

Makalu 1.8

User Manual

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1. Introduction

1.1 About this document



If you have any suggestions or comments regarding this documentation, please send them via email to do cumentation.stream@qvest.com.

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Notice

This user manual applies to the following Makalu version:

Release 1.8

This document is intended for beginner and intermediate Makalu users. It describes the main Makalu functions, the most frequently used tasks, and workflows.

It includes, for example, information and instructions on how to:

- · access and use the Makalu applications
- · ingest, preview, and manage files
- · create and manage playlists, shows, and clips
- · manage and assign graphics
- · control the rundown

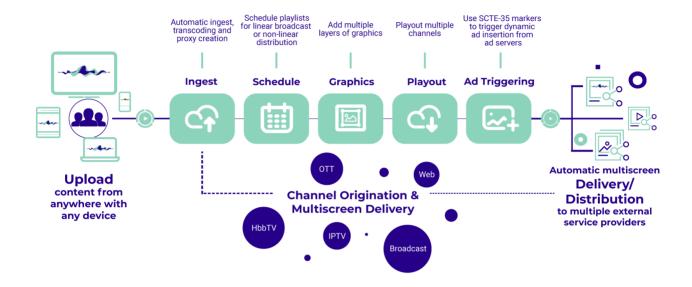
1.2 About Makalu

Makalu is a software-defined playout automation suitable for broadcasters and content providers of all kinds and sizes. It enables a full-featured end-to-end signal workflow – from ingest to distribution – and covers additional media tasks, including storage, media management, transcoding, graphics, planning, playout, and streaming. It is designed for managing and distributing linear content to social media, broadcast, IPTV, and OTT platforms.

The system is based on a manufacturer-independent, microservice-oriented architecture, enabling maximum flexibility and scalability. It runs on most public or hosted private clouds as well as on virtualized environments and on-premises. This allows a wide range of applications, including hybrid broadcast concepts (for example, cloud-based planning and physical playout servers).

1.3 Functional overview

The following graphic shows the basic workflow when using Makalu:



Makalu basic workflow and functional areas

From a high-level perspective, Makalu consists of the following functional areas:

- Ingest
- Schedule (Traffic/Planning)
- Graphics
- Playout (Automation)
- · Ad triggering (optional)

1.3.1 Ingest

The ingest functionality provided by Makalu is focused on the file-based upload of video content. To upload files, the included Asset Uploader application can be used. Uploaded video files are automatically processed, which includes, for example, the creation of a thumbnail image, a low-res (proxy) video file, and media information (technical metadata). As a result, the processed files can be used properly by Makalu. In addition to file-based content, Makalu also supports live sources. For more information, see the section Ingest.

1.3.2 Schedule

Makalu includes a traffic component for both strategic and operational planning, as well as for rough and detailed daily planning. It enables the use of uploaded files as primary events to create shows, adding shows to playlists, as well as adding graphics and other secondary events. A playlist can be added to the rundown in the Makalu Automation to define the content the playout should actually play. For more information, see the section Schedule.

1.3.3 Graphics

Makalu uses the Singular. Live graphics platform for overlay graphics, which provides tools for composing, controlling, and output of professional graphics. Each output generated by Singular. Live can be received by Makalu Automation and used as an additional layer on top of the main video output. For more information, see the section Graphics.

1.3.4 Playout

The Makalu Automation component is used to control one or more players running on playout nodes, which seamlessly play video files or live sources from a playlist. The automation can be controlled either manually by the operator or scheduled/time-triggered via the planning component. The player output can be distributed to web, OTT, and IPTV targets. For more information, see the section Automation.

1.4 Access

1.4.1 Access management and sign-in methods

Makalu provides a protected environment that requires users to log in first.

For managing user identities and controlling access to resources, Makalu supports Identity and Access Management (IAM). It also features Single Sign-On (SSO), which simplifies user login by allowing users to access multiple services with a single set of credentials.

Makalu provides the following sign-in methods:

- signing in via a Makalu user account, by entering a username and password, created specifically for a particular Makalu user
- signing in via Microsoft Entra ID (formerly Azure Active Directory/Azure AD), by using a corresponding account
- signing in via SAML (Security Assertion Markup Language) SSO login

1.4.2 Accessing Makalu applications

To control its functional areas, Makalu provides several applications (apps) with web-based user interfaces (UIs). Depending on the preferred workflow, there are multiple ways to access and use the available apps. The common approach is to use the **Makalu Hub** as the central UI and entry point for accessing and opening all available Makalu apps. It consists of one or more customizable dashboards and provides access to all available apps. The Makalu Hub is part of the **Makalu UI**, which combines multiple Makalu apps into a single UI.

1.4.3 Makalu Hub

Accessing the Makalu Hub

To access the Makalu Hub, proceed as follows:

1. Open the following URL in your browser:

https://hub.<customer-identifier>.makalu.live/dashboard



Replace customer-identifier with your actual customer identifier, for example, exampletv.

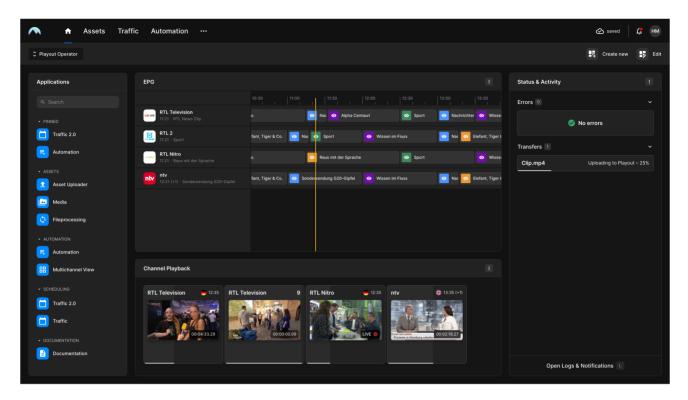
The Makalu sign-in screen is displayed.



Makalu sign-in screen

2. Sign in by using one of the available sign-in methods.

The Makalu Hub dashboard is displayed. If you have already created a dashboard, your default dashboard is displayed. Otherwise, the **Create dashboard** menu is displayed, which allows you to create your first custom dashboard. For more information, see the section Creating and configuring a custom dashboard.



Makalu Hub dashboard



The screenshot above only shows an example dashboard. The actual dashboard presentation may vary depending on the layout and the widgets you use.

5 Tip

To log out, open the user menu by clicking the circle with your initials at the top right, and select **Logout**.

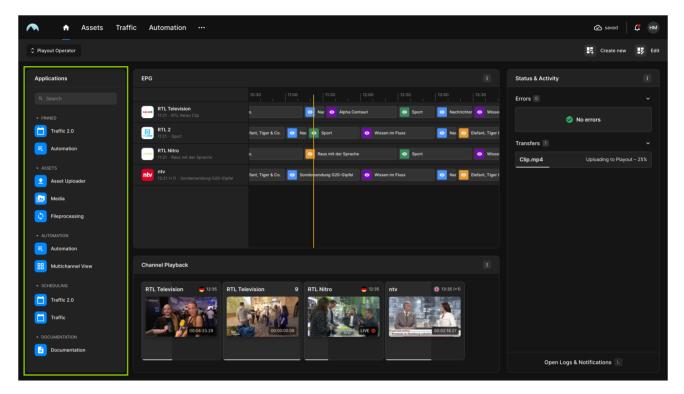
Makalu Hub UI overview

Notice

All Makalu UIs are optimized for use in current versions of Google Chrome and a display resolution of 1920 \times 1080 px. Higher resolutions (for example, as used by ultrawide monitors) are also supported.

The Makalu Hub is divided into the **Applications** area on the left side and the **Dashboard** area on the right side.

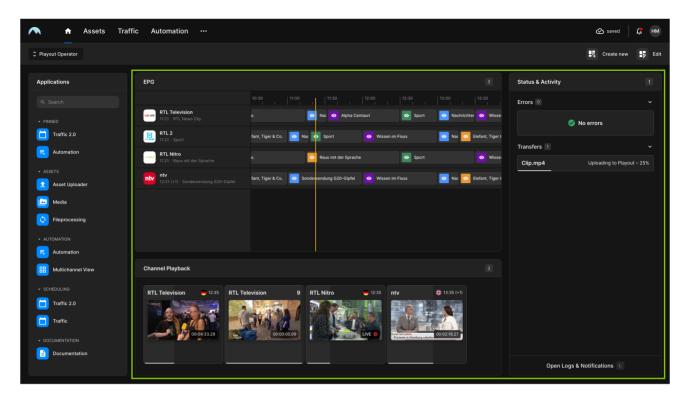
The **Applications** area is always visible, regardless of the content of the currently selected dashboard. It consists of a list of all available apps, categorized by functional areas. You can search for available apps via the search field at the top. You can also create custom app links (for more information, see the section Creating a custom app link) and pin apps to the top of the list.



Hub - Applications area

The **Dashboard** area can be used to display various elements, depending on which information and data you need as a user or which role you have (for example, playout operator, traffic operator, etc.). The focus of this area is to quickly identify if a Makalu component is not working as expected or if an error has occurred, in order to take prompt countermeasures.

Dashboards are customizable. How a dashboard is displayed and what information it shows depends on the selected dashboard layout and the widgets added to the corresponding layout areas. A widget is a reusable UI component that performs a specific function, such as displaying information or controlling UI elements, and can be placed within a dashboard.



Hub - Dashboard area



To switch between available dashboards, use the dropdown menu at the top left above the **Applications** area.

The default dashboard uses the **Preview** widget to display a preview of each available channel output. Which channels are available depends on your access permissions.

Notice

The preview initially displays a thumbnail image of the current output for each channel, which is automatically updated after a configurable interval. This keeps the network load on the client side as low as possible, especially if a large number of channels are displayed simultaneously. If required, the actual preview playback can be started, paused, and resumed manually per channel by clicking the **Play** or **Pause** icon in the preview player area.

6 Tip

You can use the **Preview** widget to quickly access the Detailed channel view by clicking the name of the corresponding channel at the top of the widget.

The default dashboard also contains the **Status & Activity** widget, which provides an overview of the current system status.

Creating a custom app link

To create a custom app link in the **Applications** area, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the upper right corner, click **Create App Link**.
 - A dialog window opens.
- 3. Set the app link properties by entering Name, URL, Category, and selecting a Group.
- 4. Click Create Link.

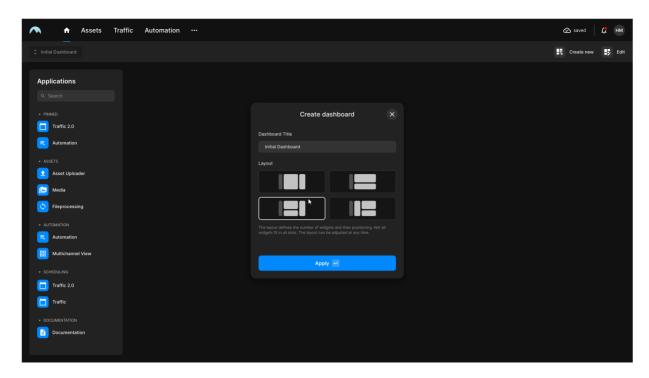
The app link is created and added to the list of available apps in the **Applications** area on the left side.

Creating and configuring a custom dashboard

To create a custom dashboard, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. Depending on whether you have already created a dashboard, proceed as follows:
 - a. If you have already created a dashboard, your default dashboard is displayed. To create a new dashboard, click **Create new** at the top right.
 - b. If you have not yet created a dashboard, the Create dashboard menu is displayed automatically.

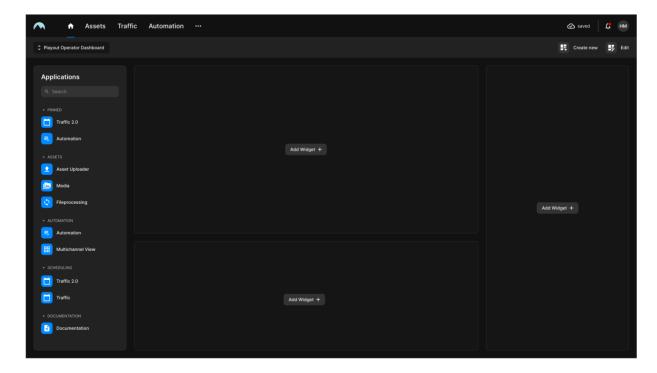
The Create dashboard menu opens.



Hub - Create dashboard menu

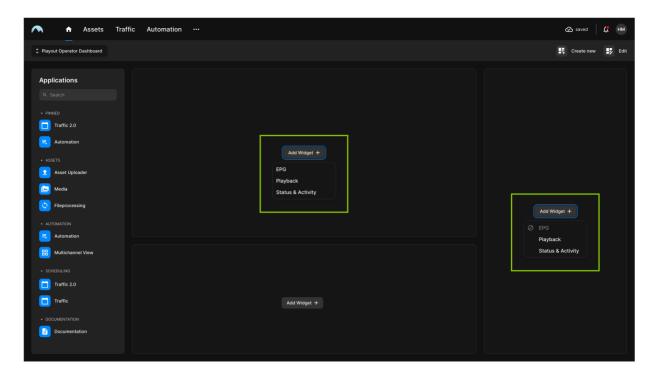
- 3. Set the basic dashboard properties by entering a **Dashboard Title** and selecting a **Layout**.
- 4. Click Apply.

The dashboard is created and displayed with empty widget areas based on your selected layout.



Hub - Newly created dashboard with empty widget areas

5. Add a widget to one of the available empty areas by clicking **Add Widget** and selecting the widget to add.



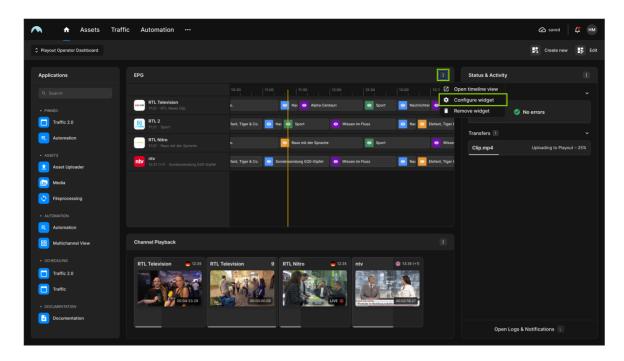
Hub - Add widget to empty area



Not all widgets are available in every layout area. Only widgets that fit the corresponding area are available (for example, the **EPG** widget cannot be displayed in a narrow column).

The selected widget is added to the selected area.

- 6. Edit the widget settings as follows:
 - a. Click the **Options** icon at the top right of the widget and select **Configure widget**.



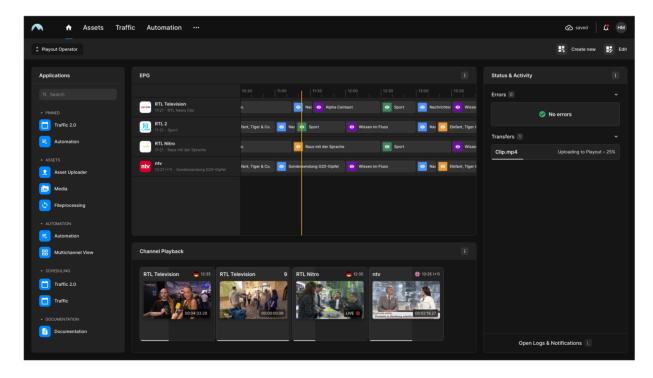
Hub - Configure widget

The **Configure widget** menu opens.

- b. Change the widget properties as required.
- c. Click Apply.

The widget is configured.

7. To add widgets to the other available empty areas, repeat steps five and six.

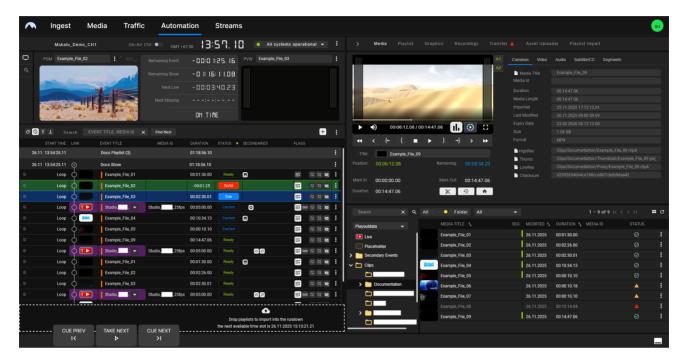


Hub - Dashboard with added and configured widgets

The newly created dashboard is now configured and ready for use.

1.4.4 Makalu UI

When you open a Makalu system app via the Makalu Hub, it is usually opened in the corresponding tab of the Makalu UI, which combines multiple Makalu apps into a single UI.



Makalu Ul

It consists of multiple tabs that provide access to the functional areas of Makalu.

The main navigation consists of the following tabs:

Element/tab	Functional area	Linked app	Described in section
Ingest	Ingest	Asset Uploader	Ingest
Media	Ingest/Asset management	Asset Viewer	Ingest
Traffic	Schedule	Traffic	Traffic

Element/tab	Functional area	Linked app	Described in section
Automation	Playout	Multichannel View/ Detailed Channel View	Automation:
Streams	Ingest/Distribution	Stream Control	Live sources and stream targets



To return to the Makalu Hub dashboard, regardless of which Makalu app is currently opened, click the **Ho** me icon at the top left.

2. How to use Makalu

2.1 Ingest

The purpose of the ingest workflow is to provide new media files to the playout. In the first step, each new file must be uploaded to the central ingest storage. After each successful upload, the corresponding file is automatically processed by Makalu (for more information, see the section File processing). When this internal file processing is completed, the uploaded file is registered in Makalu and can be scheduled for playout. In the final step, each scheduled file (added to the rundown as part of a show in a playlist) is automatically transferred from the central ingest storage to the local playout storage. For more information, see the section File transfer.

2.1.1 Uploading files

The ingest process starts with the file upload. For this purpose, Makalu includes the Asset Uploader app. With Makalu Asset Uploader, you can either upload a new file to the system, creating a completely new media asset, or assign the file to be uploaded to an existing placeholder asset.



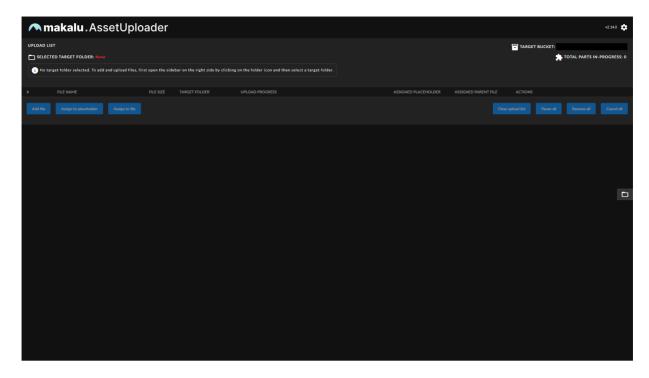
Notice

A placeholder is a virtual element that can be used to schedule a file for playout that is not yet available, for example, because the physical file has not been created yet. By using this concept, playlists can already be prepared via the planning component Makalu Traffic (for more information, see the section Schedule), even if the actual files used in them are created later. As a result, the uploaded file replaces the selected placeholder everywhere it is used in the system.

To upload a file, proceed as follows:

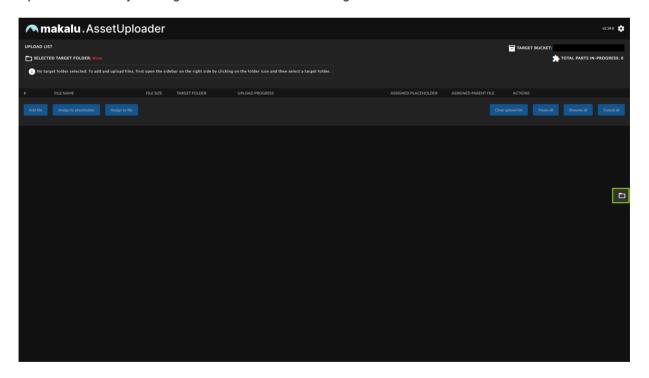
- 1. Open Makalu Asset Uploader by either:
 - a. Opening the Makalu Automation detailed channel view and selecting the Asset Uploader tab, or by
 - b. Opening the Makalu Asset Uploader via the Makalu Hub.

The Asset Uploader UI is opened.



Asset Uploader - UI

2. Open the sidebar by clicking the **Folder** icon on the right side.

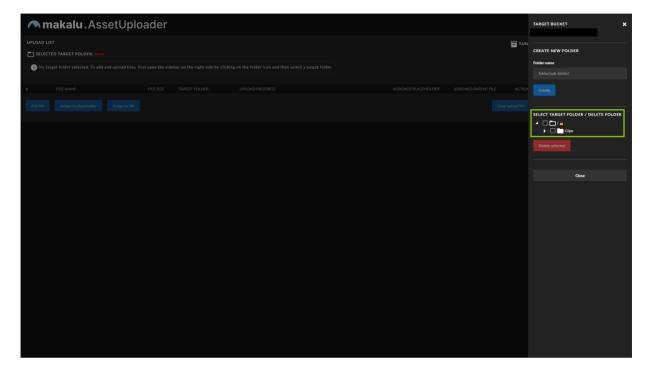


Asset Uploader - Open sidebar

3. Select the folder on the ingest storage to be used as the target for your upload, by clicking the corresponding folder icon or name.



Which folders are available in the list depends on your access permissions. Folders marked with a **L** ock icon acannot be selected as upload targets. By default, this applies to the top-level root folder.



Asset Uploader - Selecting the target folder

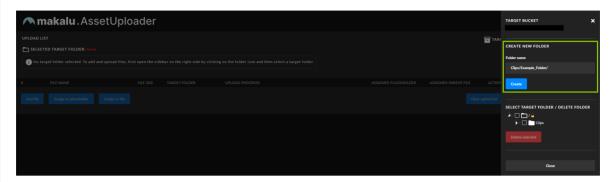
The folder is selected, and the sidebar is closed. The name of the selected folder is displayed above the upload list.



Asset Uploader - Target folder selected



You can also create a new folder on the ingest storage by using the **Create new folder** area in the target folder sidebar.



Asset Uploader - Create new folder

When creating a new folder, the following restrictions apply to the folder path and name:

- By default, you can only create subfolders in folders you are allowed to access:
 - Walid example (accessible subfolder): Clips/Example-Channel/New-example-folder/
 - New-example (inaccessible top-level folder): New-example-folder
- Do not use a leading slash, but append a closing slash:
 - Valid example: folder/subfolder/
 - Nalid example: /folder/subfolder
- Use only permitted characters, letters, and folder names:
 - Permitted characters are letters (a-z , A-Z), numbers (0-9), hyphen (), and underscore ($_{-}$)
 - Not permitted (system-reserved) top-level folder names are Live, live, Placehold er, and placeholder

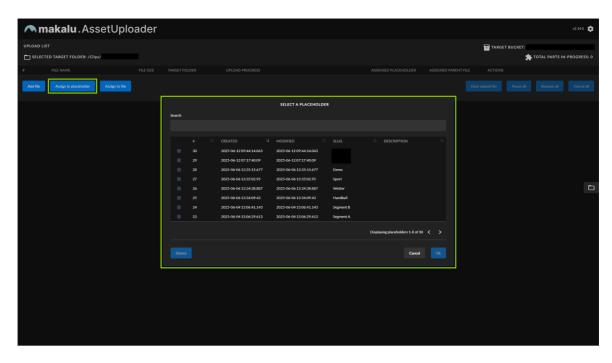
To create a new folder, proceed as follows:

- a. Enter a valid path and name for the new folder in the Folder name field.
- b. Click Create.

The folder list is updated and you can select the newly created folder as the target.

- 4. (Optional) If you want to assign the file to be uploaded to an already existing placeholder asset, select a placeholder as follows:
 - a. Click Assign to placeholder.

A list of available placeholders is displayed.



Asset Uploader - List of available placeholders

- b. Use the **Search** field and/or the paging buttons to search for a specific placeholder.
- c. Select a placeholder.
- d. Click Ok.

The list of placeholders is closed, and the name of the selected placeholder is displayed to the right of the **Assign to file** button.



Asset Uploader - Placeholder selected

5. To select the file to be uploaded, click **Add file**.

The file selection window opens.

6. In the file selection window, select one or more files and click Open.



If you selected a placeholder (to assign the uploaded file to) as described in the optional step three, you can only select a single file. If no placeholder is selected, you can select multiple files.

Notice

Depending on how the Makalu Asset Uploader is configured, only permitted file types can be selected and uploaded. It is possible to allow any file type or to restrict the permitted file types (for example, MP4 files only). In this case, only files of this type are displayed in the selection window.

The selected files are added to the upload list, and the upload starts automatically.



Asset Uploader - Upload started

Asset Uploader provides an optional feature that (if enabled) checks if a file to be uploaded already exists in the selected target folder on the ingest storage. It can be used to avoid uploading the same file and overwriting it unnecessarily, although the file was not changed. In this case, the selected file is not uploaded, and a corresponding notice is displayed. The check can also be extended only to allow overwriting an existing file if its modification date has exceeded a certain age.



Asset Uploader - Upload prevented because the file already exists



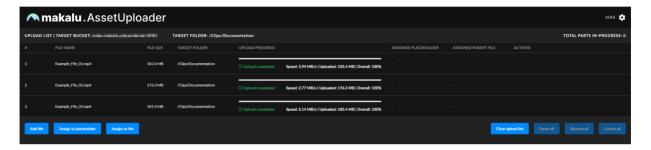
During the upload process, the progress of each upload is displayed, including the current upload speed, the amount of uploaded data, and the overall upload percentage. At the top right, the number of file parts ("chunks") currently being uploaded is displayed. The upload speed is not limited. Asset Uploader will use the full upload bandwidth currently available on the client side.

Notice

While uploads are in progress, you can either pause, resume, or cancel individual or all uploads via the corresponding buttons on the right side in the **Actions** column and below the upload list.

Warning

Do not close your browser while uploads are in progress! Otherwise, your current upload progress will be lost.



Asset Uploader - Upload completed

After the file upload is completed, the file processing starts automatically.

2.1.2 File processing

After each successful upload, the internal file processing is automatically triggered. When the file processing is completed, the uploaded files are registered in Makalu and can be scheduled for playout.

File processing includes the following sub-processes:

Sub-process	Purpose	Input (uploaded) file format	Output file format
Creating a low-res (proxy) video file Notice: This is only necessary if original files are uploaded in a format other than MP4.	Web-based preview of the video file	MXF or any other supported source video format	MP4
Creating a thumbnail image	Display the image in the UI	Created from the uploaded source video file	PNG

Sub-process	Purpose	Input (uploaded) file format	Output file format
Creating a proxy subtitle file	Web-based preview of the video file, including subtitles	SRT, STL, TTML	VTT
Notice: This is only necessary if matching subtitles are uploaded for the original video file.			
Determining technical metadata	Optimized internal file processing and displaying file information in the UI	Created from the uploaded source files	-
Creating a checksum for original and proxy files	Check if files were correctly transferred from ingest storage to playout nodes	-	-

For more information, see the sections Transfer and File processing.

2.1.3 Previewing uploaded files

For previewing uploaded files, Makalu includes the Asset Viewer app. It lists all uploaded and processed video files (assets) according to the directory structure in which they were uploaded to the ingest storage and registered in Makalu. Asset Viewer provides a preview for playable assets (incl. subtitles) in the **Content** tab and an overview of all available technical metadata of the asset in the **Metadata** tab, with the option to download the corresponding original file. Additionally, it also lists placeholder assets with basic metadata and the option to delete them.

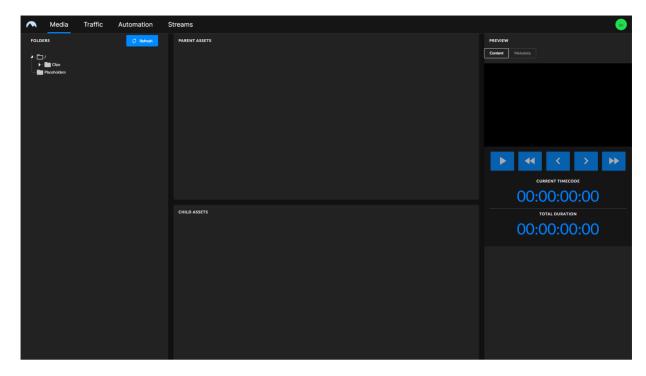


You can also preview files via the Makalu Automation detailed channel view.

To preview uploaded and processed files, proceed as follows:

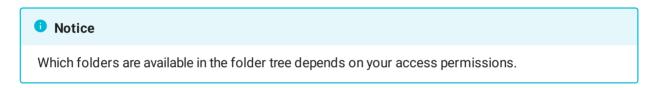
- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the app list in the left column, in the section **Assets**, select **Media**.

The Asset Viewer is opened in the **Media** tab of the Makalu UI.

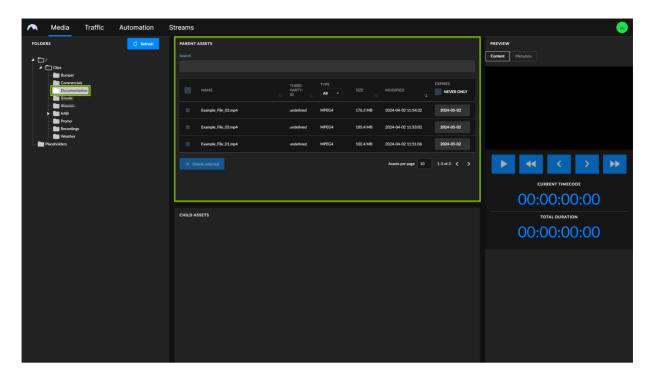


Asset Viewer - UI

3. Use the folder tree on the left side to select the folder that contains the file you want to preview.



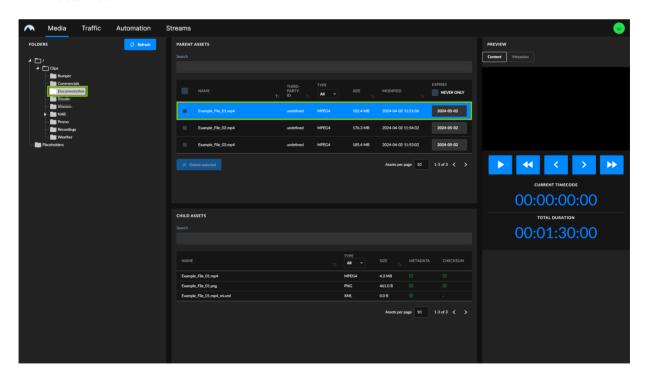
All video files included in the selected folder are listed in the **Parent Assets** area.



Asset Viewer - Folder selected

4. Select the file to be previewed from the Parent Assets list.

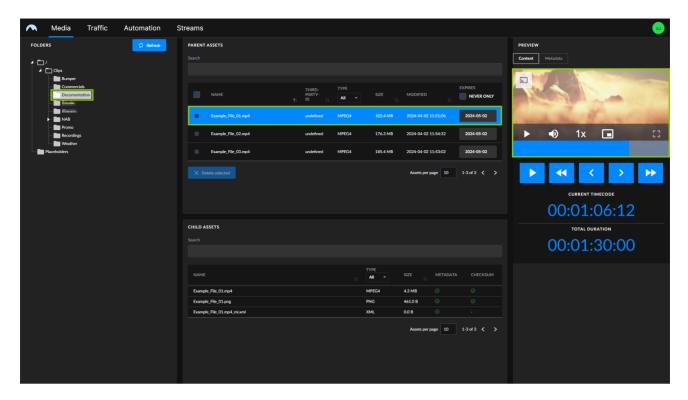
The selected file is opened in the preview player on the right side. Corresponding files are listed below in the **C** hild Assets area.



Asset Viewer - File selected

5. Use the player controls to preview the file.

The preview playback is started.



Asset Viewer - Preview a file



If subtitles were uploaded for the selected file, a **CC** icon is displayed in the player controls. To select the subtitle language to be used in the preview or to enable/disable the subtitle display, click the **CC** icon and select the corresponding option.

2.1.4 Housekeeping

Within the scope of storage/file housekeeping, Makalu provides two workflows for deleting files that are no longer needed: automatic and manual housekeeping.

Both workflows include the following steps:

- 1. Removing the file internally from the Makalu system by removing all corresponding database entries
- 2. Deleting the file from the central ingest storage
- 3. Deleting the file from the local storage on playout nodes

Additionally, folders can be deleted from the central ingest storage independently of files.

Automatic file housekeeping

Automatic file housekeeping deletes files on the central ingest storage automatically based on their expiry date and files on the local playout node storage based on their aging date. These time periods are configured globally, and the actual expiry date is calculated individually for each uploaded file based on these settings. When the expiry date is reached, a configurable grace period starts. After the end of this period, the corresponding file is automatically deleted the next time the housekeeping process is executed.

It is possible to configure protected folders that are excluded from housekeeping. Files uploaded to these folders are never automatically deleted, even if the global expiry date is reached.

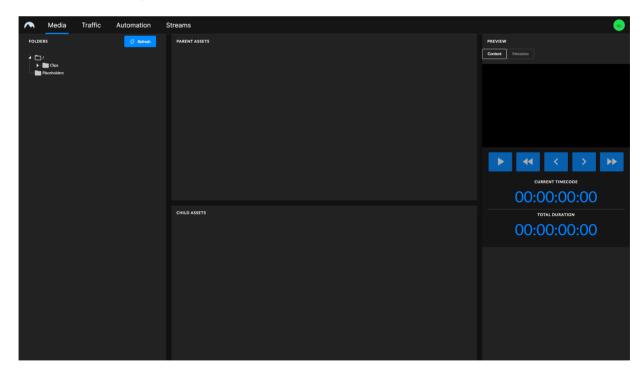
Manual file housekeeping

Manual file housekeeping allows you to delete uploaded files at any time (regardless of the global expiry date) via Makalu Asset Viewer.

To delete a file manually, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the app list in the left column, in the section Assets, select Media.

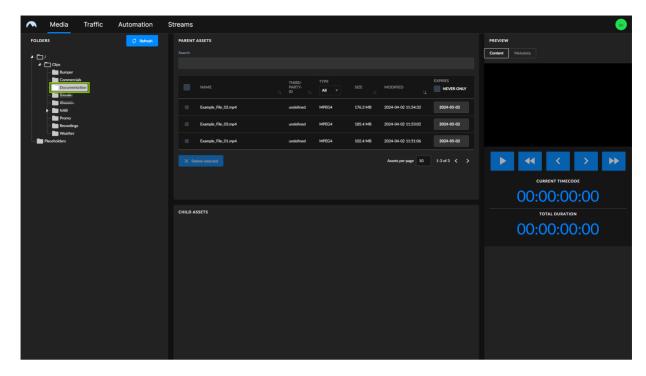
The Asset Viewer is opened in the Media tab of the Makalu UI.



Asset Viewer - UI

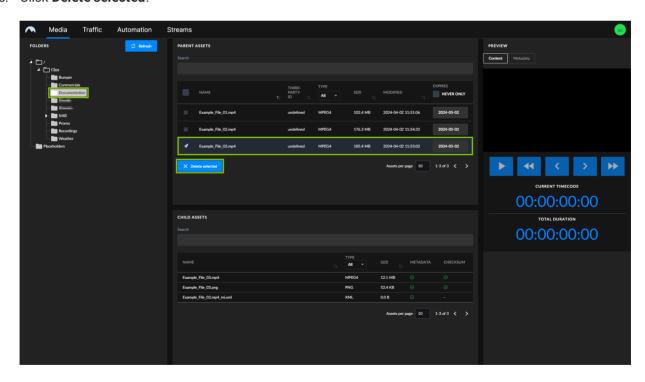
3. Use the folder tree on the left side to select the folder that contains the file you want to delete.

All video files included in the selected folder are listed in the Parent Assets area.



Asset Viewer - Folder selected

- 4. Select one or more files to be deleted from the Parent Assets list.
- 5. Click **Delete selected**.



Asset Viewer - Delete files

6. Confirm the dialog by clicking **Delete**.

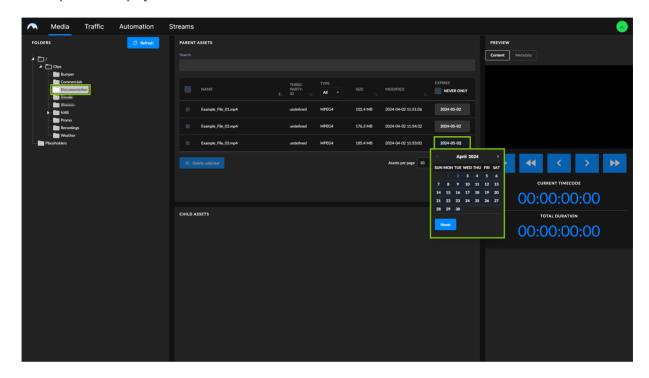
The selected files are deleted.

Instead of deleting a file immediately, you can also set the expiry date manually. As a result, the file is deleted at a later time when the expiry date and grace period have expired.

To set the expiry date manually, proceed as follows:

- 1. Repeat steps 1 to 3 as described under Manual housekeeping.
- 2. In the **Parent Assets** list, click the expiry date of the corresponding file in the **Expires** column.

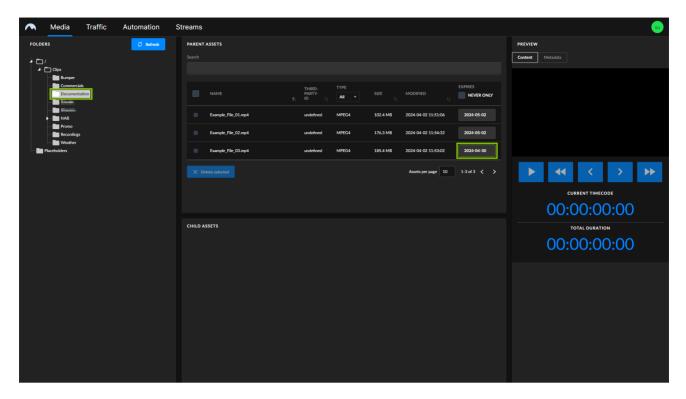
A date picker is displayed.



Asset Viewer - Set the expiry date of a file manually

3. Select the new expiry date.

The expiry date is updated.



Asset Viewer - File expiry date set manually



Alternatively, you can prevent a file from being deleted by automatic housekeeping. To do this, set the expiry date to **Never** by clicking the button of the same name in the date picker.

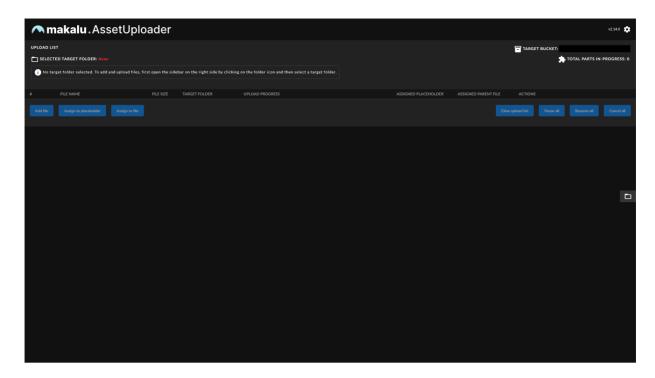
Manual folder housekeeping

Manual folder housekeeping allows you to delete empty folders from the central ingest storage via Makalu Asset Uploader.

To delete a folder manually, proceed as follows:

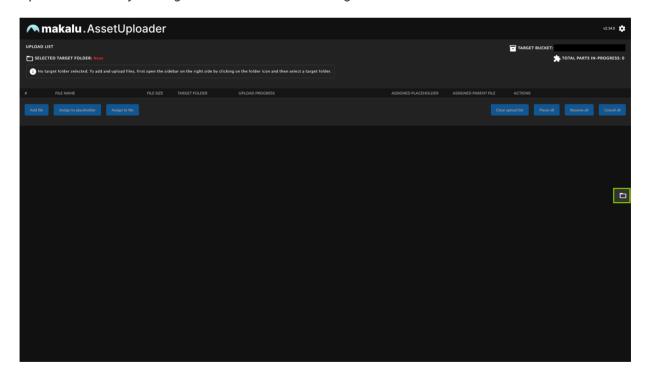
- 1. Open Makalu Asset Uploader by either:
 - a. Opening the Makalu Automation detailed channel view and selecting the Asset Uploader tab, or by
 - b. Opening the Makalu Asset Uploader via the Makalu Hub.

The Asset Uploader UI is opened.



Asset Uploader - Ul

2. Open the sidebar by clicking the **Folder** icon on the right side.

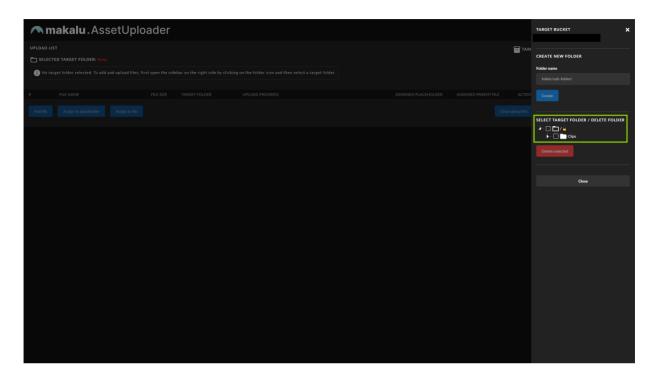


Asset Uploader - Open sidebar

The sidebar is expanded, and all available folders are listed.

Notice

Which folders are available in the list depends on your access permissions.

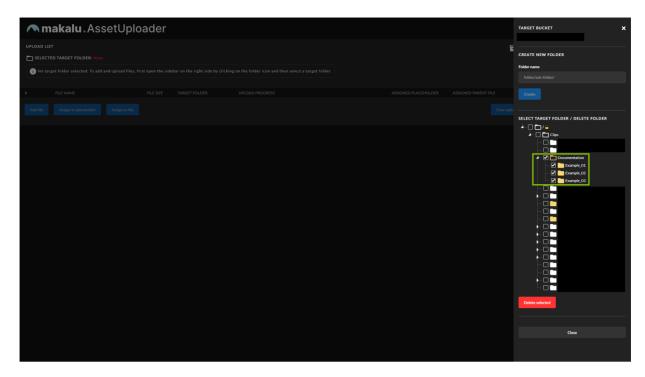


Asset Uploader - Sidebar expanded

3. Expand the folder list and select one or more empty folders to be deleted by activating their checkboxes.

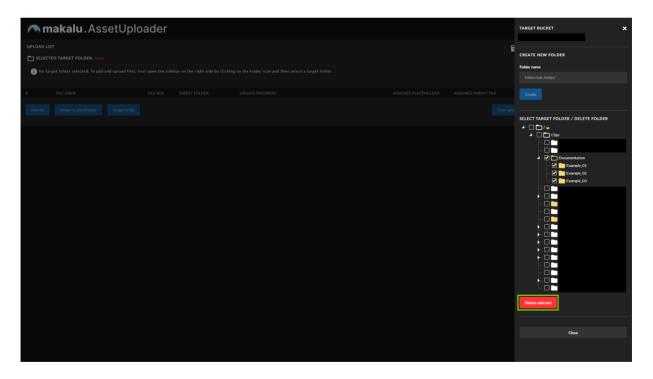


You can only select and delete empty folders. Folders are considered empty if they do not contain any files or only empty subfolders. They can be recognized by a yellow folder icon. Non-empty folders are recognizable by a white folder icon.



Asset Uploader - Select folders to be deleted

4. Click Delete selected.



Asset Uploader - Delete selected empty folders

A confirmation dialog is displayed that lists all selected folders.

5. Confirm the dialog by clicking **Delete**.

The selected folders are deleted.

2.2 Graphics

2.2.1 Basic information

Makalu uses the Singular. Live graphics platform for graphic overlays. Graphics are managed via the Singular. Live dashboard and are automatically synchronized with Makalu.

Graphics can be triggered via Makalu in the following ways:

- 1. Trigger graphics manually via the Graphics tab in Makalu Automation.
- 2. Trigger scheduled/time-controlled graphics automatically based on the current rundown, for example, by using playlists created via Makalu Traffic.

Singular. Live graphics are organized based on projects. Each project can include one or more compositions that can be considered master templates. Each composition consists of sub-compositions (the actual graphics to be displayed) that can be assigned to and controlled via control apps. Control apps allow manual triggering of graphics.



Notice

Each control app can be assigned to one Makalu channel.

Warning

Each control app has a unique output URL that is used in Makalu Automation to display the corresponding graphic overlays. Output URLs are configured during system commissioning and are used by multiple Makalu apps.

Do not change these URLs in the Singular. Live settings! Misconfigurations can cause graphics not to be displayed correctly by Makalu Automation.



Notice

If you have multiple linear playout channels and want to use one preview output per channel, at least two control apps must be created for each channel (one for the channel's main on-air output and one for its preview output).

6 Tip

You can find a Singular. Live beginner's guide in this video and a quick tutorial about how to build your own graphics in this video.

For detailed information about creating and managing Singular.Live graphics refer to the Singular.Live Support.

2.2.2 Graphics synchronization between Singular. Live and Makalu

The synchronization of graphics between Singular. Live and Makalu ensures that all graphic overlays created in Singular. Live are also available in Makalu and can be scheduled in a rundown. This synchronization process takes place automatically at a regular interval, which is configurable and usually set between 10 and 30 minutes.

If you create new or edit existing graphics via the Singular. Live dashboard, they must first be synchronized with Makalu, before you can use them, for example, in a playlist and schedule them in a rundown. It may take a few minutes until these changes are synchronized and become available in Makalu.

Warning

If you delete graphics via the Singular. Live dashboard, which are still used in a Makalu playlist, the graphics cannot be triggered and displayed anymore by Makalu.

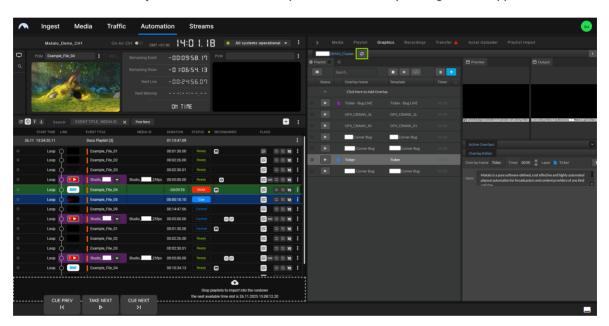
Warning

Every time you edit a Singular. Live composition, you must manually refresh the corresponding Singular. Live control app. Otherwise, your changes are not available in the control app and cannot be synchronized with Makalu. Note that as part of this refresh, all currently displayed graphics are stopped and must be restarted manually afterward again.

You can either trigger the manual refresh via the Singular. Live website or via the Graphics tab in the Makalu Automation detailed channel view.

To refresh a Singular. Live control app, proceed as follows:

1. Click the **Refresh Composition** icon in the top left of the corresponding control app.



Automation - Trigger a Singular.Live control app refresh manually

2. Confirm the dialog by clicking OK.

All currently displayed graphics are stopped, and the control app is refreshed. Afterward, the latest composition data is available in the control app.

2.2.3 Triggering graphics manually

To trigger Singular. Live graphic overlays manually, proceed as follows:

Notice

The following steps 1 to 3 are only necessary if you are logging in to Singular. Live for the first time, or if you later want to edit your graphic overlays.

If you instead want to trigger graphic overlays manually via Makalu Automation, you can skip steps one to three, open the Graphics tab in Makalu Automation, and continue with step four.

1. Open the Singular. Live website and click Login.

The Singular.Live sign-in page is opened.

2. Enter your credentials and sign in.

Notice

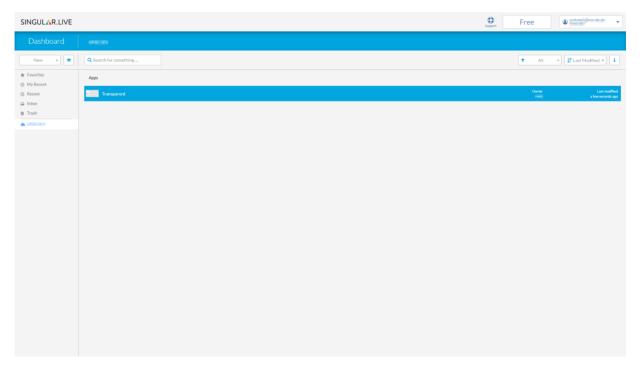
If you successfully sign in for the first time the Singular. Live marketplace is displayed. There, you can select and download default templates to try out and get familiar with Singular. Live.

To download a template, click the corresponding item and then **Download**.

The template is added to your apps.

Afterward, close the marketplace.

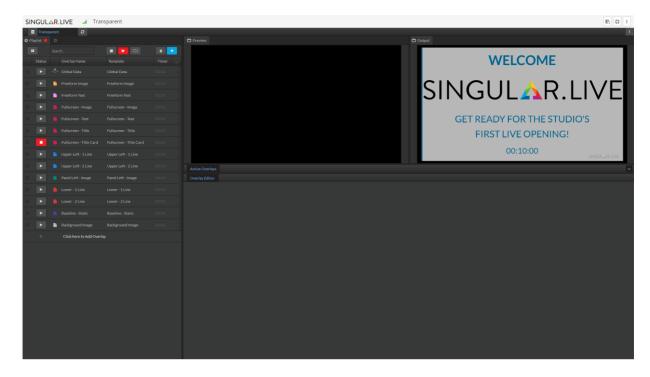
The Singular.Live Dashboard is displayed.



Singular.Live Dashboard

3. To open the control app of your template, **double-click** the corresponding item in the **Apps** list.

The control app is displayed.



Singular.Live control app



This view is also available in the Graphics tab in Makalu Automation. If you want to trigger graphics manually via Makalu Automation, you can use this tab instead of opening the Singular. Live website separately.

4. Select a graphic overlay in the list on the left side.

The selected item is opened in the preview on the right side, and its properties are displayed below.

- 5. (Optional) Use the Overlay Editor on the right side to edit the properties.
- 6. Use the controls on the left side to trigger graphic overlays.
- 7. To start a graphic overlay, click the **Overlay In** (play) icon ...
- 8. To stop a graphic overlay, click the **Overlay Out** (stop) icon ...

The graphic overlays are triggered and displayed in the corresponding Makalu channel output.

2.3 Schedule

2.3.1 Schedule

Overview

Makalu Traffic is the planning/scheduling component included in Makalu. It is used for creating and managing playlists for Makalu playout channels.



Notice

The file-based import of playlists is available via the detailed channel view of the Makalu Automation UI. For more information, see the section Importing a playlist.

The planning concept of Makalu is based on playlists, shows, and clips. Makalu Traffic enables the navigation descending from playlist to clip level and back again.

