



CISCO IOS SOFTWARE MAJOR RELEASE 12.4 INTRODUCTION

MAY 2005

Agenda

Cisco.com

- **Release 12.4 Positioning**
- Release 12.4 Highlights
- Upgrade Paths
- Summary

Cisco IOS Software Major Release 12.4

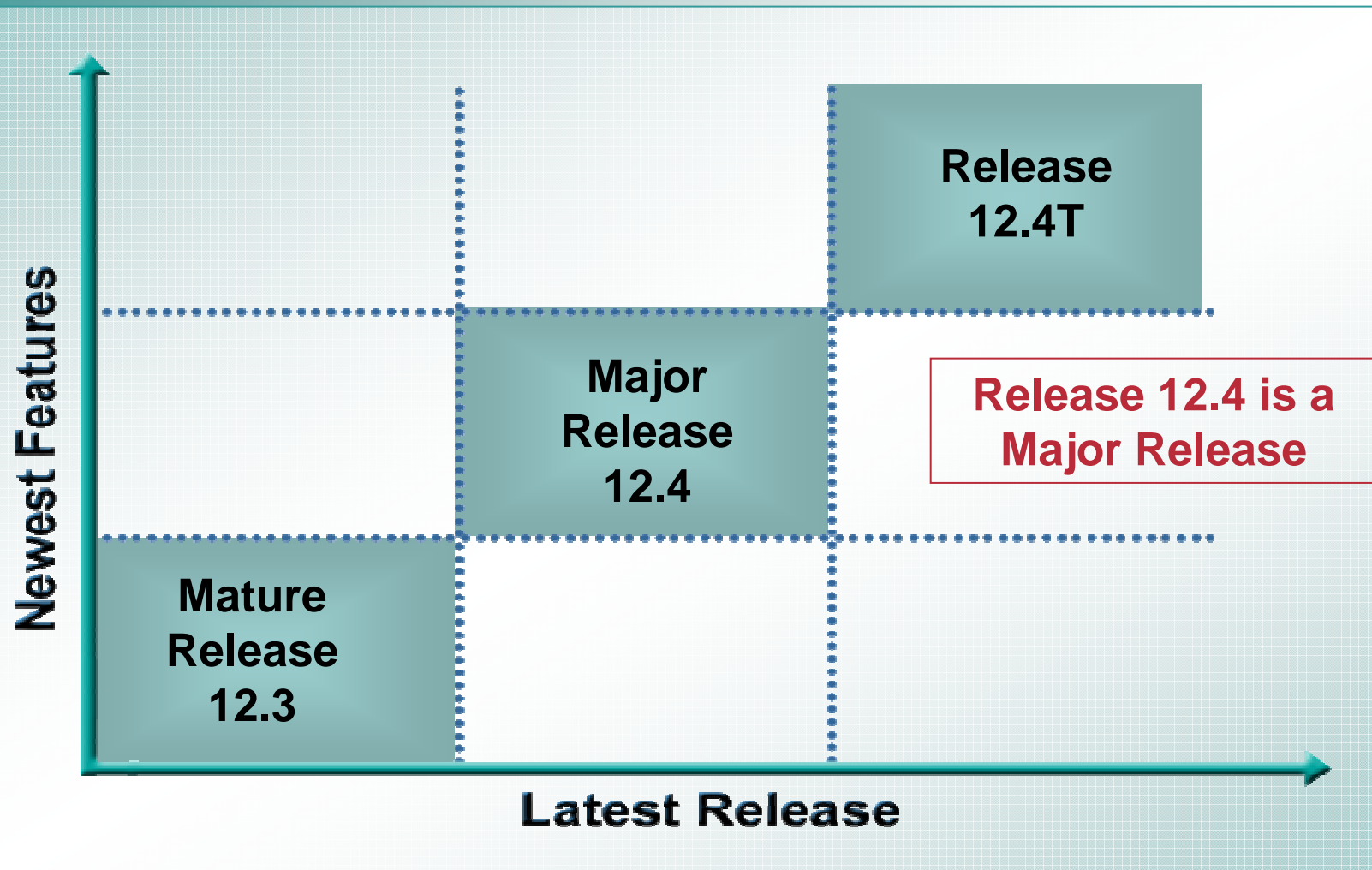
Cisco.com

Delivers Advanced Functionality with Powerful Hardware Support

- **Developed for the most demanding Enterprise, Access, and Service Provider Aggregation networks**
- **Provides a comprehensive portfolio of Cisco technologies, including the leading-edge functionality and hardware introduced in Release 12.3T**
- **Introduces more than 700 industry-leading features across the widest range of hardware in the industry**
- **Anchored by an intensive stability and testing program**

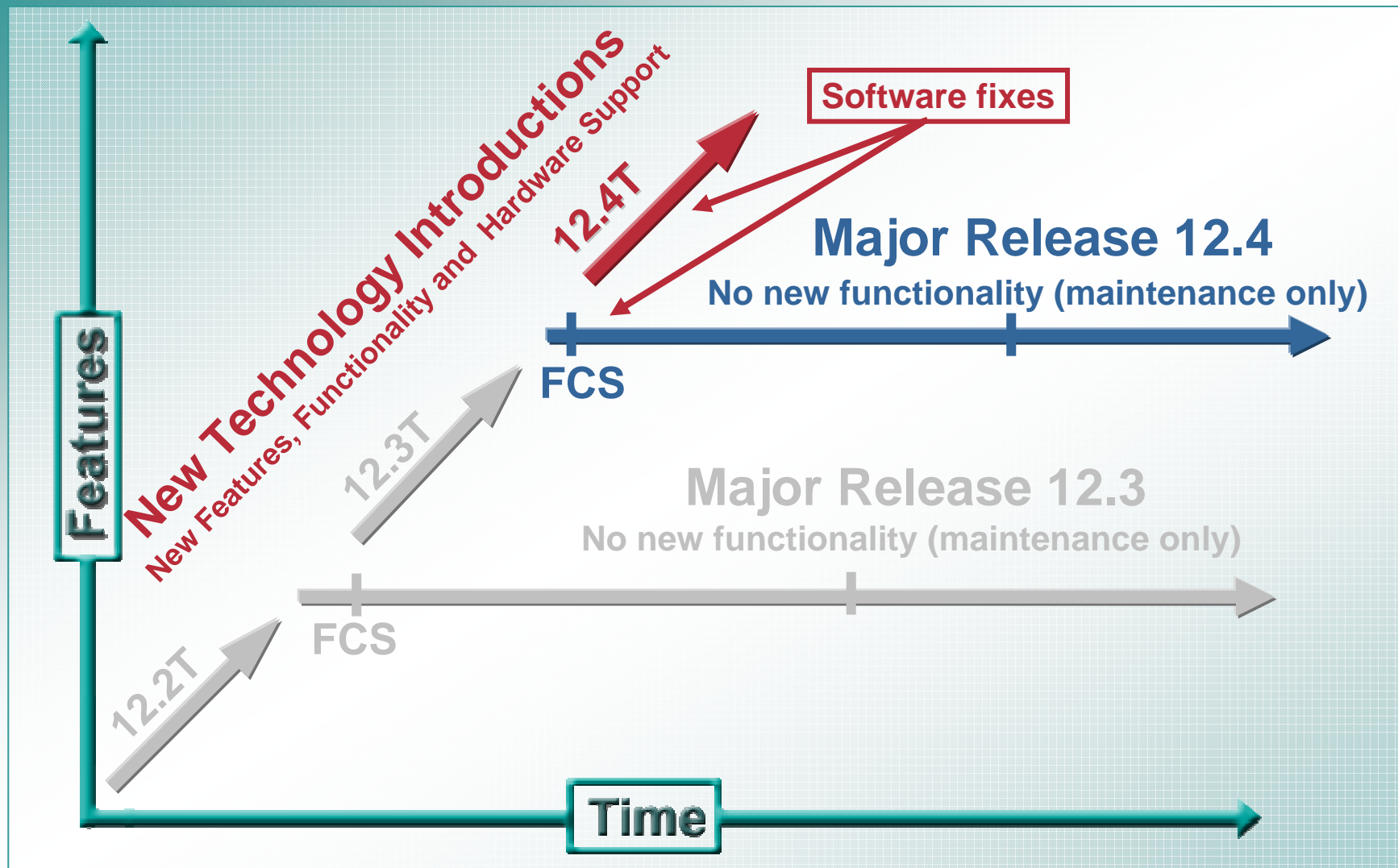
Leading-Edge Functionality and Stability

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Evolution to Release 12.4

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Releases Consolidated in Major Release 12.4

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Technology Release

Release 12.3T

**“X” and “Y” Releases
Included in 12.3T* Now in
Major Release 12.4**

Partial Listing of 12.3(x)X, and 12.3(x)Y Series

12.3(2)XA	12.3(2)XB	12.3(2)XC
12.3(4)XD	12.3(2)XE	12.3(2)XF
12.3(4)XG	12.3(4)XH	12.3(7)XI
12.3(7)XJ	12.3(4)XK	12.3(7)XL
12.3(4)XN	12.3(4)XQ	12.3(7)XR
12.3(8)XX	12.3(8)YA	12.3(8)YC
12.3(11)YF	12.3(8)YH	12.3(14)YQ

**FCS
April 2005**

12.4(1)

Note:

No continued engineering support is planned for the “X” and “Y” releases. Customers are encouraged to migrate to Release 12.4 for continued support.

*Release 12.3T is planned for End of Sales September 2005, and End of Engineering September 2006

Major Release 12.4

Advanced Functionality

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Security

- Dynamic Multipoint VPN
- Cisco IOS Firewall Enhancements
- Network Admission Control
- Cisco IOS Intrusion Prevention System
- Cisco AutoSecure
- Control Plane Policing
- Role-Based CLI Access
- Cisco Security Device Manager

Voice

- Cisco IOS IP Service Level Agreements for VoIP
- Cisco Unity Express
- High Availability
- Cisco IOS Warm Upgrade
- Cisco IOS IPsec Stateful Failover

High Availability

- Cisco IOS Warm Upgrade
- Cisco IOS IPsec Stateful Failover

IP Routing

- Cisco IOS Optimized Edge Routing
- EIGRP MPLS VPN PE-CE Site of Origin
- EIGRP Prefix List Support
- EIGRP Support for Route Map Filtering

Quality of Service

- Cisco AutoQoS for the Enterprise
- Bandwidth Estimation

IP Multicast

- IPv6 Multicast MLD Access Group and Scope Boundaries

- Extended ACL Support for IGMP to Support SSM in IPv4
- Support for SSM Mapping with DNS

IP Addressing

- Rate Limiting NAT Translation
- NBAR-NAT Integration and Real-Time Streaming Protocol
- Stateful Failover Asymmetric Outside-to-Inside
- Static IP Support

IP Mobility

- Dynamic Security Associations and Key Distribution
- Multiprotocol Label Switching
- Multiprotocol Label Switching: Label Distribution Protocol Autoconfiguration
- MPLS - LDP Graceful Restart

VPNs

- Layer 2 Tunneling Protocol Version 3

Major Release 12.4 Delivers Powerful Hardware Support

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- Cisco Small Business 100 Series Routers
- Cisco MWR 1900 Series Routers
- Cisco EtherSwitch Service Modules
- VPN Acceleration Module 2+ (VAM2+)
- Cisco 3200 Series Mobile Access Routers
- Cisco Gigabit Ethernet High-Speed WAN Interface Cards
- High-Density Analog (FXS/DIDFXO) and Digital (BRI) Extension Module for Voice/Fax
- HWIC-4ESW and HWIC-9ESW 4-and 9-port 10/100 Ethernet switch for Cisco 2800 and 3800 series
- Cisco 1800 Series Integrated Services Routers



- Cisco 4-port 10/100BASE-T Fast Ethernet Switch WAN Interface Card
- Cisco 1711 and Cisco 1712 Security Access Routers
- AIM-CUE Advanced Integrated Module
- Cisco 2800 Series Integrated Services Routers




- IP Communications High-Density Digital Voice/Fax Network Module
- NM-8AM-V2 and NM-16AM-V2 Network Modules
- Cisco SOHO 90 Series and Cisco 830 Series Routers



- Cisco 3800 Series Integrated Services Routers
- Cisco Intrusion Detection System (IDS) Network Module
- IP Communications Voice/Fax Network Module
- 16- and 36-Port Ethernet Switch Module for Cisco 2600 Series, Cisco 3600 Series, and Cisco 3700 Series
- Cisco IAD2430 Series IOS Reduced IP subset/Voice
- 100BASE-FX SMF Network Module
- Cisco 1701 ADSL Broadband Router

Major Release 12.4 Within the Cisco IOS Software Release Portfolio

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Release Families	Target Market	Planned Hardware
Cisco IOS XR	Service Provider Core	Cisco Carrier Router System-1 (CRS-1)
Release 12.3	Enterprise Access	Cisco 800, 1700, 2600, 3600, 3700 Series Routers Cisco 7200 and 7500 Series Routers
Release 12.3T	Enterprise, Access, Service Provider Aggregation	Cisco 830, 1700, 1800, 2600, 2800, 3200, 3600, 3700, 3800 Series Routers Cisco 7200 and 7500 Series Routers
 Release 12.4	Enterprise, Access, Service Provider Aggregation	Cisco 830, 1700, 1800, 2600, 2800, 3200, 3600, 3700, 3800 Series Routers Cisco 7200, 7301, 7500 Series Routers
Release 12.2S	Enterprise Core / Switching / WAN Aggregation, Service Provider Aggregation	Cisco Catalyst 2970, 3750, 4500, 6500 Series Switches Cisco 7200, 7300, 7500, 7600, ONS155x0, and uBR7000/ uBR10000 Series Routers Cisco 10000 Series Internet Router
Release 12.0S	Service Provider Core / Aggregation	Cisco 7200 and 7500 Series Routers Cisco 10000 and 12000 Series Internet Routers
Release 12.1E	Enterprise Access / Aggregation	Cisco 6500, 7200, 7500, ONS15454 Series Routers

