



# Cisco Product and Technologies

# Intranet del Estado

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# Agenda

- **Catalyst 6500**
- **Catalyst 2948G-L3**
- **CiscoWorks 2000**
- **QoS Policy Manager**

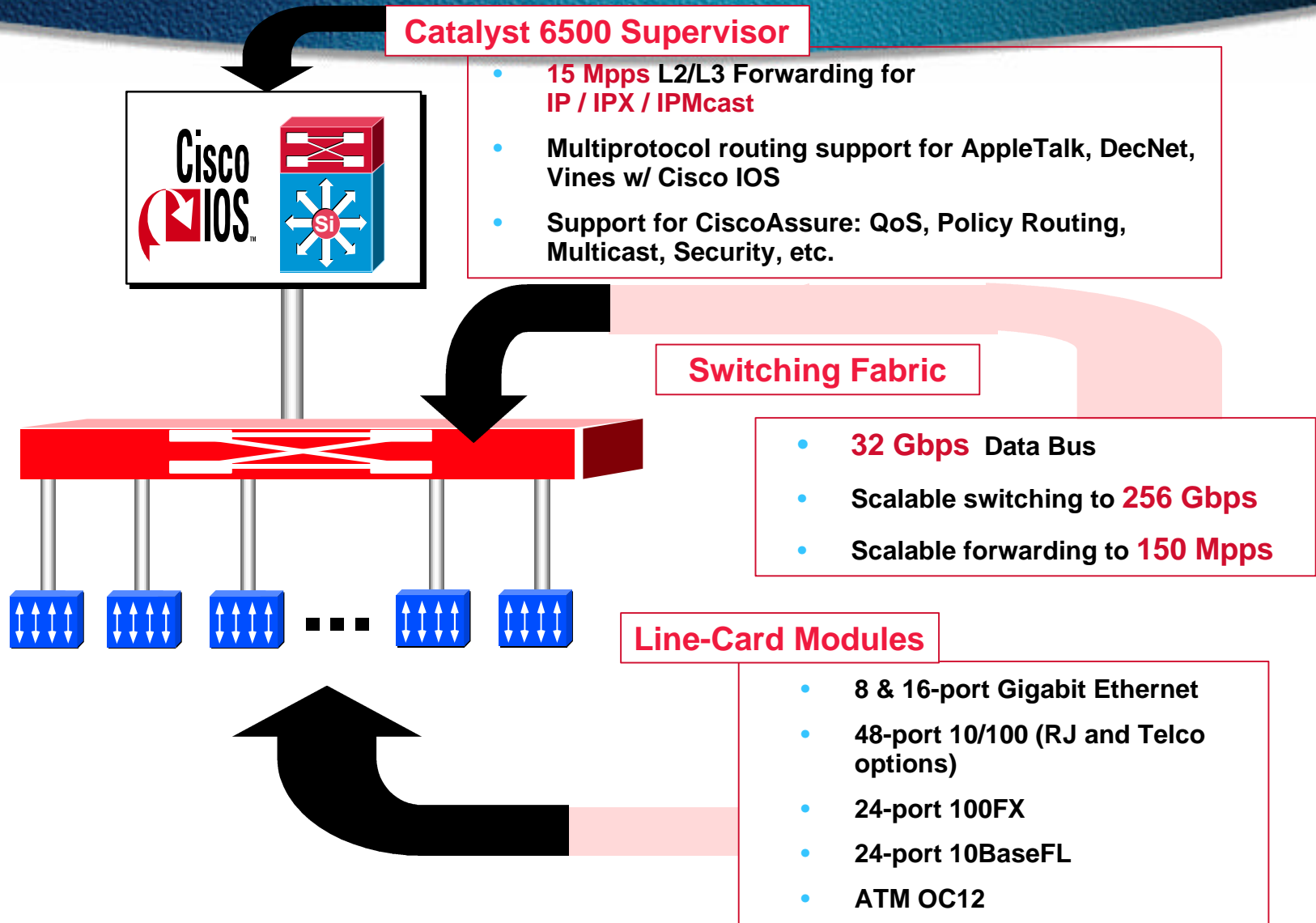


# Catalyst 6500 Family

- **Key Features include:**
  - 6 and 9 slot chassis
  - High bandwidth Switching from 32 Gbps scalable to 256 Gbps capacity
  - Wire-rate IP/IPX/IPMcast at 15Mpps scalable to 150 Mpps
  - Multiprotocol routing support for AppleTalk, DecNet, Vines
  - Gigabit Scalability
    - 100 Km ZX-GBIC
    - 130 GE ports/chassis
  - Support for Cisco IOS software

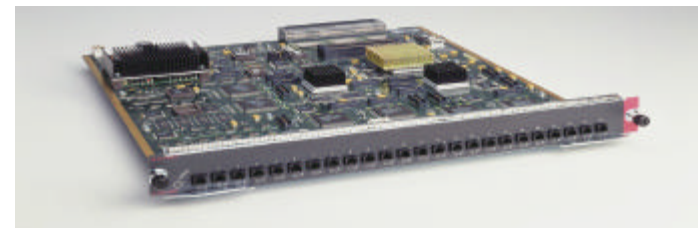
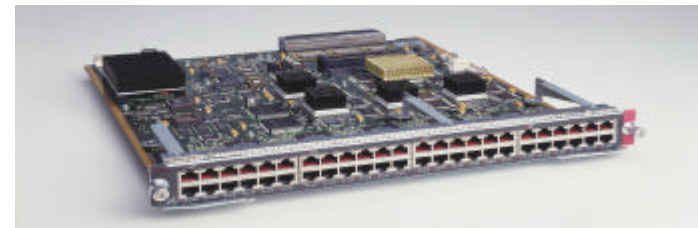
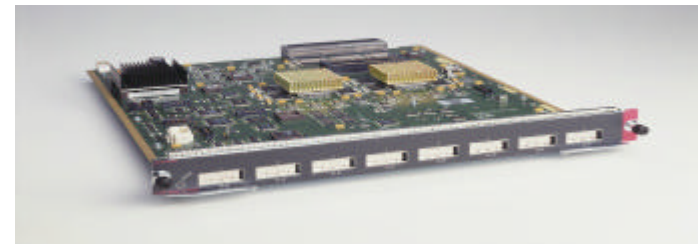


# Catalyst 6500 Architecture



# Catalyst 6K Family Line Card Modules

- **8-port Gigabit Ethernet (GBIC)**
- **48-port 10/100 (RJ-45 or RJ-21)**
- **24-port 100FX (MM Fiber)**
- **New Linecard Modules**
  - 16-port Gigabit Ethernet (MT-RJ)**
  - ATM-OC-12 uplink for LANE and MPOA support**
  - 24-port 10BaseFL**
- **Multiple Queues and Config. Thresholds / Port**
  - 3 TX, 2 RX, WRR, WRED**





