



Makalu 1.4

User Manual

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1. About this document

Notice

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Notice

This user manual applies to the following Makalu version:

Release 1.4

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

After reading this document, readers will understand how to use Makalu and will e.g. be able to:

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

2. About Makalu

Makalu is a software-defined playout automation, suitable for broadcasters and content providers of any kind and size. It enables a full-featured end-to-end signal workflow – from ingest to distribution – and covers further media tasks like 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 to achieve a maximum level of flexibility and scalability. It runs on most public or hosted private clouds as well as on virtualized environments and on-premises. This enables a wide range of applications, including hybrid broadcast concepts (e.g. cloud-based planning and physical playout servers).

3. Functional overview

The following graphic shows the basic workflow for using Makalu:

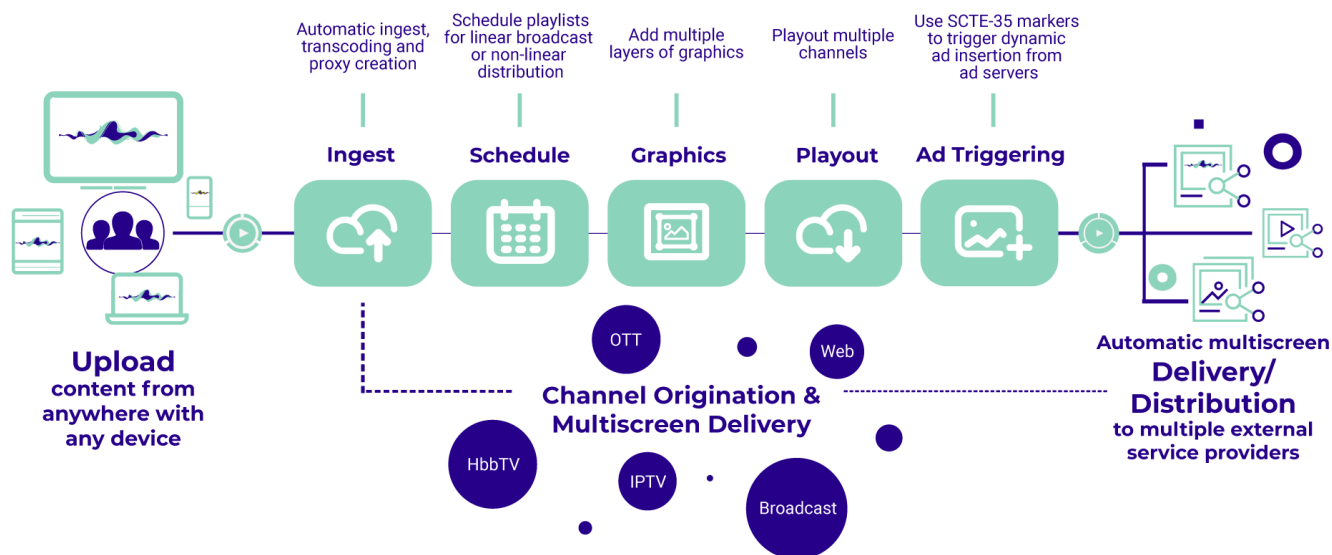


Figure: Makalu basic workflow

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

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

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 e.g. 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 (provided as web streams).

3.2 Schedule

Makalu includes a traffic component for strategic/operative as well as rough/daily planning. It enables using uploaded files to create shows, adding shows to playlists as well as adding graphics and other secondary events. A playlist can be added to a rundown in the Makalu Automation to define the content the payout should actually play.

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 the Makalu Automation and can be used as additional layer on top of the main video output.

3.4 Playout

The Makalu Automation component is used to control one or more players running on playout instances, that are seamlessly playing 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.

4. Ingest

The purpose of the ingest workflow is to provide new video files to the playout. After each successful upload, the corresponding file is automatically processed by Makalu. When the 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 (that is added to a rundown as part of a show in a playlist) is automatically transferred from the ingest storage to the playout storage. For more information, see section [File transfer](#).

4.1 Uploading files

The ingest process starts with the file upload. For this purpose, Makalu includes the Asset Uploader, a web application for uploading files to the ingest storage.

With Makalu Asset Uploader you can either upload a new file to the system, creating a completely new asset or you can assign the file to be uploaded to a placeholder asset that already exists in the system. A placeholder is a virtual element, that can be used to schedule a file for playout, that is not yet available (that has not yet been created). By using this concept, playlists can already be prepared via the planning component, even if the actual files are created later. As a result, the uploaded file replaces the placeholder everywhere it is used in the planning component.

To upload a file, proceed as follows:

1. Open **Makalu Asset Uploader** by either:
 - a. [Opening Makalu Automation](https://automation.customer-identifier.makalu.live) via `https://automation.customer-identifier.makalu.live` and selecting the **Asset Uploader** tab or
 - b. Opening the Makalu Asset Uploader standalone user interface via `https://asset-uploader.customer-identifier.makalu.live/s3uploader`

Notice

In both cases replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`. After opening the corresponding URL, log in with your Makalu credentials.

The Asset Uploader user interface is opened.

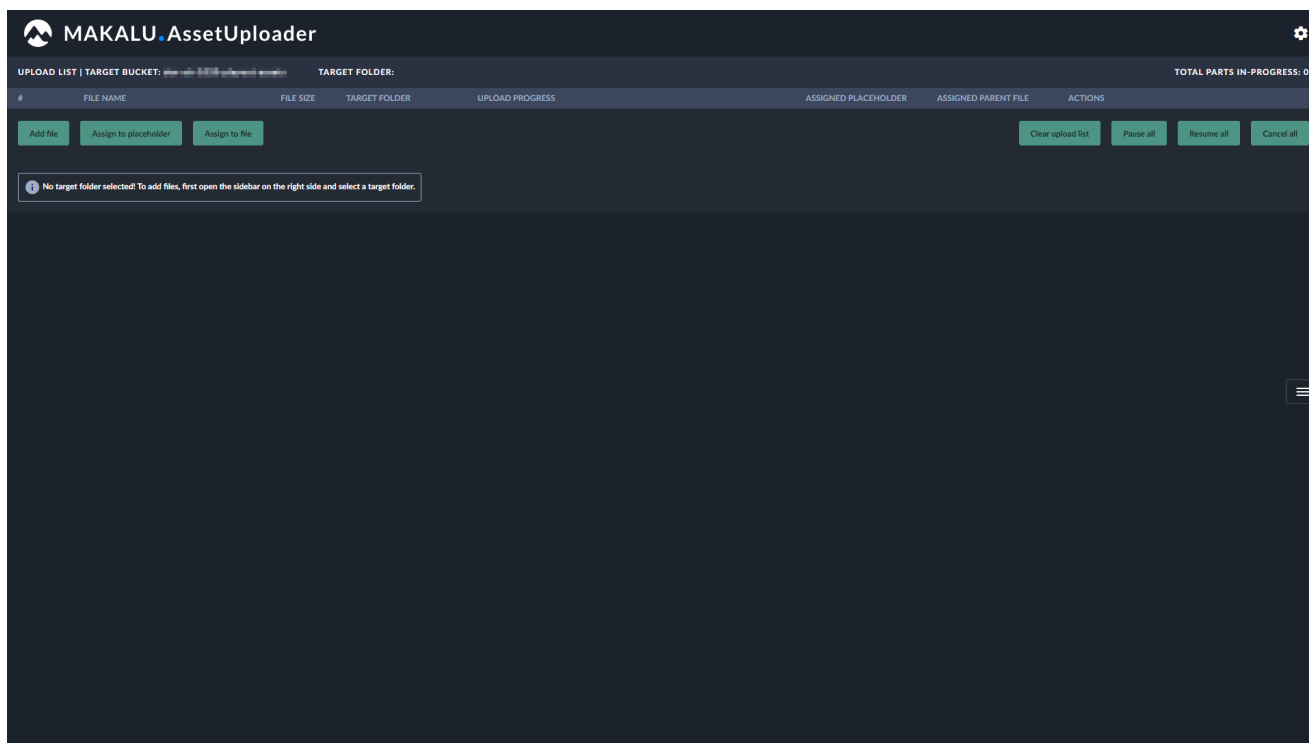



Figure: Asset Uploader - User interface

2.

Select a folder on the ingest storage as target for your upload, by clicking the  icon on the right side to open the target folder sidebar. Then select the target folder.

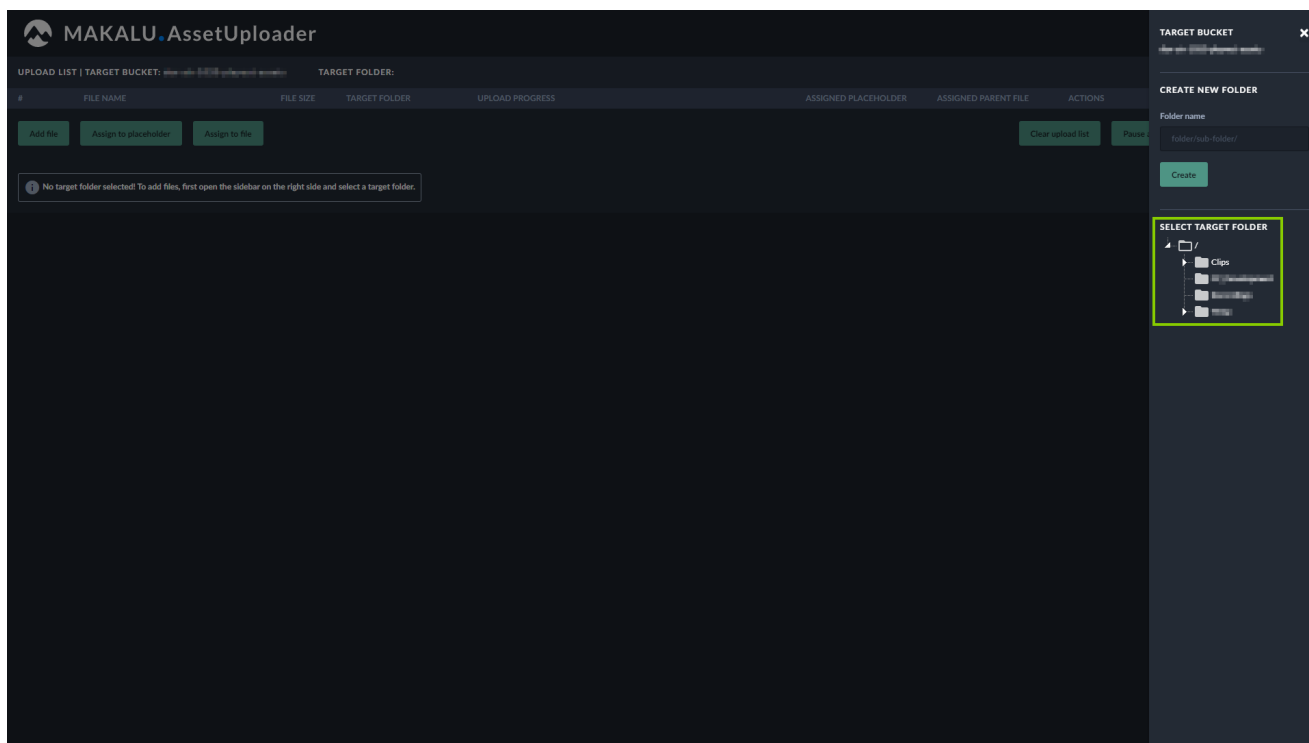


Figure: Asset Uploader - Select target folder

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

Tip

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

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

- Do not use a leading slash but append a closing slash (Example: `folder/subfolder/`).
- Not permitted (system-reserved) top-level folder names are `Live`, `live`, `Placeholder` and `placeholder`.
- Permitted characters are letters (`a-z`, `A-Z`), numbers (`0-9`), hyphen (`-`) and underscore (`_`).

To create a new folder, proceed as follows:

- Enter a valid name for the new folder in the **Folder name** field.
- To create the folder, click **Create**.

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

- Optional (if you want to assign the file to be uploaded to an already existing placeholder asset): Select a placeholder as follows:

- Click **Assign to placeholder**.

A list of available placeholders is displayed.

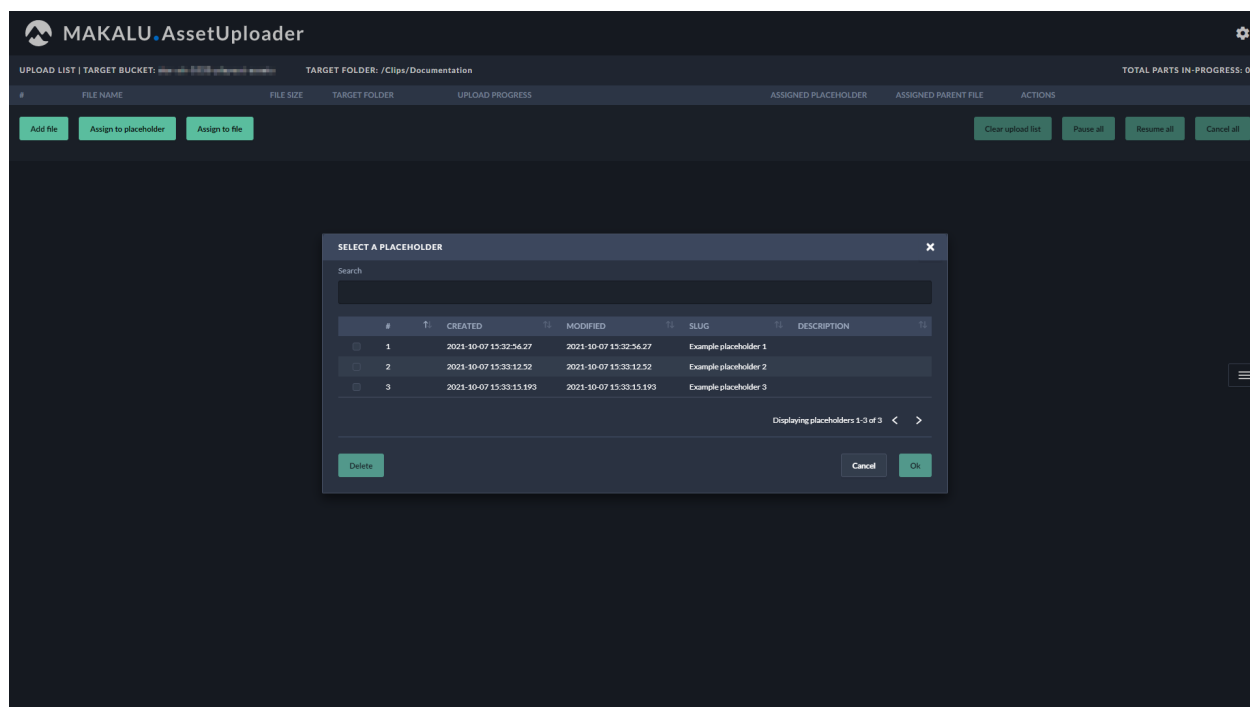


Figure: Asset Uploader - List of available placeholders

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

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

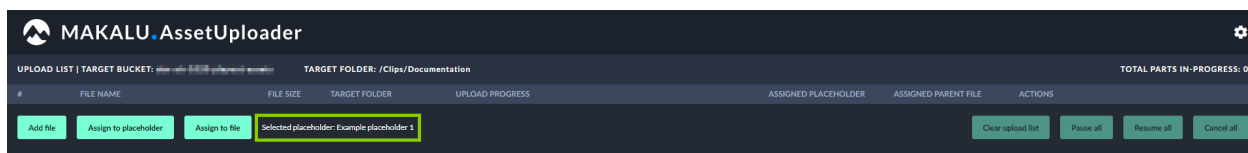


Figure: Asset Uploader - Placeholder selected

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

The file selection window opens.

- In the selection window select one or more files and click **Open**.

Notice

If you selected a placeholder as described in the optional step 3, 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 allowed file types can be selected and uploaded. It is possible to allow any file type or to restrict the allowed file types to e.g. 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.

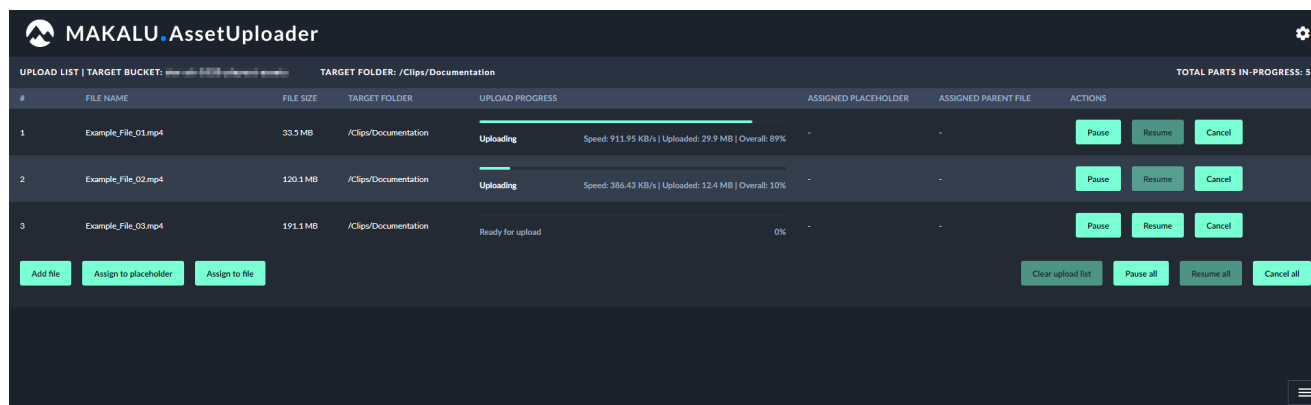


Figure: Asset Uploader - Upload started

During the upload process the progress of each upload is displayed, including current upload speed, amount of uploaded data and overall upload percentage. Completed uploads are highlighted in green with the status "Upload completed".

Notice

The upload speed is not limited. The application will use the full upload bandwidth currently available on client side.

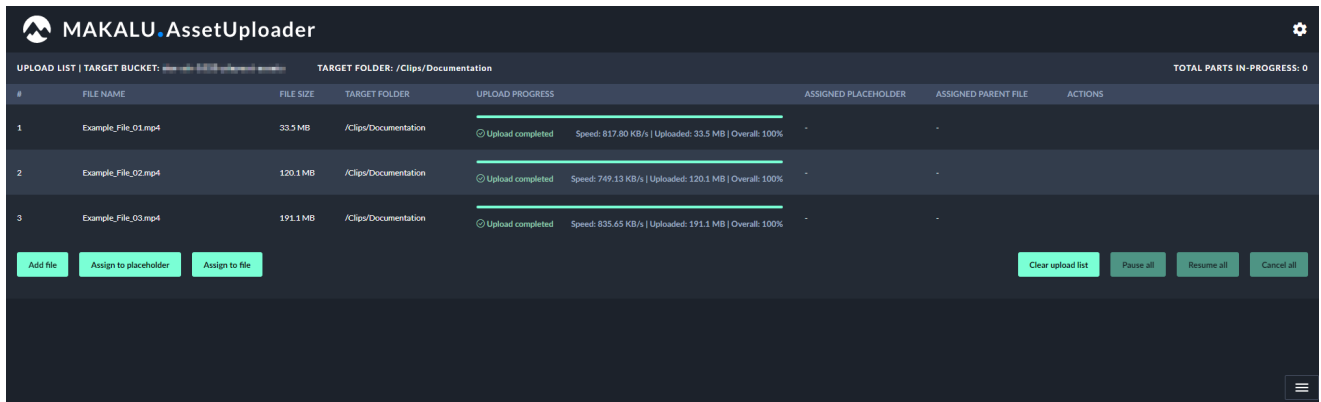


Figure: Asset Uploader - Upload completed

Notice

While uploads are in progress, you can either pause, resume, or cancel individual or all uploads via the corresponding buttons.

Warning

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

When a file upload is completed, the file processing starts automatically.

4.2 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 playback.

File processing consists of the following sub-processes:

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

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

4.3 Previewing uploaded files

For previewing uploaded files, Makalu includes the Asset Viewer web application.

To preview uploaded and processed files, proceed as follows:

1. Open the following URL in your browser:

```
https://asset-viewer.customer-identifier.makalu.live.
```

Notice

Replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`.

2. Log in with your Makalu credentials.

The Makalu Asset Viewer user interface is opened.

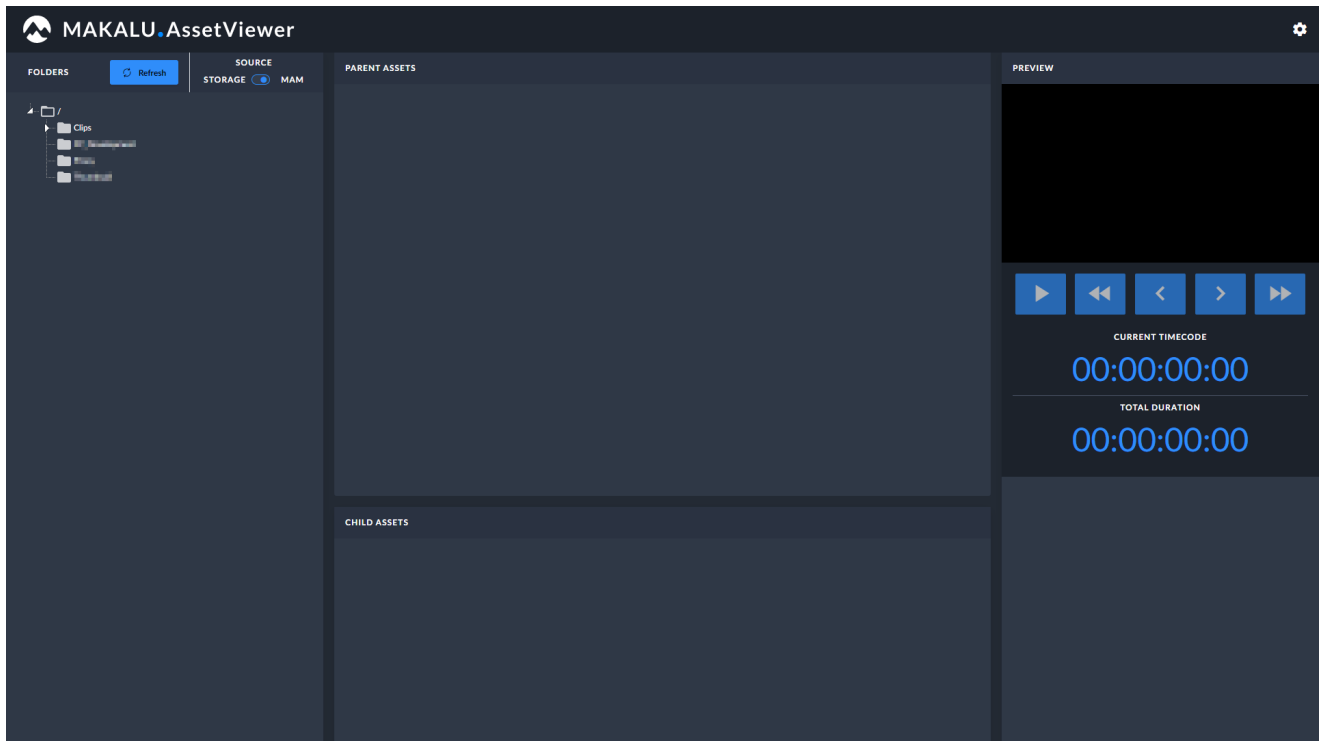


Figure: Asset Viewer - User interface

- Use the folder tree on the left side to select the folder that contains the file to be previewed.

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

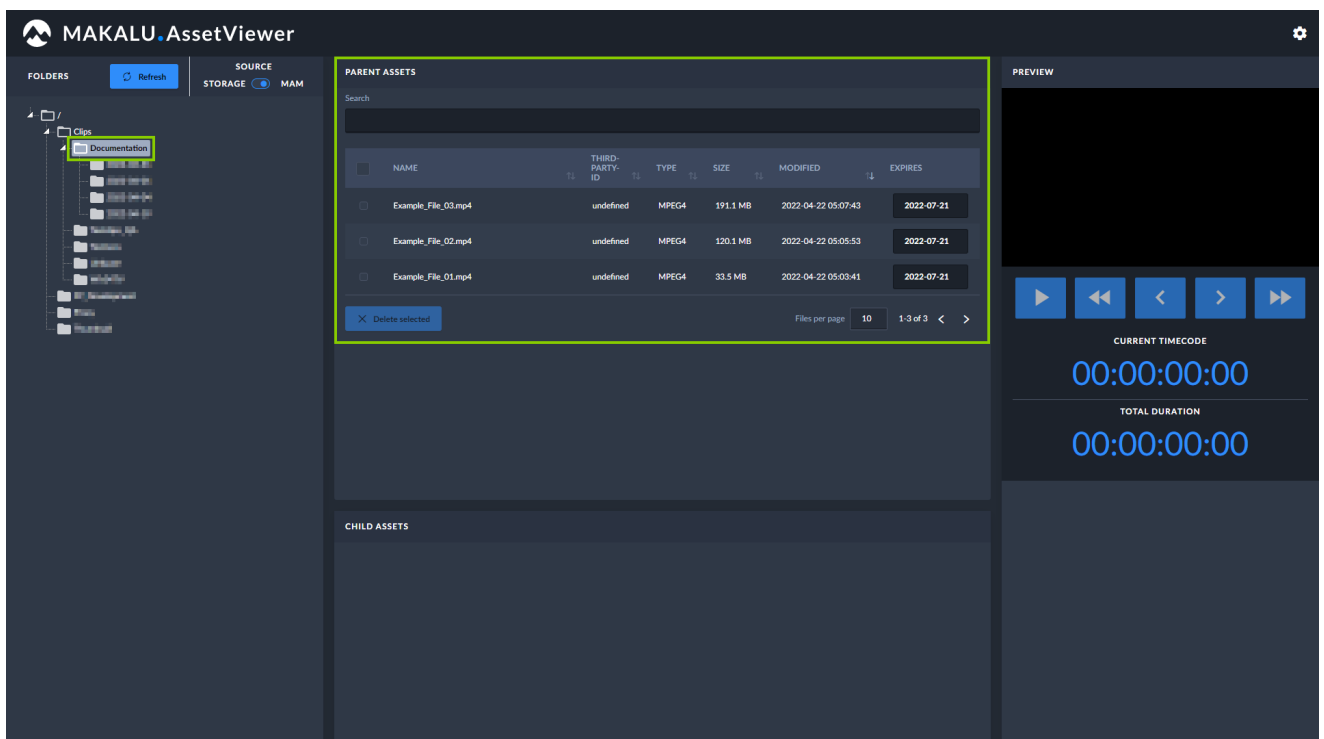


Figure: Asset Viewer - Folder selected

- 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 **Child Assets** area.

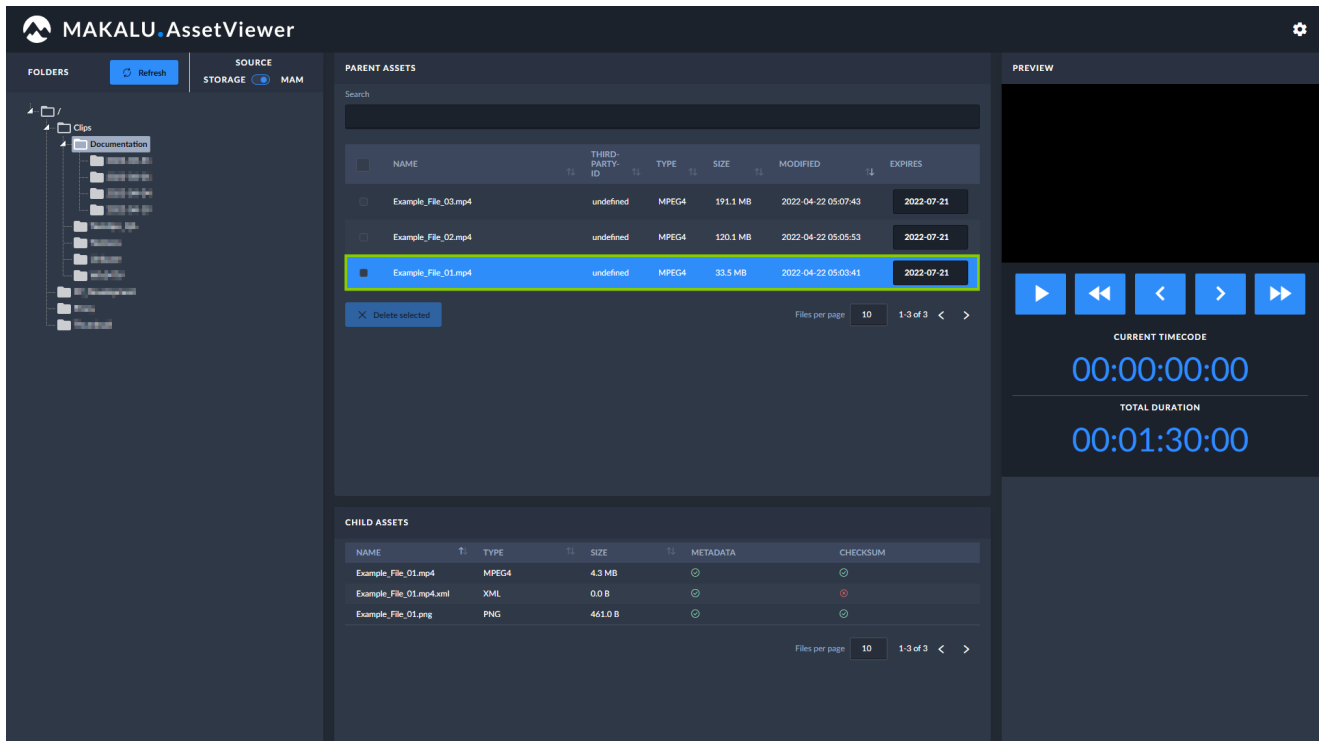


Figure: Asset Viewer - File selected

5. Use the player controls to preview the file.

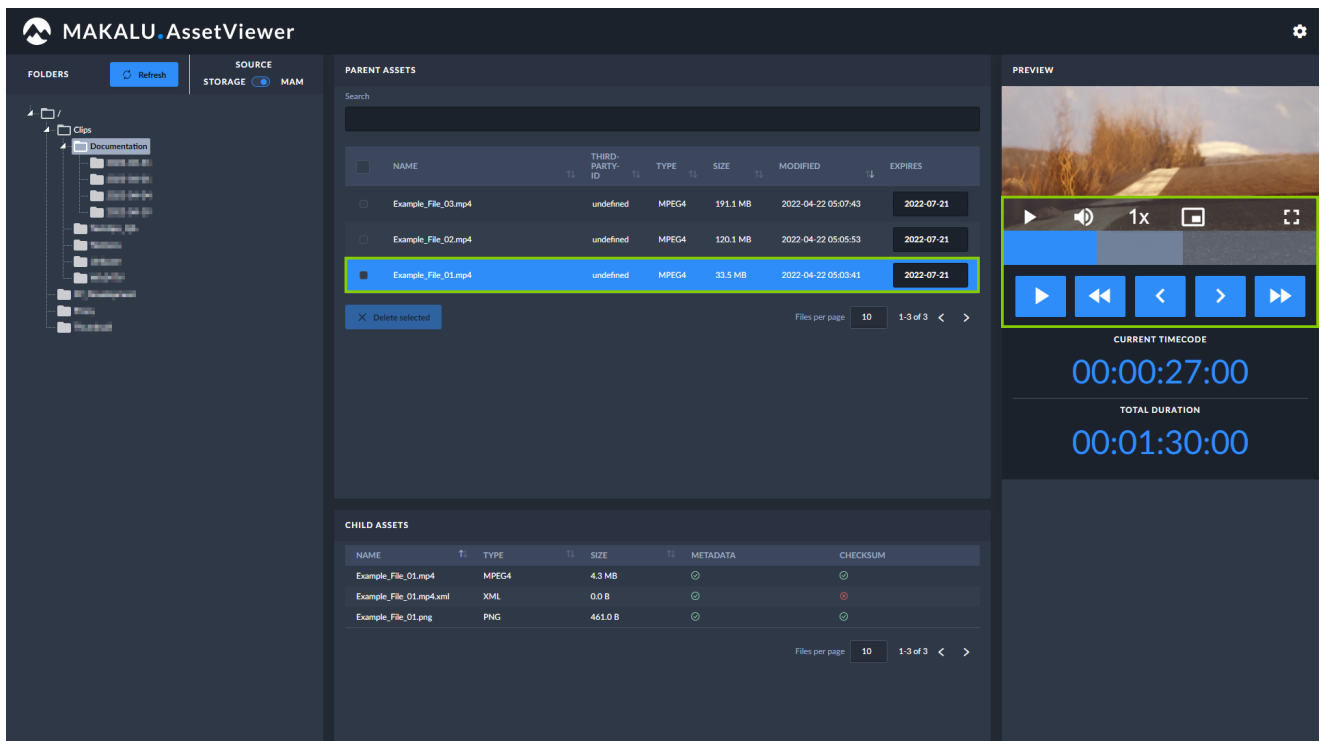


Figure: Asset Viewer - Previewing a file

4.4 Housekeeping

Makalu provides two workflows for deleting files no longer needed within the scope of housekeeping: automatic and manual.

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 ingest storage
3. Deleting the file from local storage on playout instances

4.4.1 Automatic housekeeping

Automatic housekeeping deletes files automatically based on their expiry date. This time period is configured globally, and the actual expiry date is calculated individually for each uploaded file based on this setting. When the expiry date is reached, a configurable grace period starts. After the end of this period the corresponding file is automatically deleted.

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.

4.4.2 Manual housekeeping

Manual 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 following URL in your browser:

```
https://asset-viewer.customer-identifier.makalu.live.
```

Notice

Replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`.

2. Log in with your Makalu credentials.

The Makalu Asset Viewer user interface is opened.

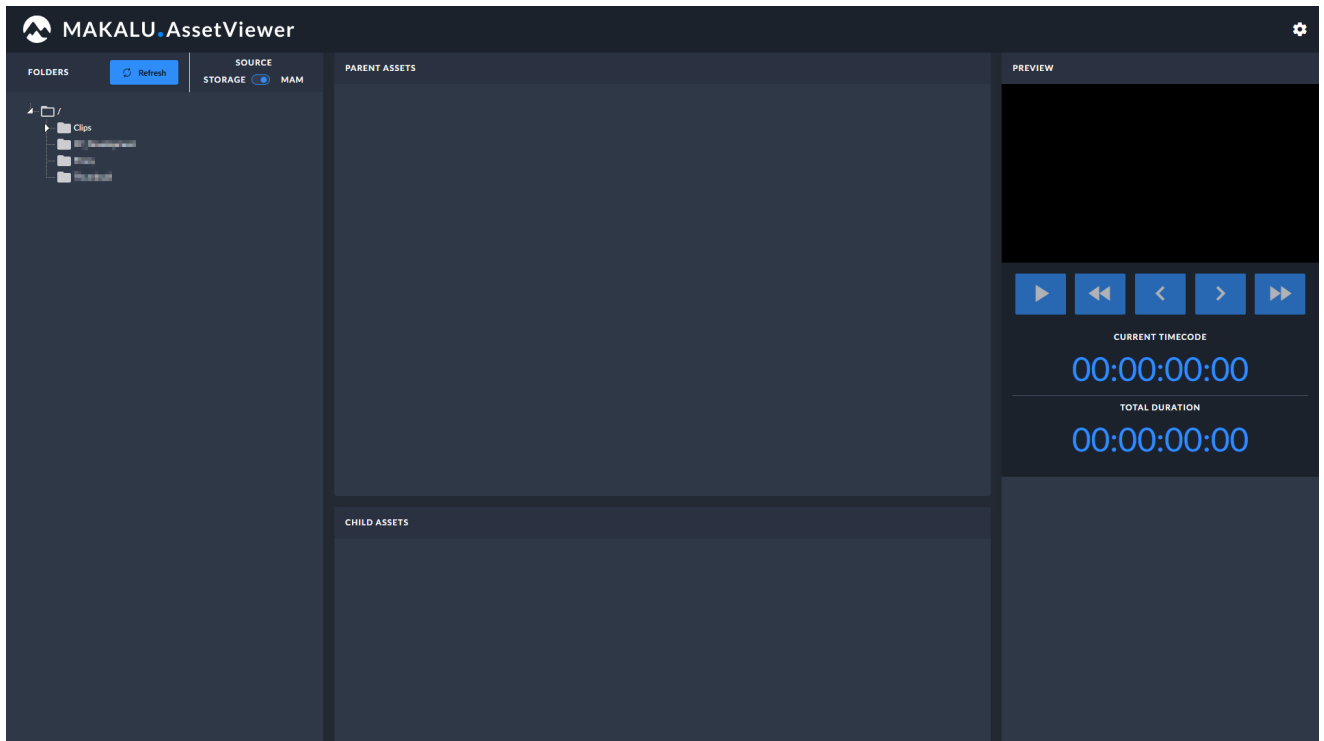


Figure: Makalu Asset Viewer - User interface

3. Use the folder tree on the left side to select the folder that contains the file to be deleted.
4. Select one or more files to be deleted from the **Parent Assets** list.
5. Click **Delete selected**.

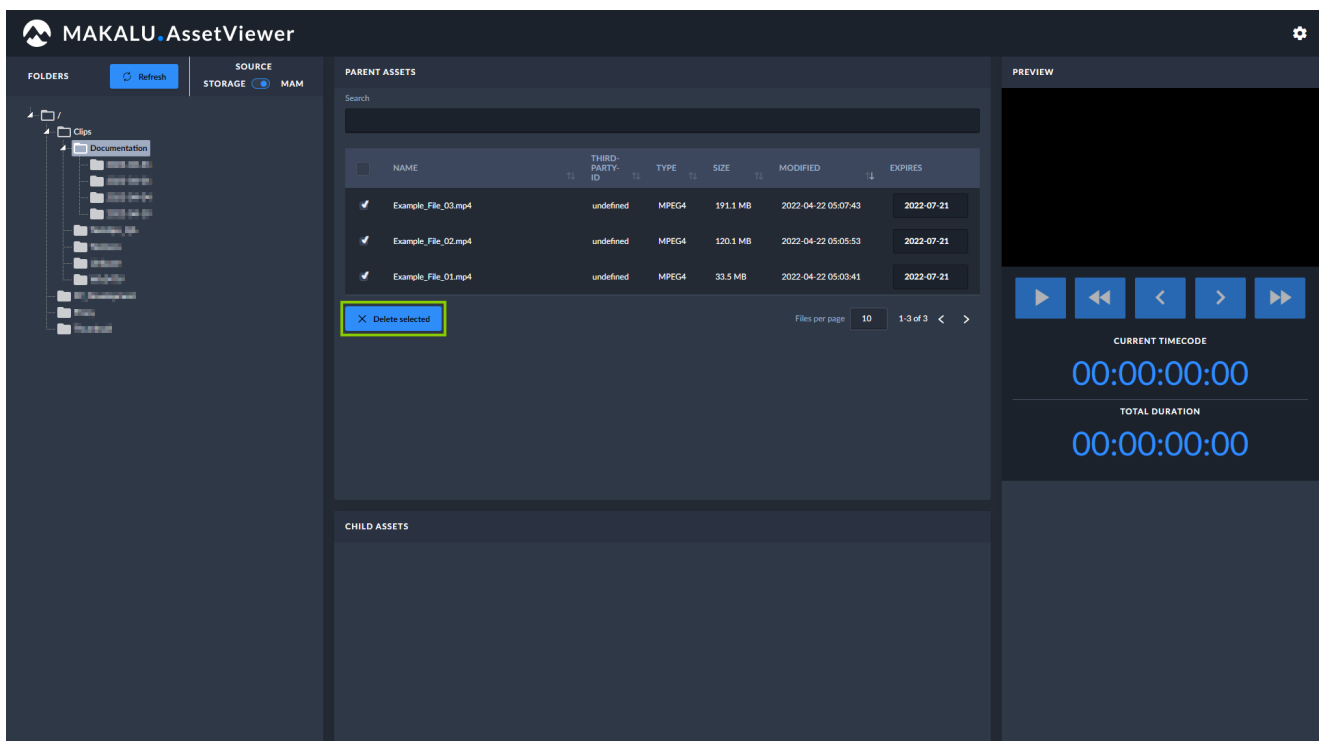


Figure: Makalu Asset Viewer - Delete files

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 expiry date and grace period have expired.

To set the expiry date manually, proceed as follows:

1. Repeat steps 1 and 2 as described under [Manual housekeeping](#).
2. In the **Parent Assets** list click the current expiry date of the corresponding file in the **Expires** column.

A date picker is displayed.

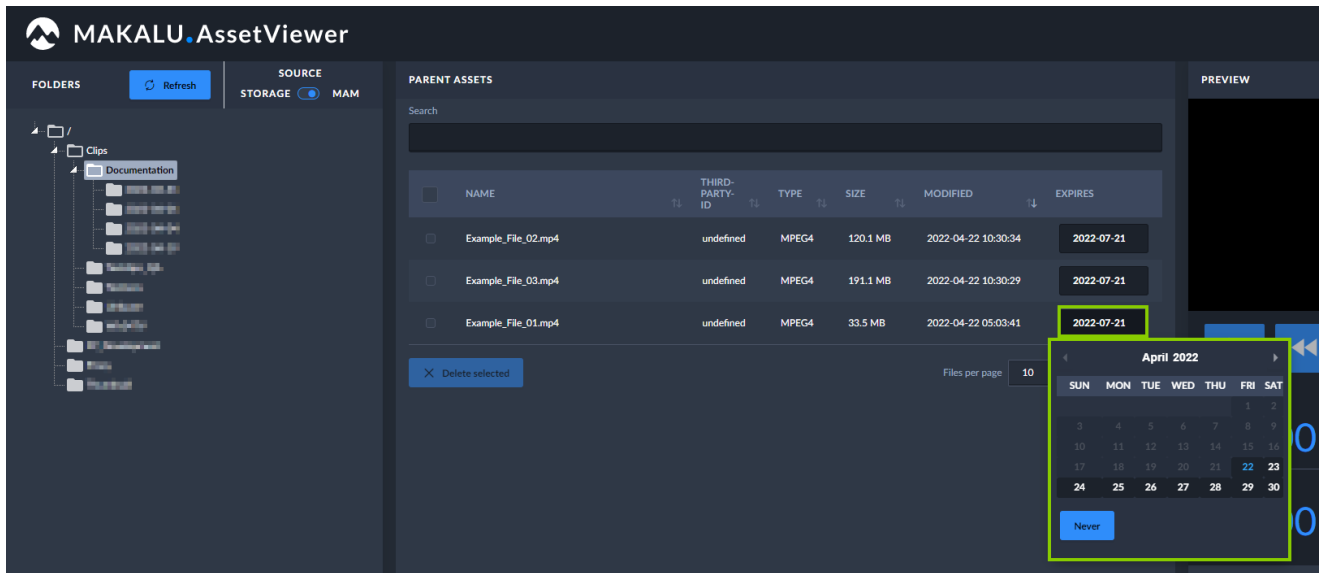


Figure: Makalu Asset Viewer - Setting the expiry date of a file manually

3. Select the new expiry date.

The expiry date is updated.

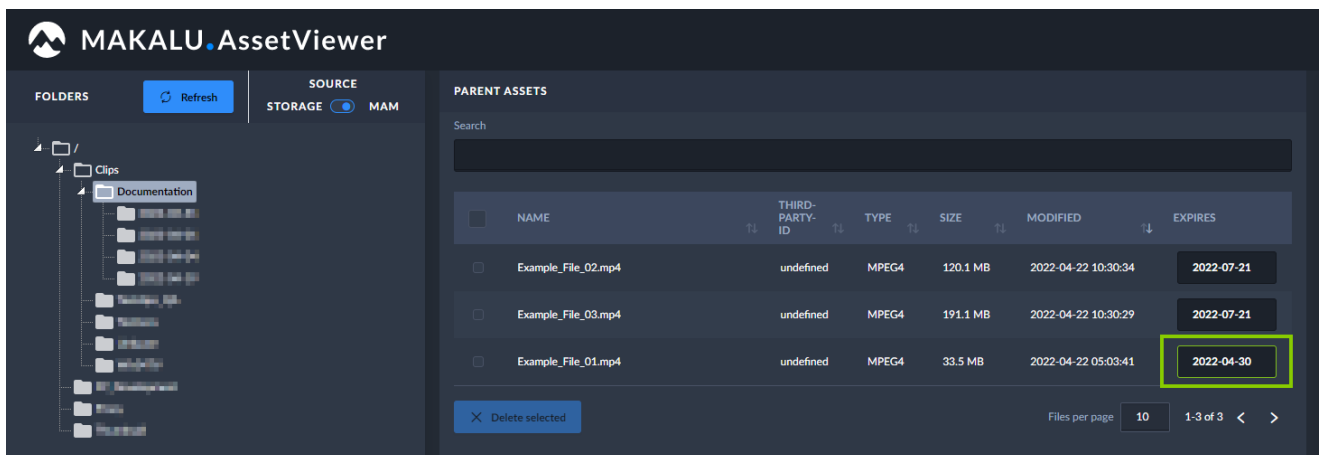


Figure: Makalu Asset Viewer - Expiry date of a file set manually

Tip

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

5. Graphics

5.1 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, e.g. 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 as 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.

The output URLs are configured during the commissioning of the system and are used by multiple Makalu applications.

Do not change these URLs in the Singular.Live settings! Misconfigurations can lead to graphics not being 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).

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 Support](#) .

5.2 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 graphics via the Singular.Live dashboard, they must first be synchronized with Makalu, before you can use them e.g. in a playlist and schedule them in a rundown. If you delete graphics via the Singular.Live dashboard, that are still used in a Makalu playlist, the graphics cannot be triggered and displayed anymore. Note that it may take a few minutes until these changes are synchronized and become available in 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 afterwards manually be restarted again.

You can either trigger the manual refresh via the Singular.Live website or via the [Graphics tab in Makalu Automation](#).

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

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

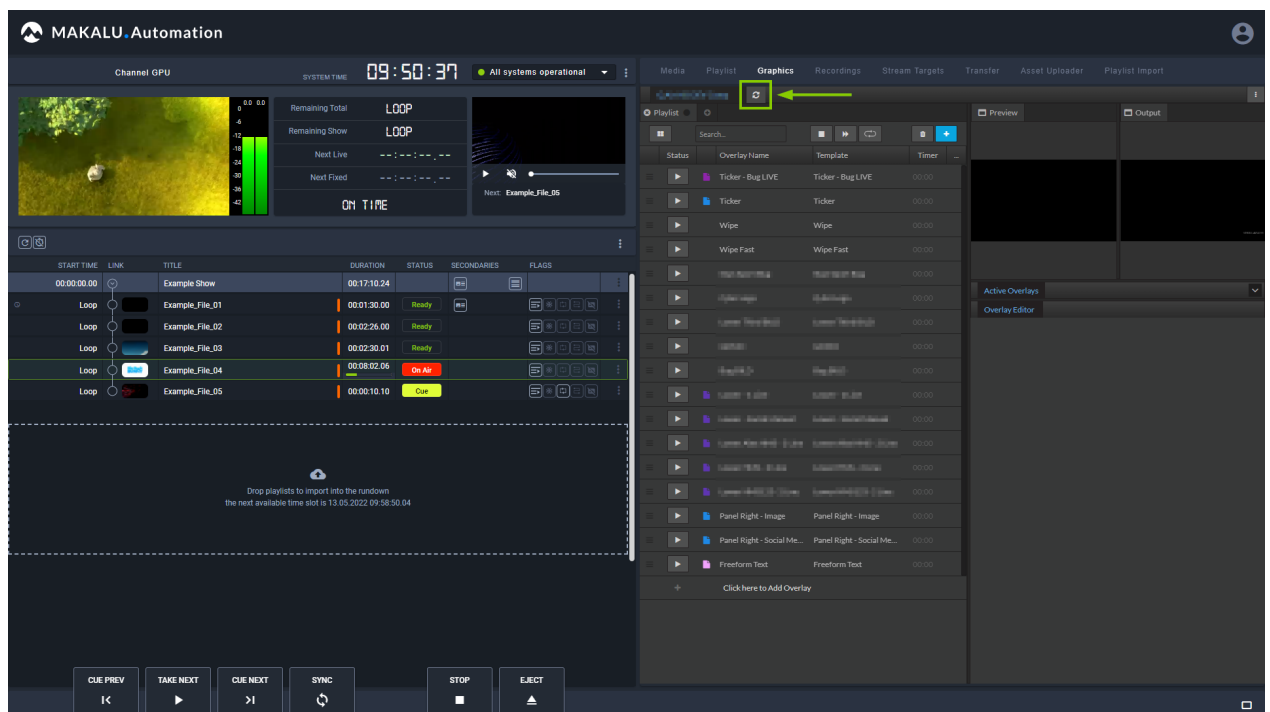


Figure: Manually trigger a Singular.Live control app refresh

2. Confirm the dialog, by clicking **OK**.

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

5.3 Triggering graphics manually

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

i 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 1 to 3, open the [Graphics tab in Makalu Automation](#) and continue with step 4.

1. Open the [Singular.Live website](#) and click **Login**.

The Singular.Live sign in page is opened.

2. Enter your credentials and sign in.

i 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.

Afterwards close the marketplace.

The Singular.Live Dashboard is displayed.

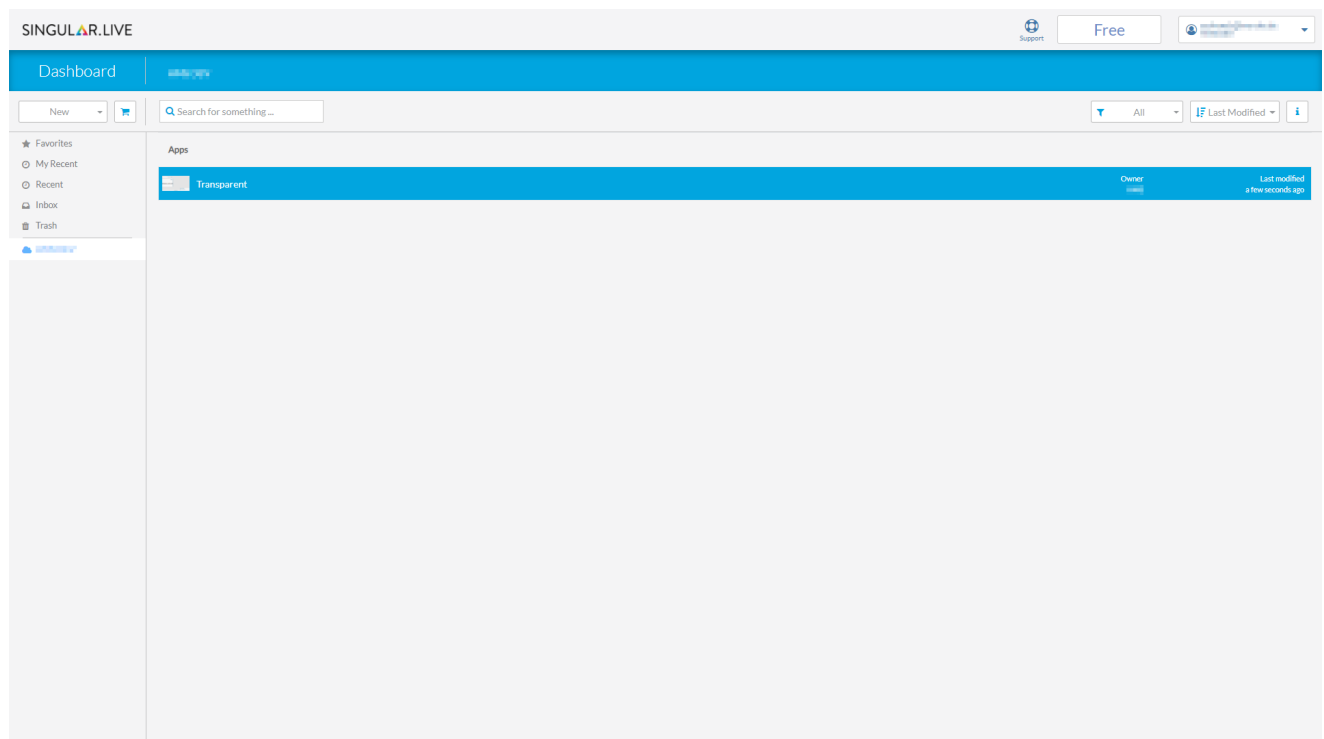


Figure: Singular.Live Dashboard

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

The control app is displayed.

