NEO Series User Manual

appear

TABLE OF CONTENTS

1. THE FRONT PANEL

The LCD front panel is attached to the front of the appliance and is used to display alarms and configure the management network interface. To toggle between displaying the alarms and the configuration menu, press the cancel button (red "x"), the configuration menu is titled "Neo 10/20 Cfg", pressing OK (the green tick) will enter the configuration menu, pressing cancel will return you to the alarm screen.

1.1. Configuring the Management Network Interface

Enter the configuration menu, select "MgmtA Config" and press OK, you will be greeted by three sub-menus (IP, Subnet, and Gateway) followed and an "Apply!" button.

After entering the desired network values and pressing OK on the Apply menu, the LCD will display "finished 0x0000" in case of a successful operation.

1.2. Alarm screens

The base alarm screen will show the total amount of hardware alarms. To toggle automatic scrolling of the alarms, press OK and you with see either "rotate" or "hold" flash up on the screen. To scroll through the alarms, use the left and right arrows.

2. LANDING PAGE

NEO's Landing Page, Figure 1, "NEO's Landing Page", makes use of a grid like layout from which is possible to access different parts of the product.
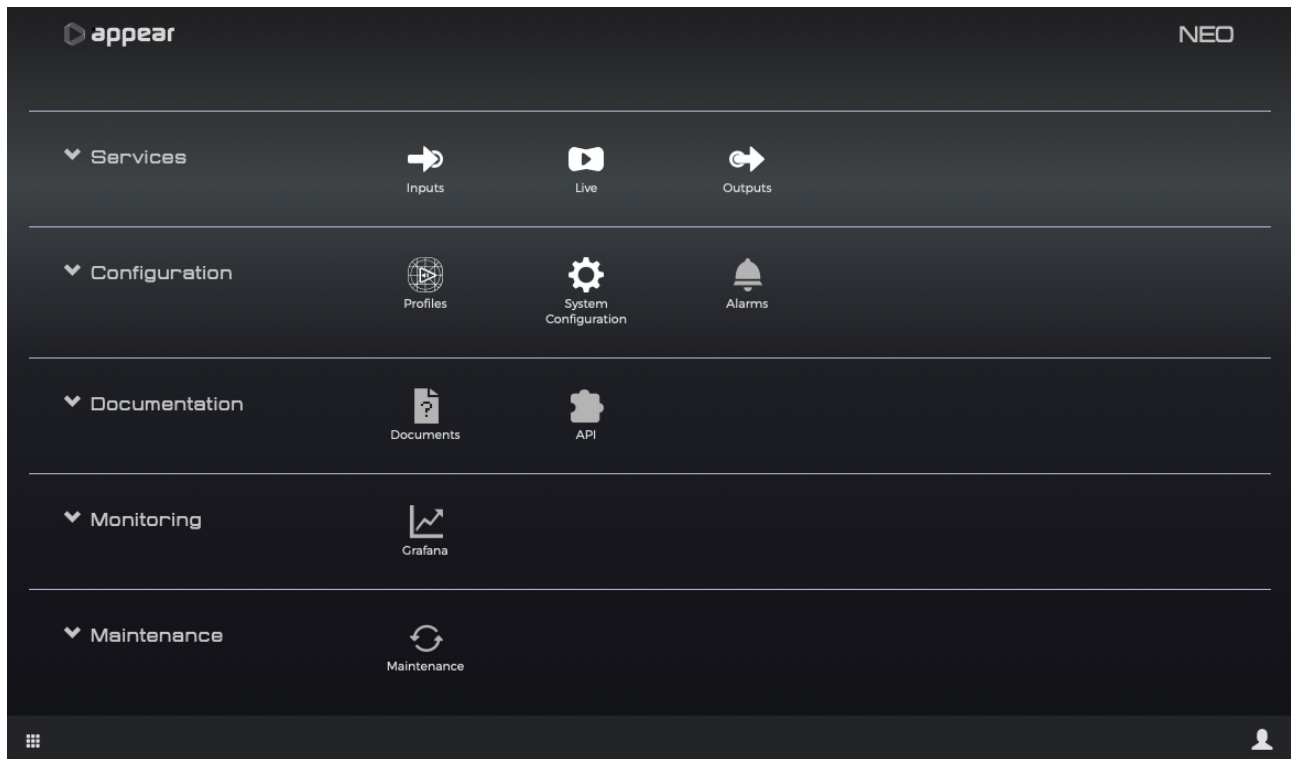

Figure 1. NEO's Landing Page

3. SYSTEM CONFIGURATION

A small configuration procedure is required before starting to use NEO. This is done via the *System Configuration* button

⚙ in the *Configuration* tab.

There are three tabs in the System Configuration page:

- Servers
- User
- System

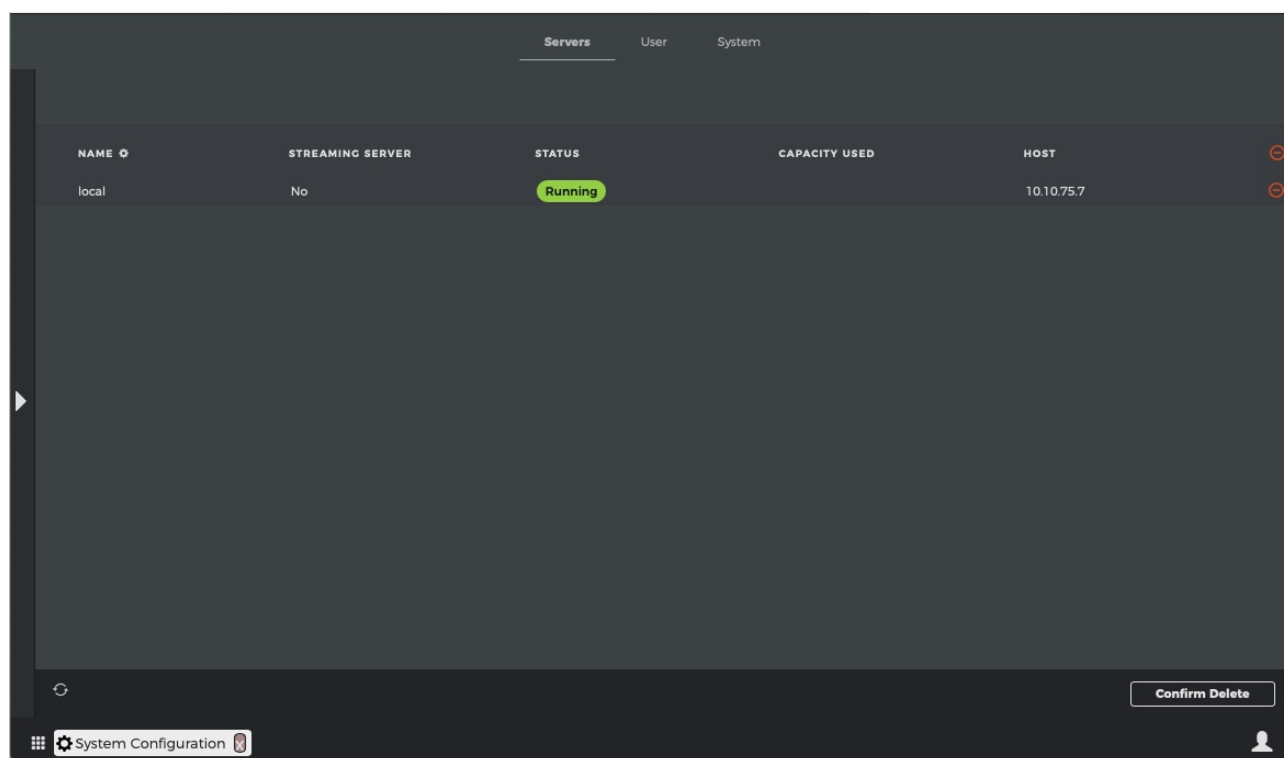By default the Servers tab is displayed, as show in Figure 2, "Servers tab in System Configuration":

Figure 2. Servers tab in System Configuration

In order to startup any transcoding service a server must be added.

3.1. Adding a Server

The Create Server view, Figure 3, "Create Server panel", can be made visible by clicking the right arrow button, ▶ while the Servers tab is active.

Figure 3. Create Server panel

Name

The name of the server to be created.

Host

The IP address of the server to be created.

Streaming server

By enabling this option a service will be able to use this server as storage when deployed with a streaming output (DASH, HLS, CMAF)

Probing

Toggle to enable probing in the server to be created. By enabling this options the server will be able to probe inputs added from the "Inputs" page found in the start menu.

3.2. Removing a Server

From the Servers tab, Figure 2, "Servers tab in System Configuration", click the Delete button ⊖. This server is now marked for deletion. Multiple servers can be marked for deletion simultaneously. In order to complete the operation, press the the *Confirm Delete* button on the lower right corner.

3.3. Server Details

By clicking an active server the Server Details view appears, Figure 4, "Server Details panel"

Figure 4. Server Details panel

Origin Server

Toggles the streaming server.

Probing

Toggles the probing server.

Management

The management's network interface selection.

PATH box

The egress/ingress configuration. Can be used for forced input allocation, or load balancing.

Monitoring

Opens the server's Grafana page.

