Data Sheet

Cisco SFS 7000D InfiniBand Server Switch

The Cisco® SFS 7000D InfiniBand Server Switch sets the standard for cost-effective, low-latency, 4X DDR and SDR InfiniBand switching for building high-performance clusters.

High-performance computing (HPC) applications that solve complex, computationally intensive problems are widely deployed within academic and research communities and enterprises because they deliver significant business benefits. An important enabler for the broad adoption of HPC applications is the practice of clustering multiple industry-standard servers using a high-speed network to provide supercomputer performance, at a fraction of the cost of traditional supercomputers.

PRODUCT OVERVIEW

The Cisco SFS 7000D delivers an ideal combination of price, performance, and packaging for building high-performance server clusters of all sizes. The Cisco SFS 7000D (Figure 1) provides 24 InfiniBand 4X ports that can operate in double data rate (DDR) or single data rate (SDR) mode, which delivers 20- or 10-Gbps server connectivity respectively. The Cisco SFS 7000D is a fully nonblocking, 960-Gbps cross-sectional bandwidth switch fabric that has less than 200 nanoseconds (ns) of port-to-port latency. In common with the Cisco SFS 7000P, the Cisco SFS 7000D comes with the embedded Cisco InfiniBand Subnet Manager, which is capable of running large clusters in a single, compact 1 rack unit (1RU) chassis.

Figure 1. Cisco SFS 7000D InfiniBand Server Switch

BENEFITS

The Cisco SFS 7000D provides the following customer benefits:

- Autosensing 24 InfiniBand 4X 20-Gbps DDR or 10-Gbps SDR Interfaces
- Superior price and performance for building HPC clusters
- Ideal form factor for top-of-rack switch for small HPC clusters or as part of a larger HPC cluster
- Embedded Cisco InfiniBand Subnet Manager facilitates convenient “plug-and-play” operation for small clusters that can scale to support large HPC clusters
- InfiniBand 1.2-compliant
- Easy configuration, monitoring, and maintenance in-band and out-of-band

FEATURES

The Cisco SFS 7000D provides the following features:

- High-performance, low-latency switched server interconnect
- 24 nonblocking, full duplex InfiniBand 4X DDR (20 Gbps) or SDR (10 Gbps) autosensing ports
- Supports DDR-to-SDR switching capability for investment protection and higher server densities
- Fully redundant power and cooling, with hot-swappable field replaceable units (FRUs)
- Command-line interface (CLI), Web, and Java-based systems management options
- 1RU stackable architecture, with included 4-post rack mounting kit suitable for rack-based shipping
- Single hop, less than 200 ns cut-through latency port to port
- Full bisectional bandwidth for all 24 ports (960 Gbps)
- Optional standalone, high-performance Cisco Subnet Manager
- Powered ports to enable flexible copper and optical interface configurations

FABRIC DENSITY AND SCALABILITY

The Cisco SFS 7000D is a fixed-configuration, 24-port, DDR/SDR 20- or 10-Gbps 4X nonblocking InfiniBand switch that is ideally suited to “top-of-rack” switch configurations that, when combined with other Cisco SFS 7000 Series InfiniBand switches, provide access-switch functionality in very large HPC clusters consisting of thousands of nodes to support the most demanding HPC applications.

HIGH AVAILABILITY

The Cisco SFS 7000D is designed for enterprise-class reliability that supports hot-swappable redundant power supplies and cooling. The embedded Cisco InfiniBand Subnet Manager constantly synchronizes operational information with other Cisco InfiniBand Subnet Managers within the network so that if any one switch fails, another subnet manager can assume active subnet manager responsibility. The Cisco InfiniBand Subnet Manager also provides rapid rerouting in the event of a path failure or switch failure, maintaining maximum availability on the InfiniBand network.

SIMPLIFIED MANAGEMENT

Using the embedded Cisco InfiniBand Subnet Manager and systems management, the Cisco SFS 7000D can be deployed in a ready-to-use fashion in the network within minutes. Configuration and maintenance are simplified with a full-featured GUI and CLI using serial console, Telnet, or Secure Shell (SSH) Protocol Version 2, enabling remote management, monitoring, diagnostics, and updates. The Cisco SFS 7000D can be managed using the Cisco SFS management suite or with existing network management systems using standard protocols such as Simple Network Management Protocol (SNMP), with supported SNMPv3 security.

FABRIC INTELLIGENCE

The Cisco SFS 7000D supports a full complement of performance monitoring, including graphing bandwidth utilization and error rates in real time to give system administrators an unprecedented view of fabric performance. The Cisco SFS 7000D quickly identifies and isolates trouble areas or “hot spots” using comprehensive fabric and chassis management embedded within the switch that automatically detects, isolates, and recovers from component-level failures. Each FRU supports a full suite of system-level diagnostic health checks that assess the health of all components to detect potential problems, such as rising temperature or internal error rates, and report these anomalies in real time to proactively notify the system administrator.

The embedded Cisco InfiniBand Subnet Manager can manage InfiniBand switch networks consisting of thousands of nodes. It may also be combined with the standalone, high-performance Cisco InfiniBand Subnet Manager to scale to much larger clusters.

