Today’s Meeting

Your phone will be on mute during the webinar.

You can use the “Chat” function to communicate with the host or panelist.

Use the Q&A panel to submit your question.

This session is being recorded on WebEx.
Agenda

- Presenters Introduction
- Quick review existing IoT Products
- IE4000
  - Configuration
  - Hardware overview
  - Software features
  - Use Case
- Resources information

Special Guest Speakers

Marc-Andre Oriani
Product Manager

Albert Mitchell
Technical Marketing Engineer

Ted Demeris
IoT Channels BDM US and Canada

Willie Chow
IoT GTM Technical Lead
The Internet of Everything

People
Connecting people in more relevant and valuable ways.

Process
Delivering the right information to the right person (or machine) at the right time.

Data
Leveraging data into more useful information for decision making.

Things
Physical devices and objects connected to the Internet and each other for intelligent decision making.

People-to-People + People-to-Machine + Machine-to-Machine
How the Network Solves Challenges and Creates Opportunities: An Aluminum Company

Extract bauxite from mine
Networked video and incident response improve safety and security

Transport ore to smelting facility
819 ruggedized routers track train cars and truck fleets

On-site generator for power
Connected Grid: makes possible selling energy to grid

Aluminum is fabricated into parts and products
Converged plant-wide Ethernet systems enable faster re-tooling and order processing

Products transported to customers
M2M solutions: new customer experiences and business continuity

Common Network for Security, Integration, Predictability
If you think of the Internet in four generations, the fourth will be Internet of Things. It's going to be driven by businesses because businesses have to connect all the devices.

John Chambers
IoE Drives $19 Trillion In Value Over 10 Years

Private Sector
$14.4T
Includes both industry-specific and horizontal use cases.

Total IoE Value at Stake
$19.0 Trillion

Public Sector
$4.6T
Includes cities, agencies, and verticals such as healthcare, education, defense.
Cisco IoT Products review
## Cisco Internet of Things Portfolio - Shipping

<table>
<thead>
<tr>
<th>Industry</th>
<th>Products and Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>IE 2000, IE2000 IP67, IE 3000, IE 3010, CGS 2500</td>
</tr>
<tr>
<td>Mining</td>
<td></td>
</tr>
<tr>
<td>Energy-Utility</td>
<td>CGR 2000</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>ASR 903/902</td>
</tr>
<tr>
<td>Transportation</td>
<td>ASR 903/902, 1552 Rugged Wireless</td>
</tr>
<tr>
<td>City</td>
<td>CGR 1000, 819H M2M ISR Gateway Router</td>
</tr>
<tr>
<td>Defense</td>
<td>Connected Safety and Security</td>
</tr>
<tr>
<td>SP/M2M</td>
<td>Video Surveillance Manager and IP Cameras</td>
</tr>
<tr>
<td></td>
<td>IPICS, Physical Access Manager</td>
</tr>
<tr>
<td>Connected Factory / Connected Train / City Safety &amp; Security / Energy Distribution Automation / Connected Well</td>
<td></td>
</tr>
</tbody>
</table>

### Connected Safety and Security
- Video Surveillance Manager and IP Cameras
- IPICS
- Physical Access Manager

### Industrial Switching
- IE 2000, IE2000 IP67, IE 3000, IE 3010, CGS 2500

### Industrial Routing
- CGR 2000
- ASR 903/902
- 1552 Rugged Wireless

### Field Networks - Industrial Routing and Wireless
- CGR 1000
- 819H M2M ISR Gateway Router

### Embedded Networks
- 5915 + 5921 + 5940 Rugged Embedded Services Routers
- ESS2020 Rugged Switch

### Connected Safety and Security
- Video Surveillance Manager and IP Cameras
- IPICS
- Physical Access Manager

### IoT Security
- Application Enablement [Fog Computing / IOx]

### Management
- Connected Factory / Connected Train / City Safety & Security / Energy Distribution Automation / Connected Well
Cisco IE Switches Product Overview

Features

- Layer 2
- Small Form Factor
- IP30 and IP67
- CC*
- DLR (only Stratix)
- MRP (from Beni)
- Layer 2 NAT
- IEEE 1588 PTP
- PoE/PoE+
- Layer 2 and 3 (IP services)
- Modular
- Up to 24 ports
- IEEE 1588 PTP
- PoE/PoE+
- Layer 2 or 3 (IP services)
- 1RU
- Up to 24 ports
- 8 PoE and 16 SFP or 24 copper
- IEEE 1588 PTP (power profile*)
- PoE/PoE+
- Designed for all industries
- Layer 2 or 3 (IP services)
- 4-port GE uplinks
- Up to 20 ports GE
- IEEE 1588 PTP (power profile*)
- Layer 2 NAT
- Up to 8 PoE/PoE+
- Dying Gasp
- Cisco TrustSec® hardware ready
- MACsec hardware ready
- FNF hardware ready
- Time Sensitive Network (TSN) ready