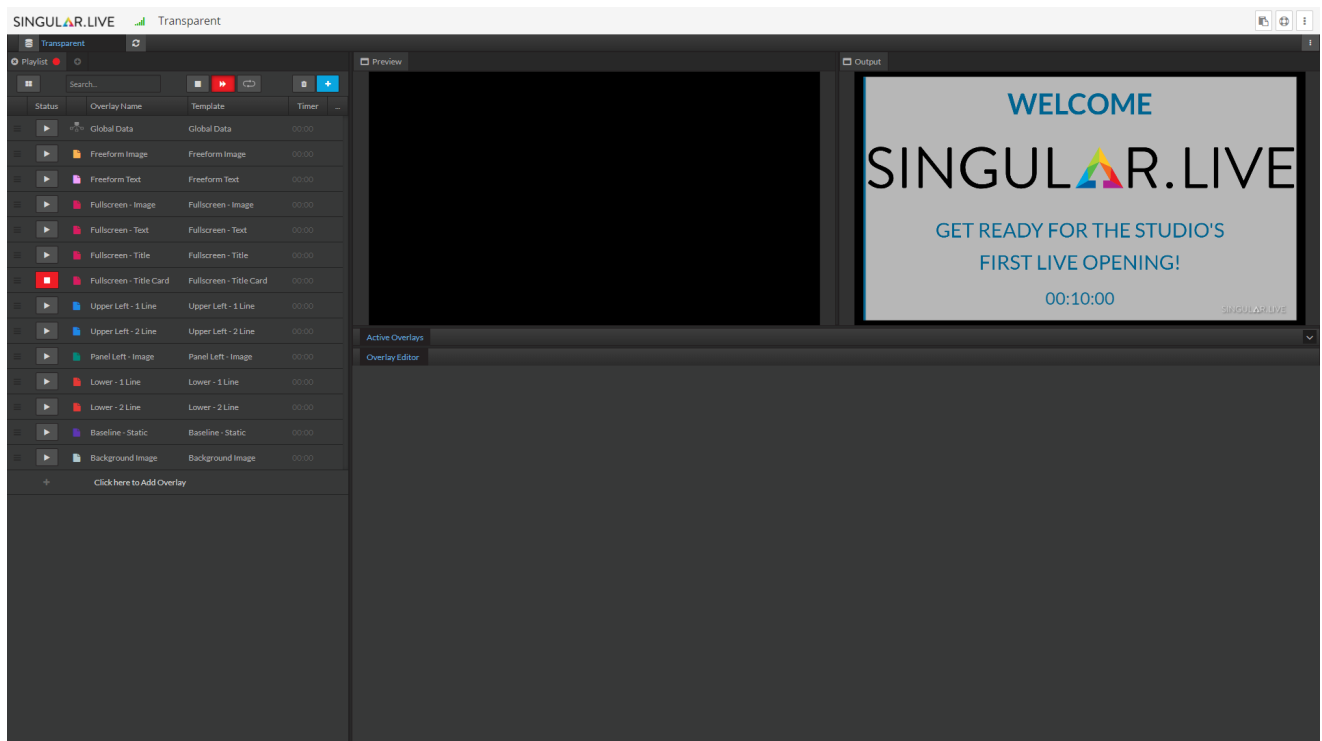




Figure: Singular.Live control app

Tip

This is the same view that 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.

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

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

6. Schedule

Makalu Traffic is the planning/scheduling component included in Makalu. Its planning concept is based on playlists, shows and clips. The following table summarizes the characteristics of these and other elements that are used in the planning concept:

Element	Characteristics
Asset	<ul style="list-style-type: none"> • any uploaded and ingested file • virtual placeholders for video files
Primary event	<ul style="list-style-type: none"> • main component of a show • types: <ul style="list-style-type: none"> • a video file added to a show (turning it into a "clip") • a live segment added to a show (turning it into a "clip")
Secondary event	<ul style="list-style-type: none"> • additional component of a playlist, show or clip • examples: <ul style="list-style-type: none"> • graphics (e.g. corner bug, crawl) • metadata (e.g. EPG) • stream targets (e.g. YouTube, generic)
Clip	<ul style="list-style-type: none"> • an asset (original 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

Element	Characteristics
Show	<ul style="list-style-type: none"> • container for one or more media elements (primary events and optional secondary events) <p>Example: A show created for a television news program</p> <p>This usually consists of primary events like:</p> <ul style="list-style-type: none"> • opener • multiple stories (each consisting of an introduction and a report) • closer <ul style="list-style-type: none"> • show content can be categorized • has a duration that corresponds to the combined duration of all included primary events • flags define the show behavior, e.g. play clips randomly, play show without any assigned secondary events (if the show includes ads), show is approved, etc. • flags define the clip behavior and can be set for each clip • can have secondary events (optional) • in order to be played, a show must be added to a playlist (cannot be played directly)
Playlist	<ul style="list-style-type: none"> • consists of one or more shows • is time-related, as it has an actual start date and time • has a duration that corresponds to the total duration of all included shows • consists only of shows and optional secondary events • if all included shows are approved, the playlist can be transferred to the Makalu Automation to be used in a rundown for a channel
Rundown	<ul style="list-style-type: none"> • channel-specific list of media elements to be played • consists of playlists

6.1 Accessing Makalu Traffic

To access **Makalu Traffic**, proceed as follows:

1. Open the following URL in your browser:

```
https://traffic.customer-identifier.makalu.live.
```

Notice

Replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`.

2. Log in with your Makalu credentials.

The Makalu Traffic user interface is opened. In the sidebar on the left the Playlists entry is pre-selected and available playlists are listed on the right.

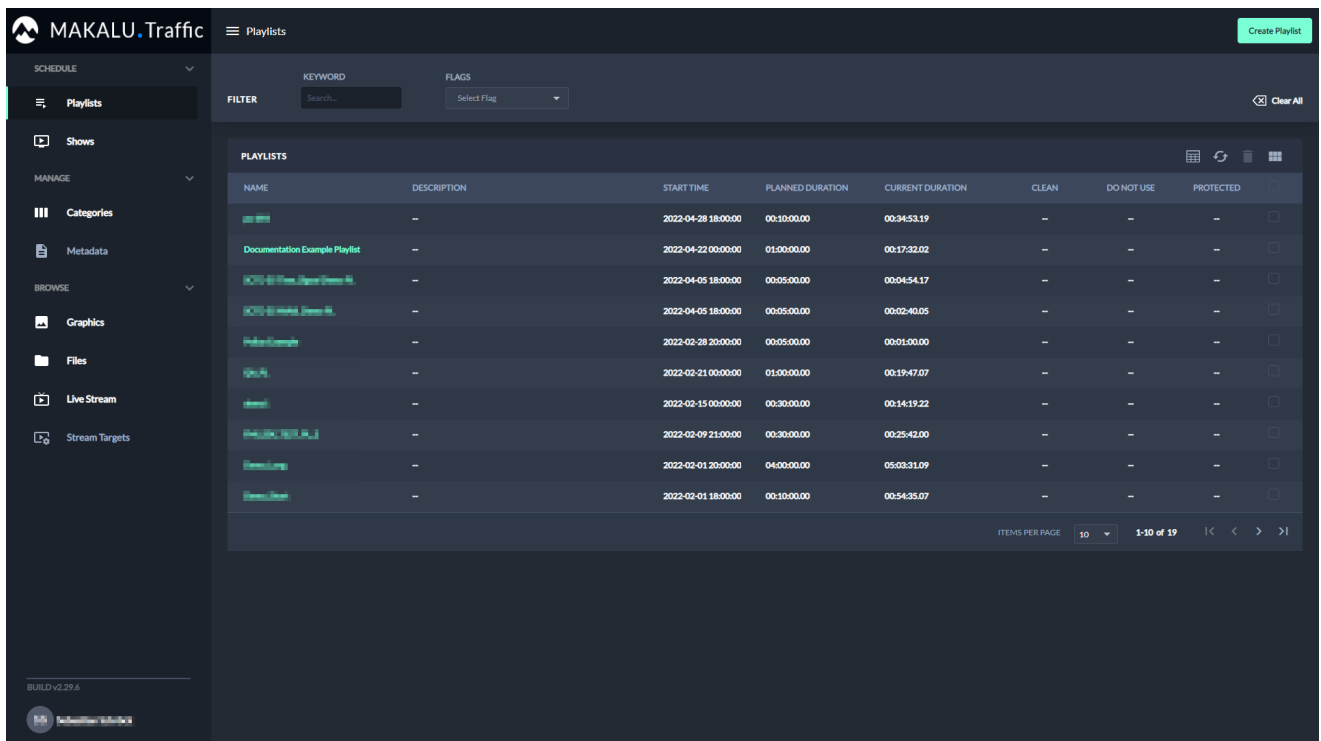


Figure: Makalu Traffic user interface

6.2 Using shows

6.2.1 Creating a show

To create a show, proceed as follows:

1. In the sidebar on the left, select **Shows**.
All available shows are listed on the right side.
2. In the top right click **Create Show**.

The screenshot shows the MAKALU.Traffic interface. The top navigation bar includes the logo and a 'Shows' menu. A sidebar on the left contains sections for 'SCHEDULE' (Playlists, Shows), 'MANAGE' (Categories, Metadata), and 'BROWSE' (Graphics, Files, Live Stream, Stream Targets). The main content area features a 'Shows' table with the following data:

NAME	DESCRIPTION	CATEGORY	SUB-CATEGORY	PLANNED DURATION	CURRENT DURATION	APPROVED	MEDIA READY	CLEAN	RANDOM PLAY
9PM News	-	News	Morning News	15:00:00.00	00:34:53.19	-	-	-	-
Example Show	-	Testing	Automation Testing	01:00:00.00	00:17:32.02	-	-	-	-
12:30-1:00 News Report Test	-	Testing	Automation Testing	00:05:00.00	00:04:54.17	-	-	-	-
12:30-1:00 Morning News	-	Testing	Automation Testing	00:05:00.00	00:02:40.05	-	-	-	-
Autobus Examples	-	Testing	Automation Testing	00:05:00.00	00:01:09.02	-	-	-	-
1:00-1:30 News	-	Testing	Automation Testing	01:00:00.00	00:09:53.16	-	-	-	-
1:00-1:30 News	-	Testing	Automation Testing	01:00:00.00	00:09:53.16	-	-	-	-
1:00-1:30 News	-	Testing	Automation Testing	00:30:00.00	00:04:46.15	-	-	-	-
1:00-1:30 News	-	Testing	Automation Testing	00:30:00.00	00:04:46.15	-	-	-	-
1:00-1:30 News	-	Testing	Automation Testing	00:30:00.00	00:04:46.15	-	-	-	-

The interface also includes a 'Create Show' button in the top right corner and a pagination control at the bottom right showing 'ITEMS PER PAGE 10' and '1-10 of 36'.

Figure: Makalu Traffic - Create show

A dialog is displayed that allows you to define the basic show properties.

3. Set the basic show properties.

CREATE A SHOW

SHOW NAME
Example Show

CATEGORY: News SUB-CATEGORY: Daily News

FLAGS
 Media Ready Random Play
 Approved Clean

PLANNED DURATION
00 : 15 : 00 . 00

DESCRIPTION
An example show for documentation purposes.
43/260

Cancel Confirm

Figure: Makalu Traffic - Define basic show properties

Notice

To create a new show, at least the following properties must be set:

- Show name
- Category
- Sub-category
- Planned duration

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

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 clicking on the name of the show in the list of available shows.
The show is opened.
2. (Optional) In the **Show properties** area, edit the [basic show properties](#).

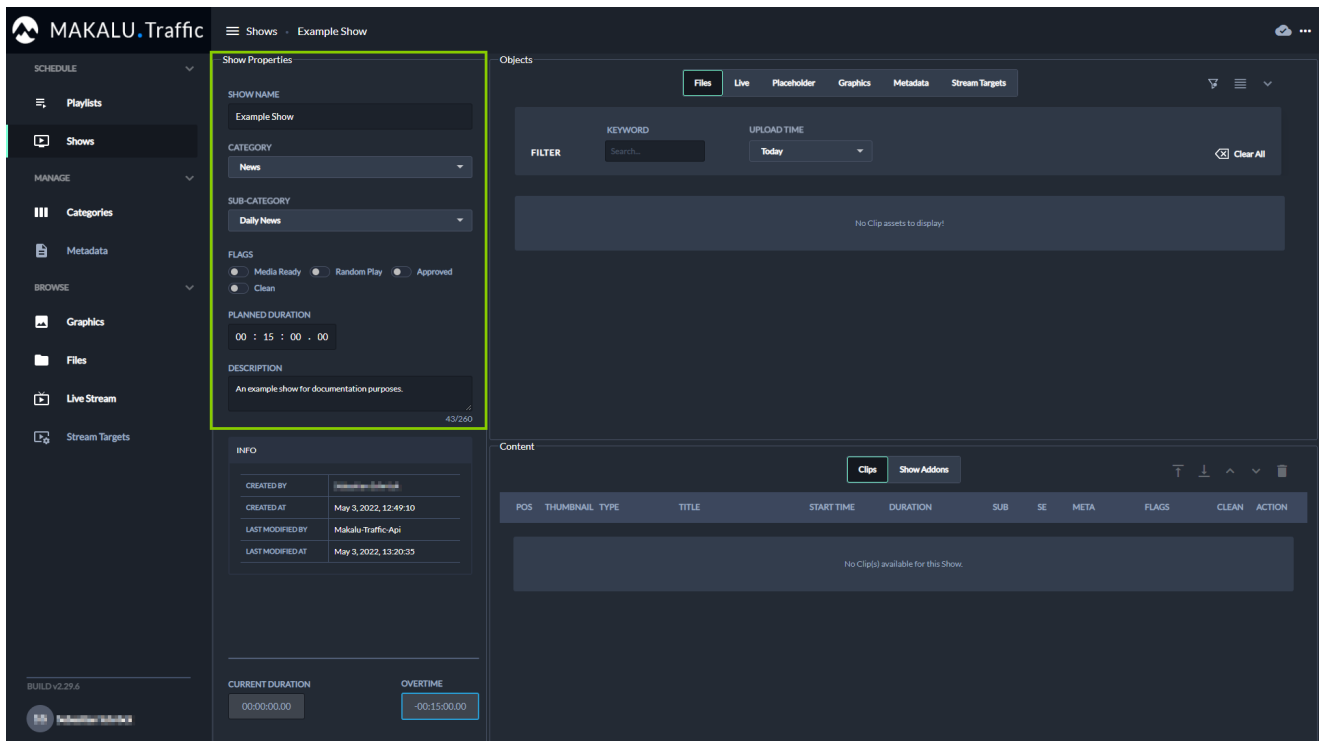


Figure: Makalu Traffic - Edit basic show properties

i Notice

Any changes you make to the show are saved automatically.

3. Add a primary event to the show.
 - a. On the right in the **Objects** area select the type of primary event you want to add (either **Files**, **Live** or **Placeholder**).
Depending on your selection, either available files, live sources or placeholders are listed in the corresponding area below.
 - b. To filter the available primary events, either use the **Keyword** search field (if you want to search for a specific file name) and/or use the **Upload Time** dropdown menu (if you want to select a specific time period when the file was uploaded/created).

The screenshot displays the MAKALU Traffic interface for configuring a show. The left sidebar contains navigation options: SCHEDULE, Playlists, Shows, MANAGE, Categories, Metadata, BROWSE, Graphics, Files, Live Stream, and Stream Targets. The main area is divided into 'Show Properties' and 'Objects'.

Show Properties:

- SHOW NAME: Example Show
- CATEGORY: News
- SUB-CATEGORY: Daily News
- FLAGS: Media Ready (selected), Random Play, Approved, Clean
- PLANNED DURATION: 00 : 15 : 00 . 00
- DESCRIPTION: An example show for documentation purposes. 43/260
- INFO:

CREATED BY	makalu@makalu.com
CREATED AT	May 3, 2022, 12:49:10
LAST MODIFIED BY	Makalu Traffic Api
LAST MODIFIED AT	May 3, 2022, 13:20:35
- CURRENT DURATION: 00:00:00.00
- OVERTIME: -00:15:00.00



Objects: This section is highlighted with a green border. It features a search bar with 'example' in the filter and 'All Assets' in the upload time dropdown. Below are seven file thumbnails with their respective IDs and durations:

- EXAMPLE_FILE_01 (ID: 36063, DURATION: 00:01:30:00)
- EXAMPLE_FILE_02 (ID: 36067, DURATION: 00:02:25:00)
- EXAMPLE_FILE_03 (ID: 36090, DURATION: 00:02:30:01)
- EXAMPLE_FILE_04 (ID: 36004, DURATION: 00:10:34:13)
- EXAMPLE_FILE_05 (ID: 36005, DURATION: 00:00:11:10)
- EXAMPLE_FILE_06 (ID: 36005, DURATION: 00:00:10:18)
- EXAMPLE_FILE_07 (ID: 36007, DURATION: 00:00:11:10)

Content: This section contains a table for clips. The table headers are POS, THUMBNAIL, TYPE, TITLE, START TIME, DURATION, SUB, SE, META, FLAGS, CLEAN, and ACTION. The table is currently empty, with a message: "No Clip(s) available for this Show."

Figure: Makalu Traffic - Filtered primary events

Tip

You can switch between a presentation as card or list view, by clicking the **Enable card view** icon  or **Enable list view** icon  in the top right.

- c. Select one or more primary events and drag them on the clip list in the **Content** area below.

Notice

If you drag a file, it is directly added to the show's clip list.

If you drag a live event, a dialog is displayed where you must set the planned duration for the event.

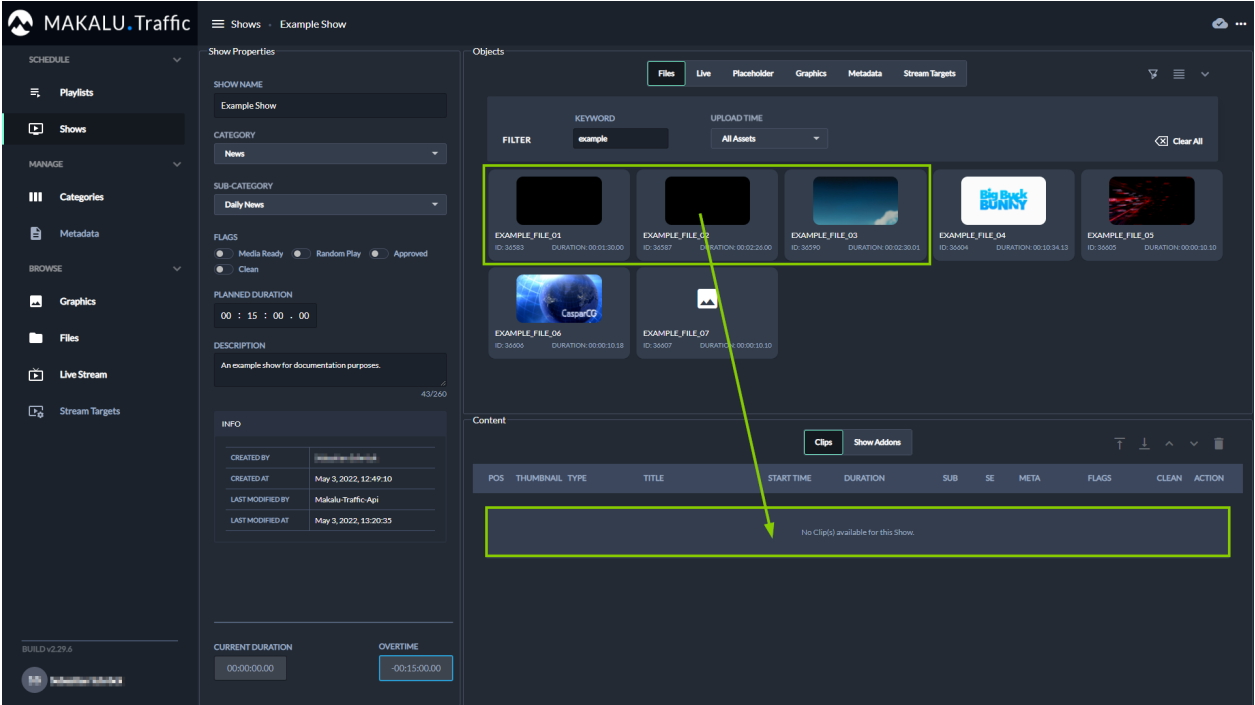


Figure: Makalu Traffic - Add primary events to a show
The primary events are added to the show's clip list.

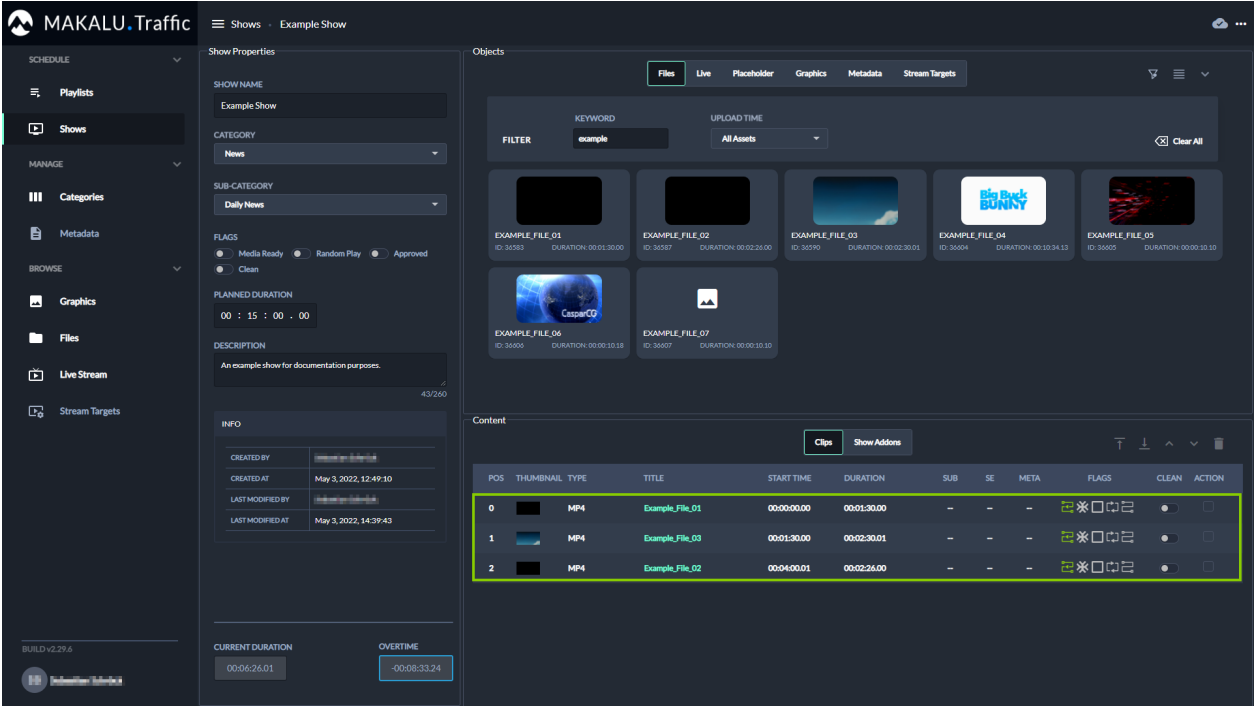


Figure: Makalu Traffic - Primary events added to a show

Notice


The fields **Current duration** and **Overtime** are updated accordingly.


d. (Optional) Repeat steps a to c to add more primary events to the show.

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

Tip

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

- 1 - Select one or more clips to be deleted, by activating the corresponding **Action** checkbox(es) in the clip list.
- 2 - Click the **Delete Clip** icon .
- 3 - In the subsequently displayed dialog click **Confirm**.

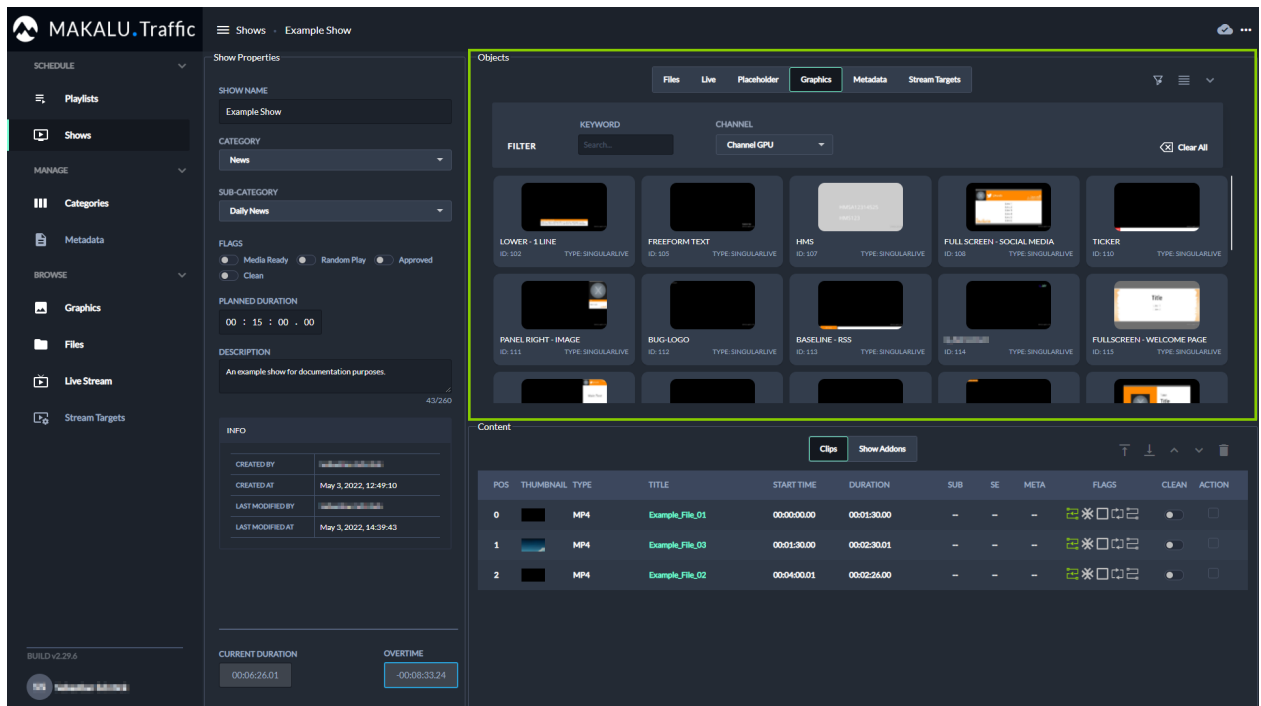
4. (Optional) Change the order of the clip list.
 - a. Select one or more clips, by activating the checkbox in the **Action** column.
 - b. Use the arrow icons (**move up/down, move to top/bottom**)  above the clip list to change the order.
5. (Optional) Edit the **clip flags**.

Notice

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

6. (Optional) Add secondary events to the show.
 - a. On the right in the **Objects** area select the type of secondary event you want to add (either **Graphics**, **Metadata** or **Stream Targets**).

Available secondary events of the selected type are displayed below.





The screenshot displays the MAKALU Traffic interface for a show named 'Example Show'. The 'Objects' section is highlighted with a green border and shows a grid of event types including Lower-1 Line, Freeform Text, HMS, Fullscreen - Social Media, Ticker, Panel Right - Image, Bug-Logo, Baseline - RSS, and Fullscreen - Welcome Page. Below this, the 'Content' table lists clips with their positions, thumbnails, titles, start times, durations, and various flags.

POS	THUMBNAIL	TYPE	TITLE	START TIME	DURATION	SUB	SE	META	FLAGS	CLEAN	ACTION
0		MP4	Example_File_01	00:00:00.00	00:01:30.00	--	--	--		<input type="checkbox"/>	<input type="checkbox"/>
1		MP4	Example_File_03	00:01:30.00	00:02:30.01	--	--	--		<input type="checkbox"/>	<input type="checkbox"/>
2		MP4	Example_File_02	00:04:00.01	00:02:36.00	--	--	--		<input type="checkbox"/>	<input type="checkbox"/>

Figure: Makalu Traffic - Secondary events

Tip

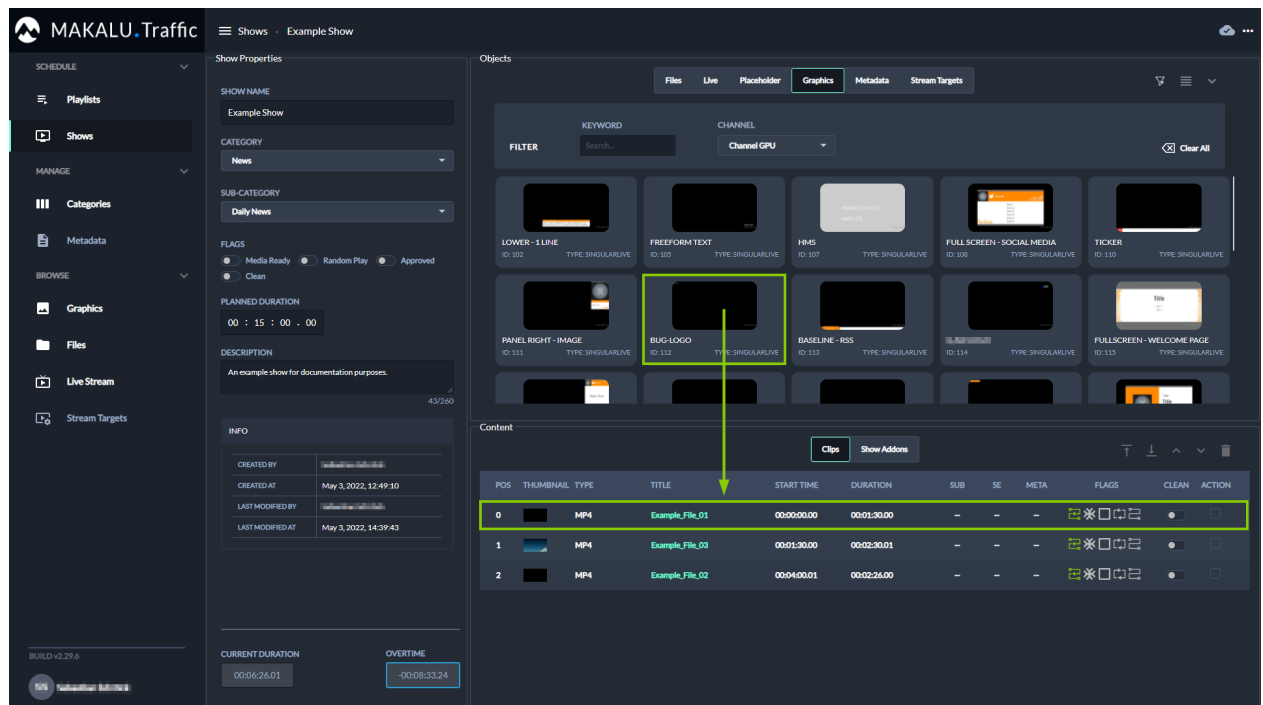
You can switch between a presentation as card or list view, by clicking the **Enable card view** icon  or **Enable list view** icon  in the top right.

- b. (Optional) To search for secondary events based on the event name, use the **Keyword** search field.
- c. (Optional) To search for graphics based on the channel they are assigned to, select a channel in the **Channel** dropdown menu right to the search field.

Warning

If you add multiple graphics to a show, only add graphics that are all assigned to the same channel. Otherwise, you cannot [send a playlist to playout](#) that includes this show.

- d. To add a secondary event to a single clip in the show, select a secondary event and drag it into the **Content** area on the corresponding clip.



The screenshot shows the Makalu Traffic interface. On the left is a sidebar with navigation options like SCHEDULE, Playlists, Shows, MANAGE, Categories, Metadata, BROWSE, Graphics, Files, Live Stream, and Stream Targets. The main area is divided into 'Show Properties' and 'Objects'.

Show Properties:

- SHOW NAME: Example Show
- CATEGORY: News
- SUB-CATEGORY: Daily News
- FLAGS: Media Ready, Random Play, Approved, Clean
- PLANNED DURATION: 00 : 15 : 00 . 00
- DESCRIPTION: An example show for documentation purposes.
- INFO: CREATED BY, CREATED AT (May 3, 2022, 12:49:30), LAST MODIFIED BY, LAST MODIFIED AT (May 3, 2022, 14:39:43)
- CURRENT DURATION: 00:06:26.01
- OVERTIME: -00:08:33.24

Objects:

Filter: KEYWORD (Search), CHANNEL (Channel GPU)

ID	TYPE	NAME
ID: 102	TYPE: SINGULAR LIVE	LOWER-1 LINE
ID: 105	TYPE: SINGULAR LIVE	FREEFORM TEXT
ID: 107	TYPE: SINGULAR LIVE	HMS
ID: 108	TYPE: SINGULAR LIVE	FULLSCREEN - SOCIAL MEDIA
ID: 110	TYPE: SINGULAR LIVE	TICKER
ID: 111	TYPE: SINGULAR LIVE	PANEL RIGHT - IMAGE
ID: 112	TYPE: SINGULAR LIVE	BUG-LOGO
ID: 113	TYPE: SINGULAR LIVE	BASELINE - RSS
ID: 114	TYPE: SINGULAR LIVE	
ID: 115	TYPE: SINGULAR LIVE	FULLSCREEN - WELCOME PAGE

Content:

POS	THUMBNAIL	TYPE	TITLE	START TIME	DURATION	SUB	SE	META	FLAGS	CLEAN	ACTION
0		MP4	Example_File_01	00:00:00.00	00:01:30.00	--	--	--			
1		MP4	Example_File_03	00:01:30.00	00:02:30.01	--	--	--			
2		MP4	Example_File_02	00:04:00.01	00:02:26.00	--	--	--			

Figure: Makalu Traffic - Add secondary event to a clip

The secondary event is added to the clip.

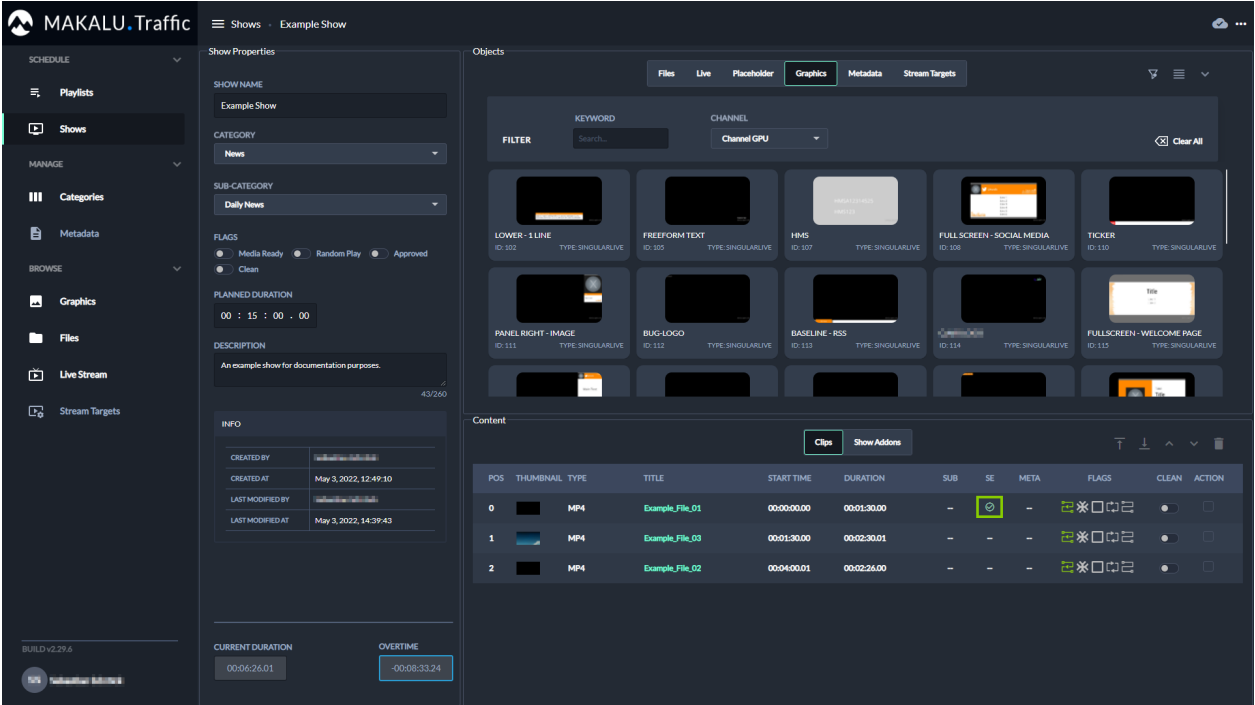


Figure: Makalu Traffic - Secondary event added to a clip

Notice

The check marks in the columns **Sub**, **SE** and **Meta** in the clip list indicate, if there are additional elements (subtitles, graphics and/or metadata) assigned to the clip.

- e. To add a secondary event to the show, in the **Content** area select **Show Addons**, then select a secondary event and drag it on the show addons list.

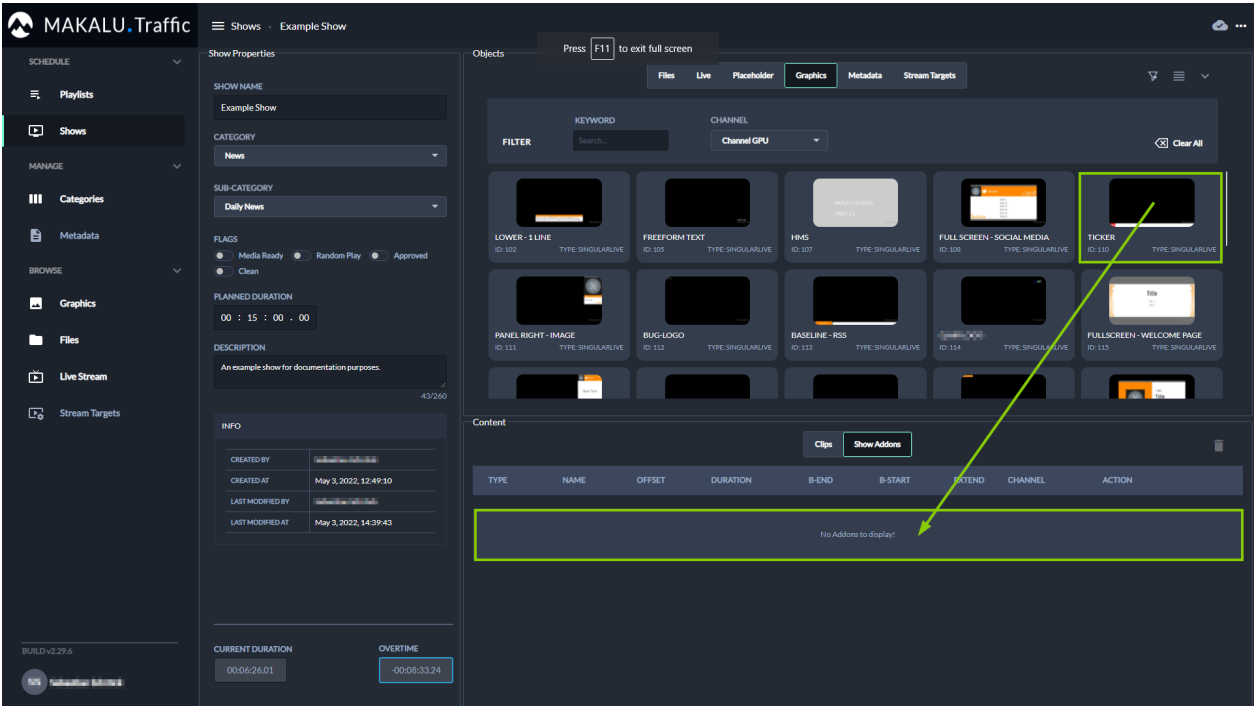


Figure: Makalu Traffic - Add secondary event to a show

The secondary event is added to the show addons list.

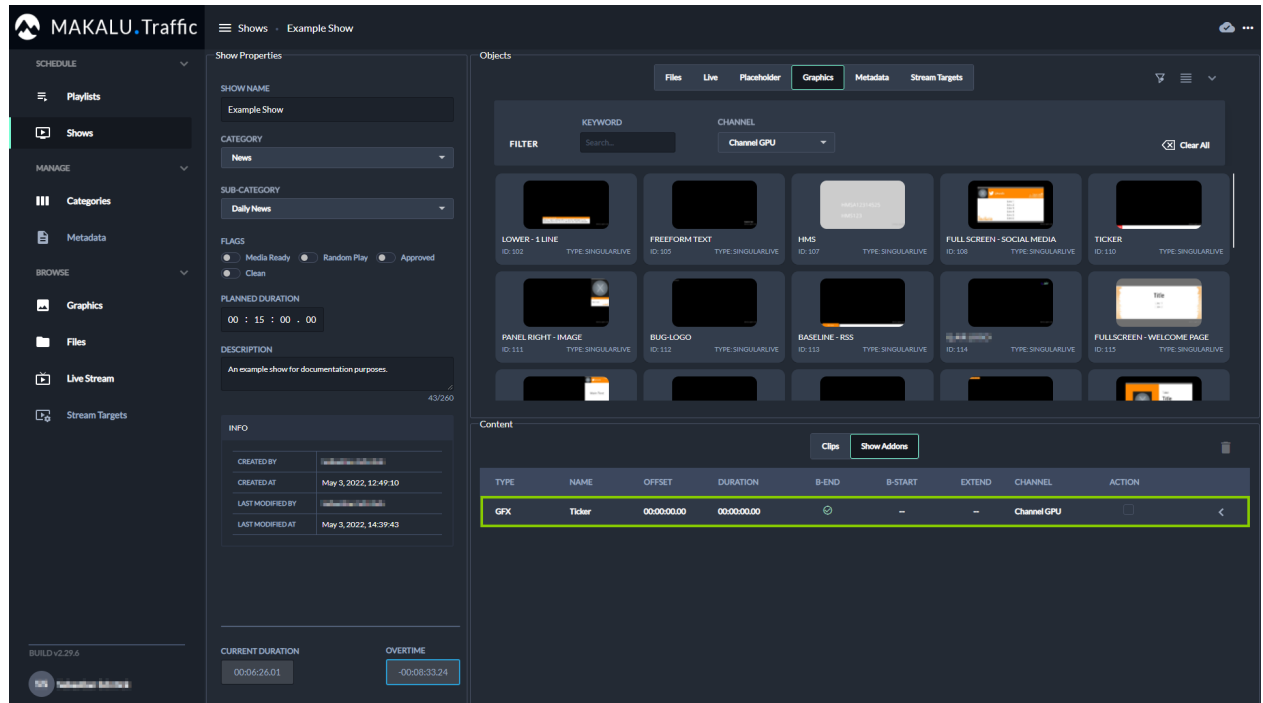





Figure: Makalu Traffic - Secondary event added to a show

- f. (Optional) Repeat the previous two steps to add more secondary events.
- g. (Optional) [Edit the properties of an added secondary event](#), by either [Editing a clip](#) or by editing the show addons. To edit the show addons, select the **Show Addons** tab and click the **Expand** icon  on the right.


The addon properties are displayed in the Addon Details area below.

Tip

You can expand and collapse the **Objects** area via the **Expand**  and **Collapse**  icons in the top right. This is useful if you want to display an extensive list of addon properties. Collapsing the **Objects** area allows you to use most of the right side for displaying the details of an addon.

Tip

To delete an added secondary event, proceed as follows:

- 1 - Select one or more secondary events to be deleted, by activating the corresponding **Action** checkbox(es).
- 2 - Click the **Delete Addon** icon .
- 3 - In the subsequently displayed dialog, click **Confirm**.

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

6.2.2 Editing a show

To edit a show, proceed as follows:

1. In the sidebar on the left select **Shows**.
All available shows are listed on the right side.
2. (Optional) To narrow the listed shows, use the filters above the list of available shows.(e.g. select a content category, flags, or enter a name).
3. click the name of the show to be edited.

The show details are opened.

The screenshot displays the MAKALU.Traffic interface for editing a show. The left sidebar contains navigation options: SCHEDULE (Playlists, Shows), MANAGE (Categories, Metadata), BROWSE (Graphics, Files, Live Stream, Stream Targets). The main area is divided into 'Show Properties' and 'Objects'.

Show Properties:

- SHOW NAME: Example Show
- CATEGORY: News
- SUB-CATEGORY: Daily News
- FLAGS: Media Ready, Random Play, Approved, Clean
- PLANNED DURATION: 00 : 15 : 00 . 00
- DESCRIPTION: An example show for documentation purposes.
- INFO:

CREATED BY	Example User
CREATED AT	May 3, 2022, 12:49:10
LAST MODIFIED BY	Example User
LAST MODIFIED AT	May 4, 2022, 15:31:39
- BUILD v2.29.6
- CURRENT DURATION: 00:06:26.01
- OVERTIME: -00:08:33.24

Objects:

- Filters: KEYWORD (example), UPLOAD TIME (All Assets)
- Grid of asset thumbnails: EXAMPLE_FILE_02, EXAMPLE_FILE_03, EXAMPLE_FILE_04 (Big Buck Bunny), EXAMPLE_FILE_05, EXAMPLE_FILE_06 (Casper), EXAMPLE_FILE_07, EXAMPLE_FILE_01.

Content:

POS	THUMBNAIL	TYPE	TITLE	START TIME	DURATION	SUB	SE	META	FLAGS	CLEAN	ACTION
0		MP4	Example_File_01	00:00:00.00	00:01:30.00	-	-	-	🔍 🗑️ 🔄	🔴	🗑️
1		MP4	Example_File_02	00:01:30.00	00:02:26.00	-	-	-	🔍 🗑️ 🔄	🔴	🗑️
2		MP4	Example_File_03	00:03:56.00	00:02:30.01	-	-	-	🔍 🗑️ 🔄	🔴	🗑️

Figure: Makalu Traffic - Show details

i Notice

When a user opens a show for editing, the show is locked. Until the editing user closes the show, other users only have read access to the show.

4. Edit [show properties](#), primary and/or secondary events as described in section [Creating a show](#).

The edited show is saved automatically.

6.2.3 Editing a clip

To edit a clip, proceed as follows:

1. In the left sidebar, select **Shows** and click the name of a show that contains the clip to be edited.

The show details are opened.

The screenshot displays the MAKALU.Traffic interface for 'Example Show'. The left sidebar contains navigation options: SCHEDULE (Playlists, Shows), MANAGE (Categories, Metadata), and BROWSE (Graphics, Files, Live Stream, Stream Targets). The main area is divided into 'Show Properties' and 'Objects'.

Show Properties:

- SHOW NAME: Example Show
- CATEGORY: News
- SUB-CATEGORY: Daily News
- FLAGS: Media Ready, Random Play, Approved, Clean
- PLANNED DURATION: 00 : 15 : 00 . 00
- DESCRIPTION: An example show for documentation purposes.
- INFO:

CREATED BY	
CREATED AT	May 3, 2022, 12:49:10
LAST MODIFIED BY	
LAST MODIFIED AT	May 4, 2022, 15:31:39
- CURRENT DURATION: 00:06:26.01
- OVERTIME: -00:08:33.24

Objects:

- Filters: KEYWORD (example), UPLOAD TIME (All Assets)
- Grid of asset thumbnails: EXAMPLE_FILE_02, EXAMPLE_FILE_03, EXAMPLE_FILE_04 (Big Buck Bunny), EXAMPLE_FILE_05, EXAMPLE_FILE_06 (Casper CD), EXAMPLE_FILE_07, EXAMPLE_FILE_01.

Content:

POS	THUMBNAIL	TYPE	TITLE	START TIME	DURATION	SUB	SE	META	FLAGS	CLEAN	ACTION
0		MP4	Example_File_01	00:00:00.00	00:01:30.00	-	⊕	-	🔍 🔄 🗑️	🔍	🗑️
1		MP4	Example_File_02	00:01:30.00	00:02:26.00	-	-	-	🔍 🔄 🗑️	🔍	🗑️
2		MP4	Example_File_03	00:03:56.00	00:02:30.01	-	-	-	🔍 🔄 🗑️	🔍	🗑️

Figure: Makalu Traffic - Show details

- In the clip list select a clip to be edited, by clicking on the clip title.

This screenshot is identical to the previous one, but with the 'Example_File_01' title in the content table highlighted by a yellow box, indicating it has been selected for editing.

Figure: Makalu Traffic - Select clip

The clip details are opened.

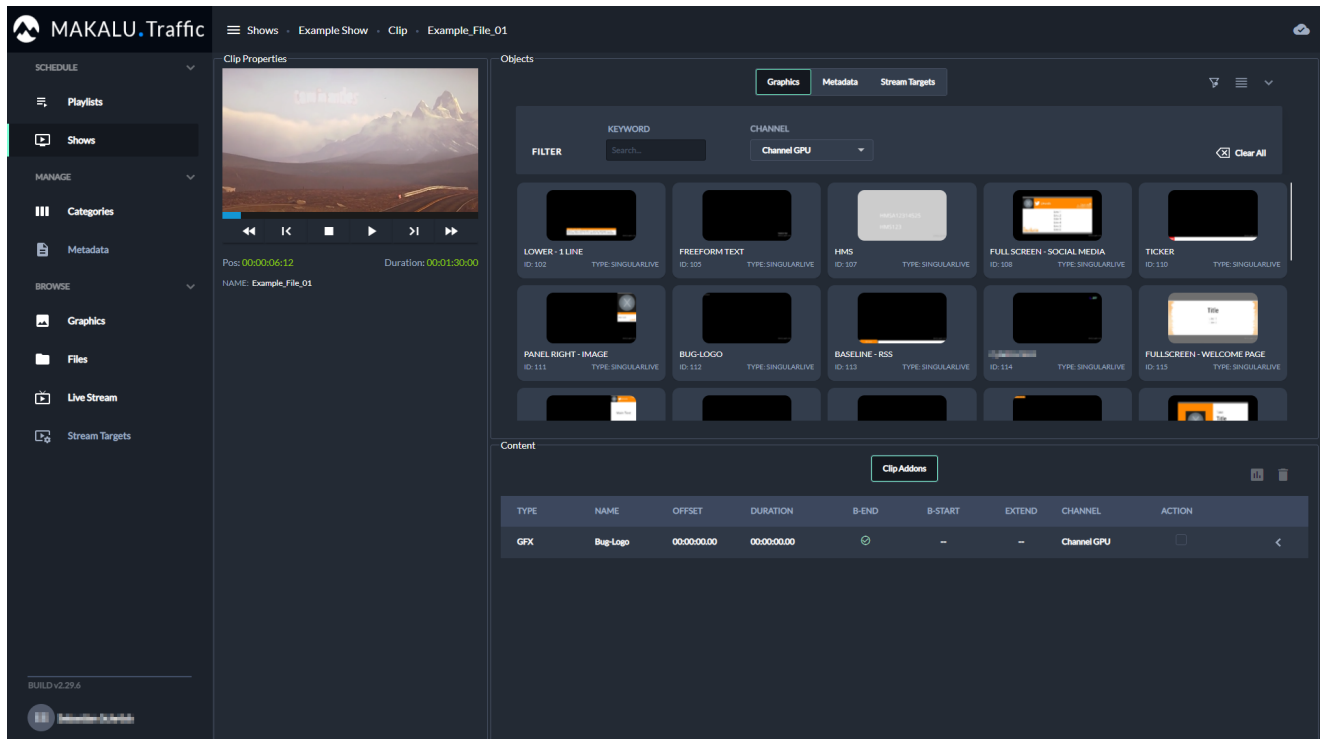


Figure: Makalu Traffic - Clip details

3. (Optional) Add secondary events to the clip.

