Cisco Extends Security, Voice, and Wireless Services with Cisco IOS Software Release 12.4(4)T

Internet Technologies Division

October 2005

Agenda

- **Release 12.4T Family**

- **Introducing Release 12.4(4)T**

- **Additional Features and Enhancements**

- **Cisco IOS® Packaging**

- **Upgrade Paths**

- **Summary**
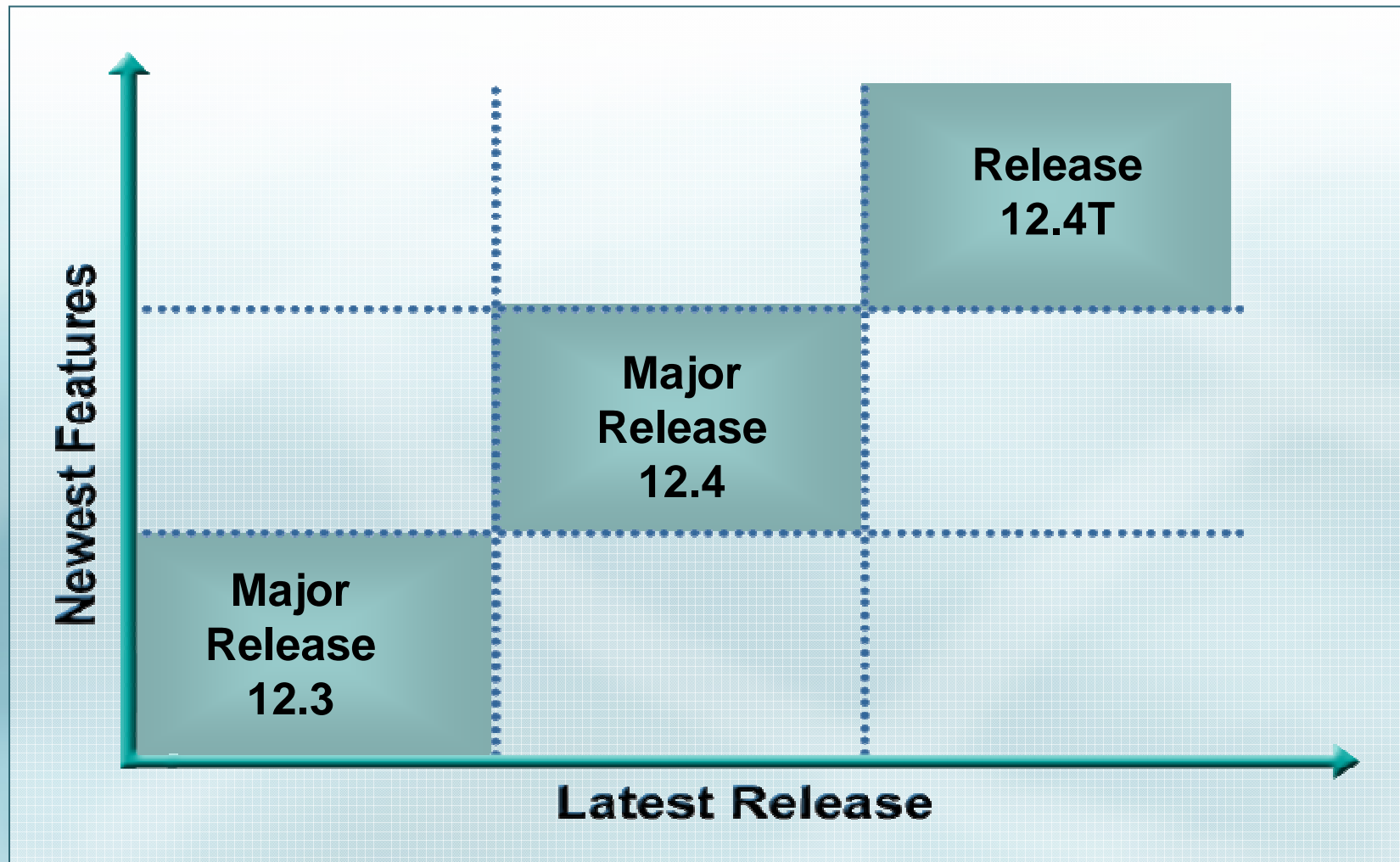
Cisco IOS Software Release 12.4T

Extending Security, Voice, and Wireless Services

Integrates a portfolio of new capabilities, including security, voice, and wireless, with powerful hardware support

Delivers advanced services for enterprise and access customers

Series of regularly scheduled individual releases, which Cisco will ultimately consolidate to form the next major release

Release 12.4T: Built on the Mature Base of Major Release 12.4

Release 12.4T Within the Cisco IOS Software Release Portfolio

Release Families	Target Market	Planned Hardware
Cisco IOS XR	Service Provider Core	Cisco Carrier Router System-1 (CRS-1)
Release 12.4	Enterprise Access Service Provider Aggregation	Cisco 800, 1700, 1800, 2600, 2600XM, 2800, 3600, 3700, 3800, and 7200 Series Routers Cisco 7301 Router
Release 12.4T	Enterprise Access	Cisco 800, 1700, 1800, 2600, 2600XM, 2800, 3600, 3700, 3800, and 7200 Series Routers Cisco 7301 Router Cisco AS5000 Series
Release 12.2S	Enterprise Core / Switching / WAN Aggregation, Service Provider Aggregation	Cisco Catalyst 2970, 3750, 4500, 6500 Series Switches Cisco 7200, 7300, 7500, 7600, 10000, ONS155x0 Cisco uBR7000/ uBR10000 Series Routers
Release 12.0S	Service Provider Core / Aggregation	Cisco 7200, 7500, 10000, and 12000 Series Routers

Release 12.4T Family Inheritance
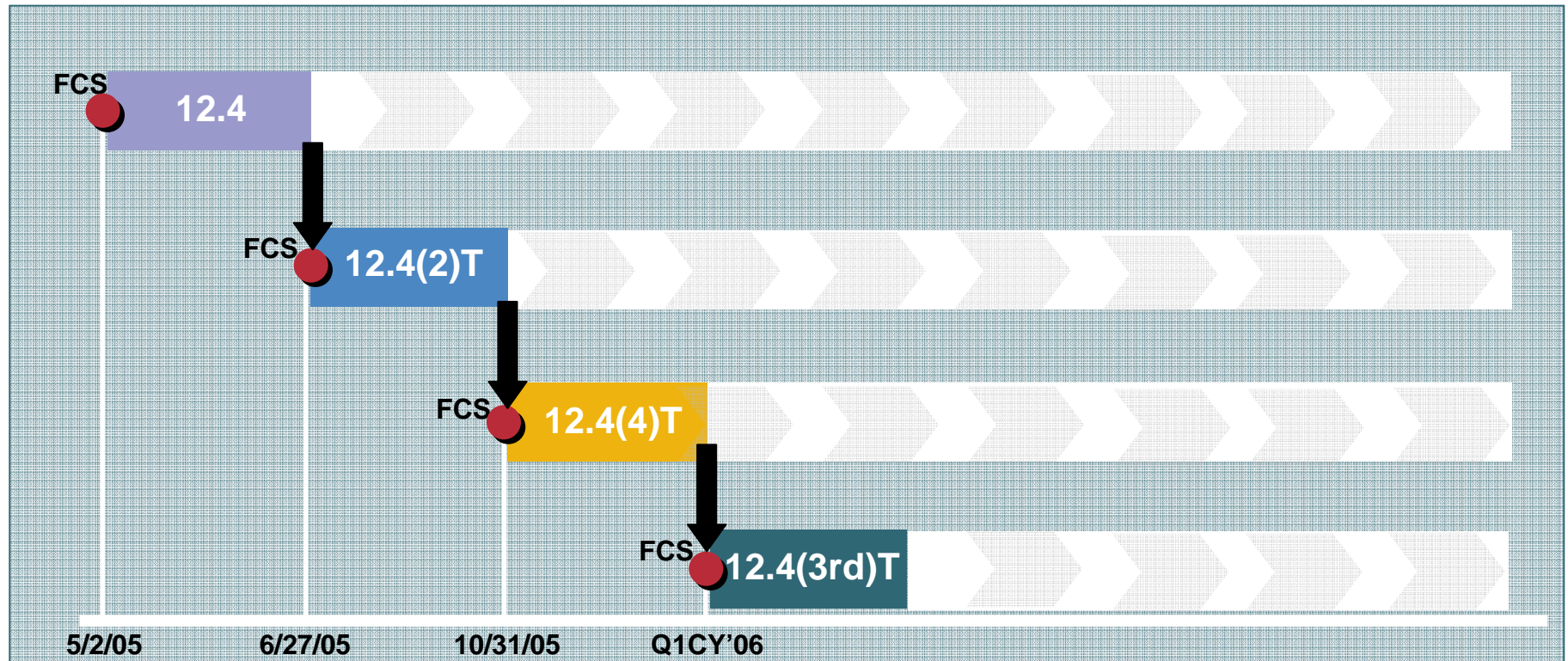
**Each release inherits the functionality
of its predecessor in the Release 12.4T family**

