Cisco Catalyst IR8100 Heavy Duty Series Router

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Rugged, IP67-rated, 5G router that's fully modular and multi-access capable, allowing you to converge technologies as they evolve.

The Cisco® Catalyst® IR8100 Heavy Duty Series Router is Cisco's most versatile 5G multi-access outdoor industrial router. Its flexible and highly modular form factor makes it an ideal solution for remote asset management across multiple industrial markets.

Other than GPS/GNSS built into the base chassis to track the router's location, all the electronics of the router are fully modular – from the supervisor module to the radio modules, power supply, and battery kit – to address a variety of use cases and help ensure a long chassis life. The IR8100's IP67/NEMA Type 4 enclosure is designed to withstand hostile environments, including shock, vibration, dust, salt, and fog. The IR8100 also supports a wide temperature range of -40° to 70°C (-140° to 158°F) standard operation and is type-tested at 85°C (185°F). This durability, coupled with a battery backup for use during extended outages and multiple backhaul connectivity options, makes this router the ideal choice for any application that needs secure, reliable connectivity in a harsh environment, such as utilities, cities, transportation, oil and gas, and mining.

Product highlights

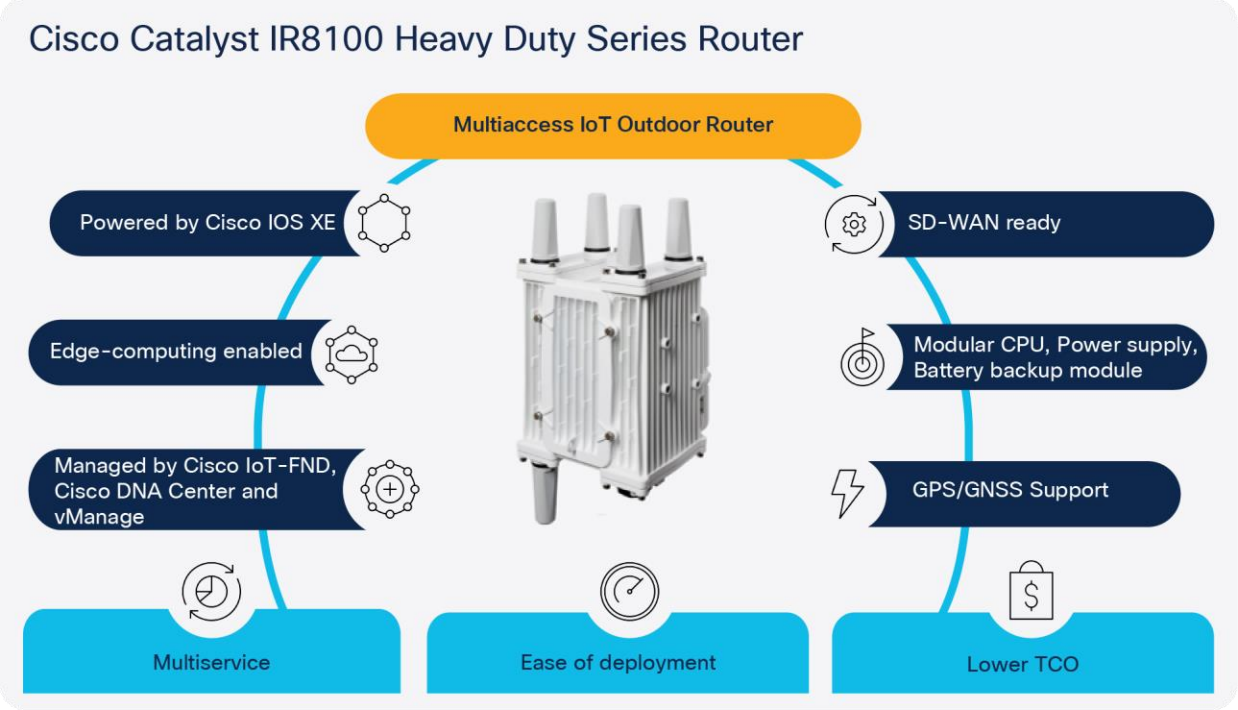

Figure 1.
Overview of the Catalyst IR8100 Heavy Duty Series

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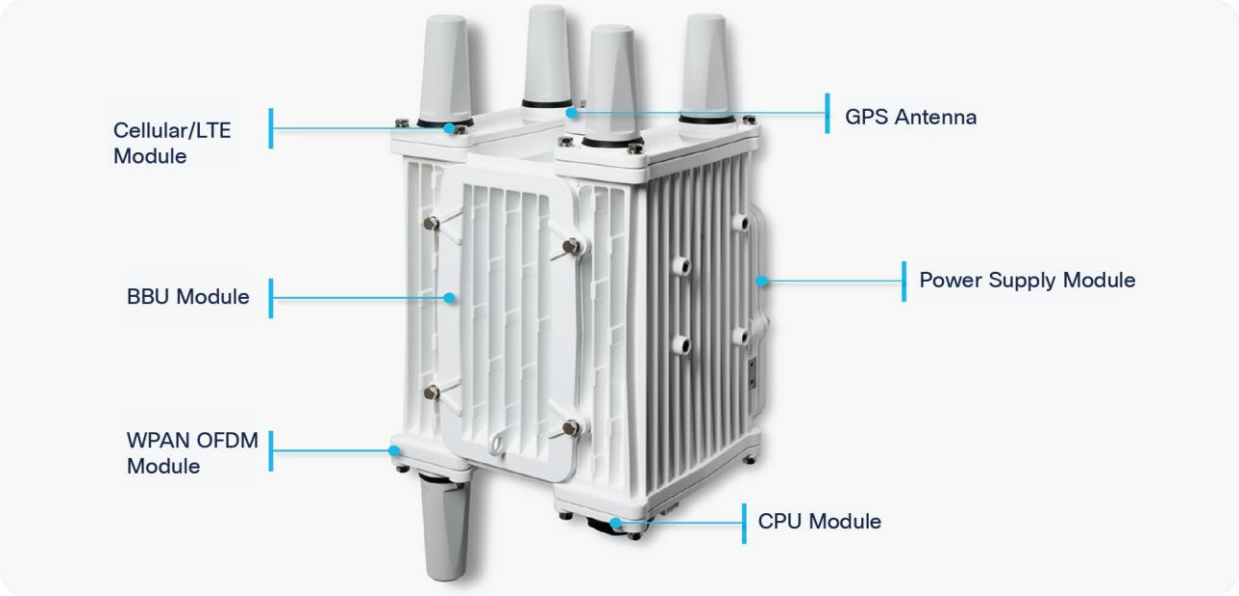

Figure 2.
Catalyst IR8140H platform front view

The IR8100 router offers a modular platform designed to meet the evolving needs of industrial settings.

The following components are essential to the operation of the IR8100 router and must be ordered with every chassis:

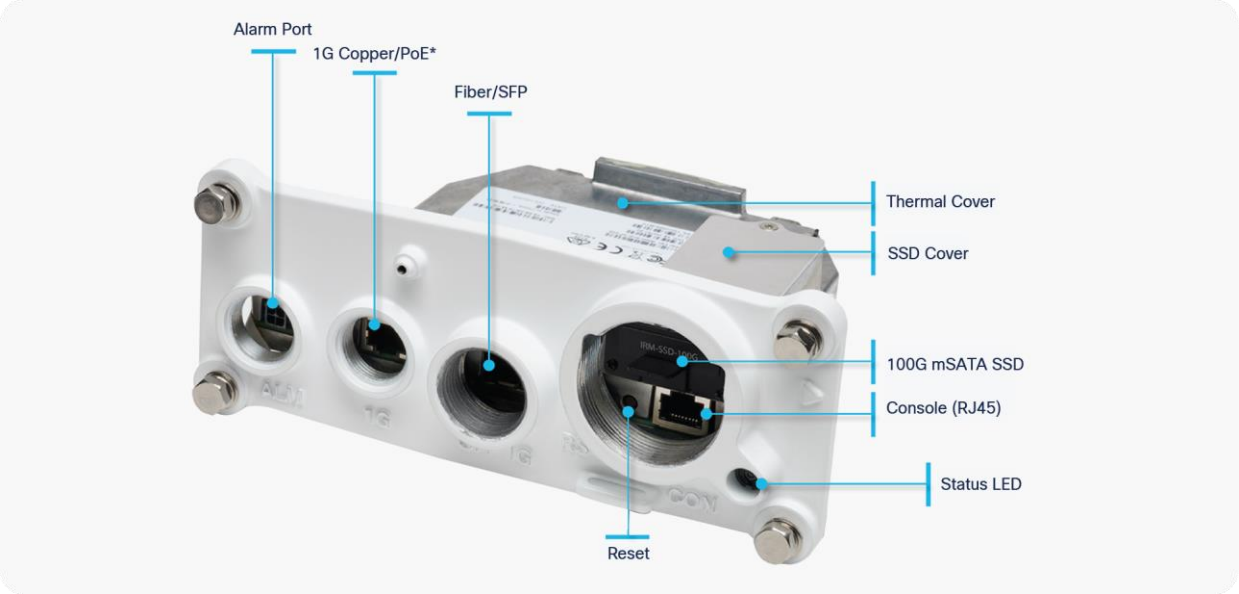

Figure 3.
CPU/supervisor module (PoE port available only on the IR8140H-P-K9)

