



XOS Advanced Media Processor

User Guide

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Introduction

XOS is a high-performance live video processor designed for broadcast and OTT delivery.

It is powered by the Harmonic PURE Compression Engine a software-based solution that is continually updated with the latest technology innovations. This enables broadcasters and cable operators to pack more SD, HD and UHD channels into a limited amount of bandwidth.

XOS includes a vanguard feature set, including UHD with statistical multiplexing, HDR processing, uncompressed IP inputs, and integrated OTT packaging, simplifying live video workflows. It can be deployed as a software application on standard IP infrastructure or on a standard server with optional SDI interfaces.

Optimize cost of ownership

With XOS, you improve your cost of ownership through the use of standard IT servers, as well as Electra's unparalleled function integration.

Application versatility

XOS can be used for broadcast and OTT delivery applications, and is easily adaptable to multiple deployment environments.

XOS addresses legacy infrastructures with SDI support and also full IP architectures without any single point of failure and hit-less source redundancy. It supports compressed formats and the latest SMPTE-2110 standard with or without mezzanine compression.

Future-proof solution

XOS features a common software architecture that is shared with the cloud so that you can rapidly respond to market needs and immediately benefit from performance increases.

UHD at its best

XOS delivers UHD statmux and OTT encoding with multiple UHD profiles to make UHD a reality on any distribution network. Its integrated HDR processor with Dolby®Vision support and HDR tone expansion delivers true outstanding pictures.

[LEARN MORE](#)

Important Notice

XOS standalone interface is shared with several products.

Some parameters and functionalities shown in the user interface are not applicable to XOS and shall not be considered as a commitment to be functional in a feature release.

XOS Installation

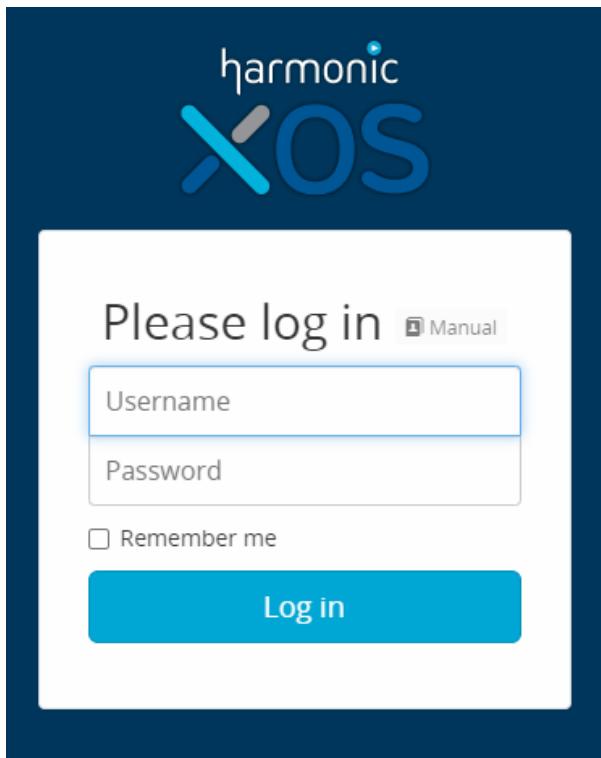
First of all, refer to the [XOS Installation Guide](#) to find important information and warnings about:

- Rack mounting
- Power supply
- Connection to the Management and Data ports
- Management IP address setting

Accessing XOS

Chrome or Firefox web browsers are recommended for accessing, through HTTPS only, the XOS Stand Alone GUI (SAG).

1. In a web browser, type the URL of your XOS and press **Enter**. Example: <https://192.100.100.10>
2. Log in to the XOS using your credentials
 - For the first connection, use the default credentials:
 - Username: xos
 - Password: xos-user



Tip

If the C&C IP address of your unit is unknown, refer to the XOS Installation Guide

Note

After the very first login, it is strongly recommended for security reasons to change the **Password**.

Warning

Configuration from NMX Digital Service Manager and from SAG are exclusive. Switching between NMX and SAG for configuration will erase the running channels. Therefore, alarm monitoring can be performed from NMX and SAG simultaneously.

Changing your password

1. Move your mouse pointer over the user icon (top right) and **select XOS**
2. Click on **Change Password**
3. Follow the instructions
4. Click on **Update Password**

Credentials cache

Credentials are cached for six hours after a user logs in. This can have an impact on suspending and deleting user accounts and changing user roles.

The credentials cache works in the following ways:

- If the user leaves XOS without logging out, and without ending the browser session, they can resume their previous session without logging in.
- If the user account is suspended or deleted, the user can continue to access XOS until their cached credentials expire.
- If the user tries to log in while their account is suspended, and the cache has expired, the login fails. The login dialog box displays an error message stating that the account has been disabled. A Super Admin must unsuspend the account before you can log in again.
- If the user role changes after a user logs in, they can continue to use their previous user role until they log out and log in again.

Description of the Home page

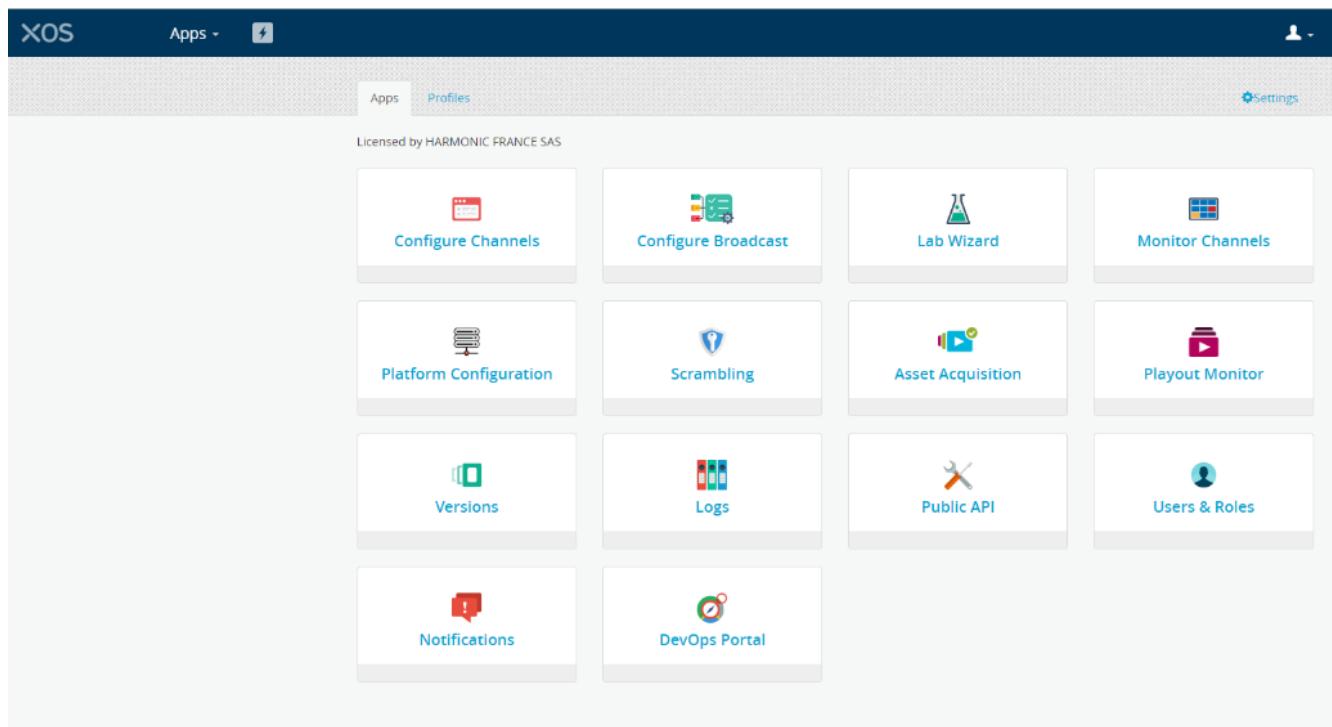
The **Home Page** is based on the concept of tiles that represent the different apps.

If the XOS is managed with the NMX, only a few tiles are displayed. If so, configure the **Operation Mode** into *Monitoring Mode* in the NMX:

To change the Operation Mode:

1. Open the application **Designer**.
2. Select the tab **Network**.
3. Click on your unit.
4. Change the Operation mode to *Monitoring Mode*.
5. Refresh the web page of the unit in order to display all tiles.

The following figure shows how the Home page should look like:



⚠ Note

According to the user roles, the number of tiles displayed could be reduced.

✓ Tip

While browsing the different applications, you can add or remove settings. The following buttons will allow you to do it:



to add



to remove

XOS Applications

Each application has a specific use.

Application	Description
Configure Channels	Create, manage, and delete the Sources, Destinations, and Services for OTT & SPTS services
Lab Wizard	Create, manage, and delete Profiles
Monitor Channels	Display Service, Processing, and Video output bitrates and specifications
Scrambling	Scramble and encrypt services to protect media content
Configure Broadcast	Create, manage, and delete mux services for MPTS outputs
Versions	Apply updated profiles to running services
Logs	View the logs database and download log files
Public API	Access XOS REST APIs
Users & Roles	Create, manage, and delete user and role profiles
Notifications	Display, filter, or forward alerts and schedule dates and times to resolve notifications
DevOps Portal	Get access to Kibana and Developer API (Full API to change settings not accessible through UI - for developers only)
Platform Configuration	Configure basic parameters such as IP Management and Data addresses, DNS and NTP servers, SDI and RF cards, Ports redundancy Upgrade Software, Download Technical Dump
Playout Monitor	Monitor the channel timeline and perform master control operations
Asset Acquisition	Manually upload video assets and graphics to XOS and loop record of live assets for playout

 **Note**

When you navigate to different apps, XOS can take just a few moments to gather and display data.

Settings - General

You can register the XOS system with the appropriate information and settings.

- From the System app, navigate to **Settings > General**.

- Turn on the **Lab Device License (Not for Production)** toggle if the XOS system is performed for lab use only.

⚠ Note

If this toggle is enabled, the XOS device needs to have the specific Lab licenses purchased and must not be used for production under any circumstances.

- Specify the Runtime Name and Runtime Location for the XOS device.

⚠ Note

Once the Runtime Name is saved it will be displayed at the footer of the XOS UI.

- Click **Save**.

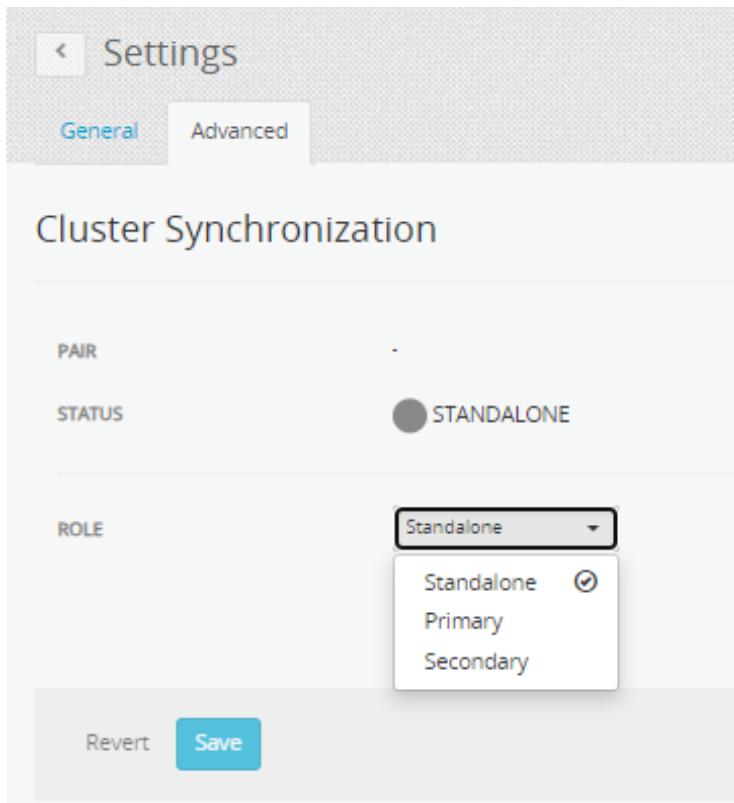
Settings - Advanced

The Active-Active Redundancy is intended to pair XOS servers for 1+1 geo-redundancy.

It is used to synchronize all services running on both XOS servers.

⚠ Note

The **Role** parameter is used for synchronizing two servers used for geo-redundancy applications. For all other applications, keep the role as Standalone.



To do so, follow the procedure below:

1. Log into the XOS that you wish to set as the primary instance and then do the following:
 - Select **Settings > Advanced**.
 - For the **Role** under Cluster Synchronization, choose **Primary** and then enter the **Host Address for Sync** for the XOS management.
 - Click **Save**.
2. Log into the XOS that you wish to set as the secondary instance and then do the following:
 - Select **Settings > Advanced**.
 - For the **Role** under Cluster Synchronization, choose **Secondary** and then enter the **Host Address for Sync** for the XOS management.
 - For **Primary XOS Host address for Sync**, enter the management IP address of the primary XOS.

Note

Ensure that this IP address matches the IP address that was entered in Step 1.

3. Click **Save**.

Settings - Client Apps

Register an OAuth Client Application to generate a key for third-party access to the XOS.

Authorization Code and Client Credentials grant types are supported.

Note

Only **super admins** have permission to register OAuth applications.

1. From the System app, click **Settings**.
2. Select the **Client Apps** tab

CLIENT ID	CLIENT SECRET	CREATED BY	DESCRIPTION	GRANT TYPE	ROLE	ACTION
a007f1c7.....		Authorization code			<button>Edit</button>
522040d2.....		Authorization code			<button>Edit</button>
23a24f43.....		Authorization code			<button>Edit</button>

3. Click **+Add client** to open the **Add new key** dialog.

4. For **Grant Type**, select the method that will be used to obtain the access token:

- **Authorization code:** Used by confidential and public clients to exchange an authorization code for an access token. After the user returns to the client via the redirect URL, the application will get the authorization code from the URL and use it to request an access token.
- **Client credential:** Used by clients to obtain an access token outside of the context of a user. Select this option to obtain an access key that may be used for CloudLink registration.

Info

You may select both grant types. A single client secret will be generated for use in both flows.

5. Optionally, add a description of the OAuth client app that users will see.
6. Optionally, provide a **Redirect URI** where users will be sent after authorization.

 **Note**

For security purposes, Harmonic recommends that you register a redirect URI. The URI must begin with "https".

If the client app will be used for CloudLink registration, you can type <https://localhost/vos-api/cloudlink/v1/callback> for the redirect URI.

7. Click **Add**

Result: XOS generates a **Client App ID** and **Client Secret**.

 **Note**

For security purposes, the system does not store the **Client Secret**. Harmonic recommends that you immediately copy and store this information in a secure place.

CLIENT APP ID: 7be0c46f-

CLIENT SECRET: 

8. To copy the full client object (recommended), click **Copy**. Or, to copy only the client secret, click the button to the right of the **Client Secret** string.

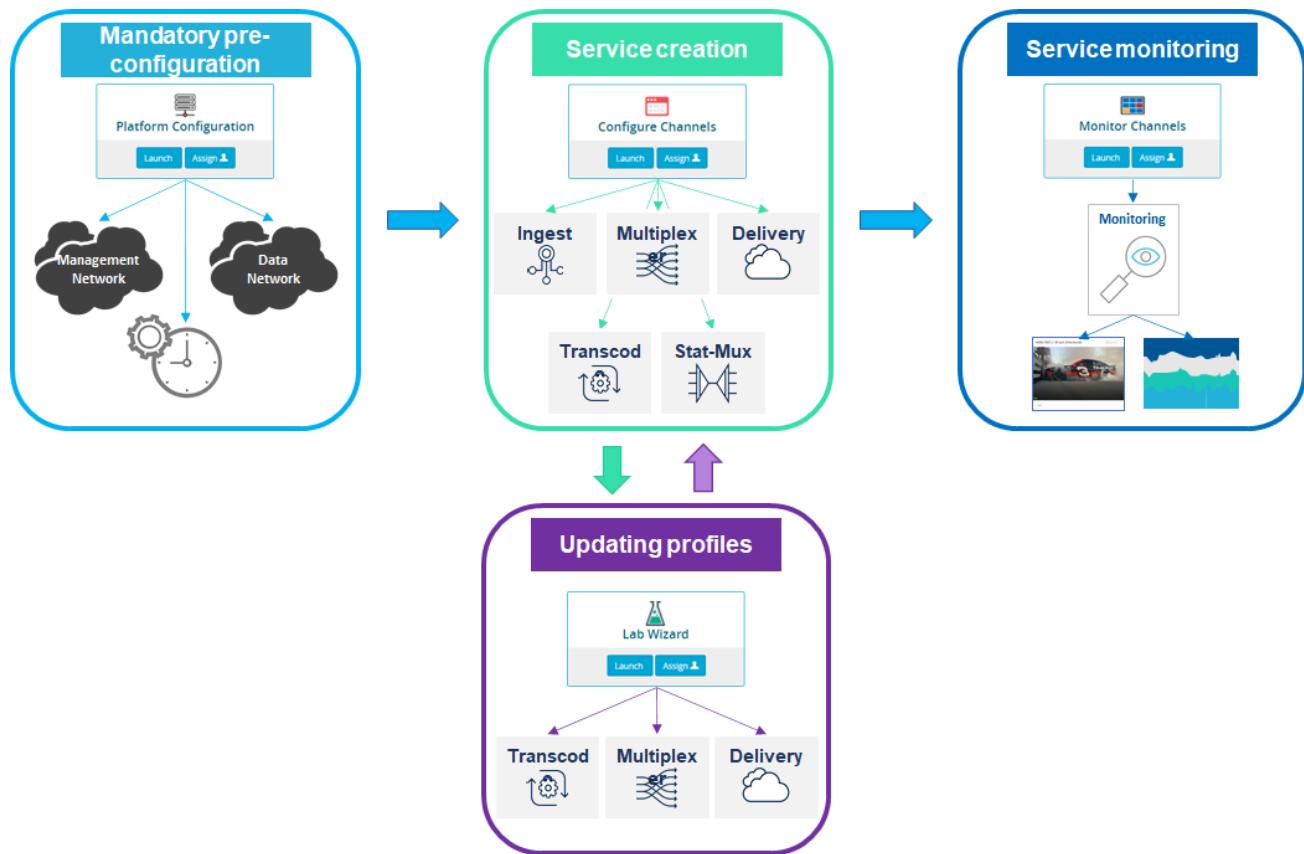
 **Note**

If necessary, you may generate a new **Client Secret** for an existing application from the **Client Apps** page.

XOS general workflow

The diagram below shows in a simple way the steps to follow to configure the XOS, create and manage the associated services.

1. Mandatory pre-configuration
 - Used at least to set the Management IP address of the unit and the Time synchronisation.
2. Service creation
 - Used to define the input sources, the destinations and the services with pre-defined profiles.
3. Updating profile when required
 - Used if no pre-defined profile corresponds to the required service.
4. Service monitoring
 - Used to monitor XOS output services and to troubleshoot an issue.



XOS pre-configuration

Before configuring services to transcode, launch the **Platform Configuration** app to configure basic parameters:

- Set the Runtime Name and enable the Lab Device License for the XOS appliance. (Refer to the [Settings - General](#) page for details.)
 - The configured Runtime Name will be displayed on the footer of each page within the XOS UI.
 - Turning on the Lab Device License (Not for Production) toggle will enable the specific lab license you have purchased.
- IP Settings for Management and Data IP ports (mandatory).
- If port redundancy is used, IP Monitoring allows to manage manual switching.
- DNS server, if required.
- IP Routes, if required.
- Security, if required.
- Time synchronization with NTP server (recommended).
- SDI to enable SDI ports, if required.
- RF to set downlink parameters, if required. If you don't have a RF card, the tab does not appear.
- SNMP allows to define community string and trap recipient.
- File Server to configure the FTP Server settings and managing FTP Users.
- System Information to retrieve the serial number of the chassis, storage, and volume information.
- OneCare Portal, if requested by the customer.
- Configure Backup allows to save configuration on the C&C PC and to restore it.
- **Configure CAM (Conditional Access Module)** to descramble programs in the Configure Broadcast app.

For all the above items, follow the instructions described immediately after.



Info

ASI and UHD cards are automatically detected and do not need any specific pre-configuration.



Note

The synchronization of the platform to the NTP server is required for playout and OTT packaging and is useful to keep date and time consistent in logs and alarms.

Configuring the Ethernet ports



Note

When XOS is installed as software (RPM installation), Ethernet ports are configured from Linux. Changes performed here have no effect.

1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **Ethernet Ports** sub-tab.
3. Check the ports to use (see details below).
4. If required, set the Redundancy parameters. To do so, refer to [Configuring the Redundancy ports](#).

Ethernet Ports		Config	Monitoring	DNS	Routes	Security	Redundancy			
Designation	State	MAC address	Duplex	Speed	Active	Mode	Policy		Main	
<input checked="" type="checkbox"/> Management 01		20-67-7c-ef-07-d4	AUTO	1000Mb/s	NONE	Manual			N/A	
<input type="checkbox"/> Management 02		20-67-7c-ef-07-d5	AUTO	(Offline)					N/A	
<input type="checkbox"/> GbE 03		20-67-7c-ef-07-d6	AUTO	(Offline)					N/A	
<input type="checkbox"/> GbE 04		20-67-7c-ef-07-d7	AUTO	(Offline)					N/A	
<input type="checkbox"/> GbE 05		98-f2-b3-0b-89-18	AUTO	(Offline)					N/A	
<input type="checkbox"/> GbE 06		98-f2-b3-0b-89-19	AUTO	(Offline)					N/A	
<input checked="" type="checkbox"/> GbE 07		98-f2-b3-0b-89-1a	AUTO	1000Mb/s	NONE	Manual			N/A	
<input type="checkbox"/> GbE 08		98-f2-b3-0b-89-1b	AUTO	(Offline)					N/A	

Revert Save

5. Move to the **Config** tab.
6. Set the IP address, Netmask, and Gateway for each port selected.

Ethernet Ports		Config	Monitoring	DNS	Routes	Security	Lan
Designation	IP Address	Network Mask	Gateway				
Management 01	198.18.120.226	255.255.252.0	198.18.120.1	+			
GbE 07	192.168.1.100	255.255.255.0	0.0.0.0	+			

Revert Save

7. Click **Save**.

The list of Ethernet interfaces may vary depending on the following:

- the hardware configuration of the unit for appliances
- the operating system configuration for software installations

It is recommended to use the following scheme:

- Ethernet port #1: for control & command
- Ethernet port #2: as the port for control & command backup
- Ethernet port #5: as the port for the main input streams to process and eventually for the main outgoing streams
- Ethernet port #6: as the port for input backup streams to process and eventually for backup outgoing streams
- Ethernet port #7: as the port for main outgoing streams
- Ethernet port #8: as the port for backup outgoing streams
- Ethernet port #9: as the port for main input streams and for main outgoing streams from additional Ethernet ports with SFP cages
- Ethernet port #10: as the port for backup input streams and for backup outgoing streams from additional Ethernet ports with SFP cages



Warning

If you plan to use 172.17.x.x. networks, conflicts may happen with the internal IP network of XOS. Contact Harmonic support for the specific setting of your product.

Configuring the Redundancy ports

The XOS allows, for Management and Data IP ports, two modes of redundancy:

- **TEAMING:** Both ports use the same IP Address, while the main port is active, the second port is up but the traffic is down, so both ports can be connected to the same IP switch.
- **REDUNDANCY:** Each port uses a different IP Address and are both active, so they can be connected to the same IP switch or to two different IP switches.

Note

Redundancy mode: It is recommended to use separate network. If it's not the case, set a different VLAN for each port.

The Redundancy Policy offers several possibilities:

Mode	Switch	Switch Back
Auto / revert on backup failure	Automatic switch on alarm detection on the main port	Switch back on alarm detection on the backup port and if the main port is healthy
Auto / revert on healthy main	Automatic switch on alarm detection on the main port	Switch back when the the main port is healthy
Manual	The switch is performed by the operator	The switch back is performed by the operator if the main port is healthy

Mode	Switch	Switch Back
Auto / manual revert	Automatic switch on alarm detection on the main port	The switch back is performed by the operator if the main port is healthy
Dual only available when Redundancy mode is set		

Configuring Teaming mode

1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **Ethernet Ports** sub-tab.
3. Enable a second port.
4. Set the redundancy Mode to *TEAMING*.
5. Set the redundancy Policy.

The screenshot shows the 'Ethernet Ports' configuration page. The 'Config' tab is selected. There are two ports listed:

- Management 01:** Enabled (checkmark), State: Up, MAC address: 20-67-7c-ef-07-d4, Duplex: AUTO, Speed: 1000Mb/s, Redundancy: TEAMING, Policy: Auto / revert on backup failure.
- Management 02:** Disabled (unchecked), State: Down, MAC address: 20-67-7c-ef-07-d5, Duplex: AUTO, Speed: (Offline), Redundancy: N/A.

6. Move to the **Config** tab to check the teaming.

The screenshot shows the 'Config' tab of the Ethernet Ports configuration page. It displays IP settings for two ports:

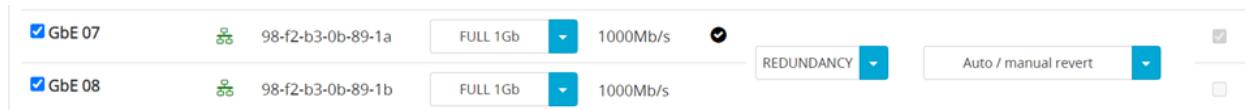
Designation	IP Address	Network Mask	Gateway	Lan
Management 01 / Management 02 Teaming	198.18.120.226	255.255.252.0	198.18.120.1	+ (button)
GbE 07	192.120.226.70	255.255.255.0	0.0.0.0	+ (button)

At the bottom, there are 'Revert' and 'Save' buttons.

7. Click **Save**.

Configuring Redundancy mode

1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **Ethernet Ports** sub-tab.
3. Enable a second port.
4. Set the redundancy Mode to *REDUNDANCY*.
5. Set the redundancy Policy.



6. Move to the **Config** sub-tab.
7. Set the network parameters of the backup port.

Ethernet Ports	Designation	IP Address	Network Mask	Gateway	Lan
Management 01		198.18.120.226	255.255.252.0	198.18.120.1	
GbE 07	GbE 08	192.120.226.70	255.255.255.0	0.0.0.0	
GbE 08	GbE 07	0.0.0.0	0.0.0.0	0.0.0.0	

Buttons at the bottom: Revert, Save

8. Click **Save**.

Managing manual redundancy

From the **Platform Configuration** app > **IP** tab > **Monitoring** tab, if Teaming and Redundancy are configured, click on the blue button that represents the inactive port to switch from the main port to the backup port or to switch back from the backup to the main port.

Management 01	Speed: 1000Mb/s
GbE 07	Speed: 1000Mb/s

Configuring the DNS server

The XOS can be connected to a DNS server.



Note

Configuring a DNS server is necessary for automatic management of XOS Licensing.

1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **DNS** sub-tab.
3. Click the **Add Dns** button.
4. Set the IP address of the DNS server.

The screenshot shows the XOS Platform Configuration interface. At the top, there's a navigation bar with tabs: IP, Time, SDI, SNMP, File Server, System Information, OneCare Portal, and Configure Backup. Below this is a sub-navigation bar with tabs: Ethernet Ports, Config, Monitoring, DNS (which is highlighted), Routes, and Security. Under the DNS tab, there's a section for 'DNS SERVER ADDRESS' with a '+' button and a text input field containing '10.1.3.3'. At the bottom of this section are 'Revert' and 'Save' buttons.

5. Repeat the same operation to add any further servers.
6. Click **Save**.

Configuring a Routing table

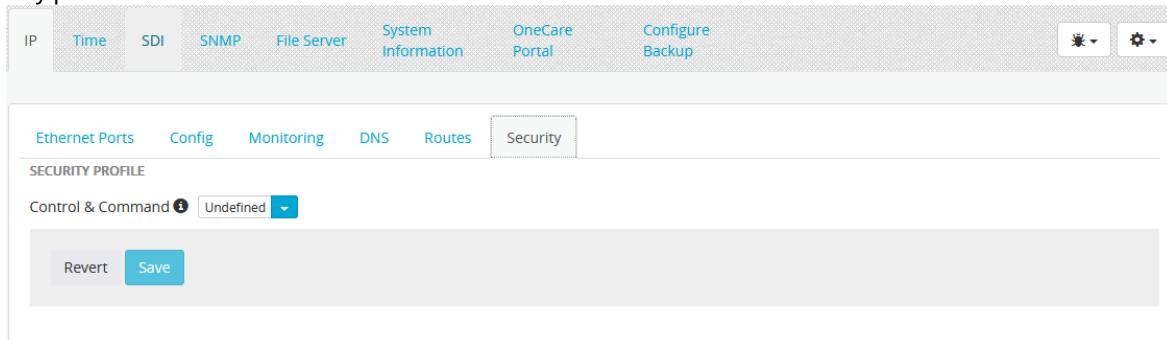
1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **Routes** sub-tab.
3. Click the **Create new route** button.
4. Set the Destination IP address, the Network mask, and the Gateway.

The screenshot shows the XOS Platform Configuration interface. At the top, there's a navigation bar with tabs: IP, Time, SDI, SNMP, File Server, System Information, OneCare Portal, and Configure Backup. Below this is a sub-navigation bar with tabs: Ethernet Ports, Config, Monitoring, DNS, Routes (which is highlighted), and Security. Under the Routes tab, there's a table with columns: Destination, Network mask, and Gateway. Each column has a text input field with placeholder text: 'e.g 192.168.1.0', 'e.g 255.255.255.0', and 'e.g 192.168.10.1'. At the bottom of this section are 'Revert' and 'Save' buttons.

5. Repeat the same operation to add any routes.
6. Click **Save**.

Configuring Security

1. Navigate to the **Platform Configuration** app > **IP** tab.
2. Select the **Security** sub-tab.
3. Set the **Control & Command** parameter. Options are:
 - a. Undefined (default)
 - b. Management ports
 - c. Any port

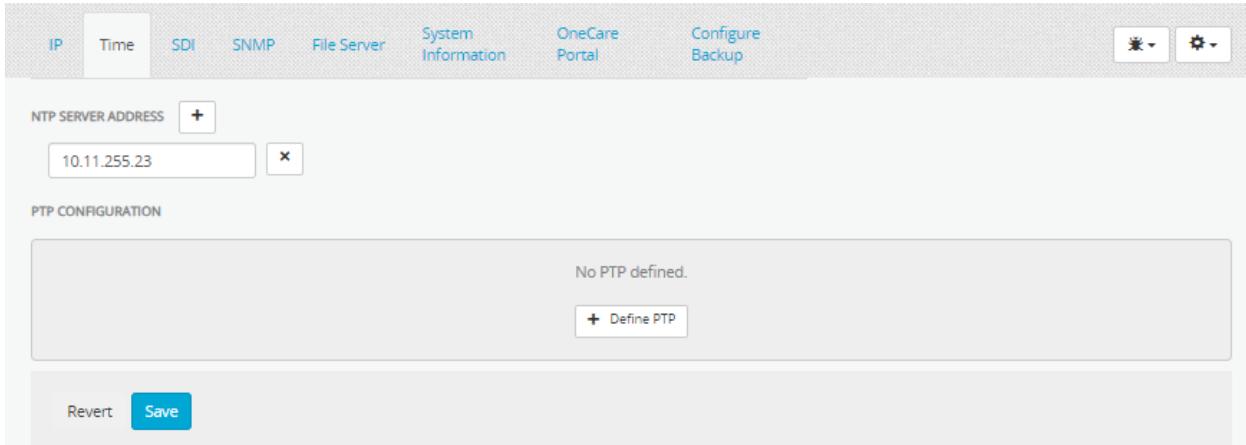


4. Click **Save**.

i **Note:** This parameter enables management protocols (WebGUI, SNMP, REST API, and ICMP) on all ports or only on management ports (1&2). For security, it is highly recommended to enable these protocols **only on management ports**.

Setting the time synchronization

1. Navigate to the **Platform Configuration** app > **Time** tab.
2. Click the **Add NTP** button.
3. Set the IP address of the NTP server.



4. (Optional) Configure the **PTP** (Precision Time Protocol) of the XOS encoder or decoder with the associated Ethernet Port and Domain Number.
5. Repeat the same operation to add any further servers.

6. Click **Save**.

 **Note**

The XOS needs to be synchronized with the NTP server to deliver signals with accurate timings.

Enabling the ports of SDI card

You can enable the SDI ports depending on the type of SDI card.

The supported types of SDI cards are:

- Deltacast
- Dektec

1. Navigate to the **Platform Configuration > SDI** tab.

2. (**For Deltacast card only**) Verify the number of available SDI ports.

Card #1

Number of ports : 8

Revert **Save**

3. (**For Dektec card only**) Configure the appropriate firmware for the SDI card.

Card #1

Number of ports : 8

Firmware variant : **SDI up to 3G and ASI**

Revert **Save**

4. Click **Save**.



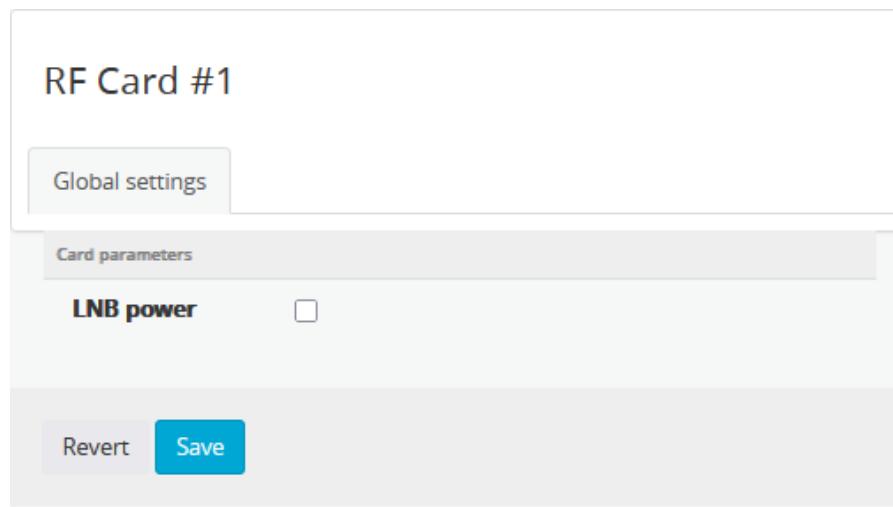
Note

Up to 24 SDI inputs are supported.

Configuring the RF card (satellite reception)

Setting the LNB power

1. From the **RF** tab, select the **Global settings** tab.
2. **LNB power**: if selected, the LNB converter is powered by the XOS



SNMP community string and trap recipient

SNMP READ allows to enable a Community string, to do so:

- check the box to enable community string.
- define a community name.

SNMP TRAP allows to add trap recipient, to do so:

- check the Synchronization trap box and set a Sync trap time period.
- click the *Define SNMP trap recipient* button to add a recipient.
- set the IP address of the recipient.
- set the community string by entering the community name.
- click Save to apply the configuration.

The screenshot shows the XOS Advanced Media Processor interface with the following navigation bar:

- IP
- Time
- SDI
- SNMP**
- File Server
- System Information
- OneCare Portal
- Configure Backup

The **SNMP** tab is selected. Below it, the **SNMP READ** section is visible, containing the following settings:

Enabled	Parameters
<input checked="" type="checkbox"/>	Community string Harmonic

The **SNMP TRAP** section is also visible, containing the following settings:

Global parameters	Value
Synchronization trap	<input checked="" type="checkbox"/>
Sync trap time period	60
Recipient #1	<input type="button" value="x"/>
Enable	<input type="checkbox"/>
IP address	192.100.100.101
Community string	Harmonic

At the bottom of the **SNMP TRAP** section is a button labeled **+ Add SNMP trap recipient**.

At the very bottom of the interface are two buttons: **Revert** and **Save**.

- Click the *Add SNMP trap recipient* button to add any further recipients.

Configure file server settings

FTP Server Settings

1. Navigate to the **Platform Configuration** app > File Server tab.
2. Insert the Network Address and the Port.
3. Set the state to Enable.
4. Click Save

FTP Users

1. Navigate to the **Platform Configuration** app > File Server tab.
2. Click **Add** to add a new user.
3. Enter username and password.
4. Change status to **Activated** and click **Create**.

Note The three buttons after the FTP User can be used to change the status, password, and remove the user.

System Information

1. Navigate to the **Platform Configuration** app > System Information.
- Hardware Platform S/N is displayed.
 - If XOS is equipped with a RAID controller and SSD disks,
 - Storage space is displayed with total space, used space, and remaining space.
 - SSD volumes information is presented.

The screenshot shows the XOS Advanced Media Processor interface. At the top, there are tabs for IP, Time, ASI/SDI, RF, SNMP, and File Server. Below these are tabs for System Information, OneCare Portal, and Configure Backup. On the right side, there are two small icons: a gear and a wrench.

INFORMATION

Data	Value
Hardware Platform S/N :	CZ2D1Y06L8

STORAGE (Total space: 2.58 TB)

Used 13% (364.96 GB) Remaining 87% (2.22 TB)

VOLUMES INFORMATION (RAIDS)

Index	Location	Media type	Size	Vendor	Model	Serial	Status	Temperature	Wearout percent
#1	Box 252 Bay 5	SSD SATA	960.00 GB	-	MK000960GXWBU	S7FFNA0XA01893	OK	9 °C	0 %
#2	Box 252 Bay 6	SSD SATA	960.00 GB	-	MK000960GXWBU	S7FFNA0XA00933	OK	9 °C	0 %
#3	Box 252 Bay 7	SSD SATA	960.00 GB	-	MK000960GXWBU	S7FFNA0XA01898	OK	10 °C	0 %
#4	Box 252 Bay 8	SSD SATA	960.00 GB	-	MK000960GXWBU	S7FFNA0XA01892	OK	10 °C	0 %

Testing OneCare Portal connectivity

⚠ Note

To use the OneCare Portal, the XOS has to be connected to a DNS server.

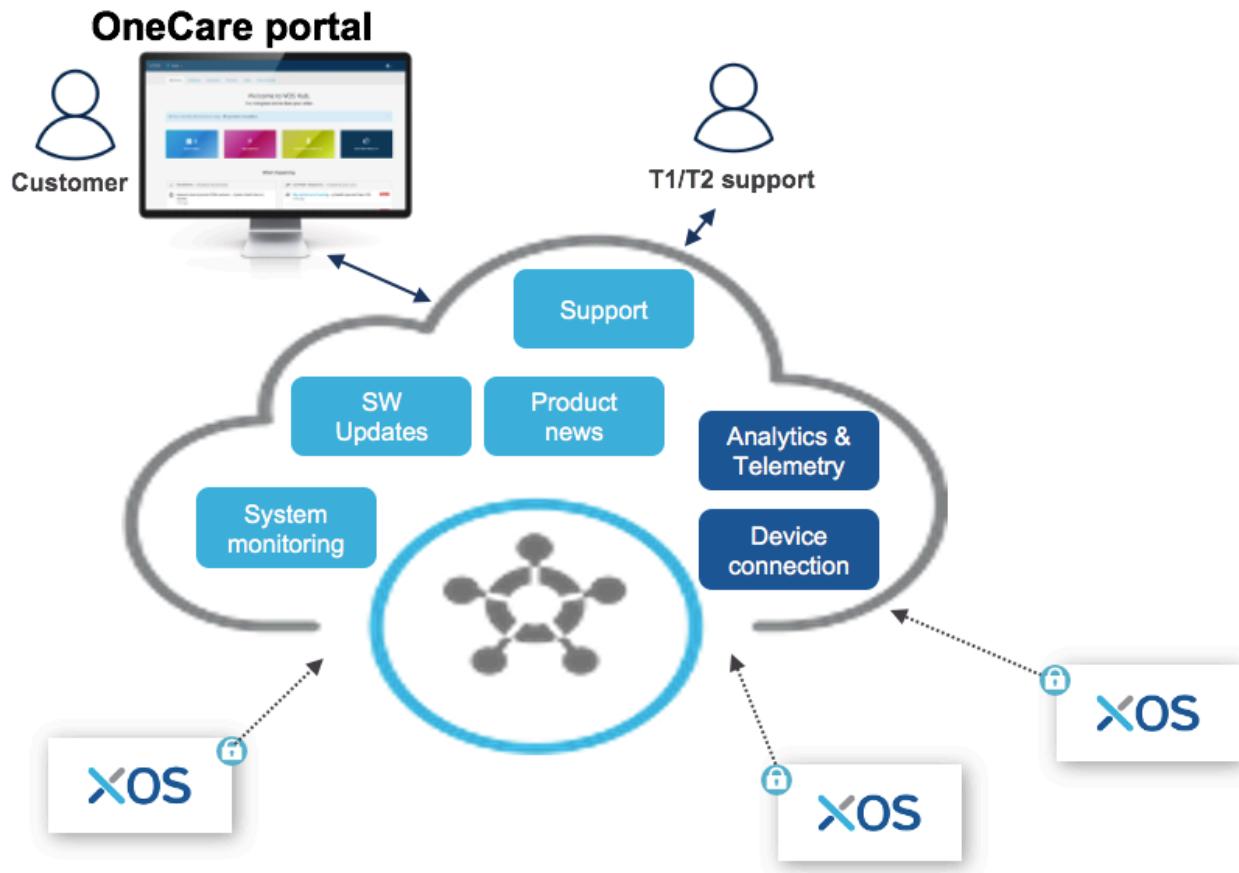
Definition

For appliances, Harmonic is providing OneCare Portal. The OneCare portal provides the following to XOS customers:

- Products announcement, such as new product version availability.
- Overview of all the products deployed.
- Access to software versions of entitled products.
- An entry point to open and follow support cases.
- Service Level Agreement follow-up when an SLA is in place.

⚠ Note

OneCare portal connection is optional but it facilitates usage reporting (mandatory with standard XOS licensing).



Your XOS is designed to connect to the Harmonic back-end running in the cloud. This cloud connectivity is secured and is enabled by default but you can disable it via the user interface.

XOS connection to the cloud enables the following:

System monitoring

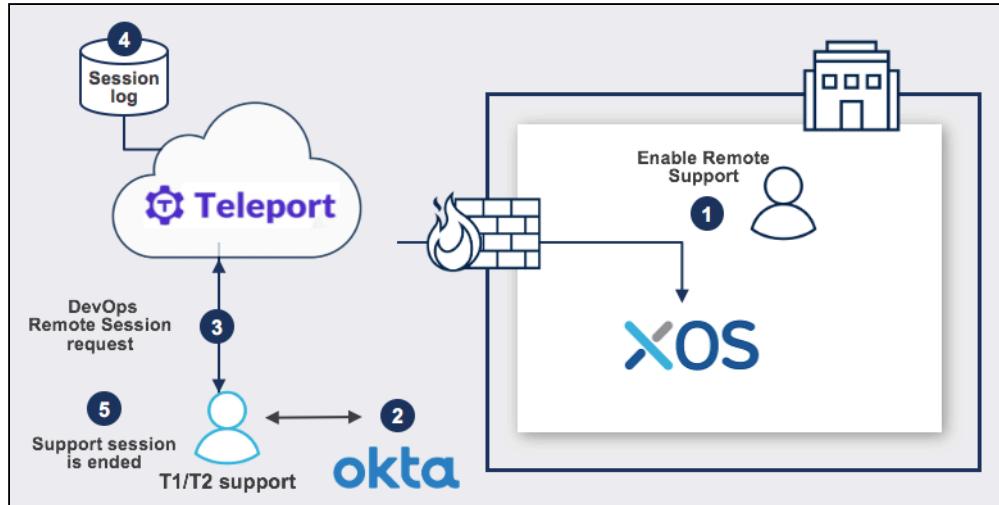
- Through the OneCare portal, you can access the list of all XOS deployed in the field. All XOS details, such as serial number, MAC address, etc., are available.
- You can also add custom labels to each XOS to easily identify devices.
- When your XOS is connected to the Harmonic back-end, it provides regular health status, enabling you to identify devices in use.

Device	Last Connection	ID	Action
XOS IRD MXQ04210XK	18-02-2021 10:19:32	MXQ04210XK	
XOS IRD MXQ037167D	18-02-2021 10:19:09	MXQ037167D	
XOS IRD MXQ0380KLH	18-02-2021 10:19:00	MXQ0380KLH	
XOS IRD MXQ03716ZW	18-02-2021 10:18:06	MXQ03716ZW	
XOS IRD MXQ0360JRC	18-02-2021 10:17:21	MXQ0360JRC	
XOS IRD MXQ0371664	18-02-2021 10:17:12	MXQ0371664	
XOS IRD MXQ0360JRD	18-02-2021 10:16:42	MXQ0360JRD	
XOS IRD MXQ03716VV	18-02-2021 10:15:51	MXQ03716VV	

Enhanced support

When your XOS is connected to the Harmonic back-end it allows secure support to connected XOS devices. This connectivity improves support, as the XOS is accessible and you do not need to set up remote access when facing a critical situation.

This connection is secured with a double authentication process, eliminating the need for an unsecured tool like TeamViewer.



By using TELEPORT, the Harmonic support team can access XOS through **RestApi**. When required, Harmonic support can also access the UI using the BOMGAR application. This allows more efficient support compared to what is achievable through TeamViewer or other equivalent methods.

As the Harmonic support team has access to the XOS, they are able to collect relevant information without requiring action from you. Collected information is more relevant as it is done by a product expert. This allows for quicker

diagnosis and resolution.

This process is used for our VOS360 or VOS Media Software solution. It is a unified process enabling customers to easily migrate from appliances to the Cloud solution.

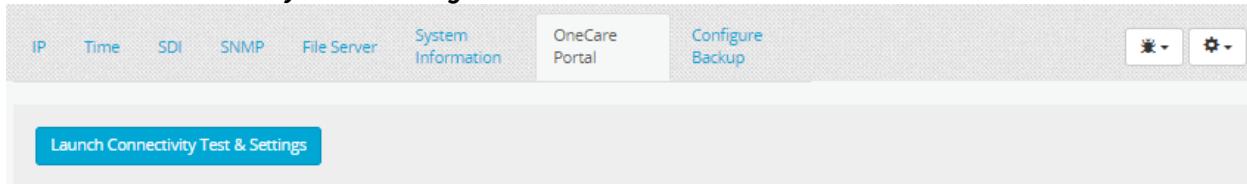
When your XOS is connected to the Harmonic back-end, it provides regular telemetry and analytics information. This information is extremely useful to quickly diagnose any problems.

For example, if RF monitoring parameters are regularly sent to the cloud, it's much easier to check the RF input when a service interruption happens in real time.

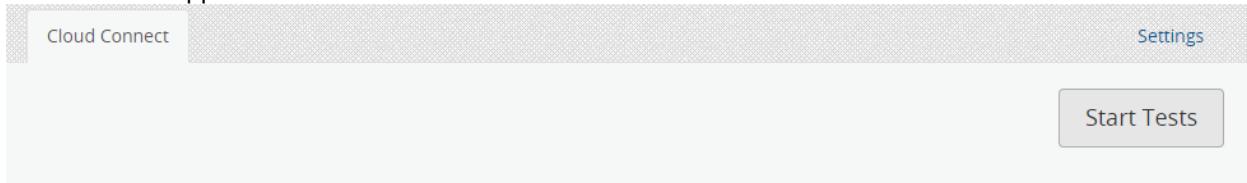
Testing and Managing the connectivity

From the **Platform Configuration** app > **OneCare Portal** tab:

1. Click **Launch Connectivity Test & Settings**.



2. A new window appears: Click **Start Tests** to check the connection with the OneCare Portal.



3. After a few minutes, the result should appear as follows:



The XOS should appear on the OneCare Portal with your credentials.

Tip

To use the OneCare Portal, contact your Harmonic Technical Support

4. Click **Settings** at the top-right and click **ON** to switch to OFF.

Note

By default the Cloud Connectivity is enabled: ON.

The screenshot shows the 'Cloud Connect' settings page. At the top, there's a note: 'By default the Cloud Connectivity is enabled: ON.' Below this is a section titled 'FLEX CONNECTIVITY SETTINGS'. A switch labeled 'CLOUD CONNECTIVITY' is set to 'ON'. At the bottom of the page are two buttons: 'Revert' and 'Save'.

5. Click **Save**.

The screenshot shows the 'Cloud Connect' settings page again. The 'CLOUD CONNECTIVITY' switch is now set to 'OFF'. A green success message at the top right says 'Successfully saved Flex connectivity Settings'. At the bottom of the page are two buttons: 'Revert' and 'Save'.

Saving/Restoring a backup configuration

The XOS allows for generating a backup configuration, saving it on the C&C PC, and restoring it.

From the **Platform Configuration** app > **Configure Backup** tab, click **Generate** to save the current configuration:

The screenshot shows the 'Platform Configuration' app with the 'Configure Backup' tab selected. A table lists a single backup configuration entry:

SW Version	Date	Size (bytes)	Restore	Download	Delete
1.24.0.0.51	2024-04-22 06:29:49	265914			

A green banner at the bottom of the screen says 'Backup generated!'. At the bottom left are two buttons: 'Generate' and 'Load'.

Once generated, the configuration is saved on the XOS, and the user can:

- **Restore** it directly from the XOS and apply it.
- **Download** it to the C&C PC.
- **Delete** it from the XOS.
- **Load** it from the C&C PC.

⚠ Note

When the user loads and restores a configuration from one XOS to another, pay attention to the Ethernet configuration (Management and Data) to avoid any conflict on the IP network.
When loading a configuration, each service is Off Air, the user must put individually each service On Air.

✖ Warning

Restoring the backup configuration on the equipment makes the XOS unavailable for a few minutes.

⬆ Restore backup on the equipment.

When restoring backup :

- GUI will be unavailable during a few minutes.
- Current services will be stopped and deleted.
- Current LabWizard profiles and service configurations will be replaced by the backup ones.

Do you want to proceed?



Enabling CAM (Conditional Access Module)

XOS supports descrambling (e.g. Verimatrix, Conax) via CAM (Conditional Access Module). A DVB-CI card (HWR-XOS-OPT-DVBCI) needs to be installed in the XOS device to provide up to 2 x CAM slots. These CAM slots are located at the rear of the XOS. Each CAM slot can accommodate a single smart card. It is possible to use CAMs from different Conditional Access System (CAS) vendors on the same XOS.

The CAM descrambling can be used with any type of demux available in the Configure Broadcast app. A CAM can only be associated with one source (RF, IP, ASI, etc.) at a time, but this will not prevent it from being used with the redundancy feature of demux. Additionally, both CAMs can be used on the same source.

1. Navigate to the **Platform Configuration** app > **CAM** tab.

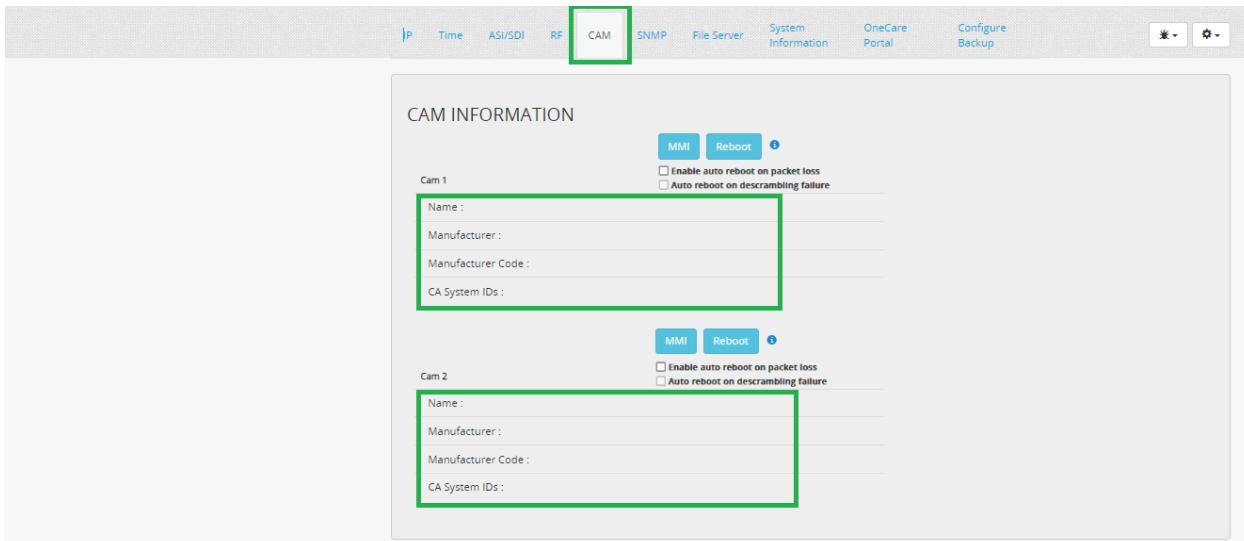
i Prerequisite

A DVB-CI card (HWR-XOS-OPT-DVBCI) needs to be installed in the XOS device to provide up to 2 x CAM slots.

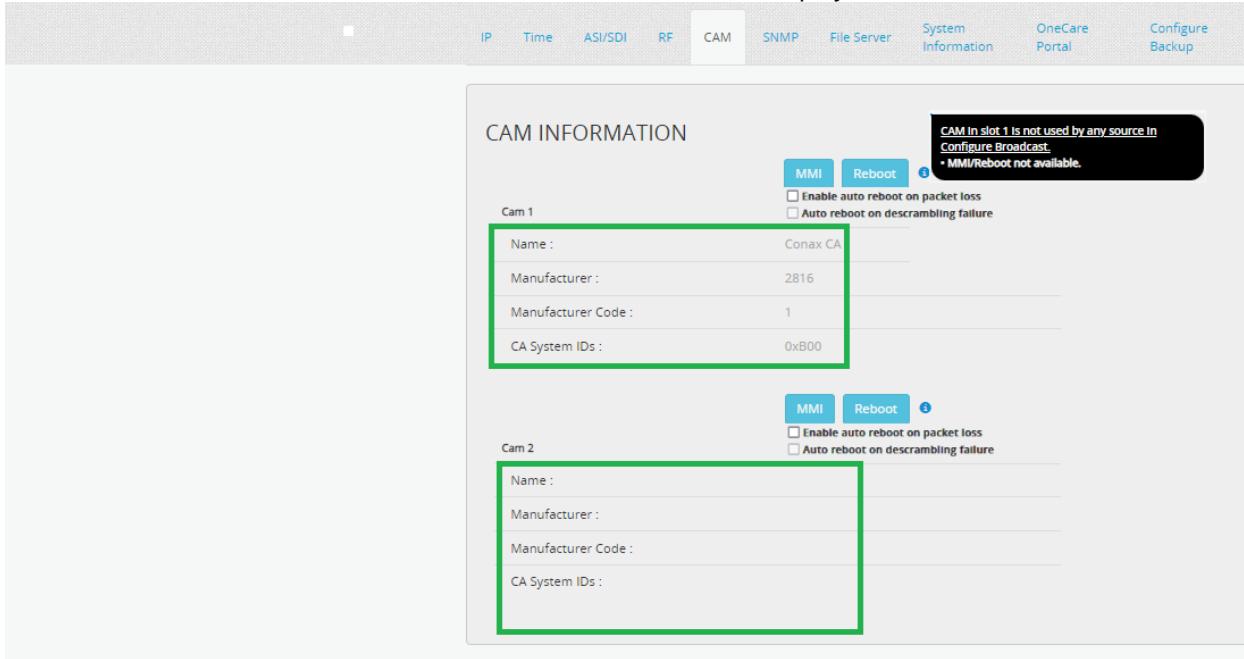
2. Check the **CAM Information** before inserting a CAM.

⚠ Note

This displays two areas related to the two CAM cards that may be inserted in both CAM slots. Those two areas are empty if no CAM cards are inserted.



- Insert a CAM in the CAM slot 1. The information related to this CAM is displayed in the **Cam 1** area.



⚠ Note

Depending on the XOS configuration, the CAM information may be inverted and not correspond to the physical location of the CAM.

4. Insert a second CAM in the CAM slot 2. The information related to this CAM is displayed in the **Cam 2** area.

Cam 1		Cam 2	
Name :	Conax CA	Name :	Conax CA
Manufacturer :	2816	Manufacturer :	2816
Manufacturer Code:	1	Manufacturer Code:	1
CA System IDs :	0xB00	CA System IDs :	0xB00

5. (Optional) Click the **Reboot** button to reboot the CAM. Note that the services configured in the Configure Broadcast using the CAM will be disrupted.
6. (Optional) Click the **MMI** button to display the MMI responses from CAM and send MMI commands to the CAM. Note that you need to configure a service in Configure Broadcast with a demux using the CAM to display the MMI responses.
7. (Optional) Check the "**Enable auto reboot on packet loss**" and "**Auto reboot on descrambling failure**" boxes for CAM 1 and CAM 2 as needed. In the event of packet losses or descrambling failures, an auto reboot will be triggered, with notification alerts.
8. Navigate to the **Configure Broadcast** app to configure CAM descrambling on programs from demux sources. (Refer to the [Configuring descrambling](#) for CAM details.)

Configuring Playout/Transcoding/Passthrough services

A service, or channel, consists of a processing profile, a source input, a destination (or delivery location), and, optionally, service add-ons such as graphic overlays and SCTE ad insertion.

Create and manage sources, destinations, and services with the **Configure Channels** app.

XOS supports a variety of input types for various **Transcoding** and **Destination** profiles.

Type of service	Type of source	Processing profile	Destination type, Destination profile, Output
Broadcast CBR encoding with SPTS output	Third-party/Baseband (for SDI, 2022-6, 2110) Third-Party/IP (for MPEG2-TS) Third-Party/SRT Harmonic/HSP (for HLS from VOS360)	IPTV profile	Broadcast, IPTV, IP Broadcast, IPTV, SRT
Multiscreen encoding	Third-Party/Baseband (for SDI, 2022-6, 2110) Third-Party/IP (for MPEG2-TS) Third-Party/SRT Harmonic/HSP (for HLS from VOS360)	Multiscreen profile	Origin/CDN ATS
OTT Packaging only	Third-Party/IP (for ATS) Loopback IP output (for ATSC-3.0 with Statmux)	Multiscreens passthrough profile	Origin/CDN

XOS also supports Playout services with various **Transcoding** and **Destination** profiles.

To create a service, the operator needs, in the following order, to:

1. Configure the Input source(s)
2. Configure the Destination
3. Configure the Service
4. Activate the Service

Configure Channels app overview

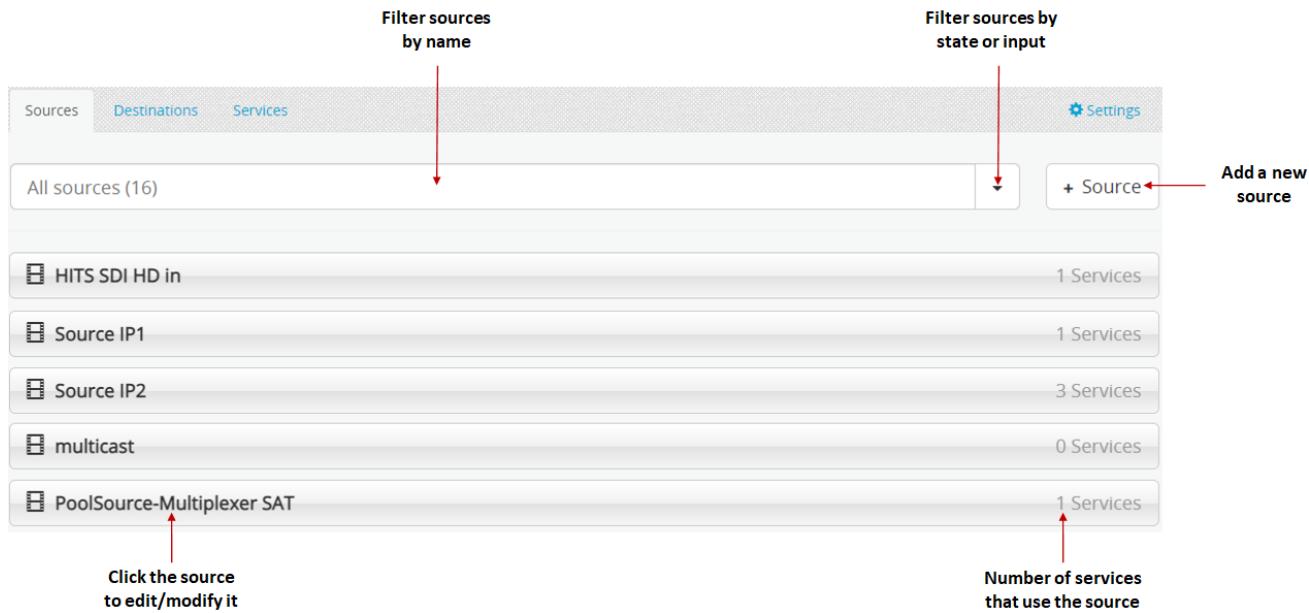
Review the layout of each page and the function of each element on the page.

Sources page

View all of the sources that have been configured.

A source is a set of streams that are defining a service to encode, to transcode, to pass through or to package.

Divittrack Pools are internal sources for multiplexers and also listed in this page.



Destinations & Divittrack Pools page

View all of the service destinations that have been configured.

Destinations are gathering settings about external points where transcoded services, packaged services and generated multiplexers must be sent.

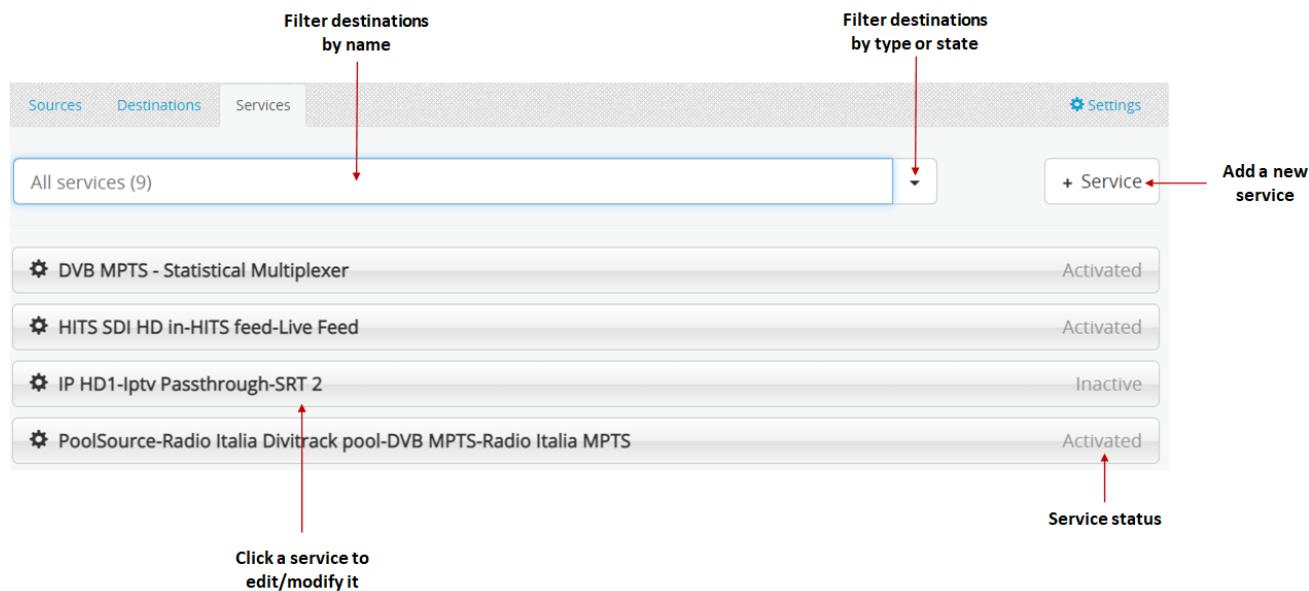
Internal destinations are also listed in this page for services gathered in a Divittrack pool.



Services page

View all of the services that have been configured.

Service means Encoding service, Transcoding service, Pass through service, Packaging only service or multiplexing service.



Filtering sources, destinations and services

From the Configure Channels app, filter using a variety of facets to help you quickly find a desired source, destination, or service.

The filter drop-down

The filter drop-down presents a list of facets based on the page you are viewing. You can filter sources by the following:

- State (**Used** or **Unused**)
- Input status (**Input defined** or **No input**)

You can filter destinations by the following:

- Type (**IP**)
- State (**Used** or **Unused**)

You can filter services by the following:

- State (**Active** or **Inactive**)
- Type (**IPTV**)
- Scrambling (**Enable** or **Disable**), only for OTT services

The screenshot shows the 'Services' tab selected in the top navigation bar. A dropdown menu is open, showing various filtering options. The 'All services (9)' option is at the top. Below it are sections for 'Active' (9 services), 'Inactive' (0 services), 'IPTV' (9 services), 'Scrambling enabled' (9 services), 'Scrambling disabled' (0 services), and 'All' (9 services). A red box highlights the dropdown arrow icon.

Category	Count
All services	(9)
Active	(9)
Inactive	(0)
IPTV	(9)
Scrambling enabled	(9)
Scrambling disabled	(0)
All	(9)

Name filter

To filter by name, type a letter or string of letters in the **Search** field.

The screenshot shows the 'Sources' tab selected in the top navigation bar. A search field contains the text 'UHD', which is highlighted with a red box. Below the search field is a list of sources. The first item, 'IP UHD Source', has '0 Services' next to it. The second item, 'UHD Source SPTS', also has '0 Services' next to it. To the right of the search field is a dropdown arrow and a '+ Source' button.

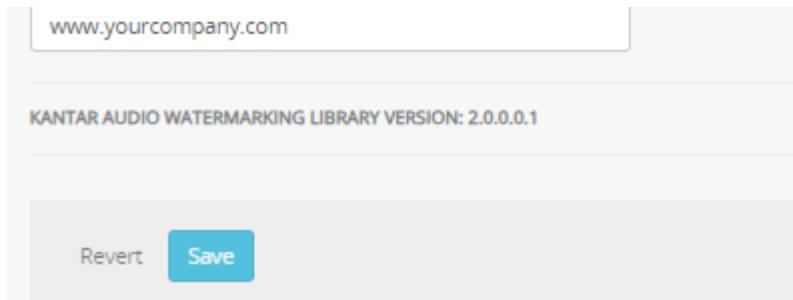
Settings

General tab

This is used to define Service preferences and Video Languages preferences. This list appears when a language needs to be indicated on other pages (to select an audio component for instance).

The screenshot shows the 'General' tab of the XOS Advanced Media Processor settings. At the top, there's a back arrow and the word 'Settings'. Below that is a navigation bar with 'General' and 'Advanced' tabs, where 'General' is selected. Under 'SERVICE PREFERENCES', there are two buttons: 'IPTV' (selected) and 'Multiscreen'. The 'VIDEO LANGUAGES — in order of preference' section contains a dropdown menu showing 'Unknown' and a list of 16 languages with their codes. At the bottom of this section is a blue 'Add' button. At the very bottom of the page, there's a footer with 'NIELSEN' and 'VENDOR ID: 503'.

Rank	Language	Code
1	English [eng]	
2	French [fra]	
3	Spanish [spa]	
4	Arabic [ara]	
5	Bengali [ben]	
6	Yue Chinese [yue]	
7	Dutch [nld]	
8	German [deu]	
9	Hindi [hin]	
10	Italian [ita]	
11	Japanese [jpn]	
12	Korean [kor]	
13	Latin [lat]	
14	Mandarin Chinese [cmn]	
15	Portuguese [por]	
16	Russian [rus]	



- Click **Add** to add any missing languages.
- Click **Save** to commit the changes.



Important

For Audio grooming, the language has to be defined here in the list.
Modifying this list (adding or removing items or changing the order of languages), will affect all profiles using Match By Language criteria.



Note

In addition to the regular ISO language codes, the following reserved ISO language code values can also be used:

- “qab” => Language name: "qab"
- “qac” => Language name: "qac"
- “qae” => Language name: "qae"
- “qaf” => Language name: "qaf"
- “qks” => Language name: "qks"
- “qtz” => Language name: "qtz"

Advanced tab

This is used to customize global settings for Video, Audio, Subtitle, Source, and Nielsen watermarking.

The screenshot shows the 'Settings' screen with the 'Advanced' tab selected. The interface is organized into sections: VIDEO, AUDIO, SUBTITLE, and SOURCE. Each section contains configuration options like COPY RIGHT, VIDEO STANDARD, STRESS BIAS, and various processing modes or fail-over conditions. The 'Advanced' tab is highlighted in blue, and the other tabs ('General') are greyed out.

VIDEO — Customize global setting for the video.

COPY RIGHT
Copyrighted Original ▾

VIDEO STANDARD
Nothing selected ▾

STRESS BIAS
Nothing selected ▾

AUDIO — Customize global setting for the audio.

COPY RIGHT
Copyrighted Original ▾

SUBTITLE — Customize global setting for subtitle.

TELETEXT SUBTITLE PROCESSING MODE
Nothing selected ▾

SOURCE — Customize global setting for the source fail over conditions.

TYPE

VIDEO MISSING

SCRAMBLED VIDEO PID

AUDIO PID MISSING

NMOS — Enable NMOS adapter for IS-04/IS-05 communication to NMOS controller

 NMOS

SYNAMEDIA WATERMARKING — Customize Synamedia setting for the video watermarking.

SYNAMEDIA PADDING — Customize the SEI insertion for downstream watermarking

SEI UUID**ESAM****ESAM ENDPOINT****ESAM OOB MESSAGE PREROLL****ESAM SCTE-35 PASSTHROUGH ON UNREACHABLE POIS****SCHEDULER360****SCHEDULER360 ENDPOINT****AUTH SERVER****CLIENT ID****CLIENT SECRET****TIMECODE****DAILY SYNC TIME (UTC HOUR)****GPS UTC OFFSET (S.)**

For the **NMOS** setting, NMOS IS-04/IS-05 can be enabled for provisioning the SMPTE 2110 source streams. When NMOS is selected, two new drop-down lists are shown:

NMOS — Enable NMOS adapter for IS-04/IS-05 communication to NMOS controller

NMOS

SOURCE REGISTRATION MODE

Sources with running service attached ▾

NMOS REGISTRY DISCOVERY MODE

Discover ▾

Options for the **Source Registration Mode** are:

SOURCE REGISTRATION MODE

Sources with running service attached ▾

Sources with running service attached

All sources

Option for the NMOS Registry Discovery Mode are:

NMOS REGISTRY DISCOVERY MODE

Discover ▾

Discover

Static

When **Static** is selected three new input fields are shown:

NMOS — Enable NMOS adapter for IS-04/IS-05 communication to NMOS controller

NMOS

SOURCE REGISTRATION MODE
Sources with running service attached

NMOS REGISTRY DISCOVERY MODE
Static

NMOS REGISTRY IPV4 ADDRESS
127.0.0.1
This field is required

NMOS REGISTRY TCP PORT
8010
This field is required

NMOS REGISTRY IS04 VERSION
v1.3

Provide a valid IPv4 address and tcp port for the static registry, otherwise the UI will warn you with an invalid parameter and you cannot save the configuration.

Choose the IS04 version from the drop-down list. Only "v1.2" or "v1.3" can be selected.

NMOS REGISTRY IS04 VERSION

v1.3

v1.2

v1.3

- For **Nielsen** audio watermarking, the **Sender Time Zone** setting is used to calculate the daylight saving time according to the time zone of the sender automatically.
- Configure the Timecode settings **Daily Sync Time (UTC Hour)** for 60Hz sources only.
- (Optional) Configure the global setting **GPS UTC Offset**. The default value is 18s. If the GPS UTC Offset is configured, the system time will be computed from the current UTC time and configured GPS UTC offset duration.

The screenshot shows two sections of the XOS Advanced Media Processor configuration interface:

- FONTS** section:
 - Table with one row: **dejavu** (</ui/fnt/DejaVuSans.ttf>)
 - Buttons: **Delete selected** (red), **Revert**, and **Save** (blue)
- LUT** section:
 - Table with one row: **Clayton_33(cube)** ([http://198.18.84.42:8880/NG-66731/Clayton_33\(cube](http://198.18.84.42:8880/NG-66731/Clayton_33(cube))
 - Buttons: **Delete selected** (red), **Revert**, and **Save** (blue)

Both sections include fields for **PATH TO FONT FILE** and **PATH TO LUT FILE** with example URLs (<https://domain.com/fonts/myfont.ttf> and [https://domain.com/lut/mylut\(cube](https://domain.com/lut/mylut(cube) respectively), **USERNAME** (username), **PASSWORD**, and a **Add** button.

- For the **LUT** setting, the LUT file record can be added or deleted after adding the HTTPS path to retrieve the LUT file with the associated login credentials (Note that only the **.cube** extension is allowed). The 3D-LUT files can be used for HDR conversions (Color conversion) using the Multiscreen profile and IPTV profile from the Lab Wizard app.
- For the **Kantar Snap Watermarking Licenses** setting, the Kantar Product and Audience license files can be added to the VOS system to enable the Kantar Watermarking insertion. Once the valid license files are loaded, you can enable the watermarking by configuring the **Kantar Snap Watermarking** field in Multiscreen profile and IPTV profile from the Lab Wizard app.

KANTAR SNAP WATERMARKING LICENSES

PRODUCT LICENSES ('LIC' TYPE) — AUDIENCE LICENSES ('AUD' TYPE) — Delete selected	LICENSE FILE PATH Select... LICENSE NAME <input type="text"/> Clear Add
---	--

- For the **AHDR SL-HDR1 Configuration** setting, specify the "Path to AHDR SL-HDR1 Configuration File" and login credentials to upload the configuration JSON files for SL-HDR1 metadata generation. Once the valid AHDR SL-HDR1 configuration files are loaded, you can enable the SL-HDR metadata generation by configuring the **Color Conversion** and **HDR Dynamic Metadata** fields in the Multiscreen profile and IPTV profile from the Lab Wizard app.

AHDR SL-HDR1 CONFIGURATION

Delete selected	PATH TO AHDR SL-HDR1 CONFIGURATION FILE <input type="text" value="sfd"/> USERNAME <input type="text" value="username"/> PASSWORD <input type="text"/> Add
--	---

- For the **DOLBY-VISION** setting, the DOLBY-VISION file record can be added or deleted after adding the HTTPS path to retrieve the DOLBY-VISION file with the associated login credentials. The file contains additional metadata. This is in addition to setting Dolby-Vision at the output.

DOLBY-VISION

Delete selected	PATH TO DOLBY-VISION FILE <input type="text" value="https://domain.com/DolbyVisionFolder/myDolbyVisi"/> USERNAME <input type="text" value="username"/> PASSWORD <input type="text"/> Add
--	--

- Click **Save** to commit the changes.

**Note**

Scheduler360 is not used in this release.

Configuring an Input Source

To add a source, click **+ Source**:

**Note**

When adding a source, automatically the **Signal loss** input is proposed by default. You can remove it or keep it if required and then add another input type.

(Refer to [Configuring a signal loss slate for source input](#) for details.)

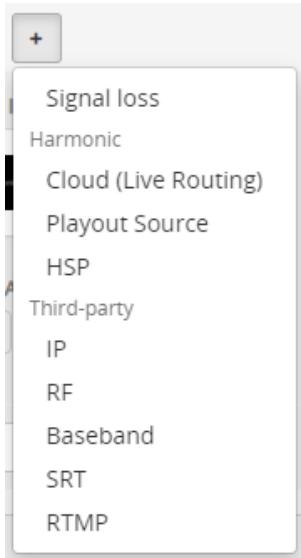
For any source added, the operator has to:

- define an **Input source Name** that appears in the source list
- optionally, enter the **Label** associated with the source by clicking **+ Label**

**Tip**

The label can help the operator search and find a source more quickly.

By clicking the add input icon, the XOS displays the list of available inputs that can be configured.



Select one to display and configure its settings.

Once settings are done, click **Create** to save the configuration and thus add the new source to the list.

Note

The following Inputs are not available in this release: Cloud (Live Routing) - Playout Source - RTMP

Configuring a baseband source

Different formats of Baseband signal can be received:

- SDI
- SMPTE 2022-6
- SMPTE 2110

SDI source

Note

To create an SDI source used in an **MPTS output**, refer to [Configuring a multiplexer and its services \(MPTS output\)](#).

Once Baseband Input is selected:

1. In the **Baseband type**, select SDI.
2. Select the **Frame Rate** and **Resolution** for the source.
3. (Optional) Configure the input **Format** supported on the SDI card for specific Frame Rates and Resolutions. The possible values: SD-SDI, HD-SDI, 3G-SDI, 12G-SDI.

Note

Sharing the same SDI input between services is only possible with Dektec SDI cards.

4. Select the **SDI Card** from which you expect to receive the source and the associated **Port** number.

 **Note**

When using an SDI card supporting 12G-SDI, ensure that the card is correctly configured either for 12G-SDI input, or for SDI/ASI input/output in the **Platform Configuration** app.

SDI Card #	Description
SDI Card 1	First SDI card from left to right from rear view in XOS M/L/XL (can be in any slot), SDI Card in XOS S (only one card is supported)
SDI Card 2	Second SDI card from left to right from rear view in XOS M/L/XL (can only be in middle or in right slot)
SDI Card 3	Third SDI card in XOS M/L/XL (right slot in rear view)

 **Note**

Regarding port numbering from rear view, card in the middle slot in XOS M/L/XL is upside down (reverse order).

5. Select the **Active Region Source** and **AFD Fallback** mode.
6. To activate the **Noise Reduction** pre-processing, set it to **ON**.
 - Select the noise reduction mode: Auto, Moderate, or Strong.
7. To mask the widescreen signaling (**WSS**) or automated measurement of lineups (**AMOL**) lines, the **WSS/AMOL LINE KILLER** has to be set to **ON**.
8. Click the Plus under **Caption Services** and enter the relevant information for conversion of CEA-608 and CEA-708 Closed Captions to the DVB Subtitles format.
9. (Optional) You can define **Audio track** and **Data track**. (Refer to [Audio grooming](#) and [Data grooming](#) for details.)

The screenshot shows the XOS Advanced Media Processor interface for creating a new input source named "SDI-3_60". The configuration includes:

- INPUT SOURCE NAME:** SDI-3_60
- LABELS:** + Label
- Used in 0 services.**
- INPUTS:**
 - Primary Baseband:** Primary Baseband
 - BASEBAND TYPE:** SDI
 - RANK:** Primary
 - Video Stream:**
 - FRAME RATE:** 1:29.97
 - RESOLUTION:** 1920x1080
 - FORMAT:** HD-SDI
 - SDI CARD:** Card 1
 - PORT:** 3
 - ACTIVE REGION SOURCE:** SMPTE 2016
 - AFD FALBACK:** AFD=8 (full frame)
 - NOISE REDUCTION:** OFF
 - WSS/AMOL LINE KILLER:** OFF
 - CAPTION SERVICES:**

NUMBER	LANGUAGE	EASY READER	WIDE AR	DEFAULT
1	English	OFF	4:3	<input type="checkbox"/>
 - Data Grooming:** +
 - Audio Grooming:** Edit
- Buttons:** Delete, Save, Revert, Close

10. Click **Create** to add the new source.

⚠ Note

With the Dektec (ASI/SDI) card used, XOS supports sharing the same SDI source between encoding channels in broadcast & OTT. Multiple broadcast services and OTT services can be created from one SDI source.

⚠ SDI input for XOS playout

XOS supports SDI inputs as sources for Playout applications, with only Dektec cards (DTA-2178 & DTA-2174B) being supported.

The SDI sources are available in the **Playout Monitor** app library in the **Feeds** widget. You can add and monitor your SDI sources to a playlist just as you proceed with other types of live sources.

SMPTE 2022-6 source

Once Baseband Input is selected:

1. In **Baseband type**, select SMPTE 2022-6.
2. Set the IP parameters of the source:
 - **IP address:** Multicast source IP address
 - **Network:** select the subnet from which you expect to receive the multicast source
 - **Port:** the multicast source port number
 - **SSM:** add a source-specific multicast IP address (optional)

- **2022-7:** Set it to **ON** to enable stream redundancy and thus define the redundancy IP source
3. Set the **Video Stream** parameters. (Refer to [SDI source](#) for details.)
 4. (Optional) You can define **Audio track** and **Data track**. (Refer to [Audio grooming](#) and [Data grooming](#) for details.)

Add source

INPUT SOURCE NAME Harmonic-2	INPUTS Primary Baseband +
LABELS + Label	BASEBAND TYPE SMPTE 2022-6 RANK Primary
	IP ADDRESS 239.220.140.140 NETWORK GbE 07(192.168.112.2...) PORT 80 SSM + SSM 2022-7 OFF
	+
Video Stream	
FRAME RATE 1:25	RESOLUTION 1920x1080
ACTIVE REGION SOURCE SMPTE 2016	AFD FALBACK AFD=8 (full frame)
NOISE REDUCTION OFF	
WSS/AMOL LINE KILLER OFF	
Data Grooming	
+ 	
Audio Grooming	
Create	
	Remove

Create

5. Click **Create** to add the new source.

SMPTE 2110 source

Once Baseband Input is selected:

1. In **Baseband type**, select SMPTE 2110.

2. Set the **Maximum Supported Delay** (milliseconds), it's the maximum buffer supported to align the different streams, Video, Audio, and Data, between them.

3. (Optional) Turn On/Off the **NMOS** toggle. This setting is available only for the SMPTE 2110 source if the **NMOS** checkbox is enabled on the Advanced Settings page. (Refer to [Settings](#) for details). When NMOS is enabled, the following 2110 settings are default values that can be overridden by NMOS orders.

 **Warning**

Be sure to set the same payload type value on the emitting device.

4. (Optional) Turn On/Off the **Audio-Only** toggle. This setting allows enabling audio-only services with the SMPTE 2110 source. Once this is turned on, the Video Stream section with associated parameters will be omitted.

5. Set the **Video Stream** parameters. (Refer to [SDI source](#) for details.)

Video Stream

TID#1

IP ADDRESS	PORT	SSM	2022-7
e.g., 226.1.1.1	e.g., 80	+ SSM	OFF
RTP PAYLOAD TYPE	STANDARD		
AUTO	2110-20		
GENERATE VITC FROM RTP TIMESTAMP			
OFF			
FRAME RATE	RESOLUTION	FRAME MODE	
1:25	1920x1080	Interlaced	
ACTIVE REGION SOURCE	AFD FALBACK		
SMPTE 2016	AFD=8 (full frame)		
NOISE REDUCTION			
OFF			
WSS/AMOL LINE KILLER			
OFF			

Info

For each **Video Stream** with **NMOS** enabled, the NMOS Receiver Number of each 2110 stream will be displayed next to the assigned transport ID. (e.g. TID#1 **2110_Video_RN1** 239.1.1.1:11111)

Note

It is recommended to set **RTP Payload Type** as "Auto" to ease the reception of audio streams.

6. To generate VITC from the RTP timestamp, set it to **ON**. The VITC UTC-based timecode will be generated from the RTP timestamp in the SMPTE 2110 source which can be inserted into the SEI messages on the output H.264/TS output.
7. Click **+Audio Stream** to add an audio component. Click as many times as there is a component to add.

Note

XOS supports services with audio stream only for the SMPTE 2110 source. In this case, the Video Stream section will not be displayed.

8. Set the **Audio Stream** parameters:

Audio Stream

IP ADDRESS	NETWORK	PORT	SSM	2022-7
224.7.7.53	GbE 07(192.168.7.103)	80	+ SSM	OFF
RTP PAYLOAD TYPE		NUM CHANNEL	2110-31	
AUTO		2	ON	
Audio Tracks				
Create				

Info

For each **Audio Stream** with **NMOS** enabled, the NMOS Receiver Number of each 2110 stream will be displayed next to the assigned transport ID. (e.g. TID#2 **2110_Audio_RN1** 239.1.1.1:22222)

9. (Optional) You can define **Audio track**. (Refer to [Audio grooming](#) for details.)

10. Click **+Data Stream** to add a data component. Click as many times as there is a component to add.

11. Set the **Data Stream** parameters.

Data Stream

IP ADDRESS	NETWORK	PORT	SSM	2022-7
224.7.7.2	GbE 07(192.168.7.103)	80	+ SSM	OFF
RTP PAYLOAD TYPE		EXTRACT AFD	EXTRACT CC	
AUTO		OFF	OFF	
+ Data track				

Info

For each **Data Stream** with **NMOS** enabled, the NMOS Receiver Number of each 2110 stream will be displayed next to the assigned transport ID. (e.g. TID#3 **2110_Data_RN1** 239.1.1.1:33333)

12. (Optional) Click the **+ Data track** button to define the data track information. (Refer to [Data grooming](#) for details).

13. Click **Create** to add and save the new source.

Audio grooming

- Under **Audio**, click **Create** to define the audio track. Click as many times as there is a track to add.
- For **SDI** or **SMPTE 2022-6** input source:

Create Audio Grooming

Codec	Program	Language	Type	Channels	Pair	Backup	Labels	Delay	Level (LKFS)	Keep meta data	Silence Threshold (ms)	Default	
PCM 2.0	English	Program		L / R:	Group1-P1		+ Label	0	-24	<input checked="" type="checkbox"/>	Disabled	<input type="checkbox"/>	<input type="button" value="-"/>
<input style="width: 20px; height: 20px; margin-left: 10px;" type="button" value="+"/>													
<input type="button" value="Reset"/> <input checked="" type="button" value="Save"/> <input type="button" value="Close"/>													

- For **SMPTE 2110** input source:

Create Audio Grooming

Codec	Delay	Languages	Channel number	Sample rate	Sample size	Type	Labels	Nielsen	Level (LKFS)	Keep meta data	Silence Threshold (ms)	Default	
PCM 2.0	0	English	L: Choose R: Choose	48000 Hz	24 bits	Program Audio	+ Label	<input type="checkbox"/>	-24	<input checked="" type="checkbox"/>	Disabled	<input type="checkbox"/>	<input type="button" value="-"/>
<input style="width: 20px; height: 20px; margin-left: 10px;" type="button" value="+"/>													
<input type="button" value="Reset"/> <input checked="" type="button" value="Save"/> <input type="button" value="Close"/>													

- Configure the Audio Grooming settings for the input sources:

- Codec:** Choose the audio codec for the track.
- Languages:** The language of audio in source. This value is used to define the language in the outgoing stream.

Note

List of proposed languages is defined in Configure Channel → Settings → General

- Channels / Channel number:** Each line corresponds to a specific set of audio codec.
- Group:** Choose according to source definitions.
- Pair:** Choose according to source definitions.
- Type:** Choose the audio type according to source destinations.
- Labels:** This value is used to select the processing to apply depending on the label indicated in the processing profile.
- Delay:** Set a delay in case of lip-sync, to synchronize the audio with the video.
- Nielsen (For SMPTE 2110 input source only):** Check it to enable Nielsen ID3 watermarks (used to measure live and on-demand viewing on multiple device types).
- Level:** Set loudness level measurement for audio normalization. Default = -24 LKFS.
- Sample rate**(only with SMPTE 2110): Choose the number of samples of audio carried per second.
- Sample size** (only with SMPTE 2110): Choose the number of bits of information in each sample.
- Keep Metadata:** Check it to keep the metadata in the audio stream for the AC3 (Dolby Digital) and E-AC3 (Dolby Digital Plus) stream types.
- Silence Threshold (ms):** Specify the silence threshold in milliseconds. If the silence threshold is met, the audio fallback will be triggered and the alarm will be raised.

Prerequisite: Audio Fallback Configurations

Configure the audio fallback settings in the IPTV Profile/Multiscreen Profile as follows:

- Set up the Audio with "*Match by Source Label*" mode selected.
- Create at least 2 unique audio tracks that must be configured with each with its unique Source Label.
- Configure the "**Fallback source label**" and "**Fallback on Silence**". (Refer to [IPTV Profile/Multiscreen Profile](#) for details.)

- **Default:** Default audio is used by some OTT packaging formats.

3. Click **Save** to exit the **Audio Grooming** dialog.

Data grooming

If the source contains data, such as SCTE-104:

1. Click **+ Data Grooming** or **+ Data Stream** to customize downstream processing. Click as many times as there is a track to add.
2. In the **Input Line Settings**, select the data type that is present in the source:
 - SCTE 104
 - SMPTE 2031
 - OP 47
 - OP 42
 - VITC
 - VPS
 - WST
 - WSS
3. Set their parameters accordingly.
 - **Languages:** The language of audio in source. This value is used to define the language in the outgoing stream.

