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Cisco's Industrial Ethernet Switching Portfolio

An Introduction and Overview

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Agenda

- Introduction: What is unique about Industrial Ethernet?
- Portfolio Overview
- Vertical Examples





Introduction: What is unique about Industrial Ethernet?

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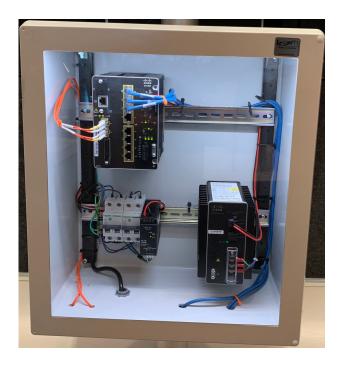
Hardened for Harsh(er) Environments



- Extended temperature range
- · Fanless
- · IP30 and IP67
- Conformal Coating

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Non-19"



- Installation in (electrical) cabinets on DIN-RAIL
- Wallmount for IP67 models
- But classic 19" also available

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Industrial Protocols



Common Industrial Protocol (CIP)

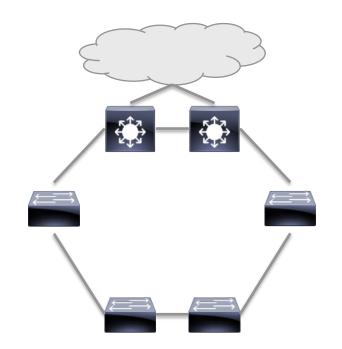
Precision Time Protocol (PTP) (See: BRKIOT-2517) Modbus

Time-Sensitive Networking (TSN)

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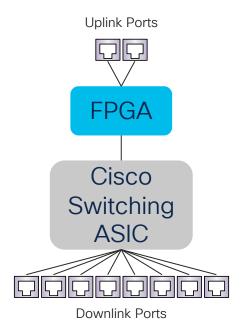
 Integration into industrial environments by supporting common industrial protocols

Redundancy Protocols



- L2 rings are a very common redundancy design in IoT
- Protocols in use:
 - REP Resilient Ethernet Protocol
 - MRP Media Redundancy Prot.
 - PRP Parallel Redundancy Prot.
 - · HSR HA Seamless Redundancy

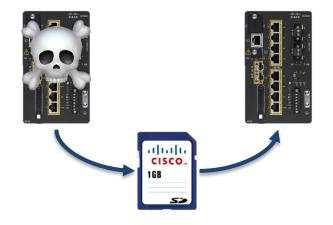
Integrated FPGA



- Select models leverage FPGAs to support special IoT features at line-rate
- Future-proofing
- Examples:
 - ·L2NAT
 - PRP / HSR
 - ·IEEE1588 PTP

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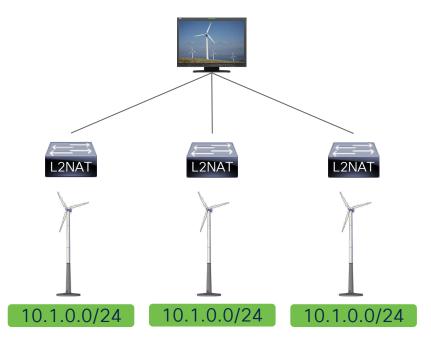
"Swap-drive"



- Easy device replacement by non-IT personal
- Transfer OS and Config to new device using SD-Card



L2 NAT



- "Cookie-cutter" approach: Reuse same IP addressing across multiple entities
- L2NAT used for north-bound connectivity
- Examples:
 - Manufacturing lines
 - Wind farms

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Certifications

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examination and test results are recorded	in confidential rep	port no. 4788695857.6		
replance with the Essential Health and Sal	ety Requirements	has been assured by com	plance with:	
EN 60079-0:2012+A11:	2013	EN 60079-15	:2010	
ept in respect of those requirements listed	at item 15 of the 5	Schedule.		
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a Type examination certificate relates only refactured.	to the design of th	w specified product, and n	ot to specific items of	product subsequently
(Ex)	II 3 G E	x nA IIC T4 Gc		
3300-8T, IEM-3300-6T2S, IE IEM-330	M-3300-8P,	IEM-3300-16P IE	EM-3300-8S, IE 00-8T	EM-3300-14T2S,
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IE-3200-8T2S, IE-3200-	8P2S, IE-33	300-8T2S, IE-3300)-8P2S, IE-340	00-8T2S
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Certification Body				Ballerup, Denmark
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- Devices can't be used in certain applications (e.g. trains) without certification
- Extended testing of IE Switches
 - · Profinet, CIP
 - · Electrical immunity
 - Temp., Vibration, Shock

• ...



