System configurations and diagrams

System block diagram and hardware configurations

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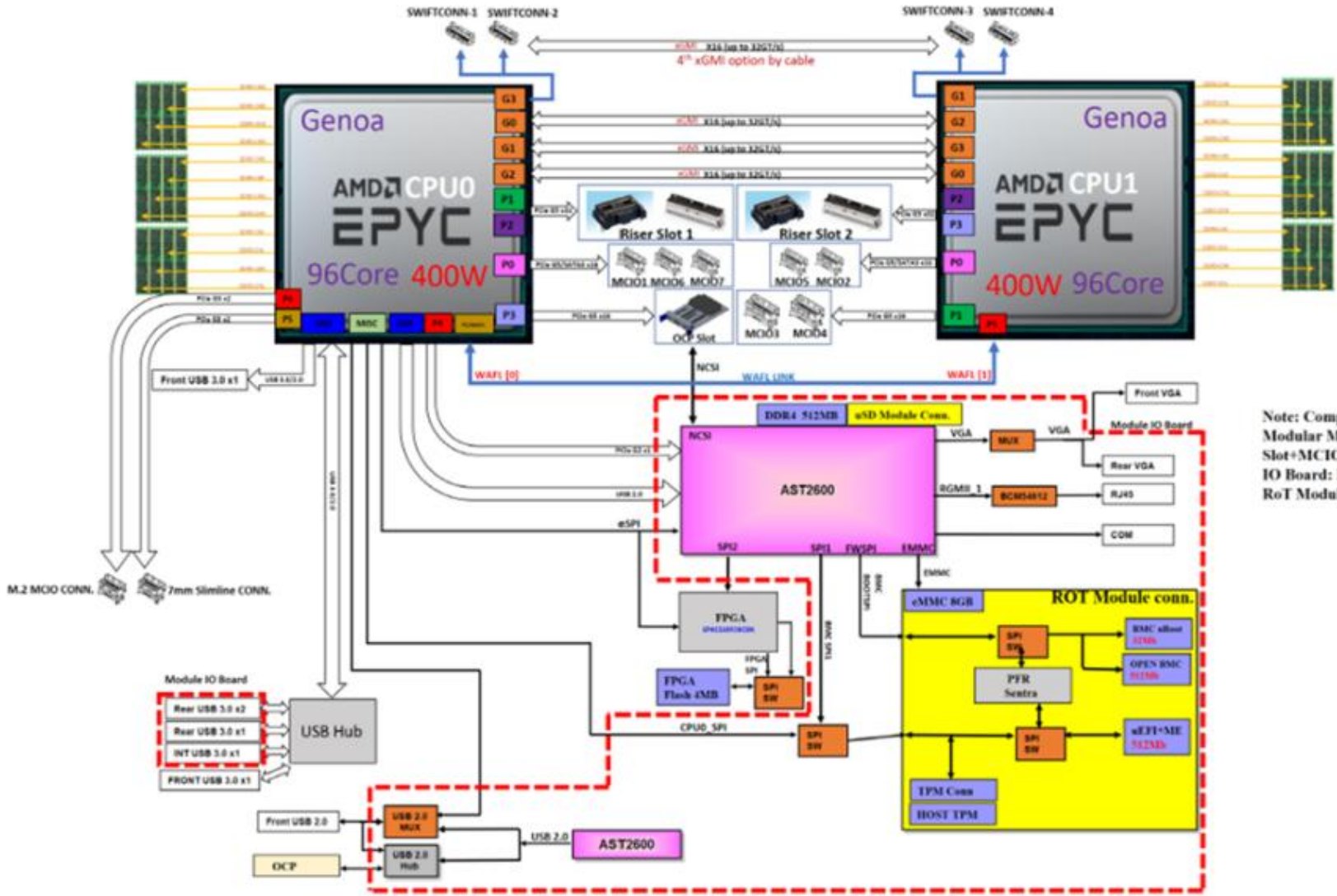
SR665 V3 system block diagram



Note: Complete MB include 3 separate boards
Modular MB: CPU+DIMM+PCH+FPGA+Riser Slot+MCIO+OCP
IO Board: BMC+Rear IO
RoT Module: PFR+eMMC+UEFI/BMC ROM+TPM

