



Huawei CX220 Switch Module
V100R001C10

White Paper

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About This Document

Overview

This white paper describes the CX220 FC switch module in terms of the functions, advantages, appearance, specifications, internal chassis networking, and standards and certifications compliance. You can learn about the CX220 by reading this document.






Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.
 WARNING	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
 CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
 TIP	Provides a tip that may help you solve a problem or save time.
 NOTE	Provides additional information to emphasize or supplement important points in the main text.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 06 (2017-03-27)

This issue is the sixth official release.

Mode	Change Description
Added	Added product model descriptions to 1.3 Appearance .

Issue 05 (2017-02-17)

This issue is the fifth official release.

Mode	Change Description
Modified	Changed the altitude in 1.8 Technical Specifications .

Issue 04 (2016-11-22)

This issue is the fourth official release.

Mode	Change Description
Added	Added the description about the working temperature's compliance with the ASHRAE Class A3 standard in 1.8 Technical Specifications .

Issue 03 (2016-05-12)

This issue is the third official release.

Mode	Change Description
Added	In 1.7 Software and Hardware Compatibility , the following note is added: FC ports of the CX220 support only single-mode and multi-mode Brocade swappable optical modules.
Modified	Updated the supported standards and communication protocols in 2.1 Standards Compliance .

Issue 02 (2015-07-17)

This issue is the second official release.

Mode	Change Description
Modified	Added the throughput description to 1.8 Technical Specifications .

Issue 01 (2015-03-20)

The issue is the first official release.

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1 Overview

About This Chapter

[1.1 Functions](#)

This topic describes the CX220 FC switch module in terms of the functions, protocols, and ports.

[1.2 Advantages](#)

This topic describes the advantages of the CX220: high performance and ease of deployment and maintenance; abundant data center features.

[1.3 Appearance](#)

This topic describes the CX220 in terms of its appearance, panel, and installation positions in the chassis.

[1.4 Ports](#)

This topic describes the features, numbering rules, names, types, and quantities of the CX220 ports.

[1.5 Indicators](#)

This topic describes the names, meanings, colors and status of the indicators on the CX220.

[1.6 Internal Chassis Networking](#)

This topic describes connection relationships between the CX220 and mezzanine cards on compute nodes.

[1.7 Software and Hardware Compatibility](#)

This topic describes mezzanine cards that can work with the CX220 and pluggable modules and cables supported by ports on the CX220 panel.

[1.8 Technical Specifications](#)

This topic describes the physical, environmental, power, and network switching specifications of the CX220.

1.1 Functions

This topic describes the CX220 FC switch module in terms of the functions, protocols, and ports.

The CX220 FC switch module (hereinafter referred to as CX220) is the storage switching unit that provides storage data switching for server blades and provides external service and management ports in a centralized manner.

The CX220s are installed in the rear slots of the E9000 chassis. Through the E9000 chassis midplane, the CX220s are connected to the compute nodes and management modules to implement storage and management data switching, providing high-speed data transmission for users.

Table 1-1 describes the functions of the CX220.

Table 1-1 FC switching plane function description

Function		Description
Fibre Channel (FC) switching	FC optical port	Supports 4G/8G/16G FC autonegotiation, full duplex.
	Switching	<ul style="list-style-type: none"> ● Supports the FC switching mode (Native) and access gateway mode (that is, NPV mode). NPV is short for N-Port virtualization. ● Supports free mapping to the internal fibre channel (FC) ports and external FC ports in NPV mode. ● Supports network connection between E_Ports and Brocade FC switches in FC mode. A license is required for the function.
	NPIV	Supports N_Port ID virtualization (NPIV). A physical port supports access of multiple N_Port_IDs.
FC switching	Link aggregation	<p>Supports FC port multi-link aggregation to expand the port bandwidth and provide redundancy.</p> <ul style="list-style-type: none"> ● Supports connection only to Brocade FC switches. ● Requires a license.
Configuration and maintenance	Configuration and management modes	<ul style="list-style-type: none"> ● Supports configurations using command lines. ● Supports the HTTPS-based Webtool (graphical user interface). ● Simple Network Management Protocol version 1/3 (SNMPv1/v3). ● Supports the FC Fabric Element management information base (MIB).

