



Catalyst 6500 Product Update



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Agenda

- Catalyst 6500 Strategic Direction
- Catalyst 6500 Hardware Update
- Catalyst 6500 Software Update
- Catalyst 6500 & Campus Communication Fabric
 - Application Intelligence
 - Virtualization
 - Non-stop Communications
 - Operational Manageability
 - Integrated Security
 - Unified Network Services

Cisco Catalyst 6500 – Leading the Campus Communication Fabric Evolution



Catalyst 6500 UNIQUE Value Propositions



Backbone	<ul style="list-style-type: none"> 2Tbit system roadmap 264 10GE ports/system Virtual Switching Network Virtualization Scalable Wireless Integration Integrated Security (FWSM, IDSM2) 																
DC/High Performance Access	<ul style="list-style-type: none"> Virtual Switching 10GE-T (802.3an) 1000+ GE Ports/system Resource Mgmt (EEM, V-Frame) Environmentals (Power, cabling) Converged Services (ACE, FWSM) 																
Wiring Closet Access	<ul style="list-style-type: none"> Core/Dist Feature consistency Integrated Security Application Intelligence PoE Scalability & Port Density Instrumentation (Netflow, ERSPAN, NAM) 																
EWAN Service Aggregation/Metro	<ul style="list-style-type: none"> Virtualized Services Application Optimization 6524-10GE, self-managed MAN Scalable IPSec Solutions Routing Leadership (MPLS, IPv6) Scalable Service Flexibility 																
<table border="1"> <tr> <td>Software Modularity</td> <td>ISSU</td> <td colspan="2">Safe Harbor</td> </tr> <tr> <td>GOLD</td> <td>EEM</td> <td>Call Home</td> <td>TDR</td> </tr> <tr> <td>SNMP</td> <td>Smart Port</td> <td>Rollback</td> <td>Capacity</td> </tr> <tr> <td>Netflow</td> <td>NAM</td> <td>NBAR</td> <td>ERSPAN</td> </tr> </table>		Software Modularity	ISSU	Safe Harbor		GOLD	EEM	Call Home	TDR	SNMP	Smart Port	Rollback	Capacity	Netflow	NAM	NBAR	ERSPAN
Software Modularity	ISSU	Safe Harbor															
GOLD	EEM	Call Home	TDR														
SNMP	Smart Port	Rollback	Capacity														
Netflow	NAM	NBAR	ERSPAN														

32 gigabit to 4 Terabits Capacity

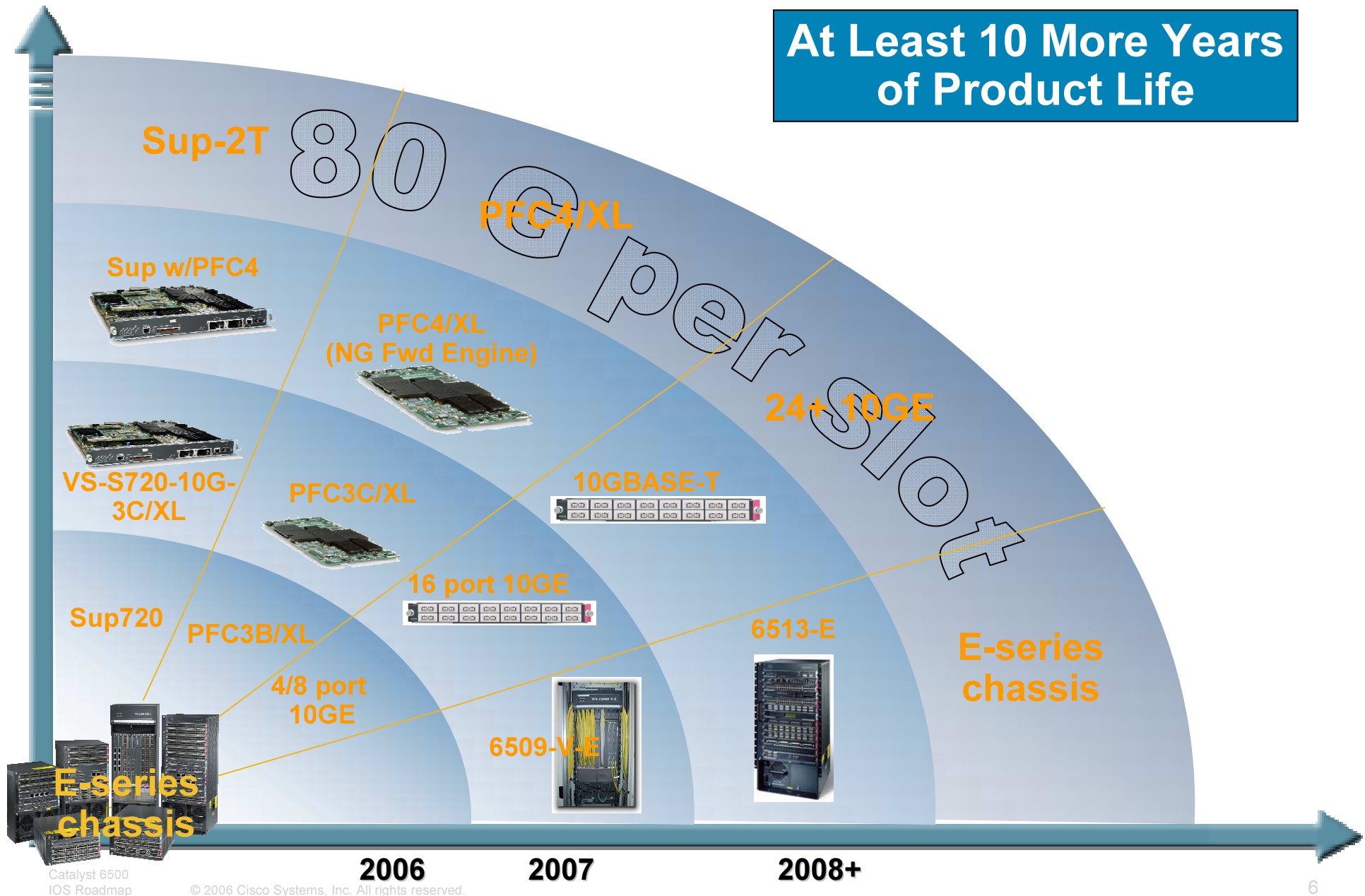


Catalyst 6500 Hardware Update



Catalyst 6500 – Switch with a Future !

At Least 10 More Years of Product Life



Catalyst 6500 Family

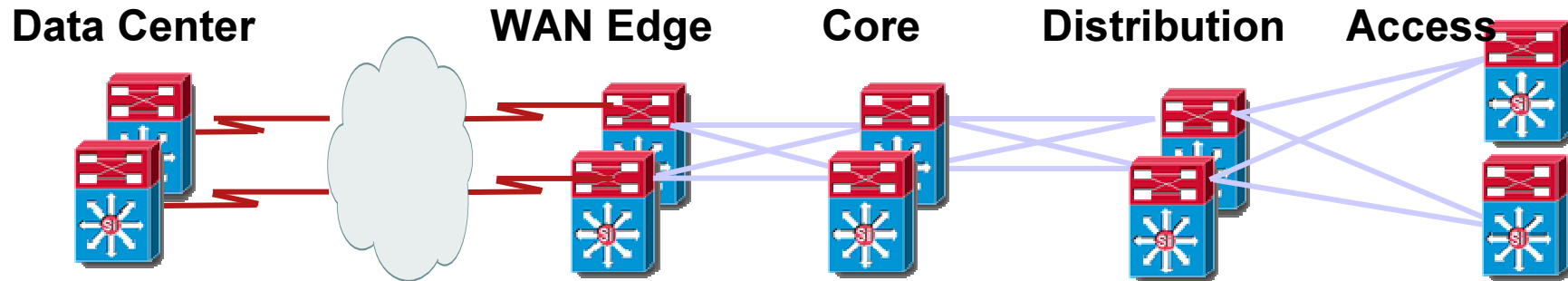
“E” Series Chassis Options



Catalyst 6500 “E” Series Chassis Benefits		
Provides future scalability to 80Gbps/slot	Support up to 14,500W of power	Same Pricing as existing chassis

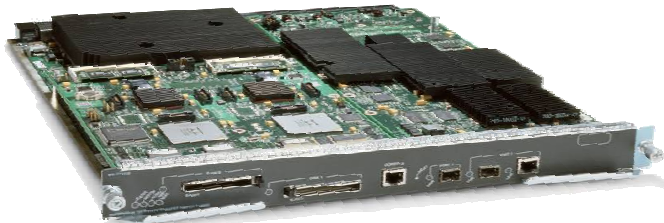
Catalyst 6500 Supervisors

Enable Consistent Features Across Your Entire Network



Supervisor 720
Core, Distribution & Data Center

Supervisor 32
Access & WAN Edge



Hardware Accelerated Services and Forwarding Across Both Supervisors:

IPv4 IPv6 QoS MPLS Port ACL's NAT GRE Multicast

Security

- Catalyst Security Toolkit
- Identity Based Networking (IBNS)
- Network Admission Control (NAC)
- Control Plane Policing
- Svc Modules (FW, IDS, AD, VPN)
- HW-based L2 MAC Learning

Multicast

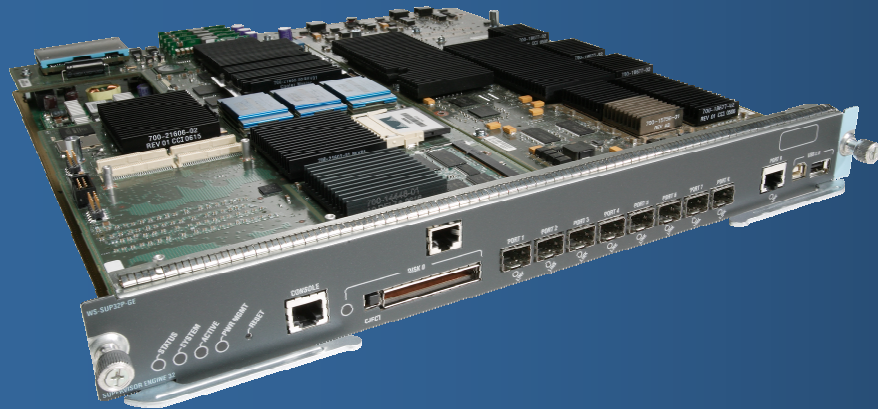
- Bi-Directional PIM
- IGMP Querier
- RGMP, MBGP
- PIM Snooping
- IGMP v3 and SSM
- MSDP

High Availability & Quality

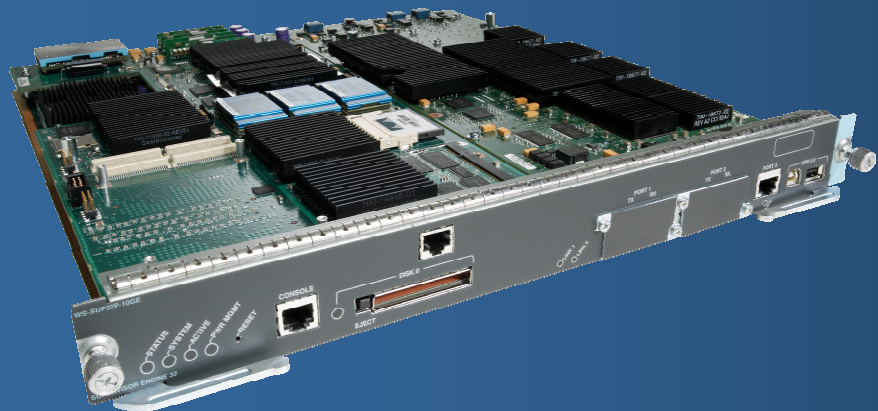
- Modular IOS
- Soft HA
- GOLD
- L2 / L3 Sub-Second Switchover
- Non-Stop Forwarding
- Safe Harbor and FTL

Supervisor Engine 32 PISA

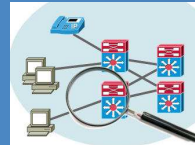
Delivers Intelligence At the Edge



Supervisor Engine 32 PISA
8x1GE Uplinks + 1x 10/100/1000



Supervisor Engine 32 PISA
2x10GE Uplinks + 1x 10/100/1000



▶ NBAR

Application awareness and intelligent classification
Multigigabit Performance



▶ Flexible Packet Matching

Rapid Security Protection
Multigigabit Performance



▶ Programmable architecture

Seamless new service adoption



▶ Full Integration with

IPv4 & IPv6 in hardware
Advanced multicast & MPLS
Enhanced Manageability
HA with NSF/SSO and more

Virtual Switching Sup 720-10G

Virtual Switching – Supervisor720-10GE



VS-S720-10G-3C

VS-S720-10G-3CXL

- 2 x 10GE ports (X2 Optics) – VSS Capable
- 2 X 1GE (SFP)
- 1 X 1GE (10/100/1000)
- All uplinks active even in redundant configuration
- 100 MB Per port Ingress/Egress buffering
- VSS capable PFC3C and PFC3CXL included
- SP DRAM – 1G, RP DRAM – 1G
- SP Bootflash – 1G, RP Bootflash - 64M

Catalyst 6500 Linecards

Latest Core, Distribution, and Data Center Portfolio



WS-X6708-10GE

8 Port 10GE X2 (2x20G Fabric Enabled Card)

ER, LR, LX4, SR, CX4 optics; DFC included; Queuing: TX - 1p7q4t, RX - 8q8t; Jumbo frame support: 200MB/port Buffer



WS-X6704-10GE

4 Port 10GE XENPAK (2x20G Fabric Enabled Card)

ER, LR, LX4, SR, CX4, ZR optics; Optional DFC; Queuing: TX - 1p7q4t, RX - 1q8t or 8q8t (w/DFC); Jumbo frame support



WS-X6748-SFP

48 Port GE SFP (2x20G Fabric Enabled Card)

SX, LX, ZX, Tx, CWDM SFPs; Optional DFC; Queuing: TX - 1p3q8t, RX - 1q8t or 2q8t (w/DFC); Jumbo frame support