12.4T Releases Prior To Release 12.4(4)T: Key Features in Release 12.4(2)T

Hardware
- Cisco 850 Series Integrated Services Routers
- Cisco 870 Series Integrated Services Routers
- Cisco 1800 Series Integrated Services Routers - Fixed Configuration Models
- Cisco High-Speed Intra Chassis Module Interconnect
- Inline Power Auto Negotiation

Cisco IOS Security
- Cisco Router and Security Device Manager 2.1.2
- Transparent Cisco IOS Intrusion Prevention System
- Easy VPN Dynamic Virtual Tunnel Interfaces
- Other Easy VPN Enhancements
- Certificate Authority Key Rollover
- Configurable Certificate Storage Location
- NAT Optimize Media Path for SIP Traffic
- Zeroization

Cisco IOS Infrastructure
- Cisco IOS EEM Version 2.2

Voice
- SIP Support of Resource Priority Header and Reason Header
- SIP: User Agent MIB
- Configurable Hostname in Locally Generated SIP Headers
- Secure Communication between IP-STE Endpoint and STE Endpoint
- Land Mobile Radio over IP Enhancement
- MGCP Controlled Backhaul of Basic Rate Interface Signaling
- SCCP Analog (FXS) Ports Supplementary Feature Support for Cisco VG 224
- E1 R2 Collect Call Blocking

Quality of Service
- BitTorrent PDLMs Native Implementation
- Citrix ICA Published Applications Native Implementation
- Multiple Matches Per Port
- MQC Policy Map Support on Configured Virtual Circuit Range ATM

Cisco IOS Software Release 12.4(2)T

IP Multicast
- Multicast Listener Discovery Group Limits
- IPv6 Boot Strap Router—Ability to Configure Rendezvous Point Mapping
- IPv6 Source Specific Multicast Mapping
- Multicast Source Discovery Protocol MD5 Password Authentication

Access Technology
- AAA CLI Stop Record Enhancement
- Calling Number Suppression for L2TP Setup
- Multilink Frame Relay (FRF.16.1) Variable Bandwidth Class Support
- SSG - Configurable Maximum Number of Allowed Subscribers
- SSG Support for WISPr RADIUS Attributes
- Routed Bridge Encapsulation Client Side Encapsulation with QoS
- Define Interface Policy-Map AV Pairs AAA

Management Instrumentation
- Cisco IOS IP SLAs Random Scheduler
- NetFlow Top Talker CLI - Phase 2
- AES and Triple-Data Encryption Standard Algorithm Encryption Support for SNMPv3

IP Services
- IPv6 ACL Extensions for Mobile IPv6
- IPv6 Default Router Preference
- Foreign Agent Local Route Optimization

IP Routing
- Application-Aware Routing: Policy Based Routing
- TCP Show Extension
- ICMP Unreachable Rate Limiting User Feedback
- "Clear IP Traffic" CLI

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- **Additional Features and Enhancements**

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Introducing Release 12.4(4)T

Cisco IOS Software Release 12.4(4)T

- Enhances threat protection against malicious worm and virus attacks

- Improves performance monitoring of VoIP networks

- Extends support for secure concurrent services on the Cisco 1800 Series router

- Second in a series of individual 12.4T releases, each of which aggregate the functionality delivered via its predecessor

Release 12.4(4)T Highlights

- **Hardware**

    Cisco 1801, 1802, and 1803 Integrated Services Routers

- **Security**

    Cisco IOS Flexible Packet Matching (FPM)

    Application Firewall for Instant Messenger Traffic Enforcement

- **Voice**

    Cisco IOS IP Service Level Agreements (SLAs) for VoIP with Real Time Protocol (RTP)

- **High Availability**

    Hot Standby Router Protocol (HSRP) for IPv6

    NetFlow Reliable Export via Stream Control Transport Protocol (SCTP)

Cisco 1800 Series Integrated Services Routers

- Secure, concurrent services for broadband access in branch and small offices

- Advanced security services, including Stateful Inspection Firewall, IPsec VPNs (3DES or AES), Intrusion Prevention System (IPS), Antivirus support through Network Admission Control (NAC) and enforcement of secure access policies, and Cisco Easy VPN and DMVPN with Cisco AutoSecure

- Integrated ISDN, analog modem, or Ethernet backup port for redundant WAN links and load balancing

- Secure WLAN for simultaneous 802.11a and 802.11b/g with use of multiple replaceable antennas

- 8-port 10/100 managed switch with 802.1q VLAN support & inline power

Cisco 1800 Series Benefits

- **High-speed processor delivers exceptional processing power for applications and concurrent security and wireless services**

- **Offers flexibility to connect to various types of DSL broadband including ADSL2/ADSL2+ for the Cisco 1801 and 1802 Routers**

  Additional capability includes the ability to deploy redundant WAN connections for failover protections and load balancing.

- **Detects harmful network activity and generates alarms to warn of threats and intrusion attempts**

  New IPS signatures can be dynamically loaded

- **Provides simultaneous operation at multiple Wi-Fi frequencies, including 2.4 GHz and 5 GHz**

- **Easy set up, deployment, and remote management capabilities through web-based tools and Cisco IOS Software**

  Enterprise advanced management and configuration capabilities are offered through a Web-based GUI

Cisco IOS Flexible Packet Matching

- **Next-generation Access Control List (ACL) technology that provides rapid first line of defense against malicious traffic at the entry point into the network**

- **Features powerful custom pattern matching deep within packet header or payload**

  Minimizes inadvertent blocking of legitimate business traffic

- **Ability to match on arbitrary bits of a packet at arbitrary depth (offset) in the packet header and payload**

- **Off box language (XML) to define protocol headers and filters**

- **Allows custom filters**

  Detects malicious patterns anywhere within the packet

Create custom filters using XML

Deploy across network

Incoming packets

Filter match
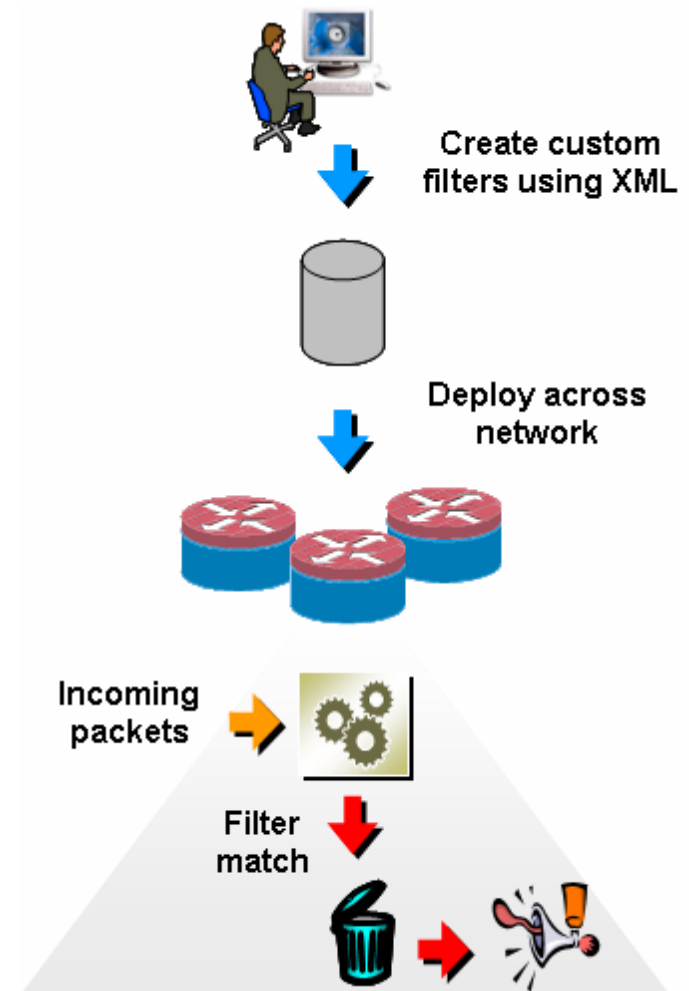
Cisco IOS FPM Benefits

- **Enables users to create their own stateless packet classification criteria and to define policies with multiple actions (ie: drop, log or send ICMP unreachable) to immediately block new viruses, worms, and attacks**