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- **Release 12.4 Highlights**
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Major Release 12.4

Hardware and Feature Highlights

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New Hardware

- Cisco Integrated Services Routers
- Cisco 830 Series Routers

Security

- Dynamic Multipoint VPN
- Cisco IOS Firewall Enhancements
- Network Admission Control
- Cisco IOS Intrusion Prevention System
- Cisco AutoSecure
- Control Plane Policing
- Role-Based CLI Access
- Cisco Security Device Manager

Voice

- Cisco IOS IP Service Level Agreements for VoIP
- Cisco CallManager Express

High Availability

- Cisco IOS Warm Upgrade

IP Routing

- Cisco IOS Optimized Edge Routing
- Enhanced Interior Gateway Routing Protocol Enhancements

Cisco IOS Software Major Release 12.4

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Major Release 12.4

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New Router Portfolio Fully Leverages a Systems Approach

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- **Cisco Integrated Services Routers (ISR)**
 - Cisco 3800 Series
 - Cisco 2800 Series
 - Cisco 1800 Series
- **First hardware / software system to deliver concurrent services at **wire-speed****
- **Enables customers to:**
 - Deploy the right router for every office
 - Maintain self-defending networks
 - Leverage advanced network routing capabilities



Scalable from Small Businesses to Large Enterprises

Cisco.com

Performance and Services Density

Cisco 3800 Series



Highest Density and Performance for Concurrent Services

Embedded, Advanced Voice, Video, Data & Security Services

Integrated Security & Data

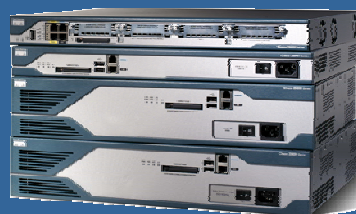
Industry-leading Cisco IOS Software Release 12.4

Enterprise Branch Office

Small Branch

SMB

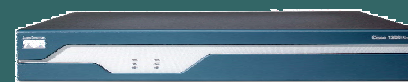
Cisco 2800 Series



Increased Value Extended to New Markets

- Substantial increase in price/performance!
- Extension into new markets!
- Greater service densities across the portfolio!

Cisco 1800 Series



Cisco Integrated Services Routers

Key Features & Benefits

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Embedded Security and Voice

- Fast, on-board encryption
- Highest voice services densities
- Cisco IOS Software delivers seamless integration and business-critical services

Higher Performance

- New ASIC, Bus design, and processor boost performance for services
- Double services density and memory defaults
- Leverages Cisco IOS Software intelligence and automation

Increased Modularity

- Increased high speed slots — up to 2.2 Gbps
- High density, larger form factor network modules

Resiliency

- Redundant power option with online insertion and removal
- Cisco IOS Software enables network-wide resilience to increase IP network availability

Investment Protection

- Leverages existing modules
- Up to 4X memory capacity
- Cisco IOS Software: most widely leveraged network infrastructure software in the world

Integrated
Services

Security

Voice

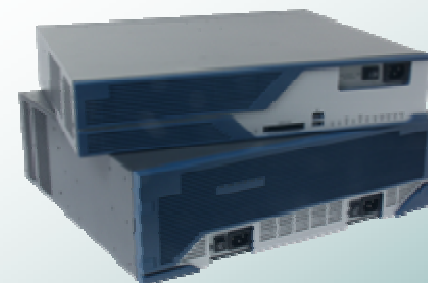
Content

L2 Switching

Wireless*

Management

Extended Services,
Headroom and
Investment Protection



Cisco Integrated
Services Routers

* future

Cisco 830 Series Access Routers

Cisco.com

- Offer advanced security for data, voice, and video access to small remote office and teleworkers that need secure Internet and corporate network connectivity
- Provide a wide range of integrated security & advanced QoS features for high-quality applications
- Offer easy deployment and remote management features with Cisco IOS Software



Cisco 830 Series Routers Feature Support

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- **Enterprise class VPNs**
 - Hardware-assisted encryption (3DES IPsec)
 - Cisco Easy VPN remote/server
- **Cisco V3PN**
 - Secure voice and video
 - Quality of Service (QoS)
 - Multicast
- **Manageable, scalable, and reliable access**
 - Cisco SDM
 - Cisco Router Web Set-Up Tool (CRWS),
 - Integration with IP Solution Center

Major Release 12.4 Security Highlights

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New Hardware

- Cisco Integrated Services Routers
- Cisco 830 Series Routers

Security

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- Network Admission Control
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High Availability

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IP Routing

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Cisco IOS Software Major Release 12.4

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- Cisco AutoQoS for the Enterprise
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- Support for SSM Mapping with DNS

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VPNs

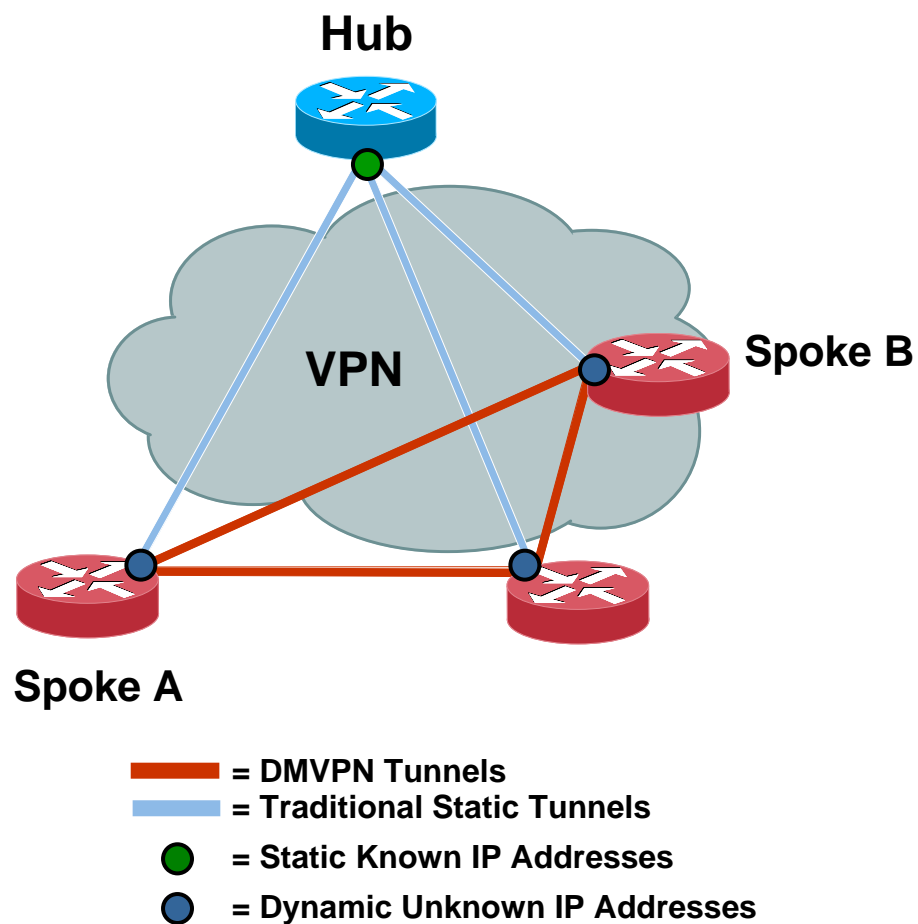
- Layer 2 Tunneling Protocol Version 3

Dynamic Multipoint VPN

Cisco.com

- Full meshed connectivity with configuration simplicity of hub and spoke
- Preserves (central) bandwidth and minimizes latency
- Supports dynamically addressed spokes
- Zero touch configuration for addition of new spokes in the DMVPN

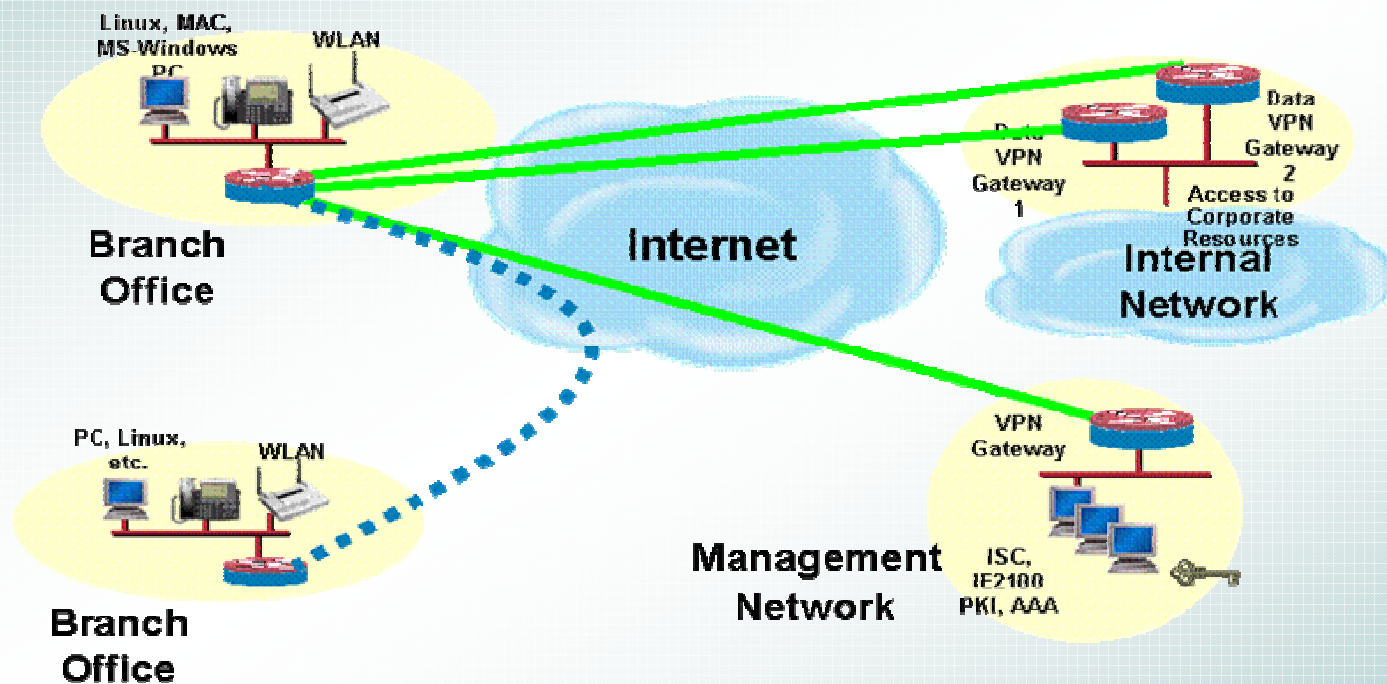
Secure Meshed Tunnels Automatically



DMVPN Spoke-to-Spoke Functionality

Cisco.com

Enhances DMVPN by enabling the secure exchange of data between two branch offices without traversing the head office



DMVPN Spoke-to-Spoke Functionality Benefits

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- **Intelligent tunnel creation**

Connects branch offices directly via an existing Internet connection

- **Improved network performance**

Decreases head office congestion, reducing latency and jitter, while optimizing head office bandwidth utilization

- **Simplified encryption and decryption**

Avoids duplicate head office encryption/decryption with direct on-demand branch office tunnels

Cisco IOS Security Certifications

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	FIPS	ICSA		Common Criteria	
	140-2, Level 2	IPsec	Firewall	IPsec (EAL4)	Firewall (EAL4+)
Cisco 1700	X	X	X	X	---
Cisco 2600	X	X	X	X	---
Cisco 3600	X	X	X	X	---
Cisco 3700	X	X	X	---	---
Cisco 1800 (ISR)	Q2CY'05	CY'05	X	CY'06	CY'06
Cisco 2800 (ISR)	Q2CY'05	CY'05	X	CY'06	CY'06
Cisco 3800 (ISR)	Q2CY'05	CY'05	X	CY'06	CY'06
Cisco 7200	X	CY'05		X	CY'06
Cisco 7301	X			CY'06	CY'06



- Important note : “FIPS KITS” are required to meet FIPS Level 140-2 in full
- ICSA Certification for Cisco IOS Firewall
newsroom.cisco.com/dlls/2005/prod_031405.html
- Cisco Security & VPN Certification/Evaluation
www.cisco.com/go/securitycert/

Application Firewall – Advanced Application Inspection and Control

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- **HTTP Inspection Engine**

Port 80 (http) is a conduit for web-embedded attacks & inappropriate application use

Delivers application level control through inspection of port 80 tunneled traffic

Convergence of Cisco IOS Firewall and Inline Intrusion Prevention System (IPS)

Control port 80 misuse by rogue apps that hide traffic inside http to avoid scrutiny

Example: Instant messaging and peer-to-peer applications (ie: Kazaa)

