

Cisco Catalyst[®] 3550 Series Switches

Catalyst 3550 Series

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- **Product Overview**
- **Intelligence in the Network**
- **Features and Benefits**
- **Deployment Examples**
- **Service and Support**

News: Catalyst 3550 Switches

“...the introduction of these products [Catalyst 3550/2950] will put Cisco competitors on the defensive to match its price, performance, and value.”

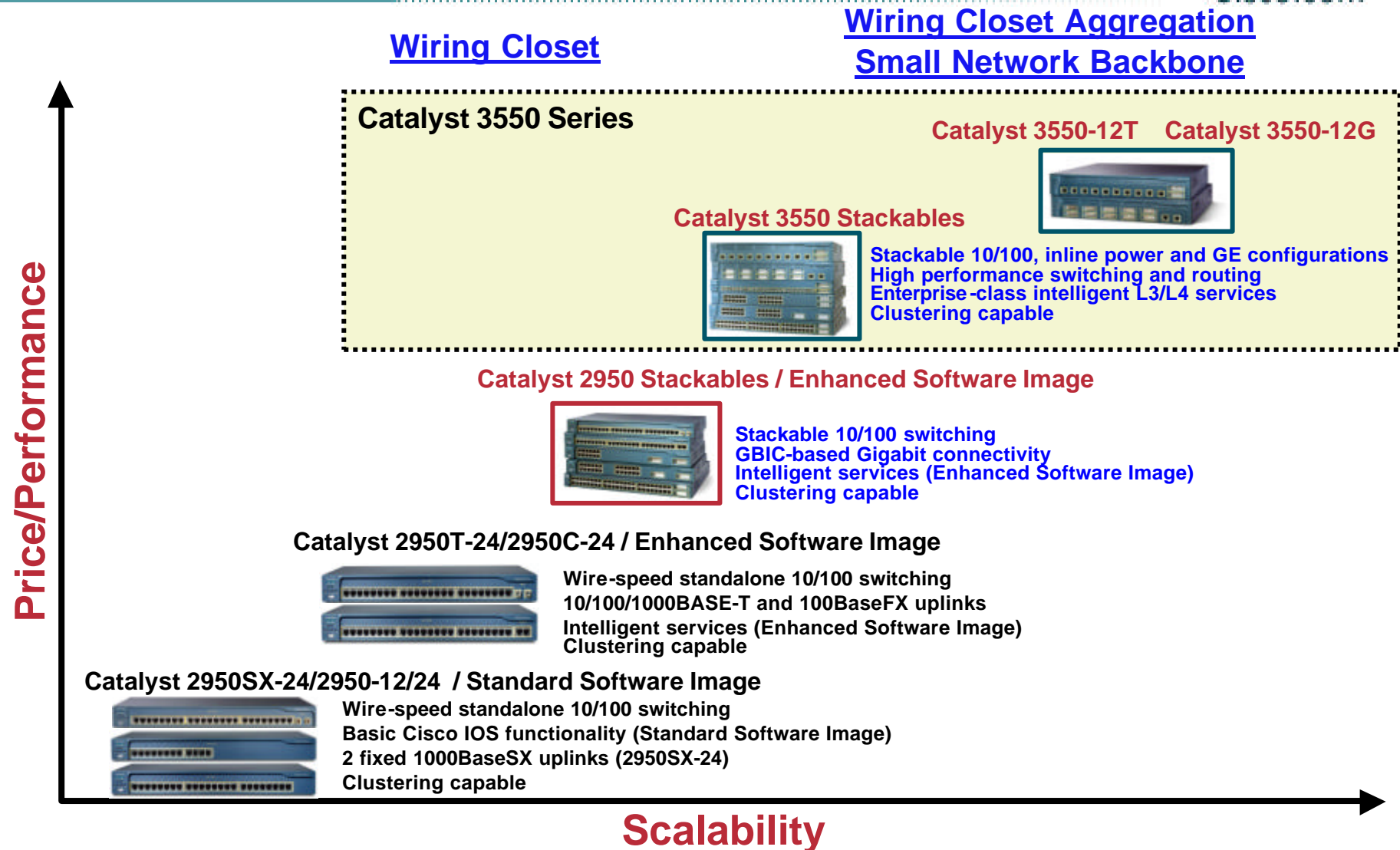
Current Analysis
December 2001

Catalyst 3550 Series



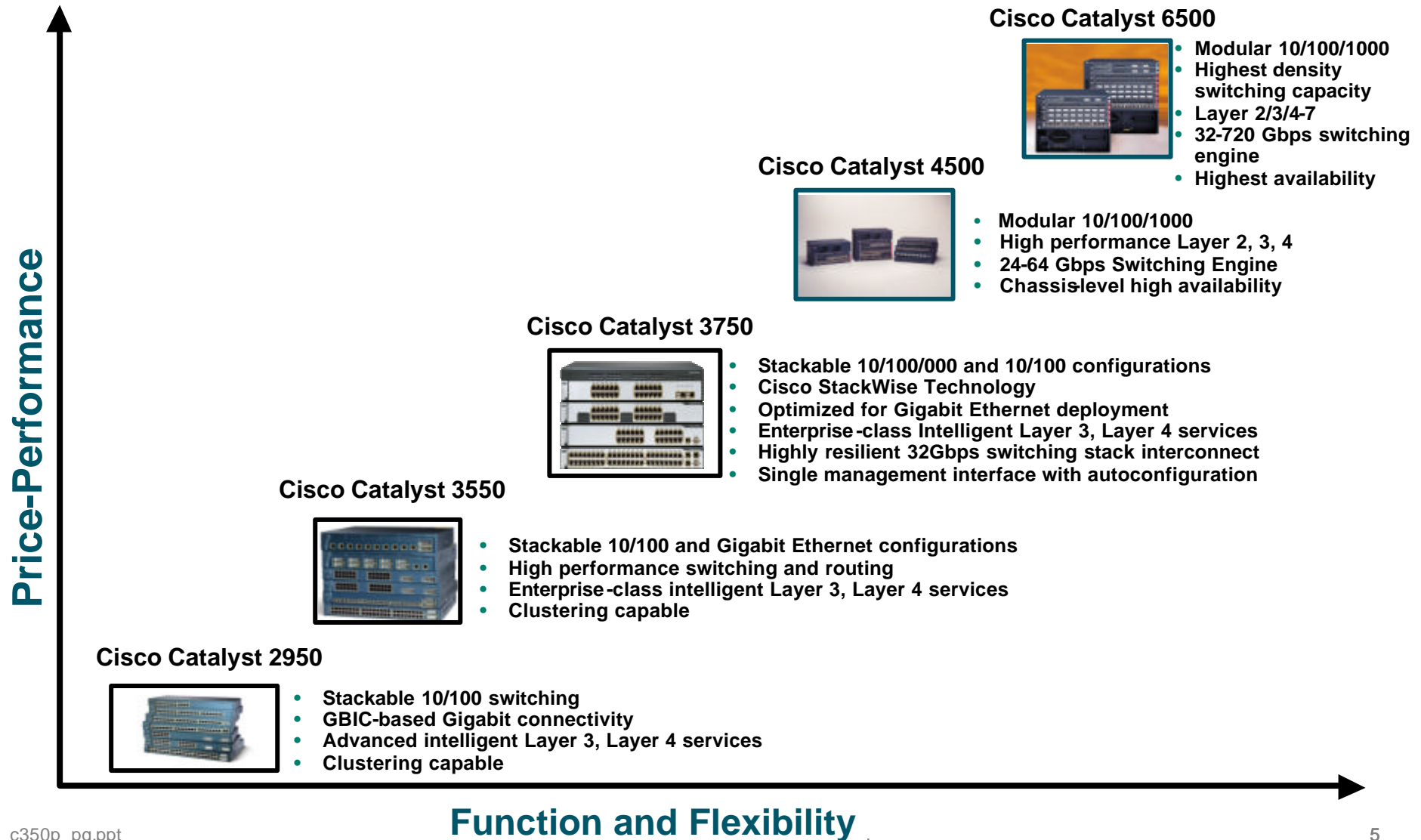
Catalyst 3550 and Catalyst 2950 Series Switches

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Cisco Delivers the **Most Complete** Line of LAN Products in the Industry

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Catalyst 3550 Series Switches

Positioning

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- **Enterprise-class, stackable, multilayer switch family with Fast Ethernet and Gigabit Ethernet configurations**
- **Enables the deployment of network-wide intelligent services**
 - High Availability
 - Enhanced Security
 - Advanced Quality of Service
- **Powerful access layer or small network backbone switch deployed in enterprise wiring closets and branch offices**
- **Embedded Cluster Management Suite software allows easy configuration of network-wide intelligent services**
- **Familiar IOS Software**
 - Software based on Native IOS release for the Cat 6x00 Series
 - Supports same port, VLAN and SVI configuration options in CLI



Catalyst 3550 Series

Product Overview

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- **Enterprise-class services**

- High Availability: IP Routing, HSRP, STP enhancements, 802.1s/w, IGMP snooping
- Enhanced Security: 802.1x, SSH, SNMPv3, ACL, Port Security, MAC address notification, RADIUS/TACAC+
- Advanced QoS: L2-L4 QoS with CoS/DSCP, WRR, WRED, Strict Priority Queuing

- **High performance**

- GE configurations provide dynamic IP routing at 17 Mpps forwarding rate
- FE configurations provide wire-speed switching and routing
 - 10.1 Mpps forwarding rate on Catalyst 3550-48
 - 6.6 Mpps forwarding rate on Catalyst 3550-24
- CEF based forwarding

- **Ease of management**

- Extends Web-based Cluster Management Suite to Layer 3/4 services

- **Ease of deployment**

- Boots as a traditional Layer 2 Catalyst switch, configurable for Layer 3 routing and services
- 1 or 1.5 rack unit (RU) stackable form factor

- **Full Cisco GBIC support**

- All existing GBICs (GigaStack™ GBIC, 1000BASE-T, 1000Base-SX, LX, ZX)

Catalyst 3550 Series

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Catalyst 3550-24	Catalyst 3550-24-FX	Catalyst 3550-48	Catalyst 3550-12T	Catalyst 3550-12G
				
24 10/100 Ports 2 GBIC ports Inline Power version DC version	24 100FX ports 2 GBIC ports	48 10/100 Ports 2 GBIC ports	10 10/100/1000 Ports 2 GBIC ports	10 GBIC Ports 2 10/100/1000 Ports
Medium Port Density		High Port Density	Gigabit Ethernet Aggregation	

Enhanced Multilayer Software Image (EMI)

- SMI feature set plus more functionality including
 - Advanced IP unicast and multicast routing, WCCP

Standard Multilayer Software Image (SMI)

- Enterprise-class intelligent services and Basic IP unicast routing
 - Advanced QoS, Rate-Limiting, ACLs, **Static and RIP routing**
- Available on the Catalyst 3550-24 and 3550-48

Ordering Information

- Catalyst 3550-24/48 are orderable with either software image preinstalled
- Catalyst 3550-24/48 can be upgraded from SMI to EMI
- Catalyst 3550-12T/12G are only orderable with the EMI image

Cisco Catalyst 3550-24 PWR Intelligent Ethernet Switch

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Excellent Performance

- Twenty-four 10/100 ports with two built-in GBIC ports
- Wire-speed switching and routing
- Delivers inline power up to 15.4W per 10/100 port

Power Redundancy

- Compatible with **NEW Cisco Redundant Power System 675 (RPS 675)** and an uninterruptible power system (UPS) to provide maximum availability

Intelligent Services

- High performance IP routing, advanced QoS, and enhanced security features support integrated voice, video and data applications

Lower Total Cost of Ownership

- Deliver inline power to Cisco IP phones and Cisco Aironet wireless LAN access points directly from the switch:
 - Centralizes power provisioning
 - Eliminates the need for wall power to each device, easing deployment
 - Eliminates the need for additional, separate wiring to power devices

Catalyst 3550 and 2950 Series

Key Positioning *Differences*

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Feature	Catalyst 3550 Series	Catalyst 2950 Series
Product Breadth	Aggregation: 3550-12T/12G Stackable: 3550-24/48; 3550-24PWR; 3550-FX; 3550-DC	Stackable: 2950G-12/24/48-EI Standalone: 2950T-24/2950C-24 Basic Standalone: 2950-SX/2950-12/24
Deployment	Aggregation: Medium-sized network / enterprise branch office distribution or small network core/backbone switch with fixed and GBIC-based gigabit / fiber connectivity. Stackable: Medium –sized network / enterprise branch office, serves as enterprise-class multilayer access switch and provides increased availability and control over Catalyst 2950 Series. Inline power capability ideal for IP phone and wireless LAN deployments. Able to provided routed uplinks to the core to maximize network availability. Supports GBIC-based gigabit/fiber connectivity.	Stackable: Medium-sized network / enterprise branch office multilayer access switch with flexible GBIC-based connectivity. Standalone: Small to medium-sized business or enterprise branch office access switches with options for fixed 100BASE-FX and 10/100/1000BASE-T connectivity. Basic Standalone: Small to medium-sized network access switch providing basic connectivity. Available with two fixed 1000BASE-SX uplinks.

Catalyst 3550 and 2950 Series

Key Feature *Differences*

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Feature	3550 Series	2950 Series (Enhanced Image)	2950 Series (Standard Image)
Availability:			
RIP/Static Routing	Yes (EMI/SMI)	No	No
Upgrade to Advanced IP unicast and multicast routing (OSPF, IGRP, EIGRP, BGPv4)	Yes	No	No
Flexible TCAM resource allocation across filters	Yes	No	No
Routed ACLs, HSRP	Yes	No	No
WCCP	Yes (EMI)	No	No
ISL-based VLANs	Yes	No	No
Multicast Management:			
802.1s Multiple Spanning Tree Protocol	Yes	Yes	No
802.1w Rapid Spanning Tree Protocol	Yes	Yes	No
IGMP Snooping / PIM	Yes	IGMP Snooping	IGMP Snooping
Gigabit EtherChannel	Yes	Yes	Yes (2950SX-24 only)
CrossStack UplinkFast	Yes	Yes	No
Security:			
ACLs	Port-based, VACL, RACL	Port-based	No
DHCP Interface Tracker	Yes	No	No
Secure Shell / SNMPv3 (crypto images)	Yes	Yes	No

Catalyst 3550 and 2950 Series

Key Feature *Differences*

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Feature	3550 Series SMI & EMI	2950 Series (Enhanced Image)	2950 Series (Standard Image)
QoS Details			
Class of Service (L2 Classification)	Yes	Yes	Yes
WRED (on GE ports)	Yes	No	No
Full DSCP Support	Yes, All 64 Values	No, Only 13 Values	No
Support for IP Precedence	Yes	No	No
Rate Limiting	Yes	Yes	No
Policing Range	8 Kb-100 Mbps for 10/100b	1 Mbps-100 Mbps for 10/100 ports	None
Number of policers: - Ingress policers/port - Egress policers/port	8 on 10/100, 128 on GE 8 on 10/100, 8 on GE	6 on 10/100, 60 on GE N/A	None
DSCP to DSCP maps between autonomous systems	Yes	No	No
Active VLANs	1000 (128 spanning-tree instances)	250 (64 spanning- tree instances)	64 (64 spanning- tree instance)
Number of MAC addresses	8,000-12,000	8,000	8000
Number of multicast groups	2,000-8,000	255	255

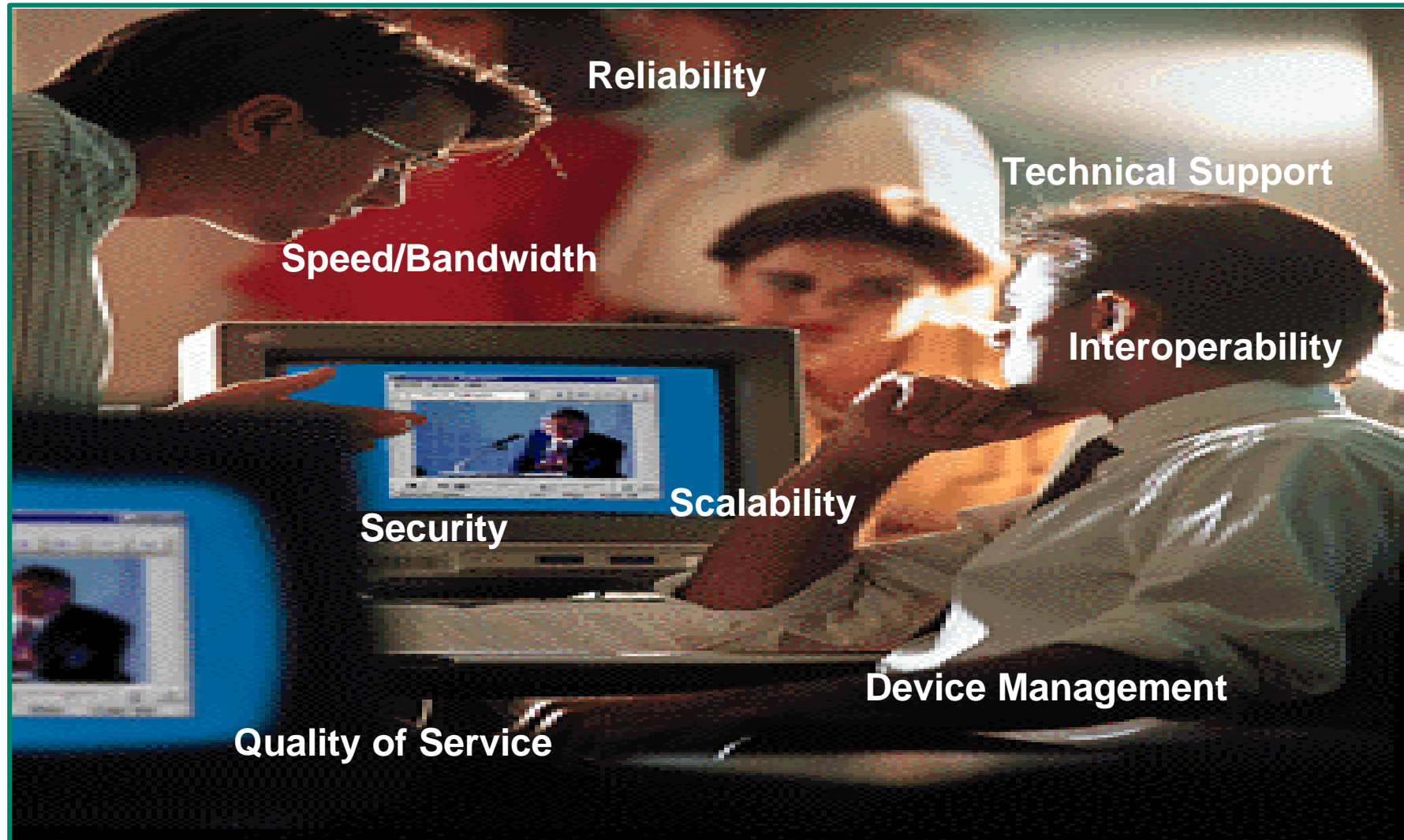
Catalyst 3550 Series

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Concerns in the Network

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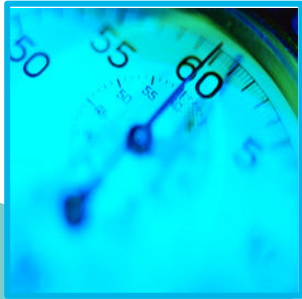
Key to a Successful Implementation

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Intelligent Network Attributes & Services

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Availability



Security



Quality of Service

**Delivering Layer 3 and 4 Services
From the Edge to the Core to the WAN**

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Catalyst 3550 Feature Overview

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Availability

- **IP Unicast Routing**
 - Static, RIPv1/v2, OSPF, IGRP, EIGRP, BGPv4
- **IP Multicast Routing**
 - PIM, DVMRP tunneling
- **PBR***
- **PVRST+***
- **HSRP**
- **WCCP**
- **DTP and PAgP**
- **802.3ad**
- **Dynamic VLANs**
- **IGMP Snooping**
- **STP enhancements**
- **L2 load balancing (PVST)**
- **L3 load balancing (ECR)**
- **802.1s/w**
- **RPS 675**
- **RPS 300**

* New Cisco IOS® Software Release 12.1(13)EA1

Security

- **ACLs**
- **802.1x**
- **802.1x w/ VLAN assignment**
- **802.1x w/ ACL assignment**
- **SNMPv3**
- **SSH**
- **Kerberos**
- **Port Security**
- **Private VLAN Edge**
- **DHCP Interface Tracker**
- **MAC Address Notification**
- **CMS Security Wizard**



Quality of Service

- **Quality of Service**
 - **Auto-QoS for VoIP**
 - 802.1p CoS and DSCP
 - Egress queue servicing: WRR and Strict Priority Queuing
 - Congestion Avoidance: WRED for GE ports
 - **Granular Rate Limiting**

Manageability

- **Cisco CMS Software**
- **CiscoWorks**
- **Voice VLANs**
- **Dynamic VLANs**
- **QoS Policy Manager (QPM)**
- **SPAN, RSPAN**