WS-X6724-SFP

24 Port GE SFP (1x20G Fabric Enabled Card)

SX, LX, ZX, Tx, CWDM SFPs; Optional DFC; Queuing: TX - 1p3q8t, RX - 1q8t or 2q8t (w/DFC); Jumbo frame support



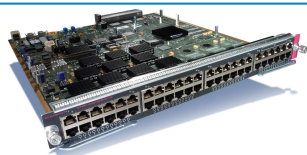
WS-X6748-GE-TX

48 Port 10/100/1000 (2x20G Fabric Enabled Card)

Supports TDR; Optional Distributed Forwarding Card (DFC); Queuing: TX - 1p3q8t, RX - 1q8t; Jumbo frame support

Catalyst 6500 Linecards

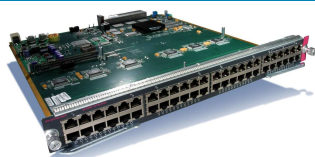
Latest Wiring Closet Portfolio



WS-X6148A-GE-TX

48 Port 10/100/1000 Wiring Closet Card with PoE Option

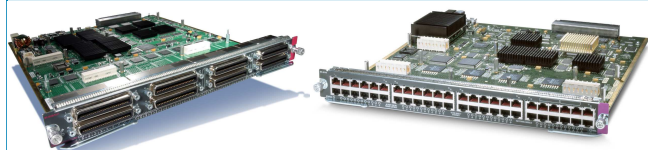
Integrated TDR, deeper per port buffers (5.2Mb), jumbo frames, Q-in-Q, 4 TX queues (one with strict priority), WRED



WS-X6148A-RJ-45

48 Port 10/100 Wiring Closet Card with PoE Option

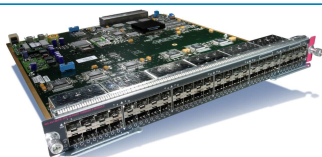
Integrated TDR, deeper per port buffers (5.2Mb), 4 TX queues (one with strict priority), WRED



WS-X6196-RJ-21, WS-X6148X2-RJ-45

96 port 10/100 Wiring Closet Cards with PoE Option

Supports strict priority queue, receive queue type 1p1q0t, transmit queue type 1p3q1t, buffers – 28K Rx, 1088K Tx



WS-X6148-FE-SFP

48 Port 100FX Card

Optics supported – FX, LX, BX-U and BX-D; Deep per port buffers (5.2Mb), 4 TX queues (one with strict priority), WRED

Catalyst 6500 New Products

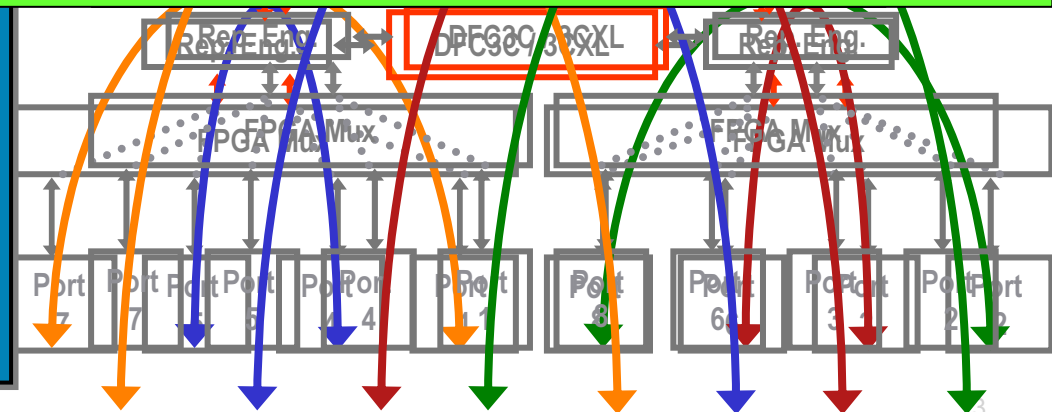
8 Port 10GE Linecard

IOS: 12.2(18)SXF5

- 8 x 10GE ports (X2 Optics)
- CEF720 linecard
- Integrated DFC3C or DFC3CXL (No CFC option)
- 2:1 oversubscribed
- Works with PFC3A/3B-XL
- All ports VSL Capable
- Egress Shaping (SRR, DWRR)
- 110MB buffer / port - ingress
- 90MB buffer / port – egress
- 1GB DRAM
- Supports < 200msec fast switchover (Whitney 1)
- Supported in 6500 and 6500-E family
- Supports SR,ER,LR, LX4, CX4, LRM X2 optics



40 Gbps Switching Across Fabric

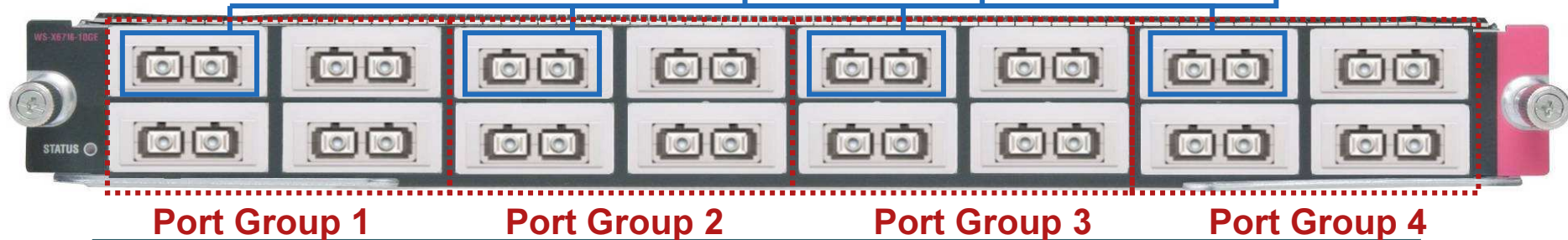


16 Port 10 Gigabit Ethernet Linecard

2HCY07

WS-X6716-10GE

4-port non-blocking mode



New 16 port 10GE Linecard Featuring :

IOS : 12.2(33)SXH

- Up to 130 ports of 10GbE in a single chassis for Campus Aggregation
- 4:1 oversubscribed
- Operates in two modes – Transparent (non-blocking 4 port) and Muxed (over-subscribed 16 ports)
- Mix mode operation supported for maximum flexibility
- VSL Support in 4-port Non-blocking mode
- X2 optics based
- DFC3C/DFC3CXL included
- Support for <200ms fast switchover
- Compatible with all chassis (E- and non-E series)

New Additions To Catalyst 6500 Chassis Family

6513-E

- **Highest Density for Core/Distribution and DC Access**
- **E-Series (80 Gbps/Slot) - 2 Terabit Ready**
- **Dual fabric trace for all slots***
- **Fan tray easily removable from the back of the chassis**
- **Supports up to 14500W of system power**
- **20 RU (2 x 6513-E in a Single Rack)**
- **Supports Sup32,720 and beyond**
- **NTE: \$25,000**
- **Software Release: 12.2(33)SXI (Whitney 2) (Minimum 12.2(18)SXF)**
- **Availability: Q3CY08**

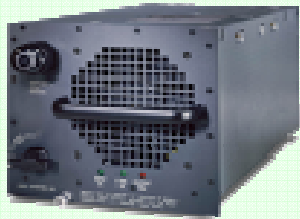
6509-V-E

- **Front to Back Airflow – Optimized for Data Center**
- **E-Series (80 Gbps/Slot)**
- **Integrated Enhanced Cable Management**
- **Redundant and easily removable fan tray**
- **Supports up to 14500W of system power**
- **21 RU (2 x 6509-V-E in a Single Rack)**
- **Supports Sup720 and beyond**
- **NTE: \$20,000**
- **Software Release: Minimum 12.2(33)SXH (Whitney 1)**
- **Availability: Q4CY07**

* Dual fabric trace on all slots not supported on Sup720, Sup720-10G

PoE and Catalyst 6500 AC Power Supply

3000W



1 input

20A

110V/220V

110V→1400W

Class 3→ 9
Class 2→ 21

220V→3000W

Class 3→102
Class 2→224

6000W



2 input

20A

110V/220V

110V→2900W

Class 3→ 96
Class 2→ 211

220V→6000W

Class 3→281
Class 2→603

8700W



3 input

20A

110V/220V

110V→4200W

Class 3→ 179
Class 2→ 375

220V→8700W

Class 3→420
Class 2→943

**Industry Leading
PoE Density
Support**

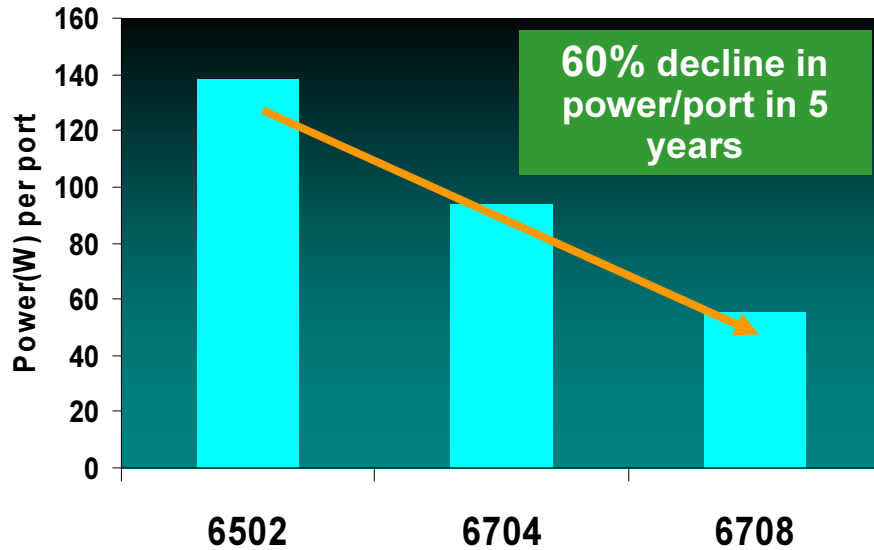
**Provision circuits
as-you-grow with
multiple input
power supply**

**Integrated PoE –
No additional rack
space**

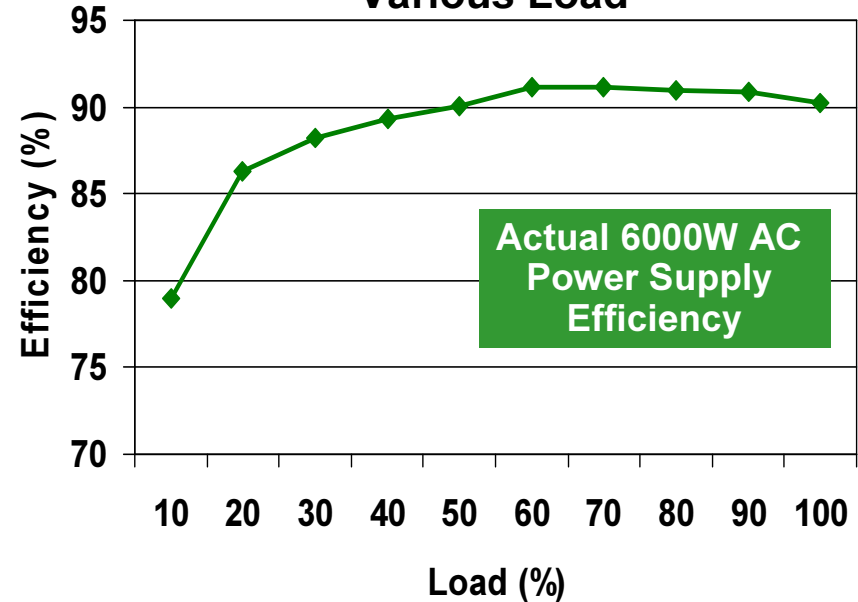
**Ready for PoE
Plus – > 12000 W
per chassis and
1800W per module**

Catalyst 6500 : A GREEN SWITCH !

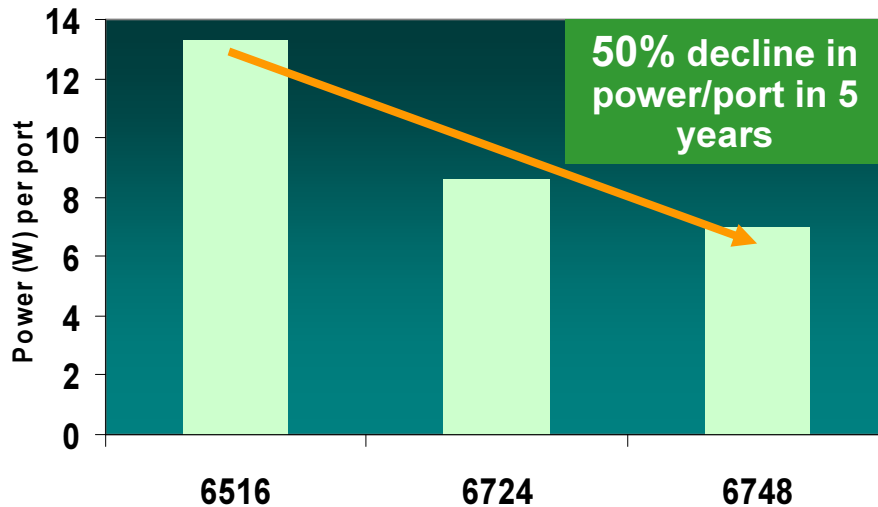
C6K 10GE Power Trends*



HIGH Power Supply Efficiency Across Various Load

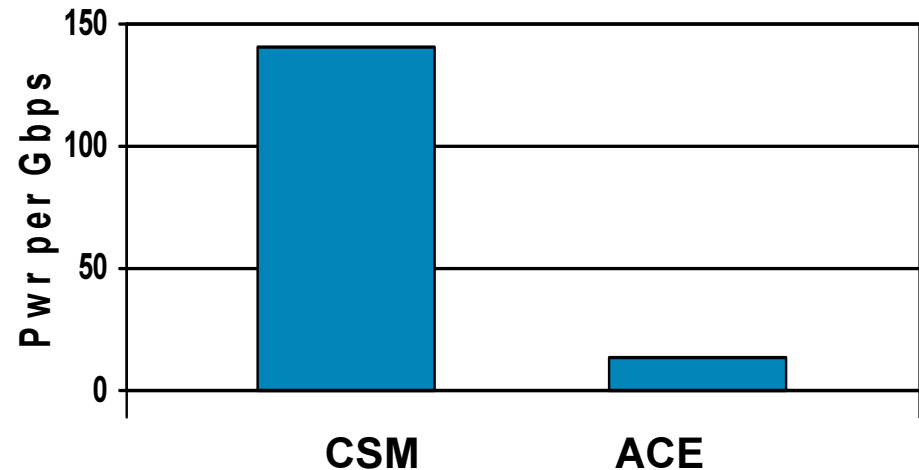


C6K 1GE Power Trends*



*Includes DFC in the calculations

Catalyst 6500 SLB





Catalyst 6500 Software Update



CatOS to IOS Migration Resources

- NEW REVISED CatOS to IOS configuration tool

Free Download from CCO – Available Now !

