PROFITAP

XX series

XX-720G
XX-1800G
XX-2800G
XX-3200G

NETWORK PACKET BROKERS

USER MANUAL

XX-Series software version: v0.31.2

If you have any questions, visit our Knowledge Base:

https://kb.profitap.com/

You can also contact us through our website:

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1. Overview

1.1. Hardware Overview

XX-Series is a high-end versatile solution, designed for aggregation, advanced filtering and routing of multiple high speed inputs, used in very high sustained bandwidth port monitoring and analysis scenarios.

1.1.1. XX-720G

XX-720G is supplied with either 24 x 1/10G + 2 x 40G or 48 x 1/10G + 6 x 40G enabled ports, depending on the license:

- **XX-720G-242-AC**: 24 x 1/10G SFP+, 2 x 40G QSFP+, 2 x AC PSUs
- **XX-720G-486-AC**: 48 x 1/10G SFP+, 6 x 40G QSFP+, 2 x AC PSUs
- **XX-720G-242-DC**: 24 x 1/10G SFP+, 2 x 40G QSFP+, 2 x DC PSUs
- **XX-720G-486-DC**: 48 x 1/10G SFP+, 6 x 40G QSFP+, 2 x DC PSUs

The unit features the following ports:

- 48 x 1/10G SFP+ and 6 x 40G QSFP+ ports supporting optical transceivers, active optical cables or DAC cables to connect the ports to the hosts
- 1 x management port used to access the unit through an RJ45 Ethernet cable
- 1 x serial management port (mini-USB) to connect to a PC for the initial configuration
- 1 x USB port to load the configuration files or OS from a USB storage device

QSFP+ ports support 4 x 10G splits via fanout cables.

1.1.2. XX-1800G

XX-1800G is supplied with either 24 x 1/10/25G + 2 x 40/100G or 48 x 1/10/25G + 6 x 40/100G enabled ports, depending on the license:

- **XX-1800G-242-AC**: 24 x 1/10/25G SFP28, 2 x 40/100G QSFP28, 2 x AC PSUs
- **XX-1800G-486-AC**: 48 x 1/10/25G SFP28, 6 x 40/100G QSFP28, 2 x AC PSUs
- **XX-1800G-242-DC**: 24 x 1/10/25G SFP28, 2 x 40/100G QSFP28, 2 x DC PSUs
- **XX-1800G-486-DC**: 48 x 1/10/25G SFP28, 6 x 40/100G QSFP28, 2 x DC PSUs

The unit features the following ports:

- 48 x 1/10/25G SFP28 and 6 x 40/100G QSFP28 ports supporting optical transceivers, active optical cables or DAC cables to connect the ports to the hosts
- 1 x management port used to access the unit through an RJ45 Ethernet cable
- 1 x serial management port (mini-USB) to connect to a PC for the initial configuration
- 1 x USB port to load the configuration files or OS from a USB storage device

QSFP28 ports support 4 x 10G and 4 x 25G splits via fanout cables.

1.1.3. XX-2800G

XX-2800G is supplied with either 24 x 1/10/25G + 8 x 40/100G or 48 x 1/10/25G + 16 x 40/100G enabled ports, depending on the license:

- **XX-2800G-248-AC**: 24 x 1/10/25G SFP28, 8 x 40/100G QSFP28, 2 x AC PSUs
- **XX-2800G-4816-AC**: 48 x 1/10/25G SFP28, 16 x 40/100G QSFP28, 2 x AC PSUs
- **XX-2800G-248-DC**: 24 x 1/10/25G SFP28, 8 x 40/100G QSFP28, 2 x DC PSUs
- **XX-2800G-4816-DC**: 48 x 1/10/25G SFP28, 16 x 40/100G QSFP28, 2 x DC PSUs

The unit features the following ports:

- 48 x 1/10/25G SFP28 and 16 x 40/100G QSFP28 ports supporting optical transceivers, active optical cables or DAC cables to connect the ports to the hosts
- 1 x management port used to access the unit through an RJ45 Ethernet cable
- 1 x serial management port (RJ45) to connect to a PC for the initial configuration
- 1 x USB port to load the configuration files or OS from a USB storage device

QSFP28 ports support 4 x 10G and 4 x 25G splits via fanout cables.

1.1.4. XX-3200G

XX-3200G is supplied with either 16 x 40/100G or 32 x 40/100G enabled ports, depending on the license:

- **XX-3200G-16-AC**: 16 x 40/100G QSFP28, 2 x AC PSUs
- **XX-3200G-32-AC**: 32 x 40/100G QSFP28, 2 x AC PSUs
- **XX-3200G-16-DC**: 16 x 40/100G QSFP28, 2 x DC PSUs
- **XX-3200G-32-DC**: 32 x 40/100G QSFP28, 2 x DC PSUs

The unit features the following ports:

- 32 x 40/100G QSFP28 ports supporting optical transceivers, active optical cables or DAC cables to connect the ports to the hosts
- 1 x management port used to access the unit through an RJ45 Ethernet cable
- 1 x serial management port (RJ45) to connect to a PC for the initial configuration
- 1 x USB port to load the configuration files or OS from a USB storage device

QSFP28 ports support 4 x 10G and 4 x 25G splits via fanout cables.

All models can be managed via CLI, or via a web-based GUI.

1.2. Supported Cables and Transceivers

Profitap XX-Series devices are not vendor locked to any specific brand of QSFP or SFP modules and cables. For optimal support, Profitap transceivers are recommended.

	XX-720G	XX-1800G	XX-2800G	XX-3200G
1000BASE-T SFP Module	✔	✔	✔	
1000BASE-SX SFP Module	✔	✔	✔	
1000BASE-LX/LH SFP Module	✔	✔	✔	
10G SFP+ Direct Attach Cable	✔	✔	✔	
10G SFP+ Active Optical Cable	✔	✔	✔	
10GBASE-T SFP+ Module	✔	✔	✔	
10GBASE-SR SFP+ Module	✔	✔	✔	
10GBASE-LR SFP+ Module	✔	✔	✔	
25G SFP28 Direct Attach Cable		✔	✔	
25G SFP28 Active Optical Cable		✔	✔	
25GBASE-SR SFP28 Module		✔	✔	
40G QSFP+ Direct Attach Cable	✔	✔	✔	✔
40G QSFP+ Active Optical Cable	✔	✔	✔	✔
40GBASE-SR4 QSFP+ Module	✔	✔	✔	✔
40GBASE-LR4 QSFP+ Module	✔	✔	✔	✔
40GBASE-PLR4 QSFP+ Module	✔	✔	✔	✔
40GBASE-SR-BD QSFP+ Module	✔	✔	✔	✔
40GBASE-SR-BD Rx only QSFP+ Module	✔	✔	✔	✔
100G QSFP28 Direct Attach Cable		✔	✔	✔
100G QSFP28 Active Optical Cable		✔	✔	✔
100GBASE-SR4 QSFP28 Module		✔	✔	✔
100GBASE-LR4 QSFP28 Module		✔	✔	✔
100GBASE-SR-BD QSFP28 Module		✔	✔	✔
100GBASE-SR-BD Rx only QSFP28 Module		✔	✔	✔

1.3. XX-720G

1.3.1. Package Contents

Carefully unpack all the supplied items and retain the packaging for later use.

- 1 x XX-720G main unit
- 2 x C13 AC power cord
- 1 x mini-USB to RJ45 male serial cable
- 1 x mini-USB to RJ45 female serial cable
- 1 x RJ45 female to 9-pin serial adapter
- 1 x rack mounting kit (front and rear brackets, screws)

> **Note:** Please contact the supplier if any part is missing or damaged.

1.3.2. Installation as Standalone

The unit can be installed as a standalone unit.

To ensure proper heat dissipation and ventilation, leave at least 15 cm (6 inches) of space behind the unit and 5 cm (2 inches) in front.

1.3.3. Installation in a Rack

The unit can be mounted in a standard 19’’ (1U) rack using the provided mounting brackets.

