

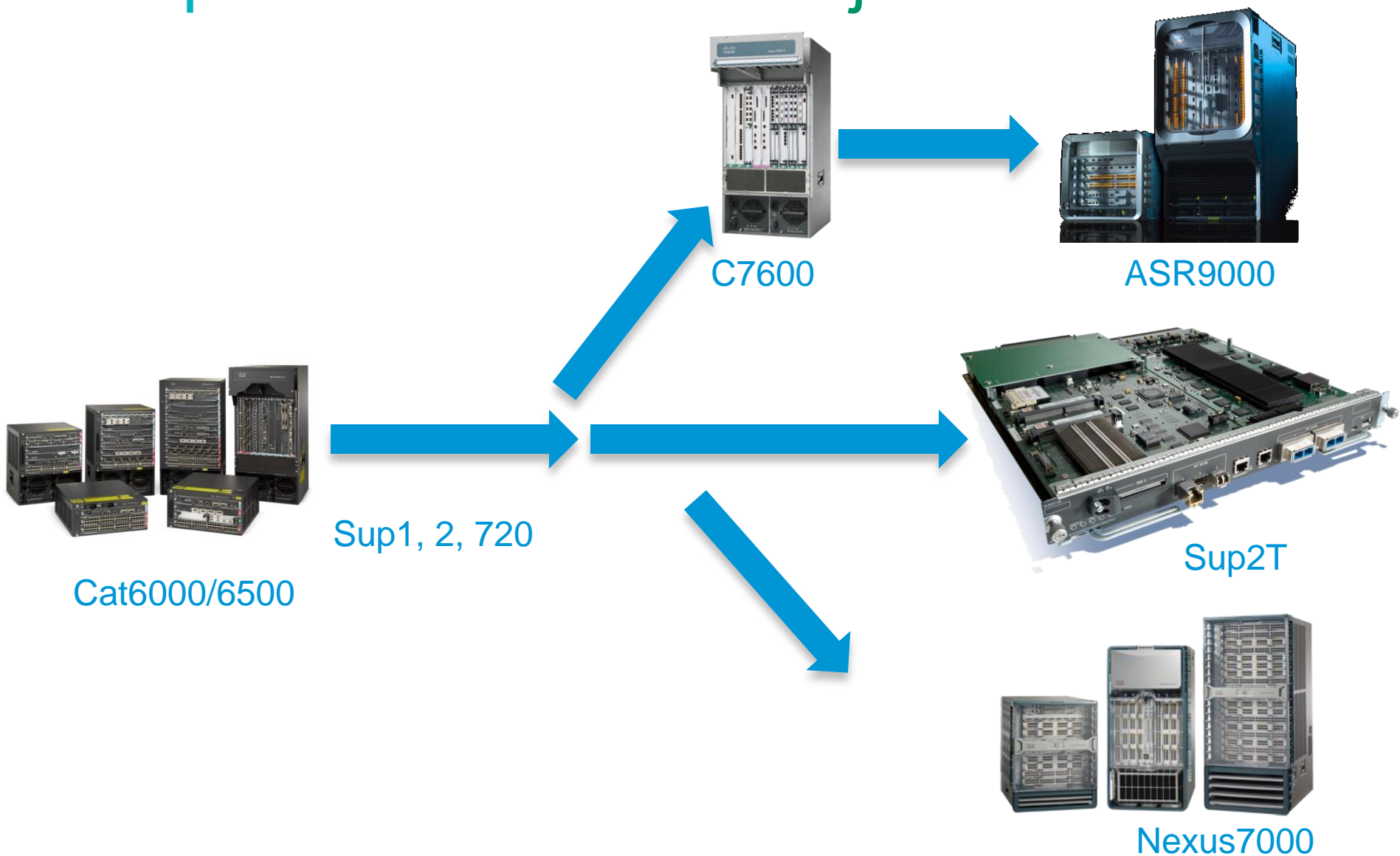
Nagysűrűségű 10GE switching/routing - fejlesztési lehetőségek

Zeisel Tamás
Konzultáns Rendszermérnök

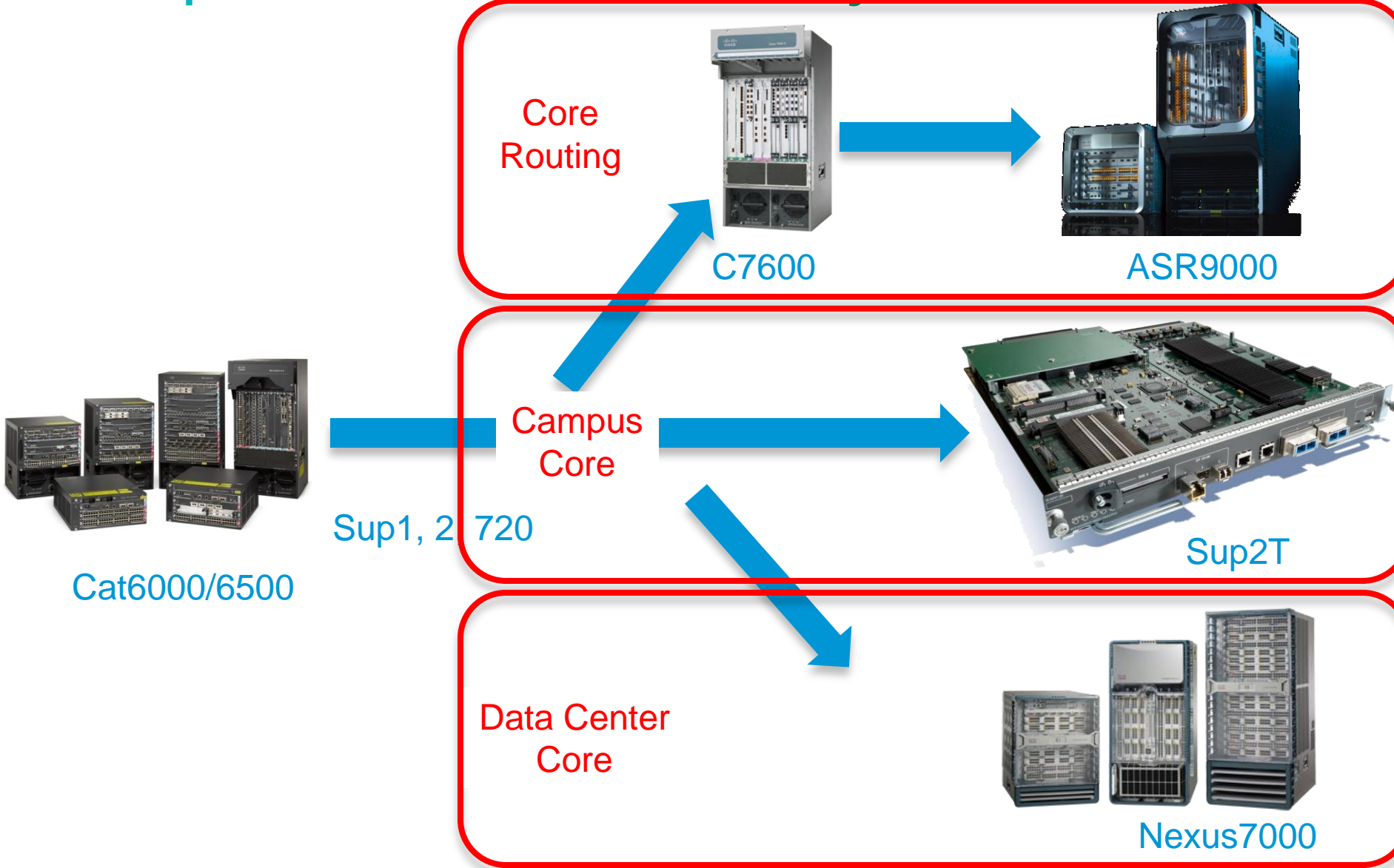
Miről lesz szó

- Kampus Gerinc eszköz fejlődése (történelem)
- Catalyst 6500 újdonságok
- Nexus 7000 újdonságok
- ASR9000 újdonságok

