

HAIVISION

Haivision Gateway 3.7.5
REST API Integrator's Reference

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Edition Notice

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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.



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

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Getting Service Support

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Introduction

The Haivision Media Gateway/SRT Gateway (HMG/HSG) REST API is an application programming interface that allows you to create custom applications for HMG/HSG.

For an introduction to HMG/HSG, as well as information on managing the server from the Web interface, please see the **User's Guide**.

Topics Discussed

- Introduction to REST API
- HMG/HSG Concepts
- REST API Concepts

Introduction to REST API

The HMG/HSG REST API is a Representational State Transfer (REST) Application Programming Interface (REST API). REST is a style of software architecture for distributed hyper-media systems such as the World Wide Web. REST provides a set of rules (constraints) to which an architecture should conform. This is in contrast to an "unconstrained architecture" in which services are free to define their own idiosyncratic interfaces.

REST provides a uniform interface between components, allowing them to communicate in a standard way. Requests use the standard HTTP methods; GET, PUT and DELETE requests can do only what is expected.

The effect is that your services are accessible through standard tools, and it is safe for other services and utilities to use yours in ways you did not predict.

Informational Links

Following are some useful external references to learn more about REST:

- Architectural Styles and the Design of Network-based Software Architectures (dissertation by Roy Fielding)
- Representational State Transfer (Wikipedia entry)
- How to Create a REST Protocol
- REST Anti-Patterns

Introduction to JSON

The REST API uses JSON (JavaScript Object Notation) to format API requests and responses. JSON is a lightweight data-interchange format that is easy for both humans to read and write, and machines to parse and generate. It is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, and Python.

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JSON is built on two universal data structures, which are supported by nearly all modern programming languages:

- A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
- An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

A full description of JSON can be found at http://www.json.org.

HMG/HSG Concepts

This section introduces concepts that you should understand to use the REST API effectively.

Resources

The REST API can create and manipulate the routes used on the HMG/HSG system. This section provides a brief description of their functions.

Identifiers

Each unique HMG/HSG API object is assigned a randomly generated identifier (ID) when it is created. The REST API uses these IDs to identify specific resources.

Route

A route is an source-to-multiple-destination resource for distributing a video stream.

Sources

A *source* is the incoming video stream of a route.

Destination

A destination is the outgoing video stream of a route. Each route may contain multiple destinations.

Accounts

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



Note

Default passwords for each account are provided in the Important Notice document that is shipped with your hardware, or available on the Support Portal.

To view the available user accounts:

- 1. In the side menu under Administration, click Access Control.
- 2. Click **Accounts** in the navigation toolbar.

The available accounts are listed grouped by their roles. The account names and roles assigned to the accounts cannot be changed.

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Role	Account Name	Description
Administrator	haiadmin	All access rights and administrator privileges.
Operator	operator	All rights to create and configure routes. Does not include rights to the administration screens.
Observer	user	Read-only access to the system. Does not include the rights to the administration screens.

See **REST API Concepts** for details on using the available accounts to access the REST API.

REST API Concepts

This section introduces REST API concepts underlying the HMG/HSG REST API.

- Required Authorization
- Default Success HTTP Status Code
- JSON Properties
- HTTP Request Headers
- Errors

Required Authorization

The REST API requires user authentication. Execute the **Initiate Session** command to start an API session, using the login/password of the appropriate user role as described in **HMG/HSG Concepts**.

Each API command listed in **REST API Reference** includes an "Authorizations" heading that lists the user role necessary to execute the command. If you make an API call with a user role that is not authorized to execute the command, the following response is returned:

```
{
  "error": {
    "type": "SessionAuthorization",
    "message": "Operation not authorized for roles: [User role]"
    }
}
```

where User role is role of the current session's user.

Default Success HTTP Status Code

Unless otherwise specified, the standard response for successful HTTP requests is 200 OK.

JSON Properties

JSON properties are either optional, required, immutable, or ignored. The definitions are as follows:

Property	Description
Optional	If the property is not provided on a PUT or POST, the server uses the default value for PUT requests or the current value stored on the server for POST.
Required	If the property is not provided on a PUT or POST, an error is returned stating that the property must be provided.
Ignored	Ignored properties are informational only in responses and are ignored for PUT and POST requests.
Immutable	Immutable properties cannot be changed. If a PUT or POST request attempts to change or assign an immutable property, an error is returned.



HTTP Request Headers

On a POST or PUT request, the content type request header should be one of the content types supported for that specific API endpoint, either:

- application/json
- application/octet-stream
- multipart/form-data

If the content type is different, the HTTP error 415 Unsupported Media Type is returned.

Errors

In case of an error on an API call, the API returns a response with the appropriate HTTP status code and an error message encapsulated in the body:

```
{
  "error": {
    "type": "[string]",
    "message": "[string]"
  }
}
```

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REST API Reference

This API command reference lists and describes the available resources for the Haivision Media Gateway/SRT Gateway REST API. This is a list of API calls that can be used to create and manage stream routes on your HMG/HSG.

Topics Discussed

- Login and Device Info
 - Initiate Session
 - Get Session Information
 - Delete Existing Session
 - · Get Device Info
 - Get Device Configuration
- Managing and Configuring Routes
 - Get List of Routes
 - Get Route Configuration
 - Create a Route
 - Update a Route
 - Delete a Route
 - Start or Stop Routes
 - Start or Stop a Route's Destination
 - Export System Preset
 - Import System Preset
 - Example: Stopping an Individual Destination of a Route
- Statistics
 - Get Route Statistics
 - Get Source Statistics
 - Get Destination Statistics
 - Get SRT Client Statistics
- Object Model Reference
 - Route Object Model
 - Source Object Model
 - Destinations Object Model
 - Source Statistics Object Model
 - Destinations Statistics Object Model
 - SRT Statistics Connections Object Model

Login and Device Info

- Initiate Session
- Get Session Information
- Delete Existing Session
- Get Device Info
- Get Device Configuration



Initiate Session

Initiating a session requires a user name and a password. The configured users are the same as configured for the web application. When you issue the Initiate Session request, a sessionID cookie is returned in the response.

Authorizations: Administrator, Operator, Observer



Note

All subsequent API requests must be made with a valid sessionID cookie in the request header.

Requests

```
POST /api/session
              "[user name]",
 "username" :
"password" : "[password]"
```

Parameters

Name	Туре	Description
username	string	Valid user.
password	string	Valid password.

```
"response": {
    "type": "Session",
    "message": "Session successfully started for haiadmin",
    "sessionID": "[Session ID]",
"lastLoginDate": 1536777877871,
    "numLoginFailures": 0
```



Get Session Information

Get existing session information.

Authorizations: Administrator, Operator, Observer

Requests

```
GET /api/session cookie: sessionID: [Session ID]
```

Parameters

N/A

```
"sessionID": "[Session ID]",
   "displayName": "Administrator",
   "email": "haiadmin@localhost",
   "roles": [
        "Administrator"
   ],
   "startAt": 1536937838919,
   "expireAt": 1536938857529,
   "lastLoginDate": null,
   "numLoginFailures": null,
   "isLicensed": true
}
```

Name	Туре	Description
sessionID	string	ID of the session.
displayName	string	User name.
email	string	Email address of user.
roles	object	List of strings of user roles.
startAt	number	User session started at in Unix time.
expireAt	number	When current user session will expire in Unix time.
lastLoginDate	number	Last login date in Unix time.



Name	Туре	Description
numLoginFailures	number	Login failure count.
isLicensed	Boolean	Indicates if Haivision Gateway license is valid.



Delete Existing Session

Delete existing session.

Authorizations: Administrator, Operator, Observer

Requests

```
DELETE /api/session
cookie: sessionID: [Session ID]
```

Parameters

N/A

Response

```
{
  "type": "Session",
  "message": "[success message]"
}
```

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Get Device Info

Retrieves information about the appliance. Use the Device ID value from the _id property to reference the device in subsequent API calls.

Authorizations: Administrator, Operator, Observer

Requests

```
GET /api/devices cookie: sessionID: [Session ID]
```

Parameters

N/A

```
[
{
    "_id": "[Device ID]",
    "type": "gateway",
    "ip": "127.0.0.1",
    "name": "Haivision Gateway",
    "lastConnectedAt": [Date/time shown in Unix time],
    "statusCode": "ok",
    "status": "Online",
    "statusDetails": "Connection has been established in the last 1 minutes.",
    "serialNumber": null,
    "firmware": "5.0.180611.1530",
    "hasAdminError": false,
    "pendingSync": false,
    "lastConnection": "<1m"
}
]</pre>
```

Name	Туре	Description
_id	string	Device ID.
type	string	Device type.
ip	string	IP address of the device.
		A Note The IP address is from the front end to the backend, so 127.0.0.1 is expected.
name	string	Name of device.



Name	Туре	Description
lastConnectedAt	number	Last time connected to the device in Unix time.
statusCode	string	Device status code: warn, error, ok, or unknown.
status	string	Device status: Online, Device error, Offline, Never, or Communication error.
statusDetails	string	Device status details.
serialNumber	string	Device serial number.
firmware	string	Device firmware version.
hasAdminError	Boolean	Indicates if device has an error.
pendingSync	Boolean	Indicates if there is a device pending a sync task.
lastConnection	string	Last time connected to the device in string format (e.g., "<1m").

