# Cisco Industrial Ethernet 3000 Layer 2/Layer 3 Series Switches

## Product Overview

The Cisco® Industrial Ethernet 3000 Series (IE 3000 Series) is a family of Layer 2 and Layer 3 switches that bring Cisco's leadership in switching to Industrial Ethernet applications with Innovative features, robust security, and superior ease of use. The Cisco IE 3000 Series features:

- Industrial design and compliance

- Tools for easy deployment, management, and replacement

- Network security based on open standards

- Integration of IT and industrial automation networks

The Cisco IE 3000 Series is an ideal product for Industrial Ethernet applications, including factory automation, energy and process control, and intelligent transportation systems (ITSs).

The Cisco IE 3000 offers:

- Design for Industrial Ethernet applications, including extended environmental, shock/vibration, and surge ratings; a complete set of power input options; convection cooling; and DIN-rail or 19" rack mounting

- Support for hundreds of hardware configurations

- Easy setup and management using the Cisco Device Manager web interface and supporting tools, including Cisco Network Assistant and CiscoWorks

- Easy switch replacement using removable memory, allowing the user to replace a switch without having to reconfigure

- High availability, guaranteed determinism, and reliable security using Cisco IOS® Software

- Recommended software configurations for industrial applications that can be applied at the touch of a button

- Compliance to a wide range of Industrial Ethernet specifications covering industrial automation, ITS, substation, railway, and other markets

- Support for IEEE1588v2, a precision timing protocol with nanosecond-level precision for high-performance applications

- Improved ring resiliency with the support of Resilient Ethernet Protocol (REP)

- Transparent IT integration with the support of Layer 3 routing protocols (IP Services)

- PROFINET v2 certification, with PROFINET conformance class B compliance

- ABB Industrial IT certification

## Configurations

The Cisco IE 3000 Series includes the following products (refer to Table 1):

- **Cisco IE-3000-4TC**: Industrial Ethernet switch with four Ethernet 10/100 ports and two dual-purpose uplink ports (a dual-purpose port has one 10/100/1000BaseTX port and one Small Form-Factor Pluggable [SFP] port, port active), Layer 2 Lan Base image included

- **Cisco IE-3000-8TC**: Industrial Ethernet switch with eight Ethernet 10/100 ports and two dual-purpose uplink ports, Layer 2 Lan Base image included

- **Cisco IE-3000-4TC-E**: Industrial Ethernet switch with four Ethernet 10/100 ports and two dual-purpose uplink ports (a dual-purpose port has one 10/100/1000BaseTX port and one SFP port, port active), Layer 3 IP Services image included
- **Cisco IE-3000-8TC-E**: Industrial Ethernet switch with eight Ethernet 10/100 ports and two dual-purpose uplink ports, IP Services image included
- **Cisco IEM-3000-8TM=:** Expansion module for Cisco IE-3000-4TC, Cisco IE-3000-8TC, Cisco IE-3000-4TC-E, and Cisco IE-3000-8TC-E with eight Ethernet 10/100 ports
- **Cisco IEM-3000-8FM=:** Expansion module for Cisco IE-3000-4TC, Cisco IE-3000-8TC, Cisco IE-3000-4TC-E, and Cisco IE-3000-8TC-E with eight 100BaseFX ports
- **Cisco PWR-IE3000-AC=:** Expansion module supporting AC and extended DC power inputs

## Solution Specifications



The Cisco IE 3000 Series software, based on Cisco IOS Software, is a rich suite of intelligent services, supporting high availability, quality of service (QoS), and security features. The SFP-based uplink ports accommodate a range of industrial-grade SFP transceivers, including 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, 100BASE-FX, and 100BASE-LX10.

**Table 1.**     Cisco IE 3000 Switches

| Description | Specification |
|---|---|
| **Cisco IE-3000-4TC-E**<br> | • 4 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and one SFP-based Gigabit Ethernet port, one port active)<br>• Each switch supports two (2) Cisco IEM-3000-8TM= modules, one (1) Cisco IEM-3000-8FM= module, or one (1) Cisco IEM-3000-8TM= module and one (1) Cisco IEM-3000-8FM= module<br>• IP Services image |
| **Cisco IE-3000-8TC-E**<br> | • 8 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has one 10/100/1000 Ethernet port and one SFP-based Gigabit Ethernet port, one port active)<br>• Each switch supports two (2) Cisco IEM-3000-8TM= modules, one (1) Cisco IEM-3000-8FM= module, or one (1) Cisco IEM-3000-8TM= module and one (1) Cisco IEM-3000-8FM= module<br>• IP Services image |
| **Cisco IEM-3000-8TM=**<br> | • Expansion Module for Cisco IE-3000-4TC-E and Cisco IE-3000-8TC Switches, 8 10/100 TX ports |

