# Switch-On "2T"
## Introducing the New Cat6k
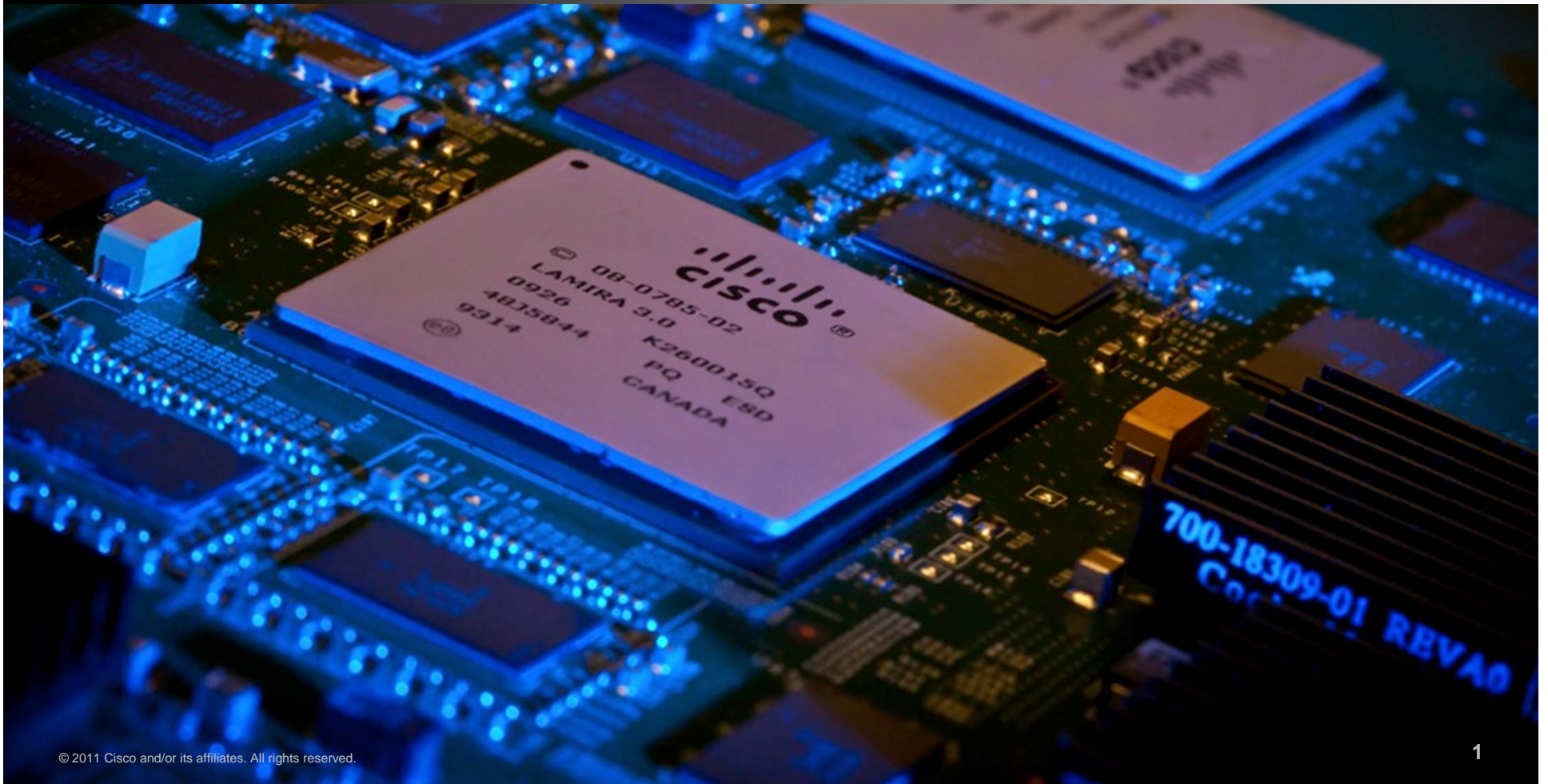
# …and a NEW Decade AHEAD
## The Biggest Platform Refresh Since Sup1 and Sup720

Sup2T FCS

Sup720

Sup1

Cat5K

Sup2

Sup72

1999

2003
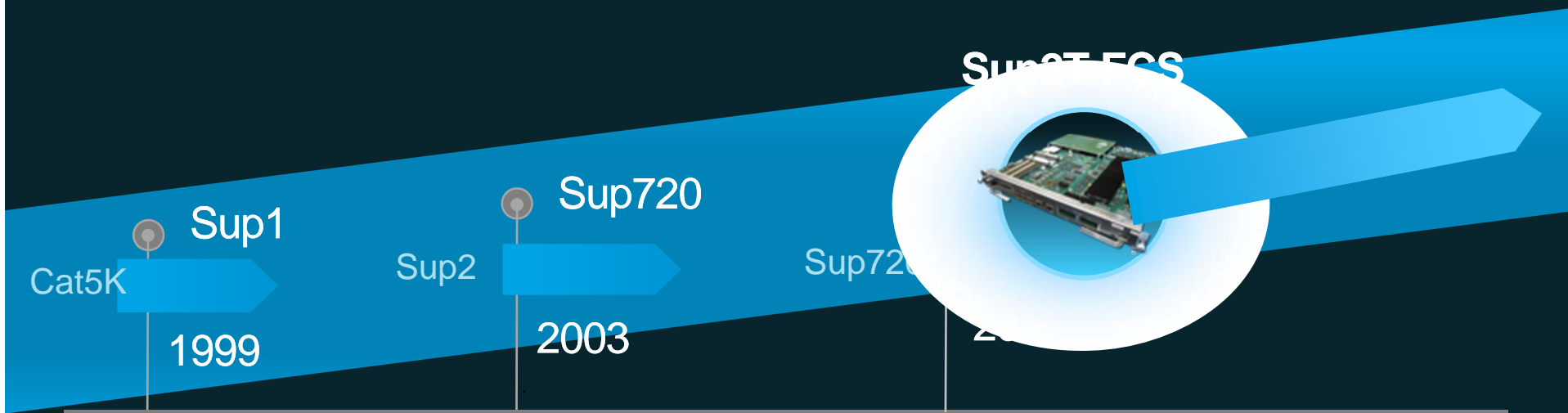
| | | |
|---|---|---|
| 1st Multicast Replication in ASICs | 1st IPv6 switching in ASICs | |
| 1st Netflow in ASICs | 1st MPLS in ASICs | 500+ Patents |
| 1st Multicast IPv6 in ASICs | 1st MVPN in ASICs | |
| 1st Service Mod. Integration | 1st UC Integration | 1st Virtual Switching |
| Driving IGMP Snooping Std. | Driving 802.1af Std | 1st UDLD, TDR, GOLD, EEM |
| 1st PVLAN, DAI, DHCP Snooping | 1st NSF/SSO | 1st RPSAN, ERSPAN, WCCP |

