



Community Live- ISR 1131

Technical Decision Maker

Abhishek Keswani- Technical Marketing Engineer

April, 19th - 2022

Spotlight Awards

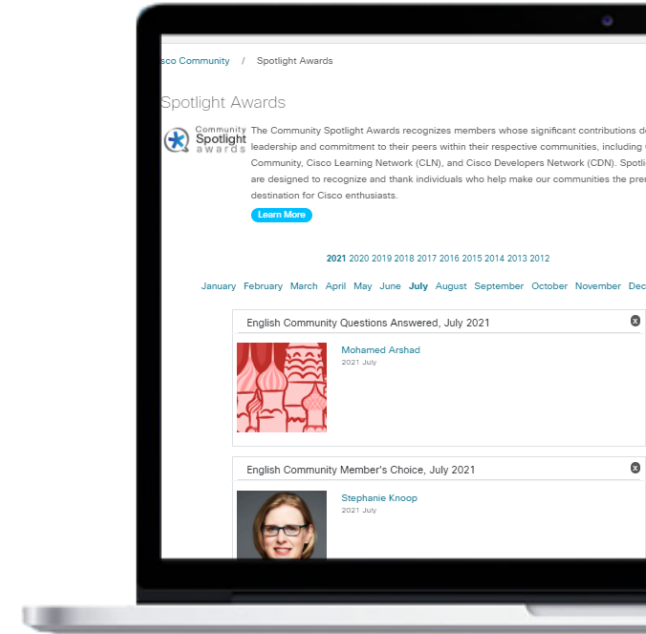


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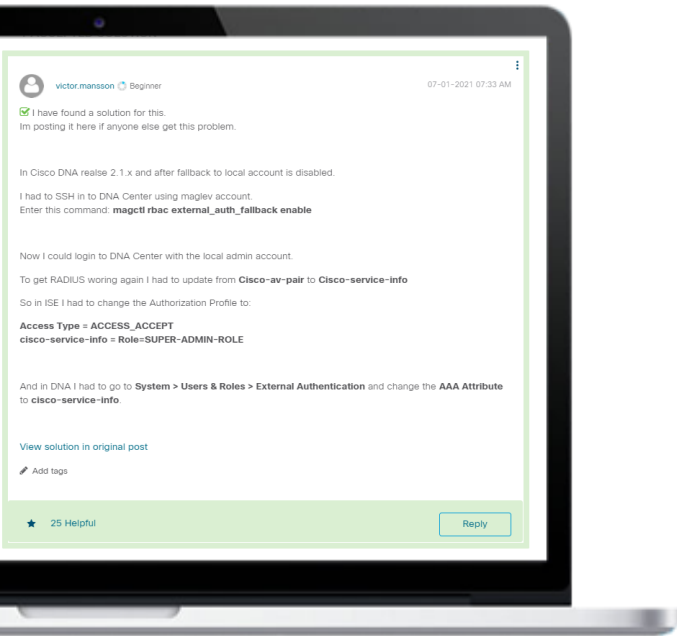
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That helps other users find correct answers.

Accept as Solution

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25 Helpful

Our Expert



Abhishek Keswani
Technical Marketing Engineer



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Submit Your Questions Now!

Use the **Q&A** panel to submit your questions and the panel of experts will respond.

They will be answered eventually



Please take a moment to complete the survey at the end of the event



Cisco ISR 1131 Technical Decision Maker

C1000 Series Integrated Services Router

March 2022



1 Cisco ISR 1000 Platforms Family Overview

2 Introducing Cisco ISR 1131 Series Platform

3 Product Overview

4 Platform Architecture

5 WAN Pluggable Options

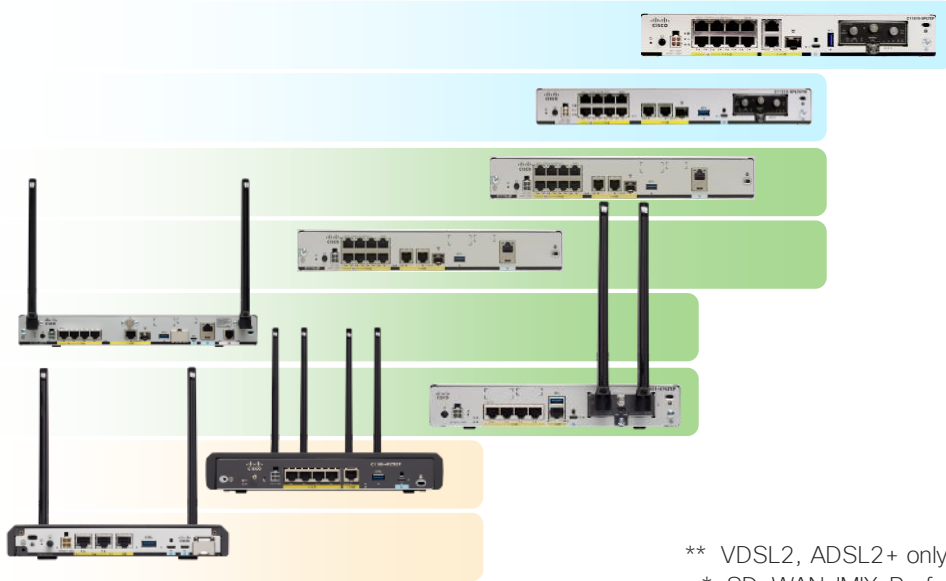
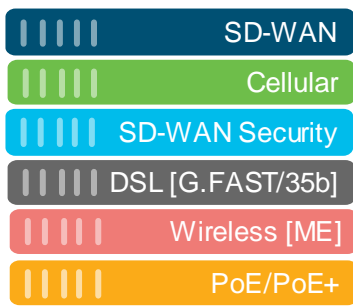
6 Wi-Fi6

7 Performance & Scale

8 Solutions and Use Cases

Cisco ISR 1000 Platforms Family Overview

Cisco ISR 1000 Platform Evolution



- ISR 1161X-8P Up to 600 Mbps*
- ISR 1121X-8P Up to 470 Mbps*
- ISR 111x-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*

** VDSL2, ADSL2+ only

* SD-WAN IMIX Perf

Machine to Machine
Extended temperature & dual LTE

Remote Workers

Managed Service
Provider CPE

Branch in a box

Today's campus is wherever we work



And faces growing IT complexity



Higher data rates

12.3 billion mobile devices in 2022 at 12% CAGR¹



IoT goes mainstream

IoT will be 50% of global connected devices by 2022²



Growing threats

27.4% average increase in security breaches in 2017

^{1, 2} Cisco VNI™ data

A modern campus requires a new network



Mobile first



Cloud driven



AI optimized

Cisco ISR 1130 Series Routers

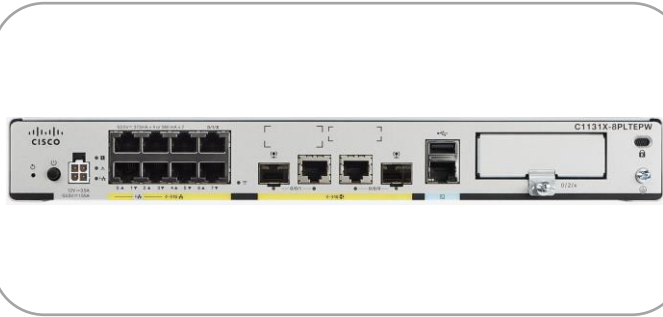
WAN and Application Assurance

Forward Error Correction
TCP Optimization
Packet Duplication
SGT Propagation



Advanced Mobility

Pluggable LTE (Cat 4|6|18|5G)
Embedded WiFi6 access point



High Performance & Scale

Up to 650Mbps of IPsec throughput
Dynamic Core Allocation
Up to 200 IPSEC and GRE Overlay Tunnels



Comprehensive Security

IPS
URL Filtering
Advanced Malware Protection
Enterprise FW with Application Awareness
Umbrella SIG

Full Featured SD-WAN



Rich Services with Enhanced Performance

WiFi6/PoE+

8GB DDR4

IOS-XE/
IOS-XE SD-WAN

Manageability

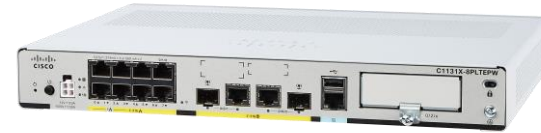
vManage

WebUI

DNAC On Prem

ISR 1130 Series Platforms List

C1131X-8PLTEPWx
(2x1G WAN Ports)



(8GB DRAM, CAT 4|6|18|5G*, WiFi6)

C1131-8PLTEPWx
(2x1G WAN Ports)



(4GB DRAM, CAT 4|6|18|5G*, WiFi6)

C1131X-8PWx
(2x1G WAN Ports)



(8GB DRAM, WiFi6)

C1131-8PWx
(2x1G WAN Ports)



