CHECK POINT

28 October 2026

MAESTRO GETTING STARTED GUIDE FOR MHO-200

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1. Important Information



Latest Software

We recommend that you install the most recent software release to stay up-to-date with the latest functional improvements, stability fixes, security enhancements and protection against new and evolving attacks.



Certifications

For third party independent certification of Check Point products, see the Check Point Certifications page.



Check Point

For more about this release, see the home page.



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Open the latest version of this document in a Web browser.

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Feedback

Check Point is engaged in a continuous effort to improve its documentation.

Please help us by sending your comments.

2. Revision History

Date	Description
26 October 2026	First release of the document

3. Introduction to MHO-200

3.1. Overview of the Maestro Orchestrator MHO-200

Maestro Orchestrator is a scalable Network Security System built to secure the largest networks in the world by orchestrating multiple Check PointSecurity Appliances into a unified system.

The Maestro Orchestrator provides:

- Security of infinite scale
- Redundancy - Maestro Orchestrator automatically distributes traffic between the Security Appliances assigned to Security Groups
- Ability to connect more Security Appliancesand use their resources easily in the existing Security Groups

Maestro Orchestrator 1U systems are ideal for leaf and spine data center network solutions that provide maximum flexibility, with port speeds from 10 Gbit/sec to 400 Gbit/sec per port, and port density that enables full rack connectivity to any server at any speed. The ports allow a variety of blocking ratios that suit all application requirements.

Maestro Orchestrator 1U systems enable the use of 10, 25, 40, 100, 200, and 400 GbE port speeds in a large scale without the need to change power infrastructure facilities.

3.2. Shipping Carton Contents for MHO-200

This section describes the contents of the shipping carton.

Item	Description
Appliance	Maestro Orchestrator
Rack Mounting Accessories	• Slide Rail Kit (+Screws)
Cables and Adapters	• 2 power cables (Type C13-C14) • USB Type-A to Type-C Cable, 90cm–100cm • RJ45 Console Cable, USB2 to RJ45 • 1 DAC cable, 3m • Cable Ethernet Cat 5E RJ45 Gray 2m F/UTP 26AWG
Documentation	• Port Mapping • User license agreement

Note:

- Before installing your new Maestro Orchestrator, unpack it and check the parts list to make sure that all the parts are in the package.
- Check the parts for visible damage that may have occurred during shipping.

3.3. Features in MHO-200

- Speeds of 10, 25 , 40, 100, 200, and 400 GbE
- Lowest power, under 5 W per 100 GbE port
- Enhanced scalability
- 1+1 hot-swappable power supplies
- 4 N+1 hot-swap fans
- Color coded PSUs and fans

3.4. Speed and Throughput in MHO-200

The table below lists maximum throughput and interface speed:

QSFP-DD Interfaces	Maximal Throughput
Each Port	12.8 Tbit/sec

3.5. Ports, Power Supply Units, and Fan Units in MHO-200

MGMT Ports	USB Ports	Console Ports	PSUs	Fans
1 on the rear panel	1 on the rear panel	2 on the rear panel	2 units on the rear panel	4 units on the rear panel

4. Safety Warnings for MHO-200

Installation Instructions

Read all installation instructions before you connect the equipment to the power source.

Bodily Injury Due to Weight

Use enough people to lift this product safely:

Weight	Recommended Number of People
<18 kg (<40 lbs)	1 person
18 - 32 kg (40 - 70 lbs)	2 people
32 - 55 kg (70 - 121 lbs)	3 people
>55 kg (>121 lbs)	Use a mechanical lift

Risk of Electric Shock!

With the fan unit removed, power pins are accessible within the module cavity.

Do not insert tools or body parts into the fan unit cavity.

Over-temperature

Do not operate this equipment in an area with an ambient temperature that exceeds the recommended maximum: 45°C (113°F).

To guarantee proper cooling, allow at least 8 cm (3 inches) of clearance around the ventilation openings.

Stacking the Chassis

Do not stack the Chassis on any other equipment. If the Chassis falls, it can cause bodily injury and equipment damage.

Redundant Power Supply Connection - Electrical Hazard

This product includes a redundant power supply or a blank cover in its place.

In case of an empty power supply bay, do not operate this equipment with the blank cover removed, or not properly fastened.

Double Pole/Neutral Fusing

This Maestro Orchestrator has double pole/neutral fusing.

Remove all power cords before you open the cover of this product or touch any internal parts.

Multiple Power Inlets

The Power Supply Units are all independent.

Disconnect all power supplies to ensure a powered down state inside of this equipment.

During Lightning - Electrical Hazard

During periods of lightning activity, do not work on the equipment, connect or disconnect cables.

Connecting and Disconnecting of Copper Cables

Copper cables are heavy and not flexible. Therefore, carefully attach or detach them from the connectors.

Refer to the cable manufacturer for special warnings and instructions.

Rack Mounting and Servicing

When this product is mounted or serviced in a rack, you must take special precautions to ensure that the Maestro Orchestrator remains stable.

In general, fill the rack with equipment from the bottom to the top.

Equipment Installation

Only trained and qualified personnel should install, replace, and service this equipment.

Equipment Disposal

Dispose of this equipment in compliance with all national laws and regulations.

Installation Codes

Install this equipment according to the latest version of the country national electrical codes.

For North America, see the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

UL Listed and CSA Certified Power Supply Cord

For North American power connection, select a power supply cord that is UL Listed and CSA Certified, 3 - conductor [16 AWG], terminated with a molded plug rated at 125 V [13 A], with a minimum length of 1.5 m [6 feet], but no longer than 4.5m (15 feet).

For European connection, select a power supply cord that is internationally harmonized and marked "<HAR>", 3 - conductor, minimum 1.0 square mm wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded plug rated at 250 V, 10 A.

Interconnection of Units

Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2 (Note - When residing in non LPS circuit).

Overcurrent Protection

You must incorporate in the building wiring a readily accessible listed branch circuit overcurrent protective device rated 20 A.

Do Not Use the Switch as a Shelf or Work Space

Caution - Do not use the slide / rail mounted equipment as a shelf or a work space. The rails are not intended for sliding the unit away from the rack. It is for permanent installation at final resting place only, not used for service and maintenance.

WEEE Directive

According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.

Dispose of this product and all of its parts in a responsible and environmentally friendly way.

Country of Norway Power Restrictions

This unit is intended for connection to a TN power system and an IT power system of Norway only.

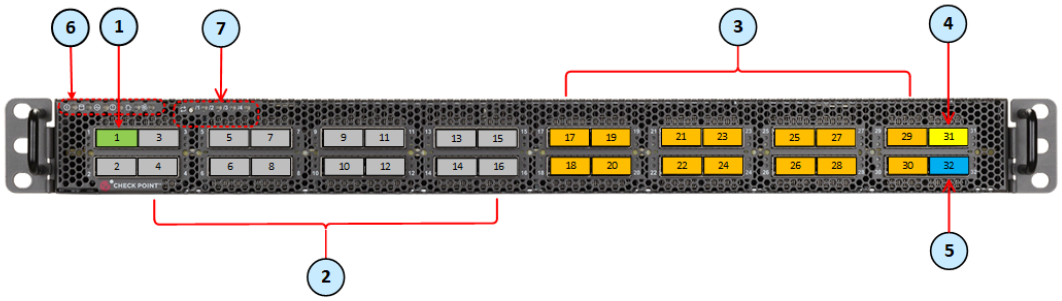
5. About This Guide for MHO-200

This Getting Started Guide describes:

- Various hardware components in a Maestro Orchestrator:
  - Overview of the Maestro Orchestrator MHO-200 *(on page 6)*
  - Front Panel of MHO-200 *(on page 12)*
  - Rear Panel of MHO-200 *(on page 14)*
- How to replace various hardware components in a Maestro Orchestrator:
  - Replacing Power Supply Units on MHO-200 *(on page 28)*
  - Replacing Fan Units on MHO-200 *(on page 30)*
- How to mount a Maestro Orchestrator in a rack:
  - Installation and initialization *(on page 32)*
- How to perform the first time configuration of a Maestro Orchestrator.
- CLI commands specific to a Maestro Orchestrator.
- Additional procedures for a Maestro Orchestrator.

6. Hardware Components in MHO-200

6.1. Front Panel of MHO-200



Important:

This section describes the default configuration. It is possible to change the port type (Management, Uplink, and Downlink) in the Gaia OS Configuration Portal on the MHO.

Item	Description
1	**Port 1** (colored green), through which you manage the Clusters (Security Groups). To this port you connect: • Check Point Management Server. • Clients, from which you configure the Gaia OS on the Security Appliances connected to the Downlink ports (**3**).
2	**Ports 2 - 16** (colored gray) are the Uplink ports. To these ports you connect your external traffic and internal traffic networks. You use DAC or Fiber cables (with transceivers)
3	**Ports 17 - 30** (colored orange) are the Downlink ports. To these ports you connect your Check Point Security Appliances. You use DAC or Fiber cables (with transceivers).

Item	Description
4	**Port 31** (colored yellow) is the External Synchronization port in the Dual Site configuration. You connect a DAC cable between ports 31 on two Orchestrators MHO-200 for redundancy between different Maestro Sites. In the Port Split mode: • 1st, 2nd, and 3rd splits are Downlinks. • 4th split is the External Sync. **Important:** It is not supported to configure this port as Uplink.
5	**Port 32** (colored blue) is the Internal Synchronization port. You connect a DAC cable between ports 32 on two Orchestrators MHO-200 for redundancy on the same Maestro Site. **Important:** It is not supported to change the default type of this port ("`ssm_sync`").
6	System Status LEDs. See LEDs on the Front Panel of MHO-200 *(on page 19)*.
7	Port LEDs that show the status of all ports (including the split ports). See LEDs on the Front Panel of MHO-200 *(on page 19)*.

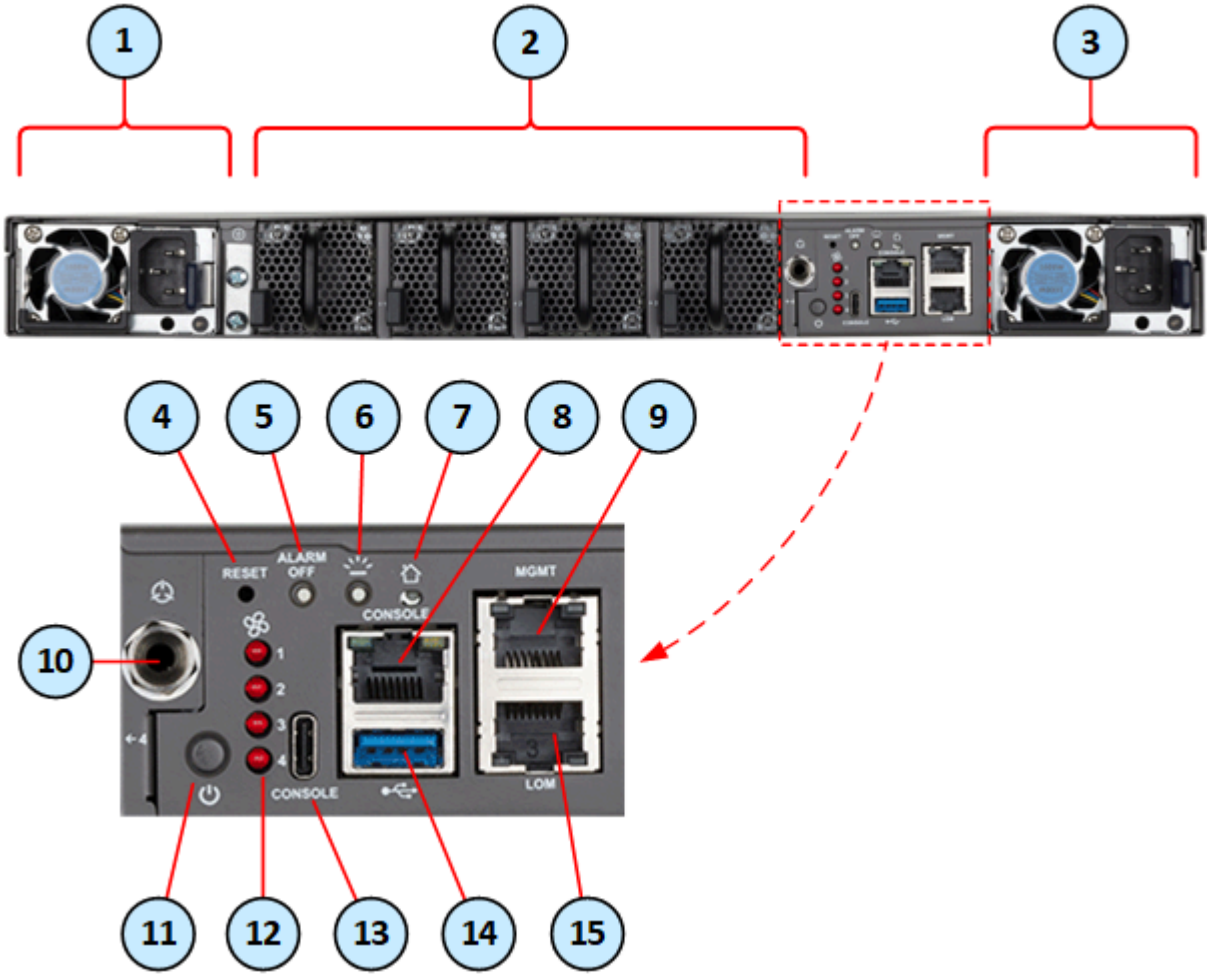
Note:

- It is possible to connect DAC or Fiber cable (with transceivers) to each port (from 1 to 32).
- It is possible to connect Breakout cables to each port. See Splitting the Ports with Breakout Cables *(on page 26)*.

Warning:

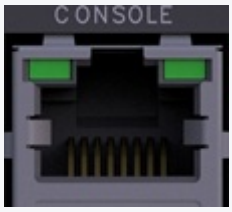
Only ports 1, 2, 31, and 32 support transceivers that require more than 5W (for example, CPAC-TR-100ERL4).

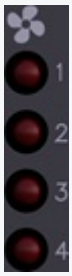
6.2. Rear Panel of MHO-200



Item	Description
1	First PSU (from left to right). See Replacing Power Supply Units on MHO-200 *(on page 28)*.
2	Fan Units 1, 2, 3 and 4 (from left to right). See Replacing Fan Units on MHO-200 *(on page 30)*.
3	Second PSU (from left to right). See Replacing Power Supply Units on MHO-200 *(on page 28)*.

Item	Description
4	The button with the label **RESET**.  To perform a power cycle (cold reboot) of the Orchestrator, use a flat object to push the reset button. Do **not** use a sharp pointed object, such as a needle or a push pin to press the reset button.
5	The button with the label **ALARM OFF**.  Press this button to silence an active PSU alarm. Pressing this button does not clear the underlying alarm condition.
6	The location beacon LED.  Blinks when the location beacon is on. Otherwise, off. The same beacon LED appears on the front panel. See Location LED *(on page 22)*. Both beacon LEDs are working at the same time in the same way.
7	The location beacon button.  Press this button to enable the location beacon LEDs on the rear and front panels. You can also enable the beacon LEDs independently in the Gaia OS on the Orchestrator.

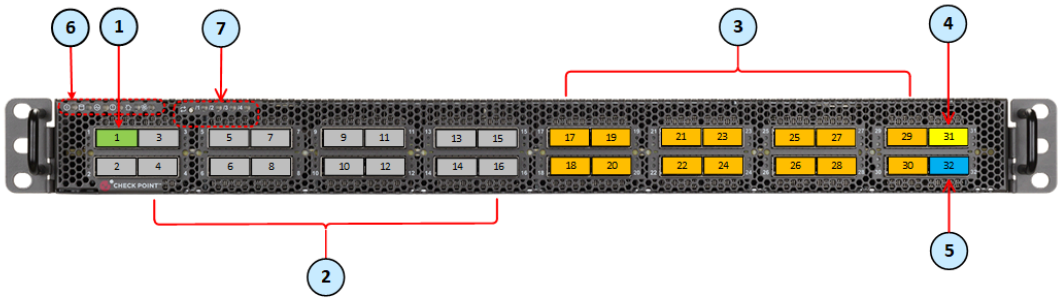
Item	Description
8	The RJ45 port with the label **CONSOLE**.  See Console Ports on MHO-200 *(on page 25)*. To this port you connect a client, from which you connect to the Gaia OS command line on the Orchestrator.
9	The RJ45 port with the label **MGMT**.  See MGMT Port on MHO-200 *(on page 24)*. To this port you connect a client, from which you configure the Gaia Operating System on the Orchestrator (in Gaia Portal, or Gaia Clish).
10	The grounding point.  Connect the required cable from this grounding point on the Orchestrator to data-center ground per your local electrical code.

Item	Description
11	The power button.  How the power button works: • While the Orchestrator is powered on, a short press on this button performs a graceful (software) shutdown. • While the Orchestrator is powered on, a long press on this button (4-8 sec) performs a hard power off. • While the Orchestrator is powered off, a short press on this button powers on the Orchestrator. The power state is preserved across input-power interruptions.
12	The Fan Failure LEDs.  Four red LEDs, one per fan bay. Lit red when any fan in that bay has failed. Off when all fans in the bay are healthy.
13	The USB-C port with the label **CONSOLE**.  See Console Ports on MHO-200 *(on page 25)*. To this port you connect a client, from which you connect to the Gaia OS command line on the Orchestrator.