# A Decade of Innovation SO FAR…
## Leading Innovation, Driving Standards and Setting the Technology Bar

# The New 2 Terabit Catalyst 6500-E

Sup2T and 6513-E

69xx Series 80Gbps
8p 10G
4p 40G/16p 10G
Built-in DFC4

68xx/67xx
Series 40Gbps
1GbE Fiber: 24p/48p
10/100/1000: 48p
10GBASE-T: 16p
10G Fiber: 16p
Built-in DFC4

Service Modules
WiSM-2
ASM-SM
NAM-3
ACE-30

Innovation

**Cat6500-E**
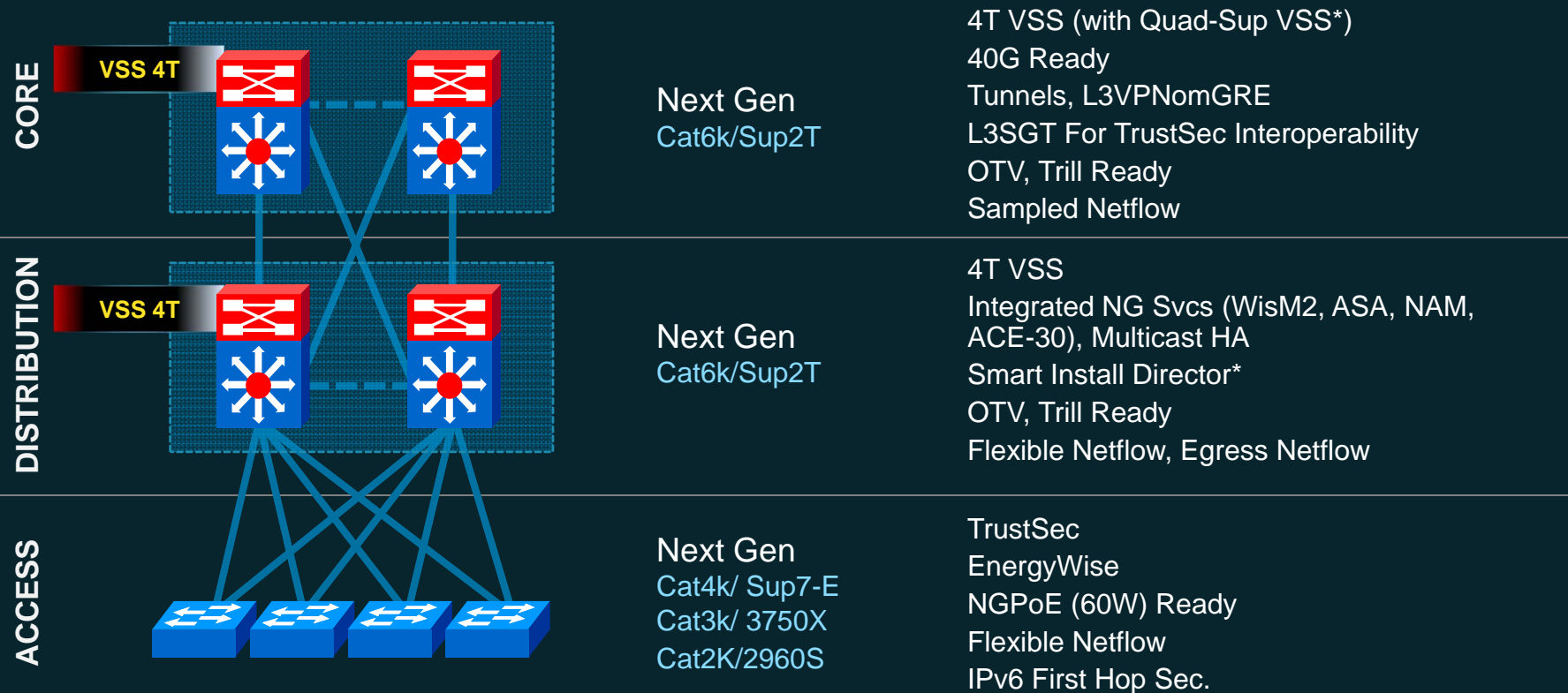
Investment Protection

ALL E-Series
Chassis

Upgrade Option
for 67xx Line Cards

All 61XX
POE/ POE+

Legacy Service
Modules

# Catalyst Portfolio Campus Refresh
## Performance with Network Services

**CORE**

VSS 4T

Next Gen
Cat6k/Sup2T

4T VSS (with Quad-Sup VSS*)
40G Ready
Tunnels, L3VPNomGRE
L3SGT For TrustSec Interoperability
OTV, Trill Ready
Sampled Netflow

**DISTRIBUTION**

VSS 4T

Next Gen
Cat6k/Sup2T

4T VSS
Integrated NG Svcs (WisM2, ASA, NAM, ACE-30), Multicast HA
Smart Install Director*
OTV, Trill Ready
Flexible Netflow, Egress Netflow

**ACCESS**

Next Gen
Cat4k/ Sup7-E
Cat3k/ 3750X
Cat2K/2960S

TrustSec
EnergyWise
NGPoE (60W) Ready
Flexible Netflow
IPv6 First Hop Sec.