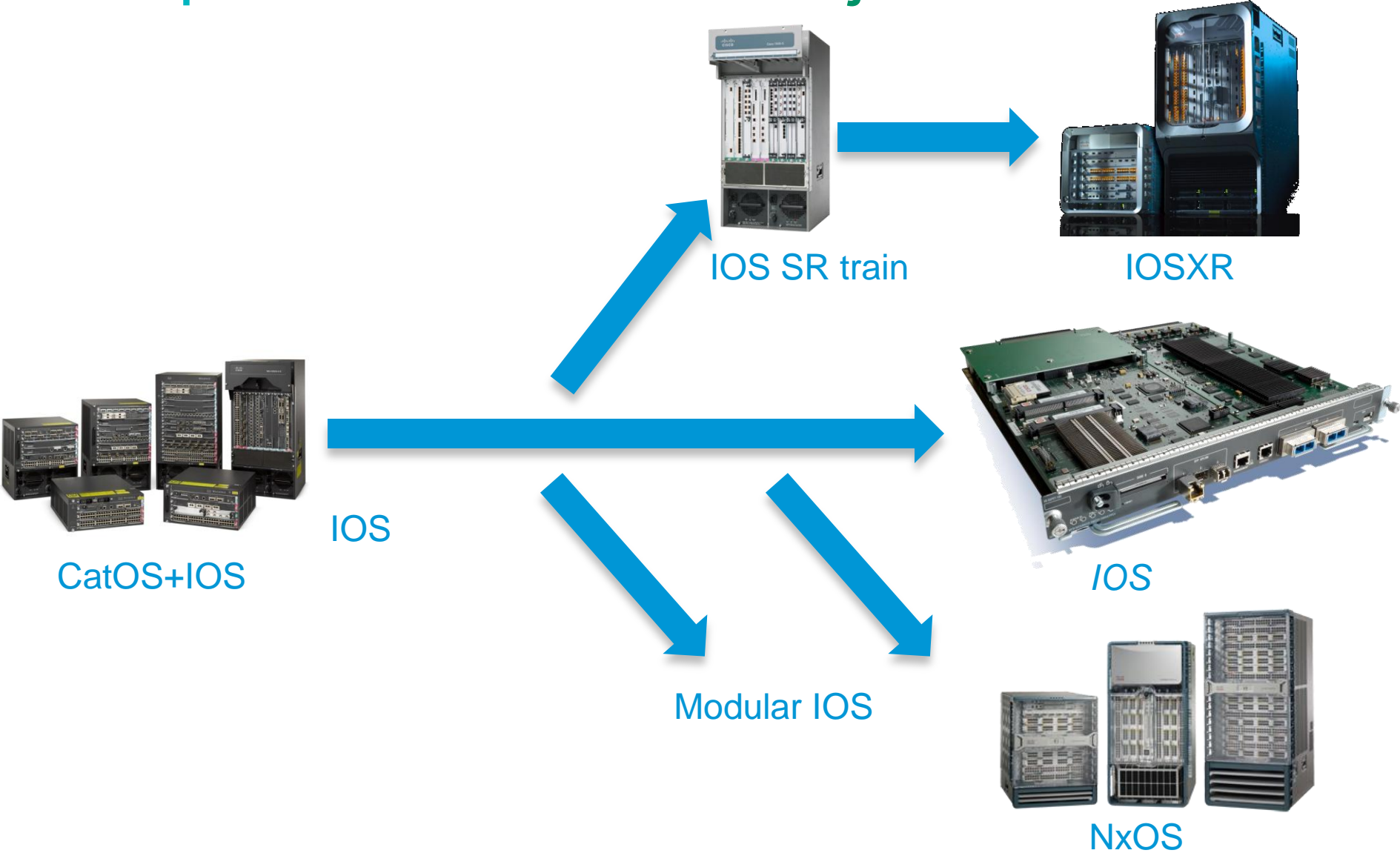
Kampus Gerinc Eszköz fejlődése



Kampus Gerinc Eszköz fejlődése



Kampus Gerinc Eszköz fejlődése





New Generation Catalyst 6500

Catalyst 6500 E Series Chassis

- **Enhanced (“E”) chassis** offer higher power capacity, better signal integrity, and higher bandwidth to **support Supervisor 2T**

3, 4, 6, 9 and 13-slot versions

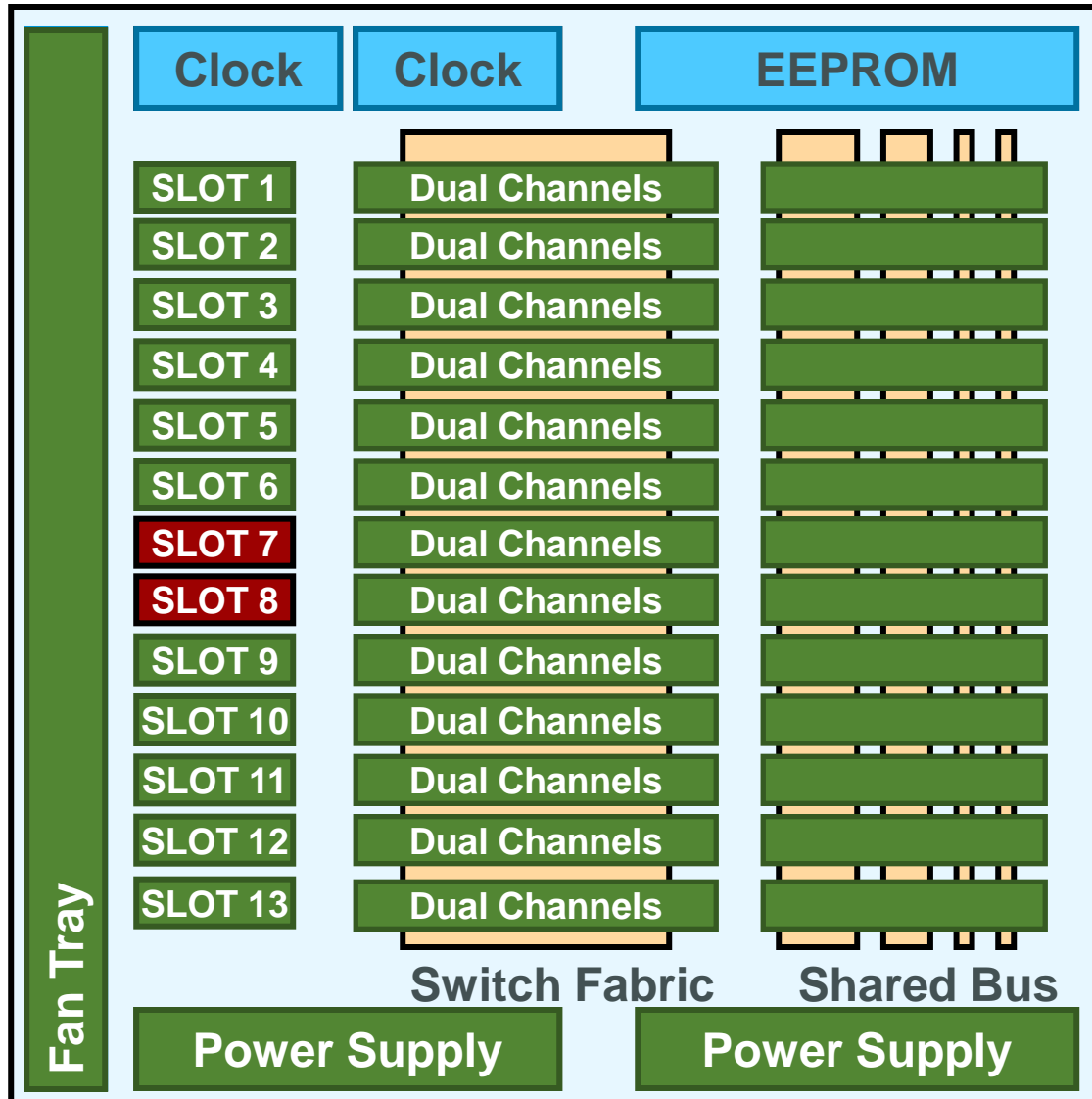
- Classic switching bus traces/connectors
- Crossbar fabric traces/connectors
- Redundant power supplies
- Fan tray for system cooling

6509-V-E chassis offers
redundant fan trays and air filtration

- Redundant voltage termination (VTT)/clock modules
- Redundant MAC address EEPROMs



New Catalyst 6513-E Chassis Architecture



- Provides 80G/slot on all 13 slots with Supervisor 2T.
- The dual fabric channels in slots 1-6 can only be used with Supervisor 2T.
- In a Supervisor 2T configuration, Slots 7 and 8 only support the Supervisor and non-Fabric Line-Cards.
- The fan tray is removed from the back.
- When using a Supervisor 720, the fabric channels are distributed the same as in a 6513 non-E chassis.

Supervisor2T - Quick Facts



The **Supervisor2T** module is designed for deployment in the **Core & Distribution Layers** - it will be the highest performing Supervisor option available for the Catalyst 6500 platform...

Supervisor 2T Quick Facts

Integrated **2 Tbps Switch Fabric** with 26 Fabric Channels

Integrated **Policy Feature Card 4 (PFC4)** supports hardware acceleration for *existing & new* software features

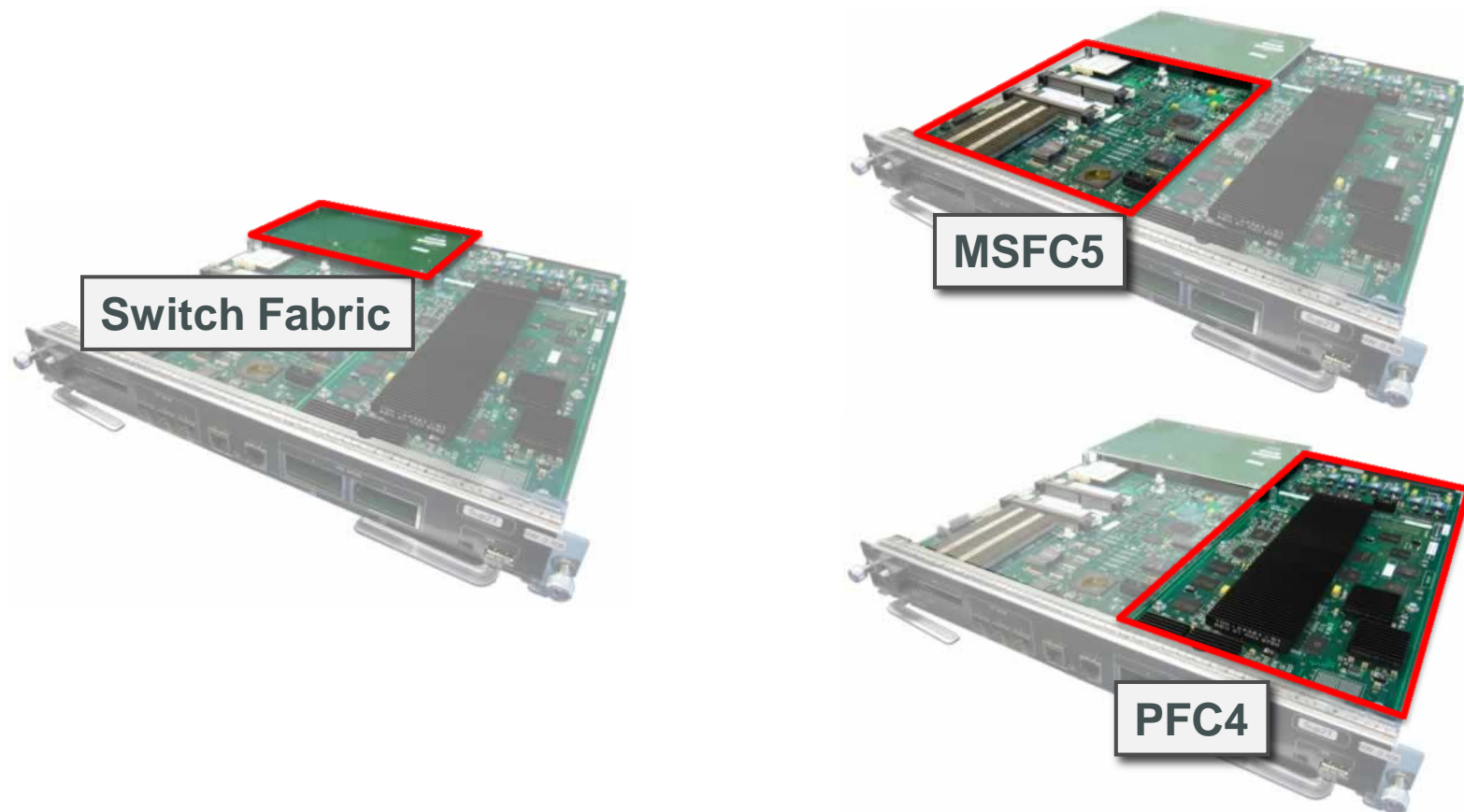
Integrated **Multilayer Switch Feature Card 5 (MSFC5)** supports a single (Dual-Core) CPU for both L2 & L3 functions & capabilities