Manage bandwidth consumption through usage policies

- **Email Inspection Engine**

Control misuse of email protocols

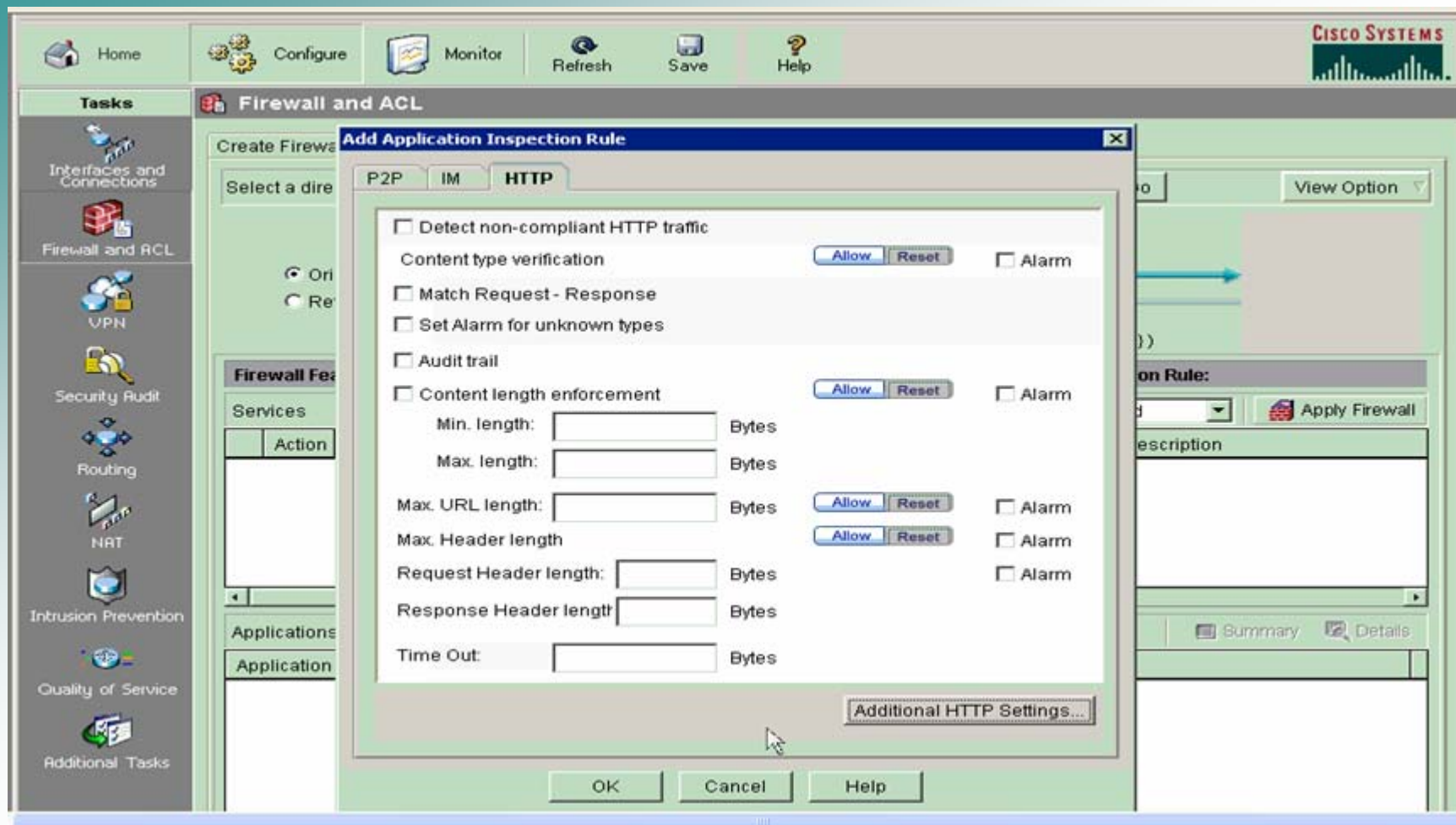
SMTP, ESMTP, IMAP, POP inspection engines

- **Inspection Engines provide protocol anomaly detection services**



Router & Security Device Manager Support for Application Firewall

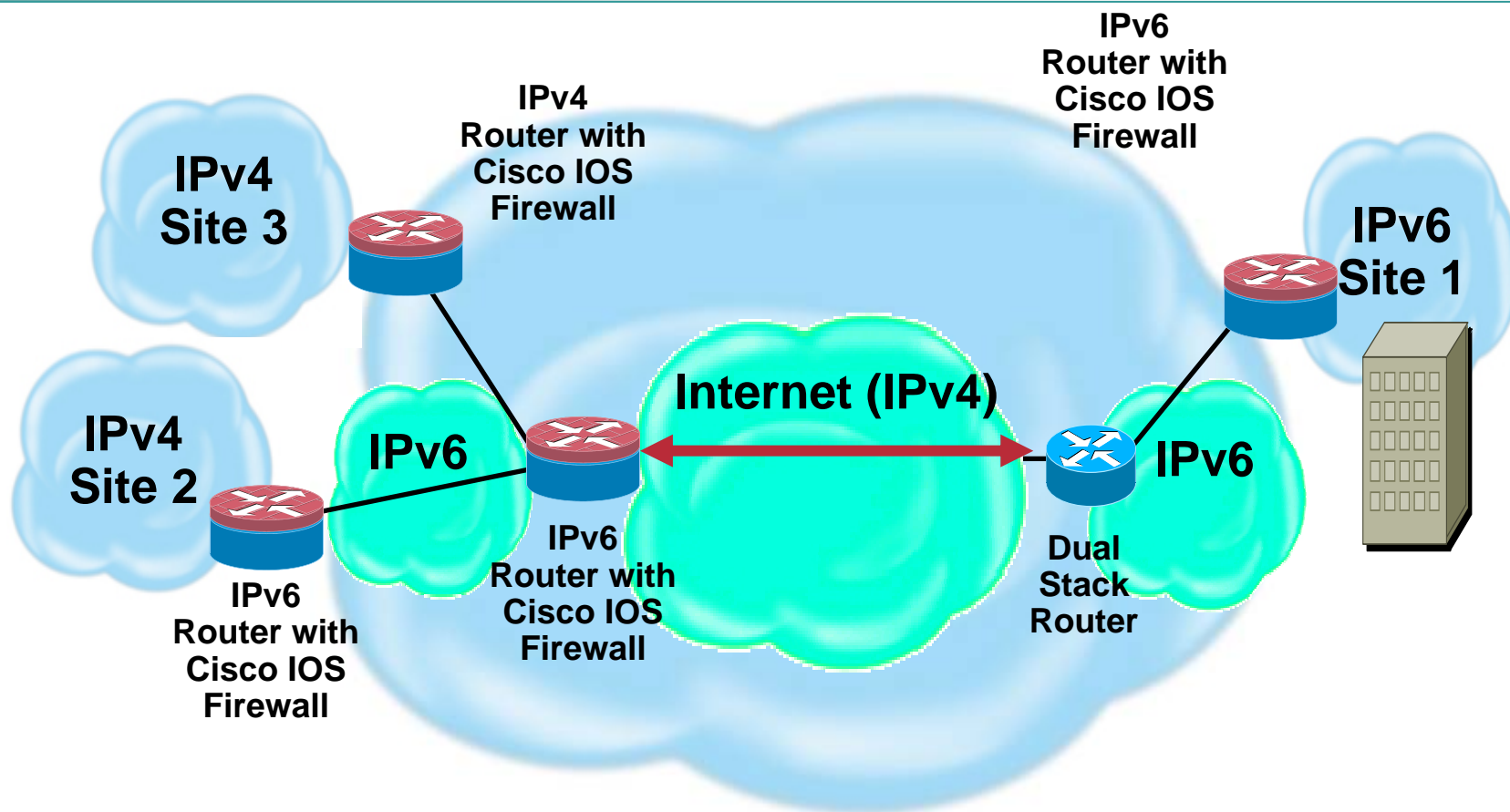
Cisco.com



Cisco IOS Firewall for IPv6

Cisco.com

Enables the user to implement
Cisco IOS Firewall in IPv4 and IPv6 networks



Cisco IOS Firewall for IPv6 Benefits

Cisco.com

- **Stateful packet inspection of TCP, UDP, and ICMP sessions**
- **Coexistence in IPv4 and IPv6 environments**
- **Traffic inspection**
 - Mitigates network attacks that would otherwise exploit IPv4 and IPv6 fragments**
- **IPv4 to IPv6 translation services**

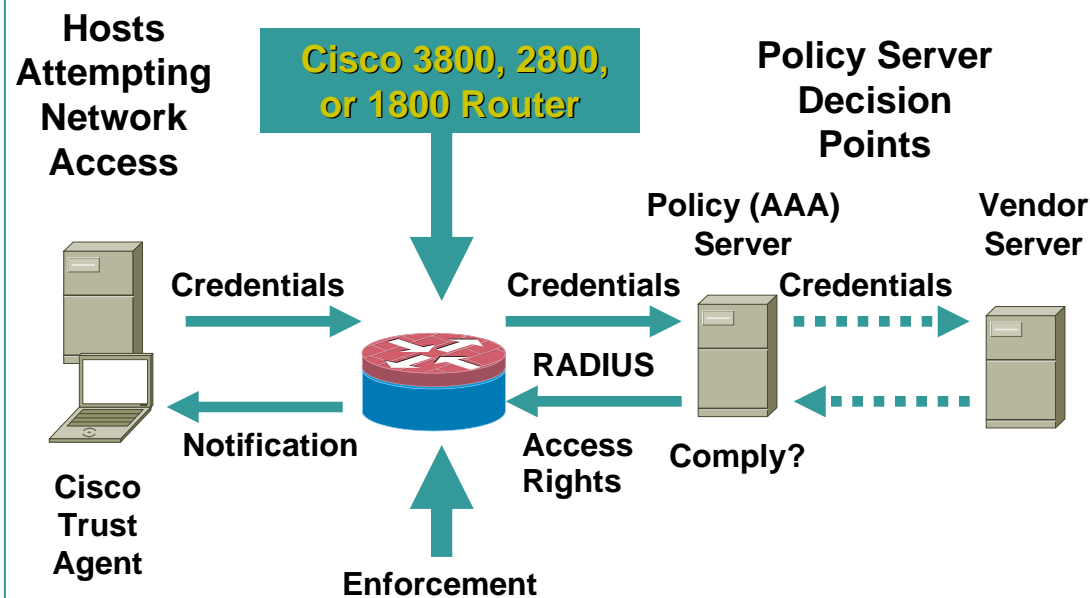
Network Admission Control

Cisco.com

Leverages the network to intelligently enforce access privileges based on endpoint security posture

- Focused on limiting damage from viruses and worms
- Limits network access to compliant, trusted endpoints
- Restricts network access to compliant devices
- Supports multiple anti-virus vendors and Cisco Security Agent
- Cisco 3800, 2800, and 1800 security bundles ship with NAC capability

Coalition of market-leading vendors



Cisco IOS Intrusion Prevention System

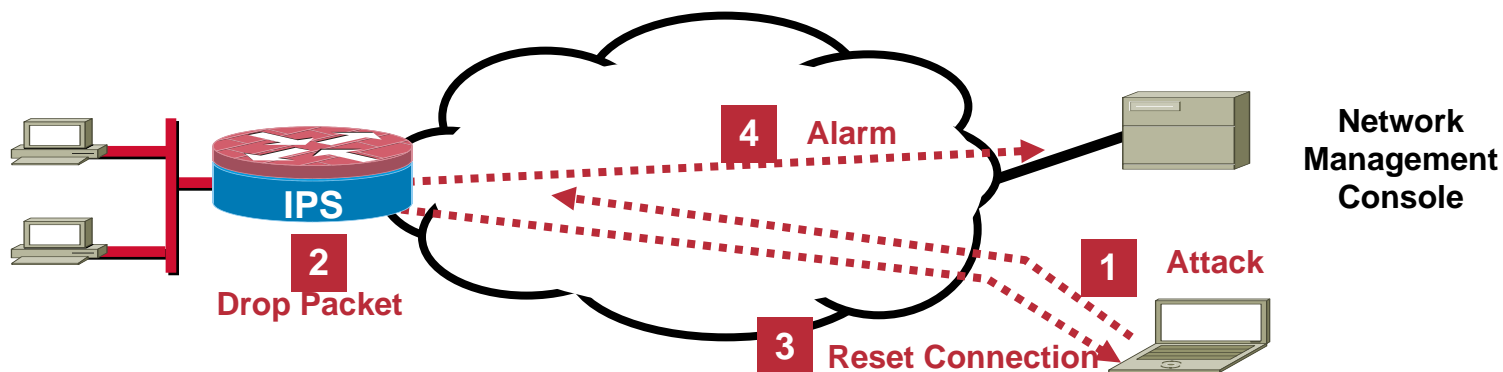
Cisco.com

- First to market with IPS in a router – *inline* ability to mitigate network attacks

DROP packet, **RESET** connection, **SEND** alarm

- Supports a wide range of attack/worm signatures supported (740+)
- Used for inline intrusion prevention and event notification
- Dynamically loads attack signatures to the router
- Integrates technology from Cisco IDS Sensor families

Cisco IDS 4200 Series Appliances, Cisco Catalyst® 6500 IDS Module, Network Module IDS appliance (NM-CIDS)



Cisco AutoSecure

Cisco.com

- **Disable non-essential services**
 - Eliminate DoS attacks based on fake requests to router services
 - Disable mechanisms that could be used to exploit security holes
- **Enforce secure access**
 - Enforce enhanced security in accessing device
 - Enhanced security logs
 - Prevent attackers from knowing that packets have been dropped
- **Secure forwarding plane**
 - Protect against Synchronous (SYN) attacks
 - Anti-Spoofing
 - Enforce stateful firewall configuration on external interfaces for firewall images

