XHub-VIA v2

Version 1.3 | June 2022

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What's New?

This Technical Reference Manual has not been subject to changes related to new features for release 1.3.

1. Introduction

About the XHub-VIA Switch

The XHub-VIA is an EVS switch that can be used for 2 use cases:

- as IP aggregator
- as XNet-VIA switch

XHub-VIA IP Aggregator

The XHub-VIA IP Aggregator enables to have a single uplink to the Live IP fabric.

It makes it possible for the XT-VIA/XS-VIA server to support single link UHD-4K streaming in ST2110 and also very dense 1080p SLSM configurations that could surpass the native 10Gbps bandwidth of the ports on the server.

This Aggregator is completely transparent to the Live IP network and all configuration on the Multicast streams is managed by the Multicam running on the EVS server.

In case of 2022-7, a redundant link can be put in place to enable this functionality.

XHub-VIA XNet-VIA Switch

The XHub-VIA XNet-VIA switch allows to interconnect XT-VIA and XS-VIA servers and to exchange data with each other at 10Gbps.

2. Hardware

2.1. Physical Dimensions

Weight

6 kg / 2.20 lbs

Size

481.20 mm / 18.9" (W), 43.60 mm / 1.8" (H), 324 mm / 12.75" (D)

Front View

481.20

465.30

43.60 | 31.70

5.95

Top View

446.80

324

Side View

324
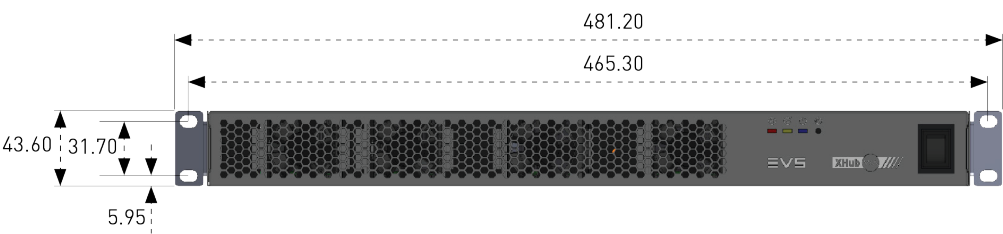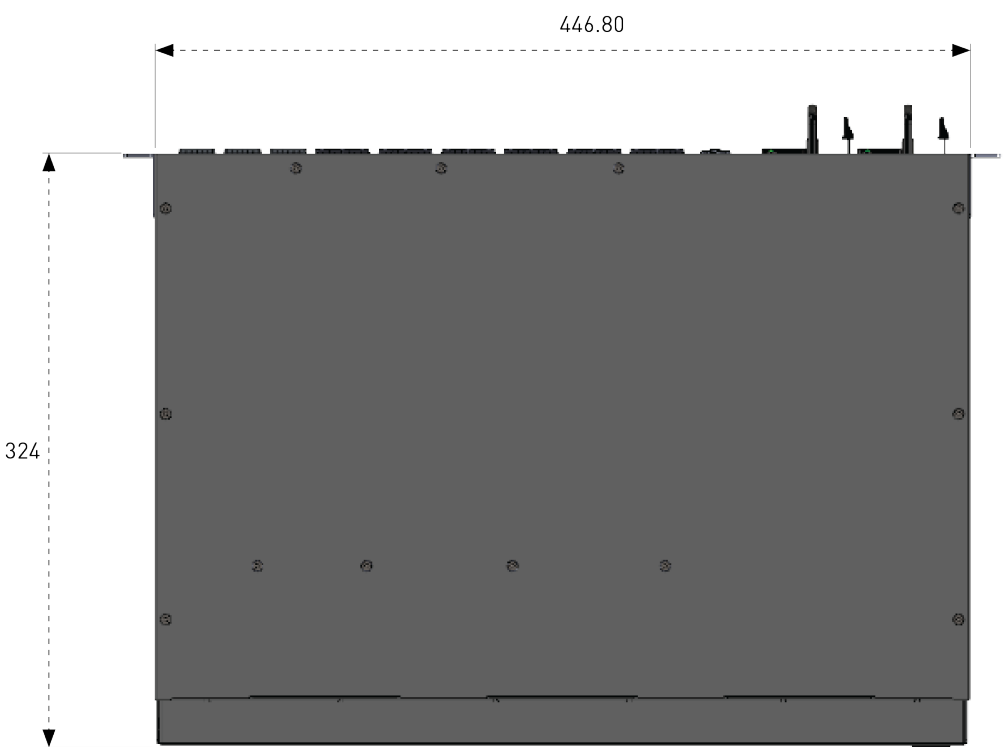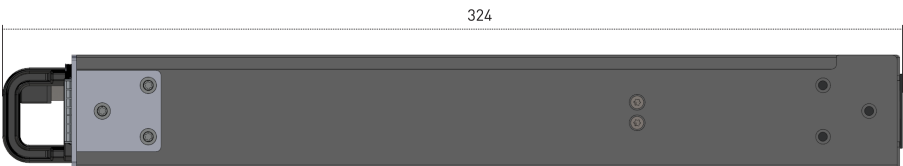
2.2. Environmental Ranges

The switch can be installed in an environment with the specific operating ranges shown in the table below:

Temperature	Operating: 0° to 45°C / 32°F to 113°F
Humidity	Operating: 85% RH (non-condensing)
Altitude	Operating: sea level to 5000m
Noise level	70dB

2.3. Power

The table below displays the global power consumption of the switch:

Global Power Consumption	Typical power with passive cables: 60W at 25°C / 77°F Max power with optical cables (assuming 3.5W per each QSFP28 port): 250W

2.4. Front Panel

Overview
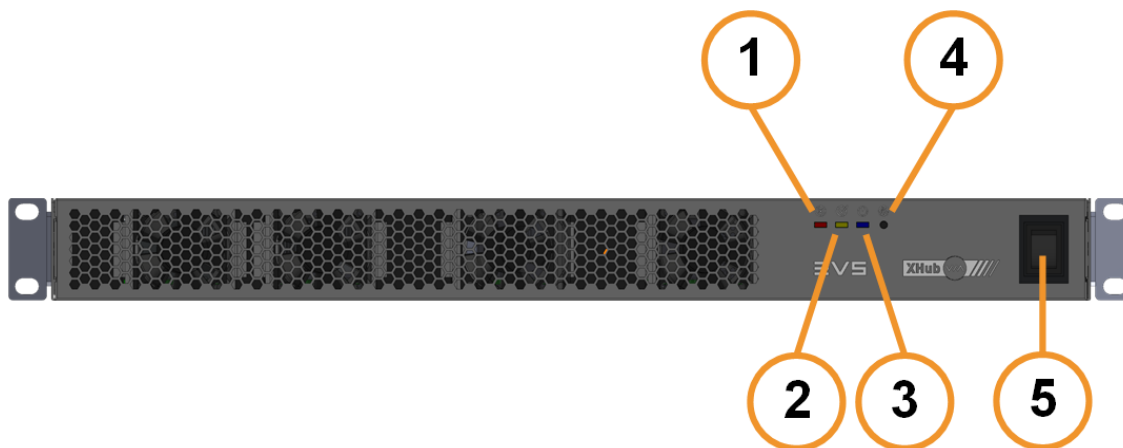
The following elements area highlighted on the image above:

#	Element
1.	Error LED (red)
2.	Software Status LED (yellow)
3.	System On/Off LED (blue)
4.	System Recovery/Reset button
5.	Power switch

Error LED

The Error LED behaves as follows:

Led Behavior	Meaning
Off	No hardware or software error occurred.
Flashing fast	In combination with: • a Software Status LED (yellow) that is <u>flashing fast</u>: The software is started in Recovery Mode. • a System On/Off LED (blue) that is <u>flashing slowly</u>: A hardware error occurred.

Software Status LED

The Software Status LED behaves as follows:

LED Behavior	Meaning
Off	In combination with: • an Error LED (red) that if off: The software is off.
Flashing fast	In combination with: • an Error LED (red) that is off: The software is starting. • an Error LED (red) that is flashing fast: The software is started in Recovery Mode. • a System On/Off LED (blue) that is flashing slowly: The software was not properly started or stopped.
Flashing fast (short period) Steady yellow (long period)	In combination with: • an Error LED (red) that if off: The software is running.

System On/Off LED

The System On/Off LED behaves as follows:

LED Behavior	Meaning
Flashing fast	XHub-VIA v2 is starting or stopping.
Flashing moderately (every 1s)	The XHub-VIA v2 firmware update is in progress.
Flashing slowly (every 4s)	In combination with: • a Software Status LED (yellow) that is flashing fast: The software was not properly started or stopped. • an Error LED (red) that is flashing fast: A hardware error occurred.
Flashing slowly (every 4s)	In combination with: • a Software Status LED (yellow) and an Error LED (red) that are off: XHub-VIA v2 is off.
Steady blue	XHub-VIA v2 is on.

Recovery/Reset Button

This button is used to start XHub-VIA v2 in Recovery mode. In this mode, you will be able to configure certain aspects of the switch and upgrade the software.

If you push this button, the default configuration file (XNet-VIA or Live IP) will be loaded by default at startup. See section "About Configuration Files" on page 57.

2.5. Rear Panel

Overview
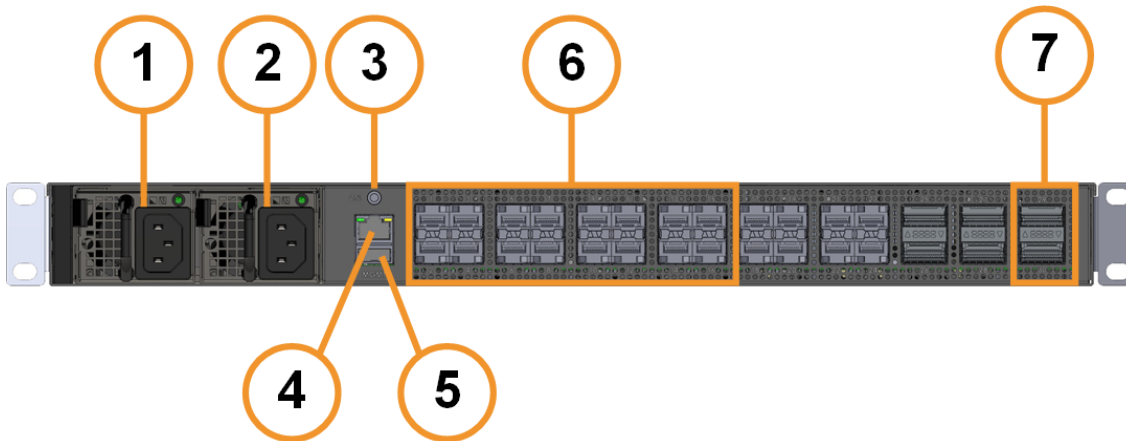
The following elements area highlighted on the image above:

#	Element
1.	Power supply 1
2.	Power supply 2
3.	Console connector
4.	1GbE (management) (RJ45)
5.	USB port (2.0)
6.	14x 25/12.5Gbps ports (SFP28)
7.	2x 100Gbps ports (QSFP28)

Power Supply

The XHub-VIA v2 is fitted with two auto switching and hot-swappable external power supplies (2x 300W). The secondary hot-swappable power supply should be connected to the main to share the load and to allow automatic power switching to one power supply in case one of the two should fail.

Management Port Status LEDS

The management port has two status LEDs that behave as follows:

LED	Color	LED Behavior	Meaning
Left	Green	Steady green	Speed is 1Gbps.
	Orange	Steady orange	Speed is 100 Mbps.
Right	Yellow	Flashing	Data is being sent or received.
		Off	The port is down.
		Steady yellow	The port is up.

SFP/QSFP Port Status LED

Each SFP and QSFP port has a status LED that behaves as follows:

LED Behavior	Meaning
Off	The port is down. The port has not been configured or there is no link.
Steady green	The port is up.
Flashing green	The port is up and there is activity.

3. IP Aggregator

3.1. Cabling

3.1.1. Accepted Connectors

To create the connections between the XT servers and the XHub-VIA switch, and to create the link between the XHub-VIA and the LiveIP network, the following connectors can be used:

Type of Connection	Type of Connector
between XT servers and XHub-VIA	7x or 14x (in case of ST 2022-7) CAB-10GESS-1M
between XHub-VIA and the LiveIP network	1x or 2x (in case of ST 2022-7) QSFP-100G-SR4

3.1.2. Connection to XT-VIA/XS-VIA

Limitation

You can connect only 1 server to the XHub-VIA IP Aggregator.

