



Технический обзор современных маршрутизаторов Cisco: ISR, ASR и... Catalyst.

День 3. Сетевой марафон Cisco: Классика WAN

Александр Бирюков, системный архитектор Cisco

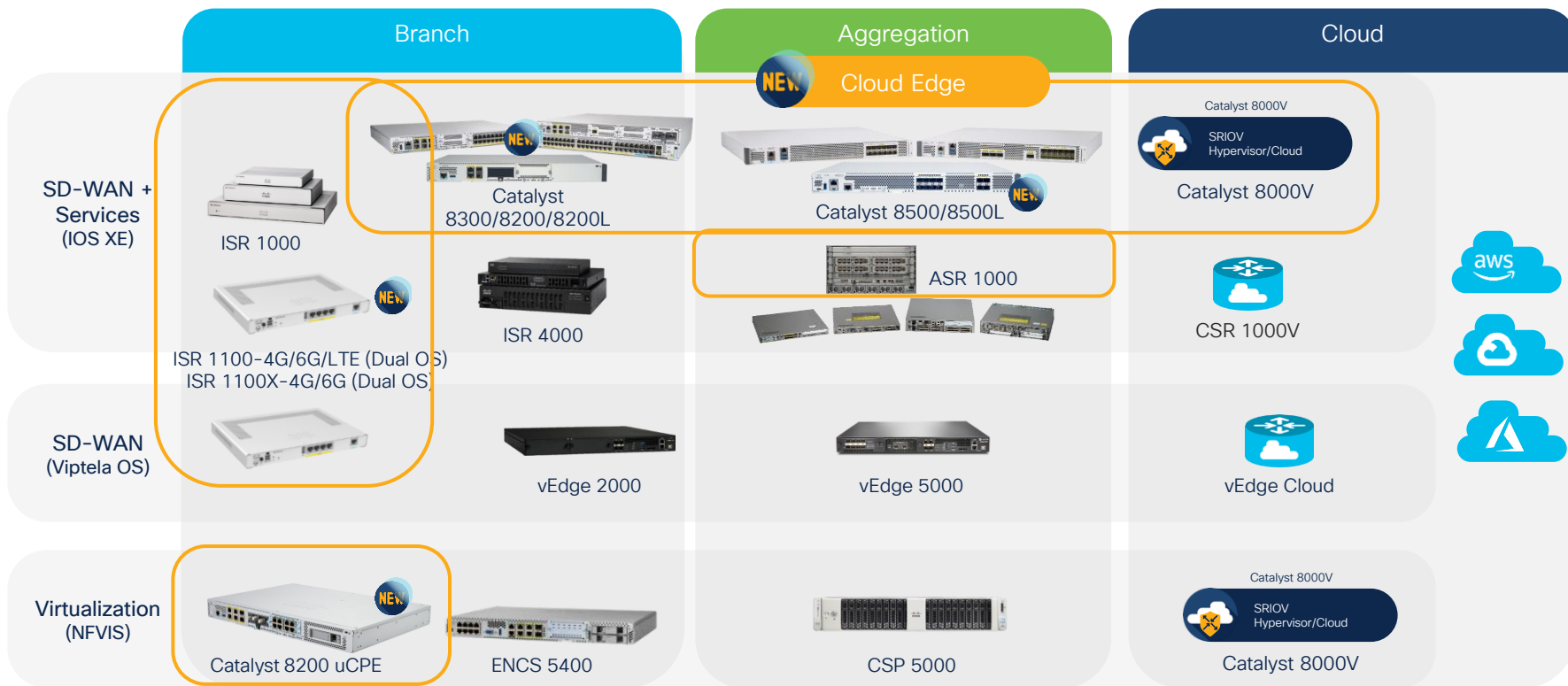
abiryuko@cisco.com

21 Апреля 2021

План презентации

- ISR 1100
- Модульные ASR 1006-X и 1009-X
- Catalyst 8500
 - Проверка знаний 1
- Catalyst 8300
 - ====Перерыв====
- Cisco Catalyst Cellular Gateway
- Catalyst 8200
 - Проверка знаний 2
- Лицензирование Cat8000
- Smart Licensing Using Policy
 - Проверка знаний 3

Маршрутизаторы для классических и SD-WAN сетей



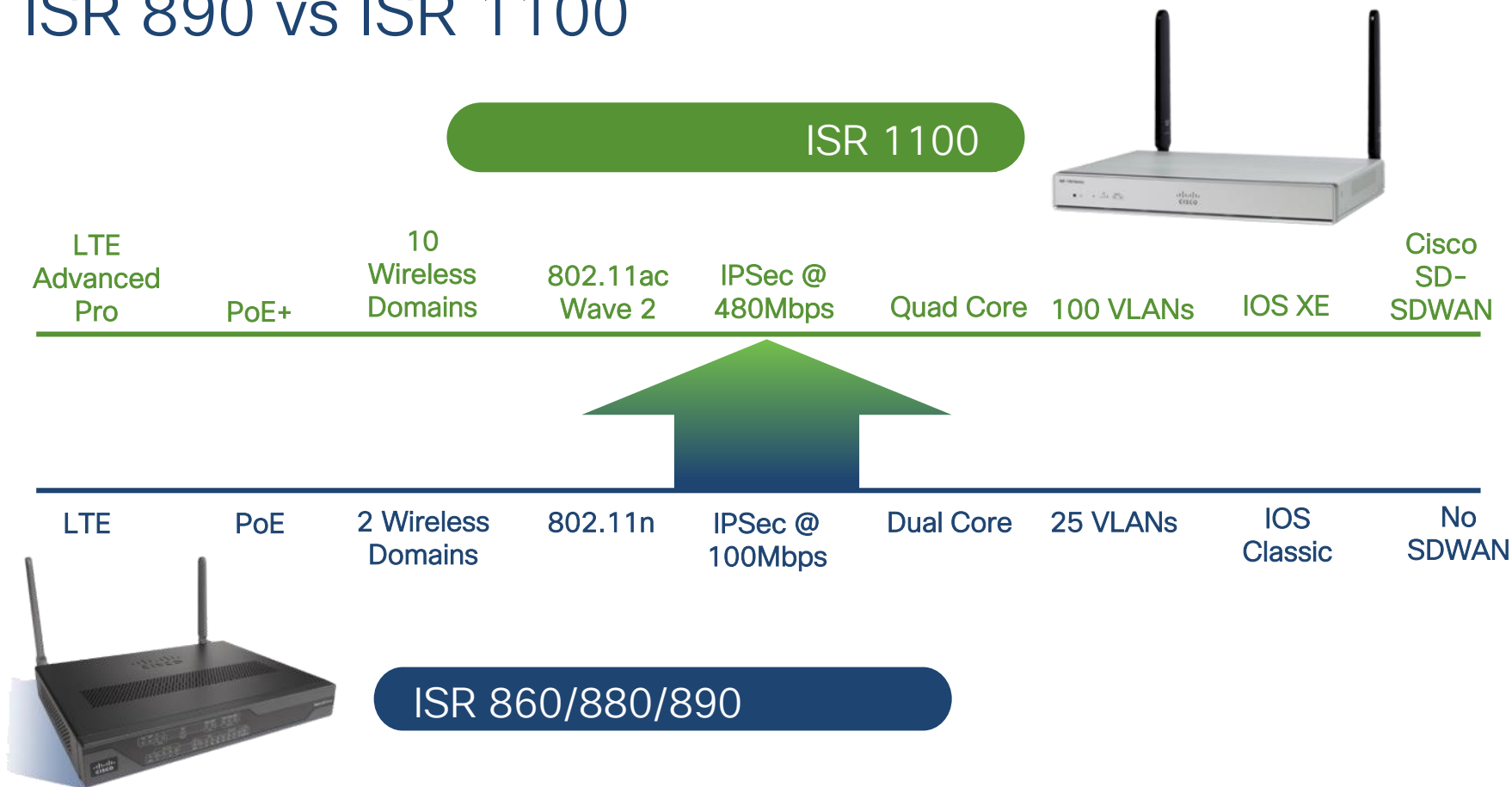
Обзор ISR 1100 Series



Традиционный WAN, SD-WAN,
расширенные функции по
безопасности, проводной и
беспроводной доступ

...в одной,
высокопроизводительной и
тихой платформе

ISR 890 vs ISR 1100



Сравнение ISR 890 и ISR 1100

For your reference

- ISR 1100 is an extension to the ISR fixed router portfolio

Branch Needs	Features	ISR 890 EOS 2 июня 2021	ISR 1100	Benefits
Connectivity & Scale w/High Performance	Throughput	100 Mbps	1Gbps	Up to 10 times performance increase
	Separate data and control planes	✗	✓	Minimal performance impact as network services are added and throughput increases
	Next-gen WAN	✗	✓	Faster connectivity with LTE Advanced
	Cisco IOS® XE	✗	✓	Open Programmable operating system
	Wireless	✗	✓	Faster wireless access with 802.11ac Wave 2 Supports Catalyst 9100 802.11ax APs in ME
Security	VPN acceleration	✗	✓	Higher performance for encrypted traffic Dedicated Crypto off-load
Costs & Business Agility	Pay-as-you-grow	✗	✓	Ability to buy what you need today and upgrade anytime with no equipment upgrades
Cyber Threat Protection	• Boot Protections • Runtime Defenses • H/W & S/W Security	✗	✓	Trustworthy Systems Assurance and peace of mind with hardware and operating system integrity

Enterprise Class WLAN для вашего филиала (Mobility Express)



Virtual WLAN ME controller in embedded access point (1815i)
802.11ac Wave 2 Dual Radio (2.4GHz & 5GHz) 2x2, 2 SS MU-MIMO



Enables simple and fast initial setup
Less than 10 minutes.



Manages our full suite of Access Points
(Aironet 700, 1540, 1560, 1600, 1700, 1815, 1830, 1850, 2600, 2700,
2800, 3600, 3700, 3800, 4800 + Catalyst 9115, 9117, 9120 & 9130)



Internal antenna
Scales up 50 APs & 1000 clients



Supports WLAN controller features and High Availability
with no price premium

Mobility Express



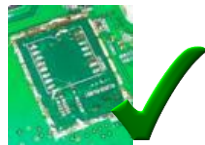
Simple yet
sophisticated deployment
Enterprise Class HA

Дополнительные функции безопасности в маршрутизаторах Cisco (все IOS-XE) – Trustworthy Solutions



Boot integrity visibility – Protects against...

- Attacker compromises the code that is supposed to protect against compromised code



Secure NVRAM Storage – Protects against...

- Attacker steals device – Uses forensic techniques to read secrets & credentials from non-volatile RAM



Simplified Factory Reset (IOS XE 17.2.1)

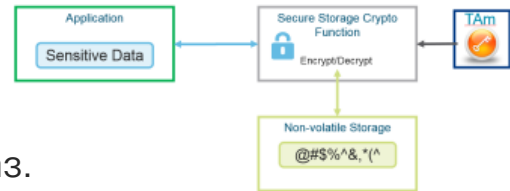
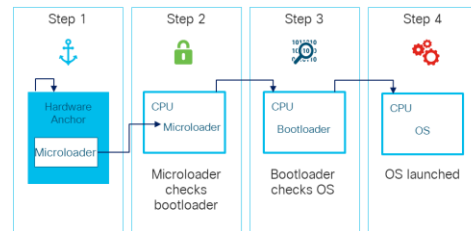
- Resets all writable file systems, licenses, ROMMON variables, User credentials etc.. С перезаписью 3 или 7 раз. Помните про ОС ☺ **#factory-reset all secure**



Secure Guest Shell

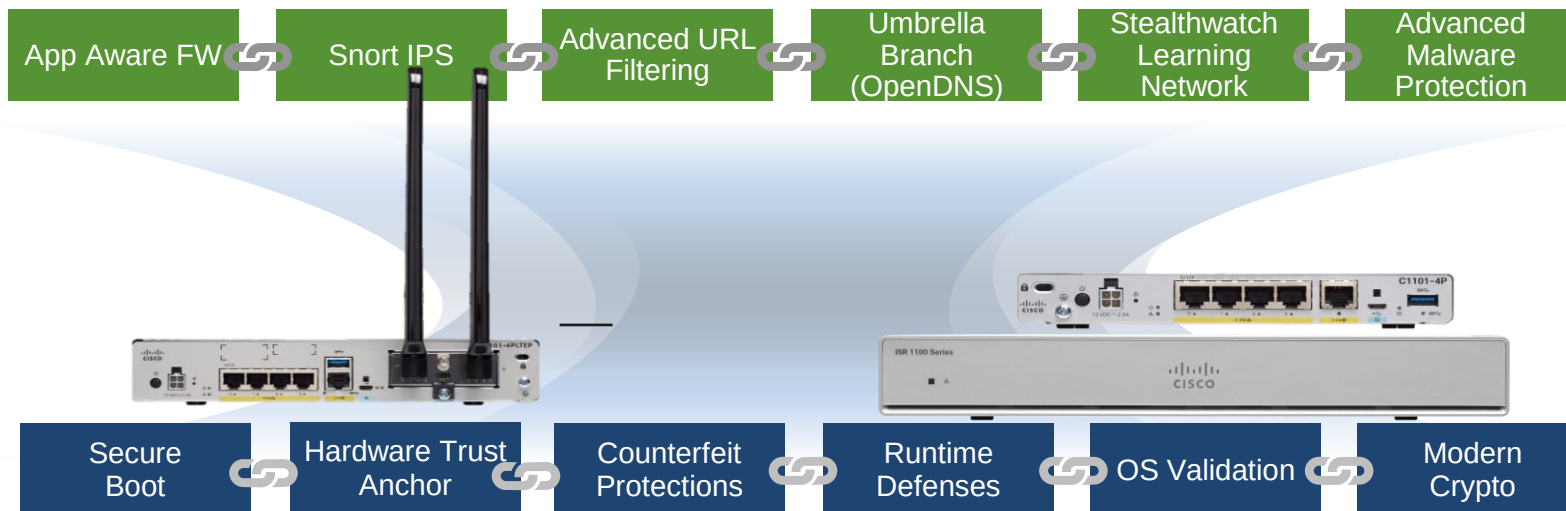
- Prevents Open Container hosted applications and their users from manipulating underlying Linux system on ISR4k & 1100

Cisco Secure Boot
Boot Code Integrity Anchored in Hardware



Набор механизмов безопасности ISR1100

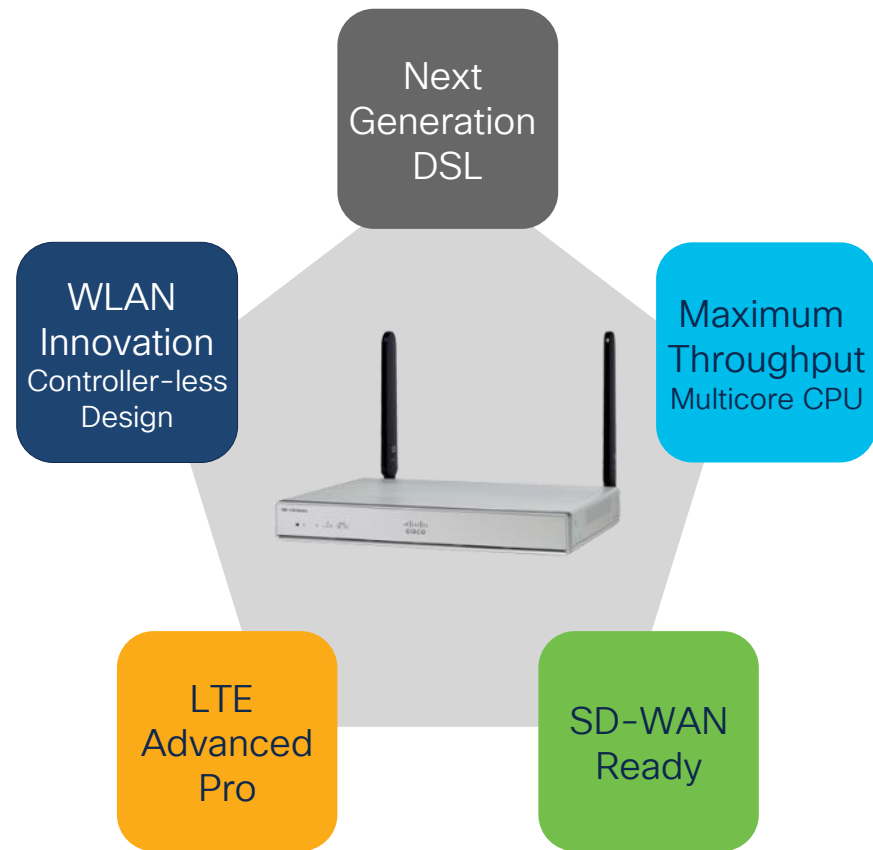
Сервисы, которые защищают ваш филиал



ISR1100 – защита сервисов, которые защищают ваш филиал

All XE based ISR's & ASR's ship with built in Cyber Resiliency

Архитектура ISR1100 и обзор моделей



ISR 1100 Обзор аппаратной части

Две основные платформы на базе которых доступны все остальные модификации

1. C1100-4: 2 WAN + 4 LAN Ports
2. C1100-8: 2 WAN + 8 LAN Ports – бОльшая производительность (выше частота CPU)

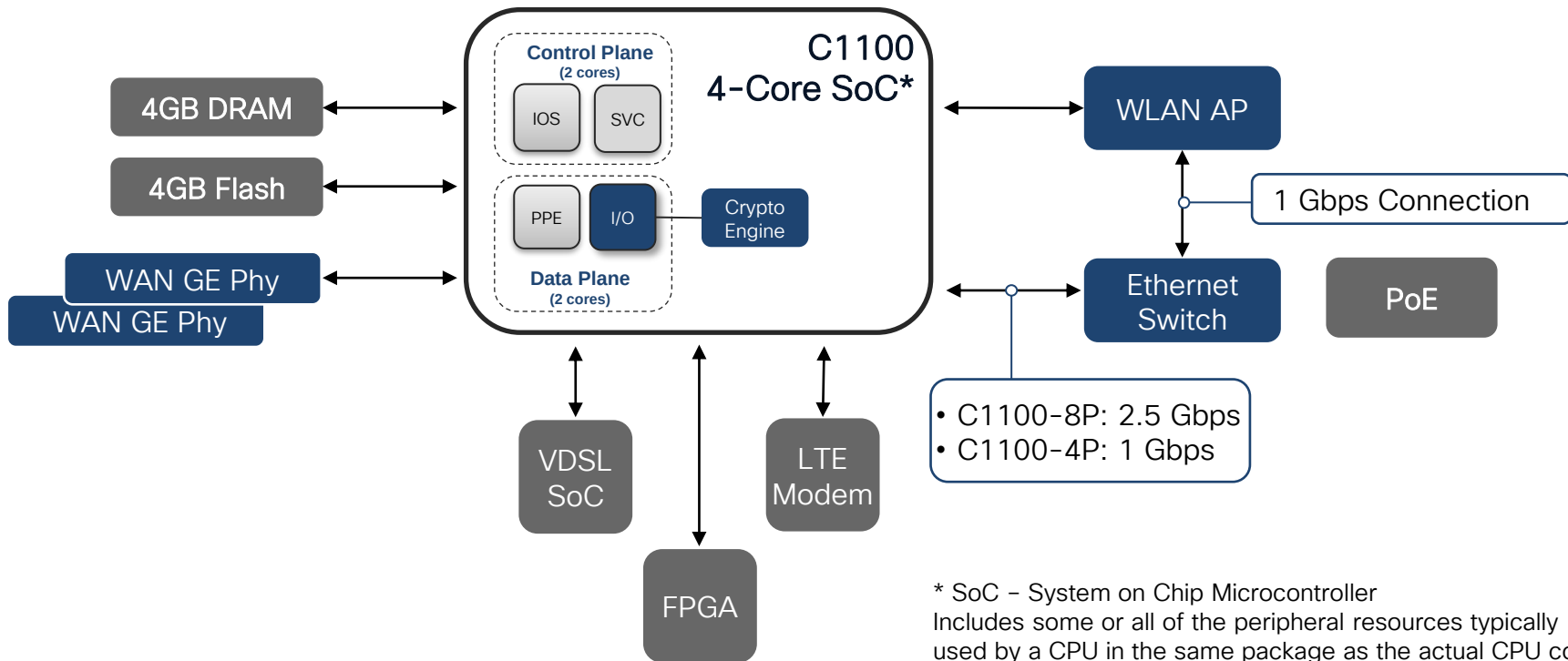
Все модели имеют одинаковую внутреннюю архитектуру – 4-х ядерный CPU

- Выделенные ядра для Data Plane и Control Plane
- Отдельный Crypto Engine для шифрования и хэширования

PoE (доступно для всех с дополнительной картой, кроме компактных C1101 и C1109)

- C1100-4P: 2 PoE or 1 PoE+ (ISR-1100-POE2(=) 1100-4P with 115W PSU)
- C1100-8P: 4 PoE or 2 PoE+ (для 1100-8P с ISR-1100-POE4(=) и 150W

Архитектура семейства Cisco ISR1100



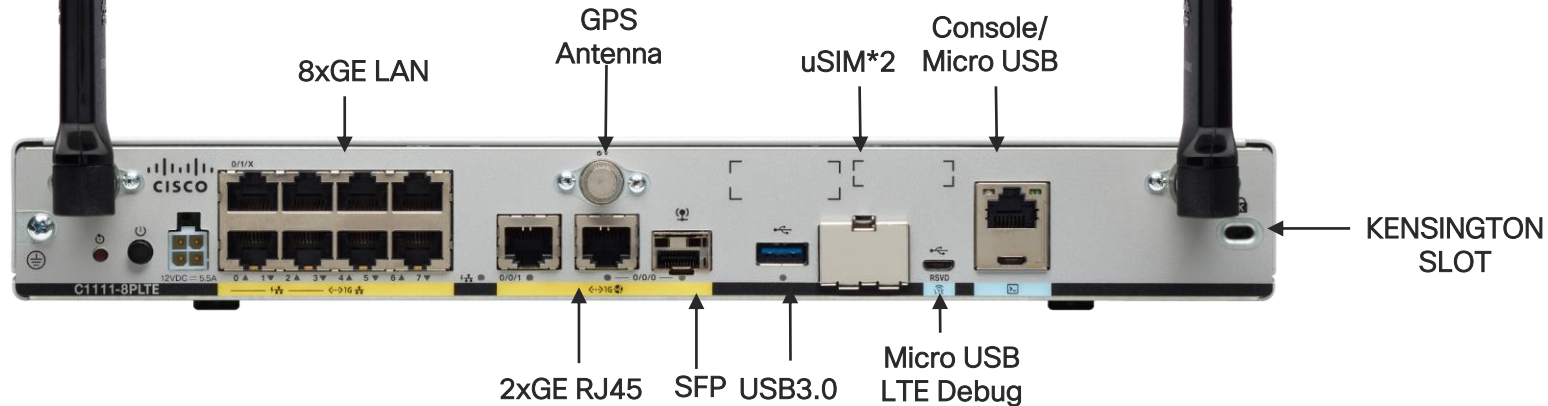
* SoC – System on Chip Microcontroller
Includes some or all of the peripheral resources typically used by a CPU in the same package as the actual CPU core

C1100-8P

Ethernet + LTE + WLAN

LTE Antenna →

← LTE Antenna

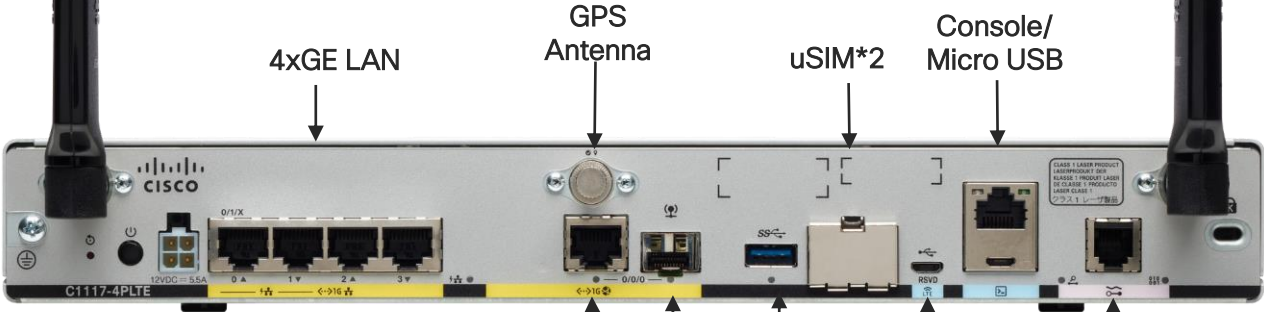


C1110-4P

Ethernet + DSL + LTE

LTE Antenna

LTE Antenna



4xGE LAN

GPS Antenna

uSIM*2

Console/
Micro USB

KENSINGTON
SLOT

1xGE RJ45

SFP

USB3.0

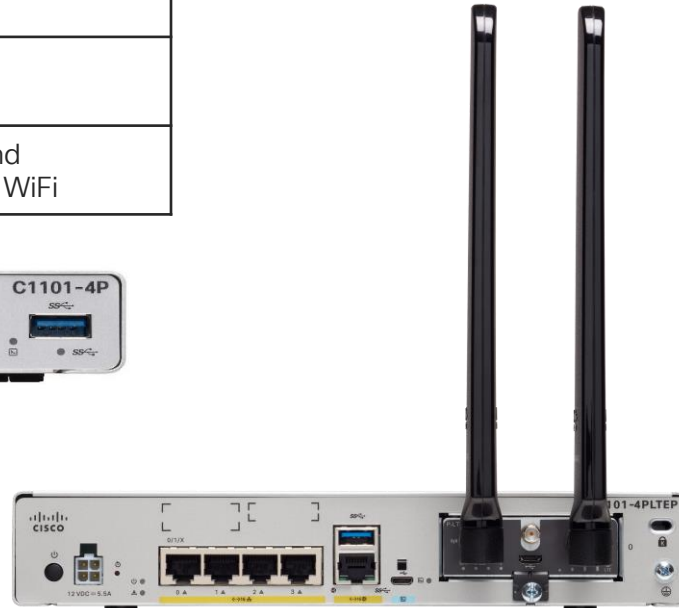
Micro USB
LTE Debug

DSL

C1101-4P



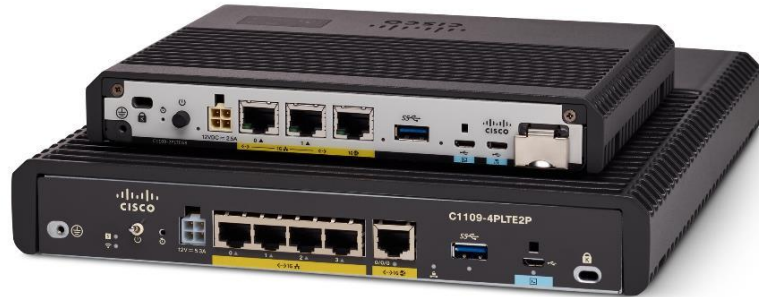
SKU	Detail
C1101-4P	Compact format
C1101-4PLTEP	With pluggable LTE
C1101-4PLTEPWX	With pluggable LTE and embedded 802.11 ac WiFi



C1109 – Hardened Platform



Dual pluggable LTE
Modules
=
Active/Active LTE



SKU	Detail
C1109-2PLTEXX	Compact form factor, Embedded LTE Cat4 , temperature range 0-50C
C1109-4PLTE2P	Dual LTE pluggable slots Temp range -15-55C
C1109-4PLTE2PWX	Dual pluggable LTE and embedded 802.11 ac WiFi, Temp range -15-55C

ISR 1100-4G & ISR 1100-6G for SDWAN

vEdge Series

Powered by Viptela OS 19.1
Or IOS XE **SD-WAN**

Next-Generation vEdge

vEdge 100B



ISR 1100-4G



- 4 Ethernet WAN ports

vEdge 100M



ISR 1100-4GLTExx*



- 4 Ethernet WAN ports
- Integrated LTE (CAT4)

* xx = LTE domain

vEdge 1000



ISR 1100-6G



- 6 WAN ports (4GE and 2 SFP)

SD-WAN Ready, New, C1120 & C1160



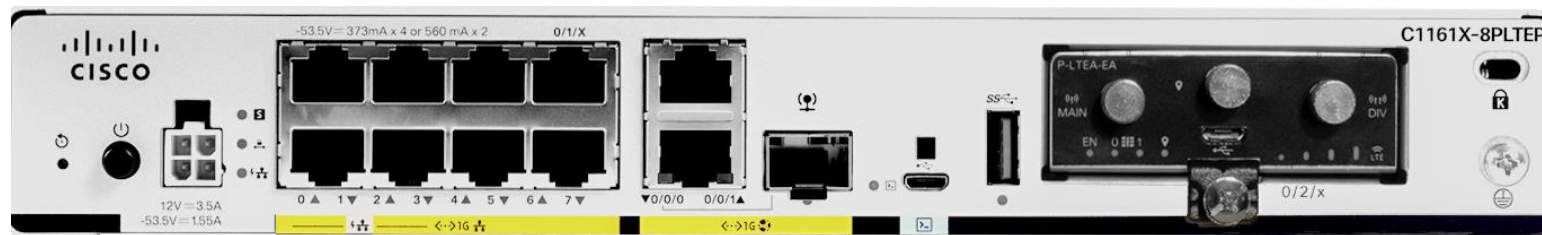
Multi-core CPU



Trustworthy Systems



High IPSec performance



ADSL2/2+/VDSL/G.SHDSL



Pluggable LTE Advanced

802.11ac WAVE2
Mobility Express

ISR 1100 Portfolio

New!

