



# **CISCO IOS SOFTWARE RELEASE 12.2(18)SXD EXTENDS CISCO IOS HIGH AVAILABILITY**

**JULY 2004**

# Agenda

- **Release 12.2S Introduction**
- **Release 12.2S Availability and Migration**
- **Release 12.2(18)SXD Highlights**
- **Release 12.2(18)SXD Hardware and Feature Summary**
- **Summary**

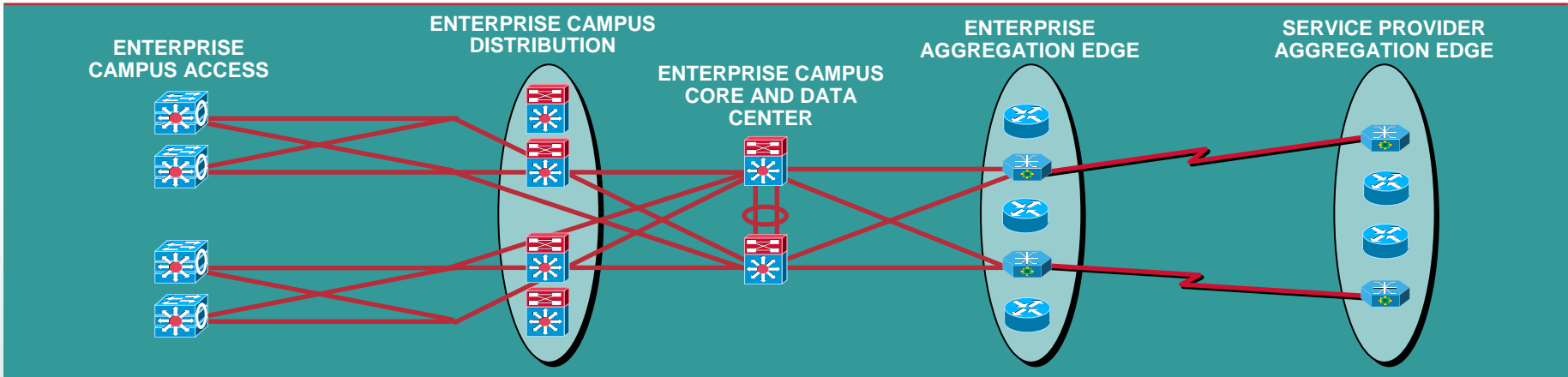
# Cisco IOS Software Release 12.2S

- **Designed for Enterprise campus and Service Provider edge networks that require world-class IP and Multiprotocol Label Switching (MPLS) services**
- **Family of releases that supports Cisco Catalyst® Switches and high-end routers for secure, converged network services, from the wiring closet and data center to the WAN edge**
- **Delivers advanced Ethernet LAN switching, Provider Edge, Metro Ethernet, and Broadband Aggregation services through enhancements in High Availability, Security, MPLS, VPNs, and IP Routing and Services**

# Release 12.2S Key Markets, Technologies, Applications, and Hardware

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## MARKETS



## TECHNOLOGIES

- High Availability
- Security
- IP Routing and Multicast
- IPv6
- Layer 2 VPNs
- Layer 3 IP/MPLS VPNs
- Manageability
- Scalability
- Quality of Service

## APPLICATIONS

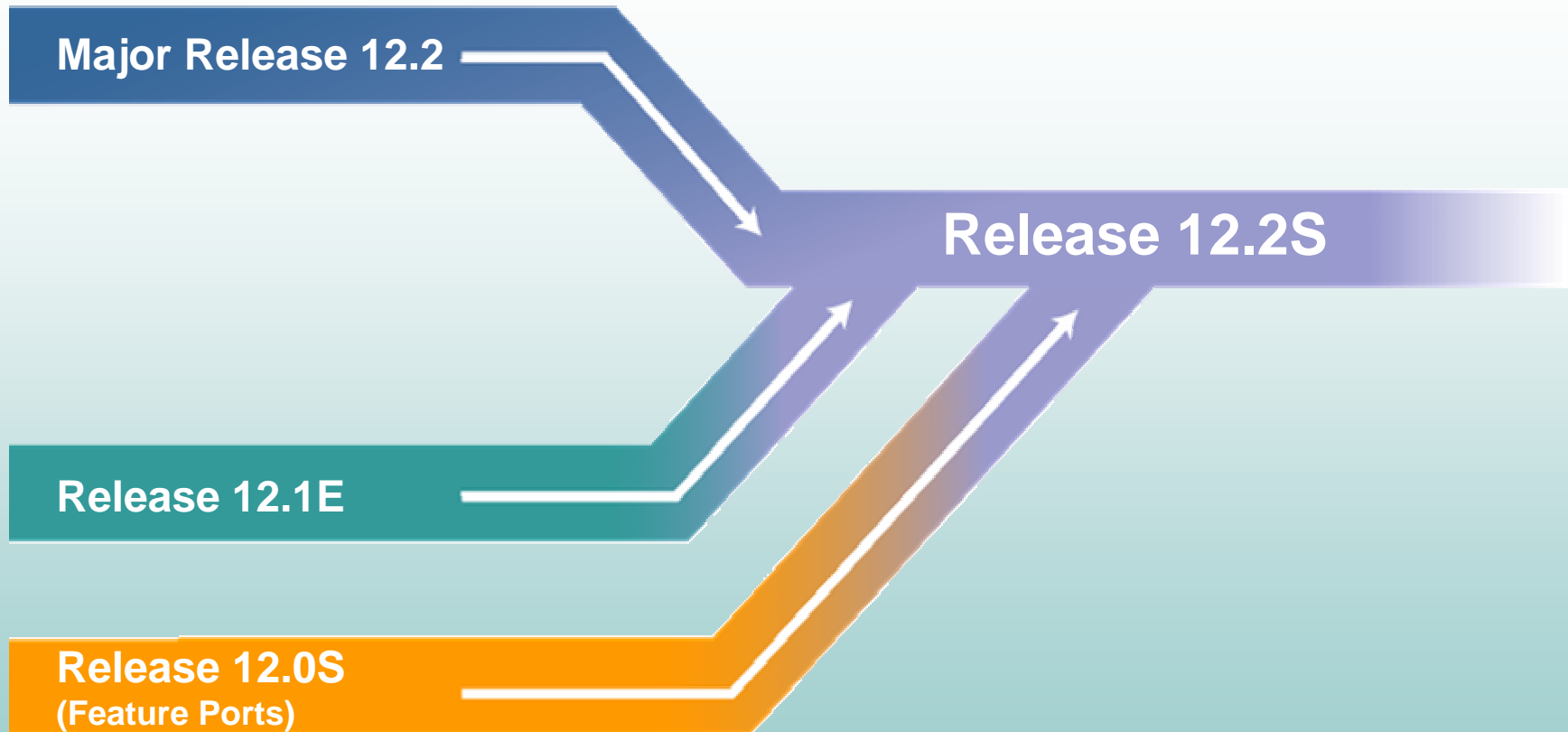
- Broadband and Leased-Line Aggregation
- IP Telephony
- Multi-Service VPNs
- Multi-Service Edge
- Metro Ethernet
- Video
- Mobile Wireless

## HARDWARE

- Cisco Catalyst 2970 Series
- Cisco Catalyst 3750 Series
- Cisco Catalyst 4500 Series
- Cisco Catalyst 6500 Series
- Cisco 7200 Series
- Cisco 7300 Series
- Cisco 7500 Series
- Cisco 7600 Series
- Cisco 10000 Series
- Cisco ONS 15500 Series
- Cisco uBR 7000/10000 Series