Management Connection

To establish a management connection between XHub-VIA and the server, the XHUB-VIA management port has to be connected to the server's **EVS LNK** connector.
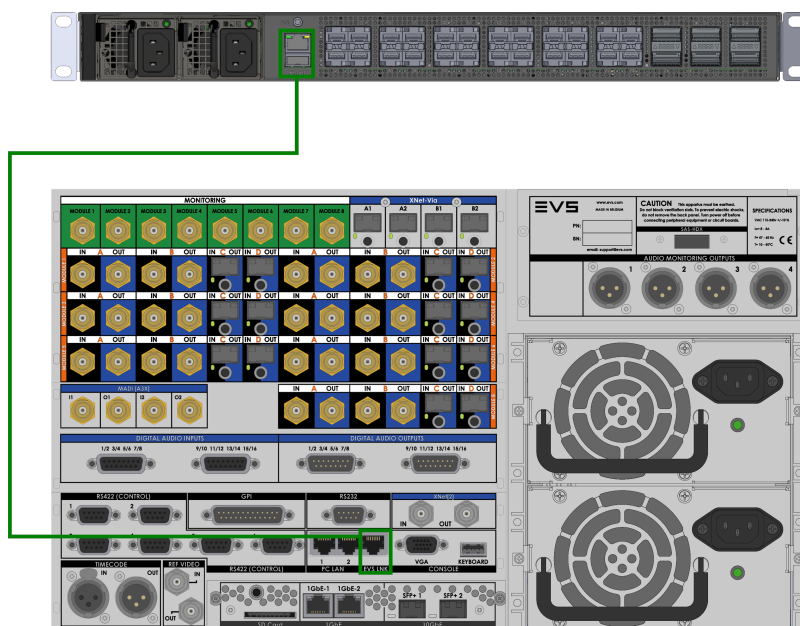
SFP Port Connections

Accepted Connectors

Type of Connection	Type of Connector
between XT servers and XHub-VIA	CAB-10GESS-1M
between XHub-VIA and LiveIP fabric	QSFP-100G-SR4

Without ST 2022-7

In a setup without redundancy (ST 2022-7), the server's SFP+ ports should be connected with the XHub-VIA SFP28 ports as follows:

XHub-VIA Port	XT-VIA Port
1	1-C
2	2-C
3	3-C
4	4-C
5	5-C
6	6-C
8	8-C
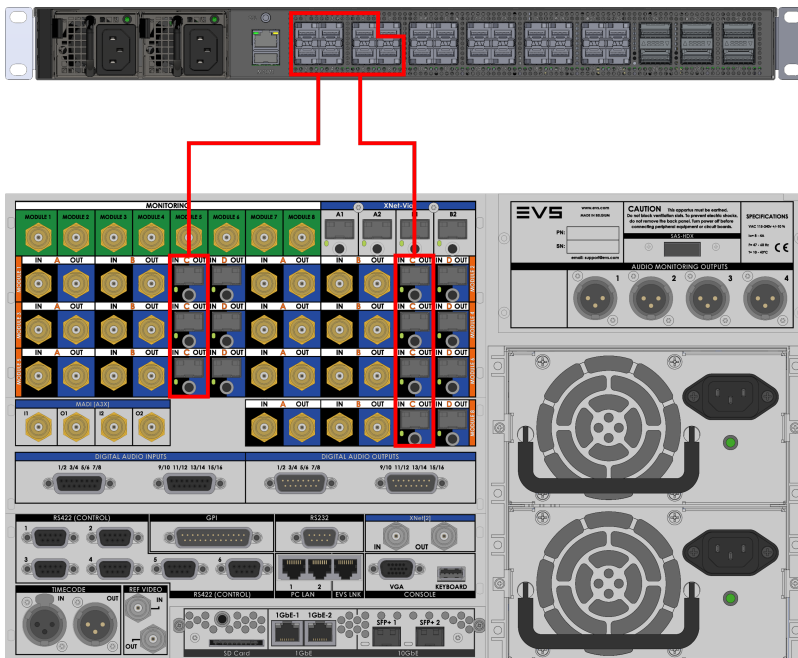
With ST 2022-7

In a setup with redundancy (ST 2022-7), the server's SFP+ ports should be connected with the XHub-VIA SFP28 ports as follows:

XHub-VIA Port	XT-VIA Port	XHub-VIA Port	XT-VIA Port
1	1-C	9	1-D
2	2-C	10	2-D
3	3-C	11	3-D
4	4-C	12	4-D
5	5-C	13	5-D
6	6-C	14	6-D
8	8-C	16	8-D
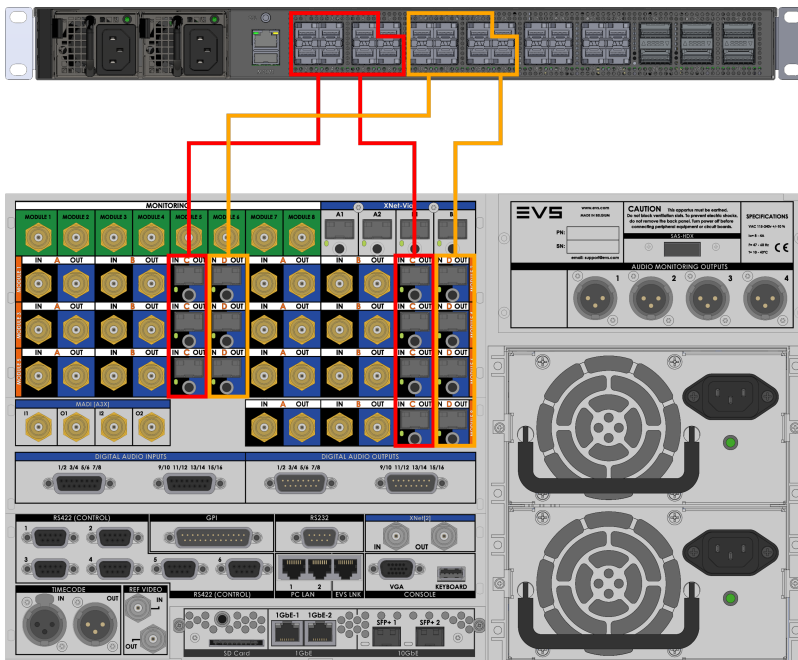
The ports 17-24 on the XHub-VIA switch are not active.

FEC (Forward Error Connection)

Forward Error Connection is not activated on the XHub-VIA SFP ports.

3.1.3.   Connection to External 100G Switch

Without ST2022-7

The XHub-VIA should be connected to an external 100G switch as follows:

XHub-VIA Port	External Switch Port
29	any
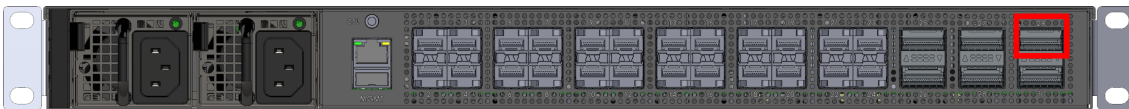
With ST2022-7

The XHub-VIA should be connected to an external 100G switch as follows:

XHub-VIA Port	External Switch Port
29	any
30	any
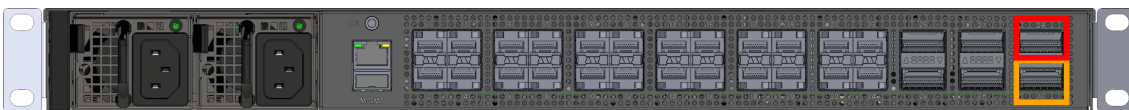
The ports 25-28 are not active.

FEC (Forward Error Connection)

Forward Error Connection activated on the QSFP ports is RS-FEC (Reed Solomon).

3.2. Network

3.2.1. Network Diagram

Without ST2022-7

The diagram below illustrates the network architecture without redundancy.
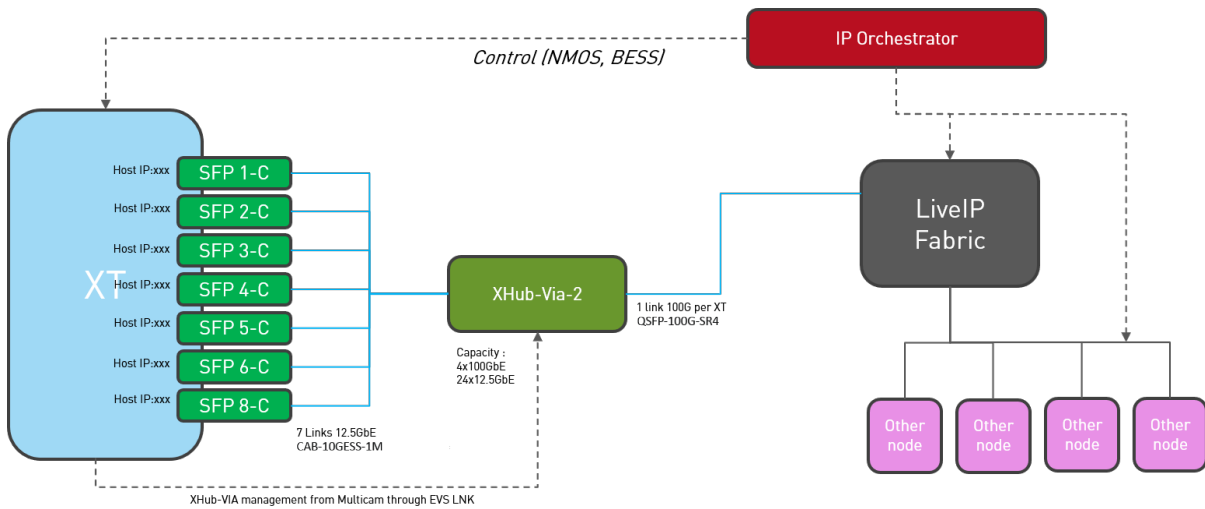
With ST2022-7

The diagram below illustrates the network architecture in case of redundancy.
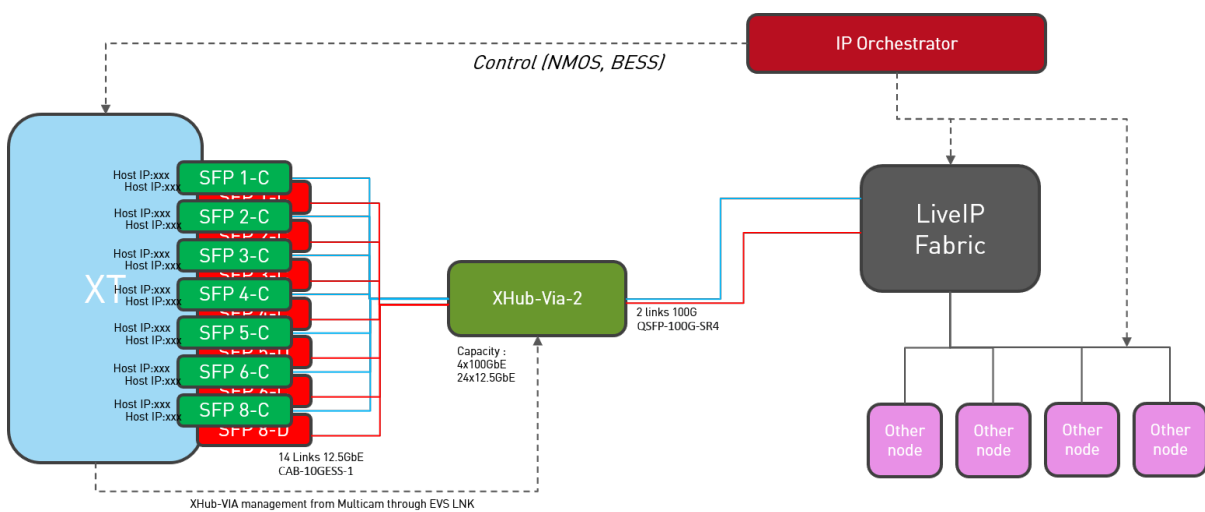
3.3. Port Speed Configuration

The port speed on the XHub-VIA is configured accordingly to the port speed on the XT-VIA or XS-VIA server.

