Cisco 8000 Routers

Anupam Barua
Product Manager, Mass Scale Infrastructure Group
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Agenda

1 Introduction

2 Cisco 8000 Series Router

3 HW and SW Roadmaps

4 Positioning and Value Propositions

5 Licensing and CX offering
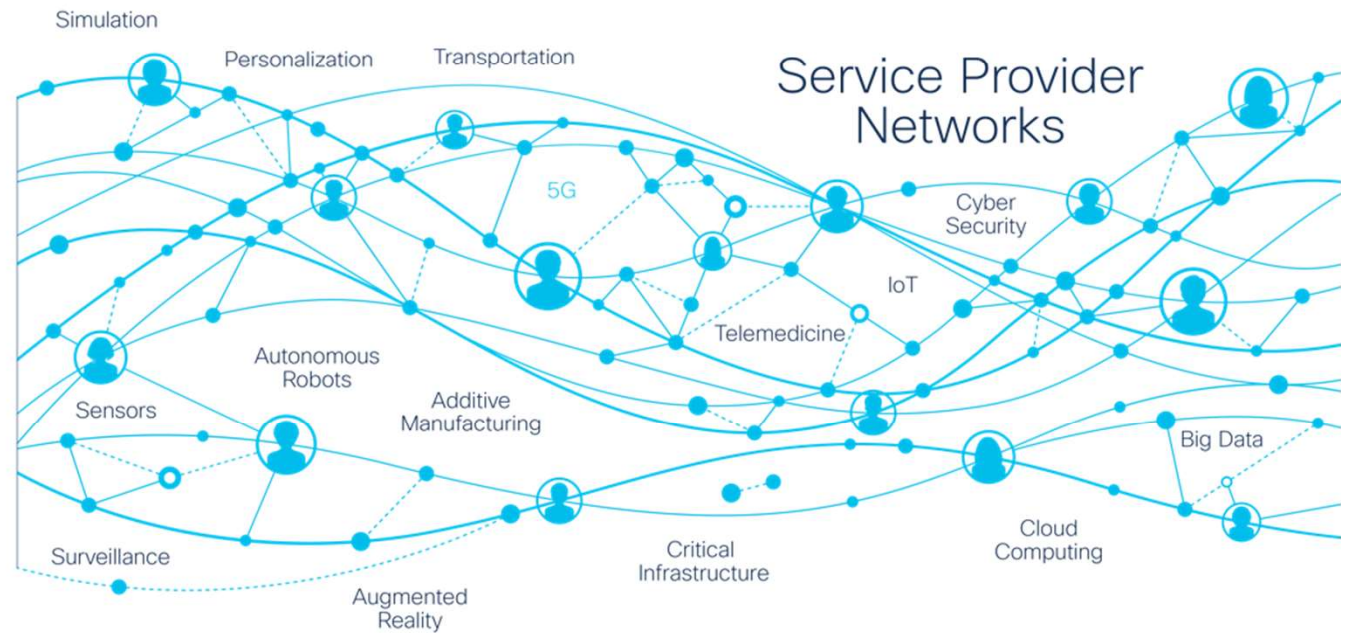
The Future of the Internet

New Normals

For the way we Work, Live, Play, and Learn

New Participants

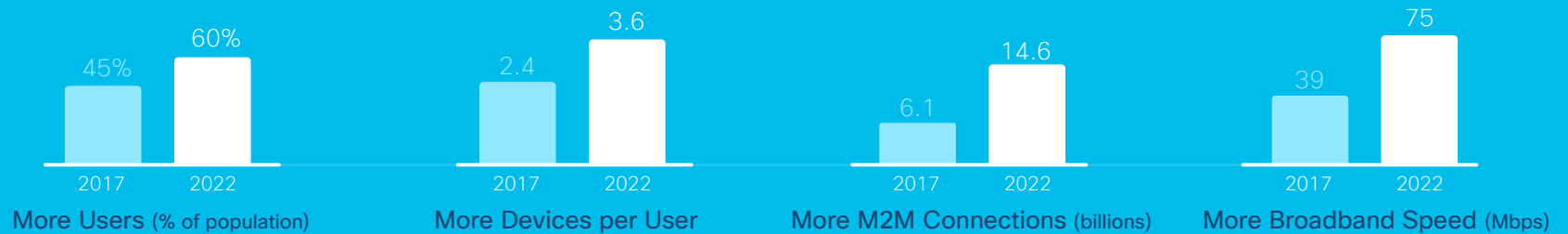Many remain unconnected and emerging IoT

New Potentials

The foundation of economies, governments, and societies

Market Dynamics

Explosive Internet Growth
2018 Cisco VNI

More Users (% of population)
- 2017: 45%
- 2022: 60%

More Devices per User
- 2017: 2.4
- 2022: 3.6

More M2M Connections (billions)
- 2017: 6.1
- 2022: 14.6

More Broadband Speed (Mbps)
- 2017: 39
- 2022: 75

Economic Challenges for SPs
IHS Markit Report

0.5%
Flat Revenue Growth
(2017 – 2022 CAGR: 0.5%)

11x
$1 of CapEx in 2020 has to do 11X the work it did in 2012

5x
Today, operators spend $5 of OpEx for each $1 of CapEx

SPs Want More for Less

Reduce Costs (CapEx, OpEx) and Latency. Increase Capacity.

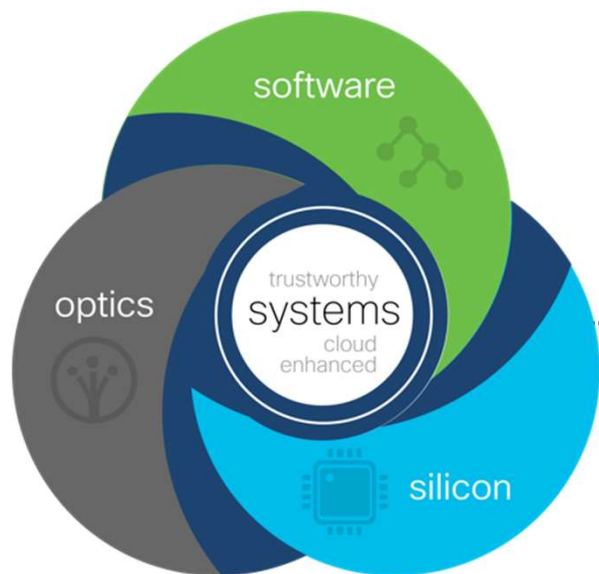Create New Revenue. Improve Experiences and Time to Service

Increase Trust and Security

HOWEVER, BUDGETS REMAIN FLAT

Redefining the Economics of the Internet

Innovation across multiple dimensions
can shift the paradigm.

New Possible Network Architectures

Converged

Cloud Enhanced

Fabric Based

Delivering Unprecedented

Cost & Power Efficiency

Prioritized Operations

Augmented Intelligence

Cisco Silicon ONE

One architecture. Unmatched capabilities
Unmatched programmability, performance, flexibility, and efficiency

Higher bandwidth
More network bandwidth than other routing silicon

Better Performance
More packets per second than other networking silicon

Lower Power
Routing features, scale, and performance at better than switching power efficiency

Larger Scale
Ready for massive internet scale

Endlessly programmable
Fully programmable for faster feature delivery and future-ready deployments

Deeper buffers
Switching devices with fully shared on-die buffers and routing devices with seamless extension to large buffers

Cisco Silicon One Family

Cisco Silicon ONE
Flexible Forwarding ASIC

One unified silicon architecture

- Comprehensive routing with switching efficiency
- Multiple segments: web and service provider
- Multiple functions: system-on-a-chip, line card, and fabric
- Multiple form-factors: fixed or modular

Delivers performance without compromise

- First routing silicon to break 10Tbps barrier
- 2x bandwidth, 3x packets-per-second over current industry routing silicon
- 2x more power efficient
- Global route scale, deep buffering, P4 programmable

Cisco Silicon ONE Q200
Industry Leading
12.8T Router on a Chip

Cisco 8000 Routers

Cisco 8800 Modular Routers

Service Provider scale and flexibility with Cisco Silicon ONE ASIC

Industry's only platform optimized for 100G & 400G without compromising for High Availability
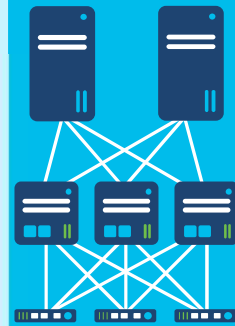
NEW

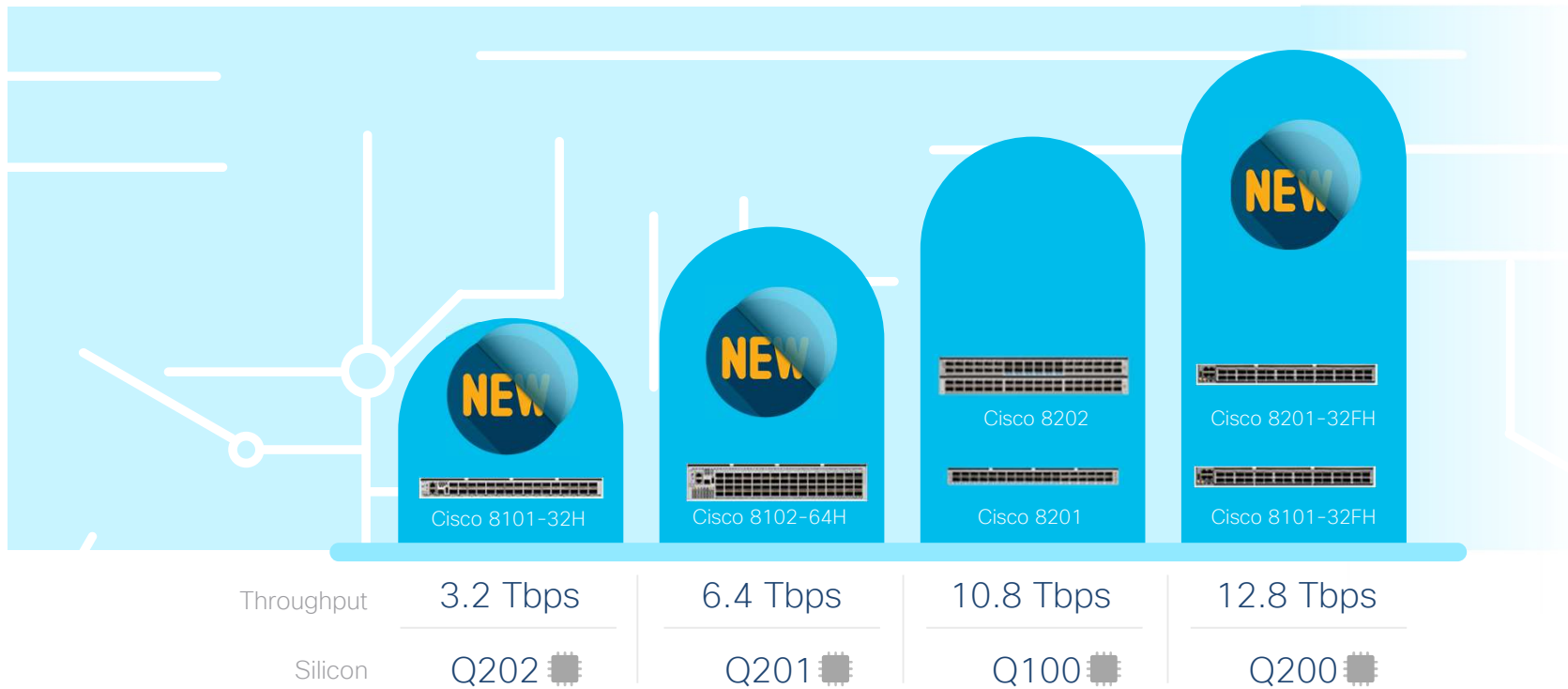| Cisco 8804	Cisco 8808	Cisco 8812	Cisco 8818	
57.6 Tbps	115 Tbps	172 Tbps	260 Tbps	2 Pbps