ISR 1100 Portfolio









	C1161X-8P *	C112xX-8P *	C1111X-8P *	C111x-4P	C1101-4P	C1109-4P	C1109-2P
Crypto (CPU clock rate)	480 Mbps (1,6GHz)	350 Mbps (1,2GHz)		250 Mbps (800Mhz)		200 Mbps (600Mhz)	
Cisco SD-WAN	Yes						
SD-WAN Security	Yes 8G DRAM			No 4G DRAM			
LTE	CAT18/CAT6/ CAT4	CAT18/CAT6/ CAT4	No	CAT6	CAT18/CAT6/ CAT4	CAT18/CAT6/ CAT4	CAT4
Wi-Fi	No	Yes	No	Yes			No
DSL	No	Yes	No	Yes	No		
PoE	Yes				No		

8G/4G DRAM FLASH variants available – Supports only Ent. FW App aware, DNS/web-layer security on SD-WAN

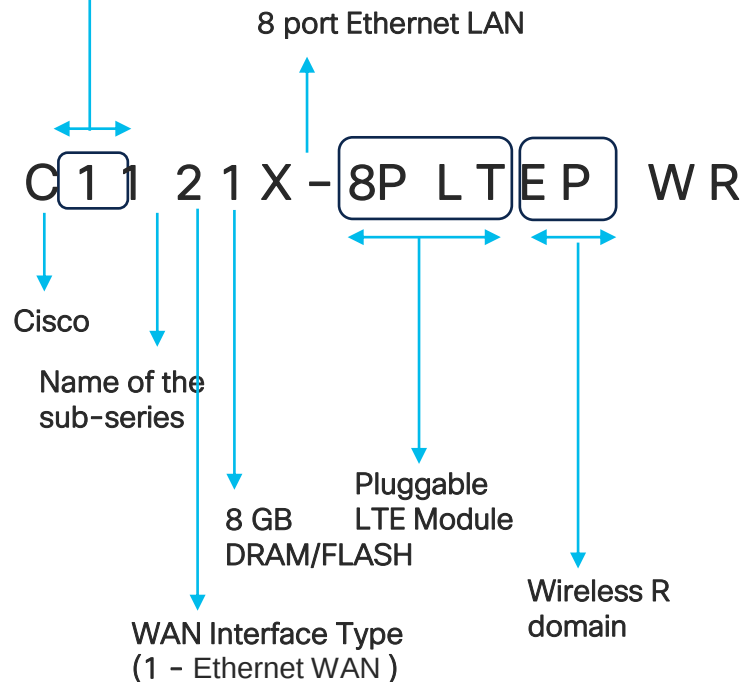
* 4GB DRAM, 16GB FLASH variants available – Supports only Ent. FW App aware, DNS/web-layer security on SD-WAN

Как читать партномер ISR1100 *

Supported Wireless Domains for C1121 *	
E	Europe
B	North America
Z	Australia/Brazil New Zealand
R	Russia

Supported Wireless Domains for C1121X *	
E	Europe
B	North America
Z	Australia/Brazil New Zealand
R	Russia

Name of the Series



DSL PIDs	
C1126	DSL Annex B&J
C1127	DSL Annex A&M
C1128	G.SHDSL

Series Variants	
C112x	CPU 1.2 GHz
C1161	CPU 1.6 GHz

*Only for IOS-XE based ISR1100
Doesn't apply to Vipela OS based ISR1100-4G/6G

Wireless WAN Overview

LTE-Advanced Pro

- 1.2 Gbps Download
- Carrier aggregation
- CBRS – Band 46,48, 66, 71
- Dying gasp



- Auto SIM switching
- Mobile IP – PMIPv6
- 4x4 MIMO

Region	Modem	Maximum Data Rate (DL/UL) Mbps
AT&T, T-Mobile	CAT 4	150/50
Global		
Verizon		
Europe, North America	CAT 6	300/50
Latin America, APAC, ANZ		
Global	CAT 18	1200/150

LTE Category 4 с использованием USB Dongle

CAT 4 LTE

75/50 Mbps

LTE Antenna

Single Micro SIM

Supported on ISR
112X, 116X Series
(проверяйте
поддержку по Data
sheet)

Modem Types	Region	Bands
D-LTE-GB	Global	Bands 1,3,7,8,20,28
D-LTE-AS	ASEAN	Bands 1,3,5,8,40,41
D-LTE-NA	North America	Bands 2,4,5,12,13,14,17



Производительность Cisco 1100 Series

1100 Non-crypto throughput is **unshaped**

- Unencrypted throughput from 800Mbps to 1.8 Gps
 - Depending on 1100 model

1100 IPsec Crypto throughput is **shaped**

- 50 Mbps @ Factory default

Activating IPsec Performance license

- Up to 250 Mbps with IPsec - 256 AES (C1100-8P)
- Up to 150 Mbps with IPsec - 256 AES (C1100-4P)

HSEC License disables the shaper for crypto throughput

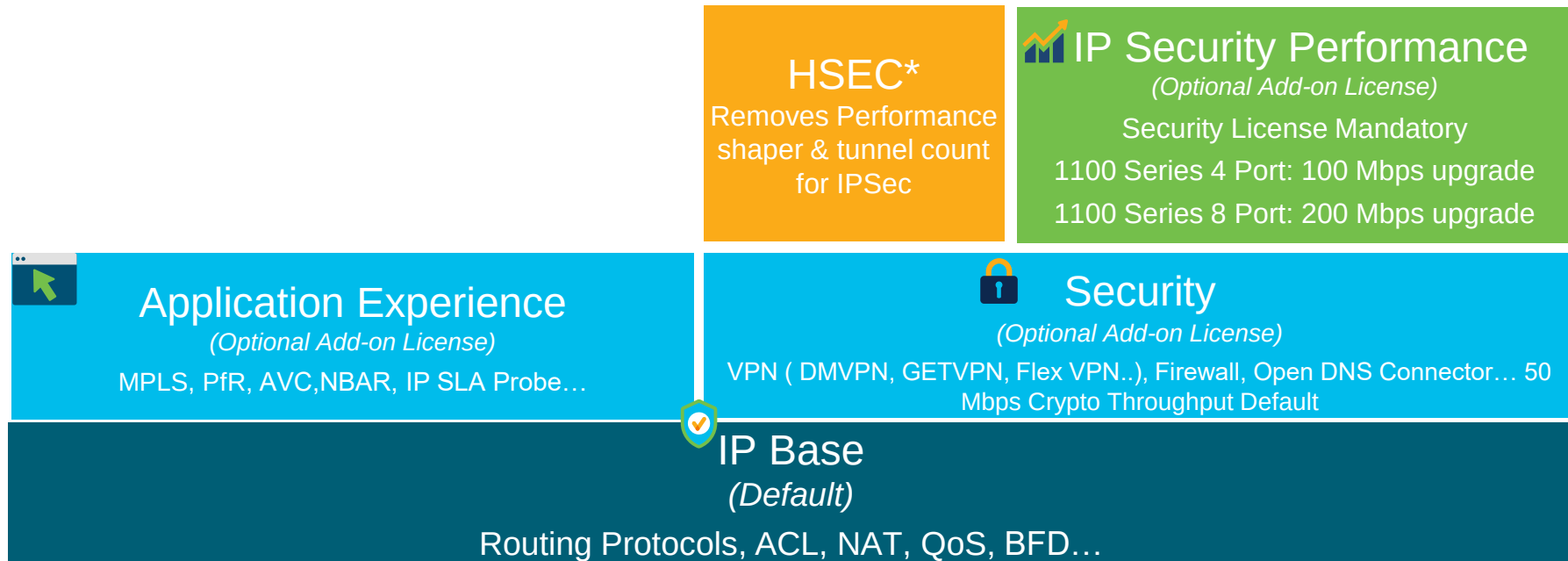
- Up to 480 Mbps with IPsec - 256 AES (C1161-8P)
- Up to 230 Mbps with IPsec - 256 AES (C1100-4P)



CPU Clocking	800MHz	1.2GHz	1.6GHz
CEF IMIX	1.2 Gbps	1.7 Gbps	1.8 Gbps
IPsec (AES256) IMIX	230 Mbps	335 Mbps	480 Mbps
NAT IMIX	660 Mbps	960 Mbps	1130 Mbps
HQoS IMIX	650 Mbps	910 Mbps	1230 Mbps

ISR 1100 Non SD-WAN

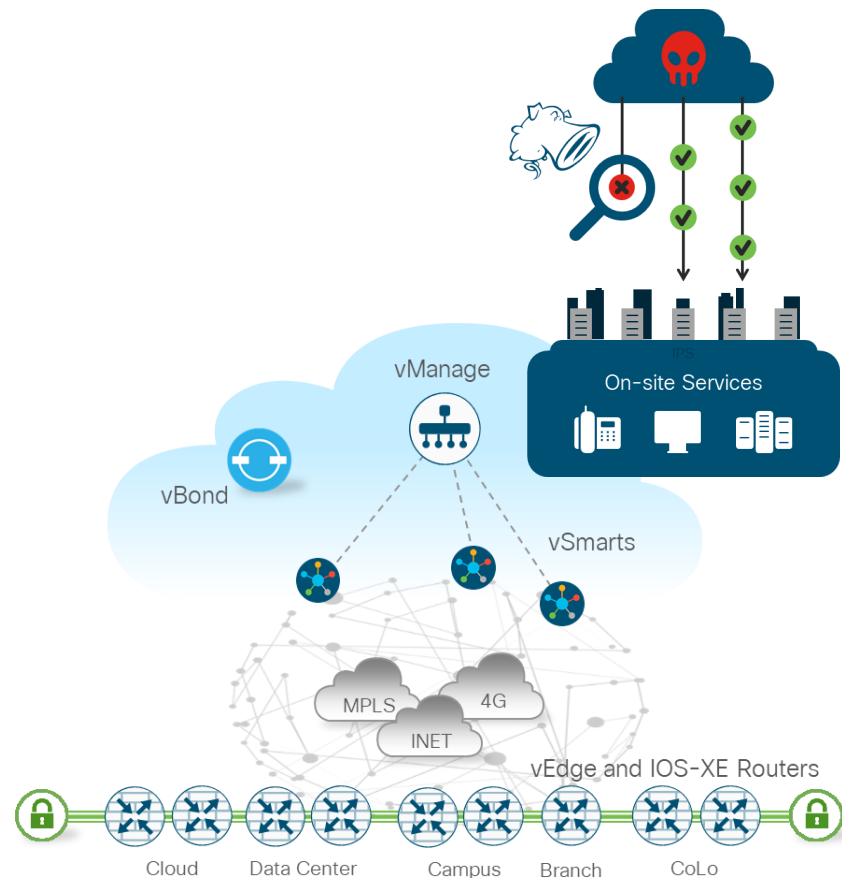
Licensing and packaging model



* Available with IOS XE 16.7.1

ISR 1100 SDWAN Security

Возможности и требования к аппаратной платформе



Cisco SD-WAN Security – Platform Support

All Services

ISR 4000



ISR 1100

CSR 1000v



ENCS 5400



App Aware FW and
DNS/web-layer security



ASR 1000

DNS/web-layer security



vEdge & ISR1100-4/6G

URL-Filtering

Onboard, using 82+ web categories

Intrusion Protection System

Onboard IPS engine powered by TALOS

Adv. Malware Protection

File Reputation and Sandboxing

Enterprise Firewall

+1400 layer 7 apps classified

Simplified Cloud Security

Cisco Umbrella

Поддержка функций безопасности в SD-WAN

Platforms/Features	Ent FW App Aware	IPS/IDS	URL Filtering	AMP/TG	DNS/Web-layer Monitoring *	SIG*
Viptela - (100, 1000, 2000, 5000, 1100-4G/6G и vEdge Cloud)	Y**	N/A	N/A	N/A	Y	Y
Cisco - CSR1000v	Y	Y	Y	Y	Y	Y
Cisco - ENCS (ISRv)	Y	Y	Y	Y	Y	Y
Cisco - ISR4K (4461, 4451, 4431, 4351, 4331, 4321, 4221-X)	Y	Y	Y	Y	Y	Y
Cisco - ISR1K (1111X-8P, 1121X, 1126X, 1127X, 1161X)	Y	Y^	Y^	Y^	Y	Y
Cisco - ASR1K 1001-HX, 1002-HX, 1001-X, 1002-X)***	Y	N/A	N/A	NA	Y	Y

* Umbrella Subscription / DNA Premier требуется для **enforcement**/SIG Tunnel establishment

** vEdges поддерживают классический stateful FW без функционала Application Aware.

*** Поддержка с default DRAM 4GB DRAM

^ **1100X 8GB DRAM models only**

Необходимые ресурсы для Security App Hosting в SD-WAN

IPS / URL-F App Hosting Profile	Security Profile - Features	Minimum Platform requirement	Platform Supported
Default	IPS + URLF (Cloud Lookup only) + AMP (hash analysis)	8GB Bootflash & 8GB Memory 1 / 2 SP cores	ISR1K/4221X/4321 4331/4351/44xx 4/8 vCPU CSR / ISRv
High	IPS + URLF (On-box DB + Cloud Lookup) + AMP (hash analysis) + Threat Grid (TG)	16GB Bootflash & 16GB Memory 2 SP cores	4331/4351/44xx 4/8vCPU CSR/ISRv

Enterprise Firewall и DNS/Web-layer security будет работать с 4 GB DRAM

Высокопроизводительные маршрутизаторы для центрального офиса/ЦОД

ASR1009-X



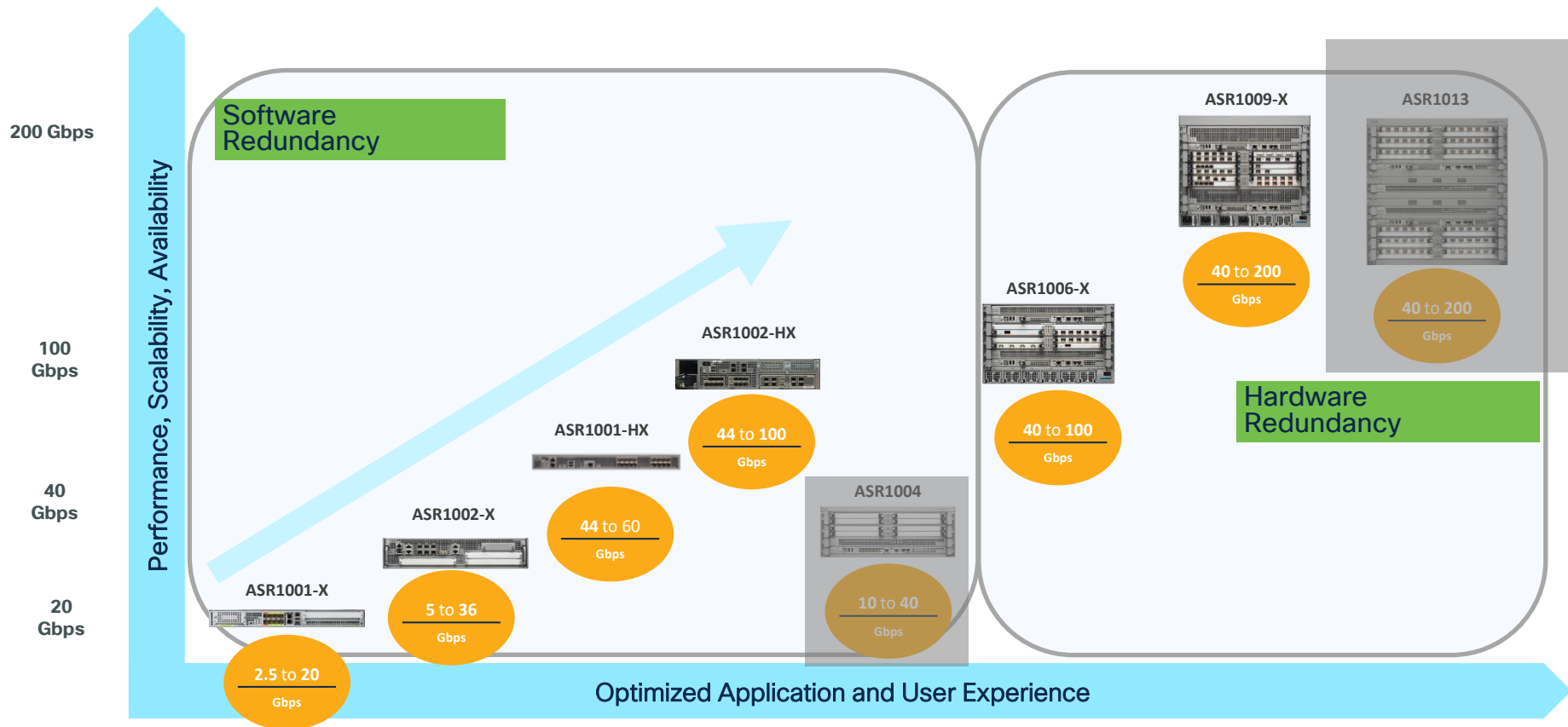
ASR1006-X



Catalyst 8500/8500L

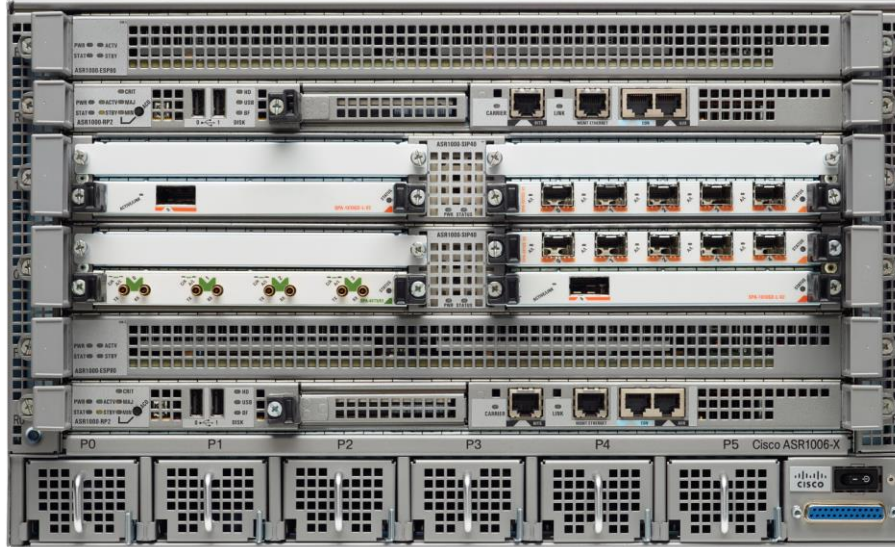


Cisco ASR1000 Series Routers



Обзор аппаратных компонент ASR1006-X, ASR1009-X

Chassis ASR1006-X



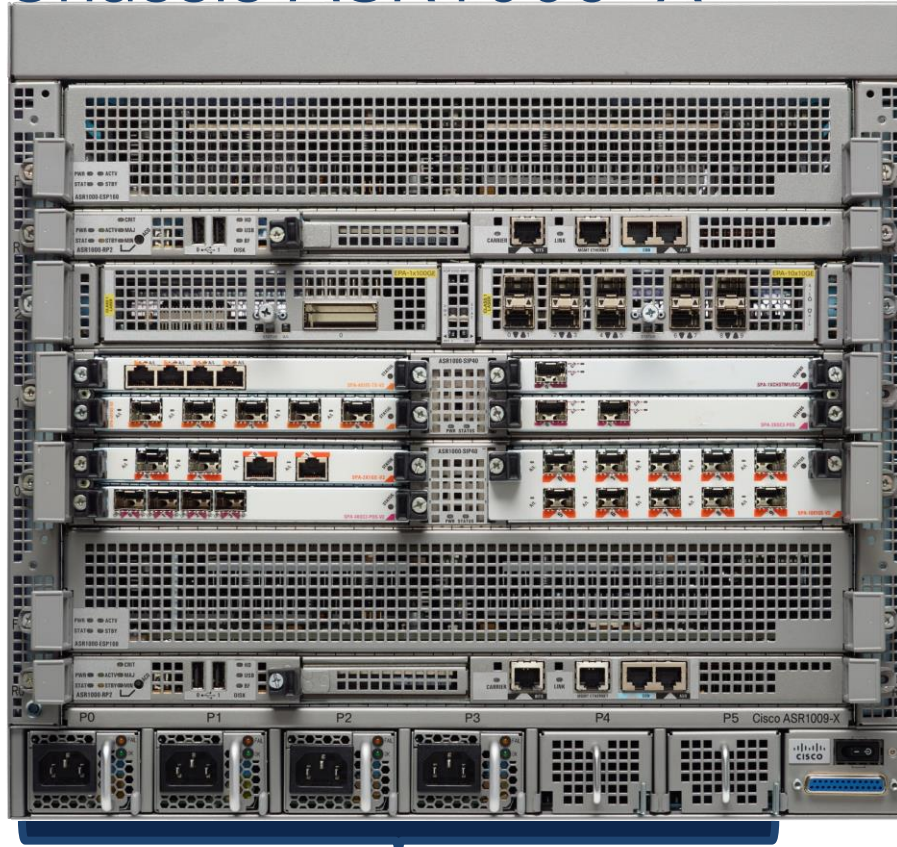
6 power supply modules

- ESP slots
(ESP40 / 100 / 100X / 200X)
- RP slots
- Linecard slots
(SIP40 / MIP100 / Fixed Ethernet)



2 fan trays

Chassis ASR1009-X



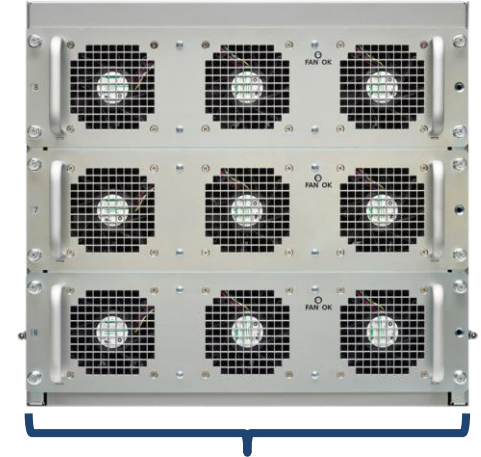
6 power supply modules

ESP slots
(ESP40 / 100 / 100X / 200 / 200X)

RP slots

Linecard slots

(SIP40 / MIP100 / Fixed Ethernet)



3 fan trays

Слоты для линейных карт в ASR1000-X

- Каждый слот для линейных карт поддерживает до **100 Gb/sec** Full duplex (т.е. туда и обратно) с текущими ESP
- Аппаратно шасси может обеспечить 200 Gb/sec Full duplex на каждый слот с будущими потенциальными ESP, которые смогут поддерживать такую скорость.
- Дополнительно поддерживаются линейные карты 40 Gb/sec Full duplex
 - SIP-40
 - ASR1000-2T+20X1GE
 - ASR1000-6TGE

Control Plane Hardware

ASR1000 Route Processors

RP2

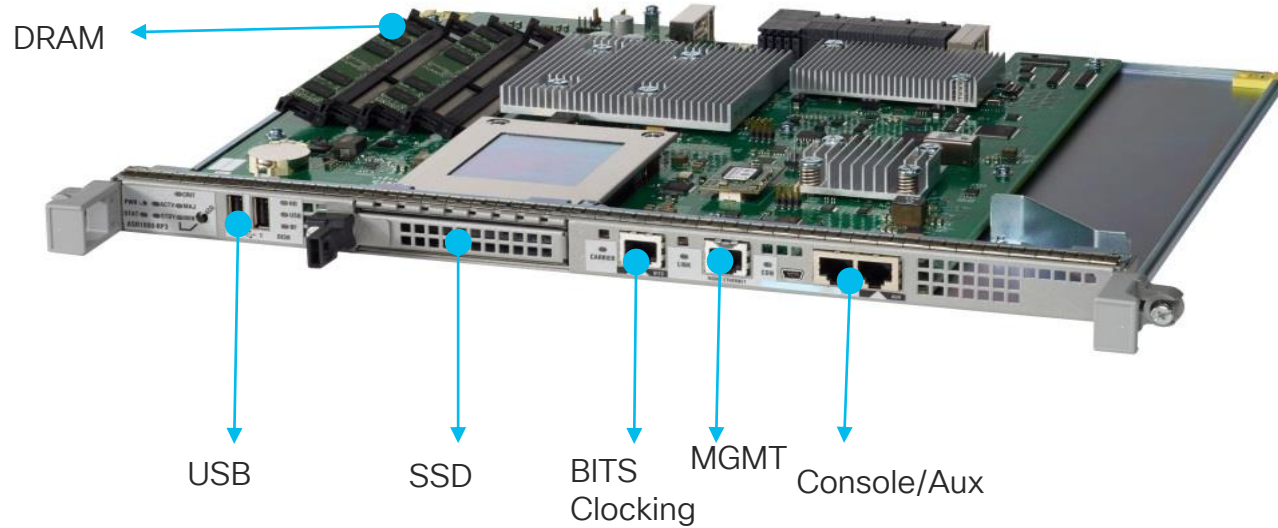


RP3

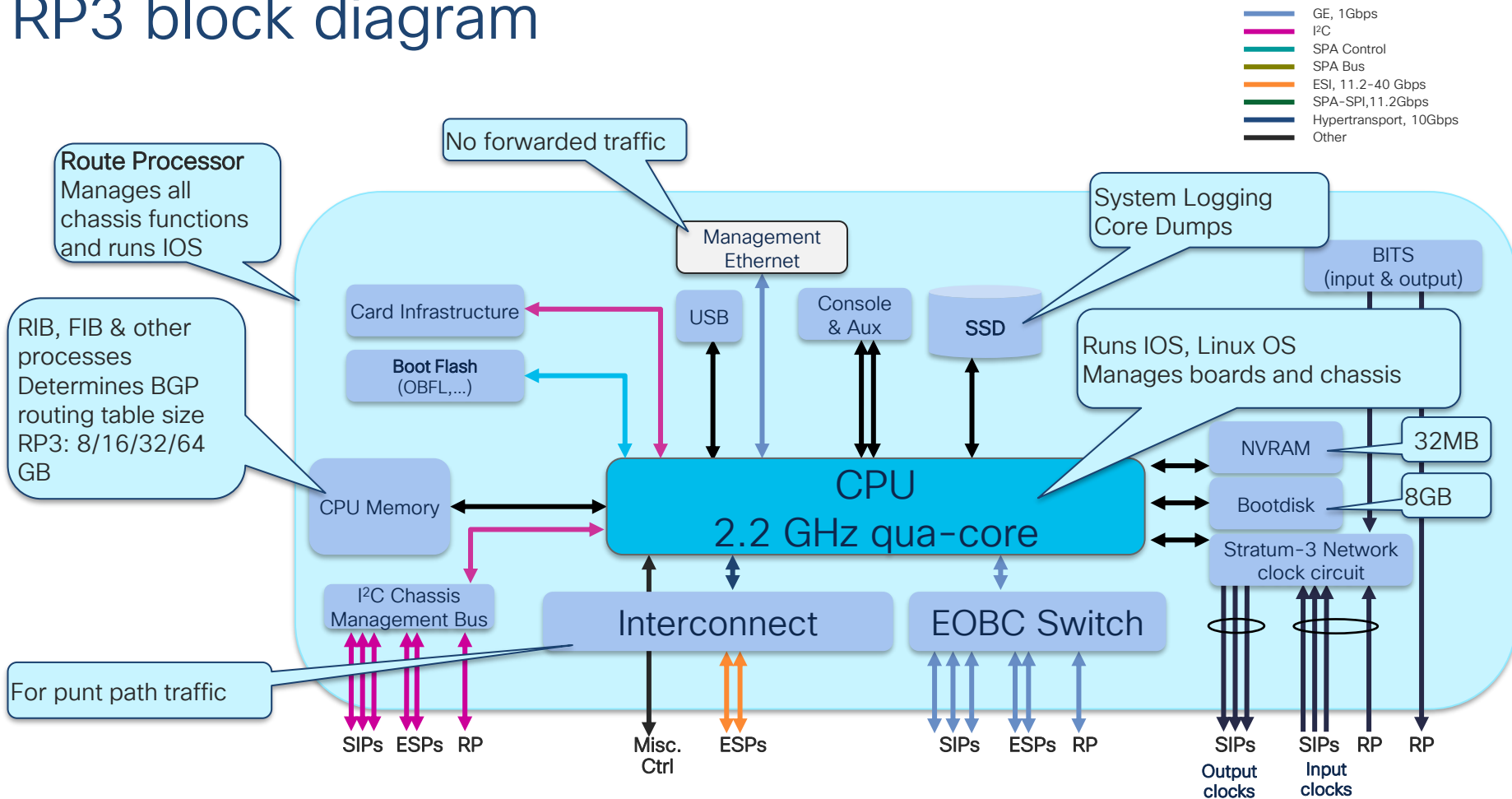


CPU	Intel Dual-core , 2.66GHz	Intel Quad-core, 2.2GHz
Memory	8, 16GB	8, 16, 32, 64GB
Built-in Boot flash	2GB	8GB
Storage	80GB HDD, External USB	100 – 400 GB SSD, External USB
Chassis Support	ASR1004 ASR1006 ASR1006-X ASR1009-X ASR1013	ASR1006-X ASR1009-X ASR1013

ASR1000 RP3

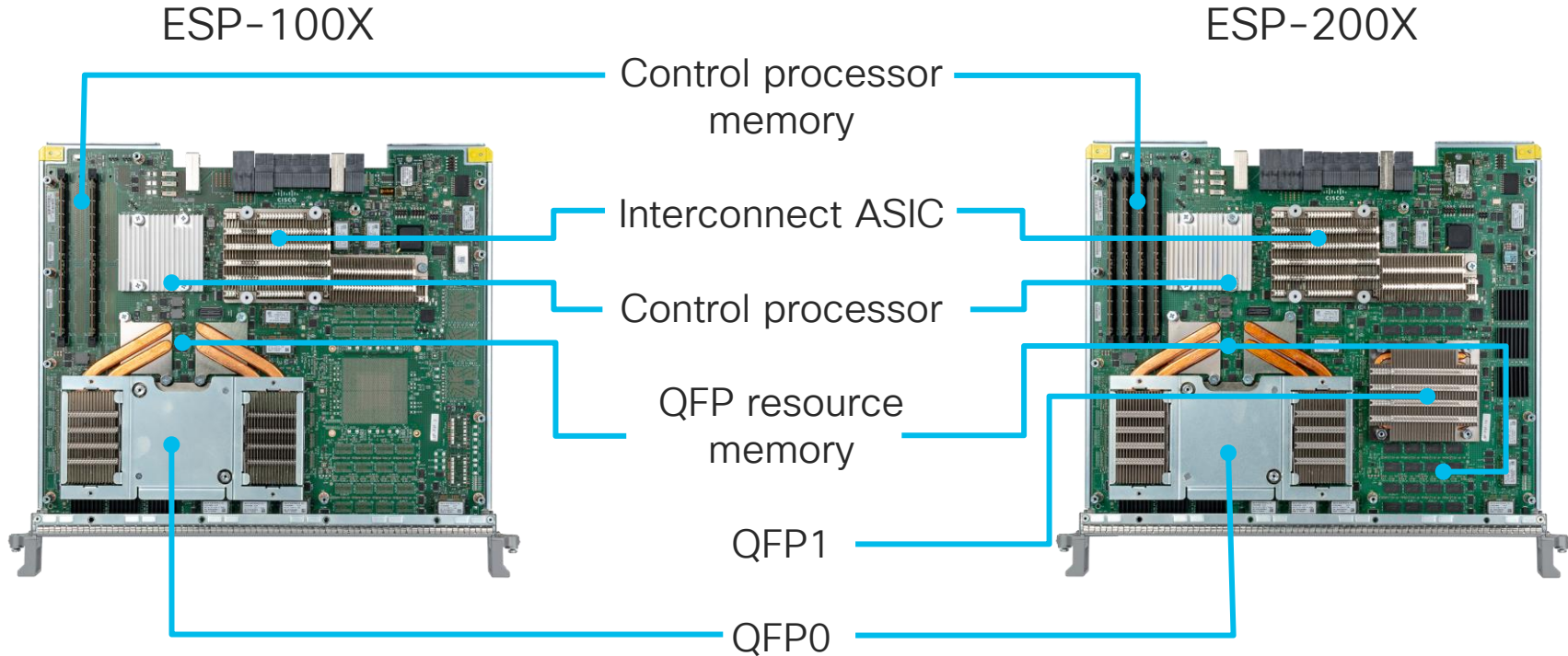


RP3 block diagram



Data Plane Hardware

Overhead view of new ESP100X and ESP200X



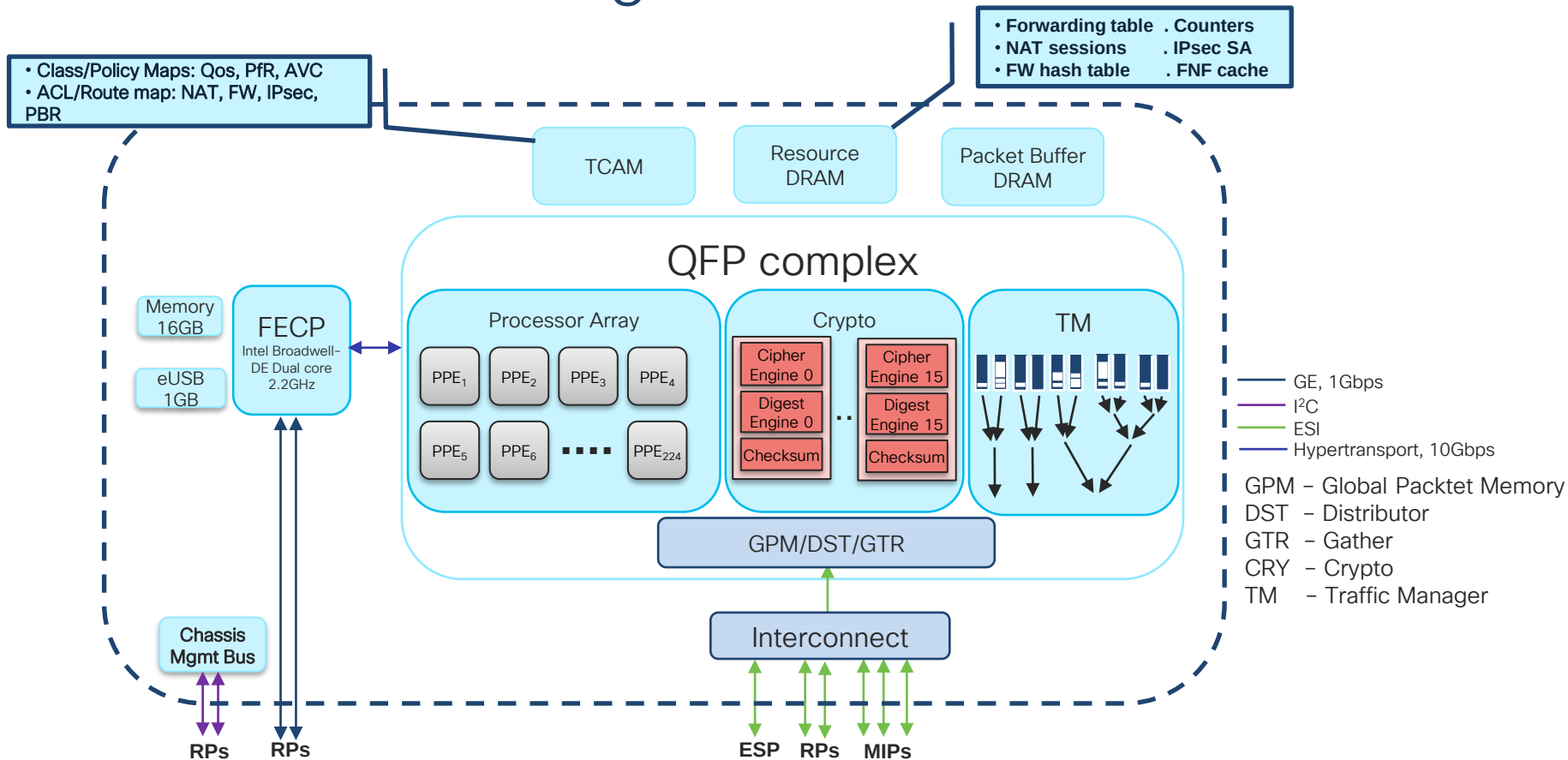
ESP Generations

	QFP 1.0		QFP 2.0	2x QFP 2.0	QFP 3.0	2x QFP 3.0
	ESP20	ESP40	ESP100	ESP200	ESP100X	ESP200X
System BW (IMIX)	20Gbps	40Gbps	130Gbps	260Gbps	134Gbps	268Gbps
Performance (64B)	26Mpps	26Mps	79Mpps	153Mpps	87Mpps	168Mpps
# of Processors	40	40	124	248	224	448
Clock Rate	1.2GHz	1.2GHz	1.5GHz	1.5GHz	1.0GHz	1.0GHz
Crypto BW* (IMIX)	5Gbps	7Gbps	15Gbps	45Gbps	67Gbps**	128Gbps**
QFP Resource Memory	1GB	1GB	4GB	8GB	32GB	64GB
Packet Buffer	256MB	256MB	1GB	2GB	1.4GB	2.8GB
Control CPU	1.2GHz	Dual core 1.86GHz	Dual core 1.73GHz	Dual core 1.73GHz	Dual core 2.2GHz	Dual core 2.2GHz
Control Memory	4GB	8GB	16GB	32GB	16GB	32GB
TCAM	40Mb	40Mb	80Mb	2x80Mb	80Mb	2x80Mb
Chassis Support	ASR1004, 1006	ASR1004, 1006, 1013, 1006-x, 1009-x	ASR1006, 1013, 1006-x, 1009-x	ASR1013, 1009-x	ASR1013, 1006-X, 1009-X	ASR1006-X, 1009-X

* Crypto BW is measured using 200 sVTI in IMIX with ESP-GCM256 in post encryption data.

