Cisco Evolved Programmable Network Manager Technical Data Sheet

Product Overview

The Cisco® Evolved Programmable Network (EPN) Manager is a simplified and cost-effective device operation, administration, network provisioning, and network assurance management solution for today's converging packet and optical multilayer networks. This all-in-one, next-generation product provides device management, network provisioning, and network assurance across core, edge, aggregation, and access networks. EPN Manager provides end-to-end network management of Carrier Ethernet, optical transport, and circuit emulation over packet networks. For example, addressing the combination of circuit emulation over packet, Optical Transport Network (OTN), and DWDM/ROADM networks provides comprehensive network management support as service providers modernize circuit transport and private line networks.

To complement its network service provisioning and assurance capabilities, EPN Manager also offers device lifecycle management, assurance visibility, and troubleshooting capabilities across service provider Wi-Fi networks, from Wi-Fi access points to switches in wiring closets. This "foundation" support (that is, the combination of device lifecycle management, assurance visibility, and troubleshooting capabilities) is also available for customer premises routers, WAN routers, core switches, and data center switches.

Built on a model-based architecture with content decoupled from the platform, it greatly improves agility in content delivery. It is a flexible, easy-to-deploy solution with a visually appealing user interface and a common inventory and data model. (See Figure 1.)

Figure 1.   Converged Network Management with Cisco EPN Manager
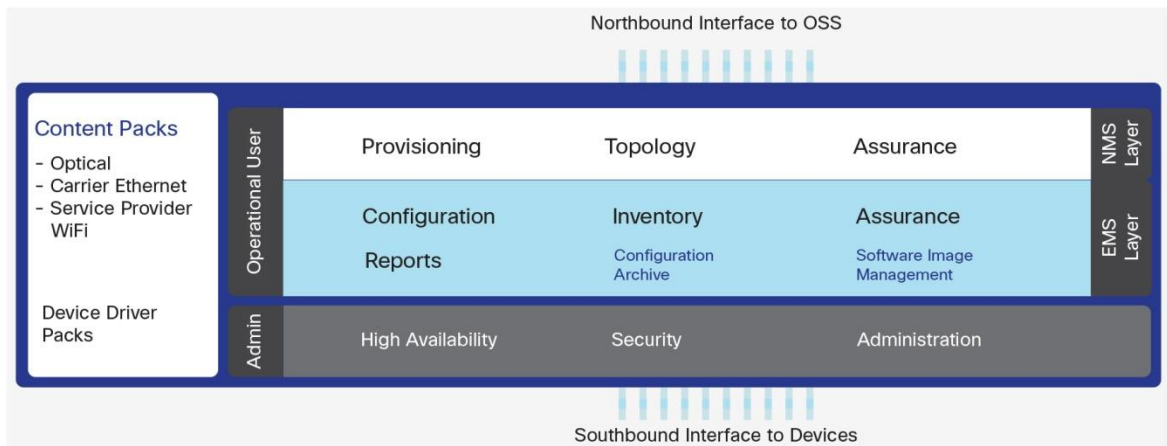
EPN Manager offers these main benefits:

- Increased operational scale and efficiency through simplified, integrated, and automated device operations, network provisioning, and network assurance
- Proactive service assurance and highly effective fault management and trend information to help providers avoid future service disruptions
- Increased service agility through integrated lifecycle management and through standards-based northbound interfaces (NBIs) to third-party operations support systems (OSSs)
- Management interface that provides a single, unified platform for network service provisioning, monitoring and assurance, and change and compliance management to accelerate device and services deployment and to rapidly resolve problems that can affect the end-user experience

EPN Manager offers these main features:

- Modern user interface with HTML 5.0 for a superior experience whether users are using a tablet or a traditional PC
- Comprehensive, graphical views of the entire network, from the topology to the device level, with centralized inventory, status, and fault information
- Automated discovery, device configuration, and change management with up-to-date displays of network events, states, and changes
- Modern GUI with wizard-led workflows, topology-guided troubleshooting, and multilayer visualization (Figure 2)
- Point-and-click provisioning for Carrier Ethernet, Layer 3 VPN, optical transport (including high-density Circuit Emulation), and service provider Wi-Fi (Figure 3)
- Unique ability to discover network services, such as OTN circuits and Ethernet Virtual Connections, from the network and reconcile the discovered services with provisioning records or create a baseline of existing network services for brownfield deployments
- Fault management for the underlying infrastructure with graphical correlation
- Proactive network health monitoring, including network-level alarms, threshold crossing alerts (TCAs), metrics collection, and performance reporting
- Multilayer management, performance monitoring, and provisioning
- Geographic topology maps that provide critical, contextual views of network resources; users can easily toggle between geographic and abstract topology maps
- Detailed chassis views that show the actual appearance and status of the physical configuration of network elements to facilitate the communication among operations center and onsite operations staffs and lend context when configuring device interface features
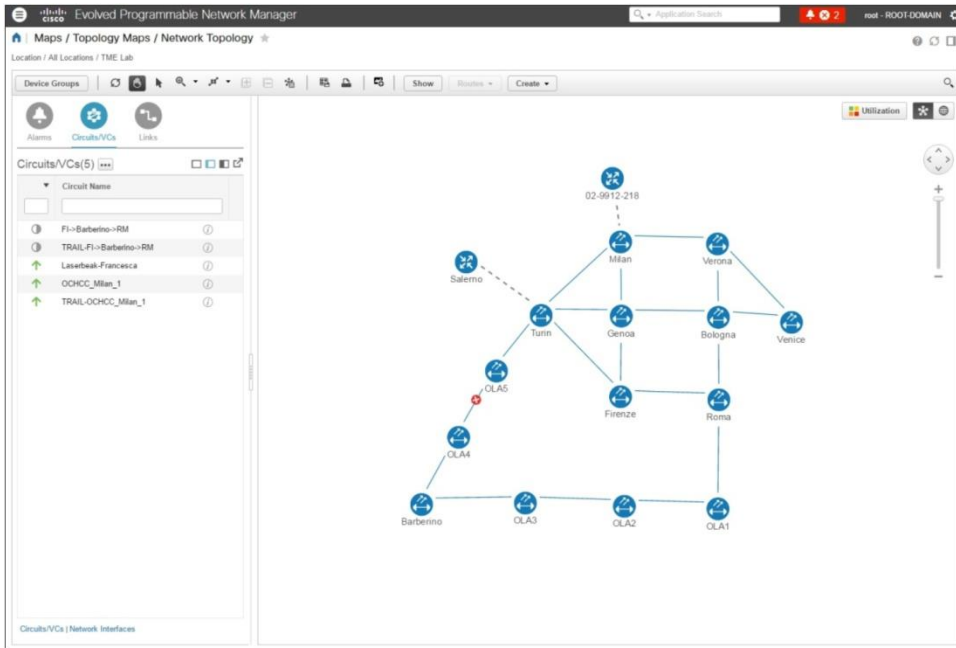
Figure 2.   Cisco EPN Manager Network Topology

Figure 3.   Cisco EPN Manager Carrier Ethernet Service Testing Capabilities

Product Description

Modular Architecture

With its modular architecture, Cisco EPN Manager makes upgrading easier and with minimal impact on operations. Application upgrades are downloaded through maintenance packs and applied through the management system. During the upgrade process, EPN Manager is fully operational unless an overarching structural or database change is necessary. Maintenance packs are also published to provide support parity, especially for service availability and troubleshooting, thereby eliminating gaps in management operations.

This innovative approach enables service providers to introduce new services faster. As new capabilities become available for EPN Manager, operators can choose the timing for adopting new technologies to best serve their needs.

Capabilities

EPN Manager was created to address customers' fault, configuration, accounting, performance, and security (FCAPS) needs, with an emphasis on service delivery and service assurance. Using simplified, end-to-end, point-and-click service provisioning across Layers 0 through 3, services can be easily created, visualized and human errors can be avoided.

EPN Manager shows what is impacting the network and how traffic is flowing through the network. To organize information by customer, users can assign customer labels to services. These can be used to quickly determine the quality of the network services being managed for a specific customer. Network elements can be organized into a variety of views, such as location views. Users can define additional groups, for example, by geography or by device family. And to help the user keep up with any network changes, EPN Manager keeps track of the network configurations and provides visual route cues (Figure 4).

To simplify operations, topology maps bring attention to the most critical aspects of the network. Simplified workflows facilitate design, deployment, and operations tasks that align with user roles. Contextual dashboards and 360-degree views (device and port levels) display only the most relevant information for fast and efficient management and remediation (Figure 5).

