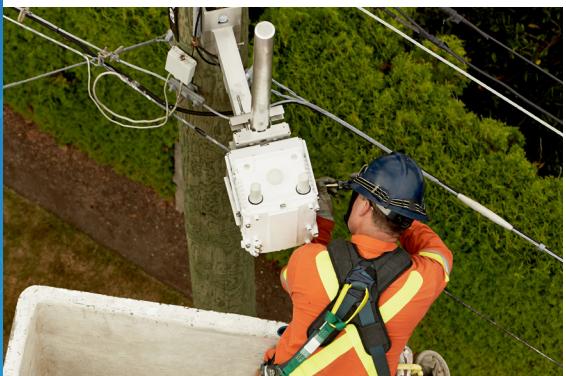


# Cisco IoT Networking

Deploy. Accelerate. Innovate.



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## Cisco IoT Networking Overview

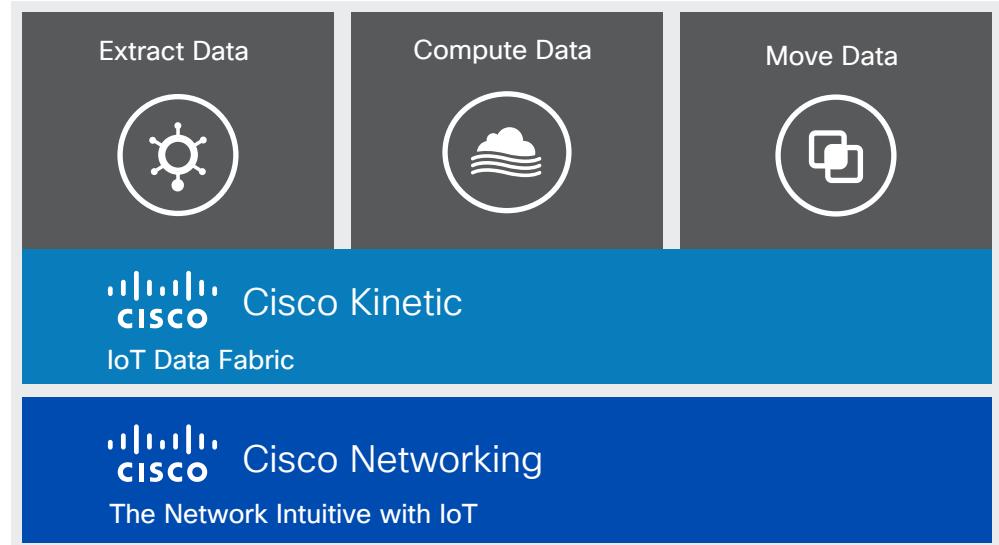
The Internet of Things (IoT) connects things with business and operational applications—energy grids, manufacturing floors, healthcare devices, cars. In fact, 500 billion devices are expected to be connected to the Internet by 2030. By linking smart things to each other and to people, places and data, we can work in ways that are simpler, more automated, and more intelligent.

IoT accelerates digital business transformation through efficiency, new business and improved customer experience.

Cisco® IoT connects things and IoT applications, allowing customers to deliver high value business outcomes across a wide range of production deployments. Cisco IoT addresses challenges across several industries, including manufacturing, energy, transportation, and public sector. Through Cisco IoT solutions, organizations can create and monetize new business models and services; innovate easily and get more things done, boosting productivity; and deliver insight for better user experience and engagement.

Elements of Cisco IoT:

Figure 1. Cisco IoT



## Network Connectivity

### New IoT Requirements

As you deploy IoT, new and more vigorous demands are placed on your networks. Applications and services such as high-speed wireless, high-definition IP video services, and others require high-bandwidth connectivity. In addition, extremely low-latency applications, such as high-speed motion controls, demand high-speed connections. You also need a flexible and scalable network infrastructure to easily deploy your applications from the cloud all the way to the edge with fog computing and to serve the thousands of devices joining the network. And you must secure and manage your IoT network infrastructure.

### Cisco Advantage: Certified Network Products with Focus on Industrial Applications

Cisco is addressing these IoT network connectivity challenges by extending our proven expertise in IT networking to industrial operational-technology environments. We offer a broad portfolio of routing, switching, and wireless products in ruggedized and nonruggedized form factors. Cisco delivers the industry's most reliable, scalable, high-performance portfolio of IoT networking solutions, offering a broad selection of routing, switching, and wireless products. Our products meet the IoT needs of several industries, such as manufacturing, oil and gas, utilities, transportation, mining, public sector, among others. With breakthrough products, such as the industry's first industrial 40 Gigabit Ethernet switches, the Cisco Industrial Ethernet 4000 Series Switches, Cisco delivers a comprehensive network connectivity portfolio certified for various industries and geographies.

### Network Connectivity Products

The following figure provides an overview of the Cisco IoT System network connectivity portfolio

**Figure 2.** Cisco IoT Networking Portfolio

| Industrial Switching  | IoT Gateways  | Industrial Routing   | Low Power Wide Area Wireless  | Industrial Wireless   |
|---|---|--|---|---|
|  |  |  |    |  |
| <b>Industrial Security</b><br>ISA 3000  | <b>Embedded Networks</b><br>ESS, 5900 ESR, 5921 SW ESR                              | <b>Edge Computing</b><br>IOx, Fog Director   | <b>Management and Automation</b><br>Field Network Director, Industrial Network Director |   |

#### Benefits:

- Resilience at scale:** High availability facilitates networkwide resilience as you scale your networks with millions of new endpoints and applications.
- Integrated security:** Cisco network-as-a-sensor approach integrates cybersecurity throughout the network, maximizing security visibility and control.
- Converged networking:** Our broad portfolio of IoT networking solutions supports the disparate needs of IT and operational technology standards and protocols.

## Industrial Switching

Cisco industrial switches are a range of compact, ruggedized switches that handle security, voice, and video traffic across industrial networks. They provide organizations in industries such as manufacturing, oil and gas, mining, transportation, and energy with highly secure access and industry-leading convergence using Cisco Resilient Ethernet Protocol (REP).

The Cisco industrial Ethernet switching portfolio includes the following product families:

- Cisco Industrial Ethernet 2000 Series Switches: A compact fixed switching platform. The 2000 Series Switches are available in two form factor options, one DIN rail mounting and one wall and/or pole mounting qualified for Ingress Protection 67 (ie2000 IP67). On the ie2000, different models provide between 6 and 20 Ethernet interfaces. On the ie2000 IP67, up to 24 Ethernet interfaces are supported. For electrical utilities specific applications, the Cisco IE 2000U Switch is available.
- Cisco Industrial Ethernet 3000 Series Switches: A multilayer switching modular platform. Composed by a main module and expansion modules, allowing scaling the configuration (up to 26 Ethernet interfaces) to grow with customer operational needs. A fixed 19-inch, one rack unit version is also available: the Cisco Industrial Ethernet 3010 Series Switches.
- Cisco 2500 Series Connected Grid Switches: A series of 19-inch, one rack unit fixed configuration switches designed for electrical utilities applications.
- Cisco Industrial Ethernet 4000 Series Switches: The industry's first DIN rail mounting 40 Gigabit Ethernet switch platform that offers high bandwidth and low-latency network connectivity. It is available in various models, up to 20 Gigabit Ethernet interfaces.
- Cisco Industrial Ethernet 5000 Series Switches: A 19-inch one rack unit, highly ruggedized full gigabit aggregation and/or backbone platform equipped with 24 Gigabit Ethernet ports plus 4 x 10 Gigabit line interfaces, making it ideal for the aggregation and/or backbones in large-scale industrial networks.

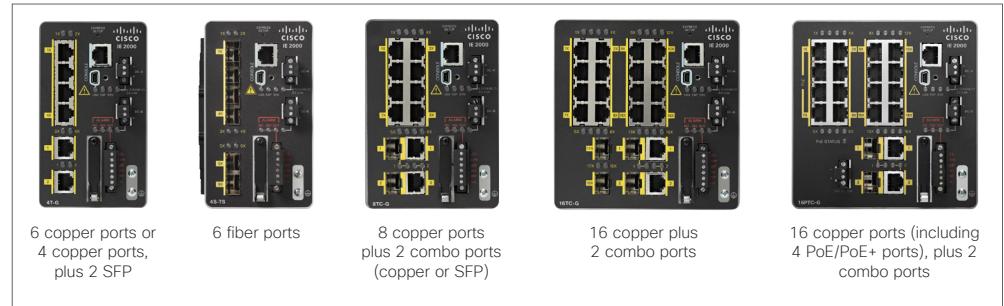
## Primary Features

- Design for industrial Ethernet applications, including extended environmental, shock and vibration, and surge ratings; a complete set of power input options; convection cooling; and DIN-rail, 19-inch rack or wall mounting
- Support for Power over Ethernet (PoE) and Power over Ethernet Plus (PoE+)
- Native support of industrial automation protocols (that is, Common Industrial Protocol [CIP]/Ethernet IP and PROFINETv2), allowing integration with industry-specific communication protocols and industrial automation management platforms
- High availability, guaranteed determinism, and reliable security using Cisco IOS® Software
- Designed and certified for many industrial and regional specific requirements and standards
- Standard 5-year hardware warranty on all models
- Easy and user-friendly deployment, setup, operation, and management

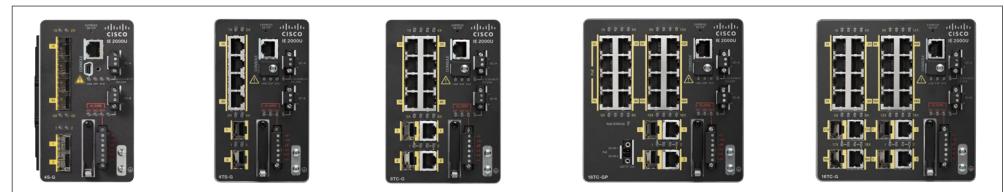
## Hardware Models

The following figures show the hardware modules available:

**Figure 3.** Industrial Ethernet 2000 Series Switches



**Figure 4.** Industrial Ethernet 2000U Series Switches



**Figure 5.** Industrial Ethernet 2000 IP67 Series Switches



**Figure 6.** 2500 Series Connected Grid Switches



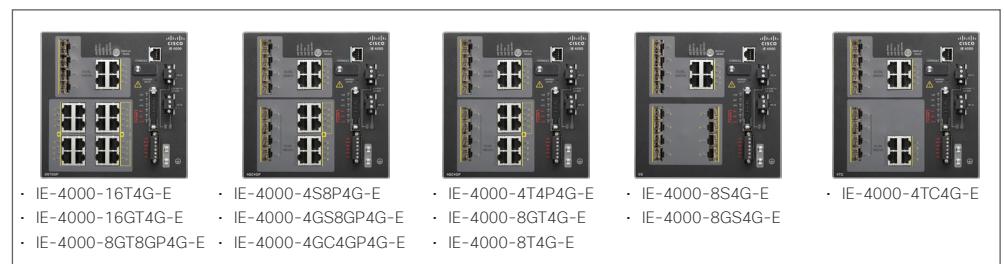
**Figure 7.** Industrial Ethernet 3000 Series Switches



**Figure 8.** Industrial Ethernet 3010 Series Switches



**Figure 9.** Industrial Ethernet 4000 Series Switches



**Figure 10.** Industrial Ethernet 5000 Series Switches



**Table 1.** Industrial Ethernet Switches Comparison Summary

| Product Family                                  | IE2000   | IE2000U  | IE2000 IP67  | CGS2520  | IE3000  | IE3010  | IE4000   | IE5000  |
|---|--|--|--|--|---|---|--|---|
| <b>Number of Models</b>                         | 25   | 7  | 5  | 2  | 2 Base + 6 Expansion                          | 2   | 12   | 1   |
| <b>Total Ports</b>                              | 20   | 20   | 24   | 26   | 24  | 26  | 20   | 28  |
| <b>Copper Ports</b>                             | 16 FE  | 16 FE  | 24 FE/16FE + 2GE                                     | 24 FE  | 24 FE   | 24 FE   | 16 FE/16 GE  | 12 FE/GE  |
| <b>SFP Ports</b>                                | 2 GE   | 2 GE   | -  | 16 FE  | 16 FE   | 16 FE   | 16 FE/GE   | 12 FE/GE + 4 GE/10GE                              |
| <b>Combo Ports</b>                              | 2 FE   | 2 FE/GE  | -  | 2 GE   | 2 GE  | 2 GE  | 4 GE   | -   |
| <b>PoE/PoE+</b>                                 | Yes  | Yes  | Yes  | Yes  | Yes   | Yes   | Yes (up to 8)  | Yes (up to 12)                                    |
| <b>Mechanical form factor</b>                   | DIN rail                                       | DIN rail                                       | Wall mountable                                       | 19"  | DIN rail                                      | 19"   | DIN rail   | 19"   |
| <b>Ingress Protection Class</b>                 | IP30   | IP30   | IP67   | IP30   | IP20  | IP30  | IP30   | IP30  |
| <b>Max Dimensions H x W x D (inches and mm)</b> | 5.1" x 5.0" x 5.26"<br>(130mm x 127mm x 134mm) | 5.1" x 5.0" x 5.26"<br>(130mm x 127mm x 134mm) | 9.5" x 14.76" x 3.2"<br>(241.7mm x 374.8mm x 81.5mm) | 1.75" x 17.5" x 14.0"<br>(44.5mm x 445mm x 356 mm) | 5.8" x 6.0" x 4.4"<br>(147mm x 152mm x 112mm) | 1.75" x 17.5" x 14.0"<br>(44.5mm x 445mm x 356mm) | 6.12" x 6.12" x 5.09"<br>(155.4mm x 155.4mm x 129.2mm) | 1.75" x 17.5" x 14.0"<br>(44.5mm x 445mm x 356mm) |
| <b>Max Power Consumption (excluding PoE)</b>    | 30 W   | 20 W   | 22 W   | 40.3 W   | 15.7 W  | 34.4 W  | 42 W   | 90 W  |
| <b>Max Weight</b>                               | 4.35 lbs (1.97 kg)                             | 4.35 lbs (1.97 kg)                             | 8.86 lbs (4.02 kg)                                   | 10 lbs (4.5 kg)                                    | 4.4 lbs. (2.0 kg)                             | 10 lbs (4.5 kg)                                   | 6.35 lbs (2.88 kg)                                     | 13.7 lbs (6.2 kg)                                 |
| <b>HW Warranty Period</b>                       | 5 years  | 5 years  | 5 years  | 5 years  | 5 years                                       | 5 years   | 5 years  | 5 years   |
| <b>MTBF (Hours) - lowest model -</b>            | 374,052  | 660,730  | 374,052  | 660,730  | 329,451                                       | 543,540   | 519,190  | 247,590   |

## Industrial Routing

The Cisco industrial routing portfolio includes a range of compact, ruggedized modular platforms on which industrial organizations can build a highly secure, reliable, and scalable communications infrastructure. These products are certified to meet harsh environmental standards. They support a variety of communications interfaces, such as Ethernet, Serial, Cellular, WiMAX, RF mesh, and others.