** Crypto BW is measured using 1 sVTI in IMIX with ESP-GCM256 in post encryption data.

ESP100-X Block Diagram

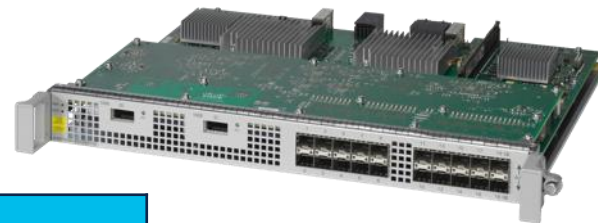


Input Output Hardware

фиксированные ELC

модульные SIP/SPA и MIP/EPA

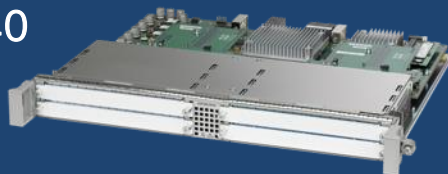
Fixed Ethernet Linecards (ELC)



	ASR1000-2T+20X1GE	ASR1000-6TGE
Ports	2 x TenGE and 20 x GE	6 x TenGE
Throughput	40 Gbps ingress / 40 Gbps egress	
Features	Feature Parity to all other Ethernet interfaces	
RP requirement	RP2, RP3	
ESP requirement	ESP40, ESP100, ESP200, ESP100-X, ESP200-X	
Features	Feature Parity to all other Ethernet interfaces	
Chassis	ASR 1004, ASR 1006, ASR 1006-X, ASR 1009-X, ASR 1013	

Модульные линейные карты

SIP40



MIP100



Bandwidth to backplane (full duplex)	40 G	100 G *
Installable cards	4 half height SPAs, ethernet and / or "legacy" WAN interfaces (E1, E3, serial, STM)	2 EPAs, Ethernet Port Adaptor, Ethernet interfaces only
Buffering	128 MB	Approximately 128 MB
Egress Buffering	8 MB	8 MB
Chassis support	ASR1004, ASR1006, ASR1006-X, ASR1009-X, ASR1013	ASR1006-X, ASR1009-X, ASR1013 *
Features	Basic ingress classification for high and low priority forwarding path to ESP. Egress high and low priority paths. All other features implemented on ESP.	
Backplane channels	Two 20 Gb/s channels	One 100 Gb/s channel

* When installed in ASR1013 chassis, 40 Gbps throughput in slots 0, 1, 4, and 5

MIP-100: High Density Modular Ethernet

Modular Interface Processors



100G Carrier Card + 2xEthernet Port Adapters

EPA options	1x100GE with CPAK (No MACSEC) 1x100GE with QSFP (MACSEC with XFP) 2x40GE via CPAK breakout cable (No MACSEC) 2x40GE and 1x40GE with QSFP (MACSEC with XFP) 10x10GE with SFP+ (MACSEC) 18X1GE with SFP (MACSEC)
Throughput	200G I/O with up to 100G ¹ throughput per line card
Key Features	- Feature Parity to 2x10GE+20xGE Plus 256-bit WAN MACSEC with VLAN tags in the clear
RP	RP2 + RP3
ESP	ESP100, ESP200, ESP100X, ESP200X

Chassis	Slots	BW
1013	Slots 2 & 3	100G
1013	Slots 0,1,4&5	40G
1006-X	All Slots	100G
1009-X	All Slots	100G
ASR1002-HX	Integrated CC	100G

¹ Max Bandwidth per slot for EPAs (ESP100 and ESP200)

Возможность SD-WAN на модульной платформе ASR1006-X

April
2021

Самое производительное SD-WAN
устройство от Cisco

ASR1006-X



Поддержка с релиза IOS XE 17.5.1



Производительность
SDWAN до 2 раз выше, чем
у C8500



Высокая плотность портов
100/40/10GE Ports



Защита инвестиций



Cisco's Highest Performance SD-WAN Headend

Highest Performance

- Up to 2 X SD-WAN performance ^{A,B}
- High 10/40/100GE port density (40 / 8 / 4)

Investment Protection

- Common hardware across all use cases
- Based on latest QFP3.0

Deploy with Confidence

- Proven hardware and software technology
- Consistent consumption, deployment and operation model
- For smooth multi-cloud SD-WAN journey

Cisco's Highest Performance SD-WAN Headend



Featuring dual QFP3.0 on the ESP200-X



What's Supported¹

SKUs	Quantity
ASR1006-X	1
ASR1000-RP3	1
ASR1000-ESP200-X	1
ASR1000-MIP100	Up to 2
EPA-10X10GE EPA-2X40GE EPA-QSFP-1X100GE	Up to 4 EPAs total
Cisco DNA T3 license	1

Target Availability

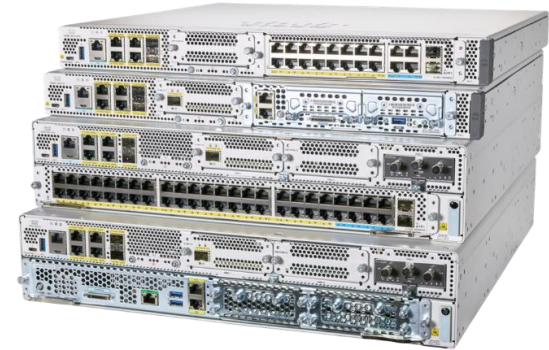
April 2021 (IOS XE 17.5.1)

- A. Estimate only, actual performance numbers based on test result
- B. Relative to 1X QFP3.0 system SD-WAN performance

1. Only modules with specified type and quantity are supported in each ASR1006-X chassis
 - No RP or ESP HA, no ISSU, no OIR
 - Other EPAs/SPAs/LCs not supported

Optimized for high-performance SD-WAN in DC/Hub

Catalyst 8000



Семейство Cisco Catalyst 8000

Пополнение в текущем портфолио маршрутизаторов

Catalyst 8500/8500L

Up to 200 Gbps CEF
& 33 Gbps SDWAN



Catalyst 8300/8200

Up to 12 Gbps CEF
& 5 Gbps SDWAN



Catalyst 8000V Edge

Software

Catalyst 8200 Edge uCPE



ASR 1K Fixed

Aggregation



ISR 4400/4300

Modular Access



CSR 1000V/ENCS 5100

Cloud/Virtual

Single
Image

IOS XE Controller Mode: SD-WAN, SD-Branch, SASE

IOS XE Autonomous Mode: DMVPN, GETVPN, FLEXVPN



Feature Parity with ASR1000, ISR4000, CSR1000v

Exceptions:
BNG, vWAAS not supported

Cisco Catalyst 8000 Edge Platforms Family

The Leading SD-WAN Edge Platforms with Rich Services

↑
Performance and Rich Services

C8500-12XQC (30Gbps)



C8500-12X (22Gbps)



C8500L-8S4X (8Gbp)



C8300-2N2S-4T2X (6Gbps)



C8300-1N1S-4T2X (4Gbps)



C8300-2N2S-6T (2Gbps)



C8300-1N1S-6T (2Gbps)



C8200-1N1S-4T (1Gbps)



C8200L-1N1S-4T (500Mbps)



C8200-uCPE-1N8 (500Mbps)



Scalable Architecture with x86 and QFP

Number in () is SD-WAN IPsec throughput with IMIX

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Catalyst 8500

Cisco Catalyst 8500/8500L

Высокопроизводительные 1RU маршрутизаторы



C8500-12X4QC

C8500-12X



QFP based hardware forwarding

- Third generation QFP ASIC designed by Cisco
- Port flexibility for 100/40/10 Gig interfaces
- Up to 200 Gb/sec forwarding on C8500-12X4QC
- TCAM hardware assist for pattern matching



C8500L-8S4X



Advanced Flow based forwarding

- x86 based SOC design
- Dedicated cores for control, data, and services
- Optimized technology for efficient packet processing
- Core reallocation to balance forwarding and services needs
- Up to 20 Gb/sec forwarding on C8500L-8S4X

IOS XE

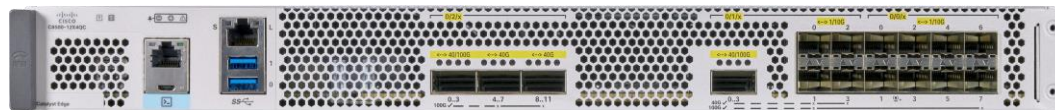
5G Ready

WAN MACsec

Port flexibility

Catalyst 8500, 8500L Series Edge Platforms

100G, 40G
'C' 'Q'



C8500-12X4QC

12 SFP+,
4 QSFP

10G, 1G
'X'



C8500-12X

12 SFP+

10G, 1G
'X' 'S'



C8500L-8S4X

8 SFP,
4 SFP+

Cisco Catalyst 8500 Series Edge Platforms

Highly Capable 1RU SD-WAN Headend



C8500L-8S4X

CEF: up to 20 Gbps
IPsec: up to 12 Gbps
SD-WAN IPsec: up to 6.6 Gbps



C8500-12X

CEF: up to 120 Gbps
IPsec: up to 30 Gbps
SD-WAN IPsec: up to 22 Gbps



C8500-12X4QC

CEF: up to 200 Gbps
IPsec: up to 46 Gbps
SD-WAN IPsec: up to 33 Gbps

IMIX traffic

CEF: Autonomous mode

IPsec: Autonomous/Controller mode

Удобство пользования – Label Tray, RFID, usability

pininfarina
ITALIAN DESIGN AND ENGINEERING



Label Tray has a **plastic strip** that can be pulled out



Label Tray

Label Tray contains

- Product ID
- PID version ID
- CLEI
- TAN
- MAC and
- Hardware version number



Label tray contains a **QR code** with encoded information

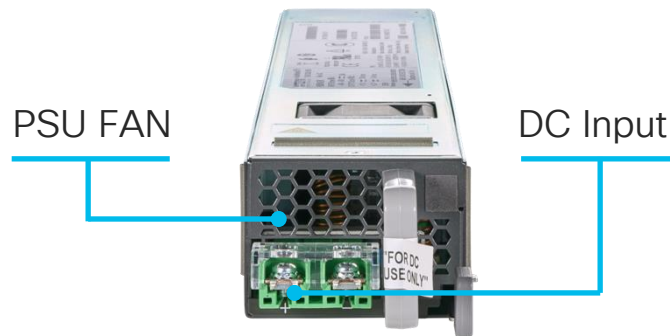


RFID Tag

AC или DC Power Supply



AC Power Supply



DC Power Supply



1 + 1
Отказоустойчивость
(по-умолчанию 2 БП)

Field Replaceable FAN Module



Replaceable FAN Tray

$N + 1$ FAN Redundancy

Front-to-Back Airflow



Management Flexibility

Console Flexibility

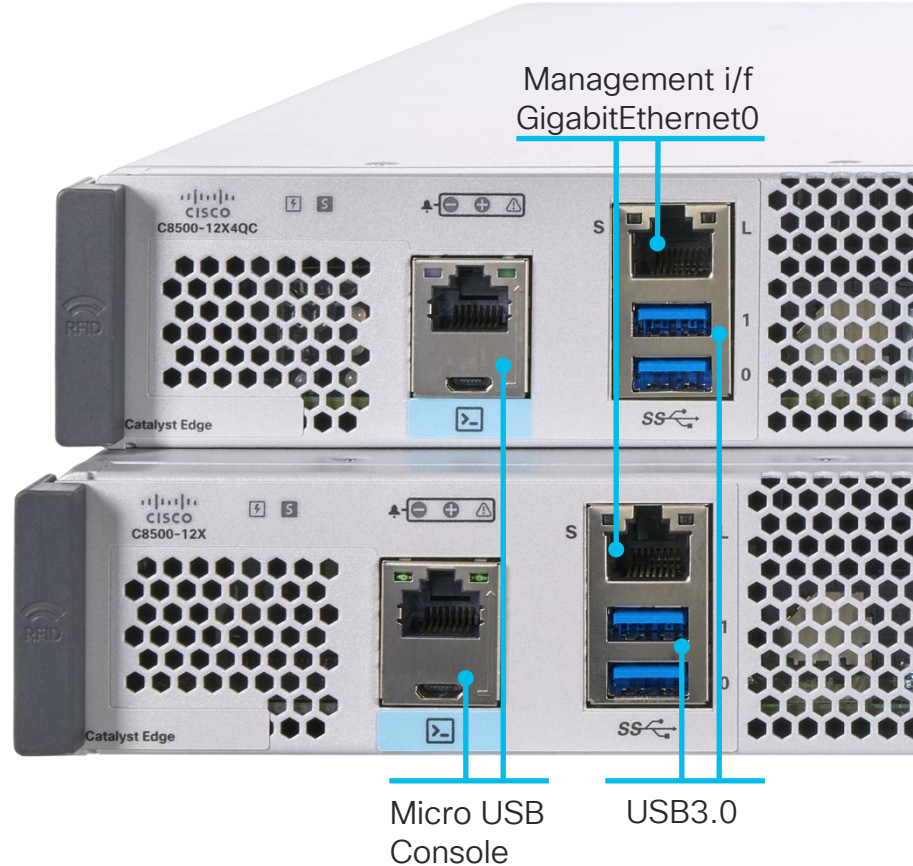
Traditional RJ45 Console Port
Micro USB Console Port

Out-of-band Management

Dedicated Management Interface

External Storage

2 x USB 3.0 Ports





Архитектура Catalyst 8500

C8500-12X4QC,
C8500-12X



Архитектура нового QFP 3.0



Multi-threaded Parallel Processing

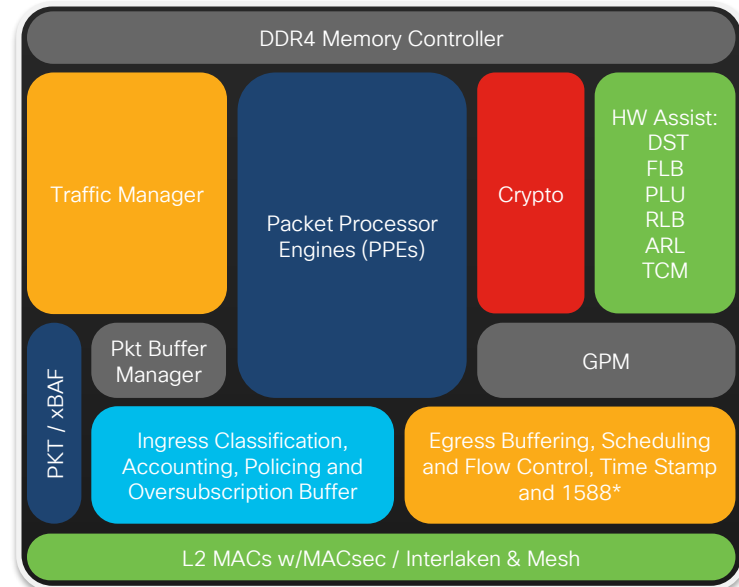
- 28 clusters of 8 PPEs each
- 224 PPEs, 4 threads each → 896 threads

Hardware Accelerated Crypto

- 16 Crypto Engines with dedicated resources
- Flow queues for complex stateful features

Layer-2 Aggregation

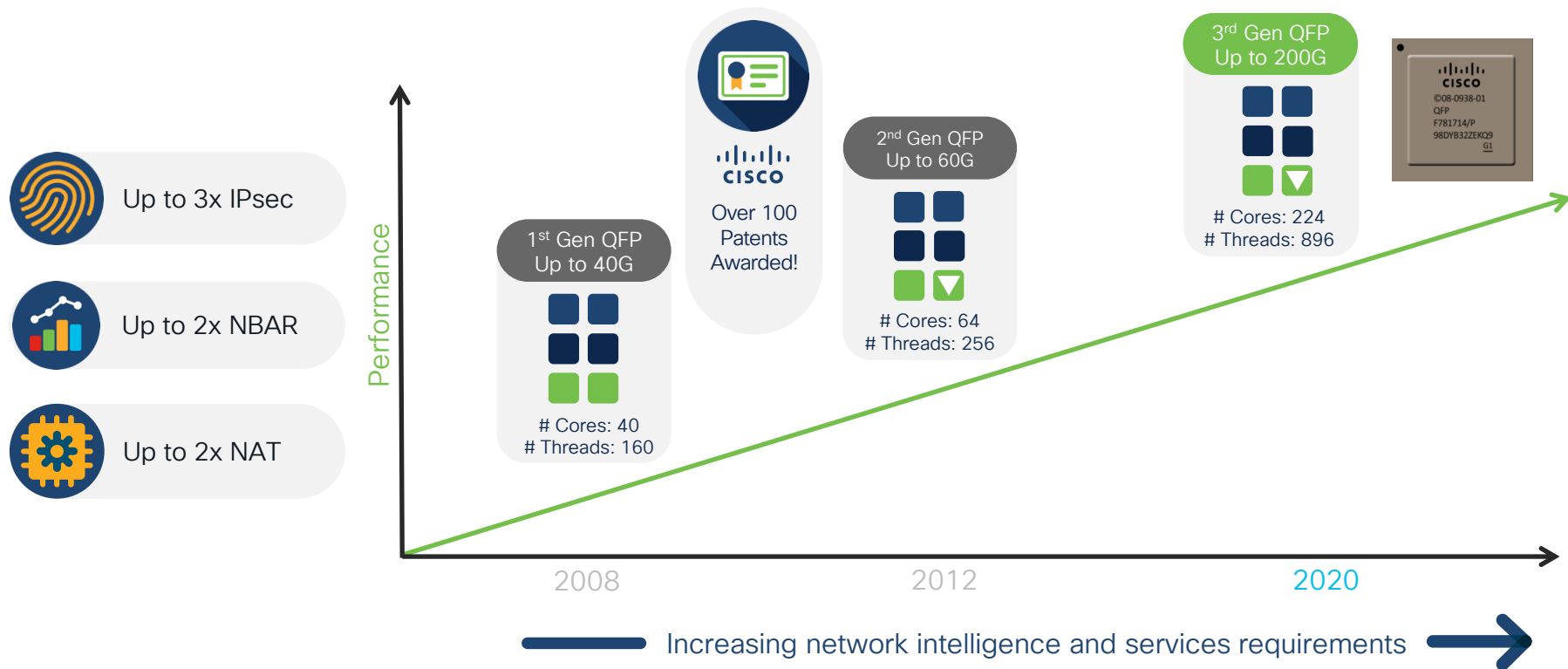
- 240Gbps of aggregation
- Per Port Classification and Accounting



QFP 3.0

Развитие Cisco QFP

Continuing Investment in Network Processor Technology



C8500-12X4QC Bays

0/2

Bay 2: 3xQSFP

1x 40/100GE QSFP28 Port
2x 40GE QSFP+ Ports

0/0

Bay 0: 8xSFP+

8x 1/10G SFP+ Ports

Bay 1: 4xSFP+/1xQSFP

4x 1/10G SFP+ Ports
1x 40/100GE QSFP28 Port

0/1

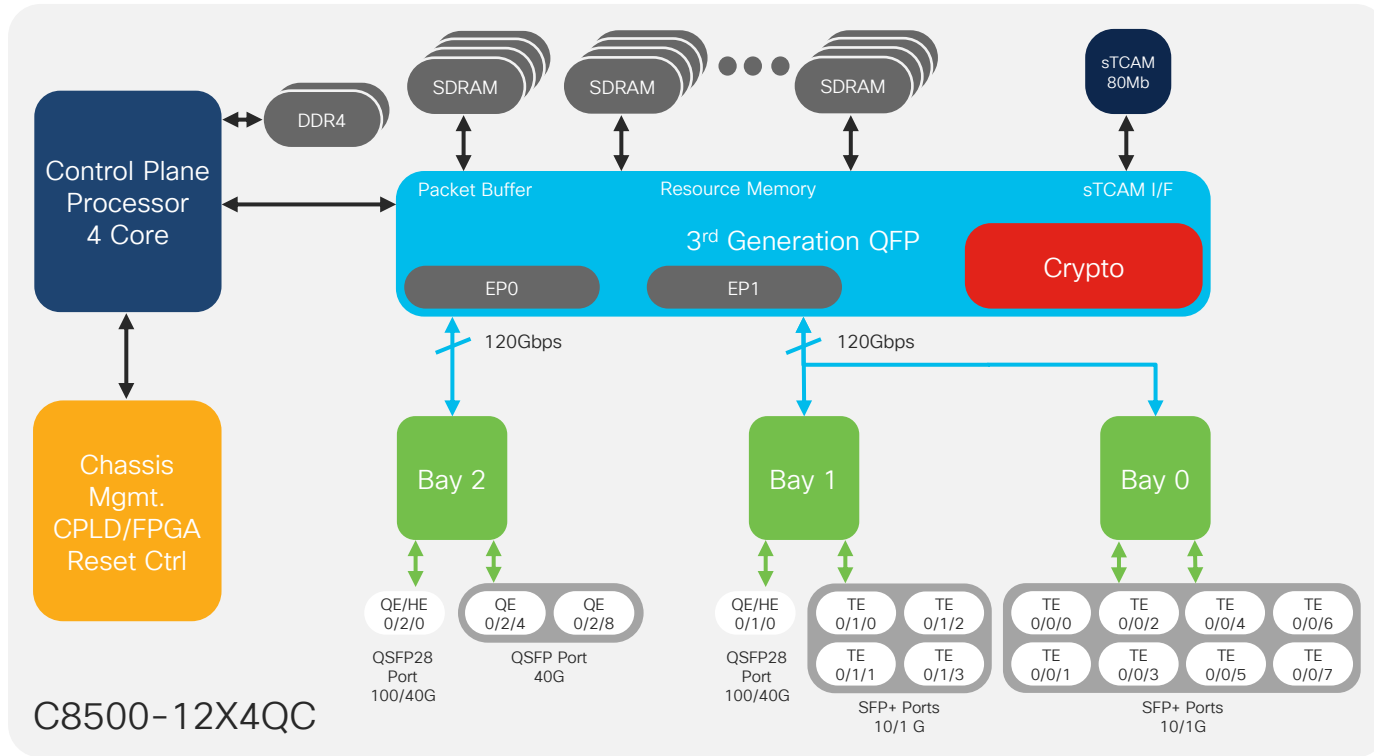
0/2

0/1

0/0



C8500-12X4QC Block Diagram



C8500-12X Bay



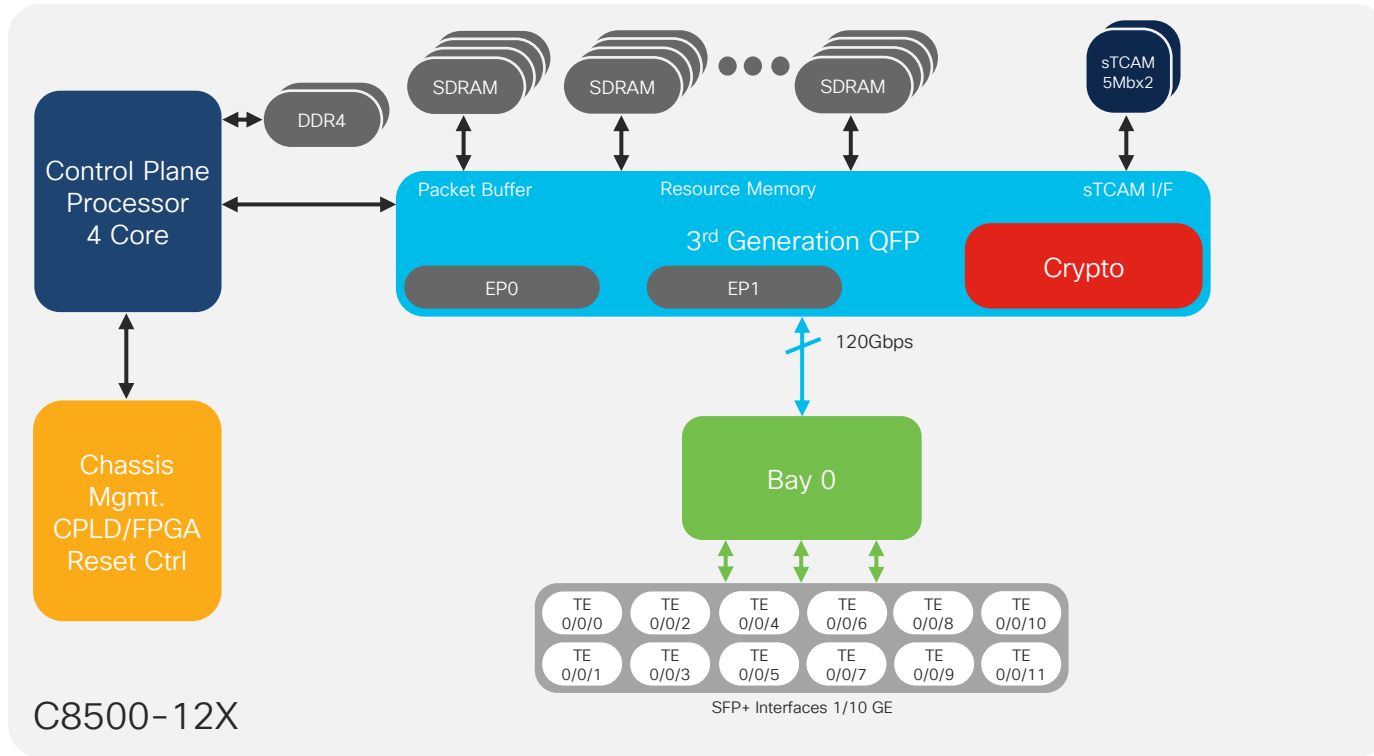
0/0

Bay 0: 12xSFP+

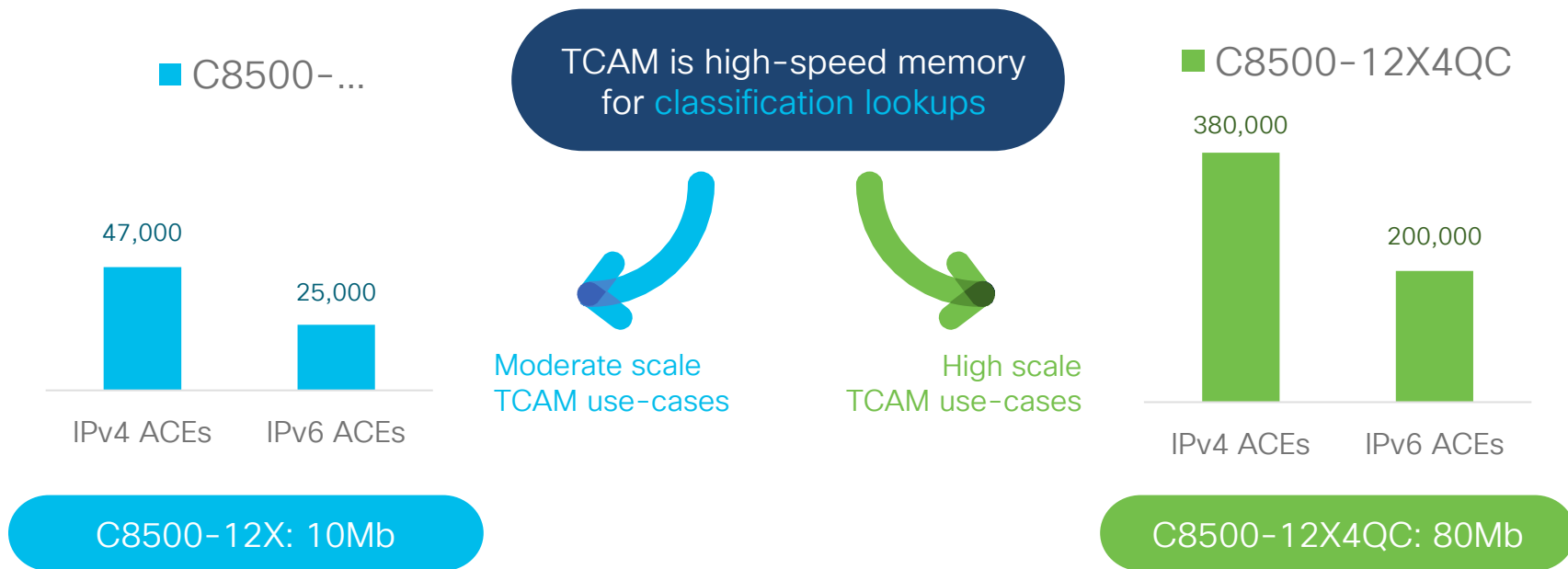
12x 1/10G SFP+ Ports



C8500-12X Block Diagram



Catalyst 8500 TCAM Capacity



C8500-12X4QC is better choice for high scale TCAM use-cases

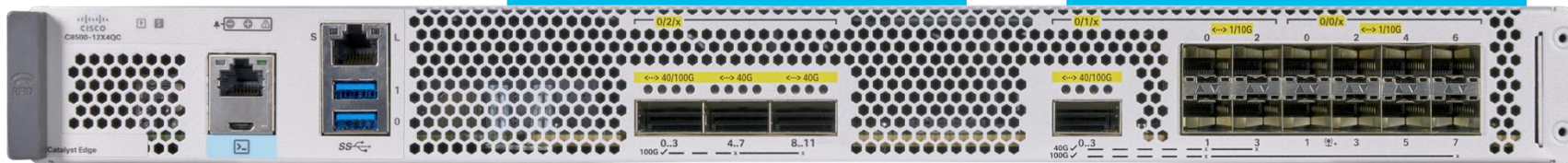
*An Access Control List (ACL) is an ordered list of classification filters and actions. Each single classification rule, together with its action, is called an Access Control Element (ACE).

C8500-12X4QC Port Connectivity

Purpose-built 100GE, 40GE Port SD-WAN 1RU Platform

Max 120G of
ports from Bay 2

Max 120G of ports across
Bay 0 + Bay 1



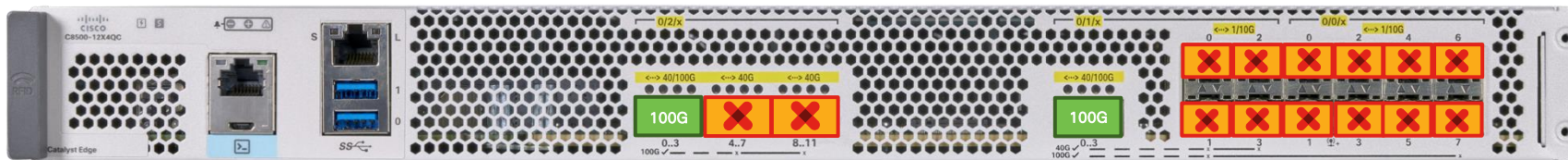
Option	Port Speed	Maximum Port Configuration
1	100GE	2x100G
2	100/40GE	1x100GE + 3x40GE
3	100/40GE	1x100GE + 12x10GE
4	40/10GE	4x40GE + 8x10GE
5	40/10GE	3x40GE + 12x10GE
6	100/40/10GE	1x100GE + 1x40GE + 8x10GE
7	10GE	12x10GE + 12x10GE (using breakout* cable)
8	1GE	12x1GE

Note: 1/10GE port's speed is detected based on SFP/SFP+ used in the port, *breakout cable support in autonomous mode only

100GE, 40GE Connectivity Options (i)

C8500-12X4QC

Option 1 2 x 100GE



Option 2 1 x 100GE + 3 x 40GE Ports



Note: For port speed change on any bay; there is an expected 1 sec traffic disruption due to backplane reset

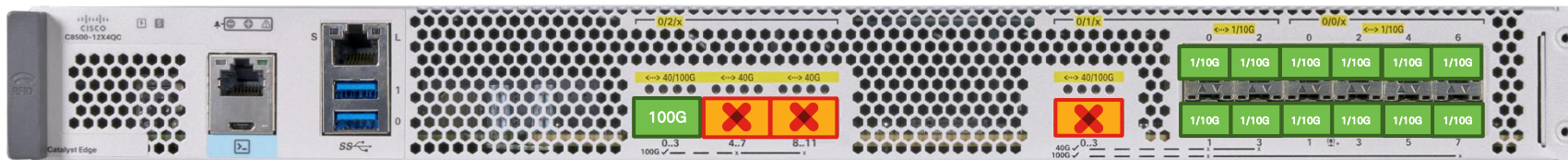
100GE, 40GE Connectivity Options (ii)

C8500-12x4QC

 Port Enabled

 Port Disabled

Option 3 1 x 100GE + 12 x 10GE



Option 4 4 x 40GE + 8 x 10GE



Note: For port speed change on any bay; there is an expected 1 sec traffic disruption due to backplane reset

100GE, 40GE Connectivity Options (iii)

C8500-12x4QC

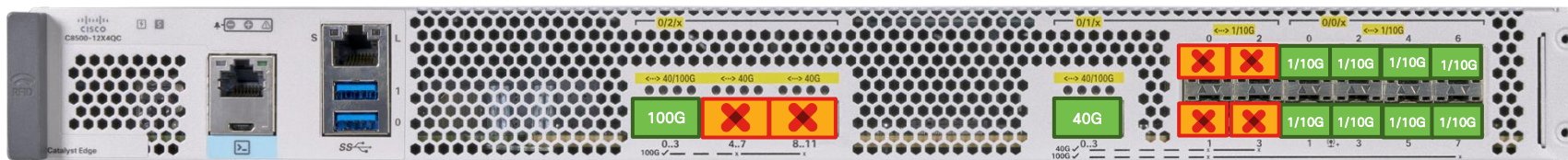
 Port Enabled

 Port Disabled

Option 5 3 x 40GE + 12 x 10GE



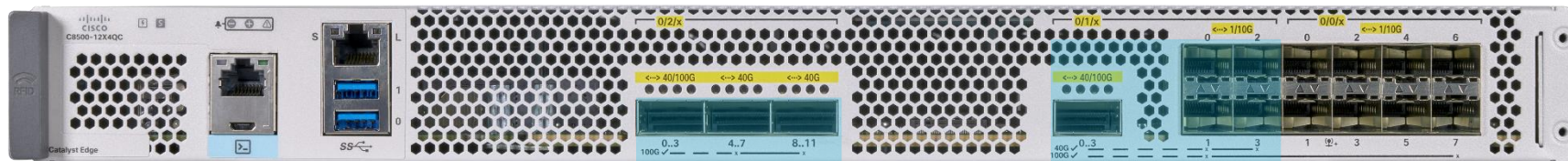
Option 6 1 x 100GE + 1 x 40GE + 8 x 10GE



Note: For port speed change on any bay; there is an expected 1 sec traffic disruption due to backplane reset

C8500-12X4QC, Bay Speed Configuration

Autonomous Mode



```
C8500(config)# hw-module subslot 0/1 mode ?
```

```
100G  configure EPA to 100G mode
```

```
10G   configure EPA to 10G mode
```

```
40G   configure EPA to 40G mode
```

```
Router(config)#hw-module subslot 0/1 mode 100G
```

Present configuration of this subslot will be erased and will not be restored.