The following table summarizes the characteristics of these and other elements that are used in the planning concept:

Element	Characteristics	
Asset ("Media item/element")	 each uploaded physical media file for which file processing and ingest have been fully completed virtual placeholders for video files 	
Primary event ("Primaries")	 main component of a show types: a video file (asset) added to a show (turning it into a "clip") 	
	 a live source (asset) added to a show (turning it into a "clip") a placeholder (asset) added to a show (turning it into a "clip") 	

Element	Characteristics
Secondary event ("Secondaries")	additional component of a playlist, show, or clip
	• examples:
	• graphics (for example, corner bug, crawl)
	• subtitles/closed captions
	 recording (for example, for scheduled recording of a live source)
	audio mapping (for customized audio track assignment)
	• splicing (marker for content replacement)
	 routing (generic routing that sends switching pulses to downstream video routers)
Clip	• an asset (video file or virtual placeholder) is considered a clip if it is assigned to a show
	• a clip is considered a primary event
	· can have secondary events (optional)
	• the duration can vary from the actual file duration if a subclip is defined, by setting mark in and mark out markers
	 initially has no specific time reference, but acquires it when it is added to a show and the show is added to a playlist

Element	Characteristics	
Show	container for one or more media elements (primary events and optional secondary events)	
	example: a show created for a television news program, which usually consists of primary events like, for example:	
	openermultiple stories (each consisting of an	
	introduction and a report)	
	• closer	
	• is channel-specific	
	• show content can be categorized	
	 has a duration that corresponds to the combined duration of all included primary events 	
	 flags define the show behavior, for example, play clips randomly, play show without any assigned secondary events (useful if the show includes ads, which should usually be played without any additional graphics), etc. 	
	 flags define the clip behavior and can be set for each clip 	
	• can have secondary events (optional)	
	 to be played, a show must be added to a playlist (cannot be played directly) 	
	 initially has no specific time reference, but acquires it when it is added to a playlist 	

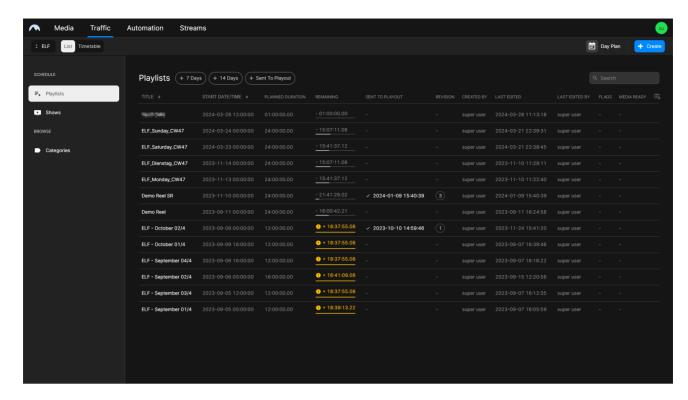
Element	Characteristics	
Playlist	 consists of one or more shows is channel-specific has a time reference, as it has a specific start date and time consists only of shows and optional 	
	secondary events • has a duration that corresponds to the total duration of all included shows	
Rundown	 channel-specific list of media elements ("events") to be played consists at the top level of playlists, which consist of shows, which in turn consist of clips 	

Accessing Makalu Traffic

To access Makalu Traffic, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the Applications area on the left side, in the section Scheduling, select Makalu Traffic 2.0.

The Makalu Traffic UI is opened in the **Traffic** tab of the **Makalu UI**.



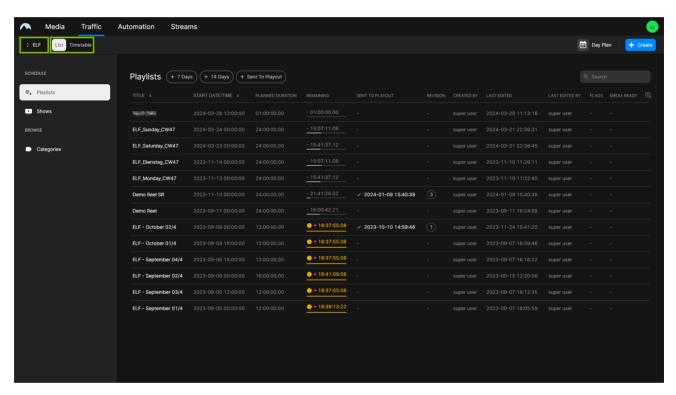
Traffic - UI

2.3.2 Using playlists

Using the Playlists view

The **Playlists** view is displayed by default when you open the Makalu Traffic UI. To display it again at a later time, select **Playlists** in the sidebar on the left.

It provides an overview of all available playlists for the currently selected channel and can be displayed as either List or Timetable view. To switch between views, use the **View selector** at the top left. To switch between channels, use the **Channel selector** to the left, which includes a list of all available channels.



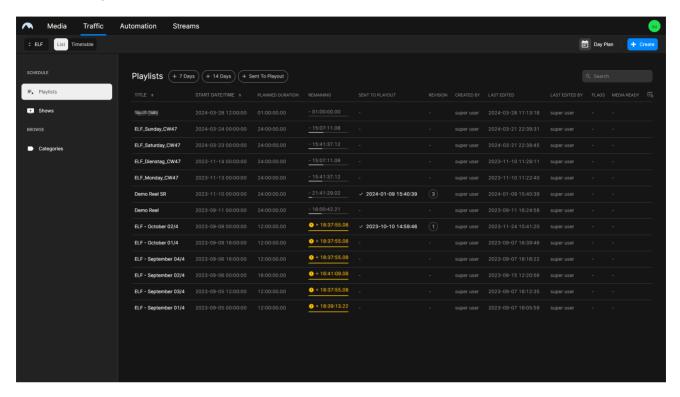
Traffic - Playlists - Channel and view selection



In the context of program planning via Makalu Traffic, no distinction is made between redundant and non-redundant channels. All available channels are listed once and can be selected using the **Channel selector**. The scheduled program applies to the entire selected channel and all its players (main and backup, if applicable).

Using the List view

When you open the **Playlists** area, the **List** view is selected by default. It displays all available playlists in table form, sorted by their start time.



Traffic - Playlists - List view

By default, only a selection of available columns is displayed. To customize the displayed columns, click the **C olumn selection** icon at the top right and select the columns to be displayed. The columns **Title** and **Start date/time** are sortable. You can change the sort order by clicking the name of the corresponding column. Most of the available columns are self-explanatory, but some columns provide additional information.

The column **Remaining** displays the fill level (the total duration of all the shows the playlist contains, in relation to the **Planned Duration** of the playlist). If a playlist is not yet completely filled, it is highlighted in gray. In this case, the time to be filled is displayed as a negative value (for example, -00:10:00:00 if there are 10 minutes still to be filled). If a playlist is "overfilled" (if the total duration of the shows it contains exceeds the planned duration of the playlist), it is highlighted in orange and with a warning icon. The remaining time is then displayed as a positive value (for example, +00:10:00:00 if the total duration of the added shows exceeds the planned playlist duration by 10 minutes).



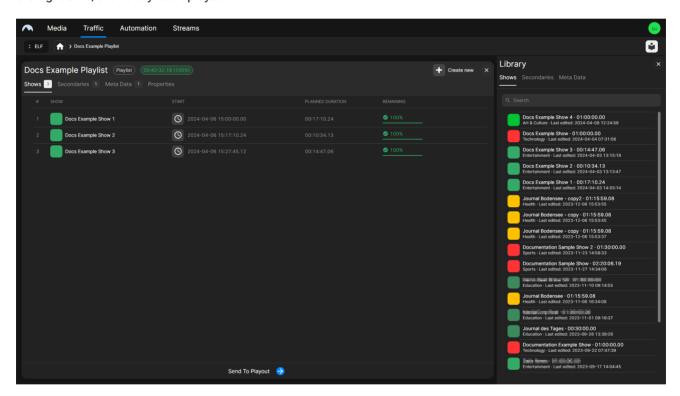
You can also display the fill level as a percentage by hovering your mouse over the value displayed in the column **Remaining**.

The optional column **Revision** displays the revision number of the playlist. It increases every time a playlist is se nt to playout.

The list of playlists can be narrowed by using the filter functions above the table. They enable you to filter the list based on the planned playlist start date (for example, in the next 7 or 14 days) or based on the status if the playlist was already sent to playout. You can also search for a specific playlist title by using the search field at the top right.

You can create a new playlist by clicking **Create** at the top right. Additional functions (**Delete, Duplicate**, and **Se nd to playout**) are available per playlist via the **Options** icon on the right side of each playlist row. A detailed view of each playlist can be opened by clicking **Open**.

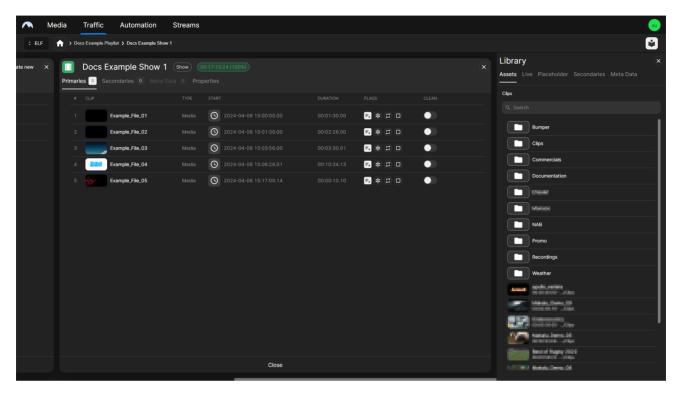
The detailed playlist view displays the fill level of the playlist at the top. The components of the playlist (shows, secondary events, metadata, and properties) are listed below and can be accessed via corresponding tabs. On the right side, the library is displayed.



Traffic - Playlist details

The library can be displayed or hidden by clicking the **Library** icon at the top right. It lists all available shows, secondary events, and metadata that can be added to the playlist and/or the shows of the playlist. You can search for specific elements by using the search menu above the list. Elements listed in the library can be added to the currently opened playlist or the included shows via drag and drop. Alternatively, you can add an element to the current playlist by clicking the **Plus** icon to the right of the element to be added.

You can create a new show by clicking **Create new** above the list of shows. Selecting a show displays the included clips on the right side. Additional functions (**Duplicate** and **Remove**) are available per show via the **Op tions** icon on the right side of each show row. You can open a detailed view of each show by clicking **Open**. It provides an overview of all components of the show and access to the details of each included clip. For more information about how to use the **Shows view**, see the section Using the Shows view.



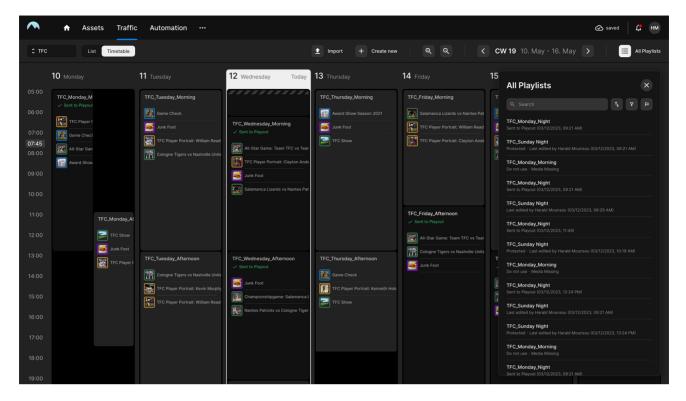
Traffic - Show details

This type of display enables efficient horizontal navigation from a playlist to a show to a single clip. All three hierarchy levels are displayed side by side. Depending on the display resolution used, a scroll bar may be displayed at the bottom of the page. By moving the scroll bar to the left or right, navigation across the three levels is possible at any time.

Additionally, a "breadcrumb" navigation is available at the top left, allowing you to navigate between the three hierarchical levels. You can also use it to return to the main page by clicking the **Home** icon Λ .

Using the Timetable view

To open the **Timetable** view, use the View selector at the top left and select **Timetable**. The **Timetable** view displays playlists in a calendar view, based on their scheduled start date and time. It is particularly beneficial during the start of the planning process and the initial playlist creation, as it makes it easy to see which days have already been completely filled with playlists and where there may still be free times or gaps. Additionally, it allows you to conveniently add playlists to the timetable and add shows to playlists via drag and drop. When opening the **Timetable** view, the current week is initially displayed, and the current day is highlighted.



Traffic - Playlists - Timetable view

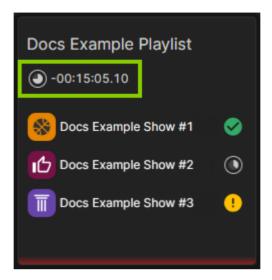
Scheduled playlists are displayed with a list of included shows, information about their total fill level, the individual fill level of each show they contain, and whether the playlist has already been sent to playout.

The following icons are used to make it easier to distinguish the fill level of the individual elements visually:

Icon	Description	
	Playlist/Show is empty	
	Playlist/Show is partially filled	
	Playlist/Show is filled completely	
•	Playlist/Show is overfilled	

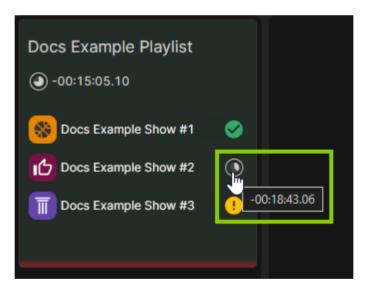


If a playlist is either partially filled or overfilled, the under- or overrun time is displayed next to its fill level icon.



Timetable view - Playlist fill level

You can also display this time for a show, by hovering your mouse over the fill level icon of the show.



Timetable view - Show fill level

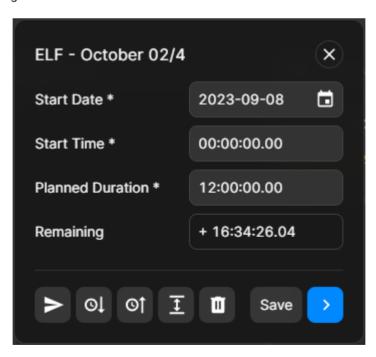
If multiple playlists are scheduled for the same time or if their planned times partially overlap, the day view is split, and the conflicting playlists are displayed side by side.



Traffic - Timetable view - Conflicting scheduled playlists

The controls at the top right of the **Timetable** view enable you to zoom in and out of the time display, as well as to select the calendar week to be displayed. To the right of these controls, your local time zone is displayed. You can also display or hide the menu for listing and searching available playlists and shows by clicking **All Playlists and Shows**.

Selecting a playlist in the **Timetable** view opens an **Actions** menu, that displays basic time properties and provides additional editing functions.



Traffic - Timetable view - Playlist actions

In addition to changing the time properties **Start Date**, **Start Time**, and **Planned Duration** of the selected playlist, the **Actions** menu provides the following functions:

Icon	Function	Description
>	Send to playout	Send playlist to playout (see the section Sending a playlist to playout)
Θţ	Snap forward	Snap playlist to the beginning of the next playlist (close the gap to the following playlist)
© †	Snap backward	Snap playlist to the end of the previous playlist (close the gap to the previous playlist)
<u>I</u>	Expand	Change planned start time and/or extend planned duration of the playlist to fill a gap before and/or after the playlist
	Delete	Delete playlist
Save	Save	Save edited time properties
>	Open	Open detailed playlist view

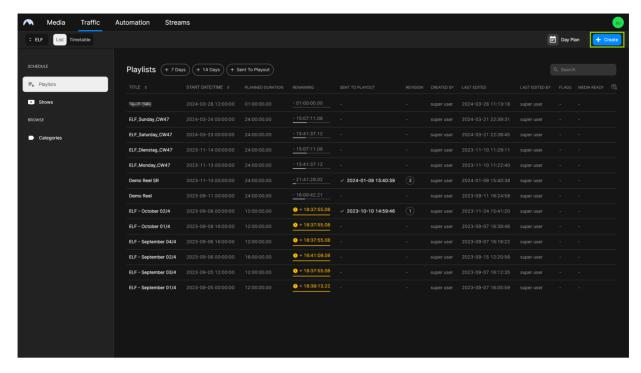
You can create a new playlist, by clicking **Create new** at the top center. Alternatively, you can also create a new playlist by clicking the **Plus** icon, which is displayed when you hover your mouse over a free time slot on a day. Afterward, a menu is displayed that allows you to specify basic playlist properties.

Opening a playlist in the timeline view displays the same detailed view as mentioned in section Using the List view.

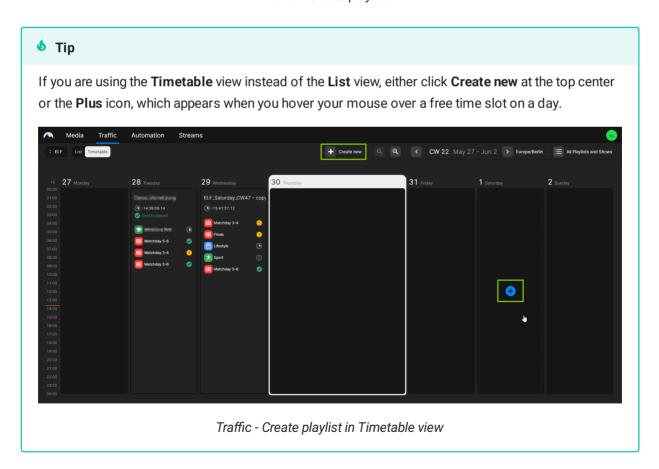
Creating a playlist

To create a new playlist, proceed as follows:

- In the sidebar on the left, select Playlists.
 The List view is opened and all available playlists for the currently selected channel are listed in the middle.
- 2. At the top right, click Create.



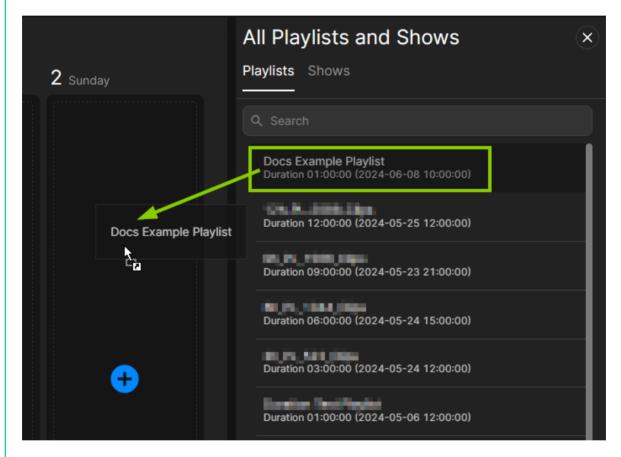
Traffic - Create playlist



5 Tip

If you are using the **Timetable** view instead of the **List** view, you can also add an existing playlist directly to the timetable from the library, by using drag and drop. To do this, proceed as follows:

- a. Open the list of available shows, by clicking All Playlists and Shows at the top right.
- b. At the top of the list select Playlists.
- c. Use the search menu above the list to search for a specific playlist.
- d. Drag a playlist from the list and drop it on a free time slot in the timetable.

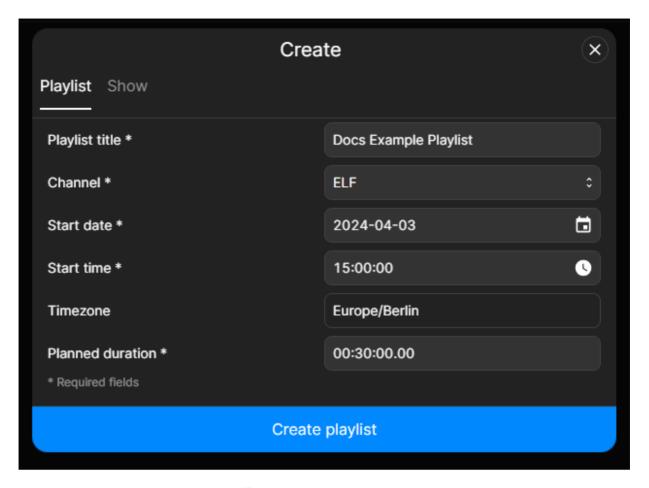


Traffic - Add playlist to timetable

The selected playlist is added to the timetable.

The Create menu is displayed.

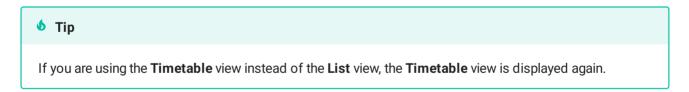
3. In the **Playlist** tab, set the basic playlist properties and fill in all required fields.



Traffic - Set basic playlist properties

4. To create the playlist with the selected properties, click **Create playlist**.

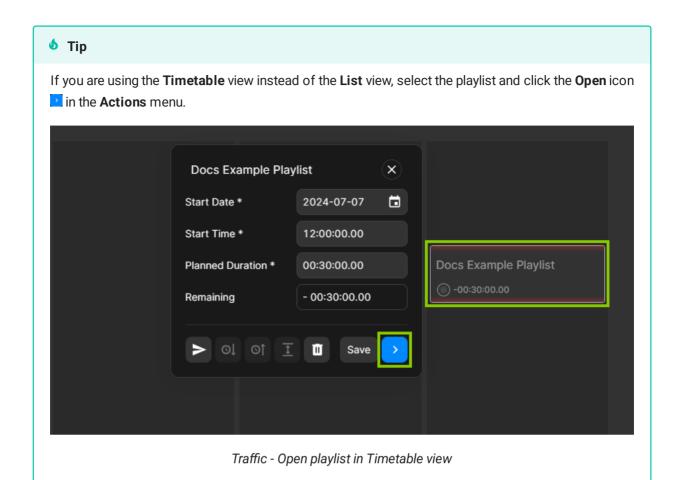
The playlist is created, and the list of available playlists is displayed again.



Since the newly created playlist is initially empty, the next step is to add a show to the playlist.

To add a show to a playlist, proceed as follows:

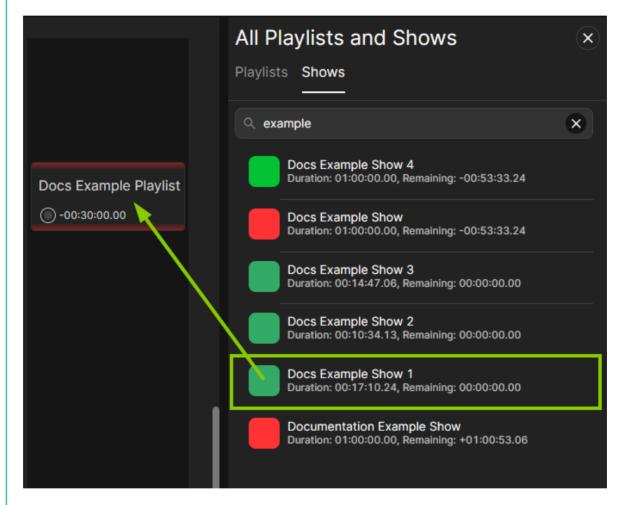
1. Open the playlist by selecting it in the list of available playlists and clicking **Open** at the right end of the corresponding row.



★ Tip

If you are using the **Timetable** view instead of the **List** view, you can also add shows directly to the playlist using drag and drop without opening the playlist first. To do this, proceed as follows:

- a. Open the list of available shows by clicking All Playlists and Shows at the top right.
- b. At the top of the list, select **Shows**.
- c. Use the search menu above the list to search for a specific show.
- d. Drag a show from the list and drop it on the corresponding playlist in the timetable.

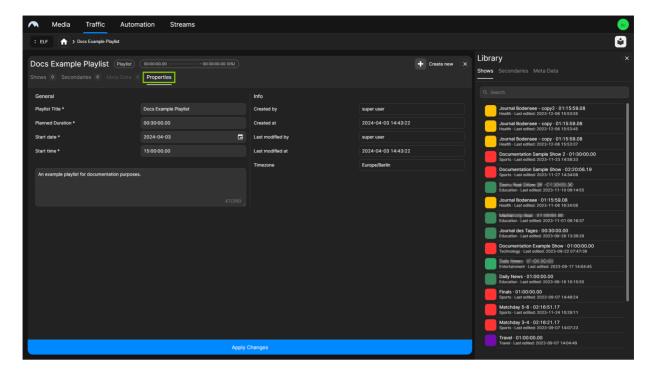


Traffic - Add show to playlist in Timetable view

The selected show is added to the playlist. The displayed fill level of the playlist is updated accordingly.

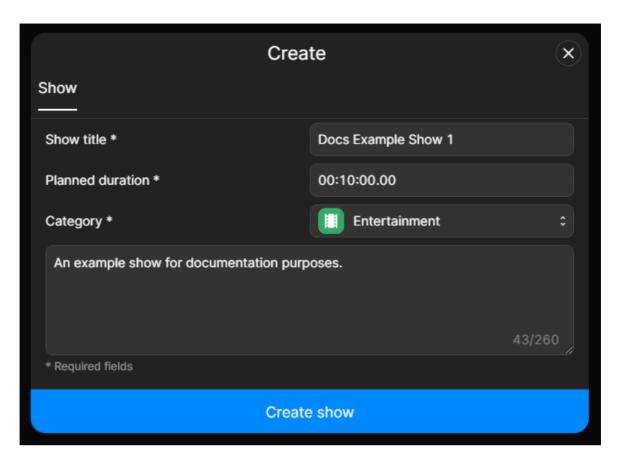
The playlist is opened.

2. (Optional) Edit the basic playlist properties in the **Properties** tab and confirm your changes by clicking **App**ly Changes at the bottom of the screen.



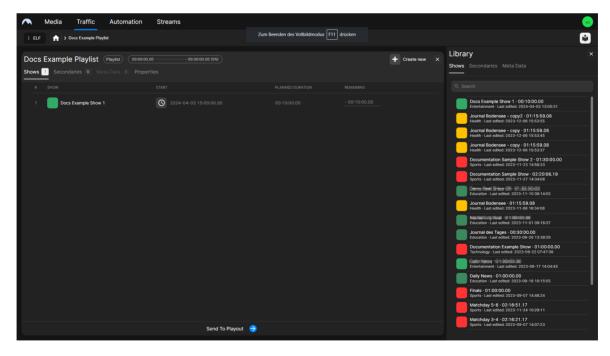
Traffic - Edit basic playlist properties

- 3. Add one or more shows to the playlist, by either creating a new show or adding an existing show from the library.
 - a. (Optional) To create a new show, click **Create new** at the top right. In the **Create** menu enter the basic show details and click **Create show**.



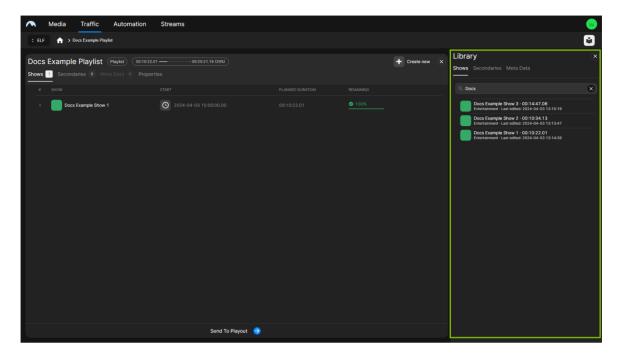
Traffic - Create new show

The show is created and added to the playlist.



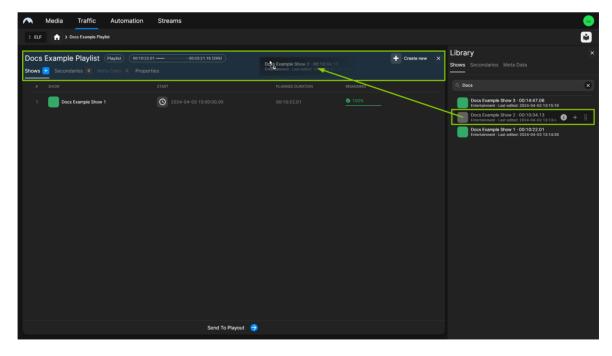
Traffic - New show created

b. To add an existing show, use the **Library**, which is displayed on the right side. The **Shows** tab is selected by default, and all available shows are listed below. To filter the available shows, use the search field above the list.



Traffic - Filtered shows

c. Add a show to the playlist, for example, as last element, by dropping it in the information area at the top of the playlist. You can also insert it at a specific position within the playlist by dragging and dropping it to the desired position in the show order. Alternatively, you can select the show in the library and click the **Plus** icon at the right end of the corresponding row.



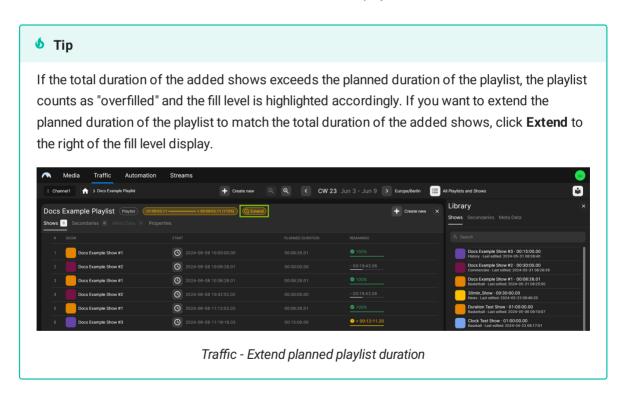
Traffic - Add shows to a playlist

Media Traffic Automation Streams

Docs Example Playlist (Playlist (Playlist)

The show is added to the playlist. The fill level display at the top is updated accordingly.

Traffic - Shows added to a playlist



d. (Optional) Repeat steps a to c to add more shows to the playlist.

The shows are added to the playlist. The start time of each added show is calculated accordingly, depending on the planned start time of the playlist and the duration of previously added shows.

★ Tip

You can manually adjust the start time of each added show. To set a fixed start time, proceed as follows:

- 1 Click the **Clock** icon in the **Start** column of the corresponding row.
- 2 In the Set fixed time dialog, set Start Date and Start Time.
- 3 Click Confirm.

To deactivate the fixed start time afterward, click the **Clock** icon **3** again.

★ Tip

To delete a show from the playlist, proceed as follows:

- 1 Select the show to be deleted and click the **Options** icon **1**.
- 2 Select Remove.
- 3 In the confirmation dialog, click Remove.

★ Tip

To change the show order of the playlist, proceed as follows:

- 1 Select the show to be moved.
- 2 Move it up or down within the show order via drag and drop.

To replace a show in the playlist with another show, proceed as follows:

- 1 On the right side in the **Library**, select the **Shows** tab.
- 2 Search the show to be used as a replacement.
- 3 Drag the show from the library and drop it on the show in the playlist to be replaced.
- 4 Confirm the replacement, by clicking **Replace**.
- 5 (Optional) If the show to be replaced is used multiple times in the playlist, you can decide if you want to replace only this specific show or all its occurrences in the playlist. To replace only the show on which you dropped the new show, click **Replace One**. To replace all occurrences of the show in the playlist, click **Replace All**.

5 Tip

To open and edit a show directly from the playlist, select a show in the playlist and click **Open** at the right end of the corresponding row.

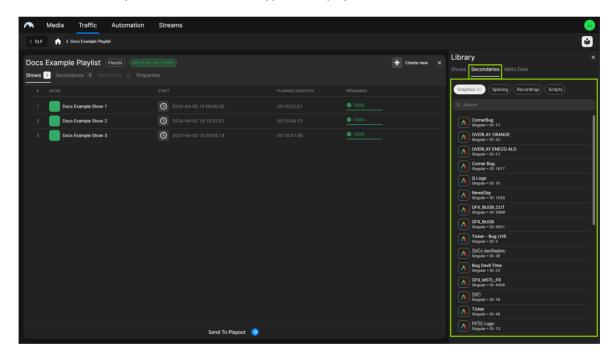
4. (Optional) Add secondary events to the playlist.

Notice

Graphics secondary events can be added to playlists, shows, and clips. If you add graphics to a playlist, they are displayed in addition to added show and clip graphics.

a. On the right side in the **Library**, select the **Secondaries** tab and below the type of secondary event you want to add (for example, **Graphics**, **Splicing**, **Recordings**, or **Scripts**).

Available secondary events of the selected type are displayed below.



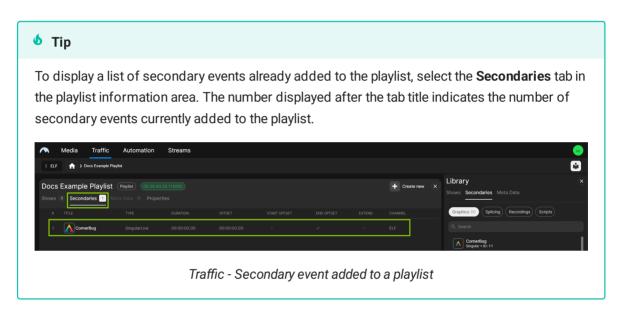
Traffic - Secondary events

- b. (Optional) To search for secondary events, use the search field above the list of available secondary events.
- c. To add a secondary event to the playlist, drag it from the library to the playlist information area.
 Alternatively, you can select the secondary event in the library and click the **Plus** icon at the right end of the corresponding row.

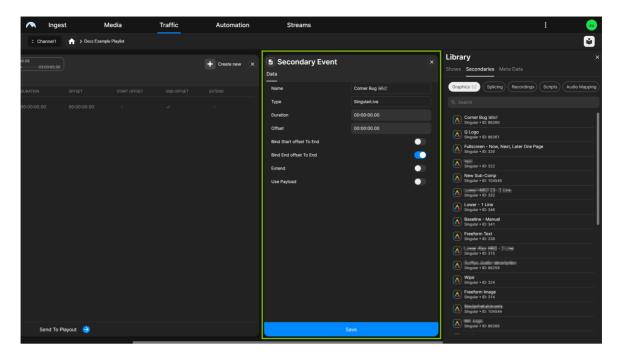


Traffic - Add a secondary event to a playlist

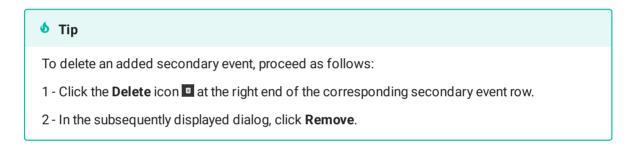
The secondary event is added to the playlist.



- d. (Optional) Repeat the previous two steps to add more secondary events to the playlist.
- e. (Optional) To edit the properties of the added secondary event, select the **Secondaries** tab in the playlist information area. All added secondary events are listed below. Click **Open** at the right end of the row of the secondary event to be edited. The secondary event properties are displayed on the right side. Edit the properties as required and apply your changes, by clicking **Save**.

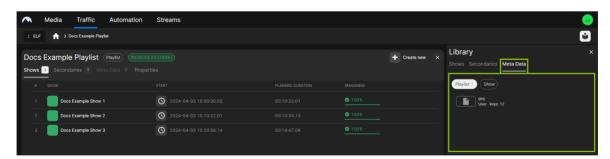


Traffic - Edit secondary event properties



- 5. (Optional) Add metadata to the playlist.
 - a. On the right side in the **Library**, select the **Meta Data** tab and below the type **Playlist**.

Available metadata keysets of the selected type are listed below.



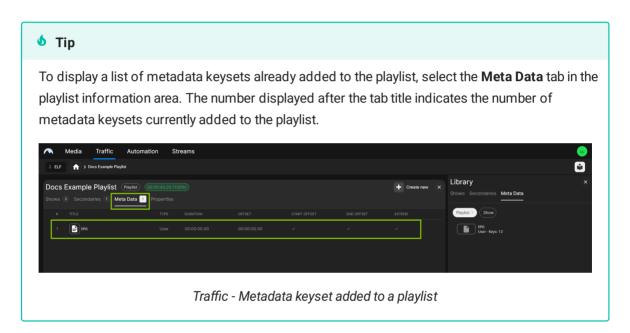
Traffic - Available metadata keysets

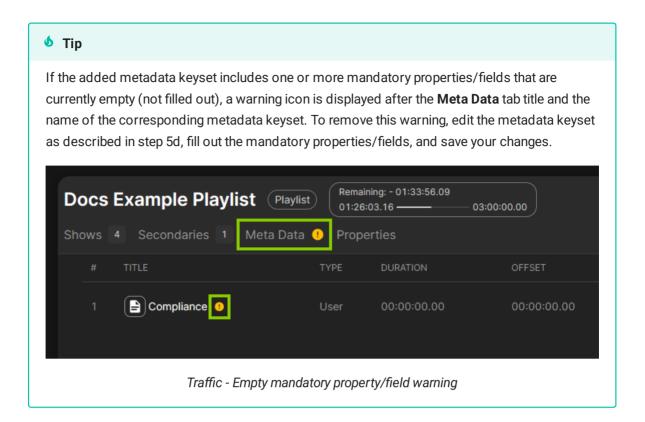
b. To add a metadata keyset to the playlist, drag it from the library and drop it on the playlist information area.



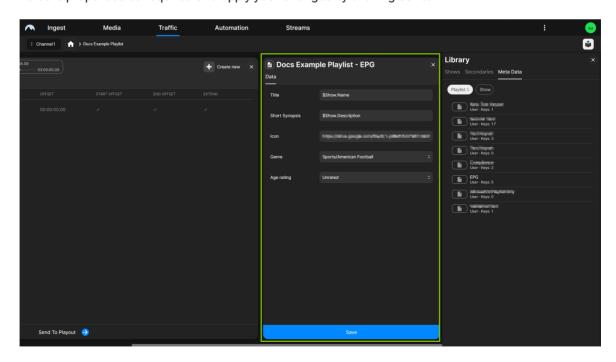
Traffic - Add a metadata keyset to a playlist

The metadata keyset is added to the playlist.





- c. (Optional) Repeat the previous two steps to add more metadata keysets to the playlist.
- d. (Optional) To edit the properties of the added metadata keyset, select the **Meta Data** tab in the playlist information area. All added metadata keysets are listed below. Click **Open** at the right end of the row of the metadata keyset to be edited. The metadata keyset properties are displayed on the right side. Edit the properties as required and apply your changes by clicking **Save**.



Traffic - Edit metadata properties

5 Tip

To delete an added metadata keyset, proceed as follows:

- 1 Click the **Delete** icon at the right end of the corresponding metadata keyset row.
- 2 In the subsequently displayed dialog, click Remove.

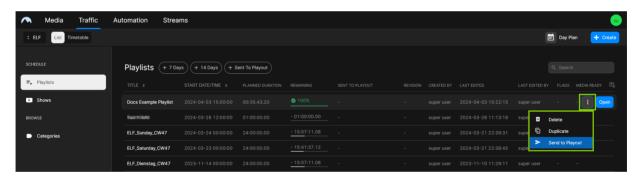
The playlist is saved automatically.

Sending a playlist to playout

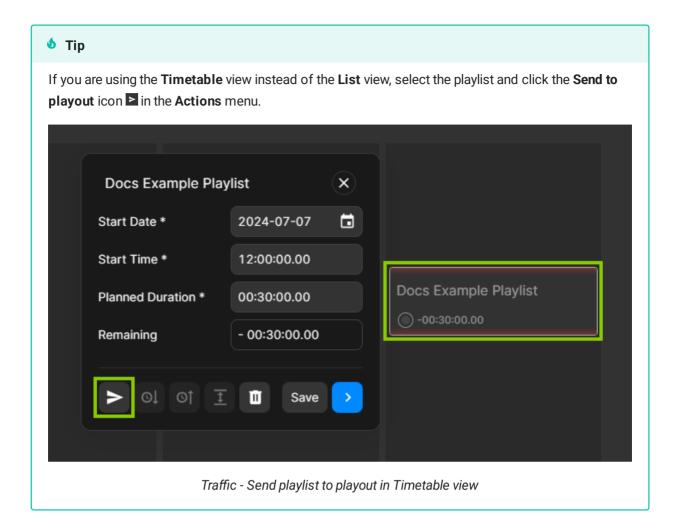
Before a playlist can be added to the rundown of a channel (see the section Adding an existing playlist to the rundown), it must first be sent to the playout.

To send a playlist to playout, proceed as follows:

- In the sidebar on the left, select Playlists.
 All available playlists for the currently selected channel are listed in the middle.
- 2. Select the playlist to be sent to playout and click the **Options** icon **1**.
- 3. Select Send to Playout.



Traffic - Send playlist to playout



The playlist is sent to playout. The transfer time is displayed in the Sent to playout column.



If you edit a playlist, that was already sent to playout and you export it again, the existing playlist is updated and can be used for the corresponding playout channel.

Editing a playlist in List view

To edit a playlist in **List** view, proceed as follows:

- In the sidebar on the left, select Playlists.
 All available playlists for the currently selected channel are listed in the middle.
- Select the playlist to be edited and click **Open** at the right end of the corresponding row.
 The playlist details are displayed.
- 3. Edit the playlist, assigned secondary events, and/or metadata as described in section Creating a playlist.

The playlist is saved automatically.

Editing a playlist in Timetable view

Editing playlist details works similarly in both the **Timetable** and **List** views. Using the **Timetable** view provides you with the following additional functions:

- You can edit the time properties of a selected playlist directly in the **Timetable** view via the **Actions** menu, either by entering specific time code values or by using the **Snap backward/forward** or **Extend** functions.
- You can add playlists to the timetable and add shows to playlists directly via drag and drop from the library, without opening the detail view of a playlist first.

Editing playlist details

To edit playlist details in **Timetable** view, proceed as follows:

- 1. In the sidebar on the left, select Playlists.
 - All available playlists for the currently selected channel are listed in the middle.
- 2. In the View selector at the top left, select Timetable.
 - The Timetable view is displayed.
- 3. Use the controls above the timetable to select the week that contains the playlist you want to edit.
- 4. Select the playlist to be edited and click the **Open** icon in the **Actions** menu.

 The playlist details are displayed.
- 5. Edit the playlist, assigned secondary events, and/or metadata as described in section Creating a playlist.

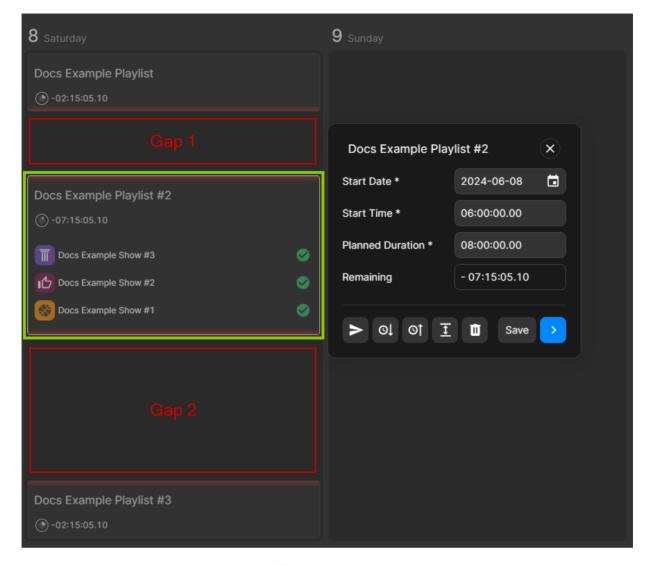
The playlist is saved automatically.

Moving a playlist

To move a playlist within the timetable to close a gap to the previous or next playlist, you can use the **Snap backward/forward** functions as follows:

1. Select the playlist to be moved.

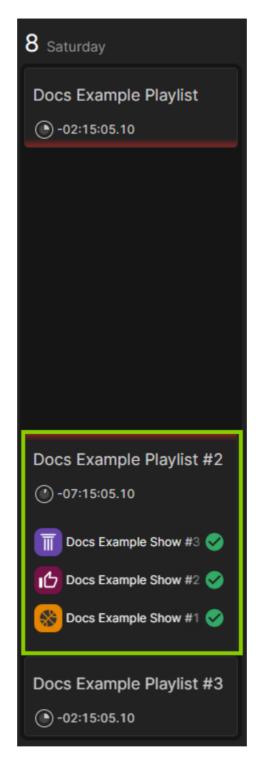
The actions menu is displayed.



Traffic - Playlist selected

- 2. Depending on where you want to move the playlist, continue as follows:
 - a. If you want to close a gap to the previous playlist (for example, "Gap 1" in the previous figure), click the **Snap backward** icon o1.
 - b. If you want to close a gap to the next playlist (for example, "Gap 2" in the previous figure), click the **Sn** ap forward icon .

The selected playlist is moved accordingly (the planned start time is changed), and the gap is closed.



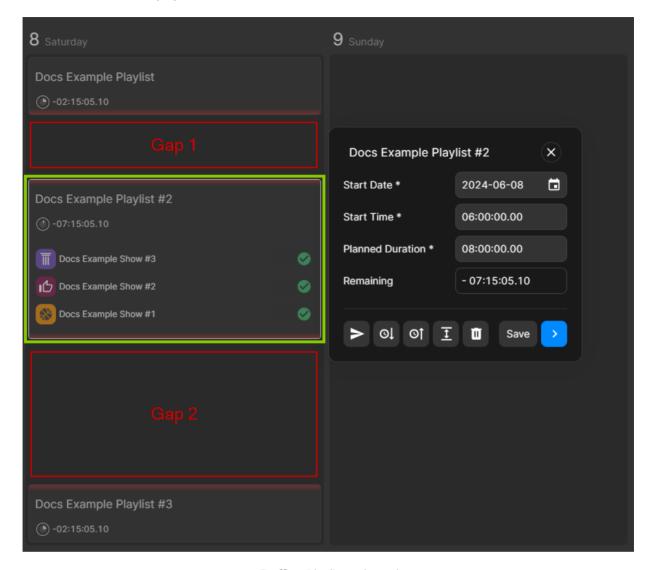
Traffic - Playlist moved to close the gap to the next playlist

Expanding a playlist

To expand a playlist within the timetable to close a gap to the previous and/or next playlist, you can use the **Exp** and function as follows:

1. Select the playlist to be expanded.

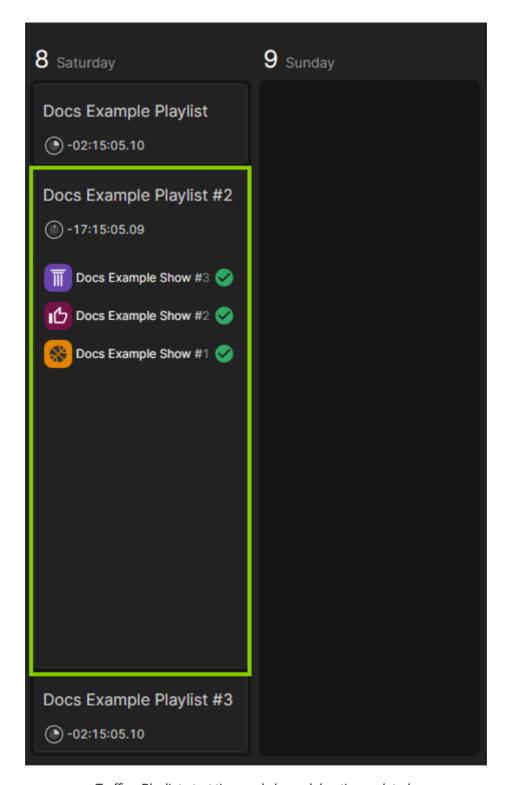
The actions menu is displayed.



Traffic - Playlist selected

2. Click the **Expand** icon **1**.

The start time and planned duration of the selected playlist are updated/expanded accordingly, and the gaps are closed.



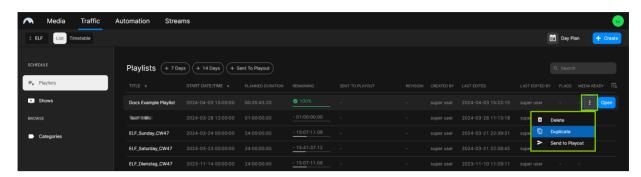
Traffic - Playlist start time and planned duration updated

Duplicating a playlist

To duplicate a single playlist, proceed as follows:

In the left sidebar, select Playlists.
 All available playlists are listed in the middle area.

- 2 In the list of available playlists select the playlist to be duplicated.
- 3. At the right end of the corresponding row, click the **Options** icon and select **Duplicate**.



Traffic - Duplicate playlist

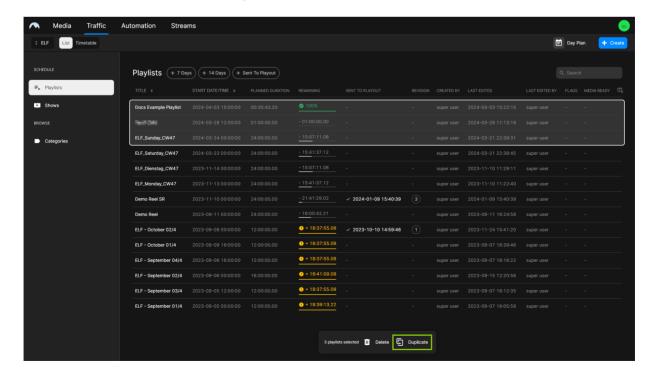
The Copy Playlist dialog is displayed.

- 4. In the Copy Playlist dialog, enter the name to be used for the duplicated playlist.
- 5. Confirm your action by clicking Copy playlist.

The playlist is duplicated.

To duplicate multiple playlists, proceed as follows:

- 1. In the left sidebar, select **Playlists**.
 - All available playlists are listed in the middle area.
- 2. Hold [Ctrl] or [Shift] and in the list of available playlists select the playlists to be duplicated.
- 3. At the bottom of the screen, select **Duplicate**.



Traffic - Duplicate multiple playlists

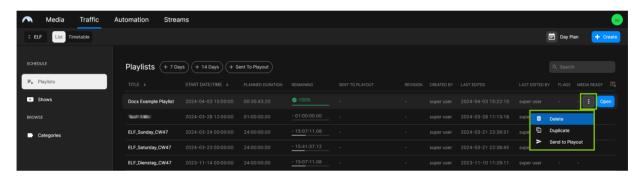
The selected playlists are duplicated. The duplicated playlists are automatically named by appending "- copy" to the original name.

Deleting a playlist

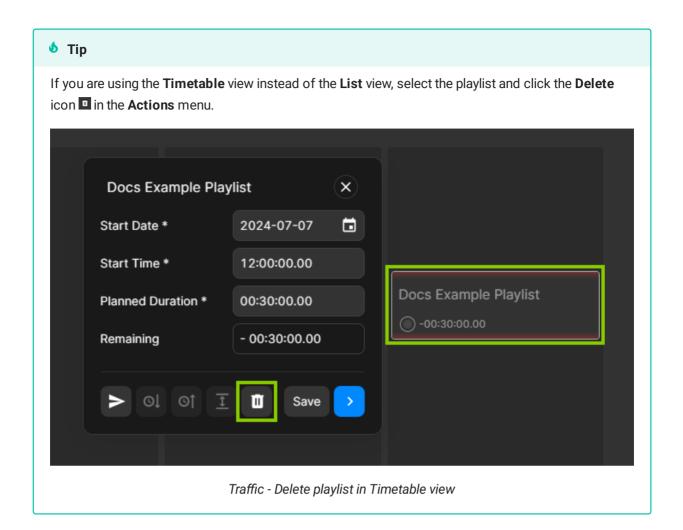
To delete a single playlist, proceed as follows:

- In the left sidebar, select Playlists.
 All available playlists are listed in the middle area.
- 2. In the list of available playlists select the playlist to be deleted.
- 3. At the right end of the corresponding row, click the **Options** icon and select **Delete**.

 A confirmation dialog is displayed.
- 4. Confirm your action by clicking **Delete**.



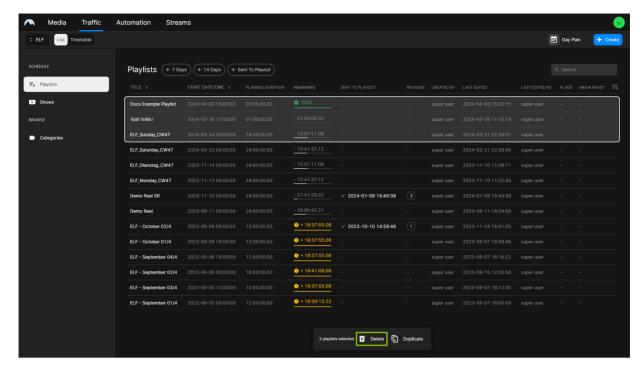
Traffic - Delete playlist



The playlist is deleted.

To delete multiple playlists, proceed as follows:

- In the left sidebar, select Playlists.
 All available playlists are listed in the middle area.
- 2. Hold [Ctrl] or [Shift] and in the list of available playlists select the playlists to be deleted.
- 3. At the bottom of the screen, select **Delete**.



Traffic - Delete multiple playlists

A confirmation dialog is displayed.

4. Confirm your action by clicking **Delete**.

The selected playlists are deleted.

Playlist properties

The following table provides an overview of all available playlist properties:



Time-related properties use a frame-accurate notation in the format <code>hh:mm:ss.ff</code>. The frame rate time base is part of the global system configuration. Makalu supports the frame rates 25, 29.97, 30, 50, and 60 fps.