The Cisco industrial routing portfolio includes the following product families:

- **Cisco 1000 Series Connected Grid Routers:** Versatile communications platforms designed to meet the communication infrastructure needs of industrial verticals, allowing integration of multiple applications as well as workforce automation onto a single platform.
- **Cisco 2000 Series Connected Grid Routers:** Rugged routers optimized for use in the multitude of different communications networks in the energy and utility industries.
- **Cisco ASR 903 Aggregation Services Router:** A converged, full-featured, modular, small-footprint, fully redundant aggregation platform. It offers service flexibility and delivers Layer 2, IP, and Multiprotocol Label Switching (MPLS) transport for advanced Layer 2 VPN, Layer 3 VPN, and multicast services.
- **Cisco 500 Series WPAN Industrial Routers:** Compact routers that provide unlicensed 915 MHz industrial, WPAN communications enabling a diverse set of IoT applications.
- **Cisco 809 Industrial Router:** Very compact Cellular (3G and 4G LTE) Industrial Router supporting 2xFE and 2xSerial interfaces for remote deployment in various industries enabling reliable, and secure remote asset management and machine-to-machine (M2M) solutions.
- **Cisco 819H Integrated Services Router:** A compact hardened form factor Cellular (3G and WLAN or 4G options available) Router supporting 1xGE WAN, up to 4xFE, and one Serial interfaces providing a rapidly deployable, highly available, reliable, and secure solution designed for Machine-to-Machine (M2M) and various industrial mobile applications.
- **Cisco 829 Industrial Router:** A highly ruggedized compact Cellular (3G and 4G/LTE with GPS and dual SIM) and WiFi (2.4/5GHz) Industrial Router supporting 5xGE and 2xSerial interfaces for scalable, reliable, and secure fleet management and remote asset monitoring solutions.
- **Cisco 910 Industrial Router:** A multiservice, flexible router offering an open platform to build a highly secure, reliable, and scalable field network infrastructure.

## Primary Features

- Design for Industrial applications, including extended environmental, shock, vibration, and surge ratings; a complete set of power input options; convection cooling; and DIN-rail, 19-inch rack or wall mounting
- High availability, advanced Quality of Service (QoS), guaranteed determinism, and reliable security using Cisco IOS Software
- Diverse modular interfaces (Ethernet, T1/E1, 3G and 4G/LTE Cellular, Asynch/Synch, serial and others) to interface and backhaul for different existing infrastructures
- Advanced QoS capabilities to support mission-critical communications, such as substation communications or Supervisory Control And Data Acquisition (SCADA)
- Support for IEEE 1588v2, a precision-timing protocol with nanosecond-level precision for high-performance applications and compliance with IEC-61850-3 and IEEE 1613 for utility substation environments
- Easy and user-friendly deployment, setup, operation, and management

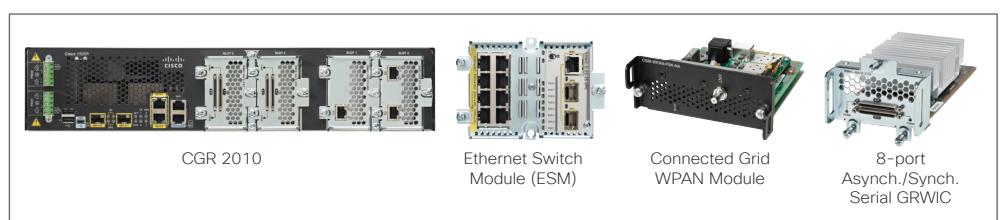
## Hardware Models

Following figures show the hardware modules available:

**Figure 11.** Cisco 1000 Series Connected Grid Router



**Figure 12.** Cisco 2000 Series Connected Grid Router



**Figure 13.** Cisco 819H Integrated Service Router



**Figure 14.** Cisco 509 WPAN Industrial Router and Cisco 529 WPAN Range Extender



**Figure 15.** Cisco 910 Industrial Router



Figure 16. Cisco 809 Industrial Router



Figure 17. Cisco 829 Industrial Router



Figure 18. Cisco ASR 900 Aggregation Services Router



Table 2. Industrial Routers Comparison Summary

|                      | CGR 1120                  | CGR 1240                  | CGR 2000      | IR 509    | IR529  | ISR 819H                  | IR 809                    | IR 829                    | IR 910                      | ASR902<br>ASR903 |
|----------------------|---------------------------|---------------------------|---------------|-----------|--------|---------------------------|---------------------------|---------------------------|-----------------------------|------------------|
| Number of Models     | 1 (*)                     | 1 (*)                     | 1 (*)         | 1         | 3      | 16                        | 4                         | 5                         | 2                           | 1 (*)            |
| O.S.                 | IOS M/T                   | IOS M/T                   | IOS M/T       | TinyOS    | TinyOS | IOS M/T                   | IOS M/T                   | IOS M/T                   | Linux                       | IOS M/T          |
| IOX                  | Hypervisor + Linux        | Hypervisor + Linux        | No            | No        | No     | Linux (4G model)          | Hypervisor + Linux        | Hypervisor + Linux        | Linux                       | No               |
| Raw Socket           | Yes (TCP/UDP)             | Yes (TCP/UDP)             | Yes (TCP/UDP) | Yes (TCP) |        | Yes (TCP/UDP)             | Yes (TCP/UDP)             | Yes (TCP/UDP)             | No                          | Yes (TCP/UDP)    |
| Protocol Translation | T101-T104<br>DNP3-DNP3/IP | T101-T104<br>DNP3-DNP3/IP | No            | No        | No     | T101-T104<br>DNP3-DNP3/IP | T101-T104<br>DNP3-DNP3/IP | T101-T104<br>DNP3-DNP3/IP | No                          | No               |
| IP Grade             | IP30                      | IP67                      | IP30          | IP41      | IP67   | IP41                      | IP30                      | IP54                      | IP30<br>IP55 (w, enclosure) | IP30             |

|   | <b>CGR 1120</b>   | <b>CGR 1240</b>  | <b>CGR 2000</b>   | <b>IR 509</b>  | <b>IR529</b>   | <b>ISR 819H</b>                          | <b>IR 809</b>                                 | <b>IR 829</b>                                   | <b>IR 910</b>                                  | <b>ASR902 ASR903</b>                                      |
|---|---|--|---|--|--|--|---|---|--|---|
| <b>Ethernet ports (LAN/WAN)</b>                 | 6 * FE RJ45<br>2 * GE RJ45/SFP  | 4 * FE RJ45<br>2 * GE RJ45/SFP   | 16 * FE RJ45<br>8 * FE SFP  | 1 * FE RJ45  | No   | 4 * FE RJ45<br>1 * GE RJ45               | 2 * FE RJ45                                   | 4 * GE RJ45<br>1 * GE SFP                       | 1 * GE RJ45/SFP                                | 8 x GE RJ45 (**)<br>8 x GE SFP (**)<br>2 x 10G SFP (**)   |
| <b>Serial ports (NAN)</b>                       | 1 * RS232<br>1 * RS232/RS485  | 1 * RS232<br>1 * RS232/RS485   | 8 * RS232   | 1 * RS232<br>1 * RS232/RS485   | No   | 1 * RS232                                | 1 * RS232<br>1 * RS232/RS485                  | 1 * RS232<br>1 * RS232/RS485                    | 2 * RS232/RS485                                | 14 x RS232 (**)   |
| <b>Cellular (WAN)</b>                           | GPRS, 3G, 4G  | GPRS, 3G, 4G   | No  | No   | No   | GPRS, 3G, 4G                             | GPRS, 3G, 4G                                  | GPRS, 3G, 4G                                    | GPRS, 3G                                       | No  |
| <b>Wi-Fi (LAN/WAN)</b>                          | Yes   | Yes  | No  | No   | No   | Yes (not 4G model)                       | No  | Yes   | Yes (IR910W-K9)                                | No  |
| <b>WiMAX (WAN)</b>                              | Yes   | Yes  | No  | No   | No   | No                                       | No  | No  | No   | No  |
| <b>802.15.4g/e (NAN)</b>                        | Yes   | Yes  | Yes   | Yes  | Yes  | No                                       | No  | No  | No   | No  |
| <b>1901.2 PLC (NAN)</b>                         | Yes   | Yes  | No  | No   | No   | No                                       | No  | No  | No   | No  |
| <b>LTN (NAN)</b>                                | No  | No   | No  | No   | No   | No                                       | No  | No  | Yes, Semtech LoRa                              | No  |
| <b>Operation Temperature</b>                    | -40°C to +60°C (-40°F to 140°F) with type test to 85°C (185°F) for 16 hours | -40° to +70°C (-40°F to 158°F) with type test to 85°C (185°F) for 16 hours | -40° to +60°C (-40°F to 140°F) with type test to 85°C (185°F) for 100 hours | -40° to +70°C (-40°F to 158°F) with type test to 85°C (185°F) for 16 hours | -40° to +70°C (-40°F to 158°F) with type test to 85°C (185°F) for 16 hours | -25° to +60°C (-13° to 140°F)            | -45° to +65°C (-49° to 149°F)                 | -40° to +60°C (-40° to 140°F)                   | -40° to +70°C (-40°F to 158°F)                 | -40° to 65°C (DC operation)<br>-5° to 55°C (AC operation) |
| <b>Max Dimensions H x W x D (inches and mm)</b> | 11.3 x 9.7 x 8.5 in.<br>287 x 246 x 216 mm (***)                            | 3.5 x 9.0 x 7.8 in.<br>89 x 229 x 200 mm (*)                               | 3.5 x 17.25 x 15 in.<br>88.9 x 438.2 x 381 mm (***)                         | 1.125 x 4.0 x 5.0 in.<br>28.6 x 101.6 x 127 mm                             | 4.85 x 7.23 x 10.37 in.<br>123.2 x 183.7 x 263.4 mm (***)                  | 1.73 x 7.7 x 9.0 in<br>44 x 186 x 229 mm | 1.25 x 5 x 6.25 in<br>31.75 x 127 x 158.75 mm | 1.73 x 7.7 x 11 in<br>43.9 x 195.58 x 279.4 mm. | 5.1 x 6.2 x 5.38 in.<br>130 x 157 x 137 mm (*) | 5.22 x 17.44 x 9.22 in.<br>132.6 x 443 x 234.2 mm         |
| <b>Max Power Consumption (excluding PoE)</b>    | 40 W  | 75 W   | 60 W (****)   | 6 W  | 18 W   | 25 W                                     | 29W   | 30W   | 12 W   | 400W (****)   |
| <b>Max Weight - heaviest model -</b>            | 8 lbs (3.6 kg)  | 23 lbs (10.4 kg)   | 25 lbs (11.4 kg)  | 0.85 lbs (0.4 kg)  | 8.48 lbs (3.85 kg)   | 3.2 lb (1.5 kg)                          | 1 lb 11 oz. (0.77 kg)                         | 5 lbs (2.27 kg)                                 | 5.07 lb (2.3 kg)                               | 34.17 lb (15.5 kg)  |

(\*) with various plug-in modules

(\*\*) for each plug-in module

(\*\*\*) without antennas

(\*\*\*\*) Typical depending on configuration

## Industrial Wireless

Cisco Outdoor and Industrial Wireless can be deployed in a variety of demanding environments. To help ensure an exceptional user experience on the wireless network, these access points provide a variety of capabilities, including:

- Cisco CleanAir® Technology for a self-healing, self-optimizing network that avoids RF interference
- Cisco ClientLink 2.0 and 3.0 to improve reliability and coverage for existing clients
- Band select to encourage 5 GHz client connections in mixed-client environments
- Cisco VideoStream which uses multicast encapsulated in unicast to improve multimedia applications

Whether you need a multilevel mesh network, flexible options such as fiber-based backhaul, or even deployment in hazardous locations, the Cisco industrial wireless portfolio provides a high-performance access point to meet your rugged outdoor requirements.