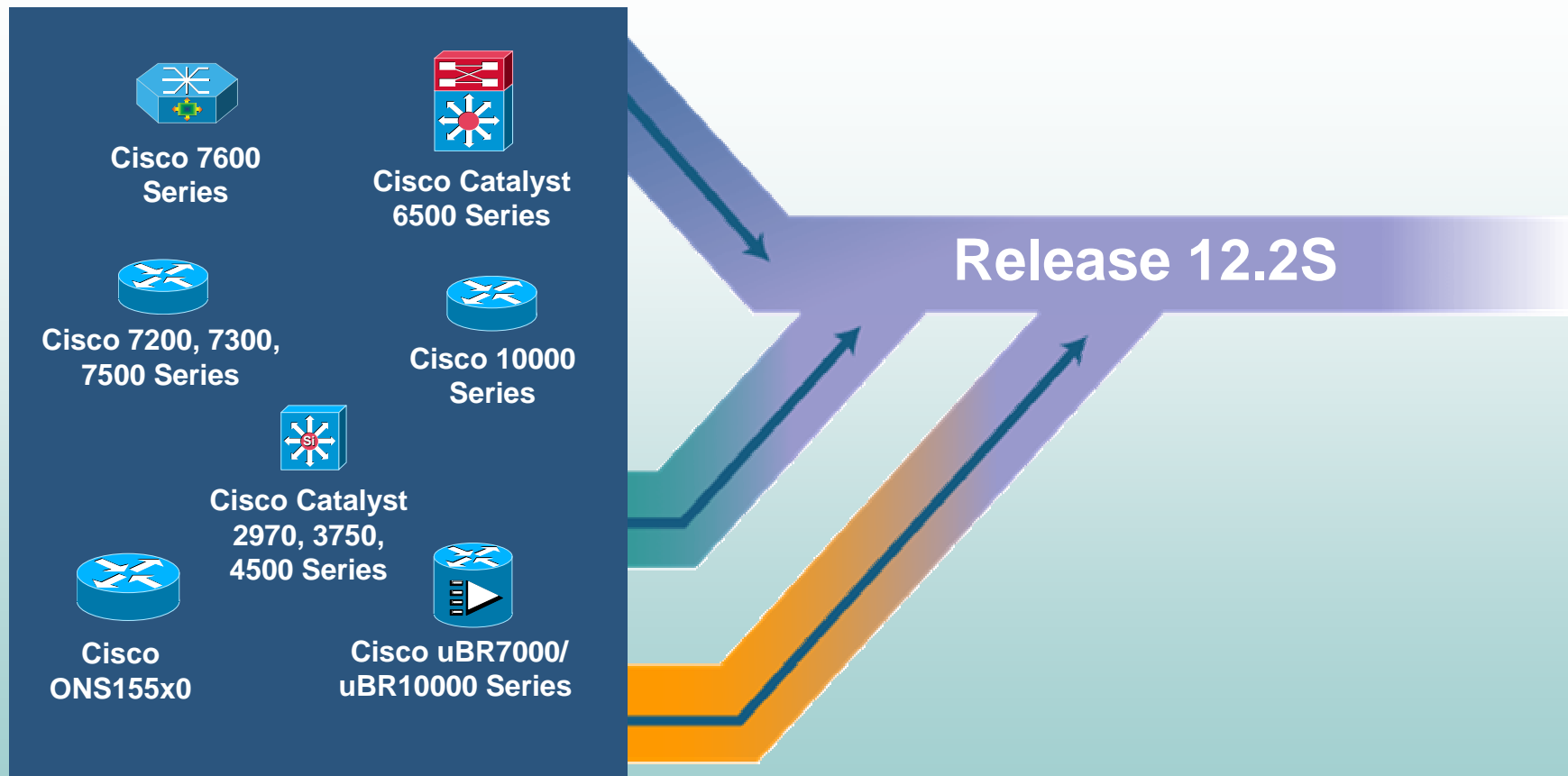
# Integrate Release 12.2 Stability with the Functionality of Releases 12.1E and 12.0S

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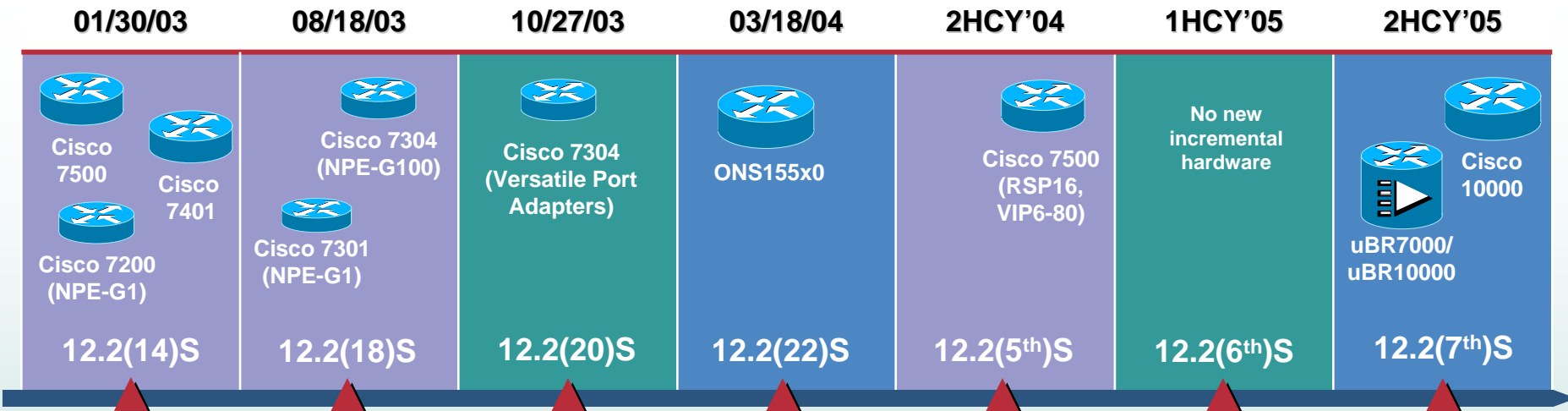
# Release 12.2S Integrates Key Enterprise and Service Provider Hardware

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# Release 12.2S Family Hardware Roadmap