Integrated **Connectivity Management Processor (CMP)** for improved (out-of-band) management capability

Two 10G X2 & Three 1G SFP uplink ports

New Supervisor2T - Key Elements

All Supervisor 2T models incorporate three main elements - the Multilayer Switch Feature Card 5 (MSFC5), the Policy Feature Card 4 (PFC4) and the Switch Fabric - each of which is highlighted below...

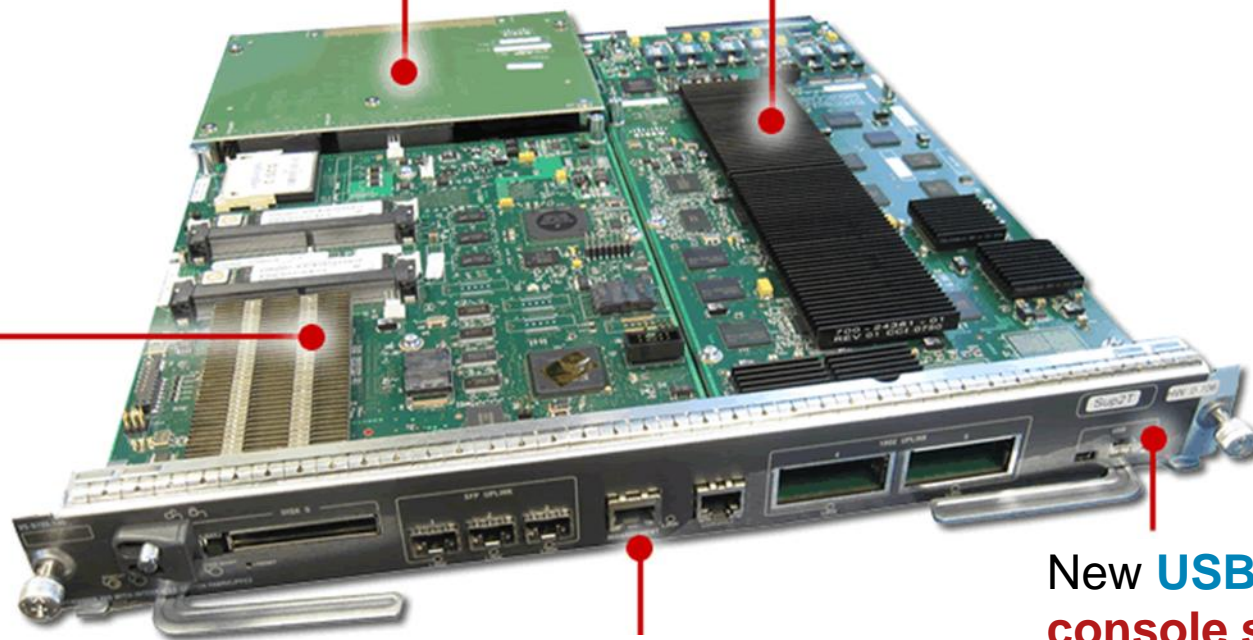


New Supervisor2T - Key Elements



New **26 Channel Switch Fabric** which provides **80G per slot**

New **PFC4** featuring **improved** performance and scalability, along with **new & enhanced** hardware features



New **MSFC5** with **single Dual-Core CPU** & **single IOS image**

New **Connectivity Management Processor (CMP)**

New **USB based console support** & **file system**

MSFC3 vs MSFC5 - Comparison



Feature	MSFC3 (Sup720-10G)	MSFC5 (Sup2T)
CPU Speed	SP CPU @ 600Mhz RP CPU @ 600Mhz	Dual-Core CPU Each Core @ 1.5Ghz
Number of CPU cores	1	2
DRAM	SP CPU – Up to 1GB RP CPU – Up to 1GB	2 x 2GB (XL) 1 x 2GB (Non-XL)
Connectivity Management Processor (CMP)	No	Single CPU @ 266Mhz 32MB Boot Flash 256MB System Memory
NVRAM	2MB	4MB
OBFL Flash	No	4MB
Bootflash / Bootdisk	SP CPU – 1GB (CF) RP CPU – 64MB (flash)	1GB (CF)
Specialized Inband	No	Yes

Multilayer Switch Feature Card 5

Accessing the CMP

- When the system comes online, RP initially owns the console.
- Use the following key sequence to switch between two consoles:
 - (Ctrl-C, Shift-M) three times to switch to CMP console
 - (Ctrl-R, Shift-M) three times to switch to RP console

```
Sup2T#
Sup2T#M
Sup2T#M
Sup2T#
Sup2T-cmp login: root
Password:
Cisco CMP Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2009-2011, Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software may be covered under the GNU Public
License or the GNU Lesser General Public License. A copy of
each such license is available at
http://www.gnu.org/licenses/gpl.html and
http://www.gnu.org/licenses/lgpl.html

Sup2T-cmp#
```

Ctrl-C, Shift-M,
Ctrl-C, Shift-M,
Ctrl-C, Shift-M

Enter 'root' as default login

Enter 'default' as default password

CMP suffix added to the prompt

Policy Feature Card 4

Introduction



- 256K/1M FIB Entries
- IPv4/IPv6 RPF check for 16 interfaces
- **Native VPLS**
- MPLS over GRE*
- Up to 16K VRFs
- 128K Logical Interfaces
- Improved Etherchannel load balance hash
- Improved forwarding Performance
- 512K/1M Flexible Netflow Entries (FnF)
- 16K Aggregate Policers
- Distributed Policing
- SGACL for Trustsec
- L2+L3+L4 ACL Support
- Improved CoPP
- Per-protocol (LIF) Interface Statistics
- Numerous IPv6 enhancements

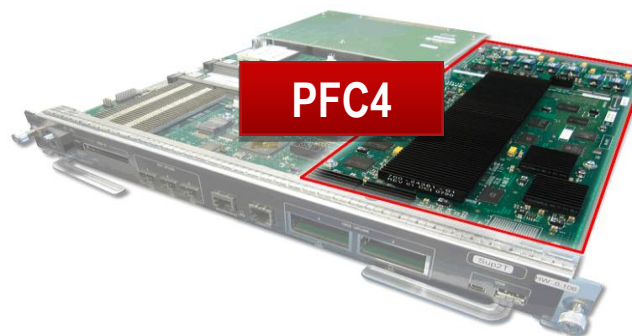
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PFC4 - Hw Feature Summary



PFC4 - Default PFC (EARL8)
FIB & Netflow @ 256K entries

PFC4XL - Upgrades FIB &
Netflow Table to 1M entries



Scalability

- Increased MAC Table (128K)
- **L2 Bridge Domains (16K)**
- L3 Logical Interfaces (128K)
- **Increased Forwarding (60Mpps)**
- **Increased Throughput (80Gbps)**

Virtualization

- **Native (H)VPLS**
- MPLS Aggregate Labels (16K)
- Multi-point EoMPLS
- L2oGRE
- VRF-based NAT & FnF

IP Routing

- IPv6 Tunneling in FIB
- Unicast RPF for IPv6
- IPv6 Multicast in FIB
- 512K Multicast Routes
- IGMPv3 / MLDv2 Snooping