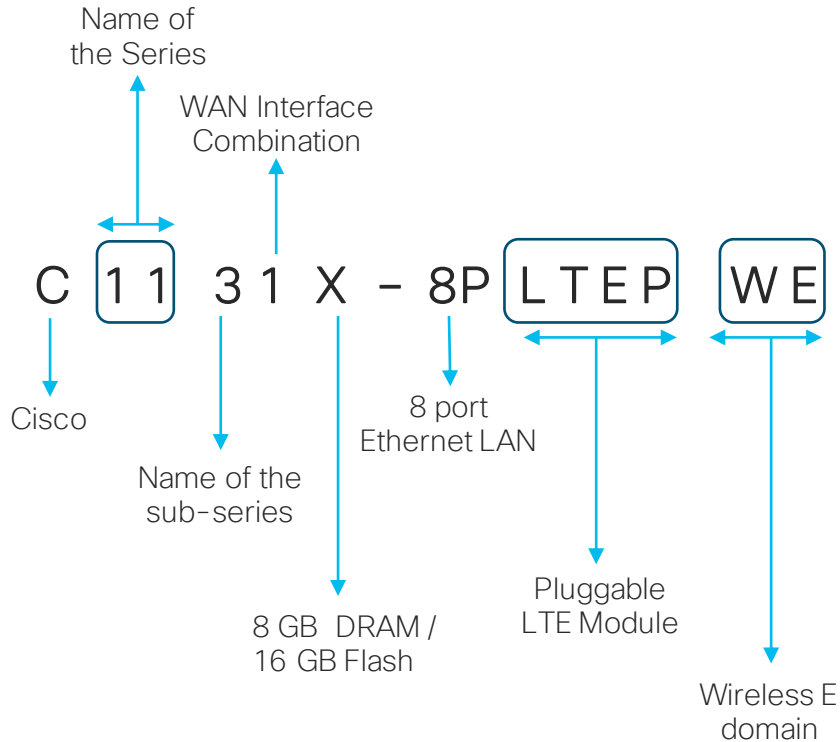
(4GB DRAM, WiFi6)

IMIX traffic (Avg. 352 bytes)
CEF: 1.8 Gbps throughput
IPsec: 650 Mbps throughput
*5G is on the roadmap

SD-WAN, Cellular Gateway, Trustworthy Solutions: Compatible with all ISR 1000 Platforms

Product Overview

Router PID Breakdown



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

Wi-Fi Bands

Band-Countries

-A

ARGENTINA
BAHRAIN
CANADA
COLOMBIA
MEXICO
OMAN
PHILIPPINES

-B

AZERBAIJAN
BAHRAIN
OMAN
UNITED STATES

Band-Countries

-E

All CE Countries
BAHRAIN
BOTSWANA
GHANA
ISRAEL
KAZAKHSTAN
KENYA
MYANMAR
OMAN
SAUDI ARABIA
SOUTH AFRICA
THAILAND
UGANDA
UNITED ARAB EMIRATES

Band-Countries

-Q

AZERBAIJAN
BAHRAIN
JAPAN
OMAN

-Z

AUSTRALIA
AZERBAIJAN
BAHRAIN

C1131-8PWx

DRAM/FLASH
4GB/8GB

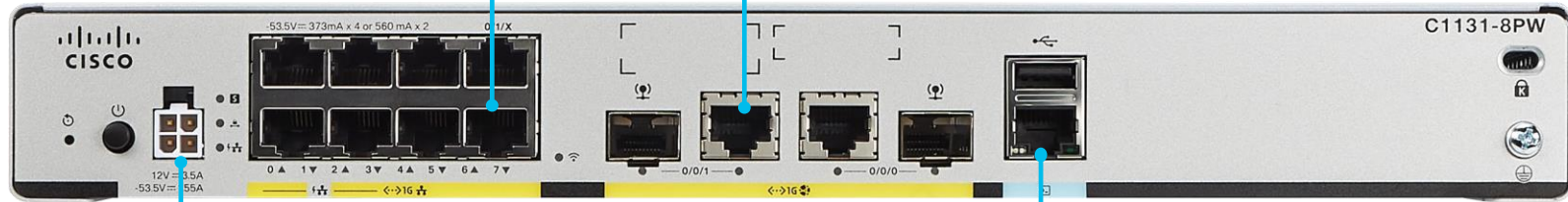
SD-WAN Ready

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

C1131X-8PWx

DRAM/FLASH
8GB/16GB

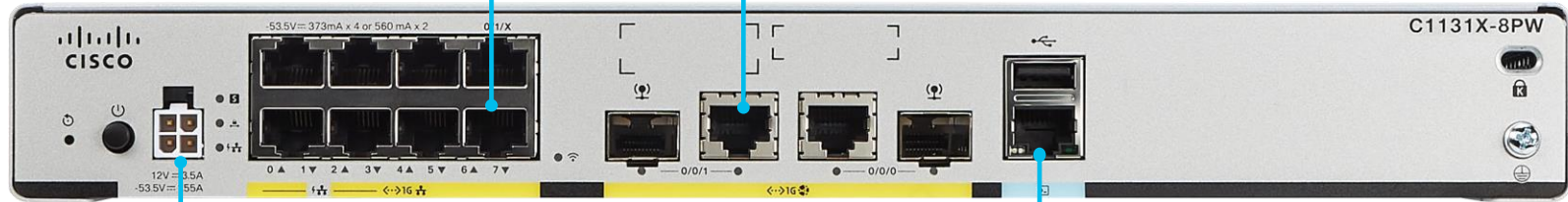
SD-WAN Ready

802.11ax
Wi-Fi 6

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Status and physical security

- Status LED
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- Reset button
- Power connector

Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

C1131-8PLTEPWx

DRAM/FLASH
4GB/8GB

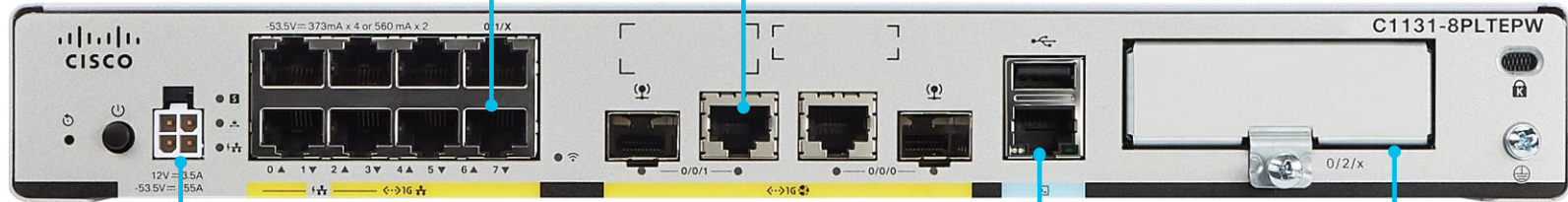
SD-WAN Ready

802.11ax
Wi-Fi6

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Status and physical security

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- Reset button
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Management/USB Storage

- RJ45 Console
- USB 3.0, Type A

Pluggable LTE Technology

- CAT 4
- CAT 6
- CAT 18

C1131X-8PLTEPWx

DRAM/FLASH
8GB/16GB

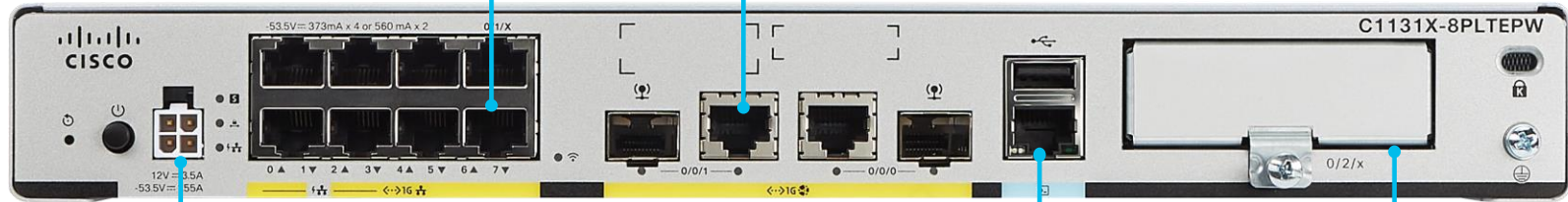
SD-WAN Ready

802.11ax
Wi-Fi6

External PSU

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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

