



The bridge to possible

Fixed Platform ISR1000 and ISR1100 Series Deep Dive

Kureli Sankar, Leader – Technical Marketing

About Me

BS in Electrical and Electronics Engineering

TAC Engineer - 2006 - 2013

CCIE Security #35505

Technical Marketing Engineer - 2013 - 2018

Leader, Technical Marketing - 2019 - Present

Areas of expertise

IOS and IOS-XE security features

SD-WAN Security solutions



Kureli Sankar



35505

Agenda

- ISR 1000 and 1100 Hardware Overview
- Features, Technologies & Use Cases
- Demo
- References
 - Performance & Scale
 - FAQs
 - Resources
- Our New Hardware at World of Solution

Cisco Webex App

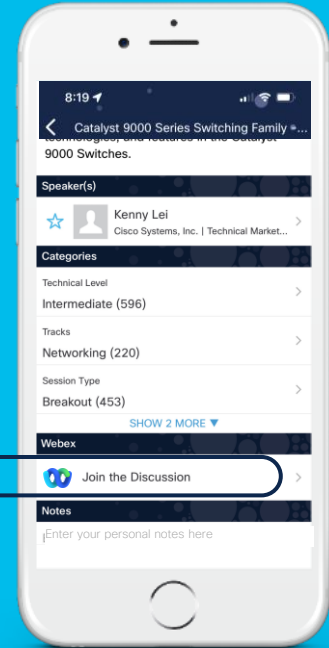
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated until February 24, 2023.



ISR 1000 Hardware Overview

What makes up a great branch router?



Cisco 1000 Series Integrated Services Routers

Foundation for a cloud first branch

Routing	Yes
SD-WAN	Yes

WAN and Application Assurance

Cisco SD-WAN
Application visibility and link optimization
Analytics and assurance

Advanced Mobility

LTE Advanced Pro
5G Sub6 PIM
Mobility Express



High Performance

WAN-WAN and LAN-WAN
VPN and security

Comprehensive Security

Branch threat defense
Trustworthy Solutions

Platform

Cisco 1000
Integrated
Services Router



Connectivity

Ethernet

xDSL

LTE
Advanced
Pro, 5G
Sub6



BRKARC-2881

Manageability

vManage

DNA Center

WebUI

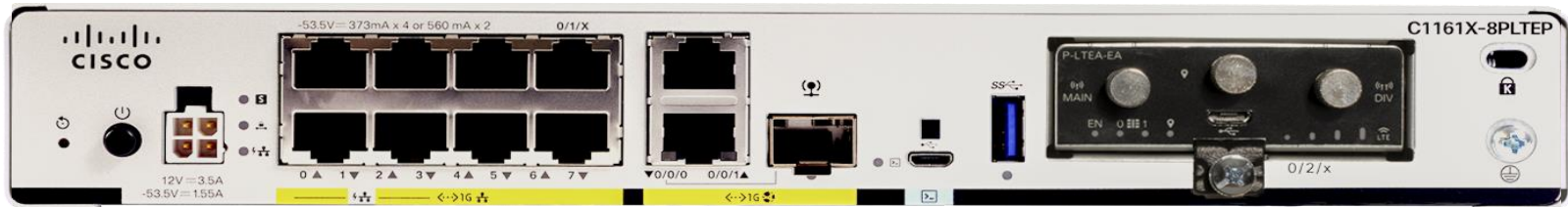
All the ISR 1000s!

DRAM/Flash Storage

Embedded Access Points

Cellular Connectivity

DSL/ADSL/VDSL/G.SHDSL



All the ISR 1000s!

DRAM/Flash
Storage

Embedded
Access Points

Cellular
Connectivity

DSL/ADSL/
VDSL/G.SHDSL



C1161X-8PLTEP



C1131X-8PLTEPW



C1121X-8PLTEPW



C1127X-8PLTEP



C1111-8PLTE



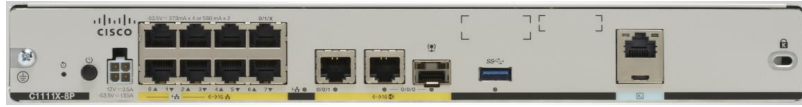
C1109-4PLTE2P



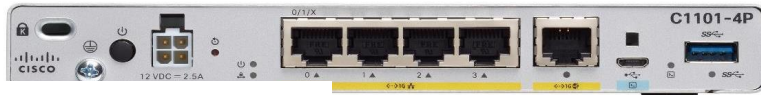
C1101-4PLTEP

CISCO *Live!*

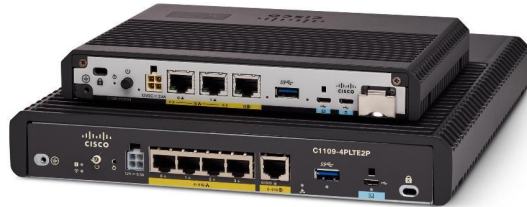
... almost all 😊



C1111X-8P



C1101-4P



C1109-2PLTE

C1109-4PLTEP2P

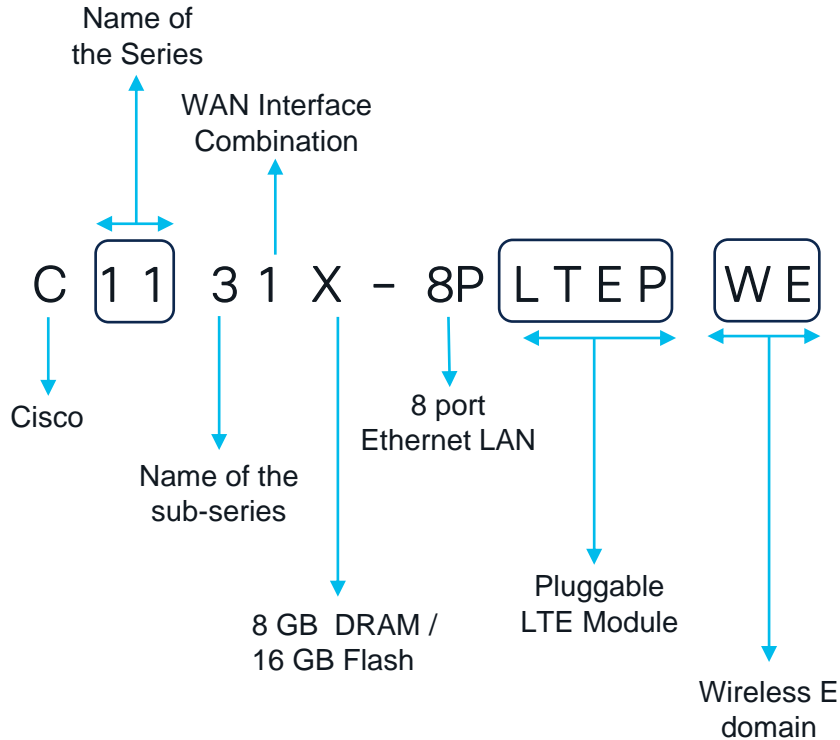


C1117-4PLTE



C1128-8PLTEP

Router PID Breakdown - <http://cs.co/isr1k-ds>



Feature	Description
Power over Ethernet (PoE/PoE+)	4PoE/2PoE+
WAN Interface Combination	2xRJ45/SFP Combo
LTE Technologies	5G PIM CAT 4 6 18 PIM CAT 4 LTE Dongle CG418, CG522
Wi-Fi Domains	A, B, E, Q, Z

What is your requirement?



Feature	ISR 116x	ISR 113x	ISR 112x	ISR 111x	ISR 110x
IPsec	820 Mbps		650 Mbps		1101 - 470 Mbps 1109 – 350 Mbps
Cisco SD-WAN			Yes		
SD-WAN Security		Yes – Additional Storage Required			No
LTE / 5G		5G Sub6 / CAT18 / CAT6 / CAT4		Integrated CAT6	CAT6 / CAT4 1109-2P – CAT4
Wi-Fi	No	Yes – Wi-Fi6	Yes*		1101-4P – Yes* 1109-2P – Yes* 1109-4P – No
DSL		No	Yes		No
PoE / PoE+		Yes			No

Hardware Features



Feature	ISR 116x	ISR 113x	ISR 112x	ISR 111x	ISR 110x
CPU			4 cores		
DRAM (Fixed)*			4GB / 8GB		4GB
Flash (Fixed)*	4GB / 8GB	8GB / 16GB		4GB / 8GB	4GB
USB Ports (USB 3.0)			Yes		
Console	Micro-USB	RJ45	Micro-USB	RJ45 + Micro-USB	Micro-USB
Operating Temperature		0 to 40°C		0 to 40°C	1101-4P 0 to 45°C 1109-2P 0 to 50°C 1109-4P -20 to 55°C
Rack/Wall Mounting		ACS-1100-RM2-19		ACS-1100-RM-19	NA

Interface Combinations

All Wi-Fi 5 based SKUs are announced End of Sale



Feature	ISR 116x	ISR 113x	ISR 112x	ISR 111x	ISR 110x
2 LAN Ports	-	-	-	-	✓
4 LAN Ports	-	-	✓	✓	✓
8 LAN Ports	✓	✓	✓	✓	-
Wi-Fi only	-	✓	-	✓	-
DSL only	-	-	✓	✓	-
LTE only	✓	-	✓	✓	-
Wi-Fi + DSL	-	-	EoS	✓	-
Wi-Fi + LTE	-	✓	✓	✓	✓
DSL + LTE	-	-	✓	✓	-
Wi-Fi + DSL + LTE	-	-	-	✓	-

Interface Combinations (contd.)

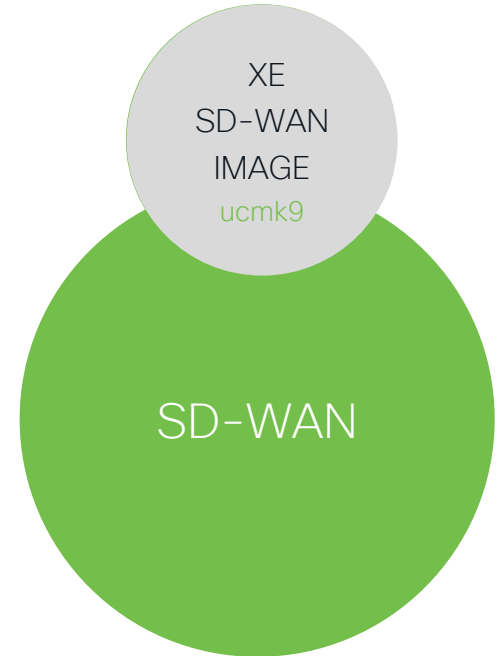
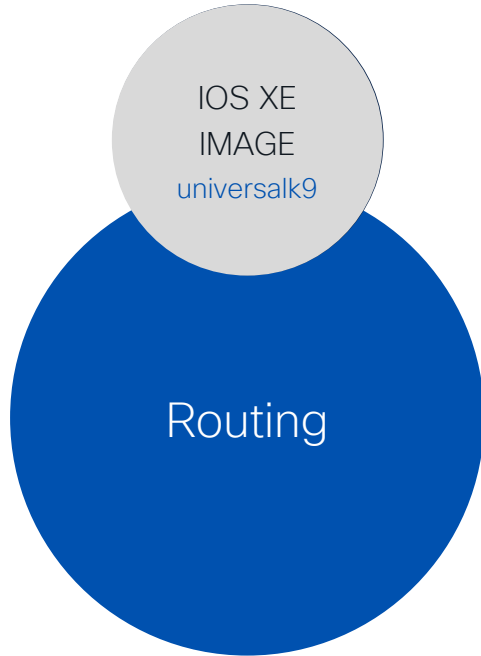
All Wi-Fi 5 based SKUs are announced End of Sale



Feature	ISR 116x	ISR 113x	ISR 112x	ISR 111x	ISR 110x
8GB DRAM ("X" PID) only	✓	-	✓	✓	-
"X" + Wi-Fi	-	✓	-	-	-
"X" + LTE	✓	-	✓	-	-
"X" + DSL	-	-	✓ EoS	-	-
"X" + Wi-Fi + LTE	-	✓	✓	-	-
"X" + Wi-Fi + DSL	-	-	-	-	-
"X" + LTE + DSL	-	-	✓	-	-
"X" + Wi-Fi + LTE + DSL	-	-	-	-	-
Voice	✓	✓	✓	✓	✓
CAT 4 LTE USB Dongle	✓	✓	✓	-	✓
CG418-E / CG 522-E	✓	✓	✓	✓	✓

Easy Operations with Single Image

```
Router# controller-mode ?  
  disable  controller-mode disable  
  enable   controller-mode enable  
  reset    controller-mode reset
```

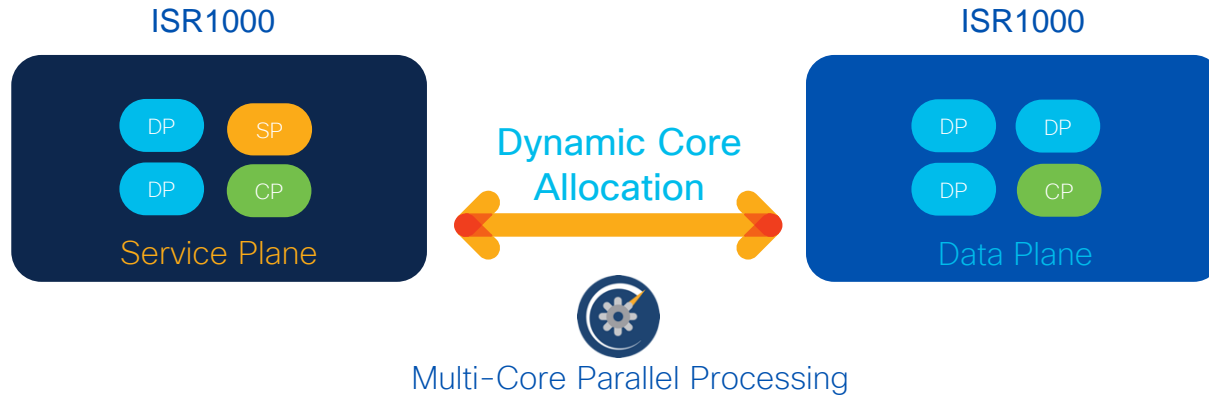


Simplify Deployments

Cloud-scale Applications

“DP Heavy” SoC Architecture

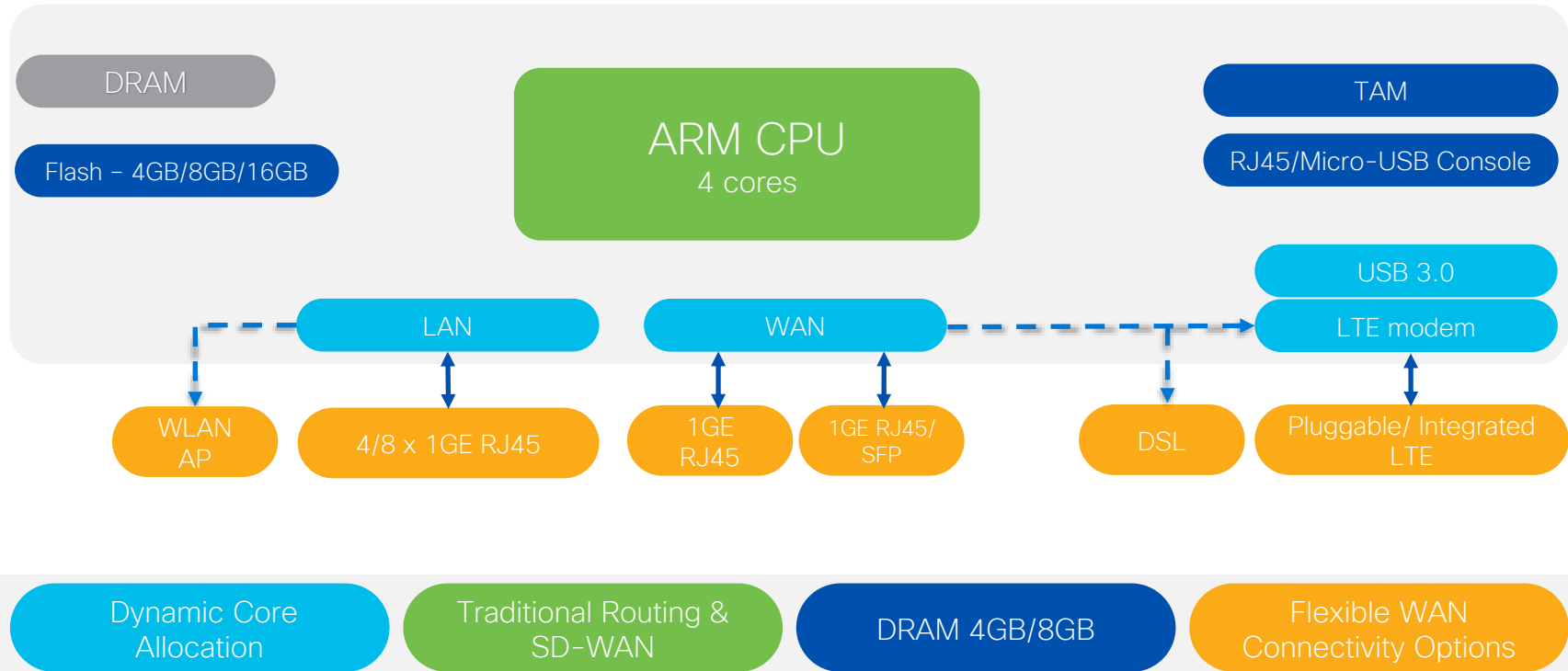
Key Datapath Innovations



```
(config)#platform resource ?  
data-plane-heavy Use Data Plane Heavy template  
service-plane-heavy Use Service Plane Heavy template
```



