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CISCO
The bridge to possible

Cisco UCS 6536 Fabric Interconnect

Contents

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).
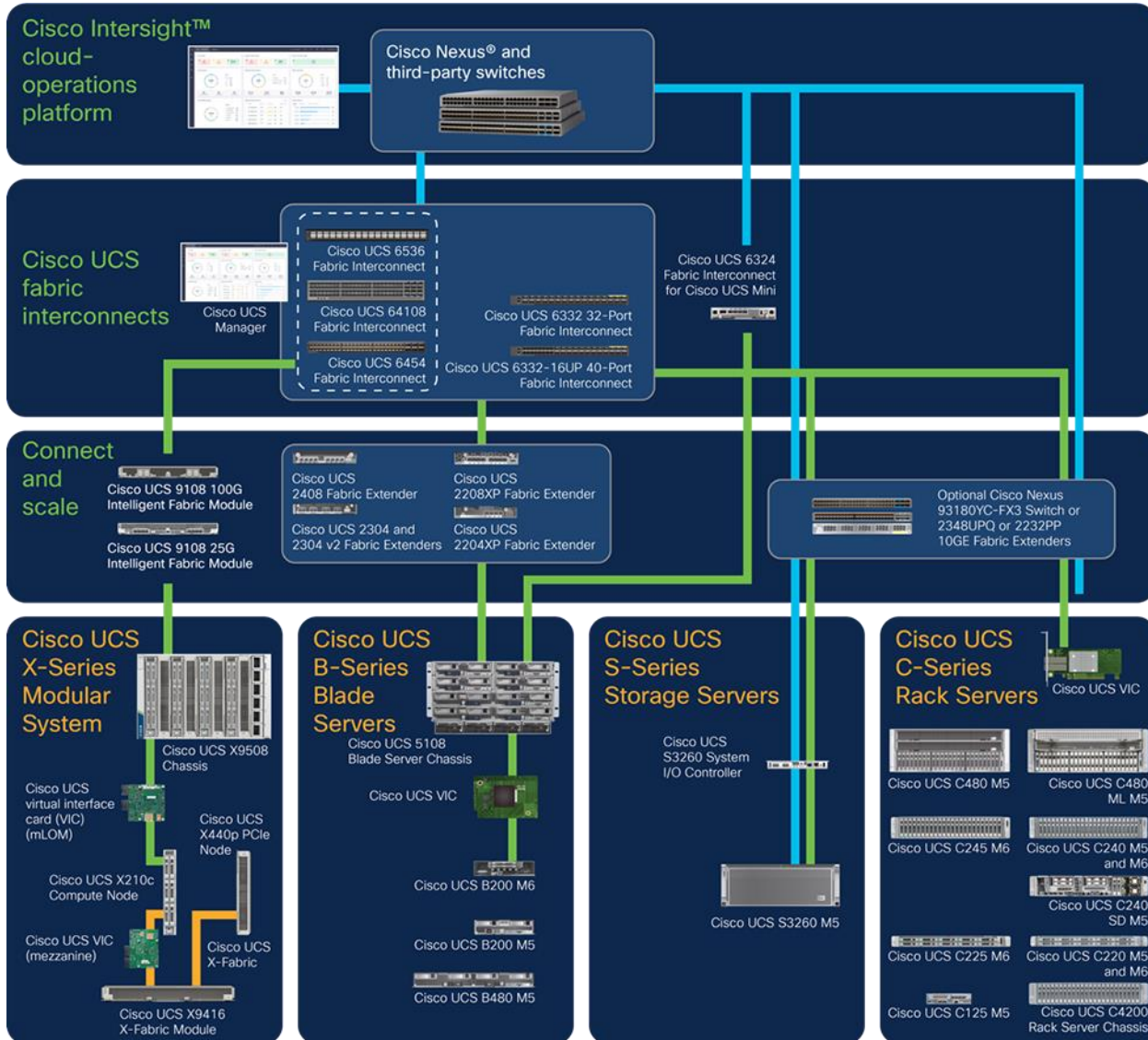

Figure 1.
The Cisco Unified Computing System's highly available, cohesive architecture

Product overview

The Cisco UCS 6536 Fabric Interconnect (FI) is a core part of the Cisco Unified Computing System, providing both network connectivity and management capabilities for the system (Figure 2). The Cisco UCS 6536 Fabric Interconnect offers line-rate, low-latency, lossless 10/25/40/100 Gigabit Ethernet, Fibre Channel, NVMe over Fabric, and Fibre Channel over Ethernet (FCoE) functions.