[–http://www.cisco.com/en/US/products/hw/switches/ps708/products_techn_note09186a0080816fbc.shtml](http://www.cisco.com/en/US/products/hw/switches/ps708/products_techn_note09186a0080816fbc.shtml)

– v2.0 & v3.0 aligned with 12.2(33)SXH & 12.2(33)SXI supporting new CatOS transition commands

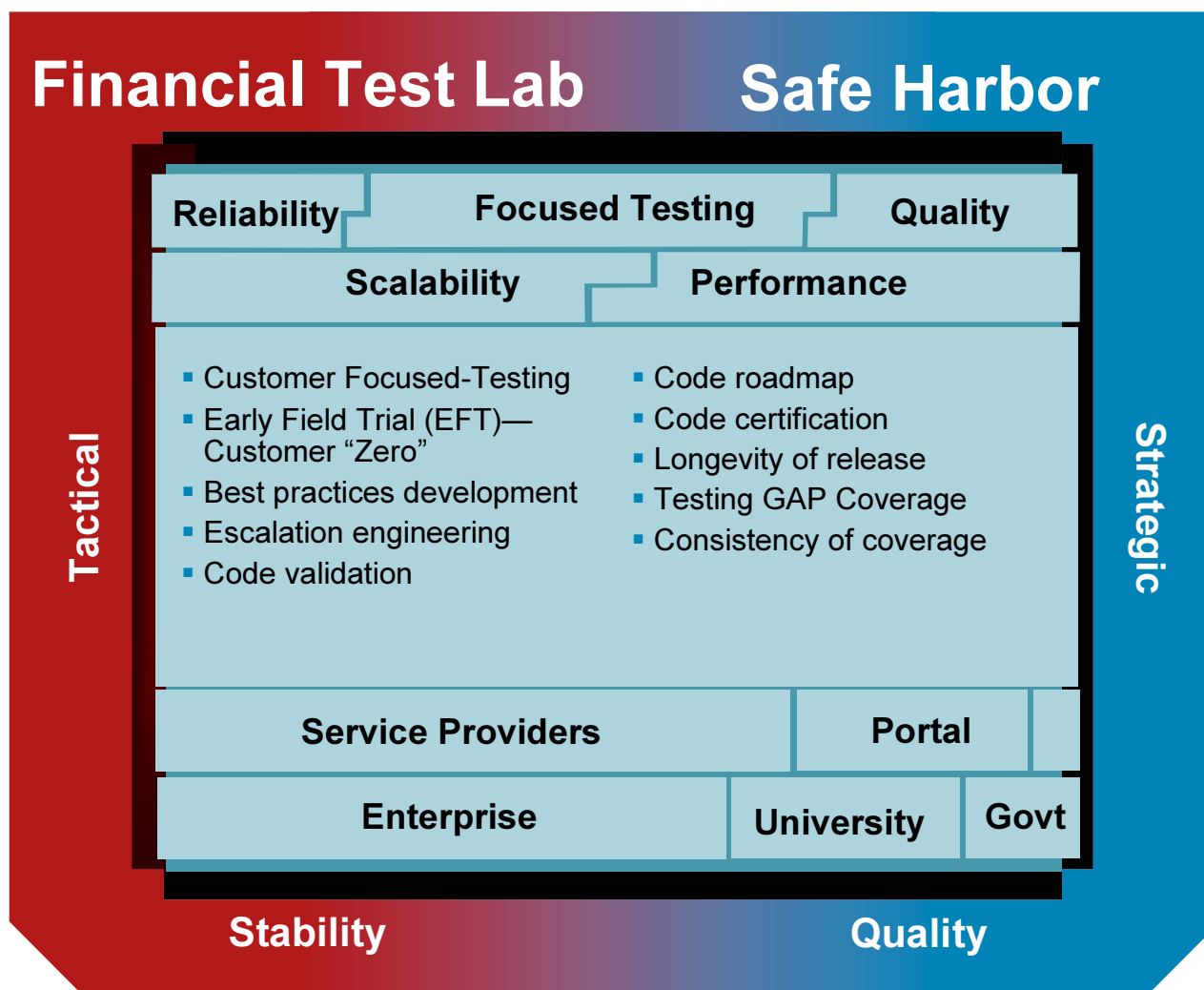
- CatOS & IOS comparison document

http://www.cisco.com/application/pdf/en/us/guest/products/ps708/c1244/ccmigration_09186a00800c8441.pdf

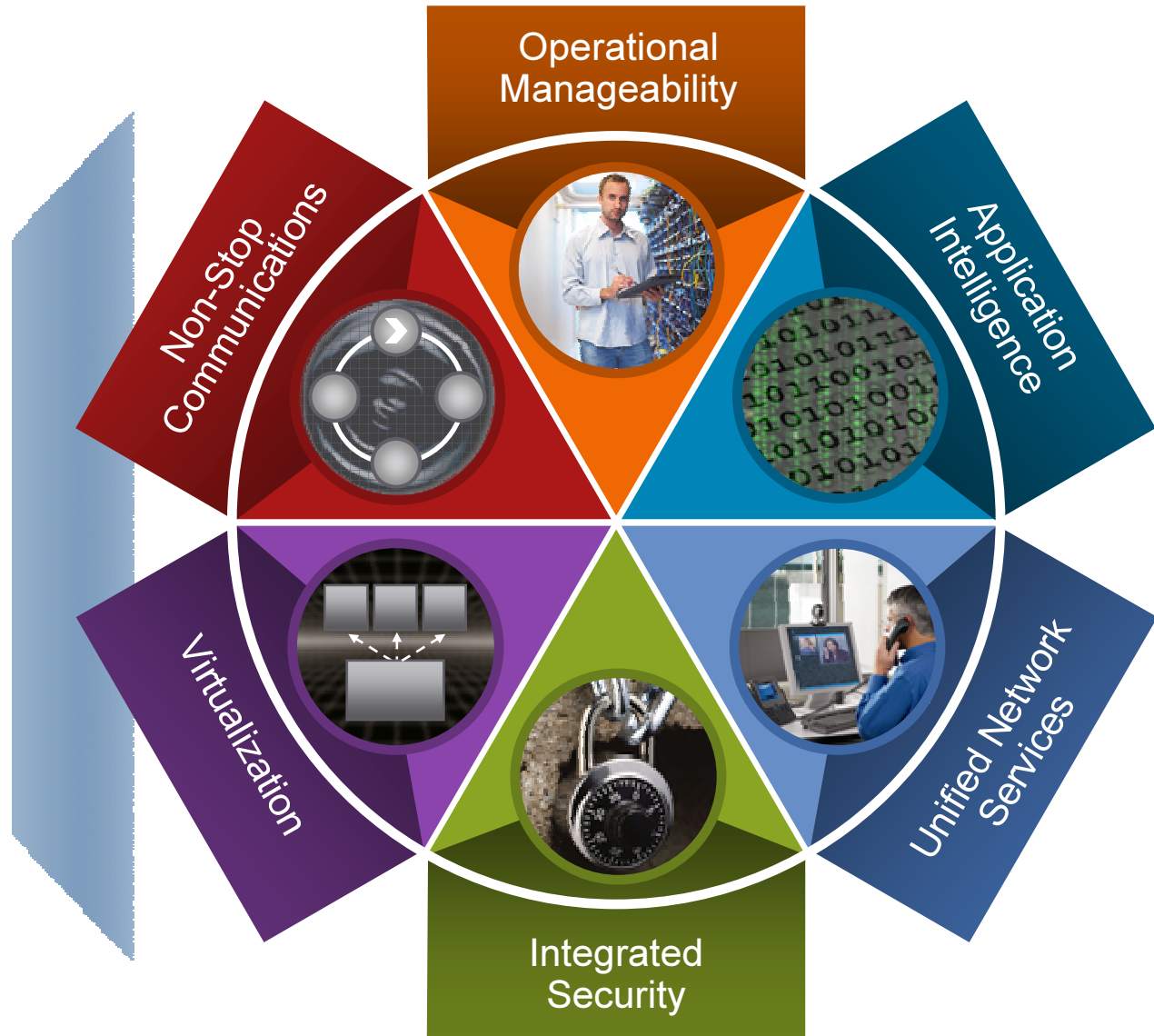
- CatOS to IOS conversion document

<http://www.cisco.com/warp/public/473/81.pdf>

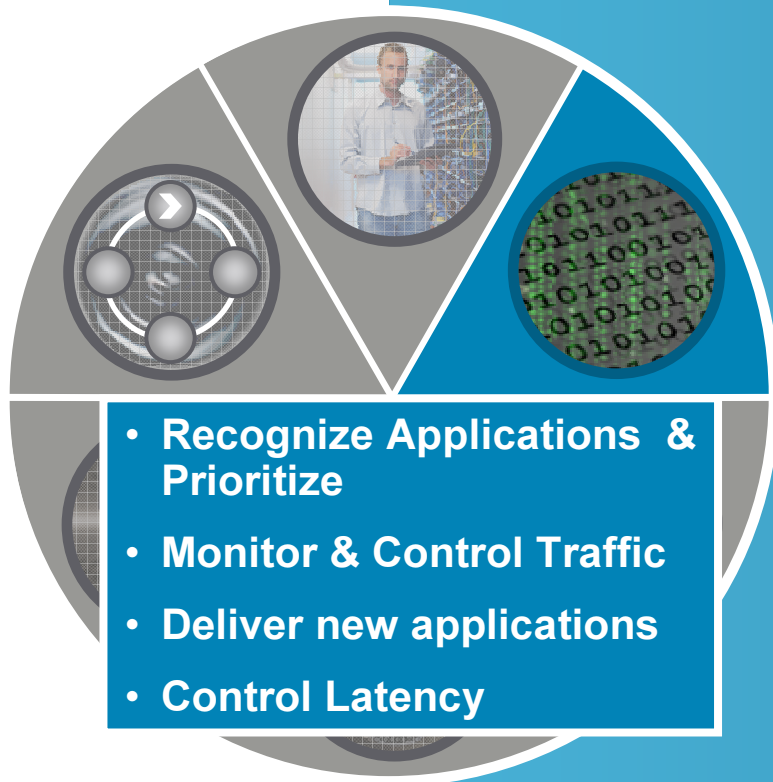
Safe Harbor and FTL At-a-Glance



Catalyst 6500 & Campus Communication Fabric



Application Intelligence: Maximize User Experience



- **Challenge:** Improve the network's ability to adjust to application requirements
- Provide enhanced visibility and control
 - Stateful Application Intelligence
 - Deep Packet Inspection
 - Application Based QoS and Security
- Support emerging trends
 - IPv6 for dynamic Point-to-Point application evolution

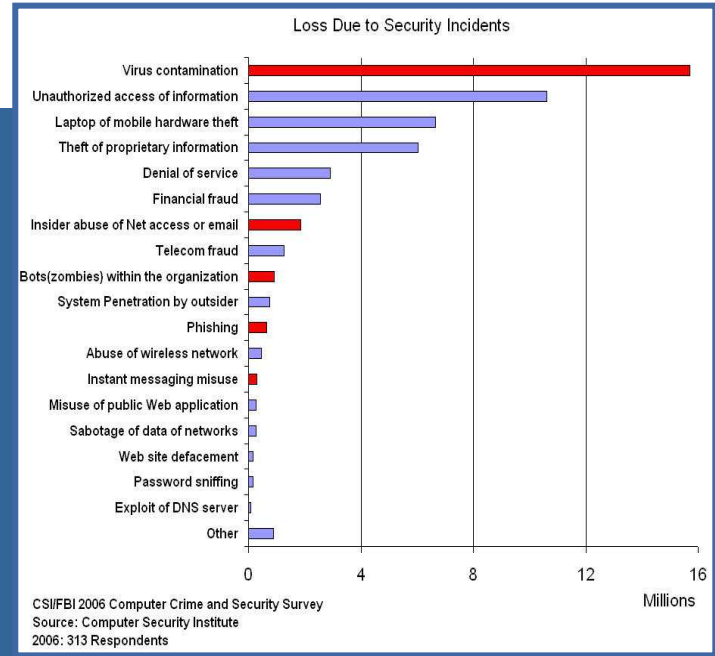
Today's Enterprise Network: Application and Security



Application

- Increasing number of users and bandwidth-intensive applications
- Converged network services: Data, Voice and Video
- Recreational traffic consuming more bandwidth
- Server consolidation & application outsourcing: More applications across WAN or Internet

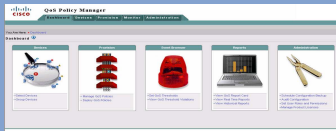
Security



- Rapid proliferation of security threats: worms, viruses
- Disappearing security boundaries
- Security threats originating from inside
- Security threat deep in the content carried inside normal application traffic such as HTTP, E-mail