- **Provides the means to inspect packets for characteristics regardless of the header fields involved**

- **Provides a flexible Layer 2 through Layer 7 stateless classification mechanism**

Application Firewall for Instant Messenger Traffic Enforcement

- **Advanced application inspection and control**

- **Can easily implement a policy that allows that text-chat capability in instant messenger, but denies access to additional services such as voice or video chat and file transfer**

- **Audit-trail capability allows customers to monitor the volume of instant messenger traffic for specific users**

IM Traffic

Payload | Port x

Payload | Port y

IM Traffic

Server Farm

Corporate Office

# Application Firewall for Instant Messenger Traffic Enforcement Benefits

- **Offers flexible policy enforcement by enabling administrators to restrict user access to specific instant messenger services (ie: text chat, voice or video chat, and file transfer) and to ensure judicious use of network resources**

- **Can limit instant messenger usage within a network by enforcing instant messenger policy in a granular manner**

- **Reduces exposure to vulnerabilities from instant messenger clients**

Cisco IOS IP SLAs for VoIP with Real Time Protocol

Voice

- **Cisco IOS IP Service Level Agreements (SLAs) is a capability embedded Cisco IOS Software, which allows Cisco customers to increase productivity, lower operational costs, and reduce the frequency of network outages**

- **Cisco IOS IP SLAs for VoIP with RTP extends the productivity, OpEx, and availability benefits of Cisco IOS IP SLAs to VoIP networks**

- **Enables application aware performance monitoring for a VoIP network to measure call and voice statistics (ie: quality, jitter, delay, and frame loss) to facilitate network health, readiness, and troubleshooting**

- **VoIP network performance monitoring for SLAs through RTP and DSP Hardware**

IP SLAs RTP Based Measurements

PSTN

IP WAN

IP SLAs End to End Measurements
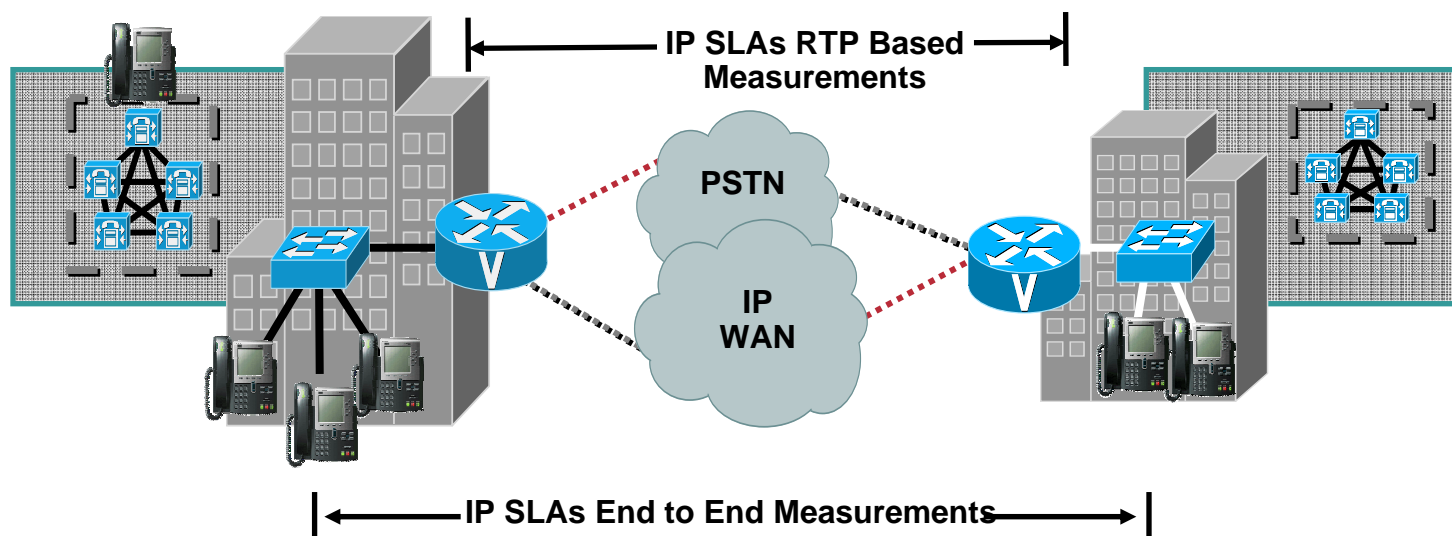
Cisco IOS IP SLAs for VoIP with RTP Benefits
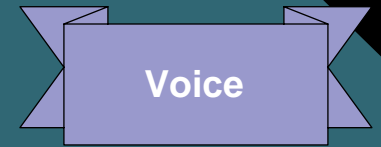
Voice

- **Measures performance characteristics for VoIP calls using RTP**

- **Calculates voice quality scores using voice gateway DSP hardware**

- **Adds to the already strong VoIP monitoring capabilities**

- **Extends the functionality provided by Cisco IOS IP SLAs**

  Performance visibility for VoIP, Video, business critical applications, MPLS, and VPN networks

  SLAs monitoring

  Network performance monitoring

  IP Service network health readiness or assessment

  Edge-to-edge network availability monitoring

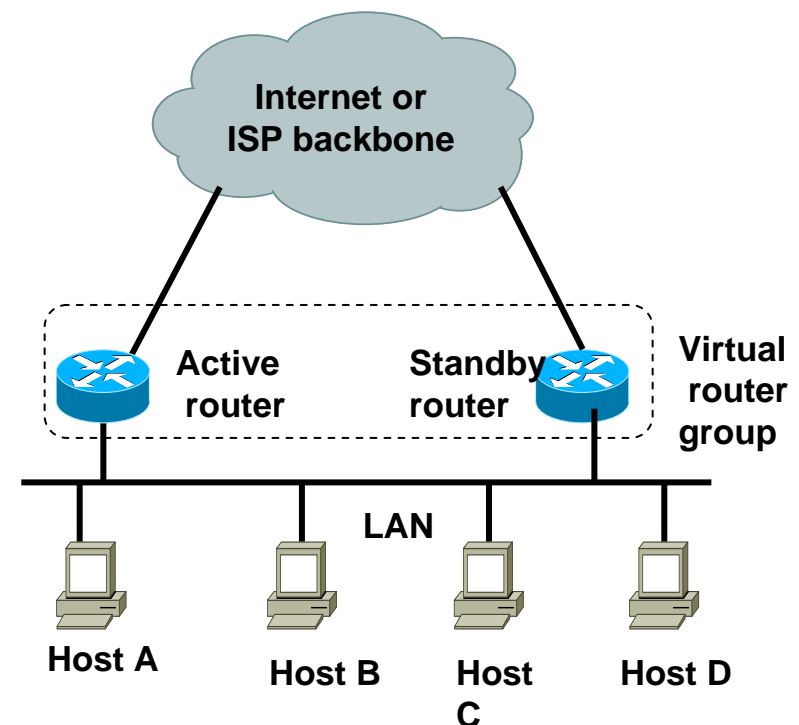 **Business-critical applications performance monitoring**

  Troubleshooting network operation

Hot Standby Router Protocol for IPv6

- **Extends the fault tolerance and fast switchover capabilities of Hot Standby Router Protocol (HSRP) to IPv6**

- **Provides a fast switchover to an alternate default router than can be obtained using standard IPv6 Neighbor Discovery (ND) procedures**

- **Backup router can take over for a failed default router within seconds using HSRP default parameters, or less than one second with millisecond HSRP timers**