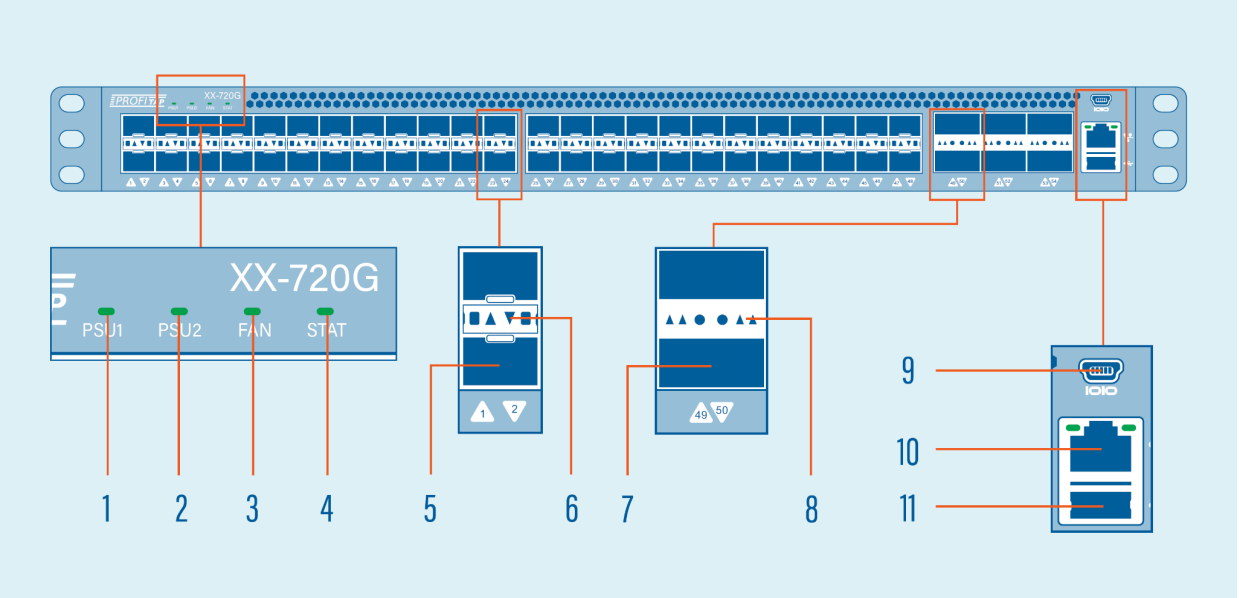
1. Slide the main chassis into the desired rack location.
2. Secure the chassis using the supplied screws.
3. Make sure the rack is grounded properly.

To install the switch without a shelf, use the included rack mount kit.

1.3.4. Technical and Electrical Specifications

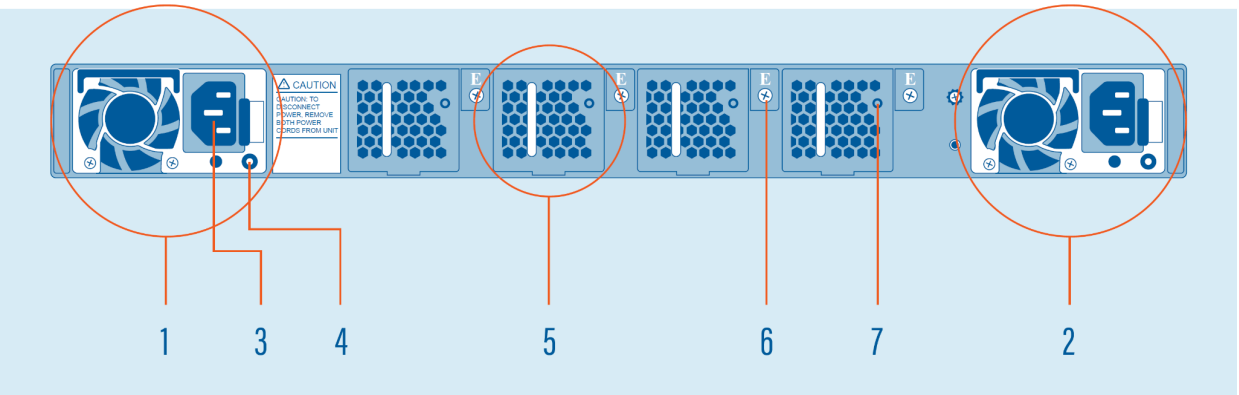
- 2.4 GHz quad-core CPU
- 1280 Gbps ASIC
- AC Model: 2 x 550 W, 100–240 VAC, 50–60 Hz, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- DC Model: 2 x 800 W, -40–-60 VDC, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- Typical/Max power draw: 210/280 W
- Maximum heat dissipation: 1650 BTU/hr
- Cooling: 4 redundant (N+1) hot-swappable fans
- Operating temperature: 0°C to 45°C — 32°F to 113°F
- Operating humidity: 20% to 95%, non-condensing
- Dimensions (WxDxH): 440 x 410 x 44 mm — 17.32 x 16.14 x 1.73 in
- MTBF: 212,443 hours

1.3.5. Front View



1	PSU1 status LED	7	40G QSFP+ ports (49–54)
2	PSU2 status LED	8	QSFP+ port activity LEDs
3	Fan status LED	9	Serial management port
4	System status LED	10	Ethernet management port
5	1/10G SFP+ ports (1–48)	11	USB port
6	SFP+ port activity LEDs		

1.3.6. Rear View



1	PSU1	5	Hot-swappable fan module
2	PSU2	6	Fan module screw
3	AC power connector	7	Fan status LED
4	PSU status LED		

1.3.7. LED Functionality

LED Function	LED State	Description
PSU1/PSU2 status LED	Off	Power is not supplied to the device
	Green	PSU is operating normally
	Orange	Signal issues: - PSU is present, but no current is supplied - Fan Lock - OTP: Over Temperature Protection - OCP: Over Current Protection - OVP: Over Voltage Protection - UVP: Under Voltage Protection
Fan status LED	Green	Fan operating normally
	Orange	Fan fault: check rear of unit to see which fan is faulty
System status LED	Green	System operating normally
	Orange	System warning
SFP+ port LED	Off	No link
	Green	10G link
	Blinking green	10G activity
	Yellow	1G link
	Blinking yellow	1G activity
QSFP+ port LED	Off	No link
	Green	40G link
	Blinking green	40G activity

1.4. XX-1800G

1.4.1. Package Contents

Carefully unpack all the supplied items and retain the packaging for later use.

- 1 x XX-1800G main unit
- 2 x C13 AC power cord
- 1 x mini-USB to RJ45 male serial cable
- 1 x mini-USB to RJ45 female serial cable
- 1 x RJ45 female to 9-pin serial adapter
- 1 x rack mounting kit (front and rear brackets, screws)

> **Note:** Please contact the supplier if any part is missing or damaged.

1.4.2. Installation as Standalone

The unit can be installed as a standalone unit.

To ensure proper heat dissipation and ventilation, leave at least 15 cm (6 inches) of space behind the unit and 5 cm (2 inches) in front.

1.4.3. Installation in a Rack

The unit can be mounted in a standard 19’’ (1U) rack using the provided mounting brackets.

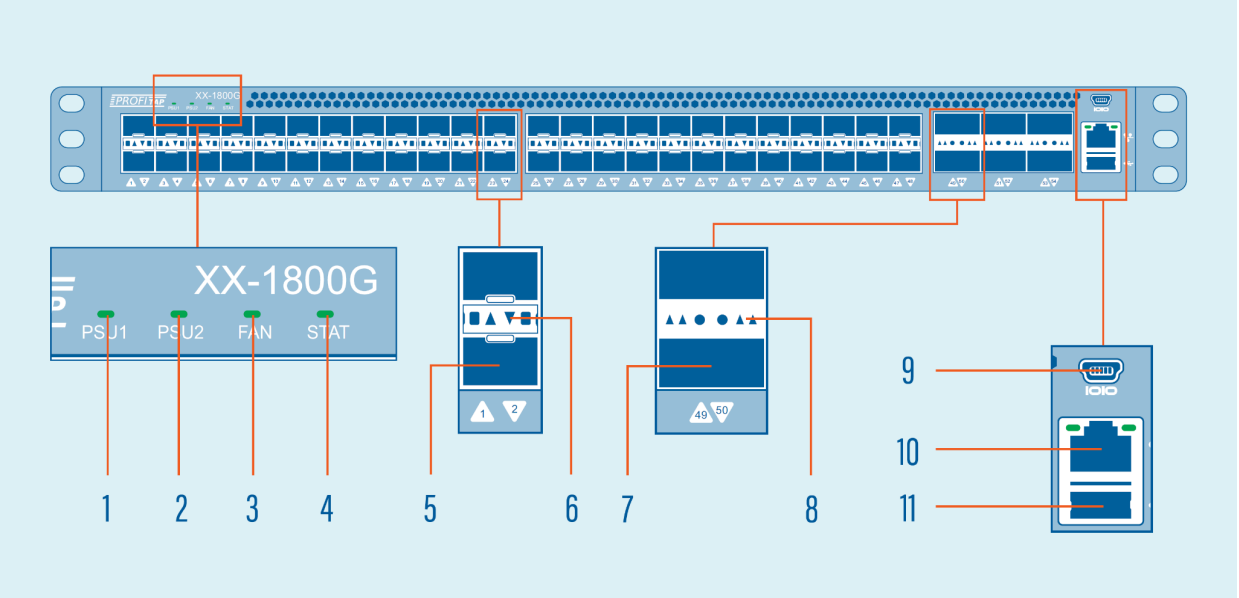
1. Slide the main chassis into the desired rack location.
2. Secure the chassis using the supplied screws.
3. Make sure the rack is grounded properly.