VALUE

The Cisco SFS 7000D single-chip design offers fully nonblocking, DDR (20-Gbps) and SDR (10-Gbps) full duplex performance at an optimal price per port compared to other networking technologies. It supports autosensing of DDR or SDR attached devices and also supports the capability to forward packets between DDR and SDR connections to provide better utilization of system resources and investment protection for existing InfiniBand 4X devices. For example, the Cisco SFS 7000D can support 16 SDR server connections with 8 DDR uplinks to the InfiniBand fabric core, which provides nonblocking uplink capacity and high-density server connectivity.

The Cisco SFS 7000D also supports sophisticated embedded system and network management that simplify network management, monitoring, diagnostics, and maintenance. It is fully compliant with the IBTA 1.0a and 1.1 standards, and is interoperable with other IBTA standards-compliant InfiniBand products. The embedded Cisco InfiniBand Subnet Manager can manage InfiniBand switch networks consisting of thousands of nodes. Optionally, the standalone, high-performance Cisco InfiniBand Subnet Manager enables the Cisco SFS 7000D to scale to support the largest InfiniBand switch networks. The Cisco SFS 7000D (Figure 2), when combined with the Cisco SFS 3000 Ethernet and Fiber Channel gateways, provides transparent IP and storage connectivity between high-performance InfiniBand server clusters and Cisco Catalyst® 6000 Series Switch-based LANs and Cisco MDS 9000 Family switch-based SANs.

Figure 2. Cisco SFS 7000D InfiniBand Server Switch

COMPLETE SERVER SWITCHING SOLUTION

The Cisco SFS 7000D is a part of the Cisco SFS 7000 Series of InfiniBand Server Switches which, combined with the Cisco Catalyst 6000 Series Switches and Cisco MDS 9000 Series Switches, deliver a comprehensive, industry-leading data center switching solution. The Cisco SFS solution also includes integrated Ethernet and Fiber Channel gateway modules, and InfiniBand 4X DDR and SDR host channel adapters (HCAs) with a complete suite of upper-layer protocols: IP over InfiniBand, Messaging Passing Interface (MPI), Sockets Direct Protocol (SDP), SCSCI RDMA Protocol (SRP), and user Data Access Provider Layer (uDAPL). The Cisco SFS 7000D shares common switch software with all the other Cisco SFS 7000D and SFS 3000 Series Server Switches, offering a clear growth path while protecting existing investments. Tables 1 through 4 provide details about the Cisco SFS 7000D system architecture, mechanical and environmental specifications, and management features.

PRODUCT SPECIFICATIONS

Table 1. Systems Architecture

Feature	Description
Ports	• 24 InfiniBand 4X autosensing DDR/SDR ports • Copper or optical interfaces • One RS-232 serial port, one RJ-45 remote Ethernet management port
Performance	4X autosensing 20-Gbps DDR or 10-Gbps SDR InfiniBand per port: • Line-rate 20- or 10-Gbps full duplex per port • Full bisectional bandwidth (960 Gbps) switch • Less than 200 nanosecond port-to-port latency

Table 2. Mechanical Specifications

Feature	Description
Size	• Standard 19-inch rack-mountable • Less than 1RU height (1.75 inch) • 22-inch depth
Air Flow	Front-to-back
Weight	Less than 30 lb

Table 3. Environmental Specifications

Feature	Description
Temperature	• Operating: 32 to 104℉ (0 to 40℃). • Storage: –40 to 158℉ (–40 to 70℃)
Altitude	• Operating: 10,000 feet • Storage: 40,000 feet
Humidity	• Operating: 8 to 80% non-condensing • Storage: 5 to 90% non-condensing
Vibration	• Operating: .25G, 5 to 300 Hz 15 minutes • Storage: 0.5G, 5 to 300 Hz 15 minutes
Power	• 90 to 264 VAC auto-ranging, 47 to 63 Hz • Maximum power dissipation less than 60W

Table 4. Management Features

Feature	Description
Operating System	• Topspin OS
Subnet Management	• Embedded Cisco InfiniBand Subnet Manager for ready-to-use deployment • Optional external Cisco High-Performance Subnet Manager
Network Management	• Easy configuration, monitoring, and maintenance through serial, in-band, and out-of-band connections • Java-based Element Manager GUI • Web-based systems management GUI • CLI using Telnet, SSHv2, and RS-232
Management Framework	• Supports SNMPv2 and v3 for management framework integration • Secure management: SSHv2, SSL, SNMPv3, RADIUS
Standards	• IBTA 1.2-compliant • Compliant with Restrictions on Hazardous Substances (RoHS) standards

SERIES OF PRODUCTS

The Cisco SFS 7000D is part of a complete family of server switches including the Cisco SFS 7000 Series InfiniBand Server Switches, Cisco SFS 3000 Series Multifabric Server Switches, and Cisco InfiniBand PCI-X and PCI Express Host Channel Adapters.

ORDERING INFORMATION

To place an order, visit the Cisco Ordering Home Page. Table 5 lists ordering information for the Cisco SFS 7000D.

Table 5. Ordering Information

Part Number	Product Name
SFS7000D-SK9	Cisco SFS 7000D InfiniBand Server Switch

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FOR MORE INFORMATION

For more information about the Cisco SFS 7000D InfiniBand Server Switch, visit http://www.cisco.com or contact your local account representative.

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