- a. On the right in the **Objects** area select the type of secondary event you want to add (either Graphics, Metadata or Stream Targets).

Available secondary events of the selected type are displayed below.

- b. To search for secondary events based on the event name, use the **Keyword** search field.
- c. To search for graphics based on the channel they are assigned to, select a channel in the **Channel** dropdown menu right to the search field.

Warning

If you add multiple graphics to a clip, only add graphics that are all assigned to the same channel. Otherwise, you cannot [send a playlist to playout](#) that includes a show with this clip.

- d. Drag an element on the **Clip Addons** area.

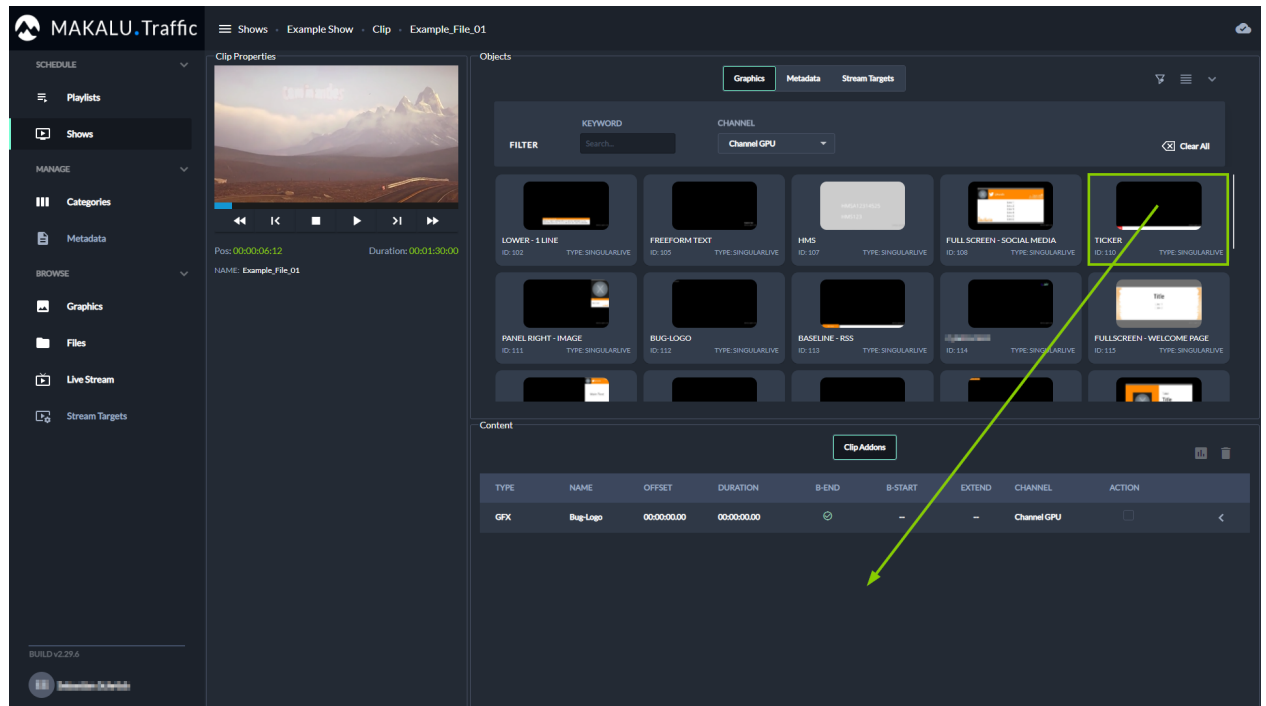


Figure: Makalu Traffic - Add secondary event to clip

The element is added to the Clip Addons list.

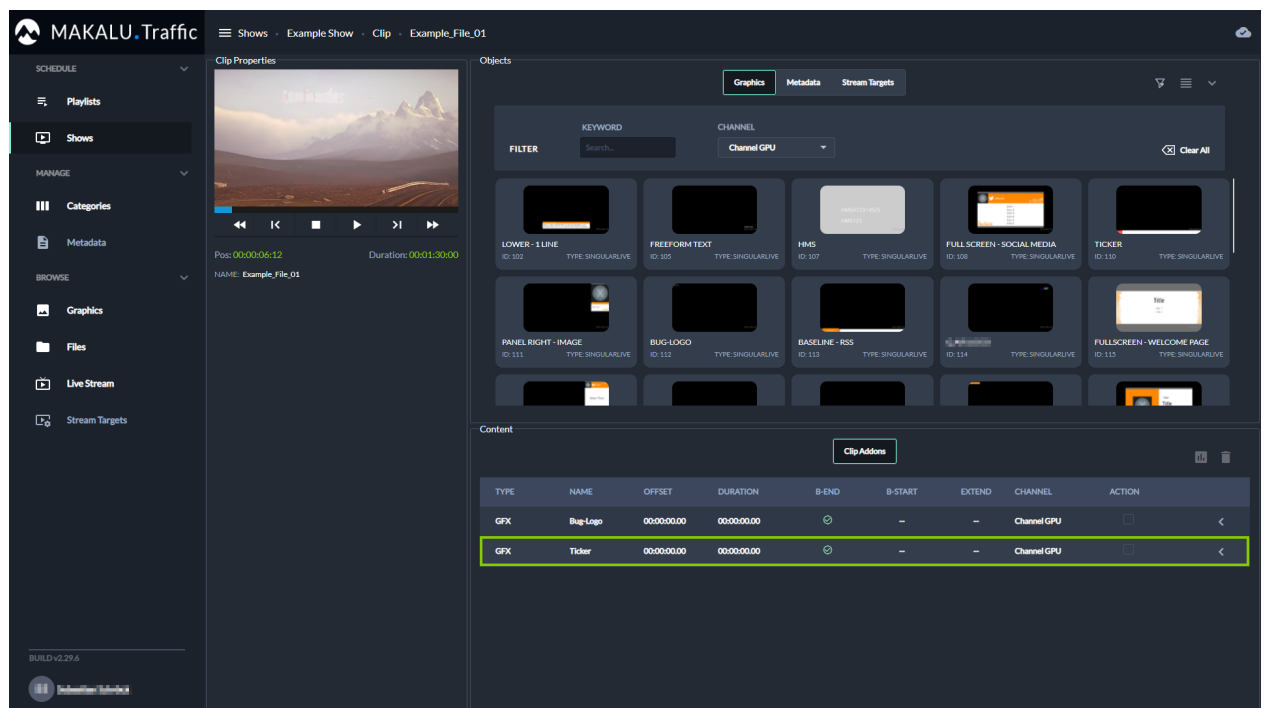





Figure: Makalu Traffic - Secondary event added to clip

- To edit a clip addon, expand it by clicking the **Expand** icon  on the right. The addon properties are displayed in the Addon details area.

Tip

You can expand and collapse the **Objects** area via the **Expand**  and **Collapse**  icons in the top right. This is useful if you want to display an extensive list of addon properties. Collapsing the **Objects** area allows you to use most of the right side for displaying the details of an addon.

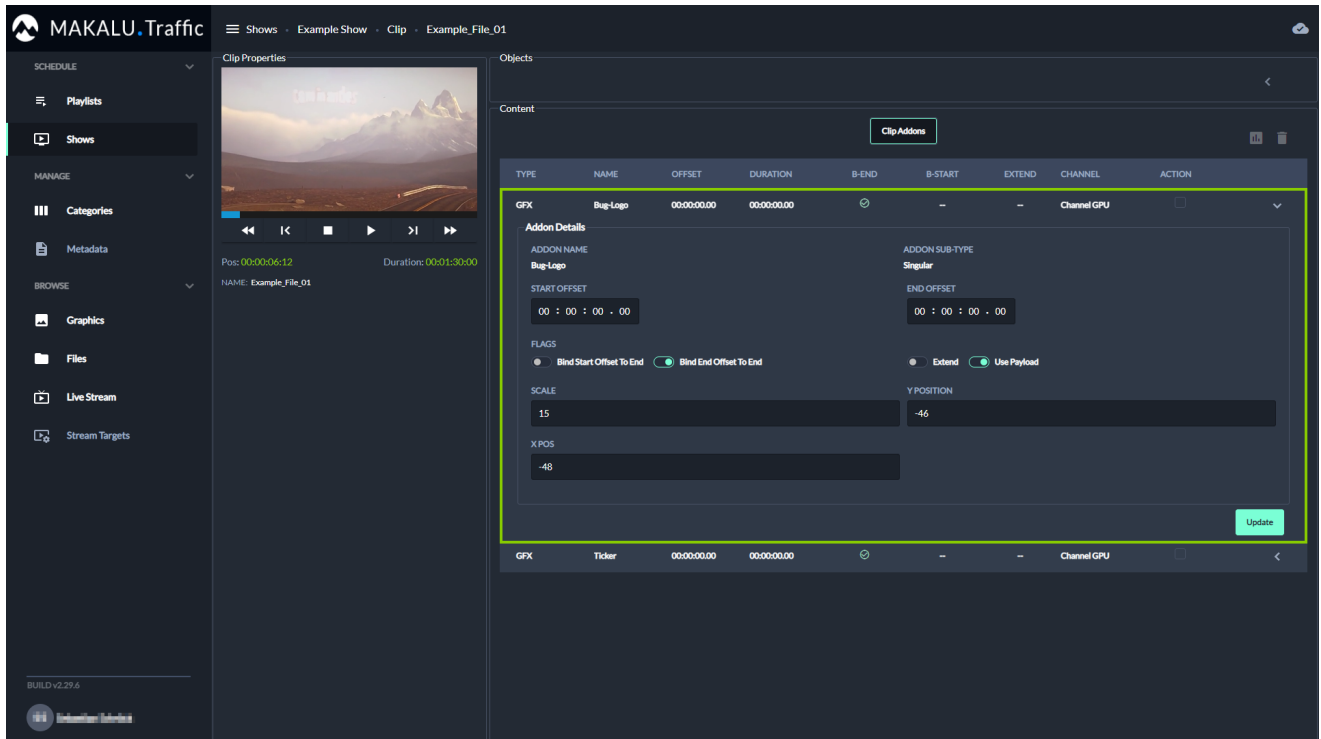



Figure: Makalu Traffic - Edit addon details

5. Edit the addon properties.

Tip

If you are editing a graphics secondary event, you can set the [time-related clip properties](#) to default values, by clicking the **Set default values** icon  above the clip addons list.

6. To save your changes, click **Update** in the **Addon details** area.

The addon properties are saved.

6.2.4 Duplicating a show

To duplicate a show, proceed as follows:

1. In the left sidebar, select **Shows** and click the name of the show to be duplicated.

The show details are opened.

2. In the top right click **More actions**  and select **Duplicate**.

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

3. Edit [show properties](#), primary and/or secondary events as required.

The duplicated show is saved automatically including all edited properties.

6.2.5 Deleting a show

To delete a single show, proceed as follows:

1. In the left sidebar, select **Shows** and click the name of the show to be deleted.

The show details are opened.

2. In the top right click **More actions**  and select **Delete**.

A confirmation dialog is displayed.

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

The show is deleted.

To delete multiple shows, proceed as follows:

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

All available shows are listed on the right side.

2. In the list of available shows activate the checkbox to the right of each show to be deleted.

3. Click the **Delete selected shows**  icon.

A confirmation dialog is displayed.

4. To delete the selected shows, click **Confirm**.

The selected shows are deleted.

6.2.6 Show properties

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

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, 30, 50 and 60 fps.


Property	Description
Show name	Name of the show
Category	Main content category
Sub-category	Content sub-category, based on the selected main content category
Flag - Media Ready	For future use






Property	Description
Flag - Random Play	For future use
Flag - Approved	For future use
Flag - Clean	<p>If activated, graphics addons are not displayed when the show is played, even if graphics are assigned to the show or included clips.</p> <p>This also applies to cases where graphics addons of the previous show would normally extend beyond the regular end of the previous show. Depending on how the duration of the graphics addon is set, graphics of the previous show can stay displayed even after the next show starts. But if the clean flag is activated for the next show, graphics are not displayed.</p> <p>This is useful for e.g. a show container, that only contains commercials.</p>
Planned Duration	Planned duration of the show
Current Duration	Actual show duration, corresponds to the total combined duration of all assigned primary events
Description	Text description for the show
Overtime	Time difference between planned duration and current duration

6.2.7 Clip flags

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

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

Flag icon	Flag name	Description
	Auto Follow	<p>When the playback of the previous clip is finished, the playback of the current clip starts automatically.</p> <p><i>Notice: By default, the Auto Follow flag is initially activated for every clip.</i></p>

Flag icon	Flag name	Description
	Open End	<p>The clip is played permanently until the operator manually triggers the start of the next clip.</p> <p><i>Notice: This flag is only available for clips of type "live source".</i></p>
	Freeze Last	<p>When the playback of the clip is finished, the last frame stays displayed.</p>
	Freeze Black	<p>When the playback of the clip is finished, a black image stays displayed.</p> <p><i>Notice: The image to be displayed is configurable.</i></p>
	Loop	<p>The clip is played in a loop until the operator manually triggers the start of the next clip.</p> <p><i>Tip: If the loop flag is activated for the last clip in a group, the whole group is played in a loop.</i></p>
	Auto Cue (Cue Next)	<p>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.</p>
	Clean	<p>The clip is played without graphics addons, even if graphics are assigned to it.</p> <p><i>Notice: This also applies to cases where graphics addons of the previous clip would normally extend beyond the regular end of the previous clip. Depending on how the duration of the graphics addon 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.</i></p>

Notice

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

6.3 Using playlists

6.3.1 Creating a new playlist

To create a new playlist, proceed as follows:

1. In the sidebar on the left, select **Playlists**.
All available playlists are listed on the right side.
2. In the top right click **Create Playlist**.

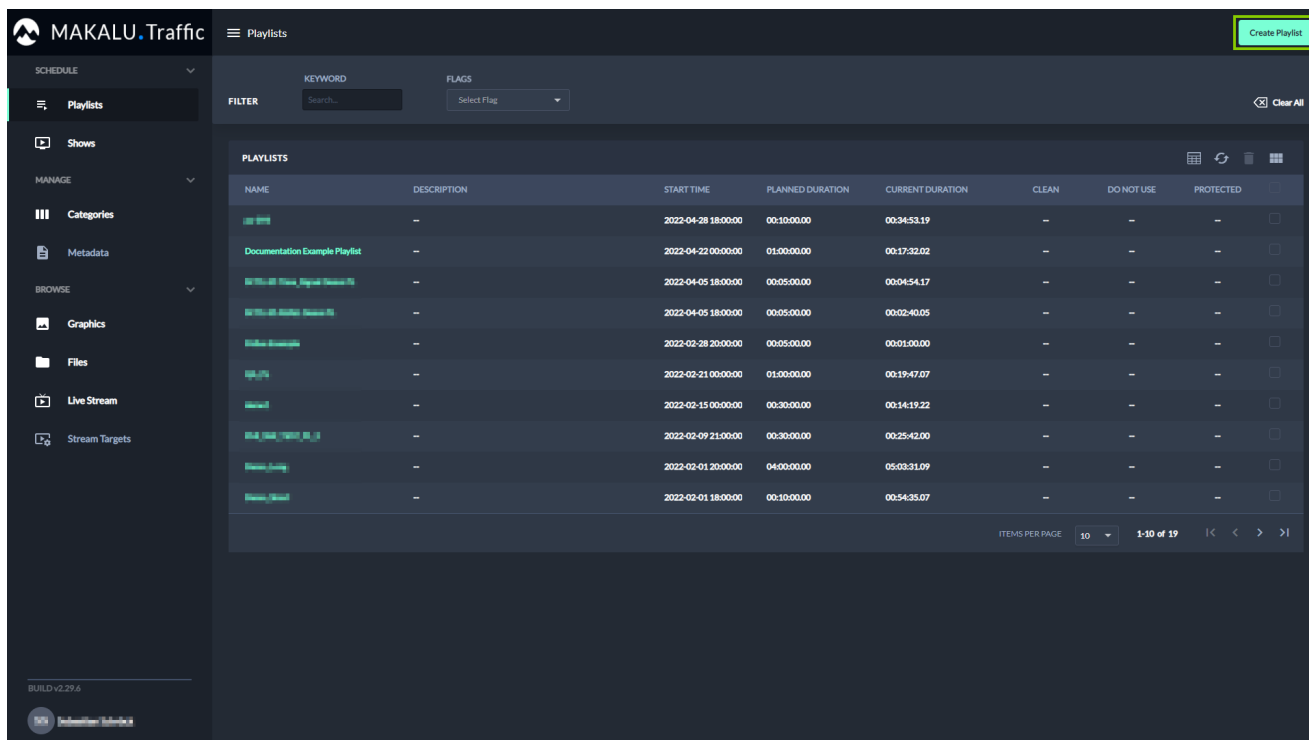


Figure: Makalu Traffic - Create playlist

A dialog is displayed that allows you to define the basic playlist properties.

3. Set the basic playlist properties.

CREATE A PLAYLIST

PLAYLIST NAME
Example Playlist

START DATE
05/06/2022

START TIME
20 : 00 : 00 . 00

PLANNED DURATION
00 : 15 : 00 . 00

FLAGS
 Clean

DESCRIPTION
Enter Description
0/260

Cancel Confirm

Figure: Makalu Traffic - Define basic playlist properties

Notice

To create a new playlist, at least the following properties must be set:

- Playlist name
- Start time
- Planned duration

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

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 clicking on the name of the playlist in the list of available playlists.

The playlist is opened.

2. (Optional) In the **Playlist Properties** area, edit the basic properties.

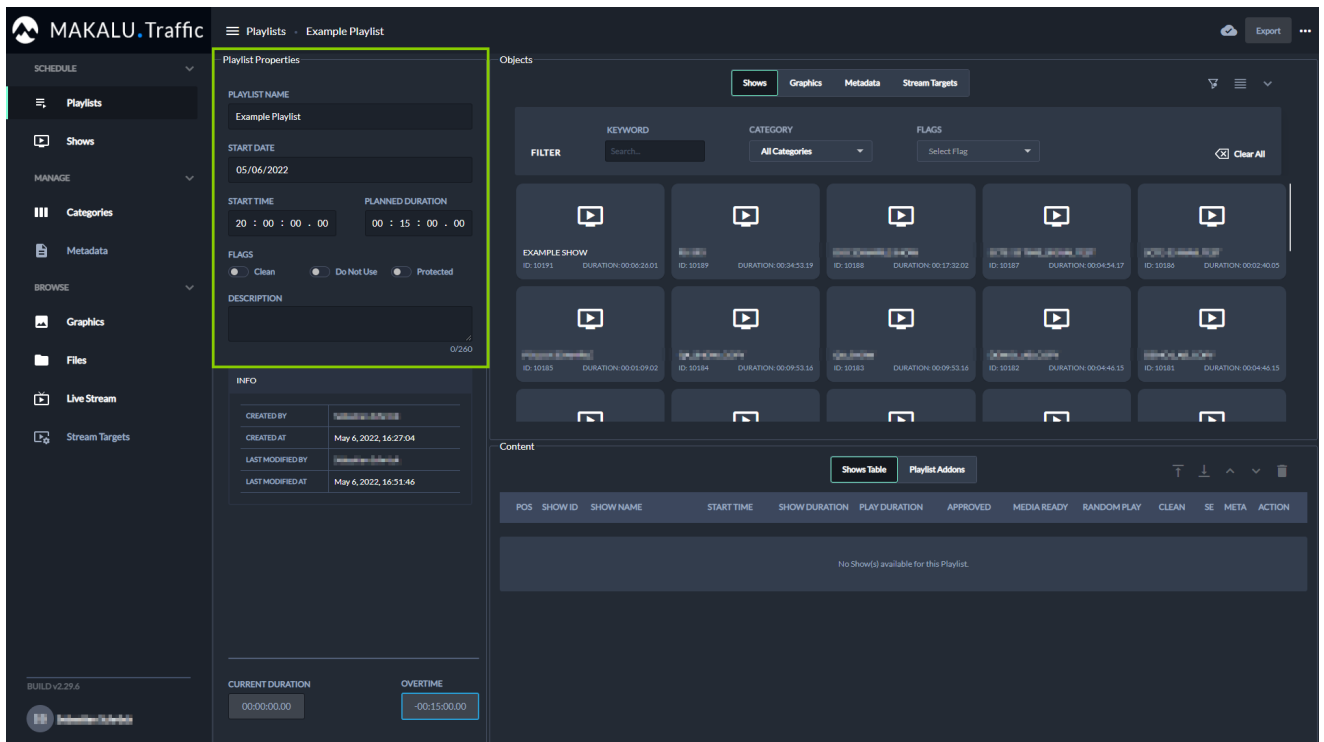


Figure: Makalu Traffic - Edit basic playlist properties

3. Add one or more shows to the playlist.

- a. On the right in the **Objects** area the **Shows** tab is selected, and all available shows are listed below. To filter the available shows, use the filters (Keyword, Category and/or Flags) above the list.

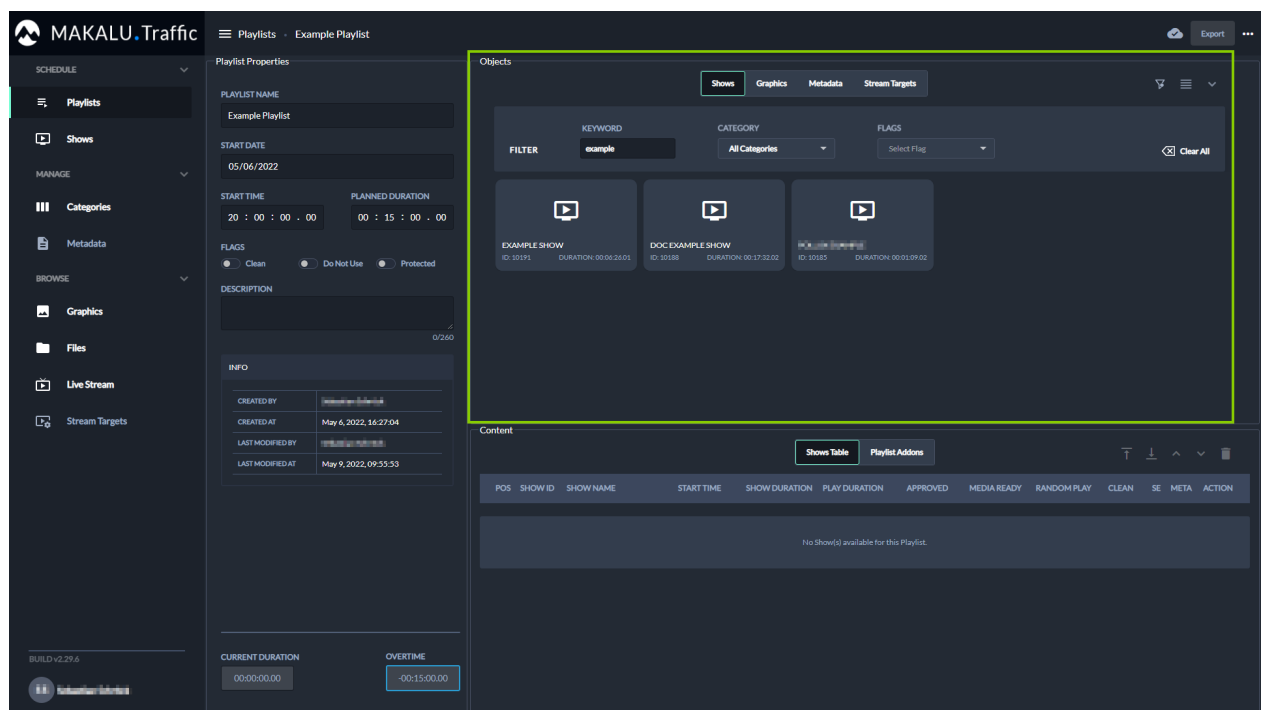




Figure: Makalu Traffic - Filtered shows

Tip

You can switch between a presentation as card or list view, by clicking the **Enable card view** icon  or **Enable list view** icon  in the top right.

b. Select one or more shows and drag them into the **Content** area on the **Shows Table** below.

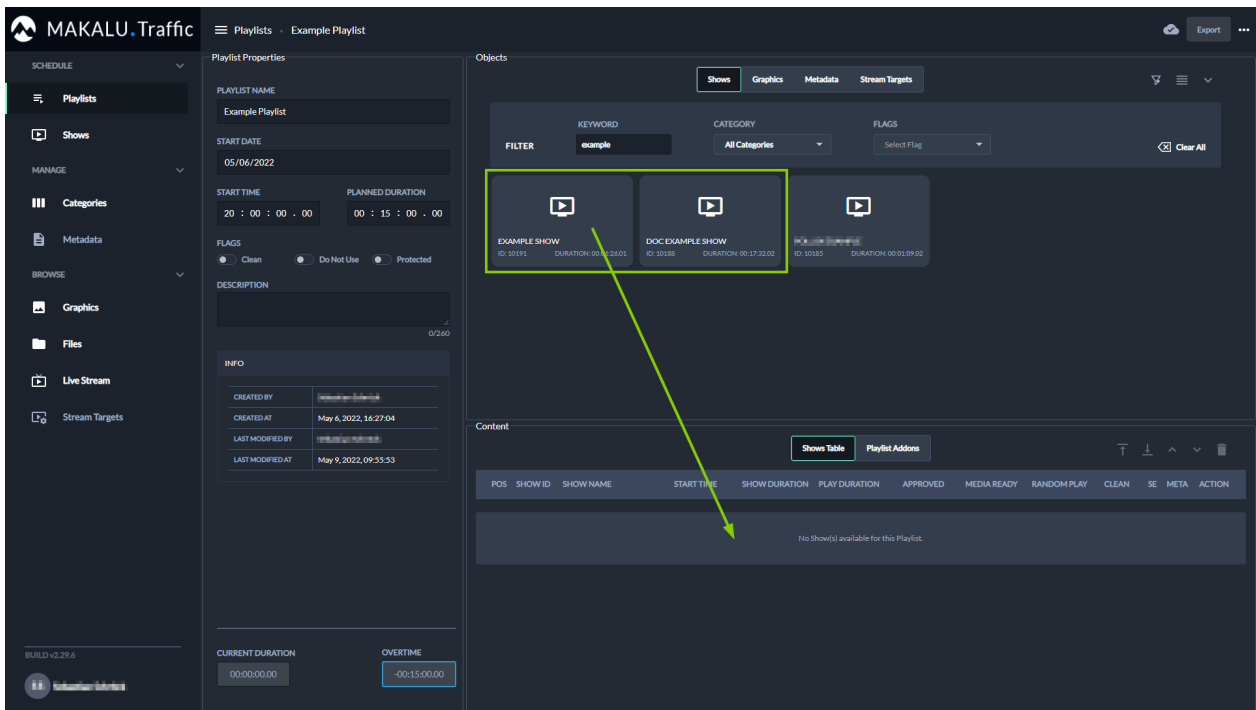


Figure: Makalu Traffic - Add shows to a playlist

The shows are added to the playlist.

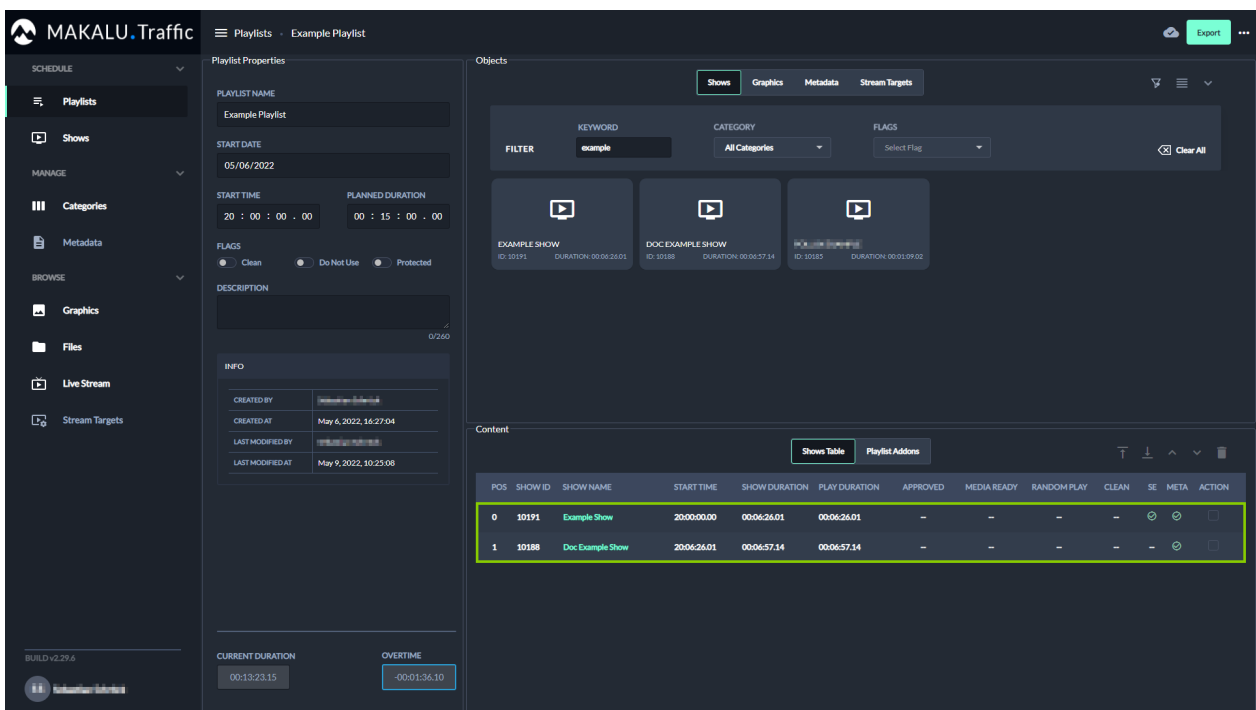


Figure: Makalu Traffic - Shows added to a playlist.

Notice


The fields **Current duration** and **Overtime** are updated accordingly.

- c. (Optional) Repeat steps a and b 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 duration of the previously added shows.


Tip

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

- 1 - Select one or more shows to be deleted, by activating the corresponding **Action** checkbox(es) in the playlist.
- 2 - Click the **Delete Show** icon .
- 3 - In the subsequently displayed dialog click **Confirm**.

Tip

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

- 1 - Select one or more shows, by activating the checkbox in the **Action** column.
- 2 - Use the arrow icons (**move up/down, move to top/bottom**)  above the show list to change the order.

Tip

To open and edit a show directly from the playlist, click the name of the show in the playlist.

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



- a. On the right in the **Objects** area select the type of secondary event you want to add (either **Graphics, Metadata** or **Stream Targets**).

Available secondary events of the selected type are displayed below.

POS	SHOW ID	SHOW NAME	START TIME	SHOW DURATION	PLAY DURATION	APPROVED	MEDIA READY	RANDOM PLAY	CLEAN	SE	META	ACTION
0	10191	Example Show	00:00:00.00	00:06:26.01	00:06:26.01	--	--	--	--	--	--	<input type="checkbox"/>
1	10188	Doc Example Show	00:06:27.01	00:06:57.14	00:06:57.14	--	--	--	--	--	--	<input type="checkbox"/>

Figure: Makalu Traffic - Secondary events

Tip

You can switch between a presentation as card or list view, by clicking the **Enable card view** icon  or **Enable list view** icon  in the top right.

- b. (Optional) To search for secondary events, use the available filters (e.g. Keyword and/or Channel).

Warning

Only add graphics to a playlist that are all assigned to the channel the playlist should later be exported to. Otherwise, you cannot [send the playlist to playout](#).

- c. To add a secondary event to the playlist, in the **Content** area select **Playlist Addons**, then select a secondary event and drag it on the Playlist Addons list.

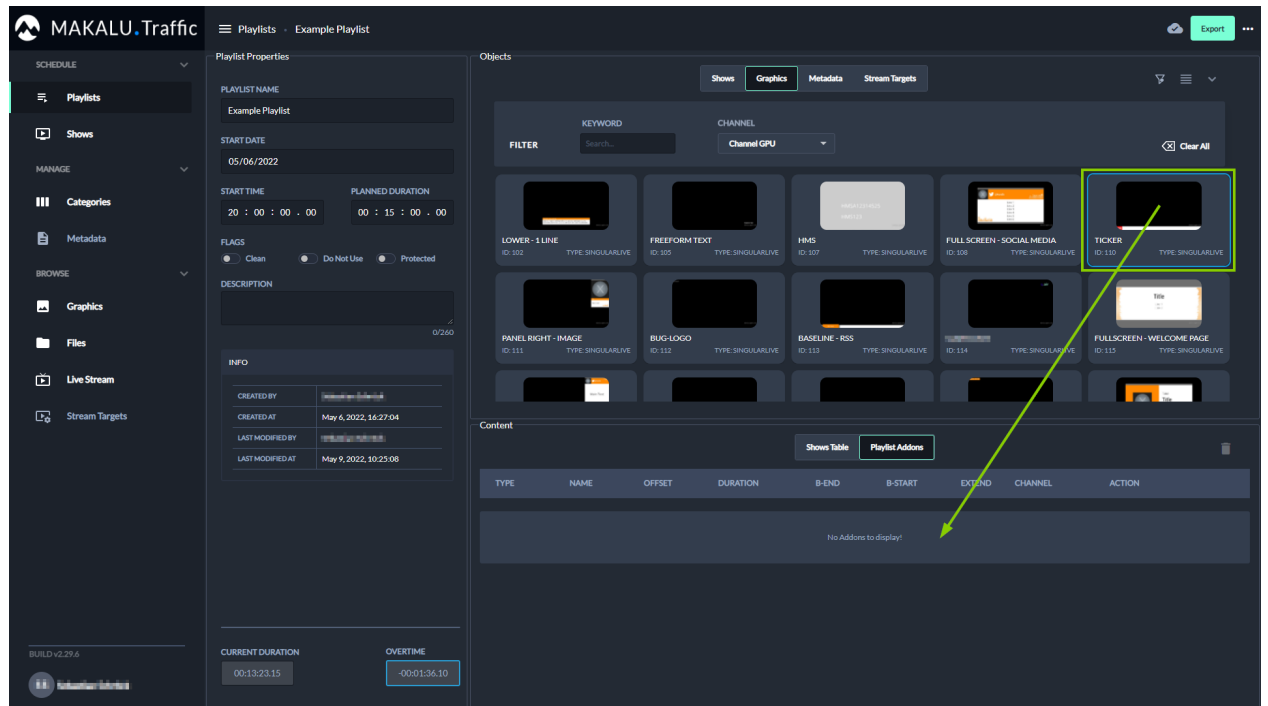


Figure: Makalu Traffic - Add a secondary event to a playlist

The secondary event is added to the Playlist Addons list.

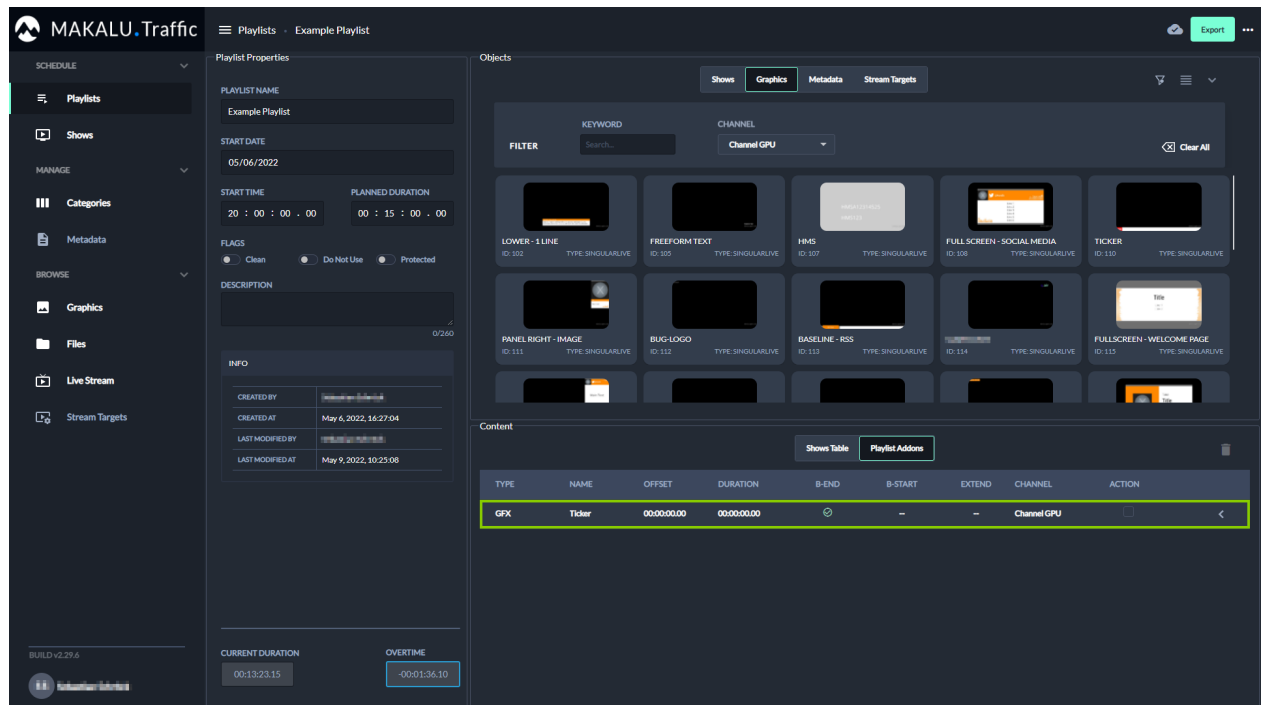





Figure: Makalu Traffic - Secondary event added to a playlist

- 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, expand it by clicking the **Expand** icon  on the right.


The addon properties are displayed in the Addon details area.

Tip

You can expand and collapse the **Objects** area via the **Expand**  and **Collapse**  icons in the top right. This is useful if you want to display an extensive list of addon properties. Collapsing the **Objects** area allows you to use most of the right side for displaying the details of an addon.

Tip

To delete an added secondary event, proceed as follows:

- 1 - Select one or more secondary events to be deleted, by activating the corresponding **Action** checkbox(es).
- 2 - Click the **Delete Addon** icon .
- 3 - In the subsequently displayed dialog, click **Confirm**.

The playlist is saved automatically.

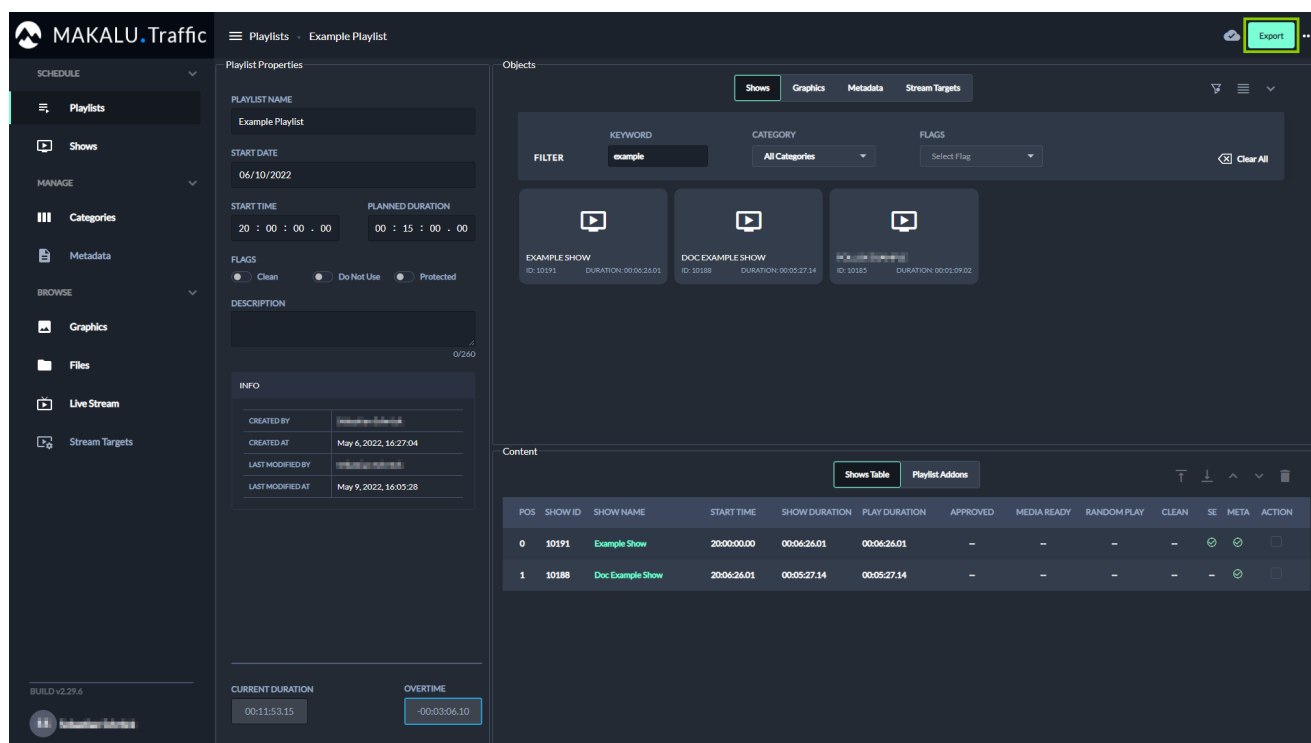
6.3.2 Sending a playlist to playout

To make a playlist available for a playout channel in the Makalu Automation, the **Export** function must be used.

To send a playlist to playout, proceed as follows:

1. In the left sidebar, select **Playlists** and click the name of the playlist that you want to send to playout.

The playlist details are opened.



The screenshot displays the Makalu Traffic interface for editing a playlist named 'Example Playlist'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation options: SCHEDULE, Playlists, Shows, MANAGE, Categories, Metadata, BROWSE, Graphics, Files, Live Stream, and Stream Targets.
- Playlist Properties:**
 - PLAYLIST NAME: Example Playlist
 - START DATE: 06/10/2022
 - START TIME: 20 : 00 : 00 . 00
 - PLANNED DURATION: 00 : 15 : 00 . 00
 - FLAGS: Clean (selected), Do Not Use, Protected
 - DESCRIPTION: 0/280
 - INFO table:

FIELD	VALUE
CREATED BY	Example User
CREATED AT	May 4, 2022, 16:27:04
LAST MODIFIED BY	Example User
LAST MODIFIED AT	May 9, 2022, 16:03:28
- Objects:**
 - Buttons: Shows, Graphics, Metadata, Stream Targets
 - Filters: KEYWORD (example), CATEGORY (All Categories), FLAGS (Select Flag)
 - Content area showing three show objects:

SHOW NAME	ID	DURATION
EXAMPLE SHOW	10191	00:06:26.01
DOC EXAMPLE SHOW	10188	00:05:27.14
EXAMPLE SHOW	10192	00:01:59.02
- Content:**
 - Buttons: Shows Table, Playlist Addons
 - Table with columns: POS, SHOW ID, SHOW NAME, START TIME, SHOW DURATION, PLAY DURATION, APPROVED, MEDIA READY, RANDOM PLAY, CLEAN, SE, META, ACTION.

POS	SHOW ID	SHOW NAME	START TIME	SHOW DURATION	PLAY DURATION	APPROVED	MEDIA READY	RANDOM PLAY	CLEAN	SE	META	ACTION
0	10191	Example Show	20:00:00.00	00:06:26.01	00:06:26.01	--	--	--	--	⊕	⊕	⊗
1	10188	Doc Example Show	20:06:26.01	00:05:27.14	00:05:27.14	--	--	--	--	⊕	⊕	⊗
- Bottom:**
 - BUILD: v2.29.6
 - CURRENT DURATION: 00:11:53.15
 - OVERTIME: -00:03:06.10

Figure: Makalu Traffic - Playlist details

2. In the top right click **Export**.

The Export dialog is displayed.

3. Select the playlist channel that you want to send the playlist to.

Warning

All graphics that you added to clips, shows and/or the playlist must be assigned to the selected channel. If you use graphics in the playlist, that are assigned to a channel other than the selected, you cannot send the playlist to playout. In this case a corresponding error message is displayed after the next step.

4. Click **Confirm**.

The playlist is made available for the selected channel in the Makalu Automation.

Notice

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.

6.3.3 Editing a playlist

To edit a playlist, proceed as follows:

1. Open **Makalu Traffic**.
2. In the left sidebar, select **Playlists** and click the name of the playlist to be edited.

The playlist details are opened.

The screenshot displays the Makalu Traffic interface for editing a playlist. The left sidebar shows navigation options: SCHEDULE, Playlists, Shows, MANAGE (Categories, Metadata), BROWSE (Graphics, Files, Live Stream, Stream Targets). The main area is divided into 'Playlist Properties' and 'Objects'.

Playlist Properties:

- PLAYLIST NAME: Example Playlist
- START DATE: 06/10/2022
- START TIME: 20 : 00 : 00 . 00
- PLANNED DURATION: 00 : 15 : 00 . 00
- FLAGS: Clean (selected), Do Not Use, Protected
- DESCRIPTION: 0/250
- INFO:

CREATED BY	Example User
CREATED AT	May 6, 2022, 16:27:04
LAST MODIFIED BY	Example User
LAST MODIFIED AT	May 9, 2022, 16:05:28
- CURRENT DURATION: 00:11:53.15
- OVERTIME: -00:03:06.10

Objects:

- Tabs: Shows, Graphics, Metadata, Stream Targets
- Filters: KEYWORD (example), CATEGORY (All Categories), FLAGS (Select Flag)
- Object Cards:
 - EXAMPLE SHOW (ID: 10191, DURATION: 00:06:26.01)
 - DOC EXAMPLE SHOW (ID: 10188, DURATION: 00:05:27.14)
 - EXAMPLE SHOW (ID: 10185, DURATION: 00:01:09.02)

Content:

- Tabs: Shows Table, Playlist Addons
- Table:

POS	SHOW ID	SHOW NAME	START TIME	SHOW DURATION	PLAY DURATION	APPROVED	MEDIA READY	RANDOM PLAY	CLEAN	SE	META	ACTION
0	10191	Example Show	2000:00:00	00:06:26.01	00:06:26.01	--	--	--	--	⊕	⊕	⊗
1	10188	Doc Example Show	2006:26.01	00:05:27.14	00:05:27.14	--	--	--	--	⊕	⊕	⊗

Figure: Makalu Traffic - Playlist details

3. Edit playlist and or secondary event properties as described in section [Creating a new playlist](#)

The playlist is saved automatically.

6.3.4 Deleting a playlist

To delete a single playlist, proceed as follows:

1. In the left sidebar, select **Playlists** and click the name of the playlist to be deleted.

The playlist details are opened.

2. In the top right click **More actions**  and select **Delete**.

A confirmation dialog is displayed.

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

The playlist is deleted.

To delete multiple playlists, proceed as follows:

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

All available playlists are listed on the right side.

2. In the list of available playlists activate the checkbox to the right of each playlist to be deleted.

3. Click the **Delete selected Playlists**  icon.

A confirmation dialog is displayed.

4. To delete the selected playlists, click **Confirm**.

The selected playlists are deleted.

6.3.5 Playlist properties

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

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, 30, 50 and 60 fps.

Property	Description
Playlist Name	Name of the playlist
Start Date	Planned on air date
Start Time	Planned airtime
Planned Duration	Planned duration

Property	Description
Flag - Clean	<p>If activated, graphics addons are not displayed when the playlist is played, even if graphics are assigned to the playlist or to included shows or clips.</p> <p>This also applies to cases where graphics addons of the previous playlist would normally extend beyond the regular end of the previous playlist. Depending on how the duration of the graphics addon is set, graphics of the previous playlist can stay displayed even after the next playlist starts. But if the clean flag is activated for the next playlist, graphics are not displayed.</p> <p>This is useful for e.g. a playlist, that only contains shows that consist exclusively of commercials.</p>
Flag - Protected	For future use
Flag - Do not use	For future use
Current Duration	Actual playlist duration, corresponds to the total combined duration of all assigned shows
Description	Text description for the playlist
Overtime	Time difference between planned duration and current duration

6.4 Secondary events

When a secondary event is added to a clip, show or playlist, it is considered as an “addon”. Each addon 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, 30, 50 and 60 fps.

6.4.1 Common properties

The following common and time-related properties are used by graphics and metadata secondary events:

Property	Description
Addon name	Name of the addon

Property	Description
Start offset	Offset until the addon is displayed (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 start of the clip, show or playlist
End offset	Offset until the addon is removed (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
Extend	If activated, the display duration of the addon can be extended beyond the regular end of the clip, show or playlist it is assigned to

6.4.2 Examples for using time-related properties

The following table provides examples for using time-related addon properties:

Example	Start offset	Duration / end offset	Bind end offset to end
Display a graphics addon for the entire duration of a clip, show or playlist	00:00:00:00	00:00:00:00	Deactivated
Display a graphics addon 5 seconds after the clip, show or playlist starts and remove it 10 seconds later	00:00:05:00	00:00:10:00	Deactivated
Display a graphics addon 20 seconds before the clip, show or playlist ends and remove it 15 seconds later	00:00:20:00	00:00:15:00	Activated

Example	Start offset	Duration / end offset	Bind end offset to end
<p>Display a graphics addon 2 seconds before the clip, show or playlist ends and remove it 4 seconds later</p> <p>In this case the addon would overlap two clips, shows or playlists. which is e.g. useful for displaying transition effects (wipe, fade, etc.).</p>	00:00:02:00	00:00:04:00	Activated

6.4.3 Graphics properties

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

Property	Description
Addon sub-type	Graphics sub type (e.g. Singular)
Use payload	<p>If activated, a custom payload text can be entered. If deactivated, the default payload configured in Singular.Live is used instead.</p> <p>Input fields for custom payload text are only available for graphics that include dynamic text.</p>
Graphics type-specific properties	Depending on the graphics type different properties are displayed (e.g. scale and position for images or input fields for the dynamic text payloads)

6.4.4 Splicing properties

i Notice

Splicing events are part of the Dynamic ad triggering (SCTE-35) feature that is available as optional Makalu addon. For more information see section [Ad triggering](#).

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

Property	Description
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)
Send duration	If activated, the splicing event duration is also included in the splicing event trigger
Splicing 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)
UPID	Splicing event UPID (allows a downstream system to decide how the original content should be replaced or blanked)
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
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
Archive allowed	If activated, the splicing event trigger includes information that signals a downstream system that archiving is allowed for the corresponding content
Device restrictions	Information about restrictions that apply to certain device groups
Use automatic	<p>If activated, the end splicing event trigger is sent automatically when the event duration is completed</p> <p>If deactivated, the end splicing event trigger must be sent manually by the operator</p>
Avail expected	<p>Total number of avails to be expected</p> <p>Range: 0-255 (use 0 to disable feature)</p> <p>Only available for splicing secondary events of type "SCTE-35 Avail"</p>

Property	Description
Avail num	<p>Current avail number</p> <p>Range: 0-255 (use 0 to disable feature, must not be greater than "Avail expected" number)</p> <p>Only available for splicing secondary events of type "SCTE-35 Avail"</p>
Auto return	<p>Defines if downstream systems should automatically switch back to the original program content at the end of an avail</p> <p>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)</p> <p>If deactivated, downstream systems get the information to not automatically switch back to the original program content. Instead they must wait until they receive the corresponding message, that is automatically sent by the splicer and triggers downstream systems to switch back to the original program content.</p> <p>Only available for splicing secondary events of type "SCTE-35 Avail"</p>

6.4.5 Stream target properties

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

Type	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 (e.g. YouTube, Facebook, LinkedIn, Twitch, RTMP, RTMPS)

Type	Property	Description
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

6.4.6 Recording properties

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

Property	Description
Source stream	Source stream to be recorded
Record channel	Encoder to be used for the recording
Job name	Name of the recording job
Dest path	Target folder for storing the recorded file
Profile	File format/profile to be used for the recording (only available if a broadcast encoder is used)

6.4.7 Metadata properties

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

Type	Property	Description
EPG	Short event descriptor	Short description of the content
EPG	Extended event descriptor	Detailed description of the content
EPG	Name	EPG name
EPG	FSK	Parental rating (based on German motion picture rating system organization FSK, e.g. 0, 6, 12, 16, 18)

Type	Property	Description
EPG	DVB content	Content category (e.g. news, magazine, comedy, etc.)
EPG	Char code	Character encoding of the EPG information (default: Western European - ISO/IEC 8859)
EPG	Language	Language of the EPG information (e.g. German or English)
Moderator	Name	Moderator name
Now Next Later	Now	Now text
Now Next Later	Next	Next text
Now Next Later	Later	Later text
Online EPG	Title	Online EPG title
Online EPG	Short synopsis	Short content summary
Online EPG	Detail synopsis	Detailed content summary

7. Automation

Makalu Automation is the user interface for manually controlling the Makalu playout automation. Depending on the number of playout channels, it includes one or more individually controllable players, running on playout instances.