10/100 Mbps

- Cisco® IE 2000 Series
- Cisco IE 2000U Series
- Cisco IE 3000 Series
- Cisco CGS-2520

2014 Control Engineering Award

2014 Interop Tokyo IoT Award

Aggregation

Access

Best in Class

Cisco IE 4000 Series

New

* Conformance Coating on select models

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IE4000 Configuration
Enriching Services Across Industries

- Manufacturing
- Oil and Gas
- Energy
- Transportation
- Cities
- Mining
IE 4000 Switches: Resilient, Flexible, Compatible with Future Versions

- Capacity, scalability, and flexibility
- Interoperability with native support of common industrial protocols
- Powerful security features and protocols
- Designed for harsh environments
- Multi-layer switching
- High resiliency and reliability
- Power over Ethernet (PoE) and PoE+ support
Transportation Customer – “PoE Port Density and will be connecting 802.11ac Access Points”

Mining Customer – “Quad Uplink will allow for Dual Rings”

City and Municipalities – “PoE ports will enable Surveillance Projects”

Automation – “Shop floor connectivity and Enable Layer 3”

Commonalities – “Looking to Future Proof our infrastructure with Gigabit”
# Cisco IE 4000 Series: 12 SKUs

<table>
<thead>
<tr>
<th>Cisco® SKUs</th>
<th>100-MB Downlink</th>
<th>4 GE Combo Uplink</th>
<th>PoE</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE-4000-4TC4G-E</td>
<td>4 100-MB combo ports</td>
<td>4-port GE combo</td>
<td></td>
<td>40W</td>
</tr>
<tr>
<td>IE-4000-8T4G-E</td>
<td>8 100-MB copper</td>
<td>4-port GE combo</td>
<td></td>
<td>35W</td>
</tr>
<tr>
<td>IE-4000-8S4G-E</td>
<td>8 100-MB SFP</td>
<td>4-port GE combo</td>
<td></td>
<td>42W</td>
</tr>
<tr>
<td>IE-4000-4T4P4G-E</td>
<td>4 100-MB copper + 4 100-MB PoE</td>
<td>4-port GE combo</td>
<td>4 PoE or 4 PoE+</td>
<td>35W</td>
</tr>
<tr>
<td>IE-4000-16T4G-E</td>
<td>16 100-MB copper</td>
<td>4-port GE combo</td>
<td></td>
<td>35W</td>
</tr>
<tr>
<td>IE-4000-4S8P4G-E</td>
<td>4 100-MB SFP + 8 100-MB PoE</td>
<td>4-port GE combo</td>
<td>8 PoE or 4 PoE+</td>
<td>40W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cisco SKUs</th>
<th>GE Downlink</th>
<th>4 GE Combo Uplink</th>
<th>PoE</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE-4000-8GT4G-E</td>
<td>8 GE copper</td>
<td>4-port GE combo</td>
<td></td>
<td>35W</td>
</tr>
<tr>
<td>IE-4000-8GS4G-E</td>
<td>8 GE SFP</td>
<td>4-port GE combo</td>
<td></td>
<td>42W</td>
</tr>
<tr>
<td>IE-4000-4GC4GP4G-E</td>
<td>4 GE combo + 4 GE PoE</td>
<td>4-port GE combo</td>
<td>4 PoE or 4 PoE+</td>
<td>40W</td>
</tr>
<tr>
<td>IE-4000-16GT4G-E</td>
<td>16 GE copper</td>
<td>4-port GE combo</td>
<td></td>
<td>40W</td>
</tr>
<tr>
<td>IE-4000-8GT8GP4G-E</td>
<td>8 GE copper + 8 GE PoE</td>
<td>4-port GE combo</td>
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</tr>
<tr>
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<td>4 GE SFP + 8 GE PoE</td>
<td>4-port GE combo</td>
<td>8 PoE or 4 PoE+</td>
<td>40W</td>
</tr>
</tbody>
</table>

T = Twisted pair, S = SFP, C = Combo, P = PoE, G = GE ports, and E = PTP
## Selection Chart

