TrueNAS® F-Series User Manual

v.25111

Contents

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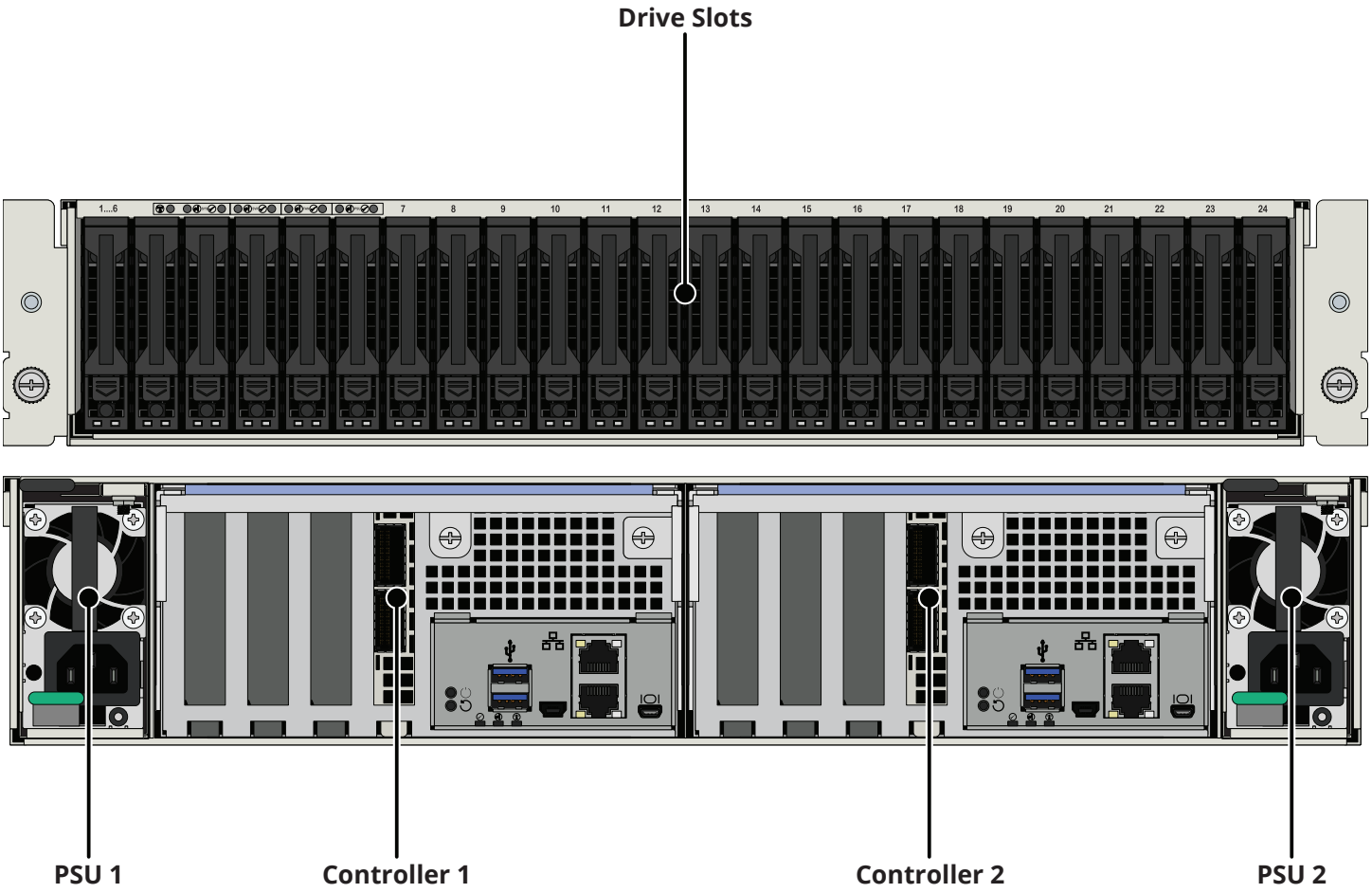
1 Introduction

The TrueNAS F-Series is a 2U, 24-bay, High-Availability storage array with redundant power supplies.

Your system comes with the TrueNAS SCALE operating system preloaded.

Review the safety considerations and requirements before interacting with the F-Series.



2 Safety

2.1 Anti-Static Precautions

Warning - Electrostatic Discharge (ESD)

Static electricity can build up in your body and discharge when touching conductive materials. Electrostatic Discharge (ESD) is harmful to sensitive electronic devices and components. Keep these safety recommendations in mind before opening the system case or handling non-hot-swappable system components.

- Turn off the system and remove power cables before opening the case or touching internal components.
- Place the system on a clean, hard work surface like a wooden tabletop. Use an ESD dissipative mat if possible to protect the internal components.
- Touch the metal chassis with your bare hand to dissipate static electricity in your body before handling any internal components, including components not yet installed in the system. We always recommend wearing an anti-static wristband and using a grounding cable.
- Store all system components in anti-static bags.

2.2 Personal Protective Equipment (PPE)

Warning - PPE

Wear proper PPE, like anti-static wrist straps and smocks before touching any sensitive equipment inside the chassis. If you are unsure how to properly replace any parts, contact iXsystems Support.

2.3 Handling the System

Hold the system from the sides or bottom whenever possible. Always be mindful of loose cabling or connectors, and avoid pinching or bumping these elements.

These instructions use “left” and “right” according to your perspective when facing the system or rack.

Warning - Damage or Injury

The F-Series weighs 58.7 lbs (26.7 kg) fully-loaded and requires a minimum of **two** people to lift.

When handling rails, system components, or drives, never force movement if a component seems stuck. Gently remove the component and check for pinched cables or obstructing material before installing it again. Installing a component with excessive force can damage the system or cause personal injury.

3 Recommended Tools

We recommend these tools when interacting with the TrueNAS F-Series:

- Long #2 Phillips head screwdriver
- Flat head screw driver
- Tape measure
- Level

4 Specifications

F-Series Components		
Drive Count	24 2.5” NVMe SSD	
Cooling Fans	6 (5 plus 1 redundant)	
Power Supplies	2	
F60 Power Draw	Typical (HA) 600W	Max (HA) 996W
F100 Power Draw	Typical (HA) 800W	Max (HA) 1152W
Storage Controllers	2	

F-Series Dimensions and Weight	
Dimensions (H x W x L)	3.43 in x 17.2 in x 27.44 in (87 mm x 438 mm x 697 mm)
Length with Chassis Rail and CMA	38.9 in (988 mm)
Net Weight (Fully Loaded)	58.7 lbs (26.7 kg)

F-Series Environmental Specifications	
Operating Temperature	41°F - 95°F (5°C - 35°C)
Non-Operating Temperature	-40°F - 140°F (-40°C - 60°C)
Operating Humidity (non-condensing)	20% - 80%
Vibration	0.10G at 5 Hz to 500 Hz
Supply Voltage	200-240VAC, 7A 50-60 Hz

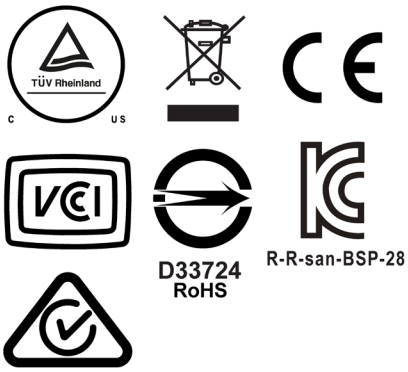
PCIe Population				
Model	Slot 1	Slot 2	Slot 3	Slot 4
F60	100G NIC (Optional)	100G NIC (Optional)	--	--
F100	100G NIC	100G NIC (Optional)	100G NIC (Optional)	--

Memory Allocation									
Model	A	B	C	D	E	F	G	H	Total
F60	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	**512GB**
F100	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	**512GB**

Compliance

型號 MODEL: TrueNAS F-Series
輸入電壓 Input Voltage: 200 - 240V AC
輸入電流 Input Current: 7A (X2)
輸入頻率 Input Frequency: 50 / 60Hz

S/N: CCMMM000YMDFPXXX



This device complies with part 15,Class A,of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme a lâ norme NMB-003 du Canada.
CANADA – ICES/NMB-003 CLASS/CLASSE A

警告使用者:
此為甲類資訊技術設備, 於居住環境中使用時, 可能會造成射頻擾動, 在此種情況下, 使用者會被要求採取某些適當的對策。

Assembled in Mexico from foreign and domestic parts
MFG:

製造商
Manufactured by Sanmina® Corp.

TrueNAS

LBL-00375-74-A REV A2

The TrueNAS F-Series is a **network storage server** intended for use in **enterprise and data center environments**.

The apparatus is designed to be operated:
- In controlled IT environments, within the specified ranges for temperature, humidity, and supply voltage
- In properly grounded electrical installations, in accordance with local electrical codes
- In accordance with the TrueNAS software documentation, including configuration, operation, and maintenance instructions

This product is not designed or intended for:
- Use in life-support systems or other safety-critical applications where failure could result in injury or loss of life
- Use in residential consumer environments, unless explicitly installed and operated in a controlled, non-domestic IT setting
- Any application outside the conditions and purposes described in this manual and the TrueNAS software documentation

For detailed configuration and operational guidance, refer to the TrueNAS software documentation provided with the product and available from TrueNAS.

The F-Series is FCC/CE-marked and complies with:
- **FCC 47 CFR Part 15, Class A -** Radiated and conducted emissions limits for commercial IT equipment (EMI/EMC)
- **Low Voltage Directive (LVD) 2014/35/EU** - Electrical safety
- **Electromagnetic Compatibility (EMC) Directive 2014/30/EU -** Electromagnetic interference and immunity
- **RoHS Directive 2011/65/EU, as amended by (EU) 2015/863** - Restriction of hazardous substances
- **WEEE Directive 2012/19/EU -** Waste electrical and electronic equipment

For regulatory or compliance-related queries, contact compliance@truenas.com.
EU Authorized Representative: Obelis S.A. - Boulevard Général Wahis 53, B-1030 Brussels, BELGIUM

ⓘ Important - Battery Information

This product contains a lithium coin cell (CMOS battery) used to maintain system settings. Do not dispose of the battery with household waste. Used batteries must be collected and disposed of separately in accordance with local regulations and the EU Battery Directive 2006/66/EC. The crossed-out wheeled bin symbol indicates that the battery must be taken to an appropriate collection facility for recycling.

5 Space Requirements

Note - Rack Space

The F-Series requires 2U of rack space and a #2 Phillips head screwdriver to install in a rack.

The system is 38.9” long with the CMA. The rack posts must be between 27” and 37” apart to install the rail kit.

You must have at least 34” (86.36 cm) of space in front of the rack to safely install the F-Series.

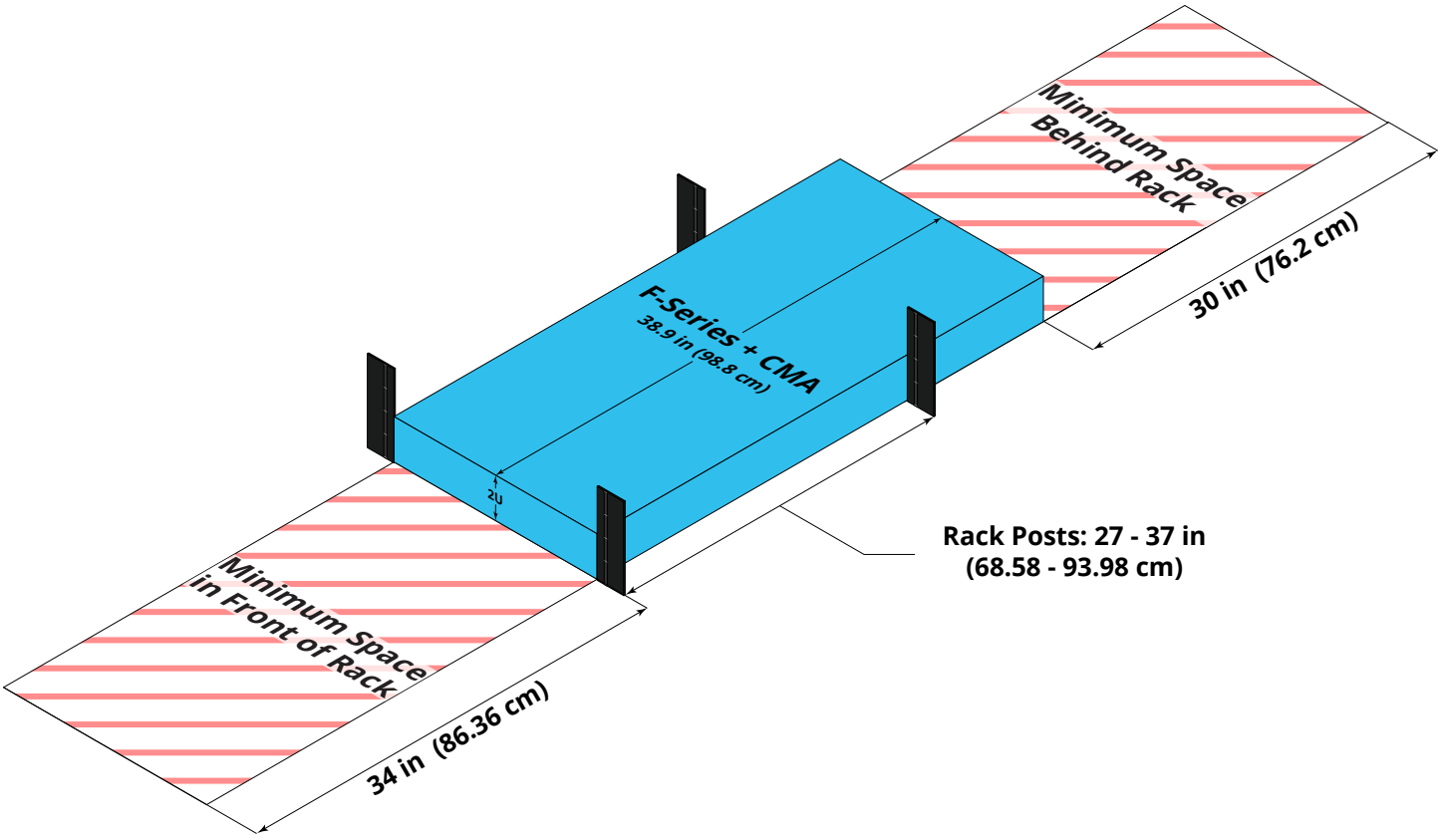
You must also have at least 30” (76.2 cm) of space behind the rack to install the cables.

Important - Damage or Injury

When handling rails, system components, or drives, never force movement if a part seems stuck or does not insert properly. Gently remove the part and check for pinched cables or obstructing material before installing it again. Installing a part with excessive force can damage the system or cause personal injury.

Warning - Team Lift

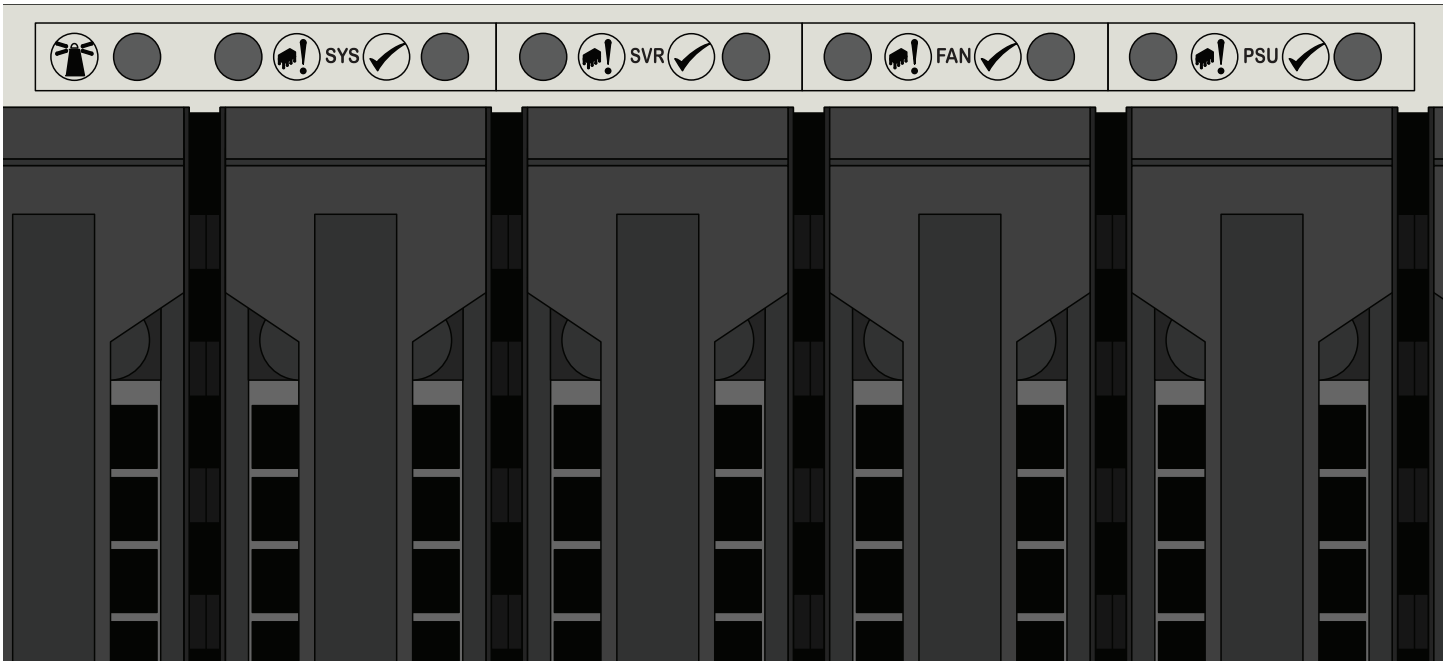
The F-Series requires two people to lift safely. Failure to follow safety recommendations can lead to severe system damage or personal injury.



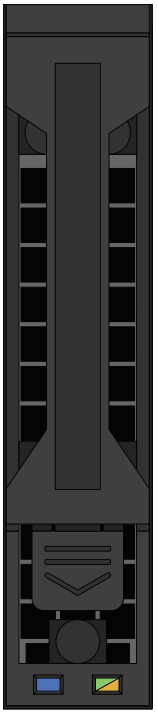
6 Buttons, Ports, and Indicators

6.1 Front Indicators

Light	Color and Indication
	Blue (Solid): Locate ID Active
	Amber (Solid): Component Fault
	Green (Solid): Component Ready

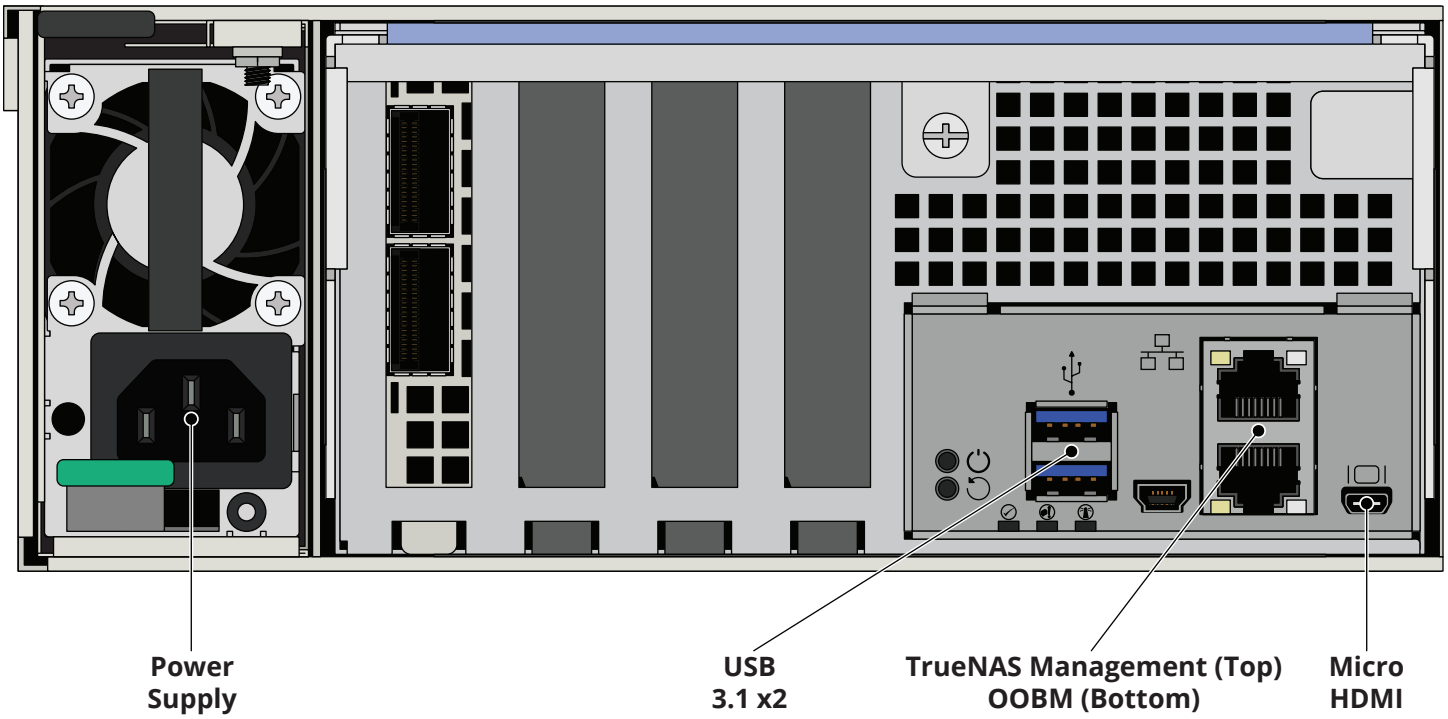


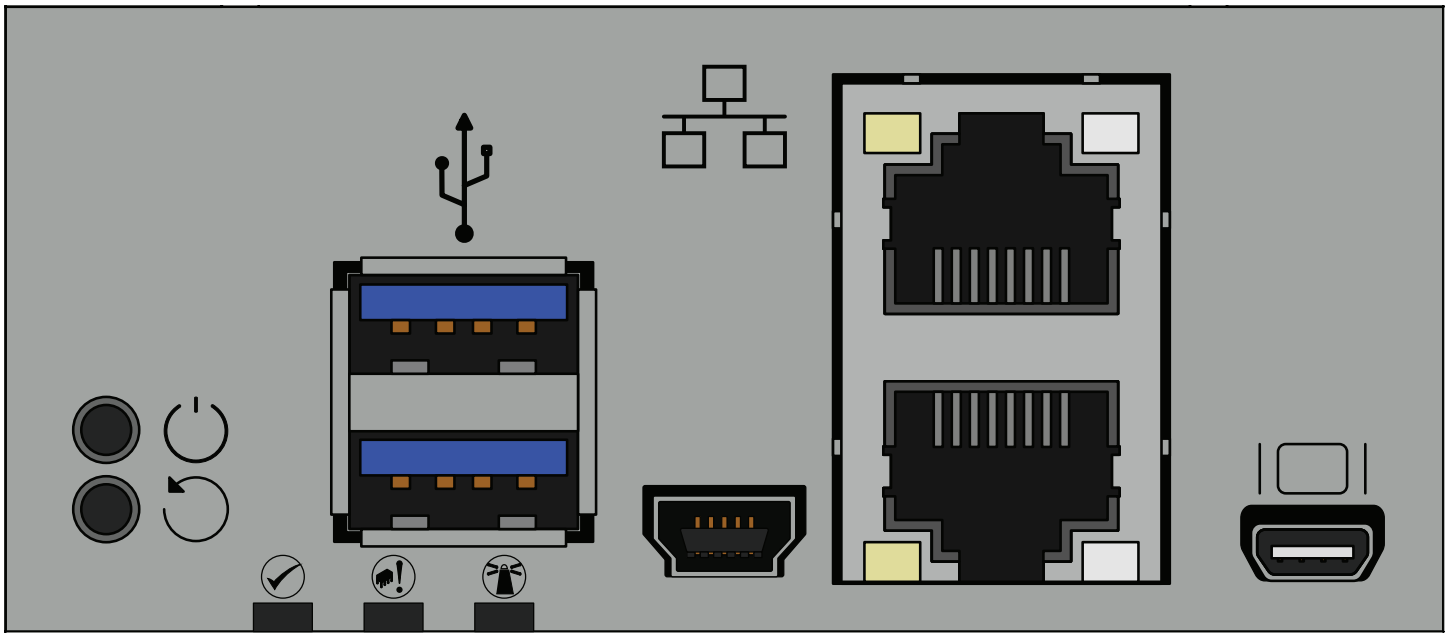
6.2 Drive Indicators



Light	Color and Indication
Left LED	Blue (Flashing): Locate ID Active
Right LED	Green (Flashing): Drive Activity
Right LED	Amber (Solid): Drive Fault
Right LED	Amber (1Hz Flashing): Linking
Right LED	Amber (2Hz Flashing): Link Failure

