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Cisco UCS 6324 Fabric Interconnect

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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 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).

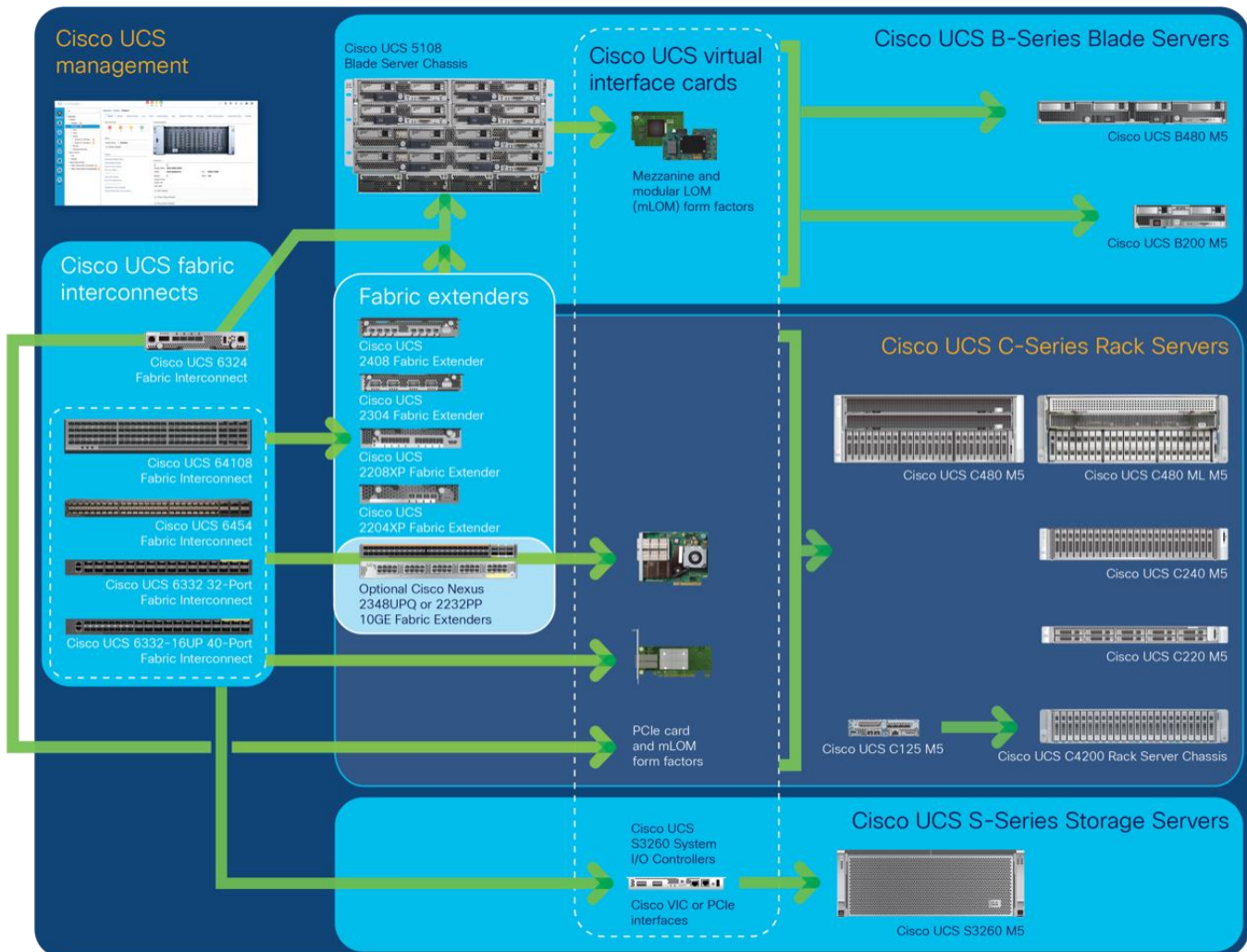


Figure 1.
The Cisco Unified Computing System is a Highly Available Cohesive Architecture

Product overview

The Cisco UCS 6324 Fabric Interconnect provides the management, LAN, and storage connectivity for the Cisco UCS 5108 Blade Server Chassis and direct-connect rack-mount servers. It provides the same full-featured Cisco UCS management capabilities and XML API as the full-scale Cisco UCS solution in addition to integrating with Cisco UCS Central Software and Cisco UCS Director (Figure 2).

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 2).