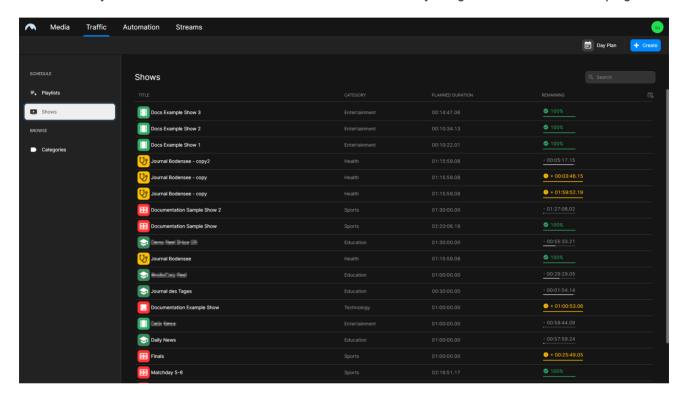
Property	Description
Playlist Title	Title of the playlist
Planned Duration	Planned duration of the playlist
Start Date	Planned start date of the playlist
Start Time	Planned start time of the playlist

Property	Description
Description	Text description for the playlist

2.3.3 Using shows

Using the Shows view

To open the **Shows view**, select **Shows** in the sidebar on the left. It provides an overview of all available shows of the currently selected channel. The list of shows can be narrowed by using the search field at the top right.

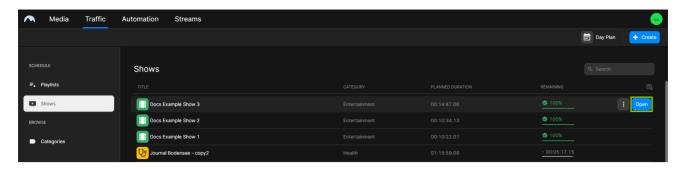


Traffic - Shows

By default, a selection of available columns is displayed. To customize the columns, click the **Column selection** icon 🖪 at the top right and select the columns to be displayed.

Additional functions (**Duplicate** and **Delete**) are available per show via the **Options** icon on the right side of each show row. You can create a new show by clicking **Create** at the top right.

To display a detailed view of a show, hover your mouse over the show and click **Open**.



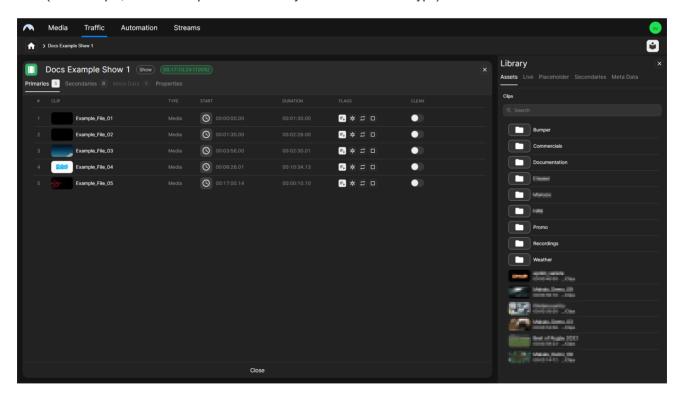
Traffic - Open show details

At the top of the detailed show view, the fill level is displayed, and below tabs for included primary events (clips), secondary events, metadata, and show properties.



You can display a larger version of a clip thumbnail image by hovering your mouse over it.

On the right side, the library of assets/clips, live sources, placeholders, secondary events, and metadata is displayed. Depending on the type of the selected library item tab, a sub-selection may be available via additional tabs (for example, to select a specific secondary event or metadata type).



Traffic - Show details and library

When the detailed view of a show is opened, the library lists all available items that can be added to a show or clip based on your access permissions. It can be displayed or hidden by clicking the **Library** icon at the top right.

Depending on where you want to add a clip, the following options are available to you for this purpose:

- 1. Add a clip as the last clip of a show by dragging it onto the area above the clip list.
- 2. Add a clip at a specific position by dragging it onto the position in the clip list (for example, between two clips).
- 3. Replace a clip by dragging the new clip onto the existing one and confirming the replacement.

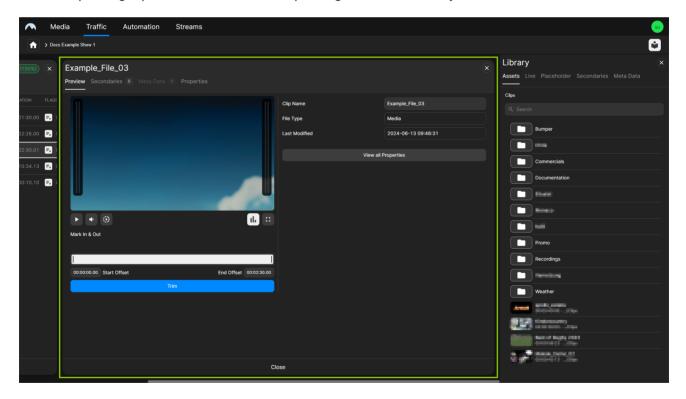
You can also change the order of the clip list via drag and drop.

Additionally, the clip list includes icons for setting clip flags, enabling/disabling graphics, and removing clips from the list.

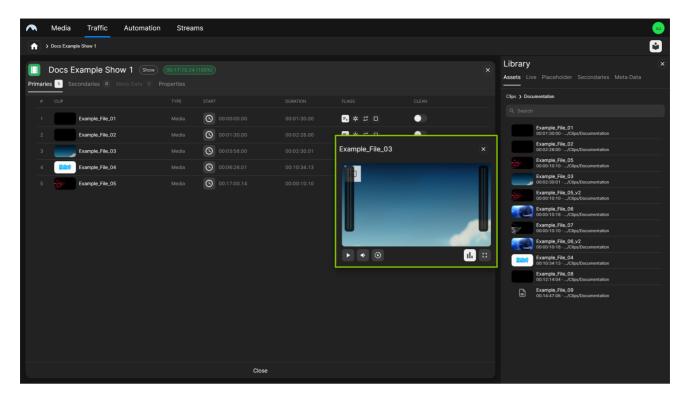
You can open the detailed view of a clip by hovering your mouse over the clip in the clip list and clicking **Open** on the right side of the corresponding row. This view provides access to the clip preview, clip properties, as well as assigned secondary events and metadata.

Using the Preview

The Traffic UI includes a preview player that enables you to preview video files and live sources, either by opening the corresponding clips of a show or the corresponding assets in the library.



Traffic - Clip preview



Traffic - Asset preview

Regardless of whether you open clips or assets, the preview player always provides the following default controls:

Icon	Description
> / II	Start/pause playback
5	Restart playback from the beginning
⊸ / ⊸ ×	Mute/unmute audio
③	Change playback speed
ıl.	Show/hide audio peak meter
	Toggle full-screen playback

Below these controls, you can find the **Mark In & Out** area with a trim bar and input fields for start and end offset. For more information about trimming, see the section Trimming a clip.

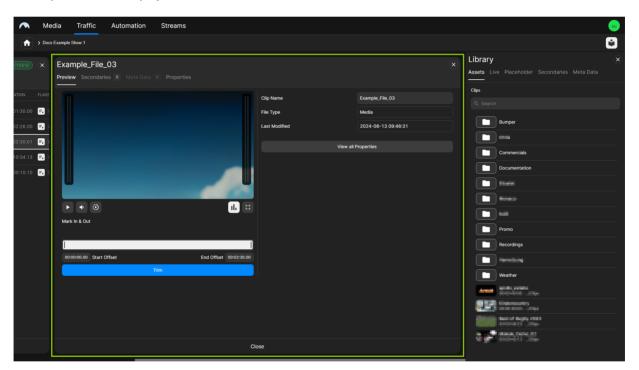
Notice

The **Mark In & Out** area is only available if you open a clip of a show, but not if you open an asset from the library.

To preview a clip of a show, proceed as follows:

- 1. In the left sidebar, select **Shows**.
 - All available shows of the currently selected channel are listed in the middle.
- 2. Hover your mouse over the show that contains the clip to be played and click **Open** on the right side of the corresponding row.
 - The show details are displayed.
- 3. Hover your mouse over the clip to be played and click **Open** on the right side of the corresponding row.

 The clip details are displayed.



Traffic - Clip details incl. preview

- 4. To start the preview playback, click the **Play** icon ▶ below the preview player.

 The preview playback starts.
- 5. Use the preview player controls to control the playback.

The preview plays accordingly.



When previewing a live source, some of the preview player controls are not available (for example, the control for changing the playback speed).

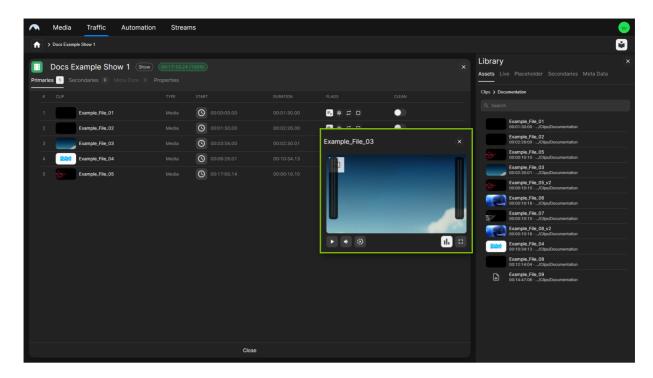
To preview assets from the library, proceed as follows:

- 1. In the left sidebar, select **Shows**.
 - All available shows of the currently selected channel are listed in the middle.
- 2. Hover your mouse over any show and click **Open** on the right side of the corresponding row.
 - The show details are displayed. The library is displayed on the right.
- 3. Depending on whether you want to preview a video file or a live source, proceed as follows:
 - a. To preview a video file, select the **Assets** tab in the library. Select the folder that contains the file to be played, hover your mouse over the file, and click the **Play** icon.
 - b. To preview a live source, select the **Live** tab in the library. Hover your mouse over the live source to be played, and click the **Play** icon.



When previewing a live source, some of the preview player controls are not available (for example, the control for changing the playback speed).

The preview player opens to the left of the library, and the preview playback starts.



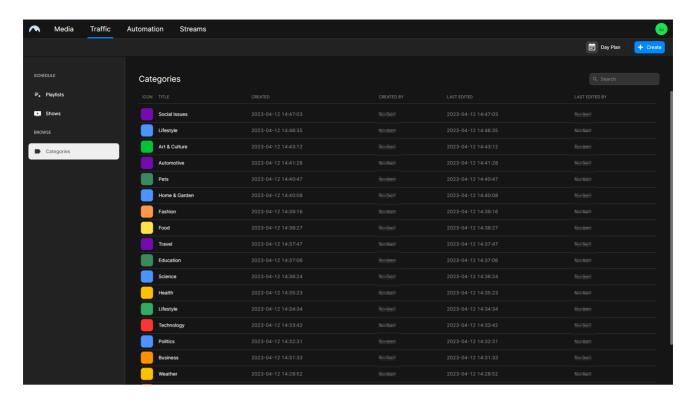
Traffic - Asset preview

4. Use the preview player controls to control the playback.

The preview plays accordingly.

Using the Categories view

To open the **Categories view**, select **Categories** in the sidebar on the left. It provides an overview of all available categories, which are used to organize the content of shows.



Traffic - Show categories

The list of show categories can be narrowed by using the search field at the top right.

Additional functions (**Edit** and **Delete**) are available per show category via the **Options** icon on the right side of each show category row.

You can create a new show category by clicking **Create** at the top right above the list of show categories. This opens a dialog that enables you to specify the category properties.

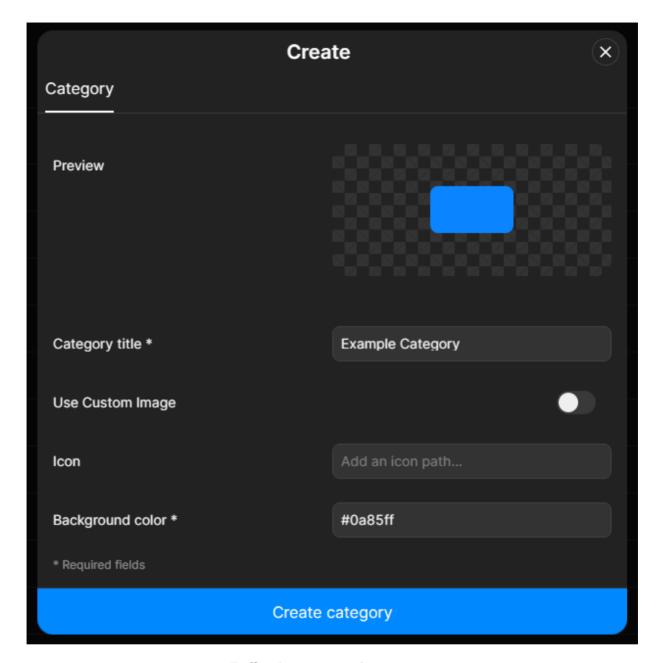
Creating a show category

To create a show category, proceed as follows:

- In the sidebar on the left, select Categories.
 All available show categories are listed in the middle.
- 2. At the top right, click Create.

The Create dialog is opened.

3. Enter a Category title and select a Background color.



Traffic - Create a new show category

- 4. (Optional) To add an icon, paste its SVG code into the **Icon** field.
- 5. (Optional) To use a custom image instead, enable **Use Custom Image** and paste the public image URL into the **Image URL** field.
- 6. Click Create category.

The category is created with the selected properties and can be used when creating or editing a show.

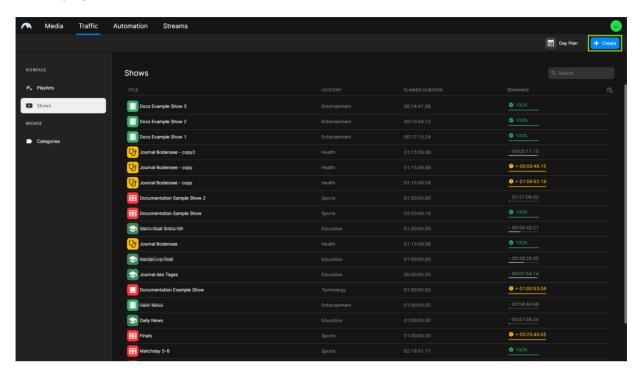
Creating a show

To create a show, proceed as follows:

1. In the sidebar on the left, select **Shows**.

All available shows are listed in the middle.

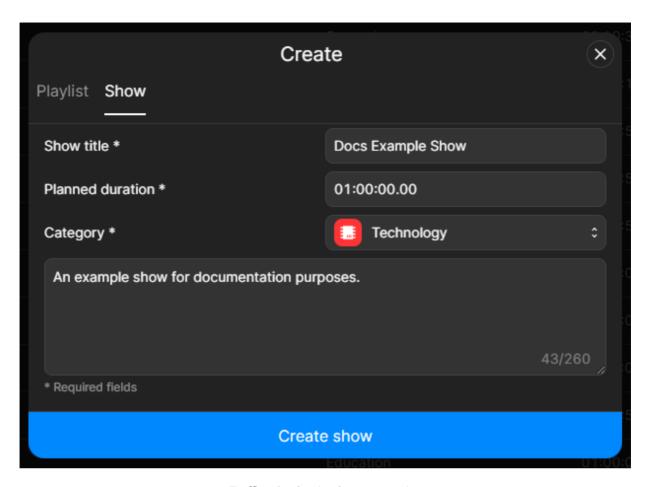
2. In the top right, click **Create**.



Traffic - Create show

The **Create** dialog is displayed.

3. In the **Show** tab, set the basic show properties and fill in all required fields.



Traffic - Set basic show properties

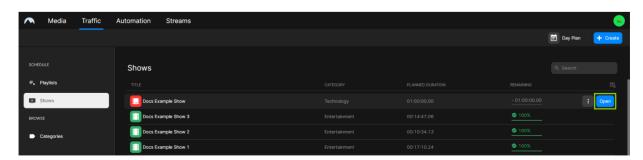
4. To create the show with the selected properties, click **Create show**.

The show is created, and the list of available shows is displayed again.

Since the newly created show is initially empty, the next step is to add content (primary and secondary events) to the show.

To add content to the show, proceed as follows:

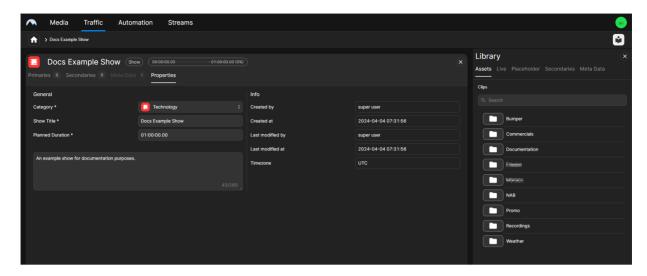
1. Open the show by selecting it in the list of available shows and clicking **Open** on the right side of the corresponding row.



Traffic - Open show

The show is opened.

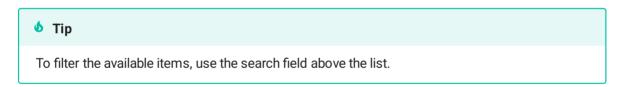
2. (Optional) Edit the basic show properties in the **Properties** tab and confirm your changes by clicking **Apply Changes** at the bottom of the screen.

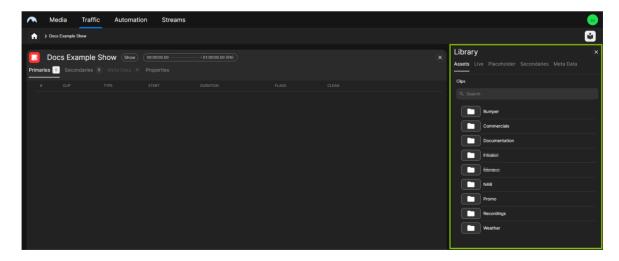


Traffic - Edit basic show properties

- 3. Add one or more primary events to the show by proceeding as follows:
 - a. Depending on the type of primary event you want to add, select the corresponding tab in the library: **A** ssets (file-based content), **Live** (live sources), or **Placeholder** (virtual placeholders).

All available items of the selected type are listed below.





Traffic - Library of available assets

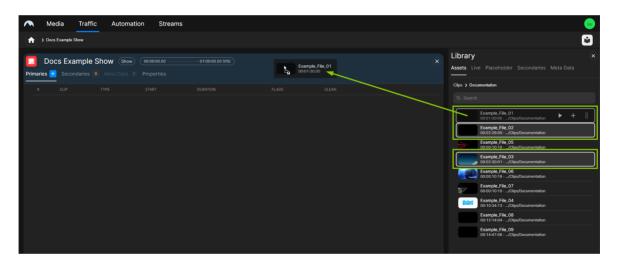
Notice

For detailed information about the types of primary events and the other elements used in the planning concept, see the section Schedule > Overview.

b. Add one or more primary events to the show, which turns them into clips. To add them at the end of the show, select the corresponding items in the library and drag and drop them in the information area at the top of the show. Alternatively, you can insert one or more items at a specific position within the show by dragging and dropping them to the desired position within the clip order.

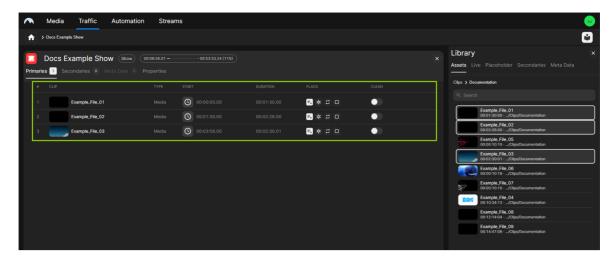
6 Tip

Adding a live source requires you to set the planned duration of the live event. By default, the remaining free time of the selected show is suggested as the duration of the live event. You can edit the duration as required.

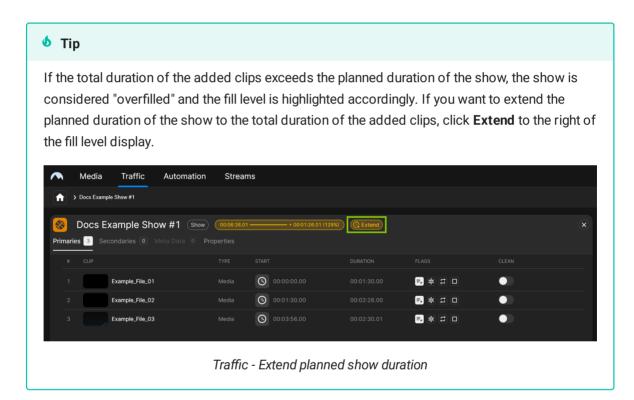


Traffic - Add clips to a show

The clips are added to the show. The fill level display at the top is updated accordingly.



Traffic - Clips added to a show



c. (Optional) Repeat steps a and b to add more clips to the show.

The clips are added to the show. The start time of each added clip is calculated accordingly, depending on the duration of the previously added clips.

6 Tip

You can manually adjust the start time of each added clip. To set a fixed start time, proceed as follows:

- 1 Click the **Clock** icon in the **Start** column of the corresponding row.
- 2 In the Set fixed time dialog, set Start Date and Start Time.
- 3 Click Confirm.

The start time of the clip is updated accordingly and the **Auto Follow** flag is deactivated.

To deactivate the fixed start time afterward, click the **Clock** icon again.

To remove a clip from the show, proceed as follows:

- 1 Select the clip to be removed.
- 2 Click the **Remove** icon .
- 3 In the confirmation dialog, click Remove.

◆ Tip

To change the order of the clips in the show, proceed as follows:

- 1 Select the clip to be moved.
- 2 Move it up or down within the clip order via drag and drop.
- 4. (Optional) Edit the clip flags.

Notice

By default, the **Auto Follow** flag is activated for all added primary events.

5. (Optional) Add secondary events to the show.

Notice

Graphics secondary events can be added to playlists, shows, and clips. If you add graphics to a show, they are displayed in addition to the added playlist and clip graphics.

a. On the right side in the **Library**, select the **Secondaries tab** and below the type of secondary event you want to add (for example, **Graphics**, **Splicing**, **Recordings**, or **Scripts**).

Media Traffic Automation Streams

Docs Example Show General Constants

Docs Example Show General Constants

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Docs Example File. 01 File Staff Constants

Example File. 03 Media Constants

Docs Example File. 04 Media C

Available secondary events of the selected type are displayed below.

Traffic - Secondary events

- b. (Optional) To search for specific secondary events, use the search field above the list of available secondary events.
- c. To add a secondary event to a single clip in the show, select a secondary event in the library and drag it on the corresponding clip.



Traffic - Add secondary event to a clip

The secondary event is added to the clip.

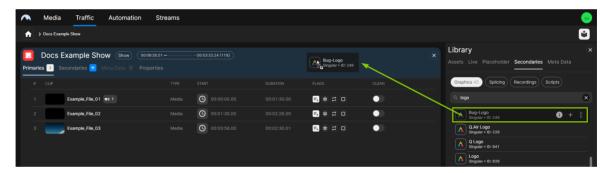


Traffic - Secondary event added to a clip

Notice

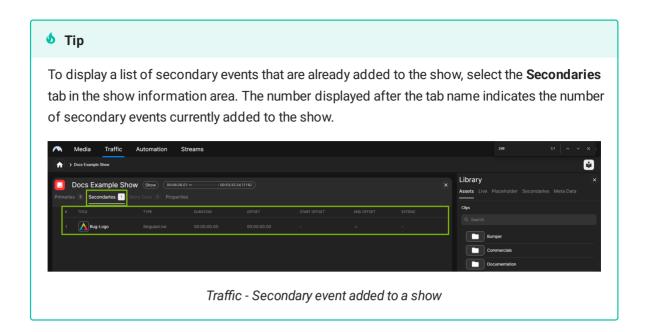
If you add a secondary event to a clip, a **Secondary event** icon and the number of added events are displayed next to the clip name.

d. To add a secondary event to the show, drag it from the library on the show information area. Alternatively, you can select the secondary event in the library and click the **Plus** icon on the right side of the corresponding row.

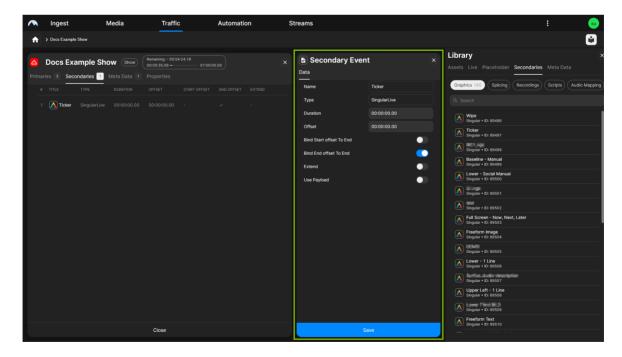


Traffic - Add a secondary event to a show

The secondary event is added to the show.



- e. (Optional) Repeat the previous two steps to add more secondary events to the show or to individual clips within the show.
- f. (Optional) Edit the properties of an added secondary event by either Editing a clip or by editing the secondary events of the show. To edit the secondary events of the show, select the **Secondaries** tab in the show information area. All added secondary events are listed below. Click **Open** at the right end of the row of the secondary event to be edited. The secondary event properties are displayed on the right side. Edit the properties as required and apply your changes by clicking **Save**.



Traffic - Edit secondary event properties

5 Tip

To delete a secondary event of a single clip within the show, proceed as follows:

- 1 In the clip list of the show, select the corresponding clip.
- 2 In the clip details area on the right side, select the tab of the corresponding secondary event type (for example, **Graphics**).
- 3 Click the **Delete** icon on the right side of the corresponding row.
- 4 In the confirmation dialog, click Remove.

b Tip

To delete a secondary event of the show, proceed as follows:

- 1 In the show information area, select the tab of the corresponding secondary event type (for example, **Graphics**).
- 2 Click the **Delete** icon on the right side of the corresponding row.
- 3 In the confirmation dialog, click **Remove**.
- 6. (Optional) Add metadata to the show.
 - a. On the right side in the **Library** select the **Meta Data** tab and below the type **Show**.

Available metadata keysets of the selected type are displayed below.



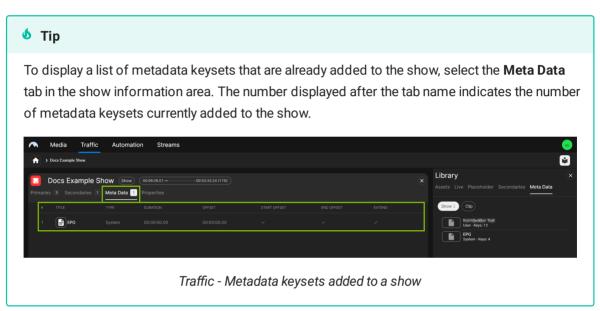
Traffic - Available metadata keysets

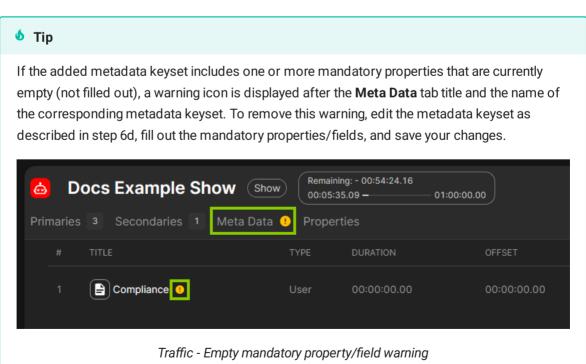
b. To add a metadata keyset to the show, drag it from the library and drop it in the show information area.



Traffic - Add a metadata keyset to a show

The metadata keyset is added to the show.

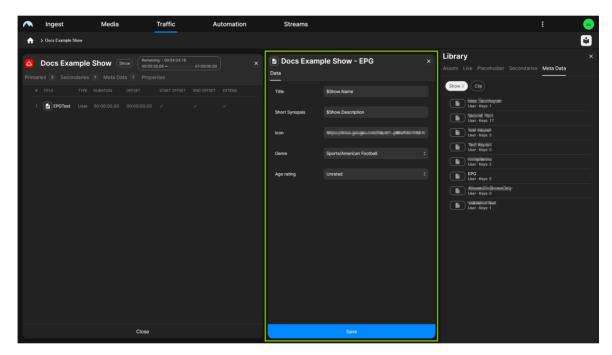




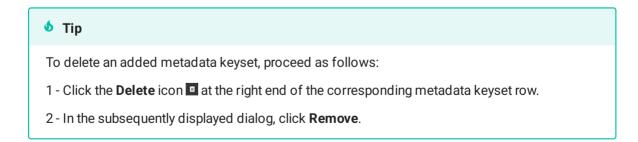
5 Tip

Instead of adding metadata to a show, you can also add it to a clip in the show (provided the corresponding metadata keyset is valid for clips). To do this, select the **Meta Data** tab on the right side in the **Library** and below the type **Clip**. Drag the metadata keyset from the library and drop it on the corresponding clip.

- c. (Optional) Repeat the previous two steps to add more metadata keysets to the show or its clips.
- d. (Optional) To edit the properties of the added metadata keyset, select the **Meta Data** tab in the show information area. All added metadata keysets are listed below. Click **Open** at the right end of the row of the metadata keyset to be edited. The metadata keyset properties are displayed on the right side. Edit the properties as required and apply your changes by clicking **Save**.



Traffic - Edit metadata properties



The show's properties and contents are saved. It can be added to a playlist, sent to playout, and used in a rundown.

Editing a show

To edit a show, proceed as follows:

- 1. In the sidebar on the left, select **Shows**.
 - All available shows of the currently selected channel are listed in the middle.
- 2. Select the show to be edited and click **Open** on the right side of the corresponding row.
 - The show details are displayed.
- 3. Edit the show, assigned secondary events, and/or metadata as described in section Creating a show.

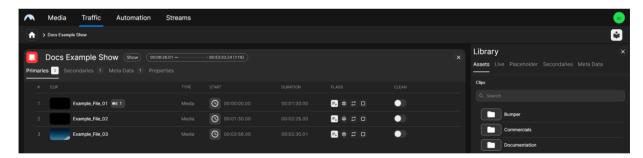
The show is saved automatically.

Editing a clip

To edit a clip, proceed as follows:

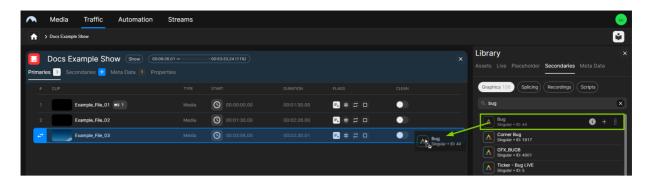
- 1. In the left sidebar, select Shows.
 - All available shows of the currently selected channel are listed in the middle.
- Select the show that contains the clip to be edited and click **Open** on the right side of the corresponding row.

The show details are displayed.



Traffic - Show details

3. (Optional) Add secondary events to the clip by selecting a secondary event in the library and dragging it on the corresponding clip.



Traffic - Add secondary event to a clip

The secondary event is added to the clip. The total number of secondary events added is displayed to the right of the clip name.



Traffic - Secondary event added to a clip

- 4. (Optional) To edit the properties of the added secondary event, proceed as follows:
 - a. In the clip list, select the clip to be edited and click **Open** on the right side of the corresponding row.
 The clip details and preview are opened on the right side.
 - b. In the clip details, select the **Secondaries** tab.
 All secondary events currently added to the clip are listed below.
 - c. In the secondary event list, select the event to be edited and click **Open** on the right side of the corresponding row.

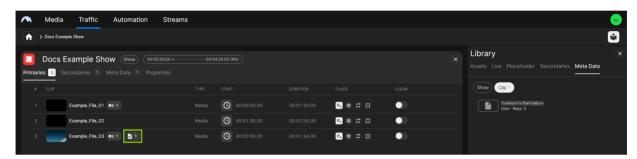
The secondary event properties are opened on the right side.

- d. Edit the properties as required.
- e. Confirm your changes by clicking Save.
- 5. (Optional) Add metadata to the clip by selecting a metadata keyset in the library under **Meta Data > Clip** and dragging it on the corresponding clip.



Traffic - Add metadata to a clip

The metadata keyset is added to the clip. The total number of metadata keysets added is displayed to the right of the clip name.



Traffic - Metadata added to a clip

- 6. (Optional) To edit the start time of a clip, proceed as follows:
 - a. Click the **Clock** icon in the **Start** column of the corresponding clip.
 - b. In the Set fixed time dialog, edit the Start Time.
 - c. Click Confirm.

The start time of the clip is updated accordingly.



To deactivate the fixed start time afterward, click the **Clock** icon again. As a result, the clip start time is set automatically so that it starts right after the previous clip ends. If there is a gap between the clip and the previous clip, it is automatically closed.

- 7. (Optional) To edit the planned duration of a live clip, proceed as follows:
 - a. Hover your mouse over the corresponding clip, click the **Options** icon **1**, and select **Edit**.
 - b. Edit the Live duration value.
 - c. Confirm the new duration by clicking **OK**.

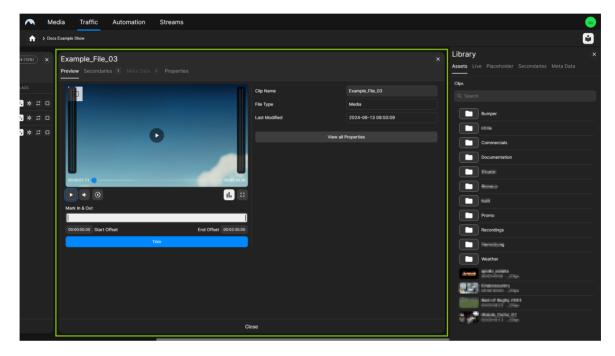
The duration of the live clip is updated accordingly.

- 8. To edit the clip properties, proceed as follows:
 - a. In the clip list, select the clip to be edited and click **Open** on the right side of the corresponding row.



Traffic - Select clip

The clip details and preview are opened on the right side.



Traffic - Clip details

b. Edit the clip properties.



You can edit the clip name in the **Preview** tab. Alternatively, you can edit additional properties (e.g. clip description) that are available in the **Properties** tab.

- 9. (Optional) Trim the clip.
- 10. To save your changes, click **Apply Changes** at the bottom of the clip details area.

The clip properties are saved.

Trimming a clip

To trim a clip, proceed as follows:

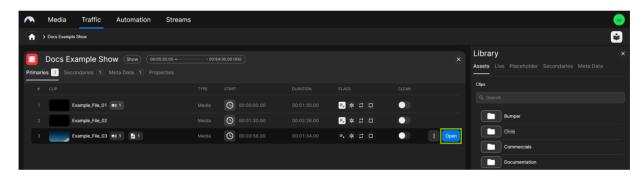
- 1 In the left sidebar, select **Shows**.
 - All available shows of the currently selected channel are listed in the middle.
- 2. Select the show that contains the clip to be edited and click **Open** on the right side of the corresponding row.

The show details are displayed.



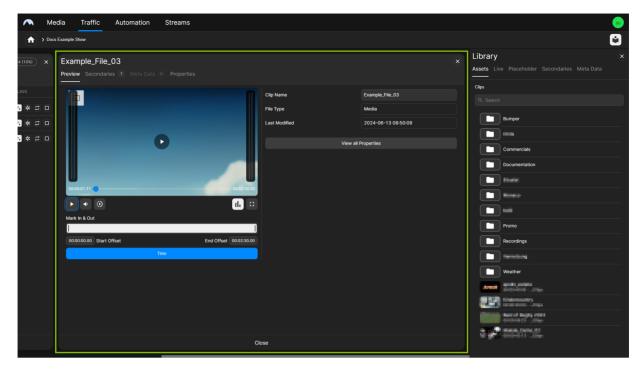
Traffic - Show details

3. In the clip list, hover your mouse over the clip to be trimmed and click **Open** on the right side of the corresponding row.



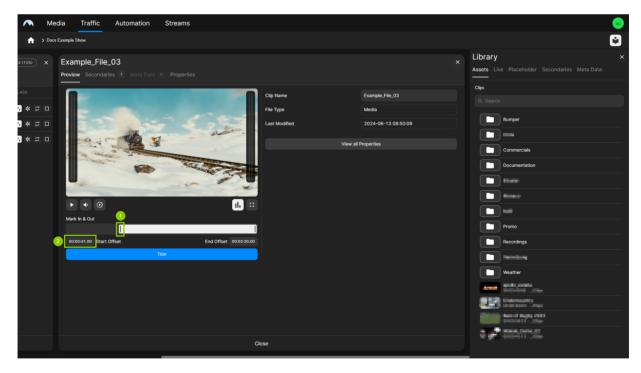
Traffic - Select clip

The clip details and preview are opened on the right side.

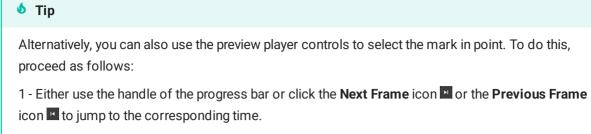


Traffic - Clip details

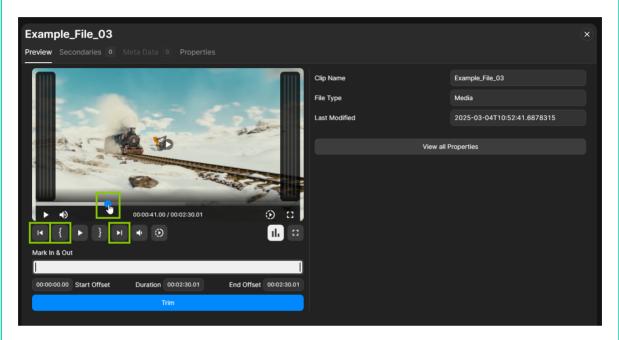
4. Set the mark in point by either dragging the left handle of the trim bar (1) to the corresponding time or by entering the timecode to be used in the **Start Offset** field (2).



Traffic - Trim clip - Set mark in





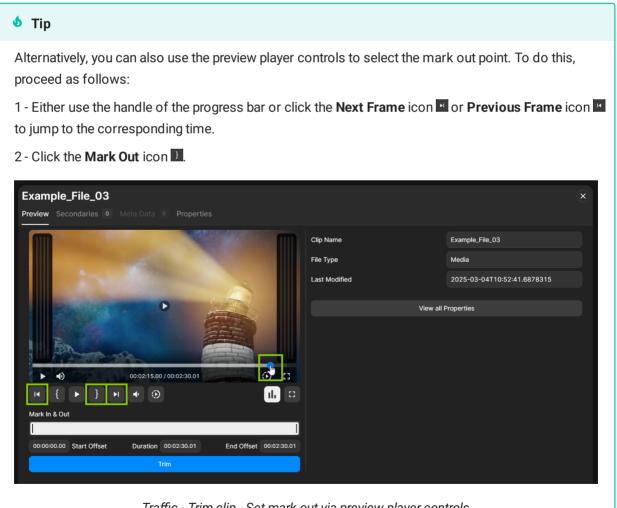


Traffic - Trim clip - Set mark in via preview player controls

5. Set the mark out point by either dragging the right handle of the trim bar (3) to the corresponding time or by entering the timecode to be used in the **Duration** or **End Offset** field (4).



Traffic - Trim clip - Set mark out



Traffic - Trim clip - Set mark out via preview player controls

To confirm your changes, click **Trim**.

The clip is trimmed. The duration displayed in the clip list is updated accordingly. When the clip is played, only the trimmed section will be used.

Deleting a clip

To delete a clip from a show, proceed as follows:

- 1. In the sidebar on the left, select **Shows**.
 - All available shows of the currently selected channel are listed in the middle.
- 2. Select the show to be edited and click **Open** on the right side of the corresponding row.
 - The show details are displayed.
- 3. To delete one or more clips from the show, proceed as follows:
 - a. To delete a single clip, hover your mouse over the clip. On the right side of the corresponding row, click the **Options** icon **1** and select **Remove**.

6 Tip

Alternatively, you can also delete a clip by selecting it and pressing [Del] on your keyboard.



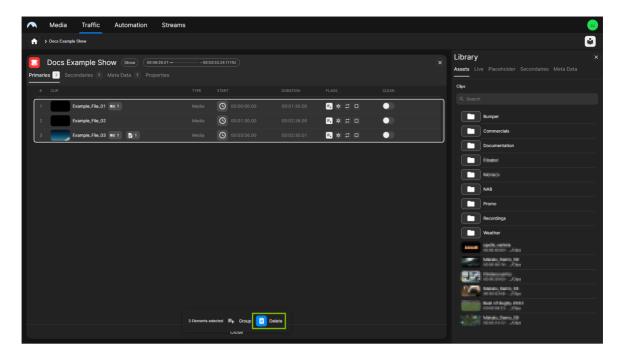
Traffic - Delete a single clip

Confirm the following dialog by clicking **Delete**.

b. To delete multiple clips, hold either [Ctrl] or [Shift] and select the corresponding clips. Then click the **Delete** icon **1** at the bottom of the screen.

Tip

Alternatively, you can also delete multiple clips by selecting them and pressing **[Del]** on your keyboard.



Traffic - Delete multiple clips

Confirm the following dialog by clicking **Delete**.

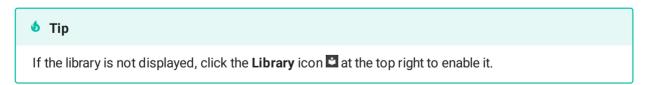
The selected clips are deleted from the show.

Creating a placeholder

When you create a program schedule, you can reuse a placeholder in shows (including reruns). You can later replace it with the corresponding physical file in the Automation UI or Traffic UI when it becomes available.

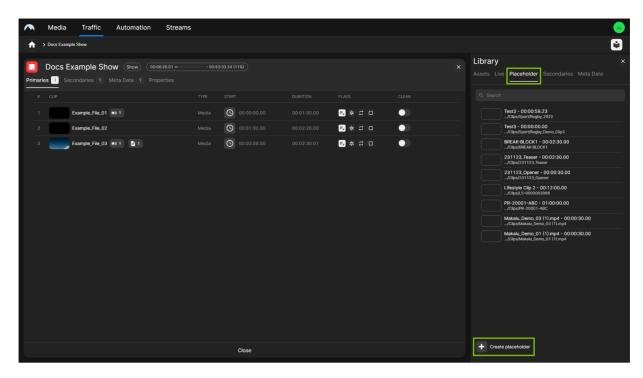
To create a placeholder, proceed as follows:

- In the left sidebar, select **Shows**.
 All available shows of the currently selected channel are listed in the middle.
- Select a show and click **Open** on the right side of the corresponding row.
 The show details are displayed.
- 3. In the library on the right side, select the Placeholder tab.



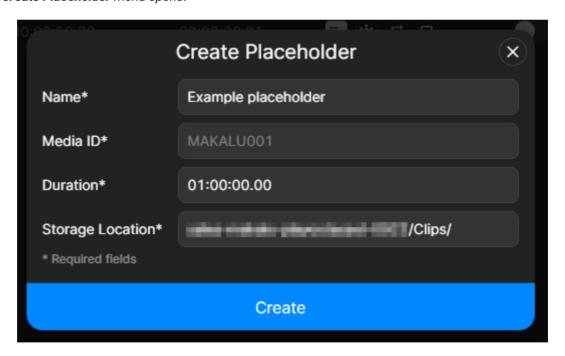
All available placeholders are listed.

4. At the bottom left of the library click Create placeholder.



Traffic - Create placeholder

The Create Placeholder menu opens.



Traffic - Create placeholder menu

- Edit the placeholder properties as required by entering its Name, Media ID, Duration, and Storage Location.
- 6. To confirm the creation, click Create.

The placeholder is created with the selected properties and added to the list of available placeholders in the library. It can be added to a show.

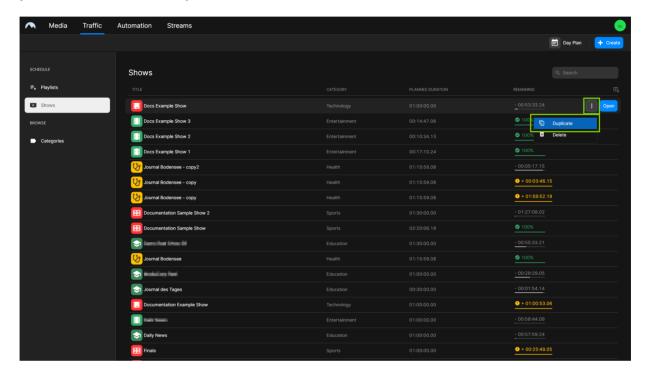
Duplicating a show

To duplicate a show, proceed as follows:

1. In the left sidebar, select **Shows**.

All available shows are listed.

2. Hover your mouse over the show to be duplicated. On the right side of the corresponding row, click the **O** ptions icon **1** and select **Duplicate**.



Traffic - Duplicate show

The **Duplicate Show** menu opens.

- 3. Enter the name of the duplicated show.
- 4. Click Confirm.

A copy of the show (including all properties, primary, and secondary events) is created.

5. Edit the show properties, primary and/or secondary events as required as described in section Editing a show.

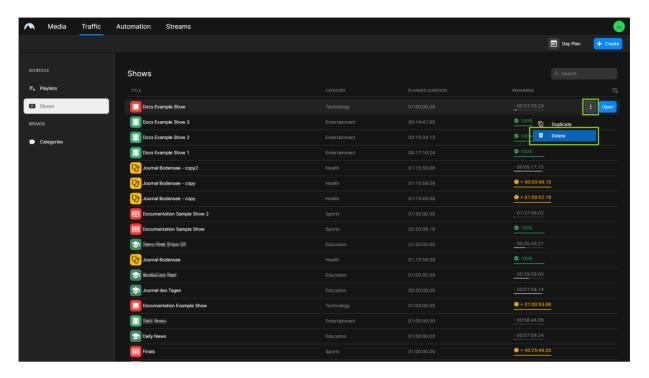
Deleting a show

To delete a single show, proceed as follows:

1. In the left sidebar, select **Shows**.

All available shows are listed.

Hover your mouse over the show to be deleted. On the right side of the corresponding row click the **Optio**ns icon and select **Delete**.



Traffic - Delete show

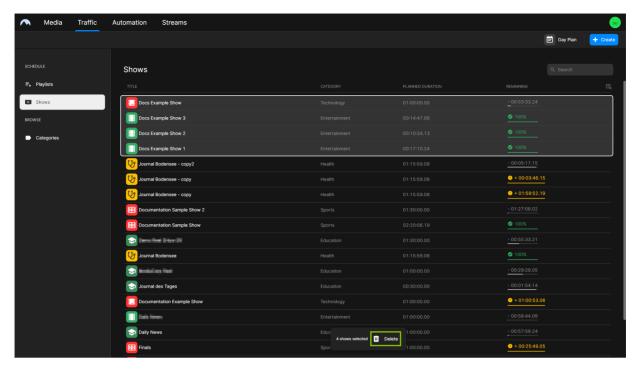
A confirmation dialog is displayed.

3. To delete the show, click **Confirm**.

The show is deleted.

To delete multiple shows, proceed as follows:

- In the left sidebar, select **Shows**.
 All available shows are listed on the right side.
- 2. Hold either [Ctrl] or [Shift] and select the corresponding shows.
- 3. Click the **Delete** icon at the bottom of the screen.



Traffic - Delete multiple shows

A confirmation dialog is displayed.

4. To delete the selected shows, click Confirm.

The selected shows are deleted.

Show properties

The following table provides an overview of all available show properties:



Time-related properties use a frame-accurate notation in the format <code>hh:mm:ss.ff</code>. The frame rate time base is part of the global system configuration. Makalu supports the frame rates 25, 29.97, 30, 50, and 60 fps.

Property	Description
Category	Content category
Show Title	Name of the show
Planned Duration	Planned duration of the show
Description	Text description for the show

Clip flags

Each clip within a show has a set of flags that define how it should be played by the automation, particularly how the start and end of each clip should be handled.

The following table provides an overview of all available clip flags:



Some of the listed clip flags are only available in Makalu Traffic, and others only in the rundown in the Makalu Automation detailed channel view (see Channel rundown).

Notice

Deactivated flags are displayed in gray, activated flags are highlighted in white.

Flag icon	Flag name	Description
≡▶	Auto Follow	When the playback of the previous clip is finished, the playback of the current clip starts automatically. Notice: By default, the Auto Follow flag is initially activated for every clip.
∞	Open End	The clip is played permanently until the operator manually triggers the start of the next clip. Notice: This flag is only available for clips of type live source.
*	Freeze Last	When the playback of the clip is finished, the last frame stays displayed.

Flag icon	Flag name	Description
	Freeze Black	When the playback of the clip is finished, a black image stays displayed. Notice: The image to be
		displayed is configurable.
#	Loop	The clip is played in a loop until the operator manually triggers the start of the next clip.
		Tip: If the loop flag is activated for the last clip in a group, the whole group is played in a loop.
	Auto Cue (Cue Next)	The next clip is automatically prepared for playback, but the first frame stays displayed until the operator manually triggers the start of the next clip.
M.	Clean	The clip is played without graphics add-ons, even if graphics are assigned to it. Notice: This also applies to cases where graphics add-ons of the previous clip would normally extend beyond the regular end of the previous clip. Depending on how the duration of the graphics add-on is set, graphics of the previous clip can stay displayed even after the next clip starts. But if the clean flag is activated for the next clip, graphics are not displayed.

2.3.4 Secondary events

When a secondary event is added/attached to a clip, show, or playlist, it is considered an "add-on". Each add-on has common time-related properties and optional content-related properties that apply and can be edited within the context of the corresponding clip, show, or playlist.



Notice

Time-related properties use a frame-accurate notation in the format hh:mm:ss.ff. The frame rate time base is part of the global system configuration. Makalu supports the frame rates 25, 29.97, 30, 50, and 60 fps.

For information about how to add secondary events, see the section Creating a playlist or Creating a show, for example.

Common properties

Graphics and metadata secondary events use the following common and time-related properties:

Property	Description
Add-on name	Name of the add-on
Start offset	Offset until the add-on is displayed/enabled (based on the start of the clip, show, or playlist)
Bind start offset to end	If activated, the start offset will be calculated based on the end of the clip, show, or playlist
Bind end offset to end	If activated, the end offset will be calculated based on the end of the clip, show, or playlist
End offset	Offset until the add-on is removed/disabled (based on the end of the clip, show, or playlist - only available if Bind end offset to end is enabled)
Duration	Duration until the add-on is removed/disabled (only available if Bind end offset to end is disabled)

Property	Description
Extend	If activated, the display/enabled duration of the add-on can be extended beyond the regular end of the clip, show, or playlist it is assigned to

Examples of using time-related properties

The following table provides examples of how time-related add-on properties are usually used:

Example	Start offset	Duration / end offset	Bind start offset to end	Bind end offset to end
Display a graphics add- on for the entire duration of a clip, show, or playlist	00:00:00	00:00:00	Deactivated	Activated
Display a graphics add- on 5 seconds after the clip, show, or playlist starts and remove it 10 seconds later	00:00:05:00	00:00:10:00	Deactivated	Deactivated
Display a graphics add- on 20 seconds before the clip, show, or playlist ends and remove it 5 seconds before the clip, show, or playlist ends	00:00:20:00	00:00:05:00	Activated	Activated

Example	Start offset	Duration / end offset	Bind start offset to end	Bind end offset to end
Display a graphics add- on 2 seconds before the clip, show, or playlist ends and remove it 4 seconds later	00:00:02:00	00:00:04:00	Activated	Deactivated
In this case,				
the add-on				
would overlap				
two clips, shows, or				
playlists. This				
is useful, for				
example, for				
displaying				
transition				
effects (wipe, fade, etc.).				

Graphics properties

The following table provides an overview of available graphics secondary event properties:

Property	Description
Add-on sub-type	Graphics sub-type (for example, Singular)
Use payload	If activated, a custom payload text can be entered. If deactivated, the default payload configured in Singular.Live is used instead.
	Input fields for custom payload text are only available for graphics that include dynamic text.

Property	Description
Graphics type-specific properties	Depending on the graphics type, different properties are displayed (for example, scale and position for images or input fields for the dynamic text payloads)

Splicing properties



Notice

Splicing events are part of the Dynamic ad triggering (SCTE 35) feature, which is available as an optional Makalu add-on. For more information, see the section Ad triggering.

