Cisco PONC 2015

Rupesh Kumar Sairam
Product Manager, Marketing

March 2015
Cisco EPN Manager
Simplified, Converged and Multilayer Management
Market Trend: Network Infrastructure Convergence
Single Any-Service Network for Lower CapEx and OpEx

Service Decoupled from Infrastructure
- One efficiently utilized network $\rightarrow$ Consolidated NMS and EMS
- One operational model $\rightarrow$ Operational transformation
- All services on a single network

Cisco® Evolved Programmable Network (EPN) Convergence Benefits
- Up to 50% CapEx savings $\rightarrow$ Multilayer optimization
- Up to 75% management savings $\rightarrow$ Single EMS
- OpEx efficiency: One skill set $\rightarrow$ Operational transformation
- Revenue opportunities: One access, multiple services

- Multiple under-utilized networks $\rightarrow$ Split operations teams
- No integration between services $\rightarrow$ Multiple OSS/BSS
- Impedance to business agility

Mobile Backhaul
Business and Private Cloud
Residential Triple Play
Optical Transport

Cisco EPN Converged Infrastructure
OpEx-Based Trends: Network Transport Convergence

Packet View  Optical Global View and Global Optimization  Optical View

- Today: Network architecture is viewed in layers
- Impact: Each layer addresses provisioning, protection, and resiliency differently; optimization between layers is challenging.

IP + Optical reduces OpEx and CapEx by 50%
Cisco EPN Manager Stands Out
Single, Converged, Multilayer Solution
Cisco Evolved Packet Network Manager

Model Driven Architecture

Carrier Ethernet Content

Packet Optical Content

Future Content

Integrated UX

Network Provisioning

Network Assurance

Common Core

Device Operations

TCO

Modern UI

Shared Repository

ASR9000
ASR 901
NCS 4016
NCS 4001*
NCS 2006/2002
ME 1200*
ME 4600*
ASR903
ME3600X/3800X
ONS 15454
(Rel 10.1, 10.2)
ASR 901S
ASR 902

*Available in later releases
Cisco Value Propositions
Capabilities to Business Outcomes

- Simplicity
- Agility
- Efficiency

Full Service Lifecycle
(Design, Provision, and Help Ensure Optimization)

Easy integration with OSS

Multidomain and Multivendor Support

Multilayer Views and Controller

Model Based

Control Plane Technology

Extensible to New Applications

Extensible to New Applications
Objectives / Vision
What?

- “One” NMS/EMS product
- Initial focus on Carrier Ethernet and Optical Transport
- “Core” shared with Enterprise and Service Provider products
- “One” product with “simple” licensing
- “One” EMS/NMS covering network management lifecycle
- “One” GUI covering end-to-end task flows across provisioning, assurance, and device management
- Model-based framework allowing frequent network management content (device drivers, network feature support) updates and customization
Why?

- Assist customers through emerging network convergence and network unification transitions
- Provide simplified solution for Day 0/1 Support for Cisco network systems
- Simplify purchase, deployment and operations
- Serve large and small network operations
- Align with emerging network “controller” architectures
- Ease customer’s transition from Enterprise to Service Provider version of EMS/NMS
How?

• **Build convergence/transition solutions**
  - ✓ Become an integral part of upcoming Cisco network system offers
  - ✓ Adapt to network configuration variations found across customers

• **Next generation, evolved programmable network manager**
  - ✓ Scope to element management and network management functions
  - ✓ Modernize the user interface to task flow-based design

• **Focus on simplicity and usability**
  - ✓ Present “one” product appearance and behavior
  - ✓ Simplify licensing and pricing
## Common Inventory

### Device List

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Reachability</th>
<th>IP Address/DNS</th>
<th>Device Type</th>
<th>Admin Status</th>
<th>Last Inventory Collection</th>
<th>Last Successful Collection</th>
<th>Software Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node205-200</td>
<td>✔️</td>
<td>10.99.205.200</td>
<td>Cisco NCS 2000</td>
<td>Managed</td>
<td>Partial Collection Failure</td>
<td>February 19, 2015 8...</td>
<td>10.01.10</td>
</tr>
<tr>
<td>ncd1-5-tme-2b-axl2-e-2</td>
<td>✔️</td>
<td>10.99.205.23</td>
<td>Device 360</td>
<td>Partial Collection Failure</td>
<td>February 19, 2015 8...</td>
<td>10.01.10</td>
<td>5.1.1</td>
</tr>
<tr>
<td>ncd1-5-tme-2b-axl4-e-4</td>
<td>✔️</td>
<td>10.99.205.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site1</td>
<td>✔️</td>
<td>10.99.204.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE10_DLA</td>
<td>✔️</td>
<td>10.89.204.238</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE12_DLE</td>
<td>✔️</td>
<td>10.99.204.229</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE13_DLA</td>
<td>✔️</td>
<td>10.99.204.240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE14_DLA</td>
<td>✔️</td>
<td>10.99.204.241</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE15_DLA</td>
<td>✔️</td>
<td>10.99.204.242</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site16_DLA</td>
<td>✔️</td>
<td>10.99.204.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE20</td>
<td>✔️</td>
<td>10.99.204.100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site21_DLA</td>
<td>✔️</td>
<td>10.99.204.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE22</td>
<td>✔️</td>
<td>10.99.204.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE2_DLA</td>
<td>✔️</td>
<td>10.99.204.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE3_DLA</td>
<td>✔️</td>
<td>10.99.204.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE4_DLA</td>
<td>✔️</td>
<td>10.99.204.32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE5_DLA</td>
<td>✔️</td>
<td>10.99.204.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SITE6</td>
<td>✔️</td>
<td>10.99.204.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Site Details