Cisco AutoSecure Rollback and Logging

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- Provides method to restore system configuration to the state prior to Cisco AutoSecure execution
- Simplifies tracking of Cisco AutoSecure command execution
- Initiate “one touch” device lockdown with confidence



Control Plane Policing

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- **Secures the control plane**

User-defined Quality of Service (QoS) policies manage and protect the control plane against reconnaissance and Denial of Service (DoS) attacks

- **Increases system reliability and availability**

Secured control plane helps to sustain traffic destined to or originating from the control plane during an attack

- **Simplifies policy configuration**

Support for Modular QoS CLI (MQC) minimizes the learning curve, number of provisioning errors, and the time and cost of deploying QoS and defining control plane policies

Role-Based CLI Access

Cisco.com

- Provide a view-based access to CLI commands
 - View: set of operational commands and configuration capabilities
- User authentication is done via an external or internal AAA Server (or TACACS+)
- Customer can define up to fifteen views, plus one reserve for the root user



***Customized Access
To Match
Operational Needs***

Role-Based CLI Access Benefits

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- **Security**

Enhances the security of the device by defining the set of CLI commands that are accessible to a particular user

- **Availability**

Avoids unintentional execution of CLI commands by unauthorized personnel

- **Operational efficiency**

Improves usability by prohibiting users from viewing CLI commands that are inaccessible to them

Cisco Security Device Manager

Cisco.com

- **Intuitive, web-based device management tool embedded within Cisco access routers**
- **Simplifies router and security configuration through intelligent wizards**
 - Enables customers to quickly and easily deploy, configure, and monitor a Cisco access router without knowledge of the Cisco IOS Software command-line interface**
- **Supports innovative, industry-leading features, including Security & 1-Step Router Lockdown**
- **Comprehensive coverage of security, LAN, WAN, and routing features**

Cisco SDM Benefits

Cisco.com

- **Reduces Cisco router deployment time and complexity**
Startup Wizard, 1-Step lockdown, WAN/VPN Wizard
- **Reduces total cost of ownership**
Leverages new Cisco IOS Security features with minimal staff re-training
Simpler security configuration management
- **Leverages network investment**
Quickly and easily integrates security into network
- **Establishes a consistent security policy across Cisco routers with Security Auditing capabilities**

Cisco SDM: Combining Ease Of Use & Application Intelligence

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- **Security Audit**

Security configuration recommended by ICSA and TAC

- **Intelligent wizards**

Auto-detect configuration errors and propose fixes

Ex: if WAN interface is DHCP-addresses, a hole is punched through the Firewall

- **Quick deployment**

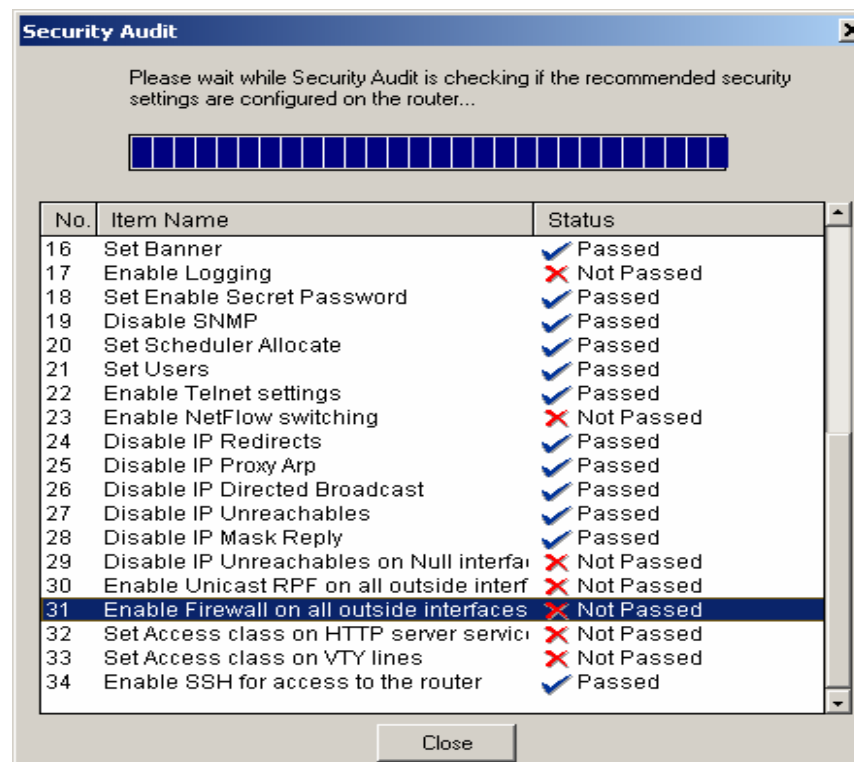
1-Step Router Lockdown: Firewall

VPN Wizard: Site-to-Site, Easy VPN

- **Tools for expert users**

ACL Editor

VPN tunnel monitoring



Major Release 12.4

Voice Highlights

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Cisco IOS IP Service Level Agreements for VoIP

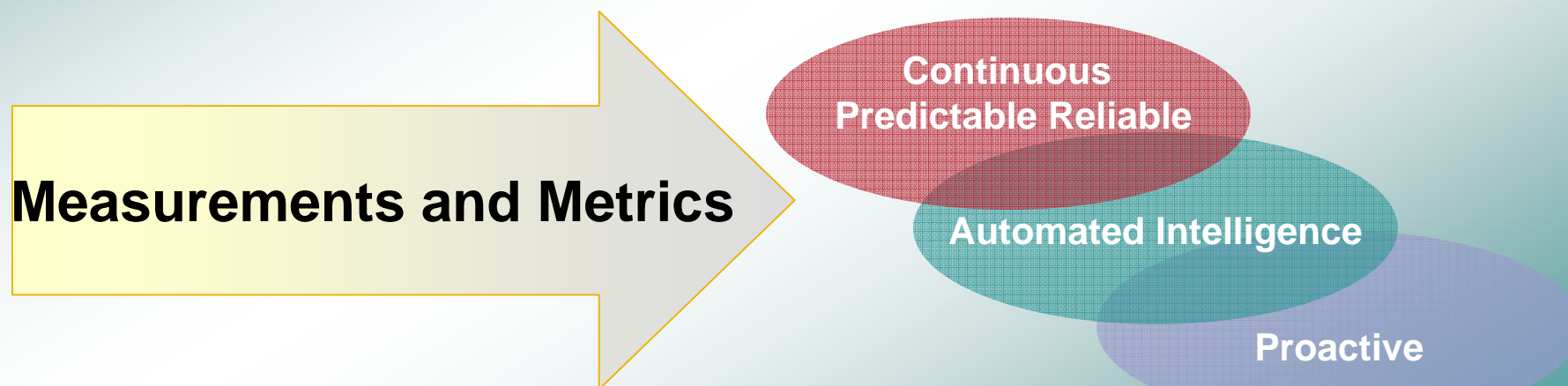
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- **Is the network ready for VoIP?**
 - Will network performance support VoIP?**
 - Verify the effectiveness of QoS**
 - Isolate network performance issues before and after deployment**
 - Troubleshoot VoIP problems**

Cisco IOS IP SLAs Benefits

Cisco.com

OPTIMIZED APPLICATIONS & SERVICES	REDUCED TOTAL COST OF OWNERSHIP AND OpEx
<ul style="list-style-type: none">• Performance visibility• Enhance acceptance of business-critical services and VoIP• Prove service levels• Enhance Customer satisfaction	<ul style="list-style-type: none">• Reduce VoIP deployment time• Lower mean time to restore and downtime• Proactive identification of issues enforces higher reliability



Cisco IOS IP SLAs Uses and Metrics

Cisco.com

	DATA TRAFFIC	VoIP	SERVICE LEVEL AGREEMENT	AVAILABILITY	STREAMING VIDEO*
REQUIREMENT	<ul style="list-style-type: none"> Minimize delay, packet loss Verify Quality of Service (QoS) 	<ul style="list-style-type: none"> Minimize delay, packet loss, jitter Verify Quality of Service (QoS) 	<ul style="list-style-type: none"> Measure delay, packet loss, jitter One-way 	<ul style="list-style-type: none"> Connectivity testing 	<ul style="list-style-type: none"> Minimize delay, packet loss
IP SLAS MEASUREMENT	<ul style="list-style-type: none"> Jitter Packet loss Latency per QoS 	<ul style="list-style-type: none"> Jitter Packet loss Latency MOS Voice Quality Score Integration Voice Hardware* 	<ul style="list-style-type: none"> Jitter Packet loss Latency One-way Enhanced accuracy NTP 	<ul style="list-style-type: none"> Connectivity tests to IP devices 	<ul style="list-style-type: none"> Jitter Packet loss Latency

*Complete in CY'05

Cisco CallManager Express

Cisco.com

- **Complete integrated voice and data capabilities**
- **Key system / low-end PBX Feature Set for < 100 station market**
- **Flexible configuration using CLI or web-based GUI**
- **Provides ease of upgrade and complete investment protection to centralized CCM-based hardware**
- **Future-proof IP architecture enable converged applications**

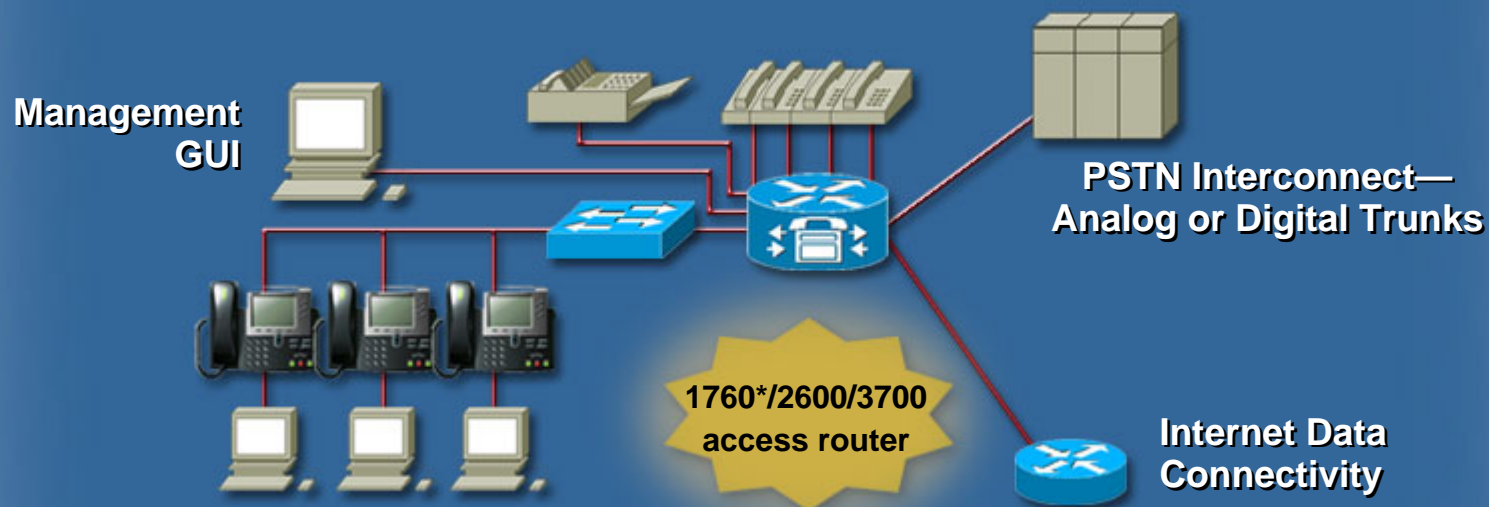
Examples: Content Networking, QoS, Cisco IOS Firewall, VPN, DSL, Ethernet, and XML

Cisco CallManager Express with Cisco Unity Express: All-In-One Solution

Cisco.com

- Single hardware product to manage, stock, and maintain – reduces operating costs
- Small footprint
- Single support contract – reduced maintenance cost
- Lower total cost of ownership
- Provides annuity revenue opportunity through Service Provider managed services
- Flexibility enables additional advanced services (ie: security or application acceleration)

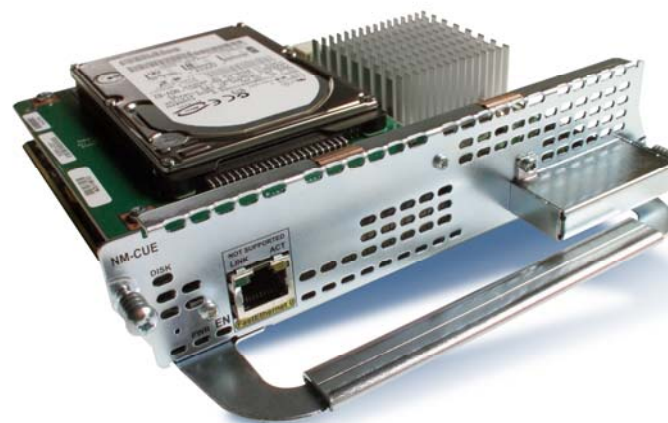
Deployment Option: Small Semi-Autonomous Office