Logging

Opens the server's Elasticsearch page. [elastic][atvmsp]

Save button

Saves any changes.

Cancel

Discards current changes.

3.4. User tab

Displays tabular information of added users. In Figure 5, "User Tab", the *Create User* panel was made visible by clicking the right arrow button, ▶ .
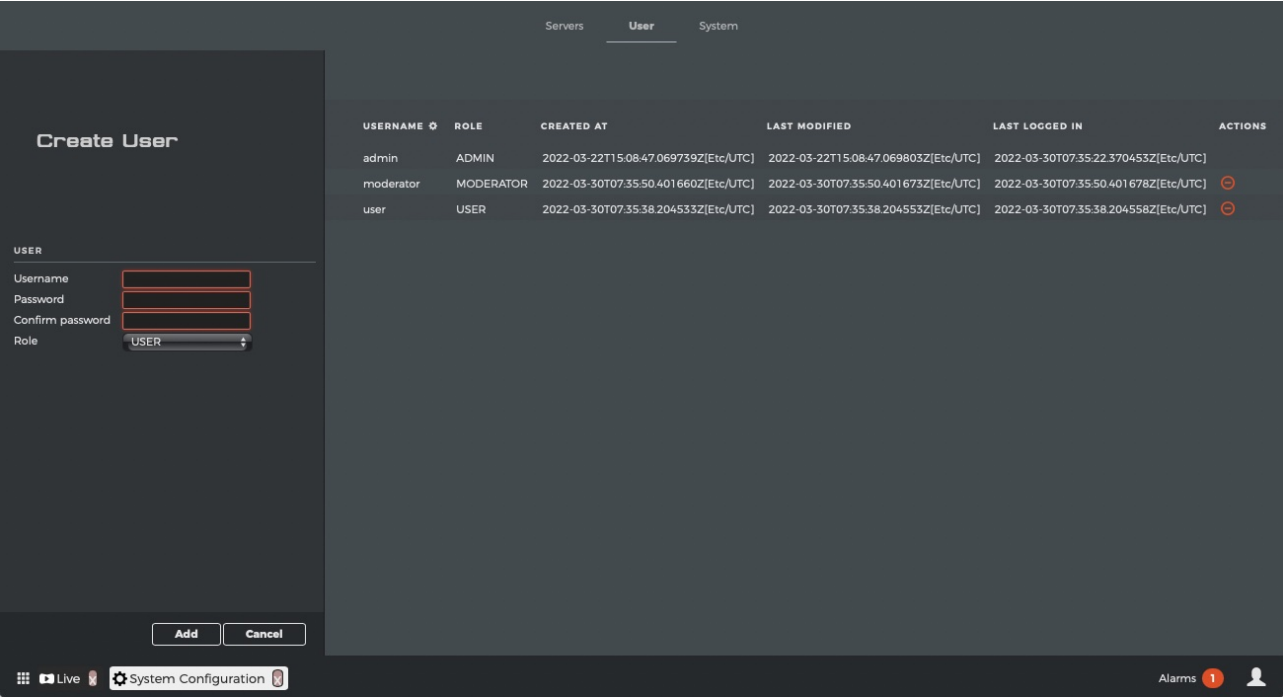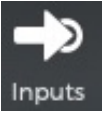
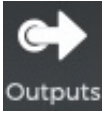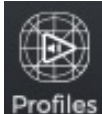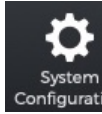*Figure 5. User Tab*

User Roles

Roles and rights are summarized in the following table. Rights are coded as follows:

- **M** – Manage: has full visibility and can perform changes.
- **V** – View: has full visibility, but cannot perform changes.
- **NR** – No right: does not have full visibilty and cannot perform any changes.

Role	Inputs	Live	Outputs	Profiles	System Configuration	Alarms
Admin	M	M	M	M	M	M
Moderator	M	M	M	M	V	M
User	M	V	V	V	NR	V

Adding a User

Users can be added via the *Create User* panel.

Removing a User

Removing a user is done by clicking the Delete button ⊖.

Changing a User's password

Selecting a user from the Figure 5, "User Tab" expands the *User* panel, visible in Figure 6, "User panel expanded"

Figure 6. User panel expanded

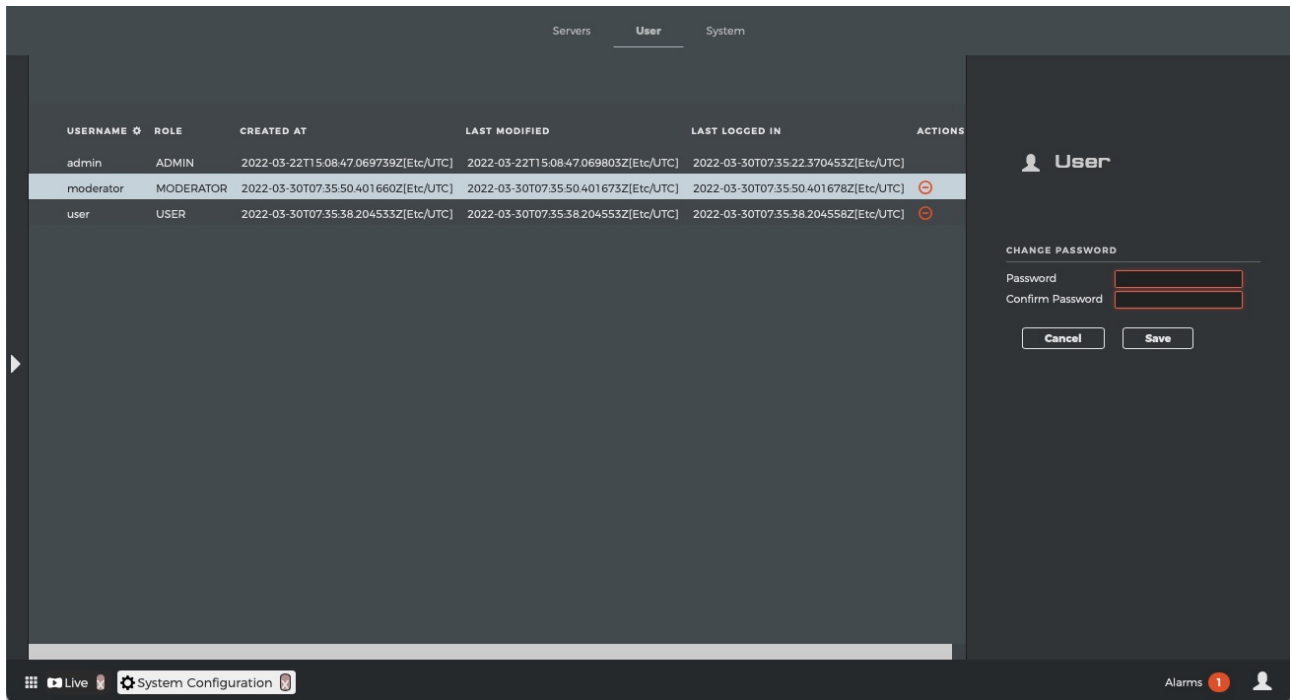The user icon ![icon] allows a user to change its own password. It is located on the right hand corner and accessible from anywhere in the GUI.

3.5. System tab

Key information about the system itself, and advanced system settings.

Figure 7. System Tab

Live License

The current active license for live transcoding. The installation ID is required to generate a matching license (done by Appear).
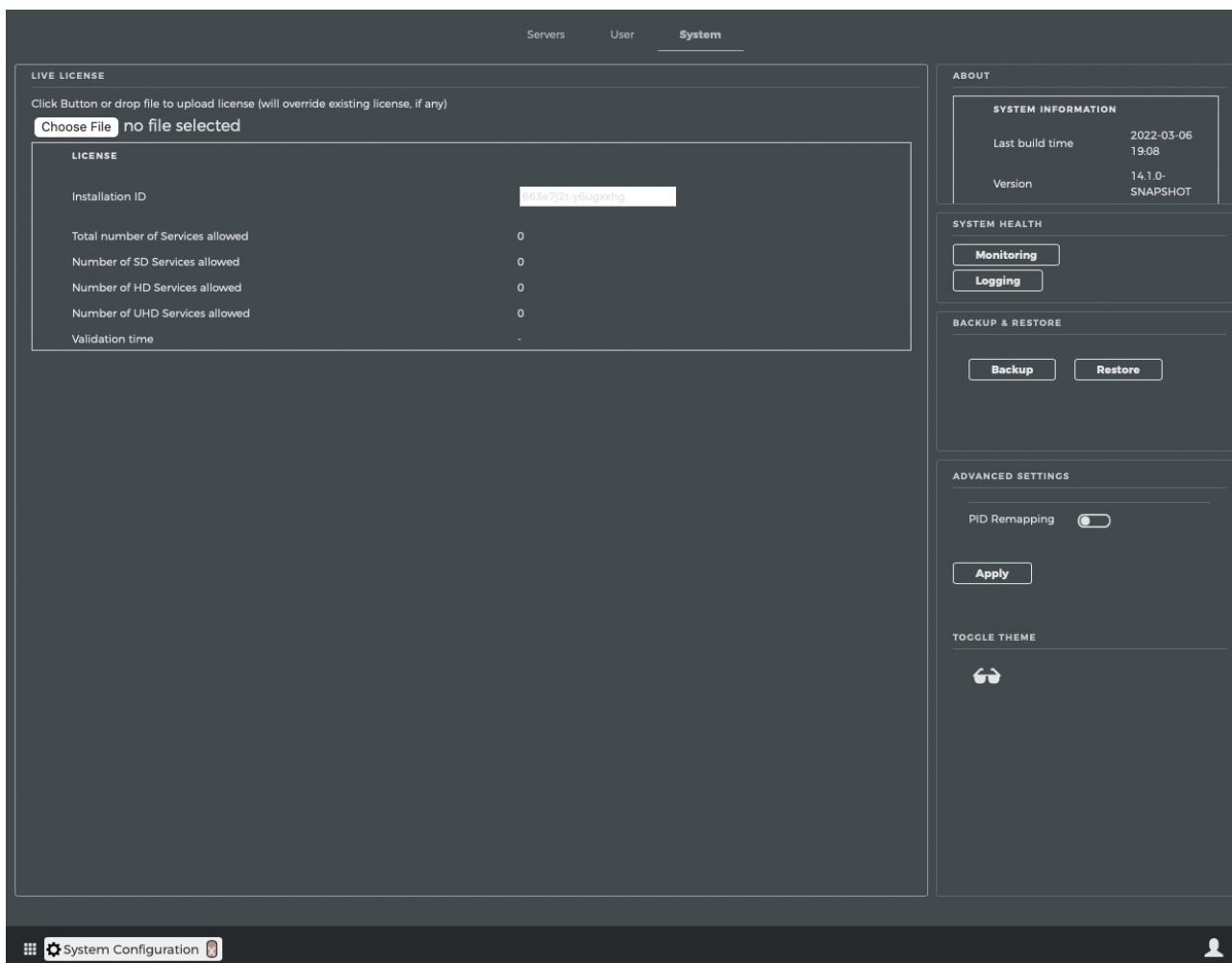
Vod License