Cisco 8100 & 8200 Fixed Routers

Service Provider scale and flexibility with Cisco Silicon ONE ASIC

	NEW	NEW	Cisco 8202	NEW
				Cisco 8201-32FH
	Cisco 8101-32H	Cisco 8102-64H	Cisco 8201	Cisco 8101-32FH
Throughput	3.2 Tbps	6.4 Tbps	10.8 Tbps	12.8 Tbps
Silicon	Q202	Q201	Q100	Q200

Cisco 8800 Modular Routers
Portfolio

NEW

	8804	8808	8812	8818
FCS	Q2 2021	Shipping	Shipping	Shipping
Rack Units	10 RU	16 RU	21 RU	33 RU
Slots	4	8	12	18
Ports & Line Cards	48x100GE w/ MACSec 36x400GE w/ Q100	36x400GE w/ MACSec 36x400GE w/ Q200	34x100GE & 14x400GE	
Total Throughput	57.6 Tbps	115 Tbps	172 Tbps	259.2 Tbps
Typical Power	4.2 KW	9.3 KW	16.3 KW	22 KW

Cisco 8100 and 8200 Fixed Routers
Portfolio

	8101-32H	8102-64H	8201	8202	8101-32FH	8201-32FH
FCS	Q1 2021	Q1 2021	Shipping	Shipping	Q2 2021	Q1 2021
Rack Units	1 RU	2 RU	1 RU	2 RU	1 RU	1 RU
Ports	32 QSFP28 100 GbE	64 QSFP28 100 GbE	24 QSFP56-DD 400 GbE 12 QSFP28 100 GbE	12 QSFP56-DD 400 GbE 60 QSFP28 100 GbE	32 QSFP56-DD 400 GbE	
Total Throughput	3.2 Tbps	6.4 Tbps	10.8 Tbps		12.8 Tbps	
Memory	No HBM		HBM		No HBM	HBM
Typical Power	172 W	256 W	415 W	750 W	288 W	

8100 Series
Fixed Model: 8101-32H and 8101-64H

8101-32H
32x QSFP56-DD

8102-64H
64x QSFP28

- System on a Chip (SoC) mode

  3.2 and 6.4 Tbps allocated to network ports

  No HBM on Q202

- Simple and efficient cooling with a single ASIC design

- Combination of QSFP28 to utilize full bandwidth

- Fixed models maintain 32 ports per RU

- Bi-directional airflow

8101-32H
1RU 32x 100GE

⚙ Management Interfaces

Front

32x 100GE ports

⚡ 5.4 Watts per 100GbE

2x 650W AC or
2x 930W DC
power supplies

5 Fans

Back

8102-64H
2RU 64x 100GE

⚙ Management Interfaces

Front

64x 100GE ports

4 Watts per 100GbE

2x 650W AC or
2x 930W DC
power supplies

3 Fans

Back

8100 Series
Fixed Models: 8101-32FH

8101-32FH
32x QSFP56-DD

- System on a Chip (SoC) mode

  12.8 Tbps allocated to network ports
  No HBM on Q200

- Simple and efficient cooling with a single ASIC design

- Combination of QSFP56-DD to utilize full bandwidth

- Fixed models maintain 32 ports per RU

- Front-to-back airflow
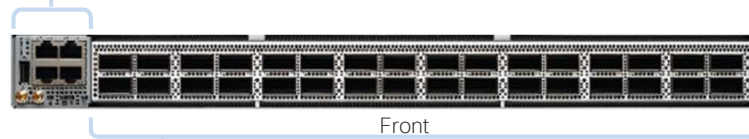
8200 Series
Fixed Models: 8201-32FH

8201-32FH
32x QSFP56-DD

- System on a Chip (SoC) mode

   12.8 Tbps allocated to network ports

   HBM on Q200

- Simple and efficient cooling with a single ASIC design

- Combination of QSFP56-DD to utilize full bandwidth

- Fixed models maintain 32 ports per RU

- Front-to-back airflow

8201-32FH
1RU 32x 400GE
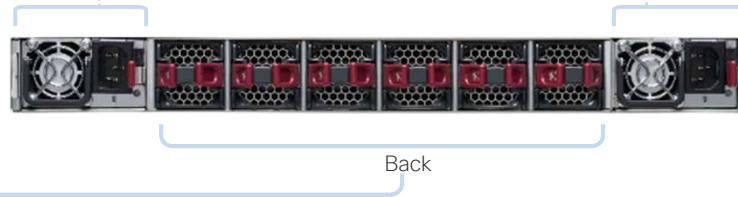
Management Interfaces

Front

32x 400GE ports

2.25 Watts per 100GbE

2x 1450W/2000W power supplies

6 Fans

Back

8201
1RU 24x 400GE + 12x 100GE

Air intake for ASICs at top (slanted intake, ok to stack chassis)

Air intake between ports (vertical & horizontal)

Front

24x 400GE ports

12x 100GE ports

4 Watts per 100GbE

2x 1450W/2000W power supplies

5 Fans

Management Interfaces

Back
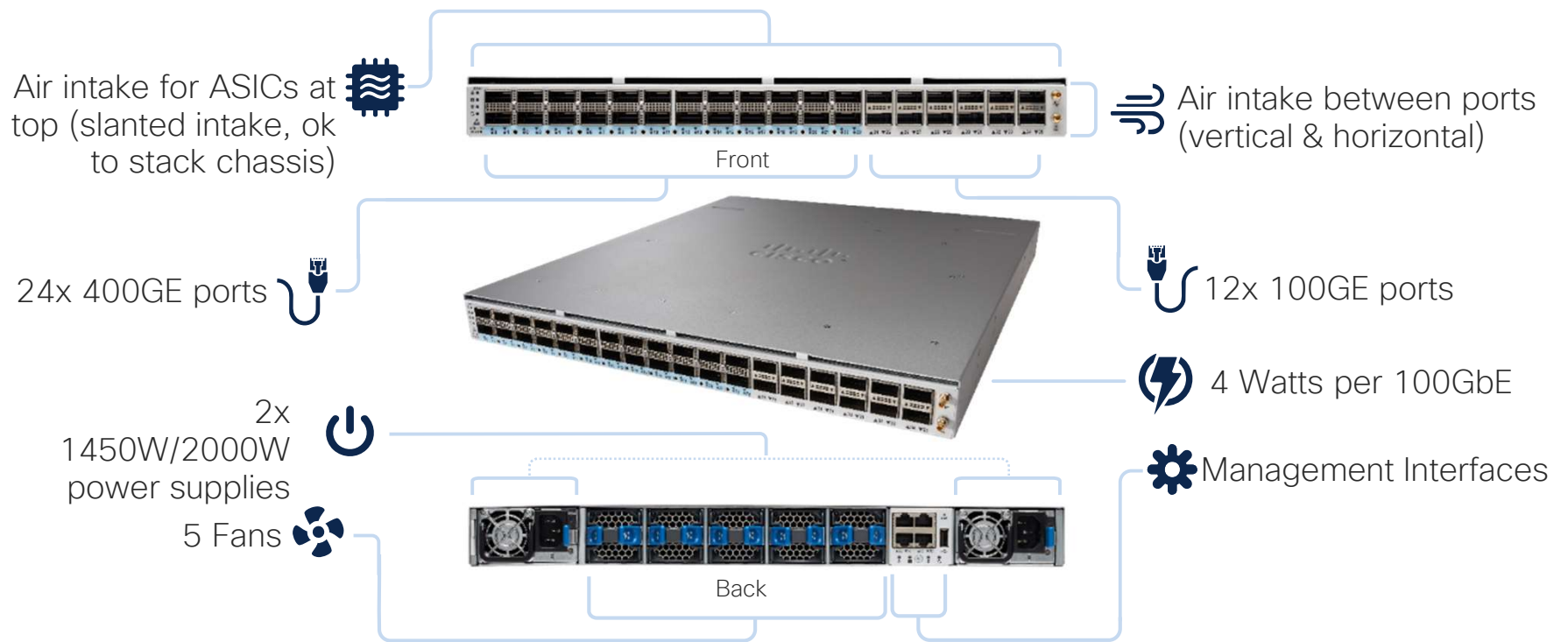
8202
2RU 12x 400GE + 60x 100GE

12x 400GE ports

Front

60x 100GE ports

*QSFP28 ports must shutdown adjacent port when used for breakout

7 Watts per 100GbE

2x 2000W power supplies

Management Interfaces

3 Fans

Back
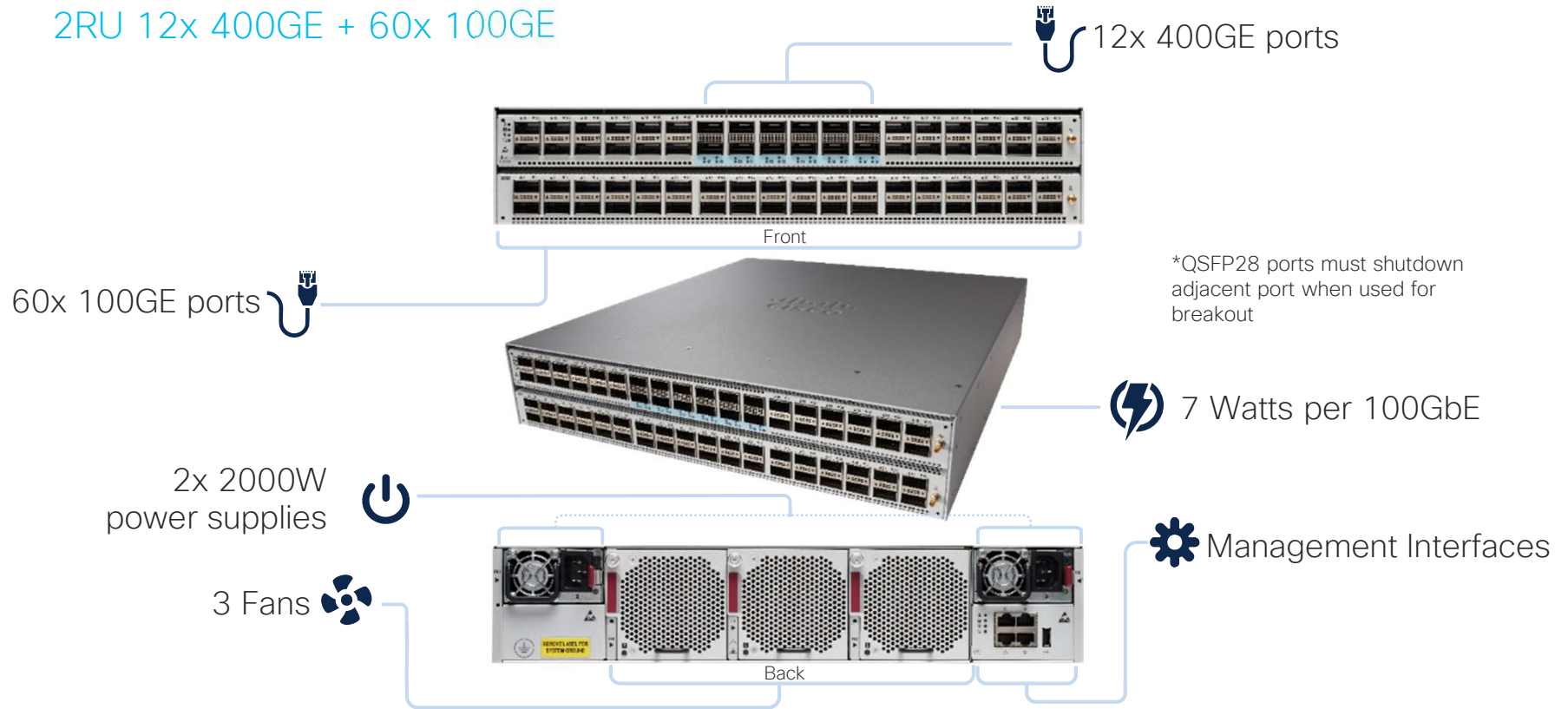
8800 Modular Systems
8804, 8808, 8812, and 8818