Platform Architecture

Easy Operations with Single Image

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

IOS XE
IMAGE
universalk9

IOS XE
'Autonomous'
mode

Accelerate SD-WAN

Single
Image
universalk9



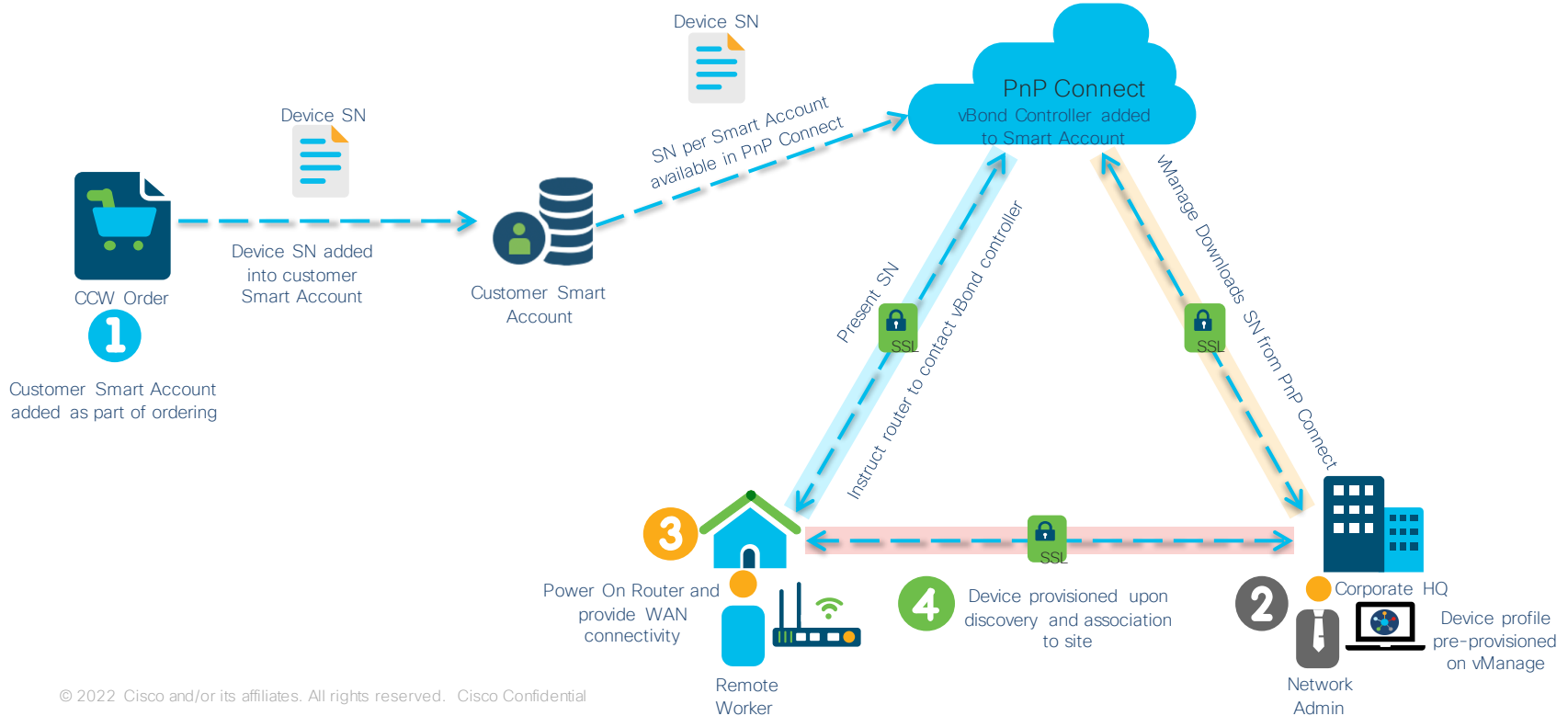
Simplify Deployments

IOS XE
SD-WAN
IMAGE
ucmk9

IOS XE
SD-WAN
'Controller'
mode

Cloud-scale Applications

Day-0 deployment using PnP Connect

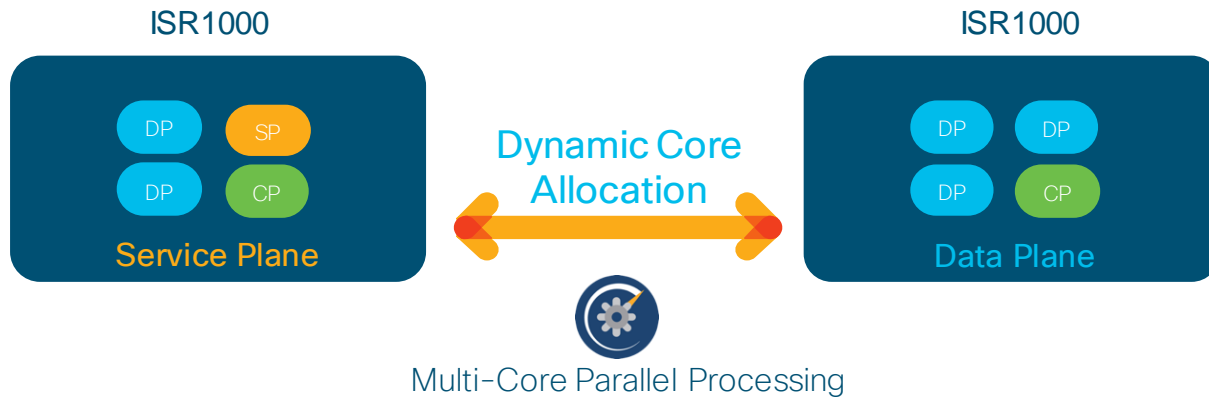


“DP Heavy” SoC Architecture

Key Datapath Innovations

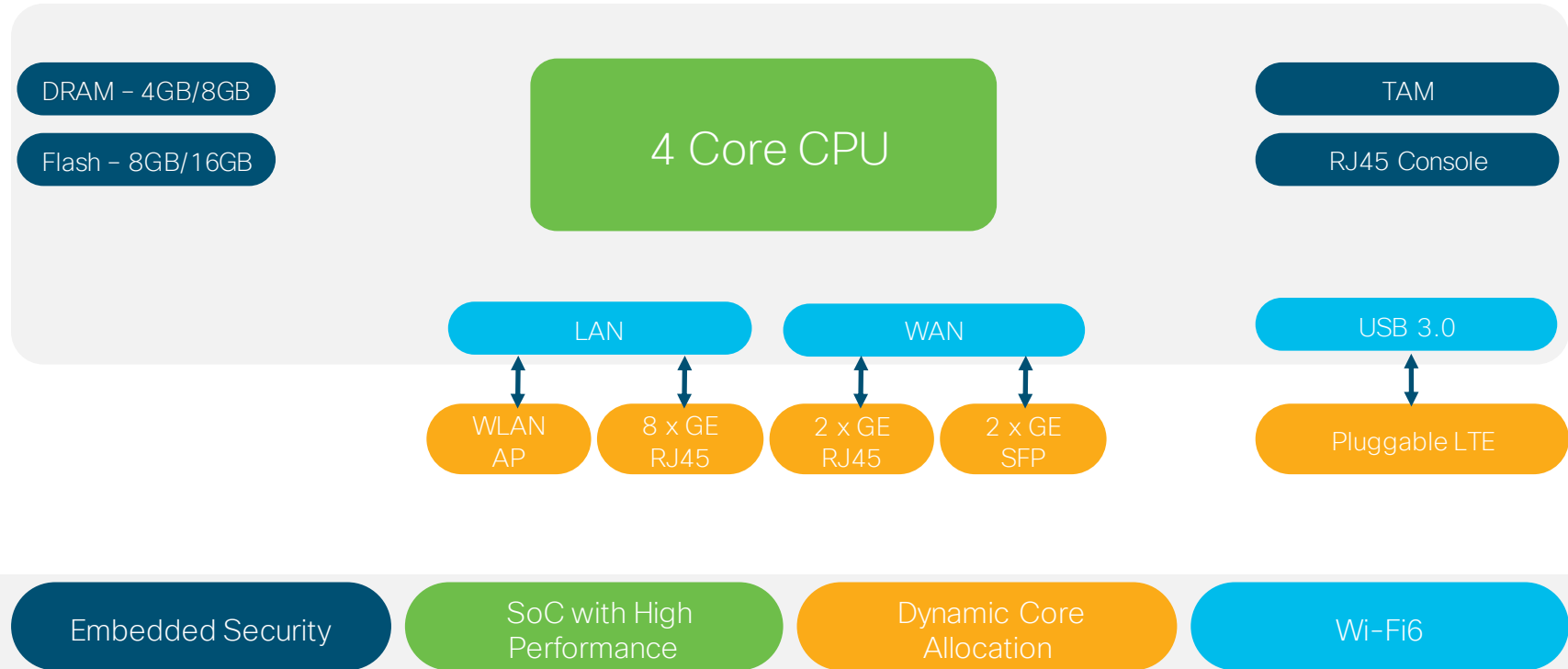


X86 Multi-core CPU



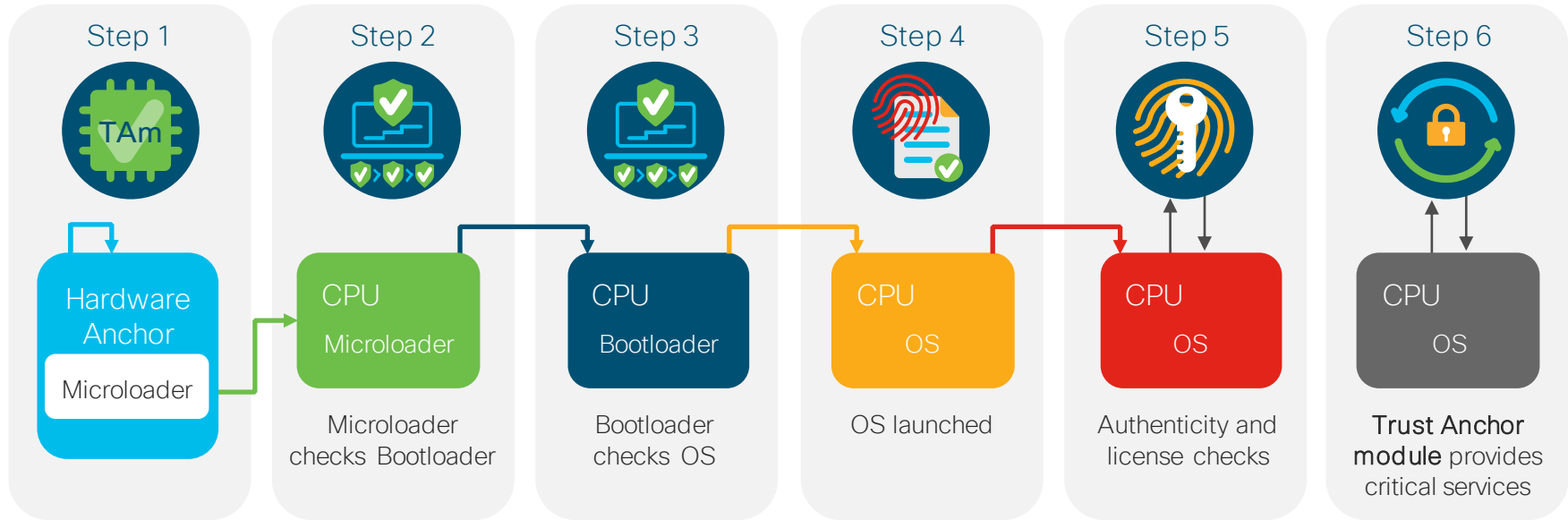
-  DP Data Plane Core
-  CP Control Plane Core
-  SP Service Plane Core

Cisco ISR 1130 Series Routers Block Diagram





Secure Platform with Trustworthy Solutions



First instructions run on CPU stored in tamper-resistant hardware

Confidentiality

Integrity

Authenticity

Specifications

Feature	C1131-8PW	C1131X-8PW	C1131-8PLTEPW	C1131X-8PLTEPW*
Dimension (H x W x D)			1.65 x 12.7 x 8.9 in.	
Weight			4.89 lbs.	
External Power Supply			<ul style="list-style-type: none"> • AC input voltage: Universal 100 to 240 VAC, 50-60 Hz • Output voltage: 12 VDC • Maximum output power: 66 W • Requires 150W power supply for optional PoE and PoE+ • External output voltage of -53.5V 	
