Cisco Nexus 4001I Switch Module for IBM BladeCenter
Lower Total Cost of Operation, High Performance, Enhanced Server Virtualization, and Increased Resilience

Challenges

While blade servers offer a high-density, cost-effective solution for delivering scale-out x86 architectures, they face the following main challenges:

- Increasing number of LAN and SAN switches and server connections within a single chassis
- Difficulty in implementing virtual machine mobility
- Increasing application workloads and bandwidth
- Availability of applications

Cisco Nexus Blade Switches Overview

As part of the Cisco® Data Center 3.0 network foundation and the latest addition to the Cisco Nexus® Family of data center–class switches, the Cisco Nexus 4000 Series Blade Switches are designed to meet the business, application, and operational requirements of the blade server access layer in data centers.

Cisco Nexus 4000 Series switches are purpose-built to provide the server access foundation required for scale-out virtualized x86 computing architectures built on high-density blade servers. The Cisco Nexus 4000 Series is an all 10-Gbps Fibre Channel over Ethernet (FCoE) switch that is fully compliant with the IEEE 802.1 Data Center Bridging specification. The Cisco Nexus 4000 Series extends the benefits of the Cisco Nexus Family of data center switches to blade servers, the fastest growing segment of the scale-out x86 server market. The Cisco Nexus 4000 Series provides innovative architecture to simplify data center transformation, enabling a standards-based, high-performance Unified Fabric over 10 Gigabit Ethernet in the blade server environment. This Unified Fabric enables consolidation of LAN traffic, storage traffic (IP-based such as iSCSI, network-attached storage [NAS], and Fibre Channel SAN), and high-performance computing (HPC) traffic over a single high-performance, 10 Gigabit Ethernet server access link.

Figure 1. Cisco Nexus 4001I Switch Module for IBM BladeCenter

Cisco Nexus Blade Switch for IBM

The Cisco Nexus 4001I Switch Module for IBM BladeCenter is a blade switch solution for the IBM BladeCenter H and HT chassis providing the server I/O solution (Figure 1). It is a line-rate, extremely low-latency, nonblocking, Layer 2, 10 Gigabit Ethernet blade switch. At the core of the Cisco Nexus 4001I is the unified switch ASIC, a new purpose-built, high-performance, line-rate switch ASIC that delivers extremely low and consistent latency across all packet sizes independent of the configured networking features. The unified switch ASIC supports standard Ethernet as well as Priority Flow Control (PFC) and Enhanced Transmission Selection (ETS), required for lossless Ethernet transmission. LAN and SAN networking protocols are delivered through Cisco NX-OS Software, the industry's first modular, fault-tolerant, highly available operating system designed specifically to support unified fabric data center networks.

Cisco Nexus 4001I Configuration

- Fourteen fixed 10 Gigabit Ethernet server-facing downlinks (autosensing ports; can also operate in Gigabit Ethernet mode)
- Six fixed 10 Gigabit Ethernet Small Form-Factor Pluggable Plus (SFP+) uplinks (autosensing ports; can also operate in Gigabit Ethernet mode)
- Three management interfaces: one external 10/100/1000BASE-T port (mgmt 0), one internal port for advanced management module (AMM) connectivity (mgmt 1), and one in-band management interface using the interface-vlan feature
- One RS-232 serial console port

Benefits of Cisco Nexus 4001I Blade Switch for IBM

The Cisco Nexus 4001I provides four major benefits:

- **Lower total cost of operation (TCO):** Deployment of Unified Fabric with the Cisco Nexus 4001I inside the blade server access enables significant reduction in the number of switches, LAN and SAN network interface cards (NICs), ports, optic modules, and cables. This consolidation of server access network elements significantly reduces the overall capital and operating costs of the data center network by reducing the number of cables, server adaptors, and blade switches that need to be purchased, managed, powered, and cooled.
- **High Performance:** The Cisco Nexus 4001I is a line-rate, feature-rich, extremely low-latency switch capable of enabling server access migration from Gigabit Ethernet to 10 Gigabit Ethernet to lossless 10 Gigabit Ethernet, as well as supporting the demanding low-latency requirements of HPC clusters or high-frequency trading applications.
- **Enhanced Server Virtualization:** Using Unified Fabric at the server access with the Cisco Nexus 4001I provides the uniform server interfaces, simplified cabling, and consistent server access design required to benefit from automated virtual

Cisco Nexus 4001I Switch Module for IBM BladeCenter
Lower Total Cost of Operation, High Performance, Enhanced Server Virtualization, and Increased Resilience

At-A-Glance

machine mobility. The Cisco Nexus 4001I used in conjunction with the Cisco Nexus 1000V Switch delivers an operationally consistent and transparent server access design for virtual machine deployments, substantially reducing the overhead needed to configure, troubleshoot, and repair the server access link between the virtual NIC (vNIC), virtual switch, and blade switch.