Cisco ISR 1000 Series Routers Block Diagram



C1161X-8PLTEP

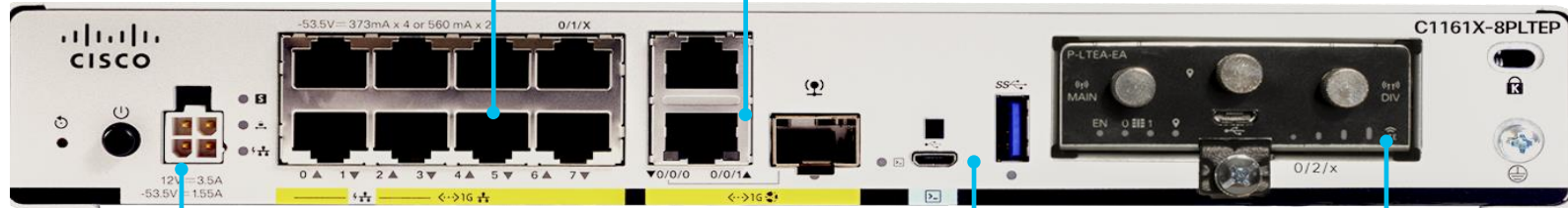
DRAM/FLASH*
8GB/8GB

SD-WAN Ready

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 1 x GE WAN + 1 x RJ45/SFP GE WAN Combination



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- Micro USB Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

* 4GB versions available in C1161 models

C1131X-8PLTEPWx

DRAM/FLASH
8GB/16GB

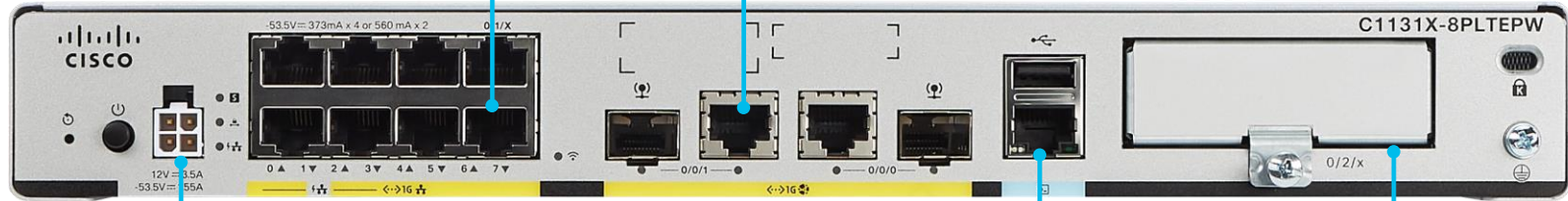
SD-WAN Ready

802.11ax
Wi-Fi6

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 2x RJ45/SFP GE WAN Combination



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

C1121X-8PLTEPWx

DRAM/FLASH*
8GB/8GB

SD-WAN Ready

802.11ac
Wave 2

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 1 x GE WAN + 1 x RJ45/SFP GE WAN Combination



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- Micro USB Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

* 4 Port (2 PoE or 1 PoE+) variants available

** 4GB versions available in C1121 models

C1127X-8PLTEP

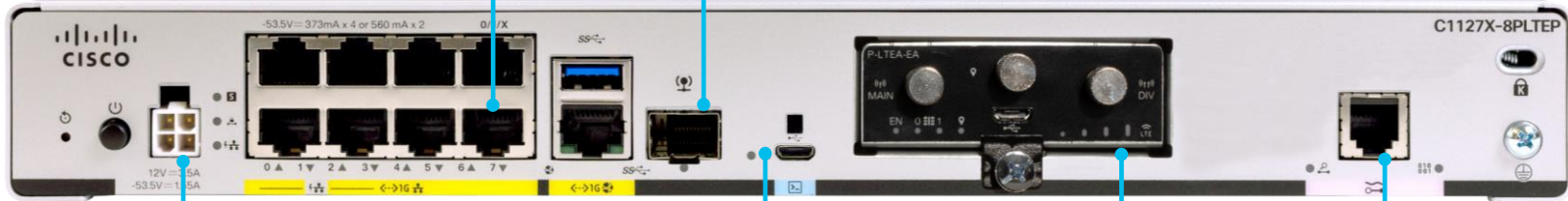
DRAM/FLASH*
8GB/8GB

SD-WAN Ready

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 1 x RJ45/SFP GE WAN Combination



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- Micro USB Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

DSL Annex A**

* 4GB versions available in C1127 models

** DSL Annex M support available in C1127X-8PMLTEP

** DSL Annex B/J Support available in C1126 model

C1127X-8PLTEP

- VDSL 2 Profiles 8a, 8b, 8c, 8d, 12a, 12b, 17a
- Theoretical speeds: 22Mbps – 150 Mbps*
- Supported Platforms
 - C1126-8PLTEP / C1126X-8PLTEP
 - C1127-8PLTEP / C1127X-8PLTEP
 - C1127-8PMLTEP / C1127X-8PMLTEP
 - C1116-4P / C1117-4P / C1117-4PM



ADSL/VDSL2
Interface

DSL Technology	C1127-8P	C1127-8PM	C1126-8P	C1117-4P	C1117-4PM	C1116-4P
Multi-mode over POTS, Annex A	Yes	-	-	Yes	-	-
Multi-mode over POTS, Annex M	-	Yes	-	-	Yes	-
Multi-mode over ISDN, Annex B/J	-	-	Yes	-	-	Yes

C1128-8PLTEP

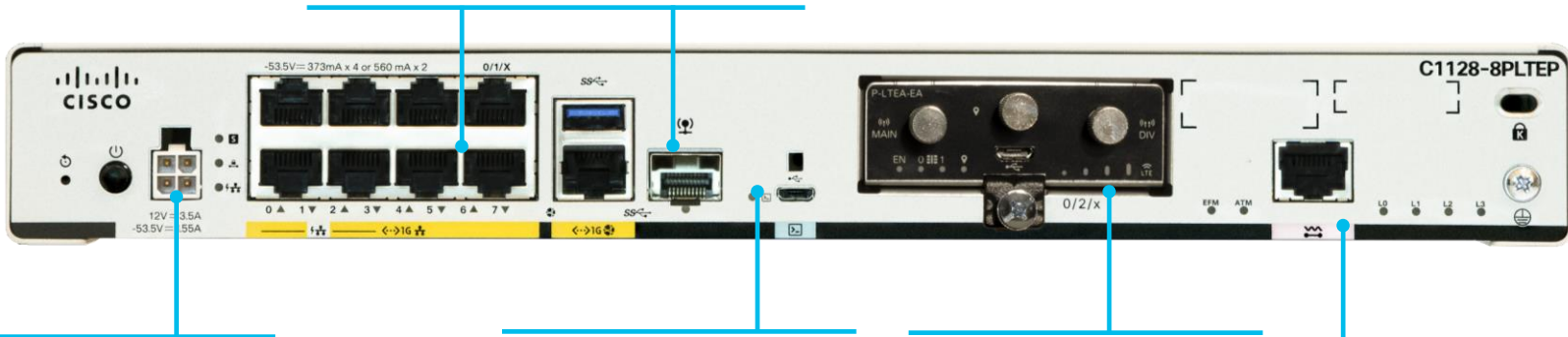
DRAM/FLASH*
4GB/4GB

SD-WAN Ready

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 1 x RJ45/SFP GE WAN Combination



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- Micro USB Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

G.SHDSL

* No 8GB version available for C1128

C1111X-8P

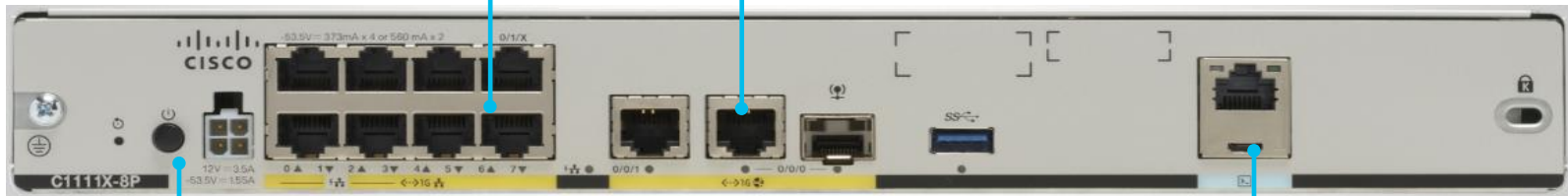
DRAM/FLASH*
8GB/8GB

SD-WAN Ready

External PSU

Data Interfaces

- 8 x GE LAN
- 4 PoE or 2 PoE+ Capable
- 1 x GE WAN + 1 x RJ45/SFP GE WAN Combination



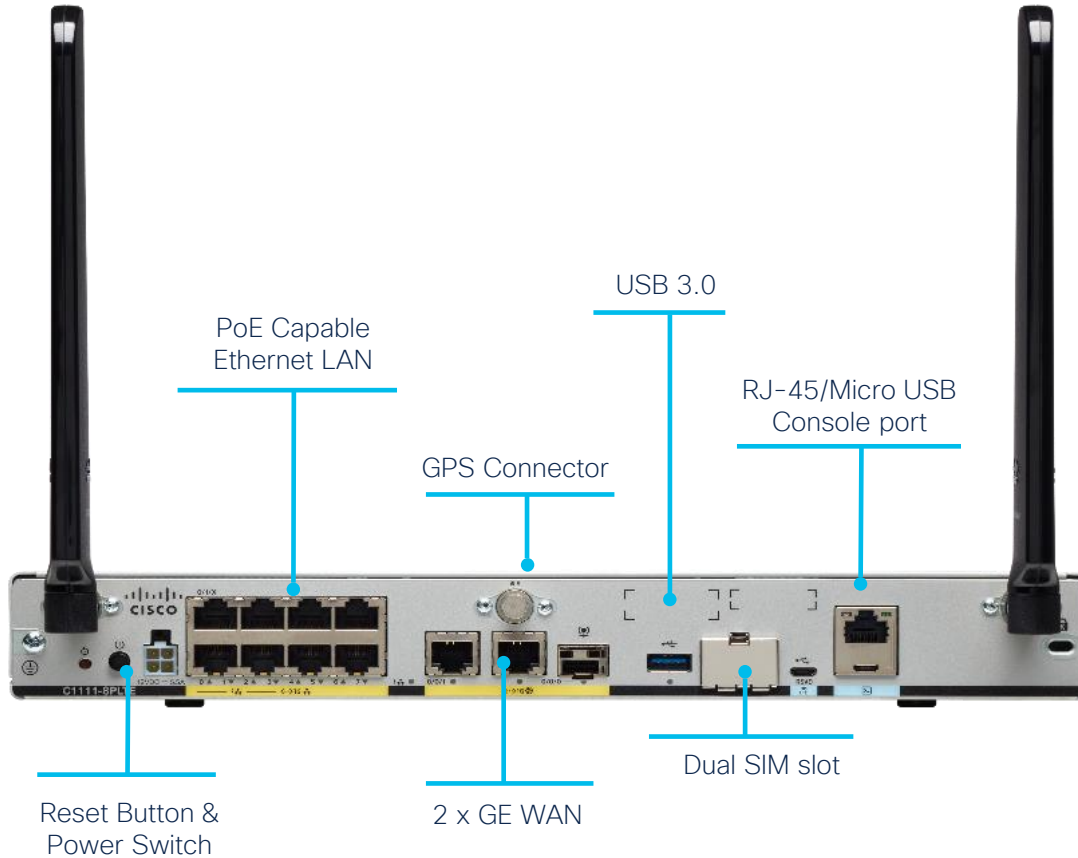
Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

C1111-8PLTEW



SD-WAN Ready

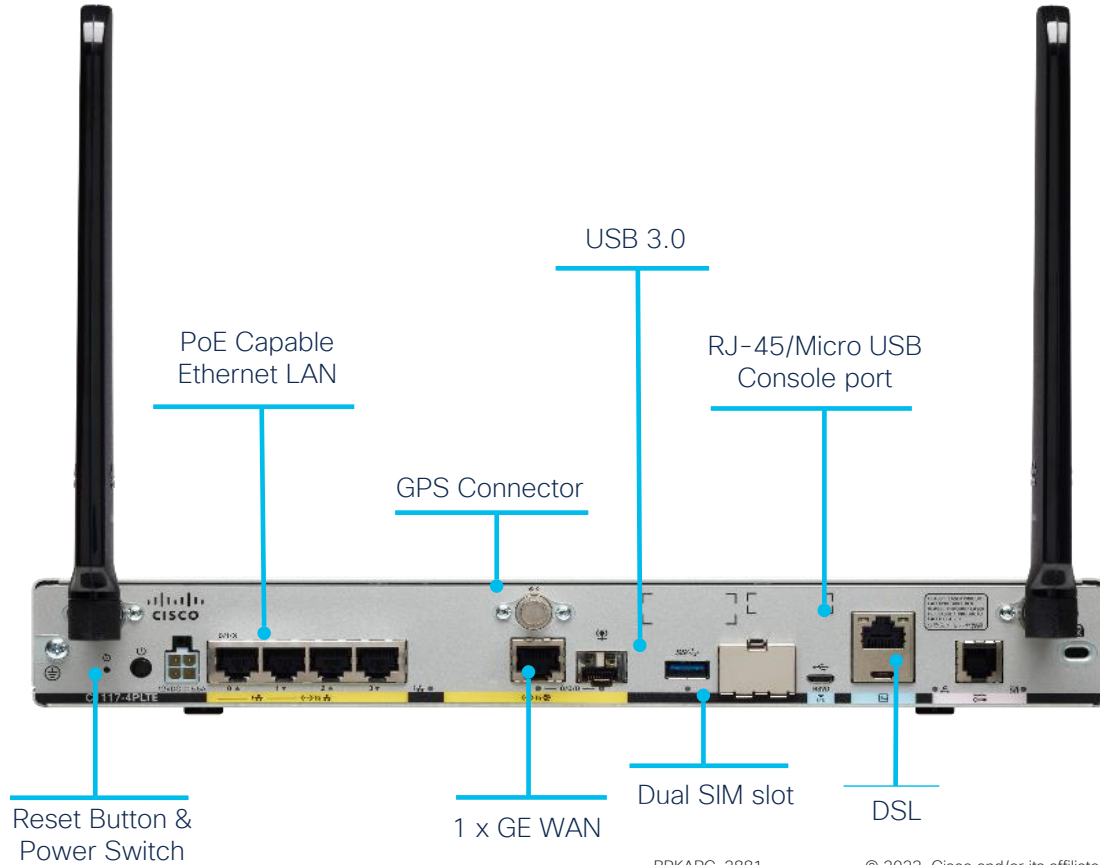
External PSU

DRAM/FLASH*
8GB/8GB

802.11ac
Wave 2

Integrated
CAT6 Modem

C111x-4PLTE



SD-WAN Ready

External PSU

DRAM/FLASH*
8GB/8GB

DSL

Integrated
CAT6 Modem

G.FAST/VDSL2

- Supports G.FAST and VDSL2
- Profile 35b, 106a, 106b
- Theoretical speeds: 150Mbps – 1Gbps*
- Supported Platforms
 - C1113-8P / C1113-8PM
 - C1112-8P



DSL Technology	C1113-8P	C1113-8PM	C1112-8P
Multi-mode over POTS, Annex A	Yes	-	-
Multi-mode over POTS, Annex M	-	Yes	-
Multi-mode over ISDN, Annex B/J	-	-	Yes

