



Cisco Community Expert series Webcast

Overview of Cisco's Branch Routing Portfolio

Meena Shar Product TME, Eric Nelson, TME and Shameel Ummer Product TME CCIE #35351

April 23rd 2019

News & Upcoming events



Ask the Expert following the Webcast

Now through Friday May 3rd 2019

With
Eric, Meena & Shameel

<http://bit.ly/ATE-webcast-apr2019>



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CCIE #35351

Cisco Community – Ask the Expert

Migrating Cisco phones from one cluster to another

Till Friday
May 3rd 2019

With
Luis Yanes & Levi Thomas
Woodcock

-For Customers & Partners-

<http://bit.ly/ATE-phones-migration>



 APR 22 - MAY 3, 2019

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Luis Yanes & Levi Woodcock

**Migrating Cisco phones
from one cluster to another**

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<https://tmt.knect365.com/big-5g-event/>



Eric Nelson
Technical Marketing Engineer
Cisco Systems, Inc

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San Diego Convention Center
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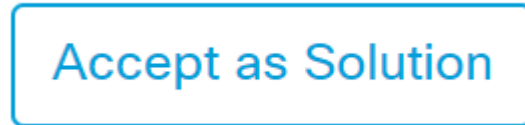
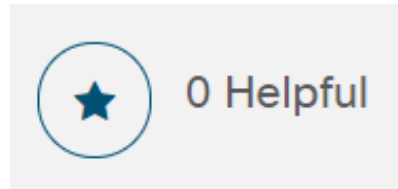


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Cisco Community Experts



Eric Nelson
Technical Marketing Engineer



Meena Shar
Technical Marketing Engineer



Shameel Ummer
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CCIE #35351

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New Webex!

The screenshot displays the Cisco Webex Events interface. At the top, the title bar reads "Cisco Webex Events" with standard window controls. Below this is a menu bar with "File", "Edit", "Share", "View", "Communicate", "Participant", "Event", and "Help". The main content area is split into two panes. The left pane shows a "VS" (Virtual Switch) icon and the name "VIDHYA S (Cisco)". The right pane contains a list of controls: "Participants (3)", "Q&A", and "Polling", each with a close button. A "Sharing" bar is visible, with "Screen /presso" highlighted in a red box. The main display area shows a presentation slide titled "VxLAN Overview" with the subtitle "Overview". The slide features a network diagram of an IP Network (Underlay) cloud. This cloud is connected to four "Edge Device" icons. Each edge device is linked to a "Local LAN Segment", which in turn connects to either a "Physical Host" or "Virtual Hosts" (via a "Virtual Switch"). An "IP Interface" is shown within the cloud. At the bottom of the slide, there is a copyright notice "© 2019 Cisco and/or its affiliates. All rights reserved." and a URL: <http://opendata.labs.lacnic.net/ipv6stats/graphs/ipv6evo.html>. The bottom of the interface has a control bar with icons for mute, video, share, stop, participants, chat, and end call.

Please make sure you follow up the presentation in the right screen



Cisco Community Expert series Webcast

Overview of Cisco's Branch Routing Portfolio

Meena Shar Product TME, Eric Nelson, TME and Shameel Ummer Product TME CCIE #35351

April 23rd 2019

Agenda

- An overview of Cisco ISR 1000 Series and Cisco ISR 900 Series
- Migration from Cisco ISR 800 Series to ISR 1000/ISR 900
- An overview of Cisco ISR 4000 Series

Polling Question 1

Does your enterprise plan to move towards Cellular as an active transport?

- A. Currently using 4G as a primary transport
- B. Planning on installing in the next 6 months
- C. Waiting for LTE-ADV-Pro
- D. Waiting for 5G



Introduction to ISR 1000 series

Eric Nelson
Technical Marketing Engineer
April, 2019

- Portfolio Overview
- Hardware Overview
 - ISR 1000
 - ISR 900

Portfolio Overview

Cisco Enterprise Routing Portfolio

Branch

ISR 900



- Fixed and fanless
- IOS Classic based

ISR 1000



- Integrated wired and wireless access
- PoE/PoE+

ISR 4000



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

vEdge 100



- 4G LTE & Wireless

vEdge 1000 & 2000



- Fixed/Pluggable Module

Aggregation

ASR 1000



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

vEdge 5000



- Modular
- RPS

Virtual and Cloud

Cisco ENCS



- 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

SD-WAN

Cisco Branch Routing Portfolio

SD-WAN
Only



vEdge 100/1000/2000

- Up to 100 Mbps/345 Mbps/2.8 Gbps
- Fixed/Pluggable Module
- 4G LTE & Wireless



ISR 900

- Up to 250 Mbps
- Fixed and fanless
- Cisco IOS based
- High performance VPN

SD-WAN
Ready



ISR 1000

- Up to 350 Mbps
- Cisco SD-WAN
- Integrated wired and wireless access
- Cisco SD-WAN Security
- 802.11AC WiFi

SD-WAN
Ready



ISR 4000

- Up to 3 Gbps
- WAN and voice module flexibility
- Cisco SD-WAN
- Compute with UCS E-Series
- Cisco SD-WAN Security

C890 vs C111x



C890

LTE

PoE

2
Wireless
Domains

802.11n

IPsec
100 Mbps+

Dual
Core

25
VLANs

IOS
Classic

LTE
Advanced

PoE+

10
Wireless
Domains

802.11ac
Wave 2

IPsec
340 Mbps+

Quad
Core

32
VLANs

IOS XE

SD-WAN
Ready

C111X



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

SD-WAN
Ready

ISR 1109



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	N/A	N/A	N/A
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

Product Overview

	C1111X-8P	C111x-8P	C111x-4P	C1101-4P	C1109-4P	C1109-2P
CPU*	4 cores**	4 cores**	4 cores**	4 cores**	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)	1 (USB 3.0)	1 (USB 3.0)	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

- The C111x-8P and the C1111X-8P are clocked at a higher CPU rate than the C111x-4P & C1101-4P
- The C1109 M2M is clocked at a slightly lower rate than C111x-4P
- ** GuestShell Supported on 4Th

ISR 1000 Series

	C1109-2P (M2M)	C1109-4P (M2M)	C1101-4P	C1111-4P	C1111-8P
Operating System	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN
SD-WAN	Up Coming	Up Coming	Up Coming	Yes	Yes
Dual Ethernet WAN	No	No	No	Yes	Yes
LTE Advanced	No	Yes (Optional)	Yes (Optional)	Yes	Yes
SFP	No	No	No	Yes	Yes
G.FAST	No	No	No	No	Yes (C1112/C1113)
VDSL2	No	No	No	Yes (C1116/1117)	Yes (C1112/C1113)
ADSL2/2+	No	No	No	Yes (C1116/1117)	Yes (C1112/C1113)
G.SHDSL	No	No	No	No	Yes (C1118)
802.11ac Wave 2	No	Yes/External Antenna	Yes	Yes	Yes
LAN Ports	2 GE	4 GE	4 GE	4 GE	8 GE
Internal PoE Option	No	No	No	1 PoE+ / 2 PoE	2 PoE+ / 4 PoE

From ISR 800 to ISR 1100

	C880	C890	C111x-8P ★	C111x-4P ★	C110x-4P ★
Operating System	IOS Classic	IOS Classic	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN	IOS-XE/XE SD-WAN
Dual Ethernet WAN	No	Yes	Yes	Yes	No
LTE Advanced	No	No	Yes	Yes	Yes
SFP	No	Yes	Yes	Yes	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 1000 Naming Convention – C1111-8PLTEAWB

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:

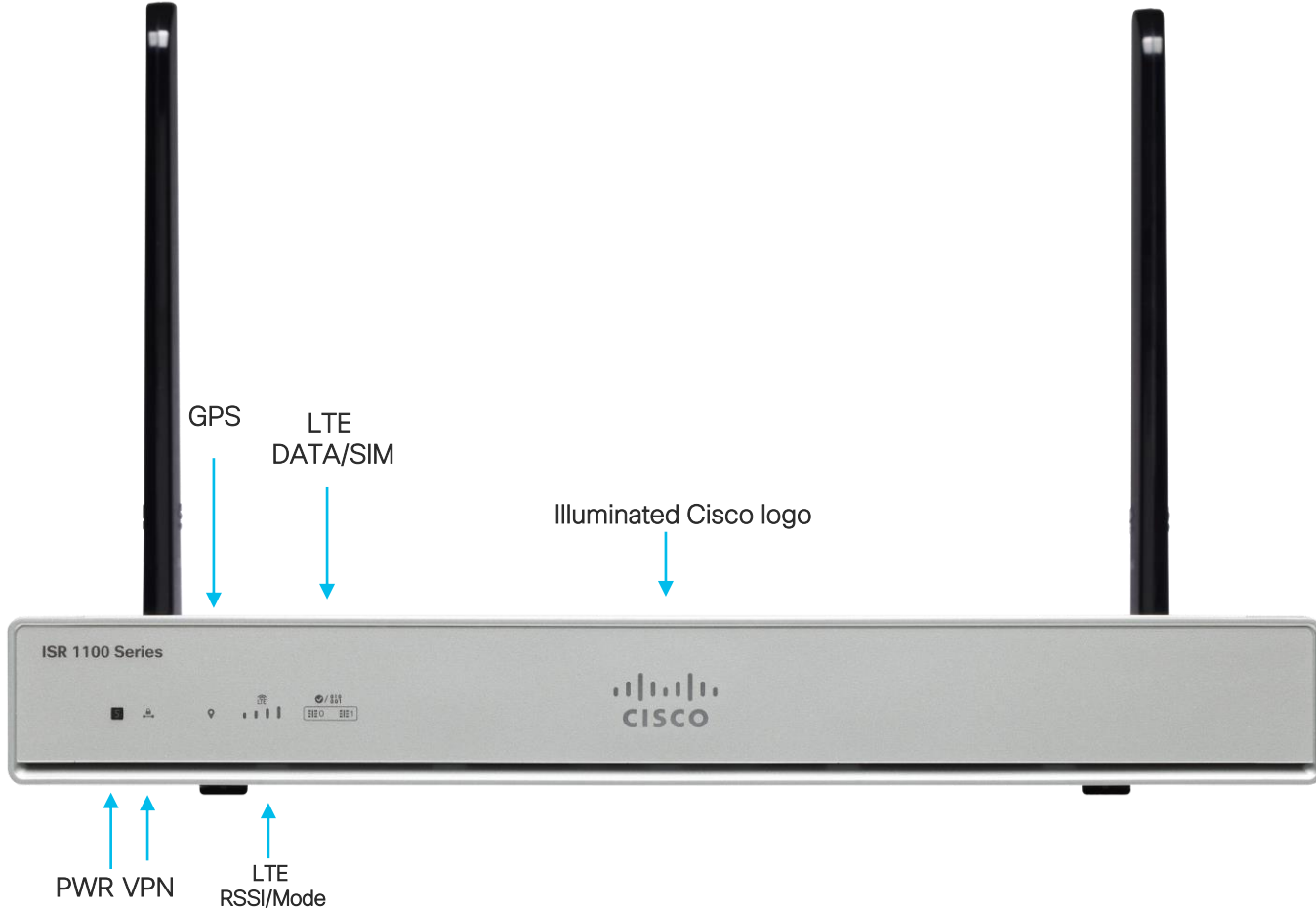
- “LTEEA” = LTE for US, Europe, Canada and Middle East
- “LTELA” = LTE for APJ and some providers in LATAM
- “LTEP” = Pluggable LTE module
- “LTE2P” = Dual Pluggable LTE module

DDR RAM:

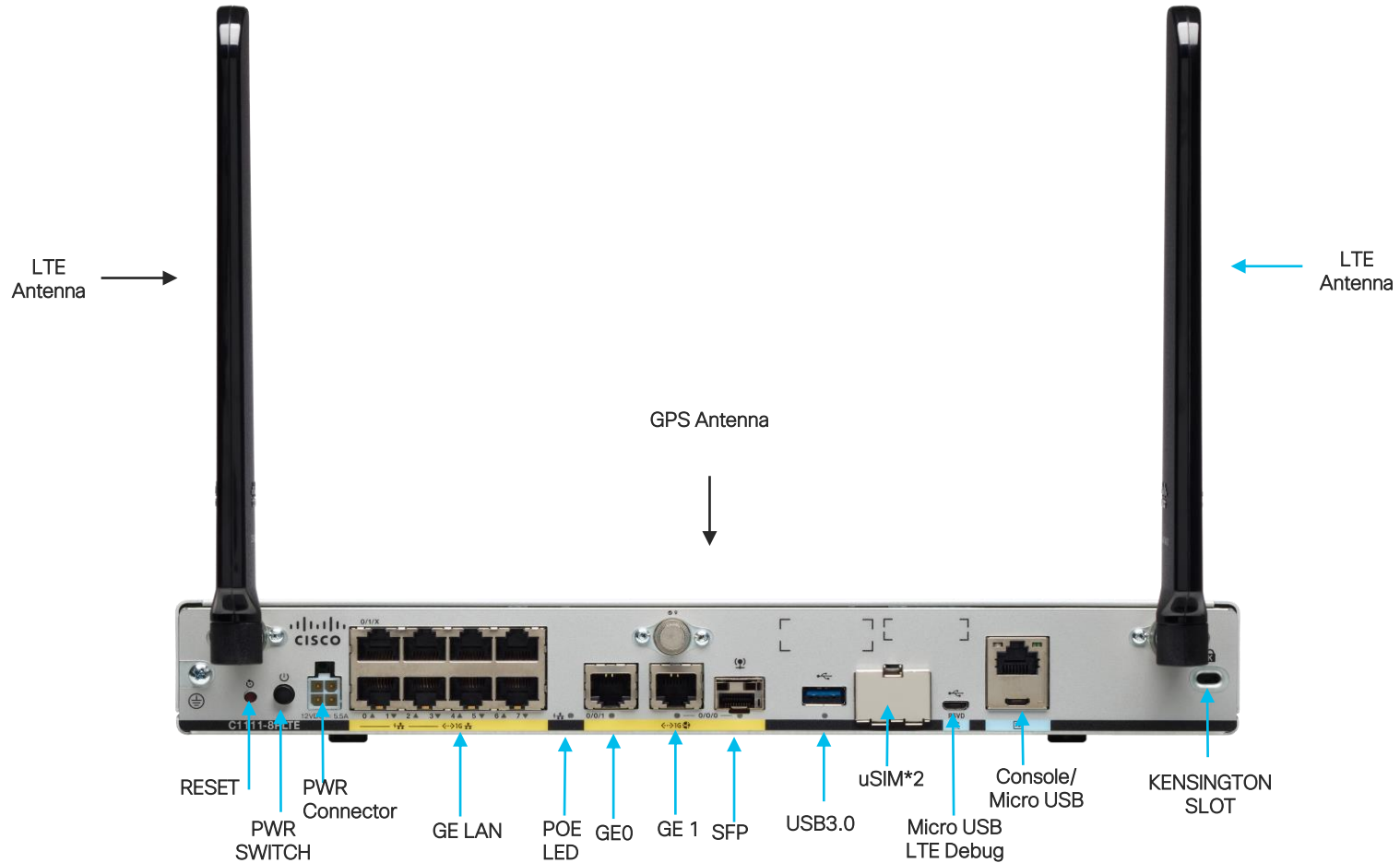
- “1111X” “1117X” “1116X” “1121X” “1161X”
X = denotes 8GB RAM