Secure      Robust      Simple      VDI Ready

## The New Catalyst 6500

Resilient      Virtualized      Video Optimized      Turn Key IPv6

# 6500 "2T" Fit in Traditional Data Centers
## Drive an Unlimited Upgrade Opportunity

**Scalability**
- Industry Leading Table Scalability: ACL, Netflow, IPv4/v6
- Industry Leading Packet Buffers: up to 256MB/10GbE port
- Industry Leading Multicast Forwarding Capabilities
- Up to 16K Bridge Domains for scalable Cloud Deployments
- Drive transition from 1GbE to 10GbE/40GbE

**Virtualization**
- 128K MAC Table (effective +50% vs. Sup720)
- VPLS in HW for L2 extension/VM Mobility
- Large L2 domains up to 1152 GbE ports/VSS for VM Mobility
- LISP and OTV ready
- Insert 10GbE to the server with 10GBASE-T

**Operations**
- Simplify w/ VSS: no STP, no FHRP, reduced mgmt overhead
- Preserve IOS operational model for "brownfield" deployments
- Only Catalyst with Lights out management (CMP)
- CoPP, SPAN/RSPAN/ERSPAN/mini protocol analyzer…
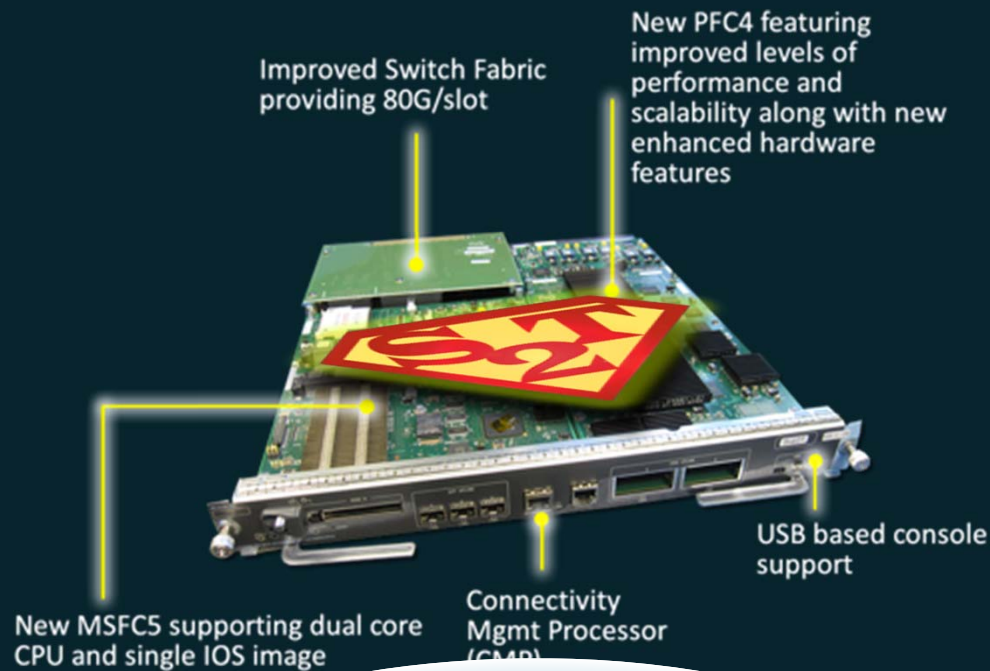- Open Manageability with XML/Web service API

**Network Services**
- ASA-SM Firewall blade for up to 64 Gbps (Chassis Performance)
- ACE-30 Load Balancer for up to 16 Gbps
- Performance analytics and 1588 services with NAM-3
- Up to 13M Netflow entries w/ FNF, Sampled, Egress, Multicast…
- Full IPv6 Hardware parity with IPv4

