Cisco Prime Network VNE Device Drivers

Overview

Today's networks have become increasingly complex with multivendor environments, multitechnology requirements, and multiservice domains. Constant introduction of new devices into the network, as well as updates to existing devices, presents challenges to service providers who need to bring these devices under management quickly and seamlessly. They need an innovative approach to device driver management that minimizes impact to network operations and service delivery.

The Cisco Prime™ Network virtual network element (VNE) device driver helps service providers meet this requirement. It is a key enabler for Cisco Prime Network to manage evolved programmable networks (EPNs), separating device information from high-level applications to promote high adaptability.

It achieves this by discovering the physical inventory and logical configuration of the managed devices, and translates this information into detailed software representations of the devices. This forms the basis for all further device and network management functionality.

Cisco Prime Network VNE device drivers support a wide range of Cisco® and non-Cisco physical and virtual devices that may be deployed across access, aggregation, edge, and core network domains and data centers.

Features and Benefits

Benefits

Cisco Prime Network VNE offers the following benefits:

- Investment protection through timely updates that support device upgrades without the need to modify or upgrade the network management system (Cisco Prime Network).
- Reduced costs through multivendor support that allows Cisco Prime Network to manage heterogeneous networks with minor customization.
- Improved operational efficiency and reduced costs and dependency on professional services through rapid user extensibility.

Features

Cisco Prime Network VNE provides the following features:

- Discovery of physical inventory and logical configuration of managed devices using simple network management protocol (SNMP), command-line interface (CLI), and Extensible Markup Language (XML).
- Device health and change monitoring through periodical polling and interpretation of autonomous event messages, such as SNMP notifications and syslog messages sent by the devices.
- An innovative and scalable approach to manage non-Cisco devices through third-party device drivers.
- User extensibility through the Cisco Prime Network VNE Customization Builder (VCB) to manage hardware modules, device types, events, and device software versions separately from ongoing VNE driver updates.
- Timely updates within 30 days of Cisco device availability.

Detailed Features and Benefits

Table 1 provides details on the features and benefits of Cisco Prime Network VNE drivers.

Table 1. Key Features and Benefits of Cisco Prime Network VNE Drivers

Feature	Description	Benefit
Autodiscovery	VNE drivers are instantiated at run time for each managed device so that synchronization with the network and device autodiscovery can be done in parallel.	Improved efficiency through automation
Distributed VNE driver instances for large-scale networks	The VNE driver instances can be distributed among multiple Cisco Prime Network unit servers to help enable Cisco Prime Network to manage large-scale carrier-class networks. They can also be redistributed among multiple unit servers for load balancing to optimize memory usage.	Improved scalability through distributed architecture and optimization techniques
Synchronization	Automatic synchronizations of device status are based on configuration change notifications from the network. VNE drivers also support adjustable periodic and manual synchronization of device status, providing an up-to-date view of the network in Cisco Prime Network with minimal impact.	Improved efficiency through automation
Independent driver releases	Individual VNE drivers can be updated without the need to upgrade or change Cisco Prime Network software.	Investment protection through timely updates
Field extensibility	Cisco VNE drivers are extensible to manage additional device types, hardware plug-in modules, additional SNMP traps imported through Management Information Base (MIB) files, and syslogs. These extensions can be performed by customers or by the system integrator local to the Cisco Prime Network installation without affecting Cisco Prime Network.	Reduced costs through flexible extension options
A generic VNE	The generic VNE driver is the default driver for discovering any unrecognized device and monitoring standard SNMP traps using standard MIB II interfaces. The IP interfaces and routing and bridge information are also discovered.	Simplified operations through default representations for unknown devices
User-defined VNE drivers	User-defined VNE drivers can be created at run time to manage additional device series. In addition to the generic VNE capability of standard SNMP MIBs and traps, they are extensible using the Cisco Prime Network customization tool (VCB) to further discover and activate devices.	Reduced costs through flexible customization options
Developer community	Cisco DevNet and the Cisco DevNet Partner Program provides individual developers, partners, system integrators, and customers a virtual community forum to learn and share, including examples of using VCB to perform field extensions to device drivers.	Improved efficiency through collaborations in communities
Physical inventory and logical configuration	Cisco VNE drivers retrieve comprehensive information from devices about the chassis, shelf, common components (for example, fan and power supply), line cards, interfaces, and software image inventory. In addition, detailed and logical configuration information, such as Ethernet switching, virtual local area network (VLAN), IP routing, IP/MPLS (Multiprotocol Label Switching), Pseudowire, MPLS Traffic Engineering, and many other device feature configurations can also be retrieved, including statically defined or dynamically established configurations.	Improved efficiency through effective representations of network information
Multiprotocol Label Switching Transport Profile (MPLS-TP) support	Cisco VNE drivers support MPLS-TP, which unifies both packet and transport technologies, giving service providers a strong foundation for the convergence of packet and transport networks.	Reduced costs through support for converged technologies

For service providers with multivendor network environments, Cisco Prime Network offers VNE drivers to manage third-party devices. For non-Cisco devices not supported by a Cisco Prime Network third-party VNE driver, Cisco Prime Network offers two VNE alternatives:

- A "generic VNE" that uses standard MIB system and interface data to create a baseline model of any network element that supports SNMP
- Extensible and user-defined VNE drivers with generic templates created by customers for specific non-Cisco device types

Cisco Advanced Services (AS) routinely provides expert support for either of these approaches and further customization.

