Cisco Nexus 7700 Switches Environment Data Sheet

Product Overview

The Cisco Nexus® 7700 Switches is the latest extension to the modular Cisco Nexus 7000 Series Switches. Capable of 83 terabits per second (Tbps) of overall switching capacity, the Cisco Nexus 7700 switches deliver the highest-capacity 10, 40, and 100 Gigabit Ethernet ports in the industry: up to 768 wire-rate 10-Gbps ports, 384 40-Gbps ports, and 192 100-Gbps ports. The Cisco Nexus 7700 switches have operation and feature consistency with the existing Cisco Nexus 7000 Series Switches, using the same system architecture, application-specific integrated circuit (ASIC) technology, and proven Cisco® NX-OS Software versions.

Designed to meet the requirements of the most mission-critical data centers, these switches deliver outstanding availability and scalability and a comprehensive Cisco NX-OS feature set that includes real-time system upgrades with exceptional manageability and serviceability.

The Cisco Nexus 7700 chassis (Figures 1, 2, and 3) incorporate significant enhancements in design, power, airflow, cooling, and cabling. All three chassis have true front-to-back airflow, making them excellent solutions for hot-aisle and cold-aisle deployments. The power supplies, I/O modules, and supervisor modules are accessible from the front of the chassis, and the fabric modules and fan trays are accessible from the back of the chassis. In addition, the Cisco Nexus 7000 Series has many power saving enhancements such as temperature sensors, variable-speed fans, and high-efficiency power supplies that reduce the total cost of ownership (TCO) for customers.

Figure 1. Cisco Nexus 7700 6-Slot Switch Chassis

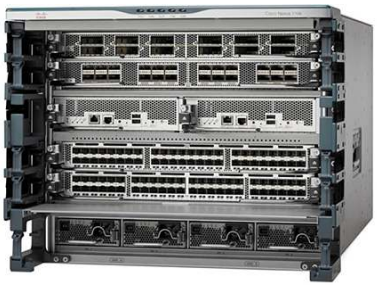
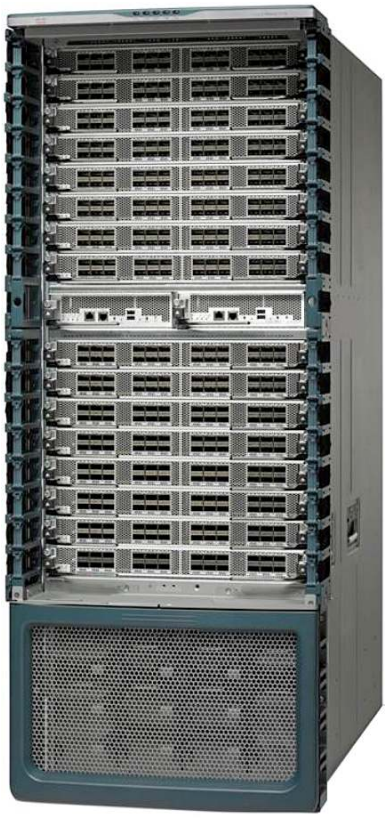


Figure 2. Cisco Nexus 7700 10-Slot Switch Chassis

Figure 3. Cisco Nexus 7700 18-Slot Switch Chassis



Physical Specifications

The Cisco Nexus 7700 6-Slot Switch chassis has two supervisor slots, four I/O module slots, dual-side integrated cable management, four power supply bays, and an optional front door with an air filter on the front of the chassis. On the back, it has three system fan trays and six fabric slots behind the fan trays.

The Cisco Nexus 7700 10-Slot Switch chassis has two supervisor slots, eight I/O module slots, dual-side integrated cable management, eight power supply bays, and an optional front door with an air filter on the front of the chassis. On the back, it has three system fan trays and six fabric slots behind the fan trays.

The Cisco Nexus 7700 18-Slot Switch chassis has two supervisor module slots, sixteen I/O module slots, dual-side integrated cable management, sixteen power supply bays, and an optional dual-hinged protective front door with an air filter at the front of the chassis. On the back are three system fan trays and six fabric module slots behind the fan trays.

