User Guide

Product Documentation

26.04.2024

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1 What is hi?

"hi human interface ®" is a control system for broadcast and media installations. It interfaces with broadcast and media hardware from different manufacturers using various protocols to provide a unified, over-all user interface. Utilizing data from all connected devices hi can provide the users real time information about their system, do calculations and respond to events with defined actions.

1.1 Scope

The main operative goals of the hi system are:

- providing an easy to use over-all user interface to control and configure devices, hardware and services from various manufacturers in a unified way. The controlled functions include
  - routing (provisioning connections and signal flows between devices)
  - parameter control (changing configuration values in connected devices)
  - monitoring
- providing dedicated hardware operation panels for quick access to most often needed controls
- calculating real-time tally information for cameras, monitors, multiviewers and other purposes via industry standard protocols or dry contact connections ("GPI/O")
- providing label information for multiviewers, vision mixers and hardware control panels
- providing security measures through access control and user rights management
- enabling the operation and control of complex installations from mobile end devices
- minimizing the effort for set-up and configuration

1.2 Applications

hi can be used in various fields, for example:

- in Outside Broadcast to provide user interfaces, hardware panels, labels and tally calculations for TV, radio or multimedia productions
- in Fixed Studio Facilities to provide user interfaces, hardware panels, labels, tally calculation, resource management and user rights administration
- in Theaters to provide a simple and easy to use interface to control media infrastructure

2 System Components

Hi is a software based system running on dedicated hardware, virtual machines or in the cloud.

2.1 Software

The hi system is based on a client and server infrastructure. A central instance holds all control connections to the controlled devices and performs all necessary calculations. Control interfaces such as computers, tablets or smartphones connect to the central instance using a web browser.

2.1.1 Clients

Following types of clients are supported:

- Smartphones (Android version 8 or newer with Chrome version 70 or newer, iOS with Safari version 13 ornewer)
- Notebooks, Desktop Computers (supported browsers: Google Chrome version 70 or newer, Apple Safari version 12 or newer)
- Tablets (Android version 8 or newer with Chrome version 70 or newer, iOS with Safari version 13 or newer
- Computers (Linux, macOS, Windows using Chrome/Chromium version 70 or never, Safari version 13 or newer)

2.1.2 Servers

The server instance is a Linux-based software solution. It can be run on:

- mini-computers (e.g. the Intel NUC platform or similar)
- dedicated servers
- server-clusters
- virtual machines
- virtual machines in the cloud (e.g. Azure, AWS, GCC, ...)

hi can be deployed on physical servers as well as on virtual machines or cloud VPS. hi can be deployed to a single computer or to a high-availability-cluster of minimum three computers/servers.

The used computing platform (server, computer or virtual machine) requires at minimum:

- 200GB of fast storage space (SSD preferred)
- 16GB of RAM (for facility sized systems with >50.000 total ports 32GB of RAM is recommended)
- min. 8 CPU cores (or 4 cores using hyperthreading so 8 threads are available)

2.2 Hardware

The hi system can be extended using hardware panels and GPI/O interfaces that are provided by hi.

3 Getting Started

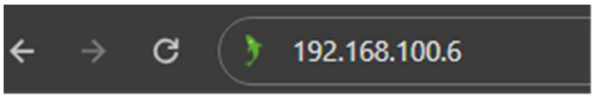
This guide will help you in making your first steps in a hi system.

3.1 Login

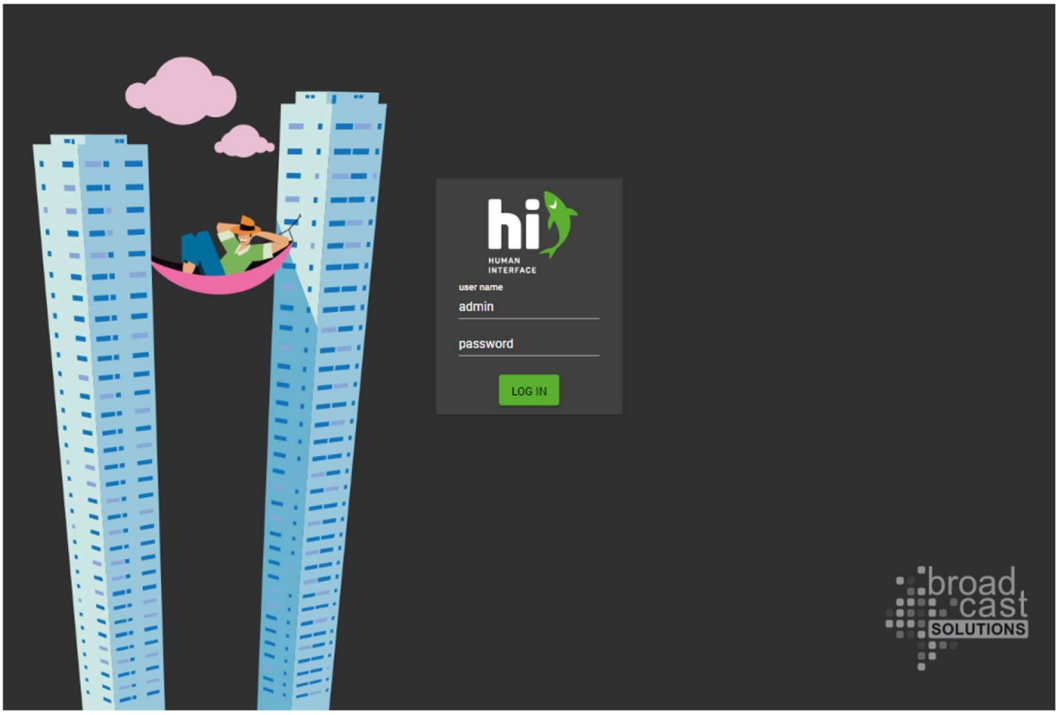
To access the hi system open a supported web browser on a computer or mobile device in the same network as the hi server.

> Supported web browsers are all Chromium based browsers such as Chrome, Edge and Safari.

Type in the IP-Address of the server:



You will see a login screen to the hi application:

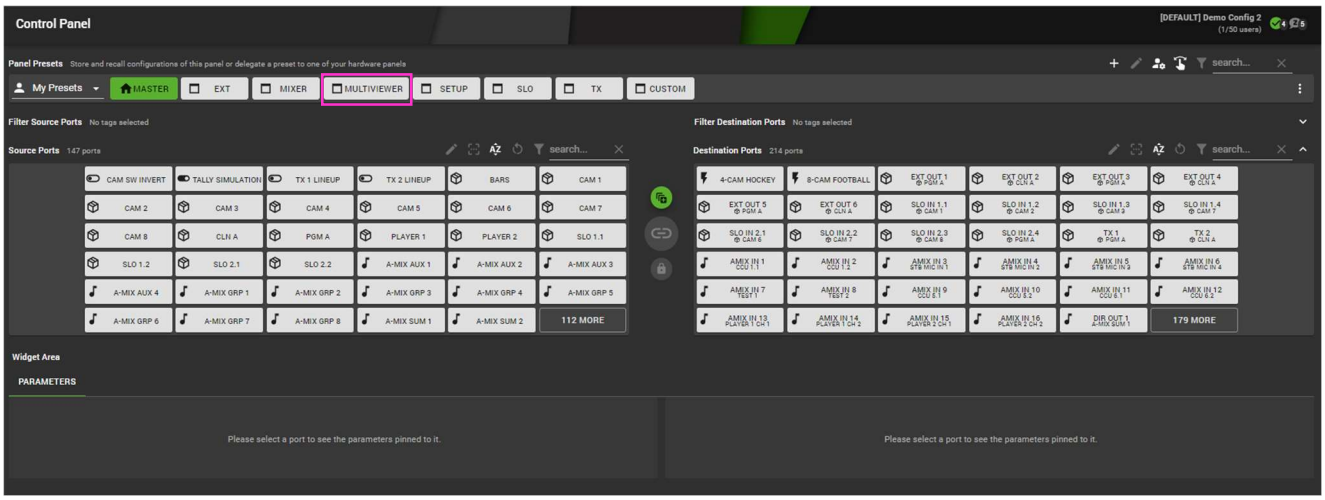


> **default credentials**
>
> If this is your first time here: the default credentials for the hi system are
> username: **admin**
> password: **p**

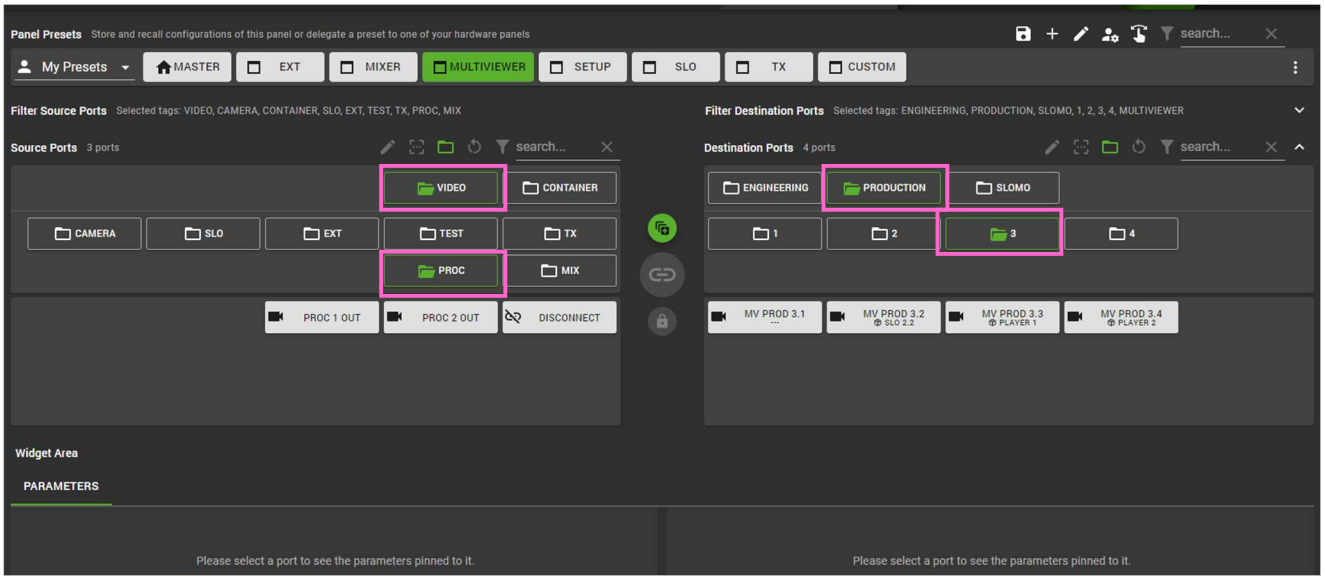
3.2 Landing Page

3.2.1 Control Panel Areas

After logging in you will be guided to the Control Panel. This panel displays sources and destinations in the system and allows for most every-day operations. For the sake of this introduction let us assume you want to change a multiviewer assignment on the third monitor in your production monitor wall.
In the first row of buttons, the preset selection, select the preset "MULTIVIEWER".

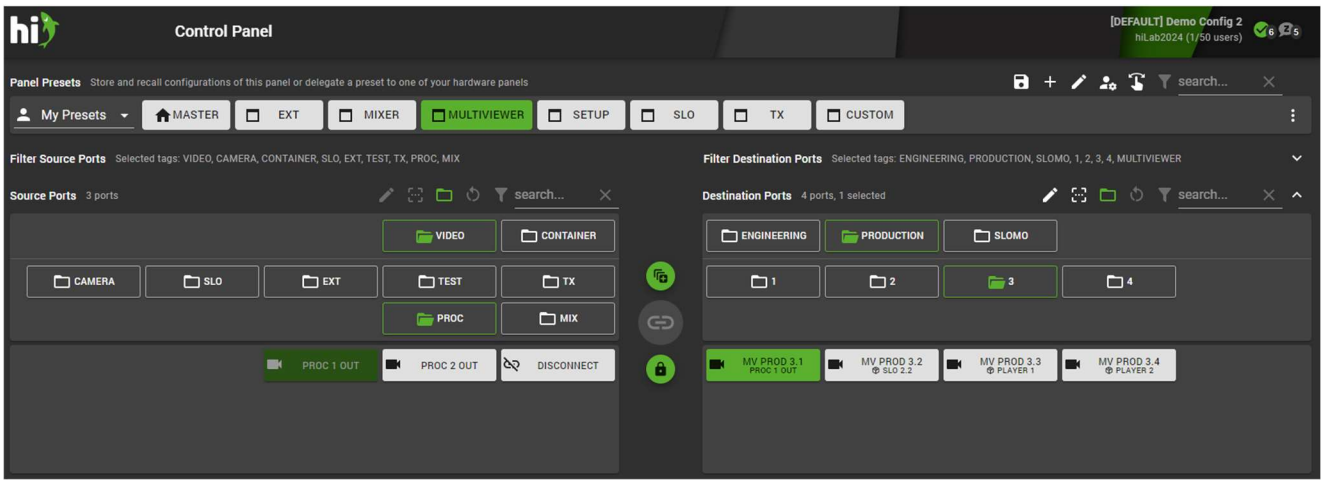


Now select the buttons "PRODUCTION" and "3" for example to narrow down the selection of possible destinations to the four inputs of the multiviewer. On the left side, select "VIDEO" and "PROC" fo example to narrow down the selection of sources.



Now, select a destination from the right side and a source from the left side. The buttons between the source and destination area become active:

Touch the connect button in the middle to route PROC 1 OUT to MV PROD 3.1. When the connection has been made, the source button will turn to a darker color and the destination button will display the newly connected source.

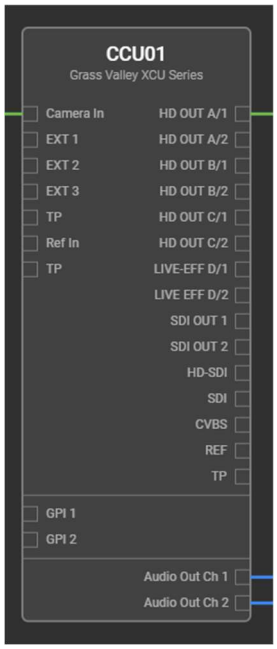


4 Core Concepts

A brief explanation of the concepts behind the hi system. Reading this will help you to understand the possibilities and applications of a hi installation.

4.1 Nodes

A node is a representation of a device, a service or a component of your physical installation in the hi system. A node can have ports and a certain set of capabilities.



4.1.1 Ports

The ports of a node describe input, output or bi-directional interfaces of a node. These can be for example physical input or output connectors of a device or endpoints of a service. Ports can be interconnected with each other using a link, which can represent a physical cable between two ports of devices.

NAMING

Each port carries five names:

Layer	Description
Primary Name	This is the main name of this port. It will be used in the user interface on computers and tablets. It has no length limitations.
Monitoring Name	This name is sent to Multiviewers and UMDs. By default, this name is empty and will inherit its content from the Primary Name.
Panel Name	This name is limited to 8 characters and is used on hardware panels buttons. When a Node is created, the Panel Name is automatically generated from the Primary Name using a shortening algorithm.

Mixer Name	This name is sent to Vision Mixers as source information. By default, this name is empty and will inherit its content from the Panel Name.
Name from Device	This name is read out from the device hi is connected to. In case of a router this would be the names configured in the router itself. Depending on the device these names are updated automatically if hi senses a change of the name in the device. In other devices the readout of the names can be triggered manually.

LAYERS

Ports exists on different Layers:

Layer	Description
Essence Ports	Describe the most atomic entity of a signal: for example a single mono audio channel.
Flow Ports	Describe signals that can be routed, for example an SDI signal with one video and sixteen audio channels
Physical Ports	Describe the physical interfaces of a node, for example the physical BNC connectors of a video router or the physical NICs of an IP device.
Mixer Name	This name is sent to Vision Mixers as source information. By default, this name is empty and will inherit its content from the Panel Name.
Name from Device	This name is read out from the device hi is connected to. In case of a router this would be the names configured in the router itself. Depending on the device these names are updated automatically if hi senses a change of the name in the device. In other devices the readout of the names can be triggered manually.

For more information about Layers please refer to Core Concepts: Layers (page 28).

FORMATS

Depending on the layer a port can have different formats. The formats are used to determine a compatibility between ports. The following format types are available:

ESSENCE LAYER

Format	Description
Video	A single-channel video signal.
Audio	A single mono channel of audio.
Auxilliary	An atomic AUX channel.

FLOW LAYER

Format	Description
SDI	An SDI link which can carry a video essence and up to 16 audio essences.
Audio	Any type of routable baseband audio: AES, MADI.
GPIO	A GPIO flow.
Data	Generic flow for Data (e.g. Ethernet Links).
ST2022-8	SMPTE 2022-8 streams
ST2110-20	SMPTE 2110-20 streams (video)
ST2110-40	SMPTE 2110-40 streams (ancillary data)

PHYSICAL LAYER

Format	Description
SDI	SDI connector.
Audio	Audio connector
GPIO	GPIO connector
Data	Data connector
Ethernet	Ethernet connector

4.1.2 Capabilities

A capability describes what features of the device are available for control in hi and which protocols are used to execute this capability. Examples for capabilities are:

- Crosspoint Management
- Parameter Control
- UMDs

Capabilities of devices (and their regarding control protocols) come pre-configured in the node template when creating a new node.

4.1.3 Wiring of Nodes

Hi works on the idea of re-creating the actual system architecture in the software to have a virtual simulation of the physical installation. This topology is built by adding relevant nodes and creating the wiring between these nodes in hi. A wire (or link) connects an output port of a node to an input port of (probably another) node. All nodes and their wires form the system topology.

For more information about Wiring and the Topology please refer to Core Concepts: Topology simulation (see page 17).

4.1.4 Creating nodes from templates

To speed up configuration hi provides a library of templates for various node types. When creating a node from a template hi will automatically select the right control protocols, the right ports and choose the right way to handle the device.

4.2 Tagging

Tags are used throughout hi to add additional information about nodes, ports and users to the system. They are the core part of browsing and filtering for resources in hi.

4.2.1 A Tag

A tag is a single piece of information, typically made of 1-3 words. Tags can describe different types of information. Examples for tags are:

- CAMERA
- MONITORING
- SYNC
- ASYNC
- EMBEDDED
- PRODUCTION A
- STUDIO A-2

4.2.2 Tag categories

Tags are sorted into categories for an easier overview. The categories usually describe a context of the tags they are containing. Examples for categories and their tags could be:

- Category: SIGNAL TYPE
  - Tag: VIDEO
  - Tag: AUDIO
  - Tag: DATA
- Category: LOCATION
  - Tag: ENGINEERING
  - Tag: PRODUCTION A
  - Tag: PRODUCTION B
  - Tag: FIELD
  - Tag: TAILBOARD
- Category: PURPOSE
  - Tag: CAMERA
  - Tag: MONITORING
  - Tag: REC/PLAY
  - Tag: MIX

hi can handle an unlimited amount of tag categories and tags.

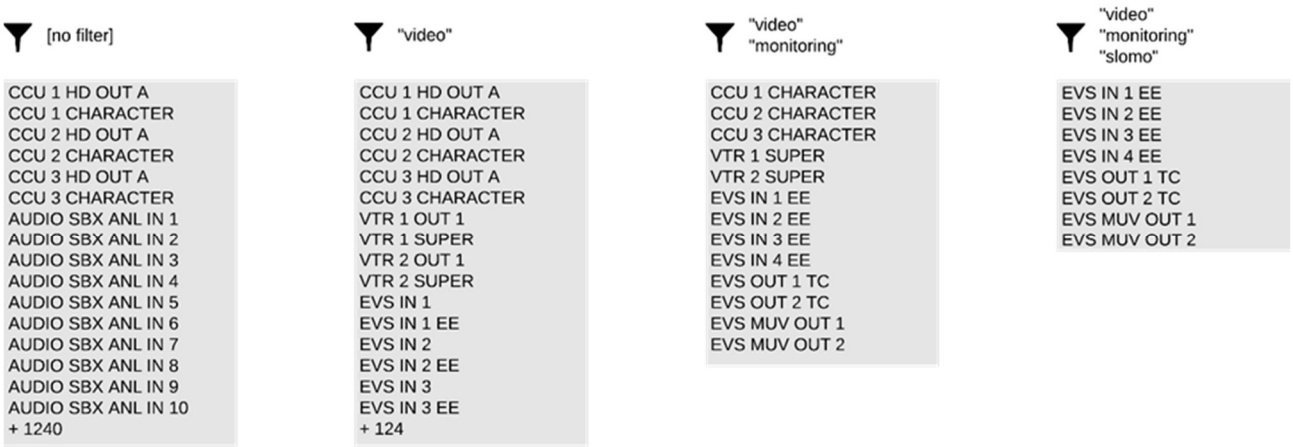
4.2.3 Assigning tags to assets

Tags can be assigned to ports, nodes and users in hi. The more tags are assigned to a port the better the port is described and the easier you can find it. Example:

Signal	Tags
CCU 1 CHARACTER OUT 1	SIGNAL TYPE / VIDEO LOCATION / FIELD PURPOSE / CAMERA PURPOSE / MONITORING
V-MIX IN 15	SIGNAL TYPE / VIDEO LOCATION / PRODUCTION A LOCATION / PRODUCTION B PURPOSE / MIX
MUV AUDIO 2 IN 15	SIGNAL TYPE / VIDEO LOCATION / AUDIO PURPOSE / MONITORING

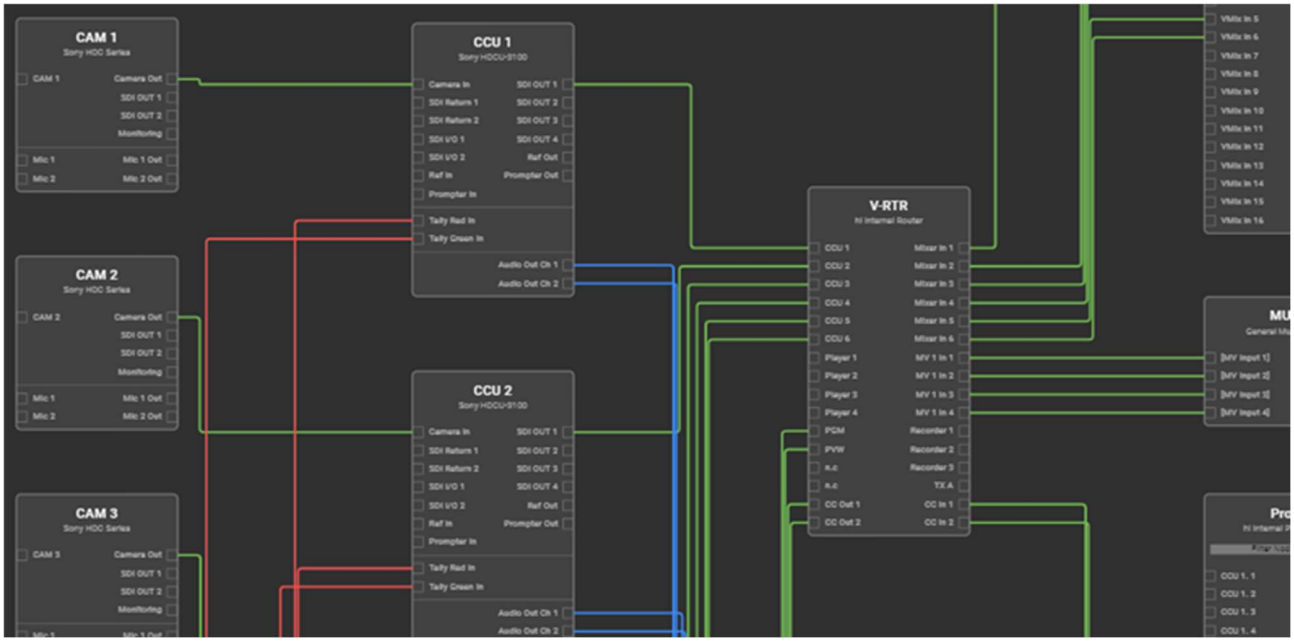
4.2.4 Filtering by tags

To find a specific asset in the system, tag filtering can be used. Add multiple tags to a filter to quickly reduce the list of visible assets and find the one you are looking for.



4.3 Topology simulation

Knowledge about the system topology enables hi to provide automatic configurations and intelligent calculations.



4.3.1 Nodes and Links

Most of the devices in a broadcast or media installation can be represented by a node in hi. Creating Links between the Ports of these nodes will represent the physical interconnections between these devices.

4.3.2 Signal Paths

With the information about nodes, their ports, the wires connecting them and the internal structure of the nodes hi can trace the origin of a signal throughout the complete topology. Traversing the tree further will also allow to read all the other places in the system where a specific signal is connected:

4.4 Handling Tally and Labels

4.4.1 Tally in hi

The knowledge about the system topology in an installation makes it possible for hi to provide tally information automatically.

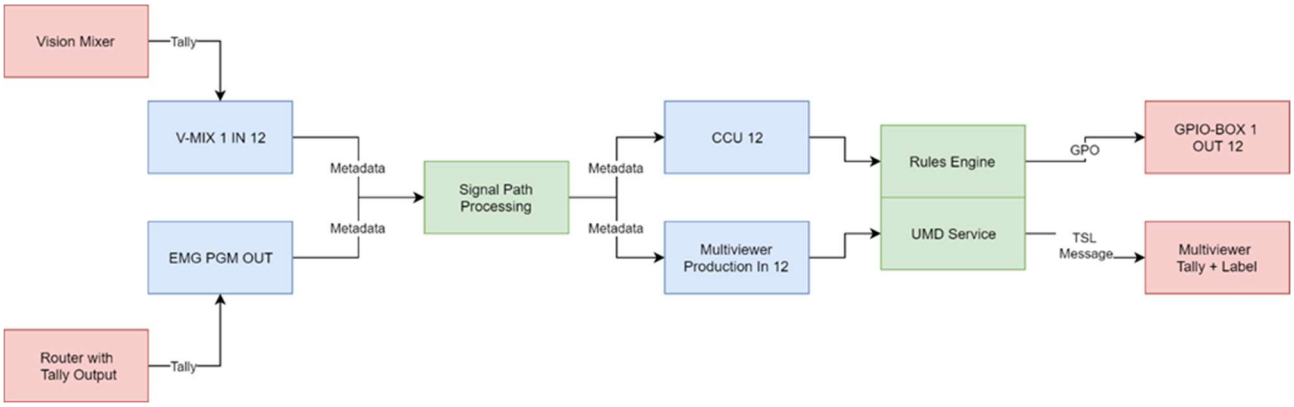
> For more information about system topology simulation please refer to Core Concepts: Topology Simulation (see page 17).

When a tally is sensed on a port in the system (because for example a vision mixer reported a tally on it's input) hi will check which wires and ports in the system are part of the same signal path (they are receiving the same signal) and send the tally information to all of these ports.

A tally change on any port in the system can be used as a trigger for a rule. (see page 33) A rule can then trigger an action, for example close a GPO contact on a GPIO-Box.

THE WAY OF TALLY IN THE HI SYSTEM

This diagram illustrates the path a tally information takes through the hi system starting in a vision mixer or in a router which is configured to create tally on an output to a GPO or a multiviewer UMD.



> Since tally propagation in the system relies heavily on the system topology we recommend to first create the nodes and the wiring before starting to configure tallies.

TALLY SOURCES

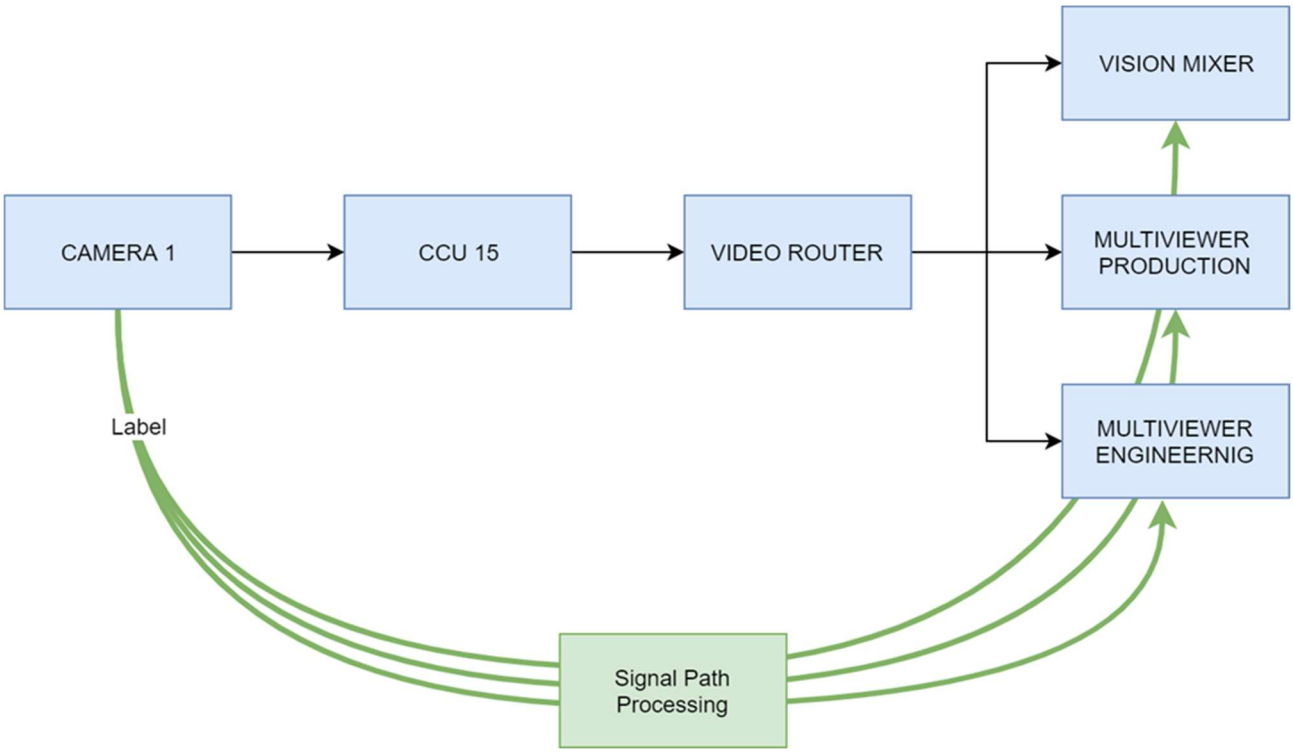
There are different parts in the hi system which can create a tally information. We refer to them as "tally sources".

Tally Source	Example
Tally Assignment in a Vision Mixer Node	"Suite A PGM A" on "V-MIX 1" triggers "ORANGE TALLY" in hi.
Tally Assignment to a Router Output	"TX A" on Router "MediorNet" triggers "EMERGENCY RED TALLY" in hi.

A Tally Rule Action	A rule toggles the status of "Tally RED" on "EXT 15" on "Router 1" with an external GPI.

4.4.2 Labels

The default way how labels are transported in hi works in a similar way. Since hi has the knowledge about the signal paths it can calculate the origin of every signal in the system. When setting up UMDs or dynamic labels for vision mixers the default setup will send the name of the signal origin to the according receivers. This means that these labels will always be correct, even if something in the system topology changes.



4.4.3 Metadata

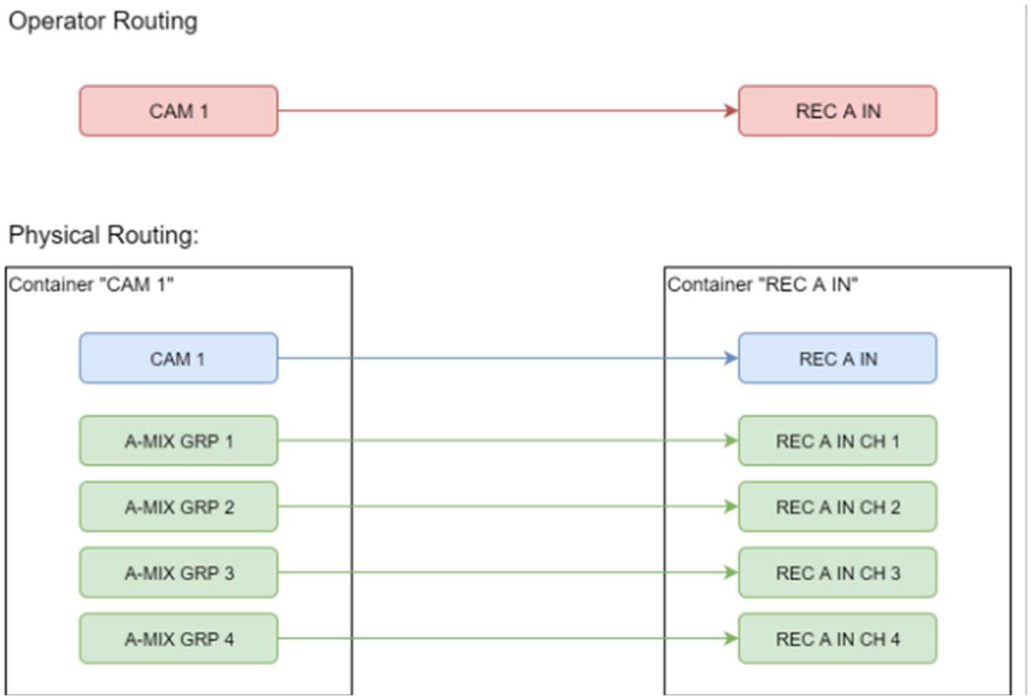
Same as the tally information the system can transport additional data along the calculated signal paths. A piece of metadata information is a Key-Value pair. When a metadata pair is created on a port, it becomes available on each port which is part of the same signal path. E.g. if a metadata key-value pair ('name':'peter') is added to the camera, this information can also be displayed on a multiviewer.

4.5 Port Containers

Port containers tie a set of ports in the system together. They can be used e.g. for audio-follow-video scenarios or for simultaneous switching of UHD links.

4.5.1 About Port Containers

A port container is a box, which can hold multiple ports. Regardless of the inner design of a container it is displayed to an operator as a single source or destination:



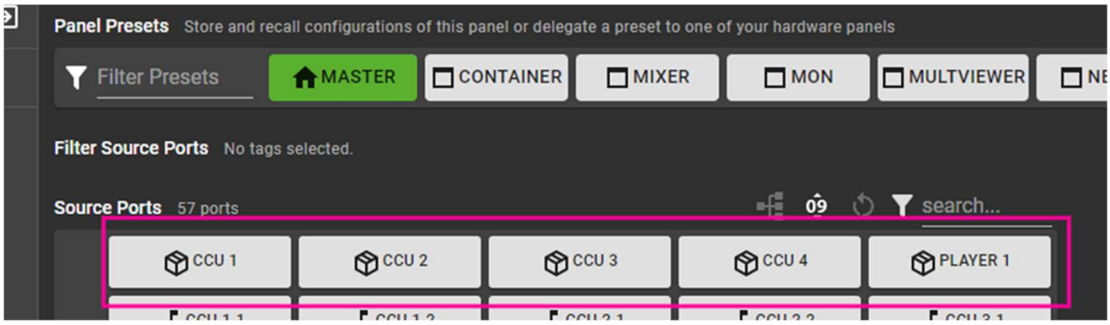
When a source container is routed to a destination container hi will resolve the containers to the discrete ports and try to connect them in the right order. When routing from a software UI additional audio shuffling at routing time is possible.

4.5.2 Creating and editing containers

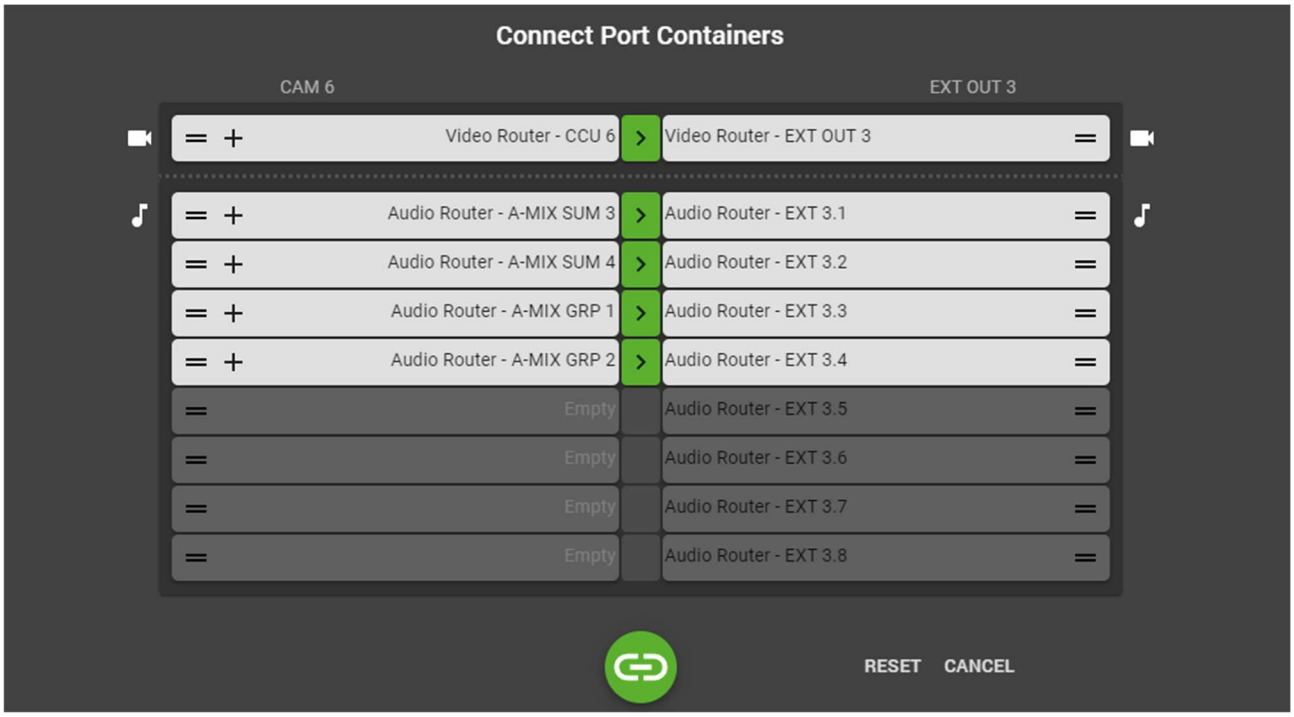
To create or edit a port container use the Port Container Setup (see page 104).

4.5.3 Connecting containers

A container will be shown on the control in a similar way to regular ports. A container is marked by the container icon:



When you connect two port containers a dialog will appear showing you a detailed view of the discrete routings that will happen once you perform the connection:



4.5.4 Updating Port Container Connections

When changing the contents of a Port Container, the system can automatically update all affected connections, effectively applying the new configuration of the Port Container throughout the system.

Example

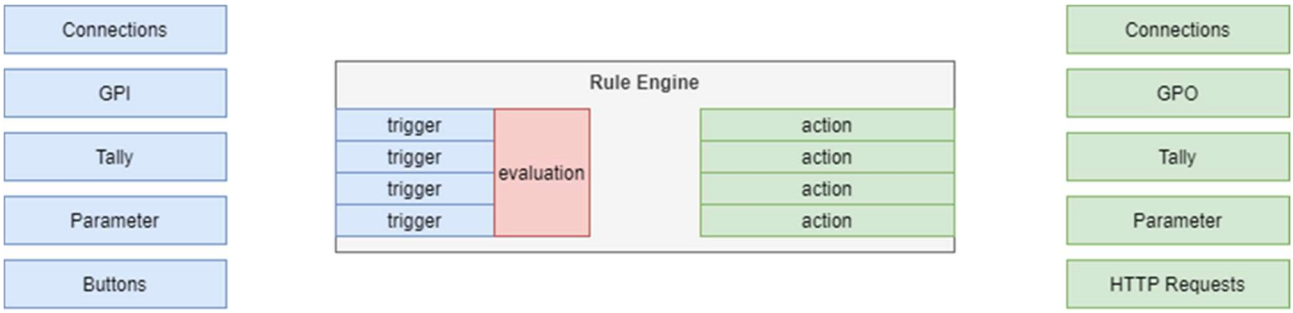
A source port container is named "CAM 1". It contains a video source: "CCU 1 HD". The user connects this container to a multiviewer input. In this moment hi will create a connection from "CCU 1 HD" to the multiviewer input.
The user changes the content of the source port container "CAM 1". It now has the video source "CCU 3 HD". When choosing "SAVE AND UPDATE CONNECTIONS", hi will automatically connect "CCU 3 HD" to the multiviewer input and any other places, where "CAM 1" has been routed.

4.6 Rule Engine

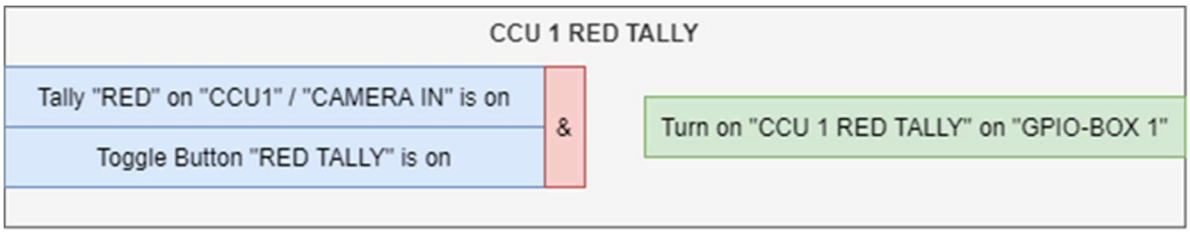
Use rules to create logical combinations of events and actions in hi.

4.6.1 Concept

The rule engine listens to events from various parts of the hi system and can trigger actions in various parts of the system:



A rule consists of one or many trigger definitions and one or multiple action definitions:



Various things in the system can serve as a trigger, for example tally changes, changes of a GPI status of connected GPI boxes, changes of parameters that are monitored by the system or also a timestamp. Multiple triggers can be combined in the same rule setting up a logical relation between them. On each change of a trigger used in the rule engine, the trigger side of the rule is evaluated. If the trigger side of the rule is evaluated positively, the rule is "fired" and the configured actions are performed. Actions can influence various parts of the system, for example change tallies, set GPOs in connected boxes or change parameters. Multiple actions can be combined in a single rule. All actions will be executed simultaneously, once the trigger side of the rule has been evaluated positively and the rule "fires".

4.6.2 Stateful and Event-based Rules

A rule and it's triggers and actions can be either stateful or event-based.

STATEFUL RULES

A stateful rule can be "active" or "inactive", and actions can be set up to follow this state.

> **Example**
>
> *"When the RED Tally is on on "CCU 1" / "Camera In", let "CCU 1 RED TALLY" on GPIO-BOX-1 follow the trigger."* The status of the GPO "CCU 1 RED TALLY" will follow the status of the tally on the specified port.

EVENT BASED RULES

An event-based rule usually "fires" on the change of things in the system. It does not provide any "active" or "inactive" information. This also influences the actions, that you can configure for this rule: only actions that do not require a state can be used in an event-based rule.

Example

At 2:00:00 PM each day, recall Snapshot 'DEFAULT'"
Every day at 2 PM the 'DEFAULT' Snapshot will be recalled.
"At 2:00:00 PM each day, let "CCU 1 RED TALLY" on GPIO-BOX-1 follow the trigger"
This rule is invalid - the trigger of the rule does not provide a state, but the action requires one.
"At 2:00:00 PM each day, set "CCU 1 RED TALLY" on GPIO-BOX-1 to ON"
This rule is valid - the action does not require a state, it will set the GPO to ON every day at 2PM.

COMBINING STATEFUL AND EVENT-BASED TRIGGERS AND ACTIONS

When creating rules, please note that some triggers are providing state, some are not, and also some Actions require a state to operate, some do not. When you create a new rule, hi will validate your configuration and warn you in case of misconfiguration. When combining multiple stateful triggers in a rule, the rule itself will be stateful and stateful actions can be used. When combining stateful and event-based triggers in a rule, the rule itself will become event-based and only actions that don't require a state can be used.

4.6.3 Available Triggers

The following triggers are available in the hi system:

Trigger Name	Description	Stateful Variants	Event Based Variants
On a Connection / Crosspoint	this trigger monitors a defined output port in the system and fires when a change occurs	When a specific source is connected to a specific destination	When the source of a specific destination changes (regardless of the source)
On a GPI input	this trigger monitors a GPI input port from a hi GPI box in the system and fires when it's status changes	When a specific GPI is ON (or OFF)	When the status of a specific GPI changes (regardless in which direction)
On a Tally change	this trigger monitors a tally color in hi and fires when a certain tally is on	When a tally on a specific essence port goes ON or OFF	When any tally of a defined color in the system changes
On a Button press	this trigger creates a button on the control panel and the hardware panels that can be used to trigger a rule	A button of "toggle" type. It can be switched on or off from the control panel	A button of "push" type. It can be fired from the control panel
On Parameter change	this trigger monitors a pinned parameter in the system and fires whenever it changes	On any change of the parameters value	when the parameter has a specific value or crosses a threshold

On Schedule	this trigger will fire on a configured date and time. It can also be set to fire in a recurring manner (every hour, every day, etc		when the current time moves past the configured timestamp
On Metadata Change	this trigger monitors a port in the system and checks whether a specified metadata key is present	when the metadata on a port has a specific value for a specified key	On any change of metadata on a port at a specified key

4.6.4 Available Actions

Action Name	Description	Variants requiring state	Variants not requiring state
On a Connection / Crosspoint	this action will connect an input of a node to an output on a node that supports routing	▪ Create a connection when the trigger is active ▪ Create a connection when the trigger is inactive ▪ Toggle between two sources	▪ Create a connection when the trigger is active (will be executed when the event-based rule fires
Switch a gPO output	this action will close a configured GPO on a GPIO-Box	▪ Let the GPO follow the trigger	▪ Set GPO ON ▪ Set GPO Off
Change a Tally	this action will change the status of a specific tally on a specific essence port in the system	▪ Let the Tally follow the trigger	▪ Set Tally on ▪ Set Tally off
Activate / deactivate a Tally	this action will change the status of a specific tally source (e.g. to enable or disable tally from a vision mixer)	▪ Let the Tally follow the trigger	▪ enable Tally from this source ▪ disable Tally from this source
Change a Parameter	this action will change the value of a specific pinned parameter in the system	▪ Set a Parameter to a value when the trigger is active ▪ Set a Parameter to a value when the trigger is inactive ▪ Toggle the Parameter between two values	▪ Set a parameter to a value when the trigger is active (will be executed when the event-based rule fires)

Recall a Snapshot	this action can recall a snapshot in the hi system.	▪ Recall the Snapshot when the trigger is active ▪ Recall the Snapshot when the trigger is inactive ▪ Toggle between two Snapshots	▪ Recall the Snapshot when the trigger is active (will be executed when the event-based rule fires)
Send a HTTP request	this action can send a HTTP request to a defined endpoint. This can be used to trigger events in 3rd party software or to interact with HTTP-based APIs		▪ send an HTTP Request
enable / disable a Rule / Rule Group	this action can disable or enable rules or rule groups.	▪ enable / disable the rule following the trigger	▪ enable selected rule / group ▪ disable selected rule / group
Change Metadata	this action will insert a key/value-pair of Metadata on a specific essence port in the system	▪ metadata follows trigger (will be set and removed according to trigger state)	▪ set Metadata ▪ remove Metadata

4.6.5 Common usage examples

CAMERA TALLIES VIA GPIO-BOXES

While the tally information is handled mostly automatic in the hi system you still need to tell hi how the information should leave the system. If you are using GPI/O for Tally in your installation you will need to create a rule for each GPO from hi that will be triggered by a tally.

1. Create a new rule
2. Select "on a Tally change" as trigger
3. Select your first CCU from the list of available nodes
4. Select an essence port from this CCU (for example you can use the "Camera In" port)
5. Click Next
6. Select "switch a GPO output" as an action
7. Select a GPIO-Box and an output where you have connected the Tally input of your CCU
8. Repeat for all CCUs

4.7 User Rights Management

4.7.1 Authentication

When opening the user interface for the first time a log in is required. The session will be kept active until the user logs out again. Without a login no interaction with the software possible. The same user can login from multiple end devices at the same time. Each session will occupy one user license (see below).

4.7.2 User Roles

A role defines what configuration changes a user is allowed to perform in the system. In most cases it restricts the access to certain parts of the software UI. For example a user that only carries the role "Router Panel access" will be able to only access the router panel and nothing else.

