



Global Sales Training

SD-WAN vEdge and XE SD-WAN Platform Overview

Partner SE

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2020

Agenda

- 1 Introduction to Cisco SD-WAN Platforms
- 2 vEdge and XE SD-WAN Platforms
- 3 SD-WAN Platforms License
- 4 BOM Demo

Agenda

1 Introduction to Cisco SD-WAN Platforms

2 vEdge and XE SD-WAN Platforms

3 SD-WAN Platforms License

4 BOM Demo

Cisco SD-WAN 解决方案 全景图



Application
SLA



Traffic
Engineering



Per-Segment
Topologies



Secure
Perimeter



Cloud
Path



Cloud
Accel



Transport
Hub

应用策略



Routing



Security



Segmentation



QoS



Multicast



Svc Insertion



Survivability

交付平台



Broadband



MPLS



Cellular

ZERO TOUCH

ZERO TRUST

构建在任何IP传输平台上的安全架构

思科SD-WAN整体架构

SD-WAN核心组件



Orchestration = vBond

- 对控制和管理平面的统一编排
- 第一认证和注册点
- 将vSmart/vManage列表转发给所有vEdge



Management = vManage (Multi-tenant or Dedicated)

- 对SD-WAN网络的配置和管理
- Policy template的集中管理
- GUI界面，简单易用
- API: Rest北向接口

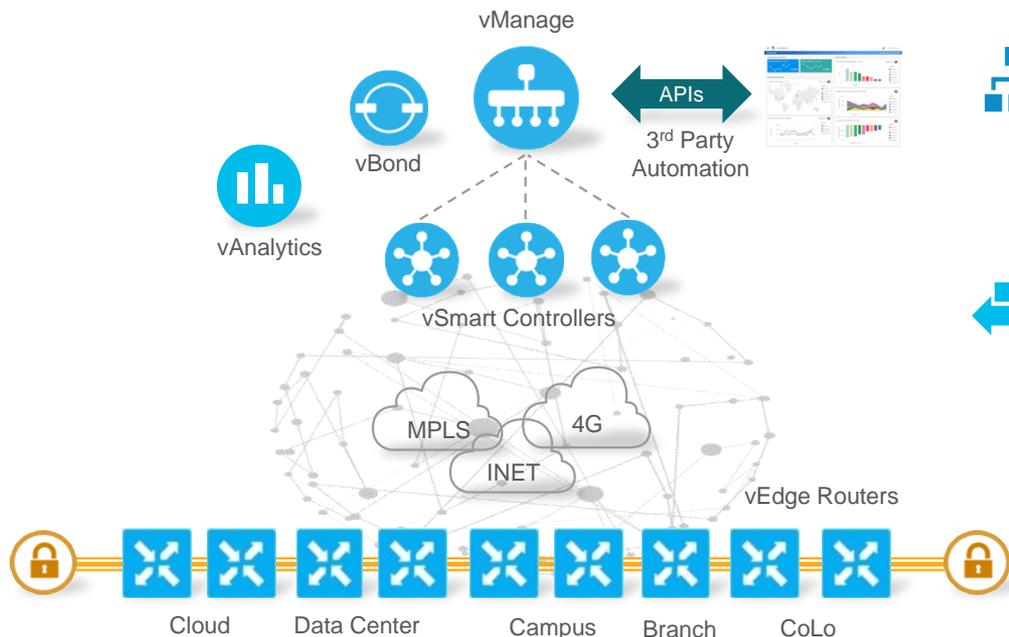


Control Plane = vSmart (Containers or VMs)

- 与vEdge共同形成控制平面
- 在vEdge之间分发数据平面和策略信息
- 实施控制平面策略

Data Plane = vEdge (Physical or Virtual)

- SD-WAN路由器，形成数据平面。
- 执行数据转发和策略
- 与现有网络通过路由协议连接



SDWAN 产品系列

XE-SDWAN

Branch

ISR 1000



- Integrated wired and wireless access
- PoE/PoE+



ISR1120 / 1160
(New 25 SKUs)



NEW

- Smallest form-factor
- PIM: 4G LTE CAT4/6/18
- Up to 30% higher perf.

ISR 4000



- WAN and voice module flexibility
- Compute with UCS E
- Integrated Security stack
- WAN Optimization

Aggregation

ASR 1000



- Hardware and software redundancy
- High-performance service with hardware assist

VEDGE OS

ISR1100-4G

NEW



- 4 GE WAN ports
- ~200 Mbps perf.

vEdge 100M



- 4G LTE (CAT3)
- ~200 Mbps perf.



ISR1100-4GLTE

Dec 19



- 4G LTE (CAT4)
- ~200 Mbps perf.
- FCS in December 2019

ISR1100-6G

NEW



- 6 WAN ports (4GE and 2 SFP)
- ~1 Gbps perf.

vEdge 2000



- ~2 Gbps perf.
- Modular and RPS

vEdge5000



- ~5 Gbps perf.
- Modular and RPS

Virtual and Cloud

Cisco ENCS



Cisco Hyperflex Edge



Nov 19

- Intersight for HX Orchestration
- Service chaining virtual functions
- Options for WAN connectivity
- Open for 3rd party services & apps

CSR 1000V



- Cisco DNA virtualization
- Extend enterprise routing, security & management to cloud

Agenda

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2 vEdge and XE SD-WAN Platforms

3 SD-WAN Platforms License

4 BOM Demo

Cisco Vedge Platform

vEdge Platform Overview (1)

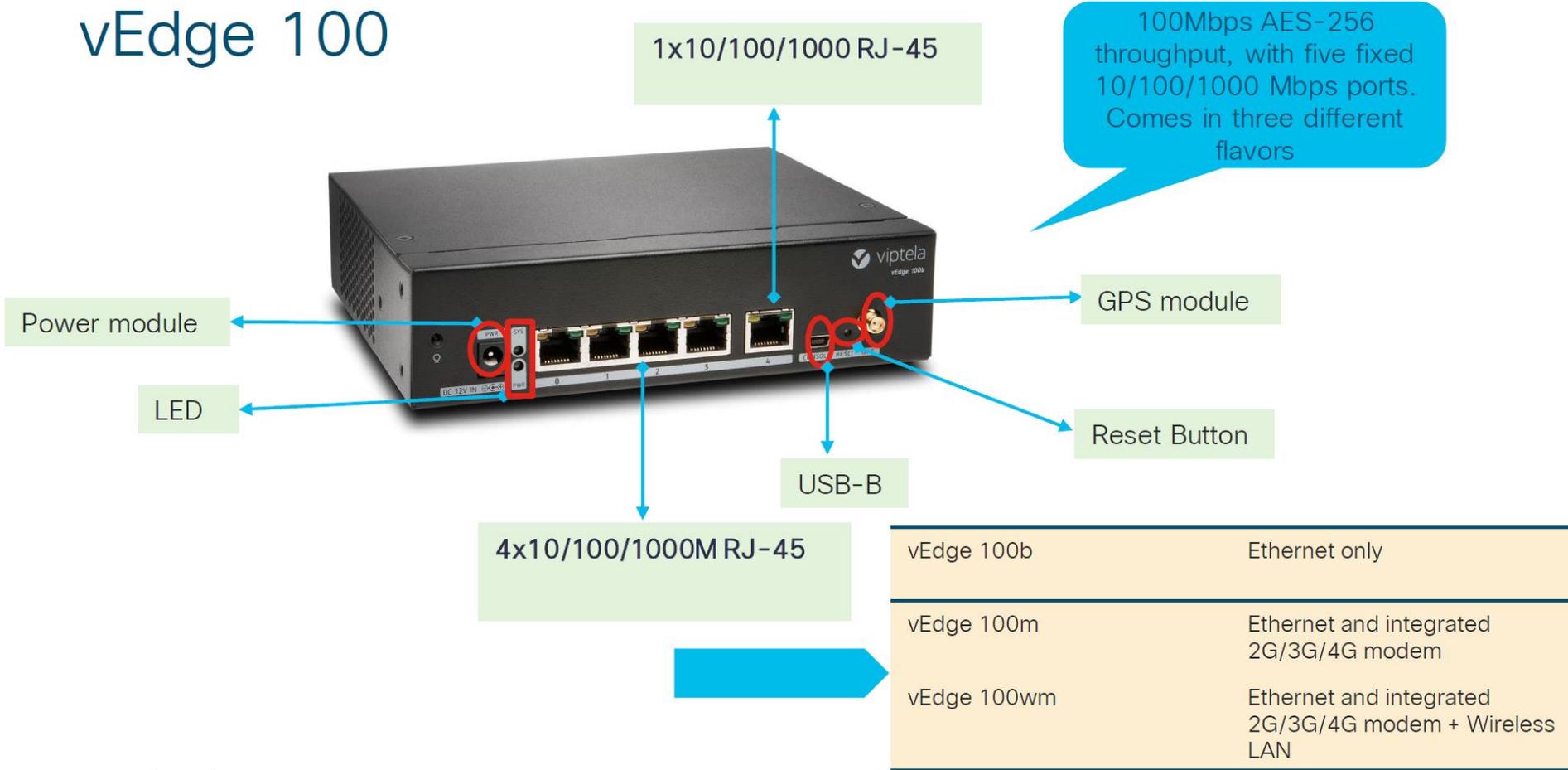
	 vEdge 100	 vEdge 1000	 vEdge 2000	 vEdge 5000
I/O	5x 10/100/1000 Mbps RJ-45	8x 1G SFP	4x 1G SFP, 2x PIM* PIM: 2x10G SFP, 8x 1G SFP	4x NIM* NIM: 8x1G Copper, 8x1G SFP, 4x10G SFP
External USB	vEdge 100: N/A vEdge 100m & 100wm: 1x USB3.0	2x USB3.0	2x USB3.0	2x USB3.0
PoE	vEdge 100: N/A vEdge 100m & 100wm: 1x port	N/A	N/A	N/A
4G LTE	vEdge 100: N/A vEdge 100m & 100wm: 1x port	N/A	N/A	N/A
Console Port	Mini-USB	Mini-USB, RJ-45	Mini-USB, RJ-45	Mini-USB, RJ-45
Mgmt port	N/A	RJ-45 (10/100/1000)	RJ-45 (10/100/1000)	RJ-45 (10/100/1000)
Power Supply / Redundancy	vEdge 100: External AC-DC Adapter vEdge 100m & 100wm: Internal fixed AC Adapter / N/A	External AC-DC Adapter / Yes	Hot-swappable PSU / 1+1 active-active	Hot-swappable PSU / Yes
FANs	vEdge 100: N/A vEdge 100m & 100wm: 1x fan, fixed	2, Front to back	2, hot swappable, Front to back	4, hot swappable, Front to back
HxWxD	1.72x7.5x5.5 in.	1.75x7.5x10 in.	1.75x17.25x18.5 in.	1.75x17.25x22.8 in.

* PIM: Pluggable Interface Module, NIM: Network Interface Module – not same NIM as ISR4000

vEdge Platform Overview (2)

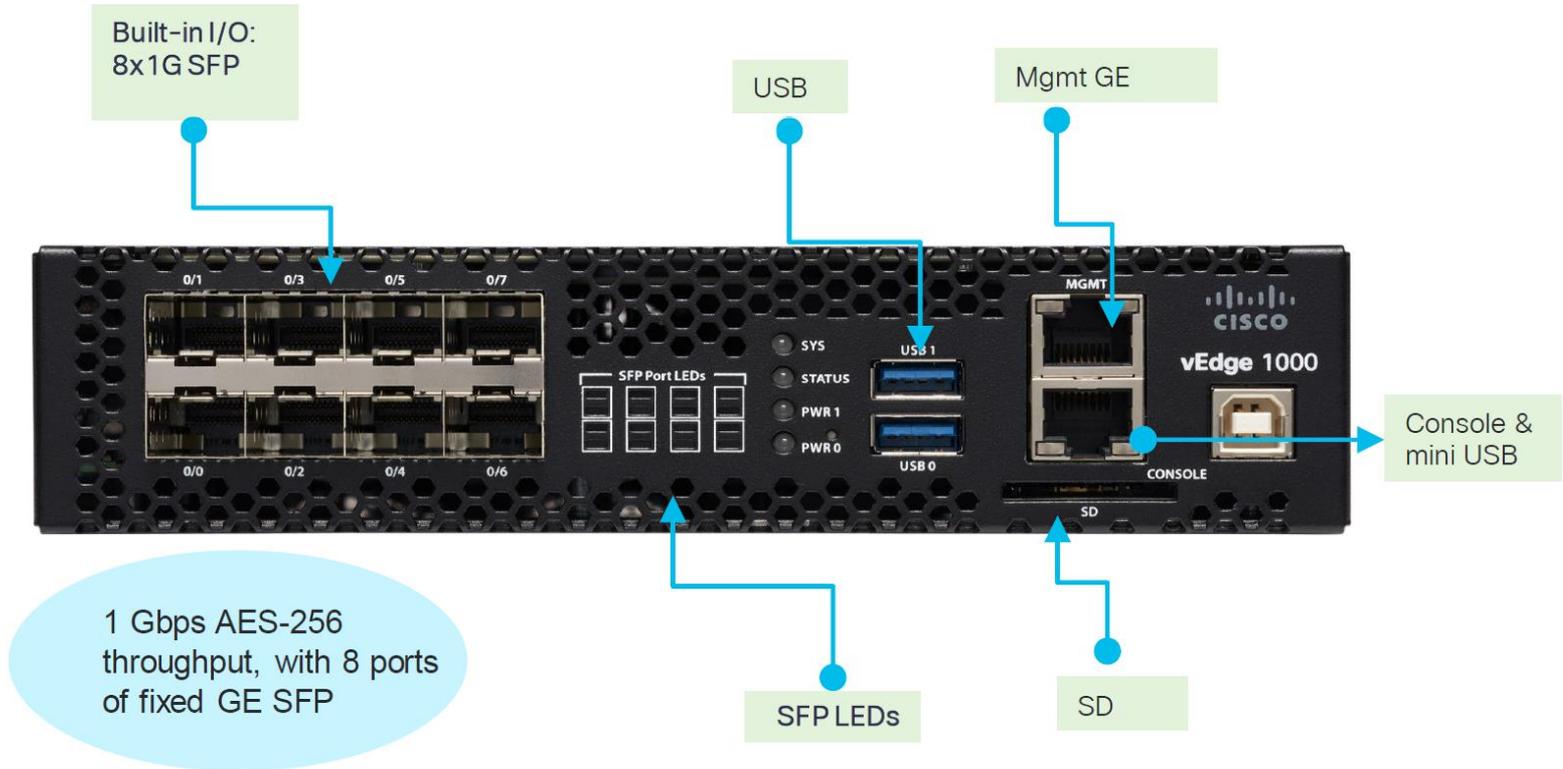
	 vEdge 100	 vEdge 1000	 vEdge 2000	 vEdge 5000
CPU	Cavium 7020 2-cores @800MHz	Cavium 6130 4-cores @1.0GHz	Cavium 6880 32-cores @1.2GHz	Intel Haswell-EP 14-cores @2.2GHz
Encryption Acceleration	N/A	N/A	N/A	Intel QAT
Memory	2GB DDR3	4GB DDR3	8GB DDR3	32GB DDR4
Flash	4GB	8GB	8GB	120GB
Throughput (361Bytes)	112Mbps	345Mbps	2.8Gbps	5.2Gbps
Tunnel Scale	250	1500	6000	6000
Route Scale	25k	128k	128k	256k

vEdge 100

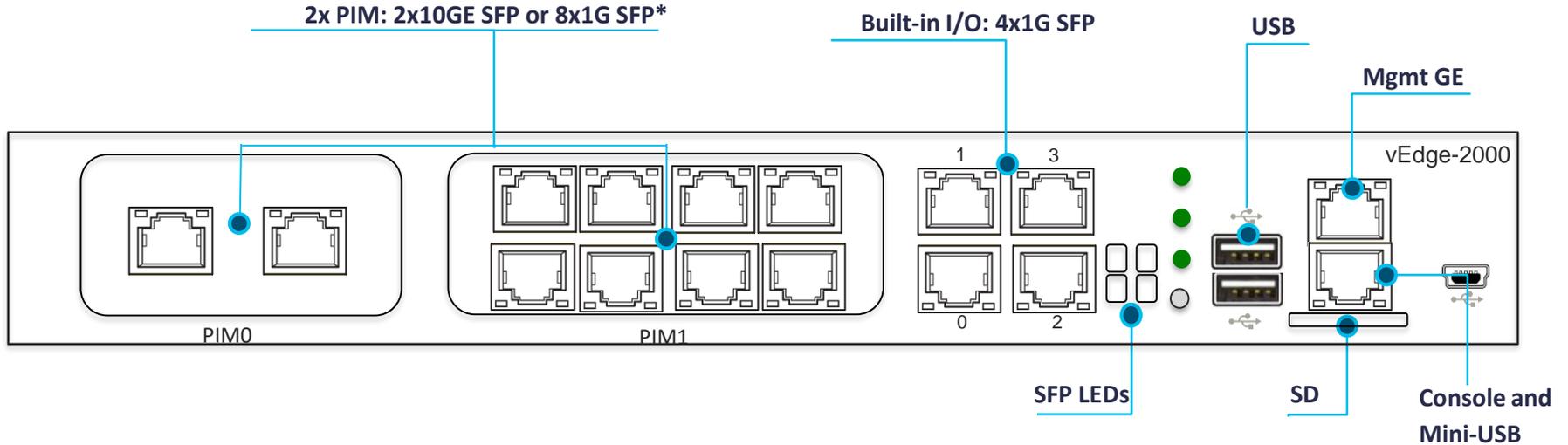


vEdge 100b	Ethernet only
vEdge 100m	Ethernet and integrated 2G/3G/4G modem
vEdge 100wm	Ethernet and integrated 2G/3G/4G modem + Wireless LAN

vEdge - 1000

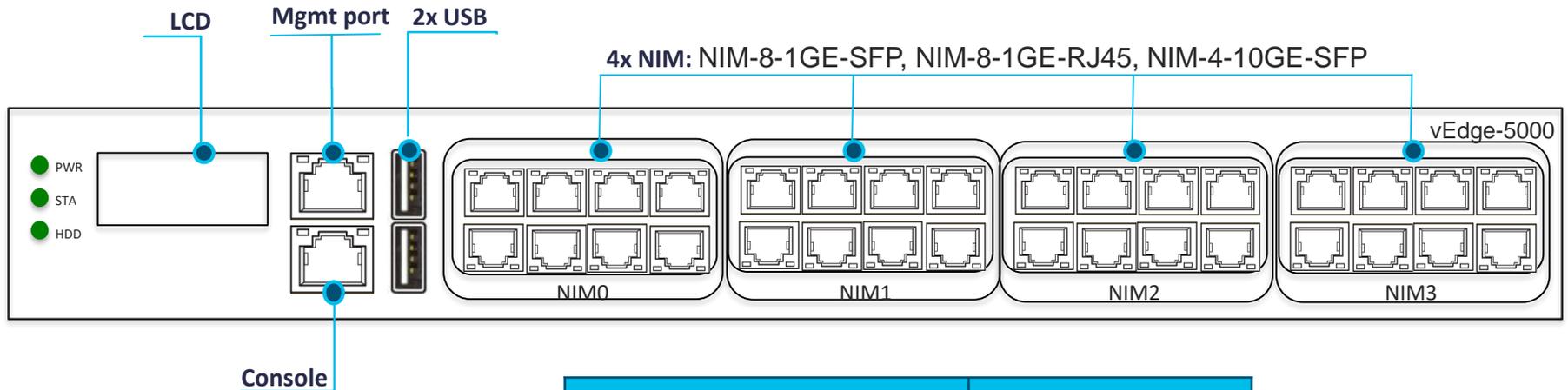


vEdge 2000



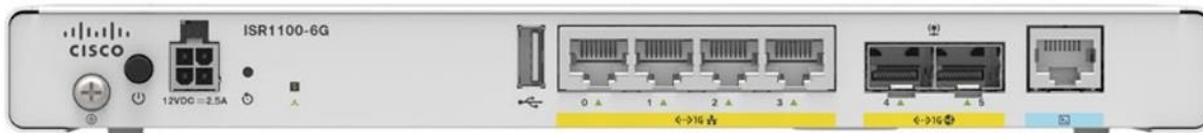
Pluggable Interface Modules (PIMs)	Supported transceivers	OIR components
<ul style="list-style-type: none">You can install the PIM-8x1GE-SFP in either PIM Slot 0 or PIM Slot 1.However, when it is installed in PIM Slot 0, only four ports are usable.When it is installed in PIM Slot 1, all eight ports are usable.There is no such restriction with the PIM-2x10GE-SFP+	<ul style="list-style-type: none">SFP-1GE-Base-TSFP-1GE-LXSFP-1GE-SXSFP-10GE-SRSFP-10GE-LR	<ul style="list-style-type: none">PIMsPower SupplyTransceiversFan Tray

vEdge 5000



NIM supported transceivers	OIR components
<ul style="list-style-type: none">• SFP-1GE-SX• SFP-1GE-LX• SFP-1GE-EX• SFP-1GE-Base-T• SFP-10GE-SR• SFP-10GE-LR	<ul style="list-style-type: none">• NIMs• Power Supply• Fan Tray• Transceivers