The Cisco UCS 6536 Fabric Interconnect provides the communication backbone and management connectivity for the Cisco UCS X-Series compute nodes, UCS X9508 X-series chassis, UCS B-series blade servers, UCS 5108 B-series server chassis, and UCS C-series rack servers. All servers attached to a Cisco UCS 6536 Fabric Interconnect become part of a single, highly available management domain. In addition, by supporting a unified fabric, Cisco UCS 6536 Fabric Interconnect provides both LAN and SAN connectivity for all servers within its domain.

From a networking perspective, the Cisco UCS 6536 uses a cut-through architecture, supporting deterministic, low-latency, line-rate 10/25/40/100 Gigabit Ethernet ports, a switching capacity of 7.42 Tbps per FI and 14.84 Tbps per unified fabric domain, independent of packet size and enabled services. It enables 1600Gbps bandwidth per X9508 chassis with X9108-IFM-100G in addition to enabling end-to-end 100G ethernet and 200G aggregate bandwidth per X210c compute node. With the X9108-IFM-25G and the IOM 2408, it enables 400Gbps bandwidth per chassis per FI domain. The product family supports Cisco® low-latency, lossless 10/25/40/100 Gigabit Ethernet unified network fabric capabilities, which increases the reliability, efficiency, and scalability of Ethernet networks. The 6536 Fabric Interconnect supports multiple traffic classes over a lossless Ethernet fabric from the server through the fabric interconnect. Significant TCO savings come from the Unified Fabric optimized server design in which Network Interface Cards (NICs), Host Bus Adapters (HBAs), cables, and switches can be consolidated.

Figure 2.
Cisco UCS 6536 Fabric Interconnect

UCS Unified fabric: I/O consolidation

The Cisco UCS 6536 Fabric Interconnect is built to consolidate LAN and SAN traffic onto a single unified fabric, saving on 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 to a native Fibre Channel protects existing storage-system investments while dramatically simplifying in-rack cabling.

UCS 6536 Fabric Interconnect supports I/O consolidation with end-to-end network virtualization, visibility, and QoS guarantees for the following LAN and SAN traffic.

- FC SAN, IP Storage (iSCSI, NFS), NVMEoF (NVMe/FC, NVMe/TCP, NVMe over ROCEv2)
- Server management and LAN traffic

The I/O consolidation under the UCS 6536 fabric interconnect along with the stateless policy-driven architecture of UCS and the hardware acceleration of the UCS Virtual Interface card provides great simplicity, flexibility, resiliency, performance, and TCO savings for the customer's compute infrastructure.
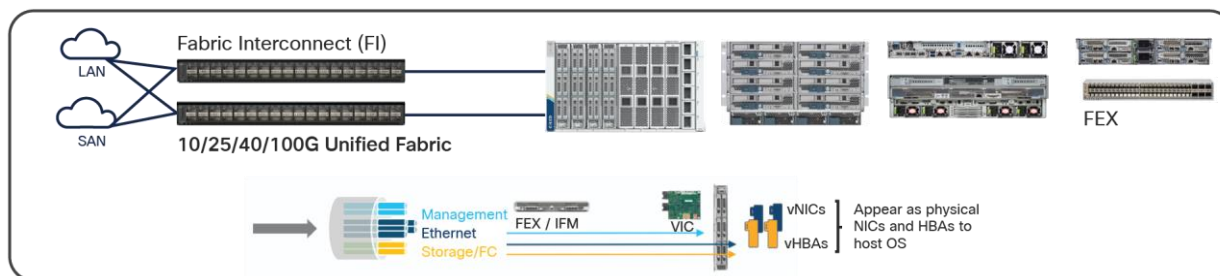

Figure 3.
Cisco UCS Unified Fabric

Management Options

Cisco UCS Manager

The Cisco UCS 6536 Fabric Interconnect hosts and run Cisco UCS Manager in a highly available configuration, enabling the fabric interconnects to fully manage all Cisco UCS elements.