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Figure 4.
60W AC power supply module

Figure 5.
Battery Backup Unit (BBU) module

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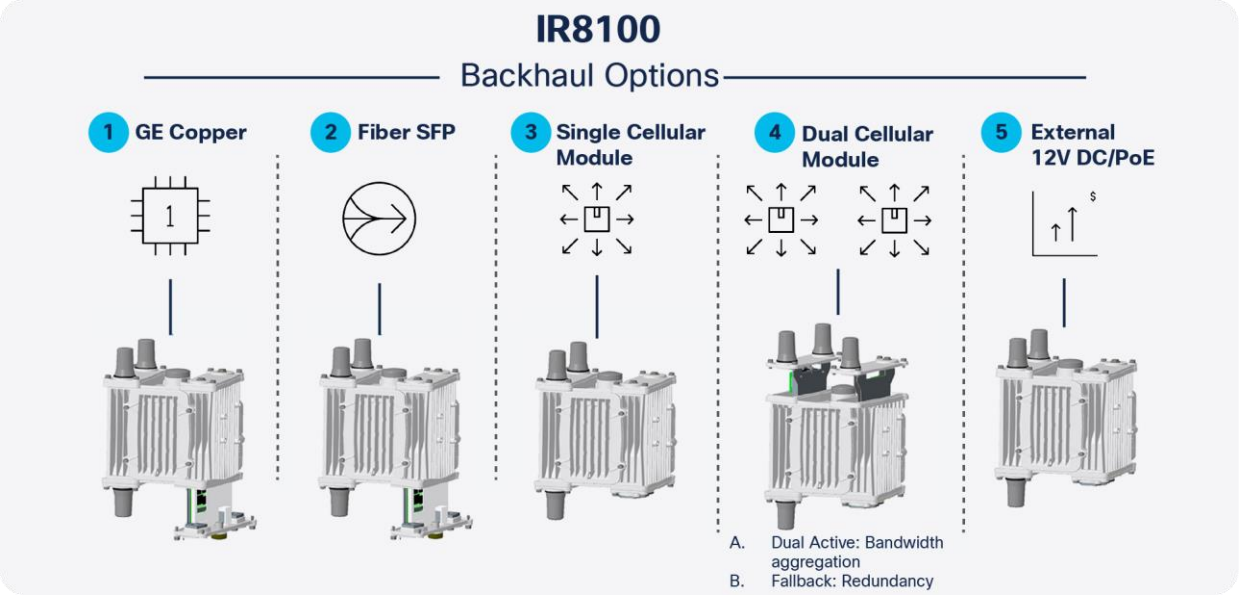

Figure 6.
Backhaul options

The following optional modules can be purchased with the IR8140H.

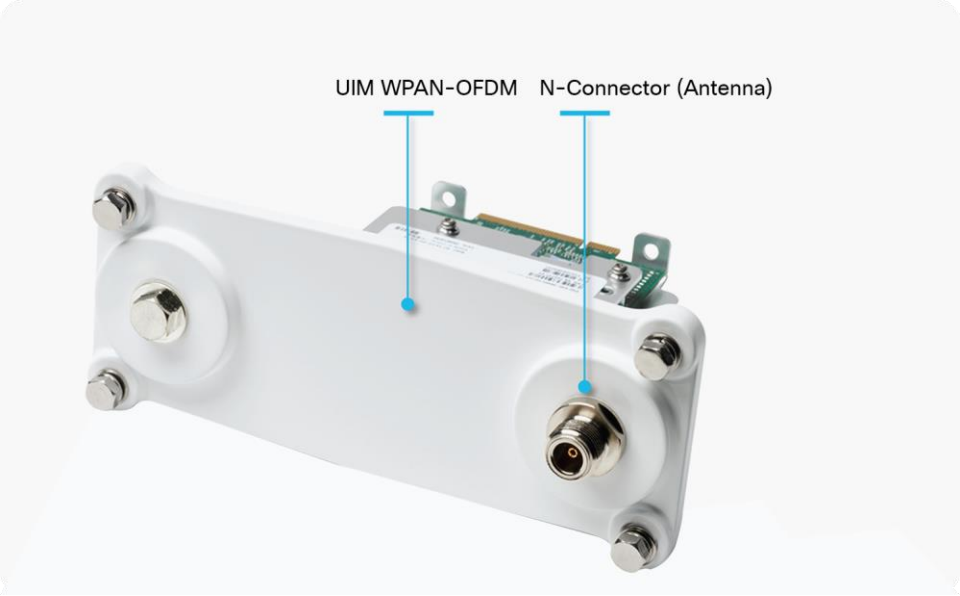

Figure 7.
Wireless Personal Area Network (WPAN) Wi-SUN module

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Figure 8.
Cellular modules CAT 18, 5G on the left and CAT 4,6 on the right

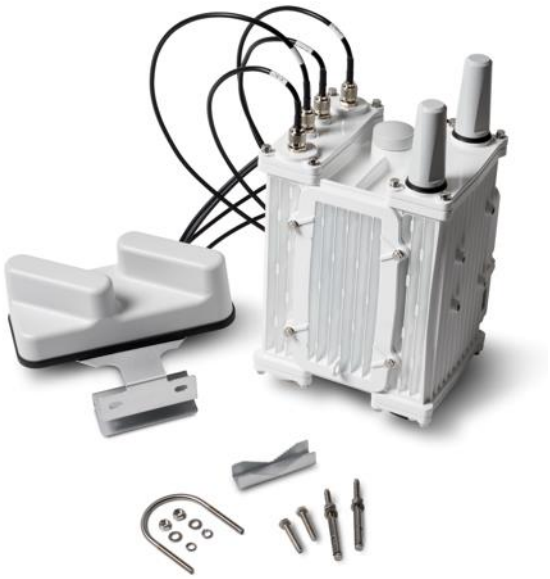

Figure 9.
Cellular module (IRMH-LTEAP18-GL / IRMH-5GS6-GL) with the 4-in-1 multi-element antenna (ANT-4-5G4-O)

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Product overview

The Catalyst IR8100 Series Heavy Duty Router offers a broad range of features for the Internet of Things (IoT).

Table 1. Key features and benefits

Feature	Benefit
	Modularity and investment protection. A single form factor with multiple WAN (LTE, LTE-Advanced, LTE Advanced Pro, 5G Sub-6GHz[1], RJ45/SFP Ethernet) and storage options enables flexibility to add or upgrade modules as technologies evolve. The platform offers CPU modularity and power upgradability, which are key to the longevity of the platform.
	Dual active 5G/LTE-capable modules. With two 5G[1] or LTE modules (LTE and LTE-Advanced/Advanced Pro with carrier aggregation), the IR8100 enables concurrent connectivity to two public and/or private cellular networks for WAN redundancy, enhanced data throughputs, load balancing, and differentiated services, making it a highly reliable and high-performance platform.
	Multiple packet data networks. Connect to different Access Point Names (APNs) for traffic segregation over a public or private cellular link. For example, public internet traffic can be kept separate from mission-critical traffic emerging from the sensors and devices connected to the router.
	5G and 4G LTE multiple-bearer Quality of Service (QoS). Differentiated treatment of traffic with multiple simultaneous bearers per 3GPP standards for an enhanced user experience. Multiple-bearer QoS depends on the cellular carrier's ability to support the service in their network.
	Software-Defined WAN (SD-WAN) capable. For high WAN availability and simplicity for large-scale distributed networks, Cisco IOS® XE provides both autonomous and controller (SD-WAN) mode support.
	802.15.4 902-928MHz Wi-SUN mesh capable. With a Wi-SUN/RF Mesh-enabled WPAN module, the platform enables Cisco Resilient Mesh endpoints and Wi-SUN-enabled endpoints to connect.
	PoE capability. The IR8140H-P-K9 allows up to 15W of Power over Ethernet (PoE) to power PoE-capable devices. Additional 12V DC output is available for powering external devices.
	Industrial security. With Cisco Trust Anchor Technology helping ensure the authenticity of the hardware and software, hardware-accelerated Next-Generation Encryption and Quantum Computer Resistant algorithms, firewall and VPN services, and alerts and notifications enabling physical and cyber security, the IR8100 offers multilayer security for mission-critical deployments.