Up to 8 Fabric cards

7.5 Watts per 100 GbE

Direct connections of LC to Fabric

Orthogonal design

Optimal front-to-back airflow for ASIC and optics cooling
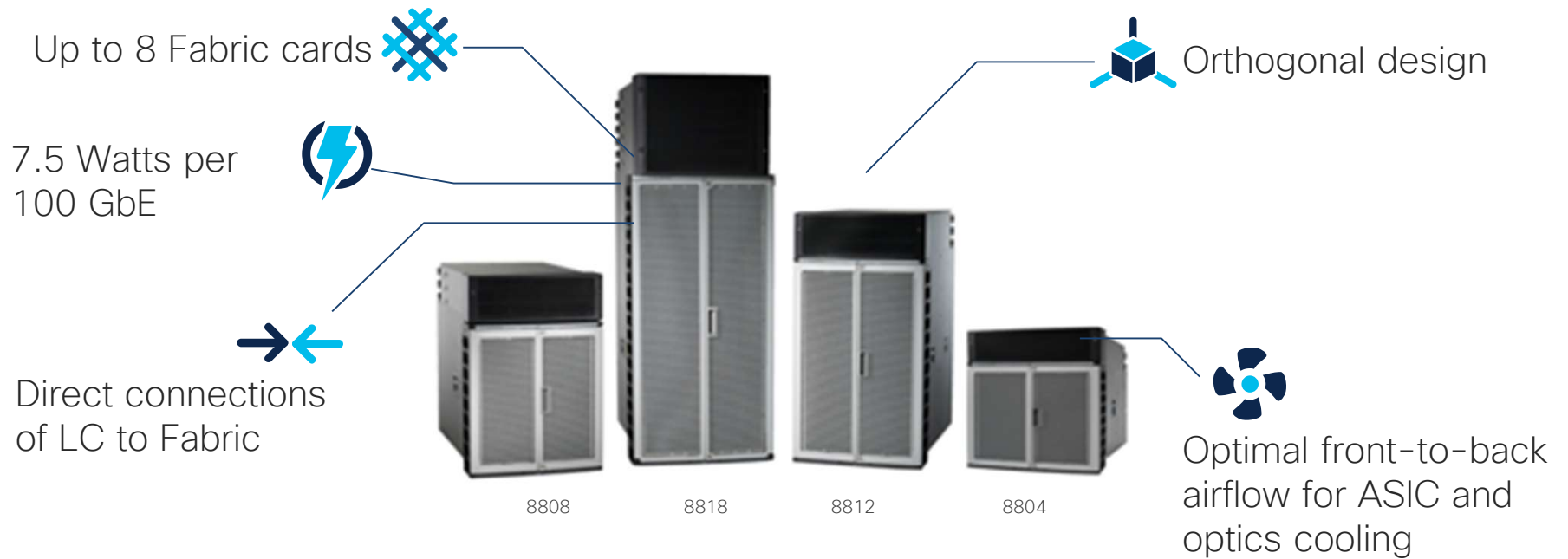
8808   8818   8812   8804

8800 Modular Systems
Common components for 8804, 8808, 8812, and 8818

Line Cards

36x 400GbE QSFP56-DD(Q100)

36x 400GbE QSFP56-DD MACsec(Q200)

36x 400GbE QSFP56-DD(Q200)

34x 100GbE + 14x 400GbE(Q200)

48x 100GbE QSFP28 MACsec(Q100)

Power supplies

- 60A 48V DC (4.2kW)
- 100A 48V DC (6.3 kW)
- AC & High Voltage DC (6.3 kW)

Route Processors (x2)

- 4-core Broadwell
- 32 GB

Small midplane for EOBC
(10G from RP to each LC)

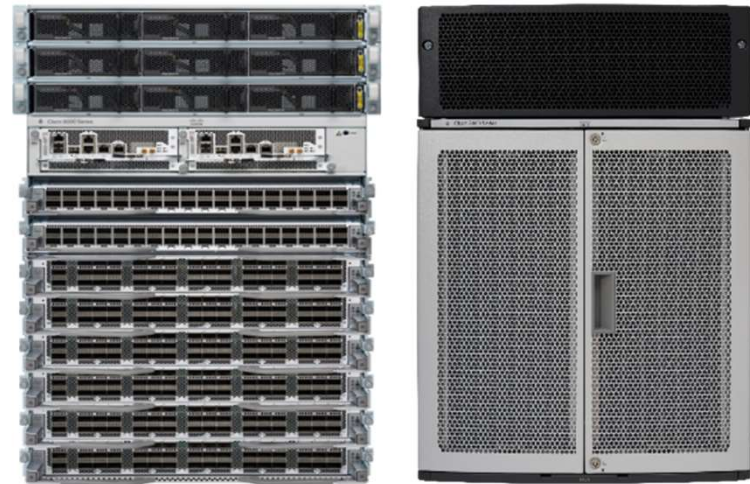8804   8808   8812   8818

8804

- 57.6 Tbps in 10 RU
- 4 fan trays
- 2 Power Shelves (9 AC or 12 48V DC supplies)
- 4 Linecard slots
- Port density
  - 144 400GE ports
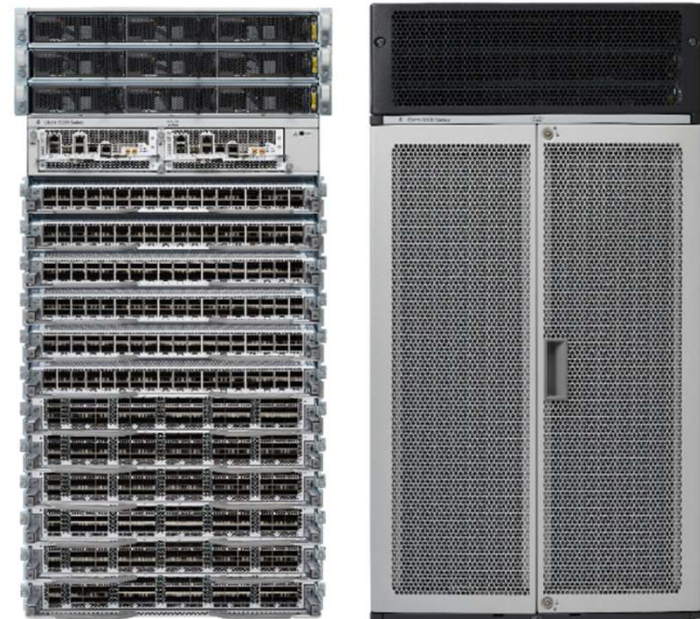 - 576 100GE breakout ports
  - 192 QSFP28 ports

8808

- 115.2 Tbps in 16 RU
- 4 fan trays
- 3 Power Shelves (9 AC or 12 48V DC supplies)
- 8 Linecard slots
- Port density
  288 400GE ports
  1152 100GE breakout ports
  384 QSFP28 ports

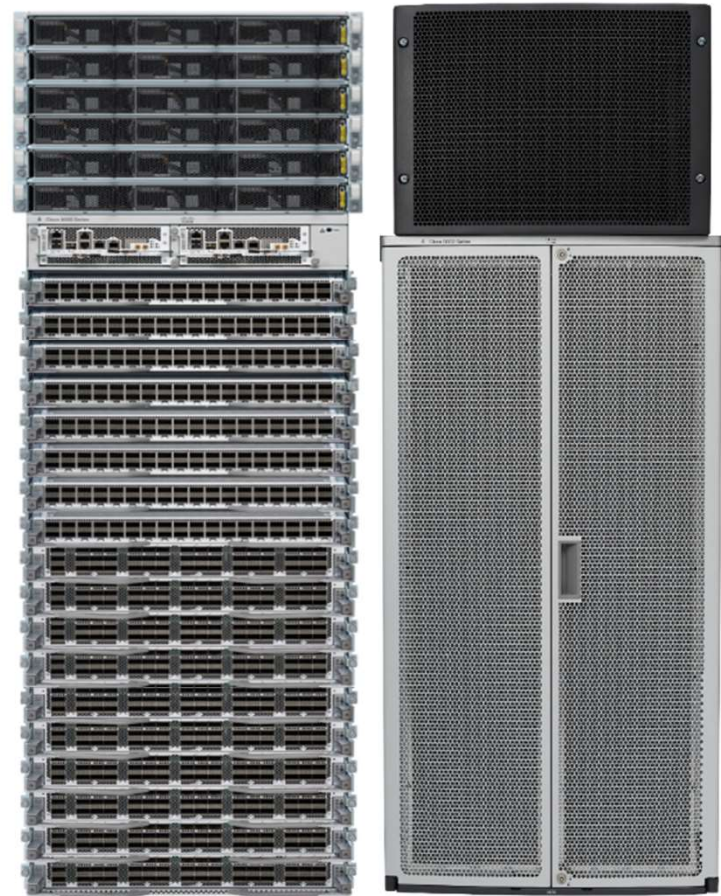# 8812

- 172.8 Tbps in 21 RU (1/2 rack)
- 4 fan trays
- 3 Power Shelves (9 AC or 12 48V DC supplies)
- 12 Linecard slots
- Port density
  432 400GE ports
  1728 100GE breakout ports
  576 QSFP28 ports

8818

- 259.2 Tbps in 33 RU
- 4 fan trays
- 6 Power Shelves (9 AC or 12 48V DC supplies)
- 18 Linecard slots
- Port density
  648 400GE ports
  2592 100GE breakout ports
  864 QSFP28 ports

8800 Modular Systems
Switch Fabric

- Orthogonal direct-connect removes the need for a mid- and/or back- plane.