C1101-4P

DRAM/FLASH
4GB/4GB

SD-WAN Ready

External PSU

Data Interfaces

- 4 x GE LAN
- 2 PoE or 1 PoE+ Capable
- 1 x GE WAN



Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

C1101-4PLTEP

Status and physical security

- Status LED
- Power button
- Reset button
- Power connector

Data Interfaces

- 4 x GE LAN
- 2 PoE or 1 PoE+ Capable
- 1 x GE WAN

SD-WAN Ready

External PSU

DRAM/FLASH
4GB/4GB



Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6

C1109-4PLTE2PWx

SD-WAN Ready

External PSU

DRAM/FLASH
4GB/4GB



Dual Pluggable LTE Technology

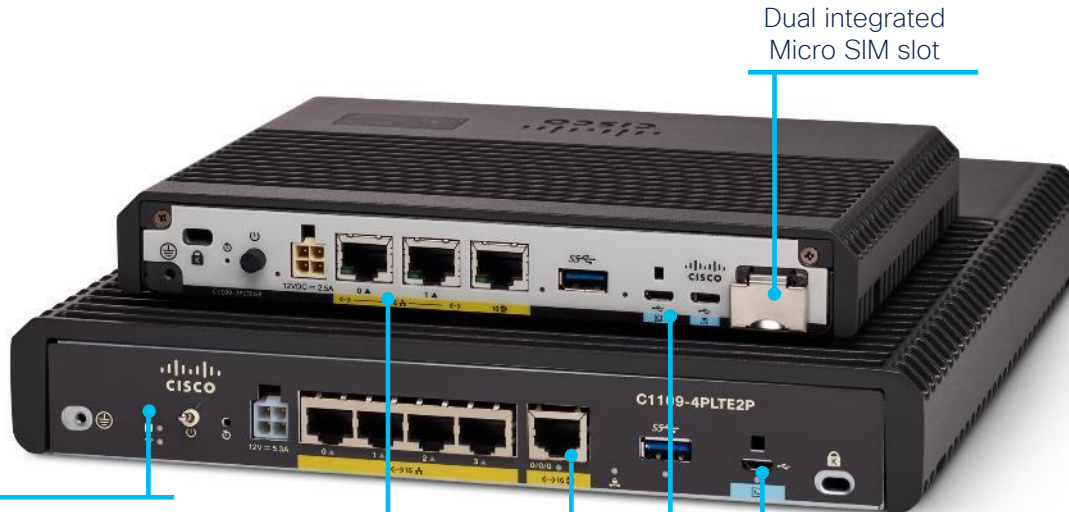
- CAT 4
- CAT 6

C1109-2PLTE / C1109-4PLTE2P

SD-WAN Ready

External PSU

DRAM/FLASH
4GB/4GB



Status and physical security

- Status LED
- Power button/switch
- Reset button
- Power connector

Data Interfaces

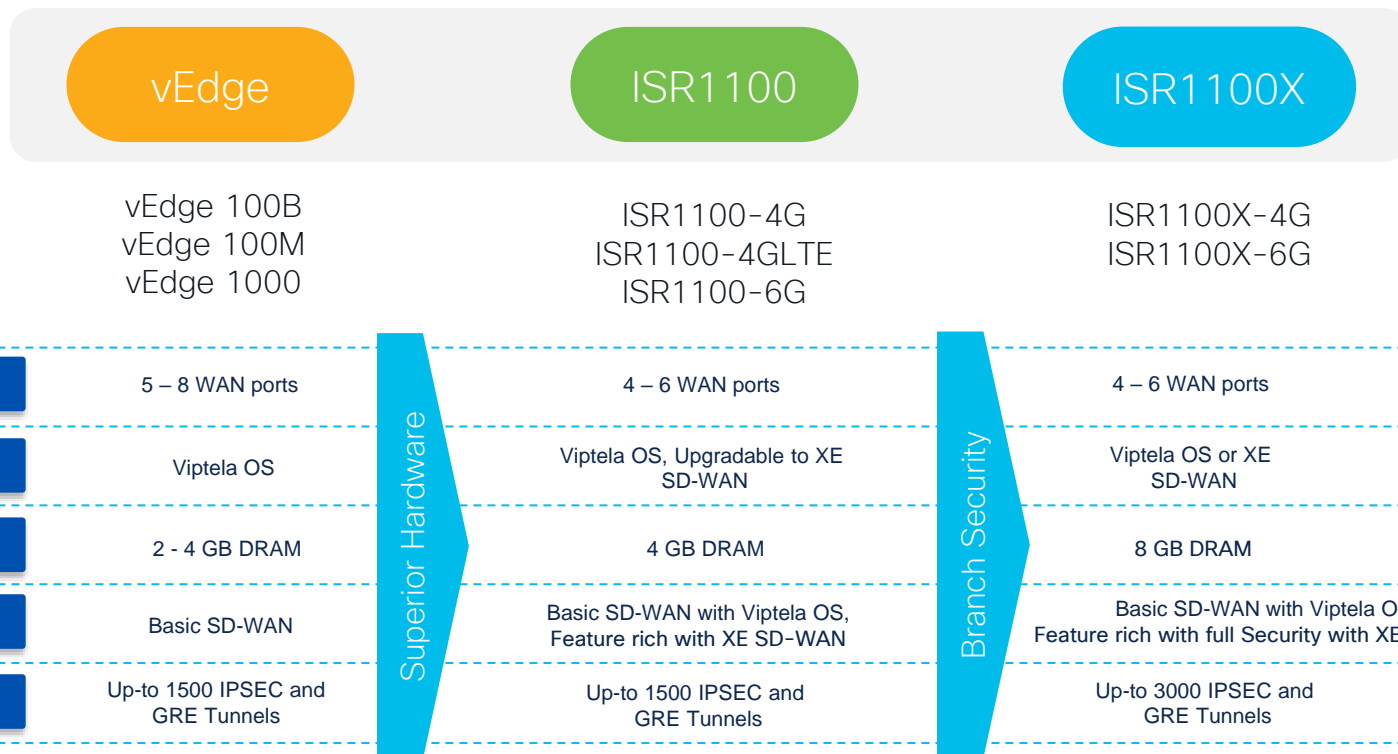
- GE LAN (2, 4)
- 1 X GE WAN

Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

ISR 1100 Hardware Overview

ISR1100 and ISR1100X Series Platform Evolution



Cisco ISR1100 and ISR1100X Series Routers for SD-WAN Branch

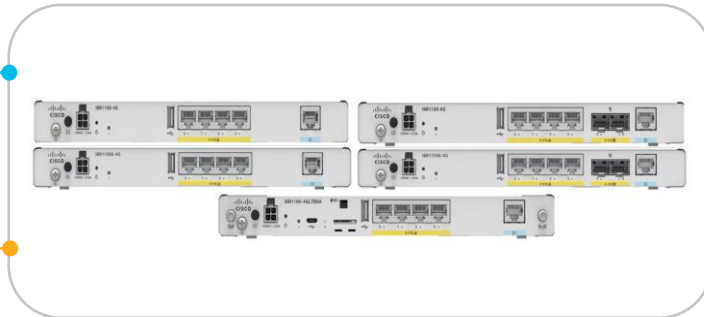
Routing	No
SD-WAN	Yes

Integrated Rich Services

Forward Error Correction & Packet Duplication, TCP Optimization
SGT Propagation*, SD-AVC*, Custom Applications*

Advanced Mobility

Integrated LTE (Cat 4)



High Performance

Up to 500Mbps of IPSEC IMIX throughput
Dynamic Core Allocation*



Comprehensive Security

IPS*
URL Filtering*
Advanced Malware Protection*
Enterprise FW*
Umbrella Integration*

* IOS-XE SD-WAN

Full Featured SD-WAN



Rich Services with Enhanced Performance

Ethernet/LTE

8GB DDR4
(ISR1100X
Series)

XE SD-WAN/
Viptela OS

Manageability

vManage

Open APIs

Analytics

Cisco ISR1100 Series Routers

Bridge to Feature Rich SD-WAN from Viptela OS

4GB DRAM

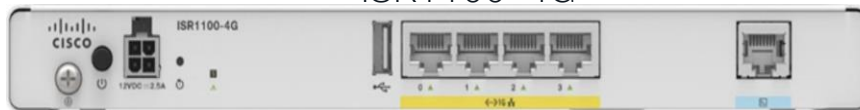
8GB Flash

4x1GE Ethernet

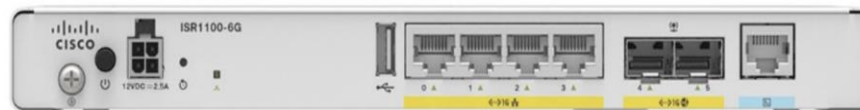
2x1GE SFP
(ISR1100-6G)

Integrated LTE
(ISR1100-4GLTE)

ISR1100-4G



ISR1100-6G



ISR1100-4GLTE



SD-WAN to the Branch

Cisco ISR1100X Series Routers

Bridge to Feature Rich SD-WAN from Viptela OS

ISR1100X-4G



8GB DRAM

8GB Flash

4x1GE Ethernet

ISR1100X-6G



8GB DRAM

16GB Flash

4x1GE Ethernet
2x1GE SFP

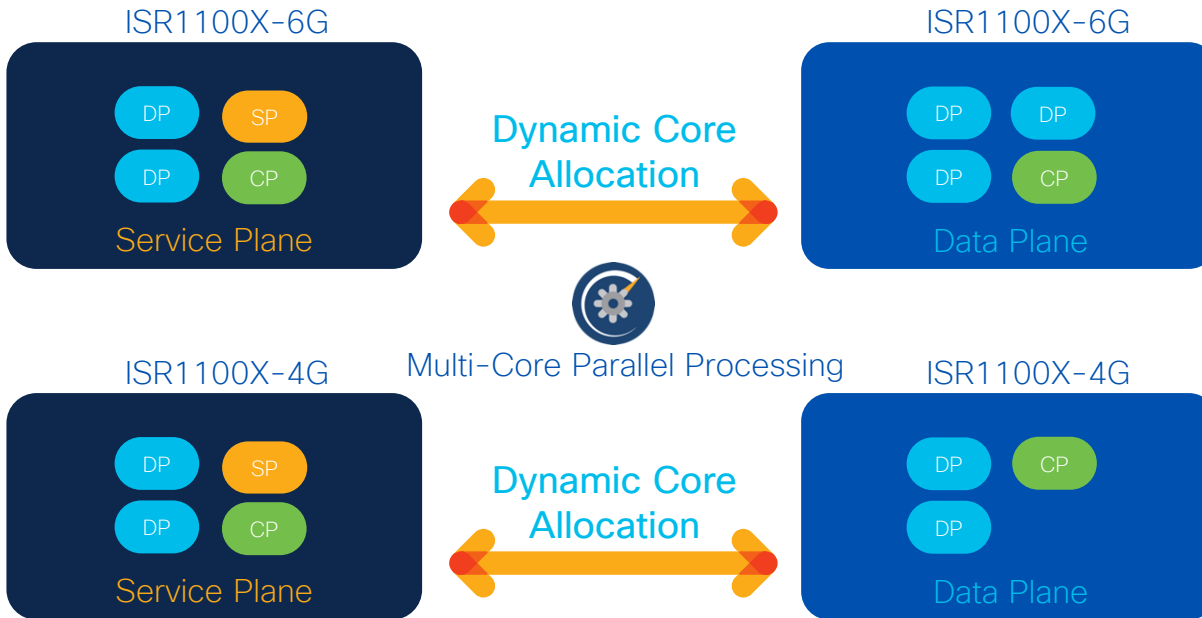
XE SD-WAN 17.4.1a or Viptela OS 20.4.1 onwards

x86 Multi-core SoC Architecture

Key Datapath Innovations



X86 Multi-core CPU



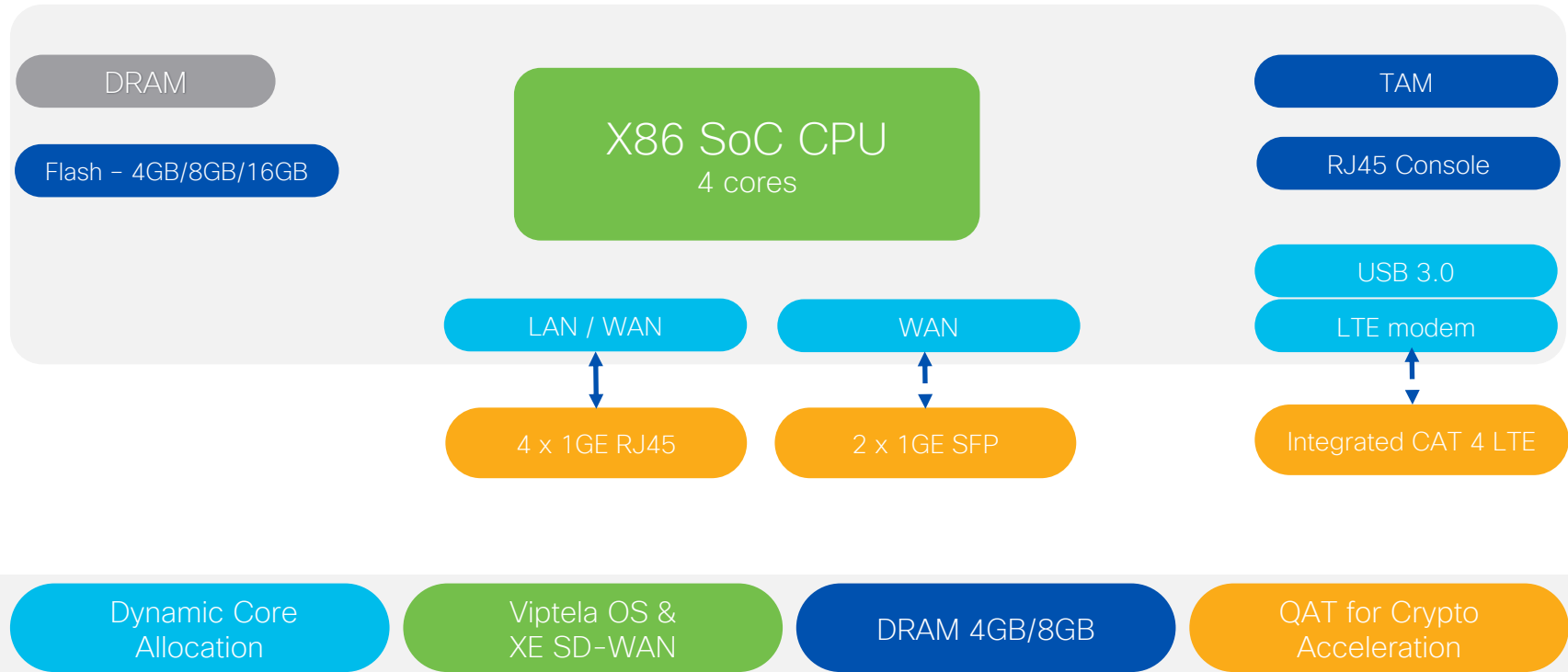
```
(config)#platform resource ?
data-plane-heavy Use Data Plane Heavy template
service-plane-heavy Use Service Plane Heavy template
```

- Data Plane Core
- Control Plane Core
- Service Plane Core

* Available in XE 17.5 release w/o reload

Cisco ISR1100 Series Routers Block Diagram

ISR1100(X)-4G/4GLTE/6G



vEdge EoS/EoL and Migration Details

vEdge Cloud EoS/EoL: <https://www.cisco.com/c/en/us/products/collateral/routers/vedge-router/vedge-cloud-eol.html>

vEdge 100 and 1000 EoS/EoL: <https://www.cisco.com/c/en/us/products/collateral/routers/vedge-router/eos-eol-notice-c51-744078.html#:~:text=Table%20of%20Contents%20%20%20End-of-Sale%20Product%20Part,1%20L%20...%20%2011%20more%20rows%20>

vEdge 2000 and 5000 EoS/EoL

<https://www.cisco.com/c/en/us/products/collateral/routers/vedge-router/vedge-2000-5000-routers-modules-accessories-eol.html>

Viptela OS EoS/EoL (18.3 and older): <https://www.cisco.com/c/en/us/products/collateral/routers/sd-wan/eos-eol-notice-c51-743306.html>

Viptela OS to XE SD-WAN Migration White Paper:

<https://www.cisco.com/c/en/us/products/collateral/networking/sdwan-routers/transform-sd-wan-ios-xe-wp.pdf>

XE SD-WAN vs Viptela OS Comparison

ISR1100X - Bridge to Feature Rich SD-WAN from Viptela OS

XE SD-WAN Benefits



Comprehensive Security now available on ISR1100X Series Routers with XE SD-WAN

		Viptela OS				IOS-XE SD-WAN			
Features		1100-4G	1100X-4G	1100-6G	1100X-6G	1100-4G	1100X-4G	1100-6G	1100X-6G
SD-WAN Security	IPS	●	●	●	●	●	●	●	●
	URL Filtering	●	●	●	●	●	●	●	●
	AMP	●	●	●	●	●	●	●	●
	ENT FW	●	●	●	●	●	●	●	●
	DNS Web Layer Security (Umbrella)	●	●	●	●	●	●	●	●
	TCP Optimization	●(BBR1)	●(BBR1)	●(BBR1)	●(BBR1)	●	●(BBR2)	●	●(BBR2)
	IPv6	●**	●**	●**	●**	●	●	●	●
	SGT Propagation	●	●	●	●	●	●	●	●
	SD-AVC	●	●	●	●	●	●	●	●
	Custom App	●	●	●	●	●	●	●	●
	Service side NAT	●	●	●	●	●	●	●	●
	Route Leaking	●	●	●	●	●	●	●	●

*Viptela OS supports only Prefix, Protocol, Port based matches conditions, however IOS-XE SD-WAN supports App based match along with 5-tuple match

**Viptela OS supports Static IPv6 addressing on Transport side

Please check Cisco documentation on exact details around feature support

BBR- Bottleneck Bandwidth & Round trip propagation time

ISR1100-4G vs ISR1100X-4G

Product Comparison

ISR1100-4G
CPU: Intel 2.2GHz 4-core
Memory: 4GB DDR4, ECC
Bulk Flash: 8GB eMMC pSLC
Routed Ports (WAN/LAN): 4x GE
Integrated LTE US and Global): No USB Dongle support (Viptela OS only)
Console: 1x RJ45
USB Type A: USB3.0, 4.5W
Power supply: External Adapter, 30W
Form Factor: 10.2" x 7" x 1.1"

ISR1100X-4G
CPU: Intel 2.2GHz 4-core
Memory: 8GB DDR4, ECC
Bulk Flash: 8GB eMMC pSLC
Routed Ports (WAN/LAN): 4x GE
Integrated LTE (US and Global): No USB Dongle support (Viptela OS only)
Console: 1x RJ45
USB Type A: USB3.0, 4.5W
Power supply: External Adapter, 30W
Form Factor: 10.2" x 7" x 1.1"