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Feature	Benefit
	Edge computing. Respond to events more quickly and conserve network bandwidth by analyzing the most time-sensitive data at the network edge, close to where it is generated. A highly secure, extensible environment for hosting applications helps ensure authenticity of applications. An optional field-replaceable SSD allows for storage of application data for recording and analysis.
	Smart grid compliant. Designed for installation in harsh secondary substation environments. Complies with IEEE 1613 and IEC 61850-3 for distribution automation.
	GPS/GNSS. Location-based services for tracking assets and protecting them from theft and intrusion.
	Ease of management. On-premises and cloud-based network management solutions cater to businesses across multiple industries. Tools such as Cisco SD-WAN, Cisco DNA Center, Cisco IoT Field Network Director, and Cisco Network Plug and Play (PnP) simplify deployment and offer breadth in the form of cross-network management and depth in multilayer visibility.
	Network segmentation. Multi-VRF and VPN enable businesses to configure and maintain more than one instance of a routing and forwarding table within the same customer edge device, enabling dynamic changes in the network with a minimal maintenance window. Service providers can enable this feature to support two or more VPNs with IP addresses that overlap across the VPNs.

Business benefits and use case examples

The Catalyst IR8100 router is built on the extensive security and routing expertise of the worldwide leader in networking. It takes full advantage of Cisco core IP networking technologies and is proven at scale. Its robust hardware and software create an open platform for industrial customers to build highly secure industrial networks while lowering their total cost of ownership. The IR8100 delivers real-time monitoring and control of industrial assets to help increase operational efficiency.

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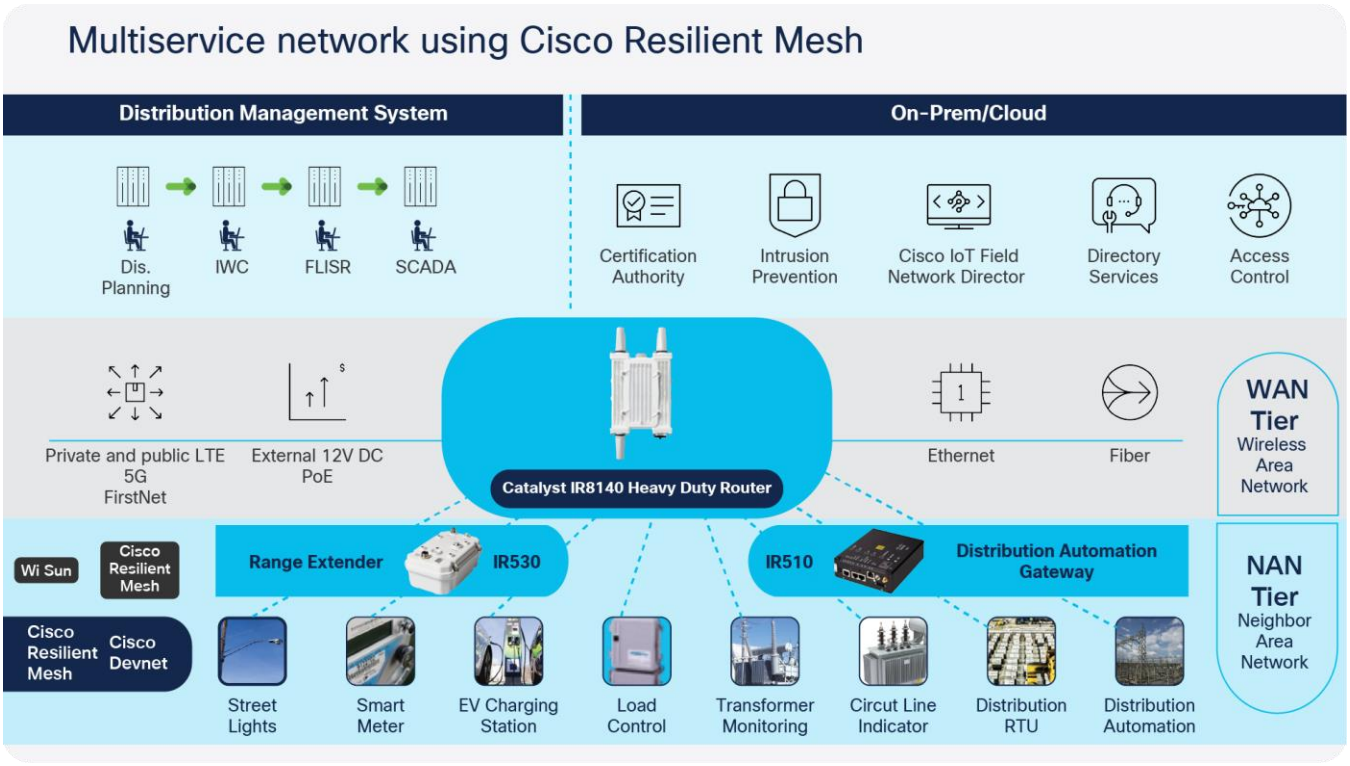

Figure 10.
Multiservice network using Cisco Resilient Mesh

Converged multiservice network architecture

The Catalyst IR8100 router is a modular platform that supports various wired and wireless interfaces. The modular design provides an easy upgrade path to future communication interfaces without platform replacement. In addition to 5G and LTE options, it also supports a Wi-SUN mesh (902- 928 MHz IPv6 RF) interface that can aggregate thousands of endpoints such as smart meters, grid sensors, and other devices into a multiservice Field Area Network (FAN). Cisco offers a wide range of external antenna choices to meet differing coverage, throughput, and range requirements.

The router has an upgradable supervisor module that incorporates a Gigabit Ethernet fiber and copper connection. An integrated GPS/GNSS enables location mapping, and flexible mounting kits allow the router to be deployed on a broad array of existing assets, such as distribution poles, walls, and inside pad-mounted enclosures.

The router is powered by Cisco IOS XE Software, an open, extensible platform that provides a set of network and application-layer services to help customers run multiple applications on a converged communication network. It is highly programmable, with open and standards-based APIs and next-generation, multilayer security built in. This unified software stack is ideal for process and workflow automation, enabling you to qualify and deploy new services more quickly.

Network segmentation and QoS features allow the logical separation of application traffic, with specific constraint policies applied on each traffic flow. In addition, the IR8100 can integrate and host customer- or partner-specific applications. This allows customers to eliminate the cost, space, power, and complexity of deploying and managing disparate devices.

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Open standards

Cisco has a long history of adopting and driving the use of open standards, not only for IT, but also across industrial technology, for use cases such as advanced metering, smart cities, and transportation. Open standards promote the growth of larger, healthier ecosystems that benefit both suppliers and end users. The Catalyst IR8100 is built on open standards, which enables users to architect and design their network independently of the application- or physical-layer infrastructure. This protects existing investments while lowering the total cost of ownership for the communications network over time.

Network reliability and high availability

The Catalyst IR8100 router contains both device-level and network-level reliability to meet harsh physical environments. It is built to meet stringent compliance standards such as IEEE 1613 and IEC 61850-3. To enable extended temperature operation, the router has enhanced thermal design and conduction cooling, with no moving parts. Additionally, the router offers mechanisms for backup power to increase uptime for mission-critical applications in the event of power outages. Finally, the support for multiple WAN communication modules and the network resiliency and routing features in Cisco IOS XE Software allow users to deploy enterprise-class high availability in their communication networks.