Item	Description
14	The USB 2.0 port.  This USB port is USB 2.0 compliant (USB 1.0 is not supported). Use this port to connect an external USB storage device for software upgrade or file management. Do not use excessive force, when inserting or removing the USB storage device to and from the connector.
15	The LOM Card Port (out-of-band Ethernet, 1 GbE, RJ-45).  Operates even when the CPU is unresponsive on Orchestrator. Use it for remote power control and emergency recovery.

Related information
Physical Ports and Gaia OS Interfaces on MHO-200 *(on page 70)*

6.3. Port Mapping in MHO-200



Item	Description
1	**Port 1** is the Management port for Clusters (Security Groups). This port leads to the Check Point Management Server. It is possible to use only this one port to manage the Clusters.

Item	Description
2	**Ports 2 - 16** are the Uplink ports 1 Gbps / 10 Gbps / 25 Gbps / 40 Gbps / 100 Gbps / 200 Gbps / 400 Gbps / 4x10 Gbps / 4x25 Gbps / 4x100 Gbps. These ports lead to external and internal data networks.
3	**Ports 17 - 30** are the Downlink ports These ports lead to Security Appliances.
4	**Port 31** is the External Synchronization port (`site_sync`) in the Dual Site configuration. This port leads to the peer Orchestrator on another Site. In the Port Split mode: • 1st, 2nd, and 3rd splits are Downlinks. • 4th split is the External Sync. **Important:** It is not supported to configure this port as Uplink.
5	**Port 32** is the Internal Synchronization port (`ssm_sync`) that leads to the peer Orchestrator on the same Site. **Important:** It is not supported to change the default type of this port (`ssm_sync`).
6	System Status LEDs. See LEDs on the Front Panel of MHO-200 *(on page 19)*.
7	Splitting Port LEDs. See Split Port LEDs *(on page 22)*.

6.4. LEDs on the Front Panel of MHO-200

LEDs on the Front Panel

The LEDs are an important tool for hardware event notification and troubleshooting.

LED Symbol	LED Description
	Power Status LED *(on page 20)*
	Storage Status LED *(on page 21)*
	PSU Status LED *(on page 21)*
	Alert LED *(on page 21)*
	Location LED *(on page 22)*
	Fan Status LED *(on page 22)*
	Split Port LEDs *(on page 22)*

Power Status LED

The  LED shows the power status.

LED Behavior	Description	Action Required
Steady green	The Orchestrator is up and running normally.	None.
Flashing green (~1 Hz)	The Orchestrator is booting up.	Wait for up to five minutes for the end of the booting process.
Flashing blue (~1 Hz)	The Orchestrator is in the standby mode. (Waits for the power up command.)	Power on the Orchestrator in one of these ways: • Press the power button on the rear panel. • Connect to the LOM Card and power on the appliance.
Steady off	The Orchestrator is powered off.	None.

Storage Status LED

The  LED shows the storage status.

LED Behavior	Description	Action Required
Steady green Flashing green (~1 Hz)	There is read/write activity.	None.
Steady off	There is no read/write activity.	None.

PSU Status LED

The  LED shows the health of the Power Supply Units.

LED Behavior	Description	Action Required
Steady green	Both Power Supply Units are operating normally.	None.
Steady amber	One of the Power Supply Units has a fault or is disconnected.	1. Make sure there is the power. 2. Make sure the power cable is plugged in to the PSU. 3. If the problem persists, replace the faulty PSU. Until you get the replacement PSU, disconnect the power cable from the faulty PSU.
Steady off	There is no power / no status	None.

Alert LED

The  LED shows the overall system status.

LED Behavior	Description	Action Required
Steady red	There is active system fault.	Contact Check Point Support.
Steady off	There is no fault.	None.

Location LED

The  LED shows the active location beacon - it helps identify the appliance in the rack.

The same beacon LED appears on the rear panel. See Rear Panel of MHO-200 *(on page 14)*.

LED Behavior	Description	Action Required
Flashing blue (~1 Hz)	An administrator activated the location beacon in one of these ways: • In the Gaia OS. • Pressed the location beacon button on the rear panel.	None. Use the same ways to deactivate the location beacon LED.
Steady off	The location beacon is not active.	None.

Fan Status LED

The  LED shows the health of the Fan Units.

LED Behavior	Description	Action Required
Steady red	At least one of the Fan Units has a fault.	Replace the faulty fan unit.
Steady off	All Fan Units are operating normally.	None.

Split Port LEDs

You can connect a 1-to-4 breakout cable to a physical port and get 4 logical ports in one physical port - see Splitting the Ports with Breakout Cables *(on page 26)*.

The 

LEDs show the selected LED indication mode when a Breakout cable is connected to **at least one** physical port and at least one port works in the split mode.

Note:

- To move between the LED indication modes, press the selection button for 2 seconds and wait for 2 seconds before pressing it again.
- Each physical port has two LEDs:
  - The top LED shows the link status.
  - The bottom LED shows the split status - whether this port is configured to work in the split mode.

When you connect a breakout cable to a physical port:

1. You press the selection button on the left of these top LEDs to show the activity of the Split port 1, Split port 2, Split port 3, or Split port 4.
2. The LED near each physical port shows the current activity in the corresponding port.

Indication Mode	Split Port LEDs	Description
	All Split LEDs are off 	No breakout cables are connected to any of the physical ports.
/1	Only the first LED from the left is lit (**/1**) 	The LED on the physical port shows the state of the **first** split port of the physical port. Example: If you connect a breakout cable to port 8 (interface `eth1-29`), then in this LED indication mode **/1**, the port LED 8 shows the state of the interface `eth1-29` (`Port 1/8/1`).
/2	Only the second LED from the left is lit (**/2**) 	The LED on the physical port shows the state of the **second** split port of the physical port. Example: If you connect a breakout cable to port 8 (interface `eth1-29`), then in this LED indication mode **/2**, the port LED 8 shows the state of the interface `eth1-30` (`Port 1/8/2`).
/3	Only the third LED from the left is lit (**/3**) 	The LED on the physical port shows the state of the **third** split port of the physical port. Example: If you connect a breakout cable to port 8 (interface `eth1-29`), then in this LED indication mode **/3**, the port LED 8 shows the state of the interface `eth1-31` (`Port 1/8/3`).
/4	Only the fourth LED from the left is lit (**/4**) 	The LED on the physical port shows the state of the **fourth** split port of the physical port. Example: If you connect a breakout cable to port 8 (interface `eth1-29`), then in this LED indication mode **/4**, the port LED 8 shows the state of the interface `eth1-32` (`Port 1/8/4`).

Behavior of the Split Mode LED (bottom LED) on the Physical Port:

LED Behavior	Port State	Action Required
Off	Link is down.	Check the breakout cable.
Steady green	Link is up in the corresponding split port, but the traffic is not flowing in that split port.	None.
Flashing green	Link is up in the corresponding split port, and the traffic is flowing in that split port.	None.
Flashing amber	A problem with the link in the corresponding split port.	Check the breakout cable, and replace if needed.

6.5. MGMT Port on MHO-200

About the MGMT Port

On the rear panel, the RJ45 Ethernet port with the label **MGMT** provide access to the Gaia OS on the Orchestrator (see Rear Panel of MHO-200 *(on page 14)*).

By default, this port is configured with these settings:

- IP address 192.168.1.1 and Net Mask 255.255.255.0
- Auto-negotiation capabilities (100 MbE to 1 GbE)

Make sure to use only FCC-compliant Ethernet cables.

Changing the Default IP Settings on the MGMT Port

The default IPv4 settings on the MGMT Port are: `192.168.1.1 / 24`

1. Connect to the Maestro Orchestrator over the console port (see Console Ports on MHO-200 *(on page 25)*).
2. Log in to Gaia Clish.
3. Configure the required IPv4 address and Subnet Mask on the interface **Mgmt1**:

   ```
   set interface Mgmt1 ipv4-address <IPv4 Address> mask-length <Mask Length>
   ```

4. Configure the required IPv4 address of the default gateway:

   ```
   set static-route default nexthop gateway address <IPv4 Address> on
   ```

5. Save the configuration:

   ```
   save config
   ```

6. Examine the configuration of the interface **Mgmt1**:

   ```
   show interface Mgmt1
   ```

7. Examine the default gateway configuration:

```
show route static all
```

6.6. Console Ports on MHO-200

About the Console Ports

On the rear panel, the Console ports provide access to the Gaia OS on the Orchestrator (see Rear Panel of MHO-200 *(on page 14)*).

You use this port for initial configuration and debugging.

Orchestrator has two console ports:

- RJ45
- USB-C

Note:

Only one console connection is active at a time.

Orchestrator automatically detects which cable is plugged in.

If you connect to both console ports at the same time, the **USB-C** port has priority.

RJ45 Serial Console Port

1. Connect a standard RJ45 console cable (Cisco pinout) between these:
   a. The Orchestrator - the **RJ45** port **CONSOLE**.
   b. Your workstation - a serial port or a USB-to-serial adapter.
2. On your workstation, open a terminal emulator (e.g., PuTTY, SecureCRT, MobaXterm, minicom, etc.) and configure the session with these parameters:

Parameter	Setting
Baud Rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

USB-C Console Port

1. Connect a USB-C cable between:

    a. Orchestrator - the **USB-C** port **CONSOLE**.

    b. Your workstation - a USB port.

2. Install the required drivers, if prompted by the operating system on your workstation.

   Orchestrator enumerates as a virtual serial (CDC-ACM) device.

3. On your workstation, open a terminal emulator (e.g., PuTTY, SecureCRT, MobaXterm, minicom, etc.) and configure the session with these parameters:

Parameter	Setting
Baud Rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

6.7. Splitting the Ports with Breakout Cables

Overview

In MHO-200, you can connect a breakout cable to each physical port on the front panel.

MHO-200 has 400 GbE ports.

A breakout cable splits the physical 400 GbE port into these logical ports:

- 2 x 100 GbE
- 4 x 100 GbE
- 4 x 25 GbE
- 4 x 10 GbE

Example of a breakout cable:



Split Example

When you connect a breakout cable to the port 8 (interface "`eth1-29`"), you get:

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
8	eth1-29	Port 1/8/1
	eth1-30	Port 1/8/2
	eth1-31	Port 1/8/3
	eth1-32	Port 1/8/4

Note:

For more information about the Orchestrator ports and interface names in the Gaia OS, see Physical Ports and Gaia OS Interfaces on MHO-200 *(on page 70)*.

Configuring the Split Mode in Command Line

1. Connect to the command line on the Orchestrator.
2. Log in to Gaia Clish.
3. Configure one of these supported speeds (QSFP mode):

```
set maestro port <Port ID> site <Site ID> speed {4x100G | 2x100G | 4x25G | 4x10G}
```

4. Save the configuration:

```
save config
```

5. Examine the port configuration:

```
show maestro port <Port ID> site <Site ID> speed
```

See:

- Gaia Clish Commands on MHO-200 - set maestro *(on page 62)*
- Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*
- Split Port LEDs *(on page 22)*
- Changing the Speed and the Default Type of a Port in MHO-200 *(on page 73)*

Split of the Orchestrator Synchronization Ports

- In the Dual Site deployment, after you connect a breakout cable to the Orchestrator **External Synchronization** port (by default, port 31), it works on the **4th** split of this port:
  - On the first Orchestrator - `Port 1/31/4`
  - On the second Orchestrator - `Port 2/31/4`
- In the Single Site deployment, after you connect a breakout cable to the Orchestrator **Internal Synchronization** Port (by default, port 32), it works on the **4th** split of this port:
  - On the first Orchestrator - `Port 1/32/4`
  - On the second Orchestrator - `Port 2/32/4`

Related information
LEDs on the Front Panel of MHO-200 *(on page 19)*

6.8. Replacing Power Supply Units on MHO-200

About PSUs

Maestro Orchestrators are equipped with two replaceable Power Supply Units (PSUs). The PSUs in these systems can work in a redundant configuration. It is possible to remove one of the PSUs without the need to bring down the Orchestrator.

Important:

PSUs have directional air flows similar to the fan module. The fan module airflow must coincide with the airflow of all of the PSUs. If the PSU airflow direction is different from the fan module airflow direction, it affects the Orchestrator's internal temperature. See Airflow in MHO-200 *(on page 43)*.

Removing a Power Supply Unit

Important:

- Before you remove one of the PSUs, make sure that:
  1. The **System Status LED** is lit in steady green (see Power Status LED *(on page 20)*).
  2. The **PSU Status LEDs** on the PSU that you **leave** in the Orchestrator are lit in steady green.

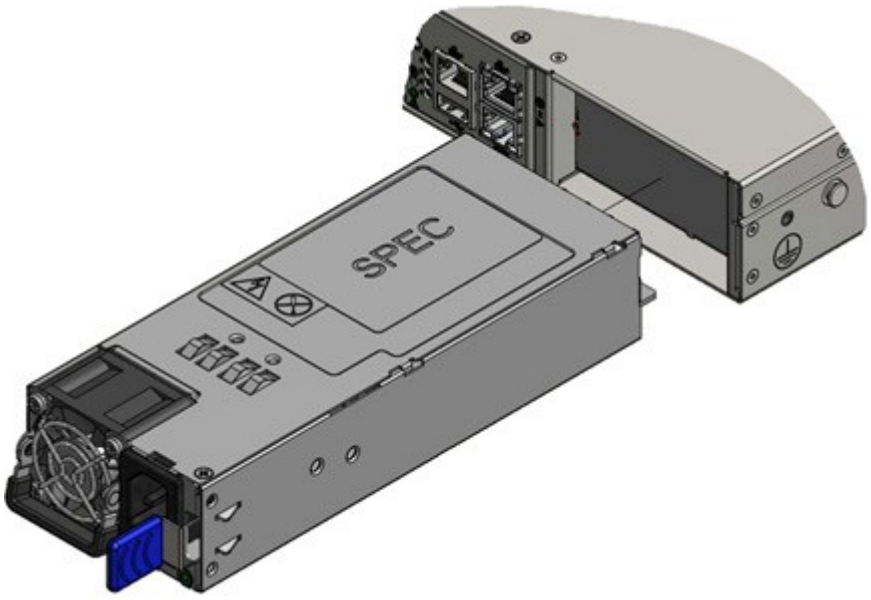
  See LEDs on the Front Panel of MHO-200 *(on page 19)*.
- To ensure proper cooling, do not leave the PSU slots of a Maestro Orchestrator empty for more than five minutes.

To remove a PSU:

1. Disconnect the power cord from the PSU.
2. Grasp and hold the PSU handle with your hand.
3. Push the latch release with your thumb.
4. Pull out the PSU from the Orchestrator.

   As you pull out the PSU, its status LED turns off.

PSU pulled out:



Installing a Power Supply Unit

Important:

Do **not** insert a PSU with a power cord connected to it.

1. Make sure the mating connector of the new PSU is free of any dirt and obstacles.
2. Insert the PSU end into the opening.
3. Slide in the PSU until you feel a slight resistance.
4. Continue to press the PSU until it seats completely.

   The PSU latch snaps into place. This confirms the proper installation.
5. Connect the power cord to the PSU connector.
6. Insert the other end of the power cord into an outlet of the correct voltage.
7. These LEDs must light up in the green color:

   a. The LED on the PSU.

   b. The **PSU Status LED** (see PSU Status LED *(on page 21)*).

   If either of these LEDs does not light up in the green color, repeat the whole procedure to remove the PSU and insert it again.

6.9. Replacing Fan Units on MHO-200

About Fans

The Maestro Orchestrators are equipped with four replaceable fan units. They can fully operate, if one fan unit failed.

Important:

- It is not supported to operate a Orchestrator, if two or more fan units failed.
- Make sure that the fans have the air flow that matches the model number.

  An air flow opposite to the Orchestrator design causes the Orchestrator to operate at a higher (less than optimal) temperature. See Airflow in MHO-200 *(on page 43)*.

Removing a Fan Unit

1. Grasp and hold the fan unit's handle with your hand.
2. Push the latch release with your thumb.
3. Pull out the fan unit from the Orchestrator.

   As you pull out the fan unit, its status LED turns off.

Installing a Fan Unit

1. Make sure the mating connector of the new fan unit is free of any dirt and obstacles.
2. Insert the fan unit end into the opening.
3. Slide in the fan unit until you feel a slight resistance.
4. Continue to press the fan unit until it seats completely.

The fan unit latch snaps into place. This confirms the proper installation.

5. These LEDs must light up in the green color:

    a. The LED on the fan unit.

    b. The **Fan Status LED** (see Fan Status LED *(on page 22)*).

    If either of these LEDs does not light up in the green color, repeat the whole procedure to remove the fan unit and insert it again.

    After two unsuccessful attempts to install the fan unit, power off the Orchestrator before you attempt any hardware troubleshooting.

7. Mounting MHO-200 in a Rack

7.1. Installation and initialization

Installation and initialization of the Maestro Orchestrator requires attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

- The rack mounting holes conform to the EIA-310 standard for racks with length 50-60 cm (19.7-23.6 inches).

  Take precautions to guarantee proper ventilation to maintain good airflow at ambient temperature.

- Unless otherwise specified, Check Point products are designed to work in an environmentally controlled data center with low levels of gaseous and dust (particulate) contamination.

The installation procedure for the Maestro Orchestrator involves these phases:

Phase	Instructions
1	Make sure that none of the shipping carton contents is missing or damaged. See Shipping Carton Contents for MHO-200 *(on page 6)*.
2	Follow the Safety Warnings for MHO-200 *(on page 8)*.
3	Pay attention to the airflow consideration within the Maestro Orchestrator and rack. See Airflow in MHO-200 *(on page 43)*.
4	Mount the Maestro Orchestrator into a rack enclosure. See Description of Sliding Rails Kit *(on page 32)* and Mounting the Appliance into the Rack *(on page 42)*
5	Power on the Maestro Orchestrator. See Rear Panel of MHO-200 *(on page 14)*.