Each player seamlessly plays the video content of a linear playout channel based on a rundown, that consists of playlists, shows, and clips. The playlists are created via the [Makalu Traffic](#) planning component.

7.1 Accessing Makalu Automation

To access **Makalu Automation**, proceed as follows:

1. Open the following URL in your browser:

```
https://automation.customer-identifier.makalu.live.
```

i Notice

Replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`.

2. Log in with your Makalu credentials.

The channel status overview is opened.

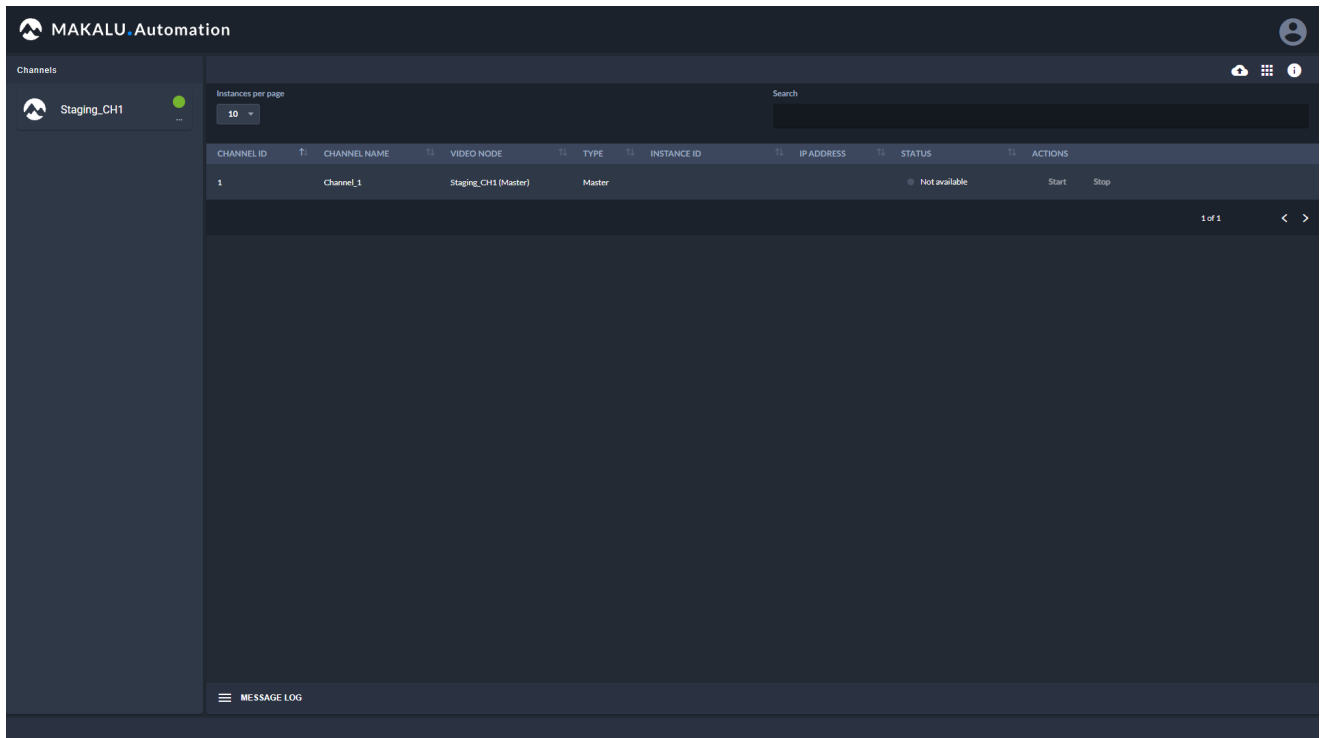


Figure: Makalu Automation - Channel status overview

3. In the **Channels** sidebar on the left select a channel.

Notice

You can only select channels that are online. Online channels are highlighted with a green circle icon. Offline channels are highlighted with a red circle icon.

The Makalu Automation user interface for the selected channel is opened.



Figure: Makalu Automation user interface

Tip

From the Makalu Automation user interface you can go back to the channel status overview, by clicking the white Makalu logo in the top left corner.

7.2 Starting and stopping a channel

Notice

Each playout instance can be started or stopped individually when deployed on AWS.

Warning

If you stop a channel, the corresponding playout instance is shut down and distribution targets configured for this channel will not receive any content.

Depending on the system configuration, in Makalu Automation each playout instance can individually be started or stopped. To do this, open the channel status overview like described in section [Accessing Makalu Automation](#) and proceed as follows:

To start a playout instance, in the status list click **Start** for the channel to be started.

To stop a playout instance, in the status list click **Stop** for the channel to be stopped.

7.3 Makalu Automation user interface overview

The main user interface consists of the following elements:

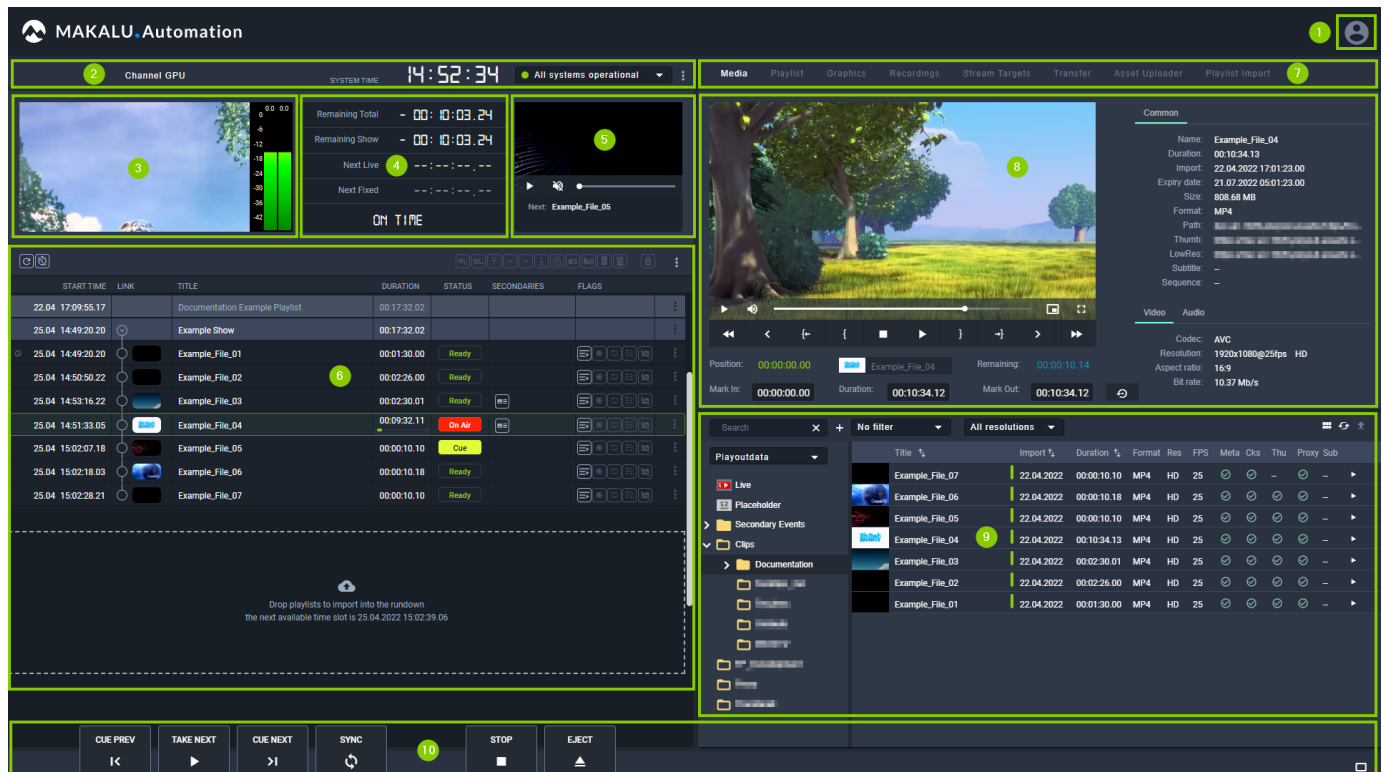


Figure: Makalu Automation - User interface

1. User account settings
2. Channel/system information
3. Channel preview including peak audio meter
4. Time-related rundown information
5. Next clip information and preview
6. Channel rundown
7. Navigation tabs for accessing the areas [media](#), [playlist](#), [graphics](#), [recordings](#), [stream targets](#), [transfer](#), [Asset Uploader](#) and [playlist import](#)
8. Media asset preview and information (content varies depending on the selected navigation tab)
9. Media asset list (content varies depending on the selected navigation tab)
10. Rundown and player controls

7.3.1 Channel/system information

This area includes the following information:

- Channel name
- System time
- System health status

The system time displays the local time based on the time zone that is configured for the channel.

The system health status indicator displays the current operating status of the most important internal system components (e.g. connection to backend components and player status).

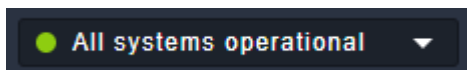


Figure: System status indicator

To display a list of individual components, click the system status indicator.

A green indicator means that the component runs normally, while a red indicator means that it has an error.

The menu button to the right of the system health status  provides access to the following channel actions:

Action	Purpose
Restart player	Restart the player <i>Warning: Restart the player only in case of an emergency (e.g. if a player error occurs). Restarting the player takes a short amount of time. During this time no output signal is generated.</i>
Show preview	Enable/disable the preview player
Restart preview	Restart the preview component <i>Notice: Manually restarting the preview is only necessary in case of an audio or video error.</i>
Delete graphics	Remove all currently displayed graphics secondary events <i>Notice: Manually deleting graphics is only necessary if graphics are not automatically removed as expected.</i>

7.3.2 Channel preview

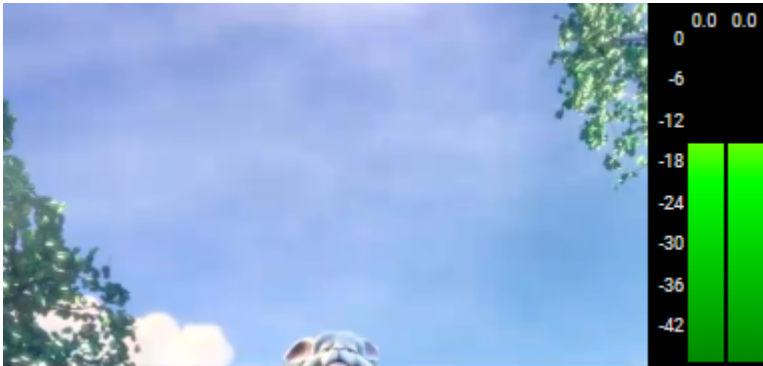


Figure: Makalu Automation - Channel preview

The channel preview displays a low-res version of the current player output in real-time.

It also includes a peak audio meter that indicates the current audio signal level of the channel preview.

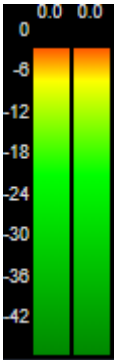


Figure: Makalu Automation - Peak audio meter

Tip

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

MAKALU.Automation

Channel GPU SYSTEM TIME 13:55:50 All systems operational

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
27.04 13:26:46.11		Documentation Example Playlist	00:17:32.02			
27.04 13:43:04.00	⌵	Example Show	00:17:32.02			
27.04 13:43:04.00	○	Example_File_01	00:01:30.00	Ready		
27.04 13:44:34.04	○	Example_File_02	00:02:26.00	Ready		
27.04 13:47:00.04	○	Example_File_03	00:02:30.01	Ready		
27.04 13:49:30.05	○	Example_File_04	00:04:26.13	On Air		
27.04 14:00:04.18	○	Example_File_05	00:00:10.10	Cue		
27.04 14:00:15.03	○	Example_File_06	00:00:10.18	Ready		
27.04 14:00:25.21	○	Example_File_07	00:00:10.10	Ready		

Drop playlists to import into the rundown
the next available time slot is 27.04.2022 14:00:36.06

CUE PREV TAKE NEXT CUE NEXT SYNC STOP EJECT

Figure: Makalu Automation - Rundown simple view

7.3.3 Time-related rundown information

Remaining Total	- 00:45:42.01
Remaining Show	- 00:27:09.15
Next Live	- 00:44:42.01
Next Fixed	- 00:27:09.24
ON TIME	

Figure: Makalu Automation - Time-related rundown information

This area provides the following information:

Element	Description
Remaining Total	<ul style="list-style-type: none"> • Remaining playback time of all playlists currently in the rundown, or • "LOOP" (the current clip is played in a loop until the operator manually triggers the start of the next clip)
Remaining Show	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Remaining time until the next live clip in the rundown, or • "LIVE" (if a live clip is currently played)
Next Fixed	Remaining time until the next element in the rundown with a fixed start time
Overtime / Undertime	<ul style="list-style-type: none"> • "ON TIME" or time difference regarding the scheduled time of elements in the rundown • Relevant e.g. if a live clip ran shorter or longer than originally planned

Tip

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

7.3.4 Next clip information and preview

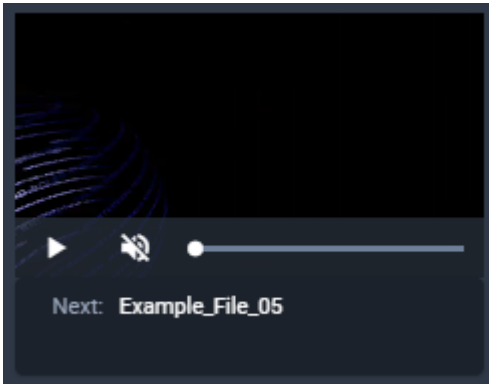


Figure: Makalu Automation - Next clip information and preview


This area provides a preview for the next cued clip. It can be used to preview file-based and live clips.

Tip

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

7.3.5 Channel rundown

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
22.04 17:09:55.17		Documentation Example Playlist	00:17:32.02			
25.04 14:49:20.20		Example Show	00:17:32.02			
25.04 14:49:20.20		Example_File_01	00:01:30.00	Ready		
25.04 14:50:50.22		Example_File_02	00:02:26.00	Ready		
25.04 14:53:16.22		Example_File_03	00:02:30.01	Ready		
25.04 14:51:33.05		Example_File_04	00:09:32.11	On Air		
25.04 15:02:07.18		Example_File_05	00:00:10.10	Cue		
25.04 15:02:18.03		Example_File_06	00:00:10.18	Ready		
25.04 15:02:28.21		Example_File_07	00:00:10.10	Ready		


















Drop playlists to import into the rundown
the next available time slot is 25.04.2022 15:02:39.06

Figure: Makalu Automation - Channel rundown



This area contains the rundown of the current channel. The rundown list contains all playlists, shows, and clips that are scheduled for playback. In this list each playlist and show can be expanded and collapsed. If a clip has assigned secondary events (e.g. graphics), it can also be expanded and closed, and the corresponding secondary events are listed.






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


Icon/Element	Description
	Reload rundown
	Automatically expand rundown and jump to current on air clip every 15 seconds (click to deactivate)
	Group selected clips
	Ungroup selected clips
	Move selected clip to the top (set it as first clip of the show)
	Move selected clip one position up
	Move selected clip one position down
	Move selected clip to the bottom (set it as last clip of the show)
	Remove fixed scheduled start time from selected element
	Add default graphic to selected playlist, show or clip
	Delete default graphic from selected playlist, show or clip
	Add splicing event to selected clip
	Delete splicing event from selected clip
	Delete selected playlist or clip

Icon/Element	Description
	<p>Access additional actions</p> <p>Depending on the selected element available actions are:</p> <ul style="list-style-type: none"> • Icon in the toolbar above the rundown list - Display/ hide playlists • Playlist - Delete selected playlist • Show - Delete selected show • Clip <ul style="list-style-type: none"> • Browse for clip - Open the selected clip in the preview in the media tab and reveal it in the storage folder structure • Delete selected clip

The actual rundown list includes the following information:

Column	Description
Clock icon	<p>Configure a fixed start time of a show/first clip of a show</p> <p>Depending on whether a fixed time is set or not, the clock icon is displayed as follows:</p> <ul style="list-style-type: none"> •  Small gray clock icon - show/first clip of a show does not have a fixed start time •  Large white clock icon - show/first clip of a show has a fixed start time <p><i>Tip: To set a fixed start time click the clock icon.</i></p>
Start Time	Scheduled/actual start date and time of a playlist, show or clip

Column	Description
Link	<p>Distinguish playlists, shows and clips, expand/collapse shows, display clip thumbnail</p> <p>The different types of elements are marked as follows:</p> <ul style="list-style-type: none"> • Playlist - No icon •  /  Circle with arrow icon - Show collapsed / expanded •  Circle icon - Clip <p><i>Tip: To expand/collapse a show, click the circle with arrow icon of the corresponding show.</i></p>
Title	<p>Name of the playlist, show or clip, indicator for grouped clips</p> <p><i>Notice: Grouped clips are highlighted with an orange indicator  (if multiple groups are used, each group is highlighted in a distinct color)</i></p>
Duration	<p>Total playlist, show, clip duration and remaining time of show/clip currently playing</p>
Status	<p>Clip status, possible values:</p> <ul style="list-style-type: none"> • 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 instance storage) • Error (file cannot be played)
Secondaries	<p>Indicates if there are secondary events assigned to the show or clip</p> <p><i>Tip: To expand/collapse the list of assigned secondary events, click the secondaries icon  of the corresponding clip or show.</i></p> <p><i>Notice: If a clip has an assigned splicing event it is marked with an "S" icon .</i></p>
Flags	<p>Clip flags that define how each clip should be played</p>

Column	Description
	<p>Access additional actions</p> <p>Depending on the selected element available actions are:</p> <ul style="list-style-type: none"> • Playlist - Delete selected playlist • Show - Delete selected show • Clip <ul style="list-style-type: none"> • Browse for clip - Open the selected clip in the preview in the media tab and reveal it in the storage folder structure • Delete selected clip

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)
Type	Type of the secondary event (e.g. 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

7.3.6 Rundown and player controls

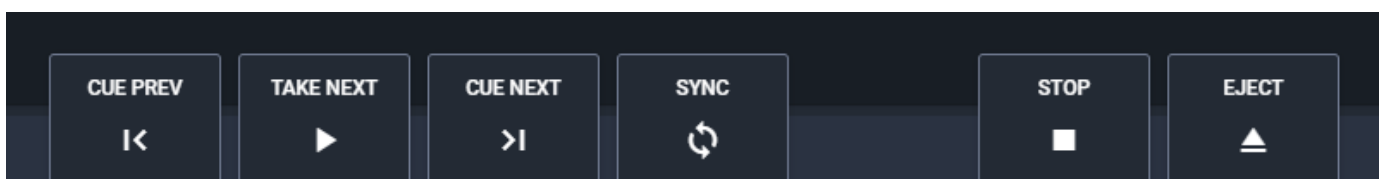




Figure: Makalu Automation - Rundown and player controls

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

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

i Notice

The control buttons on the left side are always displayed by default. The buttons on the right side can be manually displayed or hidden. 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 **Hide controls icon**  at the bottom right of the screen.

7.3.7 Media

The screenshot displays the 'Media' tab in the Makalu Automation interface. It is divided into three main sections:



- Preview Player (1):** A video player showing a landscape scene with trees and a field. It includes standard playback controls (play, stop, previous, next, full screen) and a progress bar. Below the player, it shows 'Position: 00:00:00.00', 'Example_File_04', and 'Remaining: 00:10:34.13'.
- Metadata (2):** A panel on the right showing details for 'Example_File_04':
 - Common:** Name: Example_File_04, Duration: 00:10:34.13, Import: 22.04.2022 17:01:23.00, Expiry date: 21.07.2022 05:01:23.00, Size: 808.68 MB, Format: MP4.
 - Video:** Codec: AVC, Resolution: 1920x1080@25fps HD, Aspect ratio: 16:9, Bit rate: 10.37 Mb/s.
- Asset List (3):** A table below the metadata showing a list of media assets. The table has columns for Title, Import, Duration, Format, Res, FPS, Meta, Cks, Thu, Proxy, and Sub. The list includes files from Example_File_01 to Example_File_07.

Figure: Makalu Automation - Asset list and preview

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

1. Media asset preview
2. Media asset metadata
3. Media asset list

The preview player provides the following controls:

Icon	Description
	Fast rewind
	Previous frame
	Jump to mark in
	Set mark in
	Stop
	Play
	Set mark out
	Jump to mark out
	Next frame
	Fast forward

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

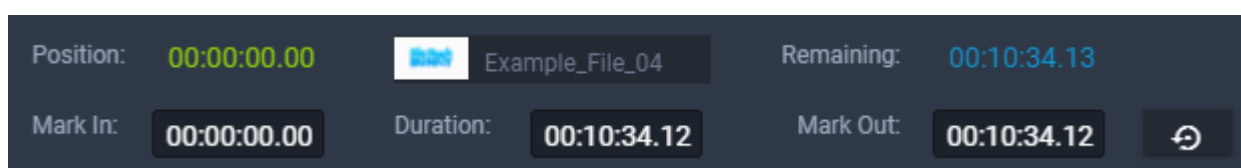


Figure: Makalu Automation - Preview (time-related information)

- Position - Current playback timecode
- Thumbnail with file name - Draggable element for adding the file (as clip) to a show in the rundown, including the mark in and mark out timecodes
- Remaining - Remaining duration
- Mark In - Mark in timecode
- Duration - Total duration
- Mark Out - Mark out timecode
- Reset - Reset mark in and mark out

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

Common

- Name: **Example_File_04**
- Duration: **00:10:34.13**
- Import: **22.04.2022 17:01:23.00**
- Expiry date: **21.07.2022 05:01:23.00**
- Size: **808.68 MB**
- Format: **MP4**
- Path: [REDACTED]
- Thumb: [REDACTED]
- LowRes: [REDACTED]
- Subtitle: **-**
- Sequence: **-**

Video **Audio**

- Codec: **AVC**
- Resolution: **1920x1080@25fps HD**
- Aspect ratio: **16:9**
- Bit rate: **10.37 Mb/s**

Figure: Makalu Automation - File metadata

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, this section either lists all files available on the ingest storage or on the playout instances that are assigned to the currently selected channel.

Search [X] + No filter [v] All resolutions [v]

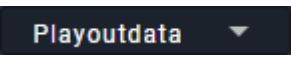

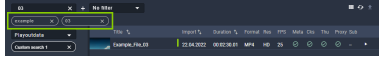
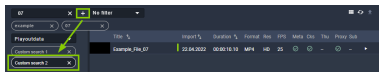
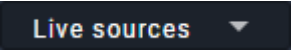
Playoutdata [v]








- Live
- Placeholder
- Secondary Events
- Clips
- Documentation
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]
 - [REDACTED]

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
Example_File_07	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	-	✓	-
Example_File_06	22.04.2022	00:00:10.18	MP4	HD	25	✓	✓	✓	✓	-
Example_File_05	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	✓	✓	-
Example_File_04	22.04.2022	00:10:34.13	MP4	HD	25	✓	✓	✓	✓	-
Example_File_03	22.04.2022	00:02:30.01	MP4	HD	25	✓	✓	✓	✓	-
Example_File_02	22.04.2022	00:02:26.00	MP4	HD	25	✓	✓	✓	✓	-
Example_File_01	22.04.2022	00:01:30.00	MP4	HD	25	✓	✓	✓	✓	-

Figure: Makalu Automation - Media asset list

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

Icon/Element	Name	Description
	Select source	<p>The source of the media assets to be displayed in the media asset list</p> <p>Available options are:</p> <ul style="list-style-type: none"> • ingest storage (e.g. "Playoutdata") • playout instance storage (e.g. "Player_Main")
	Title filter	<p>Search media assets based on their title</p> <p><i>Tip: You can chain multiple search terms. Each time you press [Enter] the current term is added to the current custom search. All currently used terms are listed below the search field:</i></p>  <p><i>You can also create multiple reusable custom searches by clicking the plus icon to the right of the search field:</i></p> 
	Live source filter	<p>Filter the available live sources based on their type (only available if asset type Live is selected)</p> <p>Available options are:</p> <ul style="list-style-type: none"> • All • Backchannel • Live sources

Icon/Element	Name	Description
	Time filter	Filter the displayed media assets based on the date they were imported into the system Available options are: <ul style="list-style-type: none"> • No filter • Today • Yesterday • Last week • Last month
	Resolution filter	Filter the displayed media assets based on their resolution Available options are: <ul style="list-style-type: none"> • All resolutions • SD • HD • UHD
	View switch	Switch between table view (default) and grid view
	Reload assets	Refresh the media asset list
	Upload assets	Trigger a file transfer from the ingest storage to a playout instance storage (only available if the ingest storage is selected as source), see section File transfer for more information
	Upload assets again	Re-trigger a file transfer from the ingest storage to a playout instance storage (only available if the playout storage is selected as source), see section File transfer for more information
	Delete assets	Delete selected assets (only available if a playout instance storage is selected as source)

7.3.8 Playlist

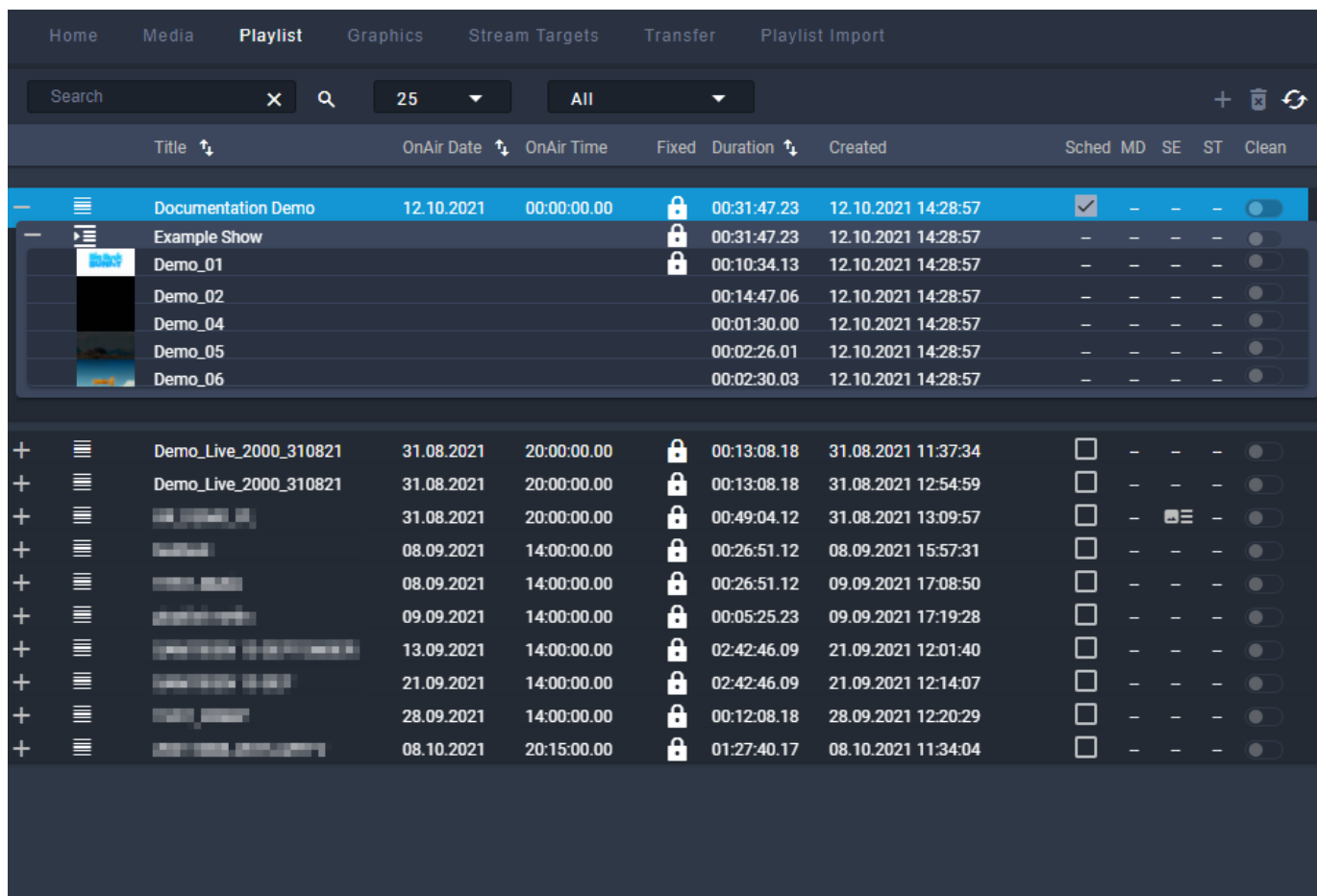






Figure: Makalu Automation - Playlist

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 section [Schedule](#) for information about how to create playlists.

The toolbar at the top contains the following elements:

Element/Icon	Description
	Search a playlist by title
	Number of playlists to display

Element/Icon	Description
	<p>Filter the displayed playlists based on their scheduled on air time</p> <p>Available options:</p> <ul style="list-style-type: none"> • Today • Next 7 days • Next 14 days • Next 30 days • Past (default) • All
	<p>Add the selected playlist to the rundown</p> <p>The position/time where the playlist is added to the rundown depends on the following:</p> <ul style="list-style-type: none"> • if the playlist does not have a fixed start time, it is appended to the rundown as last element (directly after the previously 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 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)
	<p>Delete the selected playlist</p>
	<p>Reload the list of available playlists</p>

7.3.9 Graphics

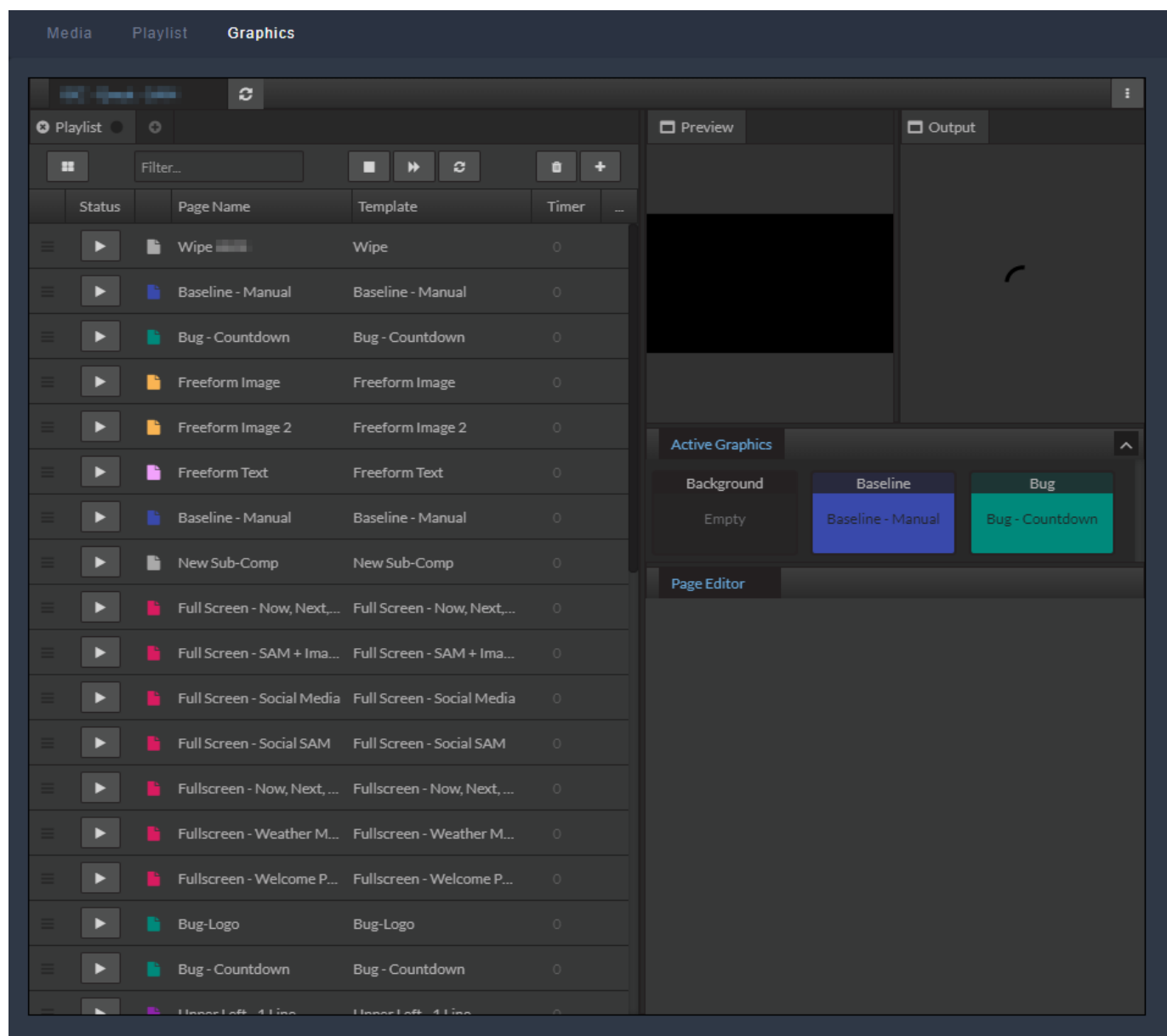


Figure: Makalu Automation - Singular.Live graphics dashboard

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.

7.3.10 Recordings

The screenshot displays the Makalu Automation Recordings interface. It features a top navigation bar with tabs for Media, Playlist, Graphics, Recordings, Stream Targets, and Transfer. The main area is divided into four numbered sections:

- Encoder 3 (Preview):** Shows a live video feed of a poker table. Below the feed are recording controls (stop, record, play, etc.) and a timer showing 00:00:56.10. A 'Next' section displays recording details: Source: Channel_1_Master.stream, Input: H.264, Profile: As Source, Status: Running, Name: Example Recording 4.
- Encoder list:** A vertical list of encoders: Encoder 1, Encoder 2 (Broadcast), Encoder 3 (selected), and Encoder 4.
- Encoder 3 (Preferences):** A configuration panel for Encoder 3. It includes fields for Title, Filename, Folder (Clips), Source (Channel_1_Master.st...), Profile (As Source), Type (Single Shot), Split, Automatic Split (off), Loop, and Retention Period (1 h). There is also a Schedule section with Start and End times (08:00:00 PM to 08:15:00 PM on 07/28/2021) and an 'Add' button.
- Recordings Table:** A table listing recording jobs. The columns are Channel, Source, Type, Status, Profile, and Action. The table shows one 'Running' job (Encoder 3, Channel_1_..., Crash, Running, As Source) and several 'Completed' jobs (Example Recording..., /Clips, Example Recording..., Completed).




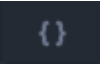


Figure: Makalu Automation - Recordings

In the **Recordings** tab you can record available ([live sources](#)) by using available encoders. For more information about how to create recordings, see section [Recording](#).

The tab contains the following areas:

1. Preview - Preview and controls of the currently selected encoder
2. Encoder list - List of available encoders
3. Preferences - Preferences for creating a new recording job for the currently selected encoder
4. Recordings - List of existing recording jobs

The **Preview** area provides the following controls and information:

Element	Description
	Prepare a recording
	Start a recording
	Stop a recording
	Split a recording
	Cancel a recording
	Delete a recording job
Current	Current recording duration of the selected recording job
Total	Total recording time of the selected recording job
Next	Time until the next scheduled recording job starts on the selected encoder
Source	Source of the selected recording job
Input	Input format of the selected source
Profile	Profile of the selected recording job
Status	Status of the selected encoder or recording job
Name	Title of the selected recording job

In the **Encoder list** area all available encoders are listed. Depending on their current status, encoders are highlighted in one of the following colors:

- Gray - Encoder is offline or has no active recording jobs
- Green - A recording job is currently prepared
- Red - A recording job is currently running

The **Preferences** area provides the following input options:

Name	Description
Title	Title of the recording job
Filename	Name of the file to be recorded <i>Notice: If no file name is provided, the title is used as file name.</i>

Name	Description
Folder	Destination folder where to store the recorded file
Source	Source stream to be recorded
Save As Default	Set the currently selected source as default for the currently selected encoder
Profile	Format/recording profile of the file to be recorded
Type	<p>Recording job type, available options:</p> <ul style="list-style-type: none"> • Single shot - to be used for single file recording jobs (after stopping the recording job it cannot be used again) • Multi shot - to be used for multi-file recording jobs (the recording can be stopped; the recording job can be used again to record another file and each time another recording is started, a consecutive number is appended to the file name)
Split	If enabled, a recorded file can be split either manually via the corresponding control or automatically based on the "Automatic Split" time setting
Automatic Split	<p>Time interval for automatically splitting a recorded file</p> <p><i>Notice: This option is only available if "Split" is enabled.</i></p>
Loop	Enable to enable the retention period field
Retention period	Select a duration (in hours) when a recorded file is automatically deleted
Apply	Create a recording job with the current settings
Schedule	Activate the checkbox to create a scheduled recording job
Start	Start time of the scheduled recording job
End	End time of the scheduled recording job
Now	Set start time to current time and end time to current time plus one hour
Add	Create a scheduled recording job with the current settings
Duration	<p>Duration of the scheduled recording job</p> <p><i>Notice: The duration is only available if "Schedule" and the toggle switch next to "End" are enabled.</i></p>

Name	Description
Open end	Activate the checkbox to create a scheduled recording job without specifying an end time <i>Notice: In this case the recording job must be stopped manually.</i>

The **Recordings** list contains all current recording jobs and the following information:

Column	Description
Channel	Recording channel/encoder used for the recording
Source	Recorded source
Type	Type of the recording job, available options: <ul style="list-style-type: none"> • Crash (manual start and stop) • Schedule (scheduled start and stop)
Status	Status of the recording job, available states: <ul style="list-style-type: none"> • Idle - the recording job is not active • Created - the recording job is created • Completed - the recording job is completed • Error - an error has occurred • Prepared - the job is ready for recording • Preparing - the recording job is in preparation • Queued - the recording job is queued • Running - the recording job is running • Started - the recording job has started • Starting - the recording job is starting • Stopped - the recording job is stopped • Stopping - the recording job is stopping • Canceled - the recording job is canceled
Profile	Format/recording profile of the recorded file

Column	Description
Action	<p>The action column provides the following controls:</p> <ul style="list-style-type: none"> • Prepare recording • Start recording • Stop recording • Split recording • Cancel recording • Delete recording job



7.3.11 Stream targets

Figure: Makalu Automation - Stream targets

The **Stream Targets** tab lists existing streaming jobs/events. It also allows you to create new streaming jobs/events and to trigger them manually.

The list of **Predefined Targets** contains all available stream targets and the following information:

Column/element	Description
Target Name	Icon representing the target platform/type and name of the stream target

Column/element	Description
Account	Internal name of the corresponding target platform-specific account to be used by the stream target (if applicable)
Source	Name of the source stream
	Set the selected source as default for the stream target
Platform	Target platform
Description	Short description of the stream target
	Create a new streaming job for the corresponding stream target

The **Joblist** contains all scheduled streaming jobs/events of the current channel and the following information:

Column	Description
Platform	Icon representing the target platform/type of the job
Event	Event title or category
Target Name	Name of the stream target
Account	Internal name of the corresponding target platform-specific account to be used by the stream target (if applicable)
Source	Name of the source stream
Scheduled	Scheduled start time
Status	Streaming event status, available states: <ul style="list-style-type: none"> • Unknown - the status of the event is unknown • Error - an error occurred • Queued - the event is queued • Preparing - the event is in preparation for the stream • Prepared - the event is ready for streaming • Starting - the event is starting • Started - the event is started • Running - the event is running • Completed - the event is completed • Stopping - the event is stopping • Stopped - the event is stopped

Column	Description
Edit	Edit metadata of the stream job
Link	<ul style="list-style-type: none"> • Open stream event in a new tab • Copy stream event link to clipboard
Action	<p>Actions for manually controlling the streaming job, available actions:</p> <ul style="list-style-type: none"> • Queue - queue the streaming event • Prepare - prepare the streaming event • Go Live - start the streaming event • Stop - stop the streaming event • Delete - delete the streaming event

Notice

You can only trigger actions that are highlighted with a white or green icon. Actions with a gray icon are not available.

For more information about streaming, see the [Social media streaming](#) section.

7.3.12 Transfer

In the **Transfer** tab all file transfers from ingest storage to playout instances are listed, that are currently running or were recently finished.

The screenshot displays the 'Transfer' tab in the Makalu Automation interface. At the top, navigation tabs include Media, Playlist, Graphics, Recordings, Stream Targets, **Transfer**, Asset Uploader, and Playlist Import. Below these, the selected instance is 'Player_Master (4)'. The main area contains a table of file transfers with the following data:

File Name	Target Folder	Uploaded	Status	Action
Example_File_04	Clips/Documentation	02.05.2022 10:02:21	Pending (0%)	Pause, Cancel, Retry
Example_File_01	Clips/Documentation	02.05.2022 10:02:24	Processing (67%)	Pause, Cancel, Retry
Example_File_05	Clips/Documentation	02.05.2022 10:02:24	Completed (100%)	Pause, Cancel, Retry
Example_File_06	Clips/Documentation	02.05.2022 10:02:24	Completed (100%)	Pause, Cancel, Retry
Example_File_07	Clips/Documentation	02.05.2022 10:02:24	Completed (100%)	Pause, Cancel, Retry
Example_File_03	Clips/Documentation	02.05.2022 10:02:26	Processing (42%)	Pause, Cancel, Retry
Example_File_02	Clips/Documentation	02.05.2022 10:02:21	Pending (0%)	Pause, Cancel, Retry

Below the table, a 'Disk space' section shows a progress bar at 7% usage and 68.34 GB | 953.87 GB available. A search and filter section includes a search box, a filter dropdown set to 'No filter', and a resolution dropdown set to 'All resolutions'. A file browser on the left shows 'Clips' and 'Documentation' folders. Below the browser is a detailed list of files with columns: Title, Transfer, Duration, Format, Res, FPS, and Aging date.

Title	Transfer	Duration	Format	Res	FPS	Aging date
Example_File_07	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_06	02.05.2022	00:00:10.18	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_05	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_03	02.05.2022	00:02:30.01	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_01	02.05.2022	00:01:30.00	MP4	HD	25	03.05.2022 10:02:24.00

Figure: Makalu Automation - File transfer list

The number in brackets beside the playout instance name indicates how many file transfers 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
	Pause file transfer
	Cancel file transfer
	Retry/re-trigger file transfer

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

At the bottom of the **Transfer** tab the media asset list is displayed. This is the same list and provides the same functionality as in the **Media** tab. The only difference is that its source is set by default to the storage of the first playout instance instead of the ingest storage. The source can be changed via the corresponding dropdown menu.

For information about how to trigger a file transfer, see section [File transfer](#).

7.3.13 Asset Uploader

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

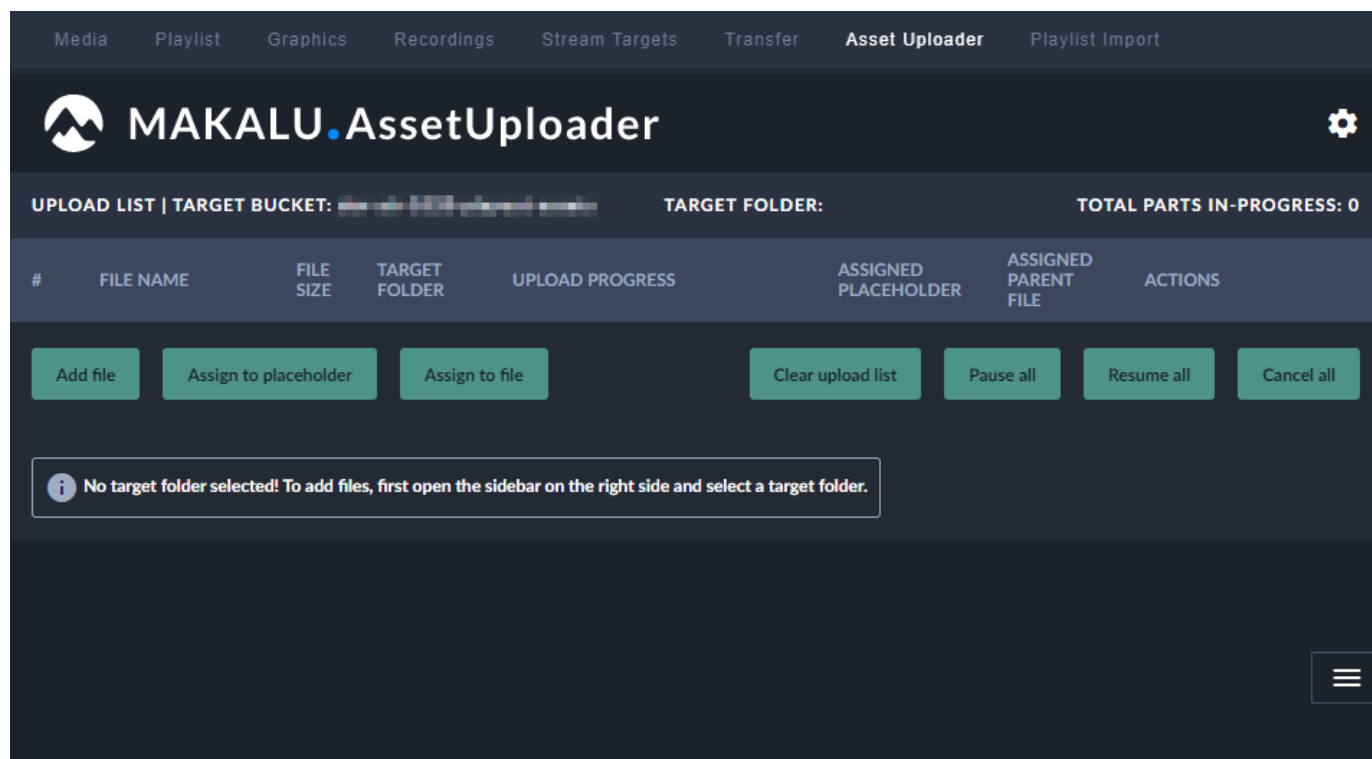


Figure: Makalu Automation - Asset Uploader

For information about how to use the Asset Uploader see section [Ingest](#).

7.3.14 Playlist Import

The **Playlist Import** tab enables you to import playlists from third-party traffic systems.

Figure: Makalu 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 <i>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. Missing file lists can also be exported. For more information see section Exporting a missing file list.</i>
Revision	Playlist revision number (each time a playlist with the same name/title is imported, the revision number is increased)
Channel	Target channel

Column	Description
Process	Progress/status of the playlist processing/import
Import	Start the playlist import

For more information see section [Importing a playlist](#).

7.4 Previewing file-based and live media

To preview media, proceed as follows:

1. On the right side, select the **Media** tab.
2. In the media list select the media type (live or clips) and the corresponding source folder that contains the media item to be previewed.
3. (Optional) To filter the displayed media items, either use the **Search** field (to filter by file name) or the dropdown menus (to filter by modification date or by resolution).

The media list is filtered based on your filter settings.

4. To preview a media item, click the **Play** icon at the right side of the corresponding list item or drag the item on the preview player.

The media item is loaded by the preview player.