Note

List of proposed languages is defined in Configure Channel → Settings → General

- **Subtitle Type and Page:** These fields are used to define in descriptor in outgoing TS outputs when applicable.
- **Labels:** used to link the source component and the processing described in the profile.

Example with **OP 47**:

TRACK 0

TELETEXT MODE	LANGUAGE	SUBTITLE TYPE	PAGE
NORMAL	English	Hearing Impaired	100
	French	Hearing Impaired	110
			-
			-
	+		
LABELS	+ labels		
INPUT LINE SETTINGS			
SOURCE MODE	OP 47		
	+		

Example with WSS:

TRACK 0

LABELS	+ labels		
INPUT LINE SETTINGS			
SOURCE MODE	WSS		
LINE NUMBER	23	+ line number	
	+		

Configuring an IP source



Note

To create an IP source used in an **MPTS output**, refer to [Configuring a multiplexer and its services \(MPTS output\)](#).

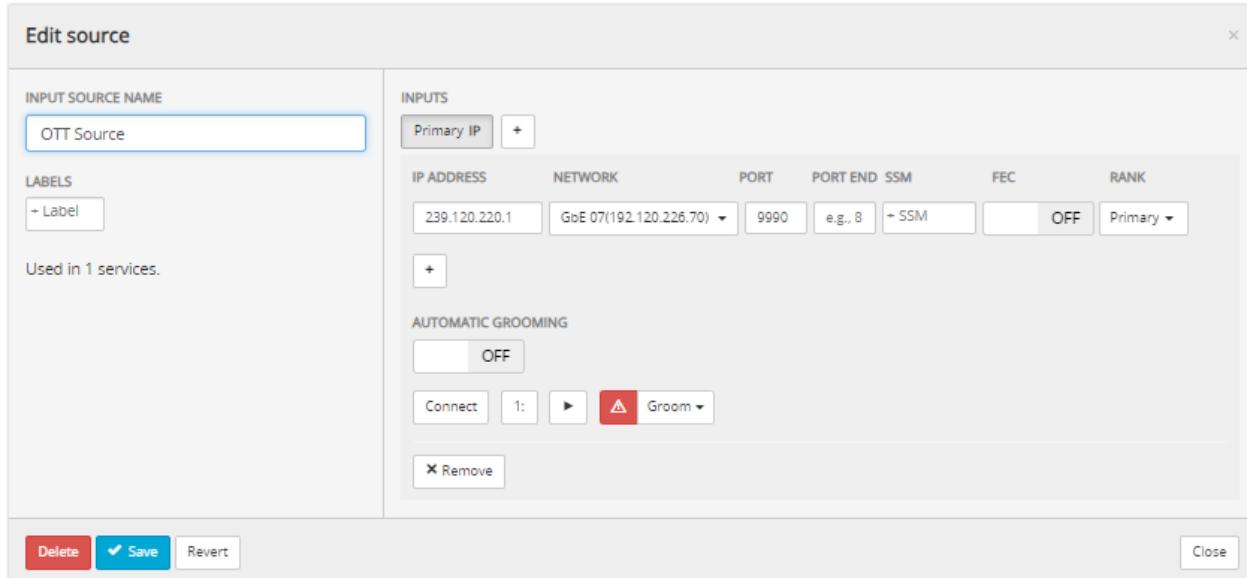
IP inputs are used to ingest MPEG2-TS sources into XOS (SPTS, MPTS, or MBTS).

Warning

Ensure that the multicast IP and port do not conflict with other network services and that your network is correctly configured (IGMP querier).

Once **IP** input is selected:

1. Enter the multicast source **IP Address**.
2. The **Network** field appears, allowing you to select the subnet from which you expect to receive the multicast source.
3. Enter the multicast source **Port** number.



4. For MBTS sources: If you are using a range of contiguous ports, such as [10001:10006], enter the **PORT END** number.

For SPTS and MPTS sources, this field must remain empty.

Info

The maximum supported range is 32 ports.

5. Optionally, add a source-specific multicast IP address in the **SSM** field.
6. For MBTS sources: Optionally, click the **Add** icon to be able to enter multiple multicast IP addresses or non-contiguous ports.

MBTS source with non-contiguous ports

IP ADDRESS	NETWORK	PORT
225.10.10.10	192.168.30.105	10001
225.10.10.10	192.168.30.105	10003
225.10.10.10	192.168.30.105	10005
+		

MBTS source with multiple multicast IP addresses

IP ADDRESS	NETWORK	PORT
225.10.10.10	192.168.30.105	10001
225.10.10.20	192.168.30.105	10001
225.10.10.30	192.168.30.105	10001
+		

7. To enable **Automatic Grooming**, toggle the selector to the **On** position. Optionally, provide the **Program Number** to specify the program in the source to be processed. Otherwise, the service will use the "smallest" detected program number in the input source for processing. This means the service will start as long as one program is detected in the source.

Info

Automatic Grooming can be used to minimize the effort of performing manual grooming for Live events. This allows users to start a service without a requirement of grooming the source, which would require a step to re-groom whenever the source changes.

8. When keeping the **Automatic Grooming** toggle on **Off**, you can, when clicking the **Groom** button, define subtitle Closed Caption conversion to DVB in the following screen:

Groom → Program 513 : MTVNI-HD

	Video	Audio	Subtitles	Data services		
PID	Type	Stream name	Page	Language	Default	Ignore?
0x07DB	Closed Caption	<input type="text"/>	CC-1	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x07DB	Closed Caption	<input type="text"/>	CC-2	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x07DB	Closed Caption	<input type="text"/>	CC-3	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x07DB	Closed Caption	<input type="text"/>	CC-4	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preferred CC type: <input type="text"/>						
<input type="button" value="Revert"/>		<input type="button" value="Ok"/>	<input type="checkbox"/> Save as default			

9. Click **Connect** to discover the input source.

- after a few seconds, if the input source is not found, the following message is displayed: "No data found. Please check your source"
10. Once the source is discovered, click **Choose from X programs** and then select the program you want to use.
- Only one program will be listed for SPTS sources.
11. Optionally click **Play** to view the video source
- If any issues with the transport stream are detected, then a **Grooming needed** alert appears
12. If grooming is needed, proceed with grooming the source input. To do so, refer to [Grooming a Source](#).

Note

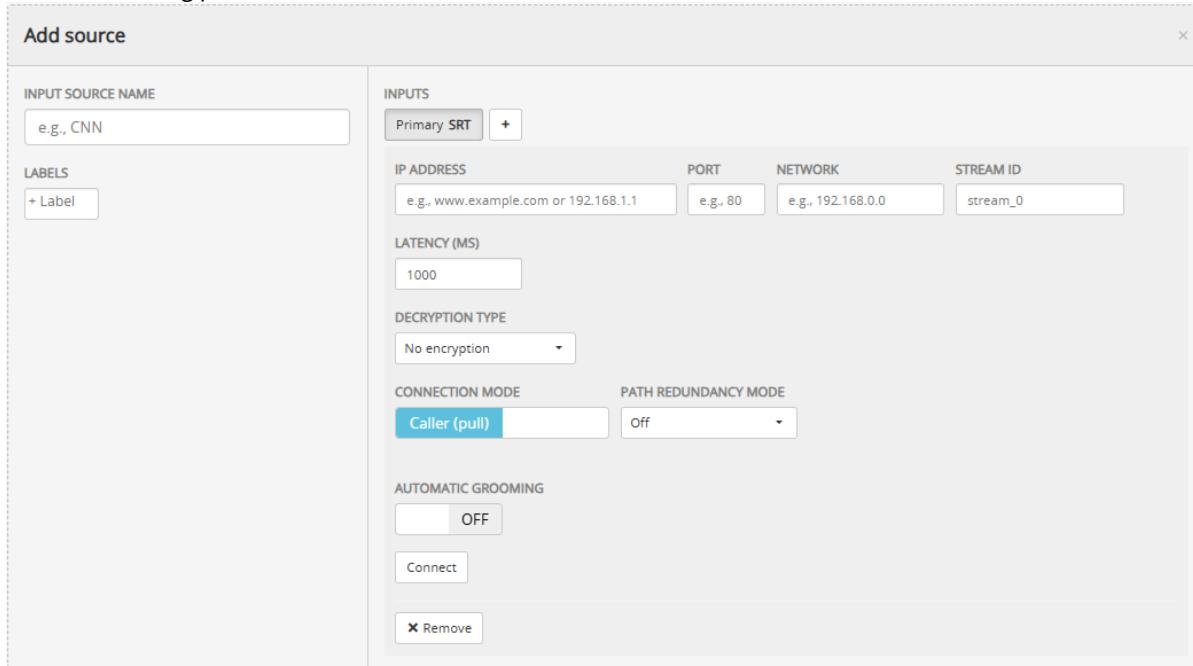
If you add a backup IP input source, the PIDs of the second input have to be identical to the PIDs of the first input, if not, an error will occur.

13. Click **Create** to add and save the new source.

Configuring a SRT source

Once **SRT** input is selected:

1. Set the following parameters:



The screenshot shows the 'Add source' dialog box for an SRT input. The 'INPUT SOURCE NAME' field contains 'e.g., CNN'. The 'LABELS' section has a '+ Label' button. The 'INPUTS' section includes 'Primary SRT' and a '+' button. Under 'INPUTS', there are fields for 'IP ADDRESS' (e.g., www.example.com or 192.168.1.1), 'PORT' (e.g., 80), 'NETWORK' (e.g., 192.168.0.0), and 'STREAM ID' (stream_0). The 'LATENCY (MS)' field is set to 1000. The 'DECRIPTION TYPE' dropdown is set to 'No encryption'. The 'CONNECTION MODE' dropdown is set to 'Caller (pull)', which is highlighted in blue. The 'PATH REDUNDANCY MODE' dropdown is set to 'Off'. The 'AUTOMATIC GROOMING' section has a 'OFF' button and a 'Connect' button below it. At the bottom are 'Remove' and 'OK' buttons.

- **Connection Mode:** Only Caller (pull) is available in this release.
 - **Listener (Push):** No configurations required.
 - **Caller (Pull):** Fill in the IP Address and Port if the Caller (Pull) mode is selected. The Caller (Pull) mode can be used for enabling SRT failover/path redundancy - SRT Path Redundancy for a transition between inputs in case of input loss.
- **Path Redundancy Mode:** (Optional) Specify the redundancy mode for the IP Address/Port which can be "Socket Group" or "2022-7".
 - **Off:** No source redundancy will be enabled for SRT input.
 - **Socket Group:** A group containing multiple SRT sockets can be configured for redundancy setup. Redundant packets that arrive over another link are simply discarded. For example,

- Stream 1: IP Address 1, Port 1, Network 1
- Stream 2: IP Address 2, Port 2, Network 2
-
- Stream (n): IP Address (n), Port (n), Network (n)
- **2022-7:** Two SRT streams can be configured with the same data using different routes to the destination (use SMPTE 2022-7 redundancy to add a backup input stream). Each SRT source stream can be routed through a different network path with "More Settings" including SRT passphrase, Latency, and Stream ID. For example,
 - Stream 1: IP Address 1, Port 1, Network 1, Latency 1, Decryption Type 1, Steam ID 1
 - Stream 2: IP Address 2, Port 2, Network 2, Latency 2, Decryption Type 2, Steam ID 2
- **IP Address** and **Port** of the source to be jointed.

Note

Only unicast protocol is supported.

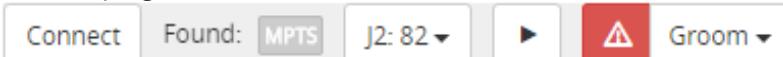
- **Network:** The subnet from which the SRT source is received.
- **Stream ID:**
 - Specify the Stream ID to filter out the desired stream when several streams are contained in one SRT source.
 - For the ST 2022-7 Redundancy Mode, configure different Stream IDs for network paths as required.
- **More Settings:** If the Path Redundancy Mode is selected with "2022-7", click the "More Settings" button to configure the Latency, Decryption Type, and Steam ID for the two SRT streams.
- **Latency** (milliseconds): Size of the buffer.
- **Decryption Type:** Define the encryption mode, if required, and then the key used to decrypt.

2. To enable **Automatic Grooming**, toggle the selector to the **On** position. Optionally, provide the **Program Number** to specify the program in the source to be processed. Otherwise, the service will use the "smallest" detected program number in the input source for processing. This means the service will start as long as one program is detected in the source.

Info

Automatic Grooming can be used to minimize the effort of performing manual grooming for Live events. This allows users to start a service without a requirement of grooming the source, which would require a step to re-groom whenever the source changes.

3. Click **Connect** to discover the input source.
 - after a few seconds, if the input source is not found, the following message is displayed: "No data found. Please check your source"
4. Choose a program from the list.



5. Optionally click **Play** to view the video source
 - If any issues with the transport stream are detected, then a **Grooming needed** alert appears
6. If grooming is needed, refer to [Grooming a Source](#).
7. Click **Create** to add and save the new source.

Note

SRT input with JPEG-XS encapsulated video up to HD resolution is supported.

Configuring a RF source

✖ Warning

This feature is LIMITED AVAILABILITY in this release

⚠ Note

Before to start the configuration, check that the RF card is well configured. Refer to [Configuring the RF card \(satellite reception\)](#).

Once **RF** input is selected:

1. Set the **Program Number**
2. Select the **Tuner**

The screenshot shows the 'Add source' dialog box. On the left, under 'INPUT SOURCE NAME', the value 'Harmonic-6' is entered. Below it, under 'LABELS', there is a button '+ Label'. On the right, under 'INPUTS', there is a section for 'PROGRAM NUMBER' with a dropdown menu showing '1' and a 'TUNER' dropdown menu showing '2'. At the bottom of the dialog are two buttons: 'Cancel' and 'Create'.

3. Click **Create** to add and save the new source.

Configuring a HSP source

⚠ Note

HSP source support has restrictions in this release: single profile, TS format (HLS v3), and no late audio binding.

Once **HSP** input is selected:

1. Choose the **HSP Input Mode**:

- **Pull:** Specify the endpoint URL to pull the source content from.

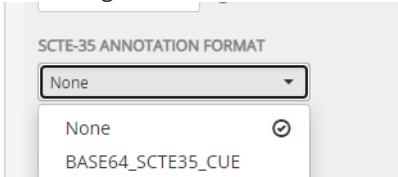
The screenshot shows the 'Add source' dialog for a 'Pull' input. The 'INPUT SOURCE NAME' field contains 'e.g., CNN'. Under 'INPUTS', there are two entries: 'Primary HSP' and 'Signal loss'. The 'ENDPOINT URL' field is empty, and the 'NETWORK' dropdown is set to 'Nothing selected'. The 'AUTHENTICATION PASSPHRASE' and 'BACKUP AUTHENTICATION PASSPHRASE' fields are also empty. The 'HSP INPUT MODE' dropdown is set to 'PULL'. The 'INPUT BUFFER SIZE (SECONDS)' dropdown is set to 'Auto'. The 'SCTE-35 ANNOTATION FORMAT' dropdown is set to 'None'. The 'RANK' dropdown is set to 'Primary'. Below these settings are 'Connect' and 'Remove' buttons. At the bottom of the dialog are 'Cancel' and 'Create' buttons, with 'Create' being highlighted.

- **Push:** No configuration is required. The endpoint URL is generated automatically for push packaging.

2. (Optional) Set the **Input Buffer Size** in 2 to 60 seconds. The HSP buffer reception can be configured to deal with short latency applications or to match network performance.

- If not specified, the input will buffer 2 segments by default.
- If the configured input buffer size is smaller than the 2-segment duration, the input will buffer 2 segments as it is the minimum requirement.
- If the configured input buffer size is not a multiple of segment duration, the input buffer size will be rounded up to the duration of the smallest number of segments larger than the input buffer size.

3. Select BASE64_SCTE35_CUE in **SCTE-35 Annotation Format** to parse SCTE-35 annotations from the HLS playlist according to the BASE64_SCTE35_CUE format and convert them into SCTE-35 packets for insertion into the TS.



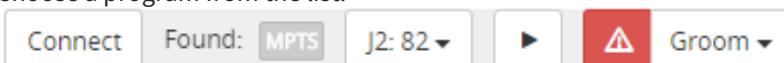
4. Set the **Rank** in case of two HSP inputs: Primary or 2.

5. Optionally, click **+ input** to add a **Watermark**. The Watermark input is also displayed in the HSP input.

6. Click **Connect** to discover the input source.

- after a few seconds, if the input source is not found, the following message is displayed: "No data found. Please check your source"

7. Choose a program from the list.



8. Optionally click **Play** to view the video source
 - If any issues with the transport stream are detected, then a **Grooming needed** alert appears
9. If grooming is needed, refer to [Grooming a Source](#).
10. Click **Create** to add and save the new source.

⚠ Note

The Signal loss button can be used to define what image should be shown when the signal is lost (either an image or a black screen).

Grooming a Source

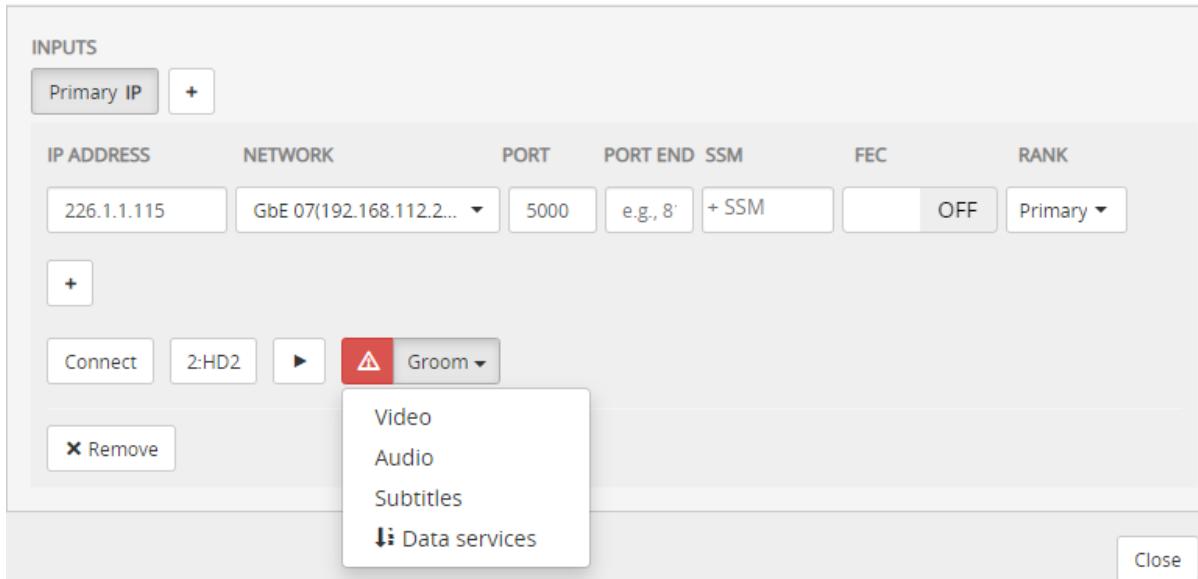
Groom a source to supply metadata that is missing or corrupt. For example, an audio track might be missing its language identifier.

⚠ Note

Ensure that the languages required by your services are defined in default languages. Even if the language codes (ISO639) are correctly set in the sources, the system will not display them in the grooming window if they are not defined and they will not be available in the streams generated by the system. To manage the language settings, refer to [Settings](#).

Once the source is connected:

1. Click **Groom** drop-down menu



2. Select the Video to open the grooming dialog box.
3. Configure settings on the **Video** tab. For details, refer to [Video grooming dialog](#).
4. Select the **Audio** tab to configure settings to use for each track. For details, refer to [Audio grooming dialog](#).

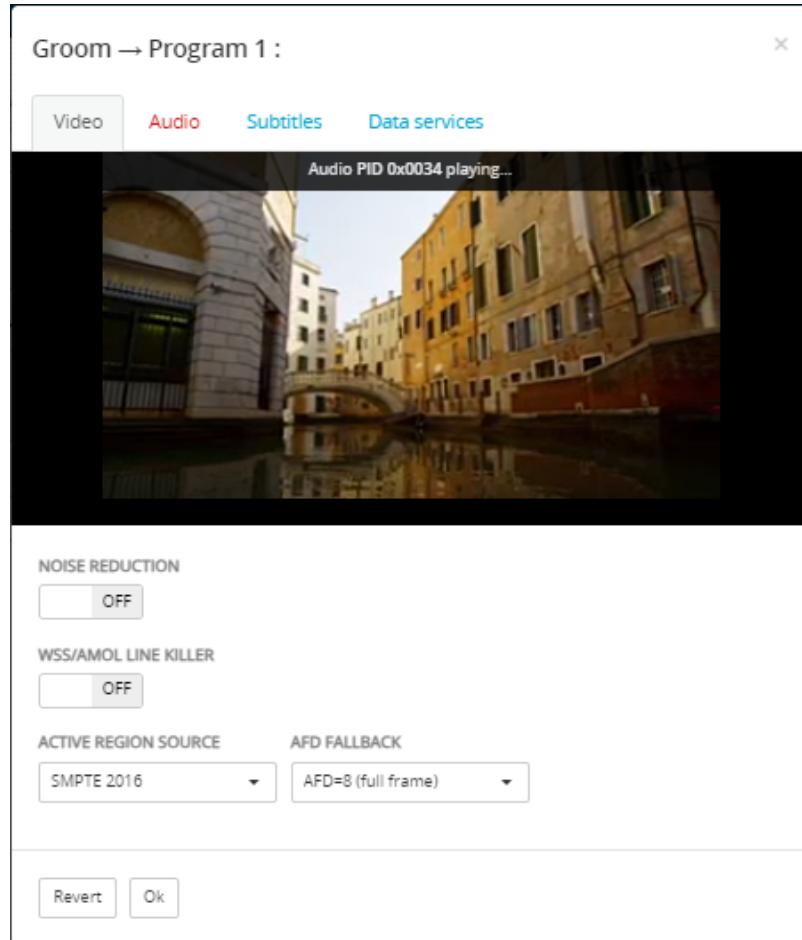
⚠ Note

XOS supports services with audio-only streams. In the case of the audio-only service, the Groom drop-down menu does not show the Video option.

5. Select the **Subtitles** tab to provide information as needed. For details, refer to [Subtitles grooming dialog](#).
6. Select the **Data services** tab to provide information as needed. For details, refer to [Data services grooming dialog](#).
7. When you have finished grooming the source input, click **OK** to exit the **Groom** dialog box.
8. Continue with creating and activating the source.

Video grooming dialog

Review the video grooming dialog for options available for your services.

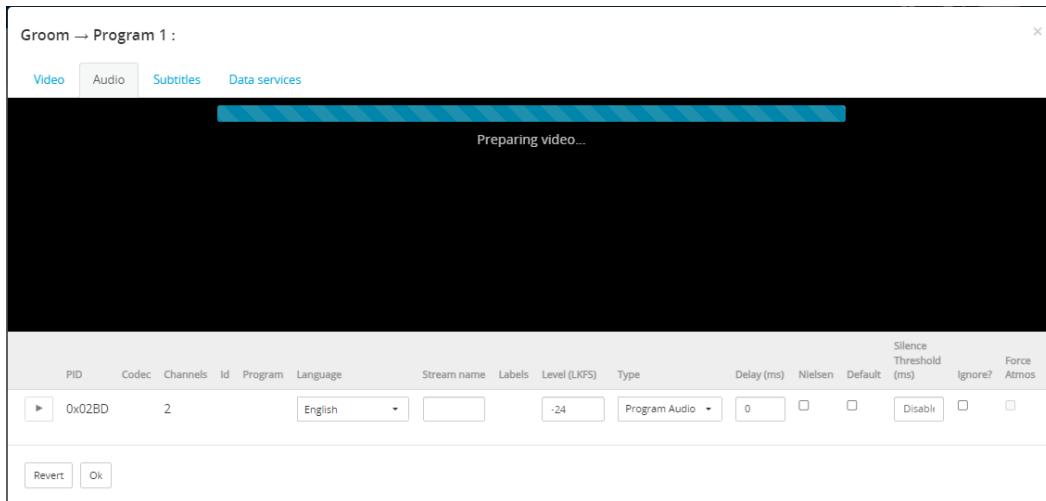


Parameter	Description
Noise Reduction	Set it to ON to reduce the noise from the video source. <u>Options:</u> Auto - Moderate - Strong
WWS/Amol Line Killer	Set it to ON to remove the widescreen signaling (WSS) or automated measurement of lineups (AMOL) lines at the top of older analog video streams. These lines are normally visible as thin white lines at the top of video streams. This replaces the line with a mix of the following two lines to remove the signal.
Active Region Source	Select the standard of the active region from the source video. Only SMPTE 2016 standard is supported.

Parameter	Description
AFD Fallback	Specify how XOS performs aspect ratio conversion based on AFD codes.
Input Aspect Ratio	Used to determine whether there has been an aspect ratio change, and therefore whether XOS needs to modify the content.

Audio grooming dialog

Review the audio grooming dialog for options available for your services.



Click the **Play** button on the left to play the audio.

Parameter	Description
PID	Component identifier.
Channels	Audio type.

Parameter	Description
Stream name	<p>Name of the audio stream used for Multiscreen packaging.</p> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>The stream name is distinct from the audio label. Audio labels can be set from Data services grooming dialog.</p> </div> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>XOS supports services with audio-only streams. In the case of the audio-only service, the grooming view does not show the Video tab, and the video preview shows "No video component in this program".</p> </div>
Language	Audio language to assign.
Level (LKFS)	Set loudness level measurement for audio normalization. Default = -24 LKFS.
Type	Configure the audio type.
Delay	Set a delay in case of lip-sync, to synchronize the audio with the video. Range: -500ms to +500ms.
Nielsen	Check it to enable Nielsen ID3 watermarks (used to measure live and on-demand viewing on multiple device types).
Default	Check it to indicate the default audio stream. This parameter is used when performing Multiscreen packaging.
Silence Threshold (ms)	<p>Specify the silence threshold in milliseconds. If the silence threshold is met, the audio fallback will be triggered and the alarm will be raised.</p> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>ⓘ Prerequisite: Audio Fallback Configurations</p> <p>Configure the audio fallback settings in the IPTV Profile/Multiscreen Profile as follows:</p> <ul style="list-style-type: none"> • Set up the Audio with "<i>Match by Source Label</i>" mode selected. • Create at least 2 unique audio tracks that must be configured with each with its unique Source Label. • Configure the "Fallback source label" and "Fallback on Silence". (Refer to IPTV Profile/Multiscreen Profile for details.) </div>

Parameter	Description
Keep metadata	Check it to keep the metadata in the audio stream for the AC3 (Dolby Digital) and E-AC3 (Dolby Digital Plus) stream types.
Ignore?	Tick it to exclude the track from the output.
Force Atmos	If the detected audio stream type is E-AC3 (Dolby Digital Plus), the checkbox will be enabled. In case an E-AC3 audio track is dynamically switching between different audio modes (stereo, 5.1, Atmos), this checkbox allows to force signaling this audio track as Atmos audio in HLS and DASH packaged outputs (instead of signaling what XOS detected at the service start).

Subtitles grooming dialog

Review the subtitles grooming dialog for options available for your services.

The screenshot shows the 'Groom → Program 1:' dialog with the 'Subtitles' tab selected. The table lists four subtitle streams, each with a PID of 0x0022 and a type of 'Closed Caption'. The streams are labeled CC-1 through CC-4. Each row includes fields for Stream name (empty), Page (CC-1 to CC-4), Language (English or Spanish), a 'Default' checkbox (unchecked), and an 'Ignore?' checkbox (unchecked). A 'Preferred CC type' dropdown menu is visible at the bottom left. At the bottom right are 'Revert', 'Ok', and 'Save as default' buttons.

PID	Type	Stream name	Page	Language	Default	Ignore?
0x0022	Closed Caption		CC-1	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x0022	Closed Caption		CC-2	Spanish	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x0022	Closed Caption		CC-3	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>
0x0022	Closed Caption		CC-4	English	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Parameter	Description
PID	Component identifier.
Type	<p>This refers to the subtitle types in the input stream.</p> <p>The subtitle types are extracted from the data descriptors included in the source or the data descriptors manually added in the "Data services" tab.</p> <p>The possible values are: "Closed Caption", "Teletext", "DVB Subtitling" and "SCTE27 Subtitling".</p>
Page	<p>For DVB subtitles, confirm the page ID. For Teletext, confirm the Page Number.</p> <p>The default values are the ones extracted from the data descriptors included in the source.</p>
Language	<p>Select the subtitle language you wish to use for each track.</p> <p>The default language is the one extracted from the language descriptor included in the source.</p>
Default	<p>Optionally, check it to select the preferred language for the first subtitle stream in this source.</p> <p>Used as default for Package Smooth Streaming.</p> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠️ Important</p> <p>When packaged into DASH output, the subtitle language that is set as the default will appear first in the MPD manifest file.</p> </div>
Ignore?	<p>Tick it to exclude the track from the output.</p>
Preferred CC Type	<p>If closed captions are detected in the input stream, this drop-down menu will be displayed. When set to Auto, XOS uses CEA-708 by default and switch to EIA-608 if the preferred CEA-708 is not present in the stream.</p>

Data services grooming dialog

Review the data services grooming dialog for options available for your services.

Groom → Program 2 : HD2

PID	Type	Labels	Descriptor	Ignore?
0x0208	H264 Video	+ Label	<input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> +	<input type="checkbox"/>
0x0212	DOLBY_DIGITAL_PLUS Audio	+ Label	<input type="checkbox"/> ⓘ ISO 639 Language Descriptor(0x0A) <input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> +	<input type="checkbox"/>
0x0213	DOLBY_DIGITAL_PLUS Audio	+ Label	<input type="checkbox"/> ⓘ ISO 639 Language Descriptor(0x0A) <input type="checkbox"/> CUSTOM <input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> +	<input type="checkbox"/>
0x021C	DVB_SUBTITLING Data	+ Label	<input type="checkbox"/> ⓘ Subtitling Descriptor(0x59) <input type="checkbox"/> Stream Identifier Descriptor(0x52) <input type="checkbox"/> +	<input type="checkbox"/>
<input type="button"/> ADD DATA TRACK				
<input type="button"/> Revert <input type="button"/> Ok				

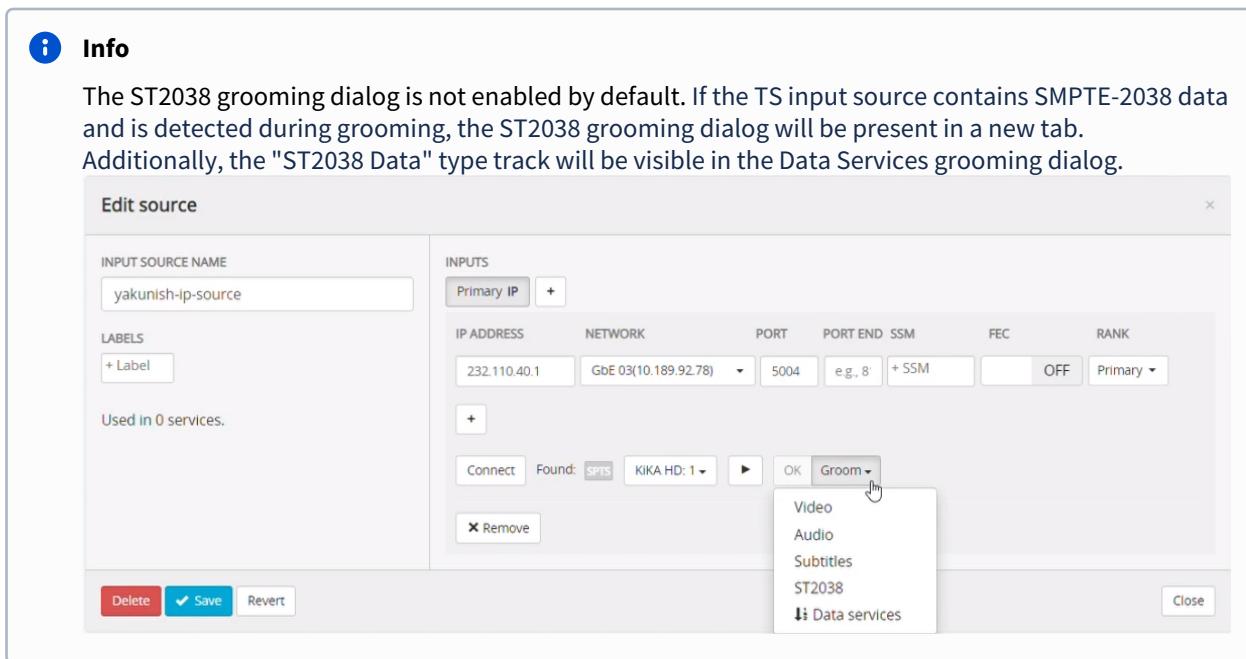
Parameter	Description
PID	Component identifier
Type	This refers to the service types in the input data stream. The types of media components are directly extracted from the descriptors included in the source.
Labels	This refers to a typical label (e.g. audio_1, SCTE-35) that can be assigned to the output audio stream. This is required if your transcoding profiles are configured for stream-based audio conversion (as opposed to language-based audio conversion).

Parameter	Description
Descriptor	Add/edit descriptors for each PID in the input stream. Note Teletext subtitle tracks must have the Teletext Descriptor in order for XOS to convert them to the proper OTT subtitles.
Ignore?	Tick it to exclude the track from the output.

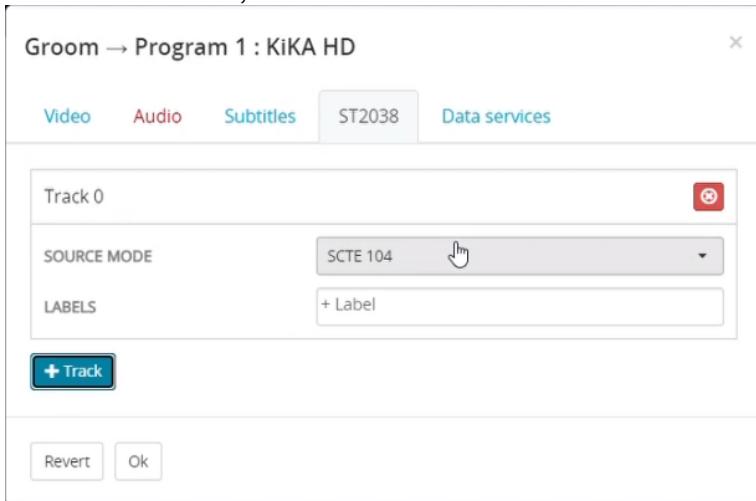
ST2038 grooming dialog

You can groom the TS input source containing the SMPTE 2038 data to perform VANC extraction and processing for your service output. The SMPTE 2038 data can be re-embedded in SDI output.

1. From the **Configure Channels** app, navigate to the **Sources** page, click **+Source**.
2. Configure the source settings in the **Inputs** pane.
3. Click the **Connect** button.



4. From the **ST2038** tab, click the **+Track** button.



5. For each track added, configure the Ancillary (ANC) data to be extracted from the ST-2038 source for processing.

Source Mode	<ul style="list-style-type: none"> <input type="radio"/> SCTE 104 The SCTE-104 data extracted from the ST-2038 source will be converted to SCTE-35 and inserted as a separate PID in output TS with correct signaling in PMT. <input type="radio"/> OP 47 The Teletext (OP-47) data extracted from the ST-2038 source will be inserted as a separate PID (as ESTI EN 301 775) in output TS with correct signaling, including the Teletext descriptor (generated according to grooming information) in PMT. <input type="radio"/> SMPTE 2031 The Teletext (ST 2031) data extracted from the ST-2038 source will be inserted as a separate PID (as ESTI EN 301 775) in output TS with correct signaling, including the Teletext descriptor (generated according to grooming information) in PMT. <input type="radio"/> AFD The AFD (ST 2016-3) data extracted from the ST-2038 source will be used during aspect ratio conversion and the output AFD in video output will be updated accordingly. <input type="radio"/> VITC The VITC (ST 12M) timecode extracted from the ST-2038 source will be used by SCTE-104 processing and attached to video output based on service configuration for whether output VITC is enabled. <input type="radio"/> Closed Caption The Closed Captions (CEA 608, CEA 708 (ST 334)) extracted from the ST-2038 source will be attached to video output based on service configuration for whether CC output is enabled (according to STB mode and source framerate).
Labels	Optional to specify the source label for filtering purposes.

6. Click **Ok**.

Create an RTMP source

RTMP Input can be used for broadcast and streaming applications.

Once **RTMP** input is selected:

1. Set the following parameters:

- **Network:** Select the subnet from which you expect to receive the multicast source.
- **Port:** Enter the multicast source port number

The screenshot shows the 'Add source' dialog box. In the 'INPUT SOURCE NAME' field, 'RTMP source' is entered. Under 'INPUTS', 'Primary RTMP' is selected. The 'NETWORK' dropdown is set to 'GbE 07(192.168.7.226)' and the 'PORT' is set to '20300'. Below these fields are 'Connect' and 'Remove' buttons. At the bottom left are 'Cancel' and 'Create' buttons, with 'Create' being highlighted.

2. Click **Create** to add the new source.

Note

When "Connect" is clicked by the user before the RTMP source is saved, the UI will show a message to let the user know that it needs to be saved first.

Configuring a signal loss slate for source input

- Configuring a signal loss image
- Configuring a WebM video file for signal loss
- Configuring insertion threshold settings for signal loss slate

Configuring a signal loss image

You can configure a static image as the signal loss slate during signal loss events.

1. Navigate to **Configure Channels** app > **Sources** tab > **Inputs**.
2. From the **Signal Loss Image**, click the **Change Image** icon to select the image file for the signal loss slate insertion.

Add source

INPUT SOURCE NAME e.g., CNN	INPUTS Signal loss <input style="width: 20px; height: 20px;" type="button" value="+"/>
LABELS - Label	DISPLAY A VIDEO SLATE <input style="width: 50px; height: 20px;" type="button" value="OFF"/>
	DISPLAY A BLACK SCREEN <input style="width: 50px; height: 20px;" type="button" value="OFF"/>
SIGNAL LOST IMAGE <input style="width: 20px; height: 20px;" type="button" value="Edit"/>	
INSERTION SETTINGS <input checked="" style="width: 50px; height: 20px;" type="button" value="ON"/>	INSERTION THRESHOLD <input type="text" value="1"/> RESET THRESHOLD <input type="text" value="1"/> REVERT THRESHOLD <input type="text" value="1"/>
<input style="width: 100px; height: 20px;" type="button" value="Remove"/>	
<input style="width: 50px; height: 20px;" type="button" value="Cancel"/> <input checked="" style="width: 50px; height: 20px;" type="button" value="Create"/>	

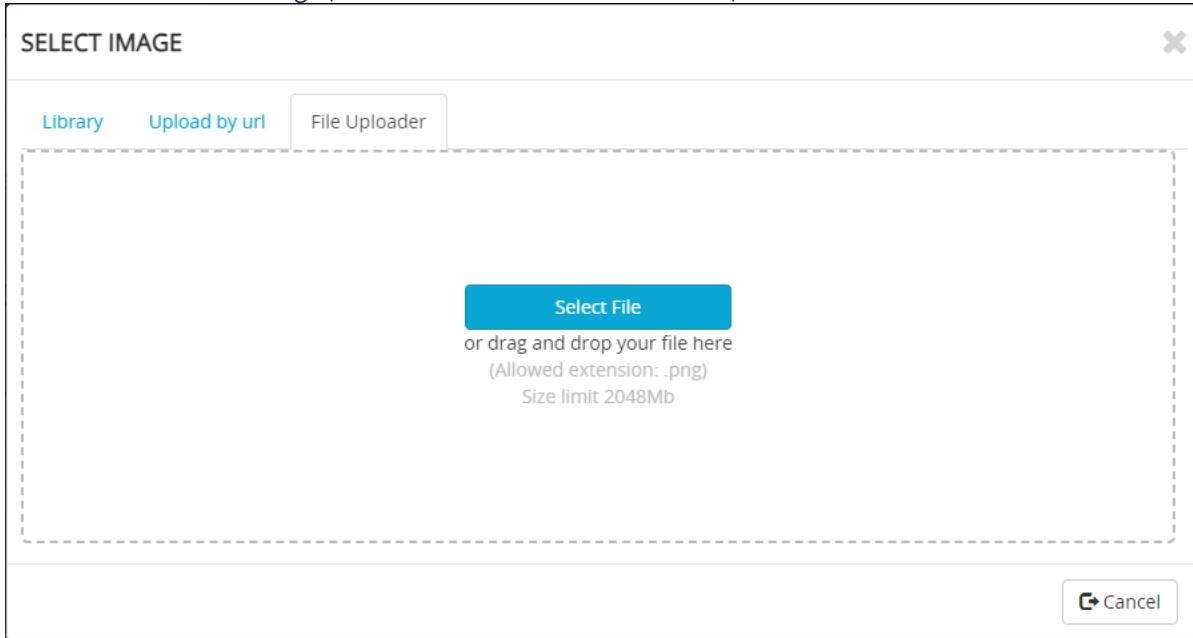
3. From the **Upload by URL** tab, you can use an HTTP server URL to download the PNG image files.

SELECT IMAGE

<input style="width: 50px; height: 20px;" type="button" value="Library"/> <input style="width: 150px; height: 20px;" type="button" value="Upload by url"/> <input style="width: 150px; height: 20px;" type="button" value="File Uploader"/>	<input style="width: 20px; height: 20px;" type="button" value="X"/>
PATH TO WATCHED FILE <input type="text" value="https://domain.com/path/filename.png or https://192.198.45.45/path/filename.png"/> <input type="checkbox"/> <input style="width: 20px; height: 20px;" type="button" value="Lock"/>	
LABELS + Label(e.g, NBC)	
<input checked="" style="width: 100px; height: 20px;" type="button" value="Add"/>	
<input style="width: 100px; height: 20px;" type="button" value="Cancel"/>	

4. Set the **Path** to download the picture.
 5. Define a **Label** to identify easily the picture.

6. From the **File Uploader** tab, you can drag and drop your file for uploading to VOS which allows the PNG files to download with local storage (no need for an external HTTP server).



7. The uploaded image will then be available in the **Library** tab and you can select it.

Configuring a WebM video file for signal loss

Video slate is supported for signal loss slate type by taking a pre-configured WebM video file.

⚠️ Important

This feature is only available for XOS units with data storage for Playout.

Pre-requisites

Prepare a WebM video file for slate insertion. The WebM file should have the same resolution and framerate as the service output (the highest output for OTT service).

1. Navigate to **Asset Acquisition** app > **Incoming** tab, upload the WebM video file using the Web Uploader.

The screenshot shows the XOS Advanced Media Processor interface. At the top, there's a navigation bar with tabs: Overview, Incoming (0), Jobs, Library, Graphics, and Settings. The Incoming tab is active. Below the tabs, there are several sections: 'Upload' (selected), 'Channels', 'Decision Queue', and 'Ready Queue'. There's also a link to 'API — Integrate programmatically' and a 'Read documentation' button. Under 'AWS S3 BUCKET', there's a form to enter 'S3 BUCKET ADDRESS' (set to 's3:// - /undefined/'), 'S3 ACCESS KEY', 'REGION', and 'AWS SECRET ACCESS KEY'. A checkbox 'Edit S3 Credentials' is also present. To the right, a large red box highlights the 'WEB UPLOADER — Simple, convenient' area, which includes a 'Select files' button and a placeholder text 'or drag and drop from your desktop'.

2. Check the assets that have been uploaded from **Asset Acquisition > Graphics**.

The screenshot shows the 'Asset Acquisition' app with the 'Graphics' tab selected. The top navigation bar includes a logo, a dropdown menu, and a user profile icon. Below the navigation, there are tabs: Overview, Incoming (0), Jobs, Library, Graphics (selected), and Settings. A search bar at the top says 'All graphics (3)'. Below the search bar, there are three asset entries, each with a thumbnail placeholder labeled 'No thumbnail available': '1080p-elephants-dre...', 'Arsenal 360_2min.we...', and '1080p-big-buck-bunn...'. To the right of the assets are two filter icons.

3. Navigate to **Configure Channels** app > **Sources** tab > **Inputs**.

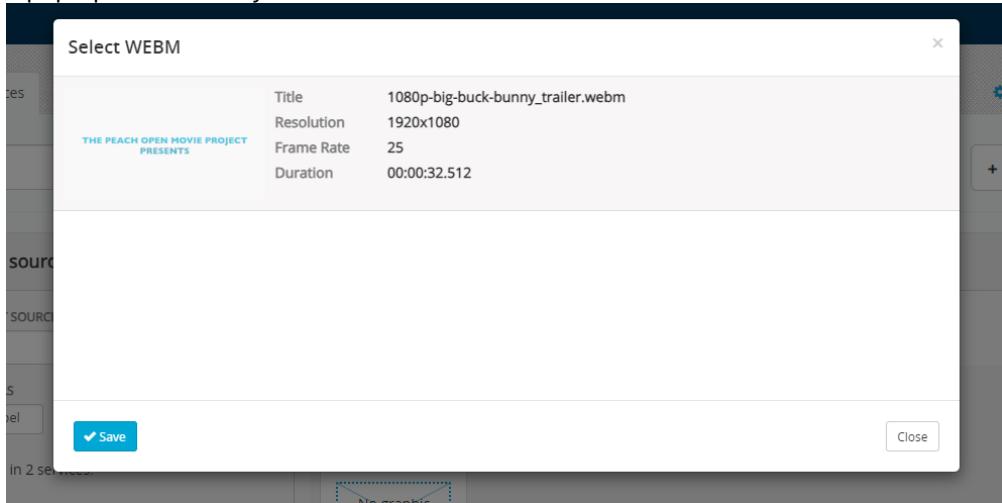
4. Turn "On" the **Display a Video Slate** toggle.

The screenshot shows the 'Edit source' dialog for an 'ip' source. In the 'INPUT SOURCE NAME' field, 'ip' is entered. Under 'LABELS', there is a '+ Label' button. The 'DISPLAY A VIDEO SLATE' section has a toggle switch labeled 'ON' which is highlighted with a red box. Below it, there is a 'SIGNAL LOST WEBM' checkbox with a checked state, and a preview window showing 'No graphic preview'. The 'INSERTION SETTINGS' section has a 'OFF' button. At the bottom, there are 'Delete', 'Save', and 'Revert' buttons, and a 'Close' button on the right.

5. Select the WebM file by clicking the button as follows.

This screenshot is identical to the previous one, showing the 'Edit source' dialog for source 'ip'. The 'DISPLAY A VIDEO SLATE' toggle is still set to 'ON'. However, a red arrow points to the edit icon (pencil symbol) located next to the 'SIGNAL LOST WEBM' checkbox, indicating where the user should click to select a WebM file.

6. A pop-up window lets you select the desired WebM file. Click the **Save** button after the selection.



7. Save the source if ready.

Configuring insertion threshold settings for signal loss slate

The signal loss slate period can be configured to delay the signal loss slate period, as well as the recovery from the signal loss slate, and have a longer tolerance of signal loss issues before displaying the signal loss slate.

This applies to static or video signal loss slate.

1. Navigate to **Configure Channels** app > **Sources** tab > **Inputs**.
2. Configure a static or video signal loss slate.

3. Turn "ON" the **Insertion Settings** toggle.

4. Configuring the insertion settings will delay slate insertion by counting erroneous/error-free windows for the source.

- a. **Insertion Threshold:** A counter counts the number of 5-second windows with input errors (signal loss, video missing, scrambled PID). When this counter reaches this value, the slate is inserted.
- b. **Reset Threshold:** When the number of consecutive 5-second windows without error reaches this value, the counter of erroneous windows is reset.
- c. **Revert Threshold:** A slate is removed when the number of consecutive 5-second windows without error reaches this value.

Configuring a Destination

! Note

To create a destination used in an **MPTS output**, refer to [Configuring a multiplexer and its services \(MPTS\)](#).

To add a destination, click **+ Destination**:

Add destination

DESTINATION NAME <input type="text" value="Harmonic-7"/>	OUTPUTS Primary IP <input type="button" value="+"/> IP ADDRESS <input type="text" value="e.g., 226.1.1.1"/> PORT <input type="text" value="e.g., 80"/> SOURCE IP ADDRESS <input type="text" value="e.g., 226.1.1.1"/> PORT <input type="text" value="e.g., 80"/> RANK <input type="button" value="Primary"/> STATUS <input type="button" value="Mandatory"/> <input type="checkbox"/> OUTPUT MONITOR <input type="button" value="Remove output"/>
<input type="button" value="Cancel"/> <input checked="" type="button" value="Create"/>	

⚠ Note

When adding a destination, automatically the **Broadcast** type is proposed with **IP** output by default. You can remove it or keep it according to the type of destination chosen.

For any destination added, the operator has to:

- define a **Destination Name** that appears in the destination list
- select the **Type** of destination
- select the **Profile** of the destination if required
- add and set the **Output** accordingly
- optionally, enter the **Label** associated with the destination by clicking **+ Label**

✔ Tip

The label can help the operator search and find a destination more quickly.

For more details and according to the destination type, refer to:

Destination Type	References
Broadcast	Configuring the broadcast service destination
Origin/CDN	Configuring a multiscreen packaging-only service or Configuring a multiscreen encoding service with packaging
ATS	Configuring the multiscreen ATS destination

Destination Type	References
MPTS	No longer used. Refer to configuring a multiplexer and its services.
2022-6	Not used.
2110	Not used. Refer to configuring a decoder.

Configuring a broadcast encoding service

XOS allows to create several types of Broadcast services as follow:

- Single CBR service in a SPTS.
- CBR service multiplexed with other services in a MPTS.
- VBR service multiplexed with other services in a MPTS (Statistical Multiplexing).

Configuring an IPTV service (SPTS output)

Broadcast encoding services are TV services compressed locally and delivered as transport streams over IP. They can be delivered in SPTS or they can be multiplexed with other services in MPTS. Operators receive uncompressed (SDI - SMPTE 2022-6 - SMPTE 2110) or compressed streams from content providers via satellite, terrestrial broadcast, and IP circuits.

 **Note**

In this release, ATSC-3.0 services can be either configured:

- as multiscreen services with a packaged output
- as broadcast services in an MPTS output.

When they are configured as broadcast services, the MPTS output has to be loopback to a DASH packaging service and the encoding profile has to be compatible with multiscreen encoding i.e. Closed Fixed GOP.

These incoming video services are groomed and transcoded by XOS for delivery to set-top boxes in UHD, HD, and SD and connected devices.

To configure a Broadcast service, complete the following tasks:

1. Configuring the source input
2. Configuring the service destination
3. Creating and activating the service

The Transport Streams can contain the following codecs:

- Video: MPEG-2, AVC and HEVC
- Audio: MPEG-1 Layer 2, AAC, and Dolby

Configuring the broadcast service destination

Once the **Broadcast** destination type and profile IPTV have been selected (for details, refer to [Configuring a Destination](#)):

1. Add output, **IP** or **SRT**.
2. Set the parameters accordingly.
3. Click **Create** to add and save the new destination.

- o With IP output:

Add destination

DESTINATION NAME <input type="text" value="Harmonic"/>	OUTPUTS Primary IP <input type="button" value="+"/>
TYPE <input type="text" value="Broadcast"/>	IP ADDRESS <input type="text" value="224.200.10.10"/> NETWORK <input type="text" value="GbE 07(192.168.112.2..."/> PORT <input type="text" value="80"/>
PROFILE <input type="text" value="IPTV Destination v.1"/>	SOURCE IP ADDRESS <input type="text" value="192.168.10.1"/> PORT <input type="text" value="80"/>
<input type="button" value="Lab Wizard"/>	RANK <input type="text" value="Primary"/> STATUS <input type="text" value="Mandatory"/>
LABELS <input type="button" value="+ Label"/>	<input type="checkbox" value="OUTPUT MONITOR"/> <input type="button" value="Remove output"/>
<input type="button" value="Cancel"/> <input type="button" value="Create"/>	

- With SRT output:

Add destination

DESTINATION NAME <input type="text" value="e.g., LimeLight"/>	OUTPUTS Primary SRT <input type="button" value="+"/>		
TYPE <input type="text" value="Broadcast"/>	IP ADDRESS <input type="text" value="e.g., www.example.com or 192.168.1.1"/>	NETWORK <input type="text" value="e.g., 192.168.0.0"/>	PORT <input type="text" value="e.g., 80"/>
PROFILE <input type="text" value="IPTV Destination v.1"/>	RANK <input type="text" value="Primary"/>	STATUS <input type="text" value="Mandatory"/>	
STREAM ID <input type="text"/>			
CONNECTION MODE <input checked="" type="radio"/> CALLER			
SRT SETTINGS <input checked="" type="radio"/> CUSTOM			
ENCRYPTION TYPE <input type="text" value="Select encryption type"/>			
CHANNEL NAME <input type="text"/>			
BANDWIDTH OVERHEAD (%) <input type="text" value="25"/>			
LATENCY (MS) <input type="text" value="1000"/>			
TIMEOUT (MS) <input type="text" value="10000"/>			
<input type="checkbox"/> BLOCKING MODE			
<input type="button" value="Remove output"/>			

Encryption Type	Choose an encryption standard, or select None .
Channel Name	Enter a channel name that will also be used in the receiver configuration.
Bandwidth Overhead (%)	The Bandwidth Overhead is the percentage of the Average Bandwidth used to accommodate SRT controls. The default value is 20%.
Latency (ms)	Sending packets over a (usually unpredictable) network could result in time delay. SRT Latency is a fixed value (min. 0 ms, no max. value) representing the maximum buffer size available for managing SRT packets. The default value is 1000 ms.

Timeout (ms)	Connection timeout, in milliseconds. The default value is 10000 ms.
Blocking Mode	When blocking mode is enabled, the SRT function will not exit until the availability condition is satisfied. In non-blocking mode the SRT function always exits immediately, and in case of lack of resource availability, it returns an error with appropriate code.

 **Note**

SRT for SPTS outputs (Caller Mode) can be configured to use a specific Network interface. A **Stream ID** can be customized to be inserted into the outgoing SRT streams.

Creating and activating a broadcast service

Broadcast services usually use an IPTV transcoding profile and IPTV destination for CBR SPTS.

IPTV services could also use a multiscreen transcoding profile with an ATS destination.

1. From the **Services** page, click **+ Service**.

Result: The **Create Service** wizard opens.

2. On the **Profile** tab, select the transcoding profile the service will use, and then click **Next**.



Note

Review default profiles from the LabWizard before using them and modify them eventually.

For ATSC application please verify that you set the **Set Top Box mode** to **ATSC 1.0**. (See [IPTV profiles parameters](#))

3. On the **Source** tab, select the name of the primary source, and optionally, an alternate source, and then click **Next**.
4. On the **Destination** tab, select the name of the destination from the **Destination** drop-down list and then click **Next**.
5. If necessary, on the **Commit** tab, for **Program Number**, type a program number for the video channel.
6. In the **Input Source Name** field, enter the name of the new source.
7. Keep the **Redundancy** setting as Off as this is not available on XOS.
8. Optionally, turn on the **Input Tracking** toggle. Input Tracking automatically follows changes such as Video/ Audio/Subtitle/SCTE-35 PID changes in a groomed source.
9. Optionally, turn on the **Dynamic Program** toggle. Dynamic Program detects disappearance/reappearance of components and reflects changes in outgoing stream.
10. Optionally, turn on the **Geo Redundancy** toggle. (This is only applicable to Multiscreen services)
11. Optionally, change **Timecode Generation** from **Disabled** to **UTC** after changing the **Daily Sync Time (UTC hour)** under the Settings>Advanced tab.
12. Optionally, turn on the **Sync Loss Detection Threshold** toggle and configure a delay before switching when doing 2022-6 source redundancy (no 2022-7) when the input stream gets sync-loss errors.
13. Select **Active** if you want the service to go online when you commit to the new service.
14. Configure service add-ons as required by the channel. For more information, see [Configuring service add-ons](#).

15. When you have finalized the service settings, click **Commit**.

Configuring a multiplexer and its services (MPTS output)

To create an MPTS output, use the **Configure Broadcast** app.

For ATSC multiplexers, if you use an external PSIP injector or fetch program guide data to build EIT/ETT, you may need to declare it first. (To do so, refer to [Customizing global settings](#) for the PSIP details.)

The following MPTS profiles are available for the multiplexer:

- ATSC 1.0 (no PSIP) MPTS
- ATSC 1.0 (no PSIP) MPTS - first program is 3
- ATSC 1.0 MPTS
- ATSC 1.0 MPTS - first program is 3
- DVB MPTS
- DVB-SIS DSA
- DVB DTT MPTS

⚠ Create Sources in Configure Broadcast

The IP, SDI, ASI, SRT, and HSP/HLS input sources need to be created directly from the **Configure Broadcast** app.

The input sources RF, already created with the **Configure Channels** app, appears automatically in the Sources pane on the left.

Creating an IP input source

Click **+Source** and select IP to create an IP source:

Setting tab

Source information:

- Define an input source name that will appear on the Configure Broadcast view.
- Configure the standard for the type of signaling in the source: DVB or ATSC.

⚠ Note

Selecting ATSC enables incoming PSIP analysis. Major channel and minor channel numbers are displayed and PSIP EIT remultiplexing is then possible.

- Define the maximum number of programs authorized from this input.

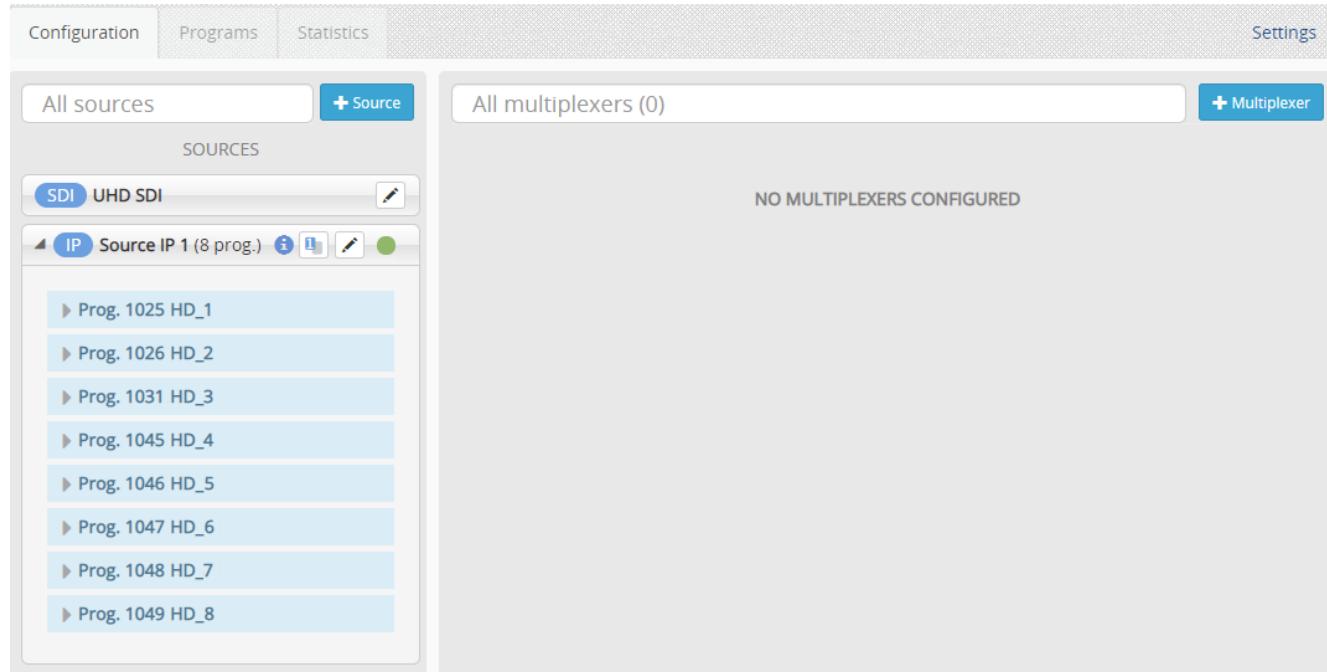
Input:

- Set the network IP parameters that allow the XOS to retrieve the IP source and its associated programs.
- High Jitter settings. Options are:
 - OFF (default) - Threshold for lost input is 180ms
 - ON - threshold for lost input is 880ms
- Set the Sync Loss Detection Threshold (applicable for services with 2022-6 source). Range 0 to 60 seconds. Default 0 seconds.
- If Redundancy is used for the source, set the network IP parameters that allow the XOS to retrieve the backup IP source.
 - Configure the Redundancy Mode with the possible values: "Auto/Revert on Backup Failure" (default), and "Manual".
 - Set the Failover Settings:
 - Global - Default settings are defined in Configure Channel → Settings → Advanced
 - Custom - Continuity Counter Error and Scrambled Video PID can be selected
- If ST 2022-7 is used for the source, set the network IP parameters to perform hitless input redundancy with TS over IP inputs based on ST 2022-7.

Note

You can enter any valid Path Differential value in the range of 50 ms to 450 ms. 50 ms will be the default value.

Click **+Create**, the source appears on the left panel:



Click on a program to display its associated components:

If source redundancy is being used with "Manual" mode selected, the icon (Input 1) appears and allows you to manually switch from one source to the other with the icon (Input 2) appearing.

The statistics related to TS over IP sources are now displayed for input monitoring by clicking the icon.

Descrambling tab

Note

You can configure descrambling for decoding services through the Descrambling tab. Refer to the [Configuring descrambling](#) page for details.

Creating an SDI input source

Click **+Source** and select SDI to create an SDI source:

Source Information:

- Define an input source name that will appear on the Configure Broadcast view.
- optionally, enter the **Label** associated with the SDI source.



Tip

The Label can help the operator search and find a source more quickly. Several Labels can be defined.

Inputs:

- Set the Video, Audio, Caption, and Data parameters of the incoming source. Refer to [SDI source](#) for details.

Click **+Create**, the source appears on the left panel.

The screenshot shows the XOS interface with two main panels: 'Sources' and 'Multiplexers'.

Sources Panel: This panel lists available sources. It includes a search bar ('All sources') and a button ('+ Source'). Below this, there are two categories: 'SDI' (selected) and 'IP'. Under 'SDI', there is one entry labeled 'HD-SDI'. Under 'IP', there are six entries labeled 'IP (6 prog.)'. Each entry has a green circular icon next to it.

Multiplexers Panel: This panel lists available multiplexers. It includes a search bar ('All multiplexers (12)') and a button ('+ Multiplexer'). Below this, there are four entries: 'IP out SPTS fr...', 'Mux1', 'SRT out 01', and 'SRT out 02'. Each entry shows its program count, transport type (e.g., UDP or SRT), IP address, port, and bandwidth (e.g., 10.0 Mbps, 20.0 Mbps, 15.0 Mbps). Each entry also has edit and delete icons.

Note

With the Dektec (ASI/SDI) card used, XOS supports sharing the same SDI source between encoding channels in broadcast & OTT. Multiple broadcast services and OTT services can be created from one SDI source.

SDI Status and Resolution:

- The LED is Red when the port does not exist on the device. The tooltip shows "The port does not exist on the device".
- The LED is Grey when the port usage is not SDI in. The tooltip shows its current usage, for example, "The port is unused", or "The port is used as ASI output".
- The LED is Green when the port is SDI in and locked, and the resolution and framerate are the same as in the source configuration.
- The LED is Orange when the port is SDI in, locked, and the resolution or framerate is not the same as in the source configuration. The tooltip shows this mismatch, for example: "Format mismatch: input signal 1080i25 while 720p50 is configured".
- The LED is Red when the port is SDI in and unlocked. The tooltip shows "Signal loss".

Creating an ASI input source

Click **+Source** and select ASI to create an ASI source:

ADD ASI SOURCE

Settings	Descrambling
SOURCE INFORMATION	
INPUT SOURCE NAME e.g. CNN	INPUT CARD PORT 1 1
STANDARD DVB	
MAXIMUM NUMBER OF PROGRAMS 10	
<input type="button" value="Create"/> <input type="button" value="Cancel"/>	

Settings tab

Source Information:

- Define an input source name that will appear on the Configure Broadcast view.
- Configure the standard for the type of signaling in the source: DVB or ATSC.

⚠ Note

Selecting ATSC enables incoming PSIP analysis. Major channel and minor channel numbers are displayed and PSIP EIT remultiplexing is then possible.

- Define the maximum number of programs that will be present on that source.

Inputs:

- Select the ASI card for this source (up to 3 cards can be placed in the chassis).

⚠ Note

On XOS M/L/XL, cards are numbered from left slot to right slot from rear view.

- Select the port on the ASI card for this source (up to 8 ports per card).

Click **+Create**, the source appears on the left panel.

× Warning

ASI interfaces can be Input or Output. It is up to the responsibility of the operator to make sure that the cabling is consistent with the declaration of the ASI sources.

Descrambling tab

! Note

You can configure descrambling for decoding services through the Descrambling tab. Refer to the [Configuring descrambling page](#) for details.

Creating an SRT source

Click **+Source** and select SRT to create an SRT source:

ADD SRT SOURCE

Settings **Descrambling**

SOURCE INFORMATION

INPUT

IP ADDRESS	PORT	NETWORK
e.g. 192.168.1.1 or www.example.com	e.g. 80	Nothing selected

STANDARD

DVB

MAXIMUM NUMBER OF PROGRAMS

10

HIGH JITTER

OFF

SYNC LOSS DETECTION THRESHOLD

Custom 0.2 s

ENABLE REDUNDANCY

None Redundancy

IP ADDRESS	PORT	NETWORK
e.g. 192.168.1.1 or www.example.com	e.g. 80	Nothing selected

LATENCY

1000 DECRYPTION TYPE

None

FAILOVER SETTINGS

Global

Continuity Counter Error
 Scrambled Video Pid

Create **Cancel**

Settings tab

Source information:

- Define an input source name that will appear on the Configure Broadcast view.
- Configure the standard for the type of signaling in the source: DVB or ATSC.

Note

Selecting ATSC enables incoming PSIP analysis. Major channel and minor channel numbers are displayed and PSIP EIT remultiplexing is then possible.

- Define the maximum number of programs authorized from this input.

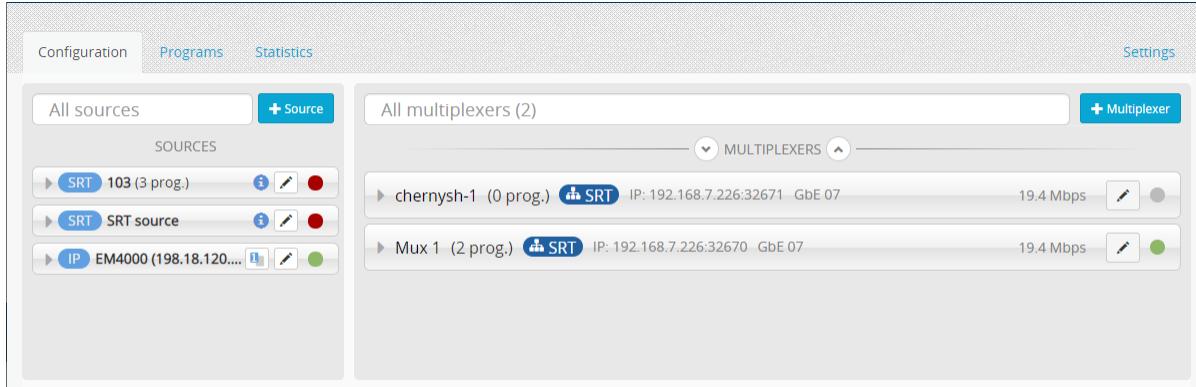
Input:

- Set the network IP parameters that will allow the XOS to retrieve the SRT source and its associated programs.
- (Optional) Set High Jitter to **ON**.
- Set the Sync Loss Detection Threshold (Default is 0.2 seconds)
- If source redundancy is used, set the network IP parameters that will allow the XOS to retrieve the backup SRT source.
 - Set the Failover Settings:
 - Global - Default settings are defined in Configure Channel → Settings → Advanced
 - Custom - Continuity Counter Error and Scrambled Video PID can be selected
- If ST 2022-7 redundancy is selected, configure the network IP parameters allowing XOS to retrieve the backup SRT stream to perform hitless input redundancy based on ST 2022-7.

Note

The range for the ST 2022-7 Delay Buffer is 0 to 200 ms, with a default value of 50 ms.

Click **+Create**, the source appears on the left panel.

**Descrambling tab****Note**

You can configure descrambling for decoding services through the Descrambling tab. Refer to the [Configuring descrambling](#) page for details.

Creating an HSP source

HSP source support has restrictions in this release: **Harmonic/HSP (for HLS from VOS360)**, HLS v3 single profile, and no late audio binding.

Click **+Source** and select IP to create an HSP source:

Setting tab

Source information:

- Define an input source name that will appear on the Configure Broadcast view.
- Configure the standard for the type of signaling in the source: DVB or ATSC.

Note

Selecting ATSC enables incoming PSIP analysis. Major channel and minor channel numbers are displayed and PSIP EIT remultiplexing is then possible.

- Define the maximum number of programs authorized from this input.

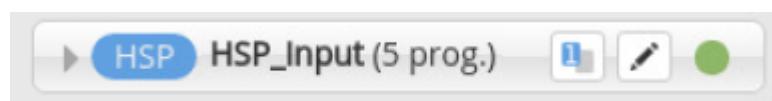
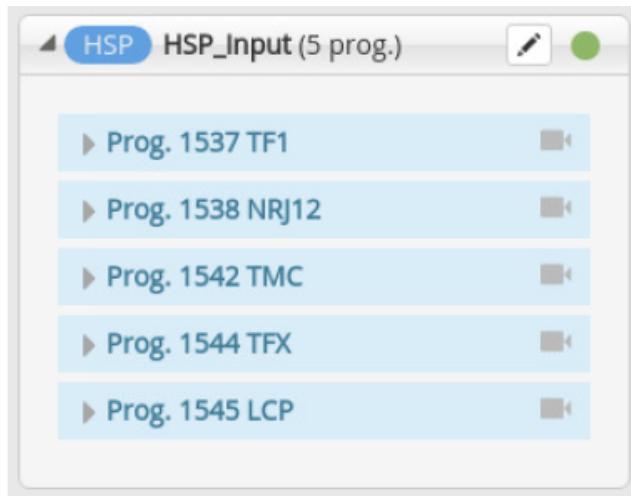
Input:

1. Specify the **Endpoint URL** to pull the source content from (Pull mode).
2. (Optional) If unauthorized access is not allowed to read the HSP input, configure the primary **Authentication Passphrase** (the authentication passphrase will be encrypted). If not, keep the configuration empty.
3. (Optional) Set the **Input Buffer Size** in 2 to 60 seconds. The HSP buffer reception can be configured to deal with short latency applications or to match network performance.
 - If not specified, the input will buffer 2 segments by default (Auto).

- If the configured input buffer size is smaller than the 2-segment duration, the input will buffer 2 segments as it is the minimum requirement.
- If the configured input buffer size is not a multiple of segment duration, the input buffer size will be rounded up to the duration of the smallest number of segments larger than the input buffer size.

4. If **Enable Redundancy** is turned on, configure the parameters for the backup: Endpoint URL, Network, Authentication Passphrase, Input Buffer Size.
5. Set the **Redundancy Mode**: "Auto / Revert on backup failure", "Manual".
6. In case source Redundancy mode is configured with "Redundancy mode" - "Auto / Revert on backup failure":
 - The toggle "Failover settings" is visible and set to "Global" by default. "Global" Failover settings are defined under Configured Channels → Settings → Advanced.
 - The "Scrambled Video Pid" and "Continuity Counter Error" trigger can be set if failover settings are custom. These triggers are in read-only if the failover settings are Global.

Click **+Create**, the source appears on the left panel.



If HSP source redundancy is being used with "Manual" mode selected, the icon (Input 1) appears and allows you to manually switch from one source to the other with the icon (Input 2) appearing.

When clicking on the Switch Source icon, this action will switch to the secondary source:



Descrambling tab

! Note

You can configure descrambling for decoding services through the Descrambling tab. Refer to the [Configuring descrambling page](#) for details.

Creating an 8VSB source

Click **+Source** and select **8VSB** to create an RF 8VSB source:

ADD RF 8VSB SOURCE

Settings **Descrambling**

SOURCE INFORMATION

INPUT SOURCE NAME
e.g. CNN

STANDARD
ATSC

MAXIMUM NUMBER OF PROGRAMS
10

INPUT

TUNER
Select value...

CHANNEL
2...51

Create **Cancel**

Setting tab

Source information:

- Define an input source name that will appear on the Configure Broadcast view.
- The supported standard for the RF 8VSB source is ATSC.
- Define the maximum number of programs authorized from this input.

Input:

- Configure Broadcast can be outfitted by an ASTC-8VSB card with 12 RF inputs.
- Select from the **Tuner** drop-down for the RF input with the ASTC-8VSB card type.

- Configure the **Channel** with a value ranging from 2 to 51 for ATSC digital television broadcasting.

Click **+Create**, the source appears on the left panel.

Descrambling tab

Note

You can configure descrambling for decoding services through the **Descrambling** tab. Refer to the [Configuring descrambling page](#) for details.

Creating a S2X source

Click **+Source** and select **S2X** to create an RF S2X source:

Setting tab

Source information:

- Define an input source name that will appear on the Configure Broadcast view.
- The supported standard for the RF S2X source is DVB.
- Define the maximum number of programs authorized from this input.

Input:

- Configure Broadcast can be outfitted by a DVB-S2X card with 4 RF inputs.
- Select from the **Tuner** drop-down for the RF input with the DVB-S2X card type.
- Configure the associated demodulation parameters for the DVB digital television broadcasting.

Click **+Create**, the source appears on the left panel.

Descrambling tab

 **Note**

You can configure descrambling for decoding services through the Descrambling tab. Refer to the [Configuring descrambling page](#) for details.

Adding and configuring a multiplexer

You can add a multiplexer to create mux services with MPTS output.

1. From the **Configure Broadcast** app, navigate to the **Configuration** tab.
2. From the right pane, click the **+Multiplexer** button to add the new multiplexer settings.

o DVB Multiplexer

ADD MULTIPLEXER

Settings **DVB SI**

GENERAL

NAME: Mux 1

PROFILE: DVB MPTS

TS BITRATE: 45

VBR

MULTIPLE POOLS

POOL NAME	ENABLE	BITRATE	LATENCY
pool 1	<input checked="" type="checkbox"/>	20 Mbps	Default
pool 2	<input checked="" type="checkbox"/>	10 Mbps	Default
pool 3	<input checked="" type="checkbox"/>	15 Mbps	Default

TS ID: 0 ON ID: 0

PSIP GENERATOR: None

UNREFERENCED PIDS
 MULTIPLEXER 1+1 REDUNDANCY
 SCRAMBLING

DESTINATION

PROFILE: MUX Destination

OUTPUTS

IP **+**

MAIN SERVICE OUTPUT

IP ADDRESS: e.g. 192.168.1.1 PORT: e.g. 43 NETWORK: Nothing selected

SOURCE IP ADDRESS: e.g. 192.168.1.1 PORT: e.g. 43

X Remove output

STATUS: **OFF**

+ Create **Cancel**

o **ATSC Multiplexer**

The screenshot shows the 'ADD MULTIPLEXER' dialog box. It has two tabs at the top: 'Settings' (selected) and 'PSIP'. The 'GENERAL' section contains fields for 'NAME' (Mux 2), 'PROFILE' (ATSC 1.0 MPTS), and 'TS BITRATE' (19.392658). A 'VBR' button is selected. The 'MULTIPLE POOLS' section contains three entries: 'pool 1' (Enable checked, Bitrate 20 Mbps, Latency Default), 'pool 2' (Enable checked, Bitrate 10 Mbps, Latency Default), and 'pool 3' (Enable checked, Bitrate 15 Mbps, Latency Default). Below these are fields for 'TS ID' (0), 'PSIP GENERATOR' (None), and checkboxes for 'UNREFERENCED PIDS', 'MULTIPLEXER 1+1 REDUNDANCY', and 'SCRAMBLING'. The 'DESTINATION' section shows 'PROFILE' set to 'ATSC 1.0 MUX Destination'. The 'OUTPUTS' section has an 'IP' button selected and a '+' button. The 'MAIN SERVICE OUTPUT' section includes fields for 'IP ADDRESS' (e.g. 192.168.1.1), 'PORT' (e.g. 42), 'NETWORK' (Nothing selected), and a 'MUTE' checkbox. A red 'Remove output' button is present. At the bottom are 'STATUS' buttons ('OFF') and 'Create'/'Cancel' buttons.

3. Set the General parameters:

- o **Name:** Name of the multiplexer that will appear in the configuration tab.
- o **Profile:** Select the appropriate multiplexer profile. (See note below about ATSC profiles)
- o **TS Bitrate:** Click the edit button to change, if necessary, the Pool Bitrate defined on the profile.
- o **VBR / CBR:** Click VBR to switch to CBR.
- o **Multiple Pools:** Up to three pools can be declared in the same mux when setting up a TV service. You can select among the declared pools with the desired latency time configured for the video stream output. The possible options for Latency: Low, Reduced, Default.
- o **TS ID / ON ID:** Set the Transport Stream identifier and the Original Network identifier if required.
- o **PSIP Generator:** PSIP Generator to get Full ATSC PSIP tables or PSIP EIT Tables (PSIP Fetch use case)

Note

This field is only visible when a PSIP Generator has been previously created (refer to [Customizing global settings](#)).

- **Unreferenced PIDs:** Check the box to allow adding an unreferenced PID (ghost component) to the outside of the service in the multiplexer.

Info

If the MPTS (No PSIP) profile is configured, the **Unreferenced PIDS/Local Programs** checkbox will be displayed for creating a local program. (Refer to [Creating a local program](#) for details.)

- **Multiplexer 1+1 Redundancy:** This setting does not apply to XOS.
- **Scrambling:** This setting enables the scrambling feature of the multiplexer.

Note

Regardless of the profile chosen, the parameters are almost identical.

4. Set the Destination parameters:

- **Profile:** Select the appropriate destination profile
- **Outputs:** By default, IP output is proposed:
 - Add another output (IP or ASI) by clicking on the +button.
 - Remove the default one and then add the SRT output with associated configurations. The SRT Connection Mode has the Caller Mode and Listener mode available.
- **IP Address / Network / Port:** set the destination IP parameters and select a port to egress.
- **Source IP Address / Port:** set the source IP parameters for IGMPv3.
- **Monitoring Clear Output:** (Only available when Scrambling is selected) changes the output to clear.

5. By default, the new multiplexer is set to OFF. To activate it, set the Status to **ON**.

6. Click **+Create**.

About DVB SI tables:

The following tables and settings are available on the DVB SI tab:

Table	Table Mode	Input	Input PID
NIT	<ul style="list-style-type: none"> • None • Pass-through 	Select from list	Insert ID
TDT	<ul style="list-style-type: none"> • None • Pass-through 	Select from list	Insert ID
TOT	Linked to TDT	n/a	n/a

ADD MULTIPLEXER

Settings	DVB SI
NIT	
NIT MODE	<input type="button" value="None"/>
TDT	
TDT MODE	<input type="button" value="None"/>
TOT	
TOT MODE	<input type="button" value="None"/>
STATUS <input checked="" type="button" value="ON"/> <input type="button" value="Create"/> <input type="button" value="Cancel"/>	

About ATSC profiles:

These profiles apply a default PID numbering on the program number starting from 1 or from 3.

First service (program number 1 or 3):

- PMT PID 0x030 (hex)
- Video PID 0x031
- Primary audio PID 0x034
- Secondary audio PID (SAP and or descriptive) 0x035
- Additional audio services on PIDs 0x036, 0x037, 0x038 0x039

Second service (program number 2 or 4):

- PMT PID is 0x040 (hex)
- Video PID is 0x041
- Audio 1 PID is 0x044
- Audio 2 PID is 0x045 etc.

This pattern continues for all remaining *channels*.

When the selected ATSC profile is "ATSC 1.0 MPTS" or "ATSC 1.0 MPTS-first program is 3", then the PSIP is locally generated by the XOS and a 'PSIP' page is available:

i PSIP Configurations on Multiplexer

EIT/ETT Depth: The PSIP fetch supports up to 48 hours of program guide data (EIT/ETT Depth).

EIT/ETT PIDs: You can customize the Repetition rates for some EIT/ETT PIDs.

For the **EIT/ETT Repetition Period** configurations, the **EIT-1 Repetition Period** is recommended to be less than 3 seconds. It is recommended to set the value as 2.8 seconds for optimal performance and accuracy.

The ETT-0 parameter for the first 3 hours can be set.

ADD MULTIPLEXER

Settings **Sources** **PSIP**

Timezone	US/Pacific (GMT-07:00)
VCT	Terrestrial
EIT DEPTH	12 Hours
ETT DEPTH	12 Hours
EIT PIDS *	5000 [5000, 5003]
ETT PIDS	5100 [5100, 5103]

EIT / ETT REPETITION PERIOD

EIT-0 *	0.5 s
EIT-1 *	3 s
EIT-2 *	60 s
EIT-3 *	60 s
ETT-0 *	60 s
OTHER ETT *	60 s

STATUS **ON** **Save** **Cancel** **Delete**

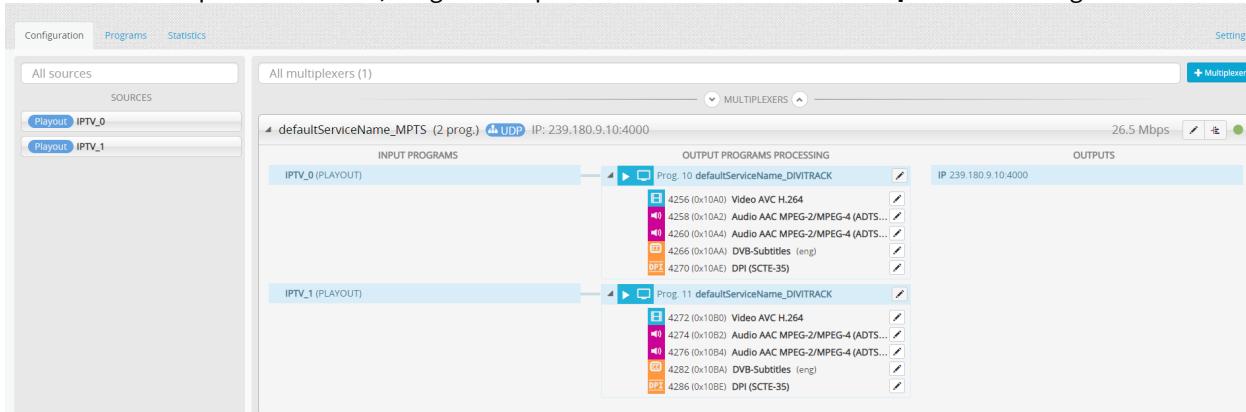
Hovering above the Timezone field will display the Local Time and the Daylight saving settings.

To declare and configure an external PSIP generator please refer to the section [Customizing global settings](#).

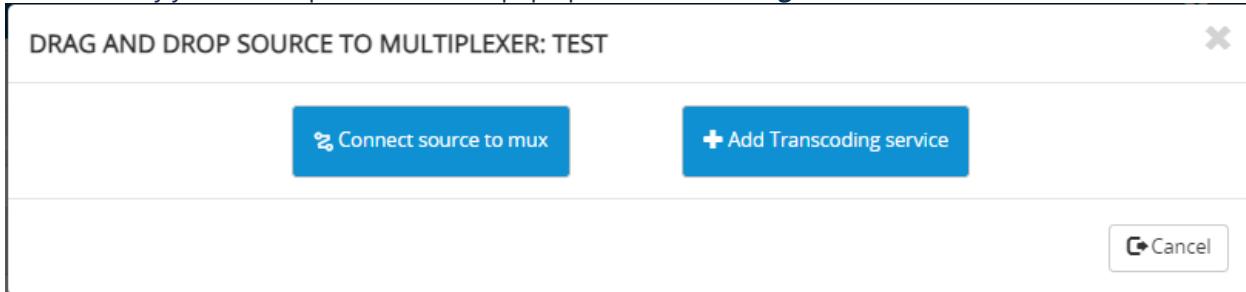
Adding transcoding services to the multiplexer

You can add transcoding services to the multiplexer that you have created in the Configure Broadcast app.

- From the **Source** panel on the left, drag and drop the source to the desired **Multiplexer** on the right.



2. Select the way you want to process from the pop-up: **Add Transcoding service**



3. The “Add Transcoding Service to Multiplexer” window pops up.

4. From the **Source** tab, set the parameters as follows.

- **Primary:** This refers to the primary source to be used for the transcoding service.
- **Secondary:** This refers to the secondary source to be used for the transcoding service.

5. From the **Transcoding** tab, choose the **Transcoding** and **Destination** profiles.

ADD TRANSCODING SERVICE TO MULTIPLEXER PoolSource-pool-DVB MPTS 20M maxSource6-m1 VBR X

Source **Transcoding** **Remapping** **Descriptors**

PROCESS NAME: ip

PROGRAM NUMBER: Enter transcoding program number

TRANSCODING PROFILE: Select a transcoding profile

Show profile ⊕ Update profile

DESTINATION PROFILE: Select a destination profile

VBR MODE: ON

MIN BITRATE: Enter minimum bitrate (VBR) Mbps

MAX BITRATE: Enter maximum bitrate (VBR) Mbps

PRIORITY: MEDIUM

INPUT TRACKING: OFF

ADDONS

LOGO: Off Configure	GRAPHICS: Off Configure
VIDEO INSERTION: Off Configure	

Stopped Off-air **On-air** Save Cancel

- **Process Name** and **Program Number** can be remapped.
- Choose the **Destination Profile**. **Destination Profile** can be modified once the service is created, this requires a restart of the service.
- Choose the bitrate mode **VBR** (ON) or **CBR** (OFF).
- Define the video **bitrate** according to bitrate mode.
- Addons: set it to ON to enable insertion of Logo / Graphics / Video.

6. From the **Remapping** tab, you may customize the configurations that can be remapped to the mux output.

- Optionally customize the **Program Name**, **Program Number**, **Program Type**, and **PMT PID**. If no changes are necessary, you can opt for the "Auto" configurations to retain the original input settings.
- Generate or pass through the **PMT Mode** based on the requirements of the system or workflow.
- When configuring an "ATSC-type" multiplexer, set the **Major Channel Number**, **Minor Channel Number**, and **Source ID** accordingly.