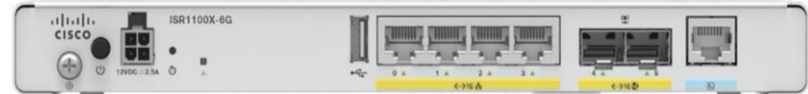


ISR1100-6G vs ISR1100X-6G

Product Comparison

ISR1100-6G
4-core x86 CPU
Memory: 4GB DDR4, ECC
Bulk Flash: 8GB eMMC pSLC
Routed Ports (WAN/LAN): 4x GE + 2x SFP (6 individual ports)
Integrated LTE (US and Global): No USB Dongle support (Viptela OS only)
Console: 1x RJ45
USB Type A: USB3.0, 4.5W
Power supply: External Adapter, 30W
Form Factor: 10.2" x 7" x 1.1"

ISR1100X-6G
4-core x86 CPU
Memory: 8GB DDR4, ECC
Bulk Flash: 16GB eMMC pSLC
Routed Ports (WAN/LAN): 4x GE + 2x SFP (6 individual ports)
Integrated LTE (US and Global): No USB Dongle support (Viptela OS only)
Console: 1x RJ45
USB Type A: USB3.0, 4.5W
Power supply: External Adapter, 30W
Form Factor: 10.2" x 7" x 1.1"



Upgrading ISR1100 and ISR1100X Series Routers

Pre 20.4/17.4

Until 20.4/17.4 release:

- ISR1100-4G, ISR1100-4G-LTE, ISR1100-6G can be deployed with Viptela OS for the pure play SD-WAN use cases
- Minimum software release supported on these platforms is Viptela OS 19.2

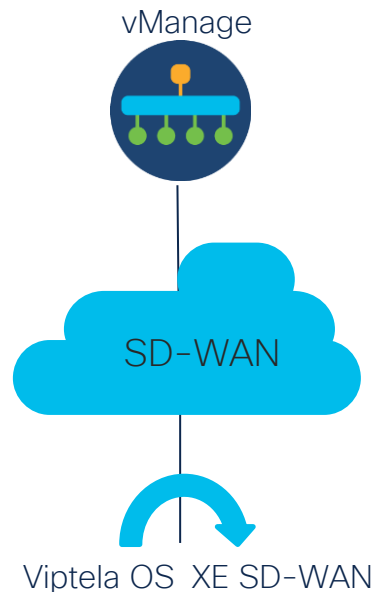
With 20.4/17.4

Starting with 20.4/17.4:

- We have option to run the XE SD-WAN code on ISR1100 and ISR1100X series routers and leverage all services such as Security, AppQoE, SD-AVC which are supported on XE SD-WAN software
- Minimum software release supported on ISR1100X series routers is Viptela OS 20.4 or XE SD-WAN 17.4

Prerequisites

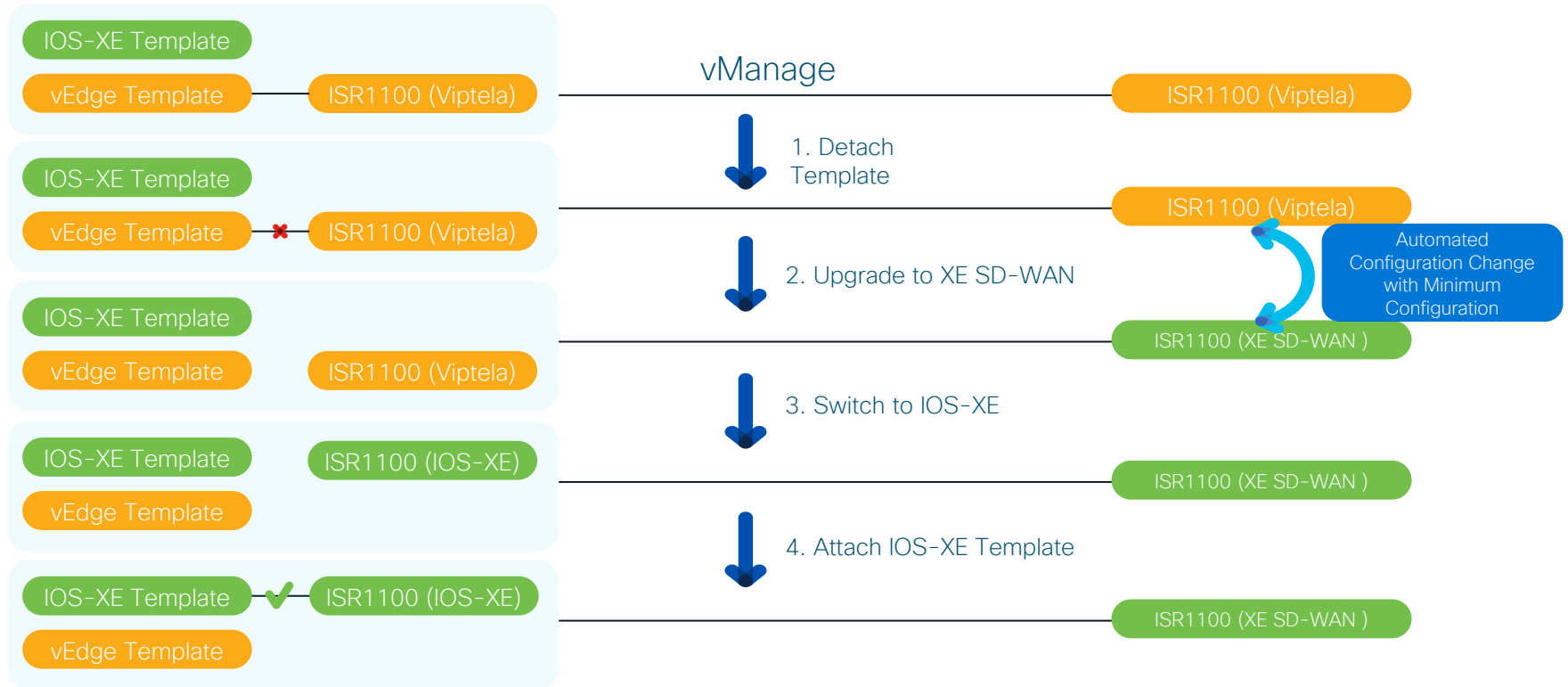
ISR1100 router should be first upgraded to 20.4 Viptela OS code to upgrade the firmware and then we can migrate to XE SD-WAN 17.4 code



Only Controller Mode is supported with support of XE SD-WAN. Autonomous Mode is not supported

Cisco ISR1100 and ISR1100X Series Routers

Migration Workflow



Features, Technologies & Use Cases

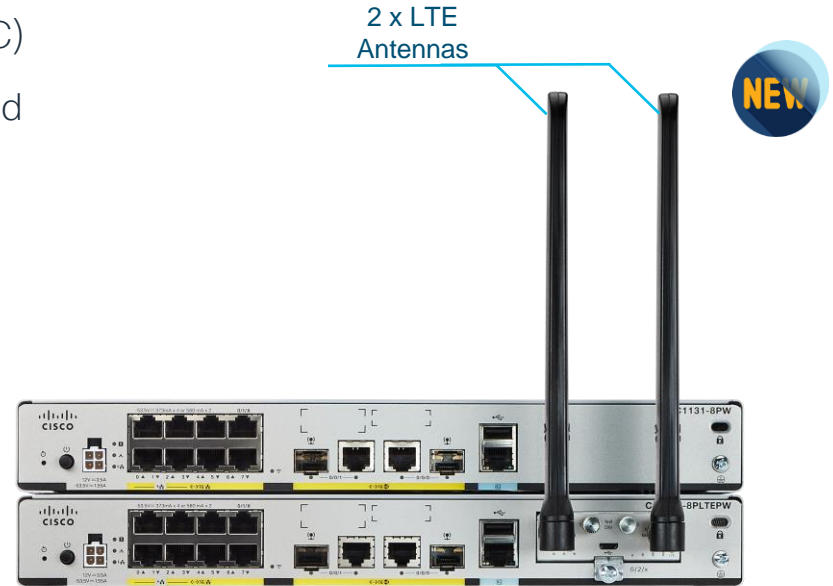
Wi-Fi Technologies



Routing	Yes
SD-WAN	Yes

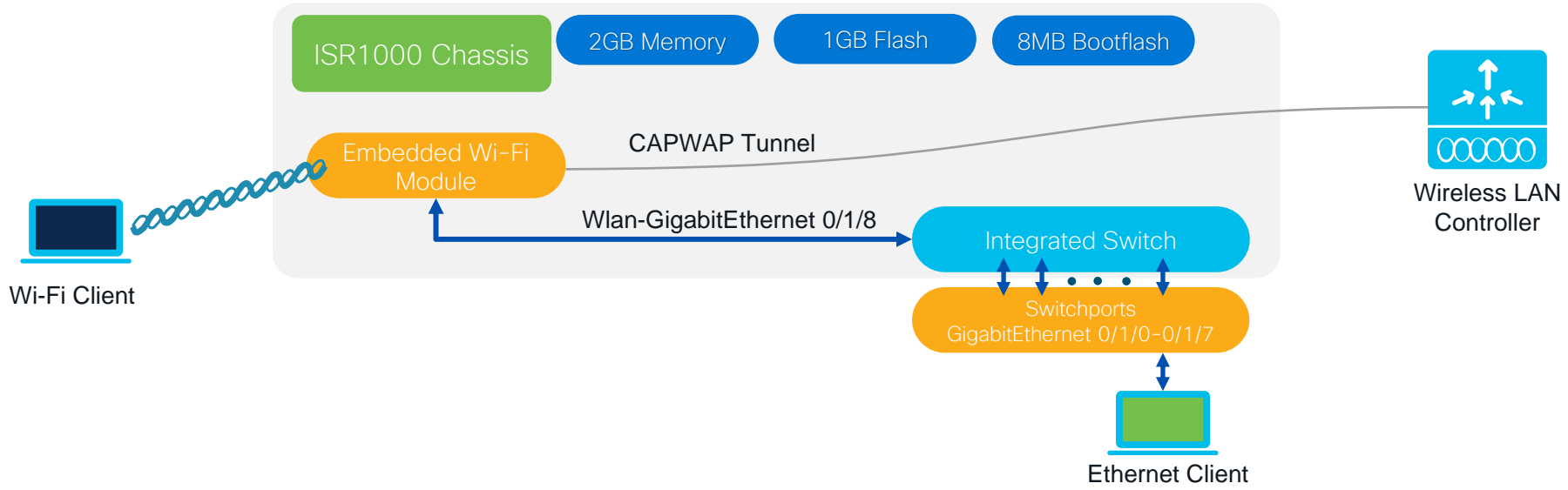
Wireless LAN Overview – ISR1131

- WLAN Module based on the Cisco Catalyst 9105 AXI
- Default image – Embedded Wireless Controller (EWC)
- For CAPWAP mode – Use DHCP option 43 command
- 802.11ax Dual Radio (2.4 GHz & 5 GHz)
- 2x2 MU-MIMO, with 2 Spatial Streams
- 2 internal Wi-Fi antennas, no external Wi-Fi antenna
- Console access via the router console
 - hw-module session 0/2 → For Non-LTE SKUs
 - hw-module session 0/3 → For LTE SKUs
- 1 Gbps uplink to the host CPU



Routing	Yes
SD-WAN	Yes

Wireless LAN Hardware Block Diagram



- Maximal Ratio Combining
- OFDMA
- BSS Coloring
- Target Wake Time

Embedded Wireless Controller Configuration

1

Baseline Configuration

2

Scan QR Code on Router

Over-the-air provisioning
Mobile app

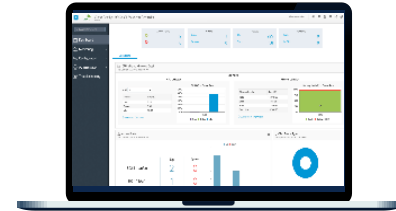


OR

2

Connect to default SSID

Go to mywifi.cisco.com
URL for WebUI



Baseline Configuration

1. Configure DHCP Pool for EWC to receive IP address

```
ip dhcp pool Wireless
 network 10.10.10.0 255.255.255.0
 default-router 10.10.10.1
 dns-server 8.8.8.8
```

2. Configure SVI

```
interface Vlan199
 description Wireless
 ip address 10.10.10.1 255.255.255.0
 ip nat inside
```

3. Configure WAN and LAN interface

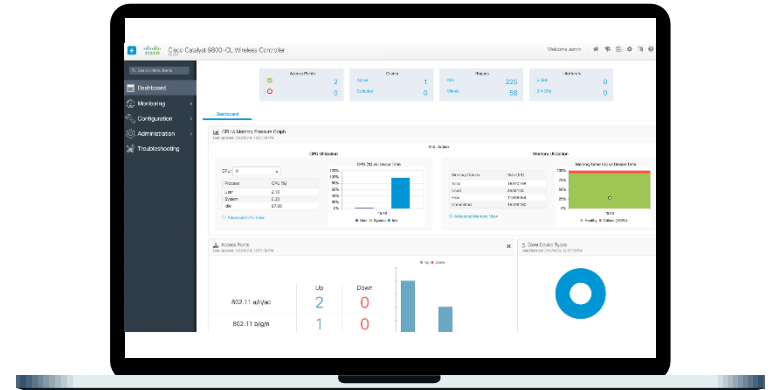
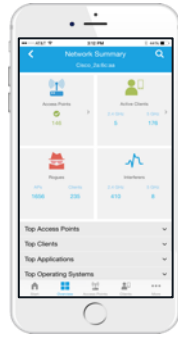
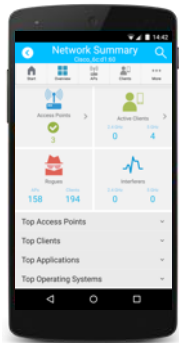
```
interface GigabitEthernet0/0/0
 ip address dhcp
 ip nat outside
 !
interface Wlan-GigabitEthernet0/1/8
 switchport mode access
 switchport access vlan 199
```

4. Configure NAT and ACL

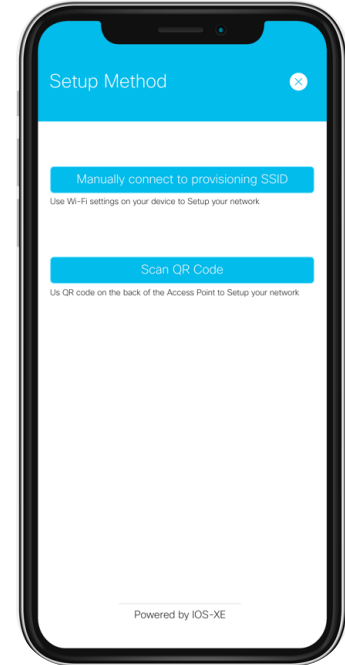
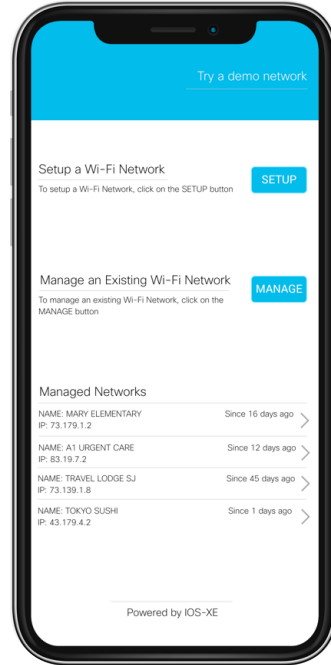
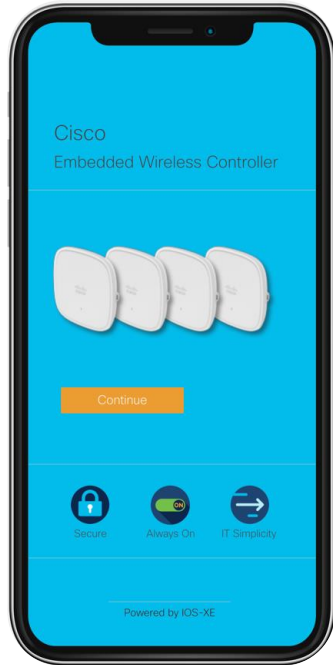
```
ip nat inside source list 10 interface
 GigabitEthernet0/0/0 overload
 !
ip route 0.0.0.0 0.0.0.0 192.168.0.1
 !
ip access-list standard 10
 10 permit 10.10.10.0 0.0.0.255
```

Over-The-Air Provisioning (OTAP)