Function		Description
	Connection mode	<ul style="list-style-type: none"> ● Ethernet connection (over SSH, SNMP, or the Web). ● Serial over LAN (SOL) connection.
	Version upgrade	<p>Supports online upgrades for software. Services are not interrupted during an upgrade. The upgrade takes effect after the restart.</p> <p>NOTE To ensure secure service application, periodically upgrade the switch module software version.</p>
Network security	System security	<ul style="list-style-type: none"> ● Hierarchical rights management based on user levels, preventing unauthorized users from accessing switch modules. ● Supports Secure Shell (SSH) and Secure Sockets Layer (SSL). ● Supports Hypertext Transfer Protocol Secure (HTTPS). ● Supports SNMPv1/v3. ● Supports Remote Authentication Dial In User Service (RADIUS) for user logins. ● Supports SSH login using the username and password or public and private keys.

1.2 Advantages

This topic describes the advantages of the CX220: high performance and ease of deployment and maintenance; abundant data center features.

High Performance

The CX220 FC switching plane provides eight 16G FC ports for connecting to the external FC SAN and provides 384 Gbit/s wire-speed switching capacity (768 Gbit/s throughput).

Easy Deployment and Maintenance

The CX220 provides one FC switching plane, which facilitates deployment. The panel indicators show the link connection status and fault status. The software upgrade and configuration files are easy to import or export, which facilitates maintenance.

Abundant Data Center Features

- Supports seamless intercommunication with the FC infrastructure, protecting investments on the FC SAN.
- Supports server virtualization VM and NPIV access to improve the data center interface bandwidth usage.

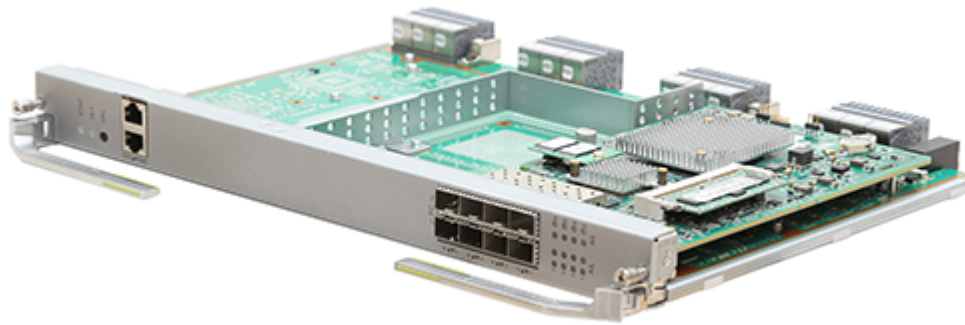
1.3 Appearance

This topic describes the CX220 in terms of its appearance, panel, and installation positions in the chassis.

Appearance

Figure 1-1 shows a CX220.