The following table provides an overview of available splicing secondary event properties:

Property	Description
Media title	Splicing event title
Туре	Splicing event type
Splice event id	Splicing event id (allows a downstream system to decide how the original content should be replaced or blanked)
UPID type	Splicing event type UPID (allows a downstream system to decide how the original content should be replaced or blanked)
	Only available for splicing secondary events of type Timed
UPID	Splicing event UPID (allows a downstream system to decide how the original content should be replaced or blanked)
Use automatic	If activated, the end splicing event trigger is sent automatically when the event duration is completed
	If deactivated, the end splicing event trigger must be sent manually by the operator

Property	Description
Duration	Splicing event duration (set to the clip length by default)
Send duration	If activated, the splicing event duration is also included in the splicing event trigger
Event offset	Offset for the start time of the splicing event (if set to 00:00:00:00 the splicing event trigger is sent starting with the first I-Frame of the corresponding clip or show the event is assigned to)
Web delivery allowed	If activated, the Web delivery allowed flag is set accordingly in the splicing event trigger, signaling a downstream system that web delivery is allowed for the corresponding content
	Only available for splicing secondary events of type Timed
Regional blackout	If activated, the Regional blackout flag is set accordingly in the splicing event trigger, signaling a downstream system that regional blackout is enabled for the corresponding content
	Only available for splicing secondary events of type Timed
Archive allowed	If activated, the splicing event trigger includes information that signals a downstream system that archiving is allowed for the corresponding content
	Only available for splicing secondary events of type Timed
Device restrictions	Information about restrictions that apply to certain device groups
	Only available for splicing secondary events of type Timed

Property	Description
Avail expected	Total number of avails to be expected
	Range: 0-255 (use 0 to disable this feature)
	Only available for splicing secondary events of type Avail
Avail num	Current avail number
	Range: 0-255 (use 0 to disable feature, must not be greater than Avail expected number)
	Only available for splicing secondary events of type Avail
Auto return	Defines if downstream systems should automatically switch back to the original program content at the end of an avail
	If activated, downstream systems get the information to automatically switch back to the original program content when the avail duration ends (requires that Send duration is also activated)
	If deactivated, downstream systems get the information not automatically to switch back to the original program content. Instead, they must wait until they receive the corresponding message, which is automatically sent by the splicer and triggers downstream systems to switch back to the original program content.
	Only available for splicing secondary events of type Avail

Stream target properties

The following table provides an overview of available stream target secondary event properties:

Туре	Property	Description
YouTube	Title	Stream event title
YouTube	Description	Stream event content description
YouTube	Automatic	Time-related switch
YouTube	Start time	Start date and time of the streaming event
Generic	Source stream	Source to be streamed
Generic	Target type	Target type of the stream (for example, YouTube, Facebook, LinkedIn, Twitch, RTMP, RTMPS)
Generic	Title	Stream event title
Generic	Description	Stream event content description
Generic	Stream URL	Target URL
Generic	Stream key	Stream key (used for authentication)
Generic	Username	Username (if required for authentication)
Generic	Password	Password (if required for authentication)
Generic	Start time	Start date and time of the streaming event

Recording properties

The following table provides an overview of available recording secondary event properties:

Property	Description
Name	Event title (read-only)

Property	Description
Rec Type	Type of recording, for example, "Broadcast" or "Standard" (for more information, see the section Recording > Encoder types) (read-only)
Start Offset	Offset until the recording starts (based on the start of the clip), default: 00:00:00:00
Bind start offset to end	If activated, the start offset will be calculated based on the end of the clip, default: disabled
Bind end offset to end	If activated, the end offset will be calculated based on the end of the clip, default: enabled
End Offset	Offset until the recording stops (based on the end of the clip - only available if Bind end offset to end is enabled), default: 00:00:00:00
Filename	Name of the file to be recorded
	Supports the following placeholders for dynamic replacements:
	• {yyyy} - Current date (year)
	• {mm} - Current date (month)
	• {dd} - Current date (day)
	• {HH} - Current time (hour)
	• {mm} - Current time (minute)
	• {TITLE} - Event title
	Notice: If no file name is provided, the event title is used as the file name.
Folder	Target folder for storing the recorded file
Source	Source stream/signal to be recorded
	Tip: Each playout channel has a configurable default live source, which is pre-selected by default in the Source field. It is used by default when a recording secondary event is attached to a live clip in the rundown. You can change this default source in the Recording tab.

Property	Description
Profile	File format/profile to be used for the recording
Туре	Reusability of the recording job
	Available options:
	Single Shot - Recording job can only be used once
	Multi Shot - Recording job can be reused (incl. all properties)
	Notice: An example use case for a multi shot recording job would be a playlist with a live event that is repeated every hour. A Multi Shot recording secondary event is attached to the live event. It can be used as often as required, and the initially selected properties are used repeatedly to record each live event.
	If the Filename field contains placeholders for dynamic elements (e.g. {yyyy}-{MM}-{dd}-{HH}-{mm}-{TITLE}}), these placeholders are automatically replaced with the corresponding values to differentiate the recorded files based on these dynamic elements of the file name. If no parameters are included, a consecutive number is appended to the file name, e.g1,2,3, etc.

Audio mapping properties

The following table provides an overview of available audio mapping secondary event properties:

Property	Description
Inputs	List/number of audio channels on the input side (for example, 1-8)

Property	Description
Outputs	Audio tracks and channels on the output side, divided by track/purpose (for example, "Full mix", "Original version", "Audio description", etc.) and type (for example, "L" and "R" for the left and right channels of a stereo audio track)

For information, see the section Audio mapping.

2.3.5 Metadata

Basic information

Makalu enables you to add descriptive metadata to playlists, shows, and clips. It can be used for various purposes, such as transmitting content-related program information to downstream systems and/or service providers, for example, metadata to be used for the Electronic Program Guide (EPG).

Within the context of Makalu, metadata is referred to as "keyset". Each keyset consists of one or more individual metadata elements/properties. Makalu also distinguishes between system- and user-specific keysets. System keysets are always available by default (for example, the "EPG" keyset) and cannot be removed. User-specific keysets can be created and configured individually by the user.

You can add a metadata keyset from the library to a playlist, show, or clip using drag and drop. For information about how to add metadata, see the section Creating a playlist or Creating a show, for example.

Metadata properties

The following table provides an overview of available system metadata keysets and their properties:

Keyset	Property	Description
EPG	Short event descriptor	Short description of the content
	Extended event descriptor	Detailed description of the content
	Name	EPG name
	FSK	Parental rating (based on the German motion picture rating system organization FSK, for example, 0, 6, 12, 16, 18)
	DVB content	Content category (for example, news, magazine, comedy, etc.)
	Char code	Character encoding of the EPG information (default: Western European - ISO/IEC 8859)

Keyset	Property	Description
	Language	Language of the EPG information (for example, German or English)

2.4 Automation

2.4.1 Automation

Overview

The Makalu Automation component provides two separate UIs/views, a multichannel view, and a detailed channel view.

The multichannel view (see the section Multichannel view) is only available in multichannel environments. It provides an overview of all available channels, including preview and rundown information.

The detailed channel view (see the section Automation) is available in all environments. It provides full control over the rundown and playout of the corresponding channel.

2.4.2 Multichannel view

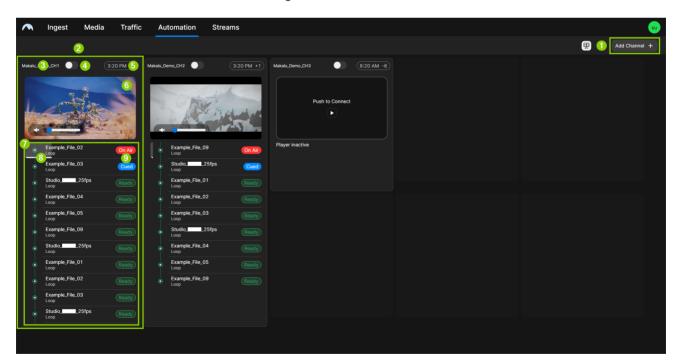
Overview

When Makalu is operated as a multichannel environment, the multichannel view is available in the Automation tab of the Makalu UI. It is a configurable view for monitoring purposes and is particularly suited for operators of multichannel environments to monitor multiple playout channels simultaneously. It is not to be confused with a multiviewer as it not only displays a preview of what is currently being played out, but also the current rundown of each channel. Additionally, it provides access to the detailed view of each channel (see the section Detailed channel view).

It displays channels as tiles, and each tile can be displayed either expanded or collapsed. When all channels are displayed collapsed, up to ten channels can be displayed simultaneously on a monitor with a resolution of 1920 x 1080 px. Which channels are available depends on the access permissions of the current user.

If an error or problem is detected on a channel, the corresponding channel tile is highlighted with a different background color. Depending on the severity of the problem, it is highlighted, for example, in yellow, orange, or red.

The multichannel view consists of the following elements:



Automation - Multichannel view

- 1. Channel selection menu
- 2. Channel tile
- 3. Channel name

- 4. Main/Backup switch (to switch between the preview output of the main or backup player of the corresponding channel)
- 5 Local UTC time of the channel
- 6. Channel output preview



Notice

The preview initially only shows a thumbnail image of the current output of each channel, which is automatically updated after a configurable interval. This keeps the network load on the client side as low as possible, especially if a large number of channels are displayed simultaneously. If required, the actual preview playback can be started, paused, and resumed manually per channel by clicking the PI ay or Pause icon in the preview player area.

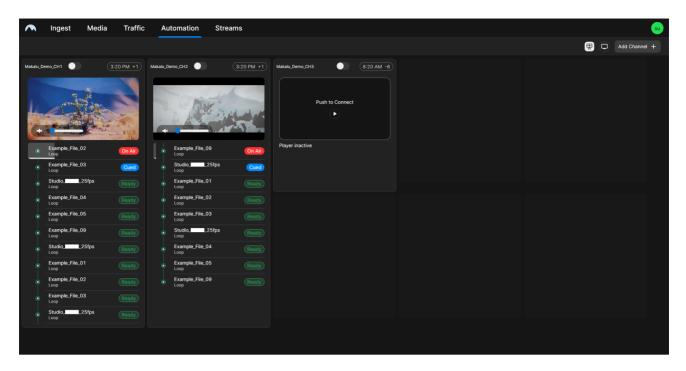
- 7. Rundown (starting with the clip currently being played and followed by the next clips scheduled in the rundown, also across shows)
- 8. Playback progress of the clip currently being played
- 9. Clip status (see the section Channel rundown)

Accessing the multichannel view

To access the Makalu Automation multichannel view, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. Select the Applications tab.
- 3. In the app list in the left column, select Automation > Makalu Automation.

The main Makalu UI is opened in a new browser tab, and the Automation tab with the multichannel view is displayed.



Automation - Multichannel view

Customizing the channel selection

To customize the channel selection, proceed as follows:

- 1. Open the Makalu Automation multichannel view as described in section Accessing the multichannel view.
- 2. At the top right, click Add Channel.

The channel selection menu is displayed, which contains an alphabetically sorted list of all available channels.

3. Select the channels to be displayed from the channel list.



You can search for specific channel names by using the Search menu above the channel list.

4. Confirm your selection by clicking Apply.

The selected channels are displayed as tiles and can be monitored.



You can manually change the order of the tiles displayed by moving them to the desired position via drag and drop.

Customizing a channel tile

The display of the tiles can be customized. The rundown and audio level peak meter can be either shown or hidden. Additionally, the rundown can be displayed either collapsed or expanded.

To customize a channel tile, proceed as follows:

- 1. Open the Makalu Automation multichannel view as described in section Accessing the multichannel view.
- 2. Select the channel tile you want to customize.
 - The tile is highlighted with a white border.
- 3. To expand or collapse the channel rundown display, click the **Expand/Collapse** icon at the bottom right corner of the tile.
- Click the Settings icon at the bottom center of the screen.
 A settings menu is displayed that enables you to show or hide the rundown and audio level peak meter.
- 5. In the settings menu, select the elements to be displayed and deselect the elements to hide.

The tile display is updated based on the selected elements.

2.4.3 Detailed channel view

Detailed channel view

Overview

The detailed channel view is a UI for manually controlling a single Makalu playout channel. Each playout channel is at least connected to one individually controllable player that runs on a playout node. If a channel is operated redundantly, it is connected to two players (main and backup), which can simultaneously be controlled via the detailed channel view.

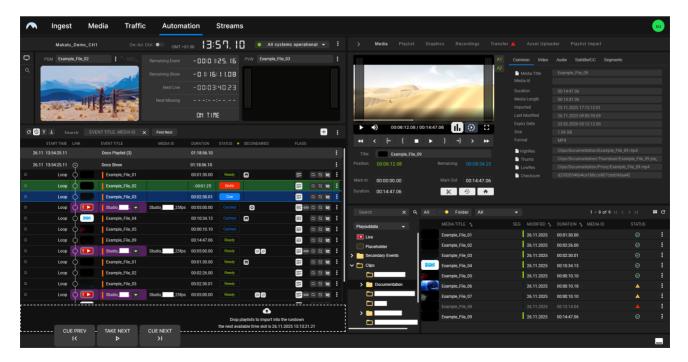
Each player seamlessly plays the video content of a linear playout channel based on a rundown that consists of playlists, shows, and clips. Playlists and shows can be created via either the detailed channel view (for short-term rundown changes) or the Makalu Traffic planning component (for long-term/strategic planning).

Accessing the detailed channel view

To access the Makalu Automation detailed channel view (see the section Automation), proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the middle preview column, click the name of the channel to be opened.

The detailed view of the selected channel is opened.



Automation - Detailed channel view

User interface

Component overview

The UI consists of the following elements:



Automation - UI components

- 1. Makalu UI main navigation
- 2. User menu
- 3. Channel/system information
- 4. Preview area navigation
- 5. Channel preview
- 6. Time-related rundown information
- 7. Next clip preview
- 8. Channel rundown
- 9. Rundown and player controls
- 10. Collapse/expand toggle for the right side and navigation to the areas media, playlist, graphics, recordings, tr ansfer, Asset Uploader, and playlist import
- 11. Media asset preview and information (content varies depending on the selected navigation tab/area)
- 12. Media asset list (content varies depending on the selected navigation tab)

View modes

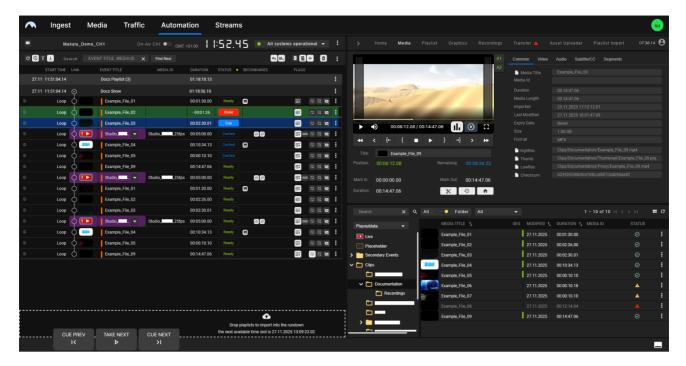
The detailed channel view includes two basic view modes, the "default" and the "simple view", providing users/operators with different display options.

When you first open the detailed channel view, the default view is enabled. It divides the view in half, creating two equal-width sides. On the left side, it displays channel information, preview, and rundown. On the right side, it displays all other areas (for example, media, playlist, graphics, etc.).



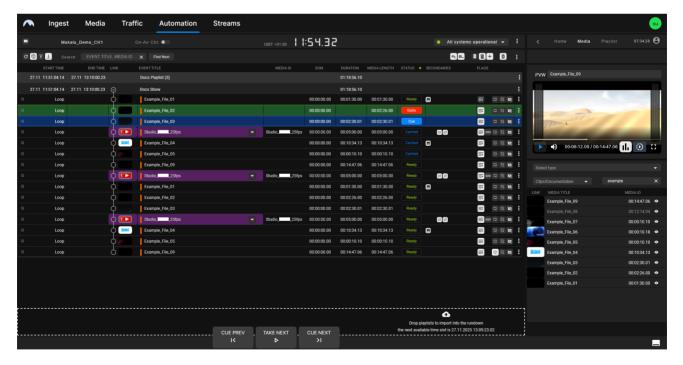
Automation - Default view

The second view mode is referred to as the "simple view" and is more focused on the rundown. It uses all available space on the left side of the screen for the rundown and displays the preview and all other areas on the right side. To switch between the two views, click the **User** icon at the top right and select or deselect **Show simple view**.



Automation - Simple view

In addition, you can collapse and expand the right side by clicking the **Angle** icon to the left of the **Home** tab. This display variant utilizes most of the screen space for the rundown on the left side. It minimizes the contents of the **Home**, **Media**, and **Playlist** tabs on the right side, creating more space for displaying additional columns in the rundown. It is therefore referred to as the "rundown-centric view".



Automation - Rundown-centric view

Makalu UI main navigation

Via the main navigation, you can access all functional areas of Makalu at any time by clicking the corresponding tab.



You can also return to the Makalu Hub by clicking the Makalu logo at the top left.

User menu

The user menu provides the following options:

Option	Purpose
User name	Displays the name of the user currently signed in
Build	Displays the build/version number of the detailed channel view
Open the documentation	Open the Makalu user manual
Copy API Token	Copy an API token to the clipboard (only relevant for development purposes)
Show simple view	Enable/disable the simple view
Switch to Main/Backup	Switch the reference player
Logout	Log the current user out of the Makalu system

Channel/system information

This area includes the following elements/information:



Automation - Channel/system information

- 1. Link to multichannel view (only available for redundant channels)
- 2. Channel name
- 3. Player used as time reference (only available for redundant channels)

- 4. On-Air Ctrl switch
- 5. Channel local time zone
- 6. Channel local time
- 7. System health status indicator
- 8. Channel actions menu

To open the multichannel view, click the **Multichannel** icon (1) on the left side.

The On-Air Ctrl switch (4) is disabled by default. It is only relevant if, optionally, a separate dashboard or an external hardware control panel is used (in addition to the detailed channel view) to trigger changes in the rundown. A typical change in this case would be, for example, switching from a currently running/on-air live source to the next clip. In this case, you must enable the On-Air Ctrl switch to give your instance of the detailed channel view primary control over the rundown regarding the correction of clip start times.

A correction of the start times is necessary if the change was triggered via an external component and if the change results in a time shift of rundown elements. This typically occurs when the switch from a running/on-air live source to the next clip is triggered manually, as it usually causes subsequent elements in the rundown to shift, resulting in different start times. By enabling the On-Air Ctrl switch, these start times are automatically corrected.

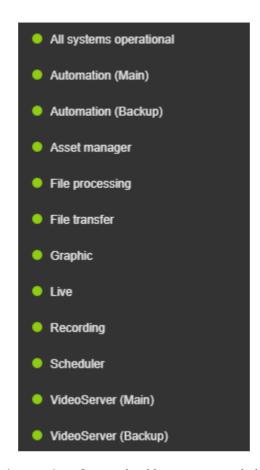


Notice

The On-Air Ctrl switch should only be activated in one instance of the detailed channel view, ideally by the operator actively managing the corresponding channel. This should be considered in particular when the detailed channel view of a specific channel is opened multiple times (for example, by different users at different locations).

The System health status indicator (7) displays the current operating status of the most important internal system components (for example, connection to backend components and player status). The list of available components depends on the actual system configuration.

To display an expanded list of individual components, click the System status indicator.



Automation - System health status expanded

A green icon indicates that the component is running normally, while a red icon indicates an error.

The menu button (8) to the right of the system health status provides access to the available channel actions, for example:

Action	Purpose
Delete graphics	Remove all currently displayed graphics secondary events (applies to the main and backup player, if redundancy is enabled) Notice: This can be useful in emergency situations (for example, if a player error occurs or if graphics are not automatically removed as expected).

Action	Purpose
Restart main/backup player	Restart the main or backup player (requires additional confirmation via dialog)
	Warning: Restart the player only in case of an emergency (for example, if a player error occurs). Restarting the player takes a short amount of time. During this time, no output signal is generated.
Restart main/backup preview	Restart the main or backup preview component (requires additional confirmation via dialog)
	Notice : Manually restarting the preview is only necessary if the preview is not displayed as expected.
Automation	List of Automation-related components that can be restarted
Recording	List of Recording-related components that can be restarted
Streams	List of streams/endpoints that can be restarted

The list of available actions depends on the actual system configuration.

Preview area navigation

The icons in the preview area navigation enable you to switch between the preview () and the search/replace view (). For more information about the search/replace view, see the section Searching for and replacing clips.

Channel preview



Automation - Channel preview

The channel preview consists of the following elements:

- 1. Source selector
- 2. Clip name display
- 3. Options menu
- 4. Recording indicator
- 5. Preview player
- 6. Peak audio meter

The source selector in the top left corner is only available for redundant channels. It enables you to select the source of the preview player below by switching between main ("M") and backup ("B"). For non-redundant channels, there is no source selector. Instead, the source display shows "PGM".

To the right of the source selector, the name of the clip currently playing is displayed.

Right beside the clip name, the following actions are available via the **Options** menu

Action	Purpose
Show Main/Backup	Select the source of the preview player below (identical to the source selector)

Action	Purpose
Show Audio	Open the edit dialog for the clip currently playing to edit the audio mapping (for more information about how to use the audio mapping feature, see the section Audio mapping)
Reload preview	Reload the preview player

In the right upper corner, the recording indicator displays "REC" if a recording is currently in progress (for example, if the clip currently playing is a live source that is being recorded).

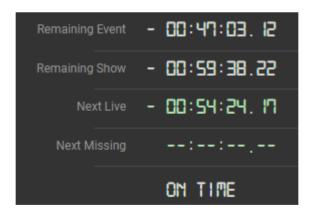
The preview player displays a low-res version of the current player output (backchannel) in real time. It also includes a peak audio meter that supports up to eight audio tracks and indicates the current audio signal level of the channel output.



If you want to use a rundown-focused view, you can hide this area by selecting **User menu > Show simple view**. As a result, the rundown list is extended to the full height of the left side.

In addition, you can collapse and expand the right side by clicking the **Angle** icon to the left of the **media** tab.

Time-related rundown information



Automation - Time-related rundown information

This area provides the following information:

Element	Description
Remaining Event	 Remaining playback time of the clip currently playing, or "LOOP" (the current clip is played in a loop until the operator manually triggers the start of the next clip)
Remaining Show	 Remaining playback time of the current show, or "LOOP" (the current clip is played in a loop until the operator manually triggers the start of the next clip)
Next Live	 Remaining time until the next live clip in the rundown, or "LIVE" (if a live source is currently playing)
Next Missing	Remaining time until the next missing element in the rundown (for example, a placeholder for which the corresponding file is not yet available)
On time / Overtime / Undertime	 Status information, for example, if a live clip runs shorter or longer than originally planned "ON TIME" or time difference regarding the scheduled time of elements in the rundown "OVERTIME" - If a live clip runs longer than originally planned, the start times of all subsequent events in the rundown are automatically updated and rescheduled to a later time (the times displayed in the rundown are updated accordingly) "UNDERTIME" - If there is a gap between the scheduled end time of a clip and the start time of the subsequent clip Tip: You can jump to the corresponding clip or gap in the rundown by clicking the displayed time status.

If you want to use a rundown-focused view, you can hide this area by selecting **User menu > Show simple view**. As a result, the rundown list is extended to the full height of the left side.

In addition, you can collapse and expand the right side by clicking the **Angle** icon to the left of the **media**

Next clip preview



Automation - Next clip preview

The preview player in this area can be used to display either a preview of the next clip to be played (the clip currently cued) or a preview of the backup player output/backchannel (available only for redundant channels). It is useful, for example, to preview and check a clip or a live source before it goes on-air. It also includes a peak audio meter that supports up to eight audio tracks and indicates the current audio signal level of the channel output.

Depending on the currently selected source, in the top left corner, either "PVW" (preview of the next cued clip) or "B" (preview of the backup player) is displayed. Using it to display the preview of the backup player allows you to preview both the main and backup players simultaneously.

To the right of the selected source, the name of the next cued clip is displayed.

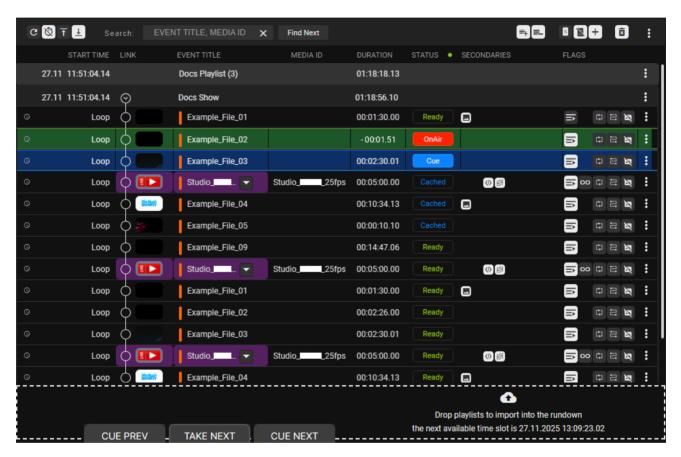
Right beside the clip name display the following actions are available via the **Options** menu **!**:

Action	Purpose	
Show Backup/Preview	Select the source of the preview player below	
Reload preview	Reload the preview player	

If you want to use a rundown-focused view you can hide this area by selecting **User menu > Show simple view**. As a result, the rundown list is extended to the full height of the left side.

In addition, you can collapse and expand the right side by clicking the **Angle** icon to the left of the **media** tab.

Channel rundown



Automation - Channel rundown

This area contains the rundown of the current channel. The rundown list contains all playlists, shows, and clips scheduled for playout. If the display of playlists and shows is enabled for this list, they can be expanded and collapsed.

To enable or disable the display of playlists and shows, use the **Options** menu in the toolbar above the rundown list and enable or display the options **Display playlists** and/or **Display Shows**.

You can also use this menu to enable/display additional columns. If you want to display all available columns, an ultrawide monitor is recommended. Alternatively, you can collapse the right side of the UI by clicking the **Angle** icon ≥ to the left of the **media** tab. This utilizes most of the screen space for the rundown and minimizes the preview and media areas on the right side.

If a clip has assigned secondary events (for example, graphics), it can also be expanded and the corresponding secondary events are listed.

Depending on the type of the currently selected element in the rundown, the toolbar above contains the following elements:

Icon/Element	Description
G	Reload the rundown and update all clip statuses
[Ŏ]	Automatically expand the rundown and jump to the section of the rundown that includes the current on-air clip every 15 seconds Tip: Deactivate this function to make changes in the rundown undisturbed.
[<u>†</u>]	Jump to and select the previous playlist
[<u>+</u>]	Jump to and select the next playlist

Icon/Element	Description
Search: EVENT TITLE, MEDIA ID X Find Next	Search for clips based on their Title or Media ID and find their next (future) occurrence in the rundown
	Notice: This function is helpful, for example, if you want to quickly find out when a specific clip is scheduled.
	Tip: If you want to check the date a specific placeholder was first used in the rundown, search for the placeholder in the media asset list in the M edia tab. If you select a placeholder in this list, its first occurrence in the rundown is displayed in column First Appearance.
[= ₊]	Group selected clips (for more information, see the section Using groups)
[E.]	Ungroup selected clips (for more information, see the section Using groups)
[↑]	Move the selected clip to the top (set it as first clip of the show) (for more information, see the section Moving clips)
[^]	Move the selected clip one position up (for more information, see the section Moving clips)
[+]	Move the selected clip one position down (for more information, see the section Moving clips)
[±]	Move the selected clip to the bottom (set it as the last clip of the show) (for more information, see the section Moving clips)
[0]	Remove fixed scheduled start time from selected element (for more information, see the section Deleting a fixed start time)
6 =	Add the default graphic to the selected playlist, show, or clip (for more information, see the section Assigning or removing the default graphic)

Icon/Element	Description
9 ∕≙	Remove the default graphic from the selected playlist, show, or clip (for more information, see the section Assigning or removing the default graphic)
	Remove the selected playlist or clip
[+]	Create a new playlist (for more information, see the section Creating a new playlist)
•	Open the options menu to access additional actions: • Display playlists - Display/hide playlists (if enabled, playlists can be expanded and collapsed in the rundown) • Display shows - Display/hide shows (if enabled, shows can be expanded and collapsed in the rundown)
	Display mediald - Display/hide the Media ID column
	 Display backup status - Display the Status column also for the backup player (only available for redundant channels - if disabled, the Status column is only displayed for the main player)
	 Show missing assets - Open the Missing assets menu to search for missing assets (see the section Searching for and requesting missing media)

The actual rundown list includes the following information:

Column	Description	
Clock icon	Configure a fixed start time of a show/first clip of a show	
	Depending on whether a fixed time is set or not, the clock icon is displayed as follows:	
	• Small gray clock icon - show/first clip of a show does not have a fixed start time	
	• S Large white clock icon - show/first clip of a show has a fixed start time	
	Tip: To set a fixed start time click the clock icon.	
Start Time	Scheduled/actual start date and time of a playlist, show, or clip	
	Notice: Displays "Loop" if a clip is part of a group that is being looped.	
Link	Distinguish playlists, shows, and clips, expand/ collapse shows, display clip thumbnail	
	The different types of elements are marked as follows:	
	• Playlist - No icon	
	• ☑ / ☑ Circle with arrow icon - Show collapsed/expanded	
	• ☐ Circle icon - Clip	
	•	
	Tip: To expand/collapse a show, click the circle with arrow icon of the corresponding show.	

Column	Description	
Event Title	Name of the primary or secondary event (playlist, show, or clip), indicator for grouped clips, source selection for live sources	
	Notice: Grouped clips are highlighted with an orange indicator (if multiple groups are used, each group is highlighted in a distinct color).	
	Tip: For clips of type "Live", you can change the source to be used by clicking the Select source icon and selecting the corresponding live source.	
Media ID (optional)	Clip Media ID (either a specific ID or, in the case of a live clip, the name of the selected live source)	
	Tip: This column is hidden by default. You can display it by enabling it via the Options menu ! in the toolbar above the rundown.	
Duration	Total playlist, show, clip duration, and remaining time of show/clip currently playing (incl. playback progress bar and countdown during the last 10 seconds before a clip change)	
	Tip: To open the Edit clip menu, click the Duration field of the corresponding clip.	

Column	Description
Status	Clip status, possible values: • Ready (clip is ready to be played)
	Cue (next clip to be played, prepared by the player)
	On Air (clip currently playing)
	• Placeholder (clip is a virtual placeholder)
	 Pending (the file is currently being transferred from the ingest storage to the playout node storage)
	 Cached (file is cached by the player to enable a seamless transition between clips, especially if a very long clip follows a very short clip)
	• Error (file cannot be played)
Secondaries	Indicates if there are secondary events assigned to the show or clip
	The secondary event types are distinguished by the following icons:
	• ■ - Graphics
	• [o] - Recording
	• [Φ] - Script
	• 🗐 - Splicing
	• 🖾 - Subtitle
	• 🗷 - Routing
	• III - Audio Mapping
	Tip: To expand/collapse the list of assigned secondary events, click the corresponding secondaries icon of the clip or show. You can then also edit the properties of each secondary event (except subtitle secondary events) by clicking the Options icon 11 on the right side and selecting Ed it Secondary.
Flags	Clip flags that define how each clip should be played

Column	Description	
•	Open the options menu for accessing additional actions Depending on the selected element the available actions are:	
	• Playlist	
	 Save as - Save the playlist internally under the selected name to make it reusable (first opens a dialog for selecting the playlist name) 	
	 Delete playlist - Remove the selected playlist from the rundown 	
	• Show • Add show - Create a new show	
	 Delete show - Remove the selected show from the rundown 	
	• Clip	
	 Browse for clip - Open the selected clip in the preview in the Media tab and reveal it in the storage folder structure 	
	 Clip info - Open the Clip info menu to display additional clip information 	
	 Fix duration - Reset the clip length to the physical media length 	
	• Edit clip - Open the Edit clip menu	
	 Reload clip - Update the statuses of the selected clip 	
	Delete clip - Remove the selected clip from the rundown	

Secondary events assigned to a clip are listed with the following information:

Column	Description
Start-Offset	Offset until the secondary event is triggered (based on the start of the corresponding clip)

Column	Description	
Туре	Type of the secondary event (for example, Singular.Live graphics, Splicing, Script)	
Title	Title of the secondary event	
Duration	Duration of the secondary event	
Flags	Delete button for removing the secondary event from the clip	

Depending on the type of the primary event and/or the severity level, the following highlight (row background) colors and icons are used in the rundown:

Color	Icon	Primary event type/severity level
Yellow	A	Placeholder
Purple		Live
Red	•	Missing
Orange	•	Gap
Green		On air
Blue		Cued

The duration of a primary event is also highlighted in different colors, depending on whether the duration corresponds to the physical media length or is set shorter/longer. In this case, the following colors are used in the duration field:

Color	Duration
White	Set duration corresponds exactly to the physical media length
Yellow	Set duration is shorter than the physical media length
Red	Set duration is longer than the physical media length (also applies to live elements with activated Open End flag)

Tip: Resetting the duration of an event

If the set duration of a primary event is either shorter or longer than the physical media length, and you want to reset the duration to the exact physical media length, use the **Options** menu **1** on the right side of the event row and select **Fix duration**. In the following dialog, you can decide whether you want to reset the duration only for the selected clip or for all occurrences of the clip (that reference the same media asset) across all shows and playlists currently in the rundown.

Below the rundown list, a dropzone is available for adding playlists to the rundown via drag and drop.



Automation - Dropzone for adding playlists to the rundown

Rundown and player controls



Automation - Rundown and player controls

Via the rundown and player controls, you can manually trigger actions to control the player(s) of the corresponding channel. By default, these actions are triggered immediately when you click the corresponding button. The behavior of the controls is customizable. There is an optional security feature, that, if enabled, highlights the selected action first and requires you to confirm the actual trigger with an additional click.

The rundown and player controls provide the following actions:

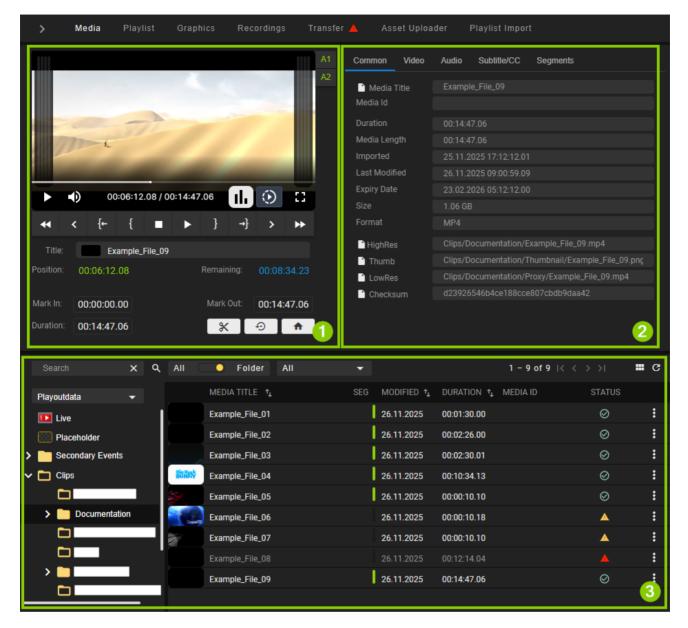
Action	Description
Cue Prev	Prepare the previous clip for playback
Take Next	Start the playback of the currently prepared/ cued clip
Cue Next	Either prepare the first clip in the rundown for playback (if no clip is currently cued) or prepare the next clip after the currently cued clip for playback

Action	Description
Sync	Synchronize rundown and player
	Notice : This action should only be used in case of an error, if rundown and player are not synchronized as expected.
Uncue	Uncue the clip currently cued
Stop	Stop the playback of the clip currently playing
Eject	Stop playback and eject player (set to idle)

Notice

The control buttons on the left side are always displayed by default. The buttons on the right side are hidden by default and can be manually displayed. If these buttons are not displayed, you can display them by clicking the **Show controls icon** at the bottom right of the screen. To hide these buttons, click the **Hi de controls icon** at the bottom right of the screen.

Media



Automation - Media tab

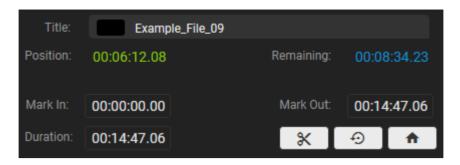
The **Media** tab contains the following elements:

- 1. Media asset preview
- 2. Media asset metadata
- 3. List of available media assets

The preview player provides the following controls:

Icon	Description
44	Fast rewind
<	Previous frame
{←	Jump to mark in
{	Set mark in
	Stop
>	Play
}	Set mark out
→}	Jump to mark out
>	Next frame
→	Fast forward
→	Mute/unmute audio, set volume level
	Hide/show peak audio meter
③	Change playback speed
1:	Enable/disable full-screen playback
A1	Mute/unmute audio channel

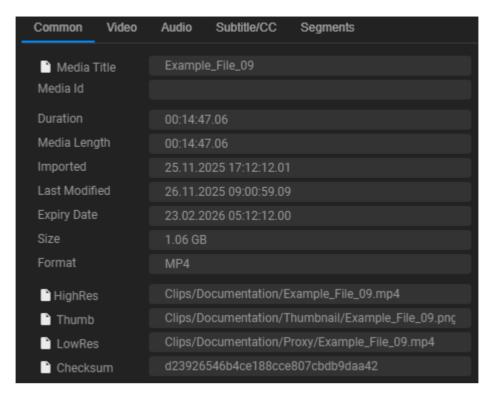
Below the player controls the following time-related information of the file currently being previewed is displayed:



Automation - Preview (time-related information)

Element/Icon	Description
Media/thumbnail with file name	Draggable element for adding the media asset to a show in the rundown, including the currently set mark in and mark out timecodes
Position	Current playback timecode
Remaining	Remaining playback duration
Mark In	Mark in timecode
Mark Out	Mark out timecode
Duration	Total media asset duration
*	Create a reusable segment from the selected media asset by applying the currently set mark in and mark out timecodes (for more information, see the section Creating media segments and adding them to the rundown)
a	Save changed mark in and mark out points of the selected segment
9	Reset mark in and mark out points of the selected segment
^	Load the parent asset of the selected segment into the preview player

To the right of the player window, the technical metadata of the file currently being previewed is listed. This section is divided into the tabs **Common**, **Video**, **Audio**, **Subtitle/CC**, and **Segments**.

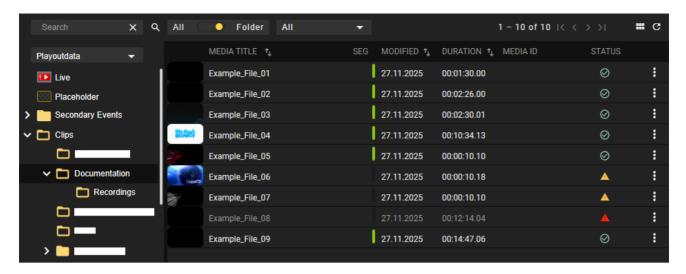


Automation - File metadata



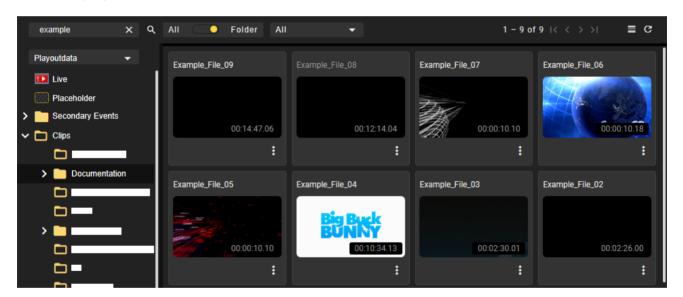
If a **Copy icon** is displayed on the left side of a metadata item, you can copy its value to the clipboard, by clicking the corresponding icon. You can paste it, for example, into the search field above the rundown to search for specific clips based on their **Title** or **Media ID**.

Below the preview player and the time-related information, the media asset list is displayed. Depending on the selected entry in the **Source** dropdown menu at the top left, this section lists either all files available on the ingest storage or on the playout nodes that are assigned to the currently selected channel. By default, the "table view" is enabled for the media asset list.



Automation - Media asset list (table view)

Alternatively, the media asset list also provides the "grid view". It displays each media asset with a large thumbnail image and the duration as an overlay. You can switch between both modes via the view switch at the top right above the media asset list.



Automation - Media asset list (grid view)



While the grid view is enabled, you can preview available live sources by selecting **Live** as asset type and hovering your mouse over the corresponding live source thumbnail image.

The toolbar of the media asset list contains the following elements:

Playoutdata ▼

Select source

The source of the media assets to be displayed in the media asset list

Available options are:

- Playoutdata central ingest storage, for example, S3 (displayed name can be customized, usually named "Playoutdata")
- Local_Playout_Storage /
 Main / Backup local
 playout node storage
 (name can be
 customized, usually
 named
 "Local_Playout_Storage"
 or "Main" or "Backup",
 depending on whether it is
 a redundant or nonredundant system)

Notice: If the local playout storage is selected, the Aging Date is displayed as an additional column in the media asset list. This displays the time when a corresponding file is automatically deleted from the local playout node storage (if the file is no longer used in the rundown) by the housekee ping. It is used to prevent the local storage of the playout node from filling up.

Notice: The status of file transfers from the central storage to the local storage of the playout nodes can be seen from the colored bar on the right-hand side of the **Media**

Icon/Element	Name	Description
Search X	Title filter	Search media assets of the currently selected type (Live, Placeholder, Secondary Events, or Clips) based on their Title or Media ID
All Folder	Title filter folder toggle	Search for the term entered in the title filter either only in the currently selected folder (default, if the toggle is set to Folder) or in all available folders (if the toggle is set to All) (only available if asset type Clips is selected)
Live sources ▼	Live source type filter	Filter the available live sources based on their type (only available if asset type Li ve is selected) Available options are: • HLS Set - all available HLS live sources (red icon) • SRT Set A - Set A of SRT live sources (blue icon) • SRT Set B - Set B of SRT live sources (green icon) • Backchannel - returned
		playout channel outputs (black icon)
All • Channel	Live source channel toggle	Switch between all available live sources of the selected type (default) and channel-specific live sources of the selected type

Icon/Element	Name	Description
All Connected	Live source connection status toggle	Switch between all available live sources of the selected type and connected live sources (default) of the selected type
All	Time filter	Filter the displayed media assets based on the date they were imported into the system Available options are: • All (default, no time filter applied) • Today • Yesterday • Last week • Last month
	View switch	Switch between table view (enabled by default) and grid view Notice: The view switch is only available in the view modes "default" and "simple". It is not available in the "rundown-centric view".
C	Reload assets	Refresh the media asset list

If you select a media asset, different columns and metadata are displayed in the list, depending on the selected type.

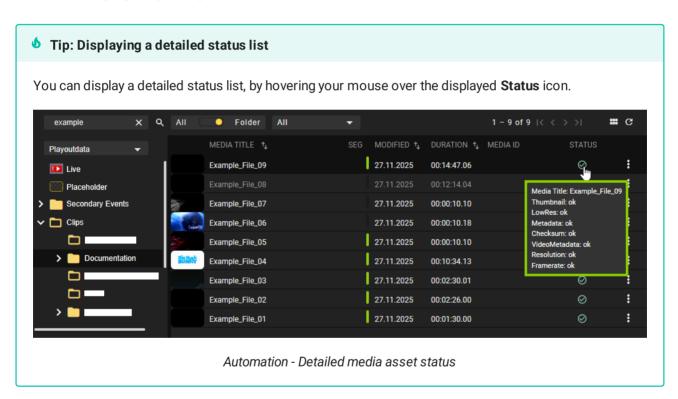


Some of the columns in the list are sortable. You can sort a column by clicking the **Sort** icon to the right of the corresponding column title.

The thumbnail image to the left of the **Event Title** column is marked with **CC** if subtitles were uploaded for the selected file. If you preview such a file, you can select the subtitle language to be used or enable/disable the subtitle display by clicking the **CC** icon in the preview player and selecting the corresponding option.

Media assets for which reusable segments have already been created are recognizable by the total number of created segments displayed in the **SEG** column. For more information about creating segments, see the section Creating media segments and adding them to the rundown.

The **Status** column provides an aggregation of several statuses for each file, that includes checks of thumbnail, proxy file, metadata, checksum, video metadata, resolution, and framerate. It either displays a green checkmark or a red warning sign, depending on whether all checks were successful or if an error occurred.

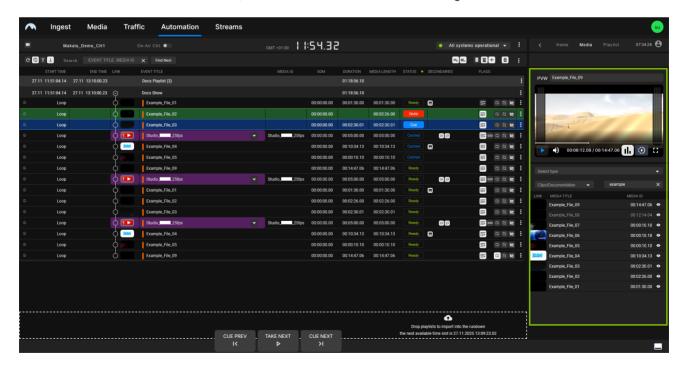


The following actions are available via the **Options** menu **1** on the right side of each row in the list:

Action	Purpose
Preview asset	Open the selected asset in the preview player (available for media items of type live, placeholder, and clip)
	Tip: Placeholders cannot be played back because they are virtual assets. Opening a placeholder in the preview player displays the metadata of the corresponding asset. This enables you, for example, to copy the Title or Media ID of the selected placeholder asset to the clipboard and paste it into the search field above the rundown. This way you can find all occurrences of the asset in the rundown. Tip: If you hover your mouse over the Path metadata item, the full file path is displayed which indicates where the corresponding file is expected.
Delete placeholder	Delete the selected asset (only available for media items of type placeholder)
Re-process asset	Trigger a full file processing again for the selected file (only available for media items of type clip) and afterward, trigger file transfer from ingest storage to playout nodes again
	Tip: This can be useful if there is a problem with a file (for example, a proxy file does not exist), which is indicated by a red warning sign in the St atus column.
Re-process thumb	Trigger the file processing again only for the thumbnail image of the selected file (only available for media items of type clip)

Action	Purpose
Upload asset	Trigger file transfer from central ingest storage to local playout node storage (only available for media items of type clip)
	Notice: The transfer is only executed if a file change is detected on the central storage that deviates from the file on the local storage (based on the file checksum).
Request media	Request initial or renewed transfer of the corresponding file from a connected MAM to the ingest storage (only available for media items of type placeholder when the system is connected to an external MAM)
	Notice: This function can also be triggered via the Missing assets menu as described in section Se arching for and requesting missing media.

If the rundown-centric view is enabled, the **Media** tab is minimized on the right side.

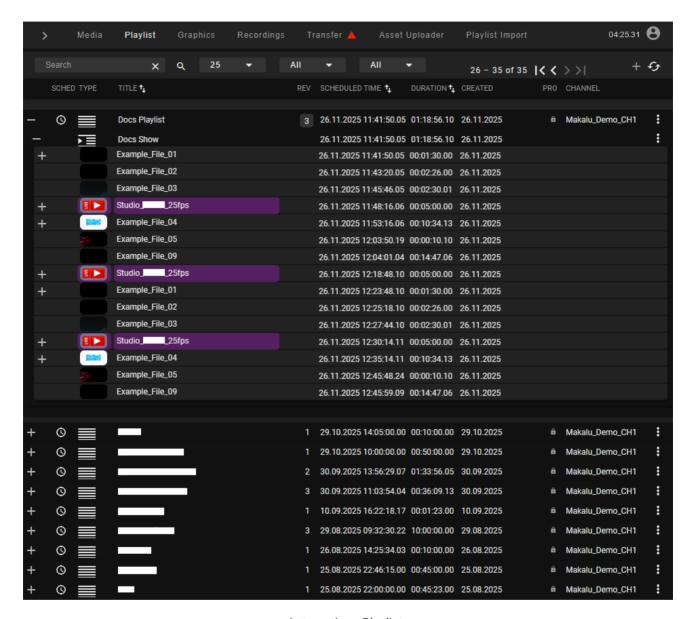


Automation - Media tab in rundown-centric view

In this display variant, the media information displayed is reduced to a minimum, and the preview player provides basic preview functionality. Media type and folders can be selected via corresponding dropdown menus. Media items can be added to the rundown in the same way as in the default or simple view mode (for

more information, see the section Adding media to the rundown). The same applies to replacing a clip in the rundown with another media item (for more information, see the section Replacing a clip with another media item).

Playlist



Automation - Playlist

The **Playlist** tab contains all available playlists of the current channel. Each playlist can be expanded to list all included components (shows, clips, secondary events, and metadata). See the section Schedule for information about how to create playlists.

The toolbar at the top contains the following elements:

Element/Icon	Description
Search X	Search for a playlist by title
25 ▼	Number of playlists to display
AII ▼	Filter the displayed playlists based on their scheduled airtime
	Available options:
	• Today
	• Tomorrow
	• Next 7 days
	• Next 14 days
	• Next 30 days
	• Past (default)
	• All
+	Add the selected playlist to the rundown
	The position/time where the playlist is added to the rundown depends on the following:
	 if the playlist does not have a fixed start time, it is appended to the rundown as the last element (directly after the previous last playlist, without creating gaps)
	• if the playlist does have a fixed start time, but you leave the Sched checkbox unchecked, it is appended to the rundown as the last element (directly after the previously last playlist, without creating gaps), ignoring the fixed start time
	• if the playlist does have a fixed start time and you activate the Sched checkbox, it is appended to the rundown corresponding to the fixed start time (creating a gap if the start time is not set directly after the end of the previous playlist)

Element/Icon	Description
豆	Delete the selected playlist
Ð	Reload the list of available playlists

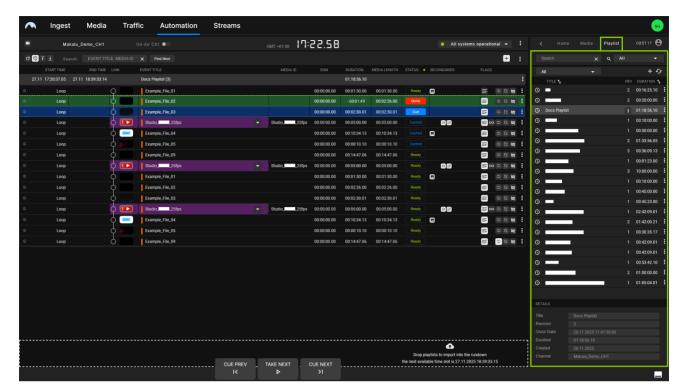
The list of playlists includes the following information:

Column	Description
±	Expand the playlist to display a list of included shows, and expand further to display a list of clips included in a show
Sched	If enabled, the playlist can be added to the rundown using its planned start time as a fixed time (for more information, see the description of the playlist toolbar)
Type	Icon of the corresponding type of rundown element: •
Title	Playlist/show title

Column	Description
Rev	Playlist revision
	Depending on whether a playlist is used in the rundown, the revision number is highlighted as follows:
	• Not highlighted - the playlist is not used in the rundown
	Highlighted with gray background color - the latest version of the playlist is used in the rundown, and no update is available
	• 13 Highlighted with yellow background color - an older version of the playlist is used in the rundown, but can be updated to the latest version
	Tip: You can jump/scroll to the corresponding playlist in the rundown by clicking the highlighted revision number.
Scheduled time	Planned start time of the playlist
Duration	Playlist duration
Created	Playlist creation date and time
Pro	Indicates if the playlist is protected. If enabled (recognizable by the Protected icon (), the playlist cannot be automatically deleted by housekeeping.
Channel	Name of the playout channel for which the playlist was created or "Global" if the playlist is not assigned to a playout channel (for example, if the playlist was not created via Makalu Traffic but imported from a connected NRCS (Newsroom Computer System) and no channel is specified)

b Tip

Some of the columns in the list are sortable. You can sort a column by clicking the **Sort** icon 1 to the right of the corresponding column title.

