

Smarter technology for all

# Servicing the ThinkSystem SR860 V3

ES72437

May 2023

Lenovo

# Prerequisites

- [ES42373 – Intel Xeon processor architecture for ThinkSystem V3 servers](#)
- [ES51757B – Introducing ThinkSystem tools](#)
- [ES52374 – ThinkSystem tools for the ThinkSystem V3 platform](#)
- [ES41759C – ThinkSystem problem determination](#)
- [ES42190 – Servicing the ThinkSystem 4350/5350/9350 RAID/HBA series adapters](#)

# Objectives

After completing the course, you will be able to:

- Describe the ThinkSystem SR860 V3 and its components
- List the SR860 V3 specifications and features
- Describe the SR860 V3 configurations and block diagrams
- Describe the SR860 V3 management tools
- Describe the problem determination steps and explain how to troubleshoot issues with the SR860 V3

# Product overview

Product description and front, rear, and inside views

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# ThinkSystem SR860 V3 product overview

The SR860 V3 is a 4U rack server that supports two or four 4<sup>th</sup> Generation Intel Xeon Scalable processors for exceptional performance and enterprise-class workloads. It is the successor to the SR860 V2, and it supports DDR5 memory, up to 48 2.5-inch drives, up to 24 direct-link NVMe drives, and up to four double-width 350 W GPUs or eight single-width GPUs.

There are three SR860 V3 machine types:

- 7D93 (three-year warranty)
- 7D94 (one-year warranty)
- 7D95 (SAP HANA configurations with a three-year warranty)



# SR860 V3 specifications

Attribute	Specifications
Form factor	4U rack mount
Processor	<p>Two or four 4<sup>th</sup> Gen Intel Xeon Scalable processors (Code name: Sapphire Rapids or SPR), either Gold or Platinum level</p> <ul style="list-style-type: none"><li>• Up to 60 cores with core speeds of up to 3.7 GHz</li><li>• TDP ratings up to 350 W</li><li>• Three Intel Ultra Path Interconnect (UPI) links at 16 GT/s each – four processors are connected in a mesh topology</li><li>• Up to four Intel embedded accelerators: QAT, DLB, IAA, and DSA</li></ul>
Memory	<p>Up to 64 DIMM slots (16 DIMMs per processor)</p> <ul style="list-style-type: none"><li>• Each processor has 8 memory channels with 2 DIMMs per channel (2 DPC)</li><li>• Support for TruDDR5 RDIMMs and 3DS RDIMMs</li><li>• DIMMs operate at up to 4800 MHz at 1 DPC and 4400 MHz at 2 DPC</li><li>• Up to 16 TB of TruDDR5 memory in 64 slots</li></ul>
Internal storage	<p>Up to 48 2.5-inch hot-swap drive bays:</p> <ul style="list-style-type: none"><li>• Up to 48 SAS/SATA drive bays</li><li>• Up to 24 SAS/SATA and 24 AnyBay (support for SAS, SATA, Gen4 NVMe, or Gen5 NVMe drives) drive bays</li></ul> <p>Boot Drives:</p> <p>Two optional 7.5-inch hot-swap SSD drive bays at the rear of the server with SATA or NVMe for OS boot</p>



# SR860 V3 specifications

Attribute	Specifications
	<ul style="list-style-type: none"><li>Two optional 7 mm hot-swap SSD drive bays at the rear of the server, either SATA or NVMe for OS boot or storage</li></ul> Maximum internal storage: <ul style="list-style-type: none"><li>1474.56 TB using forty-eight 30.72 TB 2.5-inch SAS/SATA SSDs</li><li>368.64 TB using twenty-four 15.36 TB 2.5-inch NVMe SSDs</li><li>115.2 TB using forty-eight 2.4 TB 2.5-inch HDDs</li></ul> Support for a mix of NVMe, SSDs, and HDDs
Storage controllers	<ul style="list-style-type: none"><li>Up to 24 onboard PCIe 5.0 or 4.0 NVMe ports (RAID functions provided using Intel VROC)</li><li>12 Gb SAS/SATA RAID adapters</li><li>12 Gb SAS/SATA HBA (non-RAID)</li></ul>
Network interface	Two dedicated OCP 3.0 SFF slots with a PCIe 5.0 x16 host interface Support for a variety of two-port and four-port adapters with network connectivity of up to 100 GbE One port can be shared with the XClarity Controller (XCC) management processor for Wake-on-LAN and NC-SI support
PCIe slots	Up to 18 PCIe slots (PCIe 4.0 only or PCIe 5.0 and 4.0) plus two PCIe 5.0 OCP 3.0 slots Slot combinations are based on the risers selected: <ul style="list-style-type: none"><li>18 PCIe 4.0 slots</li><li>12 PCIe 5.0 slots + four PCIe 4.0 slots</li></ul>

