Introduction to QoS Policy Manager
CiscoAssure Policy Networking
Session 807
Agenda

- Need for Policy Networking
- CiscoAssure Policy Networking
- Achieving End-to-End QoS
- Introducing Cisco QoS Policy Manager
- QoS Policy Deployment Examples
- CiscoAssure QoS Looking Forward

Networked Business Applications

Succeeding in the Internet Economy

Supply Chain
Enterprise Resource Planning
Business Decision Support
E-Commerce

Employee Service
Call Center
Distance Learning
IT Service Challenges

"...By 2000, 20% of major enterprise packaged applications will experience severe performance problems...

Gartner Group"

- What if:

  Your salespeople and channel partners can’t submit their orders efficiently...
  Your CRM deployment stalls because of user complaints about response time...
  Email and intranet traffic threaten your on-line Web transactions...
  Voice and video cannot be deployed reliably...

"By 2000, 20% of major enterprise packaged applications will experience severe performance problems..."

Productivity Loss Due to Application Downtime

Congestion-related performance degradation has been found to cause the majority of network downtime costs


Congestion-related performance degradation has been found to cause the majority of network downtime costs

President, Infonetics Research
CiscoAssure Policy Networking

Multimedia and Multiservice Applications

Mission-Critical Business Applications

WAN

Campus

Campus

Enterprise Policy

Aligning Network Resources with Business Objectives

- Application-aware network
- Intelligent traffic-enforcement
- Network-wide service policy
- Control by application and user

Network Manager

SAP

Oracle

Microsoft

Intranet

Extranet

Internet

Customers

Employees

Partners

www.cisco.com
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Setting Network-Wide Policies

Align Network Resources with Business Priorities

<table>
<thead>
<tr>
<th>What</th>
<th>QoS</th>
<th>Security</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP</td>
<td>High</td>
<td>Encrypt</td>
<td>365 x 24 x 7</td>
</tr>
<tr>
<td>Video</td>
<td>&lt;100 KB</td>
<td>Accept</td>
<td>M–F, 9–5</td>
</tr>
<tr>
<td>VoIP</td>
<td>&lt;150 ms</td>
<td>Toll Restrict</td>
<td>M–F, 9–5</td>
</tr>
</tbody>
</table>

Campus  

WAN

Campus
Components of CiscoAssure
Available Today

QoS Policy Manager
Cisco Security Manager
Cisco Call Manager
Cisco Network Registrar / User Registration & Tracking

QoS
Security
Voice

Policy and Control Servers

DNS/DHCP
Directory

Registration and Directory

Intelligent Network Devices

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What Is Quality of Service?

The ability of the network to provide better or “special” service to users/applications.

Data, Video, Voice

Consistent Predictable Performance

Cisco Assure QoS Policies

<table>
<thead>
<tr>
<th>QoS Policy</th>
<th>Status</th>
<th>Filter Condition</th>
<th>Action to Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrict Web Traffic</td>
<td>Enabled</td>
<td>Src=Internet/Port=80</td>
<td>Custom Queue 50%</td>
</tr>
<tr>
<td>Protect Voice Calls</td>
<td>Enabled</td>
<td>VoIP Sessions (RTP)</td>
<td>Color to Class “5”</td>
</tr>
</tbody>
</table>
Achieving End-to-End QoS

- Network-wide QoS solution
  - Traffic classification
  - QoS enforcement mechanisms
  - Policy-based administration

Traffic Classification

- End-to-end IP differentiated service
- Cisco routers/Catalyst switches
- Classify by flow—packet—reservation
Packet Classification

- Coloring mechanisms controlled by policy specification
- Up to sixty-four traffic classes via ToS bits
- Classification by Layer 3 addresses, Layer 4 port number, URL, application profile, or protocol

Achieving End-to-End QoS

- Network-wide QoS solution
  - Traffic classification
  - QoS enforcement mechanisms
  - Policy-based administration
Protect Mission-Critical Traffic

Intelligent QoS services
Cisco IOS: Cisco Routers 2600-7500
Campus switches: Catalyst 5500 / 6500 / 8500
Service Provider: Diff Serv / MPLS / ATM

Proven QoS Enforcement Mechanisms
Admission Control
Congestion Management
Congestion Avoidance
Traffic Shaping
CAR
WFQ/CBQ
WRED
GTS
Committed Access Rate
Weighted Fair Queuing
Weighted Random Early Detection
FRTS
Policing
CQ/PQ
Traffic Shaping
Filters
Custom/Priority Queuing