Cisco Unity Express

Cisco.com

- Intel Low Power PIII 500MHz with Embedded OS
- Voice message storage: 100 hours
- 20GB IDE Hard Drive
- Cisco IOS Connectivity to CallManager Express
- No external interfaces; no cabling
- Local auto-attendant & voice mail system
- 12-100 Mailboxes, 4-8 sessions, 100 hours of storage
- Integrated into Cisco 2600XM and 3700 Series Routers; Cisco 2691 Router
- Entry level Cisco voice storage & processing products



Major Release 12.4

High Availability Highlights

Cisco.com

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IP Addressing

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- NBAR-NAT Integration and Real-Time Streaming Protocol
- Stateful Failover Asymmetric Outside to Inside
- Static IP Support

Security

- Dynamic Multipoint VPN
- Cisco IOS Firewall Enhancements
- Network Admission Control
- Cisco IOS Intrusion Prevention System
- Cisco AutoSecure
- Control Plane Policing
- Role-Based CLI Access
- Cisco Security Device Manager

Cisco IOS Software Major Release 12.4

IP Mobility

- Dynamic Security Associations and Key Distribution

Multiprotocol Label Switching

- Multiprotocol Label Switching: Label Distribution Protocol Autoconfiguration
- MPLS - LDP Graceful Restart

Voice

- Cisco IOS IP Service Level Agreements for VoIP
- Cisco CallManager Express

Quality of Service

- Cisco AutoQoS for the Enterprise
- Bandwidth Estimation

IP Multicast

- IPv6 Multicast MLD Access Group and Scope Boundaries
- Extended ACL Support for IGMP to Support SSM in IPv4
- Support for SSM Mapping with DNS

VPNs

- Layer 2 Tunneling Protocol Version 3

High Availability

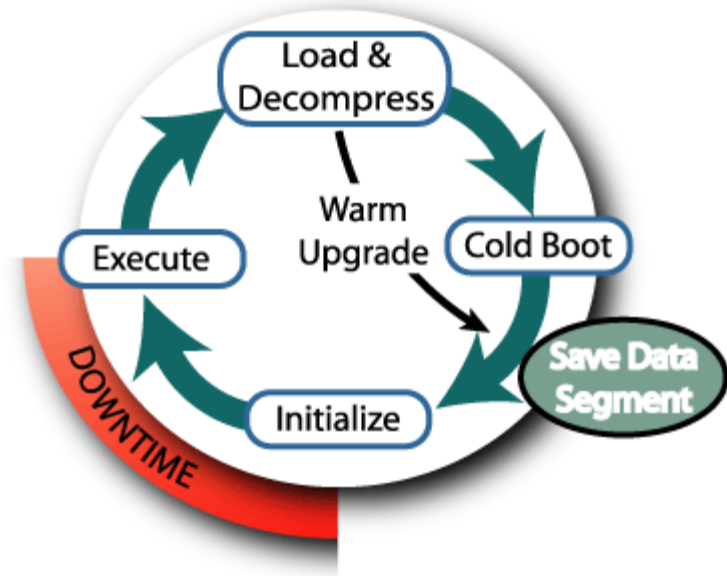
- Cisco IOS Warm Upgrade

System Level Resiliency: Warm Upgrade

Cisco.com

- Reduces downtime for planned upgrades for single RP platforms
- Builds upon Warm Reload
- The new image does not have to support Warm Upgrade

Warm Upgrade process



- Normal Reloading without Cisco IOS Warm Upgrade
Router loses packet forwarding for about 3.5 minutes
- With Cisco IOS Warm Upgrade
Router loses packet forwarding for about 30 seconds

Major Release 12.4

IP Routing Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
- Cisco 830 Series Routers

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High Availability

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IP Routing

- Cisco IOS Optimized Edge Routing
- Enhanced Interior Gateway Routing Protocol Enhancements

Cisco IOS Software Major Release 12.4

Quality of Service

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IP Multicast

- IP Multicast MLD Across Group and Scope Boundaries
- Extended ACL Support for IGMP to Support SSM to DMZ
- Support for SSM Mapping with PIM

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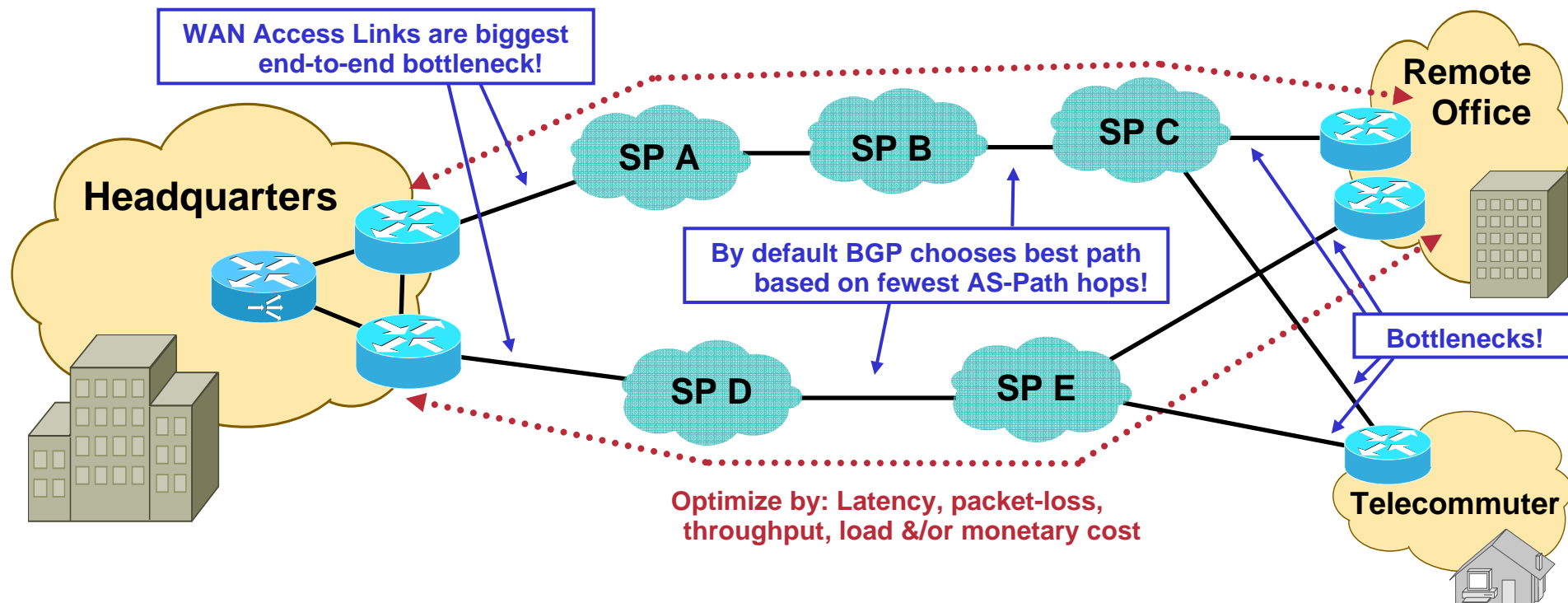
VPNs

- Layer 2 Tunneling Protocol Version 3

Cisco IOS Optimized Edge Routing

Cisco.com

Dynamic **route optimization** per prefix for two or more physical or virtual paths



Cisco IOS OER Benefits

Cisco.com

- **Improve network performance**
 - Brown-outs**
 - Bottlenecks**
- **Increase uptime**
- **Assist application deployment**
 - Business critical applications (ie: ERP, CRM, Oracle)**
 - VoIP**
 - Video On Demand (unicast)**
- **Minimize bandwidth costs**
- **Support services rollout**
 - VPN**
 - SLA**

EIGRP MPLS VPN PE-CE Site of Origin

Cisco.com

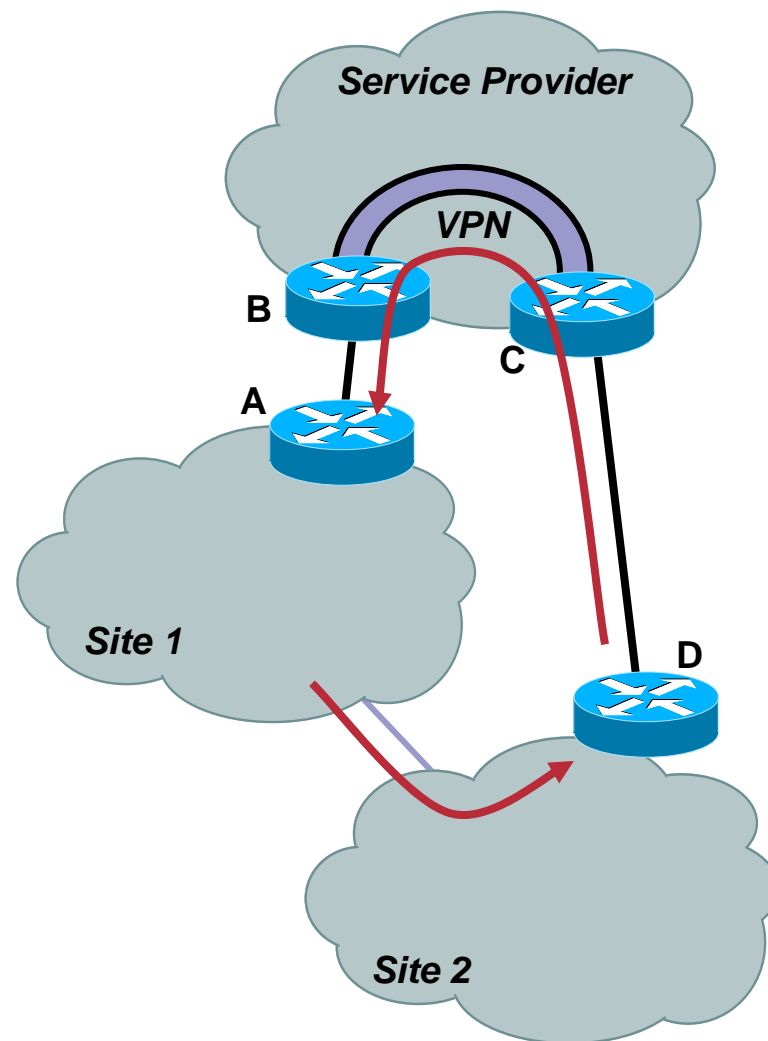
- Possible routing loops are the biggest danger with backdoor links

Site1 advertises a network through the back door to site 2

C prefers this route, and redistributes it into BGP

B prefers the BGP route, and redistributes it into EIGRP, forming a loop

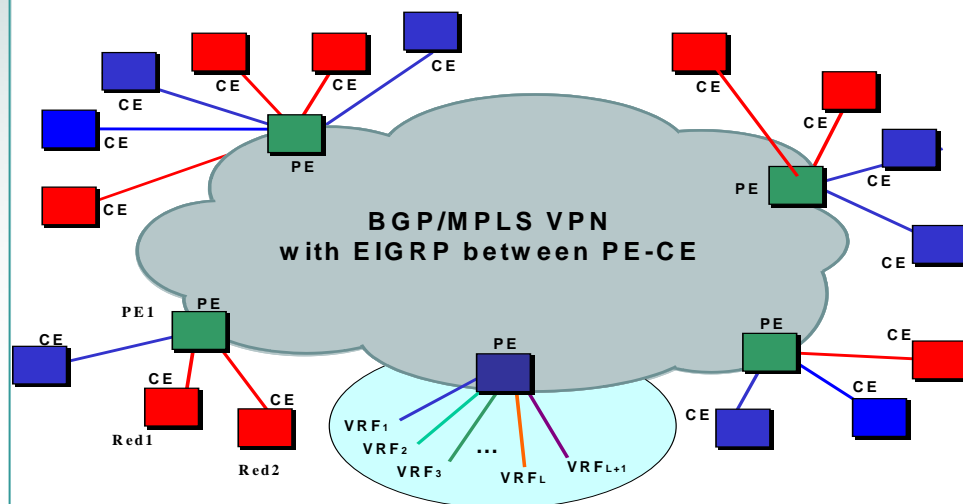
- Solution is to automatically tag all the routes originating in site 1 so they will be rejected by C
- This tag is called the Site of Origin (SoO)



EIGRP Prefix Limit Support

Cisco.com

- **Generic Redistribution:** limits the number of redistributed routes/ prefixes
- **MPLS VPN PE-CE:** limits the number of prefixes on a given PE router for
 - Entire VPN
 - Individual CEs/neighbors
- Provides optional facility to force an upper bound on the number of prefixes learned by the EIGRP routing process
- Useful for preventing unwanted oversubscription of resources (memory and CPU)