CLI will not be available until mode change is complete and EPA returns to OK state.

Do you want to proceed? [confirm]

<snip>

C8500-12X4QC, настройка Bay

Режим SD-WAN

The screenshot displays the Cisco vManage configuration interface. The top navigation bar shows 'Cisco vManage' and the user 'admin'. The main menu on the left includes 'CONFIGURATION | TEMPLATES', 'Device', and 'Feature'. The 'Feature' tab is selected, and a breadcrumb trail indicates 'Feature Template > Add Template > Dynamic Interface Mode'. Below this, a physical representation of the C8500-12X4QC switch is shown, with green arrows pointing from its ports to the configuration panel below.

The 'SUBSLOT MODE PARAMETERS' panel is visible, showing configuration for three bays:

Bay	Configuration
Bay 0	8*10g
Bay 1	1*40G (selected), 1*100G
Bay 2	1*100G

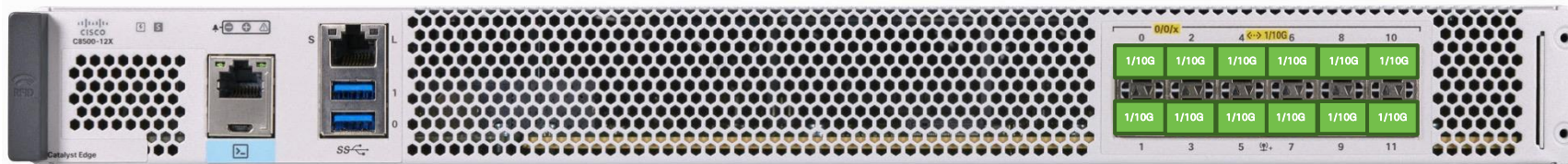
At the bottom of the panel are 'Save' and 'Cancel' buttons.

Максимальная плотность 10GE, 1GE

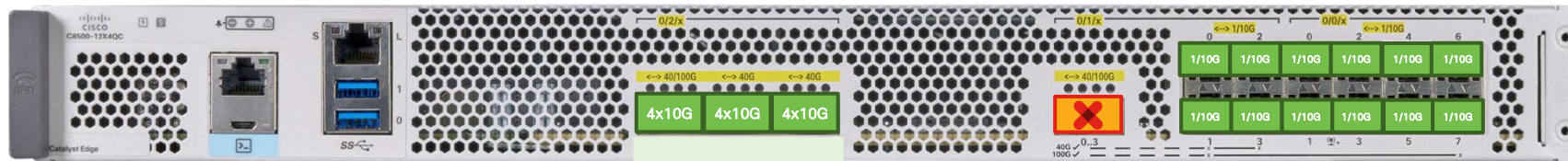
C8500-12X and C8500-12x4QC



Option 7, 8 C8500-12X: 12 x 1/10GE



Option 7, 8 C8500-12X4QC: 12 x 1/10GE + 12 x 10GE*



12 x 10GE using Breakout Cable

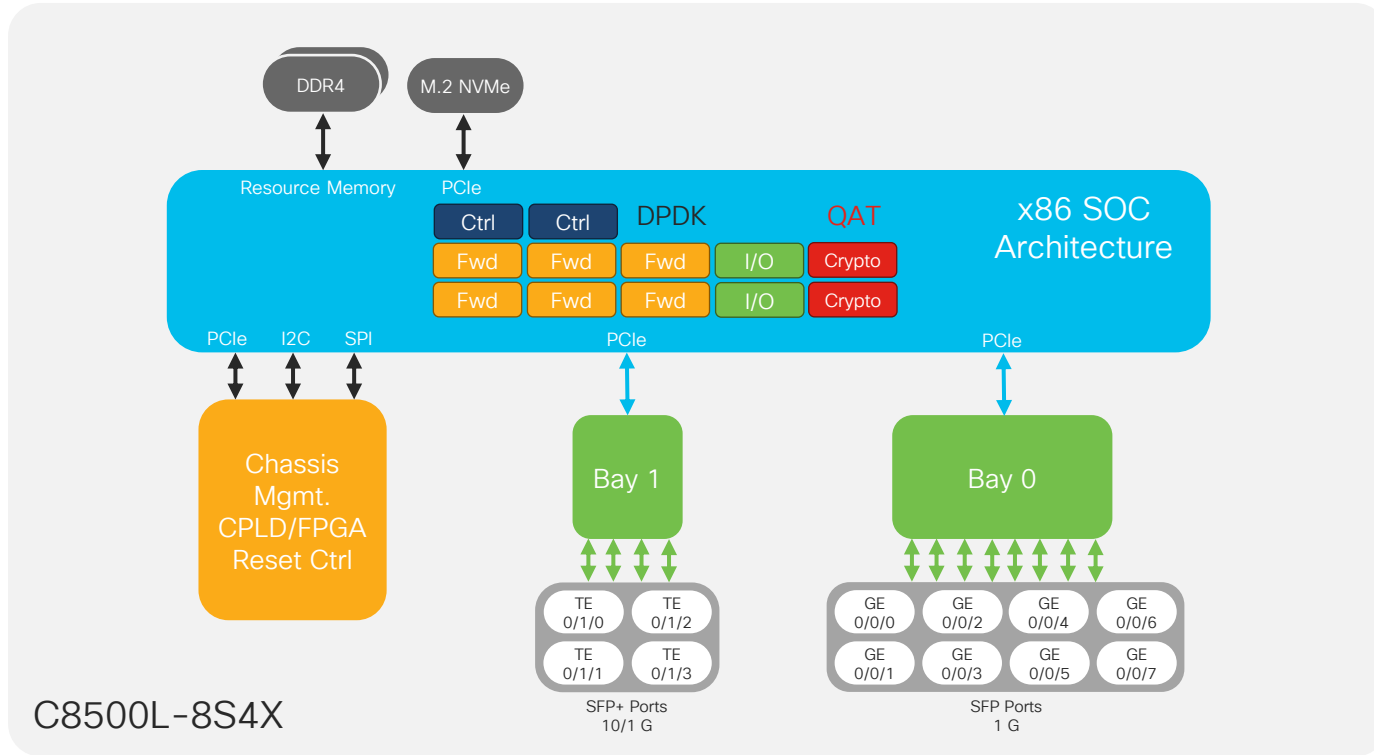
*C8500-12X4QC breakout cable is supported from 17.4.1 and on Autonomous mode only.

Архитектура Catalyst 8500L

C8500L-8S4X



C8500L-8S4X Block Diagram



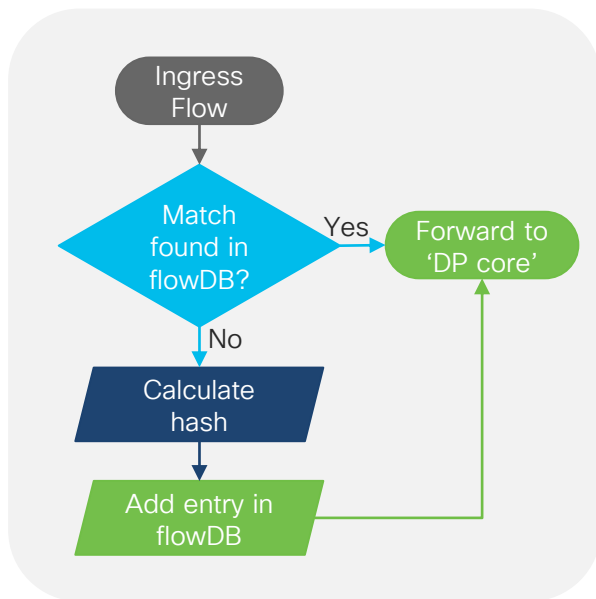


Advanced Flow-based Forwarding

Re-imagined x86 Forwarding Architecture



Quick Assist Technology



Protocol	Tuple hashing elements
TCP/UDP	srcIP, dstIP, protocol, srcPort, dstPort, vrfID
ESP	srcIP, dstIP, protocol, vrfID
All other Protocols	srcIP, dstIP, protocol, vrfID



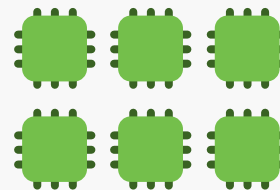
Data Plane vs Service Plane Heavy



Control Plane



I/O & queuing



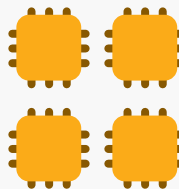
Data Plane



Crypto



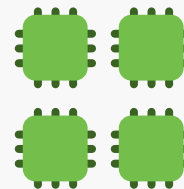
Control Plane



Service Plane



I/O & queuing



Data Plane



Crypto

CLI configuration and reboot required to change modes. Roadmap for future software to not require reboot.

Catalyst 8500

Сравнение с текущей линейкой ASR 1000X/HX

ASR1002-HX vs C8500-12X4QC

Product Comparison

Up to 18Gbps SD-WAN, 6000 tunnels

Up to 100Gbps CEF, 25Gbps Crypto

8M NAT/PAT, 12M CGN Sessions

4GB DP Memory, 232K Queues

Ports: 8x 1G, 8x 10G, One EPA Slot

16GB to 32GB upgradable DRAM

QFP 2.0, 124 Cores, extra Crypto HW

Up to 32Gbps SD-WAN, 8000 tunnels

Up to 200Gbps CEF, 46Gbps Crypto

16M NAT/PAT, 32M CGN Sessions

32GB DP Memory, 256K Queues

Ports: 12x 1/10G, 2x 40/100G, 2x 40G

16GB to 64GB upgradable DRAM

QFP 3.0, 224 Cores, Inbuilt Crypto, L2



All perf numbers are aggregate throughput

ASR1001-HX vs C8500-12X

Product Comparison

Up to 11Gbps SD-WAN, 6000 tunnels

Up to 60Gbps CEF, 16Gbps Crypto

2M NAT/PAT, 4M CGN Sessions

1GB DP Memory, 116K Queues

Ports: 8x 1G, 4x 10G, 4x 1/10G

16GB to 32GB upgradable DRAM

QFP 2.0, 124 Cores, extra. Crypto HW

Up to 23Gbps SD-WAN, 8000 tunnels

Up to 120Gbps CEF, 32Gbps Crypto

12M NAT/PAT, 24M CGN Sessions

32GB DP Memory, 256K Queues

Ports: 12x 1/10G

16GB to 64GB upgradable DRAM

QFP 3.0, 224 Cores, Inbuilt Crypto, L2



All perf numbers are aggregate throughput

ASR1001-X vs C8500L-8S4X

Product Comparison

Up to 4.5 Gbps SD-WAN, 6000 tunnels

Up to 20Gbps CEF, 5.5Gbps Crypto

2M NAT/PAT, 15 Gbps NAT perf

4GB DP Memory, 16K Queues

Ports: 6x 1G, 2x 10G

8GB to 32GB upgradable DRAM

QFP 2.0, 31 Cores

Up to 8.5Gbps SD-WAN, 8000 tunnels

Up to 20Gbps CEF, 13Gbps Crypto

2M NAT/PAT, 17 Gbps NAT perf

Max 4GB DP Memory, 16K Queues

Ports: 8x 1G, 4x 1/10G

16GB to 64GB upgradable DRAM

x86, 12 Cores, Flow Based Architecture



All perf numbers are aggregate IMIX throughput

Catalyst 8500

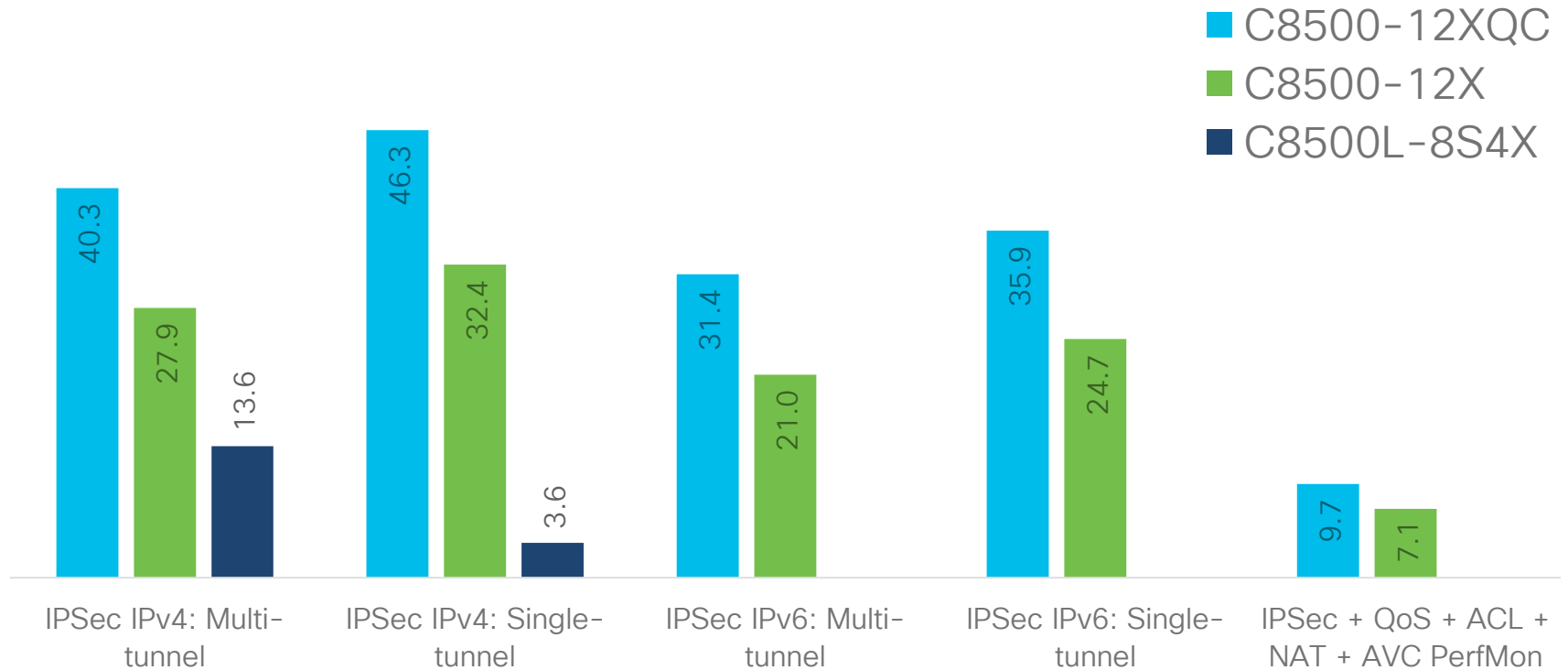
Performance and Scale

IOS XE Performance



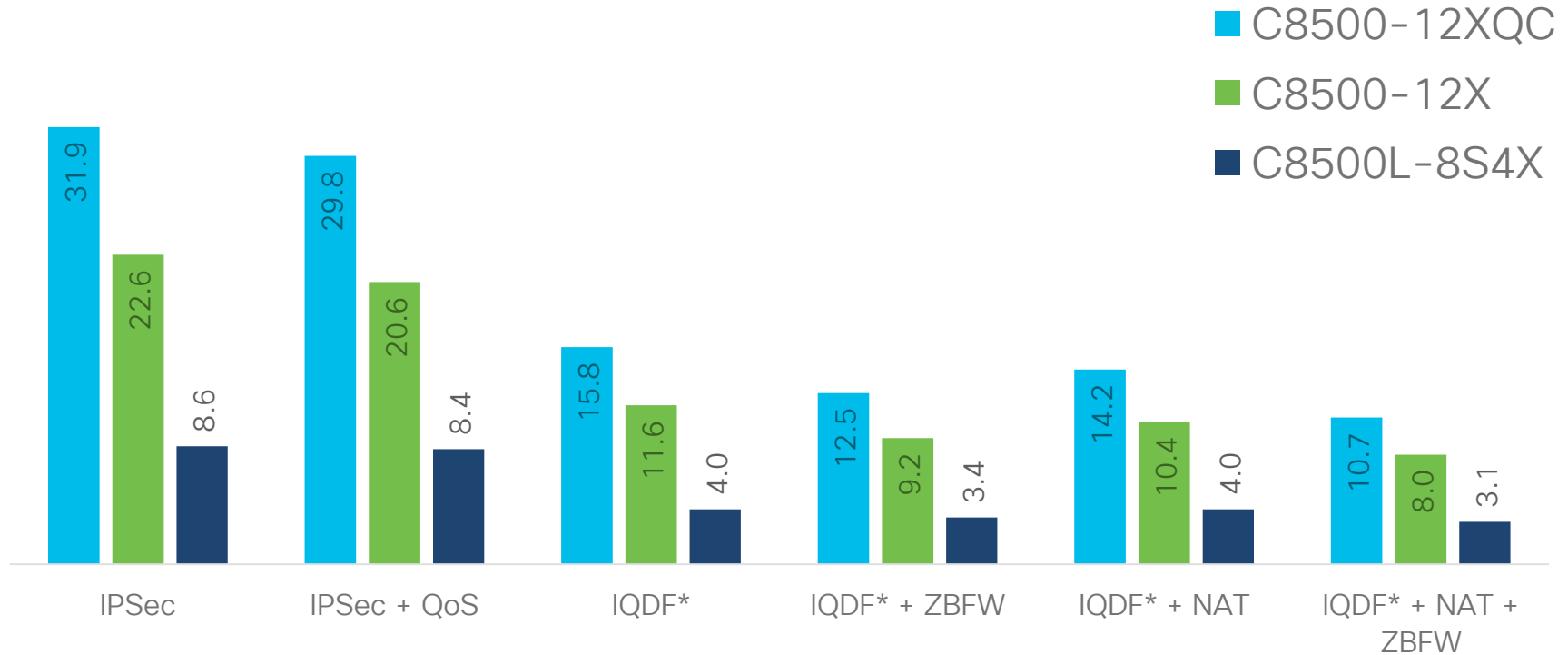
All numbers are for aggregate IMIX traffic in Gbps
IMIX Profile: 64B:7, 594B:4, 1418B:1

IOS XE IPsec Throughput Performance



All numbers are for aggregate IMIX traffic in Gbps
IMIX Profile: 64B:7, 594B:4, 1418B:1

SD-WAN Throughput Performance



All numbers are for aggregate IMIX traffic in Gbps

*IQDF: IPsec + QoS + DPI + FNF

SD-WAN 1D-Scale

Feature	C8500-12X4QC	C8500-12X	C8500L-8S4X
IPsec Overlay Tunnels (Viptela)	8,000	8,000	8,000
GRE Overlay Tunnels (Viptela)	8,000	8,000	
DPI Flows	2,000,000	2,000,000	500,000
cFlow Flows	2,000,000	2,000,000	
OMP Routes (Overlay)	2,000,000	2,000,000	300,000
IPv4 Routes	2,000,000	2,000,000	
NAT Sessions	6,000,000	6,000,000	
Firewall Sessions	6,000,000	6,000,000	
ARP Entries	500,000	500,000	

IOS XE 1D-Scale

Feature	C8500-12X4QC	C8500-12X	C8500L-8S4X
ARP Entries	1,000,000	1,000,000	
IPv4 Routes	4,000,000	4,000,000	3,500,000
IPv6 Routes	4,000,000	4,000,000	3,000,000
IPsec Tunnels	8,000	8,000	4,000
FlexVPN Tunnels	10,000	10,000	
NAT/PAT Sessions	16,000,000	12,000,000	2,000,000
CGN Sessions	32,000,000	24,000,000	3,200,000
Firewall Sessions	6,000,000	6,000,000	2,000,000
IPv4 ACE	380,000	47,000	50,000
IPv6 ACE	200,000	25,000	25,000

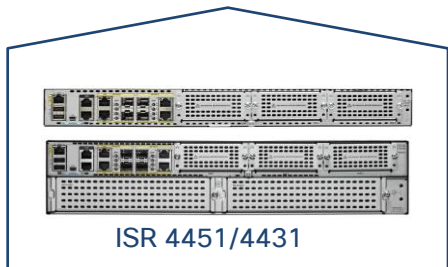
Проверка знаний 1 (Poll 1)

Catalyst 8300/8200 (Branch)

Cisco Catalyst 8300, 8200 Edge Platforms

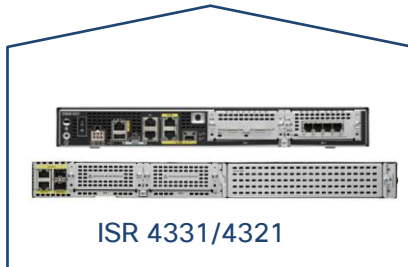
Transforming your branch...

Catalyst 8300 Series
Edge Platforms



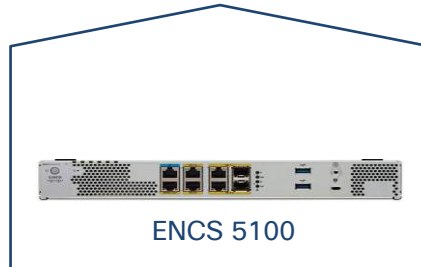
ISR 4451/4431

Catalyst 8200 Series
Edge Platforms



ISR 4331/4321

Catalyst 8200 Series
Edge uCPE



ENCS 5100

Modular Access

Optimized for **SASE** with
Cisco Secure Cloud-scale SD-WAN

Cisco Branch Routing portfolio

The leading SD-WAN Edge Platforms with rich services



Performance and Rich Services

Modularity

Voice Integration

Dynamic Core Allocation

Modular Branch Edge

C8300-1N1S-4T2X

Up to 5 Gbps SD-WAN
Up to 12 Gbps traditional



C8300-1N1S-6T

Up to 2 Gbps SD-WAN
Up to 10 Gbps traditional



C8200-1N-4T

Up to 1Gbps SD-WAN
Up to 3.8 Gbps traditional



C8200L-1N-4T

Up to 500Mbps SD-WAN
Up to 3.8 Gbps traditional



C8300-2N2S-4T2X

Up to 5 Gbps SD-WAN
Up to 12 Gbps traditional



C8300-2N2S-6T

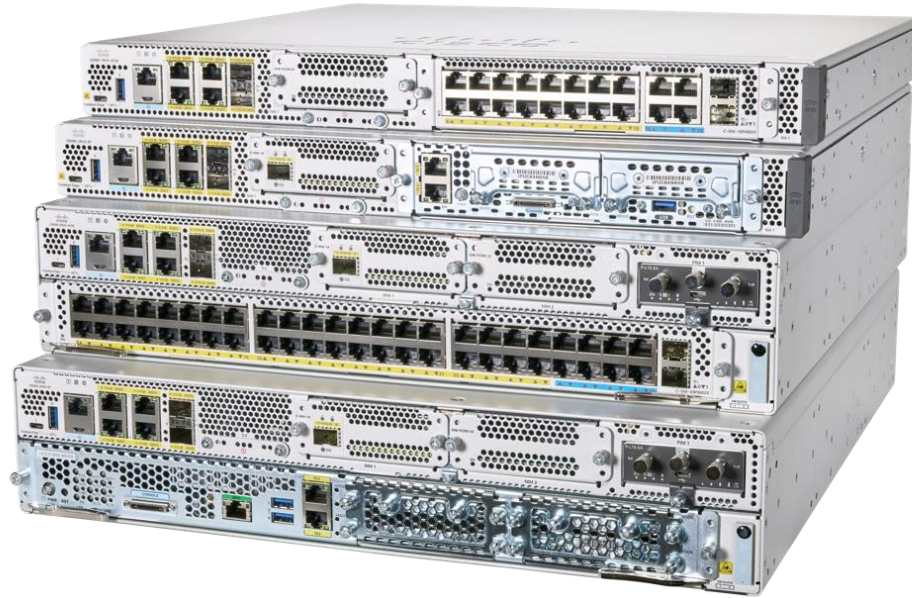
Up to 2 Gbps SD-WAN
Up to 10 Gbps traditional



Agg. throughput SD-WAN IPsec IMIX ~352 Bytes Packet Size

Agg. throughput traditional routing: no IPsec, IMIX ~352 bytes packet size

Scalable Architecture with x86



Catalyst 8300

New Age Branch

Cisco Catalyst 8300 Series Edge Platforms

Introducing 10G in Access with higher port density

10G WAN Ports 'X'
& 5G IPsec

C8300-2N2S-4T2X



C8300-1N1S-4T2X



4 RJ45
2 SFP+

1G WAN Ports 'T'
& 2G IPsec

C8300-2N2S-6T



C8300-1N1S-6T



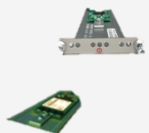
4 RJ45
2 SFP

M.2 USB/
NVMe Storage

UADP-based switch
modules/10G WAN module

User Centric Design
(RFID, QR label, FRUs)

Higher-efficiency AC
and DC power supplies



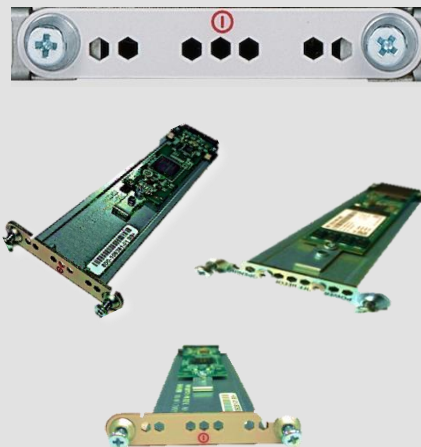
C8300 Storage Options

External M.2 storage

Storage Options

8 GB default bootflash
(not upgradable)
//8Gb DRAM default (up to
32Gb)//

16G default M2. USB
32 GB M.2 USB options
600 GB M.2 NVMe SSD options



Use Case

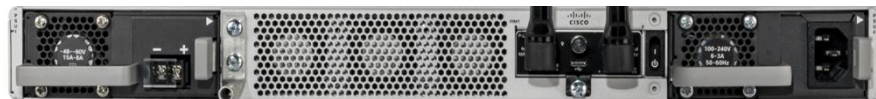
SD-WAN storage

App Hosting

Logging local

Guest Shell/Python

C8300 Power Supply



Dual AC, DC, POE PSUs

HVDC PSU support

PoE, PoE+ & UPOE Capable

PoE Boost with 500W and 1000W

Device Model	Power Supply	AC 250W	DC 400W	DC 400W HV	Dual AC PSU	Dual DC PSU	AC + POE 500W	AC + DC Mix mode
C8300-1N1S-6T	Internal	✓	✓	✓	✓	✓	✓	✓
C8300-1N1S-4T2X	Internal	✓	✓	✓	✓	✓	✓	✓

Device Model	Power Supply	AC 650W	DC 650W	DC 650W NEBS	Dual AC PSU	Dual DC PSU	PoE Adaptor	AC + DC Mix mode
C8300-2N2S-6T	Internal	✓	✓	✓	✓	✓	✓	✓
C8300-2N2S-4T2X	Internal	✓	✓	✓	✓	✓	✓	✓

PoE Supported Modules

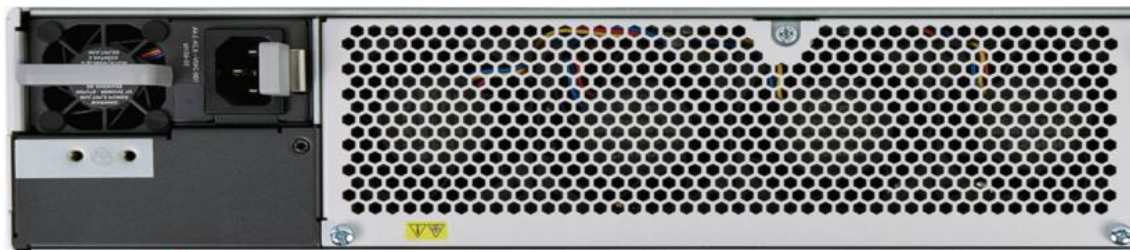
NIM-ES2-8-P
C-SM-40G8M2X
C-SM-16G4M2X



1 + 1 Redundancy with Inline Power

Охлаждение в C8300

Replaceable fan tray, 4 Internal Fans assembly module



Field Replaceable Fan Tray

Reverse Airflow (NEBS)

Front-to-Back Airflow

Для 2RU платформ вентиляторный блок рекомендуется заменить в течение 2

Fixed Fan tray, 3 Internal Fans минут assembly module



Internal Fan tray

Front-to-Back Airflow

Для 1RU платформ вентиляторный блок доступен для замены с выключением

FAN Module Build N+1 Redundancy for Cooling

Доступные модули для C8300

Обратная совместимость модулей и защита инвестиций

95% Модулей от ISR 4400 совместимы с Cat8300*

Новые модули

UCS-E M3 SM Modules	Compute		SD-WAN	Perf.	MACsec	
	Ethernet WAN	L3 1x10G WAN Module				
4P/8P/8P PoE NIM Modules	Ethernet LAN	L2 1G/2.5mG/10G Switch Modules				
CAT4/6 NIM Modules	LTE/5G	5G**/CAT18 LTE PIM				
FXS/FXO/BRI/T1E1 SM-NIM Modules	Voice	Voice DSP Modules for IP Services				
Serial/Async/DSL	Legacy WAN			Voice		

*ISR 4K Modules Not Supported: UCS-E M1/M2, Ethernet SM, Ethernet WAN, SM-NIM Carrier

**5G Roadmap

Catalyst 8300 поддерживаемые модули

* OS-XL is supported, SD-WAN support is in the roadmap
Blue color: new modules



95%
модулей от
ISR4K
совместимы
с C8K

LAN

NIM-ES2-4
NIM-ES2-8
NIM-ES2-8-P
C-SM-40P8M2X
C-SM-16P4M2X

Async

NIM-16A*
NIM-24A*
SM-X-64A*

WAN

C-NIM-1X
NIM-1T
NIM-2T*
NIM-4T*
SM-X-1T3/E3*
NIM-2BRI-S/T*
NIM-4BRI-S/T*

WAN + Voice:
NIM-1MFT-T1/E1
NIM-2MFT-T1/E1
NIM-4MFT-T1/E1
NIM-8MFT-T1/E1
NIM-1CE1T1-PRI
NIM-2CE1T1-PRI
NIM-8CE1T1-PRI

LTE

NIM-LTEA-EA
NIM-LTEA-LA
P-LTE-VZ
P-LTE-NA
P-LTE-US
P-LTE-JN
P-LTE-GB
P-LTE-IN
P-LTE-AU
P-LTEA-EA
P-LTEA-LA
P-LTEAA-EA
P-LTEAP18-GL
CG418-E
CG522-EE

5G

(1H, CY21 : Roadmap)

5G sub-6GHz PIM

Voice

SM-X-PVDM-3000
SM-X-PVDM-2000
SM-X-PVDM-1000
SM-X-PVDM-500
SM-X-24FXS/4FXO
SM-X-16FXS/2FXO
SM-X-8FXS/12FXO
SM-X-72FXS

NIM-2FXSP
NIM-4FXSP
NIM-2FXS/4FXOP
NIM-2FXO
NIM-4FXO
NIM-4E/M*
NIM-2BRI-NT/TE*
NIM-4BRI-NT/TE*
NIM-PVDM-32
NIM-PVDM-64
NIM-PVDM-128
NIM-PVDM-256