Related information
Network Cable Installation *(on page 43)*

7.2. Description of Sliding Rails Kit

Each rail has these parts:

- Outer rail part *(on page 33)* - mounted in the rack.
- Two Middle rail parts *(on page 36)* - connect between the Inner and Outer parts.
- Inner rail part *(on page 38)* - mounted on the appliance.

Outer rail part

The outer rail part attaches to the rack.

The outer rail part has these ends:

- **Front end:** Has round pins. Install this end on the side of the rack from which you pull out the appliance for servicing.
- **Rear end:** Has square pins. Install this end on the opposite side of the rack.

To attach the outer rail part to the rack:

1. Detach the inner rail part from the rail.

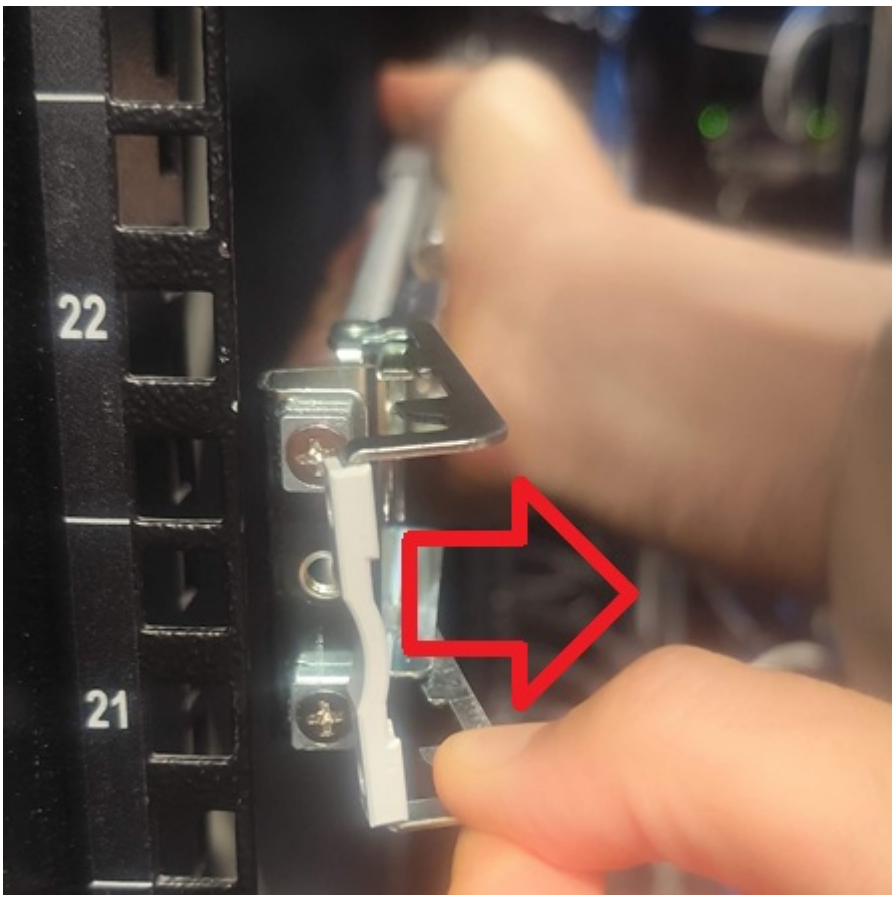
   Note:

   You can also detach the inner rail part after you attach the outer rail part to the rack.

2. Attach the rear end of the outer rail part:

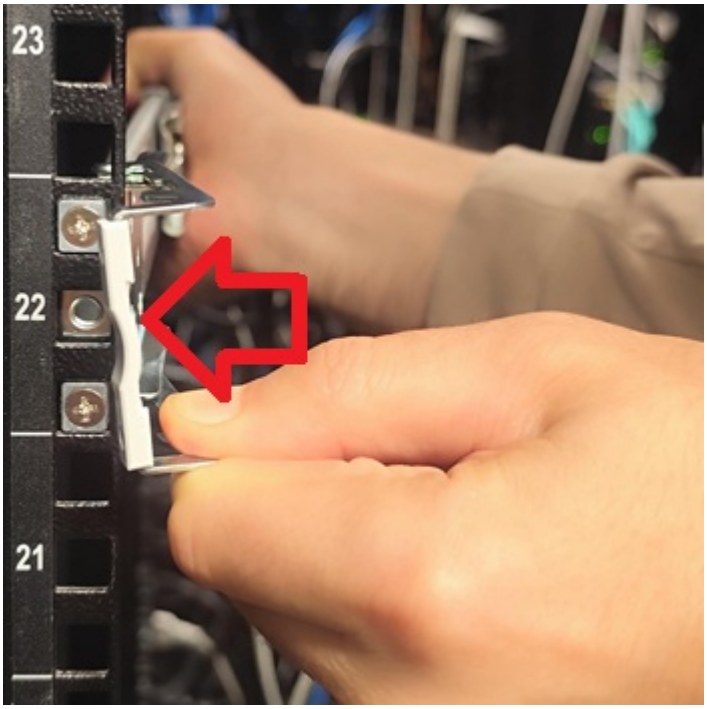
   a. Make sure that the latch is on the inner side of the rack, where the appliance will be installed.

   b. Move the latch aside.

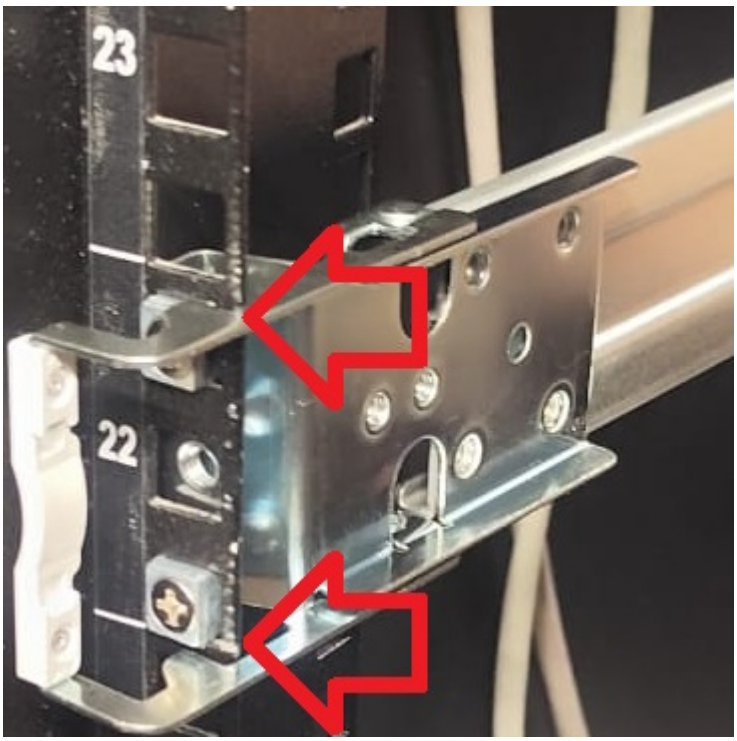


   c. Insert the square pins into the rack holes.

   d. Push the rail end fully into the rack.

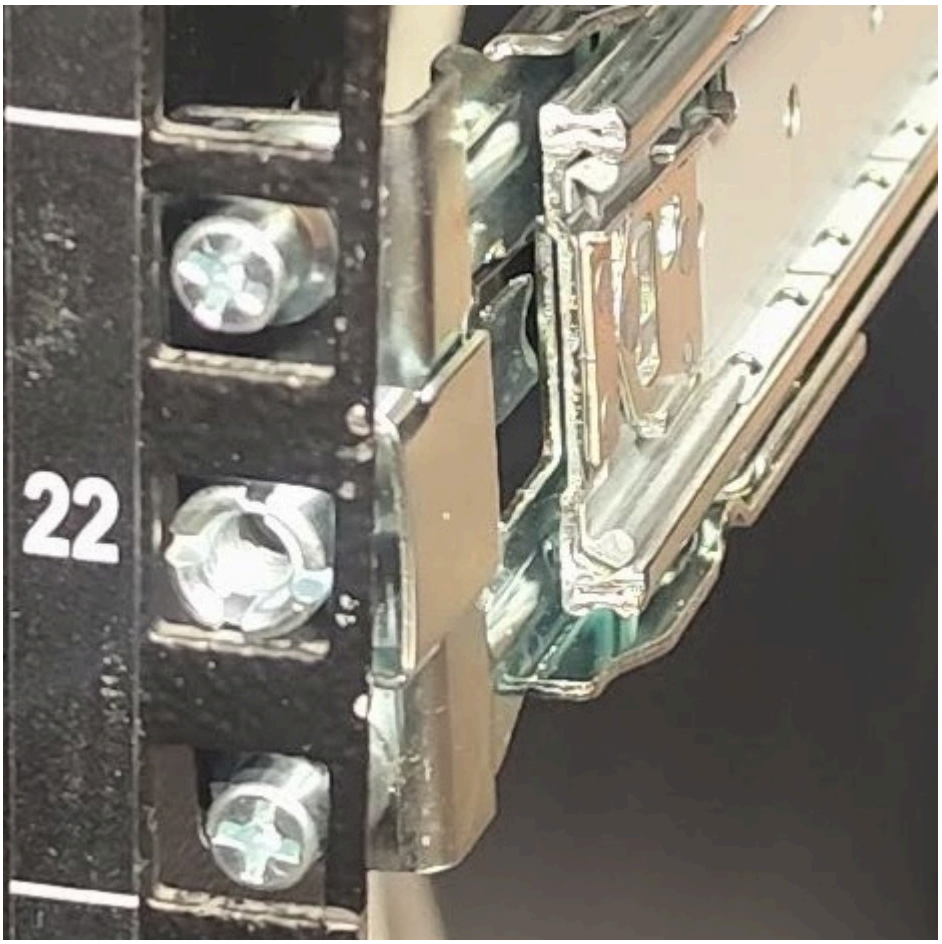


e. Close the latch on the rack.

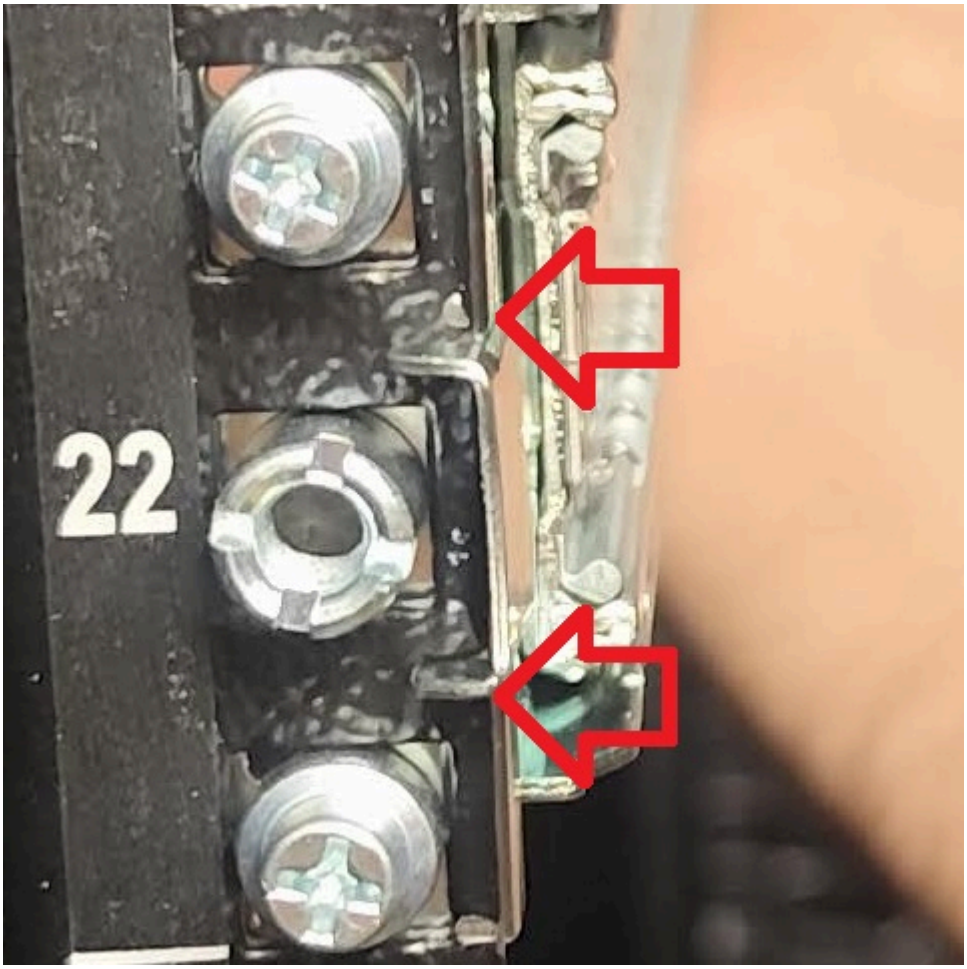


3. Attach the front end of the outer rail part:

a. Insert the round pins into the rack holes.



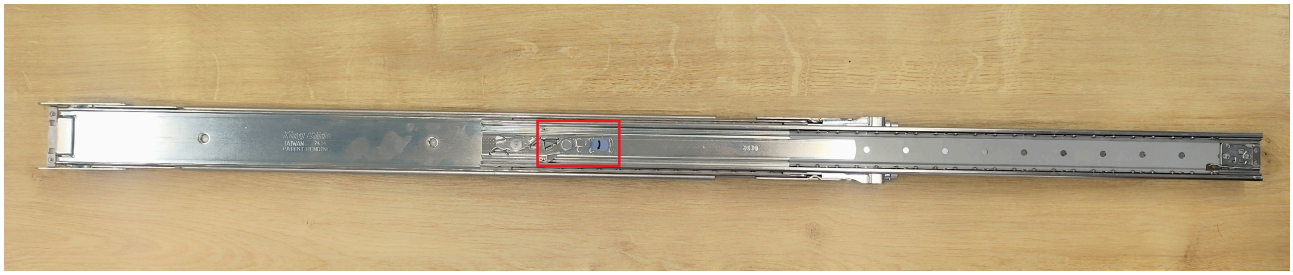
b. Push the rail end into the rack until the latch locks.

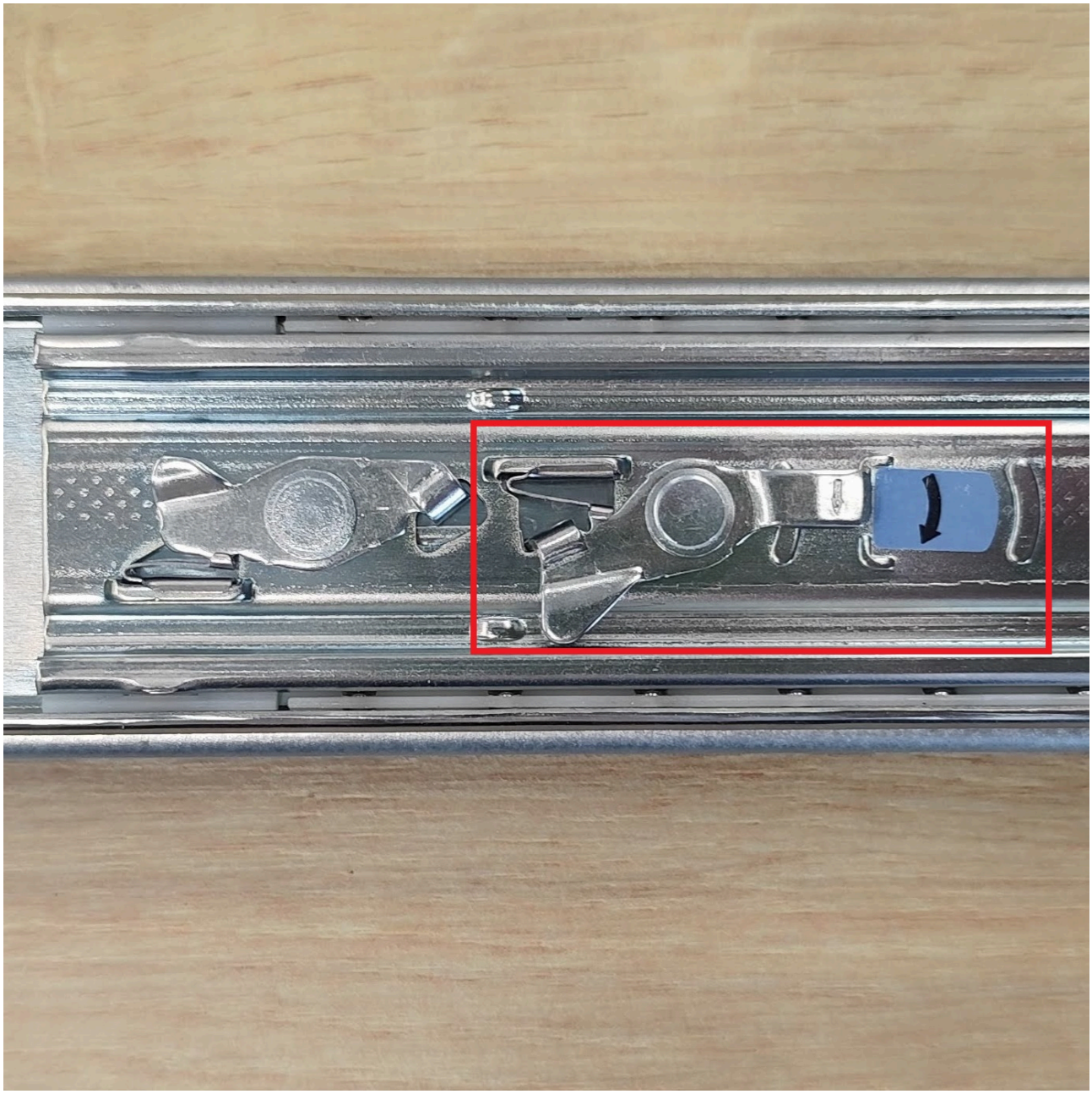


Middle rail parts

The two middle rail parts connect the outer rail part to the inner rail part.