Drive bay configurations

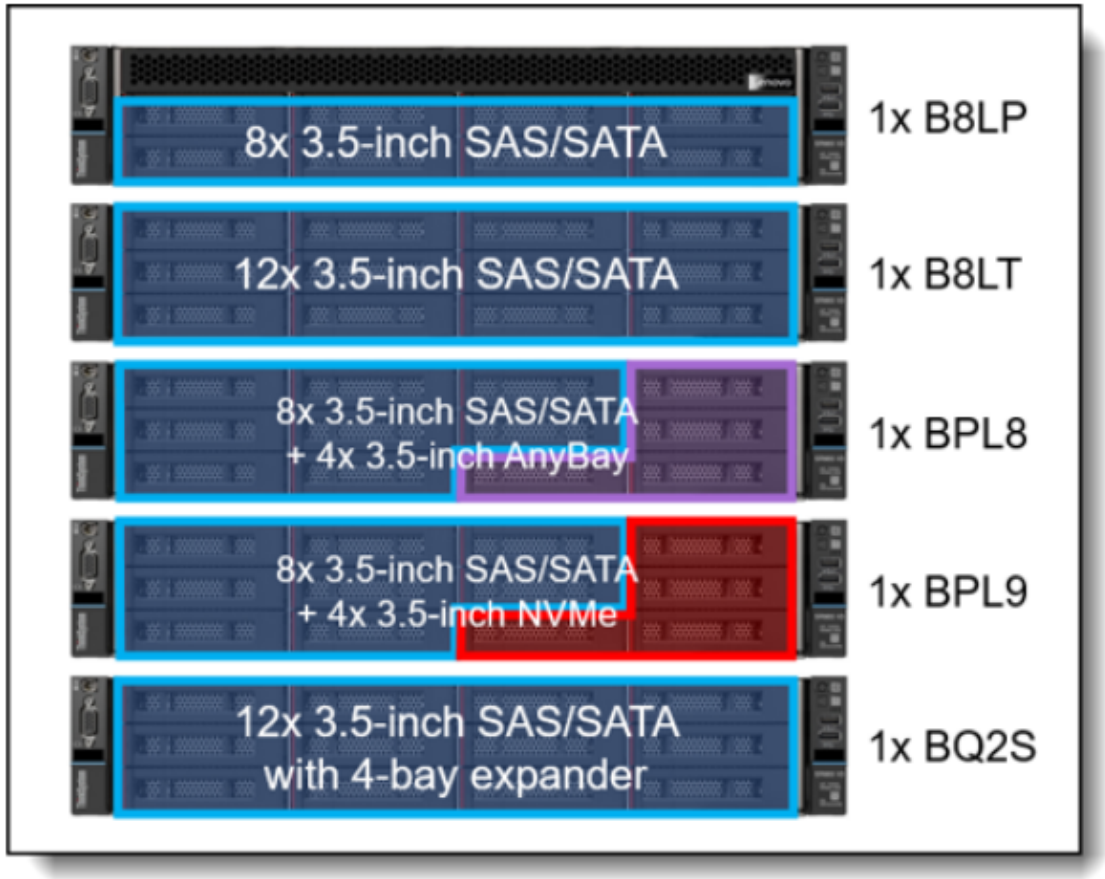
The SR665 V3 has three drive bay zones and supports up to 20 3.5-inch hot-swap drive bays or 40 2.5-inch hot-swap drive bays. A combination of drive bays is also possible depending on the selected chassis and backplane configuration. The server also supports configurations with zero drive bays.
The three drive bay zones are as follows:

- Front:
  - Up to 12 3.5-inch hot-swap bays
  - Up to 24 2.5-inch hot-swap bays
- Middle:
  - Four 3.5-inch hot-swap bays
  - Eight 2.5-inch hot-swap bays
- Rear:
  - Up to four 3.5-inch hot-swap bays
  - Up to eight 2.5-inch hot-swap bays
  - Two 7 mm hot-swap drives bays
- The M.2 SATA and M.2 NVMe drives support RAID 0 and RAID 1 – use a 5350 8i RAID adapter for SATA drives or a 540 8i RAID adapter for NVMe drives
- The 2.5-inch and 3.5-inch NVMe drives do not support RAID

Front 3.5-inch drive bay configurations

The following front 3.5-inch drive bay configurations are supported:

- Eight 3.5-inch SAS/SATA bays
- 12 3.5-inch SAS/SATA bays
- Eight 3.5-inch SAS/SATA with four 3.5-inch AnyBay bays
- Eight 3.5-inch SAS/SATA with four 3.5-inch NVMe bays