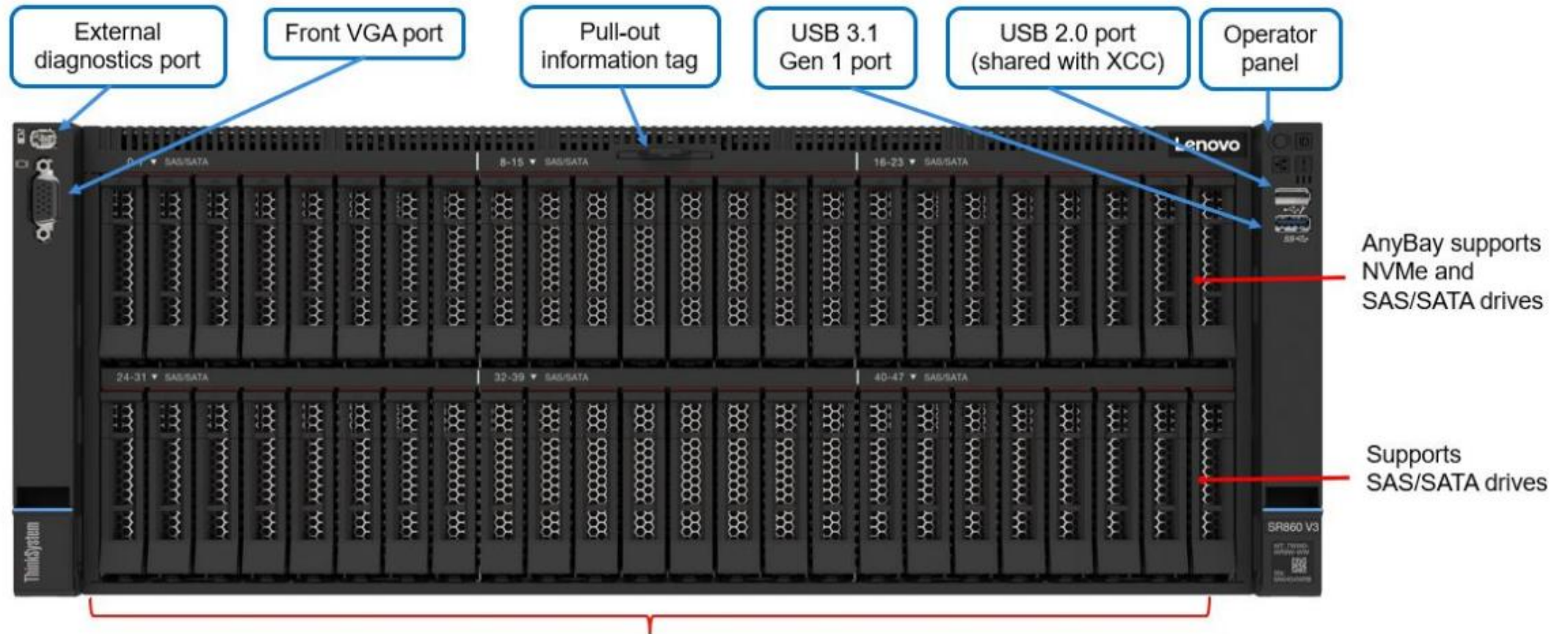
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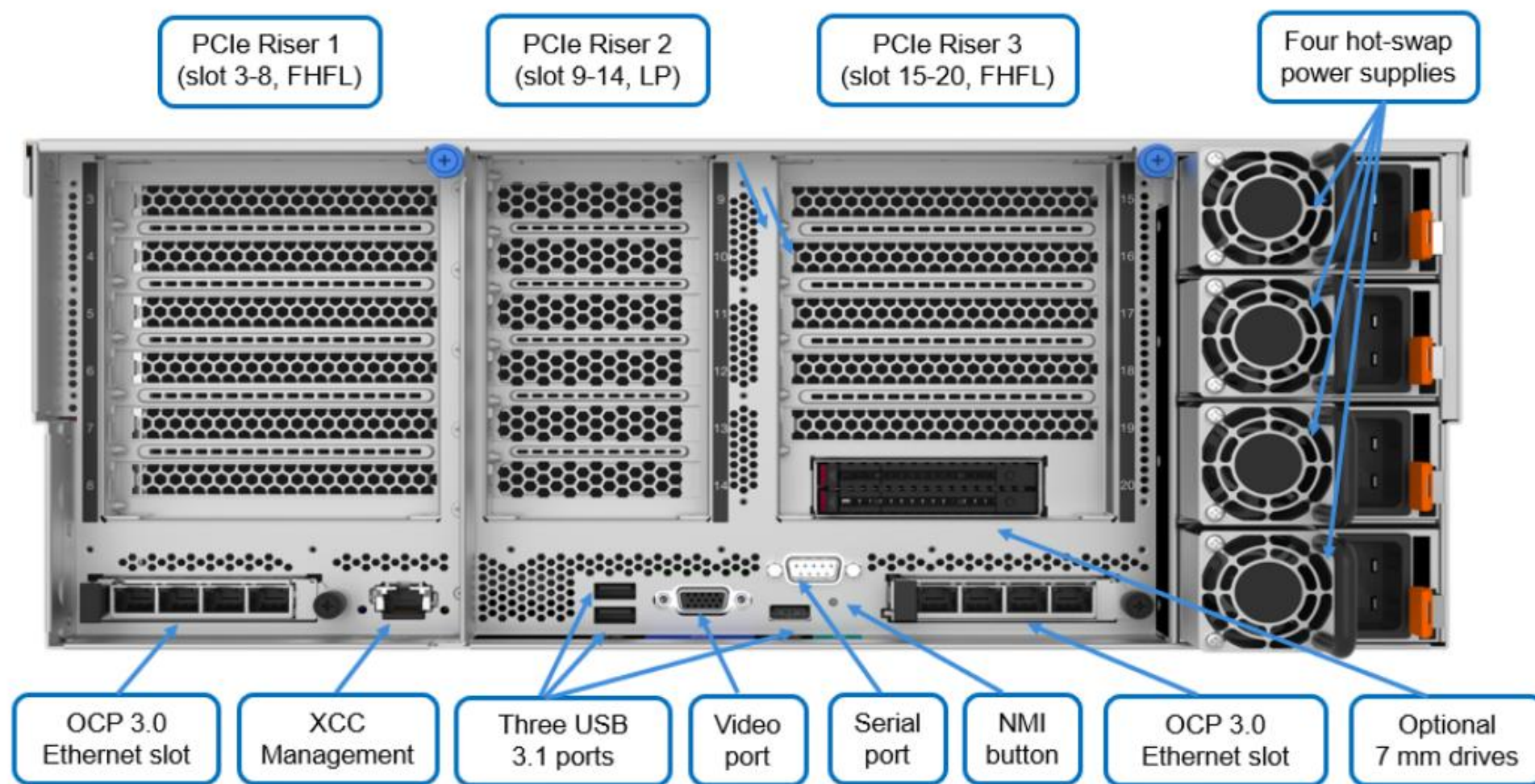
# SR860 V3 front view

Front drive configurations are shown in the [System configurations and diagrams](#) section.



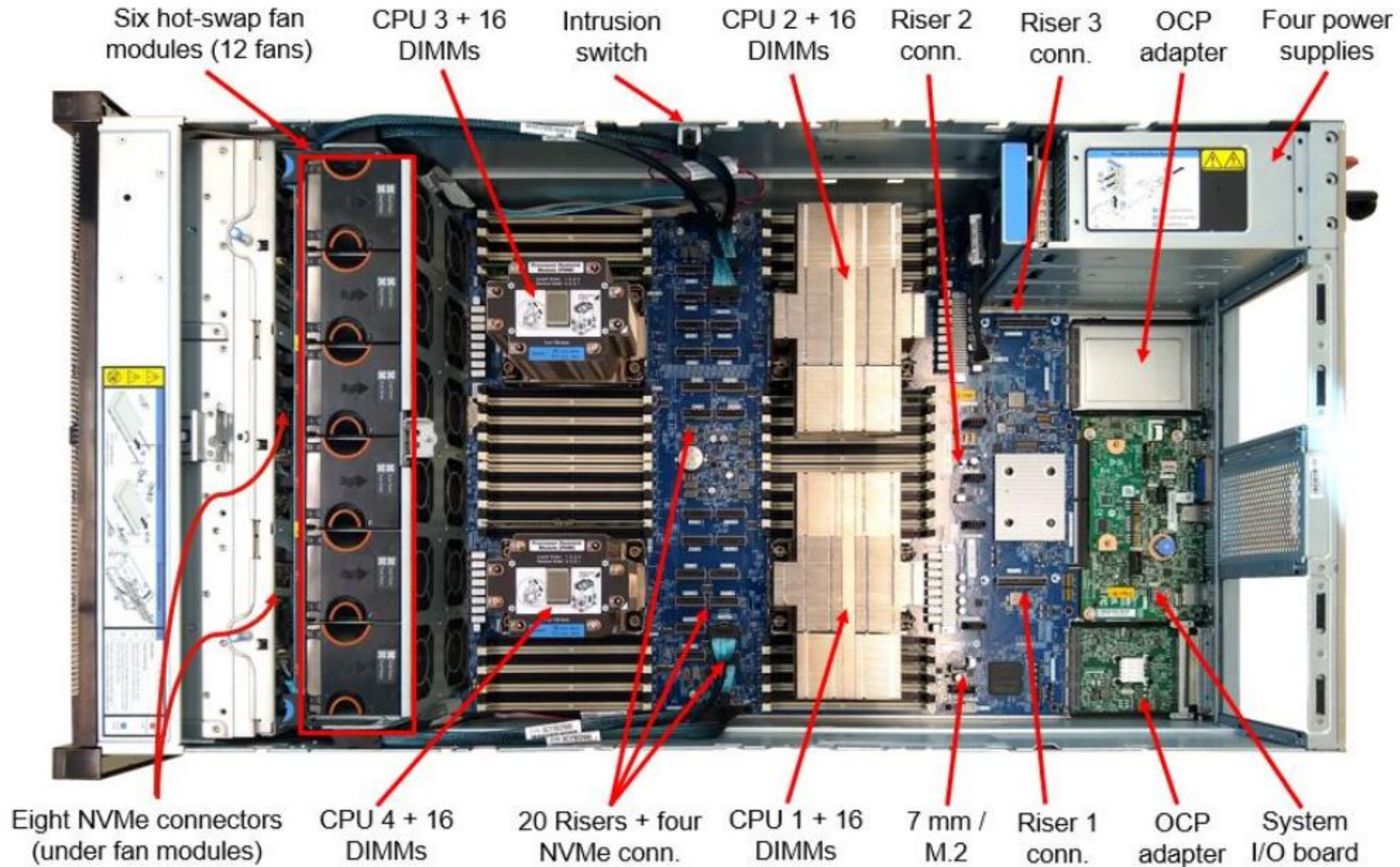
## SR860 V3 rear view

Other rear configurations will be shown in the System configurations and diagrams section.