The Cisco industrial wireless portfolio includes the following product families:

- **Cisco Industrial Wireless 3700 Series Access Point:** Offers industrial-grade environmental qualifications while providing higher speeds for video and other bandwidth-intensive applications and extending support to a new generation of Wi-Fi clients that have integrated 802.11ac support.
- **Cisco Aironet 1550 Series Outdoor Access Points:** Points: A highly ruggedized access point qualified for Hazloc operations. Some models integrate an ISA100-compliant backbone router (Cisco Aironet 1552S Outdoor Access Point) and a WirelessHART gateway (Cisco Aironet 1552WU Outdoor Access Point), providing an easy-to-use solution for wireless sensor networks.
- **Cisco Aironet 1570 Series Outdoor Access Points:** A robust mobility experience for outdoor deployments, supporting IEEE 802.11ac, optimized roaming and cellular handoff, and Cisco High Density Experience.

## Primary Features

- Rugged industrial design and an extended operational temperature range
- Carrier-grade outdoor Wi-Fi access point with dual-band (2.4 GHz 802.11n and 5 GHz 802.11ac) radios
- Industry's only 4x4 MIMO, three-spatial-stream outdoor access point
- Fast workgroup bridge roaming
- Up to 1.3 gigabits (5 GHz) WLAN RF data rates
- Various uplink options: Fiber and SFP, Gigabit Ethernet, cable modem and various power options (AC, DC, cable, PoE, PoE+, UPoE, PoE-Out)

## Hardware Models

The following figures show the hardware models available:

**Figure 19.** Cisco Industrial Wireless 3700 Series Access Point:



**Figure 20.** Cisco Aironet 1550 Series Outdoor Access Point:



**Figure 21.** Cisco Aironet 1570 Series Outdoor Access Point:



**Table 3.** Industrial Wireless: Main Features and Characteristics

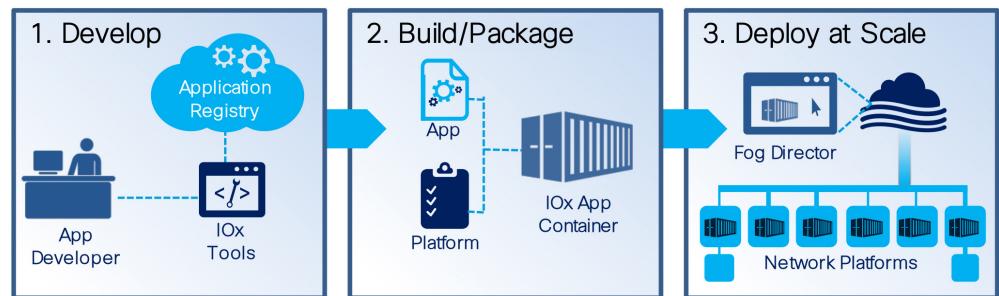
| Feature           | IW 3700<br>  | Aironet 1550<br>   | Aironet 1570<br>  |
|-------------------|---|--|--|
| Wireless Standard | 802.11a<br>802.11b<br>802.11g<br>802.11n<br>802.11ac  | 802.11a<br>802.11b<br>802.11g<br>802.11n   | 802.11a<br>802.11b<br>802.11g<br>802.11n<br>802.11ac   |
| Radio type        | 2.4 GHz (802.11b/g/n)<br>5 GHz (802.11a/n/ac)   | 2.4 GHz (802.11b/g/n)<br>5 GHz (802.11a/n)   | 2.4 GHz 802.11b/g/n)<br>5 GHz (802.11a/n/ac)   |
| Main Capabilities | <b>802.11n and Related:</b> <ul style="list-style-type: none"> <li>• 4x4 MIMO with 3 spatial streams</li> <li>• Maximal ratio combining (MRC)</li> <li>• 802.11n and 802.11a/g beamforming</li> <li>• 20- and 40-MHz channels</li> <li>• PHY data rates up to 450 Mbps (40 MHz with 5 GHz)</li> </ul> <b>802.11ac Related:</b> <ul style="list-style-type: none"> <li>• 4x4 MIMO with 3 spatial streams</li> <li>• Maximal ratio combining (MRC)</li> <li>• 802.11ac Beamforming</li> <li>• 20-, 40-, and 80-MHz channels</li> <li>• PHY data rates up to 1.3 Gbps (80 MHz with 5 GHz)</li> </ul> | <b>802.11n and Related:</b> <ul style="list-style-type: none"> <li>• 2x3 MIMO with 2 spatial streams</li> <li>• Legacy beamforming</li> <li>• 20- and 40-MHz channels</li> <li>• PHY data rates up to 300 Mbps</li> </ul> <b>Wireless Sensor Network Related:</b> <ul style="list-style-type: none"> <li>• Honeywell ISA-100 gateway integrated (AP1552SA/AP1552SD)</li> <li>• Emerson WirelessHART gateway integrated (AP1552WU)</li> </ul> | <b>802.11n and Related:</b> <ul style="list-style-type: none"> <li>• 4x4 MIMO with 3 spatial streams</li> <li>• Maximal ratio combining (MRC)</li> <li>• 802.11n and 802.11a/g Beamforming</li> <li>• 20- and 40-MHz channels</li> <li>• PHY data rates up to 450 Mbps (40 MHz with 5 GHz)</li> </ul> <b>802.11ac Related:</b> <ul style="list-style-type: none"> <li>• 44x4 MIMO with 3 spatial streams</li> <li>• Maximal ratio combining (MRC)</li> <li>• 802.11ac Beamforming</li> <li>• 20-, 40-, and 80-MHz channels</li> <li>• PHY data rates up to 1.3 Gbps (80 MHz with 5 GHz)</li> </ul> |
| RF output power   | Up to 23 dBm  | Up to 27/28 dBm  | Up to 30 dBm   |
| Interfacing       | <ul style="list-style-type: none"> <li>• WAN port: 10/100/1000BASE-T</li> <li>• (M12 8P female connector with X-coding), PoE In (802.3af), PoE+ In (802.3at)</li> <li>• LAN port: 10/100/1000BASE-T</li> <li>• (M12 8P female connector with X-coding), PoE Out(802.3af)</li> <li>• Management console port (RJ-45) with Reset button</li> </ul>  | <ul style="list-style-type: none"> <li>• WAN port: 10/100/1000BASE-T</li> <li>• Ethernet, (RJ-45)</li> <li>• LAN port: 10/100/1000BASE-T</li> <li>• Ethernet (RJ-45)</li> <li>• Fiber SFP</li> <li>• Management console port (RJ-45) with Reset button</li> </ul>  | <ul style="list-style-type: none"> <li>• WAN port: 10/100/1000BASE-T</li> <li>• Ethernet, (RJ-45)</li> <li>• LAN port: 10/100/1000BASE-T</li> <li>• Ethernet (RJ-45)</li> <li>• Fiber SFP</li> <li>• Cable modem: NA-DOCSIS3.0/ Euro-DOCSIS3.0/Japan- DOCSIS3.0 (8x4, 16x8, or 24x8), (1572IC/1572EC model)</li> <li>• Management console port (RJ-45) with Reset button</li> </ul>  |

| Feature   | IW 3700   | Aironet 1550   | Aironet 1570   |
|---|---|--|--|
| <b>Input power Requirements</b>                 | <ul style="list-style-type: none"> <li>9.6 to 60 VDC (M12 4P male connector with A-coding)</li> <li>PoE and PoE+ (M12 8P female connector with X-coding)</li> </ul> | <ul style="list-style-type: none"> <li>12 VDC (not for hazardous environments)</li> </ul> <p><b>1552H</b></p> <ul style="list-style-type: none"> <li>100-240 VAC, 50-60 Hz</li> <li>PoE with power injector</li> </ul> <p><b>1552SA</b></p> <ul style="list-style-type: none"> <li>100-240 VAC, 47-63 Hz</li> </ul> <p><b>1552SD</b></p> <ul style="list-style-type: none"> <li>19-30 VDC</li> </ul> <p><b>1552WU</b></p> <ul style="list-style-type: none"> <li>24 VDC</li> </ul> | <p><b>1572EAC AC:</b></p> <ul style="list-style-type: none"> <li>100-277 VAC, 50/60 Hz DC:</li> <li>10 to 16 VDC</li> <li>PoE-Input: <ul style="list-style-type: none"> <li>- UPOE compliant PSE</li> <li>- Cisco AIR-PWRINJ1500-2= PoE-out: PoE+ (802.3at)</li> </ul> </li> </ul> <p><b>1572IC/1572EC</b></p> <ul style="list-style-type: none"> <li>DC: 10 to 16 VDC</li> <li>PoC-Input: 40-90 VAC, 50/60 Hz, quasi-square wave, Power over Cable (PoC)</li> </ul> |
| PoE output                                      | PoE   | PoE (1552H)  | PoE+ (1572EAC/1572EC)  |
| Mounting options                                | Wall, pole, DIN rail  | Wall, pole   | Wall, pole   |
| Mode of operation                               | Unified and autonomous  | Unified and autonomous   | Unified and autonomous   |
| <b>Max Dimensions H x W x D (inches and mm)</b> | 11.3 x 8.0 x 2.34 in.<br>(28.7 x 20.3 x 5.9 cm)   | 12.3 x 8.6 x 6.1 in.<br>(31.2 x 22.9 x 16.3 cm)  | 11.8 x 7.9 x 7.9 in.<br>(30.0 x 20.1 x 20.1 cm)  |
| <b>Max Weight - heaviest model -</b>            | 6.7 lb (3.0 kg)   | 17.6 lbs (8 kg)  | 13.5 lbs. (6.1 kg)   |
| Ingress Protection Class                        | IP67  | IP67   | IP67   |
| Hazloc Certification                            | N/A   | <ul style="list-style-type: none"> <li>NRTL/CSA: Class I, Division 2; Groups A, B, C, and D</li> <li>ATEX: Class I, Zone 2; Ex nA IIC T5 Gc</li> <li>IECEx: Class I, Zone 2, Ex nA IIC T5 Gc</li> </ul>  | N/A  |
| <b>Operating temperature</b>                    | -40° to +167°F (-40° to +75°C) without solar loading or wind cooling  | -40° to 131°F (-40 to 55°C) plus solar loading   | -40° to 149°F (-40 to 65°C) ambient air with no solar loading  |
| <b>Warranty</b>                                 | 5 Year Limited HW   | 1 Year Limited HW  | 1 Year Limited HW  |

## Cisco IOx and Fog Applications

Fast. Simple. Secure. Scalable.

Run your IoT Applications at the Network Edge with Cisco IOx in 3 simple steps:



Cisco IOx combines Internet-of-Things (IoT) application execution within the fog and offers highly secure connectivity with Cisco IOS technology, as well as powerful services for rapid, reliable integration with IoT sensors and the cloud.

### Cisco IOx Components

- Cisco IOx application framework provides uniform and consistent hosting capabilities for applications across Cisco IoT network infrastructure. The Cisco IOx application environment brings together Cisco IOS software, the industry-leading & highly secure networking operating system, and Linux, the leading open-source platform.
- Cisco Fog Director allows administrators to deploy, manage, and troubleshoot Cisco IOx applications at scale.
- Cisco IOx Development tools allow the developers to easily package their applications for Cisco IOx-enabled network infrastructure products.
- Cisco IOx Client is a command-line utility for developers to control IOx application lifecycle tasks.
- Cisco IOx Local Manager is an embedded web-based application included with the Cisco IOx Application Framework that provides local management of applications hosted on IOx-enabled network infrastructures.
- Fog applications are packaged as containers, ready for execution on IOx-enabled infrastructure. They may be supplied by ecosystem partners and/or Cisco or developed with a range of common programming languages.

## Benefits

- Transformation of IoT data into new digital business value: Build new business with the ability to process high volumes of data in the factory and deliver closed loop system control in real time.
- Rapid time to value: Achieve business outcomes associated with IoT initiatives more rapidly with application execution within the factory.
- Broad scope of impact: Reach production deployment rapidly with factory application management and execution at IoT scale.

The following Cisco network infrastructure products currently support IOx:

- Cisco Industrial Ethernet 4000 Switches Series
- Cisco 829 Industrial Integrated Services Routers
- Cisco 809 Industrial Integrated Services Routers
- Cisco 800 series Integrated Services Routers

## Next Steps

The Cisco IOx application framework offers consistent management and hosting across network infrastructure products. To find out more about the Cisco IOx visit <https://www.cisco.com/go/iox>

## Embedded Networks

### Cisco Embedded Service Switch

Cisco Embedded Service switches are optimized for mobile and embedded networks that require switching capability in harsh environments. The primary product offering is the Cisco Embedded Service 2020 Series Switches product family. The flexible, compact form factor of the switch cards, complemented by Cisco IOS Software, provides highly secure data, voice, and video communications to stationary and mobile network nodes.