To install the switch without a shelf, use the included rack mount kit.

1.4.4. Technical and Electrical Specifications

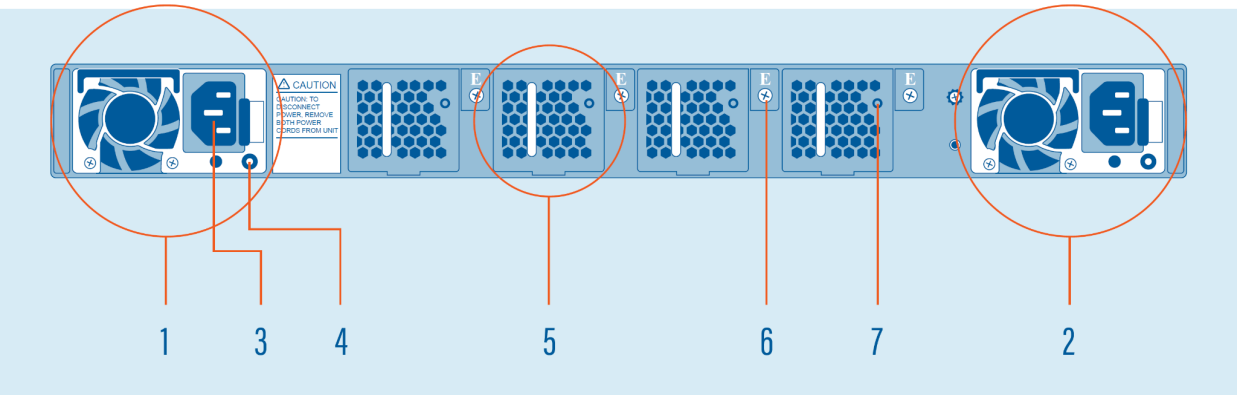
- 2.4 GHz quad-core CPU
- 1.8 Tbps ASIC
- AC Model: 2 x 550 W, 100–240 VAC, 50–60 Hz, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- DC Model: 2 x 800 W, -40–-60 VDC, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- Typical/Max power draw: 210/480 W
- Maximum heat dissipation: 1650 BTU/hr
- Cooling: 4 redundant (N+1) hot-swappable fans
- Acoustic low-speed fan: each fan is ~70 dB max, therefore < 80 dB total (including the PSU fans); the actual value will depend on fan management policy
- Operating temperature: 0°C to 45°C — 32°F to 113°F
- Operating humidity: 20% to 95%, non-condensing
- Non-operating/Storage temperature: -40 °C to 70 °C
- Non-operating/Storage relative humidity: 10% to 95%, non-condensing
- Dimensions (WxDxH): 440 x 410 x 44 mm — 17.32 x 16.14 x 1.73 in
- MTBF: 212,443 hours
- MTTR: 20 hours

1.4.5. Front View



1	PSU1 status LED	7	40/100G QSFP28 ports (49–54)
2	PSU2 status LED	8	QSFP28 port activity LEDs
3	Fan status LED	9	Serial management port
4	System status LED	10	Ethernet management port
5	1/10/25G SFP28 ports (1–48)	11	USB port
6	SFP28 port activity LEDs		

1.4.6. Rear View



1	PSU1	5	Hot-swappable fan module
2	PSU2	6	Fan module screw
3	AC power connector	7	Fan status LED
4	PSU status LED		

1.4.7. LED Functionality

LED Function	LED State	Description
PSU1/PSU2 status LED	Off	Power is not supplied to the device
	Green	PSU is operating normally
	Orange	Signal issues: - PSU is present, but no current is supplied - Fan Lock - OTP: Over Temperature Protection - OCP: Over Current Protection - OVP: Over Voltage Protection - UVP: Under Voltage Protection
Fan status LED	Green	Fan operating normally
	Orange	Fan fault: check rear of unit to see which fan is faulty
System status LED	Green	System operating normally
	Orange	System warning
SFP28 port LED	Off	No link
	Green	25G link
	Blinking green	25G activity
	Yellow	10G link
	Blinking yellow	10G activity
QSFP28 port LED	Off	No link
	Green	100G link
	Blinking green	100G activity
	Yellow	40G link
	Blinking yellow	40G activity

1.5. XX-2800G

1.5.1. Package Contents

Carefully unpack all the supplied items and retain the packaging for later use.

- 1 x XX-2800G main unit
- 2 x C13 AC power cord
- 1 x RJ45 female to 9-pin serial adapter
- 1 x RJ45 cable
- 1 x rack mounting kit (front and rear brackets, screws)

> **Note:** Please contact the supplier if any part is missing or damaged.

1.5.2. Installation as Standalone

The unit can be installed as a standalone unit.

To ensure proper heat dissipation and ventilation, leave at least 15 cm (6 inches) of space behind the unit and 5 cm (2 inches) in front.

1.5.3. Installation in a Rack

The unit can be mounted in a standard 19’’ (1U) rack using the provided mounting brackets.

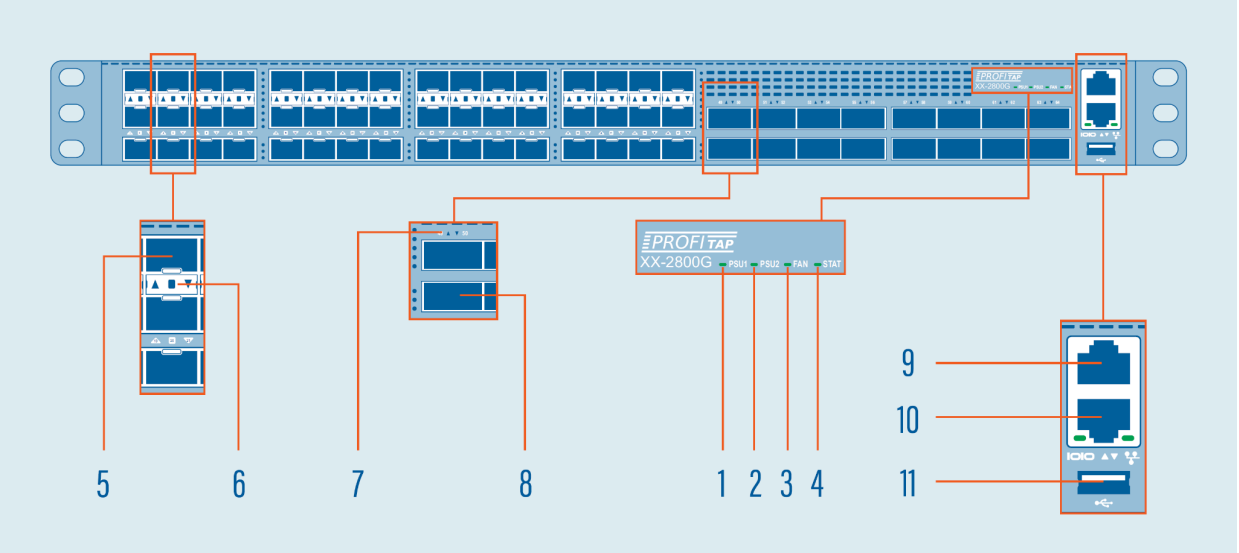
1. Slide the main chassis into the desired rack location.
2. Secure the chassis using the supplied screws.
3. Make sure the rack is grounded properly.