7. From the **Descriptors** tab, add any descriptor if required. Once added the descriptors can be re-ordered.

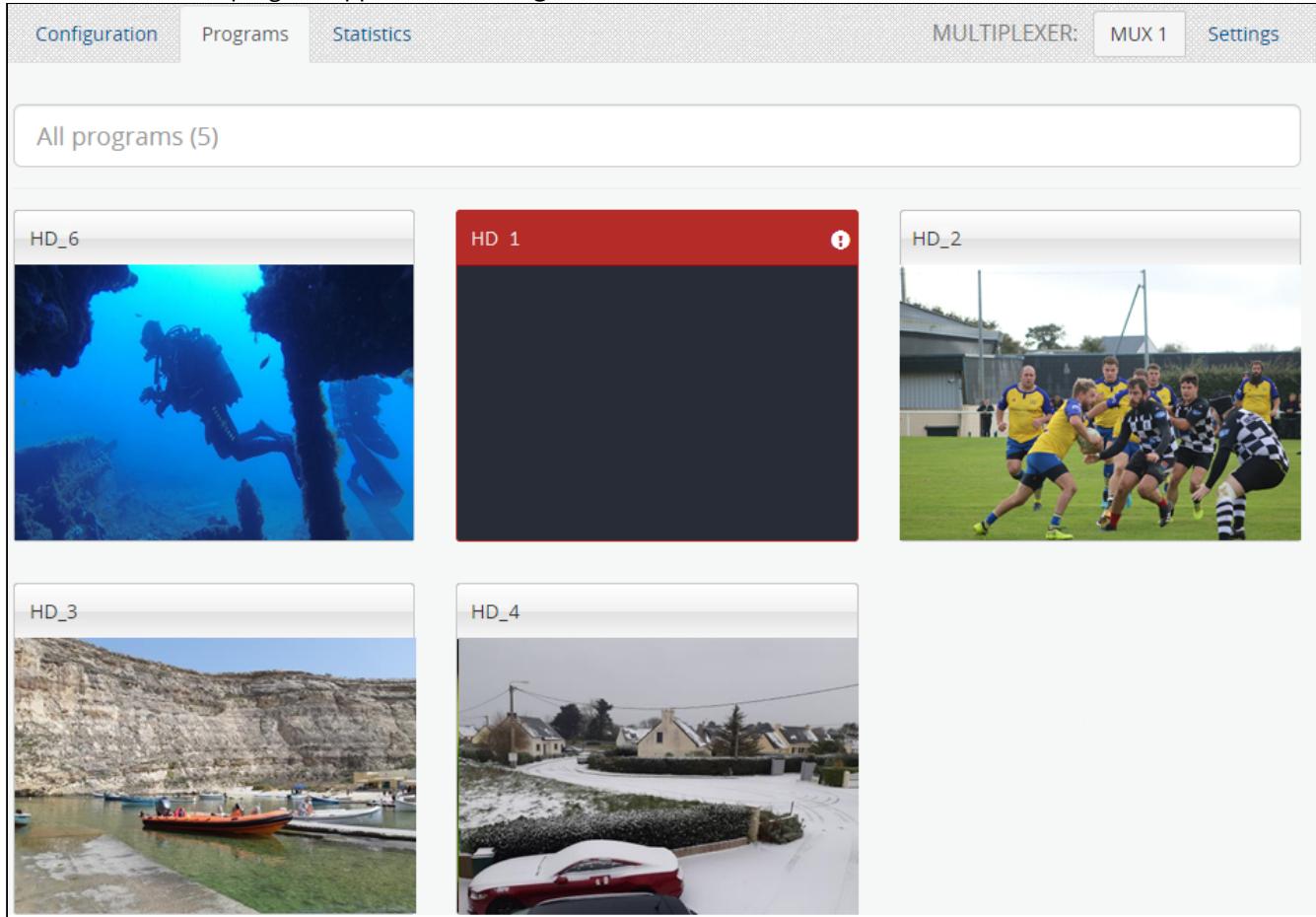
8. Configure the status of the transcoding service.

- a. **Stopped**: The transcoding service is not started. The mux monitoring does not consider the service as an input. This program is not present in the output of the mux.

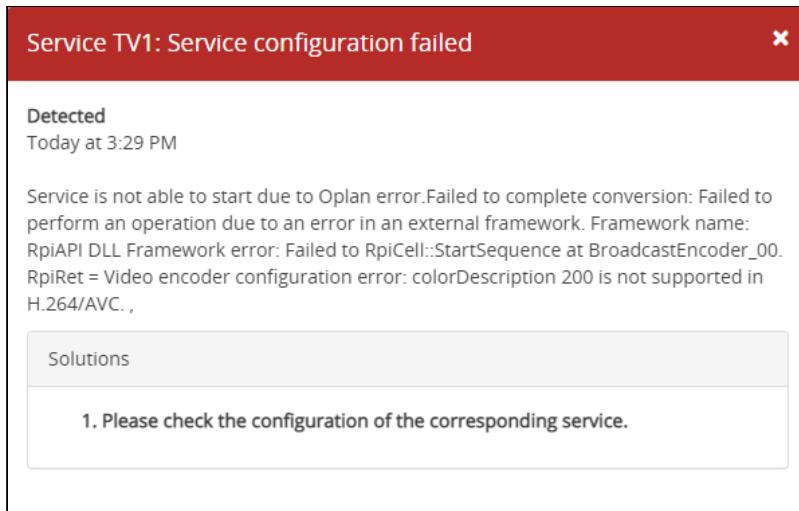
- b. **Off-air:** The transcoding service is started. The stream is sent to the mux but the service does not use any pool bandwidth. The mux monitoring provides information on this program. This program is not present in the output of the mux.
- c. **On-air:** The transcoding service is started. The mux monitoring provides information on this program. This program is present in the output of the mux.

9. Click **Save**.

A thumbnail of each program appears in the **Programs** tab.



If a service has an alarm, click the exclamation mark to show the notification.



Adding programs to the multiplexer

Repeat the procedure below as many times as you have programs to add to the multiplexer.

1. From the source panel, drag and drop a program to multiplexer on the right.

2. Select the way you want to process the program: **Transcoding** or **Pass through**

3. (Optional) Click the **Transcoding**.

- From the **Source** tab, set the general parameters.

ADD TRANSCODING SERVICE TO MULTIPLEXER MUX-DVB VBR ×

<input type="button" value="Source"/> <input type="button" value="Transcoding"/> <input type="button" value="A/V settings"/> <input type="button" value="Remapping"/> <input type="button" value="Descriptors"/>	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> PRIMARY <p>NAME <input type="text" value="name1"/></p> <p>SOURCE <input type="button" value="input1"/></p> <p>PROGRAM NUMBER <input type="text" value="8"/></p> <p><input type="button" value="Connect"/> Found: Spts 8 : name1 <input type="button" value="▶"/></p> <p><input type="button" value="OK"/> <input type="button" value="Groom"/></p> </div> <div style="width: 45%;"> SECONDARY <p><input type="button" value="OFF"/></p> </div> </div> <p>SIGNAL LOSS SLATE <input type="button" value="OFF"/></p>	
<input type="button" value="Stopped"/> <input type="button" value="Off-air"/> <input type="button" value="On-air"/> <input type="button" value="Save"/> <input type="button" value="Cancel"/>	

After a few seconds, the program is connected, and the user can change some parameters:

- Name:** The name can be changed.
- Source:** No change is allowed.
- Program Number:** No change is allowed.
- Connect:** Once the program is found the user can:
 - play the video by clicking the arrow button on the right, a thumbnail is displayed.
 - groom the video, audio, subtitle, captions and data services. To do so, refer to [Grooming a Source](#).
- Signal Loss Slate:** Set it to **ON** to add a slate picture in case of signal loss. To do so, refer to [Setting video overlays](#).
- Status:** By default, the Status is set to On-air.
 - Stopped:** The program is not transcoded and not broadcast at the output of the multiplexer.
 - Off-air:** The program is transcoded but not broadcast at the output of the multiplexer.
 - On-air:** The program is transcoded and broadcast at the output of the multiplexer.

i Info

Switching between Off-air status and On-air status allows to quickly remove or add a service in a mux since the program does not need to be started.

- From the **Transcoding** tab, choose the **Transcoding** and **Destination** profiles.

ADD TRANSCODING SERVICE TO MULTIPLEXER MUX-DVB **VBR**

Source **Transcoding** **A/V settings** **Remapping** **Descriptors**

PROCESS NAME

PROGRAM NUMBER

TRANSCODING PROFILE

DESTINATION PROFILE

VBR MODE **ON**

MIN BITRATE Mbps

MAX BITRATE Mbps

PRIORITY

INPUT TRACKING

TRANSCODER 1+1 REDUNDANCY

ADDONS

LOGO <input type="button" value="Off"/> <input type="button" value="Configure"/>	GRAPHICS <input type="button" value="Off"/> <input type="button" value="Configure"/>
VIDEO INSERTION <input type="button" value="Off"/> <input type="button" value="Configure"/>	BLACKOUT SLATE <input type="button" value="Off"/> <input type="button" value="Configure"/>

Stopped **Off-air** **On-air** **Save** **Cancel**

Info

- Service Name** and **Program Number** can be remapped.
- Choose the **Destination Profile**. **Destination Profile** can be modified once the service is created, this requires a restart of the service.
- Choose the bitrate mode **VBR** (ON) or **CBR** (OFF).
- Define the video **bitrate** according to bitrate mode.
- Define the **priority** for video in a statmux pool for videos in **VBR** mode.
- (Optional) **Stream Conditioning** is displayed and allowed to configure when the source contains an SCTE-35 component (TS source) or SCTE-104 component (Baseband source). Possible configuration values:
 - Auto: IDR insertion depends on the output SCTE-35 message.
 - On ESAM conditioninginfo: IDR is inserted on the reception of ConditioningInfo section through ESAM protocol.
 - None: IDR insertion is not triggered by the output SCTE-35 message.
- Enable **Input Tracking** to adapt to incoming PID changes in the source.

Input tracking allows automatic adaptation to changes in the source like PMT PID change, PCR PID change, Video PID change, Video Codec change, Audio PID change, Audio Codec change, Audio language change, Number of audio change, SCTE35 PID change, Number of SCTE35 change, DVB Subtitle PID change, DVB Subtitle language change, Number of DVB Subtitle change, Teletext PID change, Teletext language change, Number of Teletext change.

Tracking Rules (how to retrieve components when PID has changed inside a program) depend on:

- Component Type
- Language & codec for audio components
- Order in PMT when required

- **Transcoder 1+1 Redundancy:** This option is irrelevant to XOS.
- **Addons:** Set it to ON to enable insertion of Logo / Graphics / Video Insertion / EAS-NET / Blackout Slate / Nielsen Watermark / Caption insertion. To do so, refer to [Setting video overlays](#).

 **Note**

The Nielsen Watermark add-on is only visible when the transcoding profile has the Nielsen Insertion setting configured as "True" on audio tracks.

- From the **A/V settings** tab, select and change the properties which will override the values in the profile.

Note

The **Still Detection** toggle can be turned "ON" to reduce the bitrate when the input video is still and when slate insertion takes place. This is available for both VBR and CBR services. In "CBR" mode the **Still bitrate** is seamlessly applied freeing bandwidth for downstream data insertion. In "VBR" mode, "Still bitrate" can be set under the minimum VBR bitrate, freeing more bandwidth for other programs in the same VBR pool.

- From the **Remapping** tab, make changes if required.

Note

You may enable the scrambling which is pre-configured in the Scrambling app by configuring **Enable Scrambling** and the desired **Scrambling Group**.

ADD TRANSCODING SERVICE TO MULTIPLEXER MUX-DVB **VBR** X

Source	Transcoding	A/V settings	Remapping	Descriptors
PROGRAM NAME	auto edit			
PROGRAM NUMBER	auto edit			
PMT MODE	Generate ▼ edit			
PMT PID	auto edit			
PROVIDER	auto edit			
TYPE	auto edit			
ENABLE SCRAMBLING	<input checked="" type="checkbox"/>			
SCRAMBLING GROUP	SCG_BISSJO ▼			
<input type="button" value="Stopped"/> <input type="button" value="Off-air"/> <input style="background-color: #009640; color: white; font-weight: bold; border-radius: 5px; padding: 2px 10px; border: none; margin-right: 10px;" type="button" value="On-air"/> <input checked="" type="checkbox"/> Save Cancel Delete				

- From the **Descriptors** tab, add custom PMT/SDT descriptors to generated MPT/SDT for MPTS outputs. Once added, descriptors can be re-ordered.

Note

Adding descriptors to the SDT table can be used for DVB multiplexers only.

ADD TRANSCODING SERVICE TO MULTIPLEXER MUX-DVB **VBR** X

Source	Transcoding	A/V settings	Remapping	Descriptors
PMT DESCRIPTORS No additional PMT descriptors <input style="background-color: #009640; color: white; font-weight: bold; border-radius: 5px; padding: 2px 10px; border: none;" type="button" value="+ Add PMT Descriptor"/>				
SDT DESCRIPTORS No additional SDT descriptors <input style="background-color: #009640; color: white; font-weight: bold; border-radius: 5px; padding: 2px 10px; border: none;" type="button" value="+ Add SDT Descriptor"/>				
<input type="button" value="Stopped"/> <input type="button" value="Off-air"/> <input type="button" value="On-air"/> <input checked="" type="checkbox"/> Save Cancel				

- From the **EIT/ETT** tabs, configure to transcode PSIP EIT/ETT for ATSC services.

Note

This tab is only visible for ATSC programs in muxes not using an external PSIP injector. Only sources configured as ATSC standard can be used for the EIT/ETT remux.

ADD TRANSCODING SERVICE TO MULTIPLEXER ATSC 1.0 Mux VBR X

- Source Transcoding A/V settings Remapping Descriptors EIT / ETT

EIT / ETT REMULTIPLEXING ON

INPUT EM4000

INPUT MAJOR CHANNEL NUMBER Major channel number

INPUT MINOR CHANNEL NUMBER Minor channel number

Stopped Off-air On-air Save Cancel

4. Click **Save**.

5. (Optional) Click the **Pass through**.

- **Source** tab: no change allowed.

Add pass through service to multiplexer MUX-DVB VBR X

- Source Remapping Descriptors EAS

SOURCE NAME IP_source_1

PROGRAM NAME HD_1

PROGRAM NUMBER 100 (0x64)

ON AIR Save Cancel

- **Remapping** tab: the Program Name, Program Number, Program Type, and PMT PID can be changed. You may enable the scrambling which is pre-configured in the Scrambling app by configuring **Enable Scrambling** and the desired **Scrambling Group**.

Add pass through service to multiplexer **MUX-DVB** **VBR**

Source	Remapping	Descriptors	EAS
PROGRAM NAME	HD_1		
PROGRAM NUMBER	100 [0x64]		
PMT PID	32 [0x20]		
PROVIDER	empty		
TYPE	Digital television ▾		
DYNAMIC PROGRAM	<input type="checkbox"/>		
ENABLE SCRAMBLING	<input type="checkbox"/>		
STATUS	ON AIR		
<input checked="" type="button"/> Save <input type="button"/> Cancel			

- **Descriptors tab:** Custom PMT/SDT descriptors can be added to generated MPT/SDT for MPTS outputs. Once added, descriptors can be re-ordered.

Note

Adding descriptors to the SDT table can be used for DVB multiplexers only.

Add pass through service to multiplexer **MUX-DVB** **VBR**

Source	Remapping	Descriptors	EIT
PMT DESCRIPTORS No additional PMT descriptors <input type="button"/> + Add PMT Descriptor			
SDT DESCRIPTORS No additional SDT descriptors <input type="button"/> + Add SDT Descriptor			
STATUS	ON AIR		
<input checked="" type="button"/> Save <input type="button"/> Cancel			

- **EAS tab:** add any EAS descriptor if required.

Note

This tab is only visible when EAS mode has been set to SCTE-18 in [Customizing global settings](#).

Add pass through service to multiplexer **MUX-DVB** **VBR** X

Source	Remapping	Descriptors	EAS
ENABLE	ON		
GROUP FOR TEST MESSAGES	Please select ...		
ALTERNATIVE SOURCE	No alternative source		
ALTERNATIVE PROGRAM	Please select ...		
STATE		COUNTY	
No Locations were added			
+ Add Location			
STATUS	ON AIR	Save Cancel	

- **EIT/ETT** tab: Configure to pass through PSIP EIT/ETT when transcoding or passing through ATSC services.

Note

This tab is only visible for ATSC programs in muxes not using an external PSIP injector. Only sources configured as ATSC standard can be used for the EIT/ETT remux.

ADD PASS THROUGH SERVICE TO MULTIPLEXER **ATSC 1.0 MUX** X

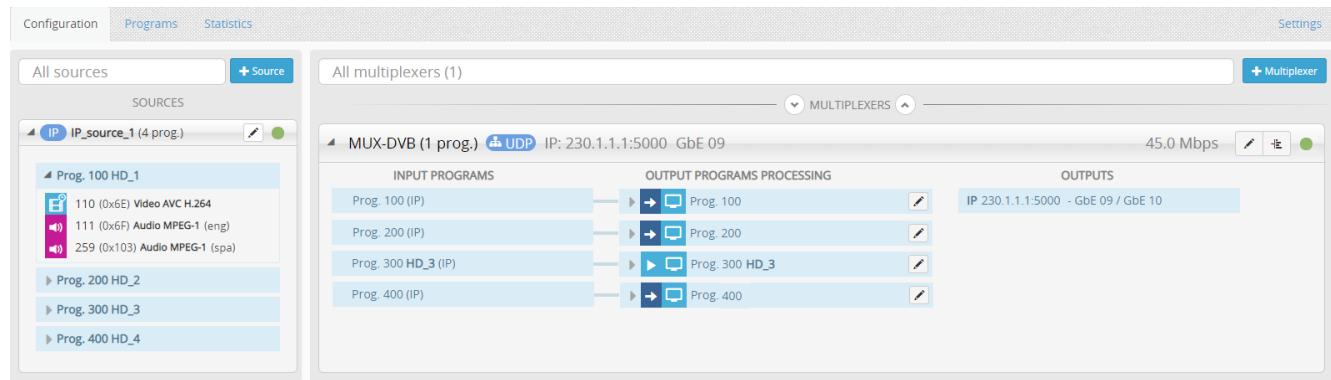
Source	Remapping	Descriptors	EIT / ETT
EIT / ETT REMULTIPLEXING	ON		
INPUT	EM4000		
INPUT MAJOR CHANNEL NUMBER	Major channel number		
INPUT MINOR CHANNEL NUMBER	Minor channel number		
STATUS ON AIR Save Cancel			

6. Click **+Add**.

Note

Data received as TS over IP without PCR can be re-muxed by drag-and-drop to the service in the multiplexer directly.

Once all programs have been added, the multiplexer's display should be like that:



A thumbnail of each program appears in the **Programs** tab.

Configuration Programs Statistics MULTIPLEXER: MUX 1 Settings

All programs (5)

HD_6



HD_1



HD_2



HD_3



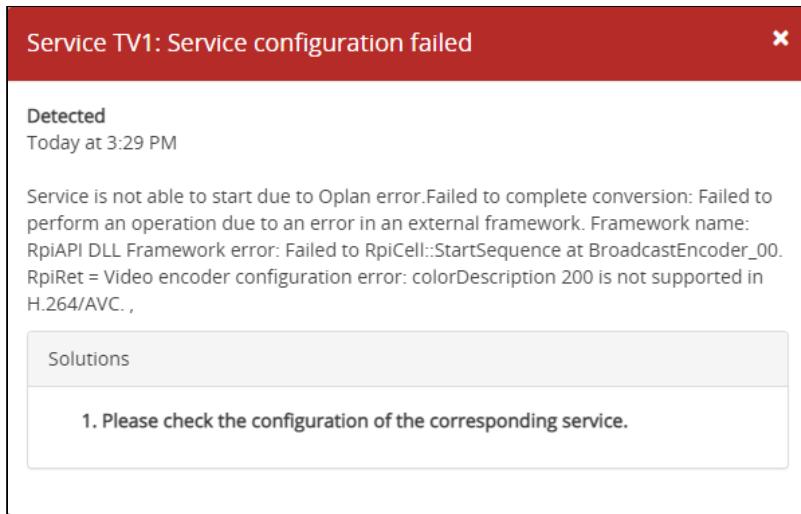
HD_4



i Info

Thumbnails are not available for passthrough programs. The thumbnail refresh rate is deliberately low to avoid impacting performance.

- If a service has an alarm, click on the exclamation mark to show the notification.



Creating a local program

A local program is a program (service) within a multiplexed transport stream that lacks an input program source. It can comprise various data type components (PIPs) derived from different input sources, excluding audio/video components.

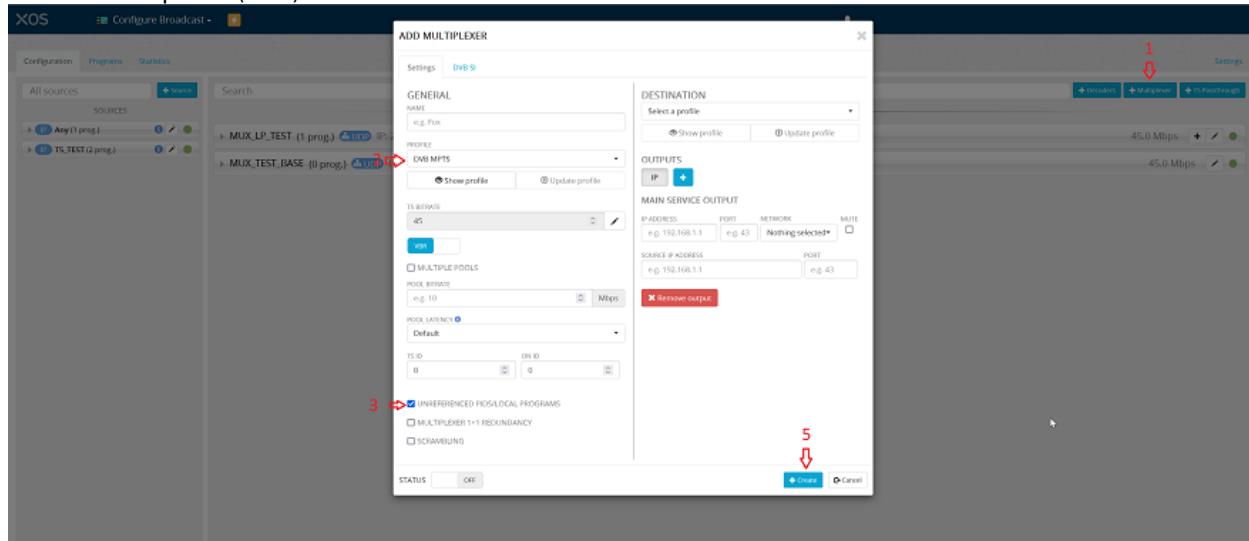
XOS enables the creation of locally generated services within the Program Map Table (PMT). This allows the creation of a new program in a transport stream for re-muxing input data components present as ghost PIPs. It can be used for the "download" services to deliver application or software updates.

Prerequisite

Create a source in the [Configure Broadcast app](#).

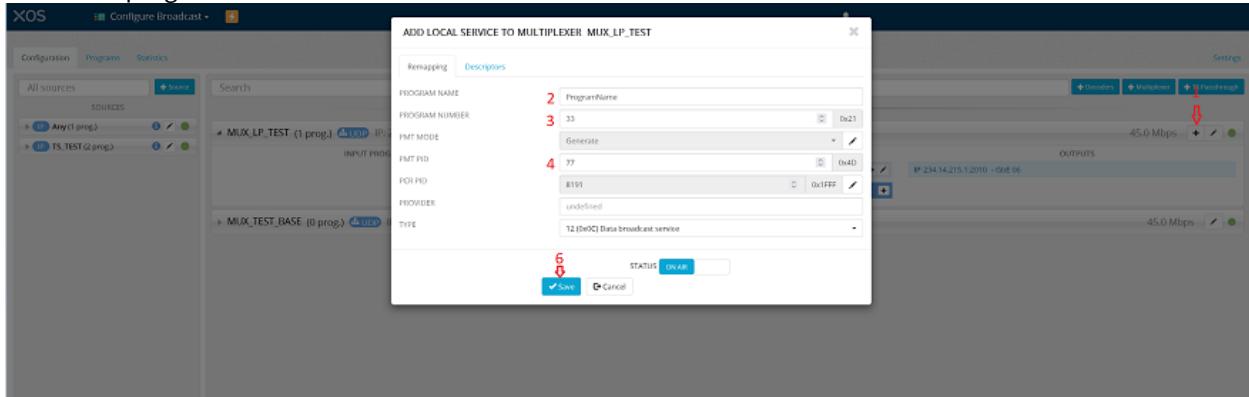
1. Navigate to the **Configure Broadcast** app.

2. Create a Multiplexer (mux).



- Click on the "+ Multiplexer" button.
- Select the appropriate MPTS profile without PSIP configured. {e.g. DVB MPTS, ATSC 1.0 (No PSIP) MPTS}.
- Enable the **Unreferenced PIDS/Local Programs** checkbox. Note: The "Unreferenced PIDS" checkbox will be displayed if the MPTS (with PSIP) profile is configured.
- Configure other mux properties. (Refer to [Adding and configuring a multiplexer](#) for details.)
- Click the **Create** button.

3. Add a new program.



- Create a local program with the "+" button on the mux.
- Set the **Program Name** (required).
- Set the **Program Number** (required).
- Set the **PMT PID** (required).
- Configure other parameters.
- Click the **Save** button.

4. Configure the PMT mode (Generate/Passthrough):

The screenshot shows the XOS interface with a modal dialog titled "EDIT PROGRAMLP_TEST". The dialog has tabs for "Remapping" and "Descriptors". The "Remapping" tab is active, showing fields for:

- PROGRAM NAME: LP_TEST
- PROGRAM NUMBER: 4
- PMT MODE: 2 Passthrough
- PMT INPUT: 3 Please select...
- PMT INPUT PID: 4 undefined
- PMT PID: 123
- PCR PID: 246
- PROVIDER: undefined
- TYPE: 0 (0x00)

At the bottom of the dialog are "Save", "Cancel", and "Delete" buttons. A red arrow points to the "Passthrough" option in the PMT MODE dropdown.

- Edit the **PMT Mode**.
- Select the appropriate **PMT Mode**: Generate/Passthrough.

- For the "Passthrough" PMT mode, configure the **PMT Input** source.
- For the "Passthrough" PMT mode, configure the **PMT Input PID**.

5. From the **Descriptors** tab, add the PMT and SDT descriptors on the program level.

EDIT PROGRAM LP_TEST

Descriptors

PMT DESCRIPTORS
0201e4

+ Add PMT Descriptor ✕ Clear all descriptors

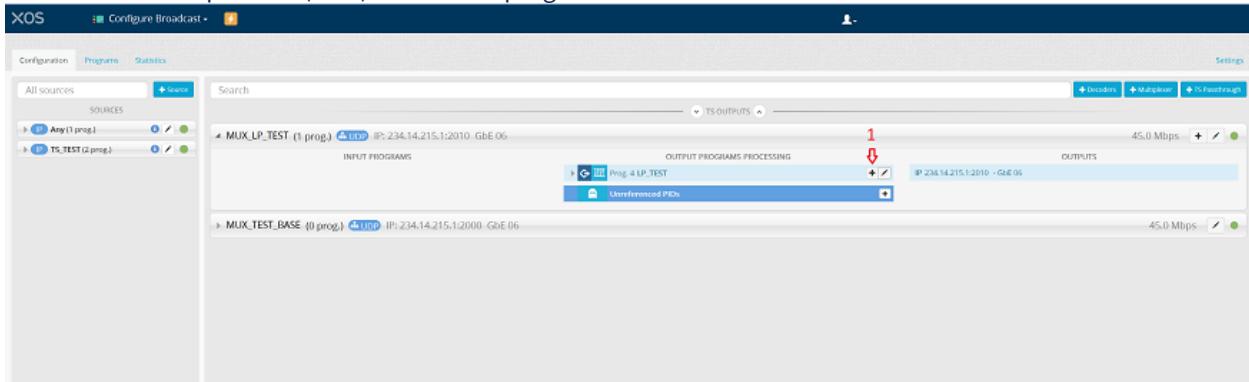
SDT DESCRIPTORS
0201e4

+ Add SDT Descriptor ✕ Clear all descriptors

STATUS ON AIR

✓ Save ⌂ Cancel ✕ Delete

6. Add the Data Components (PIDs) to the local program:



ADD DATA COMPONENT FROM INPUT UNREFERENCED PID TO OUTPUT PROGRAM LP_TEST

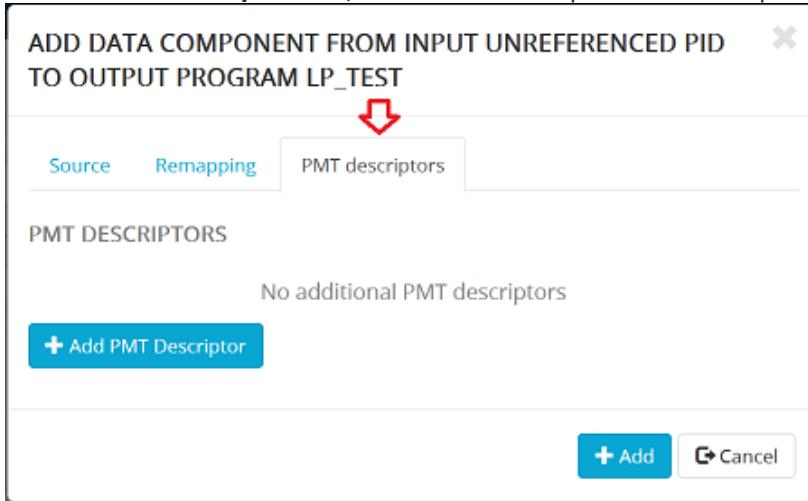
Source	Remapping	PMT descriptors
SOURCE 2	Any	
COMPONENT PID 3	5134	0x140E
<input type="button" value="+ Add"/> <input type="button" value="Cancel"/>		

ADD DATA COMPONENT FROM INPUT UNREFERENCED PID TO OUTPUT PROGRAM LP_TEST

Source	Remapping	PMT descriptors
COMPONENT PID 4	5134	0x140E
STREAM TYPE 5	5 (0x05) Private section	
COMPONENT TAG	undefined	
ENABLE SCRAMBLING	OFF	
<input type="button" value="+ Add"/> <input type="button" value="Cancel"/>		

- Create a component with the "+" button on the program.
- From the **Source** tab,
 - Select the input **Source**.
 - Set the input **Component PID** number.
- From the **Remapping** tab,
 - Set the output **Component PID** number
 - Select the **Stream Type**.

7. From the **PMT Descriptors** tab, add the PMT descriptors on the component level.



Creating a virtual program

The multiplexing service allows for the duplication of any component from the input. Creating a virtual program enables the creation of an output service that consists of a virtual program duplicated from another output program.

1. Navigate to **Configure Broadcast**.
2. Go to the program of which you want to create a virtual version in the mux.
3. Click and drag the program onto itself.
4. When using the **DVB multiplexer**, insert a new Program Name, Program Number, and PMT PID.
5. When using the **ATSC multiplexer**, fill in the data according to your mode.
 - With the *Static PSIP*, *Fetch (PMCP over FTP)*, or *Remux* (PSIP EIT/ETT Remultiplexing) modes, fill in the mandatory data required to add PSIP to the virtual program locally:

Field	Output Generated
Short Name	VCT
Program Number	PAT, PMT, VCT
Major/Minor Channel Number	VCT
Source ID	VCT
PMT PID	PAT, PMT
Type	VCT

i Info for ATSC mux using Static PSIP, Fetch, or Remux modes

EIT/ETT will be duplicated with the same content and depth; only the Source ID will differ.

- With the *Triveni* mode, fill in the mandatory data related to the virtual program, and other data will be provided by the PSIP injector:

Field	Output Generated
Program Number	PAT, PMT
PMT PID	PAT, PMT

i Info for ATSC mux using Triveni mode

EIT is duplicated from virtual programs, except the Source ID.

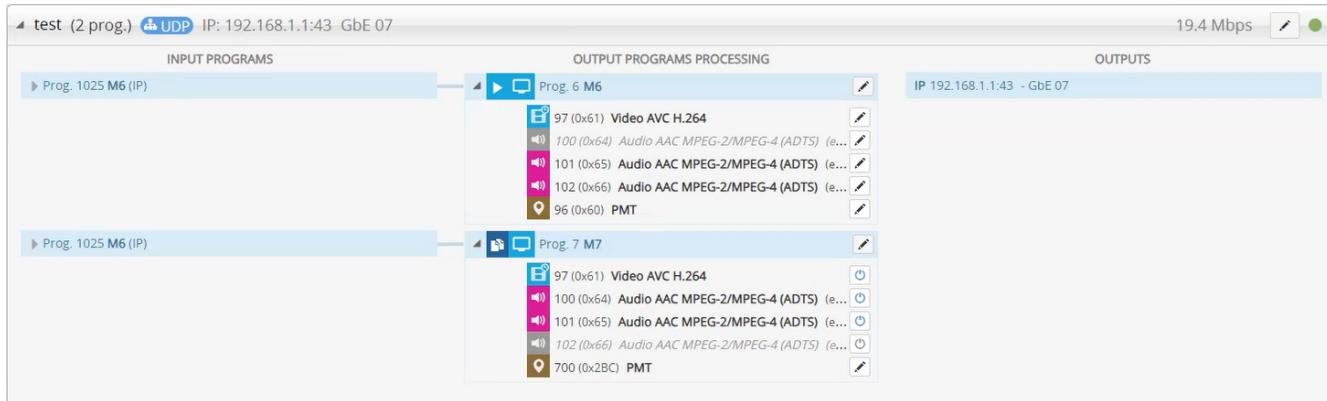
ETT related to virtual programs are duplicated from virtual programs except:

- ETT table id extension
- sourceld part (left part) of ETM id

6. Click **Save**.



The virtual program is shown with the icon as can be seen in the following example.



⚠ Note

When you remove the original program, the virtual program will be removed automatically.

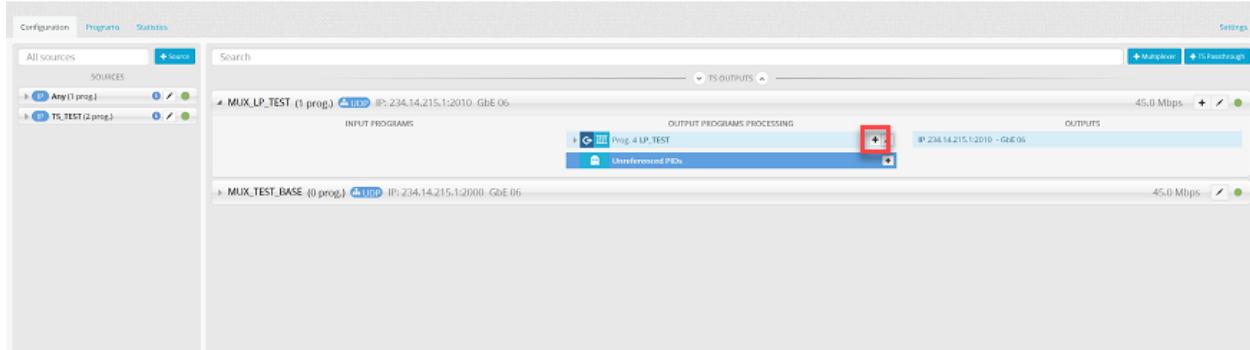
⚠ Note

In the virtual program, components can be muted by clicking the icon after the component.

Adding unreference PIDs to the transcoded or passthrough output programs

The Configure Broadcast app allows the ingestion of data PID that belongs to a program without PCR or that comes as an unreference PID. The unreference PID can be re-multiplexed as a data component of an output transcoded or passthrough program. The generated output data PID is referenced in a service.

1. Navigate to the **Configure Broadcast** app.
2. Create a data component by clicking the "+" button on the output program.



i Info

If the "+" button is not displayed, click the button at the top right to edit the Multiplexer settings and configure the **Unreferenced PIDs/Local Programs** checkbox.

3. From the **Source** tab, do the following:

ADD DATA COMPONENT FROM INPUT UNREFERENCED PID TO OUTPUT PROGRAM LP_TEST

Source **Remapping** **PMT descriptors**

SOURCE	Any
COMPONENT PID	5134 <input type="button" value="0x140E"/>

+ Add **Cancel**

- a. select the input **Source**.
- b. Set the input **Component PID** number.

4. From the **Remapping** tab, do the following:

ADD DATA COMPONENT FROM INPUT UNREFERENCED PID TO OUTPUT PROGRAM LP_TEST ✖

Source	Remapping	PMT descriptors
COMPONENT PID	5134	0x140E
STREAM TYPE	5 (0x05) Private section	
COMPONENT TAG	undefined	
ENABLE SCRAMBLING	<input type="button" value="OFF"/>	
<input type="button" value="+ Add"/> <input type="button" value="Cancel"/>		

- Set the output **Component PID** number.
- Select the **Stream Type**.

5. From the **PMT descriptors** tab, add the PMT descriptors on the component level.

ADD DATA COMPONENT FROM INPUT UNREFERENCED PID TO OUTPUT PROGRAM LP_TEST ✖

Source	Remapping	PMT descriptors
PMT DESCRIPTORS		
No additional PMT descriptors		
<input type="button" value="+ Add PMT Descriptor"/>		
<input type="button" value="+ Add"/> <input type="button" value="Cancel"/>		

6. Click **+Add**.

Adding unreferenced PIDs to the multiplexer

The Configure Broadcast app allows the ingestion of a data PID that belongs to a program without PCR or that comes as an unreferenced PID. An unreferenced PID not associated with any specific output program can be generated and remultiplexed in a service based on remapping the input data PID to the output PID. The generated output PID is unreferenced in a service.

1. Navigate to the **Configure Broadcast** app.

2. Click the "+" button beside the **Unreferenced PIDs** output program.

i Info

If the "+" button is not displayed, click the button at the top right to edit the Multiplexer settings and configure the **Unreferenced PIDs/Local Programs** checkbox.

3. Select the **Input** source from the drop-down.

ADD UNREFERENCED PID

INPUT

Select value...

INPUT PID

Input

OUTPUT PID

Output

Add **Cancel**

4. Specify the **Input PID** from the input source that will be remapped into the **Output PID**.

ADD UNREFERENCED PID

INPUT

InputData

INPUT PID

222 0xDE

OUTPUT PID

333 0x14D

Add **Cancel**

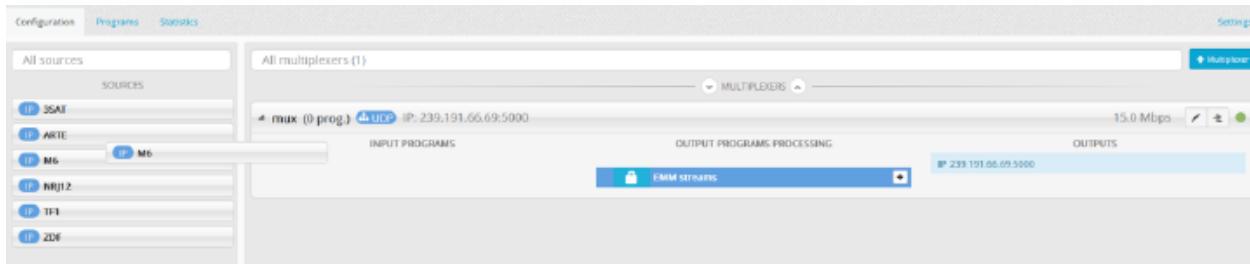
5. Verify the Unreferenced PID generated with the Output PID displayed.

Adding on-air/off-air components to output programs in the multiplexer

In the Configure Broadcast app, you can insert pass-through components from other programs to the output programs in the created Multiplexer. The off-air components will be displayed in the output but disabled for output processing (i.e. not inserted in PMT table).

1. Navigate to the **Configure Broadcast** app.

2. From the **Source** panel on the left, drag and drop the source to the **Multiplexer** created on the right. (Refer to the [Adding and configuring a multiplexer](#).)



3. Configure the transcoding service added to the multiplexer. (Refer to [Adding programs to the multiplexer](#).)
4. Drag and drop the component from the source to the **Output Programs Processing** in the Multiplexer you have created.
5. The "Add Pass-through Component to Service" window pops up.

ADD PASS-THROUGH COMPONENT TO SERVICE ARTE.TV

	Source	Remapping	PMT descriptors
INPUT			
SOURCE	test_IP		
PROGRAM NAME	3sat HD		
PROGRAM NUMBER	11150	0x2B8E	
PROGRAM TYPE	25		
COMPONENT PID	6510 0x196E		
STREAM TYPE	Video AVC H.264		
STATUS	OFF AIR	<input type="button" value="+ Add"/> <input type="button" value="Cancel"/>	

6. Configure the **Status** toggle to create the **Off-Air/On-Air** components accordingly.
7. Click the **+Add** button to confirm.

⚠ A disabled component still appears at the **Output Programs Processing**, with the same information (type, output PID, etc) but is shown in grey without bold text.

OUTPUT PROGRAMS PROCESSING

PMT PID	Prog. 1 Arte.Tv	
4112 (0x1010)	Video HEVC	
4122 (0x101A)	Private PES	
4112 (0x1010)	Video AVC H.264	
33 (0x21)	PMT	

8. (Optional) Click the **Edit Component** button beside the component to adjust the **Off-Air/On-Air** status for the component.

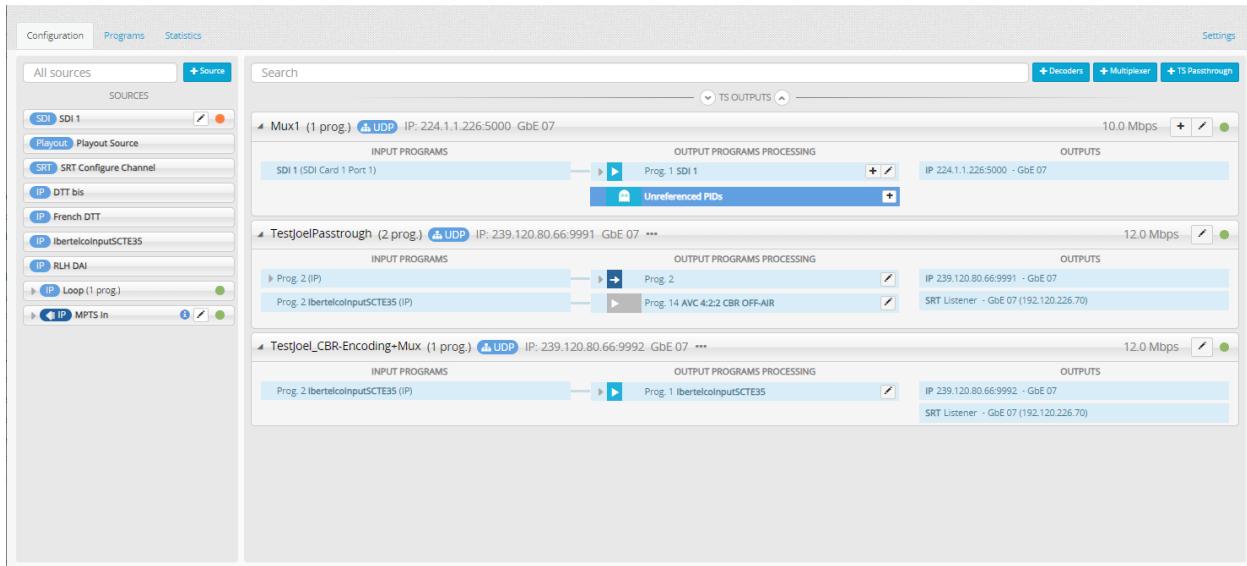
EDIT COMPONENT

Component	Descriptor
OUTPUT	
OUTPUT PID	100 <input type="text" value="0x64"/>
OUTPUT STREAM TYPE	15 (0x0F) Audio AAC MPEG-2/MPEG-4 (ADTS)
COMPONENT TAG	auto
STATUS	ON AIR
<input checked="" type="button" value="Save"/> <input type="button" value="Cancel"/>	

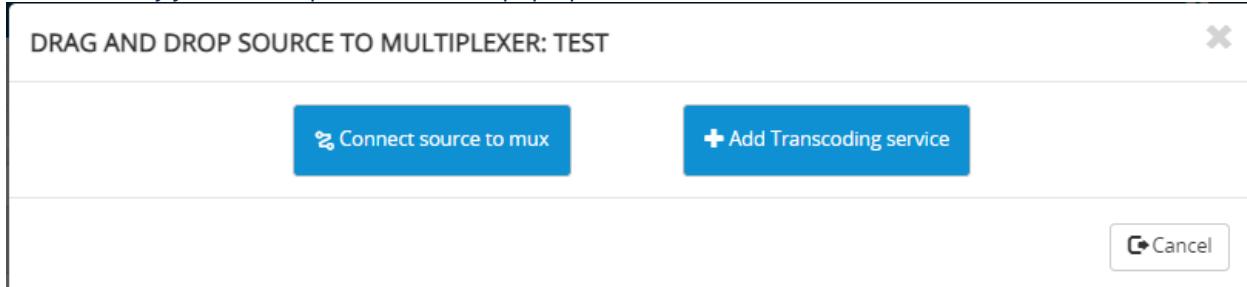
Connecting sources to the multiplexer

You can connect the source to the multiplexer created in the Configure Broadcast app to insert pass-through data directly to a multiplexer.

1. From the **Source** panel on the left, drag and drop the source to the desired **Multiplexer** on the right.

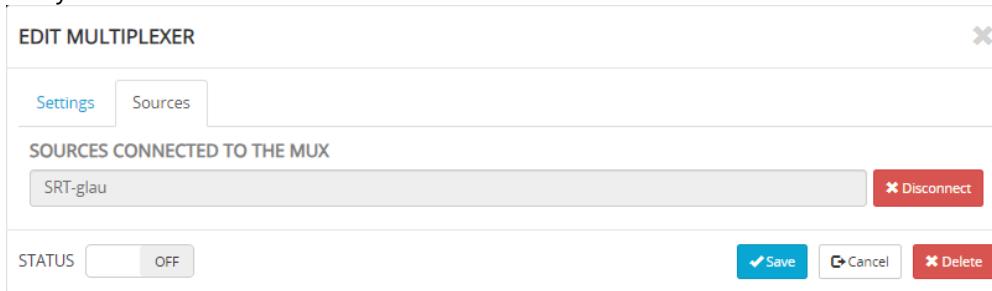


2. Select the way you want to process from the pop-up: **Connect source to mux**



3. Click **Connect** to confirm.

4. Once the connection between the source and the mux is successfully created, click the **Edit Multiplexer** icon to verify.



Setting video overlays

You can insert the video with some overlay as follows:

- Logo: for Station ID purposes. (Refer to the sub-section for details.)
- Graphics: crawl text or animated logo. (Refer to the sub-section for details.)
- Video Insertion: for blackout purposes (not described in this document).
- EAS-NET: video overlay can be performed according to the alert based on Station ID configured using the EAS-NET protocol.
- Blackout Slate: in case of signal loss.

Trigger	<ul style="list-style-type: none"> ◦ Auto (Default): Select this option if you need to trigger the blackout slate with both the SCTE-35 message and Monitor app. ◦ ESAM Alternate Content: Select this option if you need to trigger the blackout slate with the Monitor app. Note that if this option is selected, do not configure the ESAM acquisition point ID or ESAM POIS endpoint for the service.
Zone Identity	(Optional) Enter the provided Zone identity received from the ESAM message.

- Nielsen Watermark: for Nielsen watermark insertion purposes and the Nielsen parameters (SID, Check Digits, CBET SID, and CBET Check Digit) can be configured for the audio.
- Caption Insertion: for enabling Closed Caption Insertion using NCI Cloud Captioning service.

Inserting a Station Id (Logo)

A Station Id corresponds to a logo that is inserted on the video.

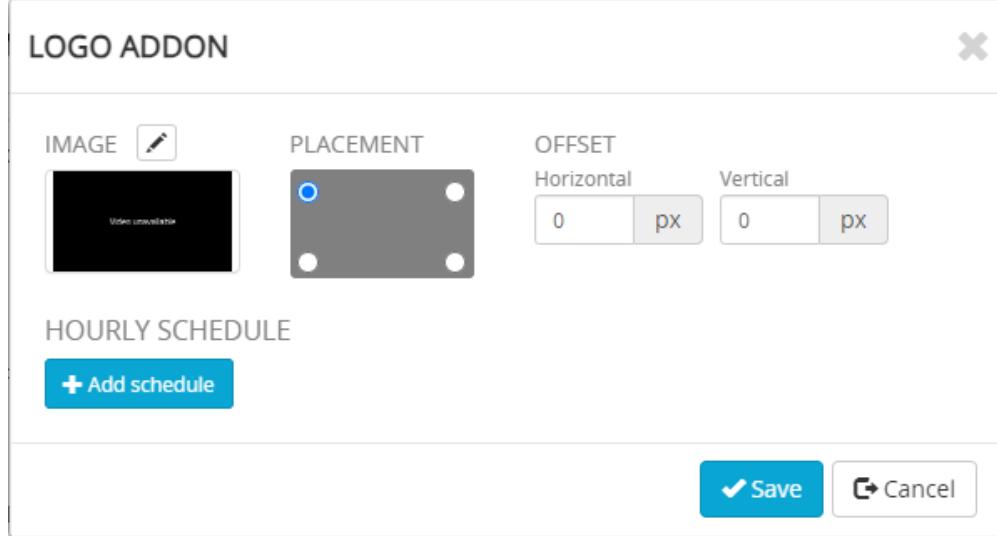
From **Configure Broadcast** app, at multiplexer level:



Note

This logo add-on is also applied to the service level.

1. Click the **Edit** button of the program.
2. Select the **Transcoding** tab.
3. From the Logo add-on, click **Configure** and the **Edit** icon to select the image file for logo insertion.



4. From the **Upload by URL** tab, you can use an HTTP server URL to download the PNG image files.

The screenshot shows a modal window titled "SELECT IMAGE". At the top, there are three tabs: "Library", "Upload by url" (which is selected and highlighted in blue), and "File Uploader". Below the tabs, there are two main input fields: "PATH TO WATCHED FILE" containing the URL "https://domain.com/path/filename.png or https://192.198.45.45/path/filename.png", and "LABELS" containing "+ Label(e.g, NBC)". To the right of the URL field is a small checkbox and a lock icon. At the bottom right of the modal is a blue "Add" button with a checkmark icon.

5. Set the **Path** to download the picture.
 6. Define a **Label** to identify easily the picture.
 7. From the **File Uploader** tab, you can drag and drop your file for uploading to XOS which allows the PNG files to download with local storage (no need for an external HTTP server).

The screenshot shows the same "SELECT IMAGE" dialog, but the "File Uploader" tab is now selected. The central area contains a large dashed rectangular box for dragging files. Inside this box, there is a blue "Select File" button and the text "or drag and drop your file here". Below this, it specifies "(Allowed extension: .png)" and "Size limit 2048Mb". At the bottom right of the modal is a "Cancel" button.

8. Click **Save**.
 9. Set the **Offset** of the image.
 10. If it's not a permanent logo, set the **Hourly Schedule**. Up to two schedules can be added.
 11. Click **Save**, the Logo becomes **ON**.
 12. After a few seconds, the logo appears on the thumbnail of the video.



 **Warning**

*png file only and the logo size should be smaller than the source size of the video.

Inserting graphics for crawl texts and animated logos

You can use HTML5 templates (.zip files) which can be used to enable crawl texts and animated logos.

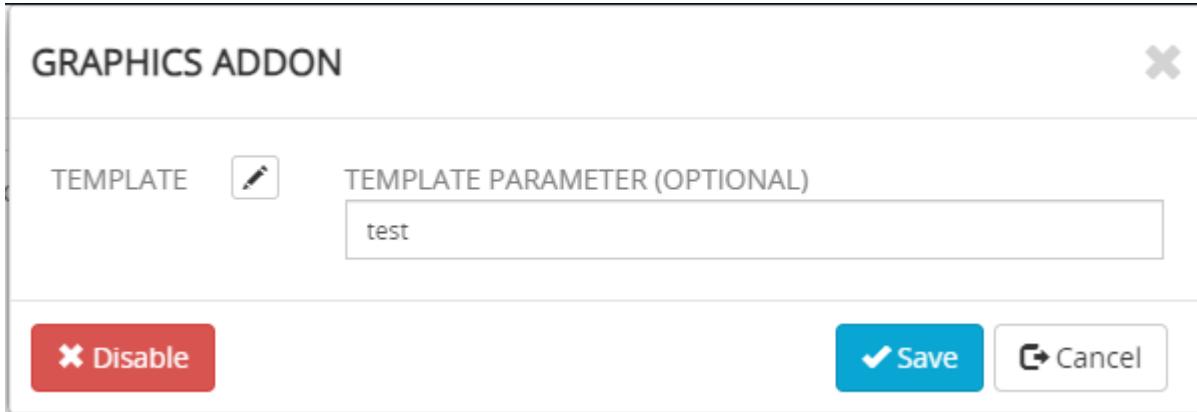
From **Configure Broadcast** app, for a transcoded program:

 **Note**

This section explains how to configure the HTML5 renderer with a template file. HTML5 rendering is performed before encoding. For more information about how to create HTML5 templates for crawl text, animated logos and more, please refer to the dedicated document.

1. Click the **Edit** button of the program.
2. Select the **Transcoding** tab.
3. From the **Graphics** add-on, click the **Configure** button.

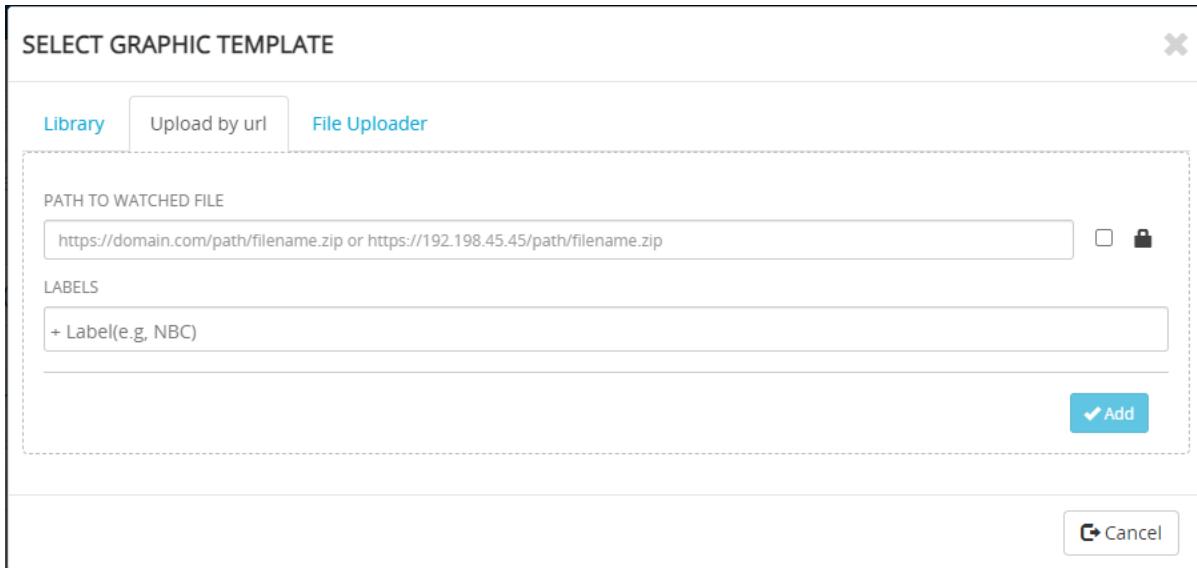
4. (Optional) Enter the template parameter. With the example template for crawl text, the template parameter is the text to crawl.



5. Click the icon to select the Graphic Template.
 6. (Optional) From the **Upload by URL** tab, you can use an external Web server URL to download the .zip file that contains the HTML5 template.

Note

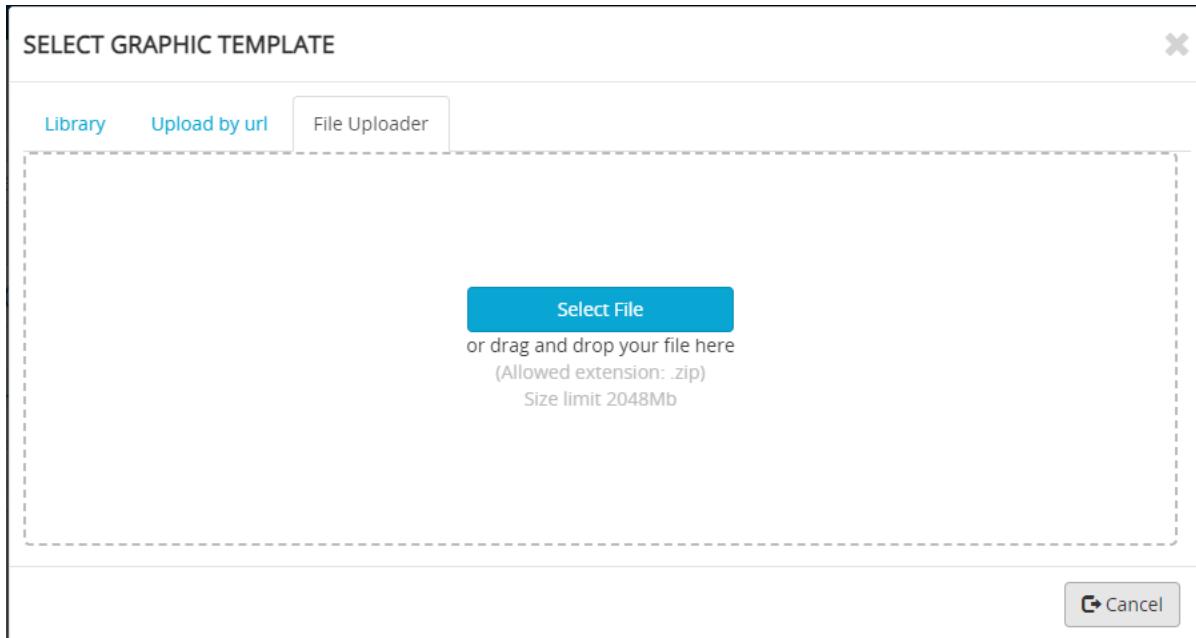
When using **Upload by URL**, the reference URL is watched. If the .zip file is updated, the HTML5 template will be updated automatically.



7. (Optional) From the **File Uploader** tab, you can drag-and-drop to upload your file to XOS, allowing the crawl texts or animated logos to download with local storage (no need for an external Web server).

Note

When using **File Uploader**, the HTML5 template is uploaded into the XOS manually. You will need to upload the .zip file manually if the HTML5 template is updated.



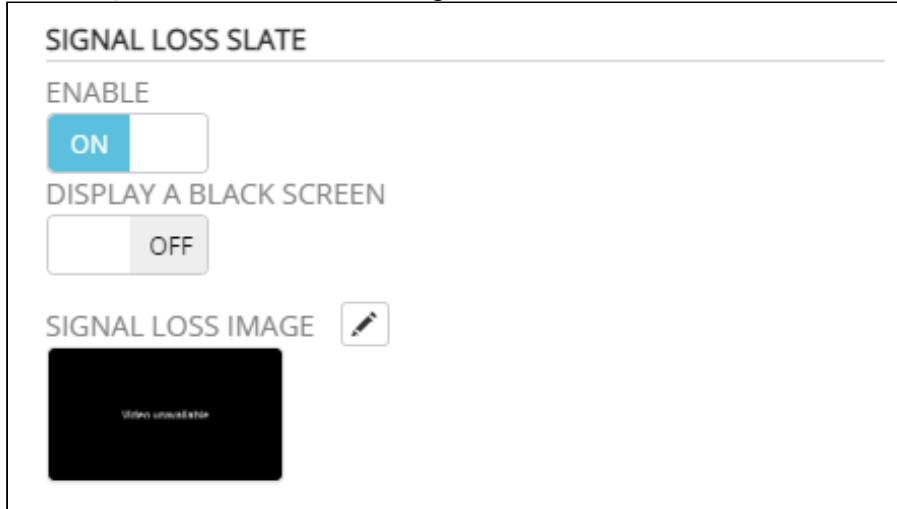
8. Click **Apply**.

Inserting a slate (signal loss)

When signal loss occurs, a slate can replace the video.

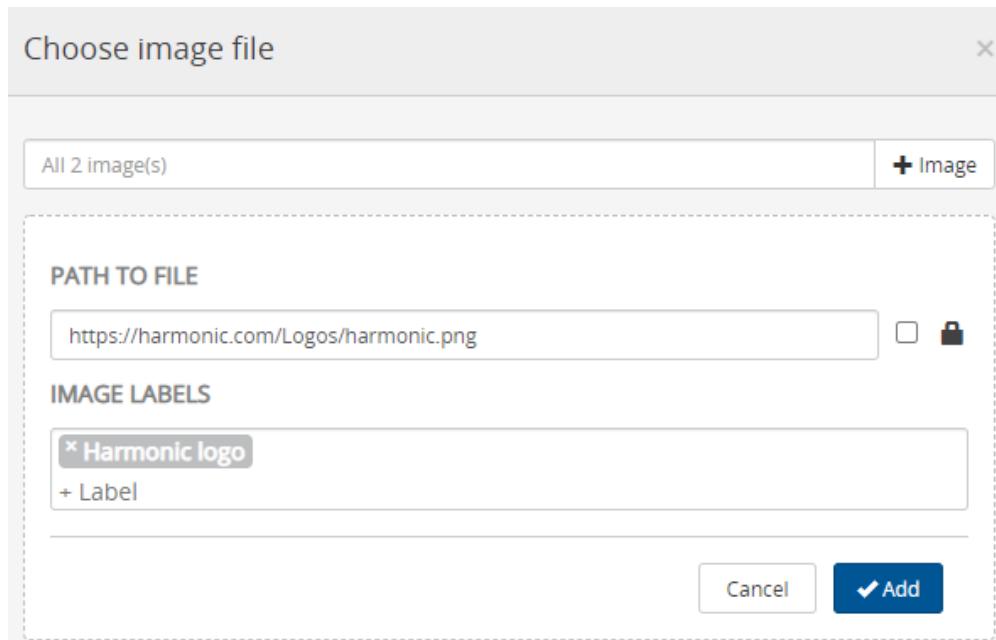
From **Configure Broadcast** app, at multiplexer level:

1. Click edit button of the program.
2. From the source tab, enable **Signal Loss Slate (ON)**
3. To **Display a black screen** in case of signal loss, set it to **ON**.

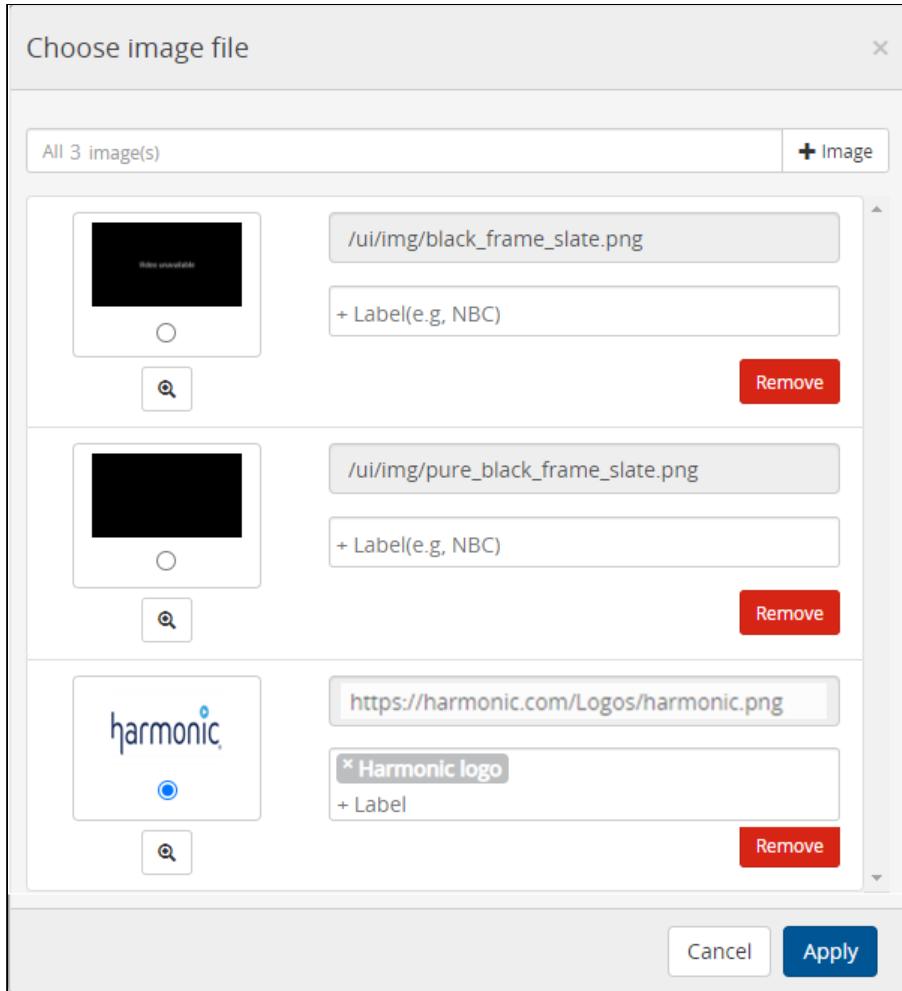


4. To insert a customized slate click edit button at signal loss image level.

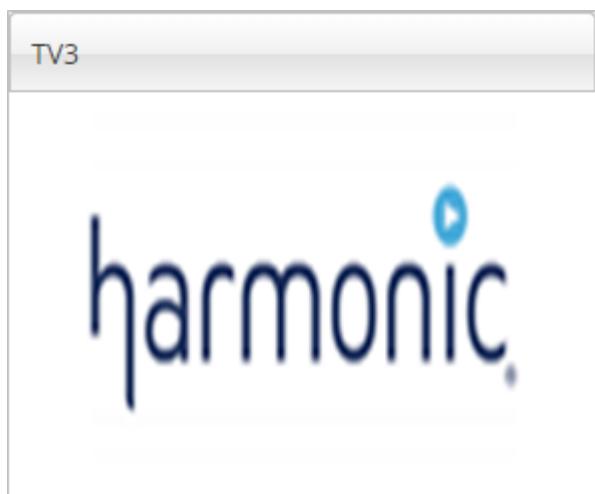
5. Click **+Image** to select from the C&C PC the slate to insert.



6. Set the **Path** to download the picture.
7. Define a **Label** to identify easily the picture.
8. Click **Add**.
9. Select the slate that will replace the video in case of signal loss.



10. Click **Apply**.
11. Click **Save**,
12. After few seconds the slate appears on the thumbnail of the program.



Customizing global settings

From the **Configure Broadcast** app, users can customize settings for EAS, PSIP generators, descrambling keys, and logs/troubleshooting information.

To do so, navigate to the **Configure Broadcast > Settings** to configure the global settings:

- [EAS setting](#)
- [PSIP](#)
- [Descrambling](#)
- [Advanced](#)

EAS setting

The screenshot shows the XOS Configure Broadcast interface. The top navigation bar has tabs for Configuration, Programs, Statistics, and Settings. The Settings tab is active. Below it, there are four sub-tabs: EAS setting (selected), PSIP, Descrambling, and Advanced. The main content area is titled "EAS - Customize global settings for the EAS". It contains a "EAS MODE" dropdown menu set to "None". At the bottom are two buttons: "Revert" and "Save".

- Configure the **EAS Mode**:
 - **SCTE_18**: Configure EAS grouping for monthly testing.
 - SCTE-18 Source: Choose the incoming source for the SCTE-18 message. Note: Do not use the input source with the Signal Loss slate configured through the Configure Channels app for this SCTE-18 test message. Using this source will trigger errors. If your selected "SCTE-18 Source" is enabled with slate insertion, XOS disables or ignores slate insertion for the SCTE-18 source to avoid any possible configuration errors.
 - Alert Priority Threshold: Set the Priority Threshold.
 - Process Test Messages: Set the toggle to enable the test messages processing.
 - Active Group for Test Message: Select the Active Group ID that is used for the test message. For example, select a group of Muxes 1-10 in order to perform monthly testing for Emergency Alert System. Each time is performed for 10% of the Muxes. Note: When the Active Group ID and the Group ID of the output program are configured but the two IDs do not match, the SCTE-18 "test message" is ignored.
 - **EAS_Net**: Connect to the EAS using the EAS-Net protocol.
 - Network: Configure the network port to establish a connection to the EAS Receiver.
 - **EAS_Net (S3 based)**: Connect to the EAS using the EAS-Net (S3 based) protocol. An AWS S3 Bucket source can be monitored to enable EAS alarms.
(Refer to [Configuring S3-based EAS-NET alerts](#) for details)

PSIP

Two modes are supported:

- Connection to external PSIP generators compatible with Triveni Guide Builder protocol
- Click **+Generator** to add a new one.
- Select 'Type' = PSIP INJECTOR

ADD GENERATOR	
GENERATOR NAME	TYPE
e.g. Generator	PSIP Injector
IP ADDRESS	NETWORK
e.g. 192.168.1.1	Nothing selected
<input type="button" value="Create"/> <input type="button" value="Cancel"/>	

- Set the parameters that allow XOS to receive signalization from the PSIP generator.
- Click on **Create**.

- Locally generated EIT tables for EPG data fetch from the FTP Site.

- Click **+Generator** to add a new one.
- Select 'Type' = PMCP over FTP

ADD GENERATOR

GENERATOR NAME: e.g. Generator

TYPE: PMCP over FTP

PROTOCOL: FTPS

FTP SITE: e.g. ftp://ftp.myExample.com/test

LOGIN:

PASSWORD:

Create **Cancel**

- Select the 'Protocol' with either **FTP** (File Transfer Protocol) or **FTPS** (File Transfer Protocol Secure).
- Set the parameters that allow XOS to connect to the remote FTP site.
- Click on **Create**.

EAS setting PSIP Descrambling Advanced

All generators (1)

+Generator

Test (PMCP over FTP) ftp://www.titantv.com/ftp/1 **Edit** **Delete**

Descrambling

Descrambling keys can be generated and added to multiple programs of the demux sources created in the Configure Broadcast app.

GLOBAL INJECTED ID CONFIGURATION FOR BISS2 MODE E DESCRAMBLING

GLOBAL INJECTED ID Save

All descrambling keys (1) +Descrambling Key

Key1 (Used by 2 programs) Edit Delete

i (Optional) Create Global Injected ID for BISS2 Mode E Descrambling Key

For configuring a descrambling key in BISS2 Mode E, you can create a Global Injected ID which is used to descramble BISS2 Mode E keys.

For configuring a descrambling key in BISS2 Mode 1, the Global Injected ID configurations are not required.

- Click the **+Descrambling Key** button to configure the BISS2 Mode 1/E descrambling.
- Configure the Descrambling Key settings:
 - Key ID: Specify a unique identifier assigned to a specific descrambling key.
 - Mode: Select the BISS2 Mode 1 or BISS2 Mode E from the drop-down.
 - The mode is selected depending on how the Session Words are provided to the descrambler operator.
 - Mode 1: The Session Words (Even and Odd) are provided in clear (without encryption) to the descrambler. These are the actual keys used during the descrambling.
 - Mode E: the Session Words (Even and Odd) are provided with encryption.
 - Even Session Word & Odd Session Word
 - Only one is used at a time.
 - The Transport Scrambling Control (TSC) bits present in the header of each TS packets indicates whether the even or odd session word should be used.
 - The TSC bits are set on the scrambler side.
 - Injected ID (for BISS2 Mode E only): This refers to the individual key provided for each BISS2 Mode E key in addition to the Session Words to decrypt them, or provided globally by setting the *Global Injected ID* displayed in the picture above. This *Global Injected ID* will be used by all BISS2 Mode E keys if not created with an individual *Injected ID*. (At least one of these Injected ID fields must be defined to be able to create a BISS2 mode E key.)

EDIT KEY

KEY ID	Key1
MODE	BISS2 Mode E
EVEN SESSION WORD <small>i</small>	*****
ODD SESSION WORD <small>i</small>	*****
INJECTED ID	Global Injected Id is using

✓ Save Cancel ✗ Delete

- Once the Descrambling Key is created, it can be added to multiple programs of the demux sources created in the Configure Broadcast app. (Refer to the [Configure Fixed Key descrambling](#) for details.)

Advanced

You can customize advanced settings to enable Speech to Closed Caption using NCI cloud service, enable out-of-band SCTE-104, download DPI logs and display troubleshooting information in the Configure Broadcast app.

The screenshot shows the XOS Configure Broadcast interface. At the top, there are tabs for Configuration, Programs, Statistics, and a Settings button. Below these are tabs for EAS setting, PSIP, Descrambling, and Advanced. Under the Advanced tab, there are sections for SERVICE SETTINGS and ADVANCED. In the SERVICE SETTINGS section, there are two toggle switches: 'ENABLE NCI CLOUD CAPTIONING' set to ON and 'ENABLE OUT-OF-BAND SCTE-104' also set to ON. In the ADVANCED section, there are two more toggle switches: 'ENABLE DPI LOGS DOWNLOAD' set to ON and 'DISPLAY TROUBLESHOOTING INFORMATION' set to ON. To the right of these switches are informational notes. Below the notes are buttons for 'Revert' and 'Save'.

- Enable NCI Cloud Captioning
 - Set the toggle to **ON** to allow configuring the connection of XOS to an NCI Server for Speech to Closed Caption. In principle the data (Speech) has to be sent using a standard RTMP service (see [Create an RTMP source](#)) to the NCI Server and then the Caption Insertion on the Transcoding tab of the relevant Program needs to be configured (see [Adding programs to the multiplexer](#)).
- Enable Out-of-Band SCTE-104
 - Set the toggle to **ON** to allow an SCTE server to receive SCTE-104 out-of-band messages. The messages are then forwarded to the services with the DPI PID Index defined in the source configuration.
- Enable DPI Logs Download
 - Set the toggle to **ON** that allows downloading DPI logs of a service using the icon in the Configuration tab. From the Configuration tab, on the service row, click the download button to retrieve the DPI logs.
- Display Troubleshooting Information
 - Set the toggle to **ON** that allows debugging, using the icon in the Configuration tab. Shortcut ON/OFF Debugging mode Alt+Ctrl+S is available.

Configuring S3-based EAS-NET alerts

EAS-Net is a protocol used for the distribution of Emergency Alert Systems. XOS can monitor an AWS S3 Bucket source to enable EAS alerts.

Note

After enabling the EAS-Net option, you must restart the service.

Enabling EAS on your system

1. Open the **Configure Broadcast** app.
2. Click **Settings** on the top right.
3. In the EAS Mode row, select **EAS_NET (S3 based)**.

EAS - Customize global settings for the EAS

EAS MODE: EAS_NET (S3 based)

ACTIVE GROUP FOR TEST MESSAGES: Unused

S3 BUCKETS: + S3 Bucket

Revert **Save**

4. Enter your S3 bucket information in the window that appears.

ADD S3 BUCKET

AWS REGION	BUCKET NAME	RELATIVE PATH

ACCESS: By key/secret

ACCESS KEY	SECRET KEY

+ Create **Cancel**

5. Click **Create**.
6. Restart the transcoding service.

Configuring the add-on to a specific transcoding service

Once the S3-based EAS-Net is set up, use the following instructions to enable it on a service.

1. Open the **Configure Broadcast** app.
2. Select the mux that contains the desired service.

The screenshot shows the XOS Configuration Broadcast interface. In the center, there's a 'Mux' program (3 prog.) with an IP address of ingress-66fec4d0fabf203b35b98d25.lrs-staging.nebula.video:7086 and a bandwidth of 19.4 Mbps. It has three input programs: 'Prog. 274 SRT Source from XOS15 (...)' repeated three times. Each input connects to a corresponding output: 'Prog. 1 (1-2) STAT1 service', 'Prog. 2 (1-3) STAT2 service', and 'Prog. 3 (1-4) STAT3 service'. The 'STAT1 service' output is highlighted with a red box.

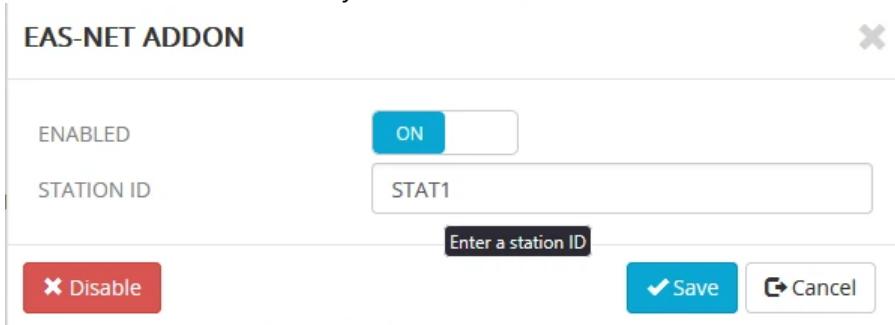
3. Click the pencil icon and select the **Transcoding** tab to modify the program properties.

The screenshot shows the 'EDIT PROGRAM: stat1s VBR' configuration page. The 'Transcoding' tab is selected. The configuration includes:

- PROCESS NAME:** STAT1 service
- PROGRAM NUMBER:** 1
- TRANSCODING PROFILE:** Avc420Default1080i2997
- DESTINATION PROFILE:** ATSC 1.0 Destination
- VBR MODE:** ON
- MIN BITRATE:** 4 Mbps
- MAX BITRATE:** 6 Mbps
- PRIORITY:** MEDIUM
- STILL DETECTION:** OFF
- INPUT TRACKING:** OFF
- TRANSCODER 1+1 REDUNDANCY:** OFF
- LOGO:** Off |
- VIDEO INSERTION:** Off |
- ADDONS:** EAS-NET (highlighted with a red box)
- GRAPHICS:** Off |
- BLACKOUT SLATE:** Off |

4. In the Add-ons section, click the pencil icon to enable the EAS-NET option.

5. Enter the Station ID related to your EAS alarm file and click **Save**.



6. Click **Save** again at the bottom of the page to enable the S3-based EAS on your service.

Creating Decoding services

- Configuring a decoder with SDI output
- Configuring Teletext for decoding services with SDI output
- Adding Genlock input for SDI output
- Configuring descrambling

Configuring a decoder with SDI output

You can configure decoding channels with SDI output from the Configure Broadcast app.

- Creating a new decoder
- Configuring the Source Tab
- Configuring the Decoding Tab

Creating a new decoder

1. Navigate to the **Configure Broadcast** app.
2. Click the **+ Decoders** button to display the Decoders panel.



3. Drag and drop a program from the **Sources** panel into the **Decoders** panel. The Create Decoder window appears with two tabs:

- a. Source tab
- b. Decoding tab

Configuring the Source Tab

You can groom the source and configure the add-ons for the decoder service.

1. Groom the Primary source

- First XOS is searching for a connection on its input. Once the input is found, the **Groom** button is displayed.

CREATE DECODER

Source Decoding

PRIMARY

NAME: SF 1 HD

SOURCE: SF1 HD

PROGRAM NUMBER: 1

Connect Found: Spts 1 : SF 1 HD ▶

OK Groom

SECONDARY

OFF

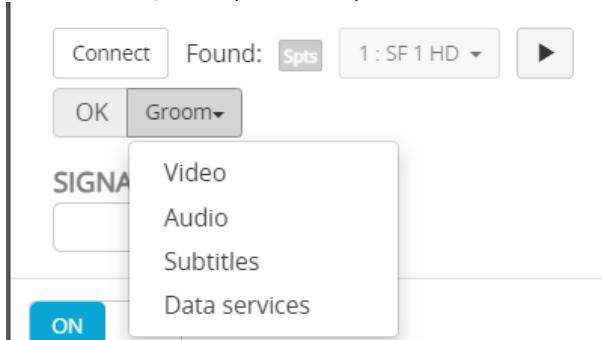
SIGNAL LOSS SLATE

OFF

ON

✓ Save Cancel

- Groom **Video, Audio, Subtitles, and "Data services"**.



2. Configuring the Signal Loss Slate.

- You can activate **Signal Loss Slate** and choose a black screen or a personalized picture.

SIGNAL LOSS SLATE

ON

DISPLAY A BLACK SCREEN

OFF

SIGNAL LOSS IMAGE



Video unavailable

3. (Optional) Configuring a Secondary source.

- You can configure a **secondary source** and specify when it will apply by setting the failover settings.

CREATE DECODER

Source **Decoding**

PRIMARY

NAME: Lifetime HD East

SOURCE: RF Tuner 1

PROGRAM NUMBER: 1

Connect Found: Mpts 1 : Lifetime HD East ▶

OK Groom▼

SIGNAL LOSS SLATE

ENABLE: **ON**

DISPLAY A BLACK SCREEN: **OFF**

SIGNAL LOSS IMAGE

Video unavailable

SECONDARY

ENABLE: **ON**

NAME: e.g. NBA

SOURCE: Select value...
RF Tuner 1
asi-source
ip-source-01
Connect

FAILOVER SETTINGS

MODE: **Custom**

Video Missing
 Scrambled Video Pid
 Continuity Counter Error
 Audio Pid Missing

STATUS: **OFF**

Save **Cancel**

Configuring the Decoding Tab

You can configure the general decoder information for SDI output.

1. Configure the mandatory parameters:

- **SDI Outputs:** Select the SDI card number(s) being used with the respective SDI port number(s).

Note

Using the same SDI card, the signal generated by a decoder channel can be duplicated up to four times.

- **Video Profile:** Select the video profile of the decoder.

- **Input Tracking:** Activate or not Input tracking (OFF by default).

EDIT DECODER: TV5MONDE EUROPE HD

Source	Decoding									
NAME	TV5MONDE EUROPE HD									
SDI OUTPUTS	<table border="1"> <thead> <tr> <th>CARD</th> <th>PORT</th> <th>MUTE OUTPUT ON INPUT SYNC LOSS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> <td>OFF</td> </tr> <tr> <td>1</td> <td>2</td> <td>OFF</td> </tr> </tbody> </table> + SDI output	CARD	PORT	MUTE OUTPUT ON INPUT SYNC LOSS	1	5	OFF	1	2	OFF
CARD	PORT	MUTE OUTPUT ON INPUT SYNC LOSS								
1	5	OFF								
1	2	OFF								
VIDEO PROFILE	HD 1080i25									
INPUT TRACKING	ON									
AUDIO CONFIGURATION	Edit									
TELETEXT FORMAT	OP 47									
ADDONS	<table border="1"> <thead> <tr> <th>LOGO</th> <th>GRAPHICS</th> </tr> </thead> <tbody> <tr> <td>Off Configure</td> <td>Off Configure</td> </tr> </tbody> </table>	LOGO	GRAPHICS	Off Configure	Off Configure					
LOGO	GRAPHICS									
Off Configure	Off Configure									
<input type="button" value="Stopped"/> <input type="button" value="On-air"/> <input checked="" type="button" value="Save"/> <input type="button" value="Cancel"/> <input type="button" value="Delete"/>										

VIDEO PROFILE	HD 1080p25				
INPUT TRACKING	HD 1080i29.97				
AUDIO CONFIGURATION	HD 720p59.94				
ADDONS	HD 1080i25				
<input type="button" value="Stopped"/> <input type="button" value="On-air"/>					
<table border="1"> <tbody> <tr> <td>HD 1080p50</td> </tr> <tr> <td>HD 1080p59.94</td> </tr> <tr> <td>HD 1080p25</td> </tr> <tr> <td>HD 1080p29.97</td> </tr> </tbody> </table>		HD 1080p50	HD 1080p59.94	HD 1080p25	HD 1080p29.97
HD 1080p50					
HD 1080p59.94					
HD 1080p25					
HD 1080p29.97					

2. Configure the **Aspect Ratio**.

The aspect ratio parameter is visible in case the video resolution in the profile is SD.

3. Set the **Audio Configuration**.

- To see the Audio Configuration, click on the Edit button.
- The number of audio components in the service configuration is automatically adjusted to fit the number of audio components in the source
- The audio management will be by label: Audio_1, Audio_2... with automatic labeling in grooming (cf Source Tab)
- Select the audio format: PCM stereo / PCM 5.1 / Passthrough

SDI AUDIO FORMATS		SDI Pair
Audio #	Audio format	
1	PCM 5.1	Group 1 Pair 1 Group 2 Pair 1
2	PCM 5.1	Group 2 Pair 2 Group 3 Pair 1 Group 3 Pair 2
3	PCM stereo	Group 4 Pair 1
4	PCM stereo	Group 4 Pair 2
5	PCM stereo	No pairs
6	PCM stereo	No pairs
7	Passthrough	No pairs

Buttons: Cancel, Update

4. Configure the **Logo Add-ons**.

- Click the **Configure** button to enable the logo insertion.



- The logo can be uploaded directly with URL or the File Uploader tab.

SELECT IMAGE

X

Library Upload by url **File Uploader**

PATH TO WATCHED FILE
https://domain.com/path/filename.png or https://192.198.45.45/path/filename.png

LABELS
+ Label(e.g, NBC)

✓ Add

SELECT IMAGE

Library **Upload by url** File Uploader

Select File
or drag and drop your file here
(Allowed extension: .png)
Size limit 2048Mb

- The uploaded image will then be available in the **Library** tab and you can select it:

The screenshot shows a 'SELECT IMAGE' dialog with the following interface:

- Toolbar:** Library (selected), Upload by url, File Uploader.
- List:**
 - Id: DEFAULT_SLATE_IMAGEID**: Preview shows a black screen with 'Video unavailable'. Action buttons: checkmark, edit, delete.
 - Id: PURE_BLACK_SLATE_IMAGEID**: Preview shows a solid black screen. Action buttons: checkmark, edit, delete.
 - Id: STANDBY_BLACKOUT_SLATE_IMAGEID**: Preview shows a solid black screen with 'Please standby'. Action buttons: checkmark, edit, delete.
 - Id: France2_HD**: Preview shows a red box with 'France 2 HD'. Action buttons: checkmark, edit, delete.
- Buttons:** Apply (blue button), Cancel (grey button).

5. Configure Graphics Add-on.

- Click the **Configure** button to enable the graphic insertion.

The screenshot shows the 'GRAPHICS ADDON' configuration dialog with the following interface:

- Header:** GRAPHICS, On, Configure (highlighted).
- Buttons:** On, Configure.
- List:**
 - TEMPLATE**: Clickable icon.
 - TEMPLATE PARAMETER (OPTIONAL)**: Input field containing 'e.g <http://feeds.reuters.com/reuters/entertainment>'.
- Buttons:** Disable (red button), Save (blue button), Cancel (grey button).

- The graphic can be uploaded directly with URL or the File Uploader tab.

SELECT GRAPHIC TEMPLATE

Library Upload by url File Uploader

Select File
 or drag and drop your file here
 (Allowed extension: .zip)
 Size limit 2048Mb

- Upload the Zip file directly with url or with the file uploader

PROVIDE AN IMAGE ID FOR 1080-LOGO-LOOP-WEBM.ZIP

IMAGE ID

Optional, automatically generated if not provided

Upload

Cancel

- Select it in the Library and apply it

SELECT GRAPHIC TEMPLATE

Library Upload by url File Uploader

Id: 1080-logo-loop-webm	
<input type="text" value="+ Label(e.g. NBC)"/>	

Apply

Cancel

6. Click **Save**.

Configuring Teletext for decoding services with SDI output

You can configure sources with Teletext for decoding services from the Configure Broadcast app.

1. Navigate to the **Configure Broadcast** app.

2. Click the **+ Decoders** button to display the Decoders panel. (Refer to the [Configuring a decoder with SDI output for details.](#))

3. Drag and drop a program with a Teletext descriptor from the **Sources** panel into the **Decoders** panel.

4. Configure the Source tab.

- The Teletext Data appears in the "Data services" tab when the grooming is finished.

GROOM			
		Subtitles	Data services
PID	Type	Labels	Descriptors
0x267	27 Video	+ Label	3D AVC Video Descriptor (0x28)
0x27B	MPEG Audio	+ Label	Audio Stream Descriptor (0x03) ISO 639 Language Descriptor (0x0A)
0x343	TELETEXT Data	+ Label	Teletext Descriptor (0x56)
0x3A7	DVB_SUBTITL...	+ Label	Subtitling Descriptor (0x59)
0x3A8	DVB_SUBTITL...	+ Label	Subtitling Descriptor (0x59)
0x3A9	DVB_SUBTITL...	+ Label	Subtitling Descriptor (0x59)

5. Configure the Decoding tab.

- The Teletext Format option appears in the "Decoding" tab when the grooming is finished.

CREATE DECODER		
	Source	Decoding
NAME	TV5MONDE EUROPE HD	
SDI CARD	1	
SDI PORT	2	
MUTE OUTPUT ON INPUT SYNC LOSS	OFF	
VIDEO PROFILE	SD 576i/25	
ASPECT RATIO	4:3	
INPUT TRACKING	OFF	
AUDIO CONFIGURATION	<input type="button" value="Edit"/>	
TELETEXT FORMAT	OP 42	
ADDONS	LOGO <input type="button" value="Off"/> <input type="button" value="Configure"/>	GRAPHICS <input type="button" value="Off"/> <input type="button" value="Configure"/>
<input type="button" value="Stopped"/> <input type="button" value="On-air"/> <input type="button" value="Save"/> <input type="button" value="Cancel"/>		

- Configure the **Teletext Format**.

TELETEXT FORMAT
OP 42
SMPTE 2031
OP 47
OP 42
WST
OP 42

6. Click **Save**.

Adding Genlock input for SDI output

XOS supports **Genlock** for SDI outputs when using the **Dektec SDI/ASI card**.

