CISCO

Cisco Tech Club Days

Novinky IoT portfolia v roce 2022

Switching, Routing, Wireless, Mngmt, Security

Jiří Rott
jirott@cisco.com
13.12.2022

Agenda

1 Portfolio Overview

2 IoT Switching IE 3K, IE 9300

3 IoT Routers IR1101, IR1800, IR8100, IR8300

4 IoT Wireless, CURWB, IAV (LoRAWAN)

5 IoT OD, Cyber vision 4.1 - update

Portfolio Overview

Comprehensive IoT Portfolio

Industrial Switching
1K, 2K, 3200, 3300, 3400, 3400H, 4K, 5K, 9k3

Industrial Routing
IR1101, IR1800, IR8100, IR8340

Embedded IoT
ESS, ESR, ESW, Resilient Mesh

Industrial Wireless
Cisco Ultra Reliable Wireless Backhaul, Catalyst IW9167E, IW6300, IW3702, IXM Gateway
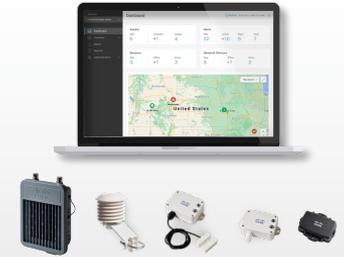
Industrial Security
ISA 3000, Cyber Vision

Edge Intelligence
IOx

Full-stack as a Service
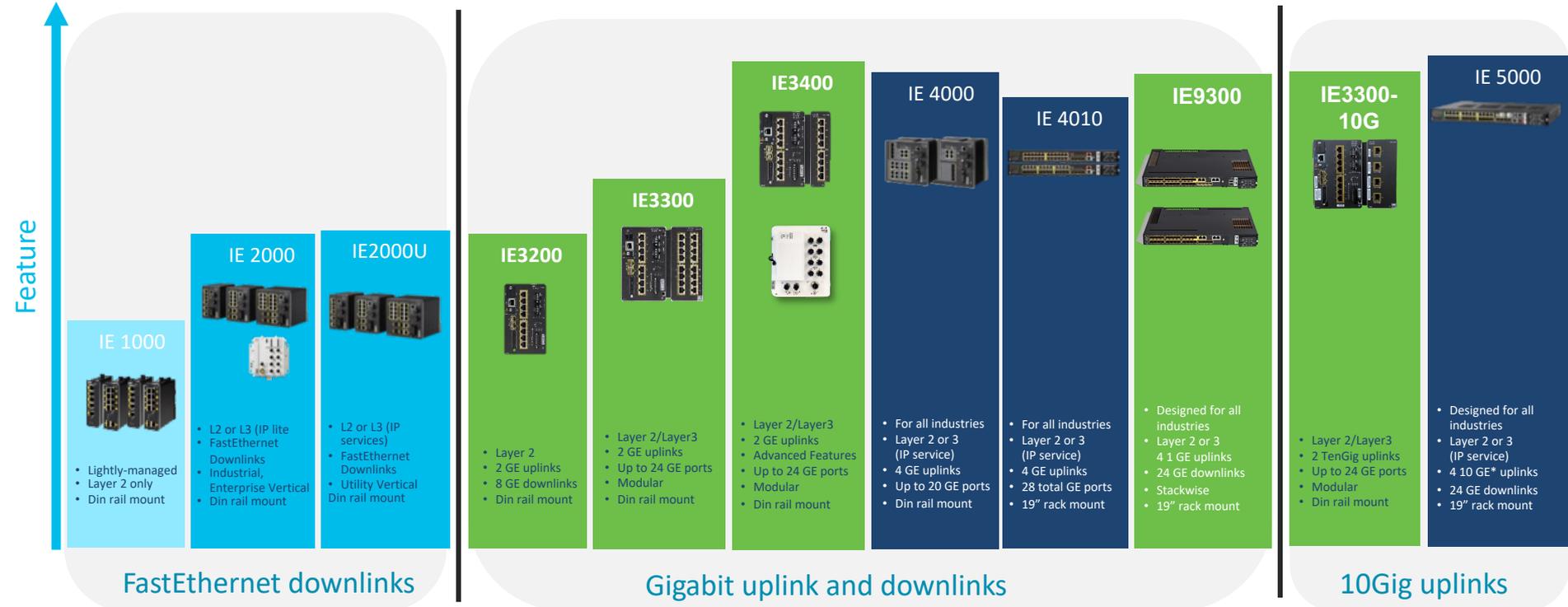Industrial Asset Vision

Management & Automation
Field Network Director, Industrial Network Director, IoT Operations Dashboard

IoT Switching

IoT Industrial Switching portfolio

Feature

FastEthernet downlinks

IE 1000
- Lightly-managed
- Layer 2 only
- Din rail mount

IE 2000
- L2 or L3 (IP lite
- FastEthernet Downlinks
- Industrial, Enterprise Vertical
- Din rail mount

IE2000U
- L2 or L3 (IP services)
- FastEthernet Downlinks
- Utility Vertical Din rail mount

Gigabit uplink and downlinks

IE3200
- Layer 2
- 2 GE uplinks
- 8 GE downlinks
- Din rail mount

IE3300
- Layer 2/Layer3
- 2 GE uplinks
- Up to 24 GE ports
- Modular
- Din rail mount

IE3400
- Layer 2/Layer3
- 2 GE uplinks
- Advanced Features
- Up to 24 GE ports
- Modular
- Din rail mount

IE 4000
- For all industries
- Layer 2 or 3 (IP service)
- 4 GE uplinks
- Up to 20 GE ports
- Din rail mount

IE 4010
- For all industries
- Layer 2 or 3 (IP service)
- 4 GE uplinks
- 28 total GE ports
- 19" rack mount

IE9300
- Designed for all industries
- Layer 2 or 3 4 1 GE uplinks
- 24 GE downlinks
- Stackwise
- 19" rack mount

10Gig uplinks

IE3300-10G
- Layer 2/Layer3
- 2 TenGig uplinks
- Up to 24 GE ports
- Modular
- Din rail mount

IE 5000
- Designed for all industries
- Layer 2 or 3 (IP service)
- 4 10 GE* uplinks
- 24 GE downlinks
- 19" rack mount

'*' –Selected Models

IE3400H has FE Model too

IoT IE Switching Din Rail Portfolio - HW

	IE1000	IE2000	IE3200	IE3300-1G uplink	IE3300-10G uplink	IE3400	IE4000
Downlink Speeds	Fast Ethernet	Fast Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet	Gigabit Ethernet
Manageability	Light	Yes	Yes	Yes	Yes	Yes	Yes
PoE / PoE+	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4PPoE					Yes		
Modularity				Yes	Yes	Yes	
IP67 Version		Yes				Yes	
10G Uplinks					Yes		
Timing: GPS, IRIG							
Conformal Coating		Yes *					

'*' – some models. Check datasheet

IoT IE Switching Din Rail Portfolio - SW

	IE1000	IE2000	IE3200	IE3300-1G uplink	IE3300-10G uplink	IE3400	IE4000
Manageability	Light	Yes	Yes	Yes	Yes	Yes	Yes
Operating system	Other	Classic IOS	IOS XE	IOS XE	IOS XE	IOS XE	Classic IOS
Full Layer 3 routing		Limited		Yes	Yes	Yes	Yes
Licensing	NA	LanLite / Lanbase / IPLite	Network Essentials	Network Essentials/ Advantage	Network Essentials/ Advantage	Network Essentials/ Advantage	LanBase / IP Services
Industrial Protocols (Profinet/Ethernet IP,…)		Yes	Yes	Yes	Yes	Yes	Yes
L2NAT		Yes *	No	Yes	No	Yes	Yes
PTP		Yes *	Yes	Yes	Yes	Yes	yes
SDA EN /PEN			EN	EN	EN	PEN	EN
MACsec 128/256			128	128/256	128/256	128/256	128
Flexible NetFlow				Yes	Yes	Yes	Yes
TSN / TSN Ready						TSN ready	Yes
Cyber Vision/ IOx					Yes	Yes	
Advanced HA: PRP, HSR						Yes	Yes

'*' – some models. Check datasheet   '**' – on roadmap

IE 9300 HW

Cisco IE-9310-26S2 Front Panel

24x SFP Gigabit Ethernet Ports (Downlinks)
- 22x 100/1000M SFP ports
- 2x GE Combo (100/1000 SFP, 10/100/1000 RJ45) ports

Alarm Contacts
- FOUR Alarm Inputs
- ONE Alarm Output

Console
- RS232
- Micro USB

Conductive Cooling
- No fans or moving parts
- Increased Operating Temp

Mode & System LEDs
- System, Alarm
- Port Status LEDs

4x SFP Gigabit Ethernet Ports (Uplinks)
- 1000M SFP

Field Replaceable Power Supplies
- High Voltage PS: 85–265 VAC , 88-300 VDC
- Low Voltage PS: 18-75 VDC

Substation Hardened
- Substation Compliant
- IEC61850-3 and IEEE1613

All Ports IEEE 1588 v2/PTP
- Power Profile c37.238, Default Profile

Storage
- SD Flash
- USB 2.0

- IE9300 Models' similarities
- IE9300 Models' Differences

Cisco IE-9320-26S2 Front Panel

24x SFP Gigabit Ethernet Ports (Downlinks)
- 22x 100/1000M SFP ports
- 2x GE Combo (100/1000 SFP, 10/100/1000 RJ45) ports

Alarm Contacts
- FOUR Alarm Inputs
- ONE Alarm Output

Console
- RS232
- Micro USB

Conductive Cooling
- No fans or moving parts
- Increased Operating Temp

Mode & System LEDs
- System, Alarm
- Port Status LEDs

Field Replaceable Power Supplies
- High Voltage PS: 85–265 VAC , 88-300 VDC
- Low Voltage PS: 18-75 VDC

4x SFP Gigabit Ethernet Ports (Uplinks)
- 100/1000M SFP

Substation Hardened
- Substation Compliant
- IEC61850-3 and IEEE1613

All Ports IEEE 1588 v2/PTP
- Power Profile c37.238, Default Profile

Storage
- SD Flash
- USB 2.0

Stacking Ports

IE9300 Models' similarities
IE9300 Models' Differences

IE 9300 Differences Between Models

IE9300 Models	PTP	L2NAT	PRP	HSR	Dying Gasp	Cyber Vision	SDA Fabric Edge	Vertical Stacking	Uplink SFP (Mbps)
IE-9310-26S2C	✓	✓	--	--	✓	✓	✓	--	1000
IE-9320-26S2C	✓	✓	✓	✓	✓	✓	✓	✓	100/1000

