Produktové a technologické novinky v oblasti přepínání

NET2/L2

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Agenda

• Cisco Switching Products Positioning
• Cisco Catalyst Product Family
  • Fixed access layer switches
  • Catalyst 4500
  • Catalyst 6500
Cisco Switching Product Positioning
Product positioning in campus switched network

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>DISTRIBUTION</th>
<th>CORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco Nexus 7K</td>
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<tr>
<td>Cisco Catalyst 6K</td>
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<tr>
<td>Cisco Catalyst 4500</td>
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<tr>
<td>Cisco Catalyst 3K</td>
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<tr>
<td>Cisco Catalyst 2K</td>
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</tbody>
</table>

- **Green**: Lead Platform
- **Yellow**: Alternate Platform
Product positioning in datacenter switched network

<table>
<thead>
<tr>
<th></th>
<th>ACCESS</th>
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<td>Cisco Nexus 7K</td>
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<tr>
<td>Cisco Nexus 5500</td>
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<tr>
<td>Cisco Nexus 1/2/3/4K</td>
<td><img src="Image" alt="Icon" /></td>
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<tr>
<td>Cisco Catalyst 4900</td>
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<tr>
<td>Cisco Catalyst 2360</td>
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</table>

**Legend:**
- **Lead Platform**
- **Alternate Platform**
Borderless network features for advanced switched campus networks

**Security**
- TrustSec, MACSec, CoPP, ISE, FNF, ...
- Comply With Security Regulations
- Eliminate Data Snooping, Tampering and Attacks
- Effortless Security Roll-outs

**Video**
- Medianet, Mediatrace, Traffic Simulator, Autoconfiguration, ...
- Simplified/Rapid Deployments
- Scalable/High Quality Video
- Easy Integration of New Video Applications

**High Availability**
- HW redundancy, SSO, NSF, ISSU, eFSU, VSS, StackWise, ...
- Uphold SLA’s
- Reduce OpEx
- Better Network Stability

**PoE Leadership**
- PoE/PoE+, UPoE, broad device support ...
- PoE with no Restrictions
- Most Efficient Solution Space, Time and Cost
- Support Widest Array of Devices

Quantifiable savings based on platform longevity, manageability, application visibility and control, EnergyWise, Smart Operations, and other OPEX reduction
Catalyst 29xx and 3xxx
Cisco Borderless Networks Access Portfolio

**Catalyst 4500E**
- Industry-leading modular access

**Catalyst 4500-X 3750-X 3560-X**
- Industry-leading fixed switching

**Catalyst 2960-S**
- Competitive feature set at compelling prices

**Catalyst Compact Switches**
- Great for secure, manageable ports ‘at the end of the wire’

**Industrial Automation**
- Purpose-Built for Industrial Applications

**Full Borderless Network Services for Enabling New Applications & Delivering Lower TCO**

**Value Switching**

**Low Port Density**
- Ruggedized for industrial applications

**Traditional Workspace**
- Data
- Voice

**Outside the Wiring Closet**
- Oil & Gas
- Retail
- Manufacturing

**Next-Generation Workspace**
- Any Device
- HD Video
- VDI

**Industry-leading fixed switching**

**Industry-leading modular access**

**Full Borderless Network Services for Enabling New Applications & Delivering Lower TCO**
Catalyst 3750-X and 3560-X

**INNOVATION**
- StackWise Plus & StackPower
- Flexible NetFlow
- Hot-swappable power supplies & fans
- Industry’s highest density PoE+
- Rolling Stack Upgrades
- MACsec

**OPERATIONAL SIMPLICITY**
- Automation
- Investment protection
- Enhanced Limited Lifetime Warranty

**WORLD’S MOST POPULAR STACKABLE**
- ¼ BILLION PORTS
- OVER 7 MILLION UNITS
- INDUSTRY LEADERSHIP
- LOWER TCO

Leading Stackable Unified Access Platform
Catalyst 3K Campus Portfolio

**STAND-ALONE SWITCH PORTFOLIO**

- **Catalyst 3560 v2**
  - Data or PoE
  - Fixed 1G Uplinks
  - Single PS
  - LLW

- **Catalyst 3560-X**
  - Data / PoE(+)
  - Modular 1G/10G Uplinks
  - Dual PS
  - E-LLW

**STACKABLE SWITCH PORTFOLIO**

- **Catalyst 3750 v2**
  - Data or PoE
  - StackWise
  - Fixed 1G Uplinks
  - Single PS
  - LLW

- **Catalyst 3750-X**
  - Data / PoE(+)
  - StackWise Plus
  - StackPower
  - Modular 1G/10G Uplinks
  - Dual PS
  - E-LLW

**NETWORK & SERVICE MODULES**

- C3KS-NM-1G
- C3KS-NM-10G
- C3KS-NM-10GT
- C3KS-SM-10G

**AGGREGATION SWITCH**

- WS-C3750X-12S-S
- WS-C3750X-12S-E
- WS-C3750X-24S-S
- WS-C3750X-24S-E
Catalyst 3560-X/3750-X
FNF and MACSec support