- **Site20**: 10.99.204.100
- **Site Details**: NCE SONET
- **OS Type**: 10.01.01
- **OS Version**: 10.01.01
- **Last Config Change**: February 17, 2015 2:35:45 PM EST
- **Last Inventory Change**: February 14, 2015 10:02:51 PM EST

### Alarms

- **Name**: Not Sortable
- **Type**: Name
- **Description**: Not Available

### Interfaces

- **DPT-EDFA-24**: Not Available
- **DPT-EDFA-17**: Not Available
<table>
<thead>
<tr>
<th>File Name</th>
<th>Image Family</th>
<th>Image Type</th>
<th>Version</th>
<th>Size</th>
<th>Updated On</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASR9K-lcosvr-px-5.1.3.tar</td>
<td>ASR9K</td>
<td>XR_SW</td>
<td>5.1.3</td>
<td>1272 MB (1333790720 bytes)</td>
<td>February 17, 2015 12:13:10 PM EST</td>
</tr>
<tr>
<td>NCS2K.F.K9.R1001.011.pkg</td>
<td>NCS2K</td>
<td>SYSTEM_SW</td>
<td>10.0.11</td>
<td>140.3 MB (14716496 bytes)</td>
<td>February 17, 2015 11:00:01 AM EST</td>
</tr>
<tr>
<td>NCS2K.F.K9.R10103.pkg</td>
<td>NCS2K</td>
<td>SYSTEM_SW</td>
<td>10.0.03</td>
<td>157.3 MB (16494936 bytes)</td>
<td>February 19, 2015 03:56:59 PM EST</td>
</tr>
<tr>
<td>NCS2K.L.L9.R10300.pkg</td>
<td>NCS2K</td>
<td>SYSTEM_SW</td>
<td>10.3.00</td>
<td>238.6 MB (250422452 bytes)</td>
<td>February 17, 2015 09:23:46 AM EST</td>
</tr>
<tr>
<td>asr9k-asr8000-r4v-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>25.19 MB (26413891 bytes)</td>
<td>February 17, 2015 12:14:39 PM EST</td>
</tr>
<tr>
<td>asr9k-asr801-e4v-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>35.02 MB (36723607 bytes)</td>
<td>February 17, 2015 12:14:35 PM EST</td>
</tr>
<tr>
<td>asr9k-asr903-n4v-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>223.1 MB (23395899 bytes)</td>
<td>February 17, 2015 12:15:49 PM EST</td>
</tr>
<tr>
<td>asr9k-lng-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>9.202 MB (9648675 bytes)</td>
<td>February 17, 2015 12:14:45 PM EST</td>
</tr>
<tr>
<td>asr9k-doc-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>4.599 MB (4821982 bytes)</td>
<td>February 17, 2015 12:14:35 PM EST</td>
</tr>
<tr>
<td>asr9k-fpd-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>143.2 MB (150168085 bytes)</td>
<td>February 17, 2015 12:13:41 PM EST</td>
</tr>
<tr>
<td>asr9k-lse-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>0.7214 MB (756489 bytes)</td>
<td>February 17, 2015 12:12:30 PM EST</td>
</tr>
<tr>
<td>asr9k-mdm-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>16.11 MB (16985668 bytes)</td>
<td>February 17, 2015 12:14:41 PM EST</td>
</tr>
<tr>
<td>asr9k-mng-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>12.75 MB (13370024 bytes)</td>
<td>February 17, 2015 12:14:44 PM EST</td>
</tr>
<tr>
<td>asr9k-opti-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>314.8 MB (33080953 bytes)</td>
<td>February 17, 2015 12:16:22 PM EST</td>
</tr>
<tr>
<td>asr9k-opti-pie-5.1.3</td>
<td>ASR9K</td>
<td>PIE_SW</td>
<td>5.1.3</td>
<td>11.25 MB (11792999 bytes)</td>
<td>February 17, 2015 12:14:42 PM EST</td>
</tr>
</tbody>
</table>
Topology Maps
**Device 360**

![Device 360](image)