Operating Conditions			<ul style="list-style-type: none"> • Temperature: 0 – 40 °C • Altitude: 0 – 10,000 ft • Humidity: 10 – 85% relative humidity (non-condensing) 	
Non-operating Conditions			<ul style="list-style-type: none"> • Temperature: -20 – 65 °C • Altitude: 0 – 15,000 ft • Humidity: 5 – 95% relative humidity (non-condensing) 	
Min Supported Version (XE SD-WAN)			17.7	

Pluggable Options

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



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

Autonomous Mode

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

LTE Advanced Pro

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

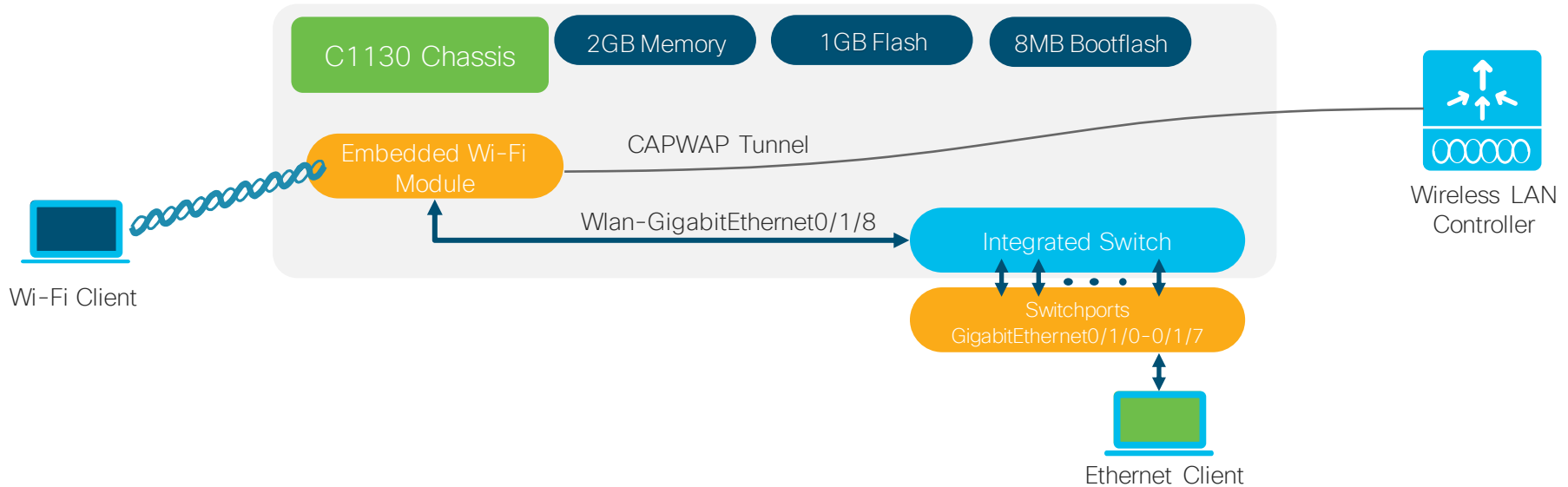
Dual SIM Support

Zero-Touch
Provisioning

SD-WAN

Wi-Fi 6

Wireless LAN Hardware Overview



Maximal Ratio Combining

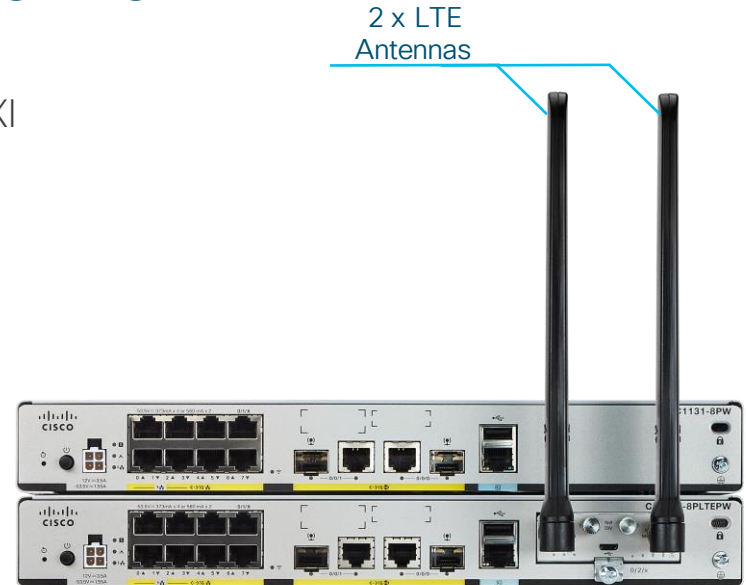
OFDMA

BSS Coloring

Target Wake Time

Wireless LAN Hardware Overview

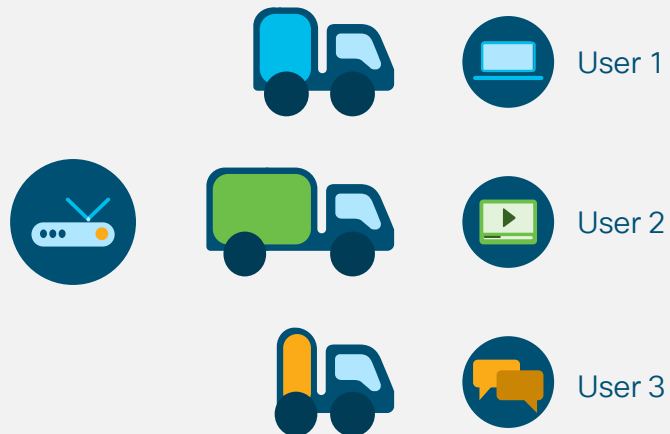
- WLAN Module based on the Cisco Catalyst 9105 AXI
- Default image – Embedded Wireless Controller (EWC)
- For CAPWAP mode – Use DHCP option 43 command
- 802.11ax Wave 2 Dual Radio (2.4 GHz & 5 GHz)
- 2x2 MU-MIMO, with 2 Spatial Streams
- 2 internal Wi-Fi antennas, no external Wi-Fi antenna
- Console 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