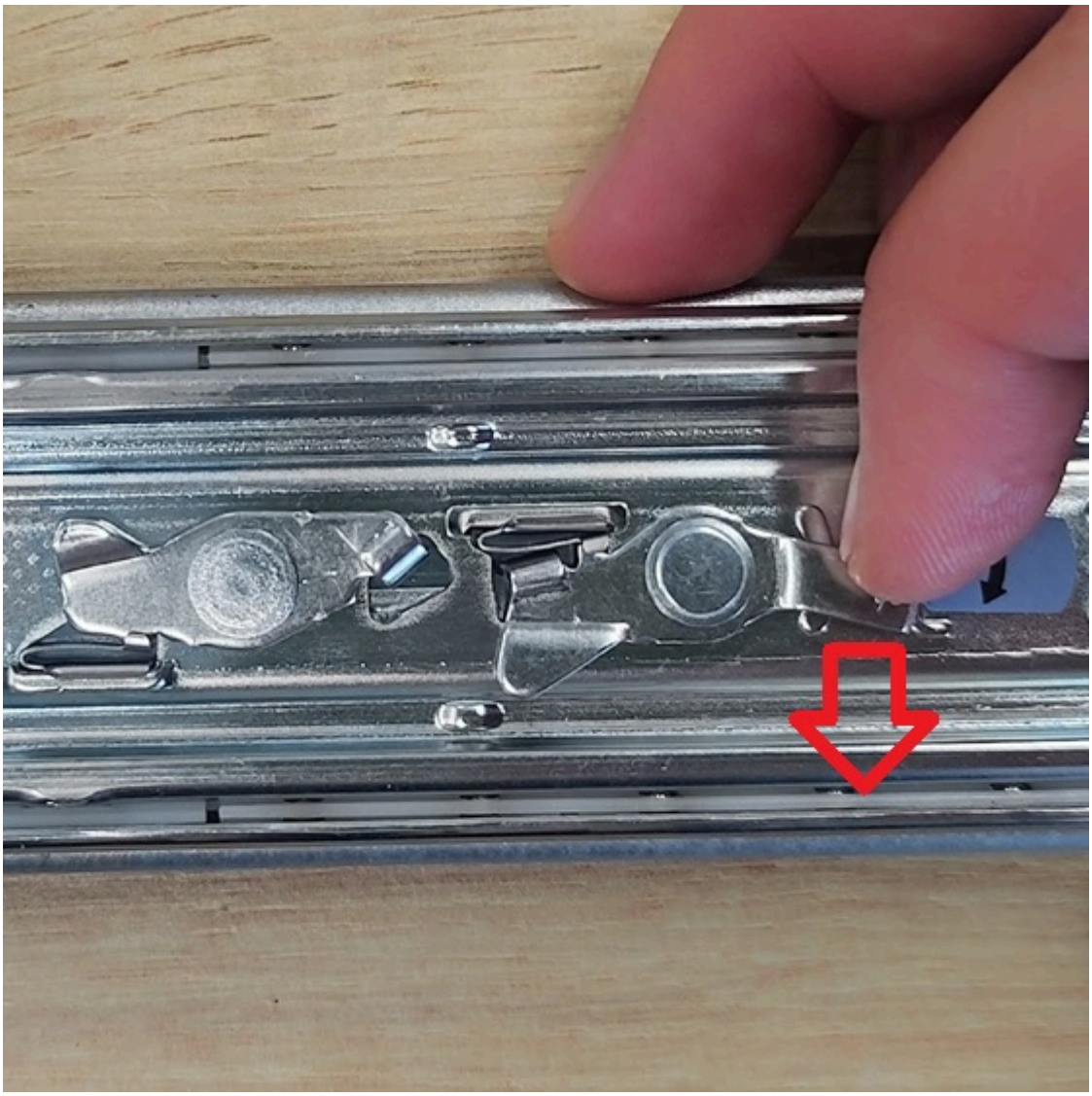
- You cannot detach the middle rail parts.
- When you fully extend the middle rail parts, a latch locks them in position.





To unlock the middle rail parts:

1. Press the latch in the direction of the arrow.
2. While you press the latch, slide one middle rail part into the other.



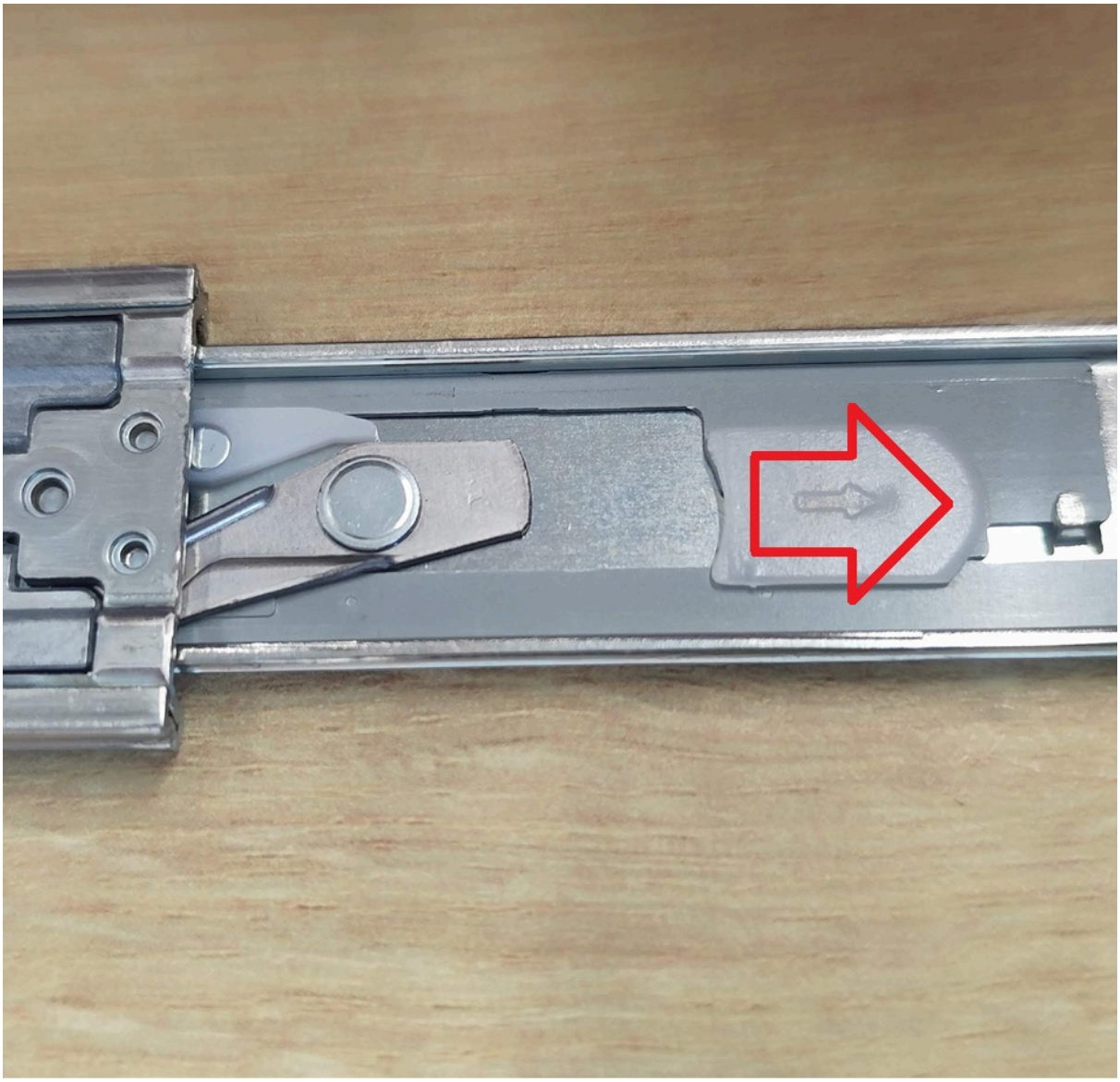
Inner rail part

The inner rail part attaches to the appliance.

You can detach the inner rail part from the other rail parts.

To detach the inner rail part:

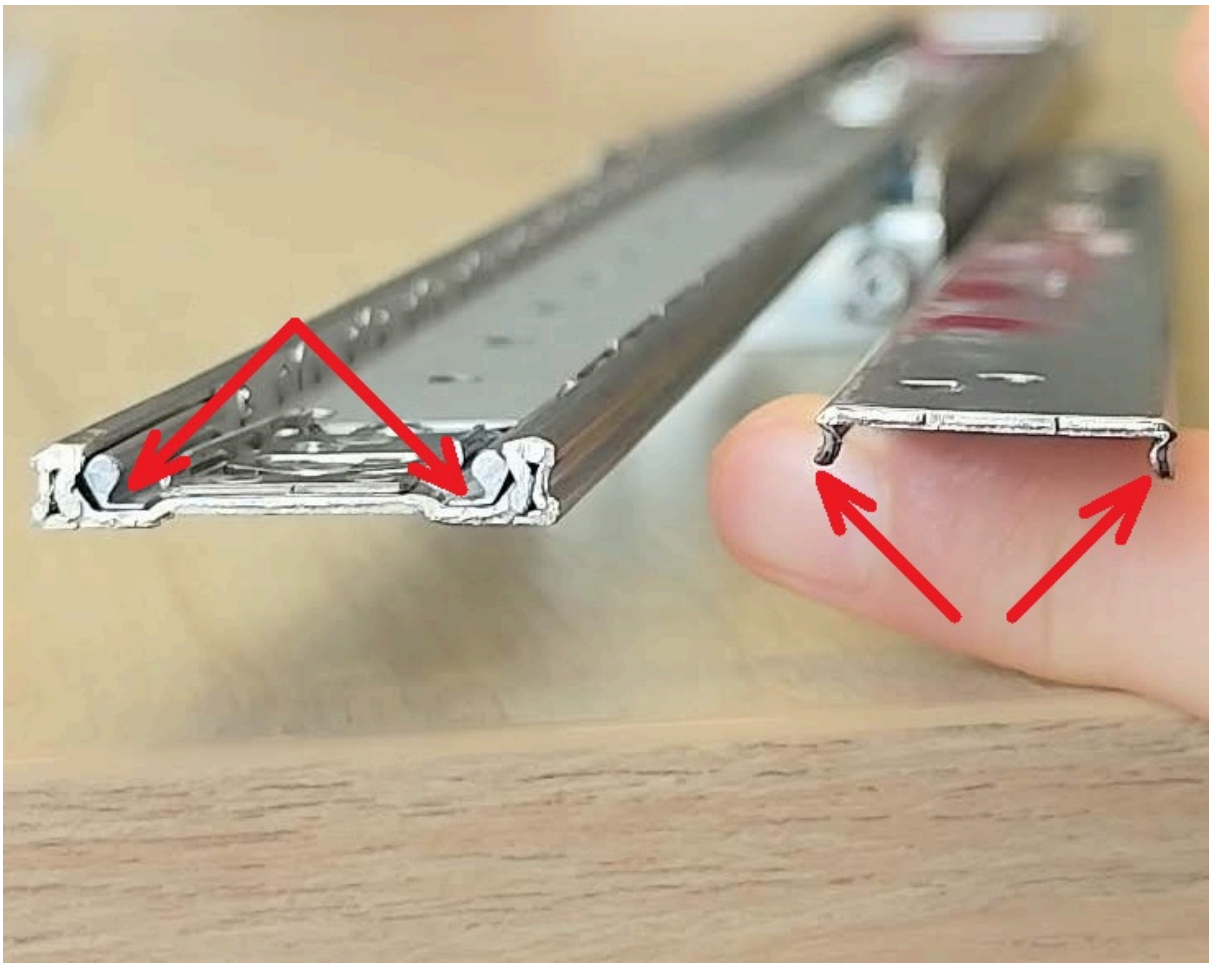
1. Pull out the inner rail part as far as possible.
2. Pull the **white plastic latch** in the direction of the arrow.



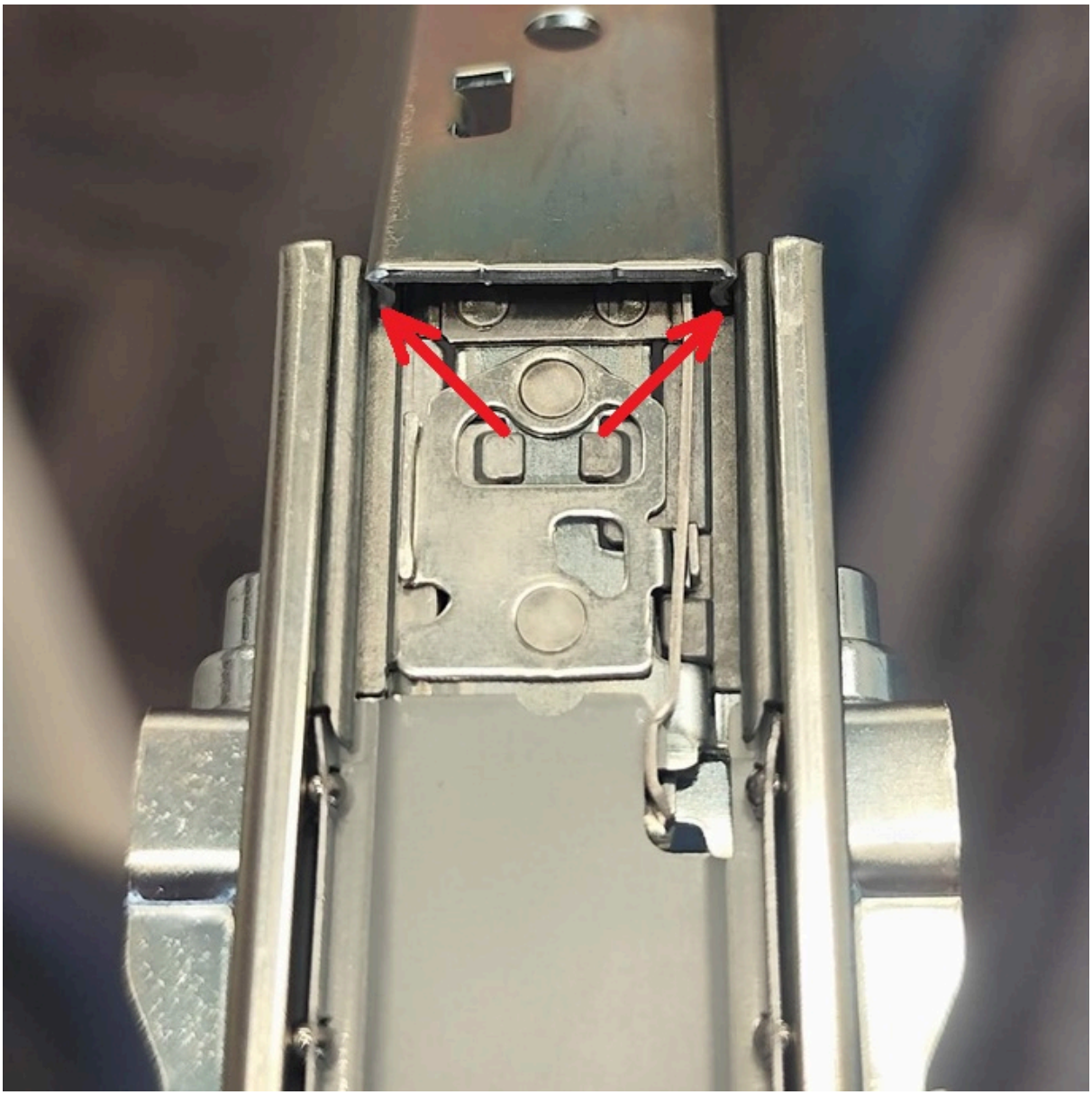
3. Pull the inner rail part out of the middle rail part.

To insert the detached inner rail part:

1. Align the inner rail part with the middle rail part.



2. Insert the inner rail part into the middle rail part in the correct orientation.

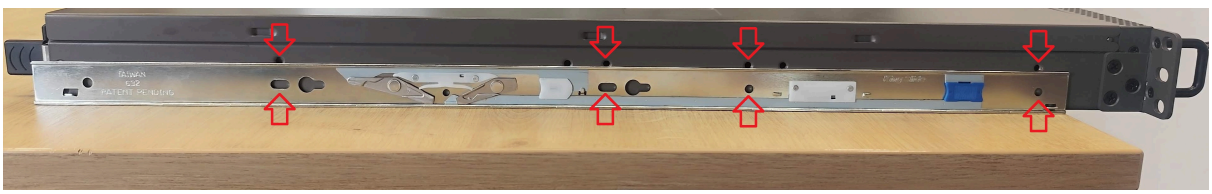


Attaching the Inner Rail Parts to the Appliance

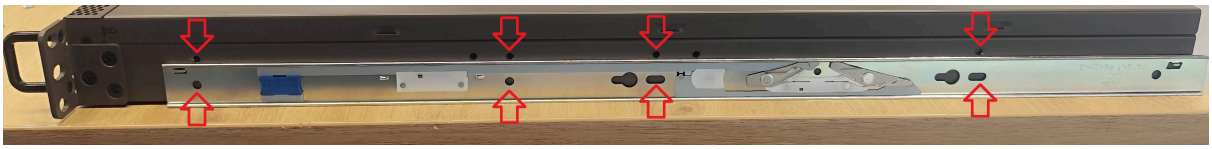
1. Put the appliance on a stable, horizontal surface.
2. Put the correct side of the appliance on the horizontal surface.

