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Cisco UCS 6400 Series Fabric Interconnects

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Cisco Unified Computing System overview

The Cisco Unified Computing System™ (Cisco UCS®) is a next-generation data center platform that unites computing, networking, storage access, and virtualization resources into a cohesive system designed to reduce total cost of ownership (TCO) and increase business agility. The system integrates a low-latency, lossless 10/25/40/100 Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers. The system is an integrated, scalable, multichassis platform in which all resources participate in a unified management domain (Figure 1).

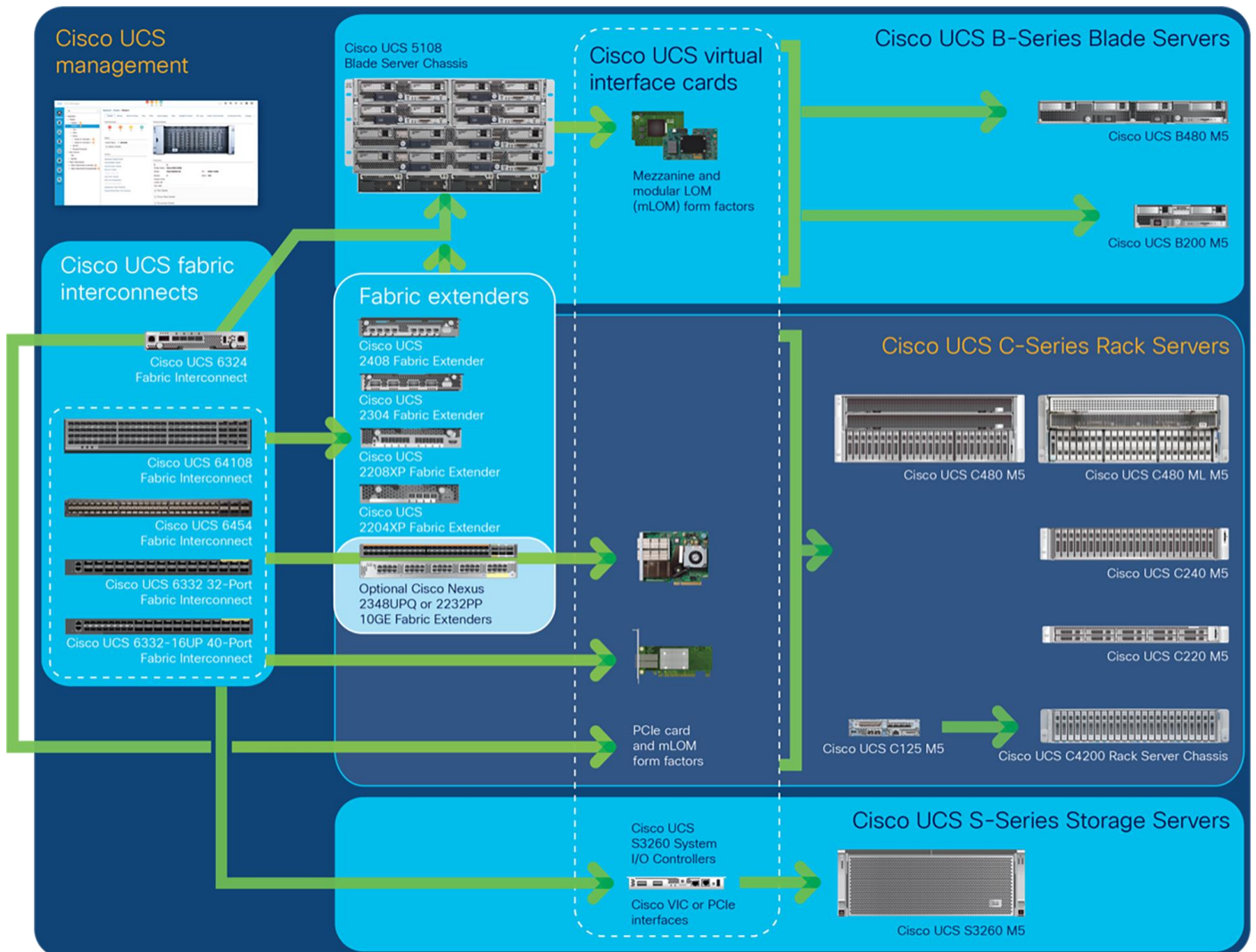


Figure 1.
The Cisco Unified Computing System's highly available, cohesive architecture

Product overview

The Cisco UCS 6400 Series Fabric Interconnects are a core part of the Cisco Unified Computing System, providing both network connectivity and management capabilities for the system (Figure 2). The Cisco UCS 6400 Series offer line-rate, low-latency, lossless 10/25/40/100 Gigabit Ethernet, Fibre Channel over Ethernet (FCoE), and Fibre Channel functions.