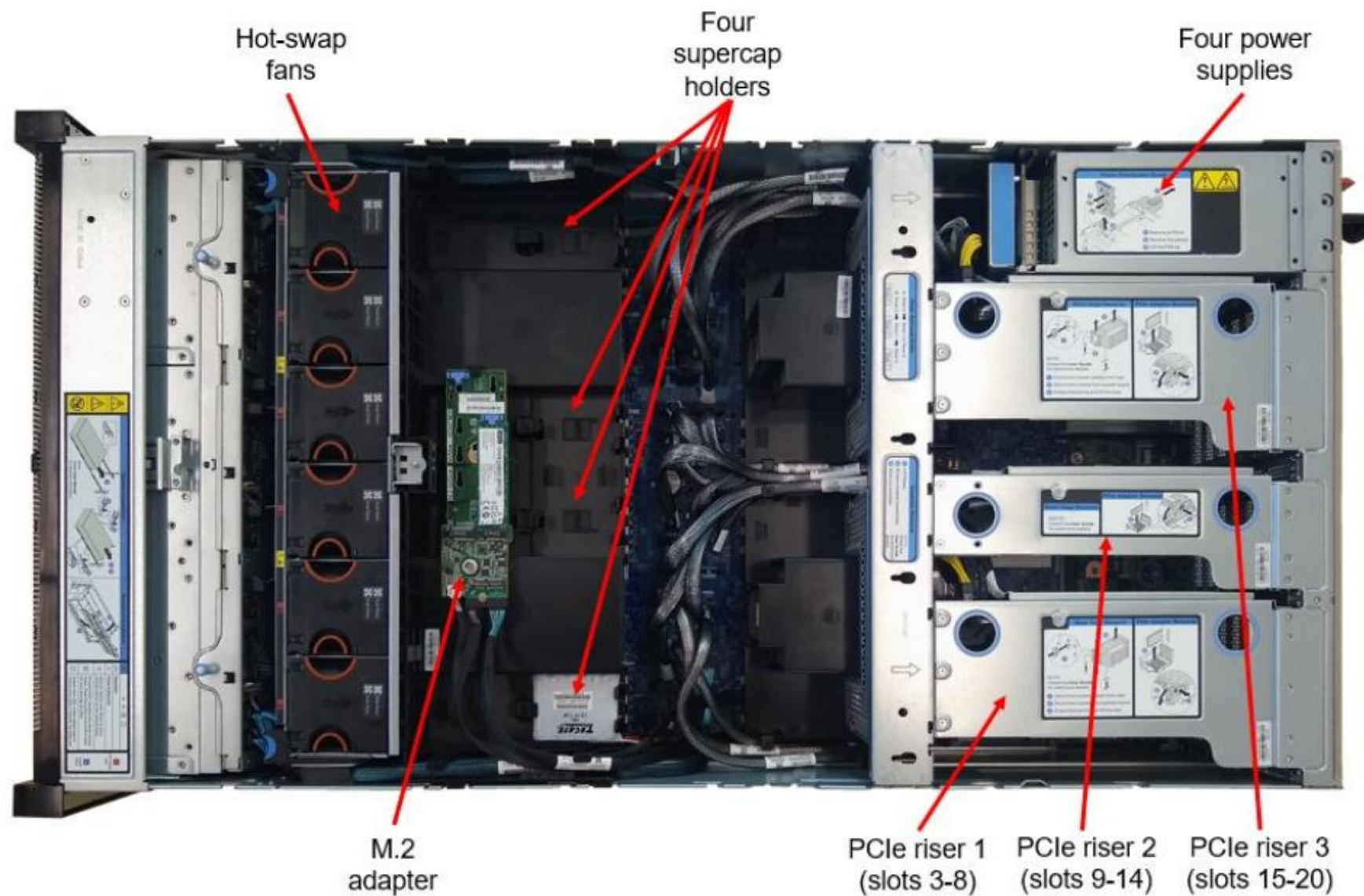




# SR860 V3 inside view -1



## SR860 V3 inside view -2





## SR860 V3 fans

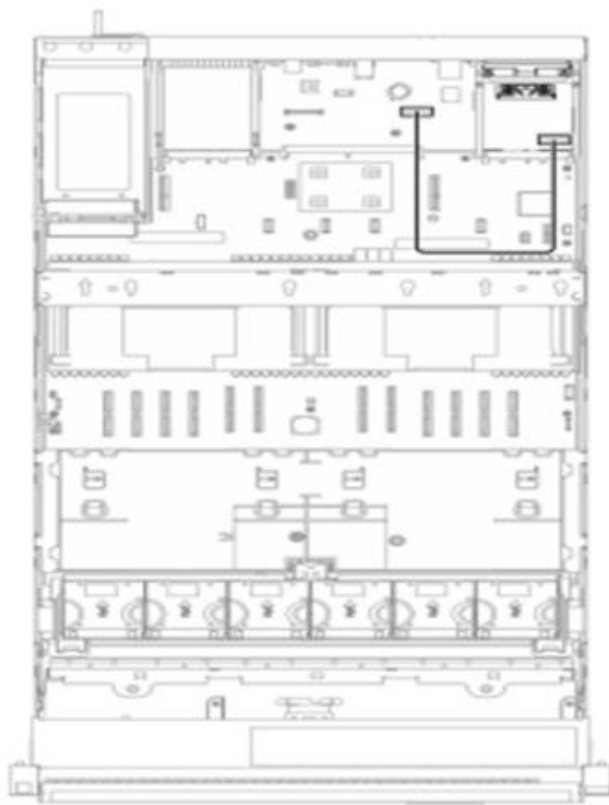
The server has twelve 60 mm, hot-swap, dual-rotor, variable-speed fans installed in six modules in vertical bays. To service fan modules, they should be removed from the top of the unit.

The server supports operational N+1 redundancy. It also supports the temporary removal of two fans to allow for fan replacement.



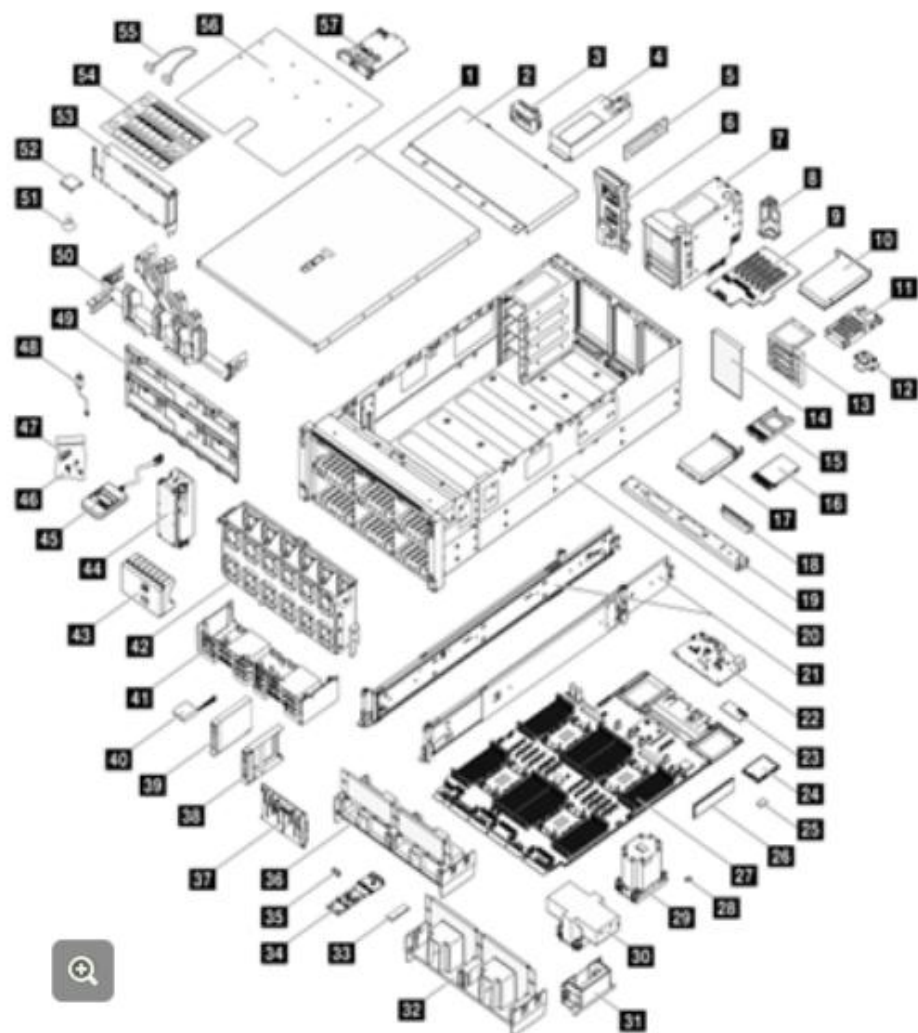
## SR860 V3 system management NIC adapter

The system management NIC adapter can be installed in OCP slot 1 in place of the OCP module, and it functions as a redundant XCC system management port (1 GB RJ-45). The cable routing for the system management NIC adapter means it is connected to the second management Ethernet connector on the system board.