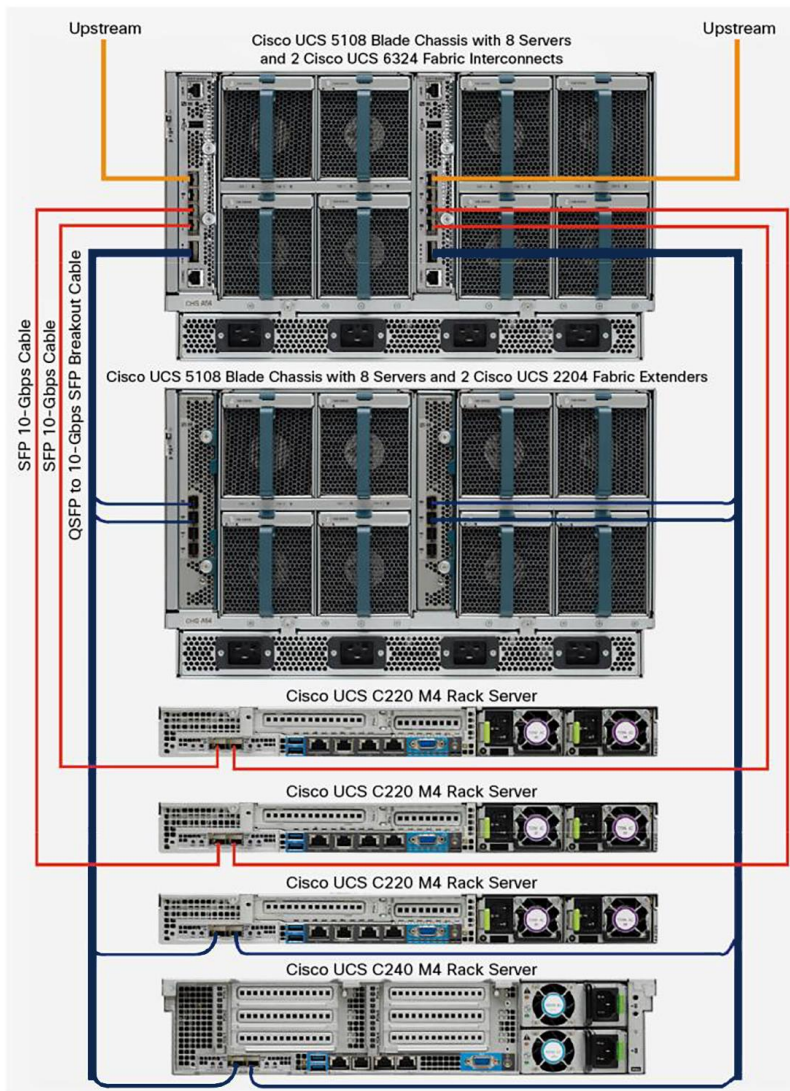


Figure 2.
Full Scale Cisco UCS 6324 Fabric Interconnect solution

From a networking perspective, the Cisco UCS 6324 Fabric Interconnect uses a cut-through architecture, supporting deterministic, low-latency, line-rate 10 Gigabit Ethernet on all ports, switching capacity of up to 500 Gbps, and 80-Gbps uplink bandwidth for each chassis, independent of packet size and enabled services. Sixteen 10-Gbps links connect to the servers, providing a 20-Gbps link from each Cisco UCS 6324 Fabric Interconnect to each server. The product family supports Cisco® low-latency, lossless 10 Gigabit Ethernet¹ 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 blade through the fabric interconnect. Significant TCO savings come from a Fibre Channel over Ethernet (FCoE)-optimized server design in which Network Interface Cards (NICs), Host Bus Adapters (HBAs), cables, and switches can be consolidated.

Note:

¹ All Cisco UCS 6324 SFP+ ports can alternatively be configured for 1 Gigabit Ethernet (see Table 2)