The current active license for vod/file transcoding. The installation ID is required to generate a matching license (done by Appear).

License information

Displays the active licenses information.

Monitoring

Opens that servers Grafana page.

Logging

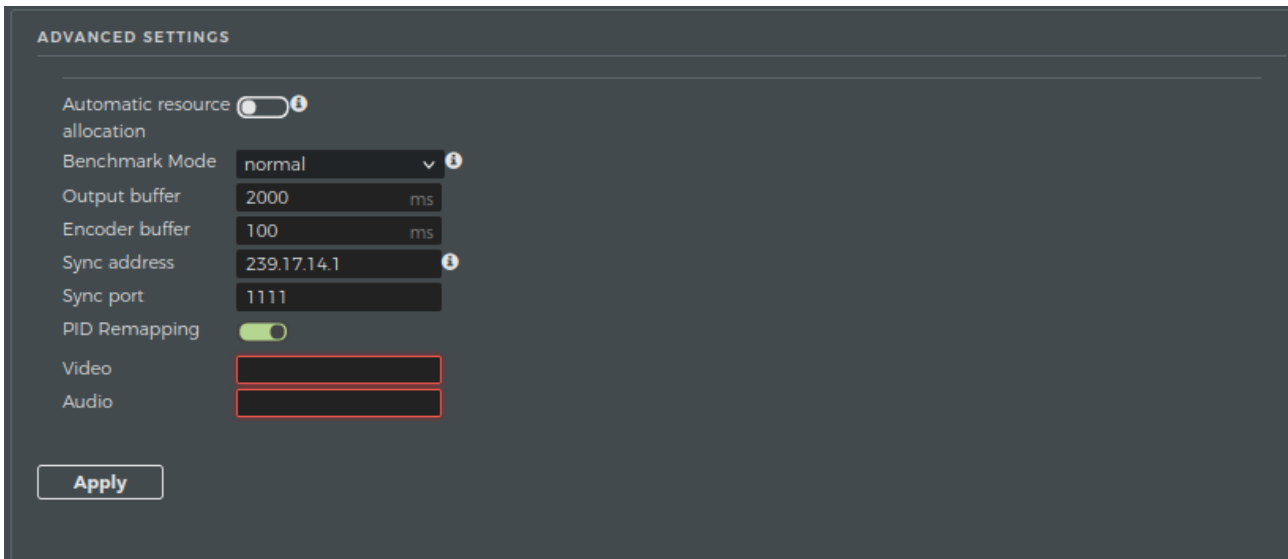Opens that servers Elastic search page. [elastic][atvmsp]

Backup

This button will backup the database to a predefined path

Restore

This button will restore the database using a backup provided by the user.

3.6. Advanced Settings

Automatic resource allocation

Enables the use of automatic resource allocation via benchmarking.

Benchmark Model

Selects the benchmark model to be used. Custom is a minimal profile, customizable only by Appear.

Output buffer

Time in ms for the output module to buffer.

Encoder buffer

Time in ms for the encoder to buffer.

Sync Address

IP adress used for output synchronization.

Sync Port

Port used for output synchronization.

PID Remapping

System wide configuration to be applied to every service that will remap video and or audio PID.

Apply button

Commits any changes. Will cause a redeployment.

4. PROFILE CONFIGURATION

The Profiles page can be accessed via the *Profiles* button, found in Figure 1, "NEO's Landing Page".
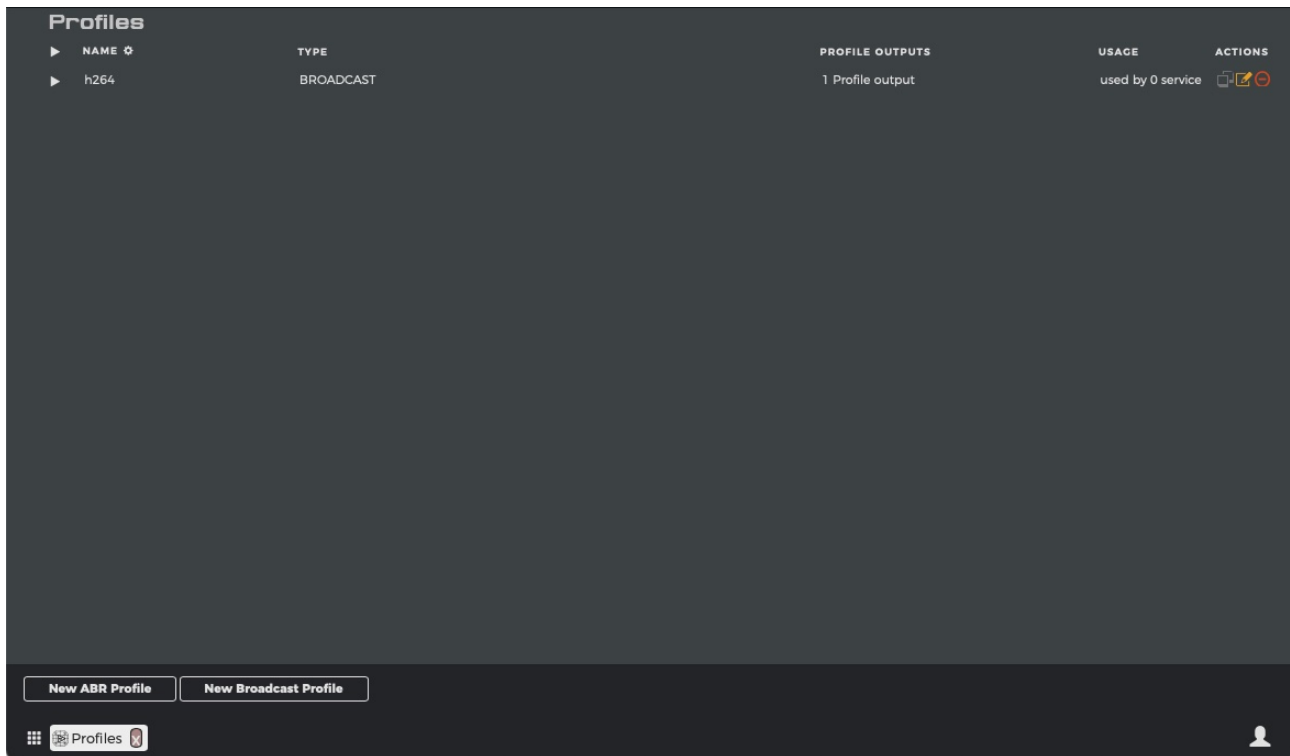
Figure 8. Profiles Page

After a profile has been saved the action buttons *Copy*, *Edit* and *Delete*, become available.