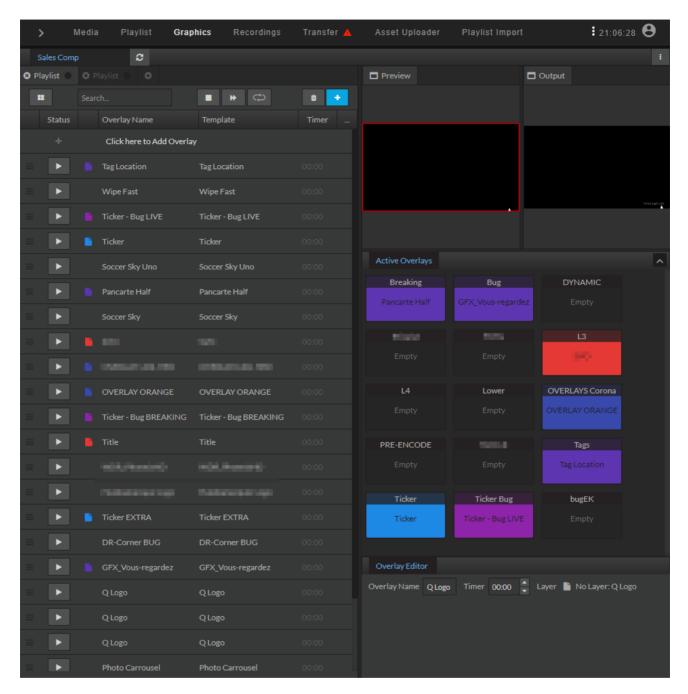


If the rundown-centric view is enabled, the **Playlist** tab is minimized on the right side.

Automation - Playlist tab in rundown-centric view

In this display variant, the playlist information displayed in the list is reduced to a minimum. Details of a selected playlist are displayed below the list. Playlists can be added to the rundown in the same way as in the default or simple view mode (for more information, see the section Adding an existing playlist to the rundown). The same applies to updating a playlist (for more information, see the section Updating a playlist). As playlists cannot be expanded when the rundown-centric view is enabled, only entire playlists can be added to the rundown, but not selected individual elements/clips used in a playlist.

Graphics



Automation - Singular.Live graphics dashboard

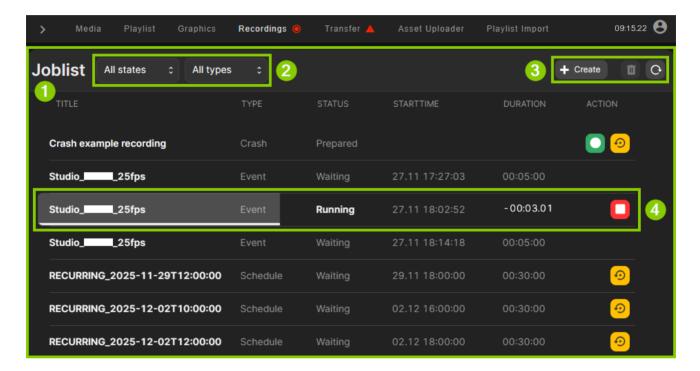
The **Graphics** tab includes an embedded version of the Singular. Live composition dashboard, allowing you to manually trigger Singular. Live graphics for the current channel directly from within Makalu Automation.

For more information about how to use graphics, see the Graphics section.

Recordings



The **Recordings** tab and the corresponding secondary event type listed under **Media > Secondary Events > Recordings** are only available if the optional Makalu Recording module is enabled for the currently selected playout channel. For more information, see the section Recording.



Automation - Recordings

The **Recordings** tab provides a list of current recording jobs and enables you to create new recording jobs. For more information about how to create recordings, see the section Recording.

The tab contains the following areas:

- 1. Job list List of current recording jobs
- 2. Job filter Options for filtering the job list based on the job status and type
- 3. Job list controls Controls for creating/deleting a recording job and refreshing the job list
- 4. Recording job A single recording job, listed with job properties and controls

In the job list, the following information and controls are displayed for each job:

Element	Description
Title	Title of the recording job

Element	Description
Туре	Type of the recording job (event, crash, schedule, or recurring); for more information, see the section Recording job types
Status	Status of the recording job
Start time	Start time of the recording job
Duration	Notice: A duration can only be displayed if the corresponding live primary event to be recorded has a scheduled end time. If the Open End flag is enabled for the event, there is no duration to be displayed.
Action	Available actions for the recording job (start, stop, cancel, and delete via the corresponding action button; info and delete via the Options menu

While a recording job is being processed, which is indicated by the status Running, a progress bar is displayed in the background of the corresponding job list item.

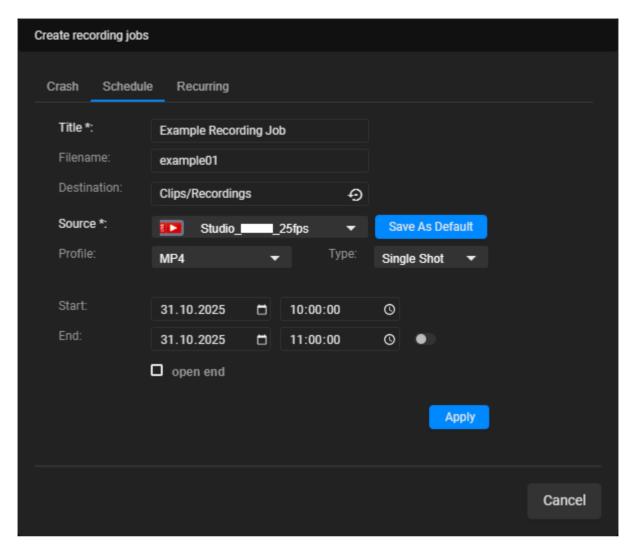
When creating a recording job manually via the Create button above the job list, the Create recording jobs menu opens, which provides the following job properties:

Notice

The create button is only available if the optional feature for manually creating recording jobs is enabled. It is part of the Makalu Recording module and can be disabled, for example, if event-based recording should be the only available type of recording. In this case, the Create button is not available.

Notice

The available properties depend on the recording job type (Crash, Schedule, or Recurring) that you select at the top of this menu.



Automation - Create recording job

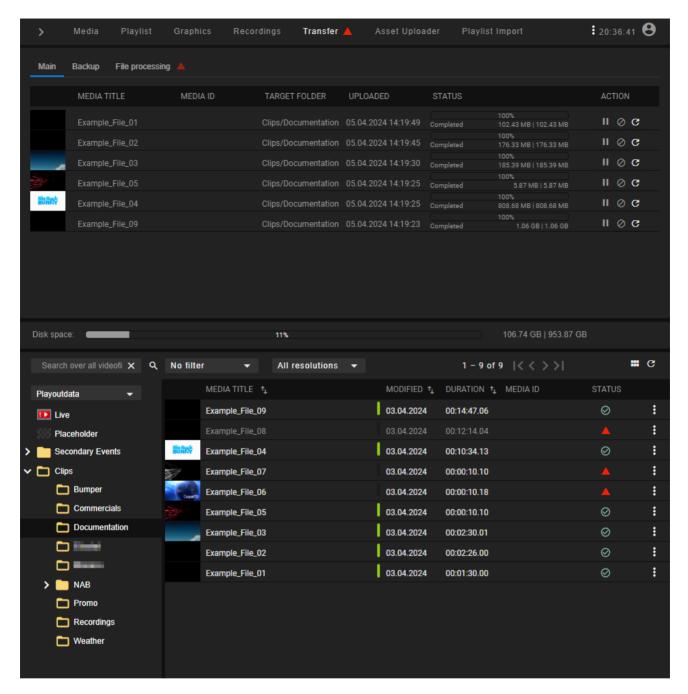
Name	Description
The following properties are available for all recording job types	
Title	Title of the recording job
Filename	Name of the file to be recorded
	Notice: If no file name is provided, the title is used as the file name.
Destination	Destination folder where to store the recorded file
Source	Source stream (live source) to be recorded
Save As Default	Set the currently selected source as the default source

Name	Description
Profile	Format/recording profile of the file to be recorded
	Notice: The list of available profiles contains all profiles supported by the corresponding recording unit.
Туре	Type of the recording job, available options:
	 Single shot - to be used for single file recording jobs (after the recording job has been completed, it cannot be used again)
	 Multi shot - to be used for multi-file recording jobs (the recording job can automatically be created again to record another file; each time another recording is started, a consecutive number is appended to the file name)
	Notice: A typical use case for this would be, for example, a playlist that contains a live source and is played in loop mode. The live source should be recorded each time it is played. By using the multi shot type, the recording job required for this is automatically recreated for each loop.
The following properties are only available for	scheduled recording jobs
Start	Start date and time of the scheduled recording job
End	End date and time of the scheduled recording job
Duration	Duration of the scheduled recording job
	Notice: The duration is only available if the toggle switch next to the end time is enabled.
Open end	If enabled, a scheduled recording job without an end time is created, which must be stopped manually
The following properties are only available for recurring recording jobs	

Name	Description
Start date	Start date and time of the validity period of the recurring job
End date	End date and time of the validity period of the recurring job
Recurring	Weekdays for which to create a recurring recording job (either daily or one or multiple specific weekdays)
Start	Start time of the recurring recording job
End	End time of the recurring recording job

Transfer

In the **Transfer** tab, all file transfers from the central ingest storage to playout nodes are listed, that are currently running or were recently finished. It also provides an overview of file processing jobs. When a file transfer or processing job is currently in progress or has ended with an error, the corresponding status icon is displayed to the right of the corresponding tab name (Main, Backup, File processing, and Transfer).



Automation - File transfer list

For redundant channels, two tabs at the top left of this area enable you to select either the **Main** or **Backup** playout node (for non-redundant channels, only one tab is displayed for the main channel). Depending on your selection, the corresponding file transfers are displayed. The number in brackets beside the playout node name indicates the number of file transfers to this node that are currently running. The columns of the list provide details about each file and the transfer progress.

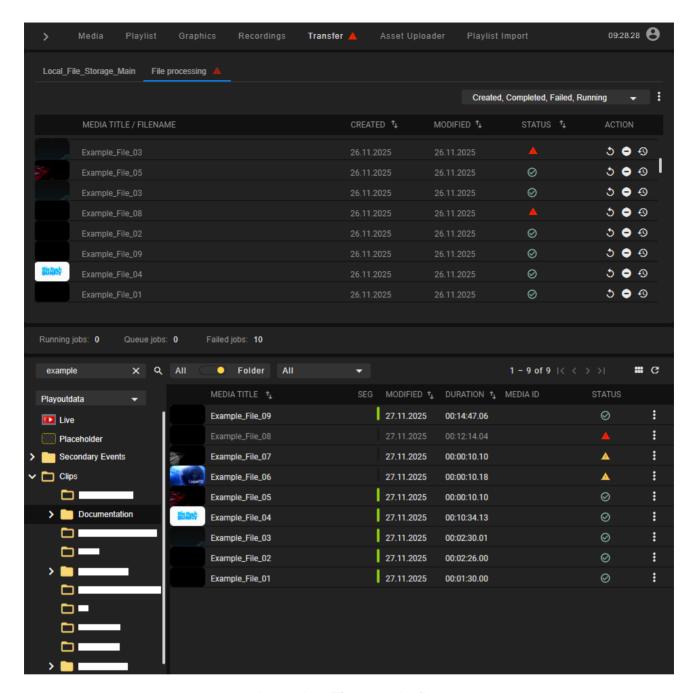
The action column provides the following elements:

Icon/Element	Description	
П	Pause file transfer	
	Cancel file transfer	
C	Retry/re-trigger file transfer	

Below the transfer list, in the **Disk space** area, the available storage space of the selected playout node is displayed.

For information about how to trigger a file transfer manually, see the section File transfer.

The **File processing** tab at the top left of this area displays a list of file processing jobs that are currently running or were recently finished. When a file is uploaded to the central ingest storage, a corresponding file processing job is automatically created and added to the list.



Automation - File processing list

Via the dropdown menu above the file processing list, you can filter the list by job status (created, completed, failed, and/or running). Right beside the dropdown menu, there is an options menu with additional display options for the file processing list. The columns of the list provide details about each file processing job.

During file processing, a progress bar is displayed for each job, showing the current processing phase (download, pre-processing, processing, or post-processing).

A file processing job can have one of the following statuses:

Icon	Description	
⊘	Processing successfully completed	
<u> </u>	Processing is currently in progress	
<u> </u>	Error during processing	



You can display additional status details by hovering your mouse over the corresponding status icon.

The action column provides the following elements:

Icon/Element	Description		
2	Restart complete file processing		
0	Cancel file processing		
•	Restart file processing for selected files (available options: checksum, low-res proxy, and/or thumbnail)		

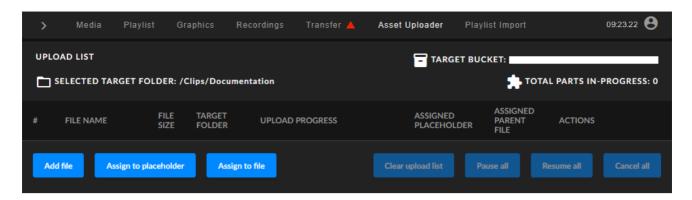
Below the file processing list, additional statistics are displayed (running jobs, queued jobs, and failed jobs).

For information about how to trigger a file processing manually, see the section File processing.

At the bottom of the **Transfer** tab, the media asset list is displayed. This is the same list with the same functionality as in the Media tab.

Asset Uploader

The **Asset Uploader** tab integrates the functionality of the Asset Uploader into the Makalu Automation UI.

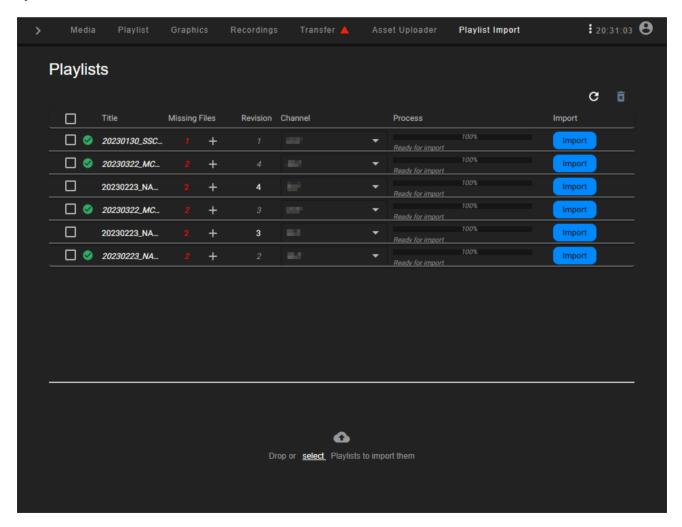


Automation - Asset Uploader

For information about how to use the Asset Uploader, see the section Ingest.

Playlist Import

The **Playlist Import** tab enables you to import XML-based playlists created by Makalu or by third-party traffic systems.



Automation - Playlist import

The list of imported playlists provides the following information:

Column	Description		
Title	Name/title of the playlist		
Missing Files	Number of files missing on the ingest storage		
	Notice: For each imported playlist, a missing file list is created. This list includes all files that are used in the imported playlist but are not yet available on the ingest storage. For each of these files, a placeholder asset is automatically created, so that the playlist can already be used in a rundown.		
	Notice: Missing file lists can also be exported. For more information, see the section Exporting a missing file list.		
Revision	Playlist revision number (each time a playlist with the same name/title is imported, the revision number is increased)		
Channel	Target channel		
Process	Progress/status of the playlist processing/ import		
Import	Start the playlist import		

For more information, see the section Importing a playlist.

Adding elements to the rundown

Creating a new playlist

In addition to creating playlists via the Makalu Traffic planning component (for long-term/strategic planning), playlists can be created and added to the rundown via the detailed channel view (for short-term rundown changes). This feature is specifically designed for TX operators and users with similar areas of responsibility who need to be able to make quick, last-minute rundown changes.



Notice

Playlists created via the detailed channel view of the Makalu Automation can only be used and edited in the detailed channel view. They are not available in Makalu Traffic.

To create a new playlist and add it to the rundown, proceed as follows:

- 1. Enable the display of shows in the rundown by clicking the **Options** icon in the toolbar above the rundown and selecting **Display shows**.
- 2. Click the **Add playlist** icon + in the toolbar above the rundown.

The Create Playlist dialog opens.

- 3. Enter and select the playlist properties:
 - a. Enter a Playlist Title.
 - b. Enter a **Show Title** for the first show to be created and added to the playlist.
 - c. Under Start Time, select the planned start date and time of the playlist.
 - d. (Optional) To use a fixed start time, enable set fix Start Time.
 - e. Under **Duration**, enter the planned duration of the playlist.
- 4. Click Create.

The playlist and the show are created with the selected properties and added to the rundown.

5. Expand the show by clicking the **Expand** icon in the link column.

The show is expanded. The planned duration of the playlist is also applied to the show.



◆ Tip

You can use the expanded area below the show as a dropzone for adding available media to the show via drag and drop.

6. Add media to the show via the **Media** or **Playlist** tab. To do this, you can either:

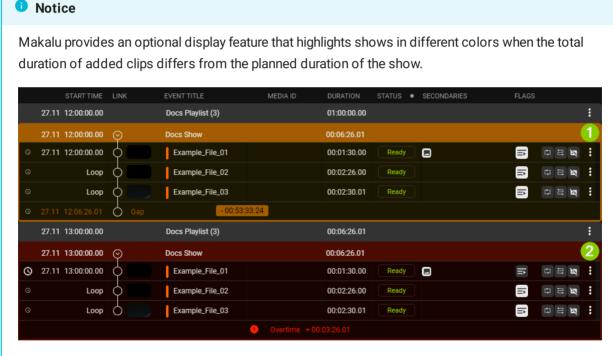
- a. Add media (primary events),
- b. Add media segments,
- c. Add secondary events, and/or
- d. Add items from an existing playlist.

Notice

If you used a fixed start time when creating the playlist, the selected time will be applied to the first primary event added to the show.

The remaining time of the show to be filled is updated accordingly in the **Duration** column.

7. Repeat step six until the show is completely filled or has reached the required duration.



Automation - Show planned duration not reached/exceeded

If this feature is enabled, and a show's planned duration is not reached ("undertime"/gap), it is highlighted in orange (1). This also applies to each newly created show because it is initially empty and does not contain any clips yet. Therefore, the remaining time to be filled matches the planned duration of the show and is listed as a gap and highlighted in orange. If a show's planned duration is exceeded ("overtime"), it is highlighted in red (2).

- 8. (Optional) Add more shows to the playlist by following the steps described in the section Creating a new show, and add media to it by repeating step six.
- 9. (Optional) To save the playlist for reusing it at a later time, proceed as follows:

- Click the **Options** icon of the playlist and select **Save as**.
 - The Create Playlist dialog opens.
- b. Enter a **Title** for the playlist.
- c. Click Apply.

The playlist is saved. It can be added to the rundown via the **Playlist** tab.

Creating a new show

You can create a new show and insert it after an existing show in the rundown.



Notice

Shows created via the detailed channel view of the Makalu Automation can only be used and edited in the detailed channel view. They are not available in Makalu Traffic.

To create a new show, proceed as follows:

- 1. Enable the display of shows in the rundown by clicking the **Options** icon in the toolbar above the rundown and selecting Display shows.
- 2. Click the **Options** icon of the show after which you want to insert the new show and select **Add show**. The Create Show dialog opens.
- 3. Enter and select the show properties.
 - a. Enter a Show Title.
 - b. Under **Start Time**, select the planned start date and time of the show.
 - c. (Optional) To use a fixed start time, enable set fix Start Time.
 - d. Under **Duration**, enter the planned duration of the show.
- 4. Click Create.

The show is created with the selected properties and added to the rundown at the selected position.

Adding media to the rundown

In addition to playlists, you can also add media assets (video files, secondary events, live sources, or placeholders) to the rundown by adding them to a show in a playlist.

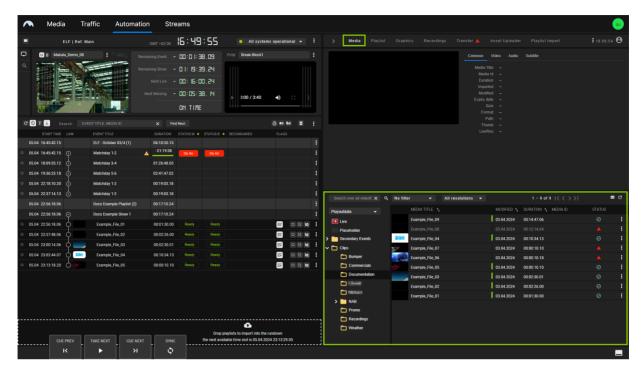
To do this, proceed as follows:

1. (Optional) To expand a show, click the corresponding **Expand** icon in the link column.

The show is expanded, and all included clips are listed.

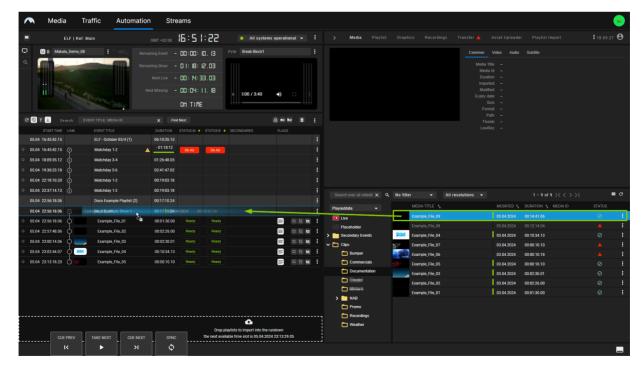
2 On the right side, select the **Media** tab.

Based on your access permissions, all available media assets are listed in the media list.



Automation - Show expanded and media tab opened

3. Select one or more media assets (video files, live sources, or placeholders) from the media list on the right side and add them to a show in the rundown on the left side via drag and drop.

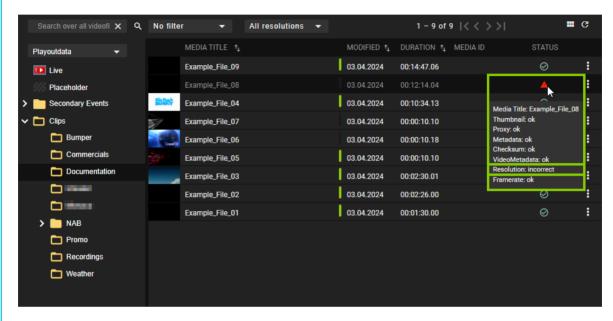


Automation - Add media assets to a show

Notice - Checking resolutions and framerates

When adding a video file media asset to the rundown, its resolution and framerate should usually match the channel output properties exactly. For example, if you use a channel that is configured for 1080p and 25 fps output, you should use files with a resolution of 1920 x 1080 px and a framerate of 25 fps.

Video files with properties that differ from the current channel output configuration are displayed with a gray font color in the media list and a red warning icon in the **Status** column. When you hover your mouse over this icon, additional status details are displayed, including information about resolution and framerate. In this case, one or both of these display properties are displayed as incorrect.



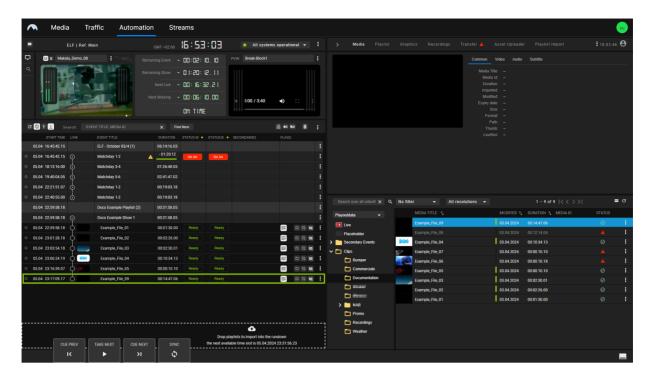
Automation - Video files with resolutions and framerates that do not match the channel output properties

By default, you cannot add video files that use other resolutions and/or framerates than the current channel output configuration.

Notice - Adding consecutive SRT live sources

If you want to add multiple consecutive SRT live sources (without any file-based clips in between), you must add them alternately from the live source SRT Sets A and B. Both are listed and selectable as separate live source types in the media list. For more information, see the section Playing SRT live sources in A/B mode.

The selected video file, live source, or placeholder is added to the rundown as the last clip of the selected show.



Automation - Video files added to a show

Tip - Replacing clips

Instead of adding a clip at the end of a show, you can also replace an individual clip in a show by dragging and dropping one or more new media items directly on the clip to be replaced while holding [Ctrl]. For more information, see the sections Replacing a clip with another media item and Replacing a clip with another playlist item.

To add a new clip before an existing clip in a show, drag and drop the new clip on an existing clip (without holding **[Ctrl]**).

Notice - File processing and transfer

If an added file is not available on the playout nodes of the channel, file processing and file transfers are automatically initiated, and the corresponding clip is listed as **Pending** in the rundown. The corresponding file is copied from the ingest storage to all playout nodes that are assigned to the channel. See the section File transfer for more information.

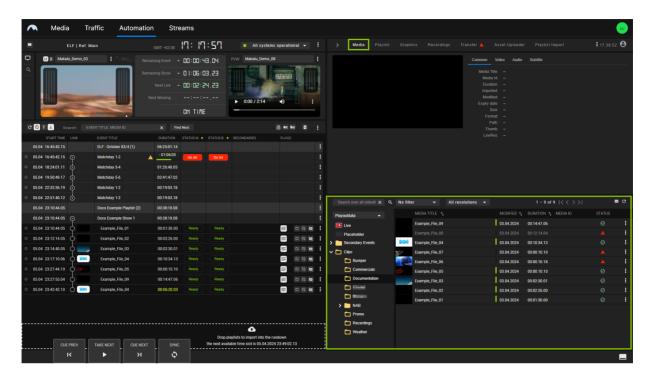
4. (Optional) Change the show's clip list order to move the added clip to a specific position within the selected show.

Adding secondary events to the rundown

To add a secondary event to the rundown, proceed as follows:

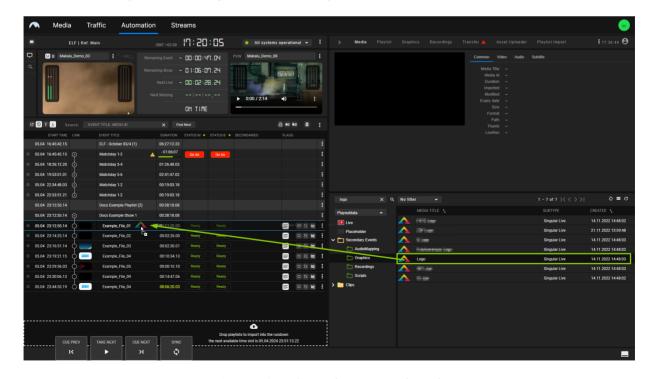
On the right side, select the **Media** tab.

All available media items are listed in the media list.



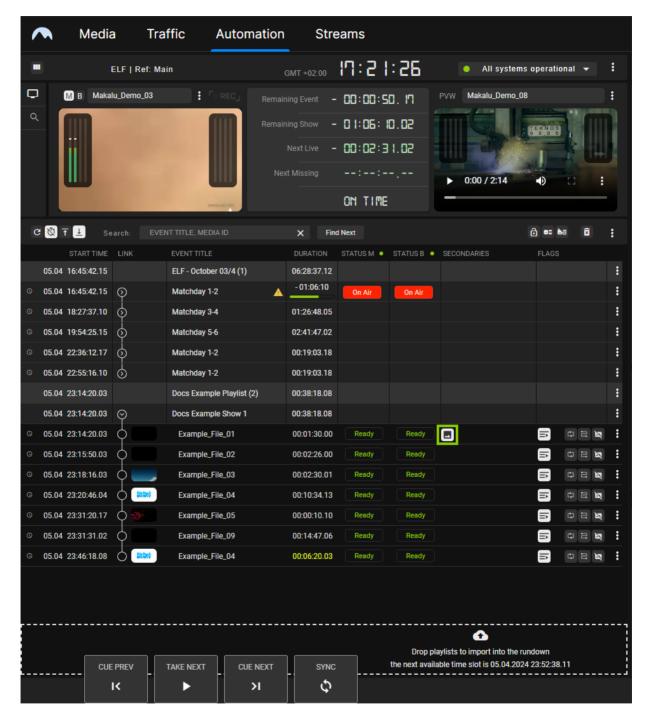
Automation - Show expanded and media tab opened

- 2. In the media list, click **Secondary Events** and select the type of secondary event you want to add.
- 3. Select a secondary event and drag it on a show or clip in the rundown.

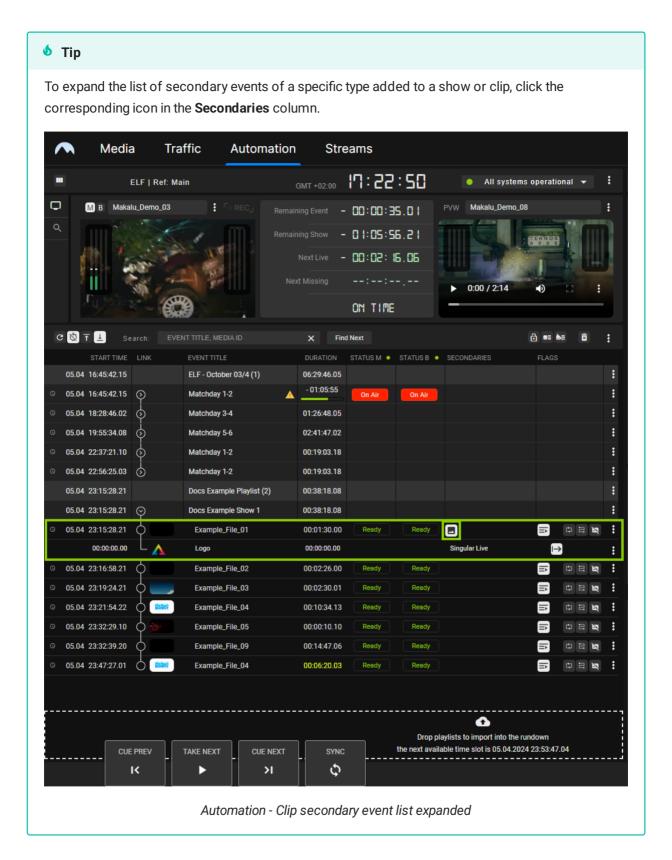


Automation - Secondary event selected

Depending on the type of secondary event, a menu may be displayed that requires you to set the properties of the secondary event. For more information about the available properties, see the section Secondary events. After you have set and confirmed the properties, the selected secondary event is added to the show or clip, which is indicated by the corresponding icon in the **Secondaries** column.



Automation - Secondary event added to a clip



4. To add more secondary events, repeat step three.

The selected secondary events are added.

Creating media segments and adding them to the rundown

If you only want to add a specific part of a video file media asset to the rundown, you can trim it to create a segment. This is useful for dividing a longer file (for example, a recording lasting several hours) into smaller parts.

You can create segments in the following ways:

- temporary (create a segment for one-time usage), or
- · permanent (create a reusable segment)



Creating a reusable segment does not create a new file on the ingest or playout storage. It only creates a new media asset internally, which references the original asset (using the original file path on the storage) and uses the set mark in and out points as additional metadata.

The basic procedure is mostly identical for creating temporary and permanent segments. Creating a permanent segment requires only a few additional steps.

Temporary segments

To create a temporary segment and add it to the rundown, proceed as follows:

Notice

Segments can only be created from media assets that represent actual video files. In the media list, these files are usually listed under **Clips** in the folder tree. Live and placeholder media assets cannot be trimmed to create segments.

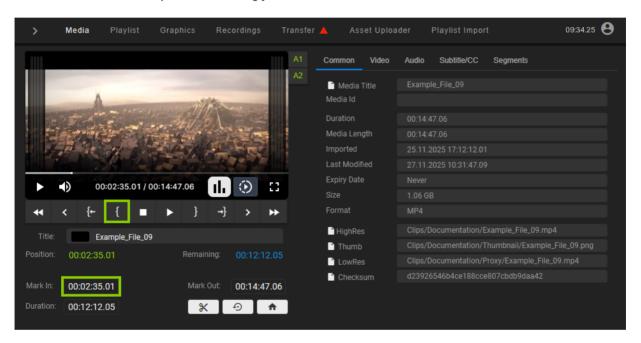
- 1. In the rundown, select and expand the show to which you want to add a segment.
 - The show is expanded, and all included clips are listed.
- 2. On the right side, select the **Media** tab.
 - All available media items are listed in the media list.
- 3. In the media list, select the media asset to be used for creating a segment, either by clicking the **Options** icon at the right side of the corresponding list item and selecting **Preview asset** or by dragging the item on the preview player.

6 Tip

If segments have already been created for this specific media asset, you can also open it in the preview player by clicking the number in the **SEG** column. This corresponds to the total number of segments already created for this media asset.

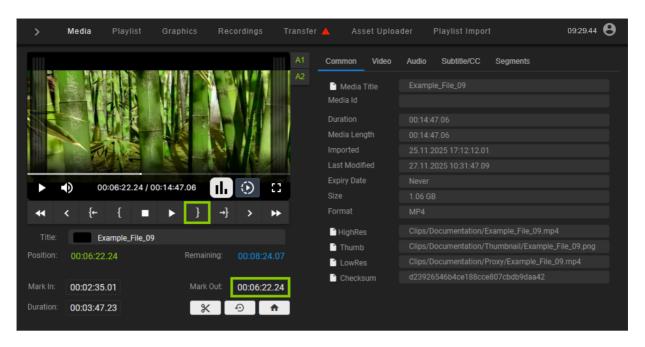
The media asset is opened by the preview player.

- 4. Use the preview player controls to select the timecode for the mark in.
- 5. To set the selected timecode as mark in, click the **Set Mark In** icon **1**. The Mark In timecode is updated accordingly.



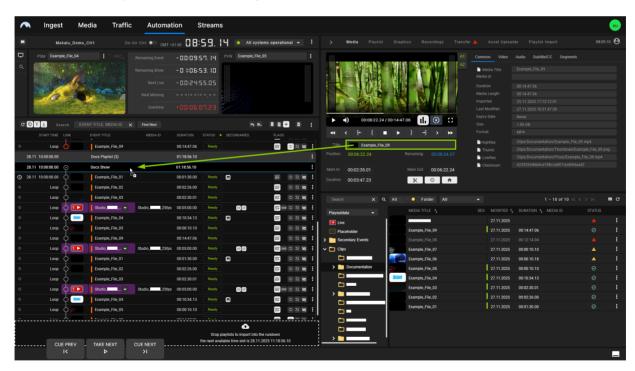
Automation - Media segments - Mark in set

- 6. Use the preview player controls to select the timecode for the mark out.
- To set the selected timecode as mark out, click the Set Mark Out icon .
 The Mark Out timecode is updated accordingly.



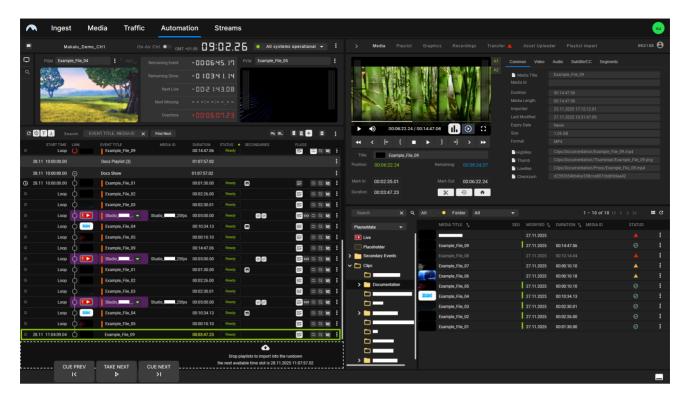
Automation - Media segments - Mark out set

8. Use the draggable element below the preview player (consisting of thumbnail and file name) and drag it on the show to which you want to add the segment.



Automation - Add media segment to a show

The selected segment is added to the rundown as the last clip of the selected show.



Automation - Media segment added to a show



Instead of adding a segment at the end of a show, you can also replace an individual clip in a show by dropping the draggable element directly on the clip to be replaced while holding **[Ctrl]**. In this case, a confirmation dialog is displayed, informing you whether the rundown duration will be shortened or extended by this replacement. For more information, see the sections Replacing a clip with another media item and Replacing a clip with another playlist item.

To add the segment before an existing clip in a show, drag and drop the draggable element on the corresponding clip (without holding [Ctrl]).

Notice

Segments in the rundown are recognizable by their color. Their scheduled duration is highlighted in yellow.

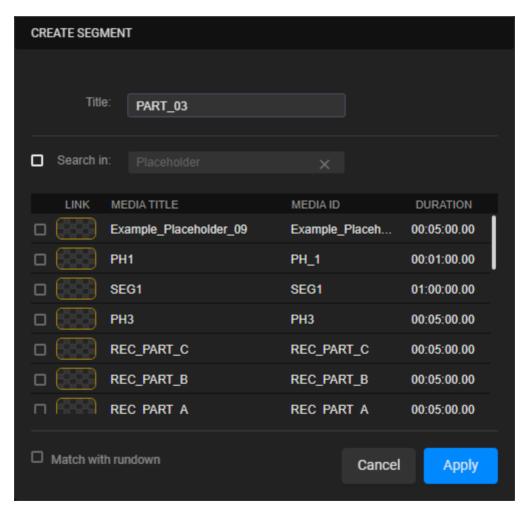
Notice

If the added file is not available on the playout nodes of the channel, file transfers and file processing are automatically initiated. As a result, even if only a short segment was created, the original full length file is copied from the ingest storage to all playout nodes that are assigned to the channel.

Permanent segments

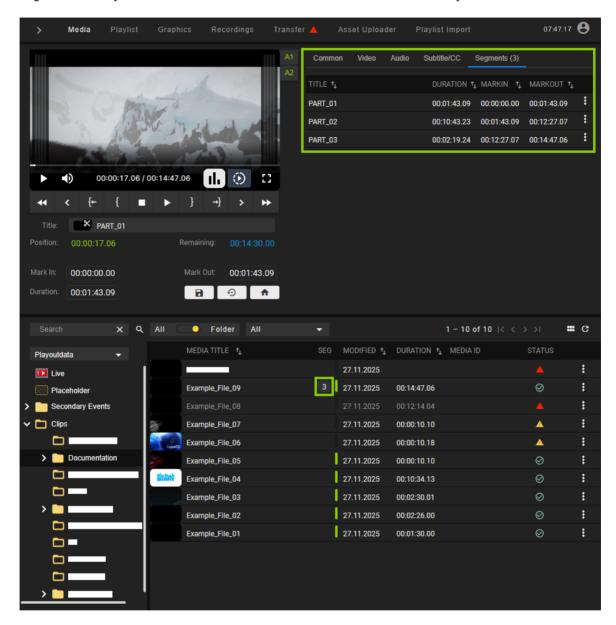
To create a permanent reusable segment and add it to the rundown, proceed as follows:

- 1. Select the media asset to be segmented and set the mark in and mark out as described in section Tempo rary segments steps 1-7.
- 2. Depending on how you want to add the created segment to the rundown, you have the following options:
 - a. If you want to create a new media asset and add it manually to the rundown, continue with step 3.
 - b. If you want to create a new media asset by replacing an already existing placeholder in the rundown, continue with step 4.
- 3. To create a new media asset and add it manually to the rundown, proceed as follows:
 - a. Click the **Trim** icon ... The **Create segment** menu opens.
 - b. In the Create segment menu, enter a title for the new segment and click Apply.



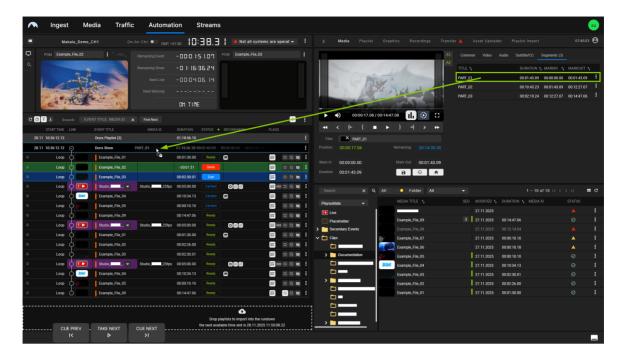
Automation - Create media segment

This creates a new media asset in the same folder as the original asset, based on the set mark in and mark out points. It is listed in the **Segments** tab in the asset metadata area. The total number of segments already created for this media asset in the **SEG** column increases by one.



Automation - Media segment created

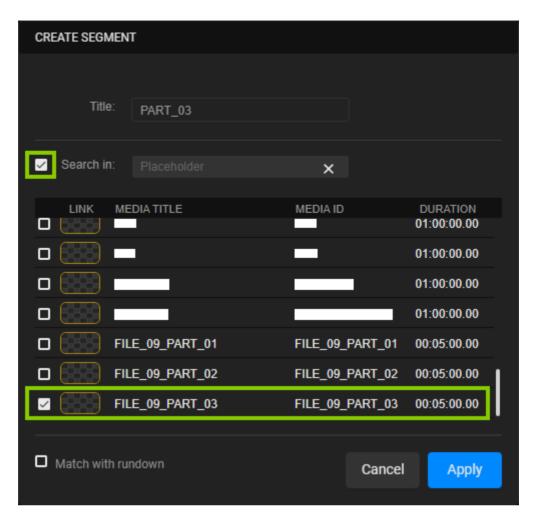
c. Add the created segment to a show by dragging it from the list of segments into the rundown on the corresponding show.



Automation - Add media segment to the rundown

The selected segment is added to the rundown. Its duration is highlighted in yellow as it is shorter than the duration of the original media asset.

- 4. To create a new media asset by replacing an already existing placeholder in the rundown, proceed as follows:
 - a. Click the **Trim** icon X.
 - The **Create segment** menu opens.
 - b. In the **Create segment** menu, enable the **Search in** checkbox above the placeholder list and select the placeholder to be replaced from the list.



Automation - Select the placeholder to be replaced by the segment



To search for a specific placeholder, enter your search term in the **Search in** input field. The list of available placeholders will be updated based on your input. Then, select the placeholder to be replaced.

- c. (Optional) If you want to replace all occurrences of the placeholder in the rundown, enable the **Match** with rundown checkbox below the placeholder list.
- d. Click Apply.

The segment is added to the rundown and replaces the selected placeholder. Its duration is highlighted in yellow, as it is shorter than the duration of the original media asset.

Notice

If the added file is not available on the playout nodes of the channel, file transfers and file processing are automatically started. As a result, even if only a short segment was created, the original full length file is copied from the ingest storage to all playout nodes that are assigned to the channel.

Tip - Editing a segment

You can edit a segment by selecting it in the **Segments** tab in the asset metadata area. Click the **Options** icon so on the right side of the corresponding segment and select **Edit**.

This loads the segment into the preview player, and you can change the mark in and mark out points as required. To confirm your changes, click the **Update segment** icon .

Tip - Duplicating a segment

You can duplicate a segment by selecting it in the **Segments** tab in the asset metadata area. Click the **Opti ons** icon **1** on the right side of the corresponding segment and select **Duplicate**.

Tip - Deleting a segment

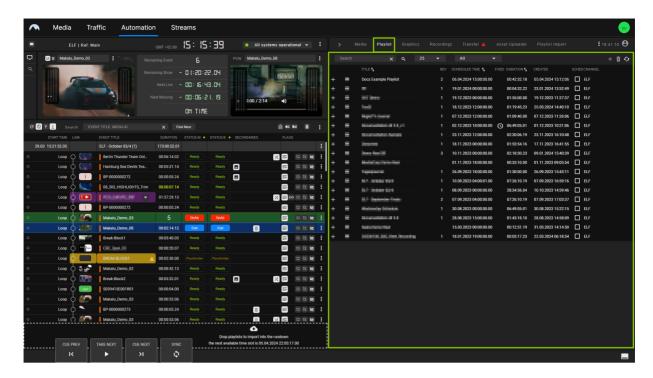
You can delete a segment by selecting it in the **Segments** tab in the asset metadata area. Click the **Options** icon on the right side of the corresponding segment and select **Delete**. Confirm the subsequent dialog by clicking **Yes**.

Adding an existing playlist to the rundown

To add an existing playlist to the rundown, proceed as follows:

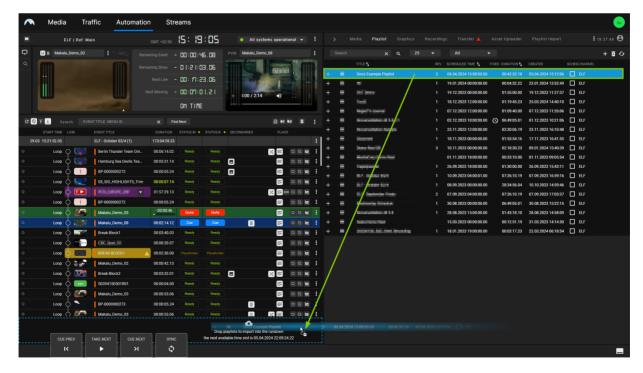
1. On the right side, select the **Playlist** tab.

All available playlists for the current channel are listed.



Automation - Available playlists

- 2. To add a playlist to the rundown, you can either:
 - a. Select a playlist by clicking the corresponding row in the **Playlist** tab (the row will be highlighted in blue) and click the **Plus** icon (Add playlist to rundown) at the top right, or
 - b. drag a playlist and drop it on the dashed area at the bottom of the rundown.



Automation - Add a playlist to the rundown

Notice

If the rundown is currently empty, a dialog is displayed that asks you to select a start time for the playlist. Select the start time and click **Apply** to confirm.

The playlist is added to the rundown.

Notice

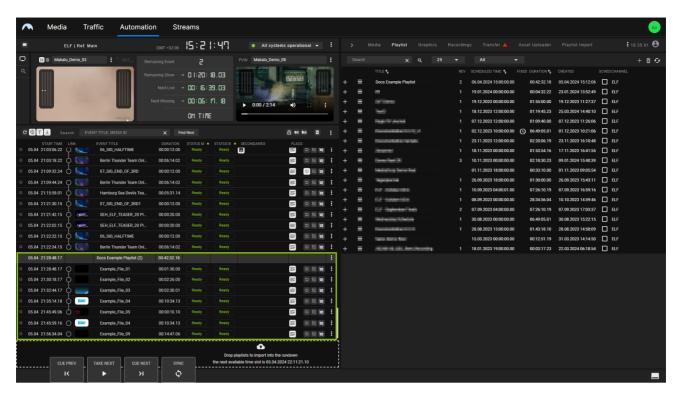
If you selected a start time, the playlist is added based on your selected start time. Otherwise, if the rundown previously already included playlists and you did not select a specific start time, the new playlist is added as the last element, and the start time is dynamically calculated without creating gaps.

Notice

Depending on the playlist size, adding a large playlist to the rundown can take a few seconds. While a playlist is being added to the rundown, the add function is locked. Another playlist can only be added once the current adding process has been completed.

3. (Optional) To display shows in the rundown, click the **Options** icon in the toolbar above the rundown and select **Display shows**. To expand a show included in the added playlist, click the corresponding **Expa nd** icon in the link column.

The show is expanded, and all included clips are listed.



Automation - Playlist added to the rundown



To add a playlist to the rundown at a specified start date/time, activate the checkbox in the **Sched** column (short for "scheduled") before you drag the playlist onto the **Dropzone** area or click the **Add playlist to rundown** button.

If the playlist already has a specified start time, this will be applied. If the playlist has no specified start date/time, a dialog is displayed that asks you to select the start time.

Notice

You cannot add a playlist with a specific scheduled start date/time to the rundown if there is already a playlist in the rundown scheduled for the same date/time.

Notice

Playlists with a fixed start date/time can only be added to the rundown if the start date/time is in the future.



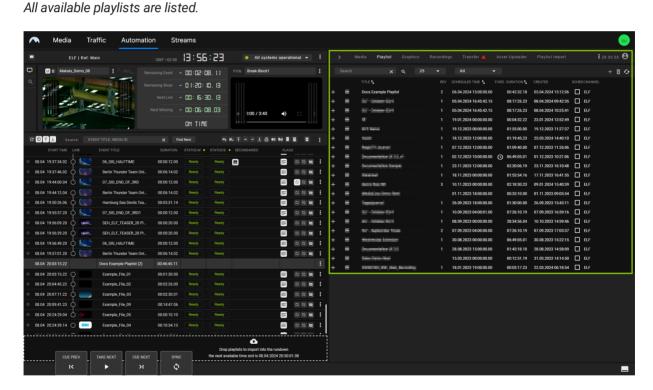
If the added playlist includes files that are not available on the playout nodes of the channel, file transfers are automatically started. As a result, all corresponding files are copied from the ingest storage to all playout nodes that are assigned to the channel. See the section File transfer for more information.

Adding a playlist item to the rundown

In addition to adding an entire playlist to the rundown, you can also add one or more individual playlist items from another playlist to the rundown via the **Playlist** tab.

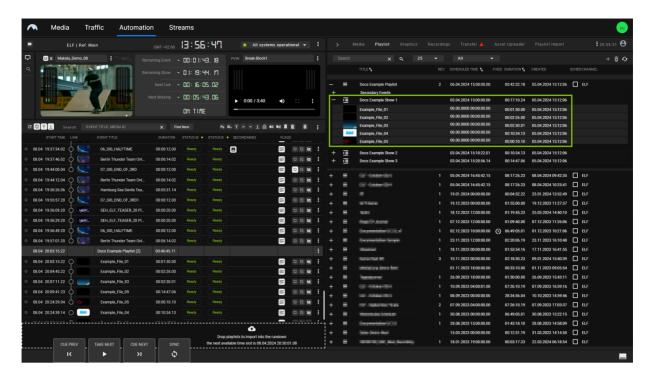
To add one or more items from another playlist to the rundown, proceed as follows:

1. On the right side, select the **Playlist** tab.



Automation - Playlist tab

- 2. Expand a playlist by clicking the corresponding **Plus** icon.
 - All shows included in the playlist are listed.
- 3. Expand a show by clicking the corresponding **Plus** icon.
 - All clips included in the show are listed.



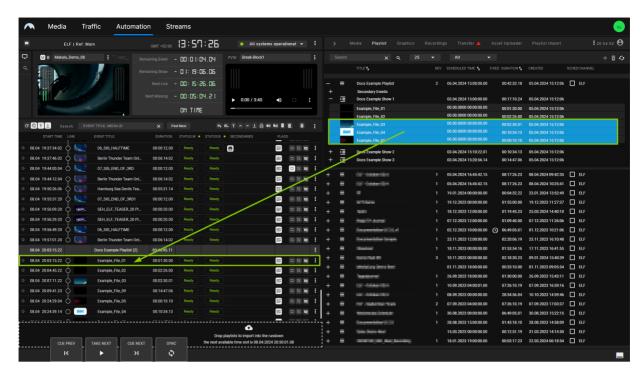
Automation - List of clips

4. Select one or more clips to be added to the rundown.



You can select multiple individual clips from one or more playlists by holding **[Ctrl]**. To select multiple consecutive clips from a playlist, hold **[Shift]**.

5. Drag the selected clip(s) to the desired position in the rundown.



Add playlist items to the rundown via drag and drop



To find and select a specific playlist as a target for adding the new playlist items, you can jump between the playlists in the rundown by using the **Next playlist** icon and **Previous playlist** icon on the left side above the rundown.

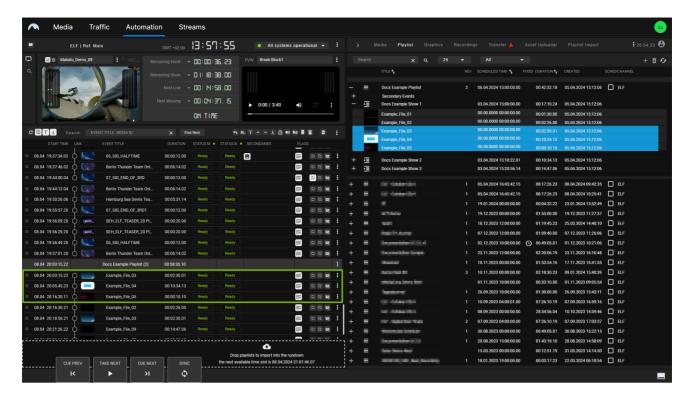
6 Tip

To add the new items at the end of a show or playlist, drag them onto the corresponding show or playlist in the rundown. To insert the new items at a specific position in the rundown (before a specific clip within the clip order), drag them onto the corresponding clip.