DSL

NIM-VAB-A
NIM-VA-B*
NIM-VAB-M
NIM-4SHDSL-EA*

ADAPTOR

C-SM-NIM-ADPT

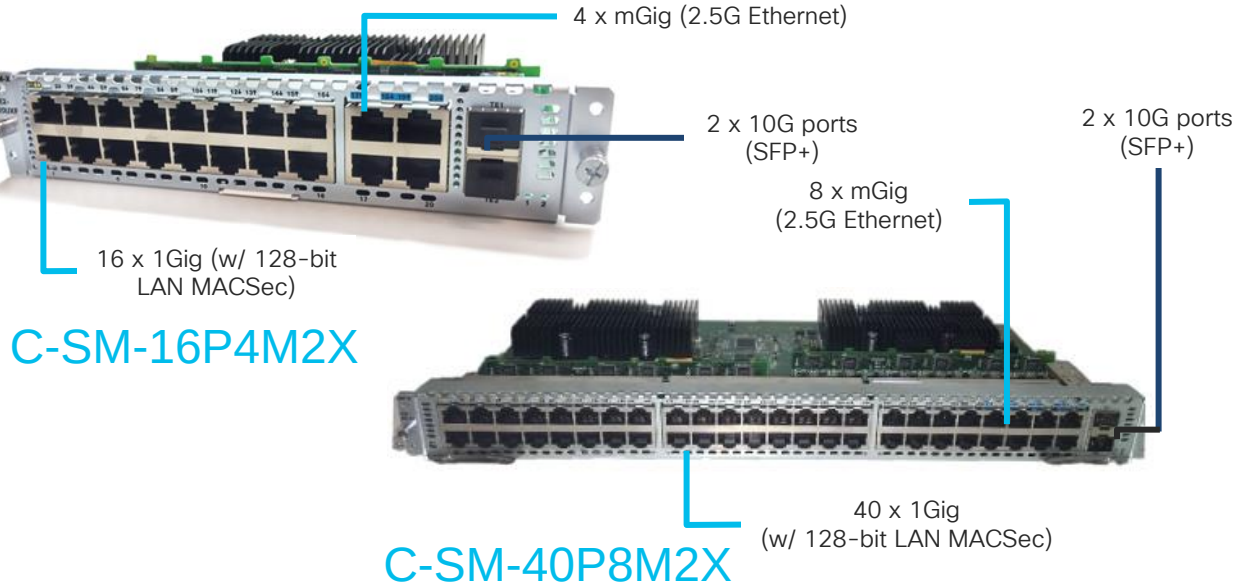
Storage

SSD-M2NVME-600G
M2USB-16G
M2USB-32G

UCS-E

UCS-E160S-M3/K9
UCS-E1120D-M3/k9
UCS-E180D-M3/K9

Модуль Catalyst 8300 SM Based Layer 2 Switch



L2 Switch Module

- 1 Layer 2 Features compatible with Cat switch
- 2 LAN MACSec for switch to host communication
- 3 2.5 mGig to connect to future Access Point/ 5G
- 4 Support for SDWAN features
- 5 UPoE Capable



Port Speed and Diversity
(1G, 2.5G mGig, 10G Fiber)



LAN MACSec
(128-bit/ 256-bit***)

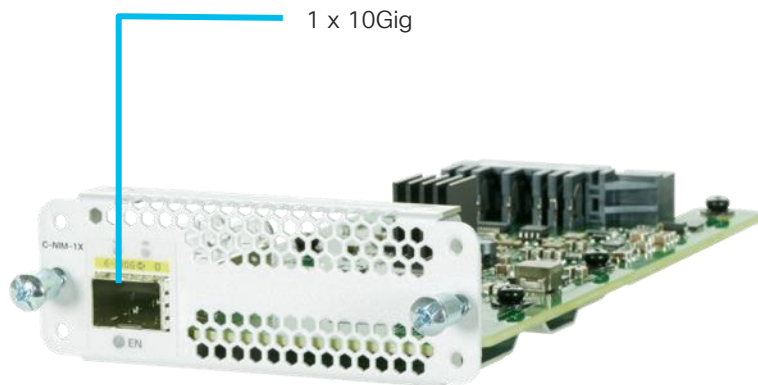


Power Over Ethernet
(PoE/ PoE+/ UPOE)



Cisco UADP ASIC
(UADP 2.0)

Модуль Catalyst 8300 10G WAN NIM (C-NIM-1X)



C-NIM-1X

L3 10G WAN Module

- 1 Layer 3 Features compatible w/ Router FPGE
- 2 WAN MACSec for Secure WAN and Metro Ethernet links
- 3 SDWAN support



Port Speed and Diversity
(10G Fiber)



WAN MACSec
(256-bit)

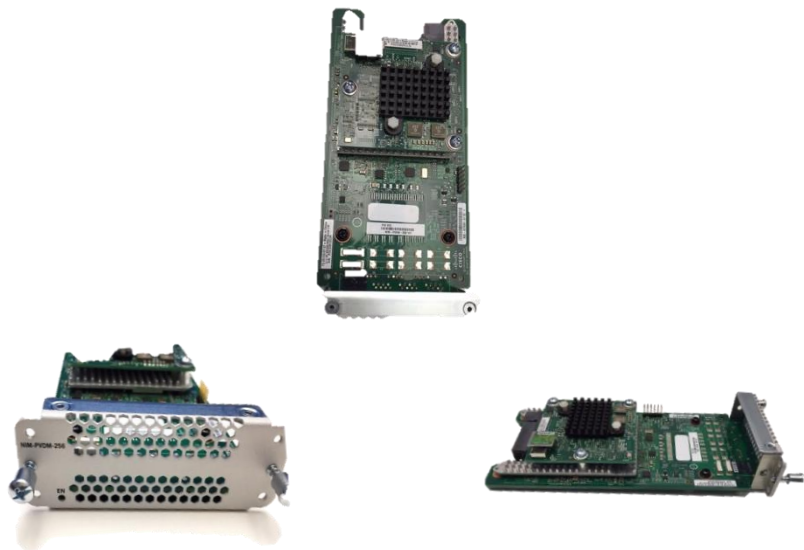


Higher Performance



SD Managed

C8300 NIM Based DSP Voice Modules



Low-medium complexity deployments

4 different NIMs to support
32,64,128,256 voice channels

IP based voice services like
transcoding and conferencing

Can be paired with service modules
for DSP farm capability

Supports wide range of codecs
for different complexities

Compatible with ISR4461 and Next
Generation Platforms

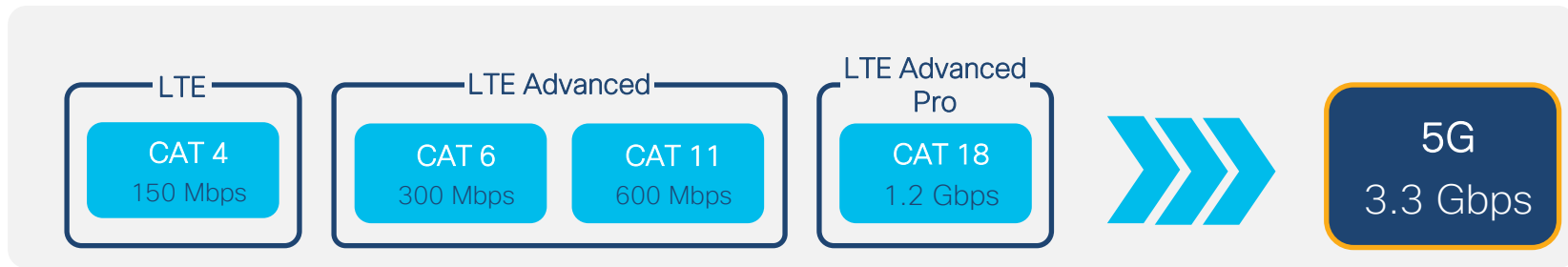
Optimized for rich-media voice applications

SM-NIM Carrier Adapter for Catalyst 8300 Series



Enables up to 2 NIM modules critical to support all combinations of Voice, WAN, LAN modules to be hot swappable and functioning in SM slot.

Wireless WAN: Эволюция технологий



Cisco's Wireless WAN portfolio supporting the evolution

Integrated Solutions

Catalyst 8000/ISR4K/ISR1K

Network Modules

5G Sub-6 GHz/ 4G/Cat18 (PIM)*

Cellular Gateways

Shipping

NEW Shipping

4G/Cat18

5G/Sub-6 GHz

* 5G Sub-6 PIM Roadmap



More flexibility at the branch



Lower TCO and operational costs



High performance & reliability

Гибкий, безопасный и мультигигабитный WAN

CG522-E



5G Sub-6 GHz

↓ 3.3 Gbps
↑ 420 Mbps

10G Ethernet port

CG418-E



CAT 18 LTE

↓ 1.2 Gbps
↑ 150 Mbps

2.5G Ethernet port

Zero Touch
Deployments

Dual micro SIM,
single radio

4x4 ↓ MIMO,
2x2 ↑ MIMO

Carrier
Aggregation

Cisco Catalyst Cellular Gateway

- Устройство IP Passthrough
 - LTE to Ethernet IPv4/IPv6 connectivity
 - No NAT
 - No Firewall
 - No L3 / L4 features
- Вынос LTE радио интерфейсов для лучшего приема
- Используйте существующую инфраструктуру Ethernet
- Не для внешнего монтажа, но есть опция выноса антенны.



Интерфейсы Cellular Gateway

Management

- Serial console
- optional micro-USB for debug
- Reset switch

SIMs (одна активна)

- 2 micro-SIM cards



AUX console

- Roadmap for reverse console support

Ethernet

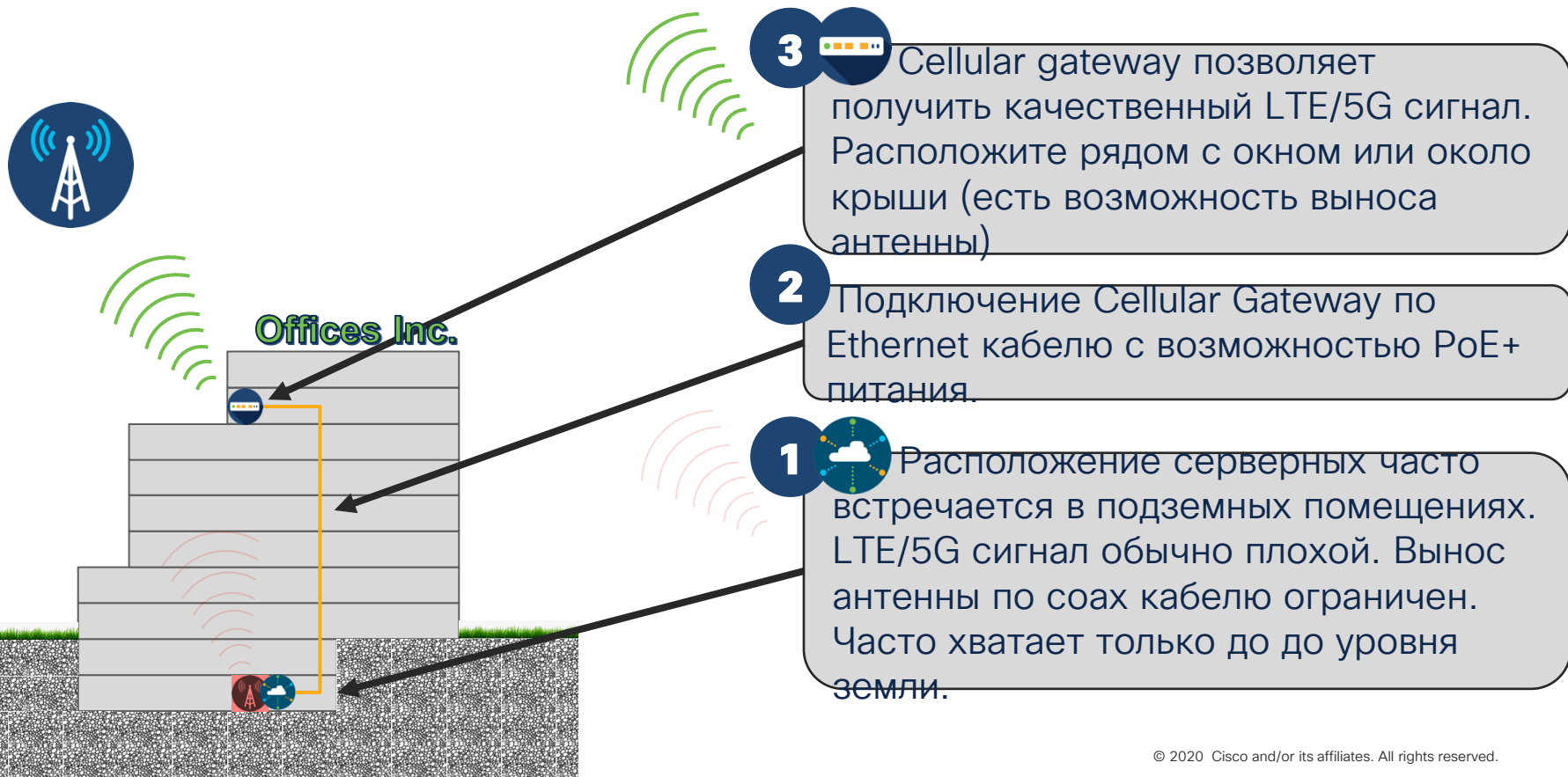
- mGig 2.5G ethernet link to the client device
- optional PoE+ power



Antennas

- 4 SMA connectors
- Supports 4x4 MIMO

Когда необходим Cisco Catalyst Cellular Gateway?



Подключение Cisco Catalyst Cellular Gateway

На стороне Catalyst Cellular Gateway 10/2.5/1G интерфейс.

Рекомендовано подключение напрямую Ethernet кабелем к WAN интерфейсу устройства (до 100м). Например, GigabitEthernet 0/0/0 – 0/0/3 на C8300.
*Не рекомендовано, но возможно через switch, но в отдельном VLAN, без других устройств и только один DHCP (напрямую или через helper)

Cellular Gateway может получать питание от PoE+, Power injector или блока питания.



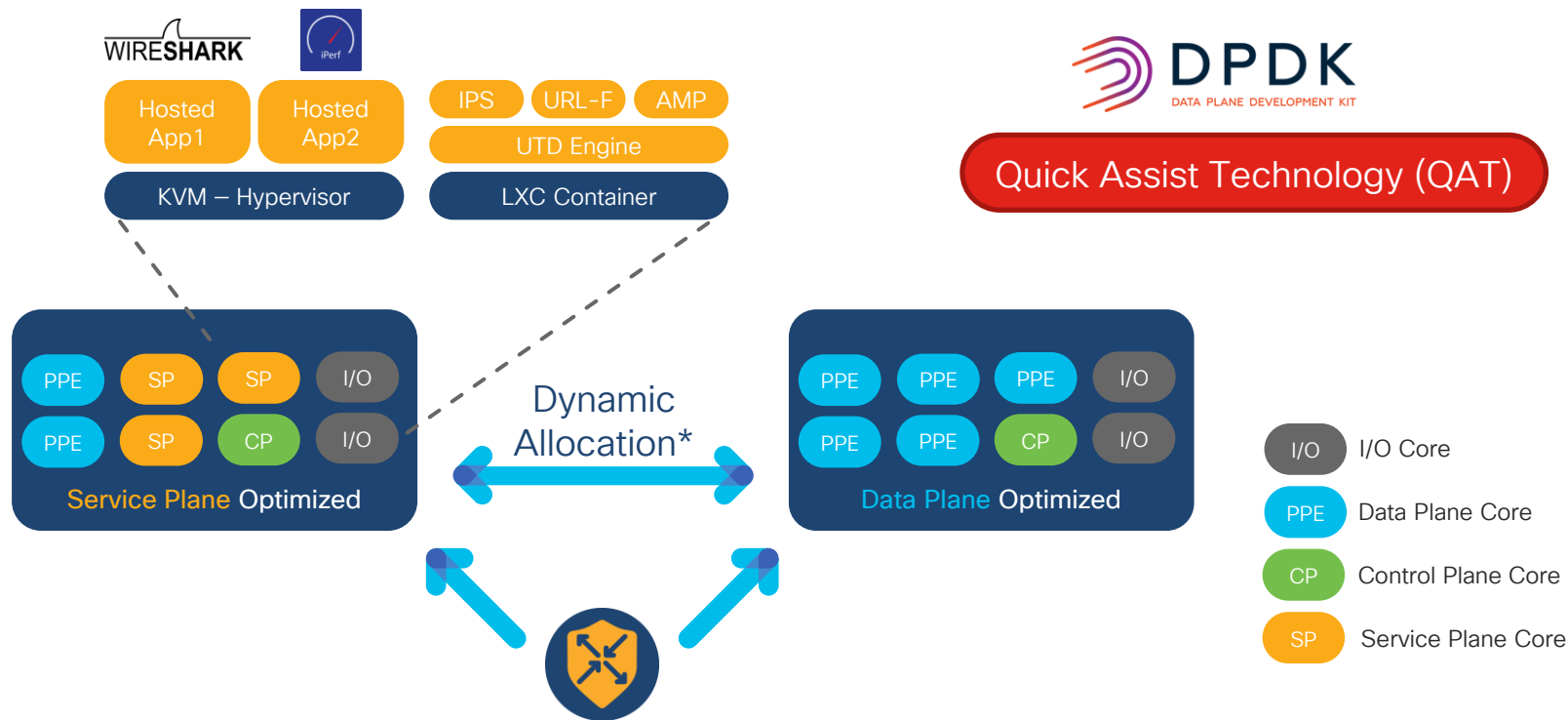
Перерыв

Архитектура Catalyst 8300

Catalyst 8000 Edge Platforms Family – SoC



X86 Multi-core CPU



* Available in XE 17.4 release

Dynamic Core allocation – meet throughput and services demand

Dynamic Core Allocation

- Optimum utilization of compute resources
 - Dynamic & flexible CPU core allocation
- Ability to do core allocation independent of the license levels
 - Allocate cores to **data plane** or **services plane** based on request
 - Core allocation change takes effect only after a system reload
 - Default core allocation is **service-plane-heavy**
 - New CLI command **platform resource** added

Catalyst 8300 Series Edge Platforms

Default optimized Core allocation XE 17.3

Default Optimized Core Allocations*

	SD-WAN	IOS XE
C8300-2N2S-4T2X 	12Core	CP-1, DP-6, SP-5
C8300-2N2S-6T 	8Core	CP-1, DP-4, SP-3
C8300-1N1S-4T2X 	8Core	CP-1, DP-4, SP-3
C8300-1N1S-6T 	8Core	CP-1, DP-4, SP-3

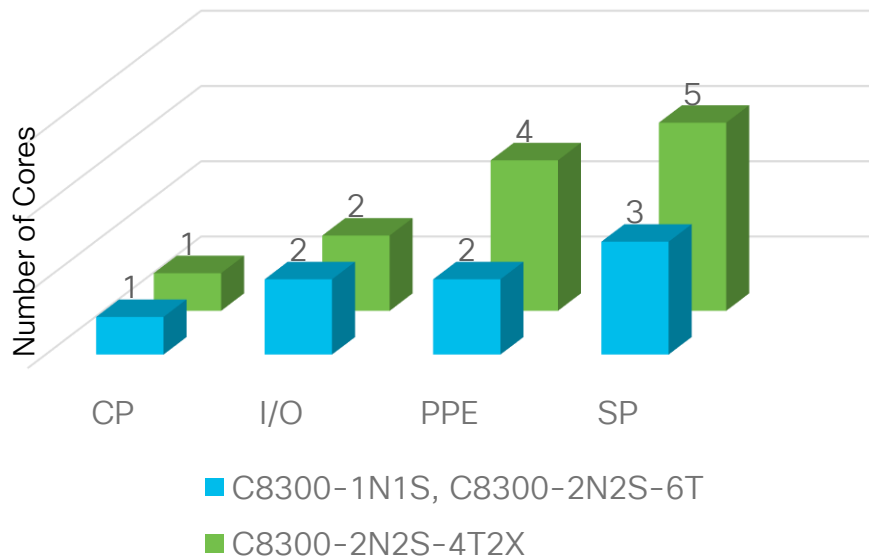
* Dynamic Core allocation available in XE 17.4 release

Catalyst 8300 Built for Service Optimization

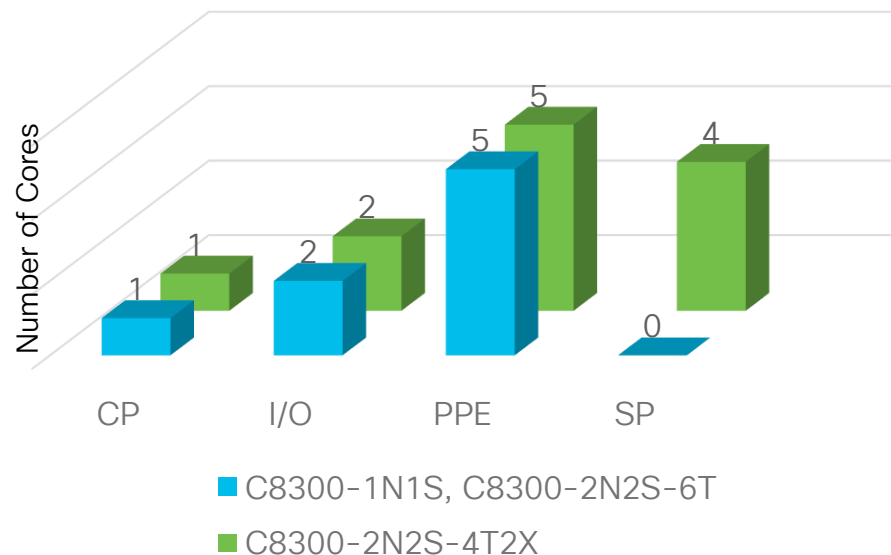
CPU Core Allocation

(Default - Service optimized mode)

Service Optimized mode



Data Optimized mode



Dynamic Core CPU Allocation

Platform	Service Plane Heavy	Data Plane Heavy
C8500L-8S4X	2CP + 6DP (1 IO, 1Crypto+ 4PPE) + 4SP	2CP + 10DP (2 IO, 2 Crypto, 6PPE)
C8300-2N2S-4T2X	1CP + 6DP (2 IO, 4PPE) + 5SP	1CP + 7DP (2 IO, 5PPE) + 4SP
C8300-2N2S-6T	1CP + 4DP (2 IO, 2PPE) + 3SP	1CP + 7DP (2 IO, 5PPE)
C8300-1N1S-4T2X	1CP + 4DP (2 IO, 2PPE) + 3SP	1CP + 7DP (2 IO, 5PPE)
C8300-1N1S-6T	1CP + 4DP (2 IO, 2PPE) + 3SP	1CP + 7DP (2 IO, 5PPE)
C8200-1N-4T	1CP + 4DP (2 IO, 2PPE) + 3SP	1CP + 7DP (2 IO, 5PPE)
ISR1100X-4G	1CP + 2DP (1 IO, 1PPE) + 1SP	1CP + 2DP (1 IO, 1PPE)
ISR1100X-6G	1CP + 2DP (1 IO, 1PPE) + 1SP	1CP + 3DP (1 IO, 2PPE)