New & Improved

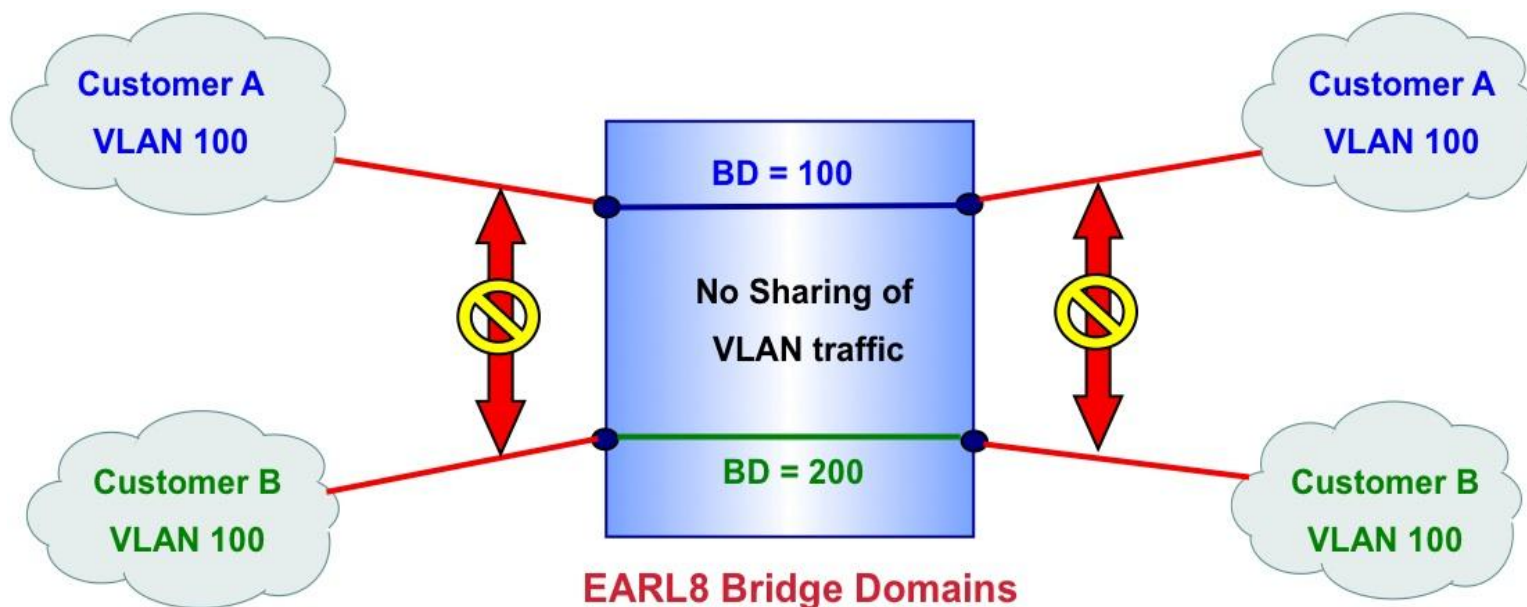
QoS & Security

- **Cisco TrustSec & SGACL's**
- Increased ACL TCAM (256K)
- Increased ACL Labels (16K)
- Per-Port / Per-VLAN QoS
- Distributed Policers (512)

Monitoring

- Flexible Netflow (FnF)
- Egress Netflow
- L2 (per VLAN) Netflow
- TCP Flags
- Per-Protocol Counters

L2 Bridge Domains (16K)



The new Bridge Domain (or BD) concept is a 14-bit (internal) ID that allows for 16,384 unique values. By mapping the *external* VLAN ID to an *internal* BD number, it is now possible to scale a single Catalyst 6500 system beyond the traditional 4K VLAN limit...

PFC3 vs PFC4 - Feature Comparison



Feature	PFC3B/BXL	PFC3C/CXL	PFC4/XL
FIB TCAM IPv4	256K / 1M	256K / 1M	256K / 1M
FIB TCAM IPv6	128K / 500K	128K / 500K	128K / 500K
Adjacency Table	1M	1M	1M
Netflow Table	Up to 256K (XL)	Up to 256K (XL)	Up to 1M (XL) Ingress 512K Egress 512K
MAC Table	64K (32K)	96K (80K)	128K
Egress Netflow	No	No	Yes
Flexible Netflow	No	No	Yes
MPLSoGRE	No	No	Yes*
Native VPLS	No	No	Yes
Native CTS	No	No	Yes
IPv6 uRPF	No	No	Yes

PFC3 vs PFC4 - Features Continued...



Feature	PFC3B/XL	PFC3C/XL	PFC4/XL
ACL Labels	4K	4K	16K
Security ACEs	Up to 32K	Up to 32K	Up to 192K (XL Default)
QoS ACEs	Up to 32K	Up to 32K	Up to 64K (XL Default)
Port ACLs	2K	2K	8K
Aggregate Policers	1023	1023	6K
Shared Microflow Policers	63	63	512
Egress Microflow Policing	No	No	Yes
Distributed Policers	No	No	Yes
Packet or Byte Based Policing	No	No	Yes
RPF Interfaces	2	2	16
PIM-Bidir RPDF	4	4	8
Virtual Switch (VSS)	No	Yes	Yes

PFC3 vs PFC4 - Scalability



Netflow Scaling

Feature	Sup720	Sup2T
Netflow Entries	256 K (Ingress Only)	512 K Ingress – 512 K Egress
Micro-Flow Policers	256 K (Ingress Only)	512 K Ingress – 512 K Egress
Shared Netflow Policers	N/A	512
Netflow Sampler	N/A	1K

ACL & QoS Scaling

Feature	Sup720	Sup2T
ACL Labels	4 K	16 K
Port ACLs	2 K	8 K
ACL and QoS TCAM Size	32 K and 32 K	256 K
Aggregate Policers	1 K	6 K
Distributed Policers	N/A	4 K
Rate Limiters	Layer3: 8 Layer2: 4	Layer3:32 Layer2:12

PFC3 vs PFC4 - Scalability Continued...



Interface Scaling

Feature	Sup720	Sup2T
Physical Ports	4 K	10 K
L2 Bridge Domains	4 K (same of # of VLANs)	16 K
L3 Logical Interfaces	4 K	128 K
VLAN / LIF Statistics	VLAN statistics (Only) 4K x 6 Counters	LIF statistics: 2M Counters (16 per LIF) Ingress/Egress (Byte & Packet)

Hardware Forwarding Scaling

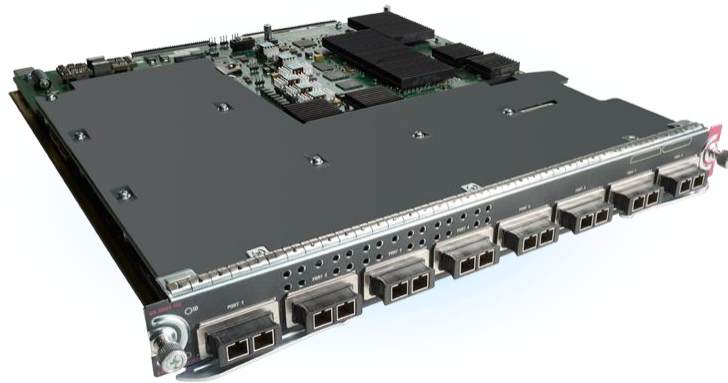
Feature	Sup720	Sup2T
L2 Mac Address Table	SUP720: 64K SUP720-10GE: 96K	128 K
FIB (non XL) FIB (XL)	256 K Entries 1 M Entries	256 K Entries 1 M Entries
Number of VPNs	4 K	16 K (IPv4) 8 K (IPv6)
MPLS aggregate VPN Labels	512 (single lookup) 1024 (with recirculation)	16 K

New Line Cards

CEF2T

69xx Series—80G Line Card

8p 10G Line Card

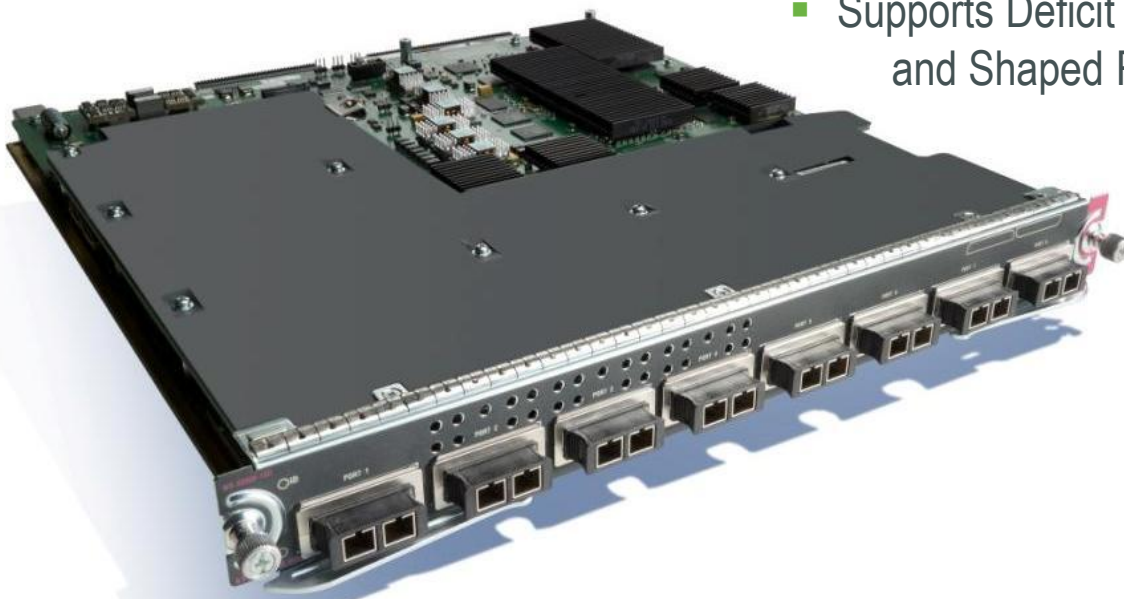


- Two SKUs: regular and XL tables (DFC4)
- X2 Transceiver or SFP+ w/ adapter
- Wire Rate MacSec (IEEE 802.1AE)
- Large packet buffers (256MB/port)
- Virtual Switch Link (for VSS)
- OTV and LISP ready*

WS-X6908-10G / 10G-XL-2T

Introduction

- dCEF2T Linecard
- 8 ports X2 10GE (SFP+ via OneX adapter)
- 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
- Up to 256MB Buffering per port
 - 100 ms buffer for each direction
- Egress Multicast Replication
- Supports Strict Priority queue on transmit
- Supports 2 receive queues per port
- Supports 8 transmit queues per port
- Supports Deficit Weighted Round Robin and Shaped Round Robin



Upgrading the Installed Base to Sup2T

Sup720

Sup2T

67xx Series w/ CFC

Supported

67xx Series 1GbE w/ DFC3

WS-F6K-DFC4-A

6704-10GE w/ DFC3

WS-F6K-DFC4-A

6716-10GE Fiber

WS-F6K-DFC4-E

6716-10GBASE-T

WS-F6K-DFC4-E

6708-10G Fiber

Special TMP* program for 6908-10G Fiber (80G)