4.1. Profile options

To create a new profile press any of the new profile buttons in the lower left corner. There are two types of profile types, ABR and Broadcast, and the fields visible in Figure 9, "New Profile page" are common.
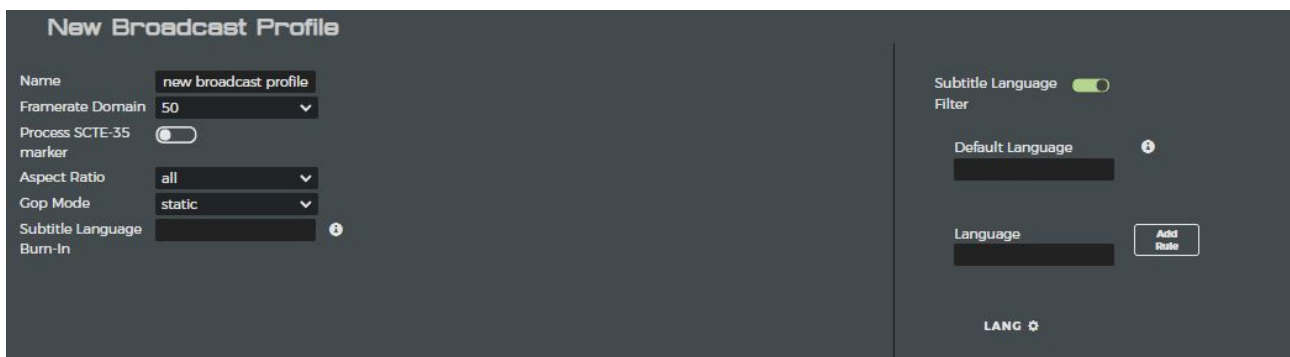

Figure 9. New Profile page

Name

The profile name, used to identify profiles later.

Framerate Domain

The Framerate domain, this should match with the input video stream's framerate domain.

Process SCTE-35 marker

Processes SCTE-35 input events, and adds them to the output.

Aspect Ratio

Filters available Format options, either 4:3, 16:9, or both.

Subtitle Language Burn-In

Enables subtitle Burn-In for DVB subtitle streams. The language code must match a language code in the input subtitle streams.

Subtitle Language Filter

Enables teletext subtitle filtering. If not enabled, all languages are either passed-through or encoded.

Default Language

The default language, must match a language code in the input subtitle streams. Required by HLS.

Languages Add Rule

Language Rules is required to produce MPEG-DASH/HLS/CMAF subtitles. Language code(s) must be found in the input subtitle stream(s).

ABR - GOP Size

Amount of frames in GOP.

ABR - Add Output button

Adds a new output.

4.2. Broadcast - GOP Mode

Changes GOP mode to either static or dynamic.

Broadcast - Add PiP button

Adds a new PiP output.

4.3. Editing Video Streams

Editing a profile's video or audio stream is done via a dedicated panel. In order to access it, click the stream you would like to edit, as shown in Figure 10, "Selecting a profile's stream".
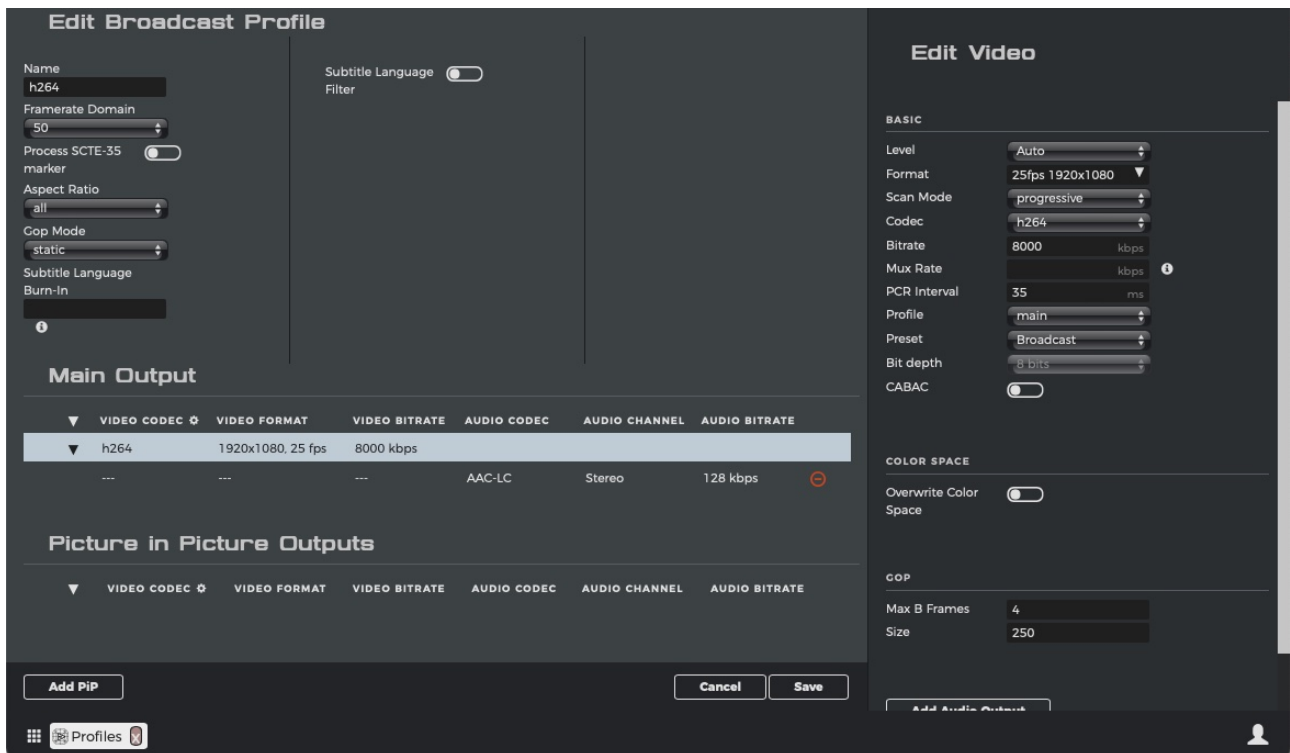
Figure 10. Selecting a profile's stream

For video, the following parameters exist:

Level

Selects a level defined in the video compression standard for the chosen codec. Auto – Automatically selects appropriate Level based on resolution, bitrate etc.

Format

The output video format. Is automatically constrained by choice of Framerate Domain.

Codec

Video compression codec.

Bitrate

The video bitrate target.

Mux Rate

Maximum bitrate, in kbps, for the multiplexer. If not defined the service runs in VBR. If defined must be 23% higher than the sum of all outputs.

PCR Interval

Sets the program clock reference interval. MPEG uses ⇐ 100ms, DVB uses ⇐ 40ms.

Profile

Profile controls methods and choice of compression. Available Profiles is restricted by the codec.

Preset

High VQ, Broadcast, and High Density, are three different levels of compression complexity. Higher complexity results in better video quality, but higher system load.

Bit depth

Color bit level.

Use High Tier

Only for the h265 codec, increases maximum allowed bitrate.

Overwrite Color Space

Expert level configuration, used to modify coloring. More details are found in the advanced part of the user manual, see Section 10.1, "Overwriting The Color Space".

Broadcast - Scan Mode

Either interlaced or progressive.

Broadcast - CABAC

Enables CABAC.

Broadcast - Max B Frames

Maximum number of successive B frames.

Broadcast - Size

GOP size.

Add Audio Output button

Adds a new audio stream to the same profile.

4.4. Editing Audio Streams

The panel to change the profile's audio configuration, Figure 11, "Edit Audio panel", can be accessed by clicking a audio stream.
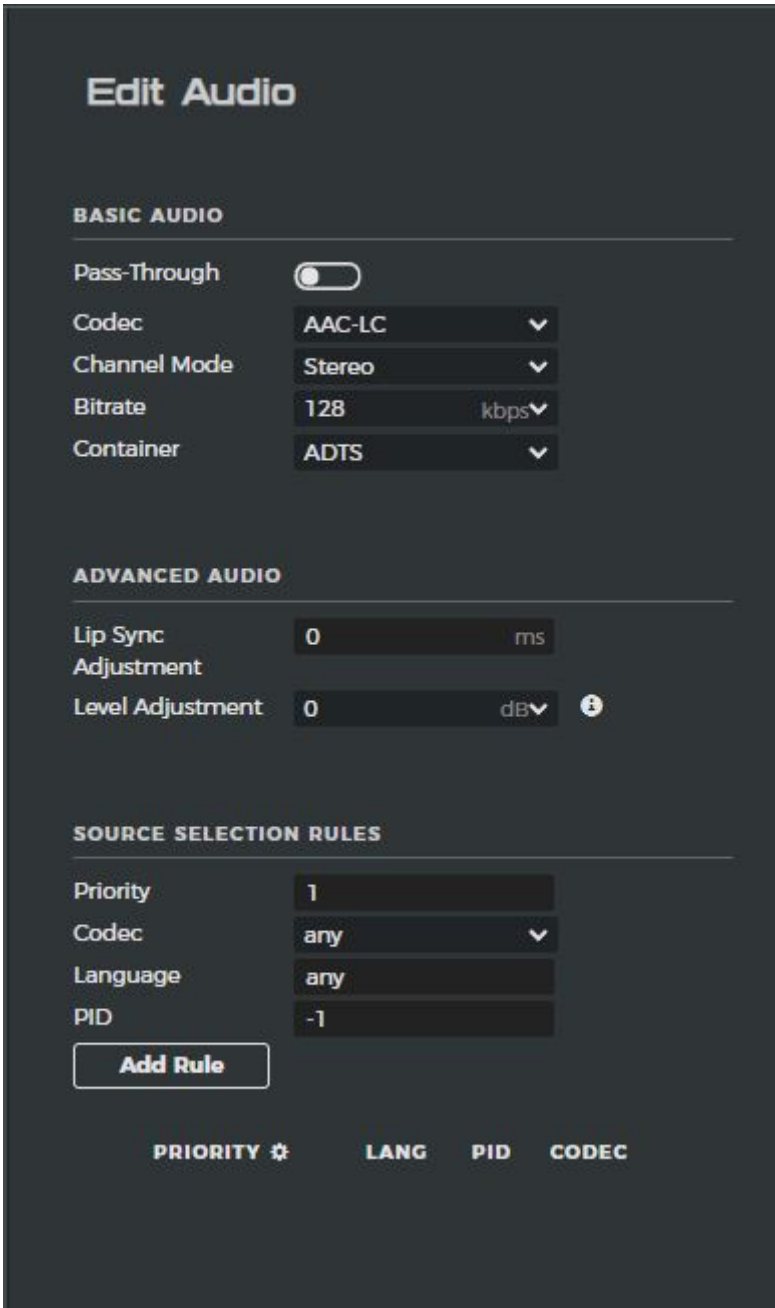
Figure 11. Edit Audio panel

The following parameters exist:

Pass-Through

Enables Pass-Through mode.

