

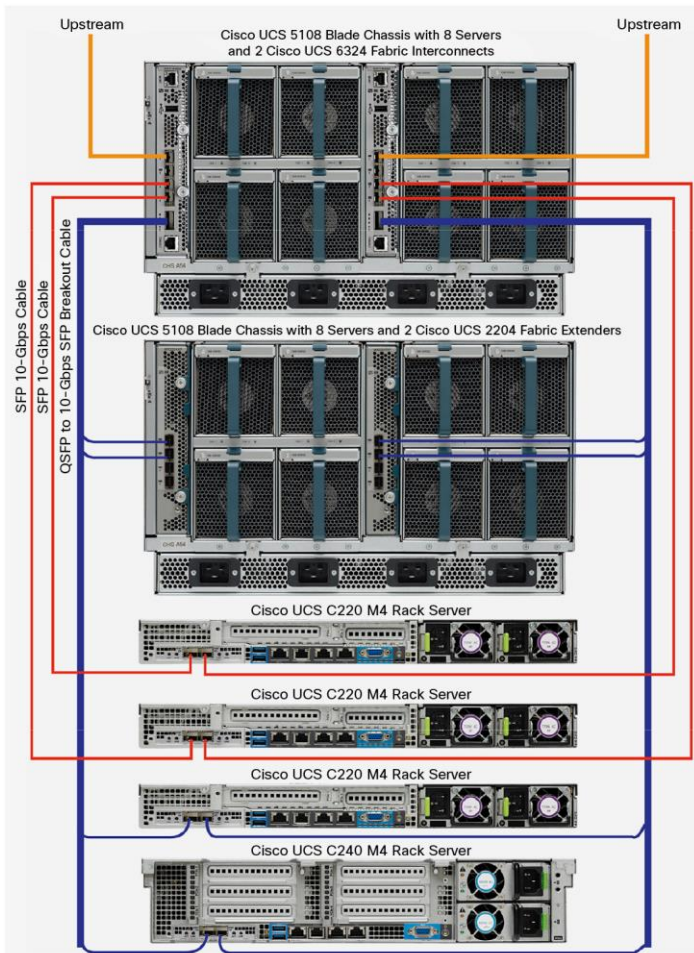
# Cisco UCS 6324 Fabric Interconnect

## 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 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).

The Cisco UCS 6324 Fabric Interconnect extends the Cisco UCS architecture into environments with requirements for smaller domains. Providing the same unified server and networking capabilities as in the full-scale Cisco UCS solution, the Cisco UCS 6324 Fabric Interconnect embeds the connectivity within the Cisco UCS 5108 Blade Server Chassis to provide a smaller domain of up to 20 servers.

**Figure 1.** The Cisco Unified Computing System Is a Highly Available Cohesive Architecture





## Cisco UCS Manager

The Cisco UCS 6324 Fabric Interconnect hosts and runs Cisco UCS Manager in a highly available configuration, enabling the fabric interconnects to fully manage all Cisco UCS elements. The Cisco UCS 6324 Fabric Interconnect Fabric Interconnects support out-of-band management through a dedicated 10/100/1000-Mbps Ethernet management port. Cisco UCS Manager typically is deployed in a clustered active-passive configuration on with two UCS 6324 Fabric Interconnects connected through the cluster interconnect built into the chassis.

## Optimization for Virtualization

For virtualized environments, the Cisco UCS 6324 Fabric Interconnect supports Cisco virtualization-aware networking and Cisco Data Center Virtual Machine Fabric Extender (VM-FEX) architecture. Cisco Data Center VM-FEX allows the fabric interconnects to provide policy-based virtual machine connectivity, with network properties moving with the virtual machine and a consistent operational model for both physical and virtual environments.

## Cisco UCS 6324 Fabric Interconnect

The Cisco UCS 6324 Fabric Interconnect Fabric Interconnect (Figure 3) is a 10 Gigabit Ethernet, FCoE, and Fibre Channel switch offering up to 500-Gbps throughput and up to four unified ports and one scalability port.