✓ at FCS
✓ post-FCS

- Both models have the same scale and performance capabilities

- IE9320 has an FPGA that allows for PRP and HSR functionality

- IE9320 extends its backplane for stacking through its UADP ASIC

IE 9320 Stacking

- Stack switches as a single virtual switch
  - Single management plane and control plane

- Stack up to 8x IE 9320s* (chain or ring connectivity)

- IE 9320 – 2 dedicated stacking ports (front panel)

- Performance (StackWise-80) – 80 Gbps bandwidth
  - Data rate per Stack port – 40 Gbps (Full Duplex)

- Mixed stacking not supported (only IE 9320 members)

- Same license level required in all stack members

- Stacking cables supported: 0.5M and 1.0M

- PTP and PRP not supported over stacking at FCS

*3-member stack at FCS

IE9300 Key Supported Features per License

Network Essentials

Layer 2 Switching	802.1q, 802.1w, 802.1ab, 802.1s, 802.3ad, PVRST+, PVST+, RPVST, RSPAN, SPAN, STP, Storm Control, VTP v2/v3, 802.1Q Tunneling, L2TP, QinQ, Selective QinQ, EtherChannel
Multicast	IGMP v1/v2/v3, IGMP Snooping, MLD Snooping
Management	WebUI, MIB, SNMP, syslog, DHCP server, NETCONF, Embedded Event Manager (EEM), PnP, Express Setup
Security	DHCPv6 Guard, IP Source Guard, IPv6 Destination Guard, IPv6 Neighbor Discovery Multicast Suppress, IPv6 Router Advertisement (RA) Guard, IPv6 Snooping, IPv6 Source/Prefix Guard, IPv6: Neighbor Discovery Duplicate Address Detection, Flexible Netflow, PACL, VACL, NEAT, HTTPS, RADIUS, TACACS+, X.509v3, Secure Shell SSH, DHCP Snooping, 802.1x, CISP, DAI, AAA, SCP, **L2NAT**[1], L3NAT, **IEEE 802.1AE MACsec-128**[1]

Quality of Service	802.1p, priority queuing, MQC, class based shaping & marking, egress policing, egress queuing and shaping, auto QoS, DSCP mapping and filtering, Low Latency Queuing
Layer 3 routing	Static routing, OSPF, OSPFv3, RIP, PBR
Industrial Ethernet	Locate Switch, SwapDrive, GOOSE Messaging, SCADA Protocol Classification, **PTP Default Profile & Power Profile 2011, Power Profile 2017**[1], NTP to PTP, BFD, **IOx (App hosting)**
Redundancy	Resilient Ethernet Protocol (REP) ring, **HSR, PRP, MRP**
Automation	YANG, NETCONF, RESTCONF

Network Advantage

Routing Protocols	HSRP, BGP, EIGRP, IS-IS, MBGP, NSF
Virtualization	VRF-Lite

Security	Cisco TrustSec – SGACL, SGACL Logging, EAP-TLS, **IEEE 802.1AE MACsec-256**[1]
IP Multicast	AutoRP, MSDP, PIMv2, IPv6 Multicast with VRF-Lite support

[1] Support planned / Roadmap

Industrial Routing

Industrial routing portfolio

Demanding, mission critical deployments		Embedded / versatile deployments

ATMs, low voltage substations, roadside traffic cabinets

Catalyst IR1101 — 5G

Compact

Remote monitoring, streetlights, intersections

Catalyst IR8100 — 5G

Outdoor

Embedded solutions for Routing, Switching and Wireless

ESR 6300

Fleet, first-responders, pipelines

Catalyst IR1800 — 5G

Mobile

Factory, high voltage substations

Catalyst IR8300 — 5G

Rack mount

IoT Industrial Modules

PIM NIM WIM

LTE Innovations & Pathway to 5G

FY2022

5G

5G Ready

Shipping

FirstNet **Private LTE/CBRS, Public Safety with FirstNet B14 (CAT18 LTE)**

P-5GS6-GL 8

Shipping

FirstNet **Public Safety with FirstNet Band 14 (Cat 4 LTE)**

P-LTEAP18-GL 7

Shipping

lte 4ADVANCED **Video surveillance (Cat 6 LTE)**

P-LTE-MNA 6

P-LTE-EA 5

P-LTE-LA 4

Shipping

lte **SCADA & Telemetry (Cat 4 LTE)**

P-LTE-GB 3

P-LTE-US 2

P-LTE-VZ 1 P-LTE-450

LTE module shared with Cisco ISR 1100

IR 1101

IR1101 - The Next Generation Industrial ISR

First IoT Router with IOS XE
High-end security Programmability

Top/Bottom Modules
for additional interfaces

Edge computing enabled
100G SATA

IOS-XE unified image 17.2.1r
Classic IOS and SDWAN

Modular LTE (public/private) & 5G

Low average Power
consumption of only 10W

Compact form factor for
Din-rail installations

Investment protection

Lower TCO

Extended product life time

IR1101 – Base Platform - Compact and Flexible

USB port Type A (IOS support)

Four 10/100Mbs RJ45 Ethernet LAN

SFP GE/FE WAN*

Pluggable LTE Module
(shared with C1100)

Copper RJ45 10/100/1000 Mbps Ethernet WAN*

Dual SIM slots Micro SIM format

Slot for Pluggable module

RS232 DTE RJ45 Async Serial Port

Mini-USB console port

DC In (+/-) Alarm Input
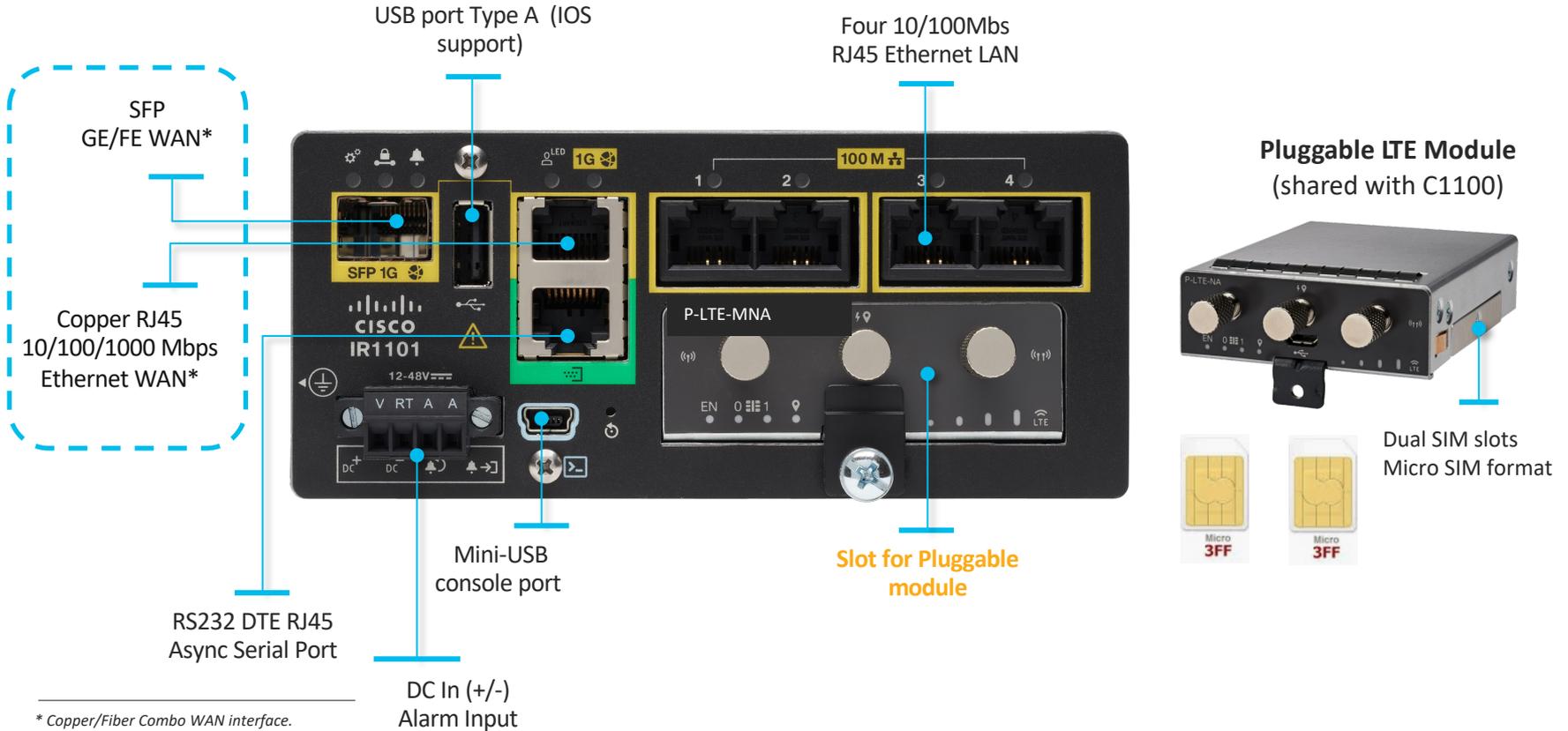
* Copper/Fiber Combo WAN interface.

Enhanced IoT OD support for Expansion modules - IR1101 Serial Module support (IRM-1100-4A2T)

Model 1: IRM-1100-SP

Second SFP GE WAN

Slot for second module

Model 2: IRM-1100-4A2T

NEW!