The Cisco UCS 6400 Series provide the management and communication backbone for the Cisco UCS B-Series Blade Servers, UCS 5108 B-Series Server Chassis, UCS Managed C-Series Rack Servers, and UCS S-Series Storage Servers. All servers attached to a Cisco UCS 6400 Series Fabric Interconnect become part of a single, highly available management domain. In addition, by supporting a unified fabric, Cisco UCS 6400 Series Fabric Interconnect provides both the LAN and SAN connectivity for all servers within its domain.

From a networking perspective, the Cisco UCS 6400 Series use a cut-through architecture, supporting deterministic, low-latency, line-rate 10/25/40/100 Gigabit Ethernet ports, switching capacity of 3.82 Tbps for the 6454, 7.42 Tbps for the 64108, and 200 Gbps bandwidth between the Fabric Interconnect 6400 series and the IOM 2408 per 5108 blade chassis, independent of packet size and enabled services. The product family supports Cisco low-latency, lossless 10/25/40/100 Gigabit Ethernet unified network fabric capabilities, which increase the reliability, efficiency, and scalability of Ethernet networks. The fabric interconnect supports multiple traffic classes over a lossless Ethernet fabric from the server through the fabric interconnect. Significant TCO savings come from an FCoE-optimized server design in which Network Interface Cards (NICs), Host Bus Adapters (HBAs), cables, and switches can be consolidated.

Cisco UCS 6454 Fabric Interconnect



Cisco UCS 64108



Unified fabric with FCoE: I/O consolidation

The Cisco UCS 6400 Series Fabric Interconnects are built to consolidate LAN and SAN traffic onto a single unified fabric, saving the Capital Expenditures (CapEx) and Operating Expenses (OpEx) associated with multiple parallel networks, different types of adapter cards, switching infrastructure, and cabling within racks. The unified ports allow ports in the fabric interconnect to support direct connections from Cisco UCS to existing native Fibre Channel SANs. The capability to connect FCoE to a native Fibre Channel protects existing storage-system investments while dramatically simplifying in-rack cabling.

Cisco UCS Manager

The Cisco UCS 6400 Series host and run Cisco UCS Manager in a highly available configuration, enabling the fabric interconnects to fully manage all Cisco UCS elements. Connectivity to the Cisco UCS 5108 Blade Server Chassis is maintained through the Cisco UCS 2200 and 2408 Series Fabric Extenders in each blade chassis. The Cisco UCS 6400 Series Fabric Interconnects support out-of-band management, through a dedicated 10/100/1000-Mbps Ethernet management port, as well as in-band management. Cisco UCS Manager typically is deployed in a clustered active/passive configuration on redundant fabric interconnects connected through dual 10/100/1000 Ethernet clustering ports.

Cisco UCS 6454 54-Port Fabric Interconnect

The Cisco UCS 6454 54-Port Fabric Interconnect (Figure 3) is a One-Rack-Unit (1RU) 10/25/40/100 Gigabit Ethernet, FCoE, and Fibre Channel switch offering up to 3.82 Tbps throughput and up to 54 ports. The switch has 28 10/25-Gbps Ethernet ports, 4 1/10/25-Gbps Ethernet ports, 6 40/100-Gbps Ethernet uplink ports, and 16 unified ports that can support 10/25-Gbps Ethernet ports or 8/16/32-Gbps Fibre Channel ports. All Ethernet ports are capable of supporting FCoE.

Front view



Rear view



Figure 2.
Cisco UCS 6454 (1RU) 54-Port Fabric Interconnect

Cisco UCS 64108 108-Port Fabric Interconnect

The Cisco UCS 64108 Fabric Interconnect (FI) is a 2-RU top-of-rack switch that mounts in a standard 19-inch rack such as the Cisco R Series rack. The 64108 is a 10/25/40/100 Gigabit Ethernet, FCoE and Fiber Channel switch offering up to 7.42 Tbps throughput and up to 108 ports. The switch has 16 unified ports (port numbers 1-16) that can support 10/25-Gbps SFP28 Ethernet ports or 8/16/32-Gbps Fibre Channel ports, 72 10/25-Gbps Ethernet SFP28 ports (port numbers 17-88), 8 1/10/25-Gbps Ethernet SFP28 ports (port numbers 89-96), and 12 40/100-Gbps Ethernet QSFP28 uplink ports (port numbers 97-108). All Ethernet ports are capable of supporting FCoE.

The Cisco UCS 64108 Fabric Interconnect also has one network management port, one console port for setting the initial configuration, and one USB port for saving or loading configurations. The FI also includes L1/L2 ports for connecting two fabric interconnects for high availability.

Front view



Rear view



Figure 3.
Cisco UCS 64108 (2 RU) 108-Port Fabric Interconnect

Table 1 summarizes the characteristics of the Cisco UCS 6400 Series Fabric Interconnects.