# GBIC Module Flexibility



SX	multimode only	275 meters
LX/LH	multimode / singlemode	550 meters / 10 km
ZX	singlemode only	70km-100km

Leverage: Catalyst 29xx, 4000, 5x00, 6x00, 8500, Cisco 7500, 12000  
*Desktop Wiring Closet to Internet Backbone*

# Catalyst 6000 Family FlexWAN Module



- **WAN/MAN functionality for the Catalyst 6000 family of switches**
  - Flexible media support:
    - T1/E1, T3/E3, HSSI, OC-3
  - Flexible protocol support:
    - Frame Relay
    - PPP
    - HDLC
    - ATM
    - Packet over SONET
  - Investment protection:
    - Support for two Cisco 7200/7500 WAN Port adapters per module
- **Intelligent network services**
  - Distributed quality of service
  - Wire-speed access control
  - Granular traffic control



# Intelligent Layer3/4 Services

## QoS, Security

- **Advanced L3/L4 QoS Support:**
  - Traffic Detection/Classification
  - Admission control
  - Traffic Policing
- **Advanced Security via Access Control Lists**
- **Wire-speed IP, IPX at 15 Mpps, and multiprotocol support for AppleTalk, DecNet & VINES**
- **IP Multicast, IGMP, protocol filtering**
- **Support large networks via EIGRP, OSPF, IS-IS and BGP4 for scalable internal or interdomain routing.**
- **ATM LANE/MPOA Integration**
- **Delivers Intelligent Server Switching and Web Scaling via:**
  - Accelerated Server Load Balancing
  - Web Caching (WCCP)
  - Policy Routing





# Catalyst 6500 Summary of Current System Features

## Embedded Manageability

- NetFlow Data Export
- TopN Ports Report
- RMON agent
- SPAN and E-SPAN
- Syslog support
- TraceRoute
- DNS Services
- NTP (Network Time Protocol)
- CDP (Cisco Discovery Protocol) v2
- SNMPv2c agent
- MIB-II support
- Multiple module software download
- Login banner for console

## Scalability

- Layer 3 Switching
- Fast EtherChannel / PAgP
- ISL Trunking 802.1Q
- DTP (Dynamic Trunking Protocol)
- VTP, VTP version 2 and VTP Pruning

## Bandwidth Management

- Protocol Filtering
- IGMP Snooping
- Broadcast Suppression
- Link load balancing

## Network Resiliency

- Redundant supervisors
- BackboneFast Convergence
- UplinkFast Convergence
- PortFast Convergence
- Spanning Tree Protocol (STP)
- Multiple Spanning Trees (Spanning tree per VLAN)

## Security Services

- Port Security by MAC address
- TACACS+ Authentication
- IP Permit List
- Traps and Syslog messages sent on security violations

# Redundancy and Reliability



## Supervisor

- *Redundant Supervisors*
- *Redundant GE Uplinks*
- *Redundant Clocks*
- *Redundant Switch Fabrics*
- *Fast Switchover without loss of conn.*
- *Hot-Insertion without network interrupt*

## Line Card Modules

- *FEC & GEC for load balancing and redundancy*
- *Hot-Swap Line Card*

## Common Equipment

- *Redundant load-sharing power supplies*
- *Redundant load-sharing fans*



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- **QoS Policy Manager**



# Introducing Catalyst 2948G-L3 Layer 3 Switch

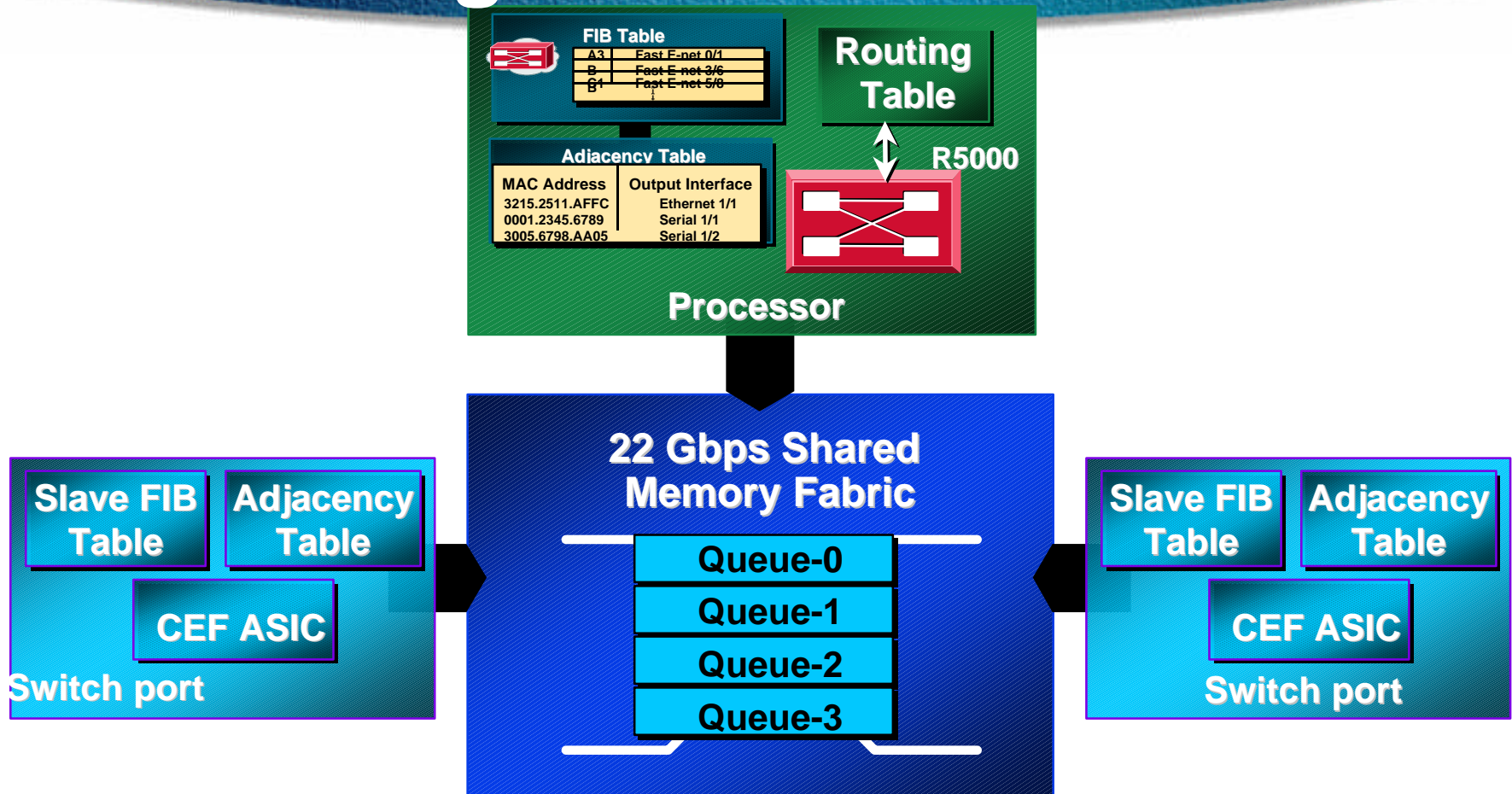
48 ports of 10/100  
Auto-sensing  
Ethernet L2/L3