Get your wireless network up and running in less than 10 minutes



Option: 1 Cisco Catalyst Wireless Mobile App



1

Landing Page

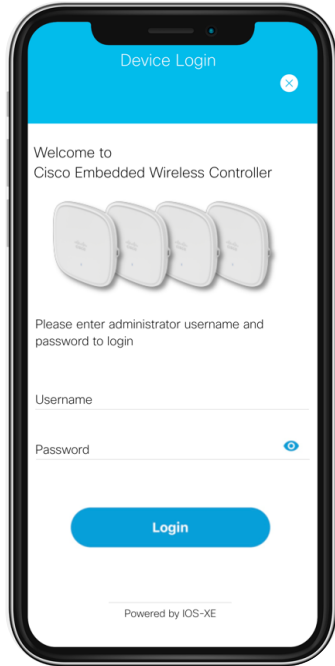
2

Setup Wi-Fi Network

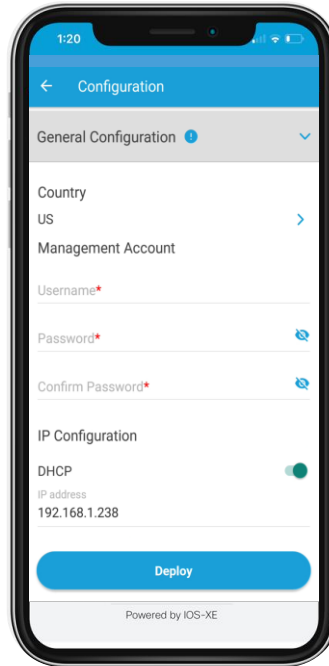
3

Manual or Scan QR Code

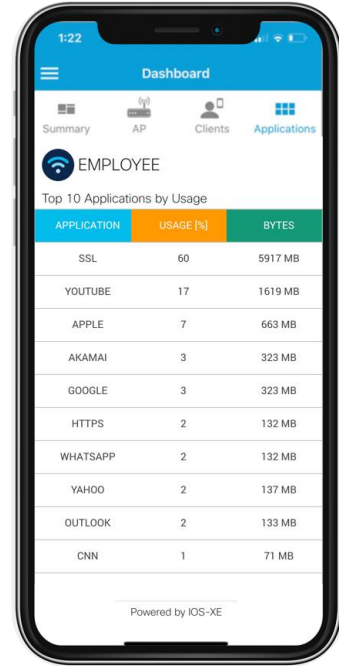
Option: 1 Cisco Catalyst Wireless Mobile App



4 Login Credentials



5 Deploy Day-0 Wizard

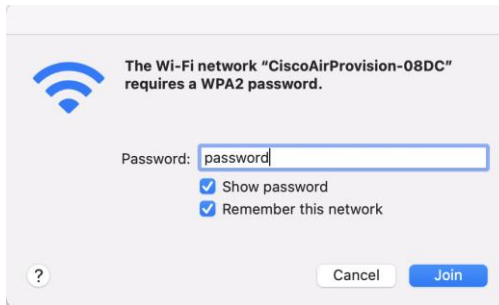
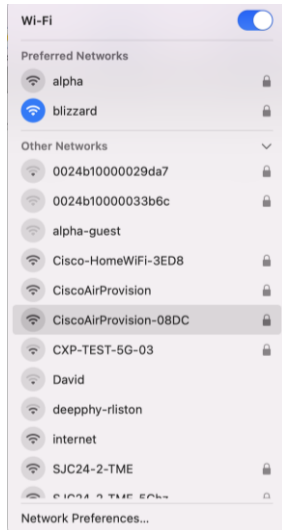


6 Manage your network

Option: 2 Connect to the default SSID

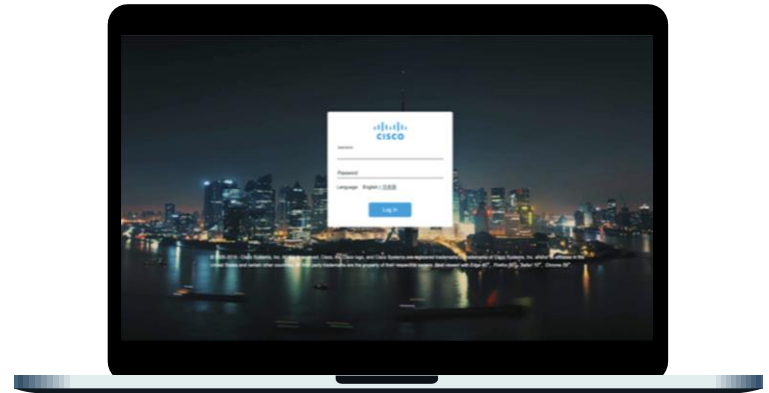
1

CiscoAirProvision-XXXX



2

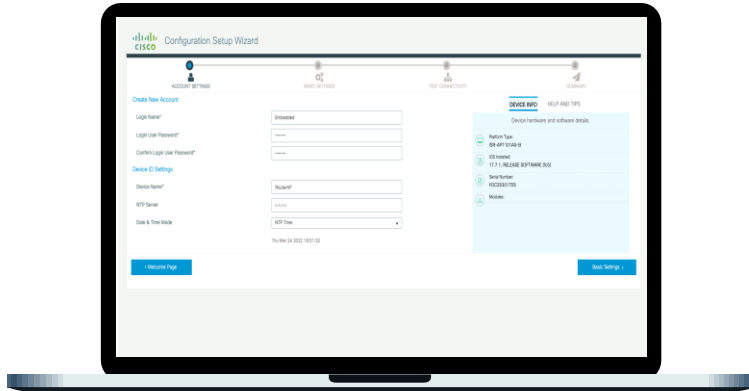
Go to mywifi.cisco.com



Option: 2 Connect to the default SSID

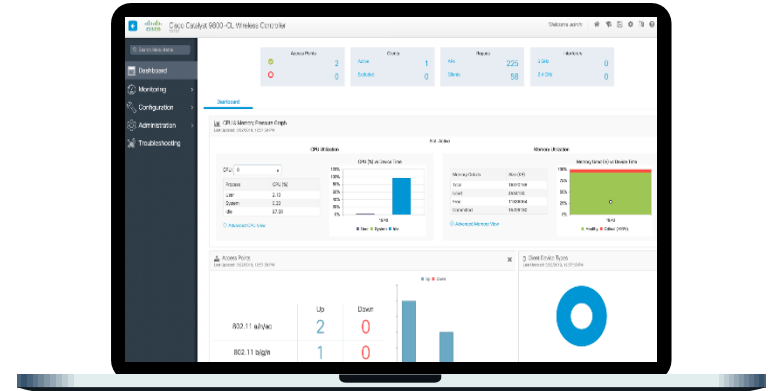
3

Day-0 Config Wizard



4

Manage Your Network



Cellular Technologies



Routing	Yes
SD-WAN	Yes

Cisco Wireless WAN Current Offerings



CAT 4 LTE
USB Dongle

CAT 18 LTE
PIM Module



CAT 4|6 LTE
PIM Module

CG418-E
CG522-E
Cellular
Gateway



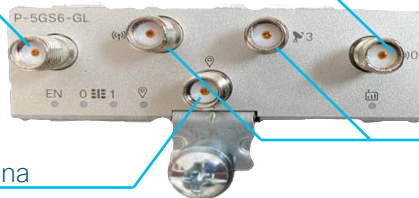
5G PIM Module

Starting from
17.9.2

NEW

5G Sub-6 GHz Module

SMA Antenna
Connector



GPS Antenna

Diversity Antenna
Connector

P-5GS6-GL

- ✓ Telit FN980 modem
- ✓ Dual micro-SIM, single radio
- ✓ 3300 Mbps DL / 400 Mbps UL
- ✓ Traditional Routing & SD-WAN
- ✓ SMA Antenna support
- ✓ Field Replaceable / Hot-Swappable

Supported Bands:

5G Bands: n1, n3, n5, n7, n8, n12, n20 ,
n25, n28, n38, n40, n41, n48,
n66, n71, n77

4G Bands: 1-5, 7,8, 12, 14*, 17, 20, 25, 26,
28 32, 34, 38, 43, 46, 48, 66, 71

All ISR1000 with PIM
Modules

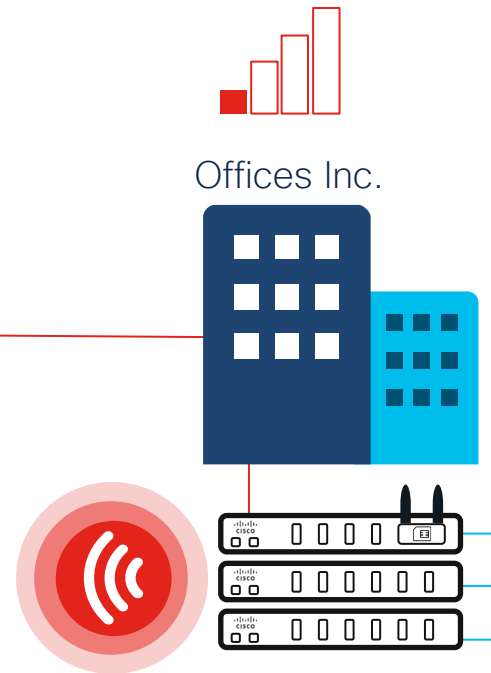
Dual SIM Support

Zero-Touch
Provisioning

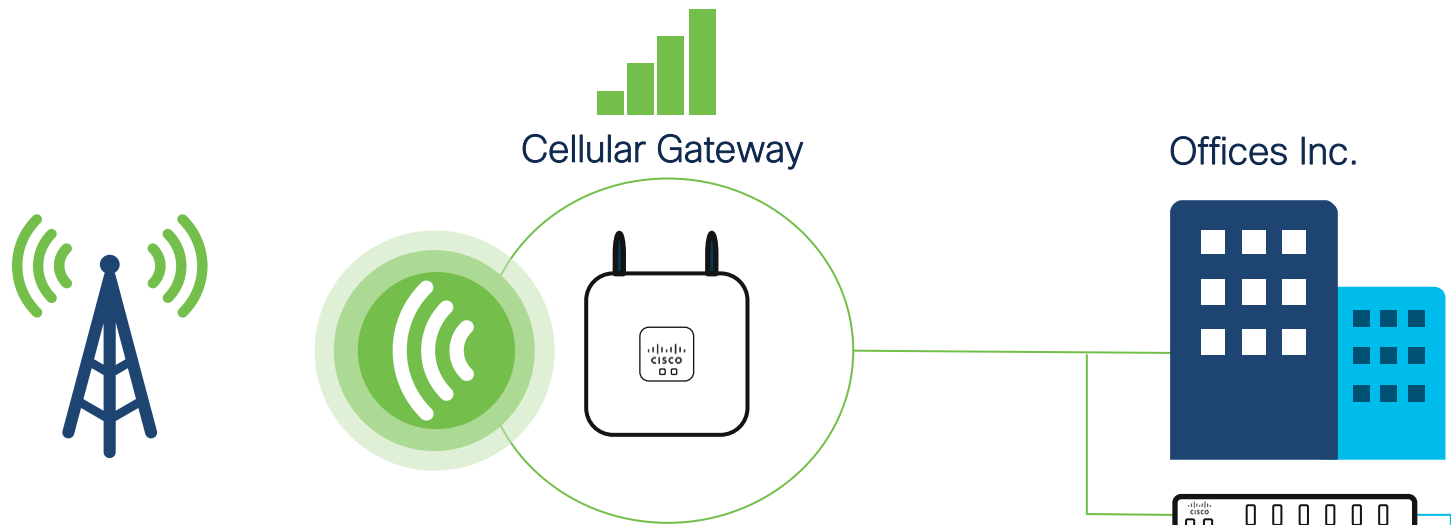
4x4 MU-MIMO

Why Cellular Gateway is needed for high quality Wireless WAN

Network stack is buried deep inside the building, maybe underground. Chance of a high-quality LTE or 5G signal is slim. Extending the antenna via coax might only get to ground level.



Why Cellular Gateway is needed for high quality Wireless WAN



Cellular gateway is positioned to get a high-quality LTE signal. Next to a window or mounted near the roof with external antennas with short coax runs.

LTE Dongle

USB Based LTE Dongle

SMA Antenna
Length: 2.46 in
Weight: 0.3 oz



Compact Form
Dimensions: 3.69 in x 1.30 in x 0.39 in
Weight: 1.1 oz

Micro-SIM Card Slot

D-LTE-xx

- ✓ Sierra Wireless WP76xx modem
- ✓ Single micro-SIM, single radio
- ✓ 75 Mbps DL / 50 Mbps UL
- ✓ USB Powered
- ✓ Sub-miniature version - A (SMA) Antenna
- ✓ Field Replaceable / Hot-Swappable

Supported Bands :

D-LTE-NA: 2,4,5,12,13,14,17

D-LTE-GB: 1,3,7,8,20,28

D-LTE-AS: 1,3,5,8,40,41

Budget LTE Dongle

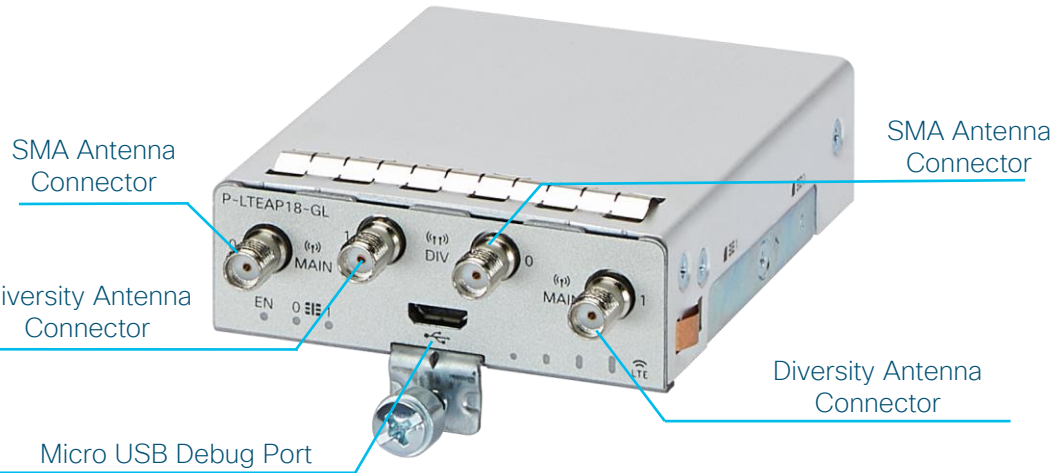
LTE Category 4

Zero-Touch
Provisioning

Routing

LTE Advanced Pro

CAT 18 LTE PIM Module



P-LTEAP18-GL

- ✓ Telit LM960A18 modem
- ✓ Dual micro-SIM, single radio
- ✓ 1.2 Gbps DL / 200 Mbps UL
- ✓ FirstNet Certified
- ✓ SMA Antenna support
- ✓ Field Replaceable / Hot-Swappable

Supported Bands:

P-LTEAP18-GL: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14*, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 38, 39, 40, 41, 42, 43, 46, 48, 66, 71

Carrier Aggregation

Dying Gasp

Active / Standby SIMs

SD-WAN

LTE Advanced

CAT 4|6 LTE PIM Module



P-LTE(A)-xx

- ✓ Telit LM960A18 modem
- ✓ Dual micro-SIM, single radio
- ✓ 300 Mbps DL / 50 Mbps UL
- ✓ GPS Enabled
- ✓ SMA Antenna support
- ✓ Field Replaceable / Hot-Swappable

Supported Bands:

CAT4:

- P-LTE-US: 2, 4, 5, 12
- P-LTE-GB: 1, 3, 7, 8, 20, 28
- P-LTE-VZ: 4, 13
- P-LTE-MNA: 2, 4, 5, 12, 13, 14, 17, 66

CAT6:

- P-LTEA-LA: 1, 3, 5, 7, 8, 18, 19, 21, 28, 38, 39, 40, 41
- P-LTEA-EA: 1-5, 7, 12, 13, 20, 25, 26, 29, 30, 41

Carrier Aggregation

Dying Gasp

Active / Standby SIMs

SD-WAN

Pathway to 5G

Cisco Cellular Gateway



CG418-E / CG522-E

- ✓ Flexible Fail-Over Cellular Gateway
- ✓ 3.3 Gbps DL / 420 Mbps UL
- ✓ PoE Powered (or externally powered)
- ✓ IP Passthrough
- ✓ External Antenna Support
- ✓ Integrated security with ACT2 for SUDI
- ✓ Console Port for Out-of-Band management

Supported Bands :

5G: n1, n2, n3, n5, n28, n41, n66, n71, n77, n78, n79
LTE: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 34, 38, 39, 40, 41, 42, 43, 46, 48, 66, 71
HSPA+: 1, 9, 19

Improved WAN
Connection Speed

Dual SIM Support

Zero-Touch
Provisioning

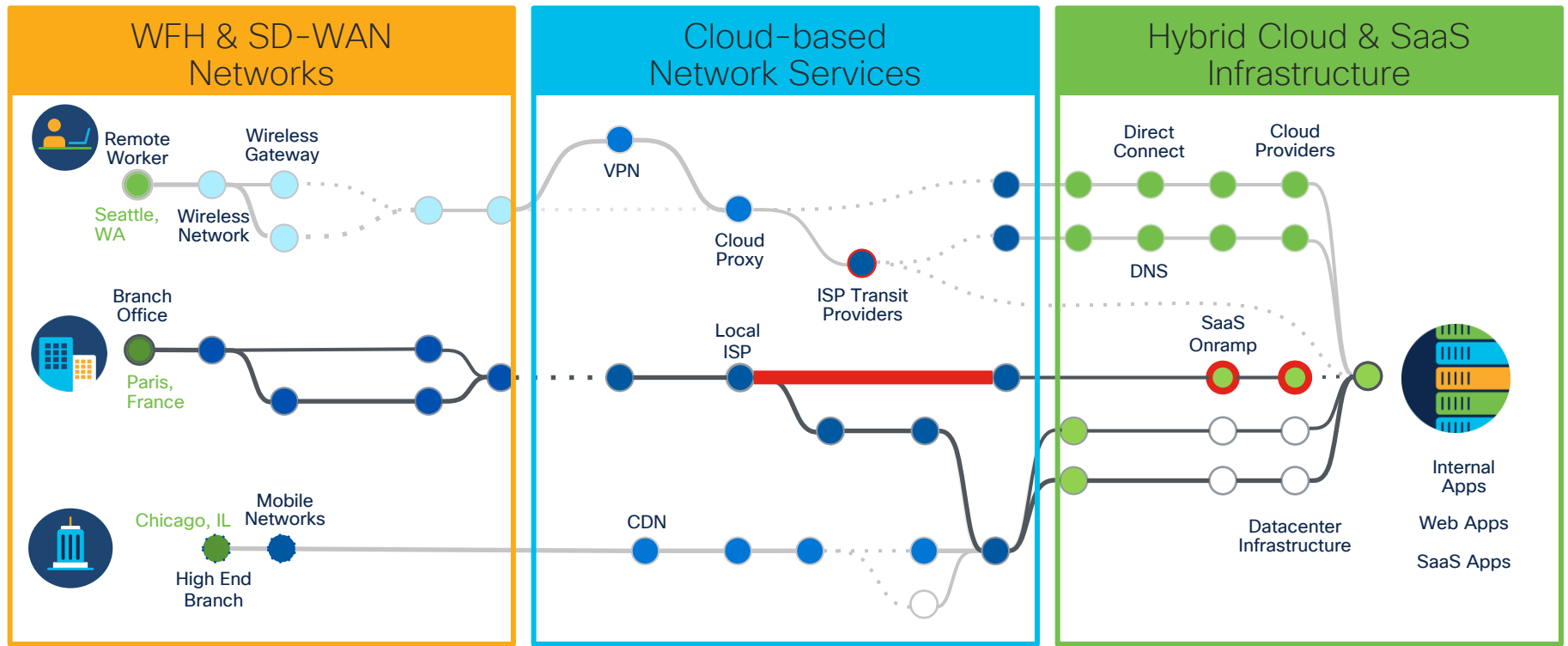
SD-WAN

Thousand Eyes



* Routing	No
SD-WAN	Yes

ThousandEyes with ISR1 100X-6G – Observability



* Supported on ISR 4K, C8500L, C8300, C8200, C8200L



How ThousandEyes Collects Data



Enterprise Agent

Lightweight agent deployed to customer sites and data center locations.