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- **Features and Benefits Examples**
 - **High Availability**
 - Enhanced Security
 - Advanced Quality of Service
 - Manageability
- **Deployment Examples**
- **Service and Support**

IP Routing

The Case for Routed Uplinks to the Core:

Traditional 80/20 Rule - Flat Layer 2 Networks

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Layer 2 only closets work

- Low number of VLANs
- Mostly local traffic
- Few Spanning-Tree Protocol instances
- Little need for redundancy

Layer 3 Core

Administration

- Local applications
- Users with similar needs grouped geographically or logically

20% of Traffic
through Core

Layer 2 Domain with 80% local traffic

Most traffic is local to a wiring closet,
or VLANs are easily trunked to
maintain locality

80% of Traffic
within wiring
closet/VLAN

Layer 2 Domain with 80% local traffic

Most traffic is local to a wiring closet,
or VLANs are easily trunked to
maintain locality

The Case for Routed Uplinks to the Core:

New 80/20 Rule - Need for Top of Stack Multilayer Switching

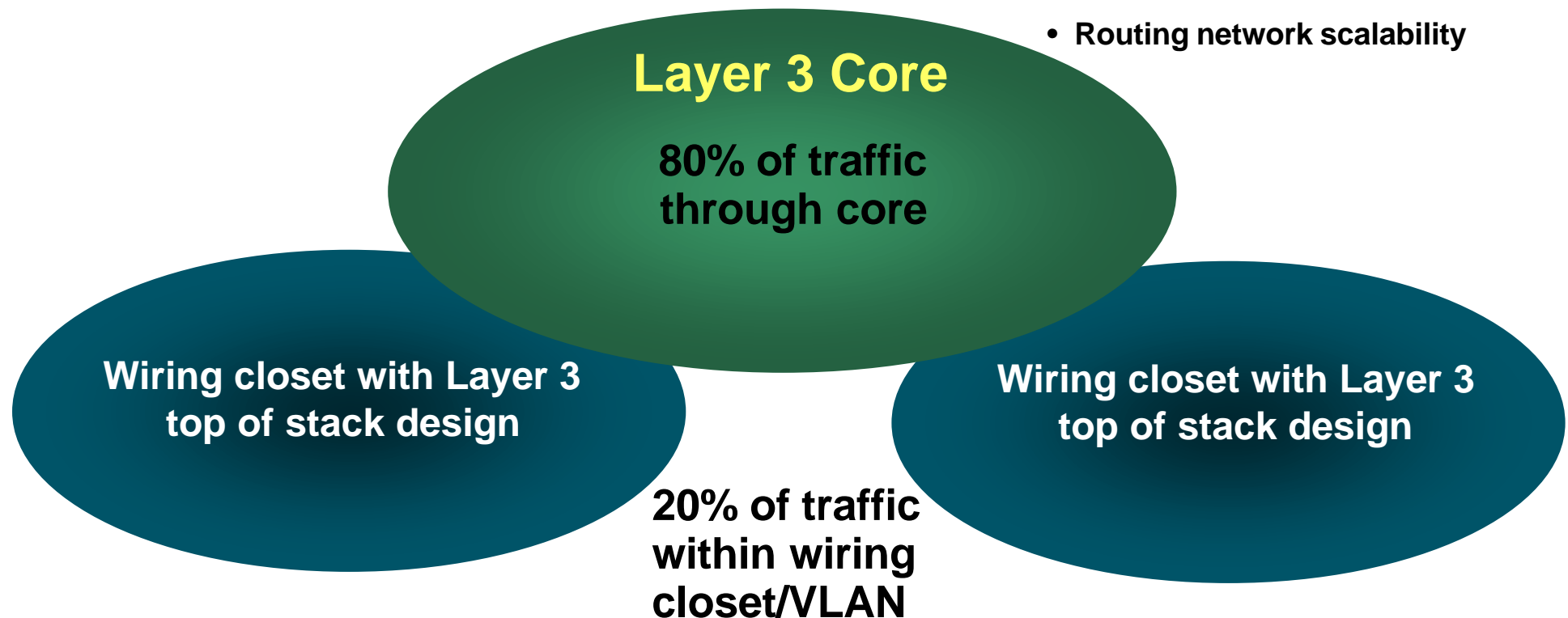
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Changes

- Web based applications
- Centralized servers/applications
- Greater reliance on the network

Advantages

- Redundant routed uplinks
- Deterministic paths/failovers
- Faster convergence
- Broadcast domain segmentation
- Routing network scalability



IP Routing Configuration

- Boots as a traditional Layer 2 Catalyst switch
- Delivers same bridging services as the Catalyst 3500 XL
- Configurable via Cluster Management Suite, CiscoWorks, or CLI
- Supported Protocols: RIPv1/v2, OSPF, IGRP, EIGRP, PIM

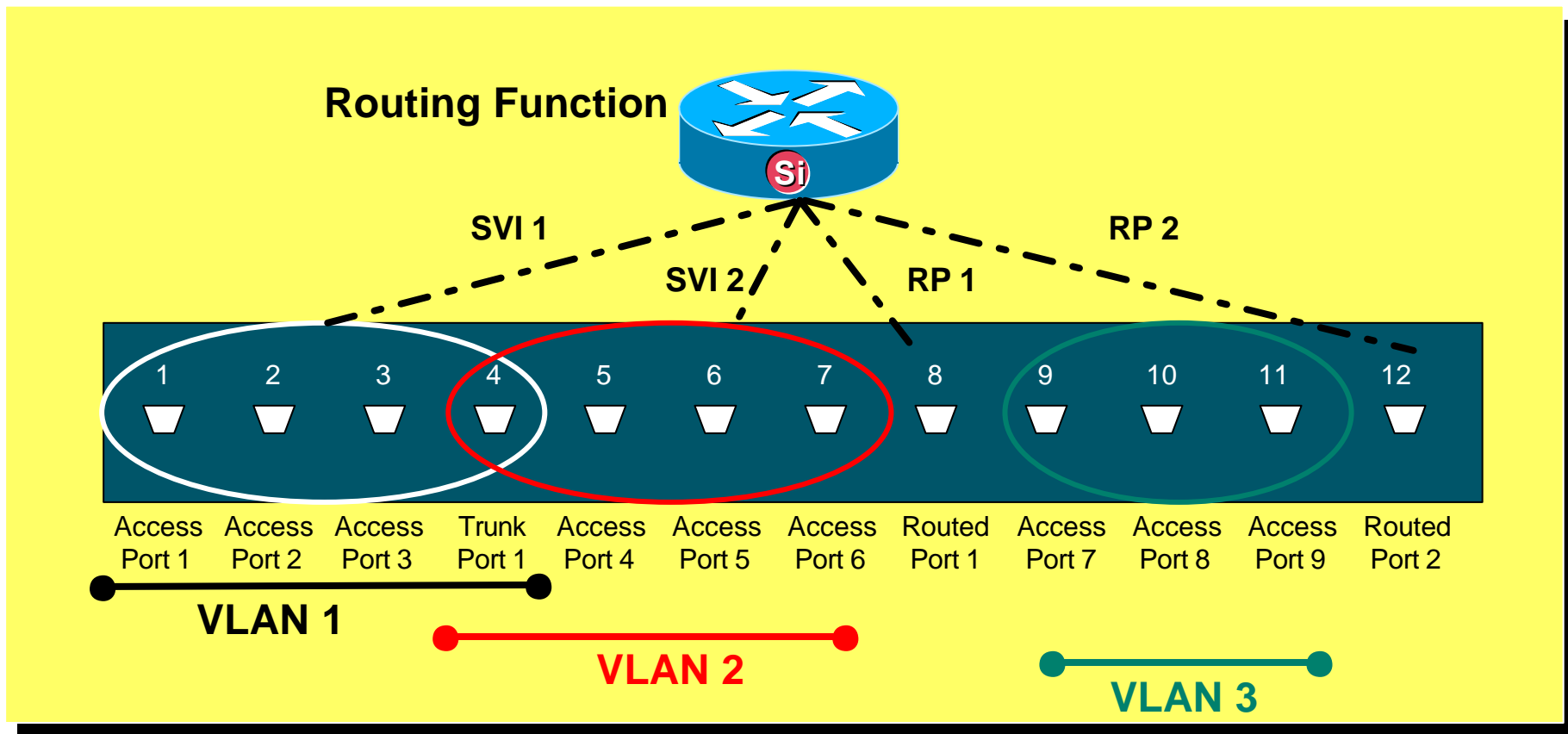
TCAM Allocation for Catalyst 3550-12T and 3550-12G				
Resource	Default Template	Access Template	Routing Template	VLAN template
Unicast MAC addresses	6K	2K	6K	12K
IGMP Groups	6K	8K	6K	6K
VLANs	1K	1K	1K	1K
QoS ACLs	4K	4K	2K	4K
Security ACLs	4K	8K	2K	4K
Unicast Routes	12K	4K	24K	0
Multicast Routes	6K	8K	6K	0
Routed Ports and SVIs	16	16	16	16
TCAM Allocation for Catalyst 3550-24 and 3550-48				
Resource	Default Template	Access Template	Routing Template	VLAN template
Unicast MAC addresses	5K	1K	5K	8K
IGMP Groups	1K	2K	1K	1K
VLANs	1K	1K	1K	1K
QoS ACLs	1K	2K	512	1K
Security ACLs	1K	2K	512	1K
Unicast Routes	8K	2K	16K	0
Multicast Routes	1K	2K	1K	0
Routed Ports and SVIs	8	8	8	8

Supported Interfaces

- **Switch Ports**: Layer 2-only interface with one switch interface per physical port
 - **Access ports**: Traffic received and transmitted must be in native format (i.e., VLAN-tagged traffic is dropped)
 - **Trunk ports**: Carries traffic from multiple VLANs
 - **ISL-Trunks**: Packet must be encapsulated with ISL header
 - **802.1Q-Trunks**: VLAN tagged packets are trunked and untagged packets are sent to user-defined default VLAN
- **Routed Ports**: A port that is configured to behave like a traditional IOS router
- **Switch Virtual Interface (SVI)**: Provides Layer 3 routing and Layer 2 bridged access to a switched VLAN

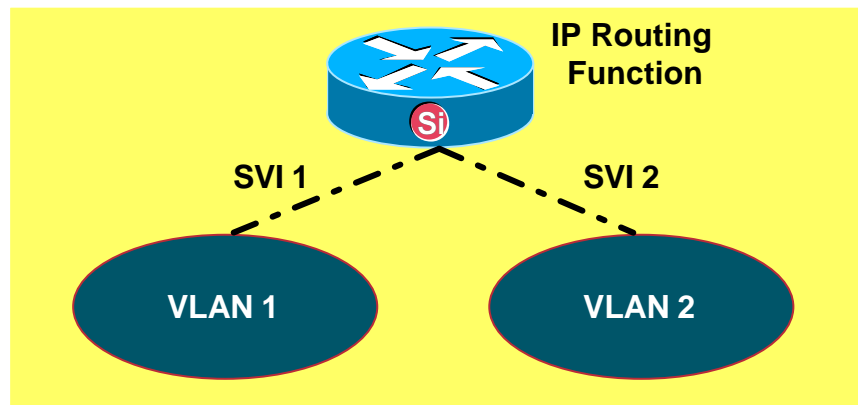
Support for Multiple Interfaces

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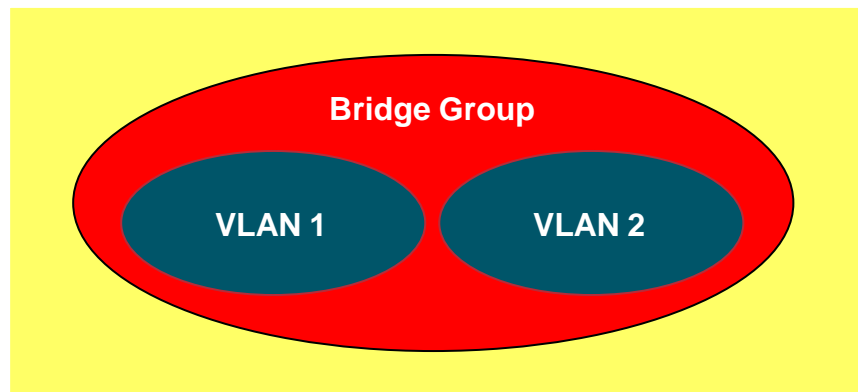


Fall Back Bridging

Routing IP Traffic



Fall Back Bridging for Non-IP Traffic



- Enables bridging of non-IPv4 traffic between VLAN/SVI
- Bridge groups are configured to connect multiple VLANs into a single bridging domain
- Example: Configure fallback bridging to bridge non-IPv4 traffic (IPX, AppleTalk, IPv6, etc.) to an appropriate VLAN
- Application: Bridging IPX or IPv6 traffic to VLAN which contains a v6 or IPX router

Multicast Management

Multicast Benefits

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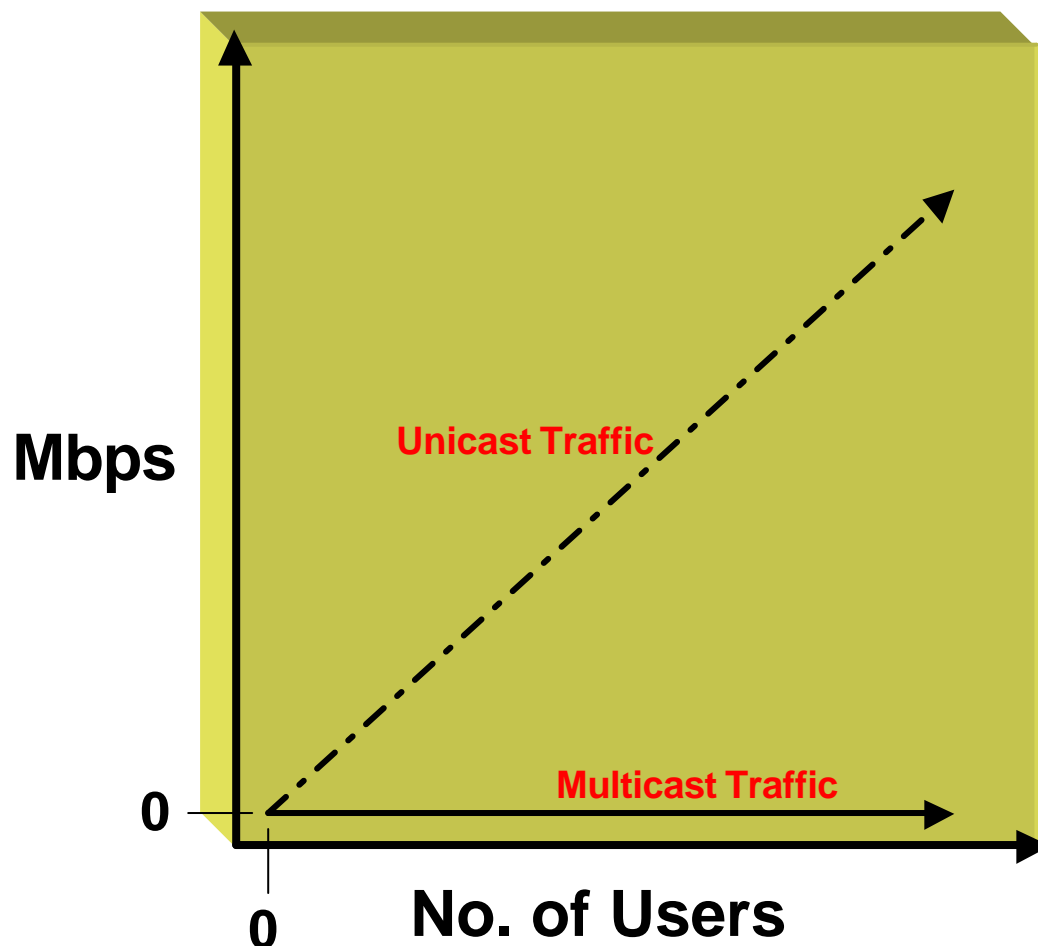
Why implement Multicast?

- Bandwidth considerations
- Server loading
- Network loading

Multicast Benefits Bandwidth Usage

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Voice/Video Unicast vs. Multicast



Increasing use of applications which require multiple user access

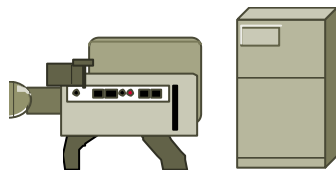
- Distance learning
- Company meetings
- Streaming financial info

Multicast more effectively manages bandwidth usage

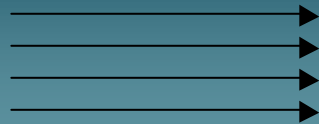
Multicast Benefits Server Load

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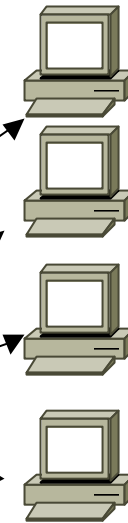
Unicast Example