To install the switch without a shelf, use the included rack mount kit.

1.5.4. Technical and Electrical Specifications

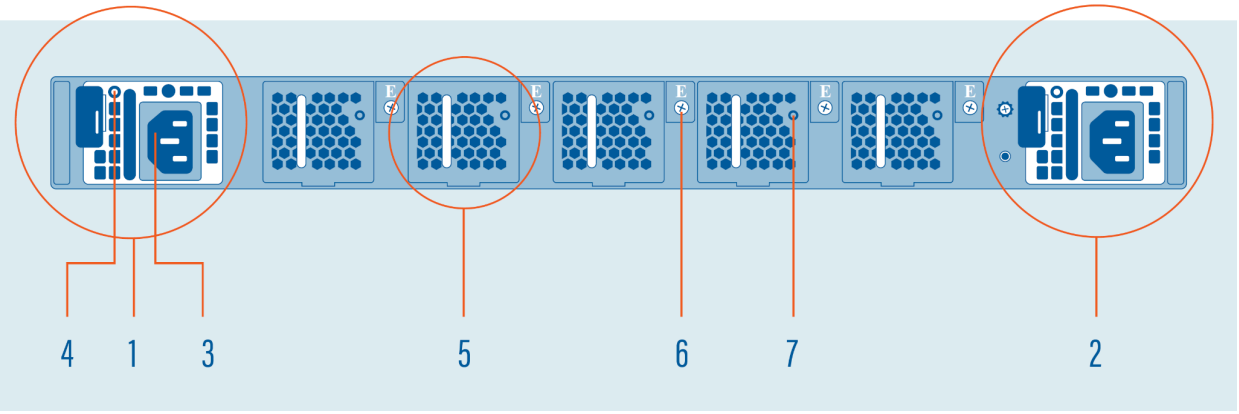
- 2.4 GHz quad-core CPU
- 3.2 Tbps ASIC
- AC Model: 2 x 550 W, 100–240 VAC, 50–60 Hz, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- DC Model: 2 x 800 W, -40–-60 VDC, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- Typical power consumption: 210 W
- Maximum heat dissipation: 1650 BTU/hr
- Cooling: 4 redundant (N+1) hot-swappable fans
- Operating temperature: 0°C to 45°C — 32°F to 113°F
- Operating humidity: 20% to 95%, non-condensing
- Dimensions (WxDxH): 440 x 410 x 44 mm — 17.32 x 16.14 x 1.73 in

1.5.5. Front View



1	PSU1 status LED	7	40/100G QSFP28 ports (49–64)
2	PSU2 status LED	8	QSFP28 port activity LEDs
3	Fan status LED	9	Serial management port
4	System status LED	10	Ethernet management port
5	1/10/25G SFP28 ports (1–48)	11	USB port
6	SFP28 port activity LEDs		

1.5.6. Rear View



1	PSU1	5	Hot-swappable fan module
2	PSU2	6	Fan module screw
3	AC power connector	7	Fan status LED
4	PSU status LED		

1.5.7. LED Functionality

LED Function	LED State	Description
PSU1/PSU2 status LED	Off	Power is not supplied to the device
	Green	PSU is operating normally
	Orange	Signal issues: - PSU is present, but no current is supplied - Fan Lock - OTP: Over Temperature Protection - OCP: Over Current Protection - OVP: Over Voltage Protection - UVP: Under Voltage Protection
Fan status LED	Green	Fan operating normally
	Orange	Fan fault: check rear of unit to see which fan is faulty
System status LED	Green	System operating normally
	Orange	System warning
SFP28 port LED	Off	No link
	Green	25G link
	Blinking green	25G activity
	Yellow	1/10G link
	Blinking yellow	1/10G activity
QSFP28 port LED	Off	No link
	Green	100G link
	Blinking green	100G activity
	Yellow	40G link
	Blinking yellow	40G activity

1.6. XX-3200G

1.6.1. Package Contents

Carefully unpack all the supplied items and retain the packaging for later use.

- 1 x XX-3200G main unit
- 2 x C13 AC power cord
- 1 x RJ45 female to 9-pin serial adapter
- 1 x RJ45 cable
- 1 x rack mounting kit (front and rear brackets, screws)

> **Note:** Please contact the supplier if any part is missing or damaged.

1.6.2. Installation as Standalone

The unit can be installed as a standalone unit.

To ensure proper heat dissipation and ventilation, leave at least 15 cm (6 inches) of space behind the unit and 5 cm (2 inches) in front.

1.6.3. Installation in a Rack

The unit can be mounted in a standard 19’’ (1U) rack using the provided mounting brackets.

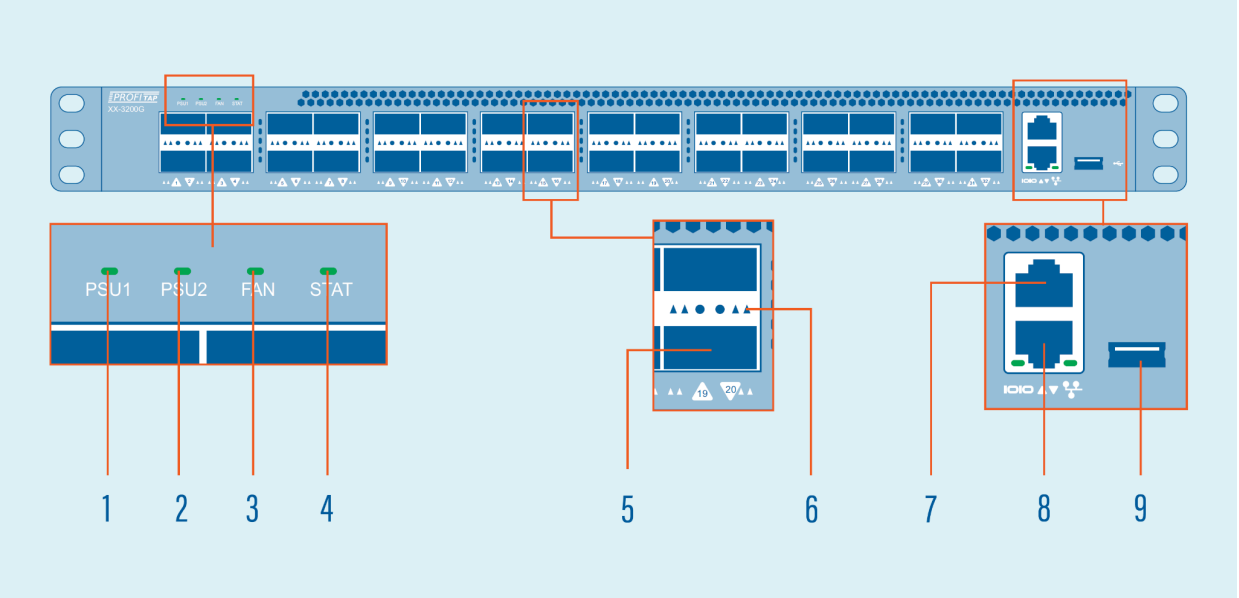
1. Slide the main chassis into the desired rack location.
2. Secure the chassis using the supplied screws.
3. Make sure the rack is grounded properly.

To install the switch without a shelf, use the included rack mount kit.