Portfolio Overview

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IE 1000 – Entry Level, Web Managed



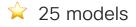
- \rightleftharpoons Small form factor
- ☆ 30s boot-time



-	
1G	Max. Uplink Speed
100	M Max. Downlink Speed
√/-	Layer 2 / Layer 3
√/-	DIN-RAIL / 19"
-	Modular / Stacking
IP30) IP Rating
√/-	PoE(+) / 4PPoE
-	Flexible NetFlow
-	MACsec: 128 / 256
-	Trustsec (SGT, SGACL)
-	L2NAT: Uplinks / All Int.
-	Profinet / MRP
-	CIP (EtherNet/IP)
-	REP / REP Fast
-	PRP / HSR
-	IEEE 1588 PTP / TSN
-	Timing Interfaces
-	IOx / Cybervision
-	SD-A. Ext. Node / PEN
-	Classic IOS / IOS XE
√/-	Mgmt: WebUI / CLI
√/-	Mgmt: IND / DNA-C
	*select models



IE 2000 – FastEthernet Access



 \rightleftharpoons Conformal coating^{*}

🔶 Alarm I/O

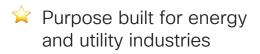


	1G	Max. Uplink Speed
	100M	Max. Downlink Speed
	√/√*	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
SI	-	Flexible NetFlow
IEZU	-	MACsec: 128 / 256
/06/	-	Trustsec (SGT, SGACL)
COT.	√*/-	L2NAT: Uplinks / All Int.
ISCO	√ /√	Profinet / MRP
uo	 Image: A second s	CIP (EtherNet/IP)
neet	√/-	REP / REP Fast
Jatas	-	PRP / HSR
the	√*/-	IEEE 1588 PTP / TSN
Sr to	-	Timing Interfaces
e rere	-	IOx / Cybervision
lease	-	SD-A. Ext. Node / PEN
IIS, p	√/-	Classic IOS / IOS XE
For details, please refer to the <u>Datasheet</u> on	V V	Mgmt: WebUI / CLI
FOL	V V	Mgmt: IND / DNA-C

select models

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IE 2000U – Special Features for Utilities



✓ IEC-61850-3 and IEEE 1613

🔶 GOOSE



	1G	Max. Uplink Speed
	100M	Max. Downlink Speed
	√ /√	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
	-	Flexible NetFlow
N A	-	MACsec: 128 / 256
106/	-	Trustsec (SGT, SGACL)
00	-	L2NAT: Uplinks / All Int.
	-	Profinet / MRP
5	-	CIP (EtherNet/IP)
E E E	√/-	REP / REP Fast
<u>a la</u>	√*/-	PRP / HSR
Ð	√*/-	IEEE 1588 PTP / TSN
0	-	Timing Interfaces
E E	-	IOx / Cybervision
I C C C	-	SD-A. Ext. Node / PEN
FOI DELAIS, PIEASE FEIER TO THE DATASTIER ON CISCO.CON	√/-	Classic IOS / IOS XE
nela	√ /√	Mgmt: WebUI / CLI
DL	√ /√	Mgmt: IND / DNA-C