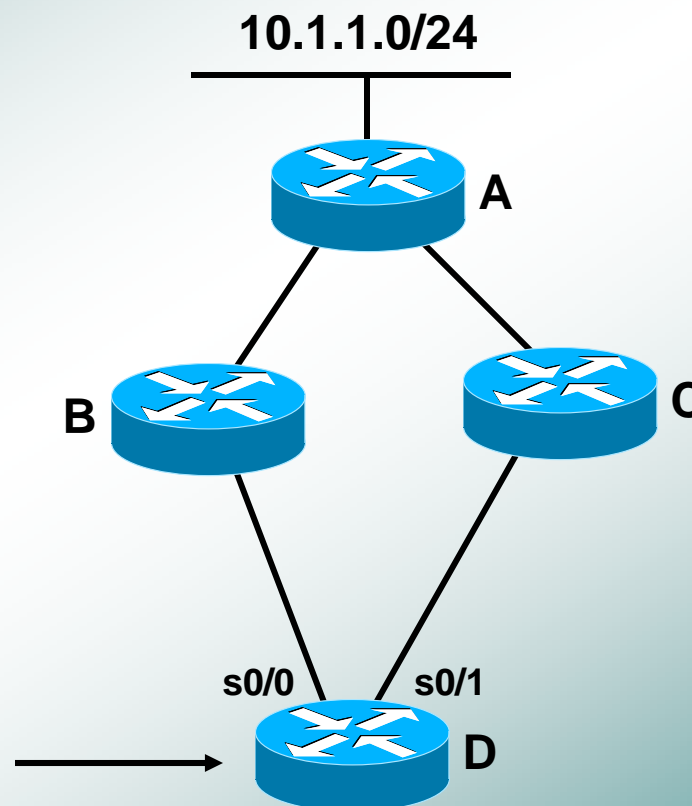


EIGRP Support for Route Map Filtering

Cisco.com

- Provides capability to filter internal and external routes based on multiple route-map options
- Enables EIGRP to process set and match parameters within route-map
- Controls advertisement and learning of routes for fine-tuning the network
- This allows setting the metric using a route map to prefer one path over another, for instance

```
route-map setmetric permit 10
  match interface serial 0/0
  set metric 1000 1 255 1 1500
route-map setmetric permit 20
  match interface serial 0/1
  set metric 2000 1 255 1 1500
route-map setmetric permit 30
....
router eigrp 100
  distribute-list route-map setmetric in
```



EIGRP Simple Network Management Protocol MIB Support

Cisco.com

- **EIGRP Traffic Statistics**
 - AS Number
 - Hellos Sent/Received
 - Updates Sent/Received
 - Queries Sent/Received
 - Replies Sent/Received
- **EIGRP Topology Data**
 - Destination Net/Mask
 - Active State
 - Feasible Successors
 - Origin Type
 - Distance
 - Reported Distance
- **EIGRP Interface Data**
 - Peer Count
 - Reliable/Unreliable Queues
 - Pacing
 - Pending Routes
 - Hello Interval
- **EIGRP Neighbor Data**
 - Peer Address
 - Peer Interface
 - Hold Time
 - Up Time
 - SRTT/RTO
 - Version

And many more....

Major Release 12.4

Quality of Service Highlights

Cisco.com

New Hardware

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Voice

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High Availability

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IP Routing

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- Enhanced Interior Gateway Routing Protocol Enhancements

Cisco IOS Software Major Release 12.4

Quality of Service

- **Cisco AutoQoS for the Enterprise**
- **Bandwidth Estimation**

IP Multicast

- IPv6 Multicast MLD Access Groups and Scope Boundaries
- Extended ACL Support for ICMP to Support SSM in IPv6
- Support for SSM Mapping with DNS

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- MPLS - LDP Graceful Restart

VPNs

- Layer 2 Tunneling Protocol Version 3

Cisco AutoQoS Automates the Key Elements of QoS Deployment

Cisco.com

- **Application Classification**

Example: automatically discovering applications and providing appropriate QoS treatment

- **Policy Generation**

Example: auto-generation of initial and ongoing QoS policies

- **Configuration**

Example: providing high level business knobs, and multi-device / domain automation for QoS

- **Monitoring & Reporting**

Example: generating intelligent, automatic alerts and summary reports

- **Consistency**

Example: enabling automatic, seamless interoperability among all QoS features and parameters across a network topology – LAN, MAN, and WAN



Cisco AutoQoS for the Enterprise

Cisco.com

- Cisco introduced Cisco AutoQoS in Releases 12.2T and 12.3
- Enhancements in Release 12.3(7)T enable automation for the deployment of QoS policies in a general business environment

- **Benefits**

Comprehensive QoS deployment in two steps

Automatically provisions up to 10 traffic classes

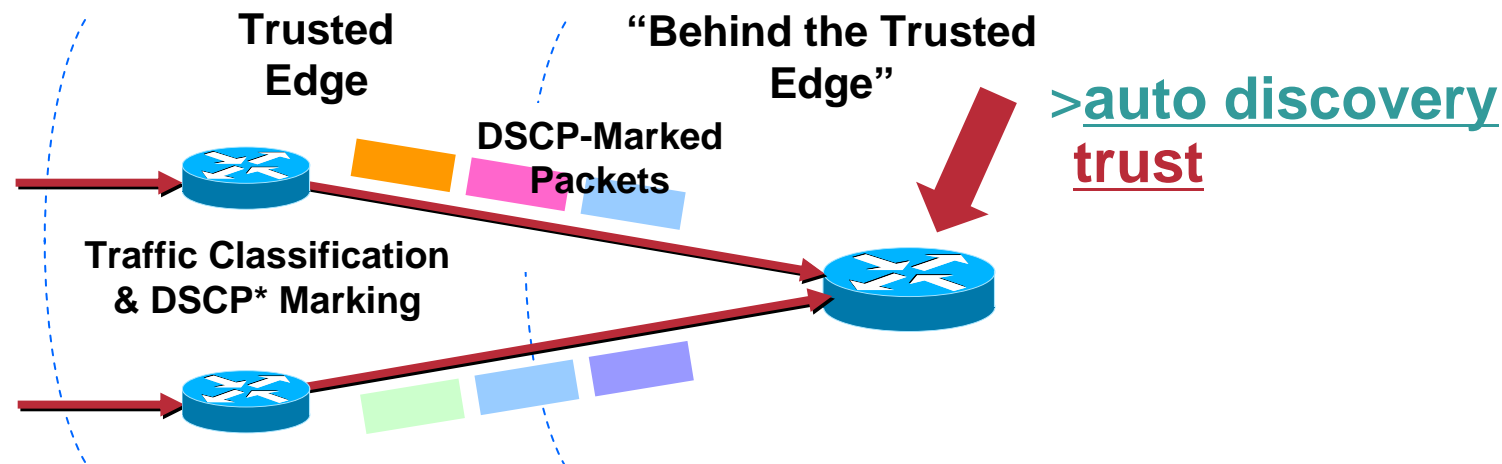
Reduces QoS deployment time and expense

Traffic Class	DSCP
IP Routing	CS6
Interactive Voice	EF
Interactive Video	AF41
Streaming Video	CS4
Telephony Signaling	CS3
Transactional/Interactive	AF21
Network Management	CS2
Bulk Data	AF11
Best Effort	0
Scavenger	CS1

Cisco AutoQoS for the Enterprise: AutoDiscovery Trust Option

Cisco.com

- Extends the power of Cisco AutoQoS for the Enterprise to routers for which Differentiated Services Code Point (DSCP) values have already been assigned at the network edge
- AutoDiscovery is not invoked: QoS policy is based on statistics for DSCP-marked traffic received by router



Cisco AutoQoS for the Enterprise: AutoDiscovery Trust Option Benefits

Cisco.com

- **Automated provisioning**
Automatically provisions up to ten traffic classes using customer-defined DSCP values
- **Extended coverage**
Generates QoS policies for routers on which traffic arrives with DSCP markings
- **Lower total cost of ownership**
Further reduces deployment time and expense by leveraging trusted DSCP markings to set the QoS policy behind the trusted edge

Cisco AutoQoS for the Enterprise

Suggested Policy

Cisco.com

- Increases customer flexibility by allowing users to view, compare, and edit a Cisco AutoQoS suggested policy prior to application



Bandwidth Estimation using Corvil Bandwidth Technology

Cisco.com

- Adequate bandwidth is essential for application performance

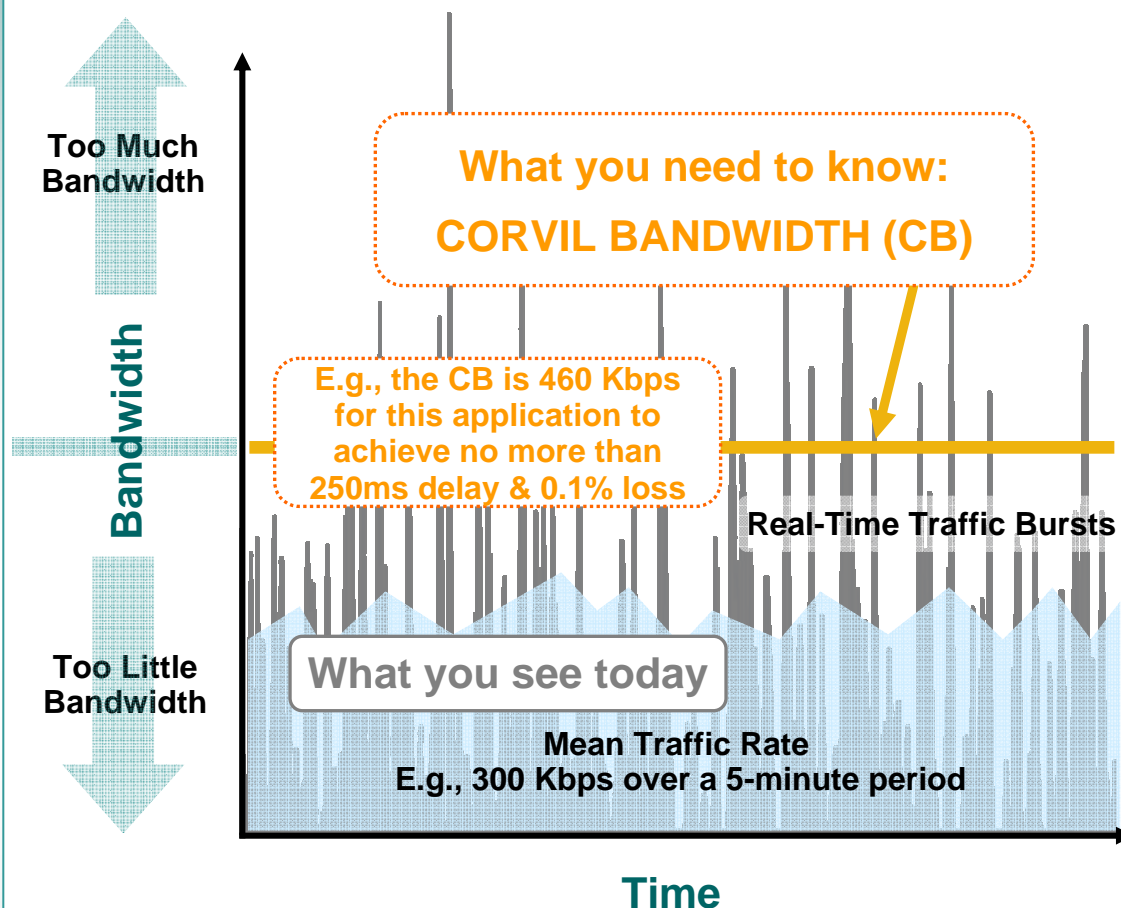
Too little bandwidth can make business services unusable

Too much bandwidth can be very costly

- Corvil Bandwidth provides the minimum bandwidth required to meet a Quality of Service target

The ability to obtain bandwidth values for *user-specified* QoS targets distinguishes Corvil Bandwidth from other approaches

Use Corvil Bandwidth values to allocate bandwidth using existing Cisco IOS QoS policy mechanisms



Bandwidth Estimation using Corvil

Bandwidth Technology Benefits

Cisco.com

- **Enables users to set service-level objectives for the desired performance of networked applications**
- **Allows network managers to eliminate operational overhead and guesswork in bandwidth provisioning and QoS configuration**
- **Provides the potential for significant bandwidth cost savings while meeting QoS requirements**
- **Increases the capability and flexibility to offer bandwidth-on-demand types of services**

Major Release 12.4

IP Multicast Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
- Cisco 830 Series Routers

Security

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- Network Admission Control
- Cisco IOS Intrusion Prevention System
- Cisco AutoSecure
- Control Plane Policing
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- Cisco Security Device Manager

Voice

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- Cisco CallManager Express

High Availability

- Cisco IOS Warm Upgrade

IP Routing

- Cisco IOS Optimized Edge Routing
- Enhanced Interior Gateway Routing Protocol Enhancements

Cisco IOS Software Major Release 12.4

Quality of Service

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- Bandwidth Estimation

IP Multicast

- IPv6 Multicast MLD Access Group and Scope Boundaries
- Extended ACL Support for IGMP to Support SSM in IPv4
- Support for SSM Mapping with DNS

IP Addressing

- Real-Linking NAT Translation
- NBAR-NAT Integration and Real-Time Streaming Protocol
- Stateless Pathway Asymmetric Outside-to-Inside
- Static IP Summary

IP Mobility

Dynamic Security Associations and Key Distribution

Multiprotocol Label Switching

- Multiprotocol Label Switching: Label Distribution Protocol Autoconfiguration
- MPLS - LDP Graceful Restart