Introducing ISR1100 routers for SD-WAN



强劲的性能

- 多核x86架构
- 控制平面专用芯片
- 集成LTE调制解调器选件*

支持SD-WAN

- 由Viptela OS驱动
- 带vManage的中央管理
- 与vEdge平台功能相同

分支机构优化

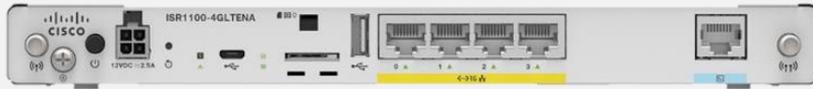
- 紧凑的外形
- 无与伦比的奖杯/性能
- 光纤上行链路**

Models at-a-Glance



ISR1100-4G

4 x 10/100/1000Mbps



ISR1100-4GLTE

4 x 10/100/1000Mbps
Cat-4 LTE



ISR1100-6G

4 x 10/100/1000Mbps
2 x 1G SFP

Ready for bringing SD-WAN to the branch

Use Cases / Deployment Scenarios

SD-WAN Use Cases



零售/售货亭
应用感知路由
安全细分



MSP
适用于中小企业的SD-WAN
多租户



金融
云安全
连接 ATM
SaaS/IaaS 优化



远程工作
安全分段

Hardware Overview

Cisco ISR1100-4G – FCS end of Oct 2019



Higher throughput than
vEdge 100b

Next Generation vEdge

4 x 10/100/1000 Ethernet

Fanless design

4GB Memory

Cisco Built Hardware with TWS

Viptela OS

Cisco ISR1100-4GLTE – FCS Jan 2020



Higher throughput than
vEdge 100m

Next Generation vEdge

4 x 10/100/1000 Ethernet
Cat-4 LTE

Fanless design

4GB Memory

Cisco Built Hardware with TWS

Viptela OS

Cisco ISR1100-6G – FCS end of Oct 2019



Higher throughput than
vEdge 100b

Next Generation vEdge

4 x 10/100/1000 Ethernet
2 x 1G SFP Ethernet

Fanless design

4GB Memory

Cisco Built Hardware with TWS

Viptela OS

Platform Features

ISR1100-4G – Front View



Status and physical security

- Status LED
- Ground screw
- Power button
- Recessed reset button
- Power connector

Copper Data Interfaces

- 4x1GE Ethernet routed

Management Interface

- 1x RJ-45 Serial Console
- USB 3.0, Type A

ISR1100-4GLTE – Front View

LTE Antenna

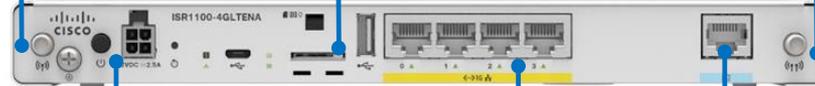
- SMA connector

SIM Card slot

- Micro (3FF)

LTE Antenna

- SMA connector



Status and physical security

- Status LED
- Ground screw
- Power button
- Recessed reset button
- Power connector

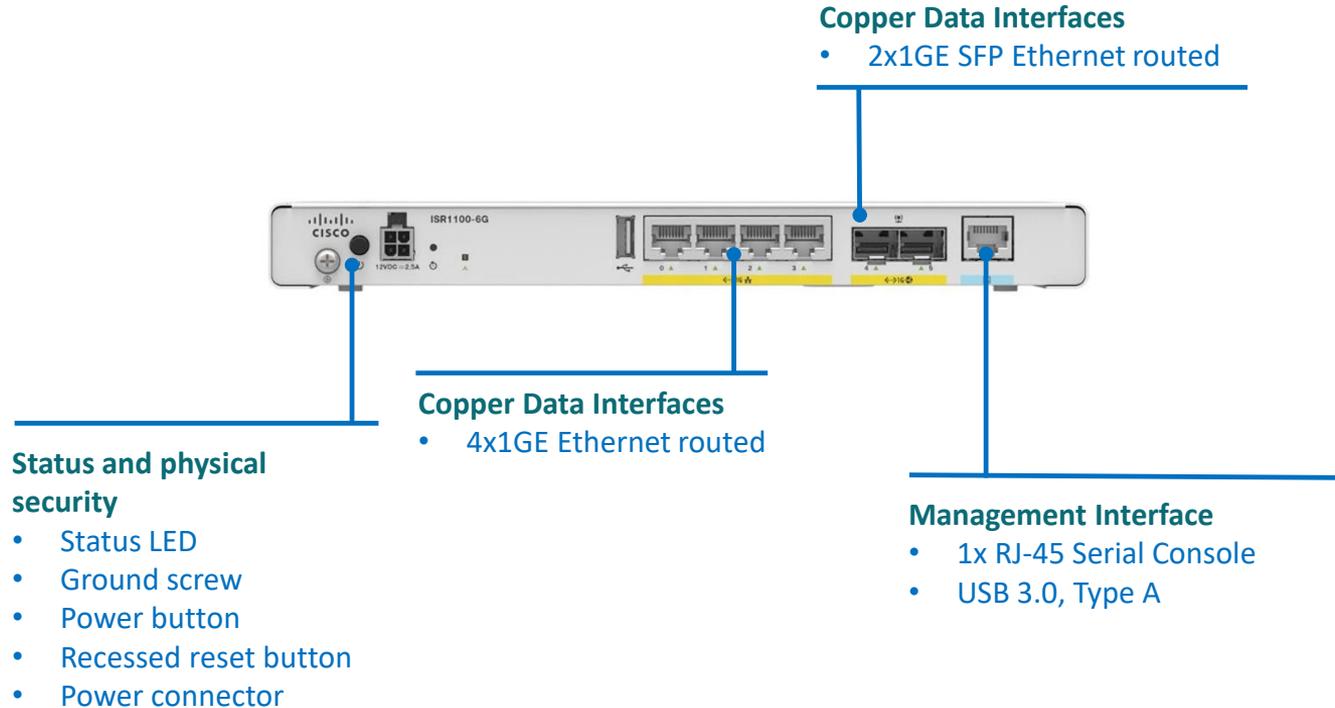
Copper Data Interfaces

- 4x1GE Ethernet routed

Management Interface

- 1x RJ-45 Serial Console
- USB 3.0, Type A
- LTE Debug Port, Micro-USB

ISR1100-6G – Front View



LTE Support on ISR1100-4GLTE

	ISR1100-4GLTENA	ISR1100-4GLTEGB
Category	Cat-4 LTE	Cat-4 LTE
Bands	LTE: B2, B4, B5, B12, B13, B14, B17, B66 UMTS: B2, B4, B5	LTE: B1, B3, B7, B8, B20, B28 HSPA+, UMTS: B1, B8 GSM/GPRS/EDGE: E-GSM 900, DCS 1800
Max. Speed (down/up)	150Mbps/50Mbps	150Mbps/50Mbps
United States / Canada	●	
Europe		● ¹
Australia / SE Asia		● ¹
Middle East		● ¹
Latin America		● ¹

¹ depending on specific operators supporting the LTE bands listed above

SFP Support on ISR1100-6G

SKU	Description	Standard(s) supported	Supported on ISR1100-6G
VIP-SFP-1GE-BASET	Pluggable transceiver - 1GE BaseT 10/100/1000	10BASE-T 100BASE-TX 1000BASE-T	•
VIP-SFP-1GE-SX	Small form-factor pluggable transceiver - 1GE SX	1000BASE-SX, Multimode 850nm	•
VIP-SFP-1GE-LX	Small form-factor pluggable transceiver - 1GE LX	1000BASE-LX, Singlemode 1310nm	•

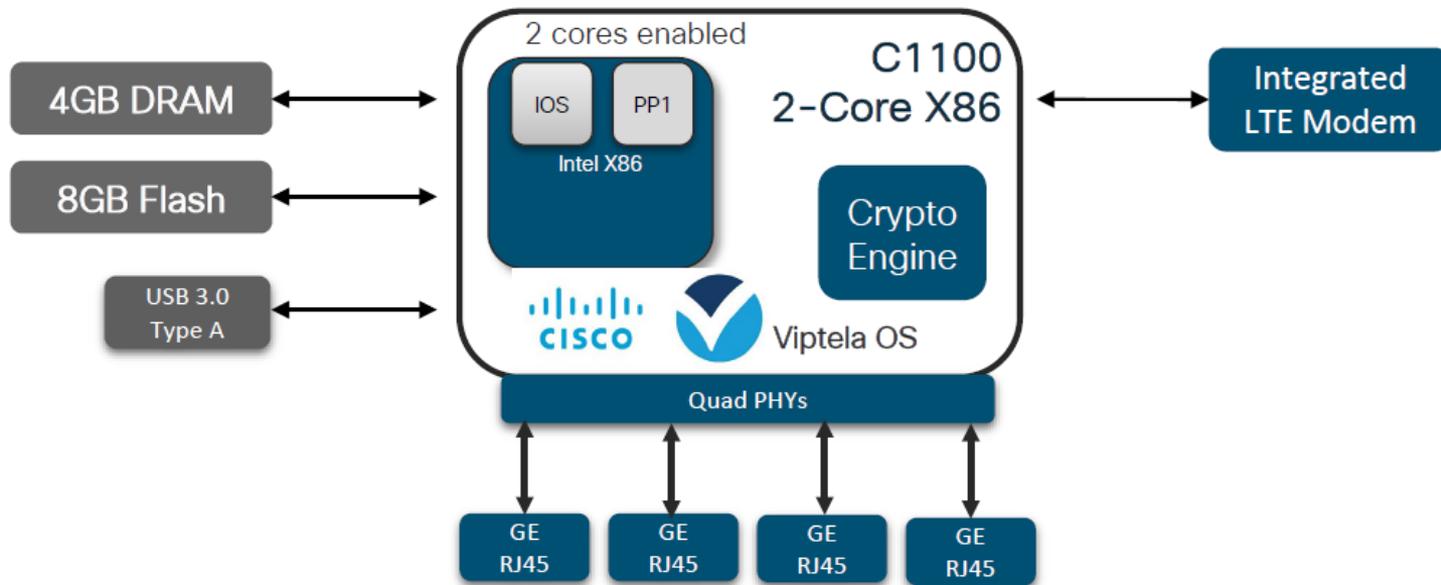
ISR1100-4G & vEdge 100 Comparison

	ISR1100-4G	ISR1100-4GLTE	vEdge 100b	vEdge 100m
Memory	4GB DDR4, ECC		2GB DDR3, ECC	
Flash	8GB eMMC		4GB NAND	
Routed Ports (WAN/LAN)	4 x 10/100/1000 RJ45		5 x 10/100/1000 RJ45	
USB Ports	USB 3.0, Type A			USB 3.0, Type A
PoE	None			1 Port, 15.4W, 802.3af
Cellular / LTE	None	Cat-4 LTE, 150/50Mbps	None	Cat-3 LTE, 100/50Mbps
Console Ports	1 x Serial, RJ45		1 x USB Mini, Type B	
Management Ports	None			
Power supply	External Adapter			Internal power supply
Fans	Fanless Design			1, Top
Form Factor	10.2" x 7" x 1.1"		6.75" x 5.5" x 1.75	9.25" x 5.75" x 1.8"

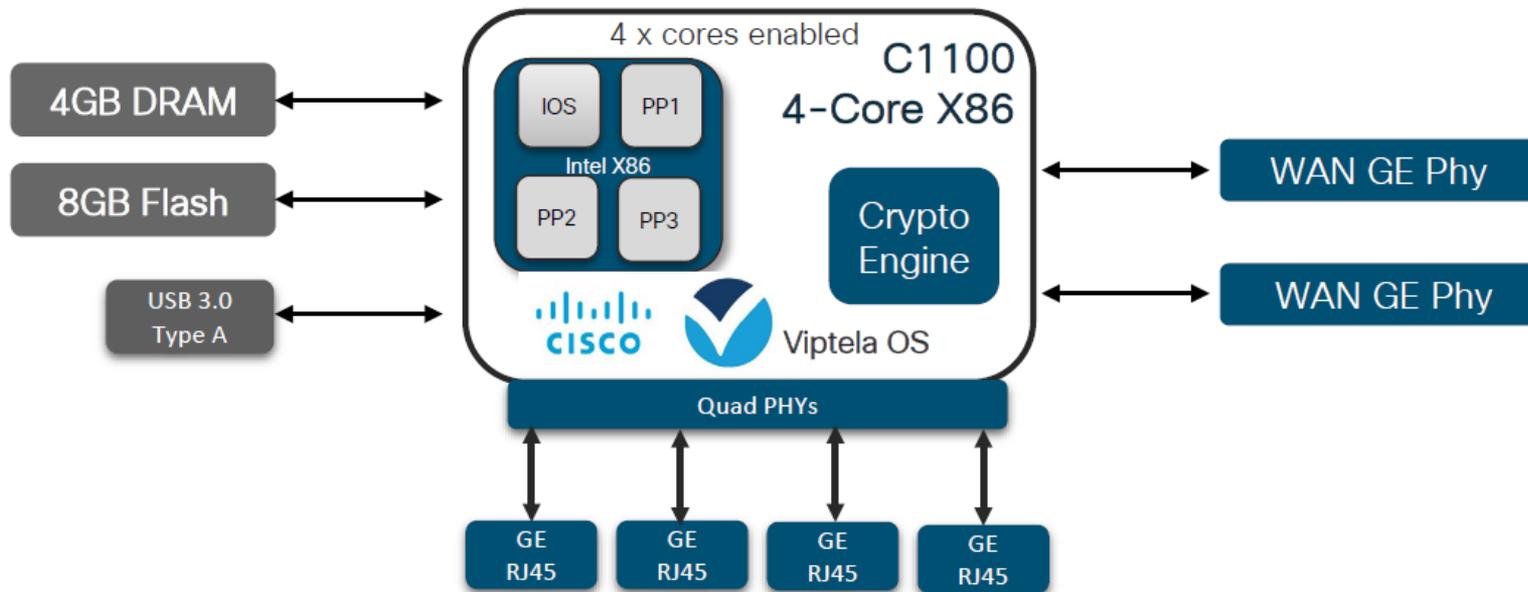
ISR1100-6G & vEdge 1000 Comparison

	ISR1100-6G	vEdge 1000
Memory	4GB DDR4, ECC	4GB DDR3, ECC
Flash	8GB eMMC	8GB NAND
Routed Ports (WAN/LAN)	4 x 10/100/1000 RJ45, 2 x 1GE SFP	8 x 1GE SFP
SD-Card slot	No	Yes, max. capacity 32GB
USB Ports	1 x USB 3.0, Type A	2 x USB 3.0, Type A
Console Ports	1 x Serial, RJ45	1 x USB Mini, Type B, 1x Serial, RJ45
Management Ports	None	1 x 10/100/1000 RJ45
Power supply	External Adapter	
Redundant power supply	No	Yes
Fans	Fanless Design	2
Form Factor	10.2" x 7" x 1.1"	7.5" x 10" x 1.75
SD-WAN	Yes	
SD-WAN Security	Enterprise FW + DPI	

ISR1100-4GLTE Block Diagram



ISR1100-6G Block Diagram



Cisco ISR 4000

Cisco ISR 4000 Series

Concurrent Services and Performance

4300 and 4200 architecture

Single Silicon with Multiple CPU cores

SD-WAN READY

4451-X

(2 RU, 3.8 Gbps)

4461

(3 RU, 10 Gbps)

4431

(1 RU, 3.4 Gbps)

4351
(2 RU, 2 Gbps)

4331

(1 RU, 1.8 Gbps)

4321

(1 RU, 1.6 Gbps)

4400 architecture

Dedicated Silicon for Control & Data Plane

SD-WAN Ready

* UC not supported on 4200

ISR 4461



3 RU form factor

Internal:
Dual AC/DC PSU

DRAM – 8/16/32 GB

Flash - 8/16/32 GB

3 x NIMs, 3 x SMs

Default throughput
IP CEF – 1.5 Gbps
Crypto – 250 Mbps

With Performance licenses
IP CEF – 3 Gbps
Crypto – **1.5 Gbps***

With Boost licenses
IP CEF – 10 + Gbps
Crypto – 7 Gbps*

* Requires HSECK9 license to support more than 250 Mbps Crypto IPSec throughput.

Cisco ISR 4461 - I/O Design

Front Panel Gigabit Ethernet

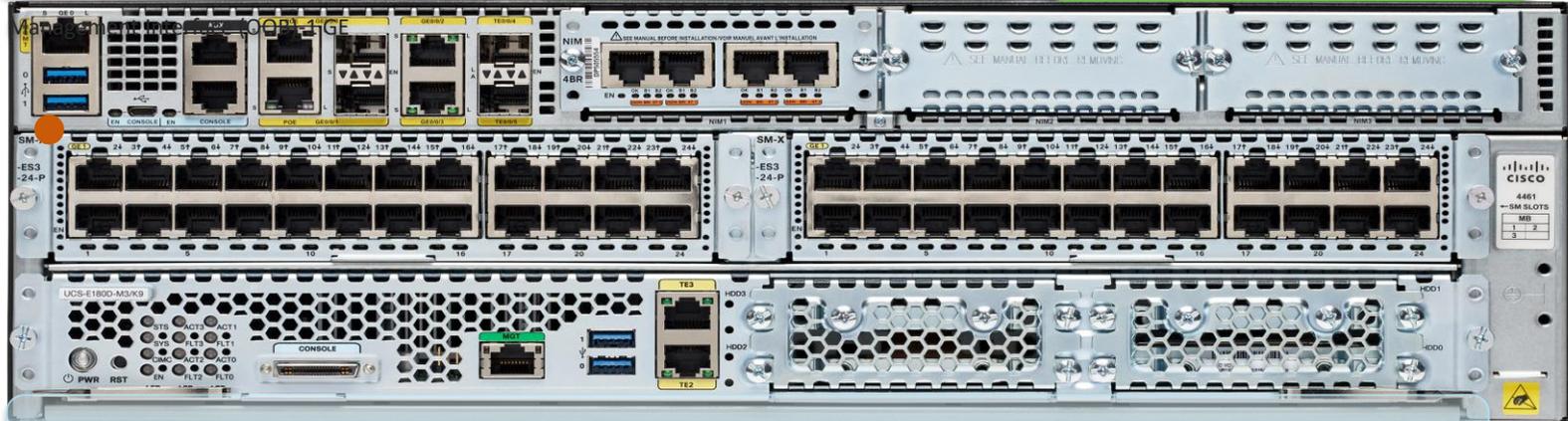
- 2x1GE combo ports (RJ45 or SFP)
- 2x1GE RJ45
- 2x10GE SFP
- PoE+ with Daughter card (on combo ports)
- 2 X USB Type A
- RJ45 console & Aux
- USB Type B console
- Management Interface (OOB)-1 GE

Network Interface Modules (NIMs)

- Larger and more powerful than EHWICs
- Up to 8 ports per module
- DSPs directly on modules

Storage for Embedded Applications

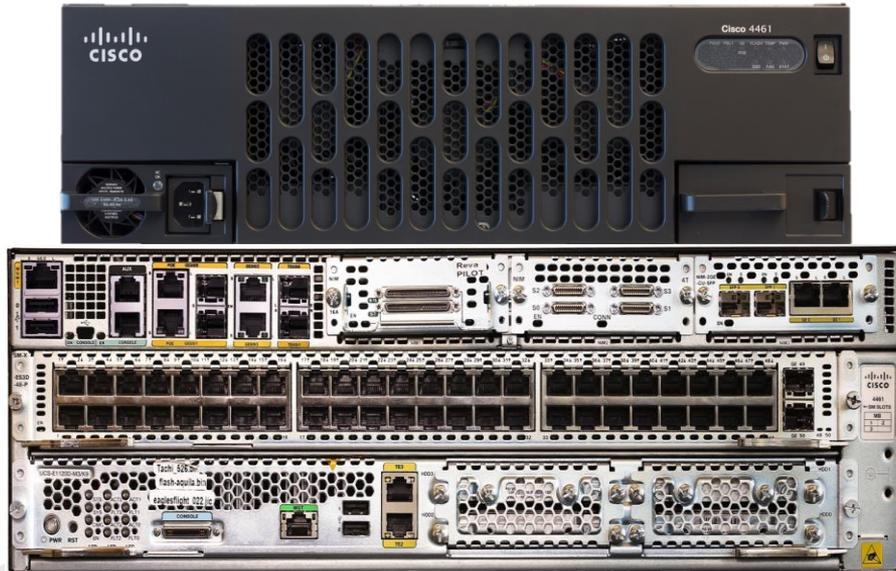
- Dual SSD NIM options
- eSATA drive



Enhanced Service Modules

Compatible with Cisco® ISR G2, 10Gbps internal connection to system, Faster and more powerful than SMs.

Cisco ISR 4461



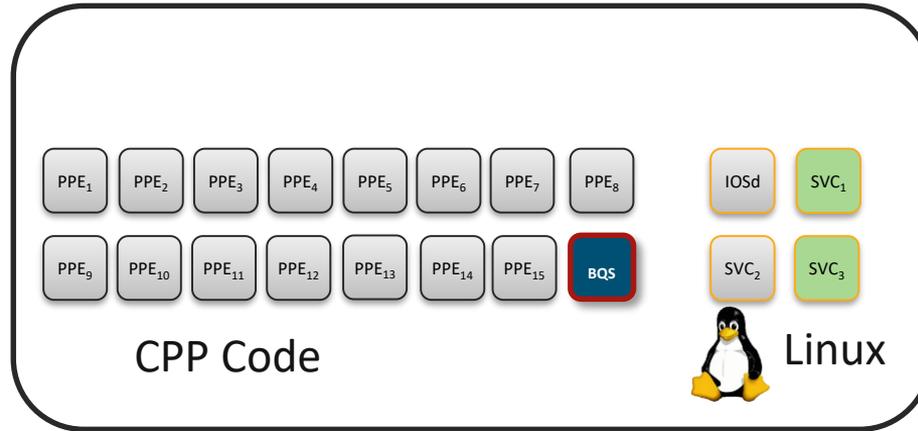
Up to 10Gbps Performance

Migrate from Cisco® 3900E ISR

SD-WAN Ready

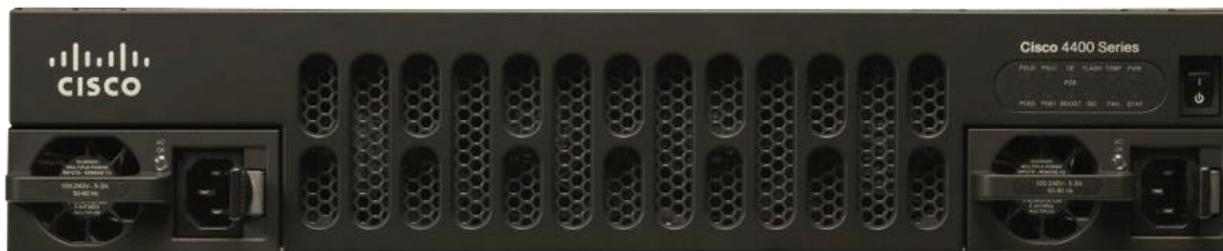
Entity	ISR 4461
CPU architecture	4 core control/services + 16 core data plane
#NIMs	3
#SMs	3 (3xSW or 2xDW or 2SW+1DW)
Front panel ports (FPGE)	2x1GE Combo ports: RJ45 or SFP 2x1GE RJ45 + 2x10GE SFP+
PoE option on GE Port	Yes
ISC slot	None
MACsec	WAN MACsec 256AES + Tag-in-clear on all embedded ports
USB type A ports	2
Power	Dual internal AC or DC
Control/services memory	CP: 1xDDR4 DIMM memory with 8GB default. 16 or 32GB Option DP: 1xDDR4 DIMM memory with 4GB
Mgmt Ethernet	1 Gbps

ISR4461 Architecture



- Same physical processing separation as on ASR1K / ISR4400
- Control Plane 4-core Intel Xeon cpu (8/16/32 GB)
- Data Plane 16-core Cavium cpu
- Data Plane DDR4 DRAM – 4GB Fixed

ISR 4451-X



2 RU form factor

Internal:

Dual AC/DC PSU

DRAM – 4/8/16 GB

Flash - 8/16/32 GB

3 x NIMs, 2 x SMs

Default throughput

IP CEF - 1 Gbps

Crypto – 250 Mbps

With Performance licenses

IP CEF – 2 Gbps

Crypto – **500 Mbps***

With Boost licenses

IP CEF – 3.8 Gbps

Crypto – 1.6 Gbps*

* Requires HSECK9 license to support more than 250 Mbps Crypto IPSec throughput.