61xx Series

Supported

Legacy Services Modules

Supported

*Up to 20% trade to credit (or \$8,000) on top of the regular discount

Sup2T—Classic Cards and Service Modules

61xx Line Cards

WS-X6148A-RJ-45

WS-X6148A-45AF

WS-X6148-FE-SFP

WS-X6148A-GE-TX

WS-X6148A-GE-45AT

WS-X6148E-GE-AT

Legacy Service Modules

FWSM

ACE 20

WiSM

NAM-1

NAM-2

Next Gen. Service Modules

ASA-SM

ACE 30

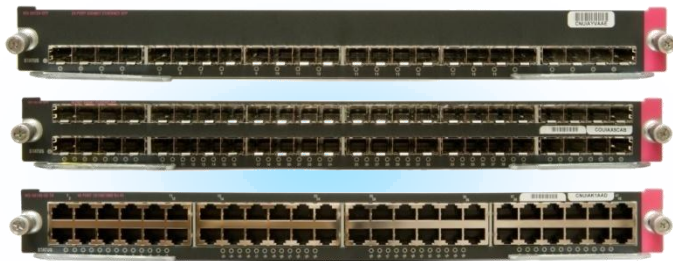
WiSM-2

NAM-3

SIP Modules, ES40 and VSPA NOT Supported

68xx Series Line Cards – 40G Backplane

1 GbE Fiber and Copper



10GbE Fiber and Copper



- Distributed Forwarding Card (DFC4)
- Two SKUs: Regular and XL tables
- **24 ports 1 GbE fiber**
- **48 ports 1 GbE fiber and 10/100/1000**
- **40G backplane**

- Distributed Forwarding Card (DFC4)
- Two SKUs: Regular and XL tables
- **16 ports 10GbE Fiber (X2 transceivers)**
- **16 ports 10GBASE-T**
- **40G backplane**

Next Generation Borderless Services Compatible with Sup720 and Sup2T

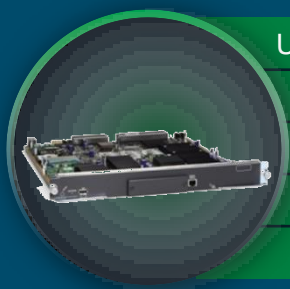
Next Generation WiSM Blade - WiSM-2

Performance	20 Gbps
Access Points	500
Clients	10,000
Concurrent AP Upgrade/Joints	Up to 500
Mobility Domain Size	Up to 36,000 APs



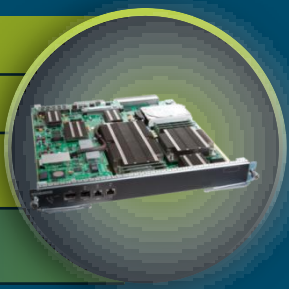
Next Generation Load Balancer - ACE-30

UP to 16 Gbps	Performance
Up to 6 Gbps	Compression
30,000	SSL Transactions per Second
250	Virtual Context
250	VLANs



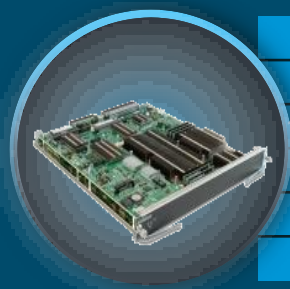
Next Generation NAM Blade - NAM-3

Monitoring Performance	15 Gbps Plus
Capture to External Disk	Up to 5 Gbps
Performance Analytics	1588 Timestamps
HW Filters/ Pkt Captures	



Next Generation Firewall Blade - ASA-SM

64 Gbps	Chassis Performance
16 Gbps	Performance
10,000,000	Concurrent Sessions
300,000	Connections per Second
250	Security Contexts
1,000	VLANs



Hardware Improvements

- **Flexible Netflow Support**
- **Control Plane Protection Enhancements**
- **New QoS Features**
- **IPv6 enhancements**
- **Port Channel Alg. enhancement 3bit(8) -> 8bit(256)**
- **Cisco TrustSec**

Cisco TrustSec

Introduction

- **Policy-based access control for**

- Users (employees, contractors ..)

- End point devices (laptops, IP phones, ..)

- Networking devices (switches, routers ..)

- **Identity and role-aware networking**

- Identity information for granular control

- Role-based business service delivery

- **Pervasive Data integrity and confidentiality**

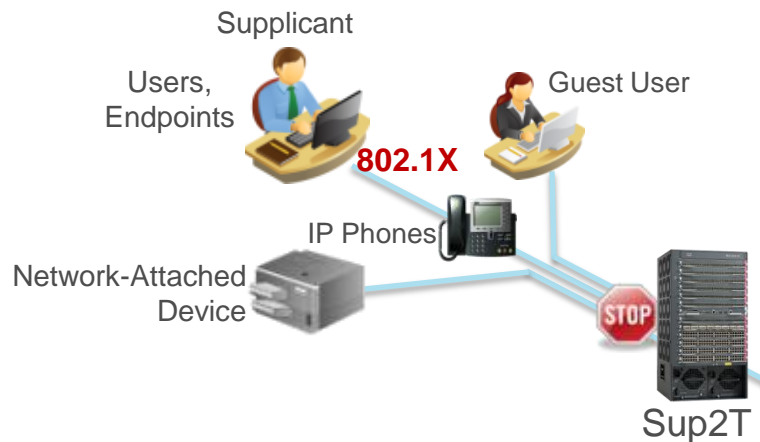
- Securing every data path in switching

- IEEE 802.1AE standard-based encryption



Cisco TrustSec

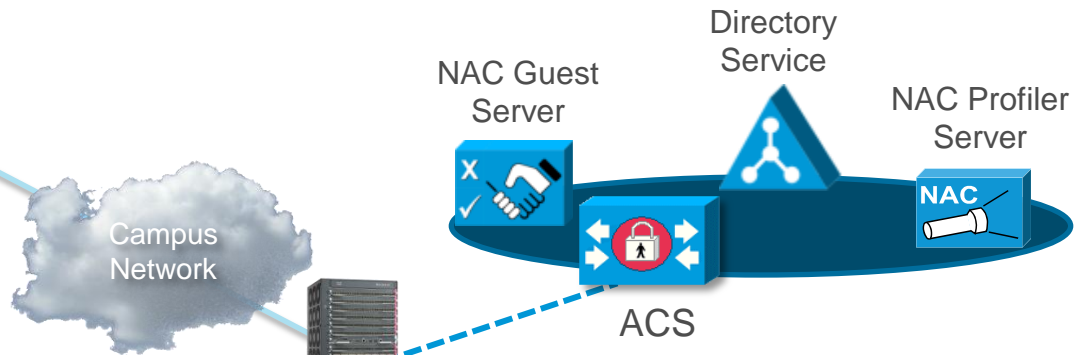
802.1X-Based Network Access Control



2

Policy Servers evaluate identity information

- NAC Profiler evaluates agentless device
- Guest Server manages temporary guest access
- ACS evaluates overall policy and returns authorization back to NAD



1

End user / Endpoint attempts to access network

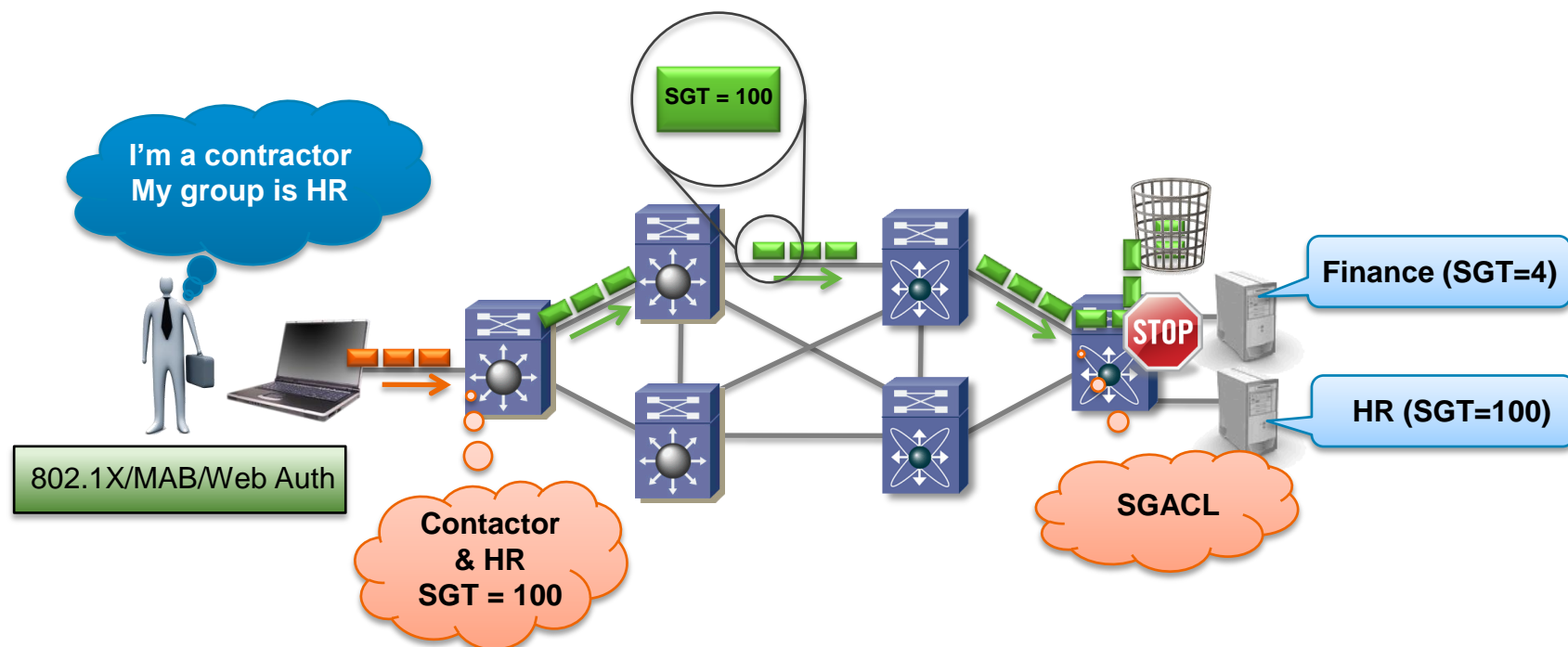
- 802.1X Authentication for registered user
- MAC Authentication Bypass for agentless device
- Web Authentication for Guest

