Cisco Prime Data Center Network Manager Release 6.3

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 as a service. Meeting this challenge calls for unification of the management plane to enable holistic management of the data center infrastructure.

Cisco Prime™ Data Center Network Manager (DCNM) provides centralized management of both Ethernet and Fibre Channel networks. The converged view enables network and storage administrators to analyze health and performance across the range of platforms running the Cisco NX-OS Software operating system covering the Cisco Nexus® and Cisco MDS 9000 Families regardless of protocol type. The range of supported protocols and overlays includes:

- Fibre Channel
- Fibre Channel over Ethernet (FCoE)
- Ethernet
- IBM Fibre Connection (FICON)
- Small Computer System over IP (iSCSI)
- Cisco FabricPath
- Cisco Overlay Transport Virtualization (OTV)

Cisco DCNM simplifies deployment of SAN and LAN components through wizard- and template-based provisioning and configuration. Role-based access control (RBAC) helps separate configuration of LAN and SAN networks on converged network switches. Cisco Prime DCNM supports TACACS+, RADIUS, and Lightweight Directory Access Protocol (LDAP) remote authentication protocols to help manage user access to the network and provide audit trail of changes made by the user.

Features and Benefits

Cisco Prime DCNM offers a number of features and benefits for the data center, discussed here and summarized in Table 1 later in this document.

The product includes five main capabilities:

- End-to-end visibility
- Performance and utilization monitoring
- End-to-end troubleshooting
- Configuration and provisioning
- Resilient and scale-out architecture

Here are some highlights:

- End-to-end visibility through domain dashboards (Figure 1): Cisco Prime DCNM provides end-to-end visibility into computing, network, and storage domains for resource planning and problem analysis. The connectivity from virtual and physical host to storage array enables understanding of path dependencies across the multihop and multiprotocol network through the topology view, configuration parameters, events, and performance. The three domain dashboards include:

  ◦ Computing domain dashboard that provides detailed view of virtual and physical host configuration and performance in context of Ethernet and Fibre Channel network.

  ◦ Storage domain dashboard provides a detailed view of storage array configuration and capacity all the way down to the logical unit (LUN), storage pool, and volume and enhances host-path redundancy analytics.

  ◦ Network domain dashboard provides a summary of inventory and health index for each switch with detailed view into switch port performance, inventory, configuration, and events.

  These dashboards enhance network and storage administrators' understanding of dependencies when planning deployments and analyzing connectivity problems, significantly reducing time to deploy and time to resolution.

Figure 1. Multidomain Dashboards: from Left to Right: Computing, Storage, and Network Dashboards
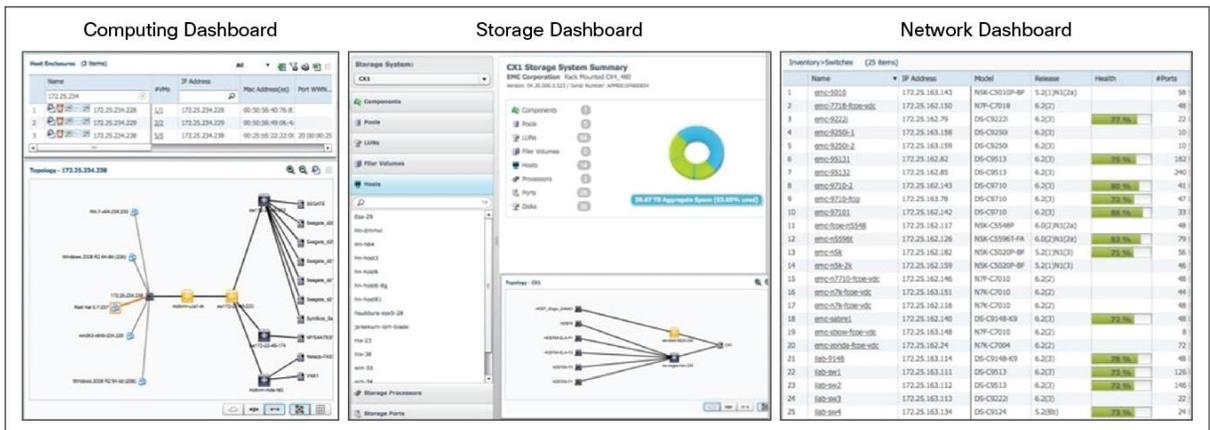
- Performance and utilization monitoring: Cisco Prime DCNM provides real-time and historic trending of switch and port performance and presents it back to the user through tables, charts, and reports. The information derived is used to identify hotspots in the network and orphaned or underutilized ports, enabling IT staff to optimize the Ethernet and Fibre Channel networks. The optimization leads to better use of existing resources, therefore reducing the operational expense of running underutilized infrastructure. Cisco Prime DCNM also configures threshold alerts on the switches and within the application to receive and forward the threshold alerts when the predefined threshold is breached. This enables operational teams to respond to service degradation quickly, identifying anomalous behavior in close to real time and in the context of the affected device.