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Achieving End-to-End QoS

- Network-wide QoS solution
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End-to-End Policy-Based QoS

- Necessary Complexity
End-to-End Policy-Based QoS

Policy Networking

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Network-Wide QoS Policy Administration

- **QoS Policy Manager 1.0:**
  - Profile key applications
  - Define, validate device-level QoS policies
  - Enable QoS mechanisms across groups of devices
  - Distribute policies
  - Report results

Flexible Consistent QoS Policy Definition

- Network-wide QoS policy administration
- Integrated validation and checking uses embedded Cisco IOS knowledge-base
- Rule-based traffic selection and action filters
- Automated policy configuration via declarations / properties
- Distributes policies to devices using commands and ACLs
Define Device Roles and Select QoS Mechanisms

- Import devices from network/element management systems
- Group device interfaces into functional groups or ‘roles’
- Select exclusive QoS property by device group, device, or interface

Select Traffic Classification

- Define applications, services, and host groups
- Policy filters combine
  - Application services (profiles)
  - Host groups
  - Source/destination IP address
  - Protocol (IP/TCP/UDP)
  - Layer 4 port (socket) numbers
- Rules-based policy filters generate an ACL statement
Activate Policy Enforcement Mechanisms

- Which QoS actions are applied to the traffic
- Actions are coloring, shaping, queuing, rate limiting
- Support for PQ, CQ, WFQ, WRRED, GTS, FRTS, ARED limiting, WRR
- User-defined selection of enforcement parameters

Limit all FTP traffic going to subnet 192.0.0.0 to 300 Kbits.
Filter:
protocol=TCP
Source - port=FTP data (20)
Destination - Host Name=192.0.0.0
Mask=255.0.0.0
Action - Shaping
rate=300

QoS Policy Manager 1.0

Reliable Policy Distribution

- Policy server distributes configuration changes
- Detailed job control, audit, previewing mechanisms
- Incremental configuration updates to devices
- Monitors status of a multi-interface distributions
- Detailed log of device configuration changes
- Maintains a policy change history
Delivery of Cisco QoS Policy Manager Completes Phase Two of CiscoAssure Policy Networking Initiative

Cisco Systems Receives Mier Communications Award for Best IP Prioritization and Performance Category
Cisco IOS 12.0 and QoS Policy Manager Demonstrate Exceptional Results

"QoS Policy Manager is a 'must have' for setting up traffic shaping/prioritization on Cisco...routers"
Mier Communications, May 1999

"Cisco has taken another step toward ensuring that voice and video run seamlessly on a data network infrastructure when it began shipping its QoS Policy Manager"
Computer Reseller News, March 1999

CiscoAssure Application Profiling
Collaborating with Leading Application Vendors

QoS Policy Manager 1.0

Profile Guidelines
Policy Templates
Test Reports
Technologies
Recommended Practices

- CiscoAssure solutions center joint testing
- Documented knowledge base
- Sales and support cooperation with ISVs
- KPMG as service partner

Cisco Systems and PeopleSoft Deliver Quality of Service Guidelines for Business-Critical Enterprise Solutions

Cisco Systems and Oracle Team Up for Priority Delivery of Business—Critical Enterprise Transactions

"We're recommending that our customers deploy CiscoAssure in PeopleSoft environments since our test results verify significant performance benefits."

Marc Stillman, VP Alliance Solutions, PeopleSoft

"The joint efforts of Oracle and Cisco will give our customers the ability to ensure that business-critical Oracle transactions are consistently delivered with priority."

Ron Wohl, Sr. VP Applications, Oracle
QPM 1.0 Customer Scenarios

- Early adopters say:
  - Improves response time for mission-critical ERP transactions
  - Ensures delay-sensitive traffic gets higher priority
  - Controls WAN resource contention between real-time and batch traffic
  - Allocates bandwidth to remote subnets and/or servers
  - Solves poor video and voice quality during network congestion

**QoS Policy**
- Policy Server
- SNMP/CLI
- Installed IOS and CatOS Software

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Example: Enabling IP Telephony

QoS Policy Manager
Condition Network for Voice Services

Cisco Call Manager
Telephony Applications

IP Voice/Data Network
Local Access Gateway
WAN Access Gateway
PSTN or PBX

Prioritize all Voice traffic and enable RSVP on gateway routers
Filter:
protocol=UDP
Source - port=C-RTP data (nn)
IP Precedence = 5
Action - Coloring: Queuing
IP Precedence = 5 --> WRR = High
Action - RSVP (QPM 1.1)
RSVP enable 50% / uFlow < 10kbps