3

Access Control based on policies

- Catalyst switch to enforce access control based on policy (VLAN Assignment, dACL, SGT)
- Sup2T to apply SGACL based on SGT mapped to role

Security Group Based Access Control



- Security Group Based Access Control allows customers
 - To keep existing logical design at access layer
 - To change / apply policy to meet today's business requirement
 - To distribute policy from central management server

Built-in MACSec Support

Point to Point L2 Encryption

- 802.1ae data confidentiality & integrity @ wire-rate
- Protects against Man-in-the-Middle DoS attacks
 - Snooping
 - Tampering
 - Replay
- No impact to other packet inspection features currently used
- Incrementally-deployed based on link vulnerability
- Supports MACSec over EoMPLS
- Secure your aggregation and core network links on your campus

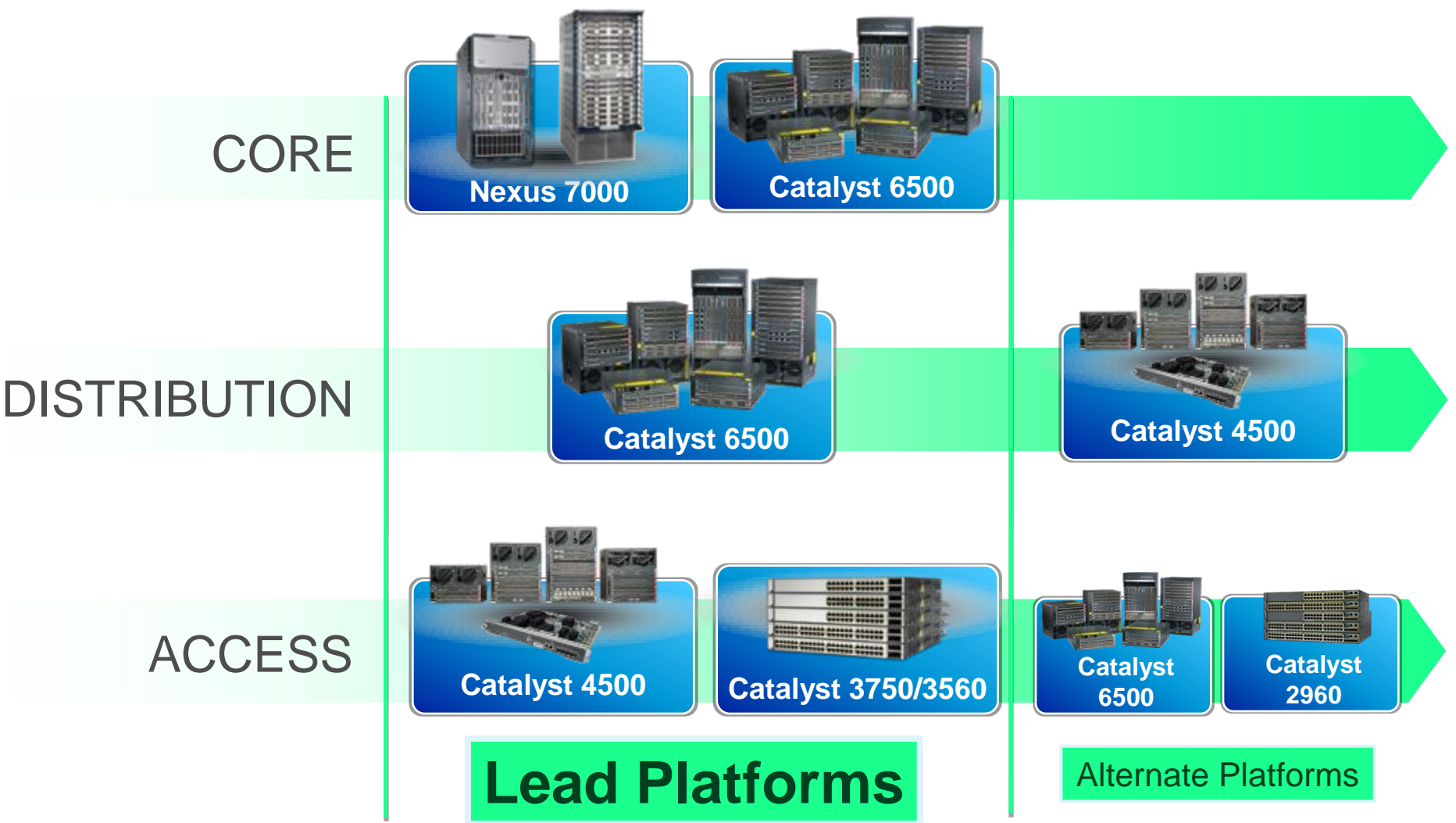


- Encrypt Up to 2T of traffic at line rate!

Nexus 7000



Borderless Network –Switching Portfolio



Borderless Network Core

Customer Requirements: Decision Points

✓ Virtualization	✓ Scalability	✓ Borderless Services
✓ Security	✓ High Availability	✓ Investment Protection

Borderless Networks: Decision Criteria in the Campus Core

Borderless Core Services

- LAN/WAN Flexibility
- Integrated BN Services
- Virtual switching (VSS)
- MPLS (L3VPN, L2VPN)
- 4 Terabit scalability



Cisco Catalyst 6500 Series



Borderless Core Performance

- 10GE port density
- SW HA → Hitless ISSU, NX-OS
- Segmentation (VDCs)
- MPLS (L3VPN), OTV
- 15 Terabit scalability



Nexus 7000 Series

Common Features: Robust L2/L3, IPv6, Scalable Multicast, Advanced QoS, SPAN/ERSPAN, WCCP, TrustSec, Flexible Netflow, GOLD, EEM, Smart Call Home