Notice

If secondary events are assigned to the selected playlist items, they are retained when the playlist items are added to the rundown. If default secondary events are configured for the corresponding Makalu channel, they are also added automatically when the playlist items are added to the rundown.

The selected playlist items are added to the rundown.



Automation - Updated playlist

Editing the rundown

Editing the start time of a show or clip

To edit the start time of a show or clip, proceed as follows:



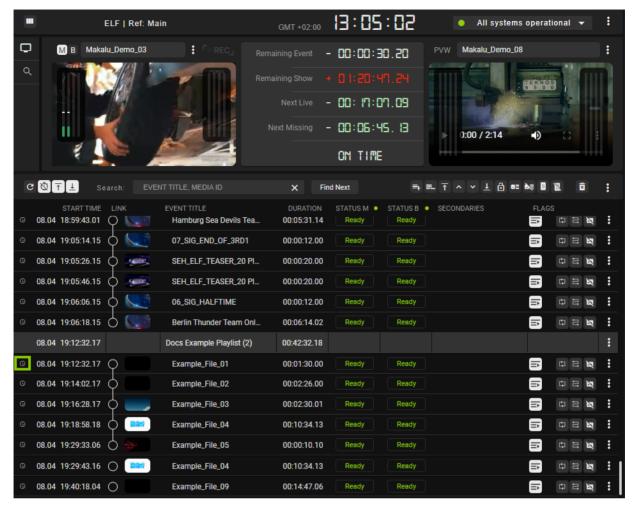
Notice

You can only edit the start time if the corresponding show or clip is not currently on-air.

1. In the rundown, click the **clock** icon **O** of the show or clip to be edited.



If the show display is expanded, the clock icon is not displayed for the show, but for the first clip of the show. In this case, click the clock icon of the first clip.



Automation - Edit show start time

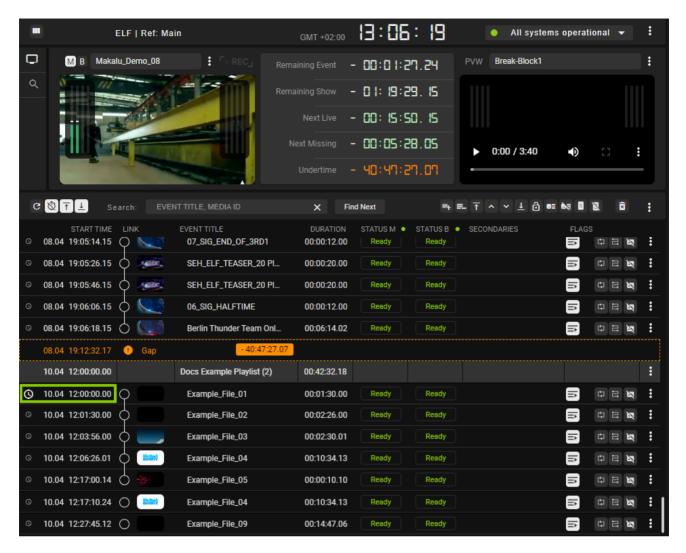
2. A dialog is displayed that asks you to select a start date and time (in the format hh:mm:ss:ff).



You can only enter a start time that lies in the future.

3. To confirm the new value, click Apply.

The edited scheduled start time is applied, and the start times of all clips used in the show are updated accordingly.



Automation - Show start time edited

Editing a clip

Via the Edit clip menu, you can view additional clip/event metadata and edit the following properties:

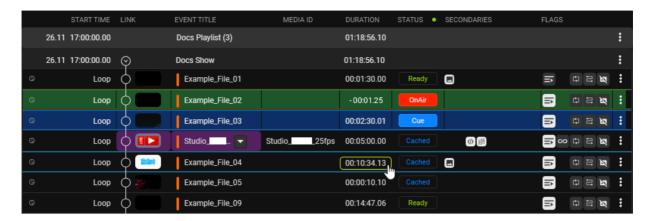
- title
- start time
- offset
- end time
- duration
- · flags

To edit a clip, proceed as follows:

1. Expand the show that contains the clip to be edited by clicking the corresponding **Expand** icon in the link column.

The show is expanded, and all included clips are listed.

2. Open the **Edit clip** menu either by clicking the **Duration** field of the clip to be edited or by clicking the **Optio**ns icon on the right side of the clip and selecting **Edit clip**.



Automation - Open the Edit clip menu

The **Edit clip** menu opens.

Edit clip				
Event Title	5			
	Example_File_04			
Event Id				
Change event	title of the corresponding	clips in the rundown		
— onlinge event	and of the corresponding	onpo in the randomi		
Media				
Media Title	Example_File_04			
Media Id				
Media Path		/Clips/Documer	nta	
Media Length	00:10:34.13			
Start				
Start Time	26.11.2025	17 : 11 : 26 .	01	
ι	set fix Start Time	hours minutes seconds f	frames	
☐ Offset		00 : 00 : 00 .	00 🖒	
		hours minutes seconds f	frames	
End				
Duration		00 : 10 : 34 .	13	
		hours minutes seconds f	frames	
☐ End Time	20 44 2025	47 - 22 - 00	42	
■ End Time	26.11.2025	17 : 22 : 00 .		
		nours minutes seconds i	Idilies	
Flags				
			Consol	Apply
			Cancel	Apply

Automation - Edit clip menu

3. Edit the clip properties:

To edit the title, select the **Event Title** field and edit it as desired.

Notice

If you want to apply your changes not only to the clip currently selected but also to all occurrences of the clip in the rundown, enable the checkbox **Change event title of the corresponding clips in the rundown**.

- b. To edit the start time, enable the checkbox Set fix Start Time and set the desired date and time.
- c. To use an offset, enable the checkbox Offset and set the time as desired.

Notice

The **Offset** property can only be set for file-based clips. It is not available for live and placeholder clips.

d. To edit the duration, enable the checkbox **Duration** and set the time as desired.

Notice

If you enter a scheduled duration that is longer than the original duration, the clip will loop during playback. When the original duration ends, the clip playback starts from the beginning and plays until the entered scheduled duration is reached.

If you enter a scheduled duration that is shorter than the original duration, the clip playback stops when the entered scheduled duration is reached.

- e. To edit the end time, enable the checkbox End Time and set the desired date and time.
- f. If the clip is part of a show that currently exceeds its planned duration, you can shorten the clip duration to remove the overtime of the show by enabling the checkbox **Adjust Clip**.
- g. To edit the clip flags, enable or disable the corresponding **Flags** (for more information, see the section Clip flags).
- 4. To confirm your changes, click Apply.

The edited properties are saved.

Editing a secondary event

To change the properties of a secondary event assigned to a show or a clip, proceed as follows:

1. Expand the list of secondary events of the corresponding element (show or clip):

- 2. If you want to edit a secondary event of a show in the rundown, click the **Secondary Events** icon in the **Secondary Events** icon econdaries column of the corresponding show.
- 3. If you want to edit a secondary event of a clip in the rundown, click the icon of the corresponding secondary event type in the **Secondaries** column of the corresponding clip.
- 4. Open the **Edit secondary event** menu, by clicking the **Options** icon on the right side of the corresponding secondary event and selecting **Edit Secondary**.

The **Edit secondary event** menu opens. Depending on the type of the selected secondary event, different properties are available for editing.

- 5. Edit the properties of the selected secondary event.
- 6. To confirm your changes, click Apply.

The edited properties are saved.

Using groups

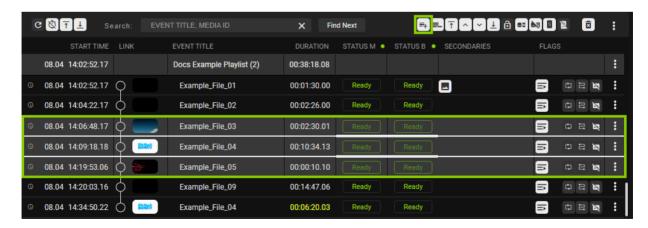
The group feature allows you to assign multiple clips within a show to a group and play them back in a loop. Each group is highlighted in a distinct color to facilitate the differentiation of groups.

To add clips to a group, proceed as follows:

1. In the rundown, expand the show that contains the clips to be grouped by clicking the corresponding **Expa**nd icon in the link column.

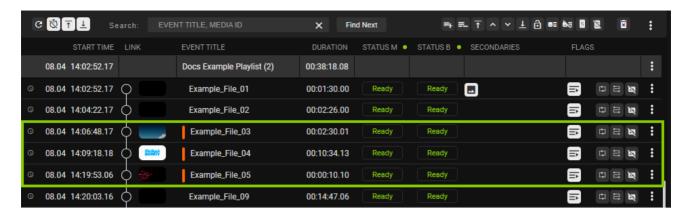
The show is expanded, and all included clips are listed.

- 2. In the selected show, select multiple clips to be grouped.
- 3. In the top right corner of the rundown, click the **Create group** icon ...



Automation - Rundown - Create group

The selected clips are assigned to a new group and are highlighted in the group color (orange in the example below).



Automation - Rundown - Group created

b Tip

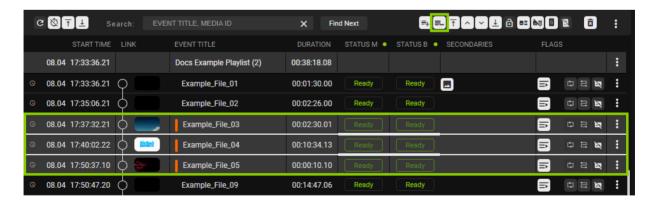
You can play a group of clips in a loop by activating the loop flag for the last clip in a group. When the playback of the last clip in the group is finished, the playback of the first clip in the group starts again.

७ Tip

In addition to grouping individually selected clips, you can group all clips of a show to play them in a loop. To do this, select the corresponding show and click the **Create group** icon above the rundown. All clips of the show are grouped, and the loop flag is activated for the last clip of the group.

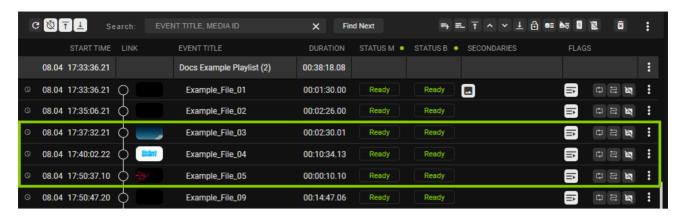
To remove clips from a group, proceed as follows:

- 1. Expand a show and select the clips to be removed from the group.
- 2. In the top right corner of the rundown, click the **Delete group** icon ...



Automation - Remove clips from group

The selected clips are removed from the group. If all clips are removed from a group, the group is removed.



Automation - Clips removed from group

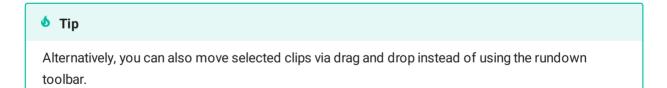
Moving clips

To change the clip order of a show, proceed as follows:

1. In the rundown, expand the show that contains the clip(s) to be moved by clicking the corresponding **Expa nd** icon in the link column.

The show is expanded, and all included clips are listed.

- 2. Select one or more clips to be moved.
- 3. Depending on where you want to move the clips, select the corresponding function in the toolbar above the rundown:
 - a. To move the clips one position up in the list, click the **File up** icon.
 - b. To move the clips one position down in the list, click the **File down** icon ...
 - c. To move the clips to the beginning of the selected show's clip list, click the **First file** icon .
 - d. To move the clips to the end of the selected show's clip list, click the **Last file** icon **L**.



The clips are moved to the selected position.

Replacing a clip with another media item



Notice

This function can be used, for example, to replace a placeholder clip with another media asset (physical media file). Additionally, it can be used to replace any clip in the rundown (regardless of the type) with any other available media asset (primary event), which is listed in the Media tab, either in the Clips folder (physical media files) or under Live (live sources).

Notice

Placeholders cannot be played back because they are virtual assets without a linked physical media file. If a placeholder scheduled in the rundown is not replaced before its actual playback starts, then the configured emergency screen or video is played for the planned duration of the placeholder.

To replace a clip in a rundown with another media item via the Media tab, proceed as follows:

1. In the rundown, expand the show that contains the clip to be replaced by clicking the corresponding Expan **d** icon in the link column.

The show is expanded, and all included clips are listed.

- 2. On the right side, select the Media tab.
- 3. In the media list, select the type of media asset (video file, live source, or placeholder).
- 4. Select one or more media assets.
- 5. Hold [Ctrl] and drag the selected item(s) from the media list on the right side and drop them on the clip to be replaced in the rundown on the left side.

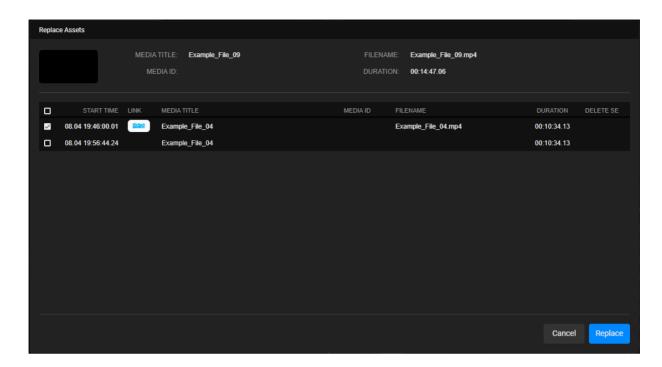


Automation - Replace clip



If the new item you want to use as a replacement is a live source, you must select the duration of the live clip and confirm it by clicking **Apply**.

If you select and drag only a single item, the **Replace Assets** menu opens, and all future occurrences of the clip to be replaced in the rundown are listed.

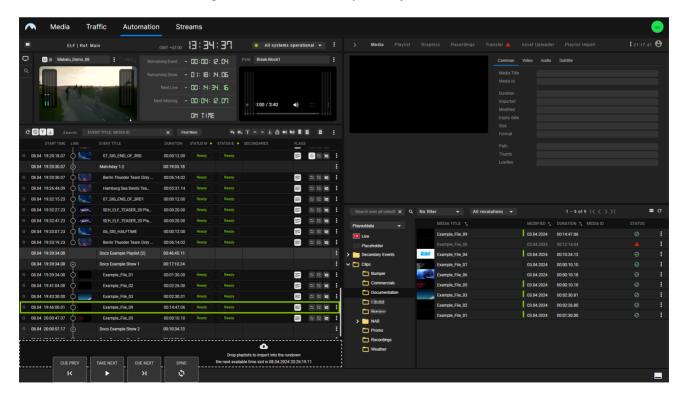


Automation - Replace assets menu

If you select and drag multiple items instead, they immediately replace the original item, and the **Replace Assets** menu is not displayed.

- 6. Select all the occurrences of the clip that you want to replace by enabling the corresponding checkbox(es).
- 7. To confirm the replacement, click **Replace**.

All selected occurrences of the original rundown item are replaced by the new item.



Automation - Clip replaced

Notice

If the new file is not available on the playout nodes of the channel, file transfers are automatically started. As a result, the corresponding file is copied from the ingest storage to all playout nodes that are assigned to the channel.

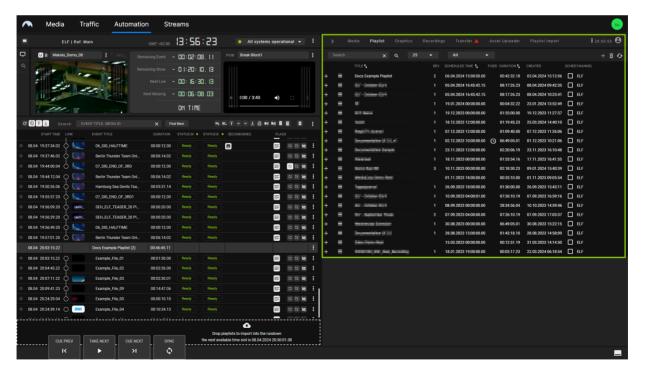
Replacing a clip with another playlist item

In addition to replacing a clip with another media item via the **Media** tab, you can also replace a clip in the rundown with one or more items from another playlist via the **Playlist** tab. If the playlist items you use as replacements have assigned secondary events and/or enabled clip flags, they will remain assigned after the replacement in the rundown. If default secondary events are configured for the corresponding Makalu channel, they are also added automatically when the playlist items are added to the rundown.

Replacing clips in this way may be especially useful for users who focus on playlists and prefer to search clips/assets using playlists rather than searching for files in the corresponding folder structures in the **Media** tab.

To replace a clip with one or more items from another playlist (via the **Playlist** tab), proceed as follows:

On the right side, select the **Playlist** tab.
 All available playlists are listed.



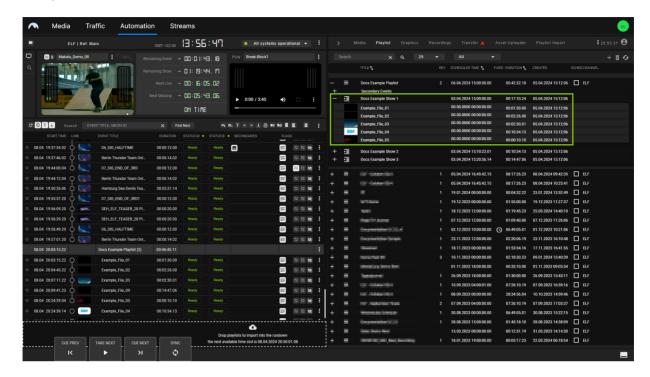
Automation - Playlist tab

2. Expand a playlist by clicking the corresponding **Plus** icon.

All shows included in the playlist are listed.

2 Expand a show by clicking the corresponding **Plus** icon.

All clips included in the show are listed.



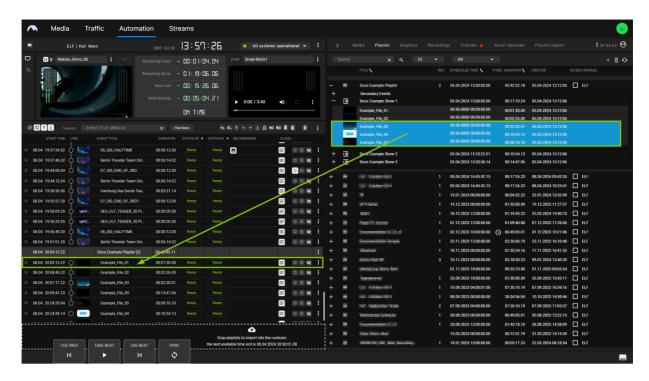
Automation - List of clips

4. Select one or more clips to be used as a replacement.



You can select multiple individual clips from one or more playlists by holding **[Ctrl]**. To select multiple consecutive clips from a playlist, hold **[Shift]**.

5. Hold [Ctrl] and drag the selected clip(s) onto the clip to be replaced in the rundown.

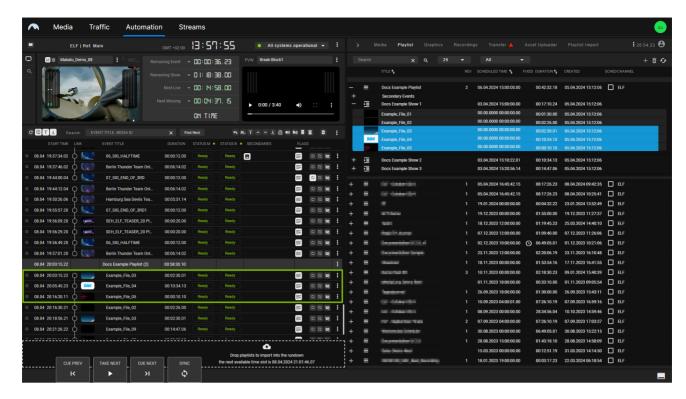


Automation - Replace playlist items via drag and drop



To find and select a specific playlist as a target for the replacement, you can jump between the playlists in the rundown by using the **Next playlist** icon and **Previous playlist** icon on the left side, above the rundown.

If you selected multiple clips as replacements, they directly replace the target clip in the rundown without requiring any additional actions. If you selected a single clip as a replacement, the **Replace Assets** menu opens as described in section Replacing a clip with another media item. It enables you to decide whether you only want to replace the single occurrence of the clip in the rundown or also other or all future occurrences of it in the rundown.



Automation - Updated playlist



If you only want to add new items to the rundown instead of replacing existing elements, execute step five without holding [Ctrl].

Searching for and replacing clips

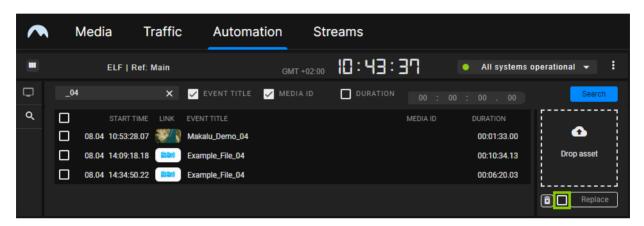
In addition to replacing a clip via drag and drop as described in section Replacing a clip with another media item or with another playlist item, you can alternatively use the search/replace view for this purpose. This also enables you to search for rundown items, based on their event title, media ID, and/or duration, and replace them with a different media item.

Notice

When replacing rundown items via the search/replace view, all properties and metadata of the original item are usually replaced by those of the new item. This includes, for example, the title, file path, and any existing secondary events.

There is a special optional feature when replacing placeholders with a file-based media item that enables you to keep all the metadata of the original placeholder item instead, so that only the file path is replaced.

To use this feature, enable the checkbox between the **Delete** icon and the **Replace** button below the **Dropz one** of the search/replace view.



Automation - Search and replace (keep placeholder metadata)

A use case where this feature can be particularly useful is a rerun of a live show in "fast turnaround mode". This applies when a live element is scheduled in the rundown and a rerun is scheduled to play shortly afterward (scheduled with a corresponding placeholder asset). The live element is recorded, and the placeholder has a specific title and media ID. Only the actual file name of the recording is unknown before the recording. When the recording of the live element is completed, and you replace the corresponding rerun placeholder with the mentioned checkbox enabled, the original metadata of the placeholder is retained, but the actual file name of the recorded live element is used.

To use the search/replace view, proceed as follows:

- In the preview area navigation at the top left, click the Search icon .
 The search/replace view is displayed.
- 2. Enter your search term in the Search field.
- (Optional) If you only want to search based on the Event title or Media ID, select/deselect the corresponding checkbox.
- 4. (Optional) If you also want to search based on the duration, enable the **Duration** checkbox and enter the desired duration.
- 5. Click **Search** at the top right of the search/replace view area.

The search results are listed below.

- 6. In the search result list, select the item(s) to be replaced by enabling the checkbox to the left of the item(s).
- 7. Drag the item to be used as a replacement from the **Media** area on the right and drop it on the **Dropzone** on the right side of the search/replace view.
- 8. To confirm the replacement, click Replace.

The selected rundown items are replaced by the new item.



To clear the dropzone, click the **Delete** icon below it.



If the new file is not available on the playout nodes of the channel, file transfers are automatically started. As a result, the corresponding file is copied from the ingest storage to all playout nodes that are assigned to the channel.

Switching a running live source

When a live source is on-air, it may be necessary to switch to another live source at short notice, for example, if the current live source becomes unavailable due to a signal outage. For this purpose, Makalu enables you to edit the rundown and quickly switch to another live source.

To switch a running live source, proceed as follows:

In the rundown, click the Select source icon of the live clip to be changed.
 A dropdown menu with all available live sources opens.



Automation - Running live source



Automation - List of available live sources

2. Select the new live source from the dropdown menu.



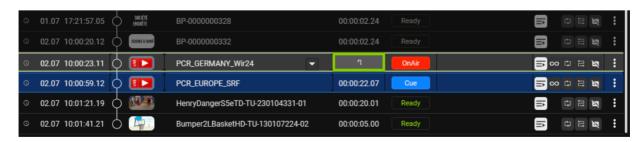
In this menu, the current connection status of each live source is indicated by a corresponding icon:

- • Iive source is connected
- Iive source is not connected

When switching a running live source, select a source that is listed as "connected". This enables uninterrupted switching between the two live sources. It is still possible to select a live source that is listed as "not connected" (regardless of whether the initial live source is currently on-air or scheduled for a later time). This is necessary, for example, if you want to switch a live source that is not currently on-air but is scheduled for a later time in the rundown. However, you should avoid selecting a live source that is listed as "not connected" when switching the on-air live source, as this usually results in black frame channel output.

3. Confirm the dialog by clicking Yes.

The switchover to the new live clip is prepared. A new clip that uses the selected live source is added to the rundown directly after the current clip and is cued. The end time of the original clip is applied to the new clip, which ensures that this change has no impact on the scheduled start times of subsequent clips in the rundown. A countdown is displayed for switching to the new live source.

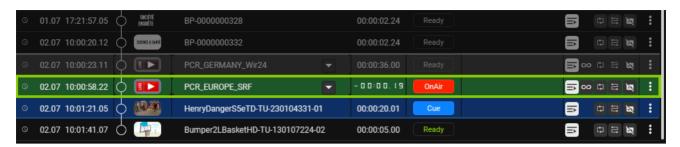


Automation - Countdown for live source switchover



The duration of the switchover interval countdown is configurable. It is set to 10 seconds by default.

When the countdown expires, playback switches to the new live source.



Automation - Switchover to new live source completed

Updating a playlist

Makalu enables you to efficiently update and replace individual items of a playlist or entire playlists in the rundown via the **Update rundownplaylist** menu/dialog. It is designed to compare and update two almost identical playlists. A typical use case for this feature is when a new revision of a playlist is created with minor changes, but an older revision of the same playlist is already scheduled in the rundown (or even currently on-air), and you want to replace the parts of it that have changed.



To update a playlist in the rundown, the start time of the playlist can be in the past, but its end time must be in the future. Playlists with an end time in the past cannot be updated.

Example: The playlist currently on-air contains a live element with an unknown duration (the **Open end** flag is enabled; see the section Clip flags). The actual duration of the live element is only known when it actually ends and may be shorter or longer than originally planned. This may have an impact on the durations of subsequent clips. For example, it may be necessary to remove, add, shorten, or extend clips to compensate for the changed duration of the live element. To do this, you can create a new revision of the playlist via Makalu Traffic and use the **Update rundownplaylist** menu/dialog in Makalu Automation to update the old revision of the playlist in the rundown with the new one.



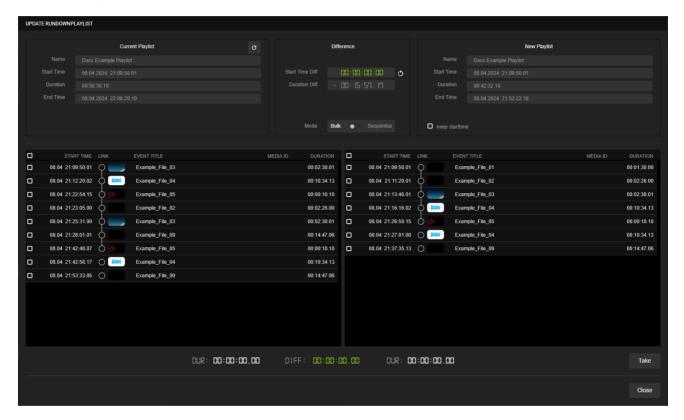
A new revision of a playlist is created whenever it is sent to playout from Makalu Traffic. The revision number of a playlist in the rundown can be recognized by the number in brackets after the name of the playlist. In the **Playlist** tab, the revision number is listed in the **Rev** column.

For more information, see the section Sending a playlist to playout.

Notice

When you update a playlist, you are not limited to using a new revision of an original playlist as a replacement. Instead, you can update or replace any playlist in the rundown with any available playlist.

You can open the **Update rundownplaylist** menu/dialog by holding **[Ctrl]** and dragging a playlist from the **Playl ist** tab onto a playlist in the rundown.



Automation - Update rundownplaylist menu

The menu is divided into two sections. The section **Current Playlist** on the left side displays information about the current playlist to be updated in the rundown. Section **New Playlist** on the right side displays information about the playlist to be used for the update. Section **Difference** in the upper middle area displays information about the time differences between both playlists. Below this information, there is a **Mode** toggle that enables you to switch between the two update/replacement modes **bulk** and **sequential**.

Bulk mode enables you to select a clip in the current playlist and the new playlist. All clips, starting with the first selected clip and continuing through to the last clip of the playlist, are automatically selected. When you click the **Take** button at the bottom right, all clips are replaced based on your selection.

The **Keep starttime** option is only available in **bulk** mode and enables you to decide how to handle the start times of the items in the new playlist. If enabled, the exact planned start times of the items of the new playlist are applied, which may create gaps. If disabled, the start times are ignored and the selected items of the new playlist are added directly after the last clip in the current playlist, which is not selected to be updated.

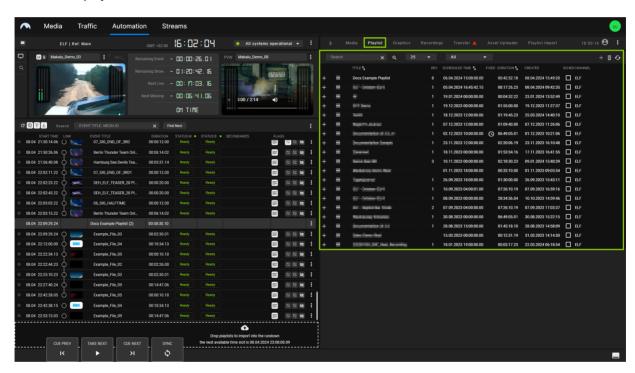
Sequential mode is designed for making incremental changes to the playlist one at a time. It automatically recognizes and displays the differences between the two playlists, enabling you to switch between them individually via the corresponding icons in the **DIFF** area at the bottom right, which also displays the total number of detected differences. You can apply each change by enabling the corresponding checkbox in the clip list of the new playlist and clicking the **Take** button at the bottom right.

Update via bulk mode

To replace one or more items of a playlist in the rundown with one or more items from another playlist via the **U pdate rundownplaylist** menu/dialog in **bulk mode**, proceed as follows:

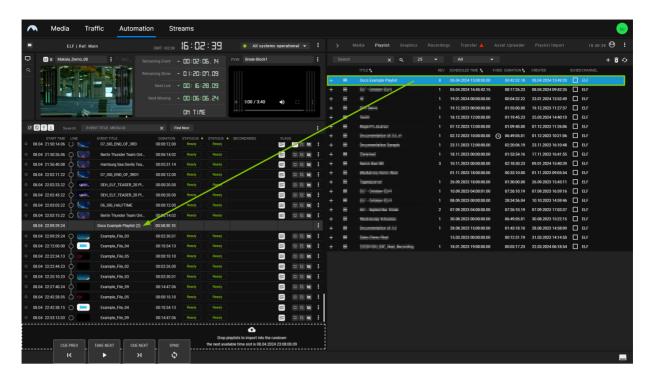
1. On the right side, select the **Playlist** tab.

All available playlists are listed.



Automation - Playlist tab

2. Hold [Ctrl] and drag the new playlist from the Playlist tab onto the playlist to be updated in the rundown.



Automation - Drag new playlist into rundown



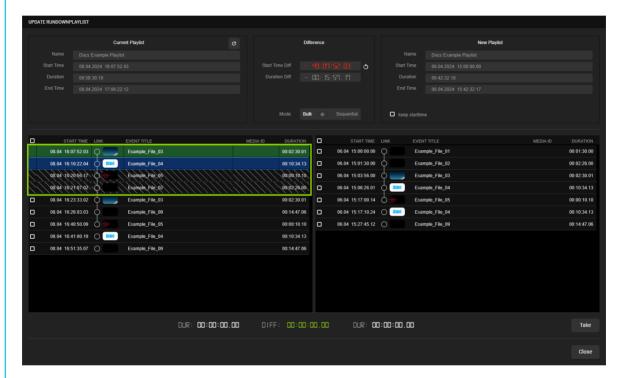
To find and select a specific playlist as a target for replacement, you can conveniently jump between playlists in the rundown by using the **Next playlist** icon [1] and **Previous playlist** icon [7] on the left side, above the rundown.

The **Update rundownplaylist** menu/dialog opens.

Notice

If you want to update the playlist that is currently on-air, some clips cannot be updated/replaced. This includes the following types of clips, which are highlighted as follows in the **Update rundownplaylist** menu/dialog:

- the clip currently on-air (highlighted in green)
- the clip currently cued (highlighted in blue)
- one or more protected clips after the cued clip (the actual number depends on the duration of the clips and if it lies within a configurable protected time period, highlighted with stripes)



Automation - Clips that cannot be updated

The clip list (including the highlighted clips) in the **Update rundownplaylist** menu/dialog is automatically updated when the playback of the next clip starts.

- 3. Leave the Mode toggle set to Bulk.
- 4. Select the first clip to be replaced in the current playlist by enabling the corresponding checkbox on the left side.
 - The clip and all subsequent clips until the end of the playlist are selected. The total duration of all selected clips is displayed below under **DUR**.
- 5. Select the first clip to be used as a replacement in the new playlist by enabling the corresponding checkbox on the right side.

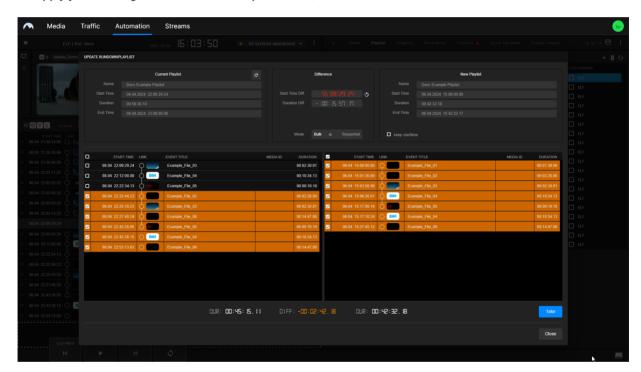
The clip and all subsequent clips until the end of the playlist are selected. The total duration of all selected clips is displayed below under **DUR**. If the total duration of the selected clips differs between the two playlists, the time difference is displayed at the bottom, centered under **DIFF**.

(Optional) If you want to apply the exact start times of the items in the new playlist, enable the Keep starttime option.



If the start time of the first selected clip in the new playlist does not begin immediately after the end of the last unselected clip in the current playlist, the playlist update may result in gaps.

7. To apply your settings and execute the replacement, click **Take**.



Automation - Apply playlist update

The selected clips in the current playlist are replaced by the selected clips from the new playlist. When this is completed, the view is updated accordingly.

8. Close the **Update rundownplaylist** menu/dialog by clicking **Close**.

The update/replacement is complete.

Update via sequential mode

To replace one or more items of a playlist in the rundown with one or more items from another playlist via the **U pdate rundownplaylist** menu/dialog in **sequential mode**, proceed as follows:

1. Execute steps one and two as described in the section Update via bulk mode.

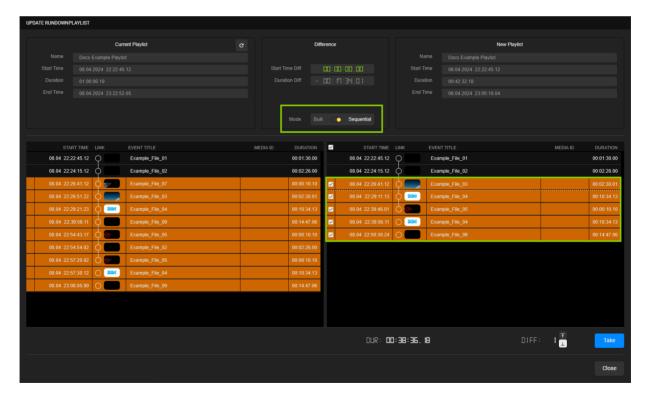
2. (Optional) If the start times of both playlists differ (recognizable by a positive or negative value in the upper middle area in the field **Difference > Start Time Diff**), adjust them by clicking the **Adjust playlist starttime** icon right to the field **Difference > Start Time Diff**.

The start time of the new playlist is synchronized with the start time of the current playlist. Afterward, both playlists have the same start time, which is recognizable by the value 00:00:00:00 displayed in the field **D** ifference > Start Time Diff and highlighted in green. As a result, the **Mode** toggle is unlocked.



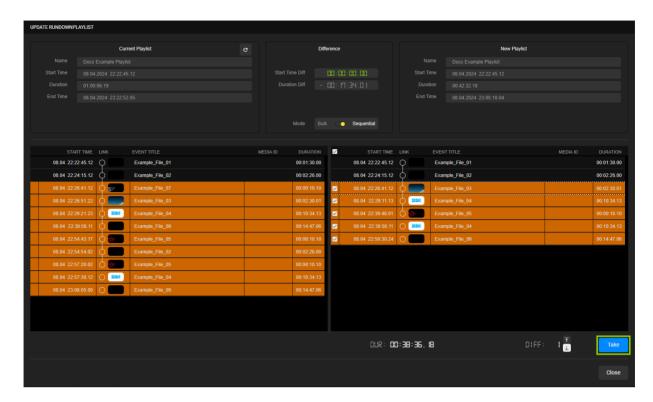
Instead of adjusting the start times of both playlists (based on the start time of the first included clip), you can also select a specific clip in the current and new playlist where the synchronization should start.

- 3. Set the Mode toggle to Sequential.
- 4. On the right side in the clip list of the new playlist, select one of the detected changes (groups of clips highlighted in orange) that you want to apply.



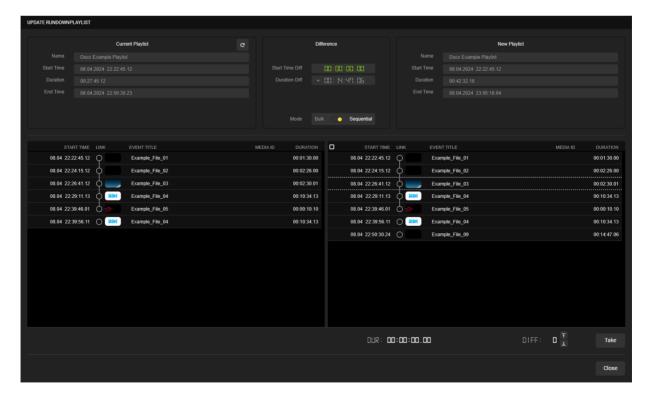
Automation - Select detected change

5. To apply the replacement, click Take.



Automation - Apply playlist update

The selected clips in the current playlist are replaced by the selected clips from the new playlist. When this is completed, the view is updated accordingly.



Automation - Playlist updated

6. To apply other detected changes, repeat steps four and five.



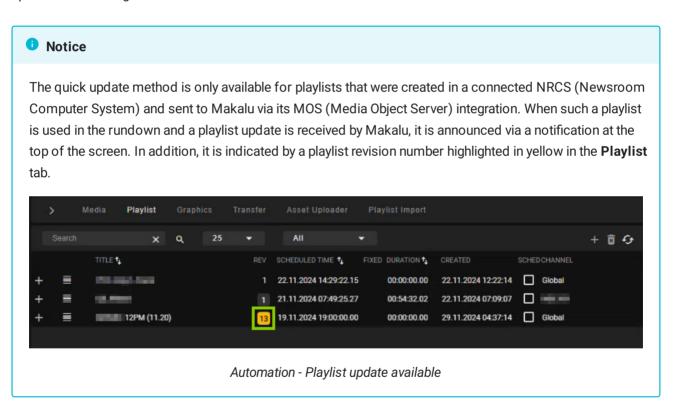
You can switch between the detected changes via the **Previous** icon **1** and **Next** icon **1** in the **DIFF** area at the bottom right.

7. Close the **Update rundownplaylist** menu/dialog by clicking **Close**.

The update/replacement is complete.

Quick update via rundown (MOS integration)

Another method for updating a playlist is the quick update function. It minimizes the required user interaction and updates the playlist in the rundown automatically to the latest available version. From a technical point of view, this method corresponds to the previously described update via bulk mode but does not require using its update menu/dialog.



To update a playlist via the quick update function, proceed as follows:

1. On the right side, select the **Playlist** tab.

All available playlists are listed.



Automation - Playlist tab

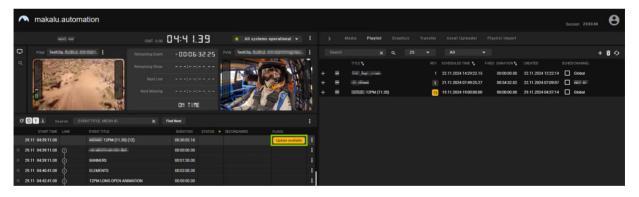
2. To jump to the corresponding position of the playlist in the rundown, click the highlighted revision number of the playlist to be updated.



Automation - Jump to playlist

The rundown jumps/scrolls to the position of the playlist. The **Update available** button is displayed in the **Flags** column.

3. Click the **Update available** button.



Automation - Start update

A confirmation dialog is displayed, showing the current revision number of the playlist used in the rundown and the new revision number to which it will be updated.

4. Confirm the update by clicking Yes.

The playlist in the rundown is updated to the latest available version.

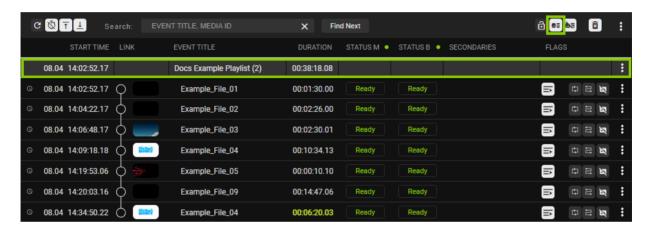
Assigning or removing the default graphic



The default graphic is part of the Makalu system configuration. It is usually defined when the system is first set up and cannot be changed by the user afterward. To request a change of the default graphic, please contact support.stream@qvest.com.

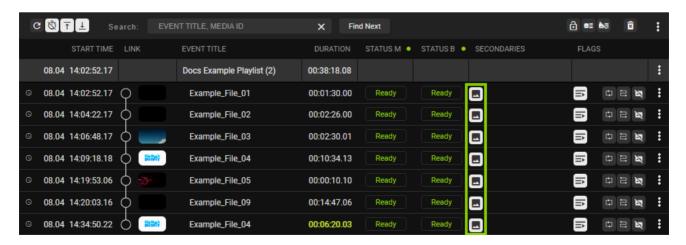
To assign the default graphic to a playlist, show, or clip, proceed as follows:

- 1. In the rundown, select a playlist, show, or clip.
- 2. Click the Add default graphic icon . in the toolbar above the rundown list.



Automation - Assign the default graphic

The default graphic is assigned to the selected element(s), which is recognizable by the corresponding icon in the **Secondaries** column.

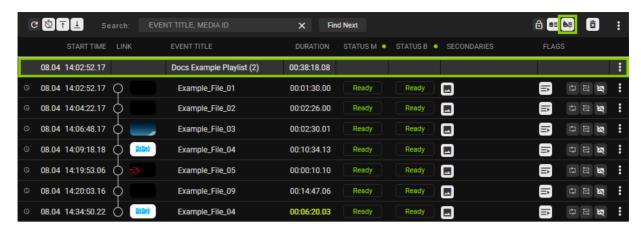


Automation - Default graphic assigned

To remove the default graphic from a playlist, show, or clip, proceed as follows:

1. In the rundown, select a playlist, show, or clip to which the default graphic is assigned.

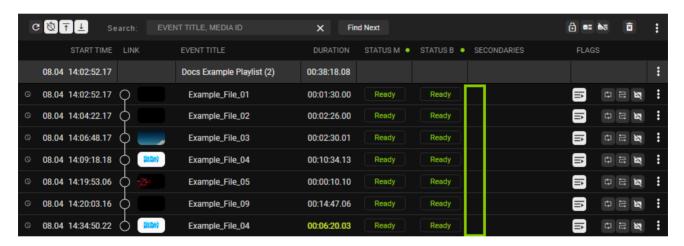
2 Click the **Delete default graphic** icon .



Automation - Remove default graphic

3. Confirm the following dialog by clicking Yes.

The default graphic is removed from the selected element(s).



Automation - Default graphic removed

Adding or removing a recording secondary event

For information about how to use recording secondary events, see the section Recording.

Adding or removing a splicing secondary event

For information about how to use splicing secondary events, see the section Ad triggering.

Deleting a clip or a playlist

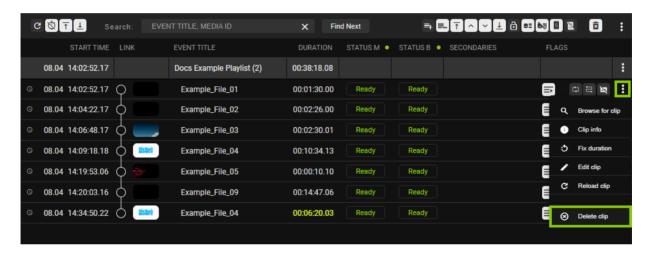


You can only delete a clip if it is in status **Ready** or if it is a placeholder. You cannot delete a clip if it is currently cued or on-air.

The same applies to playlists and shows. You can only delete a playlist or a show if no clip in the playlist or show is currently cued or on-air.

To delete a clip from the rundown, proceed as follows:

1. Select the clip to be deleted by clicking the **Options** icon and selecting **Delete clip**.



Automation - Delete a clip

2. Confirm the following dialog by clicking Yes.

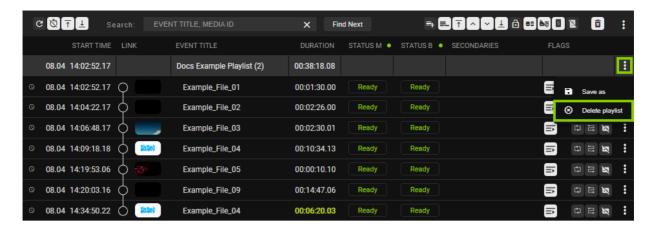
The clip is deleted.

To remove a playlist from the rundown, proceed as follows:



Playlists can only be removed if they are displayed in the rundown. To display playlists, click the **Options** icon **!!** in the toolbar above the rundown list and select **Show playlists**.

1. Select the playlist to be removed by clicking the **Options** icon and selecting **Delete playlist**.



Automation - Remove a playlist

2. Confirm the following dialog by clicking Yes.

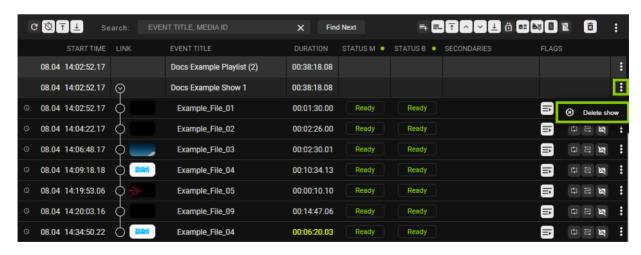
The playlist is removed.



You can remove multiple playlists by selecting the playlists to be removed. Then click the **Options** icon in the toolbar above the rundown list and select **Delete playlists**.

To delete a show from the rundown, proceed as follows:

1. Select the show to be deleted by clicking the **Options** icon and selecting **Delete show**.



Automation - Delete a show

2. Confirm the following dialog by clicking Yes.

The show is deleted.

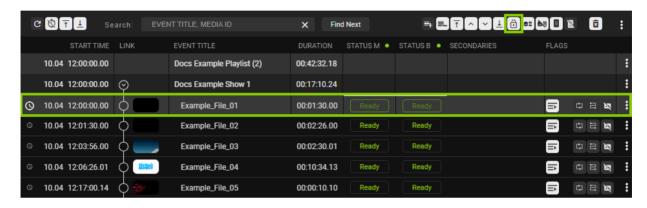
Deleting a fixed start time

To delete a fixed start time of a show in a rundown, proceed as follows:

1. In the rundown, expand the show with the fixed start time to be removed by clicking the corresponding **Ex** pand icon in the link column.

The show is expanded, and all included clips are listed.

- 2. Select the first clip of the show.
- 3. Click the **Delete fix start time** icon in the toolbar above the rundown list.



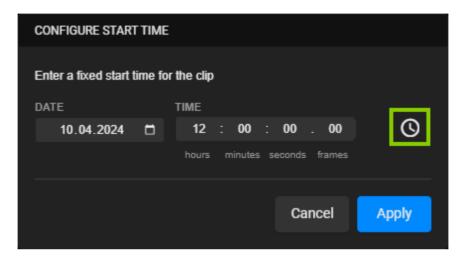
Automation - Delete fixed start time

The fixed start time is removed from the selected element. The clock icon in the first column changes from white to gray .



Alternatively, you can delete a fixed start time via the Configure start time menu as follows:

- Click the Clock icon to the left of the start time of the corresponding clip to disable it.
 The Configure start time menu opens.
- 2. In this menu, click the clock icon on the right side.



Automation - Delete fixed start time (alternative way)

3. Confirm your action by clicking Apply.

The fixed start time is removed. The corresponding clip or show is moved and placed directly after the previous element in the rundown with a specific time (if available). This automatically closes any gaps.

Reloading the rundown



Manually reloading the rundown is only necessary if an error occurs, for example, if the clip status is displayed as "Unknown".

To manually reload the rundown, click the **Reload rundown** icon in the toolbar on the left above the rundown list.

Various functions

Previewing a media asset



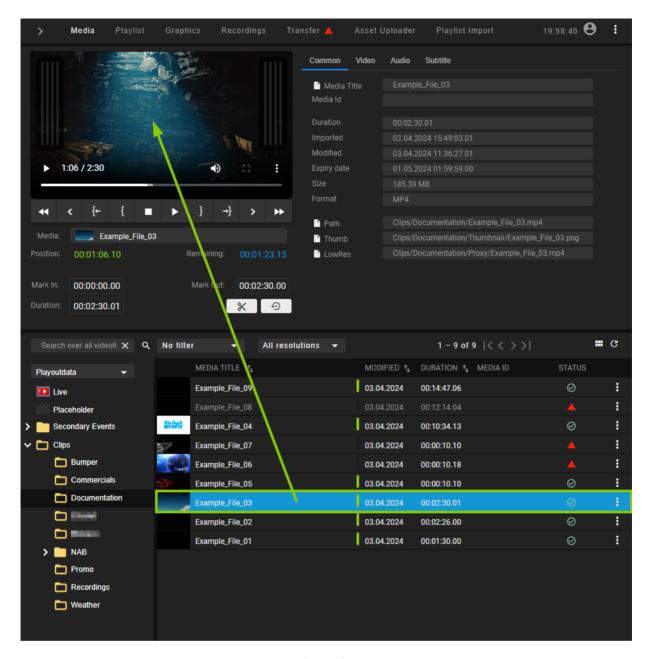
Notice

Only file-based media assets and live sources can be previewed. Placeholders can only be opened in the preview to display their metadata. Secondary events cannot be previewed.

To preview a media asset, proceed as follows:

- 1. On the right side, select the **Media** tab.
- 2. In the media asset list, select the media type (live or clips) and the corresponding source folder that contains the media asset to be previewed.
- 3. (Optional) To filter the displayed media assets, either use the Search field (to filter by file name) or the dropdown menu to filter by modification date.
 - The media asset list is filtered based on your filter settings.
- 4. To preview a media asset, either click the **Options** icon at the right side of the corresponding list item. and select Preview asset or drag the media asset on the preview player.

The media asset is loaded by the preview player.



Automation - File preview



Alternatively, you can also preview media assets by dragging the corresponding clip from the rundown into the preview player. If the clip times were edited in the rundown (for example, the clip start offset or duration was changed), these times are applied by the preview player as mark in and mark out.

5. Use the preview player controls to play the media asset.

Notice

If you preview a live source:

- the player controls are disabled, except the stop button
- you can copy the stream URL to the clipboard by clicking the corresponding Path icon in the Comm on metadata section

The preview playback starts.