- HWR-XOS-OPT-SDI-ASI-4
- HWR-XOS-OPT-SDI-ASI-8

Each card provides a Genlock input, and XOS software needs to manage it. (Refer to [Enabling the ports of SDI card](#))

The Genlock is automatically activated when the cable is plugged and the signal is present. The Genlock status is displayed in the Configure Broadcast - SDI output panel. (Refer to [Configuring a decoder with SDI output](#))

- [Configure Decoding Services in XOS](#)
- [Configure the Genlock generator](#)
- [Check the Decoding services are Genlocked](#)
- [Disconnect the Genlock signal](#)
- [Connect the Genlock signal](#)
- [Disconnect the Genlock signal and Stop/Restart the service](#)
- [Connect the Genlock](#)
- [Misconfigure the Genlock generator](#)
- [Stop/Restart the service](#)
- [Disconnect the Genlock signal](#)

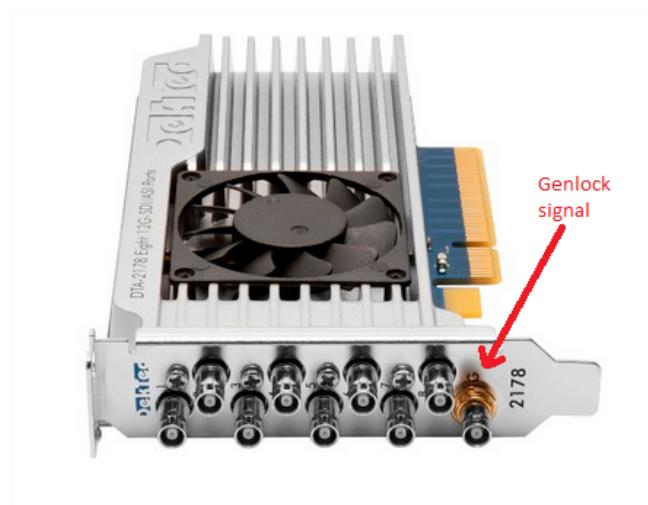
Configure Decoding Services in XOS

The Dektec cards currently have limitations that do not enable a mix of HD and SD.

Configure the Genlock generator

If the XOS decodes NTSC@29.97 or HDp@59.94 (Resp. PAL@25Hz or HDp@50), configure BlackBurst or triLevel at 29.97 or 59.94 (Resp. 25 or 50).

Connect the Genlock signal to the 9th port of the DTA-2178, which is dedicated to the Genlock signal. It will synchronize all the 8 ports.



Check the Decoding services are Genlocked

The Genlock Indicator on the GUI is not yet available.

Use the REST API: /mux/v1/monitor/sdi-ports

GET /platform-config/v1/sdiPorts Get SDI port list

Returns All SDI ports

Parameters

No parameters

Responses

Code Description

200 Success

Example Value Model

```

<com.harmonicinc.vos.flex.platform.config.model.SdiPort v= {
    cardId integer(int32)
        ASI/SDI Card ID (Read Only). Integer value starting from 1.
    enable boolean
        Reserved for internal use, shall be set to false.
    pixelOffset integer(int32)
        Specify the pixel offset to apply in output of the SDI port.
    platformObjectID string
        Platform Object ID
    portDisplayName string
        Port display name
    portId integer(int32)
        Port ID on the ASI/SDI Card (Read Only). Integer value starting from 1.
}>

```

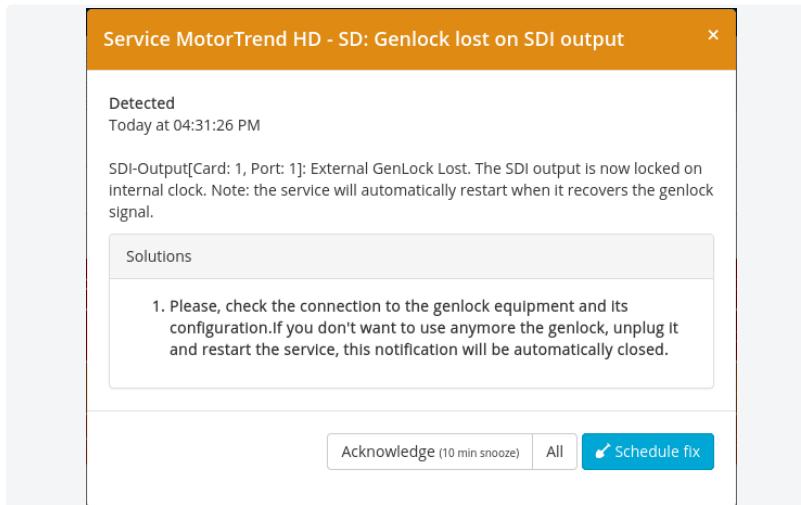
```
[
  {
    "cardNumber": 0,
    "portNumber": 0,
    "sourceFormat": null,
    "portUsage": "UNUSED",
    "syncStatus": "UNLOCKED",
    "clockReference": null,
    "genlockVideoStandard": null
  },
  {
    "cardNumber": 0,
    "portNumber": 1,
    "sourceFormat": null,
    "portUsage": "SDI OUT",
    "syncStatus": "LOCKED",
    "clockReference": "EXTERNAL_GENLOCK",
    "genlockVideoStandard": "29.97Hz"
  },
  {
    "cardNumber": 0,
    "portNumber": 2,
    "sourceFormat": null,
    "portUsage": "UNUSED",
    "syncStatus": "UNLOCKED",
    "clockReference": null
  }
]
```

Disconnect the Genlock signal

Check the status with the REST API: /mux/v1/monitor/sdi-ports

```
[  
 {  
   "cardNumber": 0,  
   "portNumber": 0,  
   "sourceFormat": null,  
   "portUsage": "UNUSED",  
   "syncStatus": "UNLOCKED",  
   "clockReference": null,  
   "genlockVideoStandard": null  
 },  
 {  
   "cardNumber": 0,  
   "portNumber": 1,  
   "sourceFormat": null,  
   "portUsage": "SDI_OUT",  
   "syncStatus": "UNLOCKED",  
   "clockReference": "EXTERNAL_GENLOCK",  
   "genlockVideoStandard": "29.97Hz"  
 },  
 {  
   "cardNumber": 0,  
   "portNumber": 2,  
   "sourceFormat": null,  
   "portUsage": "UNUSED",  
   "syncStatus": "UNLOCKED",  
   "clockReference": null,  
   "genlockVideoStandard": null  
 }]
```

The "SDI Genlock lost" alarm is asserted.



Connect the Genlock signal

Check the output, the services are restarting to acquire the GenLock synch. SDI output will disappear for a few seconds.

The alarm is remitted and the REST API: /mux/v1/monitor/sdi-ports will show SDI-out is { clockRef = EXTERNAL_GENLOCK; status=LOCKED, 29.97Hz }

Disconnect the Genlock signal and Stop/Restart the service

The "SDI Genlock lost" alarm is remitted.

No Genlock is present at the service start so the SDI-output will use its internal reference.

```
[  
  {  
    "cardNumber": 0,  
    "portNumber": 0,  
    "sourceFormat": null,  
    "portUsage": "UNUSED",  
    "syncStatus": "UNLOCKED",  
    "clockReference": null,  
    "genlockVideoStandard": null  
  },  
  {  
    "cardNumber": 0,  
    "portNumber": 1,  
    "sourceFormat": null,  
    "portUsage": "SDI_OUT",  
    "syncStatus": "LOCKED",  
    "clockReference": "INTERNAL_REF",  
    "genlockVideoStandard": null  
  },  
  {  
    "cardNumber": 0,  
    "portNumber": 2,  
    "sourceFormat": null,  
    "portUsage": "UNUSED",  
    "syncStatus": "UNLOCKED",  
    "clockReference": null,  
    "genlockVideoStandard": null  
  },  
]
```

Connect the Genlock

Check the output, the services are restarting to acquire the GenLock synch. SDI output will disappear for a few seconds.

Still no Alarm and the REST API: /mux/v1/monitor/sdi-ports will show SDI-out is { clockRef = EXTERNAL_GENLOCK; status=LOCKED, 29.97Hz }

Misconfigure the Genlock generator

Configure BlackBurst or triLevel at 25 or 50 (Resp. 29.97 or 59.94).

The "SDI Genlock lost" Alarm is raised.

The SDI output is OK using an Internal reference.

The REST API: /mux/v1/monitor/sdi-ports will show SDI-out is { clockRef = EXTERNAL_GENLOCK; status=UNLOCKED, UNKNOWN }

Stop/Restart the service

The SDI output is OK using an Internal reference.

The alarm is remitted.

The REST API: /mux/v1/monitor/sdi-ports will show SDI-out is { clockRef = INVALID; status=UNLOCKED, 25Hz }

Disconnect the Genlock signal

The SDI output is OK using an Internal reference.

No Alarm.

The REST API: /mux/v1/monitor/sdi-ports will show SDI-out is { clockRef = INVALID; status=UNLOCKED, 25Hz }

Configuring descrambling

- [Configure CAM descrambling](#)
- [Configure BISS-CA scrambling](#)

- Configure Fixed Key descrambling

Configure CAM descrambling

You can configure CAM descrambling on programs from demux sources.

⚠ Prerequisite

To enable CAM setup in XOS, navigate to the **Platform Configuration** app > **CAM**. (Refer to [Enabling CAM \(Conditional Access Module\)](#) for details)

1. Navigate to the **Configure Broadcast** app.
2. Click the **+Source** button and select the source type as follows:
 - a. IP source
 - b. ASI source
 - c. SRT source
 - d. HSP source
3. Navigate to the **Descrambling** tab > **Programs to Descramble** section.

4. Select one or both enabled CAMs (CAM1, CAM2) from the **CAM Association** drop-down.
5. Click the **+Add Program** button.
6. Configure the **Program Number** created in the source.
7. Select either CAM1 or CAM2 from the **Mode** drop-down.
8. Click **Create** to add the configured CAM descrambling to the programs to descramble the DVB-CI streams.

Configure BISS-CA scrambling

1. Navigate to the **Configure Broadcast** app.
2. Click the **+Source** button and select the source type as follows:
 - a. IP source
 - b. ASI source
 - c. SRT source
 - d. HSP source
 - e. 8VSB source
 - f. S2X source
3. Navigate to the **Descrambling** tab > **Programs to Descramble** section.

4. Click the **+Add Program** button.
5. Add the program numbers associated with the programs to descramble.
6. Click **Create** to add the programs to be descrambled.

Configure Fixed Key descrambling

You can configure fixed-key descrambling on programs from demux sources.

⚠ Prerequisite

To generate fixed descrambling keys in XOS, navigate to the **Configure Broadcast** app > **Settings**. (Refer to [Descrambling tab in Global Settings](#) for details.)

1. Navigate to the **Configure Broadcast** app.
2. Click the **+Source** button and select the source type as follows:

- a. IP source
- b. ASI source
- c. SRT source
- d. HSP source

3. Navigate to the **Descrambling** tab > **Fixed Key Descrambling** section.

4. Click the **+Add Program** button.
5. Configure the **Program Number** created in the source.
6. Select the **Descrambling Key ID** created from the Global Settings page.
7. Click **Create** to add the configured descrambling key to the programs.

Configuring TS passthrough

1. Click **+TS Passthrough**.

2. Configure the source and destination.

3. Verify the Full TS passthrough with source input with all programs.

Configuring a multiscreen encoding service

The product can be configured to create video transport streams that contain multiple bitrates (ATS destination) and can be used with an external packager.

It can also be configured to perform encoding and packaging, removing the need for an external packager by selecting an Origin/CDN destination type.

 **Note**

The ATSC-3.0 services have to be configured in the same way.

Multiple simultaneous destinations are supported to deliver for HLS, Smooth Streaming, DASH, RTMP, and ATS outputs.

When configuring a Multiscreen service, Multiscreen profiles are used to set a list of profiles to encode with their settings.

To configure a Multiscreen service, complete the following tasks:

1. Configuring the source input
2. Configuring a multiscreen ATS destination
3. Configuring the multiscreen packaged destination
4. Creating and activating the multiscreen ATS service

Configuring the multiscreen ATS destination

Once the destination type and profile have been selected (for details, refer to [Configuring a Destination](#)), follow the instructions:

1. If you wish to use an output that is different from the default, click **Remove output** and then click **+Output** and select the desired output type from the list.
 - HSP and Cloud (Live Routing) choices are not applicable to XOS.
 - **IP** and **SRT** outputs apply to the XOS application.
2. For ATS output with **IP** destination, configure the following settings:

IP address	Enter the multicast IP address for the egress output streams.
Port	Enter the port number for the egress output streams. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> Note Port numbers will be incremented for each output video stream in the profile defined in the Multiscreen encoding profile. Rules for incrementing port numbers are defined in the ATS Destination profile. </div>
Source IP address	Enter the virtual source IP address for the egress output streams.
Source Port	Enter the virtual source UDP port for the egress output streams.
Rank	Used if multiple outputs are configured.
Status	Determine how outputs are paired for redundancy: <ul style="list-style-type: none"> ◦ Mandatory output is active. ◦ Standby output is muted. ◦ Disabled output remains inactive until the status is changed to Standby or Mandatory using the REST API or UI. The first Mandatory output will be paired with the first Standby output, and so on.
Output Monitor	If the service will be encrypted and you want to be able to monitor clean video output, select Output Monitor and provide the delivery IP address and Port for monitoring.

3. For ATS output with **SRT** destination, use the default SRT settings or configure the custom SRT settings:

Stream ID	Customize the Stream ID to be inserted into the outgoing streams.
Encryption Type	Choose an encryption standard, or select None .

Channel Name	Enter a channel name that will also be used in the receiver configuration.
Bandwidth Overhead (%)	The Bandwidth Overhead is the percentage of the Average Bandwidth used to accommodate SRT controls. The default value is 20%.
Latency (ms)	Sending packets over a (usually unpredictable) network could result in time delay. SRT Latency is a fixed value (min. 0 ms, no max. value) representing the maximum buffer size available for managing SRT packets. The default value is 1000 ms.
Timeout (ms)	Connection timeout, in milliseconds. The default value is 10000 ms.
Blocking Mode	When blocking mode is enabled, the SRT function will not exit until the availability condition is satisfied. In non-blocking mode the SRT function always exits immediately, and in case of lack of resource availability, it returns an error with the appropriate code.

4. Click **Create**.

Configuring the multiscreen packaged destination

Once the source input has been configured, follow the instructions:

1. From the **Destinations** page, click **+ Destination**.
2. For **Destination Name**, type the name of the packaged destination.
3. For **Type**, select **ORIGIN/CDN**.
4. For Profile, select the desired Destination profile.

 **Note**

Default packaged destination profiles have to be updated before using them. Edit them from the Lab Wizard app or create new ones.

5. Optionally, in the **Labels** field, enter a label associated with the destination, such as Cartoon or Premium.

 **Tip**

Labels can help you search and find destinations more quickly.

6. Fill in the settings depending on the Destination profile.
7. If the used destination profile supports push packaging, then configure the following settings for OTT package output (**DASH**, **HLS**, and/or **MSS**):

 **Note**

Pull packaging is now supported on DASH package output for "Live Only". Note that the **Recording Buffer Time** needs to be configured as 0. (Refer to [Creating or Editing an Origin/CDN destination profile](#) for details.)

MPD Filename (DASH output only)	Enter the name of the MPD file of your output.
Playlist Filename (HLS output only)	Enter the name of the playlist file of your output.
Custom Tag (HLS output only)	<p>This parameter is optional and only displayed when the setting "Insert custom tag in Master playlist header" is enabled in the selected Destination Profile.</p> <p>If a text string is provisioned in this "Custom Tag" field, it is then inserted in the master playlist of the associated service, after the global tags and before the "#EXT-X-MEDIA" and "#EXT-X-STREAM-INF" tags.</p> <p>Example of text string: #EXT-X-SESSION-DATA:DATA-ID="com.example.lyrics",URI="lyrics.json"</p>

Compatibility Mode (push packaging only)	<p>Standard: WebDAV protocol (HTTP PUT/DELETE/MKCOL), in the case of HLS, DASH, and HSS formats. (With this compatibility mode, missing sub-folders are created using "MKCOL" HTTP request method and segment are removed after they have reached the retention period using "DELETE" HTTP request method).</p> <p>Akamai: HTTP POST in the case of HSS. WebDAV, with specific features, in the case of HLS and DASH.</p> <p>If you must publish to an Akamai CDN, then you must select Akamai for Compatibility Mode.</p> <p>Simple HTTP: Allows for only HTTP PUT requests to be sent. If enabled, XOS will not delete segment files after the Segment Retention Period configured in the destination profile is reached and XOS will not create the missing sub-folders.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>To use Simple HTTP, the destination folder must exist on the remote server or the remote server must automatically create the missing folders based on the PUT request (as XOS will not make any WebDAV "MKCOL" request when using Simple HTTP publishing mode). Automatically creating missing folders is not the standard behavior for most of the web servers supporting HTTP PUT. When deactivating "Flattened Structure" (such as the use of a different subfolder for each video profile) or activating "Rollover Segment Dir," XOS automatically pushes to sub-folders and it is mandatory to use a server that can create those sub-folders automatically.</p> </div> <p>S3: S3 refers to the AWS S3 bucket which supports DASH output. If selected, you will need to configure the "S3 Publishing Point" details instead of the "Primary Publishing Point".</p> <p>MediaStore: MediaStore refers to the AWS MediaStore container which supports HLS output. When selected, you will need to configure the "AWS MediaStore Publishing Point" details to manage and publish your media assets effectively.</p>
Streaming Protocol	Select HTTP or HTTPS from the toggle.
Primary Publishing Point (Compatibility Mode: Standard, Akamai, Simple HTTP)	<p>Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.</p> <p>Port: Set to 80 for HTTP. Can be customized if required.</p> <p>Network: Select the Ethernet interface to push OTT content via HTTP/HTTPS protocols.</p> <p>Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the service ("Service1", "CNN")</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>ℹ Info</p> <p>The resulting URL of the publishing point could be "HTTP(s)://Hostname:Port/Path".</p> </div> <p>Username/Password: Use only if authentication is required.</p>

<p>S3 Publishing Point (Compatibility Mode: S3)</p>	<p>AWS Region: Enter the geographical location where your S3 bucket is located. Examples include us-east-1, eu-west-1, etc.</p> <p>Bucket Name: Specify the unique name of the S3 bucket where the DASH output will be written.</p> <p>Relative Path: This is a part of the Full Path URL structure that helps organize the DASH output. (e.g. harmonic/myTest/)</p> <div style="border: 1px solid #ccc; padding: 10px;"> <p>Info</p> <p>The resulting Full Path URL of the publishing point consists of the Relative Path, Service ID, and the OTT format as follows:</p> <ul style="list-style-type: none"> ◦ DASH output: "HTTP(s)://Relative_Path/{Service ID}/DASH" where the Service ID can be found in the Configure Channel UI when the current service is selected or via Configure Service REST API GET request /configure/v1/services. </div> <p>Region Separator</p> <ul style="list-style-type: none"> ◦ Dash Separator: This separator differentiates different regions using a dash symbol ("-"), for example, folder/region1-object1, folder/region1-object2, folder/region2-object1 ◦ Dot Separator: This separator differentiates different regions using a dot symbol ("."), for example, videos.region1.video1, videos.region1.video2, images.region2.photo1 <p>Network: Select the Ethernet interface to push OTT content to an external S3 bucket via HTTP/HTTPS protocols.</p> <div style="border: 1px solid #ffcc00; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>XOS only supports pushing content to the S3 bucket for DASH output (Live application only). You can also use relative paths in addition to absolute paths in manifests for S3 connections.</p> </div> <p>Access Key: Enter the Access Key ID associated with your AWS account that grants access to the S3 bucket.</p> <p>Secret Access Key: Enter the Secret Access Key paired with the Access Key ID. It serves as the password for accessing AWS services.</p>
--	--

<p>AWS MediaStore Publishing Point (Compatibility Mode: MediaStore)</p>	<p>Host Name: The Host Name can be obtained from the "Data Endpoint" field on the container description page. Enter it without the protocol prefix (e.g., 'http:// or https://').</p> <p>AWS Region: Enter the geographical location where your MediaStore container is hosted.</p> <p>Relative Path: This is a part of the Full Path URL structure that helps organize the HLS outputs. (e.g. harmonic/myTest/)</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Info</p> <p>The resulting Full Path URL of the publishing point consists of the Relative Path, Service ID, and the OTT format as follows:</p> <ul style="list-style-type: none"> ◦ HLS output: "HTTP(s)://Relative_Path/{Service ID}/HLS" where the Service ID can be found in the Configure Channel UI when the current service is selected or via Configure Service REST API GET request / configure/v1/services. </div> <p>Network: Select the Ethernet interface to push OTT content via HTTP/HTTPS protocols.</p> <p>Access Key ID: Enter the Access Key ID associated with your AWS account that grants access to the MediaStore container.</p> <p>Secret Access Key: Enter the Secret Access Key paired with the Access Key ID. It serves as the password for accessing AWS MediaStore services.</p>
<p>Redundancy Mode</p>	<p>Select None, Active_Active, and Active_Standby from the drop-down menu for the Publishing Point redundancy setup. If the Active_Active, or Active_Standby mode is selected, you need to configure the Backup Publishing Point details.</p>
<p>Publish Generated Key to External Server (This is shown when encryption is enabled in the Destination Profile for HLS packaging output)</p>	<p>ON/OFF: When turned "ON", you can configure the service to publish internally generated keys to the external server.</p> <p>Protocol: Select HTTP or HTTPS protocol from the toggle.</p> <p>Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.</p> <p>Port: Set to 443 for HTTP/HTTPS. Can be customized if required.</p> <p>Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the key retrieval.</p> <p>Username/Password: Enter the login credentials for key retrieval.</p> <p>Key Retrieval URI Path: The resulting Full URI Path for key retrieval could be "HTTP(s):// Hostname:Port/Path". Click the Generate using key publishing URI button to create the Full URI Path for key retrieval.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Internal Key Generation</p> <p>To generate internal keys, you can configure "Internal" from the Encryption Interface drop-down through the Scrambling app > DRM tab > Systems. Keys are generated directly without KMS and license server ("clear key license").</p> </div>

Chunked Encoding	Allows you to send data in a series of chunks on a per-package basis.
------------------	---

8. If the used destination profile supports pull packaging, configure these optional settings under **Internal**:

Publish Name	<p>The publish name, if provided, is used in place of the service UUID in the egress URL. The publish name is case-sensitive and must adhere to the following guidelines:</p> <ul style="list-style-type: none"> ◦ Can have 1-32 characters ◦ Can contain a-z, A-Z, _ - :. <p>For example, the following egress URL uses a publish name (rio2016_1) instead of a service UUID (f13e52a6-45f4-c677-c5af-2fa05ac42fe5,startTime=14715212651600000): http://origin.example.com/content/HLS/Live/channel(rio2016_1)/index.m3u8</p>
Output Mode	<p>Live and Time-shift: Outputs live content and generates from-live data. (Note that the Time-shift feature is not supported in XOS.)</p> <p>Live Only: Outputs live content without generating from-live data. (Note that Live Only is supported in XOS.)</p> <p>Time-shift Only: Generates from-live data only. Note that, in this mode, there is no URL for monitoring output. (Note that the Time-shift feature is not supported in XOS.)</p>

9. For the destination profile with RTMP package output, configure the following settings under **RTMP**:

Compatibility Mode	<p>Standard: WebDAV protocol (HTTP PUT/DELETE/MKCOL), in the case of HLS, DASH, and HSS formats. (With this compatibility mode, missing sub-folders are created using "MKCOL" HTTP request method and segment are removed after they have reached the retention period using "DELETE" HTTP request method).</p> <p>Akamai: HTTP POST in the case of HSS. WebDAV, with specific features, in the case of HLS and DASH.</p> <p>If you must publish to an Akamai CDN, then you must select Akamai for Compatibility Mode.</p>
Stream Name	<p>This refers to the stream name prefix parameter {streamNamePrefix} which can be used to create a customized stream name for each "RTMP stream".</p> <p>It is possible to use a custom stream name per "RTMP stream" (individual or grouped video and audio tracks).</p> <p>For example, the customized stream name can be generated with the following format:</p> <ul style="list-style-type: none"> ◦ {streamNamePrefix}%c[{trackName1},{trackName2},{trackName3}...]
Streams Per TCP Connection	<p>For RTMP output using the Standard Compatibility Mode, you can configure the toggle as follows:</p> <ul style="list-style-type: none"> ◦ One: One single TCP connection is established for all streams. ◦ All: Individual TCP connections are established for all streams. <p>For RTMP output using the Akamai Compatibility Mode, you do not need to configure TCP Connection settings.</p> <ul style="list-style-type: none"> ◦ TCP connection per stream (mandatory for Akamai interoperability).

Streaming Protocol	Select RTMP or RTMPS from the toggle.
Primary Publishing Point	Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.
	Port: Set to 80 for HTTP. Can be customized if required.
	Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the service ("Service1", "CNN")
	<p> Info The resulting URL of the publishing point is "HTTP(s)://Hostname:Port/Path"</p>
Redundancy Mode	Select None, Active_Active, and Active_Standby from the drop-down menu for the Publishing Point redundancy setup. If the Active_Active, or Active_Standby mode is selected, you need to configure the Backup Publishing Point details.

10. Click **Create**.

Creating and activating a multiscreen service

Configure the profile, source, and destination that make up the service. Then, activate the service to begin receiving, transcoding, and outputting video.

- From the **Services** page, click **+ Service**.
Result: The **Create Service** wizard opens.
- On the **Profile** tab, select **Multiscreens Silver HD** and then click **Next**.
- On the **Source** tab, select the name of the primary source, and optionally, an alternate source, and then click **Next**.
- On the **Destination** tab, select the name of the destination from the **Destination** drop-down list (multiple selections are supported for multiple destinations) and then click **Next**.
- If necessary, on the **Commit** tab, for **Program Number**, type a program number for the video channel.
- In the **Service Name** field, enter the name of the new source.
- Keep the **Redundancy** setting as Off as this is not available on XOS.
- Optionally, turn on the **Input Tracking** toggle.
- Optionally, turn on the **Dynamic Program** toggle.
- Optionally, turn on the **Geo Redundancy** toggle.
- Optionally, in **Geo Redundancy Time Reference**, select **VITC**. Geo-redundant transcoding services support the VITC from their sources as a reference for synchronization. This will change the Geo-sync encoding for TS or SRT inputs from PTS to VITC time.
- Optionally, change **Timecode Generation** from **Disabled** to **UTC** after changing the **Daily Sync Time (UTC hour)** under the Settings>Advanced tab.
- Optionally, turn on the **Stream Conditioning** toggle.

14. Optionally, turn on the **Sync Loss Detection Threshold** toggle and configure a delay before switching when doing 2022-6 source redundancy (no 2022-7) when the input stream gets sync-loss errors.
15. Select **Active** if you want the service to go online when you commit the new service.
16. Configure service **add-ons** as required by the channel. For more information on **add-ons**, see [Configuring service add-ons](#).
17. When you have finalized the service settings, click **Commit**.

Edit service : M6 Packaging

		Monitor		
SERVICE NAME		SOURCE		PROFILE
M6 Packaging		Primary	Alternate	Multiscreens Passthrough v.1
LABELS		MPTS M6		 Lab Wizard
PROGRAM NUMBER		PRIMARY MPTS M6		DESTINATION
6				M6 DASH
PRIORITY				ORIGIN/CDN
Normal				M6 DASH
REDUNDANCY				DASH
OFF				INTERNAL
INPUT TRACKING				
OFF				
DYNAMIC PROGRAM				
OFF				
GEO REDUNDANCY				
AUTO				
GEO REDUNDANCY TIME REFERENCE				
AUTO				
TIMECODE GENERATION				
DISABLED				
<input type="checkbox"/> Add-ons				
Delete		Save	Online	Test
Offline		MUTE NOTIFICATIONS		OFF
Close				

Configuring a multiscreen packaging-only service

This configuration is only for XOS Packager.

Packaging-only services are for ABR/MBTS streams that are transcoded by an upstream device, ingested by XOS, and delivered via push packaging.

You can preview multiscreen services with DASH output in XOS using the Monitor Channels app. For multiscreen services with HLS or MSS output, you can obtain the output URL for copying to an external web-based player.

For more information, refer to [Monitoring an OTT package output](#)

To configure a Multiscreen packaging-only service, complete the following tasks:

1. Configuring the source input
2. Configuring the multiscreen packaging-only service destination
3. Creating and activating the multiscreen packaging-only service

Configuring the multiscreen packaging-only service destination

Once the source input has been configured, follow the instructions:

Note

Multiscreen service destinations support a single output.

1. From the **Destinations** page, click **+ Destination**.
2. For **Destination Name**, type the name of the new destination.
3. For **Type**, select **Origin/CDN**.
4. For **Profile**, select the desired **Multiscreen** profile.

Note

Be sure to use a Multiscreen destination profile with Pull packaging switched OFF and Push packaging switched ON.

5. Optionally, in the **Labels** field, enter a label associated with the destination, such as Cartoon or Premium.

Tip

Labels can help you search and find destinations more quickly.

6. Fill in the settings depending on the Multiscreen profile.
7. Configure the following settings for each OTT package output (DASH, HLS, MSS):

Note

Pull packaging is now supported on DASH package output for "Live Only". Note that the **Recording/Buffer Time** needs to be configured as 0. (Refer to [Creating or Editing an Origin/CDN destination profile](#) for details.)

MPD Filename (DASH output only)	Enter the name of the MPD file of your output.
Playlist Filename (HLS output only)	Enter the name of the playlist file of your output.

Custom Tag (HLS output only)	<p>This parameter is optional and only displayed when the setting "Insert custom tag in Master playlist header" is enabled in the selected Destination Profile.</p> <p>If a text string is provisioned in this "Custom Tag" field, it is then inserted in the master playlist of the associated service, after the global tags and before the "#EXT-X-MEDIA" and "#EXT-X-STREAM-INF" tags.</p> <p>Example of text string: #EXT-X-SESSION-DATA:DATA-ID="com.example.lyrics",URI="lyrics.json"</p>
Compatibility Mode (push packaging only)	<p>Standard: WebDAV protocol (HTTP PUT/DELETE/MKCOL), in the case of HLS, DASH, and HSS formats. (With this compatibility mode, missing sub-folders are created using "MKCOL" HTTP request method and segment are removed after they have reached the retention period using "DELETE" HTTP request method).</p> <p>Akamai: HTTP POST in the case of HSS. WebDAV, with specific features, in the case of HLS and DASH.</p> <p>If you must publish to an Akamai CDN, you must select Akamai for Compatibility Mode.</p> <p>Simple HTTP: Allows for only HTTP PUT requests to be sent. If enabled, XOS will not delete segment files after the Segment Retention Period configured in the destination profile is reached and XOS will not create the missing sub-folders.</p> <div style="border: 1px solid orange; padding: 10px;"> <p>⚠ Note</p> <p>To use Simple HTTP, the destination folder must exist on the remote server or the remote server must automatically create the missing folders based on the PUT request (as XOS will not make any WebDAV "MKCOL" request when using Simple HTTP publishing mode).</p> <p>Automatically creating missing folders is not the standard behavior for most of the web servers supporting HTTP PUT. When deactivating "Flattened Structure" (such as the use of a different subfolder for each video profile) or activating "Rollover Segment Dir," XOS automatically pushes to sub-folders and it is mandatory to use a server that can create those sub-folders automatically.</p> </div> <p>S3: S3 refers to the AWS S3 bucket which supports DASH output. If selected, you will need to configure the "S3 Publishing Point" details instead of the "Primary Publishing Point".</p> <p>MediaStore: MediaStore refers to the AWS MediaStore container which supports HLS output. When selected, you will need to configure the "AWS MediaStore Publishing Point" details to manage and publish your media assets effectively.</p>
Streaming Protocol	Select HTTP or HTTPS from the toggle.

<p>Primary Publishing Point (Compatibility Mode: Standard, Akamai, Simple HTTP)</p>	<p>Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.</p> <p>Port: Set to 80 for HTTP. Can be customized if required.</p> <p>Network: Select the Ethernet interface to push OTT content via HTTP/HTTPS protocols.</p> <p>Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the service ("Service1", "CNN")</p> <div style="border: 1px solid #ccc; padding: 10px;"><p>i Info</p><p>The resulting URL of the publishing point could be "HTTP(s)://Hostname:Port/Path".</p></div> <p>Username/Password: Use only if authentication is required.</p>
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<p>S3 Publishing Point (Compatibility Mode: S3)</p>	<p>AWS Region: Enter the geographical location where your S3 bucket is located. Examples include us-east-1, eu-west-1, etc.</p> <p>Bucket Name: Specify the unique name of the S3 bucket where the DASH output will be written.</p> <p>Relative Path: This is a part of the Full Path URL structure that helps organize the DASH output. (e.g. harmonic/myTest/)</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>Info</p> <p>The resulting Full Path URL of the publishing point consists of the Relative Path, Service ID, and the OTT format as follows:</p> <ul style="list-style-type: none"> ◦ DASH output: "HTTP(s)://Relative_Path/{Service ID}/DASH" where the Service ID can be found in the Configure Channel UI when the current service is selected or via Configure Service REST API GET request /configure/v1/services. </div> <p>Region Separator</p> <ul style="list-style-type: none"> ◦ Dash Separator: This separator separates different regions using a dash symbol ("-"), for example, folder/region1-object1, folder/region1-object2, folder/region2-object1 ◦ Dot Separator: This separator separates different regions using a dot symbol ("."), for example, videos.region1.video1, videos.region1.video2, images.region2.photo1 <p>Network: Select the Ethernet interface to push OTT content to an external S3 bucket via HTTP/HTTPS protocols.</p> <div style="border: 1px solid #ffcc00; border-radius: 10px; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>XOS only supports pushing content to the S3 bucket for DASH output (Live application only). You can also use relative paths in addition to absolute paths in manifests for S3 connections.</p> </div> <p>Access Key: Enter the Access Key ID associated with your AWS account that grants access to the S3 bucket.</p> <p>Secret Access Key: Enter the Secret Access Key paired with the Access Key ID. It serves as the password for accessing AWS services.</p>
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<p>AWS MediaStore Publishing Point (Compatibility Mode: MediaStore)</p>	<p>Host Name: The Host Name can be obtained from the "Data Endpoint" field on the container description page. Enter it without the protocol prefix (e.g., http:// or https://).</p> <p>AWS Region: Enter the geographical location where your MediaStore container is hosted.</p> <p>Relative Path: This is a part of the Full Path URL structure that helps organize the HLS outputs. (e.g. harmonic/myTest/)</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Info</p> <p>The resulting Full Path URL of the publishing point consists of the Relative Path, Service ID, and the OTT format as follows:</p> <ul style="list-style-type: none"> ◦ HLS output: "HTTP(s)://Relative_Path/[Service ID]/HLS" where the Service ID can be found in the Configure Channel UI when the current service is selected or via Configure Service REST API GET request /configure/v1/services. </div> <p>Network: Select the Ethernet interface to push OTT content via HTTP/HTTPS protocols.</p> <p>Access Key ID: Enter the Access Key ID associated with your AWS account that grants access to the MediaStore container.</p> <p>Secret Access Key: Enter the Secret Access Key paired with the Access Key ID. It serves as the password for accessing AWS MediaStore services.</p>
<p>Redundancy Mode</p>	<p>Select None, Active_Active, and Active_Standby from the drop-down menu for the Publishing Point redundancy setup. If the Active_Active, or Active_Standby mode is selected, you need to configure the Backup Publishing Point details.</p>
<p>Publish Generated Key to External Server (This is shown when encryption is enabled in the Destination Profile for HLS packaging output)</p>	<p>ON/OFF: When turned "ON", you can configure the service to publish internally generated keys to the external server.</p> <p>Protocol: Select HTTP or HTTPS protocol from the toggle.</p> <p>Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.</p> <p>Port: Set to 443 for HTTP/HTTPS. Can be customized if required.</p> <p>Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the key retrieval.</p> <p>Username/Password: Enter the login credentials for key retrieval.</p> <p>Key Retrieval URI Path: The resulting Full URI Path for key retrieval could be "HTTP(s)://Hostname:Port/Path". Click the Generate using key publishing URI button to create the Full URI Path for key retrieval.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Internal Key Generation</p> <p>To generate internal keys, you can configure "Internal" from the Encryption Interface drop-down through the Scrambling app > DRM tab > Systems. Keys are generated directly without KMS and license server ("clear key license").</p> </div>

Chunked Encoding	Allows you to send data in a series of chunks on a per-package basis.
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8. If the used destination profile supports pull packaging, configure these optional settings under **Internal**:

Publish Name	The publish name, if provided, is used in place of the service UUID in the egress URL. The publish name is case-sensitive and must adhere to the following guidelines: <ul style="list-style-type: none"> ◦ Can have 1-32 characters ◦ Can contain a-z, A-Z, _ - :. For example, the following egress URL uses a publish name (rio2016_1) instead of a service UUID (f13e52a6-45f4-c677-c5af-2fa05ac42fe5,startTime=14715212651600000): http://origin.example.com/content/HLS/Live/channel(rio2016_1)/index.m3u8
Output Mode	Live and Time-shift: Outputs live content and generates from-live data. (Note that the Time-shift feature is not supported in XOS.) Live Only: Outputs live content without generating from-live data. (Note that the Live Only feature is supported in XOS.) Time-shift Only: Generates from-live data only. Note that, in this mode, there is no URL for monitoring output. (Note that the Time-shift feature is not supported in XOS.)

9. For the destination profile with RTMP package output, configure the following settings under **RTMP**:

Compatibility Mode	Standard: WebDAV protocol (HTTP PUT/DELETE/MKCOL), in the case of HLS, DASH, and HSS formats. (With this compatibility mode, missing sub-folders are created using the "MKCOL" HTTP request method and segment are removed after they have reached the retention period using "DELETE" HTTP request method). Akamai: HTTP POST in the case of HSS. WebDAV, with specific features, in the case of HLS and DASH. If you must publish to an Akamai CDN, you must select Akamai for Compatibility Mode .
Stream Name	This refers to the stream name prefix parameter {streamNamePrefix} which can be used to create a customized stream name for each "RTMP stream". It is possible to use a custom stream name per "RTMP stream" (individual or grouped video and audio tracks). For example, the customized stream name can be generated with the following format: <ul style="list-style-type: none"> ◦ {streamNamePrefix}%c[{trackName1},{trackName2},{trackName3}...]
Streams Per TCP Connection	For RTMP output using the Standard Compatibility Mode, you can configure the toggle as follows: <ul style="list-style-type: none"> ◦ One: One single TCP connection is established for all streams. ◦ All: Individual TCP connections are established for all streams. For RTMP output using the Akamai Compatibility Mode, you do not need to configure TCP Connection settings. <ul style="list-style-type: none"> ◦ TCP connection per stream (mandatory for Akamai interoperability).

Streaming Protocol	Select RTMP or RTMPS from the toggle.
Primary Publishing Point	Hostname: Enter an IP address or a hostname. Note that the DNS must be correctly configured.
	Port: Set to 80 for HTTP. Can be customized if required.
	Path: Full path of the publishing point on the configured hostname, including the specific sub-path for the service ("Service1", "CNN")
	<p> Info The resulting URL of the publishing point is "HTTP(s)://Hostname:Port/Path"</p>
Redundancy Mode	Select None, Active_Active, and Active_Standby from the drop-down menu for the Publishing Point redundancy setup. If the Active_Active, or Active_Standby mode is selected, you need to configure the Backup Publishing Point details.

10. Click **Create**.

Creating and activating a multiscreen packaging-only service

- From the **Services** page, click **+ Service**.
Result: The **Create Service** wizard opens.
- On the **Profile** tab, select **Multiscreens Passthrough** and then click **Next**.
- On the **Source** tab, select the name of the primary source, and optionally, an alternate source, and then click **Next**.
- On the **Destination** tab, select the name of the destination from the **Destination** drop-down list and then click **Next**.
- If necessary, on the **Commit** tab, for **Program Number**, type a program number for the video channel.
- Keep the **Redundancy** setting as Off as this is not available on XOS.
- Select **Active** if you want the service to go online when you commit the new service.
- Configure service add-ons as required by the channel. For more information on **add-ons**, see [Configuring service add-ons](#).
- When you have finalized the service settings, click **Commit**.

Configuring an audio-only/radio transcoding service

You can configure and provision Audio-Only transcoding for a radio service. This feature enables you to configure and manage Audio-Only services for OTT channels and Broadcast outputs.

Audio-only transcoding is supported for the following sources:

- **SDI**
- **ST-2110 (AES-67)**

- **IP**

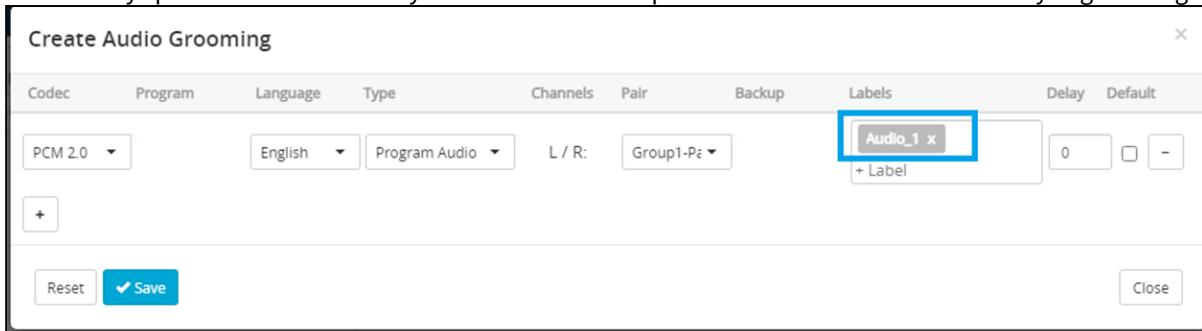
By default, two predefined profiles, namely "**Audio Only Broadcast**" and "**Audio Only OTT**", are available in the **Lab Wizard** app. Each profile consists of a single audio stream.

i Info

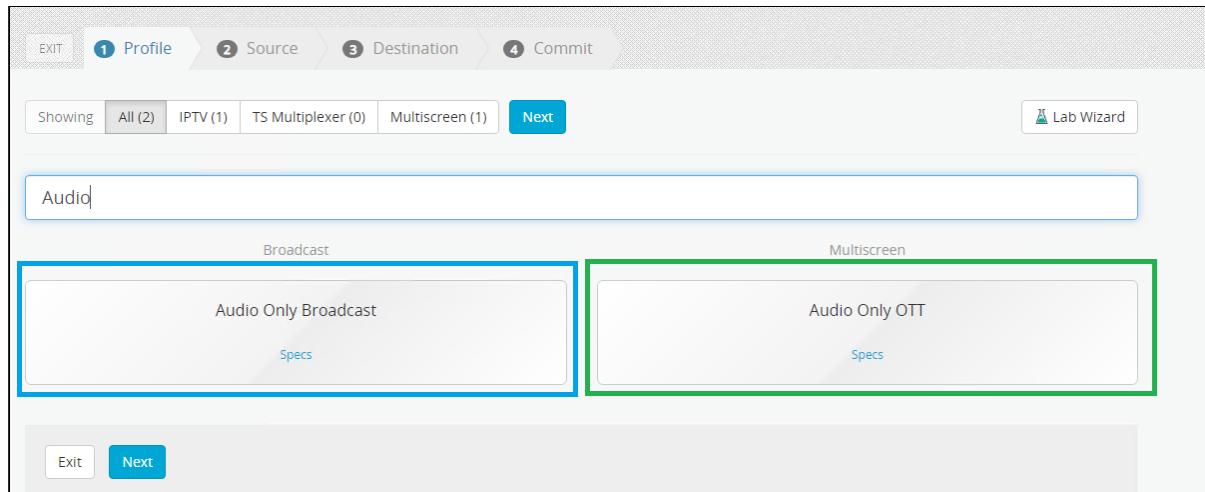
Creating a Radio Service is similar to making a regular service. Select the "Audio Only" profiles during service creation, which does not include video streams. Alternatively, you can customize Audio-Only profiles to meet their requirements.

Audio-only configurations for OTT channels

1. Create a source as the source of the Radio Service:
 - [SDI source](#)
 - [ST-2110 source \(AES-67\)](#)
 - [IP source](#)
2. Open the [Audio grooming](#) page and add the label "Label_1". "Label_1" is a predefined label within the default "Audio Only" profiles. You can modify this label within the profile but must ensure consistency in grooming.



3. Create a [Destination](#).
4. Create a [Service](#) and choose the "**Audio Only OTT**" profile during service configuration.



5. Activate and save the service.

Audio-only configurations for Broadcast Services

For broadcast services, select the "**Audio Only Broadcast**" transcoding profile when adding the service to the multiplexer. (Refer to [Adding and configuring a multiplexer](#) and [Adding programs to the multiplexer](#) for the configuration details.)

Unsupported Configurations

In the audio-only transcode service, certain configurations are not supported. Here is the list of unsupported configurations:

- Audio passthrough
- Shared service mode
- Alternate service source
- Data PIDs
- Audio mixing processing mode
- Audio processing mode SWITCH
- Source audio codec Dolby AC-4
- Audio codec Dolby AC-4
- Nielsen watermark
- Kantar Snap watermark
- Only mono and stereo channel modes are supported. Other channel modes are not supported.

Configuring and operating a playout service

Operators can use the XOS Playout Monitor app to monitor playout channels and perform master control operations. It supports the automatic execution of a playlist derived from a traffic schedule, as well as automatic fetch from the source file.

- *Primary events* consist of video events or clips. Both file-based assets and live input sources can be used for primary events. Live inputs and MXF assets support multiple languages, with multiple language playback in the output stream.
- *Secondary events* refer to graphics events, including logos and animations, and are always associated with a primary event. They are always executed with timing that is relative to the primary event.

Logos and graphic templates may be manually uploaded using the **Web Uploader** in Asset Acquisition. File-based video assets may also be uploaded manually in Asset Acquisition, but this is not recommended for production environments.

Info

You must configure at least one playout service in the **Configure Channels** app before you can access the Playout Monitor app.

The following topics are included in this section:

- Configuring a playout service
- Configuring an external live feed
- Configuring a demux source/input for a playout service
- Configuring a GPI box for splicing in XOS playout services
- XOS Playout Monitor app overview
- Configuring SCTE-104 input triggers from SDI inputs in XOS playout services
- Configuring and triggering SCTE-35 dynamic ad insertion
- XOS playlist schema
- Loading a playlist

- [Creating a primary event](#)
- [Creating a secondary event](#)
- [Creating and playing a sequence](#)
- [Creating XOS Playout clean and dirty outputs](#)
- [About Override mode](#)
- [Supported alarms](#)
- [About as-run logs](#)

Configuring a playout service

The playout service consists of an internally generated playout source, the service destination, and a transcoding or pass-through profile.

Follow these steps to configure a playout service:

1. [Configuring a playout source](#)
2. [Configuring a playout destination](#)
3. Optionally, configure external live feeds for primary events. Refer to [Configuring an external live feed](#) for more information.

Once the playout service is activated, you can monitor the timeline and perform master control operations using the Playout Monitor app. You can preview multiscreen services with DASH output in XOS using the Monitor Channels app. For multiscreen services with HLS or MSS output, you can obtain the output URL for copying to an external web-based player.

Configuring a playout source

The source defines the frame rate, resolution, and languages for the playout channel. One source can be used in multiple services, each with a unique destination.

Info

When the encoding profile is multiscreen, an interlaced Playout source is automatically converted to progressive.

1. From the **Configure Channels** app, navigate to the **Sources** page. Click **+ Source**.
2. In the **Input Source Name** field, enter the name of the new source.
3. If you wish to be able to filter by user-defined labels, enter a label in the **Labels** field.
4. Below **Inputs**, configure the **Signal Loss** input with the desired image file, or click **Remove** to delete the input if it is not required.
5. Click the **Add Input** icon, and then select **Playout Source** from the drop-down list.
6. Optionally, specify a **Playlist offset** between -2 and 0 seconds.

Note

If set to -2 seconds, an event that is scheduled at T0 will start at T0 -2 seconds.

7. For **Video Grooming**, define the frame rate and resolution for the playout source.
8. For **Audio Streams**, specify each language to be used in the playout source.

Info

Multiple audio streams are supported in external live inputs and MXF assets with PCM audio only. The languages used by the assets must match the languages defined for the playout source.

Info

A language must not be specified more than once.

9. Optionally, for **Data Streams**, choose an option from the **Type** drop-down list. Options include the following:
 - SCTE-35: If you want to trigger a switch from live to clips through SCTE104 or SCTE35 triggers from the input and/or include some SCTE35 triggers in the output, use this option. You can also configure a label for the output data stream.
 - **DVB_Subtitling**: This option can configure the output DVB Subtitle data stream and generate DVB Subtitle components to convert input subtitles in the video source into DVB subtitles for Playout output.
 - Teletext: This option can configure the output data stream.
 - Configure the Label, Subtitle Type, Page, and Language for the output stream as desired.
 - ID3: This option can configure a label for the output data stream.
 - Unknown: This option can configure a label for the output data stream.
10. Optionally, specify the **Duck Level** and the **Voice Over Level** in the **Voice over** area.
11. Set the time zone for your source from the **Time Zone** drop-down list.

Note

For drop-frame sources (29.97, 59.94 fps), configure the **UTC Time of Daily Adjustment** (or the hour at which the adjustment is done, 0-23).

12. Optionally, choose an option from the **Max Asset Bitrate** drop-down list.
13. Optionally, choose an option from the **Default Live Input** drop-down list.

Note

If you want to return to the live input, you have to select one here.

14. Optionally, click the checkbox to enable **Live Input Monitoring**.
15. Optionally, click the **Playlist: do not show gap between events in an error** checkbox to disable the displayed alarm if a playlist has a gap.
16. Optionally, select **Maximum number of sequences** (currently maximum 5).
17. Click **Create**.

Configuring a playout destination

The playout service can have an IP, downlink CloudLink, or CDN destination.

Before you begin

Configuring a playout source

1. From the **Configure Channels** app, navigate to the **Destination** page. Click **+ Destination**.
2. In the **Destination Name** field, enter the name of the new destination.
3. Select the destination **Type** and **Profile**.
4. If you wish to be able to filter by user-defined labels, enter a label in the **Labels** field.
5. Configure a signal loss output by selecting an image from a file server, or remove the output by clicking **Remove Output**.
6. Click **+Output** and select the output type from the list.
Note that Origin/CDN destinations have a single output option.
7. Configure the settings for the type of output you are using.

- For IP and CloudLink outputs, configure the following settings:

IP address	Type the multicast IP address for the egress output streams.
Port	Type the port number for the egress output streams.
Rank	Used if multiple outputs are configured.
Status	Determine how outputs are paired for redundancy: <ul style="list-style-type: none"> Mandatory output is active. Standby output is muted. Disabled output remains inactive until the status is changed to Standby or Mandatory using the VOS REST API or UI. The first Mandatory output will be paired with the first Standby output, and so on.
CloudLink	If the output type is CloudLink, select the name of the downlink CloudLink.
Output Monitor	If the service will be encrypted and you want to be able to monitor clean video output, select Output Monitor and provide the delivery IP address and Port for monitoring.

- For Zixi outputs, configure the following settings:

IP Address	Type the IP address for the egress output streams.
Port	Type the port number for the egress output streams.
Rank	Used if multiple outputs are configured.
Status	Determine how outputs are paired for redundancy: <ul style="list-style-type: none"> Mandatory output is active. Standby output is muted. Disabled output remains inactive until the status is changed to Standby or Mandatory using the VOS REST API or UI. The first Mandatory output will be paired with the first Standby output, and so on.
Output Monitor	If the service will be encrypted and you want to be able to monitor clean video output, select Output Monitor and provide the delivery IP address and Port for monitoring.
Encryption Type	Choose an encryption standard, or select None .

Channel Name	Enter a channel name that will also be used in the receiver configuration.
FEC Overhead (%)	FEC overhead in % over the source bitrate. The default value is 20%.
FEC Block (ms)	Maximum time of the FEC block, in milliseconds. The default value is 10 ms.
Max Latency (ms)	Maximum latency for error correction, in milliseconds. The default value is 1501 ms. <div style="border: 1px solid #fca; padding: 5px; margin-top: 10px;">⚠ Note<p>You must enter a value greater than 1500 ms.</p></div>
Timeout (ms)	Connection timeout, in milliseconds. The default value is 10000 ms.

- For Origin/CDN outputs, configure the following settings for each OTT package output (DASH, HLS, and/or MSS):

Rank	Used if multiple outputs are configured.
Streaming Protocol	Choose from HTTP and HTTPS.
Hostname	Enter an IP address or a hostname.
Port	Set to 80 for HTTP. Can be customized if required.
Path	Full path of the publishing point on the configured hostname, including the specific sub-path for the service ("Service1", "CNN"). <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;">⚠ Note<p>The resulting URL of the publishing point is "http://HOSTNAME:PORT/PATH".</p></div>
Username/ Password	Use only if authentication is required.

Compatibility Mode	<p>Standard: WebDAV protocol (HTTP PUT/DELETE/MKCOL), in the case of HLS, DASH, and HSS formats. (With this compatibility mode, missing sub-folders are created using "MKCOL" HTTP request method and segment are removed after they have reached the retention period using "DELETE" HTTP request method).</p> <p>Akamai: HTTP POST in the case of HSS. WebDAV, with specific features, in the case of HLS and DASH.</p> <p>If you must publish to an Akamai CDN, then you must select Akamai for Compatibility Mode.</p> <p>Simple HTTP: Allows for only HTTP PUT requests to be sent. If enabled, VOS will not delete segment files after the Segment Retention Period configured in the destination profile is reached and VOS will not create the missing sub-folders.</p> <div style="border: 1px solid #f0c987; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>To use Simple HTTP, the destination folder must exist on the remote server or the remote server must automatically create the missing folders based on the PUT request (as VOS will not make any WebDAV "MKCOL" request when using Simple HTTP publishing mode). Automatically creating missing folders is not the standard behavior for most of the web servers supporting HTTP PUT. When deactivating "Flattened Structure" (such as the use of a different subfolder for each video profile) or activating "Rollover Segment Dir," VOS automatically pushes to sub-folders and it is mandatory to use a server that can create those sub-folders automatically.</p> </div>
Chunked Encoding	Allows you to send data in a series of chunks on a per-package basis.
Output Monitor	If the service will be encrypted and you want to be able to monitor clean video output, select Output Monitor and provide the Hostname for monitoring.

8. Optionally, configure additional outputs of the same type.

9. Click **Create**.

Configuring an external live feed

External live feeds from VOS need to be configured as SRT outputs or as HSP outputs in order to be used by XOS.

For more information on how to configure VOS as an SRT or HSP output, see [Configuring a SRT source](#) or [Configuring a HSP source](#).

Configuring a demux source/input for a playout service

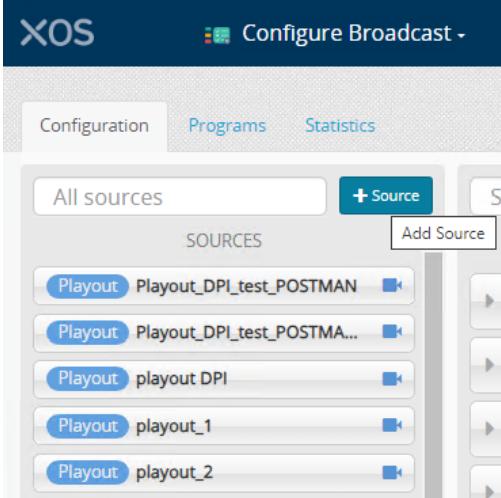
XOS Playout services provide support for various demux sources/inputs, including the following types of incoming streams:

- ASI input
- SRT input
- RF input

- TS/IP input

1. Navigate to the **Configure Broadcast** app.

2. Create a source.



- Click the **+ Source** button.
- Select the source as desired and set the appropriate parameters.
- You will have a list of sources under the list of existing playout services, previously created on your XOS Playout.

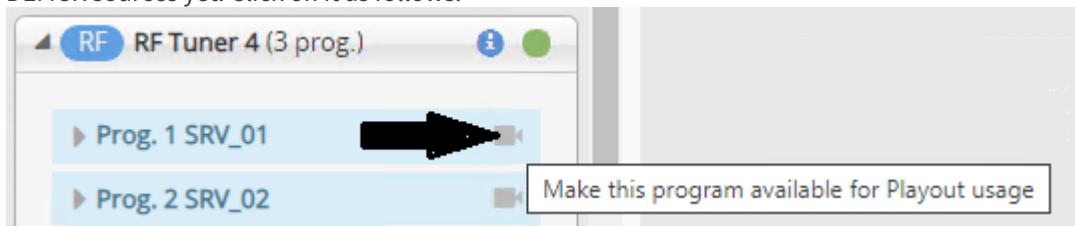


3. Configure a DEMUX source from the existing sources.

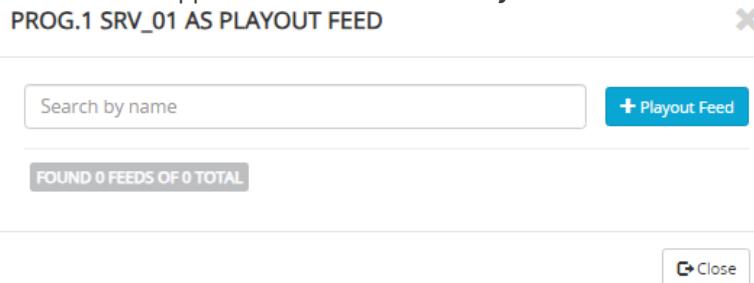
- Expand the incoming source (e.g. an RF source that contains an MPTS of three services).



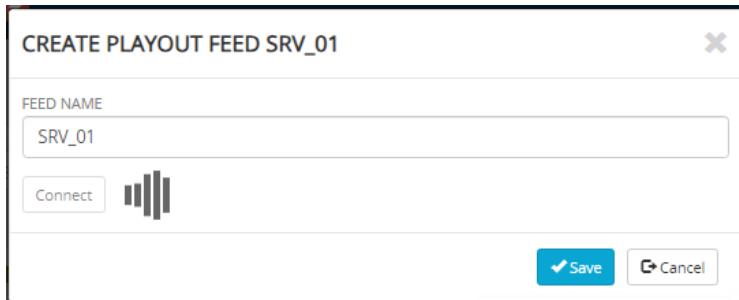
- A greyed 'camera' icon will be displayed for each program, implying that none of these services are DEMUX sources yet. Click on it as follows:



- A new window appears and click on the **+ Playout Feed** button.



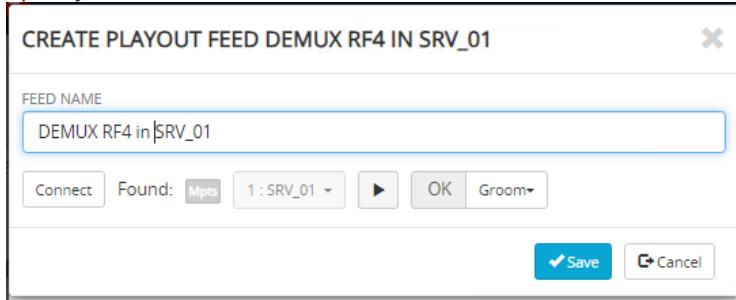
- Click **Connect**.



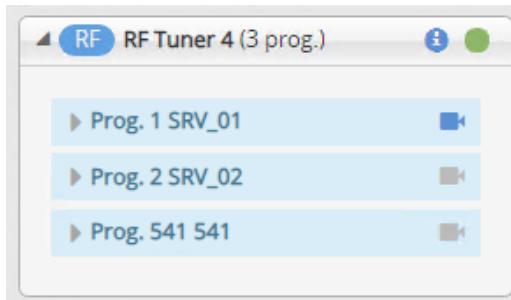
- Wait until the program is "discovered".



- Specify a Feed Name.



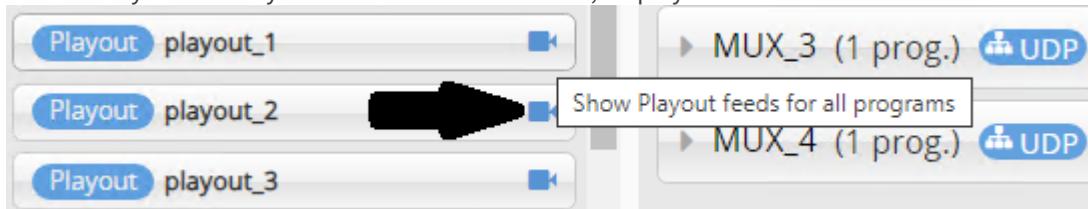
- Click **Save**.



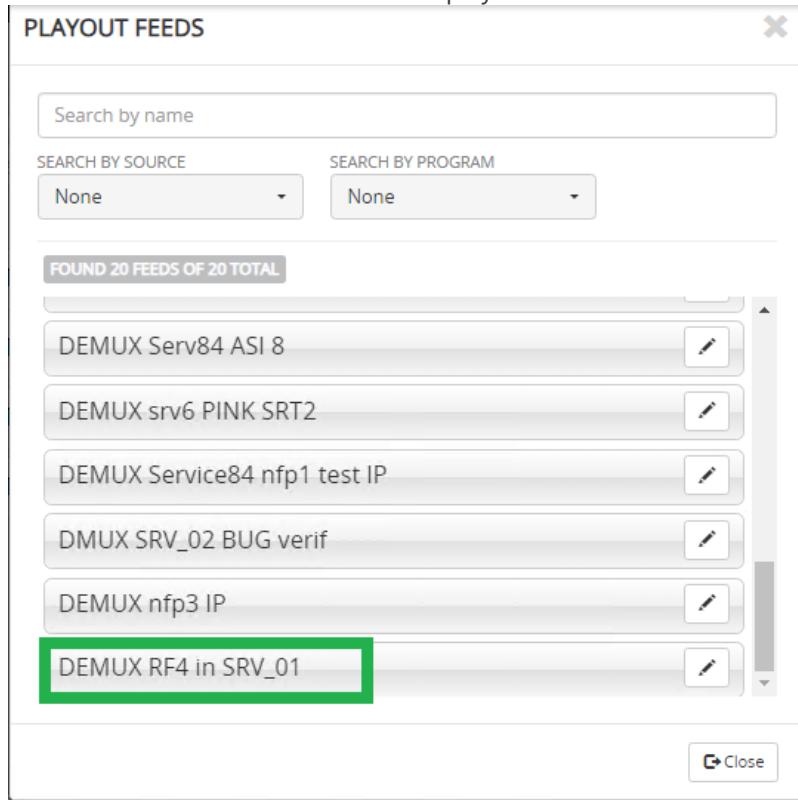
Now you can see a blue "camera" for this program which indicates it is now a DEMUX source/service.

4. Use this source for a playout service.

- Check that you can see your new DEMUX source here, on playout "camera".

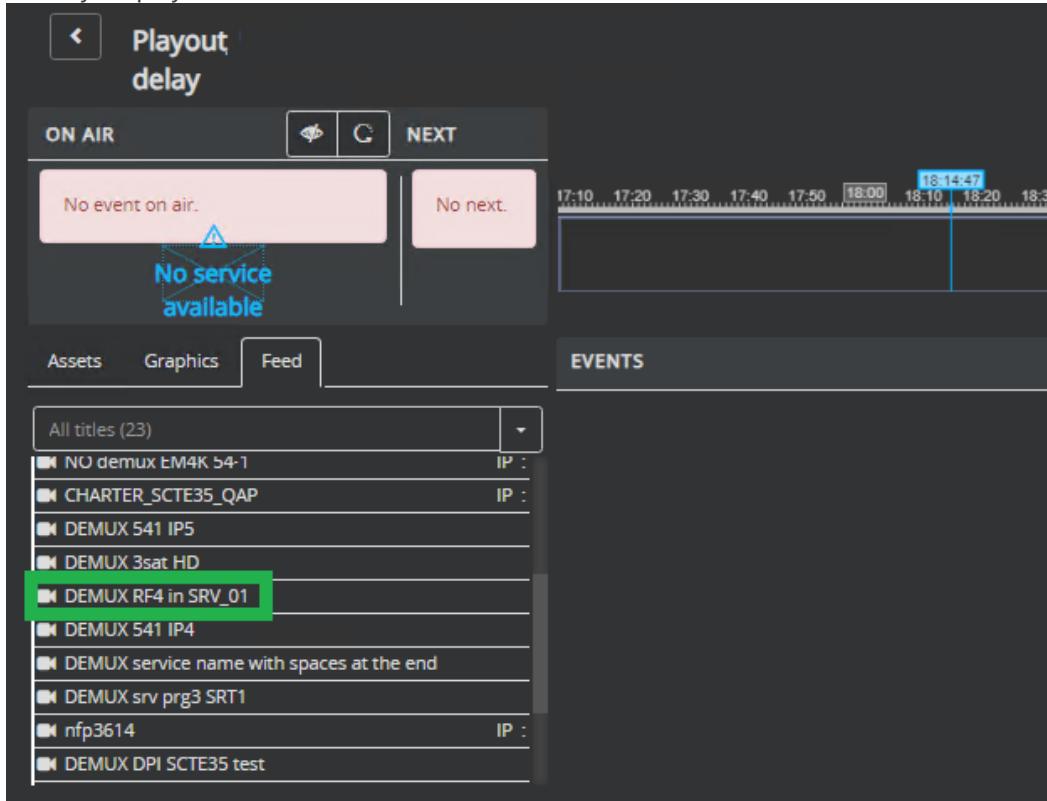


- This DEMUX source is now available for playout services.

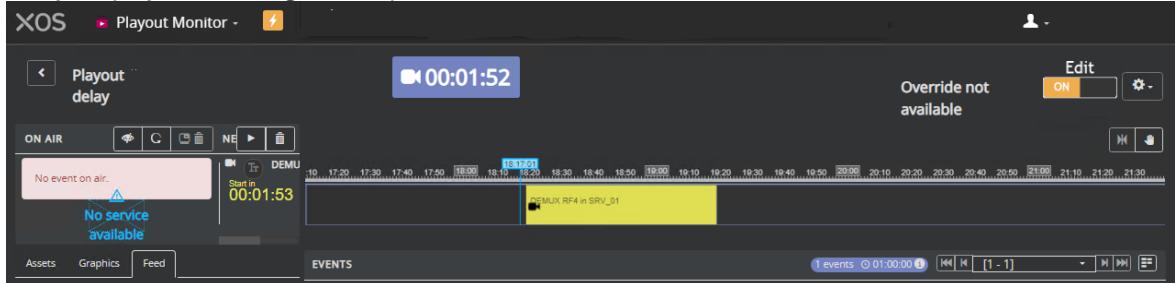


5. Navigate to the **Playout Monitor** app.

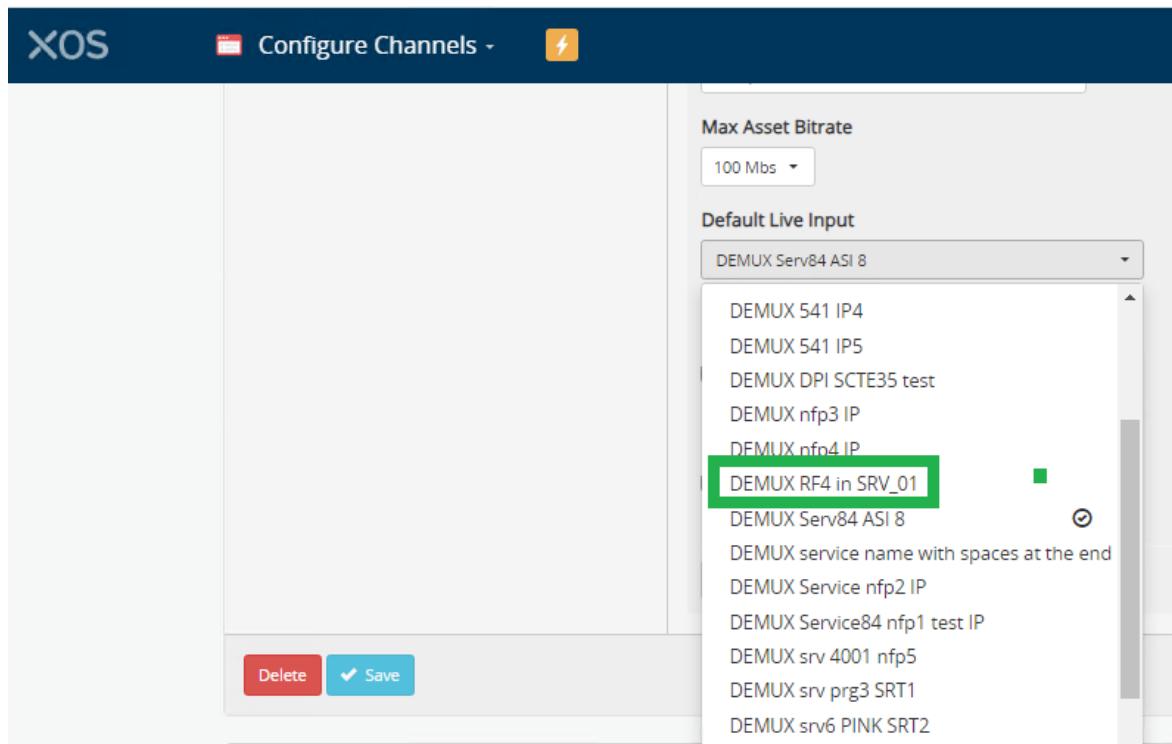
- Select your playout service.



- Edit your playlist and drag and drop it to use it.



- When you create a playout service, you can also configure this DEMUX source/service as the default Live input of this service.



Configuring a GPI box for splicing in XOS playout services

You can configure a GPI box as a GPI source to trigger switching between sources (live/clips) for the XOS playout services. When the trigger command is received from the GPI box, the corresponding primary event will be played in the playlist of the playout service.

- [Configure the GPI box settings](#)
- [Configure the GPI trigger settings](#)
- [Apply GPI triggers to the primary event](#)

Configure the GPI box settings

1. Navigate to the **Playout Monitor** app and click the icon on the right side.
2. Select the **GPI Settings** option from the drop-down menu.
3. Press the **+ Add GPI box** button from the pop-up window.
4. Configure the GPI Box settings:

- Configure the **Name** and the **IP Address** and set the **TCP Port** as configured on the GPI Box side.

The screenshot shows the 'Edit GPI box GPI BOX' configuration interface. It includes fields for NAME (GPI BOX), DESCRIPTION, IP ADDRESS (10.11.20.40), and TCP PORT (49153). Below these, there is a section titled 'Gpi box interfaces' which lists pairs of GPI inputs and outputs. The inputs are labeled GPI-0 through GPI-11, and the outputs are labeled GPI-6 through GPI-11. At the bottom right of the interface are 'Close' and 'Save' buttons.

- Under **GPI Box Interfaces**, the GPI ports will be automatically named based on the configured GPI box settings.

5. Click the **Save** button to save the GPI Box settings.

Configure the GPI trigger settings

1. Navigate to the **Playout Monitor** app and click the icon on the right side.
2. Select the **Trigger Settings** option from the drop-down menu.
3. Press the **+ Add Trigger** button from the pop-up window.

4. For GPI triggers, click **Add GPI**, add a **Trigger Name**, and select the port from the **GPI Name** as configured with the GPI ports created.

Create Trigger

TRIGGER NAME *

GPI NAME *

Select value...

GPI BOX

- GPI-0
- GPI-1
- GPI-2
- GPI-3
- GPI-4
- GPI-5
- GPI-6

+ Add GPI **+ Add SCTE35**

5. Configure the **Falling** or **Rising** logical level (GPI Edge) as a trigger.

Edit Trigger GPI1 Falling

TRIGGER NAME *

GPI NAME *

GPI-1

GPI EDGE

Falling

OFFSET (MS) *

0

+ Add GPI **+ Add SCTE35**

Close **Save**

Edit Trigger GPI1 Rising

TRIGGER NAME *

GPI NAME *

GPI-1

GPI EDGE

Rising

OFFSET (MS) *

0

+ Add GPI **+ Add SCTE35**

Close **Save**

6. Select the Offset if needed.

7. After saving the trigger settings, a new potential GPI trigger will be displayed on the list of all triggers.

Trigger Settings		
+ Add Trigger		
Default SCTE35 trigger from original source	SCTE-35	Edit Delete
GPI1 Rising	GPIO-1	Edit Delete
GPI1 Falling	GPIO-1	Edit Delete
GPI0 Rising	GPIO-0	Edit Delete
GPI 1&2	Combined	Edit Delete
SCTE-35 Event ID 1	SCTE-35	Edit Delete
GPI0 Falling	GPIO-0	Edit Delete

8. (Optional) Edit or delete the GPI trigger if needed.

Apply GPI triggers to the primary event

1. Check the playout service to add a Live source or an Asset to the playlist.
2. Set the **Start Mode** as "External".
3. Edit the Primary Event (Live or Asset).

4. Configure the **Start Trigger** by selecting and validating the desired GPI trigger from the drop-down menu.

The screenshot shows the 'Edit primary event' dialog. In the 'Start' section, the 'Trigger' dropdown is set to 'External'. The 'Start time' field shows '2024-12-04 18:11:32;28'. In the 'Duration' section, the 'Duration' field shows '00:01:50;28'. The background of the dialog has a red border around the 'Start' and 'Duration' sections.

5. Click **Save**.

Result: When the trigger command is received (Falling or Rising Edge) from the GPI box, the corresponding primary event will be played in the playlist of the playout service.

XOS Playout Monitor app overview

Review the components of the Playout Monitor user interface.

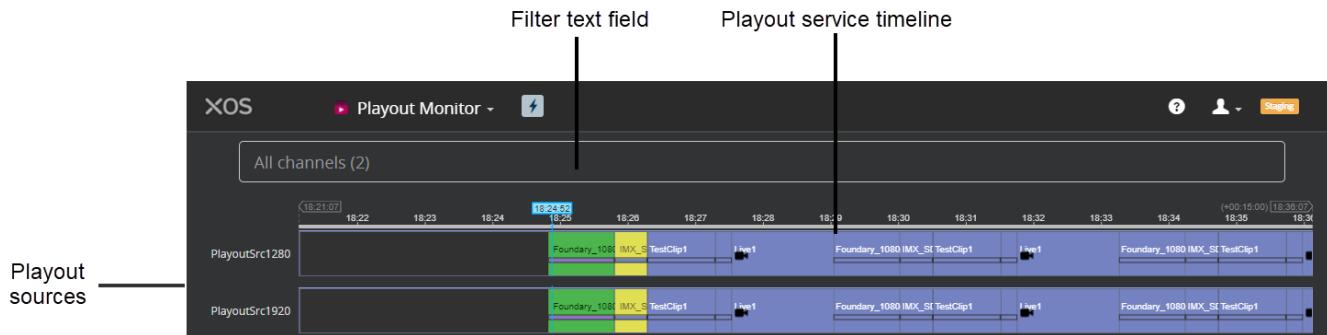
i Info

You must have a playout service configured in order to access the Playout Monitor app.

Channels source page

The **Channels source** page is the landing page for the Playout Monitor app. It displays a timeline for each playout service.

To view scheduled events, load schedules, and edit the on-air schedule, click the **Playout Source** on the left of the timeline.

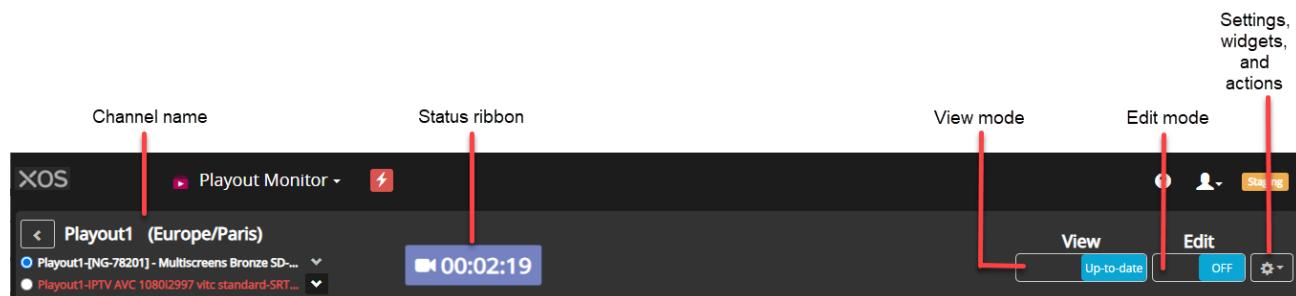


Playout monitor page

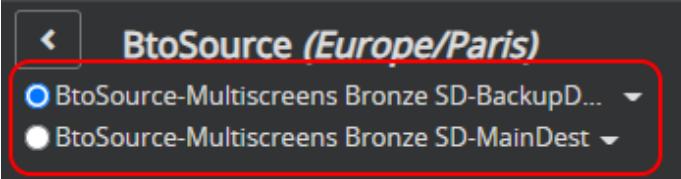
You can monitor the channel timeline and perform master control operations from the **Playout monitor** page.

- XOS Playout Monitor header
- View modes
 - Up-to-date
 - Full view
- Settings, Widgets & Actions
- Events and Timeline widgets
 - Insert comments into the playlist
- On-air widget
- Assets, Graphics, Feed, and Sequences widgets

XOS Playout Monitor header

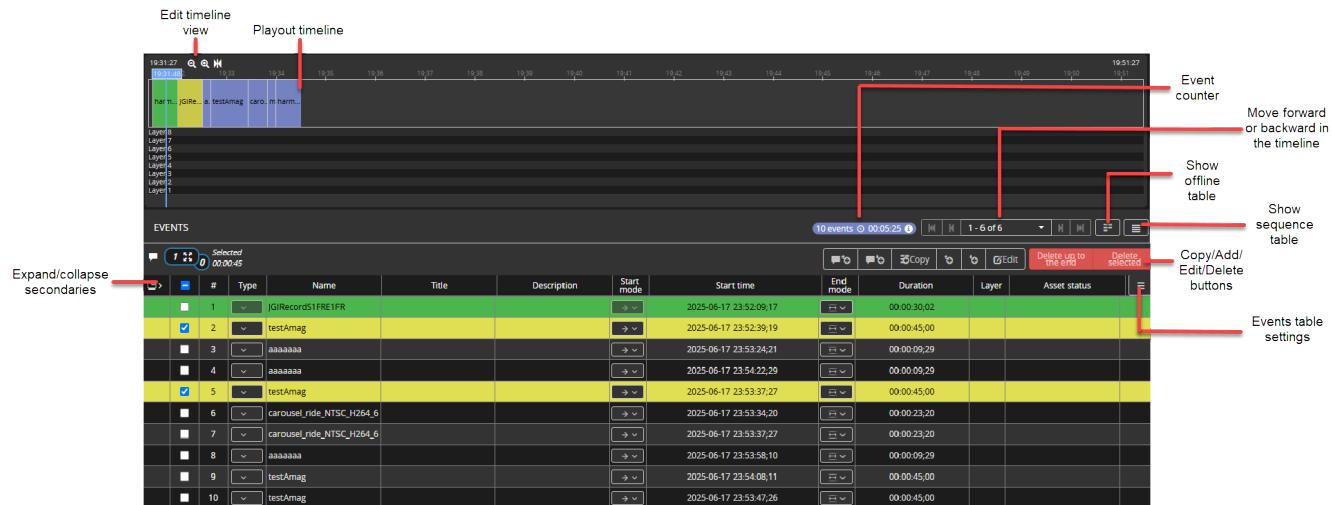


Edit mode	While the Edit toggle is turned "On", you can create, edit, and delete events, invoke Override mode, and do a manual Take Next.
-----------	--

Channel name	<p>Displays the channel name, as configured in the Configure Channels app.</p> <p>If you have multiple playout services using the same source, the following option is displayed:</p>  <p>You can do the following:</p> <ol style="list-style-type: none"> 1. Click the radio button to the left of the source name to select the service you want to view in the Live View monitor. 2. Click the pulldown icon on the right to select from the following options: <ol style="list-style-type: none"> a. Open the Monitor Channels window for that service. b. Open the Configure Channels window for that service. c. Open Configure Broadcast.
Status ribbon	<p>Displays the following notifications:</p> <ul style="list-style-type: none"> • Errors in the playlist, such as missing material or timing gaps/overlaps. Before the corresponding event goes to air, the status ribbon presents a countdown to the next error. An error count is displayed if there is more than one error. • Countdown to the next live event. For live events with manual start mode, if the scheduled start time has passed and the event has not been taken yet, the countdown notification displays 00:00:00. <div style="border: 1px solid #ccc; border-radius: 50%; padding: 2px; margin-right: 10px;"></div> Tip Click the notification to focus on the corresponding event in the Events table and timeline.

View modes

Up-to-date

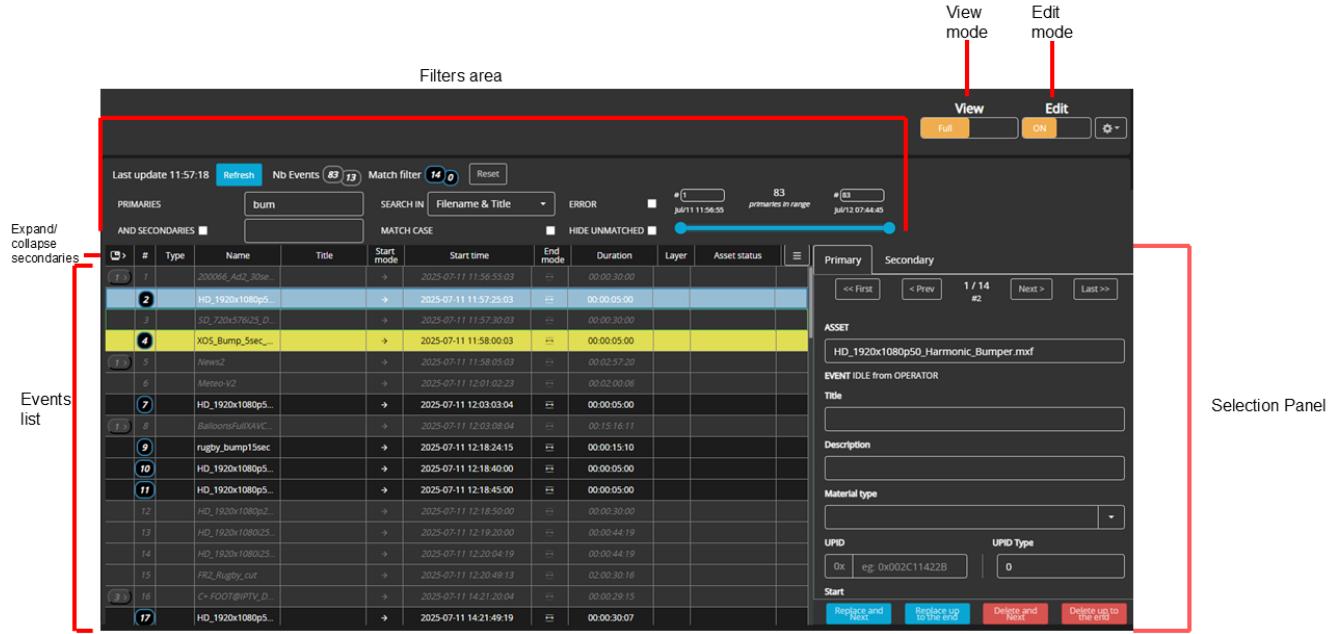


The up-to-date mode is the default view.

Edit timeline view	Use these buttons to change the display of the timeline. 🔍 : Zoom out on the timeline. 🔍 : Zoom in on the timeline. 🛠️ : Re-center the timeline
Expand/collapse secondaries	Click to expand or collapse all secondary events in the Events table.
Event counter	Displays the number of events currently in the playlist.
Move forward or backward in timeline	The Events table displays 50 events at a time. For large playlists, you may use these controls to skip to the next/previous block of events, or to the end/beginning of the playlist.
Show/hide offline table	Click to display or hide a list of any offline events. This opens an offline swap space, where you can copy in events from the running playlist, modify them as needed, and then swap them back into the running playlist to extend or modify its runtime. Note The offline table is not persistent data. It is not available to other users and will be lost after logging out.

Show/hide sequence table	Click to display or hide a list of any saved sequences.
Copy/Add/Edit/Delete buttons	<p>Use these buttons to do the following:</p>  : Click this button to insert a comment before the selected event.  : Click this button to insert a comment after the selected event.  : Click this button to copy the selected event. This button is also available for an on-air event.  : Click this button to insert an event before the selected event.  : Click this button to insert an event after the selected event. This button is also available for an on-air event.  : Click this button to open the Edit primary event window for the selected event. This button is also available for an on-air event. Delete up to the end: Click this button to remove all events after the selected item. Delete selected: Click this button to remove the selected event.
Events table settings	Allows you to hide, display, and reorder columns in the Events table.

Full view



Use the **View** toggle to switch to the Full view. A dialogue window appears confirming you want to enter the Full view mode. Acknowledge it to proceed. Once acknowledged, a progress bar appears while the events in the list are loading. You cannot make any modifications while the content is loading.

Note

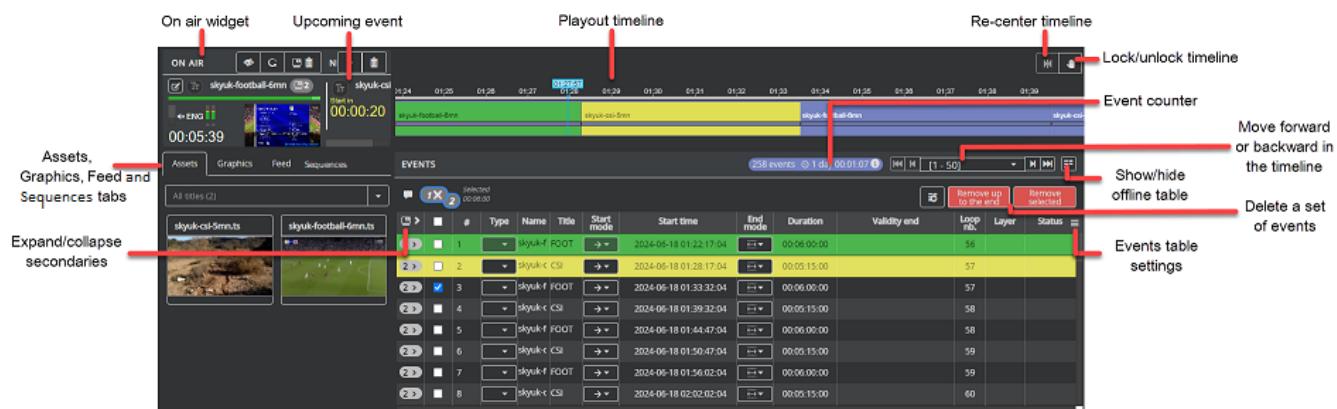
The timeline is not available in Full view.

Filters area	<p>Use the Filters area to modify what is displayed in the Events table.</p> <ul style="list-style-type: none"> • Last update: Displays the last time the playlist was updated • Nb Events: Displays the number of primary and secondary events, regardless of any filters chosen. The top number displays the amount of primary events, and the bottom number displays the amount of secondary events. • Match filter: Displays the number of primary and secondary events that match the selected filter. • Reset button: Click this button to clear all filters. • Primaries: Use this field to enter the name of any primary events you want to search for. • Secondaries: Use this field to enter the name of any secondary events you want to search for. Note that this field is optional, and the default is to not search this field. • Search In: Use this dropdown menu to select from the following search parameters: <ul style="list-style-type: none"> ◦ Filename & Title ◦ Filename ◦ Title ◦ Description/Comment • Error: Click this option to filter the list to show any primary or secondary events containing errors. • Hide unmatched: Click this option to hide any events that do not match your selected filters. • Range bar: Use the range slider bar to limit the scope of the search in the events table.
Expand/collapse secondaries	Click to expand or collapse all secondary events in the Events table.
Events list	Displays the list of events and graphics in the playlist.
Selection panel	<p>Use the selection panel to navigate the list of events that match your filter.</p> <ul style="list-style-type: none"> • First: Click this button to select the first event in the matched list. • Prev: Click this button to select the previous event in the matched list. • Numbered area: The top numbers display the number of matched elements in the list. The bottom number displays where the selected event is in the playlist. • Next: Click this button to select the next event in the matched list. • Last: Click this button to select the last event in the matched list. • Event information: This section displays the properties for the selected primary or secondary event. These fields are editable when the Edit mode is enabled. • Replace and Next: Click this button to replace the selected asset by the new asset with new properties and select the next one. • Replace up to the end: Click this button to replace the properties of all the matched events. • Delete and Next: Delete the selected event and choose the next event in the matched list. • Delete up to the end: Delete all the selected events in the matched list. <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>Replacing or deleting events triggers a dialogue message. Make sure to acknowledge the message.</p> </div>

Settings, Widgets & Actions

Settings	<p>Display: Choose to display event start time, duration, and SOM in milliseconds or timecode.</p> <p>Channel settings include the following:</p> <ul style="list-style-type: none"> • Lockout time for schedule reload: The period of time during which the on-air schedule will not be modified after you reload a schedule. For example, if you reload a schedule and the lockout time is 30 seconds, events from the new schedule will not go to air until 30 seconds after the schedule was loaded. Also, events from the new schedule whose start time is earlier than the playlist reload time + 30 seconds will be discarded. Events in the on-air schedule whose start time is later than the playlist reload time + 30 seconds will be discarded as well. The default lockout time is one minute. • Drop-frame timecode: UTC time of daily adjustment: To handle the drift of timecode in a 29.97/59.94 fps channel, the channel must be re-synched on a daily basis. Specify the UTC time at which the drop-frame time sync should occur (an integer between 0 and 23). The default value is 10.
Widgets	Allows you to customize widgets in the Playout Monitor app. If the interface is locked, click the Unlock icon to be able to hide/display and resize widgets.
Actions	<ul style="list-style-type: none"> • Import playlist: Click to browse to the playlist file location and load onto the timeline. • Export missing materials on disk: Click to export any missing materials in .csv format. • Export Playlist: Click to export the playlist in .xml format.