Get Device Configuration

Retrieves the configuration of the device, including the list of routes. The Device ID used in the command is retrieved via the Get Device Info command.

Authorizations: Administrator, Operator, Observer

Requests

GET /api/devices/[Device ID] cookie: sessionID: [Session ID]

Parameters

N/A

Response



Note

Use the config > routes > id properties on subsequent API calls to start/stop the corresponding routes, as shown in Start or Stop Routes.

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```
" id": "[Device ID]",
"type": "gateway",
"ip": "127.0.0.1",
"name": "Haivision Media Gateway",
"lastConnectedAt": [Date/time in Unix time],
"lastConfigReadAt": [Date/time in Unix time],
"statusCode": "ok",
"status": "Online",
"statusDetails": "Connection has been established in the last 1 minutes.",
"serialNumber": null,
"firmware": "5.0.180611.1530",
"hasAdminError": false,
"config": {
  "routes": [ { <Route Object> } ],
  "settings": {
    "networkAdapters": [
        "name": "eth0",
        "address": "10.67.12.128"
      },
        "name": "idrac",
        "address": "169.254.0.2"
    ]
  },
  "calypsos": [
      "id": "Lh5ZNDm7LspsseJ3pg82jw",
      "gatewayName": "MG 141",
      "address": "dev.haivision.com",
      "httpPort": 80,
      "httpsPort": 443,
      "passcode": "[Pairing passcode]",
      "lastConnectedAt": 1536759437398,
      "status": "accepted",
      "statusDetails": "pairing accepted",
      "proxyAddress": "10.69.12.141",
      "proxyHttpPort": 80,
      "proxyHttpsPort": 443,
      "lastConnection": "<1m"
  ]
"pendingSync": false,
"lastAcceptedUpdate": 1530219677119,
"lastConnection": "<1m",
"gateway": {
  "port": 1080
"suggestedPollingInterval": {
  "ms": 10000
```

Name	Туре	Description
_id	string	Device ID.



Name	Туре	Description
type	string	Device type.
ір	string	IP address of the device.
		Note The IP address is from the front end to the backend, so 127.0.0.1 is expected.
name	string	Name of device.
lastConnectedAt	number	Last time connected to the device in Unix time.
lastConfigReadAt	number	Last time a read config occurred in Unix time.
statusCode	string	Device status code.
status	string	Device status: Online, Device error, Offline, Never, or Communication error.
statusDetails	string	Device status details: warn, error, ok, or unknown.
serialNumber	string	Device serial number.
firmware	string	Device firmware version.
hasAdminError	Boolea n	Indicates if device has an error.
config	object	Device configuration object, including route objects (see Route Object Model for definition), networkAdapters objects (see following), and calypsos object (see following).
pendingSync	Boolea n	Indicates if there is a device pending a sync task.
lastAcceptedUpdate	number	Last time a device update was accepted.
lastConnection	string	Last time connected to the device in string format (e.g., "<1m").
gateway	object	Gateway device settings: port number.
suggestedPollingInte rval	object	Suggested polling device interval setting. Value in milliseconds.



NetworkAdapters Object Model

Name	Туре	Destination
name	string	Adapter name.
address	string	IP address of network adapter.

Calypsos Object Model

Name	Туре	Destination
address	string	IP address of paired HMP.
gatewayName	string	Gateway name in the relationship
httpPort	number	HTTP port of paired HMP.
httpsPort	number	HTTPS port of paired HMP.
id	string	HMP relationship ID.
lastConnectedAt	number	Last connected time.
lastConnection	string	Last connection string.
passcode	string	Pairing passcode.
proxyAddress	string	Proxy address.
proxyHttpPort	number	Proxy HTTP port.
proxyHttpsPort	number	Proxy HTTPS port.
status	string	Relationship status: accepted, pair pending, pairing error, pairing timeout, pairing denied, poll timeout, or poll error.
statusDetails	string	Relationship status detail.

Managing and Configuring Routes

- Get List of Routes
- Get Route Configuration
- · Create a Route
- Update a Route
- · Delete a Route
- Start or Stop Routes
- Start or Stop a Route's Destination
- Export System Preset
- Import System Preset
- Example: Stopping an Individual Destination of a Route

Get List of Routes

Use this command to get details of all routes. Retrieve the Device ID via the **Get Device Info** command.



Routes are paged and have a numPages attribute in the response. If the numPages value is greater than 1, use the page and/or pageSize parameters to access the rest of the data. For example, GET /api/.../routes? page=2&pageSize=10 fetches routes 11-20 from the collection.

Active for Version: 3.2+

Authorizations: Administrator, Operator, Observer

Requests

GET /api/gateway/[Device ID]/routes
cookie: sessionID: [Session ID]

Parameters

N/A



Response

```
"data": { [
  <Array of Route Objects>
"numPages": 1,
"numResults": 3,
"numActiveOutputConnections": 1,
"pendingRouteCreates": 1
```

Name	Туре	Description
data	object	Data object, including route objects (see Route Object Model for definition).
numPages	number	Number of pages of routes. See the above tip on using the numPages attribute.
numResults	number	Number of available routes.
numActiveOutputConne ctions	number	Number of currently active outputs.
pendingRouteCreates	number	Number of routes that are pending creation, and that are not yet listed.

Get Route Configuration

Use this command to get details of an individual route. Retrieve the Route ID via the Get Device Configuration command.

Active for Version: 3.1+

Authorizations: Administrator, Operator, Observer

Requests

```
GET /api/gateway/[Device ID]/routes/[Route ID]
cookie: sessionID: [Session ID]
```

Parameters

N/A

Response



Note

See Route Object Model for definition of the response.

```
<Route Object>
```



Create a Route

Use this command to create an individual route.

Authorizations: Administrator, Operator

Requests

Parameters

Name	Туре	Description
action	• create	Create the specified element type.
deviceID	string	Device ID retreived via the Get Device Info command.
elementType	• route	Create a route element.
name	string	Name of route.
startRoute	Boolean	If route is started after it is created
source	object	Source object. See Source Object Model for definition.
destinations	object list	Optional. List of route destinations. See Destinations Object Model for definition.



```
{
    "status": "[success message]"
}
```

Update a Route

Use this command to update an individual route.

Authorizations: Administrator, Operator



Note

You must include all route details (source and destinations configurations) with your update. That is, if destinations are excluded, they will be deleted from the route.

Requests

```
POST /api/devices/[Device ID]/updates
cookie: sessionID: [Session ID]
"action": "update",
 "deviceID": "[Device ID]",
 "elementType": "route",
"elementID": "[Route ID]",
 "fields":
    "name": "[Route name]",
    "source":
        <Source object>
      "destinations": [
        <Destination object list>
```

Parameters

Name	Туре	Description
action	• update	Update the specified element type.
deviceID	string	Device ID retrieved via the Get Device Info command.
elementType	• route	Update the route element.
elementID	string	Route ID retrieved via the Get Device Configuration command
name	string	Name of route.
source	object	Source object model. See Source Object Model for definition.



Name	Туре	Description
destinations	string	Optional, if no destinatsions are desired in the route. Destinations object model. See Destinations Object Model for definition.

```
{
    "status": "[success message]"
}
```



Delete a Route

Requests

```
POST /api/devices/[Device ID]/updates
cookie: sessionID: [Session ID]

{
   "action": "delete",
   "deviceID": "[Device ID]",
   "elementType": "route",
   "elementID": "[Route ID]"
}
```

Parameters

Name	Туре	Description
action	• delete	Delete the specified element type.
deviceID	string	Device ID retreived via the Get Device Info command.
elementType	• route	Delete a route element as specified by elementID.
elementID	string	Route ID to delete. Retrieved via the Get Device Configuration command.

```
{
   "status": "[success message]"
}
```

Start or Stop Routes

Use this command to start or stop individual routes.

Authorizations: Administrator, Operator

Requests

```
POST /api/devices/[Device ID]/commands
cookie: sessionID: [Session ID]
 "deviceID": "[Device ID]",
 "command": "[command]",
 "parameters": {
  "routeID": "[Route ID]"
```

Parameters

Name	Туре	Description
deviceID	string	Device ID retreived via the Get Device Info command.
command	start-route stop-route	Command to issue to the route.
routeID	string	Route ID retrieved via the Get Device Configuration command.

Response

```
[
    "action": "command",
"command": "start-route",
    "parameters": {
       "routeID": "[Route ID]"
    "deviceID": "[Device ID]",
    "createdAt": [Date/time in Unix time],
    "completedAt": 0,
    "result": null,
"state": "pending",
    "id": "a5x4-7KEApdS0UuAUUCSog"
```

Note

Status of the state property can be polled via the Get Device Configuration command. It may take several seconds to complete the command.



Start or Stop a Route's Destination

Use this command to start or stop a destination within a route.

Authorizations: Administrator, Operator



Note

You must include all route destinations, even those not being started or stopped. If destinations are excluded, they will be deleted from the route.

Requests

```
POST /api/devices/[Device ID]/updates
cookie: sessionID: [Session ID]
 "action": "update",
 "deviceID": "[Device ID]",
 "elementType": "route",
 "elementID": "[Route ID]",
 "fields":
    "name": "[Route name]",
    "source":
        "name": "[Source name]",
        "id": "[Source ID]",
        "address": "0.0.0.0",
        "port": 1234
      "destinations": [
          "name": "[Destination name]",
          "id": "[Destination ID]",
          "action": "[Command]",
"address": "10.69.12.148",
          "port": 4900
       (other destinations not being started/stopped)
   }
```

Parameters

Name	Туре	Description
action	• update	Update the specified element type.
deviceID	string	Device ID retrieved via the Get Device Info command.



Name	Туре	Description
elementType	• route	Update a route element.
elementID	string	Route ID retrieved via the Get Device Configuration command.
name	string	Name of route.
source	object	Source object model. See Source Object Model for definition.
		Only the fields shown above are required.
destinations	object	Destination object model. See Destinations Object Model for definition.
		Only the fields shown above are required.