1.6.4. Technical and Electrical Specifications

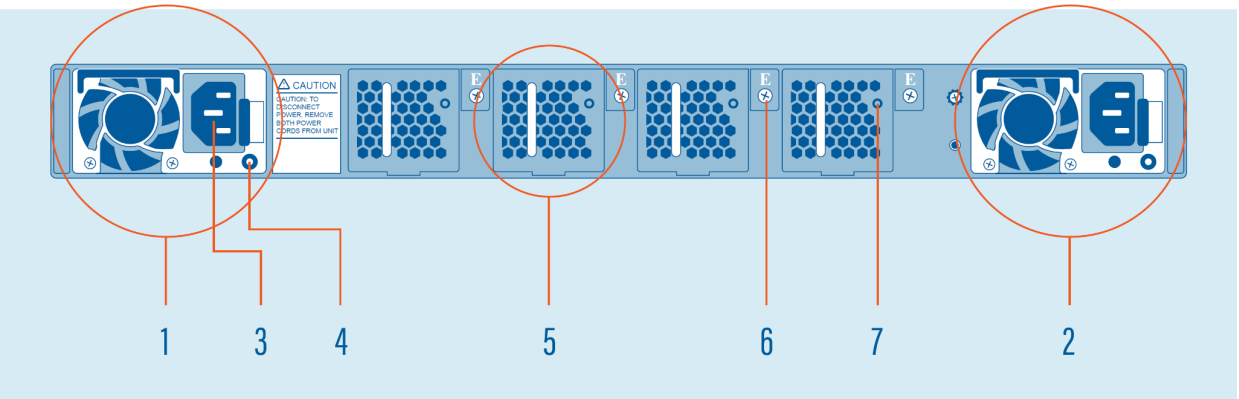
- 2.4 GHz quad-core CPU
- 3.2 Tbps ASIC
- AC Model: 2 x 550 W, 100–240 VAC, 50–60 Hz, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- DC Model: 2 x 800 W, -40–-60 VDC, 80 Plus Platinum efficiency power supply (1 required for operation, 2 for redundancy)
- Typical power consumption: 210 W
- Maximum heat dissipation: 1650 BTU/hr
- Cooling: 4 redundant (N+1) hot-swappable fans
- Operating temperature: 0°C to 45°C — 32°F to 113°F
- Operating humidity: 20% to 95%, non-condensing
- Dimensions (WxDxH): 440 x 410 x 44 mm — 17.32 x 16.14 x 1.73 in
- MTBF: 206,685 hours

1.6.5. Front View



1	PSU1 status LED	6	QSFP28 port activity LEDs
2	PSU2 status LED	7	Serial management port
3	Fan status LED	8	Ethernet management port
4	System status LED	9	USB port
5	40/100G QSFP28 ports (1–32)		

1.6.6. Rear View



1	PSU1	5	Hot-swappable fan module
2	PSU2	6	Fan module screw
3	AC power connector	7	Fan status LED
4	PSU status LED		

1.6.7. LED Functionality

LED Function	LED State	Description
PSU1/PSU2 status LED	Off	Power is not supplied to the device
	Green	PSU is operating normally
	Orange	Signal issues: - PSU is present, but no current is supplied - Fan Lock - OTP: Over Temperature Protection - OCP: Over Current Protection - OVP: Over Voltage Protection - UVP: Under Voltage Protection
Fan status LED	Green	Fan operating normally
	Orange	Fan fault: check rear of unit to see which fan is faulty
System status LED	Green	System operating normally
	Orange	System warning
QSFP28 port LED	Off	No link
	Green	100G link
	Blinking green	100G activity
	Yellow	40G link
	Blinking yellow	40G activity

2. Connecting Power and Start-Up

After ensuring all the necessary precautions have been taken during installation, the unit can be powered on. The system does not have a main switch: it powers up if one of the redundant power supplies is being connected to the main power.

The use of both power supplies is recommended to achieve a maximum fail-safe operation at all times.

The power supply modules are hot swappable: they can be exchanged or new modules can be added at all times under power, but data loss during the exchange must be taken into account.

XX-Series devices are equipped with status and activity LEDs. For more details on status LEDs color and coding, see chapters 1.3.7 (XX-720G), 1.4.7 (XX-1800G), 1.5.7 (XX-2800G), or 1.6.7 (XX-3200G).

3. Initial Access

The first-time access to the system can only be done through the serial management port. Connect a computer to the serial port, using the supplied cable and adapters. Using any terminal software, use the following connection settings: 115200 baud rate, 8 bit, no parity, 1 bit stop.

Log in, using the following credentials:

- Username: **profitap**
- Password: **profitap**

Follow the prompt to create an administrator account. After creating the new admin user, the session will close. The factory default user (profitap) remains active for direct connections to the unit's serial management port.

To reset the users database, run the following command:

```
.system.users.reset
```

3.1. Configuring the Ethernet Management Port

After logging in with the newly created admin account, the Ethernet management port can be configured by running the following command:

```
.system.network.set
```

Depending on user requirements, the IP can be set to either dynamic (DHCP) or static (custom IP). Follow the instructions to configure the preferred option.

After the configuration is complete, the system is accessible through the network via SSH and web GUI at: `https://<ip_addr>`

XX-Series devices can also be connected directly to a computer through the Ethernet management port. In this case, manual IP policy must be applied to both the unit and the computer.

> **Note:** If the computer network interface is limited to 10/100 Mbps, a special twisted pair cable must be used instead of a normal patch cable.

For security reasons, an SSL certificate is pre-installed. This certificate can be replaced with a new one via the following command (see command line reference for more information):

```
.system.ssl_cert
```

4. Web Administration

XX-Series devices can be administered either in CLI mode or via a web-based GUI, which is OS and platform independent.

Grouped by functionality, six menu tabs are displayed on the left side of the interface:

- Device Status
- Port Management
- Statistics
- Traffic Management
- Authentication
- Administration

4.1. Device Status

The **Information** tab in the **Device Status** menu displays details about the status of the device and the system administrator contact information:

- System information (model version, hardware and software revisions, serial number)
- Administrator information (name, phone number, email address)
- Date and time information
- Network details
- Sensors (air temperature measured in proximity of the fans block, system temperature measured within the forwarding plane chip, CPU temperature, PSU and fan status)
- Temperature readings for CPU, system and external air over time (can be expanded for an improved view)

4.2. Port Management

The **Port Management** page is a graphical representation of the system, providing detailed status information and allowing an easy configuration of each interface (port), as well as a more detailed view of the attached SFP modules. Besides the visual overview, the port information is also provided in a list view.

Configuration of a port is done by left-clicking on its graphical representation, thus exposing the following menu:

- **Port**: Shows the port number.
- **Status**: Displays additional information about the selected port: the current state of the port, the Tx and Rx bandwidth statistics, and the transceiver information (if present). This window also allows the port label to be changed, the transceiver TX signal to be enabled or disabled, and a VLAN tag to be added to the frames received through the interface.
- **Enable/Disable**: Allows the user to enable or disable a specific interface.
- **Speed**: Allows the user to set a specific speed for an individual port. Note that for the SFP+/SFP28 ports, the user cannot set individual port speeds, given these ports are grouped by 4 in the data plane. The interface will change the speed configuration in a consistent way, however it is the user's responsibility to make sure that the connected modules are capable of the selected speeds.
- **Split/Unsplit**: (Only for QSFP+/QSFP28 interfaces): this option allows the user to use the interface as a combined set of 4xSFP+/4xSFP28 ports. This is necessary in order to use split cables.
- **Reset**: Allows the user to reset the port configuration to the default state.

> **Note:** Enabling or disabling tags will momentarily restart the filtering engine, resulting in a brief brake in the output flow.
>
> **Note 2:** Setting any port's speed to 25G, or from 25G to any other speed, will trigger a momentary reset of the device interfaces. This will briefly impact the traffic flow.
>
> **Note 3:** Depending on the SFP model, configuring an interface from 1G to 25G may generate temporary traffic flow issues. This can be mitigated by first switching the interface to 10G, and then to 25G.

4.3. Statistics

The **Statistics** page displays specific statistics counters, either globally, or filtered by the interfaces selected.

The **Ports Statistics** tab displays traffic statistics for the selected interface(s). Clicking one or more interfaces will result in visually check-marking them and in adding new column(s) with their respective data stats. The *Reset All Statistics* button will perform a reset of the hardware counters used in all the ports.

The **Global Statistics** tab displays global sent and received data as well as traffic rules related counters.

The **Charts** tab displays Tx and Rx bandwidth usage for the selected ports with bandwidth charts.

4.4. Traffic Management

The **Traffic Management** page allows users logged in as administrators to create custom traffic aggregation, duplication and filtering rules, as well as enable load balancing for multiple interfaces, tailoring the way data flows on each port of the unit.

These custom settings are grouped into Rule Sets. Rule Sets can be managed and activated from the list in the Rule Sets tab. Only **one** Rule Set is active at any time.