Cisco ISR 4451-X – I/O Design

Front Panel Gigabit Ethernet

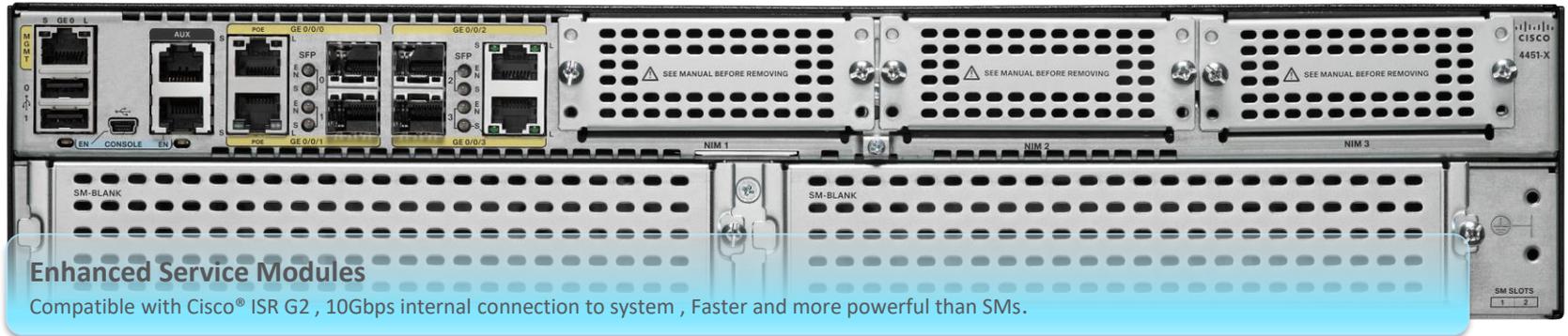
- 4x1GE Combo ports (RJ45 or SFP)
(PoE+ with Daughter card)
- 2 X USB Type A
- RJ45 console & Aux
- USB Type B console
- Management Interface (OOB)-1GE

Network Interface Modules (NIMs)

- Larger and more powerful than EHWICs
- Up to 8 ports per module
- DSPs directly on modules

Storage for Embedded Applications

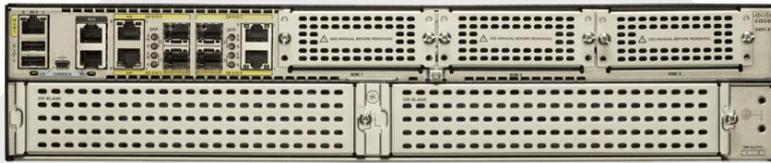
- Dual SSD NIM options



Enhanced Service Modules

Compatible with Cisco® ISR G2 , 10Gbps internal connection to system , Faster and more powerful than SMs.

Cisco ISR 4451



Up to 4Gbps Performance

Migrate from Cisco® 3945 ISR

SD-WAN Ready

Entity	ISR 4451
CPU architecture	4 core control/services 10 core data plane
#NIMs	3
#SMs	2
Front panel ports	4 GE Combo ports: RJ45 or SFP
PoE option on GE Port	Yes
ISC slot	1 for all ISC cards
USB type A ports	2
Power	Dual internal AC or DC
Control/services memory	Base 4 GB; max 16 GB 1600 MHz DIMMs 2 DIMM slots
Mgmt Ethernet	1 Gbps

ISR 4431



1 RU form factor

Internal:
Dual AC/DC PSU

DRAM – 4/8/16 GB

Flash - 8/16/32 GB

3 x NIMs

Default throughput
IP CEF - 500 Mbps
Crypto – 250 Mbps

With Performance licenses
IP CEF – 1 Gbps
Crypto – **500 Mbps***

With Boost licenses
IP CEF – 3.4 Gbps
Crypto – 900 Mbps*

* Requires HSECK9 license to support more than 250 Mbps Crypto IPsec throughput.

Cisco ISR 4431 – I/O Design

Front Panel Gigabit Ethernet

- 4x1GE Combo ports (RJ45 or SFP)
- (PoE+ with Daughter card)
- 2 X USB Type A
- RJ45 console & Aux
- USB Type B console
- Management Interface (OOB)-1 GE

Network Interface Modules (NIMs)

- Larger and more powerful than EHWICs
- Up to 8 ports per module
- DSPs directly on modules

Storage for Embedded Applications

- Dual SSD NIM options



Cisco ISR 4431



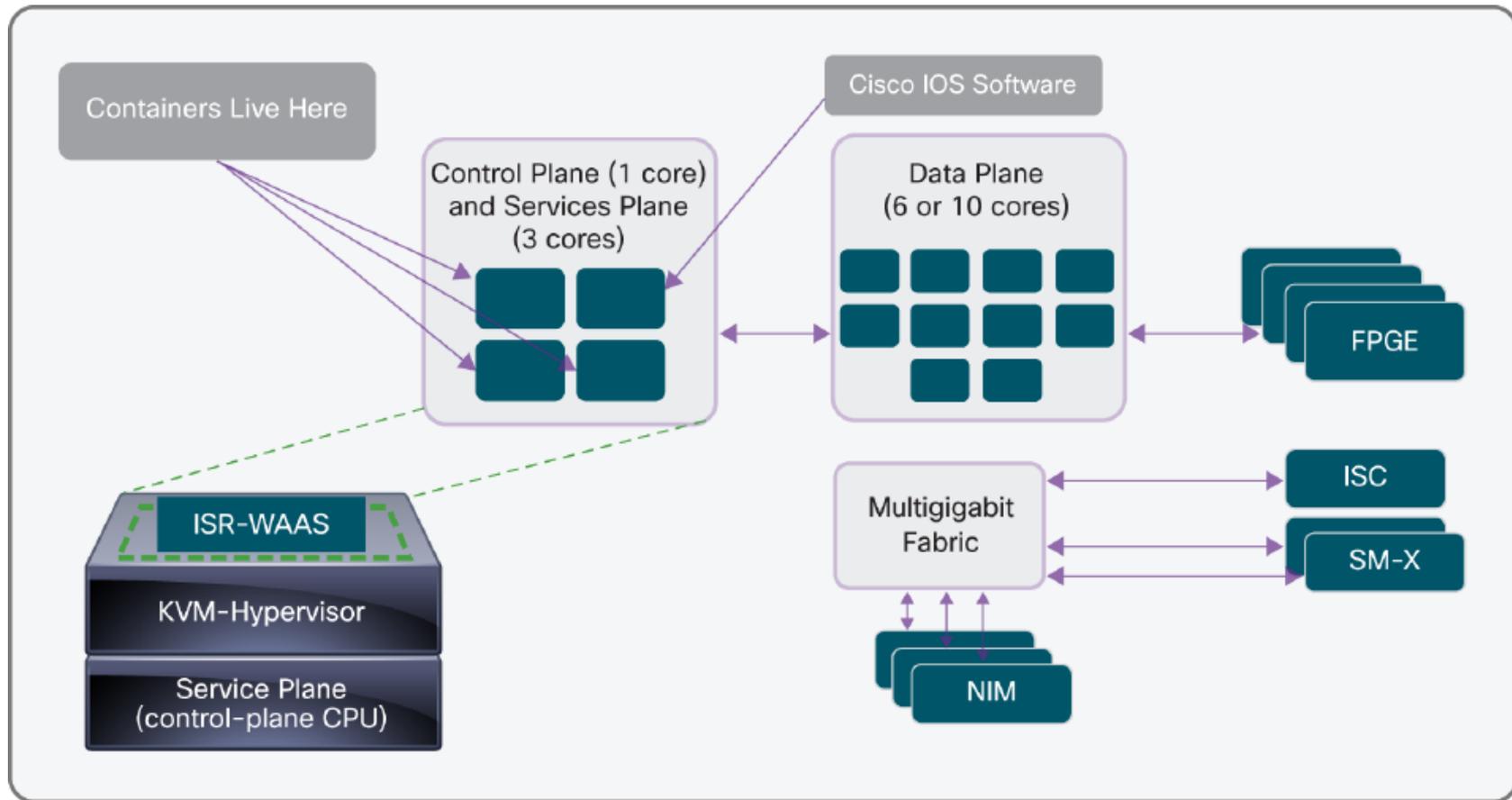
Up to 4Gbps Performance

Migrate from Cisco® 3925 Series ISR

SD-WAN Ready

Entity	ISR 4431
CPU architecture	4 core control/services 6 core data plane
#NIMs	3
#SMs	0
Front panel ports (FPGE)	4 GE Combo ports: RJ45 or SFP
PoE option on FPGE	Yes
ISC slot	1 for all ISC cards
USB type A ports	2
Power	Dual internal AC or DC
Control/services memory	Base 4 GB; max 16 GB 1600 MHz DIMMs 2 DIMM slots
Mgmt Ethernet	1 Gbps

Cisco 4400 系列架构



ISR 4351



2 RU form factor

Internal
AC/DC PSU

DRAM – 4/8/16 GB

Flash - 4/8/16 GB

3 x NIMs, 2 x SMs

Default throughput
IP CEF - 200 Mbps
Crypto – 200 Mbps

With Performance licenses
IP CEF – 400 Mbps
Crypto – 250 Mbps

With Boost licenses
IP CEF – 2 + Gbps
Crypto – 500 Mbps*

* Requires HSECK9 license to support more than 250 Mbps
Crypto IPsec throughput.

Cisco ISR 4351 – I/O Design

Front Panel Gigabit Ethernet

- 3x1GE combo ports (RJ45 or SFP)
- (PoE+ with Daughter card)
- 2 X USB Type A
- RJ45 console & Aux
- USB Type B console
- Management Interface (OOB)-1 GE

Network Interface Modules (NIMs)

- Larger and more powerful than EHWICs
- Up to 8 ports per module
- DSPs directly on modules

Storage for Embedded Applications

- Dual SSD NIM options



Enhanced Service Modules

- Compatible with Cisco® ISR G2, 10Gbps internal connection to system, Faster and more powerful than SMs.

Cisco ISR 4351



Up to 2Gbps Performance

Migrate from Cisco® 2951 ISR

SD-WAN Ready

Entity	ISR 4351
CPU architecture	8-core CPU
#NIMs	3
#SMs	2
Front panel ports (FPGE)	3 GE Combo ports: RJ45 or SFP
PoE option on FPGE	Yes
ISC slot	1 for all ISC cards
USB type A ports	2
Power	Single internal AC or DC
Control/services memory	Base 4 GB; max 16 GB 1600 MHz DIMMs 2 DIMM slots
Mgmt. Ethernet	1 Gbps

ISR 4331-AC



1 RU form factor

Internal AC PSU

DRAM – 4/8/16 GB

Flash - 4/8/16 GB

2 x NIMs, 1 SM

Default throughput
IP CEF - 100 Mbps
Crypto – 100 Mbps

With Performance licenses
IP CEF – 300 Mbps
Crypto – 250 Mbps

With Boost licenses
IP CEF – 1.8 Gbps
Crypto – 500 Mbps*

* Requires HSECK9 license to support more than 250 Mbps Crypto IPsec throughput.

ISR 4331-DC



1 RU form factor

Internal DC PSU

DRAM – 4/8/16 GB

Flash - 4/8/16 GB

2 x NIMs, 1 SM

Default throughput
IP CEF - 100 Mbps
Crypto – 100 Mbps

With Performance licenses
IP CEF – 300 Mbps
Crypto – 250 Mbps

With Boost licenses
IP CEF – 2 + Gbps
Crypto – 500 Mbps*

* Requires HSECK9 license to support more than 250 Mbps Crypto IPSec throughput.

Cisco ISR 4331 – I/O Design

FPGE Ports

- 1 X RJ45 (1GE)
- 1 X SFP (1GE)
- 1 X RJ45/SFP(1GE)

Network Interface Modules (NIMs)

Larger and more powerful than EHWICs
Up to 8 ports per module
DSPs directly on modules

Enhanced Service Modules

Compatible with Cisco® ISR G2 , 10Gbps internal connection to system , Faster and more powerful than SMs.



Storage for Embedded Applications

Dual SSD NIM options



Management (1 GE)
1 X USB Type A
RJ45 console & Aux
USB Type B console

PSU
External AC

Cisco ISR 4331



Up to 2Gbps Performance

Migrate from Cisco® 2911 or 2921 ISR

SD-WAN Ready

Entity	ISR 4331
CPU architecture	8-core CPU
#NIMs	2
#SMs	1
Front panel ports (FPGE)	3GE 1xCU+1xSFP+1xCU/SFP combo
PoE option on FPGE	No
ISC slot	1 for all ISC cards
USB type A ports	1
Power	1 internal AC
Control/services memory	Base 4 GB; max 16 GB 1333 MHz DIMMs 2 DIMM slots
Mgmt Ethernet	1 Gbps

ISR 4321



1 RU form factor

External AC PSU

DRAM – 4/8 GB

Flash – 4/8 GB

2 x NIMs

Default throughput

IP CEF - 50 Mbps

Crypto – 50 Mbps

With Performance licenses

IP CEF – 100 Mbps

Crypto – 100 Mbps

With Boost licenses

IP CEF – 1.6 Gbps

Crypto – **250 Mbps***

* Requires HSECK9 license to support more than 250 Mbps Crypto IPSec throughput.

Cisco ISR 4321 – I/O Design



Network Interface Modules (NIMs)

PSU
External AC

Front Panel Gigabit Ethernet

- 1 x1GE combo ports (RJ45 or SFP)
- 1 X 1 GE RJ45
- 1 X USB Type A
- USB Type B console
- RJ45 console & Aux
- Management Interface (OOB)-1 GE

Cisco ISR 4321



Up to 2Gbps Performance

Migrate from Cisco® 2901 ISR

SD-WAN Ready

Entity	ISR 4321
CPU architecture	4-core CPU
#NIMs	2
#SMs	0
Front panel ports (FPGE)	2 GE 1xCU+1xCU/SFP combo
PoE option on FPGE	No
ISC slot	1 for all ISC cards
USB type A ports	1
Power	1 External AC
Control/services memory	Base 4 GB; max 8 GB 1333 MHz DIMMs 2 DIMM slots
Mgmt Ethernet	1 Gbps

ISR 4221X



1 RU form factor

External AC PSU

DRAM – 8 GB Fixed

Flash – 8/16 GB Fixed

2 x NIMs (Limited)

Default throughput

IP CEF - 35 Mbps

Crypto – 35 Mbps

With Performance licenses

IP CEF – 75 Mbps

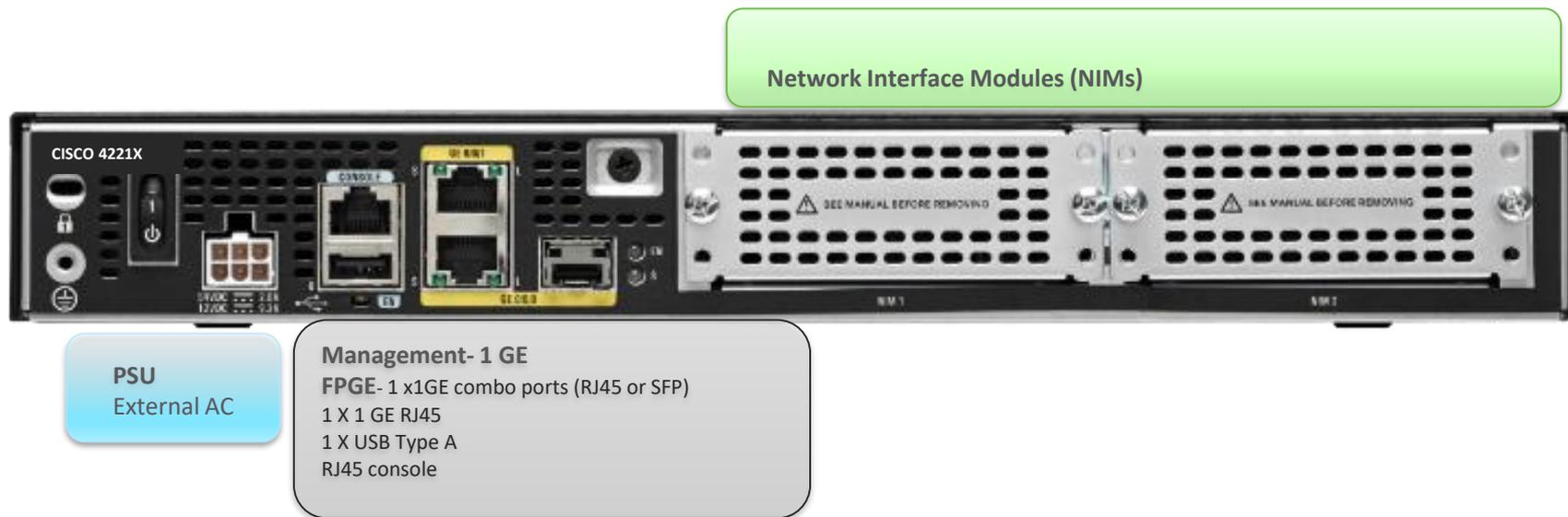
Crypto – 75 Mbps

With Boost licenses

IP CEF – 1.2 Gbps

Crypto – 75 Mbps

Cisco ISR 4221X – I/O Design



Cisco ISR 4221X



Up to 1.2Gbps Performance

Migrate from Cisco® 1921 or 1941 ISR

SD-WAN Ready

Entity	ISR 4221X
CPU architecture	4-core CPU
Network Interface Modules	2 (limited NIM support)
Enhanced Service Modules	0
Front panel ports (FPGE)	2 GE (1 dual-phy, 1 RJ45 only)
PoE option on FPGE	No
ISC slot	0
USB type A ports	1
Power	1 external AC
Control/services memory	Fixed 8 GB 3 GB for SNORT

ISR 4221



1 RU form factor

External AC PSU

DRAM – 4 GB Fixed

Flash – 8 GB Fixed

2 x NIMs (Limited)