Cisco UCS Manager (UCSM) on UCS 6536 Fabric Interconnect will support Cisco UCS product models, including Cisco UCS X-Series Servers, B-Series Blade Servers and C-Series Rack Servers, Cisco UCS S-Series Storage Servers, as well as the associated storage resources and networks.

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.

Intersight Managed Mode

The Cisco UCS 6536 Fabric Interconnect can be managed through Cisco Intersight. The UCS 6536 Fabric Interconnect supports Intersight Managed Mode (IMM), which enables full manageability of Cisco UCS elements behind the UCS 6536 FI through Cisco Intersight.

UCS 6536 Fabric Interconnect in Intersight managed mode will support Cisco UCS product models, including Cisco UCS X-Series Servers, Cisco UCS B-Series Blade Servers and C-Series Rack Servers, as well as the associated storage resources and networks.

Connectivity

Connectivity for the Cisco UCS X9508 X-series chassis is maintained through the Cisco UCS X9108-IFM-100G or X9108-IFM-25G Intelligent Fabric Module (IFM) in each X-series chassis. Connectivity to the Cisco UCS 5108 Blade Server Chassis is maintained through the Cisco UCS 2304 and 2408 Series Fabric Extenders in each blade chassis.

The Cisco UCS C-series servers can directly connect to UCS 6536 Fabric Interconnect through the UCS VIC 1300 Series, VIC 1400 series or the VIC 15000 series. The Cisco UCS C-series servers can also connect to the FI 6536 using the Cisco Nexus 93180YC-FX3 in FEX-mode or Cisco Nexus 2348UPQ.

The Cisco UCS 6536 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 6536 Fabric Interconnect

The Cisco UCS 6536 36-Port Fabric Interconnect (Figure 3) is a One-Rack-Unit (1RU) 1/10/25/40/100 Gigabit Ethernet, FCoE, and Fibre Channel switch offering up to 7.42 Tbps throughput and up to 36 ports. The switch has 32 40/100-Gbps Ethernet ports and 4 unified ports that can support 40/100-Gbps Ethernet ports or 16 Fiber Channel ports after breakout at 8/16/32-Gbps FC speeds. The 16 FC ports after breakout can operate as an FC uplink or FC storage port. The switch also supports two ports at 1-Gbps speed using QSA, and all 36 ports can breakout for 10- or 25-Gbps Ethernet connectivity. All Ethernet ports can support FCoE.

Front view

Rear view

Figure 4.
Cisco UCS 6536 (1RU) Fabric Interconnect

Table 1 summarizes the characteristics of the Cisco UCS 6536 Fabric Interconnect.

Table 1.   Characteristics of the Cisco UCS 6536 Fabric Interconnect

Item	Cisco UCS 6536 Fabric Interconnect
Description	36-port fabric interconnect
Form factor	1RU
Number of fixed 10/25/40/100-Gbps and FCoE ports with optional unified ports	36 fixed ports
Maximum number of unified ports	4 (unified ports 33–36)
Maximum number of 1-Gbps Ethernet ports	2 (ports 9, 10)
Maximum number of 10/25-Gbps Ethernet ports	144 (after breakout of ports 1–36)
Maximum number of 40/100-Gbps Ethernet ports	36 (ports 1–36)
Maximum number of 8/16/32-Gbps FC ports	16 (after breakout of ports 33–36)
Throughput	7.42 Tbps
Fan modules	6

Note: Breakout is supported on all 36 ports and of these the UCS 6536 Fabric Interconnect can support a maximum of 128 server ports after breakout. Additionally, there is also support for QSA and QSA-28 to support 1G/10G/25G speeds without using a breakout cable.

Features and benefits

Table 2 summarizes the features and benefits of Cisco UCS 6536 Fabric Interconnects.

Table 2.   Features and benefits

Feature	Benefits
Power supply	• Two power supplies (AC)
Management (Cisco UCS Manager/Cisco Intersight)	• Allows all elements connected to the interconnects to participate in a single, highly available management domain
Unified fabric	• Decreases TCO by reducing the number of NICs, HBAs, switches, and cables required • Support Fibre Channel and Ethernet traffic concurrently in a Unified Fabric
Fabric extender architecture	• 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	• 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.)