```
{
  "status": "[success message]"
}
```



Export System Preset

Retrieves a preset of the entire device, including Authorizations: Administrator route configurations.

Requests

GET /api/gateway/[Device ID]/system/preset
cookie: sessionID: [Session ID]

Parameters

N/A

Response

Response type is a downloadable file with Content-Disposition: attachment where the contents of the file are of type application/json. This file can be POSTed back to the Media Gateway/SRT Gateway using the Import System Preset command to return the system to the state captured by the preset at the moment of export.



```
"preset_version": "1.0",
"product_version": "3.0.0.79",
"routes": [
     "name": "Test route",
     "source": {
    "name": "Source Name",
       "networkInterface": "",
       "mode": "unicast",
       "address": "0.0.0.0",
"protocol": "udp",
       "port": 1234,
       "encryption": "none",
"srtLatency": null,
       "srtPassPhrase": null
     "destinations": [
         "name": "Destination Name",
         "protocol": "udp",
         "port": 7890,
"mode": "unicast",
         "networkAddress": null,
         "networkInterface": "",
         "address": "1.2.3.4",
         "ttl": 64,
"mtu": 1496,
"tos": 184,
          "encryption": "none",
          "fec": "none",
         "shaping": false,
         "maxBitrate": 10000
    ]
  }
]
```

Import System Preset

Loads a preset of the entire device, previously downloaded using the Export System Preset command.

Authorizations: Administrator

Requests

```
POST /api/gateway/[Device ID]/system/preset
cookie: sessionID: [Session ID]
Content-Type: multipart/form-data
```

A previously downloaded Gateway preset (.hmg file) should be posted using the multipart formdata file upload pattern also used by web browser file upload controls. Implementations of multipart file uploads are available in libraries for most programming/scripting languages.



Note

The format may vary depending on the REST library in use.

Parameters

N/A

Response

```
"type": "postSystemPreset",
"message": "Successfully loaded preset",
"pendingCreation": [
  "[Route Name 1]",
  "[Route Name 2]"
]
```

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Example: Stopping an Individual Destination of a Route

Stopping an individual destination of an already existing route requires multiple API calls:

- 1. Login
- 2. Get device ID.
- 3. Get list of routes.
- 4. Stop individual destination.
- 5. Confirm the destination is stopped.

Step 1: Login

If you are not already logged in, use the Initiate Session command to login.

```
POST https://192.168.0.168/api/session
{
    "username" : "[user name]",
    "password" : "[password]"
}
```

Step 2: Get Device ID

Use the Get Device Info commands to obtain the device ID.

```
GET https://192.168.0.168/api/devices
```

The server returns the device information. Copy the "_id" value for use in the next step.

```
[
    "_id": "9cr86XGNGaxtGySOtyjPDA",
    "type": "gateway",
    "ip": "127.0.0.1",
    "name": "Haivision Gateway",
    "lastConnectedAt": 1603791478291,
    "statusCode": "ok",
    "status": "Online",
    "statusDetails": "Connection has been established in the last 1 minutes.",
    "serialNumber": null,
    "firmware": "5.5.201009.1610",
    "hasAdminError": false,
    "pendingSync": false,
    "lastConnection": "<1m"
}
]</pre>
```

Step 3: Get List of Routes

Assuming the route already exists, using the id value from the previous step, get the list of all routes to find the route you wish to change. (See **Get List of Routes** for details.)

```
GET https://10.69.10.175/api/gateway/9cr86XGNGaxtGySOtyjPDA/routes
```



The server returns a list of all sources. Find the route you wish to stop the destinations of, and copy its contents for use in the next step.

```
"name": "StopDestAPIExample",
"elapsedTime": "00:22:24",
"id": "5912f2cd-00cb-41e9-b369-b6f1e139542b",
"state": "running",
"source": {
  "name": "SourceName",
  "id": "bdc42cc1-b982-4821-9d2f-4687f5b58cca",
  "networkInterface": "",
 "mode": "unicast"
 "address": "0.0.0.0",
  "protocol": "udp",
 "port": 1234,
  "sourceAddress": ""
 "encryption": "none"
  "usedBandwidth": "0.338",
  "state": "connected",
 "srtRcvBuf": 10240000,
 "srtPassPhrase": null,
 "srtGroupMode": "none",
  "summaryStatusCode": "ok",
 "summaryStatusDetails": "connected"
"destinations": [ {
 "name": "Destination1Name",
 "id": "dcb09ae4-8a1a-488a-a850-cc37da8b8ce8",
  "protocol": "udp",
  "port": 1111,
 "started": true,
  "mode": "unicast",
  "networkAddress": null,
 "networkInterface": ""
  "address": "10.0.65.10",
 "ttl": 64,
 "mtu": 1496,
  "tos": 136,
  "state": "connected",
 "encryption": "none",
  "fec": "none",
  "usedBandwidth": "0.338",
 "summaryStatusCode": "ok",
 "summaryStatusDetails": "connected",
 "shaping": false,
  "maxBitrate": 10000
 "name": "Destination2Name",
 "id": "8728c3d5-b0bf-4108-9a78-21c12c355d61",
  "protocol": "udp",
  "port": 2222,
 "started": true,
 "mode": "unicast",
 "networkAddress": null,
 "networkInterface": ""
  "address": "10.0.65.10",
 "ttl": 64,
  "mtu": 1496,
 "tos": 136,
 "state": "connected",
 "encryption": "none",
```

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```
"fec": "none",
        "usedBandwidth": "0.338",
        "summaryStatusCode": "ok",
        "summaryStatusDetails": "connected",
        "shaping": false,
        "maxBitrate": 10000
        "name": "Destination3Name",
        "id": "d07db32a-7e82-47b9-bcc3-18e5d5037f7b",
        "protocol": "udp",
        "port": 3333,
        "started": true,
        "mode": "unicast"
        "networkAddress": null,
        "networkInterface": "",
        "address": "10.0.65.10",
        "ttl": 64,
        "mtu": 1496,
        "tos": 136,
        "state": "connected",
        "encryption": "none",
        "fec": "none",
        "usedBandwidth": "0.338",
        "summaryStatusCode": "ok",
        "summaryStatusDetails": "connected",
        "shaping": false,
        "maxBitrate": 10000
      "summaryStatusCode": "ok",
      "summaryStatusDetails": "running"
    }
. . .
```

Step 4: Stop Individual Destination

Using the route update command, send the contents of the route above removing the read-only values and adding an "stop" action on the destination that you wish to stop. See Start or Stop a Route's **Destination** for the proper format.



Note

If you only include the destination you wish to stop, all other route destinations will be deleted.

```
POST /api/devices/ 9cr86XGNGaxtGySOtyjPDA /
updates
  "action": "update",
  "deviceID": "9cr86XGNGaxtGySOtyjPDA",
  "elementType": "route",
  "elementID": "5912f2cd-00cb-41e9-b369-
b6f1e139542b",
  "fields": {
      "name": "StopDestAPIExample",
      "source": {
        "name": "SourceName",
        "id": "bdc42cc1-
b982-4821-9d2f-4687f5b58cca"
        "networkInterface": "",
        "address": "0.0.0.0",
```



```
"protocol": "udp",
        "port": 1234,
        "sourceAddress": ""
      "destinations": [ {
        "name": "Destination1Name",
"id": "dcb09ae4-8a1a-488a-a850-
cc37da8b8ce8",
        "action": "stop",
        "protocol": "udp",
        "port": 1111,
        "networkInterface": "",
        "address": "10.0.65.10",
        "ttl": 64,
        "mtu": 1496,
        "tos": 136,
        "encryption": "none",
        "fec": "none",
        "shaping": false,
        "maxBitrate": 10000
        "name": "Destination2Name",
        "id": "8728c3d5-
b0bf-4108-9a78-21c12c355d61",
        "protocol": "udp",
        "port": 2222,
        "networkInterface": ""
        "address": "10.0.65.10",
        "ttl": 64,
        "mtu": 1496,
        "tos": 136,
        "encryption": "none",
        "fec": "none",
        "shaping": false,
        "maxBitrate": 10000
        "name": "Destination3Name",
        "id": "d07db32a-7e82-47b9-
bcc3-18e5d5037f7b",
        "protocol": "udp",
        "port": 3333,
        "networkInterface": "",
        "address": "10.0.65.10",
        "ttl": 64,
        "mtu": 1496,
        "tos": 136,
        "encryption": "none",
        "fec": "none",
        "shaping": false,
        "maxBitrate": 10000
    }
```

Step 4: Confirm the Destination is Stopped

Confirm the action by issuing the Get List of Routes command again.