- **Increased Resilience:** The Cisco Nexus 4001I extends Cisco NX-OS to the blade server access, providing a fault-tolerant network with a single modular operating system across the data center.

IBM BladeCenter H and HT

IBM BladeCenter H is a powerful platform built with the enterprise customer in mind, providing industry-leading performance, innovative architecture, and a solid foundation for virtualization. IBM BladeCenter HT, the newest platform in the evolution of the IBM BladeCenter product family, is a powerful new chassis that helps reduce network infrastructure costs while increasing network infrastructure performance and flexibility, making it the ideal platform to support demanding next-generation, high-performance core telecom network applications.

Deployment Scenarios

Typically, customers will deploy the Cisco Nexus 4001I in the data center access layer as an integrated solution in the I/O slots in the blade server enclosures from IBM to provide LAN and SAN connectivity for blade servers (Figure 2).

Figure 2. Four Data Center Solutions in One Switch - Deployment Scenarios for the Cisco Nexus 4001I
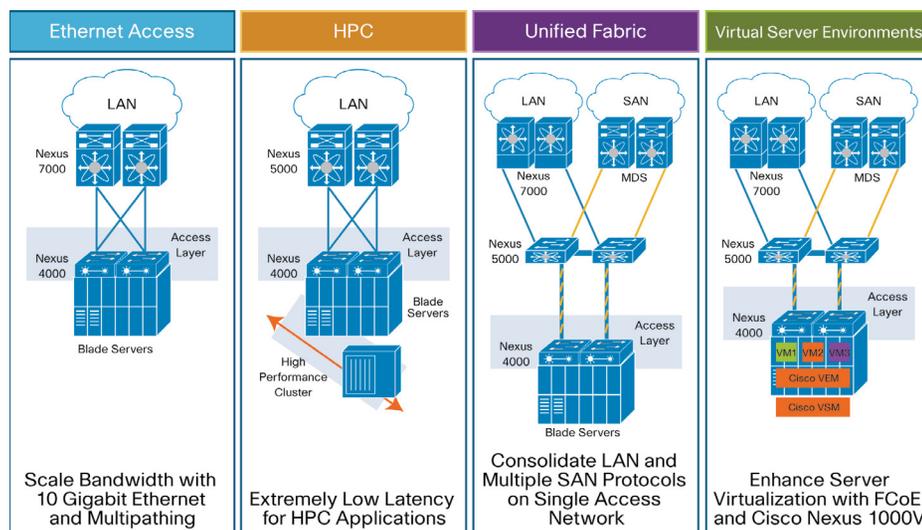
Cisco Data Center Network Manager and Cisco NX-OS

Cisco Data Center Network Manager (DCNM) supports the Cisco Nexus 4001I. Cisco DCNM is designed for hardware platforms enabled for Cisco NX-OS, which are the Cisco Nexus Family of products. Cisco DCNM is a Cisco management solution that increases overall data center infrastructure uptime and reliability, hence improving business continuity.

Cisco Nexus 4001I modules are supported by Cisco NX-OS. Cisco NX-OS interoperates with any networking OS, including Cisco IOS® Software, that conforms to its networking standards.

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 4000 Series in your data center. The innovative Cisco Services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operational efficiency and improve your data center network. Cisco Advanced Services use an architecture-led approach to help you align your data center infrastructure with your business goals and achieve 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 Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 4000 Series switches. Spanning the entire network lifecycle, Cisco Services help increase investment protection, optimize network operations, support migration operations, and strengthen your IT expertise.

For More Information

- **Cisco Blade Switches:** http://www.cisco.com/go/bladeswitch
- **Cisco Nexus 4000 Series:** http://www.cisco.com/go/nexus4000
- **Cisco Nexus Services:** http://www.cisco.com/en/US/products/ps10405/serv_home.html
- **Cisco Nexus Product Line:** http://www.cisco.com/go/nexus
- **Cisco MDS 9000 Series:** http://www.cisco.com/go/mds