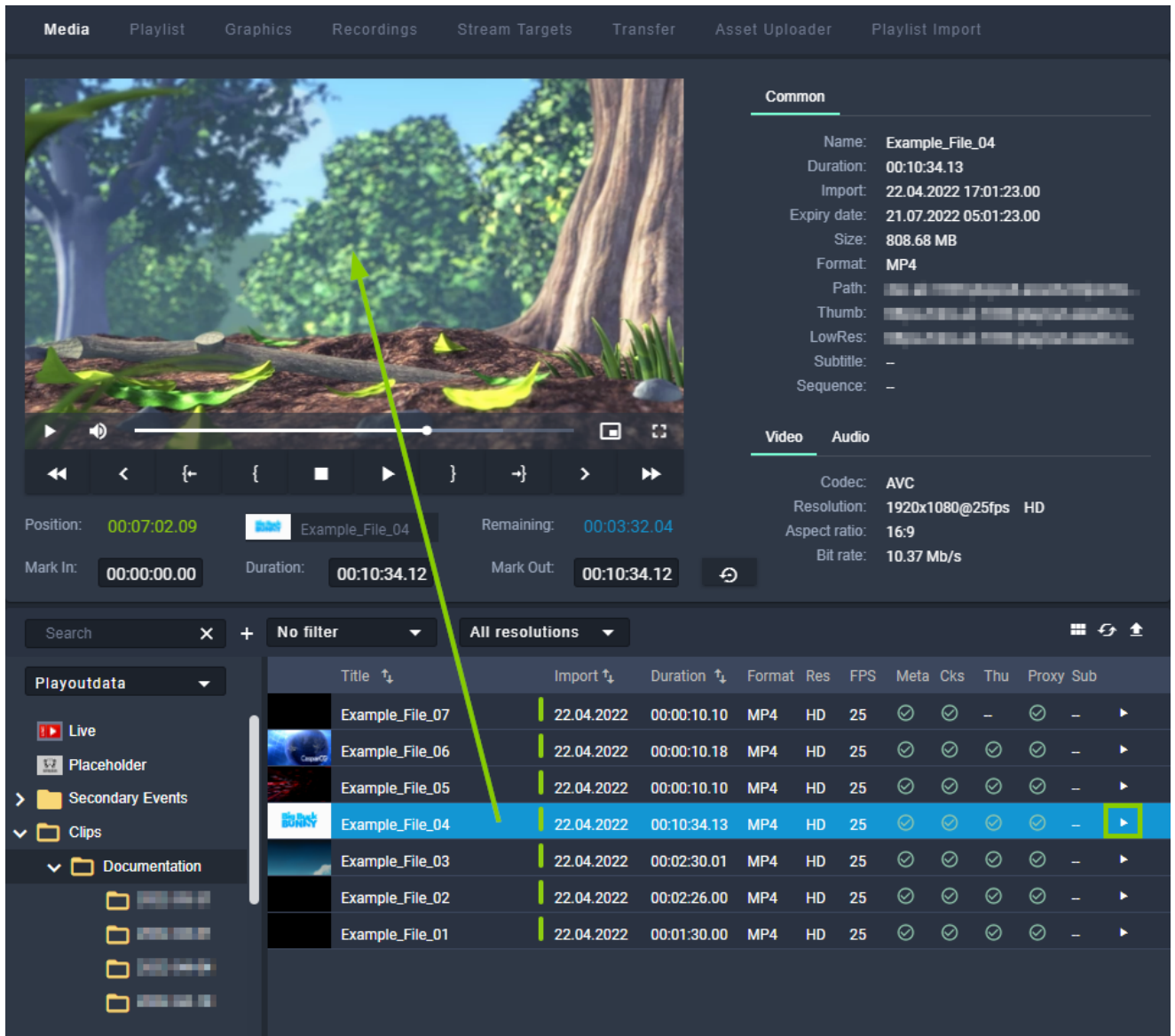


Figure: Makalu Automation - File preview

5. Use the preview player controls to play the media item.

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 **Common** metadata section

7.5 Adding elements to a rundown

7.5.1 Adding a playlist to a rundown

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

1. On the right side, select the **Playlist** tab.
All available playlists for the current channel are listed.

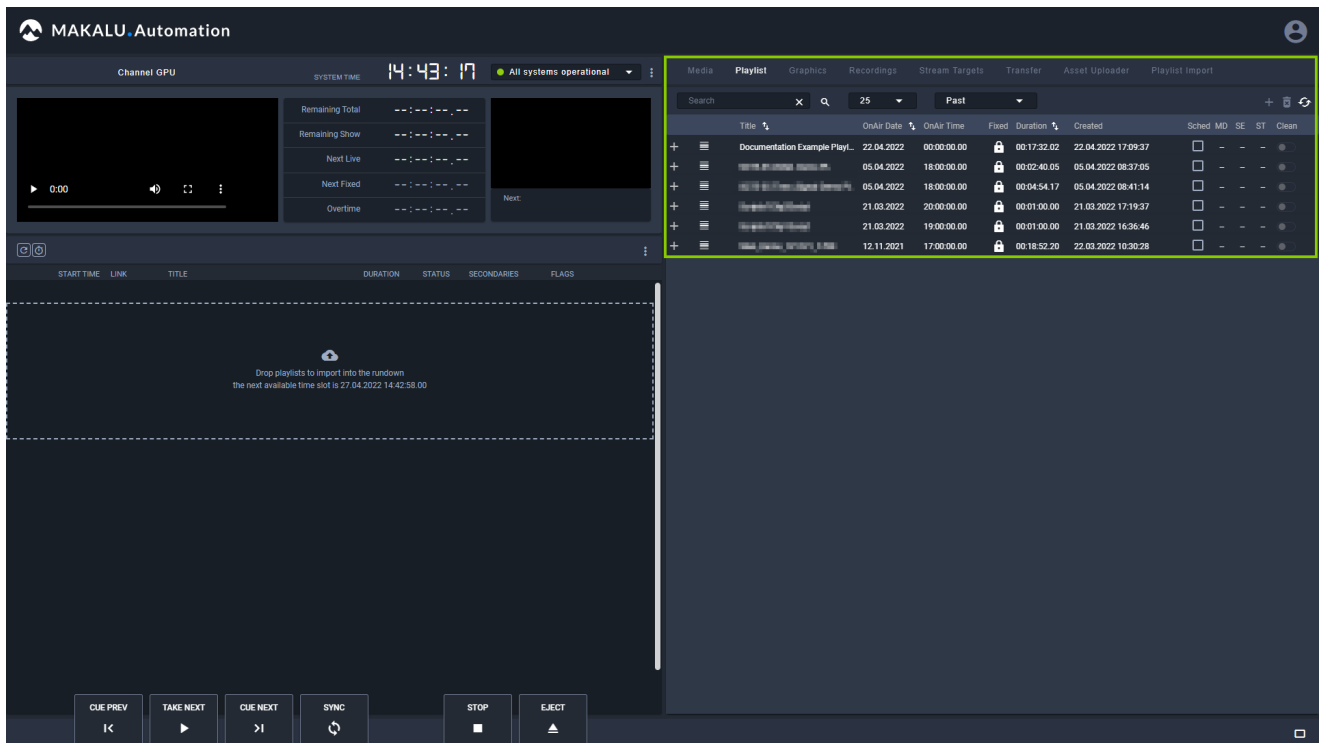


Figure: Makalu Automation - Available playlists

2. To add a playlist to a 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 in the rundown.

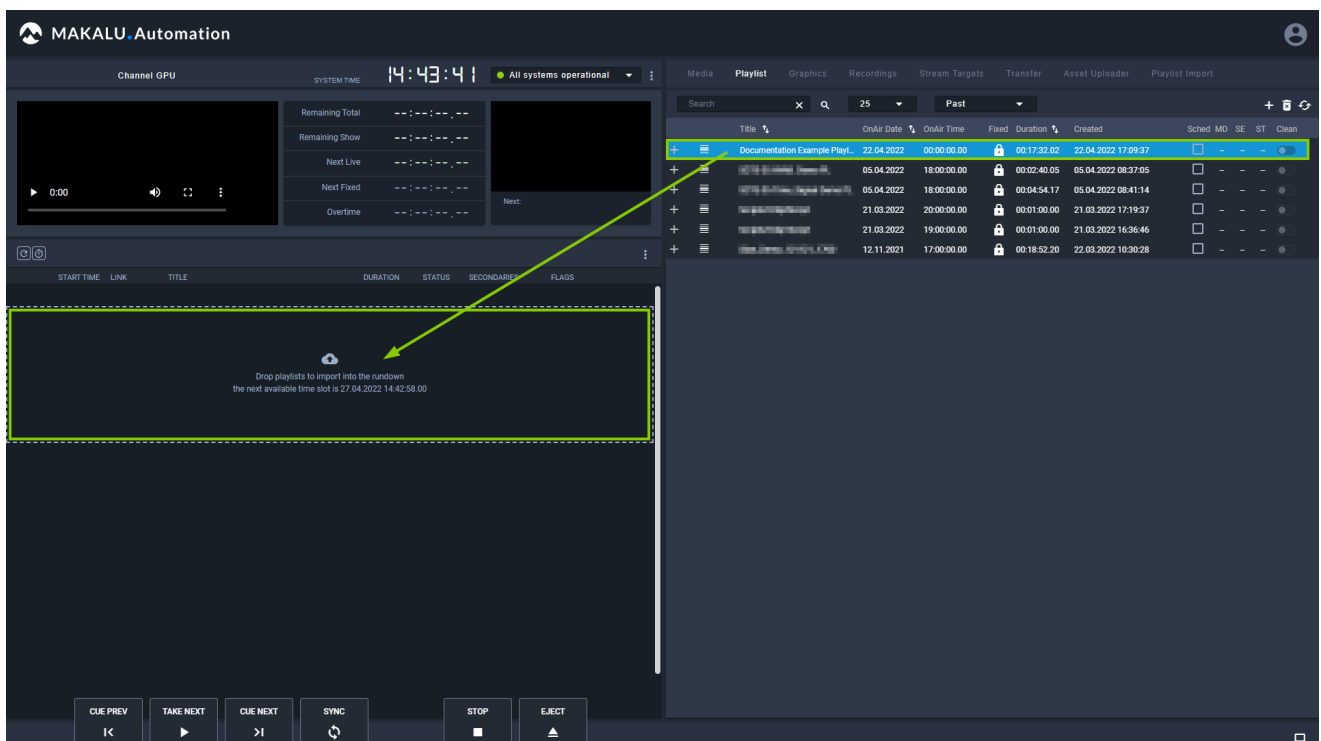


Figure: Makalu Automation - Adding a playlist to the rundown


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.

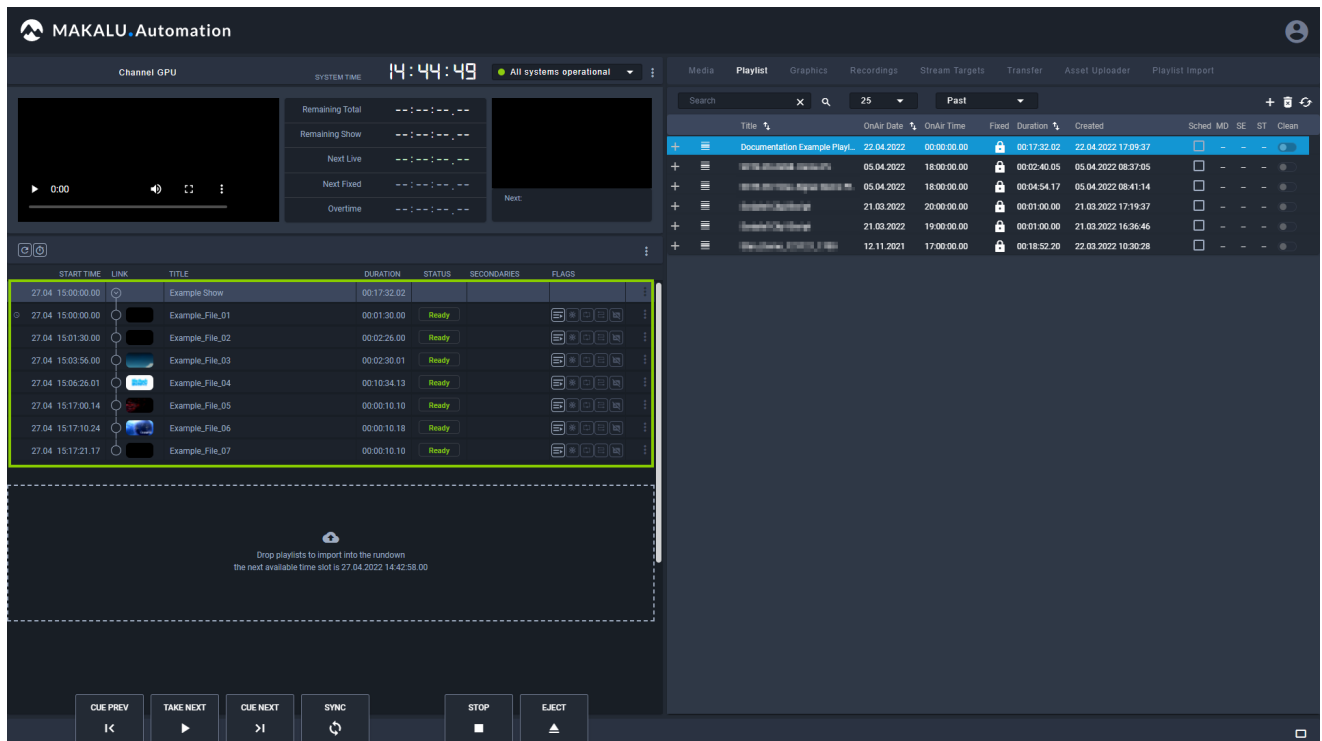
The playlist is added to the rundown.

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 last element and the start time is dynamically calculated without creating gaps.

3. (Optional) To expand an included show, click the corresponding circle with arrow icon  in the link column.

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



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
27.04 15:00:00.00		Example Show	00:17:32.02			
27.04 15:01:30.00		Example_File_01	00:01:30.00	Ready		
27.04 15:01:30.00		Example_File_02	00:02:26.00	Ready		
27.04 15:03:56.00		Example_File_03	00:02:30.01	Ready		
27.04 15:06:25.01		Example_File_04	00:10:34.13	Ready		
27.04 15:17:00.14		Example_File_05	00:00:10.10	Ready		
27.04 15:17:10.24		Example_File_06	00:00:10.18	Ready		
27.04 15:17:21.17		Example_File_07	00:00:10.10	Ready		

Figure: Makalu Automation - Playlist added to the rundown

Tip

To add a playlist to a rundown at a specified start date/time, activate the checkbox in the **Sched (Scheduled)** column 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 a 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 a rundown if the start date/time is in the future.

Notice

If the added playlist includes files that are not available on the channel's playout instances, file transfers are automatically started. As a result all corresponding files are copied from the ingest storage to all playout instances that are assigned to the channel. See section [File transfer](#) for more information.

7.5.2 Adding media to a rundown

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

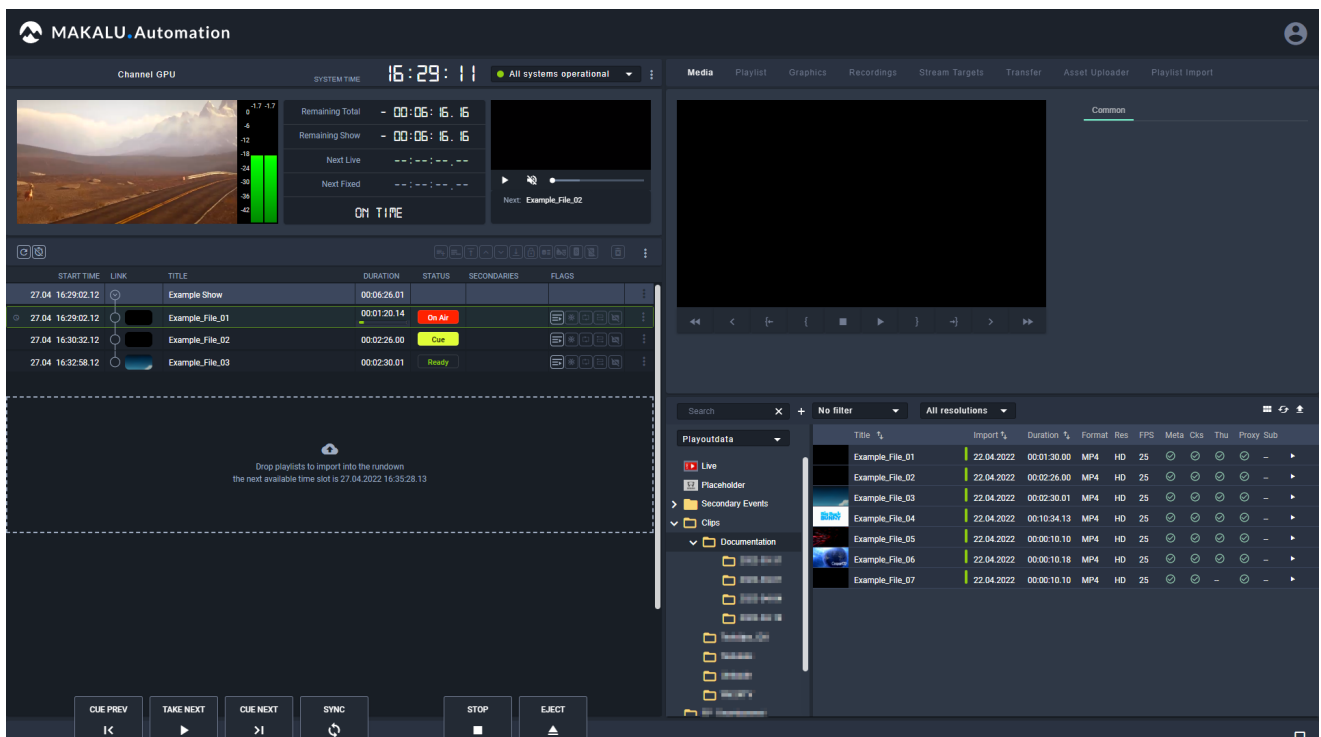
To do this, proceed as follows:

1. (Optional) To expand a show, click the corresponding circle with arrow icon  in the link column.

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.



The screenshot displays the MAKALU Automation interface. The top left shows the Channel GPU status and system time (16:29:11). The main area is divided into a rundown editor on the left and a media list on the right. The rundown editor shows a table of items with columns for Start Time, Link, Title, Duration, Status, Secondaries, and Flags. The media list on the right shows a table of media items with columns for Title, Import, Duration, Format, Res, FPS, Meta, Cks, Thu, Proxy, and Sub.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
27.04 16:29:02.12		Example Show	00:06:26.01			
27.04 16:29:02.12		Example_File_01	00:01:20.14	On Air		
27.04 16:30:32.12		Example_File_02	00:02:26.00	Cue		
27.04 16:32:58.12		Example_File_03	00:02:30.01	Ready		

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
Example_File_01	22.04.2022	00:01:30.00	MP4	HD	25					
Example_File_02	22.04.2022	00:02:30.01	MP4	HD	25					
Example_File_03	22.04.2022	00:02:26.00	MP4	HD	25					
Example_File_04	22.04.2022	00:10:34.13	MP4	HD	25					
Example_File_05	22.04.2022	00:00:10.10	MP4	HD	25					
Example_File_06	22.04.2022	00:00:10.18	MP4	HD	25					
Example_File_07	22.04.2022	00:00:10.10	MP4	HD	25					

Figure: Makalu Automation - Show expanded and media tab opened

3. Select one or more 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.

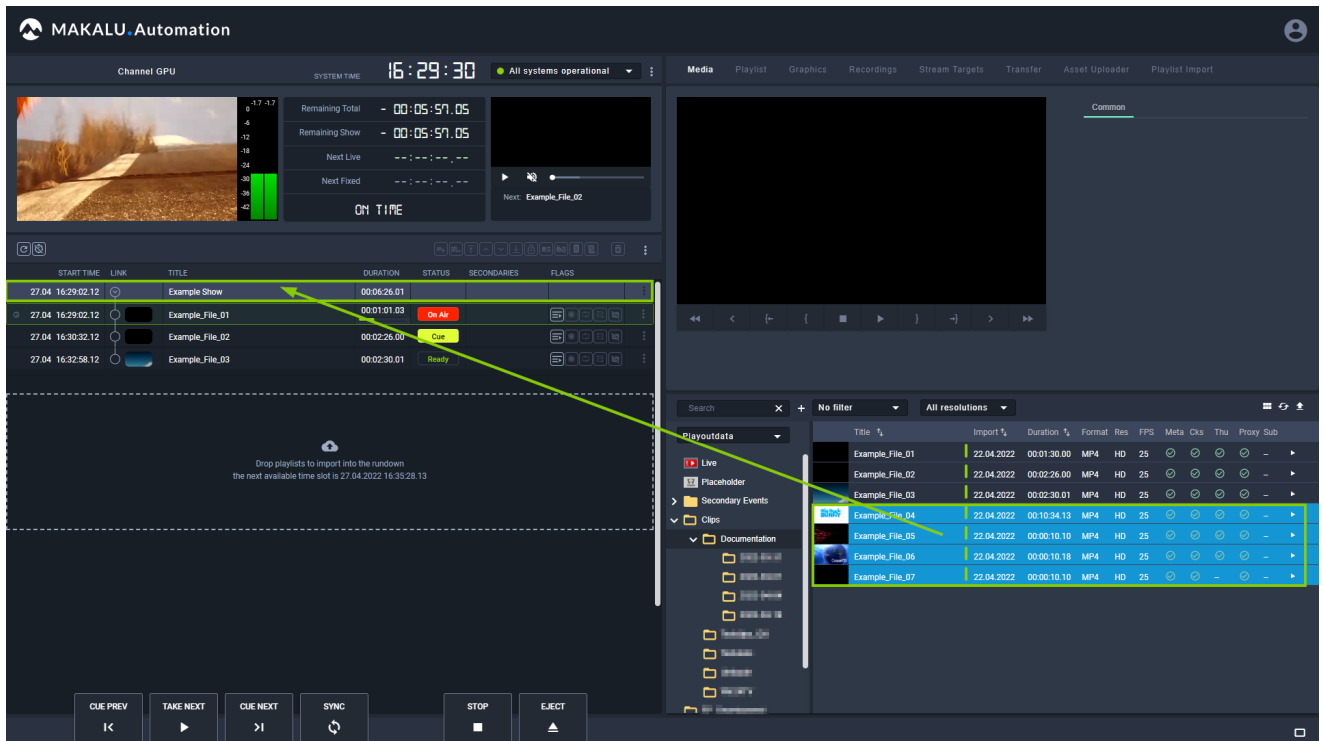


Figure: Makalu Automation - Adding video files to a show

Notice

If you want to add a video file to a 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 1920x1080 px and a framerate of 25 fps.

Video files with properties that differ from the current channel output properties are highlighted in the media list (the resolution and/or the framerate are highlighted in red):

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
big_buck_bunny_1080p60	27.04.2022	00:10:34.13	MP4	HD	60	✓	✓	✓	-	-
big_buck_bunny_1080p30	27.04.2022	00:10:34.13	MP4	HD	30	✓	✓	✓	-	-
Example_File_07	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	✓	-	▶
Example_File_06	22.04.2022	00:00:10.18	MP4	HD	25	✓	✓	✓	✓	-
Example_File_05	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	✓	✓	-
Example_File_04	22.04.2022	00:10:34.13	MP4	HD	25	✓	✓	✓	✓	-
Example_File_03	22.04.2022	00:02:30.01	MP4	HD	25	✓	✓	✓	✓	-
Example_File_02	22.04.2022	00:02:26.00	MP4	HD	25	✓	✓	✓	✓	-
Example_File_01	22.04.2022	00:01:30.00	MP4	HD	25	✓	✓	✓	✓	-

Figure: Makalu 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 properties. Depending on the channel configuration it may be possible to add files to a rundown, that do not match the channel properties.

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

The screenshot shows the Makalu Automation interface. On the left, a 'Channel GPU' window displays a video preview and system time (16:31:15). Below it, a rundown table lists clips with their start times, titles, durations, and statuses. The clip 'Example_File_04' is highlighted with a green box, indicating it is the selected clip. On the right, a 'Media' window shows a list of video files, with 'Example_File_04' selected. The interface also includes a 'Drop playlists to import into the rundown' message and control buttons at the bottom.

Figure: Makalu Automation - Video files added to a show

Tip

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 **[Shift]**. For more information see section [Replacing a clip](#).

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

Notice

If the added file is not available on the channel's playout instances, file transfers are automatically started. As a result the corresponding file is copied from the ingest storage to all playout instances that are assigned to the channel. See section [File transfer](#) for more information.

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

7.5.3 Adding trimmed media to a rundown

To add only a specific subsection of a video file to a rundown, proceed as follows:

Notice

Trimming is only possible for 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.

- In the rundown select and expand the show to which you want to add trimmed media.


The show is expanded, and all included clips are listed.
- On the right side, select the **Media** tab.

All available media items are listed in the media list.
- In the media list select the media asset to be trimmed and click the **Play** icon on the right side.

Tip

You can also open a media asset in the preview player by dragging it from the media list and dropping it on the preview player.

The media asset is opened by the preview player.


- Use the preview player controls to select the timecode for the mark in.
- To set the selected timecode as mark in, click the **Set Mark In**  icon.

The Mark In timecode is updated accordingly.

The screenshot displays the Makalu Automation interface. At the top, there are navigation tabs: Media, Playlist, Graphics, Recordings, Stream Targets, Transfer, Asset Uploader, and Playlist Import. The main area is divided into a preview player on the left and a metadata panel on the right. The preview player shows a video of a blue sky with green trees. Below the video are playback controls, including a play button, a stop button, and a 'Set Mark Out' icon (a right curly bracket) which is highlighted with a green box. The 'Mark In' field is also highlighted with a green box and contains the timecode '00:01:00.14'. The 'Set Mark Out' icon is also highlighted with a green box. The metadata panel on the right shows details for 'Example_File_04', including Name, Duration, Import, Expiry date, Size, Format, Path, Thumb, LowRes, Subtitle, and Sequence. Below the preview player, there is a search bar and a table of media files. The table has columns for Title, Import, Duration, Format, Res, FPS, Meta, Cks, Thu, Proxy, and Sub. The table lists several files, including 'Example_File_07' through 'Example_File_01'. The 'Example_File_04' row is highlighted with a blue background.

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
Example_File_07	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	-	✓	-
Example_File_06	22.04.2022	00:00:10.18	MP4	HD	25	✓	✓	✓	✓	-
Example_File_05	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	✓	✓	-
Example_File_04	22.04.2022	00:10:34.13	MP4	HD	25	✓	✓	✓	✓	-
Example_File_03	22.04.2022	00:02:30.01	MP4	HD	25	✓	✓	✓	✓	-
Example_File_02	22.04.2022	00:02:26.00	MP4	HD	25	✓	✓	✓	✓	-
Example_File_01	22.04.2022	00:01:30.00	MP4	HD	25	✓	✓	✓	✓	-

Figure: Makalu Automation - Trimmed media - Mark in set

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

The screenshot displays the Makalu Automation interface. At the top, navigation tabs include Media, Playlist, Graphics, Recordings, Stream Targets, Transfer, Asset Uploader, and Playlist Import. The main area is split into a preview player on the left and a metadata panel on the right.

The preview player shows a video of trees under a blue sky. Below the video is a playback control bar with a playhead at 00:07:20.16. A bracket below the playhead indicates a trim. The metadata panel shows the following information for 'Example_File_04':

- Name: Example_File_04
- Duration: 00:10:34.13
- Import: 22.04.2022 17:01:23.00
- Expiry date: 21.07.2022 05:01:23.00
- Size: 808.68 MB
- Format: MP4
- Path: [blurred]
- Thumb: [blurred]
- LowRes: [blurred]
- Subtitle: -
- Sequence: -

Below the preview player, the 'Position' is 00:07:20.16, 'Remaining' is 00:03:13.22, and 'Mark Out' is 00:07:20.16. The 'Duration' is 00:06:20.02 and 'Mark In' is 00:01:00.14.

The media library table below shows the following data:

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
Example_File_07	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	-	✓	-
Example_File_06	22.04.2022	00:00:10.18	MP4	HD	25	✓	✓	✓	✓	-
Example_File_05	22.04.2022	00:00:10.10	MP4	HD	25	✓	✓	✓	✓	-
Example_File_04	22.04.2022	00:10:34.13	MP4	HD	25	✓	✓	✓	✓	-
Example_File_03	22.04.2022	00:02:30.01	MP4	HD	25	✓	✓	✓	✓	-
Example_File_02	22.04.2022	00:02:26.00	MP4	HD	25	✓	✓	✓	✓	-
Example_File_01	22.04.2022	00:01:30.00	MP4	HD	25	✓	✓	✓	✓	-

Figure: Makalu Automation - Trimmed media - Mark out set

- Use the draggable element below the preview player (consisting of thumbnail and file name, located between "Position", and "Remaining") and drag it on the show to which you want to add it.

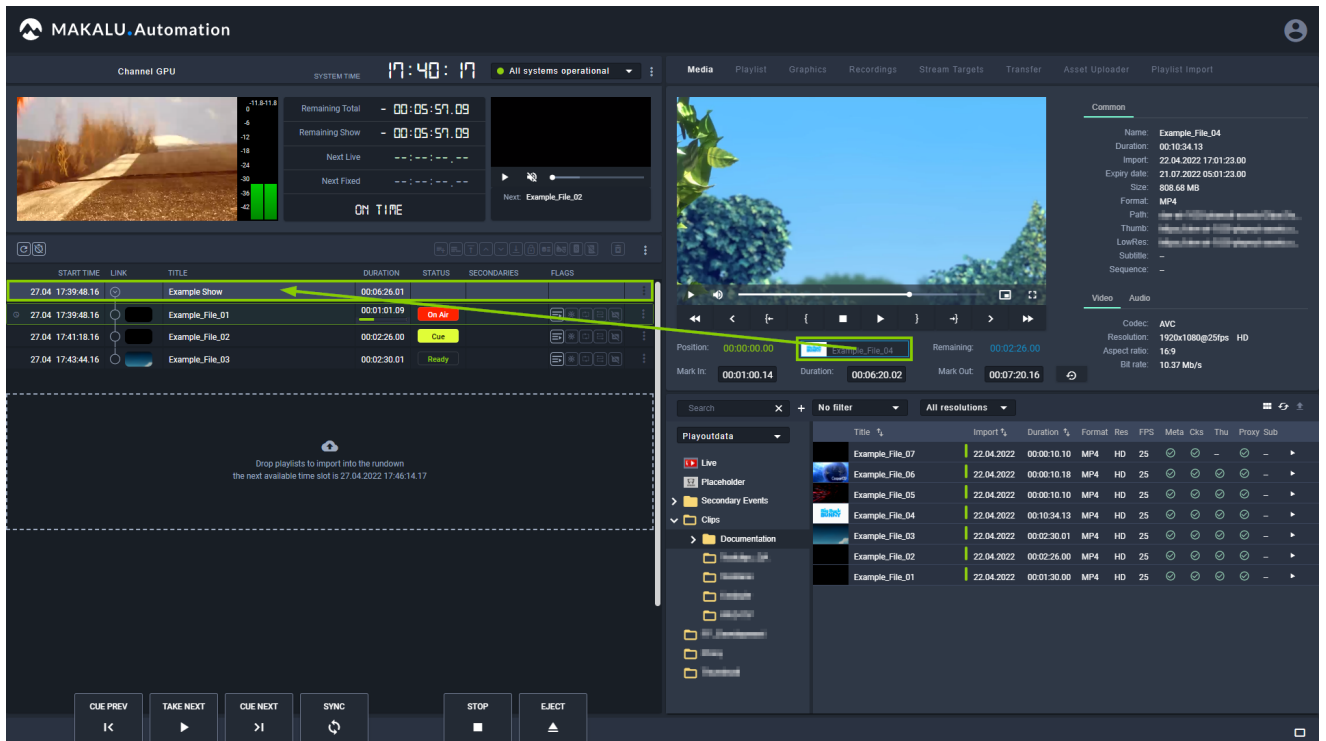


Figure: Makalu Automation - Adding trimmed media to a show
The selected video file is added to the rundown as last clip of the selected show.

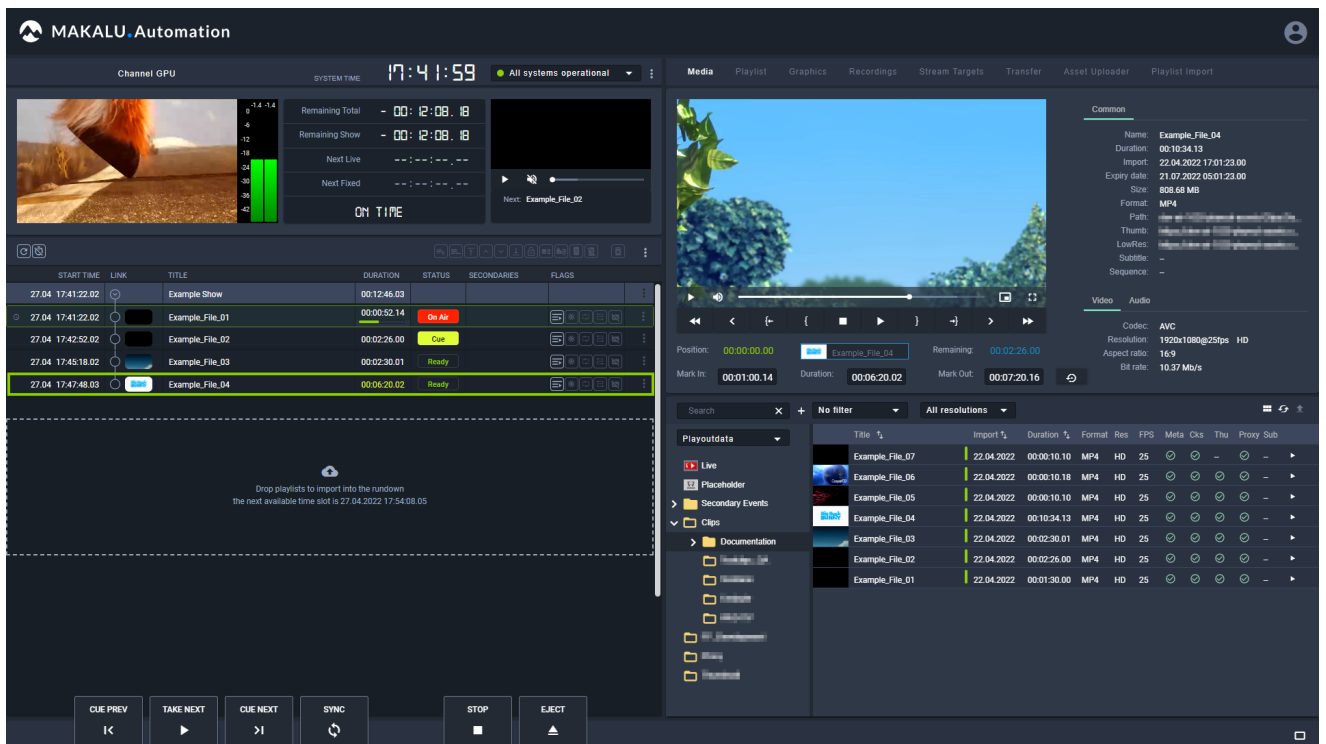



Figure: Makalu Automation - Trimmed media added to a show


 **Tip**

Instead of adding a trimmed clip 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 **[Shift]**. In this case a confirmation dialog is displayed that also informs you if the rundown duration will be shortened or extended by this replacement. For more information see section [Replacing a clip](#).

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

 **Notice**

Trimmed files 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 channel's playout instances, file transfers are automatically started. As a result the corresponding file is copied from the ingest storage to all playout instances that are assigned to the channel.

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

7.5.4 Adding secondary events to a rundown

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

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

All available media items are listed in the media list.

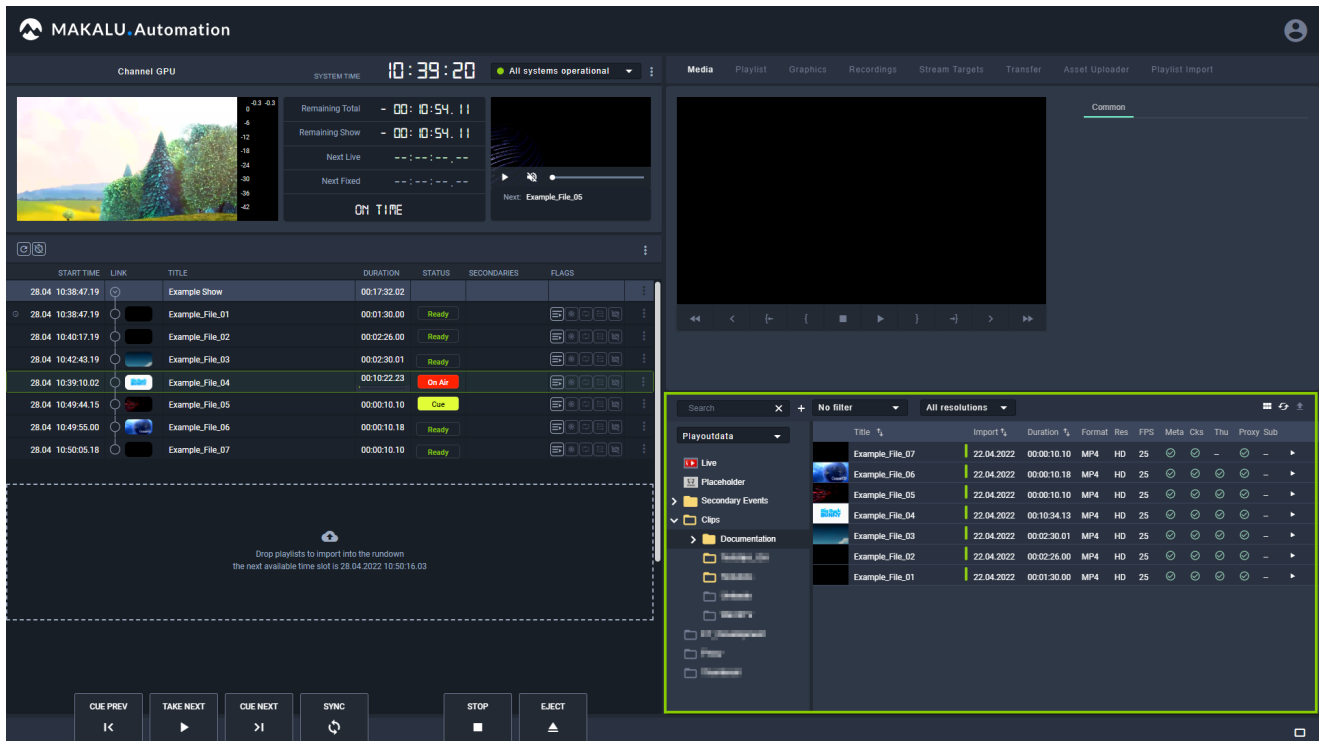


Figure: Makalu Automation - Show expanded and media tab opened

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

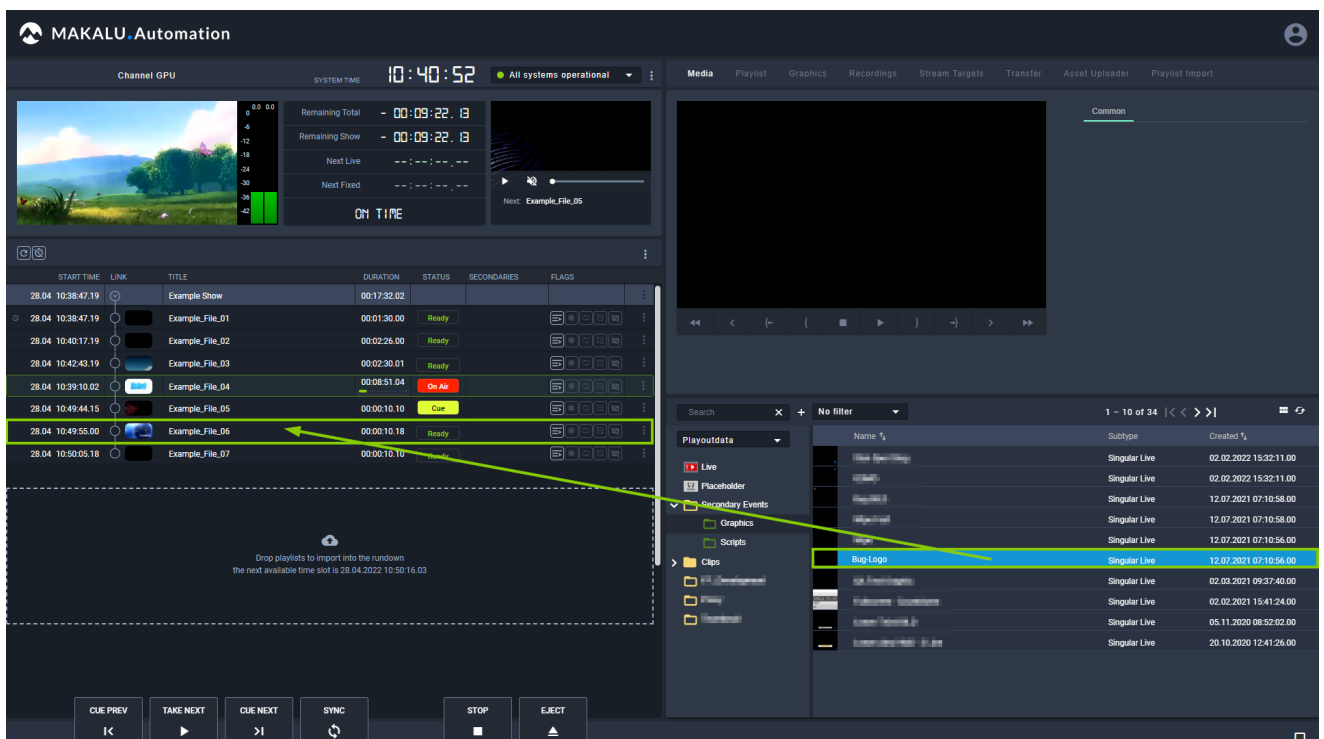


Figure: Makalu Automation - Secondary event selected

The selected secondary events are added to the show or clip, which is indicated by the corresponding icon in the "Secondaries" column.


The screenshot displays the MAKALU.Automation interface. At the top, it shows 'Channel GPU' and 'SYSTEM TIME 10:42:48' with a status indicator 'All systems operational'. Below this is a video preview window showing a 3D rendered scene of a squirrel. To the right of the preview is a technical display with 'Remaining Total - 00:07:26.19', 'Remaining Show - 00:07:26.19', 'Next Live', and 'Next Fixed'. A 'Next: Example_File_05' indicator is also present. Below the preview is a table of events:

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
28.04 10:38:47.19	⌵	Example Show	00:17:32.02			
28.04 10:38:47.19	○	Example_File_01	00:01:30.00	Ready		⌵ * ⌵ ⌵ ⌵
28.04 10:40:17.19	○	Example_File_02	00:02:26.00	Ready		⌵ * ⌵ ⌵ ⌵
28.04 10:42:43.19	○	Example_File_03	00:02:30.01	Ready		⌵ * ⌵ ⌵ ⌵
28.04 10:39:10.02	○	Example_File_04	00:06:55.12	On Air		⌵ * ⌵ ⌵ ⌵
28.04 10:49:44.15	○	Example_File_05	00:00:10.10	Cue		⌵ * ⌵ ⌵ ⌵
28.04 10:49:55.00	○	Example_File_06	00:00:10.18	Ready	⌵	⌵ * ⌵ ⌵ ⌵
28.04 10:50:05.18	○	Example_File_07	00:00:10.10	Ready		⌵ * ⌵ ⌵ ⌵

A green box highlights the 'Secondary' icon (a square with three horizontal lines) in the 'SECONDARIES' column for 'Example_File_06', with a green arrow pointing to it.

Figure: Makalu Automation - Secondary event added to a clip

Tip

To expand the list of secondary events added to a show or clip, click the secondaries icon  of the corresponding element.



The screenshot shows the MAKALU Automation interface. At the top, it displays 'Channel GPU', 'SYSTEM TIME 10:44:10', and 'All systems operational'. Below this is a video preview window showing a close-up of a tree trunk with a green leaf. To the right of the video are status indicators: 'Remaining Total - 00:06:04.18', 'Remaining Show - 00:06:04.18', 'Next Live ---:--:--', and 'Next Fixed ---:--:--'. A large 'ON TIME' indicator is also present. Below the video and status indicators is a table of events.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
28.04 10:38:47.19		Example Show	00:17:32.02			
28.04 10:38:47.19		Example_File_01	00:01:30.00	Ready		
28.04 10:40:17.19		Example_File_02	00:02:26.00	Ready		
28.04 10:42:43.19		Example_File_03	00:02:30.01	Ready		
28.04 10:39:10.02		Example_File_04	00:05:33.16	On Air		
28.04 10:49:44.15		Example_File_05	00:00:10.10	Cue		
28.04 10:49:55.00		Example_File_06	00:00:10.18	Ready		
START OFFSET	TYPE	TITLE	DURATION	STATUS	FLAGS	
00:00:00.00	Singular Live	Bug-Logo	00:00:00.00			
28.04 10:50:05.18		Example_File_07	00:00:10.10	Ready		

Figure: Makalu Automation - Clip secondary event list expanded


7.6 Editing the rundown

7.6.1 Editing the start time of a show

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

Notice

You can only edit the start time of a show if the show is not currently on air.

1. In the rundown click the clock icon  of the show to be edited.

Tip

If the show is expanded the clock icon is displayed for the first clip of the show.

The screenshot displays the MAKALU Automation interface. At the top, it shows 'Channel GPU' and 'SYSTEM TIME 14:29:00' with a status 'All systems operational'. Below this is a video preview window showing a landscape scene. To the right of the preview is a timeline with a vertical scale from 0 to -42. Further right are time-related statistics: 'Remaining Total - 00:34:35.14', 'Remaining Show - 00:17:03.12', 'Next Live ---:--:--:--', and 'Next Fixed ---:--:--:--'. Below these is a play button and a volume slider, with 'Next: Example_File_02' indicated. At the bottom, there is a table of clips with columns for START TIME, LINK, TITLE, DURATION, STATUS, SECONDARIES, and FLAGS. The first clip, 'Example Show', has a clock icon in its LINK column. The second clip, 'Example_File_01', has a clock icon in its LINK column and is highlighted with a green box.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
28.04 14:46:03.18	🕒	Example Show	00:17:32.02			
28.04 14:46:03.18	🕒	Example_File_01	00:01:30.00	Ready		
28.04 14:47:33.18	🕒	Example_File_02	00:02:26.00	Ready		
28.04 14:49:59.18	🕒	Example_File_03	00:02:30.01	Ready		
28.04 14:52:29.19	🕒	Example_File_04	00:10:34.13	Ready		
28.04 15:03:04.07	🕒	Example_File_05	00:00:10.10	Ready		
28.04 15:03:14.17	🕒	Example_File_06	00:00:10.18	Ready		
28.04 15:03:25.10	🕒	Example_File_07	00:00:10.10	Ready		

Figure: Makalu Automation - Edit show start time

2. A dialog is displayed that asks you to either use the current time by clicking **Now** or to enter a specific start time (format `hh:mm:ss:ff`).

Notice

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.

The screenshot displays the MAKALU.Automation interface. At the top, it shows 'Channel GPU' and 'SYSTEM TIME 14:30:05' with a status 'All systems operational'. Below this is a video player showing a landscape scene. To the right of the player are several time-related metrics: Remaining Total (00:47:26.12), Remaining Show (00:15:58.06), Next Live (---:---:---), Next Fixed (00:29:54.10), and Undertime (00:13:56.04). A play button and a progress bar are also visible, with the next clip identified as 'Example_File_03'.


Below the video player is a table listing clips. The first row is highlighted in green, indicating it is the selected clip for editing.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
28.04 15:00:00.00	⌵	Example Show	00:17:32.02			
28.04 15:00:00.00	⌵	Example_File_01	00:01:30.00	Ready		
28.04 15:01:30.00	○	Example_File_02	00:02:26.00	Ready		
28.04 15:03:56.00	○	Example_File_03	00:02:30.01	Ready		
28.04 15:06:26.01	○	Example_File_04	00:10:34.13	Ready		
28.04 15:17:00.14	○	Example_File_05	00:00:10.10	Ready		
28.04 15:17:10.24	○	Example_File_06	00:00:10.18	Ready		
28.04 15:17:21.17	○	Example_File_07	00:00:10.10	Ready		

Figure: Makalu Automation - Show start time edited

7.6.2 Editing the duration of a clip

To edit the duration of a clip, proceed as follows:

1. Expand the show that contains the clip to be edited, by clicking the corresponding circle with arrow icon  in the link column.

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

2. To edit the duration of a clip, click the **Duration** field to be edited.

The screenshot shows the MAKALU.Automation interface. At the top, it displays 'Channel GPU', 'SYSTEM TIME 08:41:13', and 'All systems operational'. Below this is a video preview window showing a landscape scene. To the right of the preview is a vertical color bar and a 'Remaining Total' section with the following values:

- Remaining Total: - 00:16:20.22
- Remaining Show: - 00:16:20.22
- Next Live: --:--:--:--
- Next Fixed: --:--:--:--

Below the preview is a 'Next: Example_File_02' section with a play button and a volume slider. The main part of the interface is a table with the following columns: START TIME, LINK, TITLE, DURATION, STATUS, SECONDARIES, and FLAGS.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 08:40:24.03		Example Show	00:17:10.24			
29.04 08:40:24.03		Example_File_01	00:00:39.23	On Air		
29.04 08:41:54.03		Example_File_02	00:02:26.00	Cue		
29.04 08:44:20.03		Example_File_03	00:02:30.01	Ready		
29.04 08:46:50.04		Example_File_04	00:10:34.13	Ready		
29.04 08:57:24.17		Example_File_05	00:00:10.10	Ready		

Figure: Makalu Automation - Edit clip duration

A dialog is displayed that asks you to enter the duration.

3. Enter the new duration (format `hh:mm:ss:ff`).

Notice

If you enter a scheduled duration that is longer than the original duration, the clip playback is looped. 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.

4. To confirm the new value, click **Apply**.

The edited duration is highlighted in yellow.


The screenshot displays the MAKALU.Automation interface. At the top, it shows 'Channel GPU' and 'SYSTEM TIME 08:42:16'. A status indicator shows 'All systems operational'. Below this is a video preview window showing a llama in a field, with a vertical audio level meter on the right. To the right of the preview are 'Remaining Total' and 'Remaining Show' both at -00:09:43.14, and 'Next Live' and 'Next Fixed' both at --:--:--:--:--:--:--. A large 'ON TIME' indicator is present. Below the preview is a playback control area with a play button, a mute icon, and a volume slider, with 'Next: Example_File_03' displayed.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 08:40:24.03		Example Show	00:11:36.11			
29.04 08:40:24.03		Example_File_01	00:01:30.00	Ready		
29.04 08:41:54.05		Example_File_02	00:02:03.01	On Air		
29.04 08:44:20.05		Example_File_03	00:02:30.01	Cue		
29.04 08:46:50.06		Example_File_04	00:05:00.00	Ready		
29.04 08:51:50.06		Example_File_05	00:00:10.10	Ready		

Figure: Makalu Automation - Clip duration edited

7.6.3 Editing the start time or duration of a secondary event

To edit the start time or duration of a secondary event, proceed as follows:

1. In the rundown click the secondaries icon  of the corresponding element (show or clip) to expand its list of secondary events.
2. Depending on what property you want to edit, either click the **Start Offset** or **Duration** field of the corresponding secondary event.

The screenshot displays the MAKALU.Automation control interface. At the top, it shows 'Channel GPU', 'SYSTEM TIME' as 09:29:50, and a status indicator 'All systems operational'. Below this is a video feed of a character in a desert landscape, a level meter, and a 'Remaining Total' timer. The main part of the interface is a list of events with columns for START TIME, LINK, TITLE, DURATION, STATUS, SECONDARIES, and FLAGS. A secondary event 'test' is highlighted, with its 'START OFFSET' and 'DURATION' fields selected for editing.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:28:51.13		Example Show	00:17:10.24			
29.04 09:28:51.13		Example_File_01	00:00:31.13	On Air		
29.04 09:30:21.13		Example_File_02	00:02:26.00	Cue		
29.04 09:32:47.13		Example_File_03	00:02:30.01	Ready		
29.04 09:35:17.14		Example_File_04	00:10:34.13	Ready		
START OFFSET	TYPE	TITLE	DURATION	STATUS	FLAGS	
00:00:00.00	Singular Live	test	00:00:00.00			
29.04 09:45:52.02		Example_File_05	00:00:10.10	Ready		

Figure: Edit the start-offset and duration of a secondary event

3. Enter the new value (format `hh:mm:ss:ff`).
4. Press **[Enter]**.

The entered value is applied.

Channel GPU SYSTEM TIME 09:35:47 All systems operational

Remaining Total - 00:17:02.01
 Remaining Show - 00:17:02.01
 Next Live --:--:--:--
 Next Fixed --:--:--:--
 ON TIME

Next: Example_File_02

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:35:38.22		Example Show	00:17:10.24			
29.04 09:35:38.22		Example_File_01	00:01:21.03	On Air		
29.04 09:37:08.22		Example_File_02	00:02:26.00	Cue		
29.04 09:39:34.22		Example_File_03	00:02:30.01	Ready		
29.04 09:42:04.23		Example_File_04	00:10:34.13	Ready		
START OFFSET	TYPE	TITLE	DURATION	STATUS	FLAGS	
00:00:05.00	Singular Live	test	00:05:00.00			
29.04 09:52:39.11		Example_File_05	00:00:10.10	Ready		

Figure: Start-offset and duration of a secondary event edited



7.6.4 Using groups

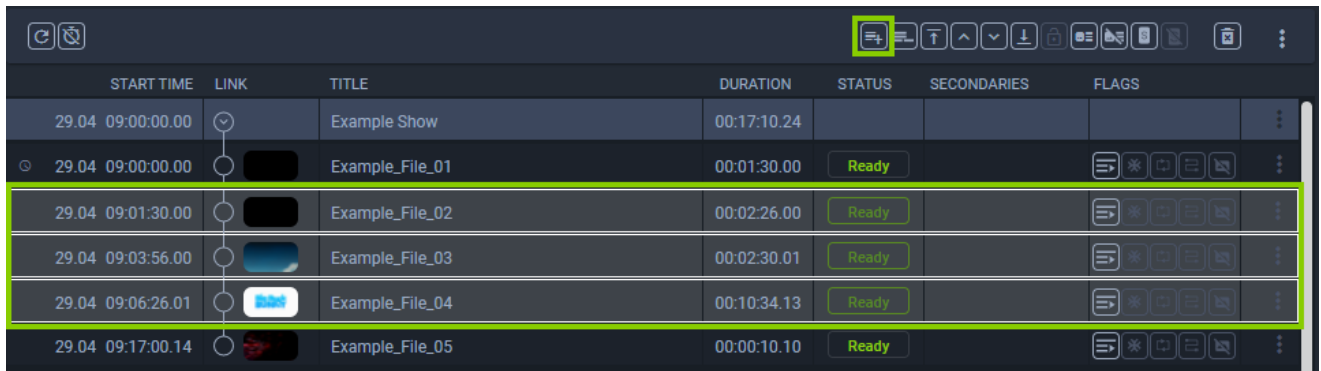
The group feature allows you to assign multiple clips within a show to a group. Each group is highlighted in a distinct color to facilitate the differentiation of groups.