**Figure 3.** Cisco UCS 6324 Fabric Interconnect

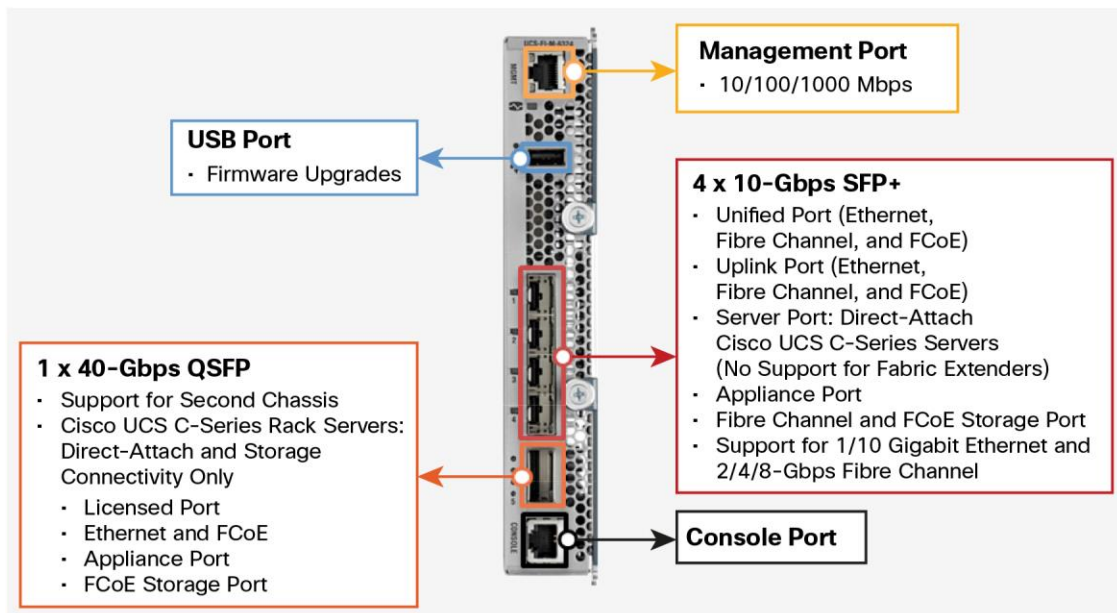


Table 1 summarizes the characteristics of the Cisco UCS 6324 Fabric Interconnect.

**Table 1.** Characteristics of Cisco UCS 6324 Fabric Interconnect<sup>2</sup>

Item	Cisco UCS 6324
<b>Description</b>	Fabric interconnect with 4 unified ports and 1 scalability port
<b>Form factor</b>	I/O module for Cisco UCS 5108 chassis
<b>Number of 1 and 10 Gigabit Ethernet, FCoE, or Fibre Channel Enhanced Small Form-Factor Pluggable (SFP+) external ports</b>	4
<b>Number of 40 Gigabit Ethernet or FCoE Enhanced Quad SFP (QSFP) ports</b>	1
<b>Server ports</b>	16 x 10GBASE-KR lanes
<b>Number of rack servers supported<sup>3</sup></b>	Single Cisco UCS 5108 Blade Server Chassis: 7 With second Cisco UCS 5108 Blade Server Chassis: 4
<b>Throughput</b>	500 Gbps
<b>Latency</b>	Less than a microsecond
<b>Quality-of-service (QoS) hardware queues</b>	16 (8 each for unicast and multicast)

## Features and Benefits

Table 2 summarizes the features and benefits of the Cisco UCS 6324 Fabric Interconnect.

