link. The selected interface tab is removed.
5. Click the **Save Settings** button.
6. Click **Reboot** to have your changes take effect.

Exporting and Importing Presets

The System Presets screen allows you to export the current configuration as a preset file with .hmg extension. It also allows you to import an exported preset file and apply the preset to the device.

To export a preset:

1. Click the ≡ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar, and click **Presets** in the sidebar menu.
3. To export a preset of the current system (device) route's configuration, click **Export Preset**.

   The browser downloads a .hmg file.

To import a preset:

1. Click the ≡ icon and click **Administration**.
2. Click **Configuration** in the admin toolbar, and click **Presets** in the sidebar menu.
3. Click **Browse** to select an .hmg preset file containing the route's configuration that you want to apply to the current system.
   After a file is selected, a warning message appears in the view pane.
4. Click the **Import** button to start importing.
5. After the upload is complete, the file is validated for the following:
   - Correct file extension (.hmg)
   - Correct JSON format
   - Contains at least one route configuration
   - A route must have a source
   - Route name, source name and destination name are required and route name must be unique
6. If an error occurs, an error message is displayed. If validation passes, then it starts applying the preset.
7. While the system is applying the preset, a message "Applying preset..." is displayed with a progress bar.
8. When complete, a message of "# routes created" is displayed.

Network Storage

Important

The Network Storage feature will be deprecated in a future version. Please contact Haivision Support for more details.

Network Storage is a licensed option that enables you to use a Network-Attached Storage (NAS) device to host the Media Gateway/SRT Gateway's video cache through a Network File System (NFS) connection.

> **Important**
>
> The NFS share must be hosted on a dedicated disk or partition to ensure that the server can control disk utilization.

Enabling Network Storage

> **Note**
>
> The NFS server must be configured on your network storage host before connecting to it.

To enable network storage:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network Storage** in the sidebar.
3. Toggle the NFS button to **On**.
4. Fill in the remote host IP address and path.
5. To test the connection to the defined NFS server, click **Test Settings**.
6. Click **Save Settings** to save the connection.
7. Click **Reboot** for the new settings to take affect.

After the reboot, any newly cached video segments are stored on the remote NFS server instead of locally on the server.

Disabling Network Storage

To disable network storage:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Network Storage** in the sidebar.
3. Toggle the NFS button to **Off**.
4. Click **Save Settings** to save the connection.
5. Click **Reboot** for the new settings to take affect.

After the reboot, the video cache is stored locally on the server.

Related Topics

- Viewing the System Activity Dashboard
- Clearing the Video Cache

Certificates

From the Certificates page, you can generate an private key and certificate signing request (CSR). You can then import the signed certificate and trust chain returned by the Certification Authority (CA).

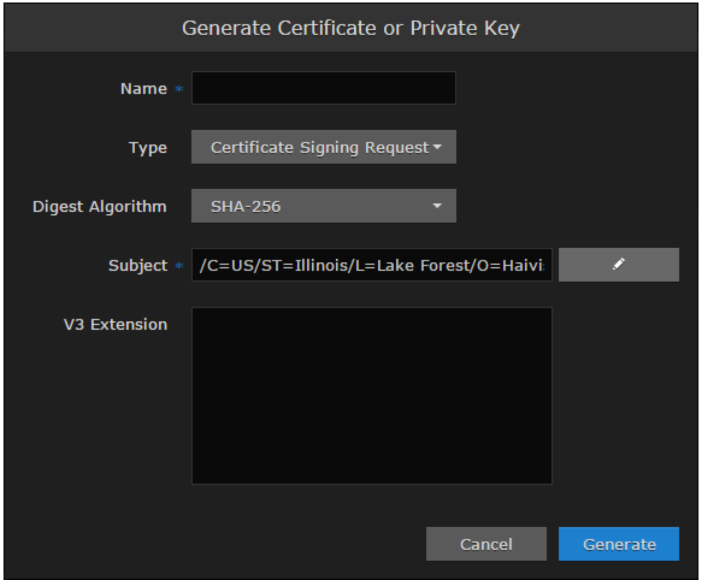
The Certificates page lists the available Identity Certificates. An Identity Certificate identifies the device during the authentication process when trying to establish a TLS connection in HTTPS session startup. Its Common Name or Alternate Subject Names must match its IP address and/or its FQDN (Fully Qualified Domain Name) if DNS is used.