Increased Server Processing

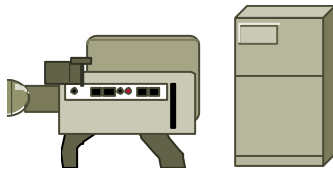


Network



Packet flow

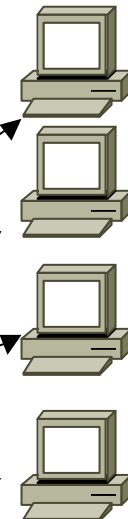
Multicast Example



Efficient Multicast



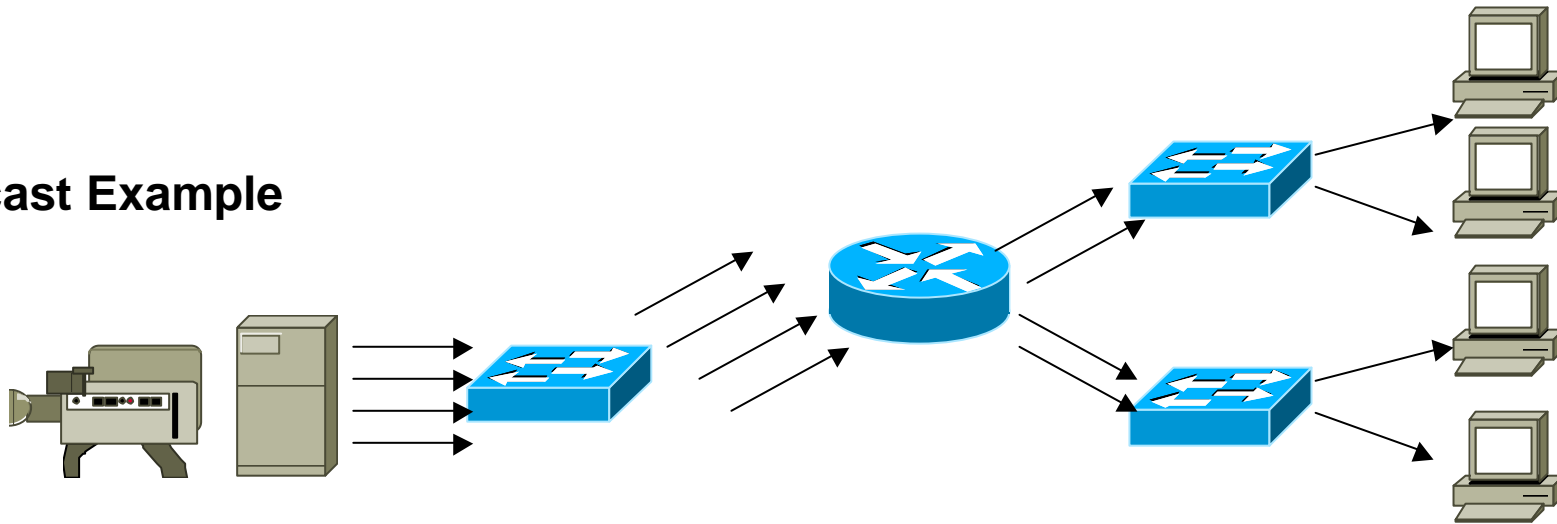
Network



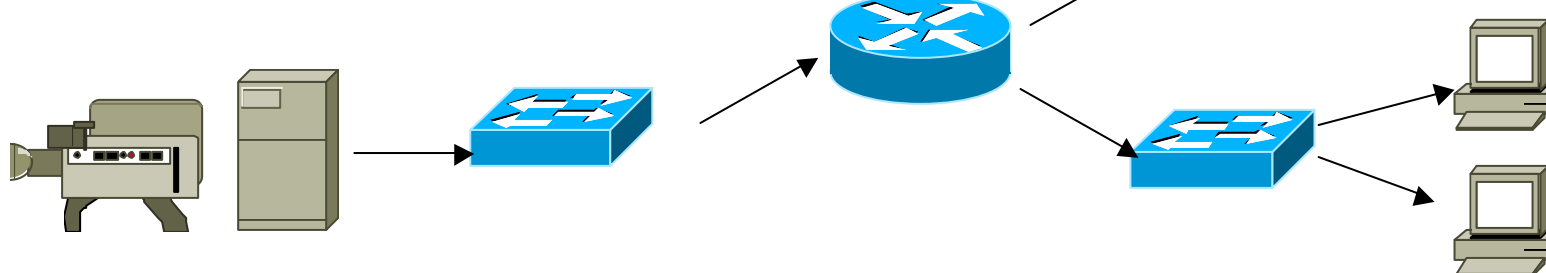
Multicast Benefits Network Load

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Unicast Example



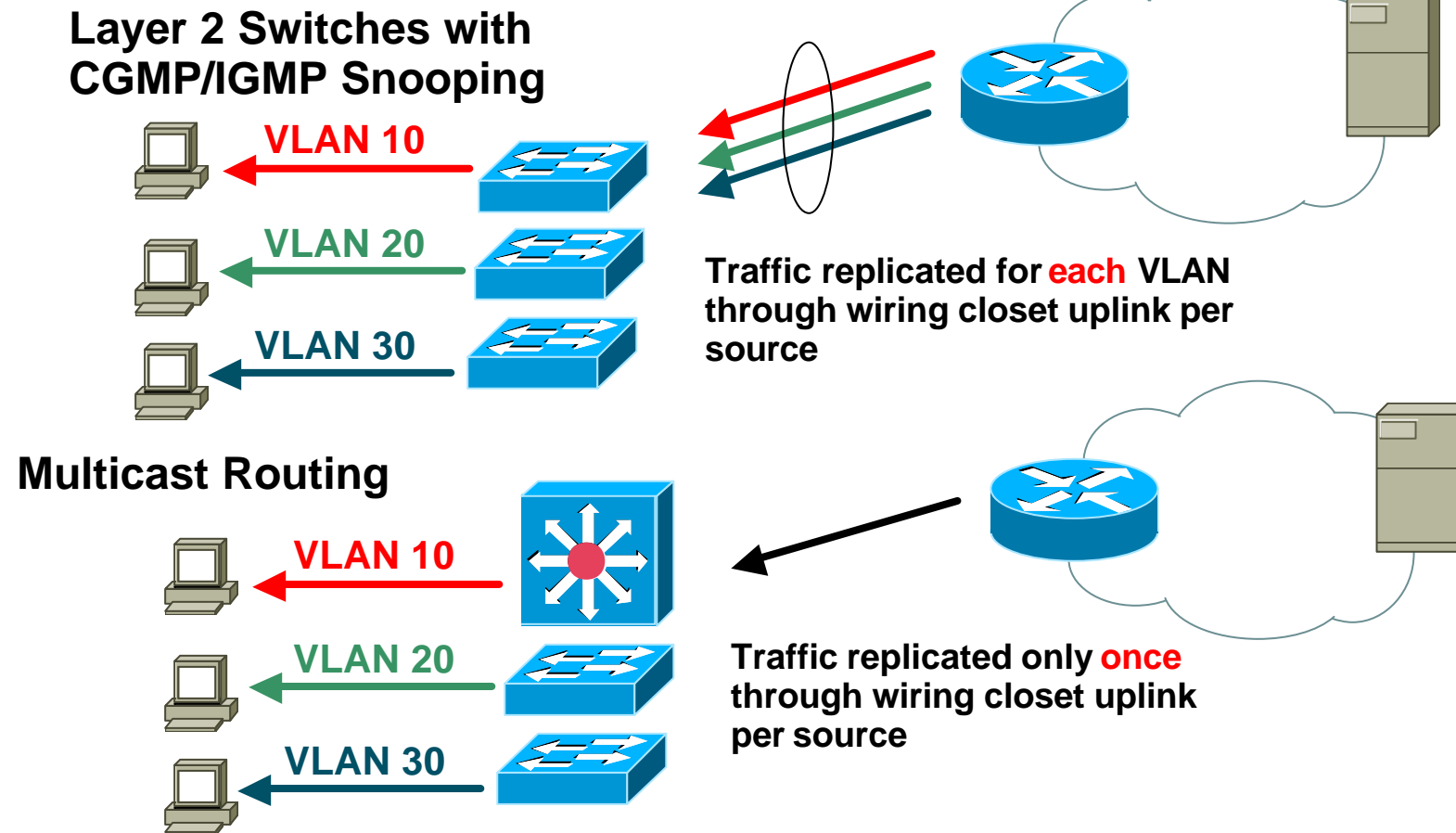
Multicast Example



Multicast Benefits Network Load

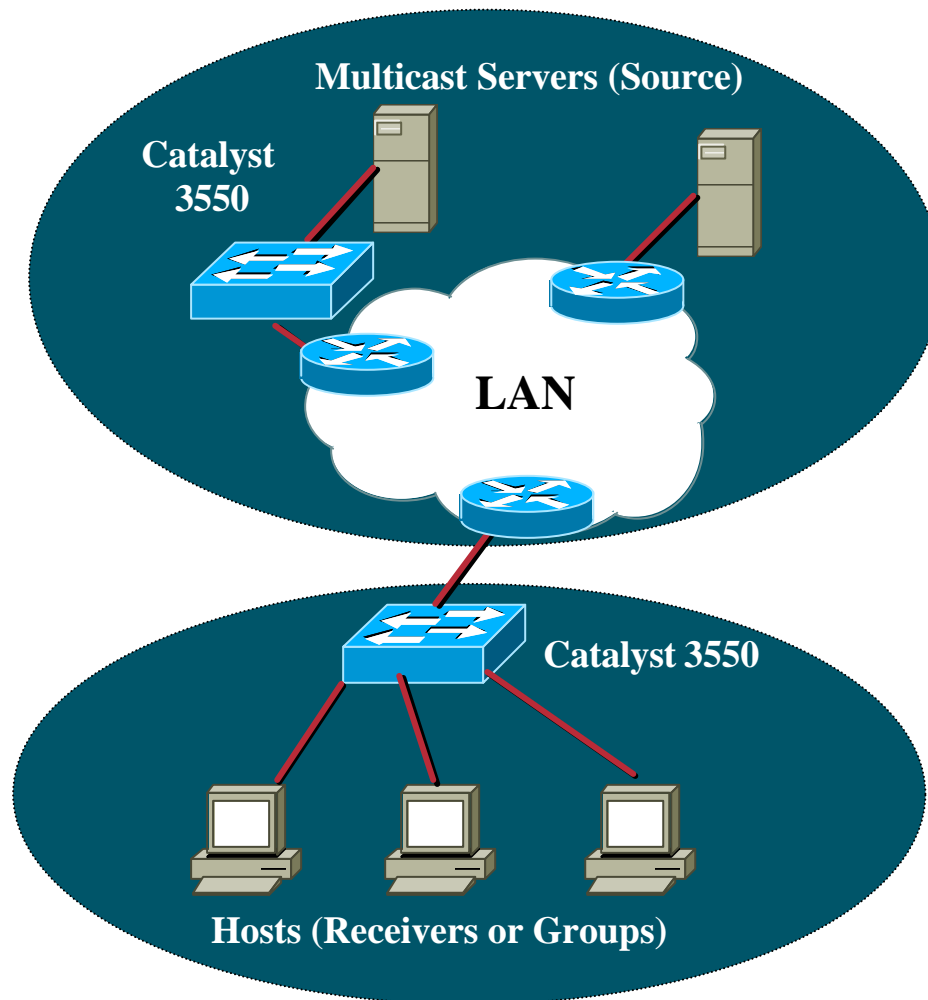
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Multicast Routing Benefits



Multicast Support

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- **CGMP/IGMP snooping** is used for the managing group membership information
- **Multicast routing protocols (PIM)** control the delivery between source, groups/receiver and maintain the multicast routing domain
- **Catalyst 3550 multicast support**
 - IGMP snooping
 - CGMP server
 - PIM (Sparse, Dense, Sparse/Dense)

Multicast Support

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- **IGMP Snooping implemented in hardware**
- **IP Multicast Routing Protocol: PIM (Dense, Sparse or Sparse-Dense Modes)**
- **Interoperate with DVMRP via DVMRP tunneling (software processing)**

IGMP Snooping

- **Default behavior of Layer 2 switch is to flood multicast packets to ports in the ingress VLAN**
- **This behavior is not desirable — IGMP Snooping resolves this issue**
- **Implemented in hardware**
 - **“Snoop” or intercept IGMP Joins and Leaves received on interfaces from hosts**
 - **Enable or disable on a global or per VLAN basis**
 - **Ingress port parses packet and sends to CPU for processing, CPU suppresses redundant IGMP joins and sends one proxy report to router**
 - **Overrides forwarding or flooding in VLAN**

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- Ethernet Switching Market Overview

Access Control Lists

- **Provides ability to access control all packets, either internally bridged within a VLAN or routed between VLANs**
- **Forwarding and routing performance not compromised by application of ACLs because all lookups are done in hardware**
- **Benefits of ACLs at the network edge**
 - **Extends security border to network's outer-most perimeter**
 - **Minimizes congestion by filtering unwanted data immediately**

Access Control Lists Types

- **Router ACL (RACL)**
 - Applied to SVI and routed ports
 - Standard and Extended IP ACLs
 - Can be applied to control plane or data plane traffic on all ports
 - Filter on MAC SA/DA, IP SA/DA, and TCP/UDP port
- **Port ACL (PACL)**
 - Applied to specific switch port
 - Filter on MAC SA/DA, IP SA/DA, and TCP/UDP port
- **VLAN ACL (VACL)**
 - Applied to all packets either bridged or routed within a VLAN, including all non-IP traffic
 - Filter on MAC SA/DA, IP SA/DA, and TCP/UDP port
- **ACL hierarchy: VLAN ACL gets applied first on ingress and last on egress**
- **Time-based ACLs: security settings for specific periods of the day**

Secure Connectivity

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Secure Shell (SSH)

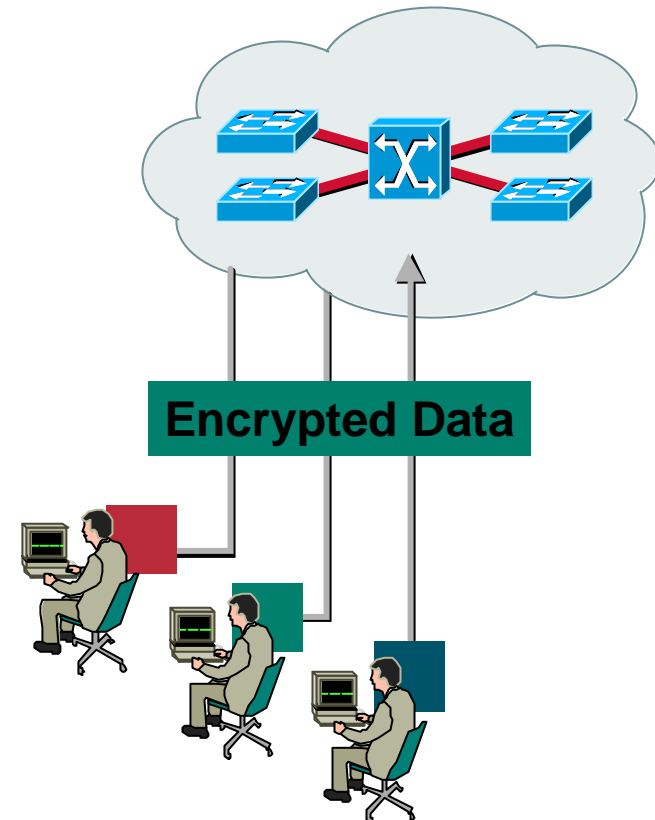
SSH encrypts administration traffic during Telnet sessions while configuring or troubleshooting switches

SNMPv3 (with crypto support)

Provides network security by encrypting administrator traffic during SNMP session to configure/troubleshoot switch

Kerberos

Authenticates users and network services using a trusted third party to perform secure verification



Perimeter Security

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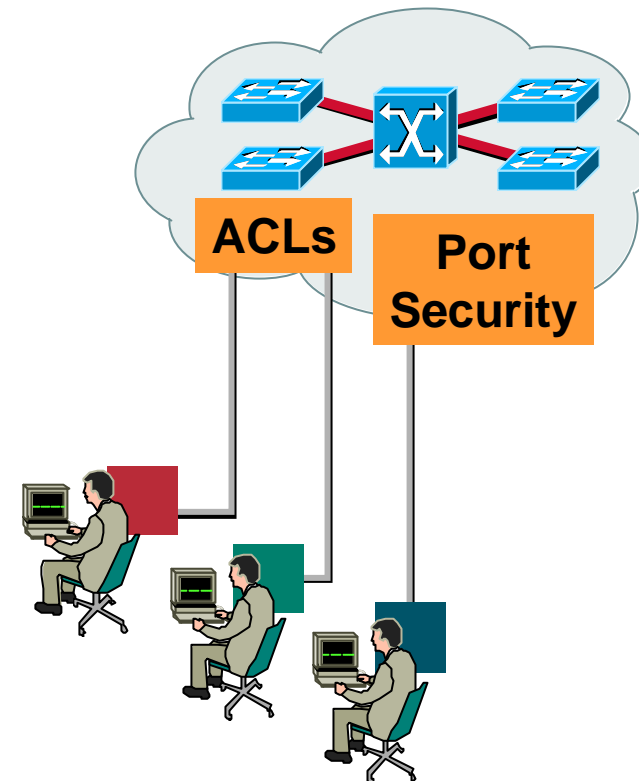


Wire-Speed ACLs

Including Port-based, VLAN-based and Router-based Access Control Lists to assist in accepting or denying access to sensitive portions of the network

Port Security

Provides another means to ensure the appropriate user is on the network by limiting access based on MAC addresses.



Note: Forwarding and routing performance is not compromised when implementing ACL-based security in the network.

Security Monitoring/Intrusion Detection

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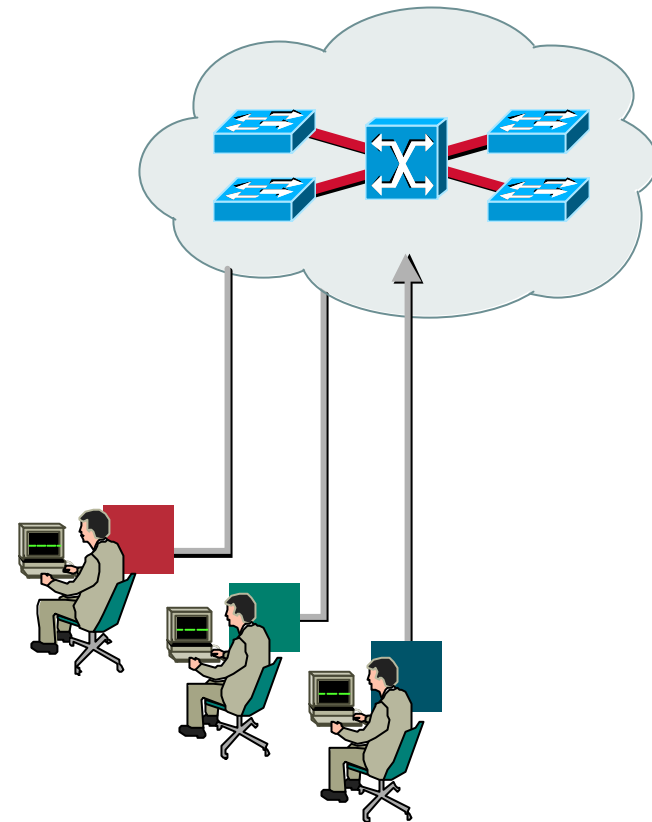


ACL Logging

Logging of Access Control Lists (ACLs) tracks ACL violations that occurs in a network. The users MAC address can be obtained to assist in tracking the users location

MAC Address Notification

Provides an alert to a management station so that network administrators know when and where users came on to the network and can take appropriate actions



Identity Services

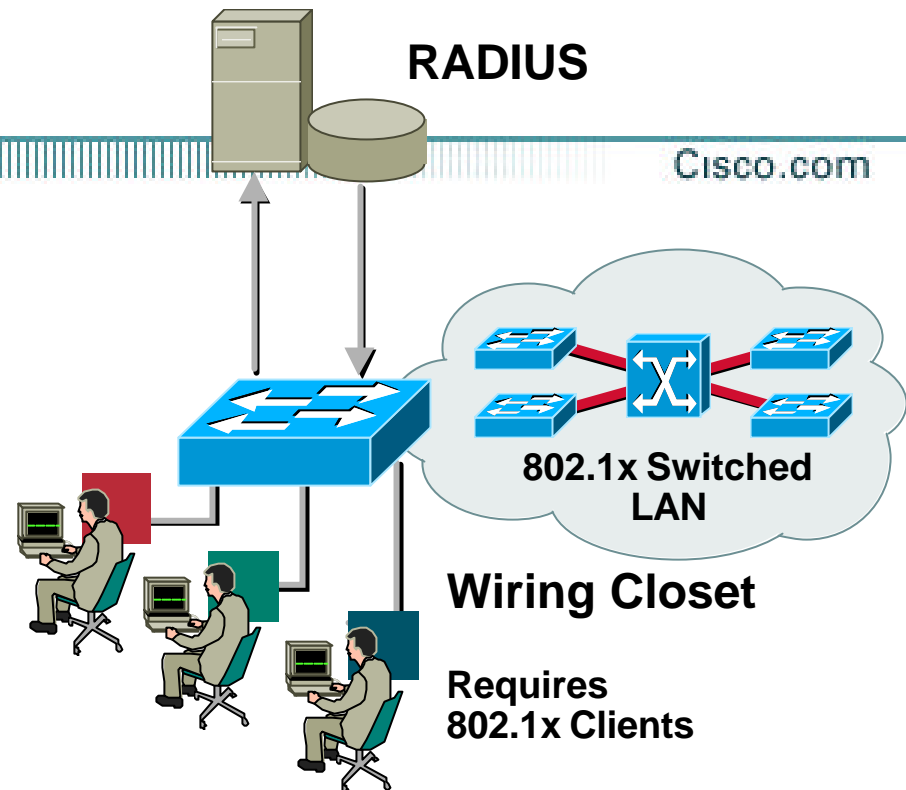


802.1x

Protects network access by allowing RADIUS server to authenticate user allowing/disallowing access to the network.

DHCP Interface Tracker (Option 82)

Tracks where a user is physically connected on a network by providing both switch and port ID to a DHCP Server.



Dynamic VLANs

Provides authentication capabilities and user segmentation by placing specific users in separate VLANs.

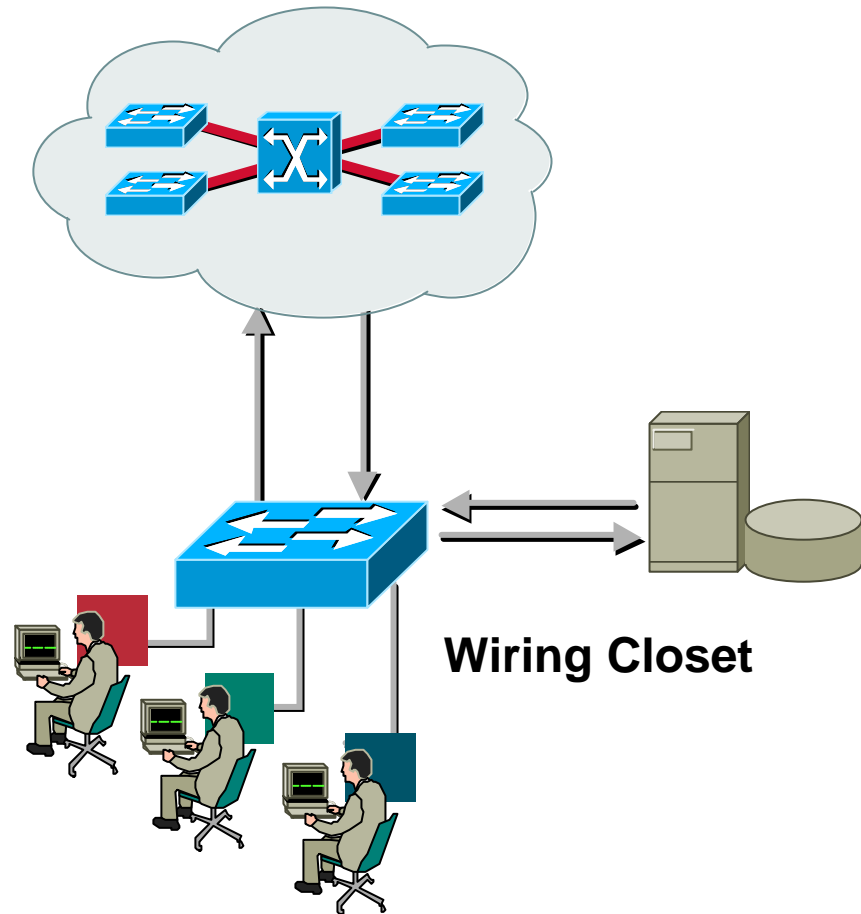
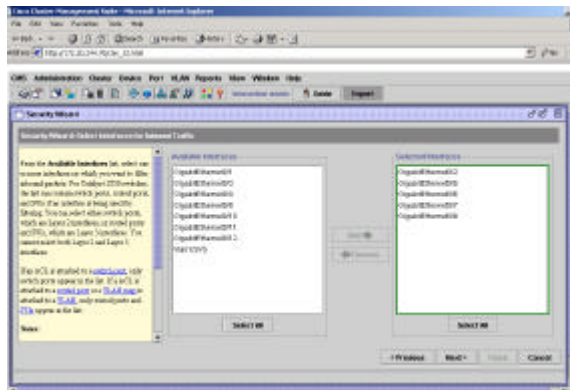
Security Management

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Cisco Cluster Management Suite (CMS) Security Wizards

Eases the deployment of security features for restricting user access to a server, a portion of the network or access to the network.



