Cisco 910 Industrial Router

The Cisco® 910 Industrial Router (IR910) enables versatile wireless connectivity to your Internet of Things (IoT) use cases and applications The IR 910 is a programmable IOT gateway that seamlessly integrates ecosystem partners' solutions to support a variety of IOT/IOE applications, including environmental monitoring, asset tracking, waste management, smart parking, metering, building automation, street lighting, and more.

Product Overview

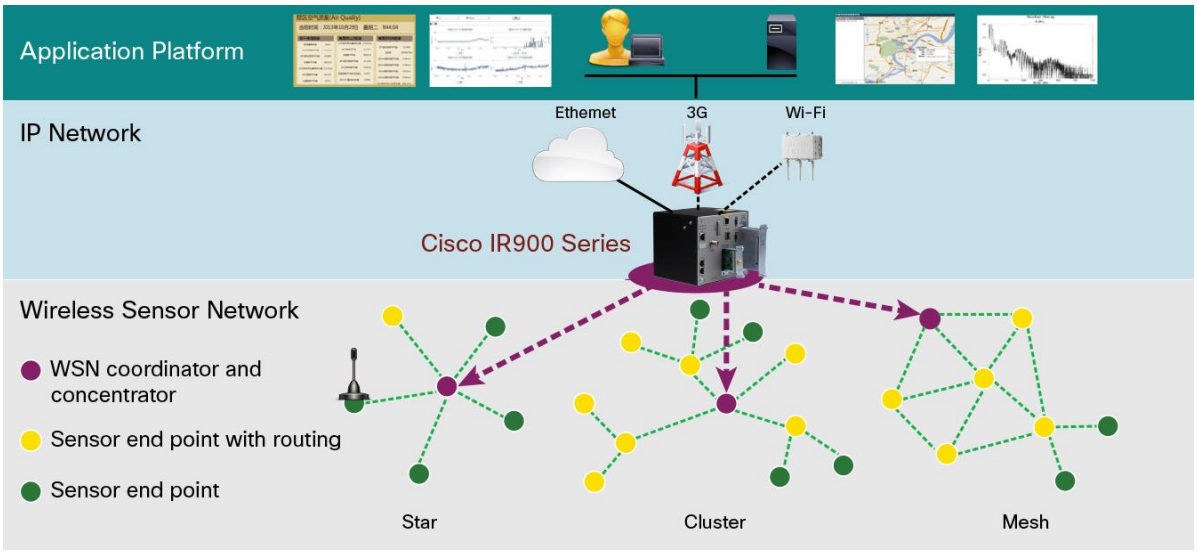
The Cisco 910 Industrial Router is part of the Cisco 900 Series Industrial Routers Family. This rugged IoT gateway can aggregate both the wireless sensor networks (WSN), including Low Power WAN (LPWA) technology such as Semtech® LoRa and wired sensors and ties them into an IP network. Offering an open hardware and software platform, the IR910 can quickly and easily host partner applications and sensor communication cards. Use the IR910 for local WSN management, raw data collection, caching, processing, and forwarding to data centers in the cloud through a variety of WAN IP interfaces.

The Cisco 910 Industrial Routers are shown in Figure 1.

Figure 1. Cisco 910 Industrial Routers and IP55 Enclosure

With a modular and open-slot design, the Cisco IR910 provides a common gateway platform to adapt to a variety of wired and wireless sensor technologies for different use cases with benefits including less development effort, quick time to market, and Cisco IP domain expertise. Offering a programmable environment and sufficient headroom of CPU horsepower, memory, and storage, the IR910 natively complies with Cisco Fog Computing architecture, executes distributed data processing at the edge of an IP network, and allows you to host partners' applications (Figure 2).

Figure 2. Cisco 910 Industrial Router Positioning



The Cisco 910 Industrial Router is designed with a modular platform to build a secure, reliable, and scalable field network infrastructure. It offers:

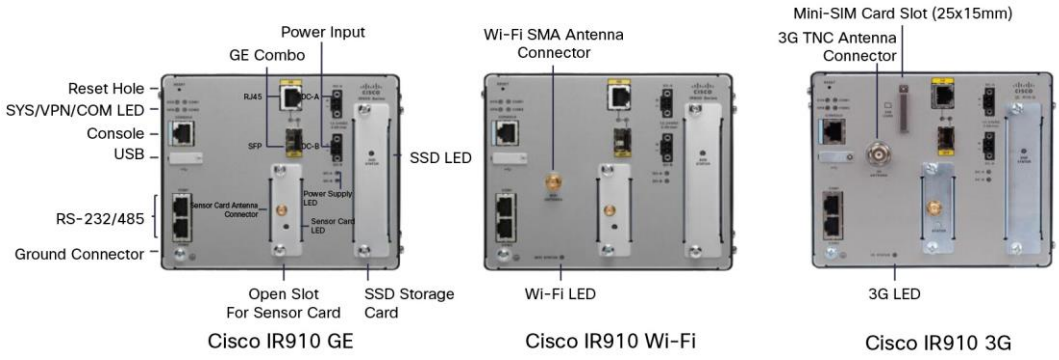
- Open hardware slot to support Cisco or partner's sensor communication card: A field-replaceable sensor communication card can be inserted into the open slot to aggregate a wireless sensor network, for example with IEEE-802.15.4 standard, LWPA or other proprietary technologies. Authorized partners can easily produce the card according to Cisco reference design specifications through Cisco Solution Partner Program.
- Programmable environment to host partner applications: The Cisco IR910 supports the compile languages such as C/C++, Python, and Java.
- Fog computing: The Cisco IR910 adheres to Cisco Fog Computing architecture to execute distributed data processing at the network edge.
- Rich types of interfaces to match different scenarios: Based on configuration of different hardware models, the IR910 can support various interfaces, such as Ethernet (RJ45 and fiber), serial (RJ45), cellular (3G), Wi-Fi, USB, solid-state drive (SSD) storage, and an open slot for the sensor communication card.

The Cisco 910 Industrial Router has three models, shown in Figure 3.

Figure 3. Cisco 910 Industrial Router Models

Figure 4 shows the interfaces and LEDs on the Cisco 910 Industrial Router.

Figure 4. Interfaces and LEDs on Cisco 910 Industrial Router



Features and Benefits

The features and benefits of the Cisco 910 Industrial Router follow:

- Open slot for field-replaceable wireless sensor communication card adaptive to a variety of wireless sensor technologies, for example Semtech LoRa interface
- Programmable environment to allow hosting of partner applications
- Sufficient headroom of compute and memory space to execute fog computing
- Third-generation (3G) high-speed packet access plus (HSPA+) and Code Division Multiple Access (CDMA) Evolution-Data Optimized (EVDO), selective in single device (IR910 3G model only)
- Pluggable 16-GB SSD for volume data storage
- Smooth integration with ecosystem partners to build smart parking, smart metering, and other E2E solutions for customer
- Support for centralized device management

Table 1 provides additional details about the primary features and benefits of the Cisco 910 Industrial Router.

Table 1. Features and Benefits

Feature	Benefit
Ruggedized for field network installation	
IP30 (without enclosure) and IP55 rating (with enclosure)	• Support for both indoor and outdoor deployments
Temperature range of -40 to 158°F (-40 to 70°C)	• Wide temperature range for harsh environments
Ability to mount by DIN, wall, and pole	• Flexible mount options according to use cases
Open slot to adapt to various WSN technology	
Hardware reference design specifications available to partners	• Quickly enable partners to build card according their technologies
Field-replaceable and mechanical rails sliding into chassis	• Easy installation, anti-shock and anti-vibration
Cisco LoRa™ interfaces for 433MHz and 868MHz (LoRa™ technology by Semtech[1])	• Comply LoRaWAN[2] to long range and low power consumption wireless IoT applications

Feature	Benefit
3G HSPA+ and CDMA EVDO selective (IR910G-K9 only)	
Quad-band Global System for Mobile Communications/General Packet Radio Service/Enhanced Data GSM Environment (GSM/GPRS/EDGE), quad-band Universal Mobile Telecommunications Service (UMTS), and dual-band CDMA EVDO	• Compatible with global 3G standards • Mitigation of 3G backhaul selection complexity through singe device • Economic spare unit inventory
Embedded industrial-grade PCIE module	• Support for severe outdoor environment
Extendable TNC antenna	• Prolonged antenna to improve 3G signals
Programmable environment and fog computing	
Support for compile environments of C/C++, Python, and Java	• Ability to easily import and host partners' applications
1-GHz CPU, 1-GB double data-rate 2 (DDR2) RAM, 2-GB NAND Flash, and resource shared by system OS and applications	• Sufficient headroom of compute, memory, and storage • Total resource optimization
Support for Cisco Fog Computing architecture for distributed data processing	• Offload computing pressure to back-end data center in cloud • Reduced traffic bandwidth consumption at IP backhaul
WAN- and LAN-configurable Gigabit Ethernet interface	
Gigabit Ethernet combination interface with Ethernet and Small Form-Factor Pluggable (SFP) slot	• Flexible to Ethernet RJ45 or fiber access
Configurable to WAN or LAN mode	• Scalable through LAN mode to a switch for more Ethernet devices
Wi-Fi interface	
IEEE 802.11b/g/n 2.4GHz interface	• Station and Access Point mode
Pluggable SSD storage (optional)	
16-GB capacity	• Volume data storage in device
Mobile Serial Advanced Technology Attachment (mSATA) interface	• High availability and fast read/write performance
Device management	
Web GUI and Cisco command-line interface (CLI)	• Easy operation and maintenance
Centralized device management	• Help to massive deployment
Product compact form factor	
Small cube	• Fewer size constraints with installation in use cases