- Up to 8 Fabric Cards between linecards and fan trays
  - 48x 100GbE linecard requires 5 fabric cards for N+1 redundancy
  - 36x 400GbE linecard requires 8 Fabric Cards for N+1 redundancy

- Cisco Silicon ONE Q100 or Q200 ASIC in fabric mode

- Fabric cards are specific to each chassis and install vertically behind linecards

8800 Series
Linecards: Q200 base

	36x QSFP56-DD 400GE MACsec (88-LC0-36FH-M)	36x QSFP56-DD 400GE (88-LC0-36FH)	34x100GbE+14x400GbE (88-LC0-34H14FH)
Software requirements	IOS XR	IOS XR	IOS XR
Interfaces	• 36 QSFP56-DD ports • Up to144 ports of 100 GbE via breakout • Supports QSFP+, QSFP28, and QSFP28-DD modules.		• 34 QSFP28 + 14 QSFP56-DD ports • Up to 90 ports of 100 GbE via breakout & native • Supports QSFP+, QSFP28, and QSFP28-DD modules.
Processor	4-core 2.4 GHz Intel Broadwell DE-NS CPU		
NPU	3 NPUs @ 4.8 Tbps line bandwidth		2 NPUs @ 4.5 Tbps line bandwidth
Memory	8GB per NPU or 24GB per LC High Bandwidth Memory (HBM)		8GB per NPU or 16GB per LC HBM
Chassis compatibility	8804, 8808, 8812, 8818		
MACsec	Yes	No	Yes(16ports 100GE only)
ASIC	Cisco Silicon One Q200 forwarding ASICs		

8800 Innovations – Summary

Cisco Silicon One
Fully integrated for high bandwidth
Run-to-completion
12.8T in 7nm
Individual SerDes shutdowns
Configurable power/perf

Large integrated router
Fewer optical interconnects
4/8/12/18 slots to right-size

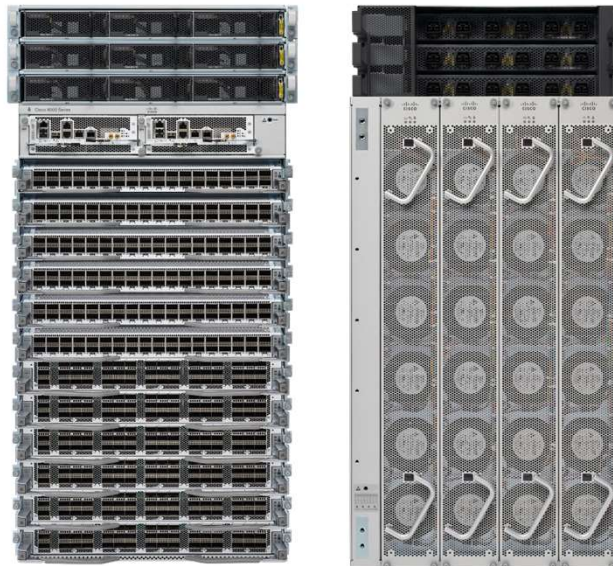## Power Delivery
New PSUs – improved redundancy
High max power capacity
Enhanced internal distribution

Optics
QSFP56-DD "3rd gen form factor"
ZR+ offers network-level savings

Cooling
Orthogonal design
Large fans, 4 trays
Advanced sw control
Increased LC pitch

Fabric
Efficient, fully scheduled

Line Cards
Thermal design
2nd gen 14.4T – 40% lower power

Cisco 8000 Routers
Securing critical infrastructure

Trust begins in hardware
Anti-counterfeit and trust anchor infrastructure

Verifying trust: Network OS
Image signing and secure boot infrastructure

Maintaining trust at runtime
Run-time defense, encrypted transport, DDoS protection

Visualize and report on trust
Integrity measurement and verification infrastructure.
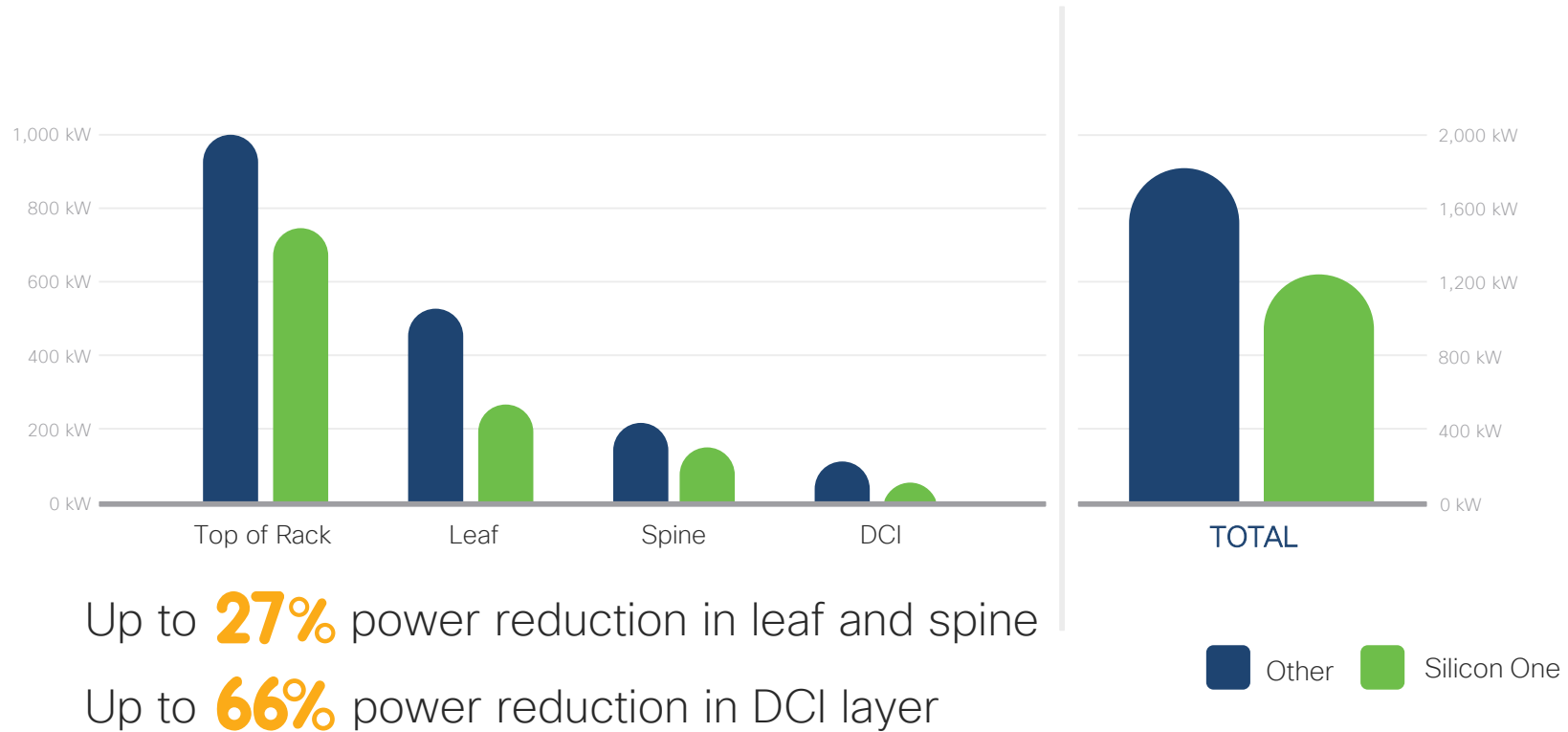
8+ years of CSDL devotion
30+ years of leadership

CISCO SDL

Protect your brand | Unlock new revenue | Reduce cost
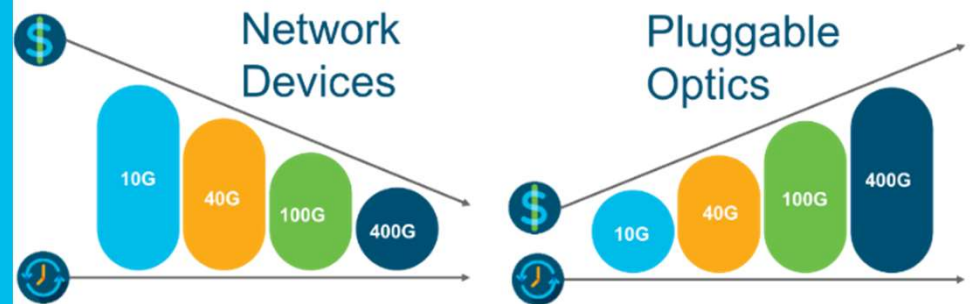
Cisco 8000 and TCO Savings

CAPEX

OPEX

Cisco 8000 optimized for cost savings

Up to **27%** power reduction in leaf and spine

Up to **66%** power reduction in DCI layer

Cisco 8000 the catalyst for Routed Optical Network

Network Devices

Pluggable Optics

10G 40G 100G 400G

10G 40G 100G 400G

Shifts in Economics and Technologies
Optics and Routing

Routing Scale Evolution

Traffic Demand
NPU Capacity

Time

Optical Systems Evolution

Shift in Economics

Total Cost (%BoM)