6.3 Rear Buttons, Ports, and Indicators





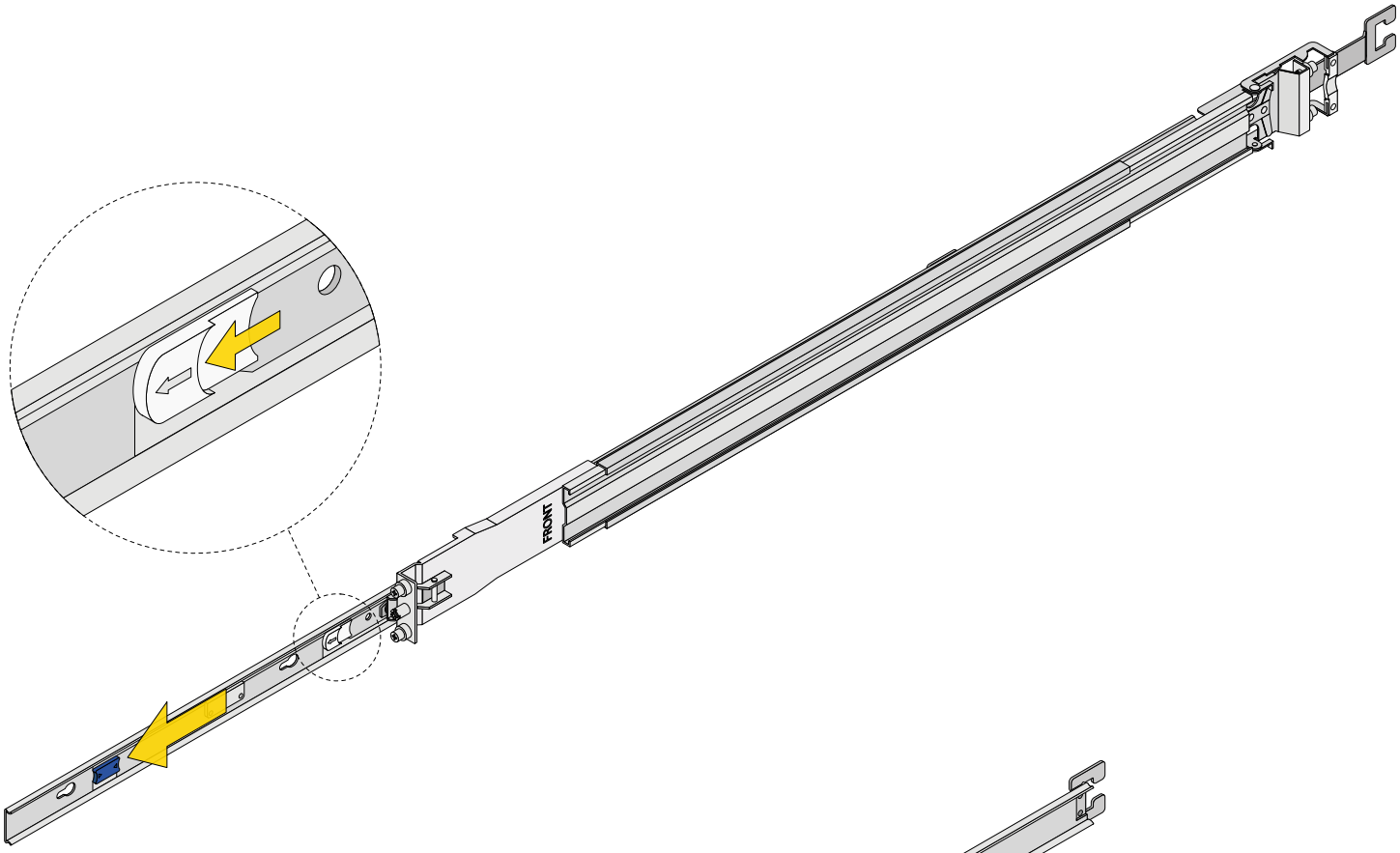
Light / Button	Color and Indication
	Blue (Solid): Locate ID active / Blue (Flashing): Service Allowed
	Amber (Flashing): Controller Fault
	Green (Solid): Controller Ready
	Powers the system on/off
	Resets the system.

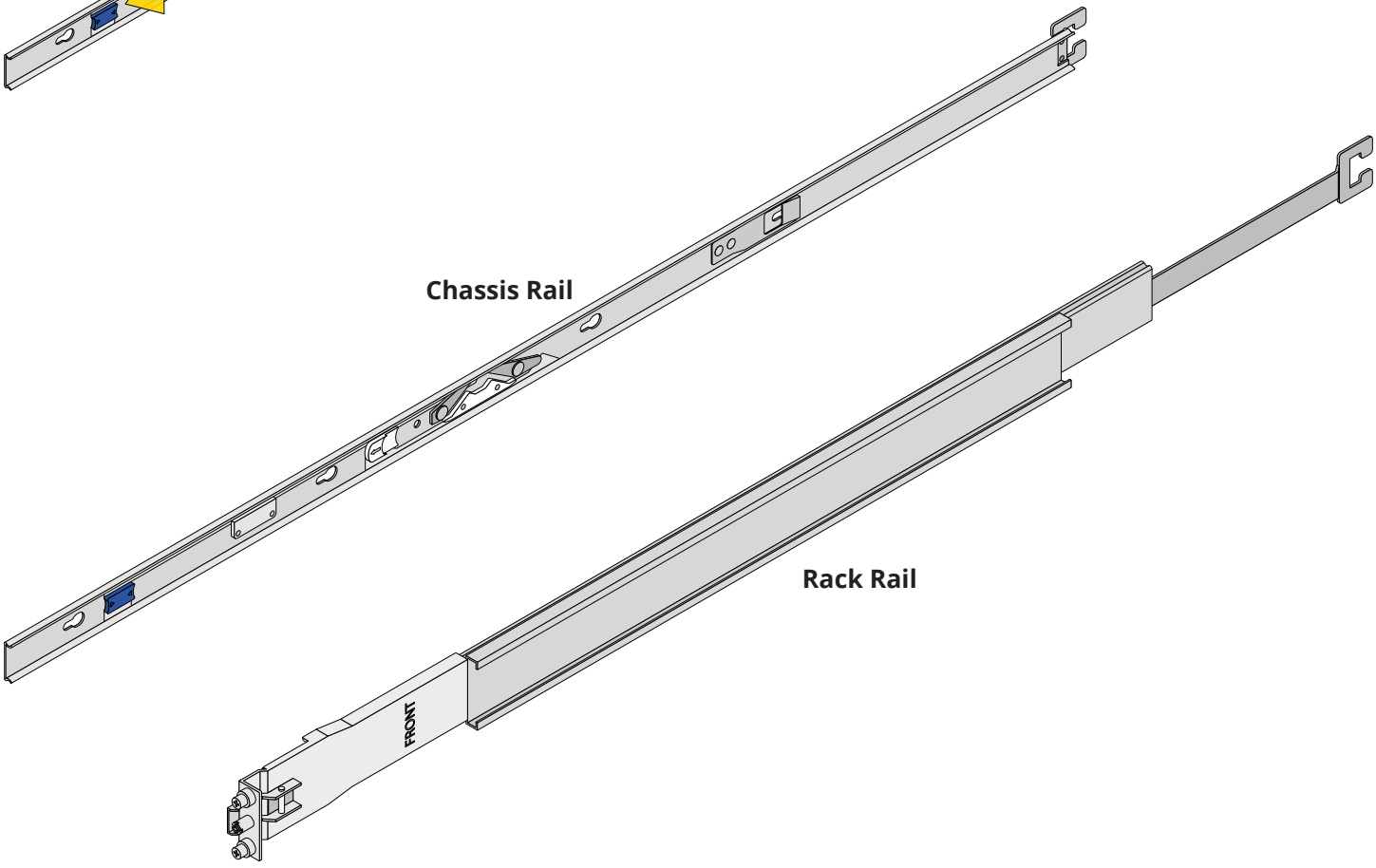
7 Racking Procedure

7.1 Remove Chassis Rail from Rack Rail

The rail kit separates into two pieces, the inner chassis rail and the outer rack rail.

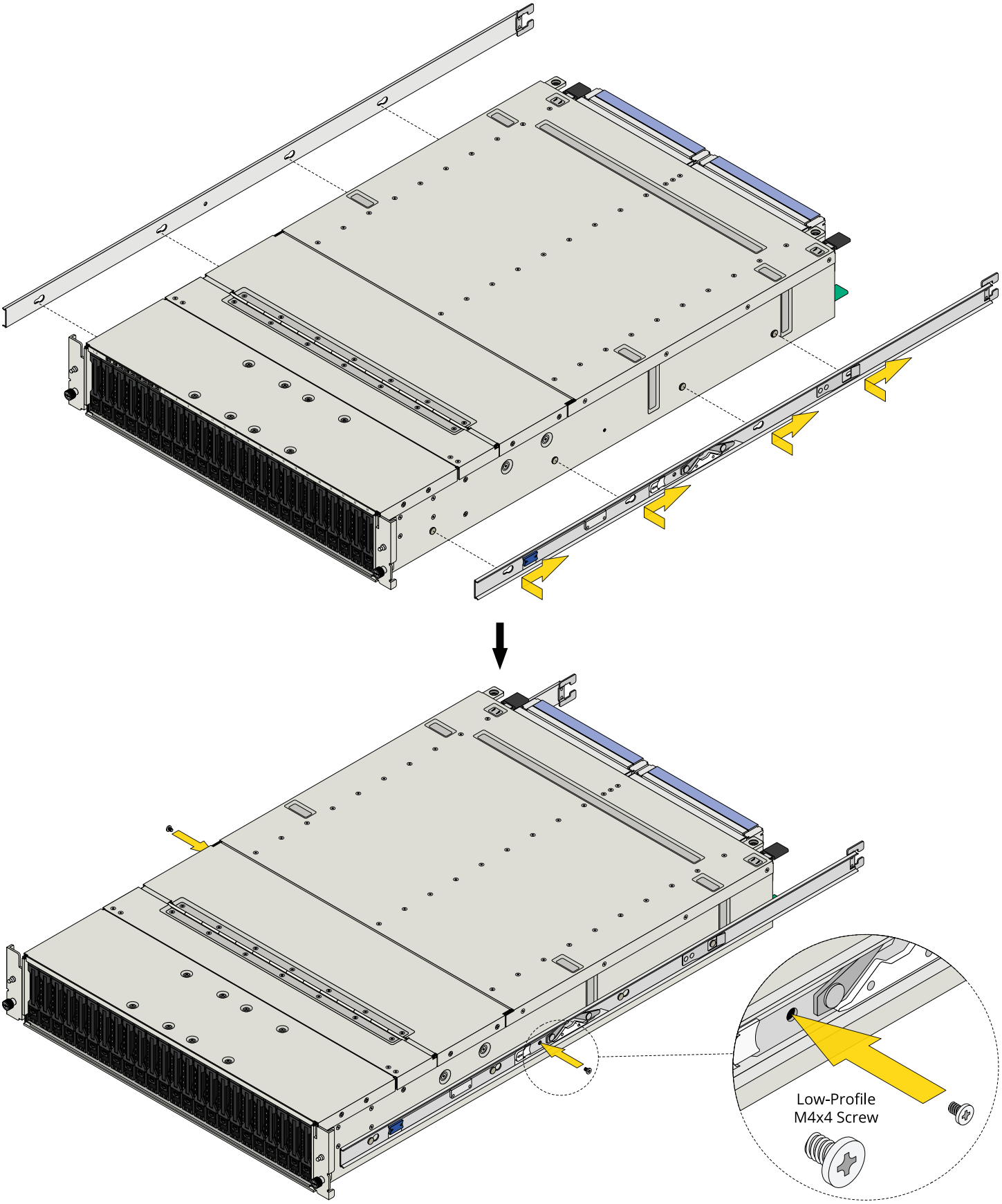
Slide the inner chassis rail out of the rack rail until it stops, then pull the white tab and remove the chassis rail.





7.2 Install the Chassis Rail on the System

Fit the rail keyholes over the mounting pegs on the system and slide the rail toward the back of the system until it locks. Use a low-profile M4x4 screw to secure the rail to the chassis. Repeat the process for the second chassis rail.



7.3 Install the Rack Rail in the Rack

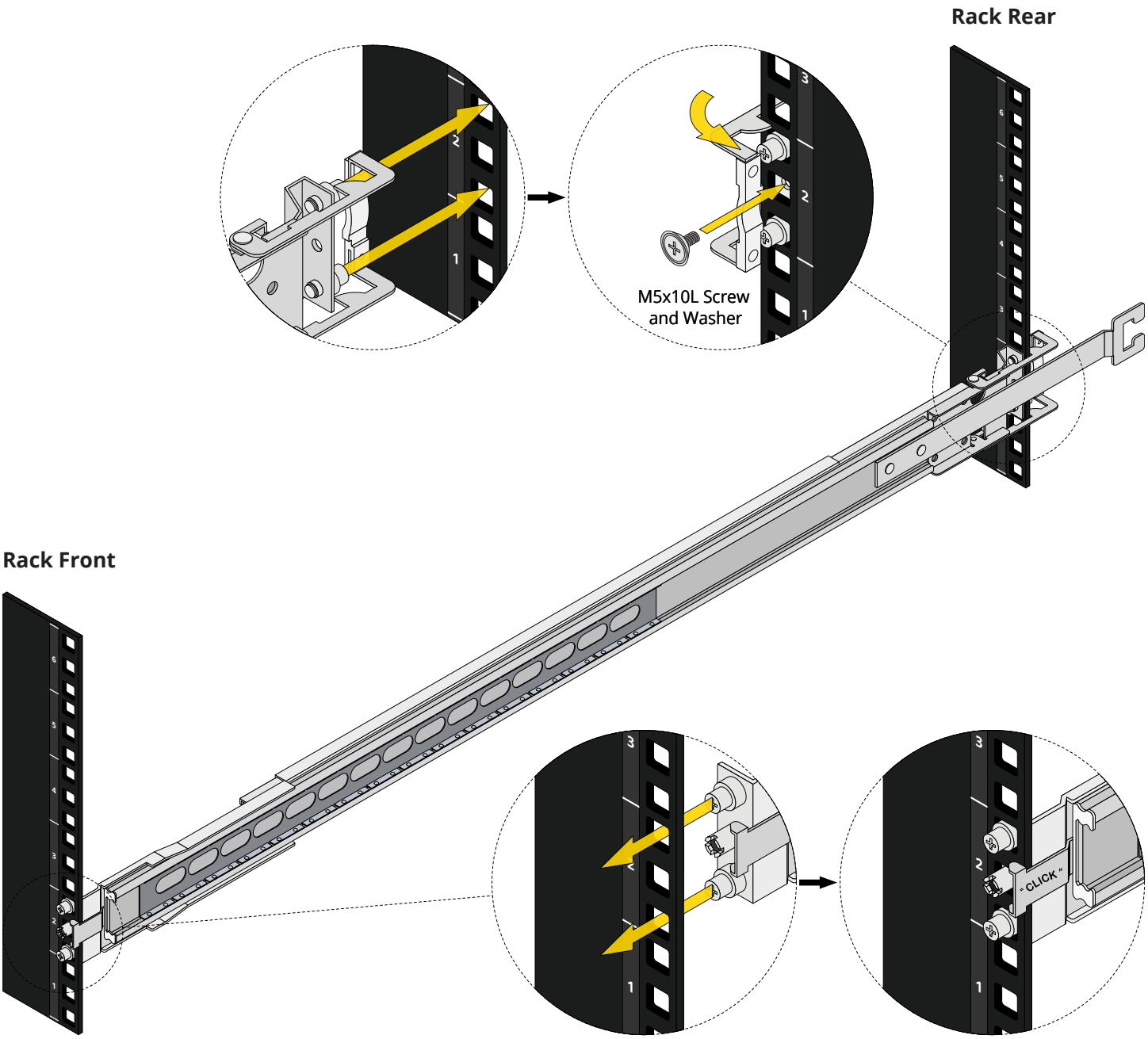
> **Tip - Rack Spacing**
>
> To ease field servicing, we recommend you avoid installing the F-Series between two other systems if possible.

Place the rail in the rack with the front end towards the front of the rack. Align the rear pins with the rear rack mounting holes in the bottom 2U of reserved rack space. Swing the gray latch handle open and pull it to extend the rail until the rail pins are fully seated in the rack holes. Release the latch to lock the rail in place, then secure the rail to the rack by installing one M5x10L screw and washer between the rail pins.

At the front of the rail, align the pins with the front rack holes, then push the pins into the holes until the latch clicks.

Ensure you mounted the front and rear rail pins in the same U in the rack and that the rail is level.

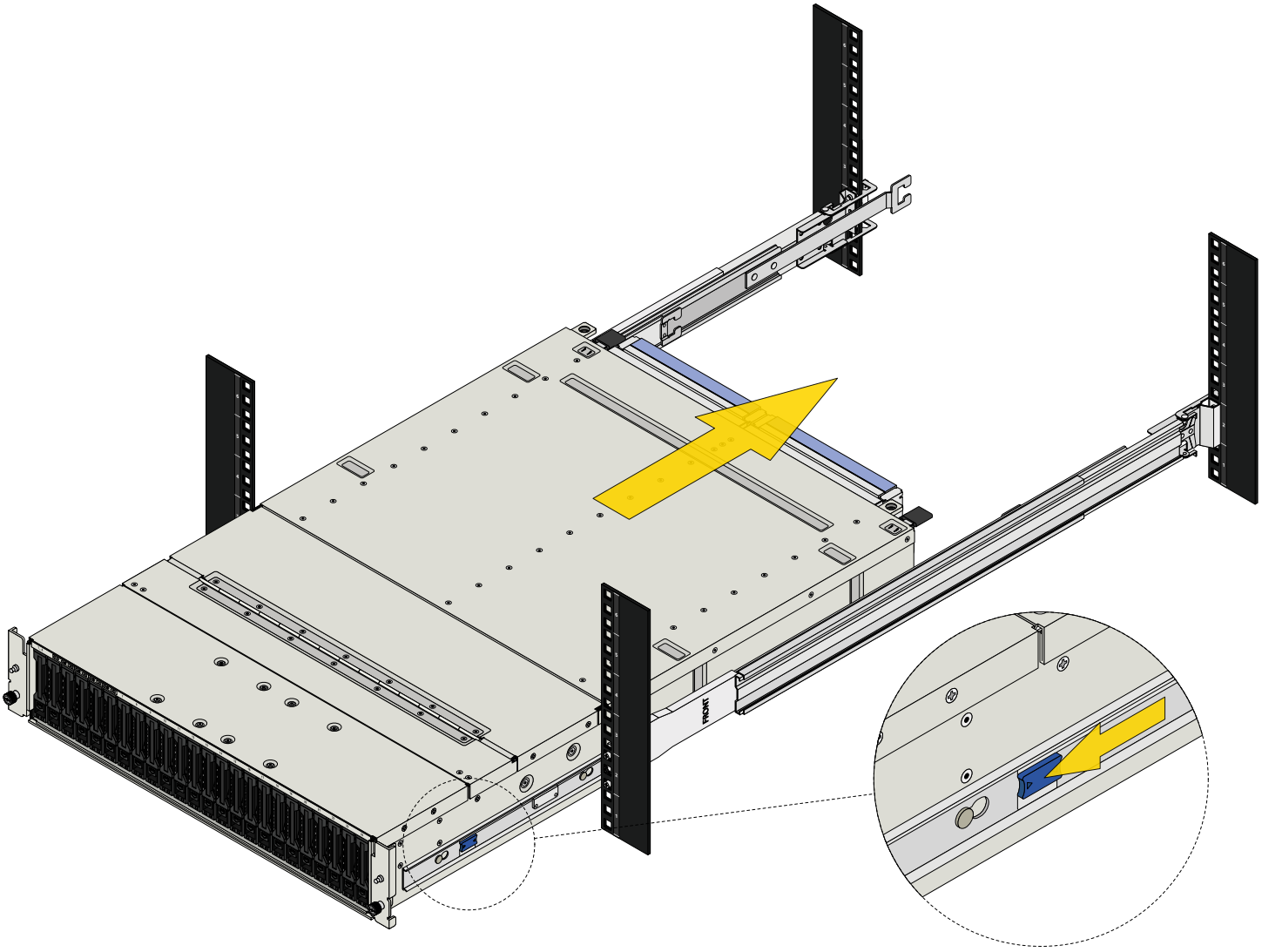
Repeat the process for the second rack rail.