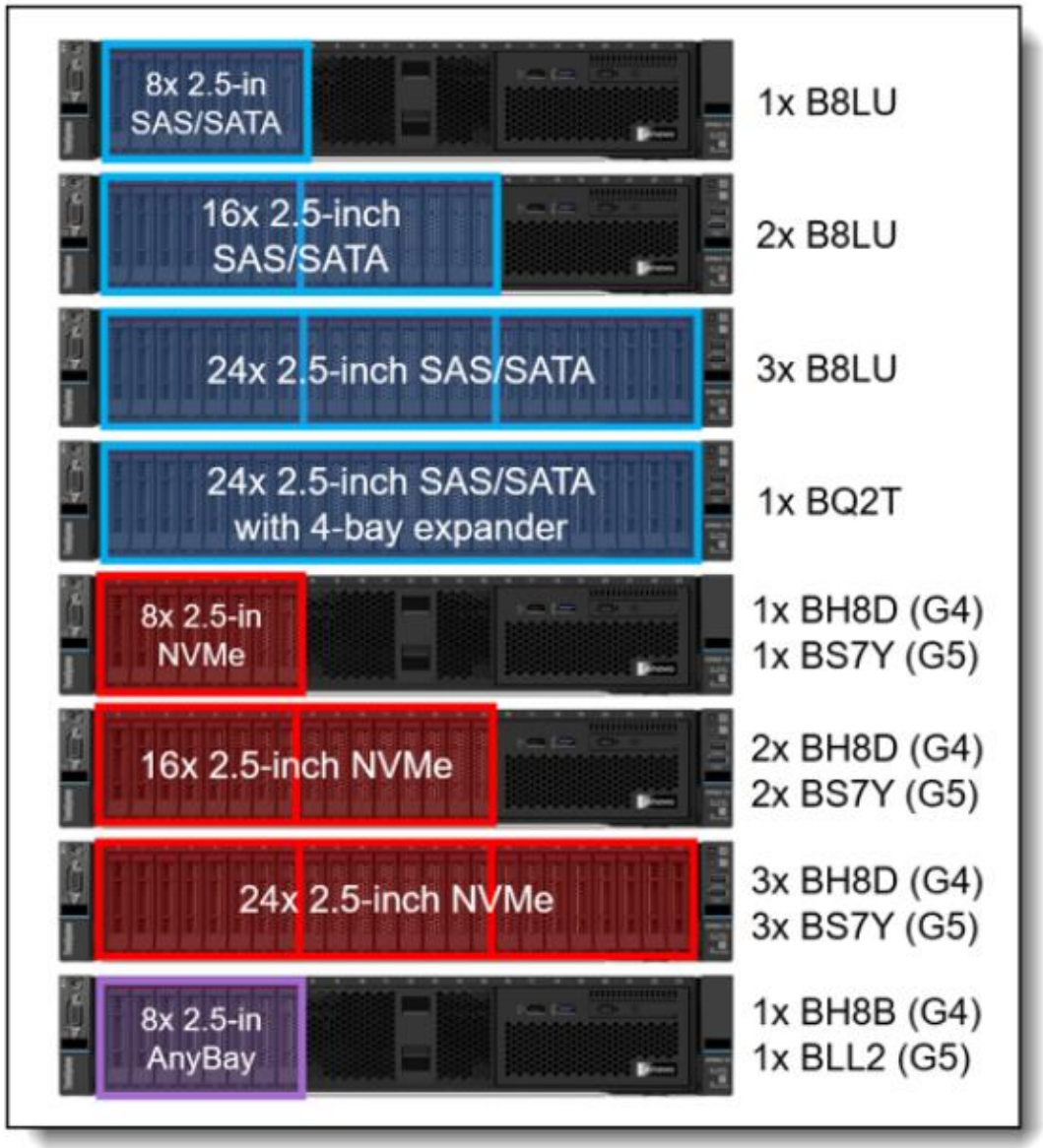


Note: All drives are hot-swappable.

Front 2.5-inch drive bay configurations – same drive types

The following front 2.5-inch drive bay configurations are supported:

- Eight SAS/SATA bays
- 16 SAS/SATA bays
- 24 SAS/SATA bays
- 24 SAS/SATA bays with an attached SAS expander for four additional bays
- 16 NVMe bays
- 24 NVMe bays
- Eight AnyBay bays

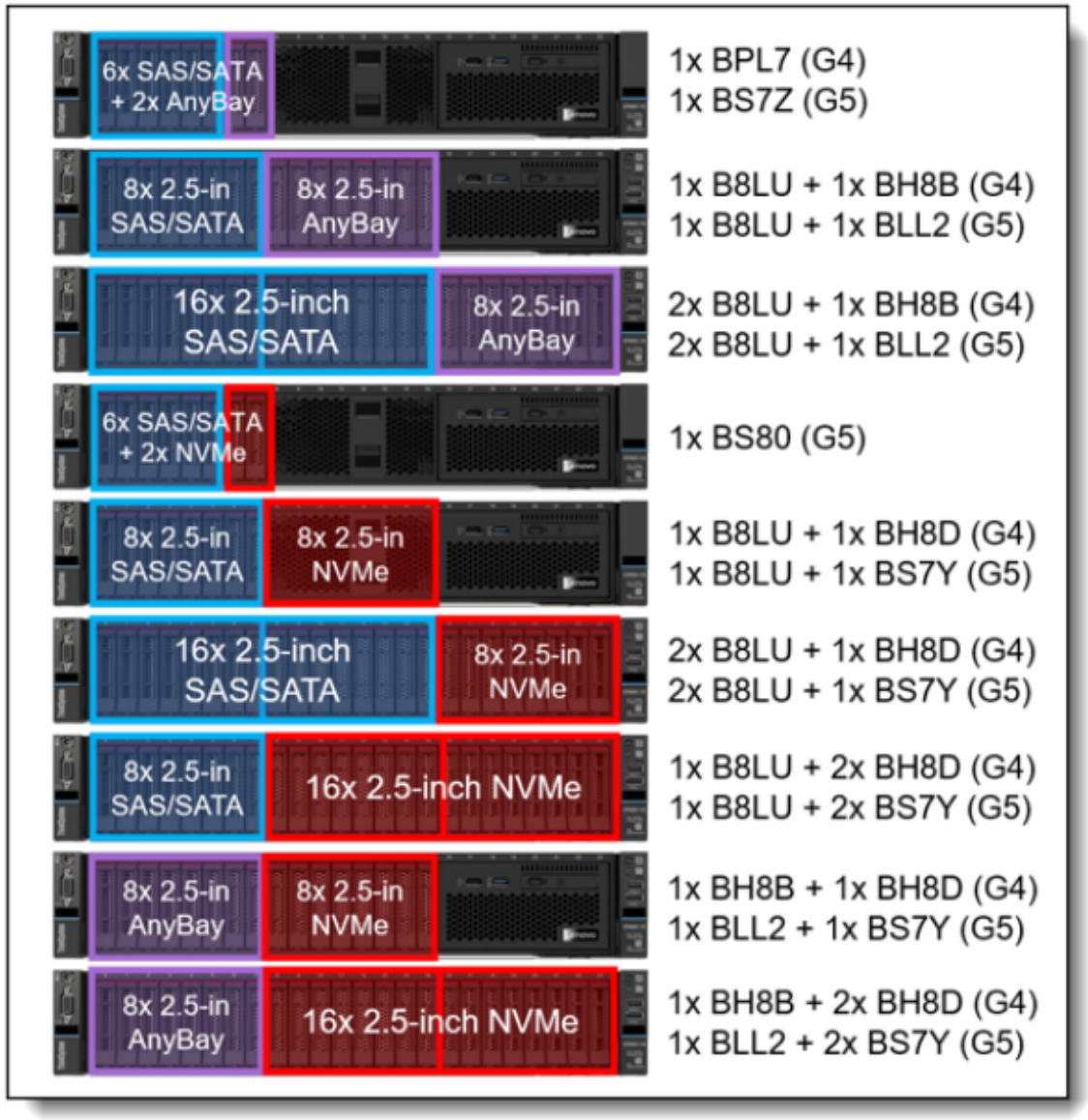


Note: All drives are hot-swappable.