Cloud Agent

No installation required. 376 internet connected vantage points.



Endpoint Agent

Pushed to end user laptop or desktop for last mile visibility.

◀ ————— Make the internet look like your own environment ————— ▶

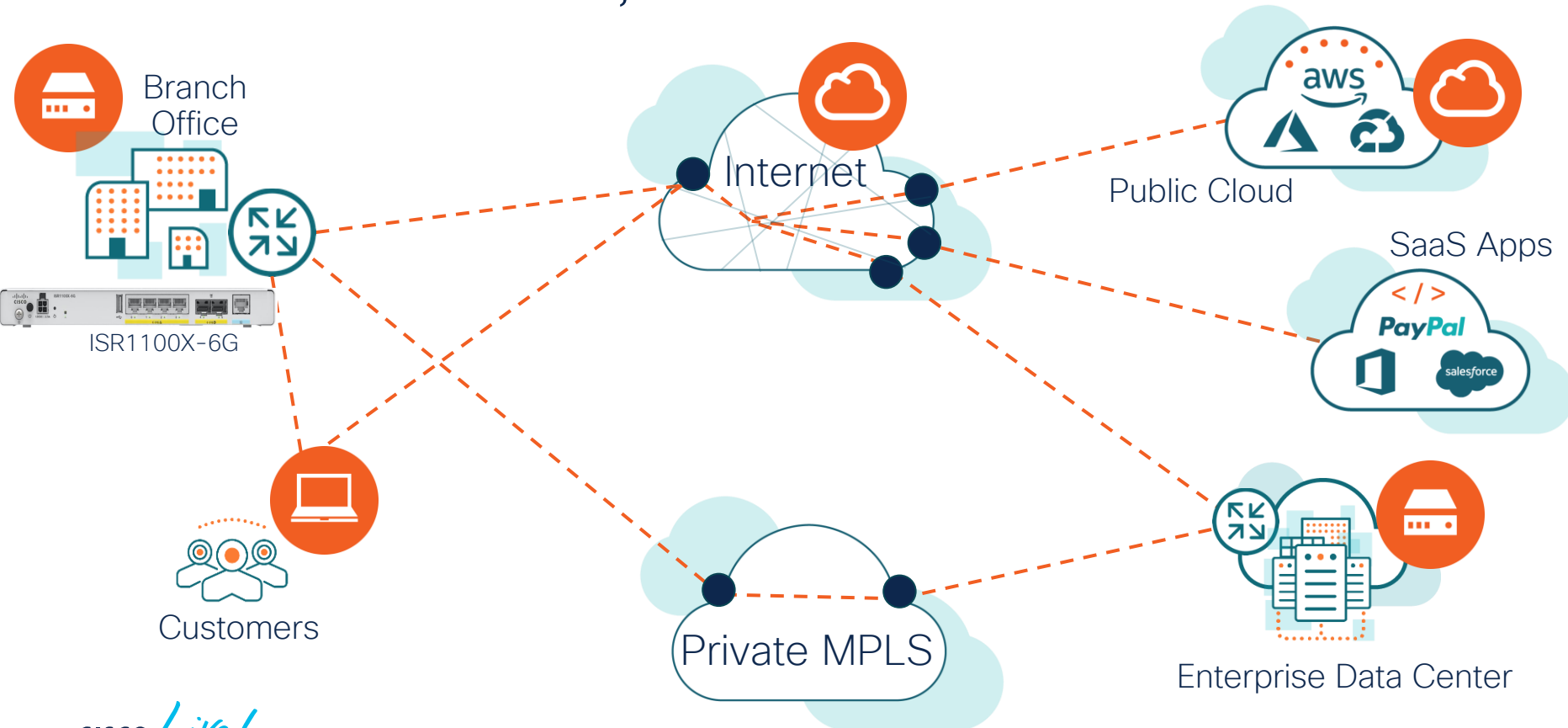
Increase business agility through visibility into connectivity issues



* Currently only supported on x86 platforms

* Routing	No
SD-WAN	Yes

Visualize the Cloud, Internet and SaaS traffic



Application Quality of Experience

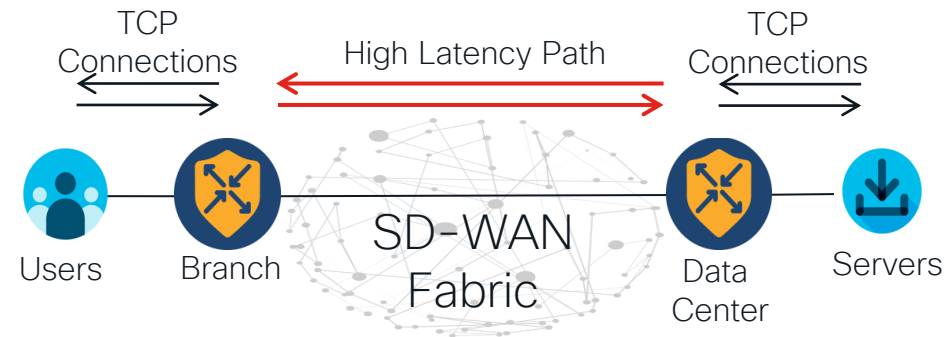
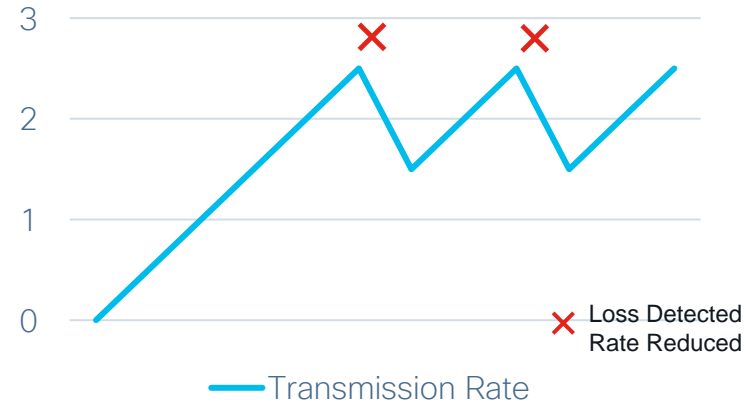


TCP Bandwidth Probing

- TCP session follows peaks and troughs during transmission
- When packet loss is detected, flow rate is reduced and then gradually increases
- Entire bandwidth is not used for end-to-end communication
- High latency path between users and applications, ex. geo-distances
- Need for mechanism to overcome high latency values

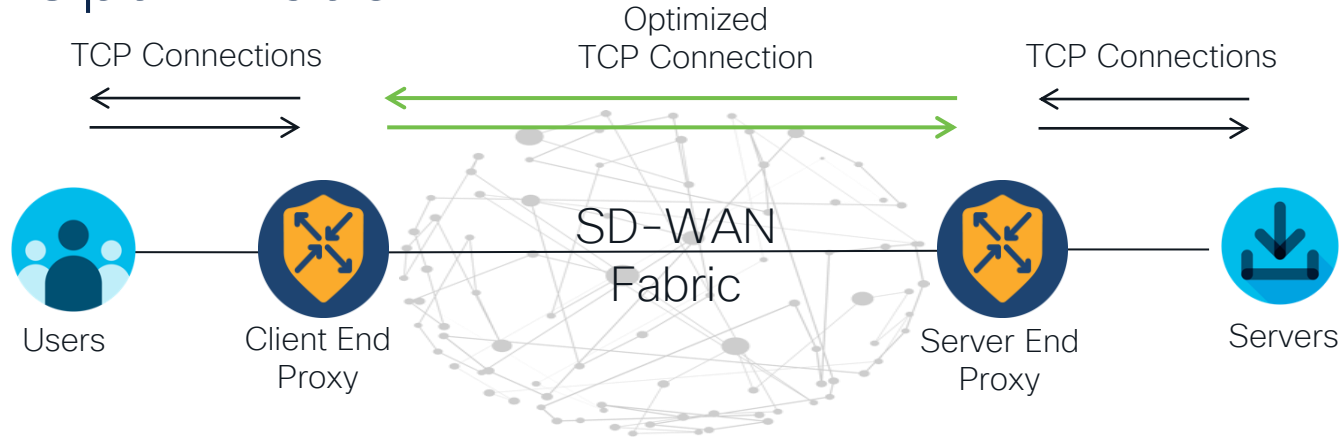
Routing	No
SD-WAN	Yes

TCP Congestion Control



Routing	No
SD-WAN	Yes

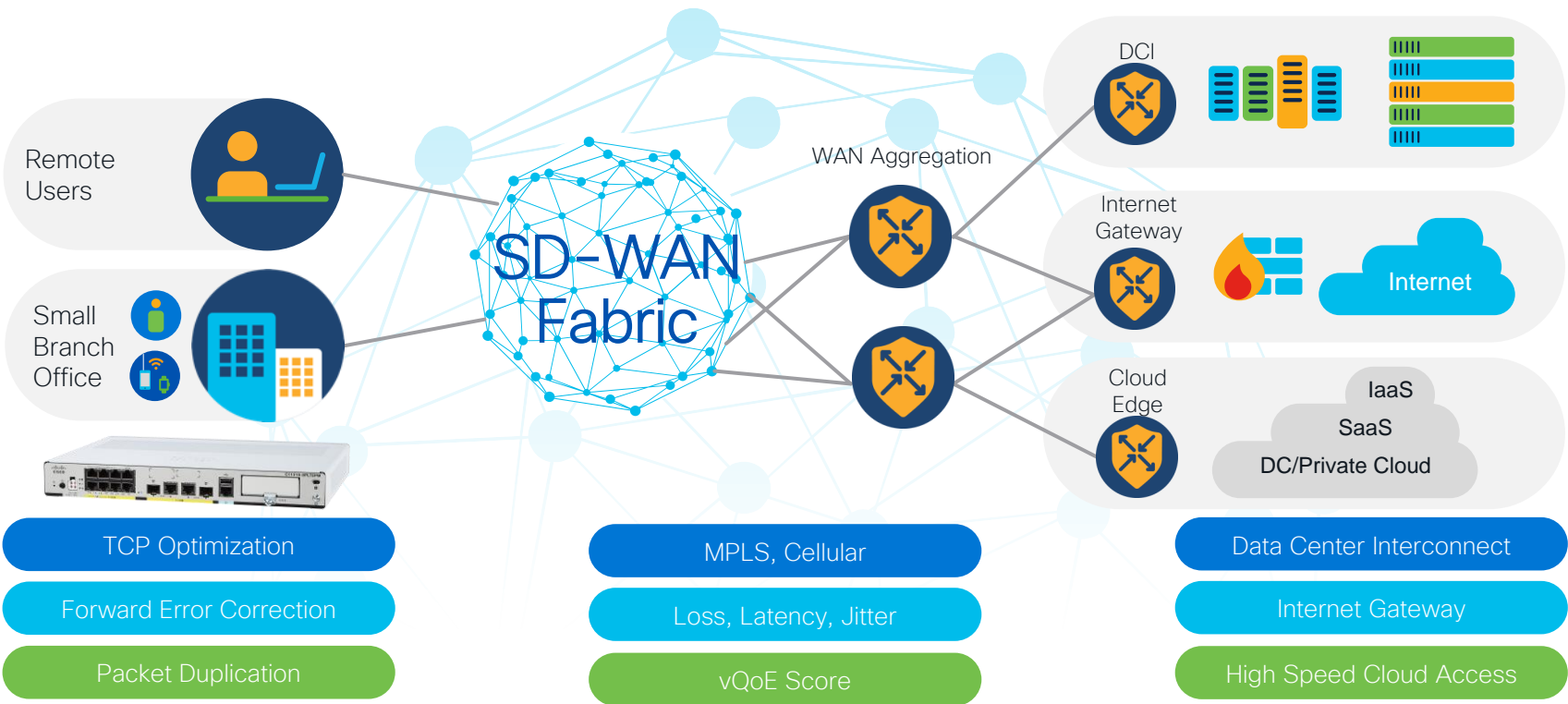
TCP Optimization



- WAN Edge routers terminate TCP sessions and provide local acknowledgements
- Hosts don't have to wait for end-to-end TCP ACKs and pause TCP transmission
- Optimized TCP connection uses selective acknowledgement to prevent unnecessary retransmissions and large initial TCP window size to maximize throughput
- Hosts using older TCP/IP stacks will see the most benefit

Routing	No
SD-WAN	Yes

AppQoE with SD-WAN



TrustSec



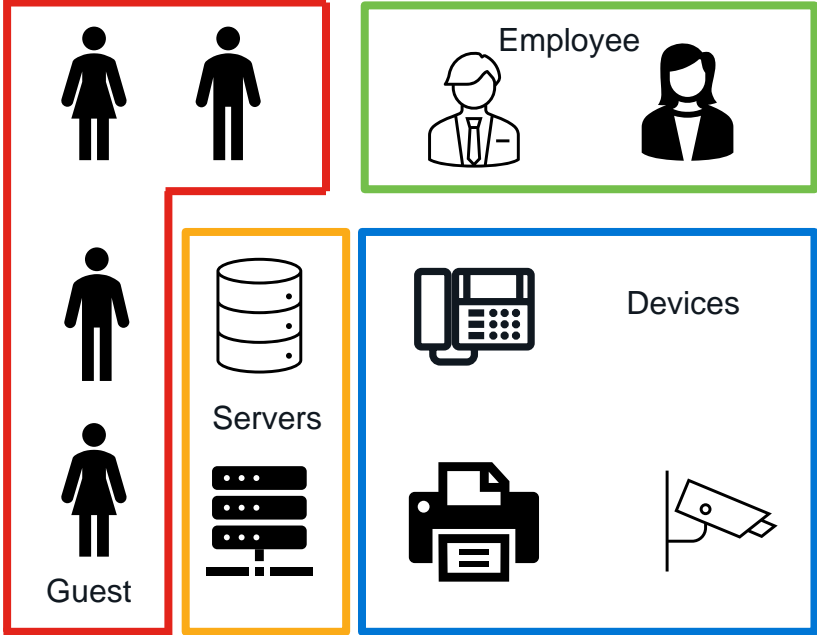
Network Segmentation with TrustSec - SGT Tags

- Traditional networks create separate VLANs for classification
- Localize threats, limit impact radius, great for fewer deployments
- Need to manually allocate IP addresses, DHCP, Routing, ACLs
- Design needs to be replicated for floors, buildings, offices, and other facilities globally
- Cost could be extremely high

