

Cisco Data Center Network Manager Release 5.2

Product Overview

Modern data centers are becoming increasingly massive and complex. Proliferation of new technologies such as virtualization is adding yet another level of complexity while enabling higher workloads to be placed on the network. Innovations such as Cisco® Unified Fabric unify storage and data networking to deliver convergence, scalability, and intelligence with reduced total cost of ownership (TCO) and faster return on investment (ROI). IT departments today are challenged to look beyond traditional silos of networking and storage to manage this converged, virtualized data center. Meeting this challenge calls for unification of the management plane to enable holistic management of the data center infrastructure.

Recognizing the need to support this convergence in management, Cisco is merging two best-in-class management solutions, Cisco Fabric Manager and Cisco Data Center Network Manager for LAN, into one unified product called Cisco Data Center Network Manager (DCNM). Administrators can still maintain control and segmentation through role-based access control (RBAC), now with single-pane visibility across the network and storage access infrastructure. Cisco DCNM streamlines the provisioning of the unified fabric and proactively monitors the SAN and LAN components. Offering an exceptional level of visibility and control through a single pane for the Cisco Nexus®, Cisco Unified Computing System™, and Cisco MDS 9000 Family products, Cisco DCNM is Cisco's recommended solution for mission-critical data centers.

Cisco DCNM can be licensed for SAN and LAN environments separately or together. Administrators still maintain control and segmentation through role-based access control (RBAC), now with visibility across the network and storage access infrastructure through a single management dashboard. Depending on licensing, different features for management of SAN and LAN infrastructure will be available.

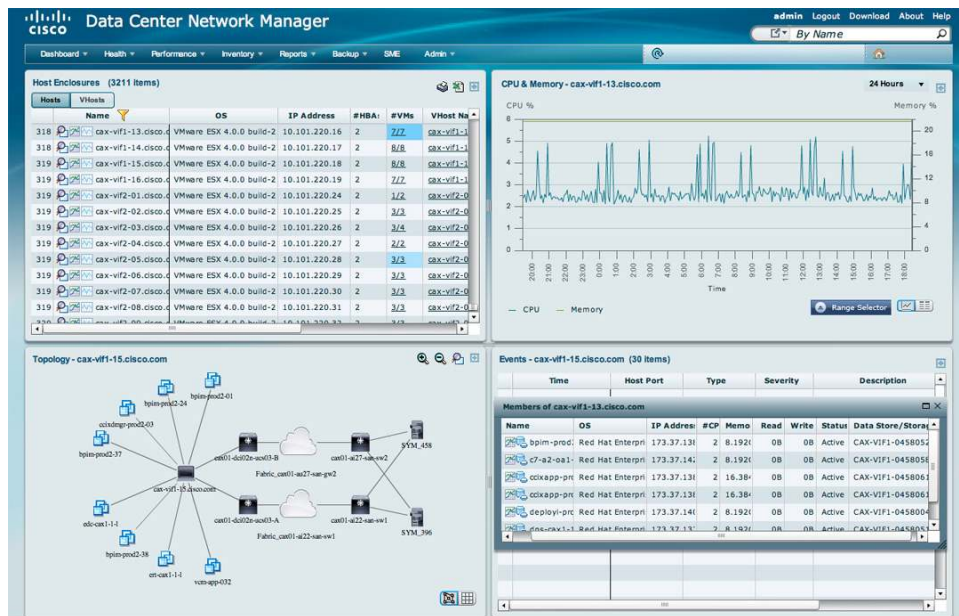
Features and Benefits

Data Center SAN Management

Virtual Machine-Aware Path Management

Cisco DCNM simplifies management of the virtual infrastructure by enabling management of the entire path through the physical to the virtual network across the whole data center environment. The VMpath views increase service availability by identifying bottlenecks in virtual machine and VMware ESX performance and extending visibility to the physical fabric. The virtual machine-aware (VM-aware) topology view shows all the dependencies from the virtual machine out to the physical host, through the fabric, and to the storage array with easy access to a detailed view of the path attributes. The VM-aware dashboard displays all the information needed to manage the virtual environment including performance charts, inventory information, events, and virtual machine and VMware ESX utilization information. Cisco DCNM maps paths all the way from the server to storage, enabling tracking of mission-critical workloads across the entire network (Figure 1).