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## Release 12.2S

## Release 12.2SE

  
Cisco Catalyst 2970, 3560, 3750 Series

## Release 12.2EW

  
Cisco Catalyst 4500 Series

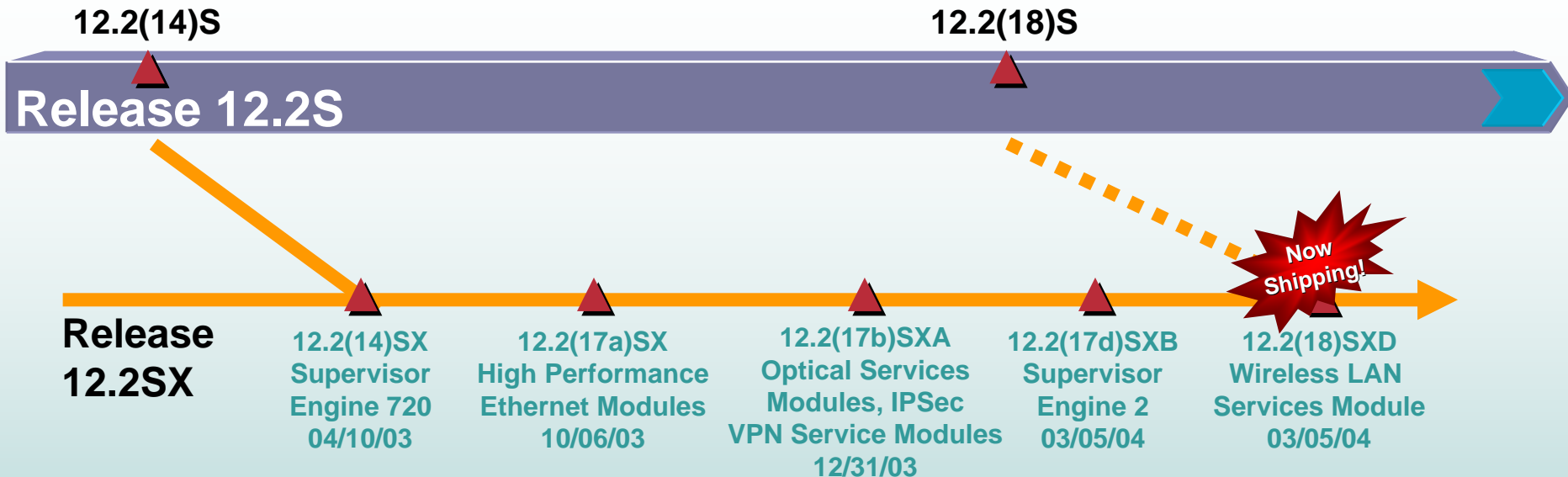
## Release 12.2SX

  
Cisco Catalyst 6500 Series

  
Cisco 7600 Series

# Release 12.2SX for Cisco Catalyst 6500 Series Switch and Cisco 7600 Series Router

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Derived from Release 12.2(14)S, Release 12.2SX provides Release 12.2S functionality, as well as new features and hardware for the Cisco Catalyst 6500 Series Switch and Cisco 7600 Series Router



# Releases 12.2SE & 12.2EW for Cisco Catalyst 2970, 3750, & 4500 Series Switches

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Derived from Release 12.2(18)S, Releases 12.2SE and 12.2EW provide Release 12.2S functionality and new features and hardware for the Cisco Catalyst 2970, 3750, and 4500 Series Switches

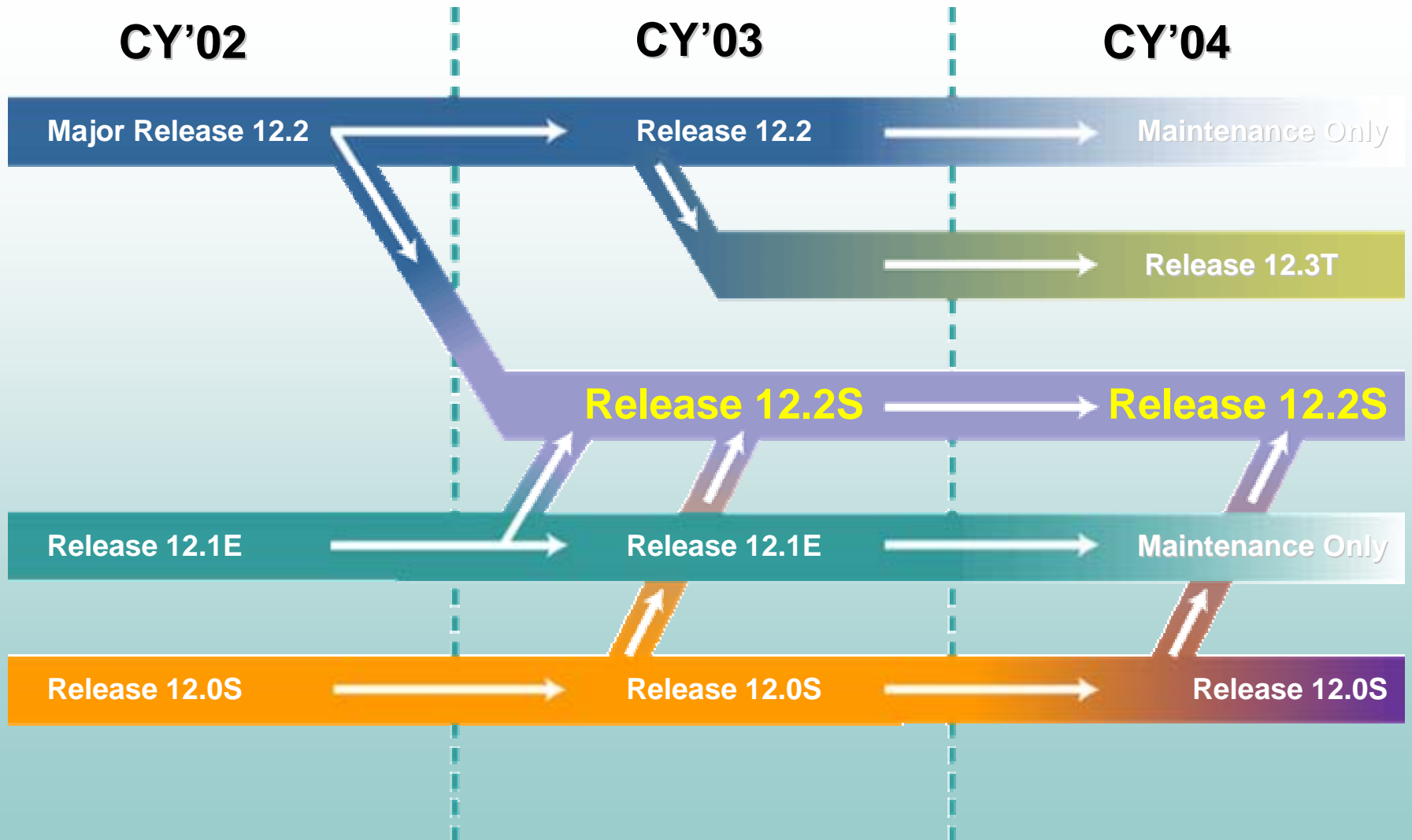
# Release 12.2S Within the Cisco IOS Software Release Portfolio

Release Families	Target Market	Planned Hardware
Cisco IOS XR	Service Provider Core	Cisco Carrier Router System-1 (CRS-1)
Release 12.3	Enterprise Access	Cisco 800, 1700, 2600, 3600, 3700 Series Routers Cisco 7200 and 7500 Series Routers
Release 12.3T	Enterprise, Service Provider Aggregation	Cisco 800, 830, 1700, 2600, 3600, 3700 Series Routers Cisco 7200 and 7500 Series Routers
<b>Release 12.2S</b>	<b>Enterprise Core / Switching / WAN Aggregation, Service Provider Aggregation</b>	<b>Cisco Catalyst 2970, 3750, 4500, 6500 Series Switches Cisco 7200, 7300, 7500, 7600, ONS155x0, and uBR7000/ uBR10000 Series Routers Cisco 10000 Series Internet Router</b>
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
Release 12.2	Enterprise Access	Cisco 800, 1700, 2600, 3600 Series Routers Cisco 7200 and 7500 Series Routers Cisco ONS15104 Router