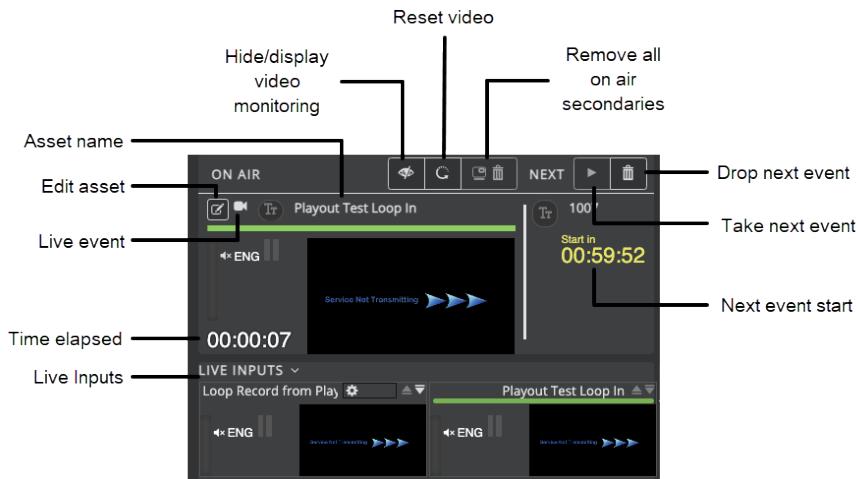
Events and Timeline widgets



Expand/collapse secondaries	Click to expand or collapse all secondary events in the Events table.
On-air widget	Displays a real-time view of the playout channel.

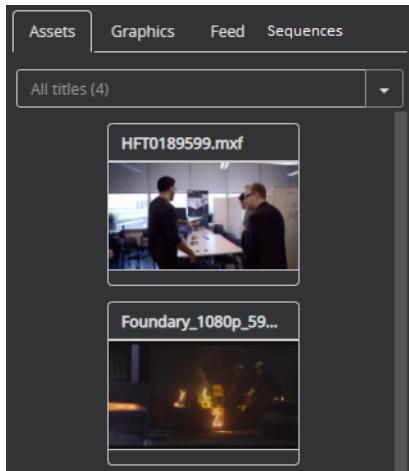
Upcoming event	Indicates what event plays next. It also displays a countdown timer to when the next event begins.
Playout timeline	A timeline display of all the events for the playout channel.
Re-center timeline	Returns the timeline to the current time (if you have dragged the timeline forward to see future events, for instance).
Lock/unlock timeline	When locked, the timeline remains stationary while the current time marker moves forward. When unlocked (default), the timeline moves forward while the current time marker remains stationary.
Move backward/forward in playlist	The Events table displays 50 events at a time. For large playlists, you may use these controls to skip to the next/previous block of events, or to the end/beginning of the playlist.
Show/hide offline table	Click to display or hide a list of any offline events.
Delete a set of events	Click the checkbox next to an event to display this option. Once clicked, choose from the following: <ul style="list-style-type: none"> • Remove up to the end: Click this button to remove all events after the selected item. • Remove selected: Click this button to remove the selected event.
Events Table settings	Allows you to hide, display, and reorder columns in the Events table. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> i Insert comments into the playlist <ul style="list-style-type: none"> • Insert comments manually: In the Playout Monitoring UI, it is possible to add a comment in the playlist by drag & drop. Comments can also be modified/deleted manually. • Insert comments automatically: Comments can be described in the OPC schedule and imported into the playlist. Comments can be inserted automatically before the first and after the last primary events at scheduled import. </div>
Select event	Select an event to edit details, remove, or create an event before or after. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ! Note Edit mode must be activated to use this option. </div>

On-air widget



Drop Next event	Click to drop the next event. Note that Edit mode must be activated in order for the icon to appear. The icon will not appear two seconds before the conclusion of a primary event, or two seconds into a primary event.
Take Next event	Click to take the next scheduled event to air. Note that Edit mode must be activated in order for the icon to appear. The icon will not appear two seconds before the conclusion of a primary event, or two seconds into a primary event. Note that if the next event has manual start mode, then the on-air widget does not display information for the next event.
Live Inputs	This area is displayed when Live Input Monitoring is enabled on the Source page. From here, you can choose from the following: <ul style="list-style-type: none"> • Click  to eject the source. • Click  to choose the source input to monitor displayed in the popup window when hovering over it. The button appears only when there is a redundant source configured.

Assets, Graphics, Feed, and Sequences widgets



 **Tip**

- Simply drag and drop an asset, graphic, or live input source onto the **Events** table to create a new event.
- Click the pull-down menu to change the display between icon view or list view.
- Hover over any item to display the source file information.

Assets widget	Displays assets available in the Asset Acquisition library.
Graphics widget	Displays graphics files that have been uploaded to the XOS using the Web Uploader in Asset Acquisition.
Feed widget	Displays live input sources that have been configured in the Configure Channels app.
Sequences widget	Displays a list of events that can be started and stopped from triggers, or added manually.

Related information

[About Override mode](#)

[Configuring an external live feed](#)

Configuring SCTE-104 input triggers from SDI inputs in XOS playout services

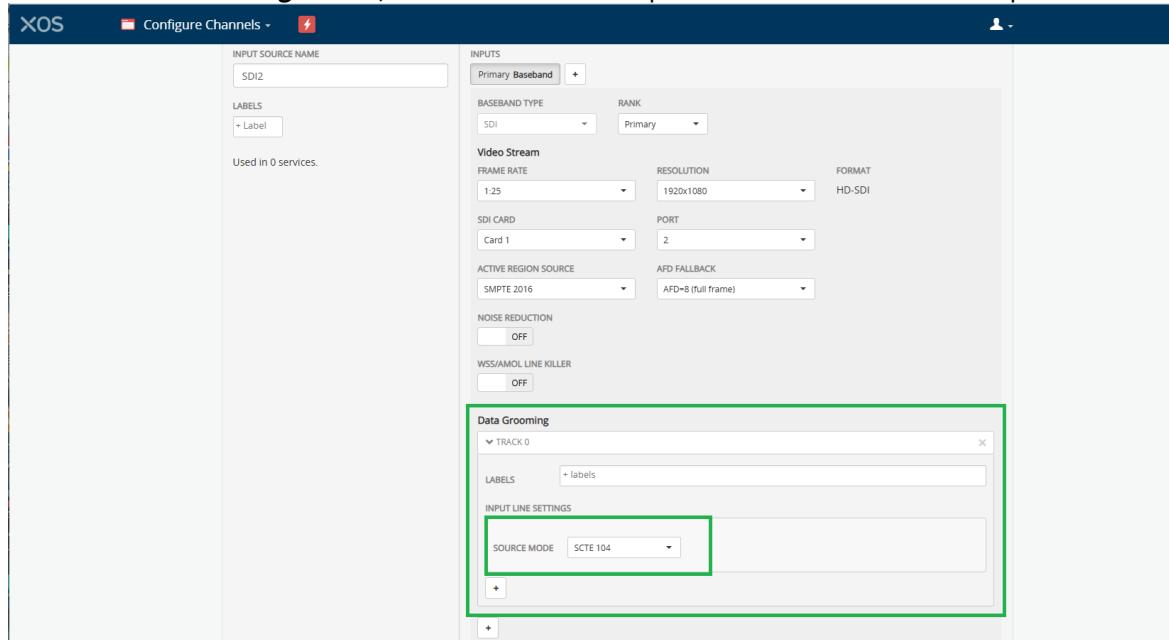
XOS playout services support receiving SDI input streams, including SCTE104 splice_start, and inband commands.

- Configure SCTE-104 settings from SDI inputs in the playout service
- Use the incoming SCTE-104 as a trigger

Configure SCTE-104 settings from SDI inputs in the playout service

1. Create a Baseband source with **SDI** inputs by navigating to the **Configure Channels** app > **Sources** tab.

- From the **Data Grooming** section, select the "SCTE 104" option from the **Source Mode** drop-down menu.



2. Create a **Playout** source by navigating to the **Configure Channels** app > **Sources** tab.

- From the **Data Streams** section > **Type** drop-down menu, select the "SCTE35" option.

The screenshot shows the 'Add source' configuration dialog in XOS. The 'Data Streams' section is highlighted, showing the 'TYPE' dropdown set to 'SCTE35'. Other settings visible include 'Primary PLAYOUT' as the input, '0 second' offset, and various video and audio grooming profiles.

- From the **Default Live Input** drop-down menu, the SDI source created previously can be added as the source in the playout source settings.

3. Create the corresponding destination and playout service (standard settings).

The screenshot shows the 'Destinations' tab in XOS. It lists several destinations, including 'PLAYOUT 1'. A 'Destination' button is visible at the top right.

4. Activate the playout service.

The screenshot shows the 'Services' tab in XOS. It lists several services, including 'Playout 1'. An 'Activated' status indicator is shown next to 'Playout 1'.

Use the incoming SCTE-104 as a trigger

1. Navigate to the **Playout Monitor** app.
2. Check if the playout service with the SCTE-104 component added is running.

i Info

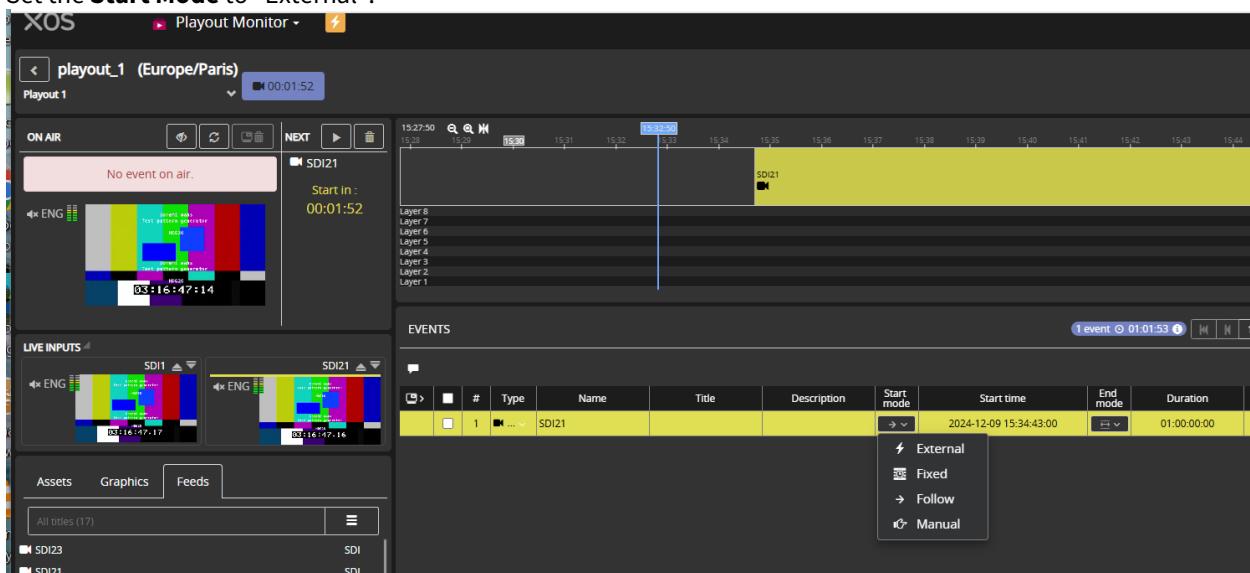
The rule to use a "splice_start" SCTE-104 inband command as a trigger in a playlist is:

'The next event (live or asset) is played when a SCTE 104 inband command is received by the current service'.

All kinds of live input (IP, RF, SRT, SDI) can be played in a playlist by this kind of trigger.

3. Set the previously created SDI source for the playout service including SCTE-104 "splice_start" commands, which can trigger an event, with the following scenarios:
 - a. Activation of live on the reception of SCTE-104 from the default live source
 - b. Activation of live on the reception of SCTE-104 from live input (different from default live)
 - c. Activation of clips on reception of SCTE-104

4. Set the **Start Mode** to "External".



i Info

The SDI source will stay "On-Air" until a valid 'Splice_start' command is detected and will trigger the next event.

Configuring and triggering SCTE-35 dynamic ad insertion

To configure the SCTE-35 trigger settings:

1. Navigate to the **Playout Monitor** app and click the icon on the right side.
2. Select the **Trigger Settings** option from the drop-down menu.
3. Press the **+ Add Trigger** button from the pop-up window.
4. Click **Add SCTE35**, add a **Trigger Name**, and define if the SCTE35 source is an **On-air source** or a **Custom source**.

Create Trigger

TRIGGER NAME *

SCTE35 SOURCE i

On-air source

MATCH SIGNAL

NONE

ASSERT i

+ Add

5. Select **None**, **Any**, or **All** for the **Match Signal** field, where:

- a. **NONE** - all asserts must be false to trigger
- b. **ANY** - one of the asserts must be true to trigger
- c. **ALL** - all asserts must be true to trigger

6. Add the **Assert**, for instance: `/SpliceInfoSection/SpliceInsert[@spliceEventId='1073741825']`

7. After saving the trigger settings, a new potential SCTE-35 trigger will be displayed on the list of all triggers.

Trigger Settings

+ Add Trigger

Default SCTE35 trigger from original source	SCTE-35	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
GPI1 Rising	GPI-1	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
GPI1 Falling	GPI-1	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
GPI0 Rising	GPI-0	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
GPI 1&2	Combined	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
SCTE-35 Event ID 1	SCTE-35	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
GPI0 Falling	GPI-0	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

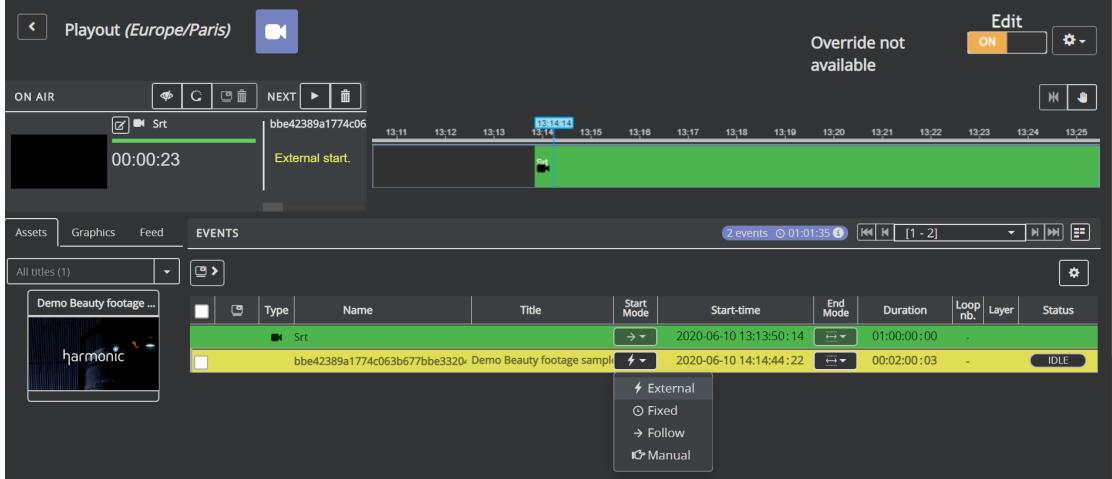
8. (Optional) Edit or delete the SCTE-35 trigger if needed.



Note

To trigger a take-next dynamic ad insertion, a playout source must be configured with an SCTE-35 data stream.

1. Launch the **Playout Monitor** app.
2. Select a live event.
3. Add the next event with the **Start Mode** set to **External**.



Note

The supported types of SCTE-35 messages are the following:

- time_signal with segmentation_descriptor for Distributor Advertisement Start (0x32) or Distributor Placement Opportunity Start (0x36)
- splice_insert with out_of_network_indicator = 1

XOS playlist schema

XOS supports XML playlist files based on the Polaris Play: Playlist Control (OPC) playlist schema. BXF playlist files are also supported.

- Schedule parameters
- <PrimaryEvent> parameters
- <VideoMaterial> parameters
- <GraphicsEvent> parameters

Sample XML playlist

```

1  <?xml version="1.0" encoding="utf-8"?>
2  <Schedule channel="6e237b24-64a5-66a8-2811-b5eac96abfba" scheduleStart="2018-07-01T14:37:00.00Z"
3    schemaVersion="1.5">
4      <Primary>
5        <PrimaryEvent endMode="Manual" scheduledDuration="00:00:59;28" scheduledStart="2018-07-01 14:38:00;02"
6          startMode="Fixed" >
7            <Description>An event description</Description>
8            <VideoMaterial materialId="Live1" source="External In" title="My Live1"/>
9            <GraphicsEvent endMode="OffsetFromEnd" endOffset="+00:00:00:00" layer="1" startMode="OffsetFromStart"
10           startOffset="+00:00:00:00" templateName="1080i60-NewsTicker-RSS.swf" >
11             <GraphicsText boxNumber="0">http://www.server.ca/cmlink/rss-topstories</GraphicsText>
12           </GraphicsEvent>
13         </PrimaryEvent>
14       <PrimaryEvent endMode="Duration" scheduledDuration="00:00:59;28" scheduledStart="2018-03-01
15         14:39:00;02" startMode="Fixed" >
16         <Description>Description of the second event</Description>
17         <VideoMaterial audioProfile="" materialId=
18           "https://s3-us-west-2.amazonaws.com/Customer-s3-bucket/Assets/MyAsset1.mp4" som="00:00:59;28" source=
19           "Player A" title="My event 02" />
20         <GraphicsEvent duration="00:00:20;02" endMode="Duration" layer="2" startMode="OffsetFromStart"
21           startOffset="+00:00:10:00" templateName="1080i60-NewsTicker-RSS.swf" title="a graphic title">
22             <GraphicsText boxNumber="0">http://www.cbc.ca/cmlink/rss-topstories</GraphicsText>
23           </GraphicsEvent>
24         </PrimaryEvent>
25       <PrimaryEvent endMode="Duration" scheduledDuration="00:00:59;28" scheduledStart="2018-03-01
26         14:40:00;02" startMode="Follow" >
27         <VideoMaterial audioProfile="stereol1" materialId=
28           "https://s3-us-west-2.amazonaws.com/Customer-s3-bucket/Assets/MyAsset2.mp4" som="00:00:30:00" source=
29           "Player A" title="My event 03" />
30         <GraphicsEvent endMode="OffsetFromEnd" endOffset="-00:00:20:00" layer="2" startMode="OffsetFromStart"
31           startOffset="+00:00:10:00" templateName="1080i60-NewsTicker-RSS.swf" title="A graphic title" />
32       </PrimaryEvent>
33     </Primary>
34   </Schedule>

```

Schedule parameters

channel	<p>This refers to the channel UUID. You can obtain the UUID as follows:</p> <ol style="list-style-type: none"> From the Public API app, click Playout Backend. Select GET /playoutcontrol/v1/channels, and then click Try it out!. In the Response Body, find the channelId parameter. This is the UUID text that you can copy and paste into the playlist file. <p><i>Channel UUID</i></p>  <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> ✓ Tip <p>You can override this parameter when you upload the playlist using the Public API app (for example, if you want to copy the playlist file to a paired channel).</p> </div>
scheduleStart	Determines the schedule start date and time. XOS uses this parameter to determine playlist boundaries. A replacement playlist must have the same scheduleStart value as the original playlist.

<PrimaryEvent> parameters

startMode	<p>Determines how the event will be taken to air:</p> <ul style="list-style-type: none"> fixed: Event is taken to air at its scheduled start date/time. follow: Event is taken to air when the current on-air event ends. manual: Requires a Take Next trigger to take the event to air.
scheduledStart	Determines when fixed start events are taken.
endMode	<p>Determines how the event is terminated:</p> <ul style="list-style-type: none"> duration: The event ends when the scheduled duration expires. A primary event with duration end mode can be preempted by an upcoming fixed start event. manual: The event remains on-air until a Take Next command is received from the operator, or it is preempted by an upcoming fixed start event.
scheduledDuration	Determines the length of time that a primary event stays on-air. For manual endMode events, the duration does not end the event.

<VideoMaterial> parameters

materialId	<ul style="list-style-type: none"> For file-based assets: <ul style="list-style-type: none"> If the asset is already registered in Asset Acquisition library, you can provide either the file name or the file name with extension. If the asset ingest shall be triggered on playlist reception, then you must provide the full S3/Blob storage URL. For a live primary event generated by an external input, provide the CloudLink input source name.
source	For a live primary event, you must set the source to External In. For file-based events, you may omit the source parameter, or set it to Player A.
som	Specify the Start of Material (SOM) in one of two ways: <ul style="list-style-type: none"> As a frame offset from the beginning of the file, for example +00:00:59;28 As the timecode value of the frame at which playback will begin, for example 05:02:23:21 (not to be expressed in milliseconds)
audioProfile	(MXF files with PCM audio only) Specify the audio grooming profile to be used for the primary event. Audio grooming profiles are configured in the Asset Acquisition app. Refer to Creating an audio/subtitle grooming profile for MXF files for more information. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> i Info <p>The languages specified in the grooming profile must match the languages defined for the playout source.</p> </div> <div style="border: 1px solid #FFD700; padding: 10px; margin-top: 10px;"> ! Note <p>For .mp4 files, it is not possible to specify an audio grooming profile. For the first audio, the first stereo pair is played. For the second audio, the second stereo pair is played, and so on.</p> </div>
title	Optionally, provide a title for the event.

<GraphicsEvent> parameters

templateName	Provide the graphic template file name.
layer	Specify the layer that the graphic template will be loaded on. Up to 8 layers are supported.

startMode	The timing of the start of a secondary event is determined by an offset from the start or end of the primary event to which it is attached (specified in startOffset). There are two secondary event start modes: <ul style="list-style-type: none"> • offsetFromStart: The secondary event will go to air at a time relative to the start of its primary event. Negative values are used to specify that the secondary event is scheduled to start before the start of the primary event, and positive values are used to specify that the secondary event is scheduled to start after the start of the primary event. • offsetFromEnd: The secondary event will go to air at a time relative to the end of its primary event. Negative values are used to specify that the secondary event is scheduled to start before the end of the primary event, and positive values used to specify that the secondary event is scheduled to start after the end of the primary event.
endMode	<ul style="list-style-type: none"> • offsetFromEnd: The secondary event will end at a time offset relative to the end of its primary event (specified in endOffset). Negative values are used to specify that the secondary event is scheduled to end before the end of the primary event, and positive values used to specify that the secondary event is scheduled to end after the end of the primary event. • duration: The secondary event will end after the time specified in the duration parameter.
title	Optionally, provide a title for the event.
<GraphicsText>	(.zip files only) If the graphic template supports dynamic text fields, you may specify the text and box number here. For an RSS News Ticker text field, enter the URL of the RSS news feed.

Related information

[Loading a playlist](#)

Loading a playlist

You can load a playlist from the Playout Monitor interface or from the REST API.

- [Loading a playlist from the Playout Monitor app](#)
- [Loading a playlist from the Public API](#)

Loading a playlist from the Playout Monitor app

When you load a playlist from the Playout Monitor app, the channelId in the playlist file is ignored and the current Playout channel is used instead. You also have the option to change the schedule start time.

1. Click **Settings > Import Playlist**, and select the playlist file you want to load.
2. In the **Import playlist** dialog, confirm the **Schedule start time** and click **OK** (checkmark icon).

Note

By default, the scheduled start time is set to now + 2 minutes. To modify the start time, do the following:

- Click **Settings**.
- Choose **Display**.
- Set the **Playlist import: set to now by default** option toggle to **No**.

- Click the checkmark icon.
- Add the playlist using the instructions described above.

Note

Once a schedule has started playing, you cannot load a schedule with an earlier scheduled start time. If you attempt to load a schedule with an earlier scheduled start time, an error message will be displayed in the UI for a few seconds indicating the practicable Schedule Start Time. For example, if the Tuesday schedule has started, you cannot load a schedule for Monday (yesterday). You can load a schedule for Thursday, and can edit and modify the playlist to start the first event of the Thursday schedule. If you try to load a schedule for Wednesday, an error occurs.

Info

The Schedule start time for the playlist OPC XML file is based on UTC. The Playout Monitor Schedule start time is based on the time zone you defined in **Settings > Display**. Make sure that the correct time zone is indicated on the playlist. An error occurs if the Schedule start time is improperly set. It is recommended that the playlist (OPC XML file) should be created and uploaded using the time format (milliseconds), as: 2019-10-18T17:00:05.000Z.

Result: The playlist loads. If you changed the **Schedule start time**, all events are updated accordingly.

Loading a playlist from the Public API

You can load OPC playlists using the Public API app, and you have the option to override the channel that the playlist is associated with.

1. Navigate to the Public API app.
2. If you want to override the channel that the playlist file is associated with, then do the following:
 - Click **Playout Backend**, then select GET /playoutcontrol/v1/channels, and click **Try it out!**.
 - In the **Response Body**, find the **channelId** parameter and copy the value. This is the UUID.



3. From the Public API app, click **BxfControlAdaptor**, click POST /bxfr-control-adapter/v1/opc/{playlist_file} and configure the following parameters:

playlist_file	Enter a name that will be used to refer to the playlist once it has been uploaded to the XOS.
channel_id	If you want to override the channel ID that is stored in the playlist file, then paste the UUID from step 2 here.
schedule	Browse to and select the playlist file you want to upload.

4. Click **Try it Out!**

Creating a primary event

You can create file-based and live primary events by simple drag-and-drop from the **Assets** or **Feed** widget. You can also use the **New primary event** dialog to create file-based primary events.

Note that if you want to specify an audio grooming profile for a primary event, you must do so using the **New Primary Event** dialog.

1. Click the **Edit** slider button to activate Edit mode.
2. Create a primary event using one of the following methods:
 - Select a file-based video asset from the **Assets** widget, or select a live input from the **Feed** widget, and then drag it to the **Events** table before the first event, between two events, or after the last event. A new primary event is automatically inserted. To edit the event details, select the event on the **Events** table and click **Edit**.
 - On the **Events** table, select a primary event and click **Create event before** or **Create event after**. The **New Primary Event** dialog opens, where you may configure the primary event details.

Configure the primary event details:

Asset	If the asset is already registered in Asset Acquisition library, you can provide either the file name or the file name with extension.
Title	(Optional) Type the title of the primary event.
Description	(Optional) Type a description of the primary event.
Start	Specify a start mode for the primary event: <ul style="list-style-type: none"> ○ Follow: A follow start mode event is taken to air when the current on-air event ends. Automatic time ripple is applied to follow start events. If the first event in a playlist has a follow start mode, it is treated as a manual start event and requires a Take Next command to go to air. If there is no on-air event, or the on-air event has a manual end mode, the next follow event is not automatically taken to air. A Take Next command is required to advance the playlist. ○ Fixed: A fixed start mode event is taken to air at its scheduled start date/time. ○ Manual: A manual start mode event requires a Take Next trigger to go to air.
Duration	Specify an end mode for the primary event: <ul style="list-style-type: none"> ○ Duration: A primary event with duration end mode will end when the scheduled duration for the event expires. A primary event with duration end mode can also be preempted by an upcoming fixed start event. ○ Manual: A primary event with manual end mode remains on-air until a Take Next command is received from the operator, or it is preempted by an upcoming fixed start event.

Start of Material (SOM)	Specify the starting point for playback of video clips in one of the following ways: <ul style="list-style-type: none"> ◦ As a frame offset from the beginning of the file ◦ As the timecode value of the frame at which playback will begin
Audio Profile Name	(MXF files with PCM audio only) Specify the audio grooming profile to be used for the primary event. Audio grooming profiles are configured in the Asset Acquisition app. Refer to Creating an audio/subtitle grooming profile for MXF files for more information. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>Info</p> <p>The languages defined in the grooming profile must match the languages defined for the playout source.</p> </div> <div style="border: 1px solid #ffcc00; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>For .mp4 files, it is not possible to select an audio grooming profile. For the first audio, the first stereo pair is played. For the second audio, the second stereo pair is played, and so on.</p> </div>

3. Click **Create** or **Save**.
4. When you are finished editing the playlist, click the **Edit** slider button to deactivate the Edit mode.

Editing a primary event

Operators should note that confirmation is not required when editing or deleting primary events.

Tip

You may edit some primary event details directly in the **Events** table.

Note

You can only edit the **Duration** of the *on-air* primary event.

1. Click the **Edit** slider button to activate Edit mode.
2. On the **Events** table, check the box next to the primary event you want to edit and then click **Edit**.
3. In the **Edit primary event** dialog, modify the parameters as needed and then click **Save**. Refer to [Creating a primary event](#) for a description of primary event parameters.
4. To delete a primary event, check the box next to the primary event on the **Events** table, and then click **Remove**. **Result:** The primary event and its associated secondary events are deleted.
5. To move a primary event, drag the event to the desired position in the playlist.
6. When you are finished editing the playlist, click the **Edit** slider button to deactivate Edit mode.

Creating a secondary event

You can create a secondary graphics event by simple drag-and-drop from the **Graphics** widget. Both live and file-based primary events support secondary graphics events. The following file types can be used to create secondary events:

- JPG
- PNG
- TGA
- FLV
- WebM
- WAV
- HTML5

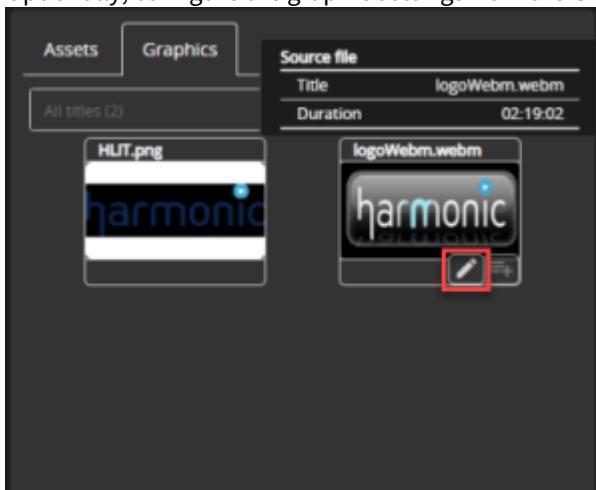
i Info

You can create a secondary event for the on-air primary event. Note that the secondary event will be created with a start offset that gives it a start time of 2 seconds in the future.

Before you begin

Upload graphic template files using the **Web Uploader** in the Asset Acquisition app, using the FTPs file transfer, or using the Asset Acquisition REST API.

1. Click the **Edit** slider button to activate Edit mode.
 2. Select an image file from the **Graphics** panel, drag it to the **Events** table and drop it onto the related primary event when the blue rectangle appears.
- Result:** A secondary event is created (no confirmation is required). By default, the secondary event is assigned to the first graphic layer and inherits the duration of the primary event. Refer to [Editing a secondary event](#) for instructions on configuring the layer, start and end mode, and dynamic text fields.
3. Optionally, configure the graphic settings from the **Graphics** panel by clicking the  icon for the image files:



- a. **Set anchor** (Applicable to **ALL** supported graphic types **EXCEPT HTML5** and **WAV**): This is used to set an anchor on the graphic/logo to run at a specific position.
 - Top left position (This is the default value if not configured.)
 - Top right position
 - Top middle position
 - Middle left position

- Middle right position
- Middle position
- Bottom left position
- Bottom right position
- Bottom middle position

 **Note**

If the anchor configuration is updated while the graphics are on air, the play of graphics will be restarted with the new anchor setting.

- b. **Set end behavior** (Applicable to the **WebM** and **FLV** graphic types): This is used to set the graphic to end in a specific behavior.

- *Loop*: If this is selected, the graphic will be set to "loop" at the end. (This is the default value if not configured.)
- *Still*: If this is selected, the graphic will be set to "still" at the end (Freeze the last frame).
- *Disappear*: If this is selected, the graphic will be set to "disappear" at the end (Nothing is displayed but the graphic is not unloaded).

 **Note**

If the end behavior is updated while the graphics are on air, the play of graphics will be restarted with the new behavior.

4. Optionally, repeat the previous step to create additional secondary events.

By default, additional secondary events will be assigned to the next sequential graphic layer. On the **Events** table and on the timeline, secondary events are sorted first by start date/time, and then by layer. When multiple secondary events share the same start time, the secondary event that has been placed on the highest layer appears first.

 **Info**

Note that changing the secondary event start time and/or layer may impact the order in which secondary events are sorted.

5. Click the **Edit** slider button to deactivate Edit mode.

Editing a secondary event

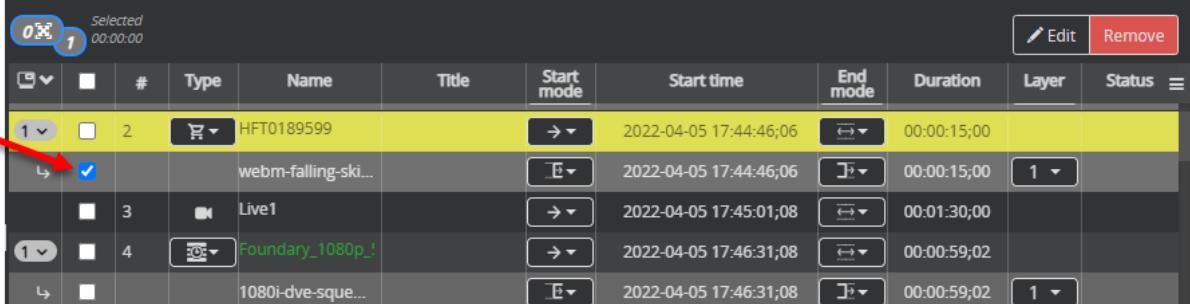
Note that confirmation is not required when editing or deleting secondary events.

 **Tip**

You can edit some secondary event details directly in the **Events** table.

1. Click the **Edit** slider button to activate the Edit mode.

2. If secondary events are collapsed, click the **Expand all secondaries** icon ().



Selected 00:00:00				Type	Name	Title	Start mode	Start time	End mode	Duration	Layer	Status
1	<input type="checkbox"/>	2		HFT0189599				2022-04-05 17:44:46;06		00:00:15;00		
	<input checked="" type="checkbox"/>			webm-falling-ski...				2022-04-05 17:44:46;06		00:00:15;00	1	
	<input type="checkbox"/>	3		Live1				2022-04-05 17:45:01;08		00:01:30;00		
1	<input type="checkbox"/>	4		Foundary_1080p_1				2022-04-05 17:46:31;08		00:00:59;02		
				1080i-dve-sque...				2022-04-05 17:46:31;08		00:00:59;02	1	

3. Check the box for the secondary event you wish to edit and then click **Edit**.

Result: The **Edit secondary event** dialog opens, where you can edit the following details:

Layer	Choose the layer that the graphic template will appear on. Up to eight layers are supported.
Start	Select the desired start mode and then specify the offset: <ul style="list-style-type: none"> ○ Offset from start: The secondary event will go to air at a time relative to the start of its primary event. Negative values are used to specify that the secondary event is scheduled to start before the start of the primary event, and positive values are used to specify that the secondary event is scheduled to start after the start of the primary event. ○ Offset from end: The secondary event will go to air at a time relative to the end of its primary event. Negative values are used to specify that the secondary event is scheduled to start before the end of the primary event, and positive values used to specify that the secondary event is scheduled to start after the end of the primary event.
End	Select the desired end mode: <ul style="list-style-type: none"> ○ Offset from end: The secondary event will end at a time offset relative to the end of its primary event. Negative values are used to specify that the secondary event is scheduled to end before the end of the primary event, and positive values used to specify that the secondary event is scheduled to end after the end of the primary event. ○ Duration: The secondary event will end after the time specified in the Duration field has passed.
Boxes	(.zip files only) If the graphic template supports dynamic text fields, you may update the text here. If you are editing the text field of an RSS News Ticker, type in the URL of the RSS feed. Note that the current contents of the text field are not displayed in the Edit secondary event dialog.
Grooming profile	Click the pulldown icon to select from the available grooming profiles.

4. To delete the secondary event, click **Remove**.

5. When you have finished editing the secondary event, click **Save**.

Creating and playing a sequence

A sequence of clips is a non-linear list of events that can be started and stopped from triggers, or started manually.

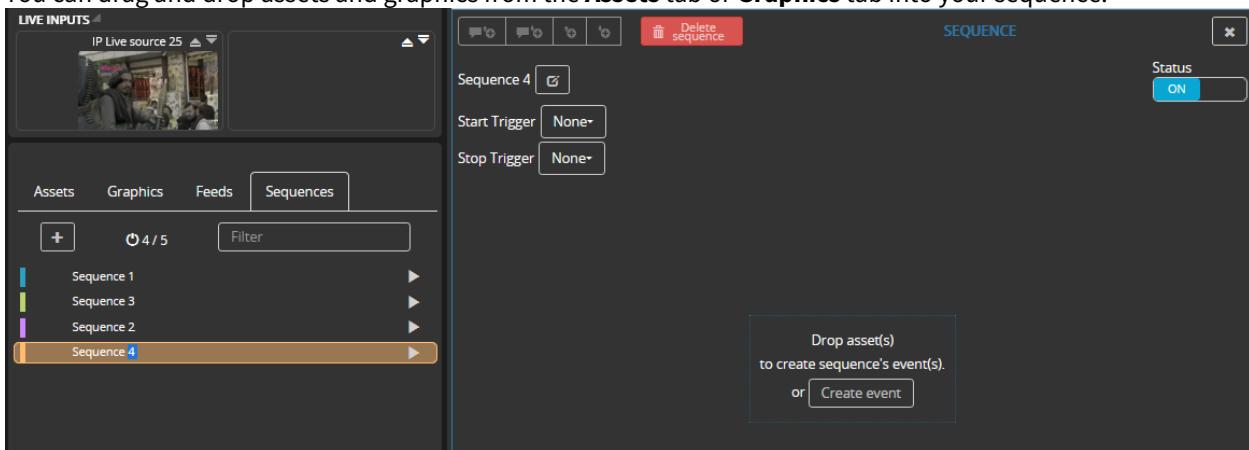
- The sequences can be imported from an OPC playlist by using the Alternate tag. Several sequences can be defined. The alternate tag contains the following:
 - Name attribute (required): defines the sequence name.
 - The name must be unique in the OPC schedule. It is used as identifier on schedule reload.
 - Enable(optional). By default, the sequence is enabled.
 - StartTrigger attribute (optional). This references a start trigger name.
 - StopTrigger attribute (optional). This references a stop trigger name.
 - List of primaries and secondaries of this sequence.

Creating a sequence

- From the **Playout Monitor** app, select the **Sequences** tab.
- Click the **+** button to add a new sequence.



- Enter a **Sequence name** and click **Create**.
- You can drag and drop assets and graphics from the **Assets** tab or **Graphics** tab into your sequence.



- Use the drop-down menu to select a **Start trigger**. When the indicated trigger occurs, the sequence is added to the playlist and started.
- Use the drop-down menu to select a **Stop trigger**. When the indicated trigger occurs, the sequence is stopped and removed from the playlist.
- Use the Status toggle to turn the sequence **On** (enabled) or **Off** (disabled).

8. Click **Delete sequence** to delete the sequence if needed.

Note

Any event error messages are displayed in the Events table.

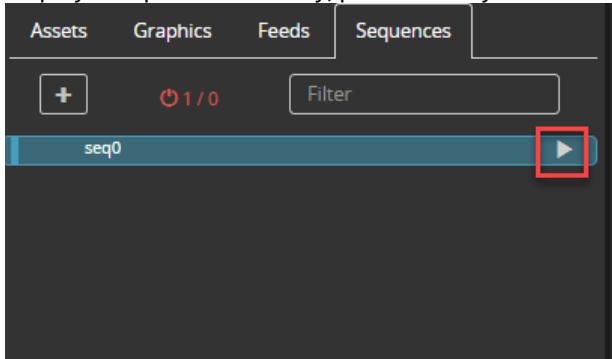
Note

The Start and Stop trigger drop-down menus contain the defined GPI and SCTE-35 triggers.

Playing a sequence

You can play a sequence manually or once a trigger occurs.

1. To play a sequence manually, press the Play button.



2. If a GPI or SCTE-35 trigger is received by XOS, the sequence is inserted and starts after the trigger occurs.

3. In the playlist, a colored ribbon indicates the events from the sequence.

#	Type	Name	Title	Description	Start mode	Start time	End mode	Duration
1	shortAsset				→ ↴	2025-03-13 22:26:44:12	↪ ↴	00:00:16:00
2	shortAsset				→ ↴	2025-03-13 22:27:00:12	↪ ↴	00:00:16:00
3	shortAsset				→ ↴	2025-03-13 22:27:16:12	↪ ↴	00:00:16:00
4	shortAsset				→ ↴	2025-03-13 22:27:32:12	↪ ↴	00:00:16:00
5	Arte_576i25_fra_				→ ↴	2025-03-13 22:27:48:12	↪ ↴	00:01:00:02
6	Arte_576i25_fra_				→ ↴	2025-03-13 22:28:48:14	↪ ↴	00:01:00:02

Note

Once a sequence is inserted into the playlist, the following occur:

- The current event is stopped or preempted
- Any following events are played at the end of the sequence

Note

If several sequences are configured with the same start trigger, the sequences are inserted in the playlist in a rotation. For example if Sequence 1 and Sequence 2 use the same trigger, only Sequence 1 will be inserted on the first occurrence of the trigger. On the next occurrence of the trigger, Sequence 2 is inserted. This process restarts with each trigger.

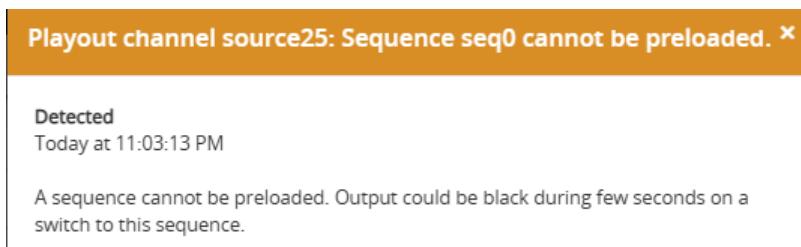
Memory consumption

Every sequence enabled increases the memory used by the playout service.

The maximum number of sequences that can be enabled must be configured in the playout source. Memory is allocated based on the configuration of this parameter, even without a sequence created.



An alarm is raised when the number of sequences enabled exceeds the maximum configured value. Using this sequence could lead to black output for the playout service.



Limitations

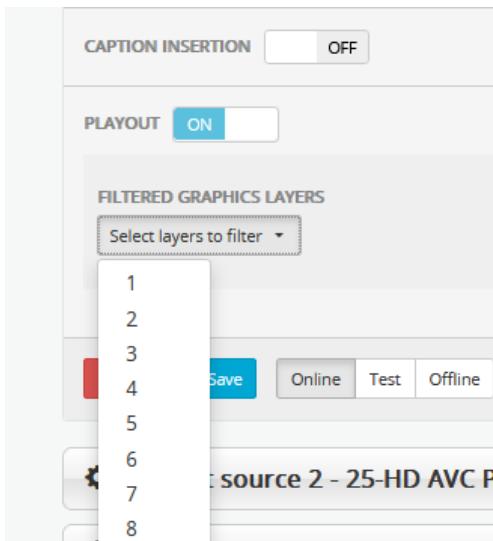
- The maximum number of primary events in a sequence is 50.
- You cannot manually define the start mode and end mode of primary events in a sequence. The default values are Follow (start mode) and Duration (end mode).
- When secondary events are added to the first primary event in a sequence, their start times can be delayed.

Creating XOS Playout clean and dirty outputs

It is possible to create clean (no graphics layers) and dirty outputs (several graphics layers) by applying service layers filtering. This way, you can have several outputs for the same playout source.

Use the following procedure to implement this feature:

1. Go to **Configure Channel>Services** tab.
2. Create several services for your Playout source
3. Select one of the services for the Playout source.
4. Click **Add-ons**.
5. Set **Playout** to **On**. This will add the Filtered Graphics Layers menu, from which you can select the layers to filter (1 to 8).



6. Perform the steps 3 to 5 for the other services of the Playout source.

i Note:
By selecting nothing in the filters, you create a dirty output and by selecting all layers, you create a clean output.

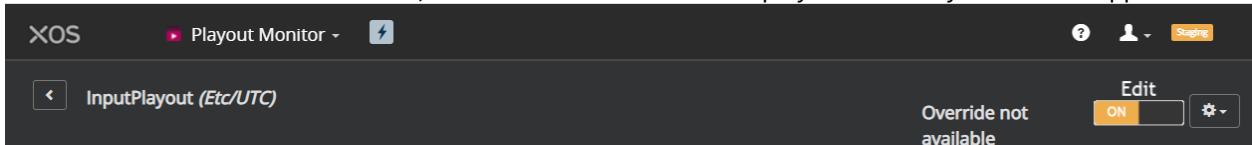
i Note:
The Playout add-on will only appear if your service is linked to a playout input.

About Override mode

In case of an on-air emergency, the XOS Playout Monitor allows you to quickly override the channel output with a slate image.

Note the following about the Override mode:

- In order to use the Override mode, you must activate the **Blackout Slate** add-on when you configure the playout service. If this add-on is not activated, the **Override** button is not displayed in the Playout Monitor app.



- In the Playout Monitor app, you must activate the **Edit** mode in order to use the **Override** button.
- When Override mode is activated, the pre-configured slate image goes to air, audio is silenced, and a notification is generated.
- The slate image remains on air until you click the **Override** button off.

Supported alarms

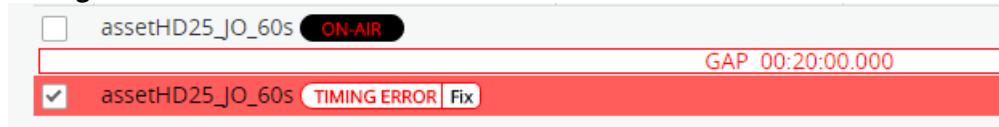
XOS warns the operator of certain errors, such as timing errors, in the Playout Monitor interface.

Timing errors

Primary events

Gap	There is a gap between two consecutive primary events. The gap error indicates the amount of the gap in timecode or milliseconds.
Overlap	A primary event is scheduled to start before the previous event ends. The overlap error indicates the amount of overlap in timecode or milliseconds. When an overlap error is present, the event with the later start time is played while the event with the earlier start time is preempted.
Asset duration	The asset duration is shorter than the primary event duration plus the SOM. In this case, a Fix button is provided, allowing the operator to automatically update the event duration to match the asset duration. Note that Edit mode must be activated in order to correct the error.

Timing error with Fix button



Secondary events

Start/End timing error	A secondary event is flagged with a timing error when its end time is before its start time. Such events are not played.
Overlap	A secondary event is flagged with an overlap error when its layer is used by another secondary event at the same time. When an overlap error is present, the event with the later start time is played while the event with the earlier start time is preempted.

Asset errors

Missing asset	A video clip or graphic template is missing and it is scheduled to air within 24 hours. A system notification is also generated.
Invalid asset	An asset is not valid (frame rate variable, truncated asset, etc.) and it is scheduled to air within 24 hours. A system notification is also generated.
Frame rate error	An asset has a frame rate that is not compatible with the playout source and is scheduled to air within 24 hours. A system notification is also generated.

Missing asset error

Status	Start	Name	Title	Duration
MISSING	Mon, 14:12:00.011	myclip2	GAP 00:12:00.019	00:00:59.993

Live event errors

Invalid format	The video resolution and framerate of the input source are not identical to the resolution and frame rate defined in the playout source.
Missing source	The CloudLink input source has not been configured in the Configure Channels app.

About as-run logs

As-run logs report the status of playout events after they have gone to air. They are saved to the XOS and you can download them to the local client using the Public API.

Event status descriptions

Event status	Description
Aired OK	No errors were detected during playout.
Joined in progress	Material was partially played; joined in progress due to initial schedule load/advance, or Override mode being turned off.
Pre-empted	Material was partially played; ended early due to truncation by Fixed start, manual take, or Override mode being turned on.
Did not air	Event executed while channel override is active.
Content discrepancy	Material not played because there is a problem with the file contents or the file is incompatible with the channel.
Missing media	Material to be played is missing (not available).
Technical difficulty	Control errors were detected during playout, for example, cannot load the clip.
Did not air (service stopped)	Event did not air due to service disruption.

Downloading as-run files

You may download as-run files using the REST API.

1. From the Public API app, click **BxfControlAdaptor**.
2. Select GET /bxf-control-adaptor/v1/asrun, and then click **Try it out!**
3. In the **Response Body**, copy the name of the as-run file you want to download.

```
[{"name": "asrun-75615c97-8783-f898-5c39-b8b45ccfb588-2018-01-24T20:30:00.000Z.xml"}]
```

4. Select GET /bxf-control-adaptor/v1/asrun{asrun_file}, and then paste the as-run file name in the **Value** field.
5. Click **Try it out!**
6. In the **Response Body**, click the link to download the as-run file to your local machine.

Muting notifications for a service

During a maintenance window, you may need to mask the notifications related to a service to reduce the noise generated.

1. From **Configure Channels > Services**, select the service you want to edit.
2. Turn the **Mute Notifications** settings to **On** to mute any notifications for this service.

Edit service : Playout-1-Multiscreens Silver SD-DASH		Monitor	X
SERVICE NAME <input type="text" value="Playout-1-Multiscreens Silver SD-DASH"/>	SOURCE <input type="radio"/> Primary <input type="radio"/> Alternate <input type="radio"/> Tertiary <input type="button" value="Playout-1"/>	PROFILE <input type="button" value="Multiscreens Silver SD v.2"/>	DESTINATION <input type="button" value="DASH"/>
PROGRAM NUMBER <input type="text" value="1"/>	PRIMARY <input type="button" value="Playout-1"/>	<input type="button" value="Lab Wizard"/>	
RANK <input type="text" value="1"/>			
REDUNDANCY <input type="button" value="OFF"/>	ORIGIN/CDN <input type="button" value="DASH"/> <input type="button" value="DASH"/> <input type="button" value="INTERNAL"/>		
INPUT TRACKING <input type="button" value="OFF"/>			
DYNAMIC PROGRAM <input type="button" value="OFF"/>			
GEO REDUNDANCY <input type="button" value="AUTO"/>			
<input type="checkbox"/> Add-ons			
<input type="button" value="Delete"/> <input checked="" type="button" value="Save"/> <input type="button" value="Online"/> <input type="button" value="Test"/> <input type="button" value="Offline"/> <input type="button" value="MUTE NOTIFICATIONS"/> <input type="button" value="OFF"/>			
<input type="button" value="Close"/>			

Turning on dynamic program for a service

When the dynamic program function is enabled, removing the program from the input source will lead to the program in output PAT get removed. Besides, other Elementary Stream PIDs (e.g. video/audio) and PMT PID will also be removed from the output stream. Similarly, adding the program to the input source will lead to the program in output PAT get

added. Other Elementary Stream PIDs (e.g. video/audio) and PMT PID will also be added to the output stream. Components have to be present during grooming phase to be managed dynamically.

1. Navigate to **Configure Channels > Sources** to create a TS source. Select the target program number (e.g. Program Number = 1 in below example) and groom the source.

The screenshot shows the 'Edit source' dialog in the XOS interface. The 'INPUT SOURCE NAME' field contains 'Dynamic Program Source'. The 'LABELS' section has a '+ Label' button. The 'INPUTS' tab is active, showing an IP address of '226.6.6.6', a network of 'e.g., 192.168.0.0', a port of '30006', and an SSM of 'e.g., 81'. A 'RANK' dropdown is set to 'Primary'. Below these fields are 'Connect', '1:j2' (which is highlighted with a red box), and 'Groom' buttons. A 'Remove' button is also present. At the bottom are 'Delete' and 'Save' buttons, and a 'Close' button.

2. Navigate to **Configure Channels > Destinations** to create a TS destination.

3. Navigate to **Configure Channels > Services** to create a service with the **Dynamic Program** enabled and the service activated.

Edit service	
SERVICE NAME	who1
PROGRAM NUMBER	2
RANK	1
REDUNDANCY	OFF
DYNAMIC PROGRAM	OFF
SOURCE FAILOVER	GLOBAL
<input checked="" type="checkbox"/> VIDEO MISSING <input type="checkbox"/> SCRAMBLED VIDEO PID <input checked="" type="checkbox"/> CONTINUITY COUNTER ERROR <input type="checkbox"/> AUDIO PID MISSING <input checked="" type="checkbox"/> Add-ons	

Result: From the **Logs** app, the dynamic program event is recorded to the domain log.

Input service tracking

The input service tracking function automatically detects input PIDs changes and update the PID mapping.

If the input tracking is enabled, XOS will keep track of the changes on the target program of input TS based on the program number specified in source configuration. XOS will not report PID missing when input video/audio/data PID of the input source is changed.

Input tracking for the transport stream components:

- PMT PID change
- PCR PID change
- Video PID change
- Video Codec change
- Audio PID change
- Audio Codec change
- Audio Language change
- Number of Audio change

Input tracking for the subtitle and SCTE-35 components:

- SCTE35 PID change
- Number of SCTE-35 change
- DVB Subtitle PID change
- DVB Subtitle Language change
- Number of DVB Subtitle change
- Teletext PID change
- Teletext Language change
- Number of Teletext change

Activating a service

When you activate a service, it can receive, transcode, and output video.

Before activating a service, Harmonic recommends that you verify the service configuration.

Tip

You can quickly determine if the service is configured correctly by looking at its name. By default, each service name is a string consisting of the components that make up the service: source name, profile name, and destination name.

Newtrain-Multiscreens Silver SD-NewTestDest



1. Verify the source input as follows:

- From **Configure Channels > Sources**, select the source you want to verify and then do the following:
 - In the **IP Address** field, verify that the multicast IP address for the source is correct.
 - In the **Port** field, verify that the multicast port number used by the source is correct.
- Click **Close** to exit the **Edit Source** pane.

2. Verify the service destination as follows:

- From the **Destinations** page, click the name of the destination you want to verify.
- In the **IP Address** field, verify that the multicast IP address for the destination is correct.
- In the **Network** field, verify that the GbE port selected is correct for transmitting the multicast.
- In the **Port** field, verify that the multicast port number used for the destination is correct.
- Click **Close** to exit the **Edit Destination** pane.

3. From the **Services** page, click the name of the service you want to verify, and then do the following:

- In the **Source** area, verify that **Primary** is selected, and the source name is correct.
- In the **Destination** area, verify that the destination name is correct.

4. If all settings are correct, click **Online** and then **Save**.

5. Click **Commit changes**.

Result: The service begins receiving, transcoding, and outputting video.

About service states

A service can be in one of three states:

State	Description
Offline	The service is inactive.
Online	The service is receiving, transcoding, and outputting video.
Test	The service is receiving and transcoding video but is not outputting video.

Deactivating a service

Deactivate a service when you wish to set the service offline.

1. From **Configure Channels > Services**, click the name of the service you wish to deactivate.

Result: The **Edit services** pane appears.

2. Click **Offline**, and then click **Save**.

3. On the **Services** page, click **Commit changes**.

Configuring source failover for a service

You can enable the custom parameters to determine how the source redundancy is triggered for a service and change seamlessly the inactive backup source of the transcoding service.

- From **Configure Channels > Services**, select the service to edit.

The screenshot shows the 'Edit service' configuration page for a service named 'who1'. The page is divided into several sections:

- Service Name:** who1
- Program Number:** 2
- Rank:** 1
- Redundancy:** OFF
- Dynamic Program:** OFF
- Source Failover:** CUSTOM (selected)
- Profile:** exploratory.dfw.1080 v.15
- Destination:** who1, who1.ats
- Redundancy Options:**
 - Primary: espn.p
 - Alternate: espn.b
 - Profile: Lab Wizard
- Failover Triggers:**
 - VIDEO MISSING
 - SCRAMBLED VIDEO PID
 - CONTINUITY COUNTER ERROR
 - AUDIO PID MISSING
 - Add-ons

- Navigate to **Source Failover**, switch the toggle from **Global** to **Custom** to configure source fail-over parameters for the particular service.

Note

The Global settings for source fail-over can be configured through **Configure Channels > Settings > Advanced**. If Custom is selected for **Source Failover**, the custom settings will override the global settings.

- Enable the following parameters for Source Failover:

- Video Missing:** If enabled, source redundancy will be triggered when video PID is missing from the source. This is also applicable when the video source is non-decodable.
- Scrambled Video PID:** If enabled, source redundancy will be triggered within a few seconds when one or more video packet is scrambled in the primary input source (consistent with PID missing).
- Continuity Counter Error:** If enabled, source redundancy will be triggered when the number of CC errors exceeds specific threshold. This parameter can ONLY be enabled/disabled by per-service source redundancy trigger instead of global setting.
- Audio PID Missing:** If enabled, source redundancy will be triggered when audio PID is missing from the source.

- (Optional) For changing seamlessly the inactive backup source of the transcoding service, navigate to **Source Redundancy Mode** and configure the setting to **Manual**. (You may update to the secondary IP source to a new source afterwards.)

⚠ Note that only IP input configuration, grooming profile, and program configuration could be changed between the old and new source seamlessly.

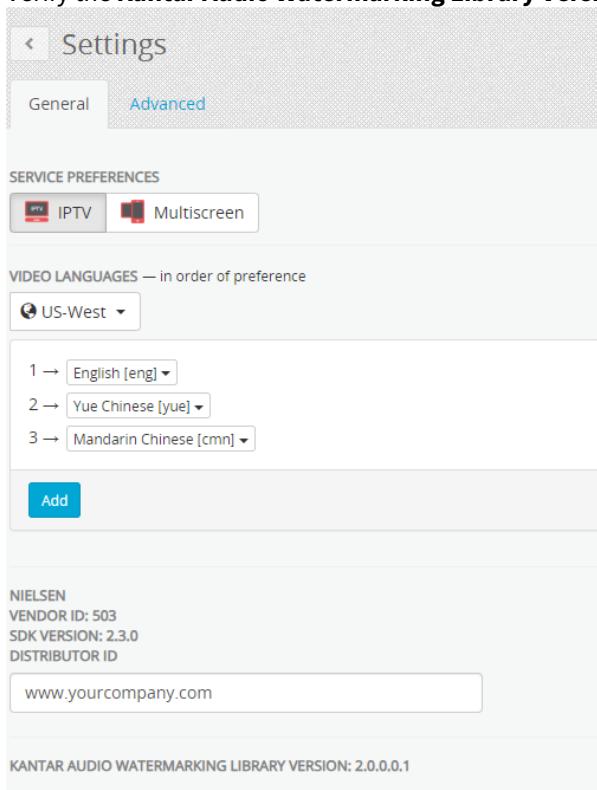
5. Click **Save**.

Configuring Kantar audio watermarking

XOS enables the insertion of Kantar audio watermarking, which allows for marking audio streams with inaudible information.

Retrieving Kantar Audio Watermarking Library Version on XOS

1. Navigate to **XOS Apps > Configure Channels** app.
2. Click **Settings > General** tab.
3. Verify the **Kantar Audio Watermarking Library Version** (e.g. 2.0.0.0.1).



Uploading Kantar Product and Audience Licenses to XOS

1. Navigate to **XOS Apps > Configure Channels** app.
2. Click **Settings > Advanced** tab.

3. From the **Kantar Snap Watermarking Licenses** section, upload the license files to the XOS system:

- **Product Licenses ("LIC" Type):** Click the **Select...** button from the **License File Path** to upload a valid Product license to XOS (with the "LIC" file type).
- **Audience Licenses ("AUD" Type):** Click the **Select...** button from the **License File Path** to upload a valid Audience license to XOS (with the "AUD" file type).

4. Specify the **License Name** for the Kantar license files to be uploaded.

Configuring Kantar Watermarking on the IPTV/Multiscreen profile

1. Navigate to **XOS Apps > Lab Wizard** app.
2. Select the appropriate *IPTV* or *Multiscreen* profile as a starting point for saving the Kantar Watermarking configurations.
3. From the "**Audio**" configuration section on the left pane, select whether to work in the **Match by Language** or **Match by Source Label** mode.
4. From the "**Audio Spec**" table on the right pane, configure the following:
 - If using the **Match by Language** mode: For each language in the top row for which a Kantar watermark is needed, set the *Kantar Snap Watermarking* parameter to *true*.

Sample Rate	Bitrate(Kbps)	AAC Header	Nielsen Insertion	Nielsen Watermark	Nielsen CBET	Nielsen StepAside	Nielsen Source Type	Nielsen Watermark Mode	Kantar Snap Watermarking	Length
48	40	ADTS	False	-	-	-	-	-	True	M

- If using the **Match by Source Label** mode: Add/update rows with the needed source labels, and for each row set the *Kantar Snap Watermarking* parameter to *true* to enable watermarking.

- When the "**Customize spec for Audio**" pop-up appears, click "Yes, override to manual mode" to accept.
- For any mode, audio *Processing* must be in the *convert* mode, with a *Sample Rate* of 48kHz.

5. When the profile configuration is done, save it as a new version or profile.

Configuring Kantar Watermarking on the IPTV/Multiscreen service

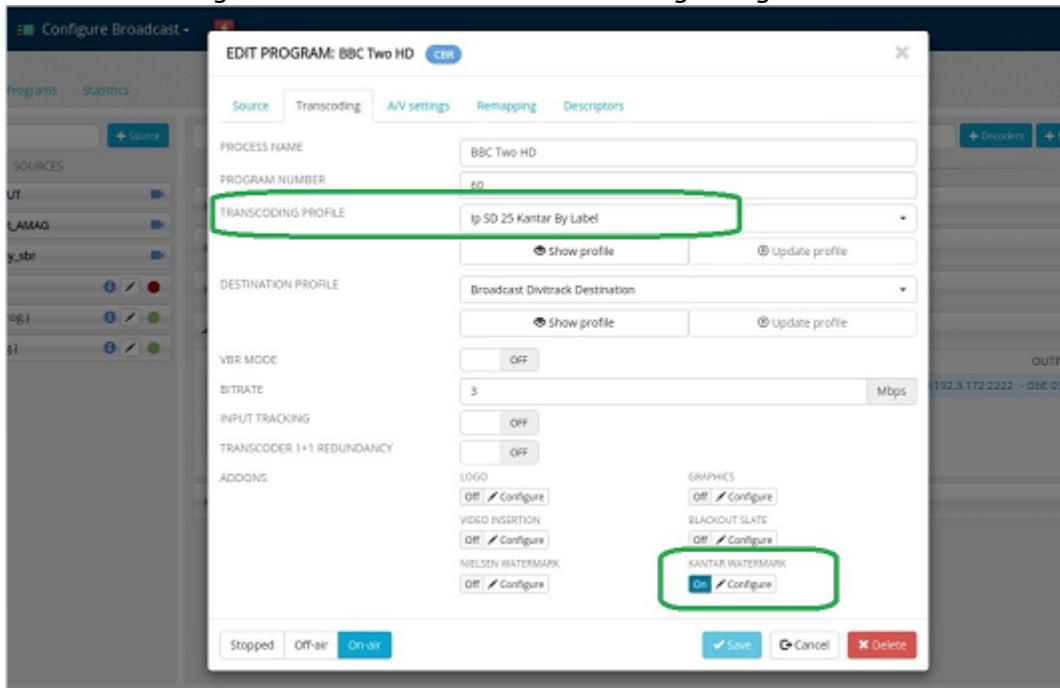
1. Navigate to **XOS Apps > Configure Channels** app > **Services** tab.
2. Click the **+ Service** button.
3. On the **Profile** tab, select the IPTV/Multiscreen profile with *Kantar Watermarking* enabled on some Languages or Source Labels (Ensure that source grooming is accurate) that the service will use.
4. On the **Source** tab, select the name of the primary source, and optionally, an alternate source.
5. On the **Destination** tab, select the name of the destination from the **Destination** drop-down.
6. On the **Commit** tab, configure all necessary settings and enable the service **Add-ons**.
7. Enable the **Kantar Snap Watermarking** add-on.

8. Select the available product and audience licenses from the drop-down menus. (Note that the drop-down options only appear when the valid licenses have been uploaded to XOS beforehand.)
9. For each Language or Source Label, specify the Channel Name as provided by *Kantar*.

Configuring Kantar Watermarking on the Broadcast service

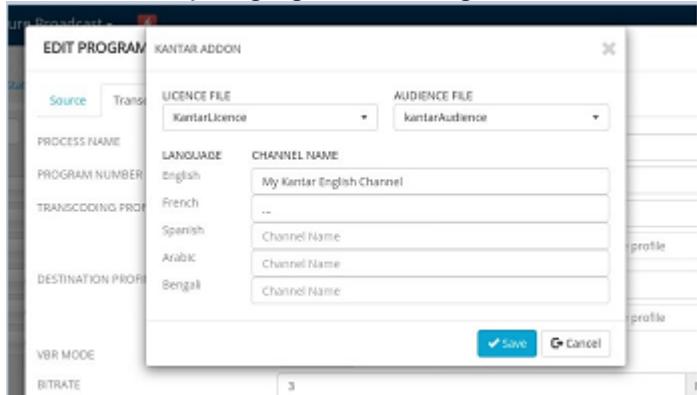
1. Navigate to **XOS Apps > Configure Broadcast** app.
2. Add and configure a Multiplexer for a broadcast service.

3. Add a transcoding service to the Multiplexer.
4. Add a Transcoding Profile with the Kantar Watermarking configured.

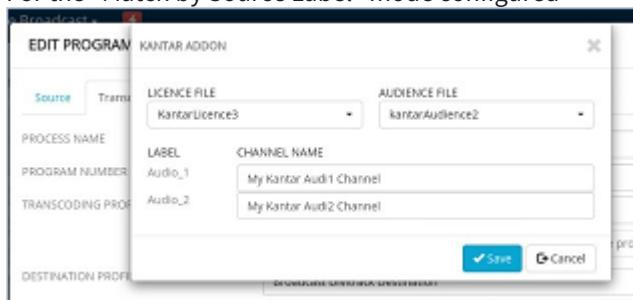


5. Turn on the **Kantar Watermark** add-on.
6. Set the Channel Name depending on the profile, using either the **Match by Language** or **Match by Source Label** mode.

- For the "Match by Language" mode configured



- For the "Match by Source Label" mode configured



Checking Kantar Watermarking logs

The Kantar SDK provides some event logs, made available in Kabana.

1. Navigate to the **XOS Apps > DevOps Portal** app > **Kabana** app.
2. Select the "rmpcontroller-debuglog-*" index pattern.
3. Add a filter based on the "originator" field with the value set to "KantarSnap".
4. Select the "service_id" and "message" fields to view the relevant information.
5. Check the available labels and license validity.

Time	service_id	message
> Jan 4, 2023 @ 19:44:12.909	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Resynchronizing timecode'
> Jan 4, 2023 @ 19:44:12.908	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Embedder Initialization starting ...'
> Jan 4, 2023 @ 19:44:12.908	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Start watermarking using ID 1 (SNAP)'
> Jan 4, 2023 @ 19:44:12.908	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='SIMD level used: AVX2'
> Jan 4, 2023 @ 19:44:12.908	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Applying CPU affinity mask - All CPU(s) selected'
> Jan 4, 2023 @ 19:44:12.908	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Embedder Initialization finished'
> Jan 4, 2023 @ 19:44:12.907	0CA35B48-2ABF-4006-B30D-0B13E539C265	license: permanent
> Jan 4, 2023 @ 19:44:12.907	0CA35B48-2ABF-4006-B30D-0B13E539C265	labels[2]: [certif, Longest_Channel_Name]
> Jan 4, 2023 @ 19:44:12.907	0CA35B48-2ABF-4006-B30D-0B13E539C265	event: type=0 code=0 message='Using channel name: certif'

Configuring a Loop Record service

A Loop Record service is a passthrough service that records a complete transport stream (TS), including both SPTS and MPTS. It can be utilized across various services, such as XOS Playout and Delay Line services.

- Configure the source for the Loop Record service
- Configure the destination for the Loop Record service
- Create the Loop Record service

Configure the source for the Loop Record service

1. Navigate to the **Configure Broadcast** app and click **+Sources**.
2. Select IP, ASI, SRT, or S2X.
 - a. For IP:
 - i. Set the Input source name.
 - ii. Set the Input IP Address, Input Port, and Network.
 - iii. Click **Create**.
 - b. For ASI:
 - i. Set the Input source name.
 - ii. Set the SDI Card and Port.
 - iii. Click **Create**.
 - c. For SRT:
 - i. Set the Input source name.
 - ii. Set the SRT IP Address, Input Port, and Network.

iii. Click **Create**.

- i** For IP and SRT sources, enable redundancy if needed. Configure the redundancy source and the redundancy parameters.

Configure the destination for the Loop Record service

1. Navigate to the **Configure Channels** app > **Destination** and click **+Destination**.
2. Set:
 - a. The Destination name = LoopRecord2
 - b. Type = ORIGIN/CDN
 - c. Profile = Loop Record Destination V.1
3. Click **Create**.

Create the Loop Record service

1. Navigate to the **Configure Channels** app > **Service** and click **+Service**.
2. Make the Profile **Loop Record** and click **Next**.
3. Enter your source in the Primary Source field and click **Next**.
If you want to delay a Demux input, configure it previously in Configure Broadcast app, and select it afterward here.
4. Enter the Destination name and click **Next**.

Configuring a Delay Line service

The source input of a Delay Line service is derived from the output of Loop Record services. The Delay Line service allows the recorded TS (loop record) to be replayed with a fixed delay of XX hours/XX minutes without modifying the input TS.

Prerequisites

Before configuring a Delay Line service, create a Loop Record service as the input TS source (**IP**, **ASI**, **SRT**, or **S2X** supported for Delay Line services) first. (Refer to [Configuring a Loop Record service](#) for details.)

⚠ Note

Ensure that you set the depth of the Loop Record service (default is 6 hours) to a duration greater than the delay you plan to configure in the Delay Line service.

⚠ Note

To conserve resources, it is recommended not to activate the preview option in the Loop Record service.

Configure a Delay Line service

i Info

The Delay Line source does not support signal loss configurations for input source redundancy.

1. Navigate to the **Configure Channels** app > **Sources** tab and click **+Source** to create a Delay Line source.
2. Select a **Loop record service** that records the stream for delayed playback.
3. Configure the following parameters to set the fixed delay you want to apply to the recorded TS:
 - o **Delay:** The delay in milliseconds. The minimum value is 180,000 (for example, 3 minutes). It will be lower than the recording buffer size of the corresponding Loop Record service.
 - The minimum delay is 5 minutes (even if the UI limits to 3 minutes, it is recommended not to configure less than 5 minutes).
 - The maximum delay is 15 days (the depth of the record service must be consistent).
 - o **Delay update:** This toggle enables a scheduled update of the delay, for example, for the next daylight saving time transition. The “Next delay” and “Next delay activation date” will be configured.
 - o **Next delay activation date:** The UTC date when the next delay will be applied, expressed by a string with the following format "yyyy-mm-dd hh:mm:ss" (for example, 2024-11-20 04:00:00)
 - o **Next delay:** The next delay to apply when the activation date is reached, also expressed in milliseconds.
4. Click **Create**.
5. Navigate to the **Configure Channels** app > **Destination** tab to create a new destination (could be an IPTV destination or an SRT destination) and set:
 - a. Destination name
 - b. Type = Broadcast
 - c. Profile = IPTV Destination
 - d. Outputs = IP Address, Network, Port

The screenshot shows the 'Add destination' dialog box. On the left, there's a sidebar with 'DESTINATION NAME' set to 'My IPTV destination', 'TYPE' set to 'Broadcast', 'PROFILE' set to 'IPTV Destination v.1', and a 'Lab Wizard' button. On the right, under 'OUTPUTS', there's a table with columns 'IP ADDRESS' (237.168.xx.yy), 'NETWORK' (GbE 07(10.172.71.101)), and 'PORT' (4000). Below the table are fields for 'SOURCE IP ADDRESS' (e.g., 226.1.1.1) and 'PORT' (e.g., 80). Further down are 'RANK' (Primary) and 'STATUS' (Mandatory) dropdowns, and a 'OUTPUT MONITOR' checkbox. At the bottom are 'Cancel' and 'Create' buttons.

6. Click **Create**.
7. Navigate to the **Configure Channels** app > **Services** tab and click **+Service** to create a new service using the source and the destination created before, and the destination (could be an IPTV destination or an SRT destination).
8. Set the Profile to IPTV Passthrough and click **Next**.
9. Set the Source to Your delay line source and click **Next**.
10. Set the Destination to Your delay line destination and click **Next**.
11. Set the Status to **Active** and **Commit**.

Schedule an update on the delay

To schedule an update on the delay (for example, to automate the summer/winter time change), you can define a different time delay to be applied from a given date.

1. Navigate to the **Configure Channels** app > **Sources** tab.
2. Edit the Delay Line source:

INPUT SOURCE NAME
My DelayLine source

LABELS
+ Label

Used in 1 services.

INPUTS
Primary DELAYLINE +
Loop record service
M6-Loop Record-REC

Delay
00 01:00:00.000

Delay update
ON

Next delay activation date
2025-04-25 02:00:00

Next delay
00 02:00:00.000

x Remove

Delete **Save** **Revert** **Close**

- a. Set the **Delay update** to “ON”.
- b. Set the **Next delay activation date** from which to use this new delay (UTC time).
- c. Set the **Next delay**.

In the screenshot above, the delay applied before April 25, 2 a.m. (UTC) time is 1 hour, and after this date it is 2 hours. Therefore, on April 25 at 2:00 a.m., the Delay Line service will rewind 1 hour and replay the same content. Inversely, with a new delay smaller than the initial one, there would have been a gap in the output signal.

i Info

Changing the delay does not restart the service.

Advanced Configuration

- Configuring service add-ons
- Uploading image files
- Manually switching input sources
- OTT scrambling services

Configuring service add-ons

The availability of service add-ons depends on the type of service you have configured. Before enabling service add-ons, you must create a service from an existing source, transcoding profile, and destination.

Configure add-ons as required by the service:

1. Navigate to **Configure Channels** app > **Services**.
2. Enable the **Add-ons** checkbox.



3. Turn "ON" your desired add-ons with specific configurations.

- Logo
- Graphics
- DRM
- CAS
- Video Insertion
- Traffic
- Timed Event
- Affiliate
- Time Adjustment
- Blackout Slate
- Thumbnail Exporter
- Input Monitoring
- Kantar Snap Watermarking
- Synamedia Watermark
- Operator Action
- Caption Insertion

Logo

If the service supports a channel logo, enable the **Logo** add-on and configure the following settings:

Image	Click the Edit icon to select an image in the XOS file system or upload a new image file.
Placement	Indicate the desired position of the logo.
Offset	Indicate the horizontal and vertical offset (relative to the Placement) in pixels.

Define Logo Per Video Profile	If enabled, you can define a logo per video profile of the Lab Wizard profile for the multiscreen service.
--------------------------------------	--

Graphics

If the service supports graphic templates, enable the **Graphics** add-on and then configure the following settings:

Template	Click the Edit icon to select a graphics template file on the XOS file system, or to upload a new file. <ul style="list-style-type: none"> Path to graphic template file: Enter the path to upload the graphic template by URLs. Note that HTTPS URLs are supported in HTML5 graphics.
Template Parameter (Optional)	Set the parameter to pass to the graphic template. This parameter is dependent on the graphic template. For the graphic template used for crawl text overlay, this could be the URL to an RSS feed containing the text to crawl.

DRM

For multiscreen services: If the service is to be encrypted, enable the **DRM** add-on and then select a DRM system and resource for each package type.

 **Note**

You must configure DRM systems in the **Scrambling app**.

CAS

For linear services: If the service is to be scrambled, enable the **CAS** add-on and then configure the required parameters.

 **Note**

You must configure CAS systems in the **Scrambling app**.

Video Insertion

If the service supports SCTE-35 video insertion, enable the **Video Insertion** add-on and then configure the following:

Acquisition Point ID	Type the ID of the Signal Acquisition System.
-----------------------------	---

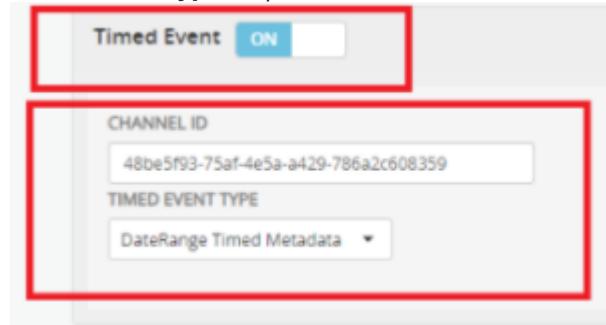
Traffic

To integrate a traffic system, enable the **Traffic** add-on and then configure the following:

Traffic ID	Type the ID of the traffic system.
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Timed Event

To accept API commands that insert custom tags into manifests, enable the **Timed Event** add-on and select from the **Timed Event Type** drop-down menu:



- **Parental Control**

Channel ID	Assign a unique ID to the channel (up to 36 Unicode characters). The ID is used by the Parental Control API to identify the channel.
HLS ID3 PID	Specify the HLS ID3 PID for assigning the HLS ID3 timed metadata.
Callback URL	Type the API endpoint used to listen on the parental control insertion status.
Authentication	(Optional) Authentication can be configured for the Callback endpoint.

Note: The Parental Control from the Timed Event add-on is service-affecting. Only OTT services are supported.

- **DateRange Timed Metadata**

Channel ID	Assign a unique ID to the channel (up to 36 Unicode characters). The DATERANGE TMD API uses this Channel ID to associate and send TMD events to the channel correctly. This setting is used to insert DATERANGE timed metadata into HLS-fMP4 or CMAF-HLS live stream playlists as EXT-X-DATERANGE tags via an API.
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⚠ Note

The Daterange tags are supported in milliseconds for CMAF-HLS with the Live, Start-over/Catch-up workflow through API.

Affiliate

If required, enable the **Affiliate** add-on and then provide the **Affiliate ID**.

Time Adjustment

Optionally, enable the **Time Adjustment** add-on and then apply a time offset to adjust for channel latency due to (for example) processing time.

Blackout Slate

If the service supports blackout slate, enable the **Blackout Slate** add-on and then configure the slate image and the following settings.

Trigger	<ul style="list-style-type: none"> Auto (Default): Select this option if you need to trigger the blackout slate with both the SCTE-35 message and Monitor app. ESAM Alternate Content: Select this option if you need to trigger the blackout slate with the Monitor app. Note that if this option is selected, do not configure the ESAM acquisition point ID or ESAM POIS endpoint for the service.
Zone Identity	(Optional) Enter the provided Zone identity received from the ESAM message.

 **Note**

You must enable this add-on to be able to invoke Override mode in the **Playout Monitor** app.

Thumbnail Exporter

Thumbnails can be regularly generated from the source to encode and pushed to an sFTP server by enabling the **Thumbnail Exporter** add-on and configuring the following settings.

SFTP Export Path	<p>Supported protocol for exporting are <i>FT</i> and <i>SFTP</i>. The syntax must be respected to have the protocol recognized by the add-on.</p> <p>The syntax template is : <protocol>://<web or IP address>:<port>/path/toSave/Thumbnail Only the protocol and web or IP address are mandatory. If the port isn't specified, the default protocol's port will be used. If the path isn't specified, the thumbnails will be saved to the address root directory.</p> <p><u>Example of accepted address</u> : (SFTP) sftp://192.18.10.1:2121/local/user/ ; (SFTP with DNS address) sftp://namedomain.com/tmp ; (FTP) ftp://198.20.15.6:2000/user</p>
File Prefix	The name used to save the generated thumbnails. The thumbnail files will be saved under the name <prefix>_<date and time>.jpg in the export path URL. The date and time will be appended by the system and will be in UTC format. It follows the pattern <i>YYYYMMDDhhmmss</i> .

Name Suffix	The parameter was added under the name " Name Suffix " with two available parameters: <ul style="list-style-type: none"> <i>Timestamp</i>: This is the default parameter to add the date and time in UTC format following the file name. <i>None</i>: This is the new parameter to have the same file name all along. It can be used to overwrite the thumbnail at the destination at every export interval.
Username and Password	These are the server username and password used to log in to the specified export path. Failure to authenticate will raise a warning.
Export interval (in s)	The exportation interval between two thumbnails.
Width	The generated thumbnail width.
Height	The generated thumbnail height.

Input Monitoring

To be able to monitor a live transport stream from an HSP endpoint, enable the **Input Monitoring** add-on.

Result: You can obtain the input monitoring URL for an active service in the Monitor Channels app.

Kantar Snap Watermarking

To insert the Kantar watermarking into your service, enable the **Kantar Snap Watermarking** add-on. (This add-on is visible only if the Kantar Product and Audience license files have been loaded to the XOS system on the [Settings](#) page.)

- Configure the Kantar Product and Audience licenses for the audio channels. (Refer to [Configuring Kantar audio watermarking](#) for details.)

Synamedia Watermark

If the service supports Synamedia Watermark in the encoded stream, enable the **Synamedia Watermark** add-on.



Note

To make this add-on visible you must first set the parameter '`'isEnable'`' of '`'globalSynamediaWatermarkSetting'` through REST-API.

Operator Action

To define the Start and End times for transcoded services, enable the **Operator Action** add-on.

- Turn on the **Mute Operation** toggle under the **Operator Action** add-on to schedule or manually start and stop streaming on the output through the **Monitor Channels** app. (Refer to Scheduling streaming start and end times in the Monitor Channels app for details.)

Caption Insertion

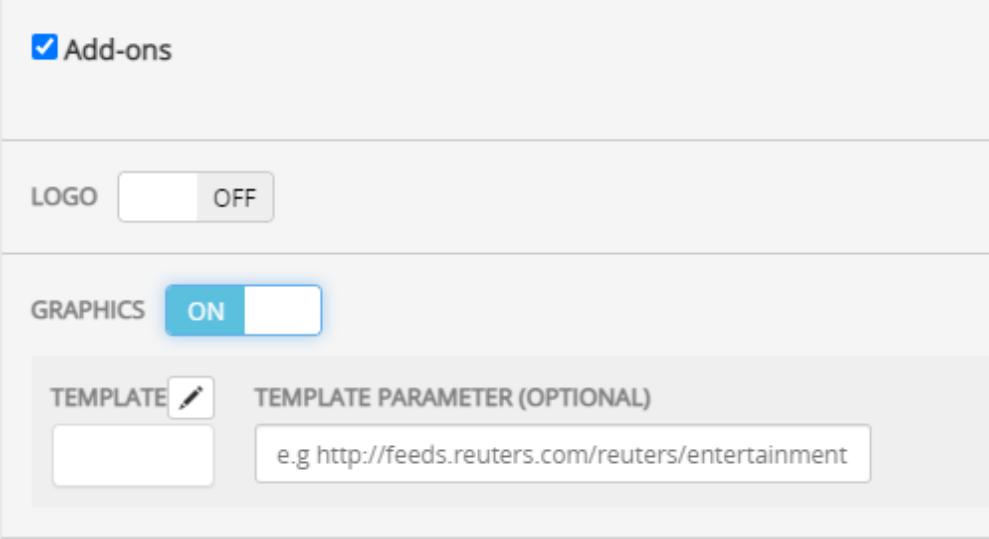
To enable NCI Live Caption on OTT, enable the **Caption Insertion** add-on, which will be available when **Enable NCI Cloud Captioning** in Configure Broadcast>Settings>Advanced tab is set and saved.

Performing crawling text insertion

⚠ Important

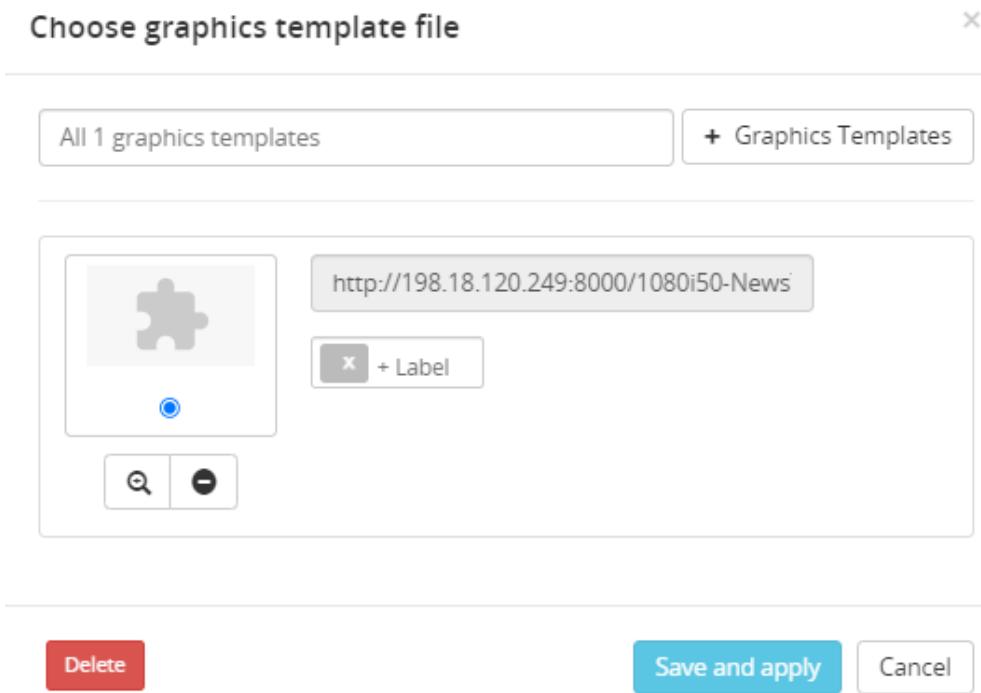
Crawl Text insertion relies on the HTML5 Graphic Engine.
HTML5 templates must follow rules described in the Template User Guide to be supported.
Please refer to the Documentation Portal to get access to these guides. 2 guides are available for Adobe Animate and for Google Web Designer.

1. Enable Graphics: set it to ON



2. Edit the template

3. Add the desired .zip file

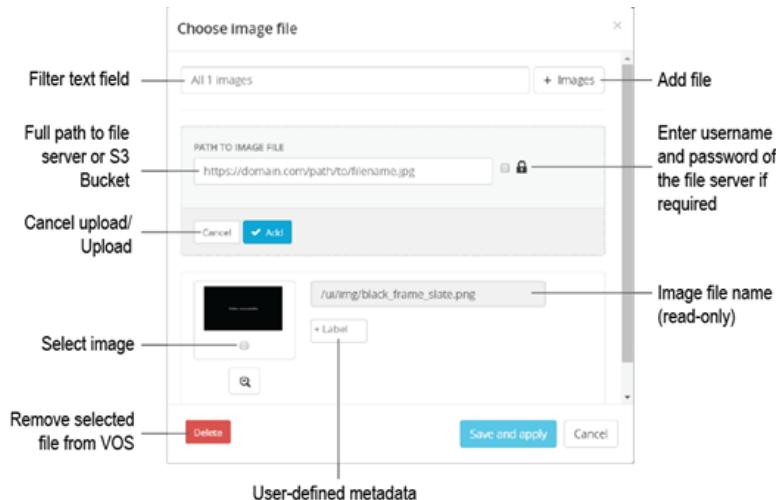


4. Click "**Save and apply**"

5. Provide the "Template parameter" as per the graphic file selected

Uploading image files

You can upload the channel logo and blackout slate image files when you configure services in the **Configure Channels app**. You can also upload image files using the **Public API app**.



- To upload a **slate image** file, do one of the following:

- Navigate to the Configure Channels app and create a new source. A backup signal loss source is added by default. Click the **Edit** icon to open the **Choose image file** dialog and upload the desired image file.
- Navigate to the **Public API**, click POST /configure/v1/images, supply the necessary parameters and click **Try it out!**.