OFDMA: Orthogonal Frequency-Division Multiple Access

Workspace use case

OFDM



Vs

OFDMA

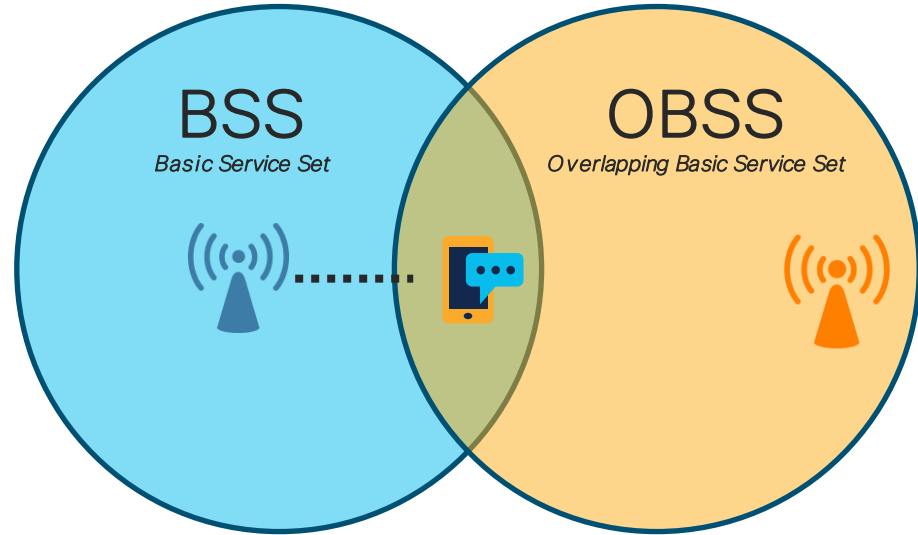


- Overhead – Amortized between users
- Efficient use of Resources
- Scales resources for different traffic mix
- Increases overall Efficiency

BSS Coloring

Spatial Reuse and Addressing Interference

- All devices within a BSS send the same value (color), which will be different than other nearby BSSs (or OBSSs)
- Each BSS (AP) uses a different “color” (6 bits in the preamble)
- Each user (station) learns its BSS color upon association, allowing it to identify other BSSs as OBSS
- Stations detecting the same BSS color (intra-BSS) use a lower RSSI threshold for deferral which reduces intra-BSS collisions
- Stations detecting a different BSS color (inter-BSS) use a higher RSSI threshold, which allows more simultaneous transmissions

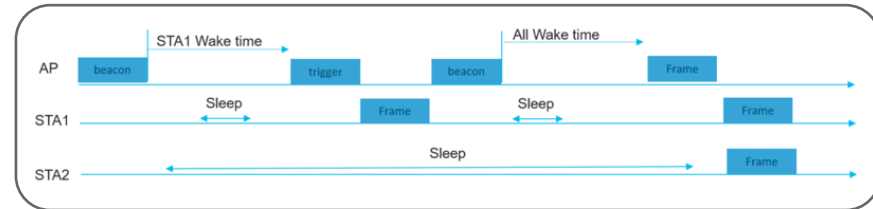
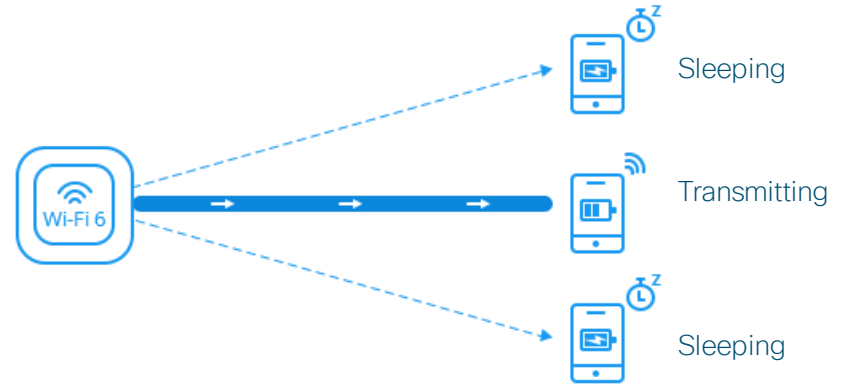


Benefit: Overcomes the problem of frequency reuse due to 2.4 GHz only having three non-overlapping Wi-Fi channels

Target Wake Time

Putting Devices to Sleep

- Target Wake Time (TWT) provides an effective mechanism to schedule transmissions in time
- Phones and IoT devices can sleep conserving battery life and then wake to take advantage of multi-user transmissions and coexist in high-density RF environments with ease
- With Target Wake Time (TWT), the AP can schedule phones and IoT devices sleep for long durations (**up to 5 years**) and then wake the individual device up.
- Devices can be configured to wake up as a group to communicate at the same time sharing the channel for increased network capacity and reduced battery drain.
- Use of BSS Color field and UL/DL flag in preamble to enable intra-PPDU power saving