Hot-Swap  
GBIC Slots  
(SX, LX/LH, ZX)

- **Cost-effective, high-performance L3 Switching**
- **Fixed configuration: 2 GE + 48 10/100 FE**
- **22 Gbps non-blocking switching fabric**
- **10 Mpps aggregate throughput**
- **10/100/1000 IP, IPX, IP Multicast L3 Switching and L2 Bridging at wire speeds**
- **Cisco IOS Software based**

# Catalyst 2948G-L3 High-Level Overview



# Terminology

## Control Plane

IP: EIGRP, OSPF, RIP, HSRP, BGP  
IPX: EIGRP, RIP/SAP  
CDP, Route Redistribution

## Data Plane

IPC

Switch port

Distributed  
FIB



IP Forwarding  
IPX Forwarding  
Data Plane ACLs

QoS Classification / rewrite

MLS

Flow Cache



# Cisco IOS 12.0 Software Feature Summary

## FEC and GEC Features

- 4 Fast Ethernet/2 Gigabit Ports
- ISL and 802.1q on FEC/GEC

## Network Services

- BOOTP, DHCP, HSRP/BVI, CDP
- ICMP, IGMP, SNMP
- CGMP Server
- UDP Turbo Flooding
- Port Mirroring, 4 Groups RMON

## L3 Switching/Routing Features

- IP, IPX, and IP M'cast
- Constrained M'cast Flooding (CMF)
- IP Precedence QoS
- Equal-cost Path Load-Balancing-2 paths in phase I
- MultiLayer Switching Prot. (MLSP)

## Layer 2 Bridging Features

- Transparent Bridging
- IEEE 802.1d
- DEC Spanning Tree ( phase II)
- Up to 16 Active Bridge Groups
- IRB
- Layer 2 Source MAC Filtering (phase II)

## Virtual LAN (VLAN) Features

- ISL-based VLAN s
- IEEE 802.1q-based VLANs

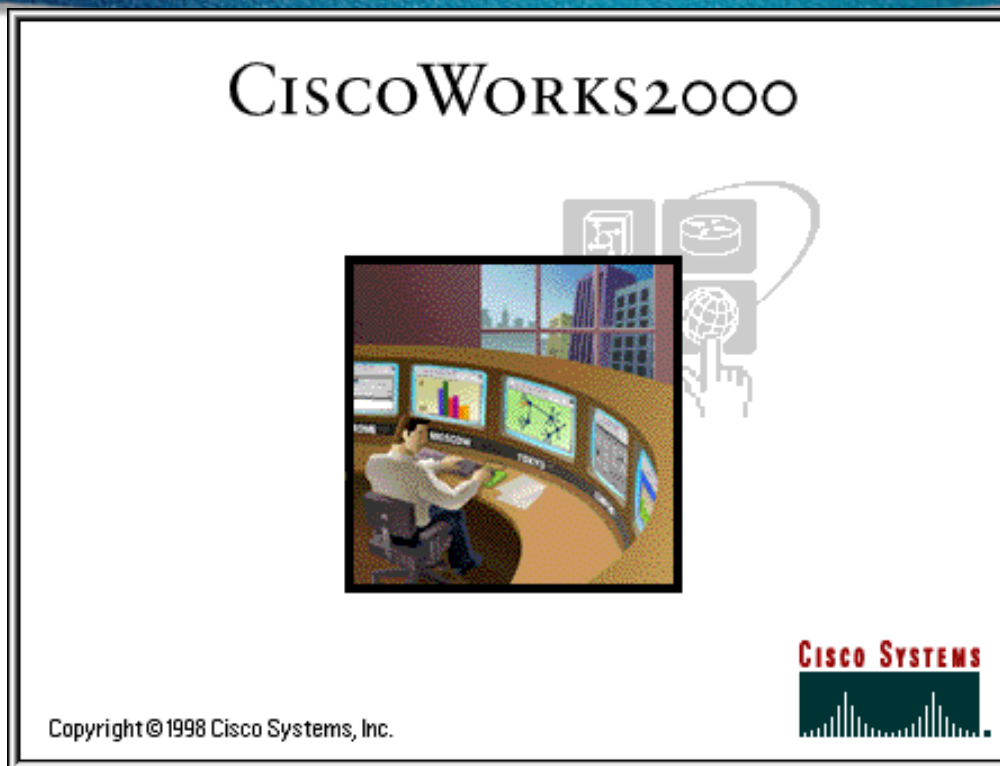
## Routing Protocols

- IGRP, EIGRP, OSPF, RIP I and II, BGP
- Static Routes
- PIM Sparse and Dense Modes
- IPX RIP and EIGRP
- Classless Interdomain Routing (CIDR)

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# CiscoWorks2000.....



***Foundation of the Management Intranet!***



# CiscoWorks2000

## Family of management products

- **Resource Manager Essentials**

Tools and services for managing Cisco routers and switches

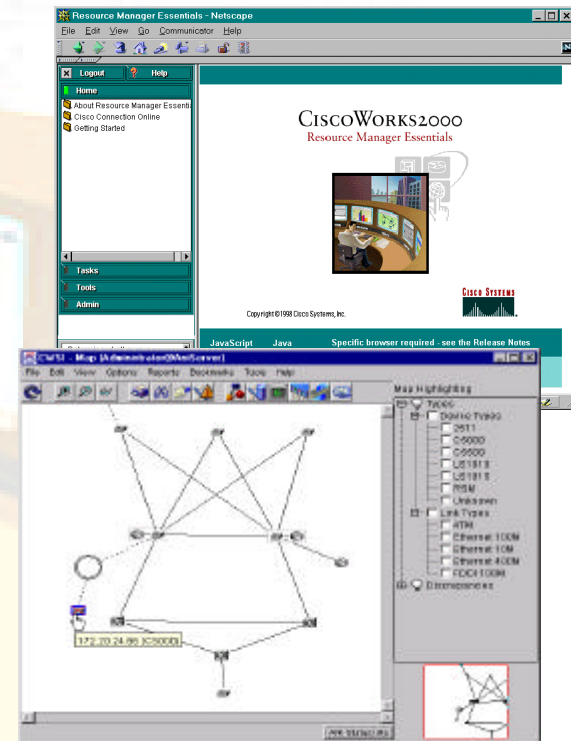
Internet technology for building Management Intranets