HAIVISION www.haivision.com

GET https://10.69.10.175/api/gateway/9cr86XGNGaxtGySOtyjPDA/routes

The result shows that only the specified destination in the previous step was stopped.

```
{
  "name": "StopDestAPIExample",
  "elapsedTime": "00:54:26",
  "id": "5912f2cd-00cb-41e9-b369-b6f1e139542b",
  "state": "running",
  "source": {
    "name": "SourceName",
  "destinations": [
      "name": "Destination1Name",
      "state": "disconnected",
    },
      "name": "Destination2Name",
      "state": "connected",
      "name": "Destination3Name",
      "state": "connected",
  "summaryStatusCode": "ok",
  "summaryStatusDetails": "running"
}
```

Statistics

- Get Route Statistics
- Get Source Statistics
- Get Destination Statistics
- Get SRT Client Statistics

Get Route Statistics

Retrieves statistics about a specific route.

Authorizations: Administrator, Operator, Observer

Requests

```
GET /api/gateway/[Device ID]/statistics?routeID=[Route ID]
cookie: sessionID: [Session ID]
```



Parameters

Name	Туре	Description
Device ID	string	Device ID retreived via the Get Device Info command.
Route ID	string	Route ID retrieved via the Get Device Configuration command.

Response

Response varies depending on which protocol is used.



Note

The Source ID and Destination ID can be used in subsequent API calls to obtain their specific statistics. See Get Source Statistics and Get Destination Statistics for more information.



Parameters

Name	Туре	Description	
collectedAt	string	Timestamp when statistics were collected.	
route	object	Refer to the table below for the route object model.	

The route object has the following fields:

Name	Туре	Description	
id	string	Unique identifier for the route.	
name	string	Name of the route.	
elapsedRunningTi me	number	Either an empty string (for idle routes), or a string in HH:MM:SS format (e.g. 00:03:46).	
state	string	Whether the route is running, idle, or stopped.	
source	object	See Source Statistics Object Model for the source statistics object model.	
destinations	object list	See Destinations Statistics Object Model for the destination statistics object model.	

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Get Source Statistics

Retrieves statistics about a specific route's source. Authorizations: Administrator, Operator, Observer

Requests

```
GET /api/gateway/[Device ID]/statistics?routeID=[Route ID]&sourceID=
  [Source ID]
cookie: sessionID: [Session ID]
```

Parameters

Name	Туре	Description
Device ID	string	Device ID retreived via the Get Device Info command.
Route ID	string	Route ID retrieved via the Get Device Configuration command.
Source ID	string	Source ID retrieved via the Get Route Statistics command.

Response

Response varies depending on which protocol is used. See **Source Statistics Object Model** for parameter definitions of the source statistics object.

```
{
  "collectedAt": [Date/time in Unix time],
  "source": {
      <Source Statistics Object>
    }
}
```

Get Destination Statistics

Retrieves statistics about a specific route's destination.

Authorizations: Administrator, Operator, Observer



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With HMG/HSG version 3.7.4+, you can use the destination name in the request to return its statistics. If special characters are used in the destination name (for example, +, ?, &), ensure you use a URL-encoded format in the request.

Requests

```
GET /api/gateway/[Device ID]/statistics?routeID=[Route ID]&destinationID=
  [Destination ID]
cookie: sessionID: [Session ID]
GET /api/gateway/[Device ID]/statistics?routeID=[Route ID]&destinationName=
 [Destination Name]
cookie: sessionID: [Session ID]
```

Parameters

Name	Туре	Description
Device ID	string	Device ID retreived via the Get Device Info command.
Route ID	string	Route ID retrieved via the Get Device Configuration command.
Destination ID	string	Destination ID retrieved via the Get Route Statistics command.
Destination Name	string	Destination name.

Response

Response varies depending on which protocol is used. See Destinations Statistics Object Model for parameter definitions of the destination statistics object.

```
"collectedAt": [Date/time in Unix time],
"destination": {
 <Destination Statistics Object>
}
```





Get SRT Client Statistics

Retrieves statistics for a specific client connected **Authorizations:** Administrator, Operator, Observer to an SRT listener destination.

Requests

```
GET /api/gateway/[Device ID]/statistics/client?routeID=[Route ID]&destinationID=
  [Destination ID]&clientAddress=[Client Address]&clientPort=[Client Port]
cookie: sessionID: [Session ID]
```

Parameters

Name	Туре	Description	
Device ID	string	Device ID retreived via the Get Device Info command.	
Route ID	string	Route ID retrieved via the Get Device Configuration command.	
Destination ID	string	Destination ID retrieved via the Get Route Statistics command.	
Client Address	string	Address of client to retrieve statistics.	
Client Port	string	Optional. Port of client to retrieve statistics.	

Response

See Client Statistics Model in **Destinations Statistics Object Model** for parameter definitions of the client statistics object.

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Object Model Reference

This section defines object models that are used across various Haivision Gateway API commands.

Route Object Model

The route object model differs when used in API requests and responses.

POST API Requests

Use the following route model when issuing the Create a Route and Update a Route API requests.

Name	Туре	Description
name	string	Name of route.
id	string	Optional when creating source, required when updating. Route ID.
source	object	Route source object. See Source Object Model for definition.
destinations	object list	Route destinations list. See Destinations Object Model for definition.

GET API Responses

The following route model is returned after issuing the **Get Device Configuration** and **Get Route Configuration** API commands.

Name	Туре	Description
name	string	Name of route.
id	string	Route ID.
source	object	Route source object. See Source Object Model for definition.
destinations	object list	Route destinations list. See Destinations Object Model for definition.
elapsedTime	string	Elapsed running time of route.
state	string	Route state: idle or running.



Name	Туре	Description
pendingUpdates	object	Route update object that lists the values that are pending an update. Only appears while a route update or a stop/start action is occurring.
summaryStatusCode	string	Route status summary code: warn, error, ok, or unknown.
summaryStatusDetails	string	Route status details.
hasPendingDelete	boolean	If the route has a pending delete task.

Source Object Model

The source object model differs when used in API requests and responses.

RTSP

POST API Requests

Use the following source model when issuing the Create a Route, Update a Route, and Start or Stop a Route's Destination API requests. Definition of each source depends on the source protocol.

UDP and RTP SRT RTMP

UDP or RTP Source

Name	Туре	Description
name	string	Name of source for route. (Unique name with length 1-60.)
id	string	Optional when creating source, required when updating. Source ID.
address	string	IP address of route source. (0.0.0.0 for unicast.)
protocol	string	Source protocol: udp or rtp
port	number	Port number of route source: 1-65535.
networkInterface	string	Optional. Network interface name. (Empty string if auto.)
retainHeader	Boolean	Optional. RTP only. To retain headers for RTP tunneling through SRT.
sourceAddress	string	Optional. IGMP v3 source address.
fec	string	Optional. For RTP inputs, PRO-MPEG FEC enable: none or prompeg.
		PRO-MPEG FEC is available only on Haivision SRT Gateway.

UDP and RTP SRT RTMP RTSP

SRT Source



Name	Туре	Description
name	string	Name of source for route. (Unique name with length 1-60.)
id	string	Optional when creating source, required when updating. Source ID.
address	string	IP address of route source. (0.0.0.0 for listener.) If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual address assignments.
protocol	string	Source protocol: srt
port	number	Port number of route source: 1-65535. If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual port assignments.
networkInterface	string	Optional. Network interface name. (Empty string if auto.) If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual network interfaces.
srtPassPhrase	string	Optional. SRT passphrase.
srtLatency	number	Optional. SRT latency.
srtMode	string	Optional. SRT mode: caller, listener, or rendezvous.
srtRcvBuf	number	Optional. SRT receive buffer size in bytes.
srtStreamID	string	Optional. SRT Caller mode only. Stream ID string to identify the listener. Note Only available for Haivision SRT Gateway.
useFec	Boolean	Optional. SRT Caller mode only. If FEC is enabled: true or false
srtFecCols	number	Optional. SRT Caller mode only. If FEC is enabled, number of columns.



Name	Туре	Description
srtFecRows	number	Optional. SRT Caller mode only. If FEC is enabled, number of rows.
srtFecLayout	string	Optional. SRT Caller mode only. If FEC is enabled, FEC layout: saircase or even.
srtFecArq	string	Optional. SRT Caller mode only. If FEC is enabled, FEC ARQ: never or onreq.
srtGroupMode	string	Optional. SRT path redundancy mode: none, broadcast, backup, or any.
srtNetworkBondingParams	object list	If srtGroupMode is not set to none, array of SRT network bonding parameters.

SRT Network Bonding Parameters Model

In SRT Listener or Caller mode with srtGroup mode not set to none, use the following SRT Network Bonding Parameters model when issuing the Create a Route, Update a Route, and Start or Stop a Route's Destination API requests for each defined network path.

Name	Туре	Description
address	string	IP address of route source.
port	number	Port number of route source: 1-65535.
networkInterface	string	Network interface name. (Empty string if auto.)

UDP and RTP SRT RTMP RTSP

RTMP Source

Name	Туре	Description
name	string	Name of source for route. (Unique name with length 1-60.)
id	string	Optional when creating source, required when updating. Source ID.
address	string	Optional in publisher mode, required in consumer mode. IP address of route source.



Name	Туре	Description
protocol	string	Source protocol: rtmp
port	number	Port number of route source: 1–65535.
networkInterface	string	Optional. Network interface name. (Empty string if auto.)
streamName	string	RTMP stream name
rtmpMode	string	RTMP mode: PUBLISHER or CONSUMER.