**Table 2.** Features and Benefits

Feature	Benefit
<b>Management by Cisco UCS Manager</b>	<ul style="list-style-type: none"> <li>Allows all elements connected to the interconnects to participate in a single, highly available management domain</li> </ul>
<b>Unified fabric</b>	<ul style="list-style-type: none"> <li>Decreases TCO by reducing the number of NICs, HBAs, switches, and cables needed</li> <li>Transparently encapsulates Fibre Channel packets into Ethernet</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>Provides high-speed, low-latency connectivity to the chassis</li> </ul>
<b>Lossless fabric</b>	<ul style="list-style-type: none"> <li>Provides a reliable, robust foundation for unifying LAN and SAN traffic on a single transport</li> </ul>
<b>Priority flow control (PFC)</b>	<ul style="list-style-type: none"> <li>Simplifies management of multiple traffic flows over a single network link</li> <li>Supports different classes of service, helping enable both lossless and classic Ethernet on the same fabric</li> </ul>
<b>Cisco Data Center VM-FEX technology</b>	<ul style="list-style-type: none"> <li>Helps enable a consistent operational model for both virtual and physical environments</li> <li>Provides the same level of network visibility for virtualized and nonvirtualized environments</li> <li>Improves diagnostic and troubleshooting capabilities in a virtual environment</li> <li>Simplifies network and security policy enforcement when migrating virtual machines from one host to another</li> </ul>
<b>SFP+ ports</b>	<ul style="list-style-type: none"> <li>Increases flexibility with a range of interconnect solutions, including copper Twinax cable for short runs and fiber for long runs</li> <li>Consumes less power per port than traditional solutions</li> <li>Helps enable cost-effective connections on fabric extenders with Cisco Fabric Extender Transceiver (FET) optics</li> </ul>
<b>SFP-compatible ports</b>	<ul style="list-style-type: none"> <li>Allows all fixed SFP+ ports to be configured to operate in 1 Gigabit Ethernet mode with the transceiver options specified for use with the SFP-compatible ports listed in Table 3</li> </ul>

<sup>2</sup> The Cisco UCS 6324 Fabric Interconnect requires Cisco UCS Manager Release 3.0 or later operating software.

<sup>3</sup> See the Cisco UCS Mini blade server chassis specifications sheet for all the permutations.

## Product Specifications

### Unified Port Transceivers

The Cisco UCS 6324 Fabric Interconnect supports a wide variety of 10 Gigabit Ethernet connectivity options using Cisco 10GBASE SFP+ modules. In addition, the four SFP+ uplink ports support 1 Gigabit Ethernet connectivity options using 1GBASE SFP modules. Alternatively, 2/4/8-Gbps Fibre Channel SFP+ interfaces are supported.

Table 3 lists the supported transceiver options.

**Table 3.** Cisco UCS 6324 Fabric Interconnect Transceiver Support Matrix

Cisco SFP	Description
<b>Cisco DS-SFP-FC4G-LW</b>	4-Gbps Fibre Channel LW SFP, LC (10-km reach)
<b>Cisco DS-SFP-FC4G-SW</b>	4-Gbps Fibre Channel SW SFP, LC
<b>Cisco DS-SFP-FC8G-LW</b>	8-Gbps Fibre Channel LW SFP+, LC
<b>Cisco DS-SFP-FC8G-SW</b>	8-Gbps Fibre Channel SW SFP+, LC
<b>Cisco GLC-TE</b>	1000BASE-T SFP (for SFP-compatible ports only, as defined in Table 2)
<b>Cisco GLC-LH-SM</b>	GE SFP, LC connector LX/LH transceiver (SMF) (for SFP-compatible ports only, as defined in Table 2)
<b>Cisco GLC-SX-MM</b>	GE SFP, LC connector SX transceiver (MMF) (for SFP-compatible ports only, as defined in Table 2)
<b>Cisco GLC-T</b>	1000BASE-T SFP (for SFP-compatible ports only, as defined in Table 2)
<b>Cisco SFP-10G-AOC10M</b>	10GBASE active optical SFP+ cable, 10m
<b>Cisco SFP-10G-AOC1M</b>	10GBASE active optical SFP+ cable, 1m
<b>Cisco SFP-10G-AOC3M</b>	10GBASE active optical SFP+ cable, 3m
<b>Cisco SFP-10G-AOC5M</b>	10GBASE active optical SFP+ cable, 5m
<b>Cisco SFP-10G-AOC7M</b>	10GBASE active optical SFP+ cable, 7m
<b>Cisco SFP-10G-LR</b>	10GBASE-LR SFP module
<b>Cisco SFP-10G-LR-X</b>	10GBASE-LR SFP module for extended temperature range
<b>Cisco SFP-10G-SR</b>	10GBASE-SR SFP+ module (multimode fiber [MMF])
<b>Cisco SFP-10G-SR-X</b>	10GBASE-SR SFP+ transceiver module for MMF, 850-nm wavelength, LC duplex connector, extended temperature range
<b>Cisco SFP-H10GB-ACU10M</b>	10GBASE-CU SFP+ cable, 10m (Twinax cable)
<b>Cisco SFP-H10GB-ACU7M</b>	10GBASE-CU SFP+ cable, 7m (Twinax cable)
<b>Cisco SFP-H10GB-CU1M</b>	10GBASE-CU SFP+ cable, 1m (Twinax cable)
<b>Cisco SFP-H10GB-CU2M</b>	10GBASE-CU SFP+ cable, 2m (Twinax cable)
<b>Cisco SFP-H10GB-CU3M</b>	10GBASE-CU SFP+ cable, 3m (Twinax cable)
<b>Cisco SFP-H10GB-CU5M</b>	10GBASE-CU SFP+ cable, 5m (Twinax cable)