Feature	Benefits
Lossless fabric	• Provides a reliable, robust foundation for unifying LAN and SAN traffic on a single transport
Priority-based Flow Control (PFC)	• 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
Systemwide bandwidth management	• Helps enable consistent and coherent Quality of Service (QoS) throughout the system.
Rear ports	• Helps keep cable lengths short and efficient
Redundant hot-swappable fans and power supplies	• Helps enable high availability in multiple configurations • Increases serviceability • Provides uninterrupted service during maintenance • Each fan module consists of two fan rotors. Redundancy of fan is implemented in the rotor level, with a total of 12 rotors across 6 fan modules.
Front-to-back cooling	• Fan-side intake, port-side exhaust
QSFP28-compatible Ports	• 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 • All 36 ports of the 6536 Fabric Interconnect support breakout and QSA/QSA28 to increase flexibility with a range of interconnect solutions at 1G/10G/25G speeds, including copper Twinax cable for short runs and SFP+ and SFP28 optics for long runs.
Licensing options	• Ships with a perpetual license. This license activates all the ports and software features of the Fabric Interconnect and no license management is needed from the customer.

Product specifications

Cables and Transceivers

Cisco UCS 6536 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 (UPs) on the Cisco UCS 6536 support 10/25/40G/100G Gigabit Ethernet connectivity or a 128G FC-QSFP28, which can breakout into four 8/16/32 Gigabit Fibre Channel connections per port. The Cisco UCS 6536 provides flexible uplink port connectivity at 1G/10G/25G/40G/100G through Gigabit Ethernet transceivers and cables.

Refer the Cisco UCS 6536 spec-sheet for the full list of supported cables and transceivers. https://www.cisco.com/c/dam/en/us/products/collateral/servers-unified-computing/ucs-x-series-modular-system/cisco-ucs-6536-fabric-interconnect-spec-sheet.pdf

Performance

- Cisco UCS 6536: Layer-2 hardware forwarding at 7.42 Tbps and 2.4 billion packets per second (bpps). Enabling an aggregate of 14.84 Tbps per UCS Unified fabric domain.

- 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
- Ethernet end-host mode
- Fibre Channel switch mode
- Fibre Channel end-host 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
- 802.1Q-in-802.1Q (QinQ) Forwarding
- VIC QinQ Tunneling

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 and fan modules.
- 1+1 power redundancy
- Fan module redundancy with dual rotors

Management

- Interconnect management using redundant 10/100/1000 Mbps management or console ports

- All management provided through Cisco Intersight.

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 6536 Fabric Interconnect, unified port can breakout into four 8/16/32-Gbps Fibre Channel ports or can be configured as 10/25/40/100G Ethernet.

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)

Table 3.   Cisco UCS FI 6536 supported IFM, IOM, FEX, VIC, and servers

Item	Supported Chassis, IFM, IOM, FEX, VIC, Servers
Chassis	UCSX-9508 and UCSB-5108
Intelligent Fabric Module	UCSX-9108-25G, UCSX-9108-100G
I/O Module	IOM 2304v1/v2, IOM 2408
Fabric Extender	N9K-C93180YC-FX3 in FEX mode, Nexus 2348UPQ
I/O Adapter	VIC 1300 series, VIC 1400/14000 series, VIC 15000 series
Servers	X-Series M6/M7, B-Series M4/M5/M6, C-Series M4/M5/M6/M7, S-series M5

Note: Cisco UCS 6536 Fabric Interconnect support was first made available in IMM mode from 4.2(2) UCS release. The UCS 6536 Fabric Interconnect from 4.2(3) UCS release enabled the following additional support – UCSM support, IOM 2304 support in IMM/UCSM, VIC 1300 series support in IMM/UCSM and Nexus FEX 2348UPQ in UCSM. Cisco UCS M4 B-series and C-series servers with UCS 6536 Fabric Interconnect are supported only in UCSM. The UCS 4.3(2) release enabled support for UCS X-Series M6/M7 servers in UCSM with UCS 6536 Fabric Interconnect.