Note: Cisco CMS Software with the Security Wizards are embedded in the switch.

Catalyst 3550 LAN Security Features

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Catalyst 3550



CISCO IOS Software, Network Management, Service and Support

Catalyst 3550 Key Security Features

- 802.1x and Identity-Based Network Services (VLAN and ACL assignments)
- SSH, SNMPv3, Kerberos
- Wire-Rate ACLs
- Port Security
- DHCP Interface Tracker
- MAC Address Notification
- Private VLAN edge
- RADIUS and TACACS+
- Dynamic VLAN

View the DSBU Security Presentation at:

http://wwwin.cisco.com/comlob/eag/dsbu/product3550/3550ps_literature.html#presos

Security features can be downloaded FREE with the latest software release

Catalyst 3550 Series

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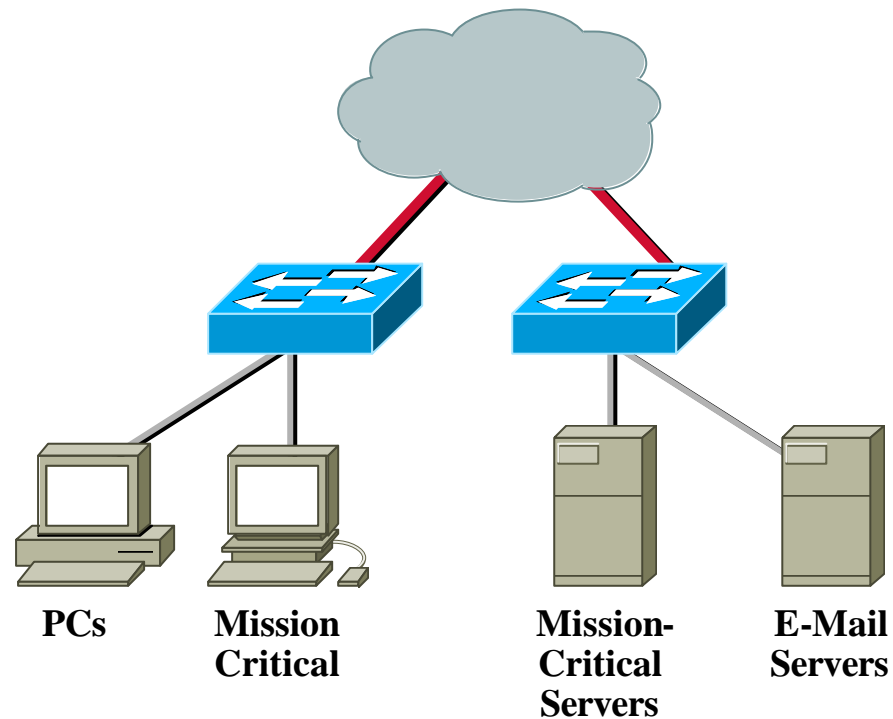
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Advanced QoS

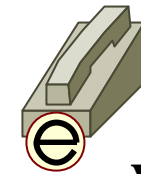
Evolving Campus Network

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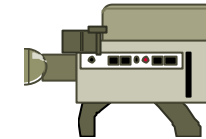
Existing Network



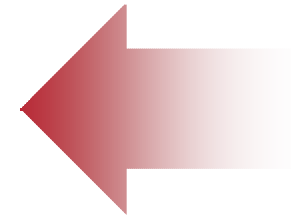
New Additions



Voice



Video
Surveillance



NetShow



Protect Mission-Critical Traffic!

Not All Traffic Is Created Equal

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	Voice	Video	Data (Best-Effort)	Mission- Critical Data
Bandwidth	Low to Moderate	Moderate to High	Moderate to High	Low to Moderate
Random Drop Sensitivity	Low	Low	High	High
Delay Sensitivity	High	High	Low	Moderate to High
Jitter Sensitivity	High	High	Low	Low to Moderate

**Why not just increase
the link speed ? throw more
bandwidth
at the problem?**

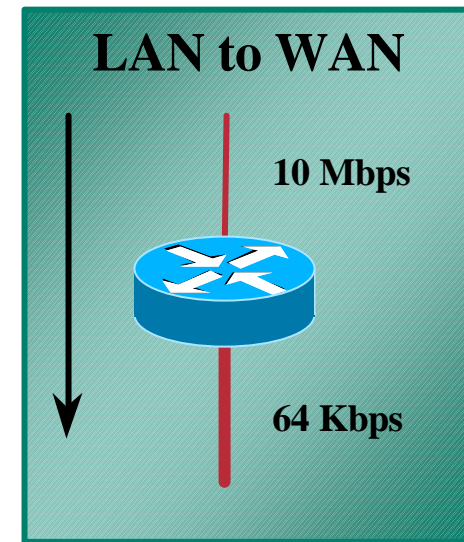
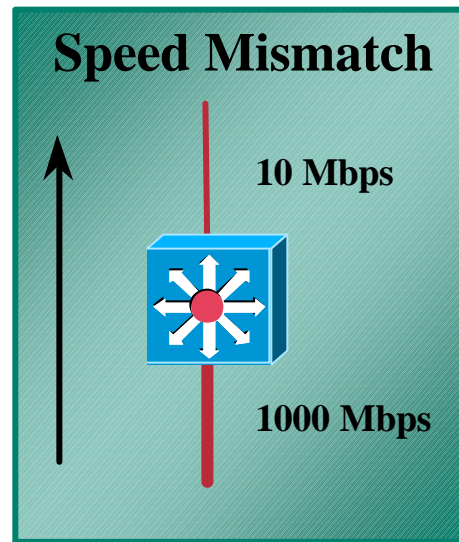
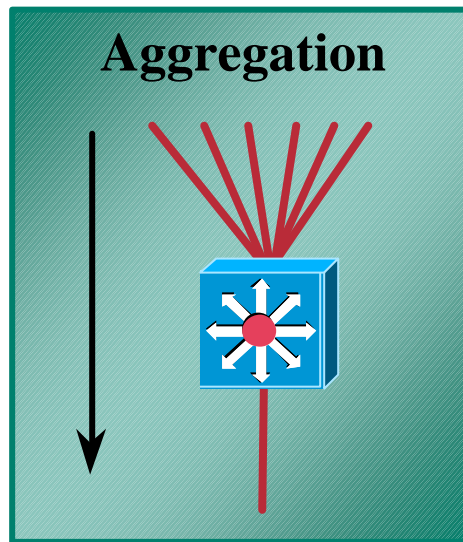
Trade Offs of QoS vs. More Bandwidth

Cisco.com

- **More Bandwidth**
 - Simplicity
 - TCP will eventually retransmit any dropped packets
 - Traffic is not delay or drop sensitive
- **QoS**
 - Differentiated traffic (video, voice, critical data)
 - Output buffers tend to operate at 100% in the campus at congestion points
 - Buffer management is required to control delay or drops

Where Congestion Exists ? QoS is Required

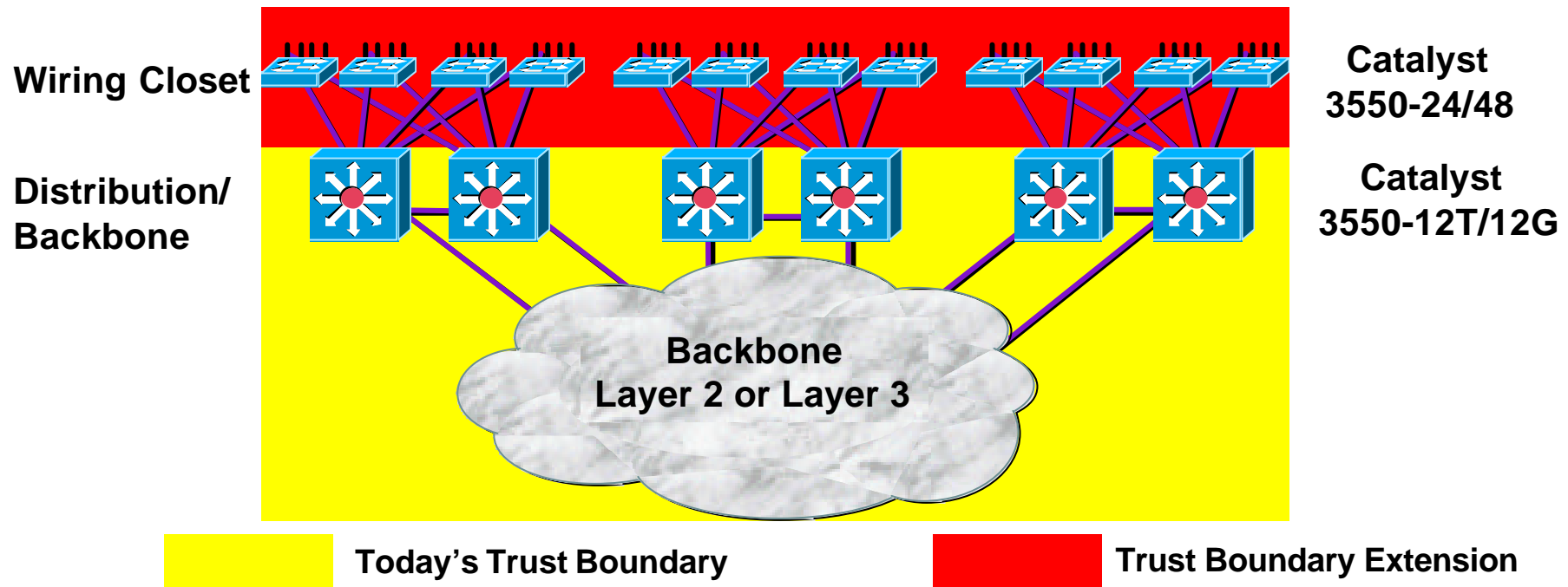
Cisco.com



- Links and buffers
- Points of substantial speed mismatch and points of aggregation
- Transmit buffers tend to fill (TCP windowing)
- Buffering reduces loss, introduces delay

QoS Trust Boundary in the LAN

Cisco.com

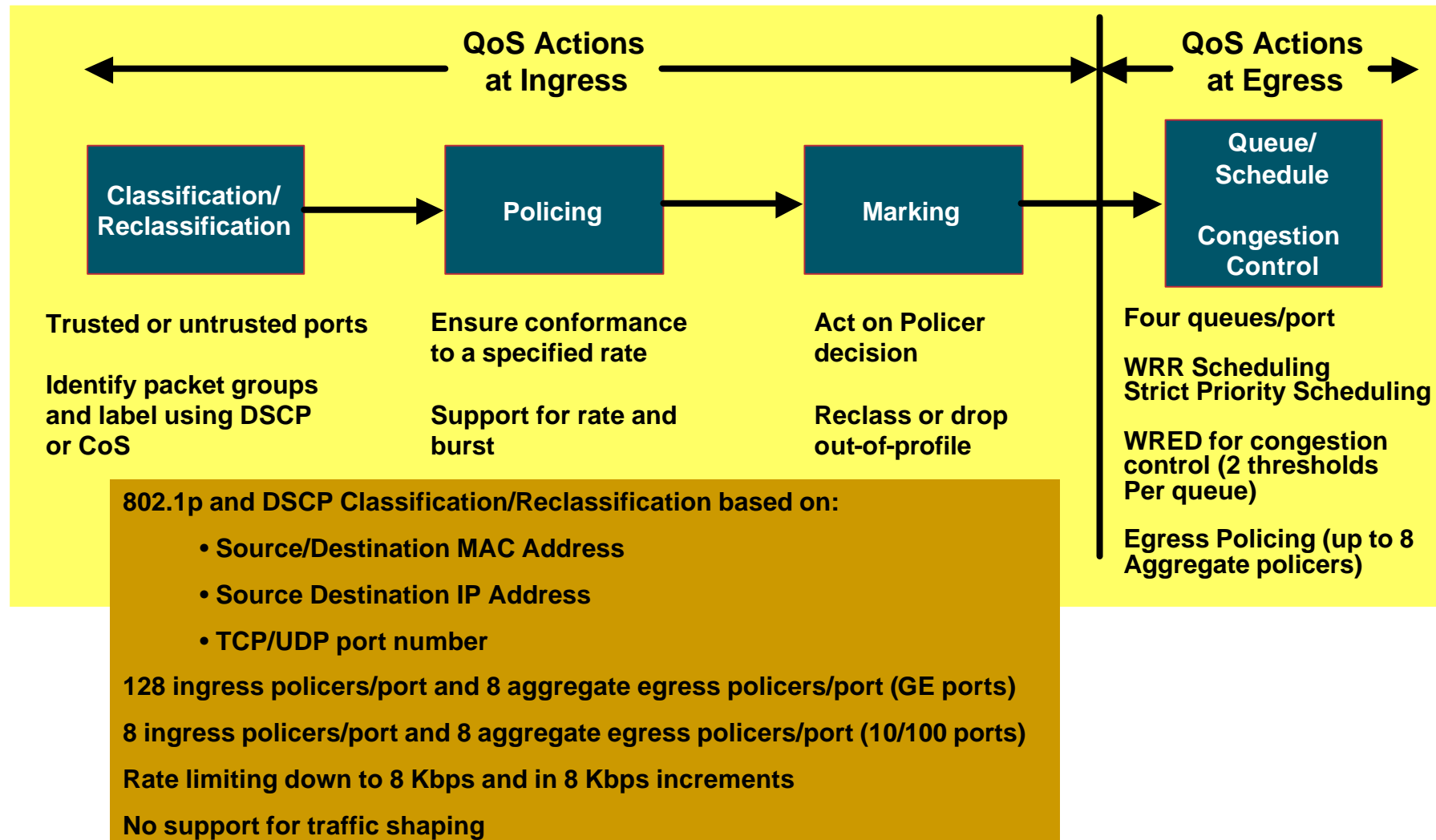


Benefits of advanced QoS at the edge

- ⇒ ability to classify and mark traffic immediately
- ⇒ minimize upstream congestion
- ⇒ easier to set up a policy per user (MAC address and physical location known)
- ⇒ frees up router processing power

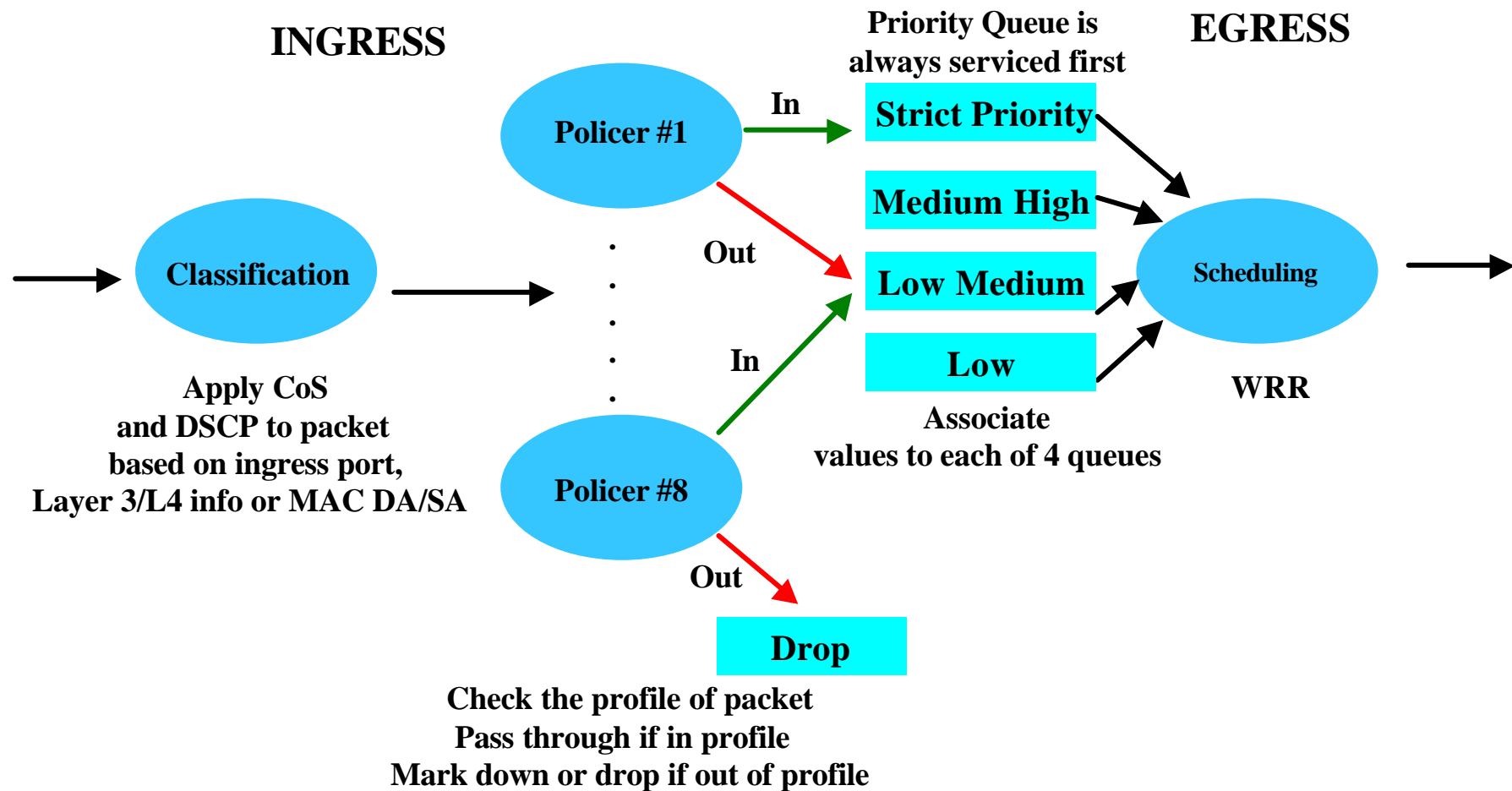
Catalyst 3550: Aggregate QoS Model

Cisco.com



QoS Functions

Cisco.com



QoS Configuration and Management

Cisco.com

- Manageable via Cisco QoS Policy Manager (QPM) application
- Cisco IOS CLI and embedded CMS will also allow configuration of all parameters
- Preconfigured template for video configuration
 - CoS to DSCP mapping
 - Policers
 - Strict priority queue for video
- Auto-QoS to simplify the configuration of QoS in VoIP networks

Catalyst 3550 Series

Cisco.com

- **Product Overview**
- **Intelligence in the Network**
- **Features and Benefits Examples**
 - High Availability
 - Enhanced Security
 - Advanced Quality of Service
 - **Manageability**
- **Deployment Examples**
- **Service and Support**
- **Competitive Positioning and Advantages**
- **Ethernet Switching Market Overview**