[1] Semtech's LoRa is a 2-way wireless modulation technology running on unlicensed ISM band. It provides a low cost, long range and low power consumption way to connect battery operated and mobile devices to the network infrastructure.

[2] LoRaWAN is the network protocol created by LoRa Alliance to leverage Semtech LoRa technology in applications.

Product Specifications

Table 2 lists product specifications for the Cisco 910 Industrial Router.

Table 2. Product Specifications for Cisco 910 Industrial Router

Specification	Description
Physical Specifications	
Dimensions (H x W x D)	• 5.1 x 6.2 x 5.08 in. (130 x 157 x 129 mm), without enclosure, front of DIN rail • 5.1 x 6.2 x 5.38 in. (130 x 157 x 137 mm), without enclosure, back of DIN rail • 11.85 x 9.56 x 5.98 in. (301 x 243 x 152 mm), with enclosure
Mount options	• DIN, without enclosure • Wall, with enclosure • Pole, with enclosure
Net weight	• ~5.07 lb (2.3 kg), without enclosure and sensor communication card • ~7.94 lb (3.6 kg), with enclosure and sensor communication card

Specification	Description		
IP grade	• IP30 (without enclosure) • IP55 (with enclosure) • NEMA Type 3R (with enclosure)		
Temperature	Operating • -40 to 158°F (-40 to 70°C), without SSD storage, in a vented enclosure • -40 to 140°F (-40 to 60°C), without SSD storage, in a sealed enclosure • 32 to 140°F (0 to 60°C), with SSD storage Storage • (-40 to 167°F (-40 to 85°C), with and without SSD storage		
Humidity	• Operating and storage relative humidity (RH): 5 to 95%, noncondensing		
Altitude	• Operating and storage: 0 to 15,000 ft (4573m)		
Operating shock	• 20G, EN 60068-2-27		
Operating vibration	• IEC 60068-2-6 and IEC 255 21.1 Class 1		
Thermal cooling	• Passive (fan-less)		
Compute and Storage			
CPU	• 1.0 GHz, single core		
Memory	• 1-GB DDR2 RAM		
Flash	• 2-GB built-in NAND		
Pluggable storage	• 16-GB SSD, mSATA interface (optional)		
Onboard interface	**IR910 GE**	**IR910 Wi-Fi**	**IR910 3G**
Gigabit Ethernet combination port (10/100/1000 copper and 100/1000 SFP)	• 1		
SFP support	• 1-Gbps SFP: GLC-SX-MM, GLC-LH-SM, GLC-SX-MM-RGD, and GLC-LX-SM-RGD • 100 Mbps SFP: GLC-FE-100LX-RGD and GLC-FE-100FX-RGD		
Wireless LAN (WLAN)		• 802.11 b/g/n, 2.4 GHz, 1Tx1R • Station and Access Point mode • Extendable female RP-SMA antenna connector	
Cellular			• Embedded PCI-E module • 3G HSPA+ and CDMA EVDO selective via CLI • Single mini-SIM card socket (25x15mm) • Extendable TNC antenna connector
Serial (RS-232 and RS-485)	• 2; RJ-45		
Console	• 1; RJ-45		
USB 2.0 (Type A host)	• 1; full sg7 • peed		
Storage slot	• 1; for optional SSD module		
Open slot	• 1; for WSN access card, i.e., Cisco IR910 LoRa card or partner’s module card		
Power Specifications			
Power supply	• 2 external power inputs, 12-24 VDC, maximum 2.8A		
Power consumption	• Average 12 watts (without LoRa module) and 15 watts (with LoRa module)		
Ground	• 1 protective ground connector		
Network Protocol			
Protocols and IP applications	• Dual stack: IPv4 and IPv6 • TCP and User Datagram Protocol (UDP) • Point-to-Point Protocol (PPP) and PPP over Ethernet (PPPoE) • IPv4 and IPv6 Static routing		