7.4 Install the System in the Rack

Team-lift the system and align the chassis rails with the rack rails. Slide the ends of the chassis rails into the rack rails and push the system into the rack until the metal safeties click and lock.

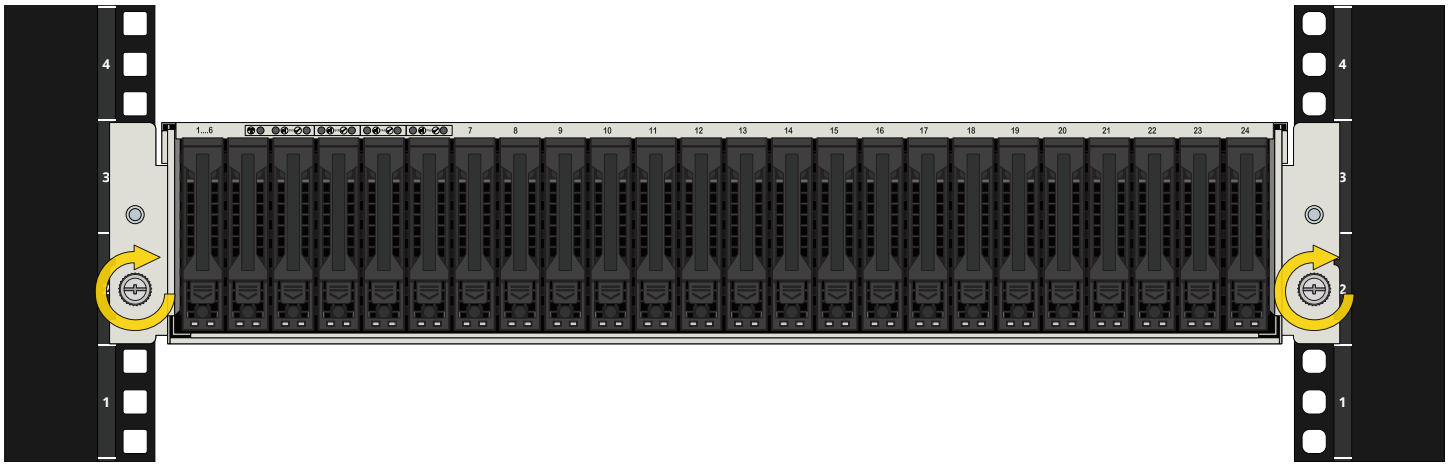
Pull the blue release tabs towards the front of the system and finish pushing the system into the rack.



Warning - Pinch Point

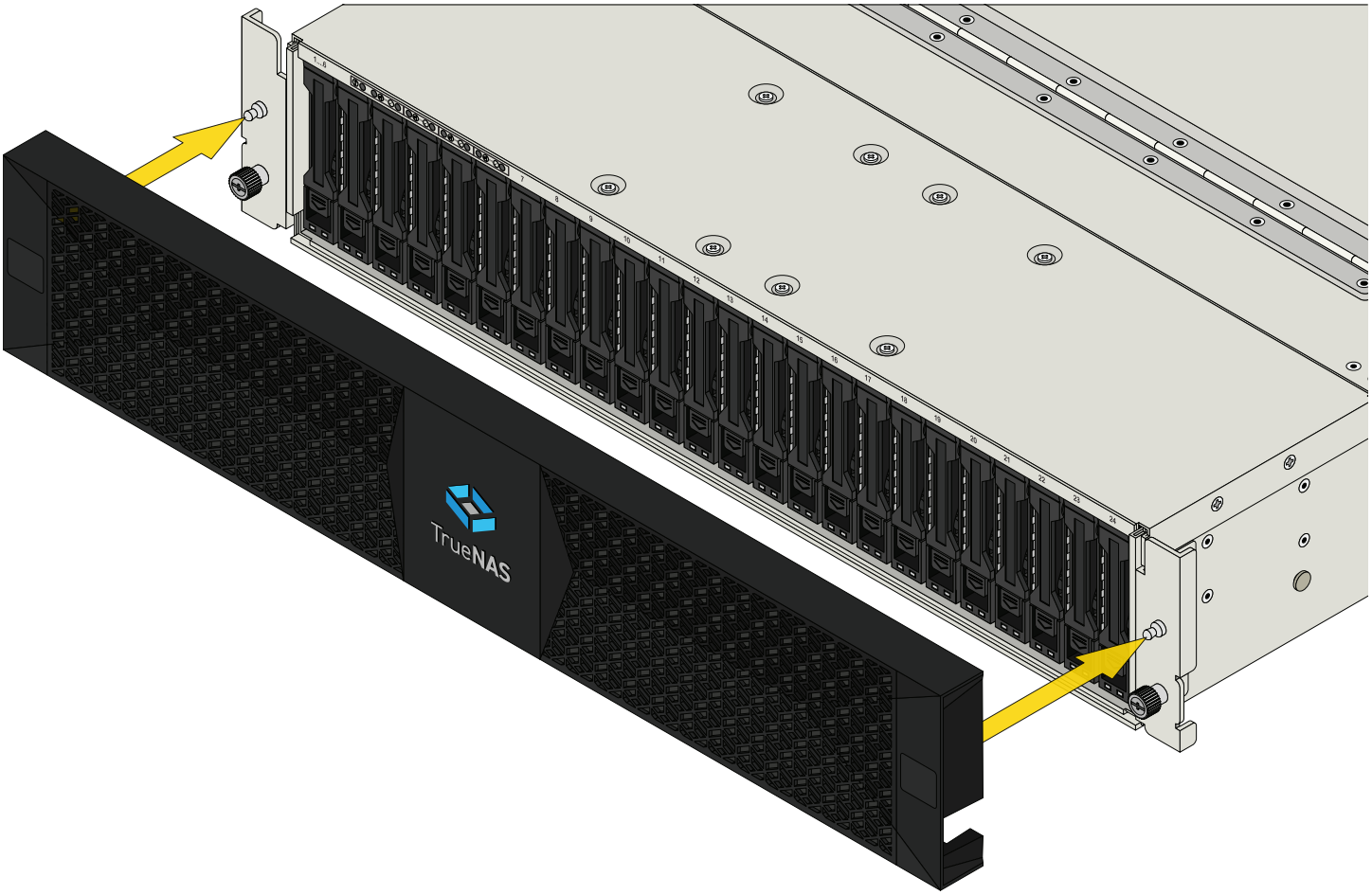
The F-Series can pinch or crush fingers when sliding the rail sleeves onto the rack rails.

Tighten the thumbscrews to secure each system ear to the rack.



7.5 Install Bezel

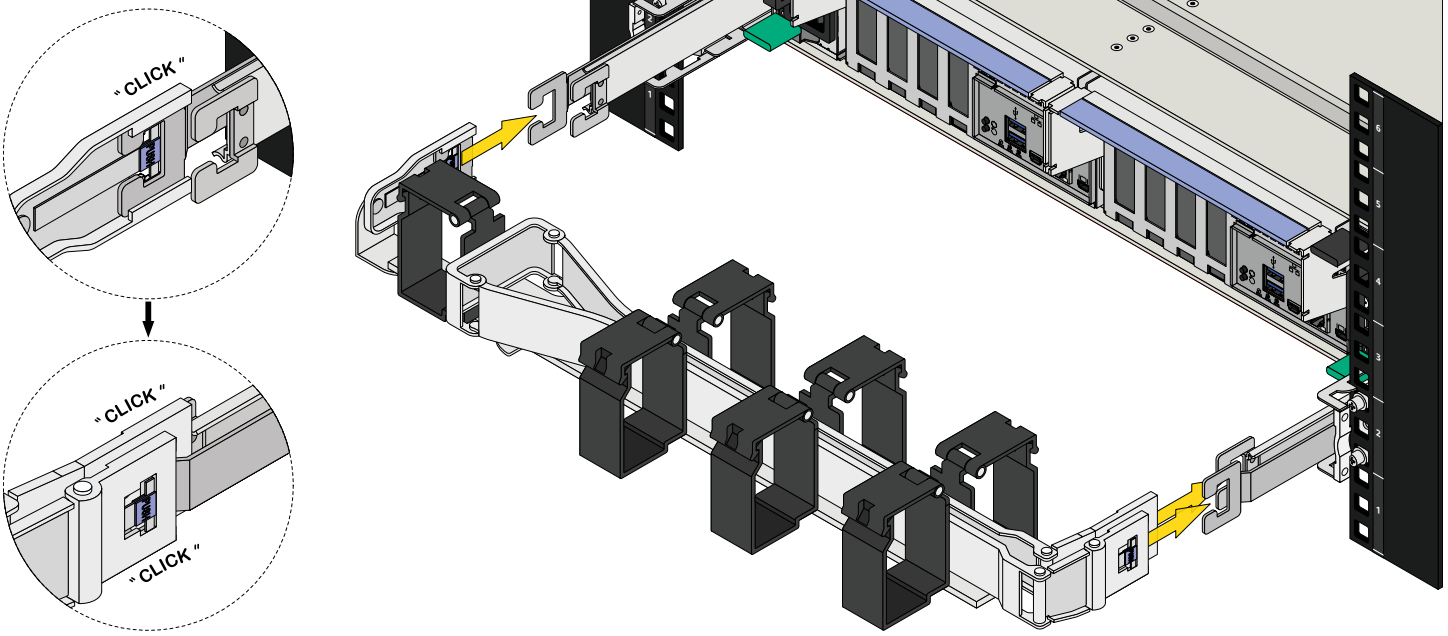
To install the bezel, align it with the pegs on the front of the system, then gently push the bezel on.



To remove the bezel, gently pull it off the front of the system.

7.6 Install the Cable Management Arm (CMA)

Starting with the left side, push the post onto the left bracket. On the right side, push the inner post onto the inner bracket, then push the outer post onto the outer bracket. The CMA posts click and lock when installed correctly.



7.7 Install Cables

Open the black baskets on the CMA and route all the wires for both controllers.

Ensure the left-side wires have at least 28" (71 cm) of slack between the system and the CMA.

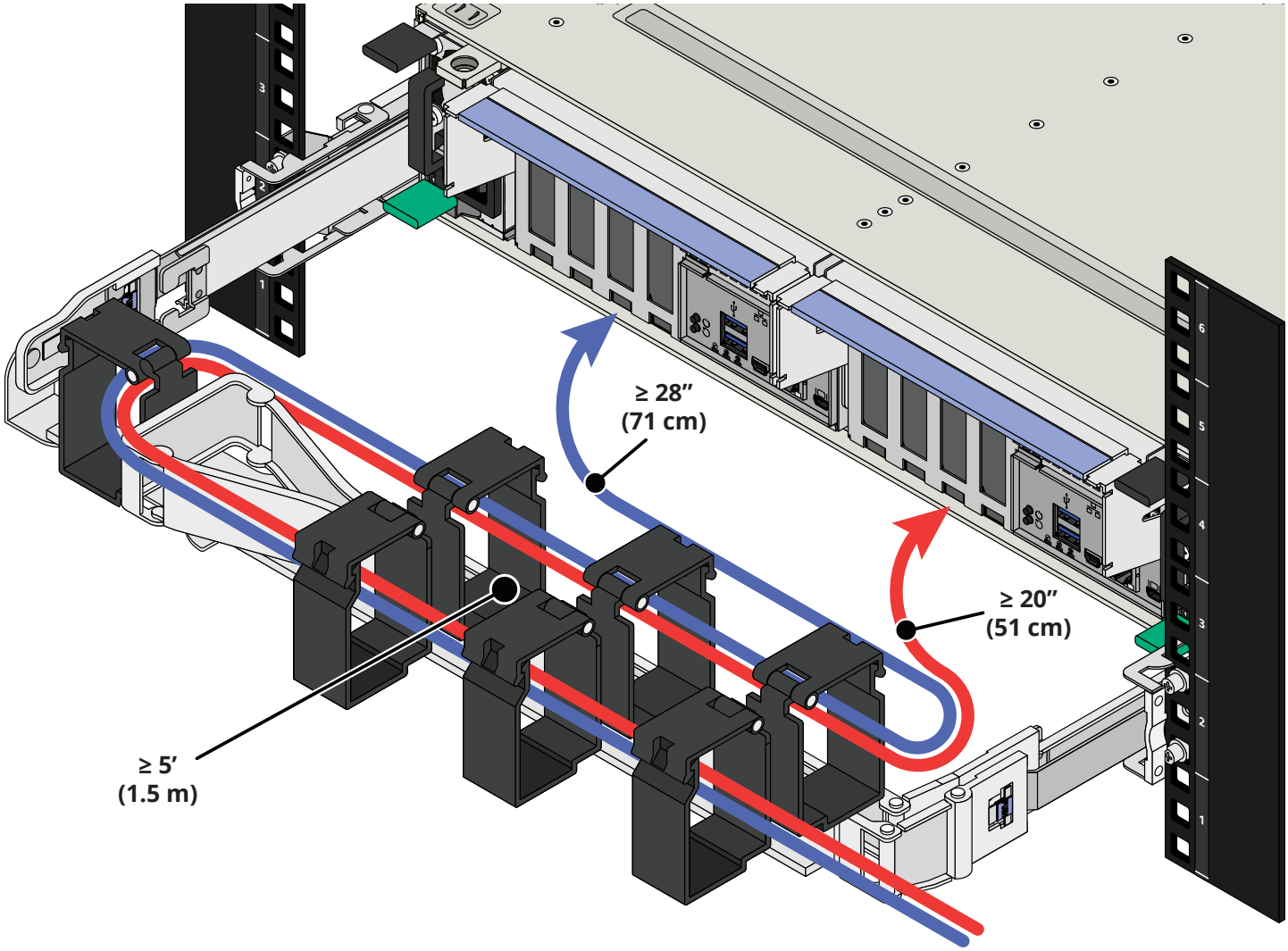
The right-side wires should have at least 20" (51 cm) of slack between the system and the CMA.

All cables going through the CMA should be at least 5' (1.5 m) long overall.

> **Tip - Cabling**
>
> We recommend bundling the cables for each controller using the included velcro straps to make servicing easier.

Left Controller Cables

Right Controller Cables



Connect ethernet network cables from your local switch or management network to the Out-of-Band Management (OOBM) and TrueNAS Management ports on both controllers.

Next, connect a monitor to one of the Micro HDMI ports using the VGA adapter, then connect a keyboard to a USB port on the same controller.

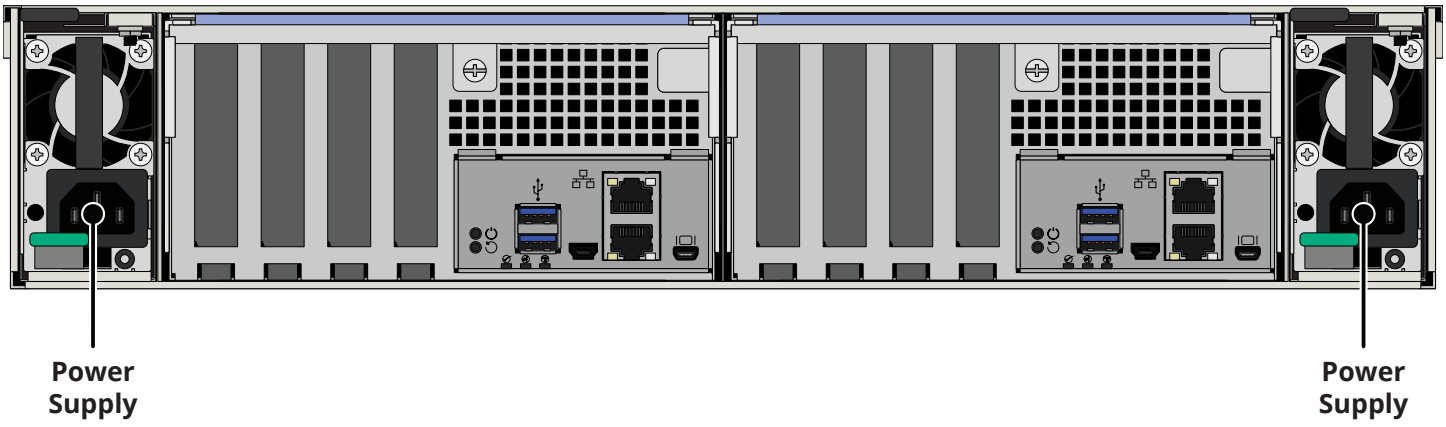
Finally, connect the power cables to both power supplies, then plug them into a power distribution unit.

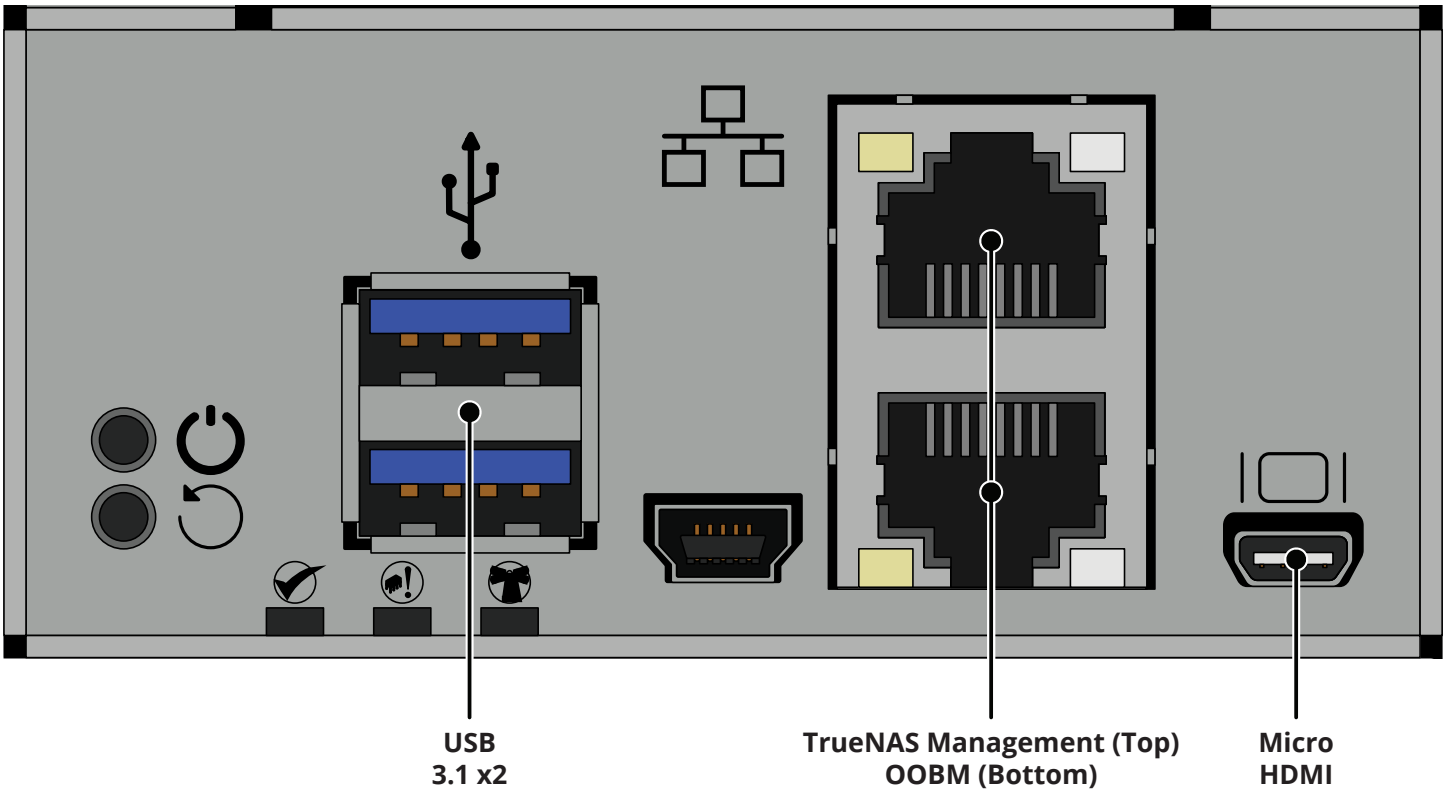
Important - AC Input Requirement

The F-Series requires 200-240 VAC (Volts Alternating Current) to operate.