   Make sure that the labels on the front panel are in their correct orientation.
3. Position the inner rail part on the side of the appliance.
4. Make sure that the **blue plastic latch** is near the front panel of the appliance.

   Left side of the appliance:



Right side of the appliance:



5. Align the first hole in the inner rail part, near the blue plastic latch, with the first threaded hole on the appliance.
6. Install the four M3x3 screws.
7. Tighten all four screws.
8. Repeat the procedure for the inner rail part on the other side of the appliance.

7.3. Mounting the Appliance into the Rack

Follow these steps:

1. Attach the outer rail parts to the rack.

   For instructions, see Outer rail part *(on page 33)*.

2. Attach the inner rail parts to the appliance.

   For instructions, see Inner rail part *(on page 38)*.

3. Insert the appliance into the rails.

   Tip:

   Two people should perform this step.

   Warning:

   Insert very carefully to make sure that both sides of each inner part are sliding correctly into the rails.

4. Push the appliance until the latches click on each inner part.

   Step result:
   The appliance cannot move further.

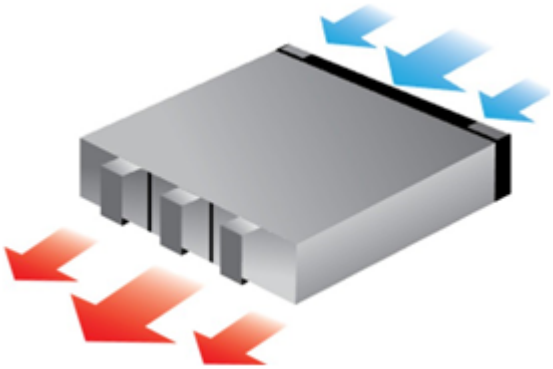
5. In each inner part, pull the **blue** plastic latch towards the front panel of the appliance and hold it.

   See Inner rail part *(on page 38)*.

6. Carefully push the appliance for approximately 5mm.
7. In each inner part, release the blue plastic latch.
8. Carefully push the appliance completely until its front panel is flush with the rack.
9. **Optional:** Secure the ear-mount brackets to the rails with screws.

7.4. Airflow in MHO-200

The fan units in the Maestro Orchestrator generate the airflow from the front panel (intake) to the rear panel:



Important:

- All systems in the same rack should be planned with the same airflow direction.
- All fan units in the same rack need to have the same air flow direction.

  A mismatch in the air flow affects the heat dissipation in the rack.

7.5. Network Cable Installation

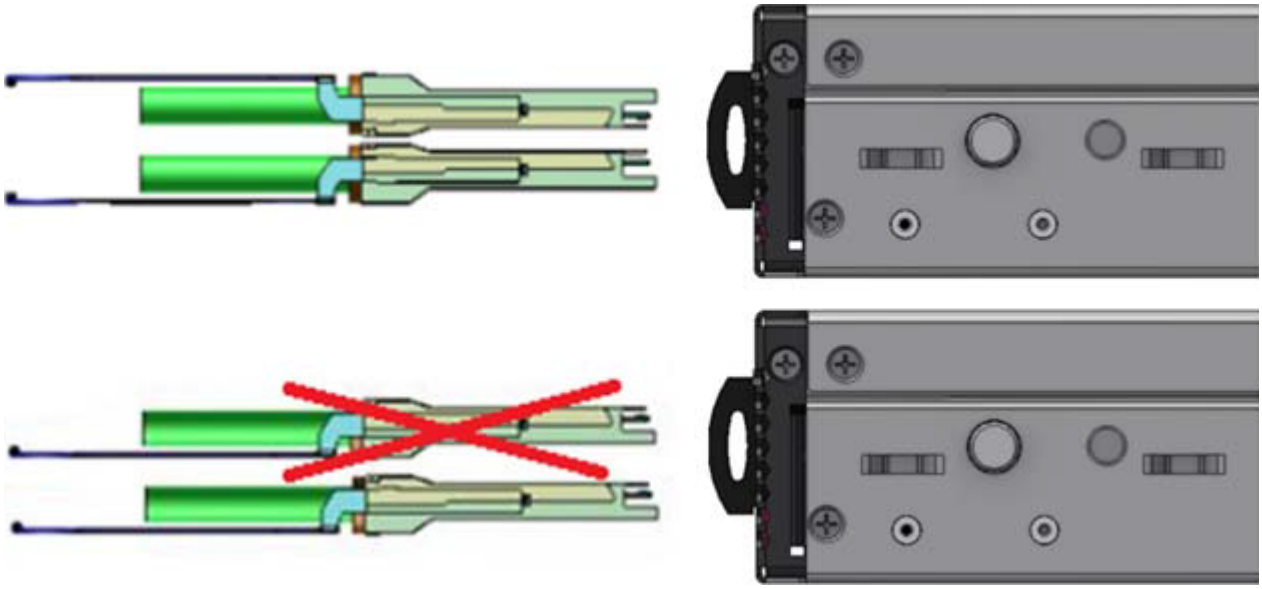
It is possible to insert or remove all network cables while the Maestro Orchestrator is powered on.

To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The LED indicator, corresponding to each data port, light up when the physical connection is established. When a logical connection is made, the relevant port LED lights up.

To remove a cable, disengage the locks and slowly pull the connector away from the port receptacle. The LED indicator for that port turns off, when the cable is unplugged.

CAUTION:

Do not force the cable into the cage with more than 40 Newtons (4 kilogram-force / 9.0 pound-force). Greater insertion force may damage the cable, or the cage.



8. First Time Configuration of MHO-200

8.1. Step 1: Run the First Time Configuration Wizard on the First Orchestrator MHO-200

Context:

This procedure configures:

1. The Gaia operating system on the first Maestro Orchestrator.
2. The Maestro environment (the number of Sites, the number of Maestro Orchestrators on each Site, the Member ID).

If your Maestro environment has two or more Maestro Orchestrators, then you configure the first Maestro Orchestrator, and then other Maestro Orchestrators join the first Maestro Orchestrator.

Follow these steps:

1. **Optional:** Change the default IP address (`192.168.1.1 / 24`) of the **Management port** of the first Maestro Orchestrator.
   a. Make sure Maestro Orchestrator is powered off.
   b. Connect your workstation to the **Console** port on the Maestro Orchestrator.
      See Console Ports on MHO-200 *(on page 25)*.
   c. Power on Maestro Orchestrator.
   d. In the terminal emulator application, log in to the Gaia operating system.
      Username: `admin`
      Password: `admin`
   e. Change the default password.
   f. Configure the required IPv4 address and Subnet Mask on the interface **Mgmt1**:
      ```
      set interface Mgmt1 ipv4-address <IPv4 Address> mask-length <Mask Length>
      ```
   g. Configure the required IPv4 address of the default gateway:
      ```
      set static-route default nexthop gateway address <IPv4 Address> on
      ```
   h. Save the configuration:
      ```
      save config
      ```
   i. Examine the configuration of the interface "Mgmt1":
      ```
      show interface Mgmt1
      ```
   j. Examine the default gateway configuration:
      ```
      show route static all
      ```

2. On a workstation, on the relevant interface, configure an IPv4 address from the same subnet that is configured on the **Management port** of the Maestro Orchestrator.

   Note:

   - The default subnet is: `192.168.1.1 / 24`
   - If you changed the default IPv4 configuration over the console connection, then configure an IPv4 address from the new subnet.

3. On your workstation, in a web browser, connect to the IPv4 address of the **Management port**.

   ```
   https://<IPv4 Address of Management Port>
   ```

   The default is:

   ```
   https://192.168.1.1
   ```

4. Log in.

   Note:

   - The default credentials are:

     Username: `admin`

     Password: `admin`
   - If you changed the default IPv4 configuration over the console connection, then enter the new password you configured.

5. On the **Welcome** page, click **Next**.
6. On the **Deployment Options** page:
   a. Select **Continue with R82.20 configuration**.
   b. Click **Next**.
7. On the **Authentication Details** page:
   a. Configure the Gaia OS administrator password.
   b. Configure the Gaia OS maintenance mode password (GRUB).
   c. Click **Next**.
8. On the **Management Connection** page:
   a. Configure the applicable IPv4 (and IPv6) settings (leave the default `192.168.1.1 / 24` and `fd00::1 / 64`).
   b. Click **Next**.
9. On the **Device Information** page:

a. Configure the desired **Host Name**.

b. Configure the required **Domain Name** in your environment.

c. Configure the required **Primary DNS Server** in your environment.

d. Configure the required **Secondary DNS Server** in your environment.

e. Configure the required **Tertiary DNS Server** in your environment.

f. Configure the required **Proxy server** in your environment.

g. Click **Next**.

10. On the **Date and Time Settings** page:

    a. Configure the required settings - manually or with NTP.

    b. Click **Next**.

11. On the **Maestro Hyperscale Orchestrator** page:

    a. In the **Environment** section, select **Set up a new environment**.

    b. Click **Next**.

12. On the **Orchestrator Configuration** page:

    a. In the **Environment Configuration** section, in the **Topology** field, select the required topology:

        - **Single site - 1 member (1 Orchestrator)**
        - **Single site - 2 member (2 Orchestrator)**
        - **Dual site - 1 member per site (2 Orchestrators)**
        - **Dual site - 2 members per site (4 Orchestrators)**

    b. Assign the Orchestrator ID:

        - If in the **Topology**, you selected **Single site - 1 member (1 Orchestrator)**, then this Orchestrator automatically gets the ID "1_1".
        - If in the **Topology**, you selected **Single site - 2 member (2 Orchestrator)**, then you can select one of these:
            - **1_1** (Member 1)
            - **1_2** (Member 2)
        - If in the **Topology**, you selected **Dual site - 1 member per site (2 Orchestrators)**, then you can select one of these:
            - **1_1** (Member 1)
            - **1_2** (Member 2)
        - If in the **Topology**, you selected **Dual site - 2 members per site (4 Orchestrators)**, then you can select one of these:

- **1_1** (Member 1 on the first Site)
- **1_2** (Member 2 on the first Site)
- **2_1** (Member 1 on the second Site)
- **2_2** (Member 2 on the second Site)

c. Click **Next**.

13. On the **Orchestrator Configuration** page:

a. In the section **Connection settings**, configure the IPv4 addresses for the external synchronization ports between the Sites.

The default IPv4 addresses are:

Site	Orchestrator	IPv4 Address
1	1_1	10.0.1.1 / 30
1	1_2	10.0.1.2 / 30
2	2_1	10.0.2.1 / 30
2	2_2	10.0.2.2 / 30

Important:

If the Orchestrators on Maestro Sites do not connect to each other directly, then the external synchronization ports must connect to an isolated dedicated network.

b. Click **Next**.

14. On the **First Time Configuration Wizard Summary** page:

a. At the bottom, in the row **Review Update and Data Sharing settings here**, click the link **here**. Review the default settings and change them as required in your environment. See sk175504.

Tip:

Leave the default settings.

b. In the **Deployment Token** field, copy the current token.

You use this token on other Orchestrators to join additional Orchestrators to the first Orchestrator.

You can also copy this token later from the first Orchestrator (Gaia Portal > **Orchestrator Management** section > **Deployment** page > at the top, click **Deployment**).

> **Warning:**
>
> Keep this token in a secured location until you join the additional Orchestrators. Share this token only with authorized personnel performing the deployment.

c. Click **Finish**.

d. Click **Yes** to confirm.

Procedure result:

The first Orchestrator completes the configuration and reboots.

What to do next:

1. On your workstation, in a web browser, connect to the IPv4 address of the **Management port**:

   ```
   https://<IPv4 Address of Management Port>
   ```

2. Follow Step 2: Run the First Time Configuration Wizard on Each Additional Orchestrator MHO-200 *(on page 49)*.

8.2. Step 2: Run the First Time Configuration Wizard on Each Additional Orchestrator MHO-200

Prerequisite:

Follow Step 1: Run the First Time Configuration Wizard on the First Orchestrator MHO-200 *(on page 45)*.

Context:

This procedure configures the additional Maestro Orchestrators.

Follow these steps:

1. **Optional:** Change the default IP address (`192.168.1.1 / 24`) of the **Management port** of the first Maestro Orchestrator.

   a. Make sure Maestro Orchestrator is powered off.

   b. Connect your workstation to the **Console** port on the Maestro Orchestrator.

   See Console Ports on MHO-200 *(on page 25)*.

   c. Power on Maestro Orchestrator.

   d. In the terminal emulator application, log in to the Gaia operating system.

   Username: `admin`

   Password: `admin`

   e. Change the default password.

   f. Configure the required IPv4 address and Subnet Mask on the interface **Mgmt1**:

   ```
   set interface Mgmt1 ipv4-address <IPv4 Address> mask-length <Mask Length>
   ```

g. Configure the required IPv4 address of the default gateway:

```
set static-route default nexthop gateway address <IPv4 Address> on
```

h. Save the configuration:

```
save config
```

i. Examine the configuration of the interface "Mgmt1":

```
show interface Mgmt1
```

j. Examine the default gateway configuration:

```
show route static all
```

2. On a workstation, on the relevant interface, configure an IPv4 address from the same subnet that is configured on the **Management port** of the Maestro Orchestrator.

Note:

- The default subnet is: `192.168.1.1 / 24`
- If you changed the default IPv4 configuration over the console connection, then configure an IPv4 address from the new subnet.

3. On your workstation, in a web browser, connect to the IPv4 address of the **Management port**.

```
https://<IPv4 Address of Management Port>
```

The default is:

```
https://192.168.1.1
```

4. Log in.

Note:

- The default credentials are:

  Username: `admin`

  Password: `admin`

- If you changed the default IPv4 configuration over the console connection, then enter the new password you configured.

5. On the **Welcome** page, click **Next**.
6. On the **Deployment Options** page:
   a. Select **Continue with R82.20 configuration**.
   b. Click **Next**.
7. On the **Authentication Details** page:

a. Configure the Gaia OS administrator password.

b. Configure the Gaia OS maintenance mode password (GRUB).

c. Click **Next**.

8. On the **Management Connection** page:

   a. Configure the applicable IPv4 (and IPv6) settings (leave the default `192.168.1.1 / 24` and `fd00::1 / 64`).

   b. Click **Next**.

9. On the **Device Information** page:

   a. Configure the desired **Host Name**.

   b. Configure the required **Domain Name** in your environment.

   c. Configure the required **Primary DNS Server** in your environment.

   d. Configure the required **Secondary DNS Server** in your environment.

   e. Configure the required **Tertiary DNS Server** in your environment.

   f. Configure the required **Proxy server** in your environment.

   g. Click **Next**.

10. On the **Date and Time Settings** page:

    a. Configure the required settings - manually or with NTP.

    b. Click **Next**.

11. On the **Maestro Hyperscale Orchestrator** page:

    a. In the **Environment** section, select **Join and existing Maestro environment**.

    b. In the **Deployment Token** field, paste the token you copied from the first Orchestrator.

    c. Click **Next**.

12. On the **Deployment Options** page:

    a. Assign the Orchestrator ID.

    The available ID values depend on the **Topology** you configured on the first Orchestrator and on the ID you already assigned to the first Orchestrator:

    - **1_1** (Member 1 on the first Site)
    - **1_2** (Member 2 on the first Site)
    - **2_1** (Member 1 on the second Site)
    - **2_2** (Member 2 on the second Site)

    b. Click **Next**.

13. On the **First Time Configuration Wizard Summary** page:

a. At the bottom, in the row **Review Update and Data Sharing settings here**, click the link **here**. Review the default settings and change them as required in your environment. See sk175504.

> **Tip:**
>
> Leave the default settings.

b. Click **Finish**.

c. Click **Yes** to confirm.

Procedure result:

The Orchestrator completes the configuration and reboots. During boot, it joins the first Orchestrator.

What to do next:

1. Configure and join all other required Orchestrators.
2. Step 3: Configure the Port Settings on Each Orchestrator MHO-200 *(on page 52)*.

8.3. Step 3: Configure the Port Settings on Each Orchestrator MHO-200

Follow these steps:

1. On your workstation, in a web browser, connect to the IPv4 address of the **Management port** on each Orchestrator:

   ```
   https://<IPv4 Address of Management Port>
   ```

2. In the left panel, in the **Orchestrator Management** section, click the **Ports** page.
3. At the top click the applicable tab:

Tab	Description
Table	Shows all ports in one summary table with these tabs: ◦ **All** ◦ **Link Up** ◦ **Link Down** ◦ **Admin Down** To show or hide columns, the at the top click **Options** and click the applicable column. To edit a port, click its row and at the top click **Edit Port**. To troubleshoot a port, click its row and at the top click **Diagnostics**.

Tab	Description
Diagram	Shows all ports in one interactive image. Click a port to see the current settings. To change the current settings, right-click a port and click **Edit Port**. To troubleshoot a port, right-click a port and click **Diagnostics**.