Specification	Description
	• Dynamic Host Configuration Protocol (DHCP) server and client for IPv4 and IPv6 • Network Address Translation (NAT) for IPv4 • Domain Name System (DNS) • Network Time Protocol (NTP) client • VLAN • Simple Network Management Protocol Versions 1, 2, and 3 (SNMP v1, v2, and v3) • Link Layer Discovery Protocol (LLDP) • Secure Shell (SSH) Protocol v1 and v2 • HTTP and Secure HTTP (HTTPS) • Syslog
Security	
VPN	• IP Security (IPSec; PSK and RSA) • Layer 2 Tunneling Protocol (L2TP) and L2TP with IPSec (PSK and RSA) • Point-to-Point Tunneling Protocol (PPTP)
Authentication, authorization, and accounting (AAA)	• RADIUS client
WLAN authentication	• Wireless Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), and WPA2 (STA and AP)
3G	
Connect mode	• Always online and on demand
Virtual private dialup network (VPDN)	• PPP Challenge Handshake Authentication Protocol (CHAP) hostname and password
Programmable Languages Supported	
Python	• v2.7.3
C and C++	• gcc 4.7.3, eglibc 2.17, binutils 2.22, and gdb 7.4.1
Java	• OpenJDK 7
System	
Status LED	• SYS • VPN • COM1 • COM2 • Wi-Fi (IR910 Wi-Fi model only) • 3G (IR910 3G model only) • GE • SFP • DC-A • DC-B
Reset button	• Push to re-boot system or factory recovery
Reliability	
Mean time between failure (MTBF)	• 200,000 hours
Operating System	
OS	• Linux with kernel 2.6.35.14

System Requirements

The Cisco 910 Industrial Router supports the following browsers for network management:

- Internet Explorer 8 and 9
- Chrome 34 and 35
- Firefox 21 and 29

Ordering Information

Table 3 provides ordering information for the Cisco 910 Industrial Router.

To place an order, visit the Cisco Ordering Home Page and refer to Table 3. To download software, visit the Cisco Software Center.

Table 3. Ordering Information

PID	Product Description	Note
Base PID		
IR910-K9	Cisco 910 Industrial Router Ethernet only sku, IP30, 1 Ethernet combo (GE/SFP) port, 2 RJ45 RS232/485 serials, 1 open slot, 1 SSD storage slot, 1 USB 2.0 port, 1 RJ45 console port, 1GB RAM, 2GB flash mem, dual 12-24VDC power inputs	• Not include power adapter[1]
IR910W-K9	Cisco 910 Industrial Router Wi-Fi sku, IP30, 1 Ethernet combo (GE/SFP) port, 2 RJ45 RS232/485 serials, 1 open slot, 1 SSD storage slot, 1 USB 2.0 port, 1 RJ45 console port, built-in Wi-Fi, 802.11 b/g/n, 2.4GHz, 1GB RAM, 2GB flash mem, dual 12-24VDC power inputs	• WLAN spectrum support - C and E domain[2] • Not include power adapter[1] • Include a detachable omnidirectional Wi-Fi antenna, IP55 rating, 5dBi gains
IR910G-K9	Cisco 910 Industrial Router generic 3G sku, IP30, 1 Ethernet combo (GE/SFP) port, 2 RJ45 RS232/485 serials, 1 open slot, 1 SSD storage slot, 1 USB 2.0 port, 1 RJ45 console port, built-in 3G HSPA and CDMA EV-DO selective, 1GB RAM, 2GB flash mem, dual 12-24VDC power inputs	• Not include power adapter[1] • Include a detachable omnidirectional 3G antenna, IP55 rating, 3dBi gains • Support quad-band UMTS WCDMA FDD - 800/850/1900/2100 MHz • Support dual-band CDMA EVDO Rev A - 800/1900 MHz • Support quad-band GSM/GPRS/EDGE - 850/900/1800/1900 MHz
IR910G-NA-K9	Cisco 910 Industrial Router North America 3G sku, IP30, 1 Ethernet combo (GE/SFP) port, 2 RJ45 RS232/485 serials, 1 open slot, 1 SSD storage slot, 1 USB 2.0 port, 1 RJ45 console port, built-in 3G HSPA and CDMA EV-DO selective, 1GB RAM, 2GB flash mem, dual 12-24VDC power inputs	• Not include power adapter[1] • Include a detachable omnidirectional 3G antenna, IP55 rating, 3dBi gains • Support quad-band UMTS WCDMA FDD - 800/850/1900/2100 MHz • Support dual-band CDMA EVDO Rev A - 800/1900 MHz • Support quad-band GSM/GPRS/EDGE - 850/900/1800/1900 MHz
Accessory PID (orderable alone)		
ACC-IR910-H-M=	Cisco IR910 IP55 enclosure, including wall and pole mount kit	• Optional and orderable alone part
ACC-IR910-W-M=	Cisco IR910 open slot modular mount bracket[3]	• Optional and orderable alone part
Configurable option PID (not orderable alone)		
ACC-IR910-LORA-868	Cisco IR910 LoRa card, 868 MHz unlicensed ISM band, 8 upstream LoRa channels at 125 KHz bandwidth, 1 downstream LoRa channel at 500/125 KHz bandwidth and 1 FSK channel at 125 KHz bandwidth, 155dB link budget	• Configurable part on IR910 open slot • Include a detachable omnidirectional 868 MHz antenna, IP55 rating, 3dBi gains
ACC-IR910-LORA-433	Cisco IR910 LoRa card, 433 MHz unlicensed ISM band, 8 upstream LoRa channels at 125 KHz bandwidth, 1 downstream LoRa channel at 500/125 KHz bandwidth and 1 FSK channel at 125 KHz bandwidth, 155dB link budget	• Configurable part on IR910 open slot • Include a detachable omnidirectional 433 MHz antenna, IP55 rating, 3dBi gains
ACC-IR910-S16	Cisco IR910 SSD storage, 16GB capacity	• Configurable part on IR910 storage slot • Operational temperature: 0 to 60°C (32 to 140°F)