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.

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 circle with arrow 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.



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:00:00.00		Example Show	00:17:10.24			
29.04 09:00:00.00		Example_File_01	00:01:30.00	Ready		
29.04 09:01:30.00		Example_File_02	00:02:26.00	Ready		
29.04 09:03:56.00		Example_File_03	00:02:30.01	Ready		
29.04 09:06:26.01		Example_File_04	00:10:34.13	Ready		
29.04 09:17:00.14		Example_File_05	00:00:10.10	Ready		

Figure: Makalu 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).

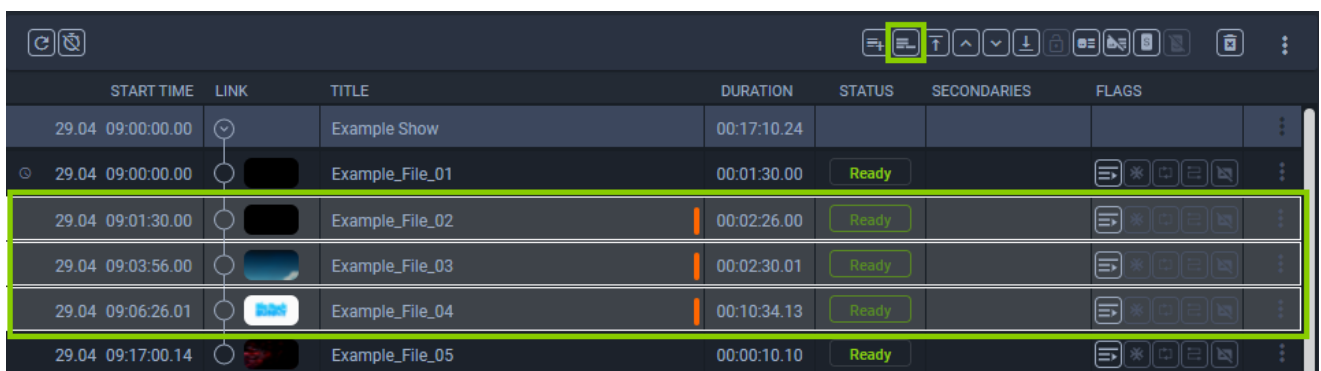


START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:00:00.00		Example Show	00:17:10.24			
29.04 09:00:00.00		Example_File_01	00:01:30.00	Ready		
29.04 09:01:30.00		Example_File_02	00:02:26.00	Ready		
29.04 09:03:56.00		Example_File_03	00:02:30.01	Ready		
29.04 09:06:26.01		Example_File_04	00:10:34.13	Ready		
29.04 09:17:00.14		Example_File_05	00:00:10.10	Ready		

Figure: Makalu Automation - Rundown - Group created

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.



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:00:00.00		Example Show	00:17:10.24			
29.04 09:00:00.00		Example_File_01	00:01:30.00	Ready		
29.04 09:01:30.00		Example_File_02	00:02:26.00	Ready		
29.04 09:03:56.00		Example_File_03	00:02:30.01	Ready		
29.04 09:06:26.01		Example_File_04	00:10:34.13	Ready		
29.04 09:17:00.14		Example_File_05	00:00:10.10	Ready		

Figure: Makalu 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.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 09:00:00.00		Example Show	00:17:10.24			
29.04 09:00:00.00		Example_File_01	00:01:30.00	Ready		
29.04 09:01:30.00		Example_File_02	00:02:26.00	Ready		
29.04 09:03:56.00		Example_File_03	00:02:30.01	Ready		
29.04 09:06:26.01		Example_File_04	00:10:34.13	Ready		
29.04 09:17:00.14		Example_File_05	00:00:10.10	Ready		

Figure: Makalu Automation - Clips removed from group

7.6.5 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 circle with arrow 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:
 - 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 .

The clips are moved to the selected position.

7.6.6 Replacing a clip

Notice

This function can be used, for example, to replace virtual placeholder assets with other media assets (actual video files). In addition it can be used to replace any clip in the rundown (regardless of the type) with any other available media asset (regardless of the type).

To replace a clip in a rundown, proceed as follows:

1. In the rundown expand the show that contains the clip to be replaced, by clicking the corresponding circle with arrow 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 the media asset (video file, live source, or placeholder).

4. Select one or more media assets.
5. Hold **[Shift]** and drag the selected item(s) from the media list on the right side and drop it on the clip to be replaced in the rundown on the left side.

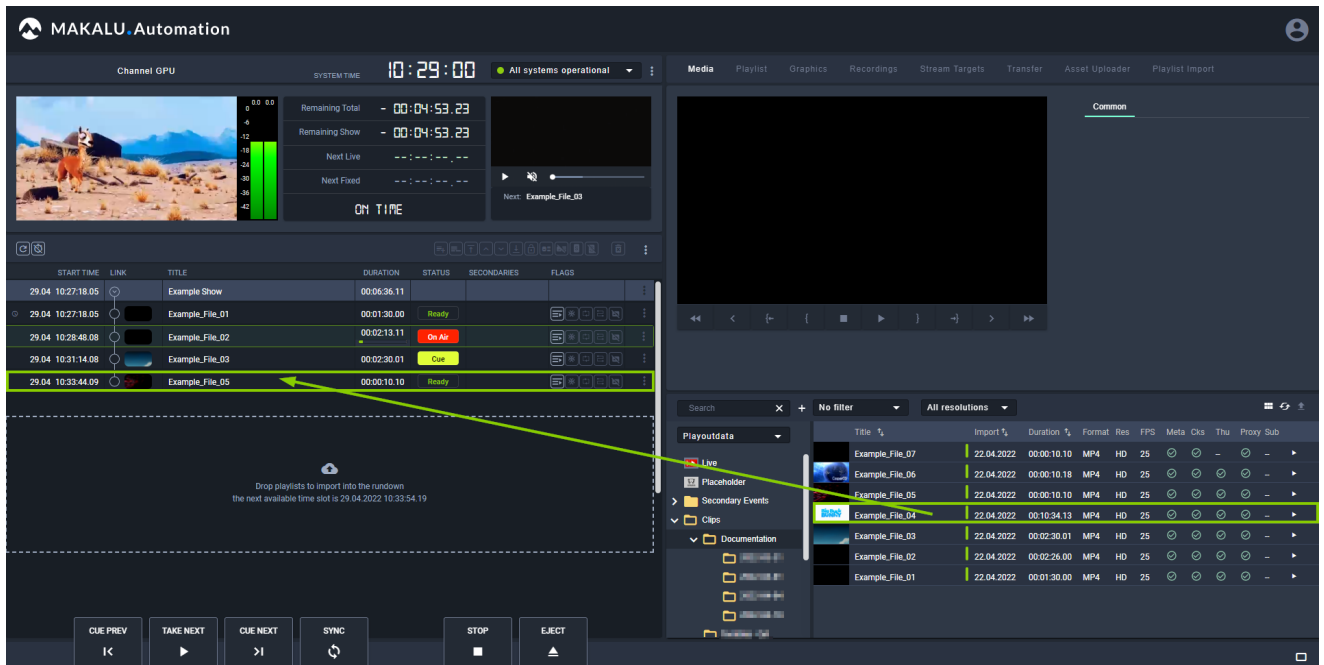


Figure: Makalu Automation - Replace clip

Notice

If the new item is a live source, you additionally must select the duration of the live clip and click **Apply**.

The original rundown item is replaced by the new item.

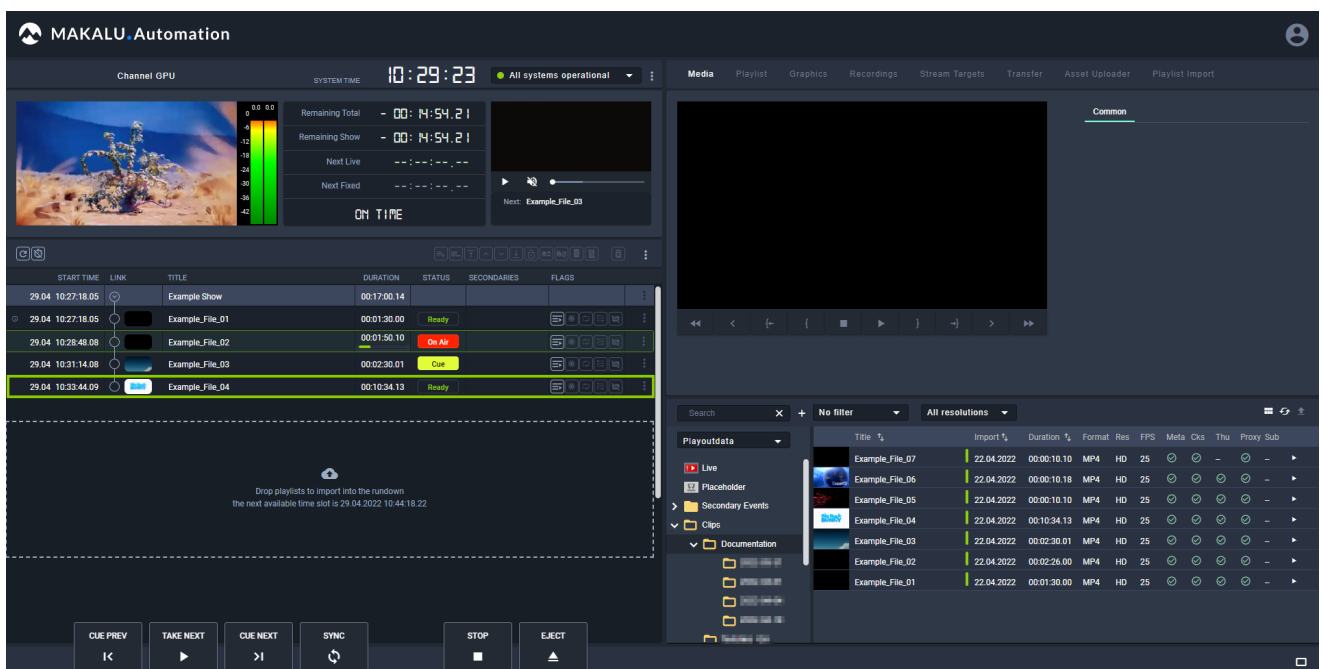



Figure: Makalu Automation - Clip replaced

Notice

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

7.6.7 Assigning or deleting a default graphic

To assign a 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.

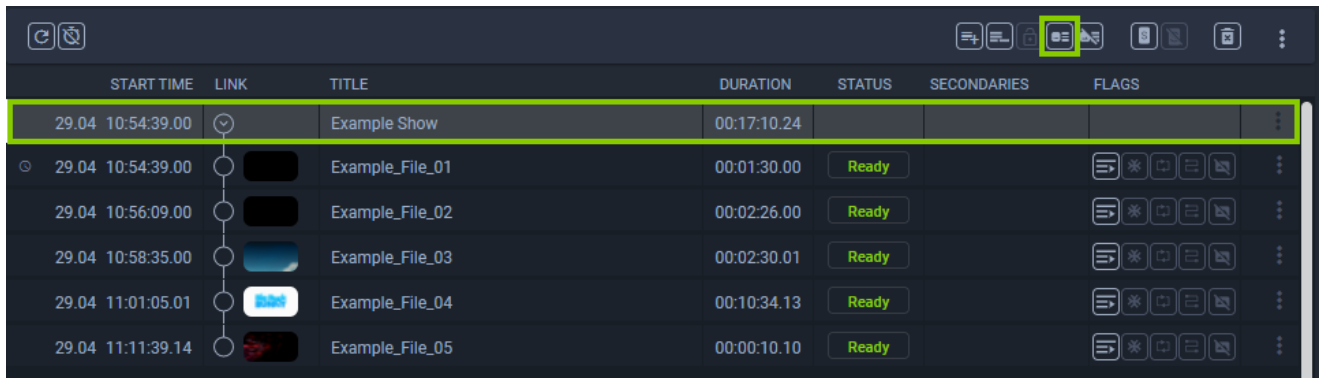


Figure: Makalu Automation - Assign default graphic

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

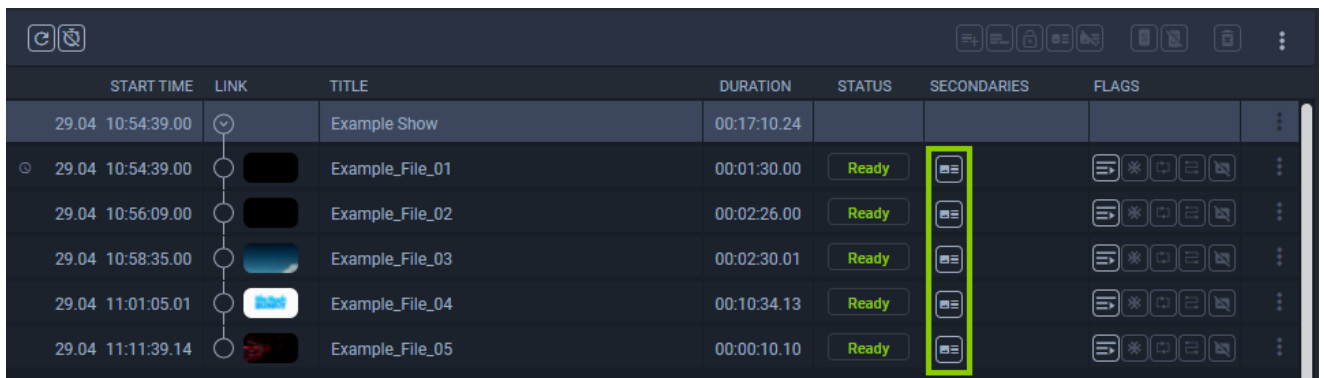

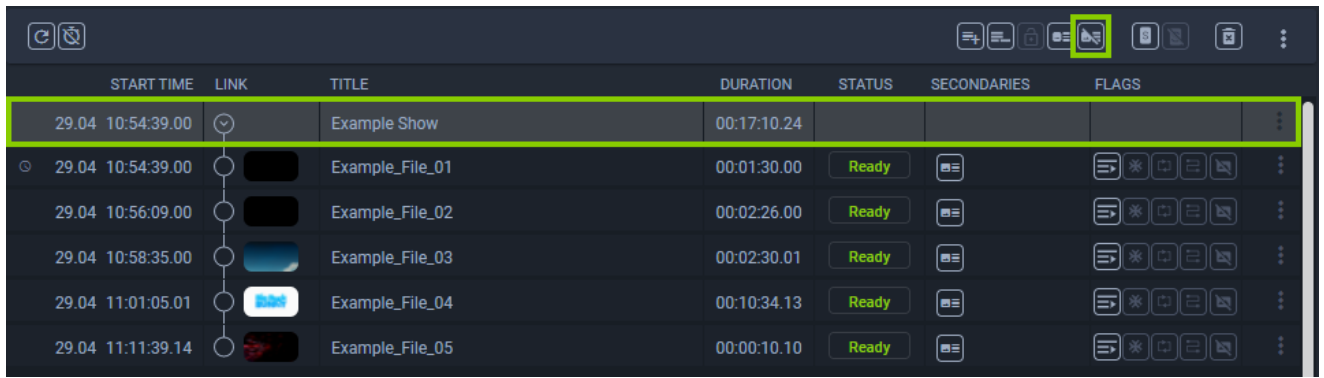


Figure: Makalu Automation - Default graphic assigned

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

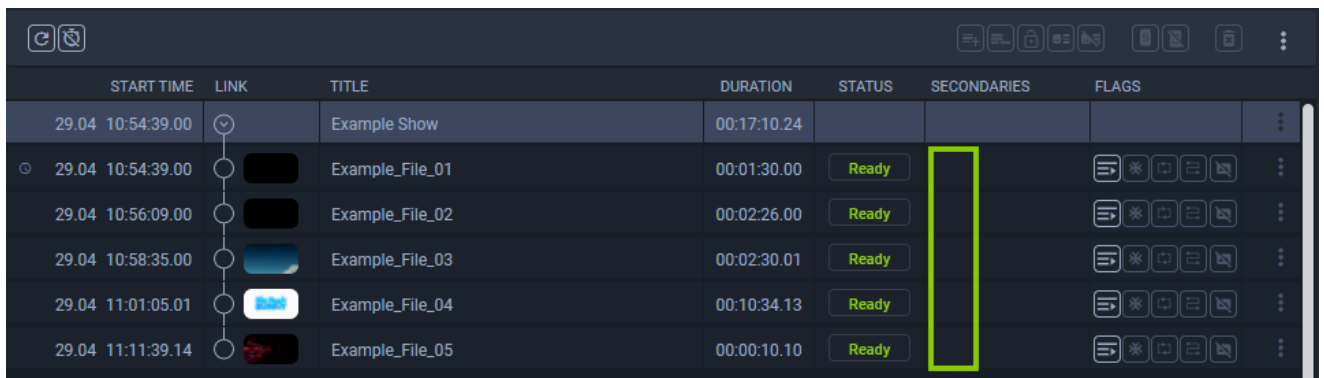
1. In the rundown select a playlist, show, or clip with an assigned default graphic.
2. Click the **Delete default graphic**  icon.



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 10:54:39.00	⌵	Example Show	00:17:10.24			
29.04 10:54:39.00	⊙	Example_File_01	00:01:30.00	Ready	≡	⌵ * ⌵ ≡ ⌵
29.04 10:56:09.00	⊙	Example_File_02	00:02:26.00	Ready	≡	⌵ * ⌵ ≡ ⌵
29.04 10:58:35.00	⊙	Example_File_03	00:02:30.01	Ready	≡	⌵ * ⌵ ≡ ⌵
29.04 11:01:05.01	⊙	Example_File_04	00:10:34.13	Ready	≡	⌵ * ⌵ ≡ ⌵
29.04 11:11:39.14	⊙	Example_File_05	00:00:10.10	Ready	≡	⌵ * ⌵ ≡ ⌵

Figure: Makalu Automation - Delete default graphic

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



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
29.04 10:54:39.00	⌵	Example Show	00:17:10.24			
29.04 10:54:39.00	⊙	Example_File_01	00:01:30.00	Ready		⌵ * ⌵ ≡ ⌵
29.04 10:56:09.00	⊙	Example_File_02	00:02:26.00	Ready		⌵ * ⌵ ≡ ⌵
29.04 10:58:35.00	⊙	Example_File_03	00:02:30.01	Ready		⌵ * ⌵ ≡ ⌵
29.04 11:01:05.01	⊙	Example_File_04	00:10:34.13	Ready		⌵ * ⌵ ≡ ⌵
29.04 11:11:39.14	⊙	Example_File_05	00:00:10.10	Ready		⌵ * ⌵ ≡ ⌵

Figure: Makalu Automation - Default graphic deleted

7.6.8 Adding or deleting a splicing event

For information about how to use splicing events, see section [Ad triggering](#):

- [Adding a splicing event via Makalu Automation](#)
- [Removing a splicing event from the rundown](#)

7.6.9 Deleting a clip or a playlist

i Notice

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 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 cued or on air.

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


1. Select the clip to be deleted, by clicking the additional actions icon  and select **Delete clip**.




Figure: Makalu Automation - Delete a clip


2. Confirm the displayed dialog by clicking **Yes**.

The clip is deleted.

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

Notice

Playlists can only be deleted if they are displayed in the rundown. To display playlists click the additional actions icon  in the toolbar above the rundown list and select **Show playlists**.

1. Select the playlist to be deleted, by clicking the additional actions icon  and select **Delete playlist**.

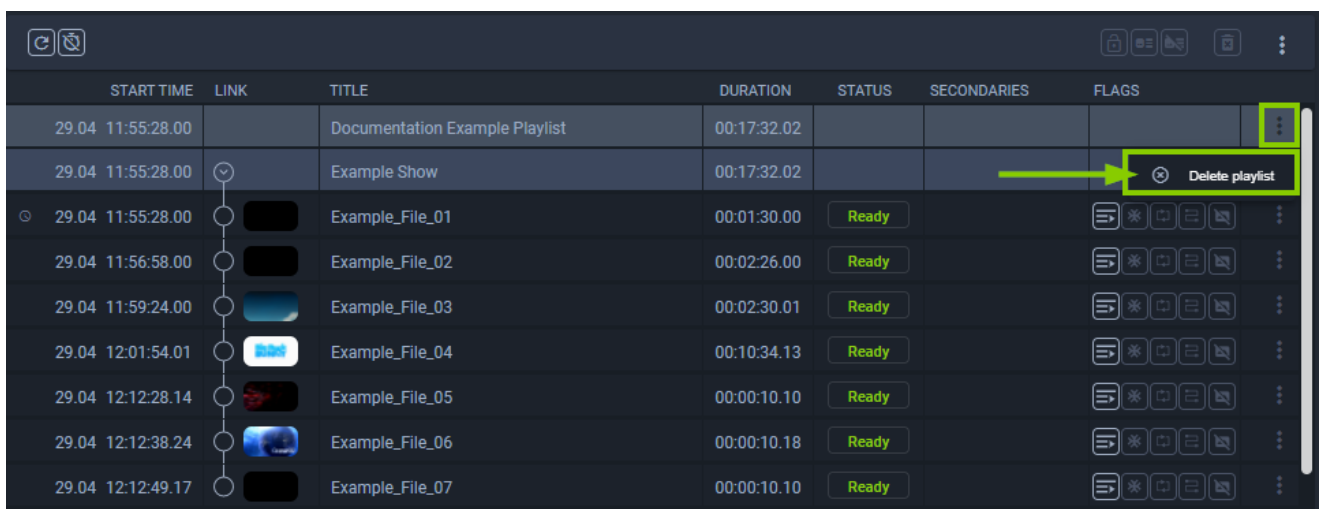



Figure: Makalu Automation - Delete a playlist


2. Confirm the displayed dialog by clicking **Yes**.

The playlist is deleted.

Tip

You can delete multiple playlists, by selecting the playlists to be deleted. Then click the additional actions 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 additional actions icon  and select **Delete show**.

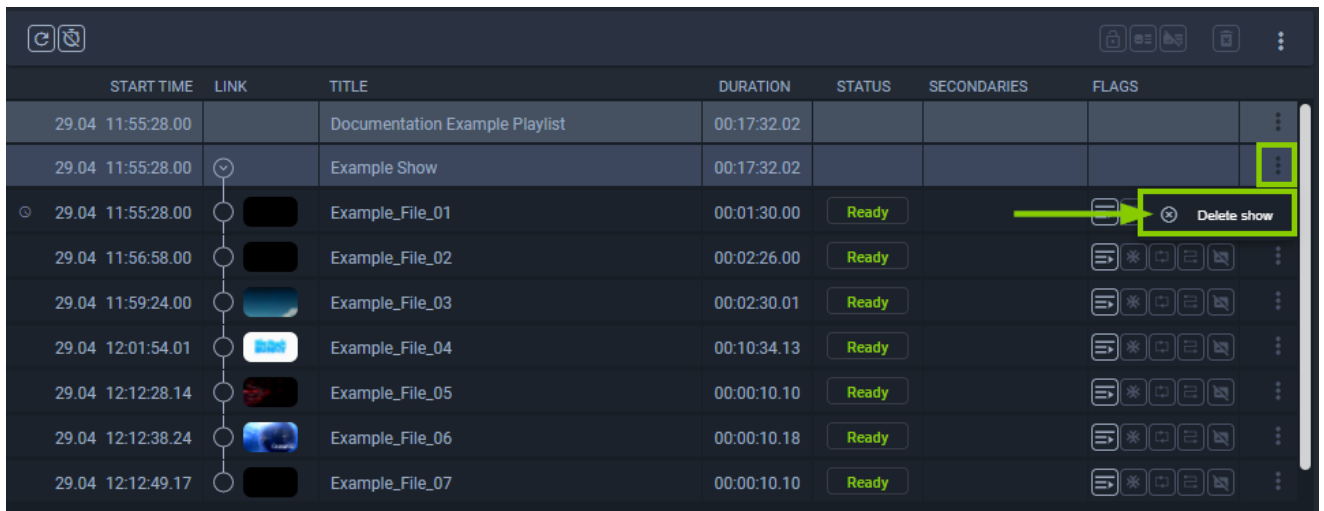



Figure: Makalu Automation - Delete a show

2. Confirm the displayed dialog by clicking **Yes**.

The show is deleted.

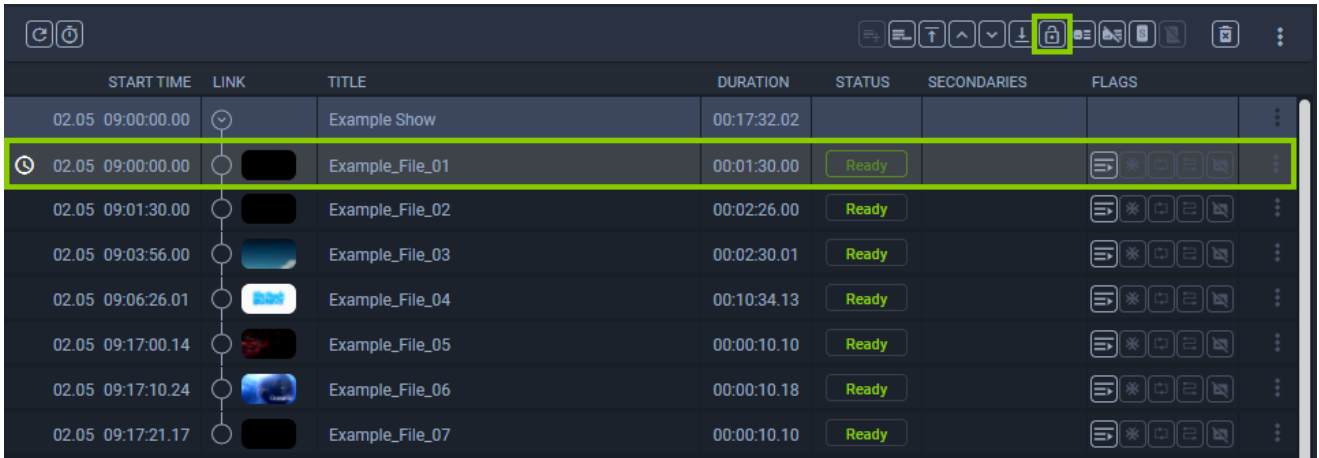
7.6.10 Deleting a fixed start time

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 circle with arrow 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.



START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 09:00:00.00	⊙	Example Show	00:17:32.02			
🕒 02.05 09:00:00.00	⊙	Example_File_01	00:01:30.00	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:01:30.00	⊙	Example_File_02	00:02:26.00	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:03:56.00	⊙	Example_File_03	00:02:30.01	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:06:26.01	⊙	Example_File_04	00:10:34.13	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:17:00.14	⊙	Example_File_05	00:00:10.10	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:17:10.24	⊙	Example_File_06	00:00:10.18	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮
02.05 09:17:21.17	⊙	Example_File_07	00:00:10.10	Ready		⏮ ⏪ ⏩ ⏭ ⏸ ⏹ ⋮


Figure: Makalu 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 .

7.6.11 Reloading the rundown

Notice

Manually reloading the rundown is only necessary in case of an error, e.g. 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.

7.7 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, this either cues the first clip in the rundown (if no clip was cued before) or the next clip after the previously cued clip.



Figure: Makalu Automation - Cueing a clip

The clip status changes to "Cue".

Channel GPU SYSTEM TIME 08:57:42 All systems operational

Remaining Total --:--:--
 Remaining Show --:--:--
 Next Live --:--:--
 Next Fixed --:--:--
 Overtime --:--:--

Next: Example_File_01

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 09:00:00.00		Example Show	00:17:32.02			
02.05 09:00:00.00		Example_File_01	00:01:30.00	Cue		
02.05 09:01:30.00		Example_File_02	00:02:26.00	Ready		
02.05 09:03:56.00		Example_File_03	00:02:30.01	Ready		
02.05 09:06:26.01		Example_File_04	00:10:34.13	Ready		
02.05 09:17:00.14		Example_File_05	00:00:10.10	Ready		
02.05 09:17:10.24		Example_File_06	00:00:10.18	Ready		
02.05 09:17:21.17		Example_File_07	00:00:10.10	Ready		

Drop playlists to import into the rundown
 the next available time slot is 02.05.2022 08:57:07.00

CUE PREV TAKE NEXT CUE NEXT SYNC STOP EJECT

Figure: Makalu Automation - Cued clip

- To start playback, click **Take next** in the rundown control.

The screenshot displays the MAKALU.Automation interface. At the top, the logo and name 'MAKALU.Automation' are visible. Below this, the 'Channel GPU' and 'SYSTEM TIME' (08:57:42) are shown, along with a status indicator 'All systems operational'. The main area is divided into several sections:

- Left Panel:** A vertical scale from 0 to -42, with a value of -90.3-90.3 at the top.
- Center Panel:** Countdowns for 'Remaining Total', 'Remaining Show', 'Next Live', 'Next Fixed', and 'Overtime', all showing '--:--:--'.
- Right Panel:** A play button, a volume slider, and the text 'Next: Example_File_01'.

Below these panels is a table with the following columns: START TIME, LINK, TITLE, DURATION, STATUS, SECONDARIES, and FLAGS.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 09:00:00.00	⌵	Example Show	00:17:32.02			
02.05 09:00:00.00	○	Example_File_01	00:01:30.00	Cue		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:01:30.00	○	Example_File_02	00:02:26.00	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:03:56.00	○	Example_File_03	00:02:30.01	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:06:26.01	○	Example_File_04	00:10:34.13	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:17:00.14	○	Example_File_05	00:00:10.10	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:17:10.24	○	Example_File_06	00:00:10.18	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿
02.05 09:17:21.17	○	Example_File_07	00:00:10.10	Ready		⌵ ⌶ ⌷ ⌸ ⌹ ⌺ ⌻ ⌼ ⌽ ⌿

Below the table is a dashed box containing a cloud icon and the text: 'Drop playlists to import into the rundown the next available time slot is 02.05.2022 08:57:07.00'.

At the bottom, there is a control bar with buttons: CUE PREV (⏪), TAKE NEXT (▶), CUE NEXT (⏩), SYNC (↻), STOP (■), and EJECT (⏏). The 'TAKE NEXT' button is highlighted with a green border.

Figure: Makalu Automation - Playing a clip

The clip is played. The clip status changes to "On Air".

Channel GPU SYSTEM TIME 08:58:21 All systems operational

Remaining Total - 00:17:02.11
 Remaining Show - 00:17:02.11
 Next Live --:--:--:--
 Next Fixed --:--:--:--
 ON TIME

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 08:57:52.19		Example_File_01	00:01:00.10	On Air		
02.05 08:59:22.19		Example_File_02	00:02:26.00	Cue		
02.05 09:01:48.19		Example_File_03	00:02:30.01	Ready		
02.05 09:04:18.20		Example_File_04	00:10:34.13	Ready		
02.05 09:14:53.08		Example_File_05	00:00:10.10	Ready		
02.05 09:15:03.18		Example_File_06	00:00:10.18	Ready		
02.05 09:15:14.11		Example_File_07	00:00:10.10	Ready		

Drop playlists to import into the rundown
 the next available time slot is 02.05.2022 09:15:24.21

CUE PREV TAKE NEXT CUE NEXT SYNC STOP EJECT

Figure: Makalu Automation - Clip is playing

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 clicking the clip status.

To manually stop the playback of the current clip and start the playback of the next cued clip, click **Take next** in the rundown control. This is required if e.g. a clip of type "live source" is currently playing with clip flag "Open End" enabled. Because of the flag the clip is playing permanently. The playback stops only when you manually cue the next clip to be played and click **Take next**.

- To manually stop playback, click **Stop** in the rundown control.

- Confirm the dialog by clicking **Yes**.

The playback is stopped. The clip status changes to "Ready".


The screenshot displays the MAKALU.Automation interface. At the top, it shows 'Channel GPU', 'SYSTEM TIME' as 08:58:51, and 'All systems operational'. A video preview window shows a llama in a field. To the right of the preview is a vertical scale from 0 to -42. Below the preview are fields for 'Remaining Total', 'Remaining Show', 'Next Live', 'Next Fixed', and 'Overtime', all showing dashes. A playback control bar shows a play button, a mute icon, and a volume slider, with 'Next: Example_File_02' displayed below it.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 08:57:52.19		Example_File_01	00:01:30.00	Ready		
02.05 08:59:22.19		Example_File_02	00:02:26.00	Cue		
02.05 09:01:48.19		Example_File_03	00:02:30.01	Ready		
02.05 09:04:18.20		Example_File_04	00:10:34.13	Ready		
02.05 09:14:53.08		Example_File_05	00:00:10.10	Ready		
02.05 09:15:03.18		Example_File_06	00:00:10.18	Ready		
02.05 09:15:14.11		Example_File_07	00:00:10.10	Ready		

Below the table is a dashed box containing a cloud icon and the text: 'Drop playlists to import into the rundown the next available time slot is 02.05.2022 09:15:24.21'. At the bottom, there are six control buttons: CUE PREV (left arrow), TAKE NEXT (right arrow), CUE NEXT (right arrow), SYNC (refresh icon), STOP (square icon), and EJECT (upward arrow icon).

Figure: Makalu Automation - Playback stopped

i Notice

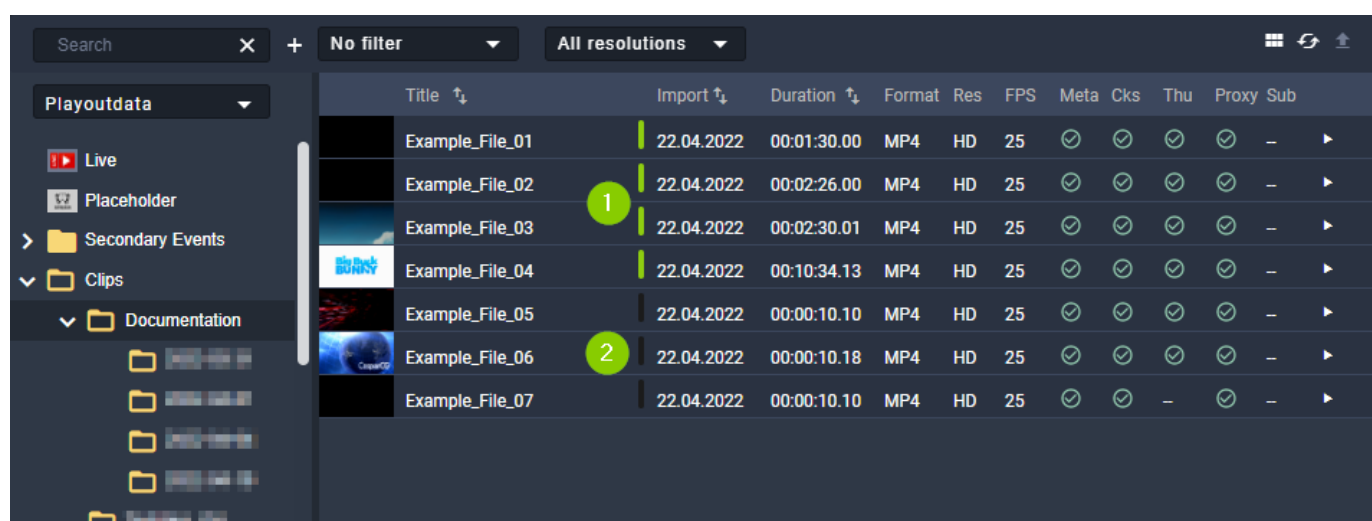
If you manually stop playback, the previously cued clip remains cued. To eject the player (setting it to idle) and reset the status of all clips (setting all available clips to status "Ready"), click the **Eject player** icon  in the **rundown control** via the buttons at the bottom left of the screen and confirm the following dialog by clicking **Yes**.

7.8 File transfer

As described in section [Ingest](#), all media files to be played are initially uploaded to the ingest storage. Afterwards each file, that is used in a rundown, must be copied to all playout instances (e.g. main and backup playout instance) that are assigned to the corresponding channel. The file transfer between ingest and playout storage can be triggered in the following ways:

- [add a new playlist to the rundown](#), which automatically triggers transfers for all used files that are not yet available on the playout instances
- [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 instances
- [trigger a file transfer manually](#) via the media asset list (either via the [Media](#) tab or [Transfer](#) tab)



The file transfer status (that indicates if a file is already available on all related playout instances) is recognizable by colored bars in the media asset list:



The screenshot shows a media asset list with columns: Title, Import, Duration, Format, Res, FPS, Meta, Cks, Thu, Proxy, Sub. The 'Import' column contains colored bars indicating transfer status. A green bar indicates completion, and a black bar indicates the file is only in ingest storage. Two green circles with numbers 1 and 2 highlight specific rows.

Title	Import	Duration	Format	Res	FPS	Meta	Cks	Thu	Proxy	Sub
Example_File_01	Green bar	22.04.2022 00:01:30.00	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_02	Green bar	22.04.2022 00:02:26.00	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_03	Green bar	22.04.2022 00:02:30.01	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_04	Green bar	22.04.2022 00:10:34.13	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_05	Black bar	22.04.2022 00:00:10.10	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_06	Black bar	22.04.2022 00:00:10.18	MP4	HD	25	✓	✓	✓	✓	- ▶
Example_File_07	Black bar	22.04.2022 00:00:10.10	MP4	HD	25	✓	✓	-	✓	- ▶

Figure: Makalu Automation - File transfer status

1.  Green bar - the file transfer is completed, the file is already available on the playout instances
2.  Black bar - the file is only available on the ingest storage but not available on the playout instances

A list of all currently running and recent file transfers is available in the [Transfer](#) tab.


Notice

The number of file transfers running at the same time is configurable and set by default to 5 parallel file transfers.

7.8.1 Triggering a file transfer manually

To trigger a file transfer from ingest storage to playout instances manually, proceed as follows:

1. Select the **Media** tab or the **Transfer** tab.
2. In the **Source** dropdown menu select the ingest storage (e.g. "Playoutdata").

3. Select a folder that contains files that are not available on playout instances (indicated by a black bar to the left of the file import date).
4. Select one or more files to be transferred.
5. In the toolbar at the top right of the media asset list click the **Upload assets** icon .

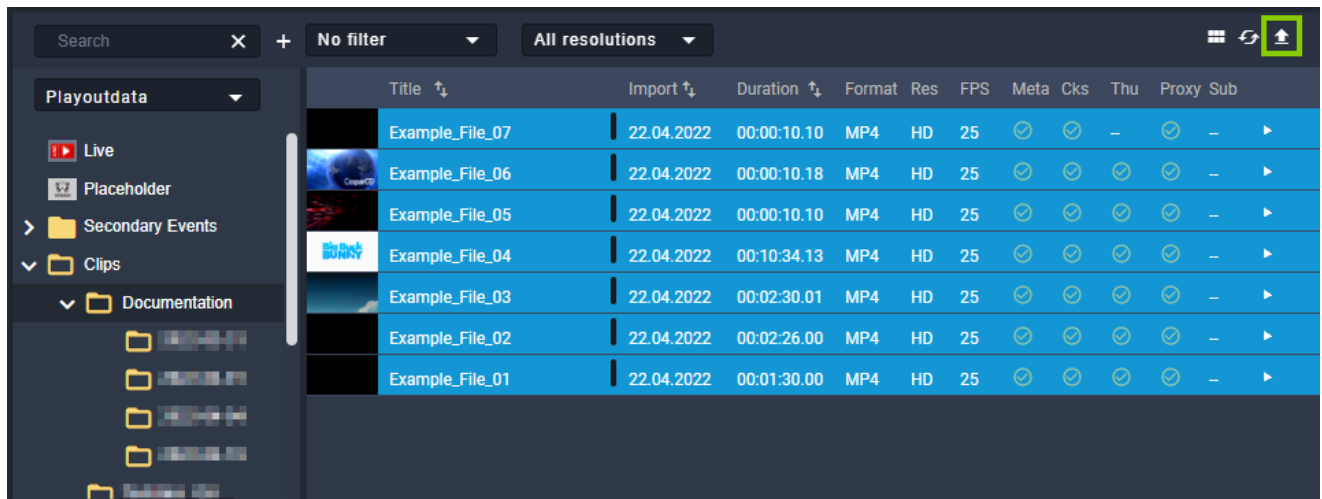


Figure: Makalu Automation - Start file transfer

6. Confirm the dialog by clicking **Yes**.
The transfer of the selected file(s) starts.
7. Select the **Transfer** tab to view the file transfer progress.

The screenshot displays the 'Transfer' tab in the Makalu Automation software. The top navigation bar includes 'Media', 'Playlist', 'Graphics', 'Recordings', 'Stream Targets', 'Transfer', 'Asset Uploader', and 'Playlist Import'. The main content area is titled 'Player_Master (4)' and contains a table with the following columns: File Name, Target Folder, Uploaded, Status, and Action.

File Name	Target Folder	Uploaded	Status	Action
Example_File_04	Clips/Documentation	02.05.2022 10:02:21	Pending (0% progress)	Pause, Stop, Refresh
Example_File_01	Clips/Documentation	02.05.2022 10:02:24	Processing (67% progress)	Pause, Stop, Refresh
Example_File_05	Clips/Documentation	02.05.2022 10:02:24	Completed (100% progress)	Pause, Stop, Refresh
Example_File_06	Clips/Documentation	02.05.2022 10:02:24	Completed (100% progress)	Pause, Stop, Refresh
Example_File_07	Clips/Documentation	02.05.2022 10:02:24	Completed (100% progress)	Pause, Stop, Refresh
Example_File_03	Clips/Documentation	02.05.2022 10:02:26	Processing (42% progress)	Pause, Stop, Refresh
Example_File_02	Clips/Documentation	02.05.2022 10:02:21	Pending (0% progress)	Pause, Stop, Refresh

Below the table, the 'Disk space' is shown as 7% used (68.34 GB | 953.87 GB). A search bar and filter options ('No filter', 'All resolutions') are present. A file list table is also visible, with columns: Title, Transfer, Duration, Format, Res, FPS, and Aging date.

Title	Transfer	Duration	Format	Res	FPS	Aging date
Example_File_07	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_06	02.05.2022	00:00:10.18	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_05	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_03	02.05.2022	00:02:30.01	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_01	02.05.2022	00:01:30.00	MP4	HD	25	03.05.2022 10:02:24.00

Figure: Makalu Automation - File transfer started

The file transfer to the playout instances is completed. This is also indicated by a green bar to the left of the file import date.

File Name	Target Folder	Uploaded	Status	Action
Example_File_04	Clips/Documentation	02.05.2022 10:03:18	Completed 100% 808.68 MB 808.68 MB	Pause, Stop, Refresh
Example_File_01	Clips/Documentation	02.05.2022 10:02:31	Completed 100% 102.43 MB 102.43 MB	Pause, Stop, Refresh
Example_File_05	Clips/Documentation	02.05.2022 10:02:24	Completed 100% 5.87 MB 5.87 MB	Pause, Stop, Refresh
Example_File_06	Clips/Documentation	02.05.2022 10:02:24	Completed 100% 6.15 MB 6.15 MB	Pause, Stop, Refresh
Example_File_07	Clips/Documentation	02.05.2022 10:02:24	Completed 100% 9.82 MB 9.82 MB	Pause, Stop, Refresh
Example_File_03	Clips/Documentation	02.05.2022 10:02:35	Completed 100% 185.39 MB 185.39 MB	Pause, Stop, Refresh
Example_File_02	Clips/Documentation	02.05.2022 10:02:43	Completed 100% 176.33 MB 176.33 MB	Pause, Stop, Refresh

Title	Transfer	Duration	Format	Res	FPS	Aging date
Example_File_07	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_06	02.05.2022	00:00:10.18	MP4	HD	25	03.05.2022 10:02:21.00
Example_File_05	02.05.2022	00:00:10.10	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_04	02.05.2022	00:10:34.13	MP4	HD	25	03.05.2022 10:02:35.00
Example_File_03	02.05.2022	00:02:30.01	MP4	HD	25	03.05.2022 10:02:24.00
Example_File_02	02.05.2022	00:02:26.00	MP4	HD	25	03.05.2022 10:02:31.00
Example_File_01	02.05.2022	00:01:30.00	MP4	HD	25	03.05.2022 10:02:24.00

Figure: Makalu Automation - File transfer completed

7.8.2 Deleting transferred files manually

Notice

You can only delete files from a playout instance, that are not currently used in the rundown.

To manually delete files from a playout instance, proceed as follows:


1. Select the **Media** tab or the **Transfer** tab.
2. In the **Source** dropdown menu select the playout instance (e.g. "Player_Master").
3. Select the folder that contains the files to be deleted.
4. Select one or more files to be deleted.
5. In the toolbar at the top right of the media asset list click the **Delete assets** icon .



Figure: Makalu Automation - Delete files

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

The selected files are deleted from the playout instance storage. This is also indicated by a black bar to the left of the file import date.

7.9 Importing a playlist

Notice

Makalu supports the import of XML-based playlists. 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 on 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**.
5. Click **Process**.

The content of the playlist file is checked and processed.

6. Click **Import**.

The playlist is imported.

7.10 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**.

The screenshot shows the 'Playlist Import' section of a software interface. At the top, there are navigation tabs: Home, Media, Playlist, Graphics, Recordings, Stream Targets, Transfer, Asset Uploader, and Playlist Import. Below the tabs, the 'Playlists' section is displayed. It contains a table with columns: Title, Missing Files, Channel, Process, and Import. Two playlists are listed: 'Scripts1Clip1Script' and 'Sprint_Review'. The 'Sprint_Review' playlist has 2 missing files. A plus icon next to it has been clicked, expanding the missing files list. The expanded list shows two files: 'TXE01291' and 'TXE01290'. The 'Export' button for this playlist is highlighted with a red box. Below the table, there is a message: 'Drop or [select](#) Playlists to import them'.

The missing file list is downloaded.

Notice

Missing file lists are exported as CSV files.

7.11 Restarting the player

Warning

Use the channel restart trigger only in case of an emergency (e.g. if 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**.
A dialog is displayed that asks you to confirm this action.
2. Confirm the dialog, by clicking **Yes**.
The player is restarted.

8. Live sources and stream targets

Each incoming live stream received by Makalu is referred to as a **live source**. Live sources are used by multiple Makalu applications, e.g. to preview incoming streams or to schedule them in a rundown. Each playout output signal can also be routed internally and used again as a live source ("backchannel"). Every live source is defined by a set of configuration properties (metadata), like e.g. the used protocol, the URL used to receive the stream or (if required) stream credentials. These configuration properties can e.g. 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), like e.g. the used protocol, the target URL or (if required) stream credentials. Stream targets can be used by multiple Makalu applications, e.g. 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 (and in addition to the streaming capabilities described in section [Social media Streaming](#)), Makalu includes the Stream Control application.

8.1 Accessing Makalu Stream Control

To access **Makalu Stream Control**, proceed as follows:

1. Open the following URL in your browser:

```
https://live-ui.customer-identifier.makalu.live.
```

Notice

Replace `customer-identifier` with your actual customer identifier, e.g. `exampletv`.

2. Log in with your Makalu credentials.

The Stream Control user interface is opened.

8.2 Manage live sources

8.2.1 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.

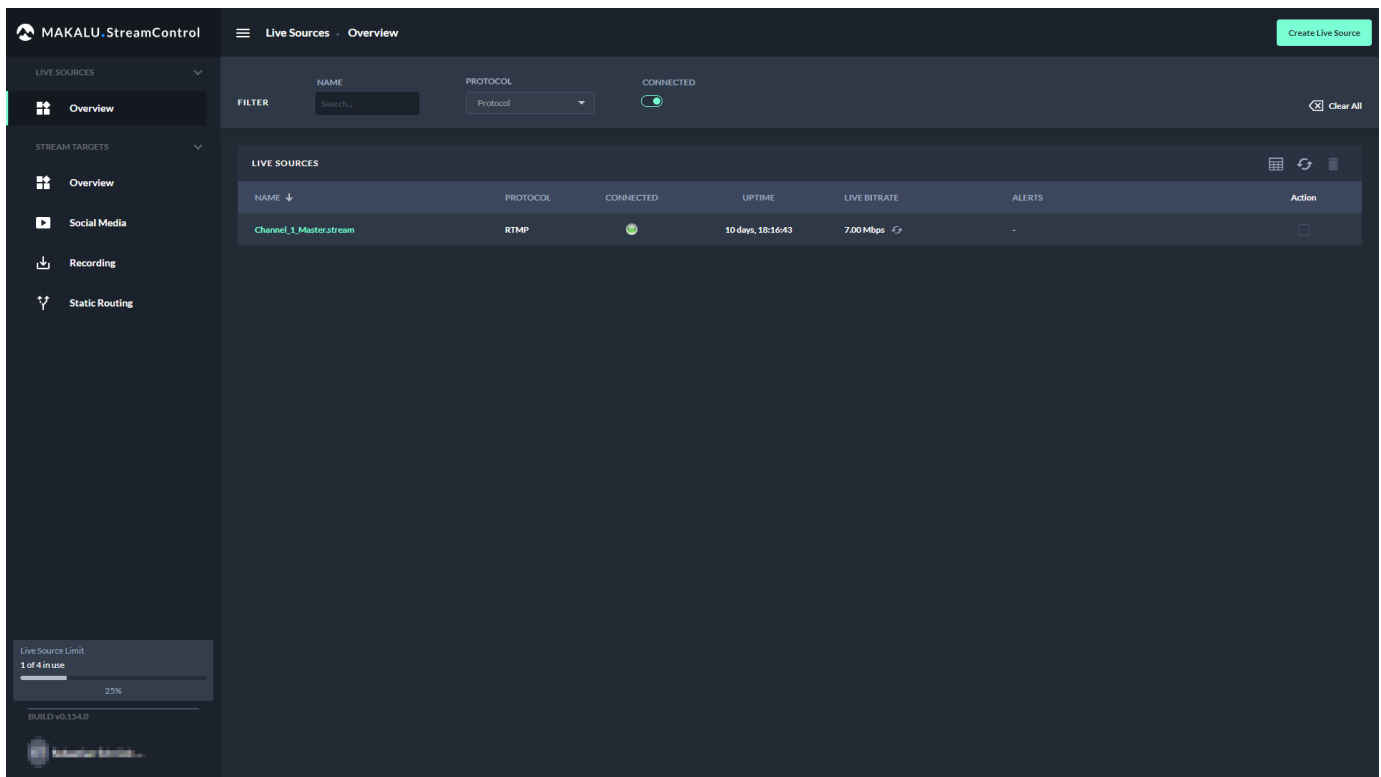


Figure: Makalu Stream Control - Live source overview

In the **Live Sources** area all currently available live sources are listed with basic information (e.g. name, protocol, status, uptime, live bitrate, and alerts). 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 e.g. search live sources by name, by status flags (connected, verified, etc.) or by protocol (RTMP, SRT, etc.).

8.2.2 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 Live Source**.
The Create A Live Source dialog is displayed.
3. Enter a name for the live source and select the protocol to be used.

Notice

The name of the live source must be unique.

Figure: Makalu Stream Control - Create live source

- (Optional) Depending on the selected protocol, additional configuration properties may be displayed. Set the values as required.

Notice

If you select e.g. protocol **RTMP** the additional property **On connect Authenticate** is available. If you enable it the URL of the created live source (which must be used to provide the source stream to Makalu) will include username and password for authentication.

- Click **Confirm**.

The live source is created and added to the live sources list. It is also available in Makalu Traffic as primary event and can be [added to shows](#). In Makalu Automation it is available under Media > Live, can be [previewed](#) and [added to a rundown](#).

Notice

You can now configure your device/software/encoder that provides the actual source stream 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. Afterwards start the stream. If everything is configured properly and the incoming stream is received correctly, the live source status changes from red (disconnected) to green (connected) and the preview can be started.