- End-to-end troubleshooting through enhanced event handling: Cisco Prime DCNM is an aggregator for all the switching accounting logs, event traps, and syslog messages. The event handling view correlates events with affected devices such as servers and storage arrays. The correlated events can then be filtered by severity and type and sent to event processing applications and directly to operation teams based on user-defined events rules. The mechanism enables IT administrators to configure actionable alerts by focusing on production and no-production segments of the data center, reducing the time to determine the root cause of the problem. In addition, the event-forwarding mechanism leads to proactive management of the network by notifying operations team of events that may have the potential to cause outages.

- End-to-end troubleshooting through SAN host-path redundancy analysis: Cisco Prime DCNM runs an automated host redundancy check every 24 hours and on demand to see if best practices are maintained. Cisco Prime DCNM checks for hardware failures and path misconfiguration and uses multidomain visibility to look beyond data center networks into storage arrays and the virtual computing environment. The feature helps IT administrators avoid outages that may be due to missing redundancy. The feature can be used during the change management window for switch and array upgrades and normal operations for hardware replacement such as replacement of switch modules, SFPs, and front-end array adapters. The host redundancy feature helps reduce risk associated with changes to infrastructure and decreases the time needed to deploy and migrate switches and storage arrays in the data center.

- Configuration and provisioning using wizards and templates: Cisco Prime DCNM provides guided wizards for deploying technologies based on Cisco NX-OS while also enabling IT administrators to use predefined templates (scripts) or import their own custom scripts into Cisco Prime DCNM templates. The operations teams can design its own templates and use Cisco Prime DCNM as a script repository, providing a central point for configuration of the Cisco Unified Computing System™ (Cisco UCS®), Cisco Nexus Family, and Cisco MDS 9000 Family platforms. The wizards and templates simplify configuration and provisioning of the fabric and significantly reduce the opportunities for human error.

- Resiliency through highly available scale-out federated architecture: Cisco Prime DCNM adds automatic fabric failover to the scale-out federated architecture that enables failover from the primary Cisco Prime DCNM federated server to a standby server with no loss of fabric visibility. The highly available architecture calls for deployment of a two-node Oracle RAC database on the remote servers along with a shared file system exported to both federated servers. This architecture allows IT administrators to continuously monitor the network without losing the visibility essential to diagnosis of connectivity problems and management of resources while using federation for load balancing and discovery of multiple fabrics and data centers.

Main Features and Benefits

Table 1 summarizes the main features and benefits of Cisco Prime DCNM 6.3.