Catalyst 3550 Series

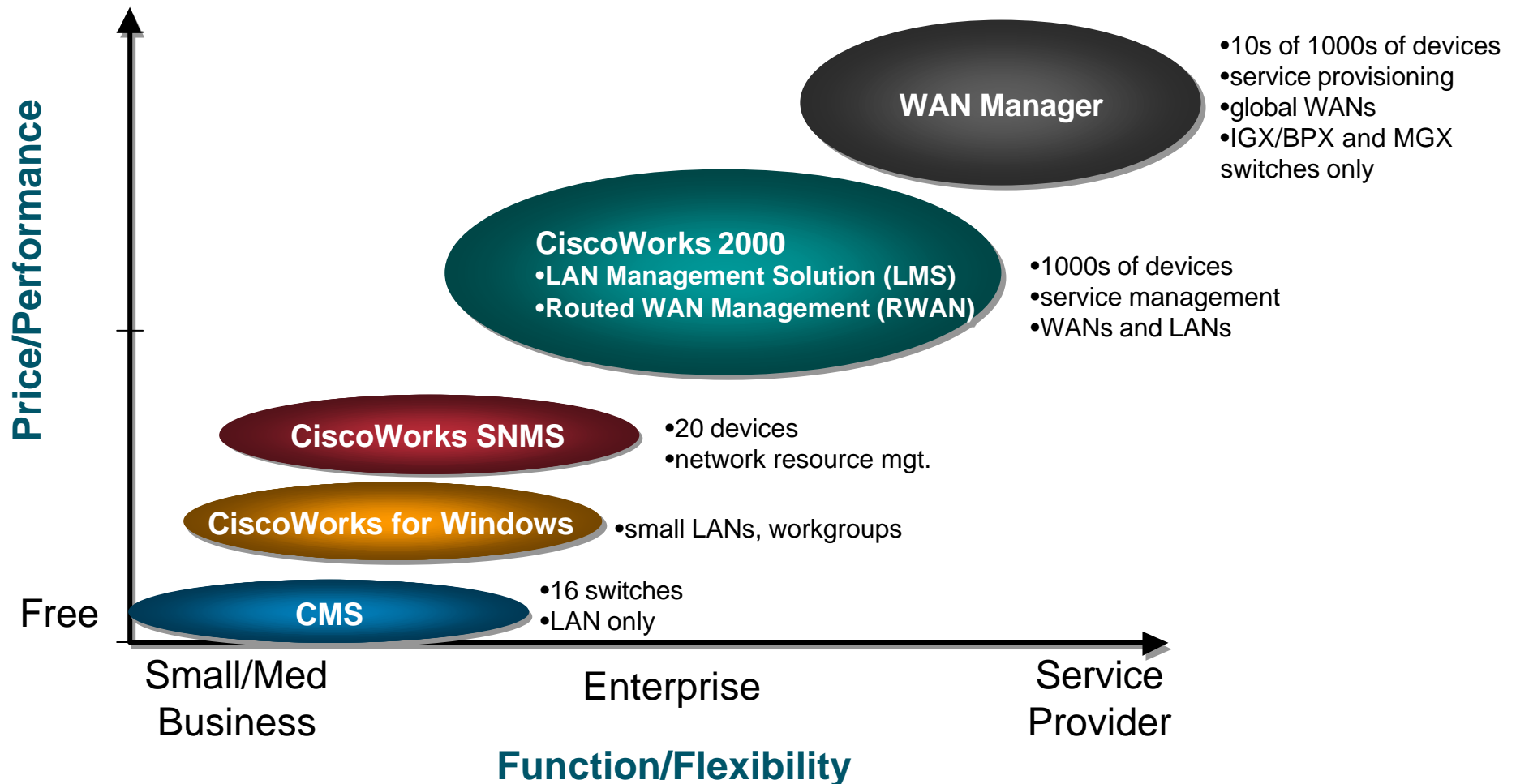
Cisco.com

- **Product Overview**
- **Intelligence in the Network**
- **Features and Benefits Examples**
 - High Availability
 - Enhanced Security
 - Advanced Quality of Service
 - **Manageability**
- **Deployment Examples**
- **Service and Support**

Cluster Management Suite

Cisco Provides the Broadest Range of Network Management Products

Cisco.com



Cisco Cluster Management Suite Software

Cisco.com

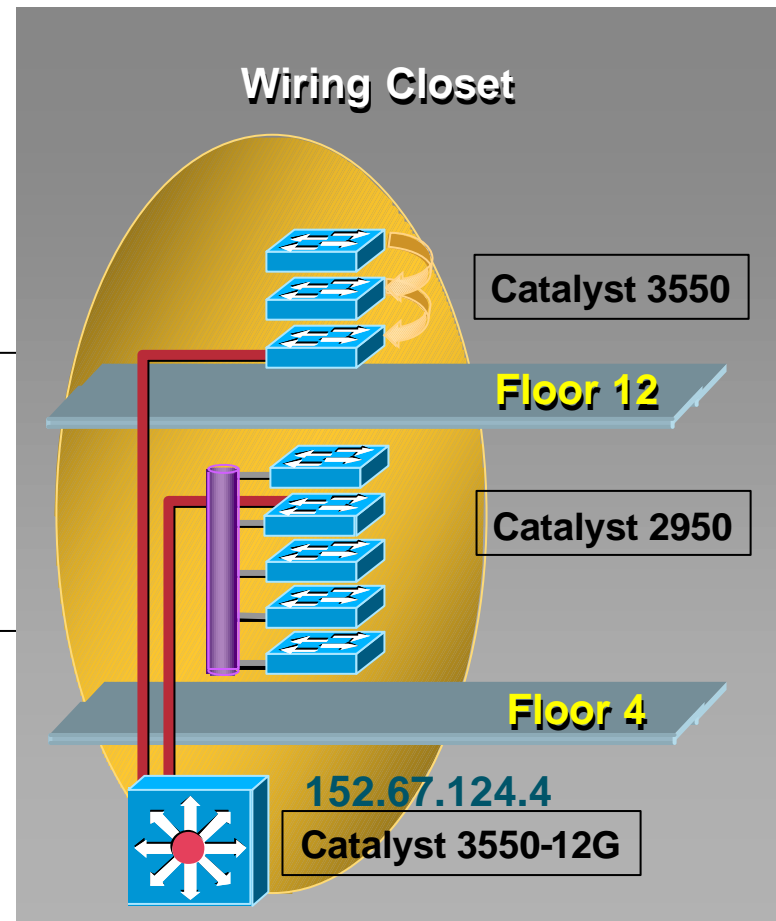
- **Manage up to 16 geographically dispersed switches simultaneously with one IP address**
- **Accessed through any standard Web browser**
- **Provides Web-based interface for configuring and managing Cisco IOS® functions**
- **Use as an alternative to command line interface (CLI)**
- **Enables configuration of Layer 3/4 intelligent services**
- **Full backward compatibility provides support for Catalyst 1900/2820, 2900 XL, 3500 XL, 2950, and 3550**



Typical CMS Environments

Cisco.com

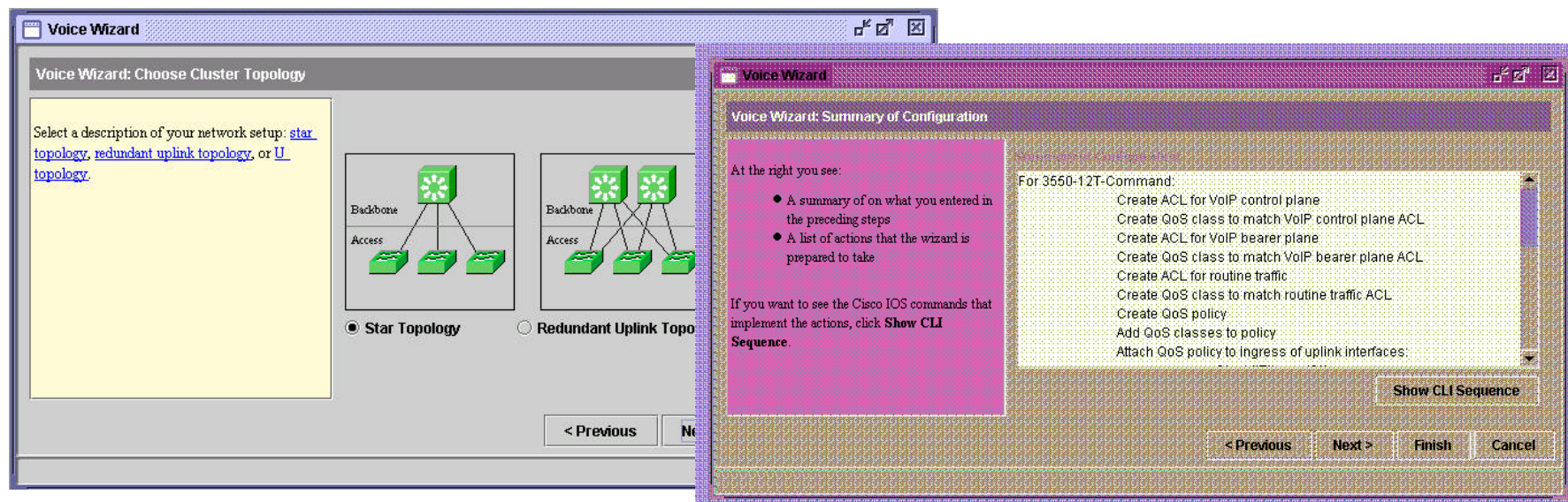
Medium Business/Branch Office



AVVID Wizards for Simple Configuration of Technology Solutions

Cisco.com

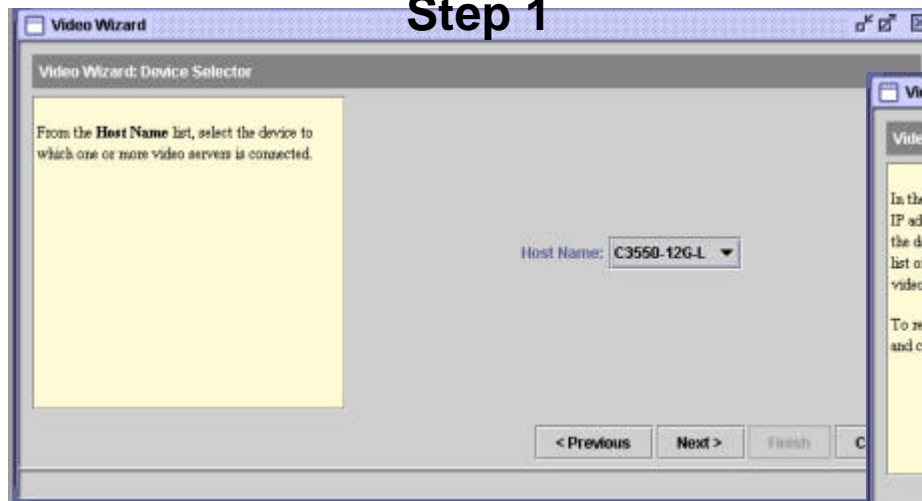
- AVVID = Architecture for Video, Voice, and Integrated Data
- In just a few steps, these wizards configure the switch for voice, video, and/or high-priority data applications.
- Wizards are compatible to each other
- Final summary page shows the configuration that will be implemented before you apply it
- Roll-back option to restore the old configuration if dissatisfied with the wizard



Example: Video Wizard – Optimally configures entire cluster for video traffic

Cisco.com

Step 1



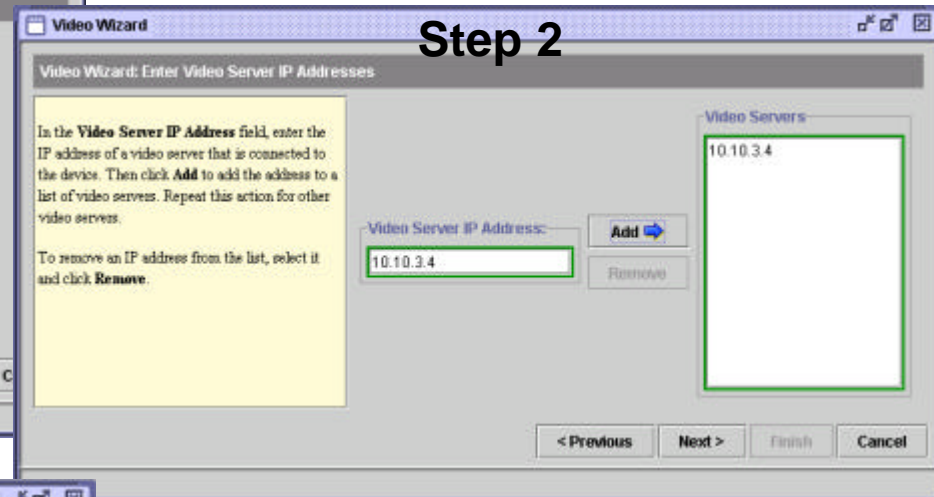
Video Wizard: Device Selector

From the **Host Name** list, select the device to which one or more video servers is connected.

Host Name: C3550-12G-L

< Previous Next > Finish

Step 2



Video Wizard: Enter Video Server IP Addresses

In the **Video Server IP Address** field, enter the IP address of a video server that is connected to the device. Then click **Add** to add the address to a list of video servers. Repeat this action for other video servers.

To remove an IP address from the list, select it and click **Remove**.

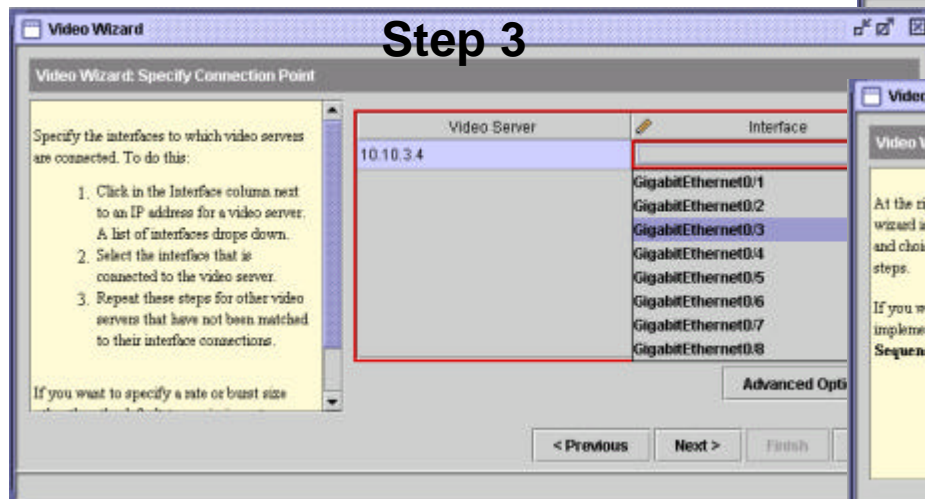
Video Server IP Address: 10.10.3.4

Add Remove

Video Servers: 10.10.3.4

< Previous Next > Finish Cancel

Step 3



Video Wizard: Specify Connection Point

Specify the interfaces to which video servers are connected. To do this:

1. Click in the **Interface** column next to an IP address for a video server. A list of interfaces drops down.
2. Select the interface that is connected to the video server.
3. Repeat these steps for other video servers that have not been matched to their interface connections.

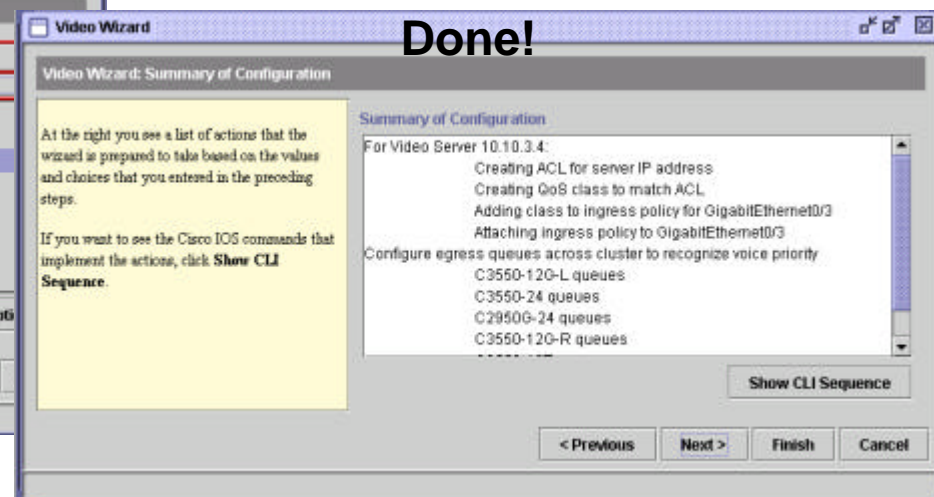
If you want to specify a rate or burst size

Video Server	Interface
10.10.3.4	GigabitEthernet0/1 GigabitEthernet0/2 GigabitEthernet0/3 GigabitEthernet0/4 GigabitEthernet0/5 GigabitEthernet0/6 GigabitEthernet0/7 GigabitEthernet0/8

Advanced Options

< Previous Next > Finish

Done!



Video Wizard: Summary of Configuration

At the right you see a list of actions that the wizard is prepared to take based on the values and choices that you entered in the preceding steps.

If you want to see the Cisco IOS commands that implement the actions, click **Show CLI Sequence**.

Summary of Configuration

For Video Server 10.10.3.4:

- Creating ACL for server IP address
- Creating QoS class to match ACL
- Adding class to ingress policy for GigabitEthernet0/3
- Attaching ingress policy to GigabitEthernet0/3

Configure egress queues across cluster to recognize voice priority

- C3550-12G-L queues
- C3550-24 queues
- C2950G-24 queues
- C3550-12G-R queues

Show CLI Sequence

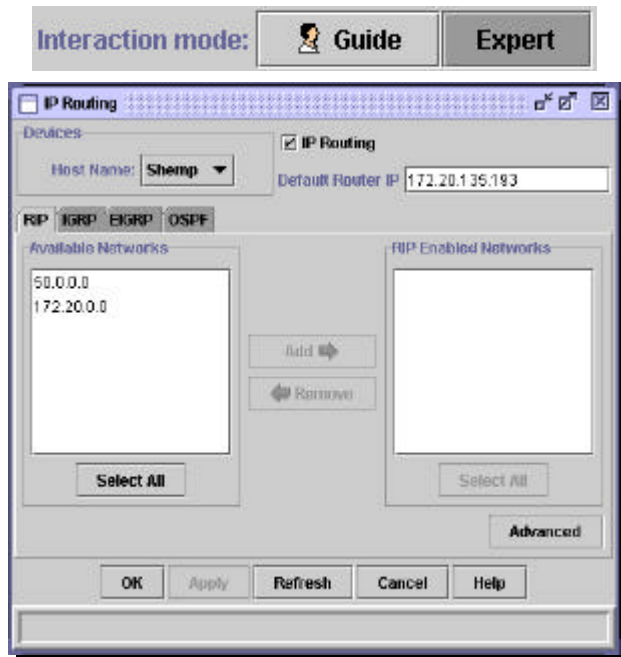
< Previous Next > Finish Cancel

Guide Mode to Simplify Complex Configurations

Cisco.com

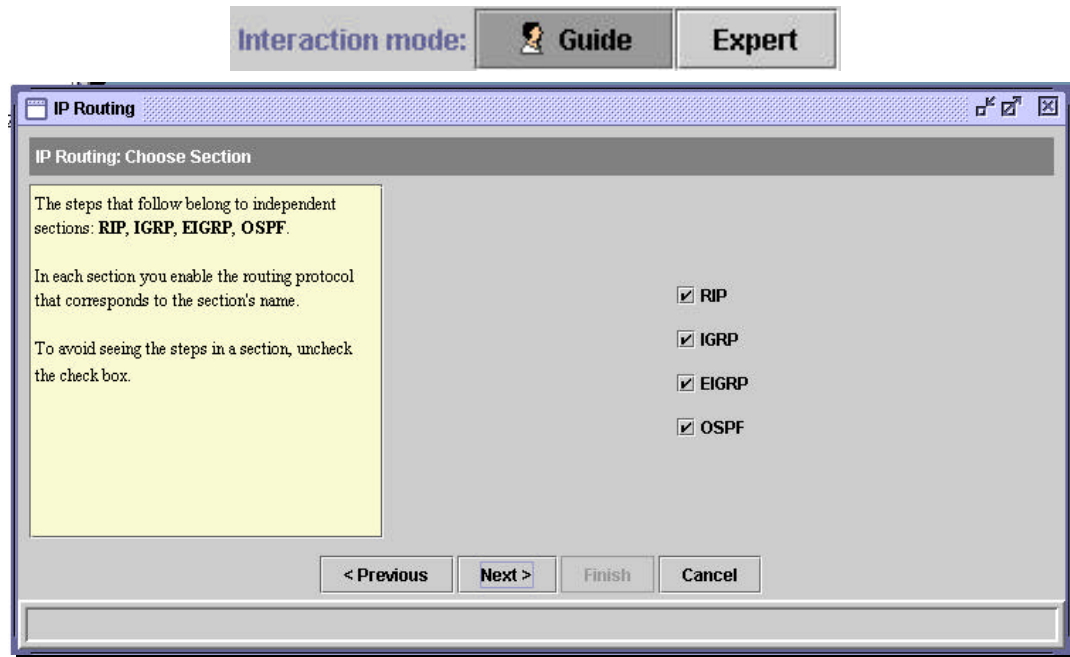
Expert Mode

- Compact windows that provide configuration options without prompts



Guide Mode

- Provides step-by-step prompts with instructions
- Used for many of the complex configuration options