Front 2.5-inch drive bay configurations - combinations

The following front 2.5-inch drive bay configurations are supported:

- Six SAS/SATA bays with two AnyBay bays
- Eight SAS/SATA bays with eight AnyBay bays
- 16 SAS/SATA bays with eight AnyBay bays
- Six SAS/SATA bays with two NVMe bays
- Eight SAS/SATA bays with eight NVMe bays
- 16 SAS/SATA bays with eight NVMe bays
- Eight SAS/SATA bays with 16 NVMe bays
- Eight AnyBay bays with eight NVMe bays
- Eight AnyBay bays with 16 NVMe bays

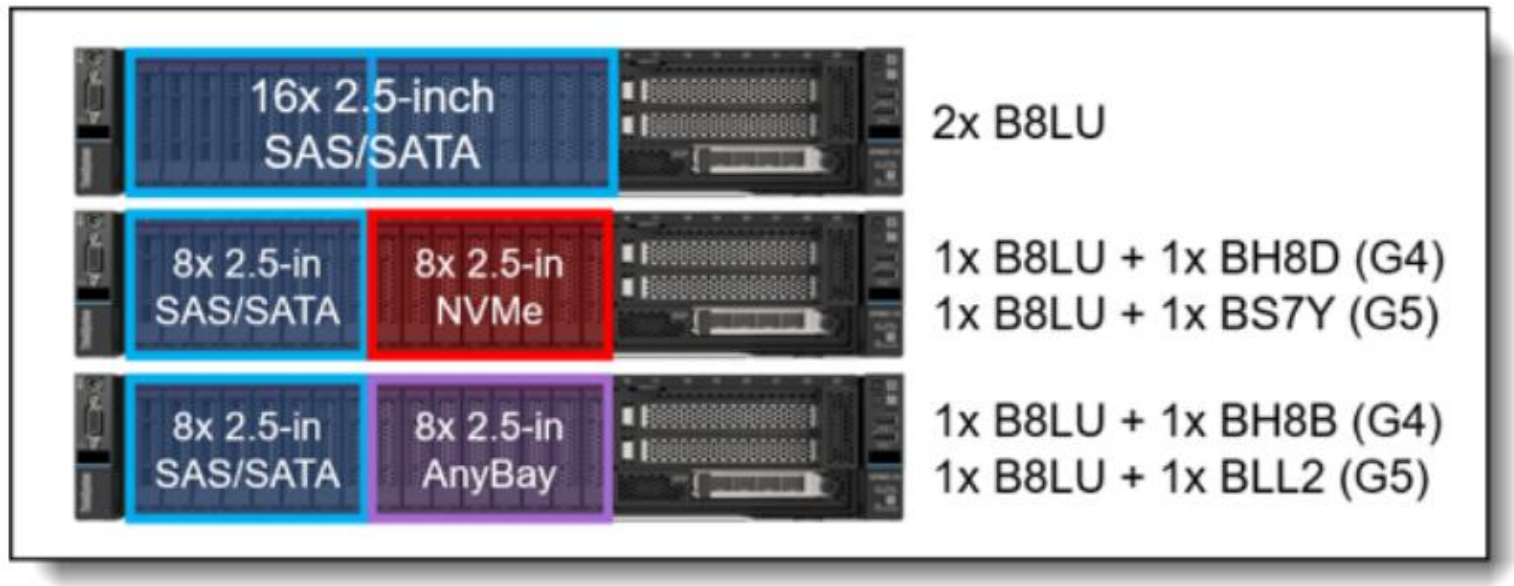


Note: All drives are hot-swappable.

Front 2.5-inch drive bay configurations - with front PCIe slots

The following configurations for front 2.5-inch drive bays that support PCIe slots are supported:

- 16 SAS/SATA bays
- Eight SAS/SATA bays with eight NVMe bays
- Eight SAS/SATA bays with eight AnyBay bays



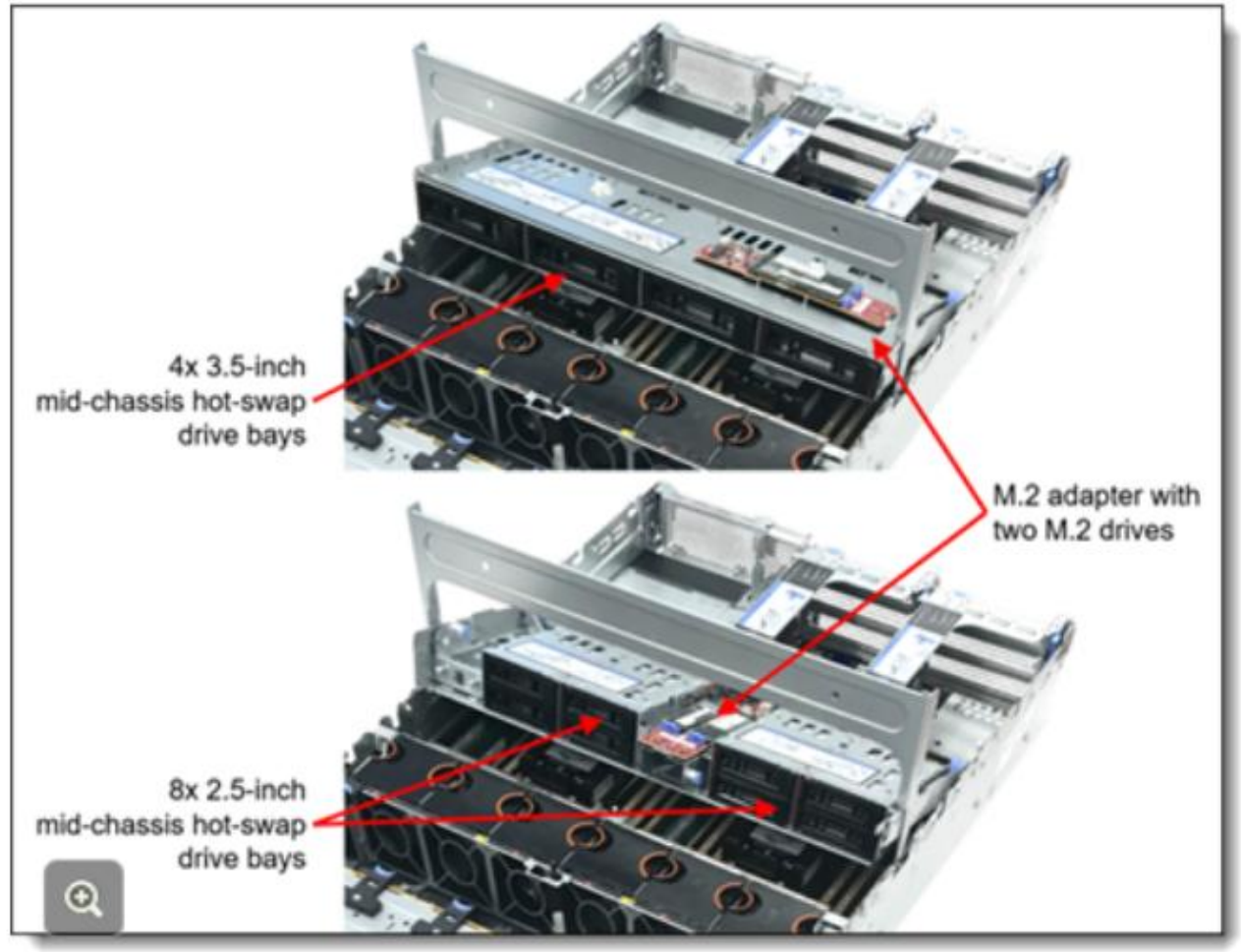
Note: All drives are hot-swappable.