If a V4X module is set to 12.5Gbps, the appropriate port on the XHub-VIA (i.e. the port connected to this V4X module) is also set to 12.5Gbps.

The port speed configuration on the XHub-VIA is managed by the EVS server.

3.4. Upgrading the XHub-VIA Software

Requirements

When working in Live IP over 100G, the XHub-VIA is fully managed by Multicam. The XHub-VIA is connected to the EVS server via the **EVS LNK** connector.

Automatic Procedure

The XHub-VIA software forms part of the Multicam installation package.

The upgrade of the XHub-VIA software is managed automatically during the boot sequence of the EVS server.

The current version of the software on the XHub-VIA is detected.

If the version is not as expected, the software is upgraded to the new version.

4. XNet-VIA

4.1. Cabling

4.1.1. Accepted Connectors

To create the connections between the XT servers and the XHub-VIA switch, and to create the uplinks between the XHub-VIA switches, the following connectors can be used:

Type of Connection	Type of Connector
between XT servers and XHub-VIA	• ESSFP-I-10G-SR • CAB-10GESS-1M • CAB-10GESS-3M • CAB-10GESS-5M
between XHub-VIAs	• QSFP-100G-SR4

4.1.2. Connecting EVS Servers

You can connect up to 24 servers to a single XHub-VIA switch.

The XNet-VIA SFP+ connector of the server is connected to one of the 24 SFP28 ports of the switch.
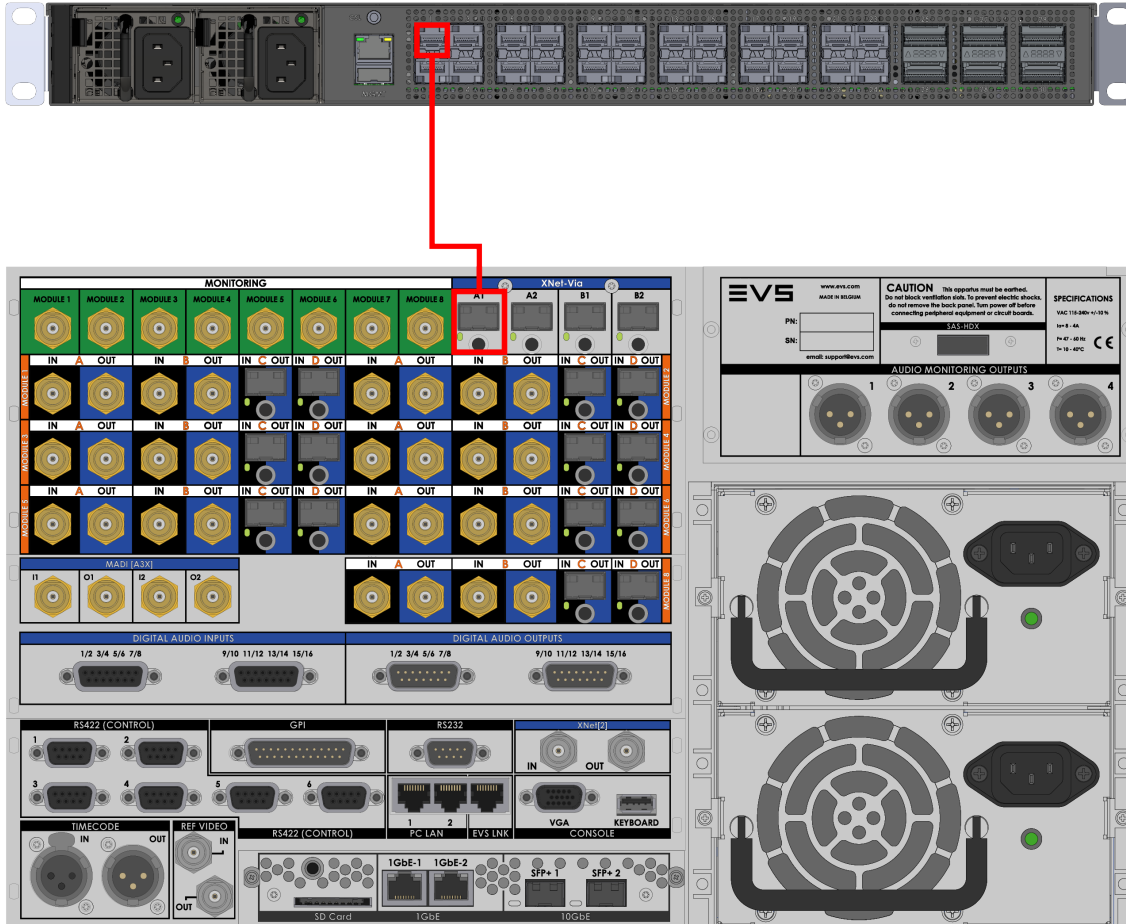
4.1.3.   Connecting XHub-VIAs

Introduction

In certain situations, it is required to create connections or uplinks between two or more XHUB-VIA switches.

This is the case if:

- there are more than 24 XT servers in the XNet-VIA network;

- the XT servers are located in different physical locations, e.g. two OB vans, and cannot be connected to the same XHub-VIA;

- the XT servers belong to different sub-setups which are temporarily interconnected.

The XHUB-VIA switches can be connected through one of the 100G QSFP ports using a fiber optics cable and QSFP adapters (QSFP-100G-SR4).
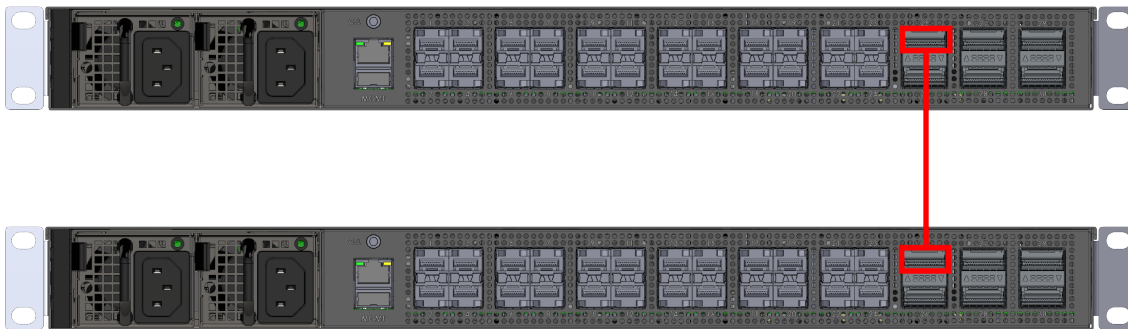
In most cases, a single uplink is realized between two XHub-VIA switches. See section "Single Uplink" on page 20.

In case a fail-over mechanism is required, a second uplink will be realized between the two switches. See section "Protection Switching" on page 24 and "Link Aggregation" on page 25.

> ✎   - Users can freely choose the QSFP ports that will be used to link the XHUB-VIA switches with each other.
> - There is no real limitation in the use of a specific type of network topology.
> - All XHUB-VIAs should be connected to the management network in order to have monitoring.

Single Uplink

Network Architectures

Limitations/Recommendations

The following limitations and recommendations apply:

- There should be at least one Allowed/Preferred server in each cluster.

- Each XT-VIA requires a full 10 Gbps connection for the transfer of the XNet AV content as well as the XNet management. Therefore, the number of XT servers on each side of an uplink connection should not exceed 10. If this number is exceeded, packet losses will occur, resulting in corrupt data transfers or an inconsistent XNet-VIA network.

- There is no fail-over or redundancy mechanism. In addition to the possibility of losing the connectivity, there is the risk that certain servers will be completely isolated, for example if one XHub-VIA has only servers that are configured as Forbidden. Because there is no XNet server, they will be isolated from each other and be in standalone mode.

- Prevent circle topologies.

2 XHub-VIAs with Single Uplink

The schema below illustrates a setup where two XHub-VIAs are connected with a single uplink.

OB Van #1 / Studio #1

XS-VIA
4 REC / 2 PLAY

XT-VIA
3 REC / 3 PLAY

RS422

XT-VIA
4 REC / 2 PLAY

XNET-VIA
10.000
Mbps

XS-VIA
4 REC / 2 PLAY

XHub-VIA

XT-VIA
4 REC / 2 PLAY

OB Van #2 / Studio #2

XT-VIA
4 REC / 2 PLAY
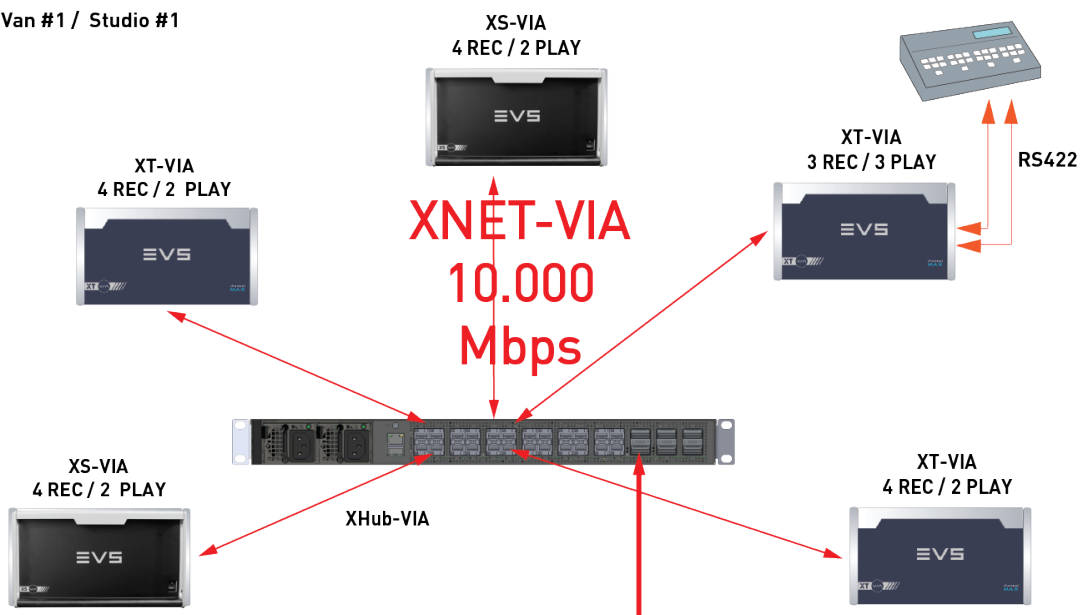
XHub-VIA

XT-VIA
2 REC / 4 PLAY

Multiple XHub-VIAs with Single Uplink

Use Case 1 - Star Topology Without Bandwidth Limitation

In the schema below, there are 100G uplinks between 2 XHub-VIAs, each with 8 XT-VIAs on one side and 10 on the other side.

The XNet-VIA bandwidth regulation makes sure that the incoming and outgoing traffic between the XT server and the XHub-VIA never exceeds 10Gbps.