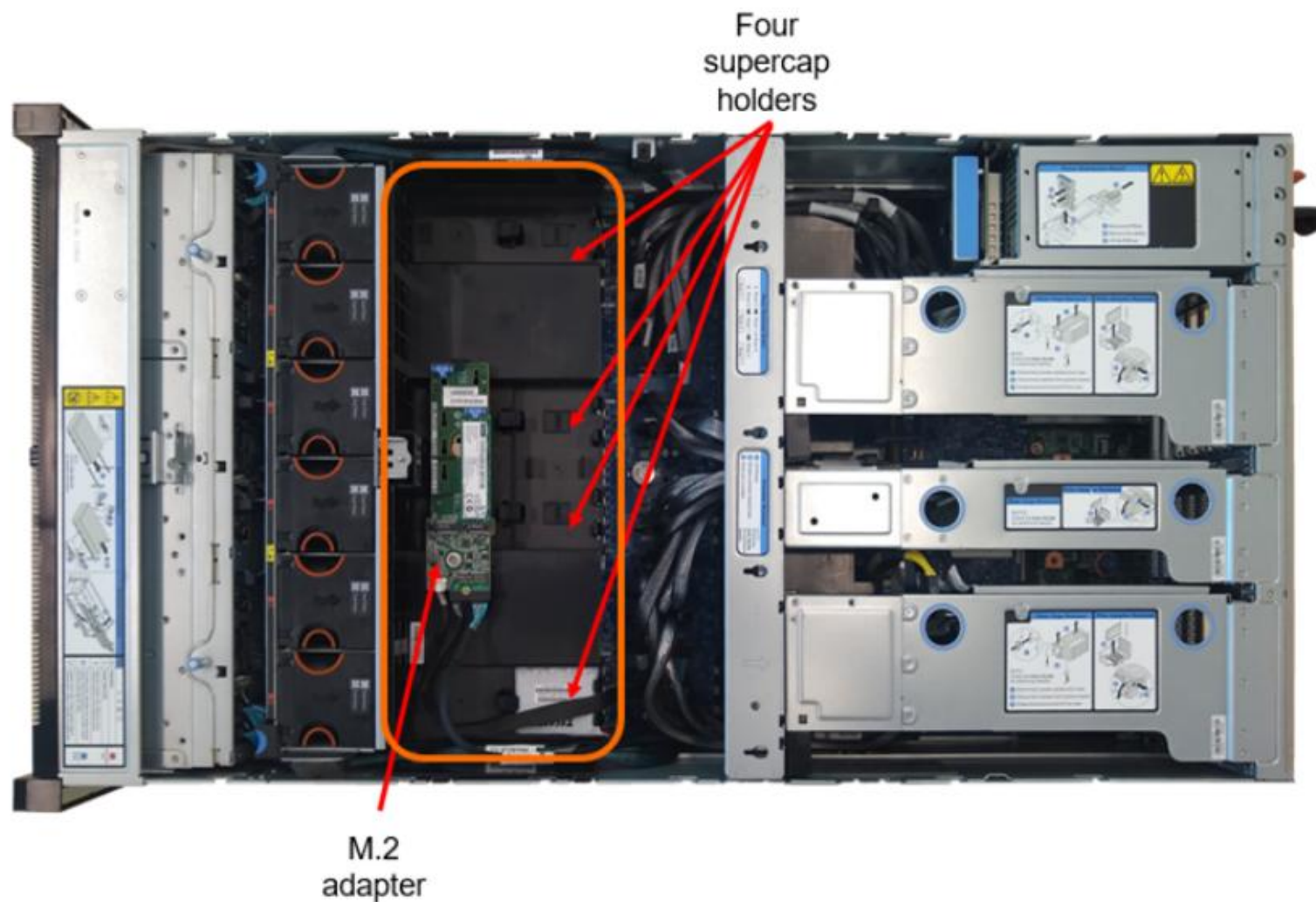
# System components



1 Front top cover	30 2U performance heat sink and processor carrier
2 Rear top cover	31 Lift handles
3 Power supply unit filler	32 Air baffle (rear, 3U standard PHM)
4 Power supply unit	33 M.2 drive
5 Power supply bracket (CRPS)	34 M.2 boot adapter
6 Power backplane	35 M.2 drive retainer
7 PCIe riser cage	36 Air baffle (rear, 2U performance PHM)
8 PCIe riser cable retainer	37 2.5-inch drive backplane
9 PCIe riser card	38 2.5-inch drive filler (1-bay)
10 PCIe adapter	39 2.5-inch hot-swap drive
11 7mm drive cage	40 Flash power module
12 7mm drive backplane	41 Air baffle (front)
13 PCIe riser extender	42 Fan cage
14 PCIe riser cage filler	43 2.5-inch drive filler (8-bay)
15 7 mm drive filler	44 Fan module
16 7 mm drive	45 External diagnostics handset
17 OCP module	46 Mechanical parts kit (power supply key, serial port filler, and screws)
18 OCP slot filler	47 Power supply key (CFFv4)
19 Crossbar	48 Intrusion switch
20 Chassis	49 Drive backplane carrier
21 Slide rail kit	50 Cable management arm
22 System I/O board	51 Suction cup
23 Firmware and RoT security module	52 GPU adapter link bridge
24 Processor	53 Full-length GPU adapter
25 MicroSD card	54 Labels kit (PCIe riser cables)
26 Memory module	55 Cable
27 Processor board	56 System service label
28 CMOS battery (CR2032)	57 System management NIC adapter
29 3U standard heat sink and processor carrier	