Note: Support for front PCIe slots is planned in Q2 2023.

Middle drive bay configurations - with M.2 adapters

The following middle drive bay configurations are supported:

- Four 3.5-inch SAS/SATA bays
- Eight 2.5-inch SAS/SATA bays
- Eight 2.5-inch NVMe bays



Note: All drives are hot-swappable.

Note: When middle drive bays are configured, M.2 adapters are installed on the middle drive bay.

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Rear drive bay configurations

The following rear drive bay configurations are supported:

- 3.5-inch drive bays
  - Two SAS/SATA bays
  - Four SAS/SATA bays
- 2.5-inch drive bays
  - Four SAS/SATA bays
  - Four AnyBay bays
  - Eight SAS/SATA bays

Two 3.5-inch SAS/SATA drives

Four 3.5-inch SAS/SATA drives

Eight 2.5-inch SAS/SATA drives

Four 2.5-inch SAS/SATA drives

Note: All drives are hot-swappable.

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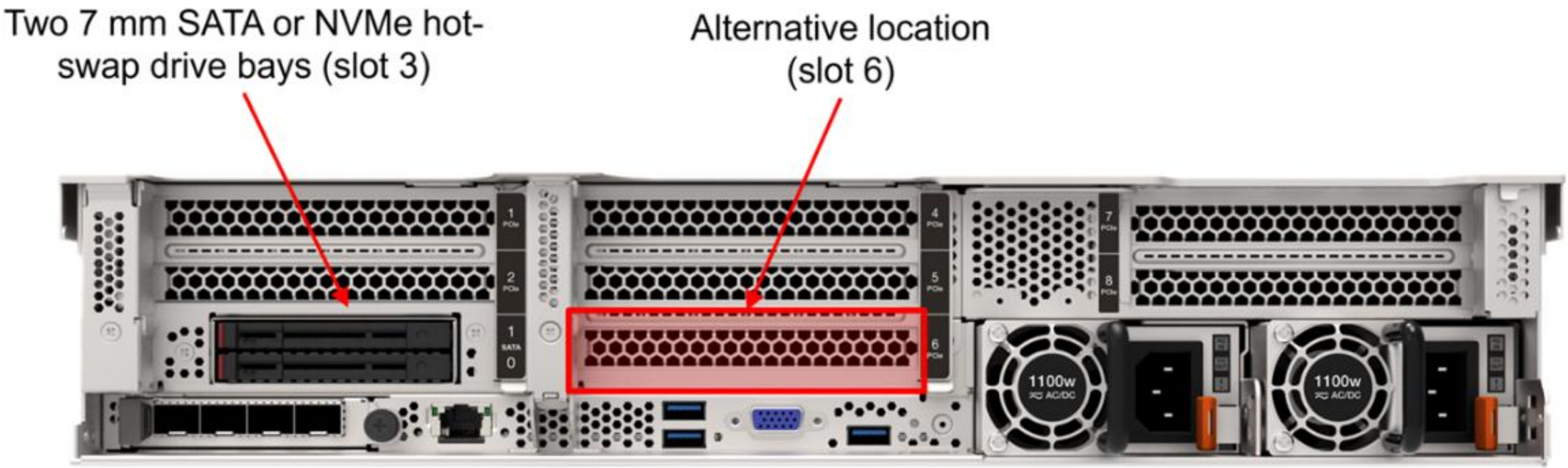
Rear 7 mm SATA or NVMe drive bay configurations

The SR665 V3 supports two 7 mm drives installed in either slot 3 or slot 6.

- Two 7 mm SATA hot-swap drive bays (RAID support requires the 5350-8i RAID adapter)
- Two 7 mm NVMe hot-swap drive bays (RAID support requires the 540-8i RAID adapter)



I/O expansion slot configuration – eight PCIe slots

The SR665 V3 can be installed with three riser cards to support up to eight full-height full-length (FHFL) form factor PCIe 4.0 slots and a dedicated OCP 3.0 SFF slot for networking. To use slots 4 to 6, both processors must be installed.

- Riser 1: slots 1, 2, and 3 (connect to CPU 1)
- Riser 2: slots 4, 5, and 6 (connect to CPU 2)
- Riser 3: slot 7 and slot 8
  - With 2 CPUs installed, slot 7 connects to CPU 1 and slot 8 to CPU 2
  - With 1 CPU installed, slots 7 and 8 both connect to CPU 1

Note: The PCIe slots can be combined with 7 mm drives, but the number of available slots will be reduced.