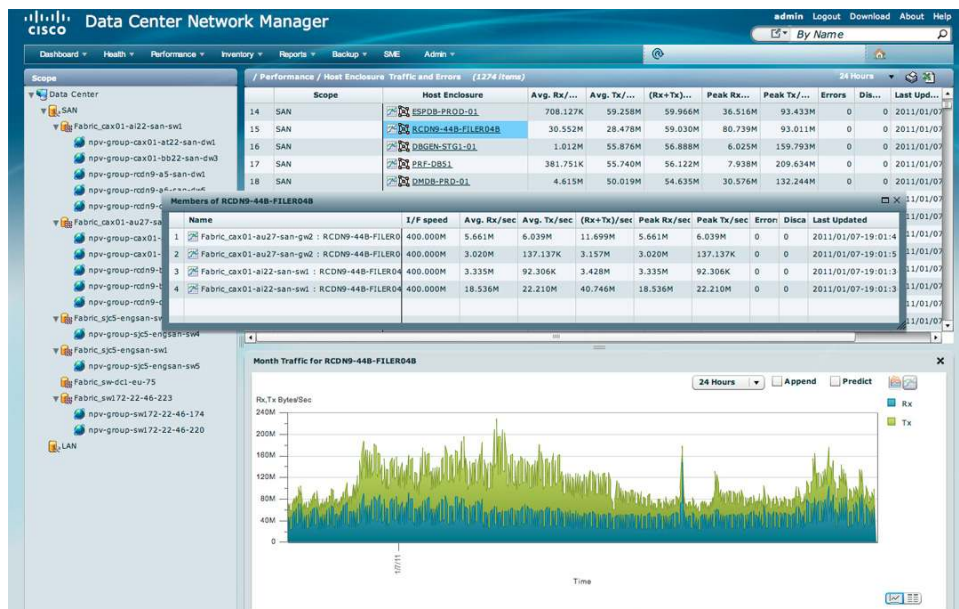
Figure 1. VMpath Analysis



Performance and Troubleshooting

Cisco DCNM helps IT ensure the resiliency of the Cisco SAN infrastructure by monitoring and providing alerts for fabric availability and performance. It provides near-real-time monitoring of fabrics with visibility into traffic spikes and establishes baseline traffic patterns. When predefined thresholds are breached, appropriate alerts are generated and can be forwarded to operations staff and enterprise operations consoles for incident management (Figure 2).

Figure 2. Host Dashboard



Single-Pane of-Glass-Management

The interactive dashboard provides intuitive views into the top fabric users with the capability to view more details of key performance indicators (KPIs). Another view displays events based on their severity, with links to reports that show affected devices, leading to quicker root-cause analysis. Cisco DCNM proactively measures, analyzes, and predicts performance of SAN infrastructure and provides critical visibility into utilization and capacity (Figure 3).

Figure 3. Summary Dashboard



Scalability: Federation and VSAN Scoping

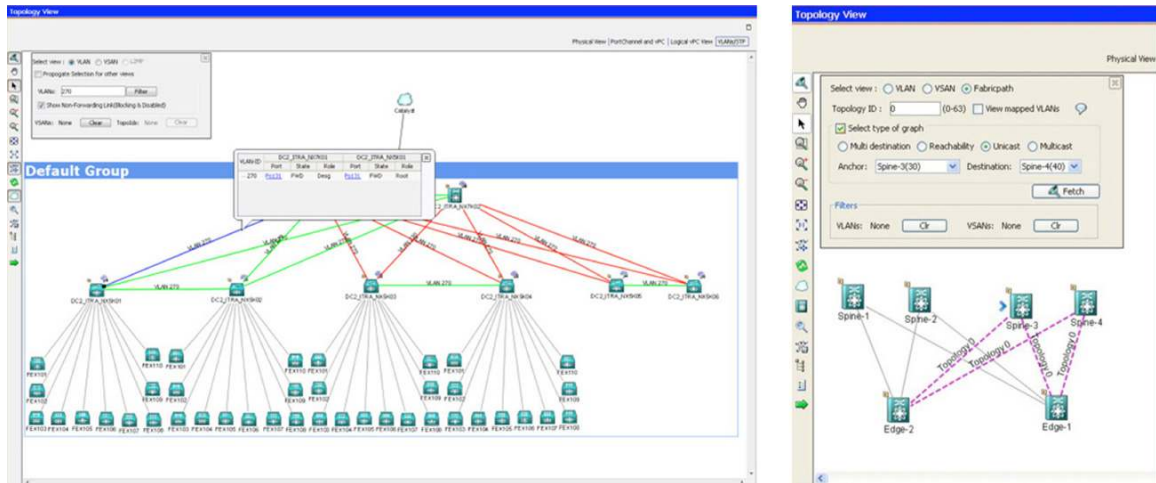
Data center management tools must scale to large and distributed data center deployments. Customers do not want to spend time switching between multiple dashboards for the information. Cisco DCNM solves this problem through the concept of federation; with federation, multiple servers can be deployed while still maintaining a consolidated view across distributed data centers. The simplicity of managing large environments from a single view revolutionizes data center management. For instance, network operations centers (NOCs) can now have a single point for monitoring alerts and events across multiple data centers.