Warning - Grounded Connection

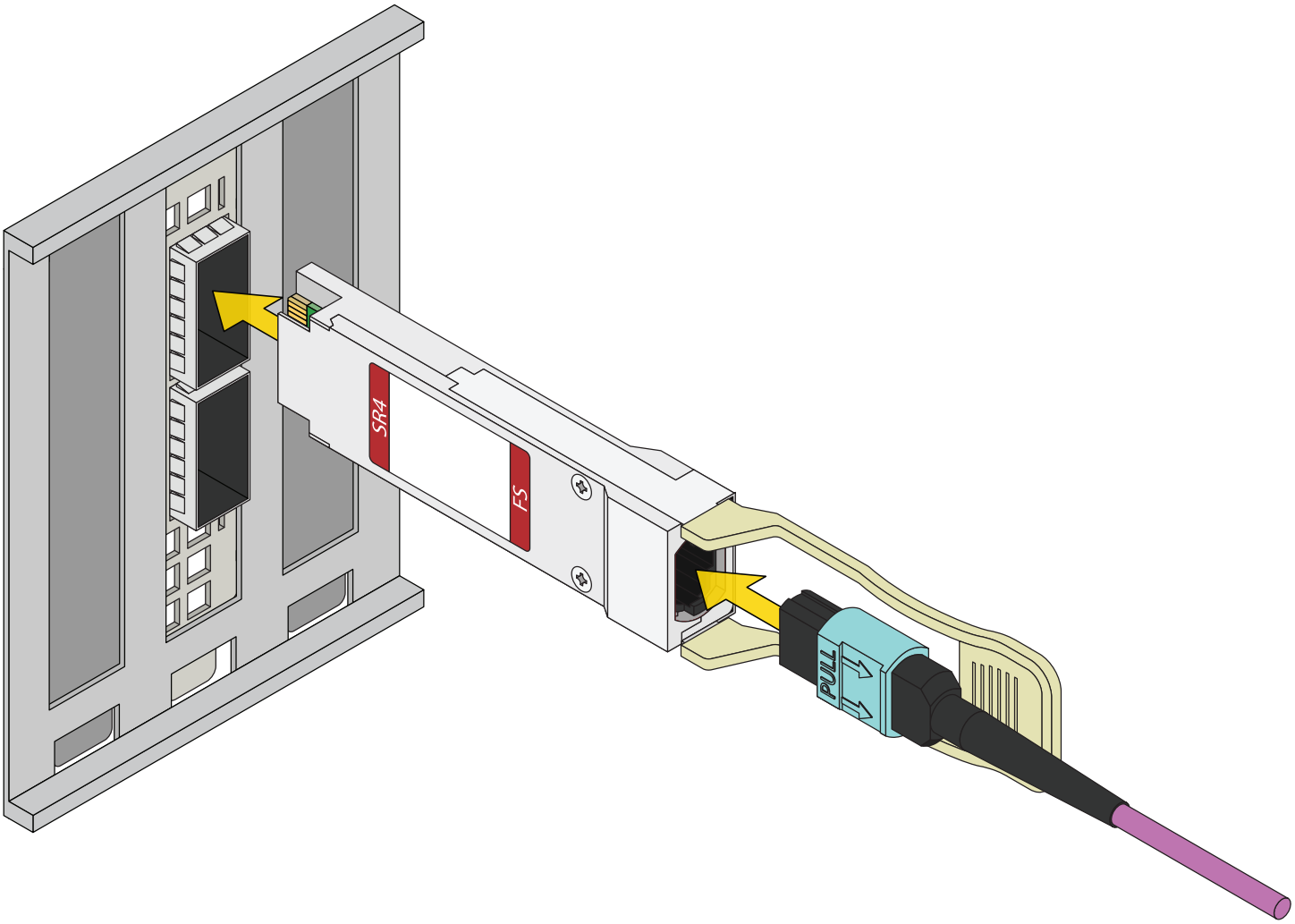
Always connect power cords to properly grounded connections.





7.7.1 NIC Cabling

If you ordered additional networking cards with your system, you can set them up now. Insert the SR optics into the first port on the NIC, then plug the SR cable into the back of the SR optics. The optics and the cable click and lock into place when installed correctly. Repeat for all remaining ports.



Tip - Cable Management

Before continuing, test your cable setup by sliding the system out of the rack. The cables should move freely with the CMA without pinching or coming loose.

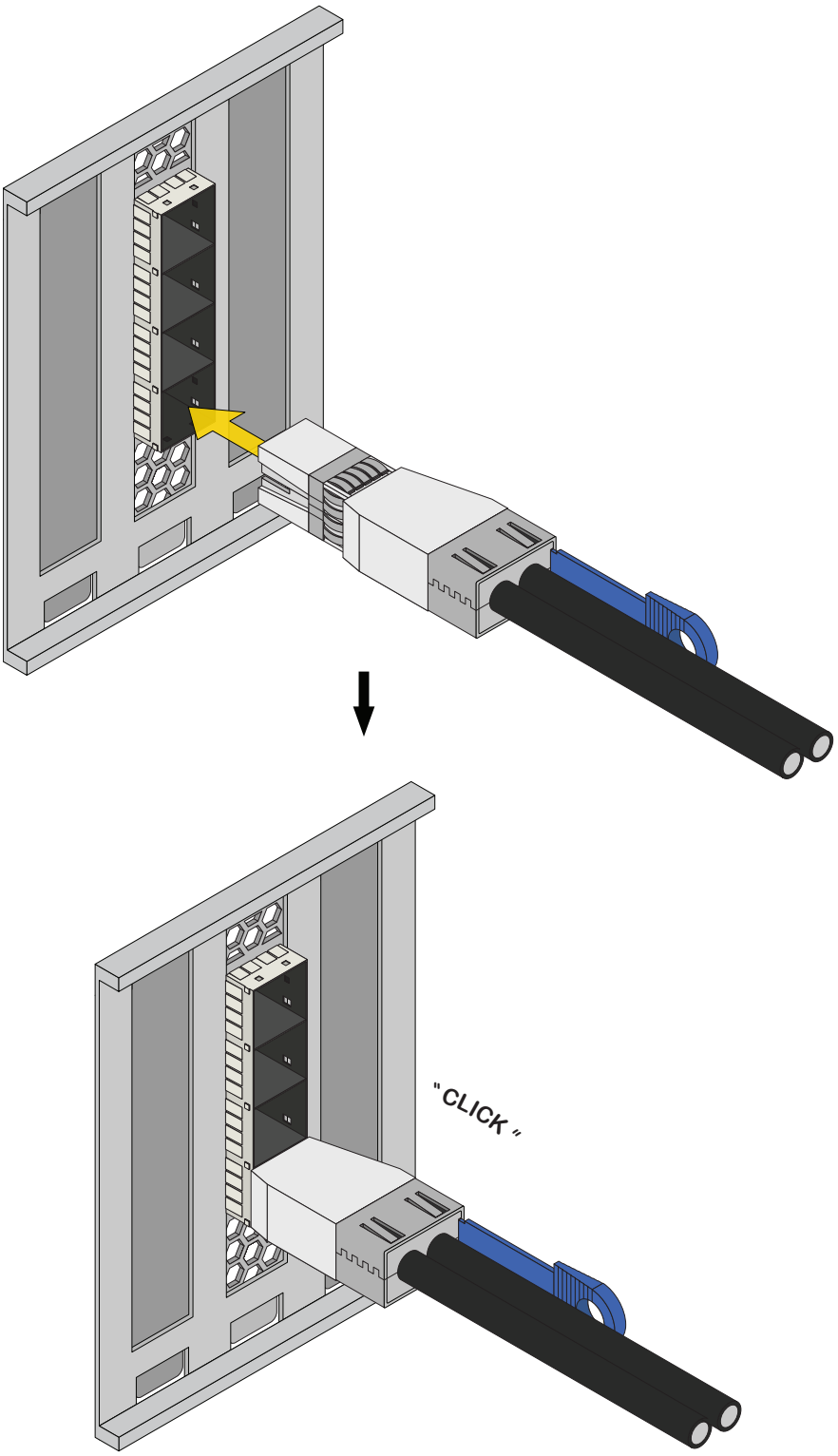
7.7.2 SAS Expansion Cabling

If you ordered your system with SAS HBAs, you can set up the SAS3 cables now.

Insert a SAS cable into the **bottom** SAS port with the blue tab facing right, then insert the other end into the first expansion shelf IOM/expander.

If you have a second expansion shelf, insert a SAS cable into the **next SAS port up** with the blue tab facing left, then insert the other end into the first expansion shelf IOM/expander on the second shelf.

For SAS connection diagrams, refer to the F-Series User Manual by scanning the QR code at the end of this document, or refer to your expansion shelf documentation.



7.8 Boot the System

After plugging the power cables into outlets, the system powers on and boots into TrueNAS.

When booted, the system console displays the TrueNAS web UI IP address. The IP address is either preconfigured according to customer guidelines or automatically generated with DHCP.

Enter the IP address into a browser on a computer on the same network to access the web user interface.

See your welcome email or the password stickers on each controller at the rear of the unit for login credentials.

8 Storage Expansion

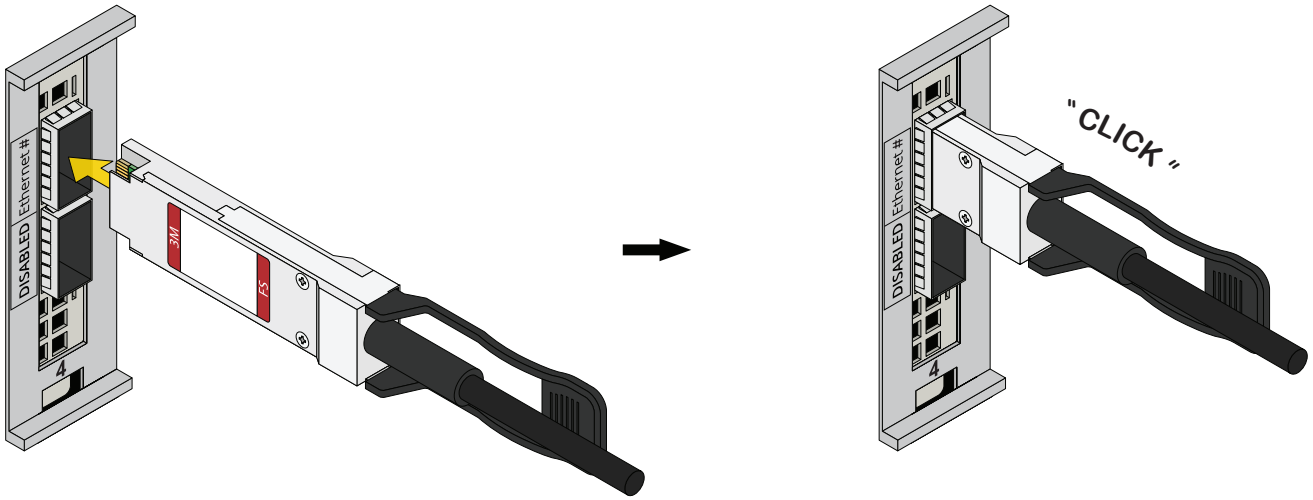
Important

When setting up SAS connections, please adhere to the wiring examples below. Connecting expansion shelves incorrectly causes errors. Never cable a single TrueNAS controller to different controllers on one expansion shelf.

You can also find these diagrams in your expansion shelf user manuals on our Docs Hub.

8.1 ES24N

Insert the DAC optics into the first (top) ethernet port. The optics cables click and lock into place when installed correctly. Repeat for the other controller.



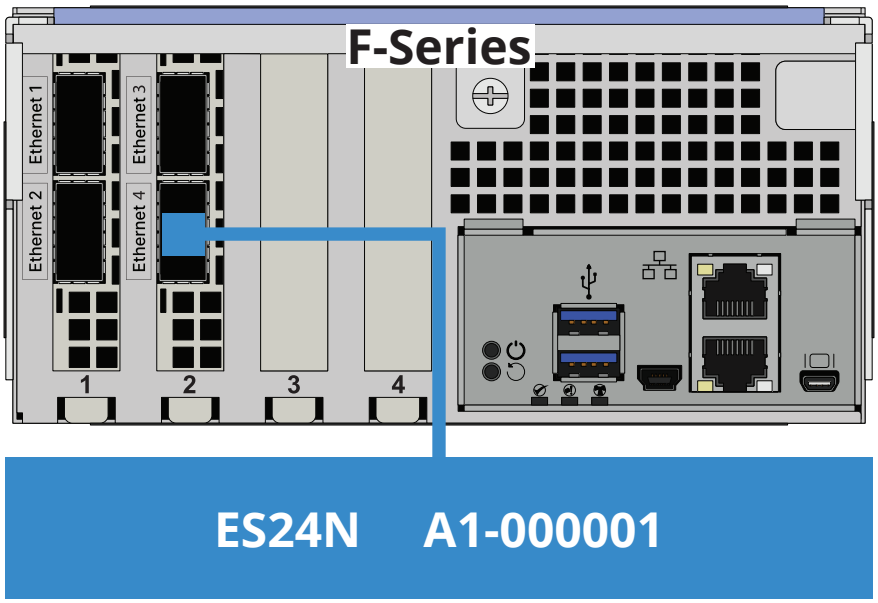
Important - Cabling Sequence

You must connect the ES24N DAC cables to the F-Series numerical ethernet ports in descending order, starting with the ES24N that has the **lowest A1 serial number**.

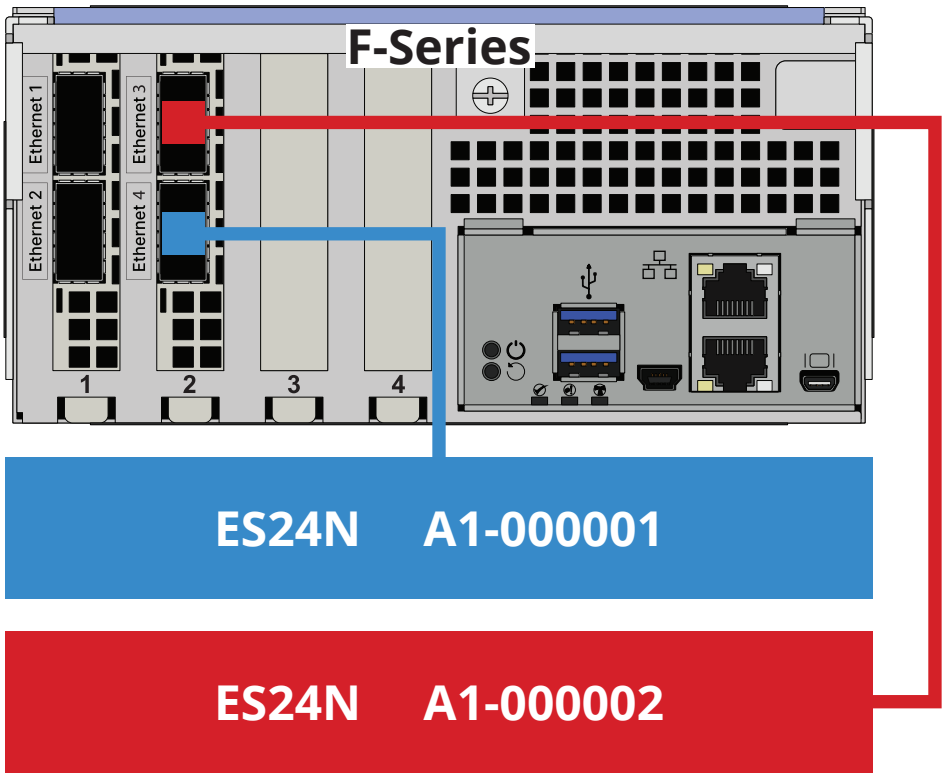
Connect the left ES24N IOM to the left F-Series controller, and the right ES24N IOM to the right F-Series controller.

The following diagrams show the correct connection sequences for two, four, and six shelf configurations on an F-Series with a single 100g NIC in the first slot.

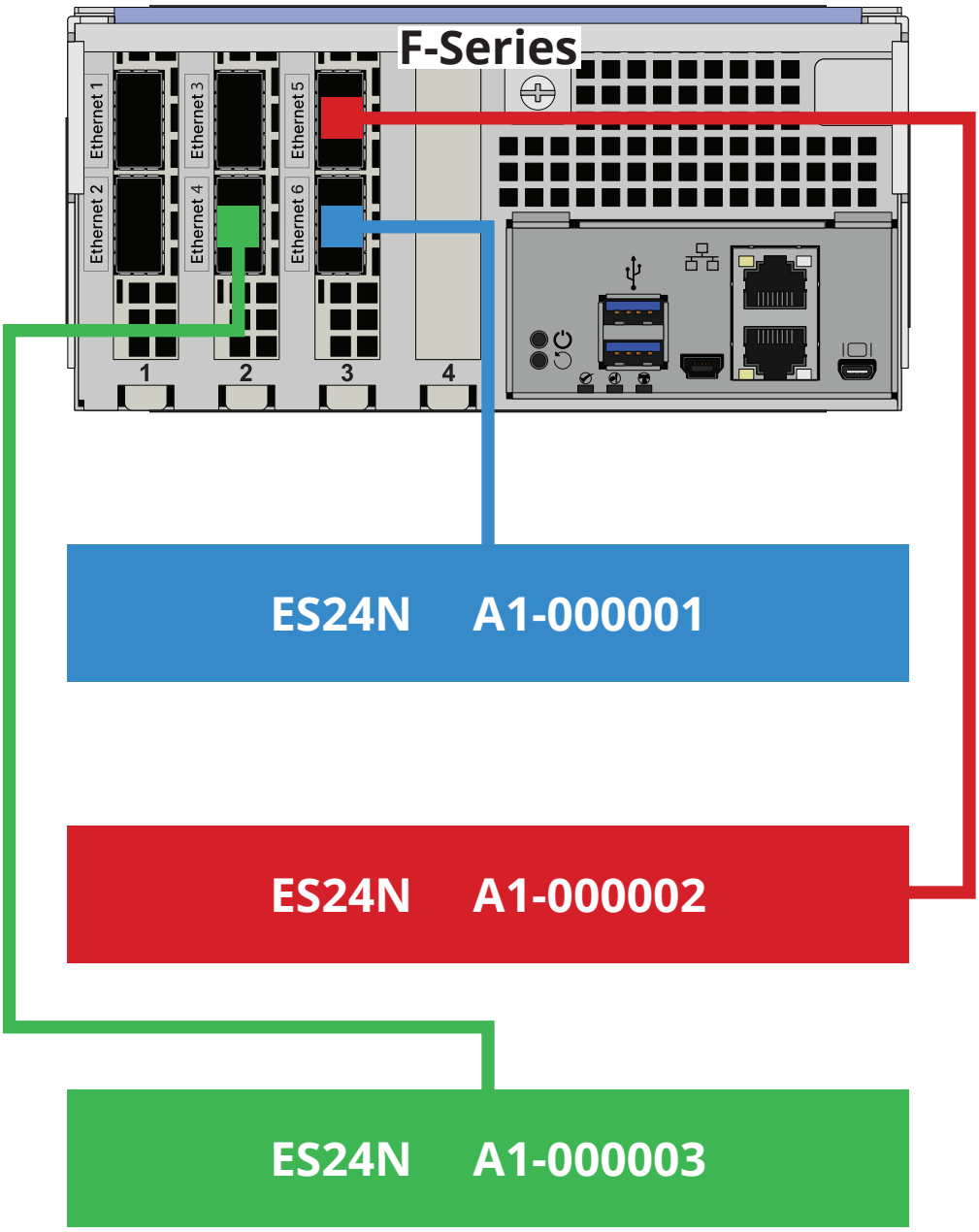
F-Series with one ES24N expansion shelf



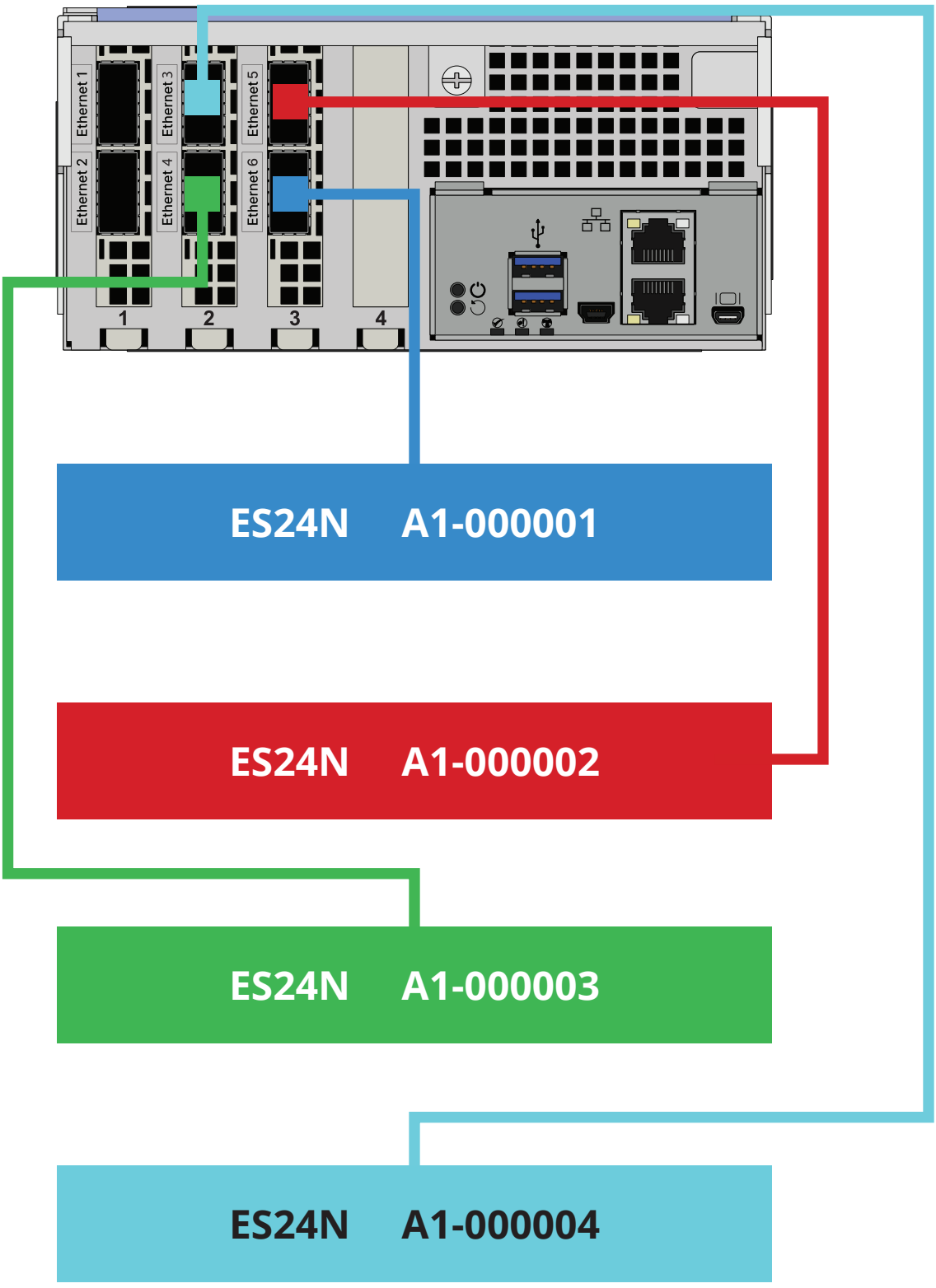
F-Series with two ES24N expansion shelves