Hardware Overview

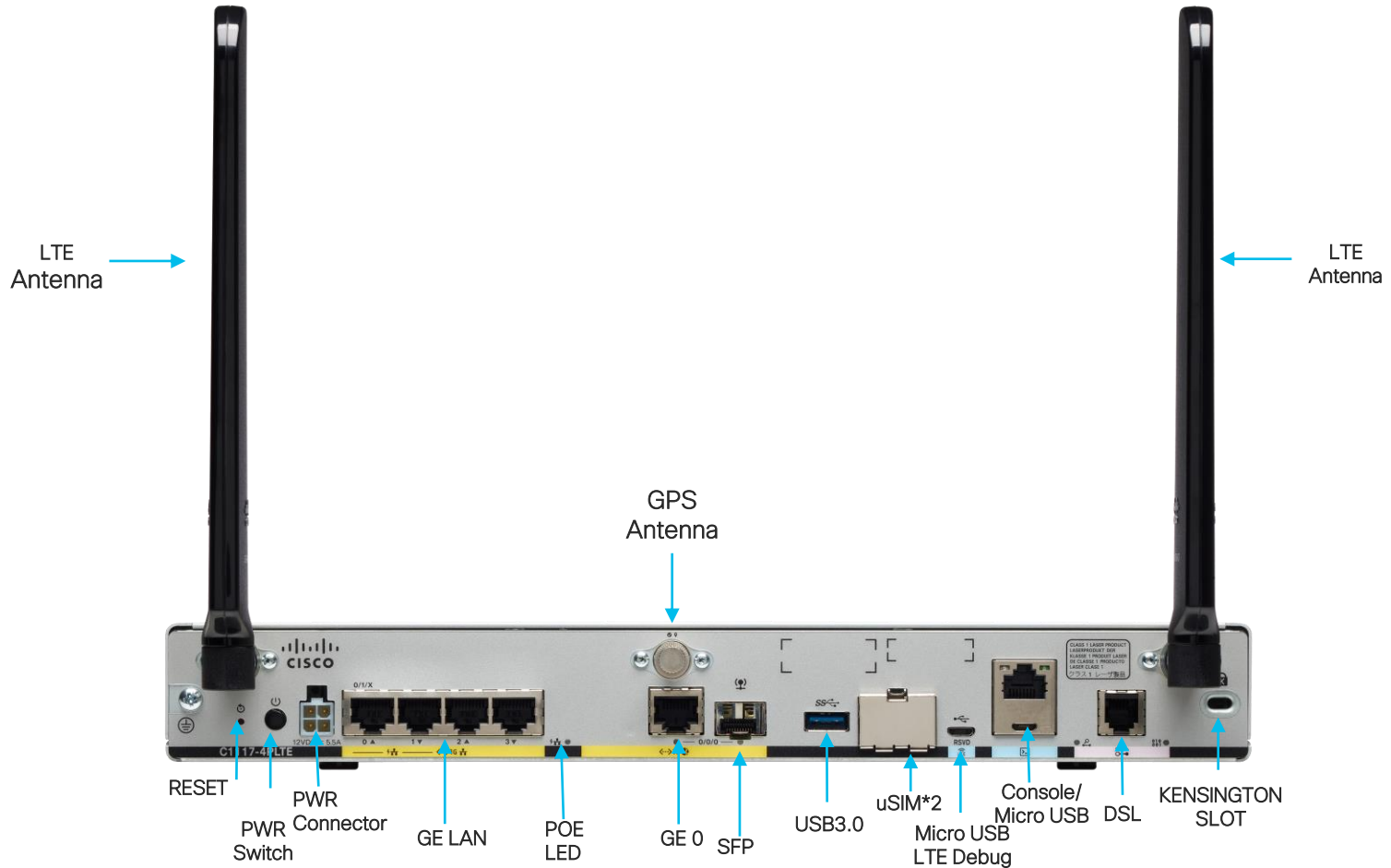
C111x-4P/8P - Front Panel



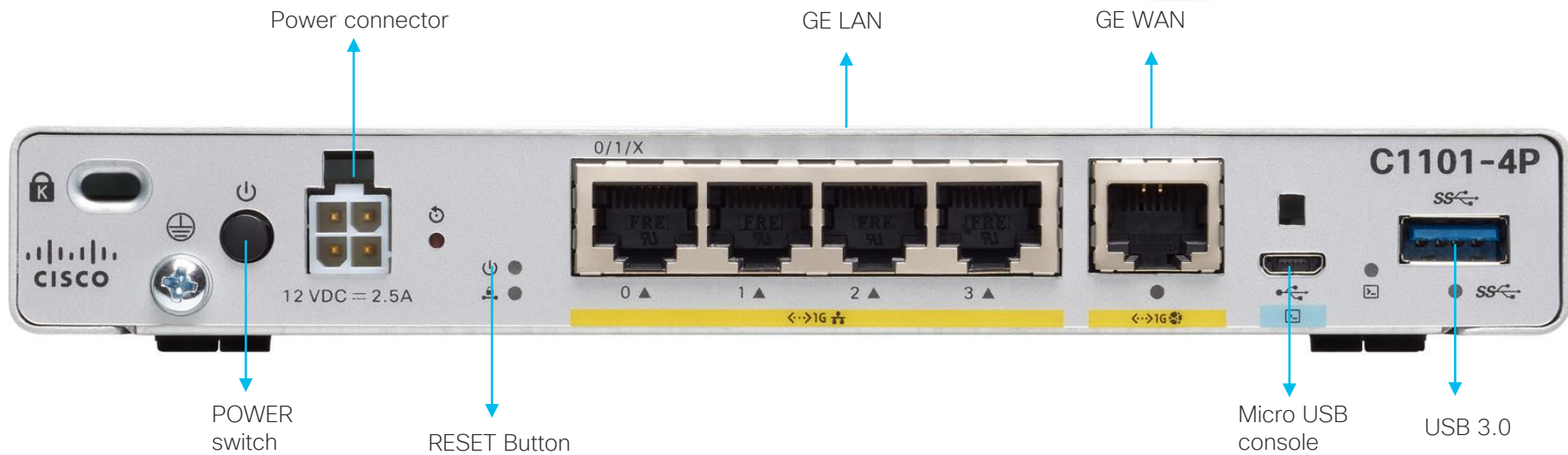
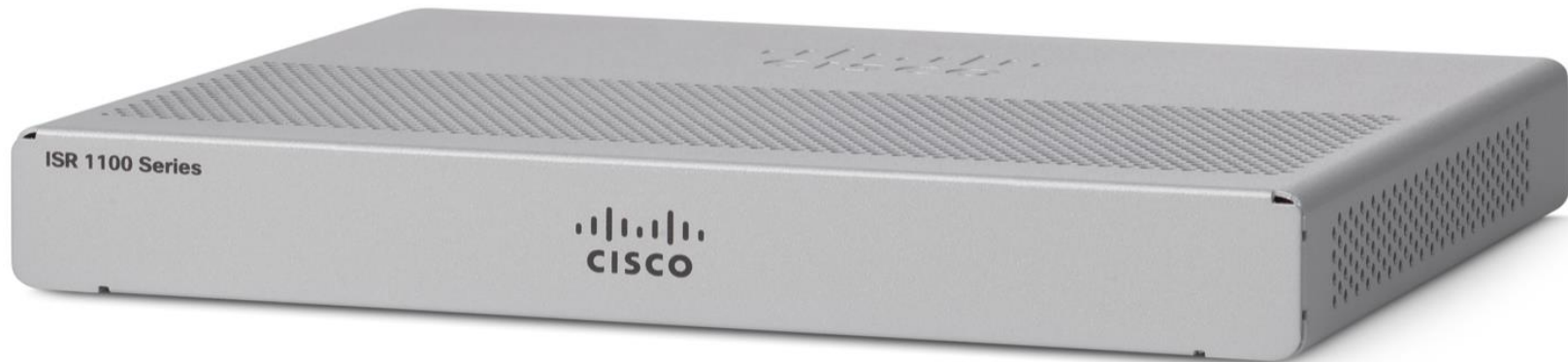
C111x-8P Ethernet + LTE + WLAN - Back Panel



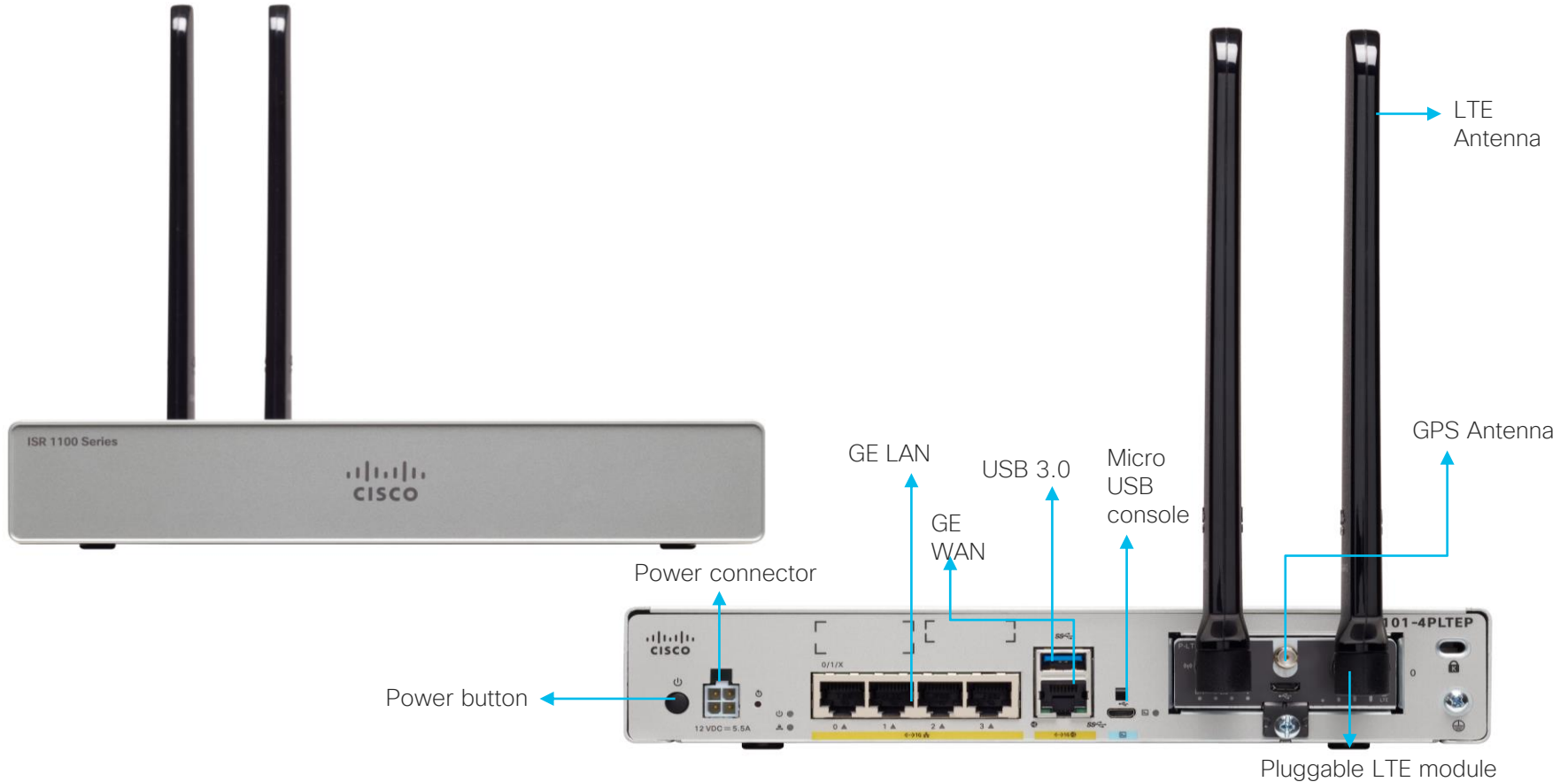
C111x-4P Ethernet + DSL + LTE - Back Panel