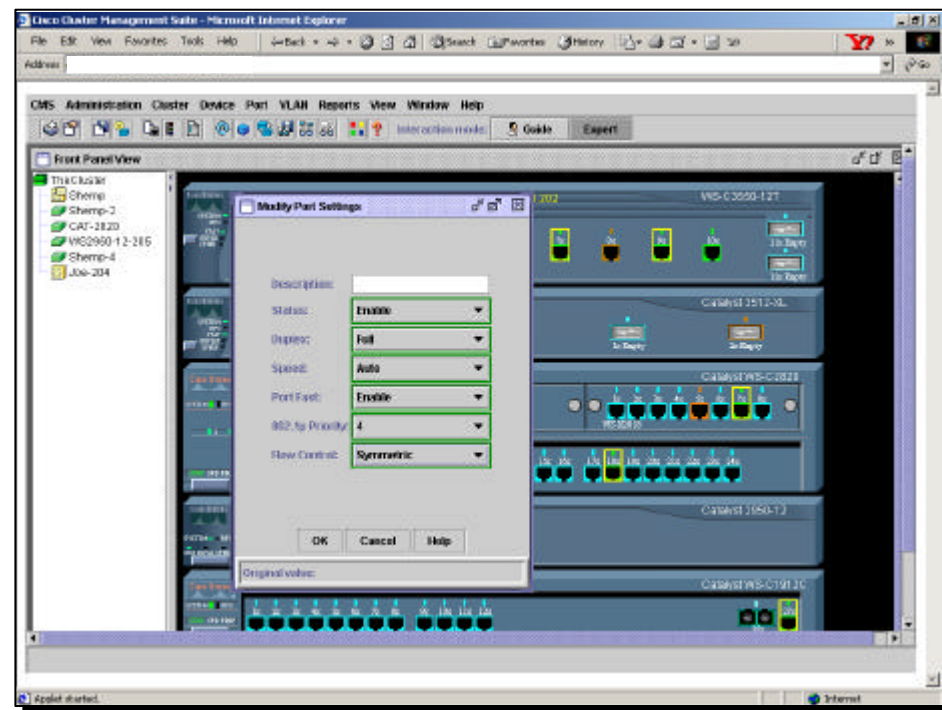


Multi-Device, Multi-Port Management

Cisco.com

Front Panel View

- Save time by selecting multiple ports across devices for simultaneous configuration
- Dynamic, detailed representation of up to 16 switches in cluster
- Simplifies troubleshooting and debugging



Configuration Cloning

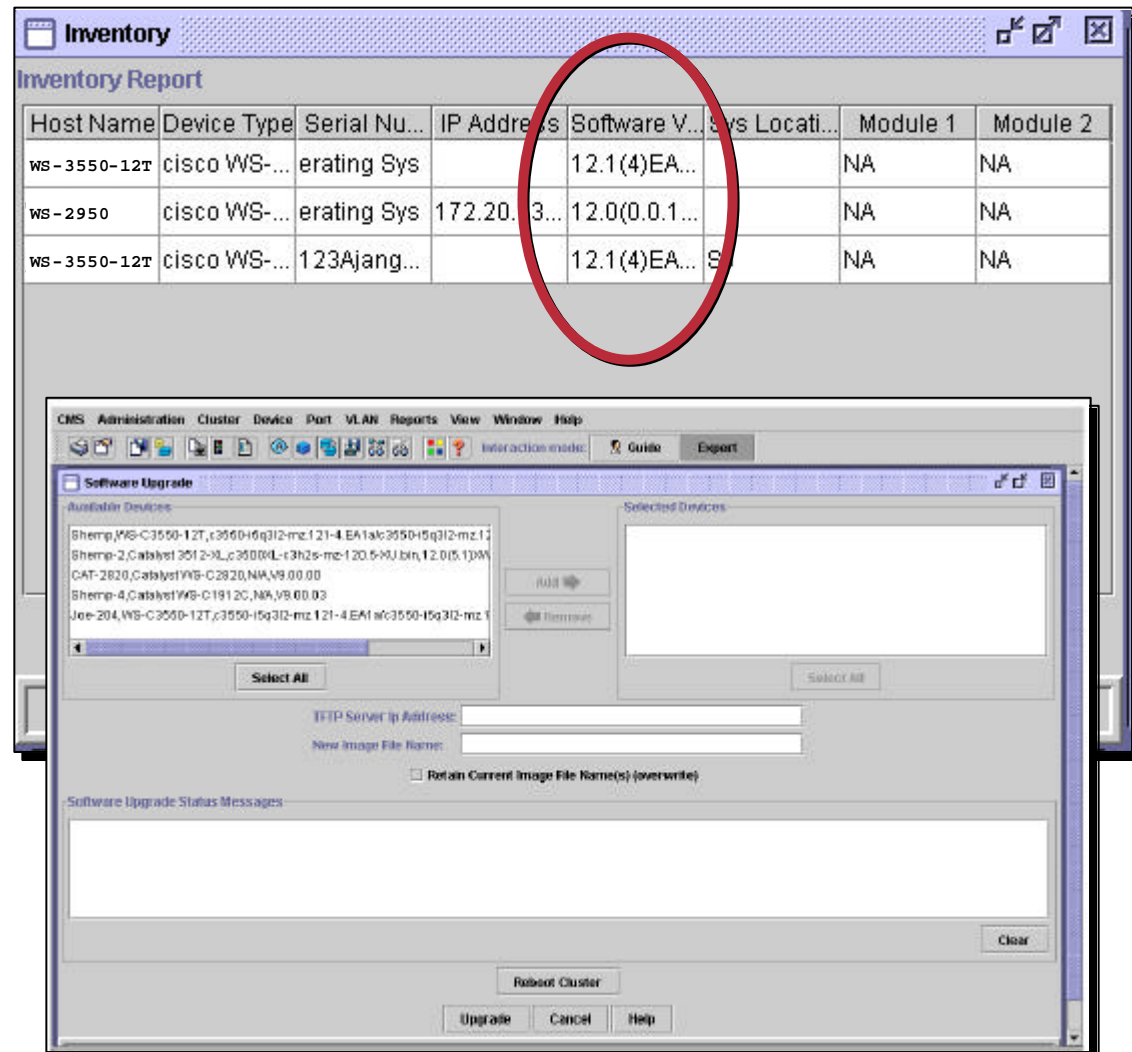
- Using the Configuration Save and Restore feature, a customer or VAR can apply a configuration file to multiple switches
- Enables very fast deployment of networks
- Provides the ability to backup config files

The screenshot shows a 'Restore Configuration' dialog box with the following fields and options:

- Host Name:** A dropdown menu currently set to 'All Devices'.
- Source:** Two radio buttons: 'Startup Configuration' (unselected) and 'TFTP Server' (selected).
- TFTP Options:** A group box containing three text input fields:
 - TFTP Server:** Contains the IP address '1.2.3.4'.
 - TFTP Configuration Path:** Contains the path 'configs/'.
 - TFTP VLAN Path:** An empty text field.
- Destination:** Two radio buttons: 'Startup Configuration' (selected) and 'Running Configuration' (unselected).
- Buttons:** 'Restore', 'Cancel', and 'Help' buttons are located at the bottom right.

One-Click Software Upgrade

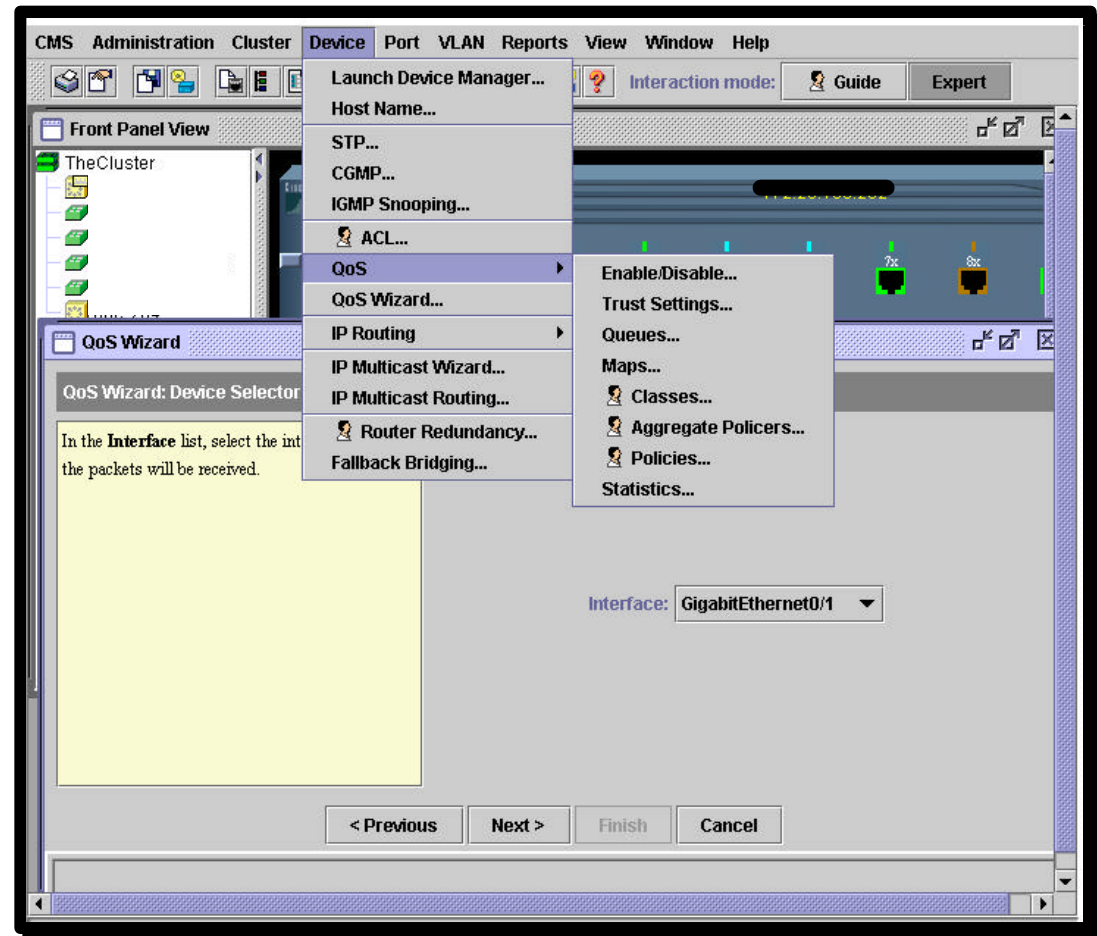
- **Use inventory report to quickly see software versions running on the switches**
- **Simultaneously update software of up to 16 devices**
- **Simply click on the desired switches and update**



Advanced Quality of Service

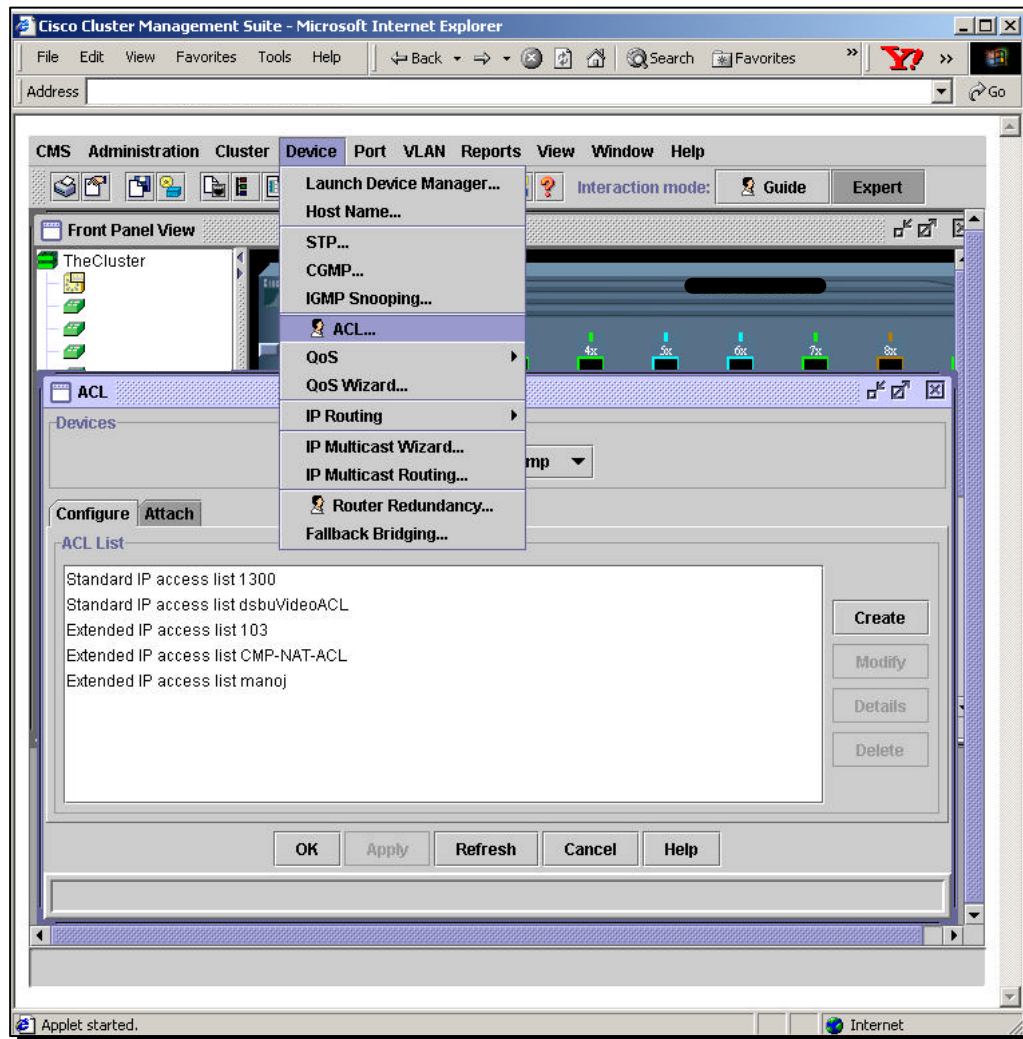
Cisco.com

- Use QoS feature to give preferential treatment to certain types of traffic
- CMS supports Layer 3 QoS and both Strict Priority and Weighted Round-Robin scheduling algorithms
- Use Guide Mode if not familiar with configuring QoS



Access Control Lists

Cisco.com



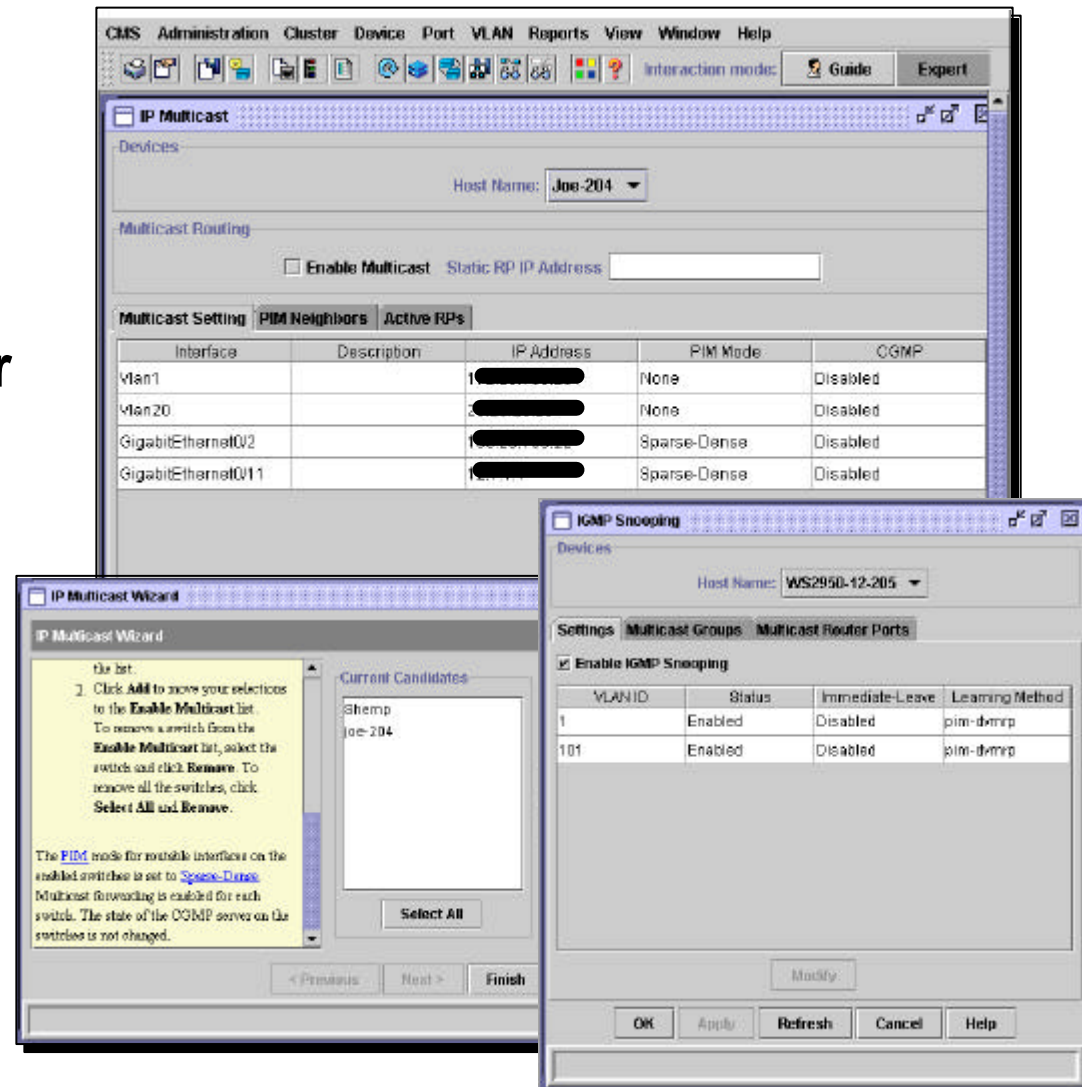
- CMS allows users to differentiate traffic into various categories and permit or deny certain categories of traffic
- Allows re-ordering of Access Control Entries (ACEs)
- Security Wizard utilizes ACLs to restrict users to the networks

IP Unicast & Multicast Routing

Cisco.com

- Configure IGMP Snooping options
- Allows easy configuration of Layer 3 IP routing protocols*
- IP Multicast Wizard guides users through steps for setting multicast routing features*

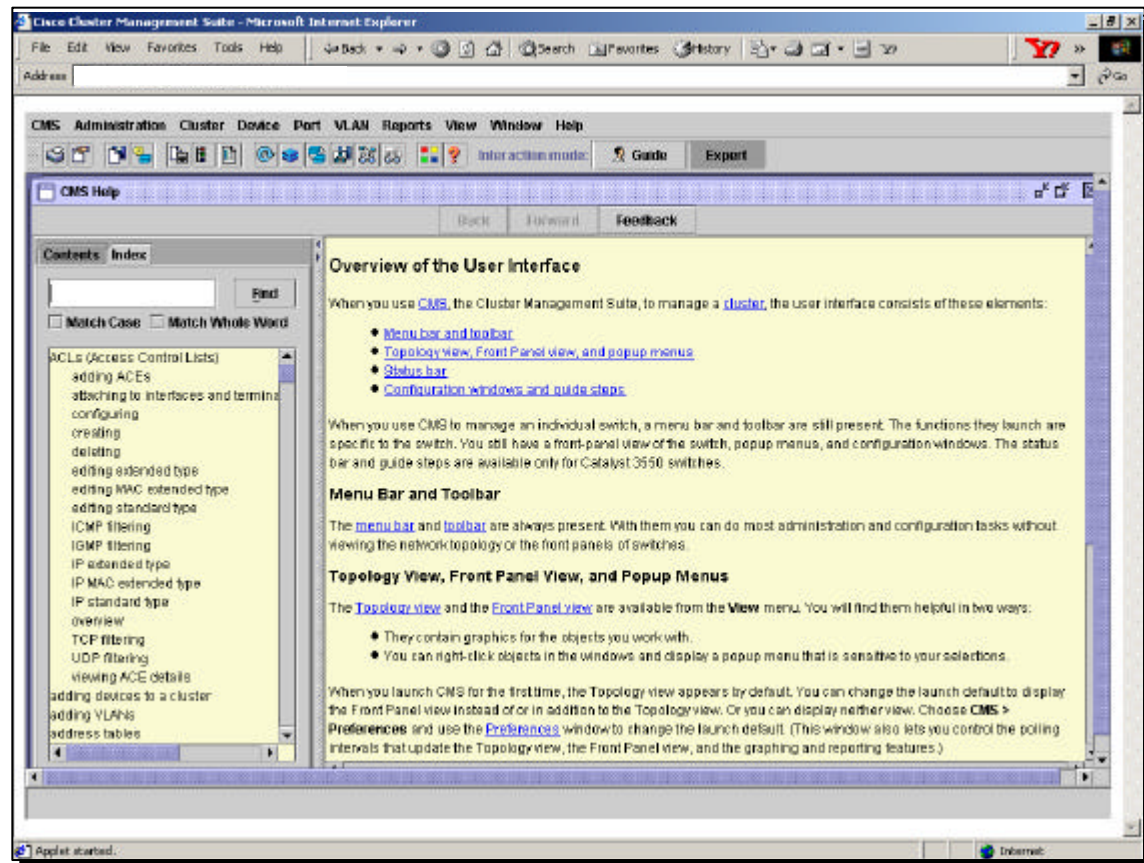
*Only supported on Catalyst 3550



Sophisticated Embedded Help System

Cisco.com

- Context-sensitive help button on every window!
- Help is embedded in the switch
- Easy navigation using:
 - Table of Contents
 - Index
 - Glossary
 - Search function