4.7.3 Defining access to ports in the system

While the roles define the access to the configuration parts of the system, the Tagging (see page 25) mechanism is used to restrict access to ports in the system. When assigning a set of tags to a user this user will only see ports that carry at least one of the assigned tags.

4.7.4 License implications

Each user created in the hi system will occupy one User Access License. The number of available User Access Licenses is restricted by the license packages which are active in your hi system.

4.8 Storing and Retrieving Configurations

4.8.1 Snapshots

hi uses a concept of snapshots to store state information about connected devices. Snapshots can be created and recalled quickly without interruptions of tally calculations and access to the system. Production-relevant changes to a system should be stored in snapshots.

4.8.2 Backups

The currently running configuration of the hi system is stored in a database on the hi server. In case of a redundant system this database is also laid out in a redundant way to be resilient against hardware or power system failures. The hi Configuration Database contains all setups and configurations of the hi system (configured nodes and connections to end devices, port names, panel presets, wiring etc.). Also snapshots that have been created are part of this configuration database.

When creating a backup, the active configuration of the hi system is saved into a file on the servers file system and can be restored at a later stage.

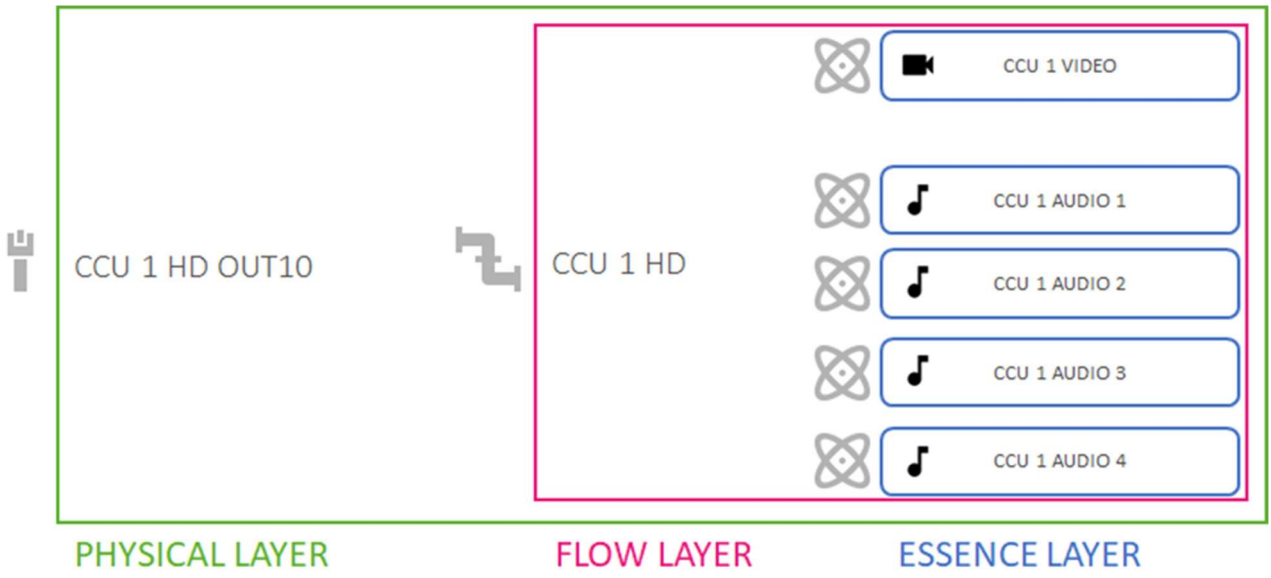
> Restoring a backup will remove all current configurations from hi and replace it with the configuration from the backup. Any unsaved changes will be lost.

Backups can be downloaded from the user interface and stored as a file. Backups can also be transferred between hi systems.

4.9 Layers

hi handles your installation and your signals on three different layers. The same way hi knows about the topology of the installation it is controlling, it also models the nature of the signals and the data itself. For instance let us look at an audio signal from a microphone. While at the microphone itself the signal travels along a cable on it's own, it later might be a channel in a MADI stream. And this MADI stream might be again transported with multiple other different signals on a fiber link.

hi needs to be aware of all these implications to automatically calculate tally and provide routing suggestion throughout your topology. This is why all input and output ports in the hi system exist on three layers:



4.9.1 Essence Layer

A port on the Essence Layer is the most atomic signal representation in the system. It describes an indivisible signal item, for example:

- one single audio channel
- one quadrant of an UHD quad-split stream

hi handles all metadata on this layer. This is especially relevant for tally calculation.

> hi provides all tally calculations on this layer, so tally is independent of signal transports. This means that the tally information will always be accurate, regardless of the path the signal takes.

4.9.2 Flow Layer

A port on the Flow Layer describes a signal which can carry multiple essences, but still can be routed independently. For Example:

- an SDI Video carrying a single video essence, 16 audio essences and various metadata essences
- a SMPTE 2110-30 Audio stream carrying 8 audio essences ("channels")
- a MADI stream carrying 64 audio essences

hi uses the flow layer for routing.

4.9.3 Physical Layer

A port on the Physical Layer describes a physical input / output or bi-directional connector of a device. A Physical Port can carry one or multiple flows, for example:

- a SDI Output Connector of a CCU carrying only a single flow, which carries a single video and 16 audio essences a 10GBiT SFP Interface of a network device carrying 12 SMPTE 2110-30 audio streams (=flow ports) which a 8 audio essences each.
- a 100GBiT Uplink port of a network switch carrying potentially hundreds of different flows with different essences each.

The physical layer is used to calculate potential signal paths and bandwidths.

4.10 Parameter Control

How to set up controlling of parameters with hi.

4.10.1 Parameter Control on a Node

When creating a node in hi the system will automatically offer parameters to control if the according template and protocol implementations support it. The node view in the UI offers a parameter browser which allows to view and change all available parameter in a tree-like structure.

4.10.2 Types of Parameters

There are different types of parameters in the system:

Type	Purpose	Example	Parameter Widget
Select from predefined values	The device offers options, the user can chose one of the options.	Select from different types of test signals in a signal generator.	
Numeric value	This parameter can have a number with a defined minimum and maximum value.	Amount of delay on an audio channel.	
On/Off value (boolean)	This parameter can be either on or off	Enable or disable the Frame Sync.	
Text value (string)	This parameter can receive a text.	Text for a character insertion.	
Read-only text value	This is a read-only parameter, it can only display it's value in hi, but cannot be changed.	The serial number of a device.	
Read-only numeric value	This is a read-only parameter, it can only display it's value in hi, but cannot be changed.	Temperature of a power supply.	
Read-only on/off value	This is a read-only parameter, it can only display it's value in hi, but cannot be changed.	Power status	

4.10.3 Pinning Parameters

To have a quicker access to parameters that are used more often the operator can pin any number of parameters. When a parameter is pinned it is monitored by the hi system and displayed in the Node view for quick access.

> Pinned parameters can be used for triggering Rules (see page 22).

4.10.4 Assigning a Pinned Parameter to a Port

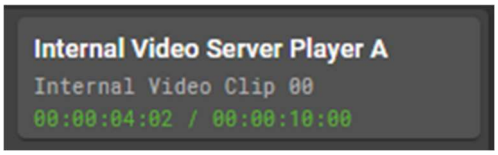
A pinned parameter can be assigned to one or multiple ports in the system. Assigned Parameters will be shown in the Control Panels for easy and contextualized access.

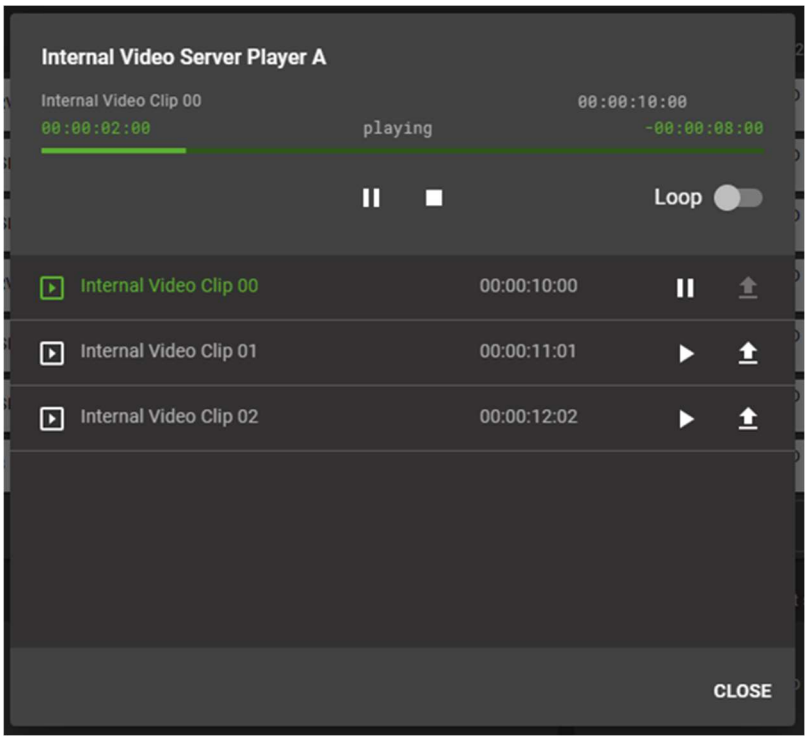
4.10.5 Parameter Containers

Parameter Containers can combine multiple parameters of the same type and expose them as a new pinned parameter. This way multiple parameters can be controlled simultanously, as if they were a single one.

4.10.6 Video Server Control

hi provides a dedicated workflow to control video servers or VTRs. Clips on the storage of the servers can be arranged in a clip list and it's playout controlled from the hi user interface. A special control widget can be assigned to Ports or Port Containers in the hi system, similar to a Parameter Control widget. The widget will show live state information of the current Server Player Channel, opening it will provide a dedicated UI to control the Player.



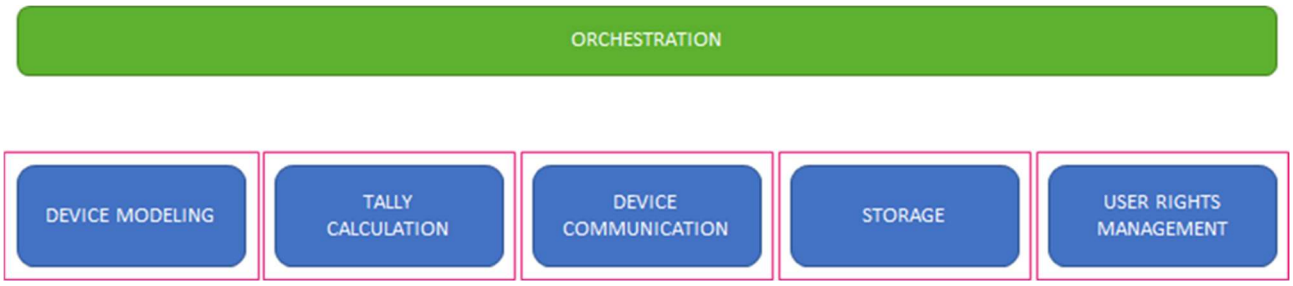


4.11 High-Availability Configurations

hi runs in a robust orchestrated micro-service approach which provides redundancy on the software level. Hardware redundancy can be achieved by deploying the system to a multi-node cluster.

4.11.1 Micro-service Approach

hi is designed on a micro-service software architecture. Instead of one monolithic program hi is made of a number of services all serving different purposes. Each service is running in an isolated container and the presence and health of all services is monitored by an orchestration system.

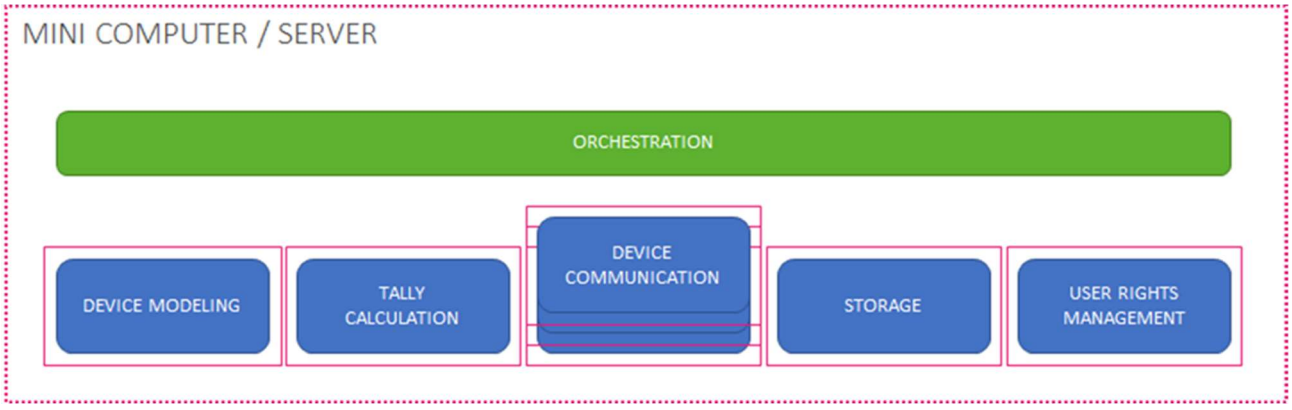


4.11.2 Self-healing

In case of a failure of one of the services the orchestration layer will automatically shutdown the current instance of the service and replace it with a new and healthy one. This process takes a few seconds. In a similar way existing services can be replaced with newer versions in a software upgrade process. This allows quick switching between software versions with almost no downtime of the system.

4.11.3 Deploying on a single computer

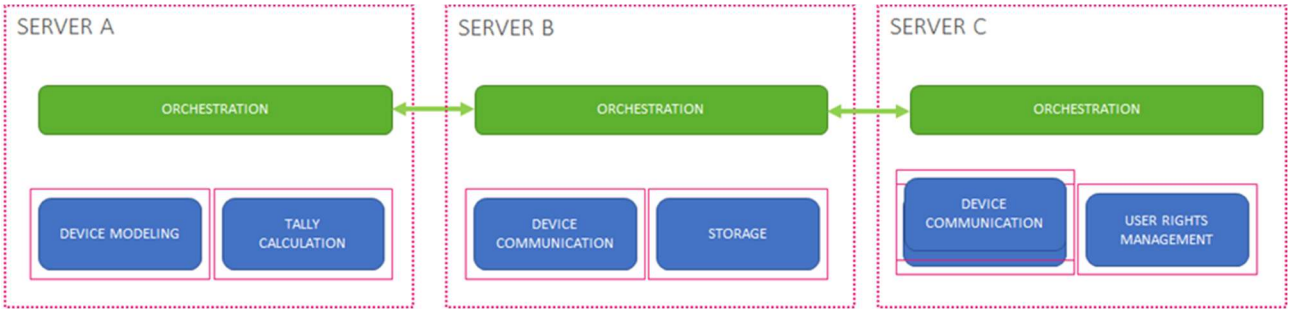
The hi system can be deployed on a single server. In this case all of the services run on the same physical machine. While the micro-service software architecture provides a high amount of security and stability on the software side, this approach is not considered a fully redundant system. Failure of the server or computer hosting the software will stop the operation of the software.



4.11.4 Deploying to a cluster of servers / nodes

When hardware redundancy is required the system can be deployed to a cluster of servers. In this case there is no classical A/B redundancy, but the system runs on all nodes in a distributed way. This means that the microservices are spread over the available worker nodes. The orchestration - while physically running on all nodes - still acts as a single orchestration layer.

The minimum number of worker nodes in this scenario is two - this is why for a hardware-redundant system a minimum of three servers is required. In this case one server can break down without harming the system.



4.12 Northbound Interface

Enabled by the hiDock license, hi can provide a northbound interface for 3rd party systems (e.g. studio automation systems).

4.12.1 Routing via ProBel SW-P-08

hi can provide a ProBel SW-P-08 server simulating the behavior of a SW-P-08 compatible router to third party control system. To enable this feature, add a new node to the system: "Northbound ProBel SW-P-08 interface" and specify a number of inputs and outputs this interface should have. Once the node is created, you can assign ports and port containers to the sources and destinations of the simulated matrix.

BEHAVIOR

LABELS

The third party system can query the labels for the inputs and outputs of the matrix. The names from the hi database are mapped to the labels specified in the ProBel SW-P-08 protocol documentation. This mapping can be influenced in the General Tab of the Northbound Interface Node.

CROSSPOINT CHANGES

The third party system can request a crosspoint change for an input and output of the ProBel SW-P-08 matrix. Hi will try to connect the mapped source and destination.

CROSSPOINT UPDATES

hi is examining incoming crosspoint changes from systems it is controlling and is evaluating whether they are relevant for the ports configured for the northbound interface. If the source of a destination mapped to the northbound interface changes, hi will send an according update via the SW-P-08 protocol. If the new source is also part of the northbound interface matrix, hi will report the according input of the northbound interface matrix. If the new source is not part of the northbound interface matrix, hi will report a special source, called "OUT OF RANGE".

SUPPORTED MESSAGE TYPES

> Please refer to the protocol documentation of ProBel SW-P-08 for further information on the available messages types and their meanings.

INCOMING MESSAGES

- `Crosspoint Interrogate`
- `Tally Dump Request`
- `Crosspoint Connect`
- `Dual Controller Request`
- `Single Source Name Request`
- `All Source Name Request`
- `Single Source Name Request`
- `All Destination Name Request`
- `Single Destination Name Request`

OUTGOING MESSAGES

- `Dual Controller Status Change`
- `Crosspoint Changes`
- `Port Label Changes`

4.12.2 License Restrictions

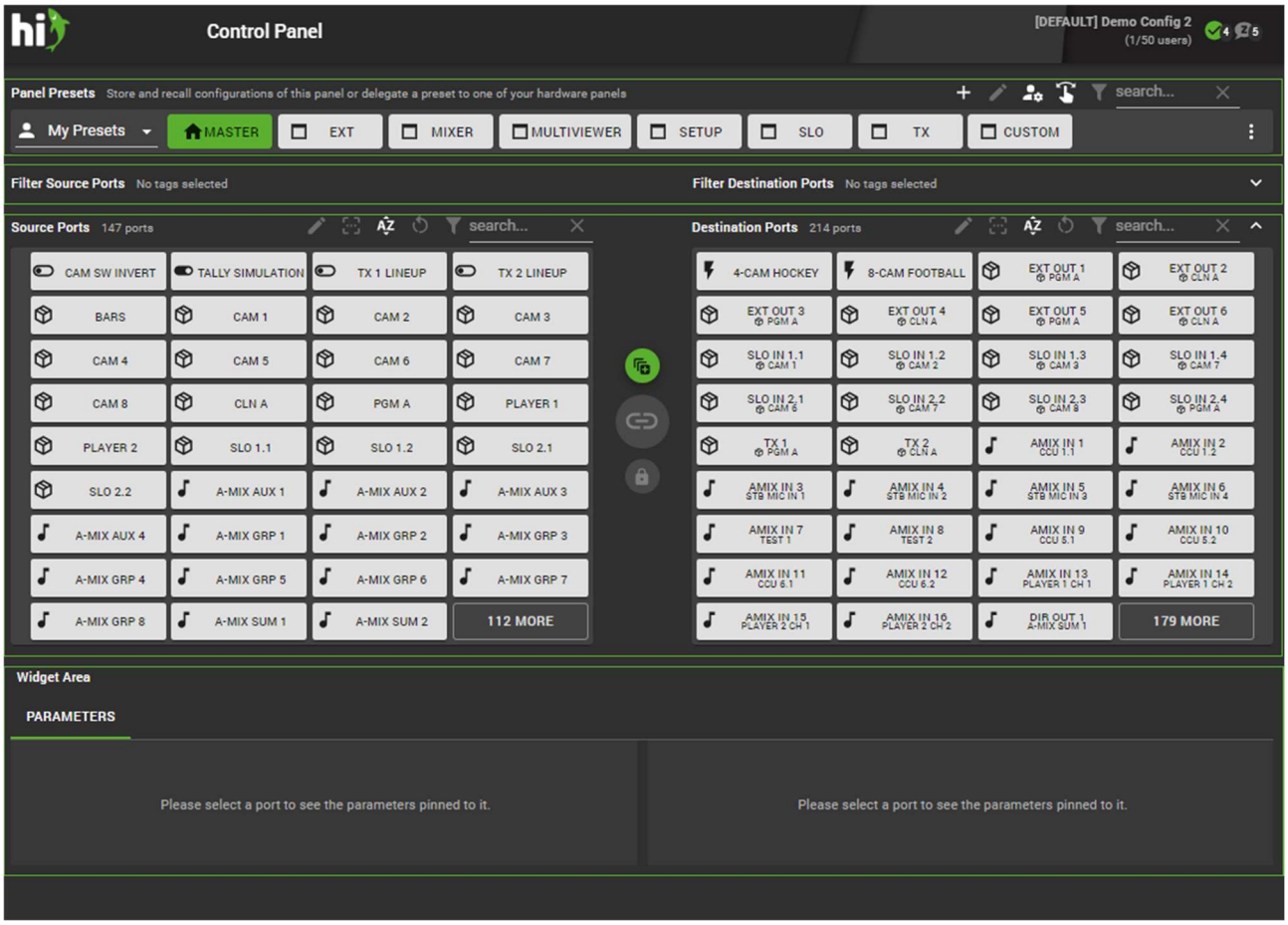
To add the Northbound Interface node to the hi system, a hiDock license must be present. Creating this node will additionally occupy one user license.

5 Functionalities

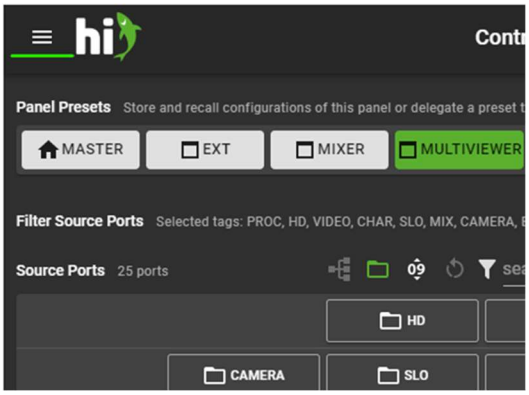
A detailed tour of the user interface and the functionalities.

5.1 General Layout

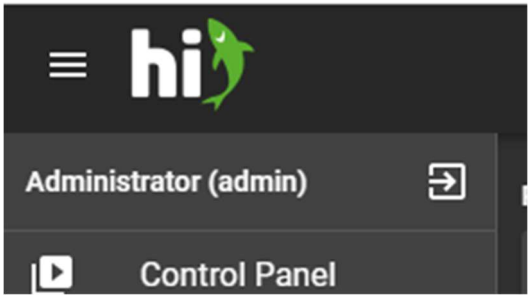
After logging in you will be redirected to the main user interface. It consists of a top bar with the application logo, the name of your installation and the status icons, a menu area on the left hand side and the content area in the center.



Depending on the resolution of the device or the web browser's zoom setting the menu bar on the left side might be hidden. To open the menu touch the menu icon next to the application logo.

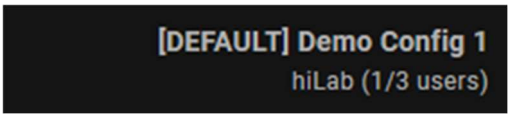


Above the Menu entries the name of the currently logged in user is displayed. Next to the user name is the Log Out button.



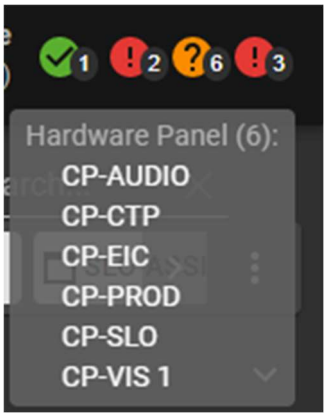
5.1.1 Currently Active Backup and License Name

The top right corner shows two lines of text. The first one is the currently active configuration name / the last restored backup. The second line states the unique name of this installation and informs about the number of currently occupied user licenses and the number of totally available licenses:



5.1.2 Connection State Indicators

The top right corner shows a range of icons indicating the state of the connections to the configured nodes in the hi system. The badges containing a number indicate, that there is multiple nodes with the same status. The status icons are grouped by type of nodes.
Placing your mouse on one of the icons will reveal further information about the status:



Please refer to the following table for possible icons and their meanings:

Icon	Meaning	Information
	Node is online	The connection to the device is working properly.
	Status unknown	The status of this node is unknown.

	Node is offline	There is no valid connection to this device.
	Node is processing	hi is performing a long running task related to this device (e.g. read out all labels from a router).
	Node is initializing	hi is establishing a connection to this device and performing initialization tasks.
	Devices discovered	hi discovered devices in the network that can be added as nodes into hi.
	Node is disabled	hi discovered devices in the network that are disabled.

5.1.3 Menu Items

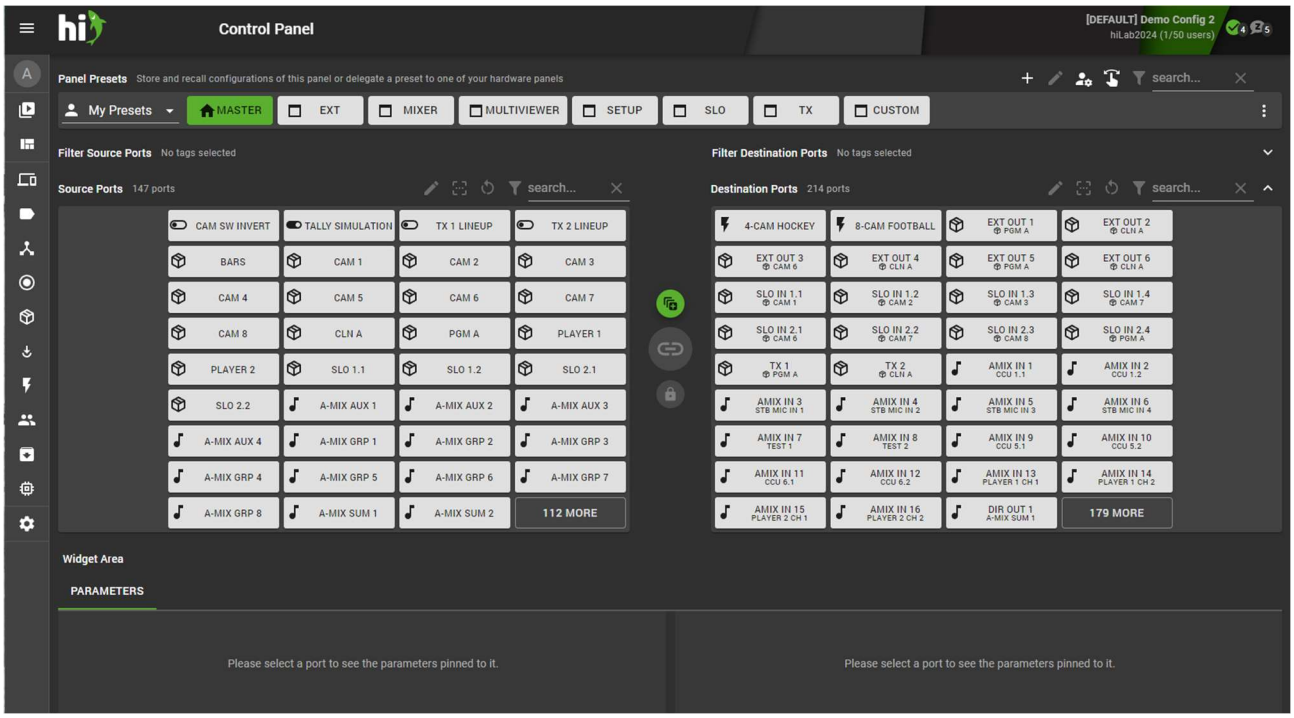
The Menu consists of the following entries:

Entry	Description	Documenation
Control Panel	create connections, change parameter values, define hardware panel contents	Control Panel (see page 39)
Nodes	add, edit or remove nodes from the system, setup connections to other devices	Nodes (see page 12)
Tags	add, edit or remove available tags	Tags (see page 94)
Diagram	review your system in an interactive block diagram, add, edit or remove wiring between nodes	Topology view (see page 97)
Tallies	add, edit or remove available tally channels in hi, enable or disable a tally globally	Tally setup (see page 101)
Port Containers	add, edit or remove port containers used to switch multiple signals at the same time	Port Container setup (see page 104)
Joystick Override	create OCP/RCP assignments for camera matching	Joystick Overried (see page 108)
Rules	add, edit or remove, enable or disable rules in the system	Rules Setup (see page 112)
Users	manage user accounts and define their access rights	User Mangement (see page 124)
Backups	backup and restore complete system configurations	Backups (see page 127)
Snapshots	save and recall crosspoints	Snapshots (see page 129)
Licenses	manage the available licenses in the hi system	License Administration (see page 131)

5.2 Control Panel

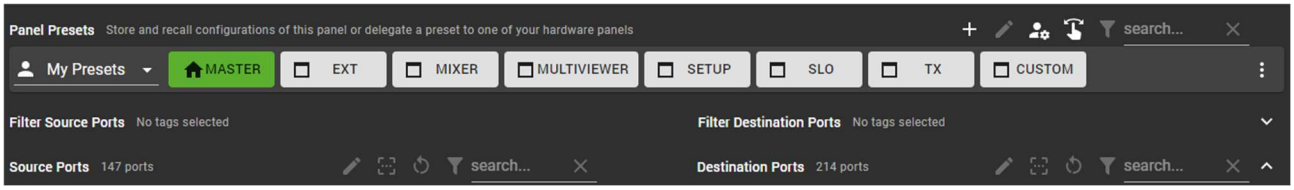
The control panel is the main control surface of the hi system. It is designed to accommodate most of the required every-day operations. To open the control panel view touch "control panel" from the main menu. The view is divided into four parts:

1. **Panel Presets** - this area shows presets for the current user for the control panel. Presets store a state of the panel and can be used to quickly switch between different scenarios.
2. **Filter Source / Destination Ports** - the ports displayed in the "Source / Destination port" area can be filtered down by selecting tags.
3. **Source / Destination Ports** - this area displays sources and destinations.
4. **Parameters** - Parameters assigned to sources or destinations are displayed dynamically in this area.



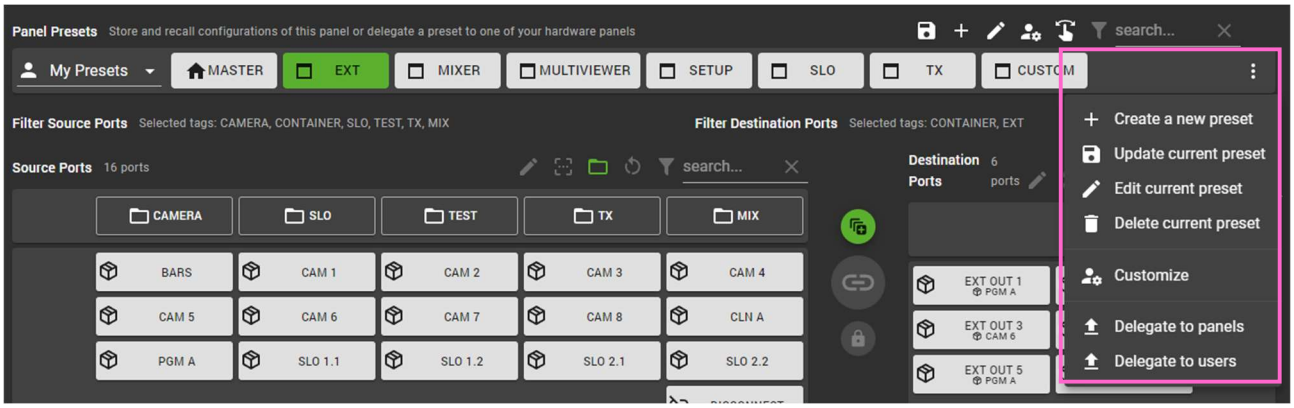
5.2.1 Panel Presets

This area shows the users presets for this panel. A preset stores the filtering configuration and layout settings of this panel. Presets can be used to quickly switch between different scenarios on the panel.



PRESET MENU

At the end of the preset bar, a three-dot button opens a menu containing various operations on presets:



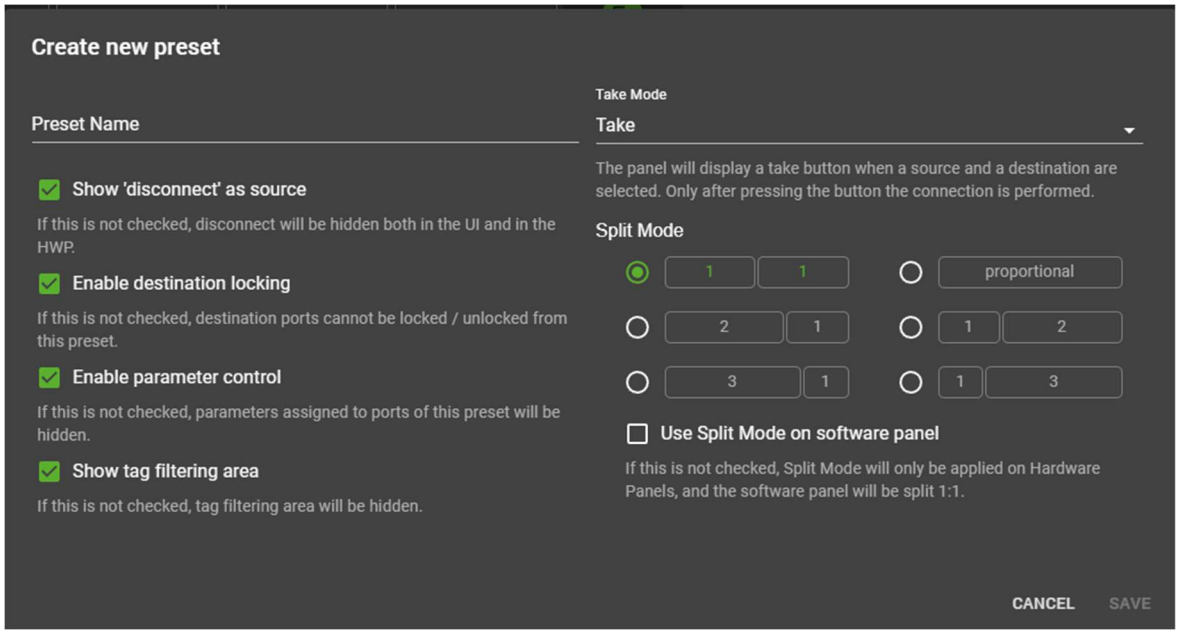
Create a new preset (see page 40)	stores the current state of the panel as a new preset
Update current preset	saves the changes that have been made to the currently active preset. This will also update all hardware panels that this preset has been delegated to
Edit current preset (see page 42)	displays a dialog to change the name and other properties of the currently active preset
Delete current preset	deletes the currently active preset. This will also remove this preset of any hardware panel where it has been delegated
Customize	enters the customization mode for this preset
Delegate to panels	displays a dialog to select the hardware panels in this system which should display this preset
Delegate to users	displays a dialog to select the users in this system which should see the current preset

The most used preset editing functionalities are also available by touching the corresponding icon above the preset bar.

Some of the options depend on user rights. Please refer to User Rights Management (see page 26) for more information.

CREATING A PRESET

To create a preset configure the filtering of the panel to your requirements and touch the Plus-Icon or select "Create a new preset" from the menu. A dialog will open:



PRESET NAME

Provide a name for this preset. This name will be visible on the button in the preset row and also on all Hardware Panels which will carry this preset.

DISCONNECT SOURCE

If this is checked, hi will display a dedicated "Disconnect" source, which will attempt to disconnect a destination when routed.

DESTINATION LOCKING

If this is checked, destinations can be locked, when this preset is opened.

PARAMETER CONTROL

By default hi will display pinned parameters that have been assigned to the currently selected source and/or destination. To disable the display of parameters on the software panel and the hardware panels this preset is delegated to, disable the checkbox.

TAG FILTERING

If this is checked, tag filtering area is visible.

TAKE MODE

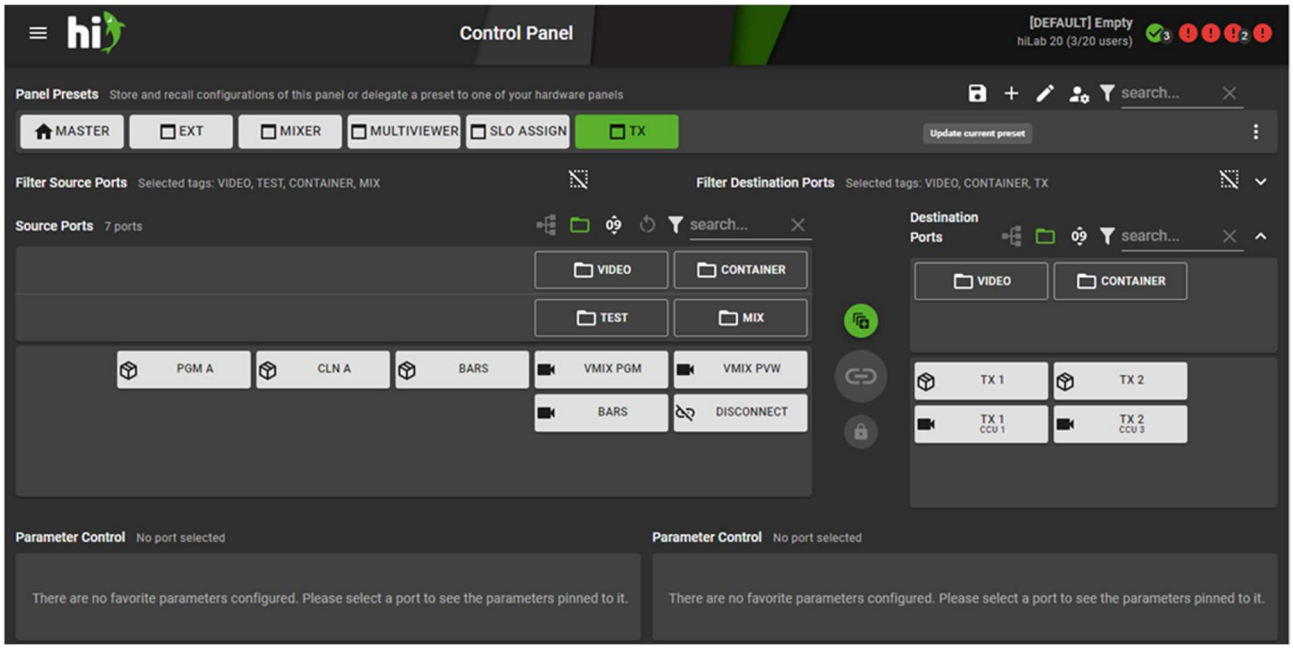
hi supports three different Take Modes for Control Panel Presets.

Entry	Description
Take	Once you select a source and a destination a Take button will appear. Only after pressing this button hi will attempt to make the connection. Use this mode for important destinations like Transmission Lines to avoid unintended operations.
Direct Take	Select a destination and then a source. hi will immediately attempt to make the connection. Use this mode for less important destinations where speed of operation is critical.

Single Destination Mode	Select a specific destination for this preset. hi will show only the source side of the preset. Once you select a source in this preset hi will immediately attempt to make the connection to the configured source. Use this mode for simple panels that should only control a single destination, e.g. under a monitor to control it's source.

SPLIT MODE

The Panel is divided in a source and a destination side. Define the layout for the sides by changing the split mode. You can configure to have larger source or destination sides or you can let hi find the right split point by comparing the number of sources and destinations ("proportional"). By default, setting the Split Mode will only affect the Hardware Panels this preset is delegated to. If you would like to use the Split Mode on the Control Panel UI as well, please mark the checkbox "Use Split Mode on Software Panel".



> Using different split modes is useful for presets carrying a higher number of sources than destinations or vice- versa. Selecting a different split mode can consume the space on the software panels and the available buttons on the hardware panels more efficiently.

EDITING A PRESET

To change the name or one of the above properties of a preset after creating it, touch the pencil icon in the preset bar or select "Edit Current Preset" from the Menu. You will be presented with a similar dialog as described above.

UPDATING A PRESET

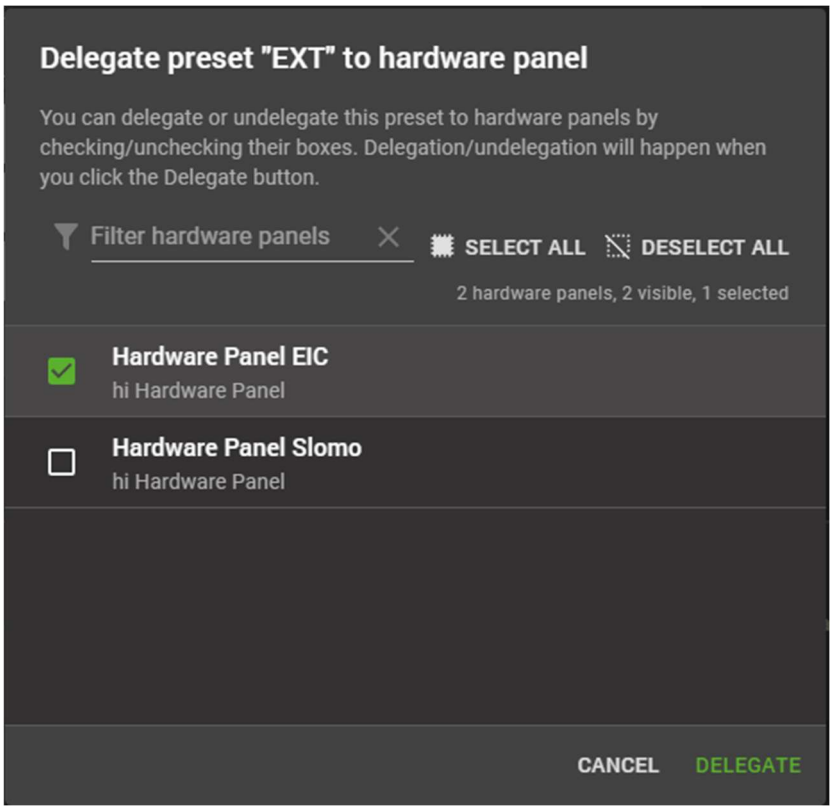
When you open a preset and change the filter settings or the sorting of ports these changes will not be automatically saved. To persist your changes touch the save icon above the preset bar or select "Update Current Preset" from the Preset Menu.

> If you update a preset that has been delegated to hardware panels, your changes will be automatically deployed to all panels.

DELEGATING PRESETS TO HARDWARE PANELS

To configure the sources and destinations which are available on a hardware panel a delegation mechanism is used. Select a preset from the control panel and delegate it to a hardware panel to access to sources and destinations of the preset from the hardware panel. After touching "Delegate to Panels" from the Preset Menu a dialog will appear.

The dialog shows all the available hardware panels in this installation. Select the hardware panels which you want to carry this preset by checking the checkbox and touch "Delegate" to apply.



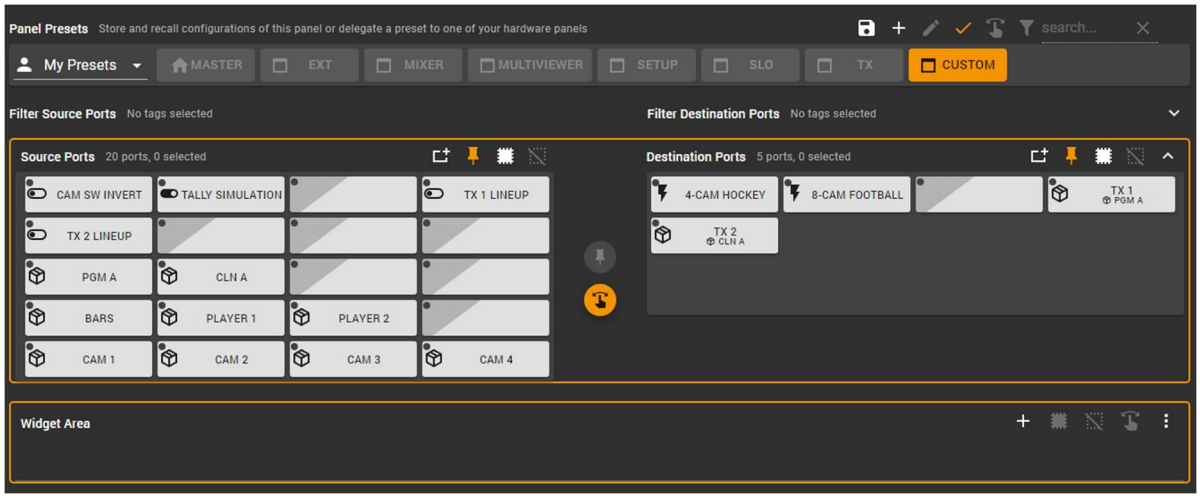
> After you delegated a preset to a hardware panel the hardware panel will display the same sources and destinations as the software panel. In the moment you edit or update the preset on the software panel, all hardware panels that carry the same preset will follow.

DELEGATING PRESETS TO USERS

As an administrative user you can delegate presets to other users in the system. Once you delegate a preset to a specific user, he will see this preset in his preset bar in the Control Panel. To delegate a preset to a user select "Delegate Preset to Users" from the Preset Menu.

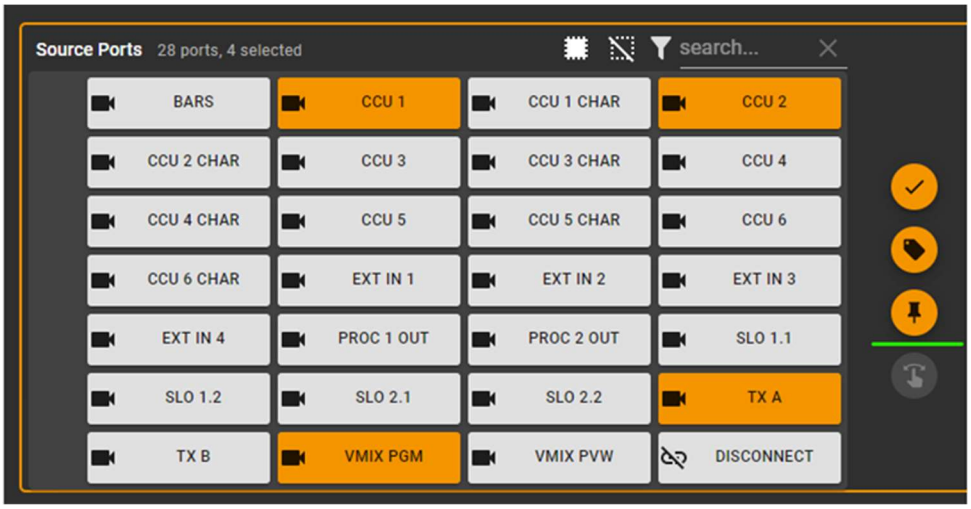
CUSTOMIZING A PRESET

To further customize a preset touch the "Customize" icon above the preset bar, or select "Customize Current Preset" from the Preset Menu. The Panel will change into Preset Customization Mode.