C1101-4P - Front view and Back Panel



C1101-4PLTEP - Front view and Back Panel



C1109 M2M series platforms

Up to 55 C

Compact form factor



1 x WAN, 2 x LAN, Cat4 LTE

Dual Pluggable slot

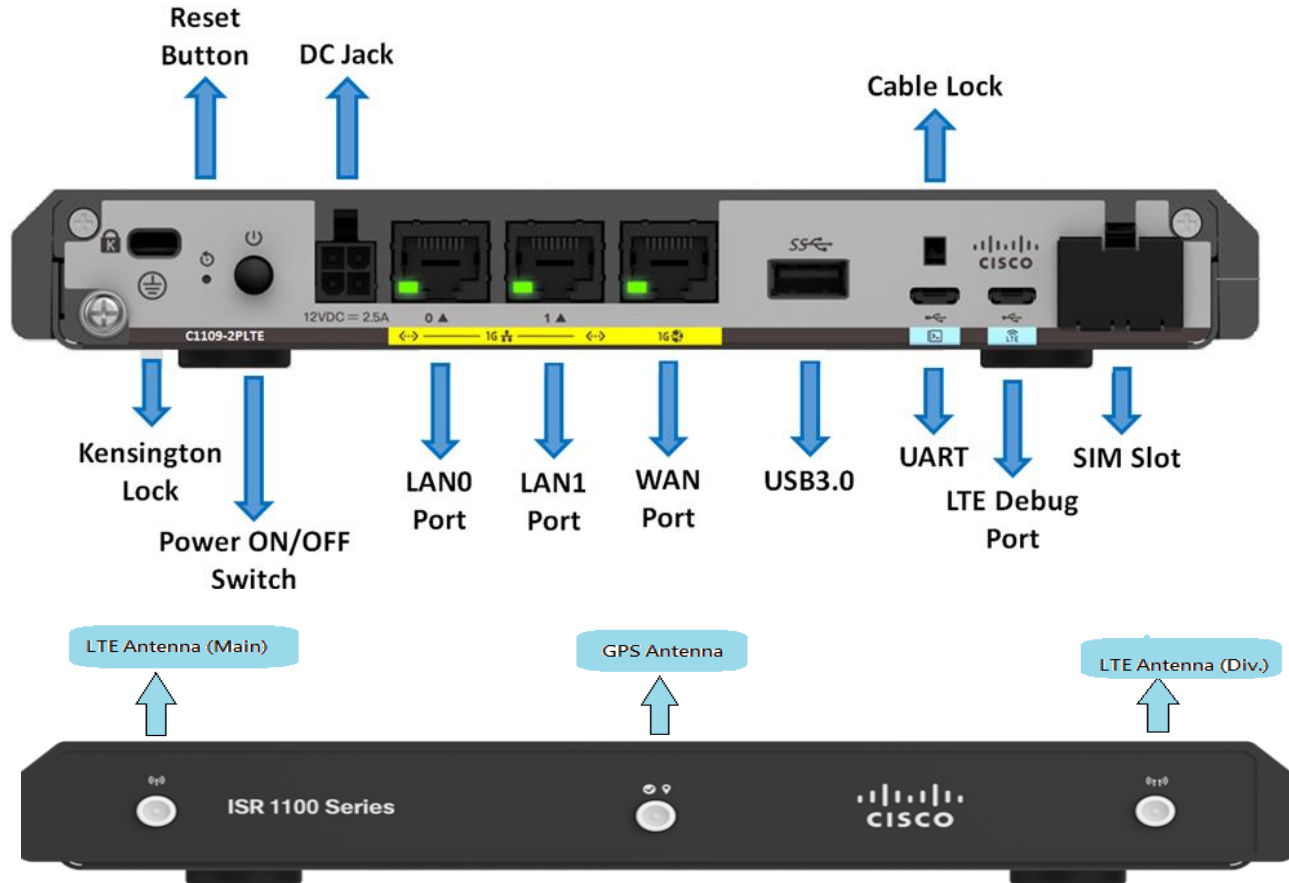


1 x WAN, 4 x LAN, Cat4/6 LTE & Wifi 802.11 ac



Down to -15 C

C1109-2 I/O Design



C1109 M2M Series



C1109-2PLTEXX



C1109-4PLTE2P



C1109-4PLTE2PWX

SKU	Description	Orderability
C1109-2PLTEXX	Compact form factor Fixed Embedded CAT4 LTE 0-50C extended temperature	Oct 2018
C1109-4PLTE2P	Dual Pluggable slots -20 to 55C extended temperature	Jan 2019
C1109-4PLTE2PWX	Dual Pluggable slots Embedded 802.11ac WiFi -20 to 55C extended temperature	Jan 2019