- 2x10GE SFP+ ports Service Module for Catalyst 3750-X and 3560-X Series switches
  - Hot swappable, Plug-n-play

- Capable of Flexible Netflow (FNF)
  - Done in hardware

- Capable of Switch-to-Switch MACSec (802.1ae)
  - First time in the access layer (3750x/3560x)

- Powered using the switch-based power supply
Catalyst 2960-S

**KEY FEATURES**

- FlexStack
- PoE on all 48 ports
- PoE+ support
- 10G uplinks available
- Low power consumption

**OPERATIONAL SIMPLICITY**

- Enhanced Limited Lifetime Warranty
- Auto Smart Ports

---

**EASE-OF-USE**

**20M PORTS**

**500K+ UNITS**

**ENERGY EFFICIENCY**

**LOWER TCO**

---

Cisco Quality at Competitive Price
Catalyst 2K Campus Portfolio

**BASIC LAYER 2 (LAN Lite) PORTFOLIO**

- **Catalyst 2960**
  - 1G Uplinks
  - Partial PoE
  - LLW
  - Fast Ethernet
- **Catalyst 2960-S**
  - 1G Uplinks
  - E-LLW
  - Gigabit Ethernet

**ADVANCED LAYER 2 (LAN Base) PORTFOLIO**

- **Catalyst 2960**
  - 1G Uplinks
  - Partial PoE
  - LLW
  - Fast Ethernet
- **Catalyst 2960-S**
  - 10G/1G Uplinks
  - FlexStack
  - Full PoE, Partial PoE+
  - E-LLW
  - Gigabit Ethernet

**FLEXSTACK MODULE**

- **C2960S-STACK**
Catalyst Compact Switches

**KEY FEATURES**

- Can be powered via PoE(+) 
- Pass through PoE for end devices 
- Uplink* & Downlink Data Encryption 
- 12 models to choose from 

**OPERATIONAL SIMPLICITY**

- Zero-touch deployment 
- Auto Smart Ports 
- Enhanced Limited Lifetime Warranty 

---

8 & 12 PORT MODELS | QUIET (FANLESS) | EXTEND THE CISCO NETWORK | FULL-SIZE CAPABILITIES | LOWER TCO

---

**Catalyst 2960-C and Catalyst 3650-C families**

* roadmap

Ideal for Retail Checkstands, Classrooms, Conference Rooms, Hotel Suites, and more…
Enterprise Class Catalyst 4500E

INNOVATION

- IOS XE open application platform (Wireshark)
- In Service Software Upgrade
- Flexible NetFlow
- Universal POE

OPERATIONAL SIMPLICITY

- Extended Lifecycle of 7-10 years
- Automation
- Investment protection
- Limited Lifetime Warranty

848GBPS SYSTEM
100M+ PORTS
700K+ CHASSIS
INDUSTRY LEADERSHIP
LOWER TCO

Leading Modular Unified Access Platform
Catalyst 4500E Campus Portfolio

**SUPERVISOR ENGINE 7-E**
- Optimized for Large Campus
- 848Gbps Switching Capacity
- 4x10G SFP+/SFP uplinks
- 250MPPS
- Flexible Netflow

**SUPERVISOR ENGINE 7L-E**
- Optimized for Small/Mid Size Campus
- 520Gbps (48G/slot)
- 2x10G (SFP/SFP+) or 4x1G SFP Uplinks
- 225MPPS
- Flexible Netflow

**FIBER LINE CARD PORTFOLIO**

<table>
<thead>
<tr>
<th>High Density</th>
<th>Low Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-X4624-SFP-E</td>
<td>WS-X4612-SFP-E</td>
</tr>
<tr>
<td>WS-X4712-SFP+E</td>
<td>WS-X4606-X2-E</td>
</tr>
</tbody>
</table>

**COPPER LINE CARD PORTFOLIO**

<table>
<thead>
<tr>
<th>48G</th>
<th>24G</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-X4748-RJ45-E</td>
<td>WS-X4648-RJ45-E</td>
</tr>
<tr>
<td>WS-X4748-UPOE+E</td>
<td>WS-X4648-UPOE+E</td>
</tr>
</tbody>
</table>

**POE POWER SUPPLIES**

- PWR-C45-1300ACV
- PWR-C45-2800ACV
- PWR-C45-4200ACV
- PWR-C45-6000ACV
Next Generation Access Linecard
WS-X4748-UPOE+E

Now Shipping

Cisco UPOE Splitter
(Shipping Sept 2011)

CISCO UNIVERSAL POE (UPOE)

- 60W PoE with max. line card budget of 1500W
- Estimate cable loss with intelligent diagnostics
- LLDP enhancement to negotiate beyond 30W
- Power X-Generation applications
  - IP Turrets in financial trading floors
  - Integrated Virtual Desktop Clients