Available port settings:

- **Admin State**
- **Auto Negotiation**
- **Type** (**Mgmt**, **Uplink**, **Downlink**, **Internal Site Sync**, **External Site Sync**, **Tap**)
- **Speed** (to split a port, connect the Breakout cable and select the **4x** value or the **2x** value)
- **FEC Mode**
- **Description**
- **Emit LLDP frames** (not available for these port types: **Downlink**, **Internal Site Sync**, **Tap**)

What to do next:

Step 4: Configure the Deployment Settings on the First Orchestrator MHO-200 *(on page 53)*

8.4. Step 4: Configure the Deployment Settings on the First Orchestrator MHO-200

Follow these steps:

1. On your workstation, in a web browser, connect to the IPv4 address of the **Management port** on the first Orchestrator:

   ```
   https://<IPv4 Address of Management Port>
   ```

2. Configure the Sites and connections between the Orchestrators:

   a. In the left panel, in the **Orchestrator Management** section, click the **Deployment** page.

   b. **Optional:** Configure a name for each Site (click in the heading **Site 1** and **Site 2**).

   c. **Optional:** Configure a description for each Site (click in the text **Enter Description**).

   d. Resolve all alerts you see in the right panel.

   > **Important:**
   >
   > All connected interfaces, links, and statuses must appear green.

Note:

For port settings, in the **Orchestrator Management** section, click the **Ports** page.

e. **Optional:** Configure the connection method between the external synchronization ports:

i. At the top, click **Topology Settings**.

ii. Configure the required settings:

Topology	Description
Direct	A dedicated cable connects the sites between each Orchestrator.
LAN	On the different Sites, the external synchronization ports on the corresponding Orchestrators must connect to each other on an isolated dedicated network. The external synchronization ports on different Sites share the same Layer 2 network. **Tip:** We recommend a dedicated VLAN. For each Orchestrator, for the external synchronization port, you must configure the IPv4 address and Subnet prefix.
Routed	On the different Sites, the external synchronization ports on the corresponding Orchestrators must connect to each other on an isolated dedicated network. The external synchronization ports on different Sites connect across separate networks. For each Orchestrator, for the external synchronization port, you must configure the IPv4 address, Subnet prefix, and the Next Hop IPv4 address.

iii. Click **Save**.

What to do next:

Step 5: Configure the Cluster *(on page 54)*

8.5. Step 5: Configure the Cluster

Prerequisite:

Make sure the required Security Appliances are connected to the relevant **Downlink** ports on all Orchestrators.

Follow these steps:

1. On your workstation, in a web browser, connect to the IPv4 address of the **Management port** on the first Orchestrator:

   ```
   https://<IPv4 Address of Management Port>
   ```

2. Configure the required Cluster (Security Group):

   a. In the left panel, in the **Orchestrator Management** section, click the **Clusters** page.

   b. Click **New Cluster**.

3. On the **Assign Gateways** page:

   a. Click **Add Gateway**.

   b. Select the checkboxes of the required Security Appliances.

   c. Click **Add Selected**.

   > **Important:**
   >
   > The first Security Appliance in the list is automatically designated as the Single Management Object (SMO). The SMO is the Cluster Member through which the Management Server communicates with the Cluster. You can reorder this list with the **Up** and **Down** buttons on the top toolbar.

   d. Click **Next**.

4. On the **General Settings** page:

   a. In the **Host name** field, configure the required string.

   b. **Optional:** In the **Description** field, enter the applicable text to describe this cluster.

   c. In the **Admin Password** and the **Confirm Admin Password** fields, enter the password for the Gaia OS on this cluster.

   > **Warning:**
   >
   > Keep this password in a secured location. Share this password only with authorized personnel.

   d. In the **SIC Password** and the **Confirm SIC Password** fields, configure the one-time activation key to establish a secure communication with the Management Server.

   > **Warning:**
   >
   > Keep this password in a secured location until you connect this cluster to the Management Server. Share this password only with authorized personnel performing the deployment.

   e. To configure this cluster in the **VSNext** mode, select **Configure as VSNext Cluster**.

   f. Click **Next**.

5. On the **Management Interface** page:

a. In the **Interfaces** field, select the one or more ports to use for management. Selecting two ports creates a bonded management interface (MAGG).

b. In the **Bond mode** section, configure the required mode - **Active - Backup**, **XOR**, or **LACP**.

c. In the **IPv4 address** field, configure the required IPv4 address and mask length.

d. In the **Default IPv4 Gateway** field, configure the required IPv4 address

e. **Optional:** In the **Default IPv6 Address** field, configure the required IPv6 address and mask length.

f. **Optional:** In the **Default IPv6 Gateway** field, configure the required IPv6 address

g. Click **Next**.

6. On the **Uplinks** page:

   a. In the **Interfaces** field, select the required interfaces. These are the external-facing interfaces that connect to your network switches or routers.

   b. Click **Next**.

7. On the **Summary** page:

   a. Review the settings.

   b. Click **Apply**.

   c. Click **Apply** to confirm.

8. On the **Cluster Created** page, click **Close**.

9. On the left, click the new Cluster card to see the details in the right panel.

   Note:

   It takes several minutes for all Security Appliances to complete the joining process and transition to the **Active** state..

10. Configure the required settings on the Management Server:

    a. Connect with SmartConsole to the Security Management Server / relevant Domain Management Server.

    b. Create a new **Security Gateway** object. Use the SIC Password your configured on the Orchestrator.

    See the R82.20 Security Management Administration Guide > Chapter "Managing Gateways" > Section "Creating a New Security Gateway".

    c. Configure the required Access Control Policy and install it.

    See the R82.20 Security Management Administration Guide > Chapter "Creating an Access Control Policy".

    d. Configure the required Threat Prevention Policy and install it.

    See the R82.20 Threat Prevention Administration Guide.

9. Command Line Reference on MHO-200

9.1. Moving to Context of Orchestrator on MHO-200 - om

Context:

Use this command to move between the CLI shells of the Orchestrators in your Maestro environment.

Follow these steps:

1. Connect to the command line on any Orchestrator in your Maestro environment.
2. Log in to Gaia Clish or to the Expert mode.
3. Run:

   ```
   om <ID of Site>_<ID of Orchestrator>
   ```

   To exit the current shell and go back to the previous shell, run: `exit`

Related information
Moving to Context of Cluster Member on MHO-200 - cm *(on page 57)*
Viewing Information About Orchestrator on MHO-200 - orch_stat *(on page 57)*
Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*

9.2. Moving to Context of Cluster Member on MHO-200 - cm

Context:

Use this command to move between the CLI shells of the Cluster Members in a Cluster (Security Group Members in a Security Group).

Follow these steps:

1. Connect to the command line on any Orchestrator.
2. Log in to Gaia Clish or to the Expert mode.
3. Run:

   ```
   cm <ID of Cluster>_<ID of Cluster Member>
   ```

   To exit the current shell and go back to the previous shell, run: `exit`

Related information
Moving to Context of Orchestrator on MHO-200 - om *(on page 57)*
Viewing Information About Orchestrator on MHO-200 - orch_stat *(on page 57)*
Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*

9.3. Viewing Information About Orchestrator on MHO-200 - orch_stat

Context:

Use this command to show information about an Orchestrator in your Maestro environment:

- Number of Maestro Sites.
- Number of Orchestrators on each Site.

- Site ID.
- Member ID (Orchestrator ID) on the Site.
- All ports (Port ID, Port Name, Port Administrative State, Port Link State, Port Transceiver State, Port Speed, Port Type, To which Cluster the port is assigned).
- All connected Security Appliances.
- Orchestrator services (Service Name, Service Status, Service PID, Service CPU Utilization, Service Memory Utilization, How many times a service restarted, Service Uptime)

Follow these steps:

1. Connect to the command line on the relevant Orchestrator in your Maestro environment.
2. Log in to the Expert mode.
3. Run:

```
orch_stat [<Parameter>]
```

Parameter	Description
No Parameter or `--tui`	Opens the live interface text interface (TUI) with these tabs: ◦ **Deployment** (the default tab) ◦ **Ports** ◦ **Gateways** ◦ **Services**
`-h` `--help`	Shows the built-in help.
`-t` `--text`	Shows all information in plain text.
`-j` `--json`	Shows all information in the JSON format.
`-j -o <Path>/<File>` `--json --output <Path>/<File>`	Saves all information in the JSON format in the specified file.
`-d` `--deployment`	Opens the live interface text interface (TUI) on the tab **Deployment**.

Parameter	Description
`-p` `--ports`	Opens the live interface text interface (TUI) on the tab **Ports**.
`-g` `--gateways`	Opens the live interface text interface (TUI) on the tab **Gateways**.
`-s` `--services`	Opens the live interface text interface (TUI) on the tab **Services**.

9.4. Viewing Internal Networks on MHO-200 - mhons

Context:

Use this command to show information about internal networks of an Orchestrator in your Maestro environment:

Follow these steps:

1. Connect to the command line on any Orchestrator in your Maestro environment.
2. Log in to the Expert mode.
3. Go to the Orchestrator "MHO" namespace shell:

   ```
   mhons
   ```

4. Run the relevant Linux commands:
   - `ip <parameters>`
   - `ping <parameters>`
   - etc.

   To exit the `mhons` shell and go back to the previous shell, run: `exit`

   Example commands:

Information	CLI Syntax
Show IP addresses of all interfaces	`ip -o addr show`
Show all routes	`ip route`
Test connectivity with a Peer Orchestrator over the Internal Sync network	`ping <IP Address of Internal Sync Port on Peer Orchestrator>`

Information	CLI Syntax
Show information about the Internal Sync tunnel (VNI, VTEP, UDP port)	`ip -d link show mho-<Remote-Site>-<Member>-esync`
Show information about Orchestrator authentication - ESP SAs and SPIs for each peer	`ip xfrm state`
Show information about Orchestrator authentication - ICMP-bypass / ESP-required policies	`ip xfrm policy`
Capture an encapsulated frame on the wire	`tcpdump -e -vv -ni mho-<ID of Remote Site>-<ID of Remote Member>-bond udp port 4789`
Confirm the next-hop monitor is running	`systemctl is-active mho_nexthop_monitor`

9.5. Gaia Clish Commands on MHO-200 - show maestro

Description:

Use these Gaia Clish commands to see the current settings and statuses.

Syntax:

```
show maestro
      cluster <ID>
            description
            site <ID> member <ID> description
      configuration
            compatibility-mode
      port <ID> site <ID>
            admin-state
            auto-negotiation
            counters
            description
            external-lldp-emit
            fec
            optic-info
            speed
            type
      site <ID>
            description
            name
      status
      tap-entries
```

Parameters:

Parameter	Description
`cluster <ID>`	Specifies the Cluster ID. Press the **Tab** key to see the available values.
`site <ID>`	Specifies the Site ID. Press the **Tab** key to see the available values.
`member <ID>`	Specifies the Member ID on the Site. Press the **Tab** key to see the available values.
`port <Port ID>`	Specifies the Port ID. Press the **Tab** key to see the available values.
`description`	Shows the configured description text.
`compatibility-mode`	Shows the status of the compatibility mode in this port.
`admin-state`	Shows the administrative status of this port.
`auto-negotiation`	Shows the status of the auto-negotiation in this port.
`counters`	Shows various traffic counters in this port.
`external-lldp-emit`	Shows the status of the LLDP in this port.
`fec`	Shows the configured FEC mode in this port.
`optic-info`	Shows information about the transceiver in this port.
`speed`	Shows the configured port speed.
`status`	Shows the live dashboard with these tabs: • `Deployment` • `Ports` • `Gateways` • `Services`

Parameter	Description
`tap-entries`	Shows the configured Tap (Span) rules. See Configuring a Tap Port on MHO-200 *(on page 75)*.

Related information
Gaia Clish Commands on MHO-200 - set maestro *(on page 62)*
Gaia Clish Commands on MHO-200 - delete maestro *(on page 66)*

9.6. Gaia Clish Commands on MHO-200 - set maestro

Description:

Use these Gaia Clish commands to configure the various settings.

> **Important:**
>
> After each change in the configuration, you must run the `save config` command.

Syntax:

```
set maestro [ main-orchestrator <Site ID>_<Member ID> ]
      authentication
            apply-recovery-key <Site ID>_<Member ID>
            generate-recovery-key-for-peer <Site ID>_<Member ID>
      cluster <Cluster ID>
            description "Text"
            site <Site ID> member <Member ID> description "Text"
      configuration
            compatibility-mode {on | off}
      deployment
      port <Port ID>
            site <Site ID>
                  admin-state {up | down}
                  auto-negotiation {enabled | disabled}
                  description "Text"
                  external-lldp-emit {enabled | disabled}
                  fec rs544
                  speed {1G | 10G | 25G | 40G | 100G | 200G | 400G | 4x10G | 4x25G
   | 4x100G | 2x100G}
                  type {mgmt | uplink | downlink | ssm_sync | site_sync | tap}
      site <Site ID>
            description "Text"
            name "Text"
      site-connectivity
            apply-local
            from-token
```

Parameters:

Parameter	Description
`cluster <ID>`	Specifies the Cluster ID. Press the **Tab** key to see the available values.
`site <ID>`	Specifies the Site ID. Press the **Tab** key to see the available values.
`member <ID>`	Specifies the Member ID on the Site. Press the **Tab** key to see the available values.
`port <Port ID>`	Specifies the Port ID. Press the **Tab** key to see the available values.
`main-orchestrator <Site ID>_<Member ID>`	Configures the Main Orchestrator. Within a Maestro deployment, one Orchestrator acts as the Main Orchestrator - the authoritative source of truth for all deployment and cluster configuration. All configuration changes are first written to the Main Orchestrator and then propagated to all other Orchestrators in the deployment. The Main Orchestrator role is managed automatically. If the current Main Orchestrator becomes unreachable, the remaining Orchestrators in the deployment will elect a new Main Orchestrator automatically. This automatic failover ensures that cluster configuration remains consistent and accessible even during an Orchestrator failure.
`authentication apply-recovery-key <Site ID>_<Member ID>`	Applies a recovery key to recover an Orchestrator authentication.
`authentication generate-recovery-key-for-peer <Site ID>_<Member ID>`	Generates a recovery key for an Orchestrator authentication.
`description "Text"`	Configures the description text.
`configuration compatibility-mode {on | off}`	Configures the compatibility mode.

Parameter	Description
`deployment`	Starts the interactive wizard that configures the Maestro (the number of Sites, the number of Maestro Orchestrators on each Site, the Member ID). **Important:** You run the command `set maestro deployment` only on the **first** Orchestrator. On all additional Orchestrators, you run the command `join maestro deployment`. Connection methods between sites: • `direct` A dedicated cable connects the sites between each Orchestrator. • `same_network` On the different Sites, the external synchronization ports on the corresponding Orchestrators must connect to each other on an isolated dedicated network. The external synchronization ports on different Sites share the same Layer 2 network. **Tip:** We recommend a dedicated VLAN. For each Orchestrator, for the external synchronization port, you must configure the IPv4 address and Subnet prefix. • `routed` On the different Sites, the external synchronization ports on the corresponding Orchestrators must connect to each other on an isolated dedicated network. The external synchronization ports on different Sites connect across separate networks. For each Orchestrator, for the external synchronization port, you must configure the IPv4 address, Subnet prefix, and the Next Hop IPv4 address.
`admin-state {up | down}`	Configures the administrative state of this port.
`auto-negotiation {enabled | disabled}`	Configures the auto-negotiation for this port.

Parameter	Description
`external-lldp-emit {enabled | disabled}`	Configures the LLDP in this port.
`fec rs544`	Configures the FEC mode for this port.
`speed`	Configures the speed for this port. To split a port, connect the Breakout cable and select the **4x** value or the **2x** value. See: • Splitting the Ports with Breakout Cables *(on page 26)*. • Changing the Speed and the Default Type of a Port in MHO-200 *(on page 73)*.
`type`	Configures the type of this port: • `mgmt` Management Port through which you manage a Cluster. • `uplink` Uplink port that connects to your networks. • `downlink` Downlink port that connects to Security Appliances. • `ssm_sync` Internal Site Sync port (synchronization between Orchestrators on the same Site). • `site_sync` External Site Sync port (synchronization between Orchestrators on the different Sites). • `tap` Tap (Span) port - see Configuring a Tap Port on MHO-200 *(on page 75)*. See Changing the Speed and the Default Type of a Port in MHO-200 *(on page 73)*.

Parameter	Description
`site-connectivity {apply-local | from-token}`	Starts the wizard that changes the Site-Sync configuration (IP address, mask length, default gateway) on one or more Orchestrators in an existing Dual Site deployment without running the full "`set maestro deployment`" wizard. • `site-connectivity apply-local` Applies the new Site-Sync configuration locally and then waits for the peer Orchestrators to catch up once reachability is restored. • `site-connectivity from-token` Reconfigures the Site-Sync from a deployment token. **Note:** • The wizard applies changes in three phases - prepare, apply, finalize. Traffic continues to flow during the IP configuration. A reboot is **not** required. • This wizard does not change the connection method (`direct` / `same_network` / `routed`).

Related information
Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*
Gaia Clish Commands on MHO-200 - delete maestro *(on page 66)*

9.7. Gaia Clish Commands on MHO-200 - delete maestro

Description:

Use these Gaia Clish commands to remove the various settings.

Important:

After each change in the configuration, you must run the `save config` command.