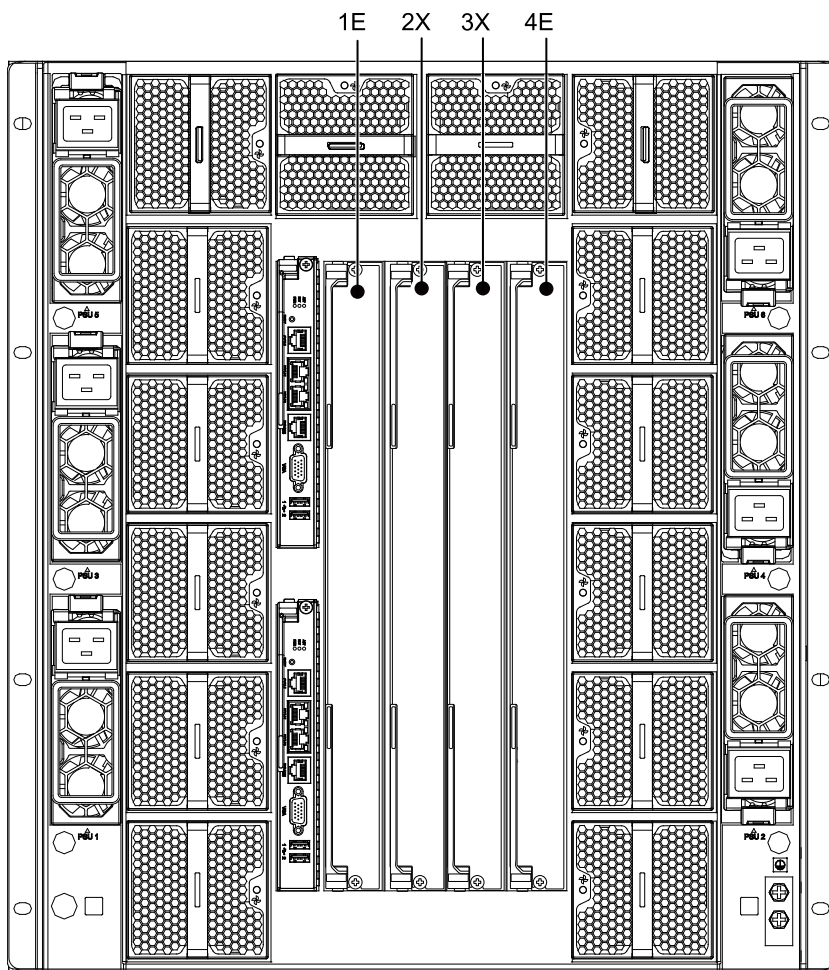
Figure 1-1 Appearance



Installation position

The CX220 can be installed in one of the four slots at the rear of the E9000 chassis. The four slots are 1E, 2X, 3X, and 4E, as shown in **Figure 1-2**.

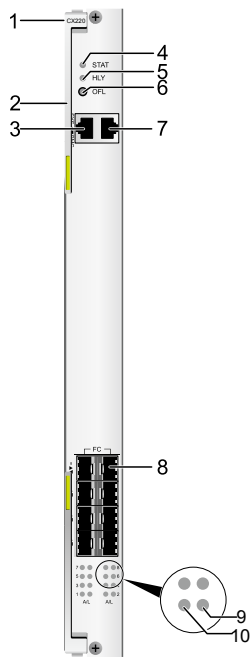
Figure 1-2 Installation positions and slot numbers



Front Panel

Figure 1-3 shows the CX220 front panel.

Figure 1-3 Front panel



1	Product Model	2	Slide-out information label (with an ESN label)
3	BMC serial port	4	Power-supply LEDs
5	Health indicator	6	Offline button/indicator
7	SYS serial port	8	16G FC optical port
9	Connection status indicator for the 16G FC optical port	10	Data transmission status indicator for the 16G FC optical port

NOTE

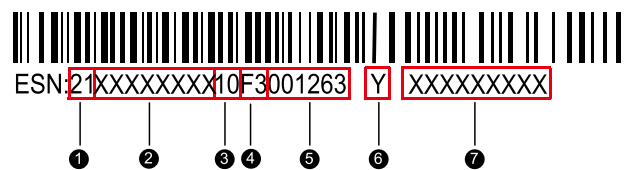
The numbers on the left of the panel are port numbers. The triangle mark directions indicate the port positions.

ESNs

An Equipment Serial Number (ESN) is a string that uniquely identifies a server. An ESN is required when you apply for technical support from Huawei.

Figure 1-4 shows the ESN format.

Figure 1-4 ESN example



No.	Description
1	Indicates the ESN ID (two digits).
2	Indicates the item identification code (eight characters).
3	Indicates the vendor code (two characters).
4	Indicates the year and month (two characters). The first character indicates the year. The digits 1 to 9 indicate 2001 to 2009, and the letters A to Z indicate 2010 to 2035. The second character indicates the month. The digits 1 to 9 indicate January to September, and the letters A to C indicate October to December.
5	Indicates the sequence number (six digits).
6	Indicates RoHS compliance (one character).
7	Indicates the internal model number of the board.

1.4 Ports

This topic describes the features, numbering rules, names, types, and quantities of the CX220 ports.

The CX220 provides ports for users to operate and configure. The ports are used to send and receive data.

The FC optical ports on the CX220 panel are numbered from 1 to 8. See [Figure 1-5](#) and [Table 1-2](#). For details about internal port numbers, see [Table 1-3](#).