A side-by-side comparison of the options for Cisco and third-party device management is provided in Table 2.

Table 2. Cisco Prime Network Cisco and Third-Party Device Management Options

Features and Functionalities	VNE for Cisco Devices	VNE for Third-Party Devices	User-Defined VNE with Generic Template (Note 2)	Generic VNE (Note 1)
Model for IP and Ethernet topology, logical attributes for routing table, Address Resolution Protocol (ARP), and bridge using standard SNMP MIB	✓	✓	✓	✓
Standard SNMP traps monitoring	✓	✓	✓	✓
Device identifications	✓	✓	✓	
User extensibility with Cisco Prime Network toolkit	✓	✓	✓	
Physical inventory discovery using device-specific MIB	✓	✓ Note 3		
Layer 2/Layer 3 logical inventory and topology discovery using device-specific MIB	✓	✓ Note 3, Note 6		
Support for device-specific SNMP traps and syslogs per customer specifications	✓	✓ Note 3		
Change and configuration management	✓			
Compatibility with Cisco Prime Network update releases	✓	✓		
Support for service requests of device OS and management interface changes that affect device inventory discovery and event monitoring	✓	✓		
Field extensions for additional physical inventory, events, and device maintenance upgrades	Note 4	Note 4	Note 4	
Activation script using Command Builder	Note 5	Note 5	Note 5	

Notes:
1. The generic VNE is not customizable. It is the default for any device not recognized by Cisco Prime Network.
2. The user-defined generic VNE is created using the Cisco Prime Network VCB generic template at run time.
3. The feature is contingent on device configuration and instrumentation available in customer's lab devices.
4. Field extensions can be performed by customers, a systems integrator (SI) or Cisco AS. For example, soft properties can be added using VCB and other extensions can be scripted using Command Builder.
5. Activation is typically handled by Command Builder and performed by customers, an SI or Cisco AS.
6. Layer 2: Ethernet, VLAN, Dot1Q, QinQ, EtherChannel, Link Aggregation, POS, ATM, IMA, FR, PPP, DSL, VPLS, Local Switching, LLDP; Layer 3: IP and Routing, MPLS, LDP, MPLS-TE, VRF, RSVP-TE, MP-BGP, OSPF, PW, GRE, BFD; not all Cisco Prime Network advanced features will be supported for Cisco Prime Network third-party VNEs. For example, the following are not included: image management, configuration archive restore, event correlation, impact analysis, and service activation.

Device Support

Table 3 provides a list of Cisco device series managed by Cisco Prime Network using VNE device drivers.

Table 3. Cisco Device Series Managed by Cisco Prime Network Using Cisco Prime Network VNE Device Drivers*

Physical and Virtual Devices
Cisco Cable Modem Termination Systems (CMTSs)
Cisco uBR Universal Broadband Routers, including: • Cisco uBR7200 Series • Cisco uBR10000 Series

* From the Cisco Prime Network Supported Cisco VNEs, 4.0 and Cisco Prime Network Supported Cisco VNEs - Addendum, 4.0

Physical and Virtual Devices
Cisco Data Center
Cisco UCS® 61xx Series Switches Cisco UCS C Series Rack Mount Servers
Cisco Optical Transport
Cisco Carrier Packet Transport (CPT) Series, including: • Cisco CPT 50 • Cisco CPT 200 • Cisco CPT 600
Cisco Security Appliances
Cisco Adaptive Security Appliance (ASA) Series, including: • Cisco ASA 5550 • Cisco ASA 5580 • Cisco ASA 1000V Cloud Firewall • Cisco Nexus® Virtual Security Gateway (VSG)
Cisco Universal Edge Quadrature Amplitude Modulation (U-EQAM)
Cisco RF Gateway 10 Series
Cisco Access Servers
Cisco Access Server 5800 Series
Cisco Gateways
Cisco Access Server 5300 Series Universal Gateways
Cisco Routers
• Cisco 800 Series Routers • Cisco 1000 Series Routers • Cisco 1600 Series Routers • Cisco 1700 Series Modular Access Routers • Cisco 1800 Series Integrated Services Routers (ISR) • Cisco 2500 Series Routers • Cisco 2600 Series Multiservice Platform Routers • Cisco 2800 Series Integrated Services Routers • Cisco 3600 Series Multiservice Platform Routers • Cisco 3700 Series Multiservice Access Routers • Cisco 3800 Series Integrated Services Routers • Cisco 7200 Series Routers • Cisco 7300 Series Routers • Cisco 7400 Series Routers • Cisco 7500 Series Routers • Cisco 7600 Series Routers • Cisco 10000 Series Routers • Cisco 12000 Series Routers • Cisco XR 12000 Series Routers • Cisco Carrier Routing System (CRS) • Cisco ASR 9000 Series Aggregation Services Routers • Cisco ASR 1000 Series Routers • Cisco MWR 2900 Series Mobile Wireless Routers • Cisco 1900 Series Integrated Services Routers • Cisco 2900 Series Integrated Services Routers • Cisco 3900 Series Integrated Services Routers • Cisco 4700 Series Routers • Cisco ASR 901 Series Mobile Wireless Routers • Cisco ASR 903 Series Routers • Cisco ASR 5000 Series Routers • Cisco 2000 Series Connected Grid Router