PINNING PORTS

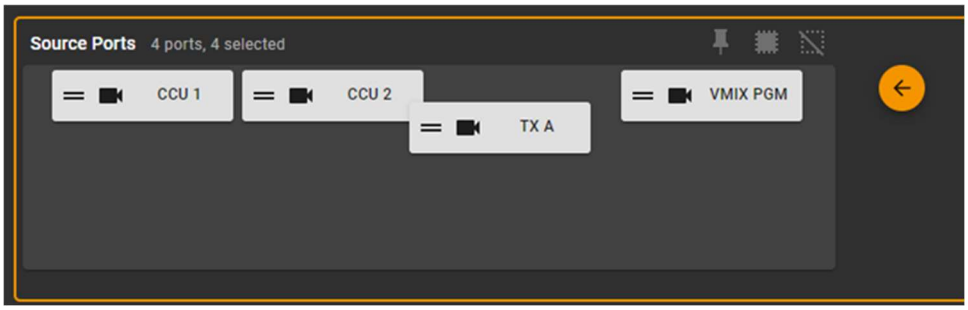
Ports can be pinned in a preset. This way they are excluded from the filtering mechanisms and are always displayed in the preset. To pin ports, select one or multiple ports on the source or the destination side, and press the "Pin" button:



If a preset contains pinned ports, you can also disable to show any other port on the according side, completely excluding this side from filtering mechanisms:

RE-ARRANGING PINNED PORTS

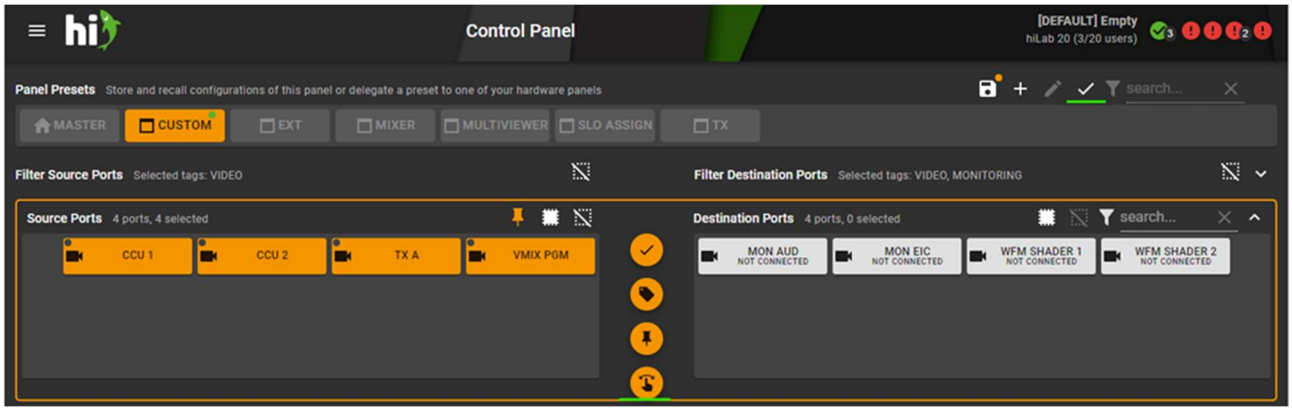
Pinned Ports can be arranged in a custom order. Touch the rearrange-button to start changing the order of the pinned buttons:



You can now rearrange the buttons by drag and drop.

LEAVING CUSTOMIZATION MODE

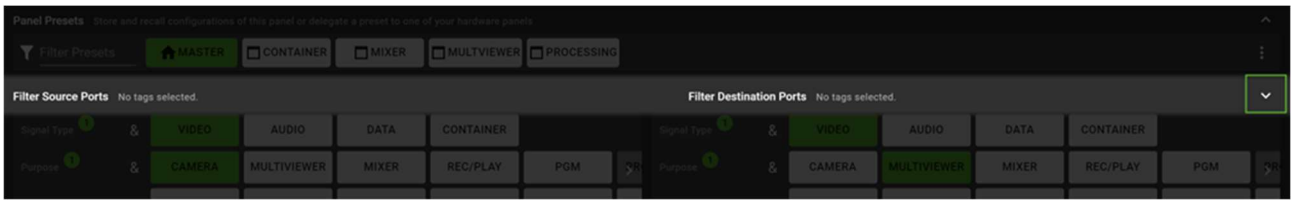
To leave the panel customization mode, touch the checkbox icon in the "Take" Area or above the Preset Bar.

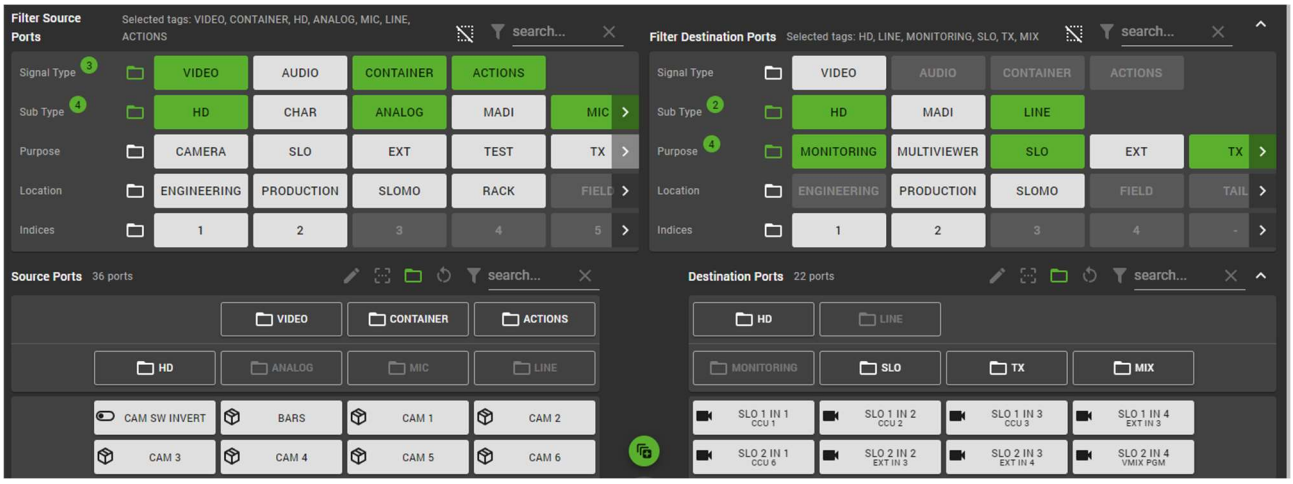


> Don't forget to save your changes by updating the preset after you left the Customization Mode!

5.2.2 Filtering Sources and Destinations using Tags

Below the preset bar is the filter area. It shows all tags that this user is allowed to see. By selecting tags on the source or destination side the list of sources and destinations is filtered.





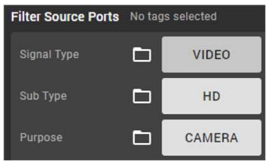
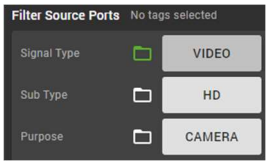
The filter area displays the available set of tags for both the sources and the destinations. Select a tag by touching it, it will be highlighted. All currently selected Tags are counted on the left side of each tag category name. Deselect a tag by touching it again or touching the marked "deselect all" icon on the top. An arrow on the left or right side of each tag row indicates if there are more tags available that are currently not visible.

Click on the category name of a tag to select all tags in this category, or to deselect all tags in this category.

> hi will track the result and disable all tags that would yield an empty result. From the example screenshot above, you can see, that there is no multiviewer destinations in the production area with the index number of 5.

CHANGING THE FILTER RELATION OR THE TAG CATEGORIES

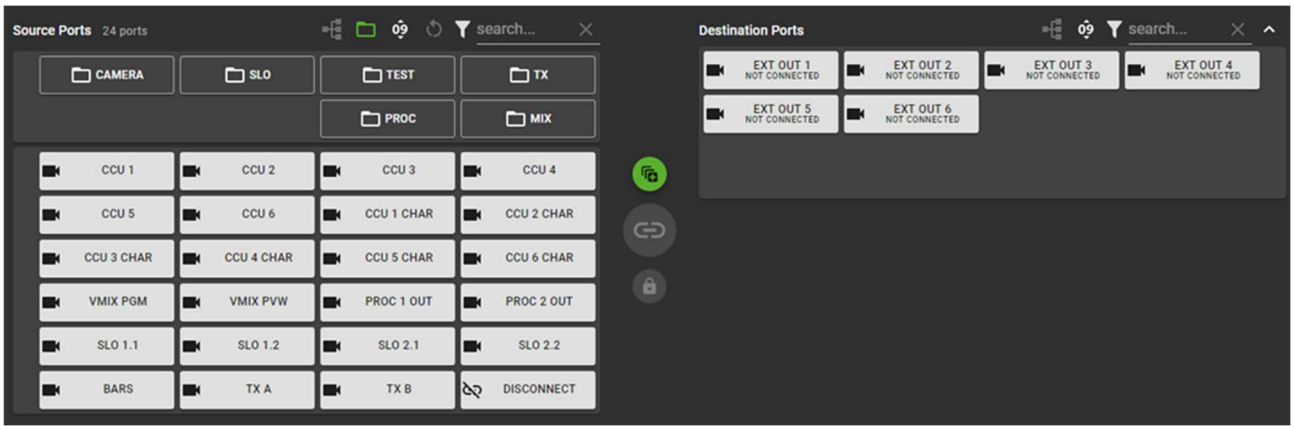
By touching the icon at the beginning of each row, the relation of the selected can be changed.

Mode	Example	Behavior
AND		When selecting multiple tags in one row, only ports will be shown that carry all of the selected tags. Selecting "CAMERA" and "MONITORING" will show all ports, that have the tag "CAMERA" AND the tag "MONITORING" assigned.
OR		When selecting multiple tags in one row, ports will be shown that carry at least one of the selected tags. Selecting "AUDIO" and "VIDEO" will show both audio and video signals in the result.

> Using OR-Related tags on the filter area will create additional sub-navigation buttons on the port list (see below).

5.2.3 The Port list

The port list shows the result of the tag filtering and allows for various operations, such as routing or creating snapshots.



NAVIGATION BUTTONS

The upper part on the source and the destination side shows Navigation Buttons. With these you can further narrow down the selection of sources and destinations. Which buttons are shown here is defined by the Tags that have been set to an OR-Relation in the Filtering panel above.

PORT BUTTONS

The port list shows all sources and destinations that match the configured tag filters set up in the preset and/or in the filter area above. Touch a source or destination port to select it. The following types of buttons will be visible on the list:

	Source Port	The source port button shows an icon indicating the signal type and the port name.
	Port Container Source	This is a special source button representing a Port Container.
	Destination Port With Connected Source	The destination port button shows an icon indicating the signal type, the port name and the currently connected source.
	Port Container Destination With Fully Connected Source	This is a special destination button representing a Port Container. The "closed box" icon indicates that a source Port Container has been connected to this destination Port Container and all connections have been made properly.
	Port Container Destination With Incompletely Connected Source	A source has been connected to this Port Container destination, but not all connections have been successful, or some connections have been altered by the user.

	"Push" Trigger Button	This button triggers a rule without providing an on/off state.
	"Toggle" Trigger Button	This button triggers a rule providing an on/off state.

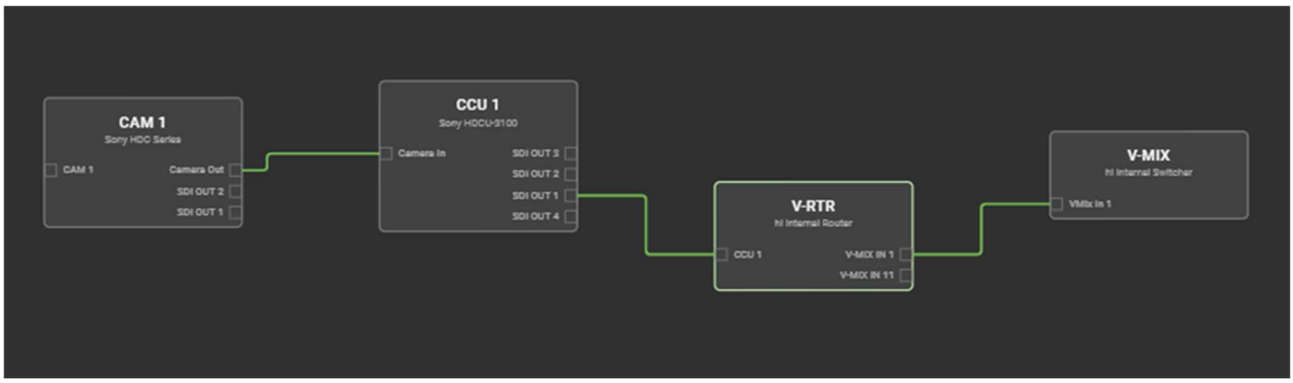
DISPLAY OPTIONS ON THE PORT LIST

On the upper right side of the port list you will find some tools that influence the list:

	Change sorting of ports	This button can be used to change the sorting method from sorting by port number to alphabetical and back.
	Reset all filter/sorting	This button removes any text filtering, if set, and reverts to default alphabetical sorting.
	Show / hide navigation buttons	Use this button to display or hide the auto-generated navigation buttons.
	Inspect a Port / Port Container	When a Port is selected, touching this icon will open the signal path view. When a Port Container is selected, touching this icon will open the Port Container Content window.
	Edit selected Ports	When a Port Container is selected, touching this icon will open the Edit Source window.
	Filter Ports by text	Here you can filter your source or destination ports via text search.

VIEWING A PORTS SIGNAL PATH

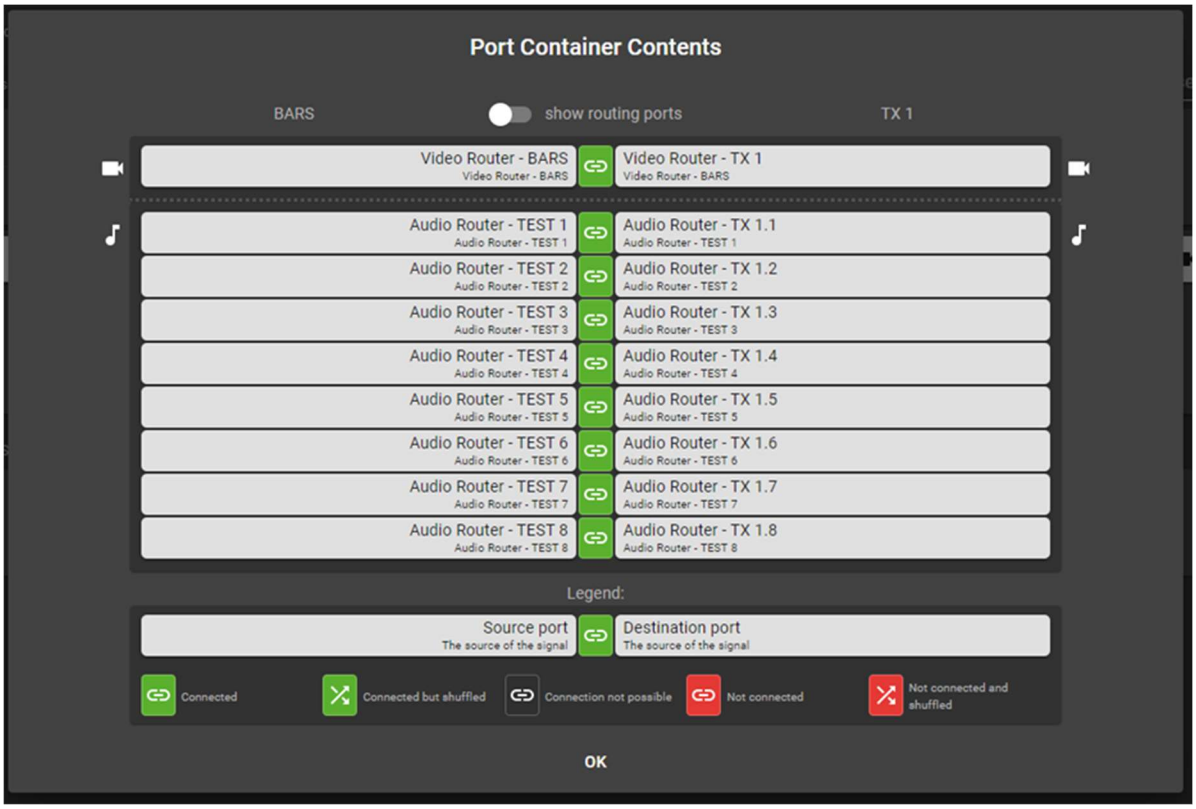
When touching the Inspect icon above the Port List, a dialog will open showing the full signal path of the selected port:



Touch "OK" to close this view and return to the Control Panel.

INSPECTING A PORT CONTAINER

When touching the Inspect icon a Dialog will open showing the current status of the selected Port Container.



The right side of the dialog shows the content of the destination Port Container, i.e. the ports that have been assigned in this container. If a destination Port Container was selected, the dialog will show the currently connected source Port or source Port Container on the left side. The column in the middle indicates whether the connection between the source and destination side is actually existing or if any shuffling has been made during the connection of the port containers.

5.2.4 Take Operations

The area between the source and destination lists holds three buttons.

SWITCH TO MULTI-SELECT MODE

Touching the first button will switch the panel to multi-select mode, which allows for multiple connections to be made at the same time or quick changing of tagging. For more information on Multi-Select Mode please refer to the end of this chapter.

TAKE (CONNECT)

When a compatible source and destination are selected the Take button will become active. Touching the take button will trigger the desired connection.

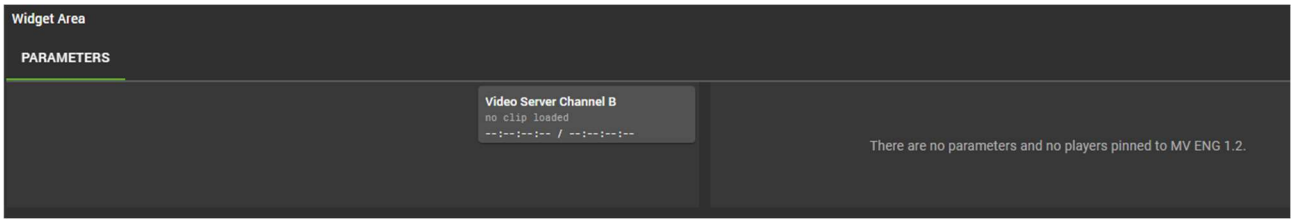
> This button is only visible if the Preset is set to "Take Mode".

LOCK

Use this button to Lock a destination, if available. When a destination is locked, its source cannot be changed. A locked destination can only be unlocked by the user, who locked it or a user with the "UnlockAdmin" role.

5.2.5 Widget Area

The PARAMETERS pane shows all parameters that have been assignedto the source/destination port selected.

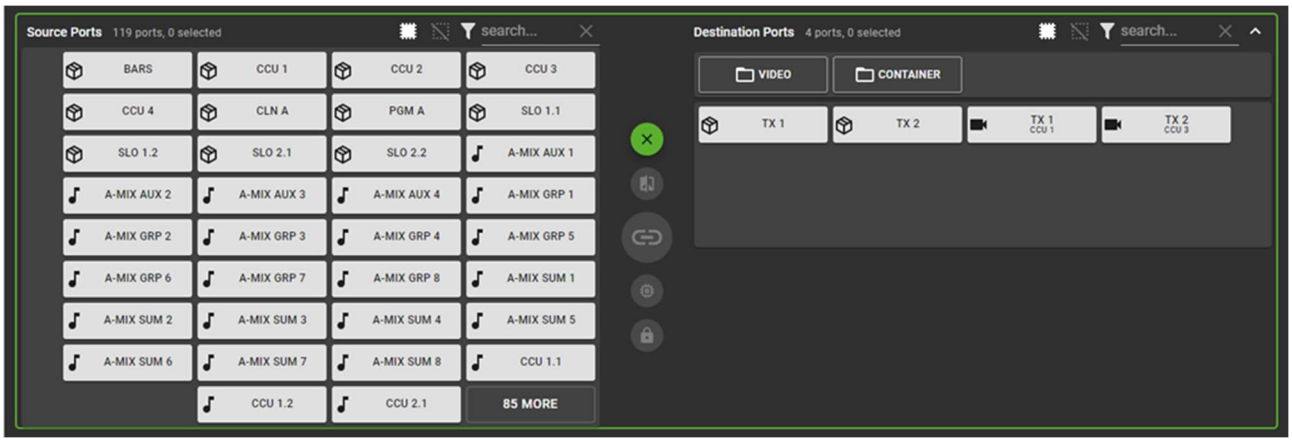


To change the value of a parameter touch the widget.

> For more information on how to configure parameters please refer to Parameter Control (see page 30).

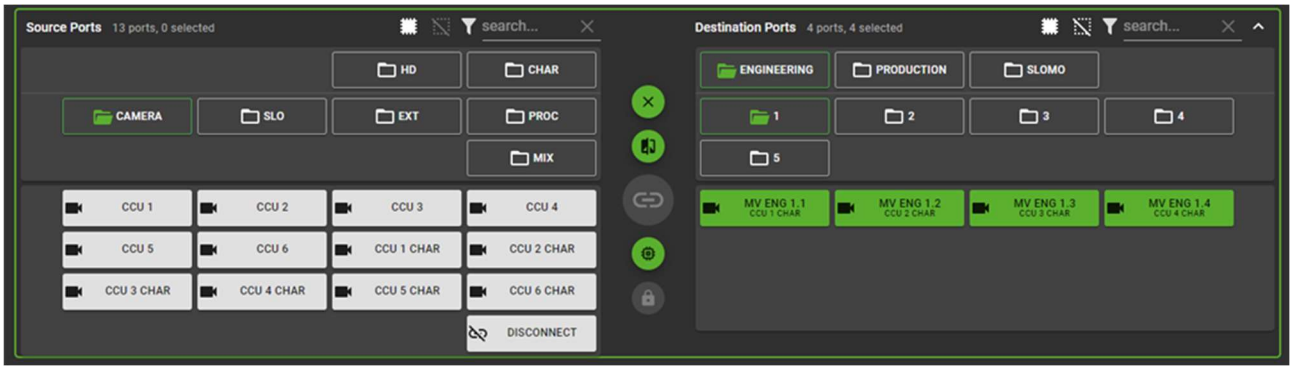
5.2.6 Multi-Select Mode

To switch to multi-select mode, touch the multi-select mode Button in the middle of the control panel.The layout of the panel will change. In multi-select mode you can select multiple sources and destinations at the same time to perform various actions.

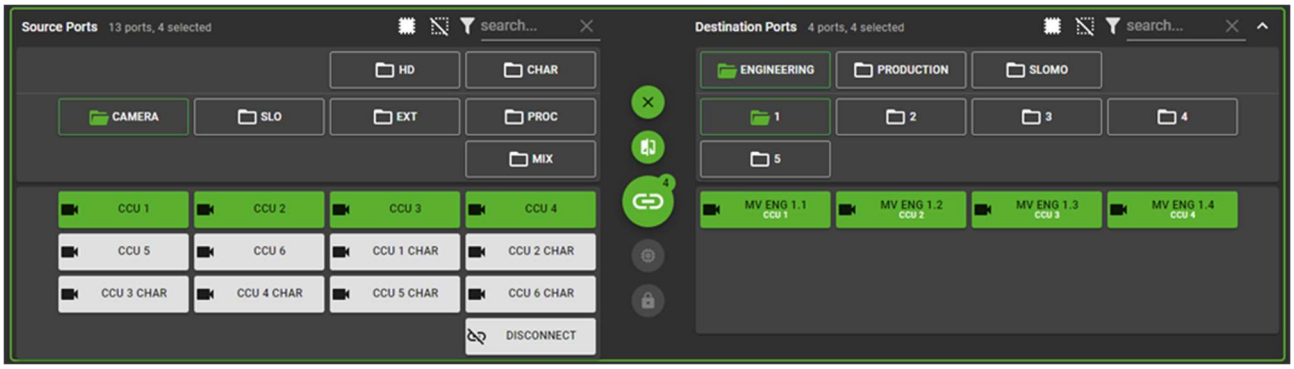


GANG TAKE

To connect multiple sources to multiple destinations at once, select a range of destinations first:



Now, select one or multiple sources:



Touch the Take button in the Middle to perform the connections.

Please note how the color of the second line in the buttons on the destination side changed from Black to White. The white colored labels show a preview of what will happen after you press the Take Button. You can toggle between displaying the current source and the queued source on the destinations by touching the Display button:

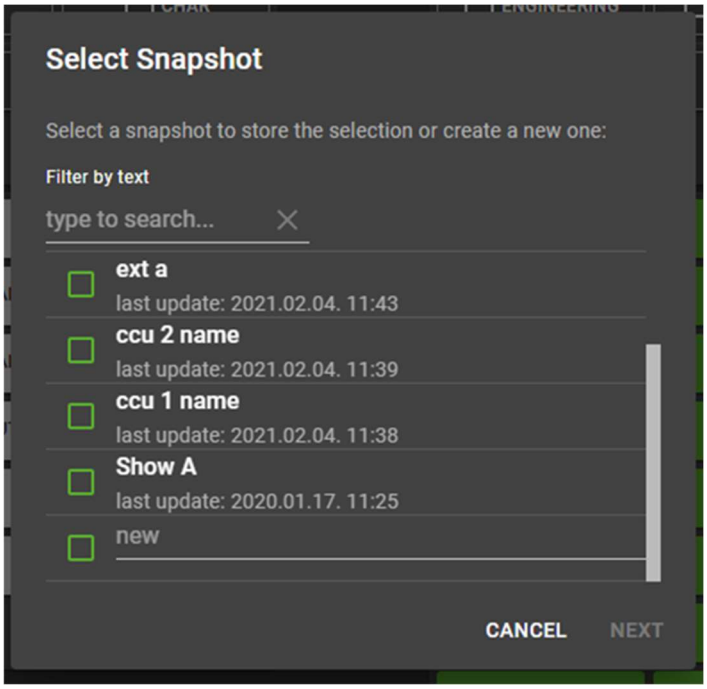
Indication	Meaning
	The current source of "MV ENG 1.1" is "CCU 1 CHAR".
	You have queued "CCU 1" to be connected to "MV ENG 1.1". This connection will be made after you press "TAKE".

CREATING SNAPSHOTS FROM THE CONTROL PANEL

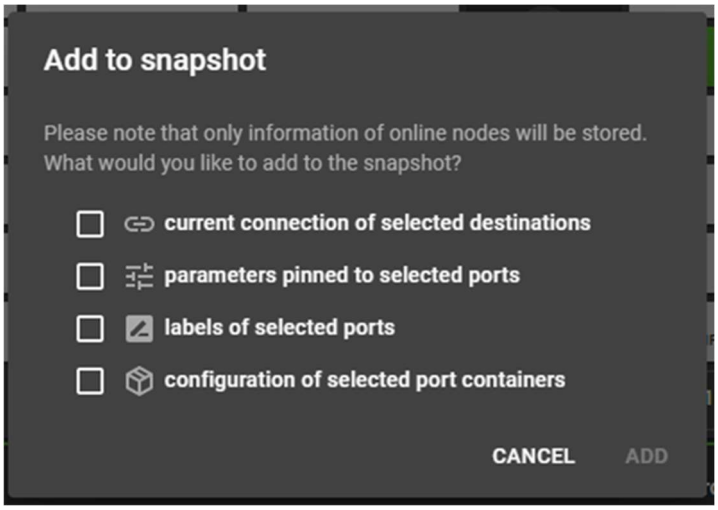
> Creating a snapshot is only available, when you are viewing the current source of the destination. It is not available if you are about to perform a Gang-Take Operation and are looking at the "queued sources" of the destinations.

Snapshots can store the current state of nodes in the system, they can be recalled at a later time and this way be used to quickly change between different configurations. To create a new snapshot, select some sources and/or destinations on the control panel and press the Snapshot button:

A dialog will appear. You can select a snapshot you would like to update with the new information, or create a new snapshot.



To create a new Snapshot, type in a name in the "new" field and touch "NEXT". In the next dialog, specify what you would like to include in your snapshot:



Label	Description
current connection of selected destinations	the system will save the current source of the selected destination in the snapshot
parameters pinned to selected ports	the system will save the current values of parameters that are pinned to the selected sources and destinations
labels of selected ports	the system will save all labels of the ports you selected (both sources and destinations)
configuration of selected port containers	the system will svae the current configuration of selected source and destination port containers

After making your selection, touch "ADD" to create or update your snapshot.

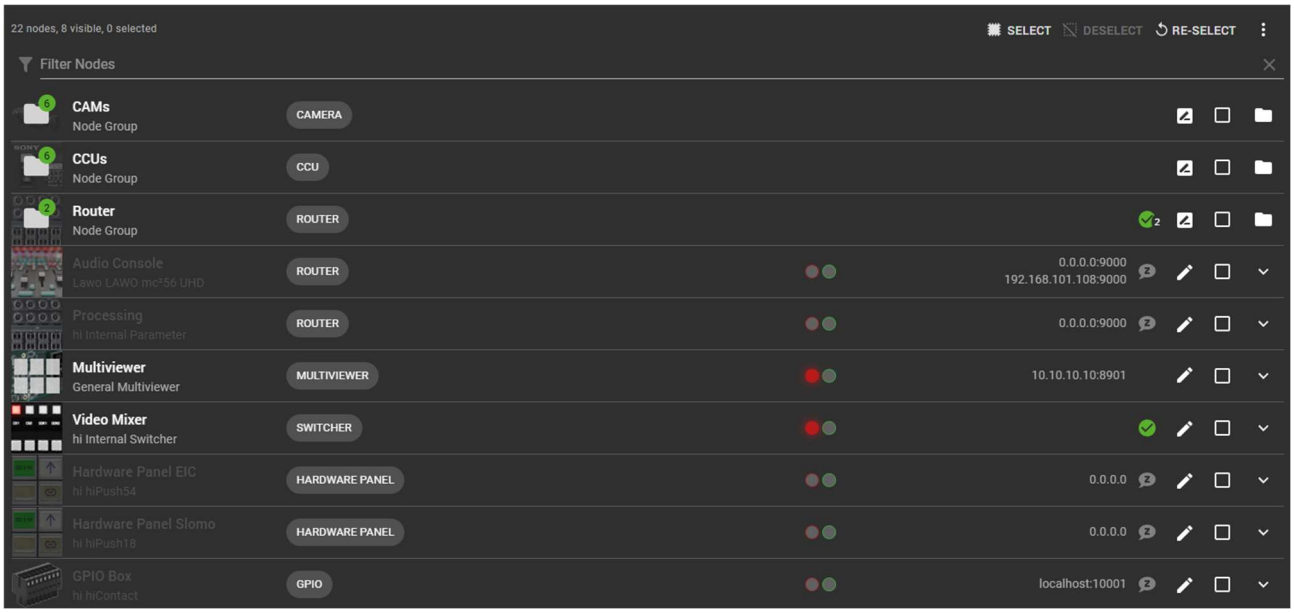
Please note that only ports are saved in the snapshot that the current user is allowed to see. This is defined by the user rights. If a user is not authorized to see a port it will not be contained in the snapshot!

To review or restore the contents of the snapshot, navigate to the Snapshots (see page 129) page.

5.3 Node List

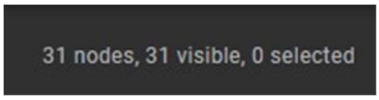
The node list shows all device representations of the current configuration.

5.3.1 Node overview



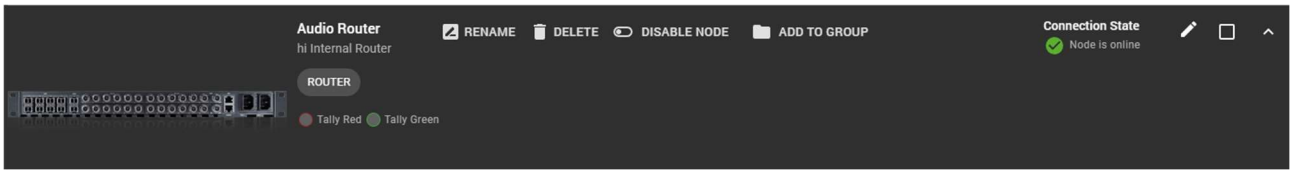
On the Nodes page all devices that can be controlled by the system are displayed and here you can add new devices, change or delete already existing Nodes.

At the top left of the Nodes list you can see how many Nodes are currently created in your system, how many of them are visible for the logged in user and how many Nodes are selected.



Every Node in the Nodes list is displayed with its name and an icon. Besides it you can see the assigned tags, the tally information (inactive, active, without tally), the IP addresses and port settings and the connection state to the node.

Touch an entry from the list to see a more detailed view of this node. To edit a node touch the edit icon or the image of the node. You can also rename or delete a node, disable the node and add it to a group.



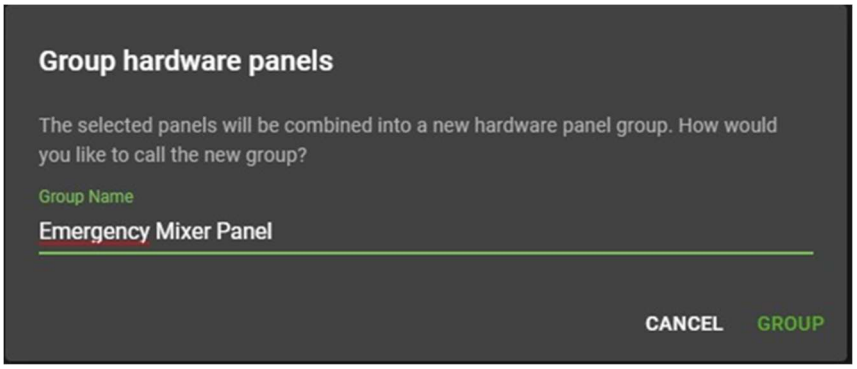
5.3.2 Operations in the Node List

On the top right of the Node list are function buttons to work with the Node list.

LINK PANELS

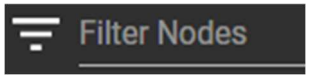
The Link Panels option can be used to link multiple panels into a group. The grouped panels will then act as a single panel in the system.

Select the panels you want to group and click Link Panels. A new window will open and you have to enter the name of the panel group. Finish grouping the panels by clicking GROUP, or click CANCEL to stop the action. The new panel group with the given name will appear in your node list and your previously displayed panels will disappear from the list.



FILTER NODES

This function allows you to filter for Node Names or Tags by entering the name.

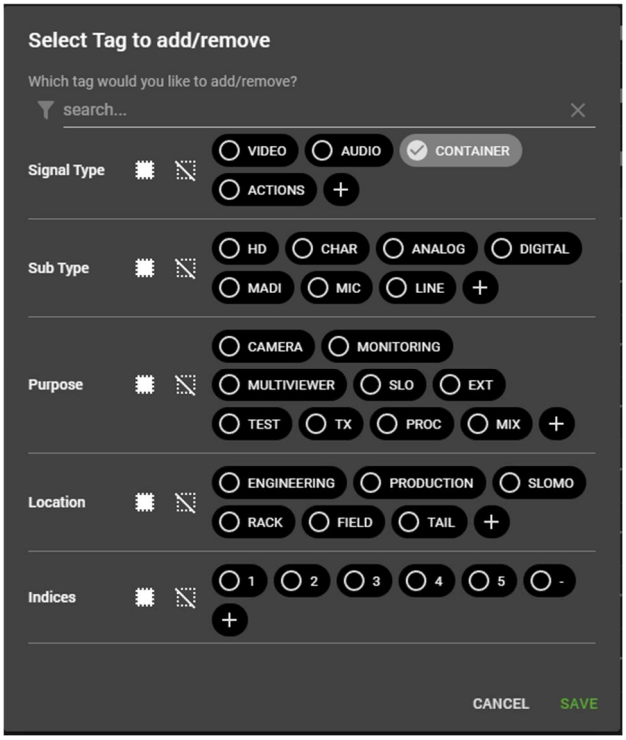


SELECTION

The button "SELECT" will select all Nodes that are currently visible in the list. The button "DESELECT" will deselect all selected nodes and the button “RE-SELECT” will re-select the selected Nodes from before.

ASSIGNING TAGS

To change the tags on a node, select the node by touching the checkbox and touch "ASSIGN TAG" in the top row. A Dialog will open showing all available tags. Select or deselect tags to change the assignment and touch SAVE to save your changes.



DELETING NODES

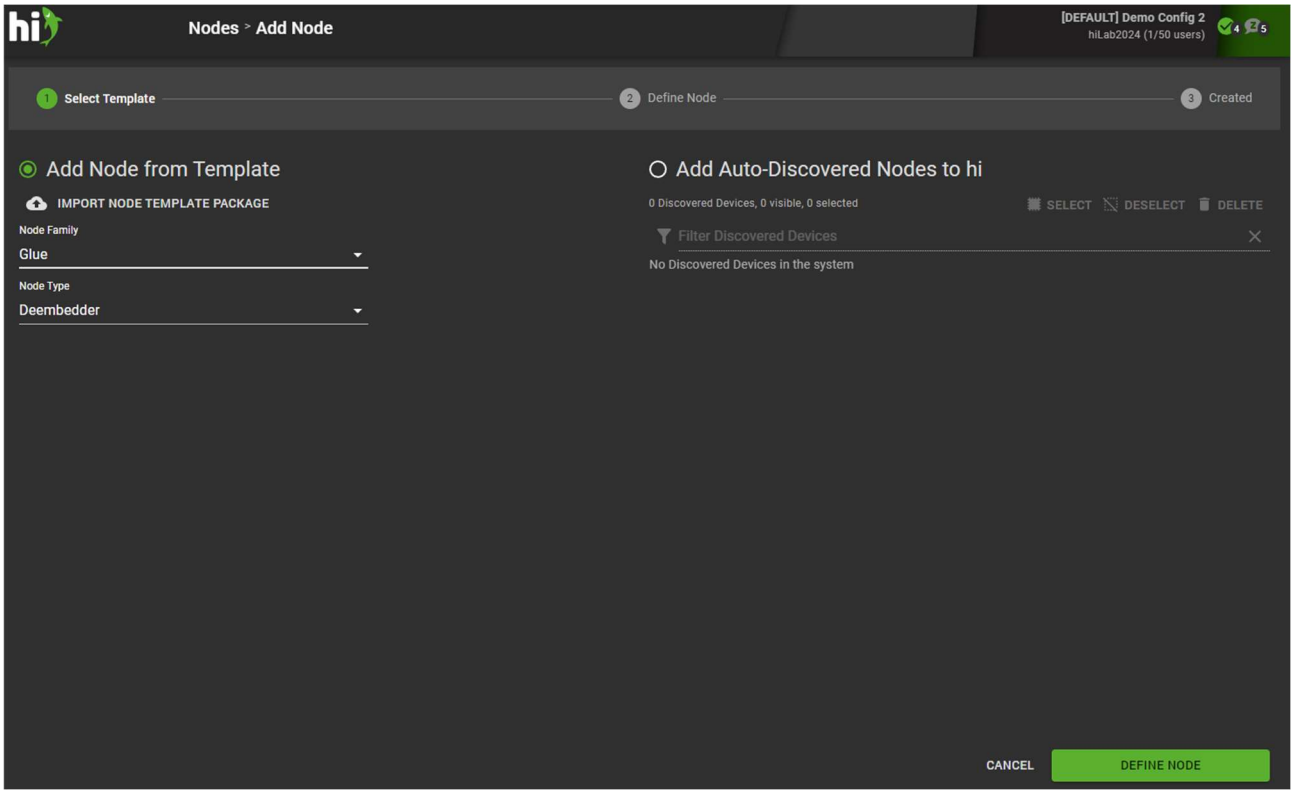
The Delete button will delete all selected Nodes from your system and for all users.

5.3.3 Adding nodes

How to add new device representations to the current configuration.Navigate to the Node list by selecting "Nodes" from the main menu. Touch the "ADD" icon in the bottom right corner.

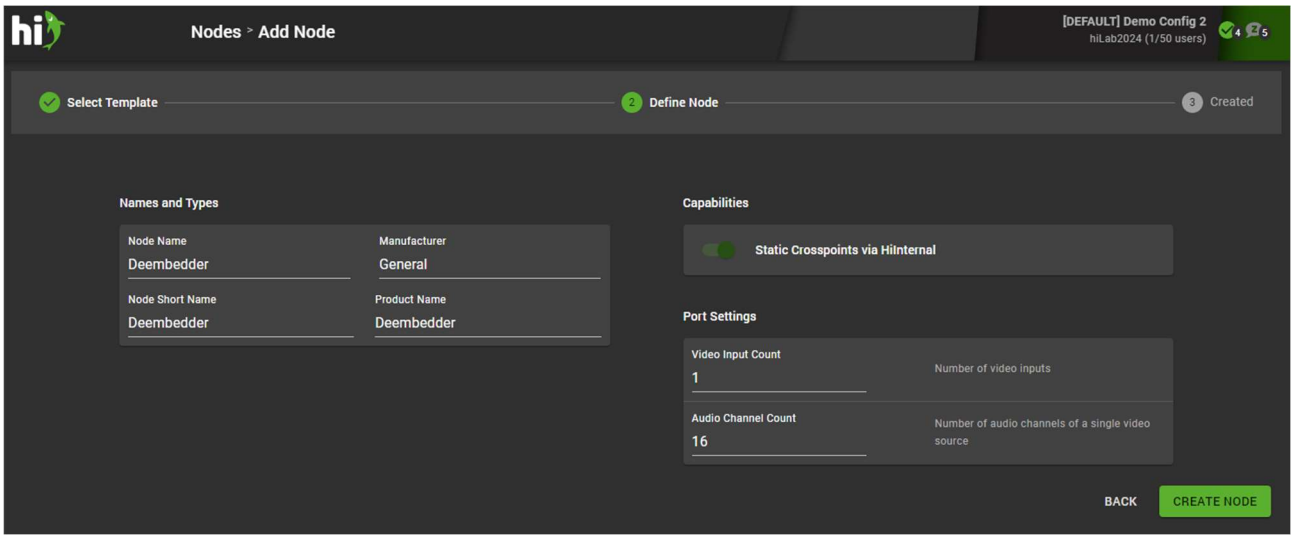
ADDING NODES FROM TEMPLATES

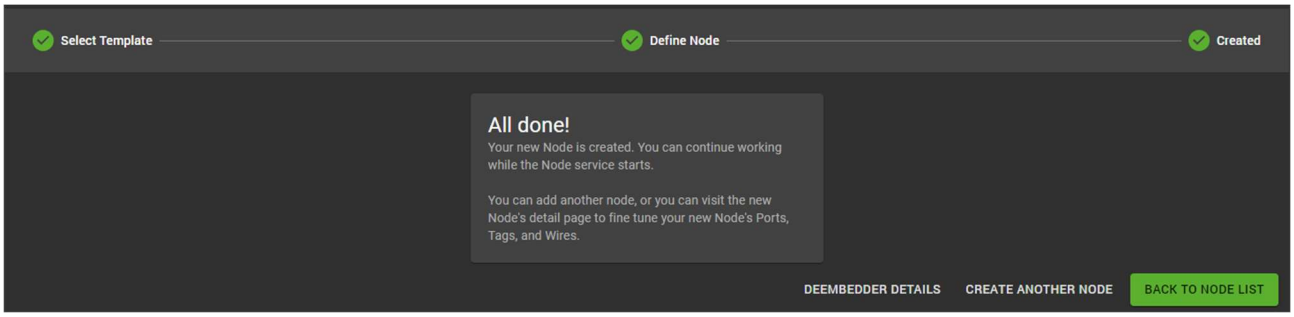
hi provides templates for often used devices. A template contains all necessary information to connect and control a device. To add a new node, first select a Node Family (e.g. "Router") and then a template. Touch "Define Node" to continue.



You can't find a Template for your device? Try to use a generic template, for example "Probel SWP08 compatible Router", if you want to control a router with this protocol.
Get in touch with the hi team to request new templates. Once you receive a new template file, you can touch "Import Node Template Package" and upload the file. The new templates will be added to your system.

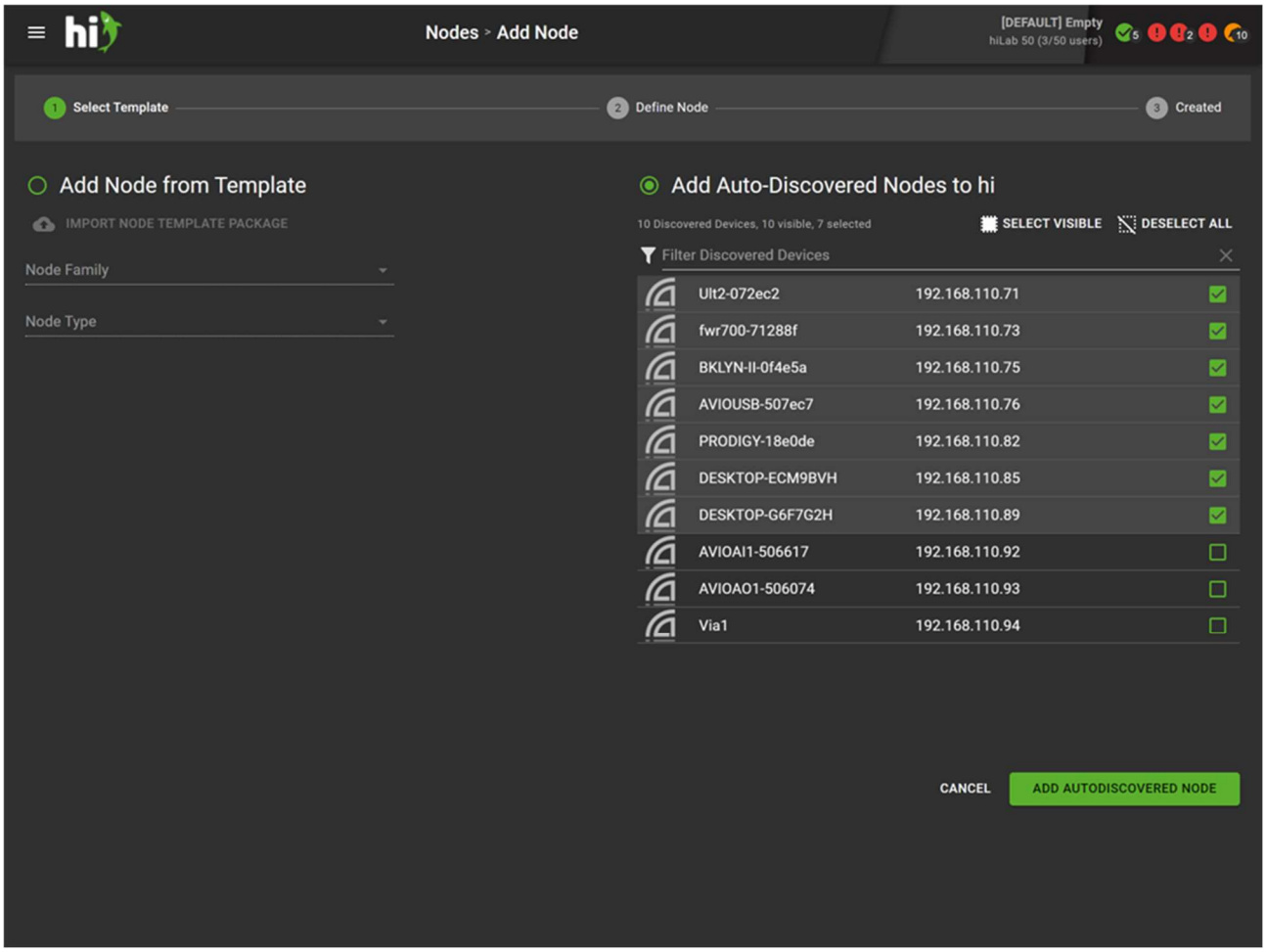
Fill up the questions about your new Node. Specify a Name for this Node in the hi system. Depending on the node you are adding, this form will look differently. Once you are ready, touch "Create Node" to add the Node to your system.





ADDING AUTO-DISCOVERED NODES

If hi has discovered any devices, it will show them in the "Create New Node" page. To add an auto-discovered node to hi, select "Add Auto-Discovered Nodes to hi" and select one or multiple nodes from the list:



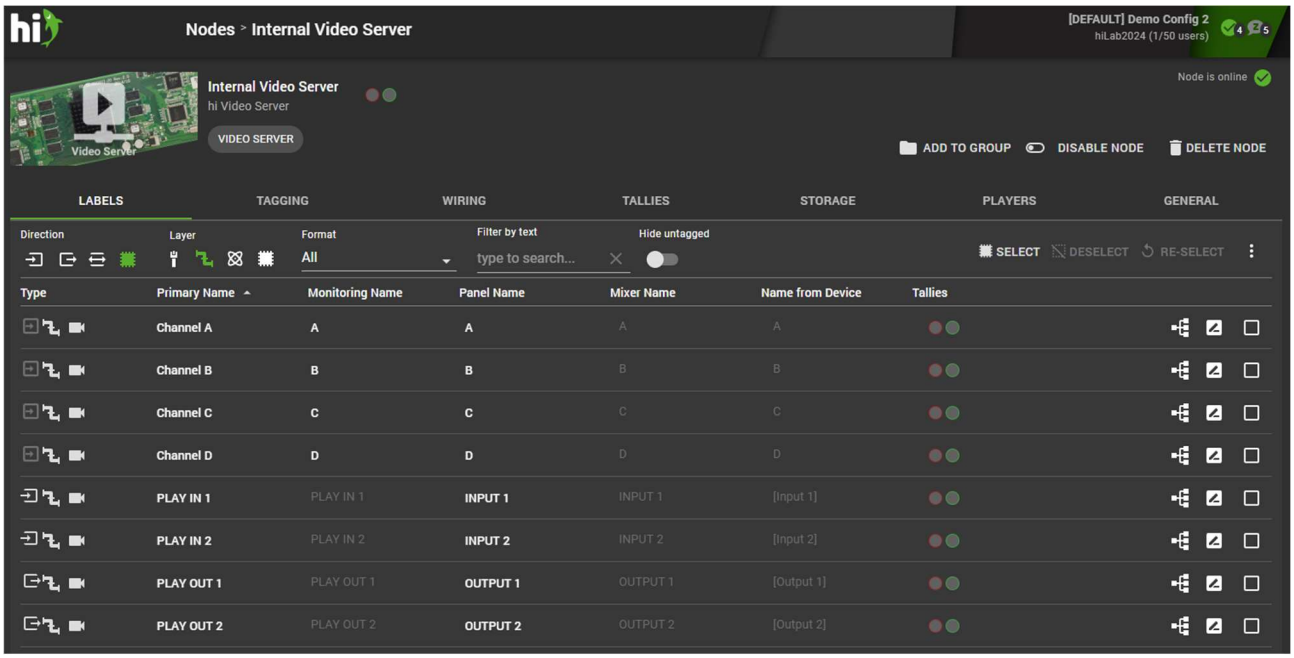
Touch "Add Autodiscovered Node" to add the selected nodes to the system.