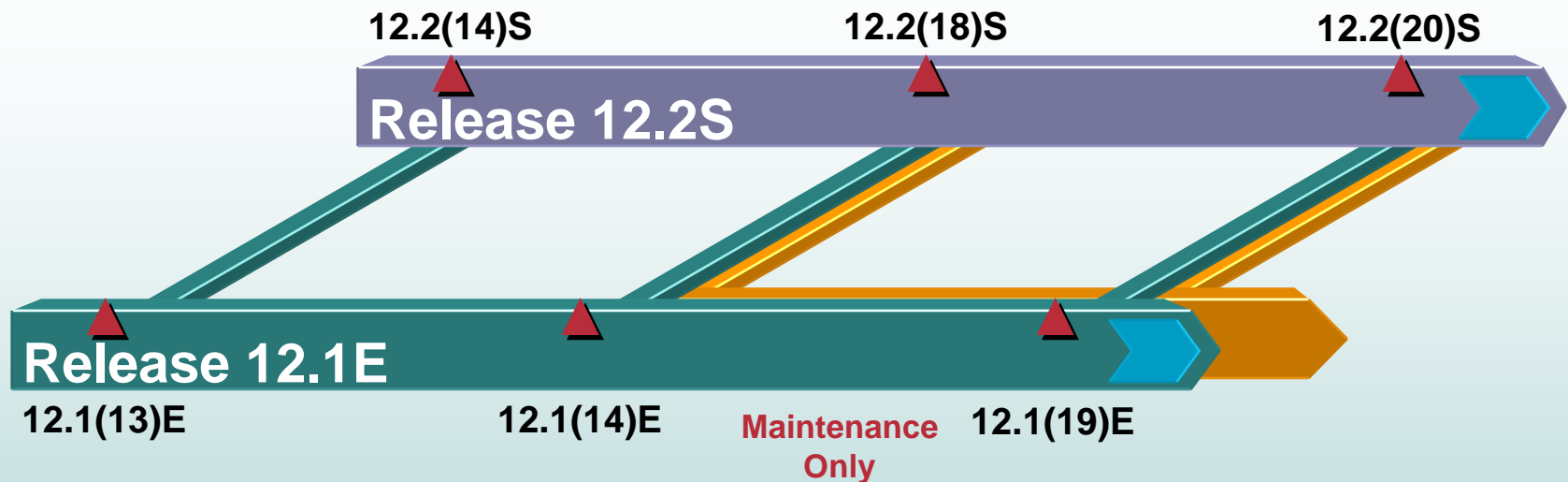
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- **Release 12.2S Availability and Migration**
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# Release 12.2S Evolution

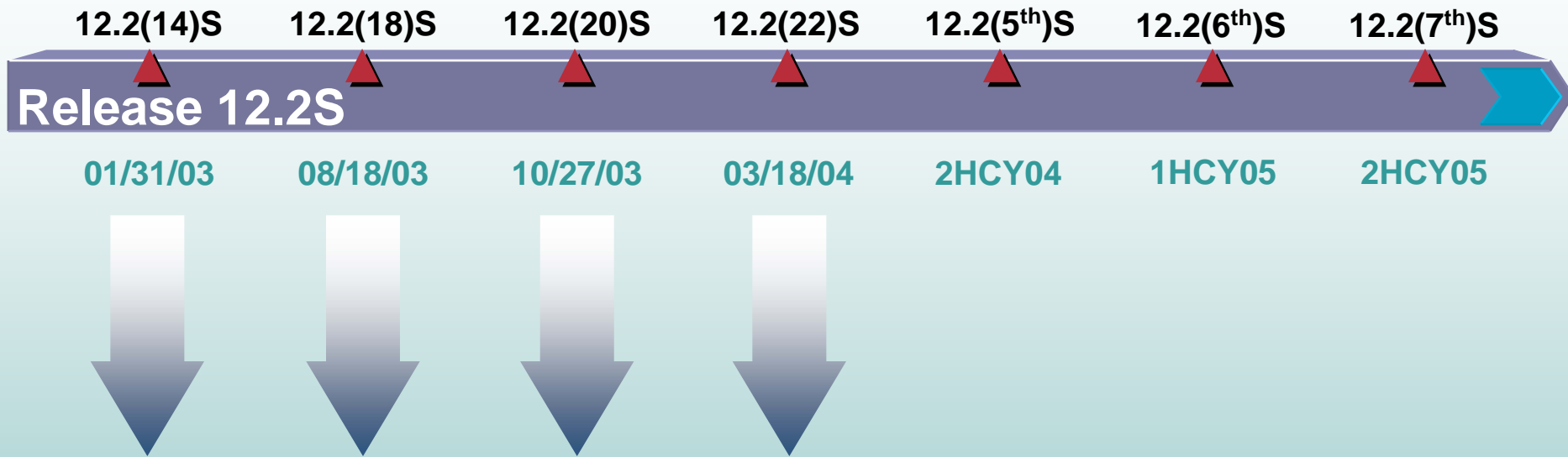


# Release 12.1E Parity



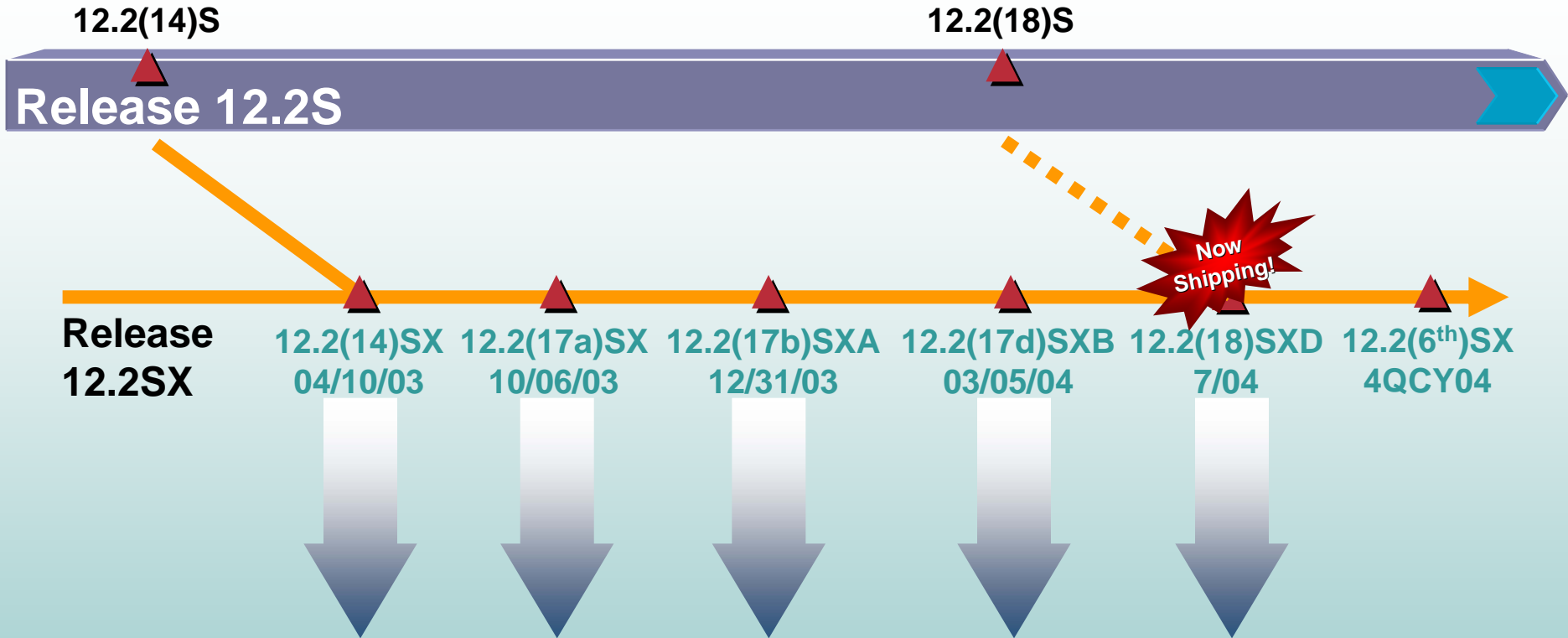
Release 12.1E parity ensures a clear migration path to Release 12.2S for Enterprise customers seeking leading-edge features and hardware