C1109-4PLTE2P



Power button

Power connector

GE LAN

GE
WAN

USB 3.0

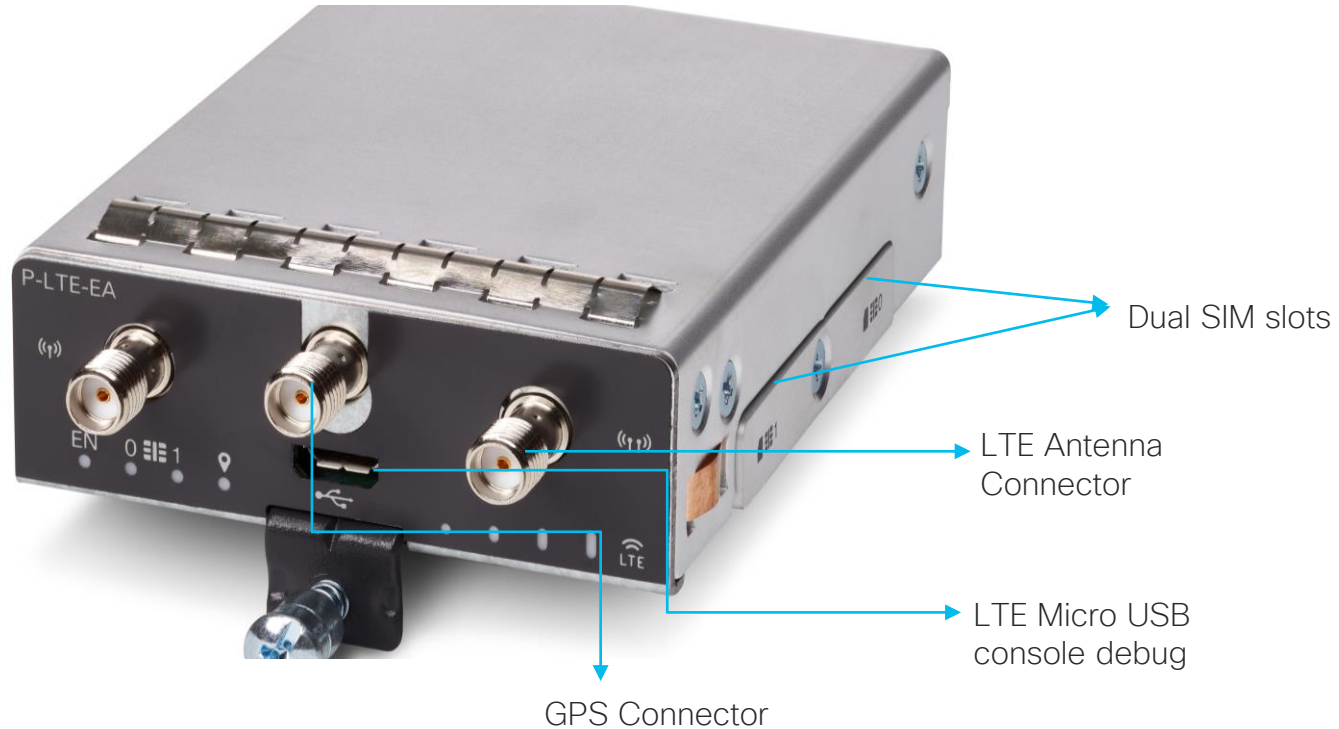
Micro
USB
console

Micro USB – RJ45 Console adapter for C1101



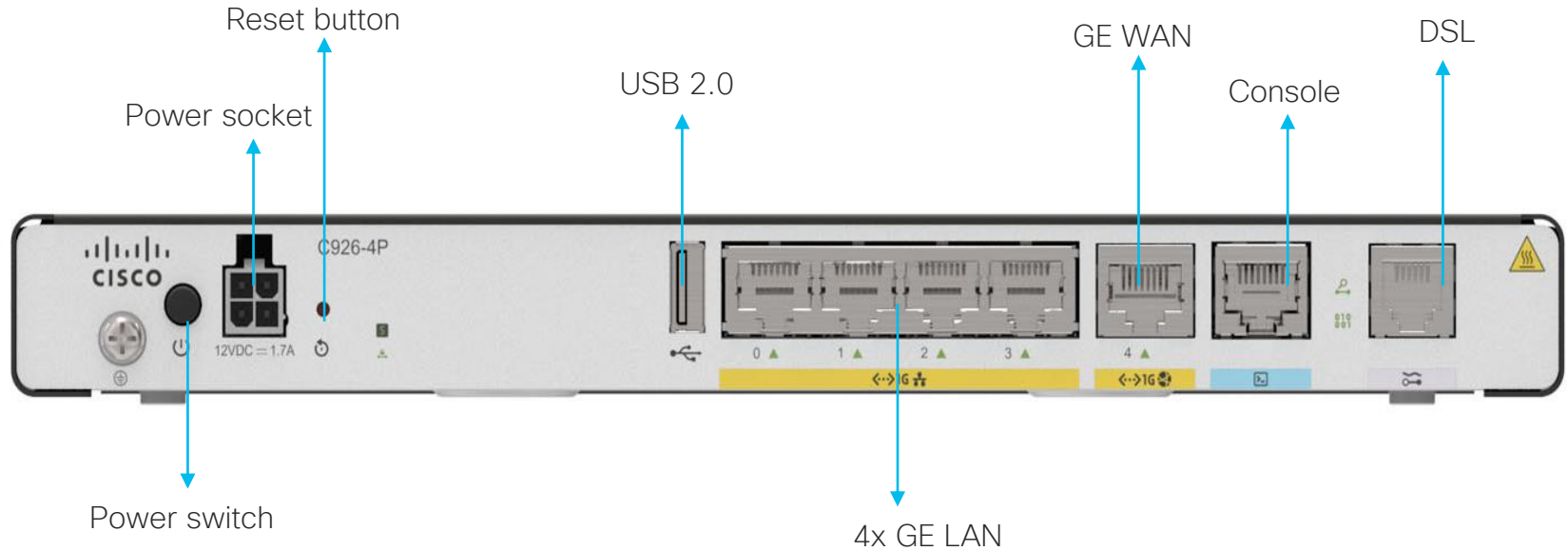
* C1101 does not have a RJ45 Console port. It comes with a Micro USB console port only.

Pluggable LTE Module for C1101/1109



ISR 900 Overview

ISR926 - Back Panel



Product Overview

	ISR 921	ISR 931	ISR 926	ISR 927
WAN Ethernet	2 GE	2 GE	1 GE	1 GE
CAT 4 LTE	Yes	No	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

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>

Upgrade to ISR 900 Series

	ISR 921	ISR 931	ISR 926	ISR 927
ISR 881	●	●	-	-
ISR 886	-	-	●	-
ISR 887	-	-	-	●

Polling Question 2

When does your Enterprise plan to rollout/move to SD-WAN?

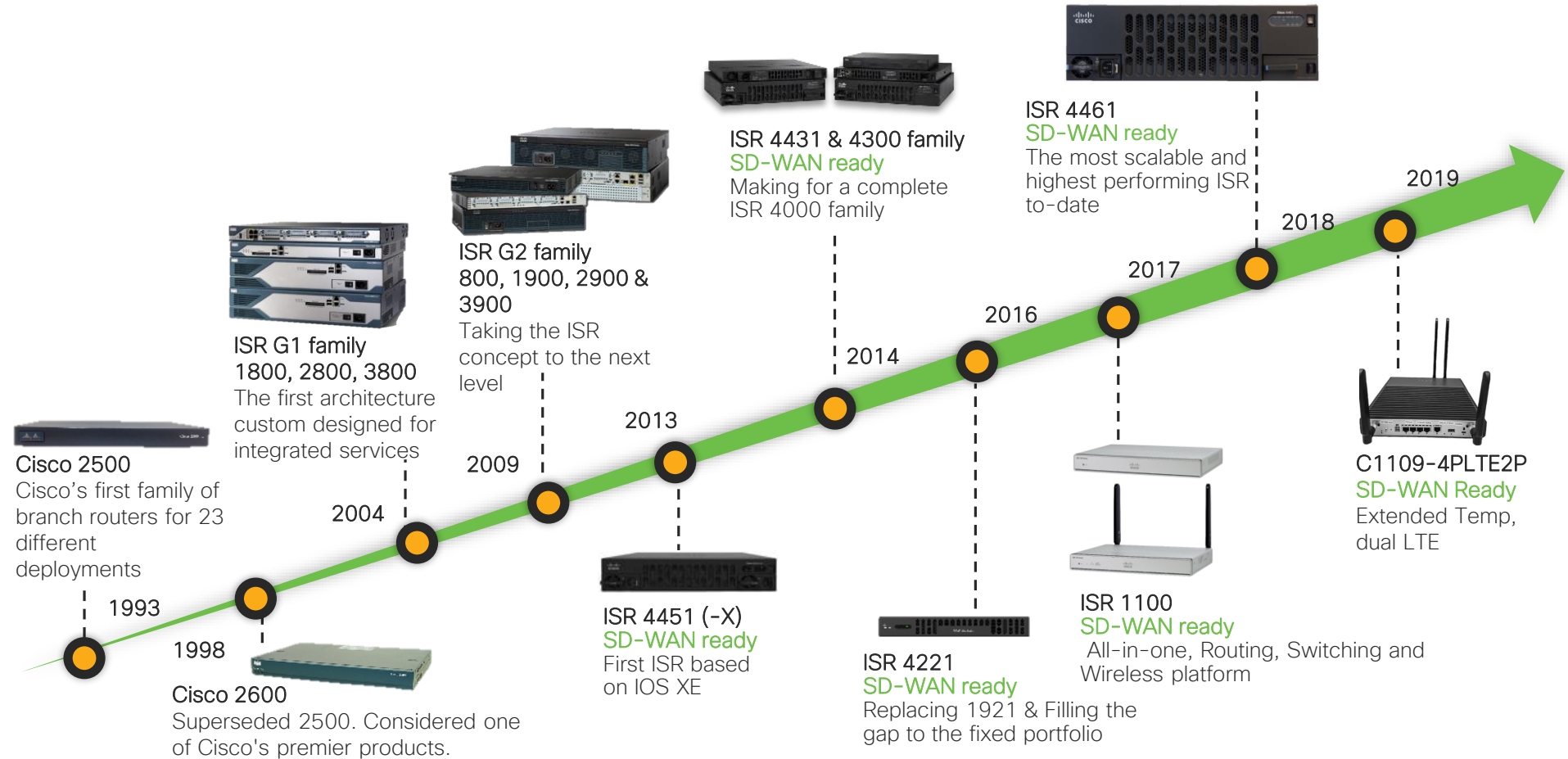
- A. In the next 3-6 months
- B. In the next 6-9 months
- C. At least one year
- D. No plan to move to SD-WAN



Introduction to ISR 4000 Series - Architecture

Meena Sehar
Technical Marketing Engineer
April, 2019

Cisco Branch Router Evolution



Cisco ISR 4000 Series

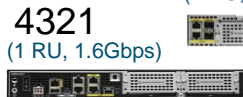
Concurrent Services and Performance

4300 and 4200 architecture

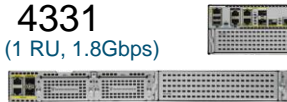
Single Silicon with Multiple CPU cores



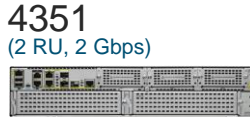
4221*
(1 RU, 1.2 Gbps)



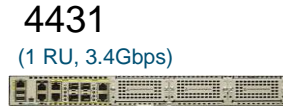
4321
(1 RU, 1.6 Gbps)



4331
(1 RU, 1.8 Gbps)



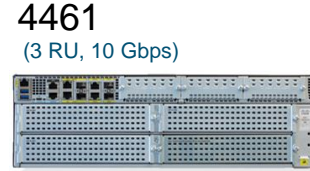
4351
(2 RU, 2 Gbps)



4431
(1 RU, 3.4 Gbps)



4451
(2 RU, 3.8 Gbps)