Embedded Wireless Controller Configuration

1

Baseline Configuration

2

Scan QR Code on Router

Over-the-air provisioning
Mobile app

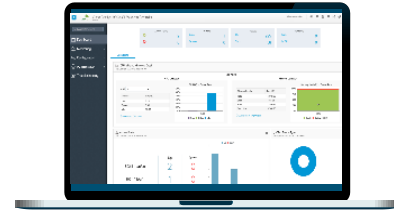


OR

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 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
```

3. Configure SVI

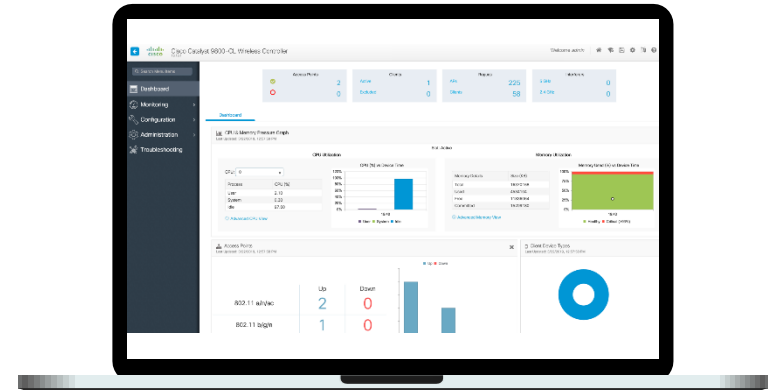
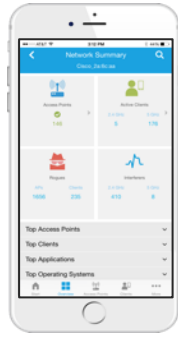
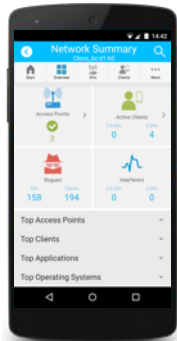
```
interface Vlan199
 description Wireless
 ip address 10.10.10.1 255.255.255.0
 ip nat inside
```

4. Configure NAT and ACL

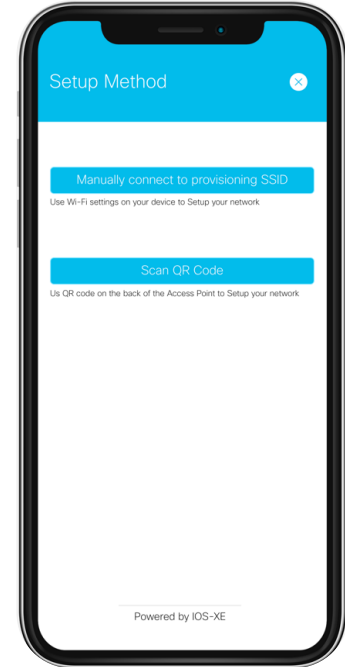
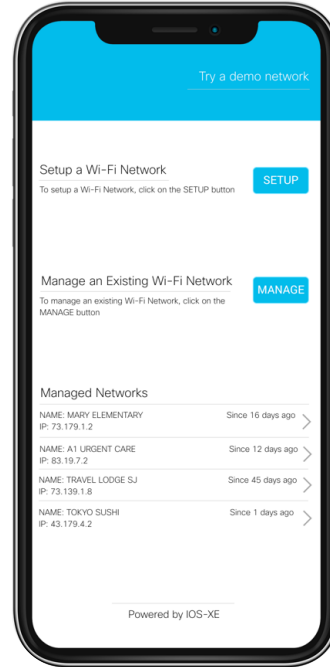
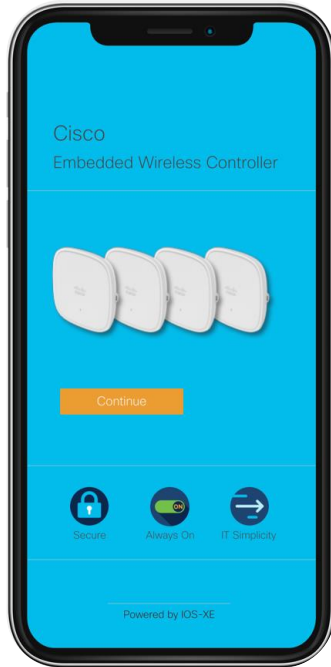
```
ip nat inside source list 10 interface
    GigabitEthernet0/0/0 overload
 !
ip route 0.0.0.0 0.0.0.0 192.168.0.1
 !
ip access-list standard 10
 10 permit 10.10.10.0 0.0.0.255
```


Over-The-Air Provisioning (OTAP)

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



Cisco Wireless Mobile App



1

Landing Page

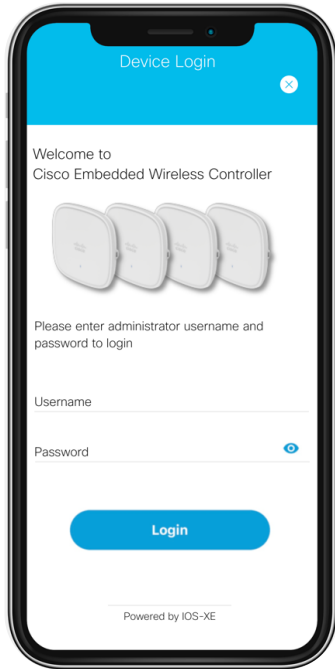
2

Setup Wi-Fi Network

3

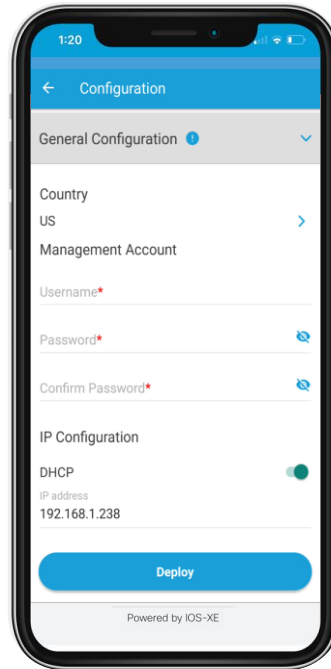
Manual or Scan QR Code

Cisco Wireless Mobile App



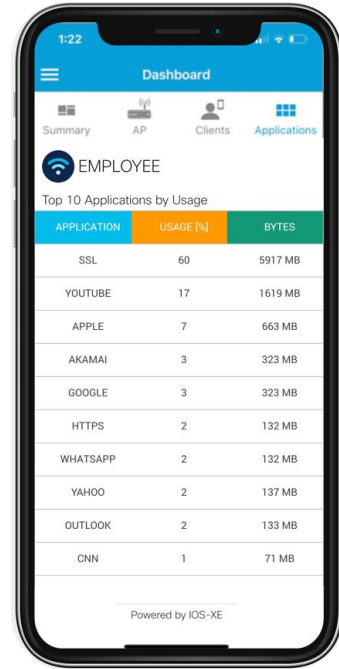
4

Login Credentials



5

Deploy Day-0 Wizard



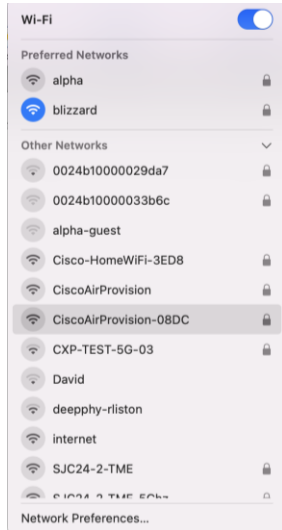
6

Manage your network

Connect to the default SSID

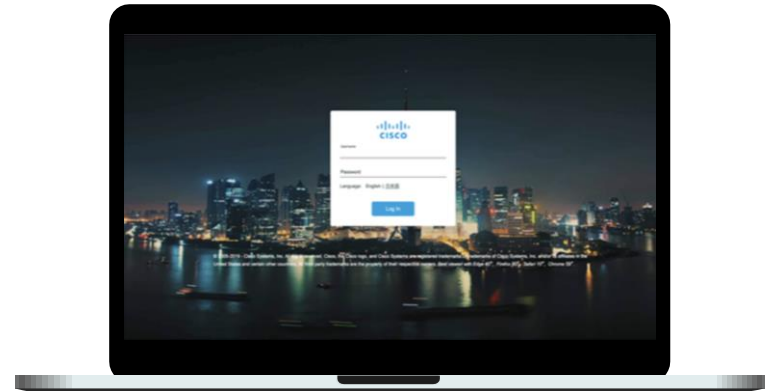
1

CiscoAirProvision-XXXX



2

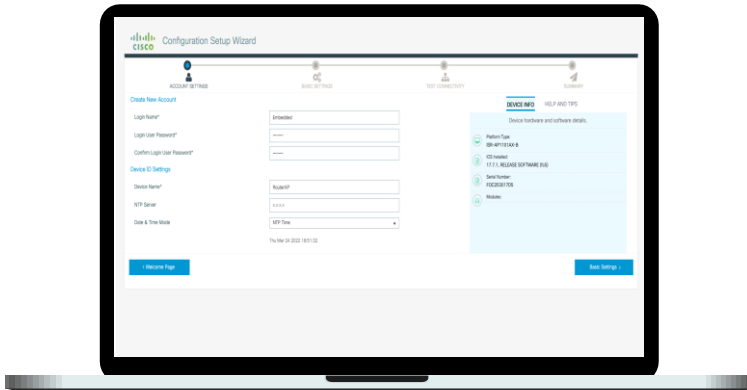
Go to mywifi.cisco.com



Connect to the default SSID

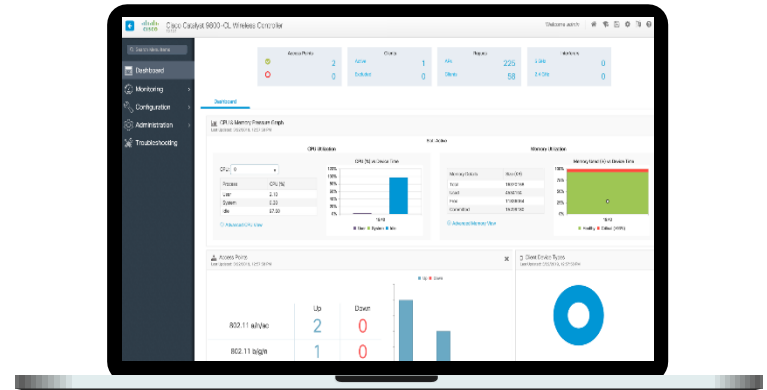
3

Day-0 Config Wizard



4

CiscoAirProvision-XXXX



Access Point mode switch

EWC → CAPWAP

1. Access AP Console from Router CLI

```
hw-module session 0/2 (or 0/3)
```

2. Login to EWC with default username & password (Cisco/Cisco)

3. Go to CAPWAP shell

```
wireless ewc-ap ap shell username <username>
```

4. Change mode to CAPWAP

```
ap-type capwap
```

CAPWAP → EWC

1. Complete baseline config for Router to AP

2. Add EWC and AP image to Router bootflash

```
copy usb0:ap1g8 bootflash:
```

```
copy usb0:C9800-AP-iosxe-wlc.bin bootflash
```

3. Access AP console from Router CLI

```
hw-module session 0/2 (or 0/3)
```

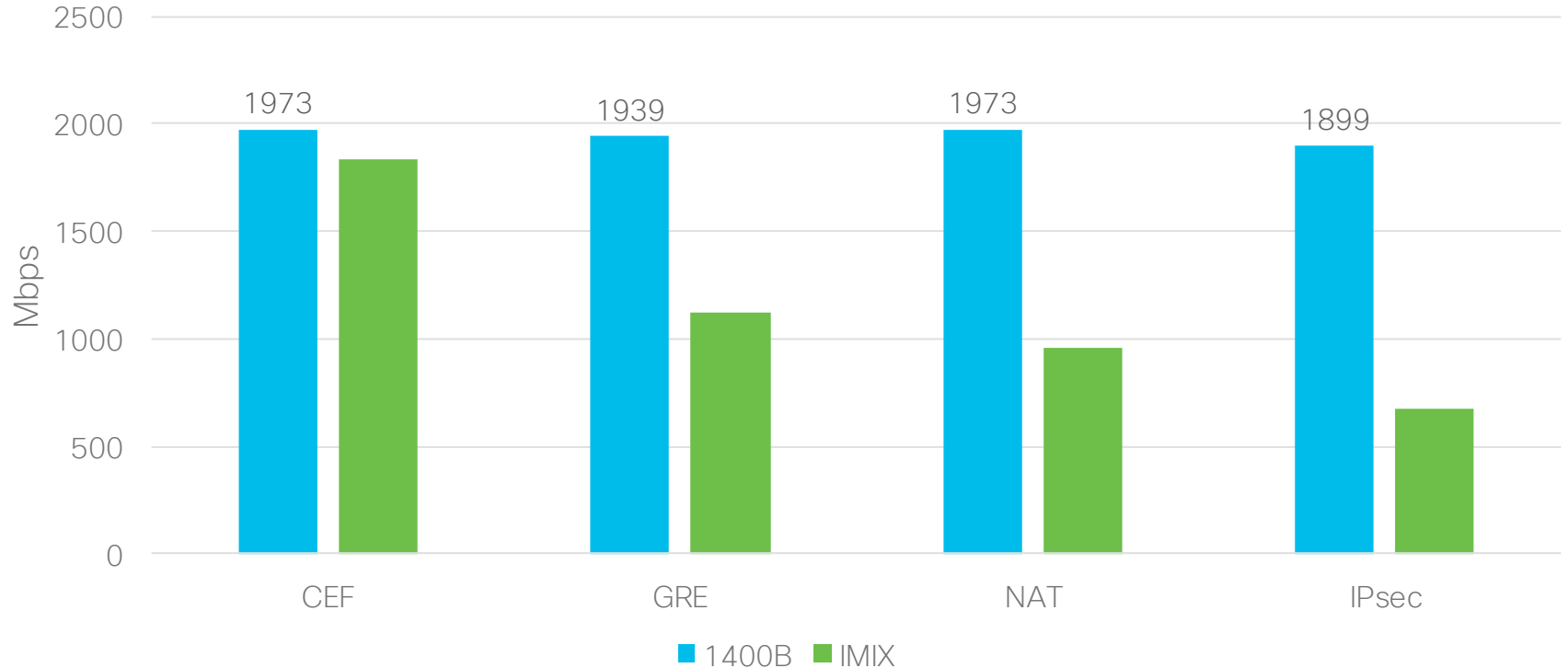
4. Change mode to EWC