Data Center LAN Management

Innovative data center technologies, mainly related to network and server virtualization, are built into the Cisco Nexus Family platforms. Virtual device context (VDC), virtual PortChannel (vPC), Cisco FabricPath, and port profile technologies are powerful new networking constructs and create challenges from a management perspective. Cisco DCNM is built to provide visibility into these features, helping remove deployment hurdles and monitor their health.

- **VDC:** Cisco DCNM enables network virtualization by creating VDCs, facilitating resource allocation across VDCs and providing independent management for each VDC. VDCs are managed transparently throughout the application; the role-based access control (RBAC) model and topology maps are VDC aware.

- **vPC:** Cisco DCNM fully automates vPC operations. Two vPC peers can be managed as one logical device, allowing enforcement of the vPC peer configuration synchronization policy. Configuration mismatches between the primary and secondary vPC peers are prevented during the initialization phase, and vPC policy compliance is monitored on an ongoing basis. If an inconsistency is detected, it can be automatically repaired, bringing the network back to an operational state.



- **Cisco FabricPath:** Because of the dynamic nature of Cisco FabricPath, which auto-regulates the traffic load across Layer 2 multiple paths, the operations team must get visual feedback as to where and how traffic is actually traversing the fabric. A dedicated Cisco FabricPath topology view with unicast, multicast, and broadcast graphs provides this visibility (Figure 1). The path taken by the traffic between two edge switches is identified. When the return path is different from the entry path, the return path is also clearly identified. An easy-to-use, prebuilt template enables quick, error-free provisioning of Cisco FabricPath across the data center fabric.

Cisco DCNM proactively measures bandwidth consumption and traffic patterns in the network, enabling early identification Cisco FabricPath hotspots, and thus congestion can be circumvented. The health of a Cisco FabricPath domain can be measured in real time for better service delivery.

Table 1. Features and Benefits

Feature	Benefit
Monitoring of Data Center Infrastructure	
Proactive monitoring	• Provides real-time network health summary with detailed view of individual network components, enabling operations staff to respond quickly to events based on their severity. • Facilitates early detection and prevention of outages, increasing network availability. • No rules to write; works immediately with prebuilt rules and thresholds.
Performance and capacity	• Provides detailed visibility into real-time and historical performance statistics in the data center. • Provides insight into port and bandwidth utilization, error count, traffic statistics, etc. • Includes scheduled custom reports that can be offloaded for postprocessing.
VMpath Analysis	• Provides view of VMpath through physical fabric to storage array and to the data store. • Provides capability to view performance for every switch hop all the way to the individual VMware ESX server and virtual machine.