Figure 1-5 Port numbers

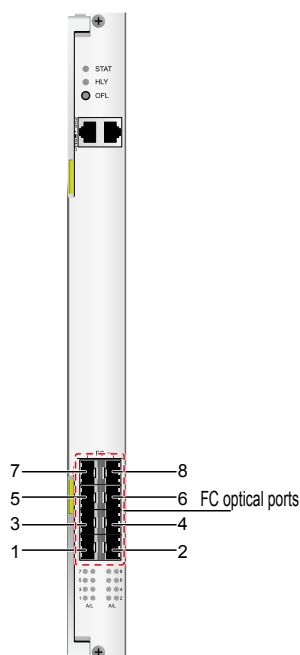


Table 1-2 lists the external ports on the CX220.

Table 1-2 External ports

Name	Type	Quantity	Subcard Number	Port Number	Description
Serial port	RJ45	2	-	-	<p>The serial ports include a BMC port and a SYS port. These two ports comply with RS232 and have no indicators.</p> <ul style="list-style-type: none"> ● BMC port: used to log in to the BMC CLI. ● SYS serial port: used to locally manage, maintain, and commission the FC switching plane. <p>The serial port baud rate of the BMC is 115200 bit/s.</p> <p>The serial port baud rate of the FC switching plane is 9600 bit/s.</p>
16G FC optical port	SFP+	8	-	-	<p>The FC switching plane provides eight 16G FC ports for connecting to the storage network.</p> <p>Ports 1 to 4 are activated by default. Ports 5 to 8 need to be activated by a license.</p> <p>Each port has two indicators: the orange one indicates the connection diagnosis status, and the green one indicates the port connection status.</p>

Table 1-3 describes the internal ports on the CX220.

Table 1-3 Internal ports

Name	Interface	Quantity	Description
FC port	0	1	The port is connected to the front half-width slot 16.
FC port	9 to 23	15	The ports are connected to half-width front slots 01 to 15.

1.5 Indicators

This topic describes the names, meanings, colors and status of the indicators on the CX220.

By observing the indicators, you can determine the current operating status of the CX220.

Table 1-4 describes the indicators on the CX220 panel.

Table 1-4 Indicator description

Label	Meaning	Color	Description
STAT	Power indicator	Green	<ul style="list-style-type: none">● Off: The CX220 is not powered on.● Blinking green: The CX220 is being powered on.● Steady green: The CX220 is operating properly.
HLY	Health indicator	Red and green	<ul style="list-style-type: none">● Off: The CX220 is not powered on.● Steady green: The CX220 is operating properly or has minor alarms.● Blinking red (1 Hz): A major alarm is generated.● Blinking red (at 5 Hz): A critical alarm is generated for the CX220, or the CX220 is not securely installed.
OFL	Offline button/ indicator (reserved)	N/A	None.

Label	Meaning	Color	Description
A	Diagnosis status indicator for the 16G FC optical port	Orange	<ul style="list-style-type: none"> ● Off: No optical module is installed, or an exception occurs when the port is receiving optical signals. (The L indicator is also off.) ● Steady orange: The port is not synchronized, and a connection exception occurs. ● Blinking orange (once/2 seconds): The port is disabled. ● Blinking orange (twice/second): The port is faulty.
L	Connection status indicator for the 16G FC optical port	Green	<ul style="list-style-type: none"> ● Off: No optical module is installed, or an exception occurs when the port is receiving optical signals. (The A indicator is also off.) ● Steady green: The port is normal, and the link is connected. ● Blinking green (blinking every two seconds): The port is normal but isolated. No link is set up. ● Blinking green (blinking twice per second): The port is in the diagnosis state. ● Blinking green (blinking four times per second): The link is properly set up and the port is transmitting data.