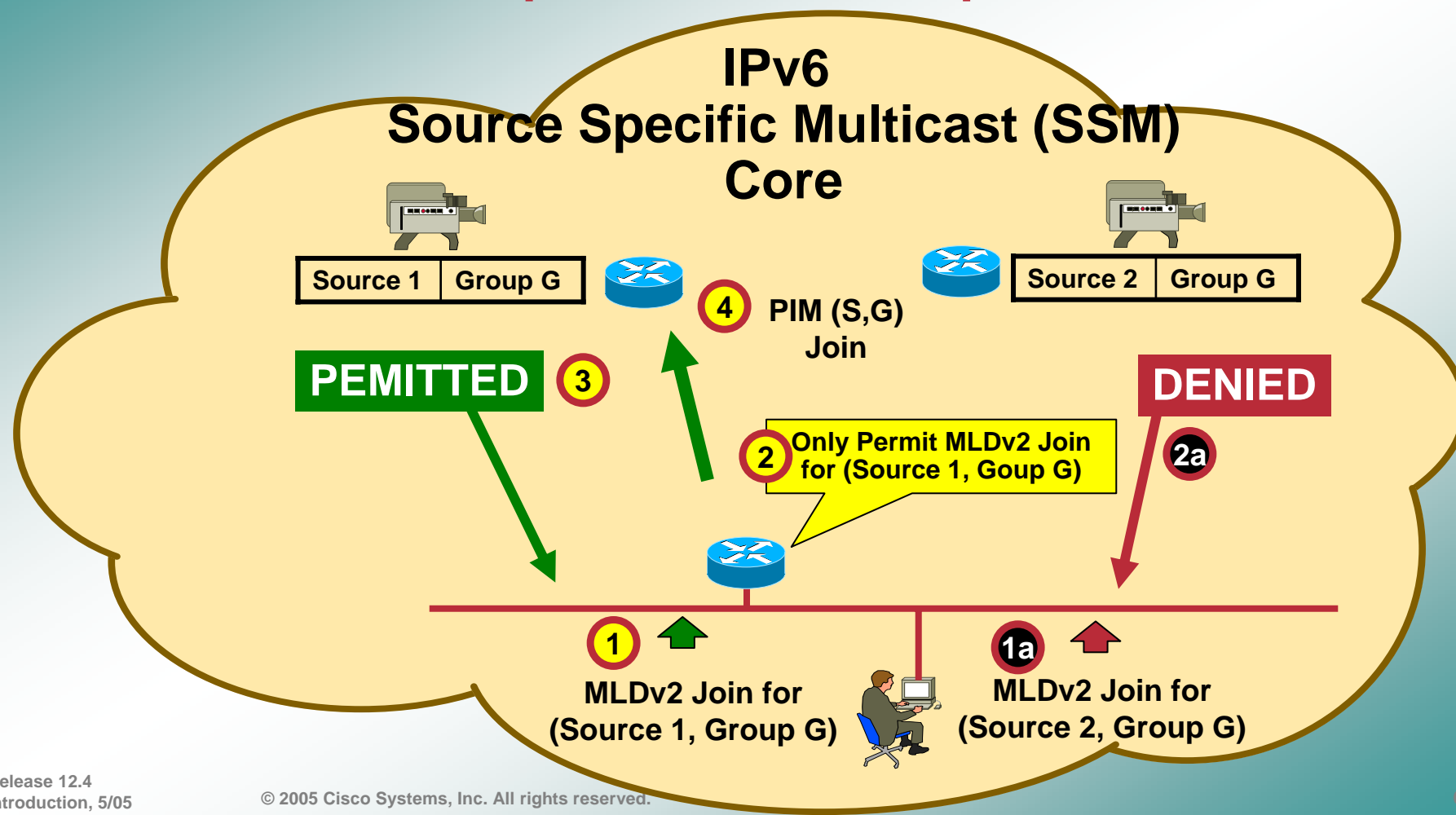
VPNs

- Layer 2 Tunneling Protocol Version 3

IPv6 Multicast Listener Discovery Access Group

Cisco.com

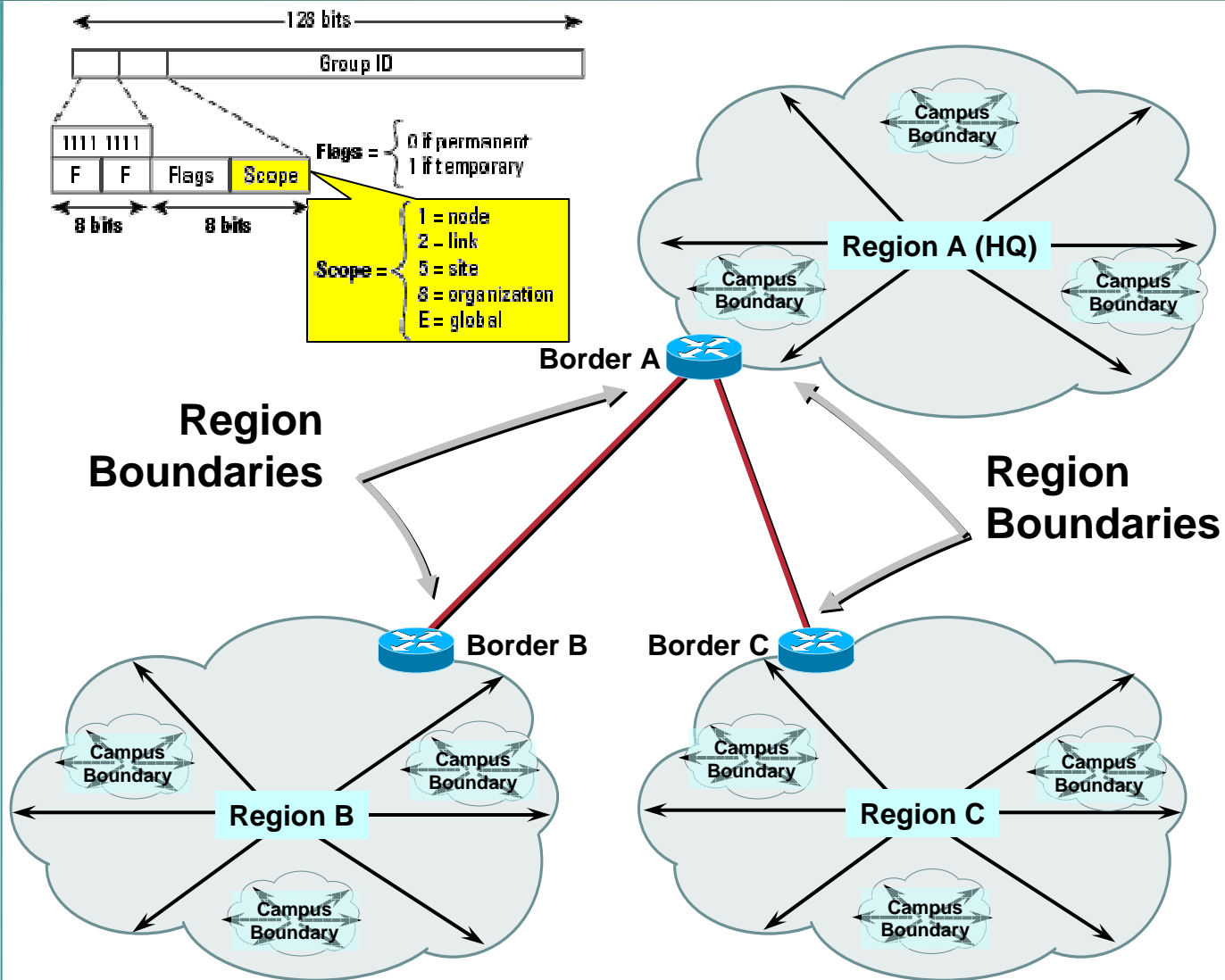
Checks Against Source S and
Group G for MLDv2 Reports



IPv6 Multicast Scope Boundaries

Cisco.com

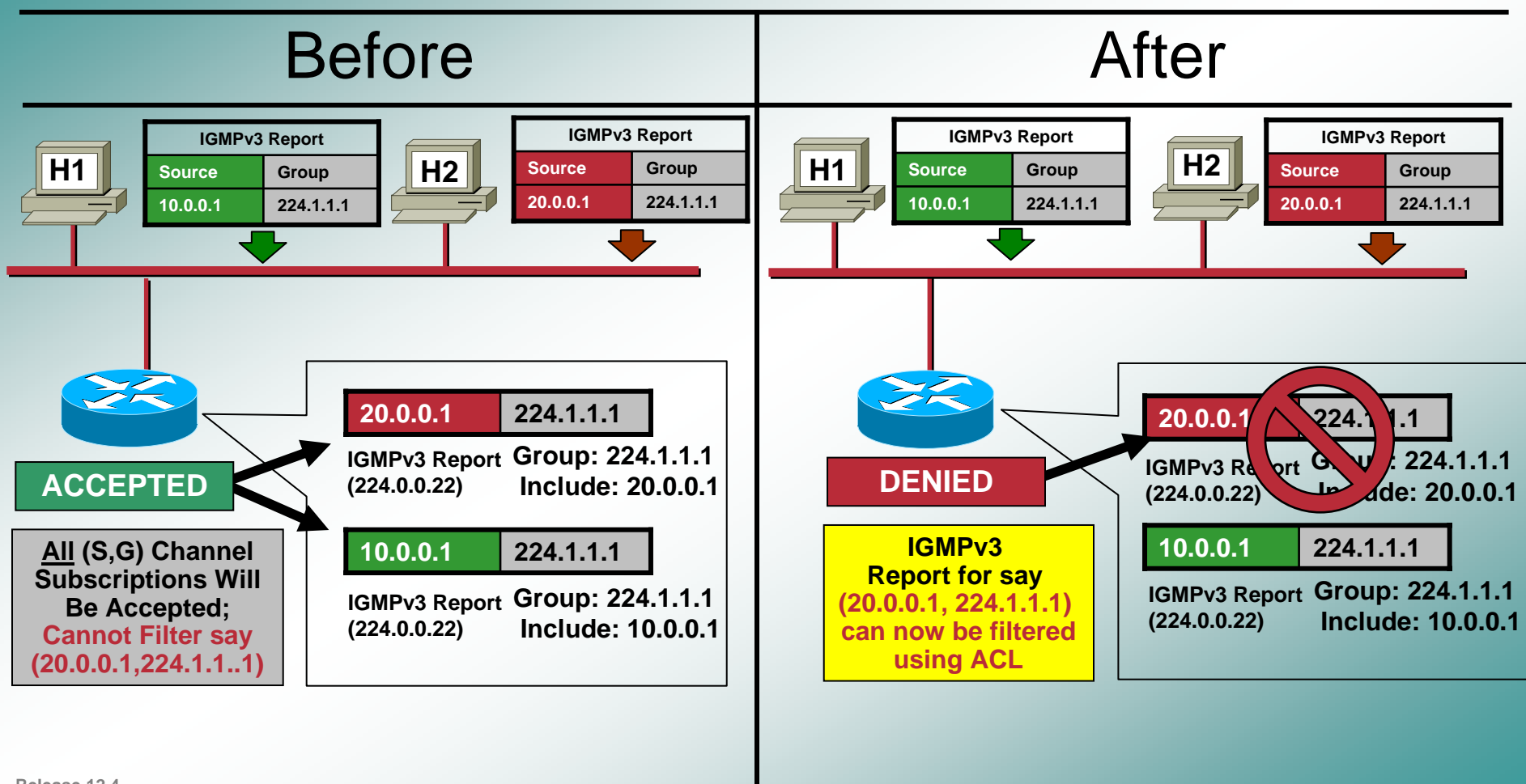
- Minimizes BW costs by keeping High-BW sources to local site(s)
- Sets well defined boundaries on different types of multicast traffic through hierarchical addressing
- Simplifies network planning by doing away with “TTL-threshold” hacks



Extended ACL Support for IGMP to Support Source Specific Multicast in IPv4a

Cisco.com

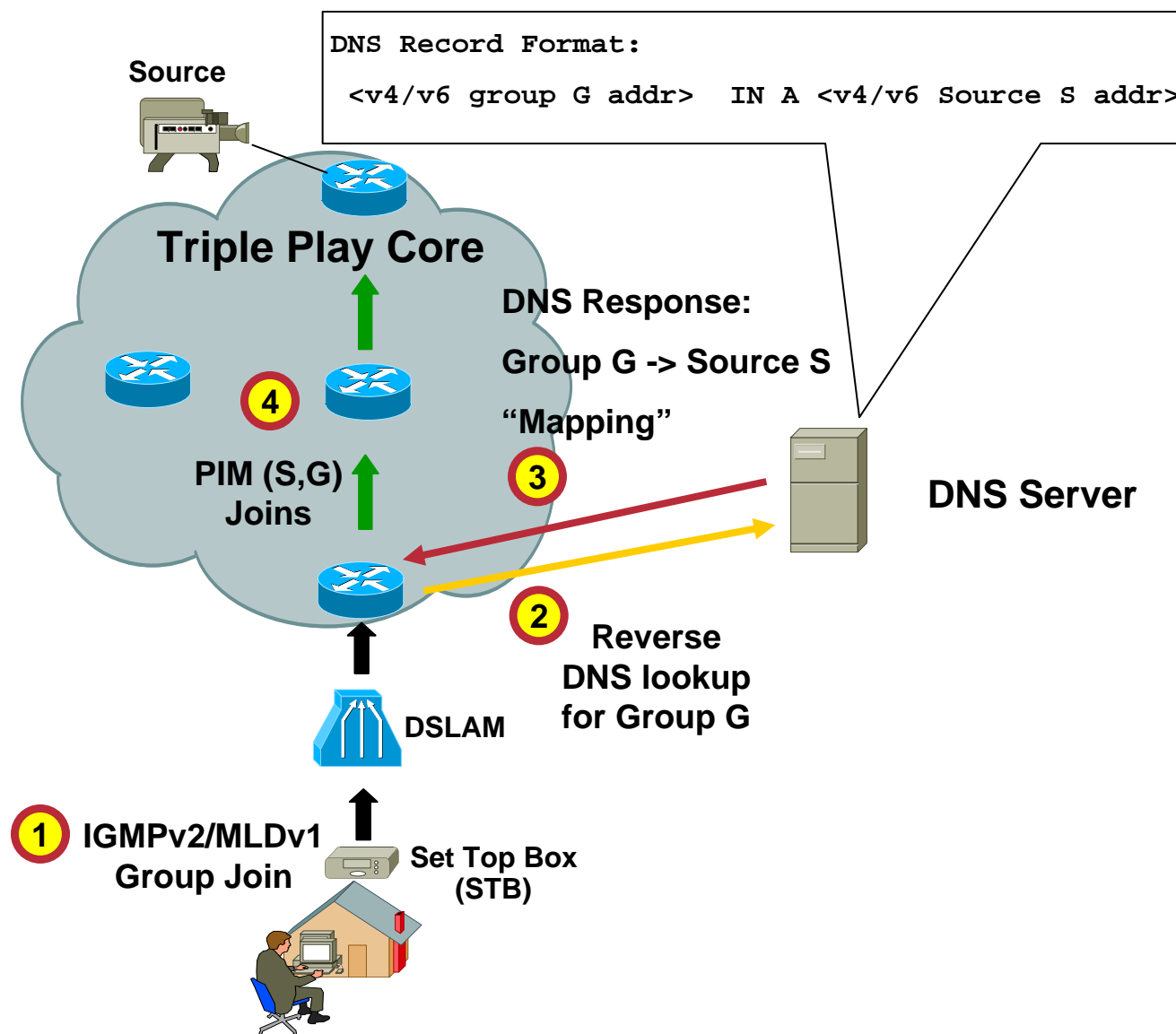
Checks Against Source S and Group G for MLDv2 Reports