Default throughput

IP CEF - 35 Mbps

Crypto – 35 Mbps

With Performance licenses

IP CEF – 75 Mbps

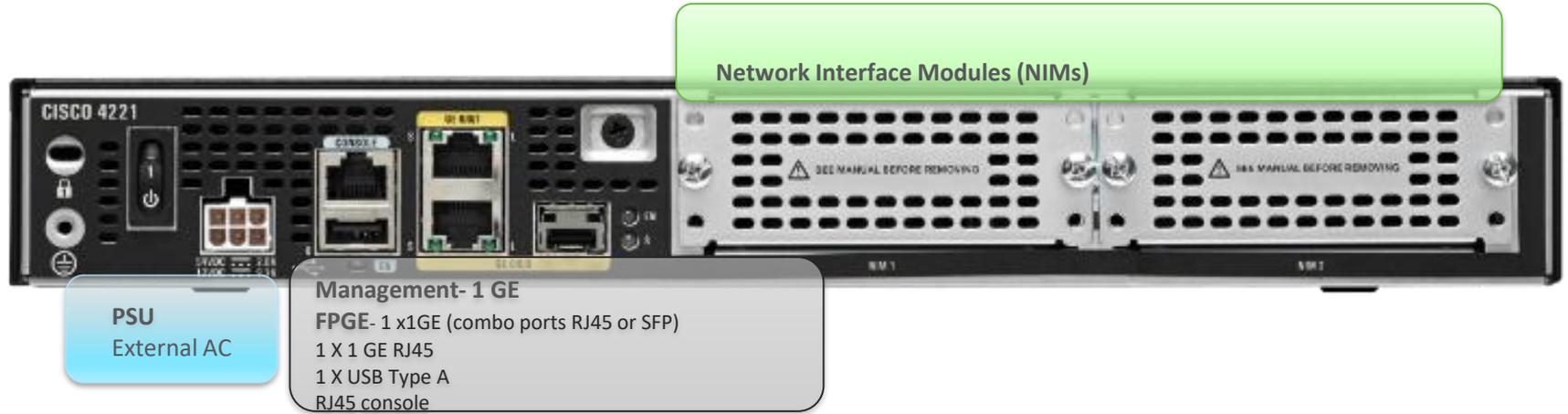
Crypto – 75 Mbps

With Boost licenses

IP CEF – 1.2 Gbps

Crypto – 75 Mbps

Cisco ISR 4221 – I/O Design



Cisco ISR 4221



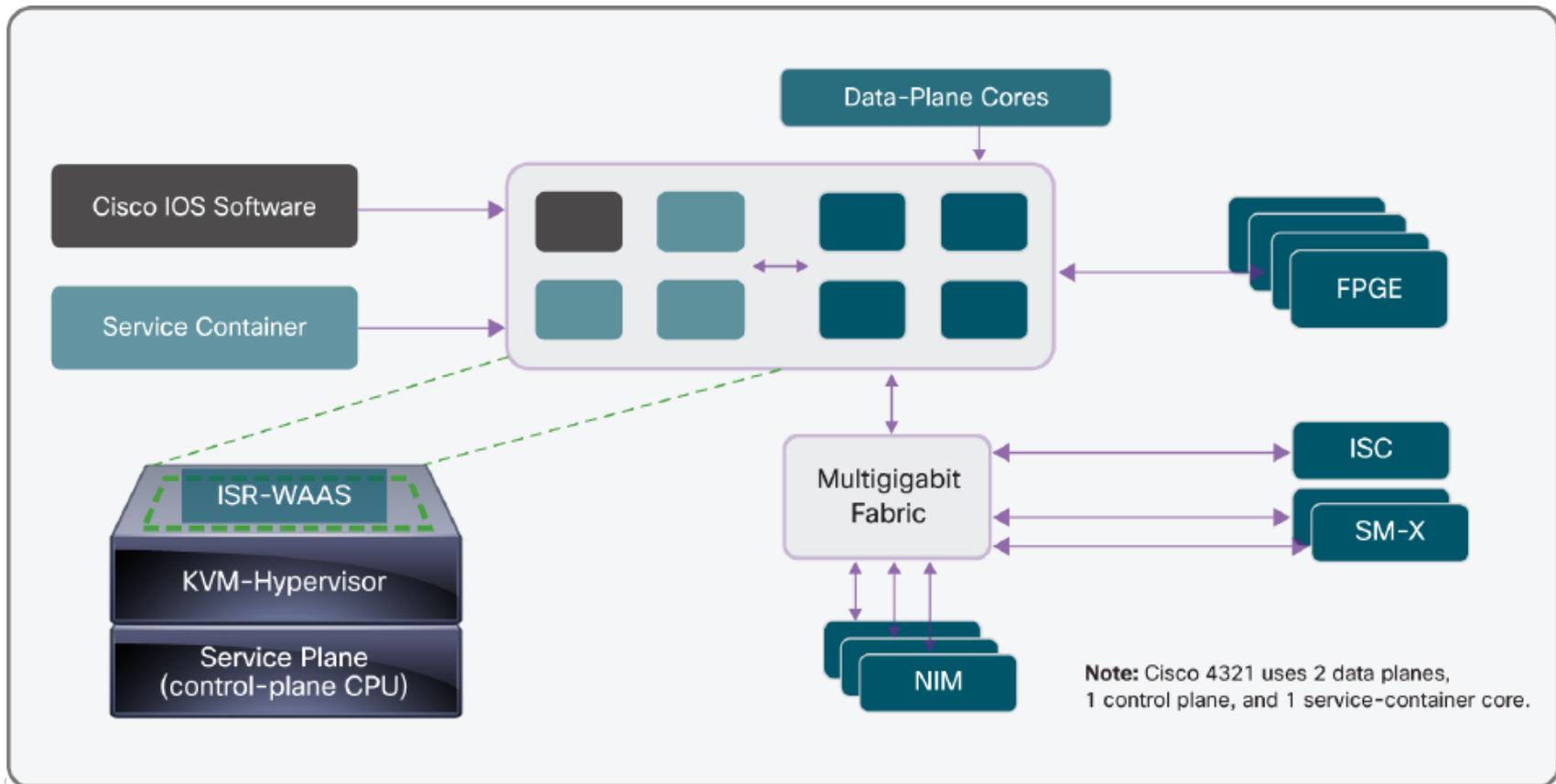
Up to 1.2Gbps Performance

Migrate from Cisco® 1921 or 1941 ISR

SD-WAN Ready

Entity	ISR 4221
CPU architecture	4-core CPU
Network Interface Modules	2 (limited NIM support)
Enhanced Service Modules	0
Front panel ports (FPGE)	2 GE (1 dual-phy, 1 RJ45 only)
PoE option on FPGE	No
ISC slot	0
USB type A ports	1
Power	1 external AC
Control/services memory	Fixed 4 GB 1 GB for SNORT

思科 4300系列路由器架构

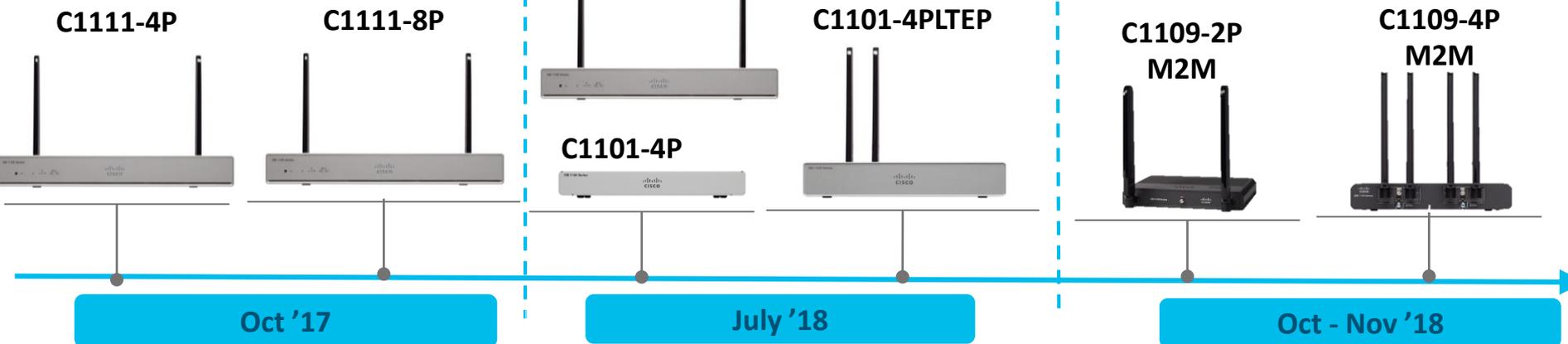


Cisco ISR 1000

Cisco ISR 1000 Series

- Compact form factor
- Scalable multi-core IOS XE Architecture

SD-WAN READY



WAN and Application Assurance
Cisco SD-WAN
Application Visibility and Link Optimization
VPN and Security

Embedded Security
Secure connectivity
TrustWorthy Systems
Threat defense
Visibility and analytics

Branch in a box
Inbuilt switch port
Optional Integrated Wifi with ME
Integrated LTE Advanced
WAN interface diversity

M2M (ATM/KIOSK/POS)
Extended temperature
Dual Modem
Small form factor

New ISR 1000 family members

C1121, C1126, C1127, C1128, and C1161

- Smaller size
- Added Cisco Pluggable Technology slot
- Faster processor option
- 8GB memory and 8GB Flash (on X-SKU's)



Product Overview

	C1111X-8P	C111x-8P	C111x-4P	C1101-4P	C1109-4P	C1109-2P
WAN Ethernet	1GE/SFP*	1GE/SFP*	1 GE/SFP*	1 GE	1 GE	1 GE
	1GE/SFP & 1GE	1GE/SFP & 1GE	1GE/SFP & 1GE			
LTE Advanced	No	Yes	Yes	Yes	Yes	No
SFP	Yes	Yes	Yes	No	No	No
VDSL2/ADSL2/2+/ G.FAST	No	Yes	Yes	No	No	No
802.11ac Wave 2 Dual Radio	No	Yes	Yes	Yes	Yes	No
Managed Switch Ports	8 GE	8 GE	4 GE	4 GE	4 GE	2 GE
Voice	No	No	No	No	No	No
VLANs (Wired and Wireless)	32	32	32	32	32	32
Switching Capacity	Line-rate	Line-rate	Line-rate	Line-rate	Line-rate	Line-rate
Internal PoE Option	2 PoE+ / 4 PoE	2 PoE+ / 4 PoE	1 PoE+ / 2 PoE	No	No	No

<https://www.cisco.com/c/dam/en/us/products/collateral/software/one-wan-subscription/guide-c07-740642.pdf>

Product Overview

	C1111X-8P	C111x-8P	C111x-4P	C1101-4P	C1109-4P	C1109-2P
CPU*	4 cores**	4 cores**				
Flash (fixed)	8 GB	4GB	4GB	4GB	4 GB	4 GB
DRAM (fixed)	8 GB	4GB	4GB	4GB	4 GB	4 GB
USB Ports	1 (USB 3.0)	1 (USB 3.0)				
Console	RJ45 + Micro USB	RJ45 + Micro USB	RJ45 + Micro USB	Micro USB	Micro USB	Micro USB
Dimension	12.7" (W) x 9.0" (D) x 1RU (H)	12.7" (W) x 9.0" (D) x 1RU (H)	12.7" (W) x 9.0" (D) x 1RU (H)	9.75" (W) x 6.6" (D) x 1RU (H)	9.8 " (W) x 11" (D) x 1.71" (H)	8.1"(W) x 6.0" (D) x1.27" (H)
Operating Temperature	0-40°C	0-40°C	0-40°C	0 - 45°C	-20 - 55°C	0 - 50°C
Rack/Wall Mounting	Yes	Yes	Yes	Desktop/Wall	Desktop/Wall/ Floor	Desktop/Wall/ Ceiling ****
SD-WAN	Yes	Yes	Yes	Yes	Yes	Yes
SD-WAN Security	Yes	No	No	No	No	No

Please read release notes for new hardware support here:

<https://software.cisco.com/download/home/286315006/type/286321980/release/16.11.1a>

- The C111x-8P and the C1111X-8P are clocked at a higher CPU rate than the C111x-4P
- The C1101-4P is clocked at the same rate as the C111x-4P
- The C1109 M2M is clocked at a slightly lower rate than C111x-4P

** Only three cores in use at the moment.

**** Ceiling mount to be available in Q1 CY'19

ISR 1000 Naming Convention

1. Prefix

“C” = Standard Product ID (PID) prefix

2. Product Number

The second portion of Product ID after the hyphen identifies the number of LAN ports:

- “-2P” = 2 LAN ports
- “-4P” = 4 LAN ports
- “-8P” = 8 LAN ports

The last digit on the first portion of Product ID identifies the onboard GE and DSL WAN interfaces:

- “1101” = One WAN interface
- “1109” = One WAN interface and M2M w/Extended Temp
- “1111” = Two GE WAN interfaces
- “1111X” = Two GE WAN interfaces with 8GB memory
- “1116” = One GE WAN Interface and One DSL Interface with VDSL/ADSL2+ Annex B & J over ISDN
- “1117” = One GE WAN Interface and One DSL with VDSL/ADSL2 + Annex A or M over POTS

3. Product Capabilities

Wireless LAN:

- “WE” = -E Wireless Domain
- “WB” = -B Wireless Domain
- “WA” = -A Wireless Domain
- “WZ” = -Z Wireless Domain
- “WN” = -N Wireless Domain
- “WQ” = -Q Wireless Domain
- “WH” = -H Wireless Domain
- “WR” = -R Wireless Domain
- “WF” = -F Wireless Domain
- “WD” = -D Wireless Domain

Wireless WAN:

- “LTEEA” = LTE for US, Europe, Canada and Middle East
- “LTELA” = LTE for APJ and some providers in LATAM
- “LTEP” = Pluggable LTE module
- “LTE2P” = Dual Pluggable LTE module

DDR RAM:

- “1111X” “1117X” “1116X” “1121X” “1161X”
X = denotes 8GB RAM

From ISR 800 to ISR 1000

	C880	C890	C111x8P/	C111x-4P	C1101-4P
Cisco SD-WAN	No		Yes		
SD-WAN Security			Yes		
Operating System	IOS Classic		IOS XE	IOS XE	IOS XE
Dual Ethernet WAN	No	Yes	Yes	Yes	1
LTE Advanced	No	No	Yes	Yes	Yes
SFP/SFP+	No	Yes/No	Yes/Yes	Yes/No	No
VDSL2	Yes	Yes	Yes	Yes	No
ADSL2/2+	Yes	Yes	Yes	Yes	No
G.SHDSL	Yes	Yes	Yes	No	No
G.FAST/VDSL2 35b	No	No	Yes	No	No
802.11ac Wave 2	No	No	Yes	Yes	Yes
LAN Ports	4 FE	8 GE	8GE	4 GE	4 GE
VLAN	25	25	32	32	32
Internal PoE Option	2 PoE	4 PoE	2 PoE+ / 4 PoE	1 PoE+ / 2 PoE	No

ISR 819 vs ISR 1109



ISR 819

LTE

Fixed

4
Wireless
Domains

802.11n

IPsec
25 Mbps+

Dual Core

16 VLANs

IOS Classic

LTE
Advanced

Dual
Pluggable

10
Wireless
Domains

802.11ac
Wave 2

IPsec
200 Mbps+

Quad
Core

32 VLANs

IOS XE

ISR 1109



890 Series EoS



- Specific 8xx SKUs
- Reason – Components no longer available
- Date 29-July-2019
- EoS announcement out now

896 and 897 VDSL2/ADSL2+ Routers:

PID	Migration PID
C896VA-K9	C1112-8P,C1116-4P
C897VA-K9	C1113-8P,C1117-4P
C897VA-M-K9	C1113-8PM,C1117-4PM
C897VAB-K9	C1113-8P

819, 881, 887, 896, 897 and 899 4G LTE Routers:

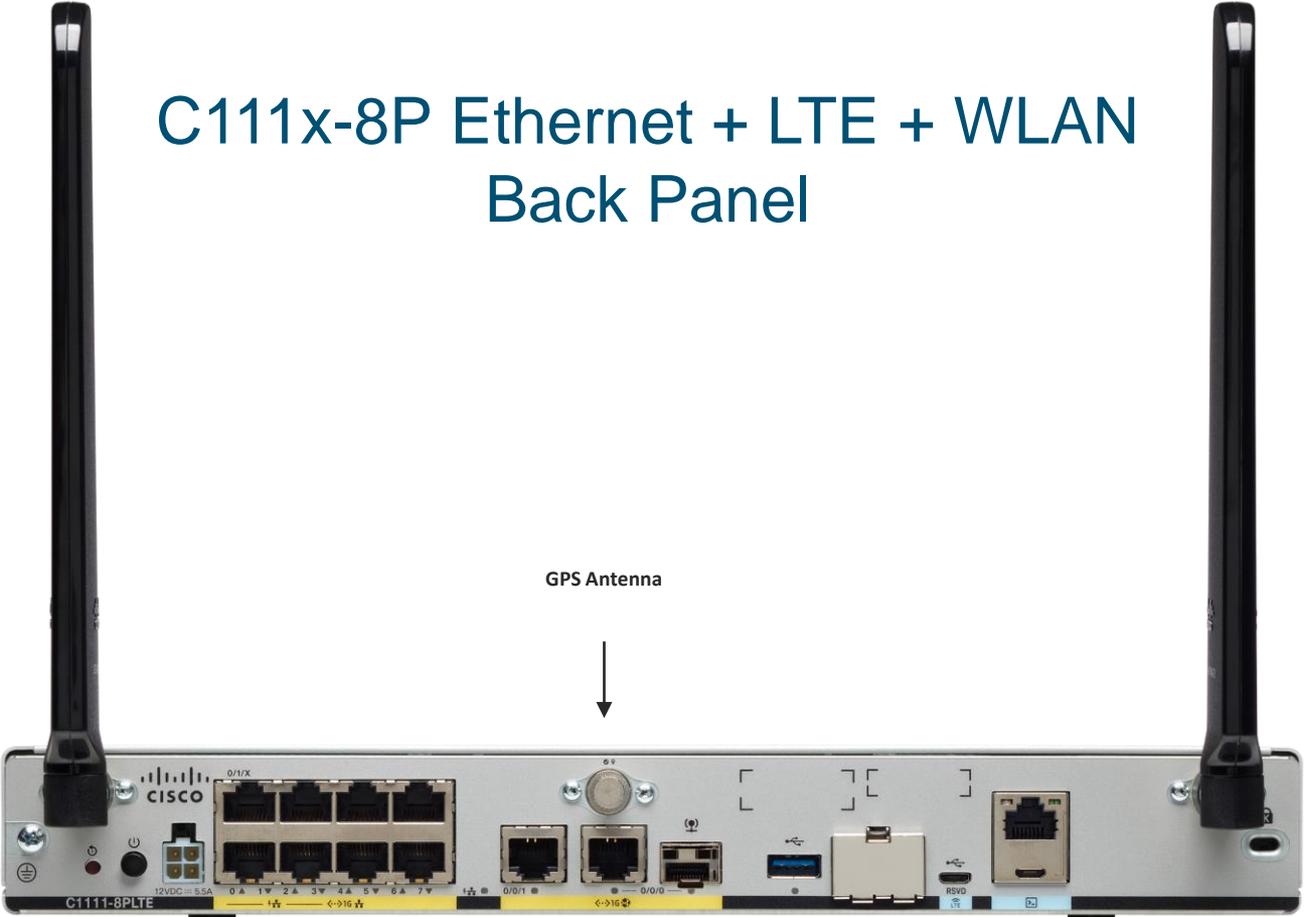
PID	Migration PID
C819G-4G-VZ-K9	C1111-4PLTEEA
C819G-4G-GA-K9	C1111-4PLTEEA,C1111-4PLTELA
C819G-4G-NA-K9	C1111-4PLTEEA,C1111-4PLTELA
C819G-4G-ST-K9	C1111-4PLTEEA
C819G-LTE-MNA-K9	C1111-4PLTEEA,C1111-4PLTELA
C881G-4G-GA-K9	C1111-4PLTEEA
C887VAG-4G-GA-K9	C1117-4PLTEEA
C896VAG-LTE-GA-K9	C1112-8PLTEEA,C1117-4PLTEEA
C897VAG-LTE-GA-K9	C1113-8PLTEEA
C897VAMG-LTE-GA-K9	C1113-8PMLTEEA
C899G-LTE-GA-K9	C1111-8PLTEEA
C899G-LTE-VZ-K9	C1111-8PLTEEA
C899G-LTE-NA-K9	C1111-8PLTEEA
C899G-LTE-ST-K9	C1111-8PLTEEA

C111x-8P Ethernet + LTE + WLAN Back Panel

LTE Antenna →

← LTE Antenna

GPS Antenna ↓



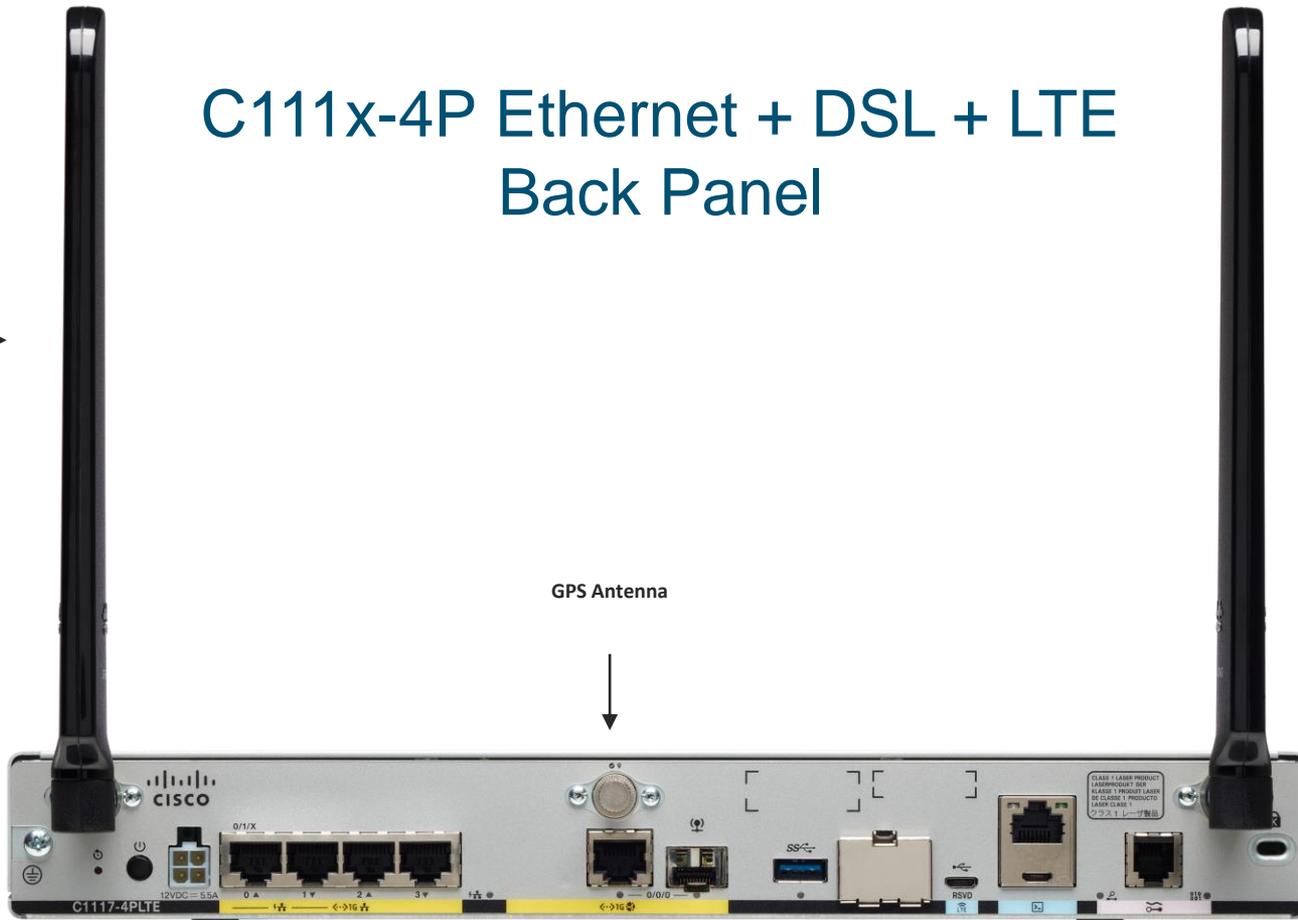
- RESET
- PWR SWITCH
- PWR Connector
- GE LAN
- POE LED
- GE0
- GE 1
- SFP
- USB3.0
- uSIM*2
- Micro USB
- LTE Debug
- Console/ Micro USB
- KENSINGTON SLOT