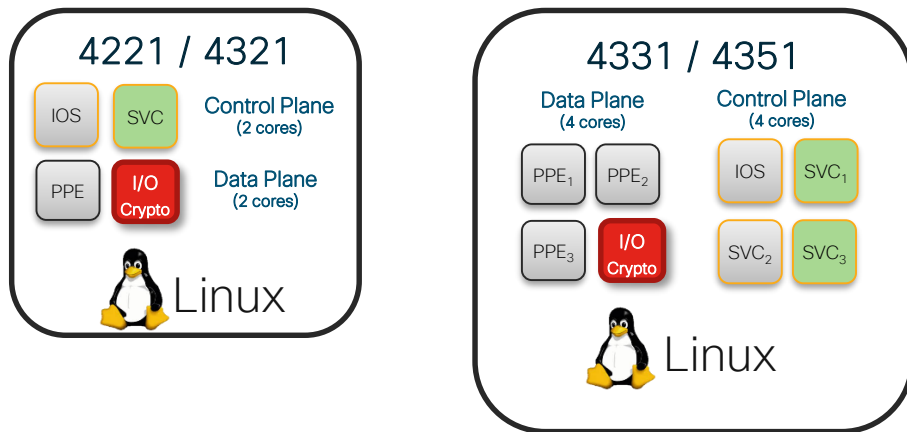
4461
(3 RU, 10 Gbps)

4400 architecture

Dedicated Silicon for Control & Data Plane

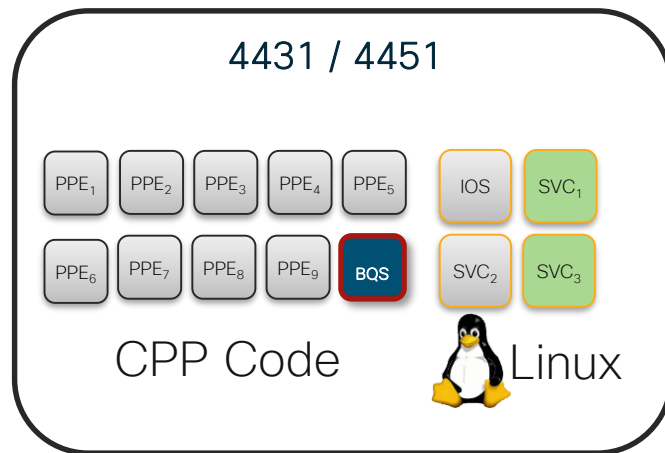
SD-WAN Ready

ISR 4200 / ISR 4300 Architecture



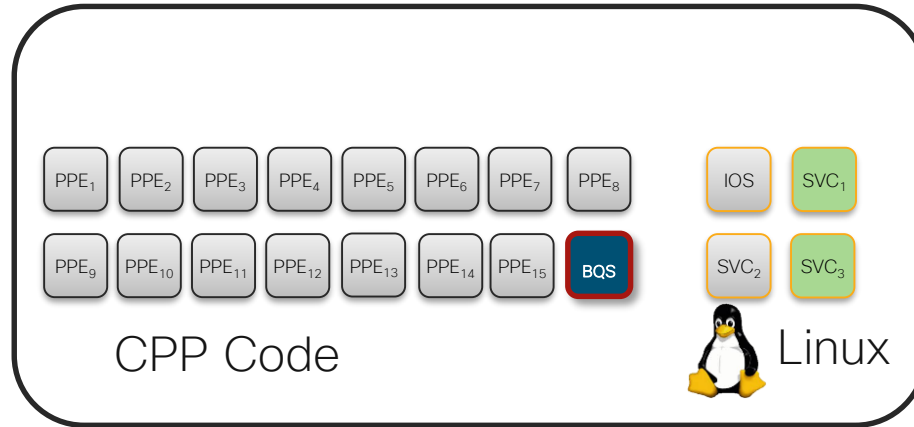
- Unified architecture - Single socket CPU
- Multiple CPU cores providing the distributed control plane
- Control & Dataplane cores run by Linux 4.4
- Dedicated forwarding, crypto and scheduling resources

ISR 4431 / ISR 4451 Architecture



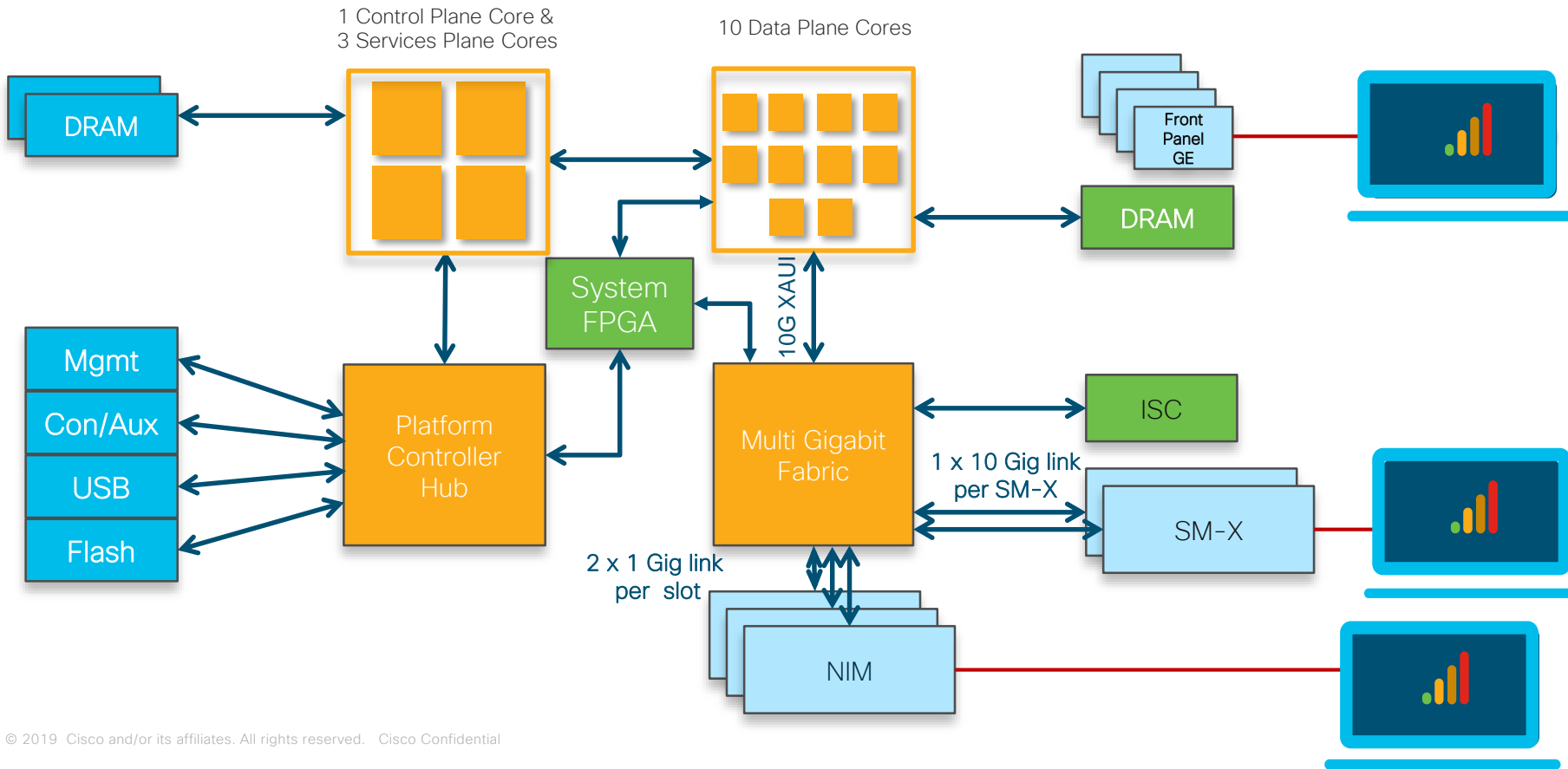
- Physical processing separation as on ASR1K
- Dedicated CPU sockets for Control Plane & Data Plane
- Control Plane run by Linux 4.4 on 4 core X86 platform
- Data Plane run by micro code on 6 or 10 cores
- Dedicated forwarding, crypto and scheduling resources

ISR4461 Architecture

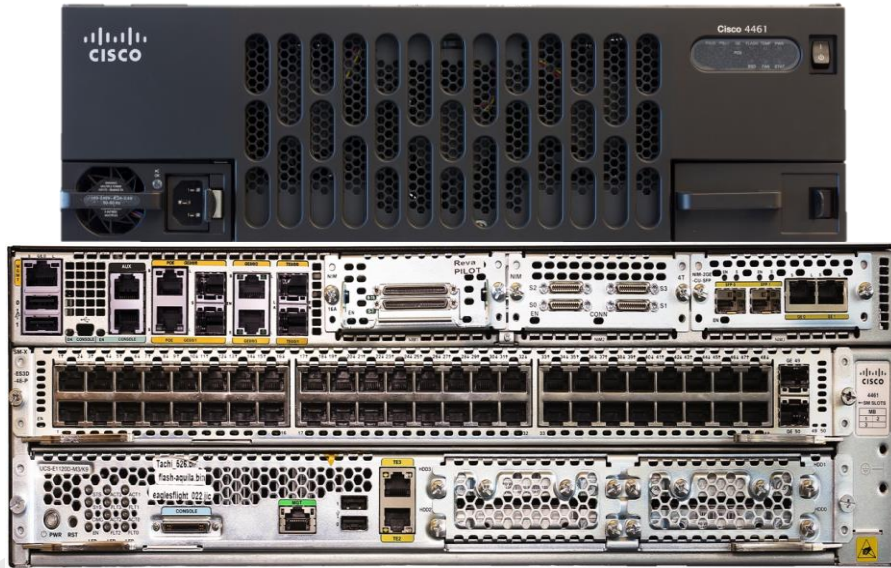


- Same physical processing separation as on ASR1K / ISR4400
- Control Plane 4-core Intel Xeon architecture
- Data Plane 16-core Cavium SoC architecture
- Data Plane DDR4 DRAM – 4GB Fixed