Table 1.   Features and Benefits

Feature	Benefit
Provisioning	
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)
Provisioning GUI, tools and wizards	• Prebuilt GUI, tools and wizards for provisioning SAN services such as zone assignment and access control list (ACL) assignment • Prebuilt GUI, tools and wizards for provisioning LAN services such as OTV • Template- and wizard-based provisioning of FCoE connectivity based on link type and platform

Feature	Benefit
Provisioning templates	• Prebuilt templates for provisioning LAN and SAN components • Prebuilt template deployment scheduler and rollback mechanism • Customizable templates with conditional statements • Create new templates using template editor • Import configuration script and turn it into template
Configuration and change management	• Provides predeployment validation of configuration changes, reducing opportunities for human error • Using historical configuration archive coupled with configuration comparison, enables you to identify the last-known good state if configuration problems occur • Provides capability to back up configuration files from all switches
One-command multiswitch CLI access	• Enables user to use the global command line as the interface for multiple switches at the same time and view output on those switches
Visibility, Monitoring, and Troubleshooting	
Dashboards	• Last-24-hours summary of events and top talkers across Ethernet and Fibre Channel networks • Custom summary view by SAN or LAN domains and topology grouping • Multidomain host, storage, and switch dashboards with detailed views into switch and storage array • Context-based searches launching domain dashboards and views • Domain view of host and storage topologies, configuration, events, and traffic
Topology views	• Displays real-time operationally focused topology of the data center infrastructure • Offers Layer 2 overlay topology maps to streamline the troubleshooting process and reduce the mean time to repair; roll the cursor over the topology to view detailed information about paths and switch attributes • Enhanced topology in web client provides capability to filter by VSAN and VLAN and identify hot spots on the links and switches
Topology overlays	• Visibility into Layer 2 network connectivity • Cisco FabricPath topology • Propagation of trunked VLAN
Performance and capacity management	• 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. • Enables troubleshooting capacity and performance problems such as link-state health, traffic distribution of unicast, multicast, broadcast, and microbursts on Cisco Nexus 3000 Series low-latency switches • Includes scheduled custom reports that can be offloaded for postprocessing
Capacity manager	• Track port utilization by port tier and predict when an individual tier pool will be consumed • Chart view of port consumption based on custom groupings • Find and combine or reclaim underutilized ports
Health check and correction	• Identify and auto resolve vPC inconsistencies • Identify missing SAN host-path redundancy all the way down to the masked LUNs
Host tracking	• Track the details and connectivity of servers (hosts) that are connected to the Cisco NX-OS devices.
Host-to-storage array LUN view	• Heterogeneous storage array discovery across block and file based storage • View of storage array inventory, host-to-LUN mapping and capacity
VMpath analysis for LAN and SAN	• Provides view of virtual machine path through physical network 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
VMware vCenter plug-in	• Brings Cisco Prime DCNM computing dashboard into VMware vCenter for dependency mapping, inventory, performance, configuration, and events • Provides topology, configuration, events, and performance view in context of virtual host
Event management	• 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 • Allows operator to acknowledge working on the alert and, when the alert is resolved, delete it • Forwards syslog alerts based on monitored facility
Reports	• Custom reports from predefined templates including inventory, utilization, and health • Provides easy-to-schedule reports that can be exported for postprocessing or sent by email • Create custom port groups related to tenants, applications, or organizations for performance reporting
Image management	• Enables easy-to-perform, nondisruptive (In-Service Software Upgrade [ISSU]) mass deployment of Cisco NX-OS Software images, which can be scheduled or run on demand

Feature	Benefit
Operations	
Role-based access control	• RBAC for segmentation of administration users and tasks • Change tracking by user and command
Highly available architecture	• Automatic fabric failover enable continuous discovery and monitoring • Redundant architecture deployment leads to highly available management solution
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 (SAN only) and SOAP APIs
Event handling	• Enables integration with enterprise operations console (NOC) for alerts and events • Uses email and traps to notify operations staff of service disruptions • Adds context to path alert by identifying name of host, ISL, and storage entity • Allows creation of custom port groups based on priority and severity of application and application of rule-based event forwarding to notify system or user of traps and syslogs generated for the custom port group

Supported Technologies and Platforms

Cisco Prime DCNM is designed to help customers efficiently implement and manage next-generation virtualized data centers. Cisco Prime DCNM provides support for Cisco Nexus and Cisco MDS 9000 Family hardware and the common operating system: Cisco NX-OS. Please see the computability matrix that describes Cisco NX-OS and platform support in more detail:
http://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/6_x/dcnm/compmatrix/compatability_matrix.html.