Physical and Virtual Devices
• Cisco Cloud Services Router (CSR) 1000v
Cisco Network Convergence System (NCS) Router Series, including:
• Cisco NCS 6000 Series
Cisco Switches
• Cisco Catalyst® 1900 Series Switches
• Cisco Catalyst 2900 Series Switches
• Cisco ME 2600X Series Ethernet Access Switches
• Cisco ME 3400 Series Ethernet Access Switches
• Cisco Catalyst 3500 XL Series Switches
• Cisco Catalyst 3550 Series Switches
• Cisco Catalyst 3560 XL Series Switches
• Cisco Catalyst 3750 Series Switches
• Cisco Catalyst 3750 Metro Series Switches
• Cisco Catalyst 4000 Series Switches
• Cisco Catalyst 4500 Series Switches
• Cisco Catalyst 4900 Series Switches
• Cisco ME 4900 Series Ethernet Switches
• Cisco Catalyst 5000 Series Switches
• Cisco Catalyst 6500 Series (Catalyst OS) Switches
• Cisco Catalyst 6500 Series (IOS) Switches
• Cisco ME 6500 Series Ethernet Switches
• Cisco ME 3600X Series Ethernet Access Switches
• Cisco ME 3800X Series Carrier Ethernet Switches
• Cisco Nexus 7000 Series Switches
• Cisco Nexus 5000 Series Switches
• Cisco Nexus 1000 Series Switches
• Cisco Nexus 3000 Series Switches
• Cisco ACE 4700 Series Application Control Engine
• Cisco SCE 2000 Series Service Control Engine
• Cisco 2500 Series Connected Grid Switches
• Cisco MDS 9000 Series Multilayer Fabric Directors and Switches

Table 4 provides a list of non-Cisco device series managed by Cisco Prime Network using VNE device drivers.

Table 4. Third-party Device Series Managed by Cisco Prime Network Using VNE Device Drivers*

Physical and Virtual Devices
Alcatel-Lucent ATM Subscriber Access Multiplexer
Alcatel-Lucent 7450 Series Ethernet Service Switches
Alcatel-Lucent 7705 Service Aggregation Router
Alcatel-Lucent 7750 Service Router
Alcatel-Lucent Intelligent Services Access Manager
Calix Blade 6214 Series DSLAM
Calix Blade 6214 Series DSLAM - Supported Service Events
Calix Blade 6216 Series DSLAM - Supported Service Events
Calix Blade 6312 Series Switches - Supported Service Events
Calix Blade 6450 Series Switches
Citrix NetScaler VPX Virtual Appliances
DragonWave Horizon Compact Device (Packet Microwave System)
DragonWave Horizon Compact Plus Device (Packet Microwave System)
DragonWave Horizon Quantum Device (Packet Microwave System)
Fortinet FortiGate 5000 Series Firewall

* From the Cisco Prime Network Device Package Third-Party Supported VNE, 4.0

Physical and Virtual Devices
Huawei - Quidway@ S9300 Series Terabit Routing Switch Huawei - Quidway@ CX600-CarrierSwitch and ATN-Cellsite-Gateway
Juniper E-Series ERX Edge Routing Switches Juniper JCS Control System Juniper M-Series Multiservice Edge Routers Juniper MX-Series Ethernet Service Routers Juniper Netscreen Security Firewall/VPN Device Juniper T-Series Core Platforms
RAD ACE-3000-Series Cell-Site Gateway RAD ETX-Series Carrier Ethernet Demarcation Device RAD Ipmux-4L TDM Pseudowire Access Gateway RAD LA-210 EFM DSL Network Termination Unit
Symmetricom Timeprovider 2700 Symmetricom Timeprovider 5000
Tellabs 8840 Multiservice Router
VMware VirtualCenter (vCenter) Server

More information about supported Cisco devices and non-Cisco devices, software versions, and device contents can be found in the Cisco Prime Network End-User Guides.

About Cisco Prime

The Cisco Prime portfolio of IT and service provider management offerings empowers organizations to more effectively manage their networks and the services they deliver. Built on a service-centered foundation, Cisco Prime supports integrated lifecycle management through an intuitive workflow-oriented user experience - providing A-to-Z management for EPNs, mobility, video, cloud, and managed services.

Ordering Information

A Right-to-Manage license for each Cisco device managed by Cisco Prime Network is required. The device series and device type will determine the appropriate Right-to-Manage license.

To place an order, contact your local Cisco account representative or visit the Cisco Download Software page.

For More Information

For more information about Cisco Prime Network, visit www.cisco.com/go/primenetwork, contact your local Cisco account representative, or send an email to prime-network@cisco.com.

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