    No interaction with the hosts is required

    Minimum amount of HSRP traffic

Internet or
ISP backbone

Active
router

Standby
router

Virtual
router
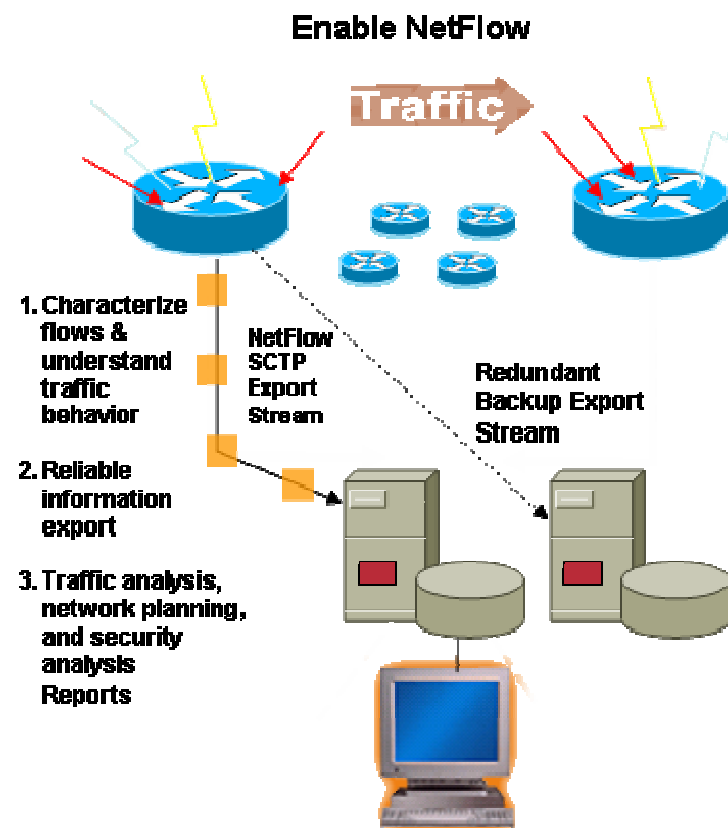group

LAN

Host A

Host B

Host
C

Host D

HSRP for IPv6 Benefits

- **Increases network availability by providing protection against router failures**

- **Provides network redundancy for IPv6 networks, ensuring that user traffic immediately and transparently recovers from first hop failures in network edge devices or access circuits**

- **Reduces protocol overhead and switchover times to just a few seconds, versus those available from the normal ND mechanisms in IPv6**

NetFlow Reliable Export via Stream Control Transport Protocol

- **Stream Control Transport Protocol (SCTP) exports NetFlow data**

- **Facilitates congestion aware and reliable export of NetFlow data to the NetFlow collector**

- **SCTP export is also highly available with redundant backup export streams for automated failover when a NetFlow collector is unavailable.**

Enable NetFlow

Traffic

1. Characterize flows & understand traffic behavior

NetFlow SCTP Export Stream

Redundant Backup Export Stream

2. Reliable information export

3. Traffic analysis, network planning, and security analysis Reports

NetFlow Reliable Export via SCTP Benefits

- **Reliable and congestion-aware NetFlow export**

- **High reliability with redundant export streams for NetFlow information**

- **Useful for accounting and billing data**

- **Ensures the integrity of accounting and billing information**

- **Facilitates highly reliable NetFlow export via redundant NetFlow streams to minimize the effects of network congestion and packet loss**

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Key Features in Release 12.4(4)T

Cisco IOS Security

- Flexible Packet Matching
- Application Firewall – Instant Message Traffic Enforcement
- VRF aware DNS
- Easy VPN Phase 6
- Control Plane Protection
- VRF Aware IPsec MIB
- IPV6 support for Site-Site IPsec VPN
- DMVPN QoS Support

Management Instrumentation

- NetFlow Top Talkers CLI

High Availability

- HSRP for IPv6
- NetFlow Reliable Export (SCTP)

IP Routing

- BDF Detection Standard Implementation
- BGP Route-Map Continue Support for Outbound Policy
- BGP Selective Next-Hop Route Filtering

Quality of Service

- Skype Classification vis NBAR PDLMs
- DirectConnect PDLM

Cisco IOS Software Release 12.4(4)T

Broadband

- Multicast User Authentication & Profile Support
- PPPoE Circuit-ID Tag Processing

Hardware

- Cisco 1801, 1802, and 1803 Integrated Services Routers
- Multi-Processor Forwarding for Broadband LAC, LNS, and PTA
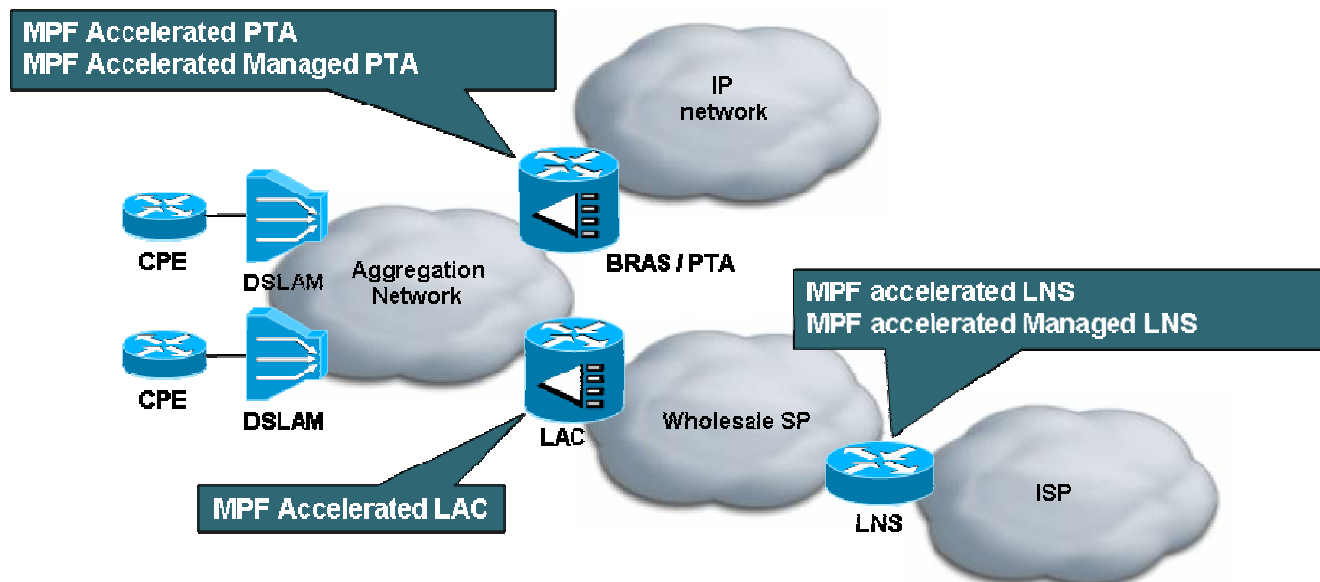- ADSL2/ADSL2+ Support for Integrated Service Routers

Voice

- Cisco IOS IP SLAs for VoIP with RTP
- Cisco CallManager Express 3.4
- Survivable Remote Site Telephony 3.4
- Secure Communication Between IP-STE and Lineside STE Endpoints
- Interoperability Enhancements to the Cisco Multiservice IP-IP Gateway
- Identify Alternate Endpoint Call Attempts in RADIUS Call Accounting Records
- Cisco Modem Relay
- SIP:CLI for Passing Calling Name when Privacy Exists
- Fax Relay Support for SG3 Fax Machines at G3 Speeds
- Basing SIP-SIP Support on the Cisco Multiservice IP-to-IP Gateway

# Multi-Processor Forwarding (MPF) for LAC, LNS, and PTA

Hardware

- **Improves broadband feature performance by accelerating features with a fast-forwarding method of switching packets on the second CPU of the Cisco 7301 and Cisco 7206 VXR Routers**

- **Significantly improves performance of Cisco 7301 or Cisco 7200 VXR Routers without any hardware changes**

- **No forklift upgrades for improved performance**

MPF Accelerated PTA
MPF Accelerated Managed PTA

IP network

CPE
DSLAM
Aggregation Network
BRAS / PTA

CPE
DSLAM
LAC
Wholesale SP

MPF accelerated LNS
MPF accelerated Managed LNS

MPF Accelerated LAC

LNS
ISP

ADSL2 / ADSL2+ for Integrated Services Routers

- **Higher speed DSL access**

- **Higher data throughput (up to 24 Mbps downstream and 1 Mbps upstream) for data, voice, and video Triple Play applications**

- **Multiple form factors to fit service provider and small/medium branch office applications**

- **Release 12.4(4)T supports ADSL2/ADSL2+ for the Cisco 857, 876, 877, 1801, and 1802 Routers**

- **Cisco 1841 Router and Cisco 2800 and 3800 Series supported via ADSL Hardware Interface Card**
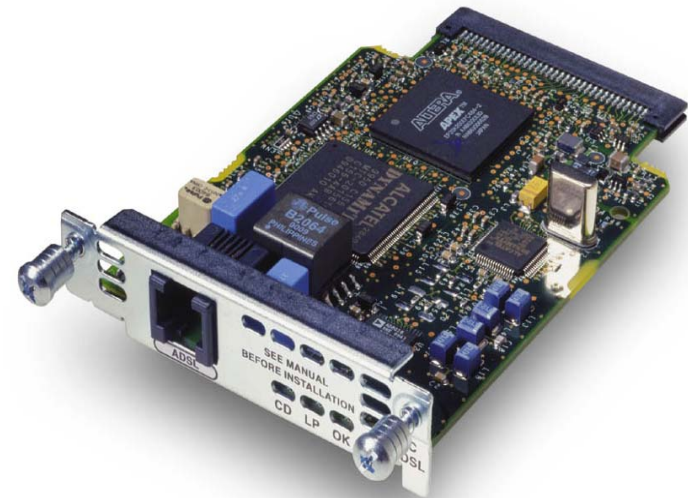
1-Port HWIC for Cisco 1841/2800/3800