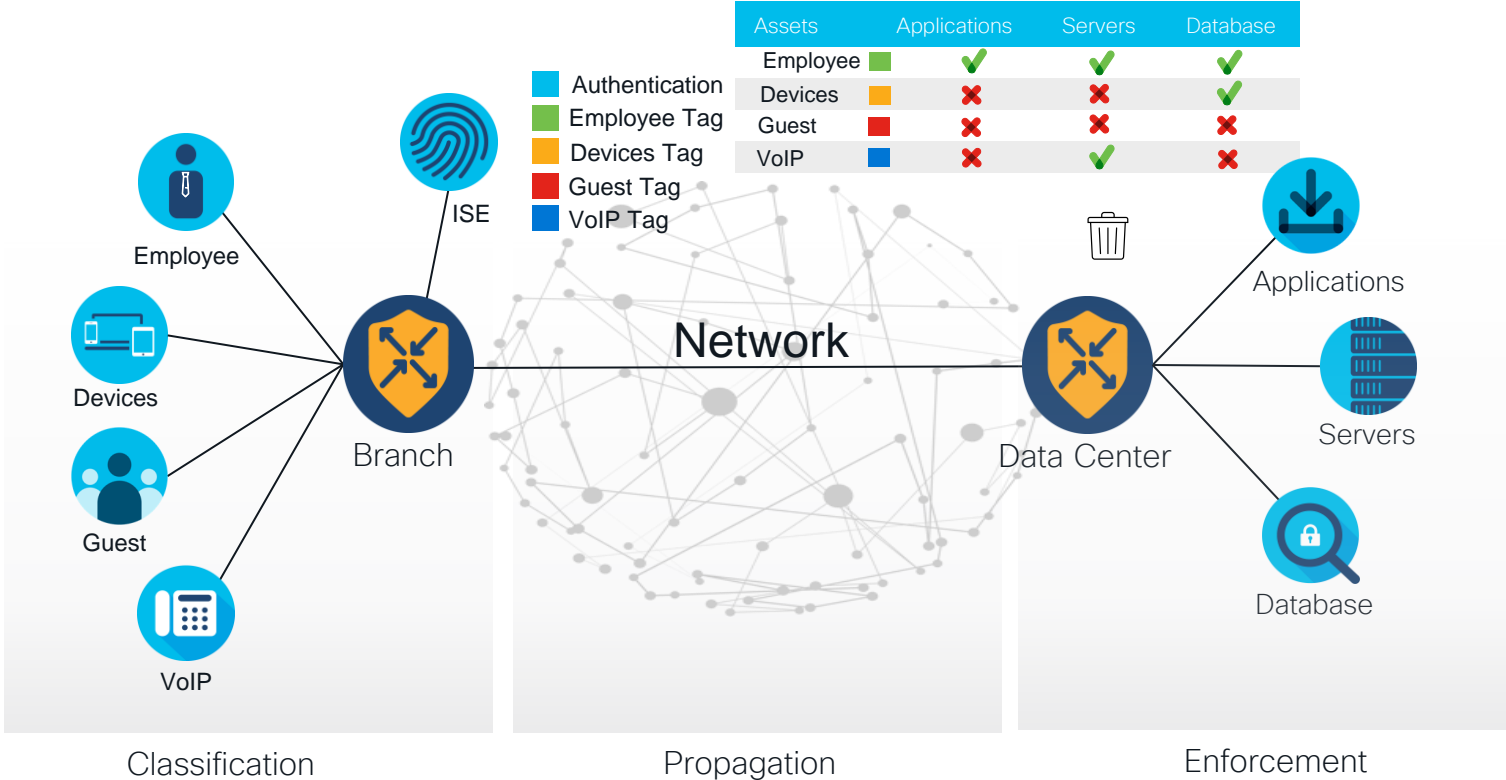


Groups Denote Common Roles and Policy

- Business based groupings to provide consistent policy and access independent of network topology
- Leverage attributes such as user role, location, device type to define group assignments



Classification, Propagation and Enforcement



Umbrella Secure Internet Gateway



Routing	Yes
SD-WAN	Yes

Umbrella Secure Internet Gateway



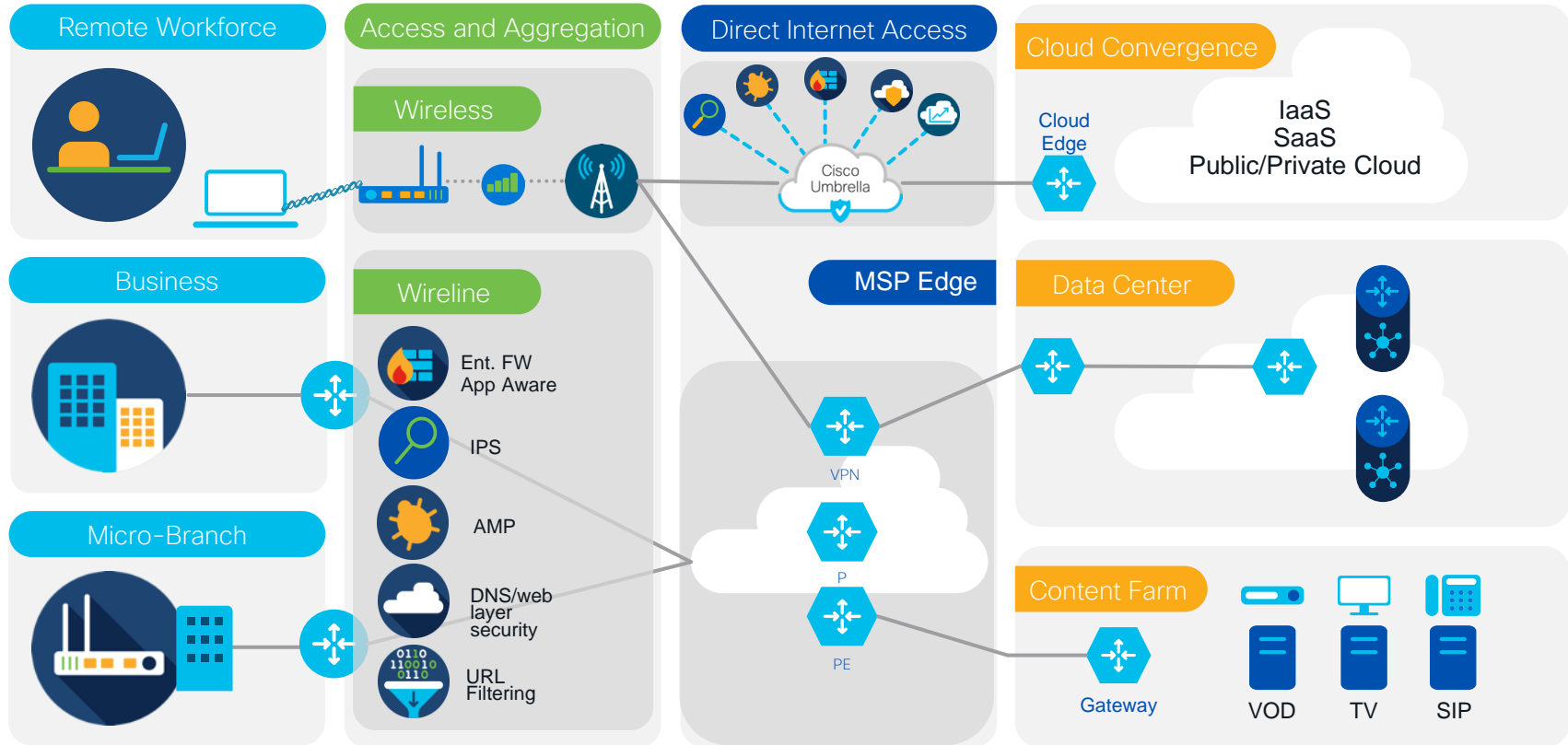
Problem

- Lean branch – no on-prem security
- Applications hosted on the internet vulnerable to attacks
- Internet bound traffic must be subjected to policy enforcement
- Enforce secure web usage & control

Solution

- Leverage cloud hosted security with SIG
- User traffic redirected to Umbrella via Transport side IPsec tunnel

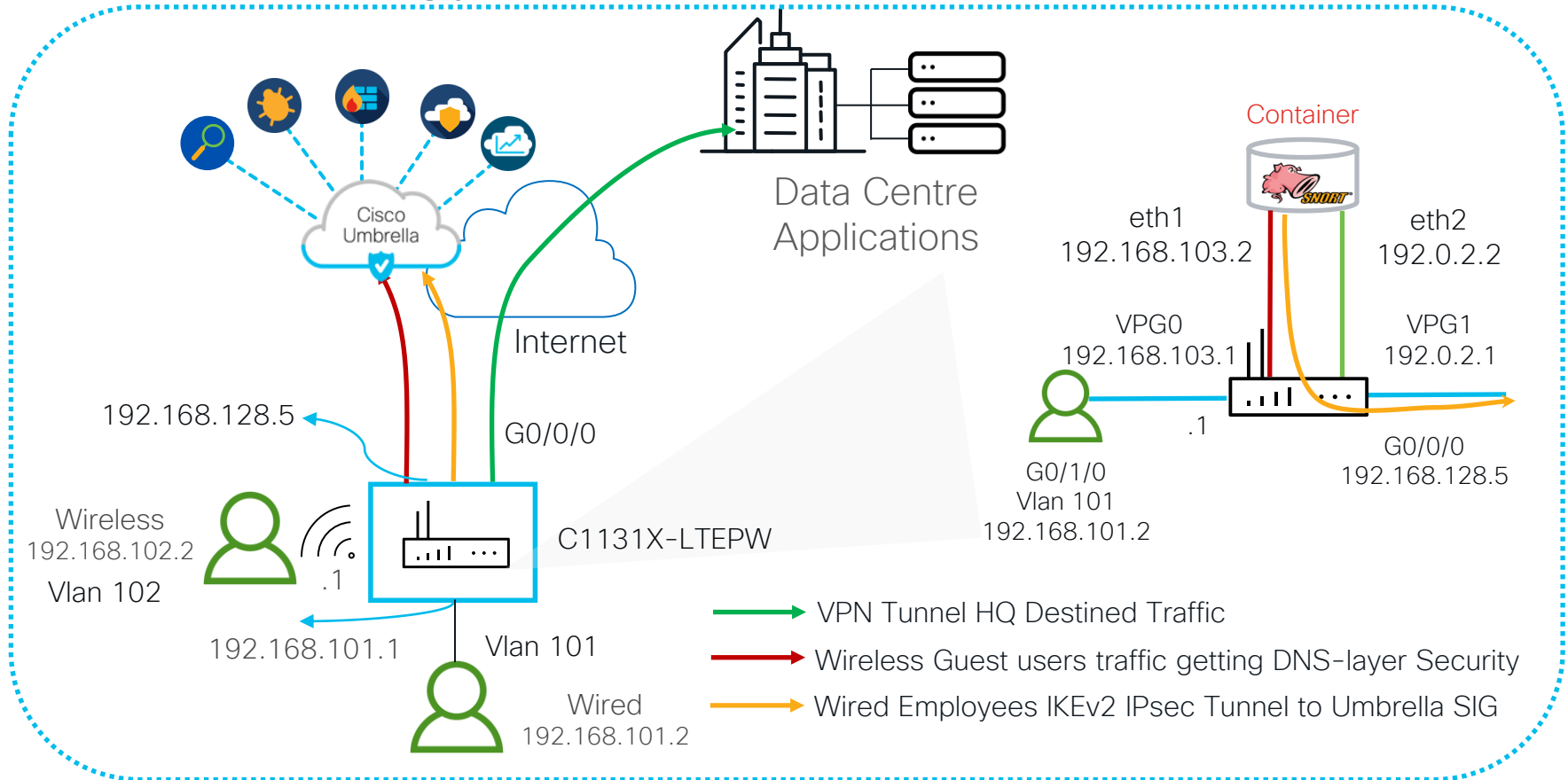
Securing the Access Layer



Demo

- Zone Based Firewall -
<https://cs.co/zbf-config>
- Snort IPS -
<https://cs.co/snortips-config>
- DNS Layer Security -
<http://cs.co/dns-layer-config>
- Umbrella SIG -
<http://cs.co/isr-sig-config>
- Troubleshooting -
<https://cs.co/ios-xe-packet-trace>

Demo Topology



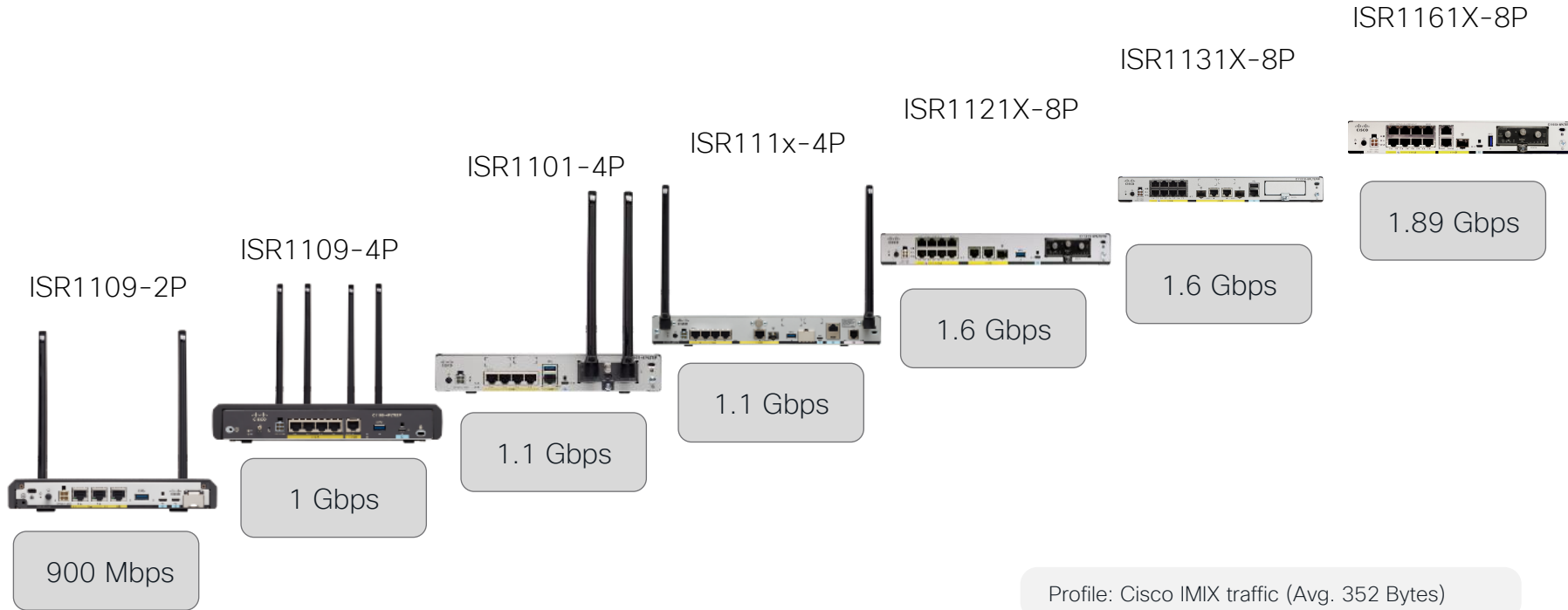
References



Performance & Scale

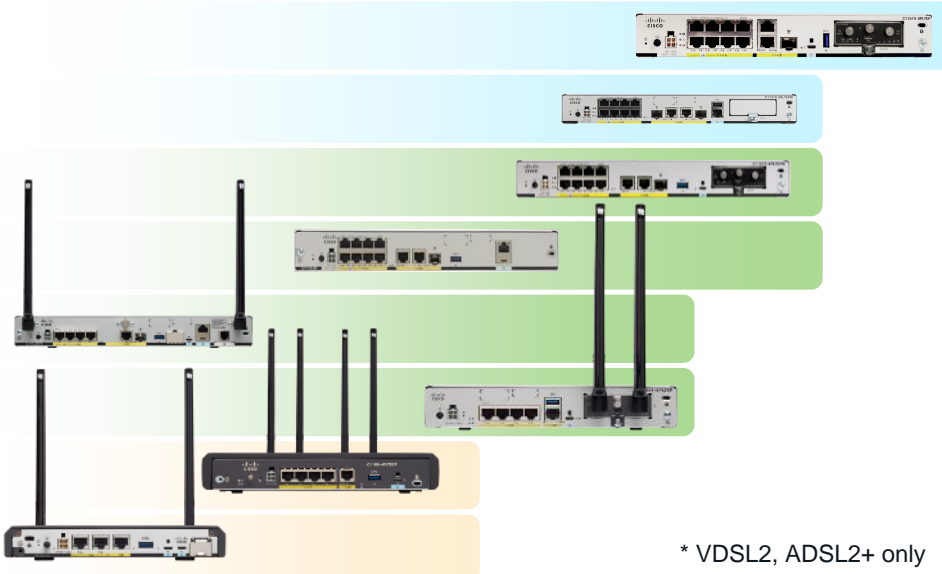
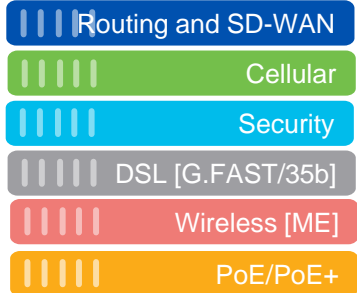
Cisco ISR 1000 - CEF Throughput

CEF Performance



Cisco ISR1000 Series Routers

Routing IPsec Performance (IMIX)



* VDSL2, ADSL2+ only

●	●	●	●	●	ISR 1161X-8P	Up to 800 Mbps
●	●	●	●	●	ISR 1131X-8P	Up to 680 Mbps
●	●	●	●*	●	ISR 1121X-8P	Up to 670 Mbps
●	●	●	●	●	ISR 1111X-8P	Up to 670 Mbps
●	●	●*	●	●	ISR 111x-4P	Up to 450 Mbps
●	●	●	●	●	ISR 1101-4P	Up to 450 Mbps
●	●	●	●	●	ISR 1109-4P	Up to 340 Mbps
●	●	●	●	●	ISR 1109-2P	Up to 340 Mbps