As a result, for each uplink the total uplink bandwidth never exceeds the available 100Gbps (in both directions). In other words, the buffer of the incoming packets are not overflowing and we will never have packet drops on the XHub-VIA switch.
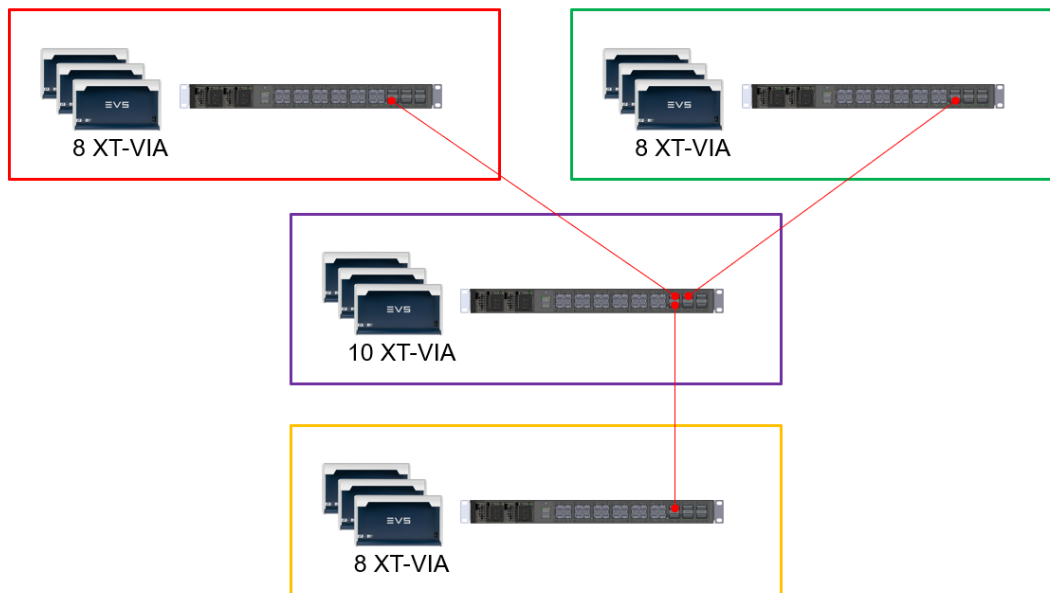
Use Case 2 - Star Topology with Bandwidth Limitation

The schema below differs slightly from the schema above. The uplink connection between the XHub-VIA in the center and the XHub-VIA in the red area has 11 XT-VIAs on one side, and 10 XT-VIAs on the other side. This uplink might become the bottleneck in a scenario where each of the 11 XT-VIAs in the red area is receiving a 10G transfer from a different other XT-VIA in the network. The total bandwidth required for the uplink may go up to 110G.
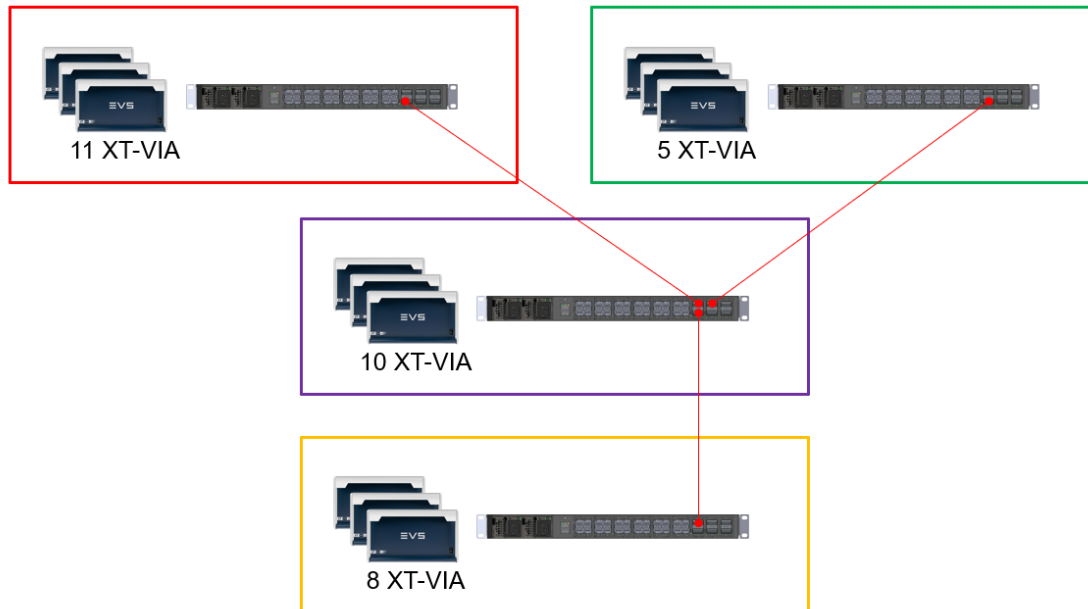
Use Case 3 - Chain Topology with Bandwidth Limitation

The schema below, the number of servers (34) is the same as the two cases above. The distribution of the XTs on the XHub-VIAs is the same as in the first use case. The uplink between the red and green area has 18 XT-VIAs on the one side and 16 on the other side. In a scenario where there are 16 independent transfers of each 10G, the uplink in the middle can become the bottleneck because it has to accommodate a total bandwidth of 160G.
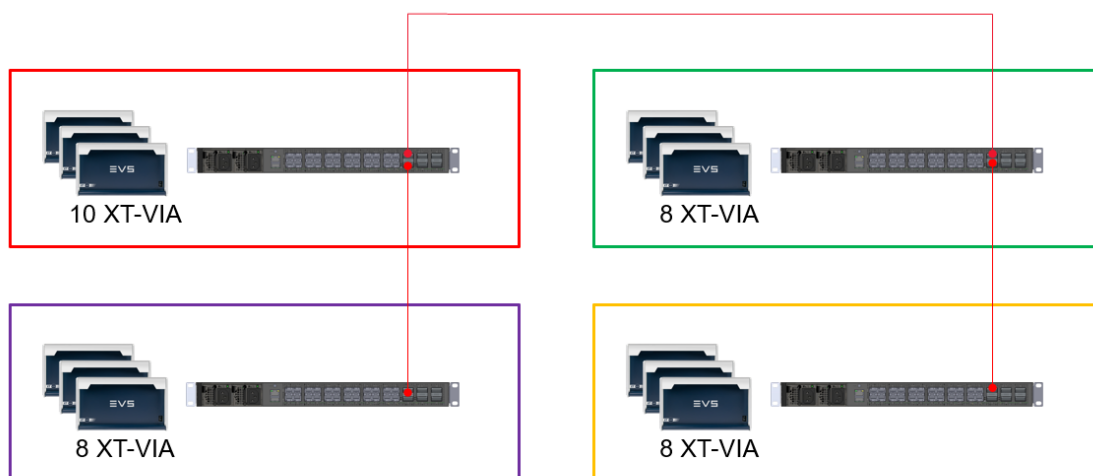
Protection Switching

About Protection Switching

Protection switching (PRS) consist in linking 2 XHub-VIA switches with two 100G uplinks, namely a 'primary' and 'secondary' uplink.

By default, the primary uplink (or 'working path') is the link used to transfer the data. If this link breaks, the secondary uplink (or 'protection path') will be used instead. This is a fail-over mechanism.

The switch from the working path to the protection path is done in approximately 10ms.

It should be noted that the bandwidth remains 100G and only one path is used at a time.

Network Architectures

2 XHub-VIAs with Protection Switching

The schema below illustrates a setup where two XHub-VIAs are connected with protection switching.
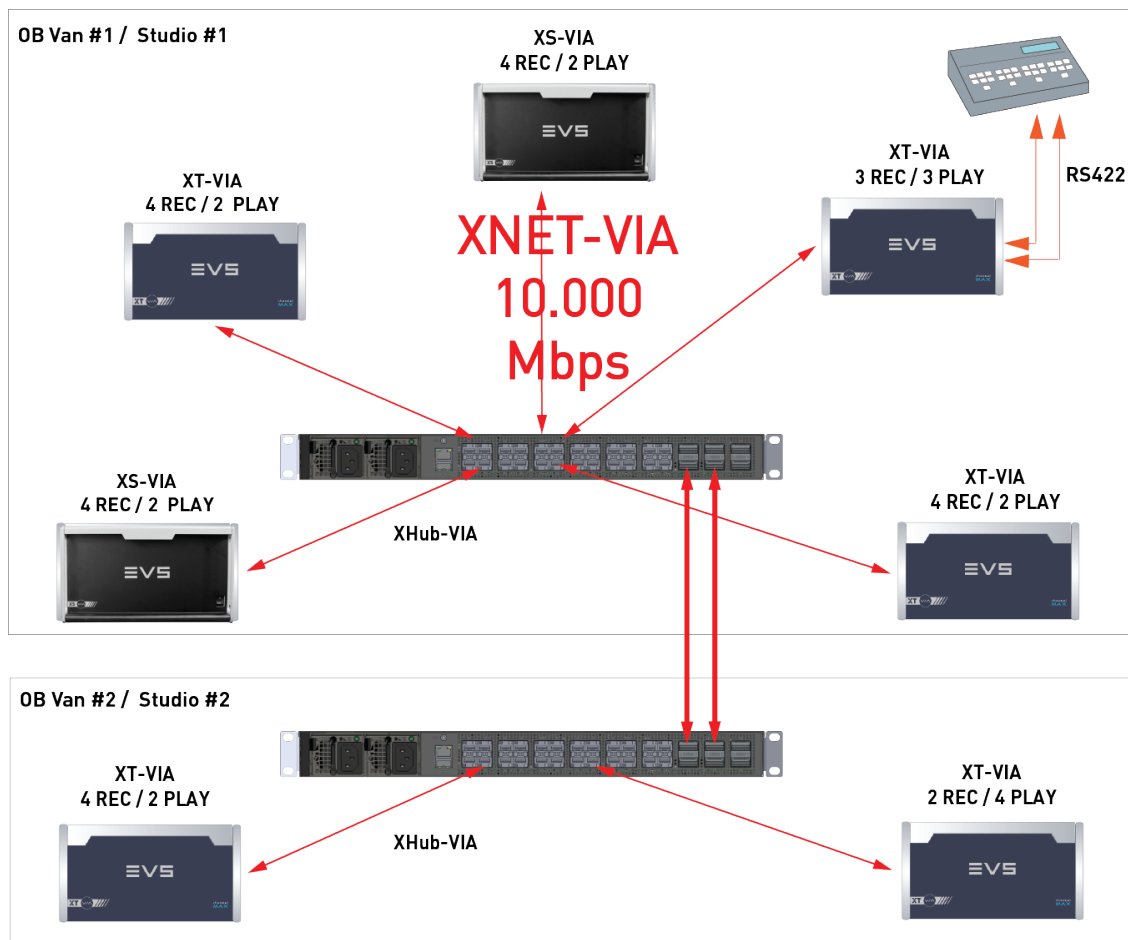
>2 XHub-VIAs with Protection Switching
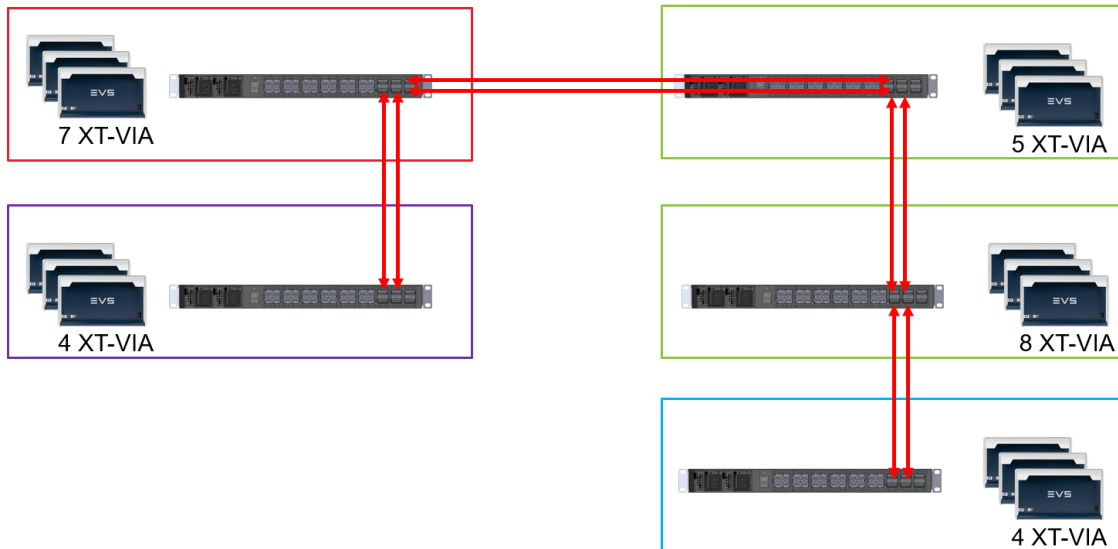
Enabling and Configuring Protection Switching

The protection switching mechanism must be enabled and configured on each XHub-VIA.

See section "Managing Protection Switching Interfaces" on page 49.

Link Aggregation

About Link Aggregation

Link aggregation (LAG) consists in bundling the physical uplinks that exist between two XHub-VIA switches into a single logical link.

The purpose is to:

- balance the traffic across the member ports to increase the cumulative throughput beyond the capacity of a single physical interface;

- to provide redundancy if there is a physical link failure.

The switch from one link to the other is done in approximately 3s.