# Release 12.2S Availability



**Available from Software Center:**  
[www.cisco.com/kobayashi/library/12.2/index.shtml](http://www.cisco.com/kobayashi/library/12.2/index.shtml)

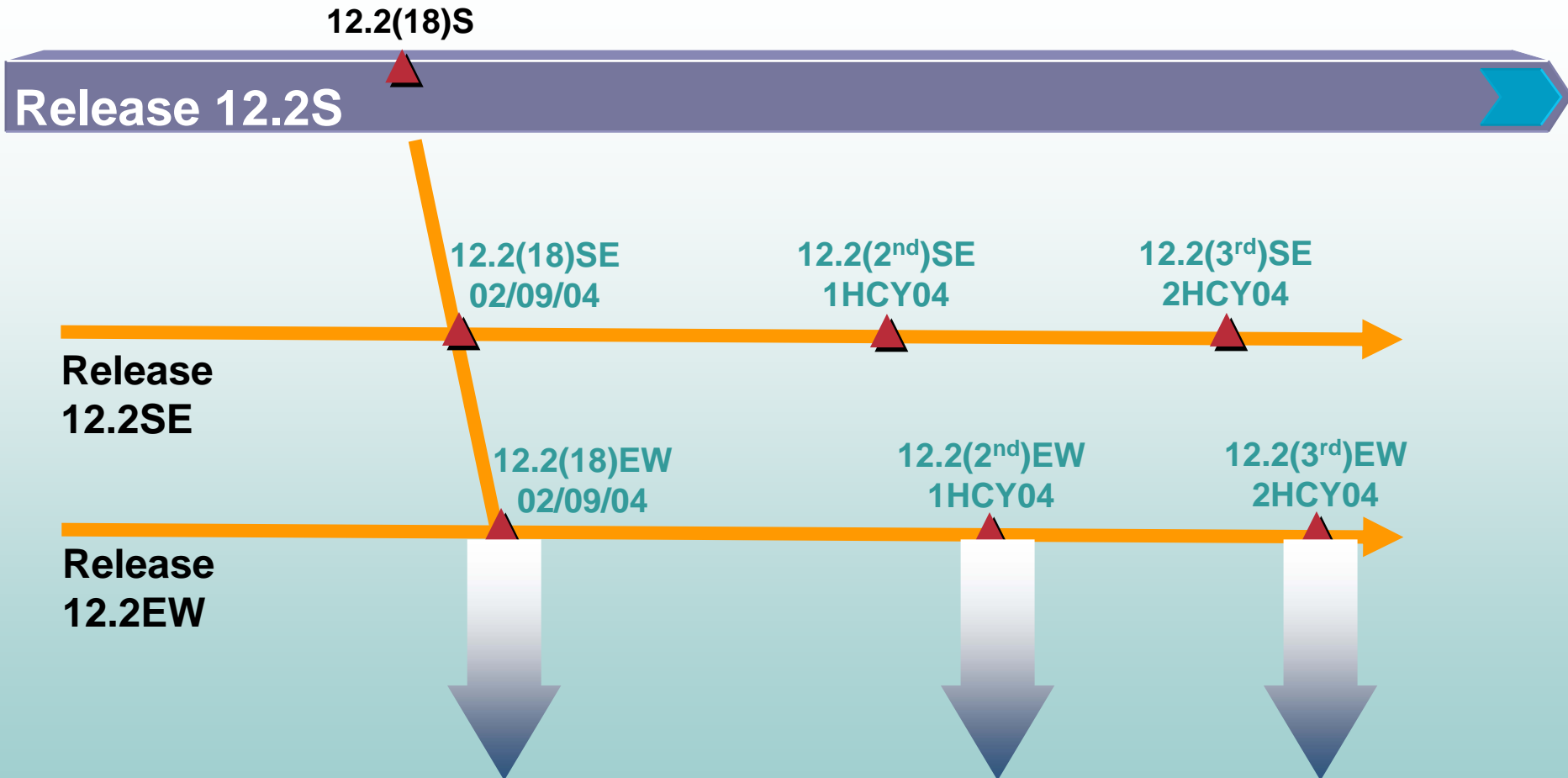
# Release 12.2SX Availability



Available from Software Center:

[www.cisco.com/kobayashi/library/12.2/index.shtml](http://www.cisco.com/kobayashi/library/12.2/index.shtml)

# Release 12.2SE and 12.2EW Availability



Available from Software Center:  
[www.cisco.com/kobayashi/library/12.2/index.shtml](http://www.cisco.com/kobayashi/library/12.2/index.shtml)



# Why Should Release 12.1E and 12.0S Customers Migrate to Release 12.2S?

- **Cisco is targeting significant infrastructure advancements for Release 12.2S**
- **Release 12.2S will receive all, leading-edge features for Enterprise campus and Service Provider edge networks**
- **Release 12.2S supports an optimized combination of high-end Enterprise and Service Provider hardware in a single Cisco IOS Software release family**

# When Should Release 12.1E Customers Migrate to Release 12.2S?

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**IF**

**THEN**

**You require new Enterprise features and hardware support, such as the Supervisor Engine 720**

**Migrate to Release 12.2SX *now***

**You require a single release family that supports the Cisco Catalyst Switches through the Cisco 10000 Series Internet Router**

**Start *planning* your migration to Release 12.2S**

**You are satisfied with your existing combination of features and hardware**

**Be aware that Release 12.1E is *maintenance only*; start planning your migration to Release 12.2S**

**Contact your Cisco account representative to register for the Release 12.2S beta program**

# When Should Release 12.0S Customers Migrate to Release 12.2S?

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**IF**

**THEN**

**You require Service Provider features and hardware support, such as the latest MPLS Provider Edge functionality and the Supervisor Engine 720**

**Migrate to Release 12.2SX *now***

**You require next-generation infrastructure and technology advancements**

**Start *planning* your migration to Release 12.2S**

**You require a single release family that integrates the Cisco Catalyst Switches through the Cisco 10000 Series Internet Router**

**Start *planning* your migration to Release 12.2S**

# Agenda

- Release 12.2S Positioning
- Release 12.2S Availability and Migration
- **Release 12.2(18)SXD Highlights**

**Extends Cisco IOS High Availability to Enterprise and Service Provider networks that run the Cisco Catalyst 6500 Series Switch and Cisco 7600 Series Router**



Delivers the Cisco Catalyst 6500 Series Wireless LAN Services Module for fast, secure, campus-wide Layer 3 roaming

- Release 12.2(18)SXD Hardware and Feature Summary
- Summary

# Cisco IOS High Availability Features Enable Resilient, Secure Business-Critical Services

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	ENTERPRISE CAMPUS ACCESS	ENTERPRISE CAMPUS DISTRIBUTION	ENTERPRISE CAMPUS CORE & DATA CENTER	ENTERPRISE AGGREGATION EDGE	SERVICE PROVIDER AGGREGATION EDGE
CISCO NONSTOP FORWARDING WITH STATEFUL SWITCHOVER	✓	✓	✓	✓	✓
CISCO GATEWAY LOAD BALANCING PROTOCOL		✓		✓	
CONTROL PLANE POLICING*	✓	✓	✓	✓	✓
MPLS TRAFFIC ENGINEERING FAST REROUTE*					✓
ROUTING PROTOCOL CONVERGENCE ENHANCEMENTS	✓	✓	✓	✓	✓