8.2.3 Previewing a live source

To preview a live source, proceed as follows:

- 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.

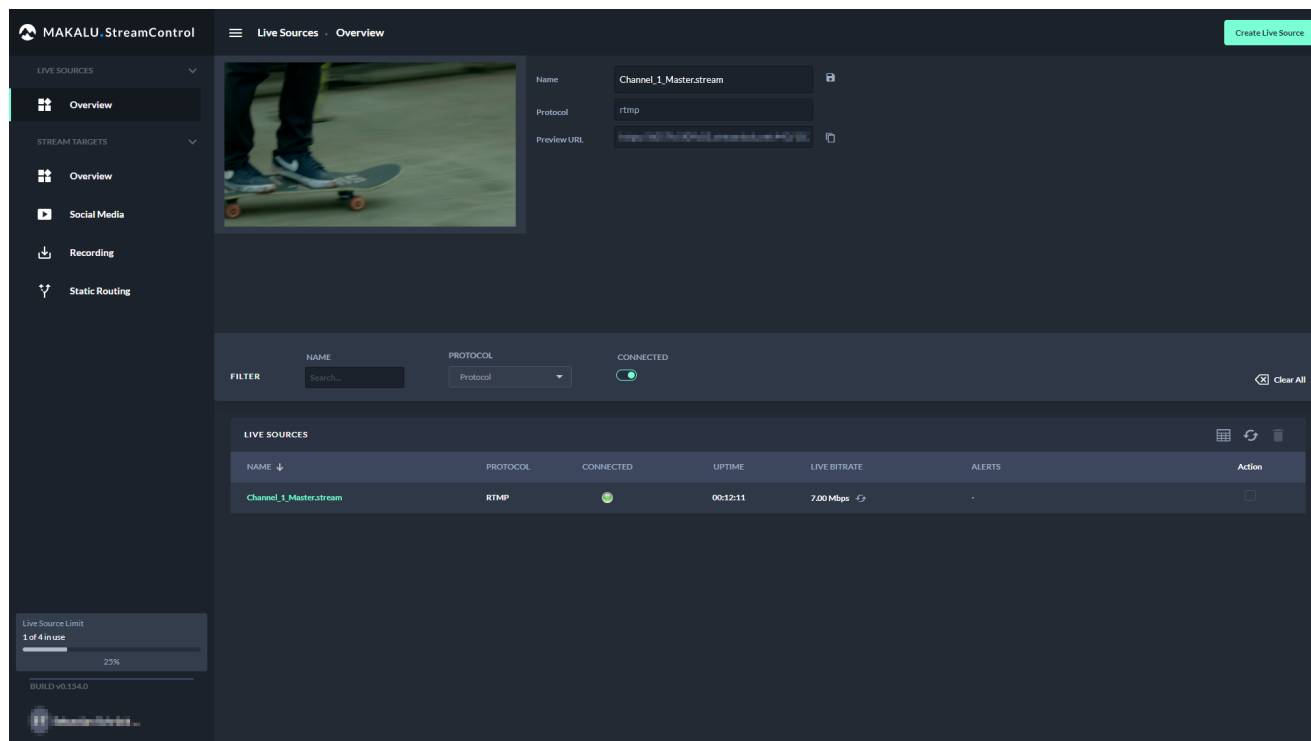


Figure: Makalu Stream Control - Live source preview

- Use the player controls to e.g. trigger pause, play or full screen view.

8.2.4 Editing a live source

Notice

You can only edit the name of a live source. All other settings cannot be changed as they are automatically generated.

To edit a live source, proceed as follows:

- 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 edited.

A preview player and detailed information about the live source are displayed at the top of the page.

- Edit the name of the live source.
- Click **Save**.

The changed live source configuration is saved.

8.2.5 Deleting a live source

To delete a live source, proceed as follows:

- 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 live source list.

8.3 Manage stream targets

8.3.1 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.

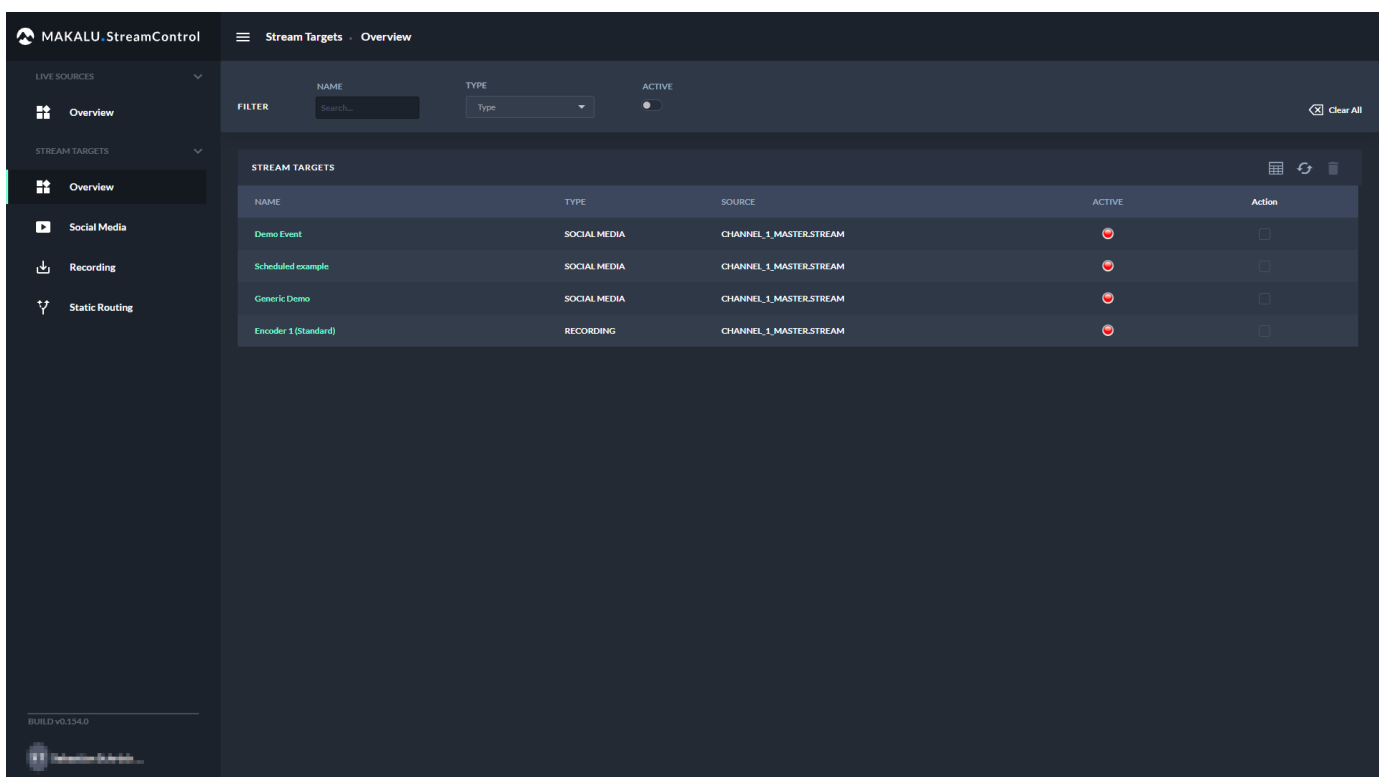


Figure: Makalu Stream Control - Stream target overview

In the **Stream Targets** area all currently available stream targets and jobs are listed with basic information (e.g. 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 you can e.g. search stream targets by name, by 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.

8.3.2 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:

1. In the navigation sidebar on the left select **Stream Targets > Static Routing**.

2. In the upper right, click **Add**.

The Create A Stream Target dialog is displayed.

3. Select the protocol to be used.

Depending on the selected protocol, different configuration properties are displayed.

4. Set all configuration properties as required.

CREATE A STREAM TARGET

PROTOCOL

RTMP

NAME ⓘ

e.g. myDestination-RTMP-720p

URL

e.g. rtmp://example.com:1935/StreamApp

STREAM KEY

e.g. StreamKey

USER NAME

User name

PASSWORD

Password

Cancel Confirm

Figure: Makalu Stream Control - Static routing stream target properties

5. Click **Confirm**.

The static routing stream target is created and added to the stream targets list with status inactive (red).

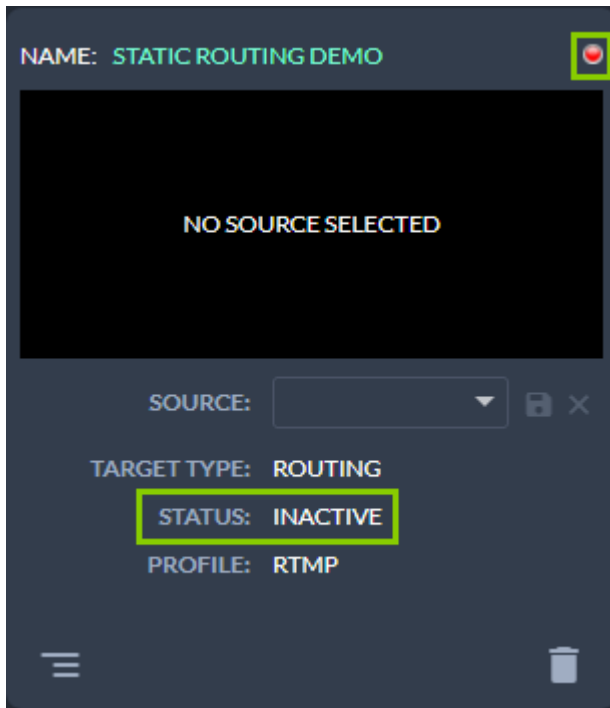


Figure: Makalu Stream Control - Static routing stream target created

6. 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 source and target are valid and the stream is running the status changes to active (green).

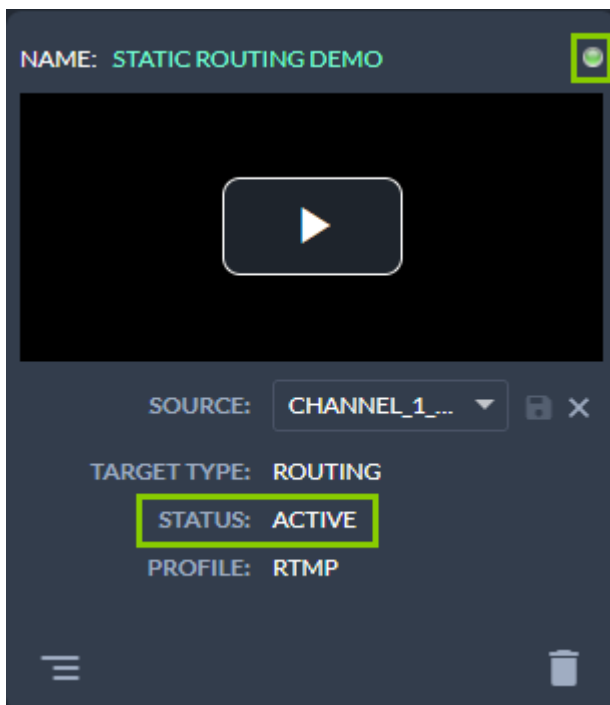


Figure: Makalu Stream Control - Active static routing stream target

Notice

To preview the live source, in the preview player click the **Play** icon and use the player controls to e.g. trigger a full screen preview.

8.3.3 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**.
2. Look for the target to be edited and in the bottom left of the corresponding tile click the **View and edit configuration data** icon.

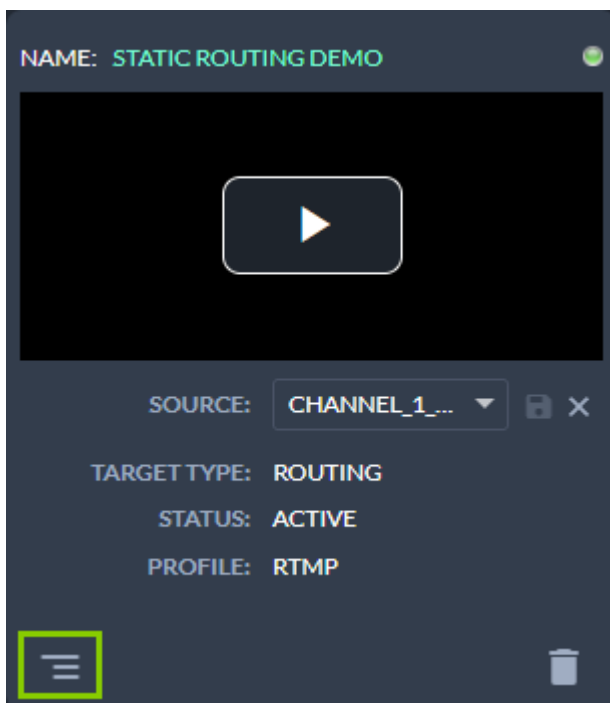


Figure: Makalu Stream Control - Open static routing stream target settings

The target settings are displayed.

3. Change the settings as required.

UPDATE STREAM TARGET

NAME

URL

STREAM KEY

Protected

USERNAME

PASSWORD

INFO

STREAM NAME	Qair-Demo
APPLICATION	Live
PROFILE	Rtmp

Cancel
Update

Figure: Makalu Stream Control - Update static routing stream target settings

4. Confirm your changes, by clicking **Update**.

The changed static routing stream target settings are saved.

8.3.4 Editing a social media or generic stream job

In the following a YouTube stream job is used as example for managing stream jobs. The same approach applies to generic stream jobs.

To edit a stream job, proceed as follows:

1. To get an overview of all available YouTube stream jobs, in the navigation sidebar on the left select **Stream Targets > Social Media**.
2. Look for the stream job to be edited and in the bottom left of the corresponding tile click the **View and edit configuration data** icon.

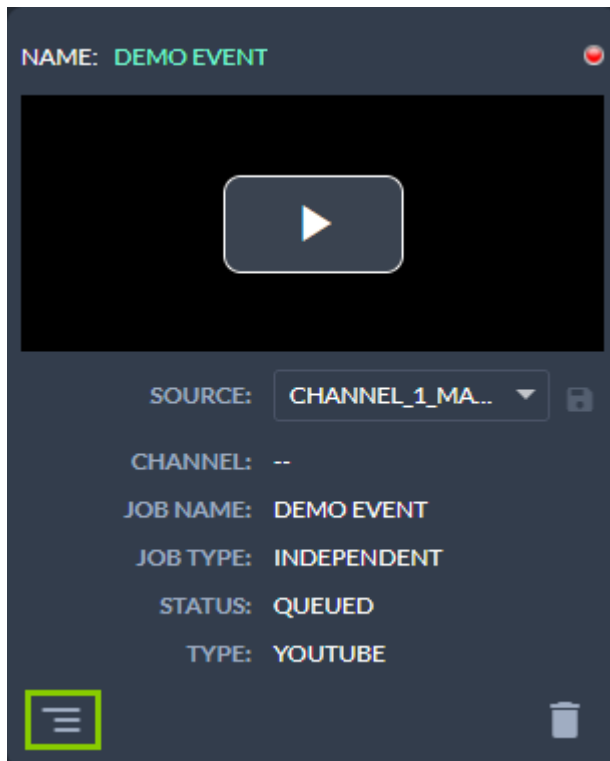


Figure: Makalu Stream Control - Open stream job settings

The target settings are displayed.

3. Change the settings as required.

UPDATE YOUTUBE STREAM

TITLE

Demo Event

START DATE

04/08/2021

START TIME

16 : 00 : 00 . 00

DESCRIPTION

--

INFO

STATUS	INACTIVE
SOURCE	CHANNEL_1_MASTER.STREAM
STREAMING CHANNEL NAME	YOUTUBE
CHANNEL NAME	--

Cancel

Update

Figure: Makalu Stream Control - Update stream job settings

4. Confirm your changes, by clicking **Update**.

The stream job settings are updated.

8.3.5 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 stream targets list.

8.3.6 Synchronizing stream targets between Wowza and Makalu

Under certain conditions (e.g. because of special customer requirements regarding the stream format or certain stream properties) it may not be possible to create a stream target via the default mechanism provided by Makalu Stream Control. In this case the corresponding stream target must be created manually via the Wowza Manager UI. Afterwards 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 that were created via the Wowza Manager UI and can be synchronized are listed.

3. Select one or more stream targets to be synchronized.

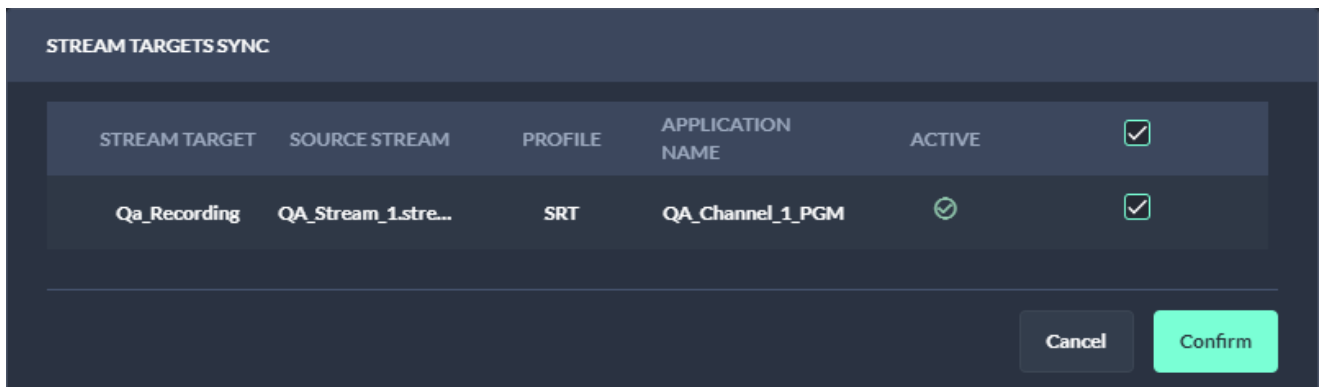


Figure: Makalu Stream Control - Synchronize stream targets

4. Click **Confirm**.

The selected stream targets are synchronized with Makalu and can afterwards be used like "regular" stream targets.

9. Social media streaming

Social media streaming is a Makalu module that allows you to distribute the output of each Makalu Automation playout channel as a stream to social media, video platforms and service providers.

9.1 Supported stream targets

Makalu supports the following target platforms/protocols:

- YouTube
- Facebook
- LinkedIn
- Twitch
- Generic RTMP (any target that supports RTMP streams)
- Generic RTMPS (any target that supports RTMPS streams)

Tip

Makalu also supports static routing stream targets that enable you to permanently stream any live source to any valid target, without having to schedule it in a rundown. These stream targets are managed via Makalu Stream Control and are described in section [Live sources and stream targets](#).

9.2 Types of stream jobs

Makalu differentiates between the following types of stream jobs, that can both be created via Makalu Automation:

Type	Description
Independent	<ul style="list-style-type: none"> • must be created manually • is independent of the rundown • does not have a time reference
Scheduled	<ul style="list-style-type: none"> • is created automatically when a playlist with an assigned stream target is added to the rundown • is assigned to a playlist, show or clip in the rundown • has a time reference • is recognizable by a small clock icon in the Platform column in the job list

9.3 Stream job metadata

Depending on the stream job type, different metadata must be provided when creating a new stream job. These differences are described in the following.

9.3.1 YouTube metadata

YouTube stream jobs allow you to provide the following metadata:

Metadata element	Mandatory	Description
Account	Yes	The YouTube account to be used as target (as configured via Makalu Configuration).
Source	Yes	The stream that is used as source and streamed to the target.
Event	Yes	The name/title of the YouTube event, that will be displayed for viewers on YouTube.
Description	No	The description of the YouTube event, that will be displayed for viewers on YouTube.
Starttime	Yes	The planned start date and time of the YouTube event.

9.3.2 Generic metadata

Generic stream jobs allow you to provide the following metadata:

Metadata element	Mandatory	Description
Target	Yes	The target platform/protocol to be used. Available options: <ul style="list-style-type: none"> • YouTube • Facebook • LinkedIn • Twitch • RTMP • RTMPS
Source	Yes	The stream that is used as source and streamed to the target.
Title	Yes	The title of the stream event.

Metadata element	Mandatory	Description
Description	No	The description of the stream event.
Stream Url	Yes	The target stream URL.
Stream Key	Yes	The stream key to be used.
Credentials	No	Enable to provide additional user credentials for authentication. Disable to send the stream without additional user credentials.
Username	No	The username to be used as part of the credentials (only available if the Credentials checkbox is activated).
Password	No	The password to be used as part of the credentials (only available if the Credentials checkbox is activated).
Starttime	Yes	The planned start date and time of the stream event.

9.4 Streaming workflow

9.4.1 Overview

To stream content, in summary the following steps are required:

1. Create a stream target via Makalu Configuration.

Notice

This is only required once for YouTube stream targets. If you want to stream to a single YouTube channel, you must create a stream target for the corresponding YouTube account. If you want to stream to multiple YouTube channels, you must create a stream target for each of your accounts.

Generic stream targets do not have to be created manually, as they are already created during the system provisioning.

2. Create an independent or scheduled stream job for the stream target via Makalu Traffic and/or Automation.
3. Manually prepare, start, and stop the stream via Makalu Automation.

9.4.2 Creating an independent YouTube stream job

To create an independent YouTube stream job, proceed as follows:

1. [Open Makalu Automation](#).
2. On the right side select the **Stream Targets** tab.
3. In the **Predefined Targets** section, click the “+” icon of the YouTube stream target to be used.

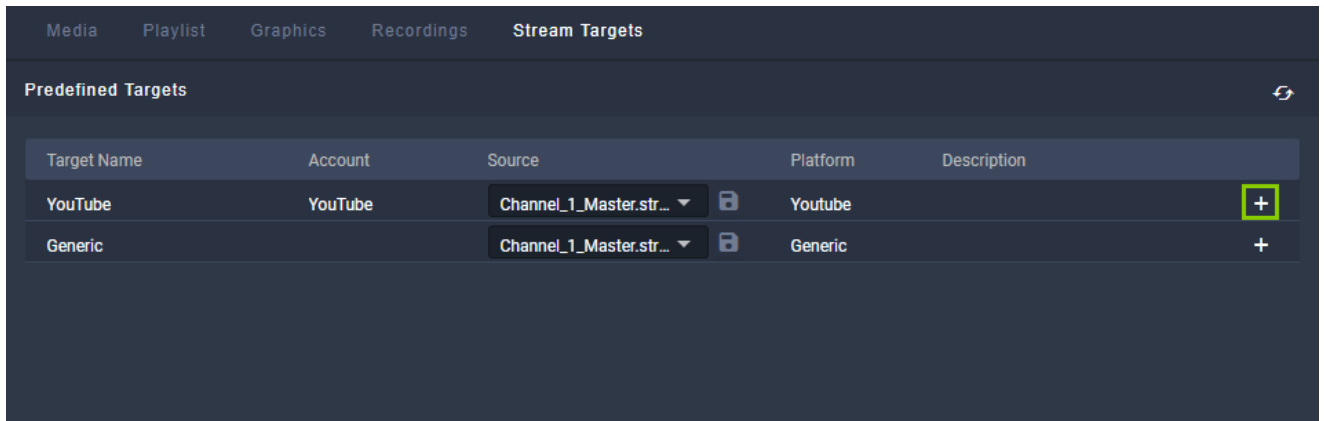


Figure: Makalu Automation - Create independent YouTube stream job

The metadata input screen is displayed.

CREATE AN INDEPENDENT YOUTUBE STREAM TARGET JOB

Enter the data of the independent youtube stream target job

Account*

Source*

Event*

Description

Starttime

hours minutes seconds frames

* This indicates mandatory fields, which must be filled in.

Figure: Makalu Automation - Create independent YouTube stream job - Metadata input screen

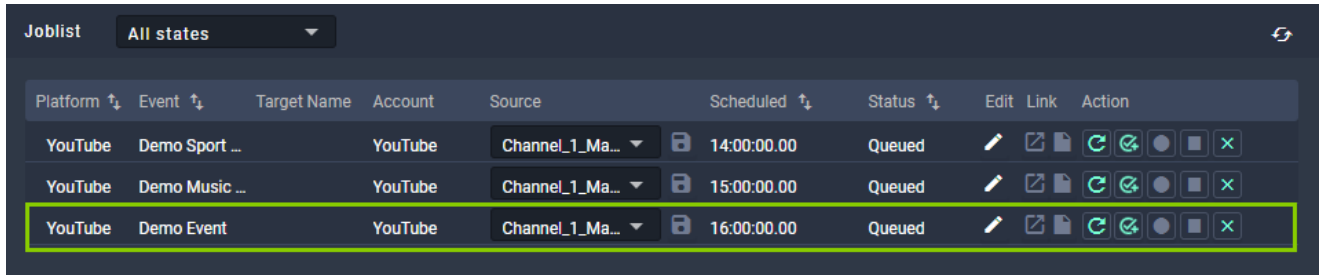
4. Enter the [metadata](#) of the stream target.

Notice

You can only apply the changes if all mandatory fields are filled in and the selected start time lies in the future.

5. Click **Apply**.

The stream job is created and added to the job list.



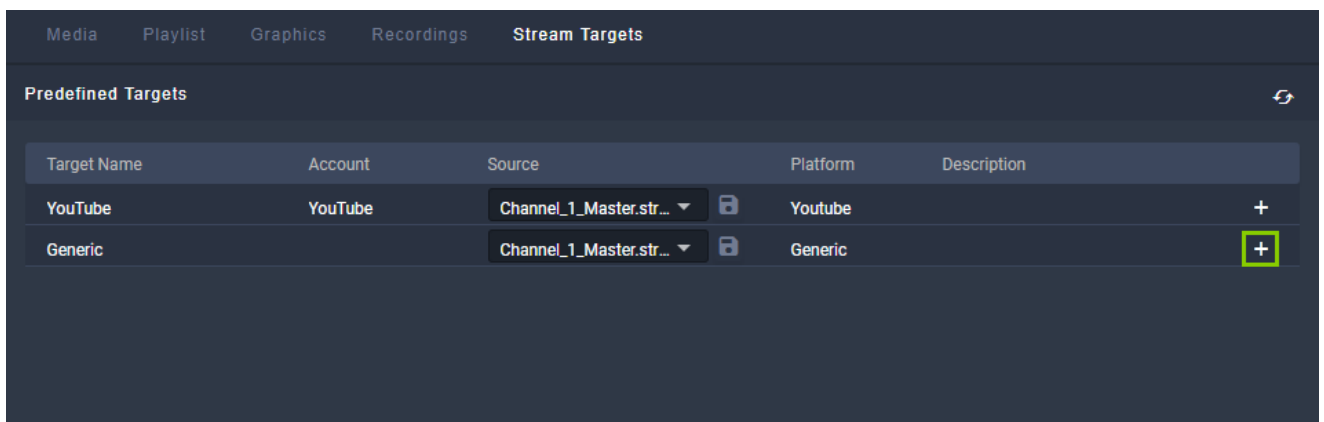
Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport ...		YouTube	Channel_1_Ma...	14:00:00.00	Queued			
YouTube	Demo Music ...		YouTube	Channel_1_Ma...	15:00:00.00	Queued			
YouTube	Demo Event		YouTube	Channel_1_Ma...	16:00:00.00	Queued			

Figure: Makalu Automation - Independent YouTube stream job created

9.4.3 Creating an independent generic stream job

To create an independent generic stream job, proceed as follows:

1. Open [Makalu Automation](#).
2. On the right side select the **Stream Targets** tab.
3. In the **Predefined Targets** section, click the “+” icon of the generic stream target to be used.



Target Name	Account	Source	Platform	Description
YouTube	YouTube	Channel_1_Master.str...	Youtube	+
Generic		Channel_1_Master.str...	Generic	+

Figure: Makalu Automation - Create independent generic stream job

The metadata input screen is displayed.

CREATE AN INDEPENDENT GENERIC STREAM TARGET JOB

Enter the data of the independent generic stream target job

Target* **RTMP**

Source* **Channel_1_Master.stream**

Title* Title

Description Description

Stream Url* Stream Url

Stream Key* Stream Key

Credentials

Username Username

Password Password

Starttime **04/08/2021** **00 : 00 : 00 . 00** **Now**

hours minutes seconds frames

* This indicates mandatory fields, which must be filled in.

Cancel **Apply**

Figure: Makalu Automation - Create independent generic stream job - Metadata input screen

4. Enter the [metadata](#) of the stream target.

Notice

You can only apply the changes if all mandatory fields are filled in and the selected start time lies in the future.

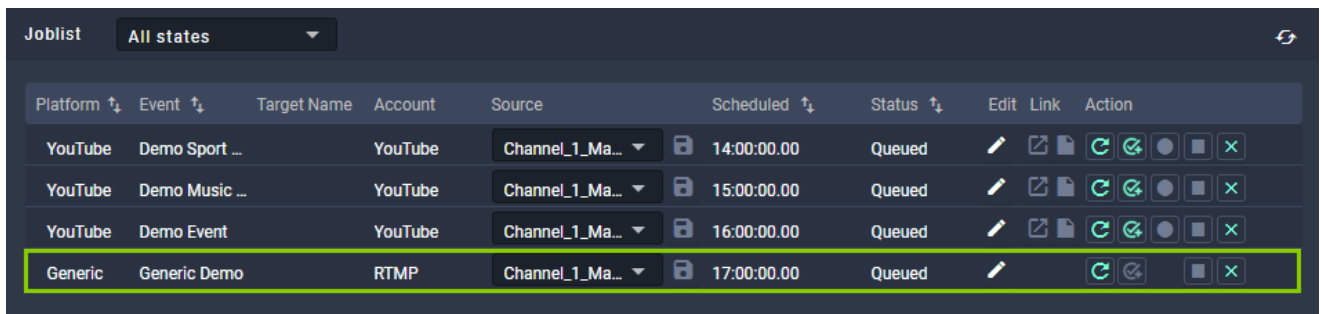
Tip

If you want to use the generic stream job for streaming to YouTube, you can retrieve the required values for **streamurl** and **streamkey** as follows:

- a. Log in to your YouTube account.
- b. In the upper right area click **Create > Go Live**.
The required information is displayed in the Stream Settings section.
- c. Copy the stream key and the stream URL and paste them into the required mandatory fields.

5. Click **Apply**.

The stream job is created and added to the job list.



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport ...		YouTube	Channel_1_Ma...	14:00:00.00	Queued			
YouTube	Demo Music ...		YouTube	Channel_1_Ma...	15:00:00.00	Queued			
YouTube	Demo Event		YouTube	Channel_1_Ma...	16:00:00.00	Queued			
Generic	Generic Demo		RTMP	Channel_1_Ma...	17:00:00.00	Queued			

Figure: Makalu Automation - Independent generic stream job created

9.4.4 Creating a scheduled stream job

In summary, creating a scheduled stream job requires the following steps:

1. Use Makalu Traffic to assign a stream target to a clip, playlist, or show.
2. Send the corresponding playlist (that includes the show or clip you assigned the stream target to) to payout.
3. Use Makalu Automation to add the corresponding playlist to the rundown.

These steps are described in detail below, based on the example of adding a YouTube stream target to a clip. They apply to any type of stream target and the mechanism is the same for clips, shows and playlists.

Use Makalu Traffic to assign a stream target to a clip

1. [Open Makalu Traffic](#).
2. In the left sidebar, select **Shows**.
The available shows are displayed.
3. Select the show that contains the clip to which you want to add a stream target, by clicking the show title.
The show properties are displayed.
4. Select the clip to which you want to assign the stream target, by clicking the clip title.
The clip properties are displayed.
5. On the right in the **Objects** area select **Stream Targets**.

Available stream targets are displayed below.

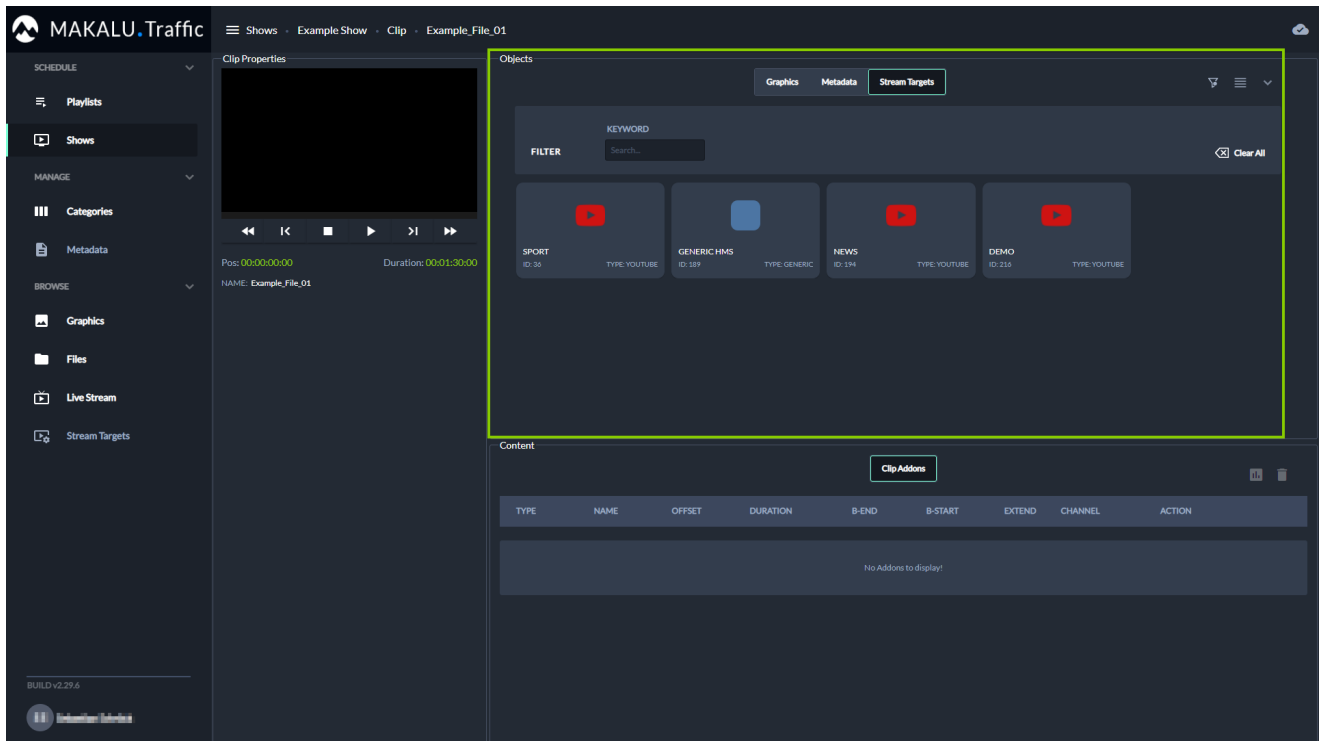




Figure: Makalu Traffic - Available stream targets

Tip

You can switch between a presentation as card or list view, by clicking the **Enable card view** icon  or **Enable list view** icon  in the top right.

6. (Optional) To search for stream targets, use the available filters (e.g. Keyword).
7. To add a stream target to the clip, select a stream target and drag it on the Clip Addons list.

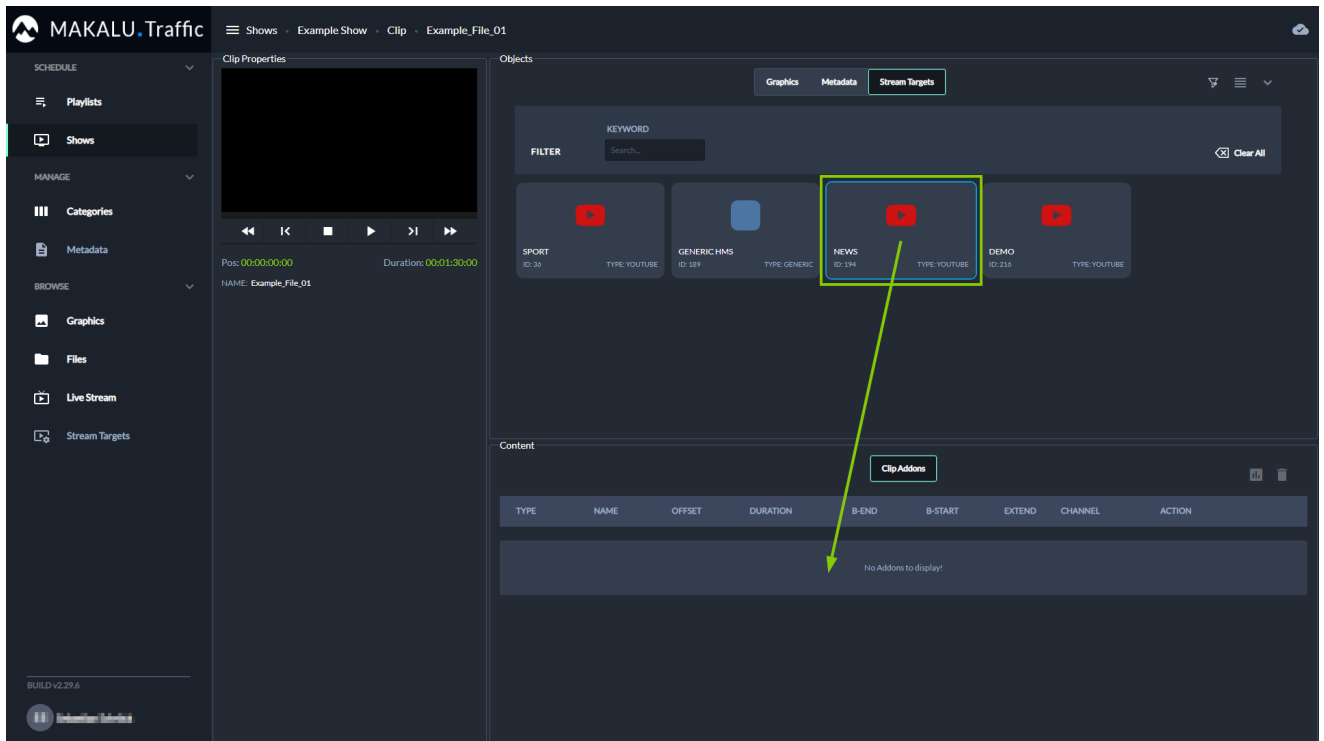


Figure: Makalu Traffic - Add stream target to clip

The stream target is added to the Clip Addons list.

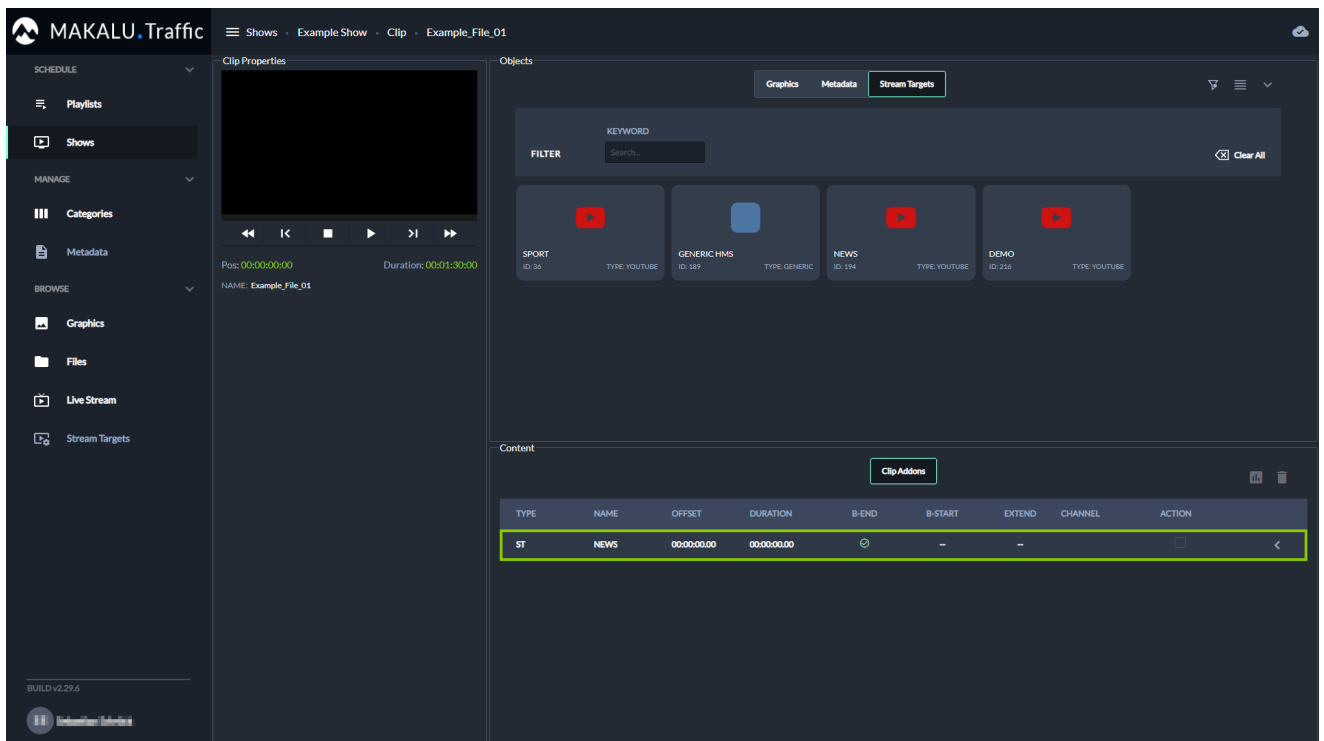





Figure: Makalu Traffic - Stream target added to clip

8. (Optional) Repeat the previous two steps to add more stream targets to the clip.
9. To edit the properties of the added stream target, expand it by clicking the **Expand** icon  on the right.


The addon properties are displayed in the Addon details area.

Tip

You can expand and collapse the **Objects** area via the **Expand**  and **Collapse**  icons in the top right. This is useful if you want to display an extensive list of addon properties. Collapsing the **Objects** area allows you to use most of the right side for displaying the details of an addon.

Tip

To delete an added stream target, proceed as follows:

- 1 - Select one or more stream targets to be deleted, by activating the corresponding **Action** checkbox(es).
- 2 - Click the **Delete Addon** icon .
- 3 - In the subsequently displayed dialog, click **Confirm**.

The clip properties are saved automatically.

Send the corresponding playlist to playout

Send the playlist (that contains the clip to which you added the stream target) to playout as described in section [Sending a playlist to playout](#)

The playlist with the assigned stream target is made available for the selected channel in Makalu Automation.

Use Makalu Automation to add the corresponding playlist to the rundown

Add the playlist to the rundown as described in section [Adding a playlist to a rundown](#).

The playlist with the assigned stream target is added to the rundown in Makalu Automation.

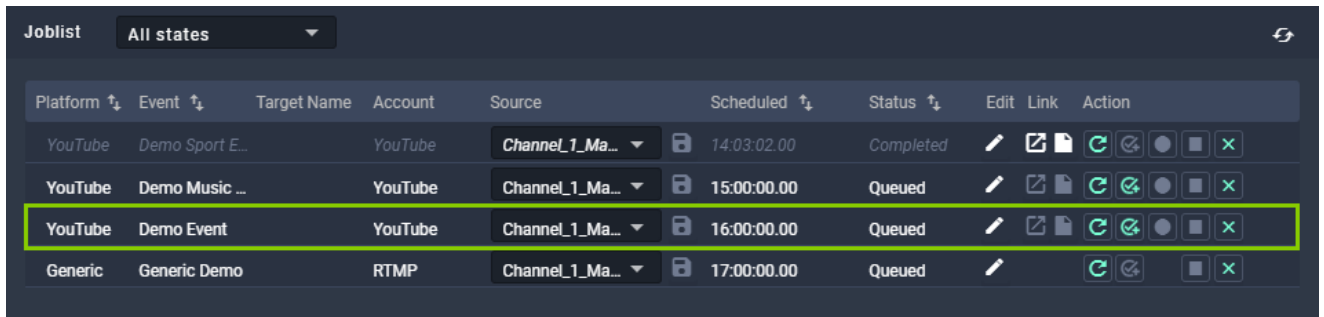
9.4.5 Starting a YouTube stream

To start a YouTube stream, proceed as follows:

1. [Open Makalu Automation](#).
2. Select the **Stream Targets** tab.
3. If the corresponding stream job in the **Joblist** is in status **Unknown**, wait until it changes to **Queued**.

Notice

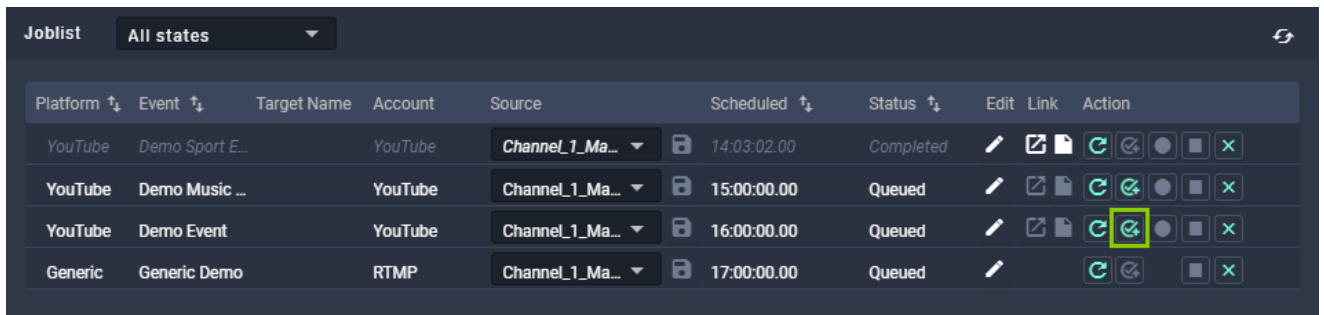
If the corresponding stream job was added to the job list shortly before, this may take a few seconds.



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport E...		YouTube	Channel_1_Ma...	14:03:02.00	Completed			
YouTube	Demo Music ...		YouTube	Channel_1_Ma...	15:00:00.00	Queued			
YouTube	Demo Event		YouTube	Channel_1_Ma...	16:00:00.00	Queued			
Generic	Generic Demo		RTMP	Channel_1_Ma...	17:00:00.00	Queued			

Figure: Makalu Automation - YouTube stream job in status "Queued"

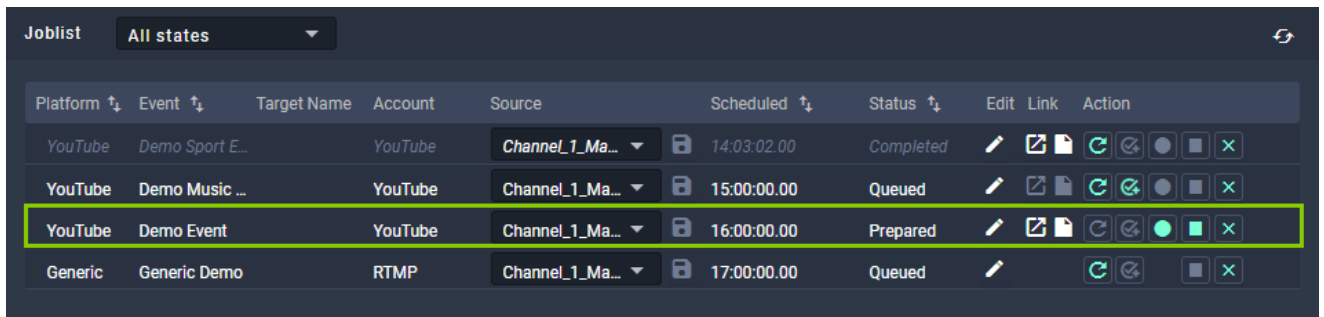
4. If the stream job is in status **Queued**, in the **Action** column click the **Prepare** icon.



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport E...		YouTube	Channel_1_Ma...	14:03:02.00	Completed			
YouTube	Demo Music ...		YouTube	Channel_1_Ma...	15:00:00.00	Queued			
YouTube	Demo Event		YouTube	Channel_1_Ma...	16:00:00.00	Queued			
Generic	Generic Demo		RTMP	Channel_1_Ma...	17:00:00.00	Queued			

Figure: Makalu Automation - Prepare YouTube stream job

The stream job status first changes to "Preparing" and after a few seconds to "Prepared".



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport E...		YouTube	Channel_1_Ma...	14:03:02.00	Completed			
YouTube	Demo Music ...		YouTube	Channel_1_Ma...	15:00:00.00	Queued			
YouTube	Demo Event		YouTube	Channel_1_Ma...	16:00:00.00	Prepared			
Generic	Generic Demo		RTMP	Channel_1_Ma...	17:00:00.00	Queued			

Figure: Makalu Automation - Prepared YouTube stream job

Tip

When the stream job changes the status to **Prepared**, the corresponding event becomes available on YouTube.

To access the event, click the  **Open YouTube in new tab** icon.

The YouTube event opens in a new tab.

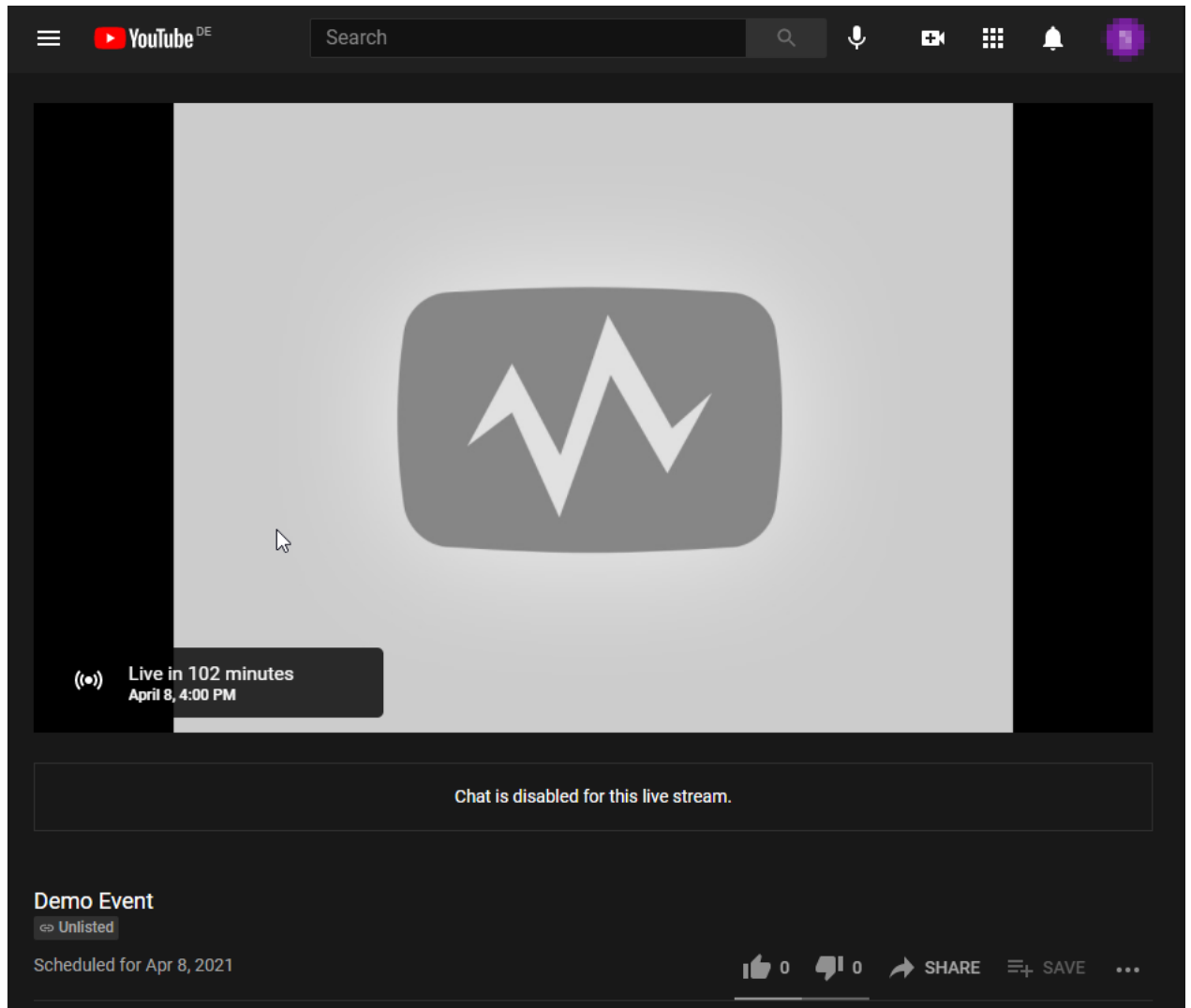


Figure: Makalu Automation - Stream event becomes available on YouTube

- To start the stream, click the **Go live** icon.