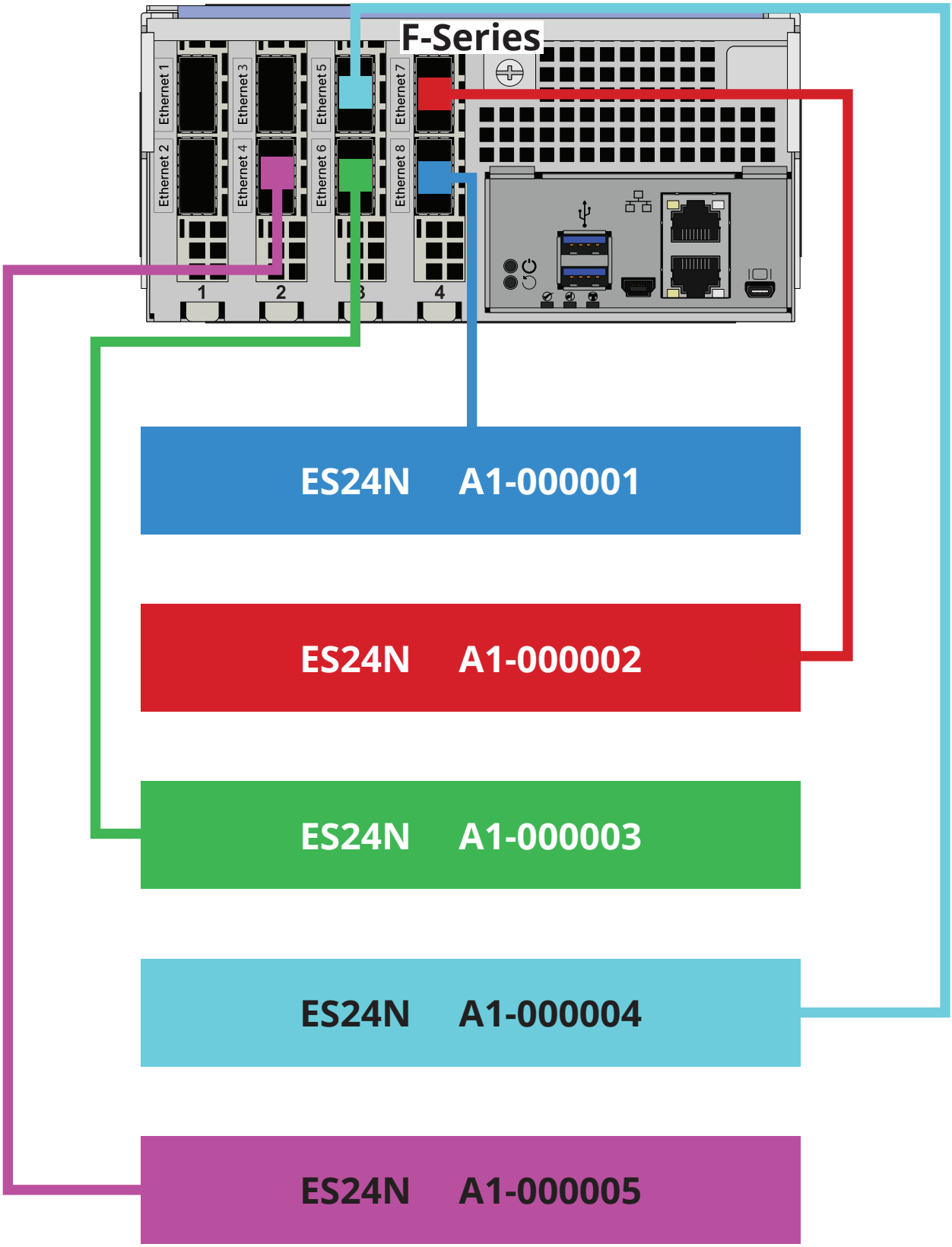
F-Series with three ES24N expansion shelves



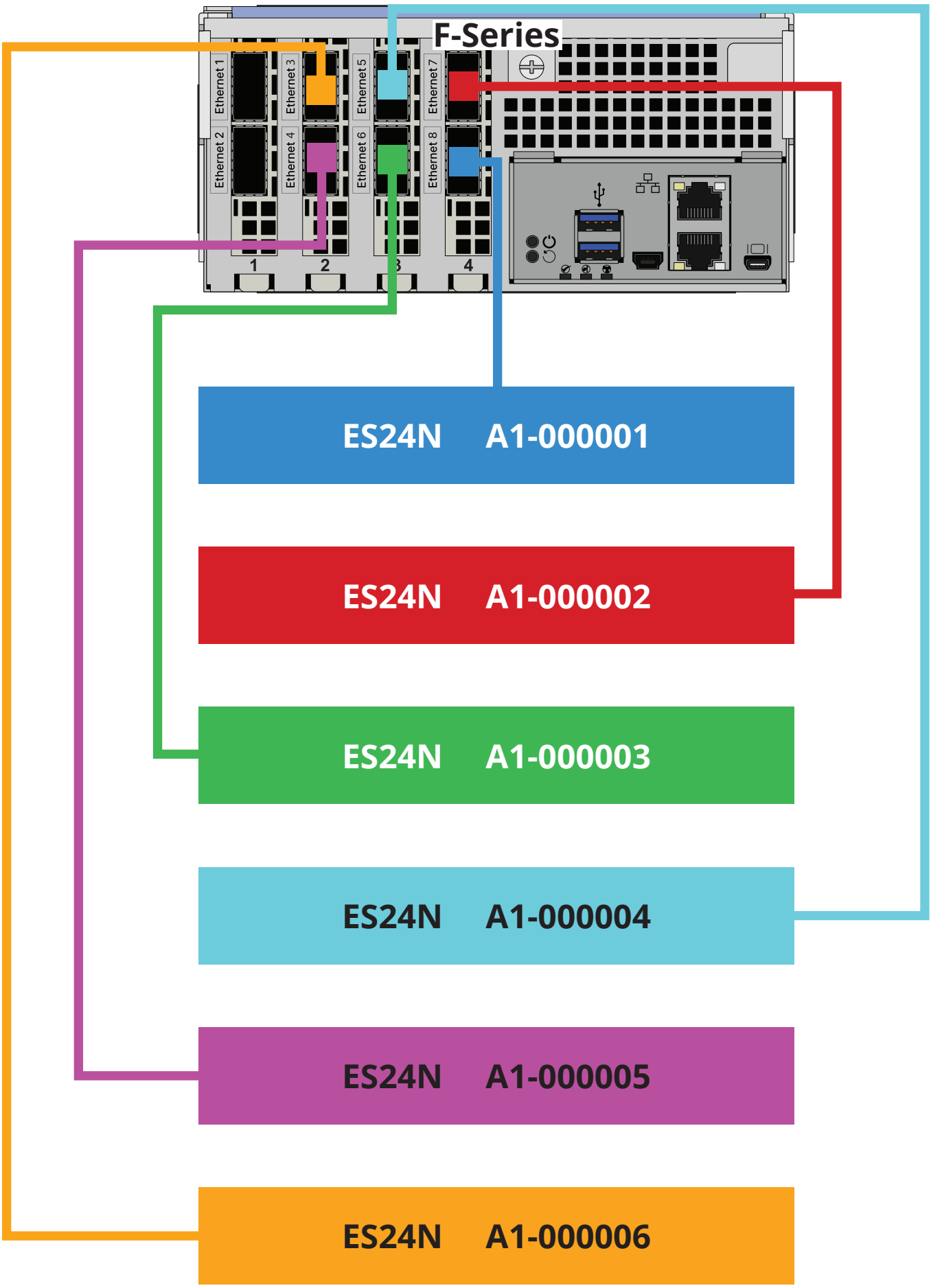
F-Series with four ES24N expansion shelves



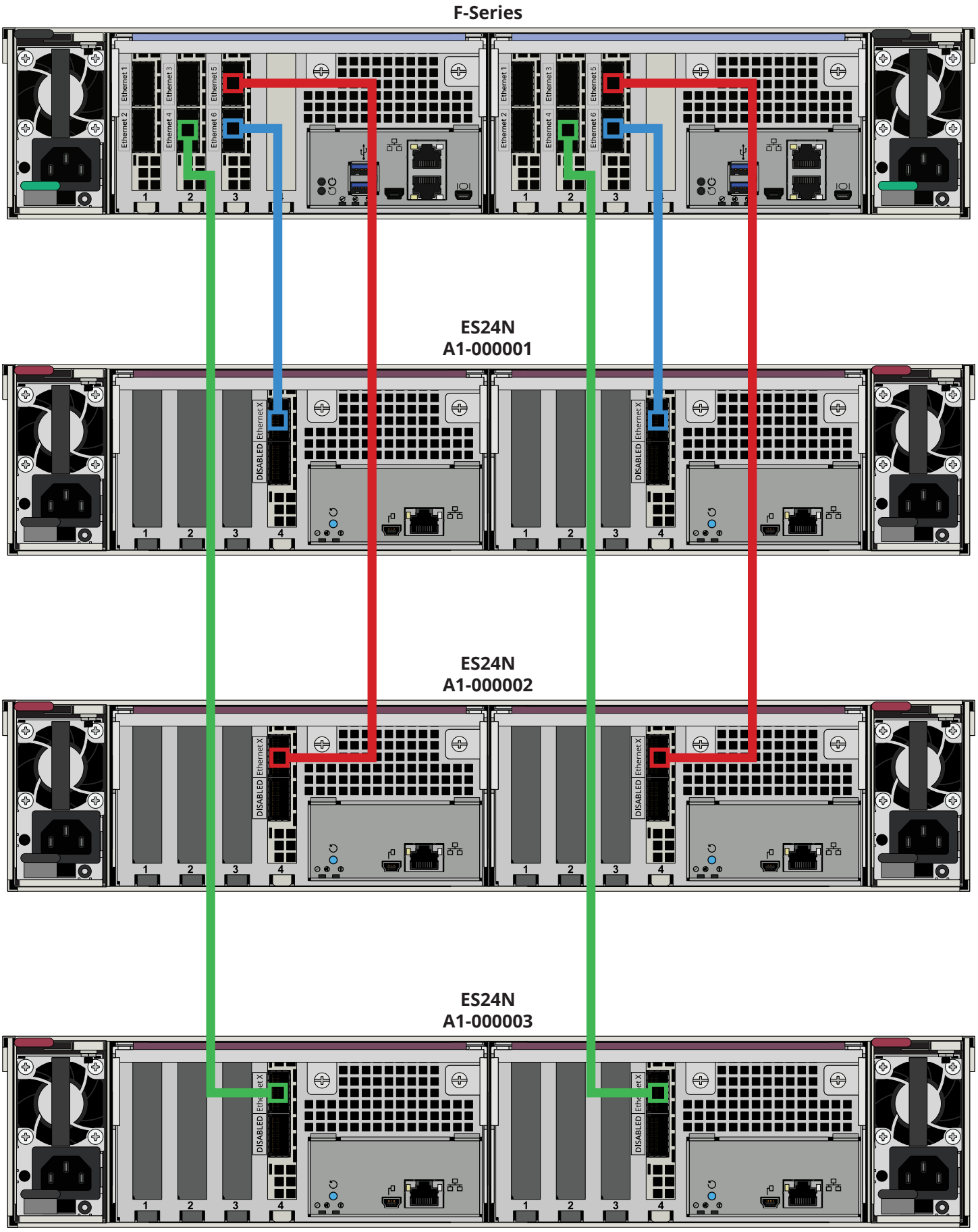
F-Series with five ES24N expansion shelves



F-Series with six ES24N expansion shelves



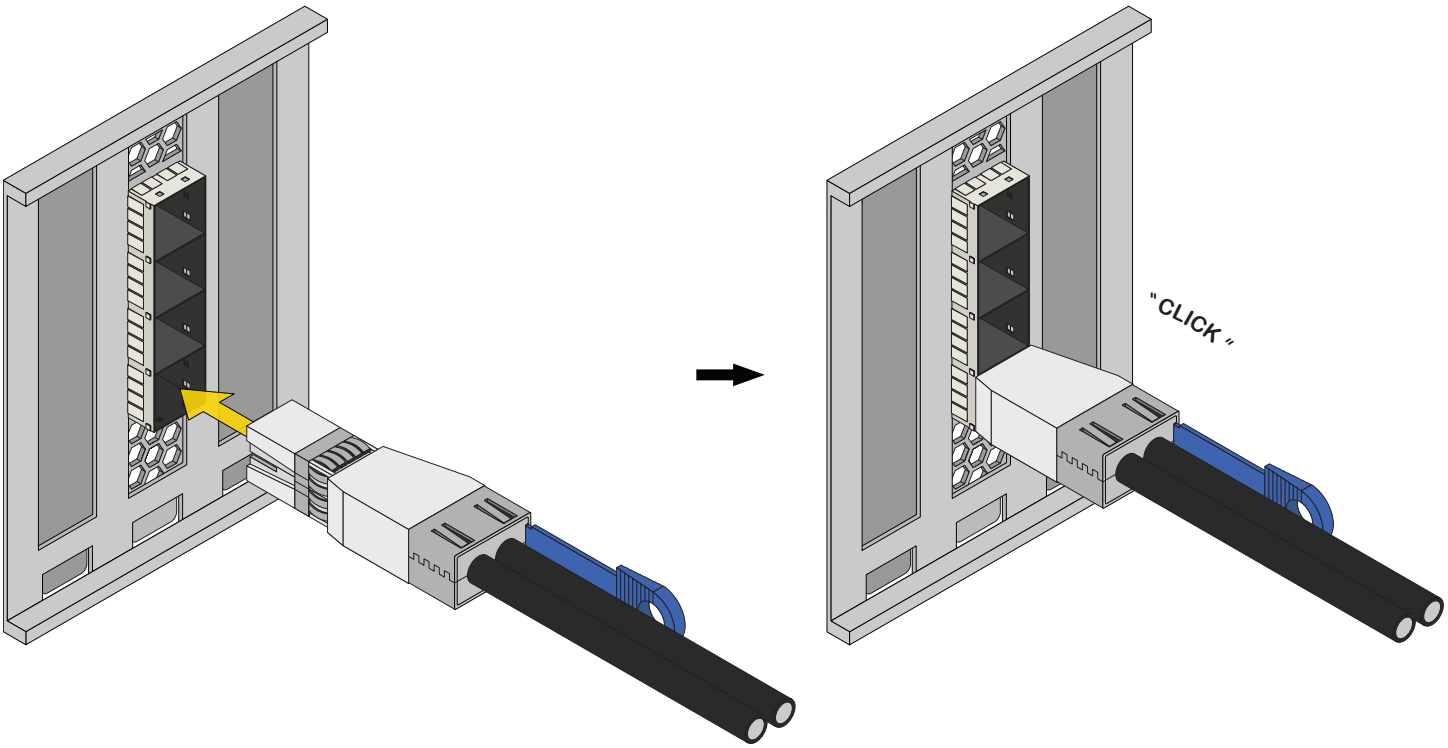
The following diagram is an example of three ES24N shelves connected to an F-Series system.



8.2 ES60

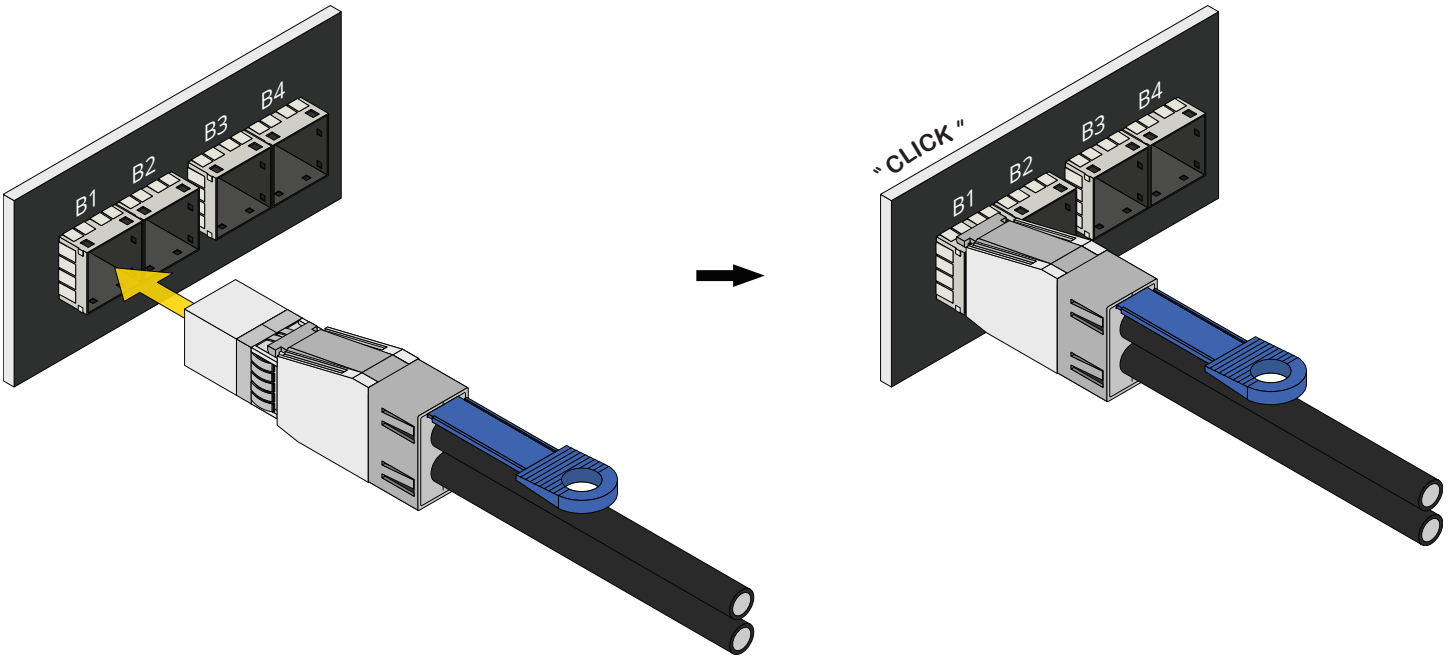
On the F-Series, line the SAS cable connector up with the first SAS port on the primary controller. Ensure the blue tab on the SAS cable is on the right.

Gently push the connector into the port until it clicks. Repeat for the second controller.

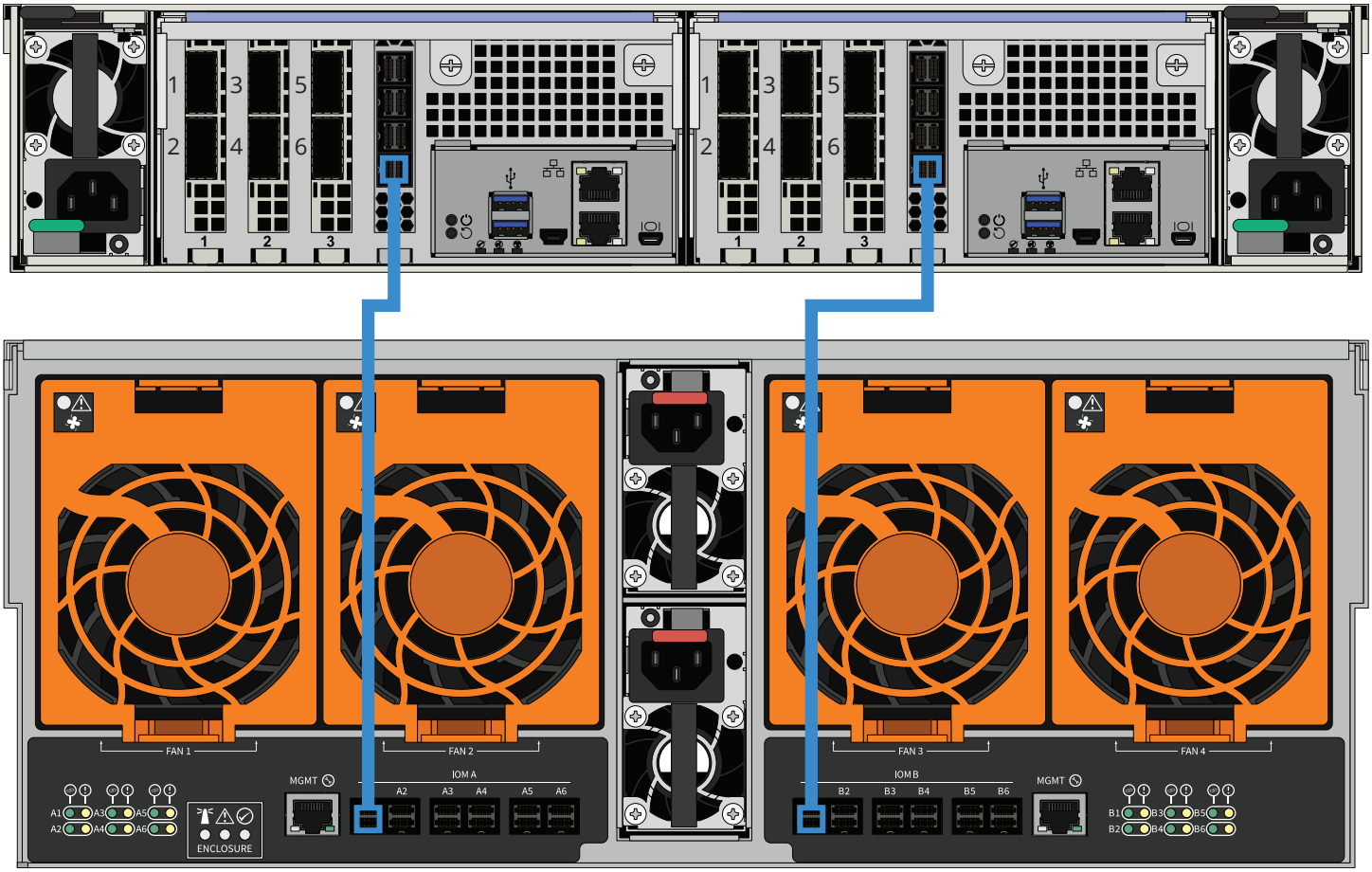


On the ES60, line the SAS cable connector up with the first SAS port IOM A. Ensure the blue tab on the SAS cable is on the top.