# Cisco Nonstop Forwarding with Stateful Switchover Benefits

- **Eliminates service disruptions**

Preserves user sessions and mitigates impacts of service outage on network users

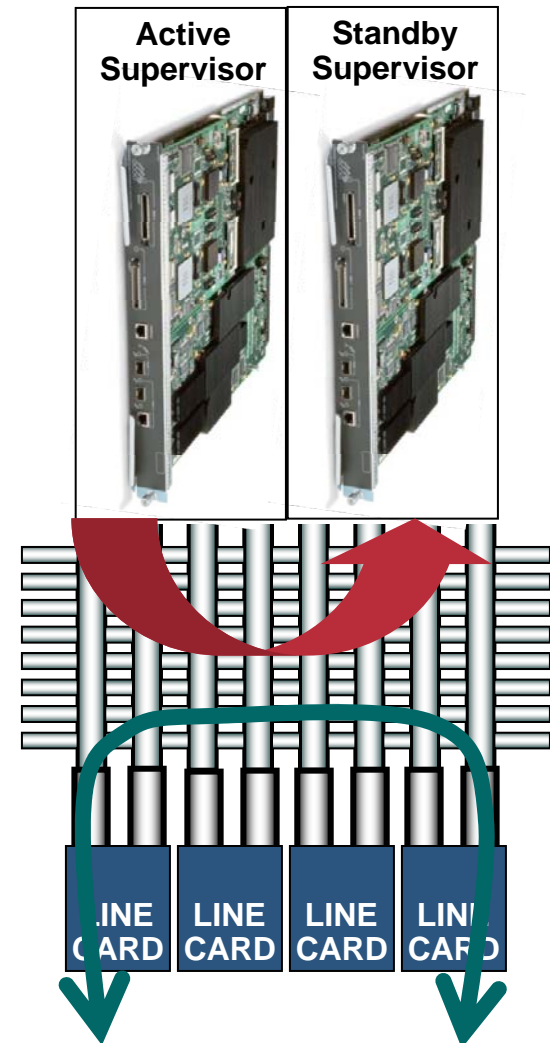
Increases network availability

- **Reduces costs**

Minimizes the costs associated with network downtime, such as loss of revenue, loss of productivity, damage to reputation, emergency network expenditures, and Service Level Agreement (SLA) penalties

- **Increases operational efficiency**

Reduces network administration, troubleshooting, and maintenance costs through increased network availability



# Cisco NSF with SSO for Supervisor Engine Switchover

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- **Delivers seamless Supervisor Engine switchover**

Enables nonstop application delivery

Protects from Supervisor Engine hardware or software faults

Supports Supervisor Engine 720 and Supervisor Engine 2

- **Stateful Switchover (SSO)**

Provides zero interruption of Layer 2 connectivity

Synchronizes state information between active and standby Supervisor Engines

Maintains protocol and session state for Layer 2 LAN and WAN connectivity protocols (eg: ATM, Frame Relay, PPP, and Cisco HDLC)

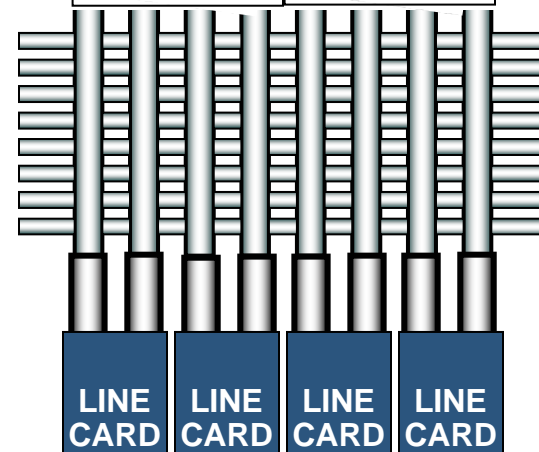
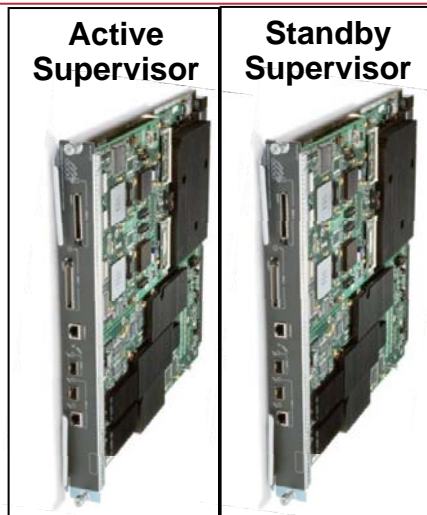
- **Cisco Nonstop Forwarding (NSF)**

Provides continuous packet forwarding with minimal or no packet loss

Eliminates route flaps between peering devices

Enables transparent route convergence – Layer 3 routing information recovered from peers

## Hot Redundancy Solution



# Cisco NSF with SSO – Layer 2 LAN Protocol Support

## SSO Layer 2 LAN protocol support includes:

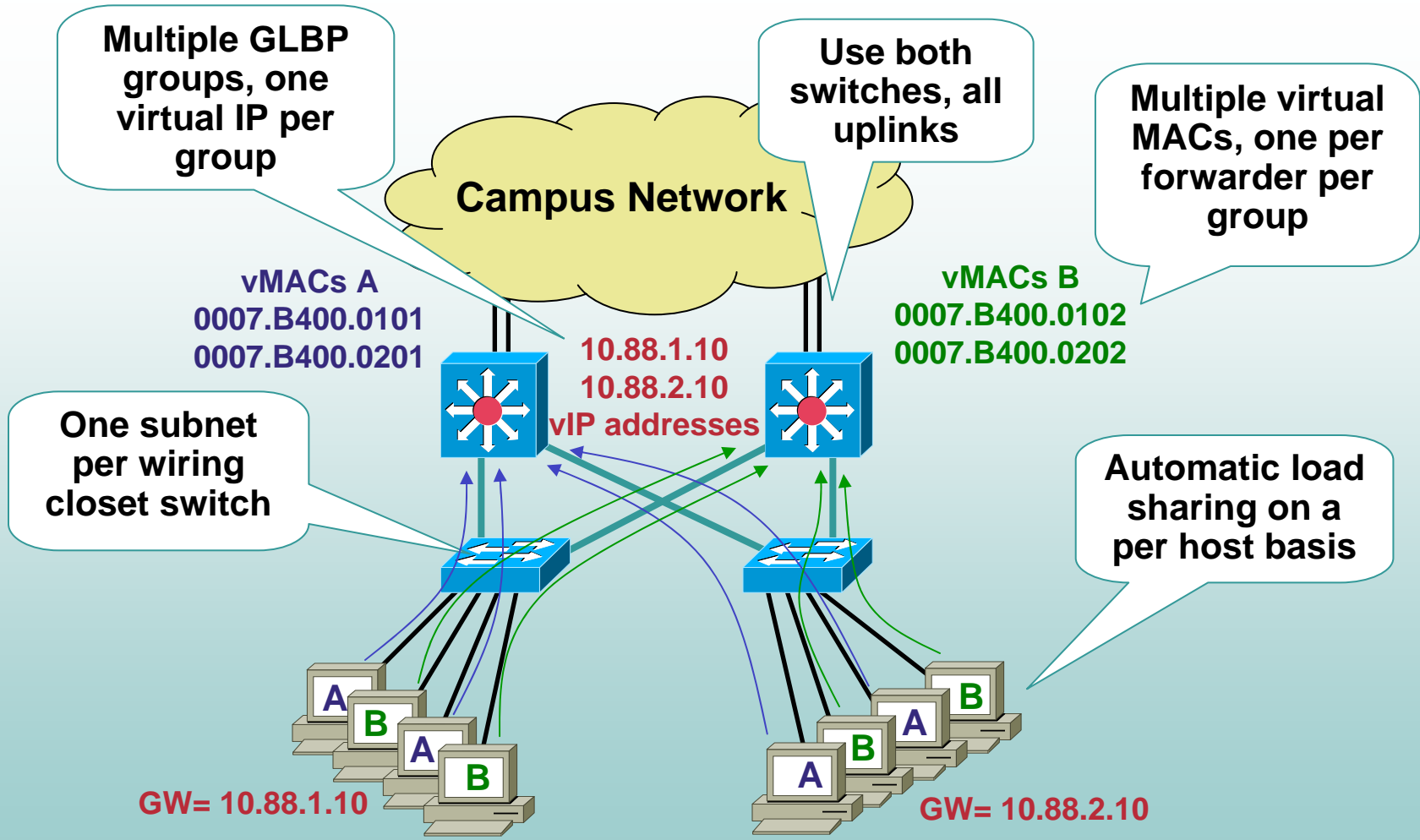
Feature	Feature
Link Negotiation	Flow Control
VLANs	VTP
VLAN Trunks	DTP
STP	PAGP/LACP
CDP	UDLD
SPAN/RSPAN	Voice VLAN with inline power
802.1x	802.1Q
Port Security	MAC Move Notification
Traffic Storm Control	802.1Q Tunneling
L2 Protocol Tunneling	ARP
Bridge Groups	IGMP Snooping