Integration of web-based Cisco products and services

- **CWSI Campus**

Tools and services for managing Cisco Catalyst and LightStream switches

Network based management of switch services and traffic performance



# CW2000 Essentials

**Configuration Manager** - Config files for routers and switches

**Change Audit Services** - audit logging and reporting of network changes

**Inventory Manager** - Capacity planning tools and inventory details

**Software Image Manager** - Distribution, archiving of image software

**Availability Manager** - reachability, reloads, response time and Stack decoder

**Syslog Analyzer** - Filtered, flexible syslog error reporting

## **Integration Tools -**

- CCO linked
- 3rd party web-based tools

## CISCOWORKS2000 Resource Manager Essentials



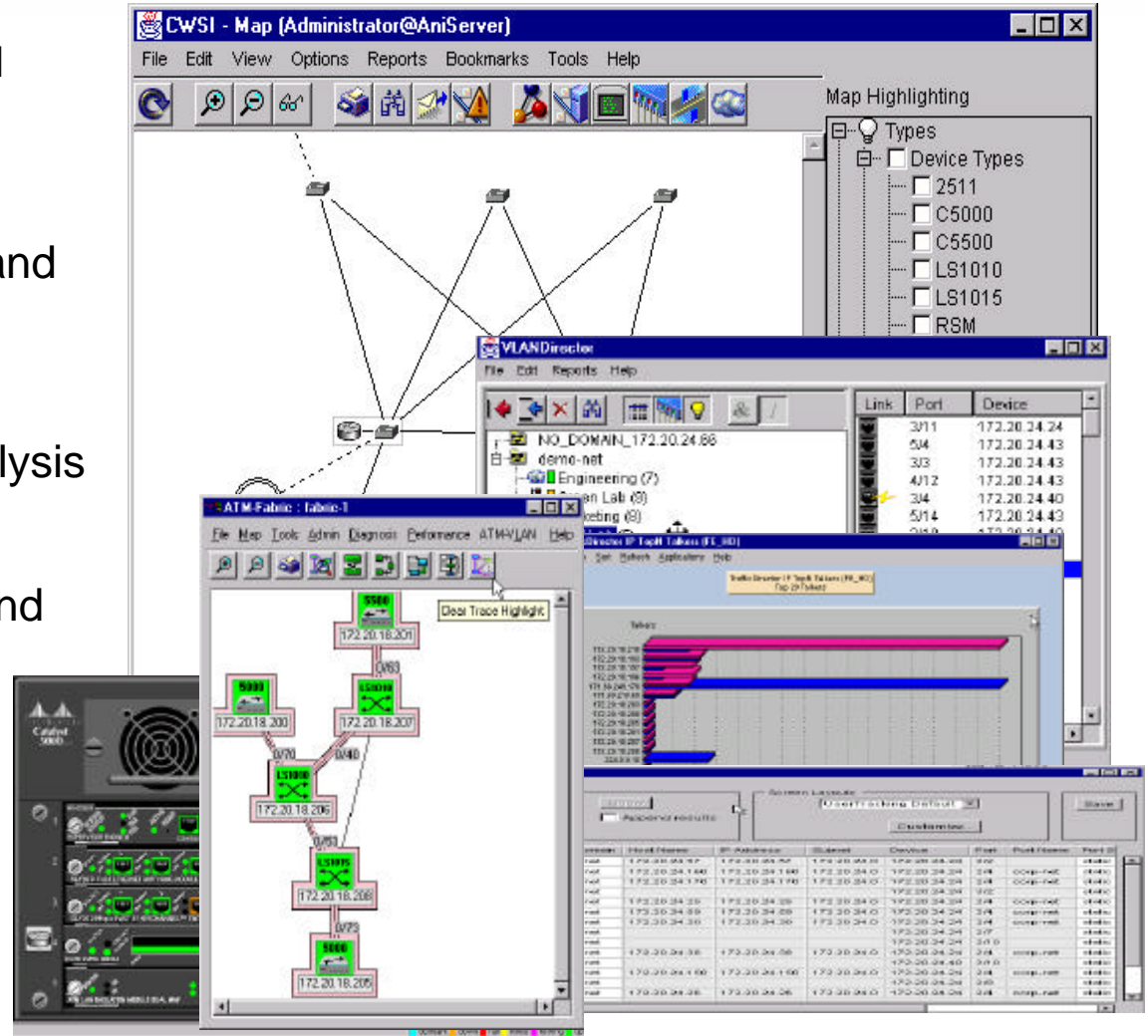
Copyright © 1998 Cisco Systems, Inc.

JavaScript	Java	Specific browser required - see the Release Notes
Enabled	Enabled	4.0 (compatible; MSIE 4.01; Windows 98)



# Campus Functional Overview

- **Device and network discovery and topology mapping**
- **Device Management**
  - Graphical device configuration and monitoring
- **Traffic Management**
  - RMON traffic collection and analysis
- **VLAN management**
  - Graphical VLAN configuration and logical topology
- **Extended ATM management**
  - ATM and LANE services
- **End-station mobility and tracking**
  - Mobile user and dynamic VLAN





# Comprehensive Device Management

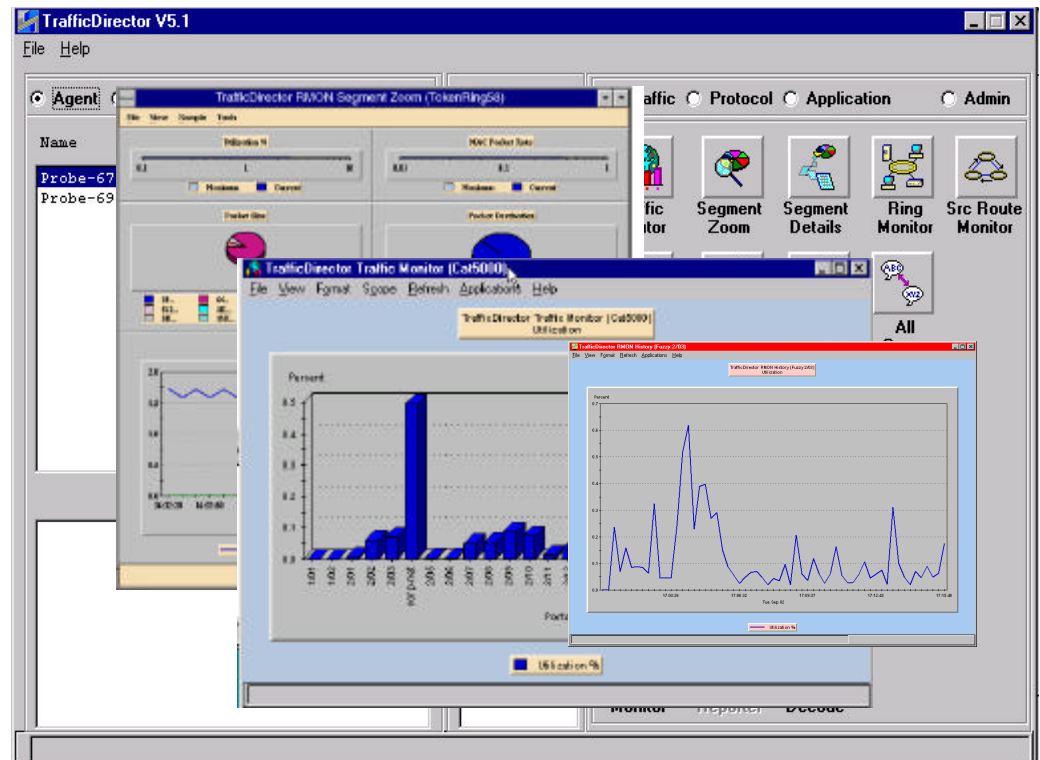
## Monitoring and Configuration

- Supports Cisco switching and routing products
- Monitors and configures ports, modules and whole devices
- Incremental device installation as new devices released
- Eliminates CLI management