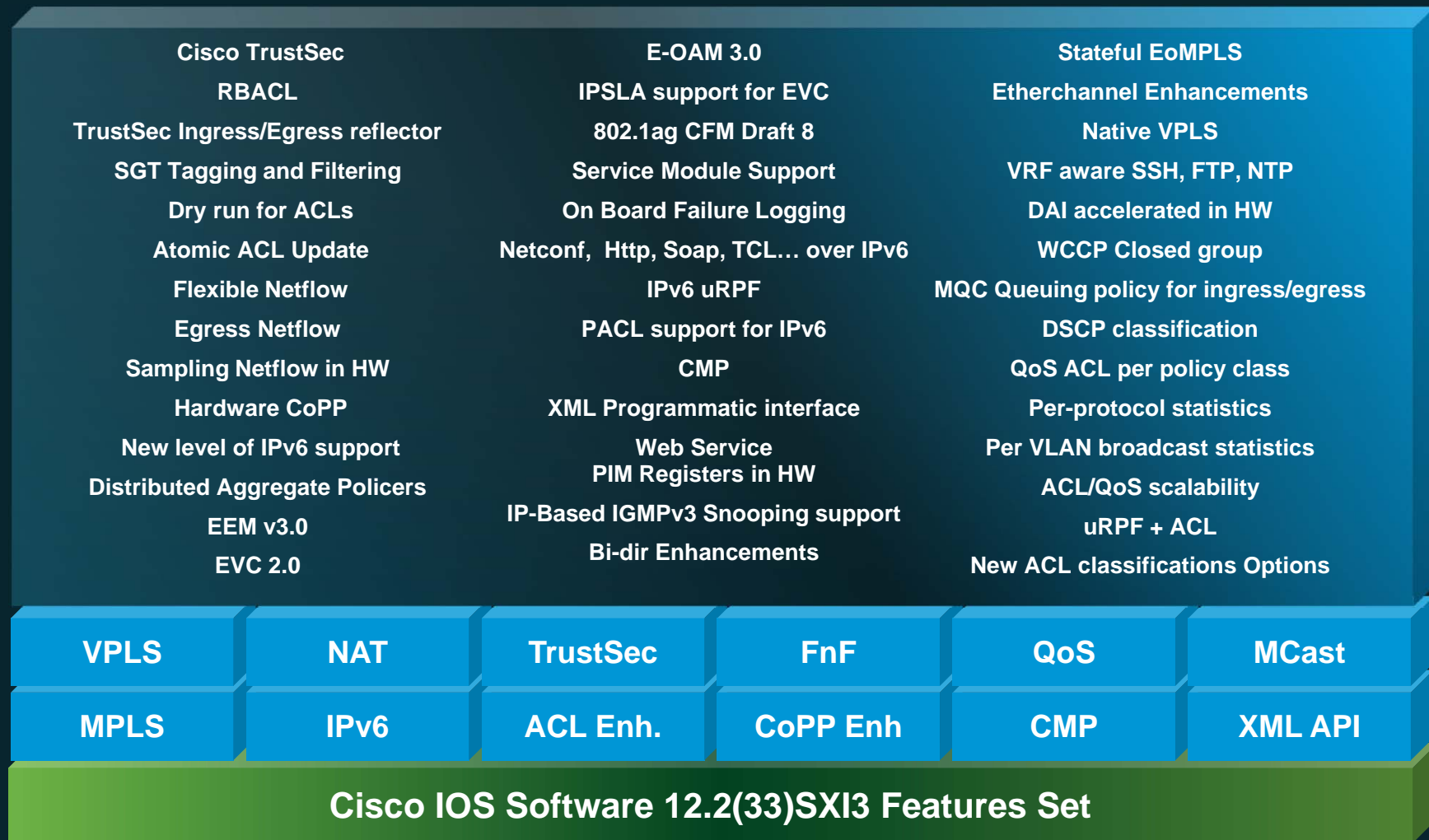# Next-Generation Sup2T At-a-Glance
## PID: VS-S2T-10G, VS-S2T-10G-XL

Improved Switch Fabric providing 80G/slot

New PFC4 featuring improved levels of performance and scalability along with new enhanced hardware features

New MSFC5 supporting dual core CPU and single IOS image

Connectivity Mgmt Processor (CMP)

USB based console support

**Sup2T**
the Superman
of all Supervisors ☺

Scalability Performance

|  | PFC3/DFC3 | PFC4/DFC4 |
|---|---|---|
| L2 MAC Table | 96K | 128K |
| Bridge Domains | 4K | 16K |
| MacSec/SGACL | – | Y |
| Etherchannel Hash | 3 bits | 8 bits |
| L2/IPv4 Mpps | 48 | 60 |
| FIB Table | 256K/1M | 256K/1M |
| L3 Interfaces | 4K | 128K |
| Netflow Table | 128K/256K | 512K/1M |
| Security ACL Table | 32K | 64K/256K |
| QoS ACL Table | 32K | Programmable |
| ACL Labels | 4K | 16K |
| Port ACLs | 2K | 8K |
| Aggregate Policers | 1K | 8K |
| Shared uflow Policers | 63 | 512 |

# Sup2T Software Innovation

**Cisco TrustSec**

**RBACL**

**TrustSec Ingress/Egress reflector**

**SGT Tagging and Filtering**

**Dry run for ACLs**

**Atomic ACL Update**

**Flexible Netflow**

**Egress Netflow**

**Sampling Netflow in HW**

**Hardware CoPP**

**New level of IPv6 support**

**Distributed Aggregate Policers**

**EEM v3.0**

**EVC 2.0**

**E-OAM 3.0**

**IPSLA support for EVC**

**802.1ag CFM Draft 8**

**Service Module Support**

**On Board Failure Logging**

**Netconf, Http, Soap, TCL… over IPv6**

**IPv6 uRPF**

**PACL support for IPv6**

**CMP**

**XML Programmatic interface**

**Web Service**
**PIM Registers in HW**

**IP-Based IGMPv3 Snooping support**

**Bi-dir Enhancements**

**Stateful EoMPLS**

**Etherchannel Enhancements**

**Native VPLS**

**VRF aware SSH, FTP, NTP**

**DAI accelerated in HW**

**WCCP Closed group**

**MQC Queuing policy for ingress/egress**

**DSCP classification**

**QoS ACL per policy class**

**Per-protocol statistics**

**Per VLAN broadcast statistics**

**ACL/QoS scalability**

**uRPF + ACL**

**New ACL classifications Options**

| **VPLS** | **NAT** | **TrustSec** | **FnF** | **QoS** | **MCast** |
| **MPLS** | **IPv6** | **ACL Enh.** | **CoPP Enh** | **CMP** | **XML API** |

**Cisco IOS Software 12.2(33)SXI3 Features Set**

…and more than 200 **NEW** features!