The **Active Rule Set** tab displays the Rule Set that is currently active, and its details, including the filtered interfaces, and the ones linked in load balancing.

The **Rule Sets** tab displays the list of existing sets of rules (the active one being highlighted), allowing users logged in as administrators to:

- Create a rule set
- Configure a rule set
- Activate a rule set
- Rename a rule set
- Delete a rule set

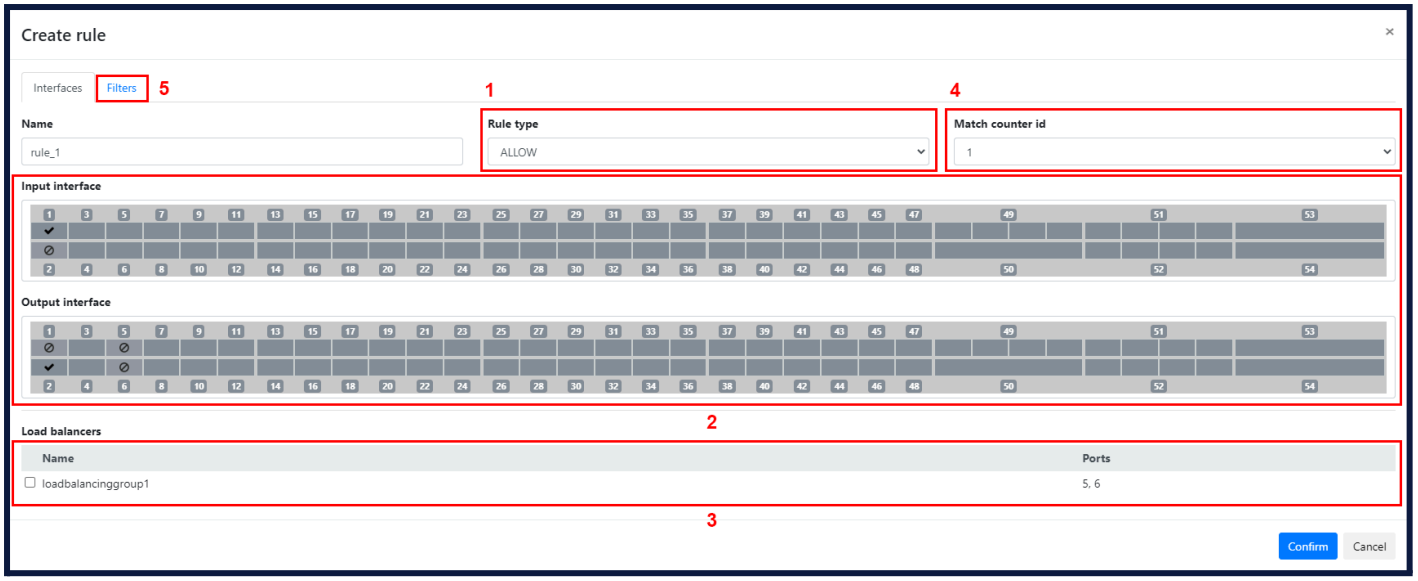
> **Note:** Only one rule set can be active at a time.

A rule set needs to be composed of at least one rule in order to be taken into account and have any effect when applied. Rules can be added, modified or deleted.

> **Important:** Only data matching at least one of the defined rules will pass through, everything else will be dropped.

The rules define how the traffic will be processed by the packet broker.

XX-Series devices support up to 255 “one port to one port” rules, or “interface links”. Each rule can contain one or more interface links.



The first step in creating a new rule is defining the behavior of that rule [1]. The possible options are:

ALLOW: Only the traffic matching the defined filters will be forwarded;
EGRESS DROP: The traffic matching the defined filter will be removed from the stream.

The *Input interface* and *Output interface* sections [2] allow the user to define which ports will be used as source for the traffic stream and which ports will be used as destination.

- ➢ When selecting multiple **input** ports, the traffic incoming on these interfaces will be **aggregated (N:1 configuration)**.
- ➢ When selecting multiple **output** ports, the traffic stream to these interfaces will be **replicated (1:M configuration)**.
- ➢ If multiple inputs and outputs are selected, the device will first **aggregate** the incoming traffic and then **replicate** the resulting stream to all of the selected output ports **(N:M configuration)**.

If load balancing groups have been created, they appear in the *Load balancers* section [3]. Selecting one or more groups here will set them as output, in which case output interfaces won't need to be selected in the section above. Selecting multiple load balancing groups will replicate the traffic to each of these groups.

The *Match counter id* option [4] can be used to start a counter monitoring the amount of packets matching the defined filter. These counters will be displayed on the **Global Statistics** page.

The **Filters** tab [5] allows the user to configure the way in which traffic is targeted, according to specific rules related to its L2, L3 and L4 packet headers:

- **Packet type**
  This selection will discard all other types of data but the selected one. Selecting *ANY PACKET* allows all types of packets to pass through.
- **MAC layer**
  Only frames matching MAC details configured in this section will be allowed to pass through.
- **EtherType**
  Only frames matching EtherType details configured in this section will be allowed to pass through. Only available when *Packet type* selection is set to *ANY PACKET*.

- **Transport layer**
  Only packets matching transport layer details configured in this section will be allowed to pass through. Not available when *Packet type* selection is set to *ARP*.

- **802.1q VLAN fields**
  Only frames matching VLAN details configured in this section (having a VLAN tag in their header, added before entering the NPB) will be allowed to pass through. The VLAN Mask is a hexadecimal field that can be used to filter one or multiple VLAN IDs at the same time.

  Example:
  VID: 0 and HEX MASK: FFC will match VIDs: 0, 1, 2, 3;
  VID: 1 and HEX MASK: FFF will match only VID 1.

- **IPv4 layer**
  Only packets matching IPv4 details configured in this section will be allowed to pass through. Only available when *Packet type* selection is set to *IPv4*.

- **IPv6 layer**
  Only packets matching IPv6 details configured in this section will be allowed to pass through. Only available when *Packet type* selection is set to *IPv6*.

> **Note:** If multiple filter fields are configured, only packets matching all filters will be targeted.

When **Load Balancing** is enabled for a group of interfaces, it is important to remember that when a port is inserted in one of these groups, it cannot be used in additional rules and will be displayed as unavailable in the port layout. Additionally, in order to have a consistent behavior of the load balancing group, all the interfaces belonging to that group must operate at the same speed.

By default, the load balancing port selection algorithm is taking into account all the information included up to Layer 4. This behavior can be changed by clicking the *Configure* button.

The **Import / Export** tab allows users to import and export one or multiple rule sets, using a .json file as the storage medium. Once a rule set has been imported, the Rule Sets tab will be displayed, showing the additional imported rule sets.

> **Note:** Rule Sets names are unique, therefore trying to import rule sets having the same name as the ones already configured in the unit will give an error message. Also, exported rules should only be imported on the same model of XX-Series network packet broker.

4.5. Authentication

4.5.1. Local Users

The **Authentication > Local** page allows users logged in as administrators to add new users or edit existing users and their privilege levels. Depending on the selected role, the user has the following privileges:

- **administrator**: full control, limitless administration and system update;
- **user**: create and set rules, aggregate and filter traffic, and port configuration;
- **viewer**: view only: settings, statistics, active rules.

The minimum requirements for the passwords are as follows:

- 8 characters;
- one letter uppercase;
- one letter lowercase;
- one digit;
- one special character.

4.5.2. TACACS+

The **Authentication > TACACS+ page** allows adding up to five TACACS+ servers, and configuring the following details:

- priority (sets the order in which the servers will be taken into account, if more are added, with a lower number corresponding to a higher priority);
- login type (chap, login, pap);
- server hostname;
- port;
- secret key;
- timeout (waiting time for response from the TACACS+ server, can be set between 1 and 3 seconds);
- privilege mapping (translates the 15 privilege levels from TACACS+ into those of the viewers, users and admins; can be configured).

Enabling TACACS+ server authentication applies to all login methods: serial, SSH, and GUI.

If multiple servers are present, server priority can be changed by using the arrow buttons and clicking the *Save server list* button.

4.5.3. RADIUS / LDAP

XX-Series doesn't support RADIUS or LDAP authentication natively, though it is possible via Profitap Supervisor.