Info

The following REST API can be used to configure a source: POST /configure/v1/sources. Specify the image UUID for the image ID parameter to configure a slate image.

- To upload a **logo image** file, do one of the following:

- Navigate to the Configure Channels app. If necessary, create the service source and destination, and then configure the service. On the **Commit** tab, select **Add-ons** and enable the **Logo** add-on. Click the **Edit** icon to open the **Choose image file** dialog and upload the desired file.
- Navigate to the **Public API**, click POST /configure/v1/images, supply the necessary parameters and click **Try it out!**.

Info

The following REST API can be used to configure a service: POST /configure/v1/services. Specify the image UUID for the image ID parameter to configure the channel logo.

Manually switching input sources

If a service has a primary and alternate input source, you can manually switch between sources while the service is active.

Note

If a signal loss occurs and the service is in redundancy mode, the failover will occur within one second. If redundancy mode is not activated, the failover process could take up to 20 seconds.

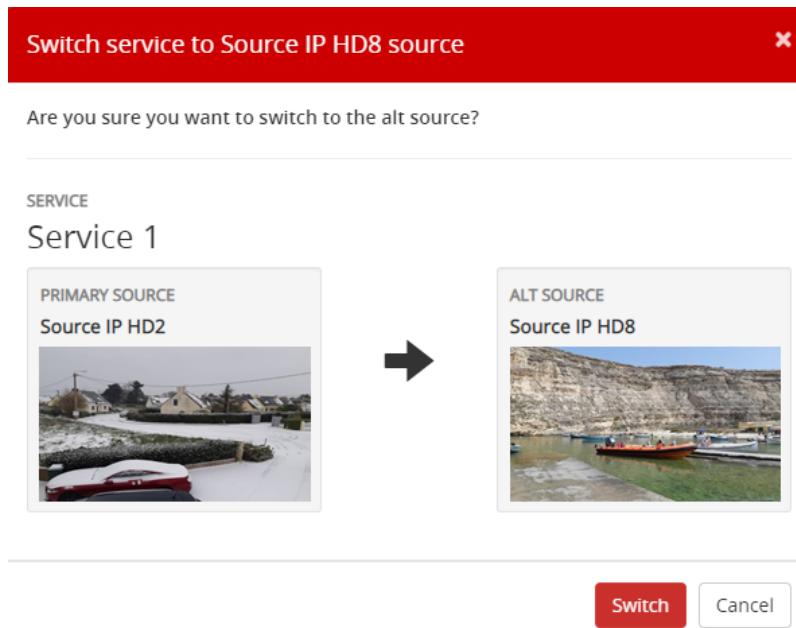
1. From **Monitor Channels > Services**, click the name of the desired service.

Result: The service visualization graph appears.

2. On the **Ingest** panel, click the **Alt Source** (Source IP HD8) icon to reveal the **Manual Override** icon.



3. Click the **Manual Override** icon to display the **Switch Service to Alt Source** dialog box, and then click **Switch**.



4. On the **Ingest** panel, verify that the check-mark now appears next to the alternate source.

5. Optionally, verify the video output by clicking the **Watch Output Video** icon in the **Origin** panel.
 6. When you are ready, return to the primary input source by clicking the **Primary Source** icon on the **Ingest** panel, and then repeat the steps above.
 7. Verify that the check-mark now appears next to the primary source.

OTT scrambling services

XOS supports scrambling and encrypting services to protect media content from being illegally accessed and copied.

Adding an external CAS

You can integrate an external CAS in the Scrambling app and then assign it to Broadcast services (used for IPTV or DTH workflows) using the Configure Broadcast app.

The external CAS must use a standard DVB-CSA or AES algorithm, including external or internal EIS, and external ECMG and EMMG.

Harmonic also supports scrambling IPTV services without the use of an external CAS.

1. From the **Scrambling** app, select **CAS > CA Systems**, and click **+ System**.
2. Configure the following settings:
 - a. CAS Name - Type the name of the CAS
 - b. Super CAS ID - Type the Super CAS ID string, which is composed of the two-byte CA system ID followed by the two-byte CA subsystem ID.
3. Configure the IP Address and Port of the primary ECMG.
4. Select **CAS > SCG**, and click **+ SCG**.
5. Select the desired option from the **Algorithm** drop-down menu.
 - a. For scrambling most commonly used for DTH workflows (i.e. **NOT** including **BISS2 mode 1/E, BISS mode 1, and BISS mode E**), configure the following:
 - i. SCG Name - Set the name of the SCG.
 - ii. Name - (Optional) Enter a label for the ECM ID.
 - iii. ECM ID - Enter the Entitlement Control Message (ECM) provided by the CAS.
 - iv. CA System - Select the created CA System.
 - v. Access Criteria - Set the access criterion which need to be in hexadecimal format with an even number of digits.
 - vi. Private Data - Set the private data which needs to be in hexadecimal format with an even number of digits.

Note:This is used for the insertion of Private Data in the PMT CA descriptor which will be used for ECMs.
 - b. For scrambling commonly used for Contribution workflows, use the "**BISS2 mode 1/E**" scrambling, and configure the following:
 - i. Clear Session Word - Set the Session Word to be used during scrambling (sequence of 32 hexadecimal characters).
 - ii. Parity Bits - Select the Parity Bits to be applied in TS packets.
 - c. For BISS mode 1 scrambling configure the following:
 - i. Clear Session Word - Set the Session Word to be used during scrambling (sequence of 12 hexadecimal characters).
 - d. For BISS mode E scrambling configure the following:
 - i. Encrypted Session Word - Set the Encrypted Session Word to be used during scrambling (sequence of 16 hexadecimal characters).
 - ii. Injected ID - Set the Injected ID to be used during scrambling (sequence of 14 hexadecimal characters).
6. Optionally, click **+ECM** to repeat the previous step for each set of access criteria.
7. Optionally, add a backup **SCG**.
8. Click **Save**.

Result

You can assign the CAS to a Broadcast (IPTV/DTH) service when you configure the service in the **Configure Broadcast** app.

Enable Scrambling at Multiplexer and Program/Component Levels

You can enable scrambling at the **Multiplexer level** by setting the **Scrambling** checkbox. (Refer to [Adding and configuring a multiplexer](#))

You can enable scrambling at the **Program/Component levels** by setting the **Enable Scrambling** and **Scrambling Group**. (Refer to [Adding programs to the multiplexer](#))

Adding a DRM system

You can configure digital rights management (DRM) systems in the Scrambling app and assign them to OTT services in the Configure Channels app.

In order to have different keys for each service, unique ResourceIDs are recommended per service. Appending a suffix to the end of a common Resource ID would allow the KMS to better differentiate between multiple package formats within the same service and return the relevant DRM metadata. For example, Harmonic_HLS, Harmonic_SSKR, and Harmonic_DASH.

 **Note**

Ensure that you specify the **Encryption Method** in the destination profile for each service that will use the DRM system.

1. From the **DRM** tab, click **Systems > Add System**.

2. Configure the following settings:

DRM System Name	The name of the configured DRM system.
Requester ID	The ID of the transcoder or scrambler requesting the key session. The requester ID must be unique among all devices that connect to the same DRM system. If it is not provided, then a random UUID is used.
Encryption Interface	<p>This is the protocol used to interface with the DRM server.</p> <p> Note</p> <p>Harmonic recommends the minimum implementation. While the full implementation provides the benefit of an additional key session layer for redundancy and horizontal scaling, there may already be pre-existing redundancy/scaling methods within the DRM implementation, making the minimum implementation a simpler, better approach</p>

3. To add a Resource ID, click in the **Resources** field.

- In the **DRM Resources** dialog, configure the following settings:

Packaging Type	Choose the targeted packaging (HLS, MPEG-Dash, MSS).
Name	Enter the name of the configured DRM resource.
Resource ID	The ID of the asset/live channel (a.k.a Content ID) that is to be encrypted. Maximum 128 characters. If it is not provided, then a random UUID is used.

- Click **Save**.
- Repeat this step for each Resource ID you wish to add.

4. Click **Add Key Management Server**, and then enter the **KMS URL**.

5. Optionally, add a backup KMS server.

6. Click **Save**.

Result: You can assign the DRM system to an OTT service when you configure service add-ons in the Configure Channels app.

Supported encryption methods

Review which DRM systems are supported by each OTT output format.

ABR format	Encryption/DRM system
HLS	AES (Native HLS Encryption)
	Sample-AES (Native HLS Encryption)
	FairPlay Encryption
	Common Encryption (sTS only)
	PlayReady* (proprietary implementations: Discretix, Authentec, Irdet; sTS only)
MSS	PlayReady (with/without key rotation)
MPEG-DASH	MPEG-CENC (Common Encryption - Multiple DRMs can be used: Widevine, PlayReady, proprietary...)

 **Warning**

*Key rotation is not supported due to format-specific limitation.

DRM system integration

Harmonic defines its own API for integrating third-party DRM systems with XOS. The Widevine KMS API is also supported.

The Harmonic KMS interface is an XML/SOAP-based interface designed to facilitate encryption key and DRM metadata exchange between an OTT packager/scrambler (XOS) and a third-party KMS.

Please check that the DRM system you intend to use is fully compliant with the Harmonic KMI (Key Management Interface) Full or Minimum specification before connecting this DRM system to XOS.

Configuring DRM using Harmonic CPIX

You can configure a service with encryption using the "Harmonic CPIX" KMS API.

1. Navigate to the **Scrambling** app > **DRM** tab > **System** tab.

2. Click **+System** to create a new DRM system.

The screenshot shows the configuration page for a new DRM system. The 'General Settings' tab is active. Key configuration parameters include:

- DRM SYSTEM NAME:** e.g., DRM-1
- ENCRYPTION INTERFACE:** Harmonic CPIX
- CUSTOM HEADER:** A dropdown menu containing a single entry.
- CENC SETTING:** A dropdown menu containing a single entry.
- RESOURCES:** A dropdown menu containing a single entry.
- Key Management Servers:** Primary (selected)
- KMS URL:** e.g., https://server:10001/node
- RANK:** Primary (selected)
- HTTPS CERTIFICATE VALIDATION:** OFF
- HTTP METHOD:** POST
- CPIX DOCUMENT VERSION:** 2.3
- COMMON ENCRYPTION SCHEME FOR HLS-TS:** Nothing selected
- SIGN KEY REQUESTS:** OFF
- VALIDATE KEY RESPONSES SIGNATURE:** OFF
- X Remove:** A button to remove the system.

3. Configure the DRM system settings:

- **DRM System Name**
- **Encryption Interface:** Select the "Harmonic CPIX".
- **Custom Header (Option):** Configure a custom HTTP header (header name + value) that will be added to the CPIX key requests sent to the KMS (It can be used for instance for providing an authentication token to the KMS).
- **CENC Setting:** Configure the DRM systems that are used for CENC encryption in HLS, DASH or CMAF. (*The selected DRM systems will be converted into the corresponding 'DRMSystem@systemId' in the CPIX key*)

requests.)

CENC DRM SETTING

Packaging Type	DRMs
HLS	<input type="checkbox"/> Microsoft PlayReady <input type="checkbox"/> Google Widevine <input type="checkbox"/> Apple FairPlay <input type="checkbox"/> Marlin <input type="checkbox"/> Clear Key
DASH	<input type="checkbox"/> Microsoft PlayReady <input type="checkbox"/> Google Widevine <input type="checkbox"/> Marlin <input type="checkbox"/> Clear Key <input type="checkbox"/> Nagra PRM
CMAF HLS	<input type="checkbox"/> Microsoft PlayReady <input type="checkbox"/> Google Widevine <input type="checkbox"/> Apple FairPlay <input type="checkbox"/> Marlin <input type="checkbox"/> Clear Key
CMAF DASH	<input type="checkbox"/> Microsoft PlayReady <input type="checkbox"/> Google Widevine <input type="checkbox"/> Marlin <input type="checkbox"/> Clear Key

Note

DRM type for HSS/MSS cannot be configured, as PlayReady is the only DRM format supported for Smooth-Streaming packaging type.

Info

The Clear Key DRM system applies to Live, Start-over, Catch-up, VOD, Long-Lasting Catch-up, and Merge-live use cases. Since "Clear Key" is not a highly secure solution, it is not recommended to use the Clear Key DRM system with other DRM systems simultaneously.

Note

Nagra PRM can only be selected in the DASH Packaging Type.

4. Click the **Add Resource** button to add resources.

- **Content ID/Resource ID:** The "Content ID/Resource ID" values correspond to the Content Identifiers (CPIX@contentId) that are included in the CPIX key requests.

- **DRM Track Filter:** For HLS/DASH packaging types, different encryption keys can be created for different track types based on the DRM Track Filtering Profiles defined from **Lab Wizard** app > **OTT Filters**.

Packaging Type	Name	Content ID / Resource ID	DRM Track Filter
HLS	hls-fmp4	hls_fmp4_resource_id	Filtering Profile
HLS	hls-ts	hls_ts_resource_id	Filtering Profile
DASH	dash	dash_resource_id	Filtering Profile

Add Resource Cancel Save

Note

When using the Nagra PRM, Packaging Type must be **DASH** and Name should be **dash_ksm_cpix**.

5. Configure the **General Settings** tab.

- **KMS URL:** Enter the URL of the CPIX compliant endpoint offered by the Key Management Server for key request. It is recommended to use only HTTPS protocol for production systems.

Note

To use HTTP basic authentication, the credentials must be included in the URL by prepending "`username:password@`" to the hostname (e.g. <https://username:password@kmsHostname/cpixEndPoint>).

When using a Nagra server, request the URL from Nagra.

- **HTTPS Certificate Validation:** If activated, XOS will validate that the certificate used by the KMS is valid (i.e. it authenticates the remote server) before completing the HTTPS connection establishment.

Note

Before using this feature, the publicly trusted certificate of the KMS must first have been uploaded to XOS using the REST API.

It is expected that the KMS server will perform the same validation using the public XOS trusted certificate (you must have uploaded the corresponding private certificate in XOS), so that both parties can trust each other. This is what is usually called HTTPS mutual authentication.

- **HTTP Method:** It allows selecting the way you want the key request to be done. The usual and recommended setting is "POST".

- When selecting HTTP POST, for each key request XOS sends a CPIX document to the KMS, this document including all the parameters (contentId, requested DRM format, key period, etc.) is needed by the KMS to process the request.

- When selecting HTTP GET, for each key request XOS sends no CPIX document to the KMS, but sends only the "content identifier"(contentId) directly in the key request KML URL.
 - The following template must be used in KMS URL field when using "HTTP GET": <https://hostname/path/{contentId}?staticParameter=staticValue> (e.g. <https://KmsHostname/configuration/df23-add2-hghh-e453?keyIdFormat=UUID>).
 - For each key request, {contentId} is replaced automatically by the "Content ID/Resource ID" configured in the "DRM Resources" section and that has been associated to the specific content (live service, VoD asset, etc.)
- **CPIX Document Version:** Select the version for the CPIX document that is supported for the DRM encryption with the Harmonic CPIX KMS. The supported versions are 2.2 (no explicit 'version' in the CPIX documents) and 2.3 (explicit 'version' and use of 'ContentKey@commonEncryptionScheme' in the CPIX documents). For Nagra, use 2.3.
- **Common encryption scheme for HLS-TS:** Allows to force a specific 'encryption scheme' when sending CPIX 2.3 (or later version) key requests to a KMS. (Even if "encryption scheme" is not applicable for content protection of HLS-sTS streams, some DRM/KMS solutions might require a value to be provided.)
 - If parameter is set to "cbc1" or "cbc3", CPIX key requests sent to KMS will contain the corresponding encryption scheme;
 - If parameter is set to "none" (default setting), CPIX key requests sent to KMS will not contain any encryption scheme.

 **Note**

Use **cbc3** for Nagra.

- **Sign Key Requests:** It forces XOS to sign the CPIX document that is included in the key request.

 **Note**

Before using this feature, you must first upload a private certificate in XOS and have the corresponding public certificate configured in the KMS, so that the KMS can validate the digital signature. When uploading the CPIX private certificate in XOS, the "Sign Key Requests" option is automatically activated (you can then deactivate it manually).

- **Validate Key Responses Signature:** It forces XOS to check that the key response CPIX document received from the KMS is signed and to validate the digital signature.

 **Note**

Before using this feature, you must first upload the public certificate of the KMS to XOS. When uploading the KMS public certificate to XOS, the "Validate Key Responses Signature" option is automatically activated (you can then deactivate it manually).

6. Configure the **Key Rotation Settings** tab.

 **Note**

When using Nagra, the **Enable key rotation** option must be off.

- **Content Key Period Mode:** This is used to define what ContentKeyPeriod attribute will be used in a CPIX request/response.

- Start End: If selected, the ContentKeyPeriod@start/end attribute will be used. Note that this is supported for Live, Start-Over, and Catch-Up services.
 - Index: If selected, the ContentKeyPeriod@index attribute will be used. Note that this is recommended for Long-Lasting Catch-Up and VOD services, but it is also supported for Live, Start-Over, and Catch-Up services.
 - In case "Start End" is selected, then the following additional parameters are available.
 - Number of Key Periods Per Request: Define the number of consecutive key periods to be added in advance to a single CPIX key request.
 - Key Pre-Request Time (In %): Define the moment relative to the end of the last period to request a new key. This refers to the time point in percentage after the start of the first (current) period when new content keys are pre-requested.
- For example, for 3 periods (300% total):

270% means key renewal at 30% of the time before the end of 3rd period;

250% means key renewal at half of the 3rd period.

 **Note**

Max value = **number** * 100. The default value is 80%.

If the Key Pre-Request Time > **number** * 100, or Key Pre-Request Time < 30, an error will be displayed when creating/updating the DRM system.

- **Time Range Management:** Define what entity controls the time range values for key periods.
 - KMS: If KMS is selected, XOS sends key requests with time range values, but it actually uses time range values included in the key responses (i.e. the KMS can change them).
 - XOS: If XOS is selected, KMS is required to use time range values provided by XOS in the key requests.

7. Configure the corresponding destination profile to use the appropriate encryption method according to the table below:

Packag e type	DRM System to select in the Scrambling app	Encryption method (in the destination profile)	Additional parameters in the destination profile
DASH	PlayReady	Common Encryption	
	Widevine		
	Marlin		

	Nagra PRM		
	Clear Key		
HLS sTS	Fairplay	Fairplay	
	Clear Key	SAMPLE-AES	
		AES-128	
HLS fMP4	Fairplay	Common Encryption	For HLS packaging type, set "Package in fMP4" to True to enable "fMP4" segment generation. (CMAF-HLS always generates fMP4 segments)
	PlayReady		
	Widevine		
	Marlin		
	Clear Key	Common Encryption	
		AES-128	
CMAF- DASH	PlayReady	Common Encryption	
	Widevine		
	Marlin		

	Clear Key		
CMAF-HLS	Fairplay	Common Encryption	
	PlayReady		
	Widevine		
	Marlin		
	Clear Key		
MSS	PlayReady	PlayReady	

8. During creation of the service enable **Add-ons**. Turn on **DRM** and choose resources from your DRM system for corresponding OTT packaging outputs.

Add-ons

Logo

Graphics

DRM

DRM SYSTEMS & CONFIGURATIONS

NAME	RESOURCE
DASH	dash

DRM SYSTEM RESOURCE

HarmonicCPIXTes dash

Managing media assets

XOS supports both automatic and manual ingest of file-based assets using the Asset Acquisition app. Only Super Admins have access to the Asset Acquisition app.



Important

Harmonic strongly recommends that you delete file-based assets that are no longer needed in order to free up system resources.



Note

The Asset Acquisition app is only relevant for XOS with Playout capabilities.

Asset Acquisition app overview

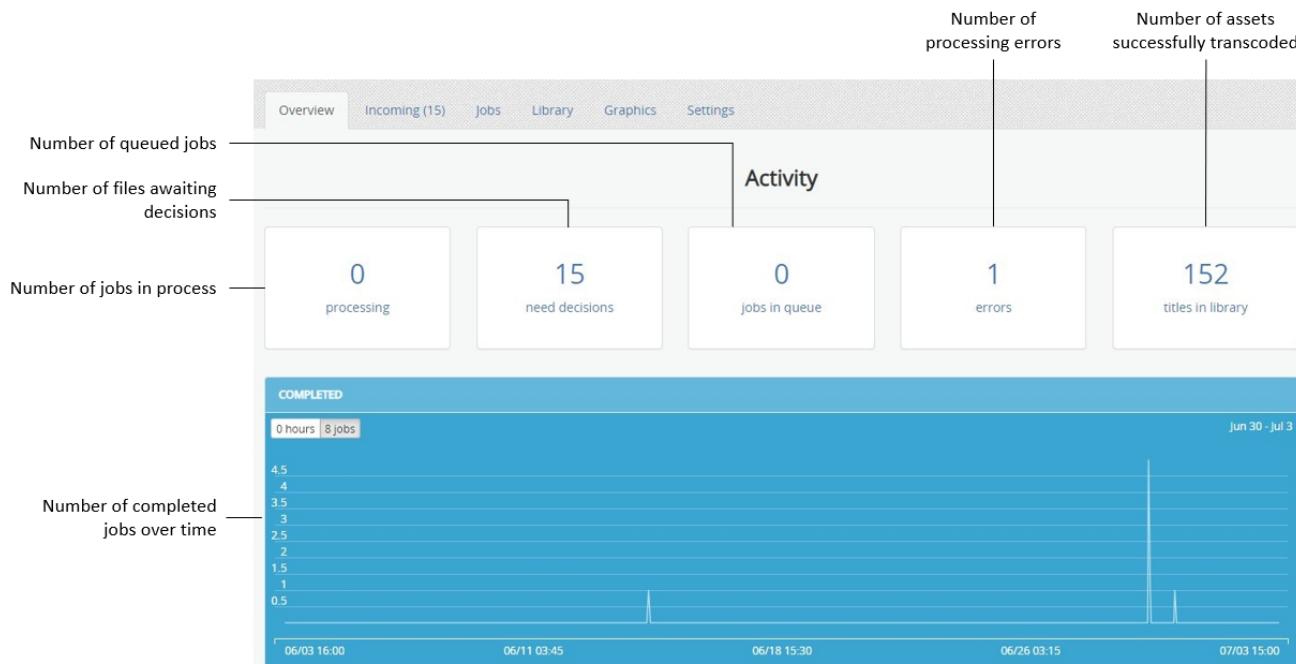
Review the app layout and function of each element in the user interface.

- Overview page
- Incoming page
- Jobs page
- Library page
- Graphics page
- Settings page

Overview page

The **Overview** page provides a summary of all activities in the Asset Acquisition app.

[Asset Acquisition Overview page](#)



Incoming page

From the **Incoming** page, you can upload files, capture assets, create jobs, and view jobs that await processing.

- [Asset Acquisition Upload assets page](#)
- [Recording](#)
- [Decision Queue](#)
- [Ready Queue](#)

[Asset Acquisition Upload assets page](#)

i Input Type (file extension) for Asset Acquisition

VIDEO: ts, trp, mp4, mxf, mov, mkv, mpg, 3gp, avi, m2s, m2t, m4t, avc, wmv, avchd, qt, m4v, mp2, mpeg, mpe, ogg
 AUDIO: mp3, m4a, flac, wav, ts (without video track)

API — Integrate programmatically
[Read documentation](#)

AZURE BLOB STORAGE — Upload source files to your managed Blob storage

BLOB STORAGE ADDRESS https://aalphoenixlizymzhqcbqks.blob.core.windows.net/2529367d-1608-4485-8329-98f112364ee5	COPY
BLOB ACCOUNT NAME aalphoenixlizymzhqcbqks	CONTAINER 2529367d-1608-4485-8329-98f112364ee5
AZURE ACCOUNT KEY	
Show & Copy	

WEB UPLOADER — Simple, convenient

Select files or drag and drop from your desktop

⚠ Note

Depending on the configuration of your XOS, the **Upload** tab represents the access credentials to the watch folder on Azure Blob, Amazon S3 or Google Cloud Storage.

You can add assets and graphics directly on the **Incoming** tab. To do so, do the following:

1. Click the **Asset Acquisition** app.
2. Select the **Incoming** tab.
3. Either drag and drop your asset or graphic into the **Web Uploader** widget, or click **Select files** to locate them on your machine.
If you choose **Select files**, navigate to your assets or graphics, select them, and click **Open**.
4. Once uploaded, the graphics display in the **Graphics** tab.
5. To use the uploaded assets or graphics on a Playout service, see the Assets, Graphics, and Feed widget section [here](#).

⚠ Note

The web upload widget accepts the files up to 2 GB. Due to this limitation, it is highly recommended to use other ways to ingest file sources (Azure Blob, Amazon S3, Google Cloud Storage, URL).

Recording

You can create, monitor, and manage a variety of recordings from your live services in the Recording tab. The functionality allows you to manage recordings from past events and the events scheduled for the future.

The screenshot shows the XOS Advanced Media Processor interface. At the top, there's a navigation bar with tabs for Overview, Incoming (1), Jobs, Library, Graphics, and Settings. Below that is a sub-navigation bar with tabs for Upload, Recording, Decision Queue, and Ready Queue. The main area is divided into two sections: 'List of live services' on the left and 'List of recordings' on the right. In the 'List of live services' section, there's a search bar and a table with one row for 'TEST-HD'. In the 'List of recordings' section, there's a dropdown menu set to 'Records' and a table with 10 rows, each representing a recording with a timestamp and a 'LLCU' button.

1. Click the **Asset Acquisition** app.
2. Navigate to the **Incoming** tab > **Recording** tab.
3. From the **List of live services** section, select the service you want to create a recording from.

⚠ Requirements for live services

The eligible services for these recordings are regular OTT services with existing time shift buffers (ECU and LLCU) and Playout recording services (Playout recording).

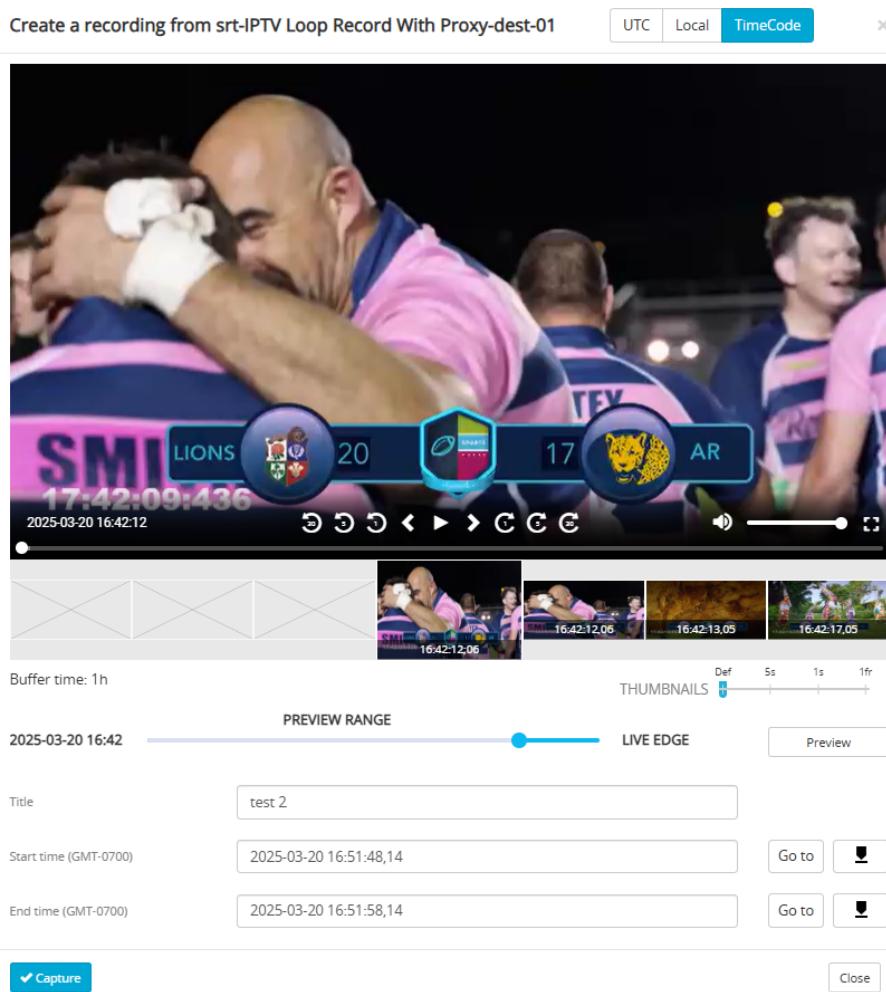
Before recording, configure a retention period in the corresponding Destination profile for the selected service. This retention period cannot be null.

If the type of the profile of the service is:

- "Multiscreen" - both LLCU and ECU can be created. Both LLCU and ECU buttons are visible. (The LOOPRECORD button is hidden)
 - The catch-up URL will be used by the player in the Recording tab.
- "TS" (Pass-through) - only LOOPRECORD for Playout can be created. The LOOPRECORD button is visible. (ECU and LLCU are hidden)
 - The start-over URL will be used by the player in the Recording tab.

- Click the button to schedule the recording.

Create a recording from srt-IPTV Loop Record With Proxy-dest-01



Use Time Code for Loop Records

The Time Code mode is supported for loop records.

- (Optional) Select the **Time Code** button to use the Time Code mode to define loop records. (This mode is selected by default.)
- (Optional) Navigate to the **Library** tab to use the **Clip Editor** to define the Start Time/End Time of the Time-Code enabled Loop Record assets. (Refer to [Library page](#) for details.)

- Select your time reference at the top of the page. Choose from the following:

- **UTC**: Select this option to reference the time in Coordinated Universal Time. The format for this option is YYYY:MM:DD HH:MM:SS.xxx
- **Local**: Select this option to reference the time based on your device's local time zone. The format for this option is YYYY:MM:DD HH:MM:SS.xxx
- **TimeCode**: Select this option to reference the time based on the clip's time code. The format for this option is YYYY:MM:DD HH:MM:SS;FF
- Use the slider to select the time segment and click **Preview**.
- Specify the **Asset ID/Title** of the recording to be created.
- Specify the desired **Start Time** (Time-In) and **End Time** (Time-Out) to schedule the recording duration. You can fine-tune these values to ensure frame accuracy.

Note

The Preview feature is only available for your services with the "Multiscreen Profile" activated.

- Click the **Go to** button to preview the **Start Time** and **End Time** frames.
 - **Pause** the preview and click the **Set** button to confirm the configured **Start Time** and **End Time**.
 - You can also enter the **Start Time** and **End Time** manually if the preview is not yet available.
 - Click the **Capture** button to capture the recording as scheduled.
4. From the **List of recordings** section, check the status and type of the recordings.
- Filter the list of recordings with the statuses: Queued, Processing, Submitted, Finished, Failed.
 - Filter the list of recordings with the types:
 - **LLCU**: This filter lists the Long-lasting catch-up (LLCU) recording assets.
 - **Record**: This filter lists the Loop recordings for Playout (ECU-based) playout recording assets.
 - **Live Record**: This filter lists the Live Event recording assets. (Refer to **Configuring a live-event service for recording** for Live Event recording details.)
 - Click  to verify the recording



- Upon successful recording, the assets are automatically saved to your Library.
- (Optional) Navigate to the Library tab to use the Clip Editor to modify the asset. For more information, see "Removing unwanted content from recorded assets" on the [Library](#) page.
- Click the **View in Library** button to view the recorded asset details.
- (Optional) Delete any unwanted recordings.

Decision Queue

Automatically and manually uploaded files awaiting decisions

1—Select files

2—Apply decisions

Priority
Rush Normal Backlog

Profiles
MBTS Test Passthrough Multiscreens Gold HD Multiscreens Gold SD

Process File Types
MXF GROOM WITH PROFILE
None selected

Search files by title

Priority level determines job position in Ready Queue

Transcoding profiles to be applied to uploaded files

Select file types for grooming

Select grooming profile

i Info

When you select multiple source files or apply multiple profiles to source files, one job is created for each source file and profile combination.

! Note

The user interface has a limitation where it only allows the display of up to 50 assets in a list. You may also use the following Public Rest API to get a full list of files in addition to "Search by title" above.
Get /asset-acquisition/v1/assets/need_decision

Ready Queue

Search jobs by title

Jobs awaiting processing in rush queue.

Jobs awaiting processing in normal queue

Jobs awaiting processing in backlog

jobs will be processed within each queue on first-in basis as infrastructure resources become available.

Rush
Currently no jobs in rush queue.

Normal
0029_GasRings.ts BBC1_1.ts smokin_acests.ts

Backlog
Currently no jobs in backlog queue.

i Info

Rush jobs start after any remaining in-progress jobs are completed.

! Note

The user interface has a limitation where it only allows the display of up to 50 jobs. Please use the following Public Rest API with the parameters skip and limit and the filtering by the status to get a full list of queued jobs:

Get /asset-acquisition/v1/jobs?status=QUEUED&limit=50&skip=0

Jobs page

The **Jobs** page provides details and status information for each job in progress.

i Info

By default, the maximum number of concurrent jobs is three.

Asset Acquisition Jobs page

The screenshot shows the Asset Acquisition interface with the following details:

- Job status:** Transcoding profiles applied
- Asset file name:** 0029_GlassRings.ts
- Asset and job details:**
 - SUBMITTED: Jul 3, 2017 5:42 PM EEST
 - PRIORITY: Normal
 - ETC: 5:45 PM
 - FILE SIZE: 4.0 MB
 - DURATION: 0:00:12
 - FORMAT: MPEG-TS
 - FRAME SIZE: 1920x1080
- JOBS AND TASKS:**
 - MBTS TEST PASSTHROUGH: Completed
 - MULTISCREEN GOLD SD: In Progress (highlighted)
 - MULTISCREEN GOLD HD: Completed
- Buttons:**
 - Cancel job
 - View transcoded asset in Library

Library page

Video assets, including .ts, .mxv, .mov and .mp4 files, appear in the **Library** once transcoding or grooming is complete.

i Info

File-based assets extracted from a Playout Channel also appear in the Asset Acquisition **Library**.

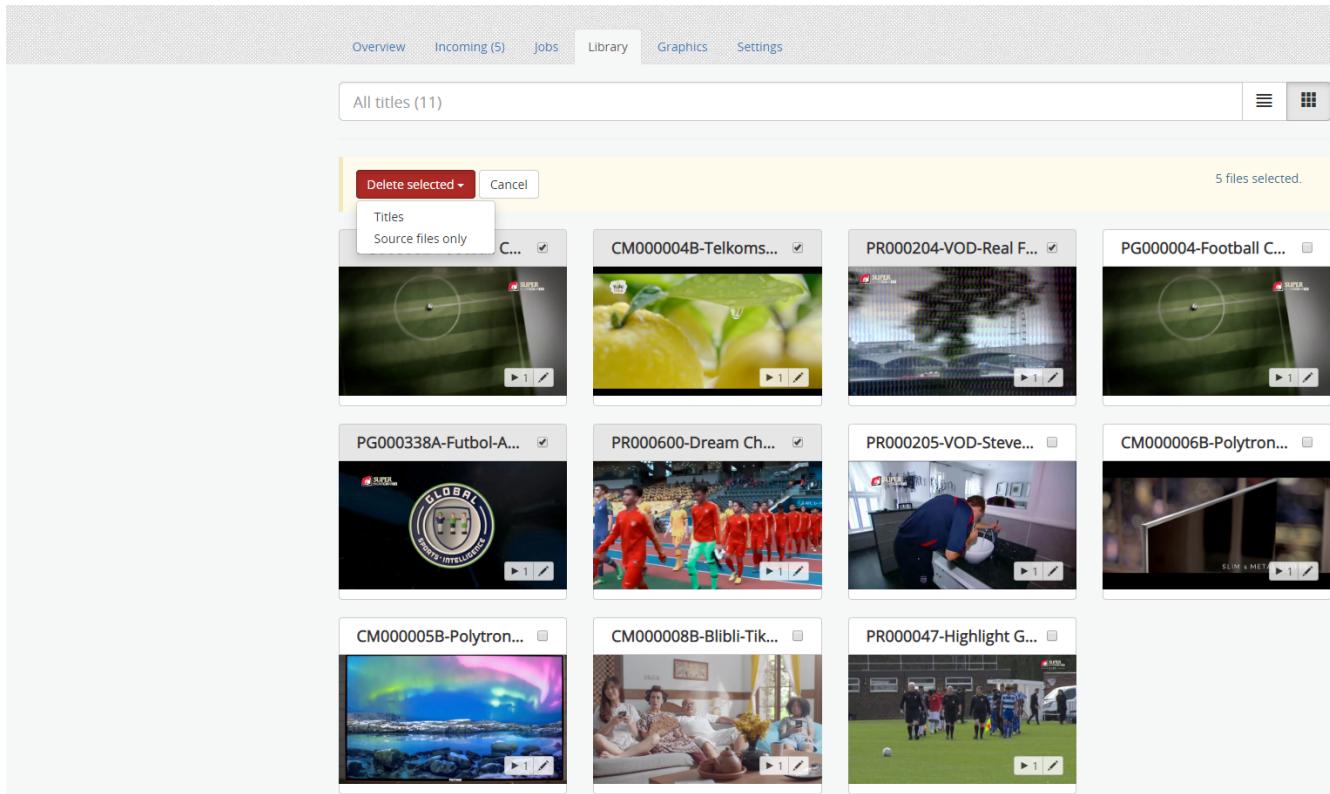
- Removing an asset file from the library
 - Removing an asset file
 - Deleting a source file
- Removing unwanted content from recorded assets
- Defining the Start or End time of a Loop Record asset with Time Code enabled

Removing an asset file from the library

Removing an asset file

You can remove an asset file from the library permanently by selecting the desired asset Titles above the thumbnail.

1. Select the Title checkbox above the thumbnail for the asset.
2. Select **Titles** from the **Delete selected** drop-down list.
3. Click **Delete** to confirm. The entire Asset is deleted, including info, transcoded files, and source files, if any.



! Note

Only up to 5 titles can be selected for deletion from the user interface. For larger amounts of assets, it is recommended to use the public REST API to perform the deletion process.

Deleting a source file

You can delete a source file only from the library by selecting the desired asset titles above the thumbnail.

1. Select the Title checkbox above the thumbnail for the asset.
2. Select **Source files only** from the **Delete selected** drop-down list.
3. Click **Delete** to confirm.

i Info

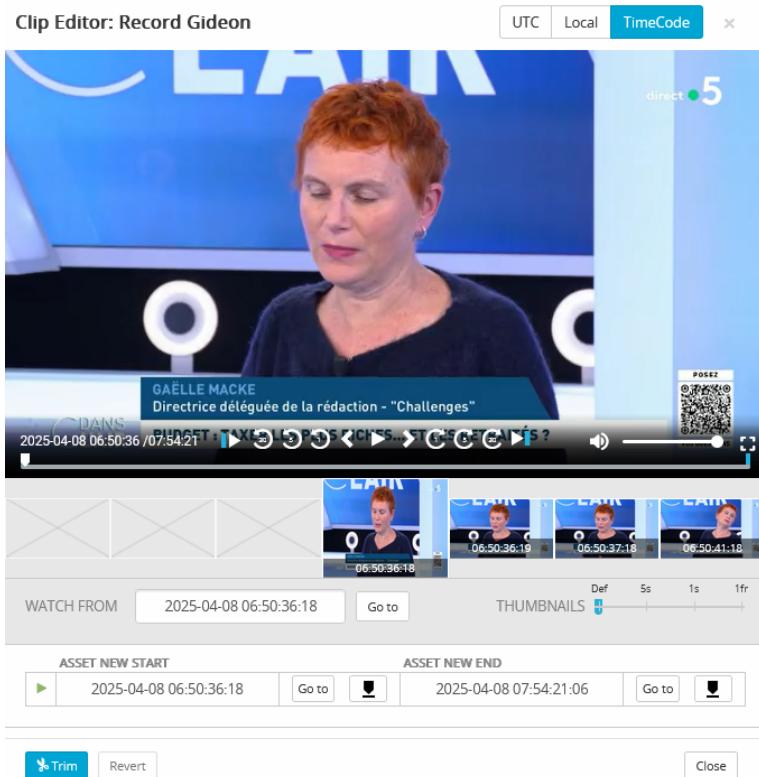
Deleting source files is essential for freeing up space. It is important to ensure that the deletion of source files occurs only after all desired transcoding processes have been completed.

Once the source files are deleted, it is no longer possible to transcode an asset into new profiles.

Removing unwanted content from recorded assets

You can remove unwanted content by using multi-cutting and stitching in the Clip Editor for your VOD/AOD assets.

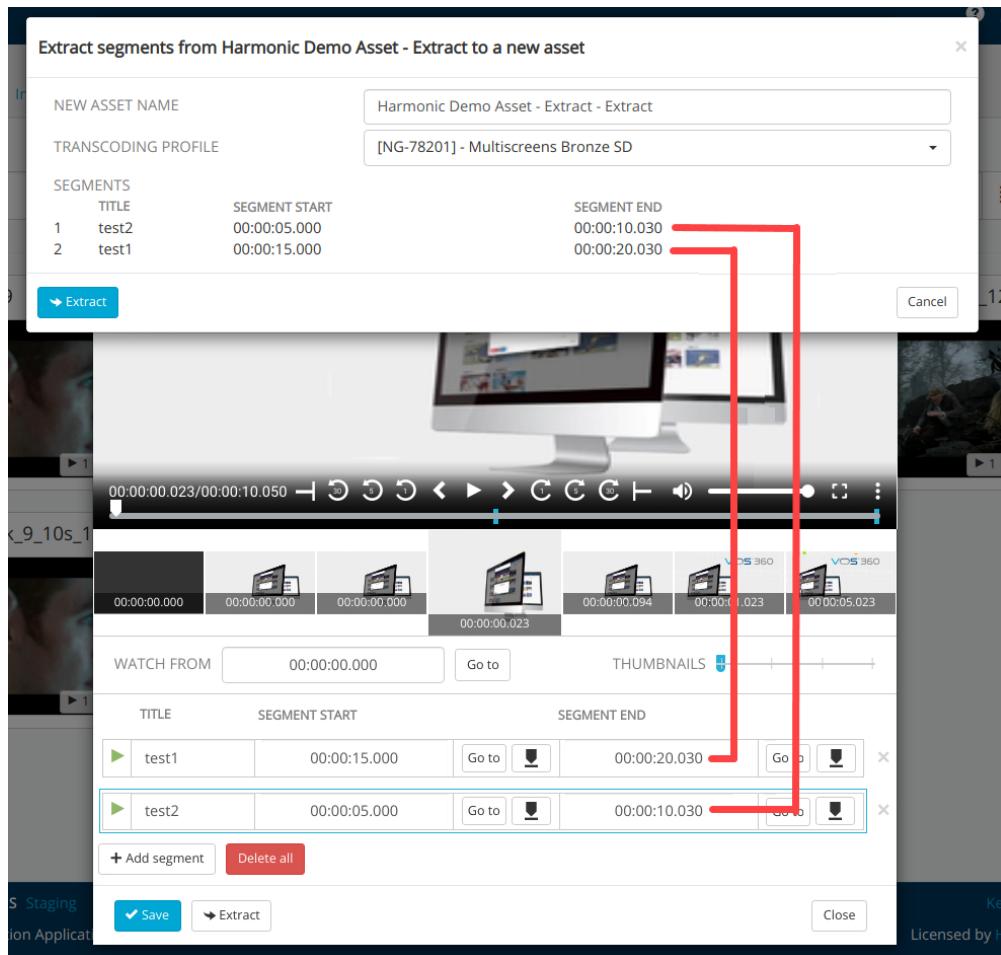
1. Navigate to the **Asset Acquisition** app. Select the **Library** tab and click the  icon from a compatible asset to open the **Clip Editor** window.
2. Add and define one or more segments using the Clip Editor.



3. When the segments are correctly defined, click on the **Extract** button. A window will open as follows:

 **Note**

If your segments are not ordered in the Clip Editor view and do not overlap or contain other errors, the Extract button will be enabled and segments will be ordered for extraction.



4. Set the name for your new asset in the input "Asset name".

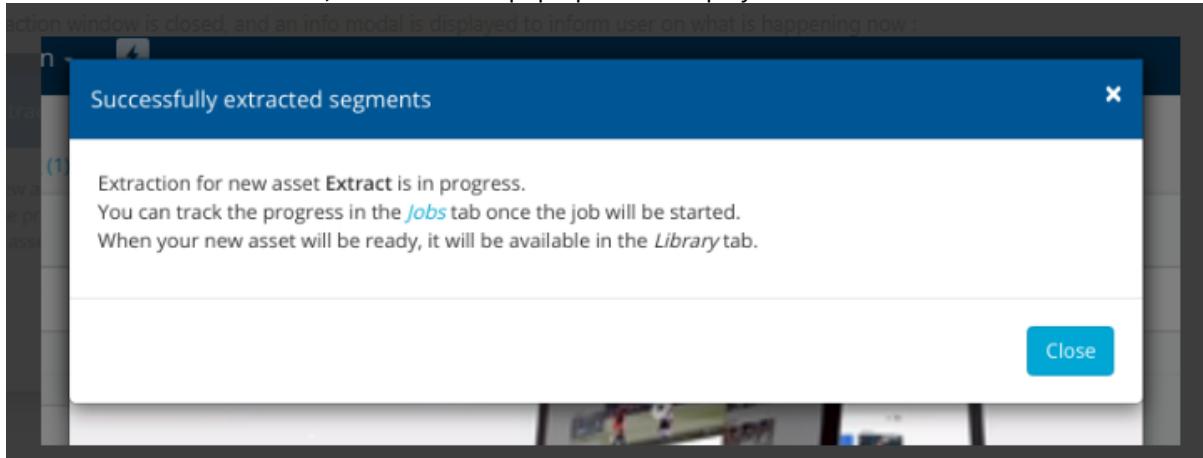
5. Select the transcoding profile from the drop-down menu (only e_Multiscreen profiles).

i Info

No profile is selected by default upon initial use. Following the first successful extraction, the selected profile will automatically be chosen by default for subsequent uses, unless the user selects a different profile.

6. Click on the **Extract** button to create a new asset from the defined segments.

7. If the extraction is successful, an information pop-up will be displayed.



Note

Clicking the "Jobs" link will open the Jobs page in a new browser tab.

8. Click on the **Close** button to return to the Clip Editor window.

9. Close the Clip Editor window once the extraction is done.

Note

Segments are not saved automatically during the extraction process. To save them, click the **Save** button in the Clip Editor window and then close the window. Otherwise, you can simply close the Clip Editor window.

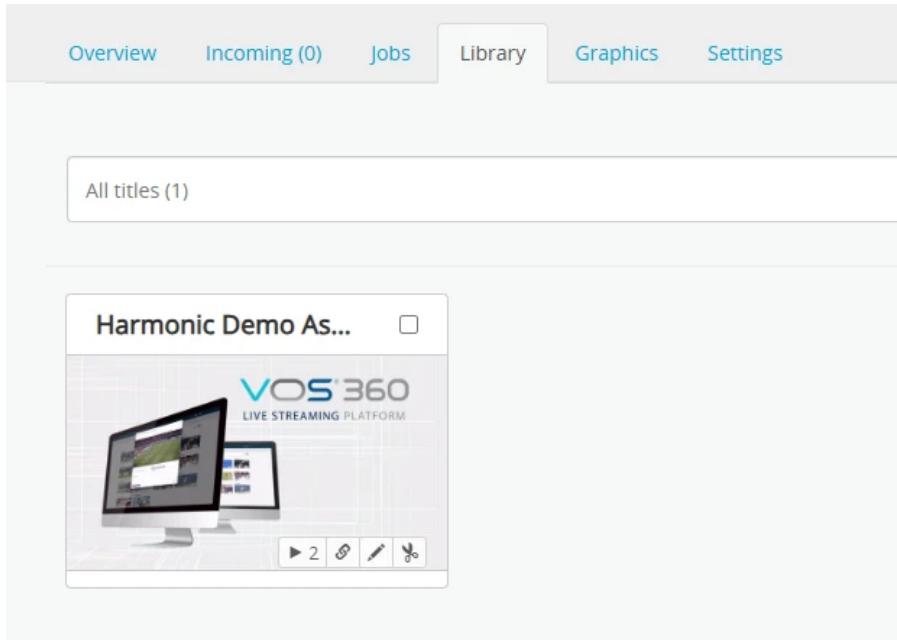
If a new extraction is required, set new segments and repeat the steps above.

10. The newly created assets will be displayed in the Library tab once the job is finished.

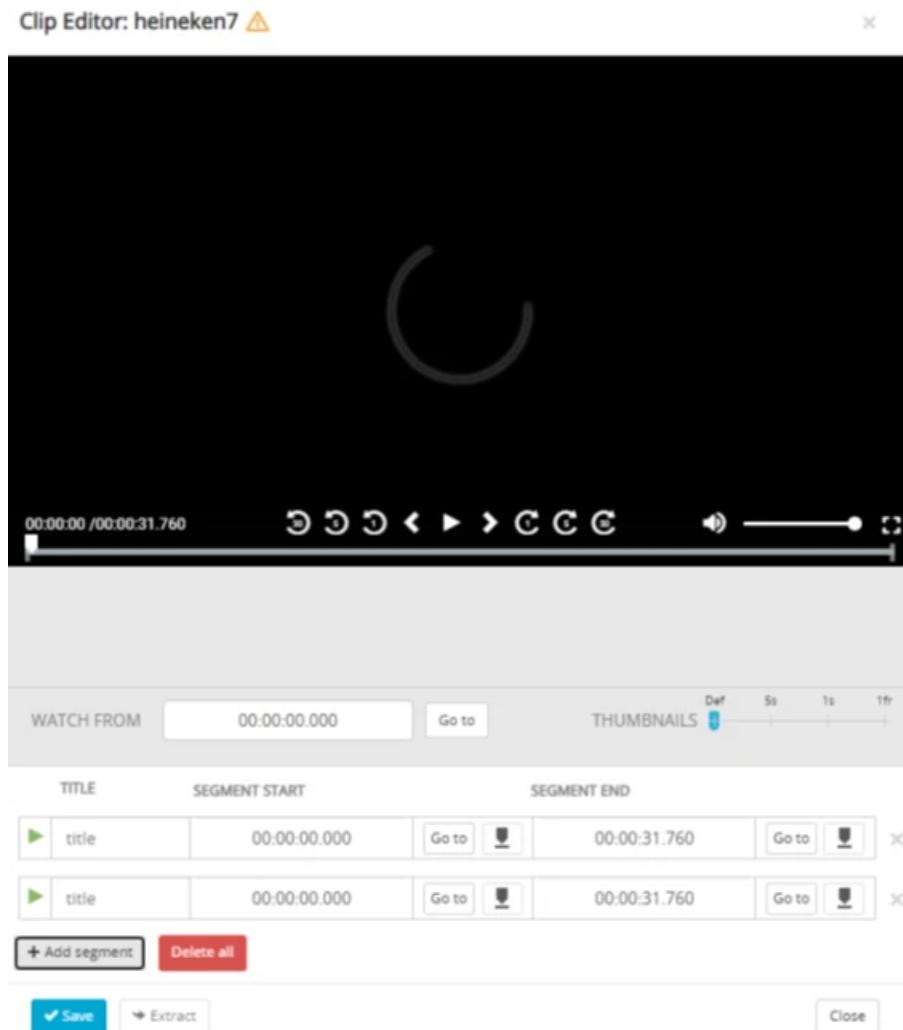
Defining the Start or End time of a Loop Record asset with Time Code enabled

1. Navigate to the **Asset Acquisition** app > **Recording** tab to create a loop record asset with the **Time Code** mode enabled. (Refer to the [Incoming page](#) for details)

2. From the **Library** tab, click the  icon from a time-code enabled loop record asset to open the **Clip Editor** window.



3. From the Clip Editor, use the timecode from the Loop Record asset to define the start time and end time of the recording.



Graphics page

The **Graphics** page displays all logo and graphic template files that have been uploaded to Asset Acquisition app.

i Info

Logo and graphic template assets are not transcoded.

Asset Acquisition Graphics page

Thumbnail/List view

Filter graphic templates by title

Select for deletion

Overview Incoming (0) Jobs Library **Graphics** Settings

All graphics (7)

72px-TV-14_icon.png 72px-TV-G_icon.png 72px-TV-MA_icon.png 72px-TV-PG_icon.png

No thumbnail available No thumbnail available No thumbnail available No thumbnail available

72px-TV-Y_icon.png 72px-TV-Y7_icon.png HarmonicLogo2.png

No thumbnail available No thumbnail available No thumbnail available

Settings page

From the **Settings** page, you can opt to delete source files after processing, enable automatic transcoding, and configure audio grooming profiles.

Asset Acquisition Settings page

Overview Incoming (10) Jobs Library Graphics Settings

General Profiles Logo Templates Social Media

KEEP SOURCE FILES
 On

DECISION DEFAULTS VIDEO
Source resolution based ▾

PRIORITY
RUSH NORMAL BACKLOG

UHD SOURCE TRANSCODING PROFILE
Add profile ▾

HD SOURCE TRANSCODING PROFILE
Add profile ▾

SD SOURCE TRANSCODING PROFILE
Add profile ▾

Each resolution need to be filled with one or multiple profile

GROOM MXF WITH PROFILE
No mxf grooming profiles. Add in [Profiles](#).

GROOM MOV WITH PROFILE
No mov grooming profiles. Add in [Profiles](#).

GROOM MP4 WITH PROFILE
No mp4 grooming profiles. Add in [Profiles](#).

GROOM TS WITH PROFILE
Nothing selected ▾

DECISION DEFAULTS AUDIO - PROFILE(S)
Add Profiles ▾

VOD DESTINATION PROFILE
DASH SCTE35 Destination v.1 ▾

PACKAGE TYPE	PACKAGE NAME	DRM SYSTEM	CONTENT ID / RESOURCE ID
DASH	base64	drm ▾	Content ID / Resource ID

ENABLE ENCRYPTION

+ go to Scrambling

ENABLE THUMBNAIL INDEXING FOR PACKAGING
 Off

APPLY LOGO TEMPLATE
 Off

Keep Source Files	De-select to delete source files from XOS storage upon job completion. Customers may wish to keep the source files in case re-transcoding is needed later without re-ingesting.
Decision Defaults	Enable automatic transcoding of assets (from the watch folder). Possible options: <ul style="list-style-type: none"> • Off • Unified (one for all) • Source resolution based
Priority	Select a priority level for automatic jobs.
Unified (one for all)	If this option is selected, you can define a single transcoding profiles for all input files.
Source resolution based	If this option is selected, you can add a default profile for SD, HD, and UHD definition types. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p> Note You must select at least one profile for each definition type.</p> </div>
Groom MXF/ MOV/TS/MP4 with Profile	Create audio/subtitle grooming profile for MXF/MOV/TS/MP4 files. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p> Note If the video asset is going to be used for playout channels or if there are any audio/ subtitle PIDs from the VOD source file need to be changed or removed then the asset needs to have a initial Grooming stage.</p> </div>
VOD Destination Profile	It is used for packaging all the VOD contents available from the Origin.
Enable Encryption	Enable this checkbox if the VOD contents are configured to use DRM and to select the DRM system for each packaging format. Each VOD asset shall be assigned to its respective resourceId to complete the encryption configuration.
Enable Thumbnail Indexing for Packaging	Enable this checkbox if you want thumbnails to be prepared for every VOD asset.
Apply Logo Template	Add logo to the VOD asset with desired graphic and logo settings.

Asset Acquisition Profiles page

The screenshot shows the 'Profiles' tab selected in the top navigation bar. Below it, a list of four profiles is displayed: 'mp4GroomingProfile', 'mxfGroomingProfile', 'tsGroomingProfile', and 'movGroomingProfile'. Each profile entry includes a small icon representing the file type (MP4, MXF, TS, MOV) and two additional icons for managing the profile.

Supported ingest file types

Asset Acquisition supports the following file types for video assets:

Transcoding workflow

General requirements:

- Sources must not contain continuity or truncation errors
- Sources should be at minimum longer than one IDR duration
- Sources should not have audio/video alignment issues
- Published frame rate should align with video encoding frame rate
- Fixed frame rate

Asset Acquisition supports the following container types for video assets:

- .ts
- .mxf
- .mp4
- .mov

Note

Asset files with MOV wrapper using DVCPRO50 codec (SD, 4:2:2 at 50 Mbps) are supported for Playout. For SD files, the playout application supports the MXF IMX30/40/50 (D10) format clips.

For detailed specs, please reach out to your Harmonic account representative.

Passthrough workflow (pre-transcoded ABR) for OTT packaging

Note

Passthrough without transcoding is supported only for MBTS and MBMP4 transcoded by WFS

Logos and Graphics

Asset Acquisition supports the following file types for logos and graphic templates:

- .png (logo)
- .jpg (logo)
- .jpeg (logo)
- .bmp (logo)
- .tga (logo)
- .tif (logo)
- .flv (graphic template)
- .webm (graphic template)
- .zip (html5)

Some file types can only be supported on Playout channels. For detailed specs, please reach out to your Harmonic account representative.

Creating audio grooming profile

- Creating an audio grooming profile for TS files
- Creating an audio/subtitle grooming profile for MP4 files
- Creating an audio/subtitle grooming profile for MXF files
- Creating an audio grooming profile for MOV files
- Creating an audio grooming profile for MP3/M4A/FLAC/TS-Audio audio-only files
- Creating an audio grooming profile for WAV audio-only files

Creating an audio grooming profile for TS files

TS audio/subtitle grooming profiles can be applied to SPTS sources.

Before you begin

Ensure that you have configured system languages in **Configure Channels > Settings**.

1. Navigate to the **Asset Acquisition** app > **Settings** tab > **Profiles**.
2. Click the **Create** button to create a TS grooming profile.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - **Update missing fields only**
 - **Override all fields**
5. On the **Audio** tab, click **Add**, and then configure the following settings for each audio track:
 - **PID**: The packet identifier for the audio stream.
 - **Languages**: Configure the languages to be used.
 - **Type**: Select from the following:
 - **Not defined**
 - **Clean effects**
 - **Hearing impaired**
 - **Visual impaired commentary**
 - **Ignore**: Select if you wish to exclude the track from the output.
6. On the **Subtitles** tab, click **Add**, and then configure the following settings:
 - **ID**

- **Type**
- **Page**
- **Language**

7. (Optional) Enter a **Label** for the Audio or Subtitle profiles.
8. (Optional) Enter a custom **Stream name** for the Audio or Subtitle profiles.
9. Click **Save**.

About audio grooming for TS files

Audio grooming for TS files is done by matching the PID number in the input file to the PID number in the grooming profile. A grooming profile specifies the list of audio streams expected in the input file.

The list of languages eligible for the grooming profile is based on Configure Channels settings. Asset Acquisition adds audio language and audio type where they are missing in the input file.

When the input file does not contain any descriptors for audio language and a grooming profile is not specified by the user, the following default grooming pattern is applied.

⚠ Note

If there is a PID mismatch, or the language specified in the input file does not match the system languages, audio will be dropped from the output.

Input file	System languages	Grooming profile	Output
Audio PID 300 Undefined	EnglishSpanish	Not specified	English
Audio PID 300 UndefinedAudio PID 301 UndefinedAudio PID 3021 Undefined	EnglishSpanish	Not specified	EnglishSpanish
Audio PID 300	EnglishSpanish	PID 300 English	English
Audio PID 300 undef	EnglishSpanish	PID 100 English	Dropped due to PID mismatch
Audio PID 300Japanese	EnglishSpanish	Not specified	Dropped due to language mismatch
Audio PID 300Japanese	EnglishSpanish	PID 300English	English
Audio PID 300Japanese	EnglishSpanish	PID 301English	Dropped due to PID mismatch and language mismatch

Creating an audio/subtitle grooming profile for MP4 files

MP4 audio/subtitle grooming profiles can be applied to MP4 sources.

Before you begin

Ensure that you have configured system languages in **Configure Channels** app > **Settings** tab.

1. Navigate to the **Asset Acquisition** app > **Settings** tab > **Profiles**.
2. Click the **Create** button to create a MP4 grooming profile.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - Update missing fields only**
 - Override all fields**
5. On the **Audio** tab, configure the following settings for each audio track:
 - Languages:** Configure the languages to be used.

 **Note**

For playout assets, the languages you define for each audio and subtitle track must match the languages defined in the playout source.

- Type:** Select from the following:
 - Not defined**
 - Clean effects**
 - Hearing impaired**
 - Visual impaired commentary**
- 6. On the **Subtitles** tab, click **Add**, and then configure the following settings:
 - ID**
 - Type**
 - Page**
 - Language**
- 7. (Optional) Enter a **Label** for the Audio or Subtitle profiles.
- 8. (Optional) Enter a custom **Stream name** for the Audio or Subtitle profiles.
- 9. Click **Save**.

Creating an audio/subtitle grooming profile for MXF files

MXF audio/subtitle grooming profiles can be applied to transcoded VOD assets. The source audio can have up to 16 mono channels, or 8 stereo pairs.

For playout channels, you can also apply audio grooming profile to primary events that use MXF assets. To do so, specify the profile name in the playlist file or when creating or editing a primary event in the Playout Monitor app.

Before you begin

Ensure that you have configured system languages in **Configure Channels** > **Settings**.

1. Navigate to the **Asset Acquisition** app > **Settings** tab > **Profiles**.
2. Click the **Create** button to create a MXF grooming profile.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - Update missing fields only**

- **Override all fields**

5. On the **Audio** tab, configure the following settings for each audio track:

- **Codec:** Select the codec to be used in the output.

 **Note**

Only PCM audio is supported at this time.

- **Channels:** Configure the channels to be used in the output. Each stereo pair must be configured to use the same language.
- **Languages:** Configure the languages to be used.

 **Note**

For playout assets, the languages you define for each audio and subtitle track must match the languages defined in the playout source.

- **Type:** Select from the following:
 - **Not defined**
 - **Clean effects**
 - **Hearing impaired**
 - **Visual impaired commentary**

6. On the **Subtitles** tab, click **Add**, and then configure the following settings:

- **ID**
- **Type**
- **Page**
- **Language**

7. (Optional) Enter a **Label** for the Audio or Subtitle profiles.

8. (Optional) Enter a custom **Stream name** for the Audio or Subtitle profiles.

9. Click **Save**.

Creating an audio grooming profile for MOV files

Create audio/subtitle grooming profile for MOV files.

 **Note**

Grooming on MOV files is available for playout workflow.

 **Note**

For playout channels, you can also apply audio grooming profile to primary events that use MOV assets in the playlist.

To do so, specify the profile name in the playlist file or when creating or editing a primary event in the Playout Monitor app as well as the Rest API call.

Before you begin

Ensure that you have configured system languages in **Configure Channels > Settings**.

1. Navigate to the **Asset Acquisition** app> **Settings** tab> **Profiles**.
2. Click the **Create** button to create a MOV grooming profile.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - Update missing fields only**
 - Override all fields**
5. On the **Audio** tab, configure the following settings for each audio track:
 - Codec**: Select the codec to be used in the output.

 **Note**

Only PCM audio is supported at this time.

- Channels**: Configure the channels to be used in the output. Each stereo pair must be configured to use the same language.
- Languages**: Configure the languages to be used.

 **Note**

For playout assets, the languages you define for each audio and subtitle track must match the languages defined in the playout source.

- Type**: Select from the following:
 - Not defined**
 - Clean effects**
 - Hearing impaired**
 - Visual impaired commentary**
- 6. On the **Subtitles** tab, click **Add**, and then configure the following settings:
 - ID**
 - Type**
 - Page**
 - Language**
- 7. (Optional) Enter a **Label** for the Audio or Subtitle profiles.
- 8. (Optional) Enter a custom **Stream name** for the Audio or Subtitle profiles.
- 9. Click **Save**.

Creating an audio grooming profile for MP3/M4A/FLAC/TS-Audio audio-only files

The MP3/M4A/FLAC/TS-Audio audio-only grooming profiles can be applied to the compressed audio input files (.mp3, .m4a, .flac, and .ts without video track).

Before you begin

Ensure that you have configured system languages in **Configure Channels > Settings**.

1. Navigate to the **Asset Acquisition** app> **Settings** tab> **Profiles**.
2. Click the **Create** button and select the **MP3/M4A/FLAC/TS-Audio** grooming profile option.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - Update missing fields only**
 - Override all fields**
5. On the **Audio** tab, configure the following settings for each audio track:
 - Languages**: Configure the languages to be used.

- **Type:** Select from the following:
 - **Not defined**
 - **Clean effects**
 - **Hearing impaired**
 - **Visual impaired commentary**

6. (Optional) Enter a **Label** for the profile.

7. Click **Save**.

Creating an audio grooming profile for WAV audio-only files

The WAV audio-only grooming profiles can be applied to the uncompressed audio input files (.wav files).

Note

When a .wav file is uploaded for Playout usage, it appears in the **Asset Acquisition > Graphics** tab.

Before you begin

Ensure that you have configured system languages in **Configure Channels > Settings**.

1. Navigate to the **Asset Acquisition** app> **Settings** tab> **Profiles**.
2. Click the **Create** button and select the **WAV** grooming profile option.
3. Enter a **Profile Name**.
4. Select how the grooming profile should be applied to the source audio:
 - **Update missing fields only**
 - **Override all fields**
5. On the **Audio** tab, configure the following settings for each audio track:
 - **Languages:** Configure the languages to be used.
 - **Type:** Select from the following:
 - **Not defined**
 - **Clean effects**
 - **Hearing impaired**
 - **Visual impaired commentary**

6. (Optional) Enter a **Label** for the profile.

7. Click **Save**.

Editing a video asset

You can edit video assets in the Asset Acquisition **Library**. For instance, you can apply a different transcoding profile to generate a new asset, add a custom thumbnail, add subtitles, and edit DRM settings.

- [Adding subtitles to a video asset](#)
- [Adding a custom thumbnail to a video asset](#)
- [Adding labels for transcoding report usage breakdown for VOD assets](#)

Adding subtitles to a video asset

Asset Acquisition supports uploading sidecar subtitles including .srt, .stl, SCC, NCI, Cheetah files, and DVB Subtitles, up to 50 MB.

1. From the **Library** tab, select the asset you wish to edit.

2. Click the **Subtitles** tab, and then browse to and select the subtitle file you wish to add, or drag and drop the subtitle file.
3. Set the subtitle **Language**.

 **Info**

Subtitle language options are based on settings in the Configure Channels app.

4. Set the subtitle **Type**. You can choose from the following:

- Normal
- Hard of hearing

 **Info**

Sidecar subtitles files can be marked as audio descriptions for Hard-of-hearing accessibility. The corresponding tagging of the subtitles track is done in OTT playlists for VOD.

5. Optionally, add more subtitle files.

 **Info**

You may add up to 4 subtitle files per video asset.

6. Click **Save**.

 **Important**

After you add subtitles to a video, you must re-transcode the asset.

7. From the **Library** tab, select the same video asset.

8. From the **Video Assets** tab, find the desired transcoding profile and then click **Generate**.

9. Click **Generate now** to confirm.

Result: The asset is sent to the **Ready** queue for processing, and then to the **Jobs** queue. The new asset will be available in the **Library** when the job is complete.

 **Note**

Due to CDN caching, the video available for preview might not update right away.

Adding a custom thumbnail to a video asset

XOS automatically generates a thumbnail image that is displayed on the **Library** tab. You may override the default thumbnail with one of your choice.

Thumbnail files must meet the following requirements:

- .jpeg or .png format
- 640x360 pixels exactly
- up to 10 MB

1. From the **Library**, select the asset you wish to edit.
2. Click the **Thumbnails** tab, and then click **Select file** to browse to the file you wish to upload, or drag and drop the file from your desktop.
3. Click **Save** to apply changes.

Result: The new thumbnail is displayed in the **Library**.

Adding labels for transcoding report usage breakdown for VOD assets

You can attach labels to the asset for billing purposes through the Asset Acquisition app. Harmonic Hub provides users the ability to download detailed usage report that breaks down usage per label. The detailed report is available with grouping costs per label 'usageGroup'.

Note

Only the completed jobs on assets having the labels are eligible for this type of reporting.

1. From the **Library** tab from the **Asset Acquisition** tab, select the asset you wish to edit.
2. Click the **Title** tab, and then navigate to the **Labels** section to add labels as desired.

Info

By default, the amount of labels allowed to add is 30. The value can be increased up to 50 through REST API by changing the *usageGroupLabelsAmount* parameter.

The *usageGroup* labels are case-insensitive. For example, if the user saves labels such as *usageGroup:UPPER* and *usagegroup:upper*, they won't be treated as 2 unique labels. Asset Acquisition will consider it the same label.

3. Navigate to the **Incoming** tab > **Decision Queue** tab and add labels as desired.

Asset Acquisition - **Decision Queue**

Can't submit decision. Number of unique usageGroup labels is exceeded.

Overview Incoming (2) Jobs Library Graphics Settings

Upload Channels Decision Queue Ready Queue

Incoming source files requiring decisions.

1— Select files 2— Apply decisions

Search by title Search Previous Next

2_HD_720p_59_94_AVC_arriage... 1_HD_1080i_29_97_AVC_basketb...

Select 2 of 2

PRIORITY: RUSH, NORMAL, BACKLOG

PROFILE(S): 1 items selected

AA Multiscreens Gold HD v.1 Time estimation: 00:00:04

GROOM TS WITH PROFILE: ts-profile

LABELS:

- usageGroup:4 ×
- usageGroup:5 ×
- usageGroup:6 ×
- usageGroup:7 ×
- usageGroup:8 ×
- usageGroup:9 ×
- usageGroup:10 ×
- usageGroup:11 ×
- usageGroup:12 ×
- usageGroup:13 ×
- usageGroup:14 ×
- usageGroup:15 ×
- + Label

Reset Delete selected Apply to selected

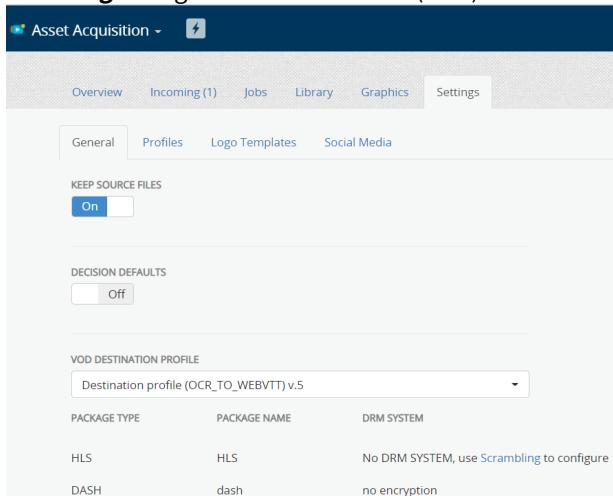
Harmonic VOS SDK - Version 1.22.0.0-eng.9712
Asset Acquisition Application Information

Keep Informed
Licensed by Harmonic Inc. miro

Configuring OCR to WebVTT conversion of DVB subtitles for VOD workflow

DVB subtitles are in-band subtitles in MPEG transport stream and can be present inside VOD source files. To use these DVB subtitles in the VOD workflow, you can configure OCR to WebVTT conversion of DVB subtitles via the VOD destination profile.

1. Navigate to **Lab Wizard > Destination** and open the destination profile created for the VOD workflow.
2. For the HLS/DASH packages, configure **DVB Subtitle Handling** to "To WebVTT (OCR)".
3. Navigate to **Asset Acquisition app > Settings** tab and select the **VOD destination profile** with **DVB Subtitle Handling** configured to "To WebVTT (OCR)".



Note: It is also possible to directly modify the existing VOD destination profile using the API.

4. Navigate to the **Public API** app.
5. Under **Asset Acquisition General**, navigate to **POST/asset-acquisition/v1/grooming-profile**.

⚠ Note

"dvbSubtitleHandling" is not supported via Asset Acquisition UI. Grooming profile must be created/modified via REST API.

The transcoding job is launched with grooming profile that has setting "dvbSubtitleHandling" set to 'OCR_TO_WEBVTT'. It is an inner field of 'subtitlesGrooming' field.

6. Use the HTTP Post to update the 'dvbSubtitleHandling'.

It is acceptable for grooming profile not containing any other grooming information at all. The plain grooming profile to enable OCR for DVB subtitles could be:

```
{
  "id": "ocrProfileId",
  "name": "ocrProfile",
  "audioGrooming": { "audioTracks": [] },
  "subtitlesGrooming": {
    "dvbSubtitleHandling": "OCR_TO_WEBVTT",
    "subtitles": []
  },
  "groomingMode": "UPDATE",
  "groomingFileType": "TS"
}
```

⚠ Note

The "dvbSubtitleHandling" setting is job-wise. Applying OCR to specific DVB subtitle tracks but not others is not supported.

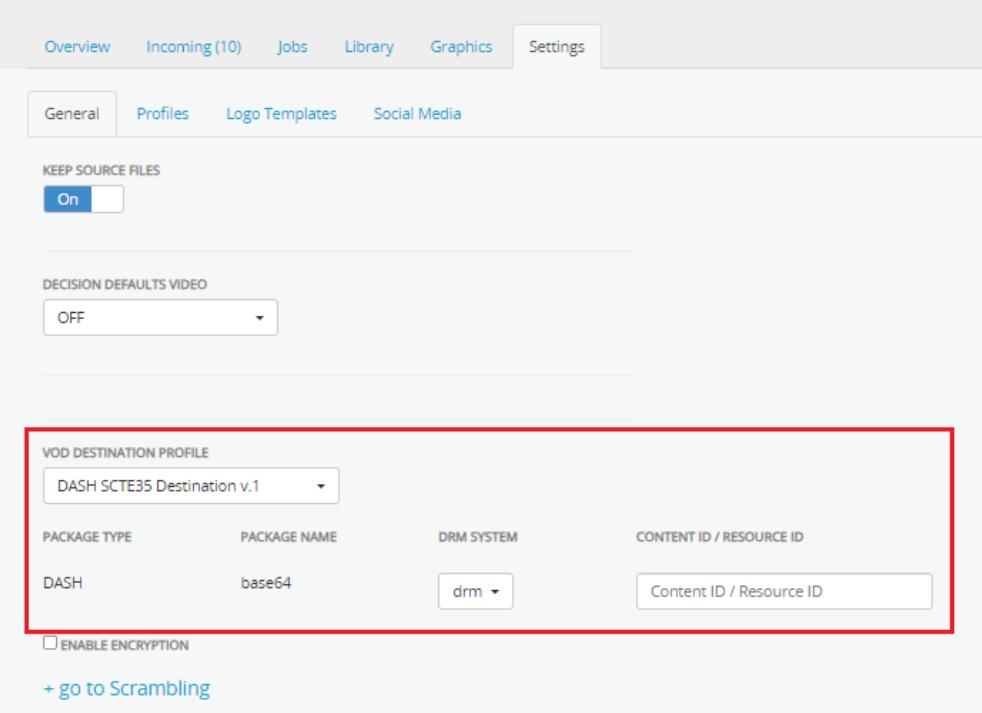
Configuring DRM settings using Harmonic CPIX encryption interface for VOD

You can use the Harmonic CPIX DRM encryption interface with HLS/DASH/SS OTT packaging outputs for VOD workflow.

⚠ Note

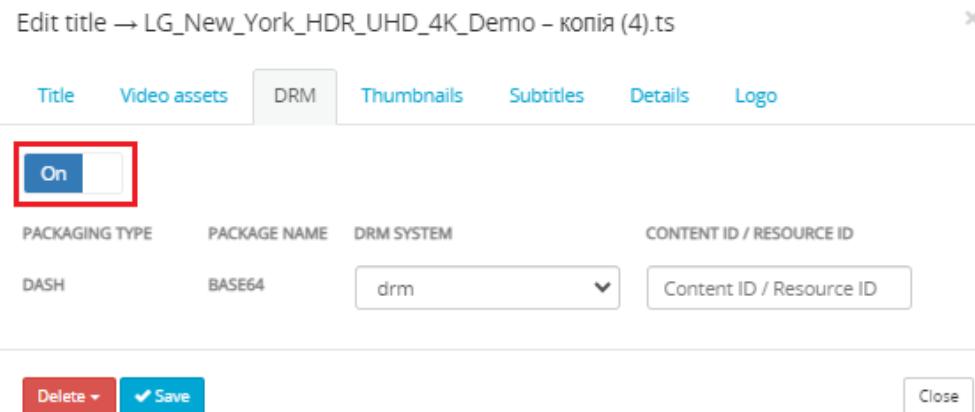
Before you begin, make sure that you have configured a service with encryption using the "Harmonic CPIX" KMS API as described in [Configuring DRM using Harmonic CPIX](#).

1. From the **Asset Acquisition** app, select the **Settings** tab.
2. Choose the **VOD Destination Profile** that you have created for the service and update with appropriate DRM settings.



3. Return to the **Asset Acquisition** app and click on the **Library** tab.
4. Locate the asset you want to modify and click the **Edit** icon.
5. Select the **DRM** tab.

6. Use the slider to turn the DRM feature **On**.



7. Update with appropriate DRM settings for the VOD asset.

Managing profiles

A profile gathers a common set of parameters that can be applied to several transcoded channels.

XOS includes default transcoding and destination profiles, that you can edit and manage to create your own profiles.

Different types of profiles are proposed:

- IPTV transcoding profiles for Broadcast encoding settings,
- TS Multiplexer profiles for Broadcast services, with statistical multiplexing pool if required.
- Multiscreen profiles for Mobile/Web encoding settings,
- Destination profiles for output settings,
- OTT Filters profiles.

From the XOS home page, click on the **Profiles** tab to display all available default profiles.

The screenshot shows the XOS Profiles management interface. At the top, there are tabs for 'Apps' and 'Profiles'. Below these are buttons for 'Profile types': 'All (110)', 'IPTV (57)', 'TS Multiplexer (3)', 'Multiscreen (29)', 'Destination (16)', and 'OTT Filters (5)'. A red arrow points from the text 'To switch to profile edition' to a 'Lab Wizard' button. Another red arrow points from the text 'To display profile specifications' to a 'Specs' link next to each profile card. The main area displays a grid of profile cards:

- IPTV SD 25**: v.1 Specs
- ATSC 1.0 Destination**: v.1 Specs
- Broadcast Divtrack Destination**: v.3 Specs
- DVB MPTS**: v.4 Specs
- HD AVC Standard Broadcast 1080...**: v.2 Specs
- ATSC 1.0 MPTS**: v.1 Specs
- ATSC 1.0 MUX Destination**: v.1 Specs
- MUX Destination**: v.1 Specs
- ATS Destination**: v.1 Specs

Profile specifications example:

IPTV SD 25 PROFILE

Type: IPTV
Architect: Harmonic Inc
Last updated: 02/17/2021 11:00:39 AM

Complete specs:

Set-top Box	IPTV Media Room
TS Bitrate	3 Mbps
VIDEO	+ [orange]
AUDIO	+ [blue]
STREAM BASED AUDIOS	+ [blue]
DATA	+ [blue]
Audio Matching	By Language
Mode	[grey]
SDT Generation	Follow Input
Mode	[grey]

Lab Wizard

Close

Click **Lab Wizard** to edit/modify the profile and then to create a new one.



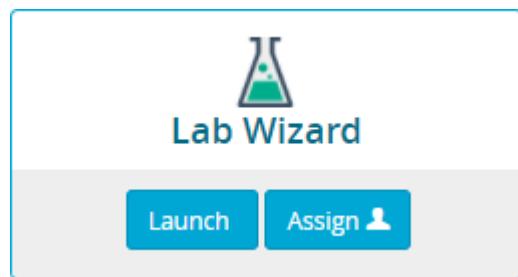
Note

The **Super Admin**, **XOS Admin** and **Lab Wizard** roles may manage profiles.

Lab Wizard app overview

The **Lab Wizard** app allows to:

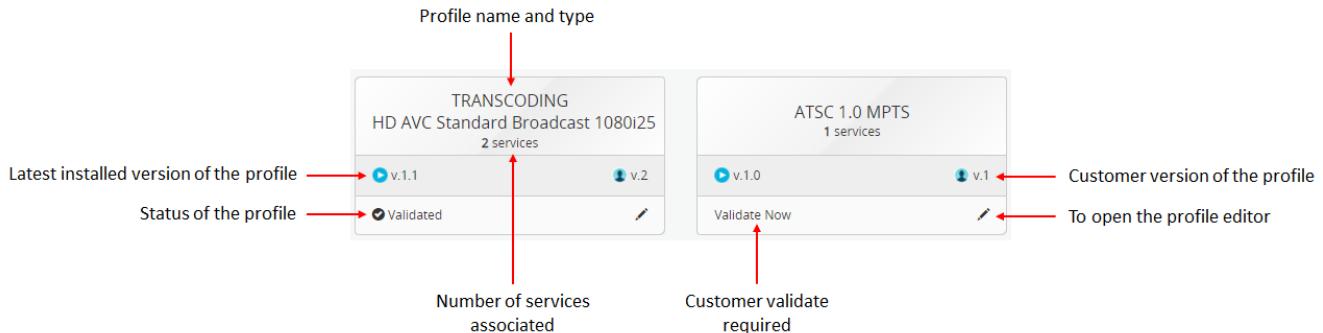
- display the default profiles,
- modify them,
- create new ones only from existing profiles.



Click **Launch** to access profiles panel and thus to the profiles editor.

Profile panel

The **Profiles Panel** displays important details about the profile and provides access to the **Profile Editor**.



If an update is required before you can install the latest version of a profile, the status message "Validate Now" appears below the version.

Profile editor (v1)

The **Profile Editor** interface is divided into three sections.

Click on a category, on the left, to highlight its specific settings, on the right.

Exit IPTV

PROFILE NAME: IPTV SD 25 HARMONIC VERSION: 3.7 CUSTOMER VERSION: v.1 - Feb 17, 2021 COMMENT: Update latency option with new enum identifier. VALIDATED: Yes used in 12 services

CATEGORIES PANEL WITH MAIN SETTINGS:

- SET-TOP BOX: IPTV Media Room
- VIDEO:
 - TS BITRATE: 3 Mbps
 - VIDEO MODE: Passthrough (selected)
 - PICTURE ENHANCEMENT: Disabled
 - VQ MODE: Premium VQ
 - STRESS BIAS: Balanced
 - VQ BOOST: Disabled
 - ASPECT RATIO: Passthrough
 - Generate PIP: Unchecked

RELEVANT SPECIFICATIONS PANEL OF THE SELECTED CATEGORY:

Video specs:

- Processing: Convert
- Latency: Default
- Vertical Resolution: 576i
- Resolution: 720 x 576i
- Video Bitrate: 1.5 ~ 2.45 Mbps
- Frame Rate: 25 fps
- Aspect Ratio: Passthrough
- Codec: AVC
- Picture Enhancement: Disabled
- VQ Mode: Premium VQ

COMPLETE SPECIFICATIONS PANEL:

- Set-top Box: IPTV Media Room
- TS Bitrate: 3 Mbps
- VIDEO
- AUDIOS
- STREAM BASED AUDIOS
- DATA
- Audio Matching Mode: By Language
- SDT Generation Mode: Follow Input

Relevant specifications panel of the selected category

Categories panel with main settings

Complete specifications panel

Categories panel	Includes the most commonly used configuration options and settings.
Relevant specifications panel	Settings in this panel vary based on the selected category.
Complete specifications panel	Read-only view of all the configuration settings for the profile.

The **Save as version** button creates a new version of the current profile.



Note

Running channels using this profile is not modified unless Operator decides to update them to the latest version. This operation is performed from the **Versions** tile.

The **Save as New Profile** button allows to duplicate the edited profile under a new name.



Note

Any new profile has to be created from an existing profile. It inherits from its settings that can be edited.

Profile editor (v2)



Note: The Profile editor (v2) is currently only available for IPTV profiles

The Profile Editor interface is divided into two panels, a summary of the categories on the left and all settings for the selected category on the right.

Broadcast - HD 1080i - ATSC 1.0

GENERAL

- SET-TOP BOX MODE: ATSC 1.0
- TS BITRATE : 20 Mbps
- PROCESSING REQUIREMENTS : 0 cores 0 MB

VIDEO

- MPEG2 1080i: 29.97 fps 11.588 Mbps

AUDIO

- MATCH BY LABEL (3)
- Primary-audio - AC-3 5.1 384 Kbps
- Secondary-audio - AC-3 Stereo 128 Kbps
- Descriptive-audio - AC-3 Stereo 128 Kbps

DATA

FILTER BY SOURCE LABEL

SET-TOP BOX MODE: ATSC 1.0

SDT GENERATION MODE: Disable Follow Input Generate

RECEIVER TIMEZONE: Select value...

CPU REQUIREMENT: 0 cores

MEMORY REQUIREMENT: 0 MB

TS BITRATE: 20 Mbps

OUTPUT PMT PID X: Manual 480

VIDEO SLATE INSERTION:

Enter a comment that will be associated with this profile

Save Save as Delete

By changing the size of the window, the number of columns on the right will be changed.

VERSIONS
v.1 Oct 12, 2023 Used by 0 services

GENERAL
SET-TOP BOX MODE: ATSC 1.0
TS BITRATE : 20 Mbps
PROCESSING REQUIREMENTS : 0 cores 0 MB

VIDEO
MPEG2 1080i 29.97 fps 11.588 Mbps

AUDIO
MATCH BY LABEL (3)
Primary-audio - AC-3 5.1 384 Kbps
Secondary-audio - AC-3 Stereo 128 Kbps
Descriptive-audio - AC-3 Stereo 128 Kbps

DATA
FILTER BY SOURCE LABEL

SET-TOP BOX MODE: ATSC 1.0

TS BITRATE: 20 Mbps

SDT GENERATION MODE: Disable Follow Input Generate

OUTPUT PMT PID X: Manual 480

RECEIVER TIMEZONE: Select value...

CPU REQUIREMENT: 0 cores

MEMORY REQUIREMENT: 0 MB

VIDEO SLATE INSERTION:

Enter a comment that will be associated with this profile

Save Save as Delete

Categories panel	Includes the most commonly used configuration options and settings.
The right panel	Contains the relevant specifications based on the selected category. It contains editable and read-only parameters.

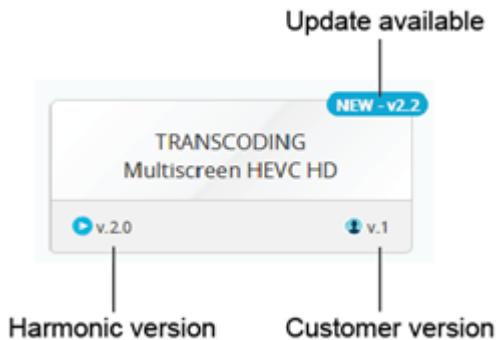
At the bottom of the screen, you can add a comment that will be associated with this profile (optional), save the profile, save the profile as a new profile and delete the profile.

At the top right of the screen, there is a button which will change the Profile editor v2 to Profile editor v1 ().

Note: The presentation of some parameters have changed in the Profile editor (v2).

About profile versions

Each profile has a Harmonic version number and a customer version number.



Harmonic version number

Updates to the Harmonic version number are at the decimal level (for example: 1.1, 1.2, 1.3, etc.). But whenever a new property or feature is added to the profile, the Harmonic version number is increased to the next whole number. For example, 1.3 becomes 2.0.

Customer version number

When you update a profile, the customer version number is increased by one whole number. This version indicates the number of times the profile has been modified, plus 1. For example, a version number of 4 indicates that the profile has been modified 3 times.

After you edit a profile, a new profile version becomes available in the Versions app, which you must validate before you can apply it to affected services.

If XOS update required appears in the **Profiles Panel**, it means that:

- Your XOS version is not recent enough to support the latest profile upgrade.
- Profiles cannot be updated until the XOS has been upgraded.
- Services and destinations created using an older profile version will continue to run until you upgrade the XOS.

Profile parameters

Each default profile can be edited and then modified to match the customer's system technical specifications.

To do so, select the profile that is closest to the technical requirements of the system.

Click the **edit** button to open the specifications panel.

- IPTV profiles parameters
- TS Multiplexer profile parameters
- Multiscreen profiles parameters
- Destination profiles parameters
- OTT Filters profiles parameters

IPTV profiles parameters

Note

IPTV profiles are dedicated to any broadcast VBR and CBR application.

Set-top Box parameters

Warning

First, define the Set-top Box option, because depending on the choice, the parameters of each category may vary.