Syntax:

```
delete maestro
      authentication <Site ID>_<Member ID>
      cluster <Cluster ID>
            description
            site <Site ID> member <Member ID> description
      cluster-interface
            cluster <Cluster ID>
                  management-interface <Port ID>
                  uplink-interface <Port ID>
      cluster-member
            cluster <Cluster ID>
```

```
12                  site <Site ID> member <Member ID>
13      port <Port ID>
14            site <Site ID> description
15      site <Site ID>
16            description
17            name
18      tap-entry
19            site <Site ID> port <Port ID>
20                  direction {ingress | egress} tap-port <Port ID>
```

Parameters:

Parameter	Description
`site <ID>`	Specifies the Site ID. Press the **Tab** key to see the available values.
`member <ID>`	Specifies the Member ID on the Site. Press the **Tab** key to see the available values.
`cluster <ID>`	Specifies the Cluster ID. Press the **Tab** key to see the available values.
`port <Port ID>`	Specifies the Port ID. Press the **Tab** key to see the available values.
`authentication`	Removes the authentication for the specified Orchestrator.
`description`	Removes the description text.
`cluster-interface ... management-interface <Port ID>`	Removes the specified Management port from the Cluster.
`cluster-interface ... uplink-interface <Port ID>`	Removes the specified Uplink port from the Cluster.
`cluster-member`	Removes the specified Security Appliance from the Cluster.
`tap-entry`	Removes the specified Tap (Span) rule. See Configuring a Tap Port on MHO-200 *(on page 75)*.

Related information
Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*
Gaia Clish Commands on MHO-200 - set maestro *(on page 62)*

9.8. Gaia Clish Commands on MHO-200 - export maestro

Description:

Use this Gaia Clish command to export the current deployment settings from the main Orchestrator.

For the complete procedure, see Transferring the Deployment Configuration from the First MHO-200 in Gaia Clish *(on page 83)*.

Syntax:

```
export maestro
      deployment
            to-file /<Path>/<Filename>
            to-token
```

Parameters:

Parameter	Description
`deployment to-file`	Exports the deployment settings to the specified file.
`deployment to-token`	Exports the deployment settings to a token string.

9.9. Gaia Clish Commands on MHO-200 - export param / import param

Description:

Use these Gaia Clish commands to export and import the Gaia OS unified configuration parameters between Orchestrators.

Note:

For more information about the Gaia OS unified configuration, see the R82.20 Gaia Administration Guide.

Syntax to export:

```
export param
      path /<Path>/<Filename> configuration {all | changed-pending | changed-saved}
```

Syntax to import:

```
import param
      configuration path /<Path>/<Filename> ignore-failure {false | true}
```

9.10. Traffic Capture on MHO-200 - m_tcpdump

Context:

Use this command in either Gaia Clish or the Expert mode to capture traffic on Orchestrator ports.

Note:

The `m_tcpdump` command is a Check Point wrapper for the standard `tcpdump` tool.

Follow these steps:

1. Connect to the command line on the Orchestrator.
2. Log in to Gaia Clish or the Expert mode.
3. Get the exact Port ID - either in Gaia Portal or in Gaia Clish.
4. Capture traffic on the relevant Port:

   ```
   m_tcpdump -i <Port ID> <options>
   ```

   For the list of options, refer to https://www.tcpdump.org/manpages/tcpdump.1.html.
5. If you saved the captured traffic in a file, then copy it from the Orchestrator to your workstation and analyze it (for example, in Wireshark).

10. Working with MHO-200

10.1. CPView on MHO-200

Context:

Use the CPView (sk101878) to monitor the Orchestrator.

Follow these steps:

1. Connect to the command line on the Orchestrator.
2. Log in to Gaia Clish or to the Expert mode.
3. Run:
   ```
   cpview
   ```
4. At the top, click the tab **Orchestrator**.
5. Click the applicable tabs.
6. Press the **Q** key to exit.

10.2. Physical Ports and Gaia OS Interfaces on MHO-200

The tables below show how the Gaia OS on the Orchestrator MHO-200 assigns the interface names to the ports on the Orchestrator's front panel (the default configuration - see Port Mapping in MHO-200 *(on page 18)*).

> **Important:**
>
> The Gaia OS on the Orchestrator does not let you configure the network settings for the Uplink or Downlink ports. You configure all the applicable network settings for the Uplink ports in the Gaia OS of the applicable Cluster (Security Group) - for example, IP addresses, Bond interfaces. There are no network settings for the Downlink ports.

First MHO-200 Orchestrator

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS	Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth1-Mgmt1	Port 1/1/1	17	dl65	Port 1/17/1
2	eth1-05	Port 1/2/1	18	dl69	Port 1/18/1
3	eth1-09	Port 1/3/1	19	dl73	Port 1/19/1

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS	Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
4	eth1-13	Port 1/4/1	20	dl77	Port 1/20/1
5	eth1-17	Port 1/5/1	21	dl81	Port 1/21/1
6	eth1-21	Port 1/6/1	22	dl85	Port 1/22/1
7	eth1-25	Port 1/7/1	23	dl89	Port 1/23/1
8	eth1-29	Port 1/8/1	24	dl93	Port 1/24/1
9	eth1-33	Port 1/9/1	25	dl97	Port 1/25/1
10	eth1-37	Port 1/10/1	26	dl101	Port 1/26/1
11	eth1-41	Port 1/11/1	27	dl105	Port 1/27/1
12	eth1-45	Port 1/12/1	28	dl109	Port 1/28/1
13	eth1-49	Port 1/13/1	29	dl113	Port 1/29/1
14	eth1-53	Port 1/14/1	30	dl117	Port 1/30/1
15	eth1-57	Port 1/15/1	31	SYNC-INT	Port 1/31/1
16	eth1-61	Port 1/16/1	32	SYNC-EXT	Port 1/32/1

Second MHO-200 Orchestrator

Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS	Port Number on the Front Panel	Interface Name in Gaia OS	Port Name in Gaia OS
1	eth2-Mgmt1	Port 2/1/1	17	dl65	Port 2/17/1
2	eth2-05	Port 2/2/1	18	dl69	Port 2/18/1
3	eth2-09	Port 2/3/1	19	dl73	Port 2/19/1
4	eth2-13	Port 2/4/1	20	dl77	Port 2/20/1
5	eth2-17	Port 2/5/1	21	dl81	Port 2/21/1
6	eth2-21	Port 2/6/1	22	dl85	Port 2/22/1
7	eth2-25	Port 2/7/1	23	dl89	Port 2/23/1
8	eth2-29	Port 2/8/1	24	dl93	Port 2/24/1
9	eth2-33	Port 2/9/1	25	dl97	Port 2/25/1
10	eth2-37	Port 2/10/1	26	dl101	Port 2/26/1
11	eth2-41	Port 2/11/1	27	dl105	Port 2/27/1
12	eth2-45	Port 2/12/1	28	dl109	Port 2/28/1
13	eth2-49	Port 2/13/1	29	dl113	Port 2/29/1
14	eth2-53	Port 2/14/1	30	dl117	Port 2/30/1
15	eth2-57	Port 2/15/1	31	SYNC-INT	Port 2/31/1
16	eth2-61	Port 2/16/1	32	SYNC-EXT	Port 2/32/1

Notes

- When you connect two Orchestrators MHO-200 for redundancy, Gaia OS shows:
  - `eth1-XX` and `Port 1/X/X` for the first Orchestrator.
  - `eth2-XX` and `Port 2/X/X` for the second Orchestrator.
- The tables above show the default configuration *before* you connect breakout cables.

  After you connect breakout cables to ports, you get *four* additional interfaces starting from the original interface name.
- The port type "`management`" is supported only for Port 1.

  See Changing the Speed and the Default Type of a Port in MHO-200 *(on page 73)*.

10.3. Changing the Speed and the Default Type of a Port in MHO-200

Follow these steps:

1. Connect to the command line on the first Orchestrator in your environment.
2. Log in to Gaia Clish.
3. Configure one of the supported speeds:
   - If you connected a DAC or Fiber cable to a port, then configure one of these supported speeds:

     ```
     set maestro port <Port ID> site 1 speed {1G | 10G | 25G | 40G | 100G | 200G |
      400G}
     ```
   - If you connected a breakout cable to a port (see Splitting the Ports with Breakout Cables *(on page 26)*), then configure one of these supported speeds (QSFP mode):

     ```
     set maestro port <Port ID> site 1 speed {4x100G | 2x100G | 4x25G | 4x10G}
     ```

   Note:

   "*<Port ID>*" specifies the port to configure.

   The format is three numbers separated with the forward slash character:

   <Orchestrator ID>/<Port Label on Front Panel>/<Port Split ID>
4. Configure the port type:

   ```
   set maestro port <Port ID> site 1 type {downlink | uplink | management | site_sync
    | ssm_sync}
   ```

   You can configure only these port types:

Port Number	Supported Port Types	Description of Port Types
1	`management` (a)	Connects to a Management Server to manage the Security Groups
	`downlink`	Connects to Security Appliances
2 - 16	`uplink`	Connects to data networks
	`downlink`	Connects to Security Appliances
	`site_sync`	External sync between Maestro Sites
	`ssm_sync`	Internal sync on the same Maestro Site
17 - 30	`downlink`	Connects to Security Appliances
	`uplink`	Connects to data networks
	`site_sync`	External sync between Maestro Sites
	`ssm_sync`	Internal sync on the same Maestro Site
31	`downlink`	Connects to Security Appliances
	`site_sync`	External sync between Maestro Sites
	`ssm_sync`	Internal sync on the same Maestro Site
32	`ssm_sync` (b)	Internal sync on the same Maestro Site

Important:

a. It is possible to use only these ports to manage the Clusters (Security Groups).

b. It is not supported to change the port type (`ssm_sync`) of the default Internal Synchronization port 32.

5. Save the configuration:

```
save config
```

6. Examine the port configuration:

```
show maestro port <Port ID> site 1 type
```

```
show maestro port <Port ID> site 1 speed
```

Related information
Gaia Clish Commands on MHO-200 - show maestro *(on page 60)*
Gaia Clish Commands on MHO-200 - set maestro *(on page 62)*
Gaia Clish Commands on MHO-200 - delete maestro *(on page 66)*

10.4. Configuring a Tap Port on MHO-200

Overview

A tap port is a dedicated port used to copy traffic passively from another Orchestrator port for observation - without disturbing whatever is already happening on the source port. It functions like a network wiretap: traffic flowing through a monitored port is duplicated and sent out the tap port, where it can be captured by an external analyser or locally using the `m_tcpdump` command.

> **Warning:**
>
> Tap ports are intended for short troubleshooting sessions, not continuous monitoring. Always remove tap entries when you complete your troubleshooting. Traffic mirroring consumes resources, and copying production traffic to an untrusted destination is a security risk.

When to use a tap port:

- A connection is misbehaving and you want to see exactly what is on the wire.
- You need to capture egress traffic (what a port is sending out), not just ingress traffic.
- You want to observe a live production port without reconfiguring it.
- You want to combine traffic from multiple ports (for example, subordinate interfaces of a bond) into a single capture.

How tap ports work:

A tap port has two ends: one inside the Orchestrator (where mirroring happens) and one physical connector on the front panel.

Something must be connected to the physical connector for captures to work.

If nothing is plugged into the tap port, mirrored traffic disappears, and the `m_tcpdump` command shows zero packets. Before debugging anything, verify the physical connection.

What you connect depends on your use case:

Use Case	What to Connect
Watch traffic arriving directly at the tap port.	The device whose traffic you want to observe, connected directly.

Use Case	What to Connect
Mirror another port and capture on an external tool.	A trusted external analyser (Wireshark host, Ixia, etc.).
Mirror another port and capture locally on the Orchestrator.	A fiber loopback connector - wires the port's transmitted traffic (TX) back into its own received traffic (RX), so mirrored traffic is received back by the Orchestrator.

Configuring a Tap Port

1. Choose an Orchestrator port that is not carrying production traffic.
2. Get the current port type and write it down:

   ```
   show maestro port <Port Name> site <Site ID> type
   ```

   Example:

   ```
   show maestro port 1/26/1 site 1 type
   ```

   Output: `downlink`
3. Configure the port type as `tap`:

   ```
   set maestro port <Port Name> site <Site ID> type tap
   ```

   Example:

   ```
   set maestro port 1/26/1 site 1 type tap
   ```
4. Add the relevant tap entries (tap rules).

   A tap entry is a mirroring rule of the form "copy traffic in the direction X, from port Y, to the tap port Y".

   ```
   add maestro tap-entry site <Site ID> port <Port Name> direction {ingress |
    egress} tap-port <Port Name>
   ```

   Orchestrator asks you to confirm.

   Examples:

   - Mirror ingress traffic from port 1/20/1 to the tap port 1/26/1:

     ```
     add maestro tap-entry site 1 port 1/20/1 direction ingress tap-port 1/26/1
     ```

   - Mirror egress traffic from port 1/20/1 to the tap port 1/26/1:

     ```
     add maestro tap-entry site 1 port 1/20/1 direction egress tap-port 1/26/1
     ```

Note:

- **<Port Name>** consists of three numbers separated with the forward slash character:

  <Orchestrator ID>/<Port Label on Front Panel>/<Port Split ID>.

- The command `add maestro tap-entry` creates a new interface with this name (the same three numbers separate with the minus character):

  `tap<Orchestrator ID>-<Port Label on Front Panel>-<Port Split ID>`

  Example:

  The command

  `add maestro tap-entry ... tap-port 1/26/1`

  creates the interface `tap1-26-1`

- To mirror traffic in both directions, add two tap entries - one for ingress and one for egress.

5. Verify the active tap entries:

   ```
   show maestro tap-entries
   ```

   Example output with two entries mirroring both directions:

   ```
   Tap Entries:

     MHO    Port to Tap    Direction    Tap Port
   ──────────────────────────────────────────────
     1_1    1/20/1         ingress      1/26/1
     1_1    1/20/1         egress       1/26/1

   ```

6. Capture the mirrored traffic using **one** of these options.

   - **Option A** - Local capture on the Orchestrator (loopback connector is required):

     Use the `m_tcpdump` command (see Traffic Capture on MHO-200 - m_tcpdump *(on page 68)*):

     ```
     m_tcpdump -i tap<Orchestrator ID>-<Port ID>-<Split ID> <options>
     ```

     Example:

     `m_tcpdump -i tap1-26-1 <options>`

     Warning:

     Local traffic captures consume CPU. Keep them short, filtered, and avoid running them during high-traffic periods.

- **Option B** - External analyser:

  Connect a Wireshark host, Ixia, or equivalent analyser to the tap port.

  Traffic will arrive at the analyser in real time - capture using the analyser's own tooling.

7. Remove all tap entries:

   ```
   delete maestro tap-entry site <Site ID> port <Port Name> direction {ingress |
    egress} tap-port <Port Name>
   ```

   Examples:

   - Mirror ingress traffic from port 1/20/1 to tap port 1/26/1:

     ```
     delete maestro tap-entry site 1 port 1/20/1 direction ingress tap-port 1/26/1
     ```

   - Mirror egress traffic from port 1/20/1 to tap port 1/26/1:

     ```
     delete maestro tap-entry site 1 port 1/20/1 direction egress tap-port 1/26/1
     ```

8. Verify there are no remaining tap entries:

   ```
   show maestro tap-entries
   ```

9. Configure the port type to its original type:

   ```
   set maestro port <Port ID> site <Site ID> type <Original Type>
   ```

   Example:

   ```
   set maestro port 1/26/1 site 1 type downlink
   ```

10.5. Monitoring of MHO-200 with SNMP

Overview

You can monitor an Orchestrator with SNMP.

To enable and configure the SNMP on an Orchestrator, see the R82.20 Gaia Administration Guide > Chapter "System Management" > Section "SNMP".

The OID branch 1.3.6.1.4.1.2620.1.56 contains the data about:

- Deployment (from 1.3.6.1.4.1.2620.1.56.301.1 to 1.3.6.1.4.1.2620.1.56.301.9)
- Daemons (from 1.3.6.1.4.1.2620.1.56.301.10.1 to 1.3.6.1.4.1.2620.1.56.301.10.7)
- Ports (from 1.3.6.1.4.1.2620.1.56.302.1.1.1)

Note:

You must query the IP address of the Orchestrator's **MGMT** port (located on the rear panel).