### Primary Features

- Base card-only configuration (8 Fast Ethernet plus 2 Gigabit Ethernet ports) or an optional expansion card capable of providing 16 additional Fast Ethernet ports (board size conforms to the widely accepted PC104 form factor)
- Line rate and/or nonblocking Application-Specific Integrated Circuit (ASIC)-based architecture
- Resiliency includes flex links for fast recovery, Cisco Resilient Ethernet Protocol (REP) for fast convergence
- Advanced security features
- Manageability includes auto Cisco SmartPorts, Web Device Manager, Telnet, HTTPS access, and Simple Network Management Protocol (SNMP)

## Hardware Models

Figure 22. Cisco Embedded Service 2020 Series Switches



## Cisco Embedded Services Routers

The Cisco 5900 Series Embedded Services Routers provide highly secure data, voice, and video communications to stationary and mobile network nodes across wired and wireless links. They solve critical size, weight, and power challenges and can operate reliably in harsh environments. These routers are powered by Cisco IOS Software and feature Cisco Mobile Ready Net capabilities.

Cisco Embedded Services routers can be used to establish mobile networks in vehicles. They also extend resources more securely to workers in harsh environments such as public safety, exploration, transportation, and defense. The Cisco 5900 Series portfolio offers a range of form factors to address diverse requirements.

The Cisco Embedded Services Routers include:

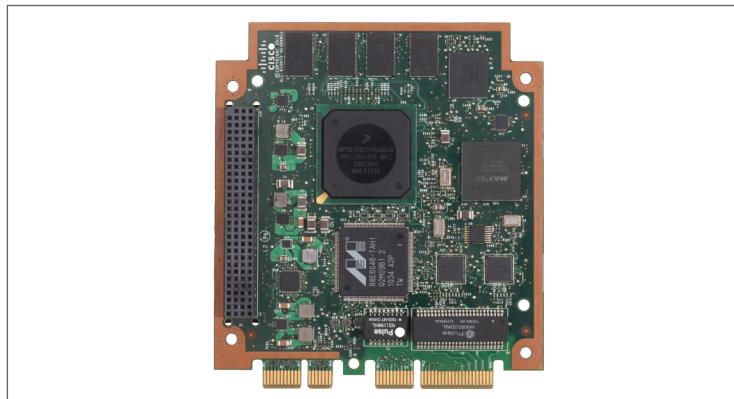
- **Cisco 5915 Embedded Services Router:** A PCI104-based card that provides two Fast Ethernet routed ports and three Fast Ethernet switched ports.
- **Cisco 5940 Embedded Services Router:** A CompactPCI (cPCI)-based card offering four Gigabit Ethernet routed ports.
- **Cisco 5921 Embedded Services Router:** A software router application designed for small, low powered Linux devices.

## Primary Features

- Hardware-based and software-only options to support a variety of form factors based on proven Cisco IOS technologies
- Remote voice services with Cisco Unified Communications Manager Express and streaming multicast video support
- Cisco Mobile Ready Net capabilities such as Cisco Radio Aware Routing and Open Shortest Path First version 3 (OSPFv3) MANET extensions
- Advanced security features integration to protect against malicious attacks and unauthorized access
- Network optimization features that improve bandwidth utilization, including IP multiplexing, QoS, and Cisco Radio Aware Routing

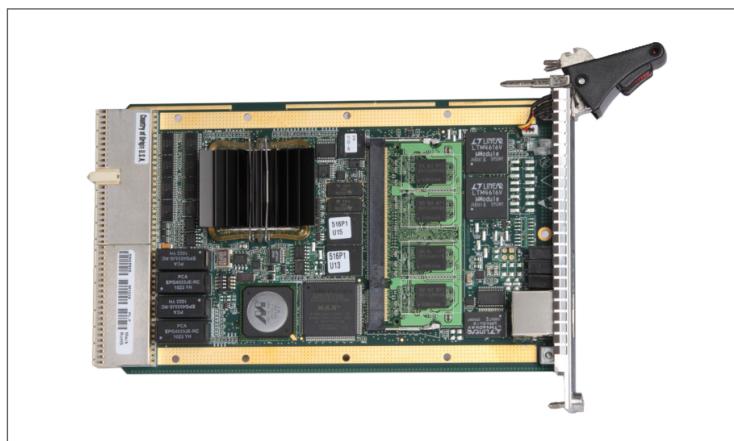
## Hardware Models

Figure 23. Cisco 5915 Embedded Services Router



Cisco 5915 ESR Air-Cooled Model

Figure 24. Cisco 5940 Embedded Services Router



Cisco 5940 ESR Air-Cooled Model

## Software Models

Figure 25. Cisco 5921 Embedded Services Router



## Security

### New IoT Requirements

With converged IT and operational technology networks, the Internet of Things (IoT) significantly expands the breadth and depth of security challenges. The billions of new connected objects dramatically increases the number of potential attack vectors. The wide variety of objects increases the diversity of threats faced. More sensitive data flowing through devices with weak or no security, located in insecure places, increases the risk of a security breach. Because IT and operational technology environments are vastly different, the same security policies cannot be applied to both. This makes remediation more complicated and requires a different approach to security. All these challenges combined have a significant impact on your organization's ability to secure networks and data.

### Cisco Advantage: Addressing the Full Attack Continuum

We are addressing these challenges by integrating comprehensive physical and cybersecurity solutions from the cloud to the fog that address the full attack continuum – before, during, and after an attack.

### Cyber Security Portfolio

Cisco offers scalable, threat-centric cybersecurity solutions, enabling you to quickly and effectively discover, scope, contain, and remediate an attack to minimize damage. These cybersecurity solutions include:

- Benefits:**
  - Pervasive security solution:** Cisco delivers a pervasive security solution throughout the extended network. Cisco security products work together to produce robust, actionable security intelligence in real-time, increasing your overall security posture with little or no human intervention required.
  - Unique policies for IT and operational technology:** Recognizing that the practical application of security policies must be different for IT and operational-technology environments, Cisco security solutions are flexible to deliver differentiated policy enforcement across the extended network for organization-driven security policies and response.
  - Actionable security intelligence:** Developers can use Cisco IOx APIs to develop applications that use Cisco security solutions to produce comprehensive, actionable security intelligence across the extended network.

- ISA3000 Industrial Security appliance
- Cloud-based threat protection
  - Cisco Advanced Malware Protection (AMP)
- Network and perimeter security
  - Cisco ASA Firewall with FirePOWER Services
  - Cisco FirePOWER™ Next-Generation Intrusion Prevention Service (NGIPS)
  - Cisco Talos Security Intelligence
- User- and group-based identity services
  - Cisco Identity Services Engine
  - Cisco TrustSec® solutions

**Table 4.** ISA3000 detailing features etc.

| <b>Product Family</b>                    | <b>ISA3000</b>                                 |
|--|--|
| <b>Number of Models</b>                  |  |
| <b>Total Ports</b>                       |  |
| Copper Ports                             | 16 FE  |
| SFP Ports                                | 2 GE   |
| Combo Ports                              | 2 FE   |
| PoE/PoE+                                 | Yes  |
| Mechanical form factor                   | DIN rail                                       |
| Ingress Protection Class                 | IP30   |
| Max Dimensions H x W x D (inches and mm) | 5.1" x 5.0" x 5.26"<br>(130mm x 127mm x 134mm) |
| Max Power Consumption (excluding PoE)    | 30 W   |
| Max Weight                               | 4.35 lbs (1.97 kg)                             |
| HW Warranty Period                       | 5 years  |
| MTBF (Hours) - lowest model -            | 374,052  |

## Use Cases

### Manufacturing: Cisco Connected Factory Solutions

The Cisco Connected Factory solution is a portfolio of validated, proven architectures, capabilities, and market-leading technologies and services. These solutions are designed to help industrial companies:

- Rapidly and more securely integrate industrial automation and control with business systems
- Build one common, converged, rugged, plant-to-business industrial ethernet network
- Scale your network as your needs change or your business grows
- Improve operational costs and efficiency
- Find and fix problems faster to improve production uptime and equipment availability
- Improve network security to protect IP and production integrity

Cisco provides the breadth of plant infrastructure capabilities across networking, wireless, security, video, computing, and communications. The solution can flexibly support the current and future business needs of manufacturers. It meets the requirements of both business IT and operational technology in a highly secure, reliable, and integrated platform.

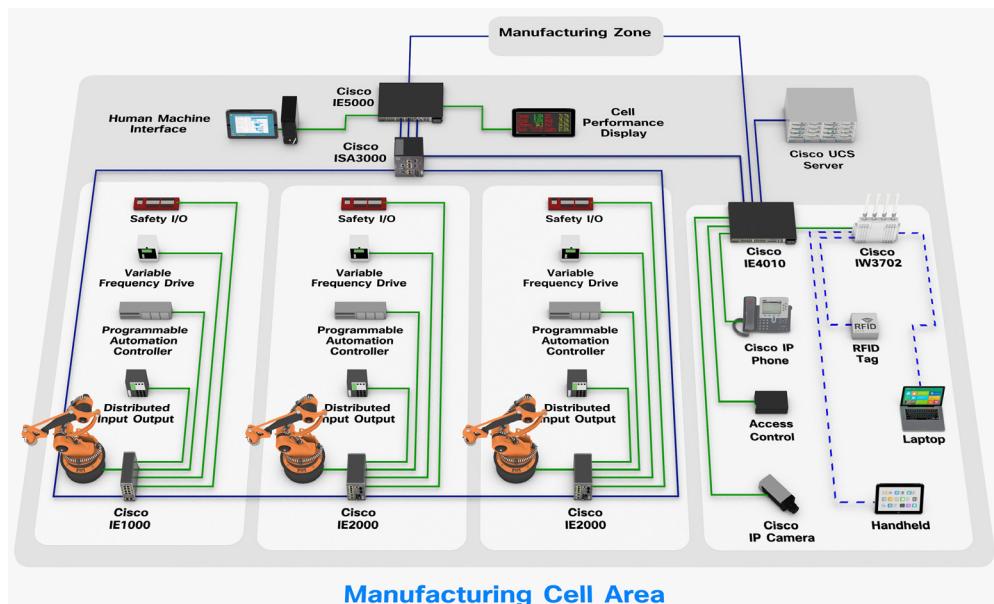
Cisco Solutions for Manufacturing include:

- [Connected Factory Network](#)
- [Connected Factory – PROFINET](#)
- [Connected Factory Wireless](#)
- [Connected Factory Security](#)
- [Time Sensitive Networking](#)

For additional info and details: [www.cisco.com/go/manufacturing](http://www.cisco.com/go/manufacturing)

The following figure provides an illustration of a manufacturing cell area using Cisco IoT Infrastructure products

**Figure 26.** Cisco Digital Factory: Manufacturing Cell Area Use Case



## Cisco Digital Utilities and Oil & Gas Solutions

With Cisco solutions, energy customers are connecting production, assets, machines and people across the diverse energy ecosystem. Cisco IoT solutions enable power and grid operators, and oil & gas companies to achieve more value from their operations on a single, intelligent platform. Sensor-based solutions offer real-time security, increased control and visibility to accelerate the pace of that transformation.

Modernizing infrastructure and integrating diverse energy resources are top priorities. Utilities are digitizing the grid – from generation to distribution to consumption. Oil & gas companies are keeping product and profits flowing. And they're using the power of Cisco networks and IoT solutions to:

- Achieve greater cyber and physical security/safety
- Improve operational efficiency and cost savings
- Increase field productivity and empower the mobile workforce
- Offer new levels of customer experiences and care
- Enable compliance with regulatory requirements

Cisco Energy Solutions:

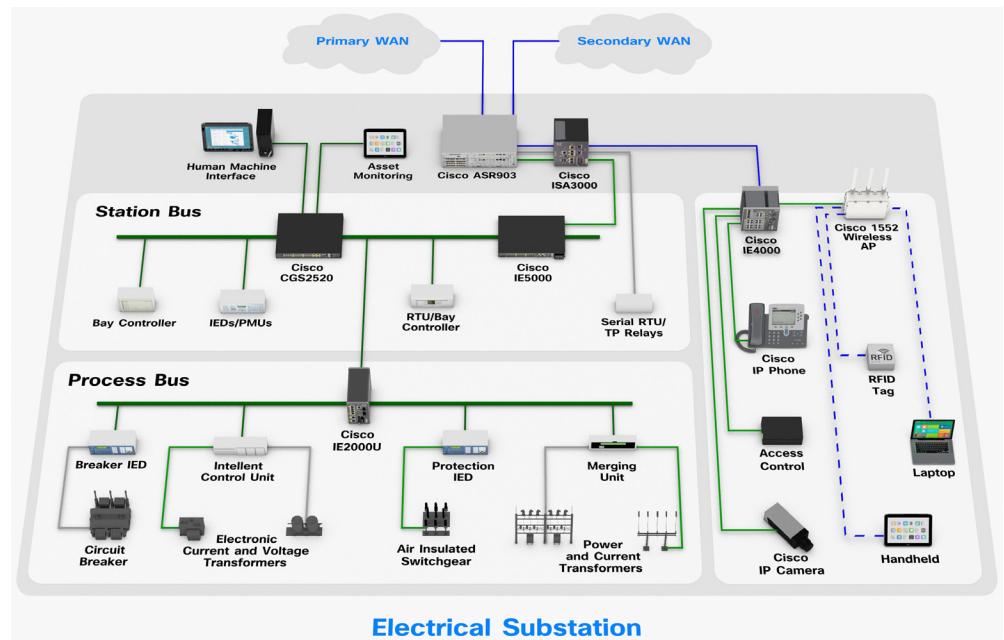
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Substation Automation</li> <li>• Substation Security</li> <li>• Field Area Network</li> <li>• Distribution Automation</li> </ul> | <ul style="list-style-type: none"> <li>• Utility WAN</li> <li>• Connected Pipeline</li> <li>• Connected Refinery</li> <li>• Connected Workforce</li> </ul> |
|---|--|

For additional info and details:

- <https://www.cisco.com/go/utilities>
- <https://www.cisco.com/go/oilandgas>

The following figure provides an illustration of an automated substation using Cisco IoT products

**Figure 27.** Cisco Connected Substation: Substation Automation Use Case



## Digital Transportation

### Cisco Digital Transportation Solutions

Digitization and advances in technology are transforming the transportation industry like never before. Cisco's new approach to integrating information and communication technology with intelligent and converged networks, create the foundation for new infrastructures of connected roads, railways, airports, stations, and ports. These new digital networks are also deployed onboard buses, trains, planes, ships, and connected vehicles.