Physical specifications

Table 4 summarizes the Cisco UCS 6536 Fabric Interconnect specifications.

Table 4.   Cisco UCS 6536 Fabric Interconnect specifications

Feature	Cisco UCS 6536
Ports	36 x 40/100-Gbps QSFP28 ports
Supported speeds	1/10/25/40/100-Gbps Ethernet/FCoE 8/16/32-Gbps Fibre Channel
CPU	4 cores
System memory	32 GB
Management ports	L1, L2, RJ-45 Management, RS-232 Serial
USB ports	1
Power supplies (up to 2)	1100W (AC)
Typical operating power	348W
Maximum power (AC)	800W
Maximum power (DC)	800W
Input voltage (AC)	100 to 240 VAC
Input voltage (DC)	-40 to -72VDC

Feature	Cisco UCS 6536
Frequency	50 to 60 Hz
Fans	6
Airflow	Standard airflow – front (PSU/fan-side) to back (port-side exhaust)
Efficiency (AC)	94 to 91% (50 to 100% load)
RoHS compliance	Yes
Hot swappable	Yes

Cisco UCS 6536 physical and environmental specifications

Table 5 summarizes the physical and environmental specifications for Cisco UCS 6536 Fabric Interconnects.

Table 5.   Physical and environmental specifications

Property	Cisco UCS 6536
Physical (height x width x depth)	1.72 in. x 17.3 in x 24.7 in (4.4 cm x 43.9 cm x 62.7 cm)
Operating temperature	32 to 104°F (0 to 40°C)
Nonoperating temperature	–40 to 158°F (–40 to 70°C)
Humidity	5 to 95%
Altitude	0 to 13,123 ft (0 to 4000m)

Weight

Table 6 summarizes the weights for the Cisco UCS 6536 Fabric Interconnect.

Table 6.   Weight, including power supplies and fan modules

Component	Weight
Cisco UCS 6536 with two power supplies and six fans installed	25.5 lb (11.6 kg), with fans

Regulatory standards compliance: Safety and EMC

Table 7 summarizes regulatory compliance for the Cisco UCS 6536 Fabric Interconnects.

Table 7.   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 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	• 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	• EN55024 • CISPR24 • EN300386 • KN 61000-4 series
RoHS	The product is RoHS 6-compliant with exceptions for leaded Ball-Grid-Array (BGA) balls and lead press-fit connectors.

Ordering information

Table 8 presents ordering information for Cisco UCS 6536 Fabric Interconnects.

Table 8.   Ordering information

Part number	Description
Fabric interconnects	
UCSX-FI-6536-U	1RU FI for Intersight (IMM), with no PSU, with 36 ports
UCS-FI-6536-U	1RU FI for UCS Manager, with no PSU, with 36 ports
Power supply and fan	
UCS-PSU-6536-AC	UCS 6536 platinum power supply/100-240VAC (1100 W)
UCS-FAN-6536	UCS 6536 fan module
Accessory and blank	
UCS-ACC-6536	UCS 6536 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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Cisco Services for Unified Computing

Using a unified view of data-center resources, Cisco and our industry-leading partners deliver services that accelerate your transition to a unified computing architecture. Cisco Services for Unified Computing help you quickly deploy your data center resources, simplify ongoing operations, and optimize your infrastructure to better meet your business needs. For more information about these and other Cisco services for the data center, visit https://www.cisco.com/go/unifiedcomputingservices.

Why Cisco?

The Cisco Unified Computing System continues Cisco's long history of innovation in delivering integrated systems for improved business results based on industry standards and using the network as the platform. Recent examples include IP telephony, LAN switching, unified communications, and unified I/O. Cisco began the unified computing phase of our unified data center strategy several years ago by assembling an experienced team from the computing and virtualization industries to augment our own networking and storage access expertise. As a result, Cisco delivered foundational technologies, including the Cisco Nexus Family, supporting unified fabric and server virtualization. Cisco UCS completes this phase, delivering innovation in architecture, technology, partnerships, and services. Cisco is well positioned to deliver this innovation by taking a systems approach to computing that unifies network intelligence and scalability with innovative ASICs, integrated management, and standard computing components.

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For more information

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

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