Nexus 7000

Vezető újgenerációs Gerinc/Disztribúciós berendezés



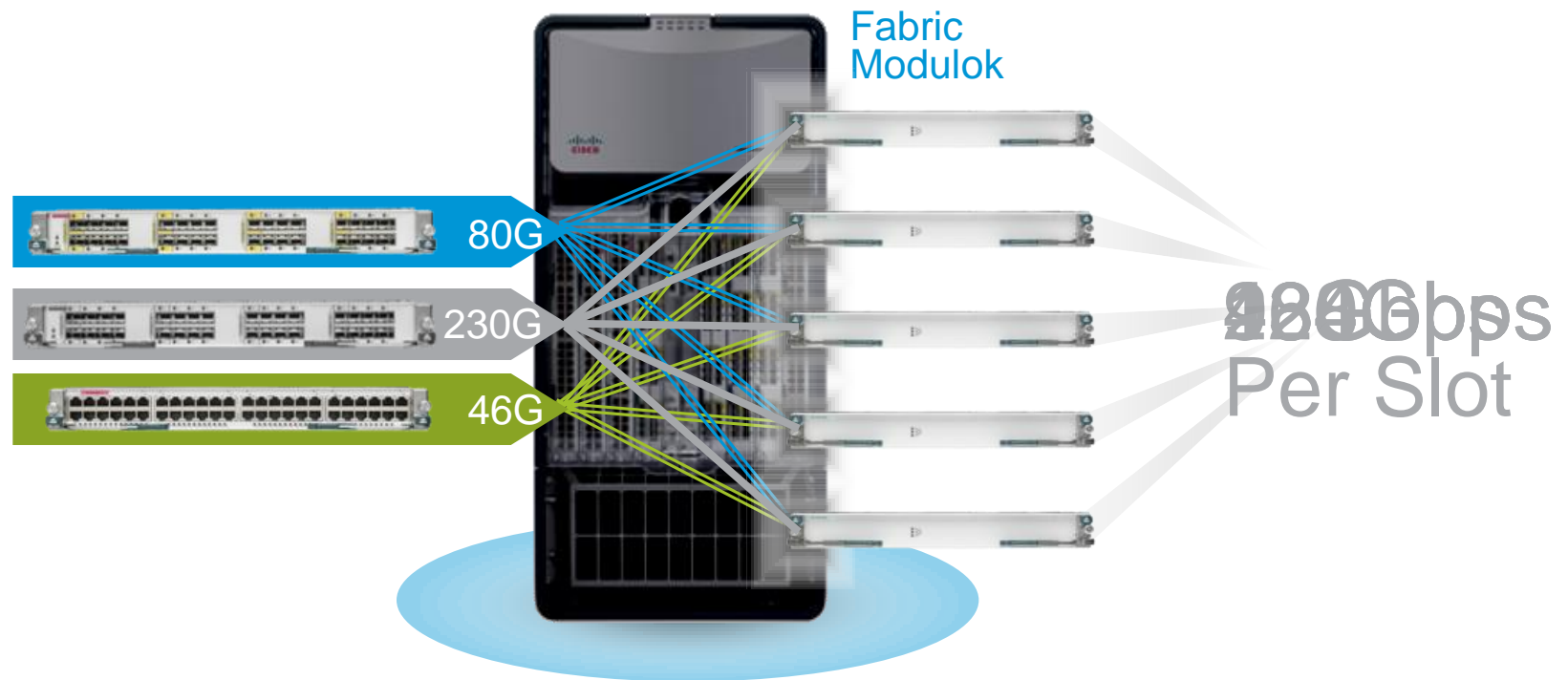
15000+ NX-OS Ügyfél

18,000+ Nexus 7000 eladott Szassi

1.2M+ eladott 10 Gigabit Ethernet Port

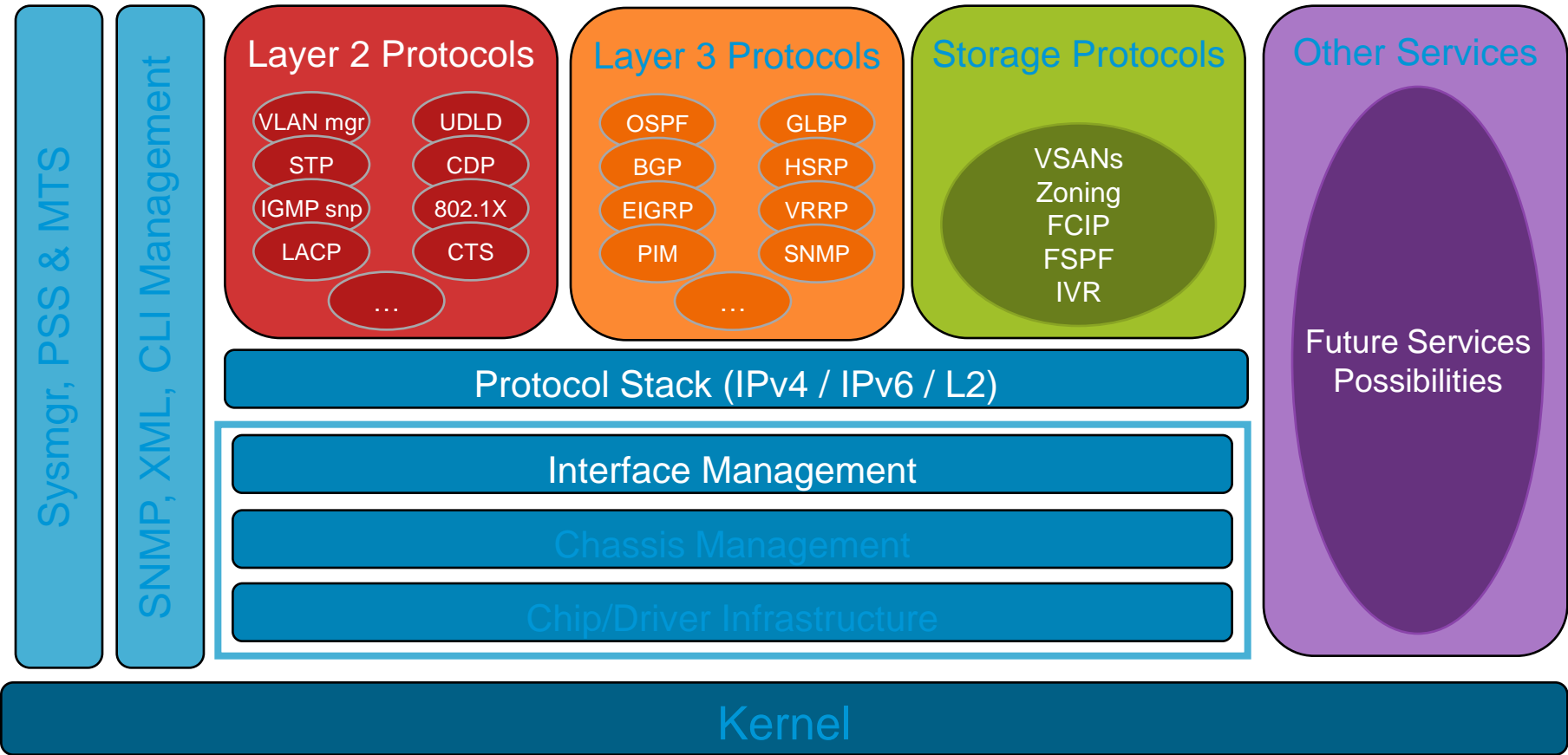
15Tb+ Rendszer teljesítmény

Sávszélesség Fabric Modullal skálázódik

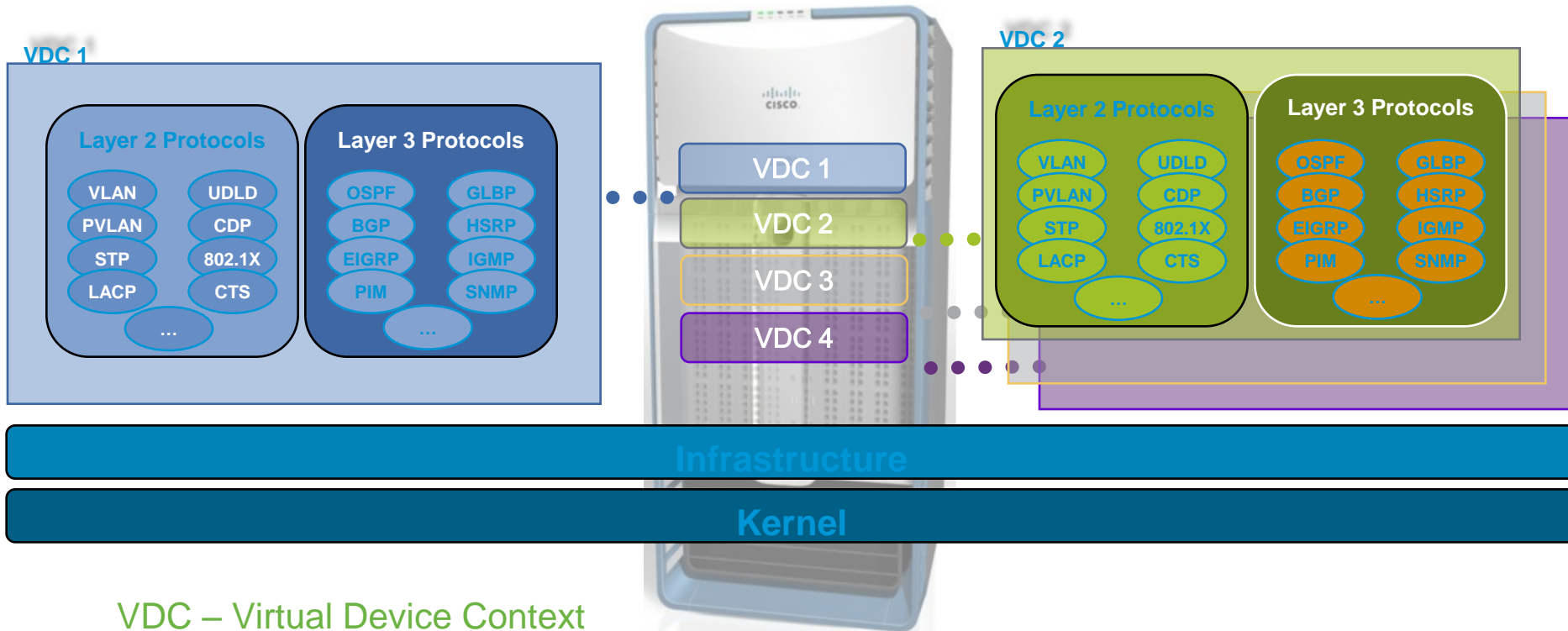


Beruházás védelem és Unified Fabric

NX-OS – SAN OS alapú operációs rendszer



Virtualization with VDCs



VDC – Virtual Device Context

- HW és SW komponensek rugalmas elválasztása
- Control plane és Data plane teljes szétválasztása
- Teljes SW hiba szeparáció
- Rugalmas interface tartalékolás

Nexus 7000 jellemzők



Nexus 7000 és NX-OS

- 10 és 18 Slot verzió
- 15+ Terabit rendszer
- Unified Fabric Ready
- Moduláris OS
- Virtualizációra képes (VDC)
- Cisco TrustSec
- Folytonos működés



F1 Series I/O Module

- 10G Ethernet
- 32 Port SFP+ Layer 2 10G



M1 Series I/O Modules

- 10G Ethernet
- 32 Port SFP+ 10G



- 1G Ethernet
- 48 Port 1G-TX
- 48 Port 1G Fiber



- 10G Ethernet XL
- 8 Port X2 10G
- 1m Entry FIB TCAM



- 1G Ethernet XL
- 48 Port SFP 1G
- 1m Entry FIB TCAM

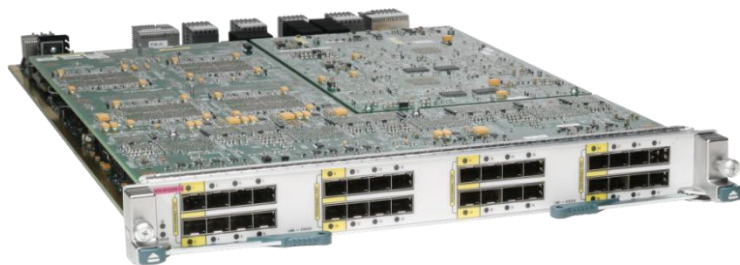


Cisco NX-OS Multi-protocol Operating System (4.2(4), 5.0(2a), 5.1

Data Center Network Manager (DCNM)

10GE M1 I/O modulok

32-Port 10GE I/O Module, 80G Fabric



- **80G full duplex fabric kapcsolat**
 - **32 port 4:1 túljegyzés**
- **M1 Forwarding Engine 60Mpps**
- Két működési mód minden 4 portból álló csoportra
 - Dedicated mód
 - Shared mód

8-Port 10GE XL I/O Modul, 80G Fabric



- **80G full duplex fabric kapcsolat**
 - **8 port Vonali sebesség 10GE**
- **Két M1 Forwarding Engine 120Mpps**
 - Csomagvesztés mentes 64 byte csomagméretre mind a 8 porton
- Rugalmas XL opció - Feature License

Integrált Forwarding Engine

- Megnövelt kapacitású forwarding engine
- Max 60Mpps IPv4 unicast, 30Mpps IPv6 unicast teljesítmény
- **M1 Series Forwarding Engine**
Azonos a Cat 6K EARL 8
- **Integrált** minden M1 sorozatú I/O modulra