Codec

Output audio codec.

Channel Mode

Selection of sound system. Choice between surround sound, stereo and mono.

Bitrate

The output audio's bitrate.

Container

Delivery container used by outpout audio codec.

Lip Sync Adjustment

Adjust audio delay to match video playout.

Level Adjustment

Adjust audio volume levels.

Dolby - Dialogue Normalization

Used to tweak the loudness of the signal.

Dolby - Evolution Framework

Enables the Dolby Evoultion Framework for metadata packaging and delivery.

Source - Selection - Priority

The priority of a source selection ruleset.

Source Selection - Codec

The desired input audio format.

Source Selection - Language

Filter audio based on language.

Source Selection - PID

Filter audio based on Program ID, (-1) meaning any PID.

5. ALARMS

Alarms provide information to the user about events happening in the system. The Alarms page, Figure 12, "Alarms page" can be accessed via the *Alarms* button, found in Figure 1, "NEO's Landing Page".

An extensive description of possible alarms is available in the Documents page, accessible via the *Documents* button, found in Figure 1, "NEO's Landing Page".
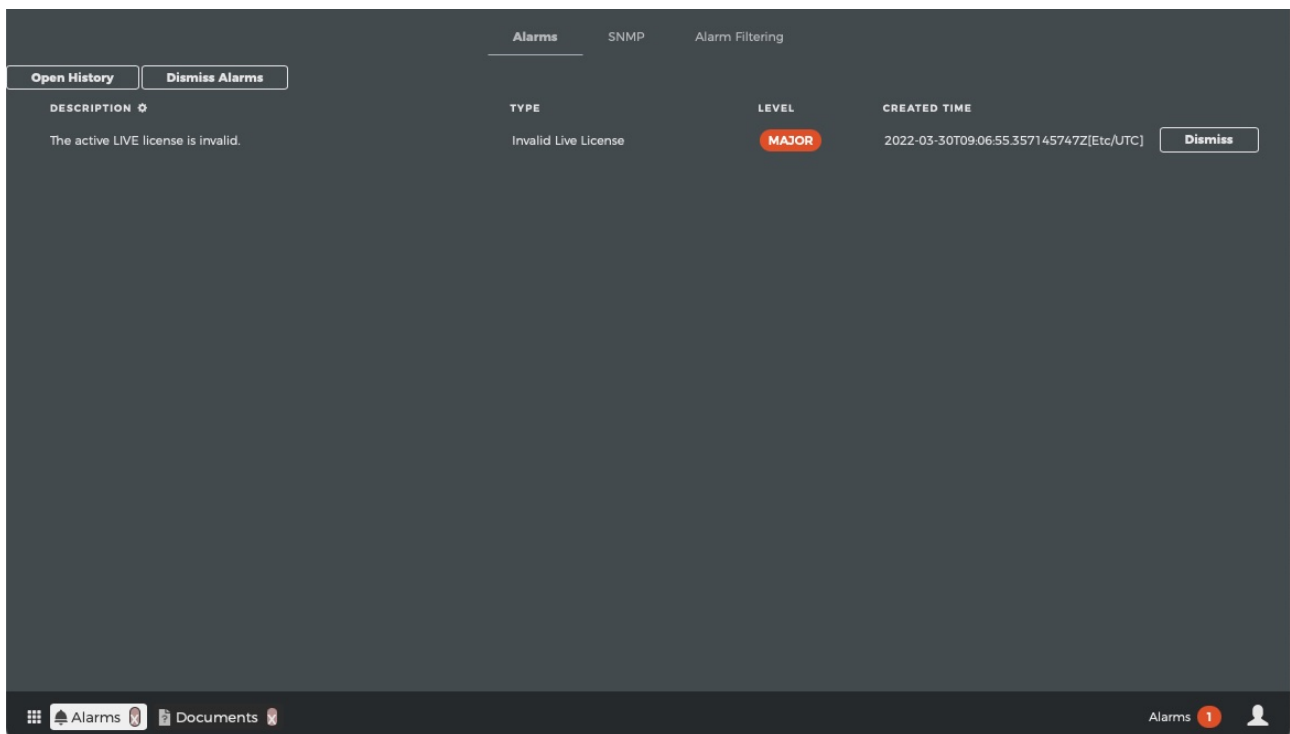

Figure 12. Alarms page

Alarms can be dismissed individually or for all services.

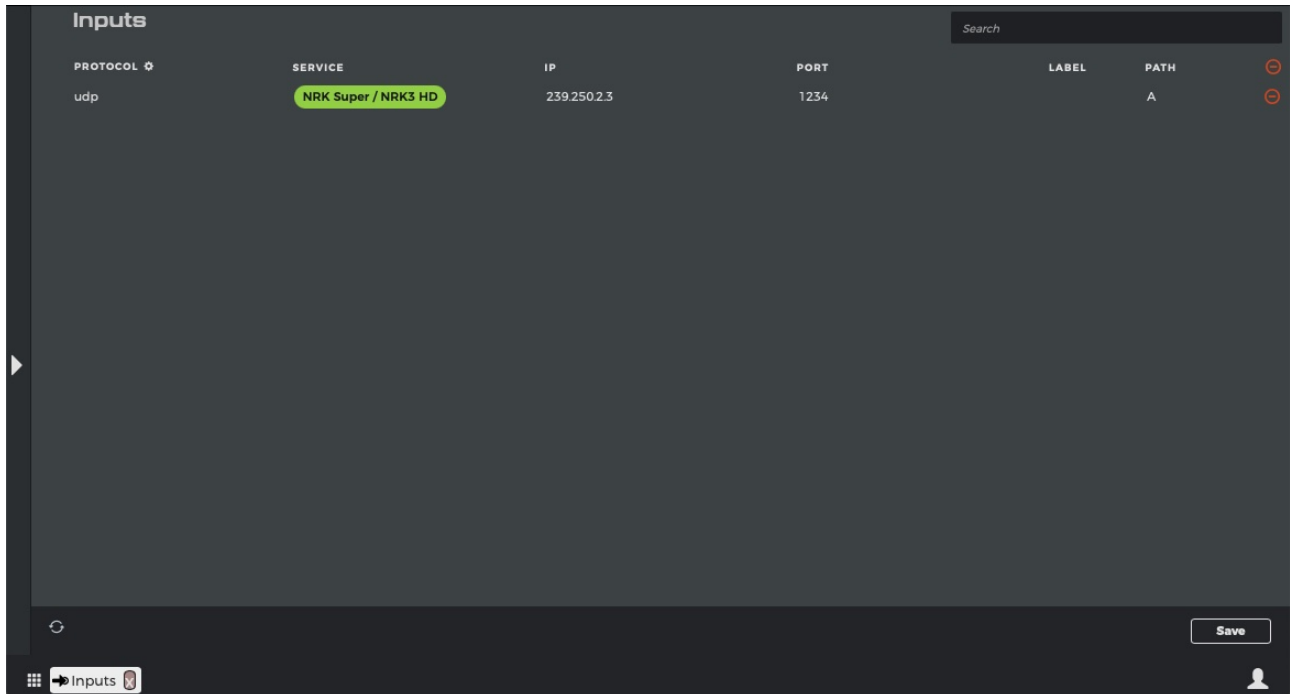The following alarm severity levels are used:

- **WARNING**: Used to alert the user about misconfigurations or minor input disruptions.
- **MAJOR**: Service operation is compromised, if the situation persists it may lead to a critical level alarm being triggered.
- **CRITICAL**: Results in service redeployment.

From the *Alarms Filtering* tab it's possible to configure a specific alarm to be ignored, not being displayed in this page.

From the *SNMP* tab it's possible to add SNMP trap destinations.

6. INPUTS

The Inputs page, Figure 13, "Inputs Page", accessible via the *Inputs* button ![Inputs] from the Landing Page, displays the currently configured inputs in a tabular fashion.

Figure 13. Inputs Page

The *Service* column is colour coded:

- Green: Input has been probed successefully
- Yellow: input is currently being probed
- Red: input cannot be probed

The configured inputs are periodically probed, and only when an input is added for the first time this field switchs from Yellow to Green.

Can be filtered via search.

6.1. Adding an Input

From the Inputs Page, toggle the Add Input panel, Figure 14, "Add Input panel", by clicking the right arrow button, ▶ . Fill out the fields in the *Add Input* panel and press the *Add* button.