# E-Series Systems for the "2T" Family

## Unlock 80G/slot across ALL E-Series Chassis



80G/Slot

| 6503-E | 6504-E | 6506-E | 6509-E | **6513-E** | 6509-V-E |
|---|---|---|---|---|---|
| 34x10GE | 50x10GE | 82x10GE | 130x10GE | 180x10GE | 130x10GE |
| 96x1GE | 144x1GE | 240x1GE | 384x1GE | 528x1GE | 384x1GE |
| 8x40GE | 12x40GE | 20x40GE | 32x40GE | 44x40GE | 32x40GE |
| 150Mpps | 210Mpps | 330Mpps | 510Mpps | 720Mpps | 510Mpps |

# 69xx Series—80G Line Cards

## 8p 10G Line Card
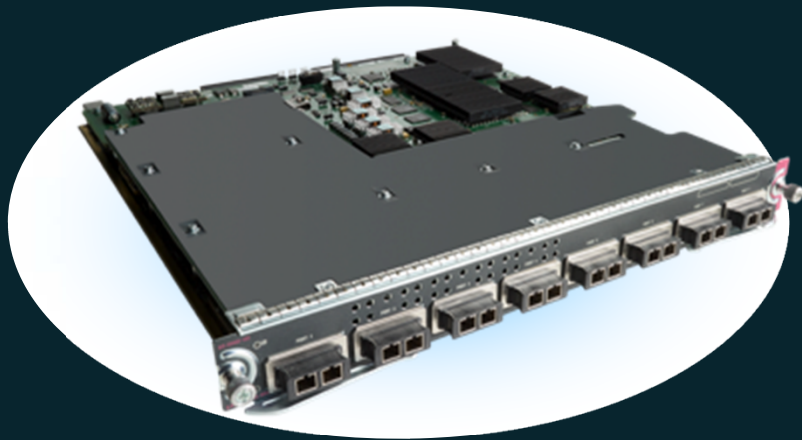


- Two SKUs: regular and XL tables (DFC4)
- X2 Transceiver or SFP+ w/ adapter
- Wire Rate MacSec  (IEEE 802.1AE)
- Large packet buffers (256MB/port)
- Virtual Switch Link (for VSS)
- OTV and LISP ready*

## 4p 40G or 16p 10G Line Card
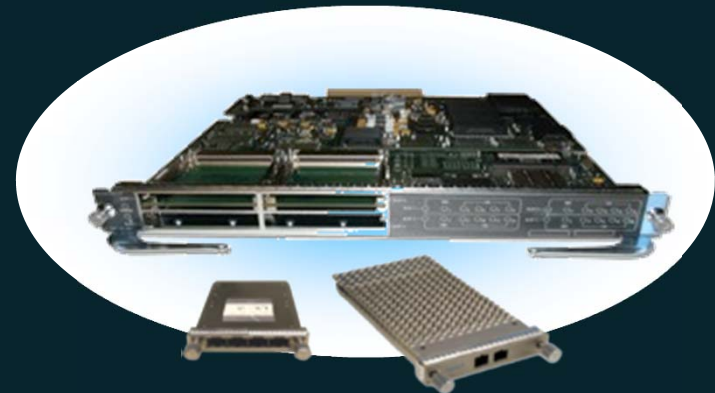


- IEEE 802.3ba standard compliant
- Two SKUs: regular and XL tables (DFC4)
- CFP Transceiver for 40G, SFP+ for 10G
- Wire Rate MacSec (IEEE 802.1AE)
- 10G mode via FourX adapter
- Virtual Switch Link (for VSS)
- OTV and LISP ready*

# Catalyst 6500 40 GbE Ready
## Successfully Completed High Speed Ethernet Plug-Fest  September, 2010



40GE

10GE    10GE         10GE    10GE

Cisco
USC C200 M2

Cisco
USC C200 M2
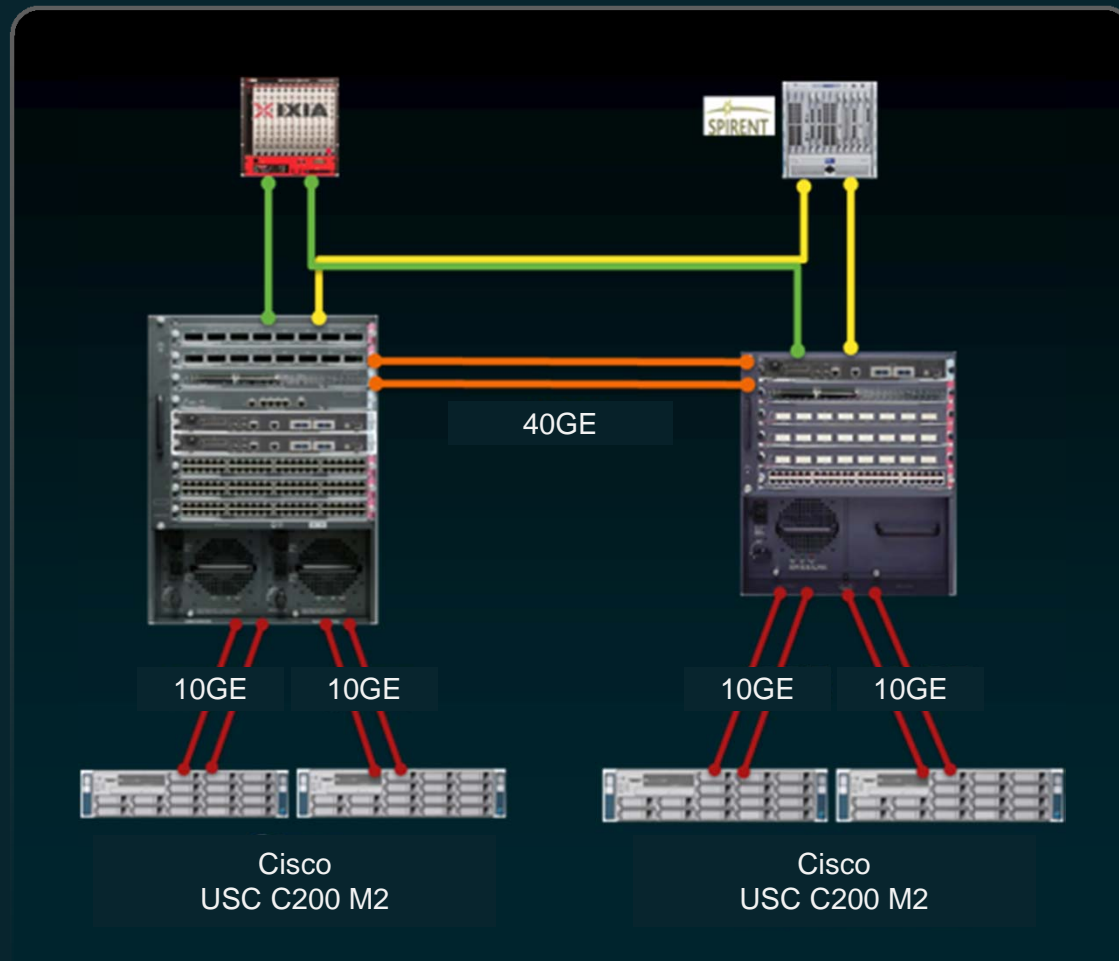
**First Ethernet Modular Switching Platform to Demonstrate 40G**