5.3.4 Editing a node

Select a node from the node list. Touch the image or the edit icon of the node to open the edit view.

NODE DETAILS

Hi will display the detail view for the Node you selected. Depending on the type of the node a different set of tabs will be available.



NODE CONFIGURATION TABS

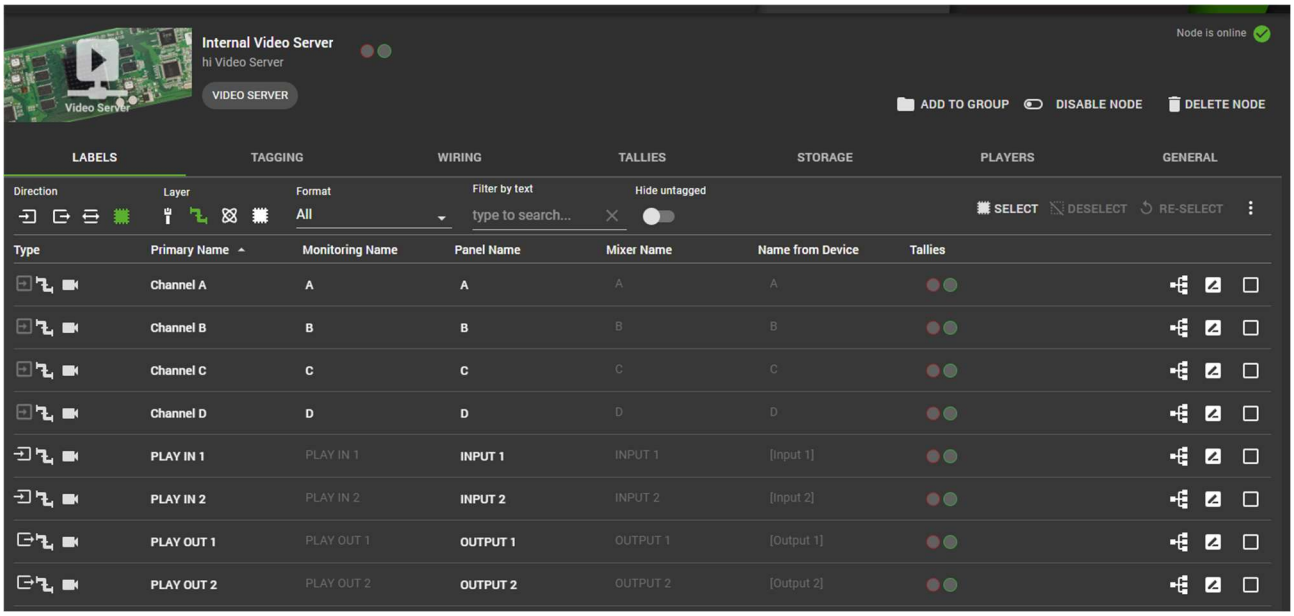
- Common Options (see page 60)
  Depending on the type of node, the selection of editable items varies. This section covers the items, that are common to all nodes.
  - Labels (see page 60)
    Changing the names of ports in a node
  - (Port) Tagging (see page 65)
    The tagging tab shows the inputs, outputs and bi-directional ports for the selected node and their current tag setup.
  - Wiring (see page 68)
    The wiring tab provides a way to quickly create the wiring between nodes.
  - General Options (see page 69)
    The "General" Tab is available on every node in the hi system. It covers basic settings as the nodes name and protocol-related custom settings.
- Device-specific settings (see page 70)
  This section describes settings specific to some device integrations.
  - Router Nodes (see page 70)
    Router nodes represent routers or other devices that expose a routing matrix, e.g. SDN systems.
  - Mixer Nodes (see page 73)
    Vision Mixers usually report their tally status by sending messages like "my input 3 is on air in Suite 1 PGM PgmA". To correctly process tally information from a vision mixer hi needs to know a mapping of the internal busses of the vision mixer to the tallies in the hi system.

- Multiviewer Nodes (see page 79)
  Multiviewer Nodes collect and calculate tally and label information and send it out to UMDs, Multiviewers or other devices receiving label information.
- Parameter Control Nodes (see page 86)
  Parameter Control Nodes show and monitor parameters in a device and provide pinned parameters to the hi system.
- Northbound Nodes (see page 89)
  A Northbound Node provides an interface for other control systems to control connections in the hi system.

COMMON OPTIONS

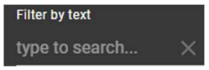
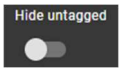
LABELS

Changing the names of ports in a node:



The "Labels" tab shows a list of all available ports of this specific node and their labels / names. You can filter the ports list by using one of the different filter options above the list.

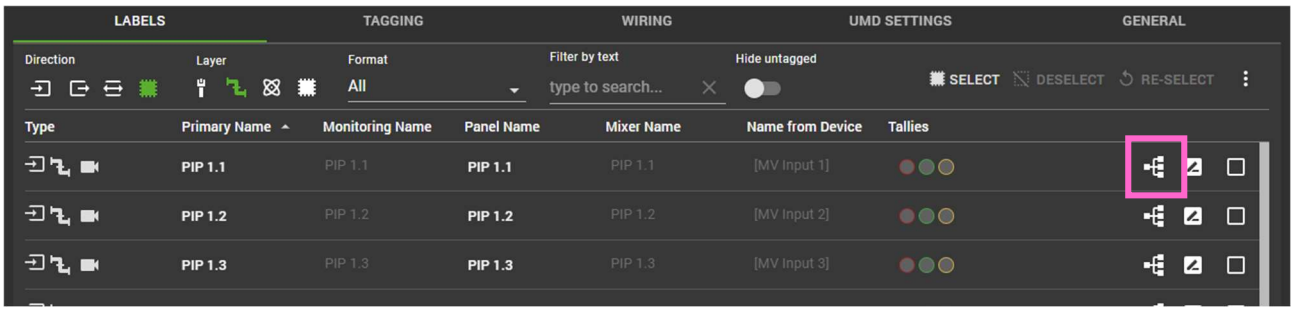
Direction Filter		Input, shows all input ports
		Output, shows all output ports
		Bidirectional, shows all bidirectional ports
		Any Direction, shows all ports and is selected as default

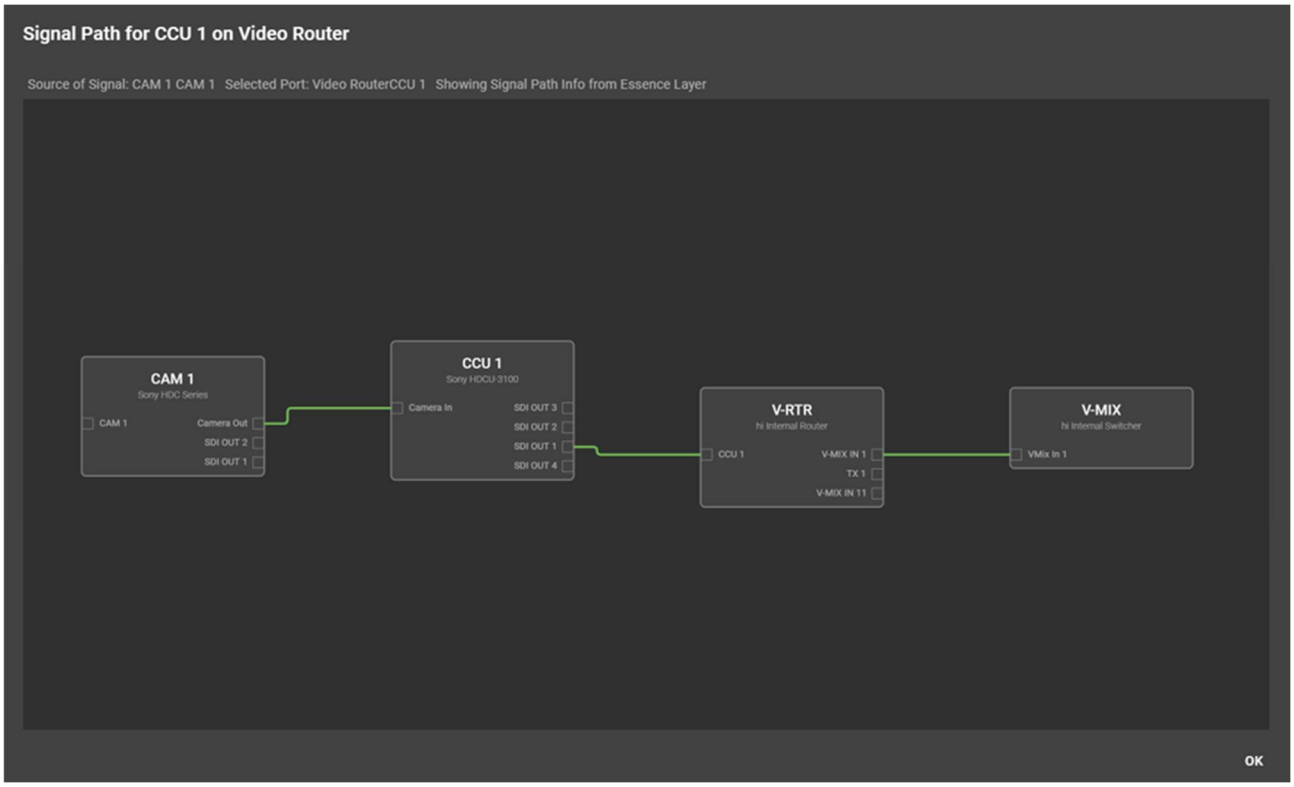
Layer Filter		Physical, shows physical ports
		Flow, shows all ports and is selected as default
		Essence
		Any Layer
Format Filter		opens a drop down list with all available formats of your system, by default All is selected
Text Filter		filters by port name, numbers or tags
Delete Filter		deletes all previously done filtering for Direction, Layer, Format or Text filters
Hide untagged		Off will show only tagged ports, On will show all ports of the Node.

To select, deselect or reselect all currently shown ports use the buttons on the right above the ports list. To select a single port mark the rectangle on the right of the port line.

SIGNAL PATH

Touch the "Signal Path" icon of a port to open a graphical representation of the Path in the system that this port belongs to:





RENAME A PORT

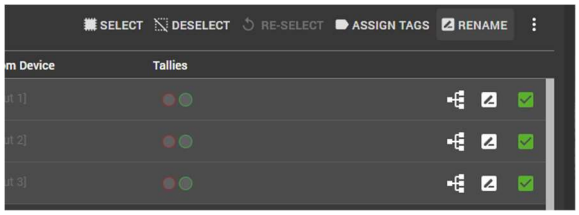
To rename a port touch any of the port names. The row will change into "Edit-Mode".

Type in a new name for the port. By pressing "ENTER" you can save your changes and continue with editing the next name. You can also save your changes or discard your changes by touching the buttons on the end of the row.

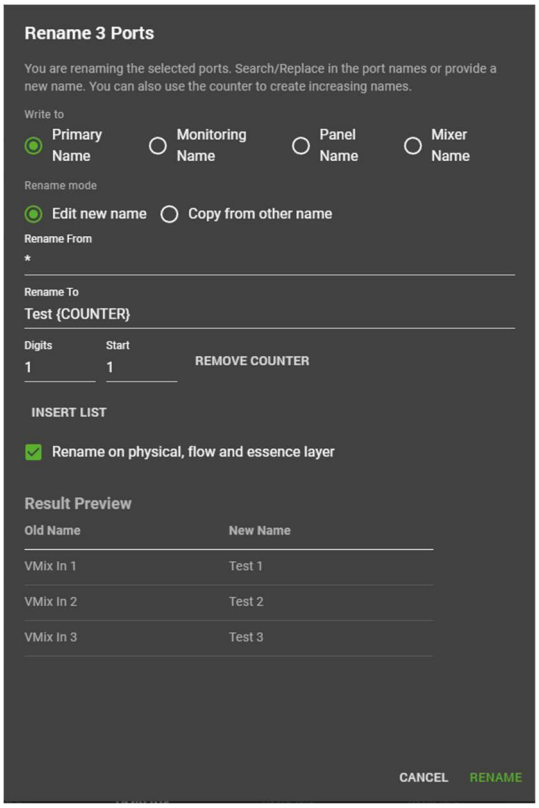
> Leaving the "Monitoring Name" empty, will make the system use the primary name for monitoring purposes. The same inheritance mechanism is used for the Mixer Name.
> We recommend to only change the Monitoring and Mixer names, if there is a need for a special / different name for these fields.

BATCH-RENAME PORTS

To rename multiple ports at the same time, select a number of ports and touch "RENAME" from the top row.

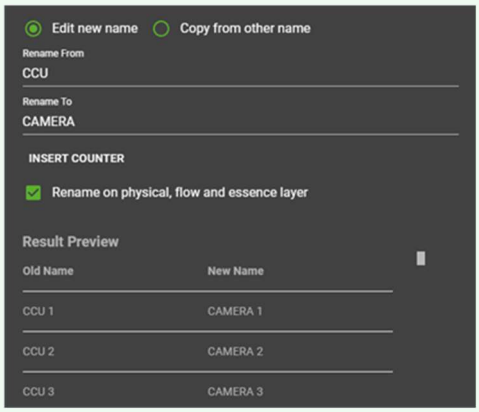


A dialog will open:

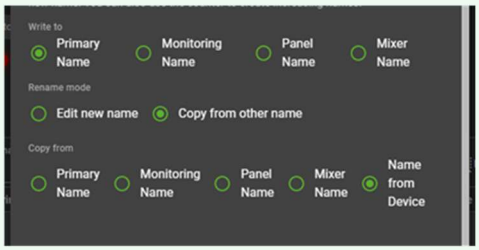


Select which port label you would like to change and provide a new name in the field "Rename To". A preview of the rename result will be shown at the end of the dialog.

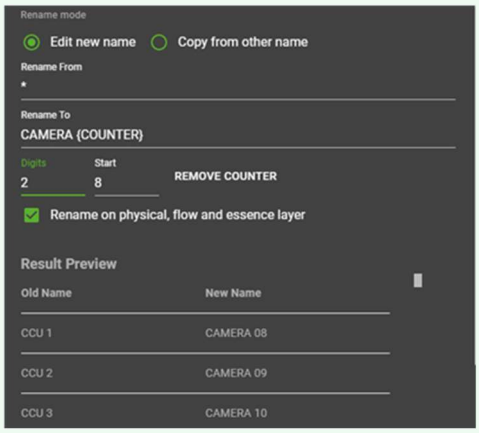
"Rename From" and "Rename To" can be used in a "search & replace" way:



Use the "Copy from other name" selection to copy names from one Name type to another:



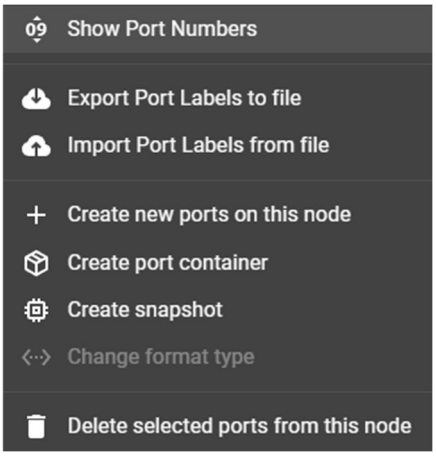
If you are renaming multiple ports at once, use the counter function. Touch "INSERT COUNTER" to insert a counter in the new name.



To save touch "RENAME".

ADDITIONAL OPERATIONS ON SELECTED PORTS

Touch the three dots on the right of the buttons to show additional operations on the node:



EXPORTING PORT LABELS

Touch "Export Port Labels to file" to create a XLSX containing the Ports and their labels. You can use this file to speed up the process of renaming ports or to copy/paste names from existing lists.

The XLSX is exported using an international locale, this means the delimiting character is a semicolon.
Depending on your region, you might not be able to open the file in Microsoft Excel directly.
In this case we recommend to temporarily change the "region" of your computer to "English (USA)" before opening the XLSX file.

IMPORTING PORTS

After you edited a XLSX file downloaded from hi you can apply the changes in two different ways:

- OVERWRITE PORTS WITH PORTS FROM FILE
  This mode will synchronize the ports in the system with the ports from the CSV file. Ports which are not existing in the CSV file will be deleted in hi, ports that have been added in the CSV will be added into hi.
- UPDATE PORTS WITH PORTS FROM FILE
  Hi will read the names from the XLSX file and update the names in hi with the new names. Ports removed from the XLSX file will not be removed from the system.

CREATING AND DELETING PORTS

Usually, the ports are defined by the node template which was used to create the node or are read-out from a device in case of routers. This means that usually there is no need to add or delete ports from a node.

Use this options only when instructed to do by the hi team.

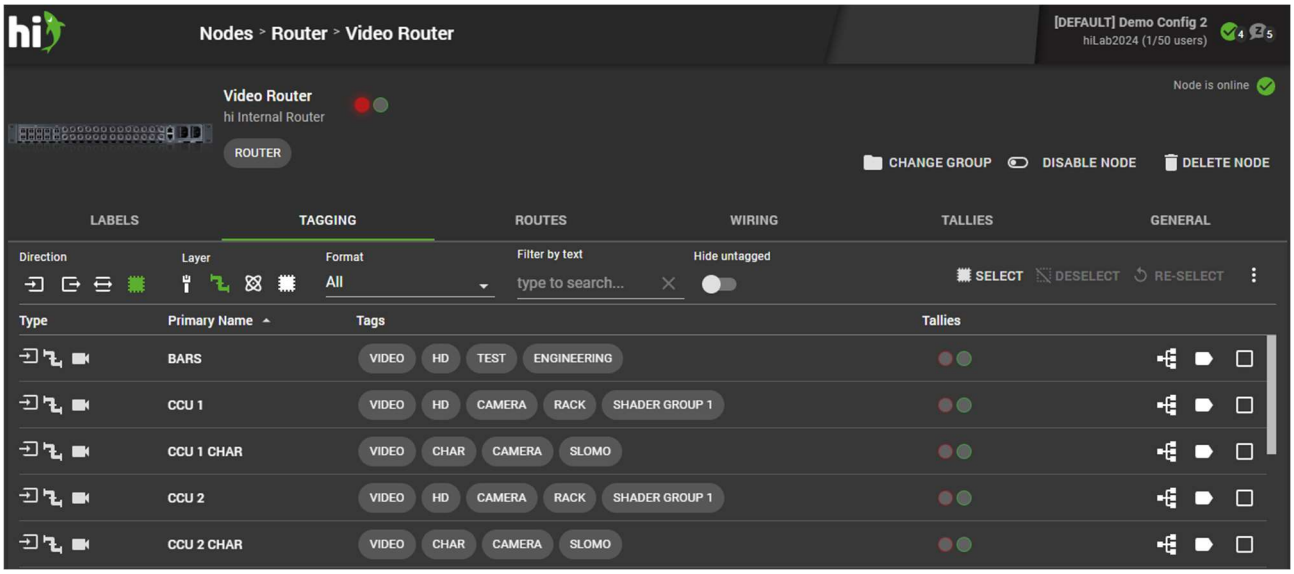
CREATING PORT CONTAINERS

Select one or many ports from the list and touch "Create port container" to create a new port container which will contain the selected ports. A dialog will pop up showing the container contents.

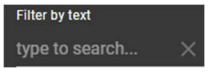
Please refer to Port Container Setup (see page 104) for further details.

PORT TAGGING

The tagging tab shows the inputs, outputs and bi-directional ports for the selected node and their current tag setup.



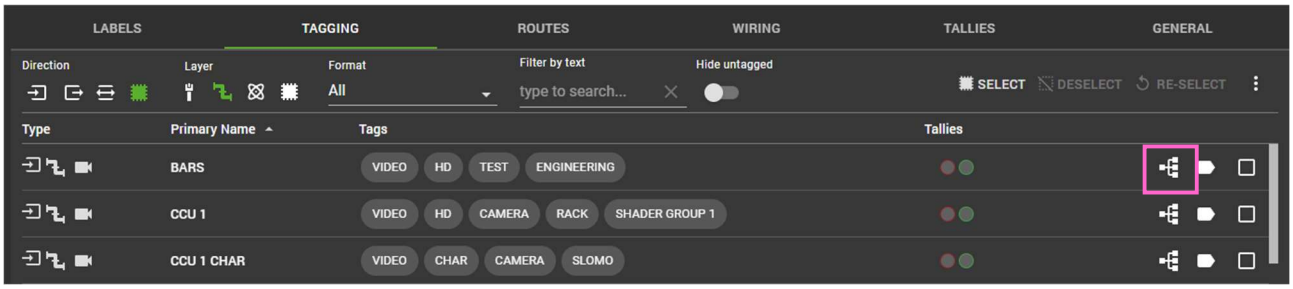
The "Labels" tab shows a list of all available ports of this specific node and their labels / names. You can filter the ports list by using one of the different filter options above the list.

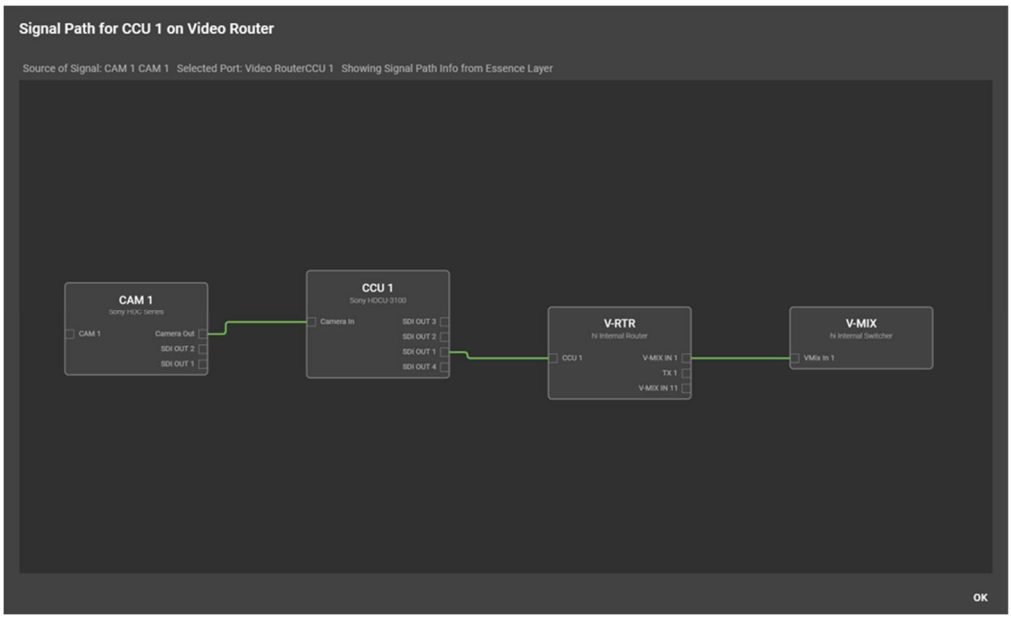
Direction Filter		Input, shows all input ports
		Output, shows all output ports
		Bidirectional, shows all bidirectional ports
		Any Direction, shows all ports and is selected as default
Layer Filter		Physical, shows physical ports
		Flow, shows all ports and is selected as default
		Essence
		Any Layer
Format Filter		opens a drop down list with all available formats of your system, by default All is selected
Text Filter		filters by port name, numbers or tags
Delete Filter		deletes all previously done filtering for Direction, Layer, Format or Text filters
Hide untagged		????

To select or deselect all currently shown ports use the buttons on the right above the ports list. To select a single port mark the rectangle on the right of the port line.

SIGNAL PATH

Touch the "Signal Path" icon of a port to open a graphical representation of the Path in the system that this port belongs to:

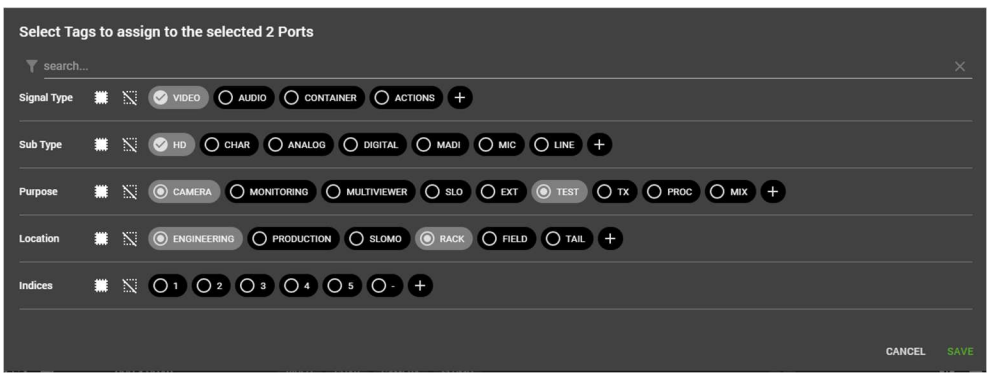




CHANGE TAG ASSIGNMENT OF PORTS

To change the tags on one or multiple ports, select the ports by touching the checkbox and touch "ASSIGN TAG" in the top row:

A Dialog will open showing all available tags. Select or deselect tags to change the assignment. Not assigned tags are shown as black, an already assigned tag will be highlighted in grey. To save your changes, touch "SAVE" in the dialog.

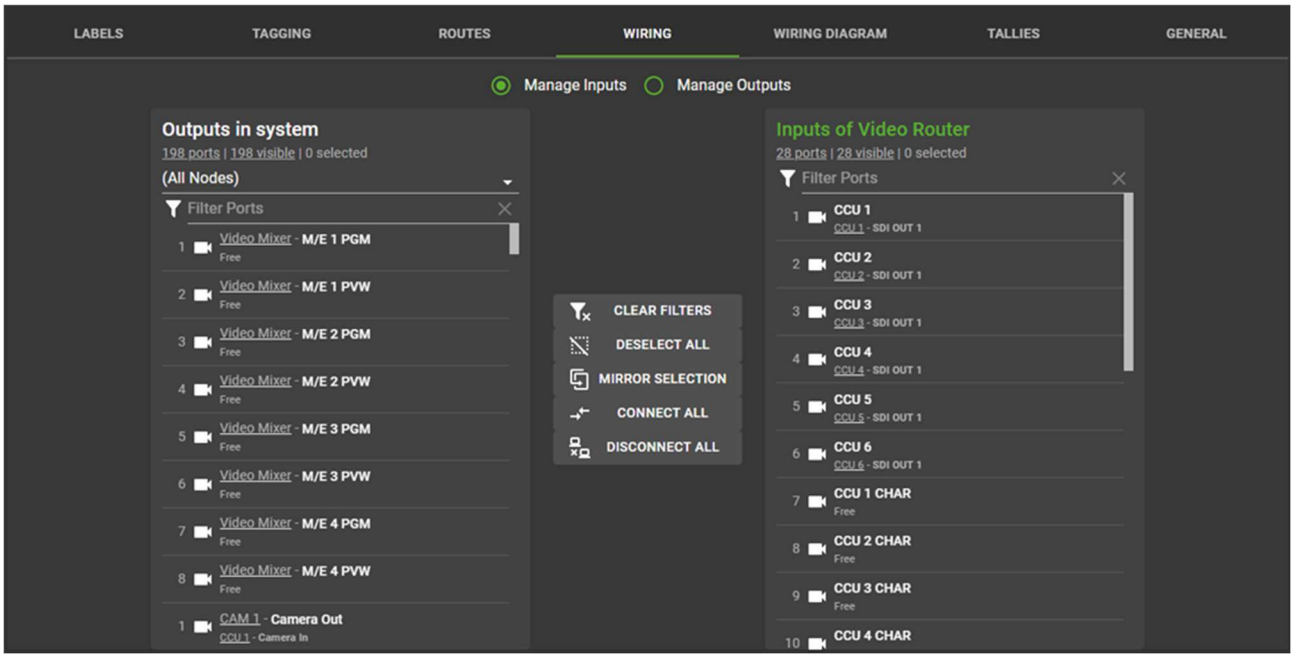


WIRING

The wiring tab provides a way to quickly create the wiring between nodes.

> If you prefer to create or edit your wiring in a graphical way you can also perform the same changes in the Topology view or the "Wiring Diagram" tab.

Please choose if you want to change the wiring of the input or the output ports of the node you are currently looking at.



Touch a port from the left and the right side and press "Connect all" to create a wire between the selected ports. If you select multiple ports on both sides and the number of selected ports match you can create multiple wires at the same time.

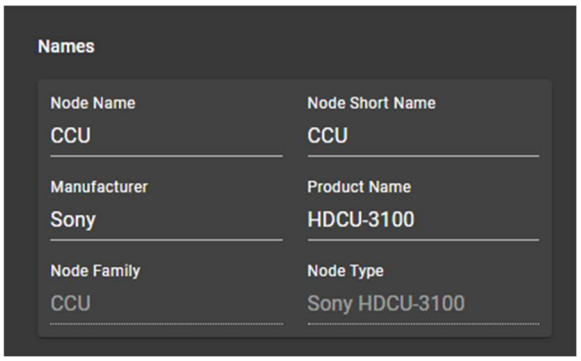
The menu in the middle gives some more helping functions:

CLEAR FILTERS	Clear all filters
DESELECT ALL	deselect all ports on both sides.
MIRROR SELECTION	Use this options to quickly mirror a pattern of selection from one side to the other, for example: select port 1,3 and 5 on the left side and port 11 on the right side. When you click "Mirror Selection" Port 11, 13 and 15 will be selected on the right side.
CONNECT ALL	Connect the selected ports on the left side to the selected ports on the right side. This button is only available when the ports to connect are compatible and the amount of ports on the left and the right side is the same.
DISCONNECT ALL	Remove all wires from the selected ports on the left and right side.

GENERAL OPTIONS

The "General" Tab is available on every node in the hi system. It covers basic settings as the nodes name and protocol- related custom settings.

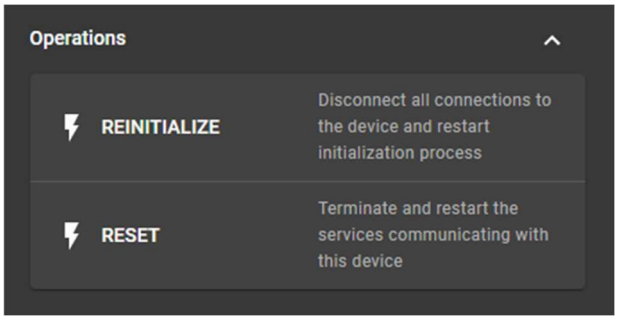
NAMES



The "Names" sections holds descriptive information about this node. The "Node Name" is the name for this node used throughout the user interface of hi. The "Node Short Name" can be used to represent a shortened variant of the Node Name, e.g. the naming used on a block diagram of the installation. The "Manufacturer" and "Product Name" fields can be used to save the information about the manufacturer and the model of the device. These values are displayed in the hi user interface, but they do not have an effect on control connections to the devices.

STANDARD OPERATIONS

For nodes that have a control connection to a physical device, an "Operation" panel is available:



All nodes using a control connection expose two operations by default:

Operation	Description
Reinitialize	All active connection to the device will be closed and opened again. Any steps taken at initialization time will be performed again (e.g. all UMD labels of a multiviewer will be sent out again).
Reset	Terminates and restarts all hi services connected with this device.

Please note that specific nodes can extend this list of operations.

ADDITIONAL OPTIONS

Depending on the type of Node this tab can hold additional sections. Please refer to the related sections of this manual.

DEVICE-SPECIFIC SETTINGS

This section describes settings specific to some device integrations.

> For some templates more than one of the following categories can apply.

Router Nodes

Router nodes represent routers or other devices that expose a routing matrix, e.g. SDN systems.

Mixer Nodes

Vision Mixers usually report their tally status by sending messages like "my input 3 is on air in Suite 1 PGM PgmA". To correctly process tally information from a vision mixer hi needs to know a mapping of the internal busses of the vision mixer to the tallies in the hi system.

Multiviewer Nodes

Multiviewer Nodes collect and calculate tally and label information and send it out to UMDs, Multiviewers or other devices receiving label information.

Parameter Control Nodes

Parameter Control Nodes show and monitor parameters in a device and provide pinned parameters to the hi system.

Northbound Nodes

A Northbound Node provides an interface for other control systems to control connections in the hi system.

ROUTER NODES

Router nodes represent routers or other devices that expose a routing matrix, e.g. SDN systems.

BEHAVIOR

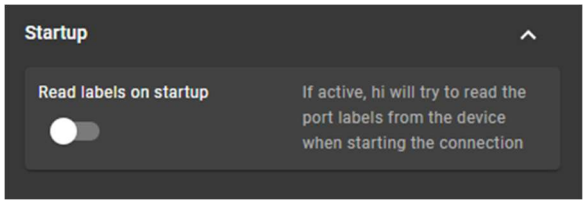
When hi connects to a router, it will query the router for available inputs and outputs and create the corresponding ports in the node. After querying inputs and outputs, hi will query the router for crosspoint information for the destinations. Once the crosspoint information is gathered, the router can be used in the hi system. hi will continue to query the router for names for the inputs and outputs and copy the queried names into the hi database. Depending on the router type and the types of available labels hi will try to fill in the Primary Names and Short/Panel Names with reasonable default values read from the routers database.

After this first-time initialization has completed, hi will forward requested routes / crosspoint changes and receive crosspoint changes from the router.

A manual refresh of label information from the routers database to the hi database can be performed in the "General" tab of the node in hi.

ADDITIONAL PROPERTIES

STARTUP

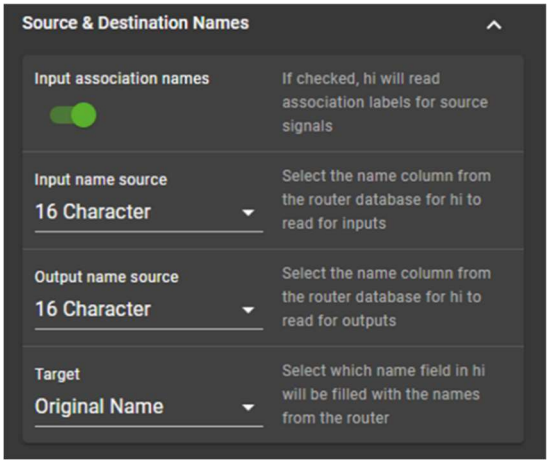


When "Read labels on startup" is activated, hi will perform a label refresh from the routers database into hi's own database each time it connects to the router (e.g. on system startup). This is useful, if the names in the router database are changing frequently and these names should be visible in the hi software.

SOURCE & DESTINATION NAMES

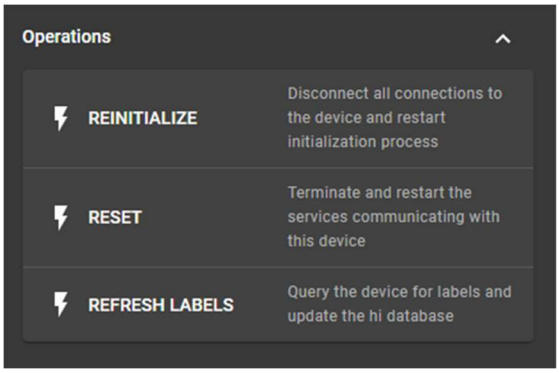
> This section is available in the Probel SW-P-08 integration only.

This section is used to setup which name information from the routers database should be used in hi in which way.



Function	Description
Input Association Names	If activated, hi will read source association names. If deactivated, hi will read the regular source names.
Input Name Source	The name field from the routers database that hi should use for the input names.
Output Name Source	The name field from the routers database that hi should use for the output names.
Target	Which name field in hi will be filled with the selected names.

ADDITIONAL OPERATIONS



Operation	Description
Refresh Labels	If activated, hi will read source association names. If deactivated, hi will read the regular source names.

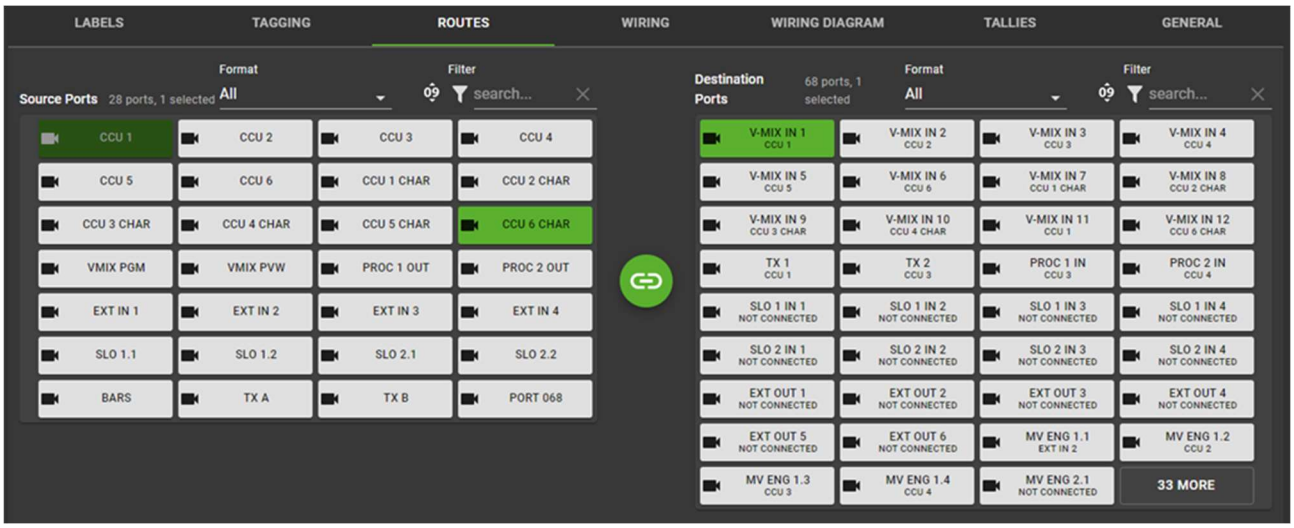
For common operations, please refer to General Options (see page 69).

DIRECT ROUTING

This "routing panel" is independent of the routing panel presets and any tagging that is done on the ports tab. It gives you the option to quickly change a crosspoint in a device that you don't want to expose to users by assigning the according tags to it.

To open this view, touch "Routes" on the nodes detail page.

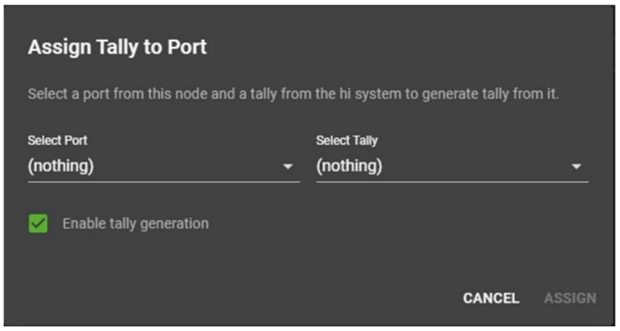
Touch a destination and a source and press the connect button to perform the crosspoint change.



TALLIES FROM ROUTER OUTPUTS

The "Tallies" tab is only available on devices with routing capability!

Assign a port from this node to a tally channel in hi to start creating tally from this port. Touch the ⊕-button at the bottom to create a new assignment.In the new window select a port from the Select Port drop-down-menu or filter for your ports by entering a name. Under Select Tally you can select the currently configured Tallies of the system via the drop-down-menu.



Touch "ASSIGN" to create this tally assignment.

In the list of tally assignments you can also disable and enable single tally assignments or edit and delete them.

> Tally assignments can be enabled or disabled from the Rule Engine (see page 22). You can use a Tally from a router output for emergency scenarios.

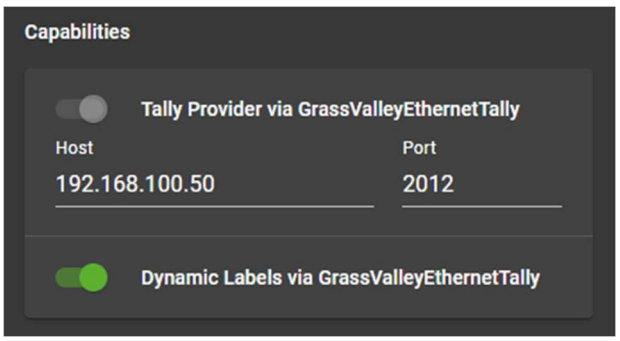
MIXER NODES

BEHAVIOR

Vision Mixers usually report their tally status by sending messages like "my input 3 is on air in Suite 1 PGM PgmA". To correctly process tally information from a vision mixer hi needs to know a mapping of the internal busses of the vision mixer to the tallies in the hi system.When hi connects to a vision mixer, it will query the mixer for available inputs and it's tally capabilities. It will create the corresponding ports in the node. To use the tally information in the hi system, it must be mapped to a tally in the hi software using the "Tallies" tab. When a tally mapping exists, hi will process incoming tally updates and update the tally status in the hi system accordingly.

CAPABILITIES

TALLY PROVIDER VIA N



All vision mixer provide a "Tally Provider" capability. This capability receives tally updates from the vision mixer and can relay them into the hi system.

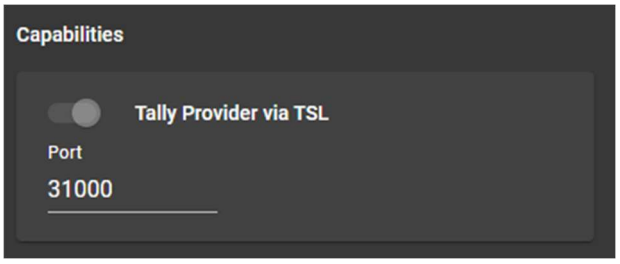
Please provide the IP-Address of the switcher. In case the port has been changed from factory default on the switcher side, it can be adjusted here.

DYNAMIC LABELS VIA N

Some vision mixer integrations provide a "Dynamic Labels" capability. This capability can change labels of vision mixer inputs depending on routing and signal path information from the hi system. If the Dynamic Labels Capability uses the same protocol as the Tally Provider, no additional setup is neccessary.

TALLY PROVIDER VIA TSL

> This section is only available in switchers receiving Tally information via TSL.



If the vision mixer reports the tally information by TSL, the IP-Address of the switcher is not relevant to the hi system since the switcher is actively sending the information and the hi system is only receiving it. The default receiving port is 31000, you can change this port here.

In the configuration of the vision mixer, provide the IP-Address of the hi system and the port selected here.

> The supported port range is 30500 to 31999. Please make sure, you don't set up multiple nodes with incoming connections on the same port.

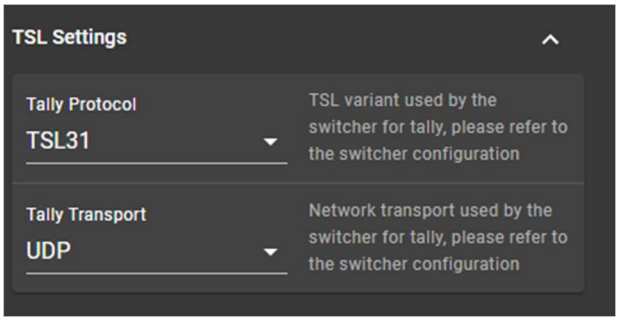
> In case you are using a redundant installation, you can use the virtual IP-Address of the hi system as a target for the switcher.

ADDITIONAL PROPERTIES

TSL SETTINGS

> This section is only available in switchers receiving Tally information via TSL.

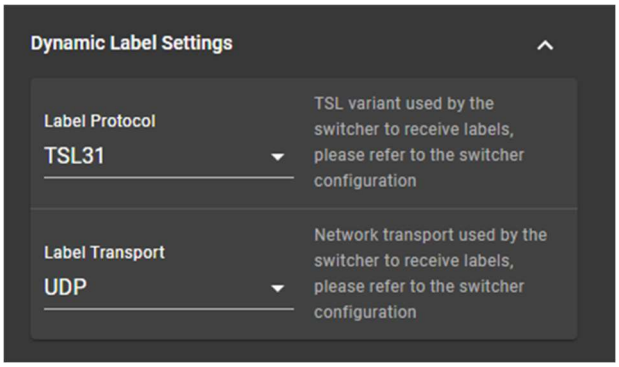
This section is used to setup the connection via TSL to receive tally information from the mixer.



Function	Description
Tally Protocol	Select the TSL protocol variant the switcher uses to send tally information.
Tally Transport	Select the transport type the switcher uses to send tally information.

DYNAMIC LABEL SETTINGS

This section is only available in switchers receiving Tally information via TSL.

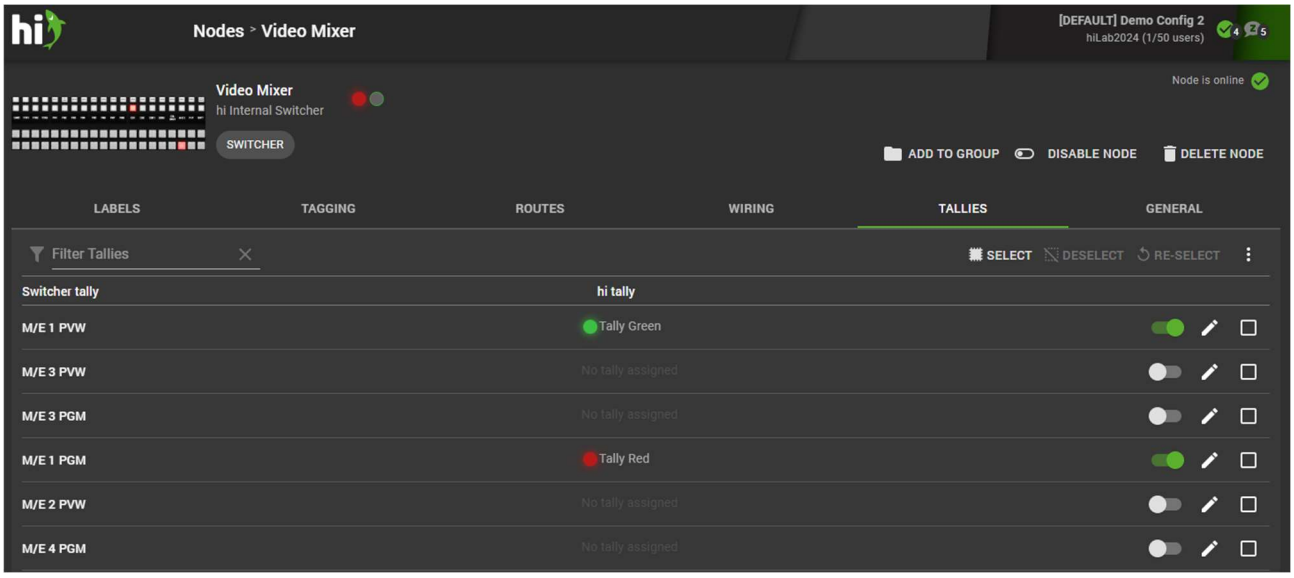


Function	Description
Label Protocol	Select the TSL protocol variant the switcher uses to receive label information.
Tally Transport	Select the transport type the switcher uses to receive label information.

TALLY SETUP

Vision Mixers usually report their tally status by sending messages like "my input 3 is on air in Suite 1 PGM PgmA". To correctly process tally information from a vision mixer hi needs to know a mapping of the internal busses of the vision mixer to the tallies in the hi system.