10G   100G   400G

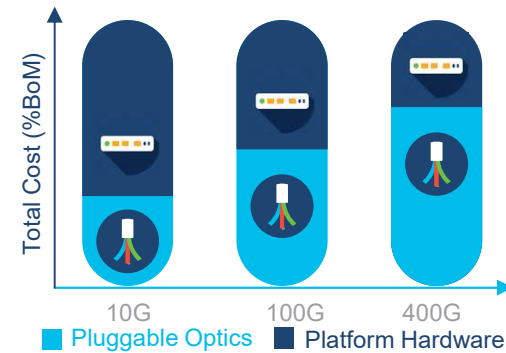■ Pluggable Optics   ■ Platform Hardware

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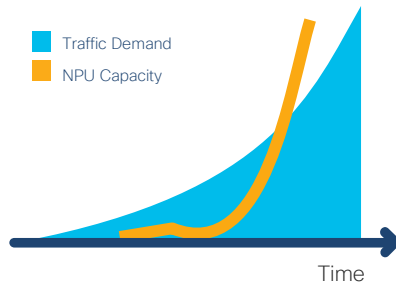
Router capacity outpaces projected traffic demand
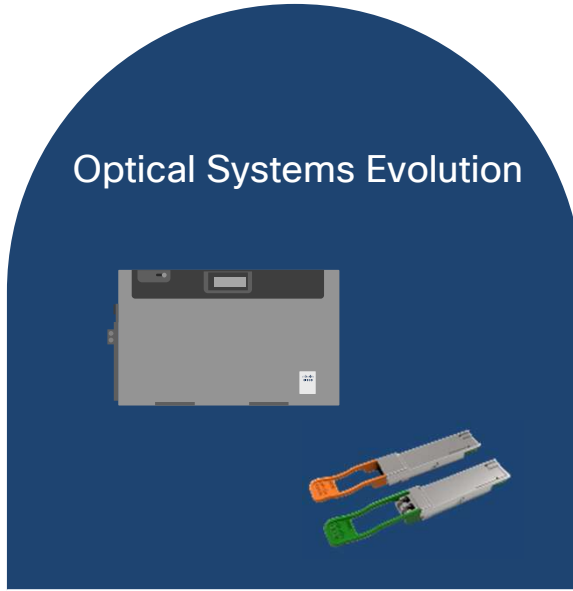
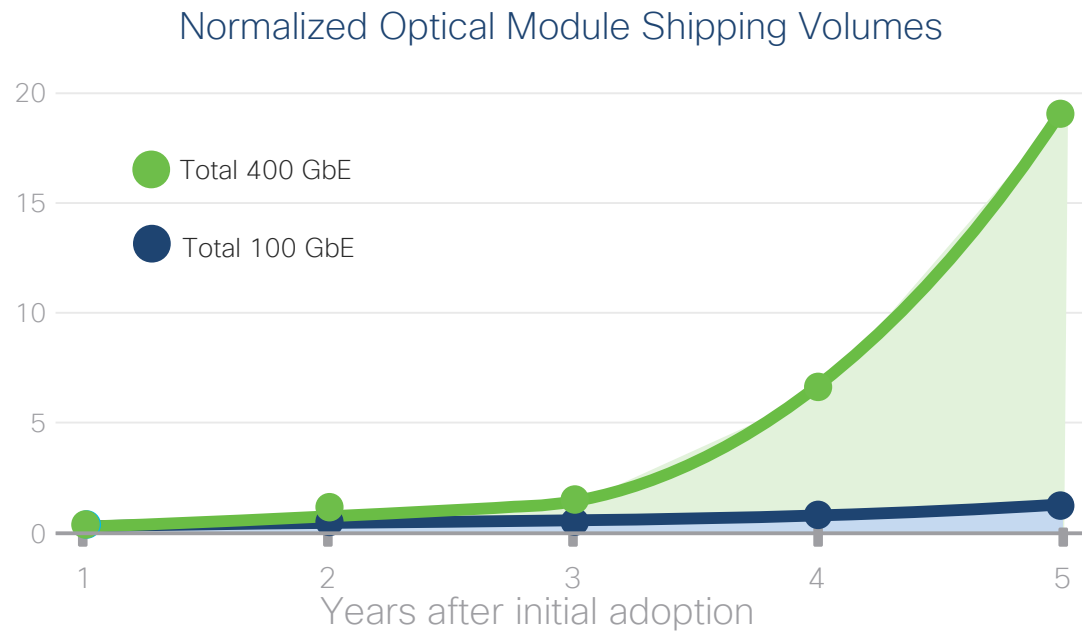Chassis begin to be replaced by pluggable optics for short to medium distance applications

Optics cost becomes greater than router port cost

Cisco 8000 Series
400GE adoption

Normalized Optical Module Shipping Volumes

● Total 400 GbE

● Total 100 GbE

Years after initial adoption

400GbE will grow at **20x** the rate of 100GbE

Source: LightCounting

Challenges of the Layered Network

Better integration between IP+Optical is needed to improve efficiency and reduce complexity
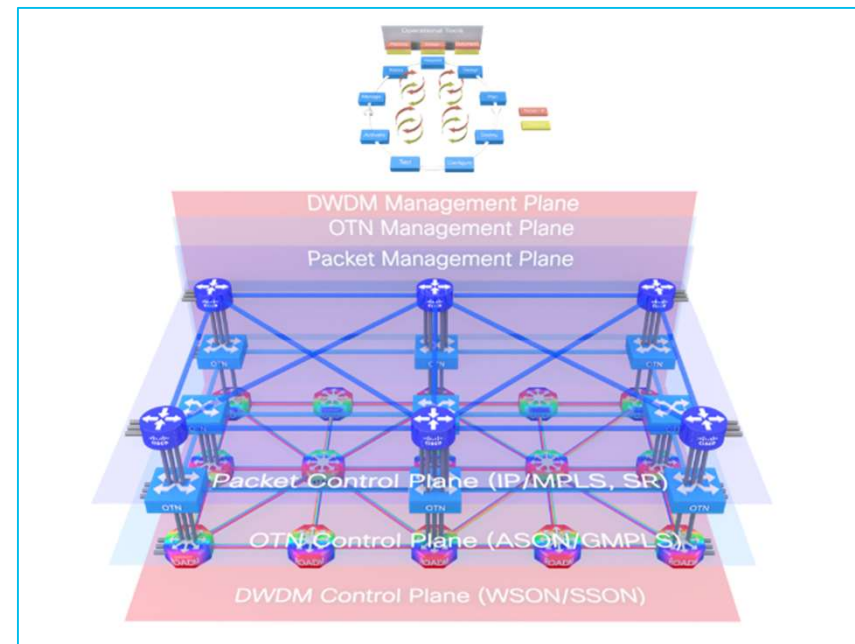
Each layer treated individually

- Multiple control planes – IP/MPLS, GMPLS, WSON/SSON

IP can be as dynamic as is the transport layer

- Adjustable Data Rate, Modulation, Baud Rate, Spectrum, etc.

Operational lifecycle is complex

- Optical / OTN switching adds complexity

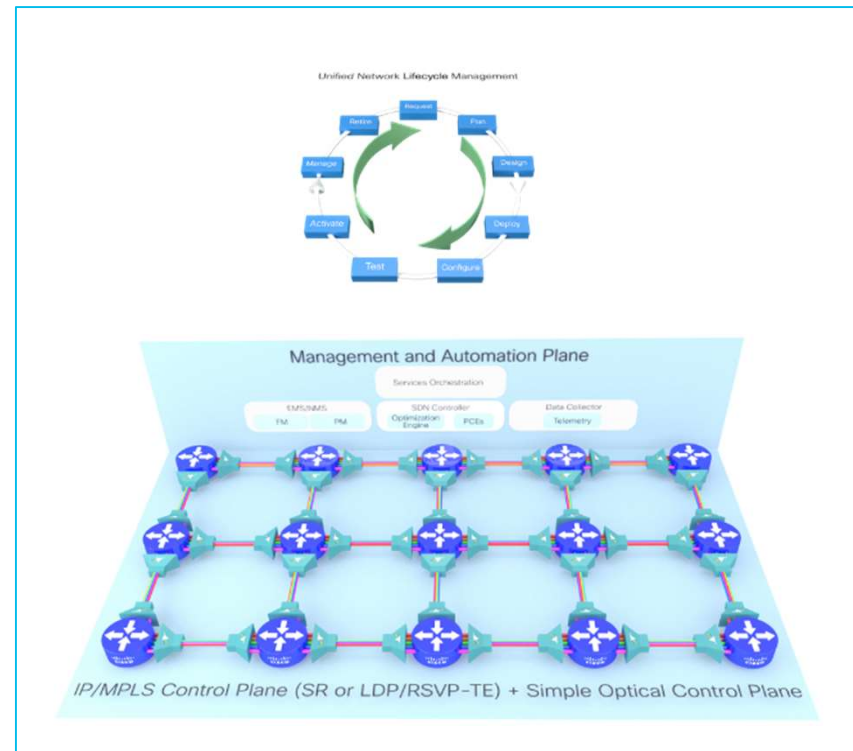# Advantages of a Simplified Network Architecture

Focus on services

- De-layered architecture
- Simple point-to-point DWDM

Hop-to-hop optical network

- Reduces the optical distance – maximizes bandwidth/distance
- Zero port density trade off on routers via QSFP-DD
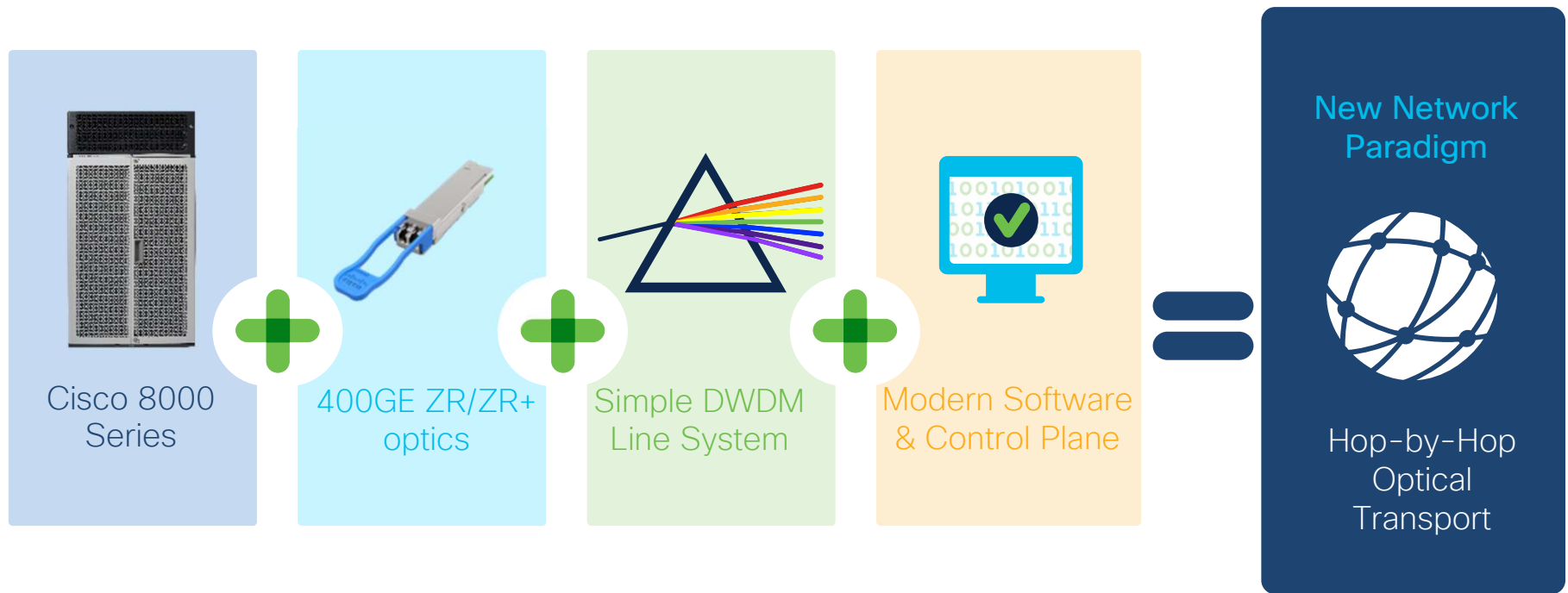- 400Gig ZR/ZR+ DCO pluggables

Simplified network lifecycle

- Planning, Design, Activation, Management, Troubleshooting, Restoration, etc.

Routed Optical Networking putting it all together

Estimated total TCO savings of 45%

Cisco 8000 Series **+** 400GE ZR/ZR+ optics **+** Simple DWDM Line System **+** Modern Software & Control Plane **=** New Network Paradigm — Hop-by-Hop Optical Transport

Software **IOS XR**

Cisco IOS XR 7

Redefining software for better operations

Simple

- Optimized to reduce memory, downloads, and boot times
- Streamlined protocols with SR/EVPN
- Secure zero-touch rollout

Modern

- Open APIs
- Customizable software images
- Cloud-enhanced

Trustworthy

- Assess hardware and software authenticity at boot and runtime
- Immutable record of all software and hardware changes
- Real-time visibility of trust posture

50% Less
Memory Footprint

50% Faster
Boot Times

40% Smaller
Image Sizes

40% Faster
Download

Cisco IOS XR 7
Cloud enhanced

Cisco Crosswork Data Gateway (inside SP Network)

Network Services Orchestrator
Optimization Engine
Situation Manager
Health Insights
and more...