<table>
<thead>
<tr>
<th>Client Ports Rate?</th>
<th>Copper or Fiber?</th>
<th>Need of PoE?</th>
<th>Proposed IE4000 model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mostly Copper Ports</td>
<td>Non-PoE</td>
<td>8T4G or 16T4G</td>
</tr>
<tr>
<td></td>
<td>Mostly Fiber Ports</td>
<td>PoE</td>
<td>4T4P4G</td>
</tr>
<tr>
<td></td>
<td>Copper and Fiber Ports</td>
<td>Non-PoE</td>
<td>8S4G</td>
</tr>
<tr>
<td></td>
<td>Can’t decide</td>
<td>PoE</td>
<td>4S8PG4G</td>
</tr>
<tr>
<td>I Need Mostly FE Ports</td>
<td></td>
<td></td>
<td>4T4P4G</td>
</tr>
</tbody>
</table>

| I Need Mostly GE Ports    | Mostly Copper Ports | Non-PoE      | 8GT4G, 16GT4G         |
|                           | Mostly Fiber Ports | PoE          | 8GT8GP4G              |
|                           | Copper and Fiber Ports | Non-PoE | 8GS4G                 |
|                           | Can’t decide      | PoE          | 4GS8GP4G              |
|                           |                  |              | 4GC4GP4G              |
Cisco IE 4000 Series for Utility and Industrial Automation

- 12 nonmodular SKUs, various port densities and speeds, copper, fiber, and PoE/PoE+
- Up to 20 GE copper or 12 GE SFP
- Thermal fin for fanless cooling
- Industrial-grade temperature range with PTC heater (positive temperature coefficient) for -0°C cold boot
- All SKUs have FPGA
- IEEE 1588 PTP support on all SKUs and all ports
- Layer 2 NAT support on all SKUs and uplinks
- Parallel redundancy ring on all SKUs and uplinks
- Dying Gasp message support
- Alarm contact: 2 input and 1 output
- Ingress protection rating: IP30
- Fanless: No moving parts

- DIN rail mount
- External 1-GB SD card (PC readable) shipped by default for zero-touch installation
- Large LED status and mode indicators
- Management port: RSR232 and mini USB
- Right-to-use trust base license scheme
- Layer 3 routing protocols: OSPF, BGP, RIP, EIGRP, and HSRP
- IEEE 802.1q tunneling
- NNI and UNI ports
- Hardware architecture: Based on Cisco Catalyst® 2960XR switches
- 16,000 MAC addresses and 8000 indirect IPv4 routes
- Hardware ready: MACsec, NetFlow, and SGT and SGACL
- CFM to E-LMI interworking and CFM to EFM interworking
- Ethernet IEEE 802.3 OAM
IE4000
Hardware Technical Details
Cisco IE 4000: Faceplate Entities

- **4 combo GE uplinks**
- **Setup pin**
- **Express**
- **Redundant Power connections**
- **170W PSU**
  - Support 8 PoE or 4 PoE+
- **MAC Address**
- **Downlink interfaces**: 4, 8, 12, 16
- **All units ship with 1-GB SD card**
- **Alarm Relay contacts**
- **Advanced ASIC**
  - New capabilities and higher capacity
- **IP Address**
- **Dual Ground connections**
- **Dying Gasp support (10 ms)**
Cisco IE 4000 Series Up Close
Heat Sink Design: Top-Down View