Set-top Box	<p>Possible options: DVB, Broadcaster ID, CAP-1000, Cable ATSC/SCTE 20, Cable SCTE 20, Closed captions (Chinese Standard), IPTV ARIB, IPTV Media Room, ATSC 3.0, IPTV Proprietary ARIB, DSR IRD, ATSC 1.0 and Default Cable.</p> <p>It is recommended to use by default the DVB mode unless your system is ATSC; in that case, use ATSC 1.0 mode or ATSC 3.0.</p>
-------------	---

Transport Stream parameter

TS Bitrate	Maximum output TS bitrate used for this profile.
------------	--

Video parameters

Processing	Options: Convert or Passthrough. Note: Passthrough means no audio/video/data processing.
Latency	<p>The desired latency time for the video stream output.</p> <p>Options: Short, Reduced, Default.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> Info</p> <p>Default latency is deprecated for OTT encoding. Services configured with Default latency will automatically transition to Reduced latency after an upgrade. The UI indication stays "Default" until users modify it.</p> </div>
Vertical Resolution	<p>The resolution of vertical video. Possible values: 480i, 540p, 576i, 720p, 1080i, 1080p, 1440p, 1800p, 2160p</p> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p> Note</p> <p>Statmux (VBR) is now extended to support HEVC 540p29.97 resolution. Programs with HEVC 540p and HEVC 1080p resolutions can also be inserted into the same statmux pool.</p> </div>

Resolution	<p>The resolution of the output video.</p> <p>If the "FOLLOW_INPUT" mode is selected, this allows the output video resolution change to be updated to follow the input resolution when the source is updated from NMOS. When the encoder starts up, it will detect the input resolution and begin outputting with that same spatial resolution. If the input video resolution changes without an input switch triggered by NMOS, the encoder will ignore the input resolution change and continue to output at the same resolution it has been using previously.</p> <div style="border: 1px solid orange; padding: 5px;"> <p> Note</p> <p>Only these input resolutions support the "FOLLOW_INPUT" mode: 720p 59.94, 1080p 23.976 / 1080i 29.97</p> </div>
Video Bitrate	This refers to the video encoding bitrate.
Frame Rate	<p>The frame rate of the output video stream.</p> <p>If the "FOLLOW_INPUT" mode is selected for "Resolution", the "Frame Rate" will also be selected as "FOLLOW_INPUT" automatically.</p>
Aspect Ratio	The aspect ratio of the output video stream (applicable for SD output). Pass-through the aspect ratio of the input source, or force the aspect ratio to 16:9 or 4:3.
Codec	The codec for video encoding/transcoding.
Reverse Telecine Mode	If True is selected, the reverse telecine feature can be set to enable RFD (Repeat Frame Detection) on XOS.
EBP Mode	This refers to the Encoder Boundary Point standard being used. Must be configured from the Set Top Box category.

GOP Option	<p>Options: Open Fixed, Open Variable, Open Capped, Closed Fixed, Closed Variable, Open Fixed M, Closed Fixed M. Must be configured from the Set Top Box category.</p> <ul style="list-style-type: none"> • Open: Encoded frames may use reference frames outside their GOP (Best for VQ). • Closed: Encoded frames are not allowed to use reference frames outside their GOP. • Fixed: The duration of the GOP is fixed and equal to GOP Len. • Capped: Duration of the GOP can not exceed GOP Len. <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p>Note</p> <p>When using UHD encoding with a UHD accelerator card, select Open Variable</p> </div>
Mini GOP Len M	<p>This refers to the minimum number of frames in GOP for M frames. You need to set the number of B pictures between the I picture and the P picture in order to achieve the desired GOP structure.</p> <p>Must be configured from the Set-top Box category.</p>
GOP Len N	<p>This refers to the duration of a GOP in the frame. In the case of a "fixed" GOP option, this is the exact duration of the GOP. In the case of a "Capped" GOP option, this is the maximum duration of a GOP.</p> <p>Must be configured from the Set-top Box category.</p>
HDR10 Metadata	<p>Options:</p> <ul style="list-style-type: none"> • Auto: The configuration with the default values. • Manual <ul style="list-style-type: none"> ◦ Use the HDR10 Preset to configure Display Primaries and White Point: BT.2020, DCI-P3 Theater, and DCI-P3 Display ◦ Min/Max Luminance, Max Content Light Level, Max Frame Average Light Level in a valid range <p>Note: When the "Auto" mode is selected, the output metadata must be the same as the input if HDR-10 is present in the input. If not, default values are used when conversion is requested by the user.</p>
HDR Dynamic Metadata	<div style="border: 1px solid #ccc; padding: 10px;"> <p>Info</p> <p>This parameter is available only when the following settings are configured:</p> <ul style="list-style-type: none"> • Codec field: "HEVC" • Color Conversion field: <ul style="list-style-type: none"> ◦ "AHDR SL-HDR1" ◦ "Dolby Version 8.1"/"Dolby Version 8.1 & HDR 10+" </div> <p>Options:</p> <ul style="list-style-type: none"> • Passthrough: If selected, the dynamic metadata from the input will be passed through to the output. • Generated: If selected, the dynamic metadata will be generated to the output. (any input dynamic metadata will be ignored)

AHDR SL-HDR1 Configuration	<p>Info</p> <p>This parameter is available only when the following settings are configured:</p> <ul style="list-style-type: none"> • Codec field: "HEVC" • Color Conversion: "AHDR SL-HDR1" <p>Select the "Default" configuration file or use the JSON file you have uploaded via the Configure Channels app > Settings > Advanced tab.</p>
Picture Enhancement	This is used to improve perceivable video quality at "non-stressful operating points". Options: Disabled, Weak, Very Weak, Vivid Tone, Conversion BT.2408, Tone Conversion Full
VQ Mode	<p>This is used to set the quality of the output video stream. Options:</p> <ul style="list-style-type: none"> • Premium VQ: If selected, output streams will be encoded with good subjective visual quality. • Objective: If selected, output streams will be encoded with a good Peak Signal-to-Noise Ratio (PSNR) score. • Standard VQ: If selected, VQ will be traded-off for enabling more transcoding channels to perform concurrently. <p>Note For XOS HIGH-DENSITY platforms, Premium VQ is not available and VQ is always Standard VQ whatever the value of this parameter.</p>
Stress Bias	This is used to improve perceivable video quality at "stressful operating points" and "very stressful operating points". Options: Clean, Balanced, Sharp.
VQ Boost	This is used to enable improvement in video quality. Options: Enabled, Disabled.
Encoding Profile	<p>This refers to the video encoding profile.</p> <p>Possible values are High, Main, Baseline, and High 4:2:2 (High 4.2.2 is only available when VQ Mode is set to "Premium VQ" and with AVC / H.264 SD/HD 4:2:2 10-bit video codec).</p> <p>Note Check that the Encoding profile is compatible with other encoding settings. Otherwise, an error will happen when starting a channel.</p>

Encoding Level	<p>This is the data depth for the given codec and profile. The level specifies the data constraints for settings such as frame rate, or maximum Width and Height.</p> <p>The default value is "Auto". If "Auto" is selected, the output level is the same as the level defined by the system controller at the time.</p> <p>Configure the appropriate value of encoding level for AVC, HEVC, and MPEG-2 codecs.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>Check that the Encoding Level is compatible with the selected codec, encoding bitrate, and resolution otherwise an error will happen when starting a channel.</p> </div>
Color conversion	<p>You can configure color space conversion for the video output using the following color modes.</p> <p>Possible values are None, Passthrough, BT.709 SDR, BT.2020 SDR, BT.2020 HLG, BT.2020 HLG-SDR compatibility, BT.2020 HDR-10, Dolby Vision 5, Dolby Vision 8.1, Dolby Vision 8.1 & HDR10+, Dolby Vision 8.4, Dolby Vision 8.4 - SDR compatibility, ST2094-10, HDR10+, ST2094-10 & HDR10+, AHDR SL-HDR1</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>ⓘ Dolby Vision 8.1 metadata</p> <p>XOS supports Dolby Vision 8.1 passthrough or generation with TS input. Dolby Vision 8.1 metadata can be passed through when present in the TS input, rather than being generated.</p> </div> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>ⓘ AHDR SL-HDR1 option is enabled with HEVC and H265 Main/H265 Main10 encoding profile</p> <ul style="list-style-type: none"> • SL-HDR1 metadata is extracted and passed through/generated with SDI inputs (3G-SDI, UHD-SDI). • SL-HDR1 metadata is extracted and passed through/generated with AVC/HEVC compressed IP input. </div> <p>3D-LUT tables are supported for HDR conversions. The following refers to the 3D-LUT Color conversion. Four color conversions are possible:</p> <ul style="list-style-type: none"> • BT.2020 PQ to BT.709 SDR • BT.2020 HLG to BT.709 SDR • BT.709 SDR to BT.2020 PQ • BT.709 SDR to BT.2020 HLG <p>Once the Color conversion is chosen, select the appropriate conversion matrix in the Set-top Box parameters. See also Settings to upload 3D-LUT conversion matrix files.</p>
Generate PIP	If True is selected, the Picture in Picture (PIP) mode and associated features are enabled for the output video stream.

Output PID	This refers to the PID which can be used for the output video stream. The default value is -1, which means disabled.
SDT Generation Mode	<p>Options:</p> <ul style="list-style-type: none"> • Follow input: The SDT generation for the output video stream follows the same behavior as the input. • Generate SDT: The SDT is always generated for the output video stream. XOS will display discovered service/service provider names with characters from any charset table and generate an SDT table with such names for IPTV/broadcast outputs, including pass-through and transcoded services. Specifically, the encoding table can be selected to handle non-Latin character sets (e.g. Chinese and Nordic) for service names and provider names. <ul style="list-style-type: none"> ◦ DVB provider name: You can specify the non-Latin characters (e.g. Chinese and Nordic) for the DVB provider name with the associated provider name/program name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). ◦ DVB provider name Coding Name: You can specify the provider name/program name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). For example, 0x13 refers to Simplified Chinese and 0x14 refers to Traditional Chinese. ◦ DVB program name Coding Name: You can specify the provider name/program name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). For example, 0x13 refers to Simplified Chinese and 0x14 refers to Traditional Chinese. • Disable SDT: The SDT is not generated for the output video stream.
Receiver Time Zone	<p>You can configure the receiver's time zone from the drop-down menu.</p> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p> Note</p> <p>For Nielsen audio watermarking, you can use the Receiver Time Zone setting to calculate the correct Nielsen time and the Daylight Saving Time status.</p> </div>
Closed Captioning	Options: SCTE 20, ATSC.
Mapping Mode	Provisioning can be based on PID or Program Number.

Audio parameters

Audio Match By	<p>Options:</p> <ul style="list-style-type: none"> • Language: Audio streams are processed based on language. <div style="border: 1px solid #f0c080; padding: 5px;"> <p>Note</p> <p>Matching by Language should be used with caution. It relies on an internal index updated when an order of languages is changed in Settings from the Configure Channel app. Modifying the order of languages will affect all profiles using Match By Language.</p> </div> <ul style="list-style-type: none"> • Source Label: Audio streams are processed based on source labels assigned to audio streams when creating a source.
Source Label	This field appears only if the Audio Match By mode is set to Source Label . This refers to typical labels (e.g. audio_1, audio_2, audio_3.....audio_n) that can be assigned to the output audio stream when grooming the source input.
Processing	Options: Convert, Passthrough, Disabled.
Codec	The desired codec that is used to encode/transcode the input audio stream.
Channels	The audio modes that are available for audio channels.
Upmix	<p>This allows users to configure upmix for audio streams and applies to all types of inputs. The supported coding formats are AC4, AC-3, EAC-3, Dolby E, MPEG 1 Layer II or AAC.</p> <p>The Upmix option will be visible when the Audio codec is not pass-through.</p> <ul style="list-style-type: none"> • Disabled • Upmix • Upmix with Auto-sense
Sample Rate(kHz)	The sample rate of the encoding audio stream (expressed in kHz).
Bitrate(kbps)	The bitrate for the encoding audio stream (expressed in kbps).
AAC Header	You can configure the container format for the AAC audio data: <ul style="list-style-type: none"> • ADTS • LATM

Nielsen Insertion	If True is selected, you can configure the Nielsen properties accordingly.											
	Nielsen Watermark	NAES II	NAES VI			NAES II & VI	NAES CBET	NAES VI & CBET				
	Nelesen Watermark Level	PC	PC	-	-	PC	-	PC				
		FD	FD			FD		FD				
	Nielsen CBET Step Aside	-	-	-	-	-	TRUE	TRUE				
							FALSE	FALSE				
	Nielsen Source Type	-	Program	Commercial	VOD Breakout	Program	-	Program				
Kantar Snap Watermarking	Nielsen Watermark Mode	REFRAIN	OVERWRITE			REFRAIN	OVERWRITE	OVERWRITE				
		OVERWRITE				OVERWRITE	-					
	<p>Note</p> <ul style="list-style-type: none"> • Nielsen properties are available only when the Processing parameter is configured as "Convert". • Only one Nielsen Insertion could be declared by Language or Label. • The availability of some parameters depends on the Nielsen Watermark Type and Source Type. 											
	<p>i Prerequisites for Kantar Watermarking</p> <p>To enable the Kantar Watermarking insertion on your service, you must first upload the <i>Kantar Product and Audience</i> license files to the XOS system.</p>											
	If True is selected, Kantar Watermarking will be available for your services with this IPTV profile selected.											

Level Mode	<p>This is used to control the audio loudness level for the audio output:</p> <ul style="list-style-type: none"> Follow Input: If selected, This allows the level of the audio output identical to the audio input source. Target Level: If selected, you can specify the target audio level details on the Target Level (dB) field. HALC-BS.1770 (EBU): If selected, XOS will take the specified loudness standard for the output audio stream. HALC-BS.1770 (ATSC): If selected, XOS will take the specified loudness standard for the output audio stream. HALC-A-WEIGHTING: If selected, XOS will take the specified loudness standard for the output audio stream. Static Gain: If selected, you can specify the static audio gain details on the Static Gain (dB) field.
Target Level (dB/LKFS)	This is the target level of loudness value, in decibels or LKFS, for the output audio stream. Applicable for 'Target Level' mode and for HALC modes.
Static Gain (dB)	This is the static gain value, in decibels, for the output audio stream. The default value is 0 dB. The range of the "Static Gain" is -20db to 20db.
ALC Preset	<p>This is used to set the audio volume in HALC modes and sound quality automatically for the audio output:</p> <ul style="list-style-type: none"> Soft Medium Hard
Preliminary gain (dB)	The Preliminary Gain is available only when the "Level Mode" is configured as one of the "HALC-*" modes. The range of the "Preliminary gain" is -20db to 20db.

Fallback source label	<p>ⓘ Audio Match by Source Label only</p> <p>This appears only when the Audio Match by "Source Label" mode is configured.</p> <p>Create at least 2 unique audio tracks that must be configured with each with its unique Source Label. The audio track will fall back based on the "Silence Threshold" configured via the input IP/SDI source Audio Grooming throughout the Configure Channel / Configure Broadcast app.</p> <p>For example,</p> <p>For the Source Label "Audio_1", if "Fallback source label" is configured as "Audio_2" and "Fallback on Silence" is set as "True", this implies "Audio_1" will fall back to the "Audio_2" when the configured "Silence Threshold" is met.</p> <p>For the Source Label "Audio_2", if "Fallback source label" is configured as "Audio_1" and "Fallback on Silence" is set as "True", this implies "Audio_2" will fall back to the "Audio_1" when the configured "Silence Threshold" is met.</p>
Fallback on Silence	<p>ⓘ Audio Match by Source Label only</p> <p>This appears only when the Audio Match by "Source Label" mode is configured.</p> <p>When the "Fallback source label" field is configured, set this to True to enable the audio fallback on silence for the specified audio track.</p>
Output PID	This refers to the PID which can be used for the output audio stream.
PIP Output PID	This refers to the PID which can be used for the output data stream with Picture in Picture (PiP) enabled.

Metadata parameters

Data Filtering	Options: Include all data or Filter by Source label.
Source Label	This refers to a typical label (e.g. SCTE-35) that can be assigned to the output data stream when grooming the source input.
Output PID	This refers to the PID which can be used for the output data stream.
PIP Output PID	This refers to the PID which can be used for the output data stream with Picture in Picture (PiP) enabled.

Burn In DVB Subtitles	If True is selected, XOS burns DVB subtitles into the video. ! Note If the DVB subtitle is burned in, the DVB subtitle PID will not be present in the output.
Bitrate (Kbps)	This refers to the bitrate set for the output data stream.
Generate SMPTE 2038	This refers to the carriage of SMPTE 2038 Ancillary Data Packets in an MPEG-2 Transport Stream. If True is selected, this will allow extraction of ancillary data from uncompressed input and encapsulating into the SMPTE-2038 component stream. ! SMPTE-2038 is used to carry any type of Ancillary Data from an uncompressed input as part of a Transport Stream. For example, it can be used to carry proprietary Ancillary Data that is not recognized and handled already by XOS. The service works, provided that the downstream receiver knows how to decode the VANC service within the generated "2038 data stream". This feature is applicable for SDI, SMPTE 2022-6 and SMPTE 2110 inputs.
DPI Componen nt	If True is selected, this will identify the component as a DPI component (SCTE-35/SCTE-104) and allow to define DPI-specific features as follows: <ul style="list-style-type: none">• DPI STB mode: If the DPI Command is set to True, the DPI STB mode is Standard by default.• SCTE-104 preroll: If the DPI Command is set to True, the SCTE-104 preroll is 4 seconds by default.• Ignore Splice Command List: If DPI Command is set to True, the following Splice Commands can be ignored: 0 (splice_null), 4 (splice_schedule), 5 (splice_insert), 6 (time_signal), 7 (bandwidth_reservation), 255 (private_command).
Convert Teletext to DVB- Subtitles	This refers to the conversion of Teletext to DVB-Subtitles. When set to True the following parameters can be set : <ul style="list-style-type: none">• Teletext Type• Frame Size• Font: Listed fonts have been previously loaded from Configure Channels settings• Font Density• Text Outline Width• Background Transparency• Min Bitrate (kbps)• Output Page Id• Output Type• Lang.

Convert SCTE27 to DVB- Subtitles	<p>This refers to the conversion of SCTE27 to DVB-Subtitles. When set to True the following parameters can be set :</p> <ul style="list-style-type: none"> • Output Page Id • Output Type • Lang. • scte27ToDVBSUBtitle Force DDS On
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DPI parameters

Filter Mode	Options: Pass All, Drop All.
Handle Stream Conditioning	This is used for the transcoder to handle stream conditioning at the splice point to prepare for the destination device.
Handle Splicing	This is used for the transcoder to handle splicing.

Processing Requirement parameters

CPU Requirement	<p>This parameter is currently unused with XOS and shall be set to 1.</p> <div style="border: 1px solid #f0c080; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>Higher values can create issues when increasing the number of running services using this profile</p> </div>
Memory Requirement	<p>This parameter is currently unused with XOS context and shall be set to 0.</p>

TS Multiplexer profile parameters

TS Multiplexer profiles are dedicated to any transcoding services added to a VBR pool.

Transport Stream parameter

TS Bitrate	Default maximum output TS bitrate used for this profile.
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Signaling Table parameters

Table Name	<ul style="list-style-type: none"> SDT Actual PAT PMT CAT <p>Note: multiplexer configuration allows to generate other tables, through Configure Broadcast GUI.</p>
Building Mode	<ul style="list-style-type: none"> None Local

Default PID Mapping parameters

Defines what are the output PIDs by default, ie when they are not defined in multiplexer configuration.

Keep input PID	Keep all original PIDs from sources
Paradigm	Customize the range of PIDs

Maximum Inputs Number parameters

Transcoding services	<p>Maximum number of transcoding services connected to this multiplexer. If exceeded, the multiplexer will automatically restart when you add a new transcoding service.</p>
TS sources	<p>Maximum number of TS/IP sources connected to this multiplexer. If exceeded, the multiplexer will automatically restart when you add a new TS/IP source.</p>
SRT sources	<p>Maximum number of SRT sources connected to this multiplexer. If exceeded, the multiplexer will automatically restart when you add a new SRT source</p>

Processing Requirement parameters

CPU Requirement	<p>This parameter is currently unused with XOS and shall be set to 1.</p> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>Higher values can create issues when increasing the number of running services using this profile</p> </div>
Memory Requirement	<p>This parameter is currently unused with XOS context and shall be set to 0.</p>

Multiscreen profiles parameters

⚠ Note

Multiscreen profiles are dedicated to multi-bitrate encoding from a unique source. Multiscreen profiles have to be used with the destination profiles providing ATS output, OTT packaged output, or RTMP output.

Endpoint Devices parameters

ENDP OINT DEVIC ES	Options: ATS, Harmonic MBTS.
AVC Device s	Options: <ul style="list-style-type: none"> • eMBMs • HEVC Single PPS • Marvolo • MBR DPI Proprietary • MBR Generic • Media Room
SDT Genera tion Mode	Options: <ul style="list-style-type: none"> • Follow input: The SDT generation for the output video stream follows the same behavior as the input. • Generate SDT: The SDT is always generated for the output video stream. XOS will display the discovered service/service provider names with characters from any charset table and generate an SDT table with such names for OTT/multiscreen outputs, including pass-through and transcoded services. Specifically, the encoding table can be selected to handle non-Latin character sets (e.g. Chinese and Nordic) for service names and provider names. <ul style="list-style-type: none"> ◦ DVB provider name: You can specify the non-Latin characters (e.g. Chinese and Nordic) for the DVB provider name with the associated provider name/program name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). ◦ DVB provider name Coding Name: You can specify the provider name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). For example, 0x13 refers to Simplified Chinese and 0x14 refers to Traditional Chinese. ◦ DVB program name Coding Name: You can specify the program name according to the ISO 639 language code specifications (e.g. the character table defined in ETSI EN 300 468 Annex A for DVB). For example, 0x13 refers to Simplified Chinese and 0x14 refers to Traditional Chinese. • Disable SDT: The SDT is not generated for the output video stream.

Output PMT PID	The Program Map Table (PMT) PID that applies to the only program in the generated output.
Receiver Time Zone	<p>You can configure the receiver's time zone from the drop-down menu.</p> <div style="border: 1px solid #fca; padding: 10px;"> <p>⚠ Note</p> <p>For Nielsen audio watermarking, set the Receiver Time Zone to the time zone in which the content will be received. The Nielsen timestamp and DST flag will be automatically updated for daylight savings time.</p> </div>
Latency	<p>Options: Default, Reduced, Short, Very Short</p> <div style="border: 1px solid #fca; padding: 10px;"> <p>ℹ Info</p> <p>Default latency is deprecated for OTT encoding. Services configured with Default latency will automatically transition to Reduced latency after an upgrade. The UI indication stays "Default" until users modify it.</p> </div>
HDR10 Metadata	<p>Options:</p> <ul style="list-style-type: none"> • Auto: Use incoming HDR-10 metadata if present or default ones • Manual: Force HDR-10 metadata to user-defined values
HDR Dynamic Metadata	<div style="border: 1px solid #fca; padding: 10px;"> <p>ℹ Info</p> <p>This parameter is available only when the following settings are configured:</p> <ul style="list-style-type: none"> • Codec field: "HEVC" • Color Conversion field: <ul style="list-style-type: none"> ◦ "AHDR SL-HDR1" ◦ "Dolby Version 8.1"/"Dolby Version 8.1 & HDR 10+" </div> <p>Options:</p> <ul style="list-style-type: none"> • Passthrough: If selected, the dynamic metadata from the input will be passed through to the output. • Generated: If selected, the dynamic metadata will be generated to the output. (any input dynamic metadata will be ignored)

AHDR SL-HDR1 Configuration	<p>Info</p> <p>This parameter is available only when the following settings are configured:</p> <ul style="list-style-type: none"> • Codec field: "HEVC" • Color Conversion: "AHDR SL-HDR1" <p>Select the "Default" configuration file or the JSON file you have uploaded via the Configure Channels app > Settings > Advanced tab > AHDR SL-HDR1 Configuration section.</p>
Bitrate Mode	Options: VBR, CBR, ABR.
Closed Captioning	Options: SCTE 20, ATSC.
Mapping Mode	Provisioning can be based on PID or Program Number.

Video general parameters

Video Bitrate Min & Max	Video profiles will be automatically adjusted based on these values.
Picture Enhancement	This is used to improve perceivable video quality at "non stressful operating points". Options: Disabled, Weak, Very Weak, Vivid, Conversion BT.2408, Tone Conversion Full
VQ Mode	This is used to set the quality for the output video stream. Options: <ul style="list-style-type: none"> • Premium VQ: If Premium VQ is selected, output streams will be encoded with good subjective visual quality. • Objective: If Objective is selected, output streams will be encoded with good Peak Signal-to-Noise Ratio (PSNR) score. • Standard VQ: If Standard VQ is selected, the high-density video transcoding mode will be activated and VQ will be traded off to enable more transcoding channels to perform concurrently. This provides a cost-effective CPU utilization compared to the Premium VQ mode.
Stress Bias	This is used to improve perceivable video quality at "stressful operating points" and "very stressful operating points". Options: Clean (Soft Cleaner), Balanced, Sharp (Sharper Blockier).

VQ Boost	This is used to enable improvement on video quality. Options: Enabled, Disabled.
Aspect Ratio	Pass-through the aspect ratio of the input source, or force the aspect ratio to 16:9 or 4:3.
EyeQ	This is used to enable real-time video compression optimization that delivers optimal viewing experience on internet-connected devices while reducing OTT bitrates.
Frame Rate Conversion	This is used to perform cross-framerate conversion and control outgoing bitrates between 50 Hz and 59.94 Hz for OTT output profile when output is progressive or interlaced. The input from 50 Hz video framerate can be converted to progressive 59.94 Hz, or vice versa. This is a video global parameter to enable Multiscreen frame rate conversion. <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p>i Info</p> <p>Refer to the Frame Rate Conversion (Progressive Output) and Frame Rate Conversion (Interlaced Output) tables below for additional details.</p> </div>
Dynamic Frame Rate Encoding	This is used to identify images that are very similar to previous ones or images having very fast motion. It can remove the redundant images and mark the remaining images with the syntax of frame doubling or tripling. Therefore, only the remaining images are encoded and the CPU usage is saved. This is supported for AVC progressive encoding for 50 Hz and 59.94 Hz output. Options: Disabled, Auto.

Frame Rate Conversion (Progressive Output)

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
Round Up	29.97i/59.94p	Full	60p
		Half	30p
		Quarter	15p
	23.98p	Full	24p
		Half	12p
		Quarter	6p
	29.97p	Full	30p

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
		Half	15p
		Quarter	7.5p
Passthrough	25i / 50p	Full	50p
		Half	25p
		Quarter	12.5p
	29.97i/59.94p	Full	59.94p (60/1.001)
		Half	29.97p (30/1.001)
		Quarter	14.98p (15/1.001)
	30p	Full	30p
		Half	15p
		Quarter	7.5p
	30i/60p	Full	60p
		Half	30p
		Quarter	15p
	23.98p	Full	23.98p (24/1.001)
		Half	11.99p (12/1.001)
		Quarter	5.99p (6/1.001)
	25p	Full	25p
		Half	12.5p

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
	29.97p	Quarter	6.25p
		Full	29.97p (30/1.001)
		Half	14.98p (15/1.001)
		Quarter	7.49p (15/2.002)
50Hz Domain	25i/50p 29.97i/59.94p 23.98p 30i/60p	Full	50p
		Half	25p
		Quarter	12.5p
	30p	Full/Half/Quarter	50p/25p/12.5p
	25p/29.97p	Full	25p
		Half	12.5p
		Quarter	6.25p
59.94Hz Domain	25i/50p 29.97i/59.94p 23.98p 30i/60p	Full	59.94p (60/1.001)
		Half	29.97p (30/1.001)
		Quarter	14.98p (15/1.001)
	30p	Full/Half/Quarter	59.94p/29.97p/14.98p
	25p/29.97p	Full	29.97p (30/1.001)
		Half	14.98p (15/1.001)
		Quarter	7.49p (15/2.002)

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
25 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	25p
		Half	12.5p
		Quarter	6.25p
29.97 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	29.97p (30/1.001)
		Half	14.98p (15/1.001)
		Quarter	7.49p (15/2.002)
50 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	50p
		Half	25p
		Quarter	12.5p
59.94 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	59.94p (60/1.001)
		Half	29.97p (30/1.001)
		Quarter	14.98p (15/1.001)
30 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	30p
		Half	15p
		Quarter	7.5p (15/2)
60 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	60p
		Half	30p
		Quarter	15p

Frame Rate Conversion (Interlaced Output)

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
Round Up	29.97i / 29.97p	Full / Half / Quarter	30i / 30p / 15p
	59.94p	Full / Half / Quarter	60p / 30p / 15p
	23.98p	Full / Half / Quarter	24i / 24p / 12p
Passthrough	25i / 25p	Full / Half / Quarter	25i / 12.5i / 6.25i
	50p	Full / Half / Quarter	50i / 25i / 12.5i
	29.97i / 29.97p	Full / Half / Quarter	29.97i (30/1.001) / 14.98i (15/1.001) / 7.49i (15/2.002)
	59.94p	Full / Half / Quarter	59.94i (60/1.001) / 29.97i (30/1.001) / 14.98i (15/1.001)
	30p	Full / Half / Quarter	30i / 15i / 7.5i
	60p	Full / Half / Quarter	60i / 30i / 15i
	30i/30p	Full / Half / Quarter	30i / 15i / 7.5i
	23.98p	Full / Half / Quarter	23.98i (24/1.001) / 11.99i (12/1.001) / 5.99p (6/1.001)
50Hz Domain	23.98p 25i/50p 30p 29.97i/59.94p 60p	Full / Half / Quarter	50i / 25i / 12.50i
	25p / 29.97p	Full / Half / Quarter	25i / 25i / 12.50i
59.94Hz Domain	25p / 29.97p	Full / Half / Quarter	29.97i (30/1.001) / 29.97i (30/1.001) / 14.98i (15/1.001)

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
	60p 59.94p/29.97i 25i/50p 23.98p 30p	Full / Half / Quarter	59.94i (60/1.001) / 29.97i (30/1.001) / 14.98i (15/1.001)
25 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	25i
		Half	12.5i
		Quarter	6.25i
29.97 fps	25i/50p 29.97i/59.94p 23.98p 30i/30p/60p 25p/29.97p	Full	29.97i (30/1.001)
		Half	14.98i (15/1.001)
		Quarter	7.49i (15/2.002)
50 fps	25i/50p 29.97i/59.94p 23.98p 30p/60p 25p/29.97p	Full	50i
		Half	25i
		Quarter	12.5i
59.94 fps	25i/50p 29.97i/59.94p 23.98p 30p/60p 25p/29.97p	Full	59.94i (60/1.001)
		Half	29.97i (30/1.001)
		Quarter	14.98i (15/1.001)
30 fps	25i/50p 29.97i/59.94p 23.98p 30p/60p 25p/29.97p	Full	30i
		Half	15i
		Quarter	7.5i

Frame Rate Conversion Options	Input Format	Frame Rate Options	Output Format
60 fps	25i/50p 29.97i/59.94p 23.98p 30p/60p 25p/29.97p	Full	60i
		Half	30i
		Quarter	15i

Video profile parameters

Video Bitrate(kbps)	The bitrate of the output video stream (expressed in kbps).																														
Horizontal Resolution	The resolution of horizontal video.																														
Vertical Resolution	The resolution of vertical video.																														
Frame Rate	<p>The frame rate of the output video stream.</p> <p>When selecting Full, or Half Quarter, the output frame rate depends on the source.</p> <table border="1"> <thead> <tr> <th>SOURCE</th> <th>FULL</th> <th>HALF</th> <th>QUARTER</th> </tr> </thead> <tbody> <tr> <td>59.94p</td> <td>59.94</td> <td>29.97</td> <td>14.98</td> </tr> <tr> <td>29.97i</td> <td>59.94</td> <td>29.97</td> <td>14.98</td> </tr> <tr> <td>29.97p</td> <td>29.97</td> <td>14.98</td> <td>7.49</td> </tr> <tr> <td>50p</td> <td>50</td> <td>25</td> <td>12.5</td> </tr> <tr> <td>25i</td> <td>50</td> <td>25</td> <td>12.5</td> </tr> <tr> <td>25p</td> <td>25</td> <td>12.5</td> <td>6.25</td> </tr> </tbody> </table>			SOURCE	FULL	HALF	QUARTER	59.94p	59.94	29.97	14.98	29.97i	59.94	29.97	14.98	29.97p	29.97	14.98	7.49	50p	50	25	12.5	25i	50	25	12.5	25p	25	12.5	6.25
SOURCE	FULL	HALF	QUARTER																												
59.94p	59.94	29.97	14.98																												
29.97i	59.94	29.97	14.98																												
29.97p	29.97	14.98	7.49																												
50p	50	25	12.5																												
25i	50	25	12.5																												
25p	25	12.5	6.25																												

Codec	<p>The codec for video encoding/transcoding.</p> <div style="border: 1px solid #f0c987; padding: 10px;"> <p>⚠ Note</p> <p>For streaming to YouTube, refer to the following page: https://support.google.com/youtube/answer/2853702</p> </div>															
Encoding Profile	<p>This refers to the video encoding profile.</p> <p>The following table gives the typical encoding profiles</p> <div style="border: 1px solid #f0c987; padding: 10px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Output Resolution & Frame Rate</th> <th style="text-align: left;">AVC Profile</th> <th style="text-align: left;">AVC Level</th> <th style="text-align: left;">HEVC Profile</th> <th style="text-align: left;">HEVC Level</th> </tr> </thead> <tbody> <tr> <td>1920x1080 25p/29.97p</td><td>High</td><td>4.2</td><td>Main/Main10</td><td>4.0</td></tr> <tr> <td>1920x1080 50p/59.94p</td><td>High</td><td>4.2</td><td>Main/Main10</td><td>4.1</td></tr> </tbody> </table> </div>	Output Resolution & Frame Rate	AVC Profile	AVC Level	HEVC Profile	HEVC Level	1920x1080 25p/29.97p	High	4.2	Main/Main10	4.0	1920x1080 50p/59.94p	High	4.2	Main/Main10	4.1
Output Resolution & Frame Rate	AVC Profile	AVC Level	HEVC Profile	HEVC Level												
1920x1080 25p/29.97p	High	4.2	Main/Main10	4.0												
1920x1080 50p/59.94p	High	4.2	Main/Main10	4.1												
Encoding Level	<p>This is the data depth for the given codec and profile. The level specifies the data constraints for settings such as frame rate, or maximum Width and Height.</p> <p>Set a value consistent with encoding resolution and bit rate for AVC and HEVC codecs. If "Auto" is selected, the output level is the same as the level defined by the system controller at the time.</p> <div style="border: 1px solid #f0c987; padding: 10px;"> <p>⚠ Note</p> <p>Check that the Encoding Level is compatible with the selected codec, encoding bitrate, and resolution otherwise an error will happen when starting a channel.</p> </div>															
IDR(s)	<p>This refers to the time interval (expressed in seconds) between IDR (Intra Decoder Refresh) frames that are inserted into the stream. The range must be between 1 and 10.</p> <div style="border: 1px solid #f0c987; padding: 10px;"> <p>ℹ Info</p> <p>In 50Hz use cases using AAC only, 1.28s or 1.92s durations align the length of audio & video segments and allow keeping compact DASH manifests.</p> </div>															
Mini GOP Len M	<p>This refers to the minimum number of frames in GOP for M frames. You need to set the number of B pictures between the I picture and the P picture in order to achieve the desired GOP structure.</p>															

<p>Color conversion</p>	<p>This refers to color space conversion for the video output using the following color modes. Possible values are None, Passthrough, BT.709 SDR, BT.2020 SDR, BT.2020 HLG, BT.2020 HLG-SDR compatibility, BT.2020 HDR-10, Dolby Vision 5, Dolby Vision 8.1, Dolby Vision 8.1 & HDR10+, Dolby Vision 8.4, Dolby Vision 8.4 - SDR compatibility, ST2094-10, HDR10+, ST2094-10 & HDR10+, AHDR SL-HDR1</p> <p>i Dolby Vision 8.1 metadata</p> <p>XOS supports Dolby Vision 8.1 passthrough or generation with TS input. Dolby Vision 8.1 metadata can be passed through when present in the TS input, rather than being generated.</p> <p>i AHDR SL-HDR1 option is enabled with HEVC and H265 Main/H265 Main10 encoding profile</p> <ul style="list-style-type: none"> • SL-HDR1 metadata is extracted and passed through/generated with SDI inputs (3G-SDI, UHD-SDI). • SL-HDR1 metadata is extracted and passed through/generated with AVC/HEVC compressed IP input. <p>3D-LUT tables are supported for HDR conversions. The following refers to the 3D-LUT Color conversion. Four color conversions are possible:</p> <ul style="list-style-type: none"> • BT.2020 PQ to BT.709 SDR • BT.2020 HLG to BT.709 SDR • BT.709 SDR to BT.2020 PQ • BT.709 SDR to BT.2020 HLG <p>Once the Color conversion is chosen, select the appropriate conversion matrix in the Set-top Box parameters. See also Settings to upload 3D-LUT conversion matrix files.</p>
<p>HDR Signaling</p>	<p>If this is enabled, HDR Signaling will work with HEVC and H265 Main 10 encoding profile.</p>
<p>Rate Control</p>	<p>This is used to control bitrate based on ABR, EyeQ, and CBR.</p>
<p>Output PID</p>	<p>This refers to the PID which can be used for the output video stream. The default value is -1, which means disabled.</p>
<p>Label</p>	<p>Displays any custom labels that have been added</p>

Audio parameters**PROFILES**

Audio Match By	<p>Options:</p> <ul style="list-style-type: none"> • Language: Audio streams are processed based on language. <div style="border: 1px solid #f0c080; padding: 5px;"> <p> Note</p> <p>Matching by Language should be used with caution. It relies on an internal index updated when the order of languages is changed in Settings from the Configure Channel app. Modifying the order of languages will affect all profiles using Match By Language.</p> </div> <ul style="list-style-type: none"> • Source Label: Audio streams are processed based on source labels assigned to audio streams when creating a source.
Source Label	This field appears only if the Audio Match By mode is set to Source Label . This refers to typical labels (e.g. audio_1, audio_2, audio_3.....audio_n) that can be assigned to the output audio stream when grooming the source input.
Processing	Options: Convert, Passthrough, Disabled.
Codec	The desired codec that is used to encode/transcode the input audio stream.
Channels	The audio modes that are available for audio channels.
Sample Rate(kHz)	The sample rate of the encoding audio stream (expressed in kHz).
Bitrate(kbps)	The bitrate for the encoding audio stream (expressed in kbps).
AAC Header	<p>You can configure the container format for the AAC audio data:</p> <ul style="list-style-type: none"> • ADTS • LATM

Nielsen Insertion	If True is selected, you can configure the Nielsen properties accordingly.											
	Nielsen Watermark	NAES II	NAES VI			NAES II & VI	NAES CBET	NAES VI & CBET				
	Nelesen Watermark Level	PC	PC	-	-	PC	-	PC				
		FD	FD			FD		FD				
	Nielsen CBET Step Aside	-	-	-	-	-	TRUE	TRUE				
							FALSE	FALSE				
	Nielsen Source Type	-	Program	Commercial	VOD Breakout	Program	-	Program				
	Nielsen Watermark Mode	REFRAIN	OVERWRITE			REFRAIN	OVERWRITE	OVERWRITE				
		OVERWRITE				OVERWRITE	-					
Kantar Snap Watermarking	<p>Note</p> <ul style="list-style-type: none"> • Nielsen properties are available only when the Processing parameter is configured as "Convert". • Only one Nielsen Insertion could be declared by Language or Label. • The availability of some parameters depends on the Nielsen Watermark Type and Source Type. 											
	<p>i Prerequisites for Kantar Watermarking</p> <p>To enable the Kantar Watermarking insertion on your service, you must first upload the <i>Kantar Product and Audience</i> license files to the XOS system.</p> <p>If True is selected, Kantar Watermarking will be available for your services with this multiscreen profile selected.</p>											

Level Mode	<p>This is used to control the audio loudness level for the audio output:</p> <ul style="list-style-type: none"> Follow Input: If selected, This allows the level of the audio output identical to the audio input source. Target Level: If selected, you can specify the target audio level details on the Target Level (dB) field. HALC-BS.1770 (EBU) (LKFS): If selected, XOS will take the specified loudness standard for the output audio stream. HALC-BS.1770 (ATSC) (LKFS): If selected, XOS will take the specified loudness standard for the output audio stream. HALC-A-WEIGHTING (dBFS): If selected, XOS will take the specified loudness standard for the output audio stream. Static Gain: If selected, you can specify the static audio gain details on the Static Gain (dB) field.
Target Level (dB)	This is the target level of loudness value, in decibels, for the output audio stream.
Static Gain (dB)	This is the static gain value, in decibels, for the output audio stream. The default value is 0 dB.
ALC Preset	<p>This is used to set the audio volume in HALC modes and sound quality automatically for the audio output:</p> <ul style="list-style-type: none"> Soft Medium Hard
Preliminary gain (dB)	The Preliminary Gain is available only when the "Level Mode" is configured as one of the "HALC-*" modes. The range of the "Preliminary gain" is -20db to 20db.

Fallback source label	<p>ⓘ Audio Match by Source Label only</p> <p>This appears only when the Audio Match by "Source Label" mode is configured.</p> <p>Create at least 2 unique audio tracks that must be configured with each with its unique Source Label. The audio track will fall back based on the "Silence Threshold" configured via the input IP/SDI source Audio Grooming throughout the Configure Channel / Configure Broadcast app.</p> <p>For example,</p> <p>For the Source Label "Audio_1", if "Fallback source label" is configured as "Audio_2" and "Fallback on Silence" is set as "True", this implies "Audio_1" will fall back to the "Audio_2" when the configured "Silence Threshold" is met.</p> <p>For the Source Label "Audio_2", if "Fallback source label" is configured as "Audio_1" and "Fallback on Silence" is set as "True", this implies "Audio_2" will fall back to the "Audio_1" when the configured "Silence Threshold" is met.</p>
Fallback on Silence	<p>ⓘ Audio Match by Source Label only</p> <p>This appears only when the Audio Match by "Source Label" mode is configured.</p> <p>When the "Fallback source label" field is configured, set this to True to enable the audio fallback on silence for the specified audio track.</p>
Output PID	This refers to the PID which can be used for the output audio stream.

Metadata parameters

NIELSEN ID3 Output PID	This refers to the PID which can be used for extracting the Nielsen ID3 output. The PID of the extracted Nielsen ID3 descriptor is set to 32.
Source Label	This refers to a typical label (e.g. SCTE-35) that can be assigned to the output data stream when grooming the source input.
Output PID	This refers to the PID which can be used for the output data stream.
PIP Output PID	This refers to the PID which can be used for the output data stream with Picture in Picture (PiP) enabled.

Burn In DVB Subtitles	If True is selected, XOS burns DVB subtitles into the video. ! Note If the DVB subtitle is burned in, the DVB subtitle PID will not be present at the output.
Generate SMPTE 2038	This refers to the carriage of SMPTE 2038 Ancillary Data Packets in an MPEG-2 Transport Stream. If True is selected, this will allow extraction of ancillary data from uncompressed input and encapsulating into the SMPTE-2038 component stream. ! Note SMPTE-2038 is used to carry any type of Ancillary Data from an uncompressed input as part of a Transport Stream. For example, it can be used to carry proprietary Ancillary Data that is not recognized and handled already by XOS. The service works, provided that the downstream receiver knows how to decode the VANC service within the generated "2038 data stream". This feature is applicable for SDI, SMPTE 2022-6 and SMPTE 2110 inputs.
DPI Compon ent	If True is selected, this will identify the component as a DPI component (SCTE-35/SCTE-104) and allow to define DPI-specific features as follows: <ul style="list-style-type: none"> • DPI STB mode: If the DPI Command is set to True, the DPI STB mode is Standard by default. • SCTE-104 preroll: If the DPI Command is set to True, the SCTE-104 preroll is 4 seconds by default. • Ignore Splice Command List: If DPI Command is set to True, the following Splice Commands can be ignored: 0 (splice_null), 4 (splice_schedule), 5 (splice_insert), 6 (time_signal), 7 (bandwidth_reservation), 255 (private_command).
Bitrates (Kbps)	This refers to the bitrate set for the output data stream, for bandwidth reservation in the TS output.
Enable Ttml Conversi on	If True is selected, the incoming Teletext components will be filtered and converted to TTML.
Ttml Languag e	This refers to the language to be used for TTML.
Ttml Subtitle Purpose	Set the "Ttml Subtitle Purpose" in case there are two Teletext components with the same language. <ul style="list-style-type: none"> ◦ 0 will allow selecting the "Normal" Teletext ◦ 0x10, 0x11, and 0x12 will allow selecting the "Hearing impaired" Teletext

DPI Parameters

Filter Mode	Options: Pass All, Drop All.
Handle Stream Conditioning	This is used for the transcoder to handle stream conditioning at the splice point to prepare for the destination device.
Handle Splicing	This is used for the transcoder to handle splicing.

Processing Requirement parameters

CPU Requirement	This parameter is currently unused with XOS and shall be set to 1. ⚠ Note Higher values can create issues when creating multiple channels using this profile.
Memory Requirement	This parameter is currently unused with XOS context and shall be set to 0.

Destination profiles parameters

⚠ Note

By default XOS provides several profiles that can be used with different products. It is highly recommended to update them or to create new ones to match your application.

HLS Destination parameters

⚠ Note

This profile can only be used with Multiscreen transcoding profiles.

✖ Warning

Only Push packaging is supported by XOS. Ensure that Push packaging is switched ON and Pull packaging is switched OFF.

Segment Length	The duration of the media segment files (expressed in seconds). The input value can be an integer value (e.g. 6s) or a floating point value down to millisecond (e.g. 6.006s).
DVR Window Size	This controls the availability of media segment files most recently added to the index files (a.k.a. playlists) (expressed in seconds). The value range is from 10 seconds to 7200 seconds.

Segment Retention Period	The duration that the media segment files actually retain in the publishing server (expressed in minutes). The value range is from 1 minute to 120 minutes.
Playlist Filename	<p>The variant playlist lists the URLs of each variant stream to allow clients to switch between encodings dynamically. This setting specifies the file name of the variant playlist excluding file extension (i.e. .m3u8). For example, if this value is set to "master", the actual file name will be "master.m3u8". The default file name of the variant playlist is index.m3u8.</p> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>This is the default Playlist Filename. You can customize the Playlist Filename via Configure Channels > Destinations. From the Destination page, you need to configure the Type as "Origin/CDN" type and Profile as HLS Destination Profile.</p> </div>
Insert custom tag in Master playlist header	<p>The aim of this setting is to allow inserting one or several custom tags / markers in the master / multivariant playlist.</p> <p>When enabling this at the LabWizard Destination Profile level, it triggers the display of a new setting "Custom Tag" at "Configure / Destination" level (for all the Destinations based on this Destination Profile). If a text string is provisioned in this "Custom Tag" field, it is then inserted in the master playlist of the associated service, after the global tags and before the "#EXT-X-MEDIA" and "#EXT-X-STREAM-INF" tags.</p> <p>Example of text string: #EXT-X-SESSION-DATA:DATA-ID="com.example.lyrics",URI="lyrics.json"</p> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>Once the LabWizard level setting is enabled, the "Master Playlist Header Custom Tag" field will appear in the Destination Profile you have created via Configure Channels > Destinations. One or multiple custom tags can be inserted into the "Master Playlist Header Custom Tag" field.</p> </div>
Audio Stream Only	If True is selected, audio-only streams will be created and added to the playlist to provide a low-bandwidth alternate stream which are used to conform with the Apple requirements. Select False if the downstream vendor does not support audio-only streams.
Late Binding Audio	If this is enabled, the video and audio variants are packaged separately and the player selects one video profile, it must also one of the audio variants (language, bitrate, codec). This is supported in HLS protocol version 4 or above. If disabled, the video and audio tracks are multiplexed together in the same HLS segments.
	<div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>It is recommended to enable it when several audio variants are available in order to save bandwidth.</p> </div>

Package in fMP4	<p>If True is selected, the media variant will be packaged using the fMP4 (fragmented MP4) format (aka HLS-CMAF packaging format).</p> <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>Mandatory for HEVC video packaging according to HLS specification. XOS also supports packaging of HEVC video into HLS-sTS segments, even if this is not compliant with the HLS specification.</p> </div> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>You can configure the Nielsen audio watermark for HLS fMP4 output. From the Configure Source app, groom the audio source and set the "Nielsen" checkbox enabled to indicate which audio stream carries the Nielsen watermarking.</p> </div>
Pass-through Parameter Sets	<p>This refers to the Package in fMP4 enabled for HLS HEVC output.</p> <p>If set to False, the HEVC playlist will show "hvc1" for codec attribute and the SPS/PPS are available only in separate Initialization Segments (they are removed from the video ES and so not included in the video segments). For example, #EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=15128000,CODECS="hvc1.2.4.L153.80,mp4a.40.2",RESOLUTION=3840x2160,FRAME-RATE=29.970,AUDIO="audio1".</p> <p>If set to True, the HEVC playlist will show "hev1" for codec attribute and the SPS/PPS are available only in separate Initialization Segments (they are removed from the video ES and so not included in the video segments). For example, #EXT-X-STREAM-INF:PROGRAM-ID=1,BANDWIDTH=15128000,CODECS="hev1.2.4.L153.80,mp4a.40.2",RESOLUTION=3840x2160,FRAME-RATE=29.970,AUDIO="audio1"</p>
Filename for Media Stream	<p>An index file is an ordered list of media URLs and informational tags. Each media URL refers to a media file which is a segment of a single contiguous stream. This setting specifies the file name of the index file (playlist) for each variant stream excluding file extension (i.e. .m3u8). XOS supports customizable file name for media stream.</p> <p>Support patterns: %streamid - Stream ID. For example, User enters: %streamid</p>

Filename for I-Frame	An index file is an ordered list of media URLs and informational tags. Each media URL refers to a media file which is a segment of an I-frame only stream. This setting specifies the file name of the index file (playlist) for each variant stream excluding file extension (i.e. .m3u8). XOS supports customizable Index File Name for I-frame only stream. Supported patterns: %streamid_iframe - I-frame only stream ID. For example, User enters: %streamid_iframe
Segment Filename Prefix	XOS supports customizable segment file names. Supported patterns: %starttime - The start time of the Publishing session. %streamid - Stream ID. %sequence - The sequence number of the media segment. %time - The start time of each segment. For example, User enters: %starttime-%sequence-%streamid-%time
Subtitle Name Pattern	The customization of subtitle track name in HLS variant playlist is supported with the following 3 patterns: %lang - The language code in lowercase. %LANG - The language code in uppercase. %index - An unique index of the subtitle track.
<p>⚠ Note</p> <p>According to the HLS spec (4.3.4.1.1), "All EXT-X-MEDIA tags in the same Group MUST have different NAME attributes.", users must specify the "%index" in the customized track name in order to avoid the track name conflict in the case when there are 2 subtitle tracks with the same language.</p>	
URL Order	Specify whether the playlist URLs are arranged based on ascending bitrate or descending bitrate.
Codecs Attribute	If True is selected, the CODECS attribute will be specified in EXT-X-STREAM-INF in the media playlist.
Segment URI Info	If True is selected, the #EXT-X-KEY tag is repeated for each segment, instead of appearing once each time the key is changed (static key or key rotation use cases).
Floating Point Duration	If True is selected, a playlist with floating-point EXTINF duration up to 3 decimal places will be generated.

Encryption Method	<p>Options:</p> <ul style="list-style-type: none"> • Sample AES: If Sample AES is selected, XOS will encrypt each individual media sample (e.g., video, audio, etc.) by its own with AES which is in compliance with HTTP Streaming spec defined by Apple. The player must download the key file to access the content. • Authentec PlayReady: If Authentec PlayReady is selected, XOS will encrypt the content according to AuthenTec's proposal for HLS encryption. • Common Encryption: If Common Encryption is selected, XOS will communicate to KMS to have common encryption using multi-DRM for HLS output. • Discretix PlayReady: If Discretix PlayReady is selected, XOS will encrypt the content according to Discretix's proposal for HLS encryption. • Irdeto PlayReady: If Irdeto PlayReady is selected, XOS will encrypt the content according to Irdeto's proposal for HLS encryption. • AES: If AES is selected, XOS will encrypt the whole segment with AES using a 128 bit key. The player must download the key file to access the content. • Fairplay: If Fairplay is selected, XOS will use the same encryption as Sample AES, but the player will request the key to a FairPlay license server. • Secure Media: If Secure Media is selected, XOS will encrypt the content according to Secure Media's proposal for HLS encryption. • Clear: No encryption (whatever the activation or not of the DRM Add-on in the service configuration). <div style="border: 1px solid orange; padding: 10px; margin-top: 20px;"> <p>⚠ Note</p> <p>XOS supports synchronized HLS internal key generation and pull delivery using HTTPS for geo-redundant deployments. The random encryption keys are used for HLS native content protection (AES, Sample AES) and are available as binary files.</p> </div>
Common Encryption Scheme	<p>This option is only applicable when "Package in fMP4" is set to true for HLS package.</p> <p>Options:</p> <ul style="list-style-type: none"> • CENC_CBCS: If selected, the MPEG-CENC 'cbc' protection scheme (AES-128 CBC mode with partial encryption) will be used for common encryption for HLS-fMP4 packages. This is the recommended option (it is the only protection scheme supported by Apple devices). • CENC_CENC: If selected, the MPEG-CENC 'cenc' protection scheme (AES-128 CTR mode with full encryption) will be used for common encryption for HLS-fMP4 packages.
Enable SEI encryption	<p>This option is only applicable when "Package in fMP4" is set to true for HLS package.</p> <p>If True is selected, the encryption of SEI input will be enabled.</p> <p>If False is selected, the encryption of SEI input will be disabled. No encryption will be processed for the sub-samples along with the total number of sub-samples of 'senc' box is reduced from 3 to 1.</p>
I-Frame Only	<p>If True is selected, I-Frame playlists are generated for allowing content preview and trick mode in the client application (player).</p>

I-Frame Codec	<p>This option is only applicable when "I-Frame Only" is set to "True".</p> <p>It allows selecting the format of the I-Frames referenced in the "I-Frame playlists":</p> <ul style="list-style-type: none"> • "Video IDR based" <ul style="list-style-type: none"> ◦ I-Frame playlists are based on IDR frames of the upstream transcoded content (AVC or HEVC) ◦ Supported for Live, Start-Over, Catch-Up, nPVR, and VOD ◦ One I-Frame playlist is generated per video profile ◦ You can choose the "I-Frame Segment Method". See the definition of the parameter. • "Motion JPEG": <ul style="list-style-type: none"> ◦ I-Frame playlists are based on Motion-JPEG thumbnail segments ◦ Supported only for Live packaging and HLS-fMP4 ◦ Only one I-Frame playlist is generated, with a fixed horizontal resolution of 400 pixels (400x224 for 16x9 content) ◦ "I-Frame Segment Method" is automatically forced to "IDR Segment" • Both <ul style="list-style-type: none"> ◦ Both types of the I-Frame playlist are generated simultaneously
I-Frame Motion JPEG Segment Interval	<p>This option is only applicable when "I-Frame Codec" is set to "Motion JPEG".</p> <ul style="list-style-type: none"> • "Per IDR": If "Per IDR" is selected, the thumbnail interval will be aligned with the IDR interval. • "Per segment": If "Per segment" is selected, the thumbnail interval will be aligned with the segment interval.
I-Frame Segment Method	<p>This option is only applicable when "I-Frame Only" is set to "True".</p> <p>It allows selecting how the I-Frames are referenced in the I-Frame Playlists:</p> <ul style="list-style-type: none"> • "Byte range": <ul style="list-style-type: none"> ◦ The I-Frame playlists reference each IDR frame as a byte-range of a video segment ◦ Only applicable when "I-Frame Codec" is set to "Video IDR based" and for Live packaging • "IDR segment": <ul style="list-style-type: none"> ◦ The I-Frame playlists reference each IDR frame as an individual segment. ◦ Automatically enabled for the following use cases: <ul style="list-style-type: none"> ▪ "Common Segment Url Delivery" enabled ▪ "I-Frame Codec" set to "Motion JPEG" ▪ Start-Over, Catch-Up, nPVR, and VOD <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> ✖ Warning <p>"IDR segment" must be selected when using live geo-synchronization.</p> </div>
Package Based Key Rotation	<p>If False is selected, the Key Rotation will be used through the DRM Settings tab from the Scrambling app.</p> <p>If True is selected, the local Key Rotation parameters (see below "Key Rotation" and "Key Change Period") are used for this package.</p>

Key Rotation	This option is only applicable when "Package Based Key Rotation" is set to true. Select True to enable key rotation for retrieving a new encryption key per package.
Key Change Period	This option is only applicable when "Package Based Key Rotation" is set to true. This is the period of time the XOS will wait until it retrieves a new encryption key (expressed in seconds).
SCTE-35 Signaling	<p>Options:</p> <ul style="list-style-type: none"> • Base64 Annotation: This enables conversion of SCTE-35 to playlist annotation in HLS using Base64 formatting. (#EXT-X-SPLICEPOINT-SCTE35 tag) • SCTE35 Standard 2019: This enables conversion of SCTE-35 to playlist annotation in HLS using SCTE-35 Standard 2019 format. (#EXT-X-SCTE35 tag) • Google Double Click: This enables conversion of SCTE-35 to playlist annotation in HLS using the Google Ad Manager (formerly DoubleClick) format. (#EXT-X-CUE-OUT/#EXT-X-CUE-IN/#EXT-OATCLS-SCTE35 tags) • UK1: This enables the conversion of SCTE-35 to playlist annotation in HLS using the UK1 DAI annotation format. (#EXT-X-CUE-OUT, #EXT-X-CUE-SPAN, #EXT-X-CUE-IN tags) • NBC Universal: This enables conversion of SCTE-35 to playlist annotation in HLS using the NBC SCTE-35 specification. (#EXT-X-SCTE35 and #EXT-X-DATERANGE tags) • Hulu: This enables the conversion of SCTE-35 to playlist annotation in HLS using the Hulu specification. (#EXT-X-SCTE35 tag) • SamsungTV+: This enables the conversion of SCTE-35 to playlist annotation in HLS using the Samsung TV+ specification. (#EXT-OATCLS-SCTE35, #EXT-X-CUE-OUT, #EXT-X-CUE-IN, #EXT-X-CUE-OUT-CONT tags) <div style="border: 1px solid orange; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>XOS supports 1+1 synchronized SCTE-35 segmentation & ad markers generation for HLS output.</p> </div>
SCTE-35 Annotation Tag	This option is only applicable when "NBC Universal" is configured in the SCTE-35 Signaling field.
Low-Latency Live Mode	<p>This option is only applicable when "Package in fMP4" is set to true for HLS package. If True is selected, HLS low-latency packaging will be activated.</p> <p>Each HLS segment will be generated first as a set of standalone partial segments (each one including a CMAF chunk) before the availability of the full segment.</p>

Chunk Duration	<p>This option is only applicable when "Low-Latency Live Mode" is set to true.</p> <p>The duration of partial segments (aka CMAF chunks), expressed in milliseconds. This should be set according to the output framerates of all bitrates.</p> <p>It is recommended using a chunk duration corresponding to an integer number of frames (e.g. 400ms = 10 frames for 25fps video). If it is not the case, the number of frames per chunk will be rounded up (e.g. if you set 380ms for a 25fps video, you will get 400ms = 10 frames per chunk), and the last chunk including fewer frames (to match the total segment duration).</p> <p>Apple recommends a partial segment duration of 1s for HLS low-latency packaging.</p>
Part Target Duration	<p>This option is only applicable when "Low-Latency Live Mode" is set to true.</p> <p>This allows overriding the part target duration to a fixed value (expressed in floating point value, up to milliseconds), e.g. 1001 for #EXT-X-PART-INF:PART-TARGET=1.00100. The default is 0, which means the part target is automatically determined from chunk duration. You may also use 'Auto' to use the most appropriate value determined from XOS.</p>
Specify Starting Live Point	If True is selected, you need to specify the Starting Live Point.
Starting Live Point	You can specify a positive number that indicates a time offset from the beginning of the Playlist. In contrast, you can specify a negative number that indicates a negative time offset from the end of the last Media Segment in the Playlist.
Target Duration	This is used to set the target segment duration in the output stream playlist. The input value 0 means to follow the segment length.
Enable Sub-folder Mode	If True is selected, a sub-folder will be created for publishing all files (i.e. playlists, segment files, key files) to a single folder.
AVERAGE-BANDWID TH Attribute	If the bitrate variation is expected to be high (if EyeQ is enabled, for instance), enable this attribute to base bitrate validation on the average bandwidth.
Teletext Handling	Select from the drop-down list to handle the Teletext subtitle input to the HLS output. The current options are "To WebVTT" and "Passthrough". None, one or multiple selections are supported.
<div style="border: 1px solid orange; padding: 10px;"> <p>Note</p> <p>The "To IMSC1" option is only available for Teletext Handling when "Package in fMP4" is set to true (i.e. for HLS fMP4 packaging only). The conversion of Teletext into IMSC1 is supported for Live, Start-over, Catch-up, and nPVR services.</p> </div>	

Closed Caption Handling	Select from the drop-down list to handle the Closed Caption subtitle input to the HLS output. The current options are "To WebVTT" and "Passthrough". None, one or multiple selections are supported.
	<p> Note</p> <p>The "To IMSC1" option is only available for Closed Caption Handling when "Package in fMP4" is set to true (i.e. for HLS fMP4 packaging only). The conversion of Closed Caption into IMSC1 is supported for Live, Start-over, Catch-up, and nPVR services.</p>
DVB Subtitle Handling	Select from the drop-down list to handle the DVB subtitle input to the HLS output. The current options are "To SMPTE-TT", "Passthrough" and "To WebVTT (OCR)". None, one or multiple selections are supported.
	<p> Note</p> <p>The "To IMSC1" option is only available for DVB Subtitle Handling when "Package in fMP4" is set to true (i.e. for HLS fMP4 packaging only). The conversion of DVB Subtitle (based on OCR) into IMSC1 is supported for Live, Start-over, Catch-up, and nPVR services.</p>
SCTE-27 Subtitle Handling	Select from the drop-down list to handle the SCTE-27 subtitle input to the HLS output. The current option is "To SMPTE-TT" and "To WebVTT (OCR)". None, one or multiple selections are supported.
Enable absolute master playlist	If True is selected, the absolute master playlist will be generated in the HLS file output.
Absolute master playlist filename	If the absolute master playlist is enabled, you can configure the filename as default for the absolute master playlist in HLS output.
	<p> Note</p> <p>You can customize the absolute master playlist file path via Configure Channels > Destinations. From the Destination page, configure the Type as "Origin/CDN" type and Profile that you have enabled the absolute master playlist. The field "ABSOLUTE BASE URL IN MASTER PLAYLIST" will appear in the HLS file output if the absolute master playlist is enabled.</p>
Declare CC in playlist	If True is selected, CC will be declared in the playlist.

Alt Watermarking Output Prefix	If the OTT Watermarking toggle is set to "On", this "Alt Watermarking Output Prefix" field will appear. This prefix will be added to the filename in the alternative playlist. The default value is " b. ". For example, b.index.m3u8 could be the Alternative Watermark Playlist Filename.
SCTE35 ContentID Handling	If True is selected, Content ID Signal Annotation in HLS will be handled when the "SCTE35 Standard 2019" option is configured in the SCTE-35 Signaling field. The annotation is in the format #EXT-X-SCTE35:TYPE=0x01,CUE=<content id base64 encoded string>. The X-SCTE35 with Content ID will appear in the stream playlist of the HLS output. <p>⚠️ The source must contain Content ID signals for the SCTE35 ContentID Handling.</p>
SCTE-35 Default Auto-return Duration	You can input the desired auto return timeout in seconds for XOS to automatically generate a splice-in SCTE-35 message according to the given timeout value. <p>⚠️ Note It is applied only if there is no splice-in SCTE-35 message received in the source before this timeout expires.</p>
SCTE-35 Google Hls Vod Annotation Type	This option is only applicable when "Google Double Click" is configured in the SCTE-35 Signaling field. Options: <ul style="list-style-type: none"> • e_None • The #EXT-X-PLACEMENT-OPPORTUNITY tag will be generated for provider placement opportunity start with duration=0 in Google Double Click VOD
Retain program/chapter start SCTE-35 messages in NBC mode	This option is only applicable when "NBC Universal" is configured in the SCTE-35 Signaling field. Options: <ul style="list-style-type: none"> • True • False
Display HDCP-LEVEL attribute	If True is selected, the HDCP-LEVEL attribute will be added in the master playlist according to Apple recommendations.

DVB TTML Handling	Select from the drop-down list to handle the DVB TTML subtitle input to the HLS output. The current option is "To WebVTT". <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>The "To IMSC1" option is only available for DVB TTML Handling when "Package in fMP4" is set to true (i.e. for HLS fMP4 packaging only). The conversion of DVB TTML into IMSC1 is supported for Live, Start-over, Catch-up, and nPVR services.</p> </div> <p>The following languages are supported for the conversion of subtitles: Latin, Cyrillic, Chinese Traditional, Chinese Simplified, Japanese, Korean, Vietnamese, Arabic, Thai</p> <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>Currently only Live services are supported to convert DVB TTML subtitle input to SMPTE-TT output.</p> </div>
Language code standard	Select from the drop-down list the language code standard that must be used to populate the LANGUAGE attribute of the HLS playlist. <p>The following language code standards are supported:</p> <ul style="list-style-type: none"> • ISO 639-1 <ul style="list-style-type: none"> ◦ Alpha-2 code space (2 letters) Examples: 'en', 'de', 'fr' ◦ Force the conversion from ISO 639-2/3 source language code to ISO 639-1 ◦ Unknown ISO 639-2/3 source language codes (e.g. 'qaa', 'qad', 'und', 'mul') are passed through • ISO 639-2/3 (default) <ul style="list-style-type: none"> ◦ Alpha-3 code space (3 letters) Examples: 'eng', 'deu' or 'ger', 'fra' or 'fre' <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>639-3 = 639-2/T = <i>terminological code</i> = derived from native name ('deu'); 639-3 = 639-2/B = <i>bibliographical code</i> = derived from English name ('ger')</p> </div> <ul style="list-style-type: none"> ◦ Pass-through from source
Common Segment Url Delivery	If True is selected, Common Segment URLs are used to deliver Live, Start-over and Catch-up applications. <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>A specific HLS master playlist URL format must be adopted to use this feature.</p> </div> <div style="border: 1px solid #fca; padding: 10px;"> <p>Note</p> <p>Pull packaging needs to be enabled for the Common Segment URL application.</p> </div>

Display resolution rounding (H)	<p>According to HLS RFC, the RESOLUTION attribute value must be the display resolution of the video, which might be different from the encoding resolution. The display resolution is calculated based on the encoding vertical resolution and the aspect ratio (4/3, 16/9)</p> <p>Options:</p> <ul style="list-style-type: none"> • To floor: If selected, the horizontal resolution of the HLS / CMAF-HLS variant playlist will be rounded to the floor number. • To closest even: If selected, the horizontal resolution of the HLS / CMAF-HLS variant playlist will be rounded to the closest even number. <p>For examples:</p> <ol style="list-style-type: none"> 1. Rounding to closest higher even: <ul style="list-style-type: none"> ◦ Encoding resolution: 854x480; Current resolution for HLS ($480 \times 16/9 = 853.33$): <table border="1"> <tbody> <tr> <td>TO_FLOOR</td><td>853x400</td></tr> <tr> <td>TO_CLOSEST_EVEN</td><td>854x400</td></tr> </tbody> </table> 2. Rounding to closest lower even: <ul style="list-style-type: none"> ◦ Encoding resolution: 854x474; Current resolution for HLS ($474 \times 16/9 = 842.6666$): <table border="1"> <tbody> <tr> <td>TO_FLOOR</td><td>842x400</td></tr> <tr> <td>TO_CLOSEST_EVEN</td><td>842x400</td></tr> </tbody> </table> 3. Anamorphic example <ul style="list-style-type: none"> ◦ Encoding resolution: 720x576; Resolution for HLS ($576 \times 16/9 = 1024$): <table border="1"> <tbody> <tr> <td>TO_FLOOR</td><td>1024x400</td></tr> <tr> <td>TO_CLOSEST_EVEN</td><td>1024x400</td></tr> </tbody> </table> 	TO_FLOOR	853x400	TO_CLOSEST_EVEN	854x400	TO_FLOOR	842x400	TO_CLOSEST_EVEN	842x400	TO_FLOOR	1024x400	TO_CLOSEST_EVEN	1024x400
TO_FLOOR	853x400												
TO_CLOSEST_EVEN	854x400												
TO_FLOOR	842x400												
TO_CLOSEST_EVEN	842x400												
TO_FLOOR	1024x400												
TO_CLOSEST_EVEN	1024x400												
Master Playlist Customization Settings EXT-X-VERSION tag value	<p>Allow defining the way the value of the EXT-X-VERSION tag is set in the master / multivariant playlist.</p> <p>The following values can be set:</p> <ul style="list-style-type: none"> • -1: Default value. The EXT-X-VERSION tag value is automatically defined by XOS, considering backward-compatibility of the enabled features with players supporting former HLS versions. • 0: Do not insert the EXT-X-VERSION tag into the playlist • 2 and more: Set / force the specified version as EXT-X-VERSION tag value in the playlist. <p><i>Note: The value 1 is invalid and will be rejected.</i></p>												

Index Playlist Customization Settings EXT-X-VERSION tag value	<p>Allow defining the way the value of the EXT-X-VERSION tag is set in the index / media playlists.</p> <p>The following values can be set:</p> <ul style="list-style-type: none"> • -1: Default value. The EXT-X-VERSION tag value is automatically defined by XOS, considering backward-compatibility of the enabled features with players supporting former HLS versions. • 0: Do not insert the EXT-X-VERSION tag into the playlists • 2 and more: Set / force the specified version as EXT-X-VERSION tag value in the playlists. <p><i>Note: The value 1 is invalid and will be rejected.</i></p>
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MSS Destination parameters

Note

This profile can only be used with Multiscreen transcoding profiles.

Warning

Only Push packaging is supported by XOS. Ensure that Push packaging is switched ON and Pull packaging is switched OFF.

Video Segment Length	<p>The duration of the video segment files (expressed in floating point value, up to milliseconds).</p>
Audio Segment Length	<p>The duration of the audio segment files (expressed in floating point value, up to milliseconds).</p>
DVR Window Size	<p>This refers to the control of the availability of media segment files most recently added to the Media Presentation Description file (expressed in seconds). The value range is from 60 seconds to 7200 seconds.</p>
Segment Retention Period	<p>The duration that the media segment files actually retain in the publishing server (expressed in minutes). The value range is from 1 minute to 120 minutes.</p>

Encryption Method	<p>Options:</p> <ul style="list-style-type: none"> • Clear: If selected, XOS will output the clear content without encryption. • PlayReady: If selected, XOS will communicate to KMS to have the Microsoft PlayReady encryption using multi-DRM. <div style="border: 1px solid orange; padding: 10px;"> <p>⚠ Note</p> <p>The Encryption Method works in association with the DRM Add-on activation in the service configuration:</p> <ul style="list-style-type: none"> ◦ Clear with DRM add-on = clear ◦ PlayReady with no DRM = Clear ◦ PlayReady with DRM = encrypted </div>
Package Based Key Rotation	<p>If False is selected, the Key Rotation will be used through the DRM Settings tab from the Scrambling app.</p> <p>If True is selected, the local Key Rotation parameters (see below "Key Rotation" and "Key Change Period") are used for this package.</p>
Key Rotation	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>Select True to enable key rotation for retrieving a new encryption key per package.</p>
Key Change Period	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>This is the period of time the XOS will wait until it retrieves a new encryption key (expressed in seconds).</p>
Subtitle FourCC	<p>You can customize the FourCC (Four-character codes) field of the Smooth Streaming manifest for subtitle tracks.</p>
Subtitle Name Pattern	<p>The customization of subtitle track name in the Smooth Streaming manifest is supported with the following 2 patterns:</p> <ul style="list-style-type: none"> • %lang - The language code in lowercase. • %index - An unique index of the subtitle track. <p>Since the track name should be unique in the Smooth Streaming manifest, users must specify the %index in the customized track name in order to avoid the track name conflict in the case when there are 2 subtitle tracks with the same language.</p>
Language Code Letter Case	<p>You can set the letter case of the language attribute in the audio/subtitle stream index in the MSS manifest.</p>
QPC Track Subtype	<p>You can configure the subtype of the QPC track (CAPT or DATA) in every single MSS publishing point for a service.</p>

SCTE-35 Signaling	Select Azure Media Services if the destination profile supports dynamic ad insertion.
Use Repeat Attribute	When False is selected, the Repeat Attribute "r" will not be used. The generated MSS manifest will then be compatible with players based on Silverlight v2.0 or other MSS players not supporting this attribute. When True is selected, the size of the manifest will be much smaller, as the list of available segments can be reduced to only the first segment with its duration and the total number of following segments having the same duration (i.e. value of the Repeat Attribute "r").
Add Latest Segment If All Ready	If True is selected, XOS will wait for all bitrates to be ready and skip to add chunks into the manifest for those not ready segments. The latest segment will be added to the output only if all are ready. If False is selected, XOS will not wait for all bitrates and add the latest segment to the output even if all segments are not ready.
Common Segment Url Delivery	If True is selected, Common Segment URLs are used to deliver Live, Start-over, and Catch-up applications. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ⚠ Note A specific MSS manifest URL format must be adopted to use this feature. </div> <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ⚠ Note Pull packaging needs to be enabled for the Common Segment URL application. </div>

DASH package parameters

⚠ Note

When encoding, this profile can only be used with Multiscreen transcoding profiles.

✖ Warning

Only Push packaging is supported by XOS. Ensure that Push packaging is switched ON and Pull packaging is switched OFF.

Segment Length	The duration of the media segment files (expressed in floating point value, up to milliseconds).
DVR Window Size	This refers to the control of the availability of media segment files most recently added to the Media Presentation Description file (expressed in seconds). The value range is from 10 seconds to 7200 seconds.

Minimum Update Period	This allows indicating to the player about the minimum update frequency of the manifest. The value range is from 0 second to 31536000 seconds (1 year). '-1' is a special value, meaning "Auto" The default value is '-1'/"Auto" If MUP = -1/Auto, then the value is equal to min(audioSegmentLength,videoSegmentLength)
Minimum Buffer Time	This allows configuring the minBufferTime in milliseconds for DASH manifests for tuning the behavior of downstream clients. The value describes how much buffer a client should have under ideal network conditions. '-1' is a special value, meaning "Auto" The default value is '-1'/"Auto"
Segment Retention Period	The duration that the media segment files actually retain in the publishing server (expressed in minutes). The value range is from 1 minute to 120 minutes.
Presentation Profile	<p>The profile used for generating Media Presentation Description (MPD) file that enables interoperability and signaling use of features in a Media Presentation.</p> <p>The following types are supported:</p> <ul style="list-style-type: none"> ISO Live: This refers to the ISO/IEC 23009-1, 8.4 ISO Base media file format live profile. This is the default and recommended setting. HbbTV ISO BMFF Live: This refers to HbbTV ISOBMFF defined in HbbTV 1.5 specification. DVB DASH Live: This refers to generate live DASH output that conforms to the DVB-DASH standards with the "urn:dvb:dash:profile:dvb-dash:2014" attribute set in the MPD element. ATSC 3.0 Live: This refers to generate live DASH output that conforms to ATSC 3.0 standards with the "urn:mpeg:dash:profile:isoff-broadcast:2015" attribute set in the MPD element. <div style="border: 1px solid red; padding: 5px; margin-top: 10px;"> ✖ Warning <p>If ATSC 3.0 Live is selected, the Minimum Update Period should be set to 0 for broadcast distribution.</p> </div>
Encryption Method	<p>Options:</p> <ul style="list-style-type: none"> Clear: If selected, XOS will output the clear content without encryption. Common Encryption: If selected, XOS will communicate to KMS to have common encryption using multi-DRM. Encryption will be based on MPEG-DASH. <div style="border: 1px solid orange; padding: 10px; margin-top: 10px;"> ⚠ Note <p>The Encryption Method works in association with the DRM Add-on activation in the service configuration:</p> <ul style="list-style-type: none"> Clear with DRM add-on = clear CENC with no DRM = Clear CENC with DRM = encrypted </div>

MPD Filename	<p>The name of Media Presentation Description (MPD) file which is used to describe a media presentation and allows the players to access the DASH service.</p> <div style="border: 1px solid #f0e68c; padding: 10px;"> <p>⚠ Note</p> <p>This is the default MPD Filename. You can customize the MPD Filename via navigating to Configure Channels > Destinations and configuring Type as "Origin/CDN" type and Profile as "DASH Destination".</p> </div>
Representation Pattern	<p>The pattern for generating the Representation ID which is used in the Media Presentation Description (MPD) file for each encoded version of video/audio.</p> <p>The following patterns are supported:</p> <ul style="list-style-type: none"> %starttimeitem – The start time of the Publishing session %streamIditem – Stream ID
Package Based Key Rotation	<p>If False is selected, the Key Rotation will be used through the DRM Settings tab from the Scrambling app.</p> <p>If True is selected, the local Key Rotation parameters (see below "Key Rotation" and "Key Change Period") are used for this package.</p>
Key Rotation	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>Select True to enable key rotation for retrieving a new encryption key per package.</p>
Key Change Period	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>This is the period of time the XOS will wait until it retrieves a new encryption key (expressed in seconds).</p>
SCTE-35 Signaling	<p>Options:</p> <ul style="list-style-type: none"> • Base64 annotation: This enables conversion of SCTE-35 to playlist annotations in DASH manifests (base64 formatting, schemeUri="urn:scte:scte35:2014:xml+bin"). • Harmonic Annotation 2020: This enables conversion of SCTE-35 to playlist annotations in DASH manifest using the Harmonic Annotation 2020 standard. (EventStream with new schemeUri "urn:hlit:scte35:2020:1" and corresponding attribute hlit-scte35:elapsedTime and hlit-scte35:segmentTypeid would be introduced in DASH manifest.) • NBC Universal: This enables conversion of SCTE-35 to playlist annotation in DASH using the NBC SCTE-35 specification. • Generic: This enables selection of the generic annotations modes, as defined in "SCTE-35 Carriage". <div style="border: 1px solid #f0e68c; padding: 10px;"> <p>⚠ Note</p> <p>XOS supports 1+1 synchronized SCTE-35 segmentation & ad-markers generation for DASH output.</p> </div>

SCTE-35 Carriage	<p>This option is available only when the "Generic" option is configured in the SCTE-35 Signaling field.</p> <p>Options (multiple selections are supported):</p> <ul style="list-style-type: none"> • Inband segment binary: When "Inband segment binary" is selected, incoming SCTE-35 messages are embedded in EMSG boxes in binary format, those EMSG boxes being packaged into all the video media segments. • In-MPD base64: When "In-MPD base64" is selected, incoming SCTE-35 messages are included in Event elements (<EventStream><Event>) as BASE-64 encoded strings, those Event elements being included in the Media Presentation Description (MPD) files.
UTC Timing Scheme Id Uri	Allows better synchronization between DASH server and client. Possible values are: <ul style="list-style-type: none"> • None (default) • urn:mpeg:dash:utc:http-xsdate:2014 • urn:mpeg:dash:utc:http-iso:2014 • urn:mpeg:dash:utc:http-ntp:2014 • urn:mpeg:dash:utc:ntp:2014 • urn:mpeg:dash:utc:http-head:2014
UTC Timing Value	If a timing scheme is set for UTC Timing Scheme Id Uri , then the URI of a time server supporting this scheme must be configured as "UTC Timing Value". It is recommended to use " urn:mpeg:dash:utc:http-iso:2014 " with the time server URL " http://time.akamai.com/?iso&ms ".
Low-Latency Live Mode	If True is selected, DASH low-latency packaging will be activated. The DASH segments will be generated as a set of multiple CMAF chunks and delivered using HTTP chunked-transfer encoding.
Chunk Duration	<p>This option is only applicable when "Low-Latency Live Mode" is set to true.</p> <p>The duration of CMAF chunks (expressed in milliseconds). This should be set according to the output framerates of all bitrates.</p> <p>It is recommended using a chunk duration corresponding to an integer number of frames (e.g. 400ms = 10 frames for 25fps video). If it is not the case, the number of frames per chunk will be rounded up (e.g. if you set 380ms for a 25fps video, you will get 400ms = 10 frames per chunk), and the last chunk including fewer frames (to match the total segment duration).</p>

Insert Service Desc. to Manifest	<p>⚠ Note</p> <p>The “Insert Service Desc. to Manifest” option is applicable only when the “Low-Latency Live Mode” is set to True.</p> <p>If True is selected, the “ServiceDescription” element will be added to the DASH client manifest (MPD) automatically. This element is used for improving control of players for low-latency decoding.</p> <p>The ServiceDescription element including the following attributes which can be used for customizing latency and playback rate:</p> <ul style="list-style-type: none"> • Service Desc. Scope Scheme Id Uri • Service Desc. Scope Value • Service Desc. Latency Target • Service Desc. Latency Max • Service Desc. Latency Min • Service Desc. Playback Rate Max • Service Desc. Playback Rate Min
Teletext Handling	Select from the drop-down list to handle the DASH subtitle format(s) in which the Teletext subtitles will be converted. The current option is “To SMPTE-TT”.
DVB Subtitle Handling	Select from the drop-down list to handle the DASH subtitle format(s) in which the DVB-SUB subtitles will be converted. The current options are “To SMPTE-TT” and “To SMPTE-TT text-based (OCR)”. None, one or multiple selections are supported.
Closed Caption Handling	Select from the drop-down list to handle the DASH subtitle format(s) in which the Closed-Caption (CEA-608/708) subtitles will be converted. The current options are “Passthrough” and “To SMPTE-TT”. None, one or multiple selections are supported.
SCTE-27 Subtitle Handling	Select from the drop-down list to handle the DASH subtitle format(s) in which the SCTE-27 subtitles will be converted. The current options are “To SMPTE-TT” and “To SMPTE-TT text-based (OCR)”. None, one or multiple selections are supported.
Use Absolute Timestamps	<p>If True is selected, the “availabilityStartTime” parameter present in the DASH manifest is always set to the fixed and default value corresponding to March 1, 2013.</p> <p>If False is selected, the “availabilityStartTime” parameter present in the DASH manifest is the timestamp corresponding to the start time of the packaging service.</p>

Pass-through Parameter Sets	<p>This is used to configure whether hvc or hev is used for DASH HEVC output.</p> <p>If set to False, the HEVC DASH manifest will show "hvc1" for codec attribute and the SPS/PPS are available only in separate Initialization Segments (they are removed from the video ES and so not included in the video segments).</p> <p>For example, <Representation ... codecs="hvc1.2.4.L120.80"</p> <p>If set to True, the HEVC DASH manifest will show "hev1" for codec attribute and the SPS/PPS are available only in separate Initialization Segments (they are removed from the video ES and so not included in the video segments).</p> <p>For example, <Representation ... codecs="hev1.2.4.L120.80"</p>
Insert default Key ID to manifest	<p>If True is selected, the default_KID (Key Identifier) attribute will be added in the default ContentProtection element for DASH-CENC encryption.</p>
Key Rotation Signalling	<ul style="list-style-type: none"> • Manifest-based, Single Period: <ul style="list-style-type: none"> ◦ The manifest DRM signalling ("default_KID" and "manifest pssh" received from the KMS) for the first key period is inserted in the manifest ◦ For each new "key period" (each time the key is rotated), the manifest is not updated, i.e. no new "DASH period" created and no DRM signalling update ◦ Segment-based DRM signalling is updated for each key period (Key ID and "segment pssh" received from KMS) • In Band (Segment-based, Single Period): <ul style="list-style-type: none"> ◦ Segment-based signalling only, with KID and pssh being updated for each key period in the media segments ◦ The "default_KID" and "pssh" are not included in the .mpd manifest (if the KMS response includes a "pssh" in the <ContentProtection> data string, it is filtered out)
Insert ProducerReferenceTime to Manifest	<div style="border: 1px solid #f0e68c; padding: 10px; margin-bottom: 10px;"> <p> Note</p> <p>The "Insert ProducerReferenceTime to Manifest" option is applicable only when the "Low-Latency Live Mode" is set to False. If "Low-Latency Live Mode" is set to True, this option is automatically enabled and hidden in the packaging configuration.</p> </div> <p>If True is selected, the Producer Reference Time will be inserted to the DASH manifest and segments:</p> <ul style="list-style-type: none"> • Enable passing through the timestamps of the packaged media components. • The timestamps are calculated based on the configuration of the "PACKAGER CLOCK" global parameter, with possible values "System Wall-clock" (the time of ingest by XOS is used) and "Source Timecodes" (the time corresponding to the timecode embedded in the original video source is used). • Permit DASH client to determine, monitor and control latency. • Enable measuring and potentially controlling the latency between the production of the media time and the media decoding by the player.

Alt Watermarking Output Prefix	If OTT Watermarking is set to "On", this "Alt Watermarking Output Prefix" field will appear. This prefix will be added to the filename in the alternative MPD file. The default value is " b. ". For example, b.master.mpd could be the Alternative Watermark MPD Filename.
Early Available Period	If True is selected, SCTE-35 messages are inserted before the beginning of the period corresponding to the splice_time of this SCTE-35 message (a period with no start time is used for that purpose).
SCTE35 ContentID Handling	<p>⚠ Note</p> <p>The "SCTE35 ContentID Handling" mode is applicable only when the "SCTE-35 Signaling" is enabled.</p> <p>If True is selected, the event message(s) with base64 string of "Content Identification" signal will be shown in the DASH manifest.</p>
SCTE-35 Default Auto-return Duration	You can input the desired auto return timeout in seconds for XOS to automatically generate a splice-in SCTE-35 message according to the given timeout value.
DVB TTML Handling	<p>Select from the drop-down list to handle the DASH subtitle format(s) in which the DVB TTML subtitles will be converted. The current option is "To SMPTE-TT".</p> <p>The following languages are supported for the conversion of subtitles: Latin, Cyrillic, Chinese Traditional, Chinese Simplified, Japanese, Korean, Vietnamese, Arabic, Thai</p> <p>⚠ Note</p> <p>Currently only Live services are supported to convert DVB TTML subtitle input to SMPTE-TT output.</p>
Common Segment Url Delivery	<p>If True is selected, Common Segment URLs are used for delivery of Live, Start-over and Catch-up applications.</p> <p>⚠ Note</p> <p>A specific DASH manifest URL format must be adopted to use this feature.</p> <p>⚠ Note</p> <p>Pull packaging needs to be enabled for the Common Segment URL application.</p>

Fill Gap Near Period Start	For some circumstances, the total length of audio can be shorter or longer than the total length of the video. If True is selected, the XOS packager will fill the gap near the start of the following period with the extra segment.
Use PTS As PTO	If True is selected, the package output will use the first Presentation Time Stamp (PTS) of audio as the Presentation Time Offset (PTO) of the audio adaptation set, so all video and audio will start at 0 of all Periods.
Generate Thumbnail	If True is selected, the DASH package output will enable thumbnail generation for Live and packaging on-the-fly services.
Thumbnail Height	Configure the thumbnail height, ranging from 1 px to 64000 px. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ⚠ Note <p>This option is available only when the Generate Thumbnail is set to True.</p> </div>
Static POF thumbnail per row	Configure the number of thumbnails tiled horizontally / how many thumbnails per row. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ⚠ Note <p>This option is available only when the Generate Thumbnail is set to True.</p> </div>
Static POF thumbnail per column	Configure the number of thumbnails tiled vertically / how many thumbnails per column. <div style="border: 1px solid #fca; padding: 10px; margin-top: 10px;"> ⚠ Note <p>This option is available only when the Generate Thumbnail is set to True.</p> </div>
Insert ProducerReferenceTime to Timeshift Manifest	This enables synchronized playback of multiple streams (e.g. different camera angles of the same game). If True is selected, the Producer Reference Time (PRFT) will be added to the DASH manifest for Catch-up, Start-over and Long-Lasting Catch-up applications.
Insert AdaptationSet Id to Manifest	If True is selected, the ID attribute will be inserted for an AdaptationSet element into the MPD manifest.