0110
110010
0110

IOS XR 7

Cisco Crosswork Cloud

Cisco Crosswork Network Insights

Visibility and intelligence to assess network routing health.

Cisco Crosswork Trust Insights

High-fidelity measurement, auditing, verification, and enforcement of network hardware and software trustworthiness.

new!

Cisco Crosswork Qualification Environment

Automated and cloud-based environment to accelerate new software deployment.

IOS XR Software release 7.0.XX

IOS XR
7.0.11

- 8000 8 & 12-slot modular
- 36x400GE line card
- 48x100GE line card
- 8201 fixed
- L3 Routing (BGP & IGP)
- BGP PIC (core)
- 100G MACSec SW
- IPinIP decap
- Multicast (SSM
- Health Checks
- QDD-400G-FR4-S
- ECMP
- QoS
- ACLs
- Netflow
- ERSPAN
- ECN
- PFC
- UDF
- Platform security
- Netconf/YANG
- ZTP & iPXIE

IOS XR
7.0.12

- Segment Routing (LSR)
- FAT PW Label (LSR)
- MPLS (ASM)
- RSVP-TE (Midpoint)
- Dark bandwidth
- Entropy Label (LSR)
- RSVP-TE (Headend)
- Dark bandwidth
- IPv4 ERSPAN and IPinIP
- MPLS
- BGP-LU
- 6PE
- mLDP
- P2MP (LSR)
- MoFRR
- BGP FS
  - NLRI types 1-6,11

IOS XR
7.0.14

- 8000 18 Slot modular support
- 128-way ECMP Route Scale
  - 128K v4 and 128K v6
- Radius over IPv6
- Health Check – phase 2
- Show MPLS forward counters
- ERSPAN
  - Tunnel IP
  - Configure IP DSCP
  - GRE header sequence

October CY19

March CY20

August CY20

IOS XR Software release 7.2.XX

IOS XR
7.2.1

- Match DSCP [ipv4/ipv6] for fixed system
- 64K mcast routes
- Forwarding LAG L3 Unicast – Mixed Bundle

August CY20

IOS XR
7.2.12

- L2 Support (including QoS)
- sFlow
- IRB
- DHCP Relay
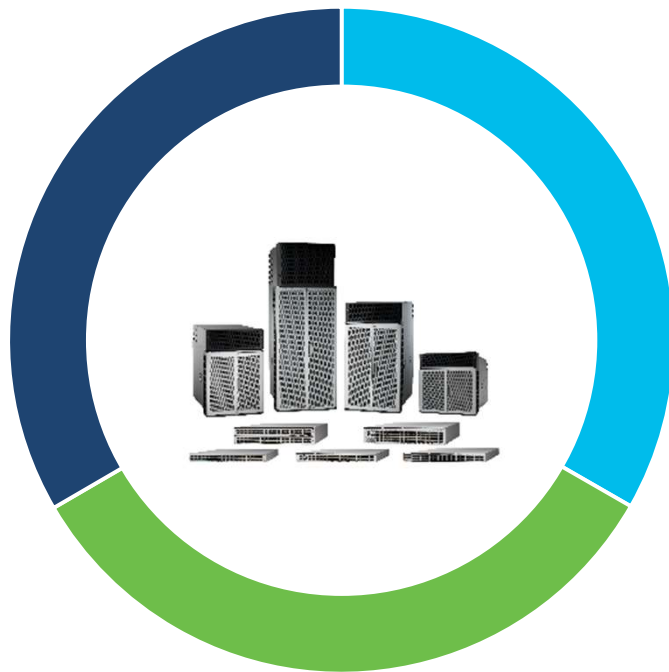- IPv4/6 ACK Permit match display counters

Sept. CY20

Open Software on Cisco 8000

SONiC on Cisco 8000

SONiC Silicon One
- One Silicon, One Software, Multiple Use cases
- Cisco 8000 series for end-to-end positioning
- 400G DC Fabrics, DCI, Peering, Core & more
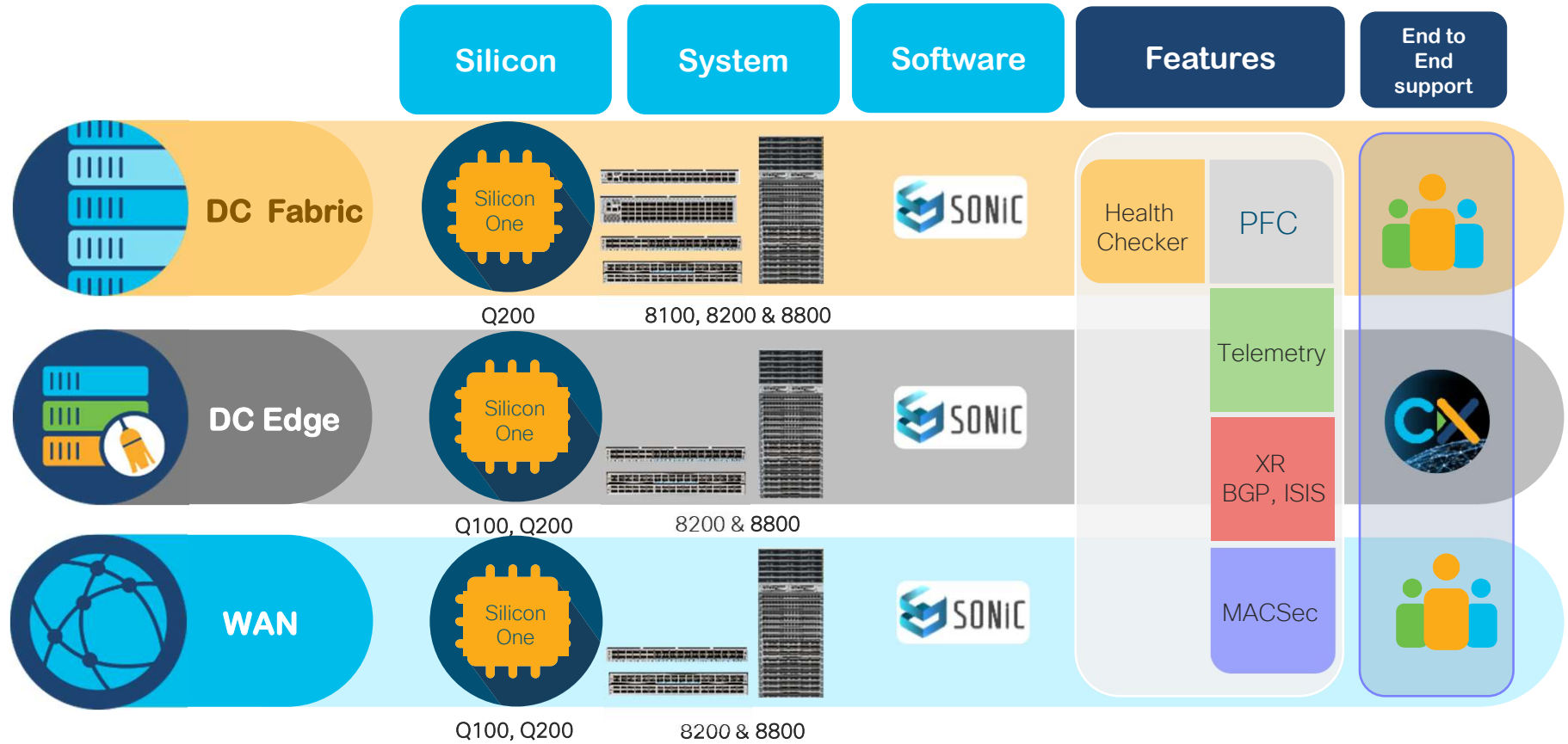
SONiC Ecosystem
- XR stack to complement SONiC
- Value added open-source ecosystem
- Full stack support model

SONiC Availability
- Limited Availability on 8201
- 8101-32H: Q1 CY2021
- 8102-64H: Q1 CY2021
- 8201-32FH (HBM): Q1 CY2021
- 8808: Q1 CY2021
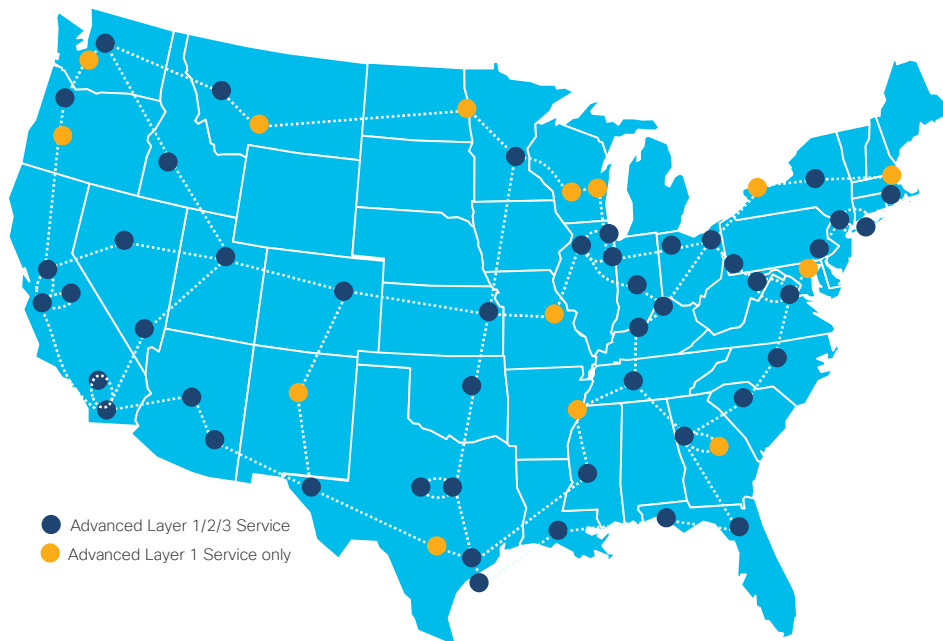
One Silicon, One Software - Multiple Use Cases

	Silicon	System	Software	Features	End to End support
DC Fabric	Silicon One		SONIC	Health Checker / PFC	
	Q200	8100, 8200 & 8800			
DC Edge	Silicon One		SONIC	Telemetry / XR BGP, ISIS	CX
	Q100, Q200	8200 & 8800			
WAN	Silicon One		SONIC	MACSec	
	Q100, Q200	8200 & 8800			

Cisco 8000

Customer Engagements

- 9 wins with major SP customers: all placed orders
    - Large Tier 1 SP already deployed Cisco 8812 with live traffic in one of the large PoP's in EMEA
- Over 60 active customer engagements. Examples:
    - America: Three MSDC Cloud customers
    - America: Two large Cable customers & five large Telco customers
    - EMEA: Three large SP's
    - APJC: Six large SP's
- Two major live traffic deployments and 9 ongoing pilots

Cisco 8000 Series customer engagement:
i2 Next Generation Infrastructure (NGI) Program