- Showcased industry's first modular 40GE with Cat 6500 at the Nov. 2010 Supercomputing show

- Showcased industry first 100GE with CRS-3

- Demonstrated interoperability with 40 GE Server as well as with variety of cable and transceivers

Reference: http://www.ethernetalliance.org/files/static_page_files/2Ethernet_Alliance_Demonstration_at_SC10.pdf

# 68xx Series Line Cards

## 1 GbE 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

## 10GbE Fiber and Copper



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

# 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 | Legacy Service Modules | Next Gen. Service Modules |
|---|---|---|
| WS-X6148A-RJ-45 | FWSM | ASA-SM |
| WS-X6148A-45AF | ACE 20 | ACE 30 |
| WS-X6148-FE-SFP | WiSM | WiSM-2 |
| WS-X6148A-GE-TX | NAM-1 | NAM-3 |
| WS-X6148A-GE-45AF | NAM-2 | |
| WS-X6148E-GE-AT | | |

## SIP Modules, ES40 and VSPA **NOT** Supported

# Next Generation Firewall
# ASA Services Module

CSM
Management tool

N-way Clustering
Improved
Performance

| | |
|---|---|
| Performance | 20 Gbps (UDP large pkts) 16 Gbps EMIX traffic |
| Concurrent Sessions | 10 Million |
| Connections/Sec | 300,000 |
| Security Contexts | Max 250 |
| VLANs | 1,000 |

# Next Generation Network Analysis
# NAM3 Services Module

Higher Performance
Precision Scalability

Integrated Application
Performance and Traffic
Analysis

| | |
|---|---|
| Monitoring Performance | 15 Gbps |
| ART Conversations | 200,000 |
| Storage | 600 GB + Ext Mini-SAS, 10GbE FCoE |
| Precision | IEEE 1588 Synchronization |
| Advanced Filters | Hardware & Software |

# Next Generation Load Balancer
# ACE30 Services Module

ANM
Management Tool

Improved
Capabilities &
Performance

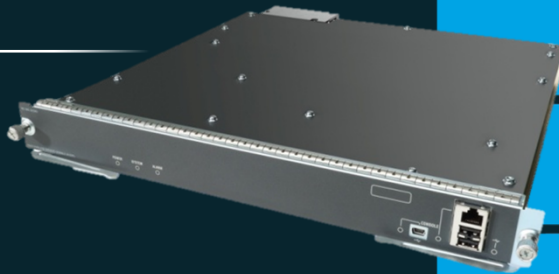| | |
|---|---|
| Performance | Up to 16 Gbps |
| Compression | Up to 6 Gbps |
| SSL Transactions per Second | 30,000 |
| Virtual Contexts | 250 |
| VLANs | 250 |