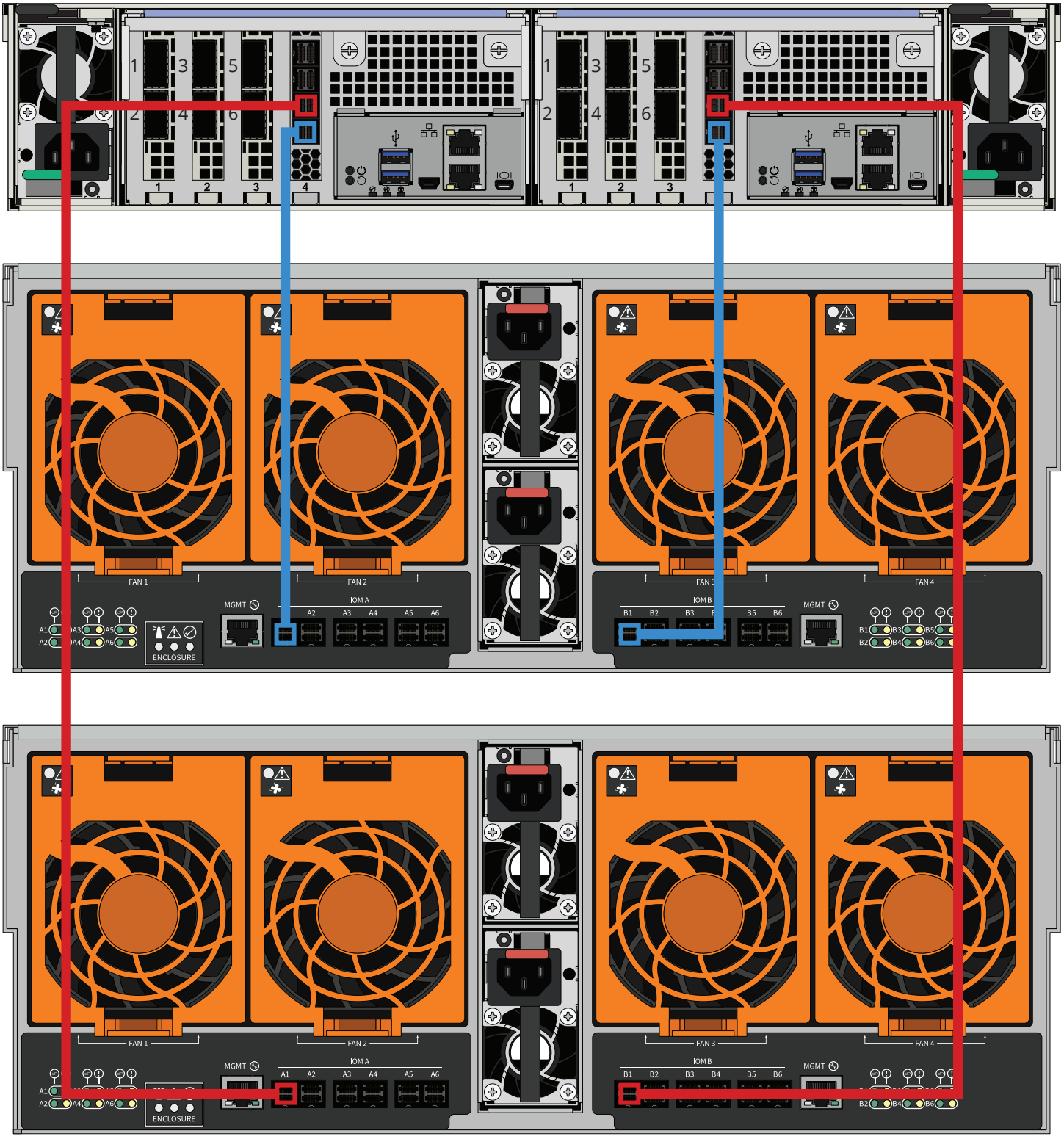
Gently push the connector into the port until it clicks. Repeat for IOM B.



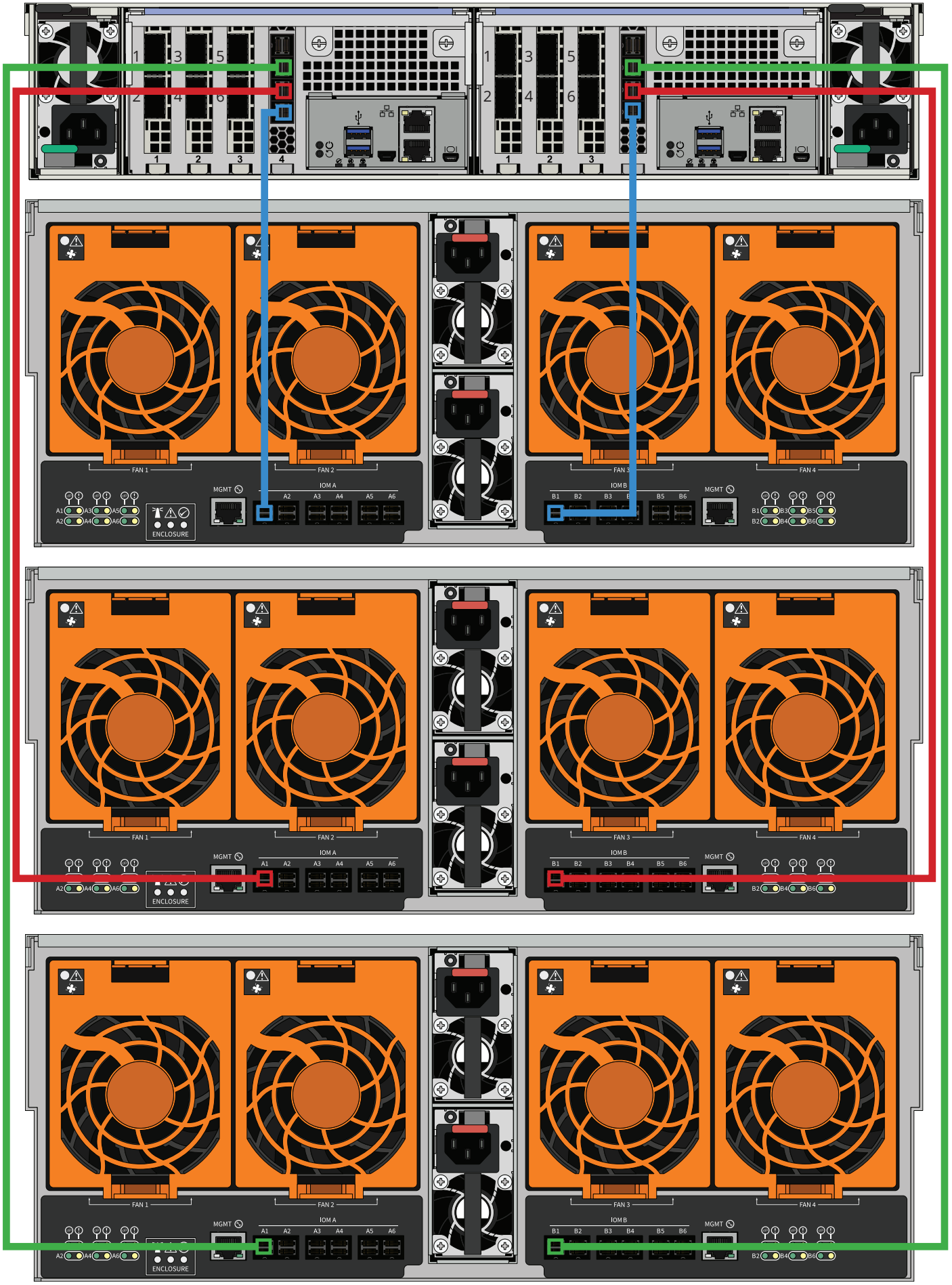
F-Series with one ES60 expansion shelf



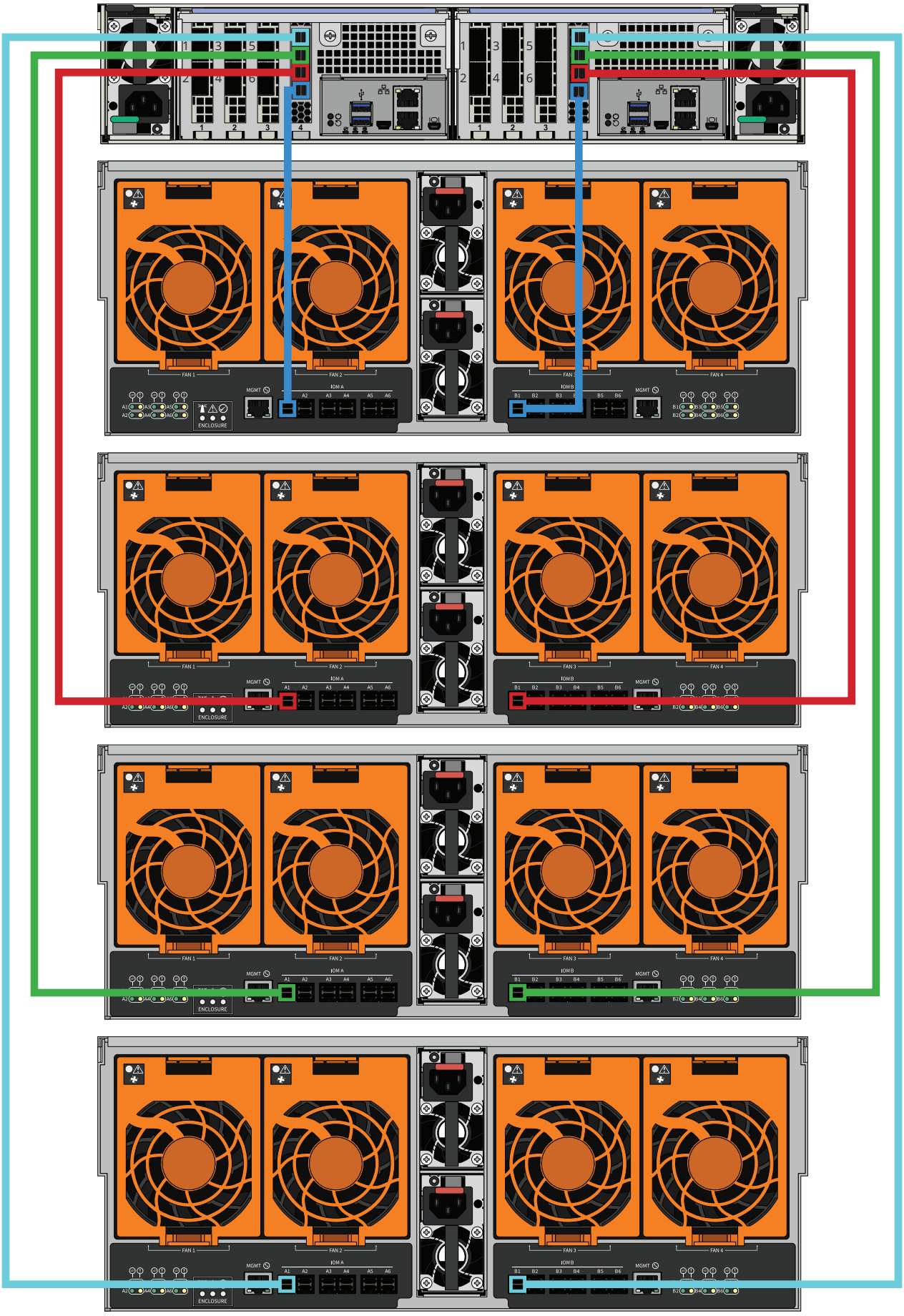
F-Series with two ES60 expansion shelves



F-Series with three ES60 expansion shelves



F-Series with four ES60 expansion shelves



9 HA Networking

Note - Diagrams

The example diagrams in this document are independent from one another. The NAS, logical, and switch setups differ between each configuration.

Tip - Disable Spanning Tree (STP)

We recommend disabling spanning tree (STP) for any network switch ports that you connect to an TrueNAS network interface.

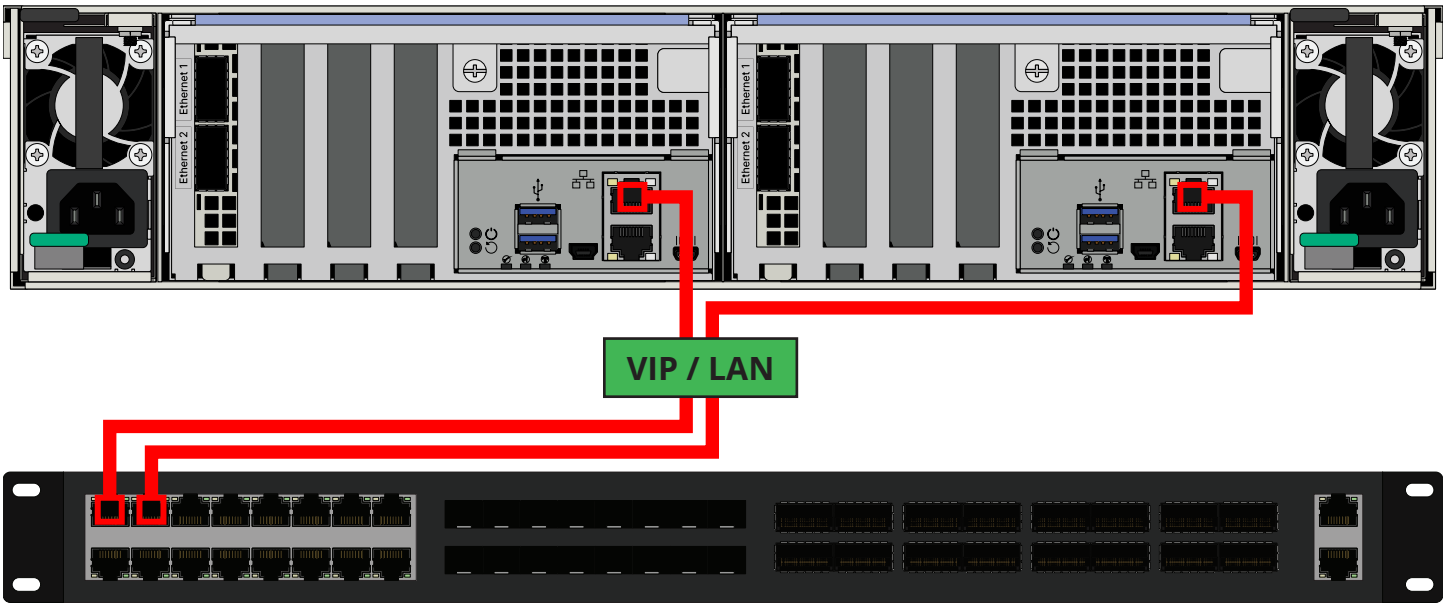
9.1 NIC Configured and Connected to Same Switch

Set up both switch ports in the same VLAN, or otherwise make them reachable from TrueNAS Web UI via the default gateway. Ports must be able to pass traffic between each other.

Configure **TrueNAS (TN) Management** interface on each controller and connect them to separate ports on the same switch.

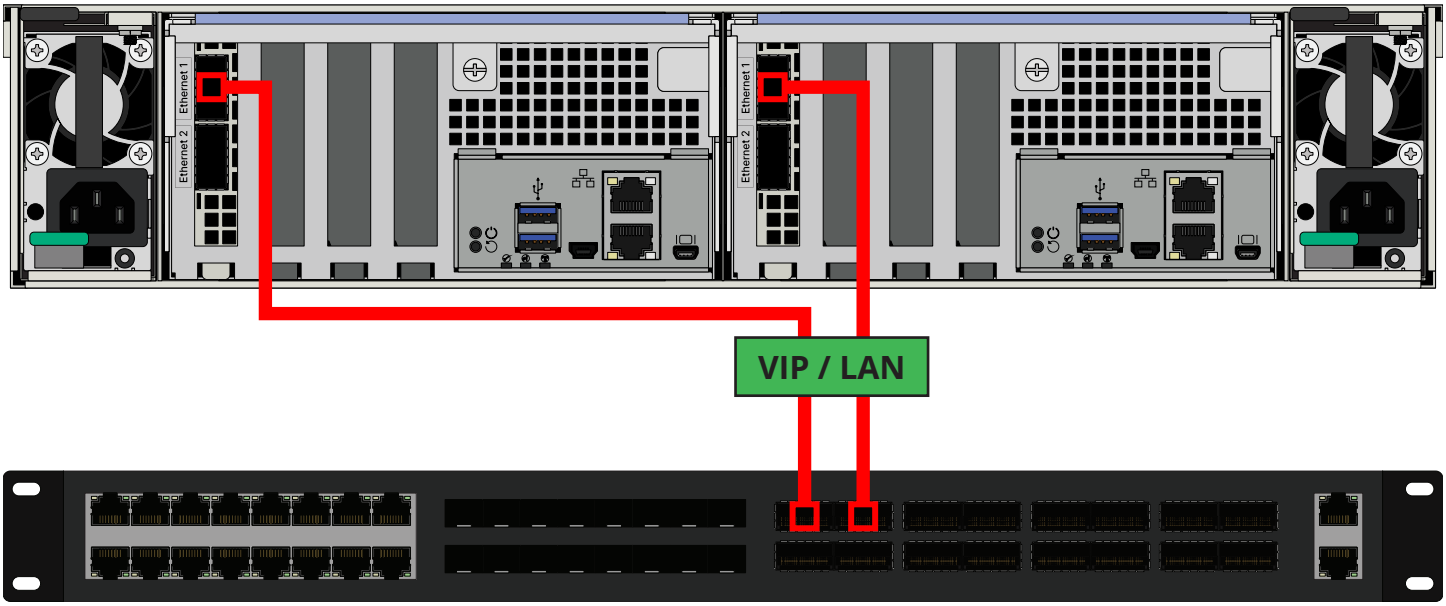
9.1.1 NIC on Same Switch Example with Onboard NICs

Configure the **TN Management** interface on each controller with its own IP address, then set up a **Virtual IP (VIP)** address that they can pass traffic to each other with. TrueNAS dynamically allocates the VIP to the active controller.



9.1.2 NIC on Same Switch Example with Additional 100G NIC

Configure the **Ethernet 1** interface on each controller with its own IP address, then set up a **Virtual IP (VIP)** address that they can pass traffic to each other with. TrueNAS dynamically allocates the VIP to the active controller.



9.2 Single Switch Active LACP Link Aggregation

Configure primary controller NIC **Ethernet 1** and **Ethernet 2** into a LAGG group.

Configure standby controller NIC **Ethernet 1** and **Ethernet 2** into another LAGG group.

You must configure each LAGG with ports of the same speed.

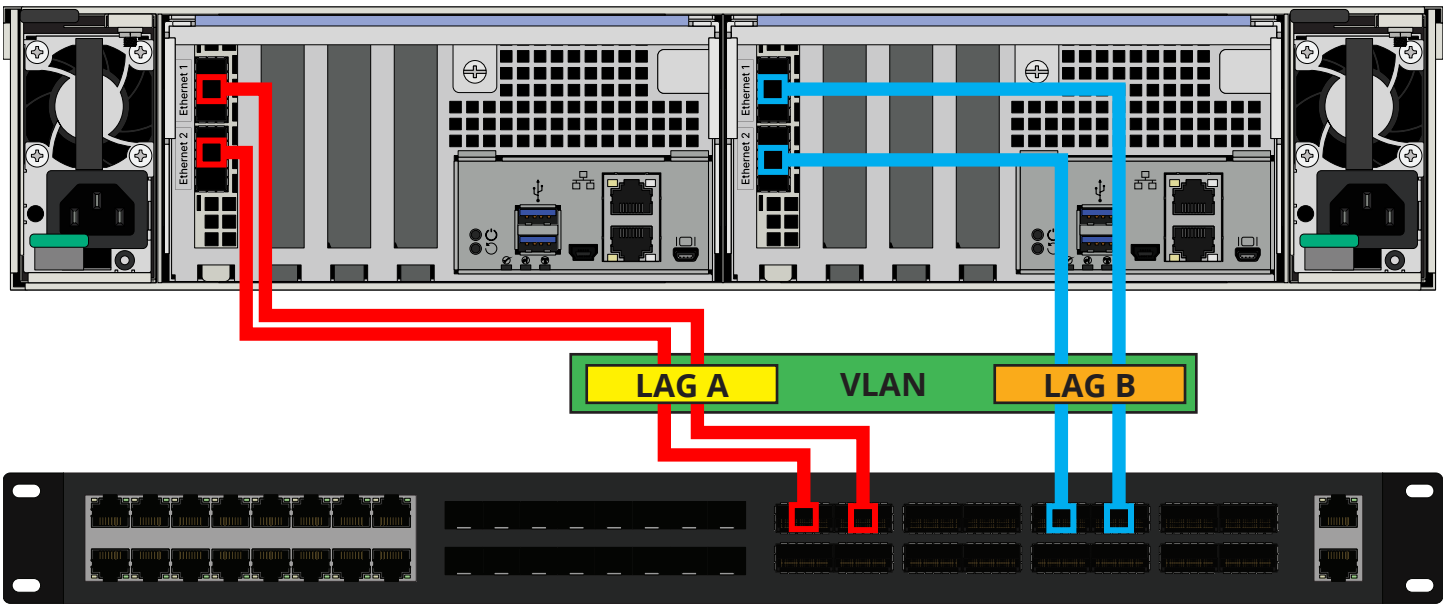
For LACP, you must configure the physical ports (Ethernet 1 and Ethernet 2) on each controller into the same LAGG group on a switch that uses Active LACP.