I/O Core



Control Plane Core

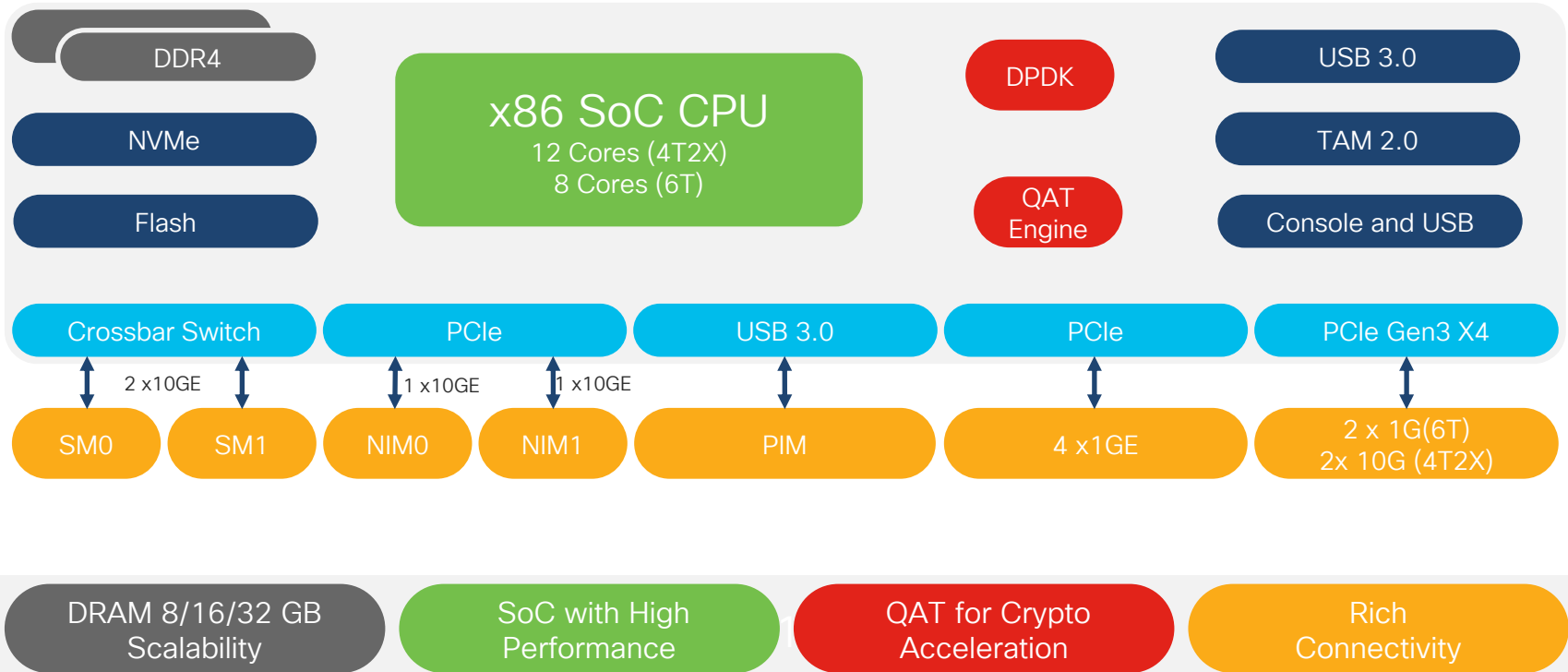


Data Plane Core

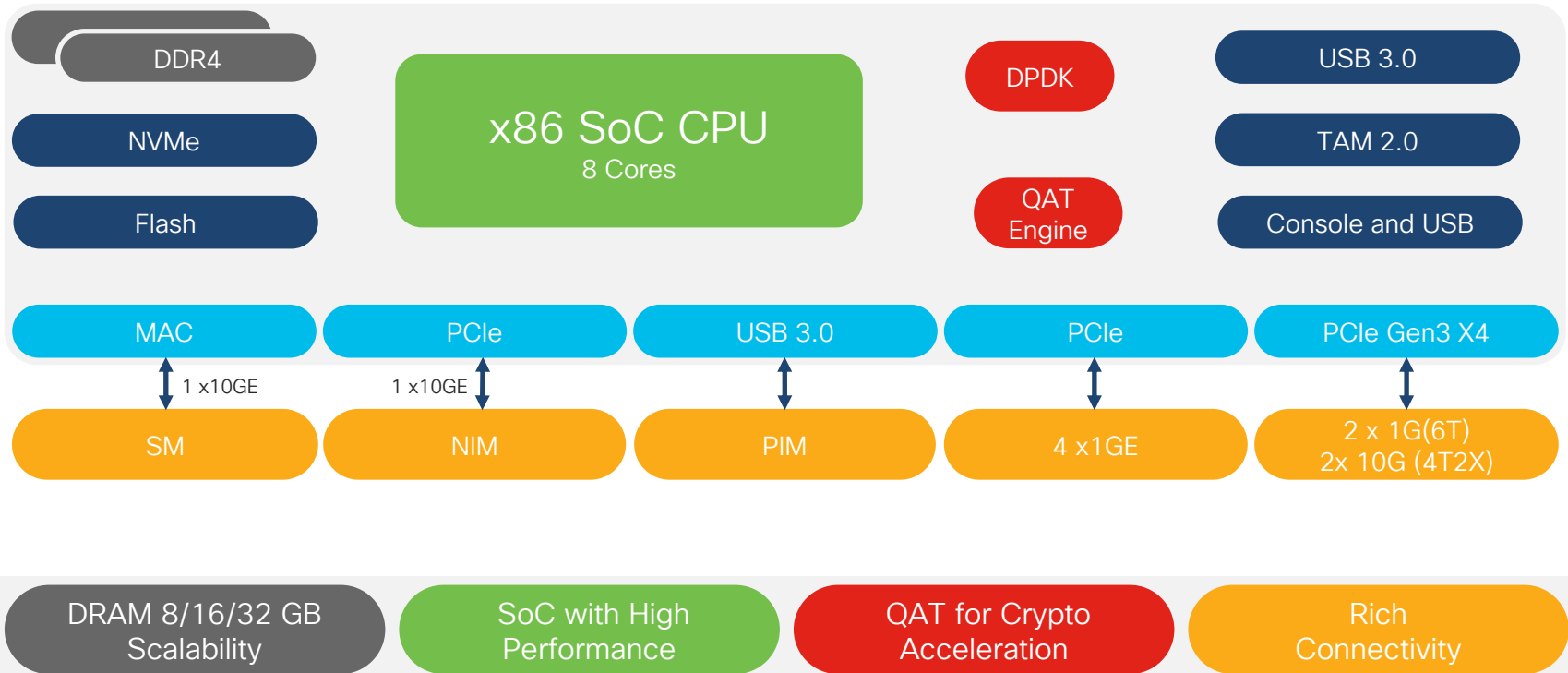


Service Plane Core

C8300-2N2S Block Diagram

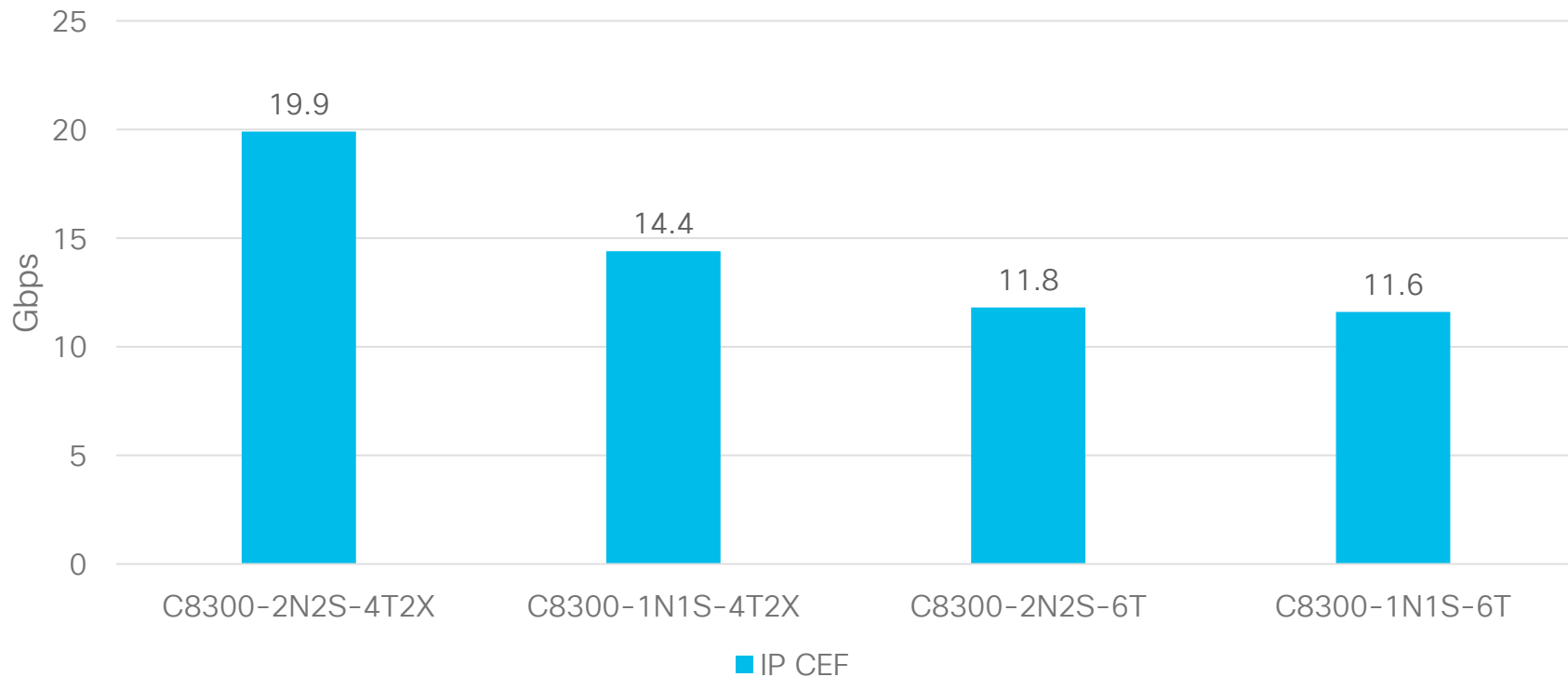


C8300-1N1S Block Diagram



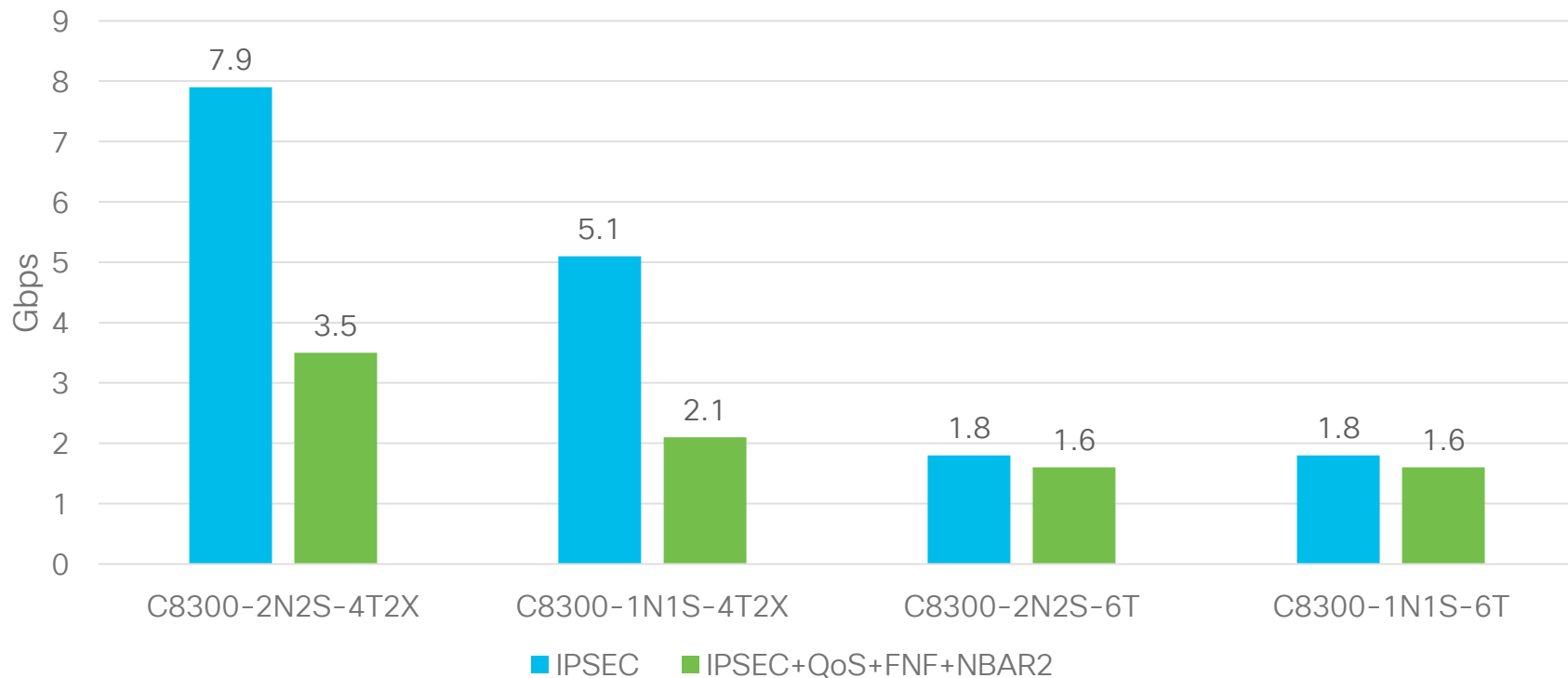
Performance

Catalyst 8300 Baseline Throughput



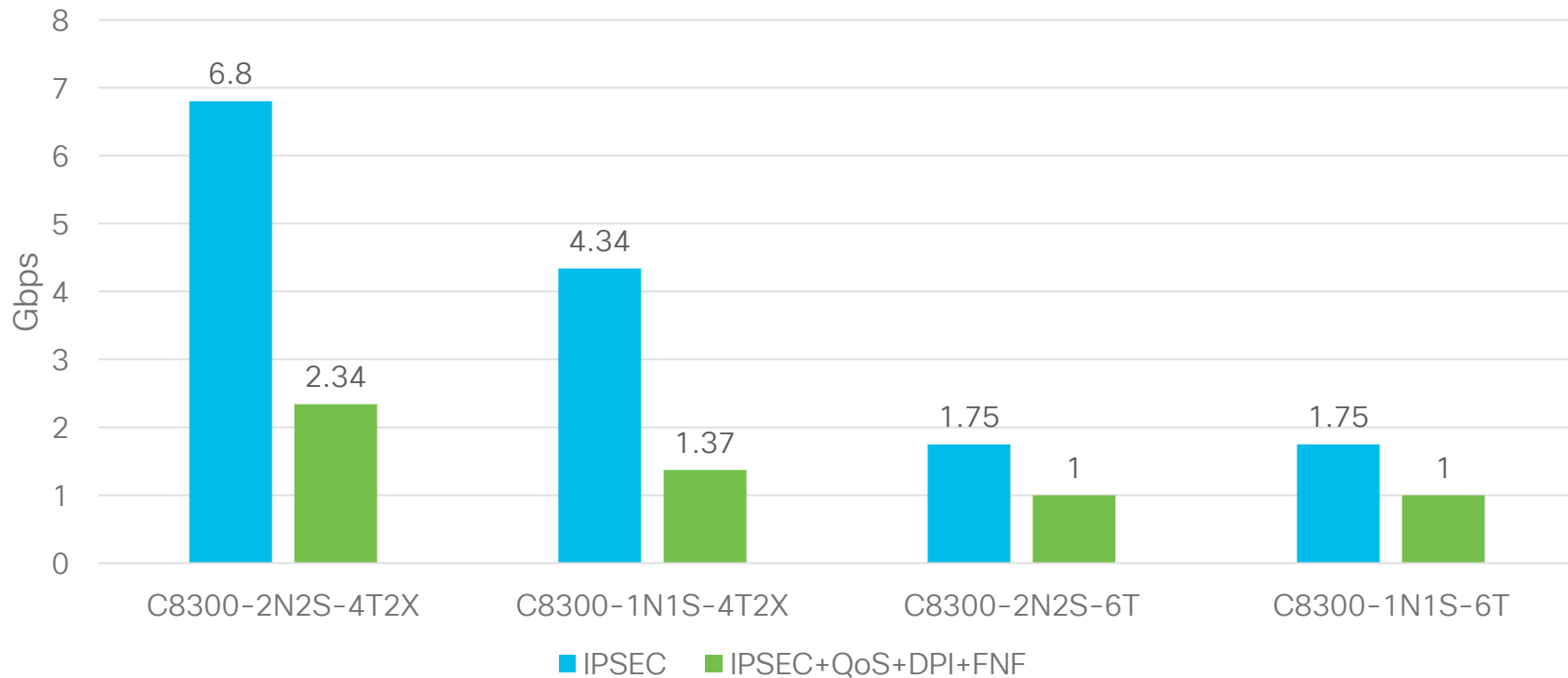
Throughput numbers are based on IMIX packets

Catalyst 8300 IOS XE IPsec Profile Throughput



Throughput numbers are based on IMIX packets

Catalyst 8300 SD-WAN Profile Throughput



Throughput numbers are based on IMIX packets

Catalyst 8300 Series Platforms Scale XE 17.3

Features	8G Default DRAM All Platforms	16G DRAM All Platforms	32G DRAM All Platforms
Number of IPv4 routes (BGP)	1.6M	4M	4M
Number of IPv6 routes (BGP)	1.5M	4M	4M
Number of IPv4 VRF Routes (MPLS VPN) - per prefix label	700K	2M	2M
Number of IPv4 VRF Routes (MPLS VPN) - per vrf label	700K	2M	2M
Number of IPv6 VRF Routes (MPLS VPN) - per prefix label	700K	2M	2M
Number of IPv6 VRF Routes (MPLS VPN) - per vrf label	700K	2M	2M
Max NAT44 static entries	10K	32K	32K
Max NAT44 static networks	2K	10K	10K
Max number of Firewall sessions	512K	512K	512K
Max number of NAT+FW sessions	340K	340K	340K
IPv4 ACLs per System	4K	4K	4K
IPv6 ACLs per System	4K	4K	4K

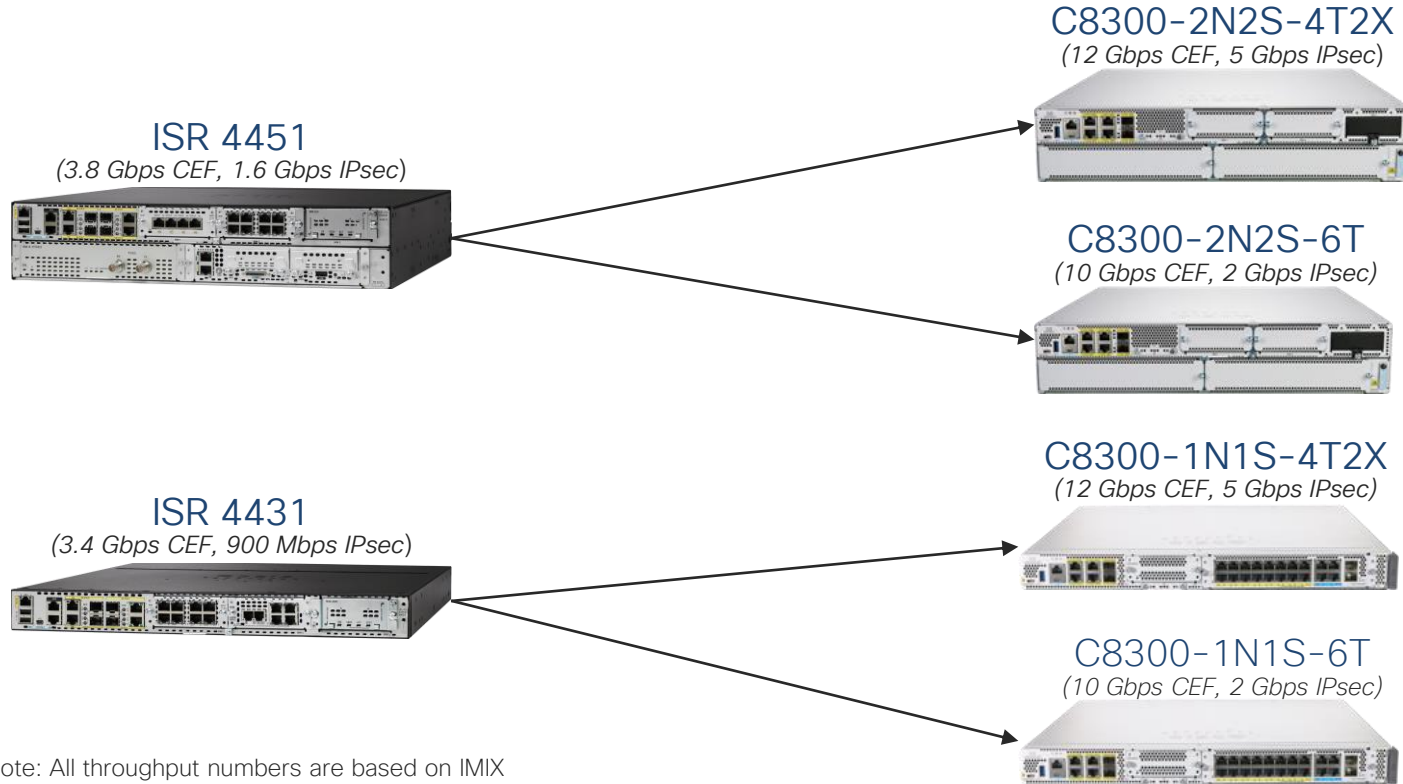
Catalyst 8300 Series Platforms Scale XE 17.3

Features	8G Default DRAM All Platforms	16G DRAM All Platforms	32G DRAM All Platforms
DMVPN / BGP Adjacencies, IKEv1, IPv4	3K	6K	6K
DMVPN / BGP Adjacencies, IKEv2, IPv4	3K	6K	6K
DMVPN / EIGRP Adjacencies, IKEv1, IPv4	3K	5K	5K
DMVPN / EIGRP Adjacencies, IKEv2, IPv4	3K	5K	5K
Number of IPsec tunnels (FlexVPN, AAA/CERT), IKEv2, IPv4	4K	5K	5K
Number of IPsec tunnels (FlexVPN, AAA/PSK), IKEv2, IPv4	4K	5K	5K
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv4	4K	4K	4K
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv6	4K	4K	4K
Number of IPsec Tunnels (IPsec, S2S), IKEv1, IPv4	4K	6K	6K
Number of IPsec Tunnels (IPsec, S2S), IKEv2, IPv4	4K	6K	6K
Number of IPsec Tunnels (IPsec, S2S), IKEv2, IPv6	4K	6K	6K
Number of IPsec Tunnels (IPsec/sVTI, S2S), IKEv2, IPv4	4K	4K	4K

Сравнение ISR 4400 Catalyst 8300

Migration Path – ISR 4400 to Catalyst 8300

Performance



ISR 4451 vs C8300-2N2S

Product Comparison

Up to 4000 IPsec Tunnels

Up to 1.4Gbps SD-WAN IPsec

Up to 3.8Gbps CEF, 2Gbps Crypto

240Mbps IPS/IDS + URL-Filtering

4GB to 16GB upgradable DRAM

Ports/Slots: 4P , 3NIM/2SM

Split CP/DP, 4C+6C

Up to 6000 IPsec Tunnels

Up to 2-5Gbps SD-WAN IPsec

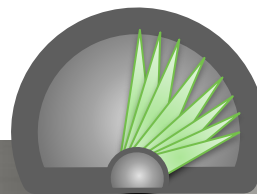
Up to 10-12Gbps CEF, 2-5Gbps Crypto

900Mbps IPS/IDS + URL-Filtering

8GB to 32GB upgradable DRAM

Ports/Slots: 4P+2xGE/TE, 2NIM/2SM/1PIM

X86 SoC, 12C/8C Cores, HW Crypto



All perf numbers are IMIX of aggregate throughput

ISR 4431 vs C8300-1N1S

Product Comparison

Up to 3500 IPsec Tunnels

Up to 750Mbps SD-WAN IPsec

Up to 3.4Gbps CEF, 1Gbps Crypto

150Mbps IPS/IDS + URL-Filtering

4GB to 16GB upgradable DRAM

Ports/Slots: 4P , 3NIM

Split CP/DP, 4C+6C

Up to 6000 IPsec Tunnels

Up to 2-5Gbps SD-WAN IPsec

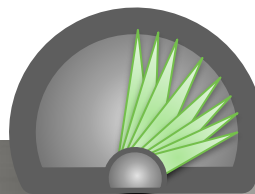
Up to 10-12Gbps CEF, 2-5Gbps Crypto

600Mbps IPS/IDS + URL-Filtering

8GB to 32GB upgradable DRAM

Ports/Slots: 4P+2xGE/TE, 1NIM/1SM/1PIM

X86 SoC, 8C Cores, HW Crypto



All perf numbers are aggregate IMIX for Crypto throughput

ISR 4400 vs Catalyst 8300 – доступные слоты

	ISR 4400		Catalyst 8300			
	4431	4451	1N1S-6T	1N1S-4T2X	2N2S-6T	2N2S-4T2X
CPU Architecture	4 + 6 core	4 + 10 core	8 core multithread			12 core multithread
Form Factor	1 RU	2 RU	1 RU		2 RU	
Number of Slots	3 NIM	3 NIM, 2 SM	1 SM, 1 NIM, 1 PIM		2 SM, 2 NIM, 1 PIM	
DRAM	Default - 2 GB (Data) + 4 GB (Control) Max - 2 GB (Data) + 16 GB (Control)		Default - 8 GB Max - 32 GB			
FLASH	Default - 8 GB Max - 32 GB		8 GB Fixed			

Cisco Catalyst 8300, 8200 Series Edge Platforms

The leading SD-WAN high performance branch router with rich services

Performance and Rich Services

C8300-1N1S-4T2X
(5Gbps SD-WAN)



C8300-2N2S-4T2X
(5Gbps SD-WAN)



C8300-1N1S-6T
(up to 2Gbps SD-WAN)



C8300-2N2S-6T
(up to 2Gbps SD-WAN)



C8200-1N-4T
(up to 1Gbps SD-WAN)



C8200L-1N-4T
(up to 500Mbps SD-WAN)



Traffic profile: Cisco IMIX (352 Bytes)
CEF: Autonomous mode Routing
IPsec: Autonomous & Controller/SDWAN mode
Throughput: Aggregate

Flexible SoC Architecture with Multiple Cores

C8200/C8200L Front View

1 NIM and 1 PIM

Status/physical security

Status LED

FAN LED

Power LED

Data Interfaces (FPGE)

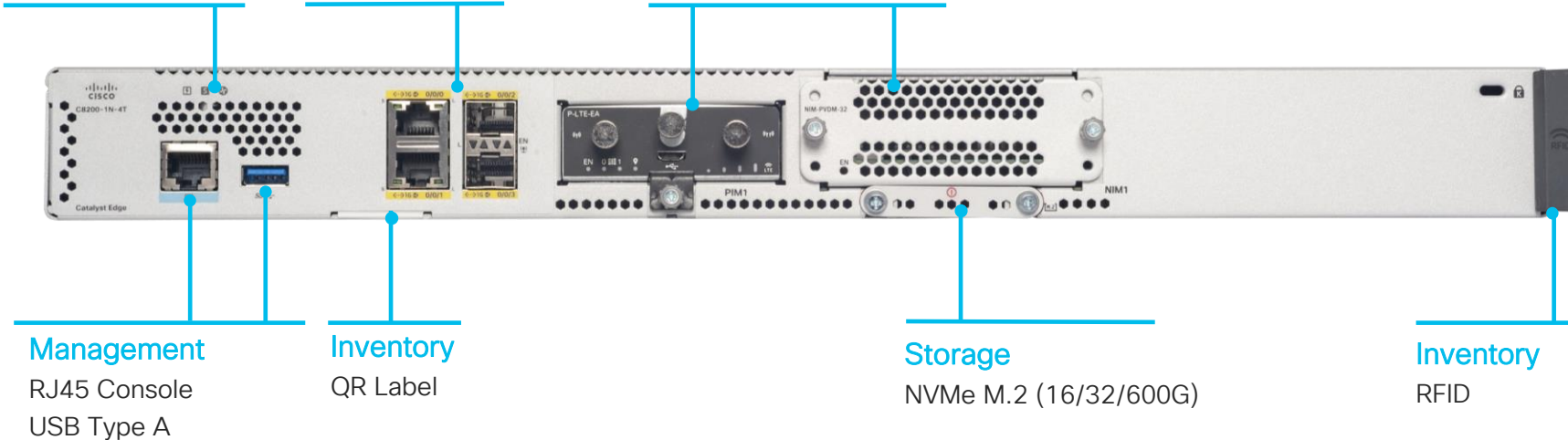
2 RJ45 GE WAN

2 SFP GE WAN

Network Modules

PIM slot

NIM slot



Note: Both C8200 and C8200L have same chassis view

C8200/C8200L Rear View

1 NIM and 1 PIM

Power supply

AC Power Supply

Power ON/OFF switch



PoE connector

External PoE Adaptor

FAN

2 Internal FANs

Note: Both C8200 and C8200L have same chassis view

C8200/C8200L Connectivity Richness

Next-gen modules and backward compatibility



Slot type

Pluggable Interface
Module (PIM)

Network Interface
Module (NIM)

Module type

LTE

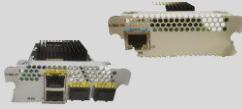
LAN, WAN, LTE, VOICE,
DSL, ASYNC

50+
varieties of
Modules
and
Interfaces

Backward Module Compatibility

ISR 4300 Modules*

New Modules

			SD-WAN	Perf.	MACsec	
	Ethernet WAN	L3 1 MGig, 2Gig WAN Modules**				
4P/8P/8P PoE NIM Modules	Ethernet LAN					
CAT4/6 NIM Modules	LTE/5G	5G**/CAT18 LTE PIM				
FXS/FXO/BRI/T1E1 Modules	Voice	Voice DSP Modules for IP Services				
Serial/Async/DSL	Legacy WAN					

Modules not Supported: Ethernet WAN
** Roadmap

Catalyst 8200/8200L Supported Modules



LAN

NIM-ES2-4
NIM-ES2-8
NIM-ES2-8-P

Async

NIM-16A*
NIM-24A*

WAN

NIM-1T
NIM-2T*
NIM-4T*
NIM-2BRI-S/T*
NIM-4BRI-S/T*

WAN + Voice:
NIM-1MFT-T1/E1
NIM-2MFT-T1/E1
NIM-4MFT-T1/E1
NIM-8MFT-T1/E1
NIM-1CE1T1-PRI
NIM-2CE1T1-PRI
NIM-8CE1T1-PRI

LTE

NIM-LTEA-EA
NIM-LTEA-LA
P-LTE-VZ
P-LTE-NA
P-LTE-US
P-LTE-JN
P-LTE-GB
P-LTE-IN
P-LTE-AU
P-LTEA-EA
P-LTEA-LA
P-LTEAA-EA
P-LTEAP18-GL
CG418-E*

5G

P-5GS6-GL
(Roadmap)
CG522-EE

Voice

NIM-2FXSP
NIM-4FXSP
NIM-2FXS/4FXOP
NIM-2FXO
NIM-4FXO
NIM-4E/M*
NIM-2BRI-NT/TE*
NIM-4BRI-NT/TE*
NIM-PVDM-32
NIM-PVDM-64
NIM-PVDM-128
NIM-PVDM-256

DSL

NIM-VAB-A
NIM-VA-B
NIM-VAB-M
NIM-4SHDSL-EA

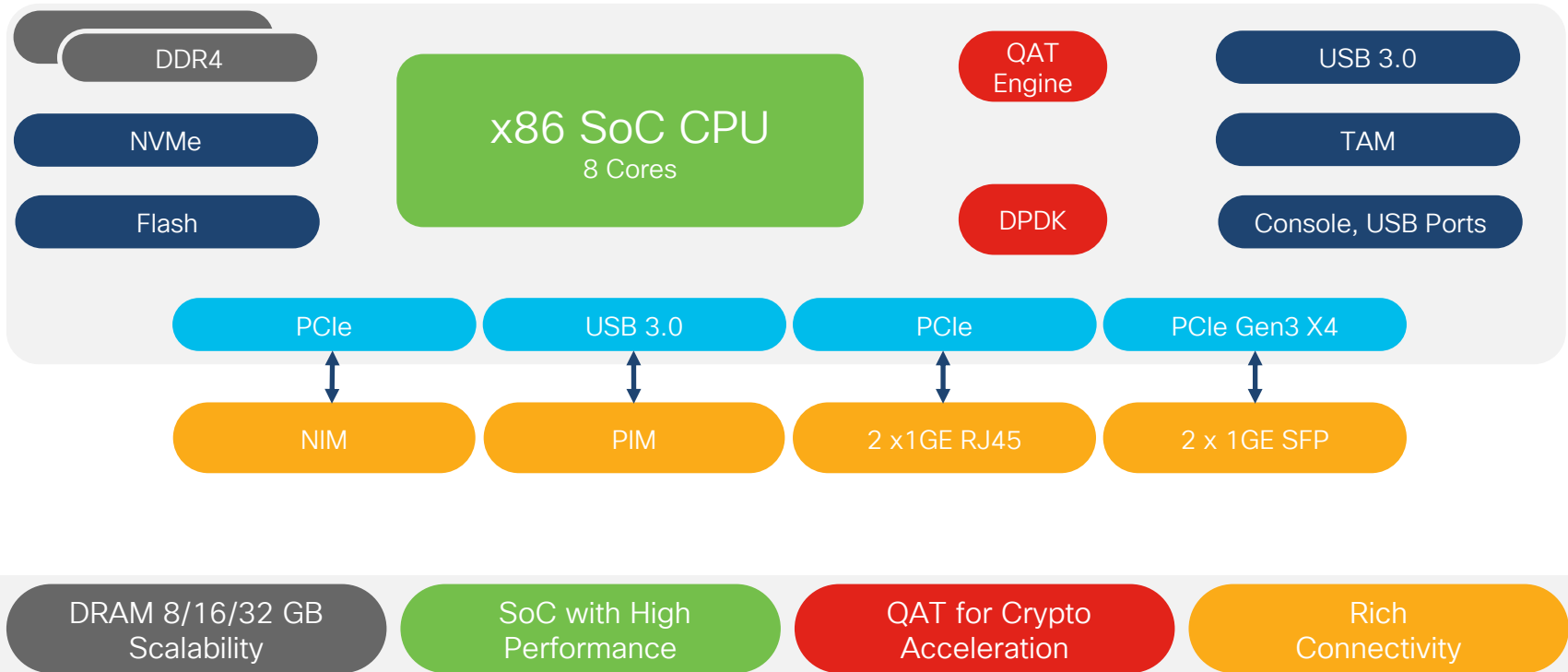
Storage

SSD-M2NVME-600G
M2USB-16G
M2USB-32G

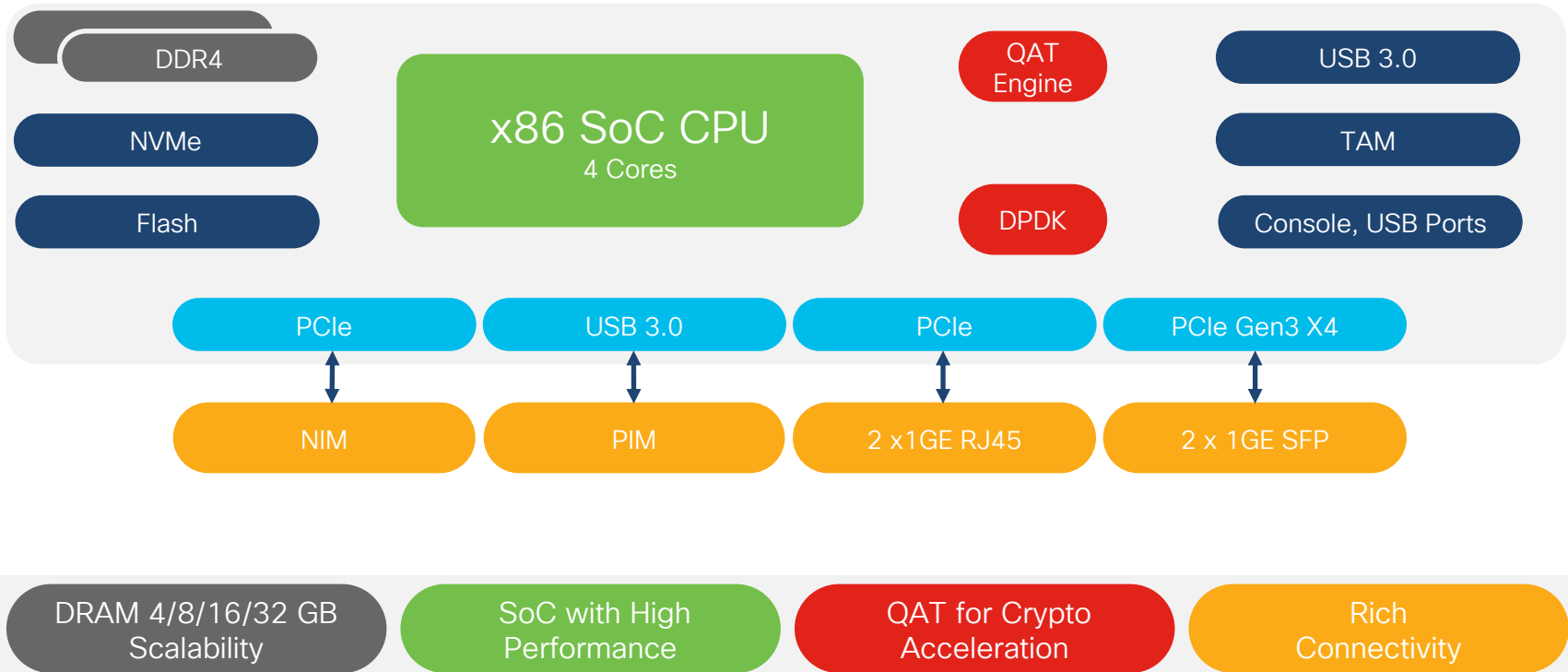
* IOS XE support, SD-WAN support in roadmap
Blue color: new modules

Архитектура 8200

C8200-1N-4T Block Diagram



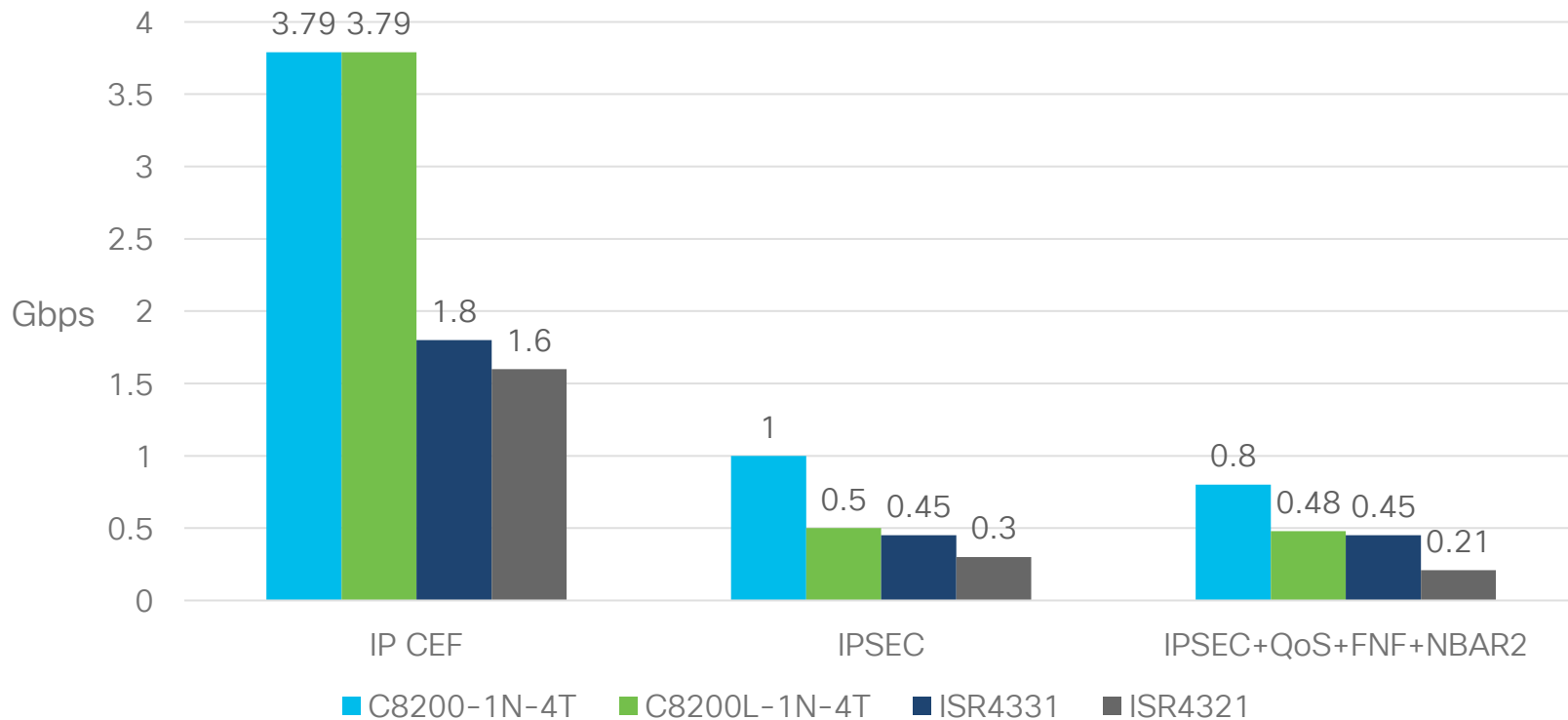
C8200L-1N-4T Block Diagram



Performance and Scale

Catalyst 8200 vs ISR4331

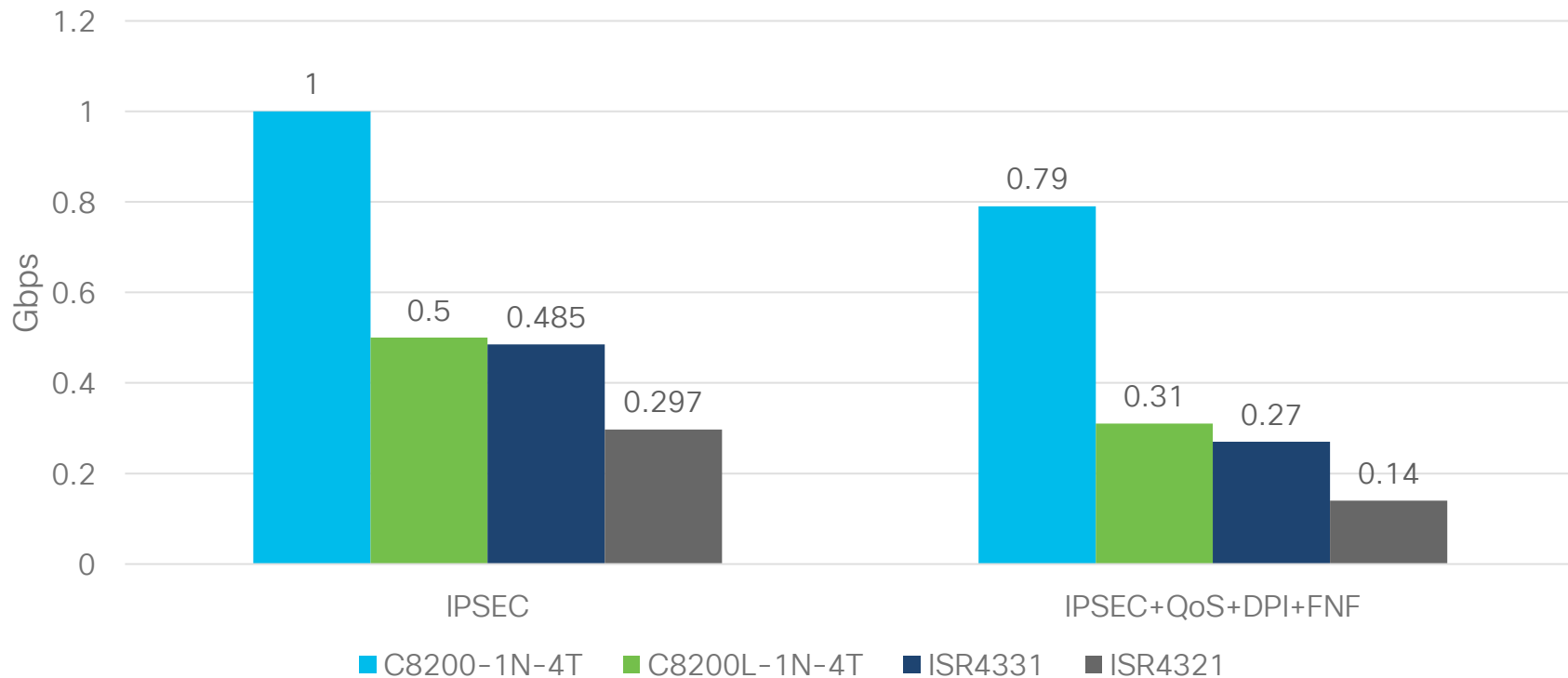
IOS XE Baseline Throughput- IMIX 352B*



* IOS XE numbers are in Data-plane heavy mode

Catalyst 8200 vs ISR4331

SD-WAN Profile Throughput- IMIX 352B*



*SD-WAN numbers are in Data-plane heavy mode

Catalyst 8200/8200L Series Platforms Scale

IOS XE

Features	C8200-1N-4T 8G Default DRAM	C8200L-1N-4T 4G Default DRAM
Number of IPv4 routes (BGP)	1.5M	280K
Number of IPv6 routes (BGP)	1.5M	270K
Number of IPv4 VRF Routes (MPLS VPN) - per prefix label	700K	200K
Number of IPv4 VRF Routes (MPLS VPN) - per vrf label	700K	200K
Number of IPv6 VRF Routes (MPLS VPN) - per prefix label	700K	200K
Number of IPv6 VRF Routes (MPLS VPN) - per vrf label	700K	200K
Max NAT44 static entries	10K	1K
Max NAT44 static networks	2K	1K
Max number of Firewall sessions	512K	512K
Max number of NAT+FW sessions	340K	280K
IPv4 ACLs per System	4K	4K
IPv6 ACLs per System	4K	4K