I/O expansion slot configuration – 10 PCIe slots

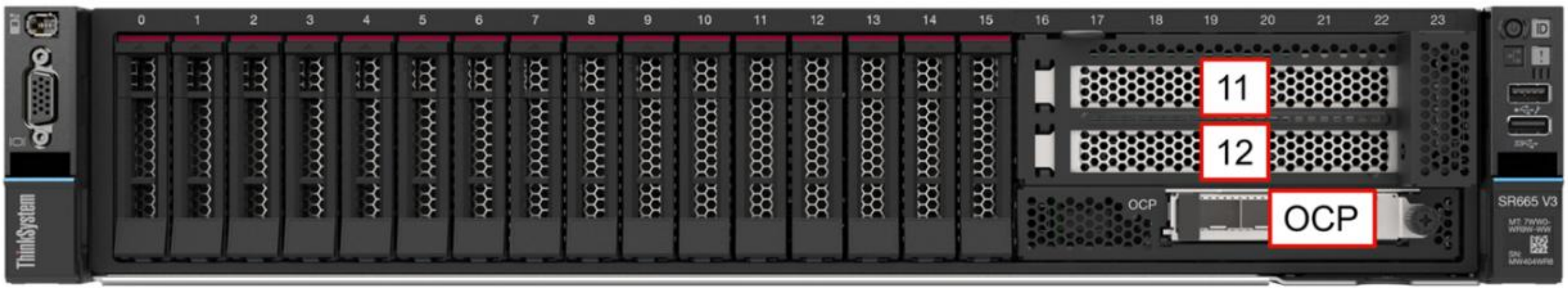
The SR665 V3 can be installed with four riser cards to support up to 10 PCIe 4.0 slots. Slots 1 to 6 support FHFL form factor PCIe adapters, and slots 7 to 10 support Low-Profile (LP) form factor PCIe adapters.

- Riser 1: slots 1, 2, and 3 (connect to CPU 1)
- Riser 2: slots 4, 5, and 6 (connect to CPU 2)
- Riser 3: slots 7 and 8 (connect to CPU 1)
- Riser 4: slots 9 and 10 (connect to CPU 2)

I/O expansion slot configuration – front PCIe slots

The SR650 V3 also supports front-accessible PCIe slots (planned for Q2 2023): Two PCIe 4.0 x16 slots plus a dedicated OCP 3.0 SFF slot for networking. Front-accessible slots are as follows:

- Slot 11: PCIe 4.0 x16 FHHL (connect to CPU 2)
- Slot 12: PCIe 4.0 x16 FHHL (connect to CPU 2)



Front adapter cage components

The front adapter cage has the following components:

Front adapter cage

Riser cage with riser card

Bottom cage with front OCP interposer card

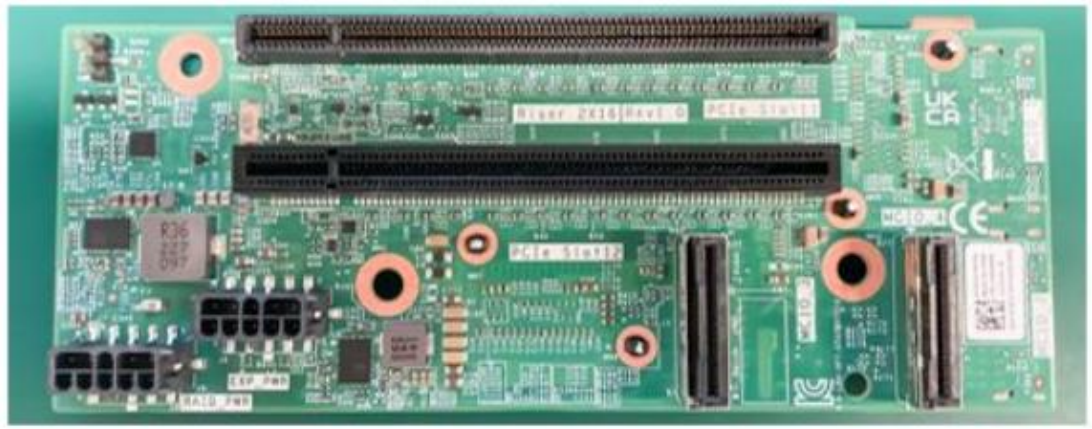
Front riser card and front OCP interposer card