PISA Management Model

QoS Policy Manager



Centralized QoS Management

- NBAR Provisioning
- NBAR Monitoring

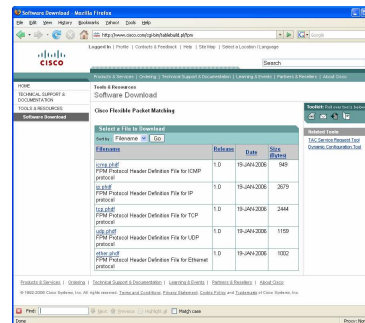
Cisco Security Manager



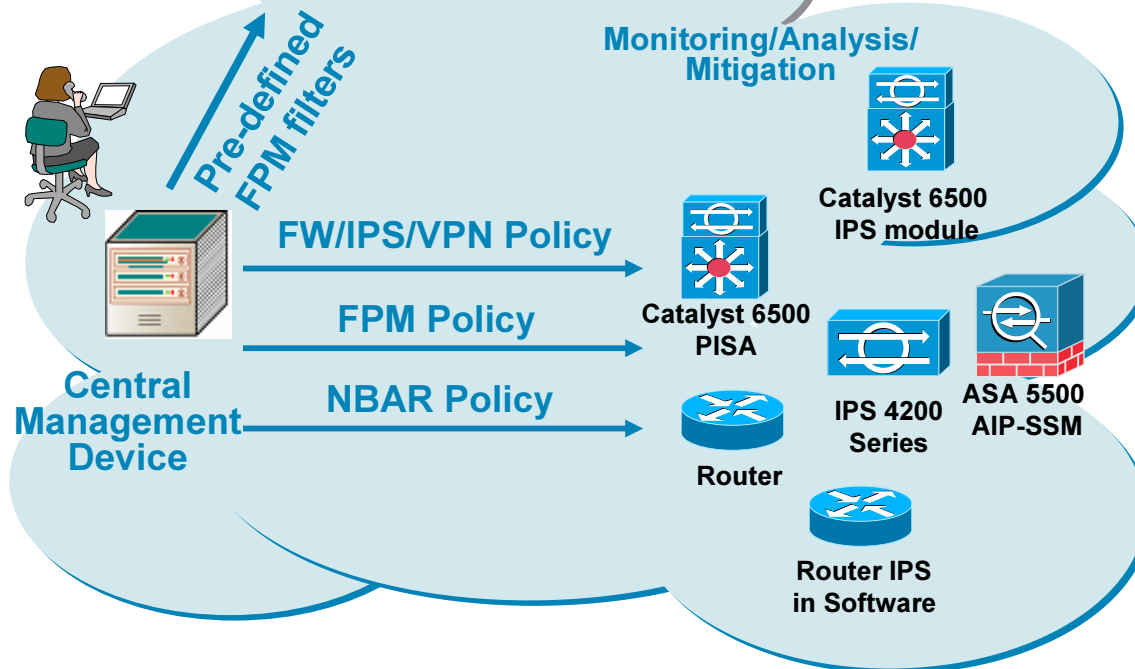
Enable Management of Integrated Security

- FPM Policy Management with FlexConfig Option

- Pre-defined FPM filters on CCO work in progress



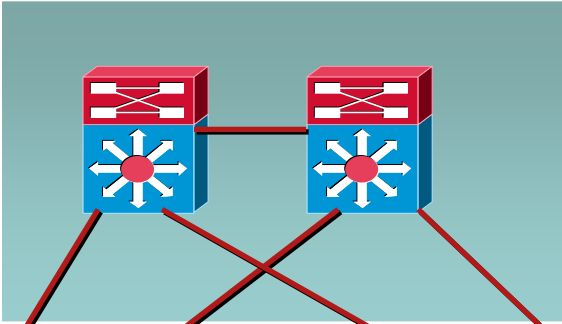
Monitoring/Analysis/Mitigation



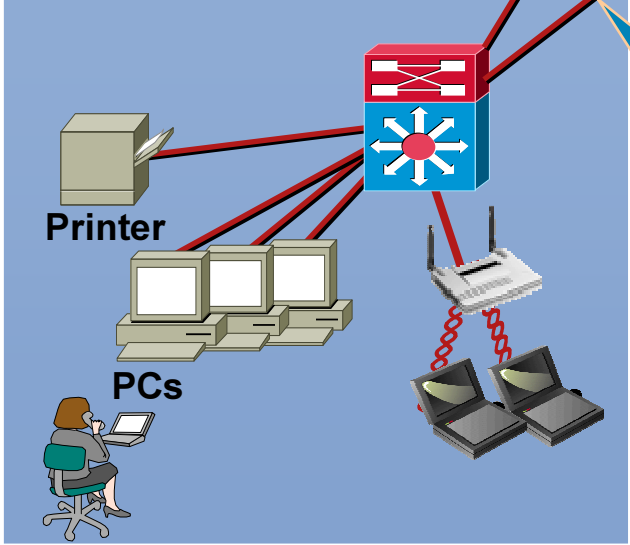
Sup 32 PISA Deployment

Campus Access Layer

- Mark Business-critical applications real-time as GOLD service
- Police non-priority applications



- Block worms like Slammer using Flexible Packet Matching
- Detect and Rate-limit undesired Peer to Peer Traffic

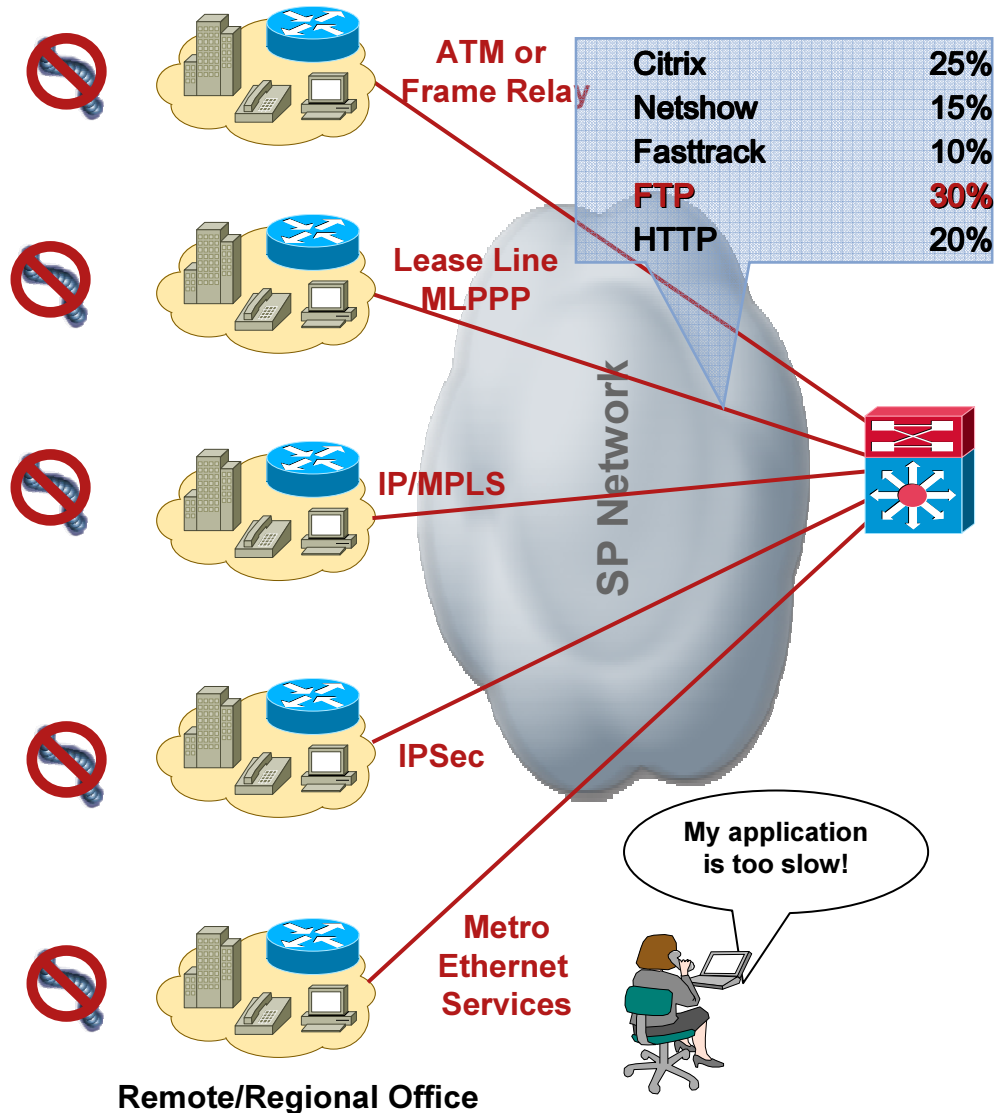


Link Utilization

Citrix	25%
Netshow	15%
Oracle	10%
FTP	30%
HTTP	20%



Sup32 PISA Deployment Enterprise WAN



► Solutions

Application prioritization with NBAR
Worm mitigation with FPM

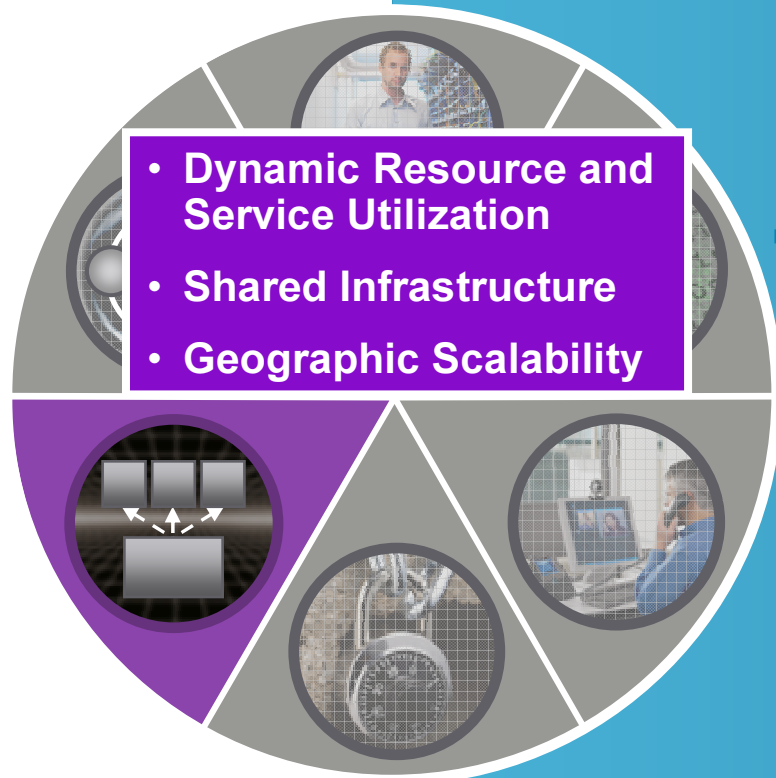
► eWAN roadmap

L2TPv3
URL filtering
TCP optimization
OER / NBAR coupling
Auto-QoS enhancements

► Catalyst 6500 & ISR integration

NBAR & FPM in hardware on the catalyst 6500
NBAR & FPM on the ISRs
Managed by the same applications (CSM and QPM)

Virtualization: Maximize Asset Utilization



- **Challenge:** Provide flexible configuration and management of all infrastructure resources to reduce costs and increase agility
- **Virtualization:** A **logical** rather than physical view of data, storage, network, and other resources presented independently of location, packaging, or capacity

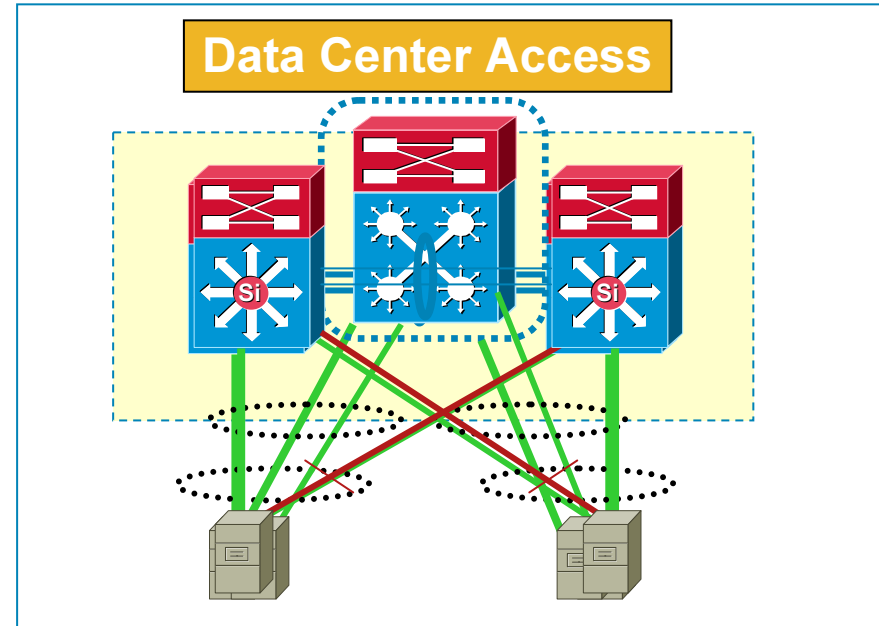
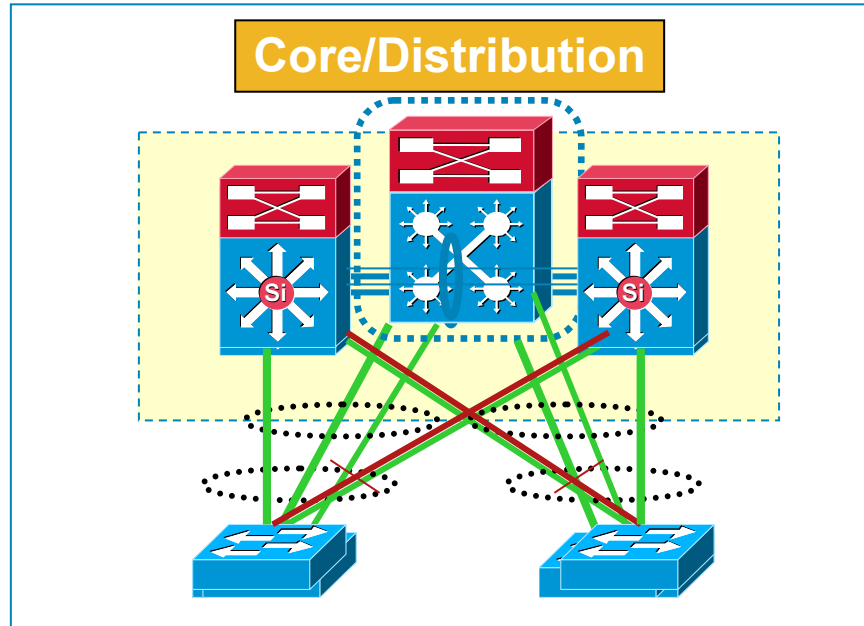
One Network Supports many physical resources: simplifies operations, reduces cost