Front Panel

Rear Panel
Cisco IE 4000 Series Switch Dimensions

All Cisco® IE 4000 Series models have the following dimensions (W x H x D):
6.12 x 6.12 x 5.09 in. (155.4 x 155.4 x 129.2 mm)
# Cisco IE 4000 Series Hardware Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension for switch (one size)</td>
<td>H x W x D: 6 x 6 x 5.1 in.</td>
</tr>
<tr>
<td>Dimension for power supply</td>
<td>H x W x D: 5.83 x 3.4 x 5.2 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>6.3 lb (2.90 kg) for 8- and 12-port downlink models, and 2.88 kg for 4-port downlink models</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>IEC60068-2-14 operating temperature: -40 to 78°C</td>
</tr>
<tr>
<td></td>
<td>- -40 to 70°C (vented enclosure operating, using IEEE 1613-2003 or IEC61850-3)</td>
</tr>
<tr>
<td></td>
<td>- -40 to 60°C (sealed enclosure operating: NEMA4X and IP54 enclosure)</td>
</tr>
<tr>
<td></td>
<td>- -34 to 75°C (fan or blower equipped enclosure operating or NEMA TS 2)</td>
</tr>
<tr>
<td></td>
<td>- -40 to 85°C (IEC environmental type testing, 16 hours including power supply)</td>
</tr>
<tr>
<td>Storage temperature and altitude</td>
<td>-40 to 85°C storage and operational up to 13,000 ft; IEC 60068-2-1 and -2-2</td>
</tr>
<tr>
<td>Humidity</td>
<td>IEC 60068-2-30, 95% noncondensing</td>
</tr>
<tr>
<td>Power-source voltage</td>
<td>24V (non-PoE SKU), 54V (PoE SKU); maximum wattage for base switch: 40W</td>
</tr>
<tr>
<td>Dying Gasp for loss of power</td>
<td>Message generated within 10 ms if external power lost</td>
</tr>
<tr>
<td>Power input</td>
<td>Dual feed ±9.6 to 60V DC (3 different voltages for 12 SKUs: 3.7A, 4.3A, and 5A)</td>
</tr>
<tr>
<td>PIKPAK Cisco® Commerce Workspace order model</td>
<td>Same as Cisco IE 2000 Series: no user options for Cisco IOS® Software revision</td>
</tr>
<tr>
<td>Large display mode</td>
<td>Easy for visual inspection of port speed, duplex, PoE, SyncE, and HSR and PRP status</td>
</tr>
<tr>
<td>Mounting free space</td>
<td>1 inch around the unit; not to exceed 60°C in enclosed box, or 70°C in vented box, or 75°C in forced-air box</td>
</tr>
<tr>
<td>Unshielded cables</td>
<td>Meet IEEE 1613 and IEC 61850-3 with both shielded and unshielded cables (CI 10 V/m, RI 20 V/m, RE, and CE)</td>
</tr>
</tbody>
</table>
DC-DC and AC-DC 170-Watt 54-Volt PoE Power Supplies
New to Cisco IE 4000 Series

DC-to-DC PSU
Part number: PWR-IE170W-PC-DC=
Nominal DC input: 12 to 54V DC
Supported DC input: 10.8 to 60V DC
Fixed output: 54V DC and 3.15A

W x H x D: 3.4 x 5.8 x 5.2 in.
Weight: 1.68 kg

AC-to-DC PSU
Part number: PWR-IE170W-PC-AC=
Nominal AC input: 100 to 240V, 2.3A, and 50 to 60 Hz
Supported AC input: 90 to 264V AC
Nominal DC input: 125 to 250V DC
Supported DC input: 106 to 300V DC
Fixed output: 54V DC and 3.15A
W x H x D: 3.4 x 5.8 x 5.2 in.
Weight: 1.76 kg

170 W power supplies work on IE2000, IE2000U & IE3000
Boost POE budget to 4 POE+ ports
### Existing Cisco® IE 3000 and 2000 Series Supported Power Supplies for Cisco IE 4000 Series

<table>
<thead>
<tr>
<th>Model</th>
<th>Input</th>
<th>Output</th>
<th>PoE</th>
<th>Dimensions (W x H x D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR-IE65W-PC-DC=</td>
<td>DC-DC, 18 to 60V DC and 4.5A</td>
<td>54V DC and 1.2A</td>
<td>~30W</td>
<td>2.1 x 5.9 x 4.9 in.</td>
</tr>
<tr>
<td>PWR-IE65W-PC-AC=</td>
<td>90 to 254V AC or 106 to 300V DC</td>
<td>54V DC and 1.2A</td>
<td>~30W</td>
<td>2.1 x 5.9 x 4.9 in.</td>
</tr>
<tr>
<td>PWR-IE50W-AC-IEC=</td>
<td>90 to 264V AC</td>
<td>24V DC and 2.1A</td>
<td>Non-PoE</td>
<td>2 x 5.8 x 4.4 in.</td>
</tr>
<tr>
<td>PWR-IE50W-AC</td>
<td>90 to 264V AC or 106 to 300V DC</td>
<td>24V DC and 2.1A</td>
<td>Non-PoE</td>
<td>2 x 5.8 x 4.4 in.</td>
</tr>
</tbody>
</table>

Note: Input range denotes supported values.
Cisco IE 4000 Series Power Supply Selection Guide

**Step 1**
Choose product
- PoE/PoE+ port model
- Non-PoE port model

**Step 2**
Determine maximum power budget

- **Option A**
  PoE budget requires more than 30W up to 125W, or more than 2 ports of PoE

- **Option B**
  PoE budget requires less than 30W and no more than 2 ports of PoE