# Traffic Monitoring Futures

- LAN/WAN traffic monitoring, management and troubleshooting tool
- Analysis of RMON/RMON2 and extensible agents/MIBs
- Protocol Decoding
- Integration with NetFlow
- Graphical Report



# Agenda

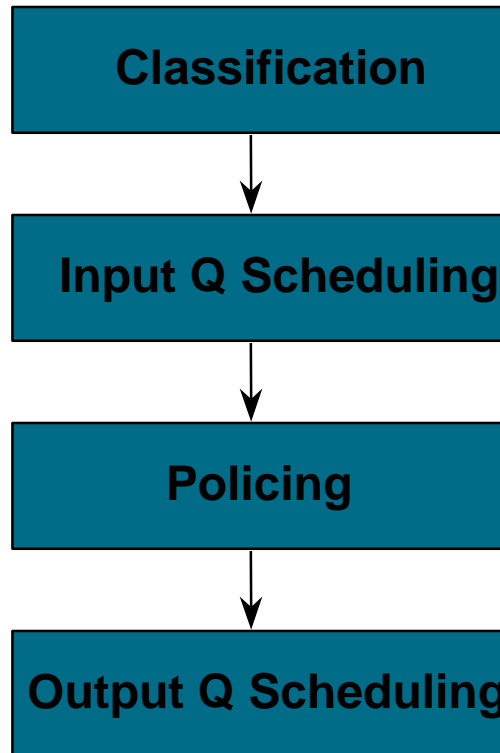
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- **CiscoWorks 2000**
- **QoS Policy Manager**



# QoS - What Is It ?

- **QoS prioritizes traffic into different service levels and provides preferential forwarding treatment to some data traffic at the expense of lower priority traffic**

# QoS Operational Model



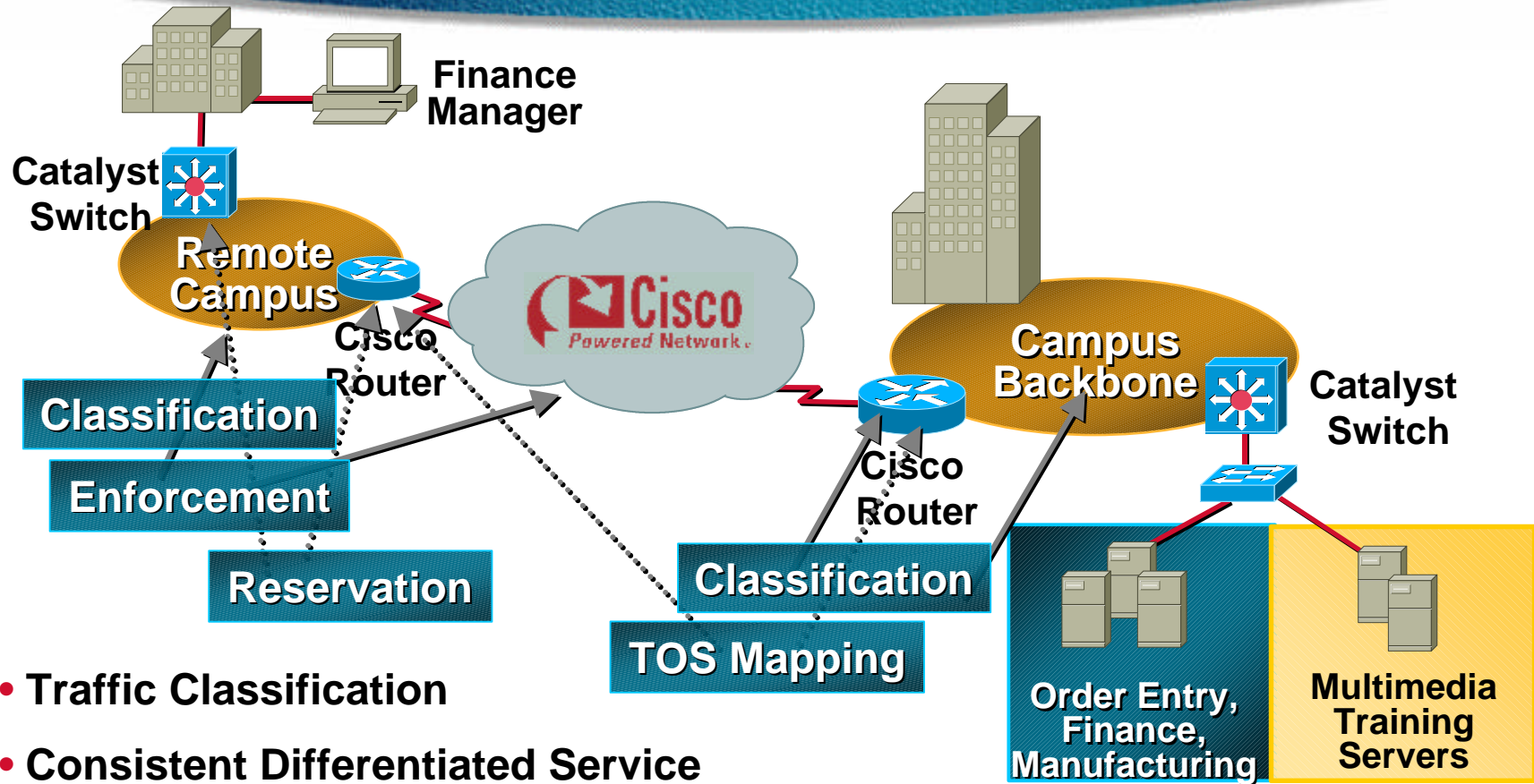
**Assigning a label based on examining multiple fields in the L2 and/or TCP/IP header**