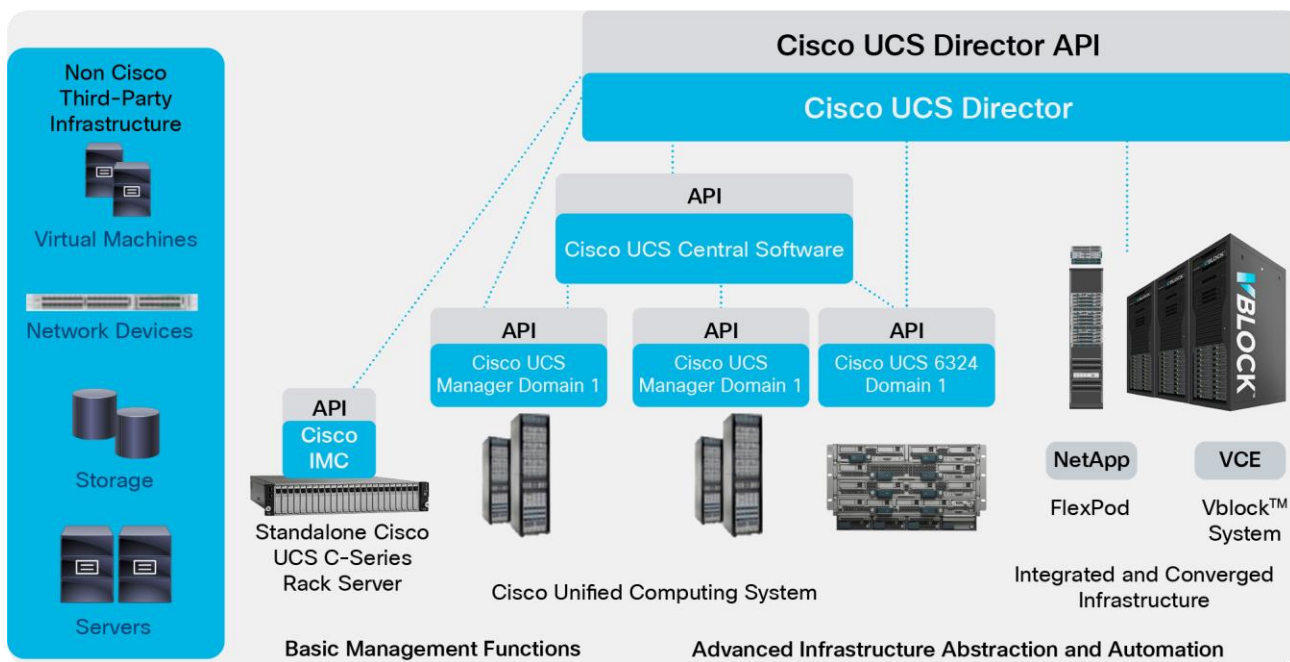


Figure 3.
Cisco UCS Management Architecture

Unified Fabric with FCoE: I/O consolidation

The Cisco UCS 6324 Fabric Interconnect is built to consolidate LAN and storage traffic onto a single unified fabric, eliminating 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 the fabric interconnect to support direct connections from Cisco UCS to Fibre Channel, FCoE, and Small Computer System Interface over IP (iSCSI) storage devices.

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 4) 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.