| Description | Specification |
|---|---|
| **Cisco IEM-3000-8FM=** | • |

**Table 2.** Features and Benefits of Cisco IE 3000 Series

| Category | Feature/Benefit |
|---|---|
| **Designed for industrial applications** | • Extended temperature, vibration, shock and surge, and noise immunity ratings comply to specifications for automation, ITS, and substation environments. |
| | • Compact, PLC-style form factor is ideal for deployment in industrial environments. |
| | • DIN-rail, wall, and 19" rack mount options allow for deployments in a variety of control systems. |
| | • Variety of power input options covers a wide range of power requirements for Industrial Ethernet applications. |
| | • Up to 300 deployment configurations, supporting a range of access port densities, copper and fiber uplinks, fiber access ports, and power input, deliver flexibility in deployment. |
| | • Support for SFP modules provides uplink connectivity supporting 100BASE-LX, 100BASE-FX, 1000BASE-SX, 1000BASE-LX, and 1000BASE-ZX options. |
| | • Alarm relay contacts can be used for an external alert system. |
| **Ease of deployment, management, and replacement** | • Cisco Express Setup simplifies initial configuration with a web browser, eliminating the need for more complex terminal emulation programs. |
| | • Cisco Smartports templates provide the option to apply a default global or interface-level macro with a recommended configuration, allowing the user to easily set up the switch in a configuration optimized for the specific application. |
| | • Smartports templates for Ethernet/IP provide an optimized setup for these Industrial Ethernet protocols at the touch of a button. |
| | • Swappable Flash memory is ideal for quick and easy switch replacement. Memory can be moved from one switch to another, so a switch can be replaced without the need to reconfigure software features. |
| | • The Common Industrial Protocol (CIP) management objects are supported, including a custom profile for primary Ethernet switch features. The Cisco IE 3000 can be managed by CIP-based management tools, allowing the user to manage an entire industrial automation system with one tool. |
| | • The Cisco IE 3000 can be managed by PROFINET based management tools. The IE 3000 has PROFINET v2 certification, with PROFINET conformance class B compliance. |
| | • Simple Network Management Protocol (SNMP) (v1/v2/v3) support allows for management using traditional IT-based management tools, including CiscoWorks. |
| | • Device Manager allows web-based switch configurations. |
| | • DHCP port-based allocation retains the IP address on a per port basis and simplifies the end-host replacement in an industrial setting. |
| | • HTTPS access |
| | • Cisco Network Assistant is a no-charge, Windows-based application that simplifies the administration of networks of up to 250 users. It supports the Cisco IE 3000 and a wide range of Cisco Catalyst® intelligent switches. With Cisco Network Assistant, users can manage Cisco Catalyst switches and launch the device managers of Cisco integrated services routers and Cisco Aironet® WLAN access points. Configuration wizards need just a few user inputs to automatically configure the switch to optimally handle different types of traffic: control, voice, video, multicast, and high-priority data. |
| **Availability and scalability** | • Virtual LANs (VLANs) allow for logical segmentation for a network for optimal use of bandwidth. |
| | • QoS classifies and prioritizes data, guaranteeing determinism for mission-critical data. |
| | • IGMPv3 snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive traffic to only the requestors. An additional querier allows this operation in a Layer 2 only environment. |
| | • IGMP filtering provides multicast authentication by filtering out no subscribers and limits the number of concurrent multicast streams available per port. |
| | • Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. |
| | • IEEE 802.1d Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. |
| | • EtherChannel LACP support for quick recovery and bandwidth utilization |
| | • FlexLinks for fast recovery |
| | • Cisco Hot Standby Router Protocol (HSRP) is supported to create redundant, failsafe routing topologies. |
| | • Resilient Ethernet Protocol, scalable up to 130 nodes with a very fast convergence, 50ms. |
| **Security** | • IEEE 802.1x with VLAN assignment, guest VLAN, and voice VLAN allows dynamic port-based security, providing user authentication. |
| | • Port-based ACLs for Layer 2 interfaces allow application of security policies on individual switch ports. |
| | • MAC address filtering prevents the forwarding of any type of packet with a matching MAC address. |
| | • Secure Shell (SSH) Protocol v2 and SNMPv3 provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSHv2 and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions. |
| | • TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration. |
| | • MAC address notification allows administrators to be notified of users added to or removed from the network. |
| | • Dynamic Host Configuration Protocol (DHCP) snooping allows administrators to help ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database and to rate limit the amount of DHCP traffic that enters a switch port. |
| | • DHCP Interface Tracker (Option 82) augments a host IP address request with the switch port ID. |
| | • Port security secures the access to an access or trunk port based on MAC address. |