**Assigning to prioritized input queue based on label assigned**

**Ensuring traffic rate is within specified contract. Mark down or drop excess**

**Assigning to prioritized output queue based on label assigned**

# End-to-End Policy-Based QoS

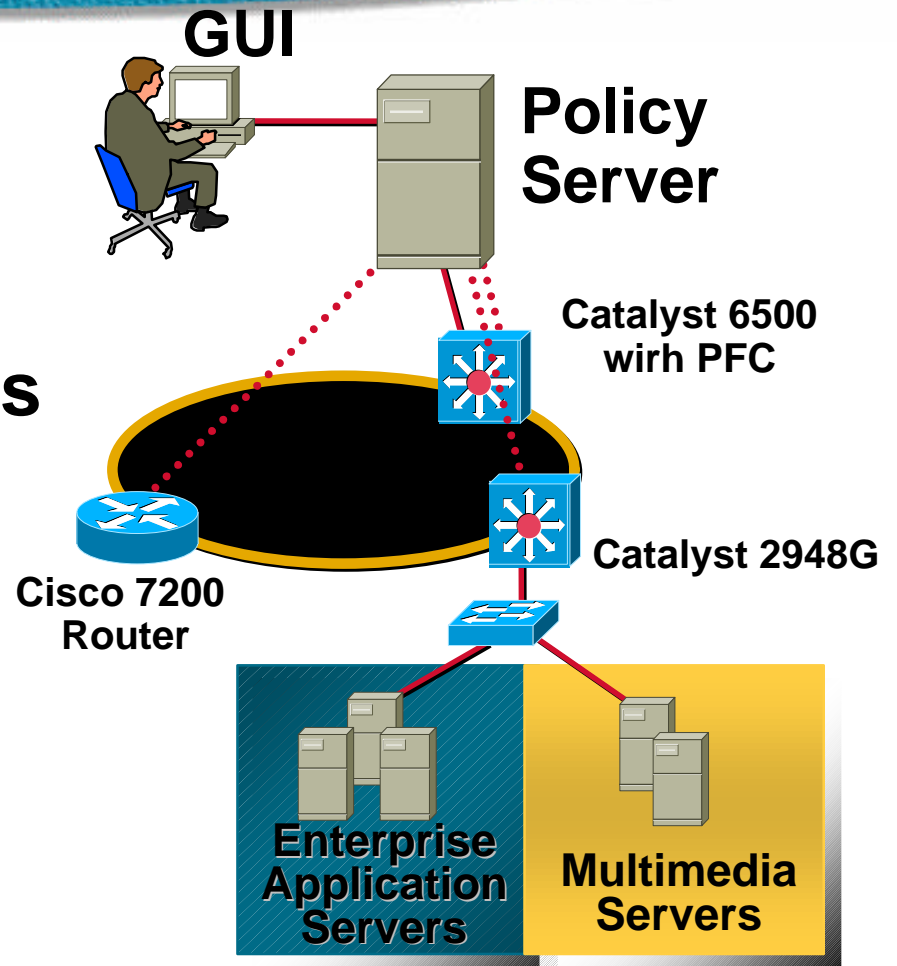


- Traffic Classification
- Consistent Differentiated Service
- QoS Enforcement Mechanisms
- Central Policy Administration



# QoS Policy Manager 1.1

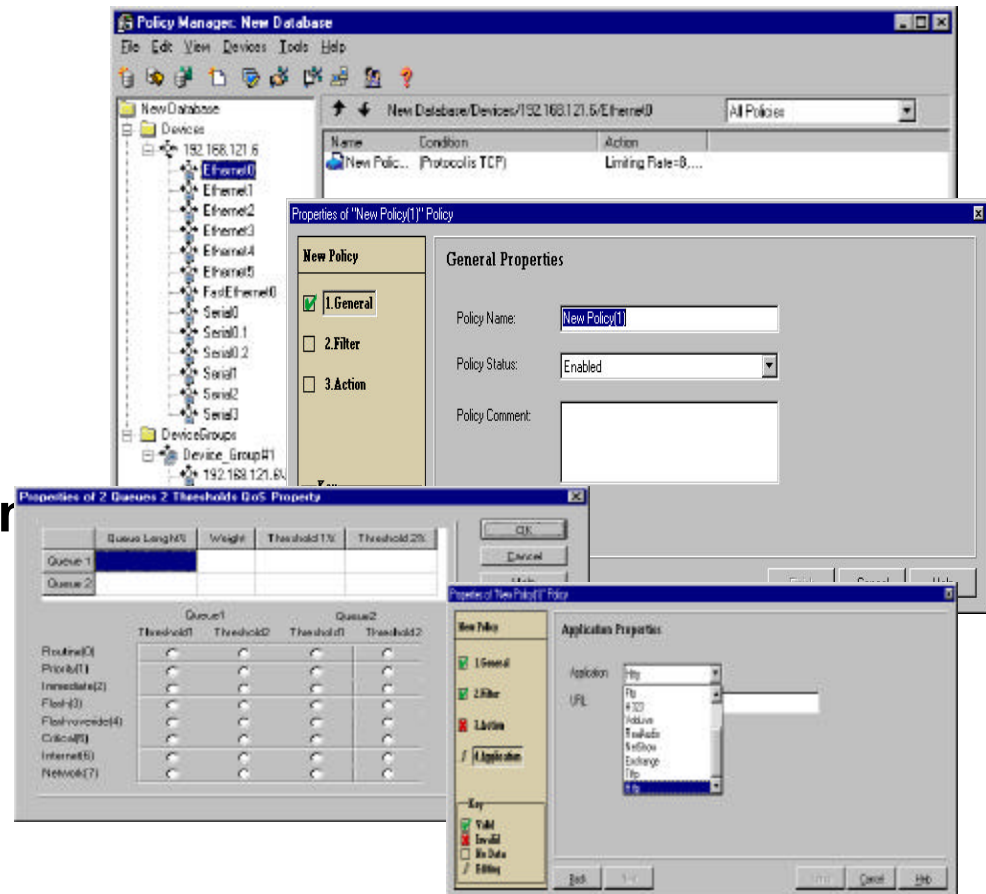
- Profile Key Applications
- Define & Validate Policies
- Set QoS Mechanisms
- Distribute Policies
- Log Policy Changes



# Centralized Policy-Based QoS Administration

- Network-wide QoS policy Administration
- Controls extensive QoS features
- Rules-based traffic selection and action filters
- Integrated validation uses embedded Cisco IOS knowledge-base
- Automated policy configuration and distribution to entire domain
- Comprehensive device and IOS support
- CiscoWorks2000 integration
- Web-based reporting