Front OCP interposer card

Top view

Bottom view

Front riser card



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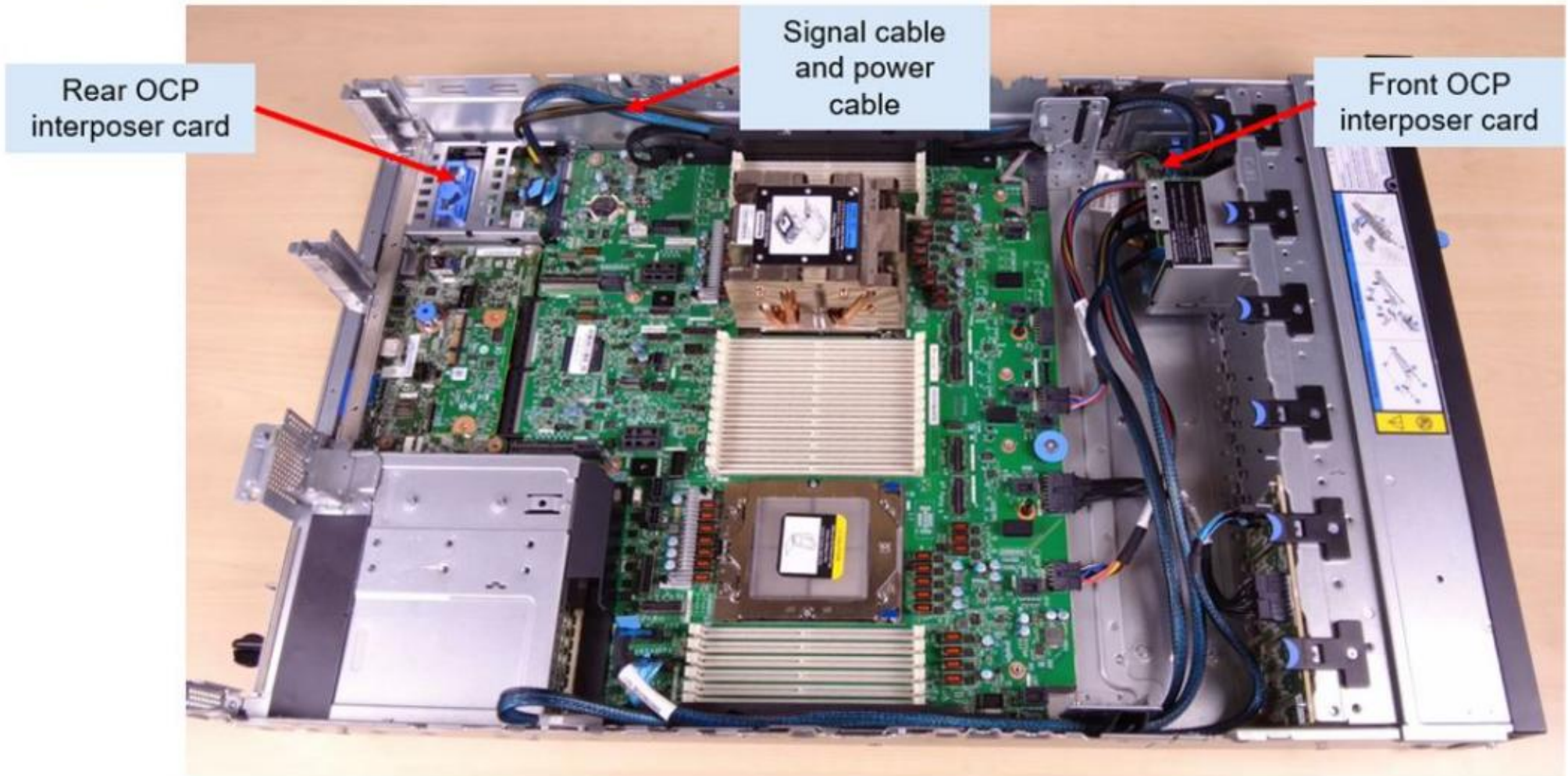
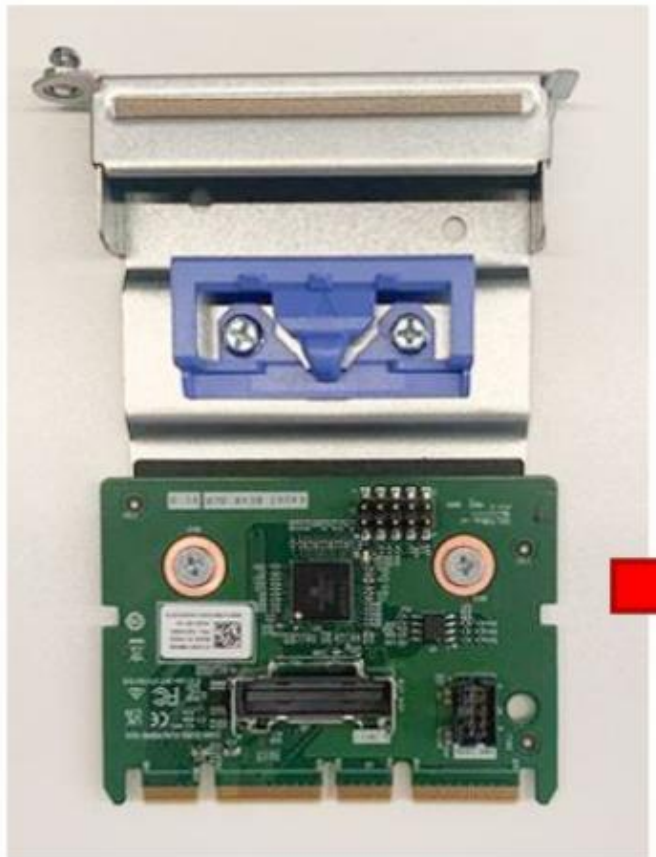
Rear OCP interposer card

The rear OCP adapter is installed in the rear OCP slot and is connected to cables to pass the signal and power to the front OCP interposer card, which means that an OCP adapter can be installed in the front.



Rear OCP interposer card location

These figures show the rear OCP interposer card before and after being installed in the rear OCP slot.