Table 1. Characteristics of Cisco UCS 6400 Series Fabric Interconnects

| Item | Cisco UCS 6454 | Cisco UCS 64108 |
|--|-----------------------------|------------------------------|
| Description | 54-port fabric interconnect | 108-port fabric interconnect |
| Form factor | 1RU | 2RU |
| Number of fixed 10/25/40/100-Gbps and FCoE ports with optional unified ports | 54 fixed ports | 108 fixed ports |
| Maximum number of unified ports | 16 (unified ports 1-16) | 16 (unified ports 1-16) |
| Maximum number of 1-Gbps Ethernet ports | 4 (ports 45-48) | 8 (ports 89-96) |

| Item | Cisco UCS 6454 | Cisco UCS 64108 |
|--|-----------------|--------------------|
| Maximum number of 40/100-Gbps Ethernet ports | 6 (ports 49–54) | 12 ((ports 97–108) |
| Throughput | 3.82 Tbps | 7.42 Tbps |
| Fan modules | 3+1 | 2+1 |

Note: Breakout cables are supported on ports 97–108 when connecting to Nexus 9K switches.

Features and benefits

Table 2 summarizes the features and benefits of Cisco UCS 6400 Series Fabric Interconnects.

Table 2. Features and benefits

| Feature | Benefits |
|--|---|
| Power supply | <ul style="list-style-type: none"> Two power supplies (AC or DC) |
| Management by Cisco UCS Manager | <ul style="list-style-type: none"> Allows all elements connected to the interconnects to participate in a single, highly available management domain |
| Unified fabric | <ul style="list-style-type: none"> Decreases TCO by reducing the number of NICs, HBAs, switches, and cables required Transparently encapsulates Fibre Channel packets into Ethernet |
| Fabric extender architecture | <ul style="list-style-type: none"> Scales to 20 blade chassis without adding complexity by eliminating the need for dedicated chassis management and blade switches and by reducing the number of cables needed Provides deterministic latency for optimized application performance |
| Performance | <ul style="list-style-type: none"> Provides high-speed, low-latency connectivity to the chassis Provides approximately 50 percent reduction in end-to-end system latency (latency is less than 1 microsecond) |
| Lossless fabric | <ul style="list-style-type: none"> Provides a reliable, robust foundation for unifying LAN and SAN traffic on a single transport |
| Priority-based flow control (PFC) | <ul style="list-style-type: none"> Simplifies management of multiple traffic flows over a single network link Supports different classes of service, helping enable both losses and classic Ethernet on the same fabric |
| Systemwide bandwidth management | <ul style="list-style-type: none"> Helps enable consistent and coherent Quality of Service (QoS) throughout the system. |
| Rear ports | <ul style="list-style-type: none"> Helps keep cable lengths short and efficient |
| Redundant hot-swappable fans and power supplies | <ul style="list-style-type: none"> Helps enable high availability in multiple configurations Increase serviceability Provides uninterrupted service during maintenance |
| Front-to-back cooling | <ul style="list-style-type: none"> Fan-side intake, port-side exhaust |
| SFP+ ports | <ul style="list-style-type: none"> Increases flexibility with a range of interconnect solutions, including copper Twinax cable for short runs and SFP28 and QSFP28 optics for long runs Consumes less power per port than traditional solutions Helps enable cost-effective connections on fabric extenders with Cisco® Fabric Extender Transceiver (FET) optics |

| Feature | Benefits |
|-------------------------------------|---|
| SFP28-compatible ports | <ul style="list-style-type: none"> Allows fixed ports to be configured to operate in 10/25 GB Ethernet mode with the transceiver options specific for use with SFP28-compatible ports in Table 3 |
| QSFP28-compatible Ports | <ul style="list-style-type: none"> Allows all ports to be configured to operate in 40/100 GB Ethernet mode with the transceiver options specific for use with QSFP28-compatible ports in Table 3 |
| Port-based licensing options | <ul style="list-style-type: none"> Helps enable a pay-as-you-grow model, allowing customers to add capacity as the networking needs of an individual system increase |

Product specifications

Transceivers

The Cisco UCS 6400 Series Fabric Interconnects support a wide variety of 10/25/40/100 Gigabit Ethernet connectivity options using Cisco 10/25/40/100 Gbps modules. Unified Ports (UP) on the Cisco UCS 6400 Series support 10/25 Gigabit Ethernet connectivity or 8/16/32 Gigabit Fibre Channel modules. Uplink ports support 40/100 Gigabit Ethernet transceivers and cables. Table 3 lists the supported transceiver options.