Now supported in IoT OD
with Form-based (eCVD) config (Jan'23)
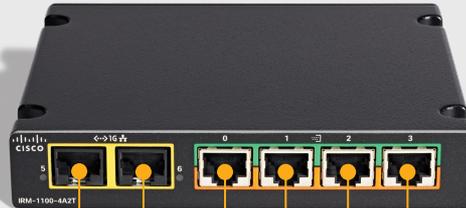
2x Gigabit Ethernet LAN

4x Asynchronous Serial RS232/RS485/RS422

Model 3: IRM-1100-SPMI

IO ports

mSATA slot

Second SFP GE WAN

Slot for second module

Configurations to be supported by IR1101
Deployment Scenarios with Serial/Ethernet Expansion Module

Config 1

IR1101
Serial Expansion Module

Config 2

IR1101
LTE Expansion Module
Serial Expansion Module

Ethernet Ports on the expansion module will **not** be operational

Config 3

IR1101
Serial Expansion Module
LTE Expansion Module (bottom)

SFP on the expansion module will **not** be operational

Config 4

IR1101
2x Serial Expansion

Ethernet Ports on the expansion module in the bottom will **not** be operational

Ethernet Ports on Expansion Module total throughput limited to 1Gbps

DSL SFP for IR1101

SFP-VADSL2+-I

Industry-grade
ADSL2, ADSL2+, VDSL2

-40 to 60° C

EMI Certifications

DSL management integrated
into Cisco IOS-XE CLI

SFP form factor provide additional
protection investment and flexibility

Secure communications at every hop

- SEL and Cisco partner to support MACsec

- MACsec SW solution added on Cisco Catalyst IR1101 Rugged Series Router from Cisco IOS-XE 17.10.1

  - SW forwarding of MACSEC traffic

MACsec 802.11 AE

IPsec

Public LTE

Public Internet

Cellular Network

Trusted Network

SEL 651R   Cisco IR1101

Private LTE

VPN HER

ZBFW   2 x Cellular Modems (inc. FirstNet)

IR1101 acts as the MACSec AES Key server
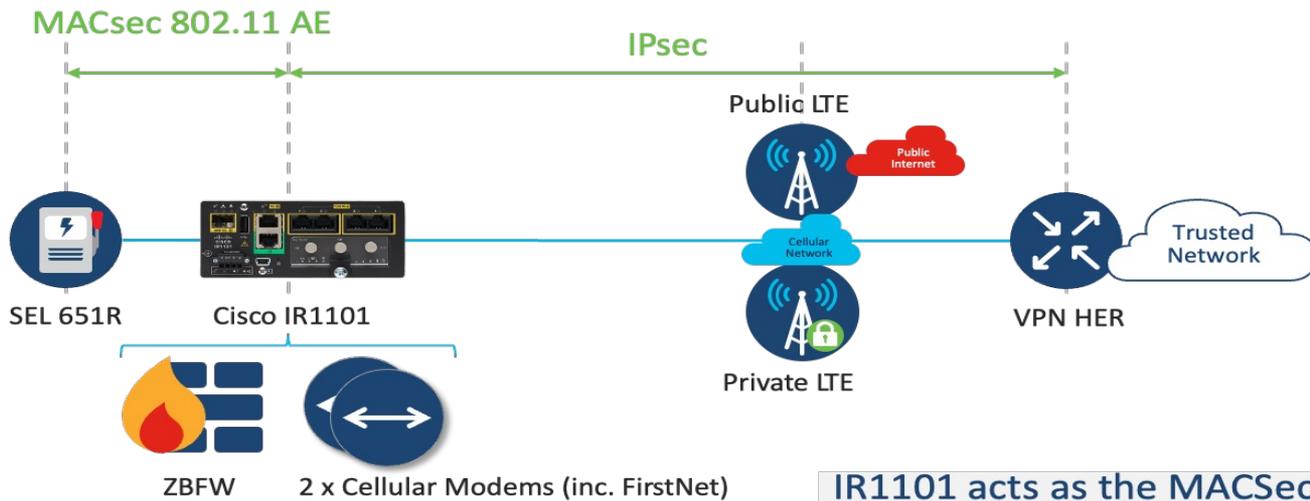
IR 1800

Catalyst IR1835-K9

Automotive Dead Reckoning GNSS

Power & CAN Bus Port

Digital IO (x4)

Industrial SSD

RS232 Serial (x1)
RS232/485 Serial (x1)

GE LAN ports(x4)

Combo RJ45/SFP GE WAN port (L3)

Wide Pluggable Module Slot (WiFI6)

Pluggable Module Slot (Cellular)

Pluggable Side
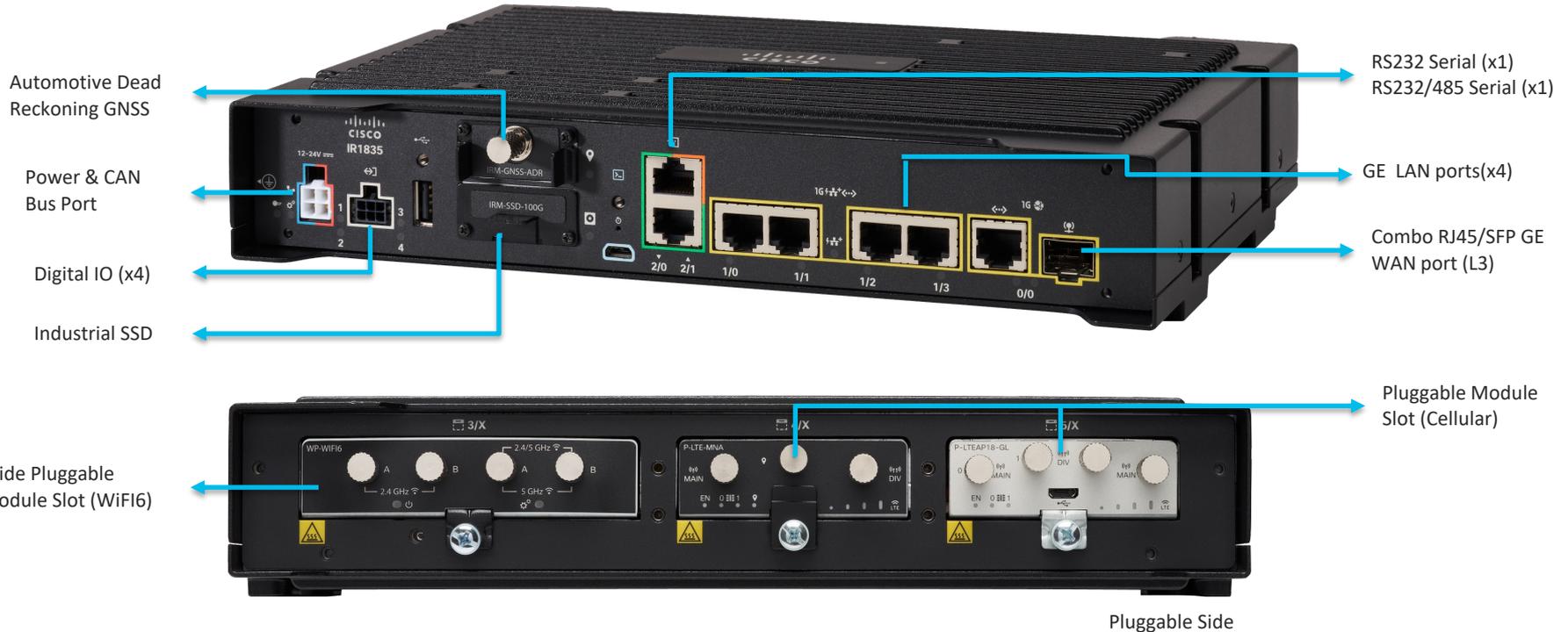
IR1800 Series Routers

Features	IR1821-K9	IR1831-K9	IR1833-K9	IR1835-K9
Processor	600 MHz	600 MHz	600 MHz	1200MHz
Memory	4GB	4GB	4GB	8GB
LTE Slot	one	two	two	two
Wi-Fi Module	✔	✔	✔	✔
CAN Bus	✔	✔	✔	✔
PoE	✖	✖	✔	✔
mSATA Module	✖	✖	✔	✔
Automotive Dead Reckoning GNSS (Module)	✖	✖	✔	✔
GPIO	✖	✖	✖	✔
Serial Interface	RS232 (1)	RS232 (2)	RS232 (2)	RS232, RS232/485

P-WIFI-AX-

802.11ax module for IR1800 Autonomous and Controller mode

P-WIFI-AX-X

2.4/5 GHz 📶

A B A B

2.4 GHz 5 GHz 📶

Pluggable 802.11ax module for IR1800 series

Supports WGB Mode

EWC Controller Support

Extended Temperature Range

Parity with WNBU's AP 9115

WIFI6 Deployment Scenarios

Controller Mode

Extended Enterprise Stationary &
Mobile Use Cases

EWC Mode

Mass Transit/Transportation Remote
& Mobile Assets

WGB Mode

Data Offloading Over Infrastructure
WiFi

Access Point   Controller
                            Cisco Catalyst 9800

Access Point + Controller

Access Point   Cisco AP

Monitor CAN Bus w/Packet Capture

IOS-XE
17.10.1

- CAN Bus packet capture as in pcap format

  - File can be analyzed on tools such as wireshark and others for CAN Bus, ODBII and J1939

```
IR1821#monitor canbus packetdump ?

  file   CAN Bus interface packet capture destination file

  start  CAN Bus interface packet capture start

  stop   CAN Bus interface packet capture stop

IR1821#show canbus packetdump
```

DSL SFP Support

- **Cisco DSL SFP can be installed on the IR1800 base platform Gigabit Ethernet0/0/0**
  - DSL SFP has 2 LEDs built in to display the connection status – see IR1800 HW/SW Installation Guide

- DSL SFP support is available for ADSL2/ADSL2+, and VDSL2.
  - ADSL2/ADSL2+ supports ANNEX A,B and L.
  - VDSL2 supports profiles 8a through 17a

- IOS-XE configuration is done under "controller vdsl 0/0/0" , linked to GigabtEthernet 0/0/0 (media-type SFP)
  - ATM VPI/VCI and encapsulation (llcsnap/vcmux) done under controller vdsl 0/0/0 and ip configuration under G0/0/0 sub-interface or Dialer interface.
  - Layer3 feature set(routing, security(AAA,Radius etc)is supported on G0/0/0 sub-interface or Dialer.