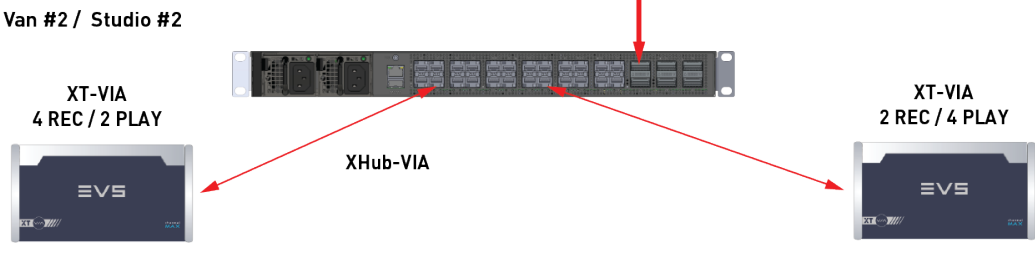## Network Architecture

2 XHub-VIAs with Link Aggregation

The schema below illustrates a setup where two XHub-VIAs are connected with link aggregation.

OB Van #1 / Studio #1

XS-VIA
4 REC / 2 PLAY

XT-VIA
4 REC / 2 PLAY

XT-VIA
3 REC / 3 PLAY

RS422

XNET-VIA
10.000
Mbps

XS-VIA
4 REC / 2 PLAY

XT-VIA
4 REC / 2 PLAY

XHub-VIA

OB Van #2 / Studio #2

XT-VIA
4 REC / 2 PLAY

XT-VIA
2 REC / 4 PLAY

XHub-VIA

>2 XHub-VIAs with Link Aggregation

7 XT-VIA

5 XT-VIA

4 XT-VIA

8 XT-VIA

4 XT-VIA
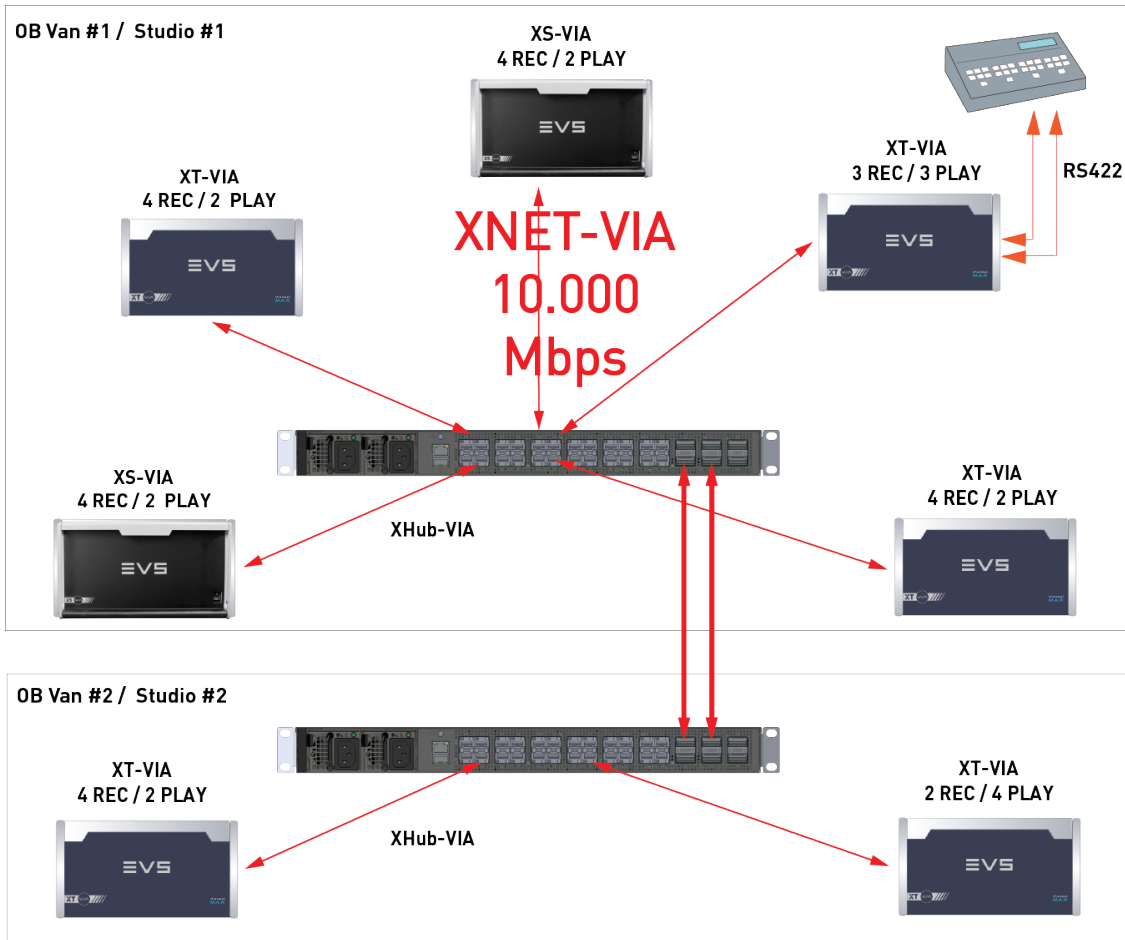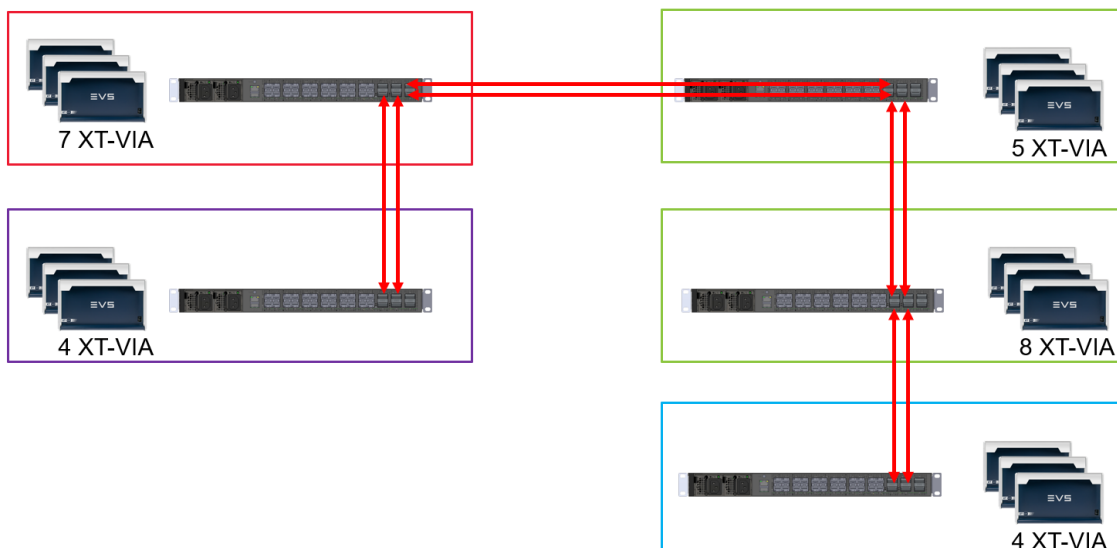
Enabling and Configuring Link Aggregation

The link aggregation mechanism must be enabled and configured on each XHub-VIA.

See section "Managing Link Aggregation Interfaces" on page 52.

4.2. Network

4.2.1. Impact on the IP Infrastructure

Live IP Network Interfaces

The 14 SFP interfaces have their own IP addresses. They are configured via the Multicam configuration pages (see XT-VIA configuration manual).

The QSFP interfaces of the XHub-VIA IP Aggregator do not have their own IP Address.

Outbound Stream

For the outbound stream, the multicast address configured in the Live IP interface will be used, together with the unicast address of the XT's SFP interface (SFP 1-C, 1-D, …). All streams will leave on the first or second 100Gbps link, depending on whether they are configured on the C or D SFP.

Inbound Stream

For the inbound streams, they are received on the 100Gbps, and because of the static routing of the XHub-VIA IP Aggregator, the packets are forwarded only to the ports connected to receivers that have actually requested the streams through IGMP.

NMOS Node / Ember+

In the NMOS tree we will find under <IP-address:3000/x-nmos/node/v1.2/self/ the information about the server and its connected interfaces. In the "interfaces" section, we expose only the 2 QSFP interfaces of the XHUB-VIA IP Aggregator.

Each sender and receiver contains a link to one or both of these interfaces through the NMOS "interface_binding".

The SDPs exposed through NMOS and Ember+ are not impacted when using XHub-VIA. In particular, the source IP is the IP address of the sender's SFP interface.

4.3. Upgrading the XHub-VIA Software

Manual Procedure

Installation From an USB Key

To install a new software package on the XHub-Via switch using a USB key, proceed as follows:

1. Plug your USB key into one of the USB ports of the XHub-VIA switch.

   The USB key will be automatically mounted.

2. Connect your computer directly to the 1GbE management port of the XHub-VIA switch.

3. Set up an SSH connection to the XHub-VIA switch.

   The command line interface will open.

4. Enter the following command:

   `install fromUSB <package_name>`

   For example, `install fromUSB xh5_update_package.bin`

   > ✏️ The installation package must be in the root of the USB key.

   By default, the software is automatically upgraded and the switch is rebooted.

   To prevent the switch from automatically rebooting, add the following option to your command: `--no-reboot`.

   `install --no-reboot fromUSB xh5_update_package.bin`

   You have 30 seconds before the switch reboots.

5. Enter the following command to safely remove your USB key:

   `unmountUSB`

6. Unplug your USB key.

Installation from SFTP

To install a new software package on the XHub-VIA switch using SFTP, proceed as follows:

1. Set up an SFTP connection with the XHUB-VIA switch.

2. Open the `/tmp` folder and create an `install` folder.

3. Transfer the installation package (`xh5_update_package.bin`) to the newly created `/tmp/install` folder.

4. Set up an SSH connection to the XHub-VIA switch.

   The command line interface will open.

5. Enter the following command:

   `install fromFileSystem xh5_update_package.bin`

   By default, the software is automatically upgraded and the switch is rebooted.

   To prevent the switch from automatically rebooting, add the following option to your command: `--no-reboot`.

   `install --no-reboot fromFileSystem xh5_update_package.bin`

5. Software

5.1. Command Line Interface

The XHub-VIA CLI (command line interface) allows you to manually configure and monitor the switch and to perform software upgrades.

5.2. Accessing the Command Line Interface in Standalone Mode (XNet-VIA)

Requirements

Make sure you know the management IP address of the XHUB-VIA switch and that your PC has network access to the management port. If not, please contact EVS support.

Basic Access

To access the XHub-VIA, proceed as follows:

1. Open the SSH client on your PC.

2. Enter the following command:

   `ssh evs@192.168.1.1`

   `evs` is the username of the default user.

   `192.168.1.1` is the default management IP address of the switch for the XNet-VIA use case. In case the default IP address was already modified, make sure to use the new address instead.

3. Press **ENTER**.

   You will be prompted to enter your password.

4. Enter the following password:

   `xHub-V1a!`

5. Press **ENTER**.

   The command-line interface will open.

   Basic access means that you cannot exit the command-line interface and access the Linux operating system.

6. Configuration

6.1. Basic Operations

6.1.1. Viewing the Software License Agreement

To view the XHub-VIA v2 software license agreement, type the following command and then press **ENTER**:

```
show license
```

6.1.2. Viewing the XHub-VIA Version

To check the version of your XHub-VIA switch, proceed as follows:

1. Access the CLI of the switch.

2. Enter the following command:

   ```
   show version
   ```

   The following information is returned:

   ```
   XHub Via        Package - x.x.x.xx - dd/mm/yy
   ```
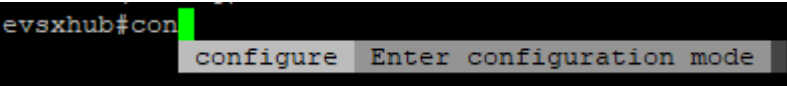
6.1.3. Entering Configuration Mode

To enter into Configuration Mode, proceed as follows:

1. From the root menu (`<user>xhub#`), start typing the following command:

   ```
   configure
   ```

   An autocomplete suggestion menu will appear. The menu item **Configure** is automatically selected.