Feature	Benefit
Topology views	- Displays real-time operationally focused topology of the data center infrastructure. - Offers Layer 2 topology maps to streamline the troubleshooting process and reduce the mean time to repair; mouse over topology to view detailed information about paths and switch attributes. - Technology-specific overlays for vPC, Cisco FabricPath, VDC, and VLAN enable provisioning and efficient management of these features.
Reports	- Lets you build custom reports from predefined templates across all fabrics, individual fabric, or VSANs. - Provides easy-to-schedule reports that can be exported for postprocessing or sent by email.
Data Center Resource Management	
Automated discovery	- Using automated network discovery, provides up-to-date physical and logical inventory information. - Tracks inventory and performance information in real time; information can be used as a source of truth for asset tracking or as a data source for a configuration management database (CMDB).
Configuration and change management	- Provides predeployment validation of configuration changes, reducing opportunities for human error. - Out-of-the-box configuration wizards are provided for critical Cisco NX-OS Software features such as vPC, VDC, and Cisco FabricPath. - Using historical configuration archive coupled with config-compare, enables you to identify the last-known good state if configuration problems occur. - Provides capability to back up configuration files from all switches.
Image management	- Enables easy to use, nondisruptive (In-Service Software Upgrade [ISSU]) mass deployment of Cisco NX-OS Software images that can be scheduled or run on demand. - Image upgrades are pre-validated, helping ensure compatibility with the running configuration, and in the event of a failure, rollback is initiated automatically.
Integration with Enterprise Systems	
Web services APIs	- Abstracts the network to implement an IT service management framework (Information Technology Infrastructure Library [ITIL]) with a CMDB at its center as well as to integrate with business intelligence reporting solutions. - Enables easy integration with third-party applications, allowing accurate flow-through provisioning and data mining. - Enables integration into enterprise storage management systems through Storage Management Initiative Specification (SMI-S)-based APIs.
Event forwarding	- Enables integration with enterprise operations console (NOC) for alerts and events. - Uses email and traps to notify operations staff of service disruptions.

Supported Technologies and Platforms

Cisco DCNM is designed to help customers efficiently implement and manage next-generation virtualized data centers. It provides timely management support for data center hardware platforms and Cisco NX-OS innovations. Table 2 provides a sample of the supported technologies and specifications.

Table 2. Product Specifications and Supported Technologies

Ethernet Switching	Network Security	General
Cisco FabricPath	IEEE 802.1X	VDC
vPC	Port security and IP source guard	Port profile (Cisco VN-Link)
Port and PortChannel	IP tunnel interface and traffic storm control	FCoE Initialization Protocol (FIP) snooping
Multi-instance Spanning Tree Protocol (MISTP)	Access control lists (ACLs): MAC address ACL, IP ACL, and VLAN ACL	Hot Standby Router Protocol (HSRP)
Rapid Spanning Tree Protocol (RSTP)	Dynamic Host Configuration Protocol (DHCP) snooping	Gateway Load-Balancing Protocol (GLBP)
VLAN and private VLAN (PVLAN)	Dynamic Address Resolution Protocol (ARP) inspection	Switched Port Analyzer (SPAN)
Link Aggregation Control Protocol (LACP)	Authentication, authorization, and accounting (AAA)	ISSU-based software upgrades

Cisco DCNM supports a variety of Cisco hardware platforms, including:

- Cisco MDS 9500 Multilayer Directors and Cisco MDS 9200 and 9100 Series Multilayer Switches
- Cisco Nexus 7000, 5000, 4000, 3000, and 2000 Series Switches
- Cisco Nexus 1000v virtual switches
- Cisco Catalyst 6500 series switches
- Cisco UCS 6100 Series Fabric Interconnects

System Requirements

Cisco DCNM is a Java-based client-server application that allows the client to be run remotely. The server and the client components can be deployed on a variety of hardware and OS platforms. Additionally, a browser-based interactive dashboard is available that enables the operator to access Cisco DCNM from anywhere in the world across a multitude of clients (PCs, mobile devices, etc.). Table 2 summarizes the system requirements.