### Scalability Port Transceivers

The Cisco UCS 6324 Fabric Interconnect supports a QSFP+ port that provides connectivity for up to 4 Cisco UCS rack servers. Table 4 lists the transceiver options support by the scalability port.

**Table 4.** QSFP+ Transceiver Support Matrix

<b>QSFP-4SFP10G-CU1M</b>	40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable assemblies, 1m passive
<b>QSFP-4SFP10G-CU3M</b>	40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable assemblies, 3m passive
<b>QSFP-4SFP10G-CU5M</b>	40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable assemblies, 5m passive
<b>QSFP-4x10G-AC10M</b>	40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable assemblies, 10m active
<b>QSFP-4x10G-AC7M</b>	40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable assemblies, 7m active
<b>QSFP-4X10G-AOC10M</b>	40GBASE active optical QSFP to 4SFP breakout cable, 10m

## Cabling

Table 5 provides cabling specifications for the Cisco UCS 6324 Fabric Interconnect.

**Table 5.** Cabling Specifications

Connector (Media)	Cable	Distance	Power (Each Side)	Transceiver Latency (Link)	Standard
<b>SFP+ copper (CU)</b>	Twinax	1, 3, 5, 7, and 10m	Approximately 0.1 watt (W)	Approximately 0.1 microsecond	SFF 8431
<b>SFP+ short reach (SR) and MMF</b>	MM OM2 MM OM3 MM OM4	82 and 300m	1W	Approximately 0 microseconds	IEEE 802.3ae
<b>QSFP+ copper (CU)</b>	Twinax	1, 3, 5, 7, and 10m	1.5W	Approximately 0.1 microsecond	SFF 8635

## Performance

- Cisco UCS 6324 Fabric Interconnect: Layer 2 hardware forwarding at 500 Gbps or 375 million packets per second (mpps)
- MAC address table entries: 20,000
- Low-latency cut-through design: Provides predictable, consistent traffic latency regardless of packet size, traffic pattern, or enabled features

## Layer 2

- Layer 2 interconnect ports and VLAN trunks
- IEEE 802.1Q VLAN encapsulation
- Support for up to 512 VLANs and 32 virtual SANs (VSANs) per interconnect
- 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)

## QoS

- Layer 2 IEEE 802.1p (class of service [CoS])
- CoS trust
- CoS-based egress queuing
- Egress port-based scheduling: Deficit Weighted Round-Robin (DWRR)
- 16 hardware queues (8 each for unicast and multicast)

## High Availability

- Two Cisco UCS 6324 Fabric Interconnect Fabric Interconnects can be clustered together within the chassis to provide a highly available interconnect system
- Firmware upgrades can be performed on each fabric interconnect independently, allowing server connectivity to be maintained while firmware upgrades are completed

## 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

## Data Center Bridging 10 Gigabit Ethernet Unified Network Fabric

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

## Unified Ports

- All 4 SFP+ ports configurable as 1/10 Gigabit Ethernet or 2/4/8-Gbps Fibre Channel