Security

Multilayer security is a fundamental principle in all Cisco products. The Catalyst IR8100 implements key security principles and widely adopted cryptography and security standards, as shown in the table below.

Table 2. Security principles

Sec Security principle	CIS. Features and capabilities
Access control	• Mutual authentication and authorization of all nodes connected to the network • IEEE 802.1X-based authentication, Role-Based Access Control (RBAC) • Certificate-based identity, strong username, and passwords
Data integrity, confidentiality, and privacy	• Link-layer encryption in the Wi-SUN mesh (AES-128) • Network-layer encryption in the WAN (IPsec for VPN, I.e. FlexVPN, DMVPN) • Scalable key management, generation, exchange, and revocation of encryption keys
Threat detection and mitigation	• Network segmentation of users, devices, and applications in Wi-SUN mesh and WAN • Access lists to filter traffic between users and devices • High-performance firewall in the control center to protect critical assets • Supports Cisco Cyber Vision, providing visibility into industrial assets connected to the router (post-FCS)
Device and platform integrity	• Tamper-resistant mechanical design; security alerts generated if compromised • Hardware chip to store the router's X.509 certificate and other security credentials • Tamper-proof secure storage of router configuration and data

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Communications network management

Network management applications are critical for lowering Operating Expenses (OpEx) while improving the availability of the communications network. These tools simplify and automate many of the day-to-day tasks associated with managing diverse network requirements. The embedded management features available in the IR8100, along with tools such as IoT Field Network Director, allow customers to effectively meet these requirements.

Cisco IoT Field Network Director (FND) is an on-premises, modular software platform for managing multiservice communication networks and security infrastructure. FND provides operators with extensive instrumentation and diagnostic information for geographic locations, wireless interfaces, battery management, and other device details to simplify day-to-day operations and real-time troubleshooting. Ease-of-use features such as secure zero-touch commissioning and a graphical field tool let non-IT field technicians deploy and manage both communications equipment and connected Wi-SUN endpoints. FND also provides customers with true enterprise-class fault, configuration, accounting, performance, and security (FCAPS) functionality. Examples include a programmatic XML interface based on the NETCONF industry standard, RBAC, over-the-air software upgrades, and security management functionality.

The IR8100 can also be managed by Cisco DNA and SD-WAN. Cisco DNA offers a network infrastructure that not only is fully programmable and open to third-party innovation, but also can fully and seamlessly integrate the cloud as an infrastructure component. Cisco DNA simplifies and automates processes and workflow by bringing the notion of user-aware and application-aware policies into the foreground of network operations. With Cisco DNA, the network can provide continuous feedback to simplify and optimize network operations. It enables automation of network configuration and delivers software-defined networking to extend the enterprise network to harsh industrial and outdoor environments. With a single management dashboard for configuration and management of WAN, Cisco SD-WAN automates application flexibility over multiple connections, such as the internet, Multiprotocol Label Switching (MPLS), and wireless 4G LTE.

Use case examples

Utilities

Utilities are seeking the capability to monitor tens of thousands of miles of electric distribution lines or water infrastructure, often located in harsh environments, over public or private cellular networks to provide remote asset monitoring and reliable and secure traffic backhauling. They are seeking to integrate multiple applications, such as Advanced Metering Infrastructure (AMI), Distribution Automation (DA), integration of Distributed Energy Resources (DER), and remote workforce automation onto a single platform. Regulatory mandates are driving initiatives related to smart metering, grid reliability, and the integration of solar and wind farms into the distribution grid. The situation imposes a unique set of challenges for utilities to build a bidirectional communication FAN that enables these diverse applications and also scales across millions of endpoints.

The IR8100 FAN solution has been specifically developed to meet these challenges. A typical communications network for the distribution grid is a two-tier architecture with a Wi-SUN mesh on the southbound side and a WAN. The Wi-SUN mesh provides network connectivity to endpoints such as smart meters, street lights, and other endpoints that form a Cisco Resilient Mesh (Wi-SUN-compliant) network. The Cisco Resilient Mesh network is aggregated at a Catalyst IR8100 router, mounted on a pole or in a secondary distribution substation. The IR8100 can use the Wi-SUN mesh to also aggregate locally connected devices for DA. The WAN tier provides network connectivity from the IR8100 to the utility's control center over a public cellular network or an Ethernet fiber network.

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Oil and gas

Oil and gas companies need to monitor pipeline infrastructure across wide geographic areas and remote locations using public or private cellular networks to collect data from remote terminal units and securely transport Supervisory Control And Data Acquisition (SCADA) traffic to a Network Operations Center (NOC).

Transportation and cities

Highways and transportation agencies require reliable, always-on communication between speed cameras, monitoring cameras, ticket terminals, and so on. Wireless devices to support such continuous communication need to support 4G and 5G networks to help ensure good, wide coverage.

The IR8100 is designed for continuous operation in very harsh environments, and its rugged form factor is deal for outdoor deployment near roadside infrastructure.

Connect remote assets and use the built-in edge compute capabilities of the IR8100 to make roadways and intersections safer.

Connected communities

Critical assets in communities need to be interconnected with a variety of technologies based on the geography and the SLA requirements. Securely connect mission-critical assets to help ensure public safety.

Mining

Mining areas often pose hazardous conditions and sensors need to be deployed to ensure workers have a safe working environment. Controlling and maintaining the assets are essential to the flexible operation for the mining workers. Gain visibility into and control over remote mission-critical assets to increase operational efficiency.

Additional features and benefits

Table 3. Additional features and benefits

Feature	Benefits
IoT enablement	
Modular, ruggedized form factor	Designed for installation in outdoor rugged environments. Upgradable supervisor module helps ensure that the router is future-ready. Three modular slots allow for a variety of radio technologies to support a choice of backhaul and field device connectivity. Modular power supply provides up to 60W of AC power.
Edge compute	Built-in edge compute environment with up to 100 GB of optional external storage available to edge applications hosted on the router.
Battery backup unit	The router supports up to three 4 Ah battery packs to handle extended outages and provide backup power for extended periods.
Optional PoE or 12V DC out	PoE is capable of providing up to 15W of power to third-party and external devices attached to the PoE port. Alternatively, a 12V DC power is available to connect an external device or interface.
High performance to run concurrent services	The multicore processor architecture allows businesses to take advantage of network-supported speeds while also hosting edge compute applications.

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Feature	Benefits
Multiple WAN, LAN and Wi-SUN / WPAN connections	
WAN diversity	• Multiple WAN links for high reliability: • Two Gigabit Ethernet Layer 3 Small Form-Factor Pluggable (SFP) (copper and fiber) and 5G[1]/4G pluggable interfaces. 5G/LTE provides WAN diversity and business continuity across public or private cellular networks
Dual active 5G/LTE interfaces	Concurrent connectivity to two cellular networks for high reliability, load balancing, and differentiated services.
Dual Active WPAN Support	The IR8140H can support dual active Wi-SUN/WPAN 900MHz Mesh modules for High availability and / OR extended Scale of mesh endpoints per Router
Transparent roaming between wireless networks	
Dual SIMs over cellular	Provides active and backup connectivity for high reliability over cellular networks.
Cisco IOS XE mobile IP	• Transparent roaming for mobile networks, enabling mission-critical applications to stay connected, even when moving between networks. • IP addresses assigned to the home network are maintained in private and public networks. • Supports Proxy Mobile IP (PMIPv6) and Network Mobility (NEMO).
Cellular fallback	Multiple technologies (5G, 4G LTE, 3G) are available to support connectivity to the best one available. 2G fallback is not supported in North America.
Software	
Cisco IOS XE Software	Designed to enable businesses to deploy services more quickly with lower TCO: • Rich functionality. Brings the full range of enterprise-class routing features to IoT applications to help ensure interoperability with IT infrastructure and provide advanced security, segmentation, and reliability features. • Autonomous and controller mode (SD-WAN) in a unified software image. • Openness and programmability: Standards-based programmable interfaces enable process, telemetry, and workflow automation. NETCONF, RESTCONF, IETF YANG, Python scripting, and custom libraries enable automation of event-based workflows. • Secure: Multilevel, end-to-end security and trust are built in. The built-in Cisco Next-Generation Encryption and Quantum Computing Resistant algorithms are expected to meet security and scalability requirements for the next two decades. • Modular: Enables patching of software bug fixes and graceful insertion and removal of software modules for ease of maintenance. • Common software stack: Reduces business and network complexity while managing an array of Cisco devices.