ENERGY EFFICIENT ETHERNET

- Compliant with IEEE 802.3az for:
  - 100/1000 Base-T
- Power consumption is based on link utilization
- Green: Save up to 190W per chassis
- Mandatory for Energy Star Compliance*
Introducing Catalyst 4500-X

INNOVATION

Virtual Switching System (VSS)*
Flexible NetFlow
Easy Virtual Network (EVN)
IOS XE Open Application Platform (Wireshark)
ISSU, NSF, SSO w/ VSS

OPERATIONAL SIMPLICITY

Automation
Investment protection
Modular 8-port 10GE uplink
Hot-swappable dual redundant power supplies & five individual fans
Limited Lifetime Warranty

800 Gbps System 1.6Tbps w/ VSS
Smallest Size – 1RU 21” Deep
Highest Scalability Richest Services
Industry Leadership
Lower TCO

Revolutionizing Fixed 10GE Campus Aggregation Platform

* roadmap
Catalyst 4500-X Typical Deployment

**Catalyst 4500-X Advantages:**

- 1.6Tbps Switching Capacity with VSS
- Small size – 1RU, 21” deep
- Supports GE SFP and 10 GE SFP+ on any ports
- Low power consumption ~ 330W
- Flexibility for future growth to 40G

* - roadmap
# Catalyst 4500-X Aggregation Portfolio

## Catalyst 4500-X PORTFOLIO

<table>
<thead>
<tr>
<th>IP Base SKUs</th>
<th>Enterprise Services SKUs w/ 8-port uplink</th>
<th>IP Base SKUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front to Back Airflow</td>
<td>Front to back Airflow</td>
<td>Back to Front Airflow</td>
</tr>
<tr>
<td>1x 750WAC P/S</td>
<td>2x 750WAC P/S</td>
<td>1x 750WAC P/S</td>
</tr>
<tr>
<td>WS-C4500X-32SFP+</td>
<td>WS-C4500X-40X-ES</td>
<td>WS-C4500X-F-32SFP+</td>
</tr>
<tr>
<td>WS-C4500X-16SFP+</td>
<td>WS-C4500X-24X-ES</td>
<td>WS-C4500X-F-16SFP+</td>
</tr>
</tbody>
</table>

- **Front to Back Airflow**: Burgundy color fan and P/S handle
- **Back to Front Airflow**: Blue color fan and P/S handle

### IP Base SKUs

- **8-port 10GE Modular Uplink Module**: C4KX-NM-8SFP+, $8,000

### Enterprise Services SKUs

- **Removable Fan Module**: $250
- **750WAC Modular P/S**: $2,000
## C4500-X Performance and Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Catalyst 4500-X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switching Fabric</td>
<td>~ 800 Gbps</td>
</tr>
<tr>
<td># of 10G Ports</td>
<td>16/24/32/40</td>
</tr>
<tr>
<td>IPv4/IPv6 Routes</td>
<td>256K/128K (32-port) &amp; 64K/32K (16-port)</td>
</tr>
<tr>
<td>MAC Address</td>
<td>55K</td>
</tr>
<tr>
<td>ACL Entries</td>
<td>64K</td>
</tr>
<tr>
<td>Mcast Routes IPv4/IPv6</td>
<td>32K/32K (32-port) &amp; 24K/12K (16-port)</td>
</tr>
<tr>
<td>Egress Buffering</td>
<td>32MB Shared</td>
</tr>
<tr>
<td>Depth</td>
<td>21&quot;</td>
</tr>
<tr>
<td>App Visibility</td>
<td>128K Netflow Entries</td>
</tr>
<tr>
<td>High Availability</td>
<td>VSS*, ISSU, CoPP</td>
</tr>
<tr>
<td>Security</td>
<td>TrustSec (MACSec, SGT, SGACL)*</td>
</tr>
<tr>
<td>Medianet</td>
<td>Mediatrace, Video Monitoring, MSI Proxy</td>
</tr>
<tr>
<td>Management</td>
<td>EEM, IPSLA, Wireshark</td>
</tr>
<tr>
<td>Network Virtualization</td>
<td>EVN, VRF-Lite</td>
</tr>
</tbody>
</table>

* roadmap
Modular Campus Access Software
Catalyst 4500E Series

Shipping Features

- TrustSec: 802.1x (flexauth, open mode, NEAT and more)
- Plug & Play with ASP
- Flexible QoS
- Location Services
- Flexible NetFlow
- Auto Smart Ports
- Auto Install, Config Rollback
- EEM & EnergyWise
- Smart Call Home
- EEE & UPOE

Q1CY12 (Yap)

- TrustSec: MACSec, Device sensor
- Medianet: MSI & MSP, AutoQoS
- Video Monitoring
- Mediatrace & Video IP SLA
- Wireshark on SUP7-E/7L-E and C4500X
- EnergyWise 2.5
- Feature Parity on Sup7-E/7L-E

Security
Video
Lower TCO
Infrastructure
## Campus Aggregation Software
### Catalyst 4500E, 4500X Series