This is done by setting up the tally configuration in the Node page of a Vision Mixer. Each entry in this list represents a tally channel from the vision mixer you are connected to

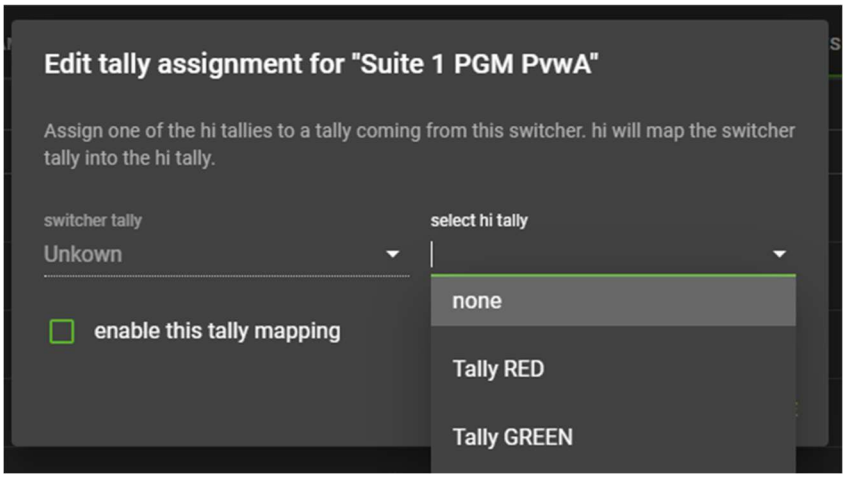


> Depending on the vision mixer model you are connecting to these lists can look differently. For example Grass Valley K-Frame Mixers provide on-air status for their internal output buses (PGM A, PGM B, PGM C, ...), while Sony Mixers report tally for different Tally Channels (GP1_RED, GP1_GREEN, ...)

ASSIGNING A TALLY FROM A VISION MIXER TO A TALLY IN HI

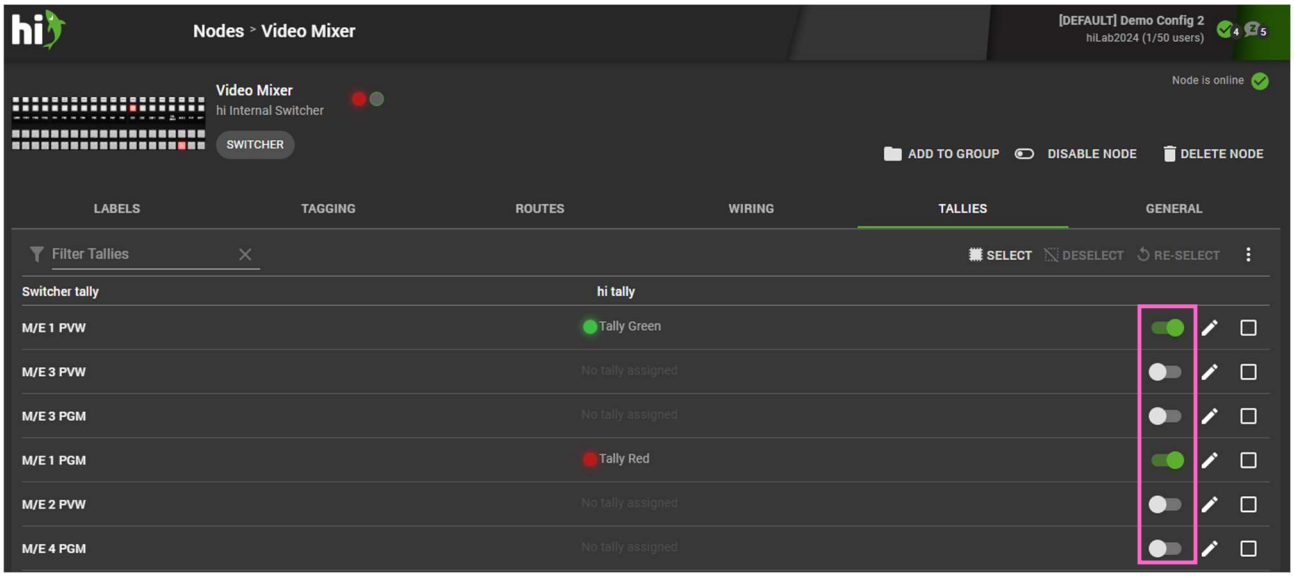
To assign a tally from a vision mixer to a tally in the hi system touch the "EDIT" button in the according tally line.

A dialog will open allowing to select a tally from the hi system. Select a tally from the hi system and click the check box to enable this mapping.



ENABLING / DISABLING TALLY MAPPINGS

Different mappings can be enabled or disabled at a later time by touching the switch next to each label:

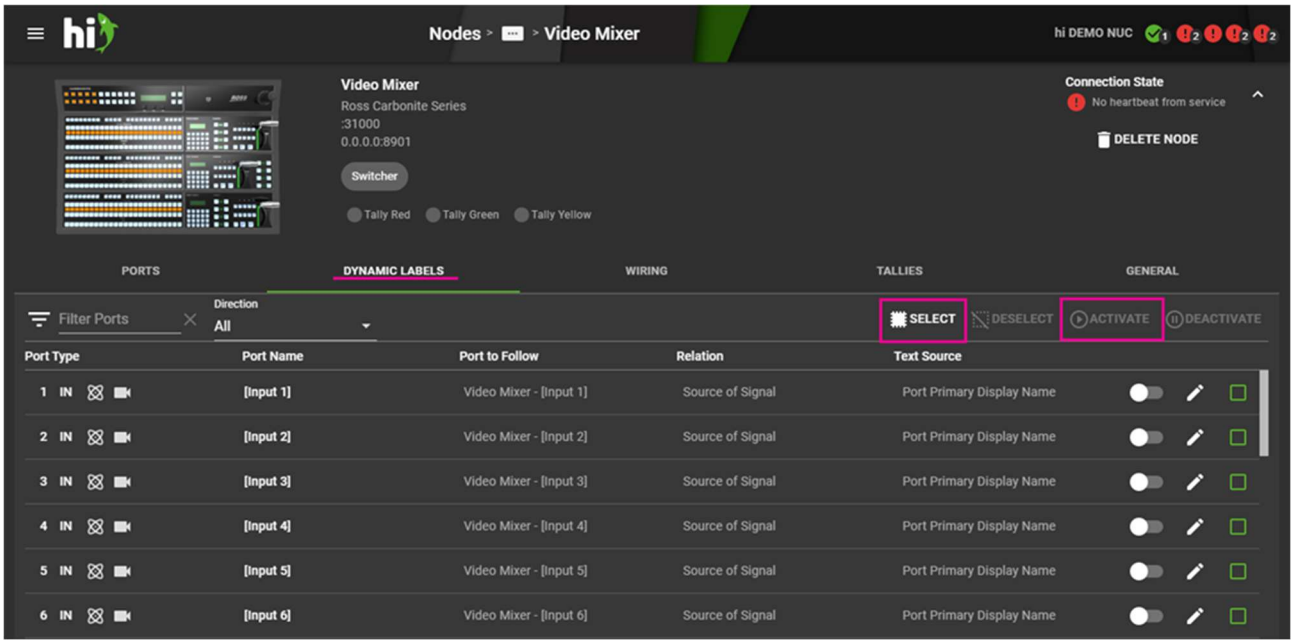


> Tally Mappings can be enabled or disabled by a rule. This way you can build emergency fallback scenarios disabling tallies from one source and enabling it from another. To learn more please refer to Rule Engine (see page 22).

DYNAMIC LABEL SETUP

> This tab is only available for devices supporting receiving of label information from a 3rd party control system.

Touch the “Dynamic Labels” tab to see the according configuration.



The hi system creates a dynamic label entry for each input port of the node automatically. In the default settings hi will trace the beginning of the signal path for each input and use the “Source of Signal” port as the source for the label that will be sent to the device.

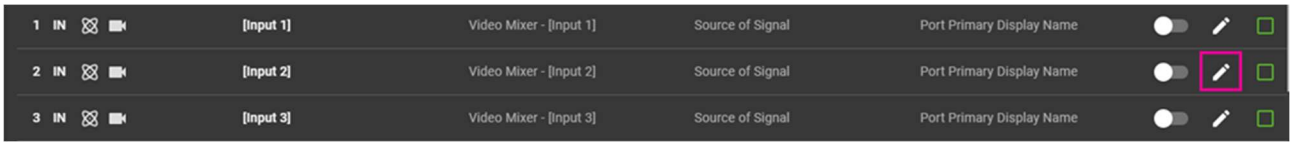
ENABLING DYNAMIC LABELS

By default the sending of dynamic labels is disabled to prevent potential overwriting of any custom names that may have been set up in the device already.

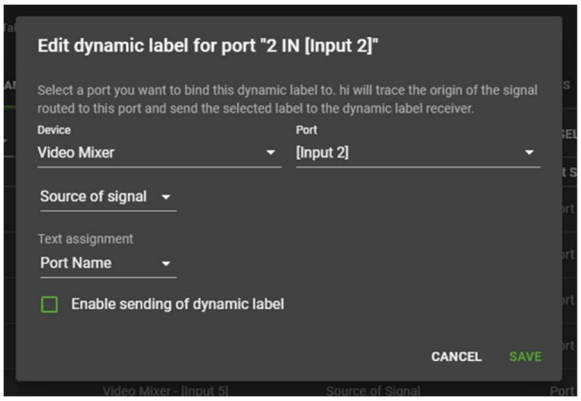
To start sending the labels touch “SELECT” to select all available labels and click on “ACTIVATE” to start sending the labels.

SETTING UP THE LABELS

There is various option on how hi can generate the label. To change the label source, touch the edit icon of a label:



A dialog will open which will allow to edit the properties of this label.



Select a port this label will listen to. Usually this is an input port of the current device, but in some cases it may be reasonable to change this to another port from the system.

Select a Relation for this port and label:

Source of Signal	hi will use the information about wiring and signal paths to find the origin of the signal and use this port for the label (e.g. the Camera connected to a CCU)
Selected Port	hi will use the port selected above as the source for the label (e.g. “V-MIX IN 2”)
Previous Port	hi will use the port connected to the port selected above (e.g. a router output connected to the mixer input)

Once you decided which port is relevant for the label, select the text assignment – which name from the port should be used?

Port Name	The main name of the port
Port Monitoring Name	The monitoring name of the port. If the monitoring name is not set, the port name will be used automatically.

Port Panel Name	The panel name of the port (max. 8 characters).	
Port Mixer Name	The mixer name of the port. If the mixer name is not set, the panel name will be used automatically.	
Port Container Name	The main name of the source port container, if a container has been connected.	In case the user did not connect a port container to the corresponding destination, the respective flow port name will be used.
Port Container Monitoring Name	The monitoring name of the port container. If the monitoring name is not set, the main name will be used automatically.	
Port Container Panel Name	The panel name of the port container (max. 8 characters).	
Port Container Mixer Name	The mixer name of the port container. If the mixer name is not set, the panel name will be used automatically.	
Node Name	The name of the node where the signal comes from.	
Custom Metadata Key	Hi will try to pick up a custom metadata value for a specified key and use it as a label.	

Touch save to save the changes.

MULTIVIEWER NODES

Multiviewer Nodes collect and calculate tally and label information and send it out to UMDs, Multiviewers or other devices receiving label information.

BEHAVIOR

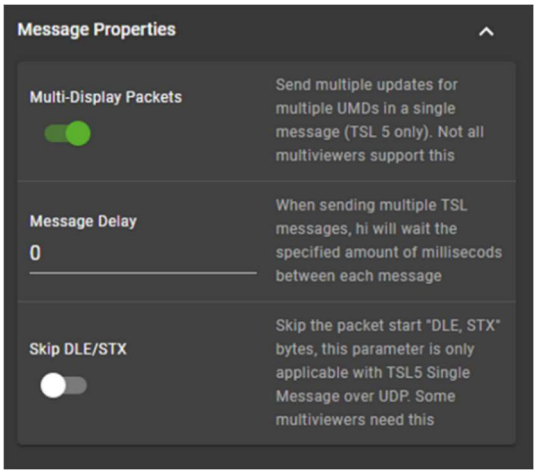
When hi starts, it will check all the UMDs that have been configured by the user. For each UMD the current label information is calculated. hi is establishing a connection to the configured multiviewer device and sending out the label information.

After this initialization process has completed, hi will monitor the configured UMDs for changes on the signal path. If a change (e.g. a tally change or a new connection) results in an updated label information, hi will calculate a new label and send out the label information to the configured multiviewer device.

ADDITIONAL PROPERTIES

MESSAGE PROPERTIES

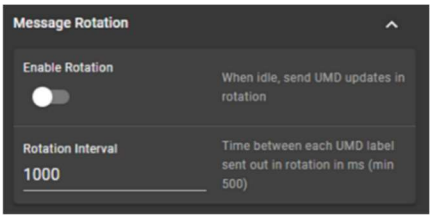
This section is used to setup which name information from the routers database should be used in hi in which way.



Function	Description
Multi-Display Packets	If active, hi will combine label updates happening simultaneously into multi-display packets. This reduces the amount of messages sent out and improves performance of tally updates on multiviewers. Connected multiviewers must support this type of TSL messages. Disable this, if your multiviewer is not supporting this type of messages.
Message Delay	By default, hi is sending out label and tally updates as soon as they have been calculated. This can result in a large number of messages sent out in a very short amount of time in some scenarios. Some multiviewers cannot reliably process large amount of messages in a short time. By adding a message delay the speed of the message stream can be reduced, giving multiviewers more time to process the messages properly.
Skip DLE/STX	Some multiviewers / UMDs have implemented TSL 5 in UDP in a different way. Try to enable this, if your multiviewer is not receiving any data when using TSL 5 in UDP. This option is only relevant in TSL 5 UDP and will be ignored in other configurations.

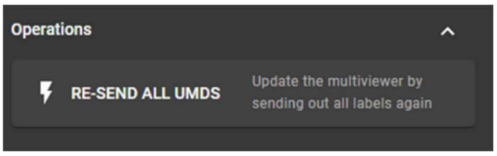
Configuring a message delay can help with "flooding issues" in some multiviewers, but will also reduce the speed and performance of the label and tally update to the multiviewer. Consider following example:
The video sources "CAM 1" and "CAM 2" are switched to 20 PIPs in the multiviewer. On a tally change from "CAM 1" to "CAM 2" 40 PiPs have to receive a tally update. Assuming a message delay of 30ms it would take 1200 ms (1,2 sec) to send out the required messages. Adding potential processing time on the multiviewer this adds an potentially inacceptable delay to the perceived "speed of the multiviewer".

MESSAGE ROTATION



Function	Description
Enable Rotation	If this is enabled, hi will cycle through all configured UMD entries and re-send their label information, if there is no other label updates happening. This is useful if devices are not keeping their label/tally information or require a periodical "confirmation" of the label/tally. Please note that enabling this options increases the amount of TSL messages sent out by hi and can introduce unwanted "noise" on the network.
Rotation Interval	The delay in milliseconds between each label update sent out in idle mode, if "enable rotation" is on. The minimum value for this field is 500, meaning hi will send out 2 label updates per second, when idle.

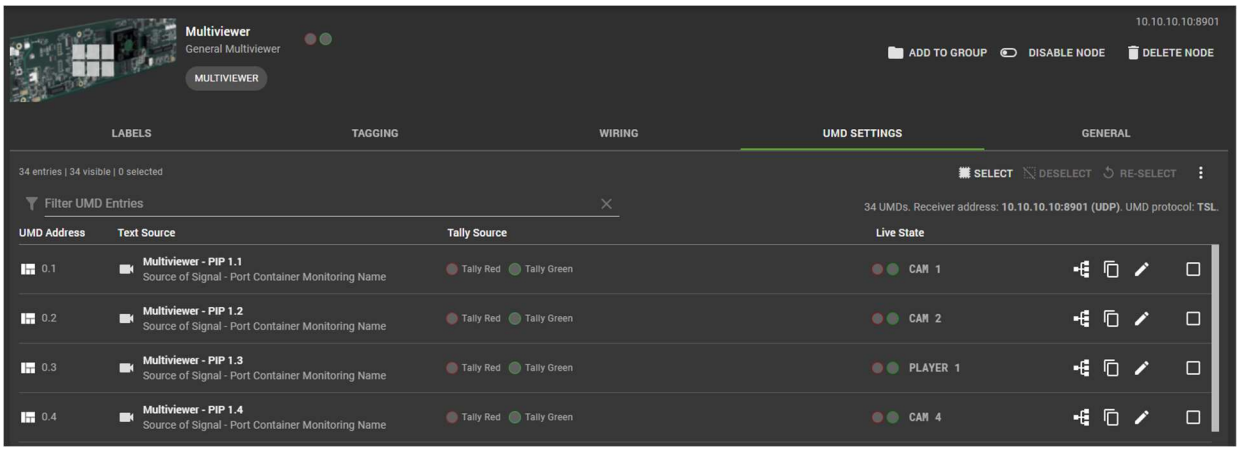
OPERATIONS



Operation	Description
Re-Send all UMDs	When clicked, hi will send out Label updates to all configured UMDs in this node. This button is useful if the multiviewer lost it's label/tally information (e.g. because it was rebooted).

UMD SETTINGS

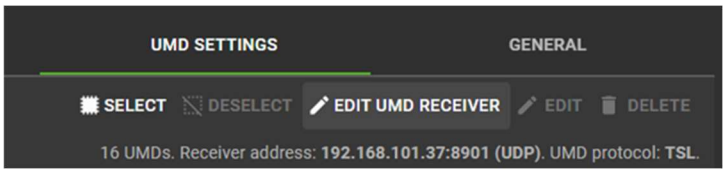
Touch “UMD Settings” to see the according configuration.



Each entry in this list represents one UMD receiver / a label on a multiviewer. Each UMD entry carries an address which consists of a Screen-Id and a Display-Id as described in the TSL protocol. Each UMD entry can be assigned to a port from the system. When creating a multiviewer node the hi system automatically creates a UMD entry for each input port of the multiviewer. In the default settings hi will trace the beginning of the signal path for each input and use the “Source of Signal” port as the source for the UMD text that will be sent to the device.

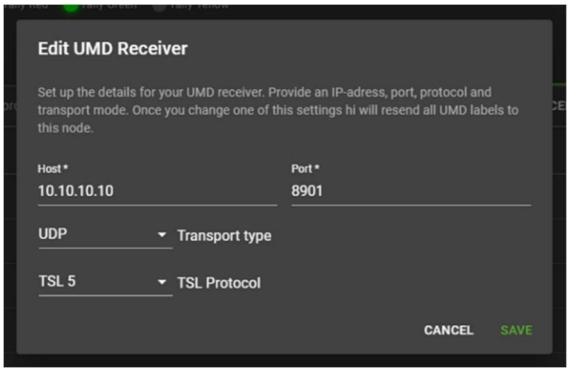
CHANGING THE GENERAL CONFIGURATION OF THE UMD RECEIVER

To change global settings for the communication with the multiviewer touch “EDIT UMD RECEIVER":



A dialog will open which allows to change various settings of the receiver:

- The IP-Address, the Port and the transport type of the Device
- The used TSL variant



Handling of TSL 3 and TSL 5 messages in hi

The TSL 3 and TSL 5 protocols differ in their handling and their features regarding tally transport. TSL 3 offers two independent tally statuses for each UMD that can be set to either active or inactive. TSL 5 offers three different positions for tally information: the left lamp, the right lamp and the text itself. All of these positions can be set to one of the predefined colors.
To achieve backwards compatibility and increase the ease of configuration hi abstracts these two different protocols in one common mode of operation:
Each UMD entry can receive two independent tally channels from the hi system, you can assign any hi tally channel to “Protocol Tally 1” and “Protocol Tally 2”.
When using TSL 3, both of these tallies will be mapped to the two tally alarm slots in the protocol.

- When the assigned tally for Protocol Tally 1 is on, “Tally 1” will be set to on.
- When the assigned tally for Protocol Tally 2 is on, “Tally 2” will be set to on.

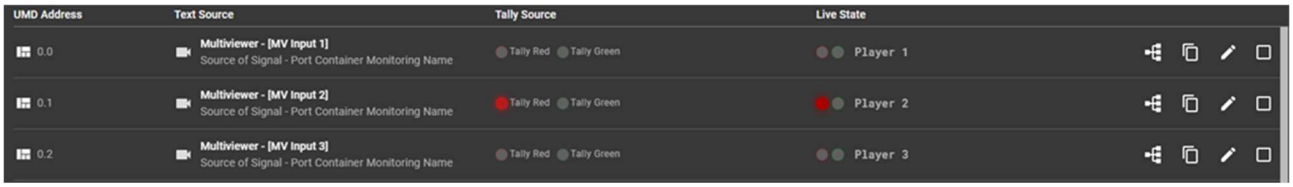
When using TSL 5 hi will use the “Left Lamp” tally property in parallel to transport the tally messages. This means

- When the assigned tally for Protocol Tally 1 is on “Lamp Left” will receive the color “RED”.
- When the assigned tally for Protocol Tally 2 is on, “Lamp Left” will receive the color “GREEN”.
- When both of the assigned tallies for Protocol Tally 1 and 2 are on, “Lamp Left” will receive the color “AMBER”.

Please make sure your multiviewer configuration is set accordingly.

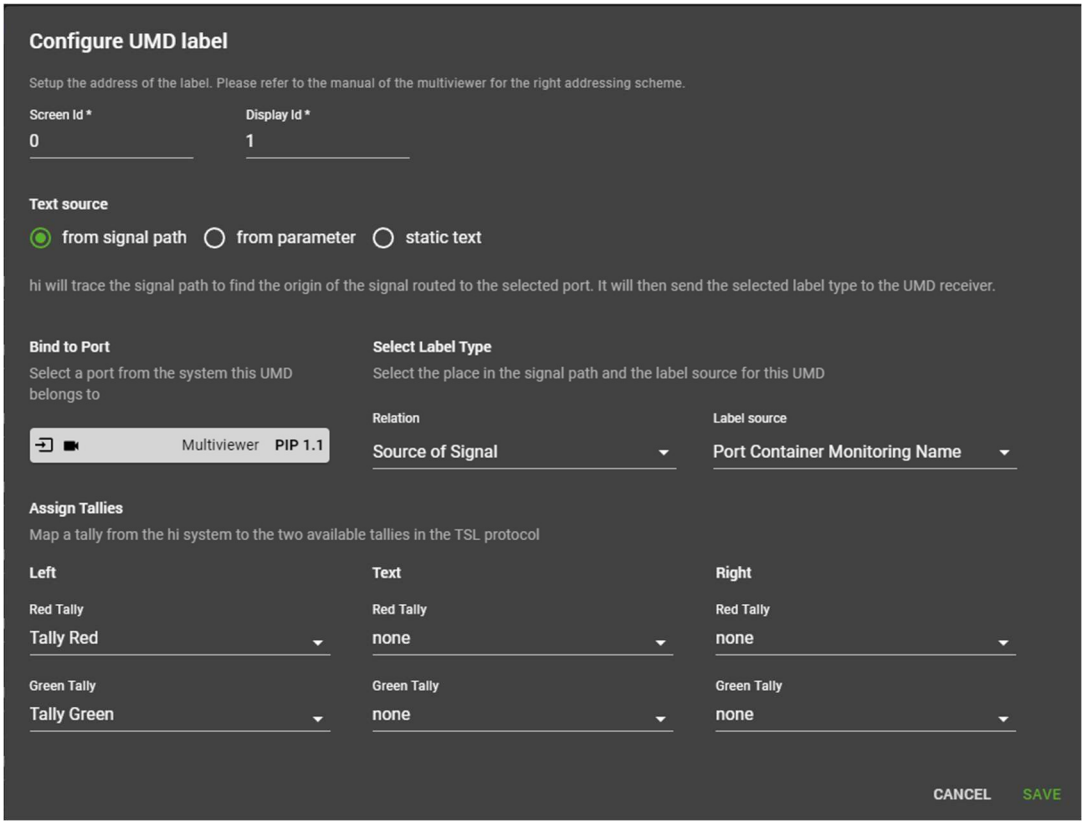
LIVE UPDATES

The “Tally Source” column shows the current status of the tallies of the port from the hi system that is currently assigned to a particular UMD. The “Live State” Column displays a visual representation of the TSL message that has actually been sent out to the device. It contains up to two tally states and the label.



CHANGING THE CONFIGURATION OF A SINGLE UMD

To change the text source or the tally mapping for a single UMD, touch the edit icon for one UMD in the list of UMD entries.



Provide a Screen Id and a Display Id for this UMD. Please refer to the manual of the controlled device for more information on the required values for this fields.

> Each UMD entry must use an individual combination of Screen and Display ID. Attempting to configure multiple UMD entries with the same address will result in an Error while saving the UMD entry.

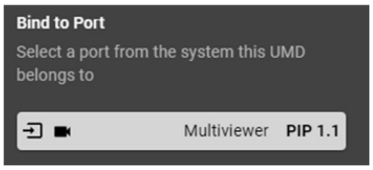
> In most cases the Screen ID refers to the number of the multiviewer head, the Display ID refers to the number of the individual PIP on a head. In most cases these values are 0-based, which means that the first head will have the screen ID of 0 and the first PIP on each head will have the display ID of 0.

TEXT SOURCES

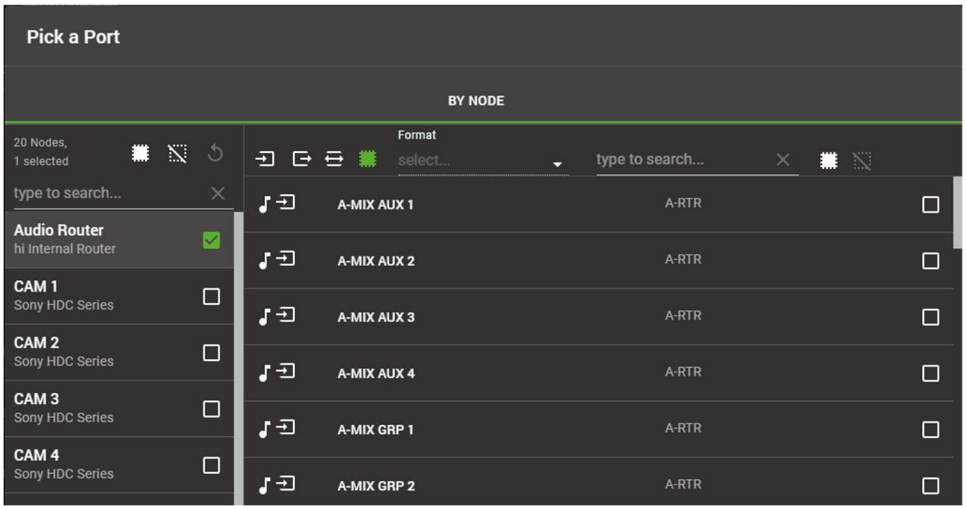
From Signal Path	The text for this UMD will be calculated by tracing a signal along it's path. For this you will need to provide a port of the system where this UMD should be assigned. In most cases this can be an input port of the multiviewer node
From Parameter	
Static Text	Disables the dynamic calculation of the UMD content and sends a static text.

BIND TO PORT

Touch the label icon to open a selection window for ports:



A new dialog window opens where you can pick a Port from the Node list:



The UMD content will update on any change on this signal path (e.g. source has changed, tally status has changed).

SELECT LABEL TYPE

Once you decided which port is relevant for the label, select the text assignment under "Label Source" – which label from the port should be used?

Port Name	The main name of the port
Port Monitoring Name	The monitoring name of the port. If the monitoring name is not set, the port name will be used automatically.
Port Panel Name	The panel name of the port (max. 8 characters).
Port Mixer Name	The mixer name of the port. If the mixer name is not set, the panel name will be used automatically.

Port Container Name	The main name of the source port container, if a container has been connected.	In case the user did not connect a port container to the corresponding destination, the respective flow port name will be used.
Port Container Monitoring Name	The monitoring name of the port container. If the monitoring name is not set, the main name will be used automatically.	
Port Container Panel Name	The panel name of the port container (max. 8 characters).	
Port Container Mixer Name	The mixer name of the port container. If the mixer name is not set, the panel name will be used automatically.	
Node Name	The name of the node where the signal comes from.	
Custom Metadata Key	Hi will try to pick up a custom metadata value for a specified key and use it as a label.	
Name from Device		

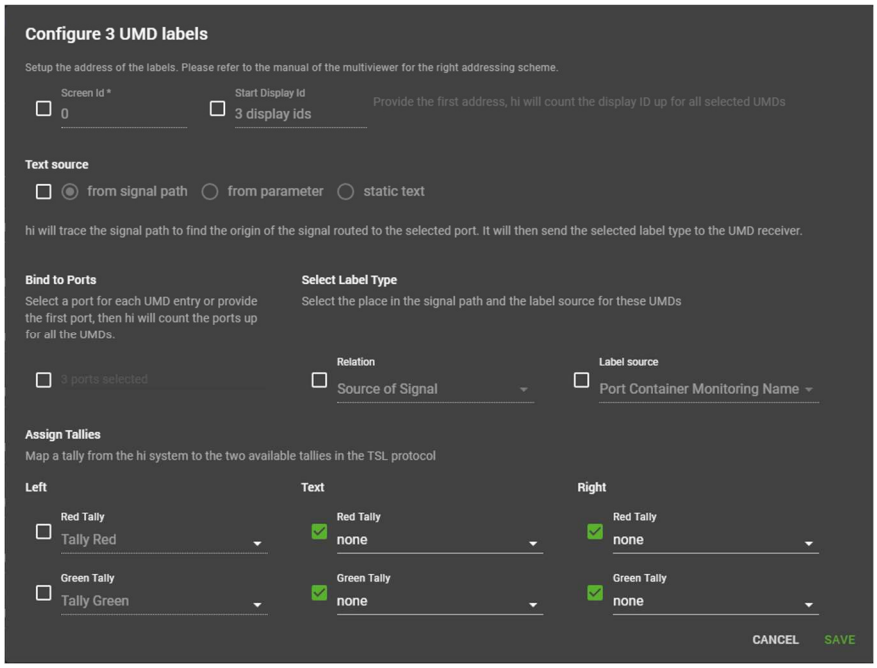
ASSIGN TALLIES

hi sends up to two tally states for each UMD entry. By assigning a tally channel from hi to a protocol tally for this UMD you define which tally in the hi system will trigger which tally in the multiviewer.

> Tally assignments can be enabled or disabled from the Rule Engine (see page 22). You can use a Tally from a router output for emergency scenarios.

EDITING MULTIPLE UMD LABELS AT THE SAME TIME

Multiple entries can be edited in a batch mode. Select multiple entries and touch the "Edit" icon from the top right area.



Enable the properties you would like to change for these labels. When changing the display ID, provide the first number, hi will count this up for the next items. When selecting the assigned ports, you will be able to select multiple ports from the appearing window.

PARAMETER CONTROL NODES

Parameter Control Nodes show and monitor parameters in a device and provide pinned parameters to the hi system.

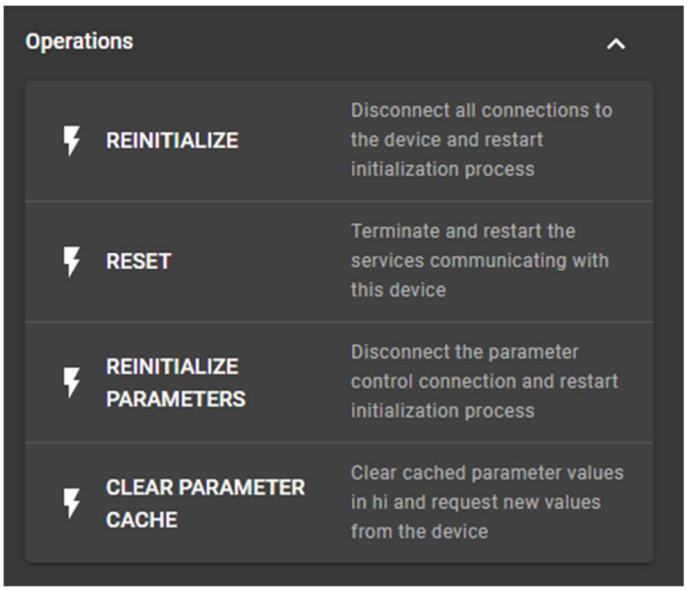
BEHAVIOR

When hi connects to a parameter control node for the first time, it loads the top of the parameter tree via the protocol specified in the template.

The user can browse this parameter tree and pin parameters that are relevant for the users workflow. Once a parameter has been pinned, hi will subscribe for value updates for this parameter. Pinned parameters can be used in multiple places in the workflow.

ADDITIONAL PROPERTIES

OPERATIONS



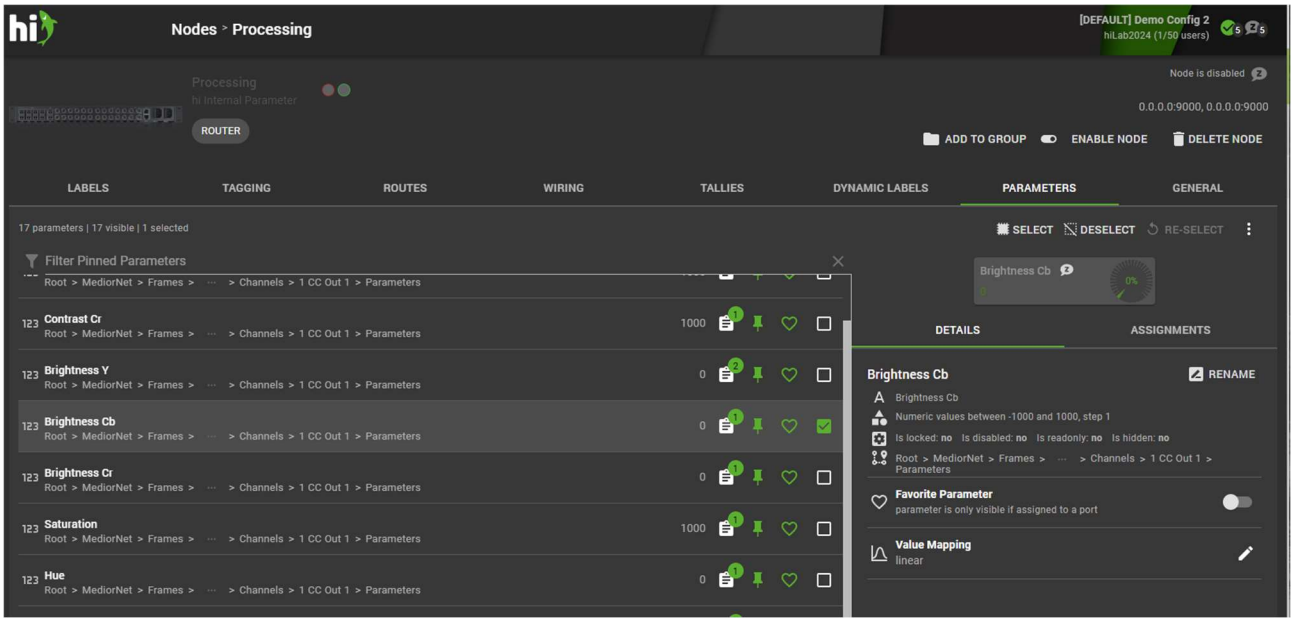
Operation	Description
Reinitialize Parameters	When clicked, hi will close the existing connection to the device and restart the initialization process.
Clear Parameter Cache	When clicked, hi will destroy the local copies of parameter values in the database and refresh them from the device.

SETTING UP PARAMETERS

> The "Parameters" tab is only available on devices with parameter control capability!

For some nodes there are parameters available to define different standard settings. They can be configured in the Parameters tab. This list displays parameters that have been pinned to a node.

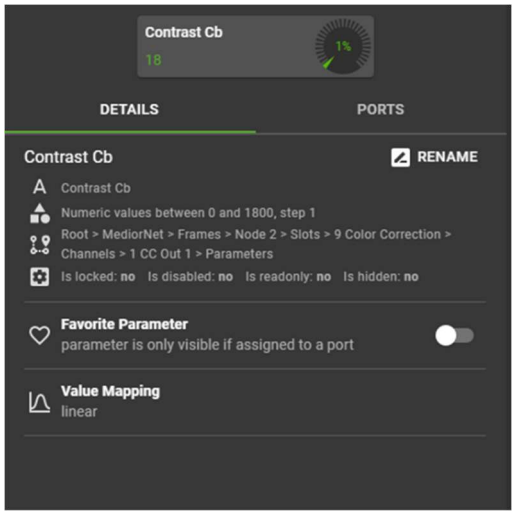
Select a parameter from the list to view it's details on the right side:



PINNING PARAMETERS

To add parameters to this list, touch the ⊕-button. This will open the parameter browser showing all available parameters from the connected device. Navigate the tree of parameters from the device on the left side.

Touching a parameter from the device will open it on the right side. Touch "Pin to parent device" to pin the parameter to the node.



Close the parameter browser by touching the ⊗-Icon in the top right corner.

Depending on the type of device you might see the live status of parameter values in the browser. To reduce the amount of subscriptions to parameter values on the device, hi uses a conservative approach for this live updates. Only one opened parameter browser will receive live updates from a device at the same time. In a situation where multiple users open parameter browsers, the live updates will only be served to the user who opened the browser last or who changed to a different place in the parameter tree.

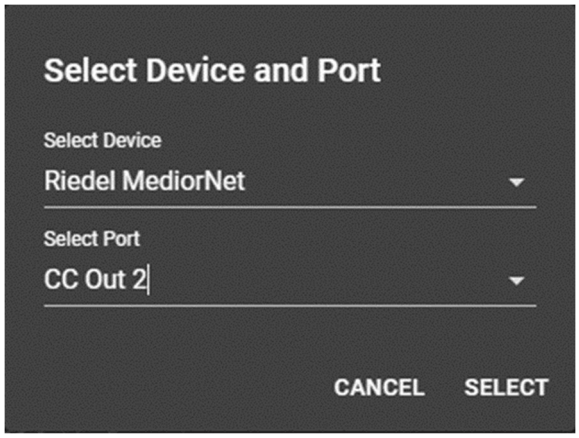
CHANGING THE VALUE OF A PARAMETER

Touch the parameter widget on the right side to change the value. Depending on the type of the parameter different ways of changing a parameter are available.

For more information on the available types of parameters and the options on how to control them, please refer to Parameter Control (see page 30).

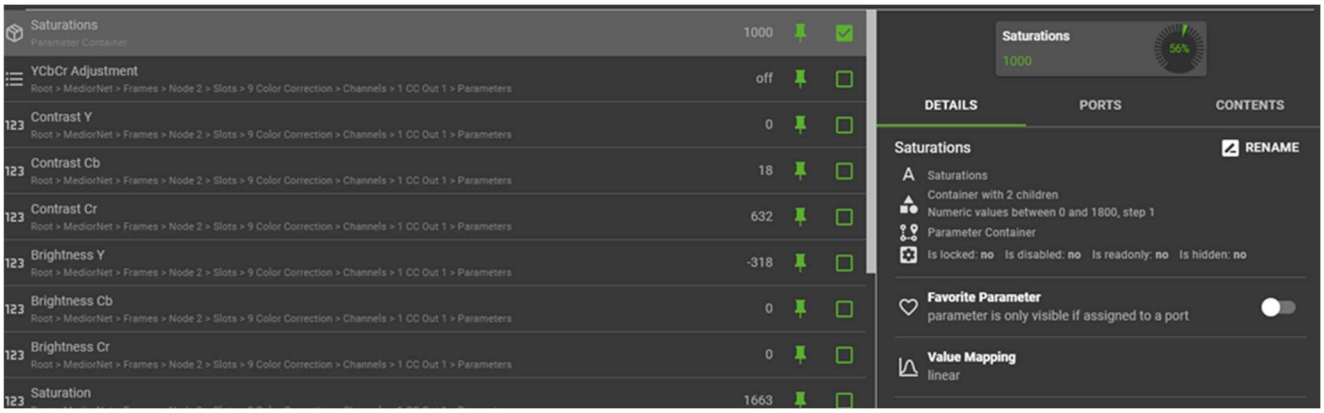
ASSIGNING PARAMETERS TO PORTS

When a parameter is assigned to a port, hi will display the parameter widget on the router panel, when this port is selected. To assign the parameter to a port touch "ASSIGN TO PORT". A dialog will open. Please select the node and the port.



CREATING A PARAMETER CONTAINER

Parameter Containers can combine multiple parameters of the same type and expose them as a new pinned parameter. Select two or more pinned parameters of the same type and touch "Create Parameter Container". A new Entry will be added to the list. You can change the value or assign the container to port just like a regular parameter.



NORTHBOUND NODES

A Northbound Node provides an interface for other control systems to control connections in the hi system.

BEHAVIOR

When a Northbound Node is created in hi, hi will start a Pro-Bel SW-P-08 server providing a matrix acting like a traditional router matrix. This matrix can be controlled from third party systems, e.g. automation systems or other broadcast control systems.

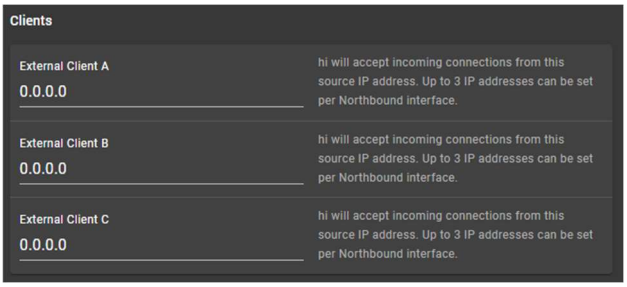
To configure this northbound matrix, the user adds northbound input and output slots. These slots can have Ports or Port Containers assigned. Hi will caluclate the connection status between the Ports / Port Containers and report it as crosspoint information on the northbound matrix. When a third party system requests a crosspoint on the matrix, hi will try to connect the Ports / Port Containers in the assigned slots. If the connection is successful, hi will report a crosspoint on the matrix.

- Each northbound node should serve one northbound system.
- Northbound Nodes require the "hiDock" license to be present.
- Each Northbound Node consumes one user license.

GENERAL

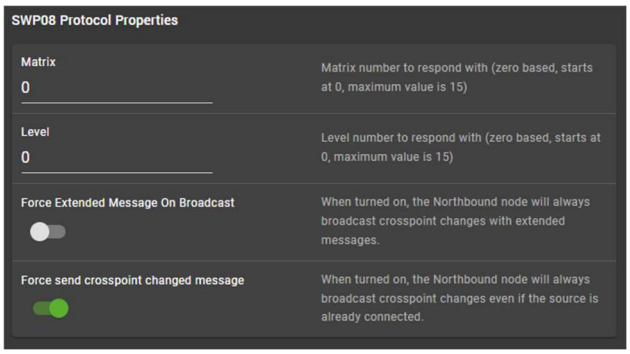
CLIENTS

Each Northbound Node serves one northbound 3rd-party system. Up to three source IP-addresses can be configured per Northbound Node. hi will only accept incoming connections from IP-Adresses specified here.



PROTOCOL PROPERTIES

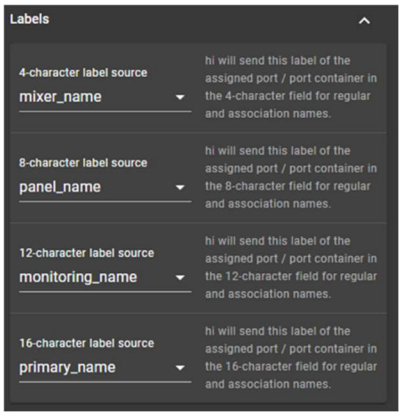
The Northbound Node exposes the matrix using the ProBel SW-P-08 protocol. Protocol-specific settings can be made here.



The Matrix and Level identifiers can cause confusion sometimes: the protocol itself uses 0-based values (so the first matrix has a value of "0"), but some applications translate it to a human-readable form and refer to the first matrix as "1".

LABELS

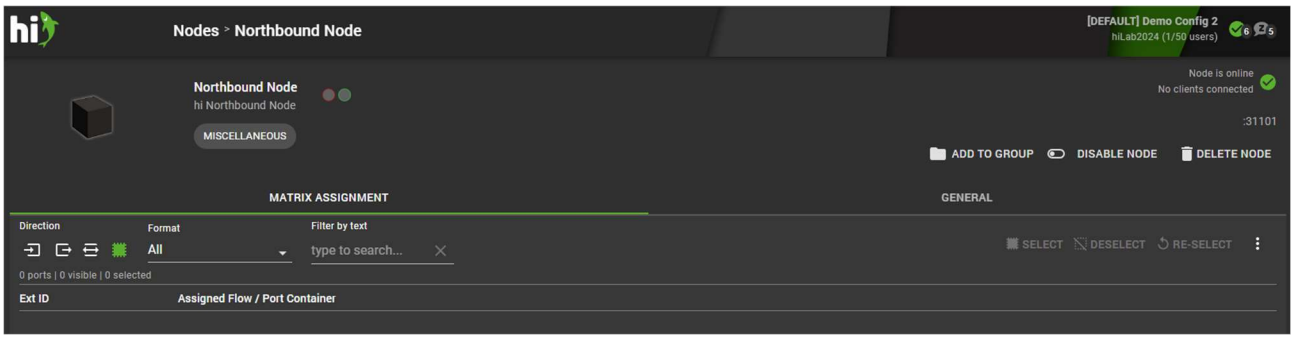
Pro-Bel SW-P-08 can support different lengths of labels. The hi system will answer requests for 4-character, 8-character, 12-character and 16-character labels. In this section the user can define, which label from the hi system will be reported over which label-length in the protocol.



> If a label in hi exceeds the maximum number of characters in the SW-P-08 protocol, the label will be truncated.

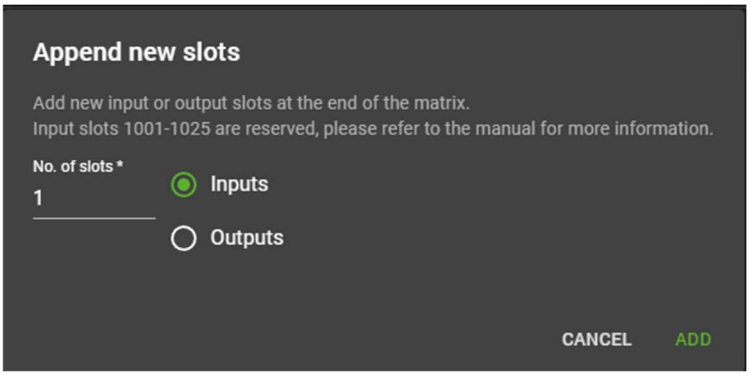
MATRIX ASSIGNMENT

The Northbound Node has a "Matrix Assignment" tab. The assignment of Ports and Port Containers to the inputs and outputs of the northbound matrix can be configured here.

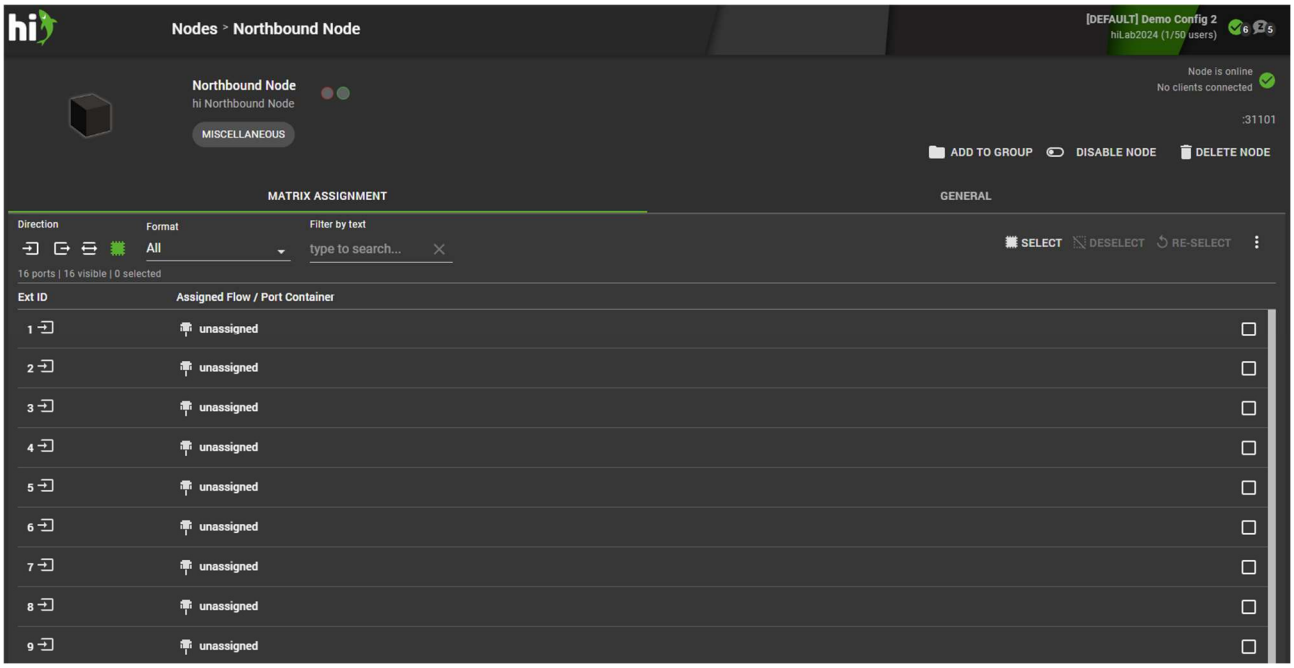


In a newly created Northbound Node, this list will be empty. To get started, add slots to this node, by touching the icon at the bottom.