Figure 4.   Cisco EPN Manager Multilayer Topology Map Automatically Groups Devices by Technology
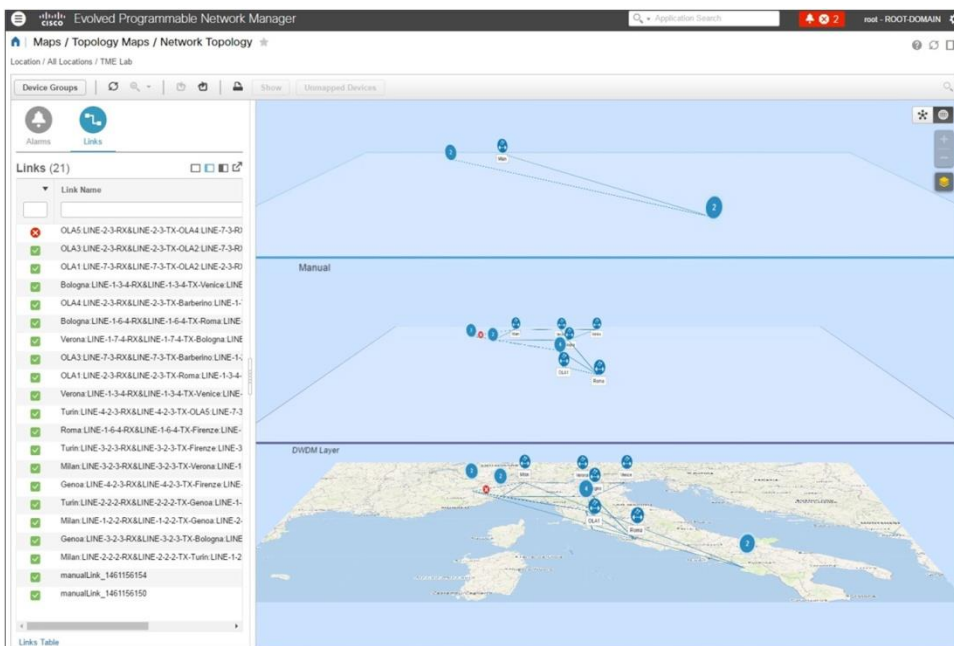
EPN Manager helps users configure and roll out network changes quickly and efficiently: for example, new configuration or monitoring templates, software image updates, and support for user-initiated changes and compliance updates. These capabilities help accelerate service rollout and reduce opportunities for errors. In addition, EPN Manager provides a simple set of guided and advanced flows to bulk-provision new devices or push an initial configuration to a device to bring it up within a few minutes, reducing IT operating expenses (OpEx). Many device actions, such as software download, activation, and database backup, can be scheduled to reduce the need for manual tasks or intervention.

EPN Manager simplifies the management of the converged packet and optical network from the access layer to the core for efficient delivery of next-generation services. Designed to scale to support a nationwide transport and core network, EPN Manager provides a high level of reliability with a high-availability redundant configuration that can fail over in less than five minutes in a geographically redundant configuration.

Figure 5. Cisco EPN Manager Multilayer Trace Capabilities
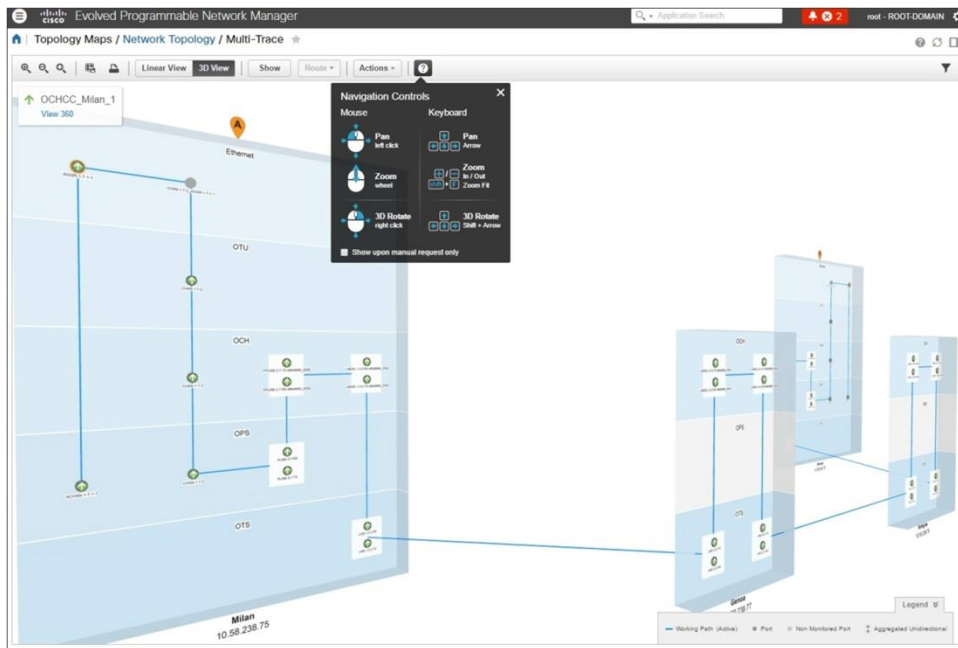