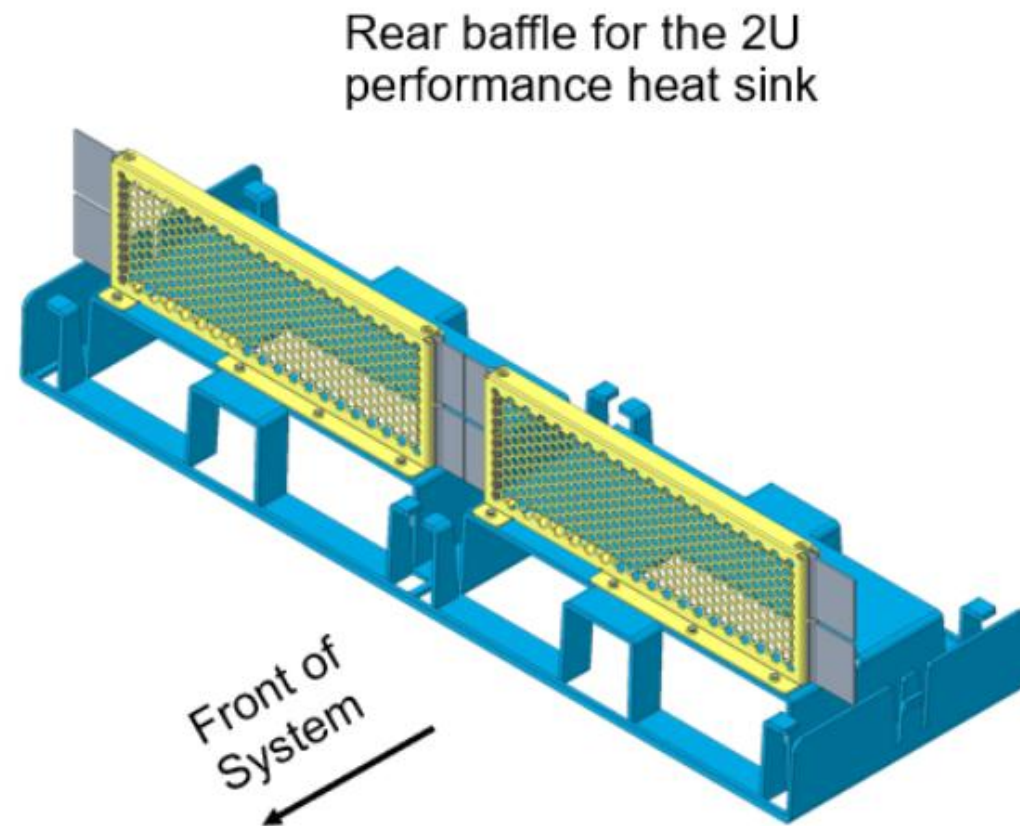
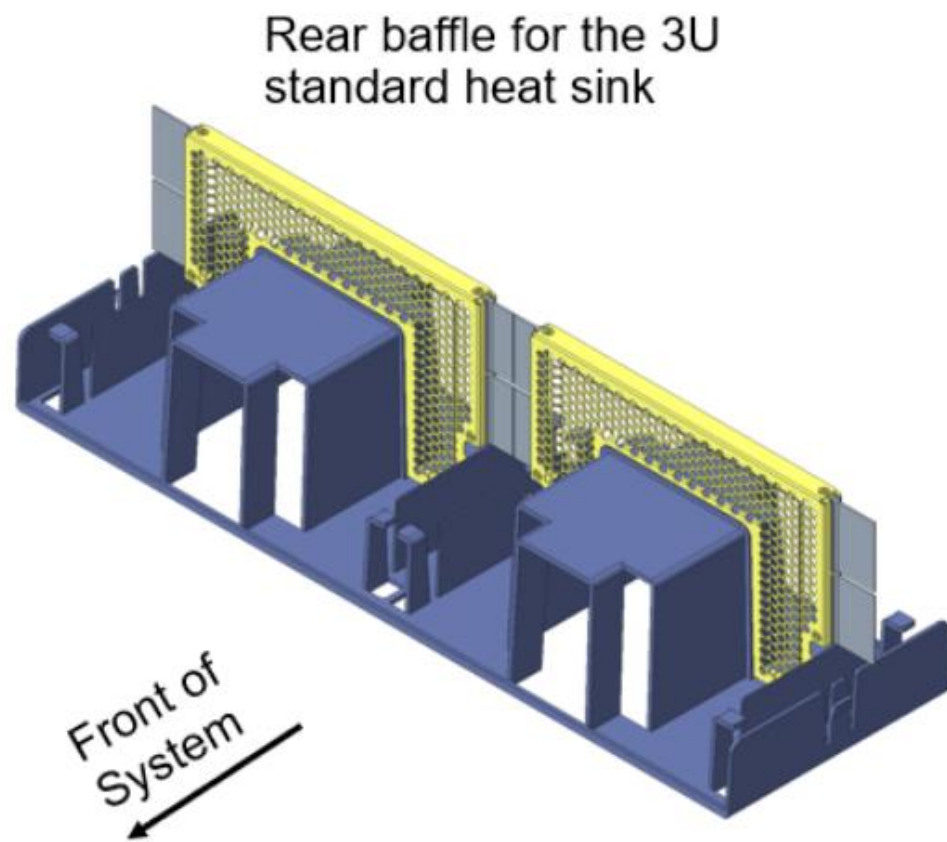
## Front baffle

The SR860 V3 front CPU/DIMM baffle assembly supports an M.2 adapter and four RAID adapter flash modules.



## Rear baffle

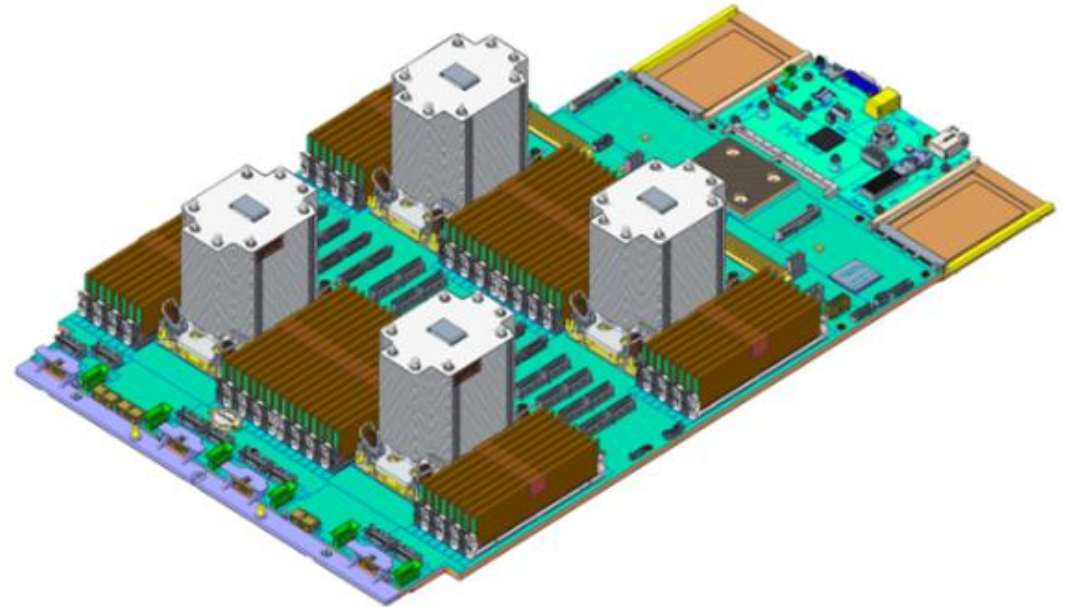
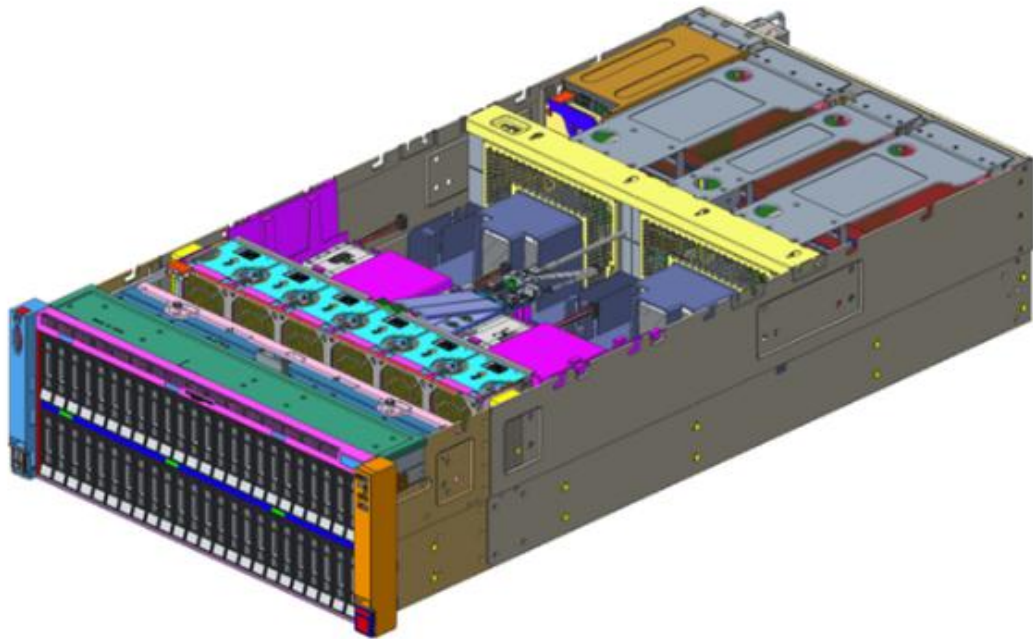
The SR860 V3 supports two types of rear baffle, which should be used according to the installed rear processors and heat sink.