2. Press **ENTER** to continue.

   In Configuration Mode, the prompt will appear as follows:

   ```
   <user>xhub (config)#
   ```

6.1.4. Configuring the Management IP Address

To manually configure the management IP address of the XHub-VIA switch, proceed as follows:

1. Enter Configuration Mode.

    See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

    ```
    management
    ```

3. Enter the following command and then press **ENTER**:

    ```
    address <IP_address>
    ```

    You are informed that the management IP address is being changed.

    ```
    Ip address change to <IP_address>|<subnet_mask>|<default_gateway>
    ```

4. To check the newly configured management IP address, enter the following command:

    ```
    show management
    ```

6.1.5. Configuring the Hostname

To manually configure the hostname of the XHub-VIA switch, proceed as follows:

1. Enter Configuration Mode.

    See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

    ```
    management
    ```

3. Enter the following command and then press **ENTER**:

    ```
    hostname <hostname>
    ```

    For example, `hostname evsxhub`

    You are informed that the hostname is being changed.

    ```
    Configuring hostname to <hostname>
    ```

4. To check the newly configured hostname, enter the following command:

    ```
    show management
    ```

6.2. Managing VLANs

6.2.1. VLANs

The XNet-VIA network is an EVS proprietary network. It consists several EVS video servers or other EVS hardware all connected with each other. 3rd party devices cannot be added to this network.

The XNet-VIA network can be considered as 1 big VLAN with no particular configuration or limitation.

6.2.2. Viewing the VLANs

Viewing the List of Configured VLANs

To view the list of configured VLANs, type the following command and then press **ENTER**:

```
show vlan
```

The VLANs appear with ID and assigned ethernet interfaces.

In the example below, 3 VLANs have been configured: 1, 10 and 20. Each VLAN has a number of ethernet interfaces assigned.

```
Vlan  | Interfaces

   1  |  eth17/1, eth18/1, eth19/1, eth20/1, eth21/1, eth22/1, eth23/1, eth24/1, eth25/1, eth26/1, eth27/1, eth28/1
  10  |  eth1/1, eth2/1, eth29/1, eth3/1, eth4/1, eth5/1, eth6/1, eth7/1, eth8/1
  20  |  eth10/1, eth11/1, eth12/1, eth13/1, eth14/1, eth15/1, eth16/1, eth30/1, eth9/1
```

Viewing the VLAN Properties

To view more detailed information about the VLANs, type one of the following command and then press **ENTER**:

```
show vlan -p
```
or
```
show vlan --properties
```

The following more detailed information is displayed:

Vlan	UnknownUcCmd	UnregedIpv6McCmd	UnregedIpv4McCmd	UnregedNoIpMcCmd	UnregedNoIpv4BcCmd	UnregedIpv4BcCmd	UnknownMacSaCmd
1	Forward	Forward	Forward	Forward	Forward	Forward	Forward
10	Forward	Forward	DropSoft	Forward	Forward	Forward	Forward
20	Forward	Forward	DropSoft	Forward	Forward	Forward	Forward

6.2.3. Configuring VLANs

Adding a New VLAN

To add a new VLAN, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

   ```
   config vlan <vlan_id>
   ```

   > The <vlan_id> has to be an integer between 1 and 4094.

   The following can happen:

   - If a VLAN already exists with that ID, no new VLAN will be created.

   - If no VLAN exists yet with that ID, it will be automatically created. You will be informed that the creation was successful:

     ```
     Configuring Vlan <vlan_id>

     Vlan <vlan_id> created
     ```

   You will enter the Configuration Mode of the existing or new VLAN. The command prompt will appear as follows:

   ```
   <user>xhub (config-vlan<vlan_id>)#
   ```

Assigning Ethernet Interfaces

See section "Assigning to and Removing Ethernet Interfaces from VLANs" on page 43.

Removing Ethernet Interfaces

See section "Assigning to and Removing Ethernet Interfaces from VLANs" on page 43.

6.2.4. Deleting VLANs

Deleting a Single VLAN

To delete a specific VLAN, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and press **ENTER**:

   ```
   no vlan <vlan_id>
   ```

   The following can happen:

   ◦ If no VLAN exists with that ID, the following message will appear:

      ```
      The vlan <vlan_id> does not exist.
      ```

   ◦ If a VLAN exists with that ID, you will be asked to confirm your action:

      ```
      Are you sure you want to delete vlan <vlan_id>? [y/N]
      ```

3. Type **Y** and press **ENTER**.

   You will be informed that the VLAN has been successfully deleted.

   ```
   Vlan <vlan_id> deleted
   ```

Deleting All VLANs

To delete all VLANs, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

   ```
   clear vlan
   ```

   You will be asked to confirm your action:

   ```
   Are you sure you want to delete all vlans? [y/N]
   ```

3. Type Y and then press **ENTER**.

   You will be informed that the VLANs have been successfully deleted.

   ```
   All vlans removed
   ```

Deleting Multiple VLANs

To delete multiple VLANs, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type one of the following commands and then press **ENTER**.

   To delete:

   - a range of VLANs, type `no vlan <vlan_id>-<vlan_id>`.

     For example, `no vlan 1-5` will delete the VLANs with IDs 1 to 5.

   - a selection of VLANs, type `no vlan <vlan_id>,<vlan_id>`.

     For example, `no vlan 7,20,40` will delete the VLANs with IDs 7, 20 and 40.

   - both a range and selection of VLANs, type `no vlan <vlan_id>-<vlan_id>,<vlan_id>,<vlan_id>`.

     For example, `no vlan 1-4,10,30` will delete the VLANs with IDs 1 to 4 and the VLANs with IDs 10 and 30.

   You will be asked to confirm your action:

   ```
   Are you sure you want to delete vlan [<vlan_id>,<vlan_id>, etc.]? [y/N]
   ```

3. Type `Y` and then press **ENTER**.

   You will be informed that the VLANs have been successfully deleted.

   ```
   Vlan [<vlan_id>,<vlan_id>, etc.] deleted
   ```

6.3. Managing Ethernet Interfaces

6.3.1. Viewing the Ethernet Interfaces

Viewing the List of Configured Ethernet Interfaces

To view the properties of one or more ethernet interfaces, proceed as follows:

1. Enter Configuration Mode. See section "Entering Configuration Mode" on page 33.

2. Type one of the following commands and then press **ENTER**.

    To view:

    ◦ a specific ethernet interface, type `show interface ethernet <ethernet_interface_id>`.

    ◦ a range of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>-<ethernet_interface_id>`.

    ◦ a selection of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>,<ethernet_interface_id>`.

    ◦ a range and selection of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id>`

    The following information will be displayed of each ethernet interface:

    ◦ **Interface:** Identifier of the ethernet interface.

    ◦ **Speed:** Line speed.

    ◦ **Mode:** Interface mode of operation: one lane (KR), two lanes (KR2) or four lanes (KR4) of an electrical backplane.

    ◦ **FEC:** Type of Forward Error Correction: RS (Reed Solomon), FC (Fire Code), Disabled.

    ◦ **State:** Indicates the physical state of the ethernet interface: NotConfigured, InReset, LinkDown, InitIntProgress, LinkUp, MacLinkDown, Failure.

    ◦ **Failure:** Indicates possible failures at startup: NoFailure, SignalStabilityFailed, TrainingFailed, AligmentTimerExpired, ConfidenceIntervalTimerExpired, CreatePortFailed.

    ◦ **Physical used:** Indicates the number of physical ports used to make the logical port: 1, 2 or 4.

    ◦ **TxSpeed (B/s):** Transmit speed in bits per second.

    ◦ **RxSpeed (B/s):** Receive speed in bits per second.

The example below shows the properties of the ethernet interfaces eth17/1:

Interface	Speed	Mode	FEC	State	Failure	Physical used	TxSpeed (B/s)	RxSpeed (B/s)
eth17/1	S10G	KR	Unknown	LinkUp	NoFailure	1	0	0

Viewing the Ethernet Interface Counters

To view the packet counters of one or more ethernet interfaces, proceed as follows:

1. Enter Configuration Mode. See section "Entering Configuration Mode" on page 33.

2. Type one of the following commands and then press **ENTER**. To view the packet counters of:

   ◦ a specific ethernet interface, type `show interface ethernet <ethernet_interface_id> -c`.

   ◦ a range of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>-<ethernet_interface_id> -c`.

   ◦ a selection of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>,<ethernet_interface_id> -c`.

   ◦ a range and selection of ethernet interfaces, type `show interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id> -c`

   The following counters will be displayed:

Counter name (Number of)	eth17/1	eth18/1
Good Bytes Received	0	0
Bad Bytes Received	0	0
Frame Not Transmitted	0	0
Good Packets Broadcast	0	0
Good Packets Multicast	0	0
Received Packets of 64 Bytes	0	0
Received Packets of 65 to 127 Bytes	0	0
Received Packets of 128 to 255 Bytes	0	0
Received Packets of 256 to 511 Bytes	0	0
Received Packets of 512 to 1023 Bytes	0	0
Received Packets of 1024 Bytes	0	0
Good Bytes Sent	0	0
Packets Drop Due To Collision	0	0
Good Multicast Packets Sent	0	0
Good Broadcast Packets Sent	0	0
Good Flow Control Frame Sent	0	0
Good Flow Control Frame Received	0	0
Internal Drop Packets BW	0	0
Packets Size Less 64 Bytes Received	0	0
Fragmented Packets Received	0	0
Oversized Packets Received	0	0
Jabber Packets Received	0	0
Received Error From Mac	0	0
Crc Error Events	0	0
Mac Collision	0	0
Late Mac Collision	0	0
Good Unicast Frame Received	0	0
Good Unicast Frame Sent	0	0
Valid Frame Sent Half Dup With Collision	0	0
Valid Frame Sent Half Dup With Out Collision	0	0
Good Packets 1024 to 1518 Bytes	0	0
Good Packets 1519 to MaxBytes	0	0

6.3.2. Configuring Ethernet Interfaces

Configuration Parameters

The following parameters can be configured for an ethernet interface:

- **Speed:** 10G, 12,5G, 20G, 25G, 40G, 50G, 100G

- **Mode:** KR, KR2, KR4

- **Fec:** Disabled, RS (Reed-Solomon), FC (Fire Code)

The following Speed-Mode Combinations are supported:

Speed Mode	10G	12,5G	20G	25G	40G	50G	100G
KR	OK	OK	QSFP*	QSFP*	NOK	NOK	NOK
KR2	NOK	NOK	SFP**	SFP**	QSFP	QSFP	NOK
KR4	NOK	NOK	NOK	NOK	SFP**	SFP**	QSFP*

* Speed-mode combination only supported by the QSFP interfaces (25/1-30/4).

**Speed-mode combination also supported by the SFP interfaces (1-24).

Configuring a Single Ethernet Interface

To configure a specific ethernet interface, proceed as follows:

1. Type one of the following commands and then press **ENTER**.

    To configure:

    - speed, type `configure interface ethernet <ethernet_interface_id> --speed <value>`.

      For example, `configure interface ethernet 1 --speed 10G` will set the speed of ethernet interface 1 to 10G.

    - mode, type `configure interface ethernet <ethernet_interface_id> --mode <value>`.

      For example, `configure interface ethernet 1 --mode KR` will set the mode of ethernet interface 1 to KR.

    > 🖉 The mode has to be set together with the speed in case the speed is > 12,5G.

- fec, type `configure interface ethernet <ethernet_interface_id> --fec <value>`.

  For example, `configure interface ethernet 1 --mode FC` will set the FEC of ethernet interface 1 to FC (Fire Code).

- all aforementioned parameters, type `configure interface ethernet <ethernet_interface_id> --speed <value> --mode <value> --fec <value>`.

You will be informed that the configuration was successful.

`Setting <parameter> <value> on ethernet interface <ethernet_interface_id>` in case you have configured a single parameter.

`Setting <parameter> <value> on ethernet interface <ethernet_interface_id> with <parameter> <value>` in case you have configured more parameters.

> 🖉 If you want to reconfigure a configured ethernet interface, you need to delete it first. See section "Deleting Ethernet Interfaces" on page 45.

Configuring Multiple Ethernet Interfaces

To configure multiple ethernet interfaces, proceed as follows:

1. Type one of the following commands and then press **ENTER**.

   To configure all parameters for:

   - a range of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id> --speed <value> --mode <value> --fec <value>`.