Virtual Routing and Forwarding Domain Name System

- **Extends Domain Name System (DNS) functionality in the context of Multiprotocol Label Switching (MPLS) VPNs by allowing users to direct DNS queries within a given VRF to their respective DNS server**

- **Integrates MPLS Edge with Secure Socket Layer (SSL)-VPN through DNS service**

- **Allows mapping of SSL-VPN clients to a specific VRF with separate DNS servers**
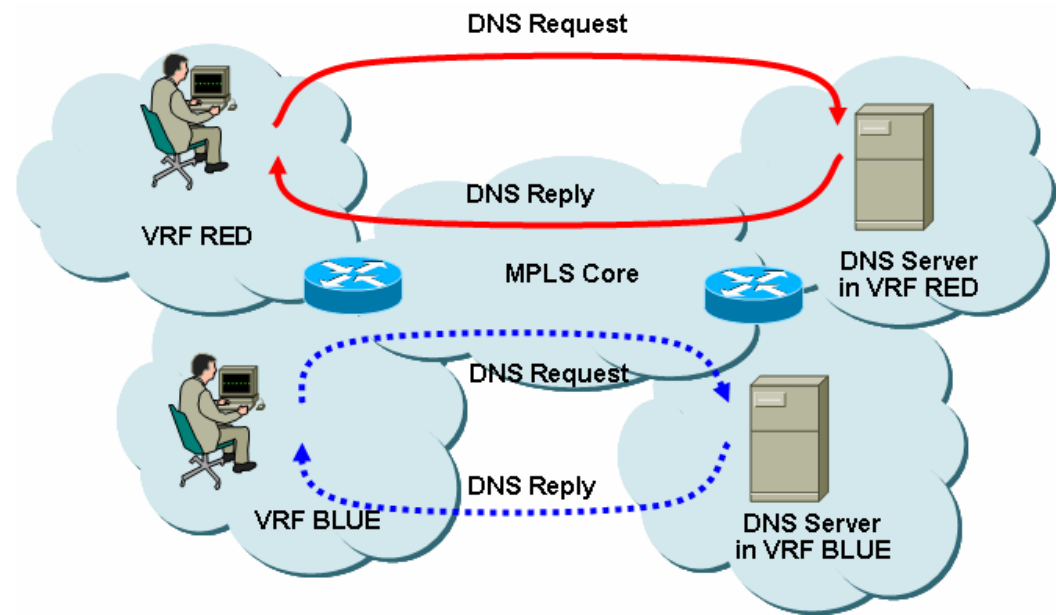
# Secure Communication between IP-STE and Lineside STE Endpoints

- **Allows Analog & BRI Secure Terminal Equipment (STE) to communicate with VoIP STEs using v.150.1 Modem Relay**

- **Secure, interoperable VoIP STE communication**

- **v.150.1 Modem Relay Cisco Voice Gateway provides interoperability**

- **STE based upon government proprietary encryption algorithms**
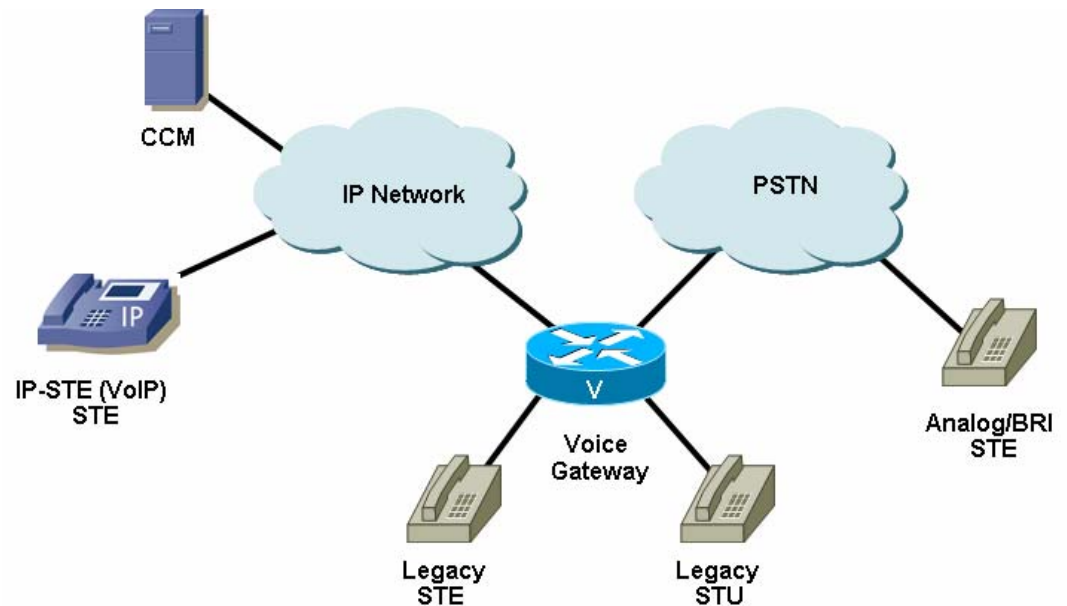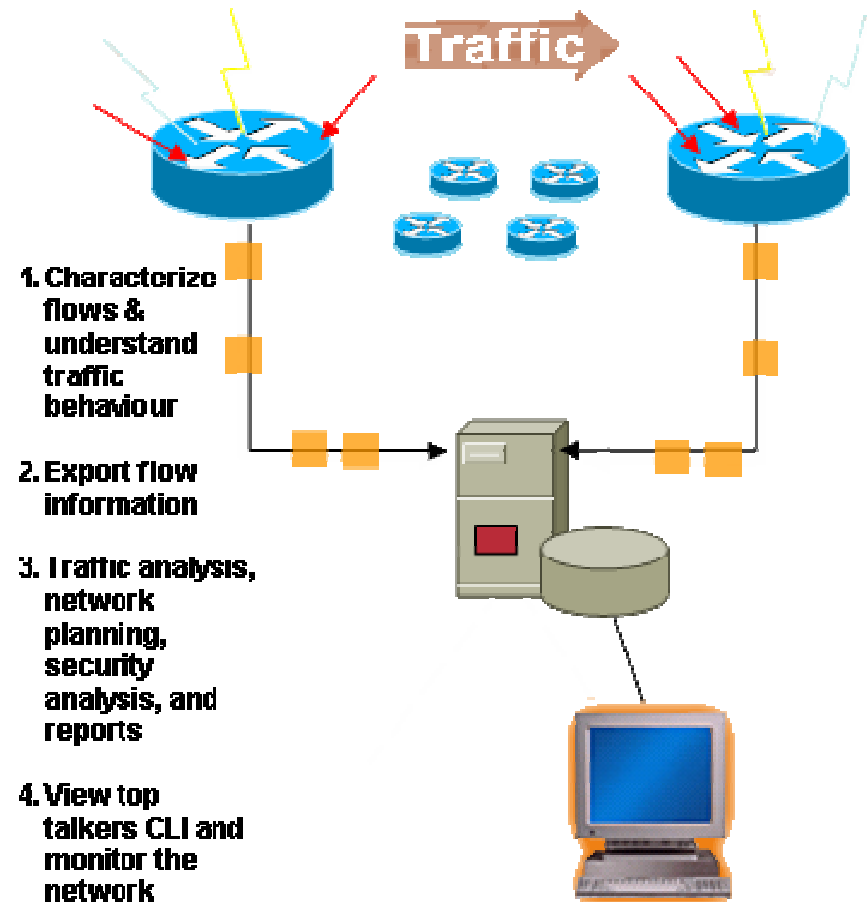
Fax Relay for SG3 Fax Machines and G3 speeds

- **Fax machine spoofing feature on select gateways used to force Super Group 3 (SG3) fax machines to automatically fallback to Group 3 (G3) speeds**