CMAF package parameters

Generic Parameters	
Segment Length	The duration of the media segment files (expressed in floating point value, up to milliseconds).
DVR Window Size	This refers to the control of the availability of media segment files most recently added to the Media Presentation Description file (expressed in seconds). The value range is from 10 seconds to 7200 seconds.
Segment Retention Period	The duration that the media segment files actually retain in the publishing server (expressed in minutes). The value range is from 1 minute to 120 minutes.
Encryption Method	<p>Options:</p> <ul style="list-style-type: none"> • Clear: If selected, XOS will output the clear content without encryption. • Common Encryption: If selected, XOS will communicate with the KMS server to get a key and the DRM signalling for one or multiple DRM systems. Encryption will be based according to the Common Encryption Scheme configured for CMAF packages.
Enable SEI Encryption	<p>If True is selected, the encryption of SEI input will be enabled.</p> <p>If False is selected, the encryption of SEI input will be disabled. No encryption will be processed for the sub-samples along with the total number of sub-samples of 'senc' box is reduced from 3 to 1.</p>
Package Based Key Rotation	<p>If False is selected, the Key Rotation will be used through the DRM Settings tab from the Scrambling app.</p> <p>If True is selected, the local Key Rotation parameters (see below "Key Rotation" and "Key Change Period") are used for this package.</p>
Key Rotation	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>Select True to enable key rotation for retrieving a new encryption key per package.</p>
Key Change Period	<p>This option is only applicable when "Package Based Key Rotation" is set to true.</p> <p>This is the period of time the XOS will wait until it retrieves a new encryption key (expressed in seconds).</p>
SCTE-35 Segmentation Mode	<p>Options:</p> <ul style="list-style-type: none"> • NBC: If the NBC mode is selected, the NBC SCTE-35 annotation will be enabled in the CMAF output. • Generic: If the Generic type is selected, it is possible to select the generic annotation modes using the DASH "SCTE-35 Carriage" parameter.

SCTE-35 Default Auto-return Duration	You can input the desired auto return timeout in seconds for XOS to automatically generate a splice-in SCTE-35 message according to the given timeout value.
	<p>⚠ Note</p> <p>It is applied only if a splice-out SCTE-35 message is received and there is no corresponding splice-in SCTE-35 message received in the source before this timeout expires.</p>
Common encryption scheme	<p>Options:</p> <ul style="list-style-type: none"> • CENC_CBCS: If selected, the MPEG-CENC 'cbc3' protection scheme will be used for common encryption for CMAF packages. This is the default and recommended option. • CENC_CENC: If selected, the MPEG-CENC 'cenc' protection scheme will be used for common encryption for CMAF packages.
Generate Segment Thumbnail	If True is selected, thumbnail images will be generated for each leading IDR of the video segments. Thumbnail tracks are created for DASH manifest and HLS playlist when using CMAF Live packaging. The thumbnail image is generated from the highest bitrate segment and converted with the configured height in the JPG format.
Segment Thumbnail Height	If Generate Segment Thumbnail is enabled, specify the height of the thumbnail image to be created (image width is determined by the aspect ratio of the video).
Enable Packaging Watermarking	If True is selected, watermarking will be enabled on the CMAF packaging output.
Low-Latency Live Mode	<p>If True is selected, unified low-latency packaging for CMAF-DASH and CMAF-HLS will be activated.</p> <p>For CMAF-DASH, the segments are delivered as a flow of "CMAF chunks" using HTTP Chunked Transfer Encoding.</p> <p>For CMAF-HLS, the partial segments are referenced as byte-range of the main segments instead of creating separate partial segment files.</p> <p>ℹ Info</p> <p>This unified low-latency packaging can bring a big bandwidth saving compared to performing separate packaging for Low-Latency for DASH and Low-Latency for HLS.</p>

Chunk duration	<p>This option is only applicable when "Low-Latency Live Mode" is set to true.</p> <p>The duration of CMAF chunks (expressed in milliseconds). This should be set according to the output framerates of all bitrates.</p> <p>It is recommended using a chunk duration corresponding to an integer number of frames (e.g. 400ms = 10 frames for 25fps video). If it is not the case, the number of frames per chunk will be rounded up (e.g. if you set 380ms for a 25fps video, you will get 400ms = 10 frames per chunk), and the last chunk including fewer frames (to match the total segment duration).</p>
DASH Parameters	
MPD Filename	The name of Media Presentation Description (MPD, aka Manifest) file which is used to describe a media presentation and allows the players to access the CMAF-DASH service.
Minimum Update Period	<p>This allows to indicate to the player about the minimum update frequency of the manifest. The value range is from 0 second to 31536000 seconds (1 year).</p> <p>'-1' is a special value, meaning "Auto"</p> <p>The default value is '-1'/"Auto"</p> <p>If MUP = -1/Auto, then the value is equal to min(audioSegmentLength,videoSegmentLength)</p>
Minimum Buffer Time	<p>This allows configuring the minBufferTime in milliseconds for CMAF-DASH manifests for tuning the behavior of downstream clients. The value describes how much buffer a client should have under ideal network conditions.</p> <p>'-1' is a special value, meaning "Auto"</p> <p>The default value is '-1'/"Auto"</p>
UTC Timing Scheme Id Uri	<p>Allows better synchronization between CMAF-DASH server and client. Possible values are:</p> <ul style="list-style-type: none"> • None (default) • urn:mpeg:dash:utc:http-xsdate:2014 • urn:mpeg:dash:utc:http-iso:2014 • urn:mpeg:dash:utc:http-ntp:2014 • urn:mpeg:dash:utc:ntp:2014 • urn:mpeg:dash:utc:http-head:2014
UTC Timing Value	If a timing scheme is set for UTC Timing Scheme Id Uri , then the URI of a time server supporting this scheme must be configured as "UTC Timing Value". It is recommended to use " urn:mpeg:dash:utc:http-iso:2014 " with the time server URL " http://time.akamai.com/?iso&ms ".
DAI Annotation Type	<p>⚠ Note</p> <p>The DAI Annotation Type is applicable only when the SCTE-35 Segmentation mode is enabled.</p> <ul style="list-style-type: none"> • If the NBC type is selected, the NBC DAI annotation will be applied to CMAF-DASH output. • If the Generic type is selected, it is possible to select the generic annotation modes using the "SCTE-35 Carriage" parameter.

SCTE-35 Carriage	<p>This option is available only when the "Generic" option is configured in the DAI Annotation Type field.</p> <p>Options (multiple selections are supported):</p> <ul style="list-style-type: none"> Inband segment binary: When "Inband segment binary" is selected, incoming SCTE-35 messages are embedded in EMSG boxes in binary format, those EMSG boxes being packaged into all the video media segments. In-MPD base64: When "In-MPD base64" is selected, incoming SCTE-35 messages are included in Event elements (<EventStream><Event>) as BASE-64 encoded strings, those Event elements being included in the Media Presentation Description (MPD) files.
Teletext Subtitle Handling	Select from the drop-down list to handle the CMAF-DASH subtitle format(s) in which the Teletext subtitles will be converted. The current options are "To IMSC1" and "To WebVTT-fMP4". None, one or multiple selections are supported.
Closed Caption Handling	Select from the drop-down list to handle the CMAF-DASH subtitle format(s) in which the Closed-Caption (CEA-608/708) subtitles will be converted. The current options are "To IMSC1" and "To WebVTT-fMP4". None, one or multiple selections are supported.
Fill Gap Near Period Start	<p>For some circumstances, the total length of audio can be shorter or longer than the total length of the video.</p> <p>If True is selected, the XOS packager will fill the gap near the start of the following period with the extra segment.</p>
Use PTS As PTO	If True is selected, the package output will use the first Presentation Time Stamp (PTS) of audio as the Presentation Time Offset (PTO) of the audio adaptation set, so all video and audio will start at 0 of all Periods.
Insert default Key ID to manifest	If True is selected, the default_KID (Key Identifier) attribute will be added in the default ContentProtection element.
Key Rotation Signaling	<ul style="list-style-type: none"> Manifest-based, Single Period: <ul style="list-style-type: none"> The manifest DRM signaling ("default_KID" and "manifest pssh" received from the KMS) for the first key period is inserted in the manifest For each new "key period" (each time the key is rotated), the manifest is not updated, i.e. no new "DASH period" created and no DRM signalling update Segment-based DRM signalling is updated for each key period (Key ID and "segment pssh" received from KMS) In Band (Segment-based, Single Period): <ul style="list-style-type: none"> Segment-based signalling only, with KID and pssh being updated for each key period in the media segments The "default_KID" and "pssh" are not included in the .mpd manifest (if the KMS response includes a "pssh" in the <ContentProtection> data string, it is filtered out)

Insert Adaptation Set Id to Manifest	If True is selected, the ID attribute will be inserted for an AdaptationSet element into the CMAF-DASH MPD manifest.
Insert Producer ReferenceTime to Manifest	If True is selected, the Producer Reference Time will be inserted into the CMAF-DASH manifest and segments: <ul style="list-style-type: none"> Enable passing through the timestamps of the packaged media components. The timestamps are calculated based on the configuration of the "PACKAGER CLOCK" global parameter, with possible values "System Wall-clock" (the time of ingest by XOS is used) and "Source Timecodes" (the time corresponding to the timecode embedded in the original video source is used). Permit DASH client to determine, monitor, and control latency. Enable measuring and potentially controlling the latency between the production of the media time and the media decoding by the player.
Insert Service Desc. to Manifest	<p>Note</p> <p>The “Insert Service Desc. to Manifest” option is applicable only when the “Low-Latency Live Mode” is set to True.</p>
HLS Parameters	
Playlist Filename	The variant playlist lists the URLs of each variant stream to allow clients to switch between encodings dynamically. This setting specifies the file name of the variant playlist excluding file extension (i.e. .m3u8). For example, if this value is set to "master", the actual file name will be "master.m3u8". The default file name of the variant playlist is index.m3u8.
URL Order	Specify whether the playlist URLs are arranged based on ascending bitrate or descending bitrate.
Specify Starting Live Point	If True is selected, you need to specify the Starting Live Point.
Starting Live Point	You can specify a positive number that indicates a time offset from the beginning of the Playlist. In contrast, you can specify a negative number that indicates a negative time offset from the end of the last Media Segment in the Playlist.
Target Duration	This is used to set the target segment duration in the output stream playlist. The input value 0 means to follow the segment length.

DAI Annotation Type	<p>⚠ Note</p> <p>The DAI Annotation Type is applicable only when the SCTE-35 Segmentation mode is enabled.</p> <p>If the NBC type is selected, the NBC DAI annotation will be applied to the CMAF-HLS output.</p>
Display HDCP-LEVEL Attribute	If True is selected, the HDCP-LEVEL attribute will be added in the master playlist.
Teletext Subtitle Handling	Select from the drop-down list to handle the CMAF-HLS subtitle format(s) in which the Teletext subtitles will be converted. The current options are "To IMSC1" and "To WebVTT". None, one or multiple selections are supported.
Closed Caption Handling	Select from the drop-down list to handle the CMAF-HLS subtitle format(s) in which the Closed-Caption (CEA-608/708) subtitles will be converted. The current options are "To IMSC1" and "To WebVTT". None, one or multiple selections are supported.
Display resolution rounding (H)	Please refer to the Display resolution rounding (H) in the HLS Package Parameters section.

Thumbnail package parameters

The thumbnail packaging format is a standalone packaging type that can be used jointly with other packaging outputs by players, in order to offer content preview functionality to end-users for seeking. This allows players to display "visual cues" in the scrub bar and also to offer a kind of trick mode fully based on a web app (avoiding decoding video frames using an actual video player).

A thumbnail package is independent of existing OTT packaging formats for it to be sharable for multiple OTT package outputs with pull packaging. The thumbnails can be grouped as image sprites for static applications (Catch-Up, Long-Lasting Catch-Up and VOD), in order to reduce the number of downloads. Thumbnail generation at the packaging level is supported for AVC and HEVC videos.

Thumbnail Interval	Configure the time interval for thumbnail extraction. It should be a multiple of the IDR period used for the ABR video profiles.
Thumbnail Height	Configure the height for the thumbnails. The thumbnail width will be determined according to the incoming video aspect ratio.

Thumbnail Filename Pattern	VOS supports customizable pattern for the thumbnail filename: Thumbnail-%sequence %sequence refers to the sequence number of the media segment E.g. Thumbnail-394422532
Thumbnail Image Format	Configure the image format in which the thumbnails will be encoded: JPG, PNG, or GIF format. The recommended format is JPG (best quality-size ratio).
WebVTT Filename Pattern	The WebVTT file format is used to list the thumbnail images. VOS supports customizable pattern for the WebVTT filename: Segment-%sequence %sequence refers to the sequence number of the associated WebVTT segment (vtt format) in the playlist. E.g. Segment-394422532
Playlist Filename	This refers to the JSON playlist used to list the WebVTT files. The default playlist filename is index.json. For Live and Start-Over this JSON playlist is updated dynamically to add the new WebVTT files (as new thumbnails are extracted from live content and referenced in new WebVTT files). For Catch-Up, LLCU and VoD this JSON playlist is static.
DVR Window Size	This refers to the control of the availability of thumbnail files most recently added to the Media Presentation Description file (expressed in seconds). The value range is from 60 seconds to 7200 seconds.
Segment Retention Period	The duration that the thumbnail files actually retain in the publishing server (expressed in minutes). The value range is from 1 minute to 120 minutes.

Fromlive Image Sprite Per Row	<p>Note</p> <p>This feature is applicable to Catch-up, Long-Lasting Catch-Up and VOD services only.</p> <p>An image sprite is formed by grouping thumbnails together based on rows and columns. The thumbnails are defined in this ordering, first row then column (Row-major ordering).</p> <table border="1"> <tr> <td>1</td><td>2</td><td>3</td></tr> <tr> <td>4</td><td>5</td><td>6</td></tr> </table> <p>Configure how many thumbnails per row in an image sprite.</p> <p>When image sprite is used, the suffix#xywh=x,y,w,h will be added to the thumbnail filename to indicate the coordinate of an individual thumbnail. The first two values (x,y) represent x, y coordinate from the top left corner of the thumbnail is an image sprite. The following two values (w,h) represent the width and height of the thumbnail.</p>	1	2	3	4	5	6
1	2	3					
4	5	6					
Fromlive Image Sprite Per Column	<p>Note</p> <p>This feature is applicable to Catch-up, Long-Lasting Catch-Up and VOD services only.</p> <p>An image sprite is formed by grouping thumbnails together based on rows and columns. The thumbnails are defined in this ordering, first row then column (Row-major ordering).</p> <table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> </tr> </table> <p>Configure how many thumbnails per column in an image sprite.</p> <p>When image sprite is used, the suffix#xywh=x,y,w,h will be added to the thumbnail filename to indicate the coordinate of an individual thumbnail. The first two values (x,y) represent x, y coordinate from the top left corner of the thumbnail is an image sprite. The following two values (w,h) represent the width and height of the thumbnail.</p>	1	2	3	4	5	6
1	2	3					
4	5	6					

RTMP Destination parameters

Reconnect ion Interval	Timeout for automatic reconnection in case the connection is interrupted.
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Late Binding Audio	<p>This parameter specifies how streams are created and named.</p> <p>For example in the case of multi-profile, with 3 videos (V1; V2; V3) and 2 audios (A1; A2):</p> <ul style="list-style-type: none"> • If Late Binding Audio (LBA) = False, then created streams are: V1_A1; V2_A1; V3_A1; A2 • If Late Binding Audio (LBA) = True, then created streams are: V1; V2; V3; A1; A2 <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>Whatever the LBA mode and the other settings, there can be only "1 video", "1 audio" or "1 video + 1 audio" per TCP connection.</p> </div>
User Agent	<p>This allows the server to identify the client which is originating the connection request, based on the 'flashVer' property. The default value is Harmonic.</p> <div style="border: 1px solid #f0e68c; padding: 10px; margin-top: 10px;"> <p>⚠ Note</p> <p>You might have to change it if the remote server accepts only a limited set of user agents</p> </div>
Publish Single Video Profile (PSVP)	<p>RTMP protocol only supports one AVC encoding video and one audio per RTMP stream.</p> <p>True: When the transcoded channel contains several videos and audio, only one RTMP is created. Audio and video streams sent through RTMP are selected by PSVP parameters.</p> <p>False: When the transcoded channel contains several videos and audio, each combination (video, audio) is sent to the destination into a dedicated RTMP stream.</p>
PSVP - Video Max Bit Rate	Select the video profile to send according to its video bit rate. The video profile having a bitrate just below the configured value is selected. If there is no profile below this value, then the closest one is selected
PSVP- Audio language	<p>Default: The preferred audio in the “Available Streams” list is used</p> <p>All: All the audio languages will be pushed (Note: the social media platforms usually support only 1 language)</p> <p>Specific audio language: Filtering based on the language selected in the list</p>
PSVP - Audio Max Bit Rate	The audio variant having a bitrate just below the configured value is selected If there is no profile below this value, then the closest one is selected

⚠ Note

For PSVP mode, for audio, the filtering is based on language and bitrate filtering

ATS Destination parameters

Note

This profile can only be used with Multiscreen transcoding profiles.

Audio Carried With Video	<p>The following options are available:</p> <ul style="list-style-type: none"> • All: The ATS carries all audio streams intended to be used with the video representation • Top: Not in use at this time • Match: Not in use at this time
Data Carried With Video	<p>The following options are available:</p> <ul style="list-style-type: none"> • All: The ATS carries all data streams intended to be used with the video representation • Top: Not in use at this time
ATS Filter	Optionally, exclude profile output based on bit rate.
Mute Output On Signal Loss	If the input signal is lost, the service can be muted (null bitrate on components). This can be applied to the internal multiplexer that allows downstream equipment to trigger redundancy.
Nielson RTVOD Flag	You can configure the RTVOD flag which will be inserted into existing Nielsen watermarks of the stream as an additional measurement point. The options are None/Auto/C3/C7 and the default value is None.
EyeQ Encapsulation	<p>You can configure the automatic generation of null packets in the ATS output when the EyeQ mode is enabled.</p> <p>Possible options:</p> <ul style="list-style-type: none"> • Without Null Packets • With Null Packets
Excluded Descriptors Tag	You can define the list of descriptor tags to be excluded from the output PMT for the ATS output. Note that the input value should be within the range of 1 to 254, inclusive.
Encapsulation Mode	<p>The encapsulation mode that is used for the output (UDP/RTP).</p> <p>Increment by Port or Multicast address (SPTS only).</p> <ul style="list-style-type: none"> • The minimum increment is 1 with FEC disabled, or 3 with FEC enabled. • The maximum increment is 100. <p>Forward Error Correction (FEC) is only available with RTP encapsulation.</p> <ul style="list-style-type: none"> • FEC Row: Valid numbers are 4 through 20. • FEC Column: Valid numbers are 1 through 20. <p>The number of rows * number of columns cannot exceed 100.</p>

IPTV Destination parameters

Note

This profile can only be used with IPTV encoding profiles.

Picture In Picture mode	Generates an additional PIP channel with a low-resolution video from the same source. SPTS : PIP channel is output on a dedicated multicast stream. MPTS : PIP channel is multiplexed with the main video channel in the same TS.
Mute Output On Signal Loss	If the input signal is lost, the service can be muted (null bitrate on components). This can be applied to the internal multiplexer that allows downstream equipment to trigger redundancy.
Output Mode	Not in Pool. The PIP video is always CBR.
Encapsulation Mode	The same encapsulation applies to the main video stream and to the PIP stream. The encapsulation mode that is used for the output (UDP/RTP). Increment by Port or Multicast address (SPTS only). <ul style="list-style-type: none"> • The minimum increment is 1 with FEC disabled, or 3 with FEC enabled. • The maximum increment is 100. Forward Error Correction (FEC) is only available with RTP encapsulation. <ul style="list-style-type: none"> • FEC Row: Valid numbers are 4 through 20. • FEC Column: Valid numbers are 1 through 20. The number of rows * number of columns cannot exceed 100.
Increment	When PIP is carried in a dedicated SPTS, determines multicast settings of PIP. Port : PIP stream is using the same multicast address of mainstream with a port number incremented from the main video one. Multicast : PIP stream is using the same port number of the mainstream with a multicast address whose last number is incremented from the main video address.

MPTS Destination parameters

Mute Output on Signal Loss	If True is selected, the mux output can be muted when the input signal (SRT/IP) of a transcoder is lost.
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Encapsulation Mode	<p>The encapsulation mode used for the output (UDP/RTP).</p> <p>Increment by Port or Multicast address (SPTS only).</p> <ul style="list-style-type: none"> • Minimum increment is 1 with FEC disabled, or 3 with FEC enabled. • Maximum increment is 100. <p>Forward Error Correction (FEC) is only available with RTP encapsulation.</p> <ul style="list-style-type: none"> • FEC Row: Valid numbers are 4 through 20. • FEC Column: Valid numbers are 1 through 20. <p>Number of rows * number of columns cannot exceed 100.</p> <p>Select FEC Column Only to use the value of the FEC Column only.</p>
Mux Redundancy Mode	<ul style="list-style-type: none"> • Active-Active: If selected, both Mux instances will output at the same time. Each of the Mux instance will output to a different address. • Active-Backup: If selected, only one Mux instance will output and the other will be muted. Both Mux instances will output to the same address.

OTT Filters profiles parameters

OTT filters are used to customize the playlists/manifests based on a set of rules.

They can be used for instance to:

- Create different manifest variants for different types of devices, each manifest variant including a different set of video profiles and audio variants
- Associate a specific audio quality to each video profile

Modifying or Creating a profile

Modify a profile's configuration or create a new one using the **Profile Editor**.

⚠ Note

Creating a new profile requires using an existing one as a baseline.

⚠ Note

If you must modify a default profile, Harmonic recommends changing the settings in the **Configured** pane only.

1. From the Lab Wizard app, click the profile panel to open the **Profile Editor**.
2. When creating a new profile, click the **Create** button and assign a new name
3. From the **Configured** pane, make any necessary changes.
Additional settings appear in the **Relevant Specs** pane.
4. If the **Customize Specs** dialog box opens, do one of the following:
 - To continue editing, click **Yes, Override to Manual Mode**. **Manual mode** enables you to override the profile's default settings.
 - To cancel editing and revert to the default settings, click **No, Keep Parametric Mode**. **Parametric mode** maintains the default settings configured by Harmonic.

5. Optionally, enter a brief description of the profile changes.

6. Click **Save as Version**

 **Note**

After a profile has been updated, you cannot revert your changes.

Result: On the **Profile panel**, the **Customer Version Number** increments by 1.

What to do next

Modified profiles need to be validated.

Updating from a master profile version

The Lab Wizard app alerts you when a new master profile version has been released. You can update a profile to the *latest* released master profile version only.

 **Note**

If XOS update required appears on the **Profile Panel**, then you must upgrade the XOS before you can install the latest released profile version.

1. Click the **Profile Panel** for the profile to be updated.
2. Click **Update from Master Profile** and then click **Yes** to confirm.
3. Click the **Exit** button to return to the **Profiles** page.

What to do next

Test and validate the new profile version.

Creating or Editing a Broadcast destination profile

If necessary, modify a Broadcast destination profile as required by your system.

 **Note**

Name of default broadcast destination profiles contains IPTV.

1. From the **Profiles** tab, click **Destination** to display only destination profiles.
2. Click on the broadcast profile to modify or to use as a baseline for a new one.
3. When creating a new profile, click **Create** at the bottom of the page
 - a. A new **Profile Name** has to be provided.
4. Edit parameters of the destination profile. Refer to [Destination profiles parameters](#) for more details
5. Result: On the **Profile panel**, the **Customer Version Number** increments by 1.

What to do next

You must validate the new profile before you can apply it to a destination.

Creating or Editing a Multiscreen destination profile

You can modify the Harmonic default profile to meet your Multiscreen output requirements.

Note

The name of default Multiscreen destination profiles contains a clear reference to ATS, RTMP, DASH, HLS, etc.

1. From the **Profiles** tab, click **Destination** to display only destination profiles.
2. Click the desired profile to modify or to use as a baseline when creating a new one. The **Profile Editor** opens.
3. When creating a new profile, click **Create** and type a new **Profile Name**.
4. When editing/creating an **ATS destination profile**:
 - If audio is present, ensure that **Audio Carried with Video** is set to **All**.
The ATS carries all audio streams intended to be used with the video representation. This is the only option supported at this time.
 - If data is present, ensure that **Data Carried with Video** is set to **All**.
The ATS carries all data streams intended to be used with the video representation. This is the only option supported at this time.
 - Configure the **Nielsen RTVOD Flag** which will be inserted into existing Nielsen watermarks of the stream as an additional measurement point.
 - Configure the **EyeQ Encapsulation** to automatically generate null packets in the ATS output when the EyeQ mode is enabled.
 - Define the list of **Excluded Descriptor Tags** to be performed from the output PMT for the ATS output.
Note that the input value should be within the range of 1 to 254, inclusive.
5. When editing/creating a **destination with HLS, DASH, CMAF, and HSS packages**:
 - Ensure that **Pull Packaging** is set to **OFF** and **Push Packaging** set to **ON**
6. Enter a brief description of the profile changes, and then click **Save as Version**.

Note

After a profile has been updated, you cannot revert your changes.

Result: On the **Profile panel**, the **Customer Version Number** increments by 1.

What to do next

You must validate the new profile before you can apply it to a destination.

Creating or Editing an Origin/CDN destination profile

You must modify a Harmonic destination profile to create a profile that supports push and/or pull packaging for Origin/CDN delivery. This workflow uses the Destination Multiscreen profile from the Lab Wizard app.

1. Navigate to the **Lab Wizard** app > **Profiles** tab and click **Destination** to display only destination profiles.
2. Click the Destination Multiscreen profile panel to open the **Profile Editor**.
3. Below **Packages**, add or remove packaging output as desired.

Tip

You may add multiple packages of the same package type to the destination profile.

Info

Each destination profile supports up to 10 package outputs.

- To edit the specifications for each package output, click a package output and then modify the settings in the **Complete Specs** pane as needed.

Info

The maximum length of the **Package Name** is 10 characters. Only one package output per package type is allowed to not have a package name (i.e. **Package Name=none**); in this case the type of package (DASH, HLS, CMAF, RTMP) is used as default name.

Note

For each package output created, if encryption is not needed, ensure that you set **Encryption Method** to **Clear**.

Note the following recommendations:

Packaging type	Specifications
DASH	Set Video Segment Length and Audio Segment Length to 2 seconds.
HLS	Set Segment Length to 6 seconds (as recommended by Apple).
MSS	Set Video Segment Length and Audio Segment Length to 2 seconds.

- To enable **Pull Packaging**, toggle the selector to the **On** position and then set the duration of the from-live buffer:
 - To perform live packaging only (no time-shifting, catchup, or nPVR), then leave the **Recording/Buffer Time** time set to **0**.
 - To use time-shifting, catchup, or nPVR, set the desired **Recording/Buffer Time** on the slider. The **specify duration in minutes** option allows you to set a custom duration.
 - The **Nielsen RTVOD Flag** drop-down menu will be enabled. You can configure the RTVOD flag which will be inserted into existing Nielsen watermarks of the stream as an additional measurement point. The options are None/Auto/C3/C7 and the default value is None.
- To enable **Push Packaging**, toggle the selector to the **On** position.
- To enable **OTT Watermarking**, toggle the selector to the **On** position.
 - For DASH and HLS destination profiles, the **Alt Watermarking Output Prefix** field will appear for configuration if this OTT Watermarking is enabled.
 - To configure an OTT Watermarking packaging service, you can navigate to the **Sources** tab from the Configure Channels app to add the watermark.
- Configure the **Packager Clock**:
 - System Wall-Clock**: If selected, the package output will be based on the system wall-clock times.
 - Source Timecodes**: If selected, the package output will be based on the timecodes from the source (included in the "picture timing SEI" messages of the video elementary stream). This setting applies to all the package outputs of the same destination profile.

Note

For an HLS package output, this setting is used to configure what time reference is used for the timestamps associated to the "X-PROGRAM-DATE-TIME" tag (based on the system wall-clock or source timecodes). This is also with geo-redundancy supported.

For a DASH package output, this setting is used to configure what time reference is used for the Producer Reference Time (PRFT) timestamps, when PRFT insertion is enabled. (Refer to "Insert ProducerReferenceTime to Manifest" in the Destination profile parameters for details.) This is also with geo-redundancy supported.

- **Timecode Max Frame Count:** The Timecode Max Frame Count defines the expected maximum frame ticks per second for incoming timecodes (i.e. "ff" in "hh:mm:ss:ff"). This is the setting of the timecode processing in order to match the utc/vitc conversion algorithm of the incoming content.

- 25/30 (SMPTE ST 12-1)
 - To be selected if the input frame rate is lower or equal to 30 fps.
 - To be selected if the input frame rate is greater than 30 fps but the timecode max frame count is lower than 30 fps, as specified in SMPTE ST 12-1. For example, according to the standard SMPTE ST 12-1, timecodes for a 50 fps stream should be incremented only every two frames, so the timecode max frame count is 25.
- 50/60/100/120
 - To be selected if the input frame rate is greater than 30 fps and the frame count is incremented on each frame.

9. To enable **Mute Output On Signal Loss**, toggle the selector to the **On** position.

10. Enter a brief description of the profile changes, and then click **Save as Version**.

 **Note**

After a profile has been updated, you cannot revert your changes.

Result: On the **Profile panel**, the **Customer Version Number** increments by 1.

Validating a profile

Validation ensures that a profile can be used without disrupting service.

If a profile has not been validated, then **Not validated** is displayed on the **Profile Panel**.

1. From the **Profiles** page, click the panel for the profile to be validated.
2. Click **Validate Profile** and then click **Yes** to confirm

 **Note**

You cannot roll back the validation process and revert to a previous version of a profile.

What to do next

Navigate to the Versions app to commit the new profile version to affected services.

Committing an updated profile version to affected services

An updated profile version becomes available when either of the following occurs:

- The customer validates a new profile version

- The XOS Runtime has been updated to a new system bundle, which supports a new Harmonic profile version

A service will continue to use an older profile version until you manually apply a new profile version to it. There is no need to restart the service after you commit the new profile version.

1. From the Versions app, click the **Profiles** tab.

Result: Updated profiles are displayed on the left.

2. Select the updated profile that you would like to commit.

Result: On the right, those services using the previous version of the profile appear.

3. Optionally, click **Changelog** to review the changes that have been made to the profile.

4. Click **Commit** to apply the profile version to a particular service or click **Commit all selected** to apply the profile version to all affected services.

 **Important**

There will be a brief service interruption while the system performs the update.

5. For services that are on rolling upgrades, verify the new service and then finalize the commit.

Viewing a profile changelog

The profile changelog tracks all profile modifications, including updates and validations, and is useful if problems occur after a profile has been modified.

1. From the Versions app, click the **History** tab.

2. Click **Profiles**, and then select a **Profile update** to view the changes made to that profile.

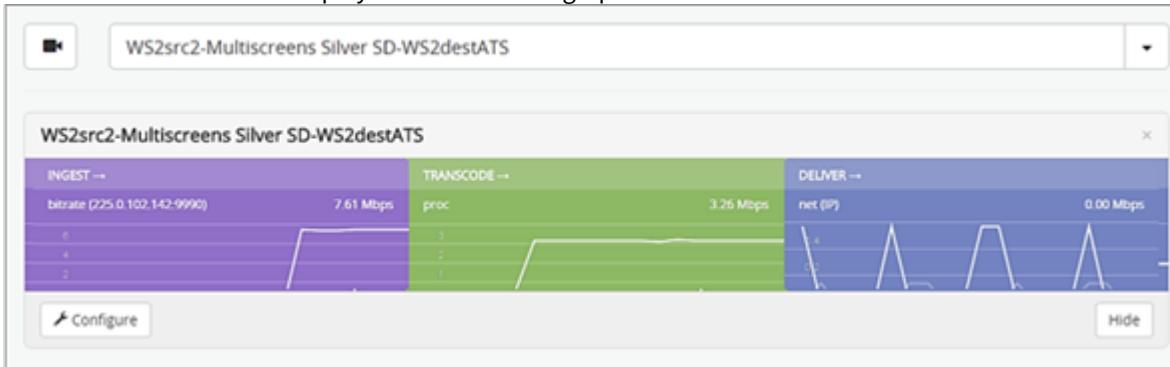
Monitoring and troubleshooting

- Monitoring a service with TS output
- Monitoring an OTT package output
- Managing notifications
- Logs and reporting
- Logs app overview
- Generating a technical report
- Generating logs output via REST API
- Encoder Stress report
- Monitoring Storage for Playout assets
- Scheduling streaming start and end times in the Monitor Channels app

Monitoring a service with TS output

Use the Monitor Channels app to monitor the transport stream after activating the service.

1. From **Monitor Channels > Services**, verify that a small graph appears to the right of the service that you recently activated.
The small graph indicates that the service is active.
2. Click the active service to display the visualization graph.



3. On the **Ingest** panel, verify the service bitrate and IP socket.
4. On the **Transcode** panel, verify the processing bitrate.
5. On the **Deliver** panel, verify the video output bitrate.



Note

If the video output bitrate is 0, then the service is not being delivered.

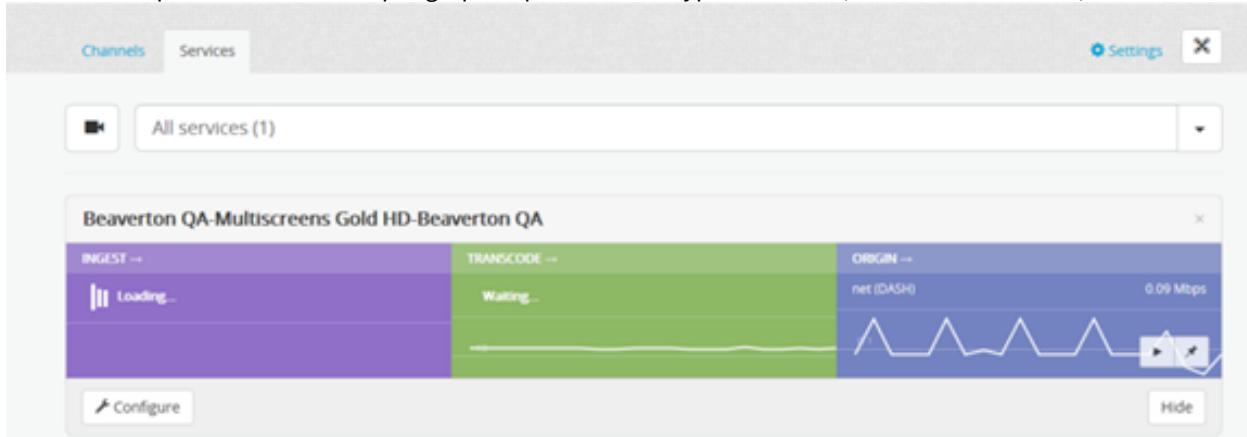
6. To monitor a different video output bitrate for an ATS service, do the following:
 - Click the title bar of the **Deliver** panel to expand the visualization graph

Result: The new bitrate is displayed in the **Deliver** panel.

Monitoring an OTT package output

You can use the embedded player in the Monitor Channels app to verify video output for services with DASH packaging. For services with HLS and MSS packaging, you must verify the video output externally.

- From **Monitor Channels > Services**, verify that a small graph appears to the right of the service that you recently activated.
The small graph indicates that the service is active.
- Click the active service to display the visualization graph.
The bitrate represented in the output graph depends on the type of service (linear or multiscreen).



⚠ Note

Pure packaging services do not display a **Transcode** graph.

⚠ Note

For push-packaging services, a **Package** graph shows the total output bitrate to the publishing point.

- To preview a multiscreen service with DASH output, click the **Watch Output Video** icon on the graph, verify the video output, and then click **Close** to exit the video player.
- To preview a multiscreen service with HLS or MSS output in an external player, do the following:

- Point to the **Copy Output URL** (push pin) icon and select the desired format.
- Open a Web browser, and then enter the URL for your web-based video player.

⚠ Note

Ensure that the player you wish to use supports the transport protocol required by the packaging mode.

- Paste the output URL for the service into the video player and then click **Load or Play**.
- Verify the video output.
- Return to the Monitor Channels app, and then click **Hide** to close the visualization graph.

Managing notifications

View, filter, or forward alerts and schedule dates and times to resolve notifications from the **Notifications app**.

- From **Notifications**, click a category or enter a search term to find the type of notifications you want to view.

Urgent	Notifications that are labeled as Critical or Warning .
--------	---

Scheduled	Notifications you have scheduled or acknowledged but not yet fixed.
Important	Notifications that have a lower severity level than those marked as Critical or Warning .
Resolved	Notifications that you have fixed.
All	A complete list of all notifications.

2. Click a single notification to view it.
3. Choose when to address the notification.
 - Click **Acknowledge (10 Min Snooze)** to schedule the fix for ten minutes from the current time.
 - Click **Schedule fix** to assign a date and time for the fix and to enter any additional information. When you are finished, click **Schedule It**.

At the scheduled time, the system will check to see if the problem has been fixed. If so, the notification will be marked **Resolved**. If not, the notification reappears in Notifications.

Configuring notifications

1. From the Notifications app, go to **Settings > Advanced**.
2. Adjust the notification settings and click **Save**.

Window	The amount of time that notifications remain in the Notifications app.
Acknowledgement Time	The amount of time the system delays a reminder after a notification has been acknowledged.
Urgency	The level of urgency assigned to the corresponding event. The choices are Warning , Critical , and Mute . Events with an urgency level of Mute are recorded in the log but do not appear in Notifications.
External Events	The status of a text-only notifications feed. Choices are On and Off .

Retrieving notifications with the Public API app

Use the Public API app to search the system log for older notification entries.

Notification activities are recorded in the system log and are available for more than the 7-day (168-hour) limit in the Notifications app. The Public API app has additional searching and filtering capabilities and download log entries.

1. From System, go to **Public API > Logs > Get Logs**.
2. Under **Parameters**, enter your search terms in the appropriate fields and then click **Try It Out!**.
The **Public API** app uses Lucene Query Syntax.

ID	Unique notification ID ID:"AVwbFHax1zyG5V0zWLm0"
----	--

Time	Universal Time Coordinate (UTC) time when the entry was logged. Enter in the Start_Time and End_Time fields. 2017-03-26T21:11:06.171Z
Severity	Event urgency: Critical, Warning, Important
Originator	System responsible for generating the log entry. Use in the Search field to limit the returned data to notification entries. Originator:"Notifications"
Message	The notification title. It is not possible to search notification text. Message:"CloudLinks down"

Result: Notification information appears under **Response Body**.

Logs and reporting

Monitor logs from the **Logs app** and **Public API app**.

Downloading logs

Download log files (Zip format) from the **Logs app** to your local hard drive.

 **Note**

The following steps are performed using a Firefox browser.

1. From the Logs page, click the **Download Logs** button.
2. From the **Opening** dialog box, select **Save File**.
3. From the **Enter Name** dialog box, verify the file location. and then click **Save**.

Logs app overview

The Logs app displays output in different formats and additional fields for log entries.

- [Logs app formats](#)
- [Filtering logs](#)
- [Searching the log](#)
- [Changing the log size](#)

Logs app formats

- Prose (plain text)
- JavaScript Object Notation (JSON)
- Extensible Markup Language (XML)

Prose mode:

Prose

```
06/19/2017 10:52:00 AM CRITICAL Notifications Schedule-fix for Service WS1src-Multiscreens Silver SD-ws1Dest2022-6: Stream processing failed, is overdue
```

JSON

```
{
  "id": "AVzBe5J9T6kFbu4vKgYX",
  "time": "2017-06-19T17:52:00.038Z",
  "severity": "CRITICAL",
  "originator": "Notifications",
  "message": "Schedule-fix for Service WS1src-Multiscreens Silver SD-ws1Dest2022-6: Stream processing failed, is overdue"
},
```

XML

```
<log>
  <id>AVzBe5J9T6kFbu4vKgYX</id>
  <time>2017-06-19T17:52:00.038Z</time>
  <severity>CRITICAL</severity>
  <originator>Notifications</originator>
  <message>Schedule-fix for Service WS1src-Multiscreens Silver SD-ws1Dest2022-6: Stream processing failed, is overdue</message>
</log>
```

Standard mode:

```
<log>
  <id>AVzBfnhPT6kFbu4vKgaL</id>
  <time>2017-06-19T17:55:09.865Z</time>
  <severity>IMPORTANT</severity>
  <originator>REST API</originator>
  <message>REST API Response [ POST /vos-api/notification/v1/notifications/20170605-2207146650-00030-64871/schedule_fix 200 ]</message>
</log>
```

Verbose mode:

```
<log>
  <id>AVzBfnhPT6kFbu4vKgaL</id>
  <time>2017-06-19T17:55:09.865Z</time>
  <severity>IMPORTANT</severity>
  <originator>REST API</originator>
  <message>REST API Response [ POST /vos-api/notification/v1/notifications/20170605-2207146650-00030-64871/schedule_fix 200 ]</message>
  <timestamp>1497894909865</timestamp>
  <rest_req_json>{"acknowledgedBy": "greg.stemp@harmonicinc.com", "scheduleFixTime": "2017-06-21T17:55:00.000Z", "scheduleFixInstruction": "Snooze after 10 minutes", "rest_src_ip": "50.206.120.10", "rest_url": "/vos-api/notification/v1/notifications/20170605-2207146650-00030-64871/schedule_fix", "rest_http_verb": "POST", "rest_host": "10.1.1.254:50200", "rest_resp_code": 200, "rest_user": "Anonymous"}</rest_req_json>
  <rest_resp_json>
    <application>VOS</application>
    <rest_url>/vos-api/notification/v1/notifications/20170605-2207146650-00030-64871/schedule_fix</rest_url>
    <rest_http_verb>POST</rest_http_verb>
    <host>10.1.1.254:50200</host>
    <rest_resp_code>200</rest_resp_code>
    <rest_user>Anonymous</rest_user>
  </rest_resp_json>
</log>
```

 Note

The Verbose mode displays additional fields for log entries.

Filtering logs

Log entries can be filtered by the severity of the event.

- Several severity levels can be used for filtering logs:
- **Critical:** System is or will be unstable if the issue is not resolved (e.g. resource unavailable).
- **Warning:** Recoverable errors (e.g. resources have reached a specified threshold).
- **Important:** Informational messages; non-negative events (e.g. user logins and logoffs).
- More than one severity level can be selected at a time

The screenshot shows the XOS Logs application interface. At the top, there are three tabs: Critical (red), Warning (orange), and Important (green). Below the tabs, there are search filters: '+ Users and messages', 'FROM 03/19/2017 02:37 PM', and a date range selector. The main area displays log entries in a table. The first three entries have the 'CRITICAL' level highlighted with a red box. The log entries are:

Date	Level	Category	Message
03/20/2017 02:42:09 PM	WARNING	Authentication	Failed to authenticate user [greg.stemp]: Bad credentials
03/20/2017 01:20:26 AM	CRITICAL	Notifications	CloudLinkGroup big_spence: CloudLinks down for big_spence resolved
03/20/2017 01:12:21 AM	CRITICAL	Notifications	CloudLinkGroup big_spence: CloudLinks down for big_spence

Searching the log

Specify text strings to display specific log entries.

- From the Logs app, in the **Users and messages** field, type the text string that you want to search for and then press **Enter**.

Note

Most special characters result in an Invalid Input error.

Info

Only log entries that include the text string somewhere in the **Originator** or **Message** fields are displayed.

- To restore the default display, click the **Remove** button located next to the text string.

Changing the log size

Change the space available for log size storage.

- From the Logs page, click **Settings**.
- From the Settings page, on the **General** tab, in the **Log Storage Limit (MB)** field, type the maximum log size (in megabytes).

Info

Logs must be between 10 and 9999 MB, inclusive.

- Click **Save**

Generating a technical report

XOS integrates a mechanism to generate a technical report (TechDump file) for internal usage by Harmonic employees.

When reporting a case, attaching a technical report can ease the analysis of the issue.

To generate the TechDump file, follow the procedure as described below:

- Launch the **Platform Configuration** app

2. On the top right click on the "Tech dump" button to open a dialog box



3. Click on the "Generate" button



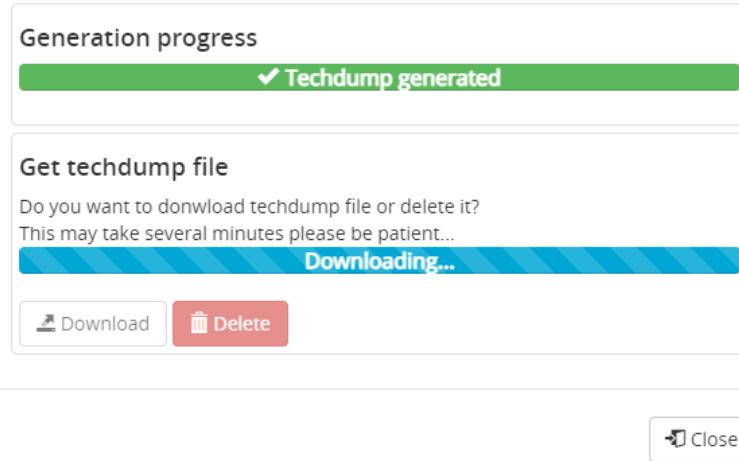
4. The TechDump progression is displayed



5. At any time you can click on the "Abort" button to stop the generation of the TechDump file

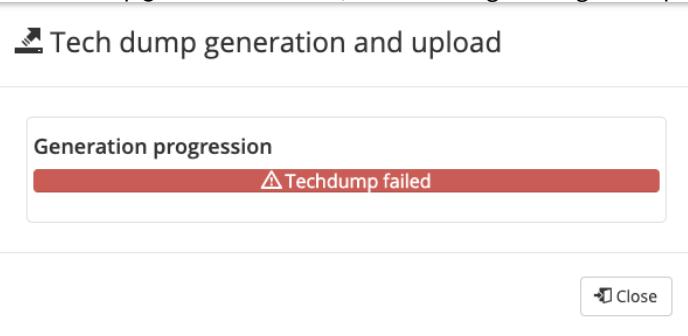
6. If TechDump is ***successfully generated***, the following message is displayed:

Tech dump generation and download



7. Click on the "Download" button opens a browser to select the file destination

8. If TechDump ***generation failed***, the following message is displayed:



9. Close the dialog box and try again

TechDump generation status:

When the TechDump dialog box is closed, the operator can follow the TechDump progression as shown below:



The button is white = the TechDump is empty



The button turns and is blue = the TechDump is in progress



The button is red = the TechDump is failed



The button is green = The TechDump is ready and can be uploaded

Note

A message informs the operator when the TechDump becomes ready or failed

Generating logs output via REST API

Generate detailed logs output with the REST API calls from the Public API app.

1. From the Public API app, click **Logs**.
2. From the Logs section, click **Get logs**.
3. From the Logs pane, from the Parameters section, click **format** and then click **Plain**.
4. Click **verbose** and then click **True**.
5. From the Response Messages section, click **Try it Out**.

Result: Returned log entries are displayed in the **Response Body** section.

XOS REST API documentation

Access the XOS REST API documentation from the Public API app.

You can also click [here](#).

Encoder Stress report

This report is accessible through **Kibana** in the Stand Alone WEB GUI of any XOS unit even if it is under NMX control.

Use **DevOps Portal** app for accessing Kibana.

From the left panel, select Dashboard and then click **Encoder Stress Dashboard**:

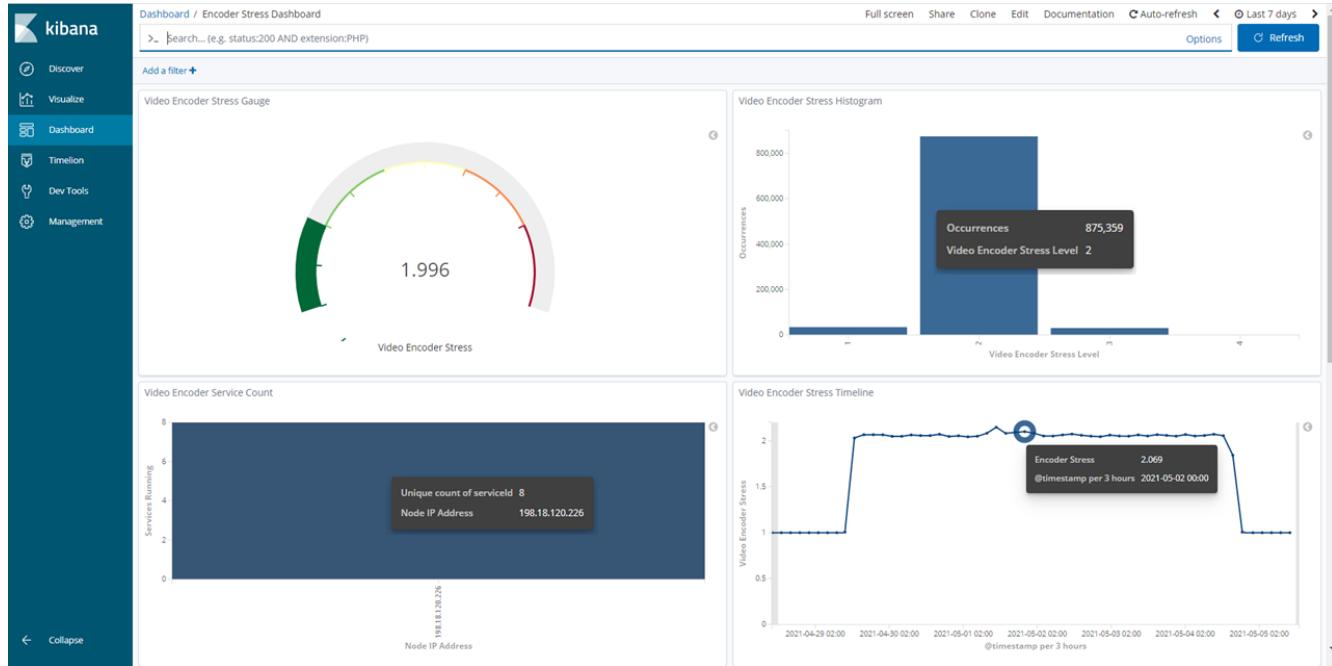
This report is presented as a dashboard showing results for the last 15 minutes, but this setting can be changed to analyze a longer period.

- On the top-right, click **Last 15 minutes** and then select a new time range:

Full screen	Share	Clone	Edit	Documentation		Auto-refresh																											
Time Range <div style="display: flex; justify-content: space-around;"> Quick Relative Absolute Recent </div> <hr/> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Today</td> <td style="width: 33%;">Last 15 minutes</td> <td style="width: 33%;">Last 30 days</td> </tr> <tr> <td>This week</td> <td>Last 30 minutes</td> <td>Last 60 days</td> </tr> <tr> <td>This month</td> <td>Last 1 hour</td> <td>Last 90 days</td> </tr> <tr> <td>This year</td> <td>Last 4 hours</td> <td>Last 6 months</td> </tr> <tr> <td>Today so far</td> <td>Last 12 hours</td> <td>Last 1 year</td> </tr> <tr> <td>Week to date</td> <td>Last 24 hours</td> <td>Last 2 years</td> </tr> <tr> <td>Month to date</td> <td>Last 7 days</td> <td>Last 5 years</td> </tr> <tr> <td>Year to date</td> <td></td> <td></td> </tr> </table>										Today	Last 15 minutes	Last 30 days	This week	Last 30 minutes	Last 60 days	This month	Last 1 hour	Last 90 days	This year	Last 4 hours	Last 6 months	Today so far	Last 12 hours	Last 1 year	Week to date	Last 24 hours	Last 2 years	Month to date	Last 7 days	Last 5 years	Year to date		
Today	Last 15 minutes	Last 30 days																															
This week	Last 30 minutes	Last 60 days																															
This month	Last 1 hour	Last 90 days																															
This year	Last 4 hours	Last 6 months																															
Today so far	Last 12 hours	Last 1 year																															
Week to date	Last 24 hours	Last 2 years																															
Month to date	Last 7 days	Last 5 years																															
Year to date																																	

The dashboard is divided into 4 parts.

- **Video Encoder Stress Gauge:** tachymeter giving the stress level on a scale from 1 to 5.
- **Video Encoder Service Count:** indicates the number of services analyzed.
- **Video Encoder Stress Histogram:** indicates the number of times each encoder stress level has been reported during the period.
- **Video Encoder Stress Timeline:** gives the history of the evolution of the stress level during the analyzed period.



Tip

Move the mouse over a graph to display information

For details, scroll down to display the **Video Encoder Stress Helper** information:

Video Encoder Stress Helper

Video Encoder Stress

The dominant user of CPU cycles on the server is video transcoding services. This metric provides a measure of CPU load on the server. The metric is defined with the following levels.

- 1 (Light load) The requested Video Quality (VQ) is delivered. There is room for additional services.
- 2 (Normal load) The requested VQ is delivered.
- 3 (High density) All services are encoded in Standard VQ.
- 4 (Overload) Too many services are processed on the server. Some services have degraded VQ. (see note below).
- 5 (Critical) Too many services are processed on the server. Many or all services have severely degraded VQ. (see note below).

Note: For XOS, reduce the number of services running on the server. For VOS, increase the CPU requirements appropriately for the transcoder service configurations to reduce the number of services running on a VOS node.

The Video Encoder Stress information is provided on a single server basis in the case of XOS. The data is aggregated over the time period specified in the top right corner of this dashboard.

In a VOS CNS / VOS360 cluster, the information is provided for the entire cluster by default. To view information for a single ingest node:

- a) Select an IP address from the "Video Encoder Service Count" graphic.
- b) Use the "Add a filter" to create a filter with "channelAddress" equal to the selected IP address.

Note

With these tools, customers, support, pre-sales can assess the load with real sources, you can get an insight of the extension capacity and you can check the evolution of this indicator in time.

This does not replace a benchmark. It does not integrate use cases not using encoding (packaging only for instance).

It may help you to confirm your benchmark.

Monitoring Storage for Playout assets

Note

This feature is only available for XOS servers delivered with a dedicated disk for storage of playout assets.

1. Navigate to **Platform Configuration > System Information**.

The screenshot shows the 'INFORMATION' section with a single entry: 'Hardware Platform S/N : CZ2212037G'. Below it is the 'STORAGE' section, which displays a total space of 2.58 TB. It shows 134.06 GB used (5%) and 2.45 TB remaining (95%). The 'VOLUMES INFORMATION' section shows four volumes in a RAID5 array:

Index	Location	Media type	Size	Vendor	Model	Serial	Status	Temperature	Wearout percent
#1	Port 1I Box 1 Bay 3	Solid State SATA	960 GB	-	ATA MK000960GXPTH	ESC2N4694I1102F33	OK	24 °C	1 %
#2	Port 1I Box 1 Bay 4	Solid State SATA	960 GB	-	ATA MK000960GXPTH	ESC2N4694I1102F34	OK	25 °C	1 %
#3	Port 2I Box 1 Bay 5	Solid State SATA	960 GB	-	ATA MK000960GXPTH	ESC2N4694I1102F31	OK	24 °C	1 %
#4	Port 2I Box 1 Bay 6	Solid State SATA	960 GB	-	ATA MK000960GXPTH	ESC2N4694I1102F32	OK	25 °C	1 %

Scheduling streaming start and end times in the Monitor Channels app

You can schedule or manually start & stop streaming by muting the service output.

- Turn on the "Mute Operation" toggle under the "Operator Action" add-on
- Manual Start & Stop Streaming
- Schedule Start & Stop Streaming

⚠ Note

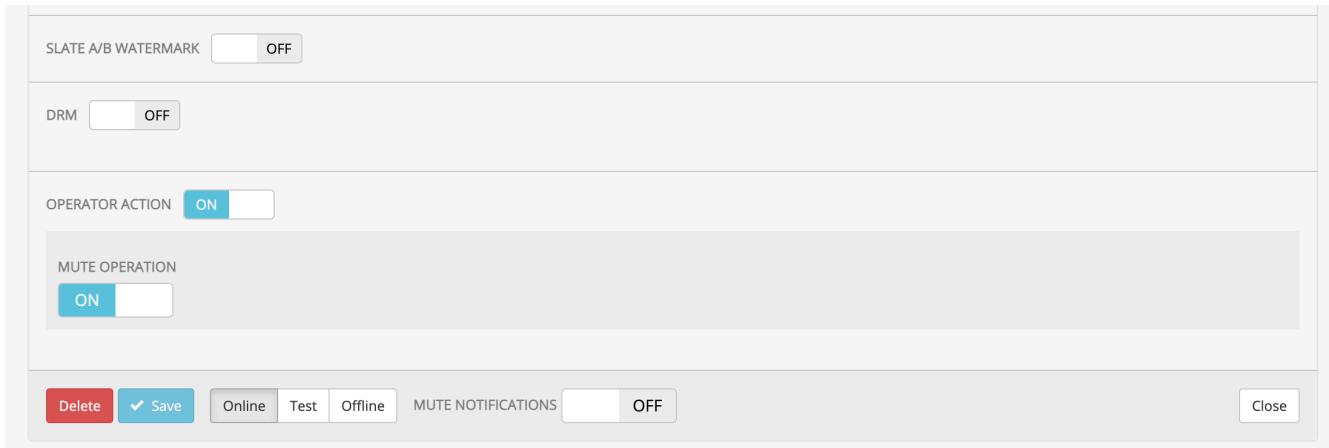
Scheduling streaming start and end times is applicable only under the following criteria:

- OTT transcoding with HLS or ATS output
- IPTV transcoding with IP or SRT Caller Mode output

Turn on the "Mute Operation" toggle under the "Operator Action" add-on

Before scheduling streaming start and end times, proceed with the following:

1. Navigate to the **Configure Channels** app > **Service** tab.
2. Enable the **Add-ons** checkbox.
3. Turn "On" the **Mute Operation** toggle under the **Operator Action** add-on.



Manual Start & Stop Streaming

1. Navigate to the **Monitor Channels** app to check the following settings.

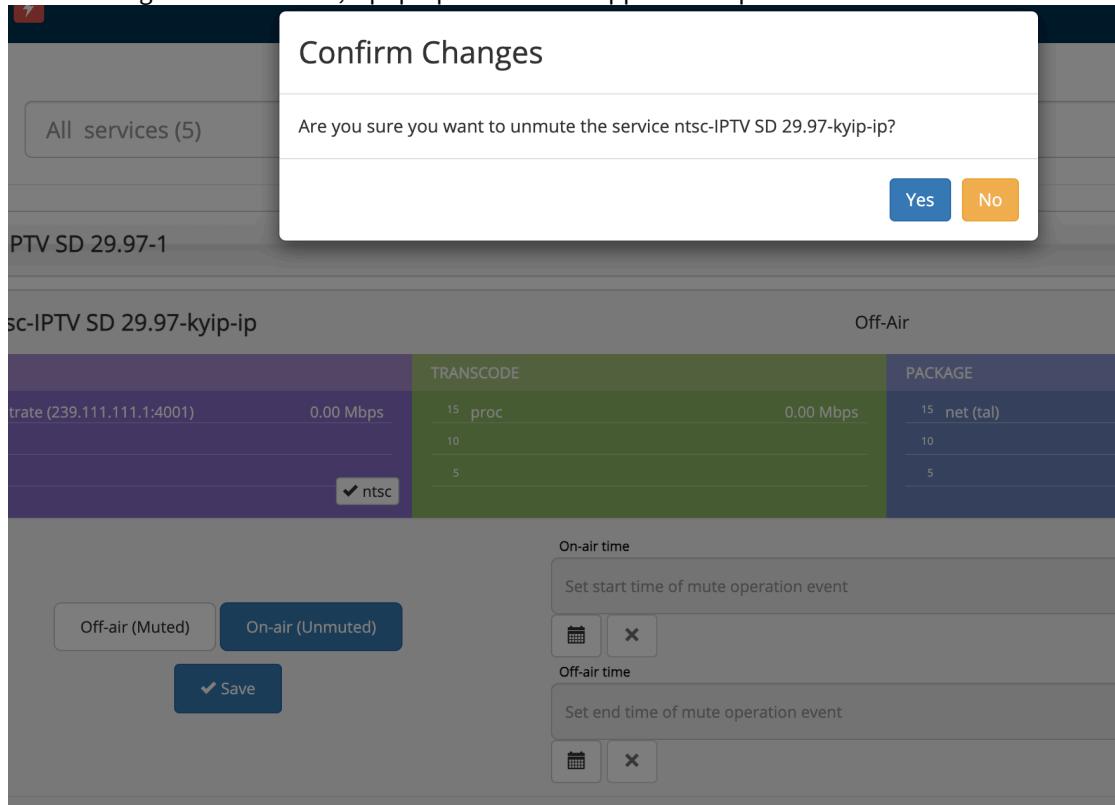
Note

This setting appears only when the **Mute Operation** toggle under the **Operator Action** add-on is turned on from the service add-on.

The screenshot shows the 'Monitor Channels' application interface. At the top, there's a navigation bar with 'XOS', 'Monitor Channels', and a user icon. Below the navigation is a search bar with 'All services (5)' and a dropdown arrow. The main content area displays a list of services. The first service listed is '1-IPTV SD 29.97-1', which is expanded to show its configuration. The configuration table has three columns: 'INGEST', 'TRANSCODE', and 'PACKAGE'. Under 'INGEST', there are fields for 'bitrate' (239.111.111.1:4001) and '0.00 Mbps'. Under 'TRANSCODE', there are fields for 'proc' and '0.00 Mbps'. Under 'PACKAGE', there are fields for 'net (tal)' and '0.00 Mbps'. To the right of the table is a 'Configure' button and a close 'x' button. Below the table is a section titled 'On-air time' with fields for 'Set start time of mute operation event' and 'Off-air time' with 'Set end time of mute operation event'. At the bottom of this section is a 'Hide' button. In the center of the expanded service view, there are two buttons: 'Off-air (Muted)' and 'On-air (Unmuted)', with the 'Off-air (Muted)' button highlighted by a red box. Below this is another service entry for 'ntsc-IPTV SD 29.97-kyip-srt'.

- **Off-air (Muted)** button: the output streaming will be stopped.
- **On-air (Unmuted)** button: the output streaming will be started.

2. After clicking the **Save** button, a pop-up window will appear to request confirmation.



3. After clicking the "Off-air" or "On-air" button and saving the setting, the scheduled time will be unset, meaning the scheduled start/stop streaming tasks will be canceled.

Schedule Start & Stop Streaming

1. Navigate to the **Monitor Channel** app and check the following settings.

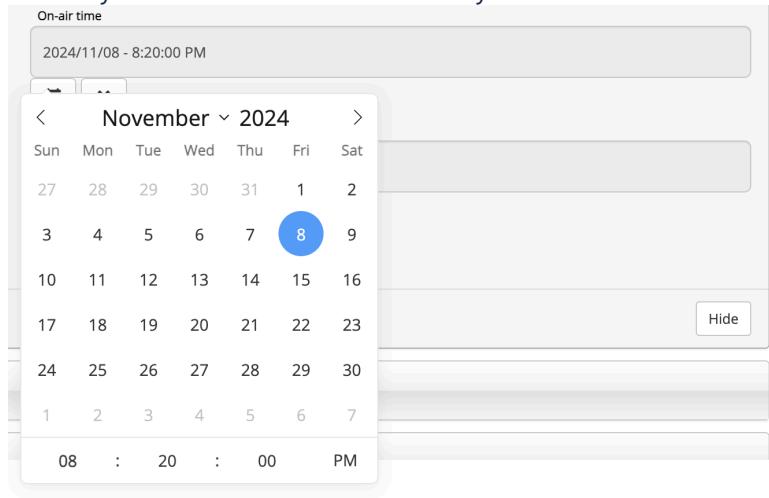
Note

This setting appears only when the **Mute Operation** toggle under the **Operator Action** add-on is turned on from the service add-on.

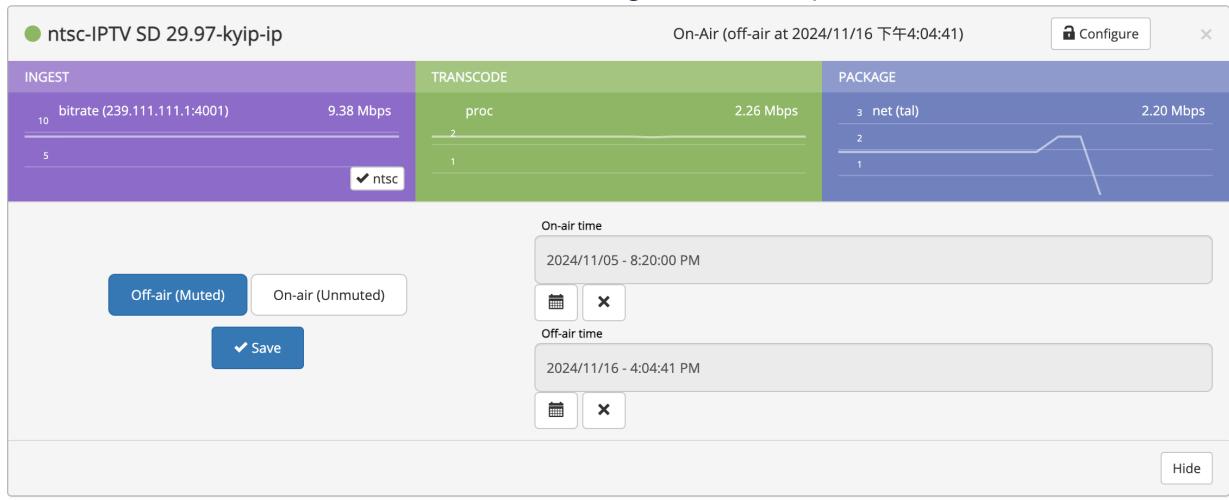
The screenshot shows the XOS interface with a service named "ntsc-IPTV SD 29.97-kyip-ip". The service has an ingest rate of 9.38 Mbps and a transcode rate of 2.28 Mbps. The package section shows a net (tal) rate of 2.50 Mbps. Below the service list, there is a modal dialog for setting mute operation events. The "On-air time" field is set to "2024/11/08 - 8:20:00 PM". The "Off-air time" field is currently empty. The "On-air (Unmuted)" button is highlighted in blue, while the "Off-air (Muted)" button is greyed out.

- **Cross** button: Unsets the "Off-air" or "On-air" time.
- **Calendar** button: Opens a calendar for users to set the "On-air" and "Off-air" times.

2. The start and end time set in the UI will be converted to the system wall clock time of XOS. There is no need to manually set the times to match the XOS system time.



3. After clicking the **Save** button upon setting the "On-air" and "Off-air" times, the bar will display the current status (On-air or Off-air) and indicate when the streaming will start or stop.



Updating the software

Upgrade of XOS software requires an external FTP server.

From the **Platform Configuration** app:

1. Click the  icon and select **Upgrade**.
2. Type the URL on the file containing the new software on the FTP/HTTP server accessible from the C&C network.
The file to download shall have a .bin extension.

 **Note**

If you use an FTP server with a standard account use the following syntax in the URL:
`ftp://<ftp_account_name>:<ftp_account_password>@<ftp_server_address>/<ftp_directory>/<bin_file_name>`

3. When the download is completed (around after 15 mn), click YES to activate the new software.

Upgrade equipment

FTP path

`ftp://anonymous@198.18.120.249/vos_upgrade-1.9.0.0-eng.788.bin`

Download progression

 Download successfull

Activation

The activation of this new software will cause the reboot of the equipment.

Are you sure to want to reboot the equipment?

YES

NO

 Stop

 Close

 **Note**

A reboot of the unit is automatically performed. The reboot can last several minutes.

 **In case an FTP server is not available**

If you do not have an FTP server, Python language provides a simple solution. Follow the steps below to set up a local FTP server using Python:

1. Download Python on your computer from python.org.

2. Open a console/terminal window and navigate to the directory containing the firmware update file (a file with a .bin extension).
3. Enter the following command: `py -m http.server 8888`.
4. The web server is now up and running.
5. If your computer's IP address is 10.1.11.22 and the XOS update file is named `xos-upgrade.bin`, use the following URL to download the update: <http://10.1.11.22.xos-upgrade.bin>.

Sending traps to SNMP manager

XOS can send traps to notify new alarms to an external SNMP manager.

To configure traps, the REST API has to be used.

Select the **Developer API** tile under the **DevOps Portal** tile.

After few seconds the list of function calls available through the API will appear with their documentation.

Search for Notification PUT /notification/v1/recipient:

Notification			Show/Hide	List Operations	Expand Operations
POST	/notification/v1/external_events			Create external events	
GET	/notification/v1/external_events/config			Get status of external events	
PUT	/notification/v1/external_events/config			Enable or disable external events	
GET	/notification/v1/feed			Get notification feed items for user	
GET	/notification/v1/feed/stat			Get notification feed statistic	
GET	/notification/v1/notifications			Query notifications	
POST	/notification/v1/notifications			Fire notification	
POST	/notification/v1/notifications/schedule_fix			Schedule fix for notifications	
GET	/notification/v1/notifications/{id}			Get notification details	
POST	/notification/v1/notifications/{id}/schedule_fix			Schedule fix for notifications	
GET	/notification/v1/recipients			Get notification recipients	
PUT	/notification/v1/recipients			Update notification recipients	

1. Copy and paste the following text in the recipients parameter and replace 10.1.10.75 with the IP address of your SNMP Manager.

```
{
  "emailRecipients": [
    {
      "address": "",
      "enabled": false
    }
  ],
  "snmpRecipients": {
    "snmpAddress": "10.1.10.75"
  }
}
```

```
"recipients": [  
    {  
        "address": "10.1.10.75",  
        "enabled": true,  
        "snmpV2Settings": {  
            "communityName": "public"  
        },  
        "snmpV3Settings": {  
            "authenticationPassphrase": "blablabla",  
            "authenticationProtocol": "string",  
            "privacyPassphrase": "blablabla",  
            "privacyProtocol": "string",  
            "userName": "string"  
        },  
        "version": "SNMP_V2"  
    },  
    ],  
    "sendAllNotifications": true,  
    "syncTrapTimePeriod": 60  
}  
}  
  
"emailRecipients": [  
    {  
        "address": "",  
        "enabled": false  
    }]
```

```

    ],
    "snmpRecipients": {
        "recipients": [
            {
                "address": "10.1.10.75",
                "enabled": true,
                "snmpV2Settings": {
                    "communityName": "public"
                },
                "snmpV3Settings": {
                    "authenticationPassphrase": "blablabla",
                    "authenticationProtocol": "string",
                    "privacyPassphrase": "blablabla",
                    "privacyProtocol": "string",
                    "userName": "string"
                },
                "version": "SNMP_V3"
            }
        ],
        "sendAllNotifications": true,
        "syncTrapTimePeriod": 60
    }
}

```

- **Sync trap time period** – Synchronization trap time period in seconds; the default value is 60. If set to 0, this disables SNMP synchronization trap.
- **Address** – recipient IP address.
- **Enabled** – enable or disable sending SNMP traps to the recipient.
- **SNMP version** – SNMPv2 or SNMPv3
- **SNMPv2 settings**

- **community name** – security name for community-based SNMP.
- **SNMPv3 settings**
 - **username** – the security name of the user (typically the user name).
 - **authenticationProtocol** – the authentication protocol ID to be associated with this user. If set to null, this user only supports unauthenticated messages.
 - **authenticationPassphrase** – the authentication passphrase. If not null, authenticationProtocol must also be not null.
 - **privacyProtocol** – the privacy protocol ID to be associated with this user. If set to null, this user only supports unencrypted messages.
 - **privacyPassphrase** – the privacy passphrase. If not null, privacyProtocol must also be not null.

To subscribe to notification updates, users need to set the "**sendAllNotifications**" flag in recipient settings to **true**, which indicates that all notifications will be sent with the default trap OID if no other one is configured for the notification.

2. Click **Try It Out** to confirm the unit

The response code shall be **200** if everything runs fine.

Request URL

```
https://198.18.120.226/vos-api/notification/v1/recipients
```

Response Body

```
no content
```

Response Code

```
200
```

Response Headers

```
{
  "cache-control": "no-cache, no-store, max-age=0, must-revalidate",
  "connection": "keep-alive",
  "date": "Thu, 18 Apr 2019 09:13:55 GMT",
  "expires": "0",
  "pragma": "no-cache",
  "server": "nginx",
  "strict-transport-security": "max-age=31536000 ; includeSubDomains",
  "transfer-encoding": "chunked",
  "x-content-type-options": "nosniff",
  "x-frame-options": "SAMEORIGIN",
  "x-xss-protection": "1; mode=block",
  "content-type": null
}
```



Info

SNMP traps are then sent to your manager in case of alarm.

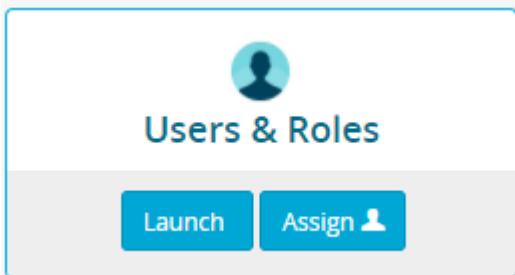
Managing users and roles

XOS super admins can manage the user accounts and roles that are associated with a particular XOS.

- [Users and Roles app overview](#)
- [About user roles](#)
- [Assigning a role to multiple users at once](#)
- [Creating a custom user role](#)
- [Viewing user logins and logouts](#)

Users and Roles app overview

Review the app layout and understand the function of each element in the UI.



Click **Launch** to manage the users and associated roles.

Roles page

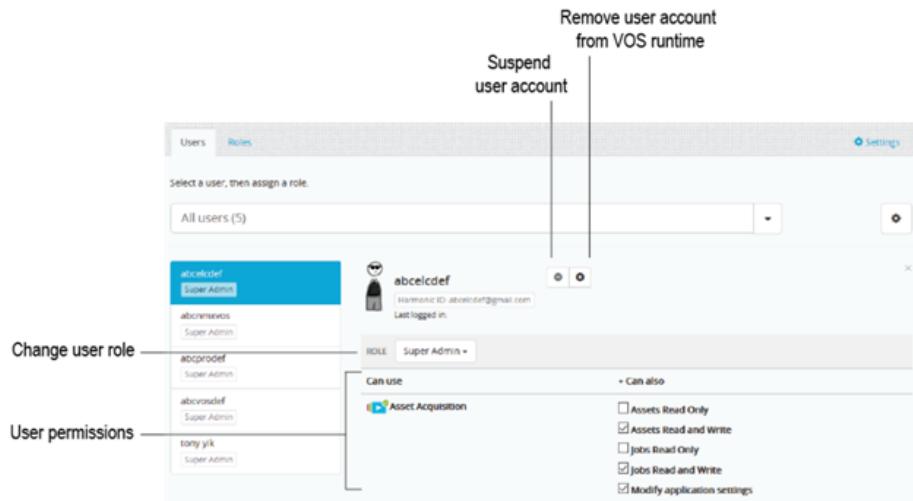
From the **Roles** page, you can view the number of users assigned to predefined and ad-hoc/custom roles and create custom roles.

User Roles main page:

Confirmed users
abc123def Super Admin
abc23456 Super Admin
abc34567 Super Admin
abc56789 Super Admin
abc78901 Super Admin

Assigned user role
abc123def Super Admin
abc23456 Super Admin
abc34567 Super Admin
abc56789 Super Admin
abc78901 Super Admin

User Role details pane:



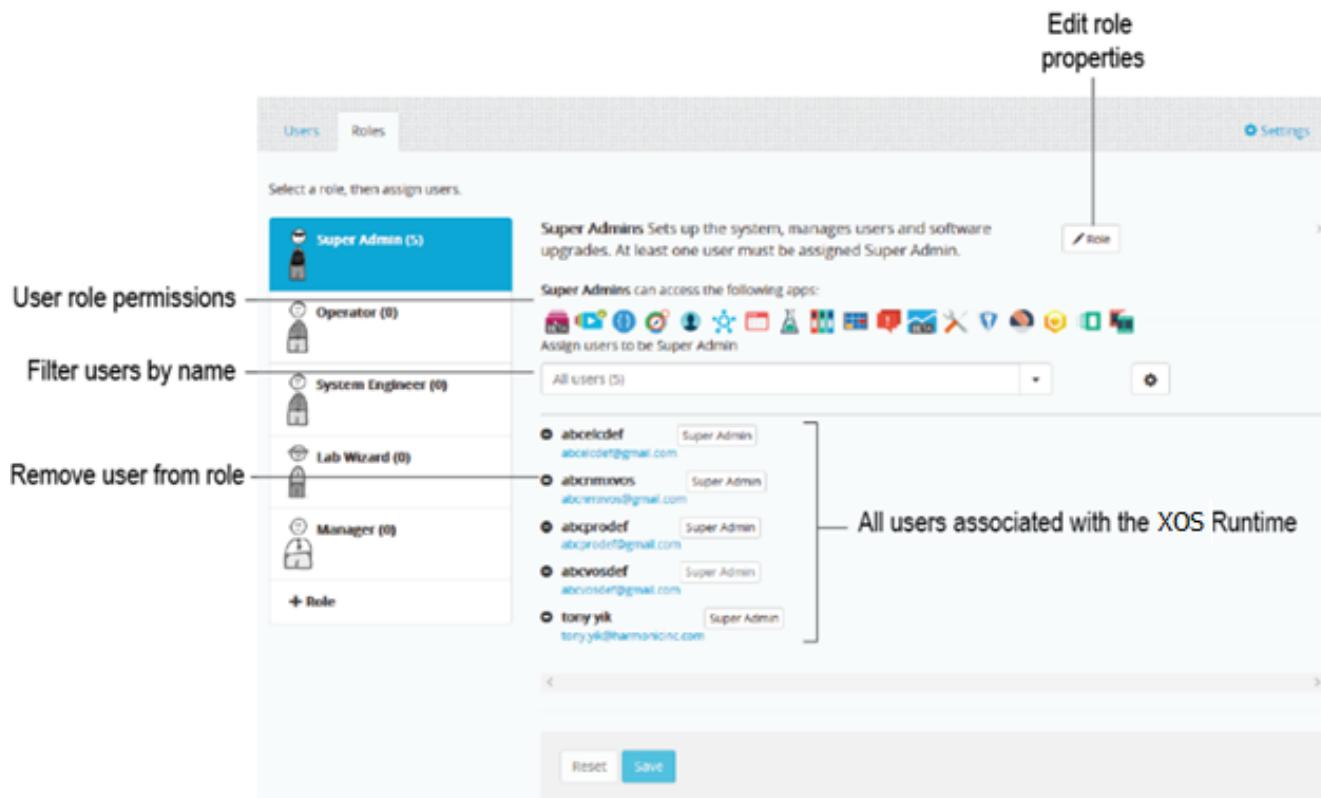
Users page

From the **Users** page, you can view usernames and their assigned roles, search for users by name, filter users by role, and import new users to this XOS.

Users page:



User account details page:



About user roles

A user's role determines the XOS apps they may access. Six pre-defined user roles are included by default.

A user can only be assigned one role at a time. Predefined roles can be modified but cannot be deleted. Super Admins can customize a role for a user by creating an Ad-hoc role.

Roles	Can	Access to apps
Super Admin	Access all apps	All
Operator	Monitor system health and integrity, but cannot modify app settings	DevOps Portal, Monitor, Notifications, Origin, System
System Engineer	Manage and configure services, sources, and destinations	Configure, Logs, Monitor, Notifications, Origin, Scrambling, System
Lab Wizard	Modify, manage, and assign service and destination profiles	Configure, Lab Wizard, Notifications, Origin, System
Manager	Monitor system health and integrity and modify app settings	DevOps Portal, Monitor, Notifications, Origin, System

Roles	Can	Access to apps
XOS Admin	Access all apps	All

Apps access matrix

Different roles access different XOS apps.

Apps	Roles					
	Super Admin	Operator	System Engineer	Lab Wizard	Manager	XOS Admin
Configure Broadcast	✓	✓	✓	✓	✓	✓
Configure Channels	✓	✗	✓	✓	✗	✓
DevOps Portal	✓	✓	✗	✗	✓	✓
	✓	✗	✗	✓	✗	✓
	✓	✗	✓	✗	✗	✓
	✓	✓	✓	✗	✓	✓
	✓	✓	✓	✓	✓	✓
	✓	✗	✗	✗	✗	✓
	✓	✗	✗	✗	✓	✓
	✓	✗	✗	✗	✗	✓
	✓	✗	✓	✗	✗	✓
	✓	✗	✗	✗	✗	✓
	✓	✗	✗	✗	✗	✓

Assigning a role to multiple users at once

Super Admins can assign a role to more than one user at a time from the **Roles** page.

- From the Users & Roles app, click **Roles**.
- From the **Roles** page, click the role that you wish to assign to users.
- From the **User Role** pane, click the name of the first user to be assigned the role.
Result: The user account icon located to the left of the username disappears, as does the label showing the user role currently held by the user.
- Click the username a second time.
Result: The user account icon reappears along with a label showing the newly-assigned user role.
- Repeat this process for all other users being assigned the user role.
- Click **Save**.

Removing a role from a user account

When you remove the role from a user account, the user is automatically assigned an Anonymous role. The user cannot log in again until they are assigned a new role.

- From the **Roles** page, click the role currently assigned to the user.
- From the **User Role** pane, click the name of the user you wish to remove this role from.
Result: The user role label disappears.
- Click **Save**.
- From the **Delete User Role** message box, click **Yes, Delete**.

5. Click **Save** to confirm the Anonymous role for the user.

The user's role is deleted, and the user is assigned the Anonymous role. The user must be assigned a different role before they can log in to XOS.

Creating a custom user role

At a minimum, custom user roles must include access to the System app and the Notifications app.

1. From the **Roles** page, click **+ Role**.
2. In the **Role Title** field, enter a name for the new role.
3. In the **Description** field, enter a brief description of the new role.
4. Select the apps and app options that will be available to role holders.

 **Info**

The **System** app is automatically selected for you and the check box cannot be cleared.

5. Select the **Notifications** app, so that users with the custom roles can log in.
6. Click **Save**.

 **Note**

A custom user role can be deleted only if the role is not assigned to any users.

Modifying a pre-defined user role

Creating a custom user role is preferable to modifying a pre-defined user role, which can create confusion for other Super Admins who assign user roles.

1. From the Users & Roles app, click **Roles**.
2. From the **Roles** page, click the role to be modified, and then click **Edit**.

 **Info**

You cannot edit the **Title** or **Description** of pre-defined user roles.

3. From the **Can Access the Following Apps** pane, select the apps and app options that will be available to role holders.
4. Click **Save**.

Assigning an ad hoc role to a user

An ad hoc role is a unique role assigned to a particular user who requires custom access to XOS apps.

1. From the Users & Roles app, click **Users**.
2. From the **User Accounts** list, click the name of the user receiving the ad hoc role.
3. From the **User Account** pane, select **Role > Ad Hoc Role**.

Select the apps and app options that will be available to the user and then click **Save**

Deleting a custom user role

Super Admins can delete a custom role from the **Users & Roles app**.

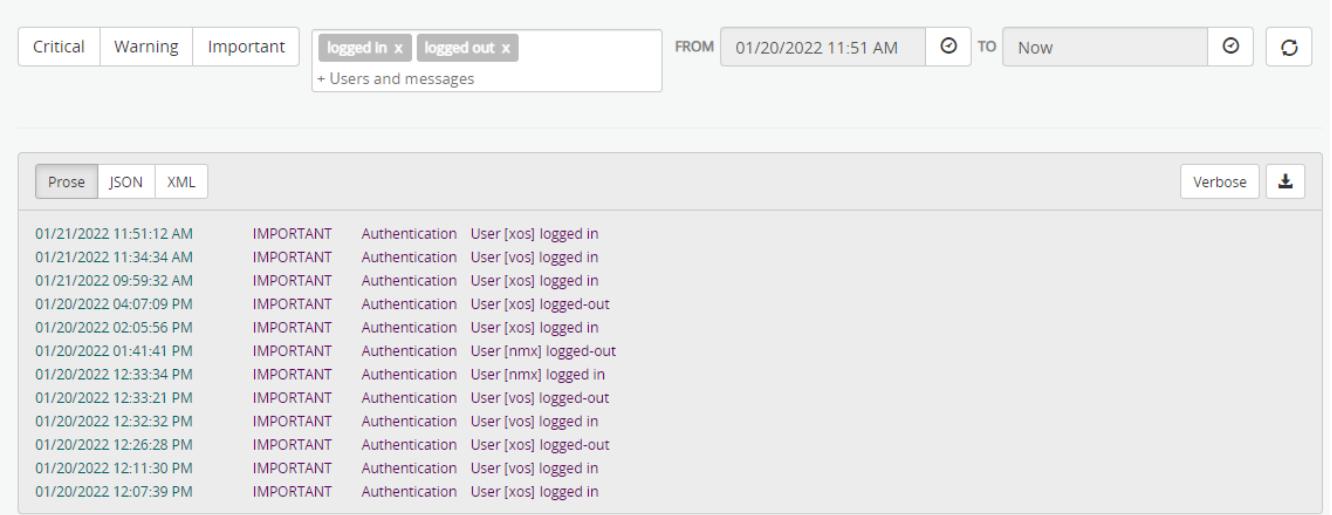
A custom user role can be deleted only if the role is not assigned to any users, so assign users with custom roles another role before deleting the custom role. When you delete a role from the User's Role pane, it can no longer be assigned to users.

1. From the Users & Roles app, click **Roles**.
2. Select the role you want to delete, and then click **Edit**.
3. Click **Delete**, and then click **Delete** again to confirm.

Viewing user logins and logouts

Use the Logs app to view user logins and logouts.

- From **Logs app** > + *Users and messages* field, type logged in or logged out and then press **Enter**.
Result: Only logs entries that include the term logged in or logged out are displayed.



The screenshot shows the XOS Logs app interface. At the top, there are three buttons: Critical, Warning, and Important. Below them are two search fields: 'logged in' and 'logged out', both with an 'x' icon. A note '+ Users and messages' is below these fields. To the right, there are search parameters: 'FROM 01/20/2022 11:51 AM' and 'TO Now', each with a circular refresh icon. At the bottom, there are three tabs: Prose (selected), JSON, and XML. To the right of the tabs are 'Verbose' and a download icon. The main area displays a list of log entries:

Date	Level	Type	Message
01/21/2022 11:51:12 AM	IMPORTANT	Authentication	User [xos] logged in
01/21/2022 11:34:34 AM	IMPORTANT	Authentication	User [vos] logged in
01/21/2022 09:59:32 AM	IMPORTANT	Authentication	User [xos] logged in
01/20/2022 04:07:09 PM	IMPORTANT	Authentication	User [xos] logged-out
01/20/2022 02:05:56 PM	IMPORTANT	Authentication	User [xos] logged in
01/20/2022 01:41:41 PM	IMPORTANT	Authentication	User [nmx] logged-out
01/20/2022 12:33:34 PM	IMPORTANT	Authentication	User [nmx] logged in
01/20/2022 12:33:21 PM	IMPORTANT	Authentication	User [vos] logged-out
01/20/2022 12:32:32 PM	IMPORTANT	Authentication	User [vos] logged in
01/20/2022 12:26:28 PM	IMPORTANT	Authentication	User [xos] logged-out
01/20/2022 12:11:30 PM	IMPORTANT	Authentication	User [vos] logged in
01/20/2022 12:07:39 PM	IMPORTANT	Authentication	User [xos] logged in

Contacting Harmonic technical support

The Harmonic Technical Assistance Center provides **24/7 Phone** support to help you solve your XOS issues.

Harmonic Technical Assistance Center contact information

A list of phone numbers and important links for the Harmonic Technical Assistance Center (TAC).

Region	Telephone Technical Support
Americas	888.673.4896 (888.MPEG.TWO) 408.490.6477
Europe, the Middle East and Africa (EMEA)	+44.1252.555.450
India	+91.120.498.3199
Japan	+81.3.5614.0524
Asia Pacific (APAC) – Other Territories	+852.3184.0045 +65.6542.0050

Report an issue online

<https://www.harmonicinc.com/video-appliances-software/technical-support/report-an-issue/>

Technical Support

<https://www.harmonicinc.com/technical-support/>

Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

2590 Orchard Parkway
San Jose, CA 95131 - U.S.A.

Harmonic corporate telephone numbers

Tel. 1.800.788.1330 (from the U.S. and Canada)
Tel. +1.408.542.2500 (outside the U.S. and Canada)
Fax. +1.408.542.2511