C111x-4P Ethernet + DSL + LTE Back Panel

LTE Antenna →

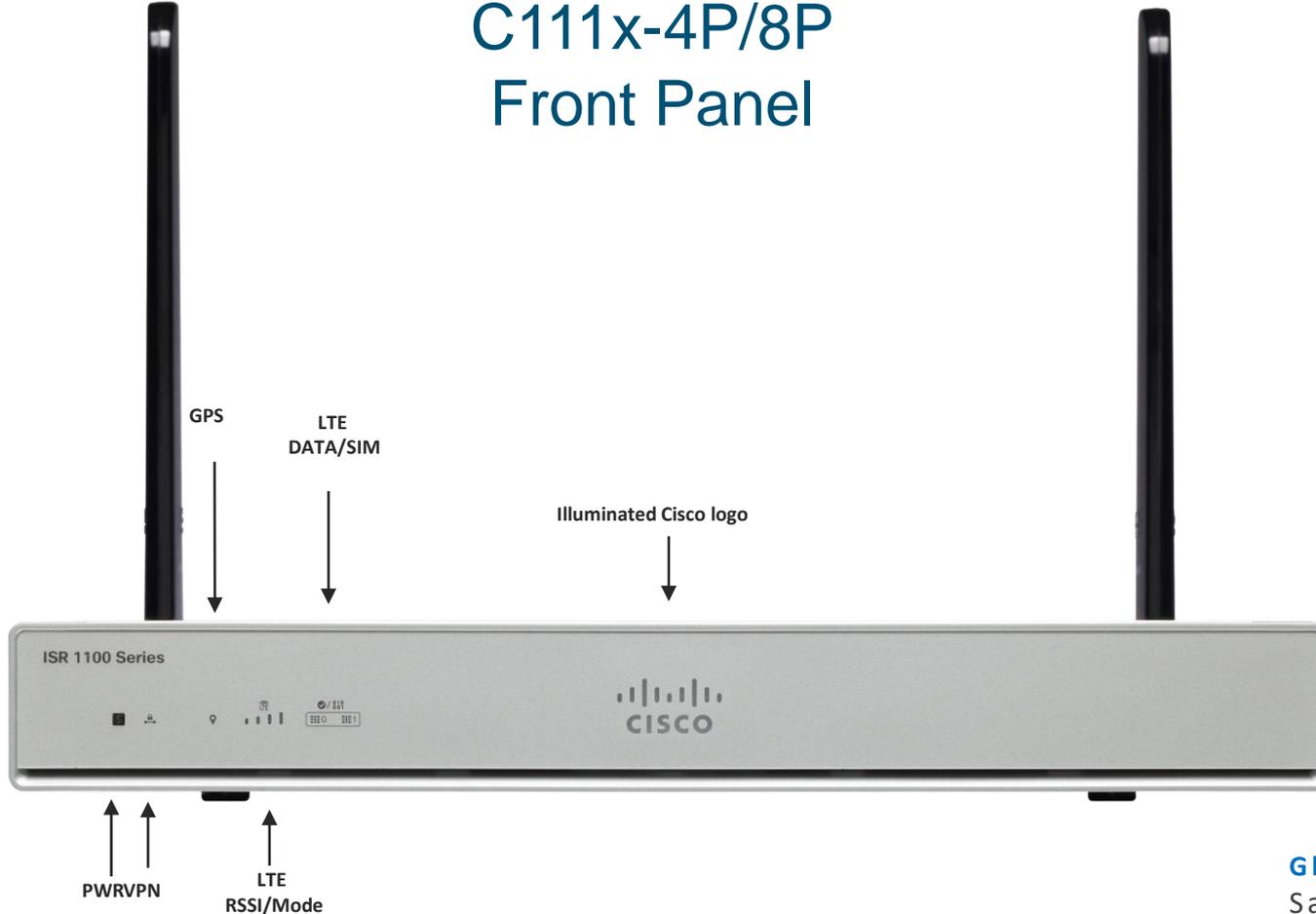
← LTE Antenna

GPS Antenna ↓

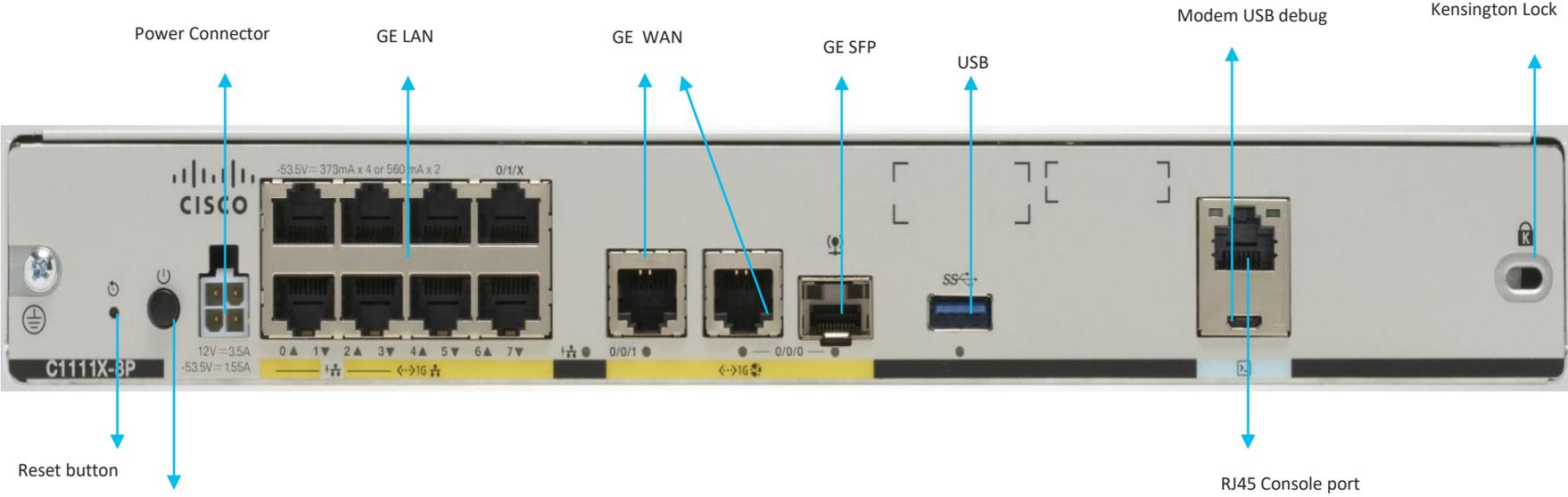


RESET
PWR SWITCH
PWR Connector
GE LAN
POE LED
GE 0
SFP
USB3.0
uSIM*2
Micro USB LTE Debug
Console/ Micro USB
DSL
KENSINGTON SLOT