- **Enables faxes to be sent between two SG3 fax machines capable of sending over 33.6 kbps over T.38 Fax Relay at supported G3 speeds (<= 14.4 kbps)**
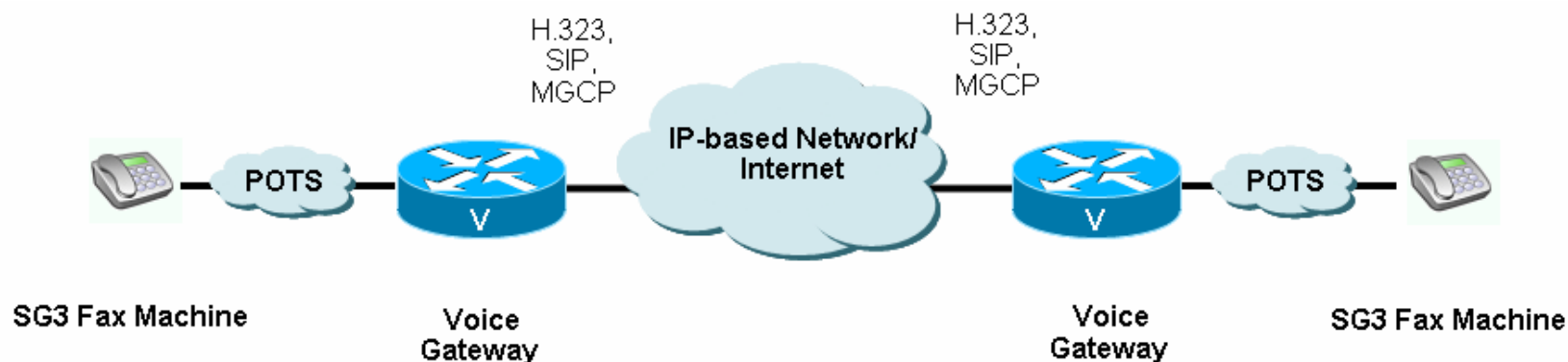
NetFlow Top Talkers CLI

- **Simplified CLI for network monitoring**

- **Allows monitoring of NetFlow data cache based upon top Protocols, Users, IP Addresses (source/destination), and VLANs**

- **Flexible Search CLI**

- **Facilitates network monitoring and troubleshooting**

Enable NetFlow

Traffic

1. Characterize flows & understand traffic behaviour

2. Export flow information

3. Traffic analysis, network planning, security analysis, and reports

4. View top talkers CLI and monitor the network

Skype Classification via NBAR PDLMs

- **Users can leverage Skype, a popular VoIP telephony service, to speak, send instant messages, and/or send files to one another via the Internet**

- **Enables the discovery of Skype application traffic, so Cisco IOS Quality of Service (QoS) policies can be applied to Skype traffic**

- **Network-Based Application Recognition (NBAR) Packet Description Language Module (PDLM) for Skype classification is integrated into Cisco IOS Software**
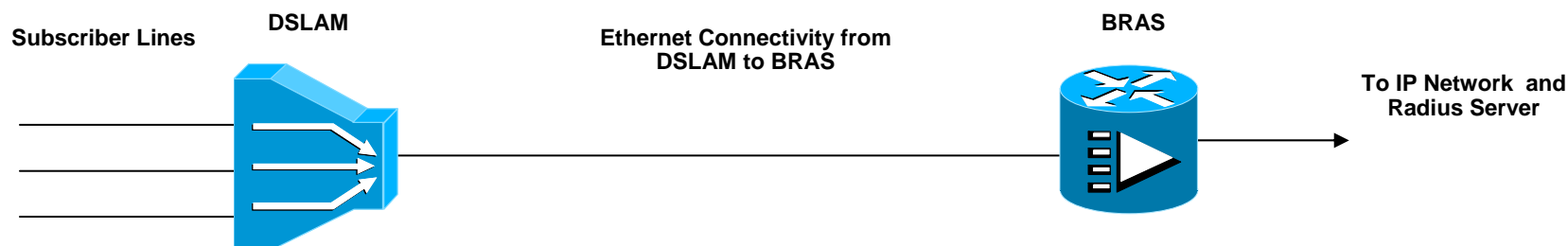
Multicast User Authentication and Profile Support
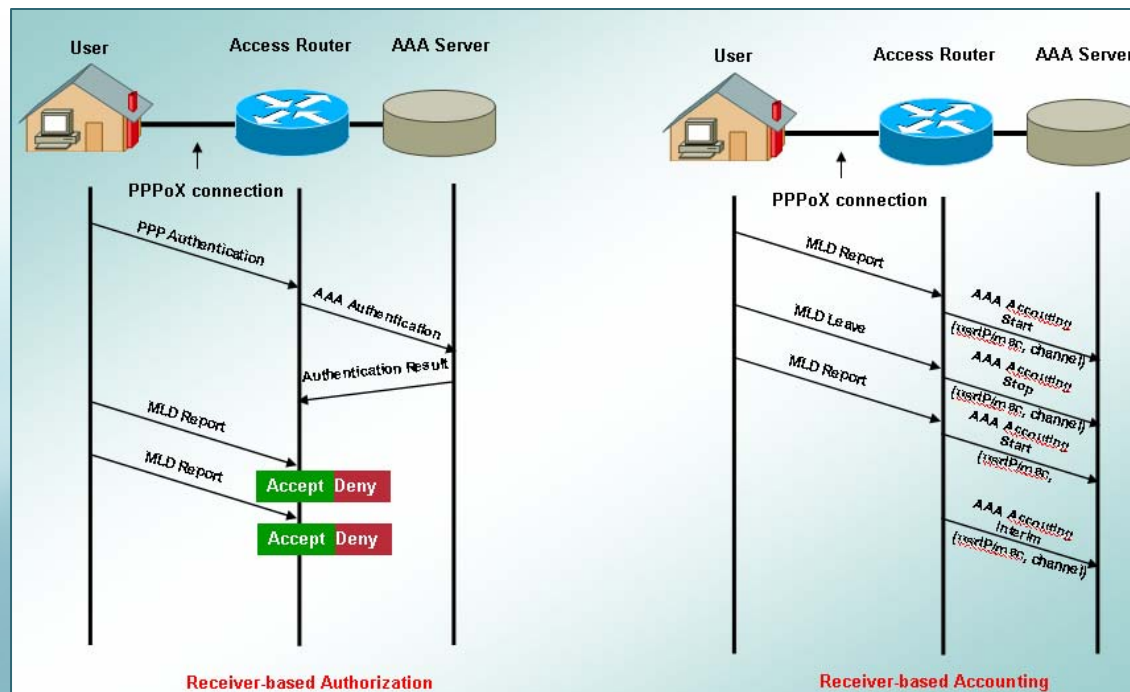
- **Improves multicast manageability for broadband**

- **Provides scalable authentication and accounting for multicast users**

- **Leverages Authentication, Authorization, and Accounting (AAA) and AAA profiles stored on central server**

Point-to-Point Protocol over Ethernet Circuit ID Tag Processing

- **Allows BRAS Interoperability with Ethernet based DSLAMs**

- **Provides a mechanism for Subscriber Line Identification for Ethernet based DSLAMs**

- **Based upon DSL Forum draft standard**

- **Simplifies troubleshooting, authentication, and accounting in Broadband networks**

Subscriber Lines   **DSLAM**   **Ethernet Connectivity from DSLAM to BRAS**   **BRAS**

To IP Network and Radius Server

Bidirectional Forwarding Detection Support

- **Provides rapid failure detection times between forwarding engines, while maintaining low overhead**

  Reduces network convergence times

- **Provides a single, standardized method of link/device/protocol failure detection at any protocol layer and over any media**