IR 8100

IR8140H - The Next Generation Industrial Router

The only IoT Heavy Duty Outdoor Router

IoT Router with IOS XE High-end security Programmability

Edge computing

Cisco IOS-XE unified image Autonomous IOS and SDWAN

Modular LTE (public/private) & 5G Ready*

Modular Battery backup and Power Supply

Modular CPU and LTE Interfaces

* with future 5G module

Lower TCO

Multi-service/Multi-Access

Extended product life-time

IR8140H –Platform dissected

UIM LTE (contains PIM)

Dual SIM Slots

Antenna: Thread-In N-Type Interface

Cellular Module

Universal Interface Module (UIM)

GPS/GNSS Antenna

Power Supply Module

Battery Backup Unit (BBU) Module

WPAN Module

CPU Module

1. Alarm Port
2. Copper/Poe* Port
3. Fiber/SFP
4. Cover for thermal performance
5. SSD
6. Reset
7. Console
8. LED

*- PoE only available on IR8140H-P-K9 SKU
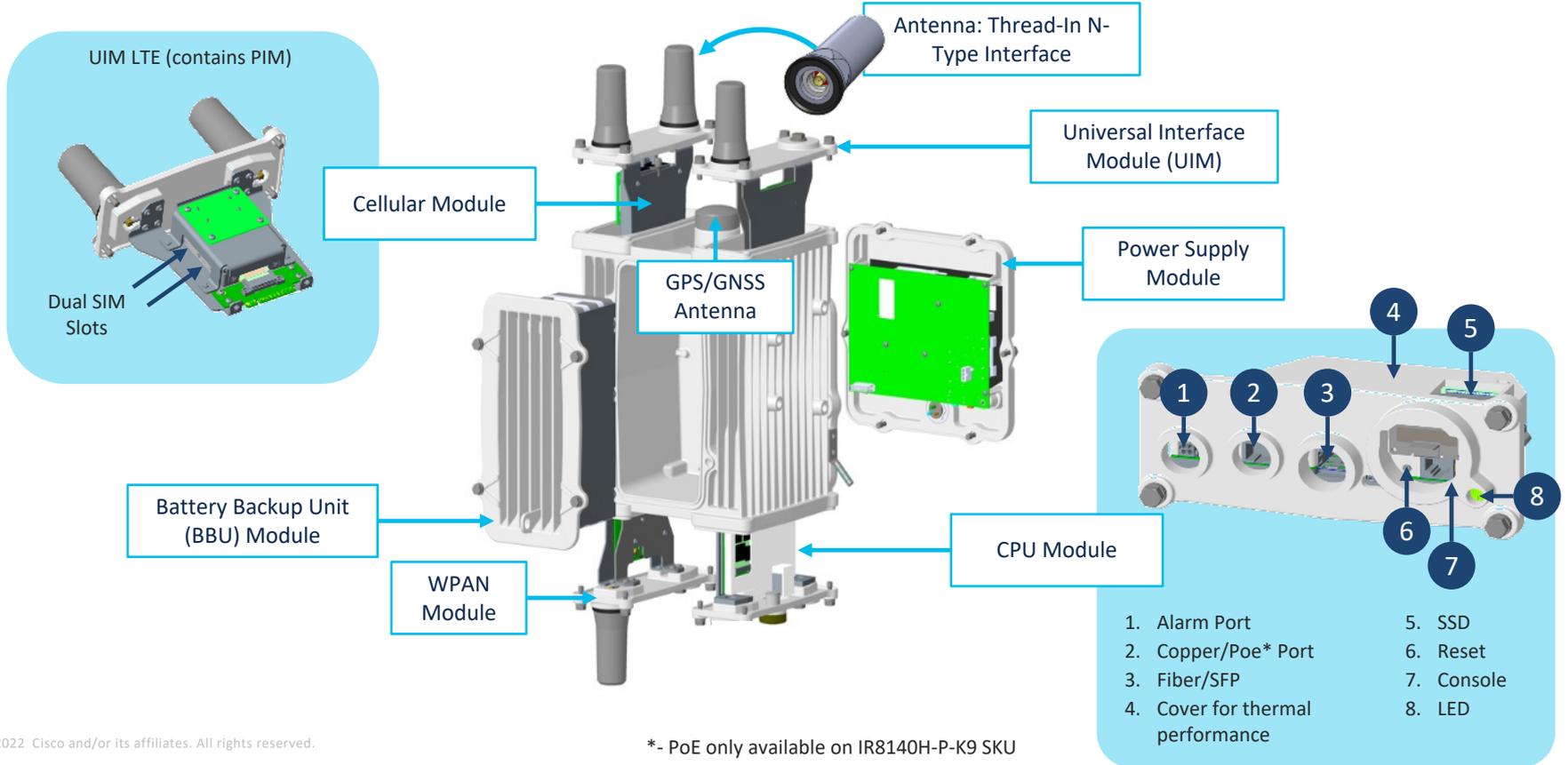
IR 8300

One Box Solution (C8300 [QFP] + IR1101 + C9200 [UADP])

Security

Timing

CGR2010

Power over Ethernet

Compute/IOx

Ethernet Switch

Catalyst IR8340

Security

Integrated Hardware and Software Features

Timing

Power Over Ethernet

Compute/IOx

Ethernet Switch
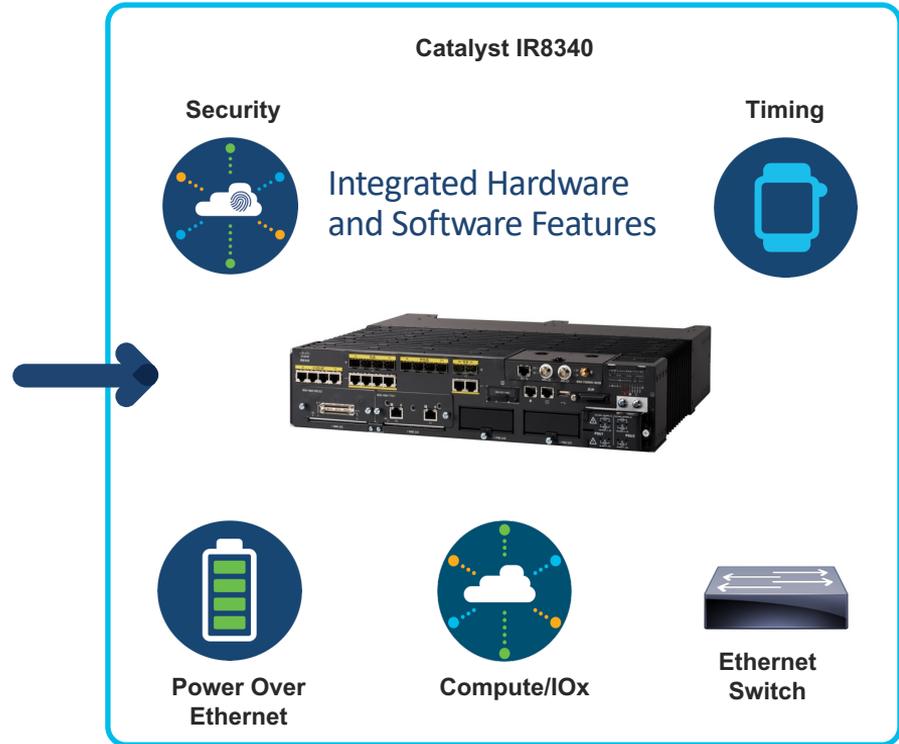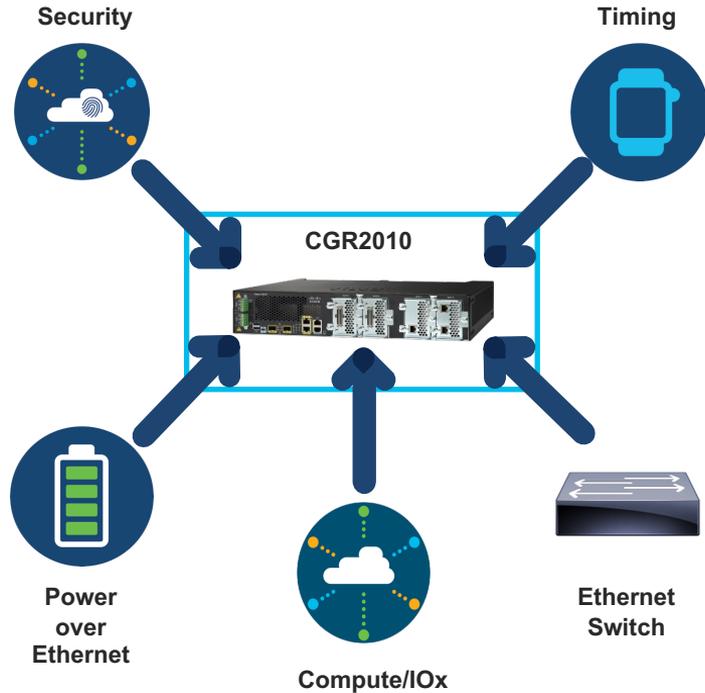
Catalyst IR8340

- Operating Temperature Range −40°C to +60°C
- MTBF 239,274 Hours
- Industrial Grade platform, **IOS-XE software**
  - Single Integrated SW image *(Switching + Routing)*
- 2RU, ~2Gbps throughput with services ON
- IPSEC 1Gbps throughput Aggregate
- 14 GE ports (12 – LAN, 2 - WAN),
  - LAN : 4 Cu, 4 Combo, 4 SFP
  - UPOE/POE/POE+ : 60W budget
  - WAN : 2 Combo ports
- Multiple WAN interfaces
  - Dual active 4G-LTE, T1/E1, xDSL (Post FCS)
- Legacy Interface Support
  - T1/E1, Serial : RS232, (RS422, RS485 Post FCS)
- Dual PSU's – AC and DC
  - High/Low Voltage
- **Enhanced Security – IPS/IDS (IOS-XE Applications)**
- **Edge Computing – Cisco IOS-XE Application**
- **SD-WAN support**
- **Timing : IRIG-B in/out, GNSS Receiver, 1588v2**
- **Support for DNA-C, vManage**
- **Adjustable CPU Core Performance Profiles (Post FCS)**

* As applicable

IR8340 T1/E1 Module

- Operating Temperature Range –40°C to +60°C
- One and two port SKU's available
- Data only, no voice support
- HDLC, PTP, Frame Relay
- Single wide NIM module

IR8340 Serial Module

- Operating Temperature Range –40°C to +60°C
- RS232 support only at FCS
- 256kbps (Synchronous max), 230kbps (Asynchronous max)
- 8 serial interfaces per module
- PPP, HDLS, Bisync support
- Single wide NIM module

IR8340 Timing Module

- GPS – Input, SMA
  - External Antenna required
  - G.8272 PRTC-A Accuracy within 100ns
- IRIG-B – Input/Output
  - Analog 122/123
  - Digital 002/003
  - IRIG-B to PTP conversion support
- Cisco TOD – RJ45
- SyncE, PTP timing support
- Stratum 1 traceable clock

Device Types – PTP 1588 v2

- Ordinary
- Grandmaster
- Boundary
- Transparent
  - Transparent End-to-End
  - Default Profile
  - Peer to Peer – Power Profile

Synch E

- ITU-T G.8261
- ITU-T G.8262
- ITU-T G.8264
- ITU-T G.781

PTP Profiles

- Default
  - Best Master Clock Algorithm
    - *BMCA Applies to all profiles
- Power Profile
  - **IEEE C37.238-2011**
- Dot1as
  - **802.1AS**
- Telecom
  - **ITU-T G.8265.1**
  - **ITU-T G.8275.1**

  *WAN only with Timing module.

Ethernet Synchronization Message Channel

- ITU-T G.8264

CGR 2010 To IR 8340

Better Throughput & Performance
Investment protection for
next-gen services!