Table 1 summarizes the physical features of the chassis.

Table 1. Physical Specifications

Item	Description		
	Cisco Nexus 7700 6-Slot Switch	**Cisco Nexus 7700 10-Slot Switch**	**Cisco Nexus 7700 18-Slot Switch**
	Dimensions		
(H x W x D)	• 15.6 x 17.3 x 32 in. (39.62 x 43.9 x 81.3 cm)	• 24.35 x 17.3 x 34 in. (61.85 x 43.9 x 86.4 cm)	• 42.25 x 17.3 x 35 in. (111.49 x 43.9 x 88.9 cm)
Chassis depth with cable management and doors	38 in. (96.52 cm)	40 in. (101.6 cm)	41 in. (104.1 cm)
Rack units (RUs)	9RU	14RU	26RU
	Weight		
Chassis only	145 lb (66 kg)	160 lb (72 kg)	300 lb (136 kg)
Fully configured	325 lb (148 kg)	438 lb (199 kg)	900 lb (408 kg)
Module orientation	• Supervisor and I/O modules: Horizontal • Fabric cards (at the back): Vertical		
Airflow	• Front to back • Designed for hot-aisle and cold-aisle deployments		
Cable management	Integrated dual-side cable management for flexible cabling deployments		
Air filter	Optional door air filter		
Doors	• Optional lockable front module doors and air filter		
System LEDs	• 5 system LEDs that summarize the device status: ◦ LED 1: Power supplies ◦ LED 2: Fans ◦ LED 3: Supervisors ◦ LED 4: Fabric modules ◦ LED 5: I/O modules Each LED is green if the status is normal, and amber otherwise.		

Power

The Cisco Nexus 7700 6-Slot chassis has four power supply bays, the Cisco Nexus 7700 10-Slot chassis has eight power supply bays, and the Cisco Nexus 7700 18-Slot chassis has sixteen power supply bays that can hold 3.0-kilowatt (kW) AC or DC power supplies. The smaller power supply configuration provides more flexibility and more detailed control in power provisioning. The four power supply bays, eight power supply bays, and sixteen power supply bays for the 6-slot, 10-slot, and 18-slot chassis respectively are designed for future growth. Each 3000-watt (W) power supply has one universal (100 to 240 volt [V]) input that can be connected to one AC source using an AC power cord with a C19 connector. Two versions are available: one for International markets, with an IEC 60309 AC plug; and one for U.S. markets, with a NEMA L6-30 AC plug.

Table 2 shows the power output provided by one Cisco Nexus 7700 3.0-kW AC Power Supply Module.

Table 2. AC Power Supply Output

Power Supply Input		Output
Single input	220V	3000W
	110V	1500W

Table 3 shows the power output provided by one Cisco Nexus 7700 3.0-kW DC Power Supply Module.

Table 3. DC Power Supply Output

Power Supply Input	Input	Output
Single input	48V	1500W
Dual Input	48V	3000W

Cisco Nexus 7700 power supplies are more than 90 percent efficient, so less power is dissipated as heat, and more power is available for the system to use than with typical power supplies. The high-efficiency 3-kW power supplies allow smaller power configuration and provide flexible power provisioning. The Cisco Nexus 7700 systems can operate in four user-configurable power redundancy modes, listed in Table 4. The power redundancy modes are designed to determine the optimum power for the combination of power supplies installed, helping ensure system availability.

Table 4. Power Redundancy Modes

Redundancy Mode	Description
Combined	This mode does not provide redundancy. The power available to the system is the sum of power outputs of all power supplies in the chassis.
Power supply redundancy (N+1 redundancy)	This mode guards against the failure of one of the power supplies. The redundant power available to the system is the sum of all power outputs less one of the maximum-rated power supplies.
Input source redundancy (grid redundancy)	This mode guards against failure of one power supply or input circuit (grid), with at least half the power supplies connected to a different independent AC or DC feed. The power available to the system is the minimum power from both the grids. If one of the power supplies fails, the operational power redundancy mode changes to Combined mode.
Power supply and input source (full) redundancy	This mode guards against failure of one power supply or one grid. The power available is the minimum power from the input source and power supply redundancy. If one of the power supplies fails, the operational power redundancy mode changes to the Power Supply Redundancy (N+1) mode.