Figure 14. Add Input panel

Detailed information about the Add Input panel's elements:

Input protocols

NEO supports MPEGTS streams delivered by RTP, UDP or SRT (listener mode) protocols.

Label

An optional custom label field can be used to more clearly identify inputs.

Increment mode

Multiple inputs can be added at a same time using incremental IPs or port addresses.

Number of inputs

This determines how many inputs are added, by incrementing either the IP or port.

IP

The source IP address, mandatory for an input.

Port

The source port number, mandatory for an input.

Path

Interface selection. The A and B paths can be modified under System Settings → Servers → Server Details.

Add button

Adds the configured input.

Close button

Closes the Add Input view.

6.2. Removing an Input

From the Inputs page, Figure 13, "Inputs Page", click the Delete button ⊖. This input is now marked for deletion. Multiple inputs can be marked for deletion simultaneously. In order to complete the operation, press the the Save_ button on the lower right corner.

6.3. The Input Details panel

The *Input Details* panel, Figure 15, "Input Details panel" can be toggled from the Inputs page, Figure 13, "Inputs Page", by clicking any active input.
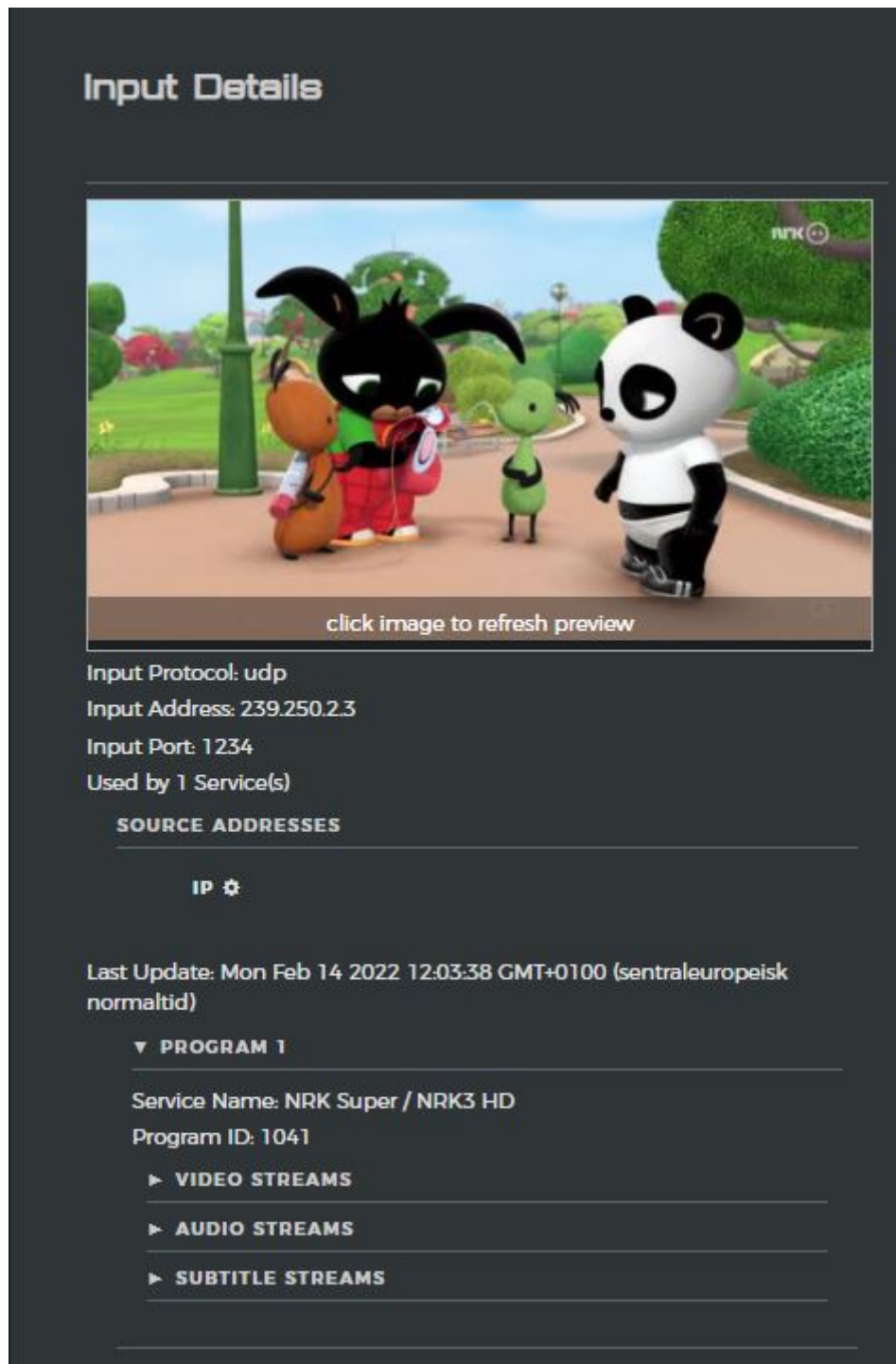
Figure 15. Input Details panel

Preview image

A display image is fetched from the input and can be refreshed by clicking.

Input information

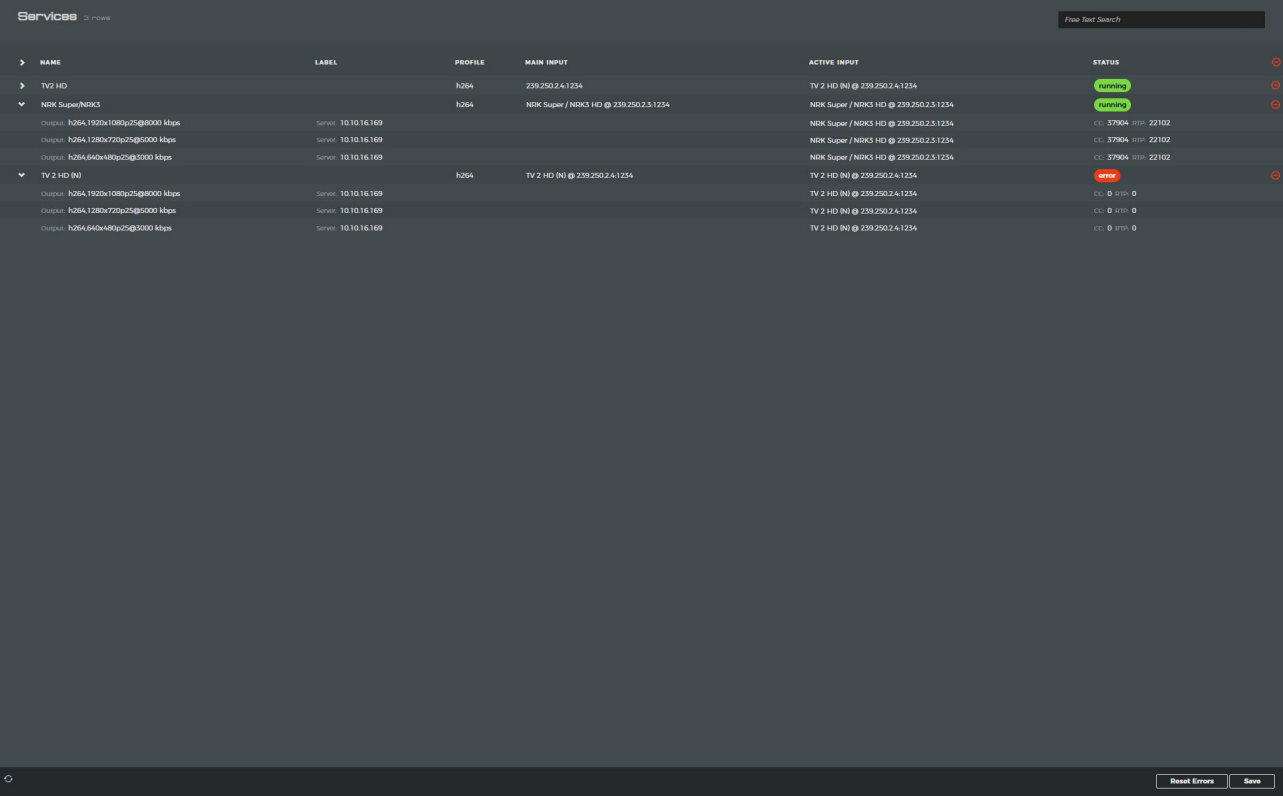The inputs port IP and protocol is shown below the preview image.

Program information

An expandable menu containing the program information, video, audio and subtitle stream information.

7. LIVE SERVICES

The Services page, Figure 16, "Services Page", accessible via the *Live* button ![Live] from the Landing Page, displays the currently configured services in a tabular fashion.

Figure 16. Services Page

Any listed service can have its output information expanded by clicking the ► button.

The *Reset Errors* in the lower right counter resets the counter for all RTP and CC errors.

7.1. Adding a Service

From the Services page, toggle the Add Service panel, Figure 17, "Add Service panel", by clicking the right arrow button, ▶ .

Figure 17. Add Service panel

Label

An optional custom label field can be used to more clearly identify active services.

Profile

The profile used to create the new service. Created via Chapter 4, *Profile Configuration*.