One Network Consolidates all types of resources for increased flexibility (data, voice, video, storage)

One Module Supports many logical networks for increased asset utilization

Architectural Scalability with VSS

VSS 1440 Benefits



Features

System Virtualization

Inter-Chassis Stateful Switch Over (SSO)

Multi-Chassis EtherChannel (MEC)

Benefits of VSS

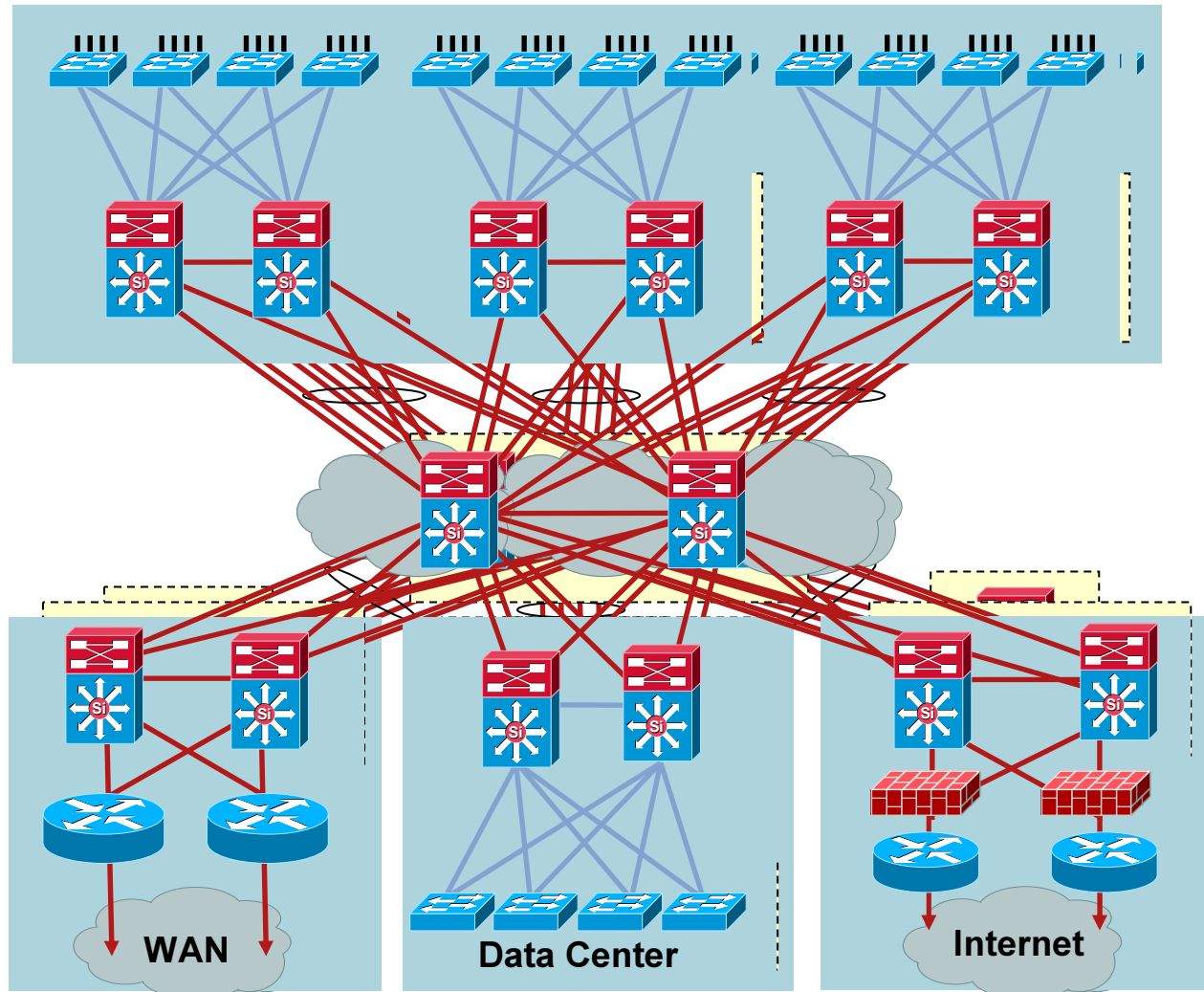
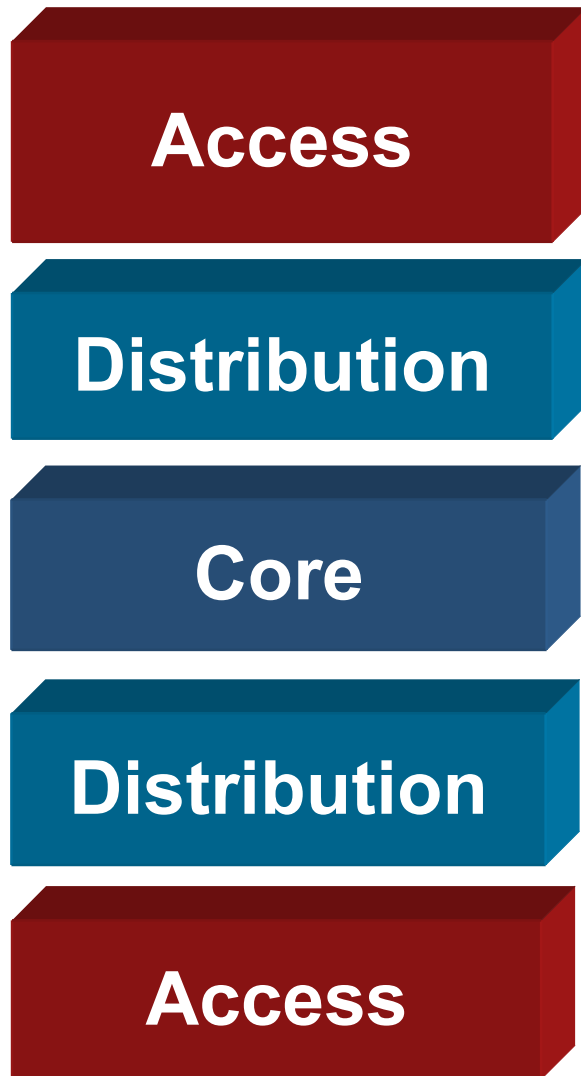
Increased Operational Efficiency via Simplified Network

Boost Non-stop Communication

Scale the Available Layer 2 Bandwidth

High Availability Campus Design

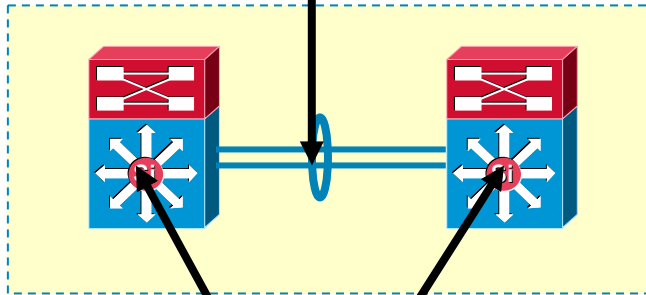
Simplified with VSS



VSS Hardware/Software Requirements

Virtual Switch Link (VSL) – 10GE

- Sup720-10G-VSS 10GE uplink
- WS-X6708-10GE
- WS-X6716-10GE (on non-blocking ports)



Virtual Switching System - FCS

- Sup720-10G-VSS (Availability Q4CY07)*
- 67XX cards with CFC or DFC-3C
- Non-E and E-Series Chassis

Software

- 12.2(33)SXH rebuild (Q4CY07)

Evolution of Traditional Multilayer Switching

Investment Protection

Standards 10GE Based Connectivity

Minimal Configuration Changes

VSL Management support in Ciscoworks at FCS – Q4CY07

VSL Management – LMS 3.01 FCS Q4CY07

- Pre-Deployment
 - Device selection and readiness report to validate hardware & software requirements for master/slave device to be converted to VSL
- Deployment
 - Convert Catalyst6500 switches to VSL, represent two switches as a single device with one Configuration file, and update LMS device credential store with one device detail
- Discovery
 - Discover pair of VSL enabled devices as one, with option to drilldown to view two independent devices
- Configuration
 - Cisco View, RME (software upgrade, inventory), Campus management enhanced to support VSL and Software Modularity
- Monitoring
 - Monitor System, Link Status, EOBC, Fabric, TCAM utilization and more
- Reports
 - Extend LMS reporting capability to support VSL specific information. Discrepancy report (Campus Manager), Net Show (RME), Detailed device report, Software report

Non-Stop Communications: Ensure Business Continuity



- **Today's Requirement:** Provide continuous access to applications, data, and content from anywhere and anytime
- **Network Level Resiliency**
 - Intelligent Network Protocols
 - Flexible Design Capabilities
- **Systems Level Resiliency**
 - Hardware and Software Redundancy
 - Hardened Control Plane
 - Proactive Fault Mgmt
- **Tested Reference Designs**

Cisco Catalyst 6500 High Availability Leadership

Maximizing Uptime

New!

Cisco IOS Software Modularity

- Subsystem In-Service Software Upgrades (ISSU)
- Stateful Process Restarts
- Fault Containment, Memory Protection



**Catalyst
6500**

Non-Stop Forwarding / Stateful Switch Over (NSF/SSO)

- Traffic continues flowing after a primary supervisor failure
- Sub-second recovery in L2 and L3 networks
- No line card reset

Generic Online Diagnostics (GOLD)

- Proactively detect and address potential hardware and software faults in the switch before they adversely impact network traffic

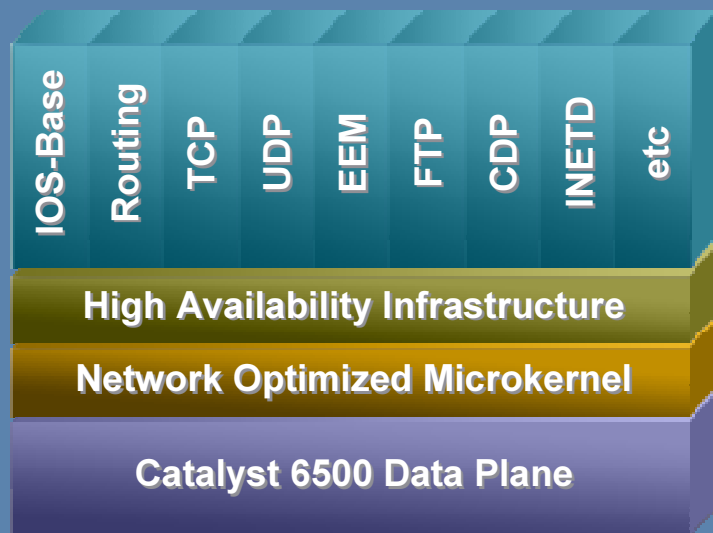
Physical Redundancy

- Redundant supervisors, power supplies, switch fabrics, and clocks

Catalyst 6500 with Cisco IOS Software Modularity

INNOVATION

Cisco IOS Software Modularity



- Memory protection
- Fault containment
- Stateful process restarts
- Subsystem ISSU

BENEFITS

Catalyst 6500 Series with Cisco IOS Software Modularity



Minimize Unplanned Downtime

Simplify Software Changes

Automated Policy Control

Catalyst 6500 with Cisco IOS Software Modularity

Catalyst 6500 with Cisco IOS Software Modularity



LAN Cards

- All LAN Linecards supported

WAN Cards

- FlexWAN (S720) and Enhanced FlexWAN (S720, S32)
- SIP/SPA support in Phase II

Service Modules

- Initial release: FWSM, CSM, IDSM, NAM, WiSM

Chassis

- All 6500-E and 6500 chassis

Modular Processes

- Include the following at FCS:
 - Routing Process
 - Internet Daemon
 - Raw IP Processing
 - TCP Process
 - UDP Process
 - CDP Process
 - Syslog Daemon
 - All Embedded Event Manager components
 - File Systems
 - Media Drivers
 - Install Manager

Supervisors

Supervisor Engine 720 (PFC3A/3B/3BXL):
Posted 3/27/06 (SXF4)
Supervisor Engine 32:
Posted 7/10/06 (SXF5)

Support

- Ability to patch individual Cisco IOS process
- **Patches for publicly announced security vulnerabilities (PSIRT)**
- CCO-based tooling to support management of patches
- Some features unavailable at FCS but being planned for next phase (notable ones are MPLS, IPv6, and BFD)

Deploying IOS Software Modularity

How Do You Identify the Images?