1.6 Internal Chassis Networking

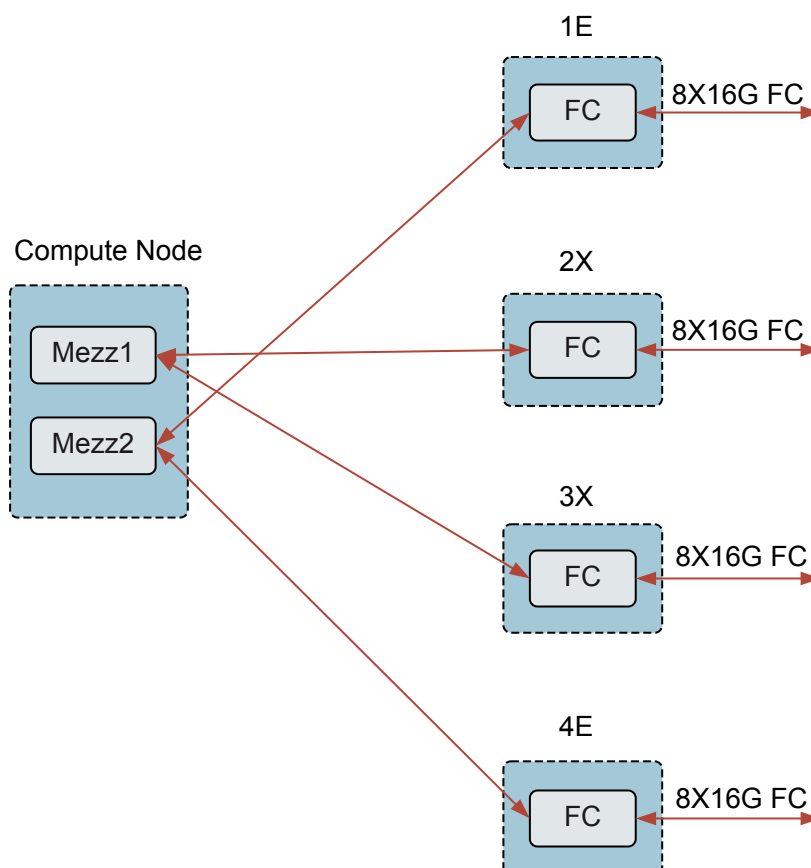
This topic describes connection relationships between the CX220 and mezzanine cards on compute nodes.

For details about the networking of the CX220 and Mezz cards on compute nodes, see [E9000 Blade Server Mezz Module-Switch Module Interface Mapping Tool](#).

Figure 1-6 shows the internal chassis networking between the CX220 and compute nodes. Compute node ports for connecting to the CX220 are provided by two mezzanine cards as follows:

- The mezz1 slot connects to the FC switching planes of the CX220s in slots 2X and 3X.
- The mezz2 slot connects to the FC switching planes of the CX220s in slots 1E and 4E.

Figure 1-6 Mapping between the CX220s and mezzanine cards on a compute node



NOTE

If a compute node uses the ports provided by four mezzanine cards to connect to the CX220, slots Mezz1 and Mezz3 connect to switch module slots 2X and 3X respectively, and slots Mezz2 and Mezz4 connect to switch module slots 1E and 4E respectively.

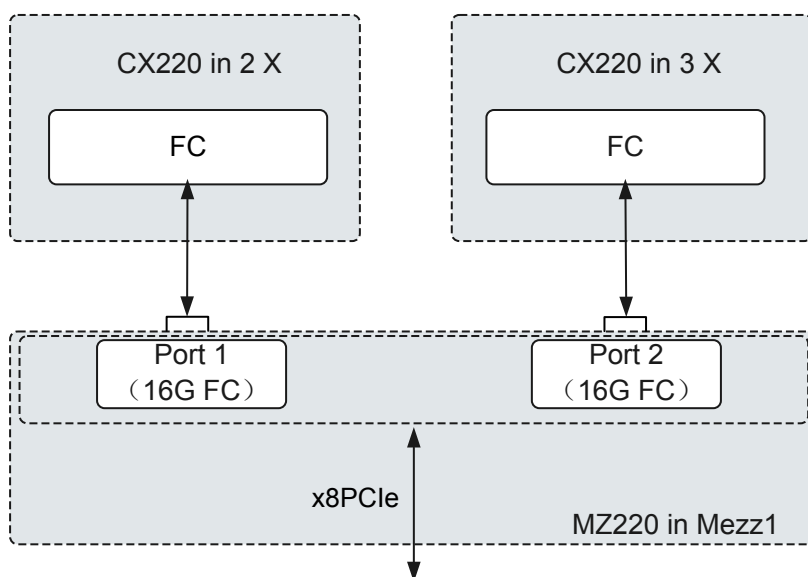
The following describes the mapping between the CX220s and mezzanine cards by assuming that the CX220s are installed in slots 2X and 3X and connect to Mezz 1. If the CX220s are installed in slots 1E and 4E, the CX220s connect to Mezz 2.