Cisco transportation solutions meet new demands and requirements for traffic management, mass transit, data analytics, telematics, vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and machine-to-machine (M2M) communications. Cisco solutions and architectures help transportation operators and transit agencies create greater safety and mobility for both workers and passengers while using new opportunities for future growth and expansion. Utilizing the power of a secure IP network, transit operators gain a competitive edge and help to make sure of greater safety, operational efficiency, and improved productivity by providing seamless, secure access from any location.

Regardless of the mode of transit, the benefits that Cisco Digital Transportation solutions deliver include:

- Greater safety and security
- Converged networks to lower costs and to simplify and centralize management
- Improved operational efficiencies and employee productivity
- New business models and opportunities for added revenue generation and competitive differentiation
- Reduced complexity with Cisco services to help plan, build and manage networks and systems
- Extensive partner ecosystem for end-to-end transportation solutions

Cisco Solutions for Transportation include:

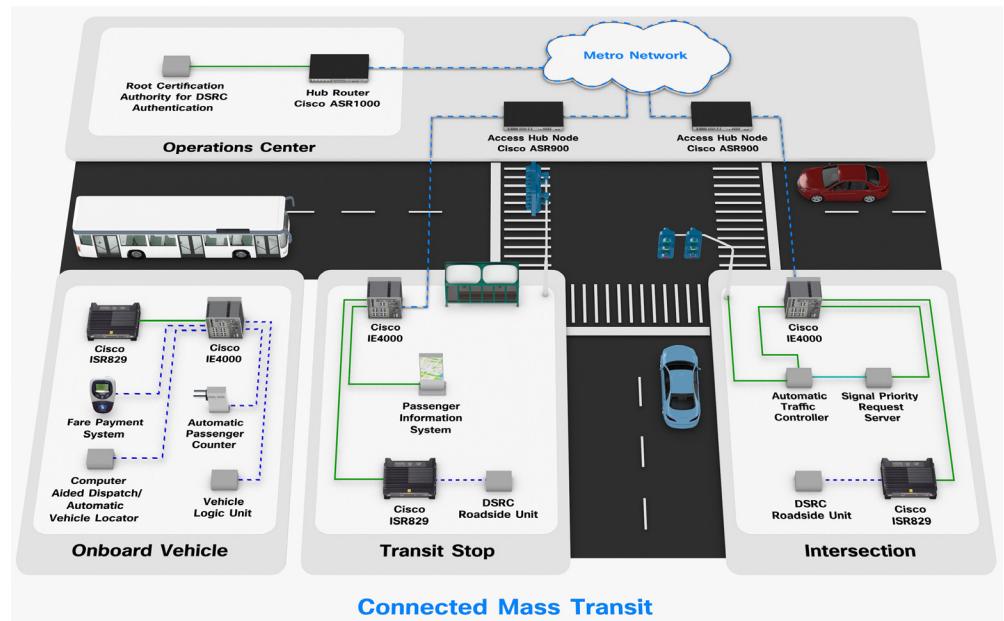
- [Cisco Connected Roadways](#)
- [Cisco Connected Rail](#)
- [Cisco Connected Mass Transit](#)

For additional info and details: [www.cisco.com/go/transportation](http://www.cisco.com/go/transportation)

The following figure provides an illustration of Transit Signal Prioritization (TSP) using Cisco IoT products.

Transit Signal Prioritization provides priority treatment for mass transit vehicles at signalized intersections. By reducing delay of transit vehicles idling at intersections, cities can improve their public transit service, maintain on-time schedules and also reduce pollution and carbon emissions. TSP can also be utilized by emergency response vehicles for safer passage through busy intersections and faster response times that can save lives when valuable seconds are often critical.

Figure 28. Cisco Digital Transportation: Transit Signal Prioritization Use Case



## Cisco IoT Networking

### Deploy, Accelerate, and Innovate

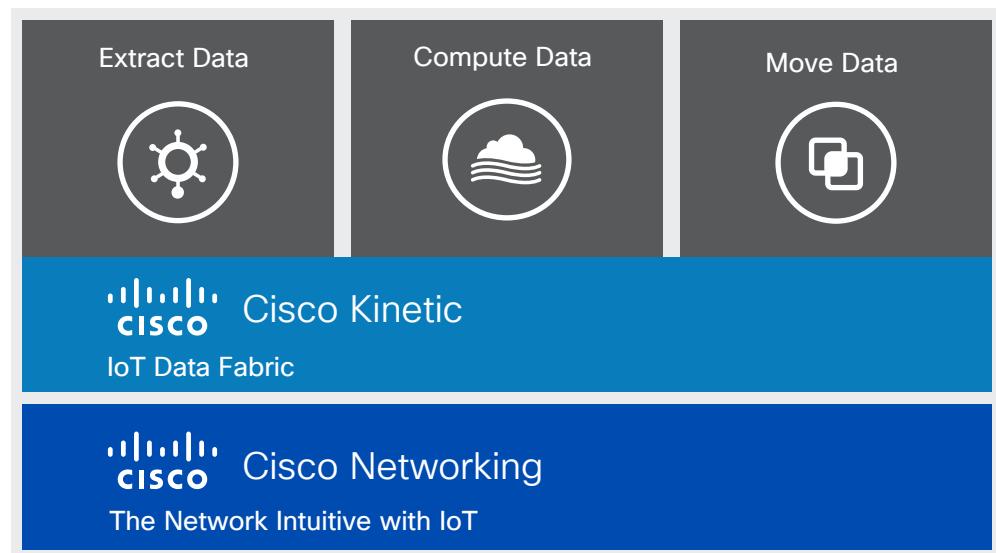
As IoT creates opportunity, it increases complexity, producing vast amounts of data and connected infrastructure. To overcome those challenges and realize the value of IoT, the Cisco IoT enables you to:

- Bridge IT and operational technology, supporting your entire organization with a scalable network infrastructure
- Understand, act on, and protect the data you collect
- Secure your entire technology ecosystem – from edge to cloud

The Cisco IoT makes all that possible with secure connectivity.

To find out how the Cisco IoT can help you innovate faster, make smarter decisions, and strengthen security, visit [www.cisco.com/go/iot](http://www.cisco.com/go/iot)

Figure 29. Cisco IoT Networking



## Appendix

### Network Connectivity

Table 6. Industrial Ethernet Switches: Main Common Features

| Layer 2 and Layer 3                                      | Security                                   | Management   | Quality of Service (QoS)                          |
|--|--|--|---|
| 802.1 Q VLAN trunking                                    | 802.1 x                                    | Auto Configuration                                     | 2 Ingress and 4 Egress Queues                     |
| Auto MDIX  | BPDU Filtering                             | Auto QoS   | 802.1p Priority                                   |
| Auto-negotiation on all ports                            | BPDU Guard                                 | Auto Smartport   | Auto QoS 1.5                                      |
| Configurable IGMP Leave Timer                            | Dynamic ARP Inspection                     | CLI-based management console                           | AutoQoS - VoIP                                    |
| Dynamic Access Ports (Dynamic VLAN)                      | Generic Message Authent. for SSH Protocol  | Digital Optical Monitor (DOM) support                  | AutoQoS - VoIP Enhancement                        |
| Dynamic ARP Inspection                                   | HTTP(S)                                    | Embedded Event Manager (EEM)                           | DSCP Mapping/Filtering                            |
| Dynamic MAC addressing                                   | Ip device tracking (IPDT)                  | Express Setup via Device Manager                       | Egress Bandwidth Limiting/port shaping            |
| Etherchannel   | IP source guard                            | IP SLA responder                                       | Egress Shaped Queues                              |
| FlexLink Mac Move Notification                           | Local RADIUS Server                        | LLDP   | Global QoS (enable QoS)                           |
| FlexLink Multicast fast convergence failover             | Loopguard                                  | Macro Smartport  | Hierarchical QOS                                  |
| FlexLink/Back up Interface                               | MAC address notification                   | Mini USB console port                                  | ingress policer                                   |
| IGMP Filtering/Snooping Timer/Throttling/Querier         | Multilevel Console Security                | RS232 serial console port                              | Ingress Rate Limiting                             |
| IGMP v1, v2, v3 Snooping                                 | Port Security                              | RSPAN session  | Ingress/egress Shared Queues                      |
| Indirect IPV4 routing                                    | Port Security for Voice VLANs              | SNMP v1 v2 v3  | Ingress/Egress Strict Priority Queuing (Expedite) |
| Inter-VLAN routing (or IPv4 static routing)              | Port Security MAC Aging                    | Software Alarm Relay                                   | Packet Based Storm Control                        |
| Mini-jumbo/Jumbo frame                                   | Private VLAN Edge (Protected Port)         | SPAN session   | Per VLAN Policy & Per Port Policer                |
| MSTP   | RADIUS Client                              | Web Device Manager                                     | Shaped Round Robin (SRR)                          |
| MVR (Multicast VLAN Registration)                        | RADIUS Server Load Balancing               | DHCP   | Storm Control - Unicast, Multicast, Broadcast     |
| Per Port Storm Control Unicast/Multicast                 | Secure Copy Protocol (SCP)                 |  | Trust Boundary Configuration                      |
| Port duplex/speed  | Secure Shell SSH 2 Server                  | DHCP Snooping  | Weighted Tail Dop (WTD)                           |
| REP LSL Age-out timer/Edge no Neighbor                   | Secure Shell SSHv 1.5                      | DHCP Option 82 data Insertion                          | Industrial Protocols                              |
| REP redundant ring                                       | SPAN                                       | DHCP Option 82 Pass Through                            |   |
| RSTP   | Spanning Tree Root Guard (STRG)            | DHCP Option 82 - Configurable Remote ID and Circuit ID | Ethernet/IP (CIP protocol)                        |
| Static MAC addressing                                    | SSL  | DHCP Snooping Statistics and SYSLOG                    | Modbus TCP/IP                                     |
| STP PortFast   | SXP (Secure Group Acccss Exchange Protcol) | DHCP server port-based address allocation              | PROFINET I/O                                      |
| SVI interface  | TACACS+                                    | IPv6   | Network Address Translation (Layer2 NAT)          |
| TrustSec: Auto Smart Port/Device Sensor/Device profiling | Trunk Port Security                        |  | 1588 PTP, CIP sync                                |
| UDLD   | TrustSec: Auto Smart Port (ASP)            | IPv6 host addressing                                   | Industrial automation Smartport (template)        |
| Voice Vlan   | TrustSec: Device Sensor, Device profiling  | IPv6 MLD v1 and V2 snooping                            | Port based DHCP allocation                        |
| VTP v2, v3   | Unicast MAC Filtering                      | HTTP and HTTPS   | Duplicate Address Detection                       |

**Table 7.** Industrial Ethernet Switches Power Supply Units: Main Specifications and Use Case Scenarios

| Product Number     | Wattage | Rated Nominal Input Operating Range                  | Supported Input Voltage Operating Range | Power Output | PoE/ PoE+ Support | Use Case Scenario  |
|--------------------|---------|--|---|--------------|-------------------|--|
| PWR-IE170W- PC-AC= | 170W    | AC 100-240V/2.3A 50-60Hz<br>or<br>DC 125-250V/2.1A   | AC 90-264V<br>or<br>DC 106-300V         | 54VDC/3.15A  | Yes               | Maximum PoE/PoE+ port support in a AC or high DC environment1          |
| PWR-IE170W- PC-DC= | 170W    | DC 12-54V/23A  | DC 10.8-60V                             | 54VDC/3.15A  | Yes               | Maximum PoE/PoE+ port support in a DC environment1                     |
| PWR-IE50W- AC=     | 50W     | AC 100-240V/1.25A 50-60Hz<br>or<br>DC 125-250V/1.25A | or<br>DC 106-300V                       | 24VDC/2.1A   | No                | No PoE/PoE+ support needed in an AC or DC environment                  |
| PWR-IE50W- AC-IEC= | 50W     | AC 100-240V/1.25A 50-60Hz                            | AC 90-264V                              | 24VDC/2.1A   | No                | No PoE/PoE+ support needed when IEC plug is desired                    |
| PWR-IE65W- PC-AC=  | 65W     | AC 100-240V/1.4A 50-60Hz<br>or<br>DC 125-250V/1.0A   | AC 90-264V<br>or<br>DC 106-300V         | 54VDC/1.2 A  | Yes               | Minimum (1~2 port) PoE support needed in an AC or high DC environment2 |
| PWR-IE65W- PC-DC=  | 65W     | DC 24-48VDC/4.5A                                     | DC 18-60V                               | 54VDC/1.2 A  | Yes               | Minimum (1~2 port) PoE support needed in a DC environment2             |