- **Allows for media independent link-failure detection**

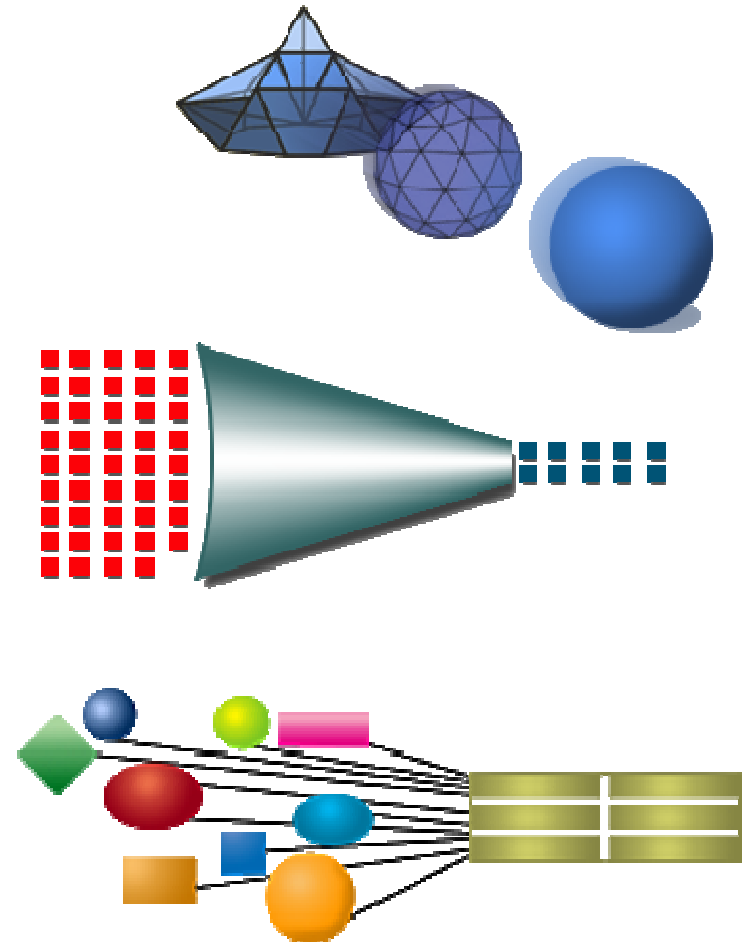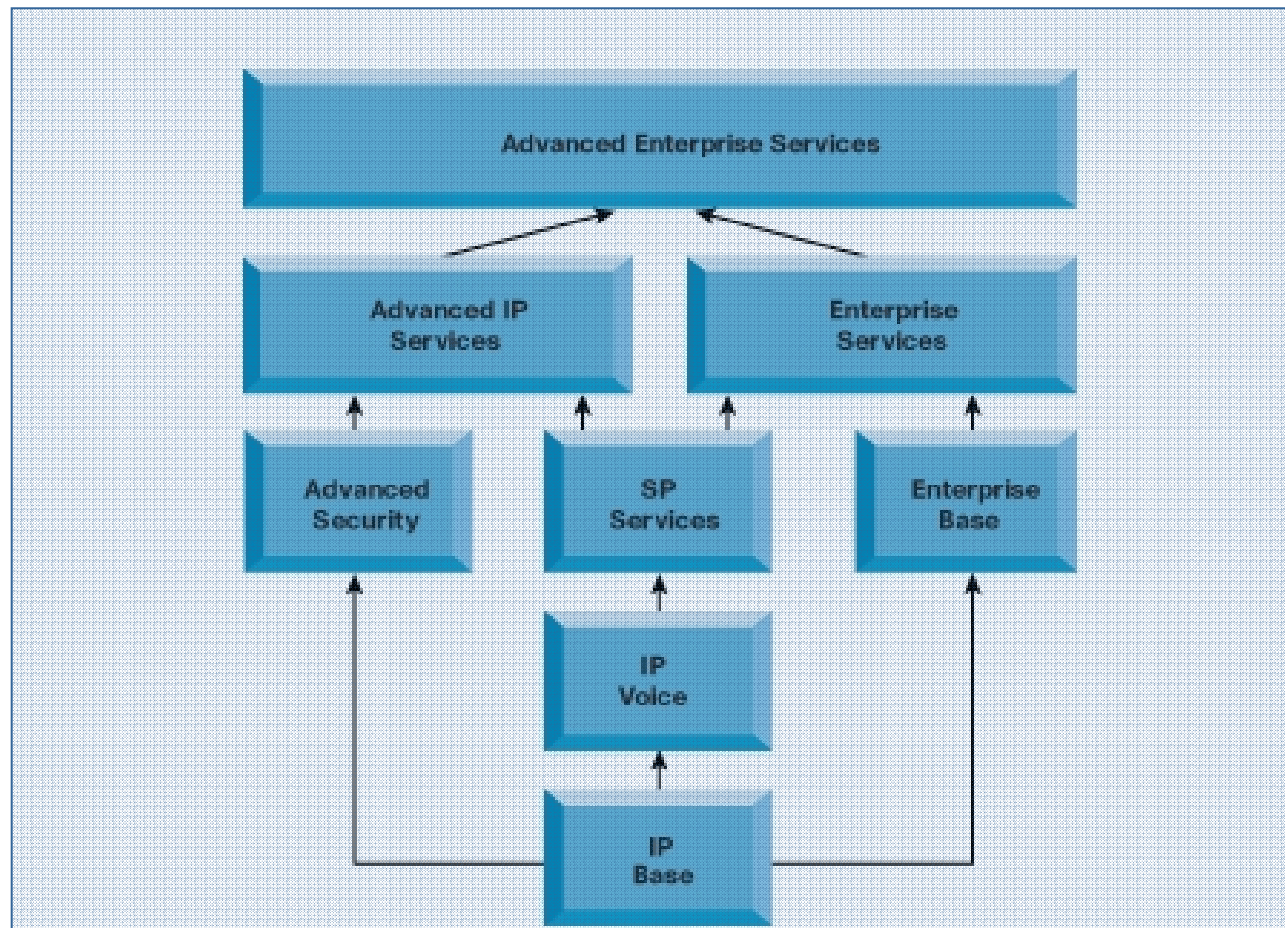- **Enables easier network profiling and planning**
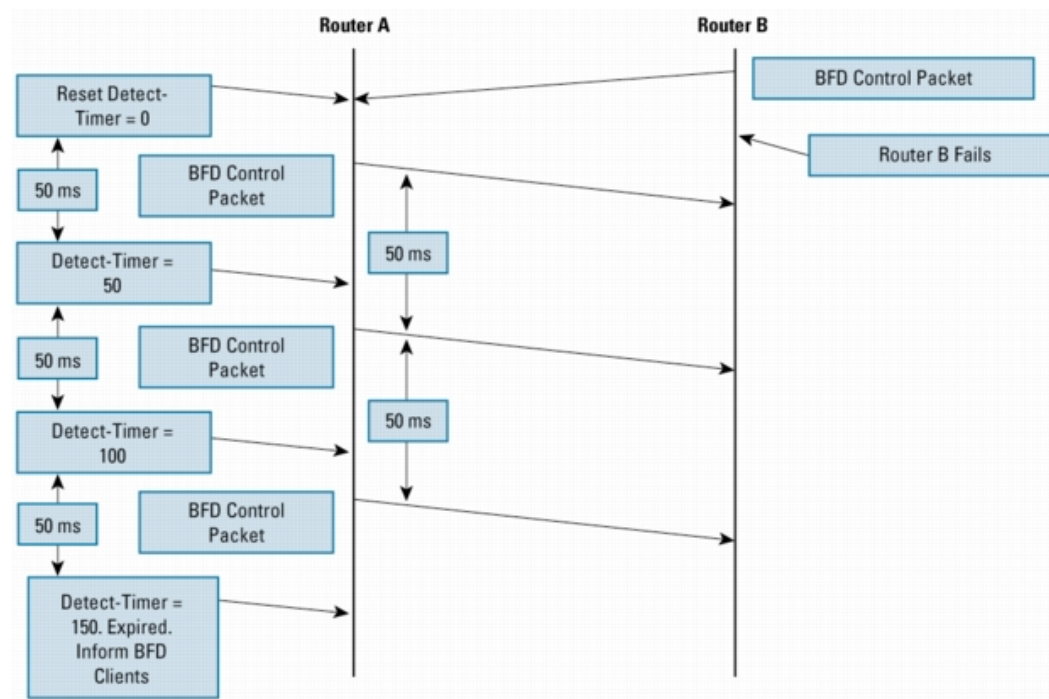
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Cisco IOS Packaging Introduction and Benefits