   - a selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>,<ethernet_interface_id> --speed <value> --mode <value> --fec <value>`.

   - a range and selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id> --speed <value> --mode <value> --fec <value>`.

   > 🖉 Valid ranges are:
   > - 1-30/4: all SFP and QSFP interfaces
   > - 1-24: all SFP interfaces
   > - 25/1-30/4: all QSFP interfaces
   >
   > If you provide an invalid range, the following error message will be displayed:
   > `Error: Invalid value for "<interface_id>": 'x' is not an available Ethernet Interface ID [1-24] or [25-30]/[1-4]`

   The following can happen:

   - If you typed an invalid ethernet interface ID, for example 'blabla', the following message will appear:

     `Error: Invalid value for "<interface_id>": 'blabla' is not a valid Ethernet Interface ID.`

◦ If you typed a valid ethernet interface ID, but no ethernet interface exists with that ID, the following message will appear:

`The interface ethernet <ethernet_interface_id> does not exist.`

◦ If the configuration was successful, the following message is displayed:

`Setting <parameter> <value> on ethernet interface <ethernet_interface_id>` in case you have configured a single parameter.

`Setting <parameter> <value> on ethernet interface <ethernet_interface_id> with <parameter> <value>` in case you have configured more parameters.

6.3.3. Assigning to and Removing Ethernet Interfaces from VLANs

Assigning Ethernet Interfaces

To assign one or more ethernet interfaces, proceed as follows:

1. Enter the Configuration Mode of the ethernet interface(s).

   To enter the Configuration Mode of:

   ◦ a single ethernet interface, type `configure interface ethernet <ethernet_interface_id>`.

   ◦ a range of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id>`.

   ◦ a selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>,<ethernet_interface_id>`.

   ◦ a range and selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id`.

2. Type one of the following commands and then press **ENTER**:

   To add the ethernet interface(s) to:

   ◦ a single VLAN, type `add_to_vlan <vlan_id>`.

   For example, `add_to_vlan 10` will add the ethernet interface(s) to the VLAN with ID 10.

   ◦ a range of VLANs, type `add_to_vlan <vlan_id>-<vlan_id>`.

   For example, `add_to_vlan 1-4` will add the ethernet interface(s) to the VLANs with IDs 1 to 4.

   ◦ a range and selection of VLANs, type `add_to_vlan <vlan_id>-<vlan_id>,<vlan_id>`.

   For example, `add_to_vlan 1-4,10` will add the ethernet interface(s) to the VLANs with IDs 1 to 4 and to the VLAN with ID 10.

   You will be informed that the VLANs have been successfully added.

```
Add interface ethernet ['<ethernet_interface_id>', '<ethernet_interface_id>',
etc.] to Vlan <vlan_id>
```

Removing Ethernet Interfaces

To remove one or more ethernet interfaces, proceed as follows:

1. Enter the Configuration Mode of the ethernet interface(s).

   To enter the Configuration Mode of:

   - a single ethernet interface, type `configure interface ethernet <ethernet_interface_id>`.

   - a range of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id>`.

   - a selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>,<ethernet_interface_id>`.

   - a range and selection of ethernet interfaces, type `configure interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id`.

2. Type one of the following commands and then press **ENTER**:

   To remove the ethernet interface(s) from:

   - a single VLAN, type `remove_from_vlan <vlan_id>`.

     For example, `remove_from_vlan 10` will remove the ethernet interface(s) from the VLAN with ID 10.

   - a range of VLANs, type `remove_from_vlan <vlan_id>-<vlan_id>`.

     For example, `remove_from_vlan 1-4` will remove the ethernet interface(s) from the VLANs with IDs 1 to 4.

   - a range and selection of VLANs, type `remove_from_vlan <vlan_id>-<vlan_id>,<vlan_id>`.

     For example, `remove_from_vlan 1-4,10` will remove the ethernet interface(s) from the VLANs with IDs 1 to 4 and from the VLAN with ID 10.

   You will be asked to confirm your action:

   ```
   Are you sure you want to remove interface ethernet [<ethernet_interface_
   id>,<ethernet_interface_id>, etc.] from vlan [<vlan_id>, <vlan_id>,etc.]?
   [y/N]:
   ```

3. Type `Y` and then press **ENTER**.

   You will be informed that the VLANs have been successfully deleted.

   ```
   Interface ethernet [<ethernet_interface_id>,<ethernet_interface_id>, etc.]
   removed
   ```

   > ✏ If you try to remove an ethernet interface from a VLAN that does not exist, the following
   > message will be displayed:
   > `The current interface is not part of VLAN <id>`

6.3.4. Deleting Ethernet Interfaces

Deleting a Single Ethernet Interface

To delete a specific ethernet interface, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and press **ENTER**:

   ```
   no interface ethernet <ethernet_interface_id>
   ```

   The following can happen:

   ○ If you typed an invalid ethernet interface ID, for example 'blabla', the following message will appear:

   ```
   Error: Invalid value for "<interface_id>": 'blabla' is not a valid
   Ethernet Interface ID.
   ```

   ○ If you typed a valid ethernet interface ID, but no ethernet interface exists with that ID, the following message will appear:

   ```
   The interface ethernet <ethernet_interface_id> does not exist.
   ```

   ○ If you typed a valid ethernet interface ID, and an ethernet interface exists with that ID, you will be asked to confirm your action:

   ```
   Are you sure you want to delete interface ethernet <ethernet_interface_
   id>? [y/N]
   ```

3. Type **Y** and press **ENTER**.

   You will be informed that the ethernet interface has been successfully deleted.

   ```
   Interface ethernet <ethernet_interface_id> deleted
   ```

   > 🖉 If you remove an existing ethernet interface, and it has been assigned to one or more VLANs, it will be automatically removed from those VLANs.

Deleting Multiple Ethernet Interfaces

To delete multiple ethernet interfaces, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type one of the following commands and then press **ENTER**.

   To delete:

   - a range of ethernet interfaces, type `no interface ethernet <ethernet_interface_id>-<ethernet_interface_id>`.

     For example, `no interface ethernet 1-4` will delete the SFP ethernet interfaces 1 to 4.

     > Valid ranges are:
     > - 1-30/4: all SFP and QSFP interfaces
     > - 1-24: all SFP interfaces
     > - 25/1-30/4: all QSFP interfaces
     >
     > If you provide an invalid range, the following error message will be displayed:
     > `Error: Invalid value for "<interface_id>": 'x' is not an available Ethernet Interface ID [1-24] or [25-30]/[1-4]`

   - a selection of ethernet interfaces, type `no interface ethernet <ethernet_interface_id>,<ethernet_interface_id>`.

     For example, `no interface ethernet 7,9,28/2` will delete the ethernet interfaces 7, 9 and 28/2.

   - both a range and selection of ethernet interfaces, type `no interface ethernet <ethernet_interface_id>-<ethernet_interface_id>,<ethernet_interface_id>,<ethernet_interface_id>`.

     For example, `no interface ethernet 25/1-30/4,14,18` will delete all the QSFP interfaces and the SFP interfaces 14 and 18.

   You will be asked to confirm your action:

   ```
   Are you sure you want to delete interface ethernet [<ethernet_interface_id>,<ethernet_interface_id>, etc.]? [y/N]
   ```

3. Type `Y` and then press **ENTER**.

   You will be informed that the ethernet interfaces have been successfully deleted.

   ```
   interface ethernet [<ethernet_interface_id>,<ethernet_interface_id>, etc.] deleted
   ```

Deleting All Ethernet Interfaces

To delete all ethernet interfaces, proceed as follows:

1. Enter Configuration Mode.

    See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

    ```
    clear interface ethernet
    ```

    You will be asked to confirm your action:

    ```
    Are you sure you want to delete all interface ethernet? [y/N]
    ```

3. Type Y and then press **ENTER**.

    You will be informed that the ethernet interfaces have been successfully deleted.

    ```
    All ethernet interface removed
    ```

    > 🖉 If there are no ethernet interfaces, the following message will be displayed instead: 'There aren't any ethernet interfaces configured.'

6.4. Managing Protection Switching Interfaces

Viewing the List of Configured Protection Switching Interfaces

To view the list of configured protection switching interfaces, type one of the following command and then press **ENTER**.

To view:

- all protection switching interfaces, type `show interface protection-switching;`
- a specific protection switching interface, type `show interface protection-switching <id>`

The following information is displayed about each interface:

- **Interface:** Unique identifier of the interface.
- **Status:** Status of the primary or secondary uplink.
- **Primary:** Port number of the QSFP ports forming the primary uplink or working path.
- **Secondary:** Port number of the QSFP ports forming the secondary uplink or protection path.

The example below shows the properties of the protection switching interfaces prs1 and prs2:

```
Interface              Status              Primary              Secondary
   prs1            IsOnWorkingPath          eth25/1                eth26/1
   prs2           IsOnProtectionPath        eth29/1                eth30/1
```

Configuring Protection Switching Interfaces

To configure protection switching between two XHub-VIA switches, proceed as follows:

1. Type the following command and press **ENTER**:

   `configure interface protection_switching <id> <primary> <secondary>`

   For example, `configure interface protection_switching 1 25/1 26/1`.

   `<id>` refers to the unique identifier you want to assign to the protection switching. It must be an integer between 1 and 2999.

   `<primary>` refers to the primary uplink or working path. It contains the port number of the connected QSFP ports.

   `<secondary>` refers to the secondary uplink or protection path. It contains the port number of the connected QSFP ports.

   > 🖉 • A QSFP port cannot belong to a protection switching and link aggregation interface at the same time.

   You will get a confirmation that the uplink has been successfully configured:

```
Configure protection switching prs1 with eth25/1 and eth26/1

Configuring interface protection switching 1
```

2. Type the following command and press **ENTER**:

    ```
    add-to-vlan <vlan_id>
    ```

    For example, `add-to-vlan 10`

    You will get a confirmation that the uplink has been successfully added to the VLAN.

Adding and Removing a Protection Switching Interface from a VLAN

Adding a Protection Switching Interface to a VLAN

To add an existing protection switching interface to a specific VLAN, proceed as follows:

1. Type the following command and press **ENTER**:

    ```
    configure interface protection_switching <id>
    ```

2. Type the following command and press **ENTER**:

    ```
    add-to-vlan <vlan_id>
    ```

    You will get a confirmation that the uplink has been successfully added to the VLAN.

Removing a Protection Switching Interface from a VLAN

To remove an existing protection switching interface from a specific VLAN, proceed as follows:

1. Type the following command and press **ENTER**:

    ```
    configure interface protection_switching <id>
    ```

2. Type the following command and press **ENTER**:

    ```
    remove-from-vlan <vlan_id>
    ```

    You will be asked to confirm your action:

    ```
    Are you sure you want to delete interface protection switching <interface_
    protection_switching_id> from vlan <vlan_id>? [y/N]
    ```

3. Type **y** and press **ENTER**.

    You will be informed that the protection switching interface has been successfully removed from the VLAN.

Deleting Protection Switching Interfaces

Deleting a Specific Interface

To delete a specific protection switching interface, proceed as follows:

1. Enter Configuration Mode.

See section "Entering Configuration Mode" on page 33.

2. Type the following command and press **ENTER**:

```
no interface protection_switching <id>
```

The following can happen:

◦ If no protection switching interface exists with that ID, the following message will appear:

```
The interface protection_switching <id> does not exist.
```

◦ If a protection switching interface exists with that ID, you will be asked to confirm your action:

```
Are you sure you want to delete interface protection_switching <id>? [y/N]
```

3. Type **y** and press **ENTER**.

You will be informed that the protection switching interface has been successfully deleted.

Deleting all Interfaces

To delete all protection switching interfaces, proceed as follows:

1. Enter Configuration Mode.

See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

```
clear interface protection_switching
```

You will be asked to confirm your action:

```
Are you sure you want to delete all interface protection_switching? [y/N]
```

3. Type **y** and then press **ENTER**.

You will be informed that the protection switching interfaces have been successfully deleted.

```
All interface protection switching removed
```

6.5. Managing Link Aggregation Interfaces

Viewing the List of Configured Link Aggregation Interfaces

To view the list of configured link aggregation interfaces, type one of the following command and then press **ENTER**.