```
ap-type ewc-ap tftp://<default-gw>/ap1g8
```

```
tftp://<default-gw>/C9800-AP-iosxe-wlc.bin
```

Performance

ISR 1131 IOS XE Throughput Profiles



ISR 1131 Series Platforms Scale IOS XE

Features	4GB DRAM
Number of VLANs per system	1K
Number of QinQ VLANs per system	1K
Number of ARP entries	8K
Number of BFD Sessions	500
Number of LDP Neighbors	1K
Number of Mcast Groups (IPv4 IGMP)	140K
Number of Mcast Groups (IPv6 MLD)	32K
Number of mroutes (IPv4, IPv6)	1K
Number of IPv4 VRF mroutes (IPv4, IPv6)	1K
Number of OIFs per group	100
Number of PIM Neighbors	100
Number of TE Tunnel Head and Tail	1K

ISR 1131 Series Platforms Scale IOS XE

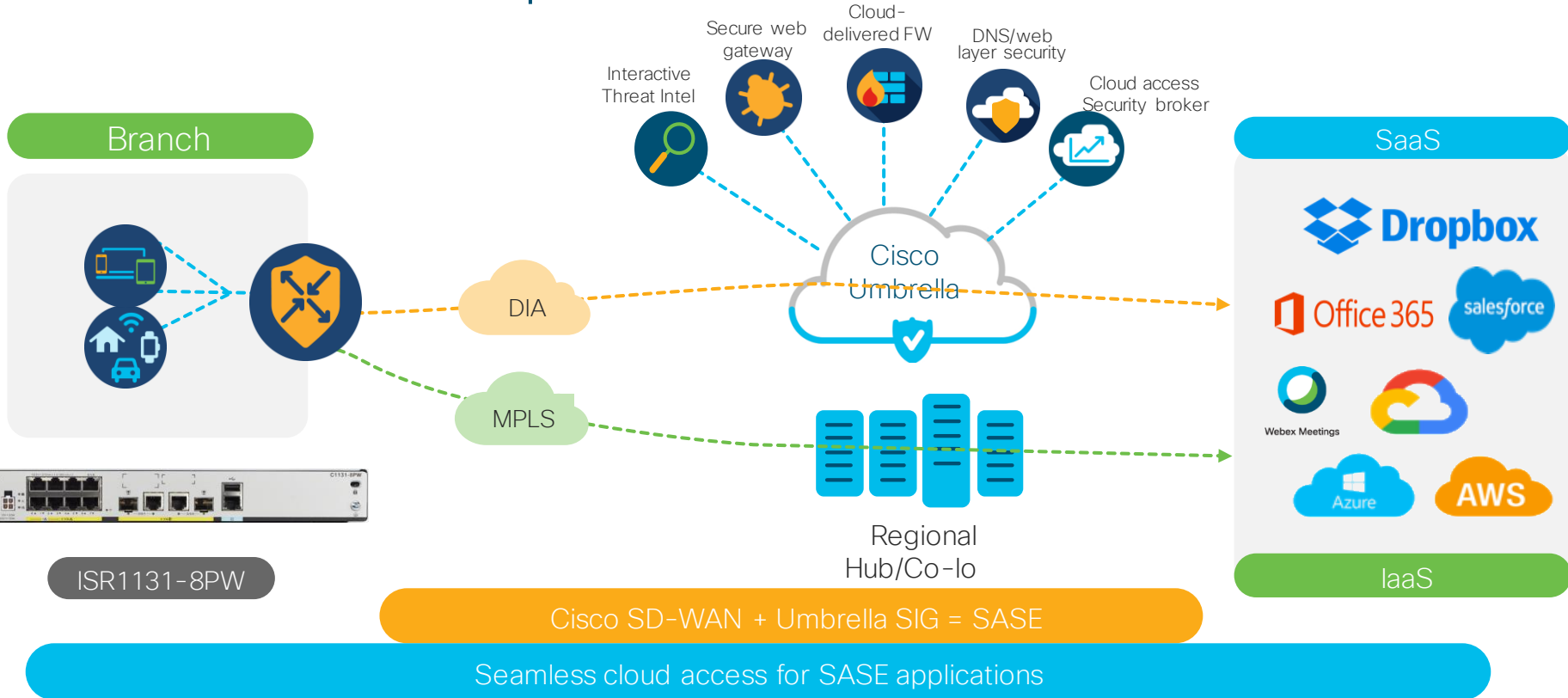
Features	4GB DRAM
Number of IPv4 routes (BGP)	280K
Number of IPv6 routes (BGP)	260K
Number of IPv4 VRF Routes (MPLS VPN) - per prefix label	150K
Number of IPv4 VRF Routes (MPLS VPN) - per vrf label	150K
Number of IPv6 VRF Routes (MPLS VPN) - per prefix label	140K
Number of IPv6 VRF Routes (MPLS VPN) - per vrf label	140K
Max NAT44 static entries	32K
Max NAT44 static networks	600
Max number of Firewall sessions	20K
Max number of NAT+FW sessions	20K
IPv4 ACLs per System	4K
IPv6 ACLs per System	4K

ISR 1131 Series Platforms Scale IOS XE

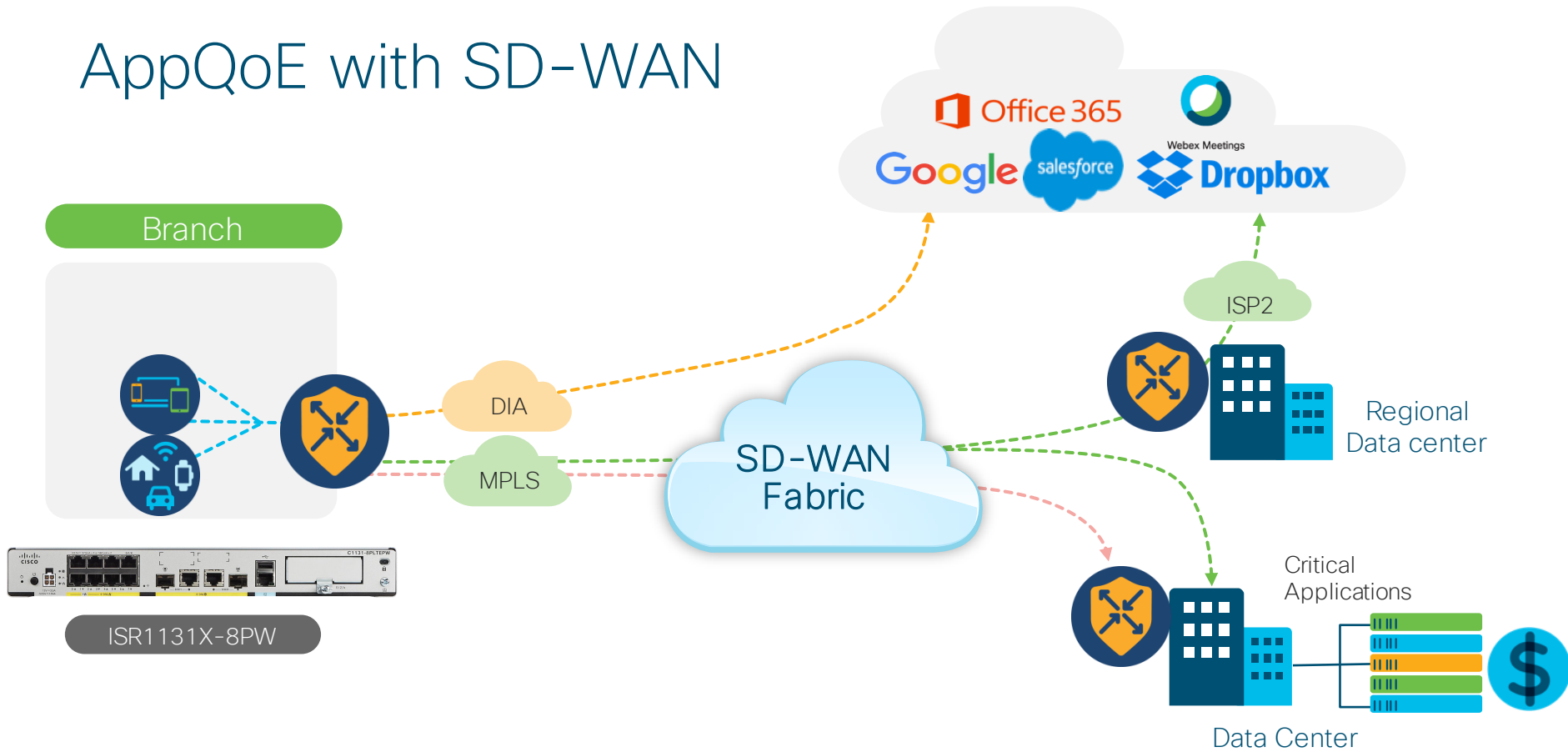
Features	4GB DRAM
DMVPN / BGP Adjacencies, IKEv1, IPv4	100
DMVPN / BGP Adjacencies, IKEv2, IPv4	100
DMVPN / EIGRP Adjacencies, IKEv1, IPv4	100
DMVPN / EIGRP Adjacencies, IKEv2, IPv4	100
Number of IPsec tunnels (FlexVPN, AAA/CERT), IKEv2, IPv4	100
Number of IPsec tunnels (FlexVPN, AAA/PSK), IKEv2, IPv4	100
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv4	100
Number of IPsec Tunnels (IPsec/GRE, S2S), IKEv2, IPv6	100
Number of IPsec Tunnels (IPsec, S2S), IKEv1, IPv4	100
Number of IPsec Tunnels (IPsec, S2S), IKEv2, IPv4	100
Number of IPsec Tunnels (IPsec, S2S), IKEv2, IPv6	100
Number of IPsec Tunnels (IPsec/sVTI, S2S), IKEv2, IPv4	100

Use Cases

SASE Cloud Adoption with SD-WAN



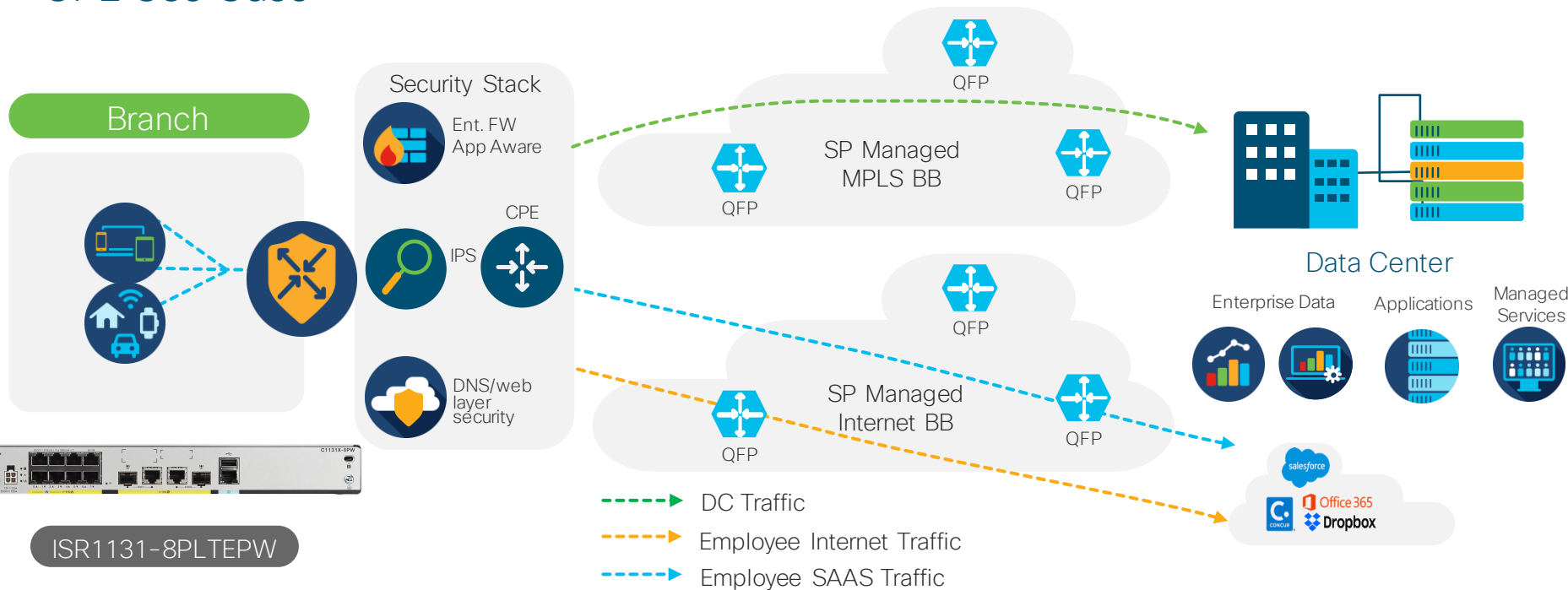
AppQoE with SD-WAN