Northbound and Southbound Interfaces

EPN Manager supports the Multi-Technology Operations System Interface (MTOSI) NBI, the Restconf/YANG based on representational state transfer (REST) API, and the Simple Network Management Protocol (SNMP) for data collection. The network management information model, defined in YANG and accessible via the Restconf interface, is based on TeleManagement Forum (TMF) standards governing the modeling of physical and service inventory. The Restconf/Yang API can be used to manage device and circuit inventory; retrieve alarms and events; perform job operations including getting job summaries and histories, cancelling jobs, and resuming and suspending jobs; performing report operations; Execute command-line interface (CLI) template. SNMP is used to collect performance and fault data.

With sophisticated API integration, EPN Manager is designed to scale to manage global service provider networks with thousands of network devices, including hundreds of thousands of Wi-Fi access devices. With its simplified workflows and intuitive interface, EPN Manager can also manage much smaller commercial networks with the same levels of control and resiliency. In addition, it provides a powerful REST-based API that organizations can use to gather and distribute network information for operations, capacity planning, automation, and business intelligence. Built with scalability and extensibility in mind, EPN Manager supports the gradual evolution to a single core network managed by a unified, highly scalable management system.

To facilitate faster training and ease of use, EPN Manager provides a consistent user experience, enabling transparent management (service creation, node provisioning, assurance testing, and troubleshooting) across different parts of the network.

Figure 6.   Cisco EPN Manager Network Topology with Geo Maps Zoomed
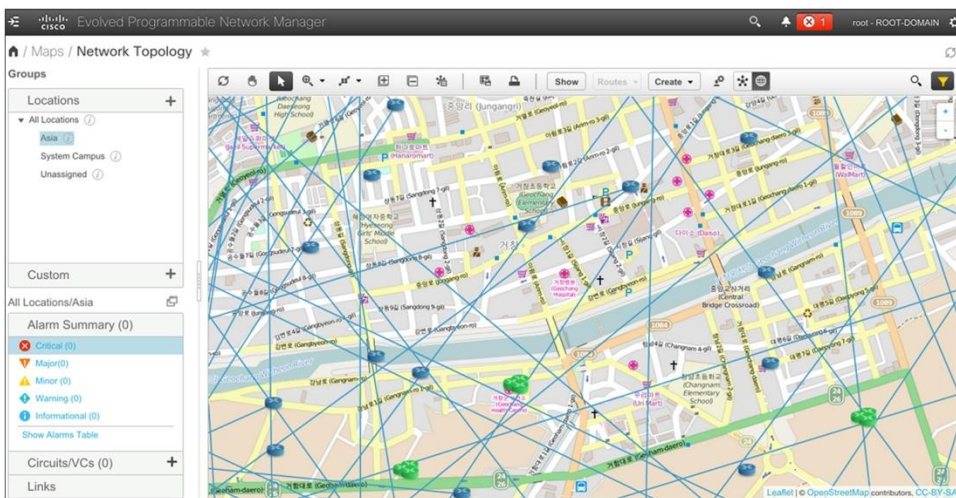
Cisco EPN Manager Overview

Table 1 outlines the main benefits of Cisco EPN Manager.