OID data about Deployment

OID Value	OID Name	OID Description	Example
1.3.6.1.4.1.2620.1.56.301.1	orchestratorDeployementDeviceType	Model of the Orchestrator	Maestro Hyperscale Orchestrator 200
1.3.6.1.4.1.2620.1.56.301.2	orchestratorDeployementSerial	Serial number of the Orchestrator	
1.3.6.1.4.1.2620.1.56.301.3	orchestratorDeployementMacAddress	*Not used.*	
1.3.6.1.4.1.2620.1.56.301.4	orchestratorDeployementSiteId	Site ID of this Orchestrator	1
1.3.6.1.4.1.2620.1.56.301.5	orchestratorDeployementMemberId	Member ID of this Orchestrator in this Site	1
1.3.6.1.4.1.2620.1.56.301.6	orchestratorDeployementNumOfMhosOnSite	Number of Orchestrators in this Site	2
1.3.6.1.4.1.2620.1.56.301.7	orchestratorDeployementNumOfSites	Total number of Sites in the deployment	2
1.3.6.1.4.1.2620.1.56.301.8	orchestratorDeployementOrchd	*Not used.*	
1.3.6.1.4.1.2620.1.56.301.9	orchestratorDeployementMainOrchId	ID of the Main Orchestrator	1_2

OID data about Daemons

OID Value	OID Name	OID Description	Example
1.3.6.1.4.1.2620.1.56.301.10.1	orchestratorDeployementDaemonsTableName	Daemon name.	linkmond

OID Value	OID Name	OID Description	Example
1.3.6.1.4.1.2620.1.56.301.10.2	orchestratorDeployementDaemonsTableStatus	Daemon status.	running
1.3.6.1.4.1.2620.1.56.301.10.3	orchestratorDeployementDaemonsTablePid	Process ID.	11202
1.3.6.1.4.1.2620.1.56.301.10.4	orchestratorDeployementDaemonsTableCpu	CPU utilization.	0.2%
1.3.6.1.4.1.2620.1.56.301.10.5	orchestratorDeployementDaemonsTableMemory	Memory utilization.	25.4 MB
1.3.6.1.4.1.2620.1.56.301.10.6	orchestratorDeployementDaemonsTableRestarts	Number of daemon restarts since the last boot.	0
1.3.6.1.4.1.2620.1.56.301.10.7	orchestratorDeployementDaemonsTableUptime	Daemon uptime.	16h 42m

OID data about Ports

OID Value	OID Name	OID Description	Exa
1.3.6.1.4.1.2620.1.56.302.1.1.1	orchestratorPortsPortsTablePhysicalPort	Physical port label.	1/20/
1.3.6.1.4.1.2620.1.56.302.1.1.2	orchestratorPortsPortsTableLogicalPort	Logical port number.	20
1.3.6.1.4.1.2620.1.56.302.1.1.3	orchestratorPortsPortsTablePortId	Internal port identifier.	1/20/
1.3.6.1.4.1.2620.1.56.302.1.1.4	orchestratorPortsPortsTableInterfaceName	Interface name in the Gaia OS.	eth1-
1.3.6.1.4.1.2620.1.56.302.1.1.5	orchestratorPortsPortsTableType	Configured port type.	Uplin
1.3.6.1.4.1.2620.1.56.302.1.1.6	orchestratorPortsPortsTableSg	To which Cluster this port is assigned.	1, 2

OID Value	OID Name	OID Description	Exa
1.3.6.1.4.1.2620.1.56.302.1.1.7	orchestratorPortsPortsTableQsfpMode	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.8	orchestratorPortsPortsTableAdminState	Administrative State of the port.	Up
1.3.6.1.4.1.2620.1.56.302.1.1.9	orchestratorPortsPortsTableOperatingSpeed	Operating speed (speed + interface mode).	25G-S
1.3.6.1.4.1.2620.1.56.302.1.1.10	orchestratorPortsPortsTableMtu	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.11	orchestratorPortsPortsTableLinkState	Link state.	Up
1.3.6.1.4.1.2620.1.56.302.1.1.12	orchestratorPortsPortsTableTransceiverState	Transceiver presence/state.	Plugg
1.3.6.1.4.1.2620.1.56.302.1.1.13	orchestratorPortsPortsTableAutoNegotiation	Auto-negotiation setting.	Disab
1.3.6.1.4.1.2620.1.56.302.1.1.14	orchestratorPortsPortsTableRxFrames	Total number of RX frames.	15425
1.3.6.1.4.1.2620.1.56.302.1.1.15	orchestratorPortsPortsTableTxFrames	Total number of TX frames.	18409
1.3.6.1.4.1.2620.1.56.302.1.1.16	orchestratorPortsPortsTableRxFramesDelta	Total number of RX frames since the last sample.	2
1.3.6.1.4.1.2620.1.56.302.1.1.17	orchestratorPortsPortsTableTxFramesDelta	Total number of TX frames since the last sample	1
1.3.6.1.4.1.2620.1.56.302.1.1.18	orchestratorPortsPortsTableRxFramesPerSecond	RX rate in frames/sec.	562
1.3.6.1.4.1.2620.1.56.302.1.1.19	orchestratorPortsPortsTableTxFramesPerSecond	TX rate in frames/sec.	110
1.3.6.1.4.1.2620.1.56.302.1.1.20	orchestratorPortsPortsTableRxBytes	Total number of RX bytes.	41289

OID Value	OID Name	OID Description	Exa
1.3.6.1.4.1.2620.1.56.302.1.1.21	orchestratorPortsPortsTableTxBytes	Total number of TX bytes.	38902
1.3.6.1.4.1.2620.1.56.302.1.1.22	orchestratorPortsPortsTableRxBytesDelta	Total number of RX bytes since the last sample.	0
1.3.6.1.4.1.2620.1.56.302.1.1.23	orchestratorPortsPortsTableTxBytesDelta	Total number of TX bytes since the last sample.	212
1.3.6.1.4.1.2620.1.56.302.1.1.24	orchestratorPortsPortsTableRxBytesPerSecond	RX rate in bytes/sec.	0
1.3.6.1.4.1.2620.1.56.302.1.1.25	orchestratorPortsPortsTableTxBytesPerSecond	TX rate in bytes/sec.	0
1.3.6.1.4.1.2620.1.56.302.1.1.26	orchestratorPortsPortsTableRxMbitPerSecond	RX rate in megabit/sec.	3
1.3.6.1.4.1.2620.1.56.302.1.1.27	orchestratorPortsPortsTableTxMbitPerSecond	TX rate in megabit/sec.	2
1.3.6.1.4.1.2620.1.56.302.1.1.28	orchestratorPortsPortsTableTemperature	Transceiver temperature in °C.	24.73
1.3.6.1.4.1.2620.1.56.302.1.1.29	orchestratorPortsPortsTableRxPowerLanes	Per-lane RX power.	-40.0 -40.0 -40.0 -40.0
1.3.6.1.4.1.2620.1.56.302.1.1.30	orchestratorPortsPortsTableTxPowerLanes	Per-lane TX power.	-40.0 -40.0 -40.0 -40.0
1.3.6.1.4.1.2620.1.56.302.1.1.31	orchestratorPortsPortsTableCableIdentifier	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.32	orchestratorPortsPortsTableCheckPointPartNumber	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.33	orchestratorPortsPortsTableMinRxPower	*Not used.*	

OID Value	OID Name	OID Description	Exa
1.3.6.1.4.1.2620.1.56.302.1.1.34	orchestratorPortsPortsTableMaxRxPower	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.35	orchestratorPortsPortsTableMinTxPower	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.36	orchestratorPortsPortsTableMaxTxPower	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.37	orchestratorPortsPortsTableMinTemperature	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.38	orchestratorPortsPortsTableMaxTemperature	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.39	orchestratorPortsPortsTablePowerRequired	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.40	orchestratorPortsPortsTableSerialNumber	Transceiver serial number.	MT185
1.3.6.1.4.1.2620.1.56.302.1.1.41	orchestratorPortsPortsTableVendorName	Transceiver vendor.	Mella
1.3.6.1.4.1.2620.1.56.302.1.1.42	orchestratorPortsPortsTableVendorPartNumber	Vendor part number.	13B8N
1.3.6.1.4.1.2620.1.56.302.1.1.43	orchestratorPortsPortsTableWavelength	Optical wavelength in nanometers.	0
1.3.6.1.4.1.2620.1.56.302.1.1.44	orchestratorPortsPortsTablePortPowerClass	*Not used.*	
1.3.6.1.4.1.2620.1.56.302.1.1.45	orchestratorPortsPortsTablePortLinkIntegrity	Link integrity status.	No is was obser
1.3.6.1.4.1.2620.1.56.302.1.1.46	orchestratorPortsPortsTableSpeed	Configured port speed.	100G
1.3.6.1.4.1.2620.1.56.302.1.1.47	orchestratorPortsPortsTableFecMode	Forward Error Correction (FEC) mode.	RS

10.6. Transferring the Deployment Configuration from the First MHO-200 in Gaia Clish

Prerequisite:

Complete the First Time Configuration Wizard on all additional Orchestrators and reboot them.

Context:

After you configure the first Orchestrator, all additional Orchestrators in the deployment must join it.

You can join additional Orchestrators in Gaia Portal (see Step 2: Run the First Time Configuration Wizard on Each Additional Orchestrator MHO-200 *(on page 49)*) or in Gaia Clish (with the command `join maestro deployment`).

Follow these steps:

1. On the first Orchestrator, export the deployment configuration:

    a. Connect to the command line on the first Orchestrator.

    b. Log in.

    c. Export the deployment configuration:

    ```
    export maestro deployment to-file /home/admin/<filename>
    ```

    Note:

    i. The export wizard automatically appends the file extension `.enc` to the filename you specify.

    ii. The export wizard automatically encrypts the exported configuration file and shows the Deployment Security Key (6-word passphrase) on the screen.

    Warning:

    - Treat this Deployment Security Key and the exported configuration file as sensitive credentials. The file is encrypted, but the key required to use it should be stored securely and shared only with authorized personnel performing the deployment.
    - This Deployment Security Key (passphrase) appears only one time. It is not possible to show it again later.

    iii. The export wizard automatically MD5 checksum for the exported file.

2. On each additional Orchestrator, import the deployment configuration:

a. Copy the exported configuration file to each additional Orchestrator.

Note:

To copy a file to an Orchestrator over the SCP, you must connect with a user, whose default shell is `/bin/bash`.

i. Connect to the command line on each additional Orchestrator.

ii. Log in to Gaia Clish.

iii. Configure the default shell `/bin/bash` for the user `admin`:

```
set user admin shell /bin/bash
```

iv. On the first Orchestrator, copy the file to each additional Orchestrator:

```
scp /home/admin/<filename>.enc admin@<IPv4 Address of Mgmt
 Interface>:/home/admin/
```

v. On each additional Orchestrator, configure the default shell `/etc/cli.sh`:

```
set user admin shell /etc/cli.sh
```

b. Connect to the command line on each Orchestrator.

c. Log in to Gaia Clish.

d. Join the first Orchestrator:

```
join maestro deployment from-file /home/admin/<filename>.enc
```

The wizard:

i. Prompts for the Deployment Security Key generated during the export.

ii. Shows a warning that the import will overwrite all existing deployment configuration on this Orchestrator.

iii. Asks for the Member ID to assign to this Orchestrator.

e. When prompted to reboot and apply the changes, enter `y`.

11. Declaration of Conformity for MHO-200

Item	Description
Name and address of the authorized trademark:	Check Point Software Technologies Ltd. 5 Shlomo Kaplan Street, Tel Aviv 6789159, Israel
Brand name:	Check Point
Marketing models:	TBD
Regulated models:	MHO-200
Applicant & Manufacturer name & address:	Silicom Ltd. 14 Atir Yeda St. Kfar Sava 4464323, Israel
Date first applied:	October 2026

Information for Regions / Countries:

Region / Country	Directive / Regulation	Standard	Applicable Test Description
EU - CE	Low Voltage Directive 2014/35/EU	EN IEC 62368-1:2020+A11:2020	Safety
	EMC Directive 2014/30/EU	EN 300 386 V2.2.1:2022	EMC telecommunications
		EN 55032:2015+A1:2020 Class A	Emissions
		EN 55035:2017+A11:2020	Multimedia equipment immunity
		EN 61000-4-2EN 61000-4-3	EMC
		EN 61000-4-4EN 61000-4-5	
		EN 61000-4-6EN 61000-4-8	
		EN 61000-4-11	
		EN IEC 61000-3-2:2019+A1:2021	Emissions
		EN 61000-3-3:2013+A1:2019+A2:2021	Voltage Fluctuation
	RoHS Directive 2011/65/EU + (EU) 2015/863	EN IEC 63000:2018	Hazardous substance RoHS

Region / Country	Directive / Regulation	Standard	Applicable Test Description
USA Canada	FCC Part 15 ISED	FCC 47 CFR Part 15 Subpart B Class A ICES-003 Issue 7 Class A	Emissions Class A digital apparatus
Canada	ISED	CAN ICES-003(A) / NMB-003(A)	
Japan	VCCI	VCCI-CISPR 32:2016 Class A	Emissions
Australia / New Zealand	ACMA / RCM	AS/NZS CISPR 32:2015+A1:2020 Class A	Emissions
International	CB Scheme	IEC 62368-1:2018	Safety
UL / ULc	Electrical Safety	UL 62368-1, 3rd Ed, 2021-10-22 CAN/CSA C22.2 No. 62368-1:19, 3rd Ed, 2021-10-22	Safety

Information about Labs:

Labs / Organization	Address
Hermon Laboratories Ltd.	Caesarea Industrial Park, Israel
UL Solutions	As stated on CB certificate and UL documentation
DEMKO Certification A/S	Borupvang 5A, 2750 Ballerup, Denmark
Silicom Ltd.	14 Atir Yeda St., Kfar Saba 4464323, Israel

We, Check Point Software Technologies Ltd., hereby declare under our sole responsibility that the product identified above complies with the applicable regulatory requirements, directives, and standards specified in this declaration.

The product is based on a hardware platform manufactured by Silicom Ltd., and conformity assessment has been established through certification reports, test reports, declarations, and supporting technical documentation issued for the equivalent OEM hardware platform. Following review of the applicable compliance documentation, Check Point Software Technologies Ltd. confirms that the product complies with the requirements of the regulations and standards listed in this declaration.

This declaration is based on compliance evidence, certifications, and test reports issued for the equivalent OEM hardware platform manufactured by Silicom Ltd., and applies only to products that are electrically, mechanically, and functionally equivalent to the certified configuration.

The object of this declaration is in conformity with the following requirements:

- European Union: Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, and RoHS Directive 2011/65/EU, as amended.
- United States: FCC 47 CFR Part 15 Subpart B, Class A Digital Device requirements.
- Canada: CAN ICES-003(A) / NMB-003(A), Class A Digital Apparatus requirements.
- Japan: VCCI Class A requirements.
- Australia / New Zealand: AS/NZS CISPR 32 Class A and RCM requirements.
- International Safety: IEC 62368-1 under the IECEE CB Scheme.

Conformity has been demonstrated through the applicable safety, electromagnetic compatibility (EMC), electromagnetic emissions (EMI), electromagnetic immunity, harmonic current emissions, voltage fluctuation/flicker, and hazardous substance compliance standards listed in this Declaration of Conformity.

12. What is the Next Step?

To configure the behavior of your Cluster (Security Group):

- See the R82.20 Scalable Platforms Administration Guide > Chapter **Configuring Security Groups**.

To configure the Gaia OS settings in your Cluster (Security Group):

- See the R82.20 Gaia Administration Guide.

13. Glossary Terms for Scalable Platforms - Maestro

B

13.1. Breakout Cable

An optical fiber cable that contains several jacketed simplex optical fibers that are packaged together inside an outer jacket. Synonyms: Fanout cable, Fan-Out cable, Splitter cable.

D

13.2. DAC Cable

Direct Attach Copper cable. A form of the high-speed shielded twinax copper cable with pluggable transceivers on both ends. Used to connect to network devices (switches, routers, or servers).

13.3. Downlink Ports

Interfaces on the Maestro Orchestrator used to connect to Check Point Security Appliances. You use DAC cables, Fiber cables (with transceivers), or Breakout cables to connect between the Downlink ports and Security Appliances. The Check Point Management traffic (policy, logs, synchronization, and so on) co-exists with the data (user) traffic on the Downlink ports. Bandwidth is guaranteed for the Check Point Management traffic (portion of the downlink bandwidth). These ports form the system backplane (management, data plane, synchronization).

G

13.4. Gaia gClish

The name of the global command line shell in Check Point Gaia operating system for Security Appliances connected to Check Point Maestro Orchestrators. Commands you run in this shell apply to all Security Appliances in the Security Group.

H

13.5. HyperSync

Check Point patented technology that makes sure that active connections are only synchronized to backup Security Appliances in the Security Group. HyperSync makes sure each connection flow has a backup within the Security Group.

M

13.6. Maestro Orchestrator

A scalable Network Security System that connects multiple Check Point Security Appliances into a unified system. Synonyms: Orchestrator, Maestro Hyperscale Orchestrator. Acronym: MHO.

O

13.7. Orchestrator

See "Maestro Orchestrator".

S

13.8. Security Group

A logical group of Security Appliances that provides Active/Active cluster functionality. A Security Group can contain one or more Security Appliances. Security Groups work separately and independently from each other. To the production networks, a Security Group appears a single Check Point Firewall. Every Security Group contains: (A) Applicable Uplink ports, to which your production networks are connected; (B) Security Appliances (the Maestro Orchestrator determines the applicable Downlink ports automatically); (C) Applicable management port, to which the Check Point Management Server is connected.

13.9. SGM

Role of a Security Appliance (Security Group Member). Part of the Security Group that contains the assigned Security Appliances. A Security Appliance in a Security Group has one IPv4 address and represents all assigned Security Appliances as one entity.

13.10. Shared Management

Feature that allows to assign the same Management Port (interface ethX-MgmtY) on a Maestro Orchestrator to different Security Groups. The assigned Management Port has a different IP address and a different MAC address in each Security Group, to which this port is assigned.

13.11. Single Management Object

Single Check Point Firewall object in SmartConsole that represents a Security Group configured on Maestro Orchestrator. Acronym: SMO.

13.12. SMO Master

The physical Security Appliance in a Security Group that handles management tasks for all Security Appliances in the Security Group. By default, this role is assigned to the Security Appliance with the lowest Member ID in the Security Group.

13.13. SSM

Role of the Maestro Orchestrator (SSM) that manages the flow of network traffic to and from the Security Groups.

U

13.14. Uplink Ports

Interfaces on the Maestro Orchestrator used to connect to external and internal networks. Gaia operating system shows these interfaces in Gaia Portal and in Gaia Clish. SmartConsole shows these interfaces in the corresponding SMO Check Point Firewall object.