4.5.4. Supervisor

Profitap Supervisor can be used as a centralized authentication facility for all XX-Series and X2-Series packet brokers.

This feature can be enabled in the Supervisor when registering the device. The centralized manager will automatically register in the device as an authentication facility. From this moment on, the XX-Series device will query the Supervisor to verify, using its authentication configuration, if the credentials used for login are valid. This feature allows the user to define the whole authentication configuration for all Profitap NPBs in a

single point and have it being used across the whole fleet of packet brokers. Thanks to this feature, it is possible to use RADIUS and LDAP authentication in XX-Series devices (in addition to Local Users and TACACS+).

In the **Profitap Supervisor** tab, it is possible to visualize if any Supervisor has been registered with the device and eventually modify the address, port and registration token. Note that the Supervisor is already performing the registration process automatically and these settings shouldn't require any manual change.

When disabling the Profitap Supervisor from this GUI, the XX-Series device will stop reaching to the Supervisor for authentication.

Note: The Profitap Supervisor Authentication is only supported for GUI and REST API access.

4.5.5. Authentication Methods Priorities

For the CLI, the authentication methods priorities are: TACACS+ > Local Users.

For the GUI and RestAPI, the priorities are: Local Users > Supervisor > TACACS+.

4.6. Administration

The **Administration** section allows users with administrator privileges to change system-related settings.

4.6.1. Setup

The **Setup** tab allows editing the administrator contact details (name, phone, email), login banner, asset information, system date and time, network configuration, exporting and importing device configuration, and managing the SSL certificate.

> **Note:** In case the IP is set from static to DHCP, the new IP must first be discovered or allocated by the gateway (using a MAC address table). Also, disabling the network interface will make the web interface unavailable, in which case a serial connection to the unit must be established in order to reactivate the network interface (see chapter 5.1).

In the *Administrator contact* section, the administrator's name, phone number and email address can be set. A login banner text can also be set, which will appear on the device's login screen.

The *Device configuration backup* section of the *Setup* tab allows the exporting and importing of the unit's configuration. The data can be exported by inserting a passphrase and pressing the *Export Configuration* button. The system will generate an encrypted archive that can be safely stored as backup. This package can be imported back to the unit by insert the passphrase that was used for exporting, pressing the *Choose File* button, selecting the archived configuration file, and pressing the *Import Configuration* button.

The *Device Control* section provides the ability to import or renew the SSL certificate for the web interface, and to reboot the unit. The *Regenerate* button creates a new SSL certificate. To import a pre-generated SSL certificate and key, click the *Choose File* button for both *HTTPS Certificate* and *HTTPS Key* and select the appropriate files to upload. Both key and certificate files are expected to be in PEM format, and should not be password-protected. Click the *Import* button. After both files have been uploaded, the system checks their validity, replaces the current versions, and restarts the web interface.

4.6.2. Firmware

The **Firmware** tab allows the installation of a new firmware on the device. The latest firmware version is available publicly at https://xxseries.profitap.com/. The system will reboot after the installation is complete.

The *License Information* section displays information related to the device license, and allows the license to be updated.

The license can also be updated from the command line interface via the following command:

```
.system.licence.install
```

4.6.3. SNMP

The **SNMP** tab can be used to control the device's SNMP (v2c/v3) settings.

The switch control at the top of the page can be used to enable or disable the SNMP agent running inside the device. The interface also allows the configuration of SNMP community entries (v2c) and users (v3). These can be used to receive GET/WALK requests or to configure trapsinks. It is possible to download the necessary Profitap-specific MIB definitions using the *Download MIBs* button. The device can register SNMP Traps sink servers. Once configured, these will receive Trap signals for one of the following events:

- PSU Hardware state change;
- FAN hardware state change;
- Device Temperature reaching warning levels;
- Device Temperature reaching critical levels;
- Ports changing link state;
- Ports detecting packets incoming with CRC error.

4.6.4. Firewall

The **Firewall** tab provides the ability to configure the device management service access control list. The IP address ranges that are allowed to access the various device services can be defined here.

The access control policy can be set to either *Whitelist* or *Blacklist*. In *Whitelist* mode, external requests not matching any ACL entry will be denied. In *Blacklist* mode, external requests not matching any ACL entry will be allowed.

WARNING: In *Whitelist* mode, if all entries are removed and the configuration is saved, management interface services won't be accessible anymore. In order to regain access, the serial CLI will need to be used, and the necessary ALLOW entry added.

4.6.5. Syslog

The **Syslog** tab displays the system logs stored locally on the device. The GUI allows the user to visualize the latest logs entries and to download the entire log file.

From this tab, it is also possible to configure remote collectors for the device logs. This can be done by clicking the *Remote Servers* button and using the view that appears to configure the remote logging server details.

5. Command Line Reference

After logging into the system, the user has access to all available commands, grouped into four menus, as follows:

- Configuration
- Statistics
- Status
- System

Each menu can be selected by typing its name in the console, e.g.:

```
.> configuration
```

Useful commands to navigate the console:

- ***ls*** or ***help*** to list available branches (or by hitting TAB from keyboards)
- ***.*** returns to the initial branch
- ***..*** returns to the previous branch
- CTRL+D cancels a running command

Commands residing in cascading menus can also be executed from any location, outside their normal context menu, using the [**.**] prefix, provided the path and the command name is known, e.g.:

```
.status.device.> .configuration.interface.01
.configuration.interface.01.>
```

5.1. Configuration

The **Configuration** menu is used for the administration of all the interfaces (ports) in the system. An interface must first be selected (from 01 to 32, 54 or 64 depending on the model) before configuring it:

```
.configuration.> interface.01
.configuration.interface.01.>
```

The following commands are available:

```
.configuration.interface.01.enable [on/off]
```

on enables the selected interface.

off disables the selected interface.

```
.configuration.interface.01.label [show/set/reset]
```

show displays the port label.

set sets the port label.

reset resets the port label.

```
.configuration.interface.01.reset
```

Deletes all configurations made for the selected interface and restores it to a default state. After issuing the command, the user must confirm it [yes / no].

```
.configuration.interface.01.show
```

Displays the configuration associated with the selected interface and its current status regarding the link, whether it is enabled or not, speed and duplex mode.

```
.configuration.interface.01.speed [value]
```

Sets the port speed. Available values (depending on the port): 1G, 10G, 25G, 40G, 100G, AUTO.

.configuration.interface.01.split [on/off]

This option is only available for QSFP+/QSFP28 interfaces. If set to **on**, the interface will be split into 4 interfaces totaling the original speed of the port before the split. If for example, the interface [50] needs to be split and its speed is set to 100G, the following 25G interfaces will be created after the split: 50.1, 50.2, 50.3, 50.4.

.configuration.interface.01.transceiver

Displays information about the SFP/QSFP transceiver present in the interface. Key metrics here are the Tx and Rx dB levels which can offer insight on whether the fiber lines are experiencing faults or even intrusion attempts.

.configuration.interface.01.tx_disable [on/off/show]

Controls the state of the TX_DISABLE SFP feature, useful in scenarios where BiDi SFP and QSFP modules are used to only receive traffic from an optic tap.

on stops the TX signal on the SFP module.

off restarts the TX signal on the SFP module.

show displays the current state of the TX_DISABLE functionality.

.configuration.interface.01.vlan [set/show/disable]

set allows the user to set an additional header tag to the frames received on the selected interface, particularly useful for aggregation purposes where it is important to know the identity of frames coming from different interfaces which are then aggregated to a single interface. If "Activate VLAN ID match check on INGRESS" is enabled by answering with "Y", all frames received through the selected interface will be dropped at the INGRESS level (before the routing stage), except those having this tag in their header.

show displays the tag status for the selected interface.

disable removes the tag on the selected interface. After issuing the command, the user must confirm it [yes / no].

Note: Enabling tags will momentarily restart the filtering engine and will have as effect a brief brake in the output flow.