IOS Upgrade Planner - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.cisco.com/cgi-bin/Software/Iosplanner/Planner-tool/iosplanner.cgi?get_crypto=&

Getting Started Latest Headlines

CISCO SYSTEMS

Close Window

IOS Upgrade Planner

0

The selections you have made are:

Platform: CAT6000-SUP720/MSFC3
Release: [12.2.18-SXF4](#) ([ED - Early Deployment](#))

Narrow your choices by choosing a major release.
[12.4](#) [12.3](#) [12.2](#) [12.1](#)
[Library](#)

Select options from the table below to find the software you want:

Choose Options
Select Software Feature Set
ADVANCED ENTERPRISE SERVICES SSH
ADVANCED ENTERPRISE SERVICES SSH (MODULAR)
ADVANCED IP SERVICES SSH
ADVANCED IP SERVICES SSH (MODULAR)
ENTERPRISE SERVICES SSH
ENTERPRISE SERVICES SSH (MODULAR)
FIELD PROGRAMMABLE DEVICE IMAGE
IP SERVICES
IP SERVICES (MODULAR)
IP SERVICES SSH
IP SERVICES SSH (MODULAR)
IP SERVICES SSH LAN ONLY
IP SERVICES SSH LAN ONLY (MODULAR)

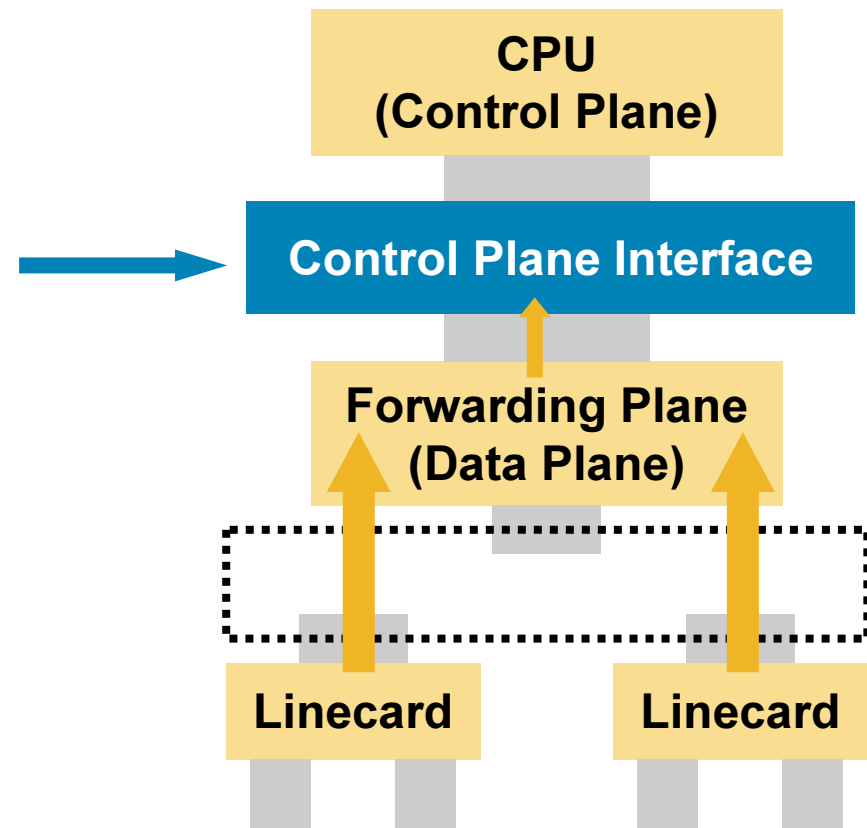
Done

Look for the
“MODULAR” keyword
in the feature set
description!

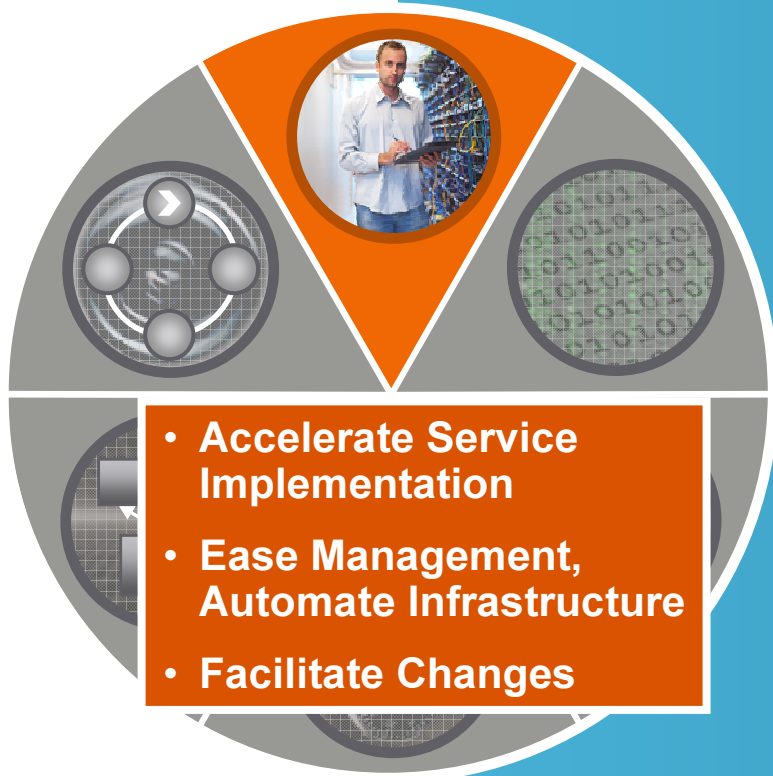
Control Plane Protection

Control Plane Policing (CoPP)

- Control Plane Policing applies Catalyst Hardware QoS policies to traffic punted to the CPU
- **New** Logical Control Plane Interface
 - Provides ability to Rate Limit Total traffic volume destined to Control Plane
- CoPP is supported on Catalyst 6500 in Hardware
- Provides customizable traffic control and CPU protection



Operational Manageability: Faster Service, Lower OpEx

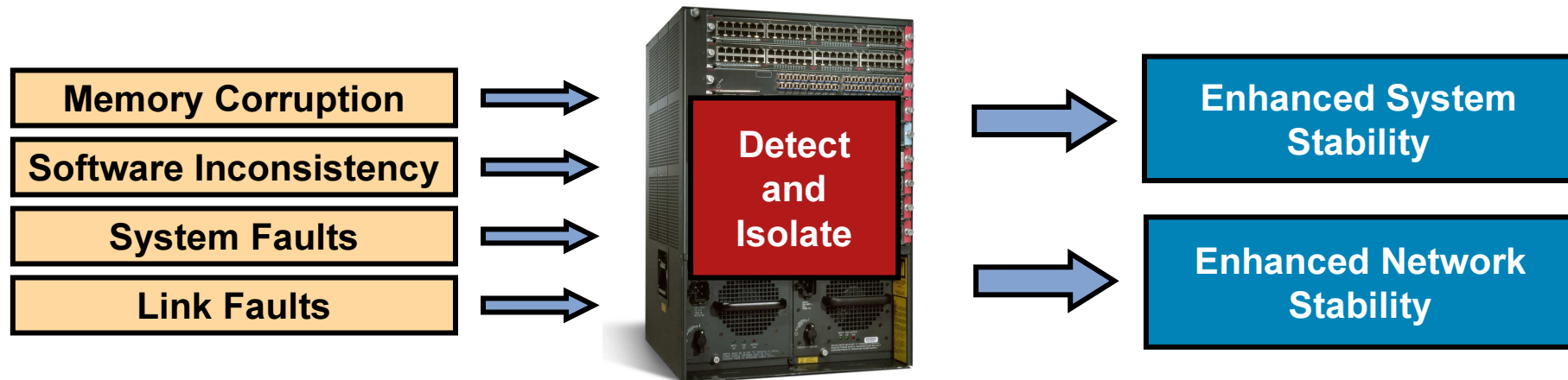


- **Challenge:** In addition to the network always being available you always need to know what is happening in the network
- Improved Fault Detection & faster reaction to events
 - Generic Online Diagnostics (GOLD)
 - Embedded Event Manager (EEM) & Enhanced Object Tracking (EOT)
- More visibility into actual state of applications and the network
 - Netflow
 - IP SLA
 - NBAR
 - ERSPAN

Proactive Fault Detection & Reaction

Distributed management intelligence

Challenge: In today's highly available networks improved physical redundancy is not enough, intelligent system failure detection and recovery are key



Generic Online Diagnostics (GOLD) provides proactive, scheduled and manual system diagnostics

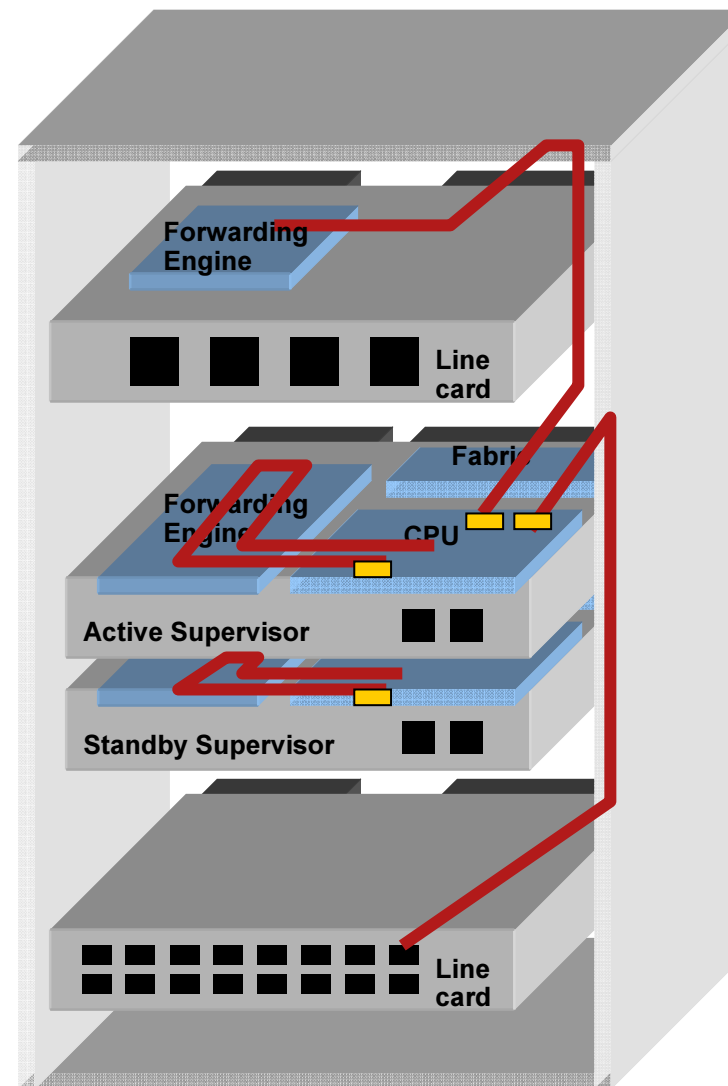


Enhanced Object Tracking (EOT) and Embedded Event Manager (EEM) provide intelligent response to system events

Generic Online Diagnostics

How does GOLD work?

- Diagnostic packet switching tests verify that the system is operating correctly:
 - Is the supervisor control plane and forwarding plane functioning properly?
 - Is the standby supervisor ready to take over?
 - Are linecards forwarding packets properly?
 - Are all ports working?
 - Is the backplane connection working?
- Other types of diagnostics tests including memory and error correlation tests are also available

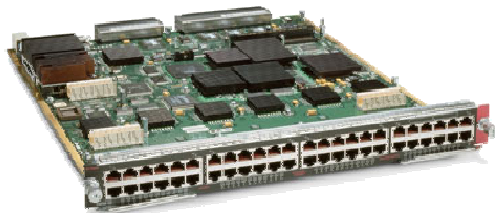


Generic Online Diagnostics Diagnostic Integration

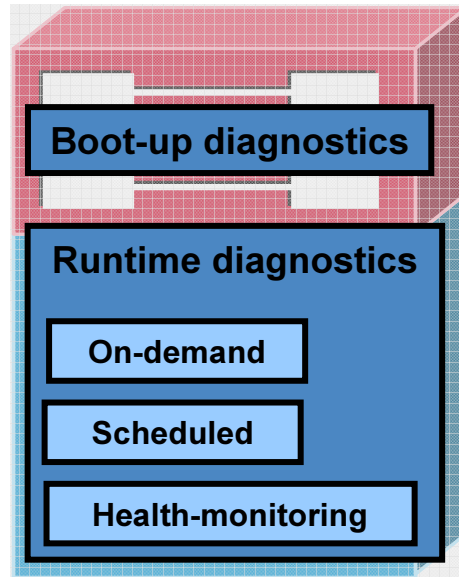
Configuration/reporting



Configure online diagnostics
and check diagnostics results



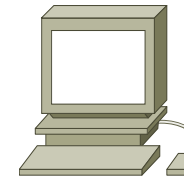
Verify hardware functionalities



Provides generic diagnostics
framework



Action



- Default corrective action
 - Supervisor reset
 - Supervisor switch-over
 - Fabric switch-over
 - Port shut down
 - Line card reset
 - Line card power down
 - Generate a call-home message
- Trigger Syslog
- Trigger EEM policies
- Generate SNMP Trap

Automated action based on
diagnostics results

Detect and identify problems before they result in network downtime!

Embedded Event Manager

What is it?

EEM is a Cisco IOS enhancement that runs on the Catalyst 6500's CPU. It is a combination of processes designed to monitor key system parameters such as CPU utilization, interface counters, SNMP and SYSLOG events. It acts on specific events or thresholds/counters that are exceeded...



EEM on the Catalyst 6500 is supported as of:

- 12.2(18)SXF4 with IOS SwMod
- 12.2(18)SXF5 with standard IOS

<http://www.cisco.com/go/eem>

Embedded Event Manager

How can it be used?

These are a few of the many uses, EEM can be applied to...

Bring a backup link up when a packet drop threshold has been exceeded...

Send an email alert when a configuration change is made in production hours...

Send a page message to operations if any unauthorized hardware is installed/removed

Run specific commands at set time intervals to assist in capacity planning

EEM

Generate custom SYSLOG on scheduled GOLD diagnostic run highlighting H/W issue..