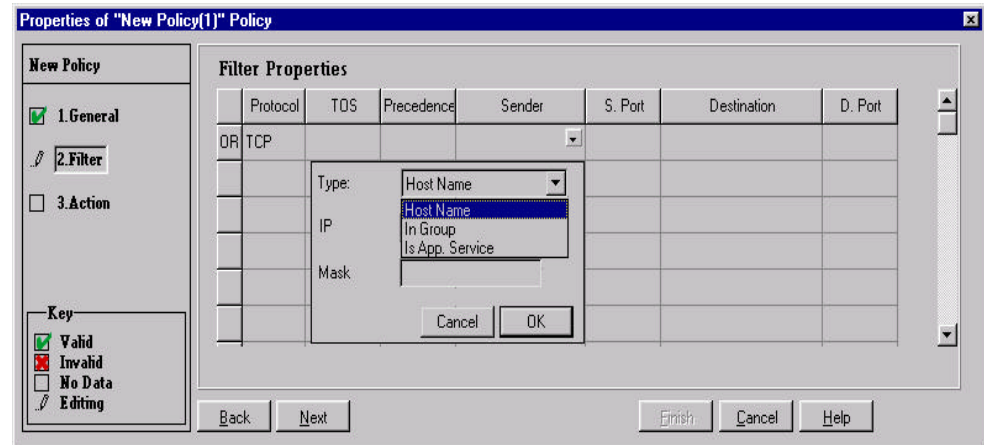
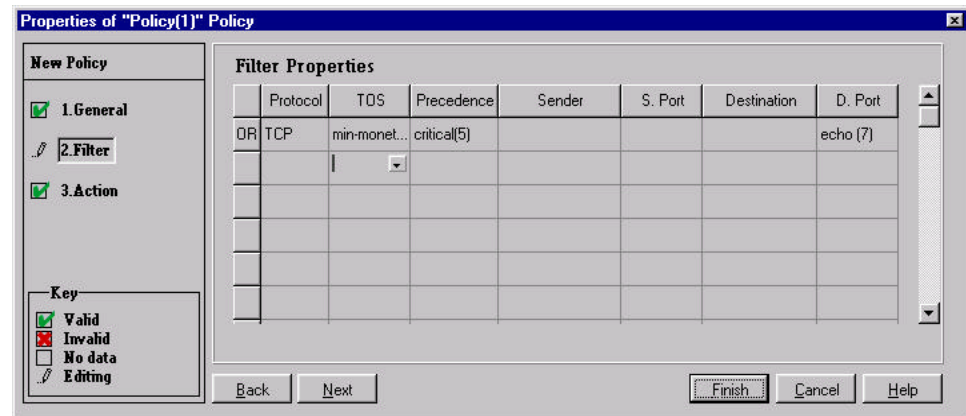
## QoS Policy Manager 1.1



# Select Traffic Classification

## QoS Policy Manager 1.1

- Define applications, services and host groups
- Policy filters combine:
  - Application services
  - Host groups
  - Source/destination IP address
  - Protocol (IP/TCP/UDP)
  - Layer 4 port (socket) numbers
  - Layer 4-7 using NBAR
- Rules-based policy filters generate an ACL statement

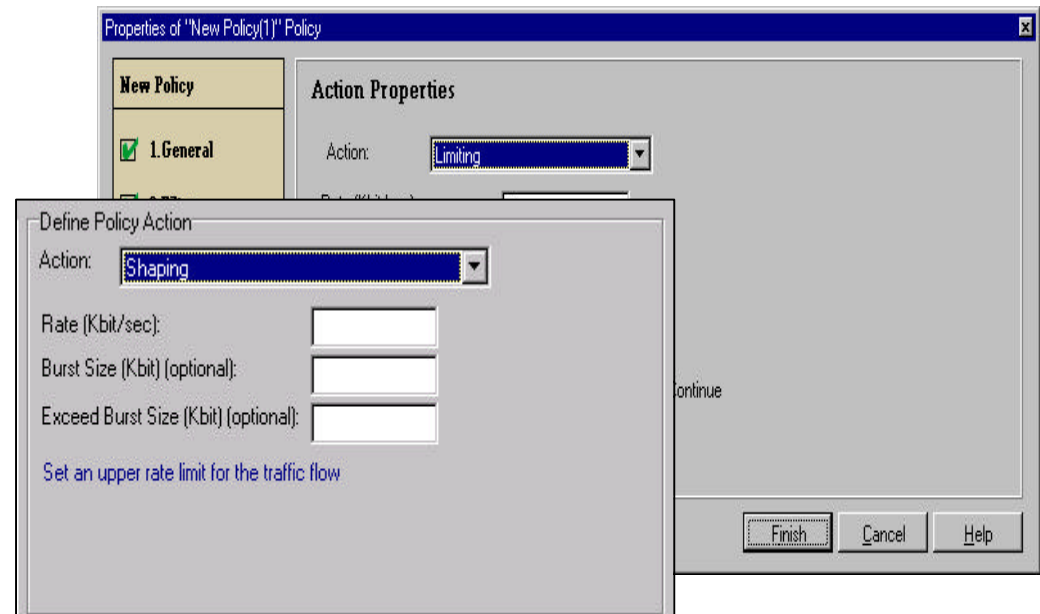




# Activate Policy Enforcement Mechanisms

## QoS Policy Manager 1.1

- Which QoS actions are applied to the flow
- Actions are coloring, shaping, queuing, rate limiting
- Support for PQ, CQ, WFQ, DWFQ, CBWFT, WRED, IP RTP, GTS, FRTS, CAR classification & limiting, WRR, NBAR
- 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)**