- ## Simplification

  Minimize user disruption during the software selection process

- ## Consolidation

  Streamline packaging across hardware that runs Cisco IOS Software

- ## Consistency

  Consistent image names

  Consistent functionality across hardware that runs Cisco IOS Software

  Consistent Cisco IOS Software pricing

Cisco IOS Packaging for Cisco Routers

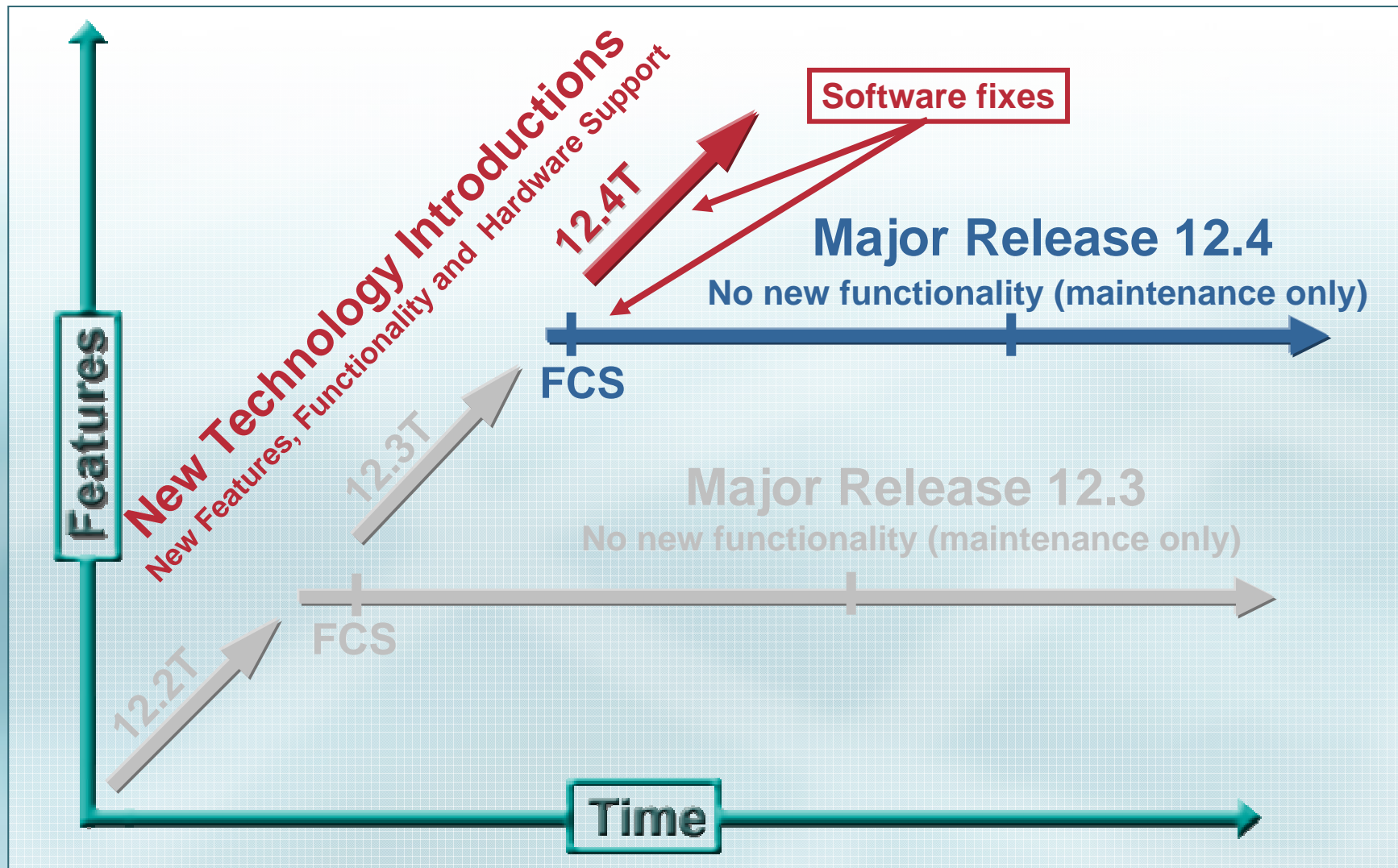**www.cisco.com/go/packaging/**

Packaging Changes in Release 12.4(4)T

- **Beginning in Release 12.4(4)T, the Advanced Security image will include Border Gateway Protocol (BGP)**

- **Prior to Release 12.4(4)T, users needed Advanced IP Services in order to deploy both Security and BGP in the same image**

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Evolution to Release 12.4T

New Technology Introductions
New Features, Functionality and Hardware Support

Software fixes

12.4T

Major Release 12.4
No new functionality (maintenance only)

FCS

Major Release 12.3
No new functionality (maintenance only)

12.3T

FCS

12.2T

Features

Time

Release 12.4T Upgrade Paths

- **Releases 12.2, 12.3, and 12.3T**
- **X releases**

Release 12.4T

For new functionality and hardware support

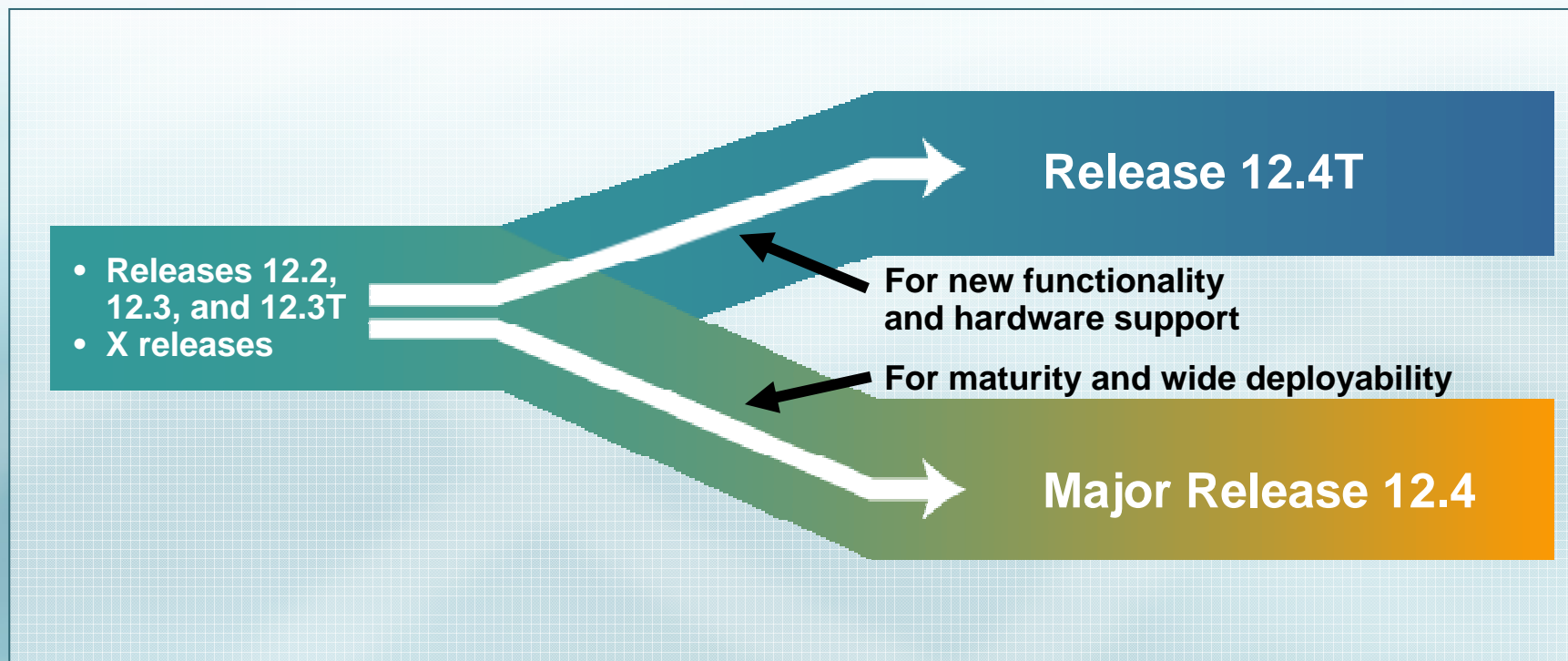**For maturity and wide deployability**

Major Release 12.4

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Cisco IOS Software Release 12.4(4)T

- **Enhances threat protection against malicious worm and virus attacks**

- **Improves performance monitoring of VoIP networks**

- **Extends support for secure concurrent services on the Cisco 1800 Series router**

References – Release 12.4(4)T Highlights

- **Cisco 1800 Series Integrated Services Routers**

    www.cisco.com/go/isr/

- **Cisco IOS Flexible Packet Matching**

    www.cisco.com/go/fpm/

- **Application Firewall for Instant Messenger Traffic Enforcement**

    www.cisco.com/go/firewall/

- **Cisco Call Manager Express 3.4**

    www.cisco.com/go/ccme/

- **Cisco IOS IP SLAs for VoIP with Real Time Protocol**

    www.cisco.com/go/ipsla/

- **Hot Standby Router Protocol for IPv6**

    www.cisco.com/go/availability/

- **NetFlow Reliable Export via Stream Control Transport Protocol**

    www.cisco.com/go/netflow/

References – Release 12.4T

- **Cisco IOS Software Release 12.4T**

  www.cisco.com/go/release124t/

- **Release 12.4T New Features and Hardware Support, Product Bulletin No. 3001**

  www.cisco.com/go/pb124t/

- **Changes to Cisco IOS Software Product Support in Release 12.4T, Product Bulletin No. 3000**

  www.cisco.com/go/124thardware/

- **Cisco IOS Software Release 12.4**

  www.cisco.com/go/release124/

- **Cisco IOS Packaging**

  www.cisco.com/go/packaging/

- **Download Cisco IOS Software releases and upgrade planners**

  www.cisco.com/public/sw-center/sw-ios.shtml