**Table 8.** Industrial Ethernet Switches: Available Models (Product IDs)

| IE 2000            | Cisco Industrial Ethernet 2000 Series Switches               |
|--------------------|--|
| IE-2000-4T-B       | IE 4 10/100,2 FE, Base                                       |
| IE-2000-4T-L       | IE 4 10/100,2 FE, Lite                                       |
| IE-2000-4TS-B      | IE 4 10/100,2 FE SFP, Base                                   |
| IE-2000-4TS-L      | IE 4 10/100,2 FE SFP, Lite                                   |
| IE-2000-4T-G-B     | IE 4 10/100,2 Gig port, Base                                 |
| IE-2000-4T-G-L     | IE 4 10/100,2 Gig port, Lite                                 |
| IE-2000-4TS-G-B    | IE 4 10/100,2 SFP Gig port, Base                             |
| IE-2000-4TS-G-L    | IE 4 10/100,2 SFP Gig port, Lite                             |
| IE-2000-4S-TS-G-B  | IE 2000 with 4-port SFP, 2-port GE SFP uplinks, LAN Base ima |
| IE-2000-4S-TS-G-L  | IE 2000 with 4-port SFP, 2-port GE SFP uplinks, LAN Lite ima |
| IE-2000-8TC-B      | IE 8 10/100,2 FE SFP+2 T/SFP FE, Base                        |
| IE-2000-8TC-L      | IE 8 10/100,2 FE SFP+2 T/SFP FE, Lite                        |
| IE-2000-8TC-G-B    | IE 8 10/100,2 T/SFP, Base                                    |
| IE-2000-8TC-G-L    | IE 8 10/100,2 T/SFP, Lite                                    |
| IE-2000-8TC-G-E    | IE 8 10/100,2 T/SFP, Base with 1588                          |
| IE-2000-8TC-G-N    | IE 8 10/100,2 T/SFP, Base with 1588 & NAT                    |
| IE-2000-16TC-B     | IE 16 10/100,2 FE SFP+2 T/SFP FE, Base                       |
| IE-2000-16TC-L     | IE 16 10/100,2 FE SFP+2 T/SFP FE, Lite                       |
| IE-2000-16TC-G-E   | IE 16 10/100,2 FE SFP+2 T/SFP, Base with 1588                |
| IE-2000-16TC-G-L   | IE 16 10/100,2 FE SFP+2 T/SFP, Lite                          |
| IE-2000-16TC-G-N   | IE 16 10/100,2 FE SFP+2 T/SFP, Base with 1588 & NAT          |
| IE-2000-16TC-G-X   | IE 16 10/100,2 FE SFP+2 T/SFP, Base with 1588, Conf. Coat    |
| IE-2000-16PTC-G-E  | IE 16 10/100,2 FE SFP+2 T/SFP, with 1588, NAT and PoE        |
| IE-2000-16PTC-G-L  | POE on LAN Lite base. GE uplinks                             |
| IE-2000-16PTC-G-NX | POE on LAN base with 1588, NAT and Conf. Coat. GE uplinks    |

| <b>IE 2000U</b>    |  | <b>Cisco Industrial Ethernet 2000U Series Switches</b>                |
|--------------------|--|---|
| IE-2000U-4S-G      |  | IE 2000U 4 SFP FE, 2 SFP GE ports                                     |
| IE-2000U-4T-G      |  | IE 2000U 4 x 10/100, 2 x 10/100/1000 ports                            |
| IE-2000U-4TS-G     |  | IE 2000U 4 x 10/100, 2 SFP GE ports                                   |
| IE-2000U-8TC-G     |  | IE 2000U 8 x 10/100, 2 T/SFP GE ports with 1588                       |
| IE-2000U-16TC-G    |  | IE 2000U 16 x 10/100, 2 FE SFP, 2 T/SFP GE ports with 1588            |
| IE-2000U-16TC-GP   |  | IE 2000U 16 x 10/100, 2 T/SFP GE ports with 1588, PoE                 |
| IE-2000U-16TC-G-X  |  | IE 2000U 16 x 10/100, 2 FE SFP, 2 T/SFP GE ports with 1588, C         |
| <b>IE2000 IP67</b> |  | <b>Cisco Industrial Ethernet 2000 IP67 Series Switch</b>              |
| IE-2000-8T67-B     |  | IP67 IE 8 10/100  |
| IE-2000-8T67P-G-E  |  | IP67 IE 8 10/100 poe, 2 GE, with 1588 & NAT                           |
| IE-2000-16T67-B    |  | IP67 IE 16 10/100   |
| IE-2000-16T67P-G-E |  | IP67 IE 8 10/100, 8 poe, 2 GE, with 1588 & NAT                        |
| IE-2000-24T67-B    |  | IP67 IE 24 10/100   |
| <b>CGS 2520</b>    |  | <b>Cisco 2520 Connected Grid Switch</b>                               |
| CGS-2520-24TC      |  | Cisco CGS2520 front/rear cabling w/2GE, 24-10/100 copper              |
| CGS-2520-16S-8PC   |  | Cisco CGS2520 front/rear cabling w/2GE, 16-SFP, 8-10/100 PoE          |
| <b>IE3000</b>      |  | <b>Cisco Industrial Ethernet 3000 Series Switches</b>                 |
| IE-3000-8TC-E      |  | IE 3000 Base Switch 8-Port 10/100 + 2 T/SFP w/ Layer 3                |
| IE-3000-4TC-E      |  | IE 3000 Base Switch 4-Port 10/100 + 2 T/SFP w/ Layer 3                |
| IE-3000-8TC        |  | IE 3000 Base Switch, 8 ports 10/100 + 2 T/SFP, LAN Base               |
| IE-3000-4TC        |  | IE 3000 Base Switch, 4 ports 10/100 + 2 T/SFP, LAN Base               |
| IEM-3000-8SM=      |  | IE 3000 Expansion module 8 port SFP                                   |
| IEM-3000-8FM=      |  | IE 3000 Expansion Module, 8 100FX                                     |
| IEM-3000-4PC-4TC=  |  | IE 3000 Expansion Module, 4 POE 10/100 4 non-POE 10/10                |
| IEM-3000-4SM=      |  | IE 3000 Expansion module 4 port SFP                                   |
| IEM-3000-4PC=      |  | IE 3000 Expansion Module, 4 POE 10/100                                |
| IEM-3000-8TM=      |  | IE 3000 Expansion Module, 8 10/100                                    |
| <b>IE 3010</b>     |  | <b>Cisco Industrial Ethernet 3010 Series Switches Layer 2/Layer 3</b> |
| IE-3010-16S-8PC    |  | Cisco IE 3010 Switch, 16 SFP, 8 PoE, 2 Combo GE uplinks               |
| IE-3010-24TC       |  | Cisco IE 3010 Switch, 24 Port 10/100, 2 Combo GE uplinks              |
| <b>IE 4000</b>     |  | <b>Cisco Industrial Ethernet 4000 Series Switches</b>                 |
| IE-4000-4GC4GP4G-E |  | IE 4000 4 x combo 1G with 4 x 1G PoE, 4 x 1G Combo, LAN Bas           |
| IE-4000-4GS8GP4G-E |  | IE 4000 4 x SFP 1G with 8 x 1G PoE, 4 x 1G Combo, LAN Base            |
| IE-4000-4S8P4G-E   |  | IE 4000 4 x SFP 100M with 8 x PoE, 4 x 1G Combo, LAN Base             |
| IE-4000-4T4P4G-E   |  | IE 4000 4 x RJ45 10/100M, 4 x PoE 10/100M, 4 x 1G Combo, LA           |
| IE-4000-4TC4G-E    |  | IE 4000 4 x combo 10/100M, 4 x 1G Combo, LAN Base                     |
| IE-4000-8GS4G-E    |  | IE 4000 8 x SFP 1G, 4 x 1G Combo, LAN Base                            |
| IE-4000-8GT4G-E    |  | IE 4000 8 x RJ45 10/100/1000, 4 x 1G Combo, LAN Base                  |
| IE-4000-8GT8GP4G-E |  | IE 4000 8 x RJ45 10/100/1000 with 8 x 1G PoE, 4 x 1G Combo,           |
| IE-4000-8S4G-E     |  | IE 4000 8 x SFP 100M, 4 x 1G Combo, LAN Base                          |
| IE-4000-8T4G-E     |  | IE 4000 8 x RJ45 10/100M, 4 x 1G Combo, LAN Base                      |
| IE-4000-16GT4G-E   |  | IE 4000 16 x RJ45 10/100/1000M, 4 x 1G Combo, LAN Base                |
| IE-4000-16T4G-E    |  | IE 4000 16 x RJ45 10/100/1000M, 4 x 1G Combo, LAN Base                |
| <b>IE 5000</b>     |  | <b>Cisco Industrial Ethernet 5000 Series Switches</b>                 |
| IE-5000-12S12P-10G |  | 12 port RJ45 10/10/1000, 12 port 1G SFP, 4 port 1G/10Guplinks         |

**Table 9.** Industrial Ethernet Switches: Main Certifications and Compliances

| Product Family | EMI | EMC | EN 50155 | FCC Part 15 | IEC 61850 | UL     | Hazardous Location | Manufacturing | Oil and Gas | Mining (facilities) | Utilities | Traffic Control | Railways | Marine | Public Safety | RoHS | CE Declaration | Service Provider | Australia | China | EU    | India | Korea | US |
|----------------|-----|-----|----------|-------------|-----------|--------|--------------------|---------------|-------------|---------------------|-----------|-----------------|----------|--------|---------------|------|----------------|------------------|-----------|-------|-------|-------|-------|----|
|                |     |     |          |             |           |        |                    |               |             |                     |           |                 |          |        |               |      |                |                  |           |       |       |       |       |    |
| IE 2000        | X   | X   | X        | X           | X(**)     | X      | X(*)               | X             | X           | X                   | X(**)     | X               | X        | X      | X             | X    | X              | X                | X         | X(**) | X     | X     | X     | X  |
| IE2000U        | X   | X   |          | X           | X         | X      | X(*)               | X             | X           | X                   | X         |                 |          |        | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |
| IE 2000 IP67   | X   | X   | X        | X           | X         | X      |                    |               | X           | X                   | X         | X               |          | X      | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |
| CGS 2520       | X   | X   | X        | X           | X         | X(***) |                    | X             | X           | X                   | X         | X               |          | X      | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |
| IE 3000        | X   | X   | X        | X           | X         | X      | X(*)               | X             | X           | X                   | X         | X               | X        | X      | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |
| IE 3010        | X   | X   | X        | X           |           | X      |                    | X             | X           | X                   |           | X               | X        | X      | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |
| IE4000         | X   | X   | X        | X           | X         | X      | X(*)               | X             | X           | X                   | X         | X               | X        | X      | X             | X    | X              | X                | X         | X     | X(**) | X     | X     | X  |
| IE 5000        | X   | X   | X        | X           | X         | X      | X(*)               | X             | X           | X                   | X         | X               | X        | X      | X             | X    | X              | X                | X         | X     | X     | X     | X     | X  |