- **Option C**
  No PoE; only power for switch

**Step 3**
Identify input current
- AC
- or
- DC

**Step 4**
Choose power supply part number

<table>
<thead>
<tr>
<th>Power Option</th>
<th>Input Current</th>
<th>Power Supply Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>AC</td>
<td>PWR-IE170W-PC-AC=</td>
</tr>
<tr>
<td>Option A</td>
<td>DC</td>
<td>PWR-IE170W-PC-DC=</td>
</tr>
<tr>
<td>Option B</td>
<td>AC</td>
<td>PWR-IE65W-PC-AC=</td>
</tr>
<tr>
<td>Option B</td>
<td>DC</td>
<td>PWR-IE65W-PC-DC=</td>
</tr>
<tr>
<td>Option C</td>
<td>AC</td>
<td>PWR-IE50W-AC-IEC= PWR-IE50W-AC=</td>
</tr>
<tr>
<td>Option C</td>
<td>DC</td>
<td>PWR-IE50W-AC=*</td>
</tr>
</tbody>
</table>

* - Accepts AC or DC input
The Cisco IE 4000 Series PoE controller cannot detect the available wattage of power supply. It is the user’s responsibility to supply sufficient voltage (54V) and wattage (125W) for PoE devices. The default wattage is set at 125W.

- If insufficient power supply is used, the switch will shut down (over-temperature protection [OTP]) when the ambient temperature exceeds the limit.
- Use global configuration to limit PoE power budget when the power supply cannot provide enough:
  - IE4000(config)#power inline wattage max 30
## Industrial Compliance
(Similar to Cisco IE 2000, 3000, and 2000U Series)

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety certification</td>
<td>UL 60950-1</td>
</tr>
<tr>
<td>Hazard location</td>
<td>ATEX Class 1, Div. 2</td>
</tr>
<tr>
<td>EMC emission compliance</td>
<td>IEC/EN 55022A Class A</td>
</tr>
<tr>
<td>EMC immunity compliance</td>
<td>IEC/EN 61000-4-2, -3, -4, -5, -6, -8, -9, -10, -11, -16, -17, -18, and -29. IEEE C37.90 (surge) C37.90.1 (fast transients), C37.90.2 (radiated immunity), and C37.90.3 (electrostatic discharge)</td>
</tr>
<tr>
<td>Shock and vibration</td>
<td>IEC 60068-2-27 (20g half-sine pulse, 11 ms duration, and 200g half-sine pulse, 2 ms duration), 2-6, 2-64, EN 61373, and drop test 100-mm height</td>
</tr>
<tr>
<td>Industrial standards</td>
<td>KEMA, IEEE-1613, IEC 61850-3, EN61000-6-1, -2, -4, -5, EN 61326 Industrial Control, EN 61132-2 Programmable Controller, EN50155 Railway EMI/EMC, EN50121-3-2 Railway Electromagnetic on Rolling Stock, EN50121-4 EMI for Signaling and Telecommunications, EN60945 Maritime, ODVA, Profinet v2, and IP30</td>
</tr>
<tr>
<td>MTBF</td>
<td>42.7 years (for example, IE-4000-8T4G-E: 60 years, and IE-4000-8S4G-E: 69 years) using Telcordia Issue 3 methodology</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years</td>
</tr>
</tbody>
</table>

**Timeline of compliance completion:**
Safety UL and worldwide EMC and ODVA by FCS (December 1, 2014)
Industrial standards: KEMA, Maritime, and Profinet: after FCS
<table>
<thead>
<tr>
<th>Resource</th>
<th>LAN Base (Default)</th>
<th>IP Service (Default)</th>
<th>Routing</th>
<th>Dual IPv4 and IPv6 Routing</th>
<th>Dual IPv4 to IPv6 Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast Mac address</td>
<td>16,000</td>
<td>16,000</td>
<td>16,000</td>
<td>16,000</td>
<td>16,000</td>
</tr>
<tr>
<td>IPv4 IGMP groups</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>IPv4 Mac address QoS ACEs</td>
<td>1000</td>
<td>1875</td>
<td>500</td>
<td>500</td>
<td>500</td>
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<tr>
<td>IPv4 policy-based routing</td>
<td>250</td>
<td>125</td>
<td>5375</td>
<td>125</td>
<td>250</td>
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<tr>
<td>IPv6 policy-based routing</td>
<td>250</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IPv4 MAC address ACL ACEs</td>
<td>1000</td>
<td>1875</td>
<td>1000</td>
<td>625</td>
<td>750</td>
</tr>
<tr>
<td>IPv4 unicast directly connected hosts</td>
<td>4000</td>
<td>16,000</td>
<td>16,000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>IPv4 unicast indirectly connected routes</td>
<td>1250</td>
<td>2000</td>
<td>8000</td>
<td>2000</td>
<td>1250</td>
</tr>
<tr>
<td>IPv6 multicast groups</td>
<td>1000</td>
<td>0</td>
<td>0</td>
<td>1000</td>
<td>1000</td>
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<tr>
<td>IPv6 directly connected IPv6 hosts</td>
<td>4000</td>
<td>0</td>
<td>0</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>IPv6 indirectly connected routes</td>
<td>1250</td>
<td>0</td>
<td>0</td>
<td>3000</td>
<td>1250</td>
</tr>
<tr>
<td>IPv6 QoS ACEs</td>
<td>250</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>500</td>
</tr>
<tr>
<td>IPv6 ACL ACEs</td>
<td>250</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>500</td>
</tr>
<tr>
<td>VLANs</td>
<td>1024</td>
<td>1024</td>
<td>1024</td>
<td>1024</td>
<td>1024</td>
</tr>
</tbody>
</table>