Mapping Between the CX220s and Ports on Mezzanine Cards

Mapping between the CX220s and ports on the MZ220

The MZ220 provides two 16G FC ports (ports 1 and 2). Ports 1 and 2 map to the FC switching planes of the CX220s in slots 2X and 3X respectively, as shown in **Figure 1-7**.

Figure 1-7 Mapping between the CX220s and ports on the MZ220



1.7 Software and Hardware Compatibility

This topic describes mezzanine cards that can work with the CX220 and pluggable modules and cables supported by ports on the CX220 panel.

For details about the software and hardware supported by the CX220, see the [Huawei Server Compatibility Checker](#).

Supported mezzanine cards

The CX220 connects to mezzanine cards of compute nodes. [Table 1-5](#) describes models and specifications of the supported mezzanine cards.

Table 1-5 Supported mezzanine cards

Model	Specifications
MZ220	FC mezzanine card with two 16G FC ports

Supported pluggable modules and cables

Table 1-6 Supported pluggable modules and cables

Type	Specifications
SFP+ multi-mode optical module (4G, 8G, or 16G) Only Brocade SFP+ optical modules can be used.	Supports FC-PI-5.
SFP+ single-mode optical module (8G or 16G) Only Brocade SFP+ optical modules can be used.	Supports FC-PI-5.
Multi-mode fiber (MMF)	Supports 850 nm OM1, OM2, and OM3 MMFs.
Single-mode fiber (SMF)	Supports 1310 nm SMFs.
Console cable	Supports the RJ45 port and serves as the connection cable for RS232 serial ports.
This table is for reference only. For details about the components that can be purchased, consult the local Huawei sales representatives.	

The CX220 provides SFP+ optical ports and supports single-mode and multi-mode SFP+ optical modules (8G or 16G). 16G SFP+ optical modules support 4G, 8G, and 16G; 8G SFP+ optical modules support 4G and 8G. Mixed use of optical fibers are supported. Select and connect cables based on actual networking requirements.

 **NOTE**

The CX220 supports only multi-mode and single-mode pluggable optical modules provided by Brocade.

1.8 Technical Specifications

This topic describes the physical, environmental, power, and network switching specifications of the CX220.

Table 1-7 describes the technical specifications of the CX220. Network switching specifications are described in **Table 1-8**.

For details about network switching parameters about the FC switching plane, see [MX210&MX220_Fabric_OS_Administrator_Guide](#).

Table 1-7 Technical specifications

Category	Item	Specifications
Physical specifications	Dimensions (H x W x D)	388.55 mm x 35.06 mm x 272.15 mm (15.30 in. x 1.38 in. x 10.71 in.)
	Color	Silver white
	Weight	2.5 kg
Environmental specifications	Temperature	<ul style="list-style-type: none"> ● Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Class A3 compliant) ● Storage temperature: -40°C to +65°C (-40°F to +149°F) ● Long-term storage temperature: 21°C to 27°C (69.8°F to 80.6°F)
	Temperature change rate	15°C/h (27°F/h)
	Humidity	<ul style="list-style-type: none"> ● Operating humidity: 5% RH to 85% RH (non-condensing) ● Storage humidity: 5% RH to 95% RH (non-condensing) ● Long-term storage humidity: 30% RH to 69% RH (non-condensing)
	Altitude	<p>At an altitude of 900 m (2952.72 ft), the highest operating temperature is 40°C (104°F).</p> <p>When the device is used at an altitude of 900 m to 5000 m, the highest operating temperature decreases by 1°C (1.8°F) as the altitude increases by 300 m (984.24 ft).</p>
Input power supply	Rated input voltage	12 V DC
Power consumption	Maximum power consumption	75 W

Table 1-8 Network switching specifications

Item	Performance Specifications	Range
Number of ports on the panel	10	<ul style="list-style-type: none"> ● Two serial ports: one BMC port and one SYS port ● Eight 8 Gbit/s FC optical ports

Item	Performance Specifications	Range
Port rate	4G, 8G, or 16G FC optical ports	Full duplex mode
Switching capacity (throughput)	768 Gbit/s	-

2 Standards and Certifications

About This Chapter

[2.1 Standards Compliance](#)

This topic describes the international and industry standards and communication protocols that the CX220 complies with.