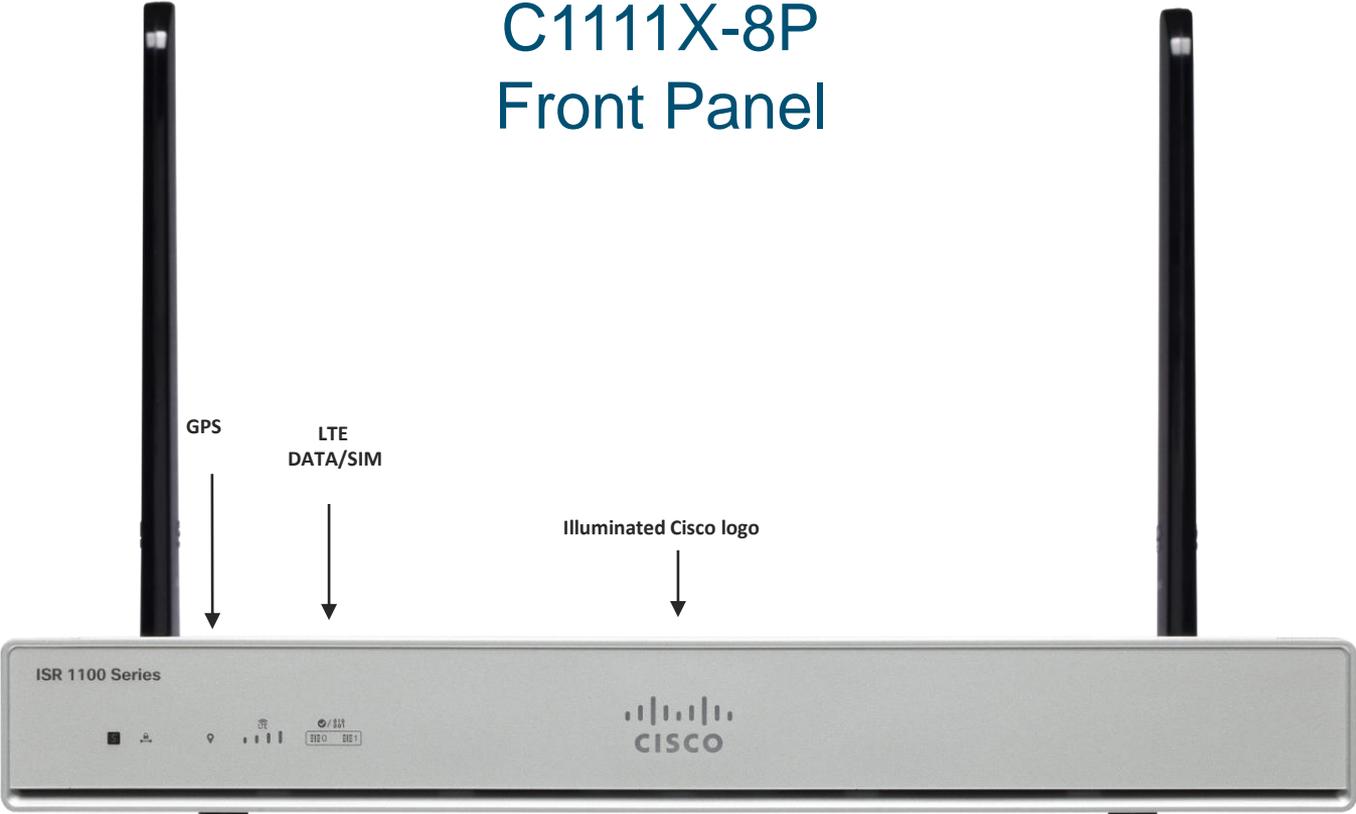
C111x-4P/8P Front Panel



C1111X-8P Back Panel



C1111X-8P Front Panel

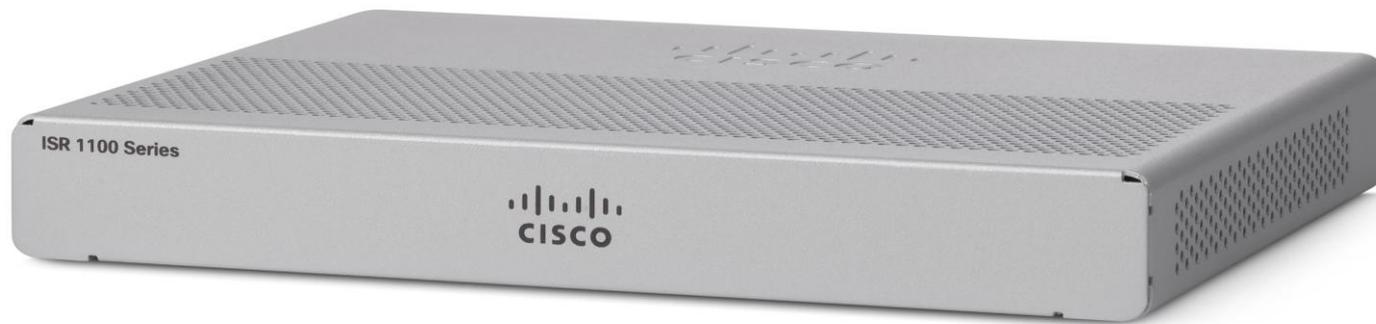


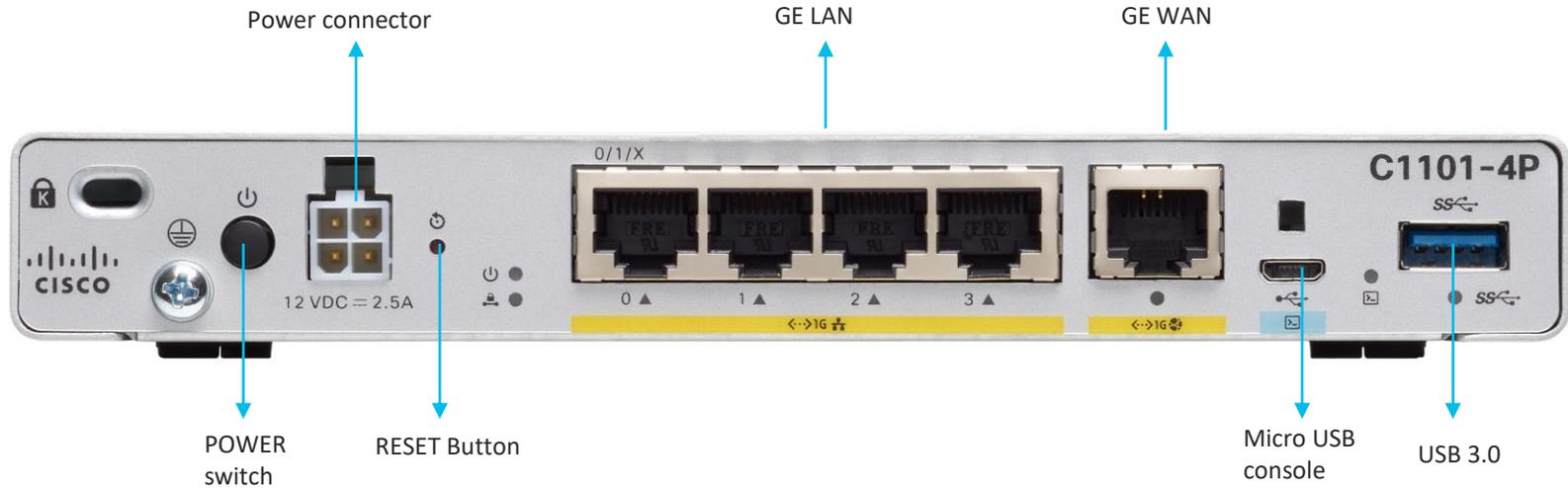
GPS
LTE DATA/SIM

PWRVFN
LTE RSSI/Mode

Illuminated Cisco logo

C1101-4P - Front view



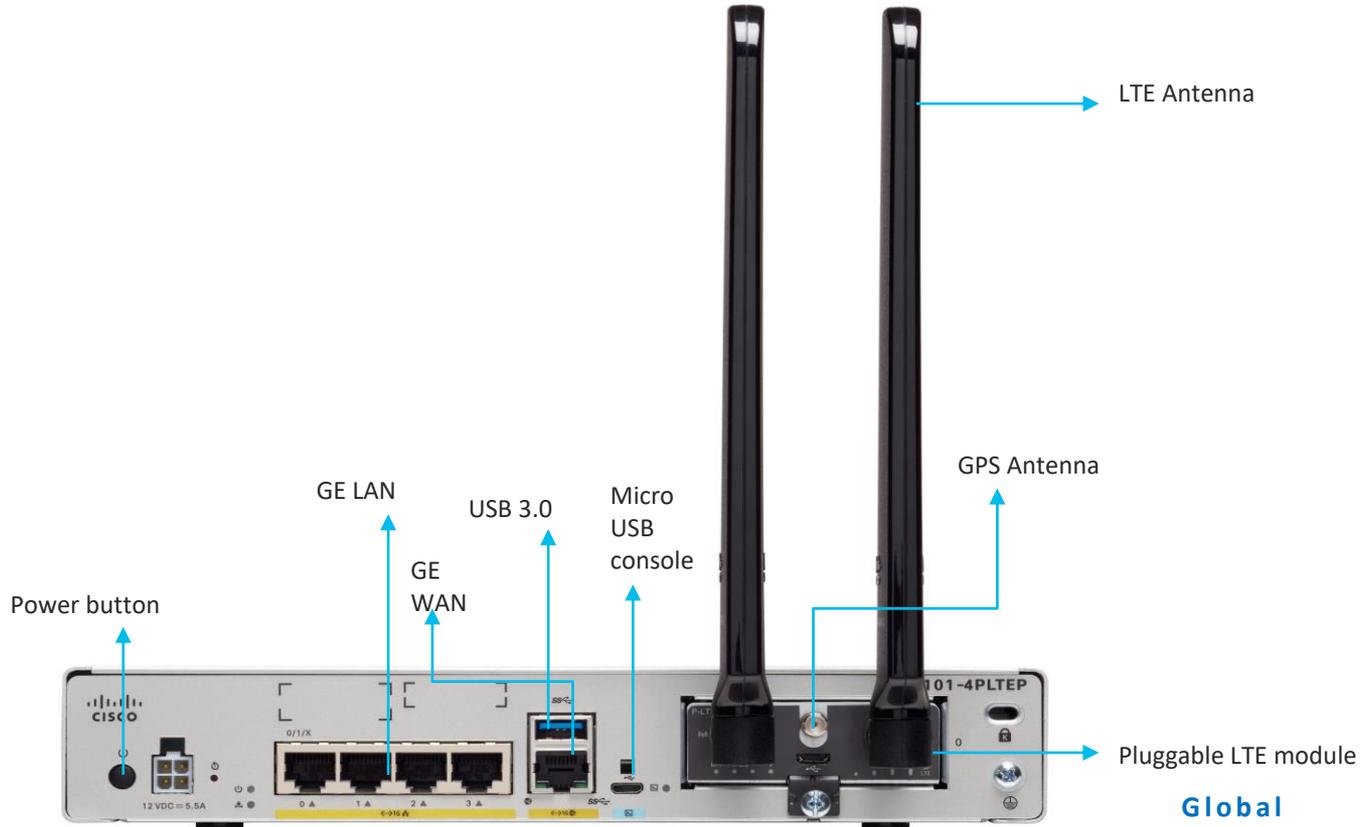


C1101-4P - Back Panel

C1101-4PLTEP - Front view

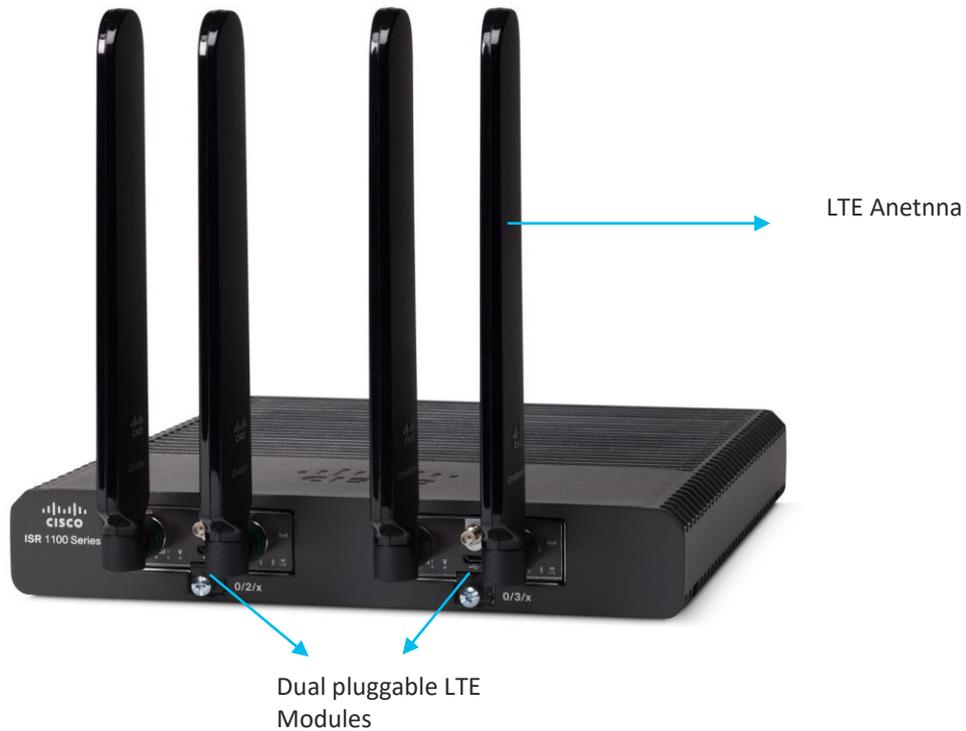


C1101-4PLTEP - Back Panel

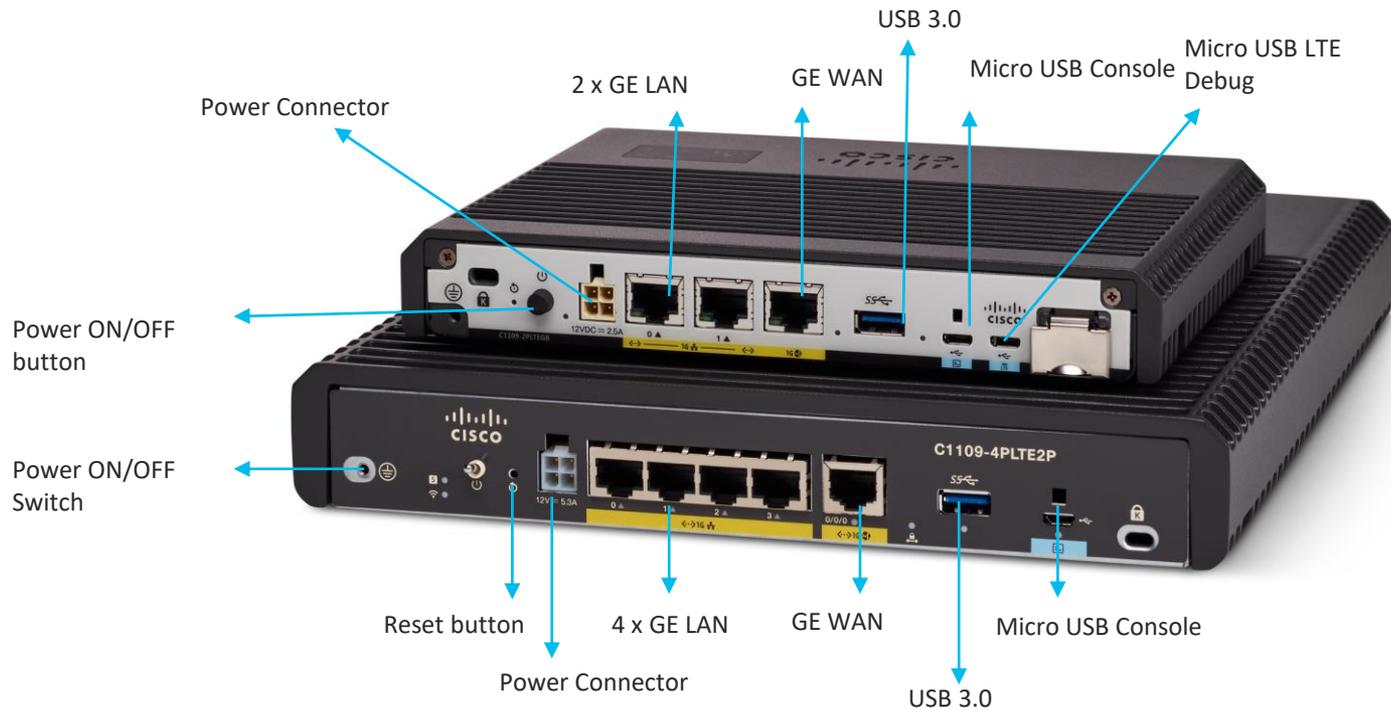




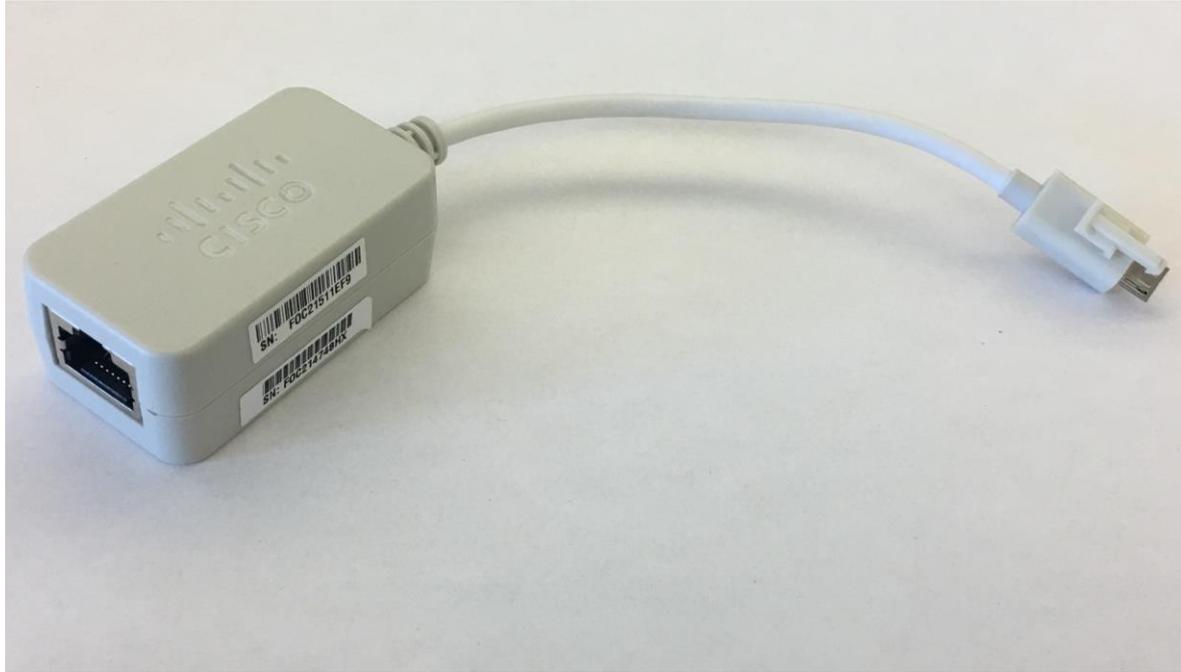
C1109-2PLTE - Front view



C1109-4PLTE2P – Front View



C1109 - Back Panel



Micro USB – RJ45 Console adapter for C1101/C1109^{**}

^{**} C1101 / C1109 does not have a RJ45 Console port .It comes with a Micro USB console port only.

可插拔LTE模块



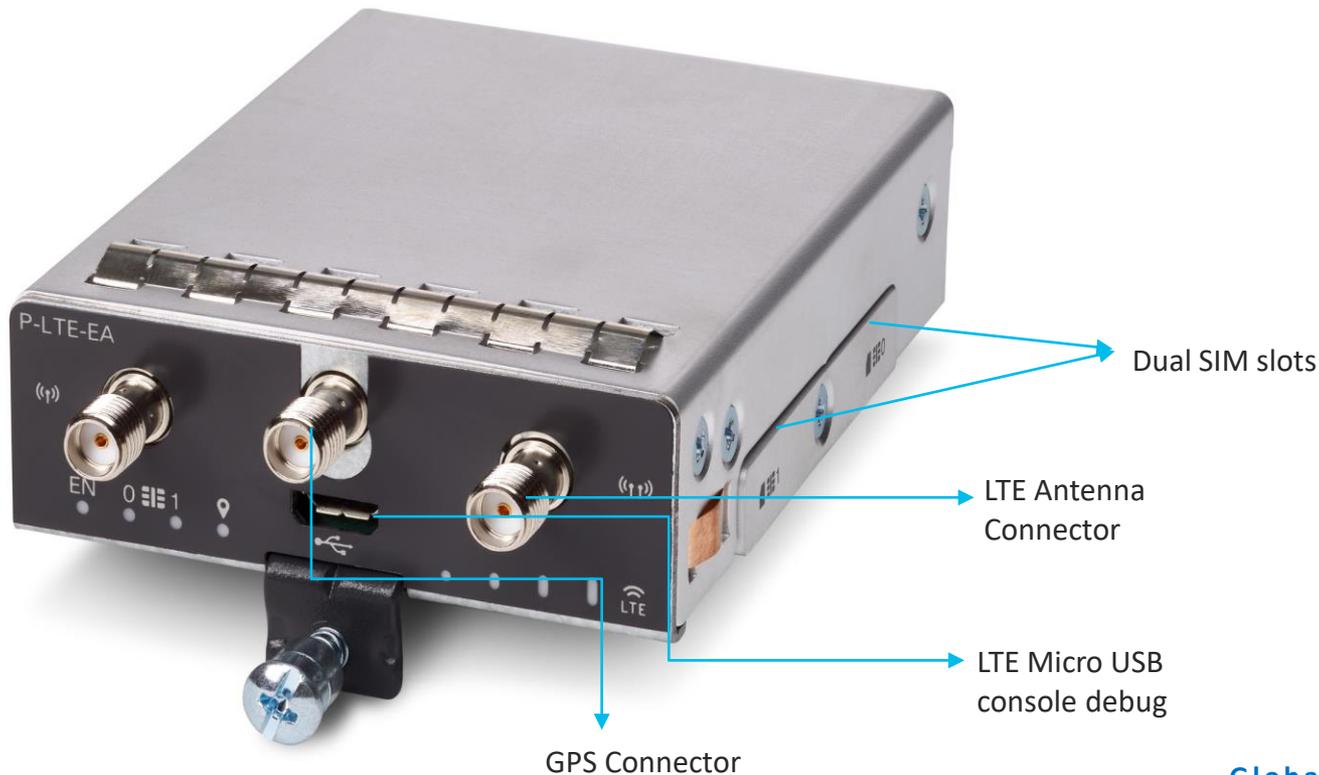
KEY FEATURES

- Twin SIM card slots **
- Choice of CAT6 and CAT4 modems
- CAT6 : P-LTE-EA, P-LTE-LA
- CAT4 : P-LTE-GB , P-LTE-VZ , P-LTE-US
- Active / Standby

** P-LTE-VZ has single slot only

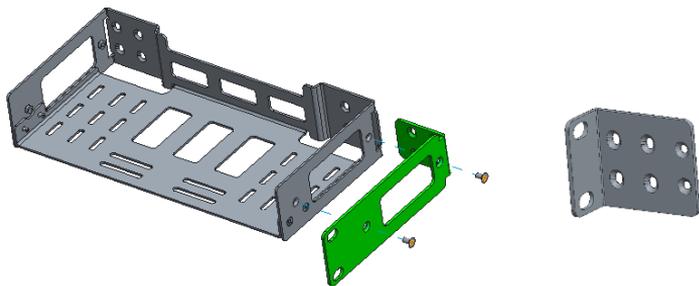


适用于C1101 / C1109的可插拔LTE模块



新的机架安装套件(For C111x and C1111X series only)

- 19英寸机架安装套件
 - 灵活的安装；两个支架都可以安装在任何一侧
 - 电源位于较大的支架上



Before:



After:



Hardware Overview

Feature	C1111X-8P	C111x-8P	C111x-4P	C1101-4P	C1109-2P	C1109-4P
Front panel switch ports	8	8	4	4	2	4
WAN ports	2 (1 Combo RJ-45/SFP + 1 RJ-45)	2 (1 Combo RJ-45/SFP + 1 RJ-45)	2 (1 Combo RJ-45/SFP + 1 RJ-45)	1 RJ-45	1 RJ-45	1 RJ-45
Console port	Serial RJ-45, Micro USB	Serial RJ-45, Micro USB	Serial RJ-45, Micro USB	Micro USB	Micro USB	Micro USB
POE (optional)	4PoE/2PoE+	4PoE/2PoE+	2 POE/1 POE+	None	None	None
WLAN (optional)	None	802.11ac WAVE 2	802.11ac WAVE 2	802.11ac WAVE 2 (C1101-4PLTEPWx)	None	802.11ac WAVE 2
LTE (optional)	None	4G LTE-Advanced (CAT6) with carrier aggregation	4G LTE-Advanced (CAT6) with carrier aggregation	4G pluggable LTE (CAT 4) and pluggable LTE Advanced (CAT 6) with carrier aggregation	CAT4	4G pluggable LTE (CAT 4) and pluggable LTE Advanced (CAT 6) with carrier aggregation
DSL (optional)	None	G.FAST, VDSL2 and ADSL2/2+	VDSL2 and ADSL2/2+	None	None	None

Cisco ISR 900

Introducing the Cisco 900 Series Integrated Services Routers

ISR 900

DSL SKUs



Ethernet only & Ethernet + LTE SKUs



专为SOHO细分市场量身定制

- 取代ISR 880系列
- 以诱人的价格获得更高的吞吐量
- IOS Classic的功能丰富，简化了包装
- 尺寸减小
- 内部电源—Ethernet & Ethernet + LTE SKUs
- 无风扇设计

可订购日期

- 将于2019年12月推出的Ethernet SKU（暂定）
- 将于2019年12月推出的DSL SKU（暂定）
- 将于2019年4月推出的LTE SKU（暂定）

Introducing the Cisco 900 Series Integrated Services Routers

ISR 1000

2017年11月推出

瞄准中小企业部门

ISR 1900和ISR 890的平台演变

- 提供更高的吞吐量
- 通过WebUI的设备管理器
- 通过vManage进行集中管理
- 支持IOS-XE的SDWAN
- 具有11AC Wave 2的Mobility Express
- LTE和DSL演进
- 通过SD-WAN安全性增强安全性堆栈



ISR 900

2018年12月的FCS

针对SOHO细分市场

ISR 880和ISR 840的平台演变

- 解决SOHO ASP
- 通过CCP Express进行设备管理
- 经典的iOS
- 以太网, DSL和LTE选项
- 包装结构类似于ISR 1000



固定投资组合转换



- Huawei Competitive (Higher throughput)
- SD-WAN (Ready/Roadmap)
- LTE Advanced
- Security – Umbrella, ETA, SD-WAN Security (Roadmap)
- Mobility Express with 802.11ac wave-2



☐ M2M use-cases like ATM/ Kiosk



- IOS Classic based
- Increased Throughput
- Consistent Packaging & Feature support

Product Overview - Global

Feature	ISR 1000	ISR 900
Software OS	IOS XE	IOS Classic
SDWAN support	Yes	No
Security stack	SD-WAN Security	Firewall, VPN
Umbrella	Yes	No
APPQOE	Roadmap	No
VPN throughput	Up to 350Mbps	Up to 250Mbps
DSL	G.FAST, ADSL, VDSL	ADSL, VDSL
LTE	CAT 6, CAT 4, Roadmap (CAT 11, CAT 18)	CAT 4
Wifi	11AC Wave 2, Mobility Express	None
Max switchports	Up to 8	4
POE	Up to 4 POE or 2 POE+	None
Centralized management	vManage	None

Product Overview

	ISR 921	ISR 931	ISR 926	ISR 927
WAN Ethernet	2 GE	2 GE	1 GE	1 GE
CAT 4 LTE	Yes	Yes	Yes	Yes
SFP	No	No	No	No
VDSL2/ADSL2/2+	No	No	Yes	Yes
802.11ac Wave 2 Dual Radio	No	No	No	No
Managed Switch Ports	4 GE	4 GE	4 GE	4 GE
Voice	No	No	No	No
VLANs	50	50	50	50
Switching Capacity	Line-rate	Line-rate	Line-rate	Line-rate
Internal PoE Option	No	No	No	No

Product Overview

	ISR 921	ISR 931	ISR 926	ISR 927
CPU	Intel X86	Intel X86	Intel X86	Intel X86
Flash (fixed)	2 GB	2 GB	2 GB	2 GB
DRAM (fixed)	1 GB	1 GB	1 GB	1 GB
USB Ports	1 (USB 2.0)	1 (USB 2.0)	1 (USB 2.0)	1 (USB 2.0)
Console	RJ45	RJ45	RJ45	RJ45
Dimension	1.70" (H) x 9.0" (W) x 9.5" (D)	1.70" (H) x 9.0" (W) x 9.5" (D)	1.10" (H) x 10.20" (W) x 7.00" (D)	1.10" (H) x 10.20" (W) x 7.00" (D)
Operating Temperature	0-50°C	0-50°C	0-45°C	0 - 45°C
Mounting	Desk/Shelf/Under Desk/Rack	Desk/Shelf/Under Desk/Rack	Desk/Shelf/Tray/Wall	Desk/Shelf/Tray/Wall
Power Supply	Internal	Internal	External	External

* CPU Clock rate = 2.2 GHz

ISR 900 Naming Convention

C921-4P

1 2 3

1. Prefix

2. Product Type

“C921” = ISR900 series router with Dual GE WAN

“C926” = ISR900 series router with 1 GE WAN+ 1 ADSL2/2+/VDSL – Annex B,J

“C927” = ISR900 series router with 1 GE WAN+ 1 ADSL2/2+/VDSL – Annex A

3. Number of LAN ports

“4P” = 4 x GE LAN ports

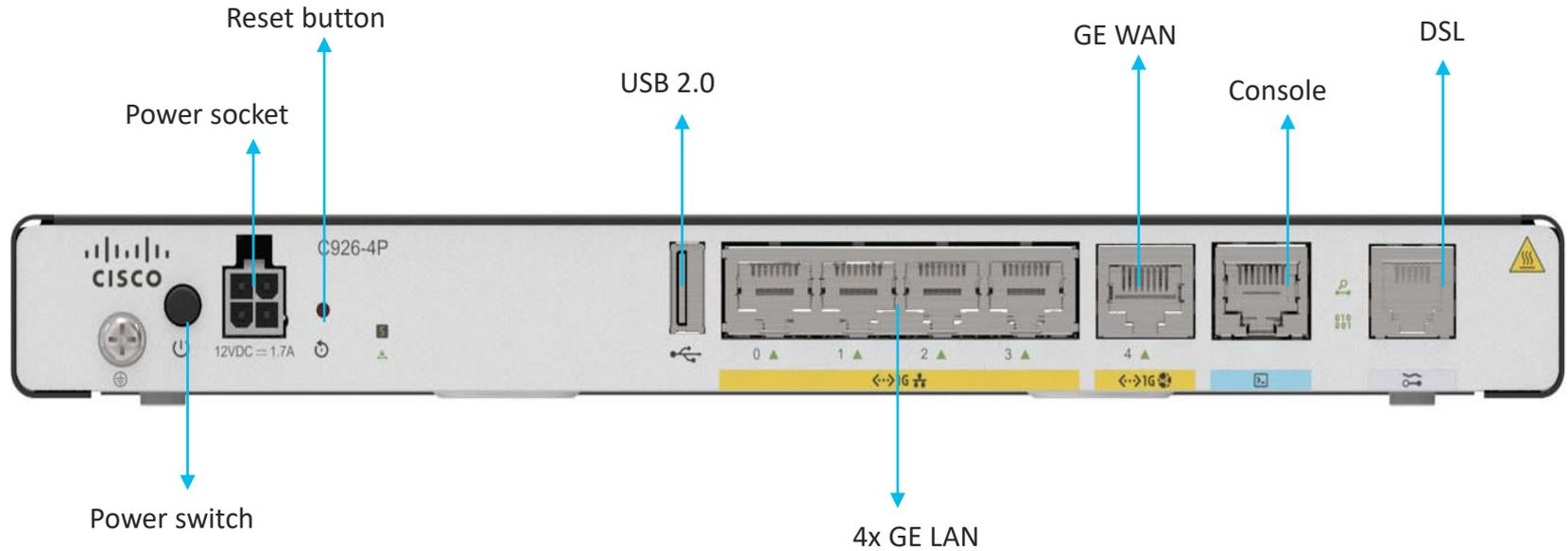
“4PM” = ISR900 Series router with 1 GE WAN+ 1 ADSL2/2+/VDSL – Annex M +4 x GE LAN ports

<https://www.cisco.com/c/en/us/products/routers/900-series-integrated-services-routers-isr/datasheet-listing.html>

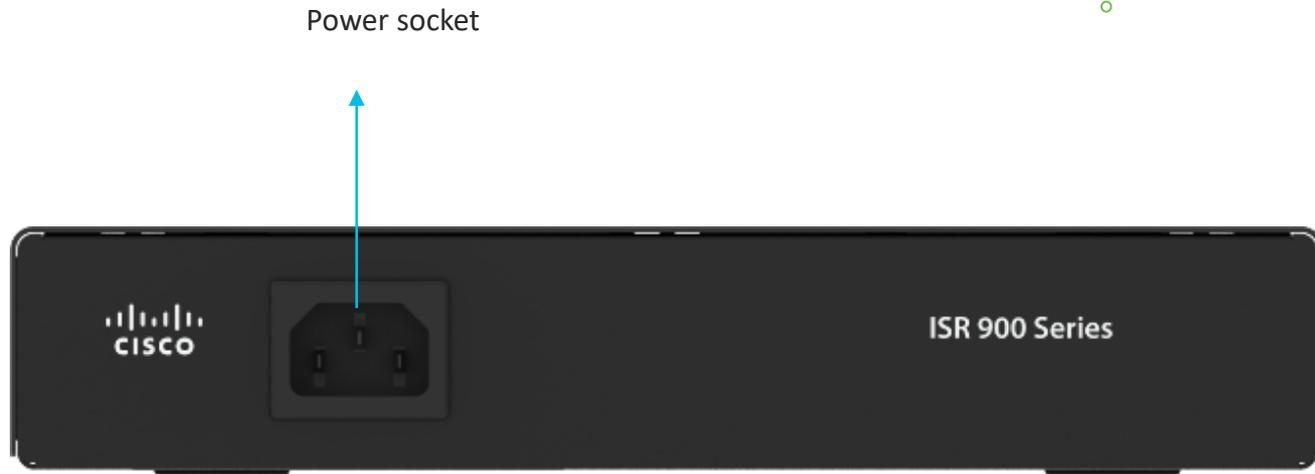
ISR 926, ISR 927 – Front view



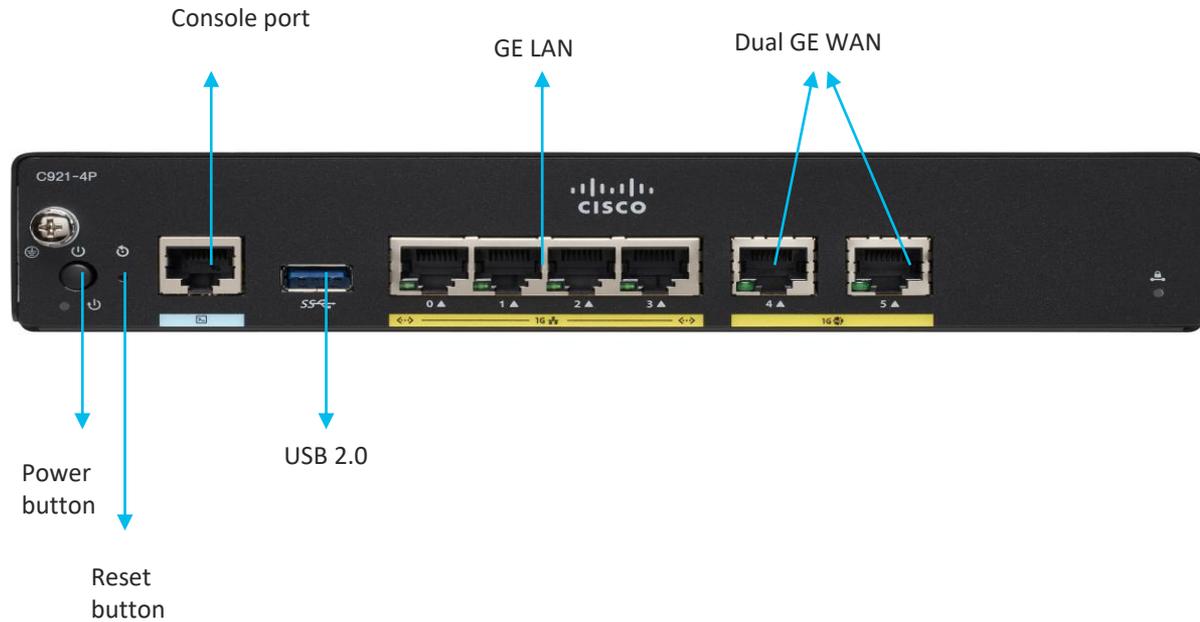
ISR 926 - Back Panel



ISR 921 Front view



ISR 921 Back Panel





Cisco ASR1K

Cisco ASR1000 Series Routers

2.5 Gbps to 200 Gbps – Available Today

XE SD-WAN

ASR1001-X



2.5 to 20
Gbps*

ASR1001-HX



44 to 60
Gbps*

ASR1002-X



5 to 36
Gbps*

ASR1002-HX



44 to 100
Gbps*

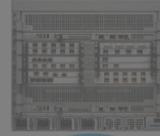
*CEF IMIX on IOS-XE

ASR1006-X



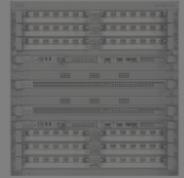
40 to 100
Gbps

ASR1009-X



40 to 200
Gbps

ASR1013



40 to 200
Gbps

Fixed Chassis

IOS-XE

Modular Chassis

Compact, Power Router

High Services performance
Investment protection
Multiple form factors

Business Critical Resiliency

Separate control and forwarding planes
HW and SW redundancy

Instant On Service Delivery

Secure solutions
Optimal Application experience
Software consumption model

ASR1000 MIP100/EPAs – High Density Ethernet Modular



100G Carrier Card + 2 x EPAs

EPA options	<ul style="list-style-type: none"> • 1x100GE • 2x40GE via breakout cable • 10x10GE • 18X1GE • 2x40GE native ports with MACSEC • 1x100 with MACsec
Throughput	<ul style="list-style-type: none"> • 200G I/O with up to 100G¹ throughput per line card
Key Features	<ul style="list-style-type: none"> • Feature Parity to 2x10GE+20xGE • 256-bit MACSEC
RP	<ul style="list-style-type: none"> • RP2, RP3
ESP	<ul style="list-style-type: none"> • ESP100 + Future • ESP200 + Future