# Cisco Gateway Load Balancing Protocol Benefits

- **Extends Hot Standby Routing Protocol (HSRP) to include automatic load sharing**
  - Backup Layer 3 devices in typical HSRP or VRRP configurations are inactive, resulting in underused resources and network capacity
- **Eliminates the need to allocate additional subnets and configure multiple groups per subnet**
  - All Layer 3 devices in a GLBP group actively participate in the forwarding of packets
- **Reduces total cost of ownership while increasing network efficiency, resiliency, and throughput**
  - Streamlines network administration
  - Uses resources and network capacity to the fullest potential
  - Reduces potential for packet loss
- **Available only from Cisco (patent pending)**

# Cisco GLBP Campus Deployment



# Control Plane Policing Benefits

- **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**

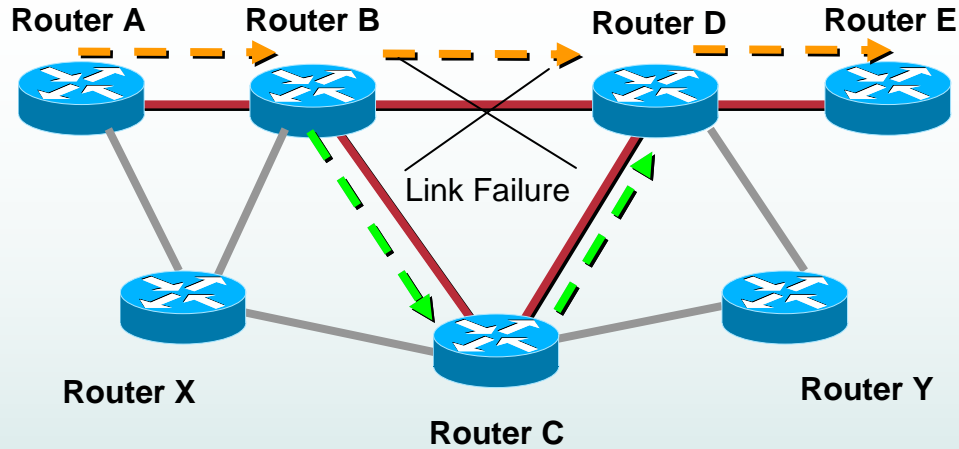
Support for Modular QoS CLI (MQC) minimizes the learning curve, number of provisioning errors, and the time and cost of deploying QoS and defining control plane policies

# MPLS Traffic Engineering

## Fast Reroute Benefits

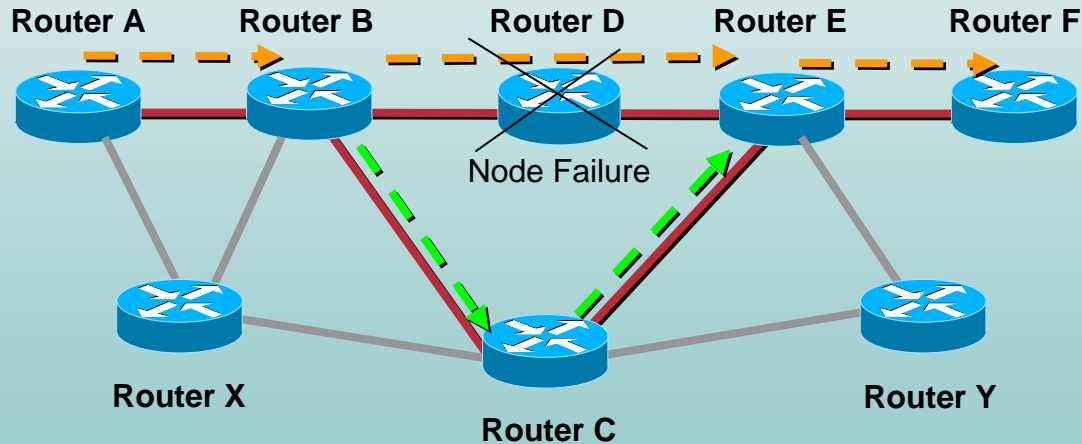
- **Provides carrier-class MPLS traffic protection and restoration, similar to Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH)**
- **Increases MPLS network availability and reliability, reducing total cost of ownership and enabling more robust MPLS-based SLAs)**
- **Provides minimal packet loss for MPLS label-switched path (LSP) traffic during link (eg: fibre cut) and node (eg: system restart) failures**

# Link and Node Protection Examples



Link

Node



- Primary Tunnel
- Backup Tunnel (Pre-provisioned)
- Recovery = ~50ms\*

\*Actual time varies – well below 50ms in lab tests, can also be higher

# Routing Protocol Convergence Enhancements

- **Border Gateway Protocol (BGP) Convergence Optimization**

  - Improves BGP convergence, router boot time, and transient memory usage

  - Optimizes and forwards neighbor updates based on peer groups and per-individual neighbors

- **BGP Dynamic Update Peer-Groups**

  - Separates update-group replication from peer-group configuration

  - Improves the convergence time and flexibility of neighbor configuration

# Routing Protocol Convergence Enhancements (Cont.)

- **Intermediate System-to-Intermediate System (IS-IS) Incremental Shortest Path First (i-SPF) support**

**Allows the system to recalculate only the affected part of the shortest path tree (rather than the entire tree)**

**Provides faster IS-IS convergence and saves processing resources**

- **IS-IS Mechanism to Exclude Connected IP Prefix from Link-State Packet (LSP) advertisements**

**Provides a mechanism for excluding connected IP prefixes from LSP advertisements in small-scale and large-scale IS-IS networks**

**Prevents the overpopulation of routing tables and reduces IS-IS convergence time**

# Routing Protocol Convergence Enhancements (Cont.)

- **Open Shortest Path First (OSPF) i-SPF Support**

Allows the system to recalculate only the affected part of the shortest path tree (rather than the entire tree), which provides faster OSPF convergence and saves processing resources