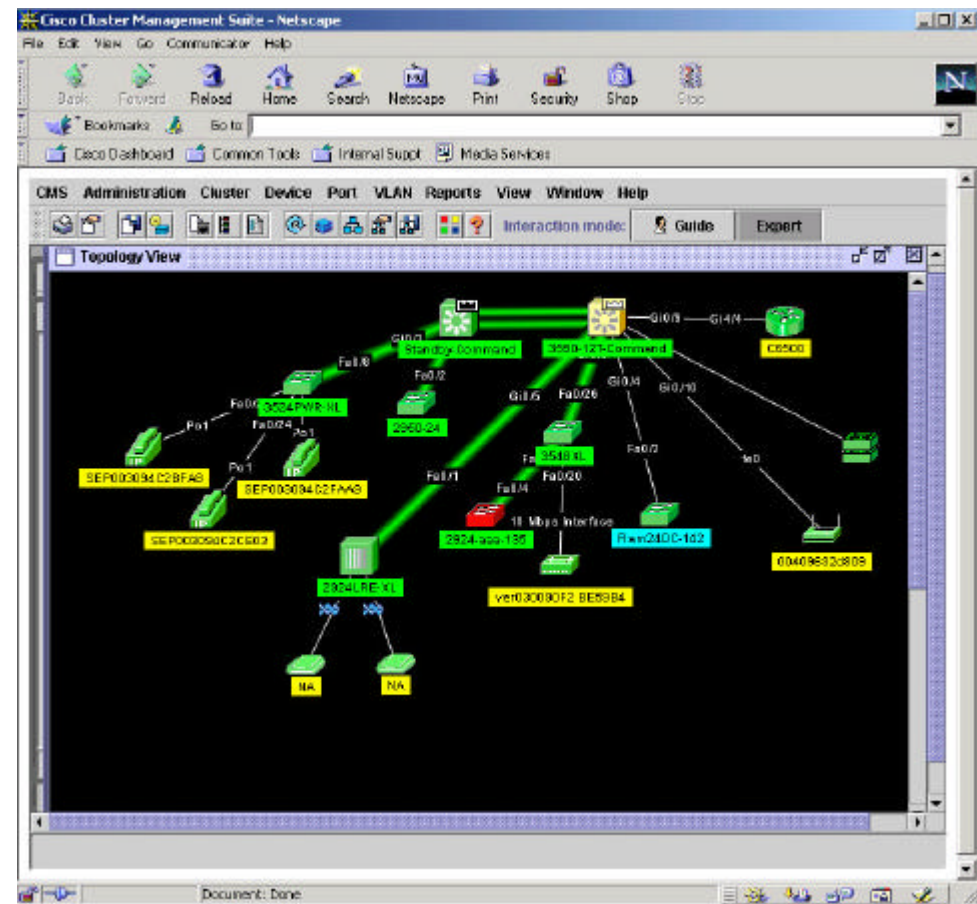


Topology View

Cisco.com

- Provides comprehensive layout of all clustered devices:
 - Switches
 - IP phones
 - Wireless access points
 - Long-Reach Ethernet CPE
- Launch the Cisco Aironet Wireless Access Point management interface
- Quickly check status of all clustered switches at once from one location
- Automatically discovers the network
 - CMS can see any Cisco Discovery Protocol (CDP)-enabled device

Topology View



Event Notification

- Enables an email to be automatically sent to a network administrator or VAR when a network problem occurs
- Can choose what severity level triggers an email notification

Event Notification

SMTP Server: mail.company.com

From Address: networkproblem@company.com

☒ Enable Notification

Notification Name List

Notification Name	Active
HighAlert	<input checked="" type="checkbox"/>

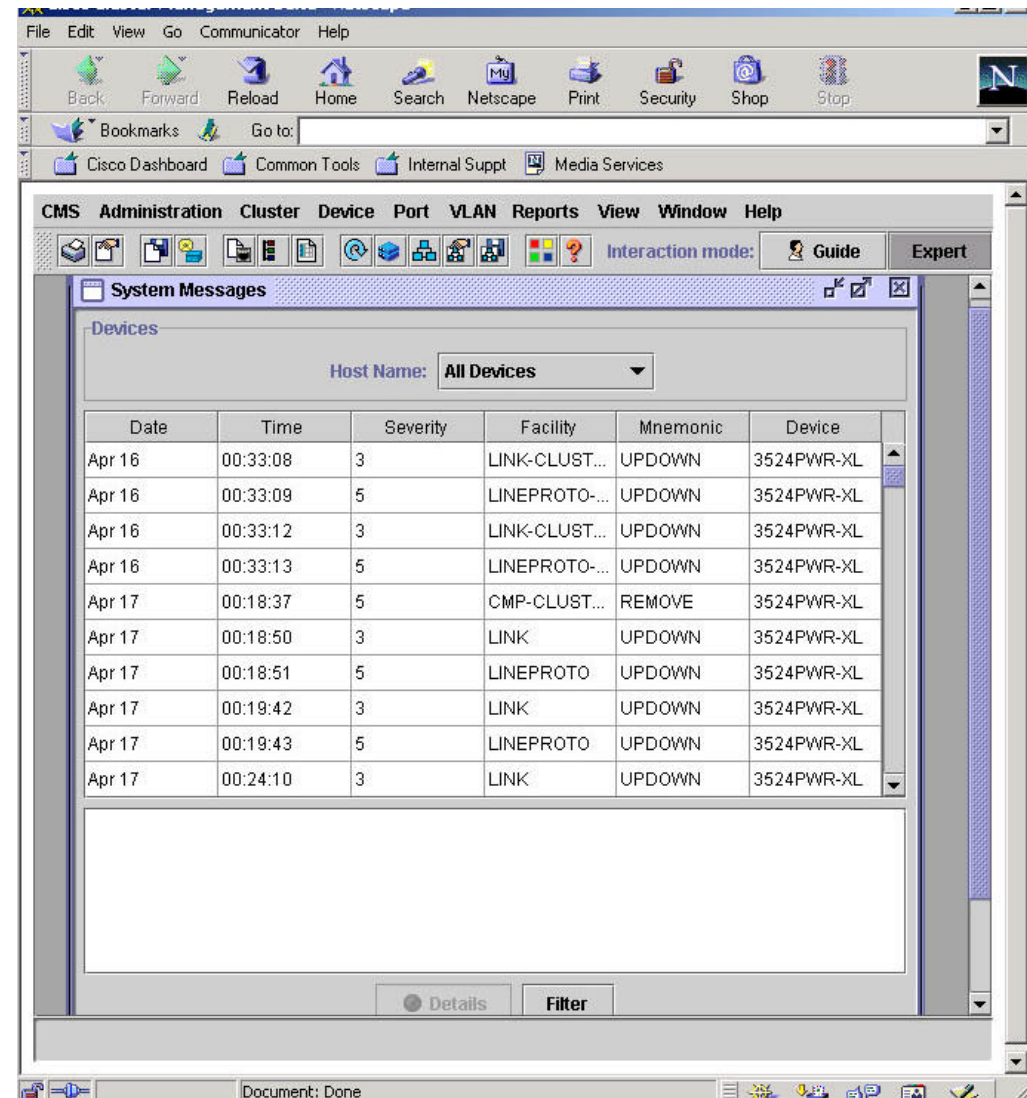
Create Modify Delete

OK Apply Refresh Cancel Help

Fault and Event Monitoring & Reporting

Cisco.com

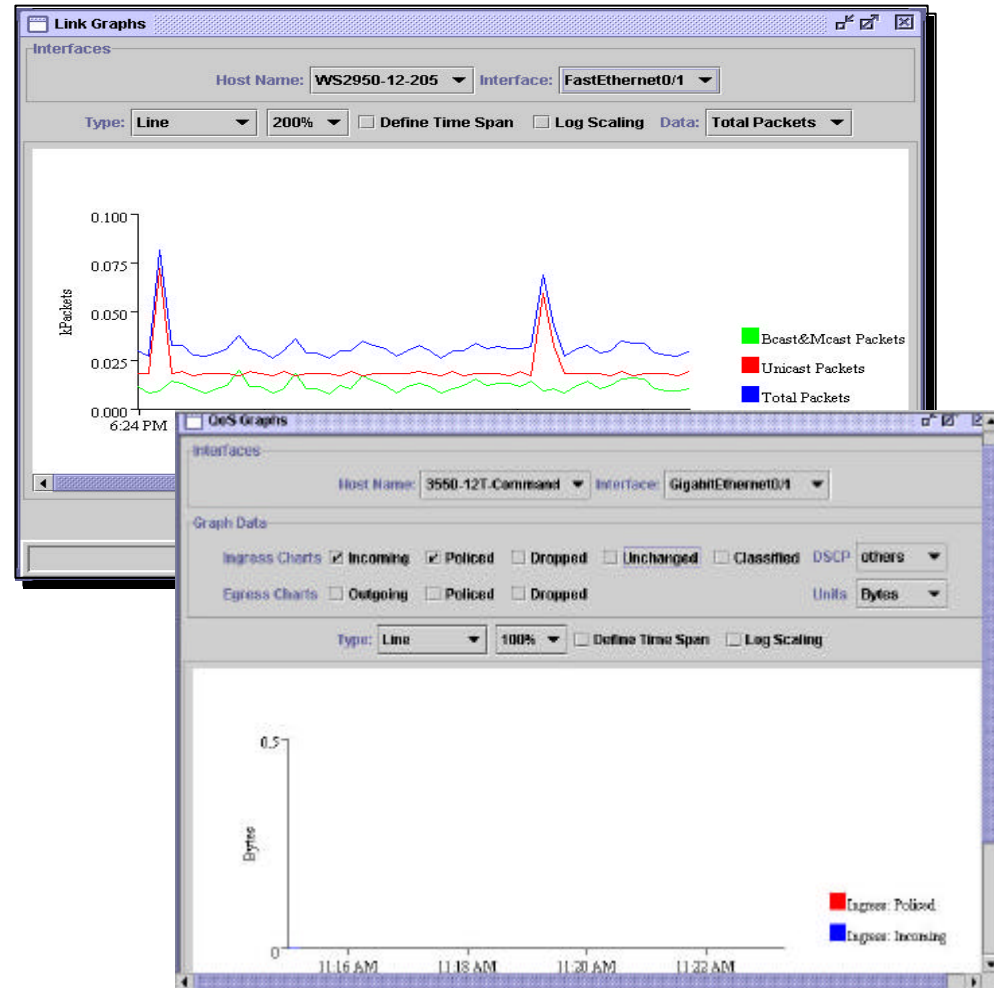
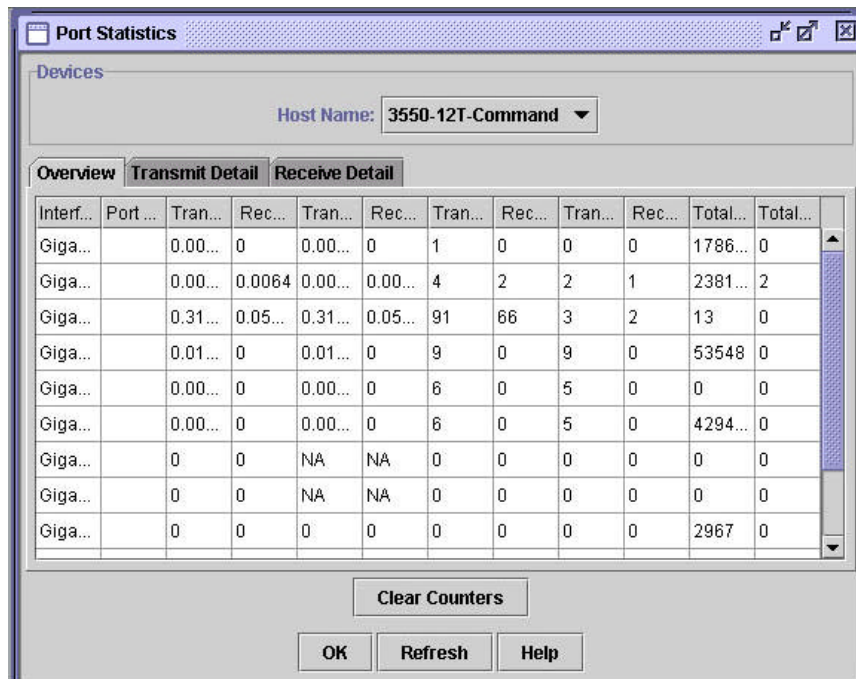
- **Systems Messages Monitor provides a filterable list of alarms and events**



Performance Monitoring & Reporting

Cisco.com

- Link Graphs and Link Reports provide network traffic updates in real-time



- All graphs can be printed for management reports

Cisco CMS Software Advantages

Cisco.com

- **No installation required – embedded in switch**
- **Manage cluster remotely from anywhere on your network**
- **Intuitive, easy to use**
- **Fast, easy tool to take advantage of Cisco Catalyst Intelligent Network Services**
- **It's FREE!**

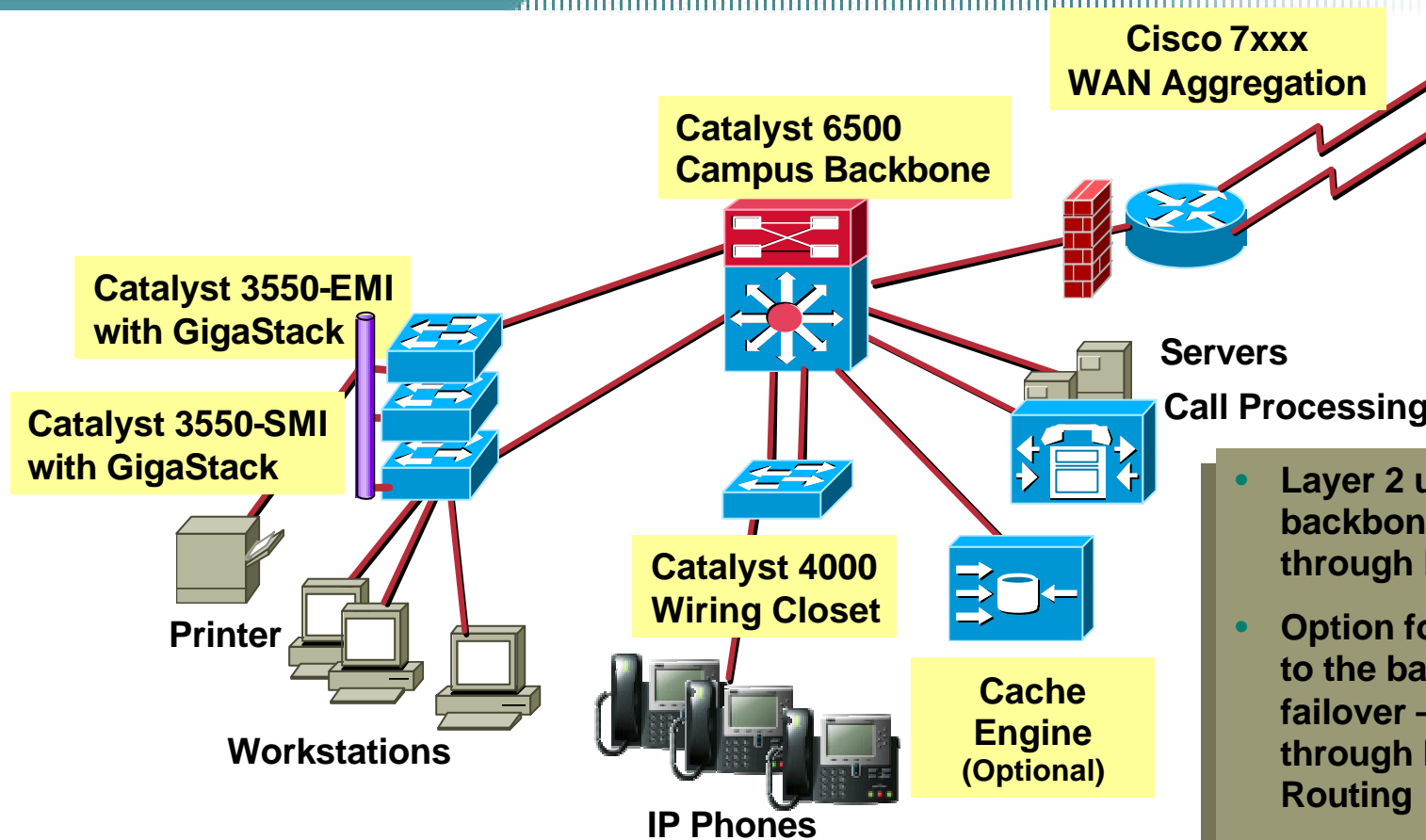
Catalyst 3550 Series

Cisco.com

- **Product Overview**
- **Intelligence in the Network**
- **Features and Benefits**
- **Deployment Examples**
- **Service and Support**