<table>
<thead>
<tr>
<th>Shipping Features</th>
<th>Q1CY12 (Yap)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSPF, EIGRP</td>
<td>BGP: 4BASN, GR</td>
</tr>
<tr>
<td></td>
<td>Enhanced Multicast Multipath, HSRPv6 Global Address</td>
</tr>
<tr>
<td>VRF-Lite(Unicast &amp; Multicast)</td>
<td>EVN (Easy Virtual Networks)</td>
</tr>
<tr>
<td>VRF aware services e.g. FTP/TFTP/SYSLOG/SNMP/uRPF</td>
<td></td>
</tr>
<tr>
<td>ISSU</td>
<td>BFD on SUP6-E/6L-E</td>
</tr>
<tr>
<td>NSF/SSO</td>
<td>IPv6 HA (OSPFv3)</td>
</tr>
<tr>
<td></td>
<td>NSF in IP BASE</td>
</tr>
<tr>
<td>WCCPv2 (Sup6-E, Sup6L-E) Flexible NetFlow on SUP7-E/7L-E, SXP</td>
<td>MACSec switch-to-switch, Wireshark on Sup7-E/7L-E/C4500X</td>
</tr>
</tbody>
</table>

**Layer3**

**Virtualization**

**HA**

**Services**
Catalyst 6500
Introducing Supervisor 2T

The Most Scalable Catalyst 6500

- 3X System Performance
- 4X Data Plane Scalability
- 4T Virtual Switching System
- 40 Gigabit Ethernet Ready
- Up to 13M NetFlow Entries/system
- 1 million routes and 256K multicast groups
- Large Packet Buffers

Unparalleled BN/DC Feature Set

- **End to End Network Virtualization**—MPLS, EoMPLS, L2VPN/VPLS, VRF-Lite, Easy Virtual Networks (EVN)
- **Security** with TrustSec, MACsec, Atomic ACL’s and ASA-SM
- **Application Visibility** with NAM-3 and Flexible NetFlow
- **Unified Mobility** with WiSM2
- **Comprehensive IPv6** Ready for Transition
- **Future Proof**: 40G Ready, OTV Ready, TRILL Ready, LiSP Ready

Supported with LMS 4.1
Supervisor 2T - positioning

The Supervisor 2T is designed for deployment in the Core and Distribution Layers of the Network - it is the highest performing Supervisor option available for the Catalyst 6500 platform…
**Supervisor 2T - Some Facts**

<table>
<thead>
<tr>
<th>Supervisor 720 Quick Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated 2-Tbps Switch Fabric</td>
</tr>
<tr>
<td>Integrated Policy Feature Card 4 (PFC4) supporting hardware acceleration for select features</td>
</tr>
<tr>
<td>Integrated Multilayer Switch Feature Card 5 (MSFC5) supporting a single CPU for L2 and L3 functionality</td>
</tr>
<tr>
<td>Connectivity Management Processor (CMP) for improved management capability</td>
</tr>
<tr>
<td>One external compact flash slot (power controlled by IOS)</td>
</tr>
<tr>
<td>All uplinks can be active in systems with redundant Supervisors</td>
</tr>
</tbody>
</table>
New 69xx Series and 68xx Series Ethernet Modules

**69xx SERIES w/ DFC4**

- 8p 10G

- Non-Blocking 80G/slot Performance
- Wire Rate MacSec
- Virtual Switching Link (VSL)
- Large packet buffers (256MB/port)
- X2 Transceiver or SFP+ w/ adapter
- Available in Standard and XL Sizes
- LISP and OTV Ready

**68XX SERIES W/ DFC4**

- 24p 1GbE
- 48p 1GbE
- 48p 10/100/1000
- 16p 10GbE Fiber and 10GBASE-T
- 16p 10GBASE-T

- 40G/slot Linecards w/ Integrated DFC4
- 24 and 48 ports 1GbE Fiber Linecards
- 48 ports 10/100/1000
- 16 ports 10GbE Fiber and 10GBASE-T
- Available in Standard and XL Sizes

Doubled System Performance

Distributed Forwarding Performance at Central Forwarding Price
# Upgrading the Installed Base to Sup2T

<table>
<thead>
<tr>
<th>Sup720</th>
<th>Sup2T</th>
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</thead>
<tbody>
<tr>
<td>67xx Series w/ CFC</td>
<td>Supported</td>
</tr>
<tr>
<td>67xx Series 1GbE w/ DFC3</td>
<td>WS-F6K-DFC4-A</td>
</tr>
<tr>
<td>6704-10GE w/ DFC3</td>
<td>WS-F6K-DFC4-A</td>
</tr>
<tr>
<td>6716-10GE Fiber</td>
<td>WS-F6K-DFC4-E</td>
</tr>
<tr>
<td>6716-10GBASE-T</td>
<td>WS-F6K-DFC4-E</td>
</tr>
<tr>
<td>6708-10G Fiber</td>
<td>Special <strong>TMP</strong> program for <strong>6908-10G</strong> Fiber (80G)</td>
</tr>
<tr>
<td>61xx Series</td>
<td>Supported</td>
</tr>
<tr>
<td>Legacy Services Modules</td>
<td>Supported</td>
</tr>
</tbody>
</table>
# Sup2T - Classic Cards and Service Modules