System Requirements

Cisco Prime DCNM is a server-client application that can be deployed on Microsoft Windows or Red Hat Enterprise Linux operating systems. The application comes with a PostgreSQL database, and for monitoring mission-critical environments it supports the Oracle database running locally or on a remote server. The unique scale-out federated server architecture enables monitoring of large enterprise networks while maintaining a centralized view from any federated server. The application consists of a converged web client for monitoring the health and performance of Cisco's multiprotocol unified fabric and extending visibility to virtual and unified computing through dynamic dashboards. The additional components include SAN and LAN Java clients to enable provisioning and configuration of storage services and network protocols through wizards along with advanced diagnostics.

Table 2 summarizes the system requirements for Cisco Prime DCNM.

Table 2.   System Requirements

Description	Small: Up to 50 Switches or 5000 ports	Medium: Up to 200 Switches or 20,000 ports	Large: More than 15 Switches and 15,000 ports	Clients
Hardware	4-core CPUs; 3 GHz	4-core CPUs; 3 GHz	Up to 10 federated nodes Scale-out architecture	3 GHz
Memory	8 GB	12 GB minimum		1 GB
Free hard disk	40 GB	60 GB		1 GB
Operating system	Microsoft Windows 2008 R2 SP1 Microsoft Windows 2008 Standard SP2 (32-bit and 64-bit) Red Hat Enterprise Linux AS Release 6.4 (32-bit and 64-bit) Hypervisor support same as guest OS			Microsoft Windows 7 Red Hat Enterprise Linux AS Release 6.4

Description	Small: Up to 50 Switches or 5000 ports	Medium: Up to 200 Switches or 20,000 ports	Large: More than 15 Switches and 15,000 ports	Clients
Clients	Web client LAN Java client SAN Java client	Web client (up to 200 switches and 15,000 ports) SAN Java client (soft limit of 24 open fabrics) LAN Java client (hard limit to 75 managed switches per instance)		JRE 1.7 prepackaged Web client is supported on Internet Explorer, Safari, and Firefox browsers
Other	PostgreSQL 8.3 Oracle 11g XE	Oracle 11g XE, Standard and Enterprise Oracle 11g Real Application Clusters (RAC) best when running Cisco Prime DCNM in federation with automated failover		Device manager Java client JRE 1.7

Ordering Information

Cisco Prime DCNM can be licensed for SAN and LAN environments separately or together. Many Cisco Prime DCNM features used for provisioning and discovery are available for free with the base image (Essentials edition); advanced features require a purchased license. Cisco Prime DCNM is priced by switch platform and licensed per number of switches within each switch platform. In addition, a yearly service contract is required to upgrade from one major release to another. For information about free and licensed features, please see the installation guide at http://www.cisco.com/en/US/products/ps9369/prod_installation_guides_list.html.

Licenses have been added to Cisco Prime DCNM 6.3 for the Cisco Nexus 9300 Series Switches and Cisco Nexus 9500 platform (Table 3).