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Table 4. Network management solutions

Operational phase	Application	Description
Stage and configure a few routers	Cisco WebUI	A GUI-based device-management tool that simplifies provisioning of devices for a small-scale deployment through easy-to-use wizards.
Deploy, manage, monitor, and maintain IoT gateways and assets at scale	Cisco IoT Field Network Director for hosting on premises	• Rapid scaling: Zero-touch deployment and secure enrollment for tens of thousands of gateways. • Enhanced security: Role-based access and user audit trail and secure communications for data transport across networks, VPN tunnels, geo-fencing, alerts, and notifications for data and physical security. • Increased reliability: Reliable communications over cellular or Ethernet networks, lifecycle management, and 24/7 real-time monitoring and alerts.
Extend your enterprise network to configure, monitor, and manage industrial assets	Cisco DNA Cisco DNA with SD-WAN	• Cisco DNA offers a network infrastructure that not only is fully programmable and open to third-party innovation, but also can fully and seamlessly integrate the cloud as an infrastructure component. • Simplifies and automates processes and workflow by bringing the notion of user-aware and application-aware policies into the foreground of network operations. • With Cisco DNA, the network can provide continuous feedback to simplify and optimize network operations. • Enables automation of network configuration. Delivers software-defined networking to extend the enterprise network to harsh industrial and outdoor environments. • Single management dashboard for configuration and management of WAN. • Cisco SD-WAN automates application flexibility over multiple connections, such as the internet, MPLS, and wireless 4G LTE/5G.

Table 5. Embedded management capabilities

Feature	Description
Cisco IOS Embedded Event Manager (EEM)	A distributed and customized approach to event detection and recovery. Provides the ability to monitor events and take corrective or any other desired action when the monitored events, such as a high or low threshold, occur.
Cisco IOS XE IP Service-Level Agreements (IP SLA)	Helps assure the performance of new, business-critical IP applications as well as IP services by actively monitoring and reliably reporting traffic statistics such as jitter, response time, packet loss, and connectivity.
Simple Network Management Protocol (SNMP), Syslog, NetFlow	Open-standards-based network monitoring and accounting tools, such as SNMP for 3G, 4G provide a common management platform for many different devices.
LTE network management and diagnostics	A dedicated diagnostic port on a cellular module enables logging of data during debugging sessions that can be analyzed by industry-standard tools such as Qualcomm CDMA Air Interface Tester (CAIT) and Spirent Universal Diagnostic Monitor (UDM).

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Product specifications

Table 6. Product specifications

Feature	Specification
Chassis details	IR8140H-K9 IR8140H-P-K9 (PoE enabled)
Ingress protection rating	IP67
Modular slots	• Supervisor module (mandatory) • Power supply module (mandatory) • Battery mounting kit (mandatory) ◦ Houses up to 3 Battery Backup Units (BBUs) with smart charging/monitoring ◦ Each BBU is 4 Ah, providing a total of 12Ah with 3 BBU units • 4 Universal Interface Module (UIM) slots, including CPU supervisor module.
GPS/GNSS	Yes
Physical characteristics	
Physical dimensions (H x W x D) **Without antennas** **With multipurpose antennas**	34.04 x 23.87 x 25.15 cm (13.4 x 9.4 x 9.9 in) 50.8 x 23.87 x 25.15 cm (20.4 x 9.4 x 9.9 in)
Maximum chassis weight: 4 UIM modules, AC power supply, 3 BBUs	30 lb (13.4 kg)
Mounting options	Wall, pole mount
Supervisor module	
Console	RJ-45
WAN interfaces	• 10/100/1000 Gigabit Ethernet port (copper). PoE enabled on IR8140H-P-K9 • 10/100/1000 Gigabit Ethernet SFP.
Default and maximum DRAM	8 GB
Default and maximum flash memory	8 GB (usable)
Backup memory	4 GB (usable)
Edge compute module	100-GB SSD
Digital alarms (I/O)	2
LED	System OK

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Feature	Specification
Power specifications	
Power supply specifications	60W AC power supply (100W AC power option available) Operating range: 100 to 240V AC
External power options	Option 1: 12V DC out for powering external third-party devices Option 2: 15W of PoE available to power third-party devices (30W using 100W AC)
Typical power consumption or dissipation*	1WO8.2W
Maximum power consumption or dissipation* (with and without charging)	27W 39.5W (with charging all 3 BBUs)
Power consumption (CPU + chassis)	Idle: 10W Typical: 15W Maximum: 16W
Power consumption (cellular/WPAN)	Idle: 2W Typical: 3W Maximum: 5W
UIMs	
IEEE 802.15.4g WPAN (OFDM/FSK)	Supports up to two 902-928 MHz WPAN modules [From IOS 17.7 release]
Cellular modules (LTE Category 4/6/18, 5G sub-6 GHz)	Supports up to two cellular modules in active/active or active/standby mode
Supervisor module	Supports one supervisor module

* Usage includes standard modules LTE and WPAN.

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Table 7. Environmental characteristics

Environmental characteristic	Specification
Environmental operating temperature[1]	–40° to +70°C (–40° to 158°F) with type test to 85°C (185°F) for 16 hours
Industry standards	**Public safety** • FirstNet Ready • **Smart grid** • IEC 61850-3 • IEEE 1613 **Security** • FIPS 140-2 • Common Criteria **IPv6** • USGv6
Environmental compliance	• IEC-61850-3 • IEEE1613
Immunity	• EN61000-4-2 (ESD) • EN61000-4-3 (RF) • EN61000-4-4 (EFT) • EN61000-4-5 (SURGE) • EN61000-4-6 (CRF) • EN61000-4-11 (VDI) • IEC 61000-4-12 (AC, I/O) • IEEE 1613: High Voltage Impulse • EN 55035 • CISPR35
EMC	• 47 CFR, Part 15 B, Class A • ICES-003 Class A • AS/NZS CISPR32 Class A • VCCI V-3 • CNS 13438 • EN 300-386 • EN 55032 Class A • CISPR32 Class A

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Environmental characteristic	Specification
Safety	• USA: UL 62368-1, UL 60950 • Canada: CAN/CSA C22.2 No. 62368-1 & 60950 • Europe: EN 62368-1 & EN 60950 • China: GB 4943 • Australia/New Zealand: AS/NZS 60950.1 • Rest of world: IEC 62368-1 • CB report to IEC 62368-1, 2nd Ed., covering all group differences and national deviations • Insulation effectiveness: ◦ AC input to chassis/ground: 1500V~/2121Vdc ◦ AC input to output/accessible connectors ◦ - 3000 V~/4242 V DC
Radio	• **WPAN** ◦ FCC Part 247, AS/NZ 4268:2018 ◦ RSS 247 • **GNSS** ◦ EN 303 413 ◦ EN 301 489-1/19 • **Cellular** ◦ EN 301 908-1/2/13 ◦ EN 301 489-1/52 ◦ FCC Part 2, 22, 24, 27,90,96 ◦ RSS 130, 132, 133, 139, 199 • **MPE** ◦ EN 50385/62311 ◦ FCC Part 2.1093 and 2.1091 ◦ RSS 102, AS/NZ 2772:2017

Table 8. Cisco IOS XE Software features

Feature	Description
Cisco IOS XE Software requirements	• Universal Cisco IOS XE Software image • Release 17.5.1 or later • Unified image for autonomous and controller (SD-WAN) mode
IPv4 and IPv6 services features	• Routing Information Protocol Versions 1 and 2 (RIPv1 and RIPv2) and IPv6 RIPng • Generic Routing Encapsulation (GRE) and Multipoint GRE (MGRE) • Network Address Translation (NAT) • Dynamic Host Configuration Protocol (DHCP) server, relay, and client for IPv4 and IPv6 • Dynamic DNS (DDNS) • DNS proxy • DNS spoofing • IPv4 and IPv6 Access Control Lists (ACLs) • IPv4 and IPv6 multicast • IP Service-Level Agreement (IP SLA) • Open Shortest Path First (OSPFv2 and OSPFv3)