Server

The server where the service will be deployed. Created via Chapter 3, *System Configuration*.

Inputs field

A search field to filter inputs.

Inputs view

Tabular information of inputs, created via Chapter 6, *Inputs*. Any active inputs can be selected. Using CTRL+Click allows multiple inputs to be selected. Selecting multiple inputs here creates multiple services at once (with the different inputs). Backup inputs are added later in the edit service page.

Create button

Creates a new service using the above configuration.

Stage button

Stages a new service using the above configuration.

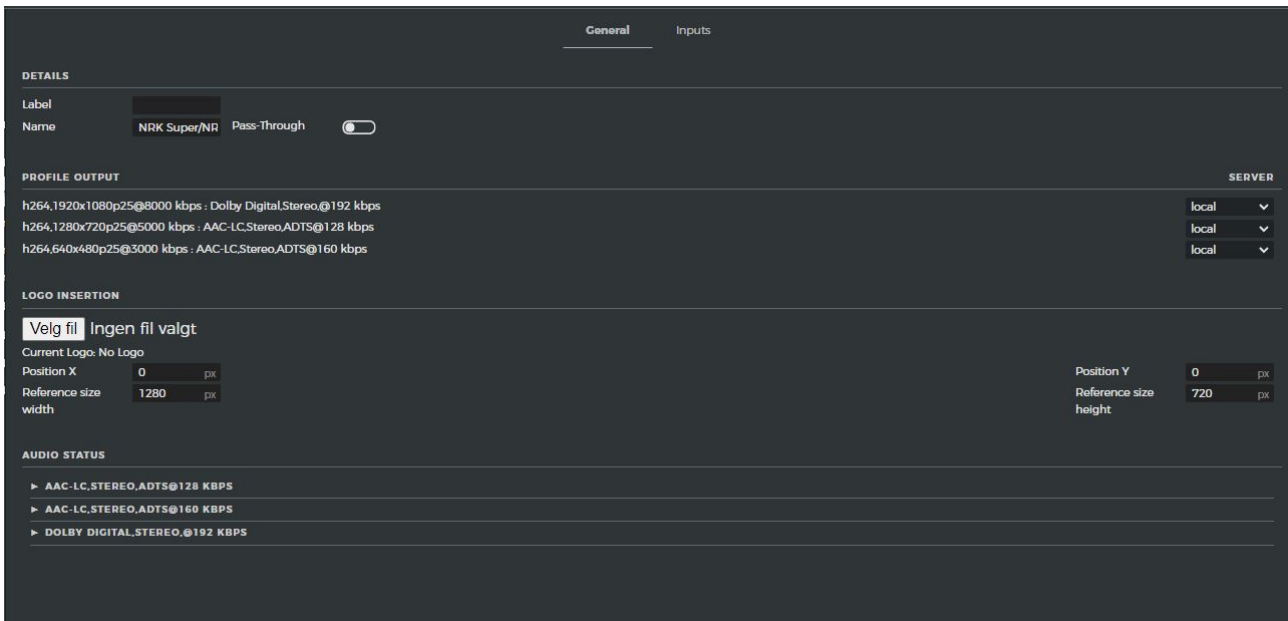Close button

Closes the Add Service panel.

7.2. Removing a Service

From the Live Services page, [img-servicesPage], click the Delete button ⊖. This service is now marked for deletion. Multiple services can be marked for deletion simultaneously. In order to complete the operation, press the the *Save* button on the lower right corner. If the service has an output configured, this is also removed.

7.3. Detailed service view

Shown by clicking any service. Has a General tab, Figure 18, "Service Details, General tab view", and an Inputs tab, Figure 19, "Service Details, Input tab view".

Modifications can be saved via the *Save* button in the lower right corner, leading to service redeployment in most cases.

Figure 18. Service Details, General tab view

General - Label

Used to change or add a label to the selected service.

General - Name

Can change the name for the selected service.

General - Pass-Through

Enables pass-through mode for the service.

General - Profile Output

Shows the expected outputs based on the selected profile.

General - Server

The server responsible for the service.

General - Logo Insertion

Scales and places a logo image on the services video stream(s).

General - Audio Status

Show wether or not an audio stream is active on the service output.
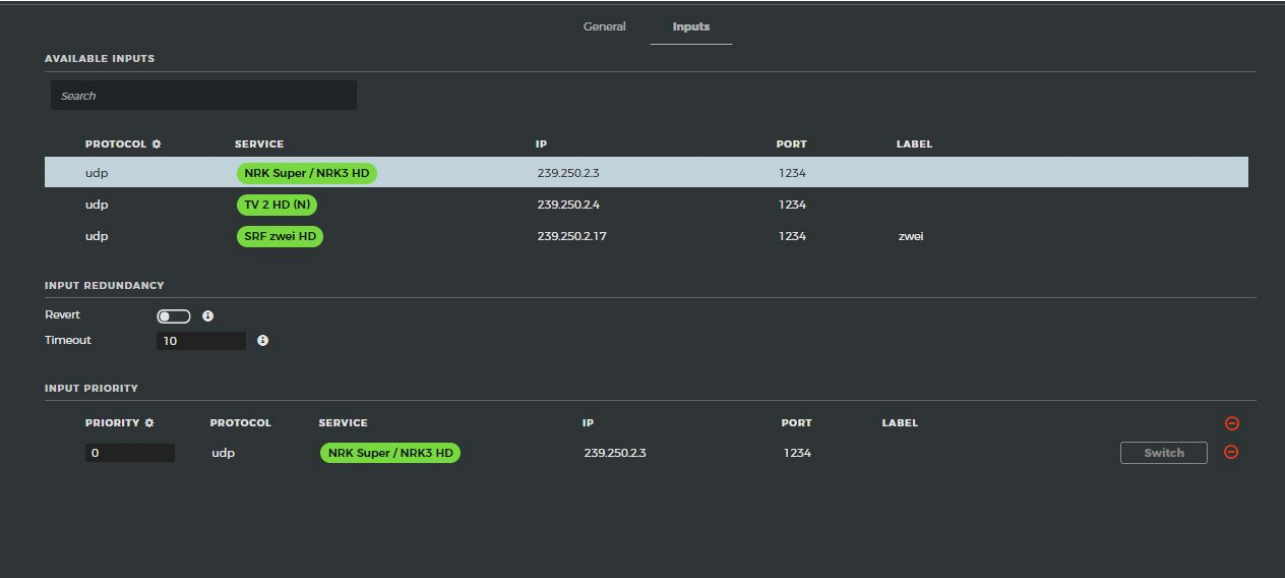
Figure 19. Service Details, Input tab view

Inputs - Available Inputs

Tabular information of inputs. Any input(s) can be added as backup for the selected service.

Inputs - Revert

Enables or disables reverting redundancy.

Inputs - Timeout

Time between reverting switches.

Inputs - Input Priority

The input priorty, can be modified.

Inputs - Switch

Switches active input.

7.4. CC Errors view

Shown by clicking any output from the service view.
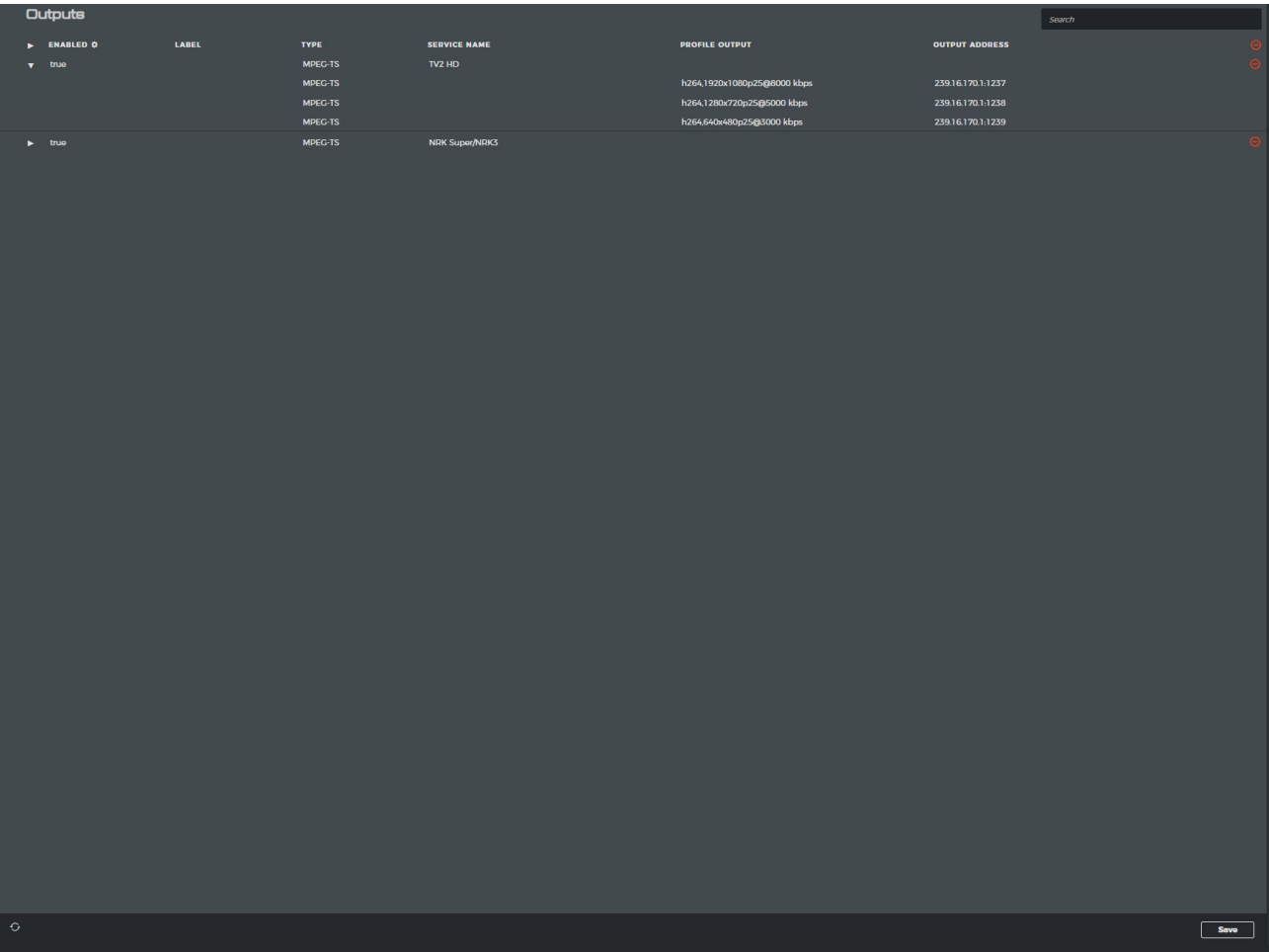
Figure 20. CC Errors view