<table>
<thead>
<tr>
<th>61xx Line Cards</th>
<th>Legacy Service Modules</th>
<th>Next Gen. Service Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-X6148A-RJ-45</td>
<td>FWSM</td>
<td>ASA-SM</td>
</tr>
<tr>
<td>WS-X6148A-45AF</td>
<td>ACE 20</td>
<td>ACE 30</td>
</tr>
<tr>
<td>WS-X6148-FE-SFP</td>
<td>WiSM</td>
<td>WiSM-2</td>
</tr>
<tr>
<td>WS-X6148A-GE-TX</td>
<td>NAM-1</td>
<td>NAM-3</td>
</tr>
<tr>
<td>WS-X6148A-GE-45AF</td>
<td>NAM-2</td>
<td></td>
</tr>
<tr>
<td>WS-X6148E-GE-AT</td>
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</tr>
</tbody>
</table>

SIP modules, ES40 and VSPA are **NOT** supported.
Why to move to Sup 2T Performance

- Delivers 80 Gbps/slot today
- Supports 40 GE modules
- Enables 160 Gbps/slot in future (announced at Networkers 1/2012)
- Enables 100 GE implementation in future
- Removes performance restriction in certain slots in Cat 6513-E because it has new fabric with sufficient number of channels.
- Delivers increased performance for IPv4, IPv6 and MPLS through embedded PFC4 card
- Delivers higher control plane performance through embedded MSFC5 with fast multicore CPU
- Combined GE and 10GE uplink ports
Why to move to Sup 2T
Enhanced Manageability

• Sup2T includes Connectivity Management Processor (separate subsystem running Linux) to provide "lights out" management capabilities (similar to Nexus 7000 supervisor)

• Enhances Netflow support by delivering Flexible Netflow, Egress Netflow etc.

• Provides embedded Wireshark protocol mini analyzer
Why to move to Sup 2T Enhanced Security

• Sup2T adds HW support for SGT tagging, forwarding and enforcement
• Sup2T adds HW support for SGACL
• Sup2T delivers MACsec encryption support for point-to-point L2 strong encryption (AES128) @ line rate
• Sup2T provides ingress and egress reflector mode support for investment protection where non-TrustSec capable cards are present
• Sup2T support ACL hitless atomic update
• Includes support for RACL "Dry run" to test if large ACLs fit into TCAM
• Enhanced CoPP
Why to move to Sup 2T
Protocol enhancements

• Native VPLS support
• IPv6 enhancements
• MPLS enhancements (less recirculation)
• Multicast enhancements with extensive support in HW
• EVN trunk configuration possible due to local VLAN significance per interface
• Sup2T delivers 8-bit etherchannel hash for more granular loadbalancing
Why to move to Sup 2T

*Future proof solution*

- Sup2T is LISP ready
- Sup2T is OTV ready
- Sup2T is TRILL ready
- Cat 6500 with Sup2T and 6904 card will work as master node for satellite (FEX like) configuration with NG Cat 3K/2K
WS-X6904-40G-2T / 2TXL

Introduction

- dCEF2T Linecard
- 4 ports CFP 40GE or 16 ports SFP+ 10GE (with converter)
- No Connection to the Shared Bus
- 2 x 40Gb Connections into the Switch Fabric
- Supports integrated DFC4 / DFC4XL
- Supports Cisco TrustSec on all ports
- Supports VSL on all ports

- Up to 60Mpps local forwarding
- Ingress buffer (5MB / 40 GE port – 1.25MB / 10GE port)
- Egress buffer (88MB / 40 GE port – 21MB / 10 GE port)
- Egress Multicast Replication
- Supports dual Strict Priority queue on transmit (post-FCS)
- Supports 2 receive queues and 8 transmit queues per port
- Supports Deficit Weighted Round Robin and Shaped Round Robin
WS-X6904-40G-2T / 2TXL
Port Numbering

- Single Mode CFP
- IEEE 802.3ba Compliant

Port 1, Port 3

Port 2, Port 4

Port 5, 6, 7, 8
Port 13, 14, 15, 16

Port 9, 10, 11, 12
Port 17, 18, 19, 20

- 4 x SFP+ converter in each slot
- Cisco TrustSec in hardware
- VSL capable in 10G or 40G mode
CHANGING MODES - 10GE and 40GE

- CLI required to change modes
- Changing modes requires a reset of the module due to port adapter mode change.
- User confirmation of reset causes module reload.
- There is also CLI to check the current running mode

PERFORMANCE MODE

- Oversubscription Mode (all ports active) is the default.
- In 40G Performance Mode, ports 1 and 3 will be active.
- In 10G Performance Mode, ports 5-8 and 13-16 will be active.
- CLI to change mode and check mode is in the notes.
- Mode can be changed per port group.