Routing and dual templates require IP services.
Cisco IE 4000 Series Hardware Summary

- Ruggedized: Compliant for utility and manufacturing deployments*
- High MTBF: No moving parts, dual DC inputs, and swap drive
- Scales with large Layer 2 and 3 forwarding tables
- Advanced IP routing features for aggregation deployments
- High performance: All packet forwarding in hardware
- Advanced QoS and security features performed in hardware for deterministic behavior (MQC)
- Layer 2 Network Address Translation (NAT) - FPGA
- DIN rail mount
- 4 Gigabit Ethernet combo (SFP and copper) uplinks in every model
- 8 PoE ports, with 125W PoE power budget
- SD card backup and external storage
- 2 dry-contact alarm inputs and 1 output alarm for temperature, power, and storage

* Some certifications in progress at time of first ship
IE4000
Software Technical Details
# Cisco IE Switching Product Series Feature Comparison

<table>
<thead>
<tr>
<th>Features</th>
<th>Cisco® IE2000</th>
<th>Cisco IE2000U</th>
<th>Cisco IE3000</th>
<th>Cisco IE4000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LAN Lite (Layer 2 Lite)</td>
<td>LAN Base (Layer 2)</td>
<td>Enhanced LAN Base (Layer 2)</td>
<td>LAN Base (Layer 2)</td>
</tr>
<tr>
<td>Layer 2 Features</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IPv6</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Security</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>OoS</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Multicast</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Manageability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Utility Enhancements</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>IE Enhancements</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Layer 3 Features</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>LAN Lite (Layer 2 Lite)</td>
<td>LAN Base (Layer 2)</td>
<td>Enhanced LAN Base (Layer 2)</td>
<td>LAN Base (Layer 2)</td>
</tr>
</tbody>
</table>

**Legend:**  ✓ Full support    ✓ Limited features support    ✗ No support
## Cisco IE 4000 Series Enhancements over Cisco IE 2000 and 3000 Series

<table>
<thead>
<tr>
<th>Features</th>
<th>Cisco® IE2000</th>
<th>Cisco® IE2000U</th>
<th>Cisco IE3000</th>
<th>Cisco IE4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uplink Dual Redundant Rings</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
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<tr>
<td>Downlink Gigabit Ports</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>IPv4 Indirect Routes</td>
<td>0</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>QoS MQS or MLS</td>
<td>MLS</td>
<td>MLS</td>
<td>MLS</td>
<td>MLS</td>
</tr>
<tr>
<td>PoE Ports</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Number of SFP Uplinks</td>
<td>2</td>
<td>2</td>
<td>2 GE 2 FE</td>
<td>2 GE 2 FE</td>
</tr>
<tr>
<td>Maximum MAC Addresses</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
</tr>
<tr>
<td>Maximum VLANs</td>
<td>64</td>
<td>255</td>
<td>255</td>
<td>1005</td>
</tr>
</tbody>
</table>

### Legend:
- ✓ Full support
- ✗ Limited features support
- ✗ No support
## L2/L3 capabilities: Comparing IE 2K 3K 4K

<table>
<thead>
<tr>
<th>Feature sets</th>
<th>IE2000</th>
<th>IE3000</th>
<th>IE3010</th>
<th>IE4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Lite (15.2(3)E)</td>
<td>LAN Base IP Services</td>
<td>LAN Base IP Services</td>
<td>LAN Base IP Services</td>
<td>LAN Base IP Services</td>
</tr>
<tr>
<td>LAN Base Lan Lite</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IOS image type</td>
<td>Universal</td>
<td>Specific to feature set</td>
<td>Specific to feature set</td>
<td>Universal</td>
</tr>
<tr>
<td>License Upgrade</td>
<td>Install license</td>
<td>Install ios image</td>
<td>Install ios image</td>
<td>Right To Use</td>
</tr>
<tr>
<td>1588 PTP</td>
<td>Yes*</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>L2 NAT</td>
<td>Yes*</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>CIP/Profinet</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*specific models with Enhanced lanbase image support
# Software Feature Summary