[1] The base PIDs don't include any power adapter in package. Customer can order the power supply complying with the power input specification of IR910.

[2] The spectrum and channel definitions of domain are given in Table 4. Customer is responsible for verifying approval for use in each country. To verify approval and identify the regulatory domain that corresponds to a specific country, please refer to Cisco 910 Industrial Router compliance status on Cisco product website.

[3] This mount bracket is orderable strictly by partners who builds sensor module card PCBA and need this bracket for faceplate assembly.

Table 4. Spectrum and Channel Definitions of Domain

Domain	2.4 GHz	Country
A (A regulatory domain)	• 2.412 to 2.462 GHz; 11 channels	• United States • Canada
C (C regulatory domain)	• 2.412 to 2.472 GHz; 13 channels	• China (mainland)
E (E regulatory domain)	• 2.412 to 2.472 GHz; 13 channels	• European Union, Thailand, Singapore, Saudi, South Africa, Turkey, Sir Lanka, and Ukraine
N (N regulatory domain)	• 2.412 to 2.462 GHz; 11 channels	• Australia, New Zealand, India, Mexico, and China (Hong Kong)

Regulatory Standards Compliance

Specification	P/N	Description
Safety	IR910-K9 IR910G-K9 IR910G-NA-K9 IR910W-K9	UL 60950-1 Second Edition CAN/CSA-C22.2 No. 60950-1 Second Edition EN 60950-1 Second Edition IEC 60950-1 UL50E, UL/EN/IEC 60950-22 and IEC 60529
EMC	IR910-K9 IR910G-K9 IR910G-NA-K9 IR910W-K9	FCC 15B, Class A EN55022 EN55024
Radio	IR910G-NA-K9	FCC Part 22, Part 24
	IR910G-K9 IR910W-K9 ACC-IR910-LORA-868 ACC-IR910-LORA-433	EN301908 EN300328 EN301489 EN300220
	IR910G-K9 IR910W-K9	China SRRC
	IR910G-K9 IR910W-K9 ACC-IR910-LORA-433	Singapore IDA

Warranty Information

Find warranty information on Cisco.com on the Product Warranties page.

Cisco Services

Cisco is committed to minimizing total cost of ownership (TCO) for your network. Our portfolio of technical support services helps ensure that our products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 5 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

Table 5 lists Cisco Services and Support programs.

Table 5. Cisco Services and Support Programs

Service and Support	Features
Cisco SMARTnet® Service	• Global access to the Cisco Technical Assistance Center (TAC) 24 hours a day • Unrestricted access to the extensive Cisco.com knowledge base and tools • Next-business-day (NBD), 8 x 5 x 4, 24 x 7 x 4, or 2 4x 7 x 2 advance hardware replacement and onsite parts replacement and installation available[1] • Ongoing operating system software updates within the licensed feature set[2]

[1] Advance hardware replacement is available in various service-level combinations. For example, 8 x 5 x NBD indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with NBD delivery. Where NBD is not available, same-day shipping is provided. Restrictions apply; please review the appropriate service descriptions for details.

[2] Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.

For More Information

For more information about the Cisco 910 Industrial Router, please visit http://www.cisco.com/go/ir900 or contact your local Cisco account representative.

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Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

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