Table 3. Cisco UCS 6400 Series Fabric Interconnect-supported transceiver and cable support matrix

| Product number | Description |
|-----------------------------------|---|
| SFP 1-Gigabit transceivers | |
| GLC-TE | 1000 BASE-T SFP transceiver module for Category 5 copper wire |
| GLC-SX-MMD | 1000 BASE-SX short wavelength; with DOM |
| SFP-GE-T | 1000 BASE-T SFP transceiver module for Category 5 copper wire, extended operating temperature range (supported but EOL) |
| SFP+ 10-Gbps transceivers | |
| SFP-10G-SR | 10GBASE-SR SFP module |
| SFP-10G-SR-S | 10GBASE-SR SFP module, Enterprise class |
| SFP-10G-LR | 10GBASE-LR SFP module |
| SFP-10G-LR-S | 10GBASE-LR SFP module, Enterprise class |
| SFP-10G-LRM | 10GBASE-LRM SFP module |
| SFP-10G-ER | 10GBASE-ER SFP module |
| SFP-10G-ER-S | 10GBASE-ER-SFP module, Enterprise class |
| SFP-10G-ZR | Cisco 10GBASE-ZR SFP10G module for SMF |
| SFP-10G-ZR-S | 10GBASE-ZR SFP module, Enterprise class |
| FET-10G | 10G line extender for FEX |

| Product number | Description |
|--|--|
| SFP28 25-Gbps transceivers | |
| SFP-25G-SR-S | 25GBASE-SR SFP module |
| SFP-10/25G-LR-S | 10/25GBASE-LR SFP28 Module for SMF |
| SFP-10/25G-CSR-S | Dual Rate 10/25GBASE-CSR SFP Module |
| QSFP+ 40-Gbps transceivers | |
| QSFP-40G-SR4 | 40GBASE-SR4 QSFP transceiver module with MPO connector |
| QSFP-40G-SR4-S | 40GBASE-SR4 QSFP transceiver module, MPO connector, Enterprise class |
| QSFP-40G-SR-BD | 40GBASE-SR-BiDi, duplex MMF (LC) |
| QSFP-40G-LR4 | QSFP 40GBASE-LR4 OTN transceiver, LC, 10KM |
| QSFP-40G-LR4-S | QSFP 40GBASE-LR4 transceiver module, LC, 10KM, Enterprise class |
| QSFP-40G-ER4 | QSFP 40GBASE-ER4 transceiver module, LC, 2KM |
| WSP-Q40GLR4L | QSFP 40G Ethernet - LR4 lite, LC, 2KM |
| QSFP-4X10G-LR-S | QSFP 4x10G transceiver module, SM MPO, 10KM, Enterprise class |
| QSFP28 100G transceivers | |
| QSFP-100G-SR4-S | 100GBASE SR4 QSFP transceiver, MPO, 100m over OM4 MMF |
| QSFP-100G-LR4-S | 100GBASE LR4 QSFP transceiver, LC, 10KM over SMF |
| QSFP-40/100-SRBD | 100GBASE/40GBASE SR-BiDi QSFP transceiver, LC, 100m over OM4 MMF |
| QSFP-100G-SM-SR | 100GBASE CWDM4 Lite QSFP transceiver, 2KM over SMF, 10-60C |
| SFP+ 10G copper cables with integrated transceivers | |
| SFP-H10GB-CU1M | 10GBASE SFP+ cable 1-meter, passive |
| SFP-H10GB-CU1-5M | 10GBASE SFP+ cable 1.5-meter, passive |
| SFP-H10GB-CU2M | 10GBASE SFP+ cable 2-meter, passive |
| SFP-H10GB-CU2-5M | 10GBASE SFP+ cable 2.5-meter, passive |
| SFP-H10GB-CU3M | 10GBASE SFP+ cable 3-meter, passive |
| SFP-H10GB-CU5M | 10GBASE SFP+ cable 5-meter, passive |
| SFP-H10GB-ACU7M | 10GBASE SFP+ cable 7-meter, active |
| SFP-H10GB-ACU10M | 10GBASE SFP+ cable 10-meter, active |

