Cisco Prime for IP NGN

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The **Cisco Prime Carrier Management** solution applied to the Next-Generation Networks Architectural Play drastically simplifies the design, provisioning and management of carrier-grade networks.

This comprehensive solution centralizes and automates service design, fulfillment, assurance and performance analysis to help you lower costs while meeting high customer expectations.
Agenda

- Overview
  Prime for IP NGN

- Resource Management
  Physical Inventory
  Logical Inventory
  Topology

- Service Provisioning
  Service Building Blocks
  Service Creation

- Service Assurance
  Service Discovery and Troubleshooting
  Alarm Management
  Performance Management

- Summary
Overview
Cisco Prime Carrier Management

- **Operational scale**: Integrated operator workflows across the IP Next Generation Network, from the Core and Data Center to the Subscriber Access
- **Improved customer experience**: Centralized network visibility and advanced troubleshooting and diagnostics capabilities
- **Lower total cost of ownership**: Pre-integrated network management software components running in complete virtualized environment
- **Eases Service Provider network transitions**: Single integrated solution supporting both legacy and current network technologies
Resource Management
Inventory is an Important Asset
What Else can be in our Inventory?

- Device Configuration
- Configuration Objects
- Logical Model
Logical Inventory

- NMS can Investigate Device Configuration and Represent it in its User Interface
vrf LTE2
  address-family ipv4 unicast
  import route-target 1001:1001
  10:101
  10:102
  export route-target 1001:1001
interface GigabitEthernet0/1/0/5
description By VPNSC: Job Id# = 58 (to IXIA:: G2/1 VPN)
vrf LTE2
ipv4 address 112.1.1.1
  255.255.255.252
  no shutdown
… From Logical Inventory to Topology
Network Discovery

• Faster and more cost effective Transport, Packet Transport, MPLS, Carrier Ethernet and RAN Backhaul management with automatic discovery of all network components

• Complete end-to-end visibility of all network elements, covering a wide range of Cisco Products from edge to access, aggregation and core

• Physical and Logical Topologies

• Support for multivendor IP devices
Service Provisioning
TDM and λ Service Delivery

- Simple point-and-click provisioning of SONET, SDH and DWDM networks
- Up-to-date support of current and new technologies
- Graphical circuit trace for troubleshooting services
Service Design
Defined Service Policies

- L3 VPN
  - 6VPE
  - Multicast VPN IPv4/IPv6
  - Management VPN & managed CPE
  - BGP Loadsharing
  - PE-CE Routing protocols
  - Ethernet access
  - EVC/Service Instance

- Carrier Ethernet
  - E-LINE E-LAN E-TREE
  - Pseudowire VPLS H-VPLS
  - VLAN Tag Manipulation
  - Ethernet access
  - MS-PW w/ redundancy

- ATM
  - VP VC
  - PW Redundancy
  - Ethernet interworking
  - MS-PW w/ redundancy

- TDM Circuit Emulation
  - CESoPSN, SAToP
  - E1, T1, SONET Controllers
  - Channelization
  - MS-PW w/ redundancy

- MPLS-TE
  - E2E & FRR Path Calc.
  - Traffic Admission
  - Link configuration
  - Tunnel discovery
  - Backup tunnel re-optimization

- MPLS-TP
  - Working Protected Path Calc.
  - Label discovery
  - Topology discovery
  - Topology Change
Service Request Lifecycle

- Service state is stored in a *Service Request* (SR)
- A history of all changes is kept (Including after decommissioning)
- The SR can be *edited* , then deployment can be *scheduled* at a later time
- The SR can be *canceled* so that resources are released
Provisioning Under the Hood

• Service Provisioning is controlled via ‘Service Profiles’ and ‘Service Requests’
• Deployment Process:
  • Read configuration from device
  • Compare with intent
  • Generate configuration differences
  • Apply configuration
  • Read configuration from device
  • Audit configuration
  • Report
• Scheduled Audits can be used to detect unexpected configuration deviations
Change and Configuration Management

- Archive/backup configurations
- View, compare, remove, export, search, and restore configurations
- Synchronize devices with different running and startup configurations
- Configuration change history, logs and reports
- Schedule, i.e.: during authorized maintenance window
- Operations scheduled to act on dynamic device groups
Manage Device Configurations

- Automatic archive, change history and device configuration comparison with color coding
- Network wide operations performed in bulk
- Basic compliance checking
Service Assurance
In-Depth Visibility into Transport Layer

- Realistic view of the device to facilitate NOC and technician interaction
- DWDM/TDM topology and multilayer link management
- Node provisioning and facilities configuration using Network Element Explorer
In-Depth Visibility into Packet Transport Network