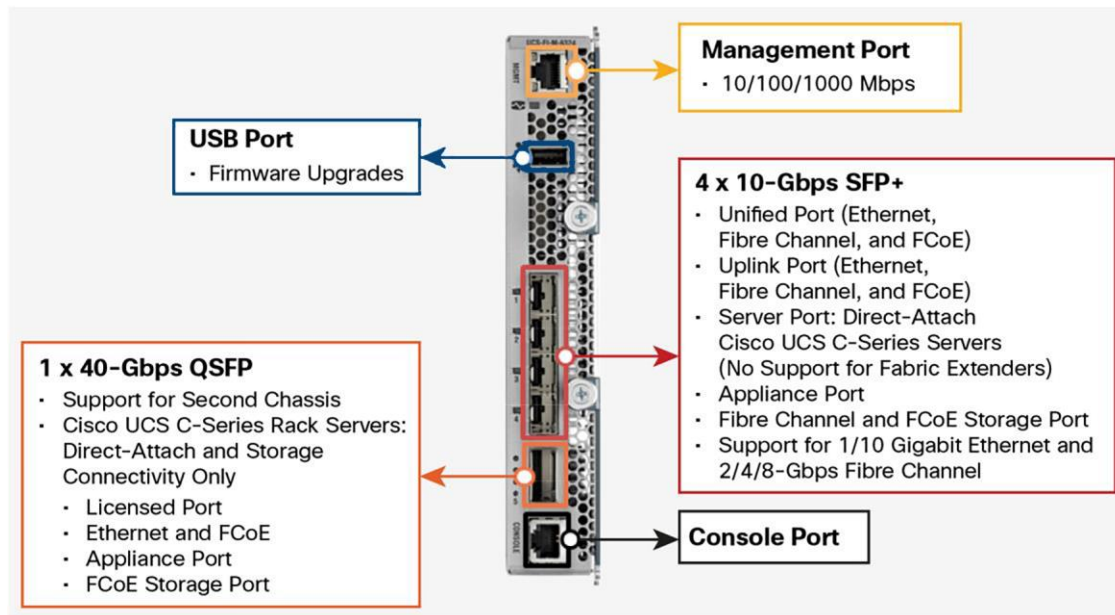


Figure 4.
Cisco UCS 6324 Fabric Interconnect

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

Table 1. Characteristics of Cisco UCS 6324 Fabric Interconnect²

Item	Cisco UCS 6324
Description	Fabric interconnect with 4 unified ports and 1 scalability port
Form factor	I/O module for Cisco UCS 5108 chassis
Number of 1/10 Gbps and FCoE or FC SFP+ external ports	4
Number of 40 Gbps or FCoE enhanced QSFP+ ports	1
Licensing	The QSFP+ port must be licensed with a port expansion in order to be put into service
Server ports	16 x 10GBASE-KR lanes
Number of rack servers supported³	Single Cisco UCS 5108 Blade Server Chassis: 7 With second Cisco UCS 5108 Blade Server Chassis: 4
Throughput	500 Gbps
Fan modules⁴	
Latency	Less than a microsecond
Quality-of-Service (QoS) hardware queues	16 (8 each for unicast and multicast)

Note: One SFP+ port must be used as an uplink.

Features and benefits

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

Table 2. Features and benefits

Feature	Benefit
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 needed Transparently encapsulates Fibre Channel packets into Ethernet
Performance	<ul style="list-style-type: none"> Provides high-speed, low-latency connectivity to the chassis
Lossless fabric	<ul style="list-style-type: none"> Provides a reliable, robust foundation for unifying LAN and SAN traffic on a single transport
Priority 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 lossless and classic Ethernet on the same fabric

Feature	Benefit
Cisco Data Center VM-FEX technology	<ul style="list-style-type: none"> • Helps enable a consistent operational model for both virtual and physical environments • Provides the same level of network visibility for virtualized and nonvirtualized environments • Improves diagnostic and troubleshooting capabilities in a virtual environment • Simplifies network and security policy enforcement when migrating virtual machines from one host to another
SFP+ ports	<ul style="list-style-type: none"> • Increases flexibility with a range of interconnect solutions, including copper Twinax cable for short runs and fiber 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
SFP-compatible ports	<ul style="list-style-type: none"> • 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

Note:

¹ We recommend that you use the current software version for above listed Gb port speed connections.

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

³ See the Cisco UCS Mini blade server chassis specifications sheet for all the permutations.

⁴ Cisco C-Series servers cannot be integrated with Cisco UCS Manager using a combination of 6324 and VIC 1400 series.

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

Product Name	Description
SFP 1-Gbps Transceivers	
GLC-TE	1000BASE-T SFP transceiver module for category 5 copper wire
GLC-LH-SM	GE SFP, LC connector LX/LH transceiver (SMF)
GLC-SX-MM	GE SFP, LC connector SX transceiver (MMF)
SFP+ 10-Gbps Transceivers	
SFP-10G-LR	Cisco 10GBASE-LR SFP+ module for Single-Mode Fiber (SMF)
SFP-10G-LR-S	Cisco 10GBASE-LR SFP+ module for SMF
SFP-10G-LR-X	Cisco 10GBASE-LR SFP Module for extended temp range

Product Name	Description
SFP-10G-SR	Cisco 10GBASE-SR SFP+ Module for Multimode Fiber (MMF)
SFP-10G-SR-S	Cisco 10GBASE-SR SFP+ module for MMF (S-Class)
SFP-10G-SR-X	Cisco 10 Gigabit Ethernet - short range SFP+ module (MMF), extended temperature
QSFP+ 40-Gbps Transceivers	
QSFP-40G-SR4	40GBASE-SR4 QSFP module (MMF at 100m)
Fibre Channel Transceivers	
DS-SFP-FC4G-SW	4-Gbps Fibre Channel shortwave, SFP, LC
DS-SFP-FC4G-LW	4-Gbps Fibre Channel longwave, SFP, LC
DS-SFP-FC8G-SW	8-Gbps Fibre Channel shortwave, SFP+, LC
DS-SFP-FC8G-LW	8-Gbps Fibre Channel longwave, SFP+, LC
SFP+ 10-Gbps Copper Cables with Integrated Transceivers	
SFP-H10GB-CU1M	10GBASE-CU SFP+ cable, 1m, passive
SFP-H10GB-CU2M	10GBASE-CU SFP+ cable, 2m, passive
SFP-H10GB-CU3M	10GBASE-CU SFP+ cable, 3m, passive
SFP-H10GB-CU5M	10GBASE-CU SFP+ cable, 5m, passive
SFP-H10GB-ACU7M	10GBASE-CU SFP+ cable, 7m, passive
SFP-H10GB-ACU10M	10GBASE-CU SFP+ cable, 10m, passive
SFP-10G-AOC1M	10GBASE-AOC SFP+ cable, 1m
SFP-10G-AOC2M	10GBASE-AOC SFP+ cable, 2m
SFP-10G-AOC3M	10GBASE-AOC SFP+ cable, 3m
SFP-10G-AOC5M	10GBASE-AOC SFP+ cable, 5m
SFP-10G-AOC7M	10GBASE-AOC SFP+ cable, 7m
SFP-10G-AOC10M	10GBASE-AOC SFP+ cable, 10m