ISR 4000 Packet Flow



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

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

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 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

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

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

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 3 GB for IOS, 1 GB for SNORT

Power Supply for ISR4000

Router Model	Internal/External power Supply	AC	AC_PoE	DC	DC+PoE	Dual AC PSU	Dual DC PSU	PoE Boost
4221	External	✓	✗	✗	✗	✗	✗	✗
4321	External	✓	✓	✗	✗	✗	✗	✗
4331	Internal	✓	✓	✓	✗	✗	✗	✗
4351	Internal	✓	✓	✓	✗	✗	✗	✗
4431	Internal	✓	✓	✓	✗	✓	✗	✓
4451	Internal	✓	✓	✓	✗	✓	✗	✓
4461	Internal	✓	✓	✓	✗	✓	✗	✓

PoE support is NOT provided with DC Power Supply

Trust Anchor Module (TAm)



- Hardware-Based Anchor
- Anti-Tamper Chip
- Secure Storage
- Built-In Crypto Functions
- Random Number Generator
- Hardware Authenticity Check
- Integrity Verification
- Verifiable Entropy

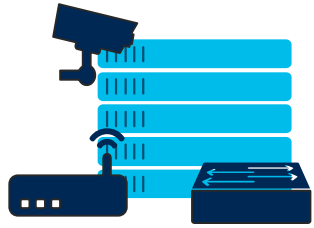
Secure Unique Device ID (SUDI) X.509 Certificate = Device's Identity

- Manufacturer installed certificate
- Hardware serial numbers
- Device-unique public key

Key Use Cases

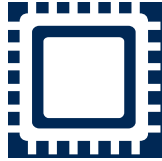
- Verifying the integrity of a device's identity
- Onboarding a new device – Secure Zero Touch Provisioning
- Secure enrollment within an organization's PKI

Trustworthy Technology Protections



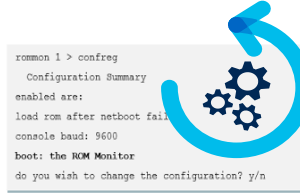
Hardware

HW
Tampering



BIOS

BIOS
Attacks



ROMMON

Rommon
Attacks



Software Image

Static Binary
Attacks



System Booted

Run-Time
Attacks

Supply Chain Security

Trust Anchor Module
+
Secure Boot
+
Digitally Signed Software

Run-Time
Defenses

Polling Question 3

Which VEdge 100 model router has the Integrated Wireless Support?

- A. vEdge100b
- B. vEdge100m
- C. Vdege100wm



ISR4K modular & vEdge Overview

Shameel Ummer
Technical Marketing Engineer
April, 2019

Agenda

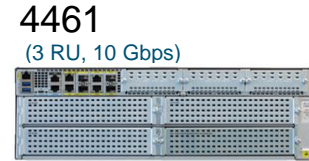
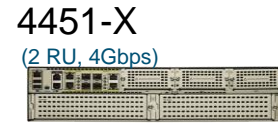
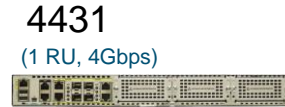
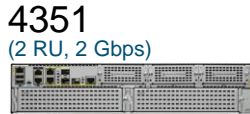
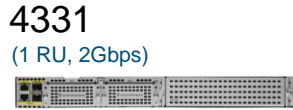
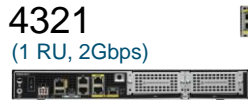
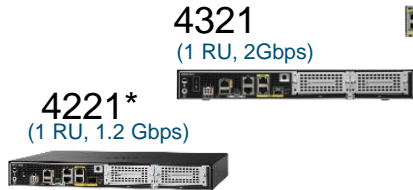
- Routing Platform overview
- Technology feature sets
- Interfaces and Modules
- Software package & License
- vEdge portfolio

Cisco ISR 4000 Series

Concurrent Services and Performance

4300 and 4200 architecture

Single Silicon with Multiple CPU cores



4400 architecture

Dedicated Silicon for Control & Data Plane



* UC not supported on ISR4221

Technology Feature Sets

- Advanced security
- Unified Communications
- Routing and Multicast
- Wireless LAN access
- Wireless WAN access
- Integrated Switching
- Application Services

ISR 4000

Modules & Interfaces

ISR4K Modules

LAN

SM-X: 16, 24 or 48 port switch modules
NIM : 4 or 8 ports switch modules

UCS-E

SM-X: CPU 6, 8 or 12 cores
NIM : CPU 4 cores

Voice

SM-X: 8, 16, 24, 72 FXS & 2, 4, 12 FXO
NIM : T1/E1, 2 or 4 ports FXS/FXO, BRI
PVDM4 : 32, 64, 128 & 256 channels

WAN

SM-X: 4 or 6 1GE, 1 10GE, 1 port T3/E3
NIM : 1 or 2 1GE, 3G/4G LTE, 1, 2, 8
T1/E1, Serial 1 or ports.
Multimode VDSL2 / ADSL
Annex A, B & M



ISR 4000

Software Packages &
Licenses

Cisco ISR Software & Licensing

IOS-XE

- Image Packaging
- Image naming
- Software packaging
- Throughput Licensing

SD-WAN XE

- DNA Licensing
- DNA PID

IOS-XE

Image Packaging : Consolidated package

- **universalk9** – Contains the ipbasek9 base package and the securityk9, uck9, and appxk9 technology packages..
- **universalk9_npe** – This image has limited crypto functionality. This image is with "No payload Encryption"
- Many features within the consolidated package are contained in the ipbasek9 base package
- The licenses key for the ipbasek9 package is activated by default.

Image naming: IOS-XE

isr4300-universalk9.16.09.03.SPA.bin

isr4300-universalk9_npe.16.09.03.SPA.bin

- ISR stands for Integrated services router
- Universal stands for Universal image: Single image for all License
- K9 support for Encryption for management
- 16.09.03 is the IOS-XE version
- NPE stands for No Encryption payload.
- SPA stands for Digitally Signed for production release

Image naming: XE SD-WAN

isr4300-ucmk9.16.9.3.SPA.bin

- ISR stands for Software for Integrated services router
- U stands for Universal image: Single image for all Licenses
- CM stands for Cloud managed SD-WAN image
- K9 support for Encryption for management
- 16.9.x is the IOS-XE version

Software Packages

- Contain software features within a consolidated package.
- License enabled for selected software package
- Each software package has an evaluation license that converts to a RTU (Right to Use) after 60 days.
- We can enable the licenses for any combination of software packages

Software Technology Packages

- **securityk9** – Includes all crypto features, IPSEC VPN, SSL/SSH, ZBFW, NAT, PKI, AAA and Secure VPN
- **uck9**–Includes Cisco Unified communication features such as CUBE, CME-SRST and SBC (Session border controller).
- **appxk9**– Contains Application Experience features AVC, FNF & NBAR, WAAS; Service provided technologies like L2/L3 VPN, MPLS, PFR, VPLS, EoMPLS; Intent based networking such as Software-defined Access using LISP, SD-WAN, Datacenter features such as Virtualization using OTV etc.

Software Feature Licenses

- **HSECK9** – Enable full crypto functionality. Without HSEC, the IPSEC throughput is limited to 250 Mbps and 1000 secure tunnels starting from 16.8.1 release.
- **CME-SRST**– Required UCk9 package. It is honor based licenses and automatically converted to RTU license after 60 days of evaluation period and the RTU license is activated once the EULA is accepted.

Software package naming

ISRXX-YY/K9

- ISR stands for Integrated Services Router
- XX stands for ISR Model (Variable based on the platform)
- YY Stands for the License/Bundle (AX/AXV/SEC/VSEC) (Variable based on the feature bundle)

Example:

Single PID: **ISR4451-X-AX/K9**

Bundled PID: **ISR4451-X-VSEC/K9** (Voice + Security bundle)

Software Feature License naming

FL-XX-HSEC-K9

- FL stands for Feature License
- XX stands for ISR Model (variable based on platform)
- HSEC stands for High Security

Example PID:

FL-4330-HSEC-K9=

FL-44-HSEC-K9=

Throughput License

- To upgrade the base throughput of the router by adding more DP CPU cores.
- Deterministic performance, a.k.a Shaped performance.
- Controlled by Performance Shapers on the Egress Interface
- Applies to the Data plane traffic only.