Refer to Scale sheet in Sales connect for more info

Catalyst 8200/8200L Series Platforms Scale

IOS XE

Features	C8200-1N-4T 8G Default DRAM	C8200L-1N-4T 4G Default DRAM
Number of NAT44 (classic) sessions, PAT	1M	512K
Number of NAT44 (CGN) sessions, PAT	1M	512K
DMVPN / BGP Adjacencies, IKEv1, IPv4	3K	3K
DMVPN / BGP Adjacencies, IKEv2, IPv4	3K	3K
DMVPN / EIGRP Adjacencies, IKEv1, IPv4	3K	3K
DMVPN / EIGRP Adjacencies, IKEv2, IPv4	3K	3K
Number of IPsec tunnels (FlexVPN, AAA/CERT), IKEv2, IPv4	4K	3K
Number of IPsec tunnels (FlexVPN, AAA/PSK), IKEv2, IPv4	4K	3K
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv4	4K	3K
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv6	4K	3K
Number of IPsec Tunnels (IPsec/SVTI, S2S), IKEv2, IPv4	4K	3K

Refer to Scale sheet in Sales connect for more info

Catalyst 8200/8200L Series Platforms Scale

XE SD-WAN

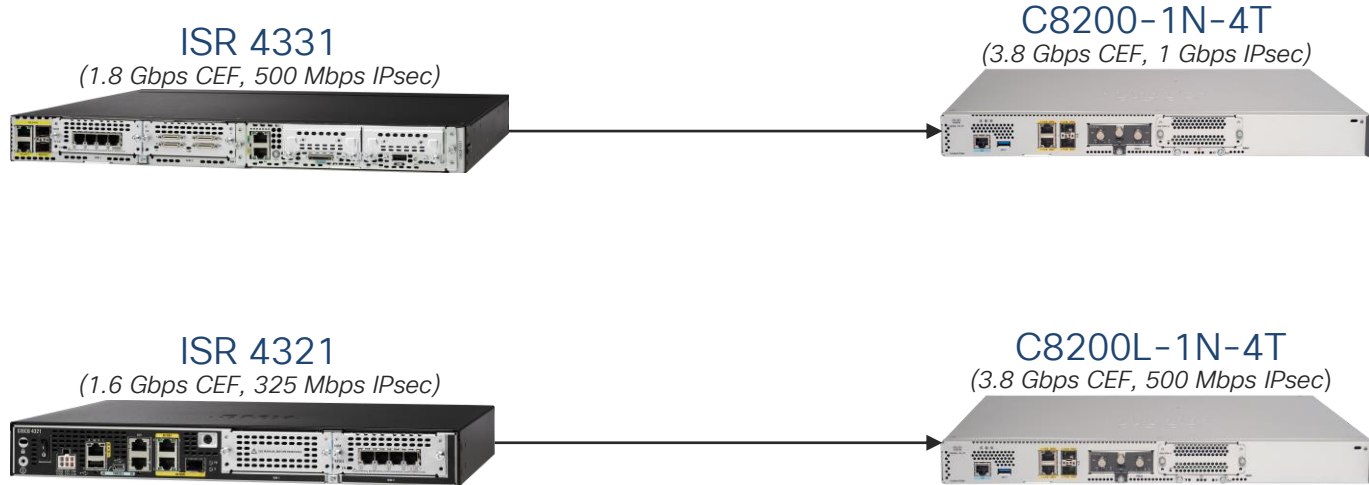
Features	C8200-1N-4T	C8200L-1N-4T
IPSec Overlay Tunnels	2.5K	2K
GRE Overlay Tunnels	2.5K	2K
OMP Routers (Overlay)	220K	75K
VPNs (VRF)	64	64

Refer to Scale sheet in Sales connect for more info

Catalyst 8200 Edge Platform vs ISR 4300 Comparison

Migration Path – ISR 4300 to Catalyst 8200

Performance



Note: All throughput numbers are based on IMIX

ISR4331 vs C8200-1N-4T

At a glance

Up to 1000 SD-WAN & 2000
Traditional IPsec Tunnels

Up to 485Mbps SD-WAN IPsec

Up to 1.8Gbps CEF, 445Mbps Crypto

200Mbps IPS/IDS + URL-Filtering

4GB to 16GB upgradable DRAM

Default WAN Ports: 3 Ports

Split CP/DP, 4C+4C

Up to 2500 SD-WAN & 4000 Traditional
IPsec Tunnels

Up to 1Gbps SD-WAN IPsec

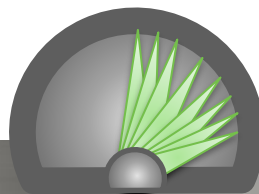
Up to 3.8Gbps CEF, 1Gbps Crypto

400Mbps IPS/IDS + URL-Filtering

8GB to 32GB upgradable DRAM

Default WAN Ports: 4 Ports

X86 SoC, 8 Cores, HW Crypto



All perf numbers are aggregate IMIX throughput (352B)

ISR4321 vs C8200L-1N-4T

At a glance

Up to 250 SD-WAN & 2000 Traditional IPsec Tunnels

Up to 300Mbps SD-WAN IPsec

Up to 1.6Gbps CEF, 300Mbps Crypto

4GB to 8GB upgradable DRAM

Default WAN Ports: 2 Ports

X86 SoC, 4 Cores

Up to 2000 SD-WAN & 4000 Traditional IPsec Tunnels

Up to 500Mbps SD-WAN IPsec

Up to 3.8Gbps CEF, 500Mbps Crypto

4GB to 32GB upgradable DRAM

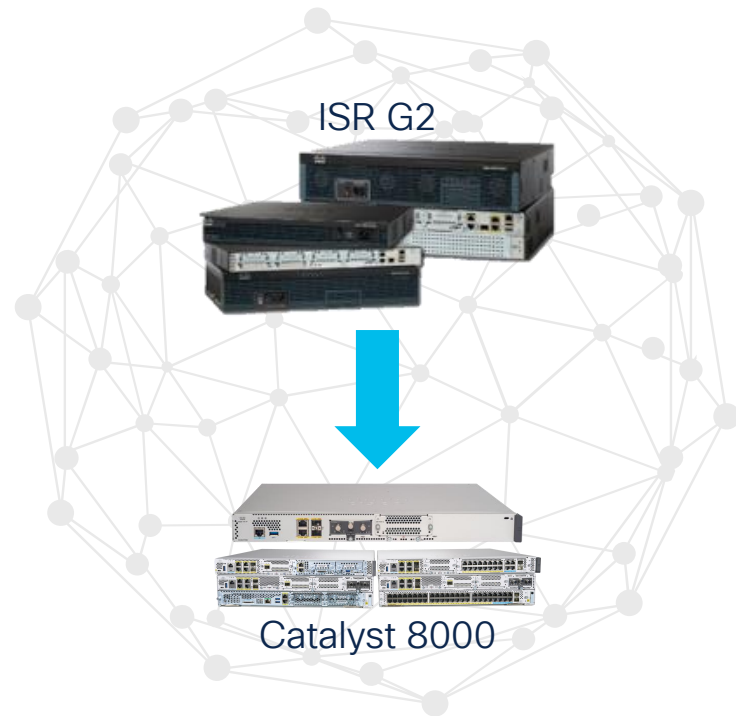
Default WAN Ports: 4 Ports

X86 SoC, 4 Cores, HW Crypto



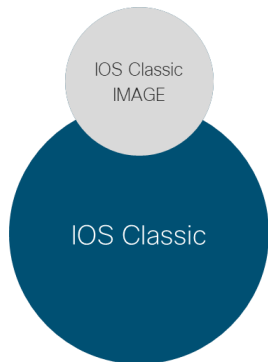
All perf numbers are aggregate IMIX throughput (352B)

Переход от ISR G2 (2900/3900) на Catalyst 8000

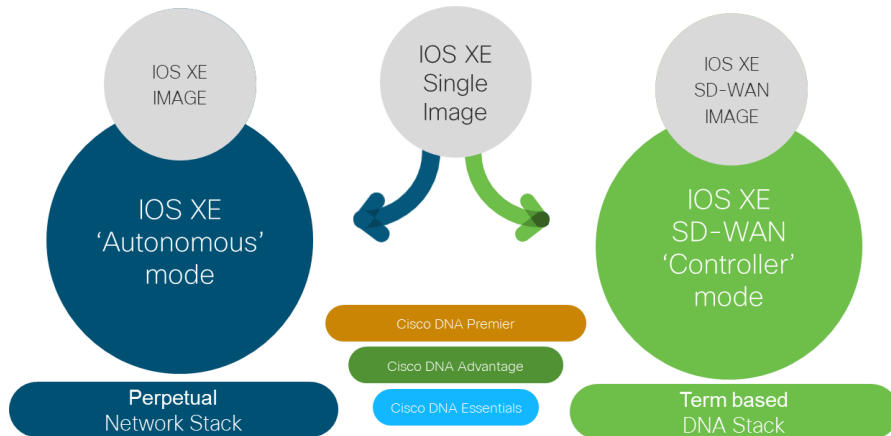


Переход к единому имиджу IOS-XE & упрощенное лицензирование

ISR G2 (2900/3900)
IOS Classic (M&T)
Single CPU

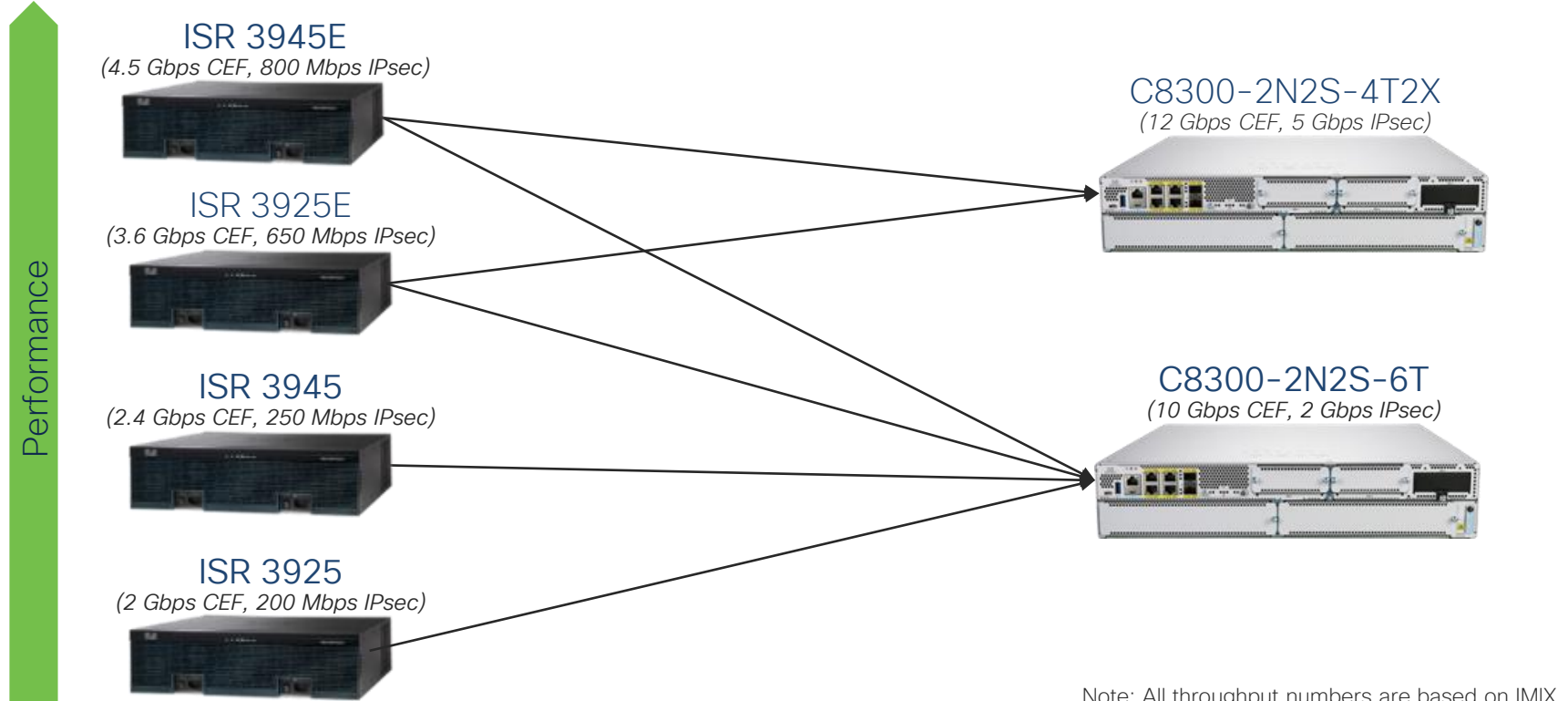


Catalyst 8000
IOS XE
Multicore CPU



End of PSIRT Support: Dec 2020
Last Day of Support: Dec 2022

Migration Path – ISR 3900 to Catalyst 8300



Migration Path – ISR 2900 to Catalyst 8300

Performance

ISR 2951
(1.4 Gbps CEF, 150 Mbps IPsec)



ISR 2921
(1.2 Gbps CEF, 80 Mbps IPsec)



C8300-1N1S-4T2X
(12 Gbps CEF, 5 Gbps IPsec)



C8300-1N1S-6T
(10 Gbps CEF, 2 Gbps IPsec)



Note: All throughput numbers are based on IMIX

Migration Path – ISR 2900 to Catalyst 8200

Performance

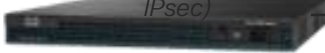
ISR 2911
(900 Mbps CEF, 65 Mbps IPsec)



C8200-1N-4T
(3.8 Gbps CEF, 1 Gbps IPsec)



ISR 2901
(870 Mbps CEF, 58 Mbps IPsec)



C8200L-1N-4T
(3.8 Gbps CEF, 500 Mbps IPsec)



Note: All throughput numbers are based on IMIX



Catalyst 8200 Series Edge uCPE

New Age Software-defined Branch

Cisco Catalyst 8200 Edge uCPE

System Status

- Status LED
- FAN LED
- Power LED

USB Storage

- USB 3.0

LTE WAN PIM Slot

- CAT 4/6/18 PIM

Network Modules

- NIM slot

Physical Security

- Kensington lock



Management Interface

- RJ 45 Console

Data Interfaces (FPGE)

- 4 RJ45 GE WAN
- 2 SFP WAN

Storage

- USB M.2 (32GB)
- NVMe SSD M.2 (600GB, 2TB)

Storage

- SATA/SSD(2TB/4TB)

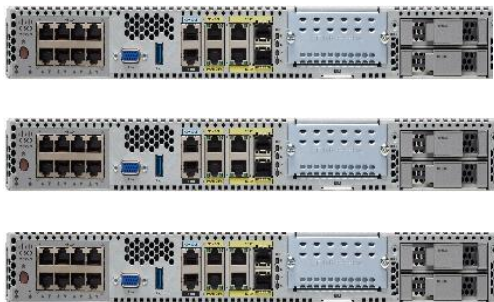
Cisco's Virtualization Portfolio

Small/Lean SD-Branch



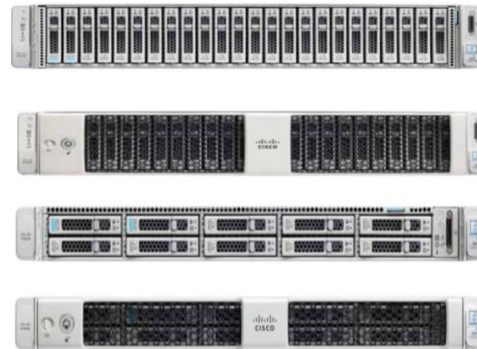
Catalyst 8200 Series Edge uCPE
8 cores

Enterprise Virtualization



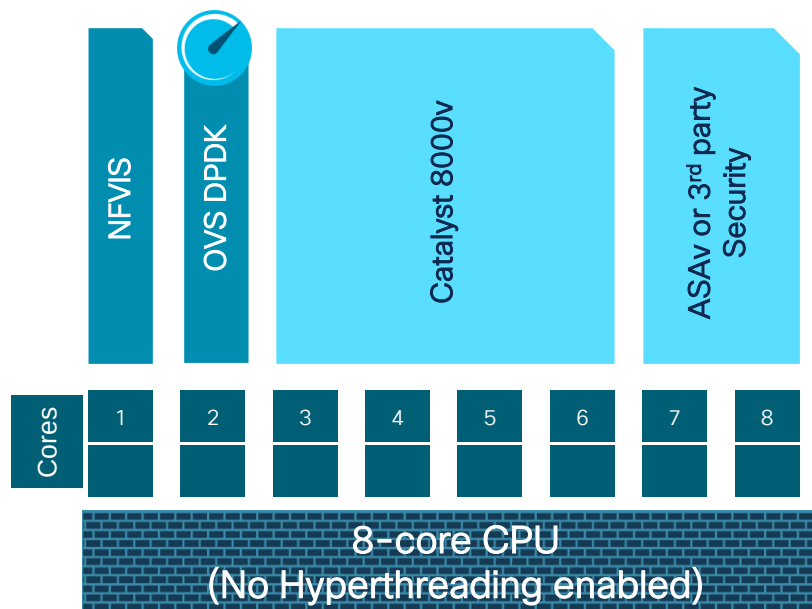
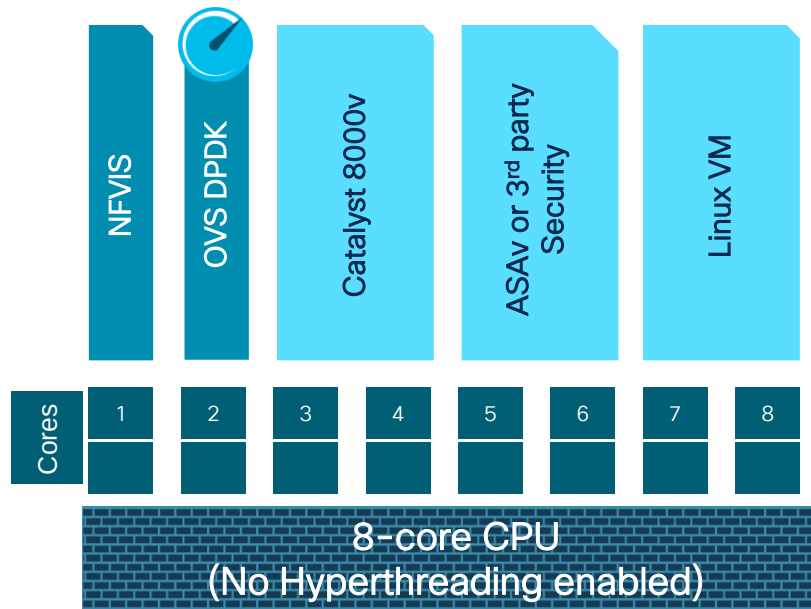
ENCS 5400 Series
6 to 12 cores

DC, Hub and Colocation



CSP 5200 & 5400 Series
16 to 56 cores

C8200 Edge uCPE распределение ресурсов CPU



Catalyst 8000V



SRIOV

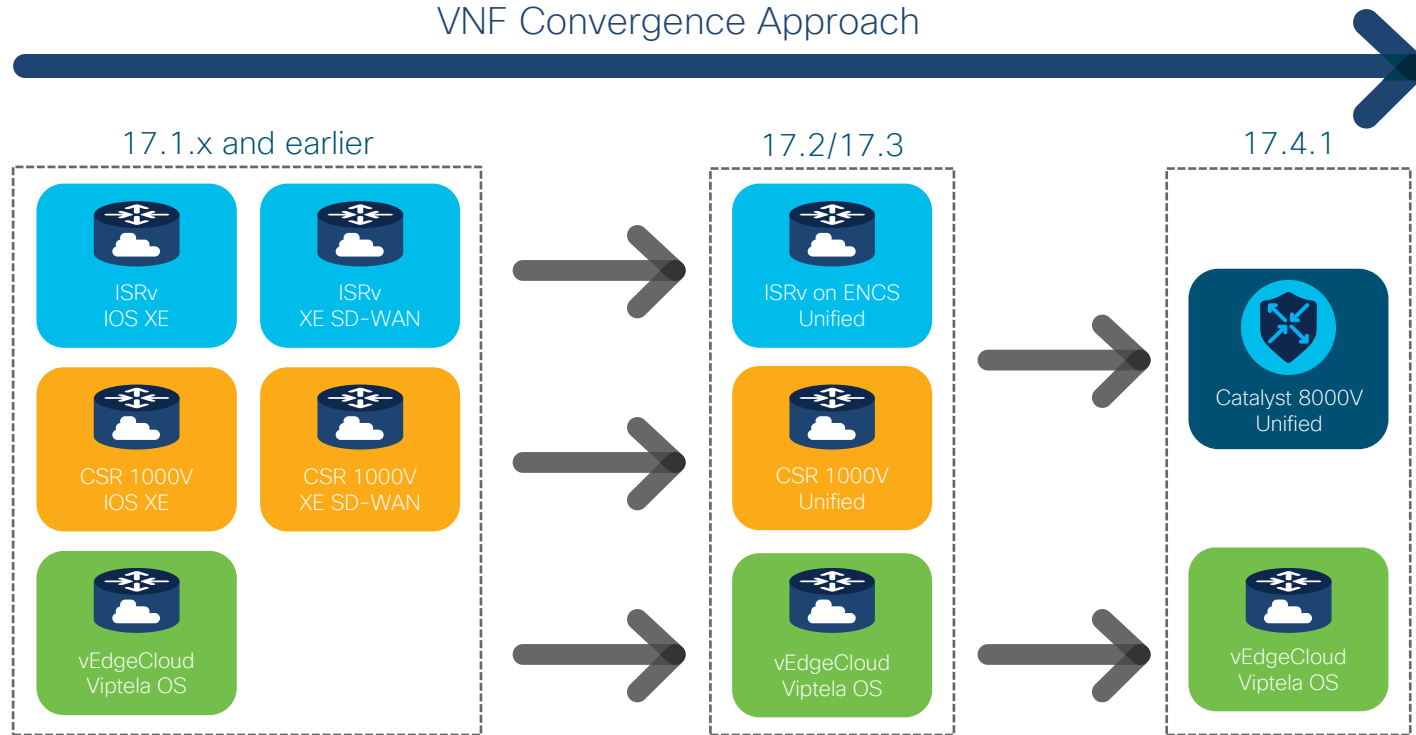
Hypervisor/Cloud

Catalyst 8000V

Future of Cloud

Консолидация предложения по виртуальным маршрутизаторам

VNF Convergence Approach



Catalyst 8000V основан на CSR 1000V

Catalyst 8000V		CSR 1000V
✓	Secure Object Store	✗
✓	ENCS NIM Support	✗
✓	SD-WAN on Google Cloud	✗
✓	Azure Virtual WAN Integration	✗
DNA Licensing	Licensing	Classic + DNA licensing



up to 10G*



up to 2G*

*Expected throughput, actual performance number is subject to change, will be published at FCS

Поддержка гипервизоров x86



Enterprise Linux 7.5
Enterprise Linux 7.7



ESXi 6.5 Update 2
ESXi 6.7 Update 3



NFVIS on ENCS &
CSP Platforms



Hyper-V
(roadmap)

Гибкое назначение ресурсов



Physical Hardware:

- CPU – Intel Nehalem or AMD
- CPU with clock frequency ≥ 2.0
- TenGigabit and Gigabit Ethernet interfaces

Catalyst 8000V



Catalyst 8000V Virtual Machine specs:

- CPU: 1 to 16 virtual CPUs
- Memory: 4 GB to 16 GB
- Disk space: 8 GB or 16GB
- Virtual Network Interface Cards (vNICs):
 - ESXI – A maximum of 8 vNICs is supported;
VMXNET3, iXGBevf, and i40eVF
 - KVM – A maximum of 26 vNICs is supported;
Virtio, ixgbevf, or i40evf

Cisco Catalyst 8000V Upgrade & Downgrade

Greenfield Deployment
C8kv ↔ C8kv

Upgrade
CSR1kv/ISRv
C8kv →

Downgrade
CSR1kv/ISRv
C8kv ←

Рекомендованный вариант для получения всех преимуществ Secure boot, Secure object storage

Upgrades и downgrades поддерживаются на C8000v софты

- Да, но вы не получите ключевых преимуществ C8000v.
- Структура разбиение диска останется прежней [т.е. не будет зашифрованного хранения блоков данных]
- При апгрейде с версий ранее 16.12 не будет так же функционала secure boot
- UUID при таком апгрейде не изменится [PID: <> Chassis Number<>]. Это позволит сертификатам продолжать действовать.
- vManage будет распознавать устройство как CSR1Kv/ISRv [With Current SWv C8000v]
- Могут применяться только темплейты для CSR1Kv/ISRv
- Текущая схема лицензирования CSR1Kv/ISRv будет продолжать действовать

- Если был переход с CSR1kv/ISRv 17.2 на C8000v 17.4. То, downgrade обратно возможен.
- Если был установлен C8000v 17.4 заново, то downgrade на CSR1kv/ISRv не возможен.

Проверка знаний 2 (Poll 2)

Лицензирование маршрутизаторов Catalyst 8000

Единое лицензирование для всей линейки Cat8000

Simple software
subscription tiers

Cisco DNA Premier

Cisco DNA Advantage

Cisco DNA
Essentials*

Consistent across
the portfolio



Flexibility and
portability

On-Premises

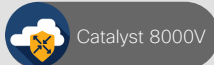
Cloud Managed

Catalyst 8000 is only available with Cisco DNA software subscription

* Only C8300, C8200, C8200-uCPE & C8

Общий подход к лицензированию для всех C8000

Systems



Catalyst 8000 Edge Platforms



DNA Licensing



Cisco DNA Premier



Cisco DNA Advantage



Cisco DNA Essentials*

Catalyst 8000 Family – DNA Packaging

DNA Essentials



Network Stack
(Perpetual #)

DNA Stack
Term (3/5Y)

DNA Advantage



Network Stack
(Perpetual #)

DNA Stack
Term (3/5/7Y)

DNA Premier



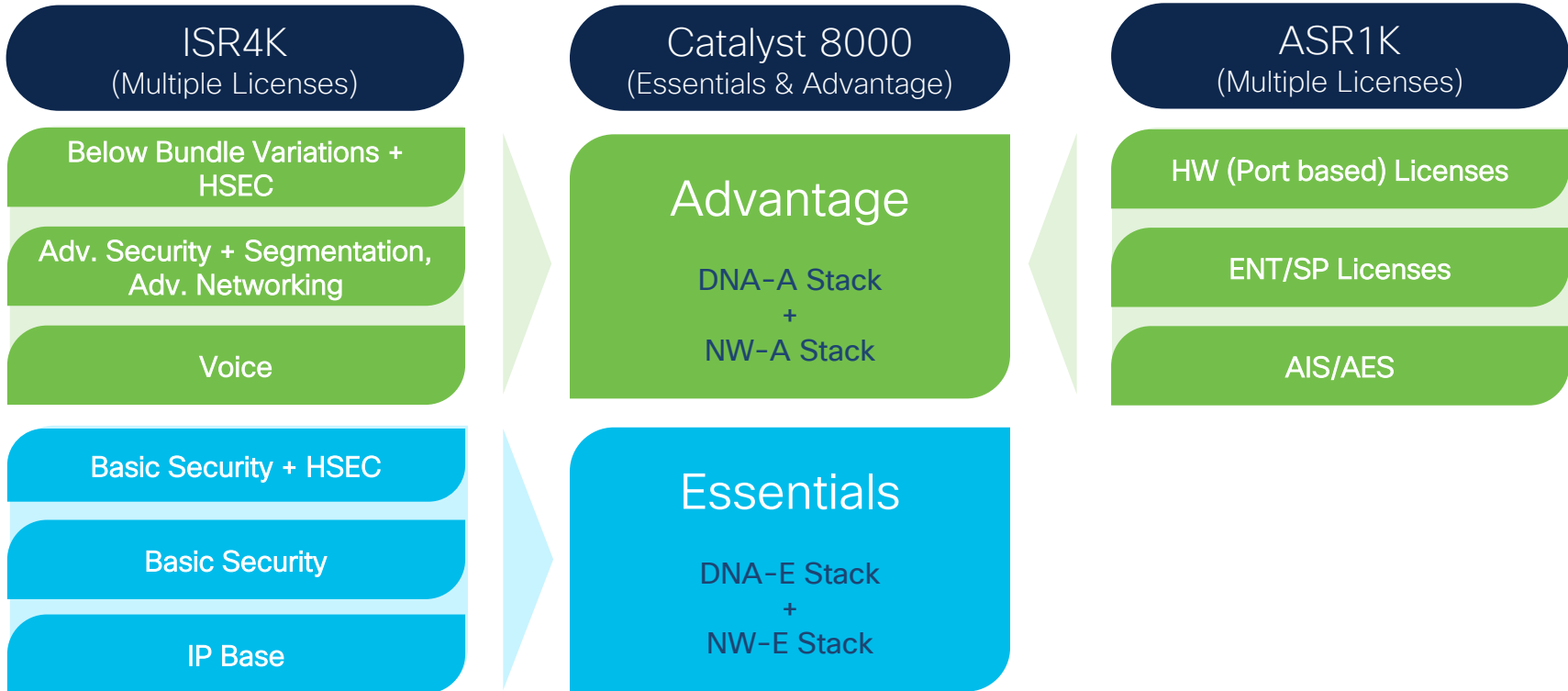
Network Stack
(Perpetual #)

DNA Stack
Term (3/5Y)

Performance, Flexibility & Investment Protection
For more information read the [Licensing FAQ](#) on SalesConnect

* Only C8300, C8200, C8200-uCPE & C8000V

Унификация в сравнении с ISR4K и ASR1K



Single Selling Motion Across IBNG Portfolio – Consistency & Simplicity

Catalyst 8000 Essentials (Tier0, 3 year) vs ISR4K



Quoted platform	Platform to replace it with	Customer's benefits in switching to Cat8k	Pricing Delta
ISR 4331	C8200L-1N-4T	• 1.5-2x increase in performance • 1 additional Ethernet port • Increased Memory	TBD
ISR 4351	C8200-1N-4T	• 2x increase in performance • 1 additional Ethernet port • Higher default memory	Avg. -30%
ISR 4431	C8300-1N1S-6T	• 5x increase in performance • 2 additional Ethernet ports • Higher default memory • Dual Power Supply included	Avg. -10%
ISR 4451	C8300-1N1S-6T	• 5x increase in performance • 2 additional Ethernet ports • Higher default memory • Dual Power Supply included	Avg. -30%
ISR 4461	C8300-1N1S-6T	• Performance increase up to +10% • Dual Power Supply included	Avg. -45%

Cisco Catalyst 8000 Edge Platforms DNA Licensing Detail

NEW

Cisco DNA Essentials

Connectivity/Mgmt

- Cloud or On-Prem Management
- Flexible Topology
 - Hub and Spoke
 - Full Mesh/Partial Mesh
- App and SLA based policy
- Dynamic Routing (BGP, OSPF)
- VNF Lifecycle Management

Security

- Enterprise Firewall with Talos-powered IPS and application controls
- Cisco Umbrella DNS Monitoring (visibility only)

SD-WAN Services

- Basic Path optimization with FEC and Packet Duplication
- TCP Optimization

Cisco DNA Advantage

Cloud/Analytics

- Cloud OnRamp for IaaS and SaaS
- Automated Service Stitching
- Encrypted Traffic Analytics
- vAnalytics

Security

- Segmentation (Unlimited VPNs)
- Cisco AMP and SSL proxy
- URL filtering
- Cisco Umbrella app discovery

X-domain Innovations

- Integrated Border for Campus (SD-Access)
- Integration with ACI for Application SLA

Services

- Web Caching, DRE (incl. SSL proxy)
- Voice Module and SRST Integration
- Multicast

Cisco DNA Essentials

Cisco DNA Premier

Security

Cisco Umbrella SIG Essentials

Transactional

- Tier 0: 25 Licenses
- Tier 1: 40 Licenses
- Tier 2: 100 Licenses
- Tier 3: 285 Licenses

Enterprise Agreement

- Tier 0: Not Available in Premier
- Tier 1: 45 Licenses
- Tier 2: 110 Licenses
- Tier 3: 325 Licenses
- Additional Cisco Umbrella SIG Essentials licenses can be purchased separately.