| Product number | Description |
|---|---|
| SFP-10G-AOC1M | 10GBASE active optical SFP+ cable, 1M |
| SFP-10G-AOC2M | 10GBASE active optical SFP+ cable, 2M |
| SFP-10G-AOC3M | 10GBASE active optical SFP+ cable, 3M |
| SFP-10G-AOC5M | 10GBASE active optical SFP+ cable, 5M |
| SFP-10G-AOC7M | 10GBASE active optical SFP+ cable, 7M |
| SFP-10G-AOC10M | 10GBASE active optical SFP+ cable, 10M |
| SFP28 25G copper cables with integrated | |
| SFP-H25G-CU1M | 25GBASE-CU SFP28 cable 1-meter |
| SFP-H25G-CU2M | 25GBASE-CU SFP28 cable 2-meter |
| SFP-H25G-CU3M | 25GBASE-CU SFP28 cable 3-meter |
| SFP-H25G-CU4M | 25GBASE-CU SFP28 Cable 4 Meter |
| SFP-H25G-CU5M | 25GBASE-CU SFP28 cable 5-meter |
| SFP-25G-AOC1M | 25GBASE active optical SFP28 cable, 1M |
| SFP-25G-AOC2M | 25GBASE active optical SFP28 cable, 2M |
| SFP-25G-AOC3M | 25GBASE active optical SFP28 cable, 3M |
| SFP-25G-AOC5M | 25GBASE active optical SFP28 cable, 5M |
| SFP-25G-AOC7M | 25GBASE active optical SFP28 cable, 7M |
| SFP-25G-AOC10M | 25GBASE active optical SFP28 cable, 10M |
| QSFP 40G cables with integrated transceivers | |
| QSFP-H40G-CU1M | 40GBASE-CR4 passive copper cable, 1M |
| QSFP-H40G-CU3M | 40GBASE-CR4 passive copper cable, 3M |
| QSFP-H40G-CU5M | 40GBASE-CR4 passive copper cable, 5M |
| QSFP-H40G-ACU7M | 40GBASE-CR4 active copper cable, 7M |
| QSFP-H40G-ACU10M | 40GBASE-CR4 active copper cable, 10M |
| QSFP-H40G-AOC1M | 40GBASE active optical cable, 1M |
| QSFP-H40G-AOC2M | 40GBASE active optical cable, 2M |
| QSFP-H40G-AOC3M | 40GBASE active optical cable, 3M |

| Product number | Description |
|--|---|
| QSFP-H40G-AOC5M | 40GBASE active optical cable, 5M |
| QSFP-H40G-AOC10M | 40GBASE active optical cable, 10M |
| QSFP-H40G-AOC15M | 40GBASE active optical cable, 15M |
| QSFP-4SFP10G-CU1M | QSFP to 4xSFP10G passive copper splitter cable, 1M |
| QSFP-4SFP10G-CU3M | QSFP to 4xSFP10G passive copper splitter cable, 3M |
| QSFP-4SFP10G-CU5M | QSFP to 4xSFP10G passive copper splitter cable, 5M |
| QSFP-4x10G-AC7M | QSFP to 4xSFP10G active copper splitter cable, 7M |
| QSFP-4x10G-AC10M | QSFP to 4xSFP10G active copper splitter cable, 10M |
| QSFP-4x10G-AOC1M | 40GBASE active optical QSFP to 4SFP breakout cable, 1M |
| QSFP-4x10G-AOC3M | 40GBASE active optical QSFP to 4SFP breakout cable, 3M |
| QSFP-4x10G-AOC5M | 40GBASE active optical QSFP to 4SFP breakout cable, 5M |
| QSFP-4x10G-AOC7M | 40GBASE active optical QSFP to 4SFP breakout cable, 7M |
| QSFP-4x10G-AOC10M | 40GBASE active optical QSFP to 4SFP breakout cable, 10M |
| QSFP28 100G cables with integrated transceivers | |
| QSFP-100G-CU1M | 100GBASE-CR4 passive copper cable, 1M |
| QSFP-100G-CU2M | 100GBASE-CR4 passive copper cable, 2M |
| QSFP-100G-CU3M | 100GBASE-CR4 passive copper cable, 3M |
| QSFP-100G-AOC1M | 100GBASE QSFP active optical cable, 1M |
| QSFP-100G-AOC2M | 100GBASE QSFP active optical cable, 2M |
| QSFP-100G-AOC3M | 100GBASE QSFP active optical cable, 3M |
| QSFP-100G-AOC5M | 100GBASE QSFP active optical cable, 5M |
| QSFP-100G-AOC7M | 100GBASE QSFP active optical cable, 7M |
| QSFP-100G-AOC10M | 100GBASE QSFP active optical cable, 10M |
| QSFP-100G-AOC15M | 100GBASE QSFP active optical cable, 15M |
| QSFP-100G-AOC20M | 100GBASE QSFP active optical cable, 20M |
| QSFP-100G-AOC25M | 100GBASE QSFP active optical cable, 25M |
| QSFP-100G-AOC30M | 100GBASE QSFP active optical cable, 30M |