> **Note - LAGG Configuration**
>
> When configuring LACP via the TrueNAS web UI, add Ethernet 1 and 2 into the LAGG group, then apply IPs.

9.2.1 Single Switch LAGG Example with Additional 100G NIC

Configure LACP for active and standby LAGG groups **Ethernet 1** and **Ethernet 2**:

1. Set **Ethernet 1** and **Ethernet 2** on the active controller in the same LACP LAGG group (port channel on the active controller and the switch port.)
2. Set **Ethernet 1** and **Ethernet 2** on the standby controller in the same LACP LAGG group (port channel on the standby controller and the switch port.)
3. Ensure both LACP LAGG groups can send multicast traffic between each other on the same VLAN.

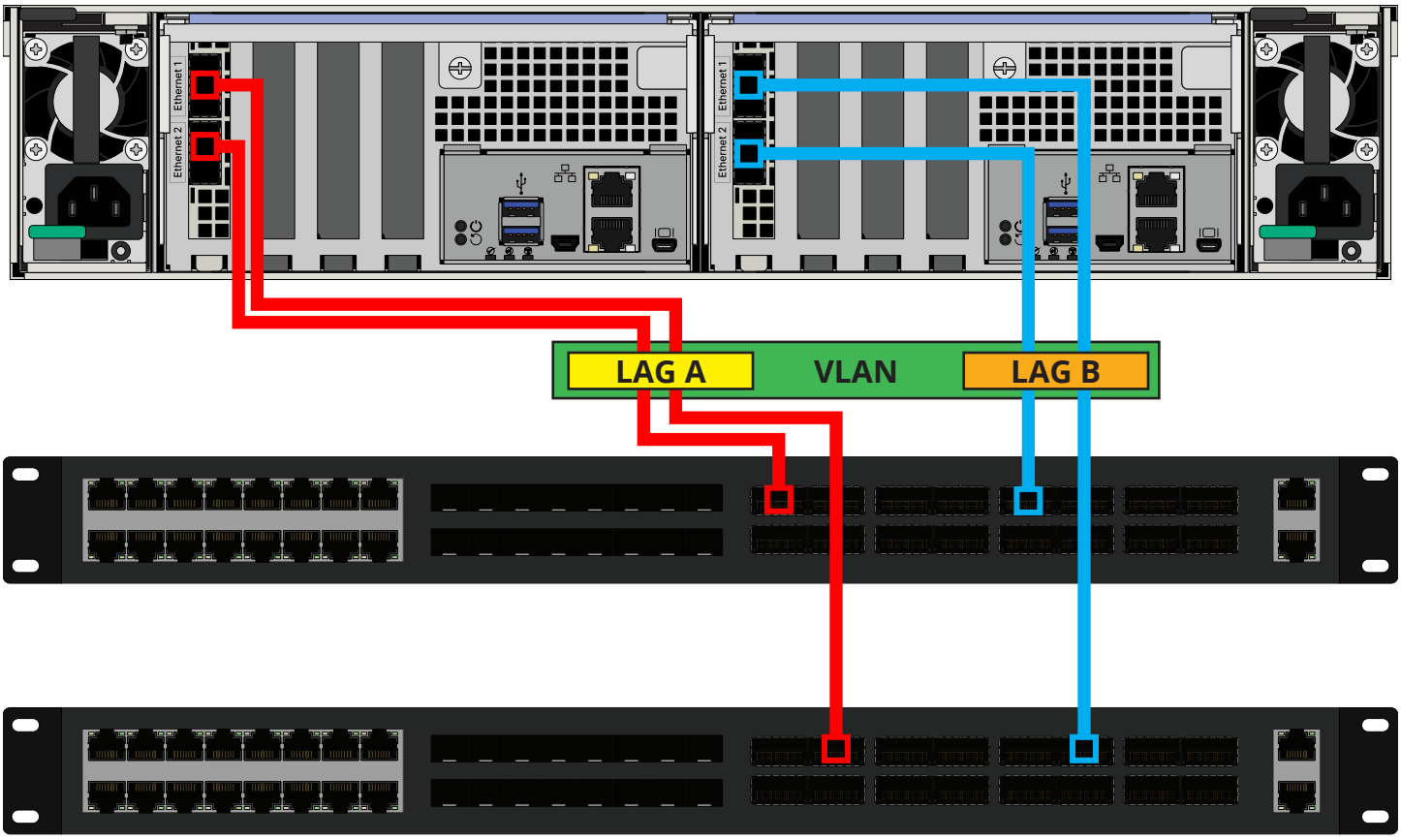


9.3 Two Switch Active LACP Link Aggregation

All of the setup methods from the 1 switch active LACP LAGG apply to the 2 switch setup with a few differences.

Both switches must support multi-chassis LAG (LAGG groups across different physical switches), since **ixl0** and **ixl1** connect to different switches for both controllers.

9.3.1 Two Switch LAGG Example with Additional 100G NIC



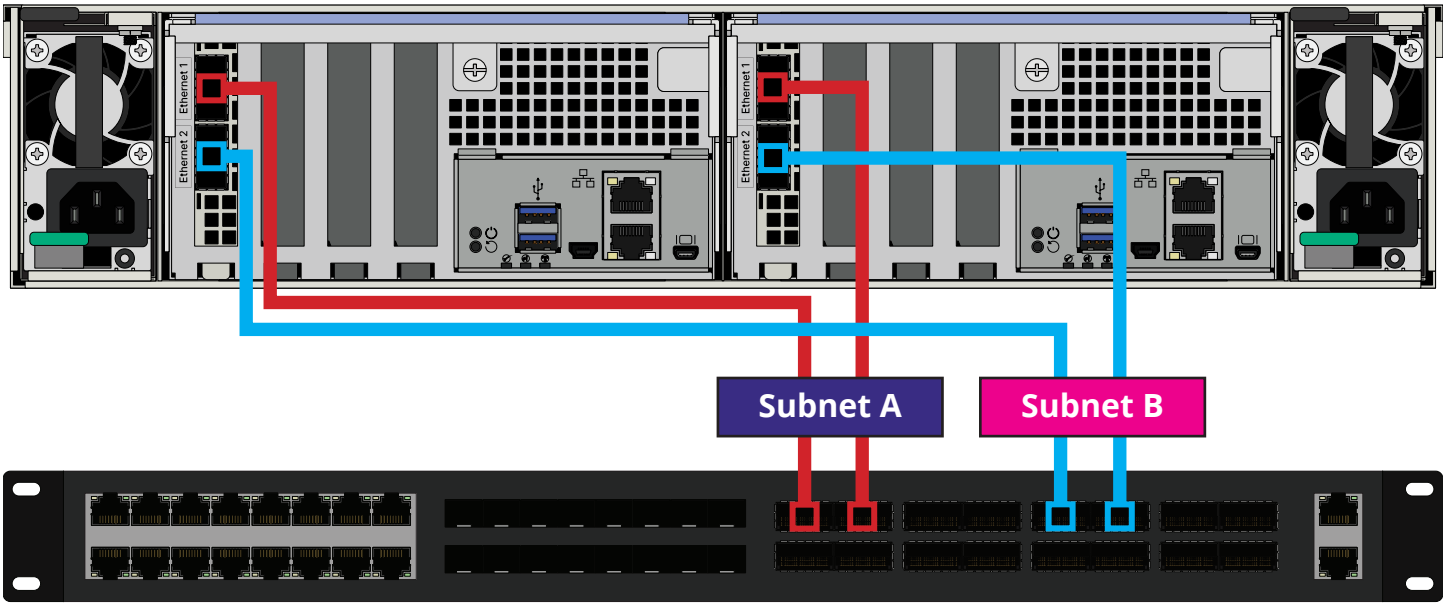
9.4 Multipath

> **Note - Optimization**
>
> Multipath networking is ideal for iSCSI and VMWare backend.

Starting with **Ethernet 1** on each controller:
1. Create an interface on its own subnet (e.g. Subnet A)
2. Configure each controller to have its own IP address
3. Define a unique Virtual IP (VIP) for the interface

Now move on to **Ethernet 2** on each controller:
1. Create an interface on its own subnet separate from Subnet A (e.g. Subnet B)
2. Configure each controller to have its own IP address
3. Define a unique Virtual IP (VIP) for the interface

9.4.1 Multipath Example with Additional 100G NIC



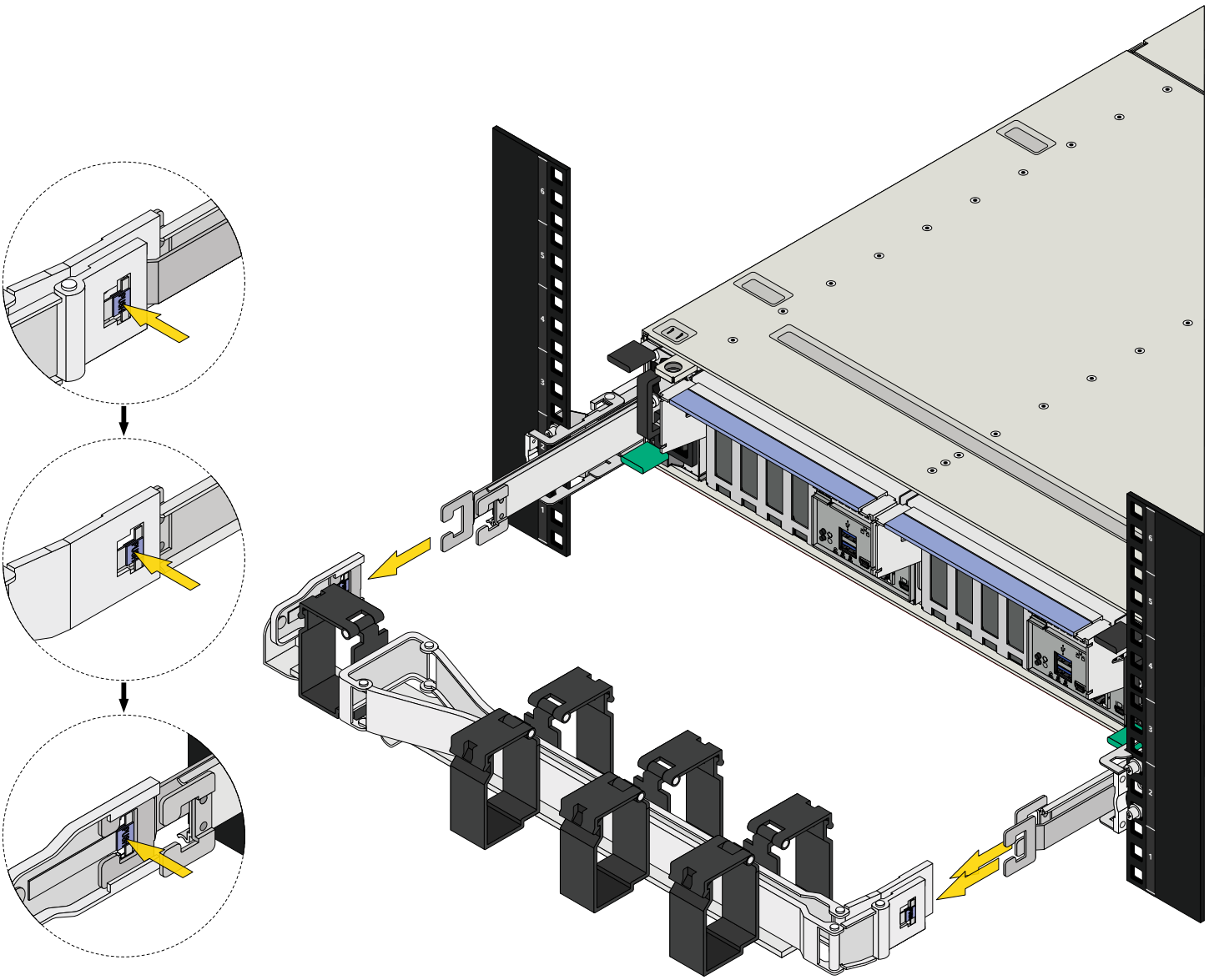
10 Unracking Procedure

Unplug all PSU, networking, and display cables, then open the baskets on the CMA and remove all the cables.

If you plan to re-install the system in the rack, be sure to label the cables so you can easily cable the system again.

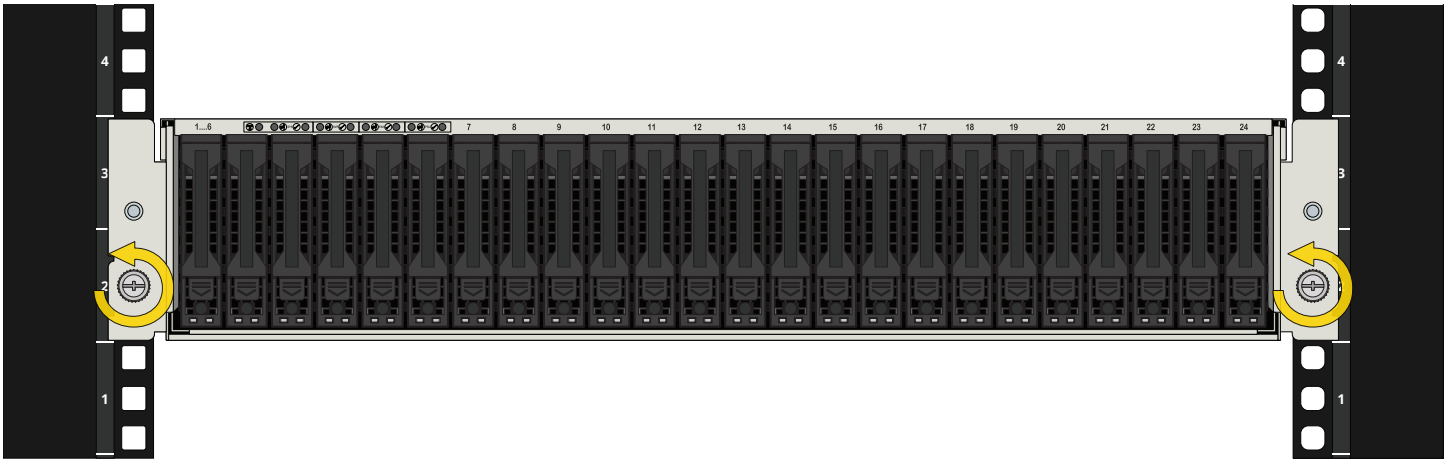
10.1 Remove the CMA

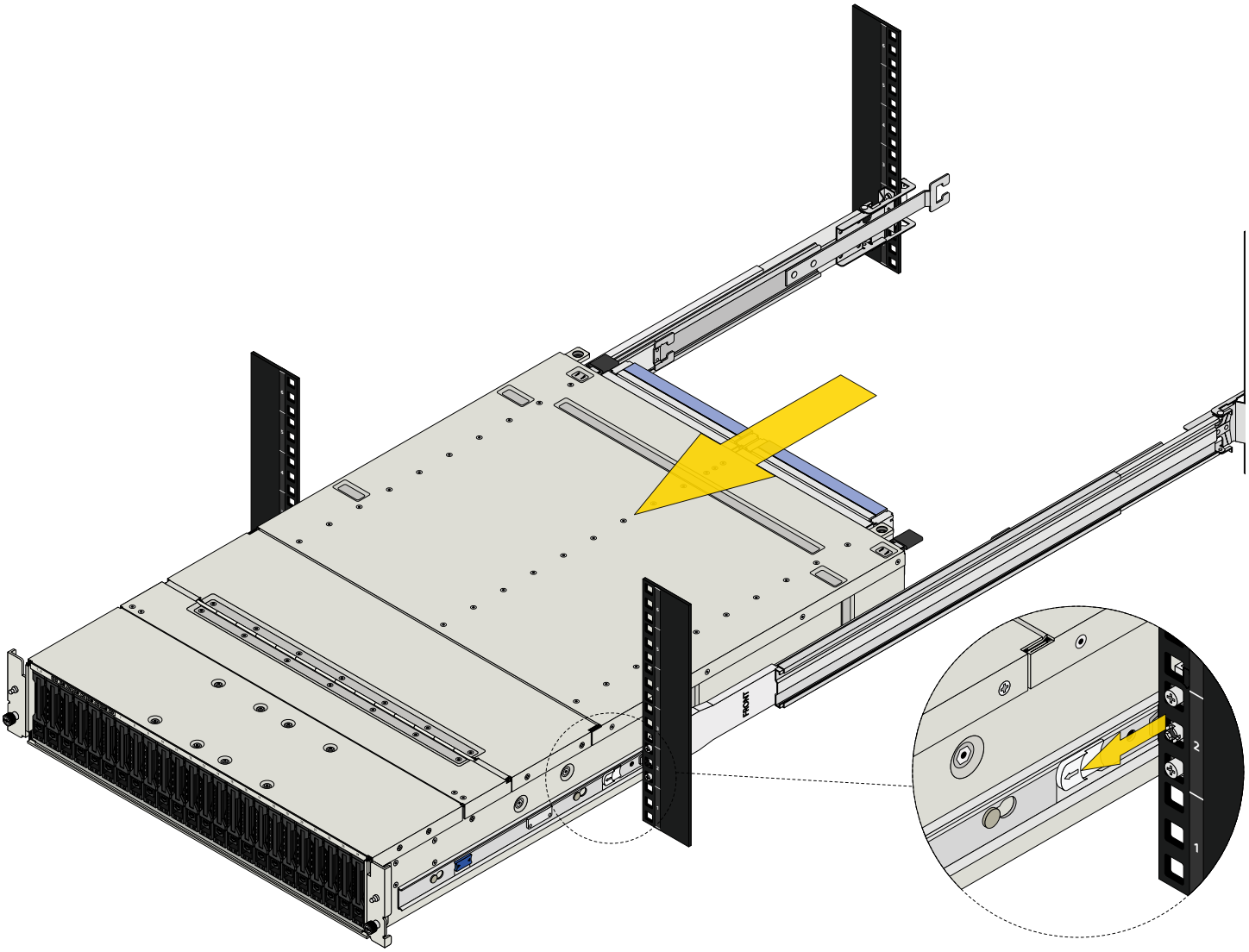
Starting with the right side, push the blue release on the outer post and pull the post off the bracket, then do the same for the inner post. Finally, push the blue release on the left CMA post and pull the CMA away from the system.



10.2 Uninstall the System from the Rack

Loosen the thumbscrews on the each system ear and pull the system out of the rack until it stops. Pull the white security tab on each chassis rail, then finish sliding the system out and team lift it out of the rack.



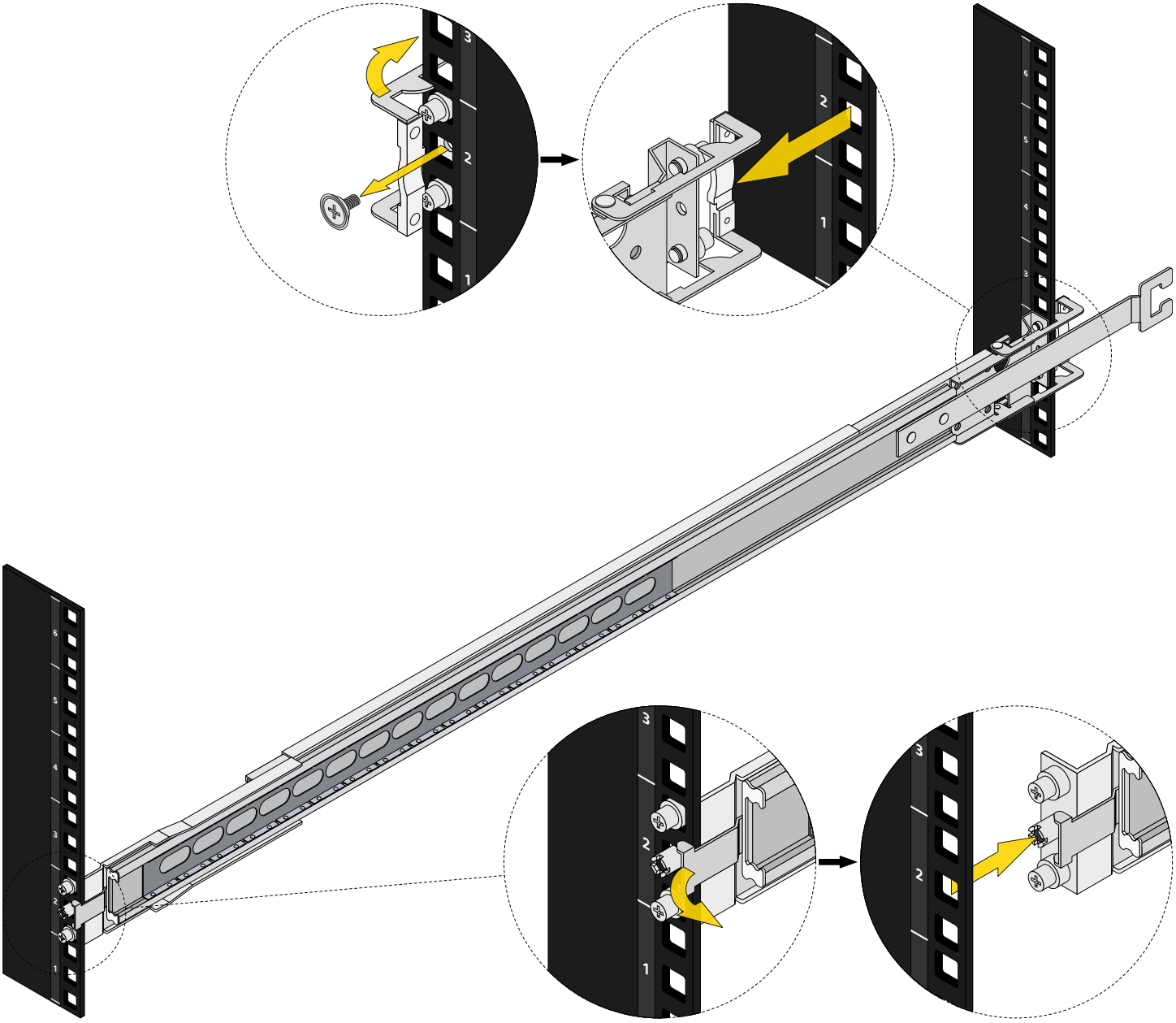


10.3 Remove the Rack Rails

At the back of one of the rails, remove the M5 screw, then swing the gray latch handle open and slide the end of the rail off the rack.