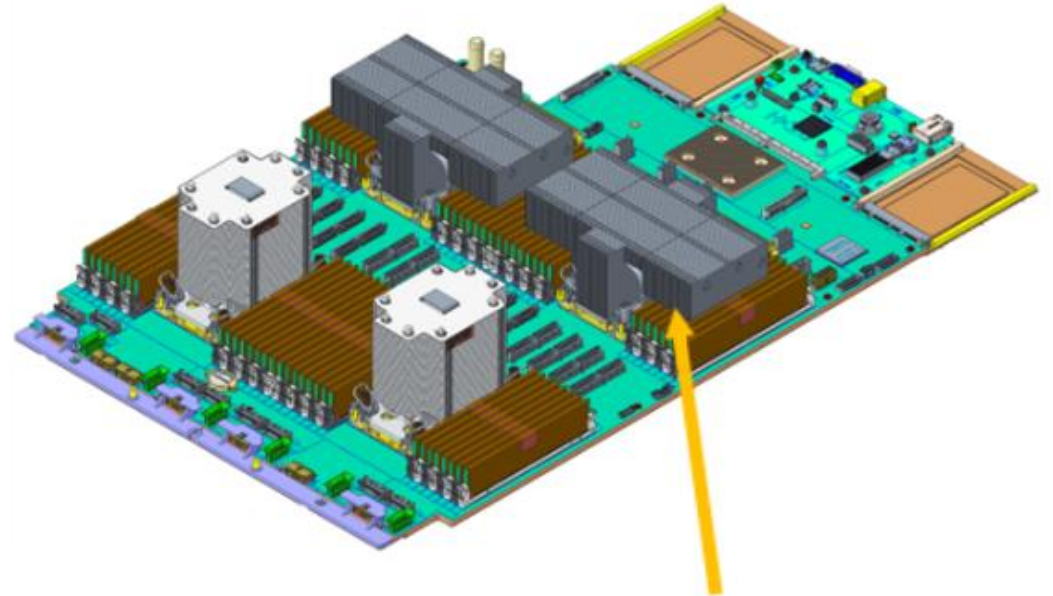
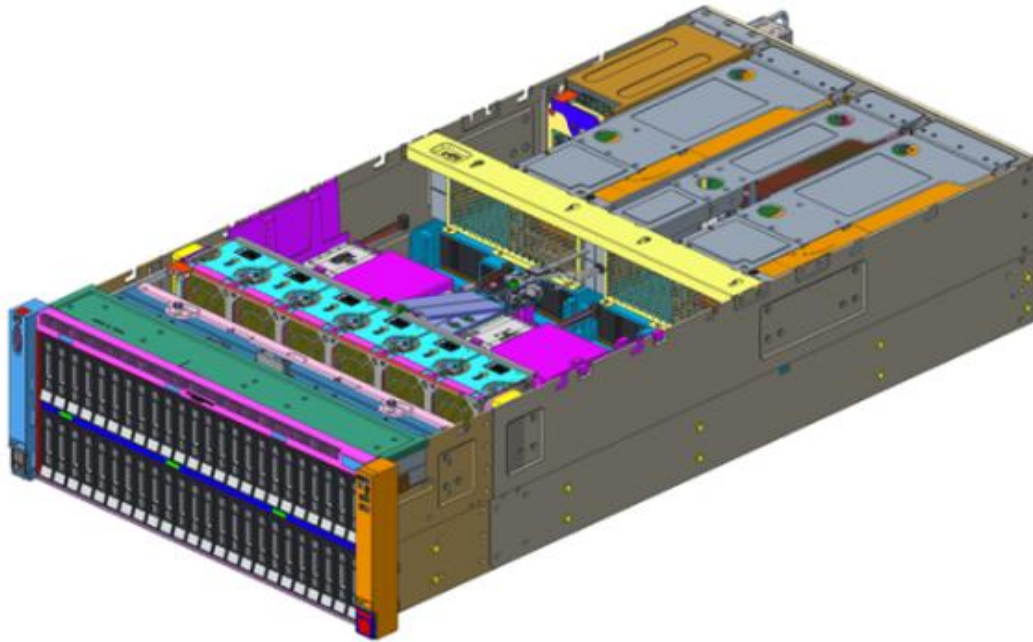
## SR860 V3 with rear 3U standard heat sinks

- Support for half-length PCIe cards only
- No support for the field kit to change from half-length to full-length PCIe riser
- Thermal configuration limitations require a 3U rear baffle



## SR860 V3 with rear 2U performance heat sinks

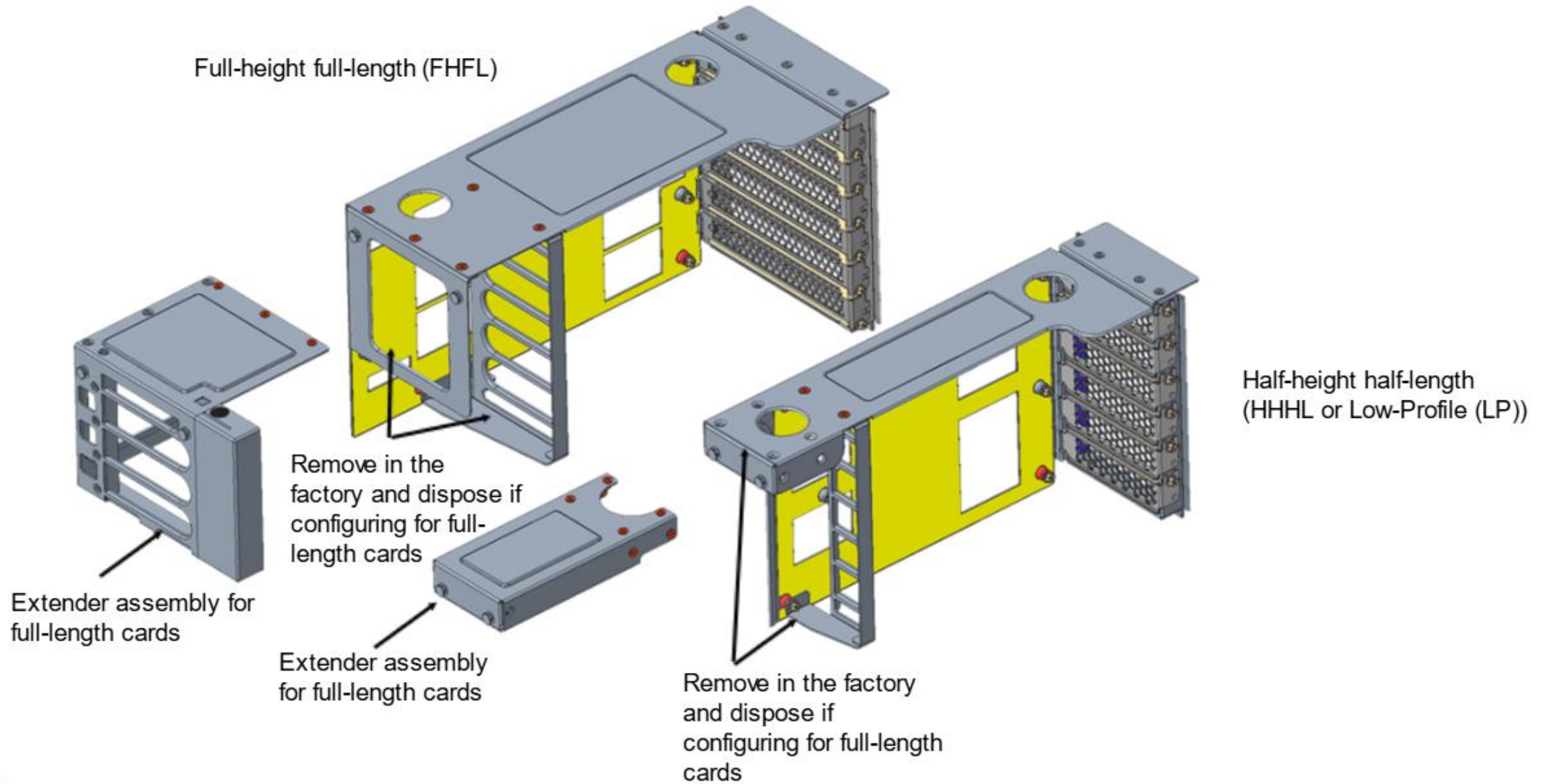
- Support for full-length and half-length PCIe cards
- No support for the field kit to change from full-length to half-length PCIe riser cages
- Thermal configuration limitations require a unique 2U rear baffle