Support for Source Specific Multicast (SSM) Mapping with DNS

Cisco.com

- Support for both IPv4 & IPv6
- Provides group to source mapping using DNS reverse lookup
- Allows rapid deployment of Source Specific Multicast (SSM) without IGMPv3/MLDv2 dependency
- Operation transparent to IGMPv2/MLDv1 hosts



Major Release 12.4

IP Addressing Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
- Cisco 830 Series Routers

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Voice

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High Availability

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IP Routing

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Cisco IOS Software Major Release 12.4

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VPNs

- Layer 2 Tunneling Protocol Version 3

Rate Limiting NAT Translation

Cisco.com

- **Allows extensive control over how NAT address pools and the translation table are allocated and used**
- **Provides an option to implement a hierarchy of rate limiting tailored to a specific network, or to specific device requirements and concerns**
- **Allows control over the number of concurrent translations that all users or a specific, individual IP host can have**
- **Enables rate limiting across all MPLS VPNs and sets limits for a specific MPLS VPN**
- **Helps control and mitigate Denial of Service attacks**

NBAR-NAT Integration and Real-Time Streaming Protocol

Cisco.com

- Extends NAT/PAT support of Voice/Video protocols
- Enables the many customers who use NAT to now run Real Time Streaming Protocol (RTSP) applications in Port Address Translation (PAT) mode
- RTSP is a client-server multimedia presentation control protocol that underlies multimedia applications (ie: video delivery) that are becoming increasingly popular:

RealSystem G2 by RealNetworks

Windows Media Services (WMS) by Microsoft

QuickTime by Apple

IPTV by Cisco

Stateful Failover Asymmetric Outside-to-Inside

Cisco.com

- Enables two NAT routers to participate in a Primary-Backup design, which improves customer ROI as the Backup NAT router is not sitting idle
- Supports multiple routing paths from outside-to-inside
- Handles IP Flow or Per Packet load balancing of asymmetric routing from outside-to-inside
- Adds support for ALL embedded addressing for all the ALGs in NAT
- Adds support for ALL NAT/PAT configuration types

Static IP Support

- **Enables customers that have statically assigned IP Addresses for their “home” network to access a public WLAN network and gain access to the IP network and related service offerings**
- **Help to prevent malicious clients from preventing access to valid host on the outside domain**
- **Requires no client reconfiguration for clients configured with static IP addresses**
- **Allows accounting information to be generated per user session**
- **Provides an Access Zone Router that supports:**
 - Web login using static IP address**
 - 802.1x login using static IP address**

Major Release 12.4

IP Mobility Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
- Cisco 530 Series Routers

IP Routing

- Cisco IOS Optimized Edge Routing
- Enhanced Interior Gateway Routing Protocol Enhancements

IP Addressing

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- Support for GDM Mapping with DNS

VPNs

- Layer 2 Tunneling Protocol Version 3

High Availability

- Cisco IOS Warm Upgrade

Dynamic Security Associations and Key Distribution

Cisco.com

- **Greatly improves network security and usability for mobile users while also simplifying Mobile IP provisioning for network administrators**
- **Improves security with renewable, dynamically generated keys; improves usability and provisioning with "single sign-on" capability for mobile users**

Enables Mobile IP to automatically derive the security associations from its user's Windows login name and password upon logging in to the Windows domain

Eliminates the need for manually configuring security associations and additional key allocation to mobile users

Leverages the existing Windows infrastructure for mobile user authentication

Major Release 12.4

Multiprotocol Label Switching Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
- Cisco E30 Series Routers

Security

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Cisco IOS Software Major Release 12.4

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Multiprotocol Label Switching

- **Multiprotocol Label Switching: Label Distribution Protocol Autoconfiguration**
- **MPLS - LDP Graceful Restart**

VPNs

- Layer 2 Tunneling Protocol Version 3

Multiprotocol Label Switching: Label Distribution Protocol Autoconfiguration

Cisco.com

- **Provides a global configuration command that automatically enables LDP on interfaces for which a specified Interior Gateway Protocol (IGP) has been enabled**
- **Simplifies LDP configuration**
- **Enables more product deployment options**
- **Features consistency across products**

MPLS - LDP Graceful Restart

Cisco.com

- **Provides Nonstop Forwarding (NSF) Awareness for LDP traffic, which enables continuous forwarding and graceful recovery of MPLS LDP traffic during an LDP reset or session restart**
- **Enables more product deployment options**
- **Features consistency across products**
- **Increases MPLS LDP network uptime and reliability**

Major Release 12.4

VPNs Highlights

Cisco.com

New Hardware

- Cisco Integrated Services Routers
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IP Routing

- Cisco IOS Optimized Edge Routing
- Enhanced Interior Gateway Routing Protocol Enhancements

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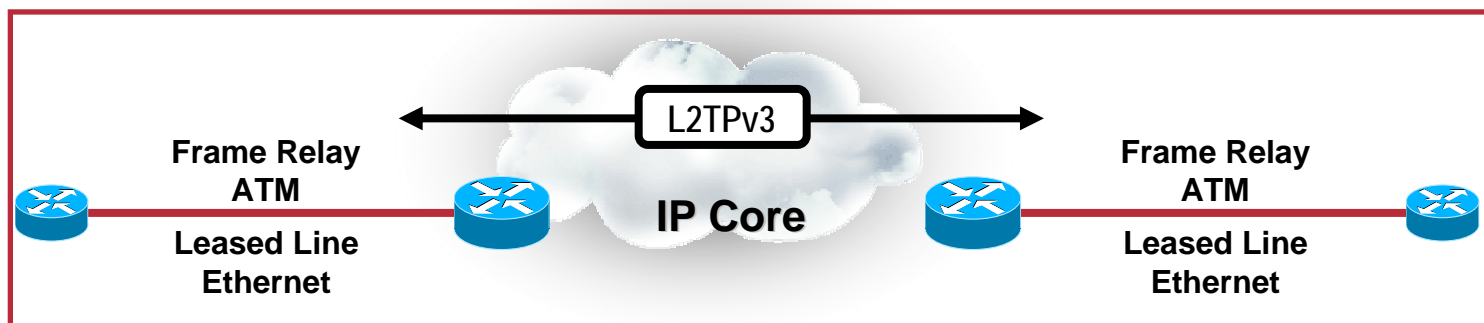
- Cisco IOS Warm Upgrade

Layer 2 Tunneling Protocol Version 3

Extends IP Capabilities to Layer 2 VPNs

Cisco.com

- L2TPv3 is designed for **multiservice tunneling** over **IP networks**
- Extends L2TPv2 (RFC 2661), the standard protocol for tunneling PPP
- **Simple** edge configuration is all that is required!
- Fixed header allows for **high-performance**/HW-accelerated decapsulation
- **Standards Based (RFC 3931)**, open architecture allows extensibility to many transport types



Layer 2 VPNs with Layer 2 Tunneling Protocol Version 3 Benefits

Cisco.com

- **Reduces total cost of ownership**

Consolidates multiple core technologies (ie: IP and ATM) into a single, packet-based infrastructure
- **Simplifies services**

Enables Service Providers to provide Layer 2 connectivity, maintaining customer autonomy (Service Providers do not participate in customer routing)
- **Protects investments**

Allows Service Providers to leverage an existing IP infrastructure to support Layer 2 networks without a Layer 2 infrastructure
- **Enhances feature support**

Enables Service Providers to use advanced Cisco IOS Software features (ie: QoS) to tailor Layer 2 traffic to customer requirements
- **Increases revenue**

Provides new service/revenue opportunities for IP-based networks (ie: Layer 2 transport and Metro Ethernet services)

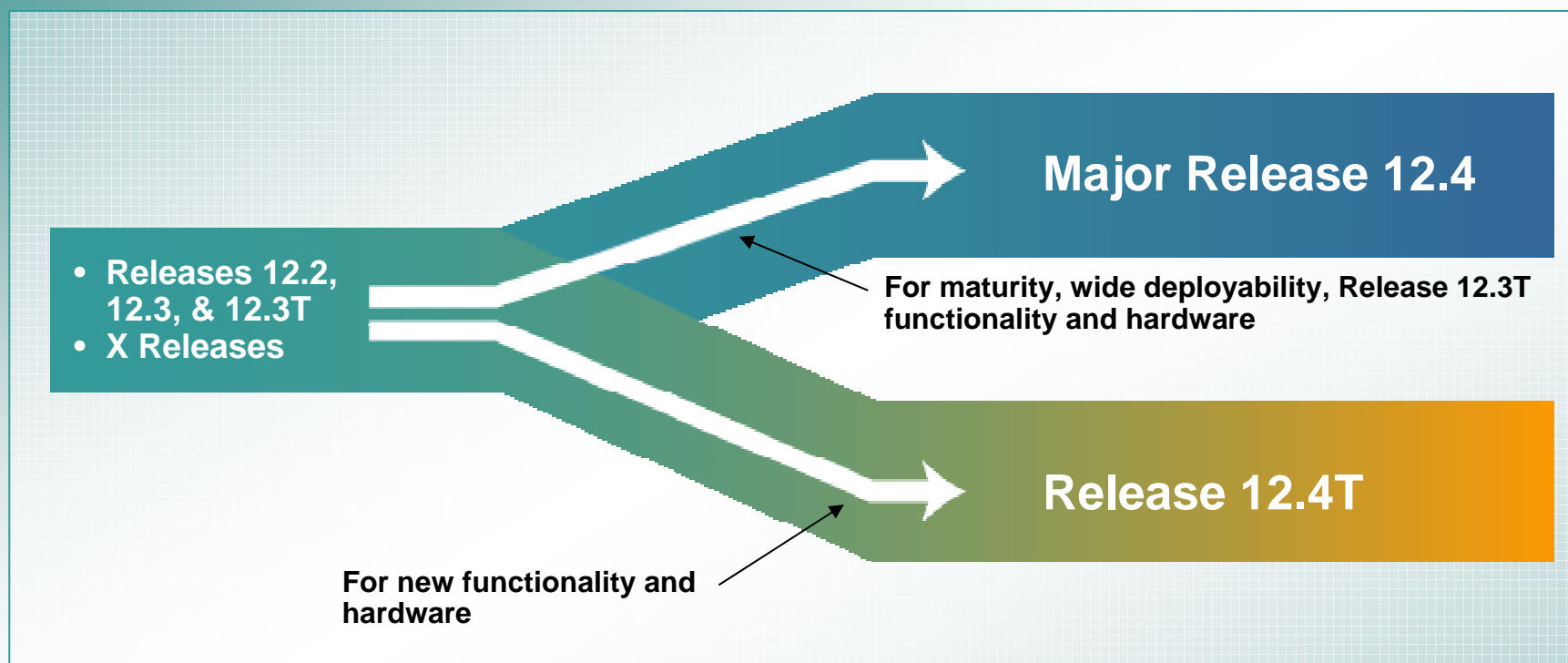
Agenda

Cisco.com

- Release 12.3T Family
- Introducing Release 12.3(8)T
- Cisco IOS Packaging
- **Upgrade Paths**
- Summary

Release 12.4 Upgrade Paths

Cisco.com



Agenda

Cisco.com

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- Upgrade Paths
- **Summary**

Cisco IOS Software Major Release 12.4

Cisco.com

Delivers Advanced Functionality with Powerful Hardware Support

- **Developed for the most demanding Enterprise, Access, and Service Provider Aggregation networks**
- **Provides a comprehensive portfolio of Cisco technologies, including the leading-edge functionality and hardware introduced in Release 12.3T**
- **Introduces more than 700 industry-leading features across the widest range of hardware in the industry**
- **Anchored by an intensive stability and testing program**

Major Release 12.4 References

Cisco.com

- **Cisco IOS Software Release 12.4**

www.cisco.com/go/release124/

- **Cisco Integrated Service Routers**

www.cisco.com/go/isr/

- **Feedback and Questions**

www.cisco.com/warp/public/732/feedback/release/

CISCO SYSTEMS