UDP and RTP SRT RTMP RTSP

RTSP Source

Name	Туре	Description
name	string	Name of source for route. (Unique name with length 1-60.)
id	string	Optional when creating source, required when updating. Source ID.
address	string	IP address of route source.
protocol	string	Source protocol: rtsp
port	number	Port number of route source: 1-65535.
networkInterface	string	Optional. Network interface name. (Empty string if auto.)
fec	string	Optional. FEC enable: none or vf
username	string	Optional. RTSP username.
password	string	Optional. RTSP password.

GET API Responses

The following source model is returned after issuing the **Get Device Configuration** and **Get Route Configuration** API commands. Definition of each source depends on the source protocol.

UDP and RTP	SRI	RIMP	RISP
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UDP or RTP Source

Name	Туре	Description
name	string	Name of source for route.
id	string	Source ID.
address	string	IP address of route source. (0.0.0.0 for unicast.)
protocol	string	Source protocol: udp or rtp
port	number	Port number of route source: 1-65535.
networkInterface	string	Network interface name. (Empty string if auto.)
retainHeader	Boolean	RTP only. To retain headers for RTP tunneling through SRT.
sourceAddress	string	IGMP v3 source address.
fec	string	RTP only. Optional. For RTP inputs, PRO-MPEG FEC enable: none or prompeg.
		Note PRO-MPEG FEC is available only on Haivision SRT Gateway.
state	string	Source state: disconnected, connecting, connection established, or connected.
summaryStatusCode	string	Source status summary code: warn, error, ok, or unknown.
summaryStatusDetails	string	Source status details.

UDP and RTP SRT RTMP RTSP

SRT Source

Name	Туре	Description
name	string	Name of source for route.

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Name	Туре	Description
id	string	Source ID.
address	string	IP address of route source. (0.0.0.0 for listener.) If path redundancy is used, pipedelimited string of addresses.
protocol	string	Source protocol: srt
port	number or string	Port number of route source: 1–65535. If path redundancy is used, pipe-delimited string of ports.
networkInterface	string	Network interface name. (Empty string if auto.) If path redundancy is used, pipe-delimited string of interface names.
srtPassPhrase	string	SRT Passphrase.
srtLatency	number	SRT latency.
srtRcvBuf	number	SRT receive buffer size in bytes.
srtStreamID	string	SRT Caller mode only. Stream ID string to identify the listener.
		Note Only available for Haivision SRT Gateway.
useFec	Boolean	SRT Caller mode only. If FEC is enabled: true or false.
srtFecCols	number	SRT Caller mode only. If FEC is enabled, number of columns.
srtFecRows	number	SRT Caller mode only. If FEC is enabled, number of rows.
srtFecLayout	string	SRT Caller mode only. If FEC is enabled, FEC layout: saircase or even.
srtFecArq	string	SRT Caller mode only. If FEC is enabled, FEC ARQ: never or onreq.
mode	string	SRT mode: caller, listener, or rendezvous.



Name	Туре	Description
state	string	Source state: disconnected, connecting, connection established, or connected.
summaryStatusCode	string	Source status summary code: warn, error, ok, or unknown.
summaryStatusDetails	string	Source status details.
srtGroupMode	string	SRT path redundancy mode: none, broadcast, backup, or any.
		Note Backup mode is an experimental feature and will be fully supported in a future version.
srtNetworkBondingParams	object list	If srtGroupMode is not set to none, array of SRT network bonding parameters.

SRT Network Bonding Parameters Model

In SRT Listener or Caller mode with srtGroup mode not set to none, the following SRT Network Bonding Parameters model is returned as part of the response to a **Get Device Configuration** or **Get Route Configuration** API command for each defined network path.

Name	Туре	Description
address	string	IP address of route source.
port	number	Port number of route source: 1-65535.
networkInterface	string	Network interface name. (Empty string if auto.)

UDP and RTP SRT RTMP RTSP

RTMP Source

Name	Туре	Description
name	string	Name of source for route.
id	string	Source ID.



Name	Туре	Description
address	string	IP address of route source. (127.0.0.1/live for publisher.)
protocol	string	Source protocol: rtmp
port	number	Port number of route source: 1-65535.
networkInterface	string	Network interface name. (Empty string if auto.)
streamName	string	RTMP stream name
rtmpMode	string	RTMP mode: PUBLISHER or CONSUMER.
state	string	Source state: disconnected, connecting, connection established, or connected.
summaryStatusCode	string	Source status summary code: warn, error, ok, or unknown.
summaryStatusDetails	string	Source status details.

UDP and RTP SRT RTMP RTSP

RTSP Source

Name	Туре	Description
name	string	Name of source for route.
id	string	Source ID.
address	string	IP address of route source.
protocol	string	Source protocol: rtsp
port	number	Port number of route source: 1-65535.
networkInterface	string	Network interface name. (Empty string if auto.)
fec	string	FEC enable: none or vf.



Name	Туре	Description
username	string	RTSP username.
password	string	RTSP password.
state	string	Source state: disconnected, connecting, connection established, or connected.
summaryStatusCo de	string	Source status summary code: warn, error, ok, or unknown.
summaryStatusDe tails	string	Source status details.



Destinations Object Model

The destinations object model differs when used in API requests and responses.

POST API Requests

Use the following destinations model when issuing the Create a Route, Update a Route, and Start or Stop a Route's Destination API requests. Definition of each destination depends on the protocol.

UDP and RTP

SRT HLS

UDP or RTP Destination

Name	Туре	Description	
name	string	Name of destination for route. (Unique name with length 1-60.)	
id	string	Optional when creating destination, required when updating. Destination ID.	
address	string	IP address of route destination.	
protocol	string	Destination protocol: udp or rtp.	
port	number	Port number of route destination: 1-65535.	
networkInterface	string	Optional. Network interface name. (Empty string if auto.)	
retainHeader	Boolean	Optional. RTP only. To retain headers for RTP tunneling through SRT.	
action	string	Optional. Destination action: start, stop, or none.	
mtu	number	Optional. Destination MTU. Range = 280-1500.	
ttl	number	Optional. Destination TTL. Range = 1-255.	
tos	number	Optional. Destination ToS. Range = 0-255.	
fec	string	Optional. • For UDP, destination FEC enable: none or vf. • For RTP, destination PRO-MPEG FEC enable: none or prompeg. Note PRO-MPEG FEC available only on Haivision SRT Gateway.	



Name	Туре	Description
prompegFecLevel	string	Optional. RTP only. PRO-MPEG FEC level: a or b.
prompegFecIsBlo ckAligned	Boolean	Optional. RTP only. PRO-MPEG FEC if block is aligned: true or false.
prompegFecColu mns	number	Optional. RTP only. PRO-MPEG FEC number of columns: 1–20.
prompegFecRows	number	Optional. RTP only. PRO-MPEG FEC number of rows: 4-20.
shaping	Boolean	Optional. Destination shaping: true or false.
maxBitrate	number	Optional. Destination maximum bitrate.

UDP and RTP SRT HLS

SRT Destination

Name	Туре	Description
name	string	Name of destination for route. (Unique name with length 1-60.)
id	string	Optional when creating destination, required when updating. Destination ID.
address	string	IP address of route destination. (0.0.0.0 for listener.) If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual address assignments.
protocol	string	Destination protocol: srt.
port	number	Port number of route destination: 1-65535. If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual port assignments.
networkInterface	string	Optional. Network interface name. (Empty string if auto.) If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual network interface names.



Name	Туре	Description
retainHeader	Boolean	Optional. To retain headers for RTP tunneling through SRT.
action	string	Optional. Destination action: start, stop, or none.
mtu	number	Optional. Destination MTU. Range = 280-1500. If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual MTU values.
ttl	number	Optional. Destination TTL. Range = 1-255. If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual TTL values.
tos	number	Optional. Destination ToS. Range = 0-255. If SRT path redundancy is used, this value is not needed. The srtNetworkBondingParams object contains the individual ToS values.
srtEncryption	string	Optional. Encryption mode: AES128, AES256, or None.
srtPassPhrase	string	Optional. SRT Passphrase.
srtLatency	number	Optional. SRT latency.
srtMode	string	Optional. SRT mode: caller, listener, or rendezvous.
srtOverhead	string	Optional. Overhead used for SRT.
srtStreamID	string	Optional. SRT Caller mode only. Stream ID string to identify the listener. Note Only available for Haivision SRT Gateway.
useFec	Boolean	SRT Caller mode with path redundancy disabled only. Enable FEC: true or false
srtFecCols	number	If useFEC is enabled, number of columns.
srtFecRows	number	If useFEC is enabled, number of rows.
srtFecLayout	string	If useFEC is enabled, FEC layout: saircase or even.
srtFecArq	string	If useFEC is enabled, FEC ARQ: never or onreq.



Name	Туре	Description
srtConnectionLimit	string	SRT Listener mode only. SRT Caller connection limit.
srtGroupMode	string	Optional. SRT path redundancy mode: none, broadcast, backup, or any.
srtNetworkBondingParams	object list	If srtGroupMode is not set to none, array of SRT network bonding parameters.

SRT Network Bonding Parameters Model

In SRT Listener or Caller mode with srtGroupmode not set to none, use the following SRT Network Bonding Parameters destinations model when issuing the Create a Route, Update a Route, and Start or Stop a Route's Destination API requests for each defined network path.