IE 2000 IP67 – Very Harsh Environments

☆ IE 2000 in IP67 form factor

Suitable for very harsh environments



	1G	Max. Uplink Speed
	100M	Max. Downlink Speed
	√/√*	Layer 2 / Layer 3
	-/-	DIN-RAIL / 19"
	I	Modular / Stacking
	IP67	IP Rating
	√*/-	PoE(+) / 4PPoE
8	-	Flexible NetFlow
For details, please refer to the Datasheet on cisco.com/go/ie2000	I	MACsec: 128 / 256
	-	Trustsec (SGT, SGACL)
	√*/-	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
	~	CIP (EtherNet/IP)
	√/-	REP / REP Fast
	-	PRP / HSR
the [√*/-	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
e refe	-	IOx / Cybervision
lease	-	SD-A. Ext. Node / PEN
ils, p	√/-	Classic IOS / IOS XE
For detai	√ /√	Mgmt: WebUI / CLI
	√ /√	Mgmt: IND / DNA-C
		*aalaat madala



IE 3200 - Fixed next-gen w/ IOS XE

Member of Cisco IOS XE based Catalyst IE3x00 family

🚖 REP Fast

☆ 2 Variants: PoE and non-PoE



	1G	Max. Uplink Speed
	1G	Max. Downlink Speed
	√/-	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
8	-	Flexible NetFlow
ie32	√/-	MACsec: 128 / 256
<u>/06/</u>	-	Trustsec (SGT, SGACL)
For details, please refer to the Datasheet on cisco.com/go/ie3200	-	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
	~	CIP (EtherNet/IP)
	√ /√	REP / REP Fast
Datas	-	PRP / HSR
the [√/-	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
e refe	-	IOx / Cybervision
lease	-	SD-A. Ext. Node / PEN
details, plo	-/√	Classic IOS / IOS XE
	√ /√	Mgmt: WebUI / CLI
For	√ √	Mgmt: IND / DNA-C



IE 3300 – Modular next-gen w/ IOS XE

🔶 Modular

- ☆ 2 Base Units: PoE and non-PoE
- \Leftrightarrow 7 Modules available
- ☆ Up to 26 GigE Interfaces
- ☆ 360W PoE power budget
- ☆ SD-Access Extended Node



1G	Max. Uplink Speed
1G	Max. Downlink Speed
√ /√	Layer 2 / Layer 3
√/-	DIN-RAIL / 19"
√/-	Modular / Stacking
IP30	IP Rating
√*/-	PoE(+) / 4PPoE
\checkmark	Flexible NetFlow
√ <i>\</i> √	MACsec: 128 / 256
-	Trustsec (SGT, SGACL)
√/-	L2NAT: Uplinks / All Int.
√ /√	Profinet / MRP
√	CIP (EtherNet/IP)
√ /√	REP / REP Fast
-	PRP / HSR
√/-	IEEE 1588 PTP / TSN
-	Timing Interfaces
-	IOx / Cybervision
√/-	SD-A. Ext. Node / PEN
-/√	Classic IOS / IOS XE
√ /√	Mgmt: WebUI / CLI
√/√	Mgmt: IND / DNA-C
	*select models



IE 3300 10G – Modular with 10G Uplinks

☆ 2 new Models: non-PoE & PoE

- ☆ 2 x 10G SFP+ Uplinks
- ☆ PoE Model supports 60W 4PPoE
- ☆ Supports App. Hosting (IOx)
- ☆ Non-PoE: Release 2nd half of 2020¹
- ☆ PoE: Release in 2021¹
- ☆ New Module: 4 x 2.5GigE w/ 90W 4PPoE^{1,2}

¹Roadmap, subject to change ²Not fully committed yet



	10G	Max. Uplink Speed
	1G	Max. Downlink Speed
	√ /√	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	√/-	Modular / Stacking
	IP30	IP Rating
	√*/√*	PoE(+) / 4PPoE
	 Image: A second s	Flexible NetFlow
For details, please refer to the Datasheet ¹ on cisco.com/go/ie330	√ /√	MACsec: 128 / 256
	-	Trustsec (SGT, SGACL)
	-/-	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
	 Image: A second s	CIP (EtherNet/IP)
sheet	√ /√	REP / REP Fast
Datas	-	PRP / HSR
the [-2/-	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
e refe	√ /√	IOx / Cybervision
lease	√/-	SD-A. Ext. Node / PEN
For details, pl	√/- -/√ √/√	Classic IOS / IOS XE
	√ /√	Mgmt: WebUI / CLI
	√ /√	Mgmt: IND / DNA-C
		* + - + +