Generate custom login message based on user-id that logs in

Cisco Beyond - A Scripting Community for Embedded Event Manager

- Cisco IOS EEM
 - Extremely flexible and powerful onboard, event driven, scripting facility
- Cisco Beyond
 - A place to share scripts, upload, download, get examples

More details:

<http://cisco.com/go/eem>

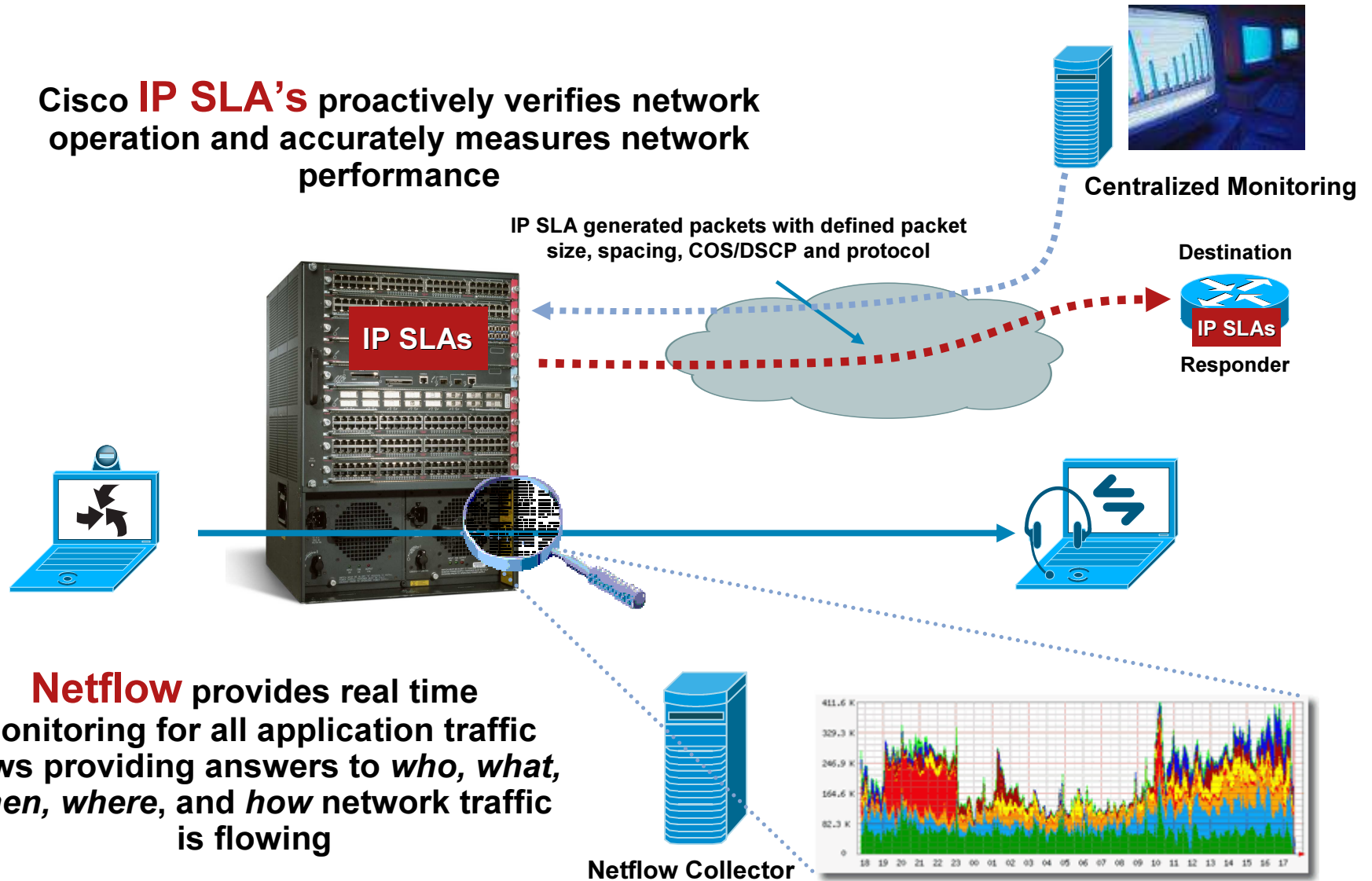
<http://forums.cisco.com/eforum/servlet/EEM?page=main>

The screenshot shows the Cisco Embedded Event Manager (EEM) website. The browser window title is "Embedded Event Manager (EEM)". The page features a navigation menu with links for "Products & Services", "Ordering", "Technical Support & Documentation", "Learning & Events", "Partners & Resellers", and "About Cisco". A search bar is located at the top right. The main content area is titled "Application Landing Page Embedded Event Manager (EEM)" and includes a search box, a description of EEM as a flexible system for customizing IOS, and a "Featured Script" section. The "Featured Script" section highlights a script named "sdld.tcl" which uses OIR events to check for certain modules. Below this, there are sections for "Browse Scripts" with sub-sections for "Network Management", "Capacity Planning", "Routing", "Qos", and "High Availability". On the right side, there is a "Log In" section with fields for "User Name" and "Password", and a "Submit" button. Below the login section is an "Upload Scripts" section with instructions on how to upload and license scripts. At the bottom right, there is a "Top Downloads" section listing various scripts like "health-check.tcl", "hsrp_helper_fixup.tcl", "if-counter.tcl", "autoqos.tcl", and "odp.tcl". A "No Gutters" graphic is also visible on the right side of the main content area.

Network and Application Visibility

Cisco NetFlow and IP SLA

Cisco **IP SLA's** proactively verifies network operation and accurately measures network performance



Netflow provides real time monitoring for all application traffic flows providing answers to *who, what, when, where, and how* network traffic is flowing

Integrated Security

The Network is the First Line of Defense



- **Challenge:** Provide distributed security tools and features required to protect and secure new traffic flow patterns
- **Scalable Security**
 - Increasingly complex security requirements
 - Scalable security mechanisms a must
- **Protect Client Resources beginning at the edge of the network**
 - Catalyst Integrated Security Features
 - Network Admission Control
 - Identity Based Networking
- **Anomaly Detection**
 - Flexible Packet Matching
 - Flow Analysis

Access Layer Authentication Solutions

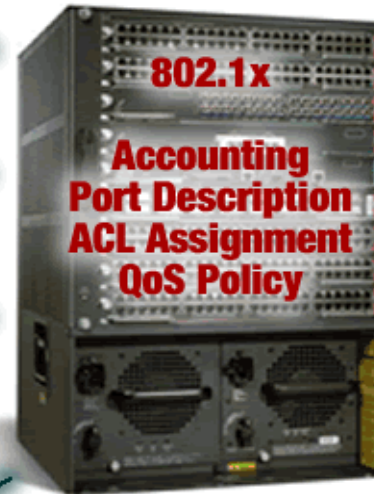
Pulling it all together

Identity Based Networking Services on the **Catalyst 6500** offers a complete authentication solution for customers wanting to better secure access to their network...

Guest VLAN access for transient workers...



Uni-Directional Control Port to initiate system backups...



Web Auth Proxy access for clients with HTTP access...



MAC Auth Bypass for clients with no 802.1x support...

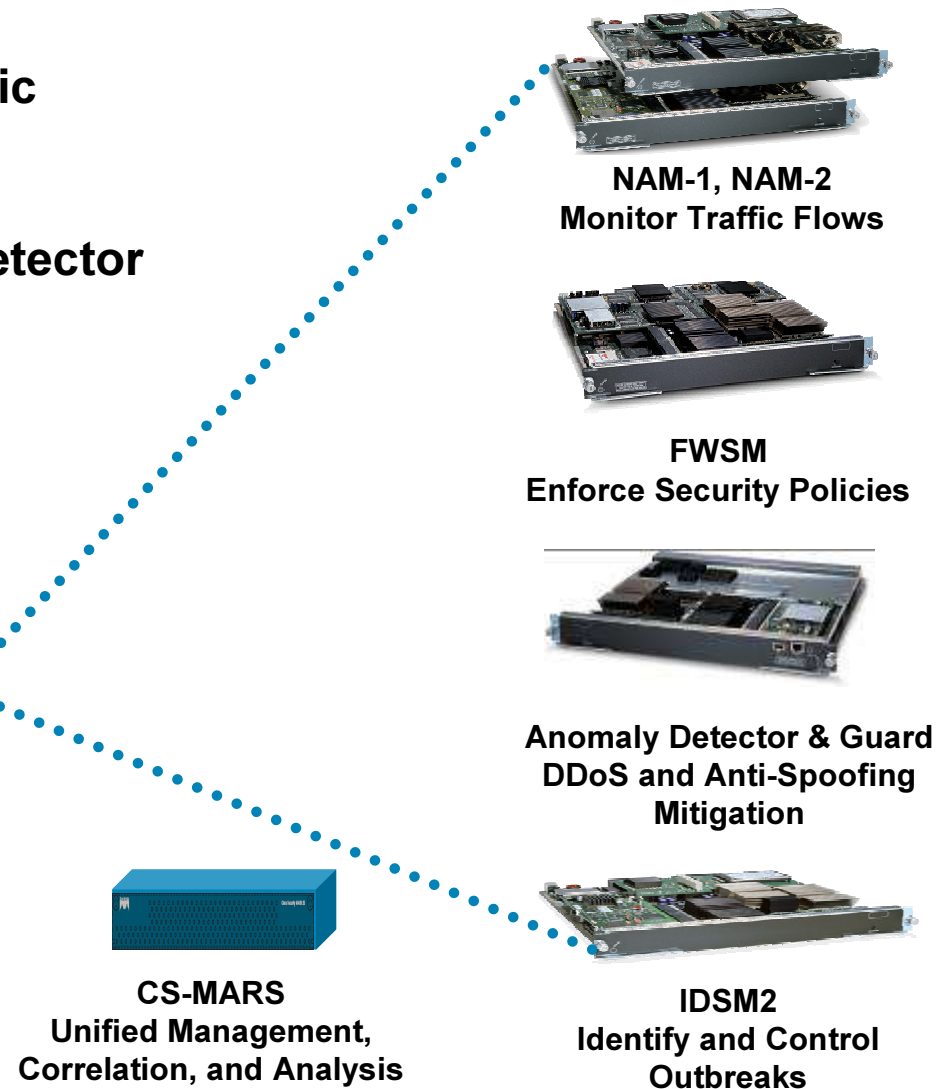
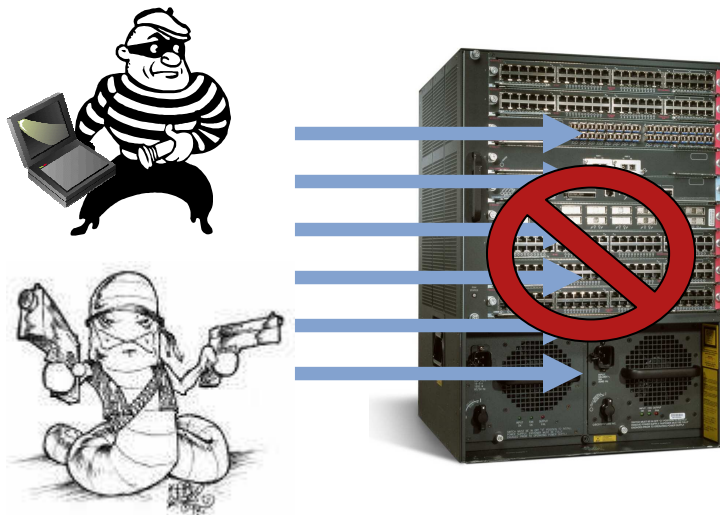


Inaccessible Auth Bypass when access to the AAA server is down...

Distributed Security Services

Integrated Services Modules

- Distributing Security Services throughout the Switching Fabric
- Security Services
 - FWSM, IDSM-2, Anomaly Detector & Guard
- Network Monitoring
 - Network Analysis Module

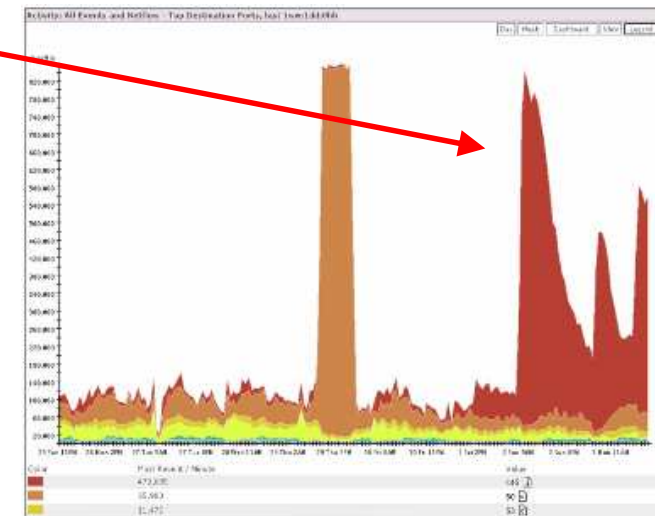
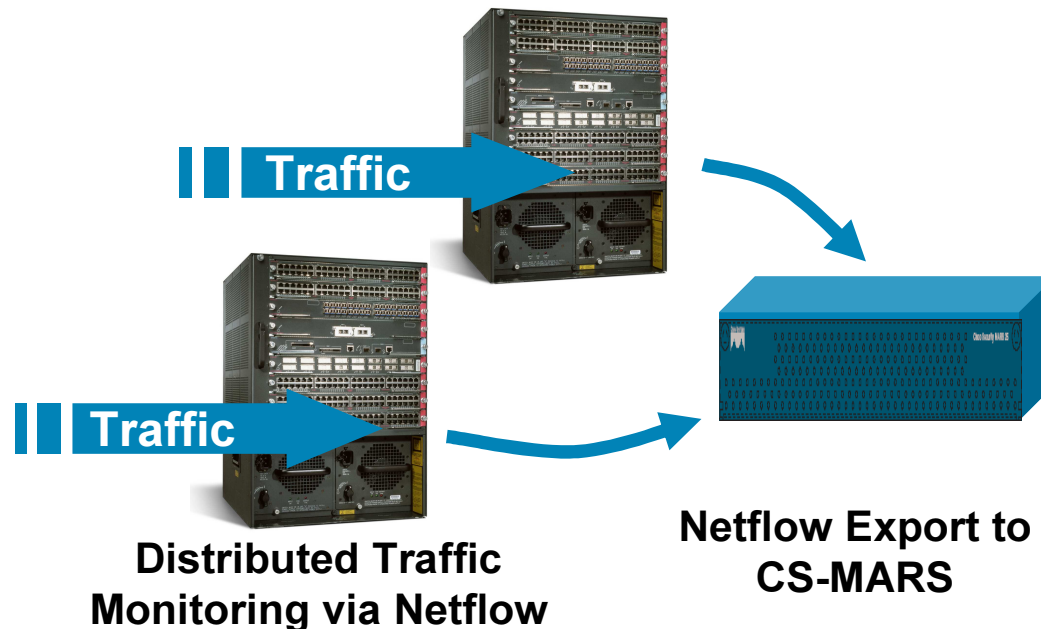