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action	
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:03:02.00	Completed					
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued					
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Prepared					
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Queued					

Figure: Makalu Automation - Go live on YouTube

The stream job status changes to "Starting" and then to "Running". From this point on the actual stream can be viewed on YouTube.

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:03:02.00	Completed				
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued				
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Running				
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Queued				

Figure: Makalu Automation - Running YouTube stream job

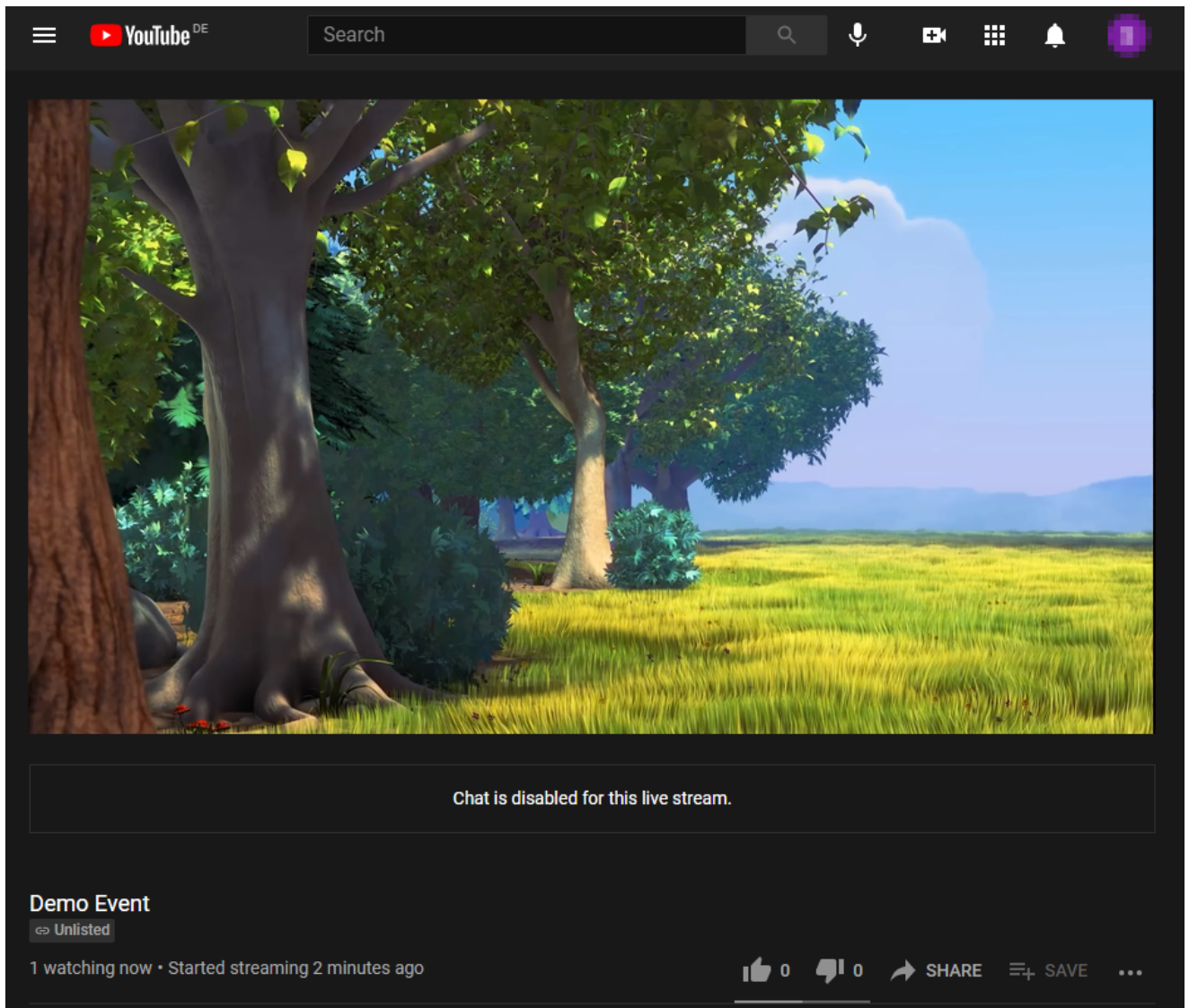


Figure: Makalu Automation - Viewing the stream on YouTube

9.4.6 Stopping a YouTube stream

To stop a YouTube stream, proceed as follows:

1. Open Makalu Automation.
2. Select the **Stream Targets** tab.
3. Click the **Stop** icon of the stream job to be stopped.

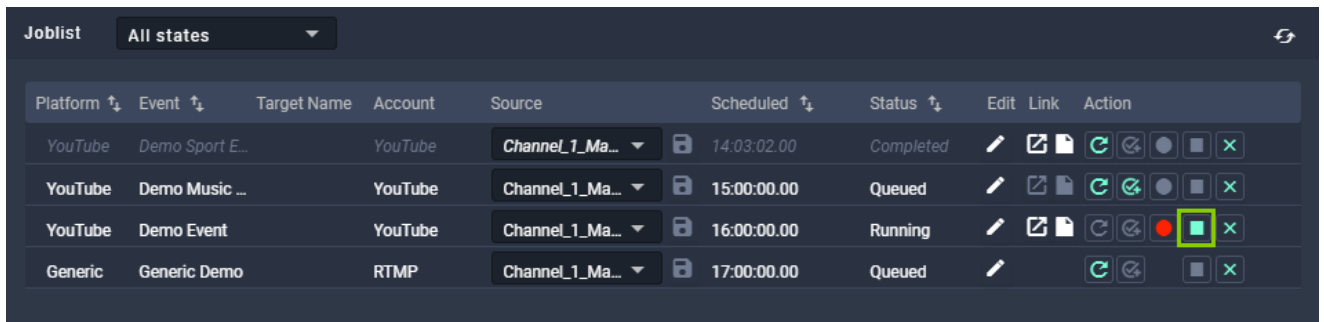


Figure: Makalu Automation - Stopping a YouTube stream job

The stream job status changes from "Running" to "Stopping" to "Completed". The stream event on YouTube is finished.

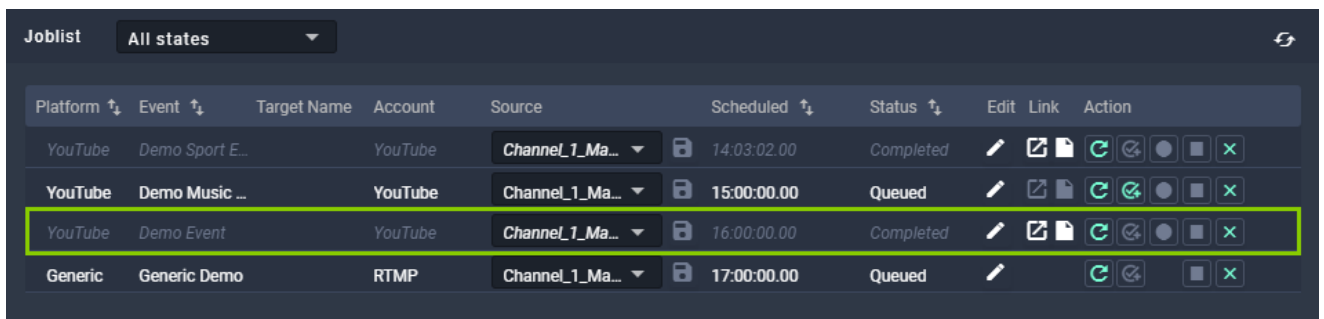


Figure: Makalu Automation - Completed YouTube stream job

9.4.7 Restarting a completed YouTube stream

To restart a completed YouTube stream, proceed as follows:

1. Open Makalu Automation.
2. Select the **Stream Targets** tab.
3. Click the **Queue** icon of the completed YouTube stream to be restarted.

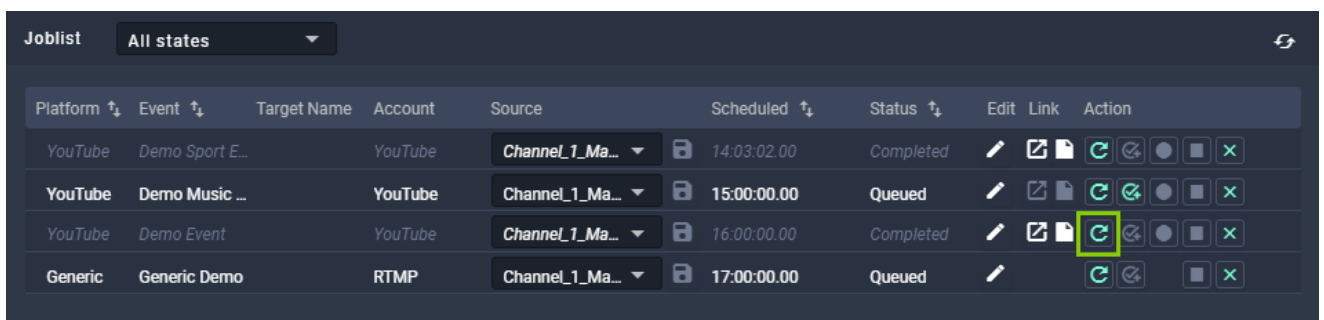


Figure: Makalu Automation - Restart completed YouTube stream job

4. Repeat steps 3-5 described in section [Starting a YouTube stream](#)

9.4.8 Accessing a YouTube stream and sharing the stream link

Notice

A YouTube stream event is not available until the status of the corresponding stream job changes to **Prepared**.

Notice

Privacy settings and access permissions affect who can access a YouTube stream.

To access a YouTube stream, proceed as follows:

1. Open [Makalu Automation](#).
2. Select the **Stream Targets** tab.
3. In the **Joblist** click the **Open YouTube in new tab** icon of the corresponding stream job.

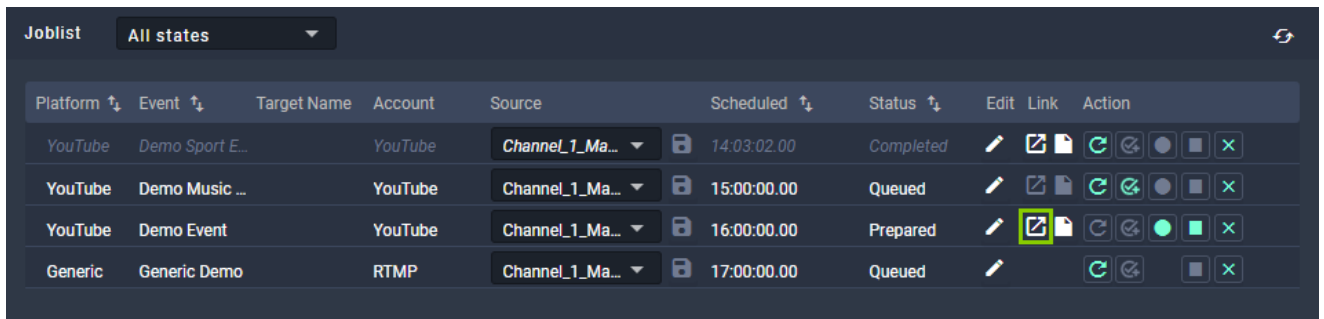


Figure: Makalu Automation - Accessing a YouTube stream

The YouTube stream opens in a new tab.

To share the stream link, proceed as follows:

1. In the **Joblist** click the **Copy to clipboard** icon of the corresponding stream job.

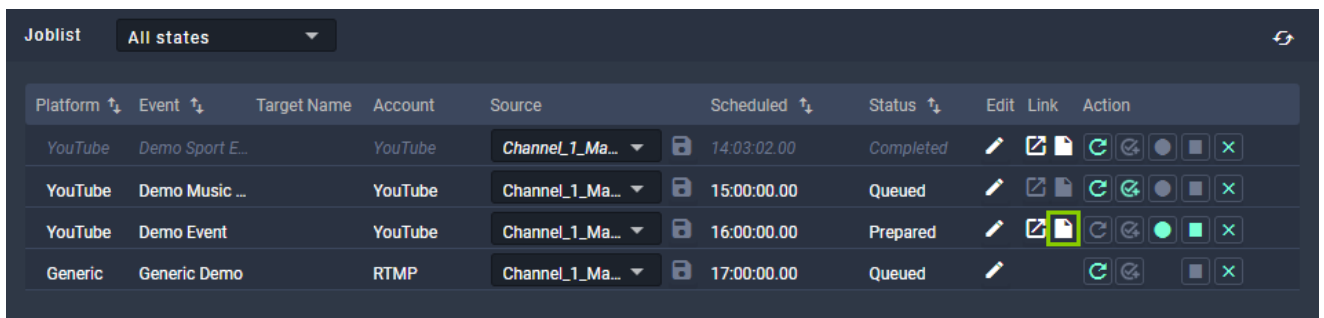


Figure: Makalu Automation - Sharing a YouTube stream link

2. Share the copied link, e.g. by sending it via email or sharing it via social media.

9.4.9 Starting a generic stream

To start a generic stream, proceed as follows:

1. Open [Makalu Automation](#).
2. Select the **Stream Targets** tab.

Notice

The generic stream job to be started should be in status **Queued**.

3. In the **Action** column click the **Prepare** icon of the generic stream job to be started.

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Queued	[Prepare icon highlighted]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed	[Prepare]	[Edit]	[Link]	[Stop] [Close]

Figure: Makalu Automation - Prepare generic stream job

The status of the generic stream job changes to "Preparing" and then to "Prepared".

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Prepared	[Prepare icon highlighted]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed	[Prepare]	[Edit]	[Link]	[Stop] [Close]

Figure: Makalu Automation - Prepared generic stream job

4. To start the stream, click the **Start** icon.

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Prepared	[Start icon highlighted]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued	[Prepare]	[Edit]	[Link]	[Stop] [Close]
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed	[Prepare]	[Edit]	[Link]	[Stop] [Close]

Figure: Makalu Automation - Start generic stream

The stream job status changes to "Started" and then to "Running".

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP		Channel_1_Ma...	17:00:00.00	Running			Stop, Refresh, Close
YouTube	Demo Event	YouTube		Channel_1_Ma...	16:00:00.00	Queued			Stop, Refresh, Close
YouTube	Demo Music ...	YouTube		Channel_1_Ma...	15:00:00.00	Queued			Stop, Refresh, Close
YouTube	Demo Sport E...	YouTube		Channel_1_Ma...	14:00:00.00	Completed			Stop, Refresh, Close

Figure: Makalu Automation - Generic stream job started

From this point on the stream is running and sent to the selected stream URL.

Notice

How you can access the stream depends on the selected target. If you stream to platforms like YouTube, Facebook, LinkedIn, or Twitch, you can access the stream directly via the corresponding target platform.

If you stream via RTMP or RTMPS to a streaming server (e.g. Wowza), you can access the stream based on the options the server provides. This could for example be an HLS preview of the stream. In this case you can access the stream via the corresponding URL.

Notice

Not all web stream formats can be played directly in Google Chrome. Depending on the format of the provided web stream, playback may only be possible via additional browser add-ons.

This e.g. applies to HLS streams that are provided as M3U8 playlist files. To open these streams in Chrome, you must install an appropriate add-on, like [Play HLS M3u8](#). If the add-on is installed, the stream is opened and played automatically. Otherwise only the corresponding M3U8 file is downloaded.

9.4.10 Stopping a generic stream

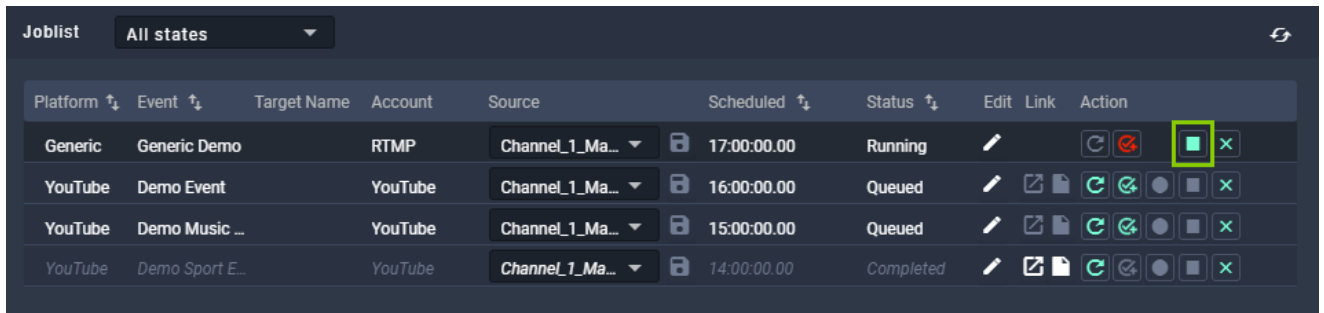
To stop a generic stream, proceed as follows:

1. [Open Makalu Automation](#).
2. Select the **Stream Targets** tab.

Notice

The generic stream job to be stopped should be in status **Started**.

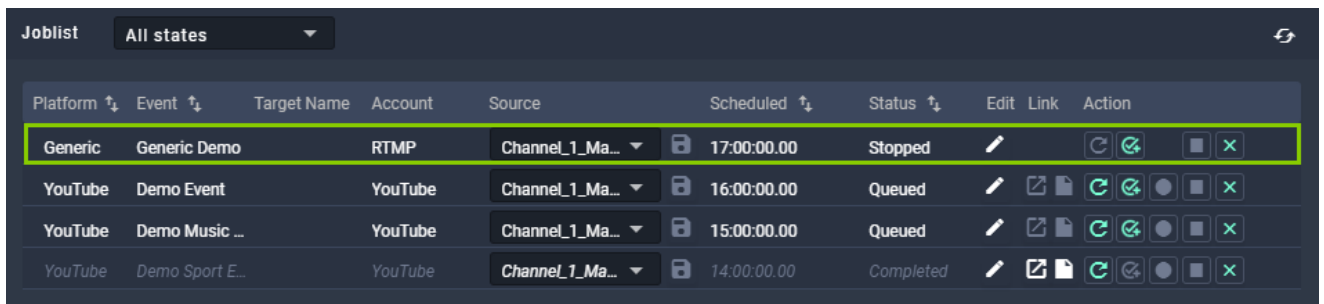
3. To stop a generic stream, click the **Stop** icon.



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Running				Stop (highlighted)
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued				
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued				
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed				

Figure: Makalu Automation - Stop generic stream

The generic stream is stopped and the status changes from "Started" to "Stopped".



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Stopped				Start (highlighted)
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued				
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued				
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed				

Figure: Makalu Automation - Generic stream stopped

9.4.11 Restarting a completed generic stream

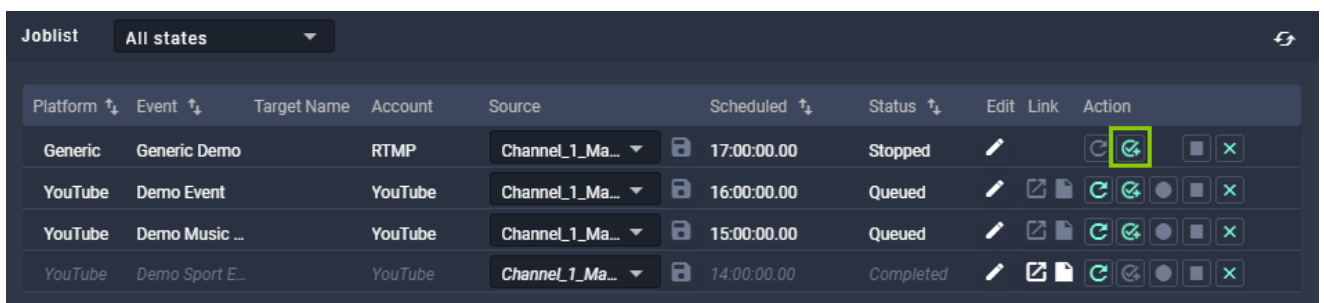
To restart a completed generic stream, proceed as follows:

1. Open Makalu Automation.
2. Select the **Stream Targets** tab.

Notice

The generic stream job to be stopped should be in status **Stopped**.

3. Click the **Start** icon of the generic stream job to be restarted.



Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Stopped				Start (highlighted)
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued				
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued				
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed				

Figure: Makalu Automation - Restart generic stream

The stream is restarted and the status changes from "Stopped" to "Started" and then to "Running".

The screenshot shows a 'Joblist' interface with a dropdown menu set to 'All states'. Below the header, there is a table with columns: Platform, Event, Target Name, Account, Source, Scheduled, Status, Edit, Link, and Action. The first row is highlighted with a green border. The 'Action' column for this row contains a red refresh icon, indicating the stream has been restarted.

Platform	Event	Target Name	Account	Source	Scheduled	Status	Edit	Link	Action
Generic	Generic Demo	RTMP	Channel_1_Ma...	17:00:00.00	Running	[Pencil]	[Refresh]	[Close]	
YouTube	Demo Event	YouTube	Channel_1_Ma...	16:00:00.00	Queued	[Pencil]	[Link]	[Refresh]	[Close]
YouTube	Demo Music ...	YouTube	Channel_1_Ma...	15:00:00.00	Queued	[Pencil]	[Link]	[Refresh]	[Close]
YouTube	Demo Sport E...	YouTube	Channel_1_Ma...	14:00:00.00	Completed	[Pencil]	[Link]	[Refresh]	[Close]

Figure: Makalu Automation - Generic stream restarted

10. Recording

Recording is an optional Makalu module that enables you to record multiple source/input streams at the same time in different formats (profile-based). It can be used e.g. for live recordings or compliance recording.

10.1 Encoder types

The modules that are used for creating recordings are internally referred to as "encoders". Makalu provides the following types of encoders:

Encoder type	Features
Standard	Stream recording (in/out) with MP4 file output
Broadcast	Stream recording (in/out) with broadcast file format output (e.g. XDCAM-HD422, AVC-Intra or XAVC) and growing file support

10.2 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:

Job type	Description
Crash	The recording can be started immediately using Makalu Automation (manual start and stop).
Schedule	The recording can be scheduled for a fixed time and period (automatic start and stop or automatic start and manual stop). Scheduled recording jobs can be created via Makalu Automation and Makalu Traffic.

Notice

The decision which application to use for creating a recording job depends on the workflow.

Makalu Automation is designed for editing the rundown at short notice. It enables you to create recording jobs immediately and independent of the used playlists and shows.

Makalu Traffic is designed for creating reusable templates for shows and playlists. It enables you to automatically create recording jobs whenever a specific show template or playlist is used in the rundown.

10.3 Creating a recording job via Makalu Traffic

Notice

In the following it is assumed that you already have created a show and want to add a recording job to this existing show. For information about how to create a new show, see section [Schedule \(Creating a show\)](#).

You can also add recording jobs to playlists in a similar way. For more information about how to edit a playlist, see section [Schedule \(Editing a playlist\)](#).

To add a recording job to a show, proceed as follows:

1. [Open Makalu Traffic](#).
2. Either use the **Shows** area in the sidebar on the left or the **list of shows** on the right to search for the show to be edited.
3. Click the name of the show to be edited.
The show details are opened in a new browser tab.
4. In the sidebar on the left select **Secondary Events > Recordings**.
The list of available [encoders](#) is displayed.
5. Select the encoder type to be added and drag it on the **Drop Zone** in the **Show Addons** area.
6. Edit the [recording properties](#), by selecting the corresponding **Recording** event in the **Show Addons** list and click the **Edit Addon** icon.
The recording details are displayed to the right.

Figure: Makalu Traffic - Recording properties

Property	Value
SOURCESTREAM	[Dropdown]
RECORDCHANNEL	Encoder 1 (Broadcast)
JOBNAME	Example
DESTPATH	Clips
PROFILE	MP4

Update

Figure: Makalu Traffic - Recording properties

7. Edit the properties as required.
8. To save your changes, click **Update**.

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.

10.4 Creating a recording job via Makalu Automation

10.4.1 Creating a crash recording job

To create a crash recording job, proceed as follows:

1. [Open Makalu Automation](#).
2. On the right side select the **Recordings** tab.

The recording controls are displayed.

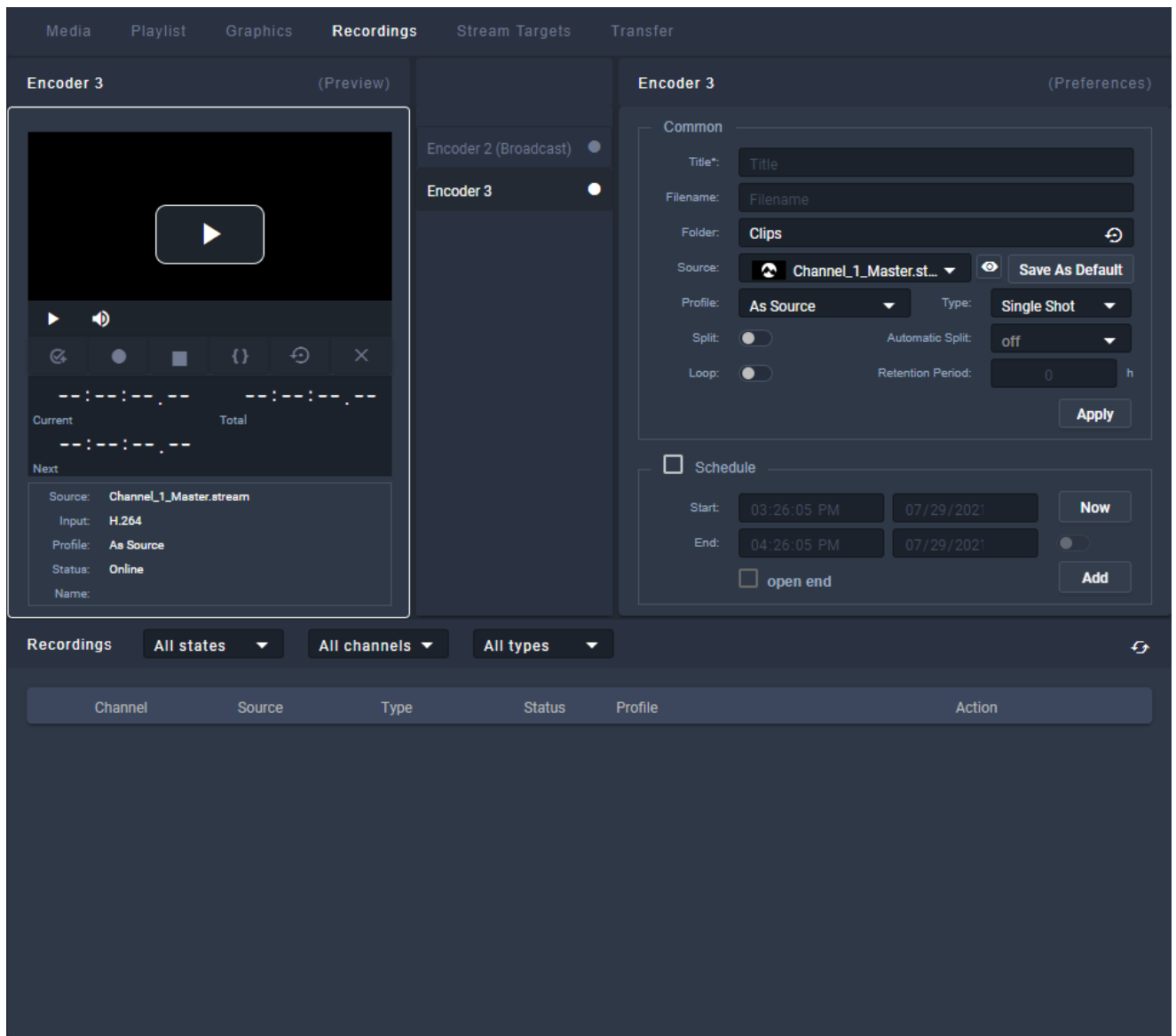


Figure: Makalu Automation - Recordings

3. In the encoder list select the encoder to be used for the recording.
4. In the **Preferences** area edit the [recording settings](#).

i Notice

To create a recording job you must enter at least the title.

5. Select the **Folder** where to save the recording.
6. Select the **Source** to be recorded.

💡 Tip

To watch a preview of the selected source, click the **Play** icon in the **Preview** area of the selected encoder.

7. (Optional) If you want to reuse the recording job and create multiple recordings, select **Type Multi Shot**. To create only a single recording, leave the default **Type Single Shot**.
8. (Optional) If you want to split the recording automatically, enable **Split** and select an **Automatic Split** interval. To split a recording manually, select **Automatic Split off**.
9. (Optional) If you want to delete the recording automatically after a predefined time, enable **Loop** and select a **Retention Period**.
10. Click **Apply**.

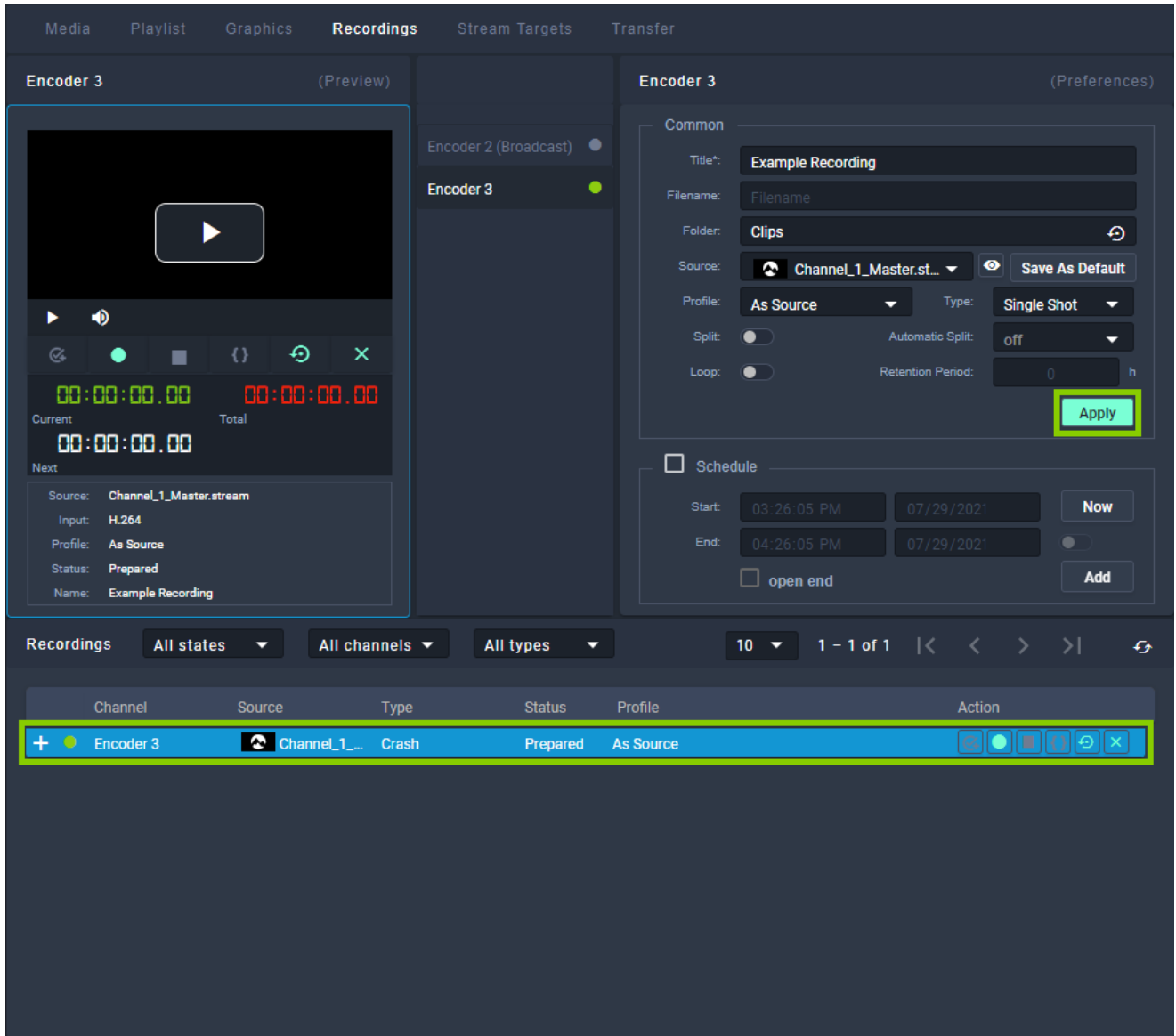


Figure: Makalu Automation - Apply crash job

The crash job is created, added to the Recordings list, and prepared. There you can control it manually. For more information see section [Controlling a recording job](#).

10.4.2 Creating a scheduled recording job

To create a scheduled recording job, proceed as follows:

1. Repeat steps 1 to 9 as described in section [Creating a crash recording job](#).

2. Enable **Schedule**.

The screenshot shows the 'Recordings' tab in the Makalu Automation interface. On the left, there is a preview window for 'Encoder 2 (Broadcast)' showing a play button and a progress bar. In the center, there is a list of encoders: 'Encoder 2 (Broadcast)' (active) and 'Encoder 3'. On the right, the 'Encoder 2 (Broadcast)' settings are shown in the 'Preferences' view. The 'Common' section includes fields for Title, Filename, Folder, Source, Profile, Type, Split, Automatic Split, Loop, and Retention Period. The 'Schedule' section is highlighted with a red box and contains a checked 'Schedule' checkbox, 'Start' time and date (05:00:00 PM, 07/29/2021), 'End' time and date (06:00:00 PM, 07/29/2021), an 'open end' checkbox, and an 'Add' button.

Figure: Makalu Automation - Add schedule job

3. Enter a **Start** time and date or, if you want to use the current time and date, click **Now**.
4. Enter an **End** time and date or, if you want to enter a duration, enable the toggle switch to the right of the end date. Alternatively you can create a scheduled recording job without specifying an end time, by selecting **Open end**.
5. Click **Add**.

The scheduled job is created and added to the recording list.

10.4.3 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.

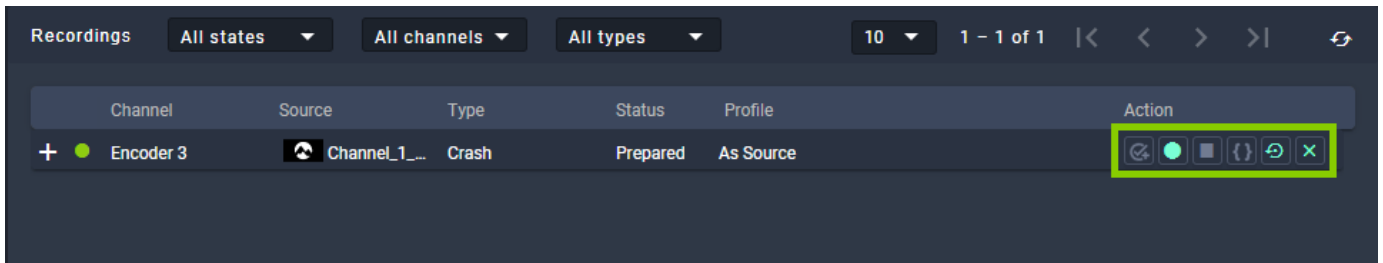





Figure: Makalu Automation - Controlling recordings


- To prepare a recording job, click the **Prepare** icon .


i Notice


Crash recording jobs are prepared automatically.

- To start a recording job, click the **Start record** icon .

- To stop a recording job, click the **Stop record** icon .


- To split a recording job, click the **Split record** icon .

- To cancel a recording job, click the **Cancel record** icon .

- To delete a recording job, click the **Delete record** icon .

10.4.4 Deleting a recording job

To delete a recording job, proceed as follows:


1. In the **Recordings** section, select the recording job to be deleted.
2. Click the **Delete record** icon .
3. Confirm the displayed dialog by clicking **Yes**.

The recording job is deleted.

10.4.5 Previewing a recorded file

To preview a recorded file, proceed as follows:

1. On the right side select the **Media** tab.
2. Below the preview player select the source **Playoutdata**.
3. Search the file to be previewed either by using the search field or by selecting the corresponding folder.

4. Select the file to be previewed and either add it to the preview player via drag and drop or by clicking **Play**  on the right side.

The file is opened in the preview player. Use the player controls to control the preview.

11. Ad triggering

Notice

Dynamic ad triggering requires the optional Makalu SCTE-35 addon.

The dynamic ad triggering feature enables you to signal ad insertion opportunities that can be used by downstream systems to automatically replace these parts of your content.

The underlying workflow is based on the SCTE-35 standard and enables you to schedule splicing event trigger points in your program that are afterwards included in the playout output data stream. These splicing trigger points can be evaluated by downstream systems to perform server-side or player-side ad insertion. In addition to ad insertion, SCTE-35-based splicing events can be used for various other purposes, e.g. for regional content variations (opt-out), for blanking content on the web or to trigger recording servers.

Shortly before a splicing event is sent by the playout, the event itself is announced. For this purpose additional information is included in the playout output stream. The time interval for announcing the upcoming splicing event is configurable and usually set between one and four seconds before the start of the actual event.

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 shows and clips via Makalu Automation.

11.1 Splicing event types

Makalu provides the following splicing event types:


Makalu splicing event type	Matching splice command according to SCTE-35 specification
SCTE-35 Avail	Corresponds to the legacy splice command <code>splice_insert()</code>
SCTE-35 Timed	Corresponds to the more recent splice command <code>time_signal()</code> with <code>segmentation descriptor</code>

Which splicing event type you need to use for your application depends on your downstream systems, what data they expect and how they are configured.

For more information about splicing events, refer to the official SCTE-35 standard specification (ANSI/SCTE 35 2020 - "Digital Program Insertion Cueing Message") which is available on the [SCTE website](#).

11.2 Adding a splicing event via Makalu Automation

To add a splicing event to a single clip, proceed as follows:

1. [Open Makalu Automation](#).
2. (Optional) If you want to add a new playlist to the rundown, see section [Adding a playlist to a rundown](#).
3. In the rundown expand the show to be edited, by clicking the corresponding circle with arrow icon  in the link column.
The show is expanded.
4. Select the clip to which you want to add the splicing event.

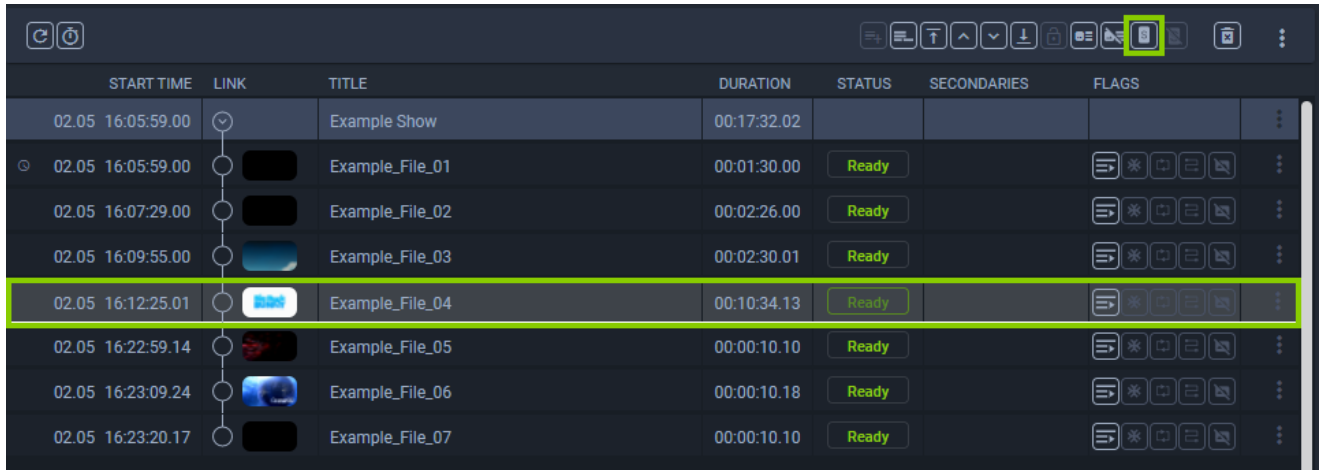



Figure: Makalu Automation - Select clip

5. Click the **Add splicing for selected clip** icon  in the rundown toolbar.
The splicing event details are displayed.

CREATE SPLICING EVENT

STD_Avail

STD_Timed

Enter the data of the splicing event

SpliceEventId*

UpidType*

Upid*

Use automatic

Duration Clip length

hours minutes seconds frames

Send duration

Event offset

hours minutes seconds frames

Web delivery allowed

Regional blackout

Archive allowed

Device restrictions

Cancel
Apply

Figure: Makalu Automation - Splicing event details

6. On the left side select the event type to be used and on the right side edit the [splicing event details](#).
7. To confirm your changes, click **Apply**.

The splicing event is added to the clip and the splicing event icon is displayed to the right of the clip status.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 16:05:59.00	⌵	Example Show	00:17:32.02			⋮
02.05 16:05:59.00	○	Example_File_01	00:01:30.00	Ready		⌵ * ⌵ ⌵ ⋮
02.05 16:07:29.00	○	Example_File_02	00:02:26.00	Ready		⌵ * ⌵ ⌵ ⋮
02.05 16:09:55.00	○	Example_File_03	00:02:30.01	Ready		⌵ * ⌵ ⌵ ⋮
02.05 16:12:25.01	○	Example_File_04	00:10:34.13	Ready	⌵ ⌵	⌵ * ⌵ ⌵ ⋮
02.05 16:22:59.14	○	Example_File_05	00:00:10.10	Ready		⌵ * ⌵ ⌵ ⋮
02.05 16:23:09.24	○	Example_File_06	00:00:10.18	Ready		⌵ * ⌵ ⌵ ⋮
02.05 16:23:20.17	○	Example_File_07	00:00:10.10	Ready		⌵ * ⌵ ⌵ ⋮

Figure: Makalu Automation - Splicing event added to clip in rundown

11.3 Visual representation of splicing events in a rundown

Splicing events with automatic stop trigger added to a single clip are highlighted with a dark gray splicing icon.

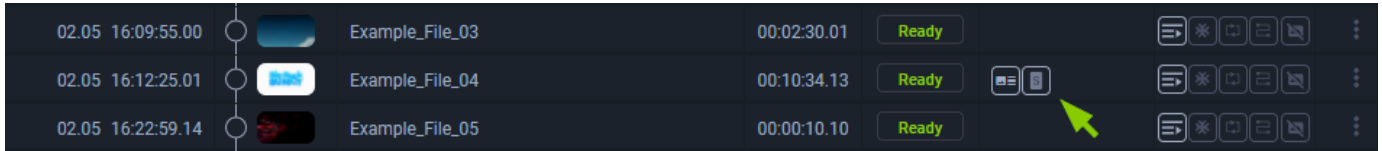


Figure: Makalu Automation - Splicing event added to a single clip, automatic stop trigger

Splicing events with manual stop trigger added to a single clip are highlighted with a white splicing icon.

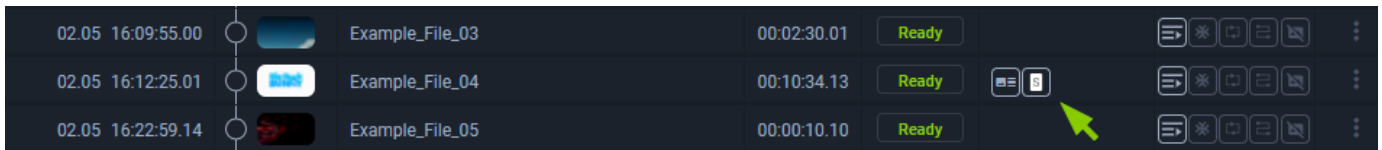


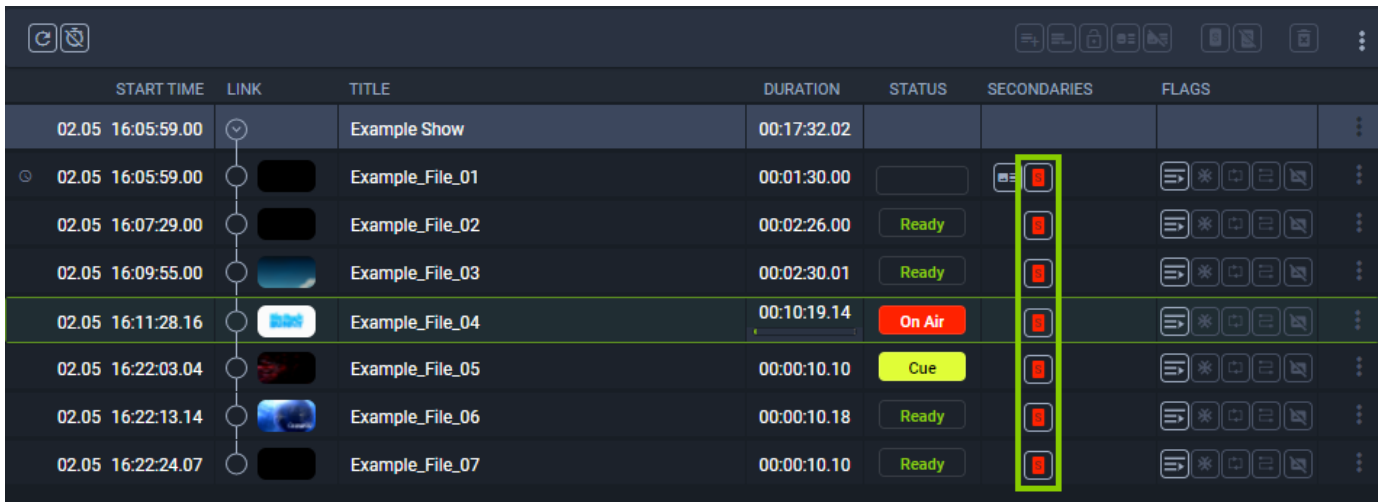
Figure: Makalu Automation - Splicing event added to a single clip, manual stop trigger

Splicing events with automatic stop trigger added to a show are highlighted with dark gray (first clip) and light gray (subsequent clips) splicing icons.

START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 16:05:59.00	⌵	Example Show	00:17:32.02			
02.05 16:05:59.00	○	Example_File_01	00:01:30.00		☐	
02.05 16:07:29.00	○	Example_File_02	00:02:26.00	Ready	☐	
02.05 16:09:55.00	○	Example_File_03	00:02:30.01	Ready	☐	
02.05 16:12:25.01	○	Example_File_04	00:10:34.13	Ready	☐	
02.05 16:22:59.14	○	Example_File_05	00:00:10.10	Ready	☐	
02.05 16:23:09.24	○	Example_File_06	00:00:10.18	Ready	☐	
02.05 16:23:20.17	○	Example_File_07	00:00:10.10	Ready	☐	

Figure: Makalu Automation - Splicing event added to a show, automatic stop trigger

Splicing events that are currently active (on air) are highlighted with a red splicing icon.




START TIME	LINK	TITLE	DURATION	STATUS	SECONDARIES	FLAGS
02.05 16:05:59.00	⌵	Example Show	00:17:32.02			
02.05 16:05:59.00	○	Example_File_01	00:01:30.00		⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:07:29.00	○	Example_File_02	00:02:26.00	Ready	⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:09:55.00	○	Example_File_03	00:02:30.01	Ready	⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:11:28.16	○	Example_File_04	00:10:19.14	On Air	⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:22:03.04	○	Example_File_05	00:00:10.10	Cue	⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:22:13.14	○	Example_File_06	00:00:10.18	Ready	⊞	⏪ * ⏩ ⏴ ⏵
02.05 16:22:24.07	○	Example_File_07	00:00:10.10	Ready	⊞	⏪ * ⏩ ⏴ ⏵

Figure: Makalu Automation - Splicing event added to a show, on air

11.4 Removing a splicing event from the rundown

To remove a splicing event from a single clip or a show in the rundown, proceed as follows:

1. Expand the corresponding show.

The show is expanded.
2. Depending on whether you want to remove a splicing event from a single clip or a show:
 - a. To remove a splicing event from a single clip, select the clip with the splicing event to be removed.
 - b. To remove a splicing event from a show, either select the show or the first clip of the show with the splicing event to be removed.
3. Click the **Delete splicing event for selected clip** icon  in the rundown toolbar.

The splicing event is removed.

12. Supported formats and codecs

12.1 Input

12.1.1 Files

Type	Video	Audio
Codec	<ul style="list-style-type: none"> • XAVC • AVC-Ultra • AVC-Intra • XDCAM • MPEG-2 • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • MPEG-1 L2 • MPEG-2 L2 • AAC-LC • HE-AAC • HE-AAC v2 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)*
Container	<ul style="list-style-type: none"> • MXF • MP4 	

12.1.2 Streams

Protocol	Video	Audio
RTMP/RTMPS	<ul style="list-style-type: none"> • H.264 (AVC) • VP6 • VP8 • Sorenson Spark • Screen Video (v1, v2) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • Speex
RTSP/RTP	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) • VP8 • VP9 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • Speex • Opus • Vorbis

Protocol	Video	Audio
ICY (SHOUTcast/Icecast)	-	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3
SRT	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)* • ALS (LOAS)
WebRTC	<ul style="list-style-type: none"> • H.264 (AVC) • VP8 • VP9 	<ul style="list-style-type: none"> • Opus (recommended) • PCM (PCMU, PCMA)
MPEG-TS, MPEG-TS over UDP	<ul style="list-style-type: none"> • MPEG-2 • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)* • ALS (LOAS)

12.1.3 Subtitles

Type	Format
File-based	<ul style="list-style-type: none"> • STL • WebVTT • SRT • EBU-TT • TTML

Type	Format
Live	<ul style="list-style-type: none"> • EBU-TT-D • FAB Public

12.2 Output

12.2.1 Streams

Protocol	Video	Audio
HLS	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)*
CMAF HLS, Low-Latency HLS	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)*
MPEG-DASH	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)* • ALS
RTMP/RTMPS	<ul style="list-style-type: none"> • H.264 (AVC) • VP6 • Sorenson Spark • Screen Video (v1, v2) 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • Speex

Protocol	Video	Audio
RTSP/RTP	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) • VP8 • VP9 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • Opus • Vorbis • Speex
SRT	<ul style="list-style-type: none"> • H.264 (AVC) • H.265 (HEVC) • VP8 • VP9 	<ul style="list-style-type: none"> • AAC • AAC-LC • HE-AAC • HE-AAC v2 • MP3 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)* • ALS (LOAS) • Vorbis
WebRTC	<ul style="list-style-type: none"> • H.264 (AVC) • VP8 • VP9 	<ul style="list-style-type: none"> • Opus (recommended) • PCM (PCMU, PCMA)
MPEG-TS	<ul style="list-style-type: none"> • MPEG-2 • H.264 (AVC) • H.265 (HEVC) 	<ul style="list-style-type: none"> • MPEG-1 L2 • MPEG-2 L2 • AAC-LC • HE-AAC • HE-AAC v2 • AC-3 (Dolby Digital)* • E-AC-3 (Dolby Digital Plus)*

12.2.2 CDN service providers

- Akamai
- Fastly
- Microsoft Azure
- Amazon CloudFront
- KeyCDN

12.2.3 Video and social media platforms

- YouTube
- Facebook
- Twitch
- LinkedIn

Notice

All Dolby audio formats (marked with a "**") require the optional Makalu Dolby add-on.

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