The default certificate is localhost.crt (self-signed).

Generating a Certificate Signing Request

To generate a Certificate Signing Request (CSR):

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Certificates** in the sidebar.
   The Certificates page lists all generated certificate signing requests. 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.



Generate Certificate or Private Key

Name *

Type: Certificate Signing Request

Digest Algorithm: SHA-256

Subject *: /C=US/ST=Illinois/L=Lake Forest/O=Haivi

V3 Extension

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).

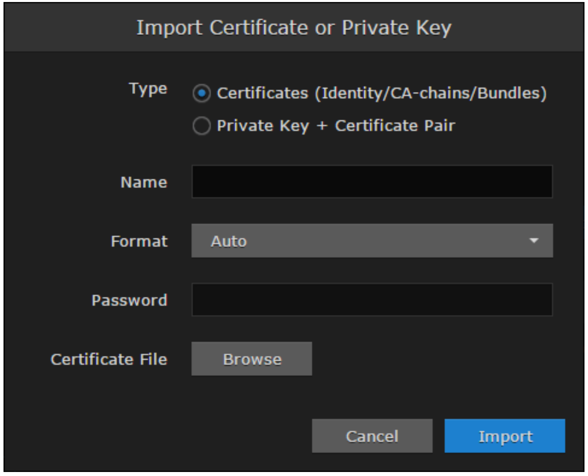
6. Returning to the Certificates list, click the link for the generated CSR to open the file in another tab. Copy the contents (including both beginning and ending delimiters) and paste it into your Certificate Authority (CA) application.

> **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 and exported for signing.

Importing and Activating a Certificate

To import and activate a certificate:

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 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 **Browse** and select the CA-signed certificate (.crt extension) returned from the certificate request generated in the previous section.



Import Certificate or Private Key

Type ● Certificates (Identity/CA-chains/Bundles) ○ Private Key + Certificate Pair

Name

Format Auto

Password

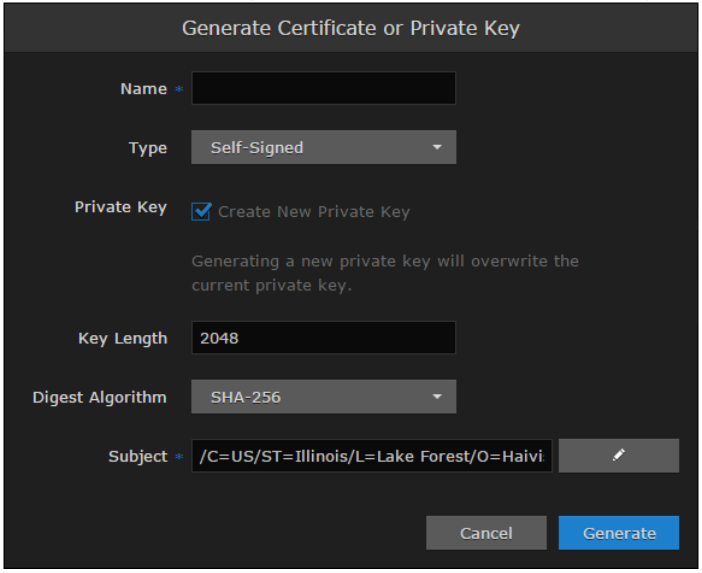
5. Click **Import**.
6. On the Certificates page, the newly imported certificate is added to the list and should have a green status LED. Click in the Active column to activate the certificate.
7. Click **Reboot** if you have changed the active certificate.

Generating and Importing a Private Key

To generate a private key:

1. Click the ☰ icon and click **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.



Generate Certificate or Private Key

Name *

Type: Self-Signed

Private Key: ☑ Create New Private Key

Generating a new private key will overwrite the current private key.