| Category | Feature/Benefit |
|---|---|
| | • After a specific time frame, the aging feature removes the MAC address from the switch to allow another device to connect to the same port. |
| | • Trusted Boundary provides the ability to trust the QoS priority settings if an IP phone is present and to disable the trust setting if the IP phone is removed, thereby preventing a malicious user from overriding prioritization policies in the network. |
| | • Up to 512 ACLs are supported, with two profiles: Security (384 Security ACL entries and 128 QoS policies) and QoS (128 Security ACL entries and 384 QoS polices). |
| | • Cisco standard and extended IP security router ACLs define security policies on routed interfaces for control-plane and data-plane traffic. |
| | • Dynamic ARP Inspection helps ensure user integrity by preventing malicious users from exploiting the insecure nature of the ARP protocol. |
| | • DHCP Snooping prevents malicious users from spoofing a DHCP server and sending out bogus addresses. This feature is used by other primary security features to prevent a number of other attacks such as ARP poisoning. |
| | • IP source guard prevents a malicious user from spoofing or taking over another user's IP address by creating a binding table between client's IP and MAC address, port, and VLAN. |
| | • Support for private VLANs |
| High-performance IP routing | • Inter-VLAN IP routing for full Layer 3 routing between 2 or more VLANs. |
| | • Basic IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], RIPv2 and RIPng). |
| | • Advanced IP unicast routing protocols (Open Shortest Path First [OSPF], Interior Gateway Routing Protocol [IGRP], Enhanced IGRP [EIGRP], Border Gateway Protocol Version 4 [BGPv4, IS-ISv4]) are supported for load balancing and constructing scalable LANs. |
| | • Protocol Independent Multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode. |
| | • Cisco Express Forwarding hardware routing architecture delivers extremely high-performance IP routing. |
| | • IPv6 routing (OSPFv6 and EIGRPv6) support in hardware for maximum performance. |
| | • Policy-based routing (PBR) allows superior control by facilitating flow redirection regardless of the routing protocol configured. |
| | • HSRP provides dynamic load balancing and failover for routed links; up to 32 HSRP links supported per unit. |
| | • Support for 1000 multicast groups. |
| | • VRF-Lite virtualization |

**Table 3.**    Cisco IE 3000 Series Switch Hardware

| Description | Specification |
|---|---|

| Description | Specification |
|---|---|
| **Weight** | • Cisco IE-3000-4TC, Cisco IE-3000-4TC-E: 4.4 lb (2.0 kg)<br>• Cisco IE-3000-8TC, Cisco IE-3000-8TC-E: 4.4 lb (2.0 kg)<br>• Cisco IEM-3000-8TM=: 2.2 lb (1.0 kg)<br>• Cisco IEM-3000-8FM=: 3.2 lb (1.45 kg)<br>• Cisco PWR-IE3000-AC=: 1.4 lb (0.65 kg) |
| **Environmental ranges** | • Operating temperature: -40 to 167ºF (–40 to 75ºC)<br>• Storage temperature: -13 to 185ºF (–25 to 85ºC)<br>• Operating relative humidity: 10 to 95% (condensing)<br>• Operating altitude: Up to 10,000 ft (3049m)<br>• Storage altitude: Up to 15,000 ft (4573m) |
| **Mean time between failure (MTBF)** | • Cisco IE-3000-4TC, Cisco IE-3000-4TC-E: 363,942<br>• Cisco IE-3000-8TC, Cisco IE-3000-8TC-E: 329,451<br>• Cisco IEM-3000-8TM=: 926,999<br>• Cisco IEM-3000-8FM=: 264,689<br>• Cisco PWR-IE3000-AC=: 1,662,359 |