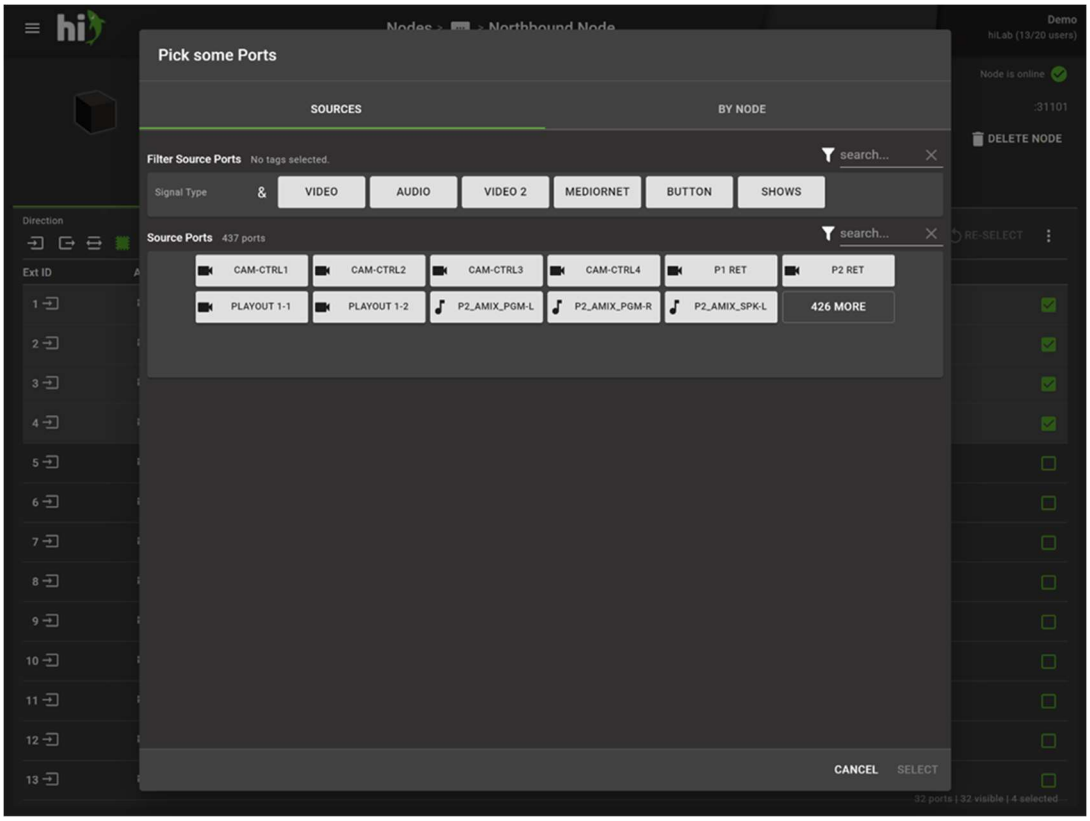
A dialog will open, please select the number of input slots you would like add. Then repeat for output slots.



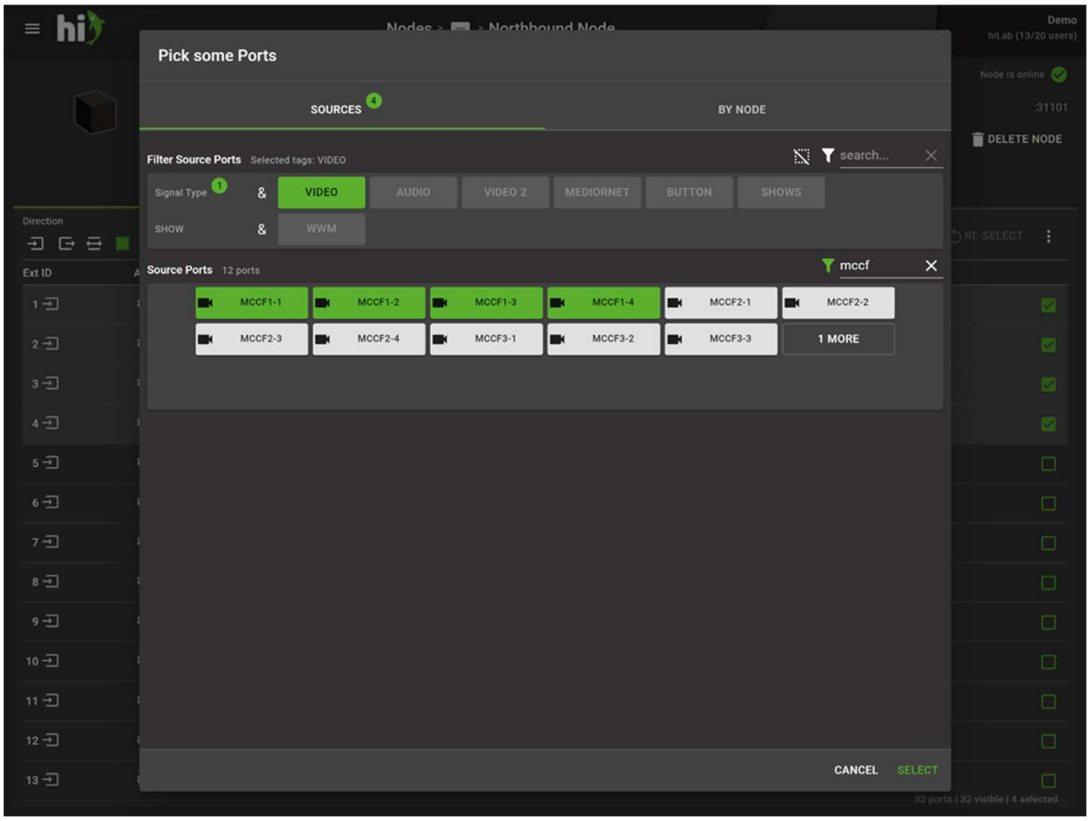
The list of slots will now show entries, with the value "unassigned":



To assign Ports or Port Containers to the slots, select a range of inputs or outputs, and select "Assign Ports" from the menu. A dialog will open showing sources or destinations, depending on your selection of slots.

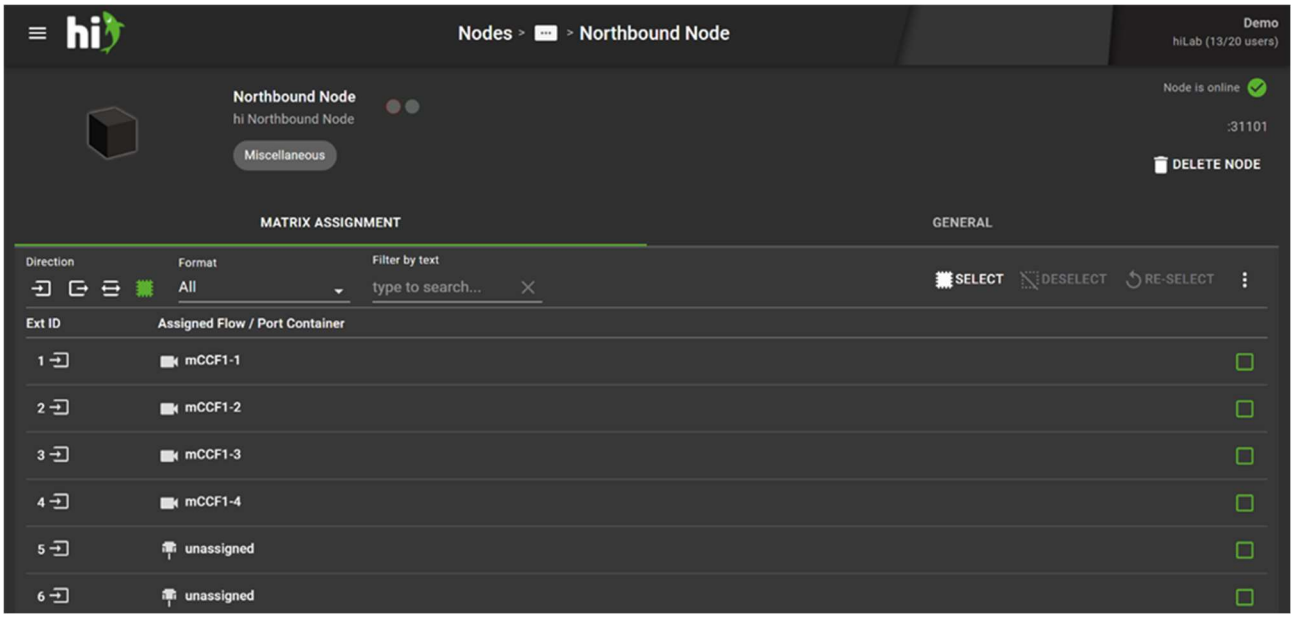


You can use the filtering options similar to the control panel to find the right ports to assign to the selected slots.



Only tagged ports will appear in this dialog!

After you selected the right ports, touch "SELECT" to assign the ports to the slots.



Reserved Source Slots

The ProBel SW-P-08 protocol does not provide indication for special destination states. To be able to pass such information to a northbound system, hi reserves a range of input slots. These reserved slots cannot be used to assign Ports or Port Containers. hi will use these IDs to answer crosspoint interrogate requests over SW-P-08 that cannot be answered with a regular source.

Source ID (SW-P-08)	Slot Number (hi)	meaning	comment
1001-1019	1002-1002	reserved	future use
1020	1021	**disconnected**	the destination is disconnected in hi
1021	1022	**unassigned**	the selected destination slot is not assigned to a port or a port container
1022	1023	**out of scope**	the destination is connected to a source, which is not part of this northbound node matrix
1023	1024	**out of range**	the requested destination number is larger than the highest destination slot configured in hi
1024	1025	reserved	Future use

Supported SW-P-08 messages

hi supports and answers the following incoming messages via SW-P-08:

- Crosspoint Interrogate
- Tally Dump Request
- Crosspoint Connect
- Dual Controller Status Request
- Single Source Name Request
- All Source Name Request
- Single Source Name Request
- All Destination Name Request
- Single Destination Name Request

hi is sending the following messages to all connected clients via SW-P-08:

- Crosspoint changes
- Port Label changes

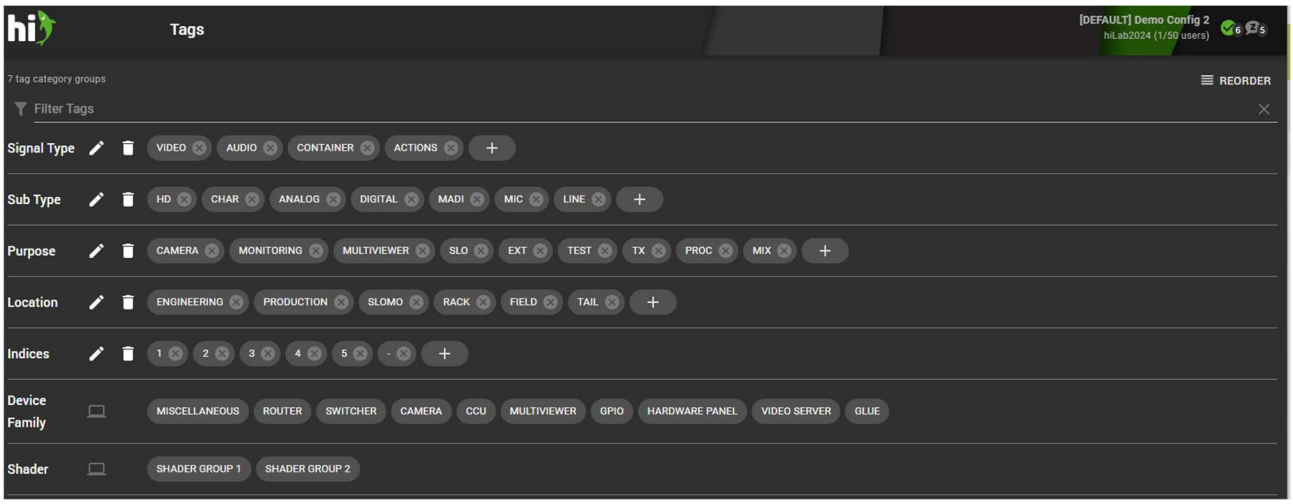
5.4 Tags

How to setup the available tags in the system and group them by categories.

> To learn more about the meaning of tags in the system please refer to Core Concepts: Tagging (see page 15).

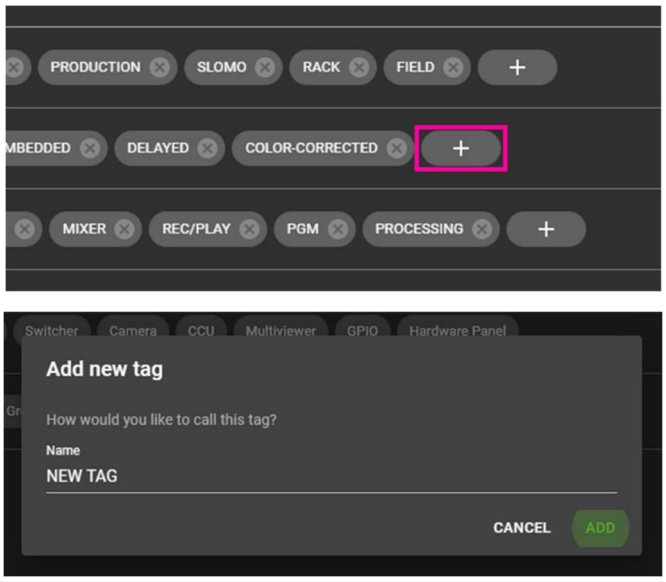
5.4.1 Viewing currently available tags

Select "Tags" from the main menu on the left side. The Tags view will display all available tags in the system. A freshly installed system will come with a predefined set of tag categories and tags. You can use the text filter on top of the list to search for tags.



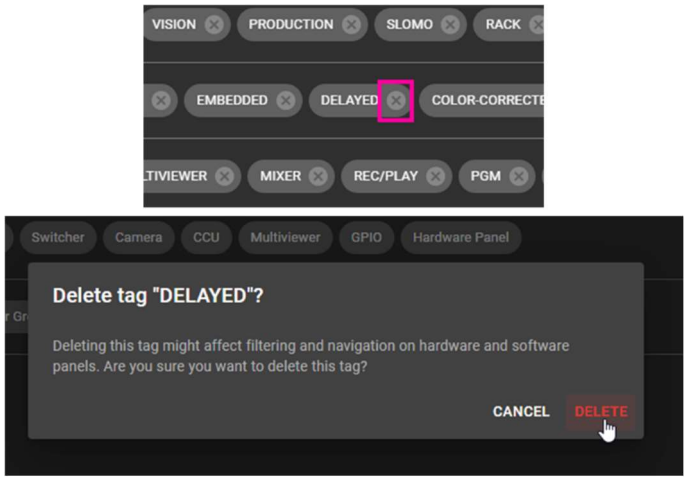
5.4.2 Adding tags

To add a tag press the ⊕ button at the end of a tag category row and enter a name for this tag.



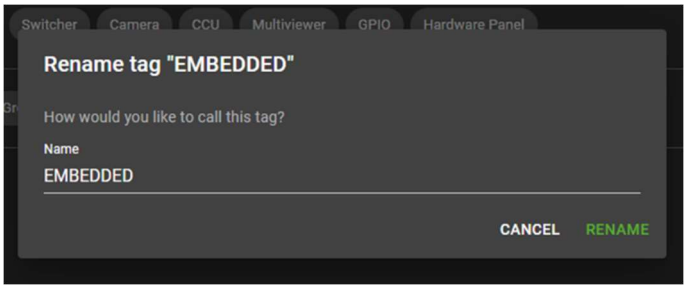
5.4.3 Removing tags

To remove an existing tag click the button on a tag and confirm your action.



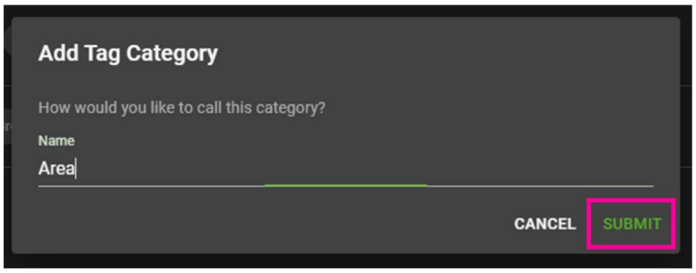
5.4.4 Renaming tags

To rename an existing tag click/touch the tag, provide a new name for the tag and apply the changes by touching "Rename"



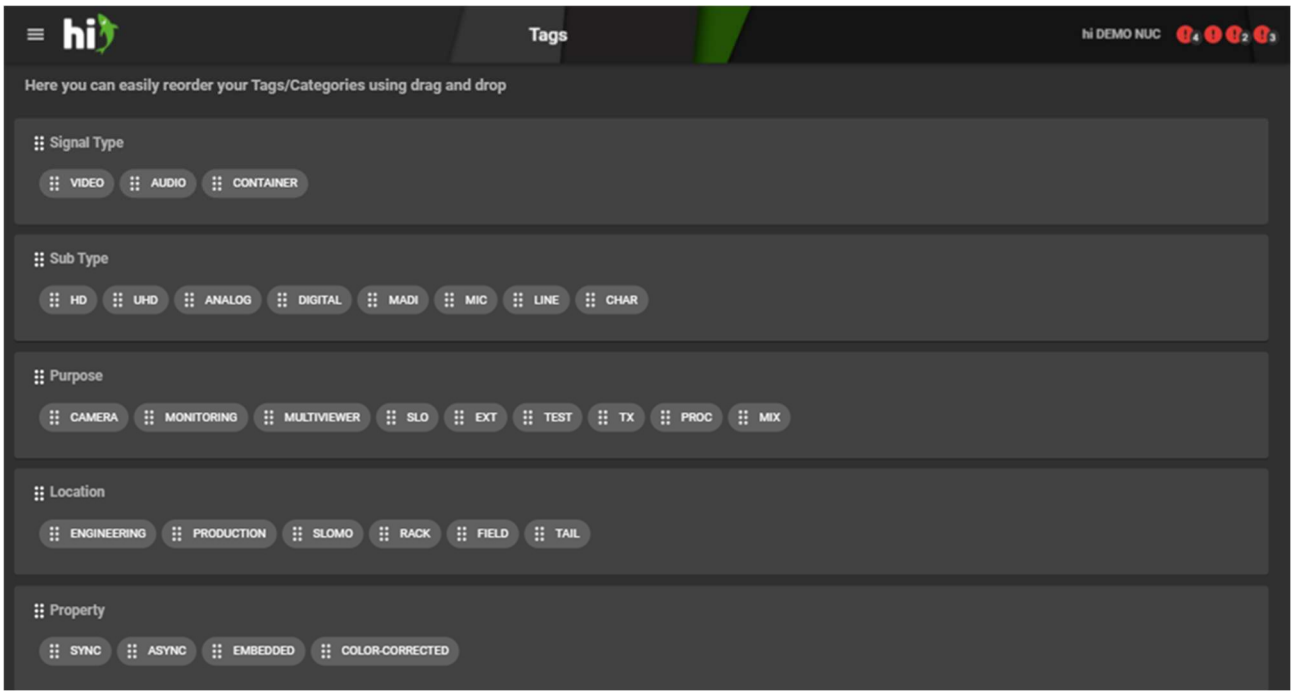
5.4.5 Adding a new tag category

To add a new tag group, use the button at the bottom right of the page and a new window opens. Enter the name of the new group and create the group with SUBMIT.



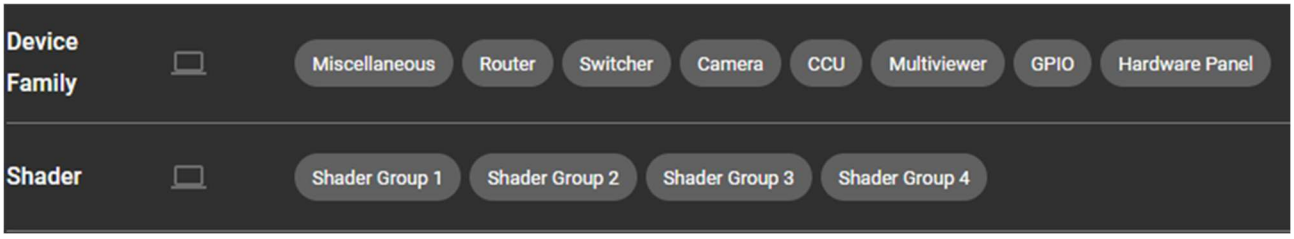
5.4.6 Reordering Tags

The order of the tag categories and tags is reflected on the router panel. To change the order of the tags touch the "REORDER" button in the top right corner. The view will change and you can now rearrange tags and categories using drag and drop. Scroll to the end of the list and touch SAVE to save your changes.



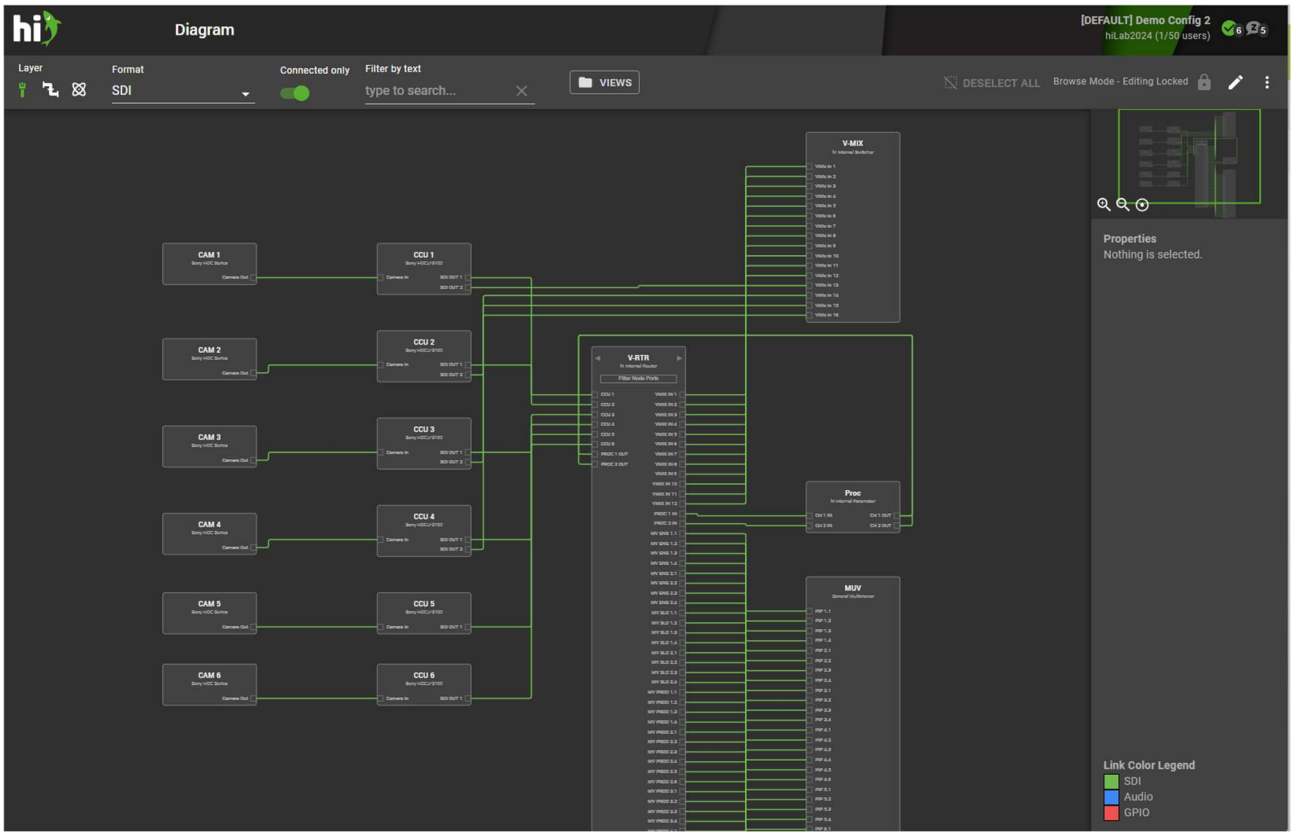
5.4.7 System generated tags

Some tags are generated by the system automatically, for example to categorize nodes or to assign signals to shader groups. While these tags cannot be changed, you still see them in this overview.



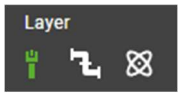
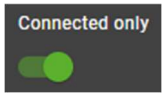
5.5 Topology view

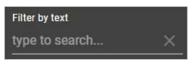
Select "Diagram" from the main menu on the left side to review the topology of your system and change wiring between your nodes easily.



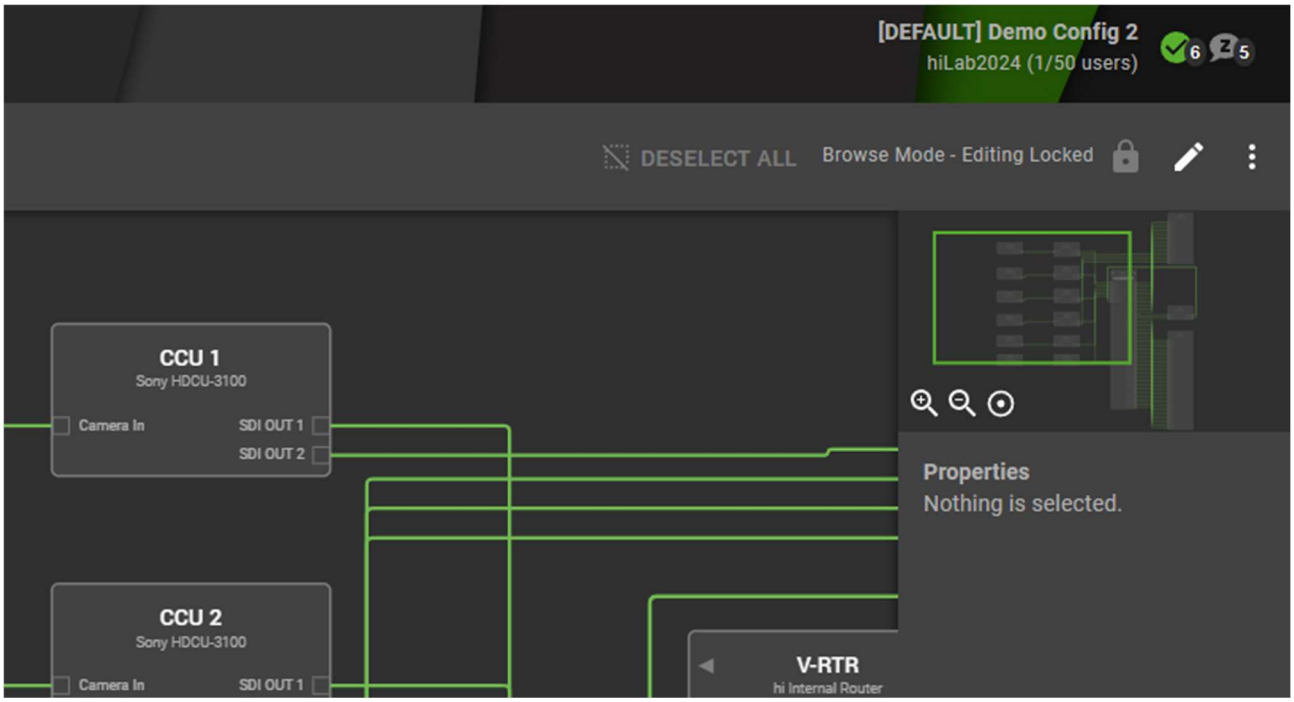
5.5.1 Navigating and filtering in the diagram

In the top menu bar there is various methods to influence the display of the diagram. For an explanation of the functions please refer to the following table:

	**Select a layer**	Select which layer the diagram should show: physical, flow or essence. For changing wires between the nodes, use the Physical Layer. For information about layers please have a look in Core Concepts: Layers (see page 28).
	Select a signal type	Use this dropdown to filter for separate signal types. Depending on the layer you selected different types of signals are available.
	**Connected ports only**	If turned on, only ports that are connected with a wire a shown in the diagram. This is useful to get a better overview of the system. However, if you want to create new wires between nodes, turn this option off, to also see the ports without a wire. This is turned on by default.

	**Filter Nodes**	Start typing in this field to search for nodes in the diagram.
	Views	Click here to open the views bar to store and recall diagram views. They can be used to quickly jump between different setups of your diagram.
	Browsing mode / lock/ unlock	Switch between the browse or editing mode of the diagram. In the browsing mode you can only view the diagram, edit mode will allow to make changes to the layout or the wiring of the system.
	Export options	Export the current diagram as PNG or SVG to your computer.

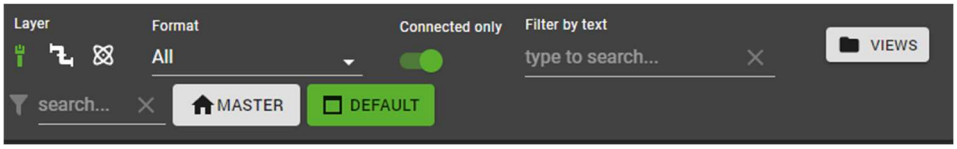
On the upper right corner there is a mini-map of the diagram which is useful for navigation in larger and more complex diagrams:



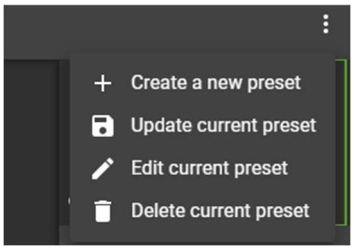
5.5.2 Using views

A view is used to store a specific configuration of a diagram. It contains the position of the nodes in the canvas and your filter settings.

Use the VIEWS button in the top bar to open the views bar:

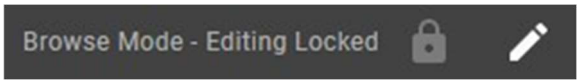


By selecting a preset you can load it into the diagram. To add, update or rename presets please use the Menu on the left side:

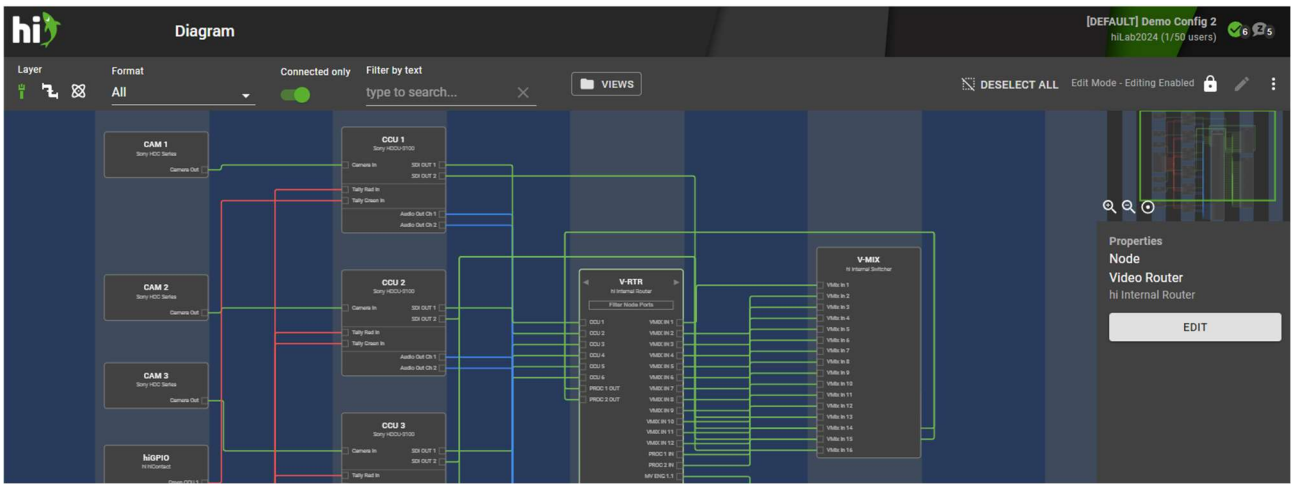


5.5.3 Editing a diagram

To change the layout of a diagram or to remove or create new wires, change to the editing mode by clicking the Edit Icon in the top bar:



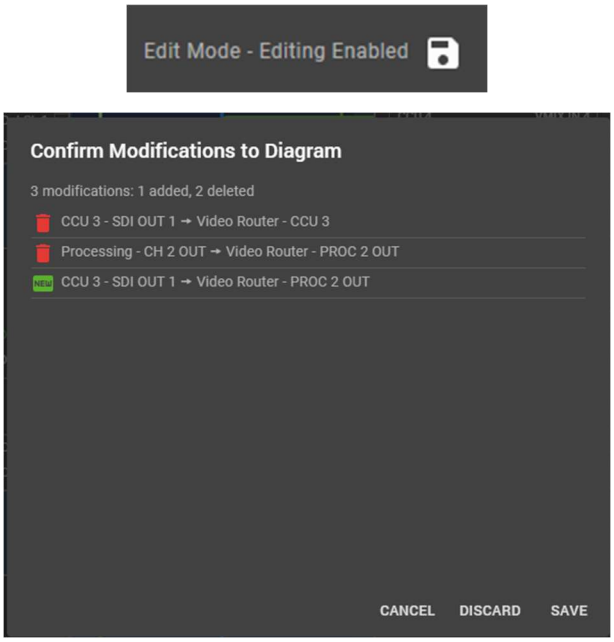
The diagram view changes from the Browse Mode into the Edit Mode and the appearance will change:



To create a new connection in the diagram select a not connected port and drag a new cable to a new port:

On the right hand side there is a property window displaying further information about the currently selected asset.

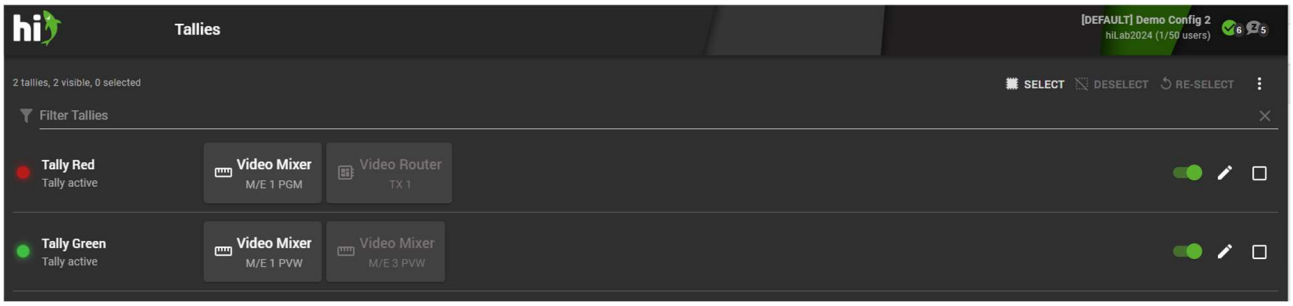
When you finished editing your diagram click the save icon to exit edit mode and confirm or discard your changes.



5.6 Tally setup

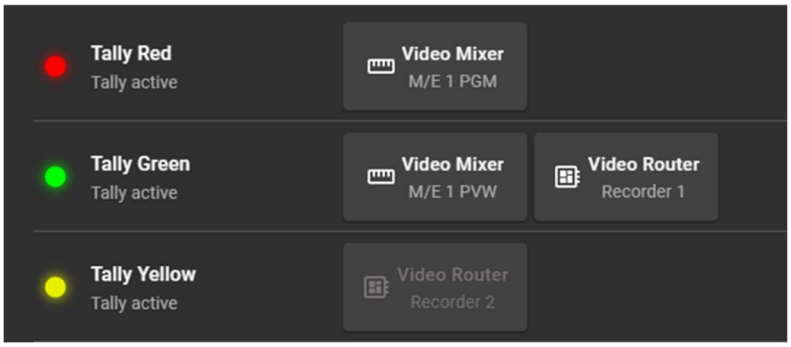
This section is used to define the available tallies, activate or deactivate tallies and review which nodes in the system are influencing tally.

> To understand how hi handles tally information please refer to Core Concepts: Handling Tally and Labels (see page 18).



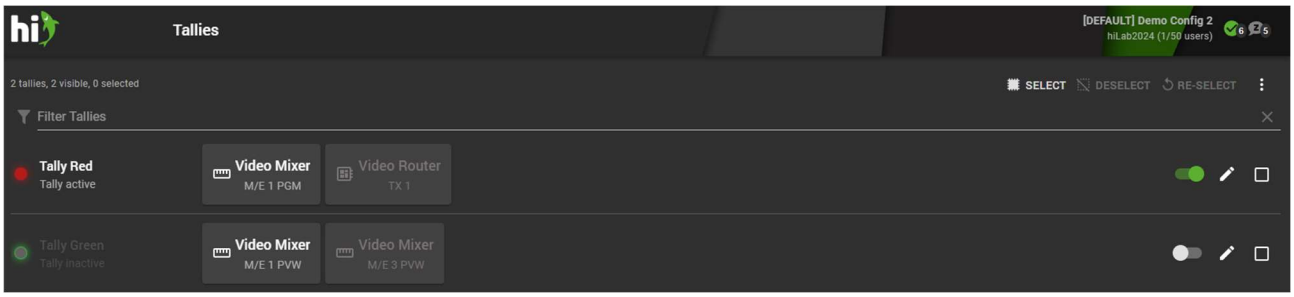
5.6.1 Currently active tally assignments

This page gives you an overview which parts in hi are influencing which tally. In this example "Tally Red" is fired by the Video Mixer M/E 1. Tally Green is fired by the Video Mixer M/E 1 Preview and by an output of a Video Router (Recorder 1). Tally Yellow is configured to be fired by an output of the video router, but this tally generation is disabled at the moment.



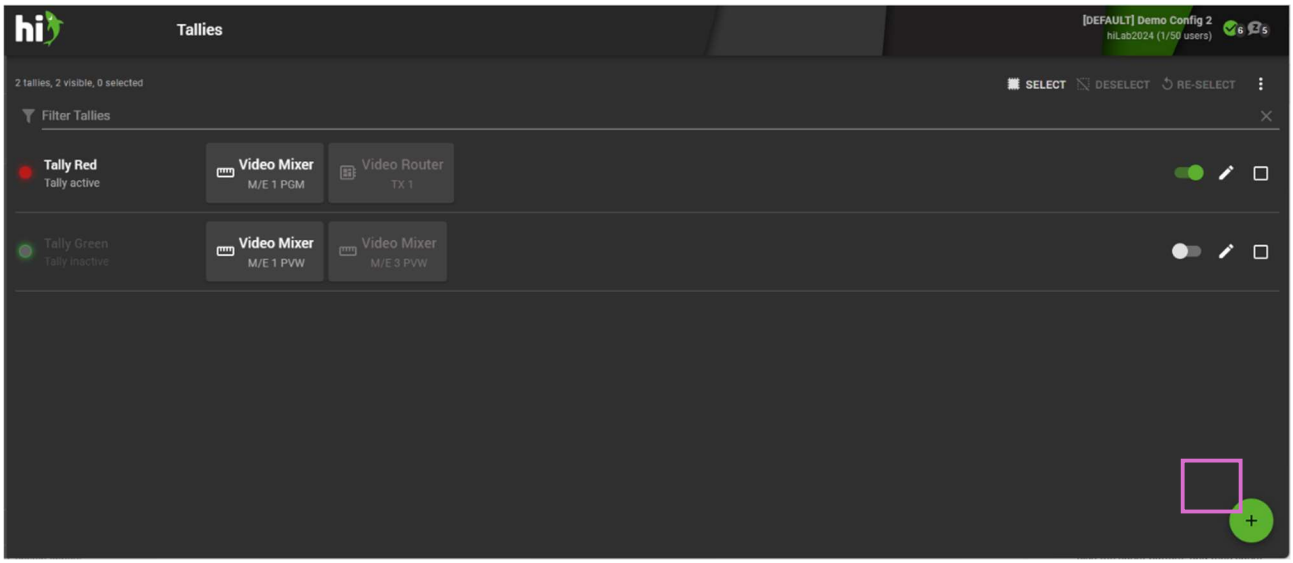
5.6.2 Enabling and disabling tallies

Disabling a tally can be useful if you have prepared a specific tally configuration but you don't want to use it at the moment. To disable a tally click the switch icon of the according tally channel. To activate again just click the switch again.

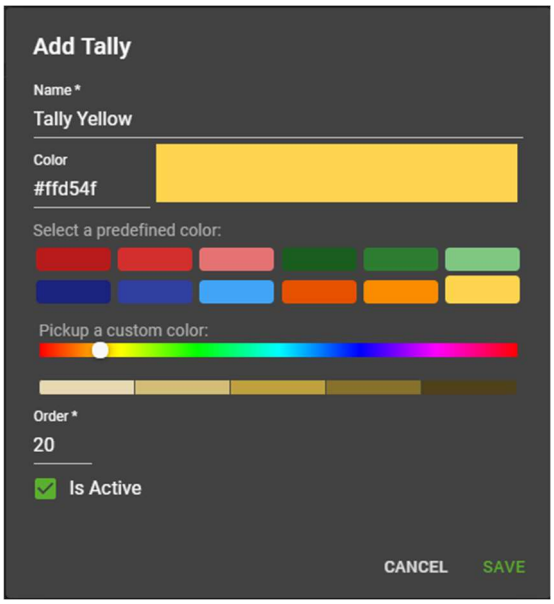


5.6.3 Adding new tallies to the system

When you start with an empty system there will be no tally configured yet. Use the button in the lower right corner to add a new tally to the system.



Configure your new tally accordingly:



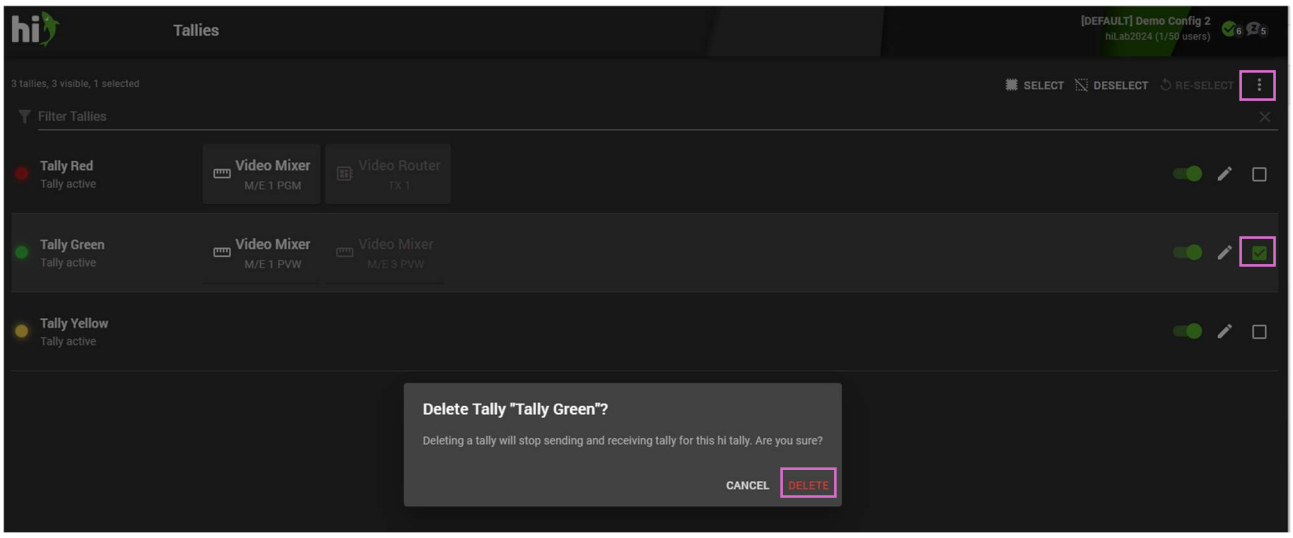
- Name: here you can add a name which reflects the usage of the Tally or describes the used Tally color
- Color: if you know the precise color you want to use you can enter it in a hexadecimal form. The color will be displayed in the big box next to it
- Predefined Colours: alternatively you can also select a predefined custom color or use the color picker to adjust the color as you like.
- Order:

Click "Save" to create your tally.

5.6.4 Removing tallies from the system

> Removing a tally from the system can have dramatic impacts on your installation. Never do this in a live situation!

To delete a tally select it by checking the checkbox at the end and select DELETE from the top right corner.

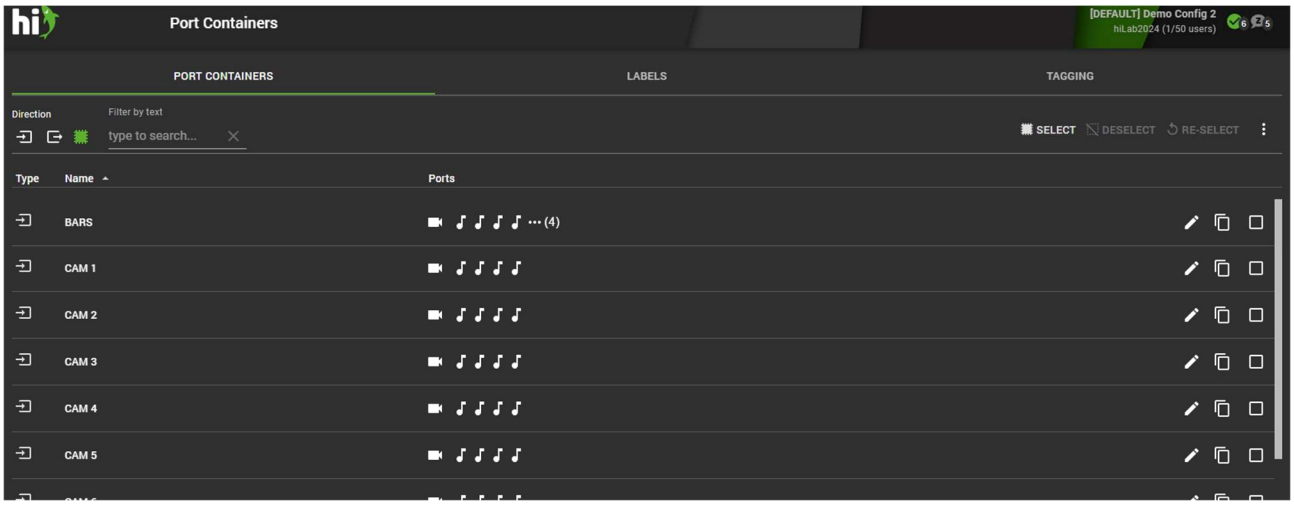


5.7 Port Container Setup

How to setup and use port containers in the hi system.

> For more information on how the port containers work please refer to Core Concepts: Port Containers (see page 20).