# Next Generation Wireless Controller
# WiSM Services Module

WCS
Management tool

Improved
Capabilities &
Performance

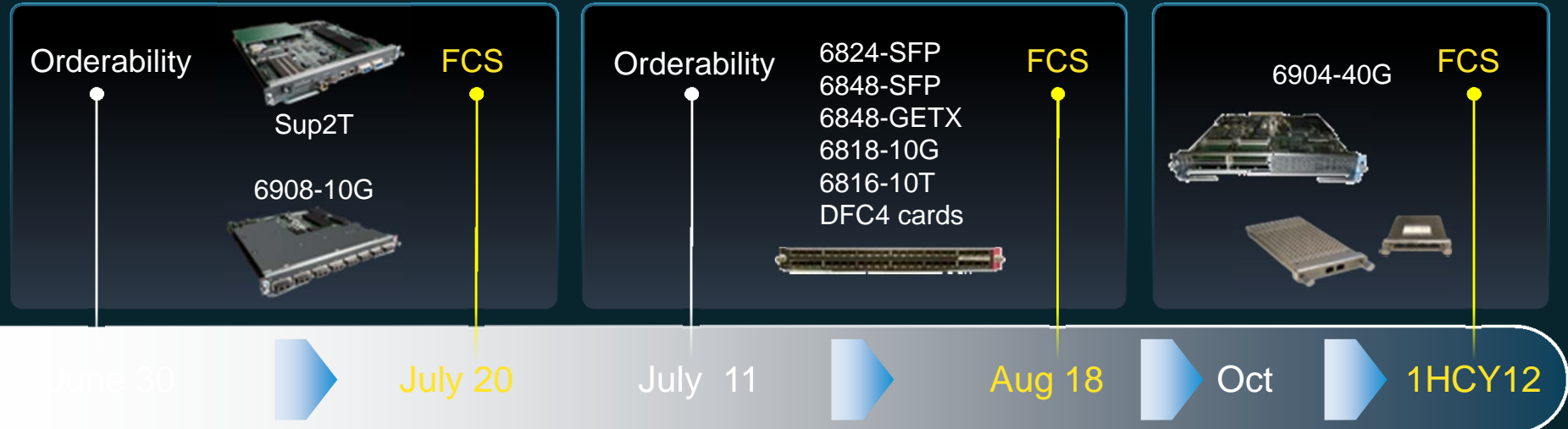| Performance | Up to 20 Gbps |
| Number of Access Points | Up to 500 |
| Clients | Up to 10,000 |
| Concurrent AP Upgrade/Joins | Up to 100 |
| Mobility Domain Size | Up to 36,000 APs |

# Catalyst 6500 Next Generation Roll Out

Orderability        FCS

Sup2T

6908-10G

Orderability

6824-SFP
6848-SFP
6848-GETX
6818-10G
6816-10T
DFC4 cards

FCS

6904-40G    FCS

June 30      July 20     July 11     Aug 18    Oct    1HCY12

IOS 12.2(50)SY      IOS 15.0(1)SY    IOS 15.0(1)SY1

ACE-30 on Sup2T

NAM-3 on Sup2T
WISM-2 on Sup2T
ASA-SM on Sup2T

# Key Packaging Changes for Software

**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, TrustSec SGACLs, L3VPN o mGRE*, etc.

**IP SERVICES:**
EVN*, EIGRP, OSPF, GLBP, NAT, VRF-Lite, Advanced Multicast, Flexible, Egress and Sampled Netflow, etc.

**IP BASE:**
VSS, Quad Sup VSS*, HA, CMP, USB, TrustSec IEEE 802.1x feature set, TrustSec MacSec, Multicast, OSPF for Routed Access, EIGRP Stub, EEM, RIP, HSRP/VRRP, GRE, WCCP, IPv6 FHS, etc.

* Roadmap   New at FCS

# Sup2T Software Release Strategy

**12.2(50)SY**

Early Adopter Release: Feature Parity with 12.2(33)SXI3

## 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-X6848-GE-TX-2T
- WS-X6824-GE-2TXL

## ACL Dry Run, Atomic Commit (incl. IPv6)

## CMP/USB/EEM3.0SGT and L3SGT
- SGACL (incl. IPv6)
- TrustSec Reflector

## Flexible Netflow

## TrustSec
- 802.1ae MacSec
- SXP
- 1 million entries
- TCP Flags
- Sampled Netflow
- Egress Netflow
- CPU Friendly Export

## Network Virtualization
- 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 (Ext Hdr, Flow Label)

## 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 (PACL)
  - IPv6 RA Guard
  - IPv6 ND Inspection
  - IPv6 per-port Address Limit

- PIM and IGMP snooping for VPLS

# "Fast Forward" to "2T"

## Why Now?

- End of support for Cisco Catalyst 6500 Series Supervisor Engines 1A and 2

- End of software maintenance for Cisco Catalyst 6500 Series Supervisor Engine 720-3A

- Upcoming end of support for select Cisco® Catalyst® 6100, Catalyst 6200, Catalyst 6300, and Catalyst 6500 Series Line Cards