| Product number | Description |
|-----------------------------------|---|
| QSFP-4SFP25G-CU1M | 100GBASE QSFP to 4xSFP25G passive copper splitter cable, 1M |
| QSFP-4SFP25G-CU2M | 100GBASE QSFP to 4xSFP25G passive copper splitter cable, 2M |
| QSFP-4SFP25G-CU3M | 100GBASE QSFP to 4xSFP25G passive copper splitter cable, 3M |
| QSFP-4SFP25G-CU5M | 100GBASE QSFP to 4xSFP25G passive copper splitter cable, 5M |
| Fibre Channel transceivers | |
| DS-SFP-FC4G-SW | 4 Gbps Fibre Channel-SW SFP, LC |
| DS-SFP-FC8G-SW | 8 Gbps Fibre Channel-SW SFP+, LC |
| DS-SFP-FC8G-LW | 8 Gbps Fibre Channel-LW SFP+, LC |
| DS-SFP-FC16G-SW | 16 Gbps Fibre Channel-SW SFP+, LC |
| DS-SFP-FC16G-LW | 16 Gbps Fibre Channel-LW SFP+, LC |
| DS-SFP-FC32G-SW | 32 Gbps Fibre Channel-SW SFP+, LC |
| DS-SFP-FC32G-LW | 32 Gbps Fibre Channel-LW SFP+, LC |

Note:

1. FI 6454 supports 1G optics on ports 45-48. FI 64108 supports 1G optics on ports 89-96.
2. Transceiver modules and cables that are supported on a specific Fabric Interconnect are not always supported on all VIC adapters, I/O modules, or Fabric Extenders that are compatible with that Fabric Interconnect. Detailed compatibility matrices for the transceiver modules are available here: <https://www.cisco.com/c/en/us/support/interfaces-modules/transceiver-modules/products-device-support-tables-list.html>.
3. SFP-10/25G-LR-S and SFP-10/25G-CSR-S currently works only at 25G speed. (i.e., FI 6454 supported ports 1-48 & FI 64108 supported ports 1-96)
4. S-Class transceivers (for example 10G and 40G) do not support FCoE.

Cabling

Table 4 provides 10-, 25-, 40-, and 100-Gigabit Ethernet cabling specifications for Cisco UCS 6400 Series Fabric Interconnects.

Table 4. 10-, 25-, 40-, and 100-Gigabit Ethernet cabling specifications

| Connector (Media) | Cable | Distance | Power (each side) | Transceiver latency (link) | Standard |
|-------------------|---------------|--------------|----------------------------|-------------------------------|----------|
| SFP+ copper (CU) | Twinax | 1, 3, and 5M | Approximately 0.1 watt (W) | Approximately 0.1 microsecond | SFF 8431 |
| SFP+ ACU copper | Active Twinax | 7M10M | Approximately 0.5W | Approximately 0.1 microsecond | SFF 8461 |

| Connector (Media) | Cable | Distance | Power (each side) | Transceiver latency (link) | Standard |
|--------------------------------------|-----------------------|-------------|-------------------|------------------------------|--------------|
| SFP+FET | MM OM2MM OM3MM OM4 | 25 and 100M | 1W | Approximately 0 microsecond | IEEE 802.3ae |
| SFP+ Short Reach (SR) and MMF | MM OM2MM OM3MM OM4 | 82 and 300M | 1W | Approximately 0 microseconds | IEEE 802.3ae |
| SFP+ Long Reach (LR) | SMF | 10 KM | 1W | Approximately 0 microseconds | IEEE 802.3ae |
| SFP+ Long Range (ER) | SMF | 40 KM | 1.5W | Approximately 0 microseconds | IEEE 802.3ae |
| SFP+ Long Reach (ZR) | SMF | 80 KM | 1.5W | Approximately 0 microseconds | IEEE 802.3ae |

Performance

- Cisco UCS 6454: Layer 2 hardware forwarding at 3.82 Tbps and 1.2 billion packets per second (bps)
- Cisco UCS 64108: Layer 2 hardware forwarding at 7.42 Tbps and 2.8 billion packets per second (bps)
- MAC address table entries: 32,000
- Low-latency cut-through design: Provides predictable, consistent traffic latency regardless of packet size, traffic pattern, or enabled features

Layer 2

- Ethernet switch mode
- Fibre Channel switch mode
- Layer 2 interconnect ports and 3K VLANs
- IEEE 802.1Q VLAN encapsulation
- Support Virtual SANs (VSANs) per interconnect
- Rapid Per-VLAN Spanning Tree Plus RPVST+
- Internet Group Management Protocol (IGMP) Versions 1, 2, and 3 snooping
- Link Aggregation Control Protocol (LACP): IEEE 802.3ad
- Advanced EtherChannel hashing based on Layer 2, 3, and 4 information
- Jumbo frames on all ports (up to 9216 bytes)
- Pause frames (IEEE 802.3x)
- FC/FCoE slow drain detection and recovery
- Port security

Quality of Service (QoS)

- Layer 2 IEEE 802.1p (class of service)
- Sixteen hardware queues per port (FCoE plus five user-defined)
- Class-of-Service(CoS)-based egress queuing
- Egress port-based scheduling: Weighted Round-Robin (WRR)
- Priority-based flow control (802.1Qbb)
- Enhanced transmission selection (802.1Qaz)