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	Bay 1	Up to 100G

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

² No MACsec

³ Breakout cable from 1x100GE

1x100G ²

2x40GE ^{2,3}

10x10GE

18x1GE

1x40GE

2x40GE

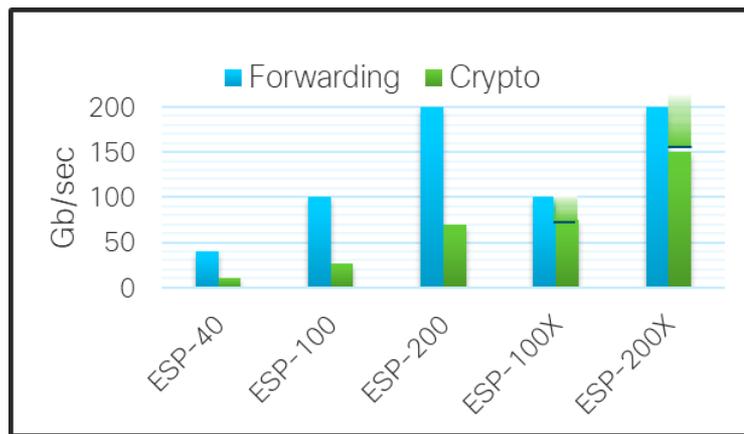
1x100G



ASR1000 Next-Gen Data Plane – ESP-X

- Powered by 3rd generation QFP ASIC - Procyon
- 100 Gbps per Procyon, used standalone or in a matrix of 2 or 4 ASICs
- Complex services support with improved service performance.
- Services include:

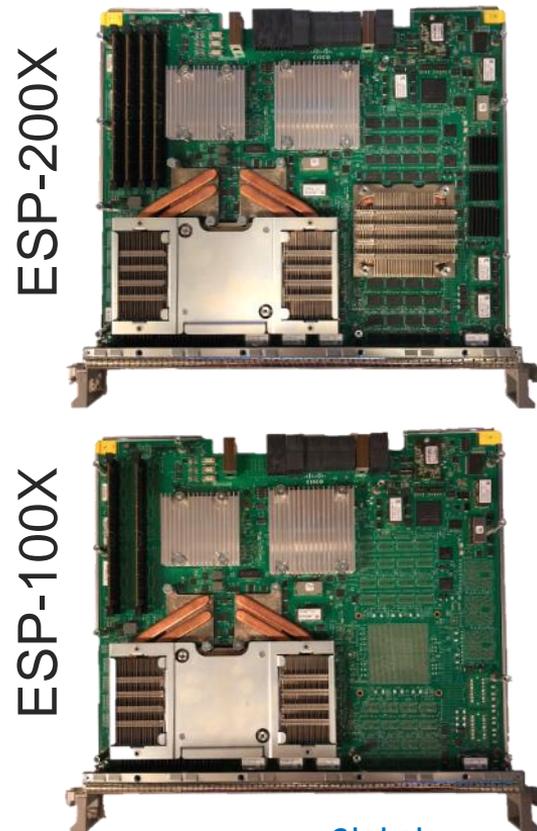
- AVC
- Crypto
- NAT
- Firewall
- QoS
- AppNav



- IPSEC现在在Procyon上以接近全转发率的速度完成

初始软件将以接近75%的线速加密率交付

后续更新可能会提高加密性能



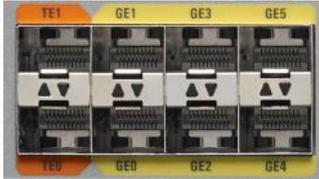
ASR 1000 Fixed Chassis Overview

	ASR 1001-X	ASR 1002-X	ASR 1001-HX	ASR 1002-HX
				
SPA Slots	1	3	N/A	N/A
EPA Slots	N/A	N/A	N/A	1
NIM Slots	1	N/A	N/A	1
Built-In GE	6	6	8	8
Built-In TenGE	2	N/A	4 + 4 (configurable 10GE/GE)	8
CPU	2.0GHz quad-core	2.13GHz quad-core	2.5GHz quad-core	2.5GHz quad-core
Memory	8GB; upgradable to 16GB	4GB; upgradable to 8GB/16GB	8GB; upgradable to 16GB	16GB; upgradable to 32GB
Storage	eUSB(8GB) SSD (200GB, 400GB)	eUSB(8GB) Optional HDD (160GB)	eUSB(32GB)	eUSB(32GB) SSD (200GB, 400GB)
IOS Redundancy	Software	Software	Software	Software
Height	1.75" (1RU)	3.5" (2RU)	1.75" (1RU)	3.5" (2RU)
Throughput	2.5 to 20Gbps	5 to 36Gbps	60Gbps	100Gbps
Maximum Output Power	250W	470W	360W	500W
Airflow	Front to back	Front to back	Front to back	Front to back

ASR 1000 System Resources Comparison

	ASR 1001-X	ASR 1002-X	ASR 1001-HX	ASR 1002-HX
System throughput (IMIX)	2.5 - 20Gbps	5 - 36Gbps	60Gbps	100Gbps
QFP cores	31	62	62	124
Clock Rate	1.5 GHz	1.2 GHz	1.5 GHz	1.5 GHz
QFP Resource Mem	4GB (unified)	1GB	4GB	4GB
Packet Buffer	256MB	512MB	512MB	1GB
TCAM	10 Mb	40 Mb	40Mb	80 Mb
Control CPU	Intel quad-core 2.0GHz	Intel quad-core 2.13GHz	Intel quad-core 2.5GHz	Intel quad-core 2.5GHz
Control CPU Memory	8GB/16GB	4GB/8GB/16GB	8GB/16GB	16GB/32GB

ASR1001-X – Best Selling Router in the Portfolio



Built-in I/O

- 2x10GE
- 6x1GE
- Multipoint MACsec support (ETA)

Network Interface Modules (NIM)

- 2xSSD Drives
- ISR 4000 modules

System Management

- RJ45 GE Ethernet
- RJ45 Console
- Auxiliary Port
- Mini-USB Console
- 2x USB Ports

Pay As You Grow

- 2.5 Gbps Default
- Upgradeable to 5, 10, or 20 Gbps
- 8 Gbps crypto throughput

Control Plane

- Quad cores clocked at 2.0G Hz
- 8G DDR3 default shared memory
- Secure Boot
- FIPS-140-3 certification

Memory

- 8 GB default
- 16 GB optional

Shared Port Adapter

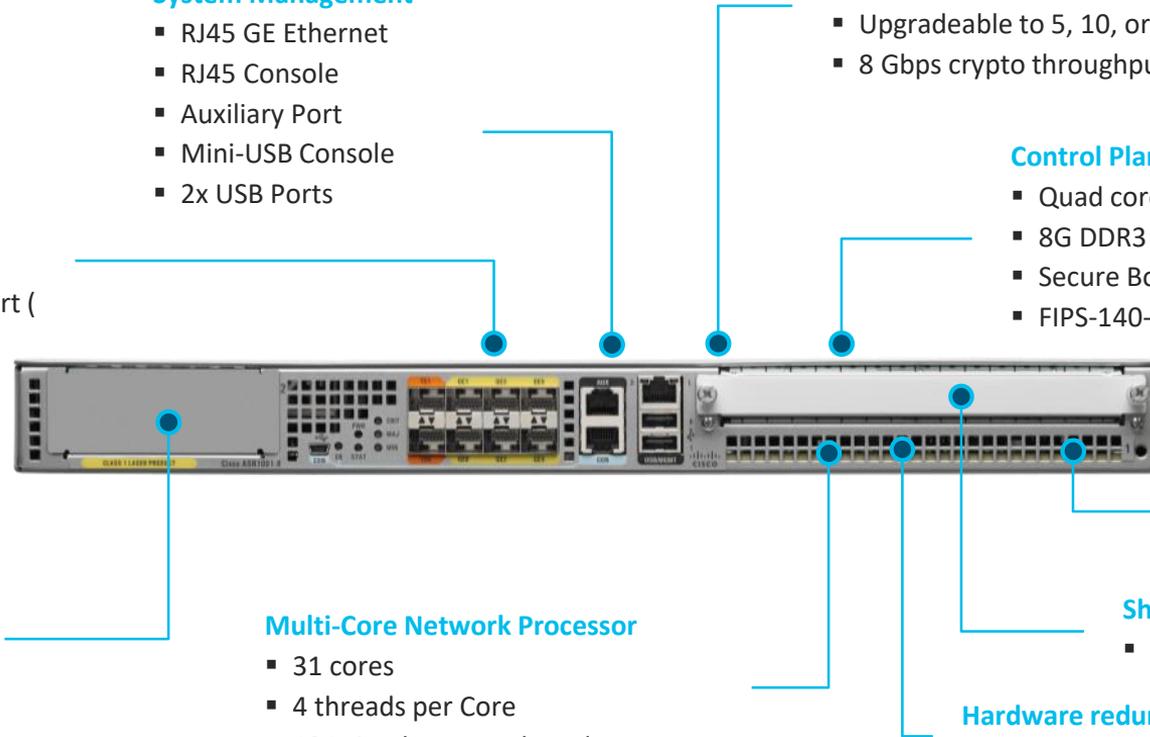
- 1x SPA slot

Hardware redundancy

- Dual power supplies

Multi-Core Network Processor

- 31 cores
- 4 threads per Core
- 124 simultaneous threads



ASR1002-X – 2RU powerhouse

System Management

- RJ45 GE Ethernet
- RJ45 Console
- Auxiliary Port
- 2x USB Ports

BITS clocking

- GPS input
- Stratum 3 built-in

Built-in I/O

- 6x1GE
- syncE

Pay As You Grow

- 5 Gbps Default
- Upgradeable to 10, 20, or 36 Gbps
- 4 Gbps crypto throughput

Optional

- 160 GB hard disk

Memory

- 4 GB default
- 8/16 GB optional

Shared Port Adapter

- 3x SPA slot

Multi-Core Network Processor

- 62 cores
- 4 threads per core
- 248 simultaneous threads

Hardware redundancy

- Dual power supplies

Control Plane

- Quad cores clocked at 2.13G Hz
- 4G default shared memory
- Secure Boot
- FIPS-140-3 certification

Cryptography

- 4 Gbps crypto throughput
- SuiteB crypto support

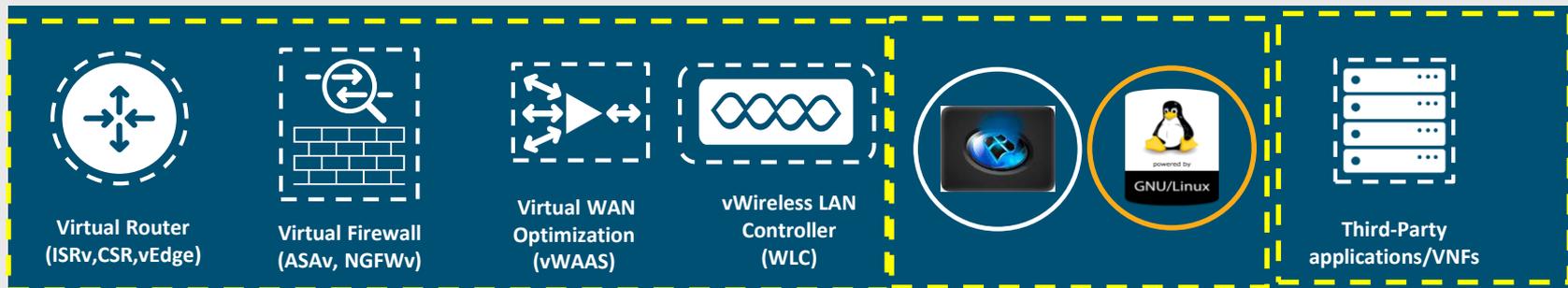


Cisco ENCS

软件定义分支 在任何平台上部署服务



Cisco DNA Center / Network Service Orchestrator/ MSX



Network Functions Virtualization Infrastructure Software (NFVIS)

Cisco 4000 Series ISR +
UCS® E-Series

Enterprise Network
Compute System (ENCS)

CSP-5000
UCS-M5 C-Series

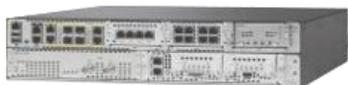
Select
3rd Party Hardware

选择的自由

思科智能分支

Traditional

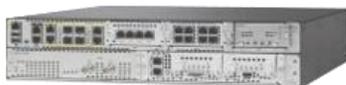
Physical Router



Cisco® 4000 Series ISR

集中的服务
固定的集成服务
保守的

Physical Router Virtual Services



4000 Series ISR +
UCS® E-Series



可升级的硬件
确定性的路由性能

Enterprise NFV

Virtual Router Virtual Services



Enterprise Network
Compute System (ENCS)

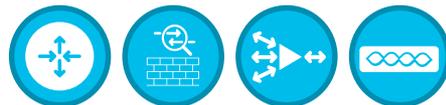


弹性路由和服务
路由器/服务器混合

Virtual Router Virtual Services



CSP5K / UCS-M5 C-Series



弹性路由和服务
性能
早期采用者

Cisco ONE™



获得持续的创新



许可证
可移植性



投资保护

ENCS 5000 Series

- Enterprise Network Compute System

- SD-WAN
- LTE Advanced
- Modularity
- RAID Storage

ENCS 5100 Series



ENCS 5400 Series



ENCS 5412
12Core(ISRv+5VNF)



ENCS 5408
8Core(ISRv+3VNF)



ENCS 5104
4Core (ISRv+1VNF)



ENCS 5406
6Core(ISRv+2VNF)



Routing and Compute

Virtualized Services

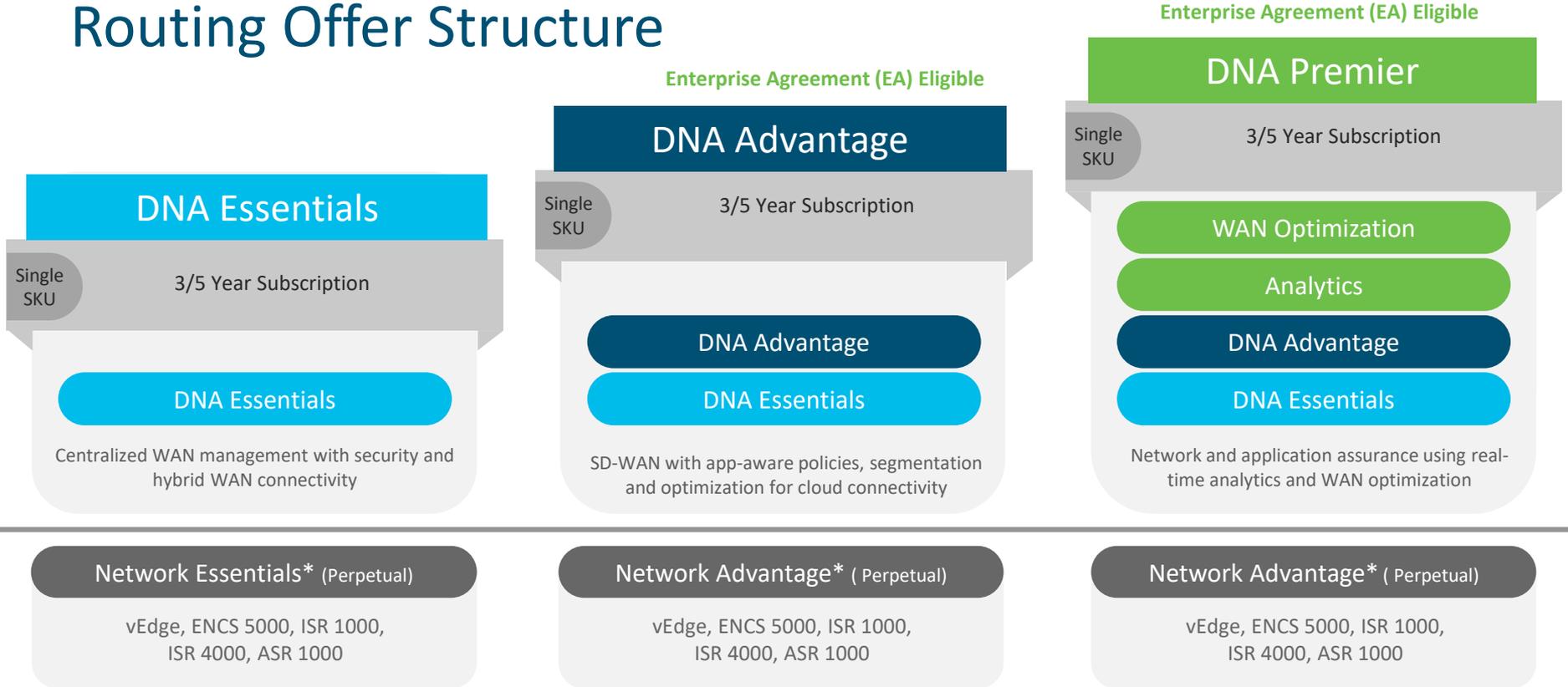
Open for 3rd party apps

NFVIS Hypervisor

Agenda

- 1 Introduction to Cisco SD-WAN Platforms
- 2 vEdge and XE SD-WAN Platforms
- 3 SD-WAN Platforms License
- 4 BOM Demo

Routing Offer Structure



*Network Essentials and Advantage are perpetual and not required for vEdge.

Software Support Service (SWSS) included in all subscriptions

Management flexibility: On-prem or cloud based

Routing Offer Details



Centralized Management

- On-prem or cloud managed
- Zero touch deployment
- Branch virtualization with Cisco VNF orchestration
- Day 0 and Day 2 provisioning
- Lifecycle management



Secure Connectivity

- Unlimited segmentation

- SD-WAN and advanced WAN topologies
- Limited segmentation
- Cloud connectivity

- All types of connectivity
- Secure VPN overlay
- L3-L4 firewall, App Aware FW
- IPS/IDS with Talos Signatures
- URL-Filtering
- Basic application visibility



Policy Based Automation

- Advanced network and application visibility
- WAN Optimization

- Application aware policies using path control, bandwidth optimization
- Cloud OnRamp
- Forwarding Error Correction
- Contextual insights with assurance
- Encrypted traffic analytics

DNA Premier

DNA Advantage

DNA Essentials



Analytics and Assurance

- Network ---optimization analytics
- Application trending and forecasting

*Network Essentials and Network Advantage are perpetual and not required for vEdge or ENCS

Network Essentials(IP Base + Sec)*
Network Advantage (IP Base + Sec+ App)*

Capabilities for Cloud Managed Through vManage*

DNA Essentials

3,5 Year Terms

Connectivity

VPN Overlay, Topology: Hub-n-spoke,
NAT, Split tunnel,
2 VPNs: 1 transport, 1 service side
VPN with L2 or L3

Security

Encryption: AES-256
Zone Based FW, Application Aware FW,
Snort IPS/IDS with Talos Signatures, URL-Filtering, DNS
Monitoring
Policy support: Local ACL only, Data policy

Application Experience

QoS (classification, policing, remarking, scheduling),
App-aware routing (5 tuple only), DPI for visibility, App
visibility (name, throughput)

Management

Viptela vManage platform, Zero Touch Provisioning,
Day 0, day 1, day N Changes

DNA Advantage (Include DNA Essentials)

3,5 Year Terms

Connectivity

Service-side routing, Mesh topology, Multicast
VPNs: 5 (1 transport, 4 service side)

Security

Control policy
Advanced policies: Service chaining, extranet

Application Experience:

DPI for app-aware routing and policies
SaaS on-ramp (was CloudExpress)
TCP Optimization
Forwarding Error Correction

Management & Orchestration

End to end SD-WAN policy orchestration,
network and application trouble shooting

DNA Premier (Include DNA Essentials & DNA Advantage)

3,5 Year Terms

Connectivity: VPNs: Up to system scale

Advanced Application Experience

WAN Full stack WAAS

Analytics:

VAnalytics platform

* vManage will continue to be available on-prem

Platforms Supported: vEdge, ISR1K, ISR 4K, ASR, ENCS

Capabilities for On-Prem Managed Through DNA Center

DNA Essentials

3,5 Year Terms

Router Deployment Day 0 and Day 2 Changes

Branch Virtualization NFV provisioning on ENCS and UCS-E, Cisco VNF orchestration (ISRv, vEdge, vASA,NGFW and vWAAS)

Application Visibility name, throughput

Assurance: Router Monitoring (Basic)

VNF monitoring (ISRv, vWAAS**), ENFV (ENCS, UCSE), Dashboards (Overall Health, Network Health, Client Health), topology, pre- canned Reports, custom Thresholds

Automation: Inventory, Discovery, Topology, Software Image Management, Site Automation, Network Settings, Device Credential Update, Integrity Verification, Template Programmer, Canned Reports, PnP Application

Advanced Telemetry & Visibility: Full Flexible Netflow, EEM

DNA Advantage (Include DNA Essentials)

3,5 Year Terms

IWAN IWAN Application

Branch Virtualization 3rd party VNF orchestration

Assurance: Router 360, ENFV 360*, Router underlay insights, ENFV Insights*, 360 pages, Health score, Time Travel, Correlated Insights, Neighbor topology, Path trace, KPIs, Baselining, Trends, Application Experience and Performance, SDA, Wifi KPIs etc.)