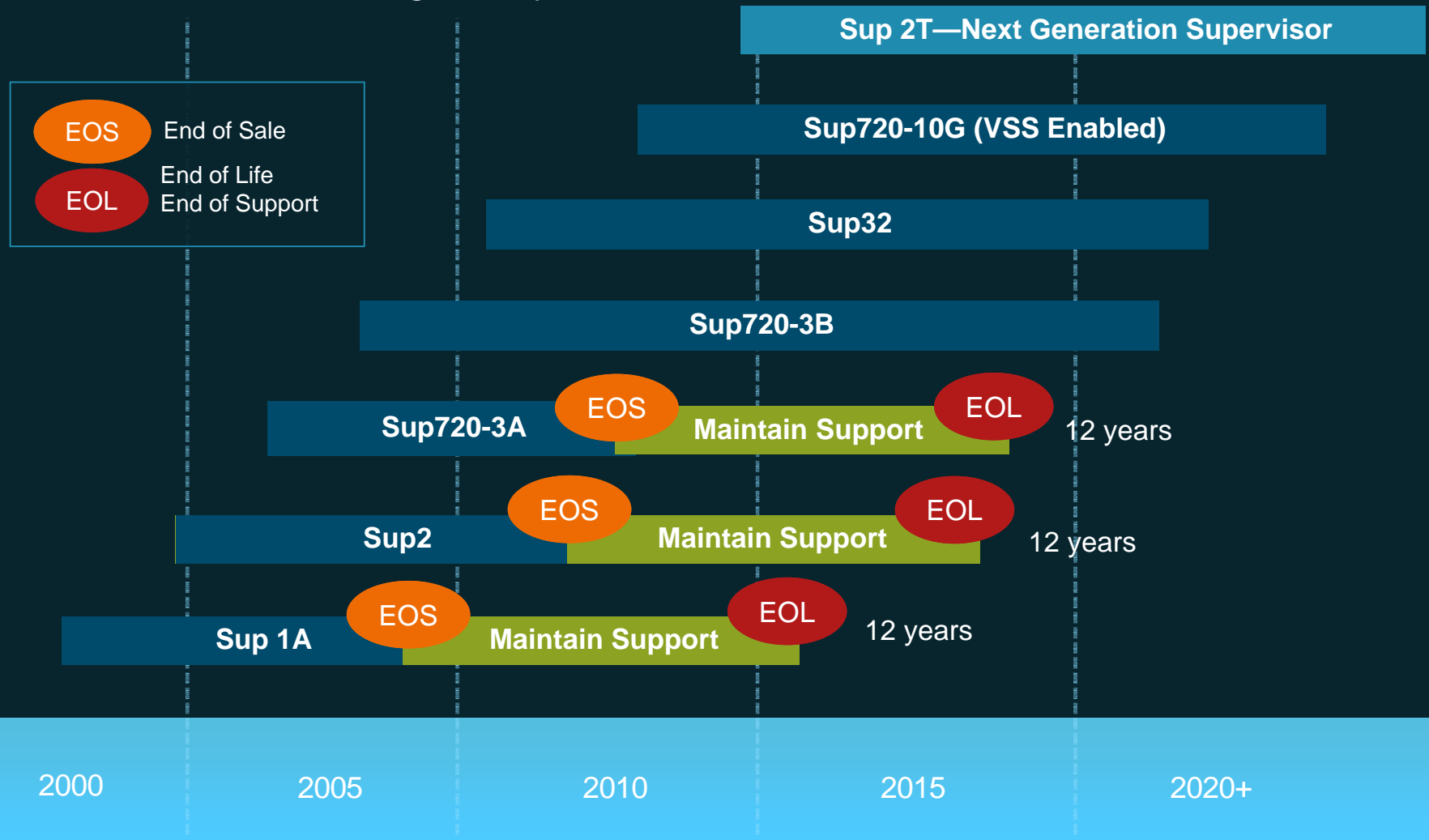- Upcoming End of Support for Non-E Series Chassis
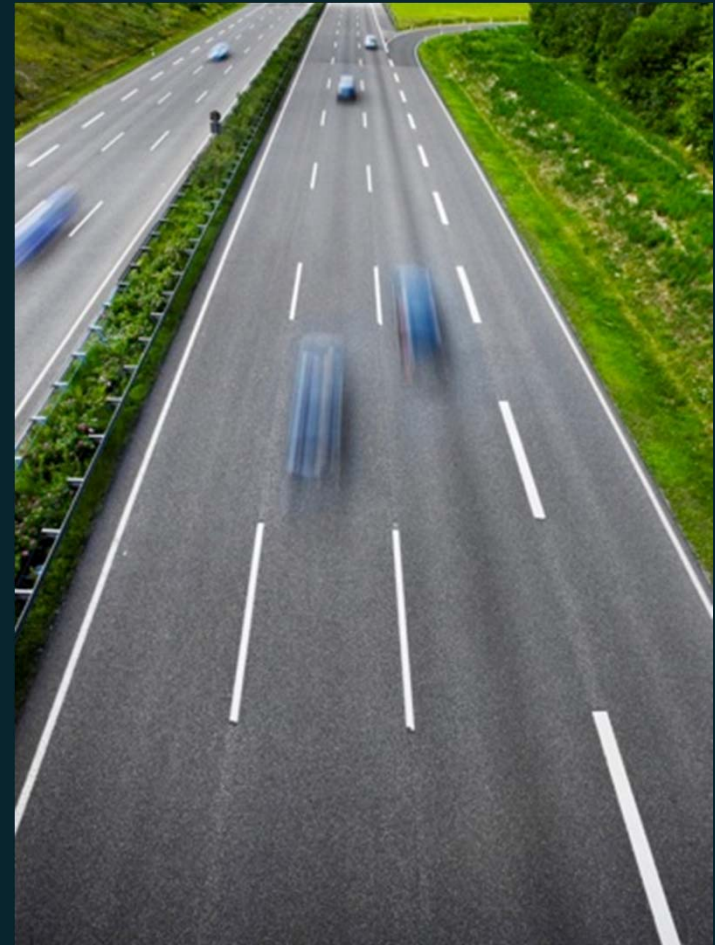


http://www.cisco.com/en/US/products/hw/switches/ps708/prod_eol_notices_list.html

# Catalyst Supervisor Lifecycle Beyond 2020+

## Unprecedented Switching Lifecycle

Supervisor 2T FCS June 2011

**Sup 2T—Next Generation Supervisor**

**Sup720-10G (VSS Enabled)**

**Sup32**

**Sup720-3B**

| | |
|---|---|
| EOS | End of Sale |
| EOL | End of Life<br>End of Support |

**Sup720-3A** — EOS — Maintain Support — EOL — 12 years

**Sup2** — EOS — Maintain Support — EOL — 12 years

**Sup 1A** — EOS — Maintain Support — EOL — 12 years

2000     2005     2010     2015     2020+

# Key Takeaways

Cat 6500 "2T" complete platform refresh focused on Services and Borderless

Unparalleled features set and scalability for Borderless (200+ NEW features @ FCS with 200+ in pipeline)

Uncompromised performance with built-in Distributed Forwarding on ALL NEW line cards (up 720 Mpps)

All of this, packaged and priced to beat HP and Juniper NO EXCUSE TO LOSE

6500 platform to deliver next generation integrated services FW, ACE, WiSM, Virtual Services Engine

Unmatched footprint and largest customer base driving roadmap and platform lifecycle beyond 2020

Thank you.