5.2. Statistics

The **Statistics** menu is used for displaying or resetting network traffic related statistics.

```
.> statistics
```

The following commands are available:

```
.statistics.counter [show/reset] [port_number/all]
```

show displays the counters enabled in *Traffic Management -> Match counter id* feature for the specified port number, or for all ports if **all** is specified.

reset resets the counter for the specified port number, or for all ports if **all** is specified.

```
.statistics.global [show/reset]
```

show displays the following global statistics: bytes received, bytes sent, packets received, packets sent.

reset resets the global statistics.

```
.statistics.interface [show/reset] [port_number/all]
```

show displays the full statistics for a specified interface, or, if **all** is specified, displays the full statistics for all interfaces.

reset resets the full statistics for a specified interface, or, if **all** is specified, resets the full statistics for all interfaces.

5.3. Status

The **Status** menu is used for displaying the status of the main functionalities and the system itself.

```
.> status
```

The following commands are available:

```
.status.device.show
```

Displays information about the system, system temperature, PSU, and fan functionality.

```
.status.interface [show/tx_disable.show/vlan.show] [port_number/all]
```

show displays the configuration associated with the specified interface (or all interfaces if **all** is specified) and its current status regarding link, whether it is enabled or not, speed and duplex mode.

tx_disable.show displays the status of the TX_DISABLE functionality for the specified interface, or for all interfaces if **all** is specified.

vlan.show displays the current VLAN tagging configuration for the specified interface, or for all interfaces if **all** is specified.

```
.status.active_ruleset.show
```

Displays information about the current active rule set, giving a view of the traffic rules, filters, and load-balancing groups currently active on the device.

```
.status.asset_information.show
```

Displays the user-defined asset information for the device.

5.4. System

The **System** menu is used for administrative changes.

```
.> system
```

The following commands are available:

```
.system.aaa.tacacs+ [add/edit/remove/show]
```

XX-Series devices support remote authentication, authorization and accounting services for networked access control through a centralized server, a protocol called TACACS+. The aaa menu allows users to configure this type of access.

add allows the user to add a new TACACS+ server. Follow the prompt, using the following details:

- **server:** the TACACS+ server hostname or IP address. The default expected port is 49. In case this port is different, specify it using the following format: *hostname:port*
- **login type:** the type of login used in the server. Possible options are PAP, CHAP and LOGIN.
- **priority:** the server priority (1-5) in the user selection within the device. A server with a lower value have higher priority, so their users will be selected first in case of duplicates. Selecting 1 will configure the current server to be the first one used for authentication. Selecting 5 will configure the current server to be the last one used for authentication.
  Note: There cannot be 2 specified servers sharing the same priority.
- **secret:** key string used to encrypt the communication between the server and the client.
- **admin minimum level:** value between 15 and 0 that defines what priv_lvl is requested for an user in order to be granted admin privileges.
- **user minimum level:** value between 15 and 0 that defines what priv_lvl is requested for an user in order to be granted normal privileges.
  Note: this value needs to be smaller than the value used for admin minimum level.

edit allows modifying one of the previously configured TACACS+ server entries.

remove allows removing one of the previously configured TACACS+ server entries.

show allows displaying the previously configured TACACS+ server entries.

Note: Enabling TACACS+ server authentication applies for all login methods: serial, SSH and web interface.

.system.asset_information [edit/reset]

edit edits the device's custom asset information.

reset removes the currently stored asset information. This operation cannot be undone.

.system.configuration [export/import]

export allows the exporting of the unit's configuration to a file, encrypted with a passphrase.

import allows the importing of a previously exported configuration file.

.system.date [ntp_server/set/show/time_mode/time_zone]

ntp_server controls the list of NTP servers that the device can use to synchronize its clock.

- **add:** Add a new NTP server.
- **edit:** Edit an existing NTP server.
- **delete:** Delete an existing NTP server.
- **disable:** Disable an existing NTP server.
- **enable:** Enable an existing NTP server.
- **show:** Display the current available NTP servers.

set allows the user to set the date and time.

show displays the date.

time_mode

- **set** selects how the system clock should be set. The "ntp" option will enable the NTP service to synchronize the clock from a network time server.
- **show** displays the current mode.

time_zone

- **set** controls the time zone used by the device to display its time.
- **show** displays the current time zone.

.system.factory_reset

Should the system become corrupted or the main parameters need to be restored to their default values, this option resets the device to the factory state and reboots the system. After issuing the command, the user must confirm it [yes / no].

Warning: In case of a factory reset, all stored Rule Set data and the Users database will be deleted.

.system.legal

Displays the product's legal information.

.system.licence [install/show]

install is used for installing a new license. The new license can be installed from USB, HTTP(S), or FTP server. In the two latter cases, the server credentials need to be passed as part of the url in the form:

`ftp://user:password@server/file`

If the username or password include special characters that cannot be expressed in the URL format, they will need to be replaced with their entity codes (e.g `@` will be `%40`). A list is available at https://dev.w3.org/html5/html-author/charref

show displays the currently installed license.

.system.network [acl/disable/set/status]

acl.policy

- **set** controls the device's ACL firewall's default policy. This can be set as "Whitelist" (deny any request not matching) or "Blacklist" (allow any request not matching).
- **show** displays the current policy.

acl.rules is used to configure the ACL entries defining the source IPv4 addresses that can or cannot access the device’s services.

- **add:** Create a new ACL entry on the device;
- **delete:** Delete an existing ACL entry on the device;
- **disable:** Disable an existing ACL entry on the device;
- **edit:** Modify an existing ACL entry on the device or its priority;
- **enable:** Enable an existing ACL entry on the device;
- **show:** Display the current ACL entries.

disable disables the Ethernet management port. The serial management port will still be operating. After issuing the command, the user must confirm it [yes].

Note: if connected through the Ethernet management port, after issuing the *disable* command, the session will be lost.

set allows the user to set the IP acquisition mode of the unit to either DHCP or STATIC. In case STATIC is selected, the user has to input the IPv4, network mask, gateway and DNS address.

status displays the network parameters of the unit: IP mode, link status, IP, mask, gateway and DNS.

```
.system.reboot
```

Reboots the system, keeping all configurations intact. After issuing the command, the user must confirm it [yes].

Note: Rebooting the unit will temporarily disrupt the data flow.

```
.system.snmp [community/enable/disable/show/trapsink/users]
```

Allows the user to configure the Simple Network Management Protocol.

community allows users to add or delete SNMP communities, used for establishing trust without standard credentials (only for SNMP v2c).

enable enables the feature.

disable disables the feature.

show displays whether the feature is enabled or disabled.

trapsink allows the user to add or delete hosts which SNMP notifications (traps) will be sent to (v2c and v3 support).

users is used to configure SNMPv3 users for accessing the device or creating traps.

```
.system.ssl_cert [renew/import]
```

renew creates a new SSL certificate for the web interface. After issuing the command, the user must confirm it [yes / no].

import allows the user to import a pre-generated SSL certificate and key to the device, required for the HTTPS web interface. After the command is issued, the user can upload from a chosen URL or from a USB device, first the new key and then the related certificate.

Note: Both key and certificate files are expected to be in PEM format. After both files have been uploaded, the system checks their validity, replaces the current versions, and restarts the web interface.

```
.system.syslog [clean/remote/show]
```

clean removes all syslogs from the system.

remote allows the configuration of remote log collection servers.

show displays all syslogs and their timestamps.

.system.update.install

This command is used for installing a new firmware image. The new image can be installed from USB, HTTP(S), or FTP server. In the two latter cases, the server credentials need to be passed as part of the url in the form:

`ftp://user:password@server/file`

If the username or password include special characters that cannot be expressed in the URL format, they will need to be replaced with their entity codes (e.g `@` will be `%40`). A list is available at https://dev.w3.org/html5/html-author/charref

.system.users [activate/block/edit/new/passwd/reset/rm/show]

activate activates an existing login user.

block prevents an existing user from login in.

edit edits the details of an existing user (username, full name, email address and role).

new creates a new user.
The following properties will be required: username, full name, email, role (viewer [default], admin, user). Depending on the selected role, the user has the following privileges:

- admin - full control, limitless administration and system update
- user - creates and sets rules, aggregate and filter traffic
- viewer - (default) view only: settings, statistics, active rules.

passwd followed by the desired username changes the login password for a certain user.

reset resets the users database.

rm followed by the desired username deletes a certain user from the user database.

show followed by either the desired username, or 'all', displays all the information for that user, or for all users: full name, email, role, and whether the user is active or not.

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