The Cisco NX-OS software requires a minimum of 1730W to run the 6-slot system (three fan trays, six fabric modules, and two supervisor modules), a minimum of 3230W to run the 10-slot system (three fan trays, six fabric modules, and two supervisor modules), and 5030W to run the 18-slot system (three fan trays, six fabric modules, and two supervisor modules). If the power available from the power supplies is more than the minimum, the additional power is used to activate the I/O modules. If there is not enough power to activate the I/O modules, the I/O modules are kept in a power-denied state. After more power is provisioned, the user must turn on power to the I/O modules manually to activate them.

Under typical operating conditions, the system consumes significantly less power than the maximum values. The Cisco NX-OS software uses the maximum values to reserve sufficient power for the I/O modules. The maximum power values are determined under the worst-case conditions. The typical power rating is the value that is commonly seen in a typical facility environment. Both the maximum and typical power ratings for the Cisco Nexus 7700 system and modules can be found using the Cisco Power Calculator (CPC) Tool at: http://tools.cisco.com/cpc/DS.cpc.

Climatic Environment

Table 5 summarizes the climatic environment for the Cisco Nexus 7700 6-Slot, 10-Slot, and 18-Slot chassis.

Table 5. Climatic Environment

Item	Description		
	Cisco Nexus 7700 6-Slot Switch	**Cisco Nexus 7700 10-Slot Switch**	**Cisco Nexus 7700 18-Slot Switch**
Floor loading	92 lb per sq ft	122 lb per sq ft	230 lb per sq ft
Seismic	Zone 4 per GR63		
Heat dissipation	Maximum 26380 BTUs per hour (actual dissipation will be lower, depending on the chassis configuration)	Maximum 52500 BTU per hour (actual dissipation will be lower, depending on the chassis configuration)	Maximum 96160 BTU per hour (actual dissipation will be lower, depending on the chassis configuration)
Temperature	• Operating: 32 to 104℉ (0 to 40℃) • Nonoperating: -40 to 158℉ (-40 to 70℃) * **Note:** Chassis external thermal requirements are defined in the GR-63-CORE Network Equipment Building Standards (NEBS)* specification published by Telcordia Technologies in Section 4.1.2, Operating Temperature and Humidity Criteria. * Validation in progress		
Humidity	• Relative humidity (nonoperating): 5 to 95%, noncondensing • Relative humidity (operating): 5 to 90%, noncondensing **Note:** An ambient relative humidity between 45 and 50% is suggested to reduce corrosive problems, to provide an operating-time buffer in the event of failures, and to reduce interference from static discharges.		
Altitude	• -500 to 13,123 ft; agency certified 0 to 6500 ft • Storage altitude: -1000 to 30,000 ft		
Operating vibration	• GR63 Section 5.4.2 • ETS 300 019-1-3 Class 3.1 Section 5.5		

Airflow and Cooling

The cooling system for the 6-slot, 10-slot, and 18-slot consists of three redundant system fan trays that deliver cooling for the I/O and supervisor modules as well as the fabric modules. Each system fan tray is composed of multiple independent fans. The fan trays are removable from the rear of the chassis, allowing continuous system operation during maintenance. Each fan module incoporates fan redundancy and fan controller redundancy to deliver resilience for either a fan or controller failure. Table 6 summarizes the airflow and cooling features of the Cisco Nexus 7700 chassis.