Capabilities	CGR-2010	IR-8340
CPU/ASIC	CPU: Cavium (500Mhz), Intel Goofy for backplane	Switching ASIC : Doppler-GS CPU : Atom (8 core)
Security	ZBFW	ZBFW, IOx Apps (IPS/IDS UTD, Cisco CyberVision)
Timing	NTP	GNSS, 1588v2, SyncE, IRIG-B
Number of Ports	2	12LAN + 2WAN
Performance/ Throughput IPSEC	54Mbps	1Gbps (Depends on Packet Size)
Compute/SD-WAN	N	Y
HA Protocols	-	Y
Management	Cisco Prime	DNA-C, vManage

Cisco IOx Application & Default Core Allocation

Control Plane CPU 1x

Service CPU 3x
(UTD/CyberVision, etc)

LXC

IOSd

BinOS / Platform Mgmt

Virtual Manager / IOx

Linux OS

L3 Data Plane 4x CPU (WAN Traffic)

CPU Cores
Allocated
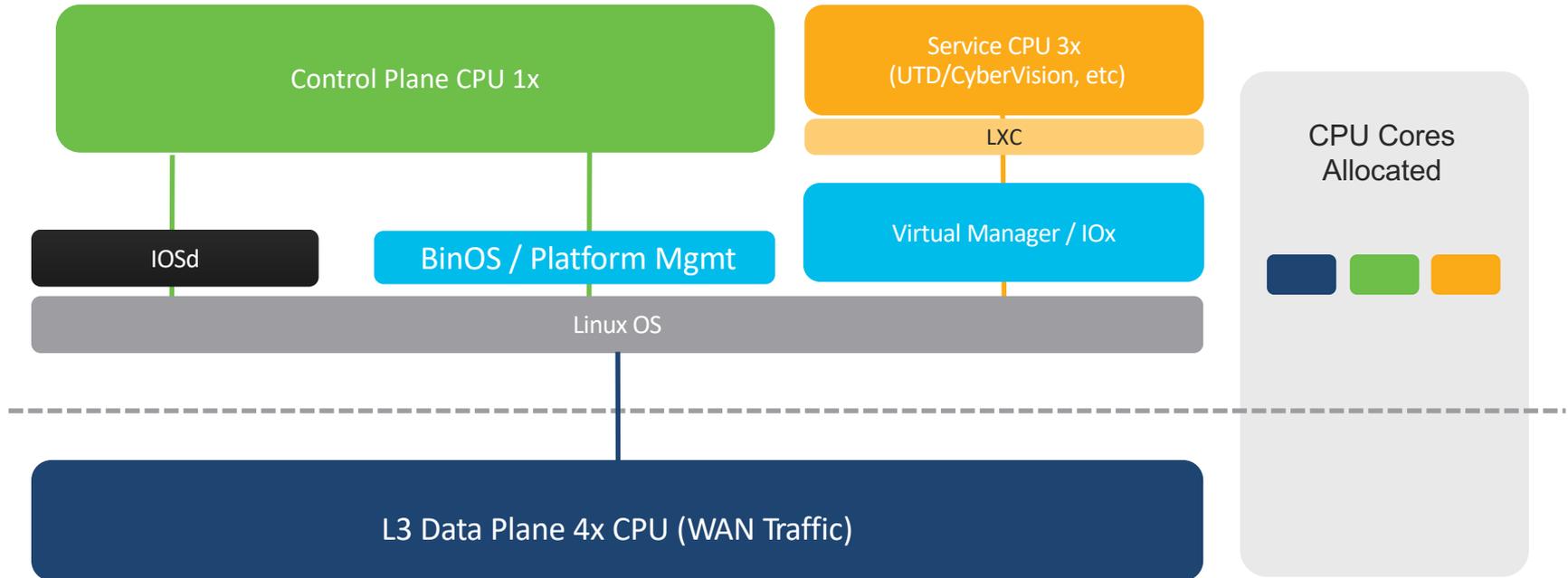
* 2 Gig of RAM available for IOx applications

Cisco IOx Application & Default Core Allocation

17.8.1 Core Allocations				
Profile	CPU group	Allocated cores	Remarks	Performance Remarks
Service-plane-heavy	Control plane	0		This is default core allocation and same as in 17.7.1.
	Machine(Services)	1,2,3	These cores are shared with non-critical control plane processes	
	Data plane	4,5,6,7		
Data-plane- heavy	Control plane	0		Not recommended for services though there is one core allocated. Control plane performance is not expected to go down when compare with 17.7.1 and data plane performance is expected to be 50% more than 17.7.1. Actuals will be documented before 17.8 release.
	Machine(Services)	1	This core is shared with control plane processes	
	Data plane	2,3,4,5,6,7		
Control-plane- heavy	Control plane	0,1		Not recommended for customers running more than one app. Control plane performance is expected to be better than 17.7.1 and Data plane performance remain same as in 17.7.1
	Machine(Services)	2,3	These cores are shared with non-critical control plane processes	
	Data plane	4,5,6,7		

Note: IOS-XE 17.9

IoT Wireless

(WiFi, Cisco Ultra-Reliable Wireless Backhaul, LoRaWAN – Industrial Asset Vision)

The next generation of
Outdoor and Industrial

C1572

C1552

IW6300

IW3702

C9124

IW9167E

?

What is Cisco URWB?
(former Fluidmesh)

- Cisco UWRB is an overlay technology that emulates a virtual switch over wireless links

- Extends your network to fixed and mobile locations

- Supports VLANs and QoS

- Layer 2 switching or Layer 3 (for advanced mobility architectures)

- Mobility (Indy Autonomous Challenge)

Physical Network

Overlay
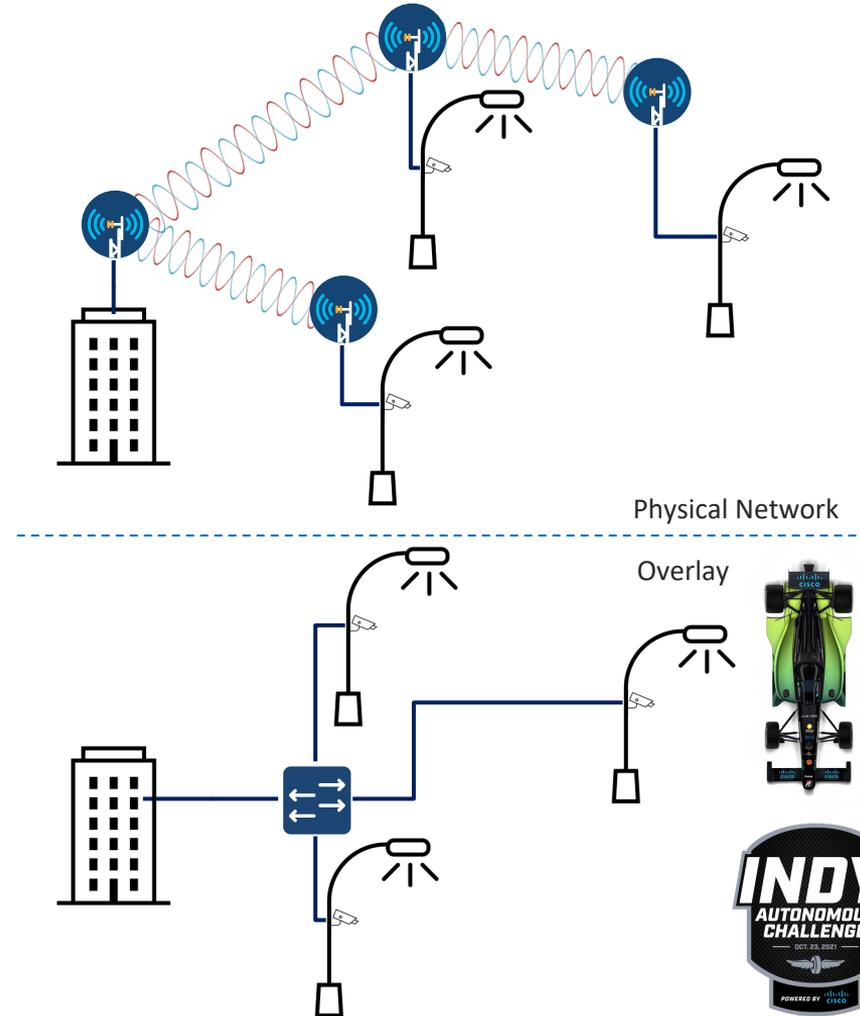
IoT Applications requirements vs technology

Latency

100 ms

10 ms

1 ms

Std WiFi and 4G

5G eMBB profile

Data Backhaul (Wi-Fi for Passengers, Fixed Networks

Autonomous Haulage
in Mining

Video Streaming for Security and Situational Awareness (e.g. trains)

Communication-based Train
Control (CBTC) &
Automated Trains

5G
URLLC
profile

Tele-Remote Crane Operations for Logistics and Ports Automation

Immersive Entertainment

Video Streaming for
Tele-remote Operations
(Trucks, Cranes, etc.)

Cisco
URWB FM

Autonomous Robots Signaling

MPO + Seamless Handoffs

Cisco
URWB IW

Throughput

10 Mbps   100 Mbps   1000 Mbps   2000 Mbps   3000 Mbps

Radio Portfolio

Fixed / Backhaul

Mobility

Environment

Rugged

Normal

FM Ponte
- Up to 50 Mbps
- 2x2 MIMO
- H-Beam: 33 deg
- V-Beam 17 deg
- Up to 27dBm
- 1 x RJ45 Port
- 1 x 24VDC PoE

FM Volo
- Up to 100Mbps
- Up to 5 miles
- 2x2 MIMO
- H-Beam: 33 deg
- V-Beam: 17 deg
- Up to 27dBm
- 1 x RJ45 Port
- 1 x 24VDC PoE

FM3200 Base
- Up to 150 Mbps
- Up to 5 miles
- 18dBi directional
- H-Beam: 120 deg
- V Beam: 10 deg
- Up to 27dBm
- 1 x 802.3af PoE Gb RJ45 Port
- 1x 10/100/1000 RJ45 Port

FM4200M
- Max Tx: 150Mbps
- Tx: up to 27dBm
- Up to 27dBm
- 1 x 802.3af PoE Gb M12 Port
- 1x 10/100/1000 M12 Port
- 48vdc input

FM4200F
- Up to 150Mbps
- Up to 27dBm
- 1x10/100/1000 M12
- SFP Fiber Port
- 48vdc input

FM3500E
- Up to 500 Mbps
- Up to 30dBm
- 1 x 802.3af PoE Gb RJ45 Port
- 1x 10/100/1000 RJ45 Port

FM4500M
- Up to 500 Mbps
- Up to 30dBm
- 1 x 802.3at PoE Gb M12 Port
- 1x10/100/1000 M12
- 48vdc input