## Industry Standards

- IEEE 802.1p: CoS prioritization
- IEEE 802.1Q: VLAN tagging
- IEEE 802.3: Ethernet
- IEEE 802.3ad: LACP
- IEEE 802.3ae: 10 Gigabit Ethernet
- IEEE 802.1AB LLDP
- SFP+ support
- RMON

## Physical Specifications

### SFP+ Optics

Cisco UCS products support 10 Gigabit Ethernet SFP+ copper Twinax cables for short distances and SFP+ optics for longer distances. SFP+ has several advantages compared to other 10 Gigabit Ethernet connectivity options:

- Small 10 Gigabit Ethernet form factor
- Optical interoperability with XENPAK, X2, and 10 Gigabit Small Form-Factor Pluggable (XFP) interface types
- Low power consumption
- Hot-swappable device

## Cisco UCS 6324 Fabric Interconnect Physical and Environmental Specifications

Table 6 summarizes the physical and environmental specifications for the Cisco UCS 6324 Fabric Interconnect.

**Table 6.** Physical and Environmental Specifications

Property	Cisco UCS 6324
<b>Physical (height x width x depth)</b>	7.64 x 1.36 x 7.2 in. (194 x 34.5 x 183 mm)
<b>Ambient Operating temperature</b>	32 to 95°F (0 to 35°C)
<b>Nonoperating temperature</b>	-40 to 158°F (-40 to 70°C)
<b>Humidity</b>	5 to 95% (noncondensing)
<b>Altitude</b>	0 to 10,000 ft (0 to 300m)
<b>Weight</b>	2.5 lb (1.134 kg)

## Regulatory Standards Compliance: Safety and EMC

Table 7 summarizes Cisco UCS 6324 Fabric Interconnect regulatory compliance.

**Table 7.** Regulatory Standards Compliance

Specification	Description
<b>Regulatory compliance</b>	Products complies with CE Markings according to directives 2004/108/EC and 2006/95/EC
<b>Safety</b>	<ul style="list-style-type: none"><li>• UL 60950-1</li><li>• CAN/CSA-C22.2 No. 60950-1</li><li>• EN 60950-1</li><li>• IEC 60950-1</li><li>• AS/NZS 60950-1</li><li>• GB4943</li></ul>
<b>EMC: Emissions</b>	<ul style="list-style-type: none"><li>• 47CFR Part 15 (CFR 47) Class A</li><li>• AS/NZS CISPR22 Class A</li><li>• CISPR22 Class A</li><li>• EN55022 Class A</li><li>• ICES003 Class A</li><li>• VCCI Class A</li><li>• EN61000-3-2</li><li>• EN61000-3-3</li><li>• KN22 Class A</li><li>• CNS13438 Class A</li></ul>
<b>EMC: Immunity</b>	<ul style="list-style-type: none"><li>• EN50082-1</li><li>• EN61000-6-1</li><li>• EN55024</li><li>• CISPR24</li><li>• EN300386</li><li>• KN 61000-4 series</li></ul>
<b>RoHS</b>	The product is RoHS 6-compliant

## Warranty Information

Warranty information is provided at Cisco.com on the [Product Warranties](#) page.



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## Cisco Unified Computing Services

Using a unified view of data center resources, Cisco and our industry-leading partners deliver services that accelerate your transition to a unified computing environment. Cisco Unified Computing Services helps you quickly deploy your data center resources and optimize ongoing operations to better meet your business needs. For more information about these and other Cisco Data Center Services, visit <http://www.cisco.com/go/dcservices>.

## Why Cisco?

Cisco has significant experience in listening to customer requirements and providing solid technology innovation for the enterprise data center. Cisco delivers standards-based solutions backed by a broad partner ecosystem of industry leaders to provide end-to-end customer solutions. Unified computing elevates the traditional product classification of network, server, storage, operating systems, and applications to a vision that encompasses the whole data center. Cisco, as one of the largest technology providers in the world, has the resources, expertise, and customer focus to deliver on this vision.

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## For More Information

For more information about the Cisco UCS 6324 Fabric Interconnect, visit <http://www.cisco.com/en/US/products/ps10276/index.html> or contact your local account representative.



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Cisco Systems, Inc.  
San Jose, CA

Asia Pacific Headquarters  
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