Distributed Anomaly Detection

Scalable Monitoring for Network Worms

Integrated NetFlow Support on Catalyst 6500

- NetFlow's anomaly detection using statistical profiling, pinpoints day zero attacks like worm outbreaks
- CS-MARS detects anomalies comparing the previous data against current data. Upon Anomaly detection, CS-MARS starts to save that data and creates an incident.
- Example of the Sasser-D breakout



Centralized Anomaly Detection and Notification

Unified Network Services: Improve Technology Integration



- **Challenge:** Providing Any Application and Service to Any Screen at Any Place and Any Time
- Wireless users need “wired” services integration
 - Secure access to data (Guest Access)
 - High availability network services
- Integrated Unified Communications Services
 - Network based resources
 - PoE for Access Points, Phones, etc
- New Wireless and UC Services Emerge
 - Voice over wireless data network
 - ID and Location Services

Catalyst 6500 Services Modules Strategy

Managed Virtualization

More granular customized control of network with lower TCO
Firewall and VPN as first virtualized services

Scalability

Highest performance
Modular Flexibility
System level L2-7 Integration

Services Convergence

Secure Data Center
Enterprise Security Segmentation
New Services

Enhanced Manageability

Role based Access Control
Programmable Interface
Drag & Drop GUI for services configuration



FWSM



ACE



IDSM2



NAM 1 & 2

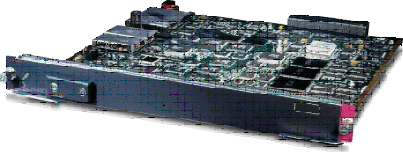
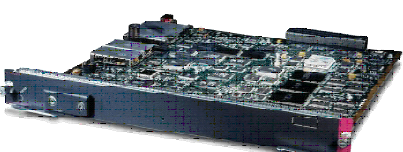
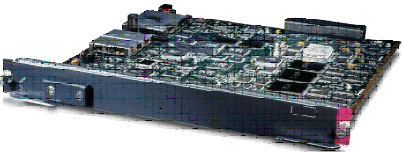
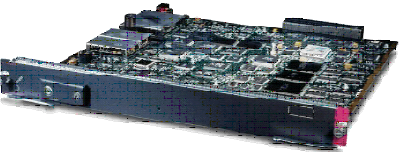
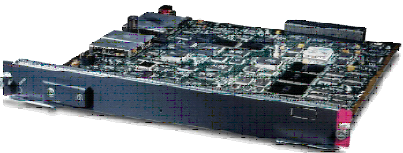
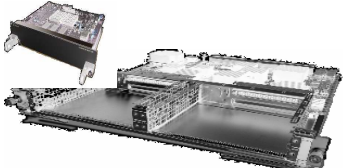


WiSM

Switch Integrated Security

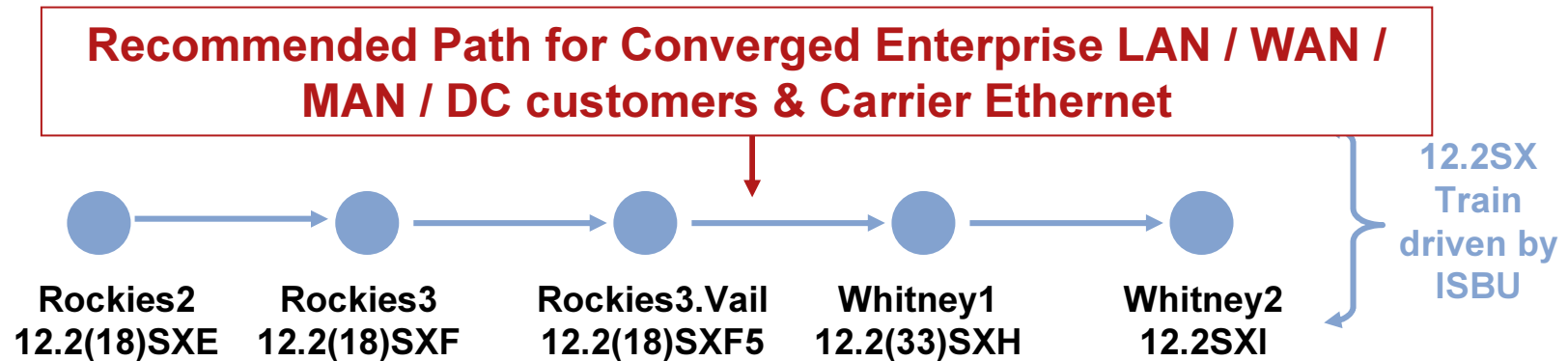
Catalyst Integrated Security Tool kit- Man-in-the-Middle Attack Prevention
Hardware integrated security- Sup 720 user based and CPU rate limiting
Identity Based Networking Service- IBNS, 802.1x
Network Admission Control (NAC)

Catalyst 6500 Services Modules Portfolio

<p>Firewall</p> 	<ul style="list-style-type: none"> • 5.5 Gbps Throughput • Routed or Transparent • Active/Active • Multicast • 250 Context/Module • Application Firewall • IPv6 Phase 1 	<p>Wireless LAN</p> 	<ul style="list-style-type: none"> • Converge wireless and wired infrastructure • Scalability to 3600 AP's per cluster; 1500 AP's per chassis; and 300 AP's per module • Layer 3, N+1 redundancy
<p>ACE</p> 	<ul style="list-style-type: none"> • SLB • SSL Offload, TCP Offload • Virtualization & RBAC • Application Acceleration • Application Security • 16 Gig 	<p>Intrusion Detection</p> 	<ul style="list-style-type: none"> • Simultaneously monitor multiple VLANs • Unlimited VLAN support • Transparent via passive promiscuous operation
<p>Network Analysis</p> 	<ul style="list-style-type: none"> • L2-7 protocol visibility, analysis and decode • Real-Time and historical statistics • Capture & Reports export • MPLS tag monitoring 	<p>IP Sec VPN SPA</p> 	<ul style="list-style-type: none"> • 2.5 Gbps Throughput • Feature parity with VPN SM • AES (128, 192, 256-bit key sizes) • Jumbo Frame support

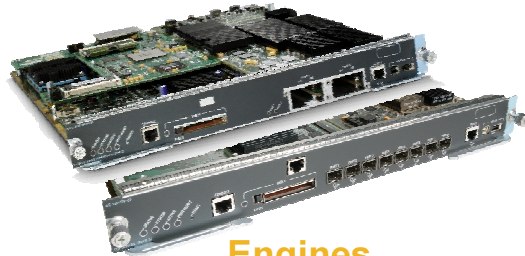
Catalyst 6500 – 12.2SX Statement of Direction

Maximize Investment and Feature Velocity for Enterprise and Metro Ethernet Segments

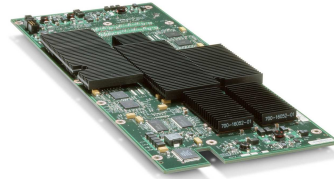


- **SW and HW consistency** in the Enterprise network for simplified operations
- IOS Software Modularity for **maximum uptime**
- Leadership in **secured WAN VPN solutions** (IPSec, DMVPN, GETVPN, L2TPv3...)
- **MPLS and VPLS** WAN solutions (EARL8 committed with H-VPLS in HW)
- **WAN links optimization** with PISA, OER
- **Safe Harbor and FTL** extended to eWAN for End-to-End solution validation
- **Application Intelligence** and **Flexible Packet Matching** at OC48 speeds

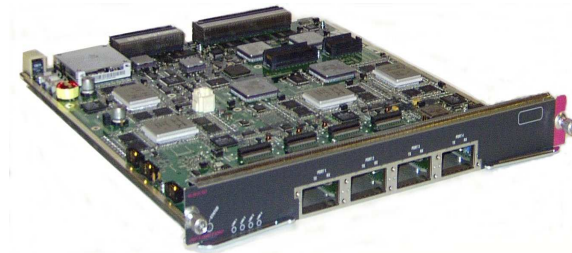
Catalyst 6500 WAN Hardware Overview



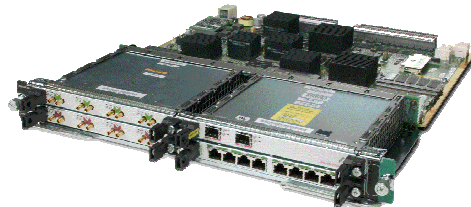
Engines
 Supervisor 32
 Supervisor 720
Supervisor 720 with 10G Uplinks
Supervisor 32 PISA



Forwarding Engine
 PFC3B/XL
 PFC3C/XL
PFC 4



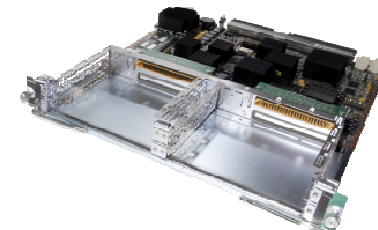
High-Density Ethernet Modules
 High-Density GE and 10GE
 8-port 10GE
16-port 10GE
802.1ah Line Card



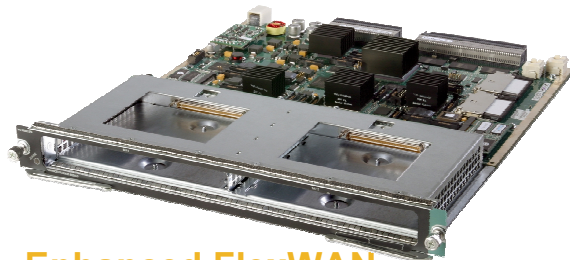
SPA Interface Processors
 SIP-200, SIP-400, SIP-600
 DS0 to OC192



Catalyst 6500 Series Switches



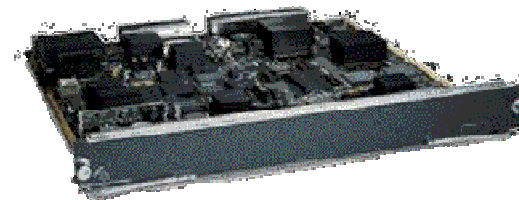
VPN SPA Module
 2.5 Gbps VPN per SPA
5 Gbps VPN
IPv6 Encryption



Enhanced FlexWAN
 7500 Parity and
 PA Investment Protection

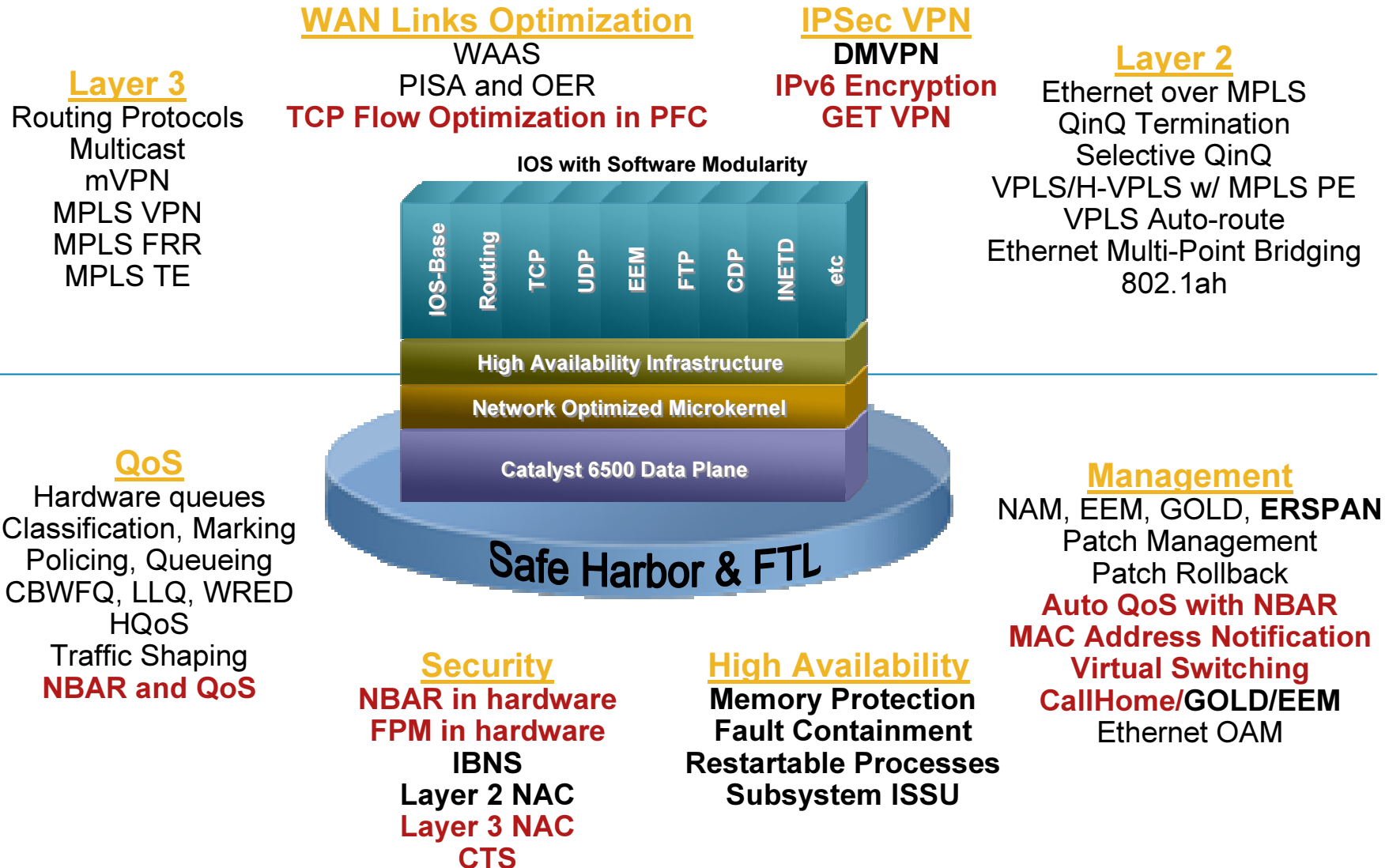


ME 6524



Services Modules
 IPSEC, Firewall, IDS,
 NAM, **WiSM**, ACE, **CMM**

Catalyst 6500 WAN Software Support



Catalyst 6500

Delivering the CCF Benefits