## Common Platform Features
- License RTU package
- Secure boot (FIPS140-2)
- Quack II and SUDI
- PoE/PoE+
- Auto Smartport (for phone or camera)
- Smart Install and Cisco EnergyWise® 2.8
- MQC QoS and CPU QoS
- 100-MB SFP default full duplex
- Digital optical monitoring (DOM)
- IP device tracking (IPDT CSCui55905)
- Layer 2 security
- Layer 3 routing protocols
- Embedded Event Manager (EEM)
- Web Device Manager

## Industrial Automation Features
- Ethernet and IP (CIP) and Profinet
- IEEE 1588 PTP
- Smart Macro for Automation
- Redundancy Ethernet Protocol (REP)
- Layer 2 Network Address Translation
- Alarm I/O
- IGMP querier and IGMP snooping
- Express setup (use web interface)
- Boot Fast
- PTC heater and alarm facility
- Dying Gasp for loss of power

## Utility Features
- UNI and NNI interfaces
- Power profile (P2P C37.238)
- Smart Macro for Utility
- Parallel Redundancy Protocol (PRP)
- GOOSE messaging
- SCADA protocol classification
- SCADA MODBUS TCP server
- Ethernet OAM, CFM, and E-LMI
- Link detection (BFD, GOLD, and OBFL)
- QinQ tunneling
- Private VLAN
- Dying Gasp for loss of power
IP Services Features

- Full IPv4 routing (OSPF, BGP, and RIP)
  - LAN Base has static routing
- IPv6 routing
- VRF (up to 26 instances)
- Multicast routing (IPv4)
- Private VLANs
- Bidirectional Forwarding Detection (BFD)
- HSRP (IPv4)

License part numbers for IP services

L-IE4000-RTU=: eDelivery (email) license
IE4000-RTU=: Paper (physical) delivery
MQC QoS

- MQC (modular quality-of-service [QoS] command-line interface [CLI])
  - enabled by default
- DSCP and CoS not modified
- no ingress queues
- 4 egress queues per port;
  - 4 class maps per output service policy; 1 class map must be “class-default”
- Ingress rate limit: 8 kbps
- Total egress packet buffer: 4 MB
- Hierarchical QoS
- QinQ ingress classification
- Ingress per-port per-VLAN policing
- CoS or DSCP marking with service policy
- Auto-QoS support
## Cisco IE 4000 Series Software Features

### Layer 2 Security Features
- Cisco TrustSec® SXP
- Device sensor, Auto Smartport, IP device tracking, and dACL
- IEEE 802.1x
- Web- and MAC-based authentication
- Port security
- DHCP snooping, dynamic ARP inspection, and IP source guard
- Spanning Tree Protocol security mechanisms
- Storm control
- Private VLAN
- QinQ tunneling

### Layer 3 IPv4 Routing
- BGP
- EIGRP
- IS-IS
- OSPF
- RIP
- HSRP
- Requires IP services

### Layer 3 IPv6 routing
- Inter-VLAN routing
- RIPng
- OSPFv3
- HSRPv6
- DHCPv6
- MLD v1/v2
IE4000
Ease of Use Features
Web Device Manager (GUI Tool)

- Point Browser to Mgmt IP Address of the IE4000
- Configure, Monitor IE4000
- CNA and Cisco Prime on the roadmap
Express Setup for fast device bringup

- Directly connected PC to port Gig1/1
- Use browser to configure
  - IP address
  - Mgmt vlan
  - Default Gateway
  - NTP server
  - User and password
  - Hostname
- NO CLI
Macros Built-in (Global and Interface)

- **IE Global Macro**
  - Name: cisco-ie-global
  - QOS for Voice, Data, CIP
  - IGMP Snooping
  - Spanning tree MST mode

- **IE Interface Macros**
  - Interface level configuration
    - Vlan configuration
    - QOS service policy
    - port security
    - Spanning tree
  - **IE Interface Macro Names**
    - cisco-ie-desktop
    - cisco-ie-phone
    - cisco-ie-wireless
    - cisco-ie-switch
    - cisco-ie-router

!!! Apply macro to an interface with arguments !
IE4000(config-if)#macro apply cisco-ie-phone $access_vlan 10 $voice_vlan 20
License: RTU Trust based

1. Right To Use (RTU) License, no more license file purchase and upgrade
   IE4000#license right-to-use activate ipservice acceptEULA (End User License Agreement)
   ipservices IPServices License Level
   lanbase LanBase License Level