(\*): requires cabinet enclosure

(\*\*): subset of PIDs in family

(\*\*\*): CUL

**Table 10.** Industrial Routers: Available Models and Options (Product IDs – Descriptions)

| Cisco Connected Grid Router (CGR) 1000                    |  |
|---|--|
| CGR1120/K9  | CGR 1120 w/ 2 module slots, 2 GE, 2 serial, 6 FE LAN, Wi-Fi, GPS |
| CGR1240/K9  | CGR1240 w/ 4 module slots, 2 GE, 2 serial, 4 FE LAN, Wi-Fi, GPS  |
| Cellular Connected Grid Modules for Cisco CGR 1000 Series |  |
| CGM-3G-EVDO-S=  | Connected Grid Module - 3G Sprint EV-DO Rev A/0/1xRTT            |
| CGM-3G-EVDO-V=  | Connected Grid Module - 3G Verizon EV-DO Rev A/0/1xRTT           |
| CGM-3G-HSPA-A=  | Connected Grid Module - 3G AT&T HSPA+/UMTS/GSM/GPRS/EDGE         |
| CGM-3G-HSPA-AB-G=   | Connected Grid Module - 3G (All Bands) HSPA+/UMTS/GSM/EDGE       |
| CGM-3G-HSPA-G=  | Connected Grid Module - 3G (Global) HSPA+/UMTS/GSM/GPRS/EDGE     |
| Cisco Connected Grid Router (CGR) 2000                    |  |
| CGR-2010-SEC/K9   | Cisco CGR2010 security bundle w/SEC license PAK                  |
| CGR-2010/K9   | Cisco CGR2010 w/2GE, 4 GRWIC slots, 256MB CF, 1GB DRAM, IPB      |
| Cisco 2010 Connected Grid Router GRWIC Options            |  |
| GRWIC-1CE1T1-PRI=   | 1 port channelized T1/E1 and PRI GRWIC (data only)               |
| GRWIC-2CE1T1-PRI=   | 2 port channelized T1/E1 and PRI GRWIC (data only)               |
| GRWIC-2SHDSL=   | Cisco Connected Grid G.SHDSL GRWIC                               |
| GRWIC-4G-LTE-A=   | Cisco Connected Grid 2G/3G/4G Multimode LTE GRWIC for ATT        |
| GRWIC-4G-LTE-G=   | Cisco Connected Grid 2G/3G/4G Multimode LTE GRWIC - Global       |
| GRWIC-4G-LTE-V=   | Cisco Connected Grid 2G/3G/4G Multimode LTE GRWIC for VZW        |
| GRWIC-4T=   | 4-Port Serial GRWIC  |
| GRWIC-8A/S-232=   | 8-Port Async/Sync Serial GRWIC, EIA-232                          |
| GRWIC-D-ES-2S-8PC=  | EtherSwitch 8x 10/100T (4 PoE) ports + 2 100/1000 SFP            |
| GRWIC-D-ES-6S=  | EtherSwitch 4 100FX SFP ports + 2 100/1000 SFP                   |
| GRWIC-VA-DSL-A=   | Cisco Connected Grid VDSL2 and ADSL2/ADSL2+ GRWIC - Annex A      |
| GRWIC-VA-DSL-M=   | Cisco Connected Grid VDSL2 and ADSL2/ADSL2+ GRWIC - Annex M      |
| SGRWILK9-15002SE=   | Cisco GRWIC ESM IP SERVICES WITH EXPRESS SETUP                   |
| SGRWISK9-12258EY=   | Cisco GRWIC ESM IP SERVICES                                      |
| SGRWISK9-15002SE=   | Cisco GRWIC ESM IP SERVICES                                      |

| Cisco 819H 3G M2M GW Series Products           |   |
|--|---|
| C819H-K9                                       | C819 M2M Hardened Secure Router with Smart Serial   |
| C819HG+7-K9                                    | C819 Secure Hardened M2M GW (non-US) 3.7G HSPA + R7, SMS/GPS  |
| C819HG-4G-A-K9                                 | C819 Hardened 4G LTE M2M GW for ATT 700 MHz Band 17   |
| C819HG-4G-G-K9                                 | C819 Hardened 4G LTE for Global, 800/900/1800/2100/2600 MHz   |
| C819HG-4G-V-K9                                 | C819 Hardened 4G LTE M2M GW for Verizon 700 MHz Band 13   |
| C819HG-S-K9                                    | C819 Secure Hardened Router, SPRINT EVDO Rev A w/ SMS/GPS   |
| C819HG-U-K9                                    | C819 Secure Hardened M2M GW (non-US) 3.5G HSPA R6 w/ SMS/GPS  |
| C819HG-V-K9                                    | C819 Secure Hardened Router, VERIZON EVDO Rev A w/ SMS/GPS  |
| Cisco 819H 3G M2M GW with WLAN Series Products |   |
| C819HGW+7-A-A-K9                               | C819 M2M Hardened 3.7G HSPA+ North America w/ Dual Radio FCC  |
| C819HGW+7-E-K9                                 | C819 M2M Hardened 3.7G HSPA+ (non-US) w/ Dual Radio ETSI  |
| C819HGW+7-N-K9                                 | C819 M2M Hardened 3.7G HSPA+ (non-US) w/ Dual Radio WiFi  |
| C819HGW-S-A-K9                                 | C819 M2M Hardened for Sprint EV-DO Rev A w/ Dual Radio FCC  |
| C819HGW-V-A-K9                                 | C819 M2M Hardened for Verizon EV-DO Rev A w/ Dual Radio FCC   |
| C819HWD-A-K9                                   | C819 M2M Hardened with Dual Radio FCC WiFi  |
| C819HWD-C-K9                                   | C819 M2M Hardened with Dual Radio China WiFi  |
| C819HWD-E-K9                                   | C819 M2M Hardened with Dual Radio ETSI WiFi   |
| Cisco Industrial Router (IR) 509 and 529 WPAN  |   |
| IR509UWP-915/K9                                | IR509 915Mhz WPAN router w/ 2 serial,1 FE LAN   |
| IR529UBWP-915D/K9                              | IR529 915Mhz WPAN IP67 Range Ext. BBU Adv PS Dual antenna   |
| IR529UBWP-915S/K9                              | IR529 915Mhz WPAN IP67 Range Ext. BBU Adv PS Single antenna   |
| IR529UWP-915D/K9                               | IR529 915Mhz WPAN IP67 Range Ext. Adv PS Dual antenna   |
| Cisco Industrial Router (IR) 809               |   |
| IR809G-LTE-VZ-K9                               | IR809 Hardened WAN 4G LTE secure platform multi-mode Verizon LTE/DoRa   |
| IR809G-LTE-NA-K9                               | IR809 Hardened WAN 4G LTE secure platform multi-mode ATT and Canada LTE/HSPA+   |
| IR809G-LTE-GA-K9                               | IR809 Hardened WAN 4G LTE secure platform multi-mode Global (Europe) LTE/HSPA+  |
| IR809G-LTE-ST-K9                               | IR809 Hardened WAN 4G LTE secure platform multi-mode Sprint LTE/DoRa  |
| Cisco Industrial Router (IR) 829               |   |
| IR829GW-LTE-VZ-AK9                             | IR829 Hardened WAN GE 4G LTE secure platform multi-mode Verizon LTE/DoRa with 802.11n, PoE, FCC compliant                   |
| IR829GW-LTE-NA-AK9                             | IR829 Hardened WAN GE 4G LTE secure platform multi-mode ATT and Canada LTE/HSPA+ with 802.11n, PoE, FCC compliant           |
| IR829GW-LTE-GA-EK9                             | IR829 Hardened WAN GE 4G LTE secure platform multi-mode Global (Europe) LTE/HSPA+ with 802.11n, PoE, ETSI Compliant         |
| IR829GW-LTE-GA-ZK9                             | IR829 Hardened WAN GE 4G LTE secure platform multi-mode Global (Australia) LTE/HSPA+ with 802.11n, PoE, Australia Compliant |
| IR829GW-LTE-ST-AK9                             | IR829 Hardened WAN GE 4G LTE secure platform multi-mode Sprint LTE/DoRa with 802.11n, PoE, FCC compliant                    |
| Cisco Industrial Router (IR) 910               |   |
| ACC-IR910-H-M=                                 | Cisco IR910 IP55 Enclosure  |
| ACC-IR910-W-M=                                 | Cisco IR910 Sensor Module Mount Kit   |
| IR910G-NA-K9                                   | Cisco IR910 3G Sku for North America  |
| Cisco ASR 903 Systems                          |   |
| ASR-903  | ASR 903 Series Router Chassis   |
| A903-FAN=                                      | ASR 903 FAN Tray, Spare   |
| A903-RCKMNT-19IN=                              | ASR 903 EIA /JIS 19in Rack Mount Kit, Spare   |
| A903-RCKMNT-ETSI=                              | ETSI Rack mount Option for the Cisco ASR 903, Spare   |

| Cisco ASR 900 Common Equipment       |   |
|--------------------------------------|---|
| A900-PWR550-A=                       | ASR 900 550W AC Power Supply, Spare                         |
| A900-PWR550-D-E=                     | ASR 900 550W Enhanced DC Power Supply, Spare                |
| Cisco ASR 900 Route Switch Processor |   |
| A900-RSP2A-128=                      | ASR 900 Route Switch Processor 2 - 128G, Base Scale, Spare  |
| A900-RSP2A-64=                       | ASR 900 Route Switch Processor 2 - 64G, Base Scale, Spare   |
| A903-RSP1A-55=                       | ASR 903 Route Switch Processor 1, Base Scale, Spare         |
| A903-RSP1B-55=                       | ASR 903 Route Switch Processor 1, Large Scale, Spare        |
| Cisco ASR 900 Interface Modules      |   |
| A900-IMA16D=                         | ASR 900 16 port T1/E1 Interface Module, Spare               |
| A900-IMA1X=                          | ASR 900 1 port 10GE XFP Interface Module, Spare             |
| A900-IMA2Z=                          | ASR 900 2 port 10GE SFP+/XFP Interface Module, Spare        |
| A900-IMA4OS=                         | ASR 900 4 OC3/STM1 or 1 OC12/STM4 Interface Module, Spare   |
| A900-IMA8S1Z=                        | ASR 900 Combo 8 port SFP GE and 1 port 10GE IM, Spare       |
| A900-IMA8S=                          | ASR 900 8 port SFP Gigabit Ethernet Interface Module, Spare |
| A900-IMA8T1Z=                        | ASR 900 Combo 8 port 10/100/1000 and 1 port 10GE IM, Spare  |
| A900-IMA8T=                          | ASR 900 8 port 10/100/1000 Ethernet Interface Module, Spare |
| A900-IMASER14A/S=                    | ASR 900 14 port Sync/Async Interface Module, Spare          |

Table 11. Industrial Routers: Main Certifications and Compliances

| Product Family | EMI | EMC | EN 50 155 | FCC Part 15 | IEC 61850 | UL     | Hazardous Location | Manufacturing | Oil and Gas | Mining (facilities) | Utilities | Traffic Control | Railways | Marine | Public Safety | RoHS | CE Declaration | Service Provider | Australia | China | EU | India | Korea | US |   |
|----------------|-----|-----|-----------|-------------|-----------|--------|--------------------|---------------|-------------|---------------------|-----------|-----------------|----------|--------|---------------|------|----------------|------------------|-----------|-------|----|-------|-------|----|---|
| CGR 1000       | X   | X   |           | X           | X         | X(***) | X(*)               | X             | X           | X                   | X         | X               |          |        | X             | X    | X              | X                | X         | X     | X  | X     | X     | X  |   |
| CGR 2000       | X   | X   |           | X           | X         | X(***) | X(*)               | X             | X           | X                   | X         | X               |          |        | X             | X    | X              | X                | X         |       | X  | X     | X     | X  |   |
| IR 509         | X   | X   |           | X           | X         | X      | X(*)               |               |             |                     | X         |                 |          |        | X             | X    | X              | X                | X         | X     |    |       |       | X  |   |
| ISR 819H       | X   | X   | X         | X           |           | X      |                    | X             | X           | X                   |           |                 | X        |        | X             | X    | X              | X                | X         | X     | X  | X     | X     | X  | X |
| IR 809         | X   | X   | X         | X           | X         | X      | X(*)               | X             | X           | X                   | X         | X               | X        | X      | X             | X    | X              | X                | X         |       | X  |       |       | X  |   |
| IR 829         | X   | X   | X         | X           | X         | X      | X(*)               | X             | X           | X                   | X         | X               | X        | X      | X             | X    | X              | X                | X         | X     | X  | X     | X     | X  |   |
| IR 910         | X   | X   |           | X           |           | X      |                    |               |             |                     |           |                 |          |        | X             | X    | X              | X                |           | X     | X  | X     |       | X  |   |
| ASR 903        | X   | X   |           | X           | X         | X      |                    | X             | X           | X                   | X         |                 |          |        | X             | X    | X              | X                | X         | X     | X  | X     | X     | X  | X |

(\*): requires cabinet enclosure

(\*\*\*): CUL

**Table 12.** Industrial Wireless: Available Models and Options (Product IDs – Descriptions)

| Cisco Industrial Wireless IW3700 Series Access Points |  |
|---|--|
| IW3702-2E-UXK9  | 2 antenna connectors on top and bottom for pole or wall mounting with direct attach antennas |
| IW3702-4E-UXK9  | 4 antenna connectors on one side for convenience in cabinet mount cabled scenarios           |
| Cisco Aironet 1530 Series Outdoor Access Points       |  |
| AIR-CAP1532E-x-K9                                     | 802.11n Low-Profile Outdoor AP, External Ant., x Reg Dom.                                    |
| AIR-CAP1532I-x-K9                                     | 802.11n Low-Profile Outdoor AP, Internal Ant., x Reg Dom.                                    |
| Cisco Aironet 1550 Series Outdoor Access Point        |  |
| AIR-CAP1552C-x-K9                                     | 802.11N Outdoor Mesh Access Point, Cable Modem, Internal Antenna                             |
| AIR-CAP1552C-x-K9G                                    | 802.11N Outdoor Mesh Access Point, Cable Modem, Internal Ant., w/ GPS                        |
| AIR-CAP1552CU-x-K9                                    | 802.11N Outdoor Mesh Access Point, Cable Modem, Single band Ext. Antenna                     |
| AIR-CAP1552CU-xK9G                                    | 802.11N Outdoor Mesh Access Point, Cable Modem, Single band Ext. Ant., w/ GPS                |
| AIR-CAP1552E-x-K9                                     | 802.11N Outdoor Mesh Access Point, Dual band Ext. Antenna                                    |
| AIR-CAP1552E-x-K9G                                    | 802.11N Outdoor Mesh Access Point, Dual band Ext. Ant., w/ GPS                               |
| AIR-CAP1552EU-x-K9                                    | 802.11N Outdoor Mesh Access Point, Single Band Ext. Antenna                                  |
| AIR-CAP1552EU-xK9G                                    | 802.11N Outdoor Mesh Access Point, Single Band Ext. Ant., w/ GPS                             |
| AIR-CAP1552H-x-K9                                     | 802.11N Outdoor Mesh Access Point, Hazardous Locations                                       |
| AIR-CAP1552I-x-K9                                     | 802.11N Outdoor Mesh Access Point, Dual band, Internal Antenna                               |
| AIR-CAP1552SA-x-K9                                    | 802.11n Outdoor Access Point w/ISA100 Gateway, AC  |
| AIR-CAP1552SD-x-K9                                    | 802.11n Outdoor Access Point w/ISA100 Gateway, DC  |
| AIR-CAP1552WU-x-K10                                   | 802.11n Outdoor Access Point w/WiHartGateway, DC   |
| Cisco Aironet 1570 Series Outdoor Access Point        |  |
| AIR-AP1572EAC-x-K9                                    | AP 1572EAC, E: External Antennas, AC: AC power   |
| AIR-AP1572EC1-x-K9                                    | AP 1572EC1, E: External Antennas, C1: Cable Backhaul; NA-DOCSIS 42/88 MHz                    |
| AIR-AP1572EC2-x-K9                                    | AP 1572EC2, E: External Antennas, C2: Cable Backhaul; NA-DOCSIS 85/108 MHz                   |
| AIR-AP1572EC3-x-K9                                    | AP 1572EC3, E: External Antennas, C3: Cable Backhaul; Euro-DOCSIS 65/108 MHz                 |
| AIR-AP1572EC4-x-K9                                    | AP 1572EC4, E: External Antennas, C4: Cable Bachhaul; Japan-DOCSIS 65/108 MHz                |
| AIR-AP1572IC1-x-K9                                    | AP 1572IC1, I: Internal Antennas, C1: Cable Backhaul; NA-DOCSIS 42/88 MHz                    |
| AIR-AP1572IC2-x-K9                                    | AP 1572IC2, I: Internal Antennas, C2: Cable Backhaul; NA-DOCSIS 85/108 MHz                   |
| AIR-AP1572IC3-x-K9                                    | AP 1572IC3, I: Internal Antennas, C3: Cable Backhaul; Euro-DOCSIS 65/108 MHz                 |
| AIR-AP1572IC4-x-K9                                    | AP 1572IC4, I: Internal Antennas, C4: Cable Bachhaul; Japan-DOCSIS 65/108 MHz                |