FM4500F
- Up to 500 Mbps
- Up to 30dBm
- 1 x 10/100/1000 M12
- SFP Fiber Port
- 48vdc input

50Mbps

150Mbps

500Mbps

Catalyst IW9167E Overview

Catalyst® IW9167E Access Point
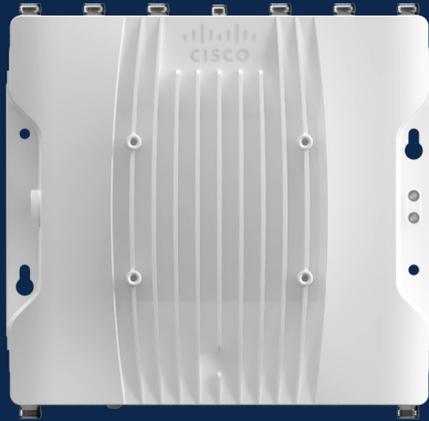
Tri-Radio Architecture in Heavy-Duty Design

- Wi-Fi 6/6E*, 802.11AX, MU-MIMO, OFDMA

- External antenna – 8 x Type N (f)

- Tri-data-radio architecture
  - 2.4-GHz, 4x4:4SS, up to 20MHz
  - 5-GHz radio, 4x4:4SS, up to 80 MHz
  - 5/6*-GHz radio, 4x4:4SS, up to 160 MHz
- Dedicated scanning radio for spectrum intelligence
- 2.4-GHz IoT/BLE radio
- Built-in GNSS with TNC connector

Wireless backhaul (Cisco URWB)   OR   **Wi-Fi 6E access point**

* 6 GHz operation subject to regulatory approval

Hardware Highlights

- ## 14 connectors and ports in a compact design

- ## Extreme Temperature Range
  - Operating:-40˚ to +158˚F (-40˚ to +70˚C)
  - Extended: -58˚ to +167˚F (-50˚to +75˚C)
  - Storage: -40˚ to +158˚F (-40˚to +70˚C)

- ## Maintained mounting points and width of IW3702

- ## 802.3bt/UPOE or DC input

Mounting Holes

10.5" (267mm)

11.3" (287mm)

Height: 2.3" (59mm)
Weight: 6.7 lbs (3.0 kg)
Volume: 3.43 liters

Optional M12 Adapter

Console Port

Reset Button

LED Status Light

SFP+ Port

RJ45 Port

Micro-fit Power

GLC-TE + M12 X-Code Adapter

M12 X-Code Adapter

M12 A-Code Adapter
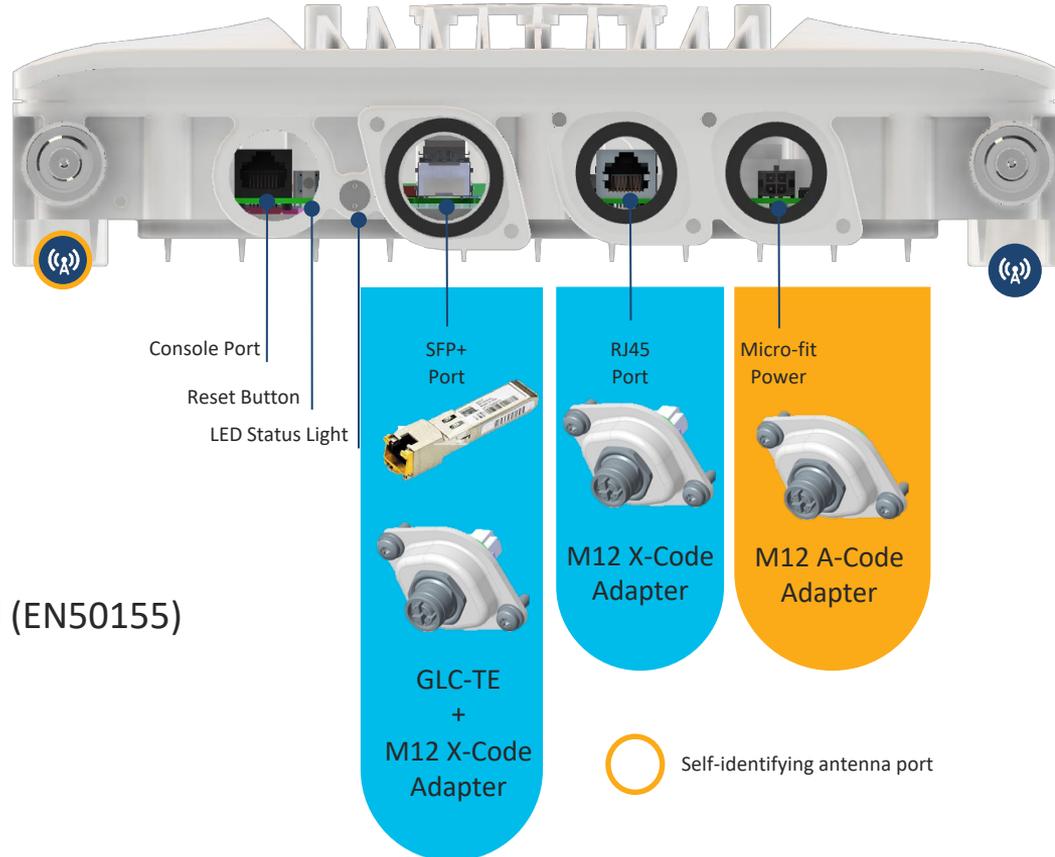
Maintain IP67 Rating

Vibration rated for rail (EN50155)

Self-identifying antenna port

Switching Modes

AP

ap1g6j-k9w8
Lightweight AP Image

URWB

`configure boot mode (ap|urwb|wgb)`

WGB†

WGB and URWB both use the ap1g6a-k9c1 image but have different boot variables
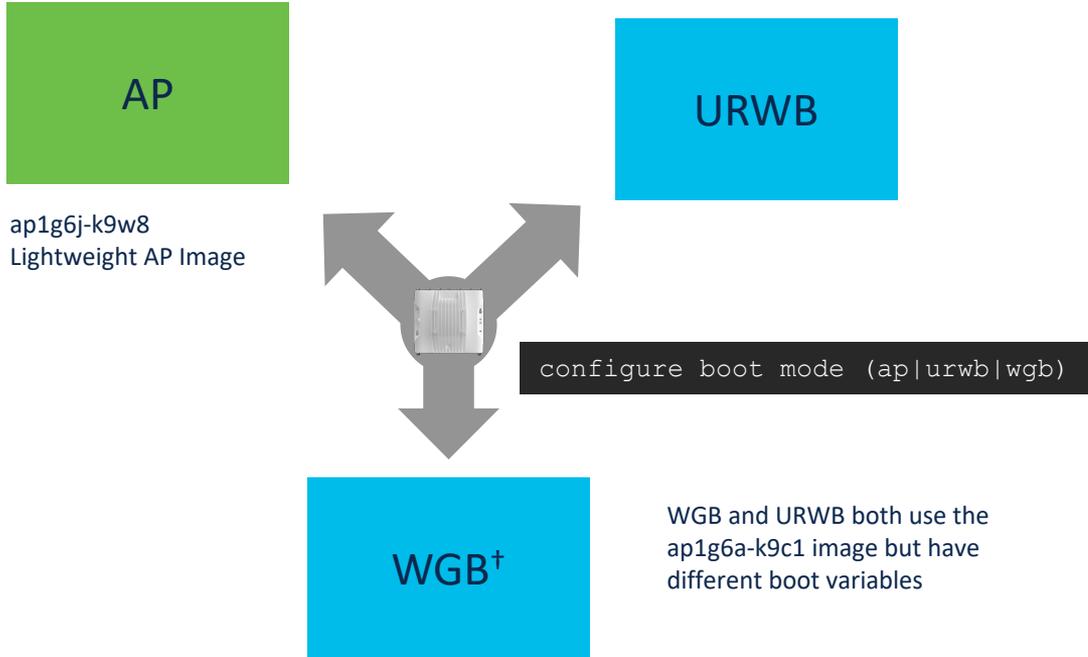
- Switching modes will factory default and reboot the AP

- Both software images are loaded at factory but updated separately thereafter.

- Licensing for AP and URWB are both SLP based.

† WGB available on IW9167 with IOS-XE / UIW release 17.11.1+

Timeline and Ordering Information

May 24 - external launch

Early 2023 - FCS

Mid 2022- orderability

Part number	Description
IW9167EH-x-AP	Catalyst IW9167E with Wi-Fi software
IW9167EH-x-CURWB	Catalyst IW9167E with CURWB software
FCS Planned regulatory domains: A, B, E, Z, ROW	

Cisco Industrial Asset Vision (IAV) Solution

A simple, all-in-one, cloud managed sensor solution to visualize asset and facility conditions

Cisco industrial environmental sensors

Cisco IXM LoRaWAN Gateway

Cisco IAV Dashboard in the cloud & mobile app

LoRa

NEW!
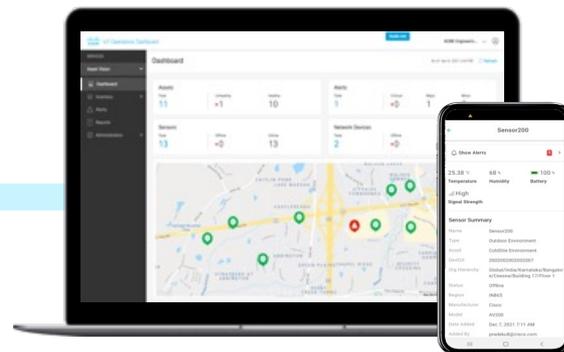
- *NEW!* **Industrial Sensor Bridge**
  Connects to any third-party sensor with analog (4-20mA, 0-10V) or digital (dry/wet contact) signals

  NEW! **Industrial Vibration Sensor**
  Machine health condition monitoring

Enhance efficiency and safety

Improve operational resiliency

Protect investments and lower costs

Sensor Listing

Monitoring Environments

AV206
Light

AV200
Outdoor Temp

AV201
Indoor Temp

AV207
Occupancy

AV204
Door/Window

AV205
Water Leak

Monitoring Assets

AV250
Machine Temp

AV300
Geolocation

AV202
Product Temp

AV203
Refrigeration

Click link to navigate to details about a sensor

AV400: Industrial Sensor Bridge

Now Orderable!

- *Connects to 3rd party industrial sensors which output a voltage, regulate a current loop, or output a digital signal.*

- *These 3rd industrial sensors exist for almost anything imaginable… tank level, air quality, proximity detection, pressure, electrical current…*

- Four analog inputs
  - (2) for current (4-20mA)
  - (2) for voltage (0-10V, 1-5V, etc.)