8. OUTPUT CONFIGURATION

The Outputs page, Figure 21, "Outputs Page" can be accessed via the *Outputs* button, Outputs found in Figure 1, "NEO's Landing Page".

Any listed output can have its information expanded by clicking the ► button.

Figure 21. Outputs Page

8.1. Adding an Output

The New Output panel, Figure 22, "New Output panel", can be made visible by clicking the right arrow button, ▶ .

Figure 22. New Output panel

Pressing the *Add & Save* button creates the output.

The following parameters are common for all outputs:

Label

The output's label.

Output type

Selects the desired output protocol, either MPEG-TS, DASH, HLS, CMAF, or SRT.

Sync group

Group id the output should synchronize with.

Enabled

Whether or not the output is enabled.

MPEG-TS output specific parameters

RTP

Enables RTP output.

Cloned Output

Enables a cloned output stream.

Increment Mode

Multiple outputs either increment the port or IP.

IP

IP address of output.

Port

Port number of output.

Path

URI path of output.

HLS output specific parameters

Type

Wether or not to use Akamai.

Origin server

The destination server for HLS segments and the playlist. Playout origin server.

Path

URI path of output.

Backup Origin server

A backup server.

Number of segments

The amount of segments available at a time for the playlist.

HLS-Akamai - PID

PID number to identify the playout.

HLS-Akamai - Event Name

Event name used to identify the playout.

HLS-Akamai - DNS

The DNS server handeling Akamai responsibilities.

DASH output specific parameters

Origin server

The destination server for DASH segments and manifest. Playout origin server.

Path

URI path of output.

Backup Origin server

A backup server.

UTC timing URL

Optional server to control time zone behavior.

Time shift buffer depth

Time in seconds for how long segments are available.

SRT output specific parameters

IP

IP address of output, only available in caller mode.

Port

Port number of output.

Path

URI path of output.

Mode

Chooses between listener or caller mode.

Encryption

Enables encryption.

Passphrase

The Passphrase used for the encryption, must be between 10 and 80 characters.

Public key Length

The length of the public key either 16, 24, or 32.

8.2. Removing an Output

From the Outputs page, Figure 2, "Servers tab in System Configuration", click the Delete button ⊖. This output is now marked for deletion. Multiple outputs can be marked for deletion simultaneously. In order to complete the operation, press the the *Save* button on the lower right corner. The respective service is unnafectted, but will redeploy.

8.3. Edit Group Panel

Toggle the panel by selecting an output from the Output overview.
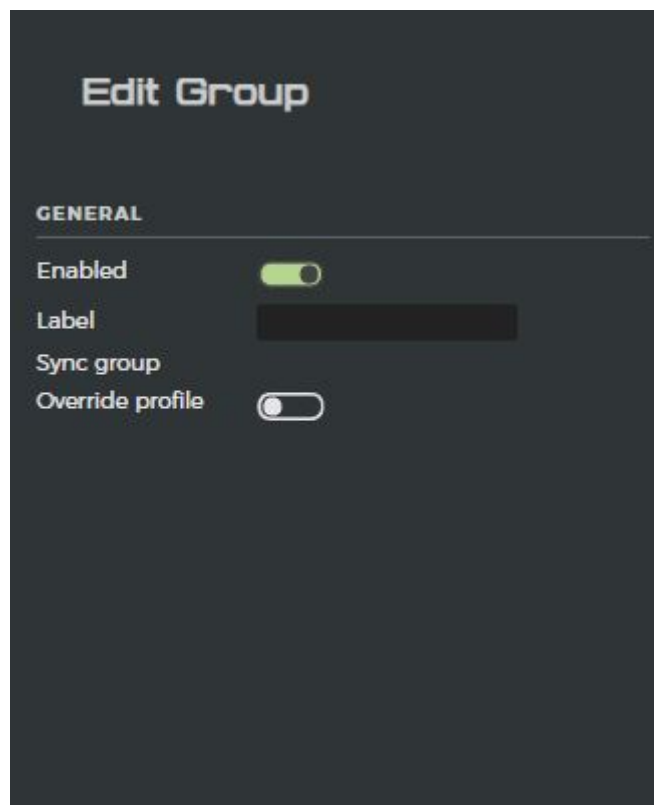
Figure 23. Edit Group panel

Allows the following settings to be modified:

Enabled

Determines if the output is enabled or disabled.

Label

Changes or adds a label to the output.

Sync group Override profile

Enables overriding of subtitle and audio settings. When override is enabled, the audio settings can be changed by visiting the child elements of the output.

In order to complete the operation, press the the *Save* button on the lower right corner. Causes service redeployment.

9. MONITORING

NEO uses Grafana as monitoring tool, accesible through the respective GUI button, found in Figure 1, "NEO's Landing Page".

In order to access Grafana it's required to allow popups in the web browser. By default the landing page displays panels related to:

- Host's CPU Usage
- Host's Memory Usage
- Network (*rx* stands for, *tx* stands for)

The same metrics are displayed on a per container basis, as well as more advanced transcoding metrics such as size and/or insertion rate of queues of frames.

It's possible to filter out the information presented via the buttons displayed in Figure 24, "Grafana Filtering buttons".

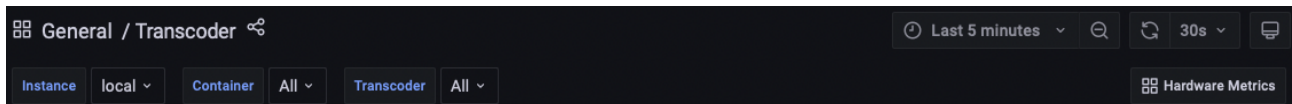*Figure 24. Grafana Filtering buttons*

- *Instance* - relevant for clusters, allows to check metrics at different nodes
- *Container* - filters out containers
- *Transcoder* - filters by Transcoder container

Additionaly, via the *Hardware Metrics* button on the right hand side it's possible to metrics such as:

- System Board Temperature
- System Board Power
- CPU Voltage & Temperature
- others

10. ADVANCED TOPICS

10.1. Overwriting The Color Space

Optional expert level configuration, used to modify coloring. Can be configured from the Edit Video section in the Profile Configuration.

Color Space

The matrix coefficients used in deriving the luma and chroma from the RGB primaries.

Value	Color Space
0	RGB
1	BT709
2	UNSPECIFIED
5	BT470BG
6	SMPTE170M
7	SMPTE240M
8	YCGCO/YCOCG
9	BT2020_NCL
10	BT2020_CL
11	SMPTE2085
12	CHROMA DERIVED NCL
13	CHROMA DERIVED CL
14	ICTCP

Color Primaries

Color primaries holds the chromacity coordinates of the source primaries.

Value	Color Primaries
1	BT709
2	UNSPECIFIED
4	BT470M
5	BT470BG
6	SMPTE170M
7	SMPTE240M
8	Illuminant C
9	BT2020
10	SMPTE428
11	SMPTE431

12	SMPTE432
22	EBU3213/JEDEC_P22

Transfer Characteristics

Sets the gamma curve correction.

Value	Transfer Characteristic
1	BT709
2	UNSPECIFIED
4	GAMMA22
5	GAMMA28
6	SMPTE170M
7	SMPTE240M
8	LINEAR
9	LOG
10	LOG SQRT
11	IEC61966 2 4
12	BT1361 ECG
13	IEC61966 2 1
14	BT2020 10
15	BT2020 12
16	SMPTE2084/SMPTEST2084
17	SMPTE428/SMPTEST428 1
18	ARIB STD B67
22	EBU3213/JEDEC_P22

Alternate Transfer Characteristics

HEVC configured to signal HDR colors, can be 0 or 1 (False or True).