Renaming a media asset



Notice

This section refers to changing the title and the ID of a media asset via the Media tab. This is independent of the clip title, which is displayed in the rundown and can be changed separately for each clip. For more information, see the section Editing a clip.

To manually rename a media asset, proceed as follows:

- 1. On the right side, select the Media tab.
- 2. In the media asset list, select the media type Clips and the corresponding source folder that contains the media asset to be renamed.
- 3. Click the **Options** icon at the right side of the corresponding list item and select **Edit**.
- 4. Enter a new Media Title.
- 5. (Optional) Enter a new (unique) Media Id.
- 6. Click Apply.

The media asset is renamed.

Controlling the rundown playback

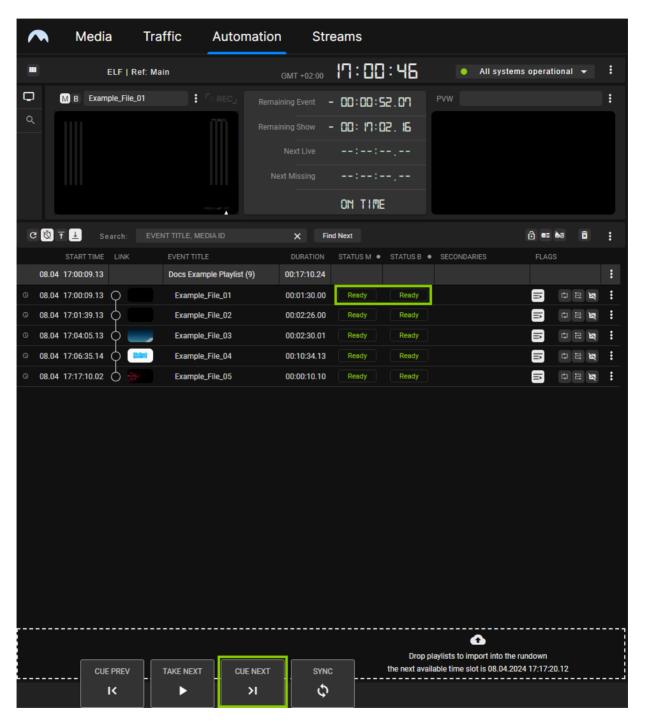
The rundown playback can either be triggered automatically (based on the scheduled playlist start time) or manually by using the rundown control via the buttons at the bottom left of the screen.

To manually start the playback, proceed as follows:

- 1. In the rundown cue a clip to prepare it for playback, by either:
 - a. clicking Cue next in the rundown control, or
 - b. by clicking the clip status of a clip that is in status **Ready**.

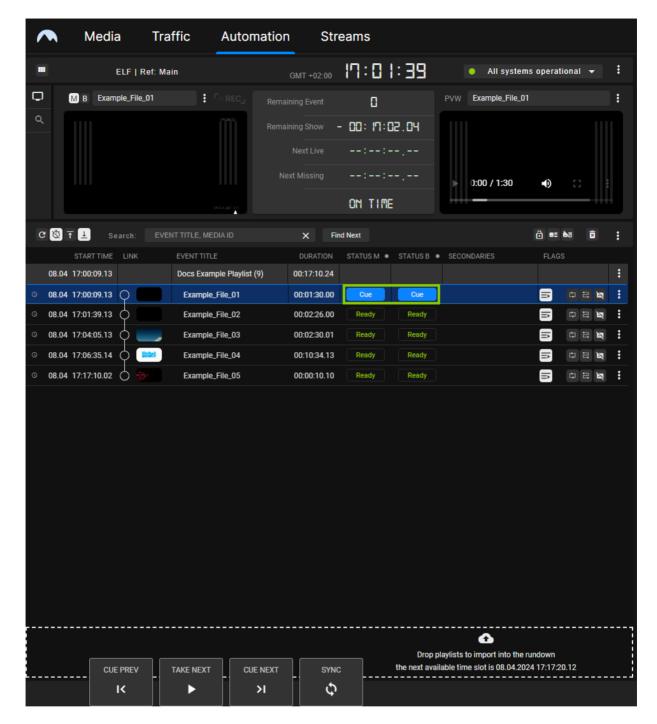
Notice

If you use the first method, it either cues the first clip in the rundown (if no clip was previously cued) or the next clip after the previously cued clip.



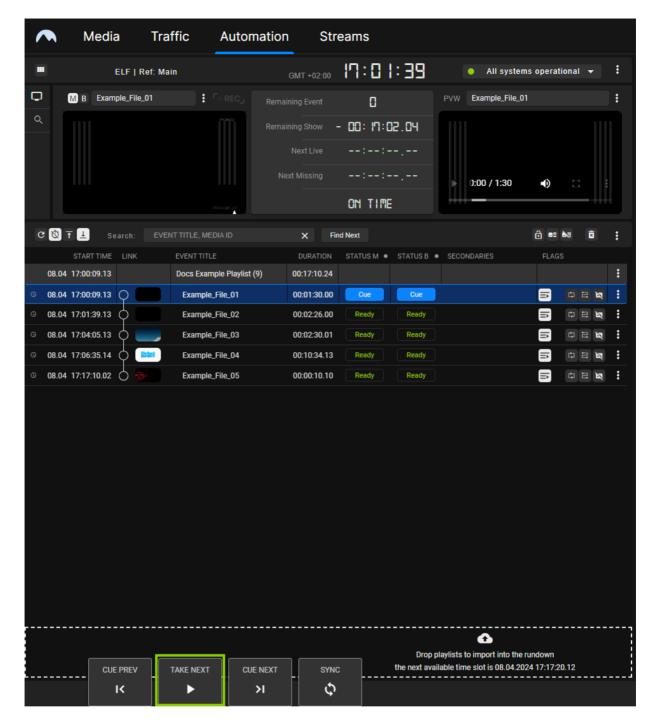
Automation - Cue a clip

The clip status changes to Cue.



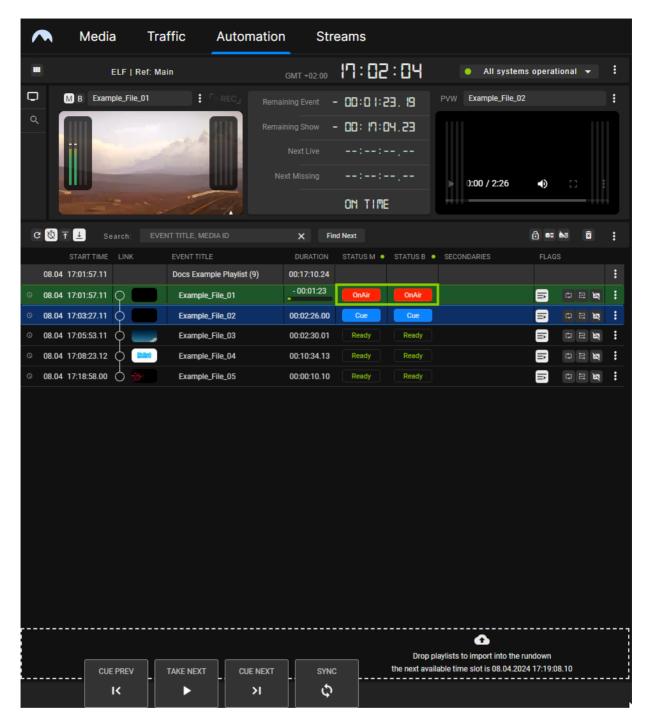
Automation - Cued clip

2. To start playback, click **Take next** in the rundown control.



Automation - Play a clip

The clip is played. The clip status changes to On Air.



Automation - Clip is playing

७ Tip

If the **Auto Follow** flag of the following clip is enabled, the following clip is automatically cued. Alternatively, you can cue any other clip (that is in status **Ready**) by either clicking the clip status or **Cu e next**.

To manually stop the playback of the current clip and start the playback of the next cued clip, click **Tak e next** in the rundown control. This is required, for example, if a clip of type **live source** is currently playing with the clip flag **Open End** enabled. Because of the flag, the clip plays continuously. The playback stops only when you manually cue the next clip to be played and click **Take next**.

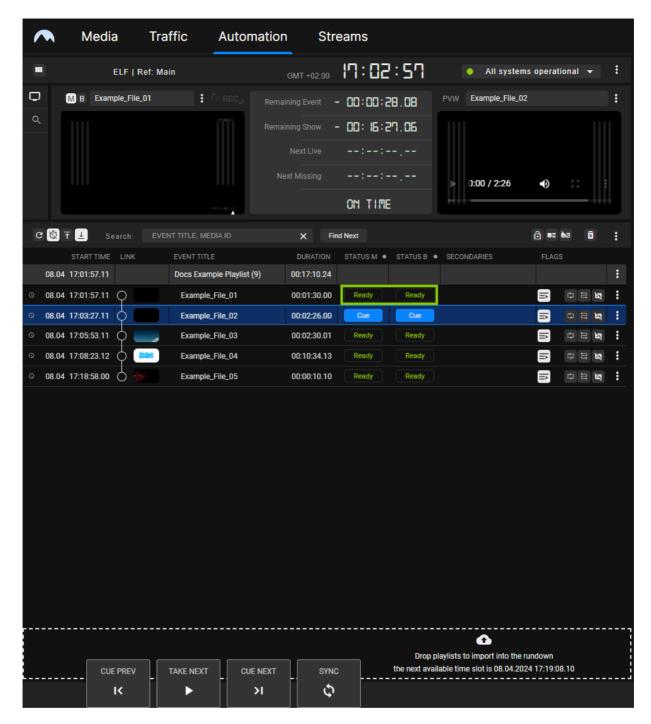
3. To manually stop playback, click **Stop** in the rundown control.

Notice

The **Stop** button is hidden by default. To display it, click the **Show controls icon** at the bottom right of the screen.

4. Confirm the dialog by clicking Yes.

The playback is stopped. The clip status changes to **Ready**.



Automation - Playback stopped



If you manually stop playback, the previously cued clip remains cued. To eject the player (setting it to idle) and reset the status of all clips (setting all available clips to status **Ready**), click the **Eject player** icon in the rundown control via the buttons at the bottom left of the screen and confirm the following dialog by clicking **Yes**.

File transfer

As described in section Ingest, all media files to be played are initially uploaded to the ingest storage. Afterward, each file used in a rundown must be copied to all playout nodes that are assigned to the corresponding channel.

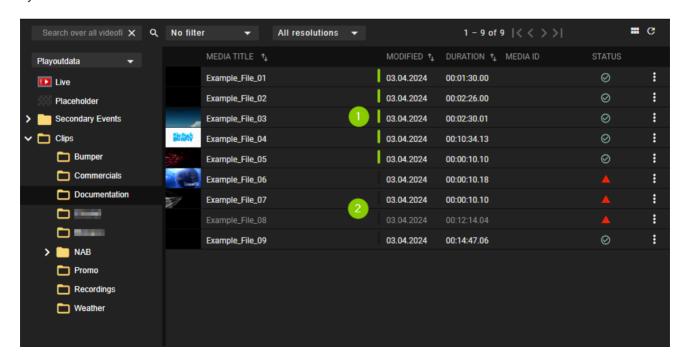
Notice

If a file is already present on the local playout node storage and the file transfer is triggered again (for example, when the file processing is triggered again manually), the file is overwritten on the local playout node storage if it is not currently on-air.

The file transfer between ingest and playout storage can be triggered in the following ways:

- add an existing playlist to the rundown, which automatically triggers transfers for all used files that are not yet available on the playout nodes
- add a media file to an existing show in a playlist in the rundown, which automatically triggers transfers for all used files that are not yet available on the playout nodes
- trigger a file transfer manually via the media asset list (either via the Media tab or Transfer tab)
- trigger file processing manually (which afterward triggers the file transfer) via the media asset list

The file transfer status (which indicates if a file is already available on all related playout nodes) is recognizable by colored bars in the media asset list:



Automation - File transfer status

1. Green bar - the file transfer is completed, the file is already available on the playout nodes

2. Black bar - the file is only available on the ingest storage, but not available on the playout nodes

A list of all currently running and recent file transfers is available in the Transfer tab.

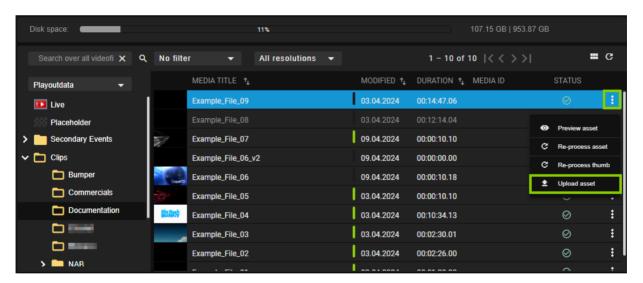


The number of file transfers running simultaneously is configurable and set by default to five parallel file transfers.

Triggering a file transfer manually

To trigger a file transfer from ingest storage to playout nodes manually, proceed as follows:

- 1. Select the **Media** tab or the **Transfer** tab.
- 2. In the Source dropdown menu, select the ingest storage (usually named Playoutdata).
- 3. Select a folder that contains a file that is not available on playout nodes (indicated by a black bar to the left of the file's modified date).
- 4. Select the file to be transferred.
- 5. Click the **Options** icon at the right side of the corresponding list item and select **Upload asset**.

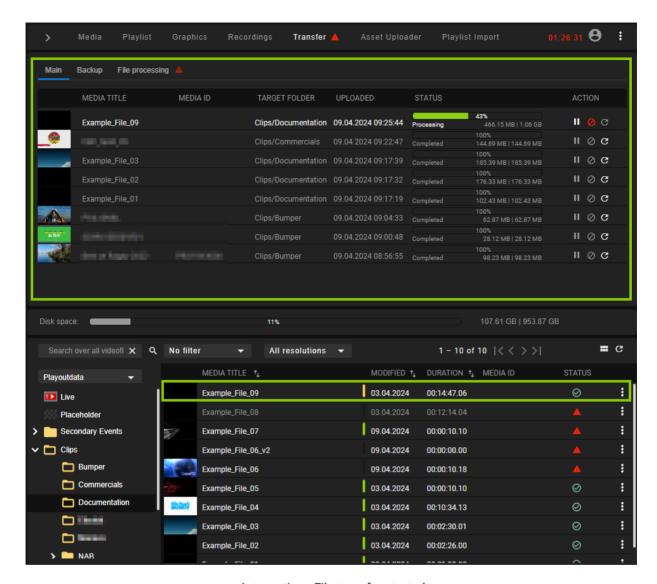


Automation - Start file transfer

6. Confirm the dialog by clicking Yes.

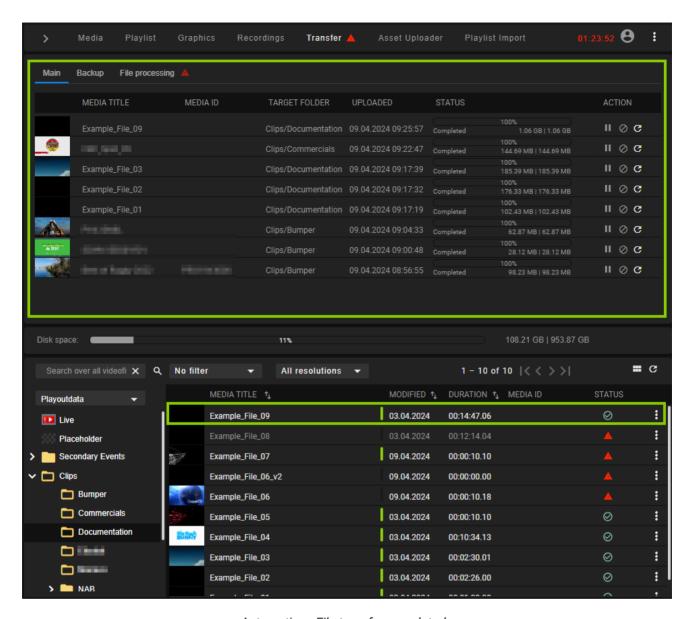
The transfer of the selected file starts.

7. Select the **Transfer** tab to view the file transfer progress.



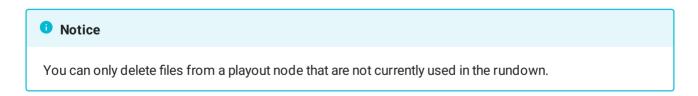
Automation - File transfer started

The file transfer to the playout nodes is completed. This is also indicated by a green bar to the left of the file's modified date.



Automation - File transfer completed

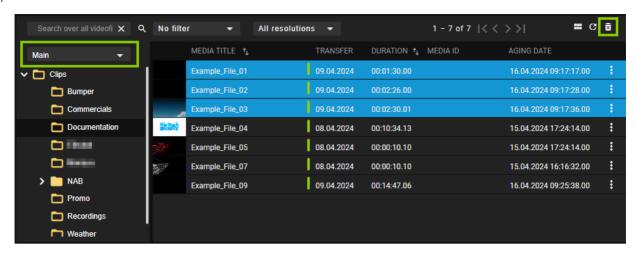
Deleting transferred files manually



To manually delete files from a playout node, proceed as follows:

- 1. Select the Media tab or the Transfer tab.
- 2. In the **Source** dropdown menu, select the playout node (usually named **Main** or **Backup**).
- 3. Select the folder that contains the files to be deleted.
- 4. Select one or more files to be deleted.

In the toolbar at the top right of the media asset list, click the **Delete assets** icon \square .



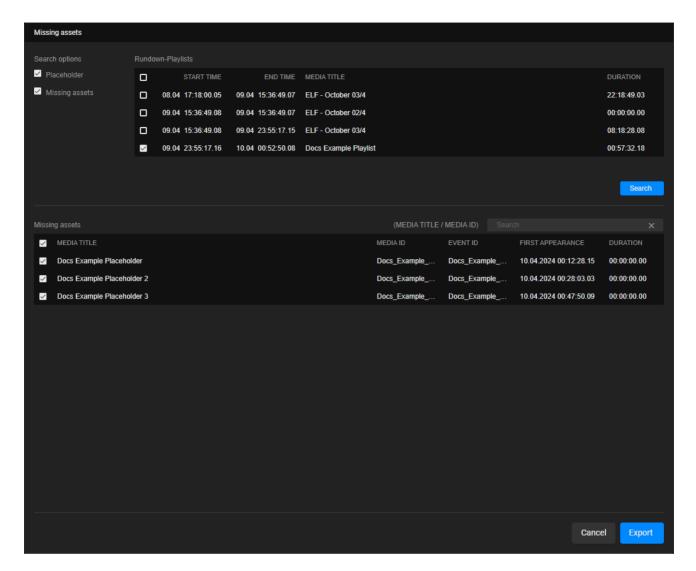
Automation - Delete files

6. Confirm the dialog by clicking Yes.

The selected files are deleted from the playout node storage. This is also indicated by a black bar to the left of the file transfer date.

Searching for and requesting missing media

Via the **Missing assets** menu, you can search the rundown for missing assets. In addition, you can export and download the missing file list as a CSV file. If Makalu is connected to an external MAM system, you can also request the transfer of missing media files from the MAM storage to the ingest storage.



Automation - Missing assets menu

Makalu distinguishes between the following types of missing assets:

Type of missing asset	Highlight color in rundown	Description
Placeholder asset	Yellow	It is expected that the corresponding file is not present yet on the local playout storage
File-based asset	Red	The corresponding file is unexpectedly not present on the local playout storage

To search for missing assets, proceed as follows:

1. Click the **Options** icon **i** above the rundown and select **Show missing assets**.

The **Missing assets** menu opens.

- 2 Under **Search options**, select if you want to search for **Placeholders** and/or **Missing assets**.
- 3. Under **Rundown-Playlists**, select one or more (if present in the rundown) playlists in which you want to search for missing assets.
- 4. Click Search.

The search results are listed under **Missing assets**.

- 5. (Optional) To search for specific missing assets based on their **Media Title** or **Media ID**, use the search field above the result list.
- 6. (Optional) To export and download the results as a CSV file, select the missing assets to be included and click **Export**.
- 7. (Optional) If Makalu is connected to an external MAM system, you can also request the transfer of missing media files from the MAM storage to the ingest storage. To do this, select the assets to be requested in the result list and click **Request media**.

The selected assets are requested from the connected MAM and are transferred.

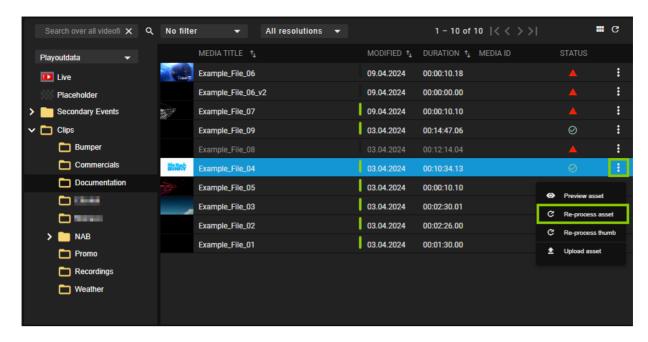
File processing

Re-triggering a full file processing

As previously mentioned in the section Ingest, file processing starts automatically when a file is uploaded to the central ingest storage. In some cases, it may be necessary to manually re-trigger the processing of a file. A possible reason could be, for example, if something went wrong during the initial file processing, and not all required files (for example, low-res/proxy video file, checksum, or thumbnail) were created as expected. In this case, the corresponding media item (in the **Media** tab) or file processing job (in the **Transfer** tab under **File processing**) is marked with an error icon in the **Status** column. If you hover your mouse over this icon, additional error details are displayed.

If you want to re-trigger the full file processing for a specific media asset manually via the **Media** tab, proceed as follows:

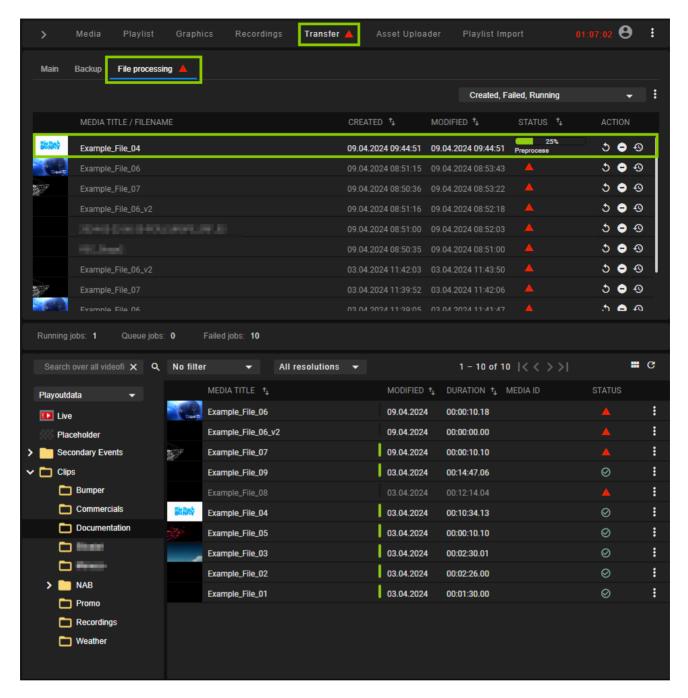
- On the right side, select the **Media** tab.
 All available media assets are listed in the lower right area.
- 2. In the media asset list, select the media type **Clips** and the source folder that contains the media asset to be re-processed.
- 3. Click the **Options** icon at the right side of the corresponding list item and select **Re-process asset**.



Automation - Re-trigger file processing

4. Confirm the following dialog by clicking Yes.

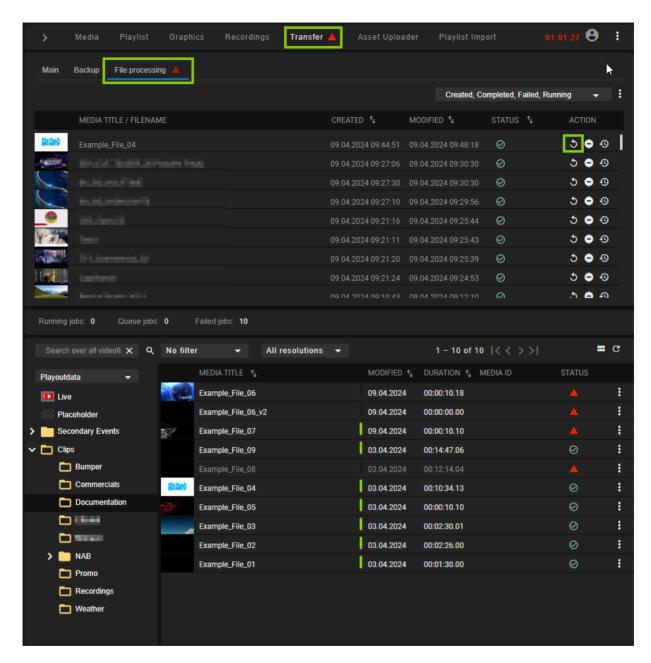
A new file processing job is created for the selected asset. You can view the progress of the processing in the **Tra nsfer** tab under **File processing**.



Automation - File processing re-triggered

Alternatively, if you want to re-trigger the file processing job manually via the file processing list, proceed as follows:

- On the right side, select the **Transfer** tab, and below select **File processing**.
 All file processing jobs currently running or recently completed are displayed below.
- 2. In the file processing list, select the job to be re-triggered and, in the **Action** column, click the **Retry job** icon



Automation - Re-trigger file processing

The file processing job is restarted.

Re-triggering a file processing for selected files

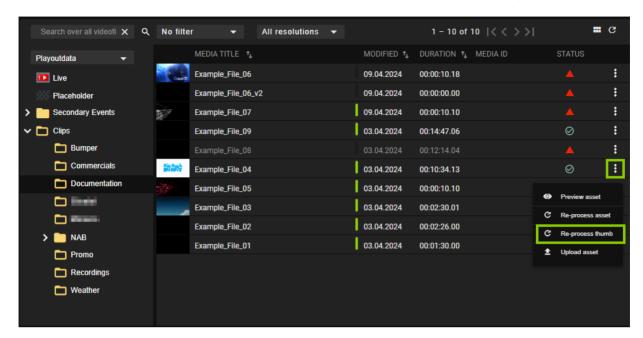
Instead of re-triggering the file processing completely, you can also restrict it to selected files.

If you want to re-trigger the file processing for a thumbnail of a specific media asset manually via the **Media** tab, proceed as follows:

1. On the right side, select the Media tab.

All available media assets are listed in the lower right area.

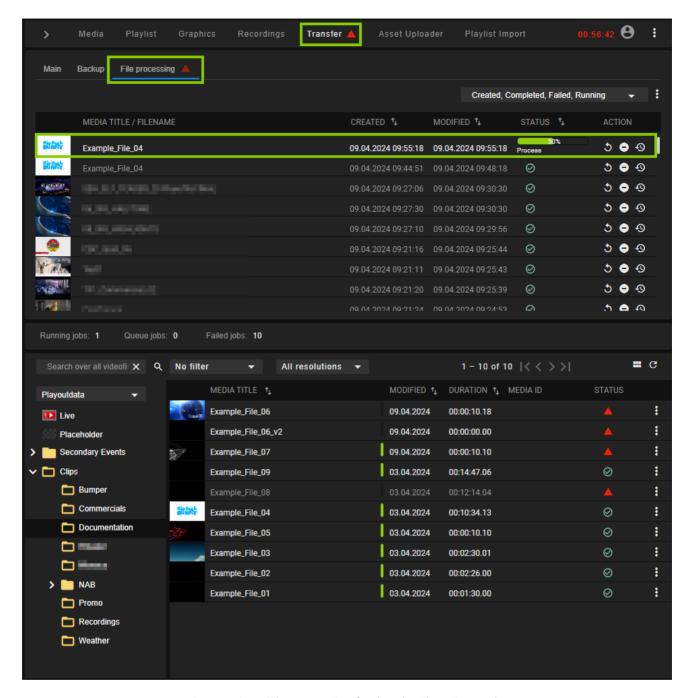
- 2. In the media asset list, select the media type **Clips** and the source folder that contains the media asset to be re-processed.
- 3. Click the **Options** icon **1** at the right side of the corresponding list item and select **Re-process thumb**.



Automation - Re-trigger file processing for thumbnail manually

4. Confirm the following dialog by clicking Yes.

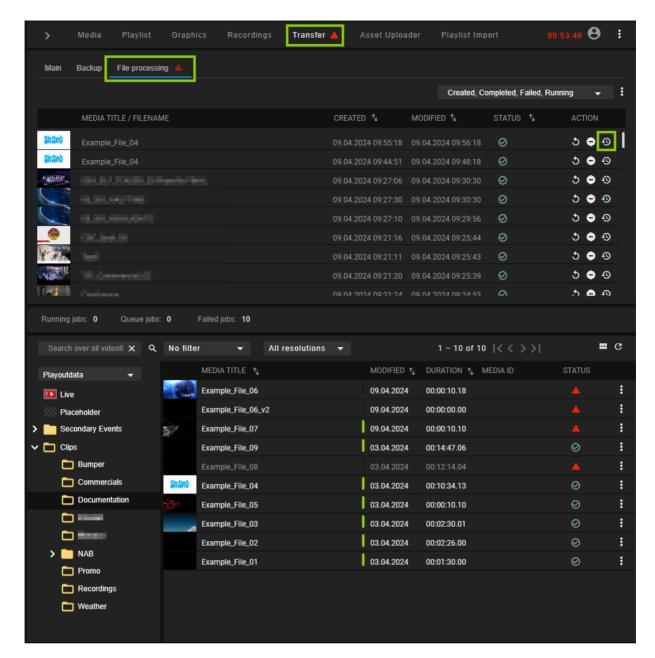
A new file processing job is created for the thumbnail of the selected asset. You can view the progress of the processing in the **Transfer** tab under **File processing**.



Automation - File processing for thumbnail re-triggered

To re-trigger the file processing for selected file types (checksum, low-res proxy, and/or thumbnail) manually via the file processing list, proceed as follows:

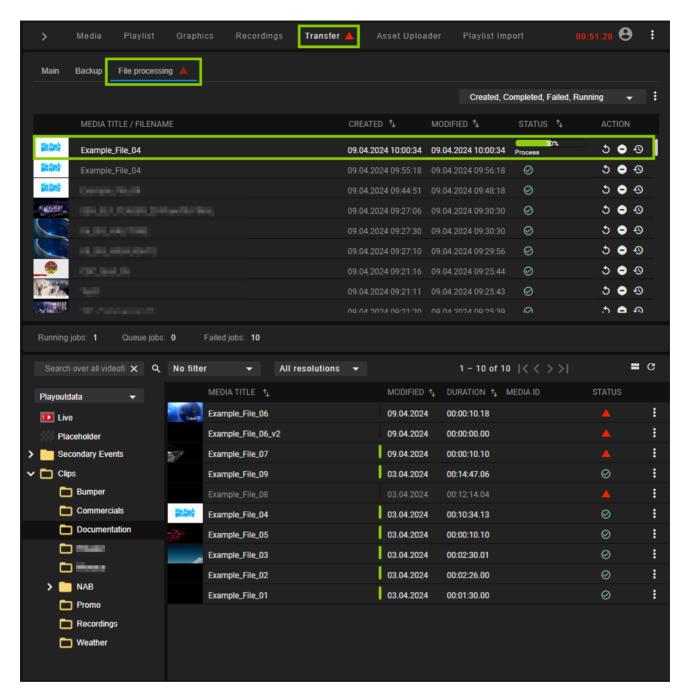
- On the right side, select the **Transfer** tab, and below select **File processing**.
 All file processing jobs currently running or recently completed are displayed below.
- 2. In the file processing list, select the job to be re-triggered, and in the **Action** column, click the **Reprocess job** icon **9**.



Automation - Re-trigger file processing for selected files manually

- 3. In the following dialog, select the file types to be re-processed (checksum, low-res proxy, and/or thumbnail).
- 4. Confirm your selection by clicking Apply.

The file processing is triggered again for the selected file types.



Automation - File processing for selected files re-triggered manually

Importing a playlist



Makalu supports the import of XML-based playlists created by Makalu or by third-party traffic systems. For further information, please contact support.stream@qvest.com.

To import a playlist, proceed as follows:

- 1. Select the Playlist Import tab.
- 2. To add a playlist, either:
 - a. drag the playlist file into the drop zone area, or
 - b. click **select** and select the playlist file.
- 3. Select the target channel to which the playlist should be assigned.
- 4. To confirm your selection, click Apply.
- Click Process.

The content of the playlist file is checked and processed.

6. Click Import.

The playlist is imported.

Creating a placeholder media asset manually

To create a placeholder media asset manually, proceed as follows:

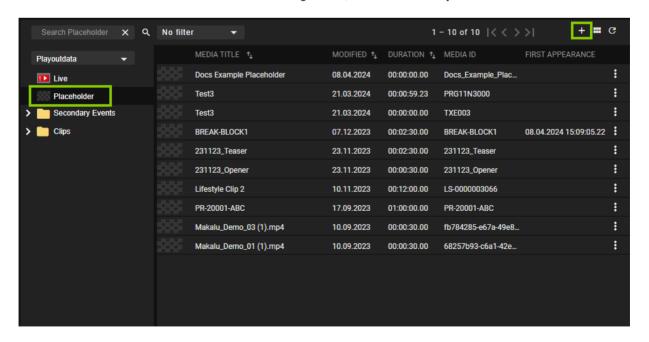
1. Select the Media tab.

The media asset list is displayed at the bottom right.

2. In the media asset list, select the asset type Placeholder.

All available placeholder media assets are listed.

3. In the toolbar above the media asset list on the right side, click the Create placeholder icon ±.



Automation - Create placeholder

The Create placeholder dialog opens.

- 4. Enter the Media Title and Media Id.
- 5. Select the **Folder** where the corresponding media file is expected.
- 6. (Optional) Set the **Duration** (default: 5 minutes).
- 7. (Optional) Set the **Expiry date** (default: one month in the future, based on the current date).



The **Expiry date** determines when a media asset/file will be deleted automatically. For more information, see the section Housekeeping.

8. Click Apply.

The placeholder media asset is created based on the properties you selected. It is then listed under **Placeholder** in the media asset list. You can add it to the rundown as described in the section Adding elements to the rundown.



To edit a placeholder media asset, click the **Options** icon at the right side of the corresponding list item and select **Edit placeholder**. Then, edit the properties in the **Edit placeholder** dialog and confirm your changes by clicking **Apply**.

Note that your changes do not automatically affect existing occurrences of the placeholder in the rundown. To apply them, you must add the edited placeholder again to the rundown.

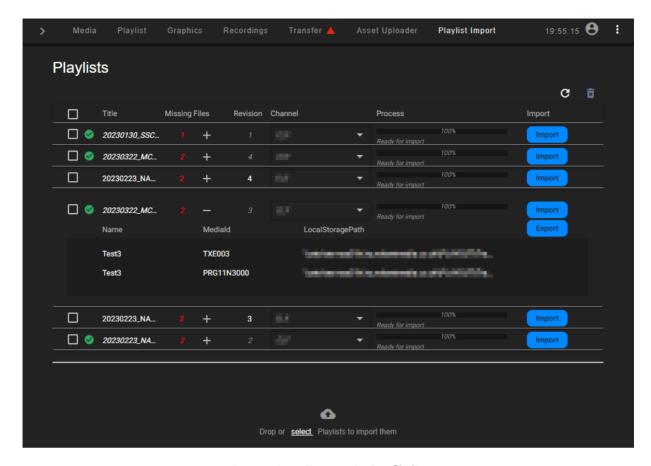
Exporting a missing file list

To export a missing file list, proceed as follows:

- 1. Select the Playlist Import tab.
- 2. Click the **plus icon** of an imported playlist that has missing files.

The missing file list expands, and all missing files are listed.

3. Click Export.

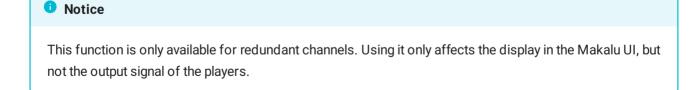


Automation - Export missing file list

The missing file list is downloaded.



Switching the reference player



With redundant channels, the clip status display in the rundown receives its data from the currently selected main or backup playout node. If one of the components involved (for example, the Automation API) fails, the clip status data cannot be updated between the player and the Makalu UI anymore.

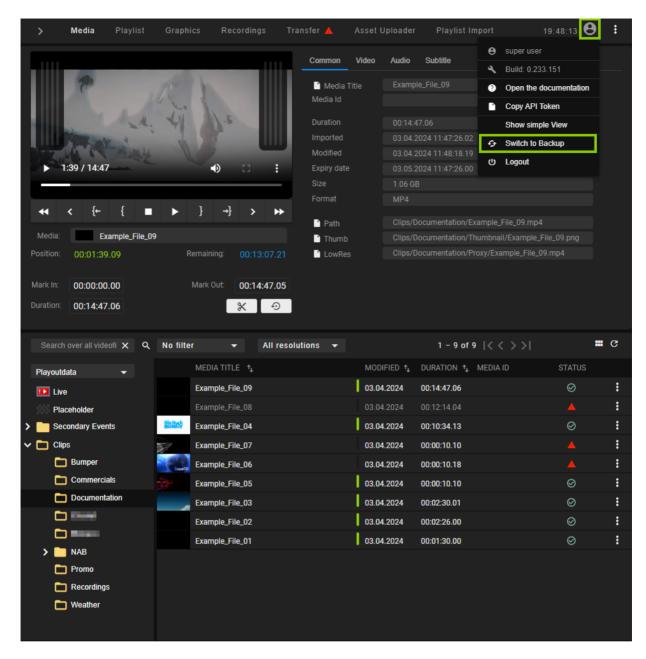
७ Tip

You can check the current status of all involved components (for example, Automation and VideoServer) via the system health status indicator. Additionally, status changes to components (for example, a component going online/offline) are displayed automatically via corresponding notifications.

In this case, all clips used in the rundown are listed with the status "offline". However, both players (main and backup) can continue to play as long as they still have a scheduled program. Rundown and player control commands (for example, Take Next, Cue Next, etc.) are still sent to both players, provided both are accessible.

To get an updated clip status display in this case, you can switch the reference player (either from main to backup or vice versa). To switch the reference player, proceed as follows:

- 1. At the top right, click the **User** icon.
- 2. Depending on the currently selected reference player, either select Switch to Backup or Switch to Main.



Automation - Switch reference player

3. Confirm your selection by clicking Yes.

The reference is switched to the selected player, and the clip status is updated accordingly.

Restarting the player

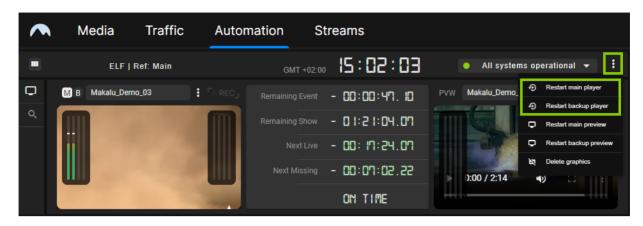


Use the channel restart trigger only in emergency situations (for example, when a player error occurs).

Restarting the player takes a short amount of time. During this time, no output signal is generated.

To manually restart the player, proceed as follows:

1. Click the menu button to the right of the system health status indicator and select **Restart player**.



Automation - Restart player



If the corresponding channel is redundant, the menu provides the option to restart the main and backup players separately.

A dialog is displayed, asking you to confirm this action.

2. Confirm the dialog by clicking Yes.

The player is restarted.

Changing an audio mapping scheme

For information about how to change an audio mapping scheme, see the following sections in the chapter Audi o mapping:

- · Using audio mapping for short-term planning
- · Using audio mapping for live/on the fly changes

Playing SRT live sources in A/B mode

To optimize the throughput time of its playout chain, Makalu provides an "A/B mode" for playing SRT live sources. This enables seamless playing and switching between SRT live sources if several consecutive live sources are scheduled in the rundown.

If you want to use multiple consecutive SRT live sources in the rundown (without any file-based primary event between them), you must add them alternately from **SRT Set A** and **SRT Set B**. Both sets contain the same live sources but are listed and can be selected as separate live source types in the **Media** area. They are available in

the media asset list under the type **Live**. For better visual differentiation, both sets use different icons (set A blue and set B green).

When you add an SRT live source to the rundown, a non-removable script secondary event is automatically added to it. This script event is used to route the live sources of each set internally as SRT connections to different ports (A or B) of the playout, enabling seamless playback and switching between sources. The routing already takes place when the live source is being prepared (cached) for playback.

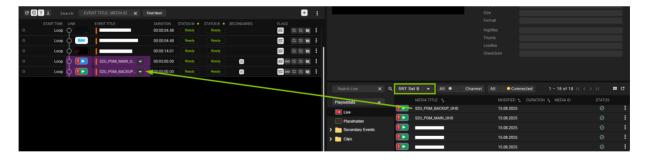
To add multiple consecutive SRT live sources to the rundown using A/B mode, proceed as follows:

1. Follow the steps 1-3 described in section Adding media to the rundown to add a live source from SRT Set A to the rundown.



Automation - Add SRT live source from Set A

2. Repeat the previous step to add a live source from SRT Set B to the rundown directly after the already added live source from SRT Set A.



Automation - Add SRT live source from Set B

- 3. (Optional) If necessary, add more sources based on the same principle (alternating between a source from SRT Set A and SRT Set B).
- 4. Start and control the rundown playback as described in section Controlling the rundown playback.

The scheduled live sources are played using A/B mode.

2.5 Live sources and stream targets

Each incoming live stream or feed received by Makalu is referred to as a **live source**. Makalu distinguishes between the following types of live sources:

- compressed signals (for example, live sources received via SRT, which are highlighted in the Makalu UI with a red thumbnail)
- uncompressed signals (for example, SDI live sources in on-premise environments, which are highlighted in the Makalu UI with a green thumbnail)

Live sources are used by multiple Makalu apps, for example, to preview incoming streams or to schedule them in a rundown. Each playout output signal can also be routed internally and used as a live source ("backchannel") again. Every live source is defined by a set of configuration properties (metadata), such as the used protocol, the URL used to receive the stream, or (if required) stream credentials. These configuration properties can, for example, be used to set up an external device or software that provides an incoming source stream to Makalu.

The target for each outgoing live stream is referred to as a **stream target**. Like a live source, each stream target is defined by a set of configuration properties (metadata), such as the used protocol, the target URL, or (if required) stream credentials. Stream targets can be used by multiple Makalu apps, for example, to schedule them in a rundown, defining which parts of the scheduled program should be streamed to downstream service providers or video platforms.

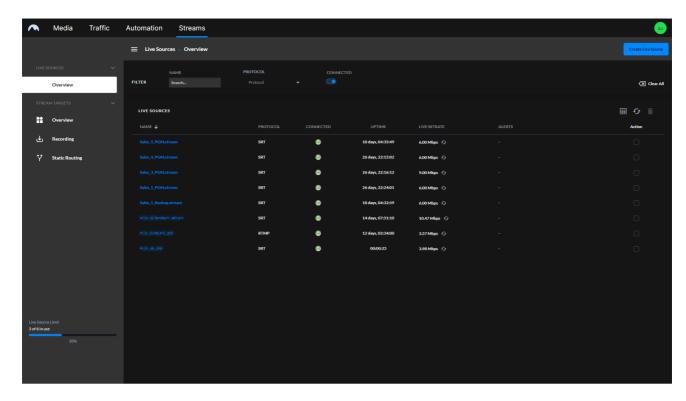
To manage, preview, monitor, and route incoming and outgoing live streams, Makalu includes the Stream Control app.

2.5.1 Accessing Makalu Stream Control

To access Makalu Stream Control, proceed as follows:

- 1. Open the Makalu Hub as described in section Accessing the Makalu Hub.
- 2. In the app list in the left column, in the section Streams, select Makalu Streams.

The Stream Control UI is opened in the Streams tab of the main Makalu UI.



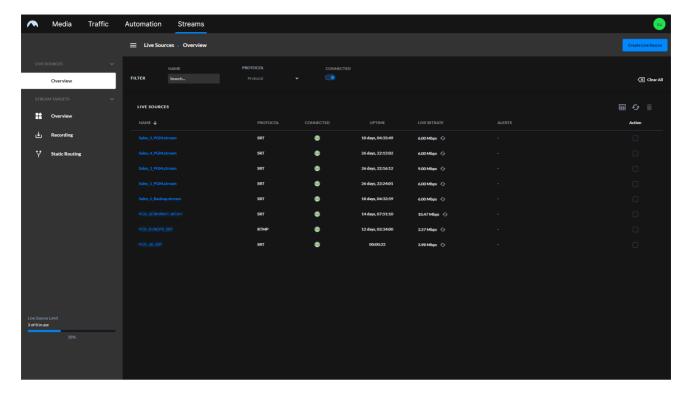
Stream Control - UI

2.5.2 Manage live sources

Using the live sources overview

To access the live sources overview, in the navigation sidebar on the left, select **Live Sources > Overview**.

The live sources overview is displayed.

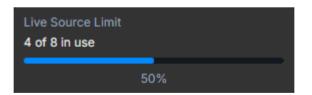


Stream Control - Live sources overview

In the **Live Sources** area, all currently available live sources are listed with their basic properties. You can customize the columns to be displayed and manually trigger a list update by using the corresponding buttons above the list.

To display only specific live sources, use the **Filter** area above the list. There, you can search live sources by name, transmission protocol, connection status, and type (backchannel or "regular" live source).

The number of available live sources is limited. Depending on the infrastructure and the Makalu subscription, this number may vary. The total number of live sources available and current utilization is displayed at the bottom left under **Live Source Limit**:



Stream Control - Live source limit

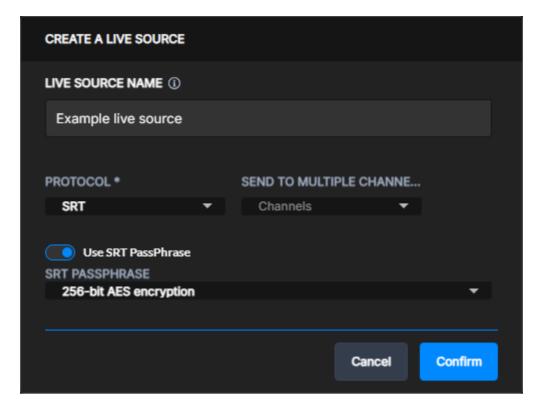
Creating a live source

To create a live source, proceed as follows:

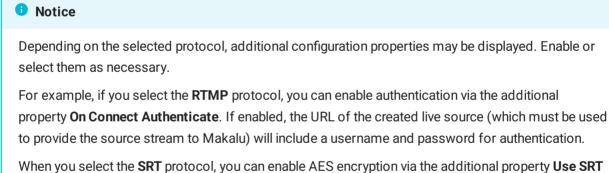
- 1. In the navigation sidebar on the left, select **Live Sources > Overview**.
- 2. In the upper right, click Create.

The Create a live source menu is displayed.

2 Enter a unique name for the live source and select the protocol to be used.



Stream Control - Create live source



- **PassPhrase**. If you enable it, you can additionally select the type of AES encryption to be used (128, 192, or 256 bits).
- (Optional) To make the live source available only to selected channels, select one or more channels in the S
 end to multiple channels dropdown menu.
- 5. Click Confirm.

The live source is created with the selected properties and added to the list of available live sources. It is also available in Makalu Traffic as a primary event and can be added to shows. In Makalu Automation, it is available under **Media > Live** and can be previewed and added to the rundown.

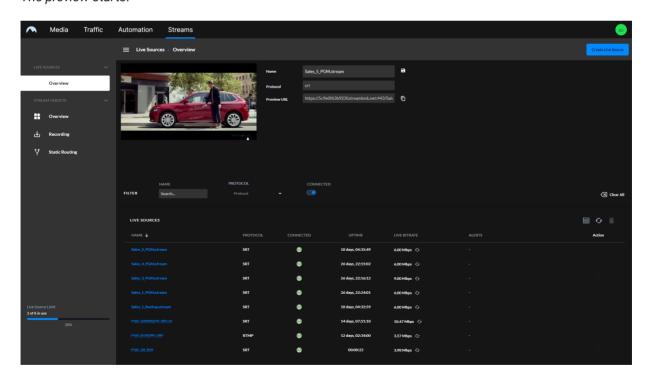
Notice

You can now configure your upstream device/software/encoder that provides the actual source stream to Makalu by using the configuration properties of the live source you created. To do this, select the newly created live source, copy the values of the corresponding configuration properties to the clipboard, and paste them into your device/software settings. Afterward, start the stream. If everything is configured properly and the incoming stream is received correctly by Makalu, the live source status changes from red (disconnected) to green (connected), and the preview can be started.

Previewing a live source

To preview a live source, proceed as follows:

- 1. In the navigation sidebar on the left, select Live Sources > Overview.
- In the live sources list, click the name of the live source to be previewed.
 A preview player and detailed information about the live source are displayed at the top of the page.
- In the preview player, click the **Play** icon.
 The preview starts.



Stream Control - Live source preview

4. Use the player controls, for example, to trigger pause, play, or full-screen view.

Editing a live source



Notice

You can only edit the name and assigned channels of a live source. All other settings cannot be changed as they are automatically generated.

To edit a live source, proceed as follows:

- 1. In the navigation sidebar on the left, select Live Sources > Overview.
- 2. In the live sources list, click the name of the live source to be edited.

A preview player and detailed information about the live source are displayed at the top of the page.

- 3. Edit the properties as required (Name and/or assigned Channels).
- 4. Click Save.

The changed live source configuration is saved.

Deleting a live source



Notice

You can only delete "regular" live sources. Backchannel live sources cannot be deleted.

To delete a live source, proceed as follows:

- 1. In the navigation sidebar on the left, select Live Sources > Overview.
- 2. In the live sources list in the Action column, activate the checkbox of the live source to be deleted.
- 3. Click the **Delete selected live source** icon above the live sources list.
- 4. Confirm the displayed dialog by clicking Confirm.

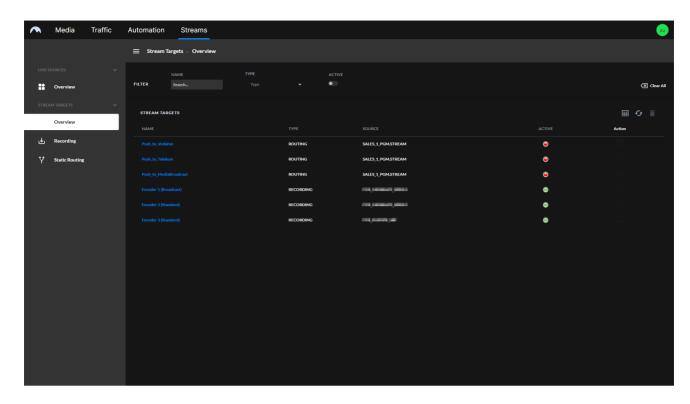
The live source is deleted and removed from the list.

2.5.3 Manage stream targets

Using the stream targets overview

To access the stream target overview, in the navigation sidebar on the left, select Stream Targets > Overview.

The stream target overview is displayed.



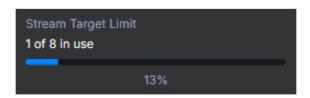
Stream Control - Stream target overview

In the **Stream Targets** area, all currently available stream targets and jobs are listed, along with basic information (such as name, type, source, and status). You can customize the columns to be displayed and manually trigger a list update by using the corresponding buttons above the list.

To display only specific stream targets, use the **Filter** area above the list. There, for example, you can search stream targets by name, type (YouTube, Generic, etc.), or active status.

You can display and edit the details of each stream target by clicking the corresponding stream target name.

The number of available stream targets is limited. Depending on the infrastructure and the Makalu subscription, this number may vary. The total number of stream targets available and current utilization is displayed under **St ream Targets > Static Routing** at the bottom left under **Stream Target Limit**:



Stream Control - Stream target limit

Creating a static routing stream target

A static routing stream target enables you to permanently stream any live source to any valid target, without having to schedule it in a rundown.