- Two digital inputs
  - Discrete measurements (1 or 0)

- Line powered by 9-36Vdc
  - External, 3rd party sensors need to be powered separately

- IP66

- Operating temp: -40 – 75C

- External antenna

- 12.7 mm (1/2") connector for conduit or cable gland (not included)

- Default reporting interval: 15 minutes

Management & security
IoT OD, FND, Cyber Security

Management Tools

	OT Operated		IT Operated	
	On-Prem	**Cloud**	**On-Prem**	**Cloud**
	IoT-FND	IoT-OD*	DNAC*	SD-WAN*

Controls Engineer T&D Engineer Mass Transit Operator

Network Administrator IT Administrator

	IoT-FND	IoT-OD*	DNAC*	SD-WAN*
Config template	CLI Based	GUI Based	CLI Based	GUI Based
NBAPI 3rd party integration	✔	✗	✔	✔
RBAC	Comprehensive	Basic	Basic	Basic
Remote Site (Extended Ent)	✗	✗	✔	✔
Edge Compute	✔	✔	✗	✗
SCADA	✔	✔ Custom template	✔	Future roadmap

Common features: ZTD, Gateway Lifecycle Management, GIS Map, Real-Time Asset Tracking/Playback, Geo Location, Geo Fencing Events/Alerts, Multi-tenancy, App Management, Cellular connectivity Metric

IOT Operational Dashboard

What is EDM?

EDM is the ***Edge Device Manager***: A core service in Cisco IoT Operations Dashboard to manage industrial network configurations at scale:

- **Zero Touch Deployment (ZTD)**
- Configuration Management
- Visibility and Monitoring
- Alerts and Reports
- Troubleshooting Tools
- **Software Upgrades**
- *SIM Management with Control Center Integration*
- **Cisco Validated Design Templates**

- IoT OD support of Meraki Camera
- Secure Equipment Access (SEA) from EDM

Navigating EDM Dashboard

Organization Navigation Dropdown

Account Setting

Service Navigation Dropdown

Task Navigation Menu

Device Status

Gateway GPS Map

Select Time Range

Summary Info

Integrated Guide

Expand Map

At-a-glance view of Device Health Dashlettes to show:

Device Count

Quick Device Status Summary

Highest Cellular Data Users

Weakest Cellular Signal

Status Over Time

GIS Map

Device Details

Device information can be drilled down in the Device Details page. Some fields can be modified. Select from the many Tabs to see different details.

Tabs

Edit Device Config

Onboard/Delete Device

Device Details

Select Device for Details

WiFi Info

Customize Column View

Supported App types and options for life cycle management

Dockerized IOx App Types

Cisco branded Apps
(SEA, CV, EI)

3d party Apps
(Customer or partner developed Apps, eg data monitoring, collection or control)

Options for App life cycle management

App Mgmt via OD UI

Application tab on OD

APIs for automation
APIs for Apps upload, deployment, remove

Cisco Secure Equipment Access: SEA and SEA Plus

SEA
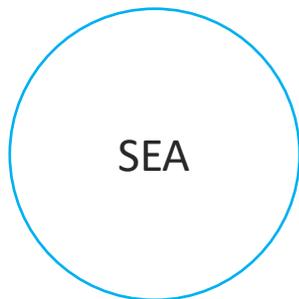
Clientless access

Browser-based access to equipment for control and management via supported access methods: SSH, RDP, VNC, HTTP/S, Telnet.

SEA Plus

Client-based access

VPN-like clear communication channel between user and remote system for any IP-protocol. It offers high security by choosing particular protocols and ports for communications.

SEA solution diagram

- SSO (SAML 2.0)
- MFA for local users

User

Web-browser

HTTPS 443

Internet

Cisco
IoT Operations
Dashboard

Secure Equipment
Access

Proxy Service
over
HTTPS 443

Remote Site

SEA agent

supported
Cisco device

LAN

Access method
over IP*

Engineering
Workstation
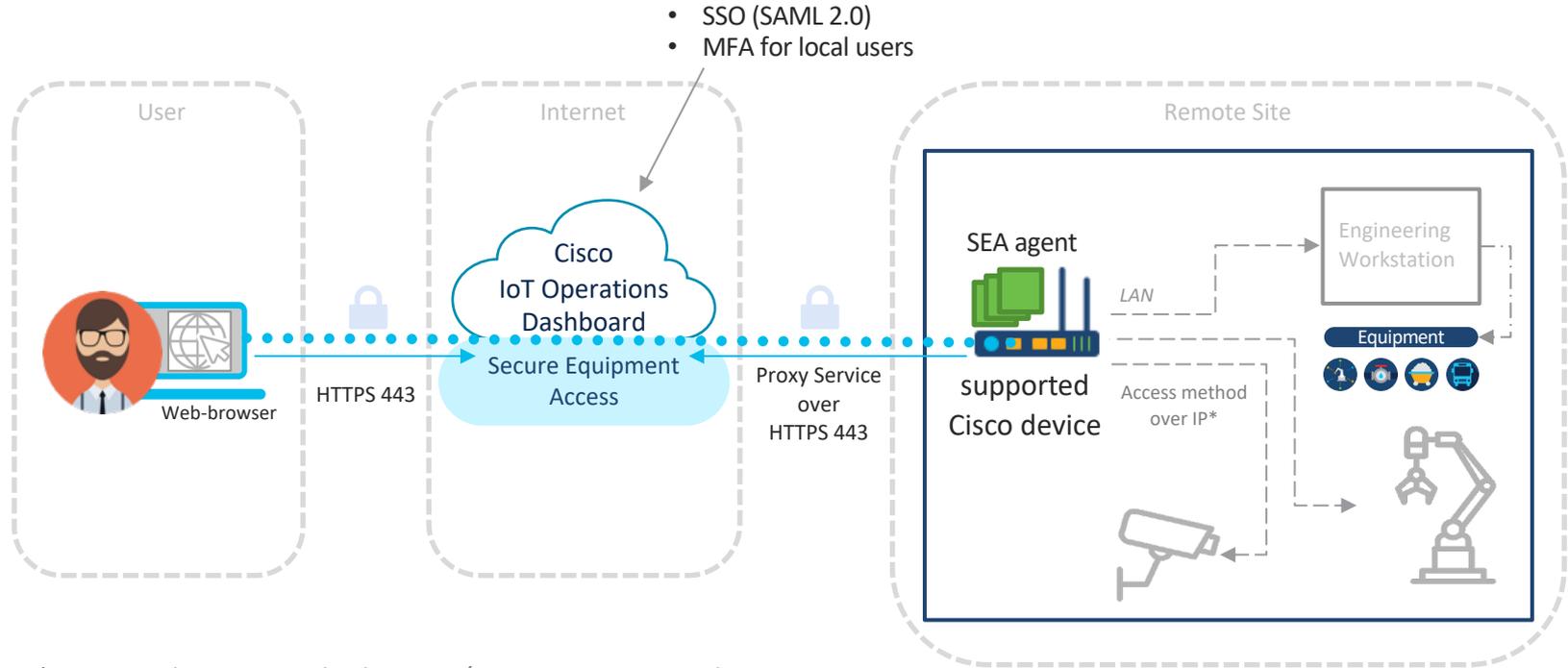
Equipment

Supported access methods: HTTP/S, RDP, VNC, SSH, Telnet

SEA Plus solution diagram

of the current Secure Equipment Access capabilities

SEA Plus technology allows applications running on a user's computer to communicate with a remote system using any TCP, UDP, and ICMP protocols and for communication between a user and a remote system. The ability to configure any particular port for communications decreases the attack surface and increases the security posture of the solution.

- SSO (SAML 2.0)
- MFA for local users

User

Internet

Remote Site

Cisco
IoT Operations
Dashboard

Secure Equipment Access

SEA agent

LAN

Engineering Workstation

Equipment

SEA Plus User App

HTTPS 443

Proxy Service over HTTPS 443

supported Cisco device
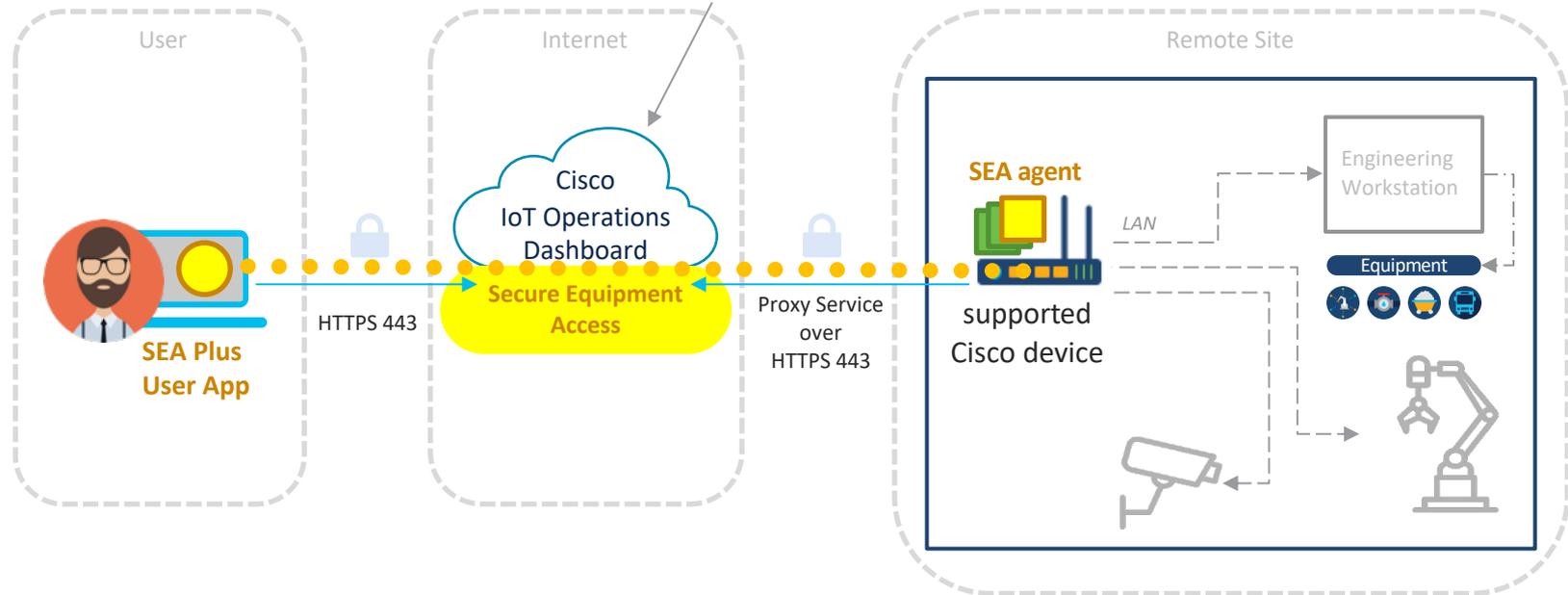
IoT Operations Dashboard subscription tiers