Integrated Enterprise Wiring Closet: Catalyst 3550/6500 Series

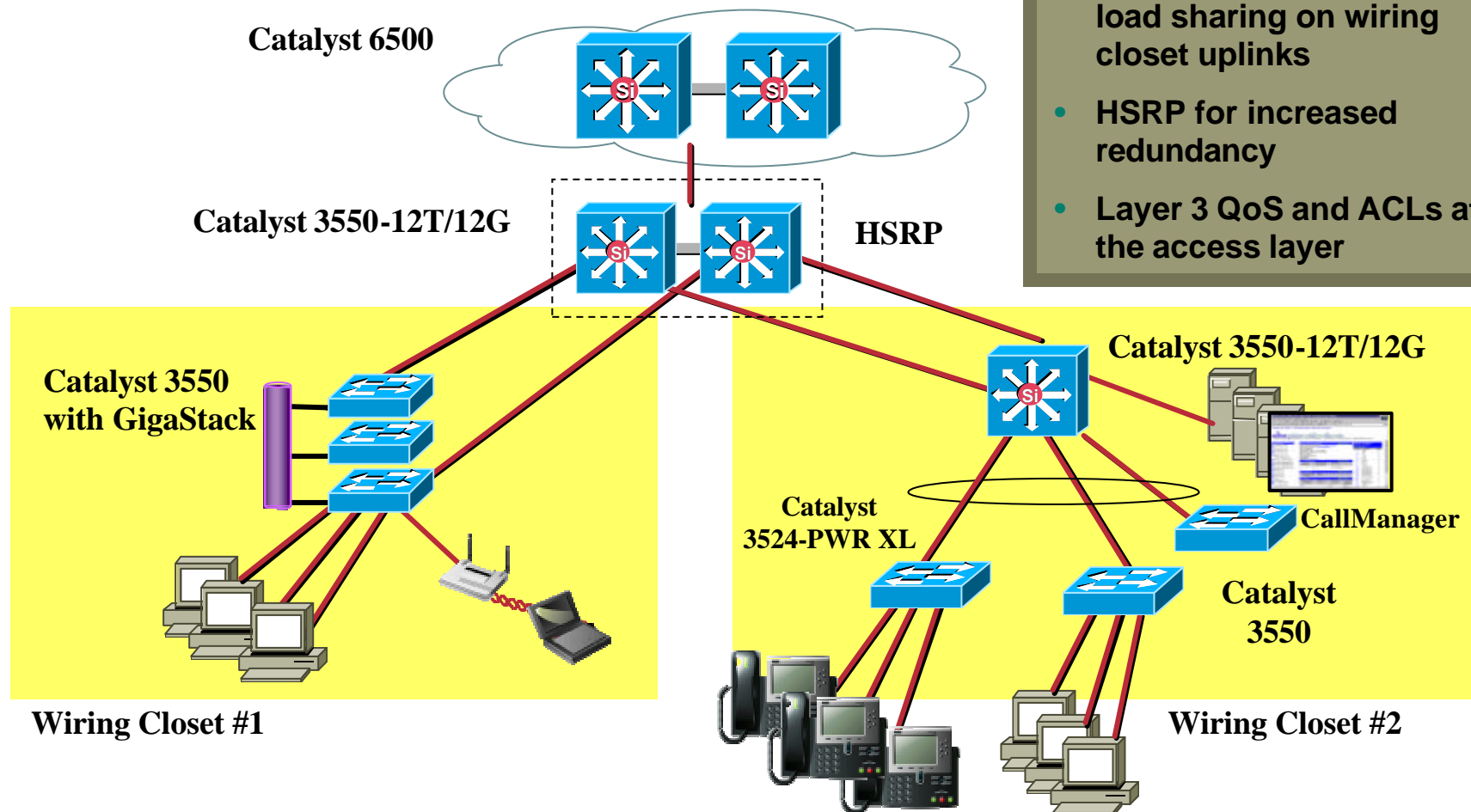
Cisco.com



Layer 2 or Layer 3 Wiring Closet Uplinks

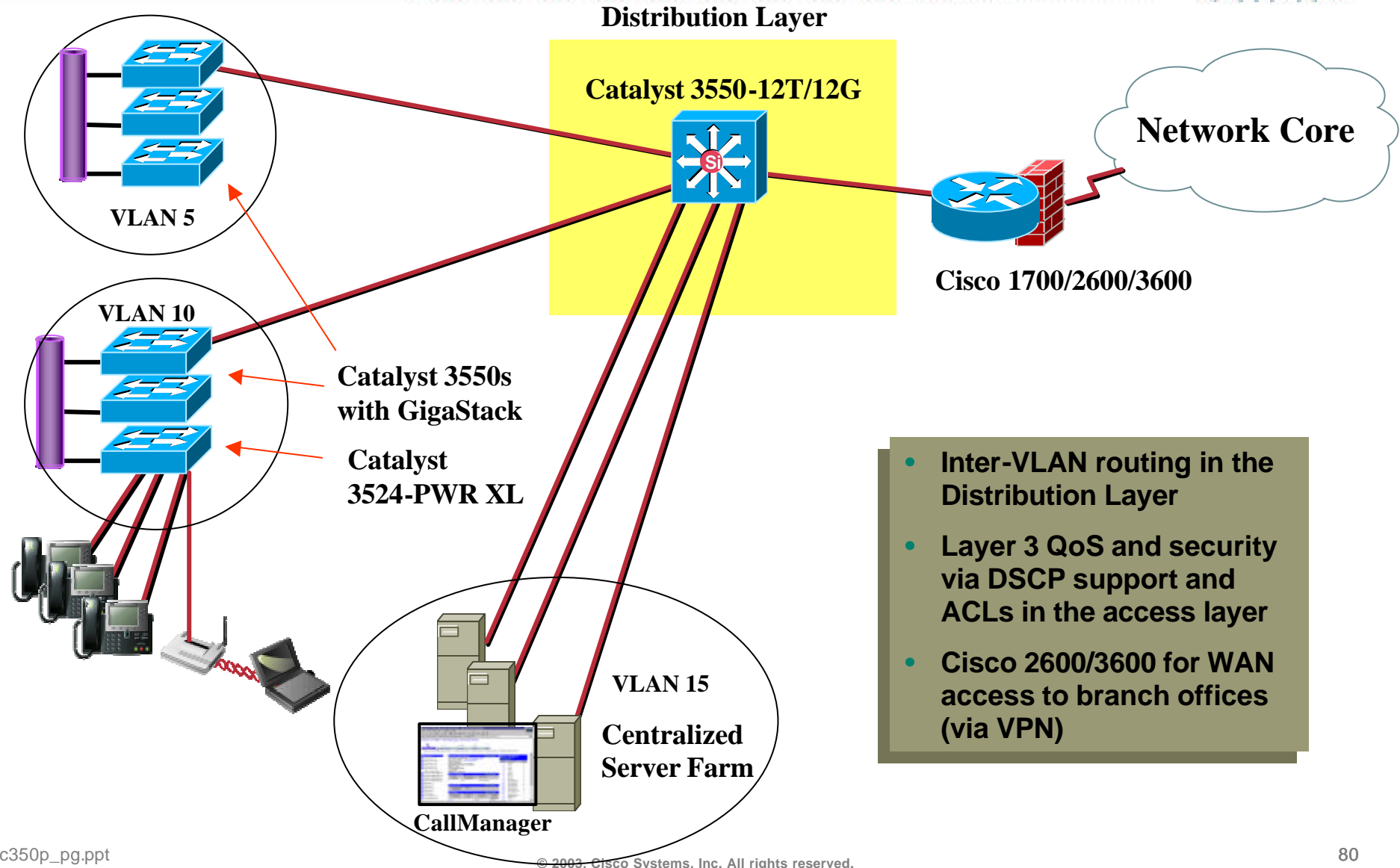
- Layer 2 uplinks to the backbone – load sharing through PVST+
- Option for routed uplinks to the backbone for faster failover – load sharing through Equal Cost Routing
- Layer 3 QoS and security via DSCP support and ACLs in the access layer
- Stack resiliency through GigaStack loopback cable

Enterprise Wiring Closet Aggregation & Access: Catalyst 3550 Series



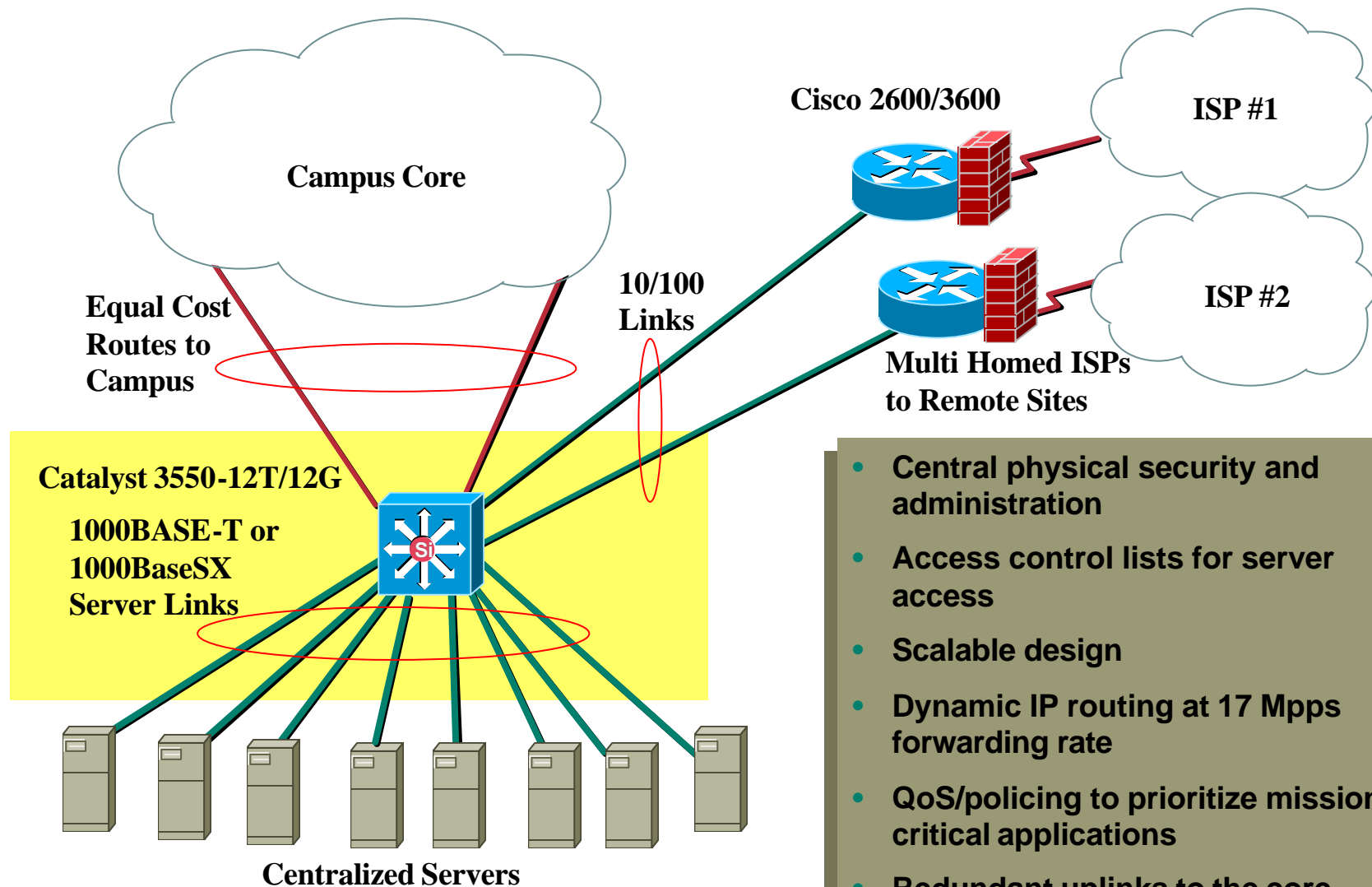
Branch Office/Medium Network: Catalyst 3550 Series

Cisco.com



Server Aggregation: Catalyst 3550-12T/12G

Cisco.com



- Central physical security and administration
- Access control lists for server access
- Scalable design
- Dynamic IP routing at 17 Mpps forwarding rate
- QoS/policing to prioritize mission-critical applications
- Redundant uplinks to the core

Cisco's Midsize 1000BASE-T Solution

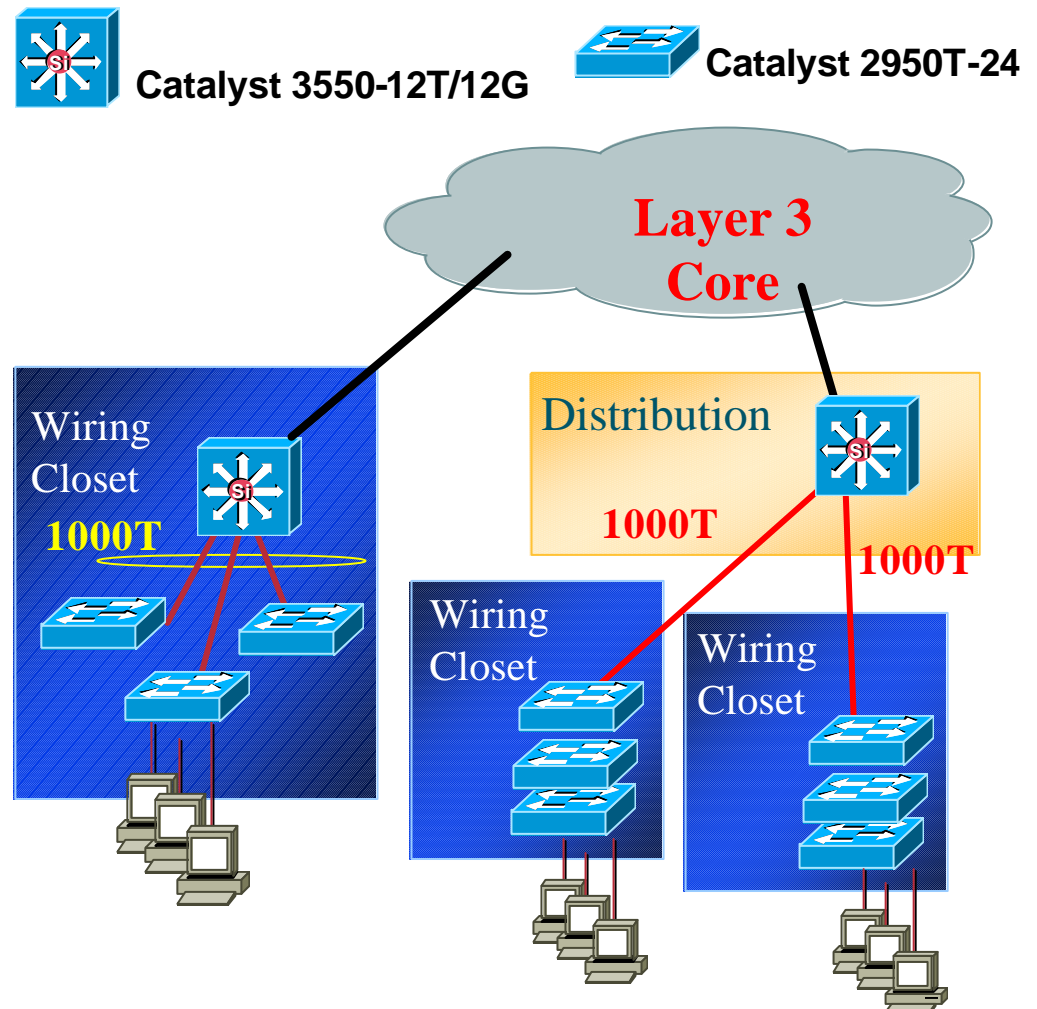
Cisco.com

Why 1000BASE-T?

- Protects investment in installed horizontal cabling (Category 5)
- Leverages investment in installed gear
- Extends intelligent services at 17 Mpps forwarding rate over copper

Where in the network?

- Aggregation of wiring closets
- Uplinks to distribution layer
- Data centers



Catalyst 3550 Series

Cisco.com

- **Product Overview**
- **Intelligence in the Network**
- **Features and Benefits**
- **Deployment Examples**
- **Service and Support**

Services & Warranty for Catalyst 3550

Cisco.com

- **Software Upgrades for Life**
 - FREE Maintenance and Version Releases for Cisco IOS® originally provided with the product
- **Limited Lifetime Hardware Warranty**
 - Advance Replacement shipping within 10 business days
 - Guest Access to Cisco Connection Online (CCO)
- **Total Implementation Solutions (TIS)**
 - Project management and Training
 - Installation, test, and cutover
 - Major Moves, Adds, Changes (MAC)
 - Design review and product staging
- **Configuration and verification services ease deployment of network-wide intelligent services: QoS and multicast management**
- **SMARTnet and SMARTnet Onsite offer 24x7x365 access to technical support via the web, email, and phone**
 - Advance replacement of hardware parts in as little as 2 hours
 - On site field engineer (SMARTnet Onsite) to assist in hardware replacements

New!

Operational Technical Support Services

Cisco.com

Onsite Services

Advance Replacement of Hardware

Diagnostics

Technology Refresh

24 hrs/day, 7 days/wk, 2 hr response											✓
24 hrs/day, 7 days/wk, 4 hr response										✓	
8 hrs/day, 5 days/wk, 4 hr response									✓		
8 hrs/day, 5 days/wk, next bus. day								✓			
24 hrs/day, 7 days/wk, 2hr response						✓					✓
24 hrs/day, 7 days/wk, 4 hr response						✓				✓	
8 hrs/day, 5 days/wk, 4 hr response					✓				✓		
8 hrs/day, 5 days/wk, next bus. day				✓				✓			
10 business day replacement	✓										
24x7 TAC Access		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Registered CCO Access		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Software Updates			✓	OS	OS	OS	OS	OS	OS	OS	OS
Software Maintenance	✓	✓	✓	OS	OS	OS	OS	OS	OS	OS	OS
	Warranty	SAS	SASU	NBD	8X5X4	24X7X4	24X7X2	NBD	8X5X4	24X7X4	24X7X2
	SMARTnet						SMARTnet Onsite				

Cisco is Your Partner for Delivering Intelligent Networks

Cisco.com

- Over 1600 support engineers, 40% CCIEs
- Average 15 years experience
- 80% issues resolved online
- Highest level of customer satisfaction *
- Multiple awards for service
- 30,000 Technical Assistance Center cases/months
- 5000+ partners worldwide deliver direct and subcontracted services for Cisco technology
- 1200+ partner-employed CCIEs

** Information Week Study in 4th Qtr 2000*



CISCO SYSTEMS



EMPOWERING THE INTERNET GENERATIONSM

Backup

GigaStack Stacking GBIC

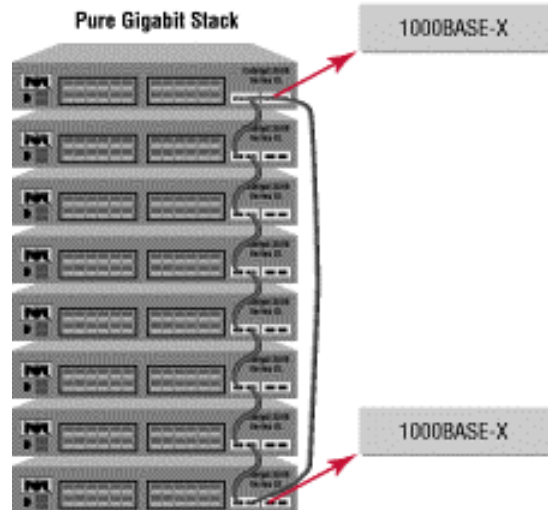
Cisco.com



Daisy Chain at 1-Gbps Forwarding Rate



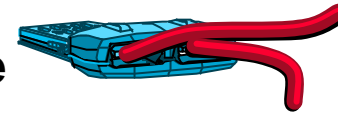
Pure Gigabit Stack



1000BASE-X

1000BASE-X

**Cascade at
1-Gbps Forwarding Rate**



**Point to Point at
2-Gbps Forwarding Rate**



- **Flexible Gigabit Ethernet GBIC-based implementation**
- **Plugs into a standard Catalyst 3550, 2950, 3500 XL, 2900 XL GBIC slot**
- **Copper-based cabling technology**

Redundant Power System 675 (RPS 675) and RPS 300



- Power supply redundancy
- RPS 300 supports up to six Cisco networking devices including Catalyst 3524-PWR XL, 3550 (except for the 3550-24PWR), 2950, 2924 LRE XL, 2912 LRE XL, 2980G-A and 4224 Access Gateway Switches
- RPS 675 supports the Catalyst 3550-24 PWR and is backward compatible to all other RPS 300 supported models (except Catalyst 3524-PWR-XL)
- Immediate failover capability
 - RPS 300 and RPS 675 sense failure and delivers uninterrupted power to device
 - Connected device will not reboot in the event of an internal power supply failure
 - Upon failure, RPS 300 and RPS 675 alerts network admin that the other connected devices will not be supported until failed device is restored or replaced

Cisco IOS Software Release 12.1(12c)EA1 – 12/2002

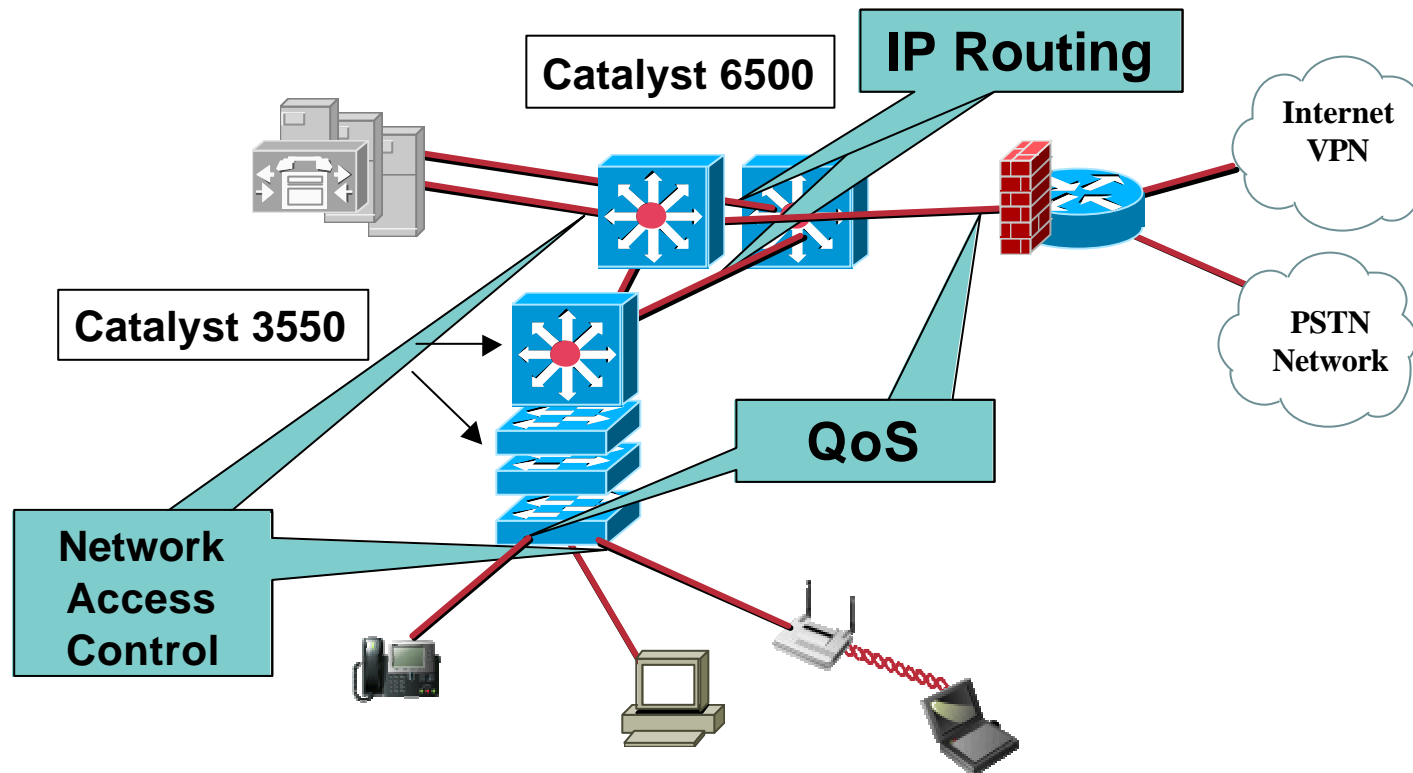
Feature Description

Cisco.com

Feature	Description
Availability	
802.3ad (LACP)	Allows EtherChannels to be configured using LACP as defined by IEEE standards
Security	
802.1x with port security	Supports co-existence of 802.1x and port security on a per-port basis
802.1x with VLAN assignment	Allows a dynamic VLAN assignment for a specific user based on 802.1x authentication
802.1x with Voice VLAN	Allows configuration of auxiliary VLAN for voice support on a 802.1x port
SPAN for IDS support	Allows configuration of SPAN destination port to receive ingress traffic as well as forward it
Kerberos	Authenticates users and network services using a trusted third party to perform secure verification
802.1x with ACL assignment	Enables configuration of extended ACLs to provide network security based on 802.1x authenticated users
Manageability	
Layer 2 Traceroute	Provides network operator with Layer 2 path of unicast traffic going from source to destination
Show interface capabilities	Provides information on configuration capabilities of an interface
QoS	
Auto QoS	Simplifies the configuration of QoS in VoIP networks

Intelligent Services Throughout the Network

Cisco.com



**Delivering Layer 2 - 4 Services
From the Edge through the Core to the WAN**