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Feature	Description
	• Multiprotocol Border Gateway Protocol (MP-BGP) • Enhanced Interior Gateway Routing Protocol (EIGRP) for IPv4 and IPv6 • Virtual Route Forwarding (VRF) Lite • Next-Hop Resolution Protocol (NHRP)
Security features	**Secure connectivity** • Hardware-accelerated encryption with minimal impact to system performance • Next Generation Encryption (NGE) and Quantum Computing Resistant (QCR) algorithms such as AES-256, SHA-384, and SHA-512 • Public-Key Infrastructure (PKI) support • Cisco Easy VPN solution client and server • NAT transparency • Dynamic Multipoint VPN (DMVPN) • Group Encrypted Transport (GETVPN) • Flex VPN • IPsec stateful failover • VRF-aware IPsec • Certificate Revocation List (CRL) and Online Certificate Status Protocol (OCSP) • IPsec over IPv6 **Cisco Umbrella** • As supported by IOS-XE **Cisco IOS Firewall** • Zone-based policy firewall • VRF-aware stateful inspection routing firewall • Stateful inspection transparent firewall • Advanced application inspection and control • Secure HTTP (HTTPS), FTP, and Telnet Authentication Proxy • Dynamic and static port security • Firewall stateful failover • VRF-aware firewall **Cisco Resilient Mesh security** • IEEE 802.15.4 g/e • 802.1X/802.11i • RBAC for device configuration • Authentication, authorization: Extensible Authentication Protocol Transport Layer Security (EAP TLS), EAP Tunneled TLS (EAP TTLS) • Enrollment over Secure Transport (EST) **Integrated threat control** • Control-plane policing (CoPP) • Flexible packet matching • Network foundation protection **Hardware security** • Device identity: IEEE 802.1AR • Trust Anchor Module (ACT2 chipset) • Hardware-based encryption

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Feature	Description
	• Input alarm for digital sensors • Security bracket
QoS features	• Provides LTE QoS with support for up to 8 concurrent bearers on each cellular WAN interface for traffic classification and prioritization • Provides traffic precedence to delay-sensitive and mission-critical services • Facilitates low-latency routing of delay-sensitive industrial applications • Supported on all LAN and WAN interfaces, including cellular • Low Latency Queuing (LLQ) • Weighted Fair Queuing (WFQ) • Class-Based WFQ (CBWFQ) • Class-Based Traffic Shaping (CBTS) • Class-Based Traffic Policing (CBTP) • Policy-Based Routing (PBR) • Class-Based QoS MIB • Class of Service (CoS) to Differentiated Services Code Point (DSCP) mapping • Class-Based Weighted Random Early Detection (CBWRED) • Resource Reservation Protocol (RSVP) • Real-Time Transport Protocol (RTP) header compression (cRTP) • Differentiated Services (DiffServ) • QoS pre-classify and pre-fragmentation
High-availability features	• Dual active LTE backhaul • Virtual Router Redundancy Protocol (VRRP) (RFC 2338) • Hot Standby Router Protocol (HSRP) • Dual SIM support on the LTE module for cellular failover
IPv6 features	• IPv6 addressing architecture • IPv6 unicast and multicast forwarding • IPv6 ACLs • IPv6 over cellular • IPv6 routing (Static, RIPng, EIGRP, OSPFv3, MP-BGP) • IPv6 domain name resolution • IETF 6LOWPAN (RFC 4919, 4944, 6282) • IETF RPL (RFC 6550, 6551, 6553, 6554, 6206) • IETF CoAP (RFC 7252)

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Software licensing

The IR8100 offers two software tiers: **Network Essentials** and **Network Advantage**.

Network Essentials license: Offers the essential elements of routing and security necessary for typical IoT deployments.

Network Advantage license: Enables advanced features, including MPLS for a highly scalable and cost-effective solution, mobile IP for seamless migration between networks, and application-aware QoS policies for built-in intelligence.

A single Cisco IOS XE universal image encompassing all functions is delivered with the product. Software feature licenses are preinstalled in the factory depending on the selection made at the time of purchase, thereby simplifying software delivery and decreasing operational costs of the deployment. Licenses can be upgraded after deployment by going through the Cisco Smart License activation process. For a more detailed overview of Cisco licensing, go to cisco.com/go/licensingguide.

The figure below explains the capabilities of each license.

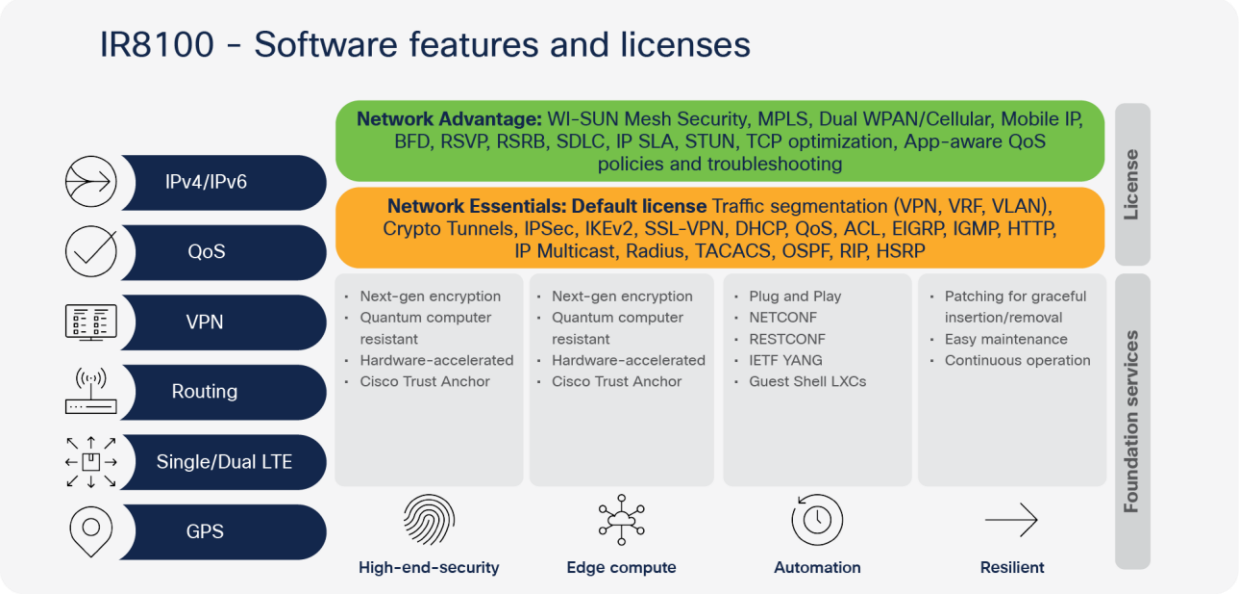

Figure 11.
Details of licensing options

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Throughput licenses

The IR8100 has three throughput license options.

Table 9. Licenses and throughput

License	Tier	Aggregate throughput	Comment
Default (DEF)	T0	30 Mbps	This is the default tier with 30 Mbps aggregate throughput.
Performance (PERF)	T1	200 Mbps	This tier provides 200 Mbps aggregate throughput.
Boost (BOOS)	T2	Uncapped	This tier allows the device to use its full hardware capacity.

Select an appropriate combination of license and throughput tier, based on your requirements.

Export regulations require HSEC license as a mandatory attach with Boost License.

A single Cisco IOS XE universal image encompassing all functions is delivered with the product. Software feature licenses are preinstalled at the factory, depending on the selection made at the time of purchase, simplifying software delivery and decreasing the operational costs of the deployment. Licenses can be upgraded after deployment by going through the Cisco Smart License activation process. For a more detailed overview of Cisco licensing, go to cisco.com/go/licensingguide.

Cellular modules

The cellular modules available for the IR8100 are leveraged from Pluggable Interface Modules (PIMs) and are repackaged as IP67 UIMs. This enables faster availability of the cellular modules. When installing a cellular module on an IR8100 equipped with a WPAN interface, the IRM-LTE-xxx-900 must be ordered.