OIR BEHAVIOR

- No effect of changing optics if same operation mode is kept.
- No support at FCS for OIR of Port Adapters or operation mode change.
## Supported Optics

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Transceiver Type</th>
<th>Media Type</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFP-40G-SR4</td>
<td>40GBASE-SR4 (MMF)</td>
<td>Multi-mode Fiber 850nm</td>
<td>100m over OM3 multi-mode fiber</td>
</tr>
<tr>
<td>CFP-40G-LR4</td>
<td>40GBASE-LR4 (SMF)</td>
<td>Single Mode Fiber 1310nm CWDM</td>
<td>10km</td>
</tr>
<tr>
<td>CVR-CFP-410GSFP</td>
<td>FourX Adapter: Converts each 40GE CFP port to 4 10GE SFP+ ports</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SFP-10G-SR</td>
<td>Supported SFP+ transceivers with FourX adapter</td>
<td>MMF (OM3)</td>
<td>Up to 300m</td>
</tr>
<tr>
<td>SFP-10G-LR</td>
<td>Supported SFP+ transceivers with FourX adapter</td>
<td>SMF (G.652)</td>
<td>10km</td>
</tr>
<tr>
<td>SFP-10G-LRM</td>
<td>Supported SFP+ transceivers with FourX adapter</td>
<td>MMF (FDDI grade)</td>
<td>220m</td>
</tr>
<tr>
<td>SFP-10G-ER</td>
<td>Supported SFP+ transceivers with FourX adapter</td>
<td>SMF(G.652)</td>
<td>40km</td>
</tr>
<tr>
<td>SFP-H10GB-CU1M</td>
<td>Copper TwinAx cable</td>
<td>Copper TwinAx cable</td>
<td>1m</td>
</tr>
<tr>
<td>SFP-H10GB-CU3M</td>
<td>Copper TwinAx cable</td>
<td>Copper TwinAx cable</td>
<td>3m</td>
</tr>
<tr>
<td>SFP-H10GB-CU5M</td>
<td>Copper TwinAx cable</td>
<td>Copper TwinAx cable</td>
<td>5m</td>
</tr>
</tbody>
</table>
WS-X6904-40G-2T / 2TXL

Use Cases

GREEN links are L2; BLUE links are L3
New High Performance Catalyst 6500 L4-7 Service Modules

Integrate Wire/Wireless Management

Next Generation WiSM Blade—WiSM-2

- Performance: 10 Gbps
- Access Points: 500 - 1000
- Clients: 10,000
- Concurrent AP Upgrade/Joins: Up to 500
- Mobility, Domain Size: Up to 18,000 APs

Accelerate & Balance Application Performance

Next Generation Load Balancer—ACE-30

- UP to 16 Gbps Performance
- Up to 6 Gbps Compression
- 30,000 Transactions per Second
- 250 Virtual Contexts
- 4000 VLANs

Enhance Visibility, Accelerate Troubleshooting

Next Generation NAM Blade—NAM-3

- Monitoring Performance: Up to 15 Gbps
- Capture to External Disk: Up to 5 Gbps
- Performance Analytics: 1588 Timestamps
- HW Filters/ Packet Captures: Rapid Troubleshooting

Deliver Robust, Integrated, Streamlined Security

Next Generation Firewall Blade—ASA-SM

- 64 Gbps System Performance
- 16 Gbps Performance / Service Mod.
- 10,000,000 Concurrent Sessions
- 300,000 Connections per Second
- 250 Security Contexts
- 1,000 VLANs