Table 1.   Cisco EPN Manager Benefits

Benefit	Description
Operation efficiency	• A unified user interface that combines optical, Carrier Ethernet, wireless, and wired services to provide a single, intuitive structure for accessing tasks and operations • Converged network management information and functions for streamlined task flows traversing provisioning, assurance, and device management functions • Contextual dashboards and 360-degree user and device views display only the most relevant information for fast and efficient troubleshooting and remediation
Improved operations and management	• Built-in high availability increases uptime for services delivery and improves operation efficiency. Ready-to-use support for high availability enables devices to call home in the event of failover • Ongoing support for Cisco devices and software releases helps ensure device support parity within each device family and is provided through device packs • New technology packs deliver new features between releases without requiring an upgrade • Flexible virtual machine– or appliance–based deployment models promote easy setup for quick time to value in global service provider networks
Simplified administration	• This single-pane solution provides complete end-to-end infrastructure management, reducing the need for multiple tools and lowering operating expenses and training costs • A consistent user experience provides transparent management (service creation, node provisioning, assurance testing, and troubleshooting) across different parts of the network

Detailed Features: Optical Transport, Carrier Ethernet, and Service Provider Wi-Fi

Tables 2 through 5 outline the features of each Cisco EPN Manager content pack.

Table 2.   Optical Transport Network Features

Feature	Description
Point-and-click provisioning of circuits	• Fast, easy, and automated provisioning that uses a single platform and similar workflows to create optical transport network (OTN) and dense wavelength-division multiplexing (DWDM) circuits • Common database shared between components • Optical circuits support for optical channel data units and optical channels (ODUxx and OCHxx)
Event and fault management for optical transport circuits	• Graphical correlation of faults at different layers (OTN and DWDM) • Support for multilayer circuit trace
Network health monitoring, including fault and performance monitoring	• Network health monitoring, including network-level alarms, performance metric gathering, and TCAs • Per-circuit performance monitoring
Visually appealing user interface with ease of use for operators	• Wizard-led interaction, network maps, circuit topology, point-and-click provisioning, circuit trace, device 360° view, port 360° view, and multilayer topology visualization of ODUxx and OCHxx circuits
Chassis view	• Display of images of the actual chassis and the modules that have been populated for the particular network element, including indicators for chassis-level and module-level alarms; multichassis nodes are shown on multiple tabs
NBIs for OSS integration	• Standards-based NBIs (MTOSI and REST) to integrate with third-party OSSs

Table 3.   Carrier Ethernet Network Features

Feature	Description
Point-and-click provisioning of services	• Fast, easy, and automated provisioning that uses a single platform and similar workflows to create Layer 3 VPN connections, Ethernet virtual connections (EVCs) and MEF 2.0 services • Common database shared between components • Provisioning and configuration of MEF 2.0 services (including quality of service [QoS], Layer 2 control protocol (L2CP), and Ethernet operations, administration and management [OAM] parameters) in a few clicks • Support for services including E-LAN, E-LINE, E-TREE, and E-ACCESS
Comprehensive workflow to provision services	• Guided workflow that allows the user to set or modify all the required parameters to configure end-to-end Carrier Ethernet services • Support for Multiprotocol Label Switching (MPLS) to the edge or Ethernet access layer (G.8032, ICCP-SM, etc.)
Event and fault management for EVCs	• Event and fault management for Carrier Ethernet services and underlying infrastructure (EVC), including event correlation • Support for multilayer circuit trace
Network health monitoring, including fault and performance monitoring	• Network health monitoring, including network-level alarms, performance metrics, and TCAs • Per-circuit performance monitoring
Service testing interface	• Integrated service testing feature that uses RFC 2544 and Y.1564 capabilities to validate service continuity and performance before delivering a service to production networks
Visually appealing user interface with ease of use for operators	• Wizard-led interaction, network maps, EVC topology, point-and-click provisioning, device 360° view, port 360° view, and multilayer topology visualization of EVCs
Layer 3 VPN provisioning	• Provisioning for full-mesh, hub-and-spoke, and combined hub-and-spoke and full-mesh topologies; provisioning includes configuration of QoS attributes
Layer 3 VPN resource allocation	• Resource allocation for Layer 3 VPN (L3VPN), including route targets, route distinguishers, bridge group virtual interface (BVI) and bridge domain interface (BDI) Instances, and IP addresses
Layer 3 VPN fault management	• Management of all potential faults (traps and syslog) in relation to L3VPN services, with alarms automatically attached to the service; alarms include interface-level alarms, IP service-level agreement (SLA) alarms, and QoS alarms
NBIs for OSS integration	• Standards-based NBIs to integrate with third-party OSSs

