Network Management: The Keys To Success

Michael D. Geller, CCIE # 5392
Architect – Managed Services
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Today’s IT Concerns
The business case for managing performance

80% of IT budget is spent on maintenance & operations

- Increasing Challenges
  - user SLA
    - rich end-user experience
    - higher expectations
  - complexity
    - global networks
    - network applications
    - web services
  - growth
    - new services
    - critical business applications
  - productivity
    - faster resolution
    - longer up-times
    - reactive to proactive

IT is business-critical, managing IT is complex
### Transforming Network Manageability: Transferring Intelligence into Value

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Solution Value-prop
Optimized application performance and network resources

- What if I add a new application?
  - Impact on network
  - Impact on existing traffic
  - Applications not getting the right service

- What apps or transactions are being used & by whom?
  - Bandwidth congestion
  - Unwanted application consuming bandwidth
  - Bandwidth oversubscription / under subscription

- What is causing slow user response?
  - Network congestion
  - Application badly configured / deployed

- How can I control network traffic based on application priority?
  - Am I meeting users and business needs?

- Am I meeting designed SLA

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Solution Case: De-Risking Application SLA And Deployment Design

Application SLA Design
- IT Engineer
  - Analyze how an application will perform over a WAN infrastructure
  - Design application SLA
  - Design application deployment

Network Design
- Network Engineer
  - Analyze impact of new application traffic on existing traffic and network
  - Design network to meet application SLA and existing traffic and network SLA

Monitor Application
- Operation Engineer
  - Monitor in real time application traffic
  - Report on application traffic
  - Monitor in real time application quality degradation

Optimize Network
- Network Engineer
  - Optimize network based on real time application traffic data
  - Ensure that network design is up to date against network traffic
Layer By Layer

BSS/OSS

OSS: Provisioning, Billing, ..
Service Activation, Link to Asset System, Configuration Interface, Billing Interface

NMS

Fault & Performance
ANA & Cisco Information Center, HP Openview, NAM II, NCM
Network Wide Fault and Performance Management

EMS

ISC
ANA
Cisco Works
EMS X

Network Elements

IP-SLA/EEM
SNMP/RMON
Netflow
Integrated Solution
Leveraging Data; faster and pro-active resolution

Operate & Optimize
- Cisco Application Analysis Solution

Plan & Design
- Cisco Network Planning Solution

Proactive Management
- Cisco Performance Visibility Manager & Cisco Bandwidth Quality Manager

Integrated Collectors
- Network Analysis Module, CiscoWorks RME(LMS), Cisco NFC, Cisco BQM

Intelligent Information
- Netflow, IPSLA, RMON, NBAR, MIBs, BQM

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<td><strong>Scope:</strong> Link/End-to-End</td>
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Integrated Solution
Leveraging Data; faster and pro-active resolution

Operate & Optimize
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Plan & Design
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Proactive Management
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Integrated Collectors
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Intelligent Information
- Netflow, IPSLA, RMON, NBAR, MIBs, BQM
Measurement Technology: SNMP

- **Cisco-Voice-Dial-Control-MIB**
  
  RoundTripDelay, Planning Impairment Factor (ICPIF)

- **Cisco-RTTMON-MIB**
  
  Collects latest IPSLA measurements and provides on device aggregation of IPSLA measurements

- **Cisco-Class-Based-QoS-MIB (CBQosMIB)**
  
  Primary Accounting Mechanism for QoS

- **IF-MIB**
  
  Collects bandwidth or link utilization and packet loss

- **CISCO-PROCESS-MIB and ENTITY-MIB**
  
  Collect statistics on the CPU utilization

- **CISCO-MEMPOOL-MIB, CISCO-ENHANCED-MEMPOOL-MIB**
Measurement Technology: Advanced Analyzer
Cisco Network Analysis Module (NAM)

Catalyst 6500 and Cisco 7600 Series

NAM-1, NAM-2 Services Module
NM-NAM Service Module

Web Server
Embedded Traffic Analyzer Software
RMON II
DSMON
SMON
ART
Voice & Video

Capture/Decode Packets
Real Time/Historical Reports
Voice & Video Reports

Port statistics are available on each interface

HTTP/S

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Measurement Technology: Advanced Analyzer
Cisco Bandwidth Quality Manager (BQM)

Link Sizing: Determine Aggregate Bandwidth for a Link

By Application Requirement: Determine Bandwidth by Type of Traffic

Real-Time Traffic Bursts

Too Much BW

Too Little BW

Time

Remote Office

Voice

Streaming Video

Transactional/Interactive

Bulk Data

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Measurement Technology: NetFlow

- Flows are unidirectional
- Flows are enabled on a per input-interface basis
- Flows are defined by 7 keys:
  
<table>
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<tr>
<td>Destination IP address</td>
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<tr>
<td>Source port</td>
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<tr>
<td>Destination port</td>
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<tr>
<td>Layer 3 protocol</td>
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<td>TOS byte (DSCP)</td>
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<td>Input interface (ifIndex)</td>
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Flow Data Exported to Management Application
Cisco Network Analysis Module (NAM)
Advanced Instrumentaion & Analysis

- Integrated services modules providing traffic analysis at key points in the network
- Embedded web-based Traffic Analyzer GUI
- Provides visibility into applications on the network and how they’re performing
- Tracks application response times
- Helps identify if issues are server- or network-related
- Offers web-based captures and decodes for anytime, anywhere troubleshooting
- Serves as a data source for PVM extending real-time and historical traffic analysis network-wide
- Serves as a data capture source for CAAS providing application transaction traces to enable what-if planning and analysis
NAM Traffic Analyzer Software
Self contained: feature rich

Real-Time and Historical Reports
- Application, Hosts, and Conversation Monitoring
- Differentiated Services (DiffServ) Monitoring
- Voice over IP (VoIP) & Video Monitoring
- Application Response Time Monitoring
- Packet Capture and Decode
- VLAN and Switch Port Monitoring

Configuration of the NAM
- Network Parameters
- Selection of Traffic to Monitor
- Types of Statistics to Gather
Cisco NetFlow Collection Engine (NFC)
Centralized, scalable, and reliable

- Cisco NetFlow Collector
  - Network analysis and behavior
  - User monitoring
  - Application monitoring
  - Internet access monitoring
  - Capacity and network planning
- Traffic engineering
- MPLS/VPN
- IP accounting and billing
- Provides standard interface with partners for analysis and reporting
NetFlow System Architecture

Highly Scalable Multi-Tier architecture

Cisco NAM
- NetFlow Accounting
  - Data Switching
  - Data Export
  - Data Aggregation

Cisco NetFlow Collector
- Data Collection
- Data Filtering
- Data Aggregation
- Data Storage
- File System Management

Cisco Multi NetFlow Collector
- Network-level correlation
- Central view of end-to-end traffic
- Web Based Interface Reporting

Performance Monitoring, Reporting and Troubleshooting

Network Planning

Customers / Partners Reporting Solutions

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Q and A

Thank You