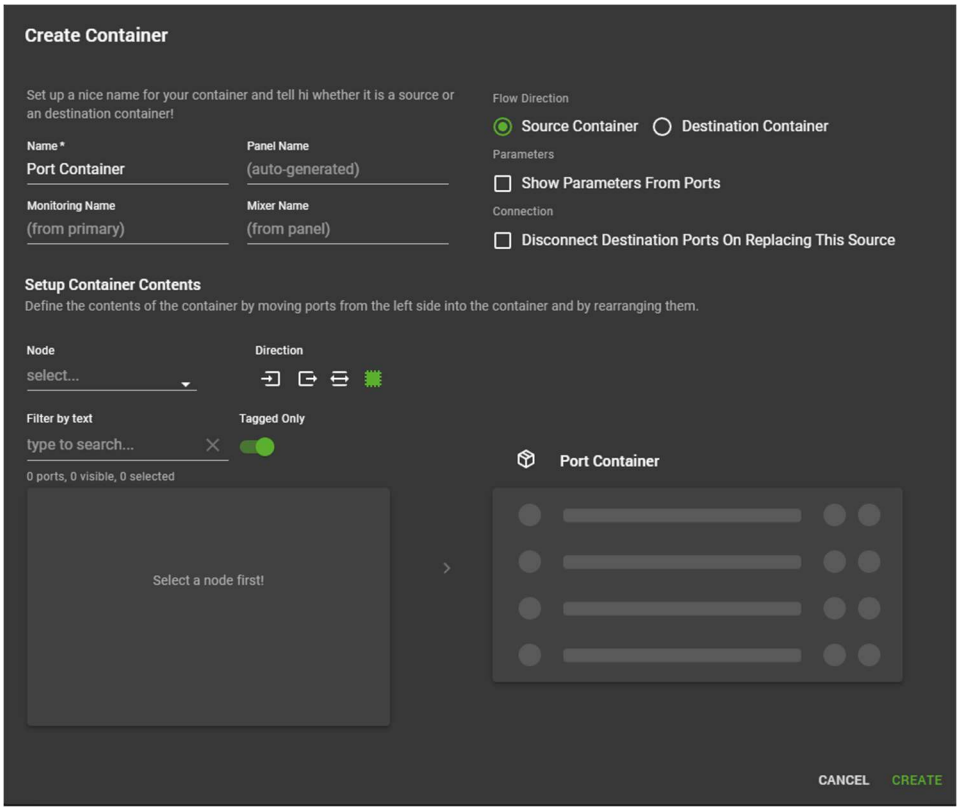
Use port containers to switch multiple signals at the same time. This can be useful for switching 2SI or Quad-Link UHD signals or setting up audio-follow-video scenarios.



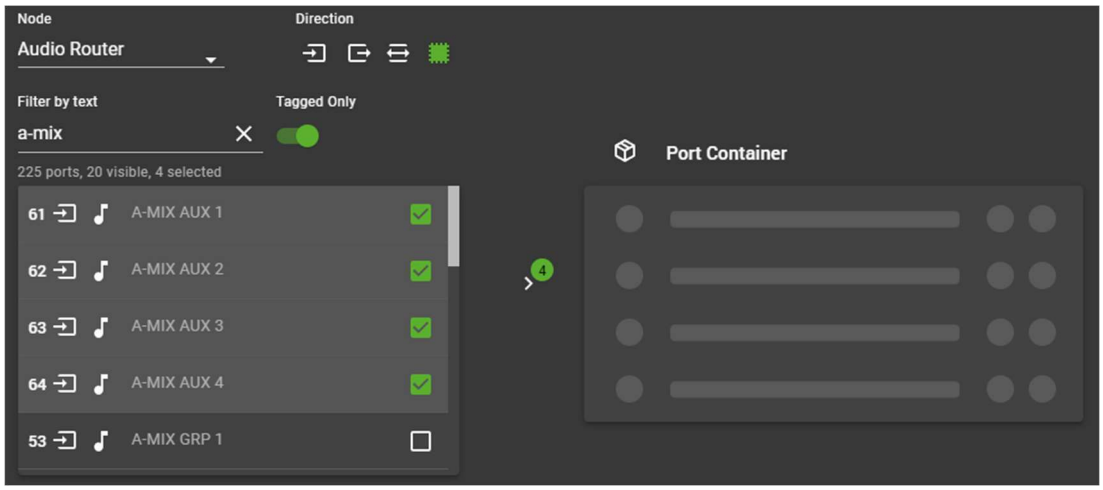
5.7.1 Creating port containers

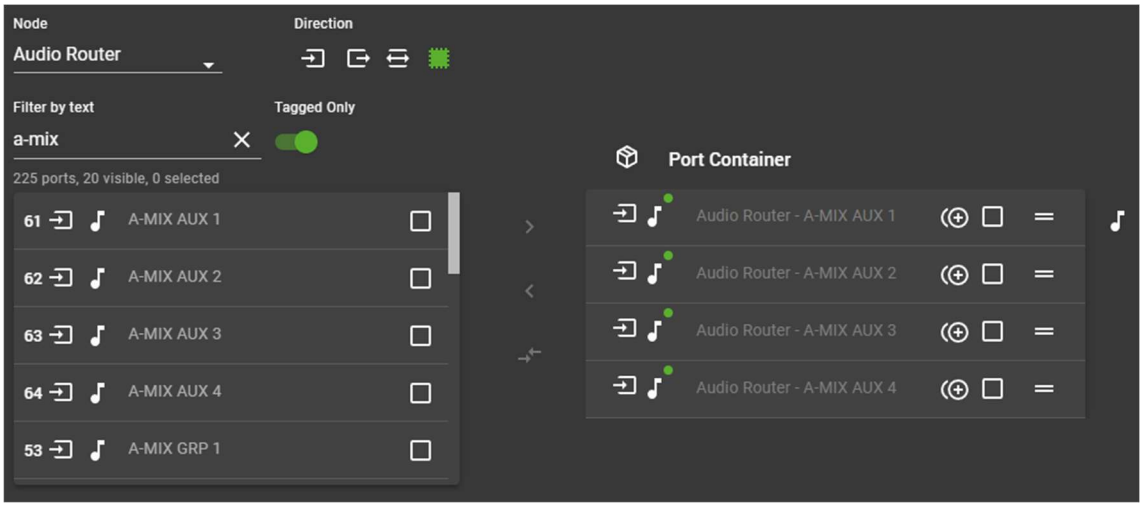
To add a new container press the button in the lower right corner. A window will open allowing to setup the container and fill it with signals.

Please provide a name for the port container and a flow direction. The flow direction will define on which side of the router panel a container will be shown.

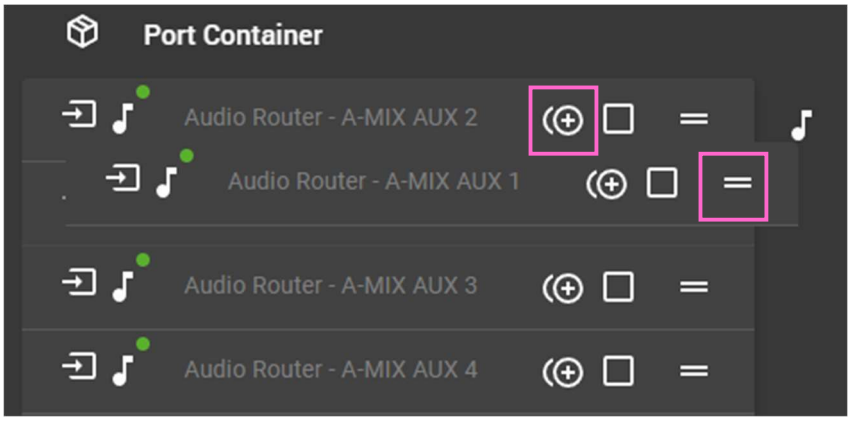


To add ports into the container please start by selecting a device on the left hand side from the Node menu. You will see all available ports of this device. You can use the text filter to filter the result list down further. Now select one or many ports from the left side and press the appearing button in the middle to add these ports to the container:

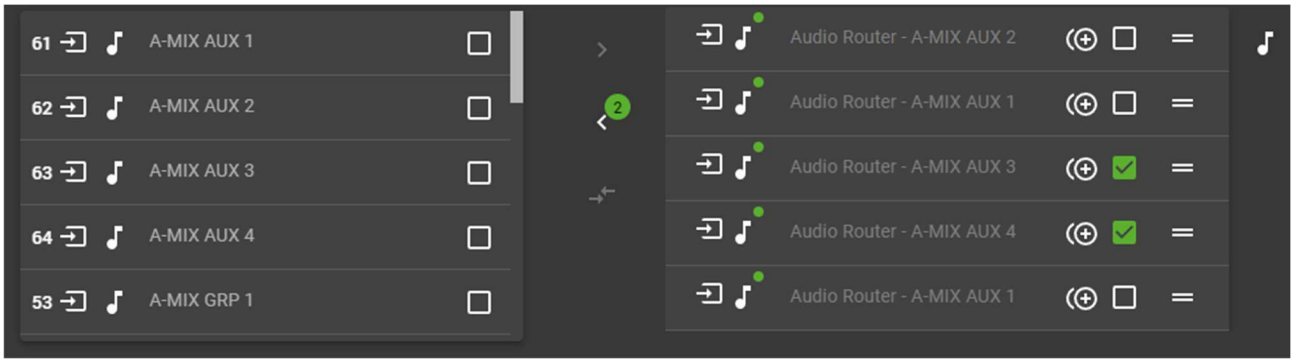




To clone a port in the container click the clone icon. You can use the drag handles to change the order of the ports.



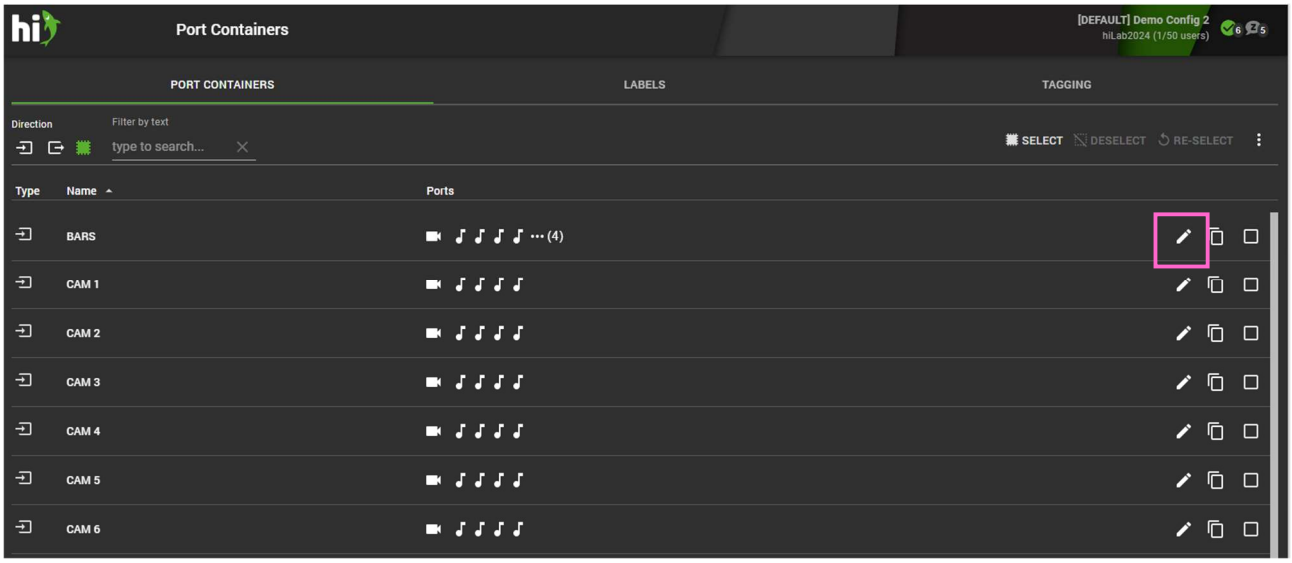
To remove ports from the container select them and press the lower button to remove.



Touch "CREATE" to create your container.

5.7.2 Editing containers

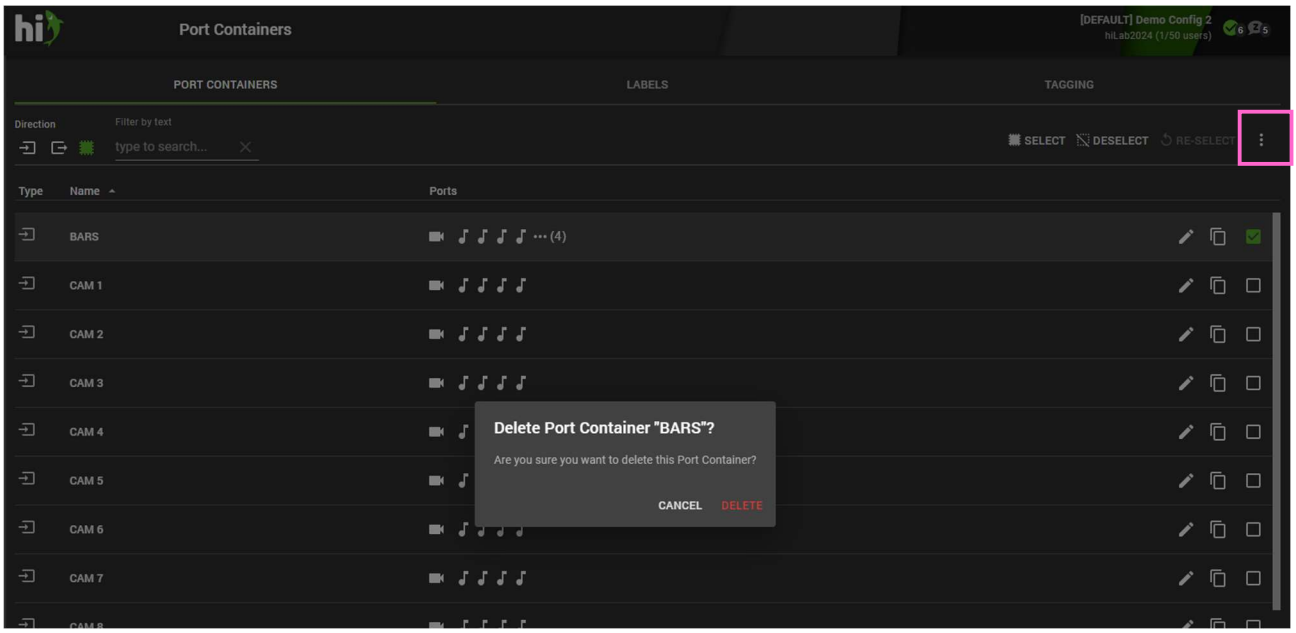
To edit a container press the edit icon at the end of the container row.



The steps to edit a container are the same as in creating.

5.7.3 Deleting a container

To delete one or multiple containers select them by checking the checkboxes and press delete on the top right corner. A dialog will ask for confirmation.



5.8 Joystick Override

Use the Joystick Override View to create CCU-Shader assignments.

5.8.1 About Joystick override

This functionality is used to configure the hi system for Shading Operation in an easy and quick way. The goal of the configuration is:

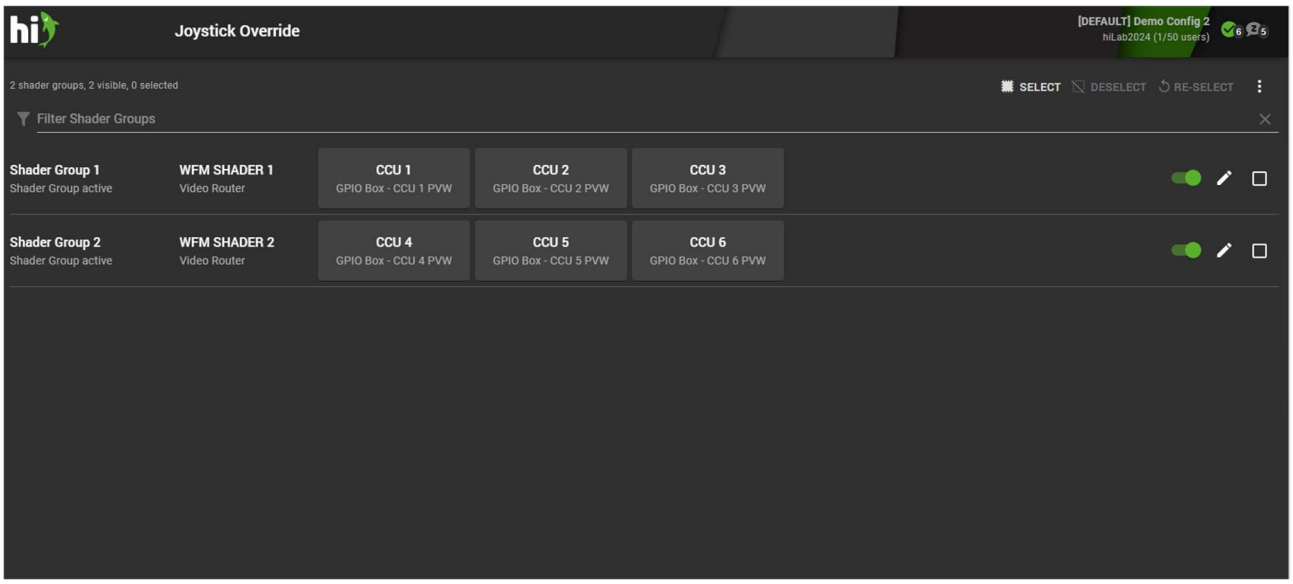
- the user presses a shader joystick on an OCP
- the OCP closes a GPO contact which is wired to a hi GPIO box
- when hi senses the GPI contact it will switch the video signal of the CCU connected to the OCP to the defined video output which will feed a monitor and/or a measurement device

hi uses a concepts of Shader Groups to achieve this:

- each Shader Group represents one shading position
- each Shader Group is related to one video output port in the system (e.g. the measurement device input or the monitor)
- each Shader Group holds multiple CCUs with the following informations
  - the relevant output of the CCU
  - the GPI Input in the hi system that is connected to the CCU
- When a GPI Input change is sensed the hi system will check if any shader group has any CCUs assigned to this GPI. If yes, it will switch the according CCU video signal to the configured output of the Shader Group.

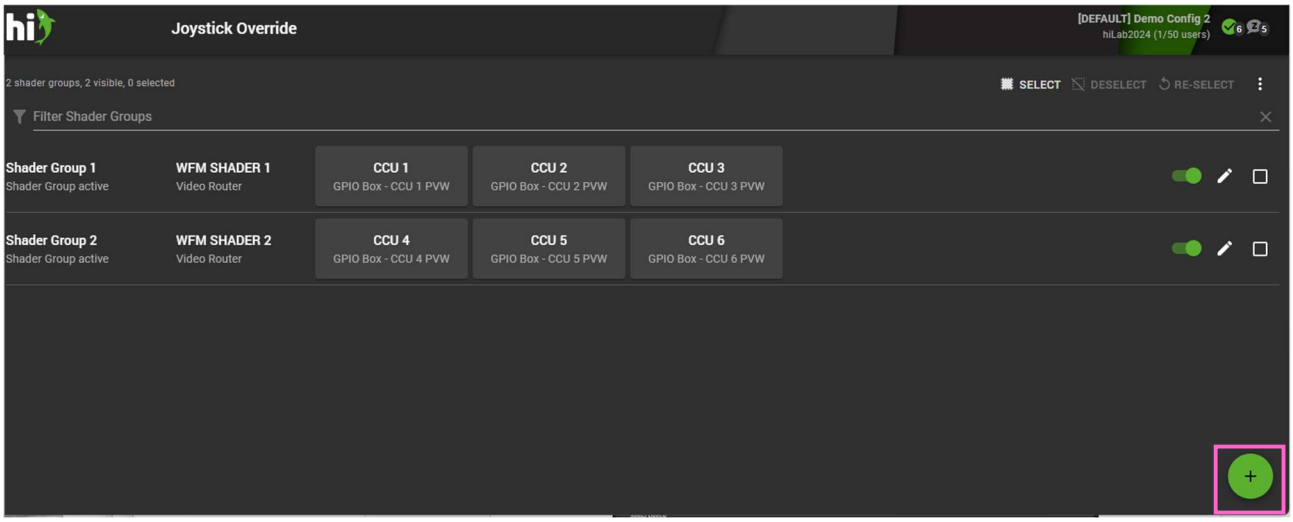
5.8.2 Overview

A system that is already configured looks like the picture below and you can see the created groups with their assignments.

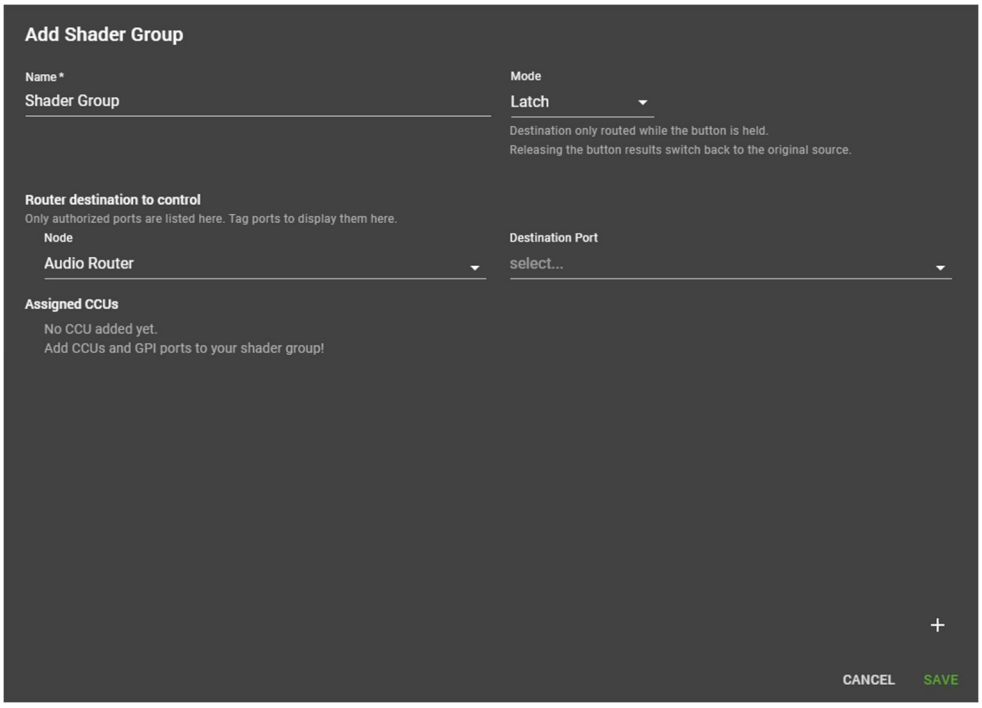


5.8.3 Creating a new shader group

To create a new shader group press the ⊕ button in the lower right corner.



A new dialog window opens. First provide a reasonable name for the Shader Group:



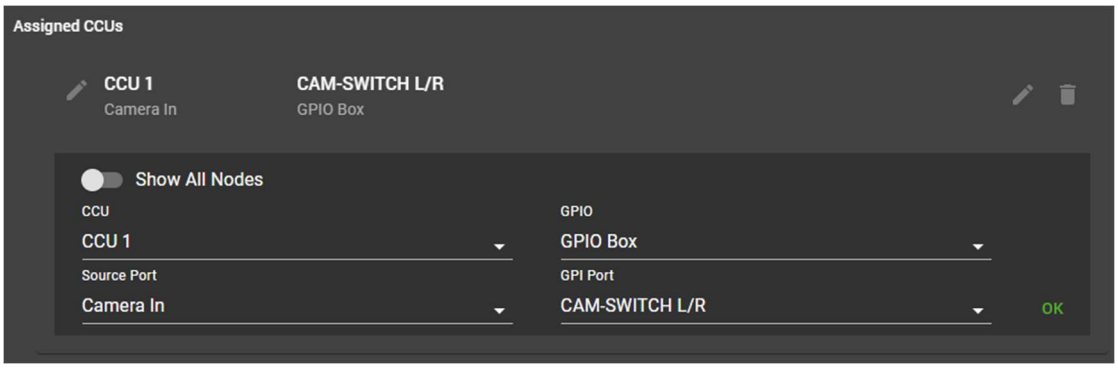
Chose a mode for this group:

Modes	Explanation
Switch	When the OCP Joystick is pressed the according signal is switched to the configured destination. When the Joystick is released nothing happens.
Latch	When the OCP Joystick is pressed the according signal is switched to the configured destination. When the Joystick is released the previous signal is restored.

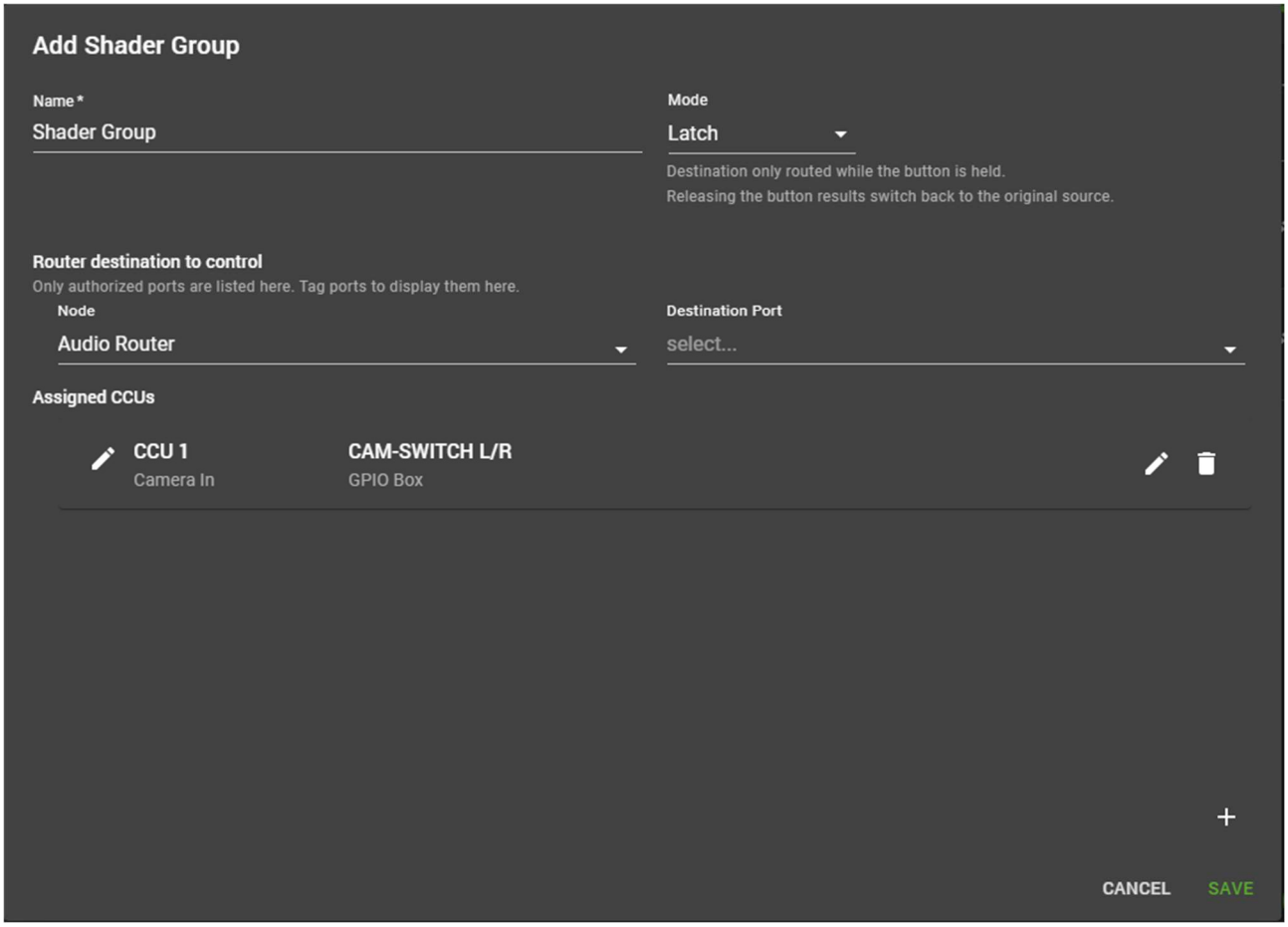
Select a routing node and an output of the node. This is the output that will be assigned to this Shader Group.

Now start adding CCUs to the Group by pressing the ⊕ button in the lower right corner.

Select a CCU from the system and an output port of this CCU. Then, select a GPI node and an GPI Input port and hit OK. Add more CCUs in the same way.



Press "SAVE" to store your new Shader Group configuration.



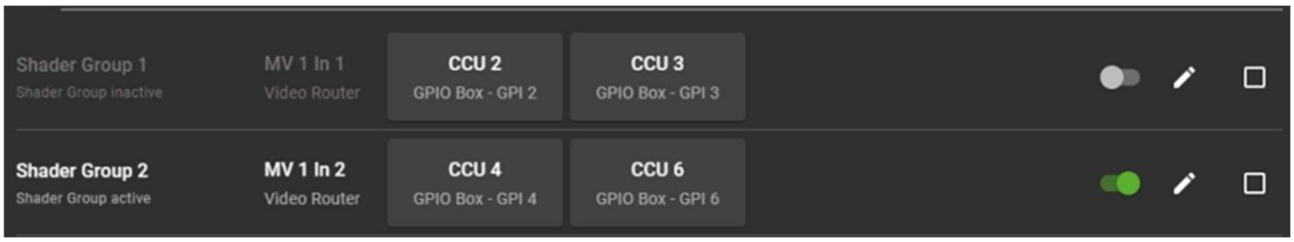
5.8.4 Reordering CCUs in Shader Groups

With the button REORDER at the right top of the page you can easily reorder the CCU assignments. After clicking the button the page changes to the following view:

Reorder the CCU assignment by drag and drop to a different Shader group and finish with the SAVE button or CANCEL to stop the action.

5.8.5 Activate / Deactivate a shader group

Sometimes it can be useful to deactivate a shader group. Deactivated Shader Groups will not react on any GPI Input assigned to CCUs in this groups. Press the slider at the end of the row to activate or deactivate a group.

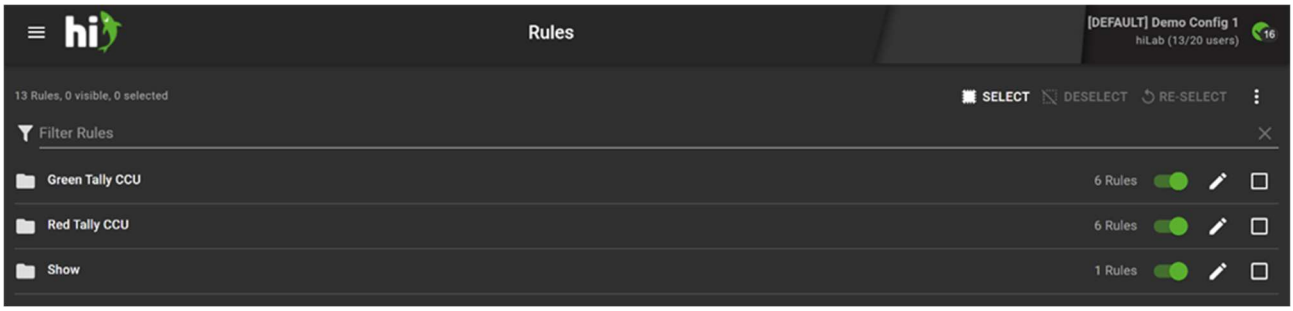


5.9 Rules Setup

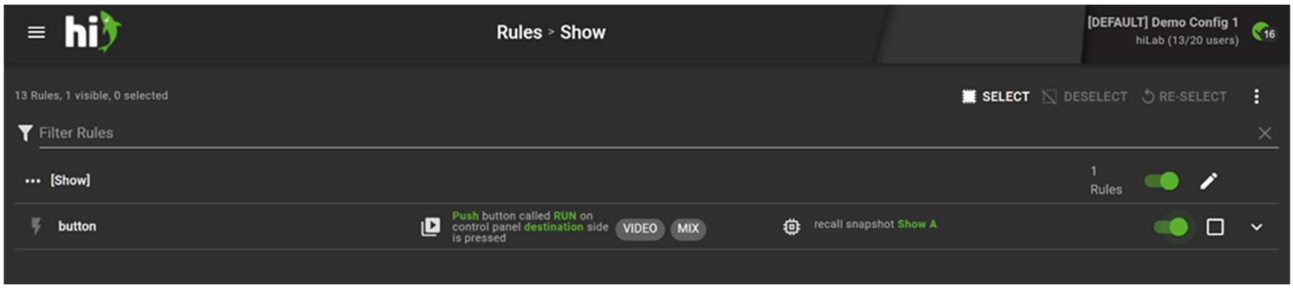
The Rules Page can be used to trigger actions by different conditions, for example Cross-points, GPI, Tally change or on a Metadata change.

> To learn more about the meaning of rules in the system have a look in Core Concepts: Rule Engine (see page 22).

Select "Rules" from the Menu to see the configured Rules in a system. The rules are sorted in Groups.

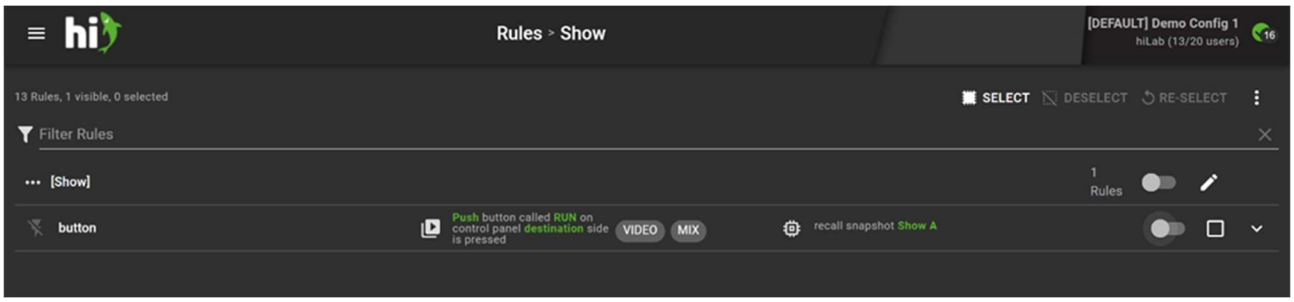


Select a group to open it and see the rules in this group.



5.9.1 Activating / Deactivating Rules

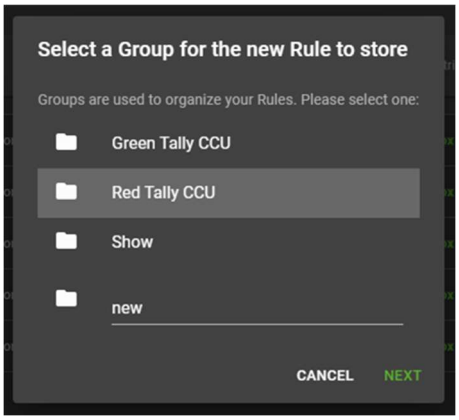
Rules can be inactive. Inactive rules will not be executed in the system, but are still part of the configuration. To deactivate or activate a rule touch the switch icon at the end of the rule line. You can also disable an entire Rule Group by pressing the switch icon at the end of a group line.



5.9.2 Creating Rules

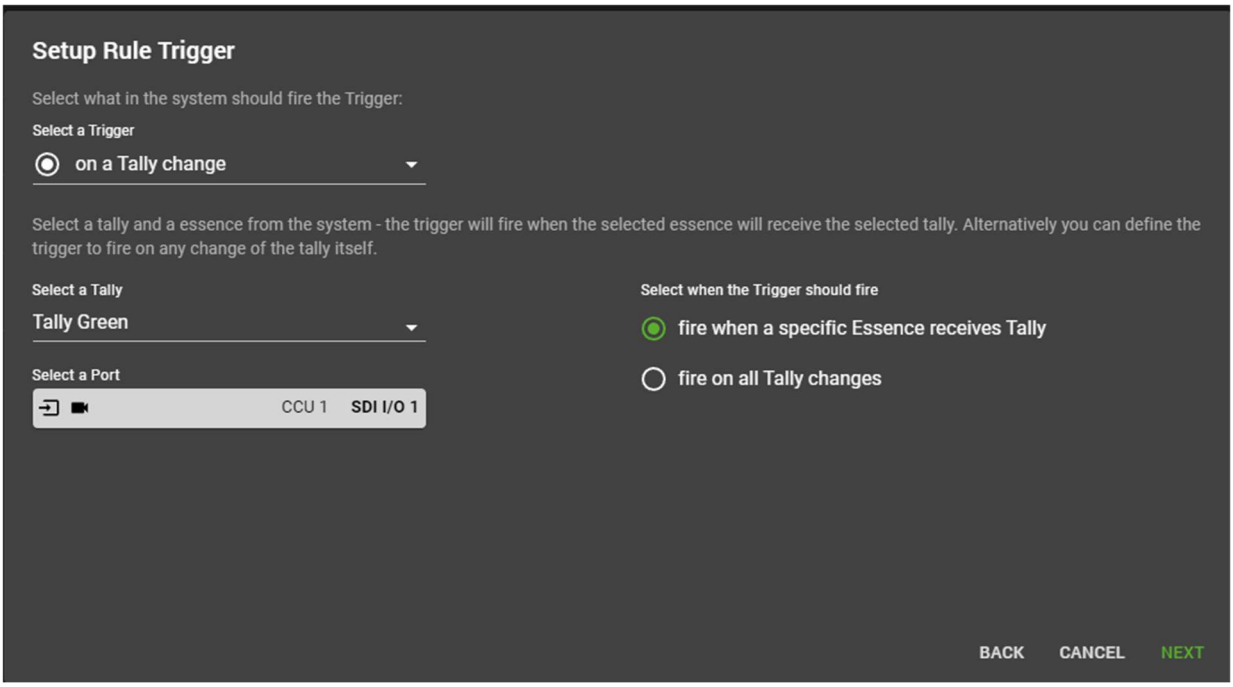
To create a rule press the ⊕ icon in the lower right corner. You will be guided through the creation process of a rule.

Please select a group for this rule. If you need, you can also create a new group at this point.



Provide a name for your rule:

Now, set up the Trigger for this rule - the event in the system that will trigger this rule. You can choose from various trigger types.



When creating a rule, you will be guided to set up a single trigger and a single action. To create rules with multiple triggers or actions, first, create a rule with a single trigger/action and add the next triggers/actions in a second step, described below.

AVAILABLE TRIGGERS

ON A CONNECTION / CROSSPOINT

This trigger monitors a defined output port in the system. It has two options on how it can fire:

type	result
fire every time when the source changes	The trigger will be fired every time the selected output is connected to a different source.
fire when a specific source is connected	The trigger will only fire when a certain input port is connected to this output port (e.g. "when PGM A is connected to transmission line TX A").

ON A GPI INPUT

This trigger monitors a GPI input port from a hi GPI box in the system. It has three options:

type	result
fire on any change	The trigger will fire each time the state of the GPI changes (it turns on or off).
fire on GPIO active	The trigger will fire each time the GPIO changes the status from open to closed (off to on).
fire on GPIO inactive	The trigger will fire each time the GPIO changes the status from closed to open (on to off).

ON A TALLY CHANGE

This trigger monitors a tally channel in the hi system. It has two options:

type	result
fire on all Tally changes	The trigger will fire every time the status of the selected tally changes (e.g. on every vision mixer cut).
fire when a specific essence receives tally	The trigger will only fire when a specified essence will receive the selected tally (e.g. RED tally on CCU 1, Camera In).

To learn more about how Tally works in the hi system please refer to Handling Tally and Labels (see page 18).

ON METADATA CHANGE

This trigger monitors a port in the system and checks whether a specified metadata key is present. When it senses the presence of the specified key it has two options:

type	result
fire on any change of metadata at this key	The trigger will fire every time the status of the specified metadata key changes (key/value-pair present/not present, value changes).

fire when a specific value is set to this key	The trigger will only fire when the metadata key is present and holds a value specified in the configuration.

ON PARAMETER CHANGE

This trigger monitors a pinned parameter in the system. It has two options:

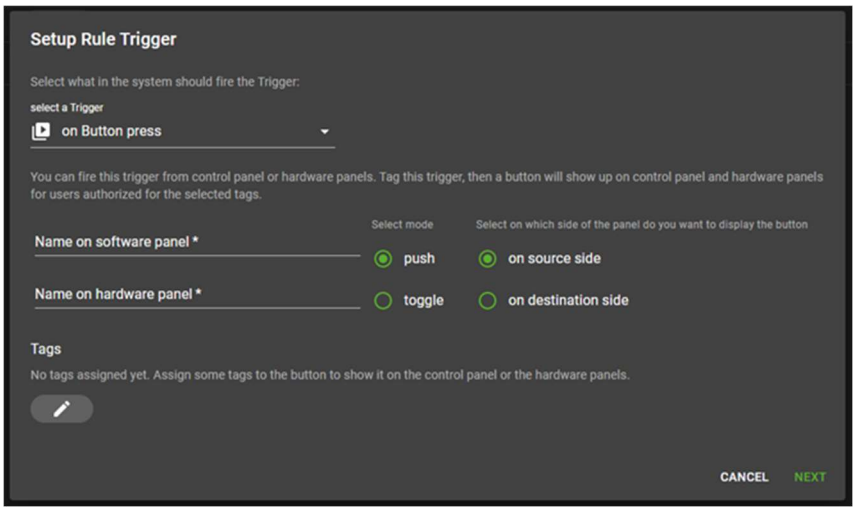
type	result
fire on any change of the parameter value	The trigger will fire every time the value of the monitored parameter changes.
fire when the parameter has a specific value	The trigger will only fire when the value of the monitored parameters holds a value that matches the provided value.

There are various modes on how the parameter values can be matched:

symbol	meaning	applies to
=	equals	all parameter types
≠	not equal	all parameter types
<	less than	numeric parameters
<=	less than or equal to	numeric parameters
>	greater than	numeric parameters
>=	greater than or equal to	numeric parameters

ON BUTTON PRESS

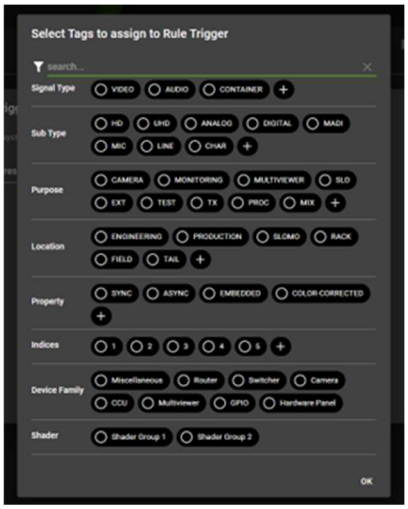
This trigger creates a button that will appear on the control panel and can be delegated to hardware panels as part of a preset. This button will behave like any other port in the hi system: it can be filtered using tags or statically pinned in a preset.



It has two modes:

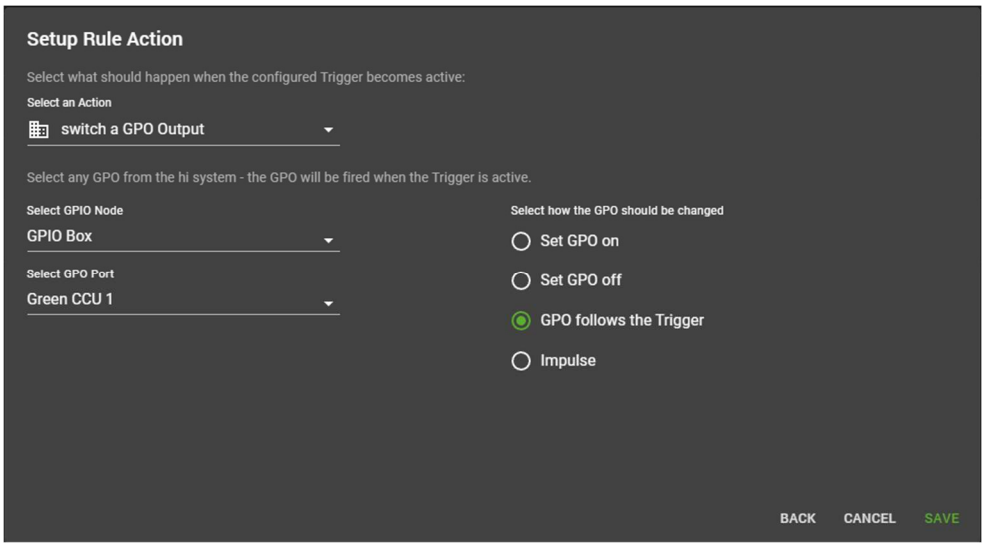
mode	result
push	The trigger will fire every time the button is pushed. The button has no on/off functionality. Use this mode to trigger one-shot actions (e.g. load a snapshot).
toggle	The button can be turned on and off. The trigger will only when the button is pressed and provide the buttons state to the configured actions. Use this mode to turn things on and off (e.g. a tally).

To appear on the router panel this trigger button must have tags assigned. Touch the "Edit" Icon to assign tags to this button.



Also provide a name that this button will carry both on the hardware and on the software panel and decide whether you want it to appear on the source or the destination side of the panel.

After you click "NEXT" you will be asked to setup the rule action:



AVAILABLE ACTIONS

CREATE A CONNECTION / CROSSPOINT

This action will connect an input of a node to an output on a node that supports routing. It has three options:

type	result
create connection when trigger is active	When the trigger has fired and is **active** the action will connect the configured source to the configured destination.
create a connection when trigger is inactive	When the trigger has fired and is **inactive** the action will connect the configured source to the configured destination.
toggle between two connections	When the trigger has fired and is active it will connect the first configured source to the destination, when it's inactive it will connect the second source.
follow source of trigger if available	

SWITCH A GPO OUTPUT

This action will close a configured GPO on a GPIO-Box. It has three options:

type	result
Set GPO on	When the trigger has fired the configured GPO will be closed, regardless of the trigger reporting "active" or "inactive".
Set GPO off	When the trigger has fired the configured GPO will be opened, regardless of the trigger reporting "active" or "inactive".
GPO follows the trigger	The GPO will be closed when the trigger is active and opened when the trigger is inactive.
Impulse	

CHANGE A TALLY

This action will change the status of a specific tally on a specific essence port in the system. It has three options:

type	result
Tally follows the trigger	The Tally will be set to active when the trigger is active and set to inactive when the trigger is inactive.
Set Tally on	When the trigger has fired the configured Tally will be set to active, regardless of the trigger reporting “active” or “inactive”.
Remove Tally	

ACTIVATE / DEACTIVATE A TALLY

This action will change the status of a specific tally source. It has four options:

type	result
toggle Tally Source with trigger	The Tally Source will be set to active when the trigger is active and set to inactive when the trigger is inactive.
toggle Tally Source with trigger inverted	The Tally Source will be set to active when the trigger is inactive and set to inactive when the trigger is active.
enable Tally from this source	When the trigger has fired the configured Tally source will be set to active, regardless where the trigger reports "active" or "inactive". This means that this source will influence the tally in the system.
disable Tally from this source	When the trigger has fired the configured Tally source will be set to inactive, regardless where the trigger reports "active" or "inactive". This means that this source will not influence the tally in the system.

CHANGE METADATA

This action will insert a key/value-pair of Metadata on a specific essence port in the system. It has three options on how to execute:

type	result
Metadata follows trigger	The configured Metadata key/value-pair will be inserted onto the selected essence when the trigger is active and removed when the trigger is inactive.
Set Metadata	When the trigger has fired the configured Metadata key/value-pair will be inserted onto the selected essence, regardless where the trigger reports "active" or "inactive".
Remove Metadata	When the trigger has fired the configured Metadata key/value-pair will be removed from the selected essence, regardless where the trigger reports "active" or "inactive".

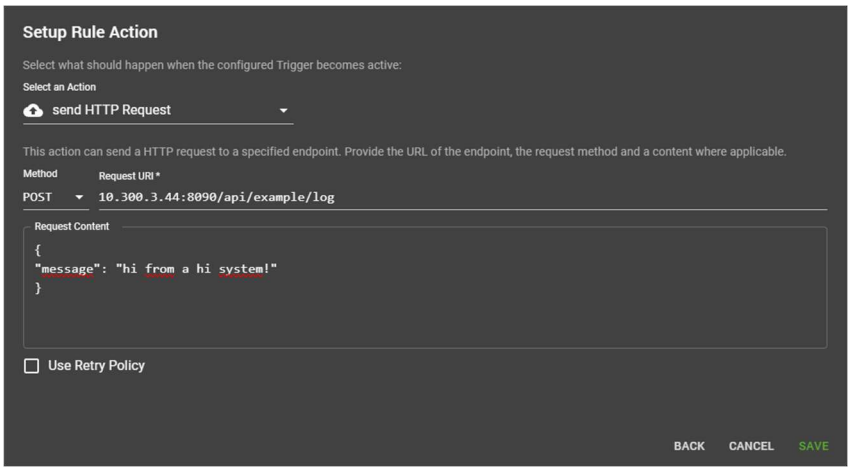
CHANGE A PARAMETER VALUE

This action will change the value of a specific pinned parameter in the system. It has three execute options:

type	result
Set parameter value when Trigger is active	When the trigger has fired and is now active the selected parameter will be set to the defined value.
Set parameter value when Trigger is inactive	When the trigger has fired and is now inactive the selected parameter will be set to the defined value.
Toggle between two values	When the trigger has fired and is now active the selected parameter will be set to the first defined value and when the trigger is inactive the parameter will be set to the second defined value.