- **OS Type**: IOS XR
- **OS Version**: 5.2.3.13P
- **Last Config Change**: February 24, 2015 11:28:18 AM CET
- **Last Inventory Change**: February 24, 2015 11:30:33 AM CET

### CPU Utilization (%)
- **No Data Available**

### Memory Utilization (%)
- **No Data Available**

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>State</th>
<th>Ports</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/4-Ethernet-Switch</td>
<td>Module</td>
<td>Not Av...</td>
<td>0</td>
<td>Ethernet Switch ...</td>
</tr>
<tr>
<td>0/RP0-CPU: Complex-Boot</td>
<td>Module</td>
<td>Not Av...</td>
<td>0</td>
<td>CPU Module</td>
</tr>
</tbody>
</table>
## Links & Circuits

### All Locations/Unassigned

<table>
<thead>
<tr>
<th>Severity</th>
<th>Link Name</th>
<th>Type</th>
<th>A Side Severity</th>
<th>A Side</th>
<th>Z Side Severity</th>
<th>Z Side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleared</td>
<td>235.58.235.223.36-235.58.235.227...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>235.58.235.225.36-235.58.235.227...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>235.58.235.222.52-235.58.235.227...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>238.58.238.227.98-238.58.238.233...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>235.58.235.222.51-235.58.235.225...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>235.58.235.223.35-235.58.235.225...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>238.58.238.230.52-238.58.238.233...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
<tr>
<td>Cleared</td>
<td>238.58.238.227.96-238.58.238.230...</td>
<td>OTU</td>
<td>Cleared</td>
<td></td>
<td>Cleared</td>
<td></td>
</tr>
</tbody>
</table>
Use Case: Multilayer Provisioning
Reduced Service Turn-Up Time Through Elimination of Manual Information Sharing

Customer Challenges
• Single-layered operations
• Complex provisioning
• Manual, complex, time-consuming processes

Solution Benefits
• Business agility: Faster service turn up - Months to Minutes
• Lower TCO: Process automation and information sharing
• Innovative service creation: New service types and different SLAs

Use Case 1 – Service Turn Up
• Support Multi Layer Service Turn Up
• Leverage Constraint based routing across all layers
• Cross domain support for service creation

Multilayer Circuit Trace
Use Case: Multilayer Assurance
Transition to IP and Optical Convergence with Simplified Management

Customer Challenges
• No cross-layer visibility for fault correlation
• Lack of automation
• Split IP and optical teams

Solution Benefits
• Reduced TCO: Multilayer visibility for faster fault identification and service impact correlation
• Improved efficiencies: Simplified and automated multilayer troubleshooting
• Enhanced customer quality of experience: SLA enablement
Use Case: Multilayer Design
Online Global Network Planning

Customer Challenges
- Low link utilization
- Inefficient use of interfaces
- No global view

Solution Benefits
- Improved operation efficiency: Multilayer restoration (MLR) and multilayer bypass optimization (MLBO) algorithms
- Reduced TCO: 50% savings with MLR against fiber (MLR-O) and interface or port (MLR-P)
- Increased business intelligence: Informed resource planning using cross-layer impact analysis, enabling “what if” scenarios and feasibility simulations
Use Case: Multilayer Optimization and Analysis
Improved Resource Utilization and Reduced Impact on Network During Traffic Spikes

Customer Challenges
- Limited failure analysis
- Inefficient utilization
- Lack of re-optimization

Solution Benefits
- Reduced TCO: Multilayer visibility for overall service impact analysis
- Increased ROI: Improved capability to plan accurately for future growth based on multilayer analysis
- Enhanced customer satisfaction: Identification and optimization of network conditions to enable SLA enforcement

<table>
<thead>
<tr>
<th>Service, Network, and Analytics REST APIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimization and Prediction</td>
</tr>
<tr>
<td>Analytics</td>
</tr>
<tr>
<td>Current Model</td>
</tr>
<tr>
<td>Collector</td>
</tr>
<tr>
<td>Deployer</td>
</tr>
<tr>
<td>Collection Drivers</td>
</tr>
<tr>
<td>Multivendor Network Devices</td>
</tr>
<tr>
<td>Multilayer Re-optimization</td>
</tr>
<tr>
<td>Central Computing Online or Offline</td>
</tr>
<tr>
<td>Optical Layer</td>
</tr>
<tr>
<td>Packet Layer</td>
</tr>
</tbody>
</table>

### Diagram
- Cisco® MATE Design
- Cisco MATE Live
- Customer and ISV Applications
- Cisco NSO

- Configlets
- CLI
- NetFlow
- BGP/LS
- NMS/EMS
- PCEP
- I2RS
- Cisco NSO
- NC/YANG
- NetFlow
- CLI
- SNMP
- BGP/LS
- PCEP
- I2RS
Summary

NMS (FCAPS) for Network Convergence – IP + Optical

- Modular; Scalable; Simple & Easy to Use

- MEF Service Provisioning; Graphical Views; 1 Portal for Network Operations
TOMORROW starts here.