Name	Туре	Description
address	string	IP address of route destination.
port	number	Port number of route destination: 1–65535.
networkInterface	string	Network interface name. (Empty string if auto.)
mtu	number	Optional. Destination MTU. Range = 280-1500
ttl	number	Optional. Destination TTL. Range = 1-255.
tos	number	Optional. Destination ToS. Range = 0-255.

UDP and RTP SRT HLS

HLS Destination

Name	Туре	Description
name	string	Name of destination for route. (Unique name with length 1-60.)
id	string	Optional when creating destination, required when updating. Destination ID.
protocol	string	Destination protocol: hls.
action	string	Optional. Destination action: start, stop, or none.



Name	Туре	Description
segmentDuration	number	Optional. HLS segment duration.
useEncryption	Boolean	Optional. Encryption enable: true or false.
segmentsPerKey	number	Optional. Number of HLS segments per key.
multitrackSegmen ter	Boolean	Optional. HLS variant playlist enable: true or false.

GET API Responses

The following destinations model is returned after issuing the **Get Device Configuration** and **Get Route Configuration** API commands. Definition of each destination depends on the protocol.

UDP and RTP SRT HLS

UDP or RTP Destination

Name	Туре	Description
name	string	Name of destination for route.
id	string	Destination ID.
address	string	IP address of route destination. (0.0.0.0 for unicast.)
protocol	string	Destination protocol: udp or rtp.
port	number	Port number of route destination: 1–65535.
networkInterface	string	Network interface name. (Empty string if auto.)
retainHeader	Boolean	RTP only. To retain headers for RTP tunneling through SRT.
mtu	number	Destination MTU. Range = 280-1500
ttl	number	Destination TTL. Range = 1-255.
tos	number	Destination ToS. Range = 0-255.

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Name	Туре	Description	
fec	string	Optional. • For UDP, destination FEC enable: none or vf. • For RTP, destination PRO-MPEG FEC enable: none or prompeg. • Note PRO-MPEG FEC available only on Haivision SRT Gateway.	
prompegFecLevel	string	Optional. RTP only. PRO-MPEG FEC level: a or b.	
prompegFecIsBlo ckAligned	Boolean	Optional. RTP only. PRO-MPEG FEC if block is aligned: true or false.	
prompegFecColu mns	number	Optional. RTP only. PRO-MPEG FEC number of columns: 1–20.	
prompegFecRows	number	Optional. RTP only. PRO-MPEG FEC number of rows: 4-20.	
shaping	Boolean	Destination shaping: true or false.	
maxBitrate	number	Destination maximum bitrate.	
state	string	Destination state: disconnected, connecting, connection established, or connected.	
summaryStatusCo de	string	Destination status summary code: warn, error, ok, or unknown.	
summaryStatusDe tails	string	Destination status details.	
started	Boolean	If destination is started: true or false.	

UDP and RTP SRT HLS

SRT Destination

Name	Туре	Description	
name	string	Name of destination for route.	
id	string	Destination ID.	



Name	Туре	Description
address	string	IP address of route destination. (0.0.0.0 for listener.) If path redundancy is used, pipe-delimited string of addresses.
protocol	string	Destination protocol: srt.
port	number or string	Port number of route destination: 1-65535. If path redundancy is used, pipe-delimited string of ports.
networkInterface	string	Network interface name. (Empty string if auto.) If path redundancy is used, pipe-delimited string of network interfaces.
retainHeader	Boolean	Optional. To retain headers for RTP tunneling through SRT.
mtu	number or string	Destination MTU. Range = 280-1500. If path redundancy is used, pipedelimited string of MTU values.
ttl	number or string	Destination TTL. Range = 1-255. If path redundancy is used, pipedelimited string of TTL values.
tos	number or string	Destination ToS. Range = 0-255. If path redundancy is used, pipedelimited string of ToS values.
srtEncryption	string	Encryption mode: AES128, AES256, or None.
srtPassPhrase	string	SRT Passphrase.
useFEC	Boolean	SRT Caller mode only. If FEC is enabled: true or false
srtFecCols	number	SRT Caller mode only. If FEC is enabled, number of columns.
srtFecRows	number	SRT Caller mode only. If FEC is enabled, number of rows.
srtFecLayout	string	SRT Caller mode only. If FEC is enabled, FEC layout: staircase or even.
srtFecArq	string	SRT Caller mode only. If FEC is enabled, FEC ARQ: never or onreq.
srtConnectionLimit	string	SRT Listener mode only. SRT Caller connection limit.
srtLatency	number	SRT latency.
mode	string	SRT mode: caller, listener, or rendezvous.
srtOverhead	string	Overhead used for SRT.



Name	Туре	Description	
state	string	Destination state: disconnected, connecting, connection established, or connected.	
summaryStatusCode	string	Destination status summary code: warn, error, ok, or unknown.	
summaryStatusDetails	string	Destination status details.	
started	Boolean	If destination is started: true or false.	
srtStreamID	string	SRT Caller mode only. Stream ID string to identify the listener.	
		Note Only available for Haivision SRT Gateway.	
srtGroupMode	string	SRT path redundancy mode: none, broadcast, backup, or any.	
srtNetworkBondingParam s	object list	If srtGroupMode is not set to none, array of SRT network bonding parameters.	

SRT Network Bonding Parameters Model

In SRT Listener or Caller mode with srtGroupMode not set to none, the following SRT Network Bonding Parameters model is returned as part of the response to a **Get Device Configuration** or **Get Route Configuration** API command for each defined network path.

Name	Туре	Description
address	string	IP address of route destination.
port	number	Port number of route destination: 1–65535.
networkInterface	string	Network interface name. (Empty string if auto.)
mtu	number	Optional. Destination MTU. Range = 280-1500
ttl	number	Optional. Destination TTL. Range = 1-255.
tos	number	Optional. Destination ToS. Range = 0-255.

UDP and RTP SRT HLS

HLS Destination



Name	Туре	Description
name	string	Name of destination for route.
id	string	Destination ID.
protocol	string	Destination protocol: http.
address	string	HLS playlist path. (Construct the URI to m3u8 playlist for this client by using: https://[IP address] + [HLS playlist path].) Playlist requests may require authorization.
segmentDuration	string	HLS segment duration.
useEncryption	boolean	Encryption enable: true or false.
segmentsPerKey	number	Number of HLS segments per key.
multitrackSegmen ter	boolean	HLS variant playlist enable: true or false.
state	string	Destination state: disconnected, connecting, connection established, or connected.
summaryStatusCo de	string	Destination status summary code: warn, error, ok, or unknown.
summaryStatusDe tails	string	Destination status details.
started	Boolean	If destination is started: true or false.



Source Statistics Object Model

The following source statistics model is returned after issuing the **Get Device Configuration** and **Get Source Statistics** API commands. The definition depends on the source protocol.

UDP, RTP, RTMP, and RTSP SRT

UDP, RTP, RTMP, and RTSP Source

Name	Туре	Description
name	string	Name of the source.
id	string	Unique identifier for the source.
mode	string	Unicast or multicast.
elapsedRunningTime	string	Either an empty string (for idle routes), or a string in HH:MM:SS format (e.g. 00:03:46).
signalLosses	number	Number of signal losses.
sendRate	number	Packet send rate in Mbits/s.
numPackets	number	Number of packets sent.
usedBandwidth	number	Bandwidth used in Mbits/s.
bitrate	number	Stream bitrate in Mbits/s.
state	string	Source state: disconnected, connecting, connection established, or connected.
fecLostPackets	number	Number of lost FEC packets.
fecRecoveredPackets	number	Number of recovered FEC packets.
fecUnrecoveredPacke ts	number	Number of unrecovered FEC packets.
fecReorderedPackets	number	Number of reordered FEC packets.

UDP, RTP, RTMP, and RTSP SRT



SRT Source

Name	Туре	Description
name	string	Name of the source.
id	string	Unique identifier for the source.
mode	string	SRT mode: caller, listener, or rendezvous.
elapsedRunningTime	string	Either an empty string (for idle routes), or a string in HH:MM:SS format (e.g. 00:03:46).
signalLosses	number	Number of signal losses.
sendRate	number	Packet send rate in Mbits/s.
numPackets	number	Number of packets sent.
usedBandwidth	number	Bandwidth used in Mbits/s.
bitrate	number	Stream bitrate in Mbits/s.
state	string	Source state: disconnected, connecting, connection established, or connected.
srtNumLostPackages	number	SRT number of lost packages.
srtRetransmitRate	number	SRT retransmit rate in bits/s.
srtRoundTripTime	number	SRT round trip time in ms.
srtNegotiatedLatency	number	SRT latency in ms.
srtLatency	number	SRT latency in ms.
srtEncryption	string	SRT encryption.
srtPacketLossRate	number	SRT packet loss rate.
srtNumSkippedPacket s	number	SRT number of skipped packet.



Name	Туре	Description
srtDecryptionState	string	SRT decryption state: <empty>, active, initializing, inactive (no passphrase), inactive (invalid passphrase).</empty>
srtBufferLevel	number	SRT buffer time in ms.
connections	object	An array of SRT source connections objects. See SRT Statistics Connections Object Model.

Destinations Statistics Object Model

The following destination statistics model is returned after issuing the **Get Route Statistics** and **Get Destination Statistics** API commands. The definition depends on the destination protocol.