2. Set license at boot:
   IE4000(config)# license boot level ipservices | lanbase

IE4000# show license
Index 1 Feature: ipservices
   Period left: Life time
   License Type: PermanentRightToUse
   License State: Active, In Use
   License Priority: High
   License Count: Non-Counted

No files to download and install
IP Services PIDs:
IE4000-RTU= Paper SW license for IE4000
L-IE4000-RTU= Electronic SW license for IE4000
SD Card: Easy device replacement

- Easy removal and insertion
- SD card comes with each Cisco® IE 4000 Series unit from manufacturer
- Device Manager synchronize flash memory and SD flash memory:
- SSH crypto key configuration is portable through SD card transfer
# Face-Plate LED Mode

Display mode shows port and redundancy protocol status.

Alarm relay I/O LED provides visual diagnostics for factory and automation users.

<table>
<thead>
<tr>
<th>Display mode LED</th>
<th>Cisco® IE 4000 Series</th>
<th>Support at FCS</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Duplex</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>PoE</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>SyncE</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>HSR and PRP</td>
<td>PRP: Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HSR: No</td>
</tr>
</tbody>
</table>

**Note:** The LED indicators in Display mode do not detect failure, but indicate whether features are on or off.
Cisco IE 4000 Series Software Summary

- High availability: Parallel Redundancy Protocol (PRP) and Resilient Ethernet Protocol (REP)
- Utility-specific features: PTP, Smartports, GOOSE, MODBUS management, and QoS classification for Utility protocols
- Industry-leading security capabilities to address NERC-CIP compliance
- Comprehensive remote troubleshooting and performance monitoring capabilities
- Network virtualization for multiservice applications and separation of traffic
- Cisco® management tools (Cisco Network Assistant and Device Manager)
- Upgrade to IP services with right-to-use (RTU) license
- Full Layer 3 protocol support with IP services
Industrial Automation Use Case
IE4000 Use case: Plant Floor

- Dual Ring support – 4 combo uplink ports
- Gigabit interfaces
- Layer 3 Distribution features
- Flexible Topologies
- Gigabit and FastEthernet interfaces

- Note: DLR / MRP – roadmap IOS Features.
Industrial Automation Features

- Protocols: CIP and Profinet
  - CIP disabled on Cisco SKUs by default
  - Profinet: Enabled on VLAN 1 by default
  - Profinet GSDML Version 2.3

- Forwarding boundary clock
  - E2E transparent clock peer-to-peer forwarding (for power profile)

- REP for network redundancy

- Layer 2 NAT: 128 instances
Resources and Next Steps
Cisco Industrial IE4000 resources >> URL
Advanced Internet of Things Specializations

Graduate from ATP "No invitation"

Design for OT Partner
Partner Central
Incentives and Promotions

URL to the page:
http://www.cisco.com/web/partners/incentives_and_promotions/index.html
Value Incentive Program “VIP”

VIP24

• Program ending on Jan 24

• For all Connected Safety & Security Product
  • Exit requirement extension on the CSS ATP or complete the IoT CSS Specialization

• For all CIE products (example IE switches, CGR/CGS, 819H etc.)
  • Exit requirement either meet all Enterprise Networks / Cloud & Managed Svc tracks or IoT Manufacturing Specialization

VIP25

• Stay tune with upcoming announcement with changes on the changes on VIP25 entry and exit requirement
• All IoT Specializations will be an important
Cisco Learning Network

Cisco Internet of Things (IoT) Partner Market Opportunity

Cisco Internet of Things (IoT) Product Deep Dive

Cisco Internet of Things (IoT) Connected Factory

Cisco Internet of Things (IoT) Transportation

Cisco Internet of Things (IoT) Oil & Gas

FY15 Incentives and Promotions IoT Products

http://cs.co/CLN_IoT
Your Area Channel IoT focused Team

United States

- Nicole Johnson
  Central
- Doug Starr
  South
- Hernando Morales
  National Acct.
- Floyd Dacosta
  West
- Bill Didden
  Northeast

EMEAR
- Gregor Simenc

Worldwide Channels
- Willie Chow
- Jason Lee
SLED West Operation

Northern Cal
Northern Cal Metro
Southern Cal
Southern Cal Metro

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<thead>
<tr>
<th>SPSS</th>
<th>CSE</th>
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<tbody>
<tr>
<td>West Interian - CSS</td>
<td>Cyrus Choobineh</td>
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<tr>
<td>Tim Adams - CIE</td>
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</table>

Northwest States

<table>
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Southwest States

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<td>Cyrus Choobineh</td>
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<tr>
<td>Tim Adams - CIE</td>
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</tr>
</tbody>
</table>

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