**Table 4.**    Power Specifications for Cisco IE300 Series Switch

| Description | Specification |
|---|---|
| **Maximum power consumption** | • 15.1W (IE-3000-4TC, IE-3000-4TC-E)<br>• 15.7W (IE-3000-8TC, IE-3000-8TC-E)<br>• 2.8W (IEM-3000-8TM=)<br>• 10.1W (IEM-3000-8FM=) |
| **Input voltage and currents supported** | • 18-60VDC, (Cisco IE-3000-4TC, Cisco IE-3000-8TC, Cisco IE-3000-4TC-E and Cisco IE-3000-8TC-E)<br>• 85-265VAC/88-300VDC, 1.3-0.8A, 50-60 Hz (with addition of Cisco PWR-IE3000-AC=) |
| **Power rating** | • Cisco IE-3000-4TC, Cisco IE-3000-4TC-E: .05KVA<br>• Cisco IE-3000-8TC, Cisco IE-3000-8TC-E: .05KVA |

**Table 5.**    Management and Standards Support for Cisco IE 3000 Series Switch

| Description | Specification | |
|---|---|---|
| Standards | • 100BASE-X (SFP)<br>• 1000BASE-X (SFP)<br>• 1000BASE-SX<br>• 1000BASE-LX/LH<br>• 1000BASE-ZX<br>• RMON I and II standards<br>• SNMPv1, SNMPv2c, and SNMPv3 | • 100BASE-X (SFP)<br>• 1000BASE-X (SFP)<br>• 1000BASE-SX<br>• 1000BASE-LX/LH<br>• 1000BASE-ZX<br>• RMON I and II standards<br>• SNMPv1, SNMPv2c, and SNMPv3 |

**Table 6.**    Compliance Specifications

| Description | Specification |
|---|---|
| **Standard safety certifications** | • UL to UL 60950-1<br>• cUL to CAN/CSA C22.2 No. 60950-1<br>• TUV/GS to EN 60950-1<br>• CB to IEC 60950-1 with all country deviations<br>• NOM (through partners)<br>• CE Marking |
| **Industrial safety certifications** | • UL 508<br>• CSA C22.2 No. 142 |
| **Mechanical stability** | • Shock—20g (operational), 30g (nonoperational) |
| **EMC interface immunity** | • IEC61000-4-2 [Criteria A—Class 2]<br>• IEC61000-4-3/ENV50204 [Criteria A]<br>• IEC61000-4-4 [Criteria A / Criteria B]<br>• IEC61000-4-5 [Criteria B]<br>• IEC61000-4-6 [Criteria A] |

| Description | Specification |
|---|---|
| Standard electromagnetic emissions certifications | • FCC Part 15 Class A<br>• EN 55022: 1998 (CISPR22)<br>• EN 55024: 1998 (CISPR24)<br>• VCCI Class A<br>• AS/NZS 3548 Class A<br>• CE<br>• CNS 13438 Class A<br>• MIC |
| Industrial electromagnetic emissions certifications | • EN 50081-2<br>• EN 50082-2<br>• EN 61131-2<br>• EN 61326-1<br>• CISPR11<br>• IEC 60533 |
| Industry specifications | • IEC 61850-3 (Substations)<br>• IEEE1613 (Substations)<br>• NEMA TS-2 (ITSs)<br>• EN50155 (Railway)<br>• ODVA Common Industrial Protocol<br>• IEEE 1588v2 |
| Hazardous locations | • UL 1602 Class 1, Div 2 A-D<br>• CSA 22.2 / 213 Class 1, Div 2 A-D<br>• IEC 60079-15<br>• EN 50021 – Class 1, Zone 2 |
| Telco | Common Language Equipment Identifier (CLEI) code |
| Warranty | One year limited warranty |

## Service and Support

Cisco is committed to minimizing total cost of ownership (TCO). The company offers a portfolio of technical support services to help ensure that its products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 7 are available as part of the Cisco Desktop Switching Service and Support solution and are available directly from Cisco and through resellers.