Key Length: 2048

Digest Algorithm: SHA-256

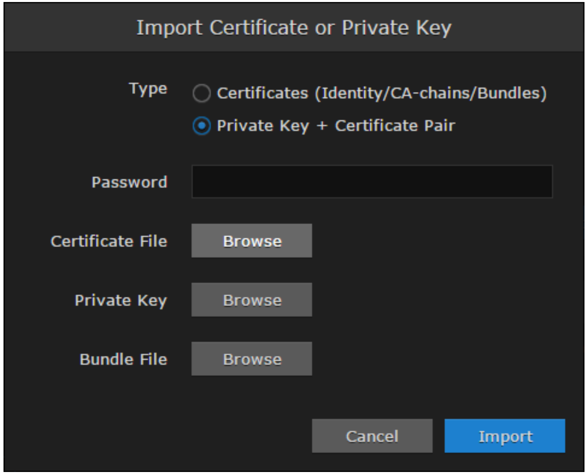
Subject *: /C=US/ST=Illinois/L=Lake Forest/O=Haivi

Cancel | Generate

5. Click the **Generate** button.
6. In 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**.

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 **Browse** and select the new Certificate and Private Key, and optionally a Intermediate Certificate Bundle file.



Import Certificate or Private Key

Type: ○ Certificates (Identity/CA-chains/Bundles)
● Private Key + Certificate Pair

Password

Certificate File: Browse

Private Key: Browse

Bundle File: Browse

Cancel | Import

5. Click the **Import** button
6. On the Certificates page, the newly imported files are added to the list. Click in the Active column to activate the certificate.
7. Click **Reboot**.

Generating a New Self-Signed Certificate

If you are upgrading to HMG/HSG version 3.2 or greater, due to a new restriction of TLS certificates in certain operating systems, a new self-signed certificate with a 2-year expiration should be generated after the upgrade. See "Cannot Access Web Interface from a Computer after an OS Update" in Troubleshooting for more details on the issue.

To generate a new self-signed certificate:

1. Click the ☰ icon and click **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. Fill in the remaining fields. See Certificate Settings.
   d. Click the **Generate** button.
5. The new certificate is added to the Certificates list.
6. Select the new certificate in the Active column to activate it.
7. Optionally, delete the old certificate.
8. Click **Reboot** for the change to take effect.

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 will be stored on the server, as well as listed on the Certificate page.
Type	Select the Signature Type: • 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. 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.
Digest Algorithm	Select the digest algorithm (Secure Hash Algorithm): • SHA-256 • SHA-384 • SHA-512

Certificate Setting	Description
Subject	The Subject identifies the device being secured, in this case, the Media Gateway/SRT Gateway. 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). Type in the subject in the form: `"/C=US/ST=Maine..."` where the most common attributes are: • /C Two Letter Country Name • /ST State or Province Name • /L Locality Name • /O Organization Name • /OU Organizational Unit Name • /CN Common Name ✓ **Tip** For successful authentication, the Common Name in the certificate should be the IP address (by default) or domain name of the device.
V3 Extension	V3 extensions allow more configuration options to be inserted in the Code Signing Request, such as alternative subject names and usage restrictions to certificates.
Import Certificate	
Type	Select the certificate type: • Certificates: (Identify/CA-chains/Bundles) • Private Key + Certificate Pair
Name	Name of the certificate.
Format	Select the file format for the Certificate (the formats differ in the way the file is encrypted): • Auto: detected from the file extension • der: Distinguish Encoding Rules • pkcs #7 • pkcs #12
Password	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.
Certificate File	Select the file to upload

Security

When setting up Media Gateway/SRT Gateway, you may configure additional security settings. Changing any of these settings requires a reboot.

- **FIPS:** Applies cryptographic modules accredited under the U.S. Federal Information Processing Standard (FIPS) Publication 140-2.
- **High Security (STIG) Environment:** Enables security hardening features for high-security environments, including:
  - Session timeouts/locks for all interfaces.
  - Stronger password requirements.
  - Lock/disable accounts due to multiple authentication failures or expired passwords.
  - Disabling unnecessary services.

- **Advisory Notice and Consent Banner:** You may also configure an Advisory Notice and Consent Banner to appear when users first access the web interface's and Console UI's log in screen. The banner is typically an advisory/warning notice the user must consent to before signing in.

To configure appliance security:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Security** in the sidebar menu.
3. To configure FIPS compliance toggle the **FIPS** button to On.
4. To configure your Haivision Gateway for use in a high-security environment, toggle the **High Security (STIG) Environment** button to On.
5. To configure a banner, toggle the **Advisory Notice** button to On, and enter the desired banner text in the Message textbox
6. Click the **Save Settings** button.
7. Click the **Reboot** button to have your security configuration changes take effect.

