



## Addressing Data Center Challenges with the Cisco Data Center 3.0 Strategy

### Challenges in the Data Center

- Multicore computing and virtualization increases the need for low-latency switching and higher bandwidth.
- Dense rack-mount and blade servers running virtualized environments increase the stress on power and cooling.
- Higher utilization increases the demand for 10 Gigabit Ethernet, Fibre Channel, and interprocess communication (IPC) network connectivity to each server and blade.
- Redundant adapters of three (LAN, SAN, Cluster) different networks add to the cost of cabling and adapters, require complex cabling at the access layer, and create manageability challenges.
- End-to-end security requirements must be met to comply with legal and business regulations to protect information from competitors as well as to protect employee and customer data from misuse.

### Summary

Today's IT infrastructure cannot cope with rapid changes in business requirements.

### Solution

A single, secure, scalable, and easy-to-manage data center network infrastructure that unifies traditionally separate server, storage, and network operations on a single unified fabric and a unified I/O, to more efficiently support evolving business applications while reducing power and cooling requirements.

### Cisco Data Center 3.0 Strategy

The Cisco® Data Center 3.0 strategy allows customers to evolve their data centers by consolidating fragmented access operations onto a unified fabric using Ethernet technology. It provides a framework for building, implementing, and operating a virtualized, next-generation data center. Cisco Data Center 3.0 offers comprehensive products, services, and programs that support a holistic view of your data center, helping you adapt to current and future business challenges.

## Data Center Transformation with Cisco Nexus 5000 Series Switches

### Cisco Nexus 5000 Series Solution

Cisco Nexus 5000 Series Switches, part of the Cisco Nexus family of data center-class switches, deliver an innovative architecture to simplify data center transformation. The platform is designed to meet the challenges of current and next-generation data centers that include multicore, virtual machine dense deployments, infrastructure sprawl, and increasingly demanding workloads. The Cisco Nexus 5000 Series solution consists of:

- **Cisco Nexus 5000 Series Switches:** A 56-port, two rack-unit (2RU), 10 Gigabit Ethernet and FCoE switch with 1.04 terabits per second (Tbps) throughput and 2 expansion slots; the system also includes three optional expansion modules: a 6-port Ethernet module, 8-port Fibre Channel module, and 8-port Fibre Channel and Ethernet module (4 ports of 10 Gigabit Ethernet and 4 ports of native Fibre Channel)
- **Cisco NX-OS operating system:** A Linux-based self-healing, modular operating system that combines the best of the Cisco MDS 9000 SAN-OS Software and Cisco IOS® Software
- **Cisco Data Center Network Manager (DCNM):** Cisco Nexus family management tool that eases manageability and increases operational efficiency
- **Full suite of Cisco Nexus services:** A comprehensive suite of services to support the design, implementation, and operation of deployments
- **Cisco Data Center Assurance Program (DCAP):** A set of unique system-level tested and validated data center infrastructure designs

### Main Capabilities

- **Unified fabric:** The Cisco Nexus 5000 Series supports FCoE and Cisco Data Center Ethernet features, enabling consolidation of IP, storage, and server cluster networks onto a unified fabric over Ethernet. Unified fabric consolidates server interfaces, simplifies cable management, lowers costs, and provides investment protection.
- **Virtualization:** The Cisco Nexus 5000 Series supports virtual machine optimized networking, allowing organizations to link server and application profiles to virtual machines across the network. Migration of virtual machines and network profiles together eases virtual machine management (no need for reprovisioning), network security, and mobility (business agility and resiliency).
- **Technology partnerships:** The Cisco Nexus 5000 Series is an open, standards-based platform supported by a broad ecosystem of technology partners that provide consolidated network adapters (CNAs) to access LANs and storage area networks (SANs) from one adapter with existing operating systems and drivers, and a low-latency, low-cost cable and transceiver combination that decreases power consumption.

## Advantages of a Unified Fabric Delivery

The unified data center infrastructure delivered with the Cisco Nexus 5000 Series can help organizations better align their IT assets and their business priorities by providing the following benefits:

- **Lower total cost of ownership (TCO):** The Cisco Nexus 5000 Series provides a unified fabric over Ethernet for LAN, SAN, and IPC traffic. This unified fabric provides consolidation and higher utilization of previously separate resources, reducing the number of adapters and cables as much as 50 percent and significantly lowering power and cooling costs.
- **Investment protection:** Unified fabric with the Cisco Nexus 5000 Series allows organizations to preserve their investments in separate IP, storage, and IPC network infrastructures by supporting a smooth transition. The Cisco Nexus 5000 Series preserves current data center infrastructure while still benefiting from end-to-end architectural integrity for improved security and manageability.
- **Business agility:** The Cisco Nexus 5000 Series supports virtual machine optimized networking, enabling applications to move across the network with consistent levels of security, quality of service (QoS), and overall performance. Virtual machine optimized networking enables IT managers respond to changing business demands by moving applications more efficiently based on CPU loads, thermal, and environmental variables, and faults.
- **Business resilience:** With a zero-service loss architecture and specific features embedded in the Cisco Nexus 5000 Series chassis hardware, operating system, and network management, the Cisco Nexus 5000 Series provides component and system-level operational continuity. IT departments can respond to disruptions or attacks by protecting infrastructure, applications, and data with the highest levels of availability, pervasive security, and business continuance.
- **Optimized service levels:** IT departments can optimize business service levels by providing secure, accelerated access to data center-hosted applications and information from anywhere, at any time, across the organization.

## Why Cisco?

- **Most comprehensive solution:** The Cisco Nexus 5000 Series solution is part of a holistic approach that also includes Cisco Advanced Services, Cisco Capital™, Cisco DCAP, and an industry-leading system of partners.
- **Market-leading technological innovation:** The Cisco Nexus 5000 Series is the first switch in the industry to support FCoE for delivery of a unified fabric.
- **Industry-leading scalability:** Data centers have traditionally been the domain of large organizations, but all organizations small or large can benefit from consolidation, virtualization, and automation. The Cisco Nexus 5000 Series is designed for investment protection, so capacity and capability can be added incrementally.
- **Best practices:** Cisco best-practice guidelines for architectural principles, technical design, and blueprints provide a map for evolving your data center. These principles and guidelines are based on thousands of real-world deployments, allowing companies to benefit from Cisco expertise and experience. The result is a proven, world-class data center architecture that reduces the risk and uncertainty of “do-it-yourself” or piecemeal approaches.
- **Global presence:** The trend toward globalization is one of the reasons that companies need to upgrade their data center infrastructures. Unlike in the days when regional subsidiaries handled international business, corporate data is now consolidated from around the world. No matter where your data center is located, Cisco can offer world-class support and consulting expertise.

## For More Information

- Cisco Data Center 3.0: <http://www.cisco.com/go/datacenter>
- Cisco Nexus 5000 Series: <http://www.cisco.com/go/nexus5000>
- Cisco NX-OS: <http://www.cisco.com/go/nxos>