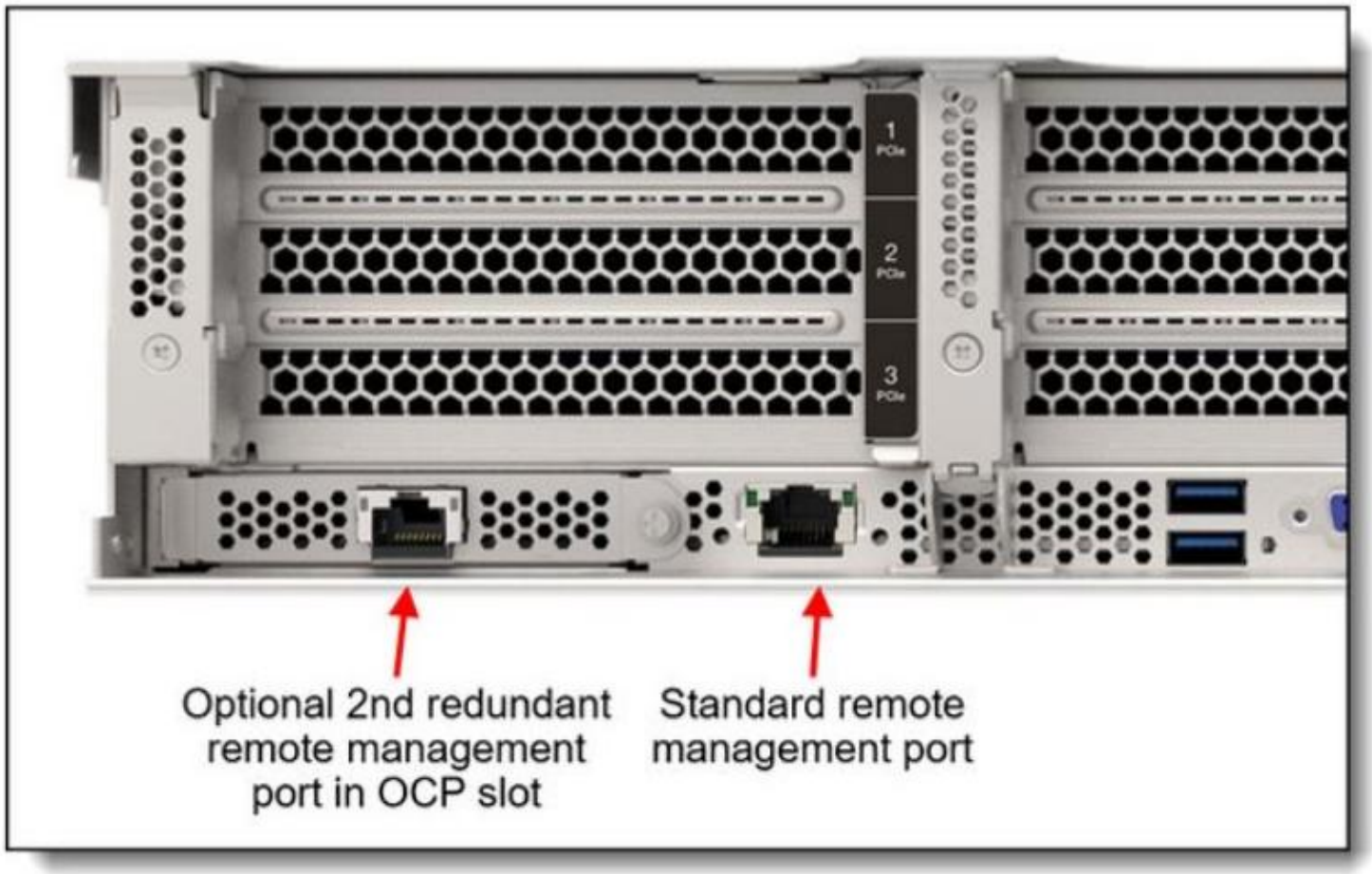


Management NIC adapter

The use of this adapter allows for concurrent remote access using both the connection on the adapter and the onboard RJ45 (XCC) remote management port provided by the server. The adapter and onboard port have separate IP addresses.

Configuration rules:

- The management NIC adapter is installed in the OCP adapter slot at the rear of the server and cannot be used with any OCP network adapter.
- The management NIC adapter cannot be installed in the front OCP slot (if the front OCP slot is configured).
- If the management NIC adapter is installed in the rear slot, then the front OCP slot (if configured) cannot be used.

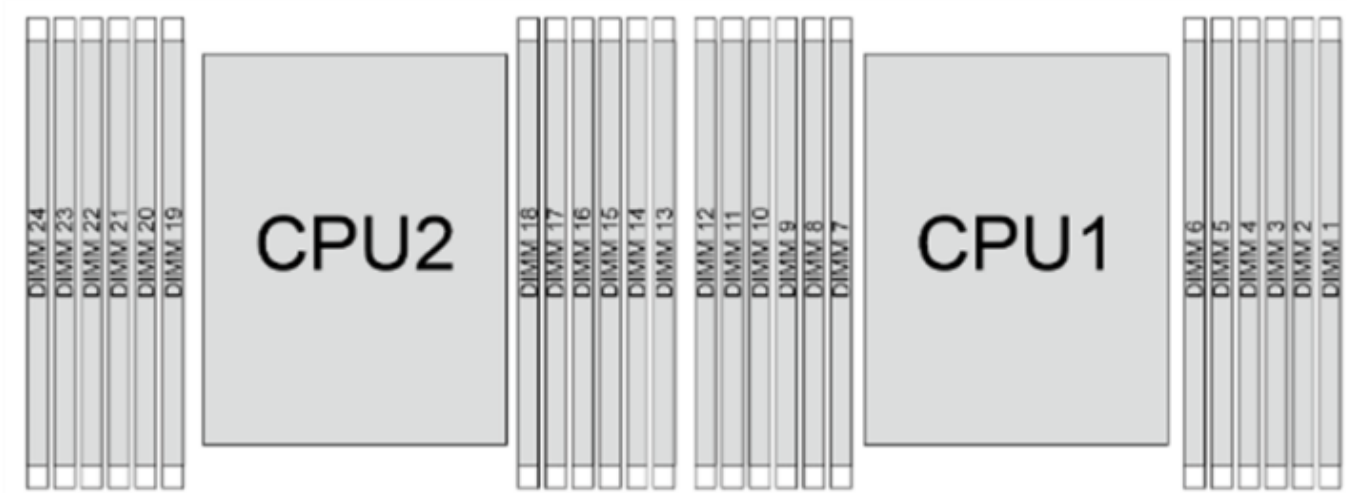


Memory module rules

The SR665 V3 has 24 memory slots and 24 channels – 12 channels per processor and one DIMM per channel. The SR665 V3 supports 16, 32, or 64 GB TruDDR5 RDIMMs running at 4800 MT/s for a maximum memory capacity of 1.5 TB (twenty-four 64 GB RDIMMs).

Apply the following rules when installing DIMMs:

- Mixing DIMMs from different vendors is supported.
- Mixing x4 and x8 DIMMs is not supported.
- Only single rank and dual rank DIMM mixing is supported.
- When installing DIMMs with different capacities, install the DIMM with the highest capacity first and follow the population sequence.



Note: For a detailed memory installation sequence, refer to the ThinkSystem SR665 V3 User Guide on Lenovo Support.