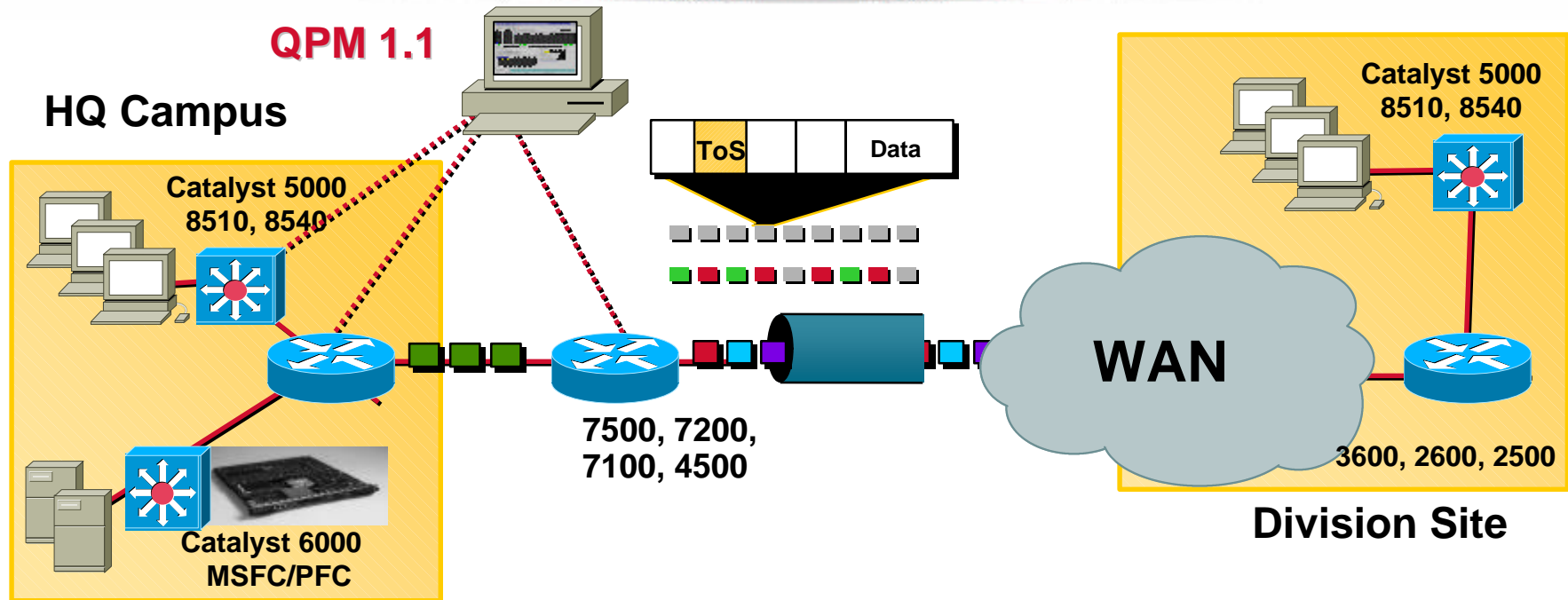
**Destination - Host Name=192.0.0.0**

**Mask=255.0.0.0**

**Action - Shaping**

**rate=300**

# QPM Delivers Network-Wide QoS Policy



Traffic classification, queuing, and policing in the Campus

Traffic classification, queuing and shaping in the WAN

**IP Prec/RSVP For End-to-End Signaling**

# Catalyst 6000 Support

- **Packet Classification**

Sender/Receiver IP Address (Layer 3)

Protocol

Source/Destination Port Range (Layer 4)

- **Traffic Scheduling**

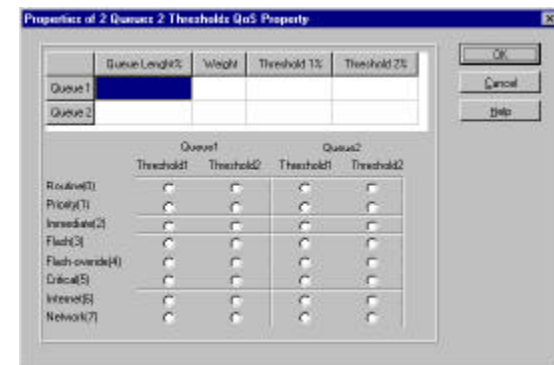
2q2t queuing with thresholds

WRR - Weight and queue length

- **Bandwidth Policing**

Rate limiting on a per port basis

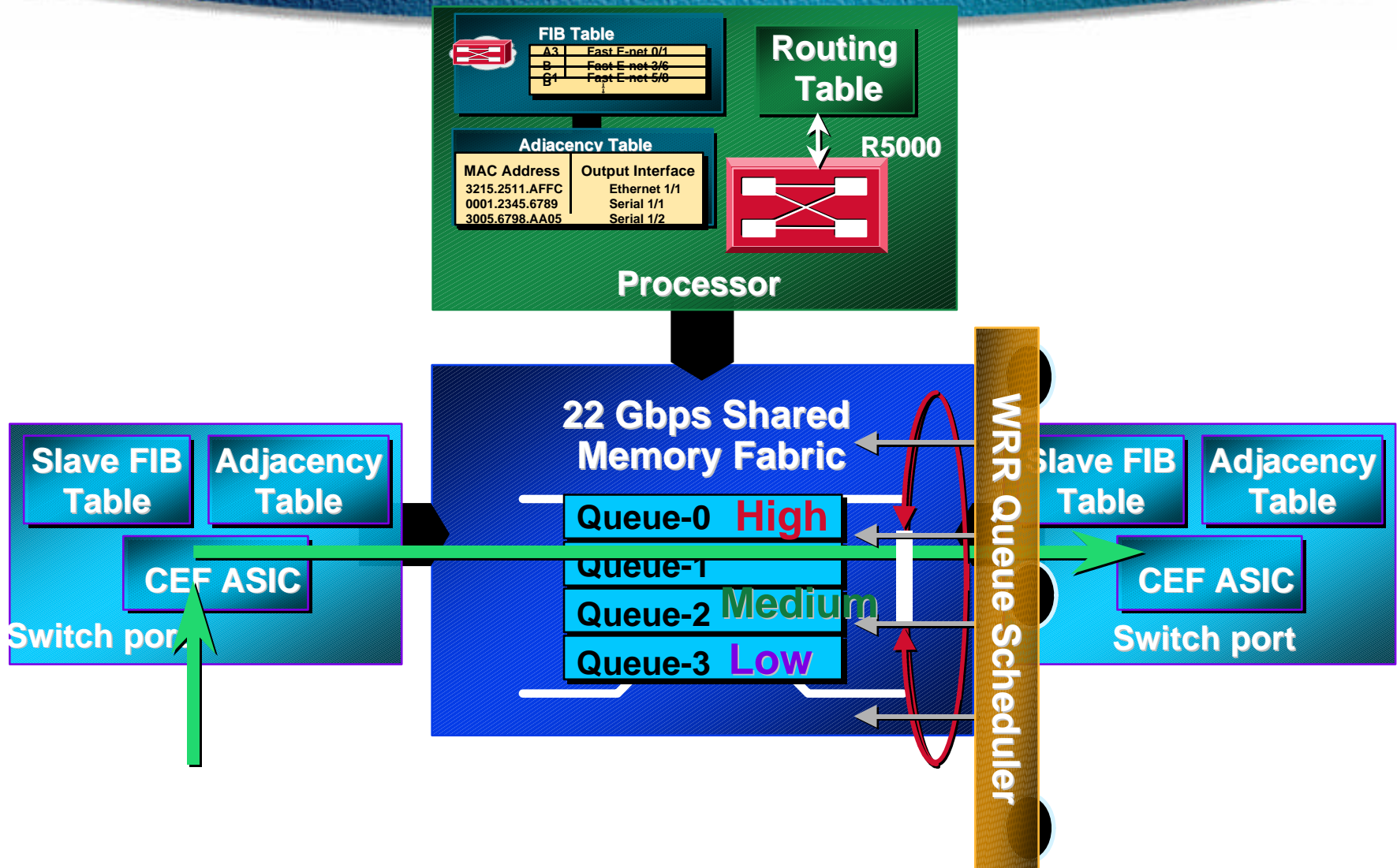
## QPM 1.1



Catalyst 6500



# Catalyst 2948G-L3 QoS



# CISCO SYSTEMS



EMPOWERING THE  
INTERNET GENERATION<sup>SM</sup>