Automation: Application Policy, Policy based QoS Automation, SWIM (Patching), SD Bonjour, Reporting (Tableau)

Optimized Telemetry & Visibility: AVC(NBAR2)

DNA Premier (Include DNA Essentials & DNA Advantage)

3,5 Year Terms

Advance application experience

AppNav, WAN Full stack WAAS (managed by WCM-WAAS Central Manager)

Network Essentials

Perpetual

Essential Routing Capabilities

OSPF, EIGRP

Router Management

TACACS+, NETCONF, AAA, DNS, DHCP, DPI Visibility (Full FNF), Basic Qos (classification, Policing, Remarkng, scheduling)

Security: PKI, MacSec

Network Advantage

Perpetual

Routing Capabilities:

Multicast, MPLS

App based policy:

PFR, PBR, App Aware Qos Policy, App performance troubleshooting (co-related insights)

Segmentation:

Trustsec (SGT, SGACL), SDA Border, SDA Ctrl plane, VRF Segmentation

VPNs: LISP

Platforms Supported: ISR, ASR, ENCS

如何选择？

Cisco DNA Premier

Cisco DNA Advantage

Cisco DNA Essentials

1

确认许可级别

2

选择带宽

3

选择许可期限

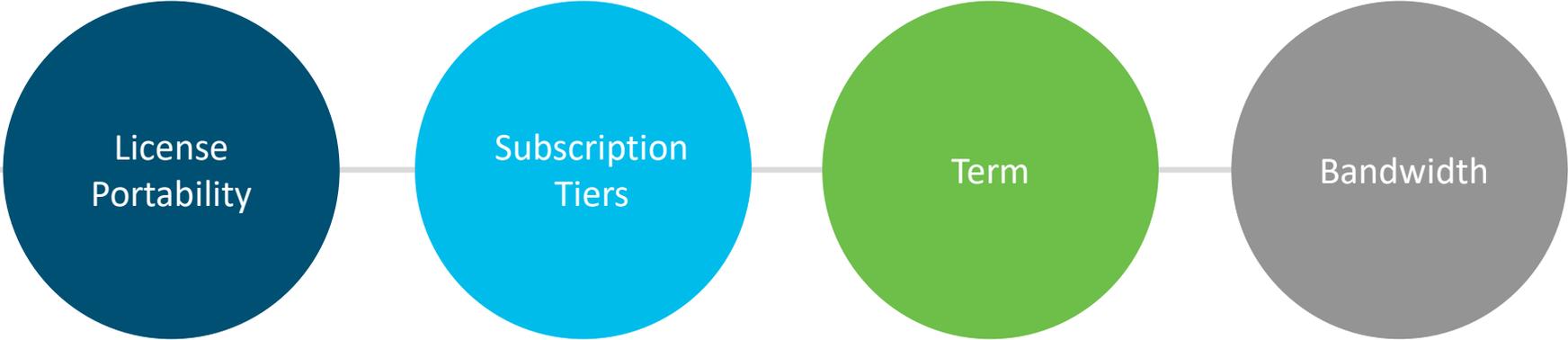
4

选择本地管理还是云端管理

5

确定未来规模的平台

WAN Solutions that Grows with Your Business



License
Portability

Move across
management platforms
(Cisco DNA Center vs
vManage), physical vs.
virtual
seamlessly

Subscription
Tiers

Upgrade from Cisco
DNA Essentials to
Advantage and
Premier tiers

Term

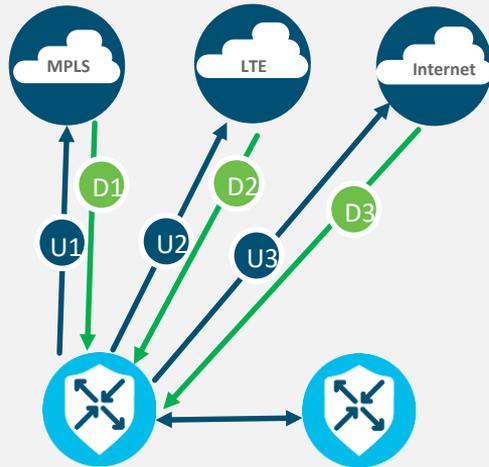
Term
flexibility: 3/5
years

Bandwidth

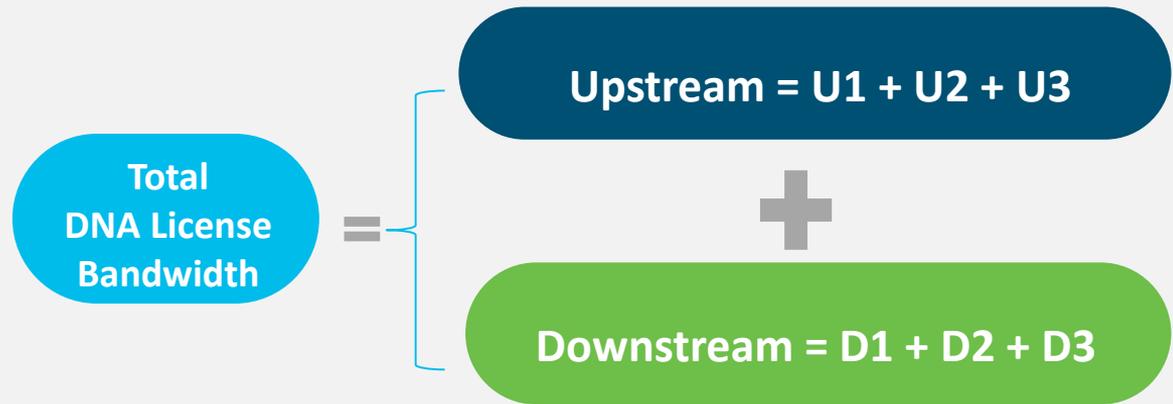
Bandwidth choice
:
10M- 10G

Respond to Business Needs Faster

Cisco DNA License Bandwidth Definition



U1 = Upstream MPLS Bandwidth
D1 = Downstream MPLS Bandwidth
U2 = Upstream LTE Bandwidth
D2 = Downstream LTE Bandwidth
U3 = Upstream Internet Bandwidth
D3 = Downstream Internet Bandwidth

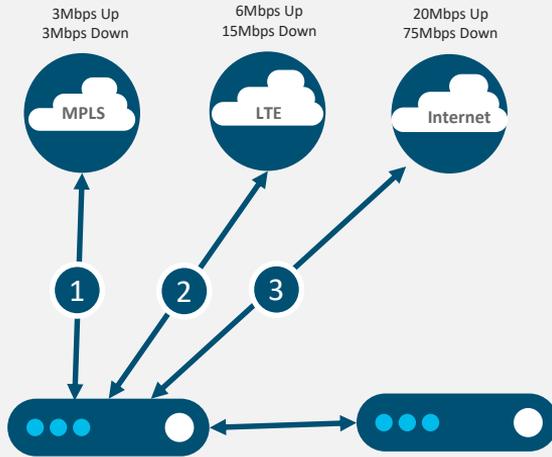


Aligned with how service providers sell WAN bandwidth

Monthly bandwidth utilization is calculated at the 95th percentile

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

Bandwidth Metering for Cisco DNA Routing 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.

Aligned with how service providers sell WAN bandwidth

Cisco DNA Applicability Matrix

Platform		License type	SD WAN	10 Mbps	20 Mbps	50 Mbps	100 Mbps	250 Mbps	500 Mbps	1 Gbps	2.5 Gbps	5 Gbps	10 Gbps	25 Gbps	50 Gbps	100 Gbps	
ISR1K		Cisco DNA Premier	✓	✓	✓	✓	✓										
		Cisco DNA Advantage	✓	✓	✓	✓	✓										
		Cisco DNA Essentials	✓	✓	✓	✓	✓										
ISR4K	ISR 4221**	Cisco DNA Premier	✓	✓	✓	✓											
		Cisco DNA Advantage	✓	✓	✓	✓											
		Cisco DNA Essentials	✓	✓	✓	✓											
	ISR 4321**	Cisco DNA Premier	✓	✓	✓	✓	✓										
		Cisco DNA Advantage	✓	✓	✓	✓	✓										
		Cisco DNA Essentials	✓	✓	✓	✓	✓										

Cisco DNA Applicability Matrix

Platform		License type	SD WAN	10 Mbps	20 Mbps	50 Mbps	100 Mbps	250 Mbps	500 Mbps	1 Gbps	2.5 Gbps	5 Gbps	10 Gbps	25 Gbps	50 Gbps	100 Gbps	
ISR4K	ISR 4331	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓								
		Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓								
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓							
	ISR 4351**	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓	✓							
		Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓	✓							
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓							
	ISR 4431	Cisco DNA Premier	✓			✓	✓	✓	✓	✓	✓						
		Cisco DNA Advantage	✓			✓	✓	✓	✓	✓	✓						
		Cisco DNA Essentials	✓			✓	✓	✓	✓	✓	✓						
ISR 4451	Cisco DNA Premier	✓			✓	✓	✓	✓	✓	✓							
	Cisco DNA Advantage	✓			✓	✓	✓	✓	✓	✓							
	Cisco DNA Essentials	✓			✓	✓	✓	✓	✓	✓							
ISR 4461	Cisco DNA Premier				✓	✓	✓	✓	✓	✓		✓					
	Cisco DNA Advantage				✓	✓	✓	✓	✓	✓		✓					
	Cisco DNA Essentials				✓	✓	✓	✓	✓	✓		✓					
CSR1Kv	Cisco DNA Premier	✓			✓	✓	✓	✓	✓	✓		✓					
	Cisco DNA Advantage	✓			✓	✓	✓	✓	✓	✓		✓					
	Cisco DNA Essentials	✓			✓	✓	✓	✓	✓	✓							
ENC	ENCS 5104	Cisco DNA Premier	✓		✓	✓	✓										
		Cisco DNA Advantage	✓		✓	✓	✓										
		Cisco DNA Essentials	✓			✓	✓	✓									
	ENCS 5412 5408 5406	Cisco DNA Premier	✓		✓	✓	✓	✓									
		Cisco DNA Advantage	✓		✓	✓	✓	✓	✓								
		Cisco DNA Essentials	✓			✓	✓	✓	✓								

* L-LIC-DNA-ADD for Cisco DNA subscription with the platform, as no Cisco DNA HW+ Subscription bundle is currently available.

** Except for the 5412 ENCS, other ENCS platforms currently support vEdge Cloud NVF for SD-WAN and not Cisco IOS XE SD-WAN

Cisco DNA Applicability Matrix

Platform		License type	SD WAN	10 Mbps	20 Mbps	50 Mbps	100 Mbps	250 Mbps	500 Mbps	1 Gbps	2.5 Gbps	5 Gbps	10 Gbps	25 Gbps	50 Gbps	100 Gbps	
ASR	ASR 1001-X	Cisco DNA Premier	✓							✓	✓						
		Cisco DNA Advantage	✓							✓	✓						
		Cisco DNA Essentials	✓														
	ASR 1002-X**	Cisco DNA Premier	✓							✓							
		Cisco DNA Advantage	✓							✓							
		Cisco DNA Essentials	✓														
	ASR 1001-HX**	Cisco DNA Premier	✓									✓	✓	✓			
		Cisco DNA Advantage	✓									✓	✓	✓			
		Cisco DNA Essentials	✓														
	ASR 1002-HX	Cisco DNA Premier	✓									✓	✓	✓			
		Cisco DNA Advantage	✓									✓	✓	✓			
		Cisco DNA Essentials	✓														
	ASR1K ESP 40**	Cisco DNA Premier										✓					
		Cisco DNA Advantage										✓					
		Cisco DNA Essentials															
ASR1K ESP 100**	Cisco DNA Premier										✓	✓	✓				
	Cisco DNA Advantage										✓	✓	✓				
	Cisco DNA Essentials																
ASR1K ESP 200**	Cisco DNA Premier												✓	✓			
	Cisco DNA Advantage												✓	✓			
	Cisco DNA Essentials																
vEdge	vEdge 100B	Cisco DNA Premier	✓	✓	✓	✓	✓										
		Cisco DNA Advantage	✓	✓	✓	✓	✓										
		Cisco DNA Essentials	✓	✓	✓	✓	✓										
	vEdge 100M	Cisco DNA Premier	✓	✓	✓	✓	✓										
		Cisco DNA Advantage	✓	✓	✓	✓	✓										
		Cisco DNA Essentials															

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Cisco DNA Applicability Matrix

Platform		License type	SD WAN	10 Mbps	20 Mbps	50 Mbps	100 Mbps	250 Mbps	500 Mbps	1 Gbps	2.5 Gbps	5 Gbps	10 Gbps	25 Gbps	50 Gbps	100 Gbps
vEdge 100WM	vEdge	Cisco DNA Premier	✓	✓	✓	✓	✓									
	100WM	Cisco DNA Advantage	✓	✓	✓	✓	✓									
		Cisco DNA Essentials														
vEdge 1000	vEdge	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓	✓						
	1000	Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓	✓						
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓						
vEdge 2000	vEdge	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
	2000	Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
vEdge 5000	vEdge	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
	5000	Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
vEdge Cloud*	vEdge	Cisco DNA Premier	✓	✓	✓	✓	✓	✓	✓	✓						
	Cloud*	Cisco DNA Advantage	✓	✓	✓	✓	✓	✓	✓	✓						
		Cisco DNA Essentials	✓	✓	✓	✓	✓	✓	✓	✓						

New Easy to Order PID's

Lead with new PID's for key product families

Easy attach of Cisco DNA offers

Better Pricing

To get Cisco DNA subscription for existing ISR/ ASR/ vEdge, use PID:
LIC-DNA-ADD

Product Family*	NEW PIDs	Description
ISR 4000 Series	ISR4331-DNA	Cisco ISR 4331 (3 GE, 2 NIM, 1 SM) with Cisco DNA Support
	ISR4321-DNA	Cisco ISR 4321 (2GE, 2 NIM) with Cisco DNA Support
	ISR 4351-DNA	Cisco ISR 4351 (3GE, 3NIM, 2SM) with Cisco DNA Support
ISR 4000 Series	ISR4451-DNA	Cisco ISR 4451 (4 GE, 3 NIM, 2 SM) with Cisco DNA Support
ISR 1000 Series	C1111-8P-DNA	ISR 1100 8 Ports Dual GE WAN with Cisco DNA Support
ISR 1000 Series	C1111-8PLTEEA-DNA	ISR 1100 8 Port Dual GE LTE EA with Cisco DNA Support
ISR 1000 Series	C1111-8PLTELA-DNA	ISR 1100 8 Port Dual GE LTE LA with Cisco DNA Support
ASR 1000 Series	ASR1001-X-DNA	Cisco ASR 1001-X Crypto,6GE, Dual-PS with Cisco DNA Support
ASR 1000 Series	ASR1002-HX-DNA	Cisco ASR 1002-HX, 4x10GE+4x1GE, Dual PS with Cisco DNA Support
VEDGE 100 Series	VEDGE-100B-AC-K9	vEdge-100 AC chassis with 5 Ethernet ports, rack mount kit and cables
VEDGE 100 Series	VEDGE-100M-AC-K9*	vEdge-100 AC chassis with single 4G/LTE SIM, integrated power supply, 5 Ethernet ports
VEDGE 100 Series	VEDGE-100WM-AC-K9*	vEdge-100 AC chassis with single 802.11 radio and single 4G/LTE SIM, integrated power supply, 5 Ethernet ports and cables
VEDGE 1000 Series	VEDGE-1000-AC-K9	vEdge-1000 AC base chassis with 8x1GE fixed ports, dual AC power adapters and cables
VEDGE 2000 Series	VEDGE-2000-AC-K9	vEdge-2000 AC base chassis with 4x1GE fixed ports and dual Pluggable Interface Module
VEDGE 5000 Series	VEDGE-5000-AC-K9	vEdge-5000 AC router base chassis with 4x10G, 8x1G copper, 8x1G fiber modular NIMS
Any IoS-XE/vEdge platform	LIC-DNA-ADD (going EOS) L-LIC-DNA-ADD	Cisco DNA subscription software for any IoS-XE/vEdge platform Ex: for ISR 4221, order ISR4221/K9 for HW And LIC-Cisco DNA-ADD for subscription software

XE SD-WAN Platform Support Matrix

FYI

July 2018 (16.9)

Dec 2018 (16.10)

March 2019 (16.11)

Platforms

ISR 1K

- ✓ C1111-8P
- ✓ C1111-8P LTEEA/LA,
- ✓ C1117-4PLTEEA/LA,

ISR 4K

- ✓ ISR 4221
- ✓ ISR 4321/4331/4351

ASR 1K

- ✓ ASR 1001-X/1002-X
- ✓ ASR 1001-HX/1002-HX

Virtual

- ✓ ISRV-ENCS 5412

ISR 1K

- ✓ C1111-4P, C1116-4P, C1117-4P
- ✓ C1111-4P LTEEA/LA
- ✓ C1116-4PLTEEA
- ✓ C1117-4PM, C1117-4PMLTEEA
- ✓ C1111X-8P (8GB DRAM)

ISR 1K Wireless

- ✓ C1111-8PLTEEA, C1111-8PW

ISR 4K

- ✓ ISR 4431/4451 (Feb 2019)

Virtual

- ✓ ISRV-ENCS 5104, 5406, 5408

ISR 4K

- ✓ ISR 4461

Virtual

- ✓ CSR-AWS Only

T1/E1

- ✓ NIM-1/2/4/8MFT-T1/E1

DSL-PPPoE, PPPoA

- ✓ NIM-VAB-A, NIM-VAB-M

4G/LTE

- ✓ NIM-LTEA-EA/LA

Ethernet-L3

- ✓ NIM-1GE-CU-SFP
- ✓ NIM-2GE-CU-SFP
- ✓ SM-X-4X1G-1X10G
- ✓ SM-X-6X1G

Ethernet-L2

- ✓ NIM-ES2-4/8
- ✓ NIM-ES2-4/8-P

DSL-IPoE, (Feb 2019)

- ✓ NIM-VAB-A, NIM-VAB-M

Ethernet-PPPoE

Serial

- ✓ NIM-1T/2T/4T

Module

Agenda

1 Introduction to Cisco SD-WAN Platforms

2 vEdge and XE SD-WAN Platforms

3 SD-WAN Platforms License

4 **BOM Demo**



思科vEdge Cloud路由器系统要求

vEdge Cloud Router Server Recommendations

Specification	Description
Software image format	<ul style="list-style-type: none">• AMI• OVA• QCOW2• VDX
Recommended host operating system	<ul style="list-style-type: none">• Red Hat Enterprise Linux 7.0• Ubuntu 14.04/16.04 LTS
Supported hypervisors	<ul style="list-style-type: none">• Amazon Machine Image (AMI) on Amazon Web Services (AWS)• Azure Hyper V• Kernel-based Virtual Machine (KVM)• VMWare ESXi 5.5 and ESXi6.0
Server specifications	<ul style="list-style-type: none">• Intel Sandy Bridge, 2.0-GHz clock frequency• Intel ATOM Rangely, 2.0-GHz clock frequency• WAN interface—Gigabit Ethernet NICs• CPU—Minimum of 2 virtual CPUs (vCPUs)• RAM—2 GB• Disk space—10 GB. The vEdge Cloud VM instance itself requires 1 GB. The recommendation of 10 GB is made to account for the hypervisor and any other modules that might require a small amount memory.• Bandwidth—Up to 2 Gbps• Network interfaces—Minimum of 3: one for tunnel interface, one for management, one for LAN. Maximum of 8 vNICs per VM. Use VMXNET3 NICs only.
Bandwidth and CPU	<ul style="list-style-type: none">• 500 Mbps—Minimum of 2 vCPUs• 1 Gbps—Minimum of 4 vCPUs• 2 Gbps—Minimum of 8 vCPUs

Controller 控制器硬件要求

vManage NMS Server Recommendations

Sites	vCPUs	RAM	OS Volume	Volume	Bandwidth	vNICs
1-250	16	32 GB	20 GB	500GB, 1500 IOPS	25 Mbps	3 (one for tunnel interface, one for management, one for the vManage cluster message bus)
251-1000	32	64 GB	20 GB	1TB, 3072 IOPS	100 Mbps	3 (one for tunnel interface, one for management, one for the vManage cluster message bus)
1001 or more	32	64 GB	20 GB	1TB, 3072 IOPS	150 Mbps	3 (one for tunnel interface, one for management, one for the vManage cluster message bus)

Note: the OS and database volumes must be on a solid-state drive (SSD).

Controller 控制器硬件要求

vBond Orchestrator Server Recommendations

Sites	vCPUs	RAM	OS Volume	Bandwidth	vNICs
1-50	2	4 GB	10 GB	1 Mbps	2 (one for tunnel interface, one for management)
21-250	2	4 GB	10 GB	2 Mbps	2 (one for tunnel interface, one for management)
251-1000	2	4 GB	10 GB	5 Mbps	2 (one for tunnel interface, one for management)
1001 or more	4	8 GB	10 GB	10 Mbps	2 (one for tunnel interface, one for management)

vSmart Controller Server Recommendations

Sites	vCPUs	RAM	OS Volume	Bandwidth	vNICs
1-50	2	4 GB	16 GB	2 Mbps	2 (one for tunnel interface, one for management)
21-250	4	8 GB	16 GB	5 Mbps	2 (one for tunnel interface, one for management)
251-1000	4	16 GB	16 GB	7 Mbps	2 (one for tunnel interface, one for management)
1001 or more	8	16 GB	16 GB	10 Mbps	2 (one for tunnel interface, one for management)

Note: the OS and database volumes must be on a solid-state drive (SSD).