- Discovery of physical topology among devices
- Topological views that identify the location and severity of alarms
- Common launch point for the majority of element management operations
- Up-to-date display of network event, state, and configuration changes
Service Visualization

- Enables visualization of the services configured on the network
- Ability to visualize services such as cross-connects, ethernet services, MPLS-TP tunnels, pseudowires, VLAN’s, VPLS, MPLS VPN’s
- Overlays allow viewing which devices and links are part of a specific service (VPN, Pseudowire, VLAN, MPLS-TP, clocking … etc)
In-Depth Visibility
Example: RAN Backhaul Network

- Full visibility into SAToP, CESoPSN, and ATM configurations on cell site and aggregation routers
- Enables operator to view virtual connections for cellular traffic across a packet network
- Clocking:
  - ITU-T Synchronous Ethernet (SynchE)
  - IEEE 1588-2008
  - Adaptive Clock Recovery (ACR)
Path Tracer

- Path Tracer enables end-to-end route tracing to be performed with information displayed simultaneously for the multiple networking layers
  
  Uses network model to trace route and display traffic stats per hop, across technologies and layers
  
  Devices in the route path are queried at a greater frequency to provide near real-time statistics

- Includes all properties at Layer 1, 2 and 3, plus alarm information, counters, and more

- View multiple paths between the source and destination
Alarms and Topology

• NOC operator activities are triggered by alarms or fault notifications
• Alarm indications available in various views
Components Involved in Fault Management

Customer Manager of Manager

Prime Central

Prime Provisioning

Prime Optical

Prime Network

Prime Performance Manager
Alarm Management
Prime Central

- Collects alarms from underlying Domain Managers
- Cross Domain Event Management
- Aggregation, Correlation and De-duplication rule-based
- Portlet with Customized Views and Filters
- Full Alarm Lifecycle Support
- Seamless X-Launch of Source Domain Manager
Alarm Management
Prime Network

- Through Prime Network’s modeling of the topological relationship between network elements, it is possible to reduce the alarms and help the user to identify the root cause

- This modeling enables:
  - Local event reduction: regular-expression filters (dropping), suppression of flapping events, etc.
  - Grouping of related events (same cause) into alarms
  - Alarm correlation, to identify causality

Local correlation: alarms emitted within a single NE

Topology-based correlation: alarms from multiple NEs
Prime Performance Manager provides ability to define thresholds on Key Performance Indicators (KPI’s)

When a KPI is crossed, an alert can be raised

Threshold Customizations Available:
- Applicable to single device or group of devices
- Testing Interval
- Scheduling – date/time range
- Alarm Severity
- Onset and Abate Occurrences
Performance Monitoring

- Network resource monitoring
  Device and interface utilization and availability

- Network congestion monitoring
  Class-based QoS, TE tunnels

- Network service monitoring
  Pseudowire, EVC and EVC QoS, IP SLA, Ethernet OAM, MPLS segments, LDP, Inline video monitoring

Support for multiple technologies

- Mobile Access Network
  - Cell Site Gateway (CSG) ASR-901

- Aggregation Network
  - Pre-Aggregation Node ASR-903, ME-3800X, 3600X
  - Aggregation Node ASR-9000

- Core Network
  - Mobile Transport Gateway (MTG) ASR-9000
  - Core Node CRS-3, ASR-9000
Performance Management

Key Features

• Dashboards present data from different sources on a single page
• Information is viewable in both Tabular and Graphical Format
• Dashboards can be modified and/or new ones created
• Supports Threshold Crossing Alerts
• 1000’s of built-in reports
  - IP-SLA, Y.1731, QoS,
  - Service-level reporting – VPN, VLAN, pseudowire

IPSLA reporting, including EOAM
Summary
Prime for IP NGN Solution
Key Capabilities

- Physical/Logical Inventory
- Complete Network Discovery
- Physical/Logical Topology Discovery
- Image and Configuration Management
- Service Provisioning and Activation
- Resource Management

- Service Visualization
- Service Path Tracing
- Alarm Management
- Root Cause Analysis
- Performance Monitoring
- Threshold Monitoring
Prime for IP NGN Solution Benefits

• Accelerate service deployment
  Significantly reduce time to deploy services consistently with GUI-based provisioning

• Lower capital expenditure (CapEx)
  Maximize existing network investment through efficient utilization of network resources and assets

• Reduce operating expenses (OpEx)
  Lower operating costs through a central point of access that enables efficient execution of design, fulfillment, assurance and analysis tasks

• Reduce Mean Time to Repair (MTTR)
  Powerful visualization and troubleshooting tools provide rapid fault isolation and repair of network issues

• Increase operational efficiency
  Leverage automation and seamless integration between domain managers and service lifecycle management applications
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