Cisco Threat Grid

- Provides entitlement for 200 files per day per customer account
- Files sent to Threat Grid cloud for sandboxing. On-premises Threat Grid not available in Premier
- Global entitlement across all customer sites
- Additional Cisco Threat Grid licenses can be purchased separately.

Cisco DNA Advantage

Cisco DNA Essentials

Cisco Catalyst 8000 Edge Platforms Licensing

Network Stack Capabilities



Network Essentials

Catalyst 8300 only

Network Essentials

Perpetual

Routing Essentials: Routing Protocols, Vrf-lite, Multicast, NAT

Security: MACSEC-128, VPNs, ZBFW, PKI, ACLs, Umbrella Connector, Snort IPS

Application Experience: HQOS, PfR, PBR, AVC, NBAR, IPSLA, FnF

Unified Communication: Cube Connector

Router Management: TACACS+, NETCONF, AAA, DNS, DHCP

With DNA Essentials



Network Advantage

Network Advantage
(Inclusive of Essentials)

Perpetual

Overlay Technologies: MPLS, VPLS, LISP, VXLAN, OTV, EVC, OAM

Security: MACSEC-256, ALG for ZBFW, VASI

Cisco Innovation: SMU Patching, SGTs, ETA, ISSU, mDNS Bonjour, EPC

Unified Communication: SRST, Support for Voice Modules

WAN Optimization: Cisco WAAS RTU*

*Available on UCS-E on C8300

With DNA Advantage and DNA Premier

Cisco DNA Software for SD-WAN Feature Matrix

https://www.cisco.com/c/m/en_us/products/software/sd-wan-routing-matrix.html?oid=otren019258



	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
License type	3- or 5-year term subscription	Includes Cisco DNA Essentials 3-, 5-, or 7-year term subscription	Includes Cisco DNA Essentials and Cisco DNA Advantage 3- or 5-year term subscription
Management options	CLI, Web UI vManage	CLI, Web UI vManage	CLI, Web UI vManage

Cisco DNA for SD-WAN subscription features Roll over each feature for more information.	Cisco DNA Essentials	Cisco DNA Advantage	Cisco DNA Premier
Connectivity and management - unlimited overlays and VPNs	✓ VPNs limited to 2 user + 1 mgmt	✓	✓
SD-WAN Layer 2 and Layer 3 routing - general	✓	✓	✓
SD-WAN Layer 2 and Layer 3 routing - IPv6	✓	✓	✓
Essential security	✓	✓	✓
SD-WAN services	✓	✓	✓
Software Support Service (SWSS)	✓ ¹	✓ ¹	✓ ¹
Smart Net Total Care® (STNC)	Optional ¹	Optional ¹	Optional ¹
Advanced SD-WAN Layer 2 and Layer 3 routing - general		✓	✓
SD-WAN Layer 2 and Layer 3 Multicast routing - IPv4		✓	✓

Новый подход к выбору лицензии по полосе для C8000 (включая виртуальный C8000v)

Current ALC		New ALC Tiers for Catalyst 8000
10M		T0
15M		
25M		T1
50M		
100M		
250M		T2
500M		
1G		
2.5G		T3
5G		
10G		



Enabling higher value at lower TCO
(Lowered min. BW for high-end Access platforms)



Consistency of consumption models
(Similar Tiers as those in EA)



Providing flexibility to scale
(Ex. 1G at the price of 250M!)



Consolidated tiers applicable across Essentials, Advantage and Premier

Доступность лицензий для различных платформ

	C8200L-1N-4T	C8200-UCPE-1NB	C8200-1N-4T	C8300-1N1S-6T	C8300-2N2S-6T	C8300-1N1S-4T2X	C8300-2N2S-4T2X	C8500L-8S4X	C8500-12X	C8500-12X4QC
Tier 0 Up to 15M BW level (30M Aggr)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓			
Tier 1 Up to 100M BW level (200M Aggr)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓			
Tier 2 Up to 1G BW level (2G Aggr)	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓		
Tier 3 Up to 10G BW level (20G Aggr)						✓✓	✓✓	✓✓	✓✓	✓✓

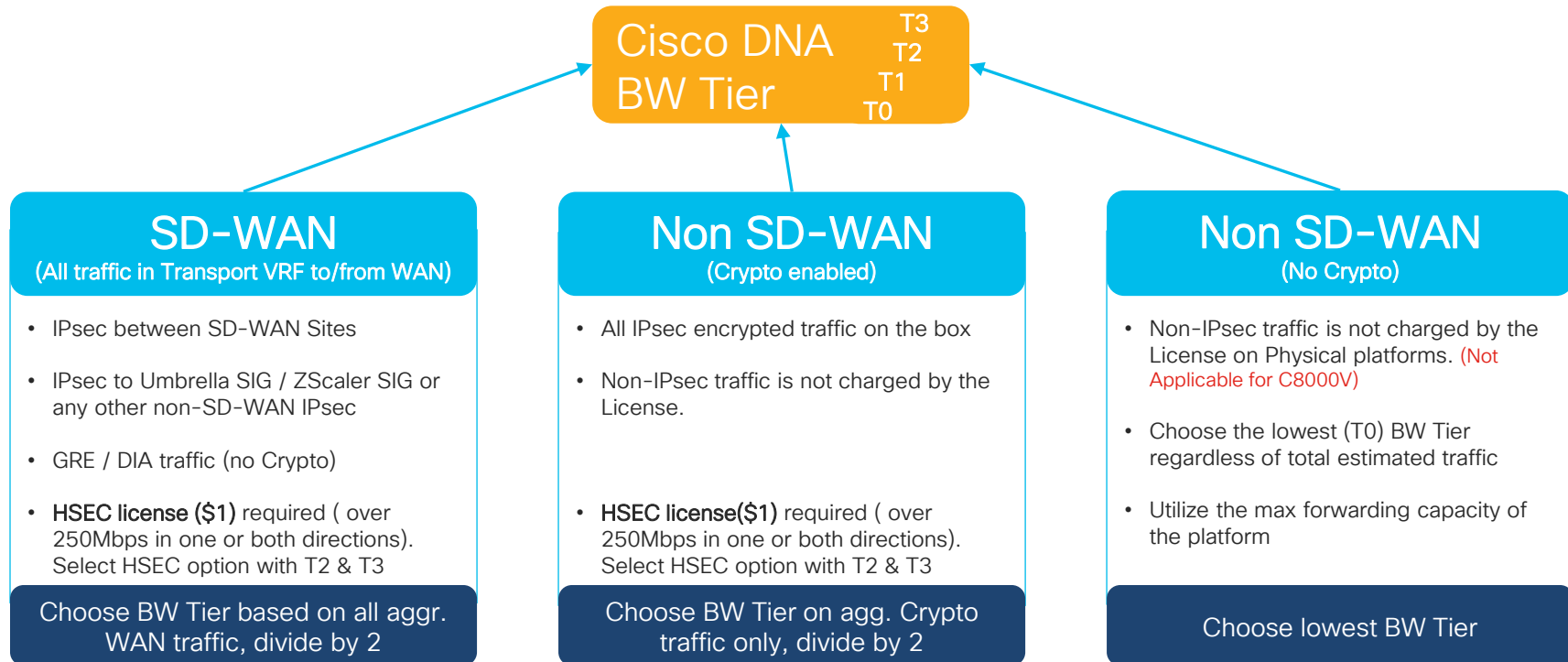
✓ Premier

✓ Advantage

✓ Essentials

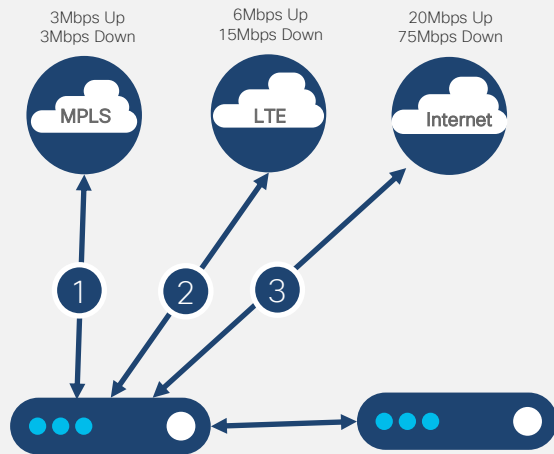
Выбор полосы пропускания при заказе лицензии

What traffic do you need to include in your BW Tier calculation?



Расчёт полосы пропускания для DNA подписки

Cisco DNA Subscriptions



With Cisco DNA subscription, bandwidth entitlement is the sum of total bandwidth utilization (either upstream or downstream) across all WAN circuits.

Examples:

For a 100 Mbps license, utilization can be up to 100 Mbps upstream and 100 Mbps downstream

In the example, bandwidth utilization adds to $3+15+75=93$ Mbps (downstream) and to $3+6+20=29$ Mbps (upstream). Considering the maximum utilization, you will need a 100 Mbps license, permitting you to use 100 Mbps up and 100 Mbps down for 200 Mbps of aggregate bandwidth.

Aligned with how service providers sell WAN bandwidth

Уровни Bandwidth (Tier)

Calculating BW Tier = Aggregated SD-WAN or IPsec traffic, divided by 2

Aggr. Throughput divided by 2	Catalyst 8000 BW Tiers
Unlimited ↑ 1001 Mbps	Unlimited T3 Select HSEC option
1000 Mbps ↑ 101 Mbps	Up to 2Gbps aggr. T2 Select HSEC option
100 Mbps ↑ 16 Mbps	Up to 200Mbps aggr. T1
15 Mbps ↑	Up to 30Mbps aggr. T0

BW tier compliant examples

C8500-12X4QC – Autonomous Mode
T3 = Only BW tier for C8500-12X & 12X4QC
Regardless of throughput, encryption or SD-WAN

C8500L – Autonomous Mode
T2 = Starting BW tier for C8500L

C8300-2N2S-4T2X – SD-WAN
Running an estimated aggr. of 2 Gbps, Transport side

C8300-2N2S-6T – Autonomous Mode
I'm running aggr. 200 Mbps IPsec + 9 Gbps unencrypted traffic

C8300-2N2S-4T2X – Autonomous Mode
I'm running 11 Gbps of unencrypted traffic

Как заказывать?

1 Order Hardware

Cisco Catalyst Edge 8300 2RU Chassis



C8300-2N2S-4T2X
C8300-2N2S-6T

Cisco Catalyst Edge 8300 1RU Chassis



C8300-1N1S-4T2X
C8300-1N1S-6T

Cisco Catalyst Edge 8200 1RU Chassis



C8200-1N-4T
C8200L-1N-4T



2

Order Cisco DNA Subscriptions

L-DNA-C8300/L-DNA-C8200

Platform

L-DNA-C8300

C8300-2N2S-4T2X
C8300-2N2S-6T
C8300-1N1S-4T2X
C8300-1N1S-6T

L-DNA-C8200

C8200-1N-4T
C8200L-1N-4T

Software mode

IOSXE-AUTO-MODE
(Autonomous mode)

IOSXE-CTRL-MODE
(Controller mode)

Cisco DNA Subscription

Cisco DNA Premier
Cloud/On-Prem
3Y, 5Y

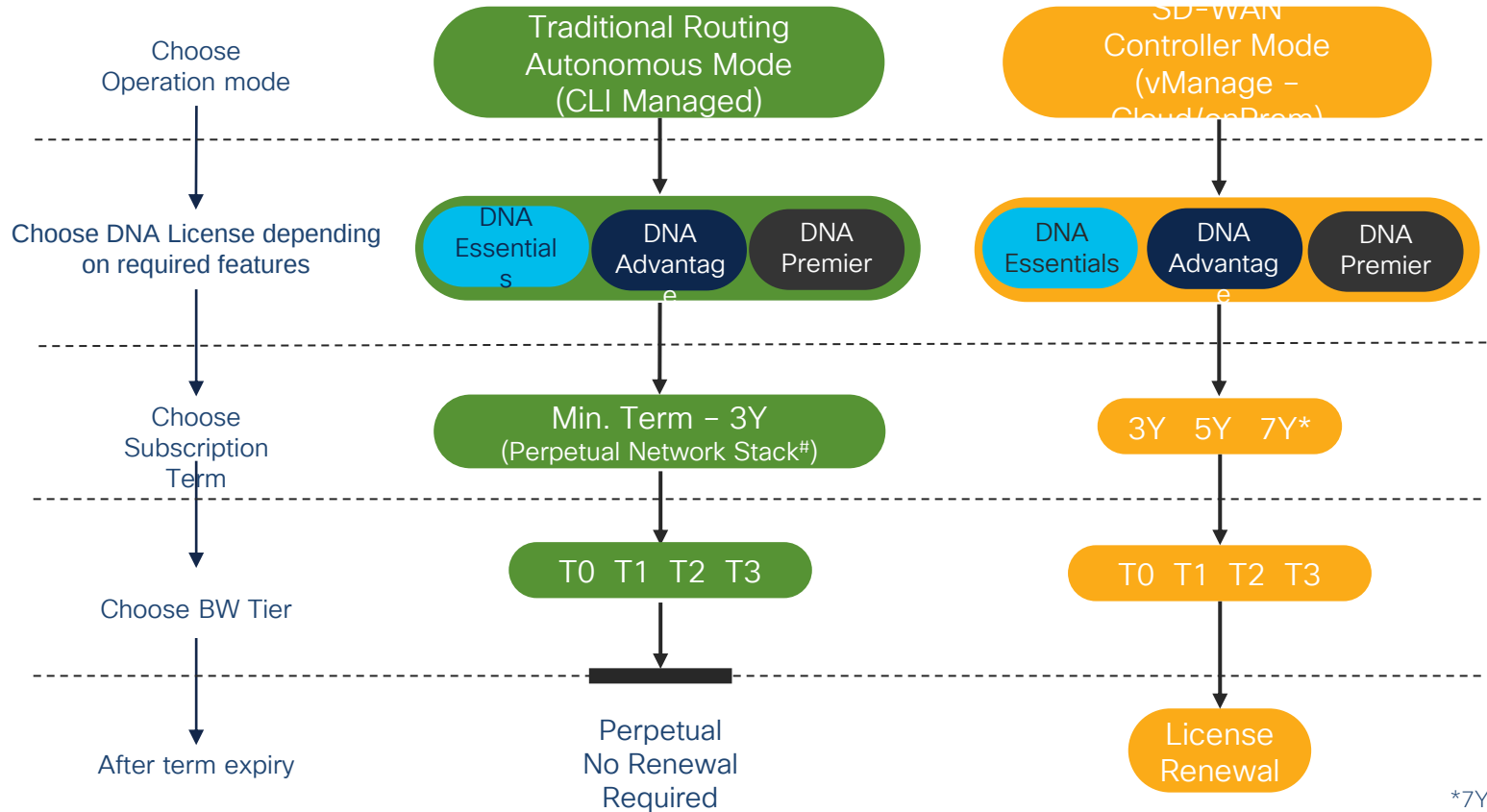
Cisco DNA Advantage
Cloud/On-Prem
3Y, 5Y, 7Y

Cisco DNA Essentials
Cloud/On-Prem
3Y, 5Y

* Only for C8000V and C8300

Performance, Flexibility & Investment Protection

DNA License model – Catalyst 8K platforms



*7Y term in Advantage only
#Not applicable for C8000V

CSR1000V and Catalyst 8000V Licensing

Traditional Routing Autonomous Mode

CSR1000V
(Term based Licenses)

10M to 10G (non-Tiered BWS)
(For all traffic – Crypto & Non
Crypto)

AX

AppX

SEC

IP Base

3Y 5Y
7Y*

C8000V
(Term based Licenses)

Tier based Licenses
(For all traffic – Crypto & Non Crypto)

Cisco DNA Premier

Cisco DNA Advantage

Cisco DNA
Essentials

3Y 5Y
7Y*

SD-WAN Controller Mode

CSR1000V
(Term based Licenses)

10M to 2.5G (non-Tiered BWS)
(For all traffic – Crypto & Non
Crypto)

Cisco DNA Premier

Cisco DNA Advantage

Cisco DNA
Essentials

3Y 5Y
7Y*

C8000V
(Term based Licenses)

Tier based Licenses
(For all traffic – Crypto & Non
Crypto)

Cisco DNA Premier

Cisco DNA Advantage

Cisco DNA
Essentials

3Y 5Y
7Y*

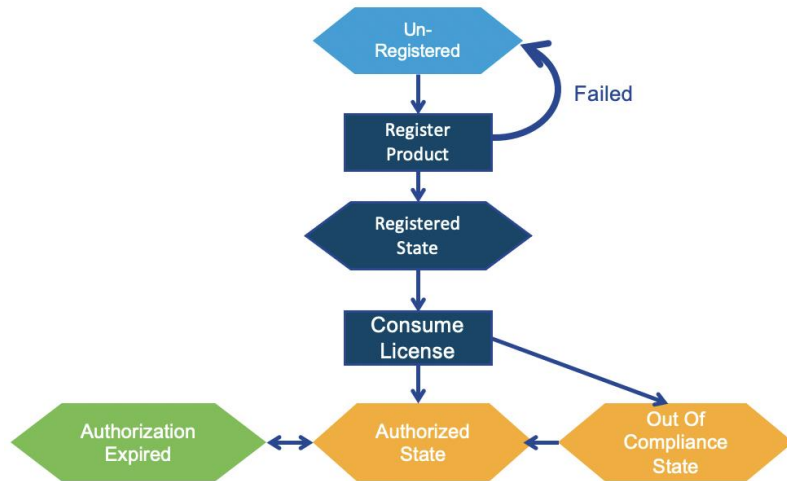
*7Y term in Advantage or

Smart Licensing Using Policy или как просто купить и начать эксплуатировать маршрутизатор Cisco

IOS XE 17.3.2 / 17.4.1 and later

Как меняется статус лицензии?

Smart Licensing (SL)



Smart Licensing USING POLICY (SLP)



- Остаётся только один статус лицензии “In-use”
- Модель построена на доверии
- Устройство ведёт учёт использованных функций и лицензионного уровня
- В Smart Account требуется отправлять отчеты в течение 90 дней, если вы активировали более высокую лицензию, чем приобрели

Smart Licensing Using Policy – IOS XE 17.3.2 / 17.4.1 and later (ПО уже доступно)



Без изменений в процедуре заказа оборудования и лицензий

Note: Не забудьте сообщить партнёру свой Smart Account



Больше NET Evaluation периода. Не нужно регистрировать лицензию перед использованием

Note: Не нужно регистрировать лицензию перед использованием оборудования. Если заканчивается срок лицензии или изменяется уровень нужно отправить отчет в SA



Не требуется регулярная коммуникация оборудования с cisco.com

Note: При условии, что вы не повышаете уровень лицензии. Каждое устройство в сети ведёт учёт используемой лицензии самостоятельно.



Отправьте отчет об использовании лицензий только при изменении уровня лицензии или при окончании срока действия.

Note: Отправка отчёта может быть on-line или off-line

Когда необходимо отправлять отчёт?

When should I report?

Perpetual

Report on-change



Know when:

Am I using what I purchased?

Yes – no report needed

No – report within 90 days

Recommended: Establish a smart account SW asset baseline, report after upgrade to 17.3.2. / 17.4.1 or >

Subscription

Report on-change



Know when:

Am I using what I purchased?

Yes – with EA, report per policy

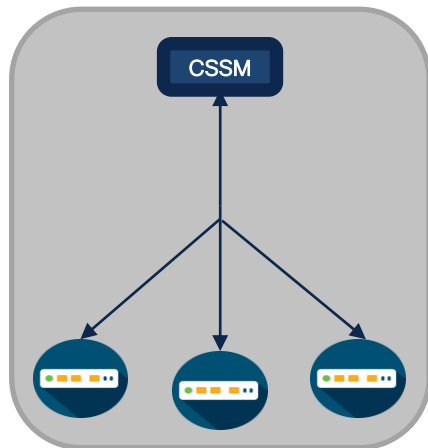
Yes – no EA, report upon renewal

No – report within 90 days

Reporting options

1

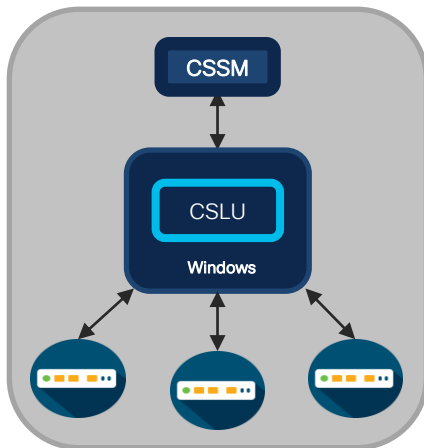
Direct Connect



- ✓ Devices directly connected to CSSM on Cloud either HTTPS or through proxy.
- ✓ No dependency on external tools

2

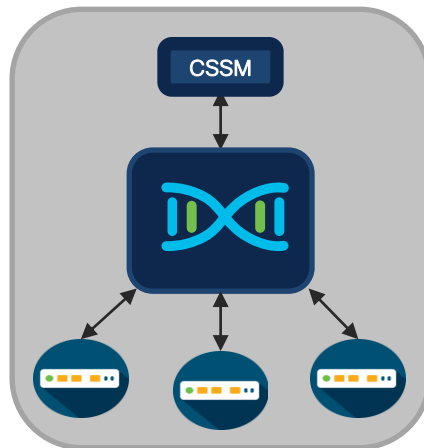
Using CSLU/ SSM on Prem*



- ✓ Standalone Win 10 Tool**.
- ✓ Devices can push reports or CSLU can pull reports.
- ✓ Can be either offline or online.

3

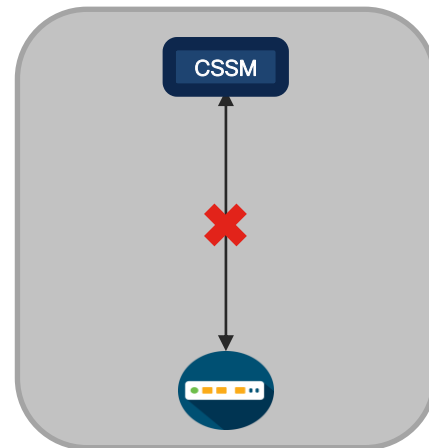
Using DNAC



- ✓ Uses DNAC to set/change licenses.
- ✓ Can be used to send reports to the CSSM on Cloud.
- ✓ Can be either offline or online.

4

Air-Gapped Networks



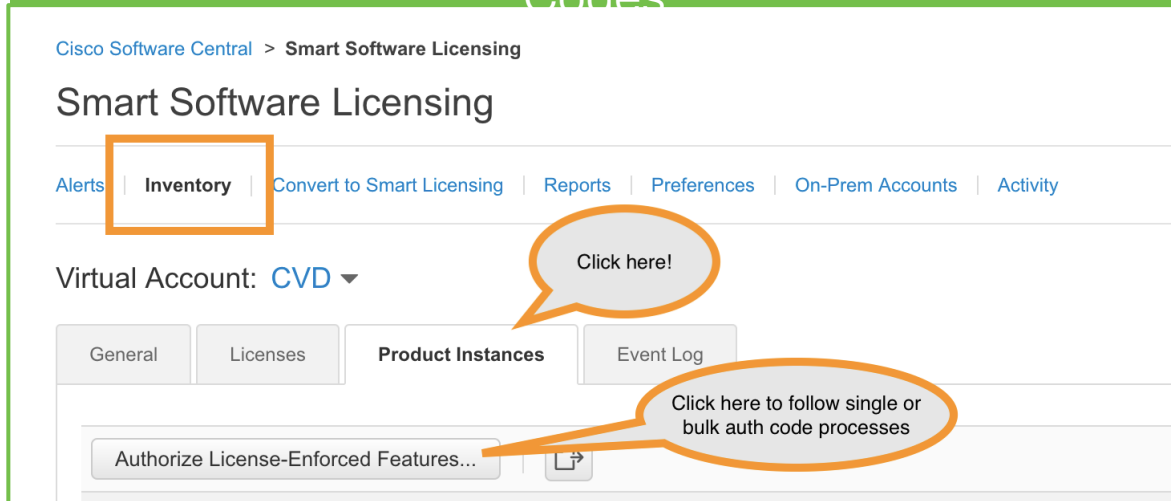
- ✓ Manually copy files between Catalyst devices and CSSM
- ✓ No dependency on external tools

Что происходит с лицензиями при апгрейде на релиз с Smart Licensing Using Policy (IOS XE 17.3.2 / 17.4.1 and later)?

- Уже активированные через ПАК лицензии при переходе на Smart Licensing Using Policy для non-export controlled/ export-controlled SW, **никаких действий не требуется**. Обновляйтесь, используйте, отправляйте отчёт при необходимости.
- RTU to Smart Licensing Using Policy for non-export controlled SW, **никаких действий не требуется**. Обновляйтесь, используйте, отправляйте отчёт при необходимости.
- SL to Smart Licensing Using Policy for non-export controlled SW/ export-controlled SW, **никаких действий не требуется**. Обновляйтесь, используйте, отправляйте отчёт при необходимости.
- **Новая покупка export-controlled лицензий (HSEC):** требуется Auth Codes на каждый UDI (unique device identifier) / SN. Cisco tools или APIs доступны для автоматизации процесса.
 - Note. Cisco uses SW use reports sent to a SA to determine deltas between purchase vs. use
 - US Commerce requires all trade-controlled SW to be purchased in advance

Активация HSEC лицензии

Use your Smart Account to Acquire Single or Bulk Codes



Or

Automate the processes by:

- ✓ Using Smart Account [APIs](#) with 3rd party systems
- ✓ A Cisco DNAC, SD WAN controller
- ✓ SSM on-prem
- ✓ Cisco Smart Licensing Utility windows App (CSLU)

Smart Account, Smart Licensing using Policy APIs:
https://apidocs-prod.cisco.com/explore;category=Smart_Accounts_&Licensing_APIs;sgroup=Smart_Licensing_Using_Policy

Smart Licensing Auth Code Request API:
https://apidocs-prod.cisco.com/explore;category=Smart_Accounts_&Licensing_APIs;sgroup=Smart_Licensing_Using_Policy;epname=Request_Authorization_Codes

Поддержка Smart Account Using Policy

Supported Products for 17.3.2:

- ✓ All ISR1K family
- ✓ All ISR4300 family
- ✓ All ISR4400 family
- ✓ All C8200 family
- ✓ All C8300 family
- ✓ All C8500 family

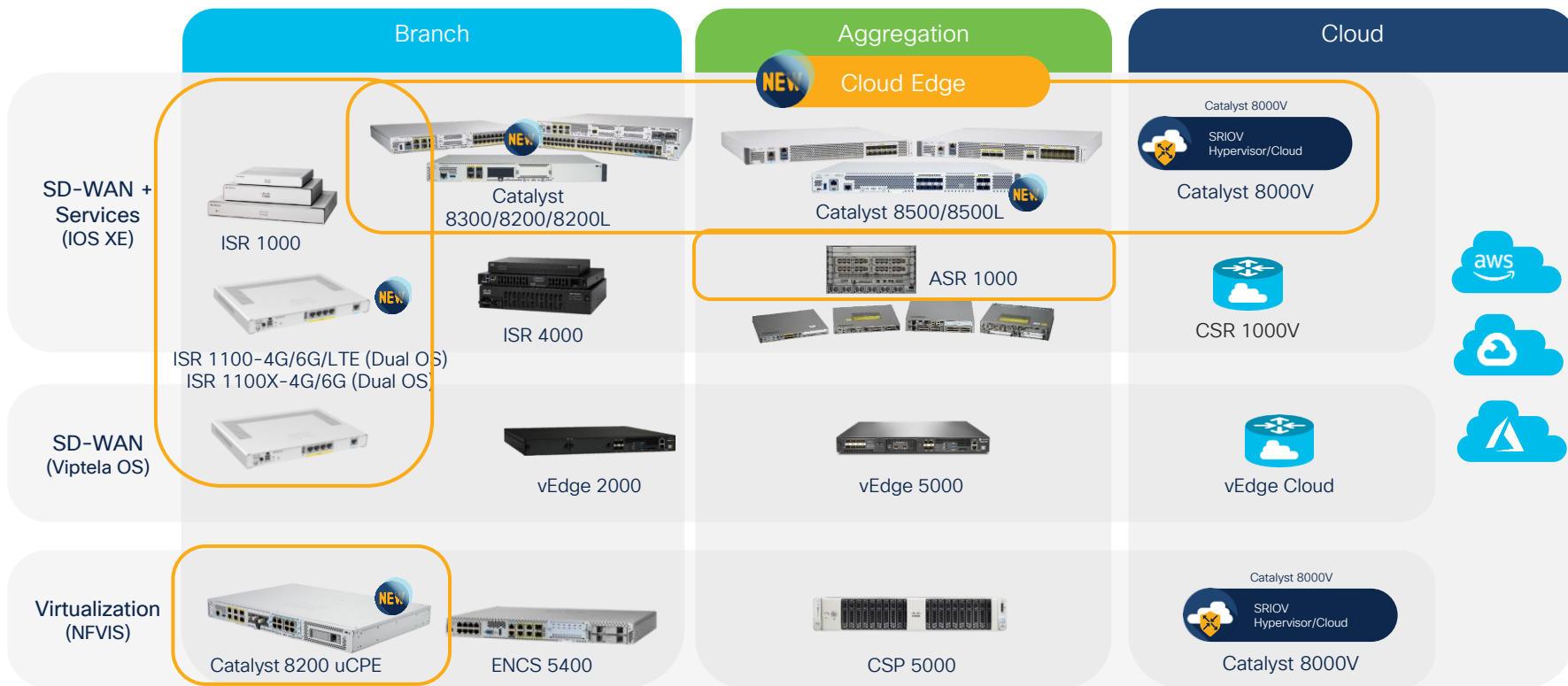
Supported Products for 17.4.1

- ✓ All products supported in 17.3.2
- ✓ CSR1000v upgrade to C8Kv
- ✓ ISRv upgrade to C8Kv
- ✓ C8Kv

Проверка знаний 3 (Poll 3)

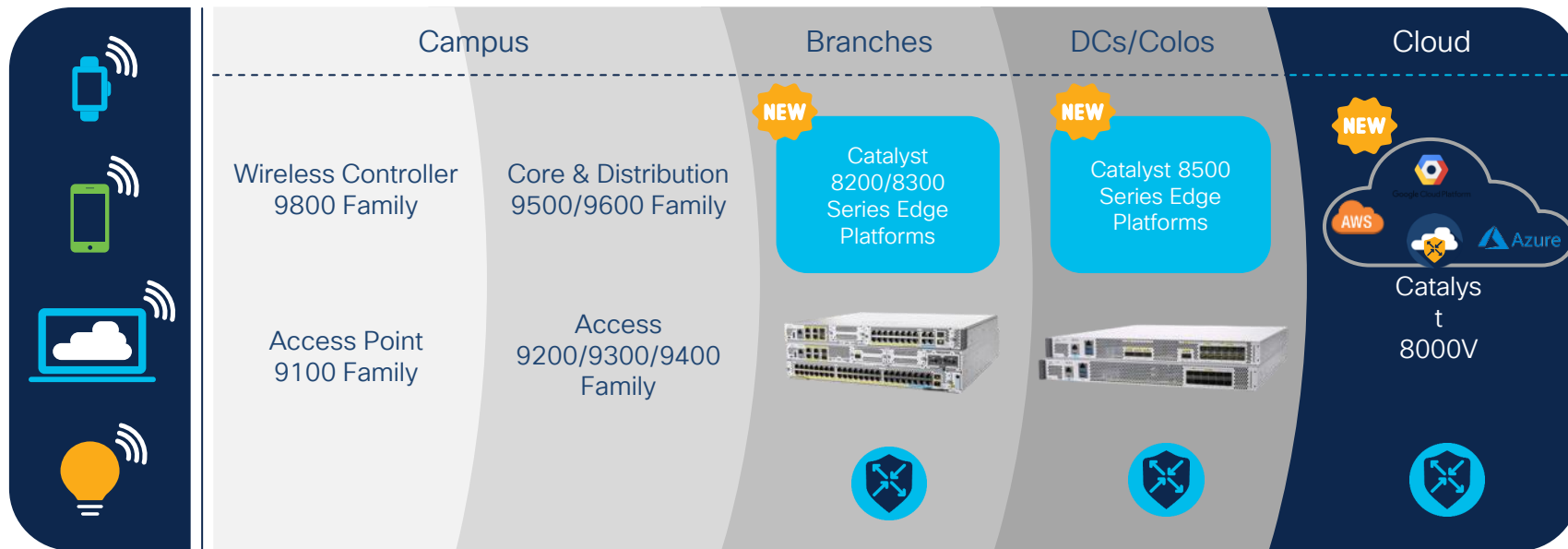
Итоги и выводы

Маршрутизаторы для классических и SD-WAN сетей



Cisco Catalyst for Intent-based Networking

Intent-based Networking



Consistent Experience End to End

Intent



Policy



Automation



Analytics

Спасибо за внимание!