Table 3.   Cisco Prime DCNM Ordering Information

Product Name	Electronic Part Numbers	Physical Part Numbers	Chassis Part Numbers
DCNM for SAN Advanced Edition for MDS 9100	L-DCNM-S-M91-K9=	DCNM-SAN-M91-K9=	DCNM-SAN-M91-K9
DCNM for SAN Advanced Edition for MDS 9200	L-DCNM-S-M92-K9=	DCNM-SAN-M92-K9=	DCNM-SAN-M92-K9
DCNM for SAN Advanced Edition for MDS 9500	L-DCNM-S-M95-K9=	DCNM-SAN-M95-K9=	DCNM-SAN-M95-K9
DCNM for SAN Advanced Edition for MDS 9700	L-DCNM-S-M97-K9=	DCNM-SAN-M97-K9=	DCNM-SAN-M97-K9
DCNM for SAN Advanced Edition for Nexus 5000	L-DCNM-S-N5K-K9=	DCNM-SAN-N5K-K9=	DCNM-SAN-N5K-K9
DCNM for SAN Advanced Edition for Nexus 6001	L-DCNM-S-N61-K9=	DCNM-SAN-N61-K9=	DCNM-SAN-N61-K9
DCNM for SAN Advanced Edition for Nexus 6004	L-DCNM-S-N64-K9=	DCNM-SAN-N64-K9=	DCNM-SAN-N64-K9
DCNM for SAN Advanced Edition for Nexus 7000	L-DCNM-S-N7K-K9=	DCNM-SAN-N7K-K9=	DCNM-SAN-N7K-K9
DCNM for SAN Advanced Edition for Nexus 7700	L-DCNM-S-N77-K9=	DCNM-SAN-N77-K9=	DCNM-SAN-N77-K9
DCNM for LAN Advanced Edition for Nexus 3000	L-DCNM-L-N3K-K9=	DCNM-LAN-N3K-K9=	DCNM-LAN-N3K-K9
DCNM for LAN Advanced Edition for Nexus 5000	L-DCNM-L-N5K-K9=	DCNM-LAN-N5K-K9=	DCNM-LAN-N5K-K9
DCNM for LAN Advanced Edition for Nexus 6001	L-DCNM-L-N61-K9=	DCNM-LAN-N61-K9=	DCNM-LAN-N61-K9
DCNM for LAN Advanced Edition for Nexus 6004	L-DCNM-L-N64-K9=	DCNM-LAN-N64-K9=	DCNM-LAN-N64-K9
DCNM for LAN Advanced Edition for Nexus 7000	L-DCNM-N7K-K9=	DCNM-N7K-K9=	DCNM-N7K-K9
DCNM for LAN Advanced Edition for Nexus 9300 [new]	L-DCNM-N93-K9=	DCNM-LAN-N93-K9=	DCNM-LAN-N93-K9
DCNM for LAN Advanced Edition for Nexus 9500 [new]	L-DCNM-N95-K9=	DCNM-LAN-N95-K9=	DCNM-LAN-N95-K9
DCNM SAN and LAN Advanced Edition for Nexus 5000	NA	DCNM-LS-N5K-K9=	DCNM-LS-N5K-K9
DCNM SAN and LAN Advanced Edition for Nexus 6001	L-DCNM-LS-N61K9=	DCNM-LS-N61-K9=	DCNM-LS-N61-K9
DCNM SAN and LAN Advanced Edition for Nexus 6004	L-DCNM-LS-N64K9=	DCNM-LS-N64-K9=	DCNM-LS-N64-K9
DCNM SAN and LAN Advanced Edition for Nexus 7700	L-DCNM-LS-N77K9=	DCNM-LS-N77-K9=	DCNM-LS-N77-K9

Service and Support

Achieve the full business value of your technology investments with smart, personalized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, Cisco Services help enable you to successfully plan, build, and run your network as a powerful business platform. Whether you are seeking to quickly seize new opportunities to meet rising customer expectations, improve operational efficiency to lower costs, mitigate risk, or accelerate growth, we have a service that can help you.

Technical Service Options

Purchasing Cisco Application Support plus Upgrades (SASU) service provides benefits not available with the warranty, including access to maintenance releases, minor and major upgrades, online resources, and cisco Technical Assistance Center (TAC) support services. For more information about Cisco warranties, go to http://www.cisco.com/go/warranty.

For information about Cisco Technical Services, go to http://www.cisco.com/go/ts.

For More Information

For more information about the Cisco Prime DCNM software, visit the product homepage at http://www.cisco.com/go/dcnm or contact your local Cisco account representative or partner.

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