TCP Optimization, Forward Error Correction, Packet Duplication, Enhanced Application Quality experience

Managed Service Providers

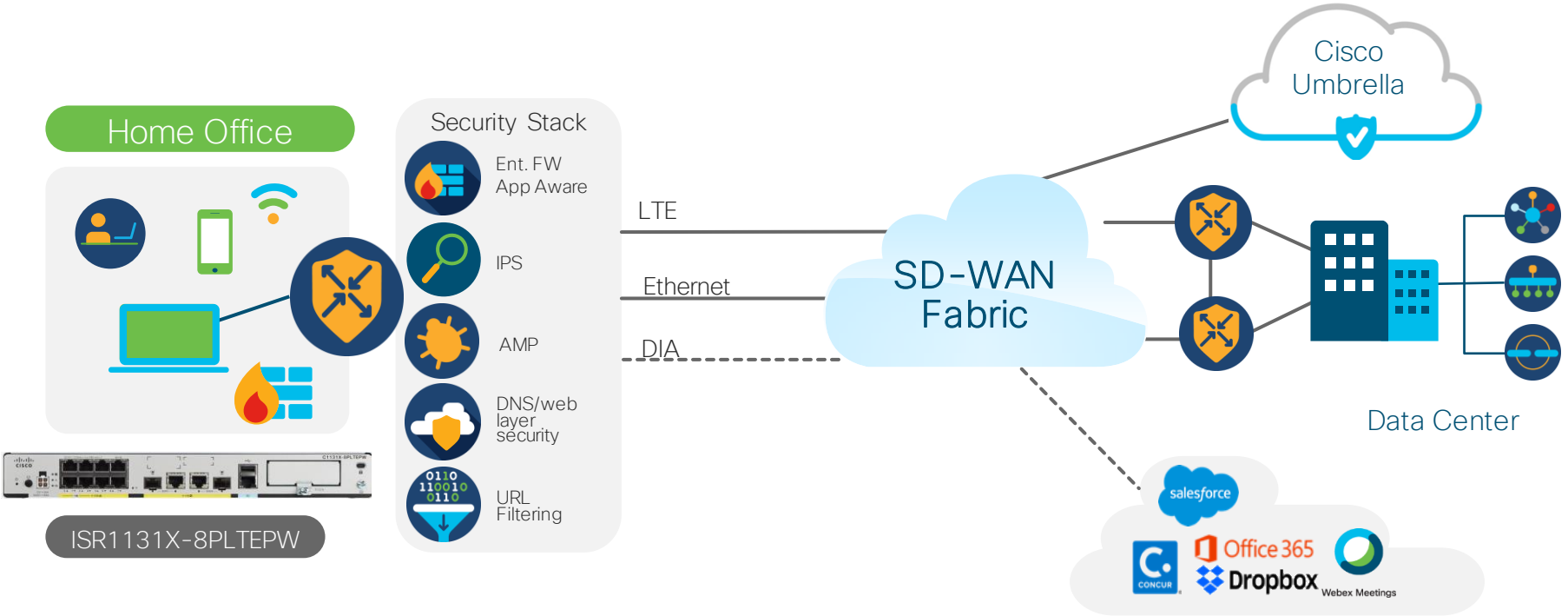
CPE Use Case



ISR1131-8PLTEPW

High Performance, SP Managed Network, SP Managed Services

Remote Worker: Zero Touch Deployment



Integrated Security, Visibility & Analytics, Cloud OnRamp for SaaS, Office in a Box (WiFi + LTE)



Backup Slides

ISR 1000 Naming Convention

1. 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

2. The third digit denotes the Product generation

- “11**1**x” = 1st generation ISR 1000
- “11**2**x” = 2nd generation compact size ISR1000
- “11**3**1” = ISR1000 with Wi-Fi 6 and/or 5G
- “11**6**1” = ISR1000 with next generation processor for higher throughput

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

- “1101” = One WAN interface
- “1111” = Two GE WAN interfaces
- “1112” = One GE and One GFAST/35b (Annex B/J) WAN interface
- “1113” = One GE and One GFAST/35b (Annex A/M) WAN interface
- “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

- “1118” = One GE WAN Interface and One DSL with G.SHDSL

4. 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

DDR RAM:

- “1111**X**” “1117**X**” “1116**X**” “1121**X**” “1131**X**” “1161**X**”
X = denotes 8GB RAM

Links & Resources

- Wireless AP EWC smartphone configuration guide – [Open link](#)
- Wireless AP EWC WebUI configuration guide – [Open link](#)
- Remote Workforce Routing Solution – Step by step guide – [Open link](#)
- Cisco ISR 1000 Datasheet – [Open link](#)
- Hardware Installation Guide – [Open link](#)
- 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>



Do you still have questions?

Use the "Q&A" panel

Ask Me Anything

ASK ME ANYTHING

Till April 22nd, 2022
With Abhishek

Participate: <https://bit.ly/AMAApril19th>



ASK ME ANYTHING

ISR 1131 Technical Decision
Maker

April, 19th -April, 22nd

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Thank you for Your
Time!

Please take a moment to complete
the survey



Thanks For Joining today!