At the front of the rail, push the latch away from the rack and guide the rail pins out of the rack mounting holes.

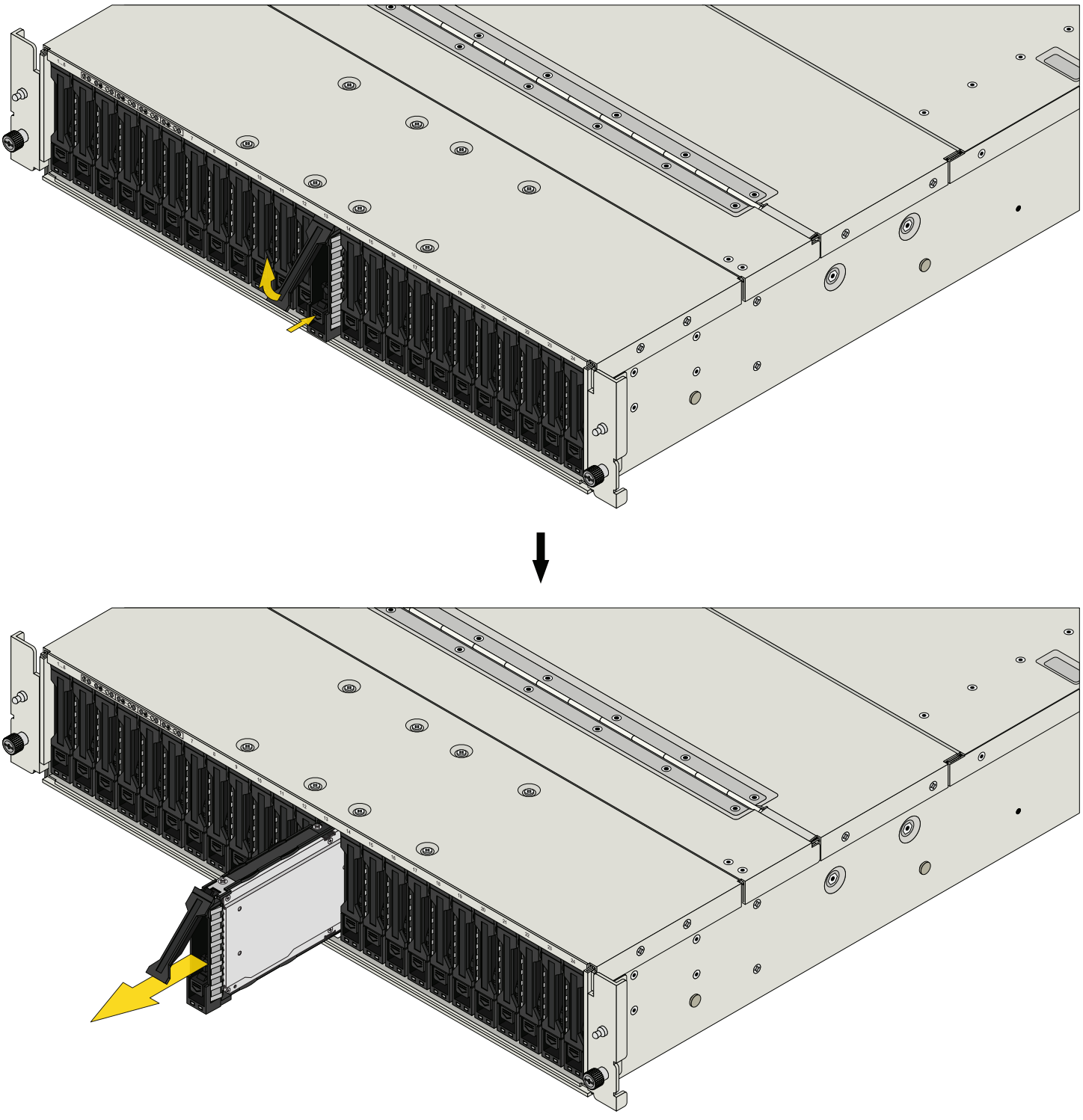
Repeat the process for the second rack rail.



11 Drive Replacement

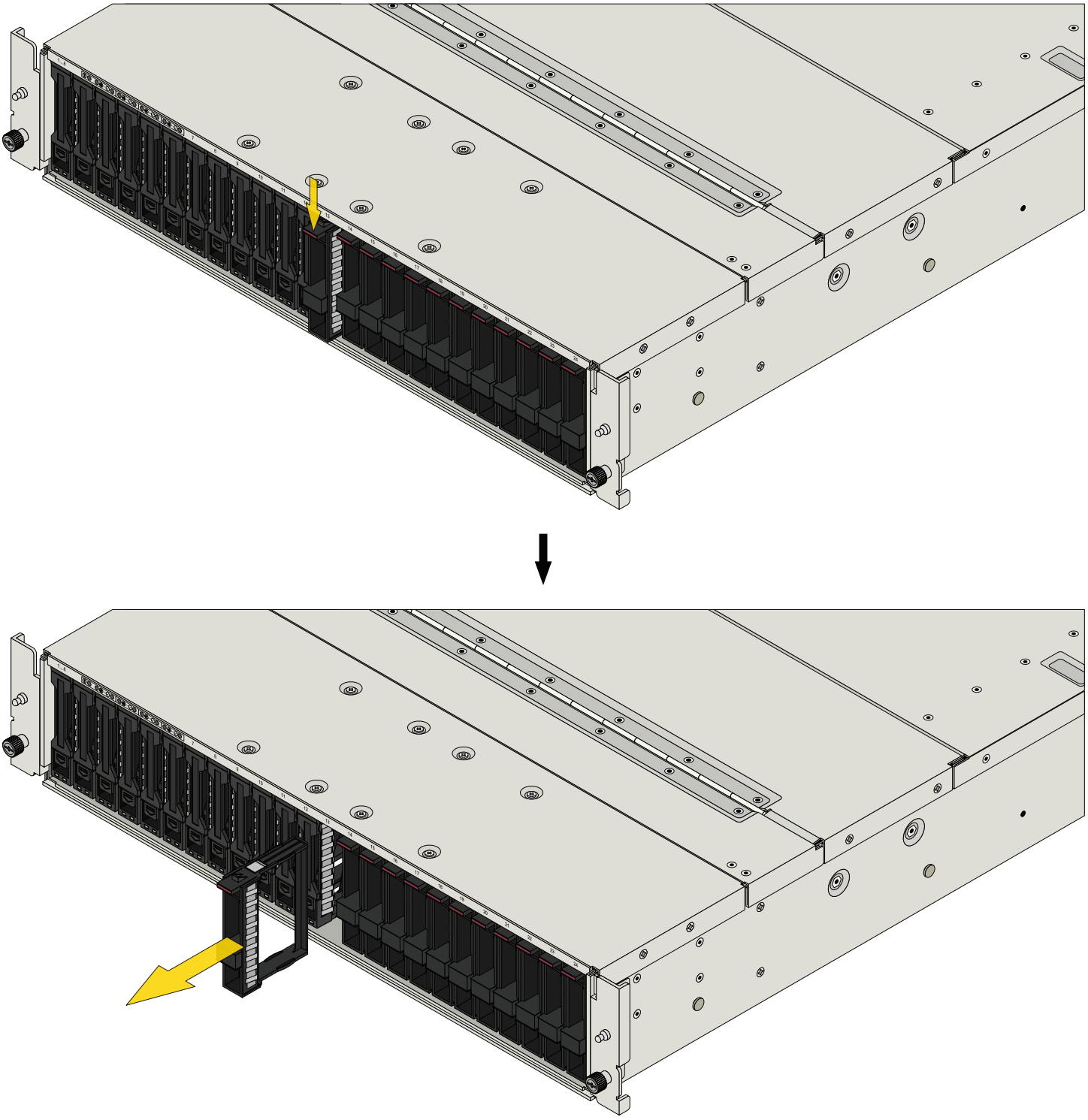
11.1 Remove Drive Tray

To remove a drive tray, push the button on the bottom end of the tray to release the locking arm. Gently open the arm until it stops, then pull the tray out from the system.



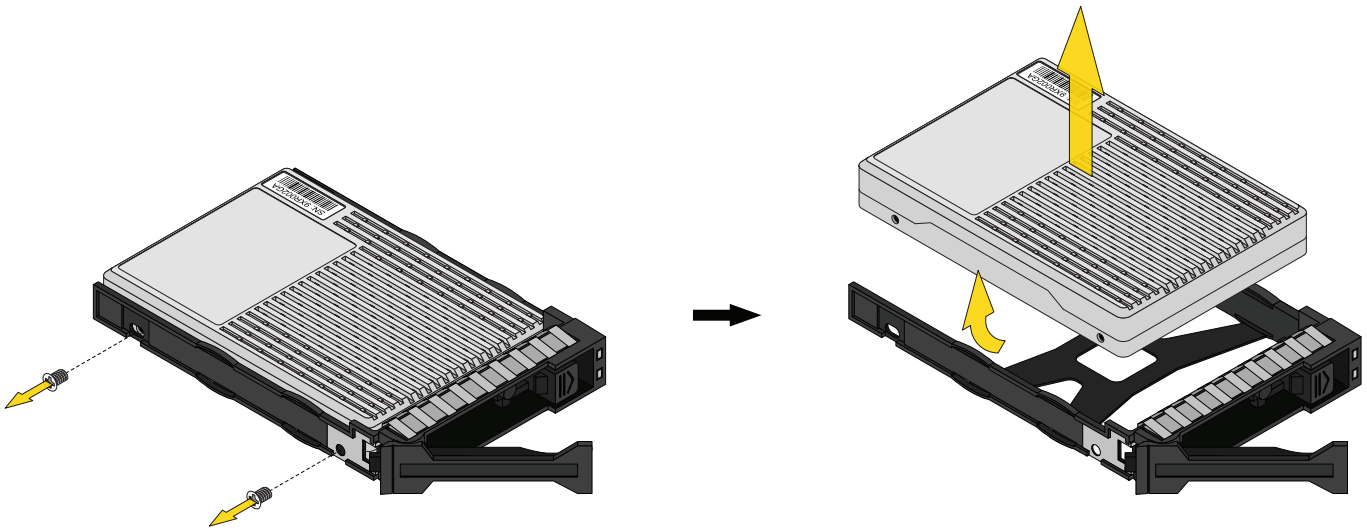
11.1.1 Remove Drive Blank

If you are replacing a drive blank with a drive assembly, remove the drive blank by pushing down on the drive blank locking tab and pulling it out of the system.



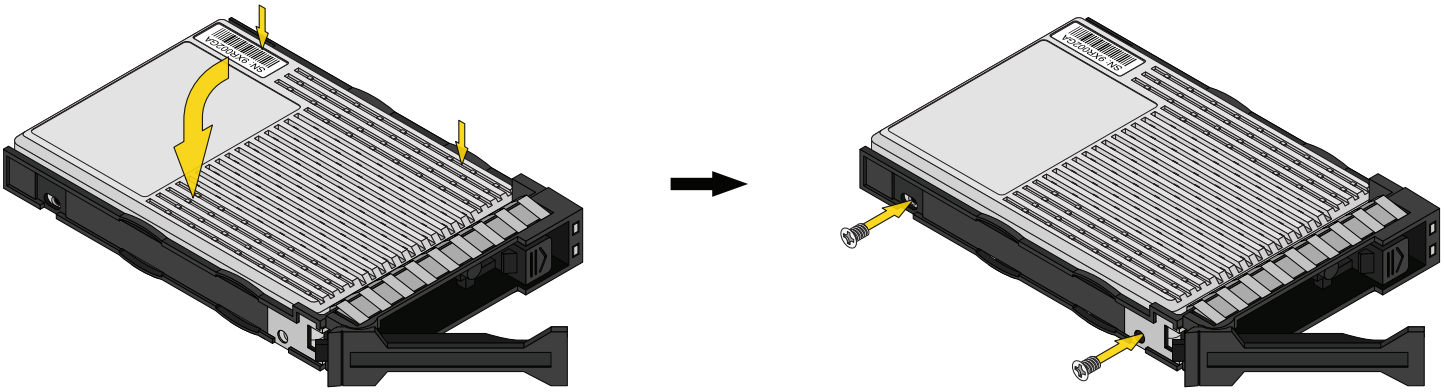
11.2 Remove a Drive From a Tray

Uninstall both SSD screws securing the drive to the tray, then gently lift the drive out of the tray screw-side first.



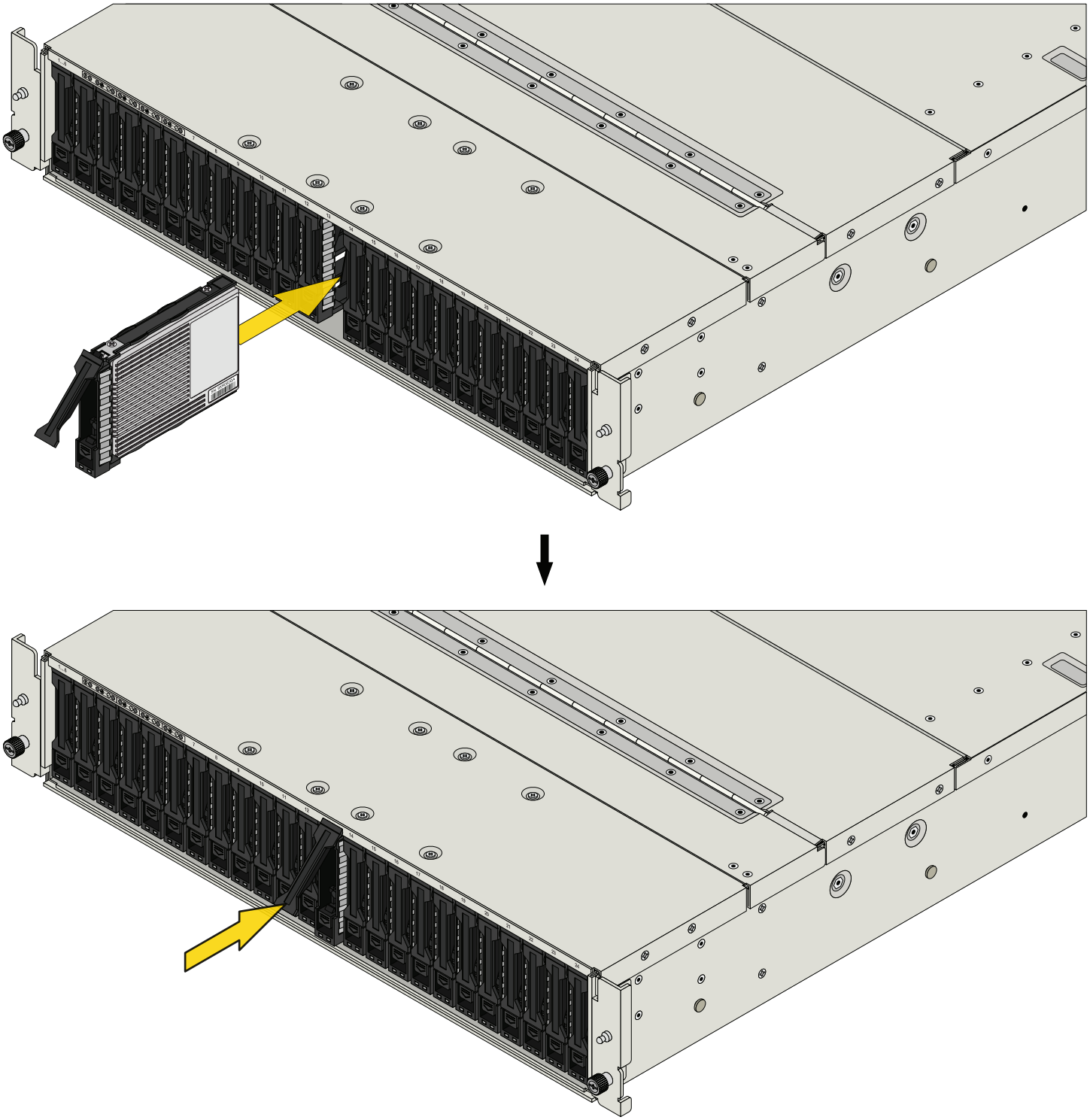
11.3 Install a Drive in a Tray

Ensure the drive connectors point out the back of the tray. Insert the drive into the tray peg-side first, then push the drive down into the tray. Secure the drive in the tray using two SSD screws.



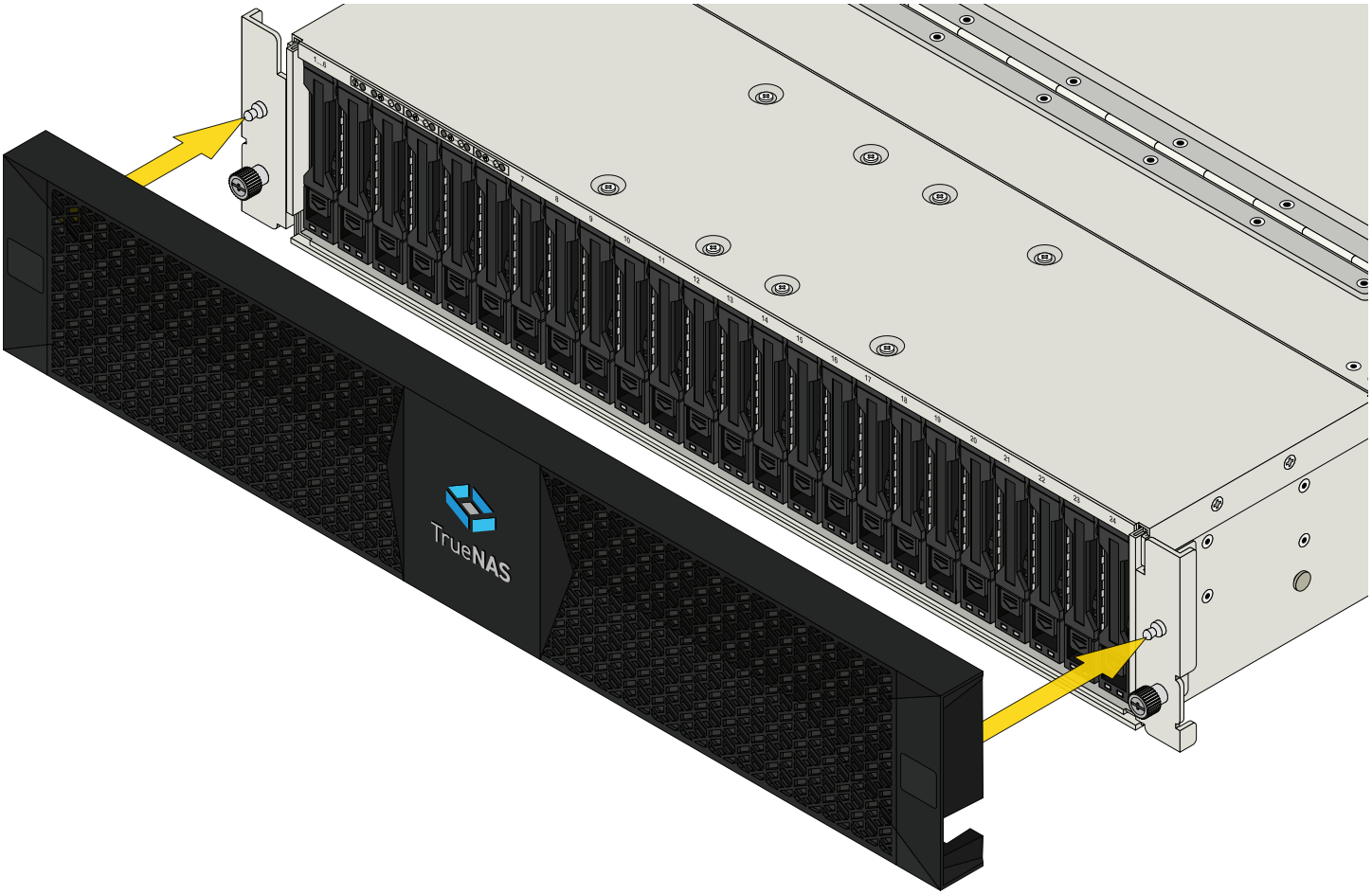
11.4 Install a Drive Tray in the System

To install a drive tray, align it with an empty slot and gently push it in until it stops, then close the locking arm.



12 Install Bezel

To install the bezel, align it with the front of the system. Make sure the two magnets on the bezel line up with the pegs on the system ears, then gently push the bezel on.



To remove the bezel, gently pull it off the front of the system.

13 Additional Resources

The TrueNAS Documentation Hub has complete software configuration and usage instructions. Click **Guide** in the TrueNAS web interface or go directly to:

https://www.truenas.com/docs

Additional hardware guides and articles are in the Documentation Hub's Hardware section:

https://www.truenas.com/docs/hardware

The TrueNAS Forums provide opportunities to interact with other TrueNAS users and discuss their configurations:

https://forums.truenas.com/

14 Contact Us

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Telephone	Telephone After Hours (24x7 Gold Level Support only): • US-only toll-free: **1-855-499-5131** • International: **1-408-878-3140** (International calling rates will apply)
Address	iXsystems, Inc. dba TrueNAS - 541 Division St, Campbell, CA 95008, USA