Integrate Wire/Wireless Management

NEW

Accelerate & Balance Application Performance

NEW

Enhance Visibility, Accelerate Troubleshooting

NEW

Deliver Robust, Integrated, Streamlined Security

NEW
# Service Module Support

<table>
<thead>
<tr>
<th>Module</th>
<th>Supervisor 720</th>
<th>Supervisor 720-10G</th>
<th>Supervisor 2T</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE10</td>
<td>12.2(33)SXF4</td>
<td>12.2(33)SXH (Standalone) 12.2(33)SXI (VSS)</td>
<td>Not Supported</td>
</tr>
<tr>
<td>ACE20</td>
<td>12.2(33)SXF4</td>
<td>12.2(33)SXH (Standalone) 12.2(33)SXI (VSS)</td>
<td>12.2(50)SY</td>
</tr>
<tr>
<td>ACE30</td>
<td>12.2(33)SXI4</td>
<td>12.2(33)SXI4</td>
<td>15.0(1)SY</td>
</tr>
<tr>
<td>ASA-SM</td>
<td>12.2(33)SXJ1</td>
<td>12.2(33)SXJ1</td>
<td>15.0(1)SY1</td>
</tr>
<tr>
<td>FWSM</td>
<td>12.2(14)SX1</td>
<td>12.2(33)SXH (Standalone) 12.2(33)SXI (VSS)</td>
<td>12.2(50)SY</td>
</tr>
<tr>
<td>IDSM-2</td>
<td>12.2(14)SX1</td>
<td>12.2(33)SXH (Standalone) 12.2(33)SXI (VSS)</td>
<td>Not Supported</td>
</tr>
<tr>
<td>NAM-1 / NAM-2</td>
<td>12.2(14)SX1</td>
<td>12.2(33)SXH</td>
<td>12.2(50)SY</td>
</tr>
<tr>
<td>NAM-3</td>
<td>12.2(33)SXJ1</td>
<td>12.2(33)SXJ1</td>
<td>15.0(1)SY1</td>
</tr>
<tr>
<td>WiSM</td>
<td>12.2(18)SXF2</td>
<td>12.2(33)SXH (Standalone) 12.2(33)SXI (VSS)</td>
<td>12.2(50)SY</td>
</tr>
<tr>
<td>WiSM-2</td>
<td>12.2(33)SXJ</td>
<td>12.2(33)SXJ</td>
<td>15.0(1)SY</td>
</tr>
</tbody>
</table>
Architecture Blueprint for Integrated Services

6500 as Borderless Services Node (BSN)

- Provides Service Virtualization, Wired / Wireless Integration and Secure Access
- Catalyst 6500 10GbE Core
- Agg 6k
- WiSM2
- NAM3
- ASA-SM
- BSN provides single point of management

6500 as Data Center Services Node (DSN)

- Virtualized infrastructure with service tiers to deliver multiple types of SLAs / offerings
- Nexus 7000 10GbE Core
- NAM3
- ASA-SM
- ACE30
- End-of-Row 1/10G Access
- Nexus 2K/5K
- Load balancer

Reduced Total Cost of Ownership
- Modular Design, Service Virtualization, Reduced power, space, cooling requirements

Simplified Operations
- Single point of management and policy enforcement
Sup2T Key Packaging for Software

*Roadmap

ADVANCED ENTERPRISE SERVICES:
L2VPN/Native VPLS, A-VPLS*, LISP*, etc.

ADVANCED IP SERVICES:
IS-IS, MPLS, L3 VPNs, IPSLA, ACL Dry-run, ACL Atomic Commit, L3VPN omGRE, etc.

IP SERVICES:
EVN, EIGRP, OSPF, BGP, GLBP, NAT, VRF-Lite, Advanced Multicast, etc.

IP BASE:
VSS, Quad Sup VSS*, HA, CMP, USB, TrustSec IEEE 802.1x feature set, TrustSec MacSec, TrustSec SGACLs, Multicast, OSPF for Routed Access, EIGRP Stub, EEM, RIP, HSRP/VRBP, GRE, WCCP, IPv6 FHS, Flexible, Egress and Sampled Netflow, etc.
Sup2T Software Release Roadmap

15.0(1)SY

Extended Maint: Parity with 12.2(33)SXI3 content + E8 Innovations 12.2(50)SY + CnH

Supervisors
- VS-S2T-10G
- VS-S2T-10G-XL

10GE Linecards
- WS-X6908-10G-2T
- WS-X6909-10G-2TXL
- WS-X6816-10T-2T
- WS-X6816-10T-2TXL
- WS-X6816-SFP-2T
- WS-X6816-SFP-2TXL

1GE Linecards
- WS-X6848-SFP-2T
- WS-X6848-SFP-2TXL
- WS-X6824-SFP-2T
- WS-X6824-SFP-2TXL
- WS-X6824-GE-TX-2T
- WS-X6824-GE-2TXL
- CMP/USB/EEM3.0

Flexible Netflow
- 1 million entries
- TCP Flags
- Sampled Netflow
- Egress Netflow
- CPU Friendly Export

TrustSec
- 802.1ae MacSec
- SXP
- SGT and L3SGT
- SGACL (incl. IPv6)
- TrustSec Reflector

HA
- IPv6 HA
- BFD for IPv6
- BGP v6 NSF and GR
- OSPFv3 BFD

Network Virtualization
- L3VPN o m GRE
- VPLS and H-VPLS (native)
- MPLS o GRE
- Per VPN Statistics
- VPN Flexible Netflow
- VRF Aware WCCP
- VRF Aware NTP, SSH, FTP
- Qos Long Pipe mode

Enhanced QoS and CoPP
- MQC Based QoS
- 50+ CoPP Hardware Rate Limiters
- Distributed and microflowPolicers
- CoPP Multicast rate limiting
- CoPP 1st Exceed Packet Capture
- CoPP to match ARP/RARP packets
- Enh v4 Classif (PktLen, TTL, Option)
- Enh v6 Classif (ExtHdr, Flow Label)

ACL Dry Run, Atomic Commit (incl. IPv6)