Performance and Boost License

- **Performance** – Allows for controlled increased throughput. Part of ipbasek9 technology package.
- **Boost**– Removes the Shaper and allows the maximum increased throughput.

ISR 4000 Performance

Platform	Factory Default	Performance License	Boost License
4461	1.5 Gbps	3 Gbps @ 16.5 CPU	10 Gbps @ 92% CPU
4451	1Gbps	2 Gbps @ 19% CPU	4 Gbps @ 35% CPU
4431	500Mbps	1 Gbps @ 18% CPU	4 Gbps @ 62% CPU
4351	200Mbps	400 Mbps @ 17% CPU	2 Gbps @ 45% CPU
4331	100Mbps	300 Mbps @ 16% CPU	2 Gbps @ 53% CPU
4321	50Mbps	100 Mbps @ 8% CPU	2 Gbps @ 68% CPU
4221	35Mbps	75 Mbps @ 8% CPU	1.4 Gbps @ 94% CPU

ISR 4000 IPSEC Performance

IPSEC Crypto throughput for ISR 4331 and 4431 (w/ HSEC & PERF)

ISR4331:

100 Mbps with SEC License (base is **100** Mbps)

250 Mbps with SEC + PERF licenses

300 Mbps with SEC + PERF + HSEC licenses

ISR4431:

250 Mbps with SEC License (base is **500** Mbps)

500 Mbps with SEC + HSEC licenses

1000 Mbps with SEC + HSEC + PERF licenses

Crypto throughput numbers varies between platforms.

Throughput License PIDs

FL-XX-PERF-K9

- FL stands for Feature License
- XX stands for ISR Model (Variable based on Platform)
- PERF stands for Performance throughput

FL-XX-BOOST-K9

- FL stands for Feature License
- XX stands for ISR Model ((Variable based on Platform)
- BOOST stands for BOOST throughput (In the Wild performance)

Example: FL-44-PERF-K9/FL-44-BOOST-K9 (4451 perf & Boost)
FL-4350-PERF-K9=/FL-4350-BOOST-K9= (4350 Perf & Boost)

XE SD-WAN

How to choose?

Cisco DNA Premier

DNA Advantage

DNA Essentials

1 Identify license tier

2 Select bandwidth

3 Pick license term

4 Choose on premises or cloud managed

5 Determine platform for future scale

DNA Subscription License Model

- DNA Essentials w/ Network Essentials (Perpetual)
- DNA Advantage w Network Advantage (Perpetual)
- DNA Premier w/ Network Advantage (Perpetual)
- All the Licenses comes with 3 & 5 year subscription terms
- Supports bandwidth choices between 10M to 10G aggregate depending on the platform you chose.
- Cisco offers On-prem using DNAC or cloud managed solutions using Cisco vManage.
- Network Essentials contains all feature supported in IPbase+ Security
- Network Advantage contains all feature supported in IPbase +Security + App.

ISR 4K DNA PID

ISRXX-DNA

- ISR stands for Integrated Services Router
- XX stands for ISR Model (Variable based on the platform)
- DNA stands for Digital Network Architecture

Example: ISR4451-DNA

- Cloud based License (Premier, Advantage and Essentials)

DNA-C-100M-E-5Y

DNA-C-100M-A-3Y

ISR 4K DNA PID

- On-Prem based License (Premier, Advantage and Essentials)

DNA-P-100M-A-5Y

DNA-P-100M-E-3Y

- DNA Stands for Digital Network Architecture
- C stands for Cloud based and P stands for On-Prem
- 100M is the Bandwidth allocated (Support for 10M-10G BW choices)
- A stands for Advantage/ E stands for Essentials
- Y is the subscription term, could be 3 or 5 years

Note: Starting from 16.10.1 XE, only smart licensing will be supported.

<https://youtu.be/47Tflbt4NEc>




vEdge Branch Portfolio

vEdge Branch Platform Overview (1)

	 vEdge 100	 vEdge 1000	 vEdge 2000
I/O	5x 10/100/1000 Mbps RJ-45	8x 1G SFP	4x 1G SFP, 2x PIM* PIM: 2x10G SFP, 8x 1G SFP
External USB	vEdge 100: N/A vEdge 100m & 100wm: 1x USB3.0	2x USB3.0	2x USB3.0
PoE	vEdge 100: N/A vEdge 100m & 100wm: 1x port	N/A	N/A
4G LTE	vEdge 100: N/A vEdge 100m & 100wm: 1x port	N/A	N/A
Console Port	Mini-USB	Mini-USB, RJ-45	Mini-USB, RJ-45
Mgmt port	N/A	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
FANs	vEdge 100: N/A vEdge 100m & 100wm: 1x fan, fixed	2, Front to back	2, hot swappable, Front to back
HxWxD	1.72x7.5x5.5 in.	1.75x7.5x10 in.	1.75x17.25x18.5 in.

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

vEdge Branch Platform Overview (2)

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

Technical resources

- Datasheet

https://www.cisco.com/c/en/us/products/collateral/routers/4000-series-integrated-services-routers-isr/data_sheet-c78-732542.html

- ISR4K Interfaces and Modules

<https://www.cisco.com/c/en/us/products/routers/4000-series-integrated-services-routers-isr/relevant-interfaces-and-modules.html>

- Software and Licensing

https://www.cisco.com/c/en/us/td/docs/routers/access/4400/software/configuration/guide/isr4400swcfg/bm_isr_4400_sw_config_guide_chapter_0101.html

- Smart licensing

https://www.cisco.com/c/en/us/td/docs/wireless/technology/mesh/8-2/b_Smart_Licensing_Deployment_Guide.html

- Smart Licensing Video

<https://youtu.be/47Tflbt4NEc>

- Cisco SD-WAN vEdge Routers Data Sheet

<https://www.cisco.com/c/en/us/solutions/collateral/enterprise-networks/sd-wan/nb-07-vedge-routers-data-sheet-cte-en.html>



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With
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Eric Nelson
Technical
Marketing Engineer



Meena Shar
Product Technical
Marketing Engineer



Shameel Ummer
Product Technical
Marketing Engineer
CCIE #35351

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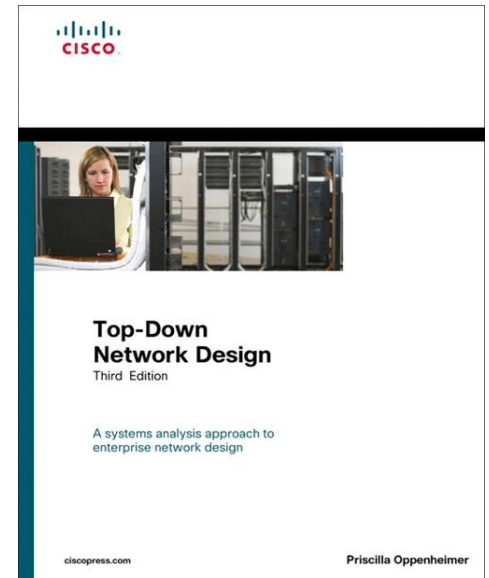
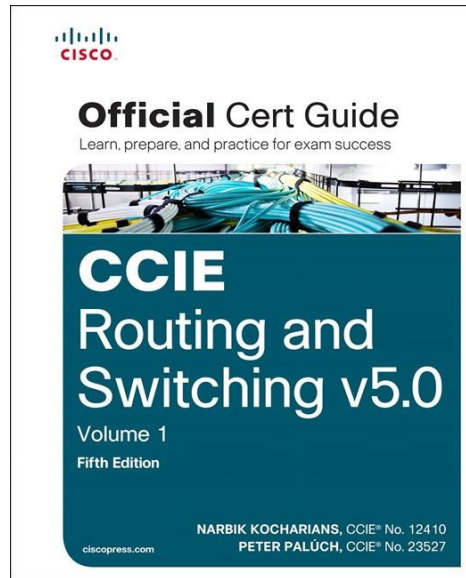
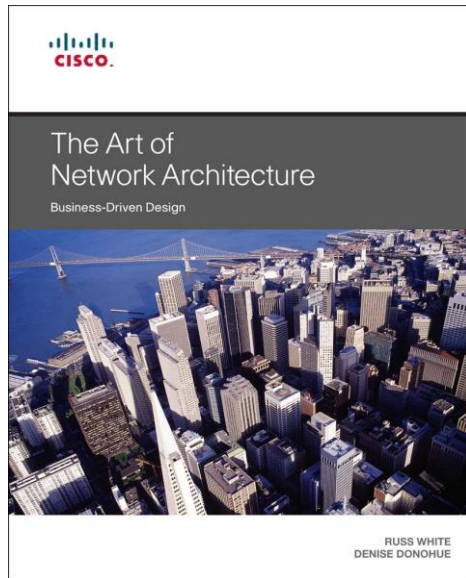
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