Product Name	Description
QSFP+ 40-Gbps Copper Cables with Integrated Transceivers	
QSFP-4SFP10G-CU1M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ passive direct-attach copper transceiver assembly, 1m
QSFP-4SFP10G-CU3M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ passive direct-attach copper transceiver assembly, 3m
QSFP-4SFP10G-CU5M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ passive direct-attach copper transceiver assembly, 5m
QSFP-4x10G-AC7M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 7m, active
QSFP-4x10G-AC10M	Cisco 40GBASE-CR4 QSFP+ to 4 10GBASE-CU SFP+ direct-attach breakout cable, 10m, active
QSFP-4x10G-AOC1M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 1m
QSFP-4x10G-AOC2M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 2m
QSFP-4x10G-AOC3M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 3m
QSFP-4x10G-AOC5M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 5m
QSFP-4x10G-AOC7M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 7m
QSFP-4x10G-AOC10M	Cisco 40GBASE-AOC QSFP to 4 SFP+ active optical breakout cable, 10m

Note:

¹ The 40-Gigabit QSFP+ transceiver module is a hot-swappable, parallel fiber-optical module with four independent optical transmit and receive channels. These channels can terminate in another 40-Gigabit QSFP+ transceiver, or the channels can be broken out to four separate 10-Gigabit SFP+ transceivers. The QSFP+ transceiver module connects the electrical circuitry of the system with either a copper or an optical external network. The transceiver is used primarily in short reach applications in switches, routers, and data center equipment where it provides higher density than SFP+ modules

² Observe the following:

The maximum number of SFP+ transceivers, SFP optical transceivers, copper transceivers, or twinax cables must be less than or equal to four. A minimum of one of these must be installed for the 6324 to have network connectivity.

The maximum number of Fibre Channel SFPs must be less than or equal to three. The reason for this is that at least one SFP+ port on the 6324 must be free so the 6324 can connect to a network.

Scalability port transceivers

The Cisco UCS 6324 Fabric Interconnect supports a QSFP+ port that provides connectivity for up to 4 Cisco UCS rack servers.

Cabling

Table 4 provides cabling specifications for the Cisco UCS 6324 Fabric Interconnect.

Table 4. Cabling specifications

Connector (Media)	Cable	Distance	Power (Each Side)	Transceiver Latency (Link)	Standard
SFP+ Copper (CU)	Twinax	1, 3, 5, 7, and 10m	Approximately 0.1 watt (W)	Approximately 0.1 microsecond	SFF 8431
SFP+ Short Reach (SR) and MMF	MM OM2 MM OM3 MM OM4	82 and 300m	1W	Approximately 0 microseconds	IEEE 802.3ae
QSFP+ Copper (CU)	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 5 summarizes the physical and environmental specifications for the Cisco UCS 6324 Fabric Interconnect.

Table 5. Physical and environmental specifications

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

Regulatory Standards Compliance: Safety and EMC

Table 6 summarizes Cisco UCS 6324 Fabric Interconnect regulatory compliance.

Table 6. Regulatory standards compliance

Specification	Description
Regulatory compliance	Products complies with CE Markings according to directives 2004/108/EC and 2006/95/EC
Safety	<ul style="list-style-type: none">• UL 60950-1• CAN/CSA-C22.2 No. 60950-1• EN 60950-1• IEC 60950-1• 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

Specification	Description
EMC: Immunity	<ul style="list-style-type: none"> • EN50082-1 • EN61000-6-1 • EN55024 • CISPR24 • EN300386 • KN 61000-4 series
RoHS	The product is RoHS 6-compliant

Warranty information

Warranty information is provided 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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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 <https://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.

Cisco Capital

Flexible payment solutions to help you achieve your objectives

Cisco Capital makes it easier to get the right technology to achieve your objectives, enable business transformation and help you stay competitive. We can help you reduce the total cost of ownership, conserve capital, and accelerate growth. In more than 100 countries, our flexible payment solutions can help you acquire hardware, software, services and complementary third-party equipment in easy, predictable payments. [Learn more.](#)

For more information

For more information about the Cisco UCS 6324 Fabric Interconnect, visit <https://www.cisco.com/c/en/us/products/servers-unified-computing/ucs-mini/index.html> or contact your local account representative.

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