Example: Prioritizing WAN Traffic

QoS Policy Manager
Differentiated Service by Application Profile

Class-Based WFQ
Class defined by user.
All voice traffic—1st class
ERP—2nd class
Web traffic—3rd class
Traffic assigned to queues based on class assignment
Traffic prioritization based on user-defined minimum bandwidth allocation
% bandwidth kpps rate

Flow-Based WFO
Flow defined by packet type.
Source/Destination IP address
Static port numbers
Traffic assigned to queues based on flows
Fair queuing, or relative bandwidth allocation

Web (20%) ERP (30%) Voice (50%)
**Example: VPN End-to-End QoS**

- Classification for encrypted and tunneled VPNs (coordinated policies enabled by Cisco IOS Software)
- Supports ISP differentiated services offerings
- Preserves QoS signaling end-to-end

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**CiscoAssure Looking Forward**

**CiscoAssure—Building Application Aware Networks**

- Protect Mission-Critical Network Resources

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<th>QPM</th>
<th>Routers</th>
<th>Catalyst Switches</th>
<th>Application Aware</th>
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<tr>
<td><strong>Now</strong></td>
<td><strong>2H - 1999</strong></td>
<td><strong>Planned Aware</strong></td>
<td></td>
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<tr>
<td><strong>WAN-Edge QoS</strong></td>
<td><strong>QoS for LAN-WAN</strong></td>
<td><strong>Enterprise-Wide</strong></td>
<td></td>
</tr>
<tr>
<td>- Introducing QPM 1.0</td>
<td>- QPM 1.1 enhancements</td>
<td>- QPM Version 2</td>
<td></td>
</tr>
<tr>
<td>- Proven IOS software</td>
<td>- Catalyst QoS and Cisco IOS</td>
<td>- Enterprise scalability</td>
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<tr>
<td>- Application profiles</td>
<td>- More app partners</td>
<td>- Directory integration</td>
<td></td>
</tr>
<tr>
<td>- Early deployment</td>
<td>- QoS monitoring</td>
<td>- Standards-based</td>
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**QPM 1.1: QoS into the Campus**

**Fall 1999**

- **Campus QoS**
  - Classification: Software and ASIC-based
  - Congestion avoidance: WRED multiple thresholds
  - Scheduling:
    - IP precedence / Diff Serv, 802.1p and ISL priority
    - Multiple queues per port
    - TOS<>COS mapping
    - Traffic policing per port

**QPM 1.1**

- Set SAP = High TOS=7
- Set DOOM = Low TOS=2

**For TOS = 7**
- Threshold=4
- High Priority Queue (70% Transmit Ratio)

**For TOS=2**
- Threshold=1
- Low Priority Queue (30% Transmit Ratio)
QPM Version 2: Network-Wide QoS

Key Customer Priorities:
- Standards-based
- Enterprise scalability
- Application registration
- User-based policies
- Directory support
- Voice enabling

CiscoAssure Application Aware Network

CiscoAssure Integration with Applications Vendors

QoS Policy Manager v2
Dynamic Application Registration

- CiscoAssure increases application awareness by registering profile information about applications
- Signaling flows to network via standards-based mechanisms
- Directory provides common binding for application classes to network services

Directory-Enabled Networks

- Directory stores and distributes
  - User identity information and credentials
  - Application, system, network information
  - Administrative roles and permissions
QoS Monitoring Solutions

- **CW2000 applications**
  - SLA management (2H '99)
  - Traffic management
  - Device-level management
- **Network instrumentation**
  - LAN and WAN probes
  - Network analysis module and embedded RMON
  - QoS MIBs for SNMP management
- **Extensive 3rd party support for**
  - Cisco Management Connection

CiscoAssure Policy Networking Progress

- ‘Best in test’ award by Mier Communications in their quality of service (QoS) test bed at N+I (May ‘99)
- Leading installed base of *policy-ready* intelligent IOS Routers and Catalyst 5000, 6000 and 8500 switches with rich set of QoS, voice, and security features
- Delivered Cisco QoS Policy Manager, Security Manager, Network Registrar and voice CallManager
- IETF policy and QoS standards leadership
- Solution partnerships with PeopleSoft, Oracle, KPMG, Hewlett-Packard, Microsoft, ...
CiscoAssure Policy Networking

- Create application-aware networks
- Protect mission-critical applications resources
- Deploy applications successfully
- Consistent predictable performance

Where to Get More Information

http://www.cisco.com/ciscoassure
Questions?

Please Complete Your Evaluation Form

Session 807

Thank You!