INTERNET**2**®

400G 400G Internet2 Network

30.4 TB/s of optical capacity with 15,700 miles of dark fiber capacity

7+ Petabytes of network traffic per day

320+ universities scientific & research fsacilities, data assets and HPC resources connected
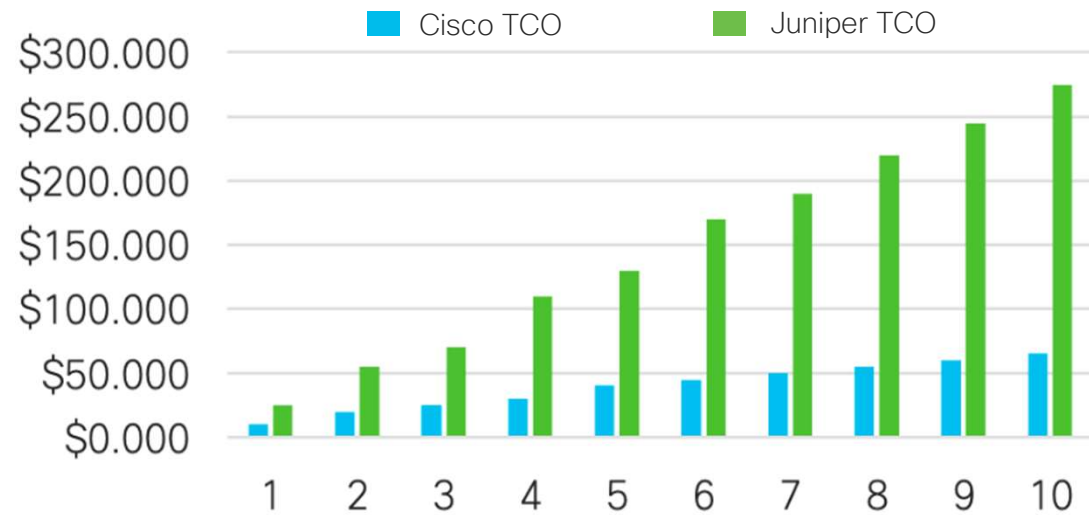
100 countries

65 partner networks

● Advanced Layer 1/2/3 Service
● Advanced Layer 1 Service only

i2 Proposed solution – cost savings

- 61x Cisco 8201 and 14x Cisco 8202 to upgrade the aging infrastructure
- $94 OPEX savings per 100G/ year compared to the alternative

Colocation TCO			
	8201	MX10003	
Capex	$0	$0	
Year	w/CAPEX	w/CAPEX	Difference
1	$7,142	$27,382	$20,241
2	$14,283	$54,765	$40,482
3	$21,425	$82,147	$60,723
4	$28,566	$109,530	$80,964
5	$35,708	$136,912	$101,205
6	$42,849	$164,295	$121,446
7	$49,991	$191,677	$141,687
8	$57,132	$219,060,	$161,927
9	$64,274	$246,442	$182,168
10	$71,416	$273,825	$202,409

$94	OPEX savings per 100G per year

Cisco 8000 – Network Infrastructure Award Winner

https://f2ff.jp/award/winner/interop-2020/?lang=en

Cisco 8000 Routers

Grow revenue
Monetize new services

Simplify architecture
Scale & performance

Reduce costs
Programmable & automatable

Mitigate risks
Secure infrastructure

5G

Polling Questions

Cisco 8000 Series Roadmap

Modular Systems Shipping & Roadmap

FC8-2

48x 100GbE (MACsec)
8800-LC-48H

36 x 400GbE
8800-LC-36FH
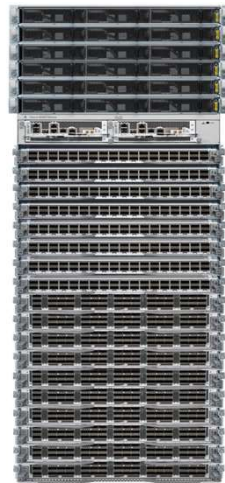
36x400GbE
88-LC0-36FH

FC18-2

36x400GbE (MACsec)
88-LC0-36FH-M

34x100GE+ 14x400GbE
88-LC0-34H14FH

8812	8808	8818		8804 w/ FC4-2	
In Production			Q2 CY2021 (7.3.15)	Q3 CY2021 (7.3.2)	Q3 CY2021 (7.3.3)

Fixed Systems Shipping & Roadmap

12x400GbE + 60x100GbE

8202

32 x 400GbE
with HBM*

8201-32FH

64 x 100GbE

8101-64H w/ XR

64 x 100GbE

8101-64H-O

24x400GbE + 12x100GbE

8201

32 x 100GbE

8101-32H-O

32 x 100GbE

8101-32H w/ XR

32 x 400GbE Mono

8101-32FH

32 x 400GbE
with HBM & MACsec

8201-32FH-M

10G/25G MPA
100G MPA
400G MPA
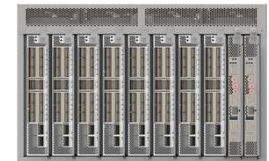
8608 Centralized

| In production | Q2 CY2021 | Q3 CY2021 | Q1 CY2022 | Q2 CY2022 |

8608 Centralized Overview

- Q200 based 12.8T Unified Centralized platform (7RU)

- Redundant Active/Standby RPs & Switch Cards
  (*CPU, NPU & LC Redundancy with no BW reduction*)

- Two variants of MPAs:
  - Redundant : MPAs which works in a single or dual SC system
  - Non-Redundant : Low cost 100G/400G MPAs work with 1xSC only

- 8 x MPAs :1.6T per slot
  - Combo:16x100G or 8x100G+2x400G (16 front panel ports)
  - 4x400G
  - 28x10/25/50G
  - PLE
  - Edge MPAs

- Max power (no optics): 1.6KW–3.2KW

Front View

8x MPA   2x RP

Rear View

2x Switch Cards (Behind Fans)

IOS XR Software release 7.0.XX

IOS XR
7.0.11

- 8000 8 & 12-slot modular
- 36x400GE line card
- 48x100GE line card
- 8201 fixed
- L3 Routing (BGP & IGP)
- BGP PIC (core)
- 100G MACSec SW
- IPinIP decap
- Multicast (SSM
- Health Checks
- QDD-400G-FR4-S
- ECMP
- QoS
- ACLs
- Netflow
- ERSPAN
- ECN
- PFC
- UDF
- Platform security
- Netconf/YANG
- ZTP & iPXIE

IOS XR
7.0.12

- Segment Routing (LSR)
- FAT PW Label (LSR)
- MPLS (ASM)
- RSVP-TE (Midpoint)
- Dark bandwidth
- Entropy Label (LSR)
- RSVP-TE (Headend)
- Dark bandwidth
- IPv4 ERSPAN and IPinIP
- MPLS
- BGP-LU
- 6PE
- mLDP
- P2MP (LSR)
- MoFRR
- BGP FS
  - NLRI types 1-6,11

IOS XR
7.0.14

- 8000 18 Slot modular support
- 128-way ECMP Route Scale
  - 128K v4 and 128K v6
- Radius over IPv6
- Health Check – phase 2
- Show MPLS forward counters
- ERSPAN
  - Tunnel IP
  - Configure IP DSCP
  - GRE header sequence

October CY19

March CY20

August CY20

IOS XR Software release 7.2.XX

IOS XR
7.2.1

- Match DSCP [ipv4/ipv6] for fixed system
- 64K mcast routes
- Forwarding LAG L3 Unicast – Mixed Bundle

IOS XR
7.2.12

- L2 Support (including QoS)
- sFlow
- IRB
- DHCP Relay
- IPv4/6 ACK Permit match display counters

August CY20

Sept. CY20

IOS XR Software release 7.3.XX

IOS XR
7.3.0

- Modular Systems
  - mFIB scale 64K routes
- Fixed Systems
  - mFIB scale 48K routes
- Local Span
- Charter deployable RPKI
- 400G AOC 30m
- 2x100G LR4

Jan. CY21

IOS XR
7.3.1
Core LSR

- SR FlexAlgo ISIS
- SR FlexAlgo OSPF
- SR PM (TWAMP Lite)
- SR DPM
- MPLS CsC
- Timing – SyncE
- LDPoRSVP
- mLDP LFA FRR

Feb. CY21

IOS XR Software release 7.3.XX

IOS XR
7.3.15

- L2VPN Pseudowire / VPWS
- L3VPN v4/v6 -Options A&C
- BGP PIC Edge Global Routing with Unipath
- BGP add-path type per Nbr control instead of global control
- Bundle counters for capacity display
- ISIS Cost Fall back enhancements
- ISIS Conditional static anycast route advertisement
- IPv4/6 ACK Permit matches display counters
- 8000 DC-100 PSU
- uRPF – lose mode
- mLDP LFA FRR
- SR Flex Algo
- SR PM

- Modular Systems
  - 120K mcast routes
- Carrier Supporting Carriers (CSC)
- CFM: L2 AC: down MEP
- CFM: L2VPN: up MEP
- BGP FS
  - NLRI types 7-10,12
  - Type 10 v4 only

IOS XR
7.3.2

- VPLS
- 1588v2 2008 Default profile on all interfaces
- ITU G.8275.2
- PTP Asymmetry correction
- CFM on Bundle Member Link for connectivity check
- 4x100G FR

April. CY21

Sept. CY21

Cisco 8000 Routers
IOS XR 7.5.x software features

IOS XR
7.5.1
Core LSR, Peering, Aggregation

- SRv6(Fmt1) LSR
- SRv6(uSID) LSR
- SRv6(uSID) Services
- SRTE Per Flow Steering
- SRTE IGP per prefix automated steering

- SRTE with TiLFA
- SRTE IGP Per Prefix Manual Steering
- SR-PCE

Nov CY21

Cisco 8000 Routers
IOS XR 7.6.x and beyond software features

IOS XR

7.6.1 and beyond
Core LSR, Peering, Aggregation

- SRv6(Fmt1) Services
- EVPN Single Multihomed
- 802.1X
- REP-AG/MSTP-AG
- G.8032
- PW-HE
- Lawful Intercept
- L2 Multicast

- EVPN SRv6 Services
- IGMP/MLD Snooping
- IGMP Snooping(VPLS)
- uRPF Strict
- BGP QPPB
- BGP PA
- P2MP TE Edge
- Multicast over BVI
- Cloud SPAN

- BGP PIC Edge – MPLS/VRF
- EVPN Single Homed
- Ethernet Link OAM-Remote Loopback
- **SRTE Services – IPv4/v6, L3VPN, L2VPN, VPLS**

2H CY22

Optics Roadmap

7.0.11	7.0.12	7.2.1	7.3.1

• 400G
   • QDD-400G-CU1M
   • QDD-400G-CU2M
   • QDD-400G-FR4-S
   • QDD-400G-LR8-S
• 2 x100G
   • QDD-2x100G-CWDM4
   • QDD-2x100G-SR4
• 100G
   • QSFP-100G-SM-SR
   • QSFP-100G-LR4-S
   • QSFP-100G-CWDM4-S
   • QSFP-100G-SR4-S
• 40G
   • QSFP-4x10G-LR-S (4x10G BO)
   • QSFP-40G-SR4-S (4x10G BO)
	• 400G
	   • QDD-400G-DR4-S
		• 400G
		   • QDD-400-CU2.5M
		   • QDD-400-CU3M
		   • QDD-400G-AOC1M
		   • QDD-400G-AOC2M
		• 100G
		   • QSFP-100G-ER4L-S
		   • QSFP-100G-FR
			• 400G
			   • QDD-400G-AOC15M
			   • QDD-400G-ZR-S
			   • QDD-400G-ZRP-S
			   • QDD- 4x100G-FR
			• 2 x100G
			   • QDD-2X100G-PSM4-S
			   • QDD-2x100G-LR4-S
			• 100G
			   • QSFP-100G-CU1M
			   • QSFP28-100G-FR-S
			   • QSFP-100G-AOC
			• 40G
			   • QSFP-40G-SR4-S
			   • QSFP-4X10G-LR-S
			   • QSFP-H40G-AOC

The Cisco difference

Breadth of portfolio
1G to 100G and now 400G

**Technical expertise &
Industry thought leadership**
Switch, Router, Optics, Silicon
photonics and and leadership
with SR, EVPN etc. technologies.