Table 3. System Requirements

Description	Server Requirements (Small: Up to 5000 Ports)	Server Requirements (Large: 5000 to 15,000 Ports)	Client Requirements
Hardware	Dual-core CPUs; 2 GHz	Quad-core CPUs; 2 GHz	2 GHz
Memory	4 GB	8 GB minimum	1 GB
Hard disk	40 GB	60 GB	1 GB
Operating system	• Microsoft Windows 2008 (32-bit and 64-bit) • Red Hat Enterprise Linux AS Release 5.4 (64-bit) • Solaris 10 • VMware ESX 4.0 and 4.1		• Microsoft Windows 7 • Solaris 10 • Red Hat Enterprise Linux AS Release 5.4 (64-bit)
Other	• PostgreSQL 8.2 • Oracle 10g XE	Oracle 11g Enterprise	• Mozilla Firefox 3.6 and Java 6.21 • Microsoft IE 7 and 8

Ordering Information

Cisco DCNM is available with multiple licensing options for a wide range of data center deployments. Cisco DCNM can be licensed for SAN and LAN environments separately or together. An important change in the licensing model with Cisco DCNM (compared to Cisco Fabric Manager) is that licenses are hosted on the server and not the switch. All prior Cisco Fabric Manager licenses on existing Cisco MDS switches deployed in the network will be grand fathered into this model, and customers do not need to order or deploy any additional licenses to manage their existing Cisco MDS 9000 Family switches (see the Q&A document at <http://www.cisco.com/go/dcnm>). Cisco DCNM Release 5.2 is available starting July 2011.

Furthermore, two types of Cisco DCNM for SAN and DCNM for LAN licenses are available: Essentials Edition and Advanced Edition. Cisco DCNM for SAN Essentials Edition is included with every Cisco MDS 9000 Family hardware purchase at no charge and can be downloaded from <http://www.cisco.com/go/dcnm>. Cisco DCNM for LAN Essentials Edition is included with every Cisco Nexus Family hardware purchase at no charge and can be downloaded from <http://www.cisco.com/go/dcnm>.

Cisco DCNM for SAN Advanced Edition adds capabilities such as performance monitoring and trending, virtual machine-aware path analysis, event forwarding, and federation across multiple data centers and can be licensed using specific part numbers (see the data sheet at <http://www.cisco.com/go/dcnm>).

Cisco DCNM for LAN Advanced Edition adds capabilities such as configuration management, image management, virtual device contexts (VDCs), and Cisco FabricPath and can be licensed using specific part numbers in Table 4. Cisco DCNM for LAN Essentials Edition and Advanced Edition can be licensed using the part numbers listed in Table 5.

Table 4. DCNM for SAN Ordering Information

Product Name	Part Number
Configure to Order PIDs (Configure Option when purchasing a switch chassis i.e MDS9513)	
DCNM for SAN Advanced Edition for MDS 9100	DCNM-SAN-M91-K9
DCNM for SAN Advanced Edition for MDS 9200	DCNM-SAN-M92-K9
DCNM for SAN Advanced Edition for MDS 9500	DCNM-SAN-M95-K9
DCNM for SAN Advanced Edition for Nexus 7000	DCNM-SAN-N7K-K9
DCNM for SAN Advanced Edition for Nexus 5000	DCNM-SAN-N5K-K9
Spare PIDs (Used outside of chassis purchase i.e. building inventory or licensing already purchased switches)	
DCNM for SAN Advanced Edition for MDS 9100 spare	DCNM-SAN-M91-K9=
DCNM for SAN Advanced Edition for MDS 9200 spare	DCNM-SAN-M92-K9=
DCNM for SAN Advanced Edition for MDS 9500 spare	DCNM-SAN-M95-K9=
DCNM for SAN Advanced Edition for Nexus 7000 spare	DCNM-SAN-N7K-K9=
DCNM for SAN Advanced Edition for Nexus 5000 spare	DCNM-SAN-N5K-K9=
DCNM for SAN PAK contains all of the chassis PIDs	L-DCNM-SAN-PAK=

Table 5. DCNM for LAN Ordering Information

Product Name	Part Number
Configure to Order and Spare PIDs	
DCNM for LAN Essentials Edition (FREE) for Nexus 1000 through Nexus 5000	DCNM-NXACC-K9
DCNM for LAN Essentials Edition (FREE) for Nexus 1000 through Nexus 5000	DCNM-NXACC-K9=
DCNM for LAN Advanced Edition for Nexus 7000	DCNM-N7K-K9
DCNM for LAN Advanced Edition for Nexus 7000 spare	DCNM-N7K-K9=

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and ROI. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

For more information about the Cisco DCNM software, send an email to ask-dcnm@cisco.com, visit the product homepage at <http://www.cisco.com/go/dcnm>, or contact your local account representative.



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