Table 10. LTE Advanced (3GPP Category 6) modules

Region theaters	IRMH-LTE-MNA	IRMH-LTE-MNA-900
LTE bands	LTE bands 2,4,5,12,13,14,17,66 FDD LTE 1700 MHz and 2100 MHz (band 66 Ext AWS), 700 MHz (bands 17, 14, 13, and 12), 850 MHz (band 5 CLR), 1700 MHz and 2100 MHz (band 4 AWS), 1900 MHz (band 2)	LTE bands 2,4,5,12,13,14,17,66 FDD LTE 1700 MHz and 2100 MHz (band 66 Ext AWS), 700 MHz (bands 17, 14, 13, and 12), 850 MHz (band 5 CLR), 1700 MHz and 2100 MHz (band 4 AWS), 1900 MHz (band 2)
Backward compatibility	UMTS, HSPA+ (bands 2, 4, and 5)	UMTS, HSPA+ (bands 2, 4, and 5)
WPAN coexistence	No	Yes
Theoretical download and upload speeds[4]	150 and 50 Mbps	150 and 50 Mbps
United States	Multicarrier (AT&T and Verizon)	Multicarrier (AT&T and Verizon)
Europe	–	–
Band 14	Yes	Yes
FirstNet Ready	Approved by AT&T	Approved by AT&T

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Table 11. LTE Advanced (3GPP Category 6) modules

Region theaters	IRMH-LTEA-EA	IRMH-LTEA-EA-900
LTE bands	LTE bands 1-5, 7, 8, 12, 13, 20, 25, 26, 29, 30, and LTE bands 1-5, 7, 8, 12, 13, 20, 25, 26, 29, 30, and 41 FDD LTE 700 MHz (band 12), 700 MHz (band 29), 800 MHz (band 20), 850 MHz (band 5 CLR), 850 MHz (band 26 Low), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1900 MHz (PCS band 25), 1700 MHz and 2100 MHz (band 4 AWS), 2100 MHz (band 1), 2300 MHz (band 30), or 2600 MHz (band 7) TDD LTE 2500 MHz (band 41) **Carrier aggregation band combinations:** 1+8; 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41	LTE bands 1-5, 7, 12, 13, 20, 25, 26, 29, 30, and 41 FDD LTE 700 MHz (band 12), 700 MHz (band 29), 800 MHz (band 20), 850 MHz (band 5 CLR), 850 MHz (band 26 Low), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1900 MHz (PCS band 25), 1700 MHz and 2100 MHz (band 4 AWS), 2100 MHz (band 1), 2300 MHz (band 30), or 2600 MHz (band 7) TDD LTE 2500 MHz (band 41) **Carrier aggregation band combinations:** 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41
Theoretical download and upload speeds	300 and 50 Mbps	300 and 50 Mbps
WPAN coexistence	No	Yes
United States	Verizon, AT&T	Verizon, AT&T
Europe	Yes	Yes
United Arab Emirates	Yes	Yes
Canada	Yes	Yes
LATAM: **Brazil Columbia, Argentina)**	Yes	Yes

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Table 12. LTE Advanced (3GPP Category 6) modules

Region theaters	IRMH-LTEA-LA
LTE bands	LTE bands 1, 3, 5, 7, 8, 18, 19, 21, 28, 38, 39, 40, and 41 FDD LTE 700 MHz (band 28), 850 MHz (band 5 CLR), 850 MHz (bands 18 and 19 Low), 900 MHz (band 8), 1500 MHz (band 21), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7) TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38) **Carrier aggregation band combinations:** 1+(8,18,19,21); 3+(5,7,19,28); 7+(5,7,28) 19+21, 38+38, 39+39,40+40, and 41+41
Theoretical download and upload speeds[2]	300 and 50 Mbps
China	Yes
Australia and New Zealand	Yes (Approved by Telstra)
Japan	Yes (NTT Docomo, KDDI, Softbank)
India, Singapore, Malaysia, Thailand	Yes
WPAN coexistence	No

Table 13. LTE Advanced (3GPP Category 18) modules

Region theaters	IRMH-LTEAP18-GL[3]
LTE bands	LTE bands 1-5, 7, 8, 12-14, 17, 18-20, 25, 26, 28-30, 32, 38-43, 46, 48, 66, and 71. FDD LTE 600 MHz (band 71), 700 MHz (bands 12, 13, 14, 17, 28, and 29), 800 MHz (band 20), 850 MHz (bands 5, 18, 19, and 26), 900 MHz (band 8), 1500 MHz (band 32), 1700 MHz (bands 4 and 66), 1800 MHz (band 3), 1900 MHz (bands 2 and 25), 2100 MHz (band 1), 2300 MHz (band 30), 2600 MHz (band 7). TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), 2600 MHz (band 38), 3500 MHz (bands 42 and 48), 3700 MHz (band 43), 5200 MHz (band 46).
Theoretical download and upload speeds[4]	1.2 Gbps/200 Mbps
United States	Multicarrier (AT&T and Verizon)
Europe	Yes
Canada	Yes
Australia	Yes
Japan	

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Region theaters	IRMH-LTEAP18-GL[3]
China	Yes
Band 14 FirstNet[5] certification	Yes Yes
Band 48 (CBRS)	Yes
WPAN coexistence	No

Table 14. LTE 5G modules

Region theaters	IRMH-5GS6-GL 5G Sub-6GHz[3]
LTE bands	5G FR1 – n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79 LTE bands 1-5, 7-8, 12-14, 17-20, 25, 26, 28-30, 32, 34, 38-43, 46 (LAA), 48 (CBRS), 66 and 71
Theoretical download and upload speeds[4]	3.3 Gbps/400 Mbps
United States	Multicarrier (AT&T, Verizon, T-Mobile)
Europe	Yes
Canada	Yes
Australia	Yes
Japan	Yes
China	Yes
Band 14 and 48 (CBRS)	Yes
WPAN coexistence	No

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Ordering information

The IR8100 is a Smart License-enabled product. A Cisco Smart Account is required to order the product. For more information how to order the IR8100 and Cisco Smart Accounts, visit the Cisco Smart Account user guide.

Ordering the Catalyst IR8100 can be divided into the sequence below:

1. Base platform and mandatory accessories
2. Software licenses
3. Select the appropriate UIM's
4. Accessories (Step 4 and later)

The following table gives a step-by step guide to placing an order for the Catalyst IR1840H. To place an order, select the right product IDs from the tables below in sequential order.

Table 15. Ordering information for Catalyst IR8140H

Step 1: Select the base platform and the mandatory accessories.

Base platform	Description
IR8140H-K9	Cisco Catalyst IR8140H Heavy Duty Router
IR8140H-P-K9	Cisco Catalyst IR8140H-P Heavy Duty Router with PoE

Power supply module	Description
IRMH-PWR60W-AC	60W AC Power Supply module for IR8140H

Supervisor module	Description
IRMH-SUP-SP	Supervisor Module with 1 Copper + 1 Fiber Port for IR8140H

Battery	Description
IRMH-BATT-BRKT	Battery Mounting Kit for IR8140H
IRMH-BATT-4AH	4AH Battery for IR8140H

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If no batteries are needed, select 0 for quantity of IRMH-BATT-4AH.

Step 2: Select the license and throughput tier.

Software license	Description
SL-IR8140-NE	Network Essentials for core routing and security features
SL-IR8140-NA	Network Advantage for WPAN, advanced routing and app-based policy management
SL-IR8140-NE-NPE	Network Essentials for No Payload Encryption software
SL-IR8140-NA-NPE	Network Advantage for No Payload Encryption software

Licenses			
Network Essentials	**Network Advantage**	**Throughput tier**	**Aggregate throughput**
SL-8100-NE/DEF-K9	SL-8100-NA/DEF-K9	T0 (default)	30 Mbps
SL-8100-NE/PERF-K9	SL-8100-NA/PERF-K9	T1 (Performance)	200 Mbps
SL-8100-NE/BOOS-K9	SL-8100-NA/BOOS-K9	T2 (Boost)	Uncapped

The T2 (Boost) license requires an additional mandatory **L-8100-HSEC-K9** license.

Upgrade licenses will be available post-FCS.

Step 3: Select the appropriate modules and antennas that are mounted on the module.

3a. Select the cellular pluggable modules.

Cellular module Category	PID	Description
CAT 4 LTE	**IRMH-LTE-MNA**	Multi-carrier band-14 CAT4 LTE Module for North America
	IRMH-LTE-MNA-900	Multi-carrier band-14 CAT4 LTE Module for North America with 900MHz WPAN co-existence filter
CAT 6 LTE	**IRMH-LTEA-EA**	CAT6 LTE Advanced Module for Europe and North America
	IRMH-LTEA-EA-900	CAT6 LTE Advanced Module for Europe and North America with 900MHz WPAN co-existence filter
	IRMH-LTEA-LA	CAT6 LTE Advanced Module for APAC, LATAM and ANZ
CAT18 LTE	**IRMH-LTEAP18-GL**	CAT18 LTE Advanced PRO Module for ALL Global Regions
5G	**IRMH-5GS6-GL**	5G Sub-6 Ghz Universal Interface Module(UIM) for IR8140

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3b. Select the FirstNet bundle, if needed.