To view:

- all link aggregation interfaces, type `show interface link-aggregation`

- a specific link aggregation interface, type `show interface link-aggregation <id>`

The following information is displayed about the aggregated ethernet interfaces:

- **Ethernet:** Index number of the ethernet interface.

- **Interface:** Identifier of the ethernet interface.

- **Speed:** Line speed.

- **Mode:** Interface mode of operation: one lane (KR), two lanes (KR2) or four lanes (KR4) of an electrical backplane.

- **FEC:** Type of Forward Error Correction: RS (Reed Solomon), FC (Fire Code), Disabled.

- **State:** Indicates the physical state of the ethernet interface: NotConfigured, InReset, LinkDown, InitIntProgress, LinkUp, MacLinkDown, Failure.

- **Failure:** Indicates possible failures at startup: NoFailure, SignalStabilityFailed, TrainingFailed, AligmentTimerExpired, ConfidenceIntervalTimerExpired, CreatePortFailed.

- **Physical Used:** Indicates the number of physical ports used to make the logical port: 1, 2 or 4.

- **TxSpeed (b/s):** Transmit speed in bits per second.

- **RxSpeed (b/s):** Receive speed in bits per second.

The example below shows the properties of the ethernet interfaces in the link aggregation:

lag<id>

Ethernet	Interface	Speed	Mode	FEC	State	Failure	Phyiscal Used	TxSpeed (b/s)	RxSpeed (b/s)
1	25/1	S100G	KR4	RS_FEC	LinkUp	NoFailure	4	0	0
2	26/1	S100G	KR4	RS_FEC	LinkDown	NoFailure	4	0	0

Configuring Link Aggregation Interfaces

To configure a link aggregation between two XHub-VIA switches, proceed as follows:

1. Type the following command and press **ENTER**:

   `configure interface link_aggregation <id> <ethernet_interface_id>,<ethernet_interface_id>`

   For example, `configure interface link_aggregation 1 25/1,26/1`.

`<id>` refers to the unique identifier you want to assign to the link aggregation. It must be an integer between 1 and 2999.

`<ethernet_interface_id>` refers to the identifier of the ethernet interface you want to aggregate.

> * You need to aggregate a minimum of 2 and can aggregate a maximum of 6 ethernet interfaces.
> * Only the QSFP ports can be aggregated: 25/1-30/4.
> * A QSFP port can only belong to one link aggregation interface.
> * A QSFP port cannot belong to a protection switching and link aggregation interface at the same time.
> * A maximum of 3 link aggregations can be configured.

You will get a confirmation that the uplink has been successfully configured:

```
Configure link aggregation lag1 with eth25/1

Configuring link aggregation interface 1
```

2. Type the following command and press **ENTER**:

```
add-to-vlan <vlan_id>
```

For example, `add-to-vlan 10`

You will get a confirmation that the link aggregation interface has been successfully added to the VLAN.

Adding and Removing a Link Aggregation Interface from a VLAN

Adding a Link Aggregation Interface to a VLAN

To add an existing link aggregation interface to a specific VLAN, proceed as follows:

1. Type the following command and press **ENTER**:

```
configure interface link_aggregation <id>
```

2. Type the following command and press **ENTER**:

```
add-to-vlan <vlan_id>
```

You will get a confirmation that the uplink has been successfully added to the VLAN.

Removing a Link Aggregation Interface from a VLAN

To remove an existing link aggregation interface from a specific VLAN, proceed as follows:

1. Type the following command and press **ENTER**:

```
configure interface link_aggregation <id>
```

2. Type the following command and press **ENTER**:

```
remove-from-vlan <vlan_id>
```

You will be asked to confirm your action:

```
Are you sure you want to remove link aggregation interface <link_aggregation_
interface_id> from vlan <vlan_id>? [y/N]
```

3. Type **y** and press **ENTER**.

   You will be informed that the link aggregation interface has been successfully removed from the VLAN.

Deleting Link Aggregation Interfaces

Deleting a Specific Interface

To delete a specific link aggregation interface, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and press **ENTER**:

   ```
   no interface link_aggregation <id>
   ```

   The following can happen:

   - If no link aggregation interface exists with that ID, the following message will appear:

     ```
     Can't Delete lag<id>
     ```

   - If a link aggregation interface exists with that ID, you will be asked to confirm your action:

     ```
     Are you sure you want to remove link aggregation interface(s) <id>? [y/N]
     ```

3. Type **y** and press **ENTER**.

   You will be informed that the link aggregation interface has been successfully deleted.

Deleting all Interfaces

To delete all link aggregation interfaces, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

   ```
   clear interface link_aggregation
   ```

   You will be asked to confirm your action:

   ```
   Are you sure you want to remove all link aggregation interface(s)? [y/N]
   ```

3. Type **y** and then press **ENTER**.

   You will be informed that the protection switching interfaces have been successfully deleted.

   ```
   All link aggregation interfaces removed
   ```

6.6. Managing Routes

6.6.1. Viewing the Routes

To view all existing multicast routes, type the following command and press **ENTER**:

```
show route
```

The following information will be displayed about each route:

- **Source IP address:** IP address of the sender of the IP packets. If you do not specify a source IP address, or enter 0.0.0.0, the switch will forward all sources originating from the VLAN you defined.

- **Destination IP address:** IP multicast group address.

- **VLAN:** Identifier of the VLAN the IP packets originate from.

- **Interfaces:** Identifier of the ethernet interfaces that will forward the IP packets to the destination IP address.

Below you can see an example of a route:

```
From                    To                      Vlan        Interfaces
1.1.1.1                 239.1.1.1               4           ['eth1/1']
```

6.6.2. Configuring Routes

To configure a new multicast route, type the following command and then press **ENTER**:

```
configure route <vlan_id><source><destination><interfaces>
```

6.6.3. Deleting Routes

Deleting a Specific Route

To delete a specific multicast route, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**.

   ```
   no route <vlan id> <source> <destination> <interfaces>
   ```

   For example, `no route 10 10.0.0.1 239.1.1.1 eth1`.

   You will be asked to confirm your action:

   ```
   Are you sure you want to delete route? [y/N]
   ```

3. Type Y and then press **ENTER**.

   You will be informed that the route has been successfully deleted.

Deleting Multiple Routes

To delete multiple multicast routes, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type one of the following command and then press **ENTER**.

   To delete:

   - all routes with a specific source IP address, type `no route --source=<source>`.

   - all routes with a specific destination IP address, type `no route --destination=<destination>`.

   - all routes with a specific VLAN, type `no route --VLAN=<vlan_id>`.

   - all routes with specific ethernet interfaces, type `no route --interfaces=<interfaces>`.

   You will be asked to confirm your action:

   `Are you sure you want to delete route? [y/N]`

3. Type Y and then press **ENTER**.

   You will be informed that the routes have been successfully deleted.

Deleting All Routes

To delete all multicast routes, proceed as follows:

1. Enter Configuration Mode.

   See section "Entering Configuration Mode" on page 33.

2. Type the following command and then press **ENTER**:

   `clear route`

   You will be asked to confirm your action:

   `Are you sure you want to delete all route? [y/N]`

3. Type Y and then press **ENTER**.

   You will be informed that the routes have been successfully deleted.

   `All route removed`

6.7. Managing Configuration Files

6.7.1. About Configuration Files

What is a Configuration File?

A configuration file contains the parameters and values used to customize the functionality of the XHub-VIA v2 switch.

It contains the configuration of the different ports, VLANs, interfaces and routes.

Multiple configuration files can be created and saved on the switch. Configuration files can be renamed, copied and deleted. See section "Renaming, Copying and Deleting Configuration Files" on page 60.

Types of Configuration Files

The **startup configuration file** (startup-config) is used during the system startup to configure the software.

The **running configuration file** contains the current configuration of the software.

The startup and running configuration file can be different.

The running configuration file can be modified and the changes can be saved to the same or to a different file. It can also be saved as startup configuration file. See section "Saving and Loading Configurations" on page 58.

Location of the Configuration Files

The configuration files are stored as JSON files on the disk of the switch in the `/data/config/` folder.

Preconfigured Configuration Files

The XHub-VIA v2 switch comes with 2 preconfigured configuration files:

- LiveIP

- XNet-VIA

Depending on the context in which the XHub-VIA v2 switch will be used, one or the other configuration file will be loaded by default at startup.

6.7.2. Viewing the Configuration Files

To view the list of available configuration files, type the following command and then press **ENTER**:

```
show config
```

Initially, only two configuration files will be available:

- LiveIP

- XNet-VIA

6.7.3. Saving and Loading Configurations

Saving the Current Configuration

How to Save the Current Configuration to a File

To save the current configuration to a file, type the following command and press **ENTER**:

```
save <filename>
```

> 🖉   •   The filename cannot contain more than 248 characters.
>   •   Every configuration with a filename that starts with the string "start" will be considered as startup configuration file.

You will be informed that the configuration has been successfully saved:

```
Configuration <filename> written to disk
```

The configuration will be saved as a JSON file in the `/data/config` folder on the switch.

> 🖉   If you save a configuration to a file, and another configuration with the same filename already exists, you will be asked if you want to overwrite that configuration:
> ```
> Are you sure you want to overwrite existing '<filename>' file with this configuration ? [y/N]
> ```

How to Save the Current Configuration as Startup Configuration

To save the current configuration as startup configuration, type one of the following commands and press **ENTER**:

* `write`

* `save startup-config`

You will be informed that the running configuration has been successfully saved as startup configuration:

```
Configuration running save as startup
```

The next time the switch is started, this configuration will be automatically loaded.

Loading a Configuration

To load a previously saved configuration, type the following command and press **ENTER**:

```
load <filename>
```

You will be informed that the configuration has been successfully loaded:

```
Configuration <filename> red from disk
```

The current running configuration is replaced with the newly loaded configuration.

6.7.4. Renaming, Copying and Deleting Configuration Files

Deleting Configuration Files

How to Delete a Configuration File

> 🖉 You cannot delete the running configuration file.

To delete a previously saved configuration, proceed as follows:

1. Type the following command and press ENTER.

   ```
   delete <filename>
   ```

   You will be asked to confirm your action:

   ```
   Are you sure you want to delete the '<filename>' configuration file? [y/N]:
   ```

2. Type Y and press **ENTER**.

   You will be informed that the configuration file ha been successfully deleted.

   ```
   Configuration '<filename>' deleted from disk.
   ```

How to Remove the Startup Configuration

To remove the current startup configuration, proceed as follows:

1. Type the following command and press **ENTER**:

   ```
   write erase
   ```

   You will be asked to confirm your action:

   ```
   Are you sure you want to erase the startup configuration? [y/N]:
   ```

2. Type Y and press **ENTER**.

   You will be informed that the startup-config is being erased and that the currently running configuration file is saved as startup configuration file.

   ```
   Erasing startup configuration file.

   Configuration read from disk

   Configuration running save as startup
   ```

Renaming Configuration Files

To change the filename of an existing configuration file, type the following command:

```
rename <old_filename> <new_filename>
```

You will be informated that the configuration file has been successfully renamed.

```
Configuration '<filename2>' renamed on disk
```

Copying Configuration Files

To create a copy of an existing configuration file, type the following command:

```
copy <filename> <filename2>
```

You will be informated that the configuration file has been successfully copied.

```
Configuration '<filename2>' copied on disk.
```

7. Monitoring

7.1. Extracting Logs

Extracting the Logs to the Local File System of Your Switch

To extract the logs to the local file system of your switch, proceed as follows:

1. Access the CLI of the switch.

2. Type the following command and then press **ENTER**.

   `extractLogs toFileSystem`

   The logs are extracted and stored in the `/data/extractedLogs` folder on the switch in the form of a tar.gz file with the following file name format: `xhubLogs_<DateTime>.tar.gz`.

> 🖉 Each time you generate a new log file, the previous file is removed from the `/data/extracedLogs` folder.

Extracting the Logs to an USB Key

To extract the logs to an USB key, proceed as follows:

1. Plug your USB key in the USB port at the rear of the switch.

2. Access the CLI of the switch.

3. Type the following command and then press **ENTER**:

   `extractLogs toUSB`

   The logs are extracted and stored in the root folder of the USB key in the form of a tar.gz file with the following file name format: `xhubLogs_<DateTime>.tar.gz`.

> 🖉 If you forgot to plug in the USB key, the following message will be displayed:
> `Extract logs Failed, No mounted usb stick`

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