IoT Operations Dashboard services	Subscription tiers	
	Advantage	**Essentials**
Secure Equipment Access (incl. SEA Plus)	✓	
3rd party IOx App Management	✓	
Deploy Network Devices (IR1101, IR1800)	✓	✓
Advanced configuration templates (CLI & Form-based)	✓	✓
Monitor Network Devices (cellular, GPS, status, location)	✓	✓
Connected Clients Monitoring	✓	✓
Cisco Platform Suite integration	✓	✓
System Capabilities (SSO, Multi-tenancy, RBAC, Alerts / Events)	✓	✓

Note: Licensing is today not enforced in IoT OD but is tracked in Cisco Smart Account and is monitored and will be enforced in the future

Cyber Vision 4.1

Cisco Cyber Vision
Asset Inventory & Security Platform for the Industrial IoT

ICS Visibilty
Asset Inventory
Communication Patterns
Device Vulnerability

Operational Insights
Identify configuration changes
Record control system events
relevant to the integrity of the system

Threat Detection
Behavioral Anomaly Detection
Signature based IDS
Real-time alerting

Cisco Cyber Vision helps companies protect
their industrial control systems against cyber risks

Cyber Vision offers flexible deployment options

Hardware sensor
DPI and IDS for any network equipment

On-Center sensor
Centralized DPI and IDS

Cyber Vision Center

Network sensor
DPI built into the network

Sensor

Lightweight Metadata
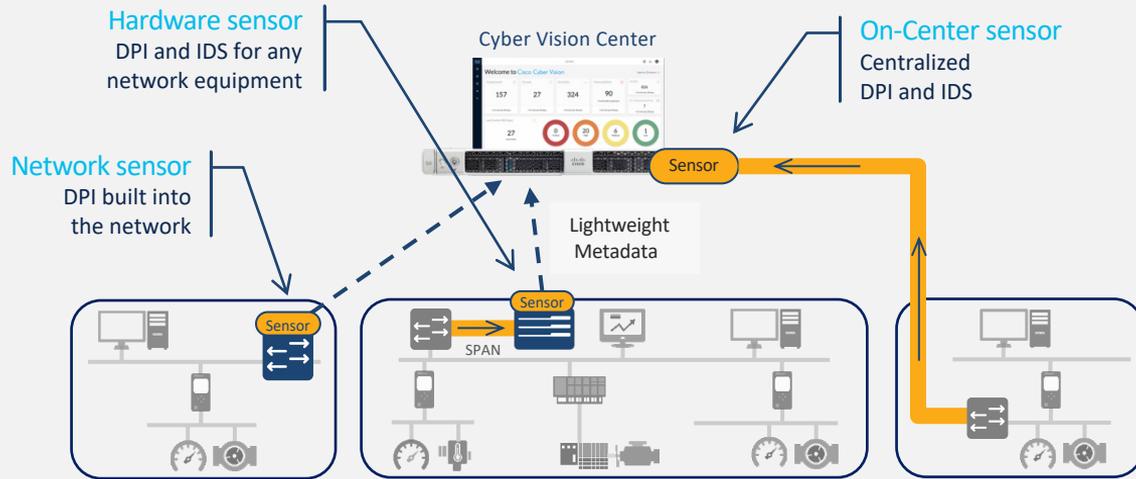
Sensor

Sensor

SPAN

- **Network-sensors** embedded in Cisco networking for simple and highly scalable deployments

- **Hardware-sensors** capturing traffic on any switch with a single hop SPAN

- **On-Center sensor** to leverage existing SPAN infrastructures, or collect traffic within the datacenter

Mixed centralized and distributed sensors to best fit your constraints

Cyber Vision Network Sensors

Deep Packet Inspection built into network-elements eliminating the need for SPAN

* IR8300 & C9300 support the optional add-on Snort IDS

Industrial Din-Rail / IR67 Switches

IE3400   IE3300-10G   IE3400H

Industrial Gateways & Routers

NEW!   17.8.x

IR1101

IR8300

IR1800 (2023**)

Industrial & Enterprise Rackmount Switches

NEW!

C9300 + C9300 L

IE9300 (2023**)

Catalyst 9300X (2023**)

Upozornění: (**) Doba i implementční plány se muhou změnit.

Visibility: Comprehensive **asset inventory**

■ Automatically maintain a detailed list of all OT & IT equipment

■ Immediate access to software & hardware characteristics

■ Track rack-slot components

■ Tags make it easily to understand asset functions and properties

Track the industrial assets to protect throughout their life cycles

Visibility: Track **application flows**

- Identify all relations between assets including application flows

- Spot unwanted communications & noisy assets

- Tags make it easily to understand the content of each communication flow

- View live information or go back in time

Drive network segmentation and fine-tune configurations
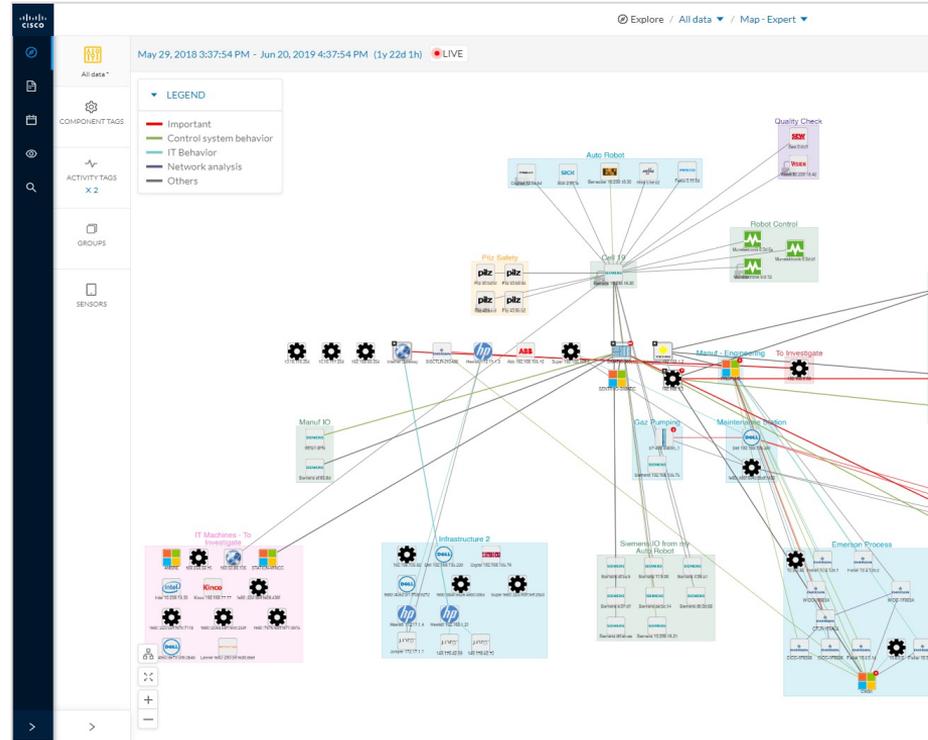
Visibility: Instantaneous **vulnerability** identification

- Automatically spot software & hardware vulnerabilities across all your industrial assets

- Access comprehensive information on vulnerability severities and solutions

- Built-in vulnerability database curated by Cisco Research Teams always up to date

Enforce cyber best practices

Operational insights: **Views for OT** teams

- Asset details

- Communication maps

- PLC program changes

- Variable accesses

Monitor the integrity of your industrial process

Defining the Cyber Vision risk scores

- Risk = Likelihood x Impact

- Likelihood
  - Activity tags (some communications create more risks)
  - Exposure to external IP addresses
  - Discovered vulnerabilities

- Impact
  - Device tags (some devices can create more damages)
  - User-defined industrial impact for groups

Impact		Minimal	Significant	High	Maximal
	Critical	High	High	High	High
	high	negligible	Significant	High	High
	limited	negligible	negligible	Significant	Significant
	No impact	negligible	negligible	negligible	negligible
		Minimal	Significant	High	Maximal
		Likelihood			

Source: EBIOS

Understanding a device risk score

Understanding what impacts the risk score

Understanding how to lower risk

Cyber Vision 4.1 Release Highlights

Ease of use

- Brownfield Global Center migration
- Secure LDAP, Custom Roles
- Center health monitoring
- Sensor management

Active Discovery

- Unicast Active Discovery using SNMP, CIP/EIP

Integrations

- SecureX Ribbon on Cyber Vision for threat investigation
- Service Now CMDB

New Deployment Options

- Center in Azure
- Sensor on IR8340

Závěr

Rozšíření portfolia switchingu

- IE9300 (stackwise)
- REP fast (DLR)

Dokončení kompletní obměny IR portfolia

- IR 1101, IR1800, IR8100, IR8300 - nové funkce a HW (PIM, moduly)

Nové wireless AP

- Cisco URWB, Catalyst IW9167E – multi systémové AP
- IAV sensory

IoT Operational Dashboard, FND, DNAc

- Nástupce Kinetic GMM, nové funkce SEA, SEA+
- Hlavní platforma pro správu IoT a ZTP

IoT Cisco Day – 18.1.2023
- *Fyzická účast v našich nových prostorách Parkview* (příp. Webex)
- Hlubší pohled na novinky i plány v následujícím období

Literatura

Indrustrial Switching:

https://www.cisco.com/site/us/en/products/networking/industrial-switches/index.html

Industrial Routers and Gateways:

https://www.cisco.com/c/en/us/products/routers/industrial-routers-gateways/index.html#~benefits

Industrial Wireless:

https://www.cisco.com/c/en/us/solutions/internet-of-things/iot-network-connectivity/industrial-wireless.html

Cisco Ultra-Reliable Wireless Backbone:

https://www.cisco.com/c/en/us/products/wireless/ultra-reliable-wireless-backhaul/index.html

IoT OD:

https://www.cisco.com/c/en/us/products/cloud-systems-management/iot-operations-dashboard/index.html

Cisco Cyber Vision:

https://www.cisco.com/c/en/us/products/security/cyber-vision/index.html

Cisco Cyber Vision Datasheet:

https://www.cisco.com/c/en/us/products/collateral/se/internet-of-things/datasheet-c78-743222.html