High availability

- Hot-swappable field-replaceable power suppliers, fan modules, and expansion modules
- 1+1 power redundancy
- N+1 fan module redundancy

Management

- Interconnect management using redundant 10/100/1000 Mbps management or console ports
- All management provided through Cisco UCS Manager. Please refer to the Cisco UCS Manager data sheet for more information about management interfaces

Low-latency, lossless 10/25/40/100 Gigabit Ethernet unified network fabric

- PFC (per priority pause frame support)
- Data Center Bridging Exchange (DCBX) Protocol
- IEEE 802.1Qaz: bandwidth management

Unified ports

- Cisco UCS 6400 Series can be configurable as 10- and 25-Gigabit Ethernet or 8/16/32-Gbps Fibre Channel

Industry standards

- IEEE 802.1p: CoS prioritization
- IEEE 802.1Q: VLAN tagging
- IEEE 802.1s: multiple VLAN instances of Spanning Tree Protocol
- IEEE 802.1w: rapid reconfiguration of Spanning Tree Protocol
- IEEE 802.3: Ethernet
- IEEE 802.3ad: LACP
- IEEE 802.3ae: 10-Gigabit Ethernet
- IEEE 802.3by: 25-Gigabit Ethernet

- IEEE 802.3bg: 40-Gigabit Ethernet
- IEEE 802.3bm: 100-Gigabit Ethernet
- SFP28 support
- QSFP28 support
- Remote monitoring (RMON)

Physical specifications

SFP28 and QSFP28 optics

Cisco UCS products support 10-, 25-, 40-, and 100-Gigabit Ethernet SFP28 and QSFP28 copper Twinax cables for short distances, and SFP28 and QSFP28 optics for longer distances. SFP28 and QSFP28 have several advantages compared to other Ethernet connectivity options:

- 10-, 25-, 40-, and 100-Gigabit Ethernet form factor
- Low power consumption
- Hot-swappable devices

Table 5 summarizes the Cisco UCS 6400 Series Fabric Interconnect specifications.

Table 5. Cisco UCS 6400 Series Fabric Interconnect specifications****

| Feature | Cisco UCS 6454 | Cisco UCS 64108 |
|----------------------------------|--|---|
| Ports | 48 x 10/25-Gbps SFP28 ports and 6 x 40/100-Gbps QSFP28 ports | 96 x 10/25-Gbps SFP28 ports and 12 x 40/100-Gbps QSFP28 ports |
| Downlink supported speeds | 1/10/25-Gbps Ethernet/FCoE8/16/32-Gbps Fibre Channel | 1/10/25-Gbps Ethernet/FCoE8/16/32-Gbps Fibre Channel |
| CPU | 6 cores | 6 cores |
| System memory | 64 GB | 64 GB |
| Management ports | L1, L2, and RJ-45 ports | L1, L2, and RJ-45 ports |
| USB ports | 1 | 1 |
| Power supplies (up to 2) | 650W (AC) or 930W (DC) | Two identical AC or DC |
| Typical operating power | 260W | 404W |
| Maximum power (AC) | 650W | 1200W |
| Maximum power (DC) | 930W | 930W |
| Input voltage (AC) | 100 to 240 VAC | 7A at 200 VAC |
| Input voltage (DC) | -40 to -72VDC | 23 A maximum at -48 VDC |
| Frequency | 50 to 60 Hz | 50 to 60 Hz |

| Feature | Cisco UCS 6454 | Cisco UCS 64108 |
|-----------------|---|---|
| Fans | 4 | 3 |
| Airflow | Standard airflow – front (PSU/fan-side) to back (port-side exhaust) | Standard airflow – front (PSU/fan-side) to back (port-side exhaust) |
| Efficiency (AC) | 95 to 98% (50 to 100% load) | 95 to 98% (50 to 100% load) |
| Efficiency (DC) | 88 to 92% (50 to 100% load) | 88 to 92% (50 to 100% load) |
| RoHS compliance | Yes | Yes |
| Hot swappable | Yes | Yes |

Cisco UCS 6400 Series physical and environmental specifications

Table 6 summarizes the physical and environmental specifications for Cisco UCS 6400 Series Fabric Interconnects.

Table 6. Physical and environmental specifications

| Property | Cisco UCS 6454 | Cisco UCS 64108 |
|-----------------------------------|--|---|
| Physical (height x width x depth) | 1.72 in. x 17.3 in x 22.5 in (4.4 cm x 43.9 cm x 57.1 cm) | 3.38 in. x 17.42 in x 22.95 in (8.33 cm x 44.25 cm x 58.29 cm) |
| Operating temperature | 32 to 104°F (0 to 40°C) | 32 to 104°F (0 to 40°C) |
| Nonoperating temperature | –40 to 158°F (–40 to 70°C) | –40 to 158°F (–40 to 70°C) |
| Humidity | 5 to 95% | 5 to 95% |
| Altitude | 0 to 13,123 ft (0 to 4000m) | 0 to 13,123 ft (0 to 4000m) |

Weight

Table 7 summarizes the weights for the Cisco UCS 6400 Series.