IE 3400 – High-End modular

- ☆ Modular, 10 Modules available
- ☆ Up to 26 GigE Interfaces
- ☆ 480W PoE power budget
- 🔶 Data plane FPGAs
- ☆ SD-A. Policy Extend Node
- ☆ App. Hosting (IOx)
- \Leftrightarrow Cybervision Sensor



	1G	Max. Uplink Speed
	1G	Max. Downlink Speed
	√ /√	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	√/-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
3	 Image: A second s	Flexible NetFlow
Ie34	√ /√	MACsec: 128 / 256
/06/	~	Trustsec (SGT, SGACL)
For details, please reter to the Datasheet on cisco.com/go/le34	√/-	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
	~	CIP (EtherNet/IP)
	√ /√	REP / REP Fast
	√/-	PRP / HSR
	√/-	IEEE 1588 PTP / TSN
	-	Timing Interfaces
e rete	√ /√	IOx / Cybervision
lease	-/√	SD-A. Ext. Node / PEN
details, pl	-/√ -/√	Classic IOS / IOS XE
	√ /√	Mgmt: WebUI / CLI
For	√ /√	Mgmt: IND / DNA-C
		*aalaat madala



IE3400H – High-End IP67

- Same features as IE3400 in IP67 form factor
- \overleftrightarrow Water and dust resistant
- FastEthernet variant with D-code M12 connectors
- GigEthernet variant with X-code M12 connectors



	1G*	Max. Uplink Speed
	1G*	Max. Downlink Speed
	√ /√	Layer 2 / Layer 3
	-/-	DIN-RAIL / 19"
	-/-	Modular / Stacking
	IP67	IP Rating
	-/-	PoE(+) / 4PPoE
For details, please refer to the Datasheet on cisco.com/go/ie3400h	~	Flexible NetFlow
	√ /√	MACsec: 128 / 256
	V	Trustsec (SGT, SGACL)
	√/-	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
	>	CIP (EtherNet/IP)
	√ /√	REP / REP Fast
	√/-	PRP / HSR
the [√/-	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
e refe	√ /√	IOx / Cybervision
lease	-/√	SD-A. Ext. Node / PEN
ils, p	-/√ √/√	Classic IOS / IOS XE
deta	√ /√	Mgmt: WebUI / CLI
For	√ /√	Mgmt: IND / DNA-C



IE 4000 – Advanced Features

- \Rightarrow 12 different models
- \rightleftharpoons 4 GE combo uplinks
- 🔶 Data-plane FPGA
- \rightleftharpoons HSR and PRP support
- ☆ Time-sensitive networking (TSN)
- ☆ 240W PoE power budget



	1G	Max. Uplink Speed
	1G*	Max. Downlink Speed
	√/√	Layer 2 / Layer 3
	√/-	DIN-RAIL / 19"
	-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
3	 Image: A second s	Flexible NetFlow
1640	√/-	MACsec: 128 / 256
100/	 Image: A second s	Trustsec (SGT, SGACL)
For details, please reter to the <u>Datasheet</u> on <u>cisco.com/go/ie</u> 2	√/-	L2NAT: Uplinks / All Int.
	√/√	Profinet / MRP
	 Image: A second s	CIP (EtherNet/IP)
sheet	√/-	REP / REP Fast
Jatas	√/√	PRP / HSR
the	√ /√	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
ease rete	-	IOx / Cybervision
	√/-	SD-A. Ext. Node / PEN
lls, p	√/-	Classic IOS / IOS XE
deta	√/√	Mgmt: WebUI / CLI
For	√/√	Mgmt: IND / DNA-C