Table 4.   Service Provider Wi-Fi Network Features

Feature	Description
Complete lifecycle management	• The wireless management capabilities include RF management, user access visibility, reporting, and troubleshooting, along with network infrastructure lifecycle functions such as discovery, inventory, configuration and image management, compliance reporting, integrated best practices, and reporting
Support for IEEE 802.11ac	• Support for IEEE 802.11ac access points delivers unified, simplified, and comprehensive management for today's wireless standards
Automatic hierarchy creation	• Create maps and assign access points to maps using regular expressions. This capability automates the tedious work of creating regional hierarchies and assigning access points by location
Automatic switch-port tracing	• Switch port tracing permits you to rapidly identify the Cisco switch and port information for a rogue access point connected to the Cisco switch for quick mitigation of threats
Geo enabled next-generation maps	• A map engine supports high-resolution images with pan and zoom controls, fast loading, and intelligent user-specific caching. Search within maps is also supported. Maps combined with search offer a fast and smooth navigation experience with quick access to information. Geo Maps capability to visualize outdoor terrain and location information for outdoor AP's
Restconf/Yang	• Read-write APIs allow you to externally trigger tasks such as wireless LAN (WLAN) configuration on controllers and access points for operations such as scheduling bulk configuration

Table 5.   Circuit Emulation over Packet Network Features **(Beta Version)**

Feature	Description
Discovery plus point-and-click provisioning of services	• Fast, easy, and automated provisioning that uses a single platform and similar workflows to create Structure Agnostic Time Division Multiplexing over Pseudowire (SAToP) and Circuit Emulation Service over Packet Switched Network circuits (for example, DS1 or SONET circuits over Pseudowire tunnels) • Creation and provisioning of CEM services on Cisco ASR 903, Cisco ASR 907, and Cisco NCS42xx devices • Support for SONET circuits with unidirectional path switched ring (UPSR) and Automatic Protection Switching (APS) protection mechanisms
Network infrastructure configuration	• Bidirectional TE tunnel and Layer 3 link creation (corouted tunnels only) • Support for creating MPLS TE service on Cisco NCS 4206 and Cisco NCS 4216 devices • Support for constraint-based routing and trunk admission control • Ability to choose the mechanism to protect the tunnel against link and node failures when provisioning an MPLS TE service • Usage of Resource Reservation Protocol (RSVP) to establish and maintain label-switched path (LSP) • Ability to configure H-QoS to specify QoS behavior at multiple levels of hierarchy for Cisco NCS 4000 and 42xx devices • Support for configuration of frequency synchronization using Sync-E and BITS
Event and fault management for CEM circuits	• Event and fault management for CEM services and underlying infrastructure (MPLS LSP, OTN), including event correlation • Support for multilayer circuit trace
Network health monitoring, including fault and performance monitoring	• Network health monitoring, including network-level alarms, performance metrics, and TCAs • Per-circuit performance monitoring
Service testing interface	• BERT Testing to validate end-to-end continuity of Circuit Emulation services
Visually appealing user interface with ease of use for operators	• Wizard-led interaction, network maps, topology, point-and-click provisioning, device 360° view, port 360° view of CEM circuits

Product Specifications

Tables 6 through 9 outline the product specifications for each Cisco EPN Manager component.