Table 7. Weight, including power supplies and fan modules

| Component | Weight |
|---|--------------------------------|
| Cisco UCS 6454 with two power supplies and two expansion modules installed | 22.24 lb (10.10 kg), with fans |
| Cisco UCS 64108 with two power supplies and two expansion modules installed | 35.86 lb (16.27 kg), with fans |

Regulatory standards compliance: safety and EMC

Table 8 summarizes regulatory compliance for the Cisco UCS 6400 Series Fabric Interconnects.

Table 8. Regulatory standards compliance: safety and EMC

| Specification | Description |
|------------------------------|--|
| Regulatory compliance | Products should comply with CE Markings according to directives 2004/108/EC and 2006/95/EC. |
| Safety | <ul style="list-style-type: none">• UL 60950-1 Second Edition• CAN/CSA-C22.2 No. 60950-1• EN 60950-1 Second Edition• IEC 60950-1 Second Edition• AS/NZS 60950-1• GB4943 |
| EMC: Emissions | <ul style="list-style-type: none">• 47CFR Part 15 (CFR 47) Class A• AS/NZS CISPR22 Class A• CISPR22 Class A• EN55022 Class A• ICES003 Class A• VCCI Class A• EN61000-3-2• EN61000-3-3• KN22 Class A• CNS13438 Class A |
| EMC: Immunity | <ul style="list-style-type: none">• EN55024• CISPR24• EN300386• KN 61000-4 series |
| RoHS | The product is RoHS 5-compliant with exceptions for leaded Ball Grid Array (BGA) balls and lead press-fit connectors. |

Ordering information

Table 9 presents ordering information for Cisco UCS 6400 Fabric Interconnects.

Table 9. Ordering information

| Part Number | Description |
|--|---|
| Fabric Interconnects | |
| UCS-FI-6454-U | Standalone model: 1RU FI, with no PSU, with 54 ports and includes 18x10/25-Gbps and 2x40/100-Gbps port licenses |
| UCS-FI-6454++ | Standalone model: TAA-UCS 6454 1RU FI, with no PSU, with 54 ports and includes 18x10/25-Gbps and 2x40/100-Gbps port licenses |
| UCS-FI-6454 | Configured model: UCS 6454 1RU FI, with no PSU, with 54 ports and includes 18x10/25-Gbps and 2x40/100-Gbps port licenses |
| UCS-FI-64108-U | Standalone model: UCS 64108 2RU FI, with no PSU, with 108 ports and includes 36x10/25-Gbps and 4x40/100-Gbps port licenses |
| UCS-FI-64108 | Configured model: UCS 64108 2RU FI, with no PSU, with 108 ports and includes 36x10/25-Gbps and 4x40/100-Gbps port licenses |
| Fabric Interconnect port licenses | |
| UCS-L-6400-25G | UCS 6400 series ONLY Fabric Int 1 Port 10/25 Gbps/FC port license |
| UCS-L-6400-25GC | UCS 6400 series ONLY Fabric Int 1 Port 10/25 Gbps/FC port license C-direct only (used to connect directly from FI 6454 to C220, C240, C460, C480, and/or C4200) |
| UCS-L-6400-100G | UCS 6400 series ONLY Fabric Int 1 Port 40/100 Gbps port license |
| Power supply and fan | |
| UCS-PSU-6332-AC | UCS 6332/6454 power supply/100-240VAC (650 W) |
| UCS-PSU-6332-DC | UCS 6332/6454 power supply/-48VDC (930 W) |
| UCS-PSU-64108-AC | UCS 64108 power supply/100-240VAC |
| UCS-PSU-6332-DC | UCS 64108 Power Supply/-48VDC |
| UCS-FAN-6332 | UCS 6332/6454 fan module |
| UCS-FAN-64108 | UCS 64108 fan module |
| Accessory and blank | |
| UCS-ACC-6332 | UCS 6332/6454 chassis accessory kit |
| UCS-ACC-64108 | UCS 64108 chassis accessory kit |

Warranty information

Find warranty information at Cisco.com on the Product Warranties page.

Cisco environmental sustainability

Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's [Corporate Social Responsibility](#) (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

| Sustainability topic | Reference |
|--|---------------------------------|
| Information on product material content laws and regulations | Materials |
| Information on electronic waste laws and regulations, including products, batteries, and packaging | WEEE compliance |

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For more information about Cisco UCS, visit <https://www.cisco.com/en/US/products/ps10265/index.html>.

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