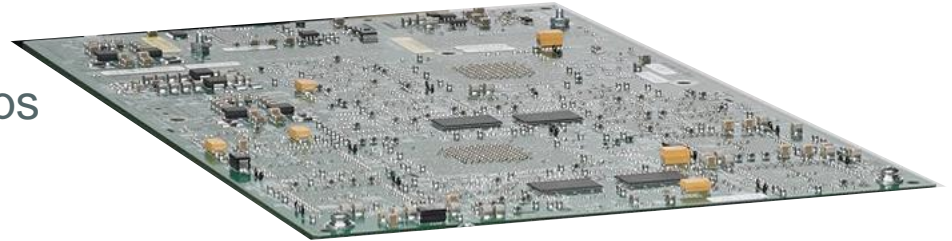


Table sizes	Non-XL	XL
FIB TCAM	128K	Up to 1M
IPv4 Routes	128K	Up to 1M
IPv6 Routes	64K	Up to 500K
Classification TCAM (ACL and QoS)	64K	128K
NetFlow TCAM (Ingress and Egress)	512K	512K
MAC table	128K	128K
Bridge Domains (VDC + VLAN)	16K	16K

Nagy teljesítményű L2 10G I/O modul

F1 Sorozat

- 32-port 10G SFP+ F1 modul
- 1G/10G dual-speed system-on-chip (SoC) architektúra
- Layer 2 továbbítás L3/L4 intelligencia
- Multi-protocol – Klasszikus Ethernet, FabricPath/DCB, FCoE (később)
- Nagy teljesítmény
 - 230Gbps fabric kapcsolat
 - 20 vonali sebességű port slotonként (64 byte)
 - 320 vonali sebességű port/system (7018 sasszi)
- **Kis késleltetés**– kb.5 μ sec modultól modulig (64 byte csomag)



N7K-F132XP-15

MAC Address Tables

- M1/M1-XL and F1 modules have different MAC table sizes:
 - M1/M1-XL modules – 128K MAC table
 - F1 modules – multiple 16K MAC tables
- SoC learns MACs based on VLAN membership and port type
 - Classic Ethernet – learn all MACs for any VLANs present on either physical port
- Efficiency/utilization depends on port type, VLAN membership, VLAN pruning (trunks)
 - VLAN pruning strongly recommended when using trunk ports on F1 modules
- In worst case, entire system limited to 16K MAC addresses (all ports in a single VLAN)
- In best case, each F1 module limited to 256K MAC addresses (different VLANs on each SoC)
- Example on next slide illustrates one case where you get “more than 16K but less than 256K MACs” on an F1 module

I/O Module Family Comparison

	M1/M1-XL Series (Service Rich)	F1 Series (Performance)
L2 Table	128K	16K-256K
L3 (IPv4, IPv6)	Yes	No
Netflow	Full	No
ACL	Up to 128K	1K-16K
SPAN/ERSPAN sessions	2 bidir	2 bidir (2 bidir + 12 unidir [†])
IEEE 1588/PTP	No	Yes [†]
Buffer per line-rate 10G port	176MB/port	2.3MB/port
Forwarding capacity per module	60-120Mpps	480Mpps
Line-rate 10G ports per module	8	20-32 [‡]
Line-rate 10G ports per chassis (10-slot/18-slot)	64/128	256/512
Latency (unicast local switching @ 64 bytes)	9.5 μ sec	4.7 μ sec
Power budget per line-rate 10G port	81W/port	12W/port

[†] Hardware capability with future software support

[‡] Dependent on frame size and amount of local switching

Cisco Nexus 7009 Sassi

Kisebb fizikai méretű 7000

Támogatja a meglévő Nexus 7000 I/O Modulokat

Azonos rendszerkomponensek – Supervisor, Táp

7+2 Szlot 14 RU méretben

336 1G/10Gport

2 Kábelvezető



Rendelhető

Főbb jellemzők	7009
10G portok	224
1G portok	336
Magasság	14RU
ISSU	Y
FEX támogatás	Y
Unified I/O	Y
FabricPath	16-way
40G és 100G	Y
MPLS	Y
vPC	Y
HA	Y

Nexus 7009: Fabric-2 Modul

- New 7009 Fabric-2
 - 550Gb / Slot Crossbar ASIC
 - 5 Fabric-2 Modul/Sasszi
 - N+1 Redundancia – Non stop Forwarding
 - Kiesés mentes fabric átállás
- 7.7 Tbps fabric kapacitás/rendszer
- Konzisztens N7k Architektúra
 - Veszteségmentes VoQ
 - Központi Arbitrálás
 - Három állapotú Fabric
- 40G/100G támogatás



Nexus 7000

Vezető újgenerációs Gerinc/Disztribúciós berendezés



Új generációs Nexus 7000

Megjelenés
2011 Okt.



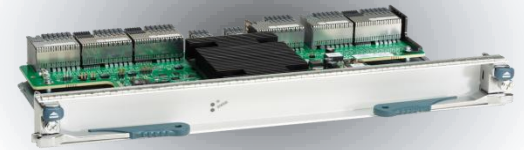
F2-Series Module

Jelenlegi
változat



Nexus 7000

Megjelenés
2011 Okt.



Fabric2

Iparág vezető 10GE port platformja: 768 non-blocking port

Új generációs Nexus 7000 Fabric2 Modul



N7K-C7010-FAB-2



N7K-C7009-FAB-2



N7K-C7018-FAB-2

Kétszeres teljesítmény valamennyi Nexus 7000 sasziban:

- 110Gbps per fabric modul per szlot
- 550Gbps per szlot 5 Fabric modullal
- Csomagvesztés mentes fabric átállás & migráció
- Max. 17.6 Tbps per saszki (7018)
- Beruházásvédelem – meglévő I/O modul támogatás

Új generáció Nexus 7000

Nexus 7000 I/O Modul Evolúció

M-Series



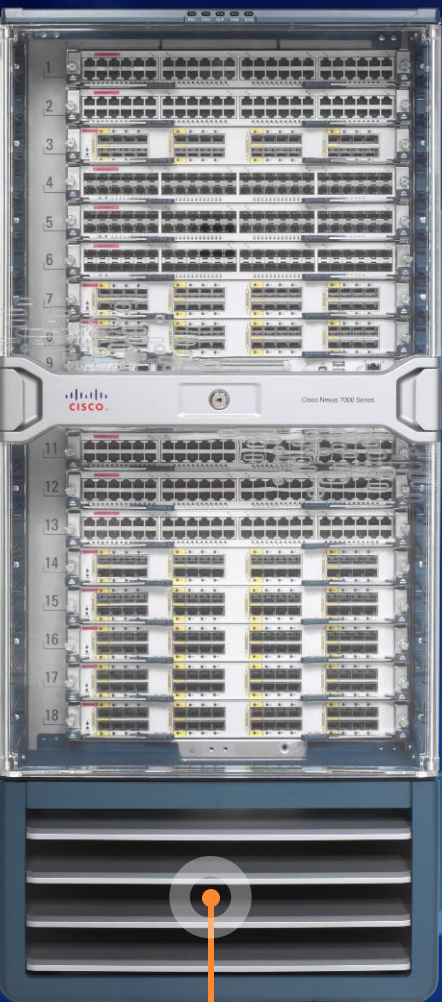
External Buffers
External Tables
Full L2/L3/L4 Scale

F-Series



System-On-Chip
On-Chip Buffers & Tables
High Performance DC Fabric

Nexus 7000 I/O Module Family Roadmap



Services Rich Platform (M Series)
Multi-purpose, full L2/L3/L4 with scale

M1 Series (Shipping)
8 port 10G-XL (80G/slot)
32 port 4:1 10G SFP+ (80G/slot)
48 port 10/100/1000 (46G/slot)
48 port 1G SFP (46G/slot)

Fabric Switching System (F Series)
FabricPath capable for high-performance Data Center Fabrics

F2 Series (Q4CY11)
48 port L3 10G SFP+ (480G/slot)
Fab2 (550G/slot)

F1 Series (Shipping)
32 port L2 10G SFP+ (230G/slot)

15+ Terabit Infrastructure

...past 2011 2012 future...

Nexus 7000 F2 Modul (L2/L3)

Nagy teljesítményű 10G Unified Fabric támogatás

Skálázható 768 veszteségmentes 10G port

Nagy teljesítmény 480Gbps/slot; 720Mpps IPv4 / IPv6

Alacsony késleltetés < 5µs port-port késleltetés

Szabvány támogatás TRILL, DCB, FCoE támogatás

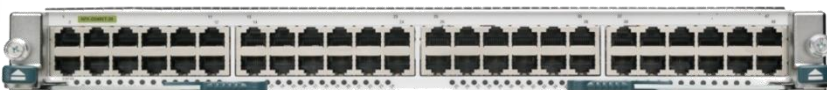
Rugalmas 1G/10G autosensing, Fabric Extender támogatás

Energia hatékony ~10W / 10GbE port



48 Port SFP/SFP+ 1/10GbE

Maximális Port sűrűség 1G és 10G
Optika támogatás



48 Port RJ45 1/10GbE

1G/10G támogatás

Nexus 7000 F-Sorozatú I/O Modulok



F1-Series
32-Port 1/10GbE Modul

320 GPS local switching
-230 Gbps/slot fabric kapcsolat
480 MPPS ~ 5us késleltetés slot -slot
(64 bytes)

Layer 2 Switching
FabricPath / TRILL Support

Multi-hop FCoE Support



F2-Series
48-Port 1/10GbE Modul

L2 / L3 720 MPPS / 480 Gbps/slot
~ 5us latency slot-slot (64 bytes)

Layer 2 Switching
Layer 3 Routing – 32K FIB
FabricPath / TRILL támogatás

Fabric Extender támogatás

Sampled Netflow
VN-Link támogatás
Multi-hop FCoE

M1 és F2 Modul összehasonlítás

M1-Series

- Max of 8 10GE line rate ports
- Full Layer2 and Layer3 Feature Set
- Large FIB, ACLs, QoS Tables
- MPLS
- LISP * and OTV
- FEX Support *
- FabricPath
- FCoE

* Only on N7K-M132XP-12(L)

F2-Series

- 48 1/10GE line rate ports
- Full Layer2 and Layer3 Feature Set
- Smaller FIB, ACLs, QoS Tables
- MPLS
- LISP and OTV
- FEX Support
- FabricPath
- FCoE **

● támogatott

● nem támogatott

Thank you.