DIMM service limitation with a 2U performance PHM



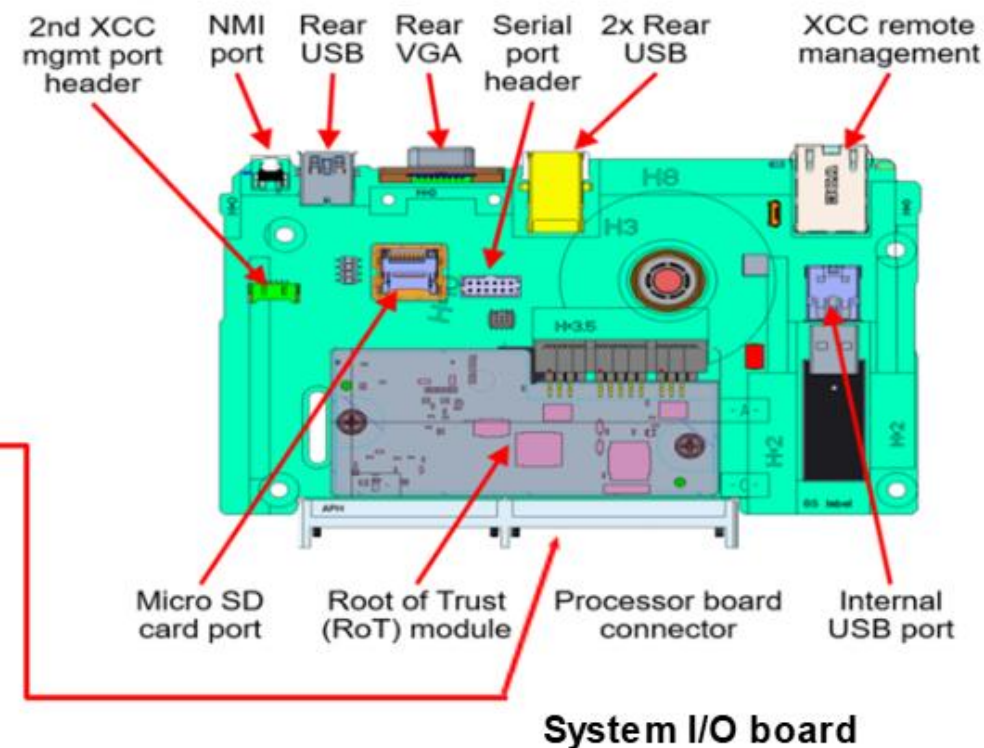
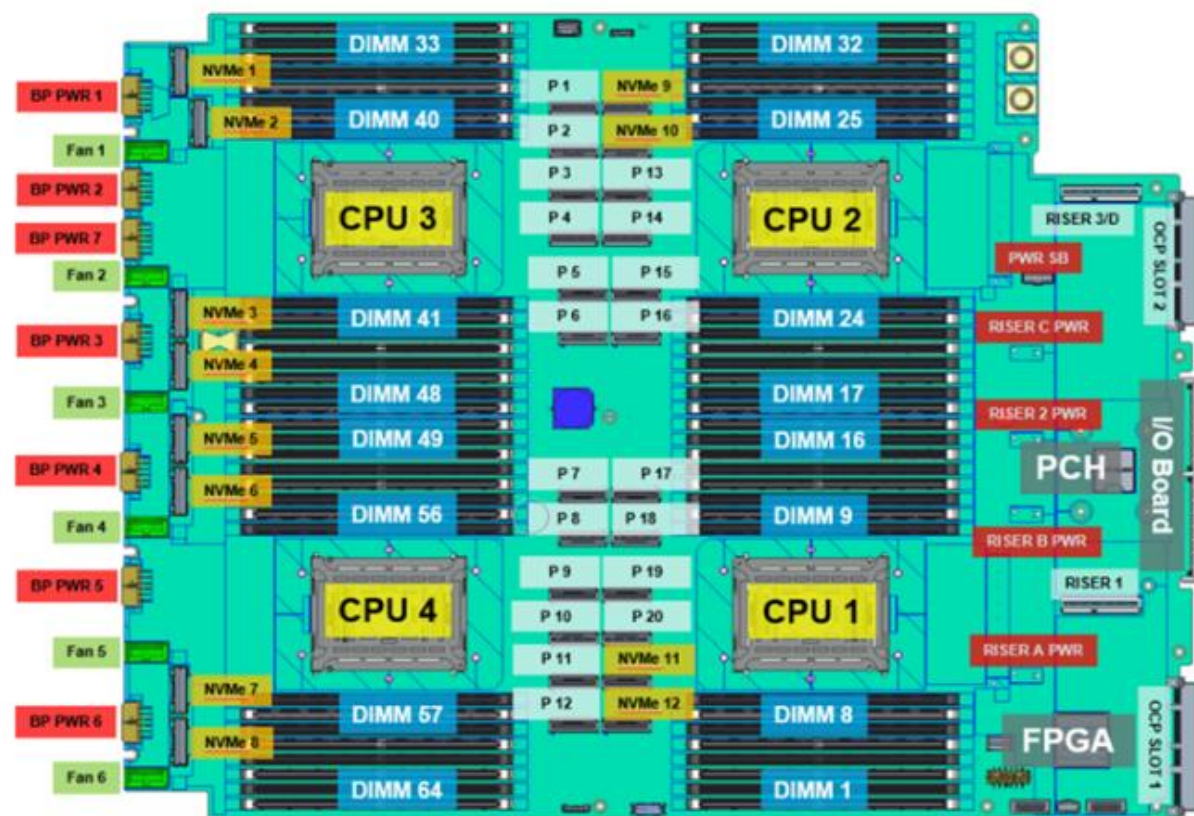
# PCIe riser cages