IE 4010 – Industrial Rackmount

IE4000 feature-set in 19" form-factor

 \Rightarrow 2 models



	1G	Max. Uplink Speed
	1G	Max. Downlink Speed
	√ √	Layer 2 / Layer 3
	-/√	DIN-RAIL / 19"
	-	Modular / Stacking
	IP30	IP Rating
	√*/-	PoE(+) / 4PPoE
10	>	Flexible NetFlow
ie40	√/-	MACsec: 128 / 256
<u>/06/</u>	~	Trustsec (SGT, SGACL)
For details, please refer to the Datasheet on cisco.com/go/ie401	√ /√	L2NAT: Uplinks / All Int.
	√ /√	Profinet / MRP
on	√	CIP (EtherNet/IP)
shee.	√/-	REP / REP Fast
Datas	√ √	PRP / HSR
the [√/-	IEEE 1588 PTP / TSN
er to	-	Timing Interfaces
e refe	-	IOx / Cybervision
lease	√/-	SD-A. Ext. Node / PEN
ils, p	√/-	Classic IOS / IOS XE
deta	√ /√	Mgmt: WebUI / CLI
For	√ /√	Mgmt: IND / DNA-C



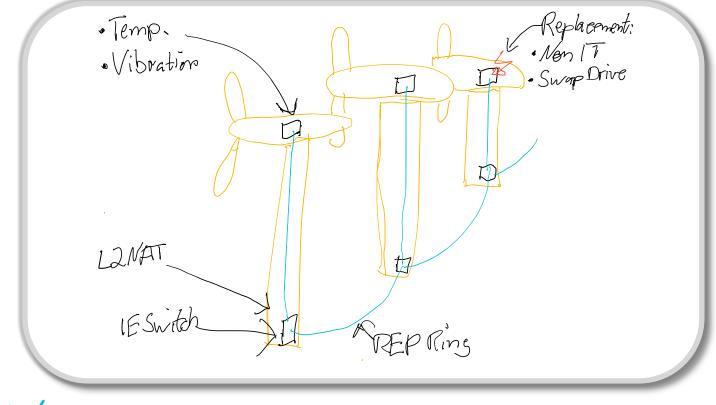
	10G*	Max. Uplink Speed
	1G	Max. Downlink Speed
	11	Layer 2 / Layer 3
	-/√	DIN-RAIL / 19"
	-/√	Modular / Stacking
	IP30	IP Rating
🔶 Horizontal stacking	√*/-	PoE(+) / 4PPoE
A Horizontal stacking	✓	Flexible NetFlow
☆ 1G or 10G uplinks	√/-	MACsec: 128 / 256
	✓	Trustsec (SGT, SGACL)
	<i>√\</i> √	L2NAT: Uplinks / All Int.
	<i>√\</i> √	Profinet / MRP
	✓	CIP (EtherNet/IP)
	√/-	REP / REP Fast
	<i>√\</i> √	PRP / HSR
	√/-	IEEE 1588 PTP / TSN
	✓	Timing Interfaces
	-	IOx / Cybervision
	√/-	SD-A. Ext. Node / PEN
	√/-	Classic IOS / IOS XE
For details,	<i>√</i> /√	Mgmt: WebUI / CLI
Lo La	√ /√	Mgmt: IND / DNA-C
area illa		*select models



Vertical Examples

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Example Vertical: Wind Farms



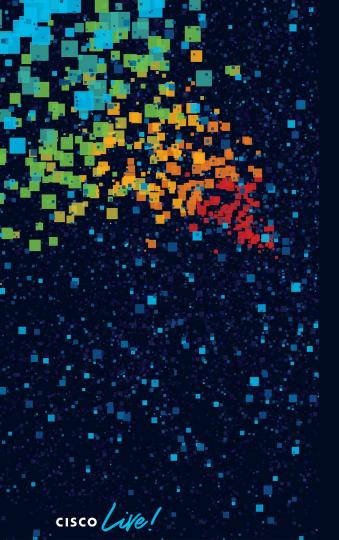
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Other Vertical Examples



- Manufacturing
- "Rugged Enterprise"
- $\boldsymbol{\cdot}$ Oil and Gas
- Utilities
- \cdot Vehicles
- · Railways
- Roadways & Intersections

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Summary

- Unique properties of IE Switching
- The Cisco IE Portfolio
- Vertical Examples





Thank you

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