Machine to Machine
Extended temperature & dual LTE

Remote Workers

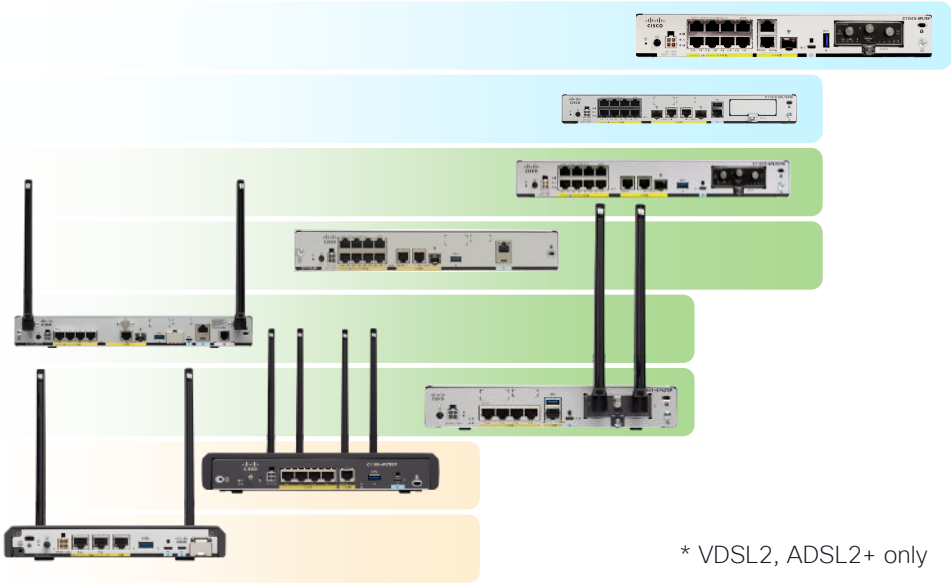
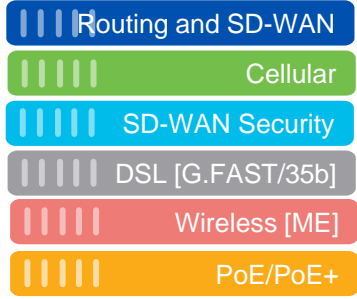
Managed Service Provider CPE

Branch in a box



Cisco ISR1000 Series Routers

SD-WAN IPsec Performance (IMIX)



* VDSL2, ADSL2+ only

● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1161X-8P	Up to 600 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1131X-8P	Up to 470 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1121X-8P	Up to 470 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1111X-8P	Up to 470 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 111x-4P	Up to 350 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1101-4P	Up to 350 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1109-4P	Up to 260 Mbps
● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	ISR 1109-2P	Up to 200 Mbps

Machine to Machine
Extended temperature & dual LTE

Remote Workers

Managed Service
Provider CPE

Branch in a box

Cisco ISR1100 and ISR1100X Routers

SD-WAN IPsec Performance (IMIX)

- SD-WAN
- Integrated LTE
- SD-WAN Security
- CAT4 USB Dongle (Viptela)



- ● ● ISR1100X-6G up to 428 Mbps
- ● ● ISR1100X-4G up to 399 Mbps
- ● ● ISR1100-6G up to 428 Mbps
- ● ● ISR1100-4GLTE up to 399 Mbps
- ● ● ISR1100-4G up to 399 Mbps

Better performance with XE SD-WAN with security

Cisco ISR1000 Series Routers

Routing Scale

FYI

XE SD-WAN	C1161X-8P	C1131X-8P	C1121-4P	C1111X-8P	C1111-8P	C1111-4P	C1101-4P	C1109-4P	C1109-2P
DRAM/Flash	8GB/8GB	8GB/16GB	4GB/4GB	8GB/8GB	4GB/4GB	4GB/4GB	4GB/4GB	4GB/4GB	4GB/4GB
No. of ACLs per System	1.6K	4K	4K	4K	4K	4K	4K	4K	4K
No. of IPv4 ACEs per System	4K	10K	10K	10K	10K	10K	10K	10K	10K
No. of IPv4 Routes	800K	280K	280K	800K	280K	280K	280K	280K	280K
No. of IPv6 Routes	700K	260K	260K	700K	260K	260K	260K	260K	260K
No. of NAT Sessions	100K	100K	100K	100K	100K	100K	100K	100K	100K
No. of VRFs	4K	1K	1K	1K	1K	1K	1K	1K	1K

Cisco ISR1000 Series Routers

SD-WAN Scale

FYI

XE SD-WAN	C1161X-8P	C1131X-8P	C1121X-8P	C1121-4P	C1111X-8P	C1111-4P	C1101-4P	C1109-4P	C1109-2P
IPSec Overlay Tunnels	200	200	200	200	200	200	200	200	200
GRE Overlay Tunnels	200	200	200	200	200	200	200	200	200
DPI Flows	32K	32K	32K	32K	32K	32K	32K	32K	32K
cFlows Entries	32K	32K	32K	32K	32K	32K	32K	32K	32K
OMP Routes (overlay)	120K	120K	120K	120K	120K	120K	120K	120K	120K
IPv4 Routes	120K	120K	120K	120K	120K	120K	120K	120K	120K

Cisco ISR1100 and ISR1100X Series Routers

SD-WAN Scale Viptela OS vs XE SD-WAN

	1100-4G	1100X-4G	1100-6G	1100X-6G	1100-4G	1100X-4G	1100-6G	1100X-6G
Viptela OS					XE SD-WAN			
IPSec Overlay Tunnels	247	250	1500	1500	250	500	1500	3000
GRE Overlay Tunnels	247	250	1500	1500	250	500	1500	3000
DPI Flows	14K	14K	14K	14K	50K	256K	50K	256K
cFlows Entries	8K	8K	65K	65K	50K	256K	50K	256K
OMP Routes (overlay)	30K	30K	128K	128K	200K	512K	200K	512K
IPv4 Routes	30K	250K	128K	250K	256K	512K	256K	512K

Higher Scale with XE SD-WAN


Frequently Asked Questions

Does ISR1K support....?

- SGT
 - SGT Inline tagging is supported. Static SGACL is supported. SGACL enforcement is available only on WAN interface
 - From 17.5, static SGACL can be enforced on SVI as well
 - From 17.5, dynamic SGT assignment and SGACL on WAN and SVI from ISE will be supported.
- Voice
 - CUBE is supported in both Routing and SD-WAN
 - CME and SRST support is supported in Routing
- VPN
 - EzVPN server only, IPSec VPN, DMVPN, GETVPN & FlexVPN
- VDSL2 35b
 - Only on G.FAST DSL platforms – C1112, C1113 variants
- Embedded Security
 - Supports entire SD-WAN security stack – ZBFW, IPS/IDS, URL-Filtering, AMP/TG, DNS/Web Layer Security
- WiFi in SD-WAN
 - Yes for CAPWAP mode. Starting 17.6, ME can be configured via SD-WAN feature templates
- LTE Dongle in Routing and SD-WAN
 - 17.8 release onwards in SD-WAN on specific ISR 1K PIDs
- FirstNet (Band 14) for CAT18 LTE PIMs
 - Currently on-track
- Active-Active LTE
 - C1109 variants support 2 LTE PIMs each operating in active-standby mode, providing 2 active LTE connections simultaneously

Resources

Cisco ISR1000 Series Routers

- ISR1000 Wi-Fi SKUs EoS:
<https://www.cisco.com/c/en/us/products/collateral/routers/1000-series-integrated-services-routers-isr/select-isr1100-product-eol.html#Productmigrationoptions>
- New ISR1000 Datasheet: 
<https://www.cisco.com/c/en/us/products/collateral/routers/1000-series-integrated-services-routers-isr/datasheet-c78-739512.html>
- Embedded Wireless AP Configuration Guide:
https://www.cisco.com/c/en/us/td/docs/routers/access/isr1100/software/configuration/xen-17/isr1100-sw-config-xe-17/configuring_wifi6.html
- Blogs:
 - Remote Worker: <https://community.cisco.com/t5/networking-blogs/simplify-your-remote-worker-network-with-cisco-sd-wan/ba-p/4308306>
 - Everything ISR1000: <https://community.cisco.com/t5/networking-blogs/your-one-stop-shop-for-soho-routing/ba-p/4270343>

Cisco ISR1 100 and ISR1 100X Series Routers for SD-WAN Branch

FYI

- Datasheet: <https://www.cisco.com/c/en/us/products/collateral/routers/1000-series-integrated-services-routers-isr/datasheet-c78-742893.html>
- OS Migration Guide: <https://www.cisco.com/c/en/us/td/docs/routers/sdwan/configuration/isr1100series-migration/sw-install-and-upgrade-guide-isr1100-series.html>
- Hardware Installation Guide: <https://www.cisco.com/c/en/us/td/docs/routers/sdwan/hardware/isr1100-4g-6g/cisco-isr-1100-4g-6g-hig.html>
- Blog: <https://community.cisco.com/t5/networking-blogs/cisco-isr1100-and-isr1100x-series-routers-for-sd-wan-branch/ba-p/4280554>
- YouTube: <https://cs.co/CatalystTV>

Our New Hardware at World of Solution

Cisco Cellular Gateway – CG522-E

CG522-E

Cisco Cellular Gateway



- ✓ Flexible Fail-Over Cellular Gateway
- ✓ 3.3Gbps DL / 420Mbps UL
- ✓ PoE+ Powered (or externally powered)
- ✓ IP Passthrough
- ✓ External Antenna Support
- ✓ Integrated security with ACT2 for SUDI
- ✓ Console Port for Out of band management
- ✓ Modem Sierra Wireless EM9190

Supported Bands :

5G: n1, n2, n3, n5, n28, n41, n66, n71, n77, n78, n79

LTE: 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 18, 19, 20, 25, 26, 28, 29, 30, 32, 34, 38, 39, 40, 41, 42, 43, 46, 48, 66, 71

HSPA+: 1, 9, 19

Improved WAN Connection
Speed

Support for Dual
SIM

Zero-Touch
Provisioning

SD-WAN

Cisco Catalyst Wireless Gateway

Cisco CG113-4GW6 / Cisco CG113-W6

Zero Touch Provisioning



Simplified Centralized Management
Automated Provisioning

Advanced Mobility



Cat 7 4G LTE modem
Integrated Wi-Fi6 capabilities
WAN Link failure detection (active/standby)



High Performance & Scale

Up to 850Mbps throughput
1 x 2.5 mGiG port for LAN/WAN connectivity
2 x 1G ports



Work from Home

Connect multiple devices at the same time
Corporate and Personal SSIDs
Site-to-site VPN with Split Tunnel
Remote Access

LTE/Wi-Fi Everywhere

Dual Nano
SIM

Home Wi-Fi

Corporate
Network

Rich Services with Enhanced Performance

1 x 2.5G (mGiG)
2 x 1G w/
switch
expansion

2GB DDR4

IOS CG Operating
System

Manageability

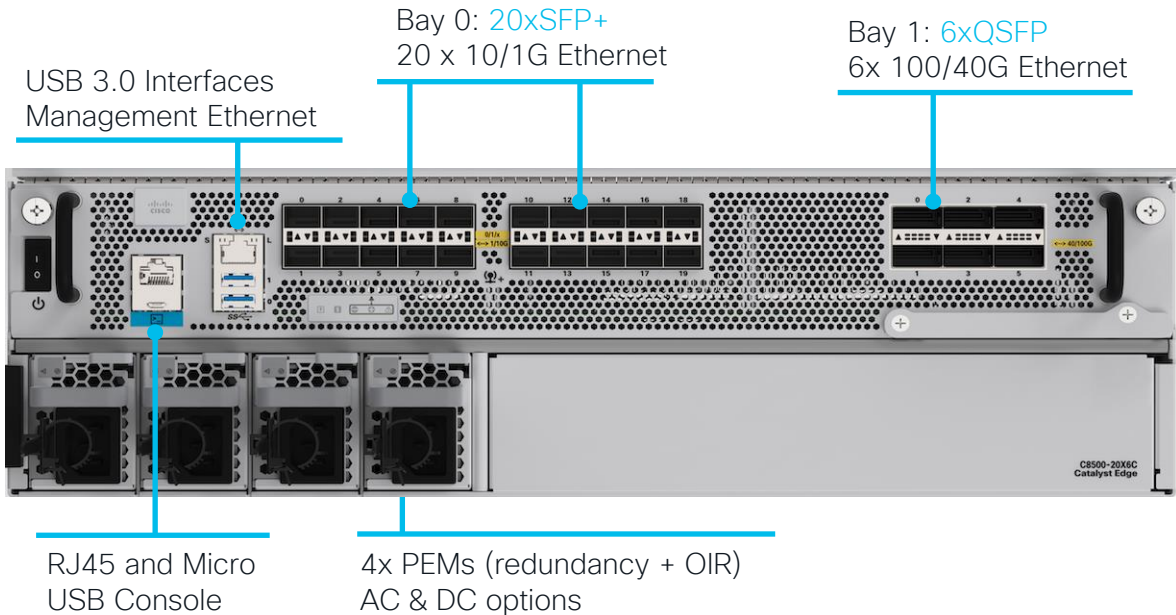
vManage

Open APIs

Catalyst 8500-20X6C Fixed Platform

FCS in February 2023
XE 17.10
minimum software

C8500-20X6C



100G, 40G, 10G
Connectivity

6 QSFP, 20 SFP+

High SD-WAN
Performance

High SD-WAN Scale

3RU form factor

Fixed platform at 500G+ CEF capacity (IMIX)

Note: Can be Oversubscribed to 800G, no breakout cable or optional modules supported

Continue Your Education



Visit the Cisco Showcase for related demos.



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Attend any of the related sessions at the DevNet, Capture the Flag, and Walk-in Labs zones.



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Breakout Sessions – Routing Platforms

Session ID	Title	Presenter Name	Date	Time in PDT	Location
TECARC-2407	Architecture, Deployments and Troubleshooting Deep Dive for Catalyst 8000 Series Edge Platforms	Jason Yang	Feb 6	8:30 AM – 1:00 PM CET	Elicium 2
BRKARC-2881	Fixed Platform ISR1000 and ISR1100 Series Deep Dive	Kureli Sankar	Feb 7	2:00 PM – 3:00 PM CET	Elicium 2
BRKENT-2139	How to Choose the Correct Branch Router	Stefan Mansson	Feb 7	3:30 PM – 4:30 PM	Elicium 3
BRKXAR-2003	Extending Enterprise Network into Public Cloud with Cisco Catalyst 8000V Edge Software	Jason Yang	Feb 8	10:30 AM – 11:30 AM CET	D203
BRKENT-2653	All You Need to Know about Forwarding on the Catalyst 8500 and 8500L Platforms	David Roten	Feb 8	8:30 AM – 10:00 AM CET	E105
BRKARC-2882	Cisco Catalyst 8200/8300 Series Access Edge Platforms Deep Dive	Stefan Mansson	Feb 8	12:00 PM – 1:30 PM	Elicium 4
BRKENT-2731	What QoS can do for your network with Catalyst 8000 and other IOS XE routers	David Roten	Feb 8	4:45 PM – 5:45 PM CET	G106
BRKARC-2885	Cisco Catalyst 8500 Series Edge Platform Deep Dive	Sumant Mali	Feb 9	8:30 AM – 10:00 AM	A3
BRKENT-2809	Untangle Enterprise Direct Cloud Connectivity with Powerful Catalyst 8500 Series Edge Platforms	Sumant Mali	Feb 9	12:00 PM – 1:00 PM	D203

Tutorials and Labs – Routing Platforms

Session ID	Title	Presenter Name(s)	Date	Time in PDT	Location
TECARC-2407	Architecture, Deployments, and Troubleshooting Deep Dive for Catalyst 8000 Series Edge Platforms	Jason Yang & Sumant Mali	Feb 6	8:30 AM - 1:00 PM CET	Elicium 2
LTRENT-2440	Catalyst 8000 Series Tour & Deployment - Branch, Agg, Wired, Wireless WAN - SD-WAN version	Kureli Sankar & David Roten	Feb 9	8:30 AM - 12:30 PM CET	Labs2

Networking

SD-WAN

Learn how to confidently adopt Cisco's SD-WAN solution in a new or existing network. These sessions provide an advanced journey through the latest Cisco SD-WAN innovations including recent development and integration with Cloud, SASE and Assurance/Analytics.

START



Feb 6 | 08:30

TECENT-2376

From Zero to SD-WAN Hero:
Planning, Designing and Implementing
Cisco SD-WAN



Feb 6 | 08:30

TECARC-2407

Architecture, Deployments, and
Troubleshooting Deep Dive for Catalyst
8000 Series Edge Platforms



Feb 6 | 14:00

TECTRS-3477

Advanced Troubleshooting SD-WAN



Feb 7 | 08:30

BRKENT-1656

Beginner's Guide to Enterprise Network
Monitoring with ThousandEyes



Feb 7 | 11:30

BRKENT-2108

Cisco SD-WAN: Start Here



Feb 7 | 11:30

BRKNWT-2210

Predicting Networks are THERE !!



Feb 7 | 14:00

BRKENT-2628

ThousandEyes with Catalyst 8000
routers: Empowerment from Data
in your Pocket



Feb 7 | 15:30

BRKENT-2139

How to Choose the Correct Branch Router



Feb 7 | 17:00

BRKENT-2423

SD-WAN From Design to Reality



Feb 8 | 08:30

BRKENT-2653

All You Need to Know about Forwarding
on the Catalyst 8500 and 8500L Platforms



Feb 8 | 08:30

BRKOPS-2857

Deploy Visibility in Your SASE
Architecture With ThousandEyes



Feb 8 | 08:30

LTRENT-2052

IPv6 Routing, SD-WAN and Services Lab

If you are unable to attend a live session, you can watch it [On Demand](#) after the event

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The bridge to possible

Thank you

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ALL IN