Table 6.   Element and Device Management

Specification	Description
Optical transport network hardware	• Cisco ONS 15454 SONET Multiservice Transport Platform (MSTP); and Cisco Network Convergence System (NCS) 2002, 2006, 2015, 4009, and 4016
Circuit emulation nodes (beta version)	• Network Convergence System (NCS) 4202, 4206, 4216
Carrier Ethernet network hardware	• Cisco ASR 9000v, 9001, 9006, 9010, 9904, 9912, 9922, 901, 902, 903, and 920 Routers; and Cisco ME 3600X and ME 3800X Series
Service provider Wi-Fi network hardware	• Cisco 2100, 2500, 4400, 5500, 5700, 7500, and 8500 Series Wireless LAN Controllers (WLCs); Cisco 3750G Integrated WLC; Cisco Wireless Services Module (WISM) and WISM2; and Cisco 5700 Series stackable WLC and virtual WLC • Unified access points: Cisco Aironet™ 1040, 1100, 1200, 1300, 1500, 1800, 2700, 3500, 3600, and 3700 Series access points; 600 Series OfficeExtend Access Point; and 700 and 800 Series, with multiple-input multiple-output (MIMO) technology • Autonomous access points: Cisco Aironet 340, 350, 700, 800, 1040,1100, 1200, 1300, 1400, 1500, 1700, 1800, 2700, 3500, 3600, and 3700 Series
Configuration compliance	• With the addition of a compliance engine, EPN Manager provides operators the ability to specify the golden network configuration and perform an audit of the network devices against the configuration archive or the device configuration. The audit report identifies devices that are out of compliance. Operators can remediate the devices that are out of compliance with the desired configuration. This engine also helps with generating reports for EoL/EoS/PCI for network devices
Software Image Management and Configuration File Management	• Management of the configurations, including backup of the configurations in a centralized database • Software download and activation: single and bulk

Table 7.   Network Assurance

Specification	Description
Discovery	
End-to-end discovery of network configuration	• Discovery with graphical overlay on topology map to quickly identify Layer 0 through 3 connections
Fault association	• Fault association to affected network services for rapid analysis of impact
Summary view	• Summary view displayed in the topology map for quick identification of connections in the selected region or logical group of devices
Service 360° view	• At-a-glance view of service performance
Port 360° view	• Shows main port and interface attributes and metrics, including interface name, port address, operational and administrative status, highest alarm severity of currently active alarms, current alarms associated with the interface, and current events associated with the port
Link 360° view	• Shows link attributes, end points, faults and circuits using the link
Fault Correlation	
Graphical correlation of fault at multiple layers with different technologies	• Complete and detailed view of the configuration change history of all devices in the network, enabling network operators to make informed decisions about unplanned changes and take appropriate action
Events correlated to single root cause alarm	• Enables events to be traced back to a single root cause and displays the root cause alarm; all events can be browsed, opening the details of the root-cause alarm
Alarm management	• One single dashboard for alarms coming from all the devices in the network • Consolidation of traps and syslogs into alarms • Graphical notification of alarms • Alarm lifecycle management

Specification	Description
Alarm Customization	
Alarm definition customization	• Ability to customize alarms based on the operational needs. Customizable syslog based alarms provides the ability to custom create new alarms and prioritize operator response
Performance Monitoring	
Correlated performance graphs	• Correlated charts enable operators to carry out comparative troubleshooting of network KPIs. The overlay of alarms and configuration change events in the correlated graphs helps connect network change events to performance degradation/improvements
Real-time performance test	• Real-time performance data accessible for quick troubleshooting; optical physical performance and protocol error counters are available
Multilayer trace	
Graphical view of used resources	• Graphic view of all the resources associated with a given connection; tracking includes the underlying layer, providing a powerful tool for root-cause analysis and impact analysis
Multilayer fault correlation	• Correlation of faults that may affect a connection at different layers

Table 8.   Network Provisioning

Specification	Description
Provisioning	Consistent workflows based on a common platform
Topology automation	Overlay visualization for provisioned services
Point-and-click operation	Simplified provisioning directly from the network topology map

Table 9.   System Integration and Customization

Specification	Description
OSS integration	• The Restconf/Yang API can be used to manage device and circuit inventory; retrieve alarms and events; perform job operations including getting job summaries and histories, cancelling jobs, and resuming and suspending jobs; performing report operations; Execute command-line interface (CLI) template.
	• The network management information model, defined in YANG and accessible via the Restconf interface, is based on TeleManagement Forum (TMF) standards governing the modeling of physical and service inventory. Physical and logical inventory access to external OSSs to eliminate the cost of building and maintenance
	• XML-based interface (for queries, commands, and notifications)
	• Event notification service for forwarding SNMP notifications and email notifications

System Requirements

Cisco EPN Manager is offered as a prepackaged virtual server open virtual appliance (OVA) on VMware. For more detailed information about system requirements and technical specifications, refer to the EPN Manager documentation.

High Availability

The Cisco EPN Manager high-availability framework helps ensure continued system operation in the event of failure. High availability is achieved through a pair of linked, synchronized EPN Manager servers to reduce or eliminate the impact of application or hardware failures that may occur on either server.

Services and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information, visit the Cisco Services page on Cisco.com.

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For More Information

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