# SR860 V3 processor and I/O board connectors

## Processor board



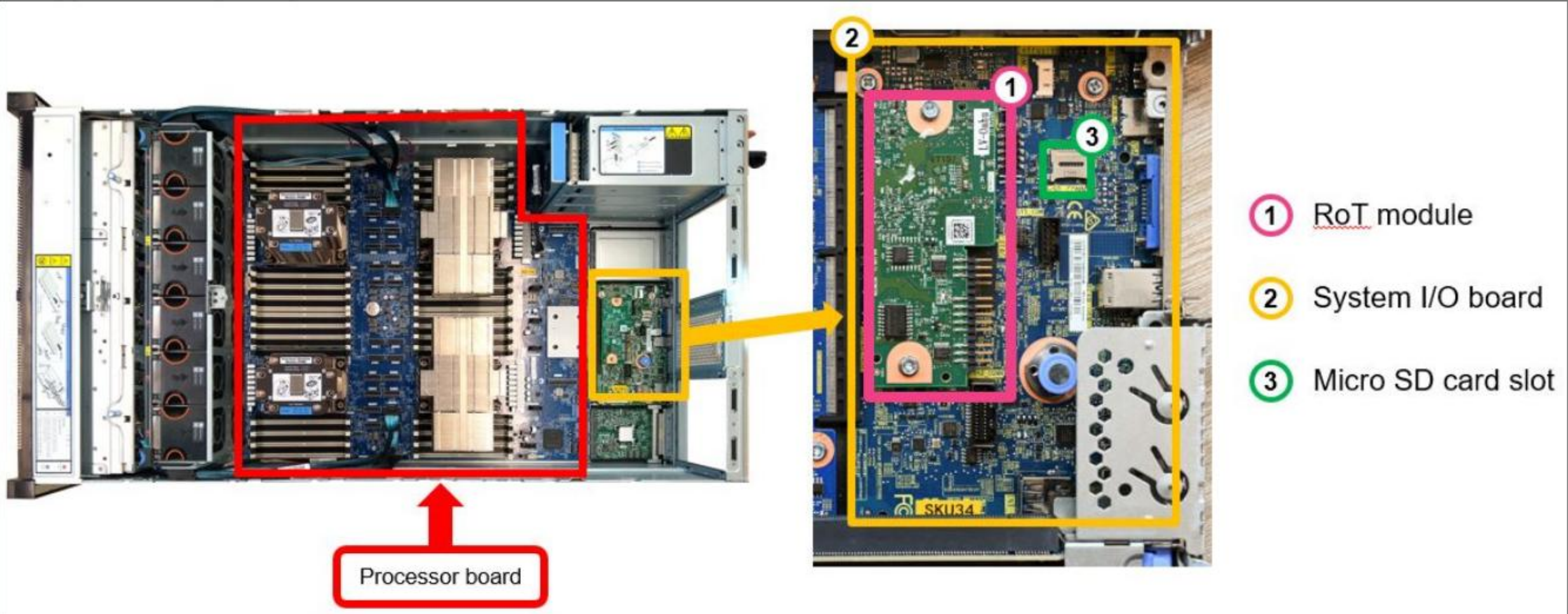
## BMC I/O board and RoT module

- The SR860 V3 system board has three components
- Processor board
  - A board containing CPU sockets, PCIe slots, memory slots, and other server component connectors
- System I/O board
  - A board containing the system BMC (XCC2) management port, USB ports, and a VGA connector
  - A Micro SD card slot to extend XCC2 storage space for the backup of firmware and for remote console virtual media
- Firmware and Root of Trust security module (RoT module)
  - A mezzanine card containing the Trusted Platform Module (TPM), UEFI firmware, XCC2 firmware, and a silicon Root of Trust
- Click [HERE](#) to see the processor board, BMC I/O board, and RoT module locations



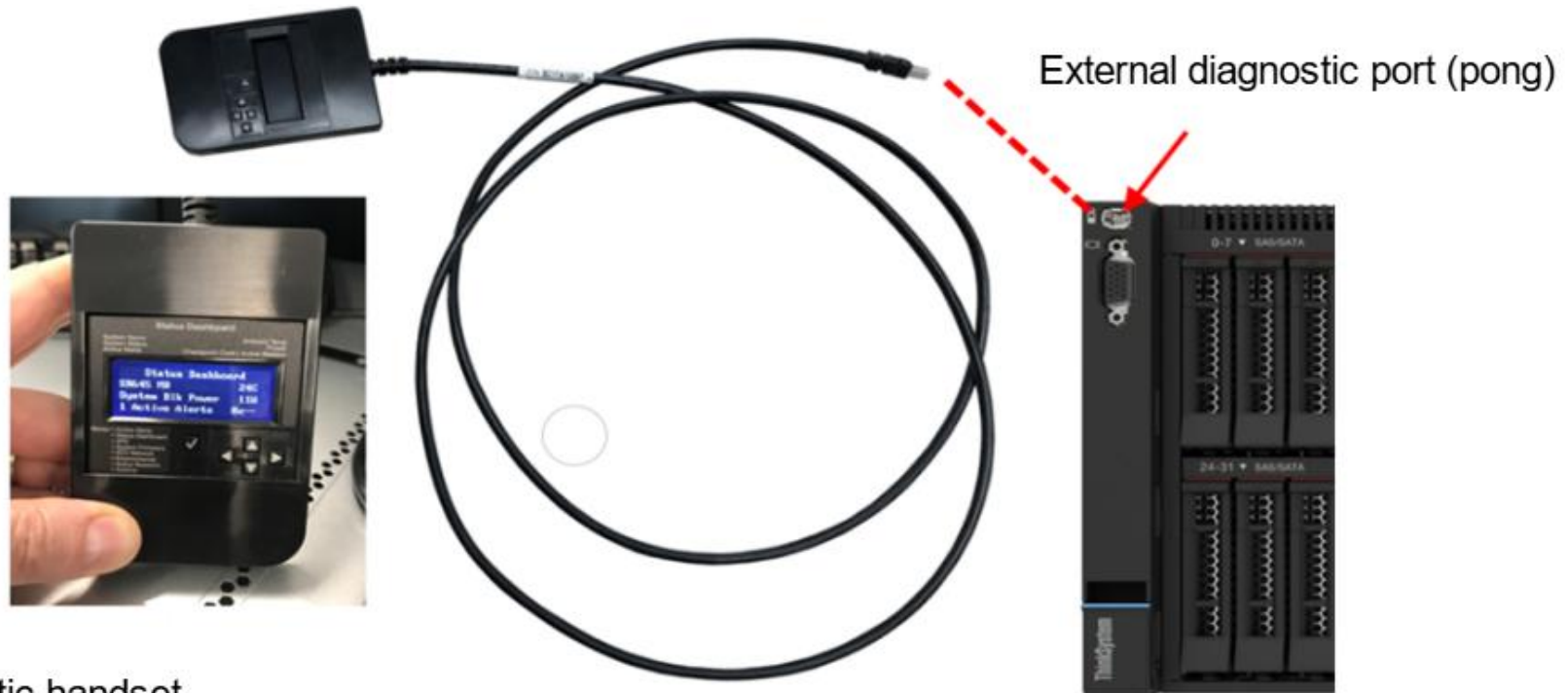
# BMC I/O board and RoT module

- The SR860 V3 system board has three components



## LCD diagnostic panel

The SR860 V3 supports the external and integrated LCD diagnostic panels. Either of the panels can be used to quickly access system information, such as active errors, system health status, firmware version, network connection status, and health information. A demo video is available on the course landing page.



External diagnostic handset

## SR860 V3 system features -1

- All supported processors have the following characteristics:
  - Eight DDR5 memory channels at two DIMMs per channel
  - Up to three UPI links between processors at 16 GT/s
  - 80 PCIe 5.0 I/O lanes
- Support for combinations of up to 48 2.5-inch drive bays – SAS or SATA HDDs or SSDs, and up to 24 NVMe Gen4 or Gen5 SSDs
- The SR860 V3 can be used with only two processors installed, and most core server functions (including XCC) are connected to processors 1 and 2. With two processors, the server has the following capabilities:
  - 32 memory DIMMs for a maximum of 8 TB
  - Riser 1: slots 3, 6, and 8
  - Riser 2: slots 11 and 14
  - Riser 3: slots 15, 18, and 20
  - Only two DW GPUs or four SW GPUs
  - Up to eight NVMe drives



## SR860 V3 system features -2

- Support for up to 64 TruDDR5 memory DIMMs operating at up to 4800 MHz, providing the fastest available memory subsystem and a memory capacity of up to 16 TB with sixty-four 256 GB 3DS RDIMMs.
- The use of double-width GPUs requires the lower-height, winged heat sink for the rear processors. These heat sinks limit the processors to a TDP of 270 W or less.
- The server also supports internal M.2 drives (one or two, installed in an adapter), or rear-accessible hot-swap 7 mm SSDs (installed in a PCIe slot).
- Support for VROC to enable RAID-1 support on M.2 or 7 mm drives for enhanced data protection of boot drives.
- M.2 and 7 mm drives are not supported together in the same configuration.
- Installed power supplies must have identical wattage. For CRPS power supplies, part numbers cannot be mixed.