SEND A HTTP REQUEST

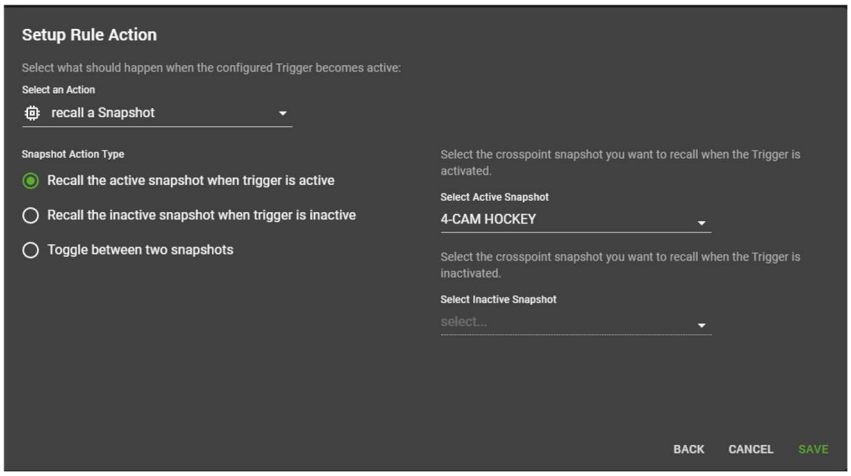
This action will send a HTTP Request to a configured endpoint.



Please provide a request URI and a method. Depending on the method you can also provide a content for the request.

RECALL A SNAPSHOT

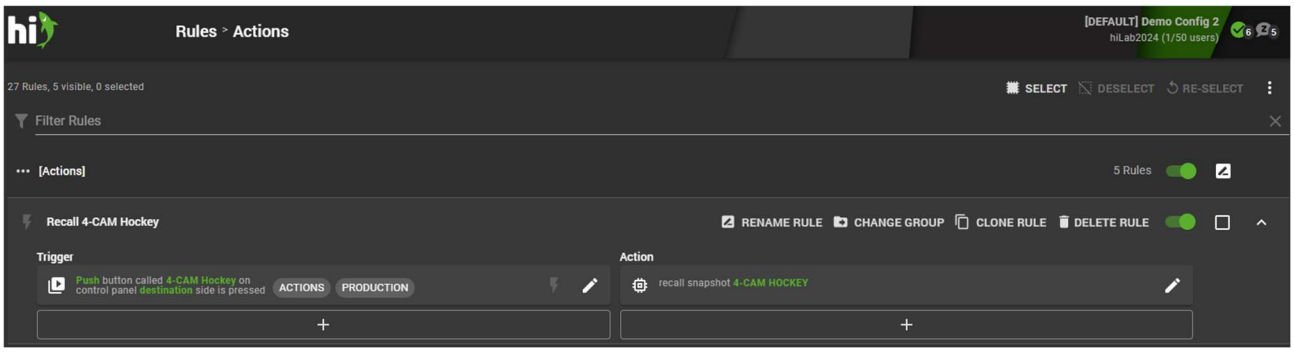
This action will recall a configured snapshot. Select a snapshot to load from the list of available snapshots in the system.



Touch „Save“ to create your new rule.

5.9.3 Edit Rules

Open the rule group by touching it and expand the rule by touching the arrow at the and of the rule row:

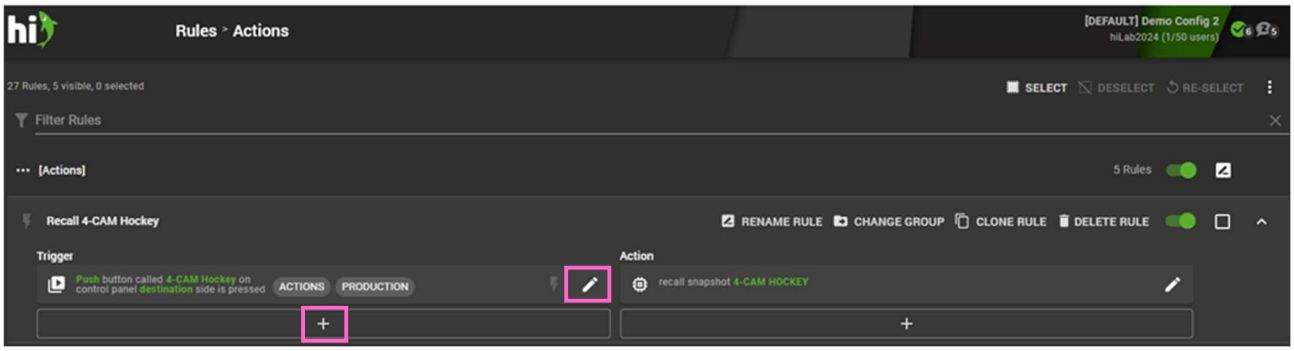


Various options are presented:

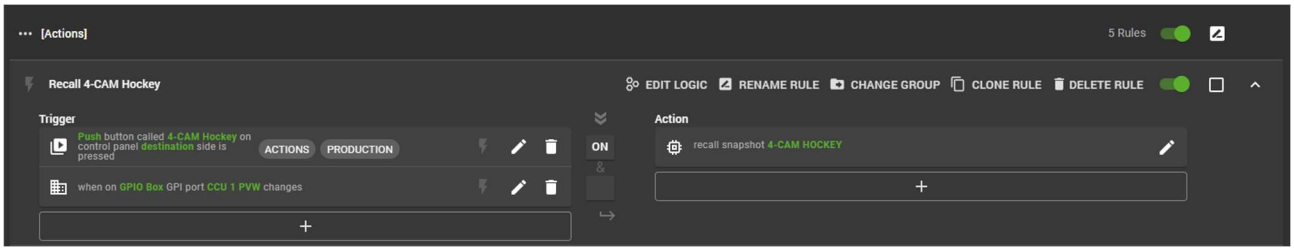
Option	Action
Rename Rule	Provide a new name for this rule.
Change Group	Move the current rule to another group.
Clone Rule	Clone the selected rule with all of its triggers and actions into a new rule.
Delete Rule	Delete the current rule.

EDITING TRIGGERS

To edit an existing trigger, touch the Edit Icon at the end of the trigger representation. For further information on the available triggers and their configuration, refer to Available Triggers (see page 114). Rules can evaluate multiple triggers being evaluated before actions are executed. To add another trigger to an existing rule, touch the plus icon below the trigger.

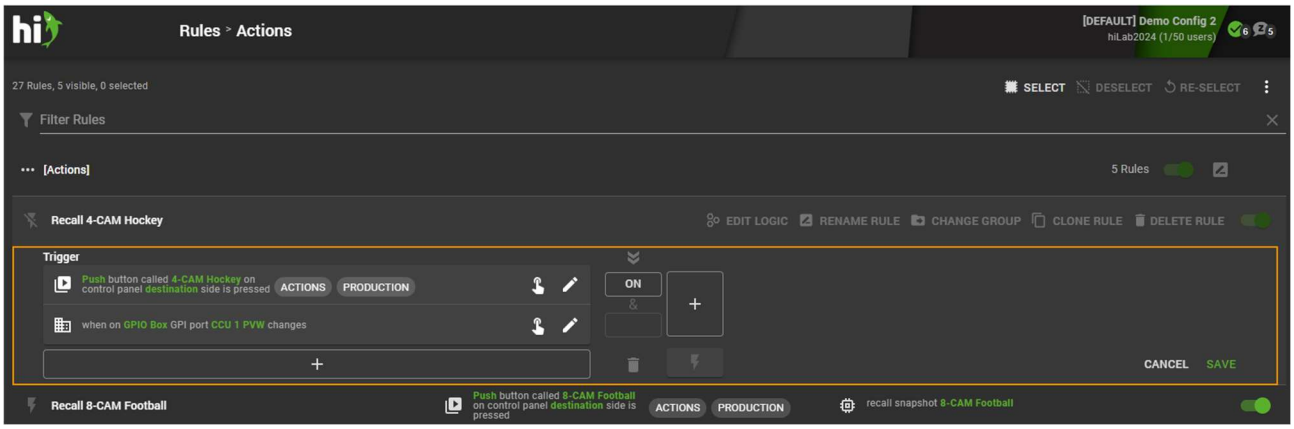


You will be presented with the available triggers and their configuration. After having configured the additional trigger, you will see it added to the list of triggers of the selected rule:



EDITING TRIGGER LOGIC

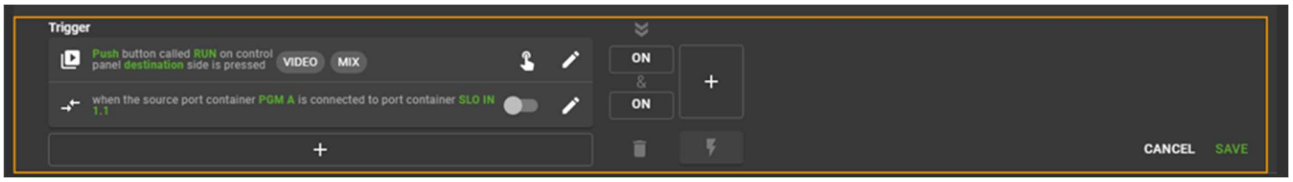
Once a rule uses multiple triggers, a logical combination between these triggers must be configured. To do so, touch the "Edit Logic" button on top of the expanded rule. The screen will change to the Logic Edit Mode:



To configure logical relations between the provided triggers, use the columns to the right side of the triggers. Items in each column can be turned to "ON", "OFF" or "empty", defining how the according trigger will be evaluated within this column. Triggers will be evaluated in an AND-manner inside each column. The result of each column is then OR- combined to calculate the final state of the rules trigger block.

EXAMPLE 1: AND-COMBINE TWO TRIGGERS

To combine two triggers in an "AND"-fashion, turn the triggers for both boxes to "ON" in the first column. Make sure there is no other columns:

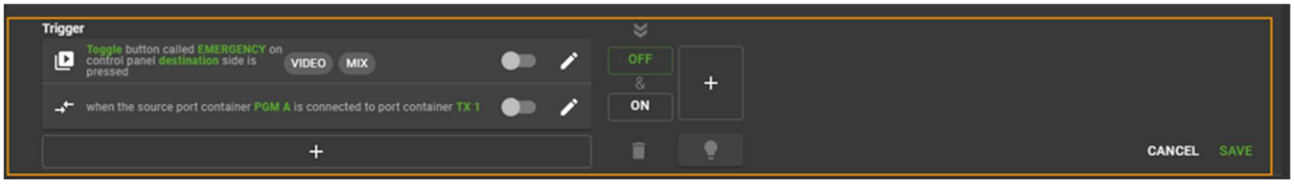


EXAMPLE 2: OR-COMBINE TWO TRIGGERS

To combine two triggers in an "OR"-fashion, turn the box for the first trigger in the first column to "ON", add a second column and set the box for the second trigger in the second column to "ON":

EXAMPLE 3: AND-COMBINE USING SPECIFIED STATES

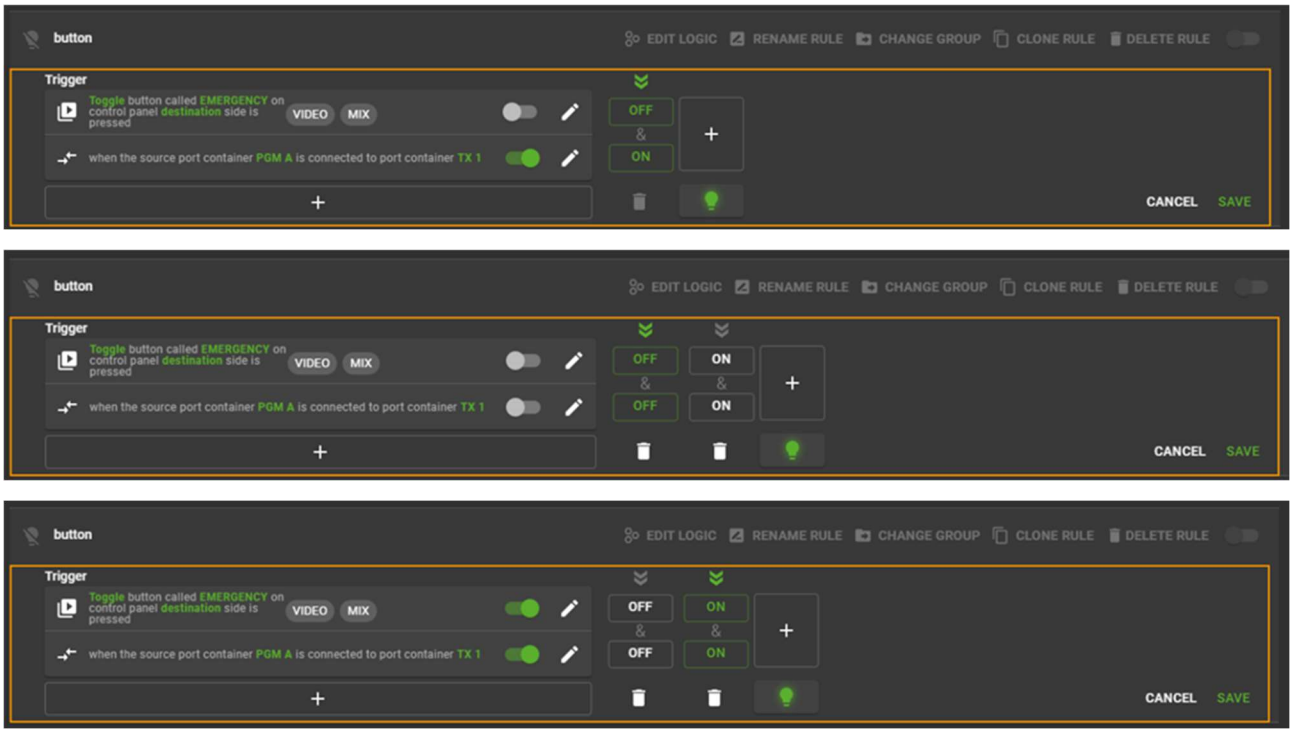
You can use the "OFF" state to ensure, that a specific trigger is NOT active, for the evaluation of the rule:



In this case the trigger will only fire, if the button named "EMERGENCY" is not pressed, and the Port Container "PGM A" is connected to destination "TX 1".

TESTING TRIGGER LOGICS

When in the logic editing mode (indicated by the orange border), the result of the configured logic can be tested, without actually changing the status of the triggers in the system itself: stateful triggers will show a switch. Changing this switch is simulating the state of the trigger and will show you what would happen if this trigger became active. Event-based triggers will show a "touch-here" icon, providing a simulation of the event.
To see the result of an simulation, observe the icon in the lower right of the trigger columns:



Combining event-based and stateful triggers

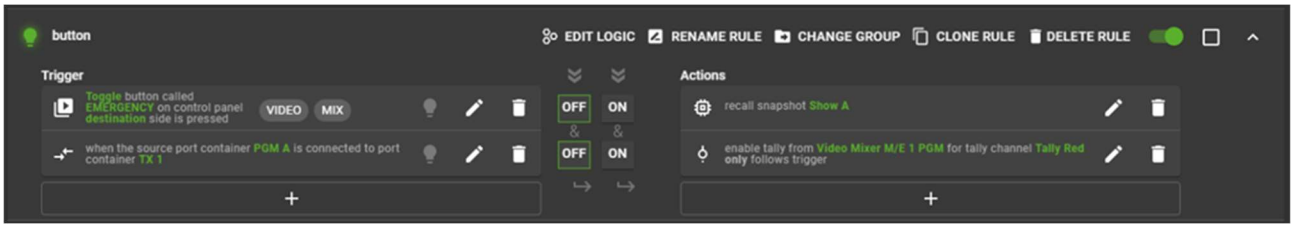
When combining multiple stateful triggers in a rule, the rule itself will be stateful and stateful actions can be used. When combining stateful and event-based triggers in a rule, the rule itself will become event-based and only actions that don't require a state can be used. For further information please refer to Rule Engine (see page 22).

To apply changes to the trigger logic, touch "SAVE", to discard the changes, touch "CANCEL".

EDITING ACTIONS

To edit an existing action, touch the Edit Icon at the end of the action representation. For further information on available actions and their configuration, refer to Available Actions (see page 24).

Rules can contain multiple actions that will be executed once the triggers have been evaluated and the rule fires. To add another action to an existing rule, touch the plus icon below the action. You will be presented with the available actionsand their configuration. After having configured the additional action, you will see it added to the list of actions of the selected rule:



If a rule using multiple actions is fired, hi will attempt to fire all actions at the same time. The order of actions inside a rule is irrelevant. Depending on the complexity of configured actions, the execution of all actions may take variable amounts of time.

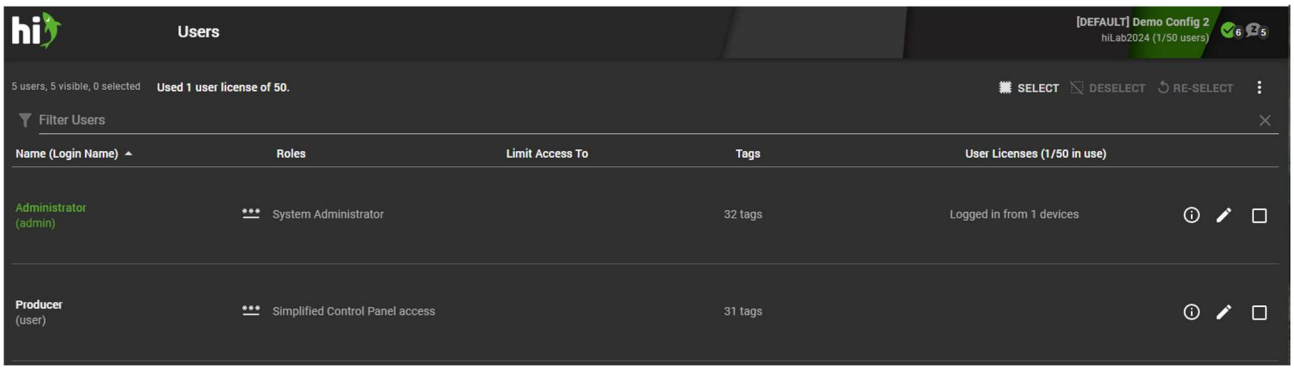
5.10 User Management

Create or edit user and their access rights in the system.

> To learn more about how user management is handled in hi please refer to Core Concepts: User Rights Management (see page 26).

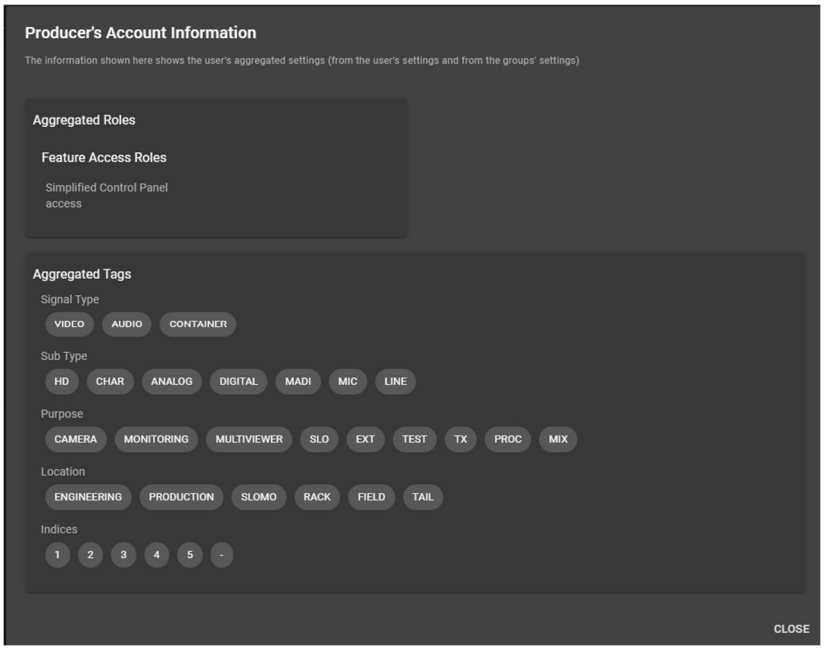
Click on "Users" in the left hand side menu to open the User List. It will display all the currently configured users.

> The system's default configuration contains an administrative user with all access rights. Adding additional users might be limited by the numbers of users granted in the according license package.



5.10.1 Account Information

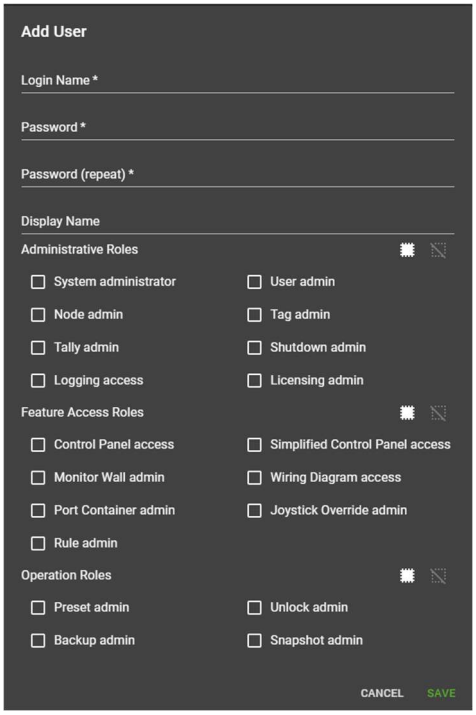
By touching the ⓘ icon besides the User you can view the account information with all the currently assigned roles and tags to this User. Assigned roles also define the access rights the User has in the system.



5.10.2 Adding a new User

To add a new user into the system press the button in the lower right corner.

Provide a login name (will be used in the login field), a password and an optional Display Name (this will be the name shown in the user interface). Also, define which Roles the user should have in the system.



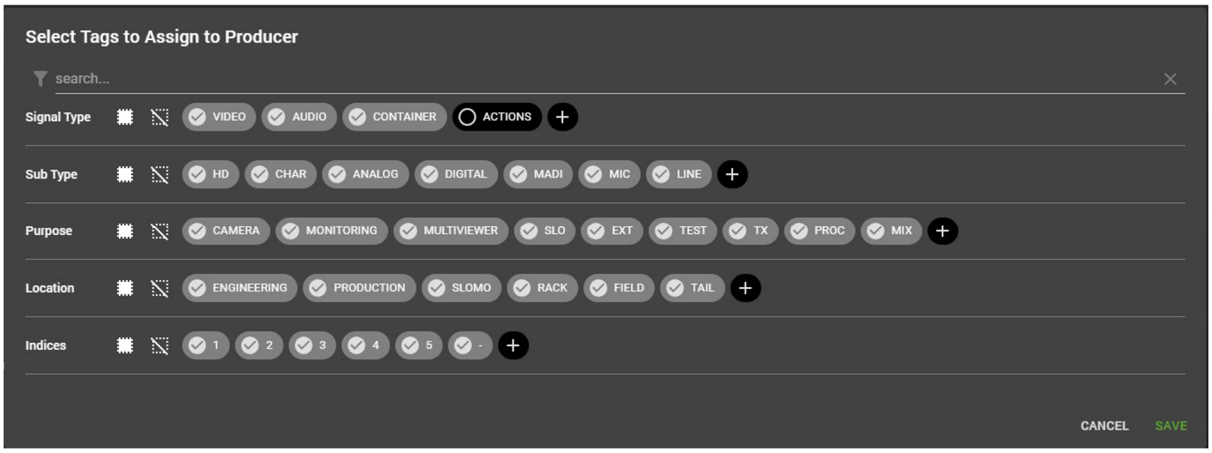
5.10.3 Editing a Users access rights

ROLES

To change the roles of a user select the according entry and touch "Edit" icon on the right. You can now add or remove roles.

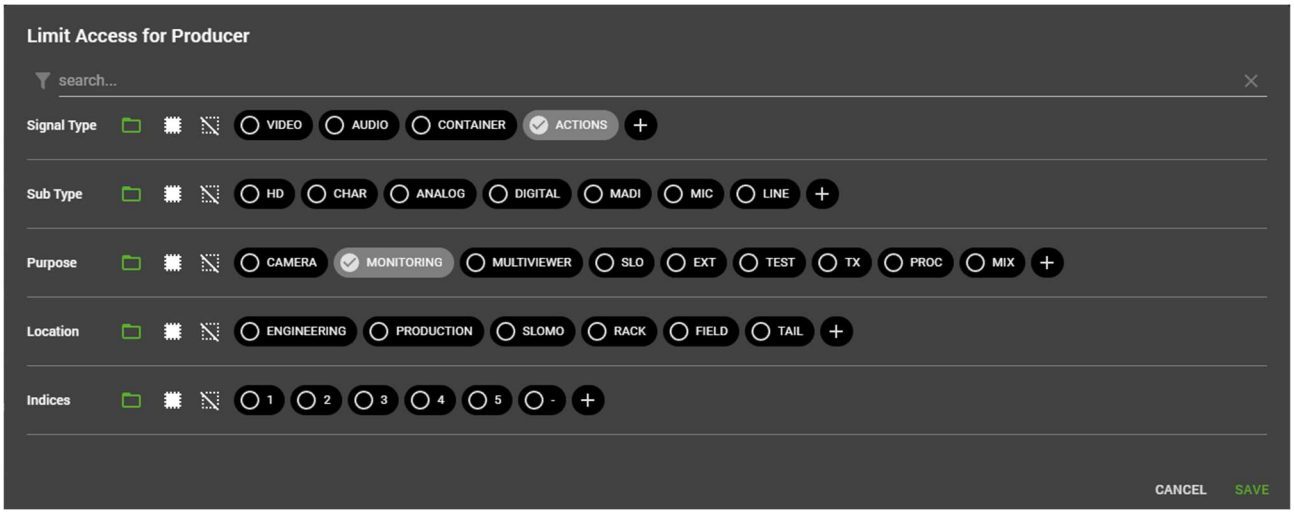
ACCESS TO PORTS

The access to ports in the system is defined by assigning Tags to the user. Select the according user entry and touch "Assign Tags".



LIMIT ACCESS OF USER

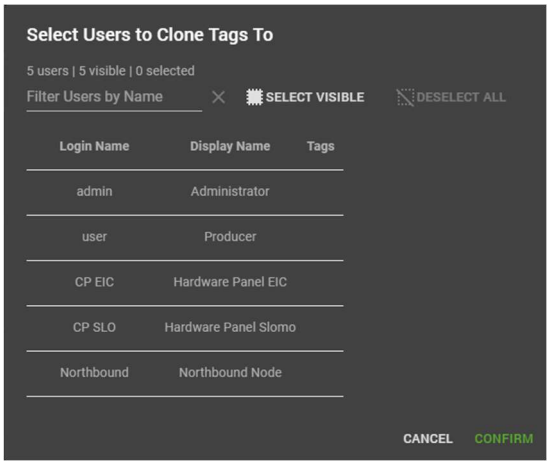
You can also restrict the access of a User to certain by selecting the User and then touching “Limit Access”. Select the tags you want to limit and then touch “Save”.



The restricted tags are now displayed in the User row.

CLONING TAGS FROM ONE USER TO ANOTHER

To quickly copy the access rights from an existing user to another select the existing user from the list and touch "Clone Tags".



DELETE USER

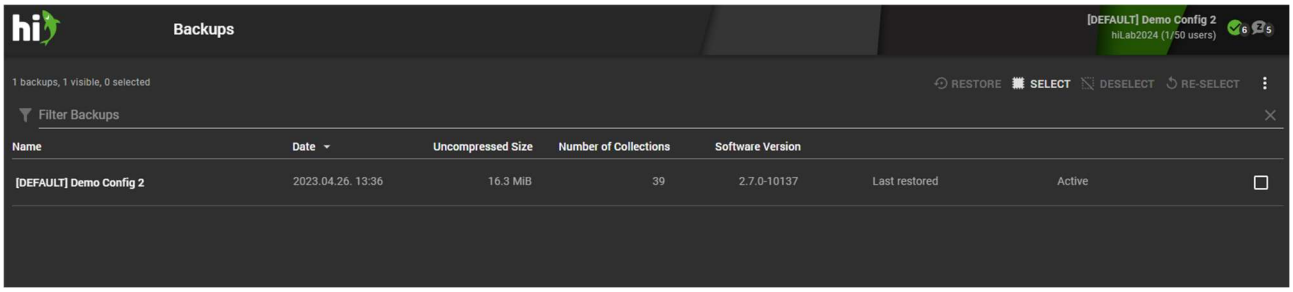
To delete a User account select the User and the touch “Delete”. Confirm the delete-query to permanently delete the User from the System.

5.11 Backups

How to store and retrieve system configurations in hi.

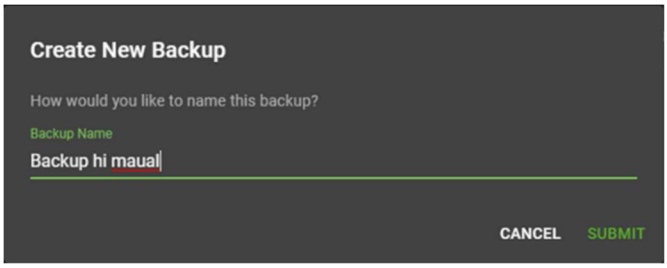
> To learn more about differences between Backups and Snapshots please refer to Storing and Retrieving Configurations (see page 27).

To access the backups select "Backups" from the menu on the left side. The system will display the list of saved backups.



5.11.1 Creating a new backup

To store the current configuration of the hi system create a new backup by touching the icon in the bottom right corner.



Depending on the size of the system creating a backup can take a few seconds.

5.11.2 Restoring a backup

To restore a previously saved backup select the according entry from the list and select "Restore" from the top menu. Depending on the size of the system restoring a backup can take a few seconds.

> When restoring a backup the current configuration of the hi system is removed and replaced by the configuration from the backup. This includes wiring, tally, user rights configurations. Please be careful and make sure to save a backup of the currently loaded configuration before reloading a backup if you want to return to the current configuration at a later time.

5.11.3 Downloading and uploading backups

Backups can be downloaded to the operators computer for backup purposes or to transfer configurations from one hi system to another.

To download a backup select an entry from the backup list and touch "Download" in the top right corner. The selected backup will download as a file in your web browser.

To upload an existing backup from your computer touch "Upload" in the top right corner. Depending on your operating system a file selection dialog will open. Select a hi-backup file here. The file will be uploaded and added to the list of available backups.

5.11.4 Update

This option allows you to add recent changes done to the configuration to an existing Backup without ceating a new Backup.

5.11.5 Delete

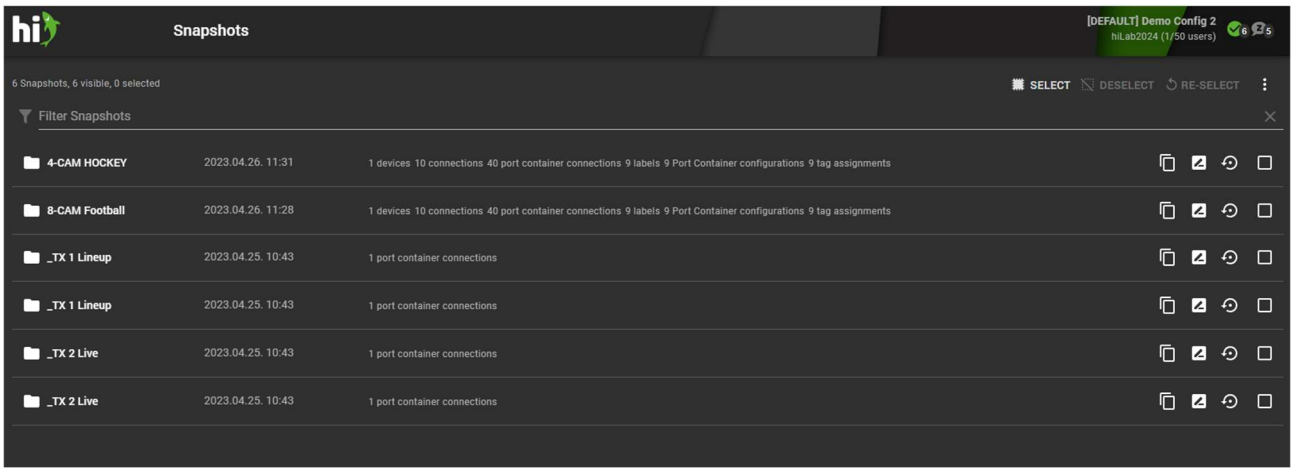
This will delete the selected Backup(s).

5.11.6 Clear System Configuration

This option will rmove the existing system configuration with nothing left but the default set of tags.

5.12 Snapshots

Snapshots save the current crosspoints in a node so they can be recalled a later time. To open the list of snapshots select "Snapshots" from the menu on the left hand side.



5.12.1 Creating a new snapshot from the Snapshots view

To create a new snapshot touch the button in the bottom right corner. A dialog will appear asking for a name for the snapshot. A new empty snapshot will be created.

> This method is useful to prepare empty snapshots for later use. In most cases you will add content to new or existing snapshots from the control panel. Please refer to the Control Panel (see page 39) description.

5.12.2 Existing Snapshots

For every Snapshot you see the name, time and date when it was created, the number of Nodes and the amount of crosspoints included in the Snapshot.

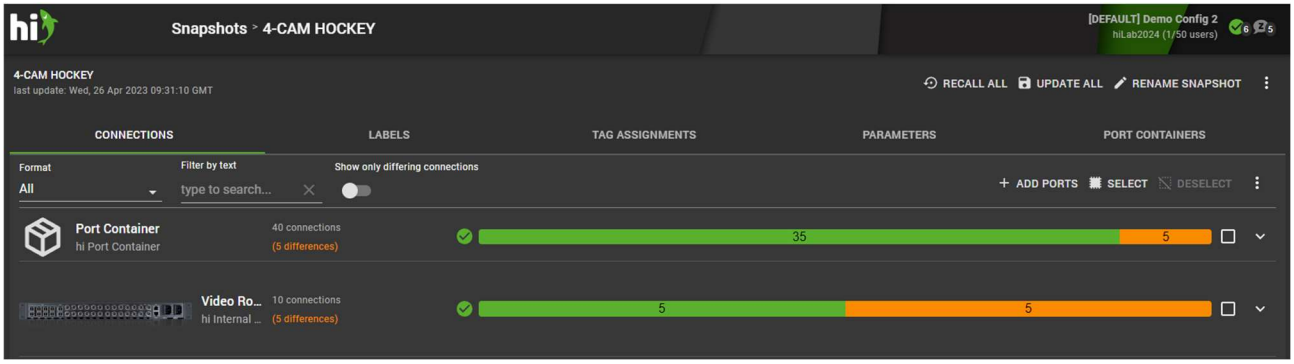
At the top of the page you have an overview of the created Snapshots and you can select and deselect all visible Snapshots or delete the currently selected or all Snapshots. You also have the option to filter for Snapshots by text or numeric value.

5.12.3 Reviewing a snapshot

Touch the folder icon of a snapshot to open it. The selected snapshot will be opened showing its contents.

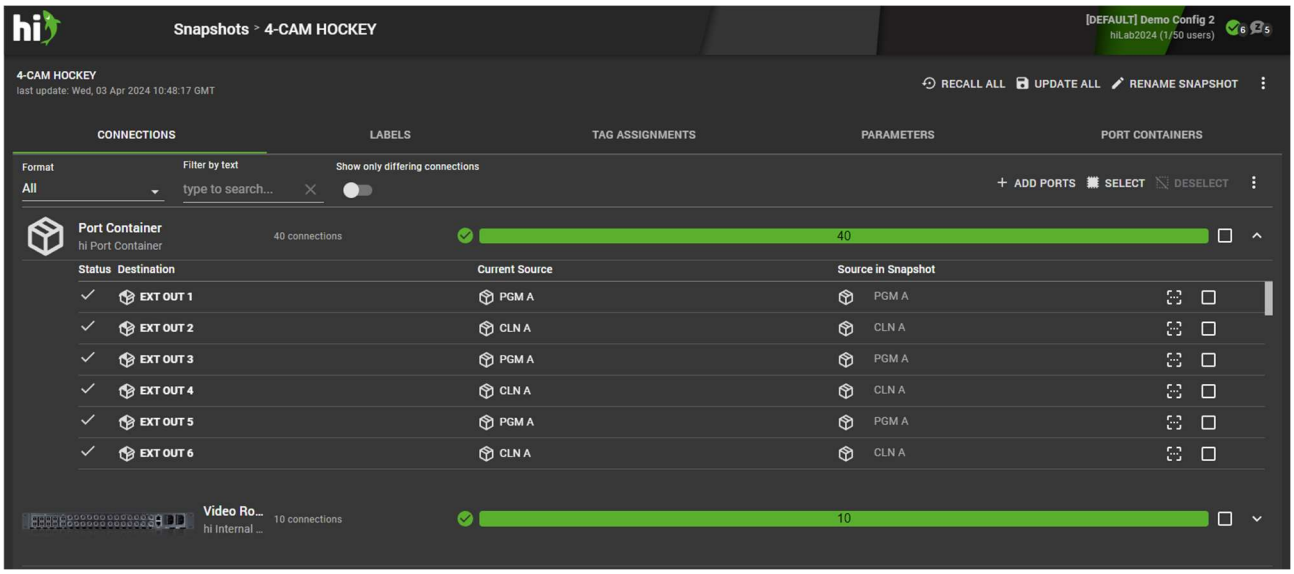
Use the tabs to view different aspects of the snapshot. Use "Recall All" to recall all elements of the snapshot, use "Update All" to update the elements saved in the snapshot with their current live state. You can also “Rename Snapshot” or “Delete” selected snapshot.

For all types of elements contained in the snapshot, a green/orange bar will indicate the current loading state of the items.



> The indication bar in the example picture shows, that of 40 stored connections, 35 are currently active (the connection in the live system equals the stored connection in the snapshot) and 5 connections are stored in the snapshot, but are different in the live system. Selecting "Recall All" would trigger these connections in the live system, so that the bar will be completely green.

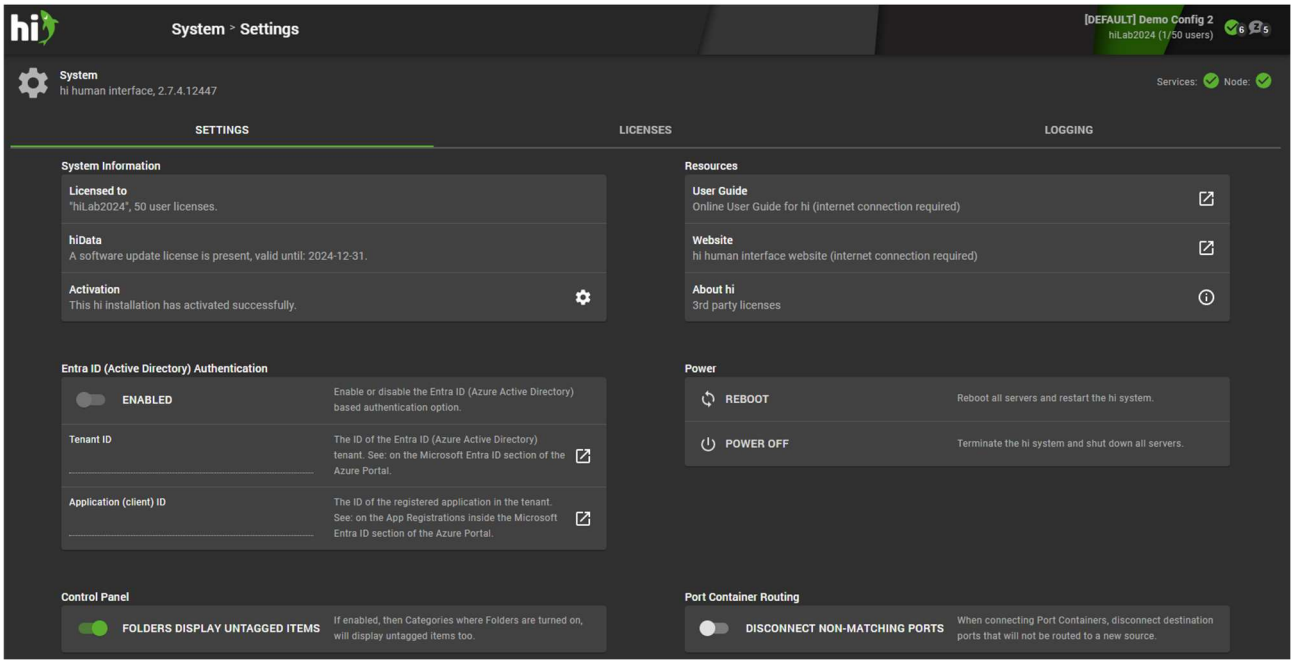
Clicking the expand icon at the end of a line will reveal the individual items stored in the snapshot:



From this list, also individual ports can be selected and recalled (or updated).

5.13 System

Text

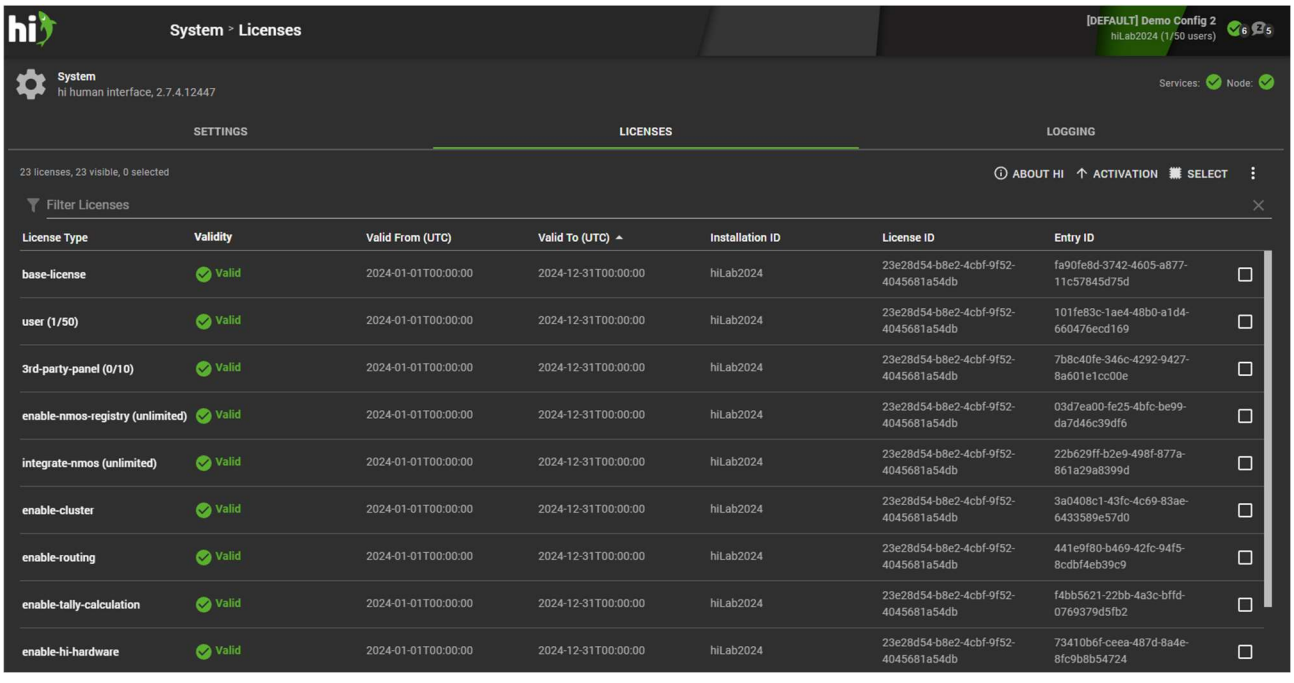


5.13.1 Licenses

LICENSE ADMINISTRATION

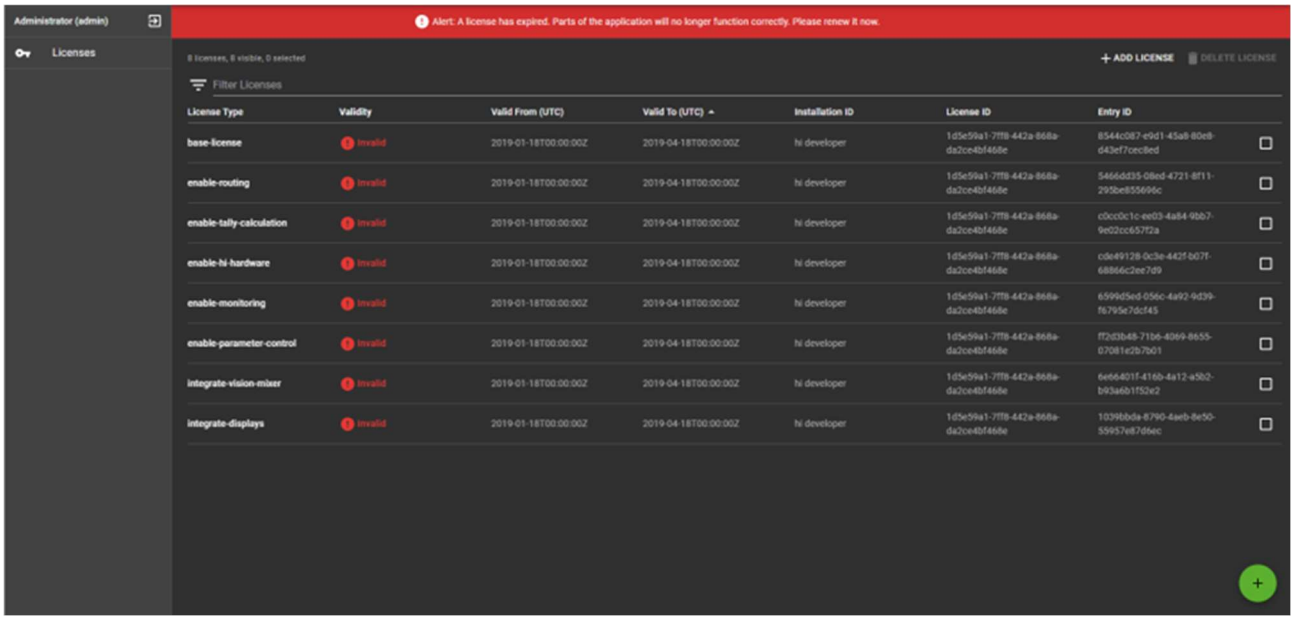
Review the status of your hi license and add new license keys.

Open the license page by navigating to the "Licenses" tab. In the list displayed you can review each license item in the hi system and also its expiration date.



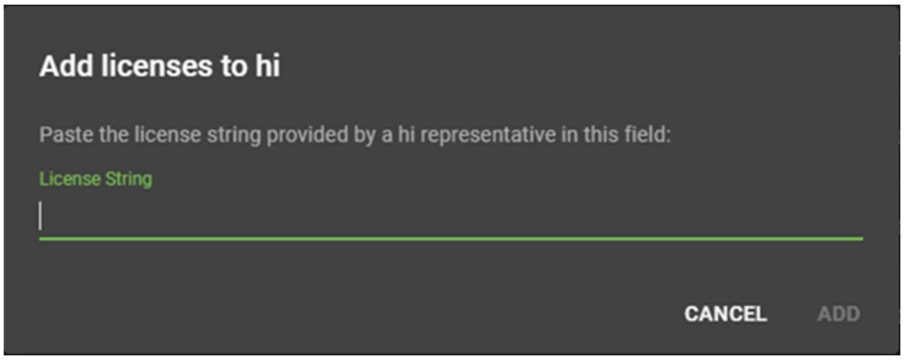
EXPIRATION OF LICENSES

The hi system will display a warning message 30 days before the expiration of a system license. In case this license is required for your further operation please contact a hi representative for a new license to extend the expiration date. When the base-license is expired the hi system will stop all operations and show an according message.



ADDING A LICENSE

To add a license you can use the ADD LICENSE button at the top of the page or use the + symbol at the bottom. A new window opens and you have to enter the license string and then confirm it with ADD or click CANCEL to stop the action. With the button DELETE LICENSE you can delete the selected licensed feature or an expired feature.



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