**Table 13.** Industrial Wireless: Main Certifications and Compliances

| Product Family | EMI | EMC | EN 50155 | FCC Part 15 | UL 60950 | Hazardous Location | Manufacturing | Oil and Gas | Mining (facilities) | Utilities | Traffic Control | Railways | Public Safety | RoHS | CE Declaration | Service Provider | Australia | China | EU | India | Korea | US |
|----------------|-----|-----|----------|-------------|----------|--------------------|---------------|-------------|---------------------|-----------|-----------------|----------|---------------|------|----------------|------------------|-----------|-------|----|-------|-------|----|
| IW 3700        | X   | X   | X        | X           | X        | X                  | X             | X           | X                   | X         | X               | X        | X             | X    | X              | X                | X         | X     | X  | X     | X     |    |
| Aironet 1530   | X   | X   |          | X           | X        |                    | X             |             |                     |           |                 |          | X             | X    | X              | X                | X         |       | X  |       | X     | X  |
| Aironet 1550   | X   | X   |          | X           | X        | X(*)               | X             | X           | X                   | X         |                 |          |               | X    | X              | X                | X         | X     | X  | X     | X     | X  |
| Aironet 1570   | X   | X   |          | X           | X        |                    | X             |             | X                   |           | X               |          | X             | X    | X              | X                | X         | X     | X  | X     | X     | X  |

(\*) subset of PIDs in family

**Table 14.** Embedded Networks: Available Models and Options (Product IDs – Descriptions)

| <b>Cisco Embedded Service 2020 Series Switches</b>           |  |
|--|--|
| ESS-2020-16TC-NCP  | Embedded Service 2020 Switch, Expansion board, No cooling plate                |
| ESS-2020-16TC-CON  | Embedded Service 2020 Switch, Expansion board, Conduction cooled               |
| ESS-2020-NCP   | Embedded Service 2020 Switch, Main board, No cooling plate, LAN Lite software  |
| ESS-2020-CON   | Embedded Service 2020 Switch, Main board, Conduction cooled, LAN Lite software |
| ESS-2020-NCP-B   | Embedded Service 2020 Switch, Main board, No cooling plate, LAN Base software  |
| ESS-2020-CON-B   | Embedded Service 2020 Switch, Main board, Conduction cooled, LAN Base software |
| <b>Cisco 5915/Cisco 5940 Embedded Services Router Series</b> |  |
| CISCO5915RA-K9   | Cisco 5915 ESR - PC104, Rugged, Air-cooled                                     |
| CISCO5915RC-K9   | Cisco 5915 ESR - PC104, Rugged, Conduction-cooled                              |
| CISCO5940RA-K9   | Cisco 5940 - cPCI, 3U, Rugged, Air-cooled/AES                                  |
| CISCO5940RC-K9   | Cisco 5940 - cPCI, 3U, Rugged, Conduction-cooled/AES                           |
| CISCO5940-RTM  | Cisco 5940 - cPCI, 3U, Rear Transition Module                                  |
| <b>Cisco 5921 Embedded Services Router</b>                   |  |
| CISCO5921-K9   | Cisco 5921 Embedded Services Router SW for x86 processor                       |

## Security

Cyber Security

| ISA-3000-2C2F-K9=  | <b>Cisco Industrial Ethernet 2000U Series Switches</b>             |
|--|--|
| <b>Table 15.</b> IP Cameras: Available Models and Options (Product IDs – Descriptions) |  |
| <b>Cisco IP Camera</b>   |  |
| CIVS-IPC-2830  | Cisco Video Surveillance SD Outdoor IP PTZ Camera, NTSC            |
| CIVS-IPC-2835  | Cisco Video Surveillance SD Outdoor IP PTZ Camera, PAL             |
| CIVS-IPC-3520  | Cisco Video Surveillance IP Dome Body, Indoor, 1MP DN, IO          |
| CIVS-IPC-3535  | Cisco Video Surveillance IP Dome Body, Outdoor, 1.3MP DN, IO       |
| CIVS-IPC-6000P   | HD Box IP Camera, 1080P, P-Iris                                    |
| CIVS-IPC-6020  | Cisco Video Surveillance IP Camera, Indoor HD Dome Body            |
| CIVS-IPC-6030  | Cisco Video Surveillance IP Camera, Outdoor VR HD Dome Body        |
| CIVS-IPC-6050  | Cisco Video Surveillance IP Camera, Outdoor, Ruggedized, M12       |
| CIVS-IPC-6400E   | Cisco Video Surveillance IP Camera, HD Bullet Camera, VR, IR       |
| CIVS-IPC-6500PD  | HD Box IP Camera, 1080P, P-Iris, DSP                               |
| CIVS-IPC-6930  | Cisco Video Surveillance HD Outdoor IP PTZ Camera                  |
| CIVS-IPC-7030  | Cisco Video Surveillance 5MP IP Outdoor Dome Camera                |
| CIVS-IPC-7030E   | Cisco Video Surveillance 5MP IP Outdoor Dome Camera, IR            |
| CIVS-IPC-7530PD  | Cisco Video Surveillance 5MP IP Outdoor Dome Camera, DSP, IR       |
| CIVS-IPC-7070  | Cisco Video Surveillance IP Camera 5MP IP 360° Outdoor Dome Camera |
| CIVS-IPC-3050  | Cisco Video Surveillance IP Dome Transportation                    |
| CIVS-SENC-4P   | Video Encoder, 4-port, Standalone                                  |
| CIVS-SENC-8P   | Video Encoder, 8-port, Standalone                                  |

**Table 16.** Video Surveillance Manager: Available Models and Options (Product IDs – Descriptions)

| Cisco Video Surveillance Manager |  |
|----------------------------------|--|
| FL-CPS-MS-SW7                    | License for One Media Server   |
| FL-CPS-OM-SW7                    | License for One Operations Manager   |
| L-CPS-MS-SW7=                    | eDelivery License for One Media Server   |
| L-CPS-OM-SW7=                    | eDelivery License for One Operations Manager                                   |
| L-CPS-SASD-7=                    | eDelivery License for 1 Safety and Security Desktop with VSM7                  |
| L-CPS-VSM7-1CAM=                 | eDelivery License for 1 Camera Connection with VSM7                            |
| L-CPS-VSMS7-B-VM=                | eDelivery License for one Media Server on B-Series                             |
| L-CPS-VSMS7-C-VM=                | eDelivery License for one Media Server on C-Series                             |
| L-CPS-VSMS7-E-VM=                | eDelivery License for one Media Server on E-Series                             |
| L-CPS-VSOM7-B-VM=                | eDelivery License for one Operations Manager on B-Series                       |
| L-CPS-VSOM7-C-VM=                | eDelivery License for one Operations Manager on C-Series                       |
| L-CPS-VSOM7-E-VM=                | eDelivery License for one Operations Manager on E-Series                       |
| L-CPS-VSMX7=                     | eDelivery License for Video Surveillance Manager Express limited to 32 cameras |
| L-CPS-VSMX7-UPG=                 | eDelivery License to upgrade from VSM Express to VSM                           |
| L-CPS-VSM7-FD=                   | eDelivery License for base Federator, purchased for each Federator installed   |
| L-CPS-FD-VSOM=                   | eDelivery License for one VSOM in Federator                                    |
| L-CPS-FD-VSOM-X=                 | eDelivery License for one VSOM Express in Federator                            |

**Table 17.** Physical Access Manager: Available Models and Options (Product IDs – Descriptions)

| Cisco Physical Access Manager |   |
|-------------------------------|---|
| <b>Hardware Appliance</b>     |   |
| CPS-MSP-1RU-K9                | Cisco Multiservices Platform Server, 1-RU MSP assembly                                  |
| CIVS-HDD-1000                 | 1 TB SATA drive for CIVS-MSP  |
| CIVS-CAB-16-CE                | CIVS C16 power cable for Europe (CE)  |
| CIVS-CAB-16-CI                | CIVS C16 power cable for Italy (CI)   |
| CIVS-CAB-16-CU                | CIVS C16 power cable for UK (CU)  |
| CIVS-CAB-16- AC               | CIVS C16 power cable for North America (AC)   |
| CIAC-PAME-M1X-K9              | Cisco Physical Access Manager Software  |
| <b>Virtual Appliance</b>      |   |
| R-CIAC-PAME-VM-K9=            | Downloadable OVF virtual appliance in the form of a single file with the extension .OVA |
| <b>Spare PIDs</b>             |   |
| <b>Via Physical Delivery</b>  |   |
| CIAC-PAME-BD=                 | Cisco Physical Access Manager Badge Designer and Enroller                               |
| CIAC-PAME-HA=                 | Cisco Physical Access Manager High-Availability License                                 |
| CIAC-PAME-M64=                | Cisco Physical Access Manager 64-Module Capacity Upgrade License                        |
| CIAC-PAME-M128=               | Cisco Physical Access Manager 128-Module Capacity Upgrade License                       |
| CIAC-PAME-M512=               | Cisco Physical Access Manager 512-Module Capacity Upgrade License                       |
| CIAC-PAME-M1024=              | Cisco Physical Access Manager 1024-Module Capacity Upgrade License                      |
| CIAC-PAME-EDI=                | Cisco Physical Access Manager Enterprise Data Integration License                       |
| CIAC-PAME-WSAPI=              | Cisco Physical Access Manager Web Services API License                                  |

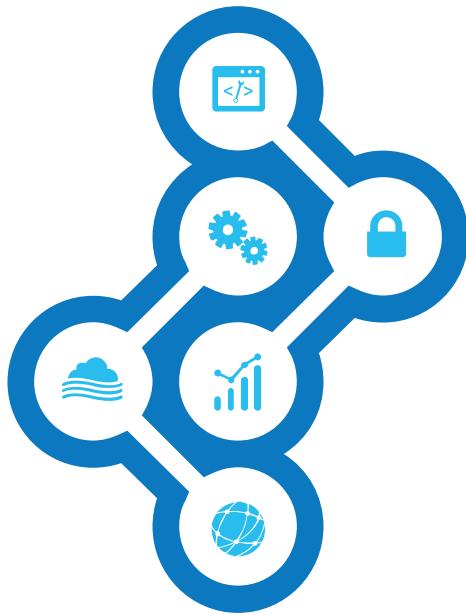
### Cisco Physical Access Manager

#### Via E-Delivery

|                    |  |
|--------------------|--|
| L-CIAC-PAME-BD=    | Cisco Physical Access Manager Badge Designer and Enroller          |
| L-CIAC-PAME-HA=    | Cisco Physical Access Manager High-Availability License            |
| L-CIAC-PAME-M64=   | Cisco Physical Access Manager 64-Module Capacity Upgrade License   |
| L-CIAC-PAME-M128=  | Cisco Physical Access Manager 128-Module Capacity Upgrade License  |
| L-CIAC-PAME-M512=  | Cisco Physical Access Manager 512-Module Capacity Upgrade License  |
| L-CIAC-PAME-M1024= | Cisco Physical Access Manager 1024-Module Capacity Upgrade License |
| L-CIAC-PAME-EDI=   | Cisco Physical Access Manager Enterprise Data Integration License  |
| L-CIAC-PAM-WSAPI=  | Cisco Physical Access Manager Web Services API License             |

For more information, visit: <http://iwe.cisco.com/web/internet-of-things/iot-system>.





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