UDP, RTP, and HLS SRT

UDP, RTP, and HLS Destinations

Name	Туре	Description
name	string	Name of the destination.
id	string	Unique identifier for the destination.
mode	string	Destination mode: unicast or multicast.
state	string	Destination state: disconnected, connecting, connection established, or connected.
elapsedRunningTime	string	Either an empty string (for idle routes), or a string in HH:MM:SS format (e.g. 00:03:46).
bitrate	number	Stream bitrate in Mbits/s.
signalLosses	number	Number of signal losses.
usedBandwidth	number	Bandwidth used in Mbits/s.
sendRate	number	Packet send rate in Mbits/s.
numPackets	number	Number of packets.

UDP, RTP, and HLS SRT



SRT Destinations

Name	Туре	Description
name	string	Name of the destination.
id	string	Unique identifier for the destination.
mode	string	Destination SRT mode: caller, listener, or rendezvous.
protocol	string	Protocol: srt.
state	string	Destination state: disconnected, connecting, connection established, or connected.
elapsedRunningTime	string	Either an empty string (for idle routes), or a string in HH:MM:SS format (e.g. 00:03:46).
bitrate	number	Stream bitrate in Mbits/s.
signalLosses	number	Number of signal losses.
usedBandwidth	number	Bandwidth used in Mbits/s.
sendRate	number	Packet send rate in Mbits/s.
numPackets	number	Number of packets.
srtNumLostPackets	number	SRT number of lost (but recovered) packages.
srtPacketLossRate	number	SRT packet loss rate in percent.
srtNumSkippedPacket s	number	(Receiver only) Missing packets skipped, because they were not recovered in time.
srtDroppedPackets	number	(Sender only) Number of dropped packets.
srtRoundTripTime	number	SRT round trip time in ms.
srtBufferLevel	number	SRT buffer time in ms.
srtNegotiatedLatency	number	SRT maximum latency in ms.
srtLatency	number	(Receiver only) SRT latency.



Name	Туре	Description
srtDecryptionState	string	(Receiver only) SRT receiver decryption state: <empty>, active, initializing, inactive (no passphrase), or inactive (invalid passphrase).</empty>
srtPeerDecryptionStat e	string	(Sender only) SRT peer decryption state: <empty>, active, initializing, inactive (no passphrase), or inactive (invalid passphrase).</empty>
srtEncryption	string	(Receiver only) Indicates the cipher used in the received stream: <empty>, AES128, or AES256.</empty>
srtMaxBandwidth	number	(Sender only) SRT maximum bandwidth used in Mbits/s.
srtRetransmitRate	number	SRT retransmit rate in bits/s.
srtEstimatedBandwidt h	number	(Sender only) SRT estimated path max bandwidth in bits/s.
clientStat	object list	(SRT listener only) Array of route client statistics objects. See below for the client statistics model.
connections	object list	(SRT caller and rendezvous only). Array of destination connections objects. See SRT Statistics Connections Object Model for the definition.

Client Statistics Model

The following client statistics model is returned as part of the response to a **Get Destination Statistics** or **Get SRT Client Statistics** API command for SRT Listener outputs.

Field	Туре	Description
label	string	Listener output label.
address	string	Client address.
port	number	Client connection port.
bitrate	number	Stream bitrate.
signalLosses	number	Number of signal losses.
srtVersion	string	SRT protocol version of the listener.
SRTPeerVersion	string	SRT protocol version of the client.
usedBandwidth	number	Bandwidth used in Mbits/s.



Field	Туре	Description
connections	object list	Array of destination connections objects. See SRT Statistics Connections Object Model for the definition.

SRT Statistics Connections Object Model

The following statistics connections model is returned after issuing the **Get Route Statistics** and **Get Destination Statistics** API commands for SRT routes. The definition depends on the SRT type.

Field	y Source		SRT Destinati	ion	Description
	p e		Listener Client	Caller/ Rendez vous	
SRTPeerVersion	st ri n g			•	Peer SRT protocol version.
address	st ri n g	•	•	•	Network address.
bitrate	n u m b e r			•	Stream bitrate in Mbits/s.
label	st ri n g			•	Label.
localAddress	st ri n g	•	•	•	Network local address.
port	n u m b e r	•	•	•	Network port.



Field	T y	SRT Source	SRT Destinati	ion	Description
	p e		Listener Client	Caller/ Rendez vous	
signalLosses	n u m b e r			•	Number of signal losses.
localPort	n u m b e r	•	•	•	Network local port.
networkInterface	st ri n g	•	•	•	Network interface.
numPackets	n u m b e r		•	•	Number of packets.
srtBufferLevel	n u m b e r	•	•	•	SRT buffer time in ms.
srtCurrentBandwidth	n u m b e r	•	•	•	SRT current bandwidth.
srtDecryptionState	st ri n g	•			SRT decryption state: <empty>, active, initializing, inactive (no passphrase), or inactive (invalid passphrase).</empty>



Field	T	SRT Source	SRT Destination		Description
	p e		Listener Client	Caller/ Rendez vous	
srtDroppedPackets	n u m b e r		•	•	Number of dropped packets.
srtDroppedPacketsDiff	n u m b e r		•	•	Number of dropped packets diff.
srtEncryption	st ri n g	•	•	•	Indicates the cipher used in the stream: None, none, AES128, or AES256.
srtEstimatedBandwidth	n u m b e r	•	•	•	SRT estimated bandwidth.
srtFec	st ri n g	•	•	•	SRT FEC.
srtFecArq	st ri n	•	•	•	SRT FEC ARQ: always, onreq, or never.
srtFecCols	n u m b e r	•	•	•	SRT FEC columns.
srtFecLayout	st ri n g	•	•	•	SRT FEC layout: even or staircase.



Field		SRT Source	SRT Destinat	ion	Description
	р е	304 100	Listener Client	Caller/ Rendez vous	
srtFecPacketLoss	n u m b e r	•			SRT FEC packet loss.
srtFecRecoveredPackets	n u m b e r	•			SRT FEC recovered packets.
srtFecRows	n u m b e r	•	•	•	SRT FEC rows.
srtFecTotalPacketLoss	n u m b e r	•			SRT FEC total packet loss.
srtFecTotalRecoveredPackets	n u m b e r	•			SRT FEC total recoverd packets.
srtGroupMemberStatus	st ri n g	•	•	•	SRT group member status.
srtGroupMemberWeight	n u m b e r	•	•	•	SRT group member weight.



Field	T	SRT Source	SRT Destinat	ion	Description
	p e		Listener Client	Caller/ Rendez vous	
srtGroupMode	st ri n g	•	•		SRT group mode: <empty>, broadcast, backup, balance, or any.</empty>
srt Max Bandwidth	n u m b e r	•	•	•	SRT maximum bandwidth used in Mbits/s.
srtNegotiatedLatency	n u m b e r	•	•	•	SRT negotiated latency in ms.
srtNumLostPackets	n u m b e r	•	•	•	SRT number of lost (but recovered) packets.
srtNumPackets	n u m b e r	•	•	•	SRT number of pacakets.
srtPacketLossRate	n u m b e r	•	•	•	SRT packet loss rate in percent.
srtPeerDecryptionState	st ri n g		•	•	SRT peer decryption state: <empty>, active, initializing, inactive (no passphrase), or inactive (invalid passphrase).</empty>



Field	T y	SRT Source	SRT Destinati	ion	Description
	p e		Listener Client	Caller/ Rendez vous	
srtRetransmitRate	n u m b e r	•	•	•	SRT retransmit rate in bits/s.
srtRoundTripTime	n u m b e r	•	•	•	SRT round trip time in ms.
srtSkippedPackets	n u m b e r	•			SRT number of skipped packets, because they were not recovered in time.
srtSkippedPacketsDiff	n u m b e r	•			SRT number of skipped packets diff.
srtVersion	st ri n g			•	SRT protocol version.
state	st ri n g	•	•	•	Source connection state.
usedBandwidth	n u m b e r			•	Bandwidth used in Mbits/s.

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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.

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- (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.

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2. RIGHTS GRANTED, RESTRICTIONS AND SUPPORT

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3. TERM AND TERMINATION

- 3.1 <u>Term</u>. The license and service term are set forth in your Entitlement(s). Additionally, this Agreement may be terminated without cause by You upon thirty (30) days written notice to Haivision.
- 3.2 <u>Termination for Breach</u>. Your rights under this Agreement will terminate immediately without notice from Haivision if You materially breach it or take any action in derogation of Haivision's rights to Software. Haivision may terminate this Agreement should any Software become, or in Haivision's reasonable opinion likely to become, the subject of a claim of intellectual property infringement or trade secret misappropriation.
- 3.3 <u>Termination</u>; <u>Effect</u>; <u>Survival</u>. Upon the termination of this Agreement for any reason: (a) all license rights granted hereunder shall terminate; (b) You shall immediately pay to Haivision all amounts due and outstanding as of the date of such termination or expiration; and (c) You shall return to Haivision all Licensed Software and all Haivision Confidential Information not otherwise required under the terms of this Agreement or certify that all such Licensed Software and



Confidential Information have been destroyed. Notwithstanding any termination of this Agreement, the following provisions of this Agreement shall survive for the relevant period of time set forth therein, if any: Sections 2.2, 4.1, 4.2, 6.