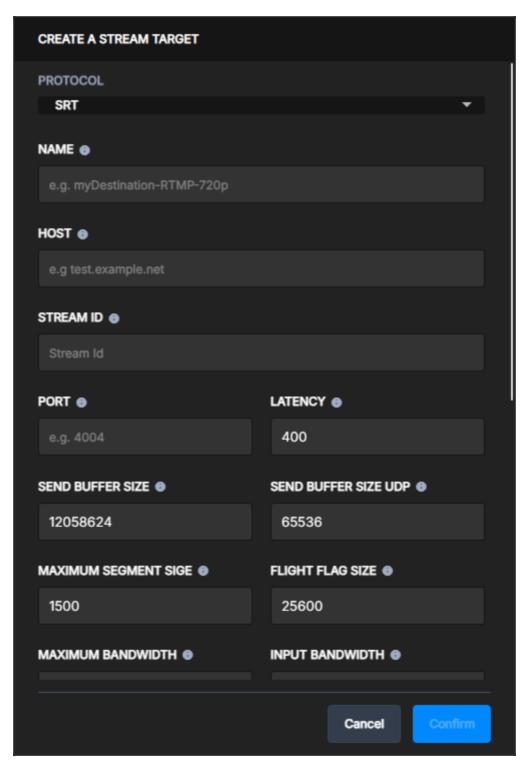
To create a static routing stream target, proceed as follows:

- In the navigation sidebar on the left, select **Stream Targets > Static Routing**.
- 2. In the upper right, click Add.

The Create a stream target menu is displayed.*

3. Select the protocol to be used.

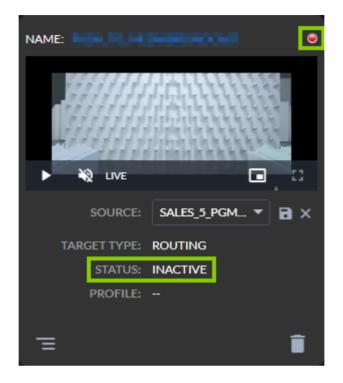
Depending on the selected protocol, different configuration properties are displayed.



Stream Control - Static routing stream target properties

- Set all configuration properties as required.
- 5. Click Confirm.

The static routing stream target is created and added to the stream targets list with the status inactive (red).



Stream Control - Static routing stream target created

- Select the live source to be used via the **Source** dropdown menu.
 If the source stream is valid and running, preview playback starts automatically.
- 7. Right next to Source, click the **Save source stream** icon.

The source of the static routing stream target is saved. If the source and target are valid and the stream is running, the status changes to active (green).

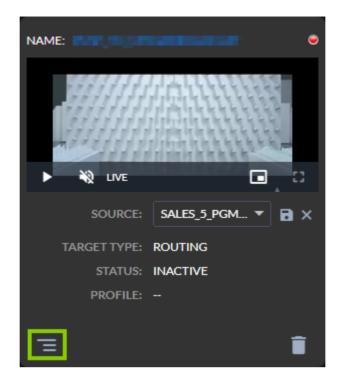


To preview the live source, in the preview player, click the **Play** icon and use the player controls, for example, to trigger a full-screen preview.

Editing a static routing stream target

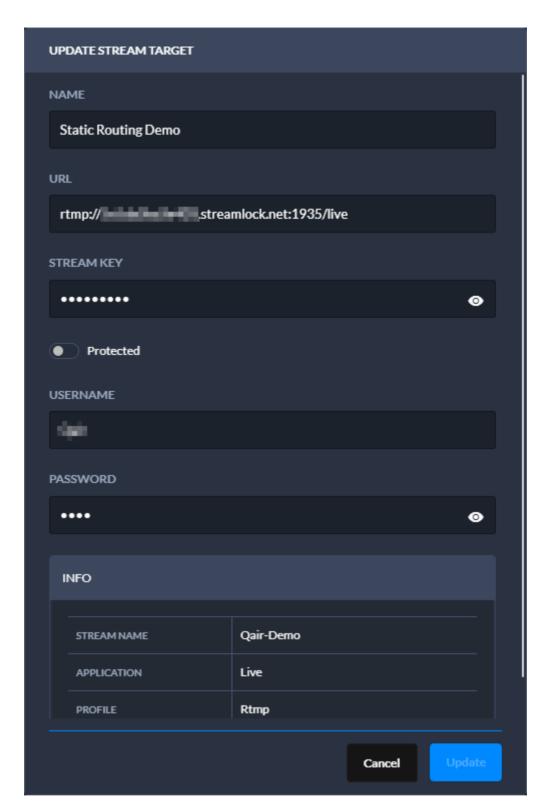
To edit a static routing stream target, proceed as follows:

- 1. In the navigation sidebar on the left, select **Stream Targets > Static Routing**.
- Look for the target to be edited and, in the bottom left of the corresponding tile, click the View and edit configuration data icon.



Stream Control - Open static routing stream target settings

The target settings are displayed.



Stream Control - Static routing stream target settings

- 3. Change the settings as required.
- 4. Confirm your changes by clicking Update.

The changed static routing stream target settings are saved.

Deleting a stream target

To delete a stream target, proceed as follows:

- 1. In the navigation sidebar on the left, select **Stream Targets > Overview**.
- 2. In the stream targets list in the Action column, activate the checkbox of the stream target to be deleted.
- 3. Click the Delete selected stream target icon above the live sources list.
- 4. Confirm the displayed dialog by clicking Confirm.

The stream target is deleted and removed from the list of stream targets.

Synchronizing stream targets between Wowza and Makalu

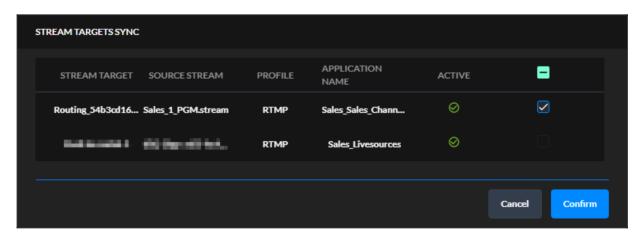
Under certain conditions (for example, due to special customer requirements regarding the stream format or certain specific stream properties), it may not be possible to create a stream target using the default mechanism provided by Makalu Stream Control. In this case, the corresponding stream target must be created manually via the Wowza Manager UI. Afterward, it can be synchronized with Makalu via Stream Control and can then be used like a "regular" stream target.

To synchronize stream targets, proceed as follows:

- 1. In the navigation sidebar on the left, select **Stream Targets > Static Routing**.
- 2. In the upper right, click **Sync**.

All stream targets created via the Wowza Manager UI and that can be synchronized are listed.

3. Select one or more stream targets to be synchronized.



Stream Control - Synchronize stream targets

4. Click Confirm.

The selected stream targets are synchronized with Makalu and can afterward be used like "regular" stream targets.

2.6 Recording

Recording is an optional Makalu module per playout channel that enables you to record multiple source/input streams simultaneously in different output file formats based on profiles. It can be used, for example, for live or compliance recordings.

2.6.1 Encoder types

Makalu provides the following types of encoders for different recording output file formats:

Encoder type	Features
Standard	Stream recording (in/out) with MP4 file output
Broadcast	Stream recording (in/out) with broadcast file format output (for example, XDCAM-HD422, AVC-Intra, or XAVC) and growing file support

2.6.2 Recording job types

Recordings are internally managed based on recording jobs. For each recording, a corresponding recording job is created. Makalu provides the following types of recording jobs:

Recording type	Job type	Start	Stop	Description
Event-based	Event-based	Automatic	Automatic/ Manual	The recording is created based on a secondary event, which contains metadata that defines the properties of the file to be recorded (e.g., format, source, and file name). A recording secondary event is attached to and scheduled for a specific primary (live) event in the rundown. Event-based recording jobs can be created via Makalu Automation and Makalu Traffic.
Event- independent	Crash	Manual	Manual	The recording can be started immediately using Makalu Automation.

Recording type	Job type	Start	Stop	Description
Event- independent	Schedule	Automatic	Automatic/ Manual	The recording is scheduled for a fixed time and period. Scheduled recording jobs can be created via Makalu Automation and Makalu Traffic.
Event-independent	Recurring	Automatic	Automatic/ Manual	The recording is scheduled for a fixed time and period and can be used for recurring recordings according to a defined schedule (for example, from October 1 to October 31, record live source "live1" every Monday and Friday from 10:00 to 11:00 a.m.). Recurring recording jobs can be created via Makalu Automation.

Depending on the actual workflow, usually either event-based or event-independent recording is enabled. Event-independent recording refers to manually created crash, schedule, and recurring jobs.

Notice

The decision of which app to use for creating a recording job depends on your workflow and how you use Makalu.

Makalu Traffic is designed for creating reusable templates for shows and playlists. It enables you to automatically generate recording jobs whenever a specific show template or playlist is used in the rundown.

Makalu Automation is designed for editing the rundown at short notice. It enables you to manually create recording jobs immediately and independently of the playlists and shows used.

2.6.3 Recording process

In summary, the recording process consists of the following steps:

- 1. A recording job is created to record a selected live source, either based on a live primary event in the rundown (by adding a recording secondary event) or independent of the rundown, based on a defined start and end time (by creating a recording job manually via the **Recordings** tab).
- 2. Depending on the selected job type, the recording starts either manually or automatically.
- 3. While a recording is running, a red recording icon is displayed above the channel preview and in the **Record ings** tab. The progress is displayed in the job list in the **Recordings** tab. There, the job can be stopped manually, if necessary. If an operator manually stops a live event, the corresponding recording job also stops at the same time.
- 4. When the recording job is completed, the recorded file is copied/uploaded from the playout/recording server to the corresponding S3 bucket (ingest storage). It can then be used like a regularly uploaded asset (which was uploaded, for example, via Makalu Asset Uploader), and the file processing starts. This is also confirmed by a notification at the top of the screen and a progress icon in the **Transfer** tab.

2.6.4 Creating a recording job via Makalu Traffic



In the following, it is assumed that you have already created a show and want to add a recording job to it. For information about how to create a new show, see the section Schedule (Creating a show).

You can also add recording jobs to playlists or clips in a similar way. For more information about how to edit a playlist, see the section Schedule (Editing a playlist). For more information about how to edit a clip, see the section Schedule (Editing a clip).

To add a recording job to a show, proceed as follows:

- Open Makalu Traffic.
- 2. In the sidebar on the left, select **Shows**.

All available shows of the currently selected channel are listed in the middle.

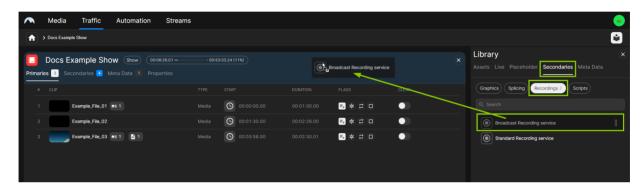
3. Select the show to be edited and click **Open** on the right side of the corresponding row.

The show details are displayed.

4. On the right side in the Library, select the Secondaries tab and below the type Recordings.

All available recording secondary events are displayed below.

5. Depending on the encoder type to be used, add the corresponding recording secondary event to the show by dragging it from the library to the show information area.



Traffic - Add a recording secondary event to a show

The recording secondary event is added to the show.

- 6. Edit the properties of the added recording secondary event as follows:
 - a. Select the **Secondaries** tab in the show information area.

All added secondary events are listed below.

b. Hover your mouse over the recording secondary event to be edited and click **Open** on the right side of the corresponding row.

The properties of the selected recording secondary event are displayed on the right side.

- c. Edit the properties of the added recording secondary event as required.
- d. To confirm your changes, click Save.

The properties of the recording secondary event are saved.

The show is saved. Whenever you add the show to the rundown, a recording job is automatically created with the properties you selected. You can control it via Makalu Automation in the Recordings area.

2.6.5 Creating a recording job via Makalu Automation



Notice

The areas of the Makalu Automation user interface relevant for recording are the **Recordings** tab and the corresponding secondary event type listed under Media > Secondary Events > Recordings. Both are only available if the optional Makalu Recording module is enabled for the currently selected playout channel.

Creating an event-based recording job



Notice

Event-based recording jobs are used to record live primary events that are scheduled in the rundown. In this case, only the clean feed of the selected live source is recorded (as fed to Makalu Automation) without any added graphics or other overlays.

To create an event-based recording job, proceed as follows:

- 1. Open Makalu Automation.
- 2. On the right side, select the Media tab.

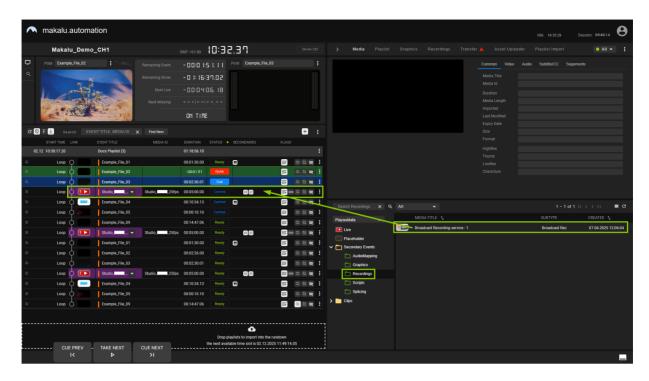
All available media items are listed in the media list at the bottom of the **Media** tab.

- 3. In the media list, select Secondary Events > Recordings.
 - All available recording secondary events are listed to the right.
- 4. Select a recording secondary event from the media list and drag it onto the live primary event in the rundown to be recorded.



Notice

By default, recording secondary events can only be added to live primary events in the rundown.



Automation - Add a recording secondary event to the rundown

The recording secondary event is added to the live primary event in the rundown. It is recognizable by the **Rec** ording secondary event icon of in the **Secondaries** column. An additional row for the secondary event and its details expands below. A corresponding recording job is created and added to the job list in the **Recordings** tab, which is also confirmed by a notification at the top of the screen.

Notice

A job duration is only displayed in the job list if the corresponding live primary event also has a planned duration. If it does not have a planned duration (if the **open end** flag is enabled), the recording job also does not have a planned duration.



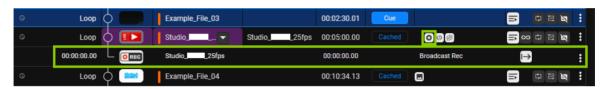
Automation - Recording secondary event added and recording job created



To display detailed information about a recording job, click the **Options** icon on the right side of the corresponding row in the job list and select **Job info**. To jump to and highlight the corresponding live primary event in the rundown, select **Link to Event**.

- 5. (Optional) Edit the properties of the added recording secondary event as follows:
 - a. If the row with the secondary event details is not displayed below the live primary event in the rundown, click the **Recording secondary event** icon [9] in the **Secondaries** column of the corresponding rundown item.

Details about the secondary event expand below.



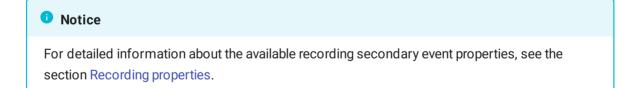
Automation - Secondary event details

b. Click the **Options** icon on the right side of the secondary event row and select **Edit Secondary**.



Automation - Open secondary event properties

c. In the **Edit secondary event** menu, edit the properties as required.



d. Confirm your changes by clicking Apply.

The properties of the recording secondary event are saved. By default (if the properties **Start Offset** and **End Offset** are set to 0), the recording job starts automatically when the corresponding live primary event actually starts and stops when it ends (either automatically at the scheduled time or when it is stopped manually by an operator).

Creating a crash recording job

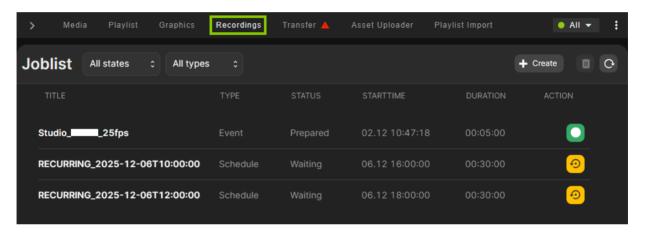


To create a crash job, the optional feature for manually creating recording jobs and the corresponding **Create** button must be enabled.

To create a crash recording job, proceed as follows:

- 1. Open Makalu Automation.
- 2. On the right side, select the Recordings tab.

The recording job list and controls are displayed.

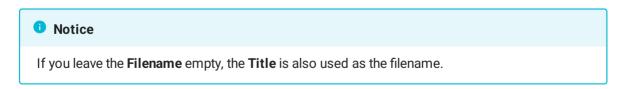


Automation - Recordings tab and job list

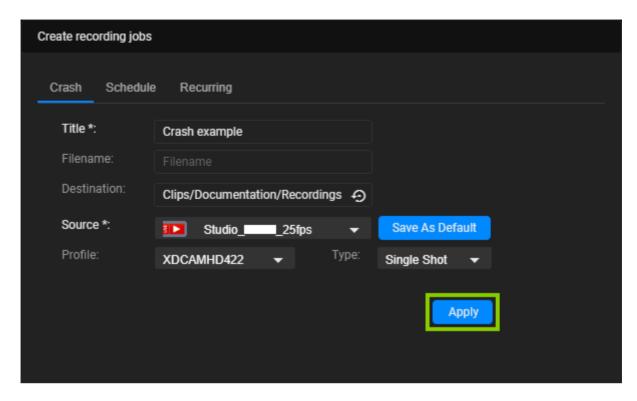
3. At the top right, click **Create**.

The Create recording jobs menu opens.

- 4. Select the **Crash** tab and set the properties of the recording job as follows:
 - a. Enter a Title and select the Source to be recorded.
 - b. (Optional) Enter a Filename and change the **Destination** and the **Profile** to be used for the recording.



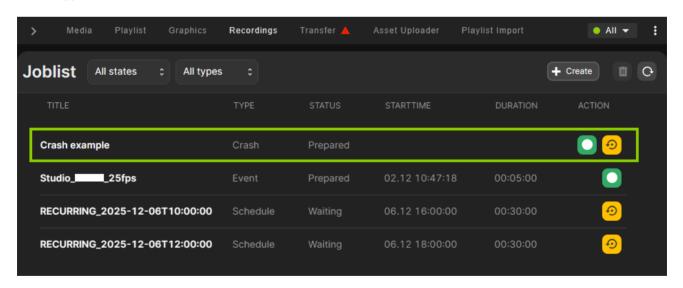
- c. (Optional) If you want to reuse the recording job and create multiple recordings, select Type Multi
 Shot. To create a single recording, select the default option Type Single Shot.
- 5. Click Apply.



Automation - Create crash recording job

6. Close the Create recording jobs menu by clicking Cancel.

The recording job is created and added to the job list in the **Recordings** tab. It is announced to and prepared by the recording unit. You can either start or cancel it manually. For more information, see the section Controlling a recording job.



Automation - Crash recording job created

Creating a scheduled recording job



Notice

To create a scheduled job, the optional feature for manually creating recording jobs and the corresponding Create button must be enabled.

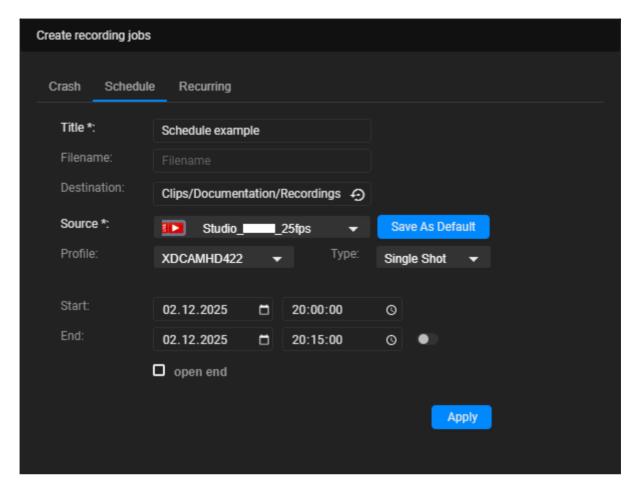
To create a scheduled recording job, proceed as follows:

- 1. Repeat steps one to four as described in section Creating a crash recording job, but instead of the Crash tab, select the Schedule tab in the Create recording jobs menu.
- 2. Select a Start date and time for the recording that does not overlap with other recording jobs already scheduled.
- 3. Select an **End** date and time for the recording that does not overlap with other recording jobs already scheduled.
- 4. (Optional) If you want to enter a duration instead of a specific start and end time, enable the toggle switch to the right of the end time and enter the duration in the corresponding field.
- 5. (Optional) Alternatively, you can create a scheduled recording job without specifying an end time by selecting Open end.



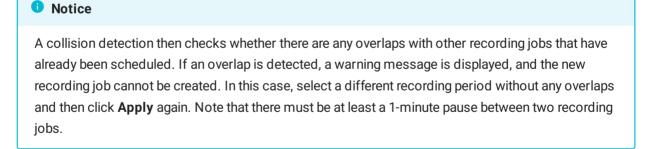
Notice

When Open end is enabled and the scheduled recording job starts, the recording either continues until you stop it manually or until the system's maximum recording duration is reached. This duration is configurable and set to 6 hours by default.



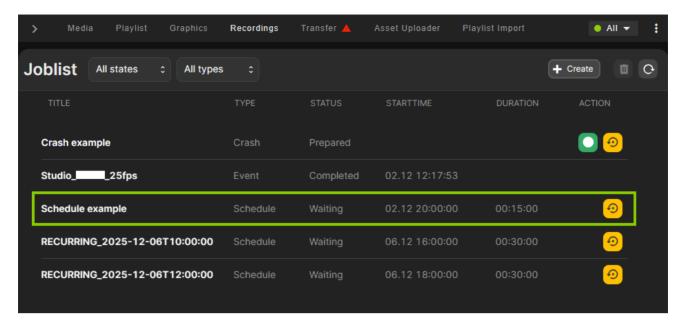
Automation - Create scheduled job

6. Click Apply.



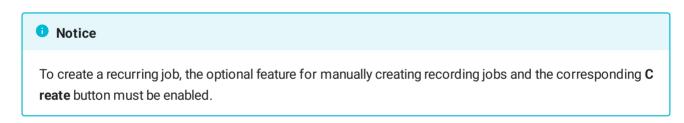
7. Close the Create recording jobs menu by clicking Cancel.

The recording job is created and added to the job list in the **Recordings** tab. It starts automatically based on the selected start date and time. Depending on your selected end settings, the recording stops either automatically based on the selected end date and time or manually, for example, when you enable **Open end** and an operator stops the recording.



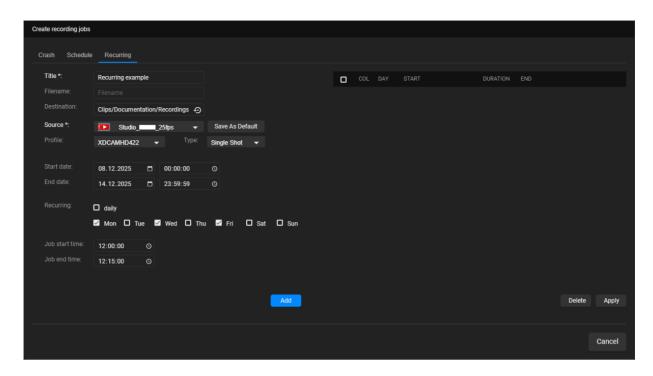
Automation - Scheduled recording job created

Creating a recurring recording job



To create a recurring recording job, proceed as follows:

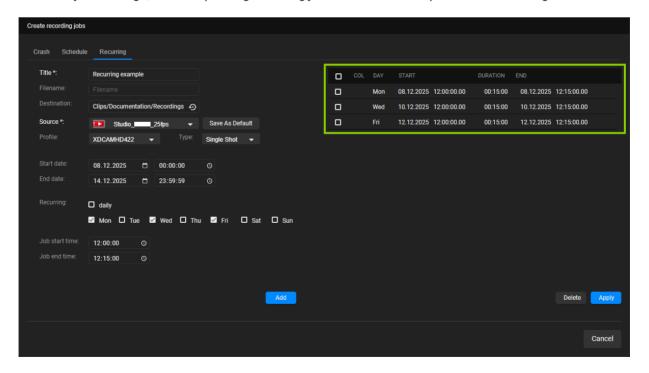
- 1. Repeat steps one to four as described in section Creating a crash recording job, but instead of the Crash tab, select the Recurring tab in the Create recording jobs menu.
- 2. Set the validity period of the recording job by selecting a **Start date** and time as well as an **End date** and time.
- 3. Use the **Recurring** options to specify on which days of the week the recording job should be executed:
 - a. To create a recording job that is executed every day, select Daily.
 - b. To create a recording job that is executed only on specific weekdays, select one or more days of the week.



Automation - Create a recurring recording job

- 4. Select a **Job start time** and a **Job end time** for the recording that does not overlap with other recording jobs already scheduled.
- 5. Click Add.

Based on your settings, all corresponding recording jobs are added to the preview list on the right side.



Automation - Recording jobs added to the preview list

Tip

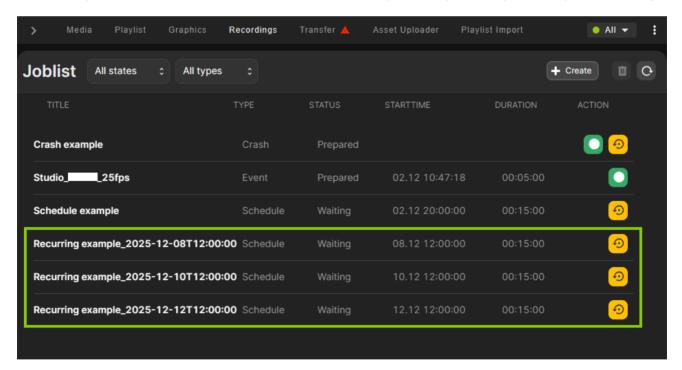
You can edit the preview list and delete individual recording jobs. To do this, select the jobs to be deleted in the preview list and click **Delete**.

Notice

A collision detection then checks whether there are any overlaps with other recording jobs that have already been scheduled. If an overlap is detected, a warning message is displayed, and the new recording job(s) cannot be created. In this case, select the overlapping jobs in the preview list and remove them by clicking **Delete**.

- 6. (Optional) Repeat steps 3 to 5 to add recording jobs with different time settings to the preview list.
- 7. Click Apply.
- 8. Close the Create recording jobs menu by clicking Cancel.

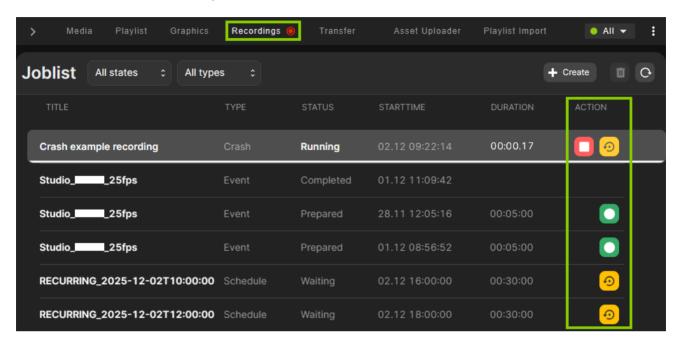
The recording jobs are created and added to the job list in the **Recordings** tab. Each job starts automatically based on the selected start date and time. Depending on your selected end settings, the recording stops either automatically based on the selected end date and time or manually, for example, if an operator stops the recording.



Automation - Recurring recording jobs created

Controlling a recording job

In the **Recordings** area, the list of available recording jobs is displayed. You can control a recording job via the icons in the **Action** column of the job list.



Automation - Recording job controls

The following actions are available:

Icon	Action	
<u>«</u>	Prepare recording job	
	Notice : This announces the job to the corresponding recording unit, which then prepares the recording.	
[0]	Cancel a prepared recording job	
	Notice : A cancelled recording job can be prepared again.	
	Start recording job	
	Stop recording job	



To display detailed information about a recording job, click the **Options** icon on the right side of the corresponding row in the job list and select **Job info**. In case of an event-based recording job, you can also jump to the corresponding event in the rundown by selecting **Link to Event**.

Deleting a recording job

You can delete a recording job either via the **Recordings** tab or, in case of an event-based job, via the rundown.

To delete a Crash, Schedule, or Recurring recording job via the Recordings tab, proceed as follows:

- 1. In the **Recordings** tab, select the recording job to be deleted from the job list.
- 2. Click the **Options** icon **!** on the right side of the corresponding row and select **Delete**.
- 3. Confirm the displayed dialog by clicking Yes.

The recording job is deleted.



To delete multiple recording jobs at once, hold **[Ctrl]** or **[Shift]** and select the corresponding jobs. Then, click the **Delete** icon above the job list and confirm the following dialog by clicking **Yes**.

To remove a recording secondary event from a clip and delete the corresponding event-based recording job, proceed as follows:

- 1. In the rundown, click the **Recording secondary event** icon **O** in the **Secondaries** column of the clip from which you want to remove a recording secondary event.
 - Details about the secondary event expand below.
- 2. Click the **Options** icon **1** on the right side of the expanded row and select **Delete secondary**.
- 3. In the confirmation dialog, click Yes.

The recording secondary event is removed from the clip, and the corresponding recording job is deleted.

Previewing a recorded file

To preview a recorded file, search and select the file in the **Media** tab, and proceed as described in section Previewing a media asset.

2.7 Ad triggering



Notice

Dynamic ad triggering requires the optional Makalu SCTE 35 add-on.

The Dynamic ad triggering feature enables you to signal ad insertion opportunities that downstream systems can use to automatically replace specific parts of your content.

The underlying workflow is based on the SCTE 35 and SCTE 104 standards, enabling you to schedule splicing event trigger points as secondary events in your program, which are subsequently included in the playout output signal/data stream. Downstream systems can evaluate these splicing trigger points to perform server-side or player-side ad insertion. In addition to ad insertion, splicing events can be used for various other purposes, such as regional content variations (opt-out), blanking content on the web, or triggering recording servers.

Shortly before the playout sends a splicing event, the event itself is announced. For this purpose, additional information is included in the playout output signal/data stream. The time interval for announcing the upcoming splicing event is configurable and typically set between 1 and 4 seconds prior to the event's start.

Depending on its properties, a splicing event can be stopped either automatically or manually. For an automatic splicing event, the end event trigger is automatically sent when the playback of the corresponding clip or show is finished. A manual splicing event must be stopped manually by an operator.

You can add splicing events to clips (primary events) in the following ways:

- · use Makalu Traffic to add splicing events manually during program planning
- use Makalu Automation to add splicing events manually at short notice
- · use Makalu Playlist Importer to add splicing events automatically, based on the data provided by an external traffic system (for more information, see the section Playlist Import)

2.7.1 Splicing event types

Makalu provides the following splicing event types:

Makalu splicing event type	Matching splice command according to SCTE 35/104 specification	
Avail (generic)	Corresponds to the legacy splice command sp	

Makalu splicing event type	Matching splice command according to SCTE 35/104 specification
Timed (generic)	Corresponds to the more recent splice command time_signal() with segmentation descriptor
Platform-specific (named after the corresponding target platform)	Corresponds to either splice_insert() or time_signal() with segmentation descriptor with a target platform-specific configuration

The type of splicing event you need to use for your application depends on the configuration of your downstream systems and what data your target platforms expect.



Makalu also supports adding multiple splicing secondary events to the same clip. This is useful if your playout output signal/data stream is delivered to multiple target platforms. Typically, a corresponding splicing secondary event is configured in Makalu for each target platform. This enables you to add multiple of these secondary events to the same clip, providing each target platform with the specific splicing data they expect.

For more information about the technical details of the corresponding standards, refer to the official specifications on the SCTE website:

- SCTE 35
- SCTE 104

2.7.2 Adding a splicing event via Makalu Traffic



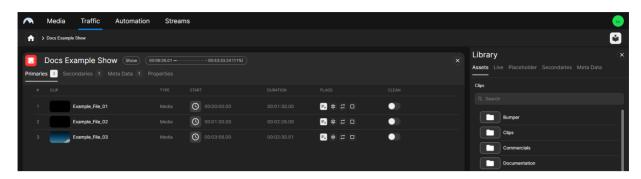
In the following, it is assumed that you have already created a show and want to add a splicing event to a clip within the show. For information about how to create a new show, see the section Creating a show.

To add a splicing event to a clip, proceed as follows:

In the sidebar on the left, select **Shows**.
 All available shows of the currently selected channel are listed in the middle.

Select the show to be edited and click **Open** at the right end of the corresponding row.

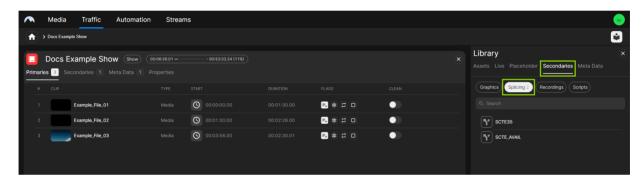
The show details are displayed.



Traffic - Show details

3. In the **Library** on the right side, select **Secondaries > Splicing**.

All available splicing secondary events are listed below.



Traffic - Available splicing secondary events

4. Drag the splicing secondary event to be added onto the corresponding clip.



Traffic - Splicing secondary event added to a clip

The splicing secondary event is added to the clip, and the secondary event icon is displayed to the right of the clip name.

- 5. If necessary, edit the secondary event properties as follows:
 - a. Select the clip.

The clip details are displayed on the right side.

In the clip details, select the **Secondaries** tab.

All secondary events added to the clip are listed.

c. Hover your mouse over the secondary event to be edited and click **Open** at the right end of the corresponding row.

The secondary event properties are displayed.

d. Edit the available properties as required.



For detailed information about available splicing secondary event properties, see the section Splicing properties.

e. To confirm your changes, click Save.

The changes are saved.

6 Tip

To delete a splicing secondary event from a single clip, proceed as follows:

- 1. In the clip list of the show, select the corresponding clip.
- 2. In the clip details area on the right side, select the **Secondaries** tab.
- 3. Hover your mouse over the splicing event to delete and click the **Delete** icon on the right side of the corresponding row.
- 4. In the confirmation dialog, click **Remove**.

The splicing secondary event is removed from the clip.

2.7.3 Adding a splicing event via Makalu Automation

To add a splicing secondary event to a clip, proceed as follows:

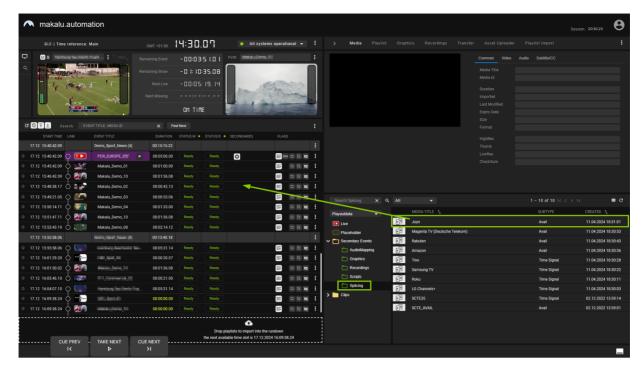
- 1. Open Makalu Automation.
- 2. On the right side, select the Media tab.

All available media items are listed in the media list in the lower area of the **Media** tab.

3. In the media list, select **Secondary Events > Splicing**.

All available splicing secondary events are listed to the right.

4. Select a splicing secondary event (usually a platform-specific event, named after the corresponding target platform) and drag it on a clip in the rundown.

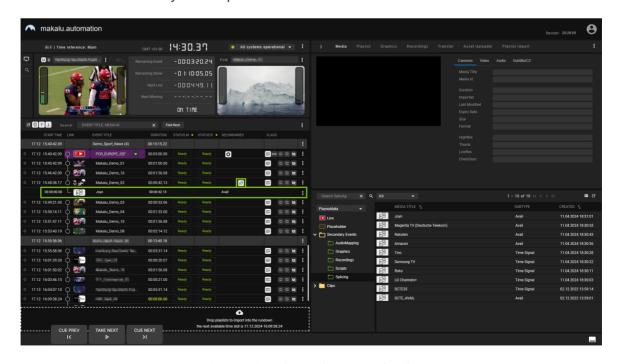


Automation - Add a splicing secondary event to the rundown

The splicing secondary event is added to the clip in the rundown. It is recognizable by the **Splicing secondary event** icon [69], in the **Secondaries** column.

- 5. (Optional) Edit the properties of the added splicing secondary event as follows:
 - a. In the rundown, click the **Splicing secondary event** icon [6], in the **Secondaries** column of the corresponding clip.

Details about the secondary event expand below.



Automation - Secondary event details

b Click the **Options** icon on the right side of the expanded row and select **Edit Secondary**.

Automation - Open secondary event properties

c. In the Edit secondary event menu, edit the properties as required.



For detailed information about available splicing secondary event properties, see the section Splicing properties.

d. Confirm your changes by clicking Apply.

The properties of the splicing secondary event are saved.

6. (Optional) To add more splicing secondary events to the corresponding clip, repeat steps four and five.



To remove a splicing secondary event from a clip, proceed as follows:

- 1. In the rundown, click the **Splicing secondary event** icon [9] in the **Secondaries** column of the clip from which you want to remove a splicing event.
 - Details about the secondary event expand below.
- 2. Click the **Options** icon **1** on the right side of the expanded row and select **Delete secondary**.
- 3. In the confirmation dialog, click Yes.

The splicing secondary event is removed from the clip.

2.8 Audio mapping

2.8.1 Basic information

Makalu includes a feature for audio mapping (also referred to as "audio routing" or "audio shuffling") that provides versatility when working with varying audio configurations, as it allows you to map audio inputs to audio outputs as required. It enables error-free audio playback by ensuring that the audio included in the files and live sources used on the input side matches the configured audio scheme of the channel on the output side. The mapping between audio input and output is controlled via audio schemes, which are part of the configuration of each Makalu playout channel.

An audio scheme could, for example, include the following default mapping for input files/live sources with eight audio channels mapped to eight output channels:

Audio input	Mapped to audio output
Input 1	Output 1 (Full Mix L)
Input 2	Output 2 (Full Mix R)
Input 3	Output 3 (Original Language L)
Input 4	Output 4 (Original Language R)
Input 5	Output 5 (Audio Description L)
Input 6	Output 6 (Audio Description R)
Input 7	Output 7 (Silence L)
Input 8	Output 8 (Silence R)

Both file-based and live sources can include multiple audio tracks, which in turn can contain multiple audio channels. To be played correctly, each source has to be checked and configured accordingly. For uploaded files, this is done automatically as part of the technical metadata determination during file processing.

The input and output audio channels are mapped either by automatically applying a standard audio scheme with a default configuration or by manually defining an individual audio mapping for each clip. This enables you to define how to deal with file-based content or live input that deviates from the configured channel audio output.

For this purpose, Makalu provides secondary events of the type **Audio mapping** that can be used in the following ways:

- they can be added to clips in the rundown at short notice via Makalu Automation
- they can be added on the fly to the clip currently on-air via Makalu Automation

2.8.2 Common use cases

A common use case for this feature is to plan the mapping/routing of audio channels in advance, for example, to adapt the audio playback of purchased content (which uses a deviating audio channel configuration, for example, a different number of audio channels) to the configured channel audio output. This eliminates the need for the time-consuming and expensive process of producing the corresponding content again with an adapted audio configuration.

An example audio scheme for input files with two audio channels mapped to eight output channels could include the following mapping:

Audio input	Mapped to audio output
Input 1	Output 1
Input 2	Output 2
Input 1	Output 3
Input 2	Output 4
Input 1	Output 5
Input 2	Output 6
Input 1	Output 7
Input 2	Output 8

Another use case could be a live source with faulty audio. For example, a live source should be played, and the TX operator checks it via the preview of the Automation UI. It turns out that only the left channel of an expected stereo signal of the live source is working. The source may have an error, but stereo output should still be made possible. By using the audio mapping feature, the TX operator can map the left input channel to all output channels as a workaround, so that at least all output channels play audio.

An example audio scheme for input sources with one audio channel mapped to eight output channels could include the following mapping:

Audio input	Mapped to audio output
Input 1	Output 1
Input 1	Output 2
Input 1	Output 3
Input 1	Output 4

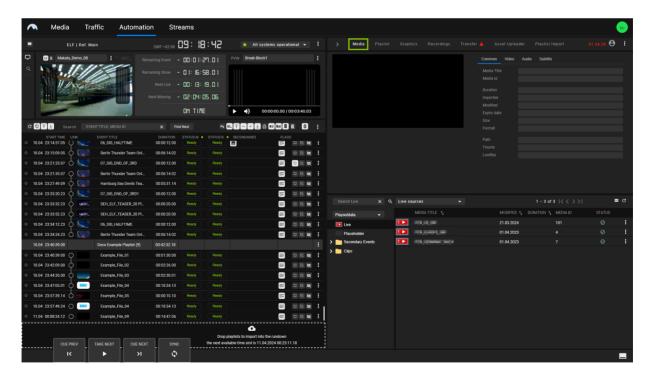
Audio input	Mapped to audio output
Input 1	Output 5
Input 1	Output 6
Input 1	Output 7
Input 1	Output 8

2.8.3 Using audio mapping for short-term planning (via Makalu Automation)

To change the audio mapping settings of any clip in the rundown, add an audio mapping secondary event as follows:

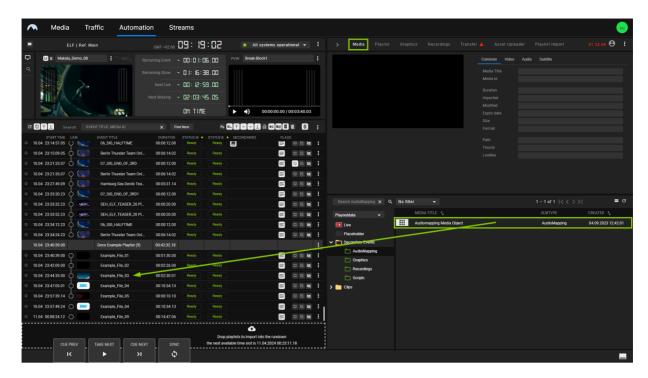
- 1. Open the Makalu Automation detailed channel view as described in section Accessing the detailed channel view.
- 2. On the right side, select the Media tab.

All available media items are listed in the media list.



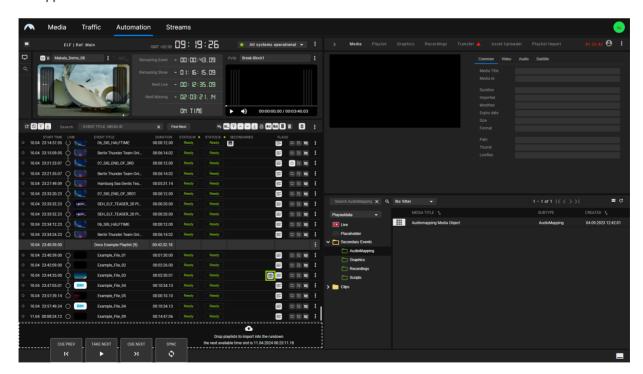
Automation - Show expanded and media tab opened

- 3. In the media list, click **Secondary Events** and select **Audio Mapping**.
 - All available audio mapping secondary events are listed.
- 4. Select an audio mapping secondary event and drag it on a show or clip in the rundown.



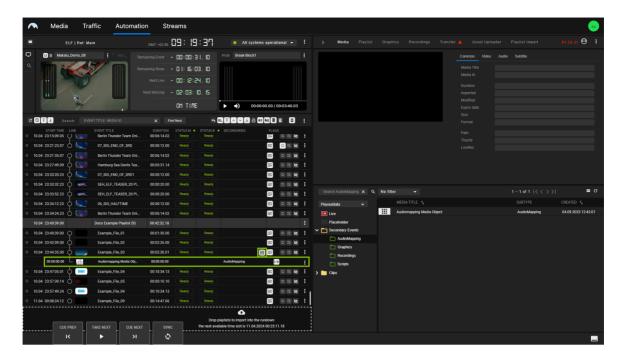
Automation - Secondary event selected

The selected audio mapping secondary event is added to the show or clip, which is indicated by the corresponding icon in the **Secondaries** column. The default settings of the audio mapping secondary event are applied.



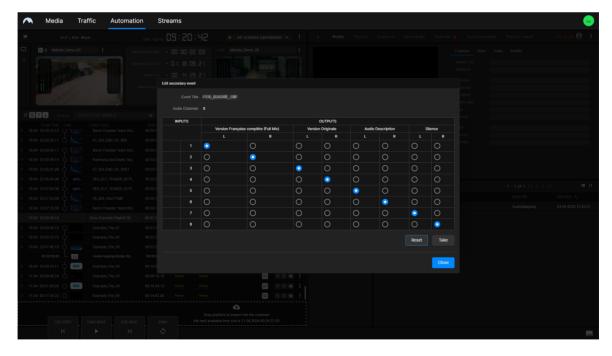
Automation - Secondary event added to a clip

- 5. To edit the settings of the added audio mapping secondary event, proceed as follows:
 - a. Expand the list of audio mapping secondary events added to the show or clip by clicking the **Audio**Mapping icon [×] in the **Secondaries** column of the corresponding element.



Automation - Clip secondary event list expanded

- b. Click the **Options** icon of the show or clip and select **Edit Secondary**.
- c. Change the audio mapping settings as required by enabling the output to be used for each corresponding input.



Automation - Change the audio mapping settings

d. To confirm your changes, click Take.

The changes are applied in real time by the corresponding player.

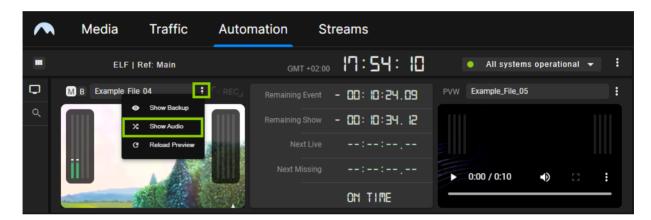
e. Close the menu by clicking Close.

The selected audio mapping secondary event is added, and the settings of the corresponding clip are changed based on your selected inputs and outputs.

2.8.4 Using audio mapping for live/on-the-fly changes (via Makalu Automation)

To change the audio mapping settings of the clip currently on-air, proceed as follows:

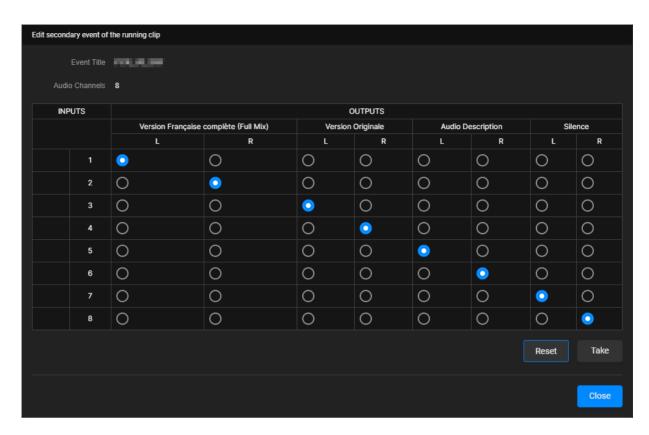
- Open the Makalu Automation detailed channel view as described in section Accessing the detailed channel view.
- 2. In the preview area at the top left, to the right of the clip name display, click the **Options** icon and select **S** how Audio.



Automation - Open the audio mapping settings

The audio mapping settings menu opens.

Change the audio mapping settings as required by enabling the output to be used for each corresponding input.



Automation - Change the audio mapping settings



To undo your changes and restore the original audio mapping settings of the clip, click Reset.

Notice

If the clip does not yet have an audio mapping secondary event, it will be added by your action, which is confirmed by the display of a corresponding note.

Notice

If playback of the current clip ends while you are making changes, you cannot save the changed audio mapping settings. In this case, a corresponding note is displayed. To change the audio mapping settings of the clip currently playing, first close the audio mapping menu and then reopen it.

4. To confirm your changes, click Take.

The changes are applied in real time by the corresponding player.

5. Close the menu by clicking Close.

The audio mapping settings of the clip currently on-air are changed based on your selected inputs and outputs.

3. Technical specifications

3.1 Supported formats and codecs

3.1.1 Input

Files

Туре	Video	Audio
Codec	• XAVC	• MPEG-1 L2
	• AVC-Ultra	• MPEG-2 L2
	• AVC-Intra	• AAC-LC
	• XDCAM	• HE-AAC
	• MPEG-2	• HE-AAC v2
	• H.264 (AVC)	• AC-3 (Dolby Digital)*
	• H.265 (HEVC)	• E-AC-3 (Dolby Digital Plus)*
Container	• MXF	
	• MP4	

Streams

Protocol	Video	Audio
RTMP/RTMPS	• H.264 (AVC)	• AAC
	• VP6	• AAC-LC
	• VP8	• HE-AAC
	• Sorenson Spark	• HE-AAC v2
	• Screen Video (v1, v2)	•MP3
		• Speex

Protocol	Video	Audio
RTSP/RTP	• H.264 (AVC)	·AAC
	• H.265 (HEVC)	• AAC-LC
	• VP8	• HE-AAC
	• VP9	• HE-AAC v2
		•MP3
		• Speex
		• Opus
		• Vorbis
ICY (SHOUTcast/Icecast)	-	•AAC
		• AAC-LC
		•HE-AAC
		• HE-AAC v2
		• MP3
SRT	• H.264 (AVC)	• AAC
	• H.265 (HEVC)	• AAC-LC
		• HE-AAC
		• HE-AAC v2
		• MP3
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
		• ALS (LOAS)
WebRTC	• H.264 (AVC)	• Opus (recommended)
	·VP8	• PCM (PCMU, PCMA)
	·VP9	

Protocol	Video	Audio
MPEG-TS, MPEG-TS over	• MPEG-2	• AAC
UDP	• H.264 (AVC)	• AAC-LC
	• H.265 (HEVC)	• HE-AAC
		• HE-AAC v2
		• MP3
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
		·ALS (LOAS)

Subtitles

Туре	Format
File-based	•STL
	• WebVTT
	• SRT
	• EBU-TT
	• TTML
Live	• EBU-TT-D
	• FAB Public

3.1.2 Output

Streams

Protocol	Video	Audio
HLS	• H.264 (AVC)	• AAC
	• H.265 (HEVC)	• AAC-LC
		• HE-AAC
		• HE-AAC v2
		• MP3
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
CMAF HLS, Low-Latency HLS	• H.264 (AVC)	• AAC
	• H.265 (HEVC)	• AAC-LC
		• HE-AAC
		• HE-AAC v2
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
MPEG-DASH	• H.264 (AVC)	• AAC
	• H.265 (HEVC)	• AAC-LC
		• HE-AAC
		• HE-AAC v2
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
		·ALS

Protocol	Video	Audio
RTMP/RTMPS	• H.264 (AVC)	•AAC
	• VP6	• AAC-LC
	• Sorenson Spark	•HE-AAC
	• Screen Video (v1, v2)	•HE-AAC v2
		•MP3
		• Speex
RTSP/RTP	• H.264 (AVC)	• AAC
	• H.265 (HEVC)	•AAC-LC
	• VP8	•HE-AAC
	• VP9	• HE-AAC v2
		• MP3
		• Opus
		• Vorbis
		• Speex
SRT	• H.264 (AVC)	•AAC
	• H.265 (HEVC)	• AAC-LC
	• VP8	• HE-AAC
	• VP9	• HE-AAC v2
		• MP3
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*
		·ALS (LOAS)
		• Vorbis
WebRTC	• H.264 (AVC)	• Opus (recommended)
	• VP8	• PCM (PCMU, PCMA)
	• VP9	

Protocol	Video	Audio
MPEG-TS	• MPEG-2	• MPEG-1 L2
	• H.264 (AVC)	• MPEG-2 L2
	• H.265 (HEVC)	•AAC-LC
		•HE-AAC
		• HE-AAC v2
		• AC-3 (Dolby Digital)*
		• E-AC-3 (Dolby Digital Plus)*

CDN service providers

- Akamai
- Fastly
- Microsoft Azure
- Amazon CloudFront
- KeyCDN

Video and social media platforms

- YouTube
- Facebook
- Twitch
- LinkedIn



All Dolby audio formats (marked with "*") require the optional Makalu Dolby add-on.

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