Update

Note

To update cloud deployments (Amazon Web Services, Microsoft Azure, and Alibaba Cloud), the instance must be re-deployed using the new version. Upgrades cannot be installed using the standard web UI update process described in this section.

Important

Any update other than a maintenance release (for example, v1.1.*x*), requires a new license.

Downloading System Updates

To download system updates:

1. Log in to the Haivision Support Portal at https://support.haivision.com.
2. Click the **Software Releases** link.
3. Under the Haivision Gateway heading, select the upgrade package you wish to install.
4. Save the selected .zip file to your local computer or network.
5. Extract the update file from the .zip file using a zip file utility.

The system update comes in the form of a HaiBundle software package, which when loaded replaces the application on your device.

Related Topics

- Installing an Update Package (HaiBundle)

Installing an Update Package (HaiBundle)

Updates are provided via a HaiBundle. You can find the latest HaiBundles on the Haivision Support Portal as described in Downloading System Updates.

Note

Your system restarts after it installs the updates.

To install a HaiBundle:

1. Click the ☰ icon and click **Administration**.
2. Click **System Settings** in the admin toolbar, and click **Update** in the sidebar. The Update screen appears showing the currently installed version and build.
3. Click **Chose a file** and select the desired update bundle (.hai extension) and click **Open**.
   -or-
   Drag and drop the update bundle file from your desktop to the highlighted area on the Update screen.
4. Verify that the bundle listed is the one you want to install, and click **Upload**.
5. When the bundle has been uploaded, click **Update**.
6. When prompted, click **OK** to confirm. Your system restarts after it has installed the updates.

Related Topics

- Downloading System Updates

Accounts

To simplify setup and security, there are three built-in user accounts available: haiadmin, operator, and user.

Default credentials for each account are provided in the *Important Notice* document.

Viewing the Available User Accounts

User account information includes the name and role.

To view the available user accounts:

1. Click the ☰ icon and click **Administration**.
2. Click **Access Controls** in the admin toolbar, and click **Accounts** in the sidebar.

The available accounts are listed in the view pane along with their current roles.

Field	**Value**
Account Name	The user name for the account. Built-in accounts set up at the factory include: • **haiadmin** — Built-in Administrator account • **operator** — Built-in Operator account • **user** — Built-in Observer account
Role	The role assigned to the account. Roles for built-in accounts are read-only. Available roles include: • **Administrator** — All access rights and administrator privileges. • **Operator** — All rights to create and configure routes. Does not include rights to the Administration page. • **Observer** — Read-only access to the system. Does not include the rights to the Administration page.

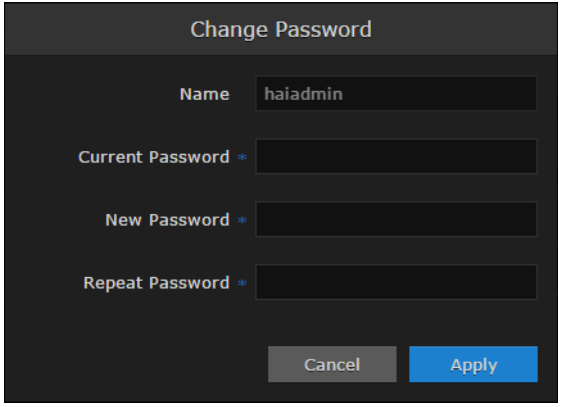
Changing an Account’s Password

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

To change an account password from the web interface:

1. Click the ☰ icon on the toolbar and click **Administration**.

2. Click **System Settings** in the admin toolbar, and click **Accounts** from the sidebar.
3. Click the **Account Name** whose password you want to change.
4. When the Change Password dialog opens, enter your current password and a new password. Then re-enter your new password to confirm it.



Change Password

Name: haiadmin

Current Password *

New Password *

Repeat Password *

5. Click **Apply**.

Note

The `haiadmin` and `hvroot` password can only be changed in the Console UI. See **Using the Console UI with Haivision Hardware** for details.

Related Topics

- Viewing the Available User Accounts

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, Havision 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	• 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	• 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	• 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	10:00pm - 5:00am	48 Hours
Urgent	• 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	• 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

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

info@haivision.com
www.haivision.com

North America: 1.877.224.5445
International: +1.514.334.5445

HAIVISION