[2.2 Certifications](#)

This topic describes the certifications that the E9000 has passed.

2.1 Standards Compliance

This topic describes the international and industry standards and communication protocols that the CX220 complies with.

International Standards

Table 2-1 lists the international standards.

Table 2-1 Standards and communication protocols

Standard	Protocol
FC-DA	FC Device Attach
FC-FS-2	FC Framing and Signaling
FC-GS-5	FC Generic Service
FC-LS	FC Link Service FC Link Service
FC-MI-2	FC Methodologies for Interconnects
FC-PI-4	FC Physical Interface-4 (8G FC Interface)
FC-SW-4	FC Switch Fabric
FC-VI	FC Virtual Interface Architecture Mapping
FCP-3	Fibre Channel Protocol for SCSI
RFC2837	Fabric Element MIB Specification
IEEE 1149.1-2001	IEEE Standard Test Access Port and Boundary-Scan Architecture
SFF-8431	Enhanced Small Form Factor Pluggable Module SFP+
SFF-8472	Diagnostic Monitoring Interface for Optical Transceivers

Industry Standards

Table 2-2 lists the industry standards.

Table 2-2 Industry standards

Organization	Standard
ECMA TR/70	Environmental protection
EN60950	Safety (Europe)
GR-929	Reliability
IEC 812	Failure Mode and Effects Analysis (FMEA)

Organization	Standard
IEC 863	Reliability, maintainability and availability
IEC60297	Chassis compliance
IEC60950	Safety
IEC60825-1/2/6	Safety
IEC60215	Safety
IEC61000	EMC
Telcordia SR-332	Reliability
UL60950	Safety (North America)

Communication Protocols

Table 2-3 lists the communication protocols.

Table 2-3 Communication protocols

Protocol	Description
ARP	Address Resolution Protocol
DHCP	Dynamic Host Configuration Protocol
FTP	File Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet Control Message Protocol
IP	Internet Protocol
IPMI	Intelligent Platform Management Interface
IPv4/IPv6	IPv4 or IPv6 Internet Protocol
NTP	Network Time Protocol
RADIUS	Remote Authentication Dial In User Service
SFTP	Secure File Transfer Protocol
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
Telnet	Remote Terminal Protocol

Protocol	Description
TFTP	Trivial File Transfer Protocol
UDP	User Datagram Protocol

2.2 Certifications

This topic describes the certifications that the E9000 has passed.

[Table 2-4](#) lists the certifications.

Table 2-4 Certifications

Country /Region	Certification	Standard
Europe	WEEE	2002/96/EC, 2012/19/EU
Europe	RoHS	2002/95/EC, 2011/65/EU, EN 50581: 2012
Europe	REACH	EC NO. 1907/2006
Europe	CE	Safety: EN 60950-1: 2006+A11: 2009+A1: 2010+A12: 2011 EMC: <ul style="list-style-type: none">● EN 55022: 2010● CISPR 22: 2008● EN 55024: 2010● CISPR 24: 2010● ETSI EN 300 386 V1.6.1: 2012● ETSI ES 201 468 V1.3.1: 2005
China	RoHS	SJ/T-11363-20006 SJ/T-11364-20006 GB/T 26572-2011
China	China Environmental Labeling	GB/T24024: 2001 idt ISO14024: 1999 HJ 2507-2011
Australia	C-tick	AS/NZS CISPR22: 2009
America	UL	UL 60950-1
America	FCC	FCC Part 15 (Class A)

Country /Region	Certification	Standard
America	NTRL-UL	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No.60950-1-07, 2nd Edition, 2011-12 (Information Technology Equipment-Safety-Part 1: General Requirements)
Canada	IC	ICES-003 Class A
Nigeria	SONCAP	IEC 60950-1: 2005 (2nd Edition) + A1: 2009 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011
Kingdom of Saudi Arabia (KSA)	SASO	IEC 60950-1: 2005 (2nd Edition) + A1: 2009 EN 60950-1: 2006+A11: 2009+A1: 2010 + A12: 2011
Global	CB	IEC 60950-1
Japan	VCCI	VCCI V-4: 2012