Table 6. Cisco Nexus 7700 Chassis Airflow and Cooling Features

Feature	Description
Air flow	• Air flows front to back. • Air enters through the perforations in the I/O and supervisor modules at the front of the chassis and exits at the rear of the chassis, making the Cisco Nexus 7700 chassis excellent for hot-aisle and cold-aisle designs.
Fan trays	3 system fan trays.
Fan trays removable from the rear	All fan trays are removable from the rear, and hence there is no obstruction from the I/O module cabling on the front. This arrangement enables continuous system operation during maintenance.
Variable fan speeds	• Current fans have 256 speed levels. • The fan speed changes based on the type of I/O module (and supervisor), the inlet temperature reading on the supervisor, and the presence or absence of an air filter. • Power consumption and noise emission by fans is optimized.
Self-healing mechanism	The software tracks the temperature of the most critical components on the I/O modules and the supervisors. If the recorded temperature is higher than a certain system-defined threshold, the fan speed automatically increases and stays at that speed until the temperature falls below the threshold.

Feature	Description
Fan redundancy	• Both system and fabric fan trays are redundant and hot swappable. • When one fan is removed, the speed of the remaining two fans will be increased and the system will shut down after 72-hours. The user will be informed via syslog every one hour. • When more than one of the fans is removed, the speed of the remaining fan trays will speed up to max and the system will shut down in 2 minutes.
Air filter	• The air filter filters dust and keeps the chassis interior clean. • Use of an air filter increases the fan speed; higher fan speeds result in higher levels of noise.

Cabling and Cabinet

The cable management system for the Cisco Nexus 7700 6-Slot, 10-Slot, and 18-Slot chassis is located on both sides of the chassis aligned with the module slots.

The Cisco Nexus 7700 6-Slot, 10-Slot, and 18-Slot chassis should be installed in either a standard four-post rack or a four-post cabinet that meets the depth, total equipment weight, and network cabling requirements. In addition, the Cisco Nexus 7700 6-Slot chassis can be installed in a standard two-post rack as well.

Regulatory Compliance

The Cisco Nexus 7700 6-Slot, 10-Slot, and 18-Slot chassis are designed to meet regulator emissions and immunity requirements when tested with existing and future cards and power supplies, as summarized in Table 7.

Table 7. Emissions and Immunity Specifications

Specification	Description
Regulatory compliance	• EMC compliance • FCC Part 15 (CFR 47) (USA) Class A • ICES-003 (Canada) Class A • EN55022 (Europe) Class A • CISPR22 (International) Class A • AS/NZS CISPR22 (Australia and New Zealand) Class A • VCCI (Japan) Class A • KN22 (Korea) Class A • CNS13438 (Taiwan) Class A • CISPR24 • EN55024 • EN50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • EN300 386

Table 8 summarizes NEBS compliance.

Table 8. NEBS Specifications

Specification	Description
Environmental standards	• NEBS criteria levels* SR-3580 NEBS Level 3 (GR-63-CORE and GR-1089-CORE) • Verizon NEBS compliance* Telecommunications Carrier Group (TCG) Checklist • Century Link NEBS requirements* Telecommunications Carrier Group (TCG) Checklist • ATT NEBS requirements* ATT TP76200 level 3 and TCG Checklist • ETSI* ETSI 300 019-1-1, Class 1.2 Storage ETSI 300 019-1-2, Class 2.3 Transportation ETSI 300 019-1-3, Class 3.2 Stationary Use * Validation in Progress

The Cisco Nexus 7700 switches are designed to meet regulator safety requirements when tested with existing and future cards and power supplies, as summarized in Table 9.

Table 9. Safety Specifications

Specification	Description
Safety	• UL/CSA/IEC/EN 60950-1 • AS/NZS 60950

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 7700 switches in your data center. Our innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operating efficiency and improve your data center network. Cisco Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and provide long-term value. Cisco SMARTnet® Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts for your Cisco Nexus 7700 switches. Spanning the entire network lifecycle, Cisco Services helps increase investment protection, optimize network operations, provide migration support, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit http://www.cisco.com/go/dcservices.

For More Information

For more information about the Cisco Nexus 7700 switches, visit the product homepage at http://www.cisco.com/go/nexus7000 or contact your local account representative.

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Printed in USA C78-728736-01 12/13