Enhanced IPv6
- IPv6 uRPF (hardware support, up to 16 paths)
- IPv6 interface stats and counters
- Netconf over IPv6
- IPv6 LLDP support
- IPv6 First Hop Security
- IPv6 Port ACL (PAACL)
- IPv6 RA Guard
- IPv6 ND Inspection
- IPv6 per-port Address Limit
- OSPFv3 Fast Conv. Enh—LSA and SPF Throttling
- FIPS-140-2
Sup2T Software Release Roadmap

**15.0(1)SY**

**Extended Maint:** Parity with 12.2(33)SX13 content + E8 Innovations 12.2(50)SY + CnH

**15.0(1)SY1**

**Rebuild:** Extended maintenance & 50+ Features

**Easy Virtual Networks (EVN)**
- EVN with OSPF
- EVN with EIGRP
- EVN Trunks
- EVN for Multicast

**Energywise on Sup2T**
- 4 port 40G Linecard/16p 10G IPv6
  - OSPFv3 auth with IPSec
- Multicast
  - IP Multicast Load Splitting with ECMP
  - Enhanced Multicast Multipath
  - PIM and IGMP snooping for VPLS

**Network Virtualization**
- MPLS VPN Inter AS Option AB
- MPLS VPN Inter AS Option AB+
- VRF Aware IS-IS
- NDE Export to VRF collector
- VRF-Lite Aware EIGRPv6
- BGP Event Based VPN Import

**Certifications**
- USGv6
- JITC/ASLAN v7
- TrustSec
  - L3 IPM
  - VLAN to SGT Mapping
  - Subnet to SGT Mapping

**Service Modules**
- WS-SVC-WISM2-1-K9
- WS-SVC-NAM-3-K9
- WS-SVC-ASA-SM

**Integrated Routing & Bridging over SVI**
Easy Virtual Networks (EVN) Supervisor 2T

**ACCESS CONTROL**
- Branch—Campus

**PATH ISOLATION**
- WAN—MAN—Campus
- GRE
- MPLS
- VRFs

**SERVICES EDGE**
- Data Center—Internet Edge—Campus

---

**Easy Virtual Networks (EVN)**

- Enterprise Scalability
- Simplified configuration and management
- Works with existing campus routing protocols
- Routing Contexts for ease of operations in a VRF
- Better Monitoring and Troubleshooting
- Shared Services between groups
VRF-Lite Hop-by-Hop Configuration Example

interface TenGigabitEthernet1/1.101
  description 10GE to SW 2
  encapsulation dot1Q 101
  ip vrf forwarding Red
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode

interface TenGigabitEthernet1/1.102
  description 10GE to SW 2
  encapsulation dot1Q 102
  ip vrf forwarding Green
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode

interface TenGigabitEthernet1/1.103
  description 10GE to SW 2
  encapsulation dot1Q 103
  ip vrf forwarding Blue
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode

interface TenGigabitEthernet1/1.101
  description 10GE to SW1
  encapsulation dot1Q 101
  ip vrf forwarding Red
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode

interface TenGigabitEthernet1/1.102
  description 10GE to SW1
  encapsulation dot1Q 102
  ip vrf forwarding Green
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode

interface TenGigabitEthernet1/1.103
  description 10GE to SW1
  encapsulation dot1Q 103
  ip vrf forwarding Blue
  ip address 10.122.5.31 255.255.255.254
  ip pim query-interval 333 msec
  ip pim sparse-mode
Easy Virtual Networks

- VNET trunk ports “repurpose” the IEEE 802.1Q VLAN ID field to indicate the VRF ID
VNET Trunk Configuration Example

vrf definition blue
  vnet tag 101

interface TenGigabitEthernet1/1
description 10GE to SW 2
vnet trunk
ip address 10.122.5.31 255.255.255.254
ip pim query-interval 333 msec
ip pim sparse-mode

vrf definition blue
  vnet tag 101

interface TenGigabitEthernet1/1
description 10GE to SW 2
vnet trunk
ip address 10.122.5.32 255.255.255.254
ip pim query-interval 333 msec
ip pim sparse-mode
**Catalyst 6500 Summary and Key Takeaways**

**INNOVATION**

2T Innovations address key Enterprise trends enabling customers to build the Next Gen Campus with Investment protection

**TRANSITION**

2T optimizes performance while maximizing services for Campus providing transition paths to 10G/40G and 100GE readiness

**UNIFIED SERVICES**

2T portfolio leads the way in delivering IOS & integrated services for Borderless and Data Center deployments

**LOWER TCO**

2T price and operational improvements such as Satellite/Smart Install offer lower TCO with a roadmap to take the platform beyond 2020
Management
Improve Operational Efficiencies
Cisco Prime Product Portfolio

• Provides a consistent web-based user experience that simplifies complete lifecycle management of Cisco switches

• Simplify the deployment of Cisco differentiated switching features; EnergyWise, Auto Smartports, Smart Install, TrustSec and many more…

• Utilize Cisco knowledge base and best practices to reduce errors and improve network availability

• Quickly isolate and fix client access issues with a single user interface and workflow for wired and wireless connectivity
Otázky a odpovědi

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