World class service
Renown Cisco TAC
experience

Unmatched SW and HW Platform
IOS XR 7, Trusted SW & HW

End-to-End Architecture
Fabric Architectures, FTTH, 5G,
Cable rPHY, TDM2IP

Innovative Business Model
Subscription based SIA, RTU
Licenses

software
optics
silicon
trustworthy systems cloud enhanced

Cisco 8000
Positioning
and Value
Propositions

Cisco 8000 Routers
Positioning

Key Features

- Up to ~260Tbps
- 400GbE Optimized with support for Terabit ports
- Fixed and Modular systems
- IP+Optical capabilities with 400G ZR/ZRP and 100G ZR*

Target Use Cases

- Core LSR
- Cloud Aggregation
- DC ToR/ Leaf
- SP Aggregation
- Peering

Value Propositions

- Unprecedented scale & performance
- Trusted SW & HW platform
- Programmability accelerates feature velocity to unlock customer-led innovation
- Fabric redundancy without compromise
- New silicon architecture ensures Cisco standard platform longevity

Cisco NCS 5500 Routers
Positioning

Key Features

- Up to ~154Tbps
- 100G Optimized (NCS-55) with upgradeability to 400G (NCS-57)
- Interface speed support from 1G to 400G
- IP+Optical capabilities with CFP2-DCO (200G), 400G ZR/ZRP and 100G ZR*

Target Use Cases

- SP Aggregation (Mobile BH, Cable/RPHY, Wireline)
- SP Peering
- Core LSR
- Cloud Aggregation
- SP Data Center
- Enterprise WAN

Value Propositions

- Mature feature set enables Broad uses case deployment
- Investment protection for existing installed base
- Wide range of HW options for both Fixed and Modular chassis
- Optimized TCO for mixed port configurations

Cisco 8000 Routers
Positioning Analysis for Core LSR and Cloud Aggregation

	Remarks	Cisco 8000 Series	NCS 5500 Series
Existing Customer – Brownfield	• Customer already certified and qualified the NCS5500		✅
	• Customer looking to transition from the CRS/NCS6K/ASR9K or require 14.4T per slot capacity or 400GE fixed	✅	
	Remarks		
Existing or New Customer - Greenfield	• Evaluate opportunity with BU PLM: use case, density, features, platform longevity	✅	✅
	Remarks		
Competing against 14.4T/slot high density products from Arista or Juniper		✅	

Cisco 8000 Routers
Positioning Analysis for Data Center ToR, Leaf & Spine

	Remarks	Nexus	Cisco 8000 Series
Existing or New Customers – Brownfield or Greenfield	• Enterprise Customer looking for ACI compatible DC solutions	✔	
	• Web Scale customers looking to take advantage of Cisco Silicon One based high performance, deep buffered, programmable and power efficient solutions		✔

Competitive

Service Provider Routing
Competitive comparisons

	Arista	Nokia	Huawei	Juniper	Cisco
Portfolio Breadth	◔	◔	◕	◕	●
End-to-end Architecture	◔	◔	◕	◕	●
Innovation & Thought Leadership	◔	◔	◔	◗	●
SW Feature Richness	◔	◗	◗	◕	●
SP Incumbency	○	◗	◗	◕	●
Network Automation & Telemetry	◔	◗	◕	◕	◕

Cisco 8000 Software Licensing

Cisco 8000 Software Licensing
Flexible consumption model (FCM)

What is FCM?

- New IOS XR capability
- Software licenses used to add capacity as needed
- Simplified license tracking

How does FCM work?

- Deploy router with minimum software fill-rate
- Easily add capacity as demand increases
- Global network visibility

Why use FCM?

- Reduced upfront capital and network-wide pooling
- Software innovation
- Investment protection
- Includes automation tools

Why is FCM better?

- On-going software innovation keeps IOS XR software cutting edge
- Only Cisco has network-wide pooling, license portability, more visibility

Cisco 8000 requires both Right-to-Use (RTU) perpetual and Software-Innovation-Access (SIA) subscription-based licenses

Cisco 8000 Software Licensing
Flexible consumption model (FCM)

Flexible Consumption Model

A la Carte
(Scale Enhanced)

2

Two simple suites:
Essentials and Advanced

Automation attach for
scalable network software

Advanced Software
(L3VPN – MPLS IPv4/IPv6, MACSec, TE, L3 Tunnel,
SL–APIs)

Essentials Software
(Most of the transport oriented feature set with
Automation, NSO)

Right to Use (RTU)

*Software Innovation
Access (SIA)*

3

SIA Feature upgrade PIDs
provide access to innovation
and investment protection. 3
years of mandatory SIA
required

1

Hardware is separated out
from new Software suites

Hardware Infrastructure

CX Offering for Cisco 8000

Customer Experience Lifecycle for Cisco 8000

Delivering expert guidance at every stage of your technology journey

Advise ···· **Implement** ···· **Optimize**

Knowledge Transfer (Base & Advanced)
Provide training on the architecture, implementation, and deployment aspects to Cisco 8000 platform

Design & Deployment
Plan, test and deploy software and solutions.
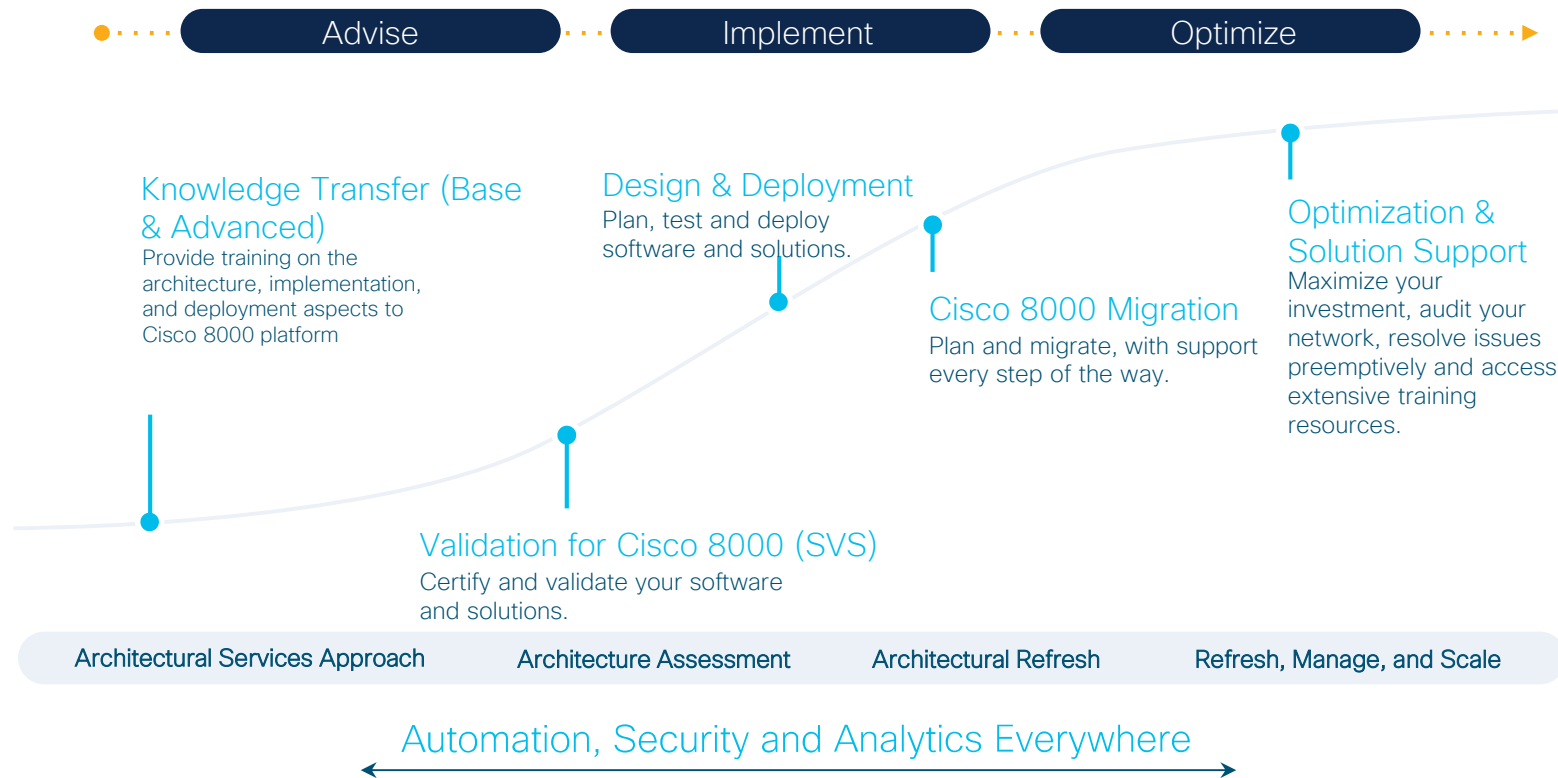
Cisco 8000 Migration
Plan and migrate, with support every step of the way.

Optimization & Solution Support
Maximize your investment, audit your network, resolve issues preemptively and access extensive training resources.

Validation for Cisco 8000 (SVS)
Certify and validate your software and solutions.

| Architectural Services Approach | Architecture Assessment | Architectural Refresh | Refresh, Manage, and Scale |

Automation, Security and Analytics Everywhere

CX Offers for Cisco 8000 Routers

Advisory   Technical

Implementation   Training
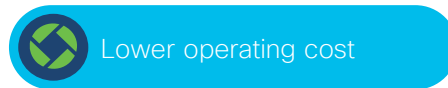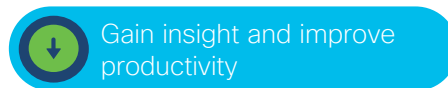
Optimization   Managed

Advise and Implement
- SP Route and Switch Advise and Implement Service (Cisco 8000 release)
- Network Migration Service Update (Cisco 8000 release with Automation)
- Solution Validation Service Update (with Cisco 8000 capability)
- Continuous Automation and Validation Testing (with Cisco 8000 capability)
- Knowledge Transfer Quickstart (Base) for Cisco 8000
- Knowledge Transfer Quickstart (Adv) for Cisco 8000

Optimize
- Cisco Business Critical Services for Cisco 8000

Support Services:
- SP Base
- SmartNet Total Care
- Partner Support Service
- SP Software Support
- Solution Support

Accelerate implementation and adoption

Gain insight and improve productivity

Lower operating cost

Reduce security risk

Q & A