**Table 7.**    Cisco Services and Support Programs

| Service and Support | Features | Benefits |
|---|---|---|
| **Advanced Services** | | |
| • Cisco Total Implementation Solutions (TIS), available direct from Cisco<br>• Cisco Packaged TIS, available through resellers<br>• Cisco SMARTnet® and SMARTnet Onsite support, available direct from Cisco<br>• Cisco Packaged SMARTnet support program, available through resellers<br>• Cisco SMB Support Assistant | • Project management<br>• Site survey, configuration, and deployment<br>• Installation, text, and cutover<br>• Training<br>• Major moves, adds, and changes<br>• Design review and product staging<br>• Access to software updates 24 hours<br>• Web access to technical repositories<br>• Telephone support through the Cisco Technical Assistance Center (TAC)<br>• Advance replacement of hardware parts | • Supplements existing staff<br>• Helps ensure that functions meet needs<br>• Mitigates risk<br>• Helps enable proactive or expedited issue resolution<br>• Lowers TCO by taking advantage of Cisco expertise and knowledge<br>• Minimizes network downtime |

## Ordering Information

Table 8 gives ordering information for the Cisco IE 3000 Series.

**Table 8.**     Ordering Information for Cisco IE 3000 Series

| Part Number | Description |
|---|---|
| IE-3000-4TC | • Industrial Ethernet switch<br>• 4 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has 1 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active)<br>• Each switch supports 2 Cisco modules, 1 Cisco IEM-3000-8FM= module, or 1 Cisco IEM-3000-8TM= module and 1 Cisco IEM-3000-8FM= module<br>• Layer 2 Lan Base image installed |
| IE-3000-8TC | • Industrial Ethernet switch<br>• 8 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has 1 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active)<br>• Each switch supports 2 Cisco IEM-3000-8TM= modules, 1 Cisco IEM-3000-8FM= module, or 1 Cisco IEM-3000-8TM= module and 1 Cisco IEM-3000-8FM= module<br>• Layer 2 Lan Base image installed |
| IE-3000-4TC-E | • Industrial Ethernet switch<br>• 4 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has 1 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active)<br>• Each switch supports 2 Cisco modules, 1 Cisco IEM-3000-8FM= module, or 1 Cisco IEM-3000-8TM= module and 1 Cisco IEM-3000-8FM= module<br>• Layer 3 IP Services image installed |
| IE-3000-8TC-E | • Industrial Ethernet switch<br>• 8 Ethernet 10/100 ports and 2 dual-purpose uplinks (each dual-purpose uplink port has 1 10/100/1000 Ethernet port and 1 SFP-based Gigabit Ethernet port, 1 port active)<br>• Each switch supports 2 Cisco IEM-3000-8TM= modules, 1 Cisco IEM-3000-8FM= module, or 1 Cisco IEM-3000-8TM= module and 1 Cisco IEM-3000-8FM= module<br>• Layer 3 IP Services image installed |
| IEM-3000-8TM= | • Expansion module for Cisco IE-3000-4TC-E and Cisco IE-3000-8TC switches<br>• 8 10/100 TX ports |
| IEM-3000-8FM= | • Expansion module for Cisco IE-3000-4TC-E and Cisco IE-3000-8TC switches<br>• 8 100 FX ports |
| PWR-IE3000-AC= | • Expansion power module for Cisco IE-3000-4TC-E and Cisco IE-3000-8TC switches<br>• Supports 110/220VAC and 90-300VDC (base switches support 18VDC-60VDC) |
| GLC-LX-SM-RGD= | Gigabit Ethernet SFP, LC connector, LH (1Gps single mode) transceiver |
| GLC-SX-MM-RGD= | Gigabit Ethernet SFP, LC connector, SX (1Gps multimode) transceiver |
| GLC-ZX-SM-RGD= | Gigabit Ethernet SFP, LC connector, ZX (1Gpbs single mode, 70km) transceiver |
| GLC-FE-100FX-RGD= | Fast Ethernet SFP, LC connector, FX (100Mb/s multimode) transceiver |
| GLC-FE-100LX-RGD= | Fast Ethernet SFP, LC connector, LX (100Mb/s single mode) transceiver |
| CAB-SM-LCSC-1M | 1m-fiber single-mode LC-to-SC connectors |
| CAB-SM-LCSC-5M | 5m-fiber single-mode LC-to-SC connectors |
| CF-IE3000= | IE 3000 Compact Flash |
| PWR-IE3000-CLP= | IE 3000 Power Transformer Spare connector clip |
| PWR-IE3000-CNCT= | IE 3000 Power Spare connector |
| LPNL-IE3000= | IE 3000 Left Panel Spare |
| RPNL-IE3000= | IE 3000 Right Panel Spare |
| DINCLP-IE3000= | Din-rail clip 4 pack Spare |
| BMP-IE3000= | Din-rail clip bumper 4 pack Spare |
| STK-RACKMNT-2955= | Din-rail adapter for rack mounting |