- **OSPF Support for Fast Hello Packets**

Provides a way to configure the sending of hello packets in intervals less than one second, which provides faster OSPF convergence

Shorter intervals for hello packet is extremely useful on LAN segments

- **OSPF Support for Link-State Advertisement (LSA) Throttling**

Provides a dynamic mechanism for slowing down LSA updates in OSPF during times of network instability

Allows faster OSPF convergence by providing LSA rate limiting in milliseconds



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- **Release 12.2S Positioning**
- **Release 12.2S Availability and Migration**
- **Release 12.2(18)SXD Highlights**
  - Extends Cisco IOS High Availability to Enterprise and Service Provider networks that run the Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers
  - Delivers the Cisco Catalyst 6500 Series Wireless LAN Services Module for fast, secure campus-wide Layer 3 roaming
- **Release 12.2(18)SXD Hardware and Feature Summary**
- **Summary**



# Catalyst 6500 Series Wireless LAN Services Module

- **Key component of the Cisco Structured Wireless-Aware Network (SWAN) framework**
- **Enables a secure campus-wide Layer 3 roaming system that is the fastest in the industry**
- **Extends the rich, intelligent network services of the Cisco Catalyst 6500 Series through the wired network to the wireless edge**
- **Maximizes network uptime for wireless traffic through Supervisor Engine 720 support for Cisco NSF with SSO**
- **Simplifies management and deployment of wireless networks by providing “out-of-box” access point configuration**
- **Supports up to 300 Cisco Aironet Series access points and 6000 users – the most in the industry**
- **Provides maximum flexibility – deployable in the wiring closet, to the core, to the data center without requiring changes to the underlying wireline infrastructure or special client devices**



# Cisco Catalyst 6500 Series Switch Benefits for the WLSM

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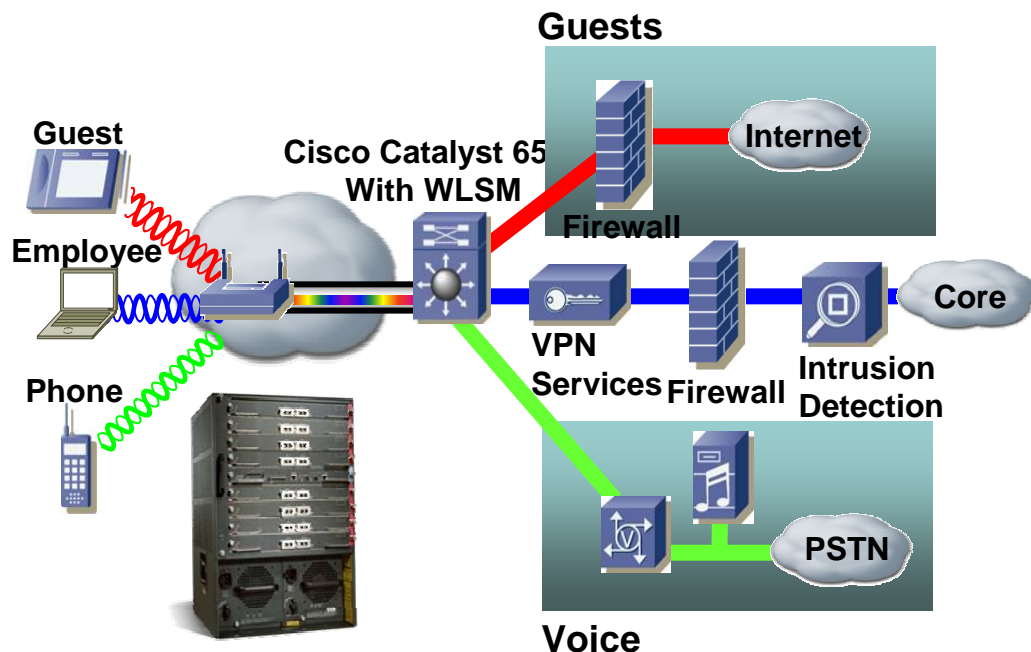
- **GRE acceleration in hardware**
  - Up to 10Mpps of generic routing encapsulation (GRE) performance
- **Diverse and rich security feature set**
  - Further strengthens security for wireless deployments
- **Extensive Layer 2 and 3 switching features**
  - Adds greater control over the movement of traffic between wired and wireless networks
- **Service module integration**
  - Enables high performance firewall, VPN, Intrusion Detection, and Network Analysis services to be leveraged in the wireless network
- **Advanced QoS support**
  - Allows prioritizing, scheduling, and controlling traffic destined to and from the wireless network



# Catalyst 6500 Series Wireless LAN Services Module Enterprise Example

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- Preserves IP address during roams for applications such as IPsec and Voice of WiFi
- Provides 50 millisecond access point to access point hand-off time, well below the threshold for applications such as Voice over WiFi
- Enables a single point of wireless/wireline integration
- Requires no changes to existing network infrastructure
- Supports up to 16 mobility groups for secure user group segmentation
- Minimizes wireless and wireline total cost of ownership
- Delivers Enterprise class wireless and wireline QoS and security



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# Release 12.2(18)SXD Hardware and Feature Summary

## Hardware Support

- Cisco Catalyst 6500 Series Wireless LAN Services Module (WLSM)
- Cisco 10GBASE-CX4 XENPAK Module
- Cisco 1000BASE-ZX SFP
- Cisco Receive-Only WDM GBIC

## High Availability

- Cisco NSF with SSO
- NetFlow Multiple Export Destinations
- Gateway Load Balancing Protocol

## Cisco IOS Software Release 12.2(18)SXD

## Security

- Control Plane Policing
- Secure Copy

## IP Routing

- Routing Convergence Enhancements
- IP Event Dampening

## MPLS and VPNs

- MPLS Traffic Engineering
- MPLS Traffic Engineering Fast Reroute\*

*See the Release Notes for a complete list of features in Release 12.2(18)SXD\*\**

\* Support is planned for an update to Release 12.2(18)SXD.

\*\* The Cisco IOS Software features in Release 12.2(18)SXD are supported in native Cisco IOS Software on the Cisco Catalyst 6500 Series Switch.

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# Summary

## Release 12.2S

- Designed for Enterprise campus and Service Provider edge networks
- Supports Cisco Catalyst Switches and high-end routers for secure, converged network services from the wiring closet and data center to the WAN edge
- Delivers advanced Ethernet LAN switching, Metro Ethernet, and Broadband Aggregation services
- Provides enhancements in High Availability, Security, MPLS, VPNs, and IP Routing and Services

## Release 12.2(18)SXD

- Extends Cisco IOS High Availability to Enterprise and Service Provider networks that run the Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers
- Delivers the Cisco Catalyst 6500 Series Wireless LAN Services Module for Fast, Secure Campus-Wide Layer 3 Roaming



# For More Information

- **Cisco IOS Software Release 12.2S**

[www.cisco.com/go/release122s/](http://www.cisco.com/go/release122s/)

- **Cisco Feature Navigator**

[www.cisco.com/go/fn/](http://www.cisco.com/go/fn/)

- **Release 12.2SX Product Bulletins**

[www.cisco.com/en/US/products/hw/switches/ps708/prod\\_bulletins\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps708/prod_bulletins_list.html)

[www.cisco.com/en/US/products/sw/iosswrel/ps5012/prod\\_bulletins\\_list.html](http://www.cisco.com/en/US/products/sw/iosswrel/ps5012/prod_bulletins_list.html)

# CISCO SYSTEMS