4. REPRESENTATIONS, DISCLAIMER AND LIMITATION OF LIABILITY

4.1 Haivision Warranty.

- (a) Haivision warrants that the Licensed Software will operate substantially in accordance with the Reference Manuals provided for a term of ninety (90) days (the "Warranty Period") after its delivery date. As Your sole and exclusive remedy for any breach of this warranty, Haivision will use its commercially reasonable efforts to correct any failure of the Licensed Software to operate substantially in accordance with the Reference Manuals which is not the result of any improper or unauthorized operation of the License Software and that is timely reported by You to Haivision in writing within the Warranty Period, provided that in lieu of initiating commercially reasonable efforts to correct any such breach, Haivision may, in its absolute discretion, either (i) replace the Licensed Software with other software or technology which substantially conforms to the Reference Manuals or (ii) refund to You a portion of the fee paid for the relevant Product, whereupon this Agreement shall terminate. This warranty shall immediately terminate if You or any third party makes or attempts to make any modification of any kind whatsoever to the Licensed Software.
- (b) All proprietary Hardware, if any, will be subject to the then current warranty terms of Haivision. All non-proprietary Hardware, if any, is sold "AS IS"; however, to the extent that Haivision has the legal right to do so, Haivision hereby transfers to You any and all warranties made by Haivision's vendors to Haivision with respect to such non-proprietary Hardware which was sold by Haivision or the Reseller to You, provided that You expressly acknowledge and agree that Haivision disclaims any and all liability in connection with any such non-proprietary Hardware, as set forth in Section 4.2 (b) of this Agreement.

4.2 Warranty Disclaimers.

- (a) THE EXPRESS WARRANTIES SET FORTH IN SECTION 4.1 (a) ABOVE IN RESPECT OF THE LICENSED SOFTWARE ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, OR STATUTORY, REGARDING THE LICENSED SOFTWARE, OR ITS OPERATION, FUNCTIONALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS (ALL OF WHICH ARE DISCLAIMED). HAIVISION DOES NOT WARRANT THAT ANY OF THE LICENSED SOFTWARE WILL MEET ALL OF YOUR NEEDS OR REQUIREMENTS, OR THAT THE USE OF ANY OF THE LICENSED SOFTWARE WILL BE UNINTERRUPTED OR ERROR-FREE, OR THAT ALL ERRORS WILL BE DETECTED OR CORRECTED.
- (b) THE EXPRESS WARRANTIES SET FORTH IN HAIVISION'S WARRANTY TERMS IN RESPECT OF HAIVISION PROPRIETARY HARDWARE ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, OR STATUTORY, REGARDING ANY SUCH PROPRIETARY HARDWARE, OR ITS OPERATION, FUNCTIONALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALL NON-PROPRIETARY HARDWARE SOLD BY HAIVISION OR THE RESELLER TO YOU IS SOLD "AS IS" EXCEPT FOR HAIVISION'S AGREEMENT TO TRANSFER TO YOU ANY WARRANTY GIVEN TO IT BY ANY VENDOR FROM WHOM SUCH HARDWARE WAS PURCHASED FOR RESALE TO YOU HEREUNDER IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.1 (b), AND HAIVISION DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, OR STATUTORY, REGARDING ANY SUCH NON-PROPRIETARY



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5. INDEMNIFICATION

5.1 Indemnification by Haivision.

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- (b) If any Licensed Software is, or in the opinion of Haivision may become, the subject of any Claim for infringement, then Haivision may, or if it is adjudicatively determined that any of the Licensed Software infringes in the manner described above (except to the extent that any translation, modification, addition or deletion or combination by You is the sole source of such Claim), then Haivision shall, at its option, either (i) procure for You the right to continue use of the Licensed Software for the term hereof, (ii) replace or modify the Licensed Software with other suitable and reasonably equivalent products so that the Licensed Software becomes non-infringing, or (iii) terminate this Agreement and refund to You a portion of the fee paid for the relevant Product.
- (c) Haivision shall have no liability for: (i) the use of other than the then current release of the Licensed Software; (ii) the use of the Licensed Software other than as set forth in its accompanying documentation and as permitted herein; (iii) the modification of any of the Licensed Software by any party other than Haivision; or (iv) any infringement arising from the use of any Licensed Software by You after Haivision has issued a written notice to You requiring You to cease using such Licensed Software when Haivision exercises its option to terminate the License pursuant to Section 3.2



(collectively, "Exclusions"). SECTION **5.1** STATES HAIVISION'S ENTIRE OBLIGATION WITH RESPECT TO ANY CLAIM REGARDING THE INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY.

5.2 <u>Indemnification by You</u>. You shall indemnify and hold Haivision harmless against any and all Claims directly or indirectly arising out of, or in any manner whatsoever associated or connected with Your performance, purported performance or non-performance of its rights and obligations under this Agreement, and against any and all Claims incurred by or on behalf of any of the foregoing in the investigation or defense of any and all such Claims.

6. OTHER PROVISIONS

- 6.1 Export and Other Restrictions. This Agreement, and all Your rights and Your obligations under this Agreement, are subject to all applicable Canadian and U.S. Government laws and regulations relating to exports including, but not limited to, the U.S. Department of Commerce Export Administration Regulations and all administrative acts of the U.S. Government thereunder. In the event the Licensed Software or the Hardware is exported from the United States or re-exported from a foreign destination, You shall ensure that the distribution and export/re-export of the Licensed Software or the Hardware is in compliance with all laws, regulations, orders, or other restrictions of the U.S. Export Administration Regulations. You agree that neither it nor any of its Affiliates will export/re-export any Licensed Software, Hardware, technical data, process, Products, or service, directly or indirectly, to any country for which the Canadian government or United States government (or any agency thereof) requires an export license, other governmental approval, or letter of assurance, without first obtaining such license, approval or letter.
- 6.2 <u>Publicity</u>. Neither party shall make or authorize or permit any other person to make any announcement or other like statement concerning this Agreement or the subject matter, terms or conditions hereof, without the other party's prior written consent.
- 6.3 <u>Transfer and Assignment</u>. Haivision may assign, sublicense, or transfer this Agreement and/or any or all of its rights or obligations hereunder. You may not assign, transfer or delegate any of its rights or obligations hereunder (whether by operation of law or otherwise) without the prior written consent of Haivision. Any unauthorized assignment, transfer or delegation by You shall be null and void. No other Person shall have or acquire any right under or by virtue of this Agreement.
- 6.4 <u>Waiver and Amendment</u>. No modification, amendment or waiver of any provision of this Agreement shall be effective. No failure or delay by either party in exercising any right, power or remedy under this Agreement, except as specifically provided herein, shall operate as a waiver of any such right, power or remedy. Without limiting the foregoing, any terms and conditions of the Entitlement or similar materials submitted by either party to the other shall be of no force or effect.
- 6.5 <u>Enforcement by Third Party</u>. For any Licensed Software licensed by Haivision from other suppliers, the applicable supplier is a third party beneficiary of this Agreement with the right to enforce directly the obligations set forth in this Agreement against You.
- 6.6 <u>Governing Law</u>. This Agreement shall be governed by and construed in accordance with the laws of the Province of Québec, Canada and the Laws of Canada applicable therein (excluding any conflict of laws rule or principle, foreign or domestic).
- 6.7 <u>Severability</u>. If any provision of this Agreement is held by a court of competent jurisdiction to be contrary to law, such provision shall be changed and interpreted so as to best accomplish the objectives of the original provision to the fullest extent allowed by law and the remaining provisions of this Agreement shall remain in full force and effect.



6.8 Force Majeure. Neither party shall be liable to the other party for any failure or delay in performance to the extent that such delay or failure is caused by fire, flood, explosion, war, terrorism, embargo, government requirement, labor problems, export controls, failure of utilities, civil or military authority, act of God, act or omission of carriers or other similar causes beyond its control. If any such event of force majeure occurs, the party delayed or unable to perform shall give immediate notice to the other party, and the party affected by the other's delay or inability to perform may elect, at its sole discretion, to terminate this Agreement or resume performance once the condition ceases, with an option in the affected party to extend the period of this Agreement up to the length of time the condition endured. Unless written notice is given within 30 calendar days after the affected party is notified of the condition, the latter option shall be deemed selected. During an event of force majeure, the affected party shall exercise reasonable effort to mitigate the effect of the event of force majeure.

If you have questions, please contact Haivision Systems, Inc., 2600 Boulevard Alfred Nobel 5th Floor, Saint-Laurent, QC H4S 1K1 Canada

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 Mainten ance	Purpose	Write Functi ons Availa ble	Read Functi ons Availa ble	Maxim um Time Per Month	Continu ous Time in Mode (Max)	Windo W (Centr al 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	10:00p m - 5:00a m	48 Hours
Urgent	 Repair errors that are immediately affecting Your use of Haivision VCMS 	No	Yes	30 Minute s	15 Minutes	Any Time	3 Hours



Type of Mainten ance	Purpose	Write Functi ons Availa ble	Read Functi ons Availa ble	Maxim um Time Per Month	Continu ous Time in Mode (Max)	Windo W (Centr al Time)	Min Notice
Upgrad es	 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	12:00a m - 4:00a m M-F	5 Days

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 https://www.ncm.ncm 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 Resolutio n 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 Resolutio n 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



North America: 1.877.224.5445 International: +1.514.334.5445