FirstNet Ready LTE module	Description	RF band information
IRMH-LTE-MNA **IRMH-LTE-MNA-900**	3GPP Category 4 LTE supporting AT&T commercial, FirstNet, and Verizon networks in the U.S.	LTE bands: 2,4,5,12,13,14,17,66 FDD LTE 1700 MHz and 2100 MHz (band 66 Ext AWS), 700 MHz (band 17, 14, 13,12), 850 MHz (band 5 CLR), 1700 MHz and 2100 MHz (band 4 AWS), 1900 MHz (band 2) UMTS, HSPA+ bands: 2,4, 5
IRMH-LTEAP18-GL	3GPP Category 18 LTE supporting AT&T, Verizon and for ALL global regions	LTE bands 1-5, 7, 8, 12-14, 17, 18-20, 25, 26, 28-30, 32, 38-43, 46, 48, 66, and 71. FDD LTE 600 MHz (band 71), 700 MHz (bands 12, 13, 14, 17, 28, and 29), 800 MHz (band 20), 850 MHz (bands 5, 18, 19, and 26), 900 MHz (band 8), 1500 MHz (band 32), 1700 MHz (bands 4 and 66), 1800 MHz (band 3), 1900 MHz (bands 2 and 25), 2100 MHz (band 1), 2300 MHz (band 30), 2600 MHz (band 7). TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), 2600 MHz (band 38), 3500 MHz (bands 42 and 48), 3700 MHz (band 43), 5200 MHz (band 46).

3c: Select the WPAN module for Cisco Resilient Mesh or Wi-SUN mesh deployments.

WPAN module	Description
IRMH-WPAN-NA	IEEE 802.15.4e/g 900MHz WPAN Module for North America
IRMH-WPAN-BRZ	IEEE 802.15.4e/g 900MHz WPAN Module for Brazil

3d: Select the suitable antennas for each UIM.

Antennas	Description
ANT-5G-OMNI-OUT-N	Outdoor Omnidirectional Antenna 617 -960, 1450-7125MHz with N type connector
ANT-5G-MP-OUT-N*	Integrated Multipurpose Antenna 617-960; 1710-5925 MHz with N type connector
ANT-4-5G4-O	4 in 1 Integrated Antenna for the IR8100
ANT-LPWA-DB-O-N-5	Outdoor 5dBi Antenna with N type Connector
IR-IP67GLAND	Liquid Tight Cable Gland for IR8140
IR-ANT-PLUG	Antenna Plug for IR8140
IOT-LA-NM-NF	Lightning Arrestor for IoT Devices

* - Does not support Japan Band 21

Refer to the Cisco Antenna and Options Guide.

Note: Antennas and other accessories are not included automatically with the IR8140H.

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Step 4: Select the additional 100-GB SSD module for edge compute applications.

SSD	Description
IRM-SSD-100G(=)	100-GB industrial grade field replaceable SSD

Step 5: Select the power cord based on the region.

Power cord	Description
IR-PWRCORD-EU	AC Power Cord for IR8140 in Europe, 10m
IR-PWRCORD-NA	AC Power Cord for IR8140 in North America, 10m

Step 6: Select the mounting kit.

Mounting kit	Description
IR-PMK	Pole Mount Kit for IR8140
IR-BAND	Band Straps for the IR8140
IRMH-SEC-BRKT	Security Bracket for the IR8140

Step 7: Select Cisco SFP modules if needed.

The IR8140H Ethernet SFP module provides connections to other devices. These field-replaceable transceiver modules provide the uplink interfaces. Local connectors provide the fiber-optic connection. RJ-45 connectors allow for copper connections.

Gigabit Ethernet SFP	Distance	Fiber	Classification
GLC-SX-MM-RGD	220 to 550 m (720 to 1800 ft)	MMF	Industrial (-40° to +85° C)
GLC-LX-SM-RGD	550 m to 10 km (1800 ft to 6 mi)	MMF / SMF	Industrial (-40° to +85° C)
GLC-ZX-SM-RGD	70 km (43 mi)	SMF	Industrial (-40° to +85° C)
GLC-FE-100FX-RGD	2 km (1.25 mi)	MMF	Industrial (-40° to +85° C)
GLC-FE-100LX-RGD	10 km (6 mi)	SMF	Industrial (-40° to +85° C)

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Ordering the IR8140H with management platforms

FND Ordering Guide: https://www.cisco.com/c/dam/en/us/products/collateral/se/internet-of-things/fnd-ordering-guide.pdf

Management	Product ID	Description
Director (FND) for hosting on premises	**IOTFND-IR8100**	IoT FND Subscription License for Managing IR8100 Router (3/5/10 year)
Cisco DNA for SD-WAN for cloud or on-premises hosting	**L-LIC-DNA-IOT-ADD** Platform Selection: **IR8100-PF**	Cisco IR8140H Heavy Duty Router with Cisco DNA subscription for SD-WAN

Warranty coverage and technical service options

The IR8100 comes with the Cisco 5-year limited hardware warranty. Adding a contract for a technical service offering, such as Cisco Smart Net Total Care® Service, provides benefits not available with the warranty, including access to OS updates, Cisco.com online resources, and Cisco Technical Assistance Center (TAC) support services. Table 15 shows the available technical services.

Find more information about Cisco product warranties.

Learn more about Cisco technical services.

Table 16. Cisco technical services for the Catalyst IR8100

Technical services
Cisco Smart Net Total Care Service • Global access to the Cisco TAC 24 hours daily • Unrestricted access to the extensive Cisco.com resources, communities, and tools • Next-business-day (NBD), 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement and onsite parts replacement and installation available[5] • Ongoing operating system software updates within the licensed feature set[6] • Proactive diagnostics and real-time alerts on Cisco Smart Call Home-enabled devices
Cisco Smart Foundation Service • NBD advance hardware replacement, as available • Business-hours access to Small and Medium-sized Business (SMB) Cisco TAC (access levels vary by region) • Access to the Cisco.com SMB knowledge base • Online technical resources through the Cisco Smart Foundation portal • OS software bug fixes and patches

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Product sustainability

Information about Cisco's environmental, social and governance (ESG) initiatives and performance is provided in Cisco's CSR and sustainability reporting.

Table 17. Cisco environmental sustainability information

Sustainability Topic		Reference
General	Information on product-material-content laws and regulations	Materials
	Information on electronic waste laws and regulations, including our products, batteries and packaging	WEEE Compliance
	Information on product takeback and resuse program	Cisco Takeback and Reuse Program
	Sustainability Inquiries	Contact: csr_inquiries@cisco.com
	Environmental characteristics	Table 7. Environmental characteristics
Power	Power specifications	Table 6. Product Specifications
Material	Product packaging weight and materials	Contact: environment@cisco.com
	Physical characteristics	Table 6. Product Specifications

Cisco makes the packaging data available for informational purposes only. It may not reflect the most current legal developments, and Cisco does not represent, warrant, or guarantee that it is complete, accurate, or up to date. This information is subject to change without notice.

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For more information

For more information about the Cisco Catalyst IR8100 Heavy Duty Series Router, visit https://www.cisco.com/go/ir8100 or contact your local Cisco account representative.

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Footnotes and Document history

[1] Operating temperature range is impacted by choice of communication modules and battery backup options. For the IR8140H, you must install the supervisor module in slot 1 only.

[2] Throughput degradation may be observed at a high temperature.

[3] IRMH-LTEAP18-GL: Conforms to IEC 61850 reliability Class 1.

[4] IRMH-LTEAP18-GL: Throughput degradation may be observed at high temperatures. Uplink communication range may be temporarily reduced at the highest temperatures supported.

[5] Advance hardware replacement is available in various service-level combinations. For example, 8 x 5 x NBD indicates that shipment is 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 shipment is provided. Restrictions apply. Review the appropriate service descriptions for details.

[6] Cisco OS updates include maintenance releases, minor updates, and major updates in the licensed feature set.

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