



Possibilities

#CiscoLive

Cisco's Industrial Ethernet Switching Portfolio

An Introduction and Overview

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DGTL-BRKIOT-2006

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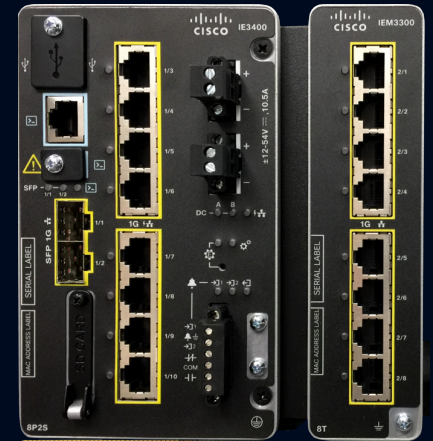
June 2-3, 2020 | ciscolive.com/us

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Agenda

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





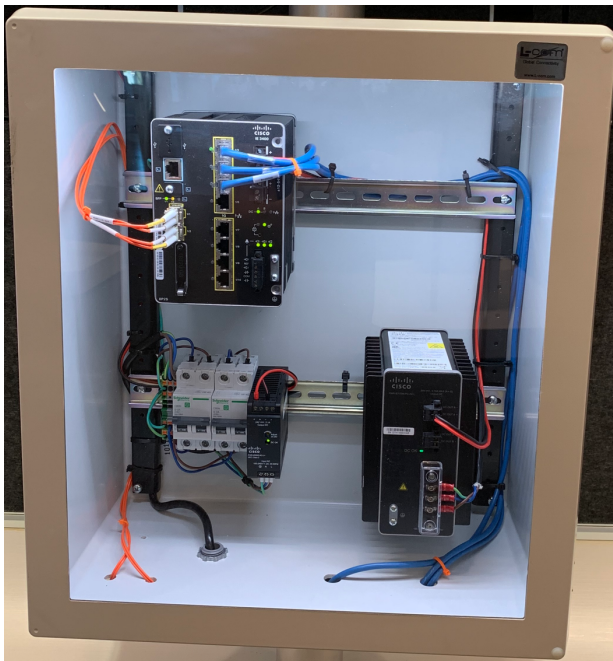
Introduction: What is unique about Industrial Ethernet?

Hardened for Harsh(er) Environments



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

Non-19"



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

Industrial Protocols

PROFINET

Common Industrial Protocol (CIP)

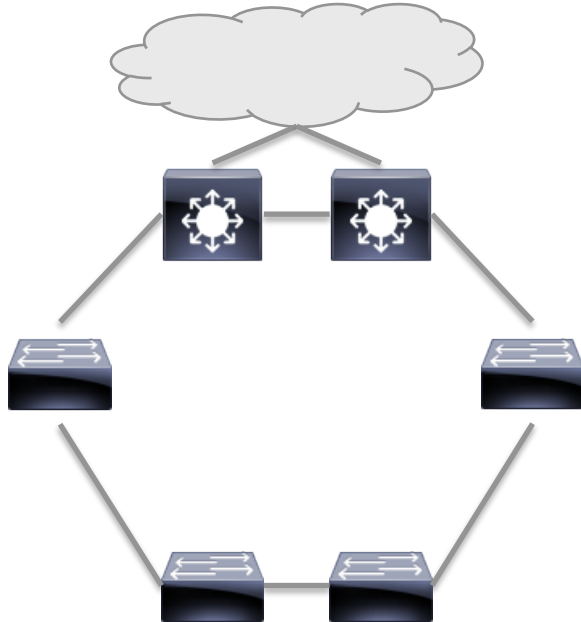
Precision Time Protocol (PTP)
(See: [BRKIOT-2517](#))

Modbus

Time-Sensitive Networking (TSN)

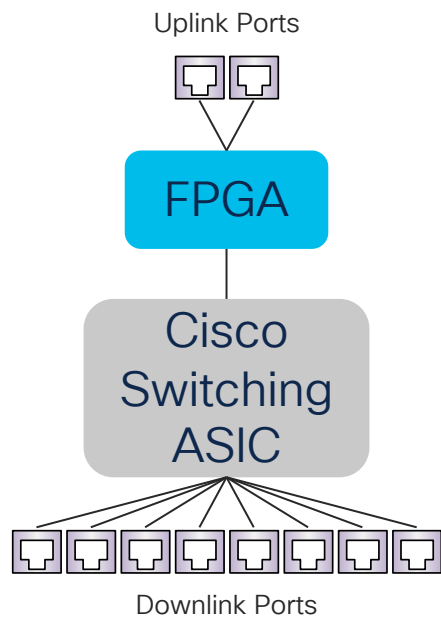
- Integration into industrial environments by supporting common industrial protocols

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



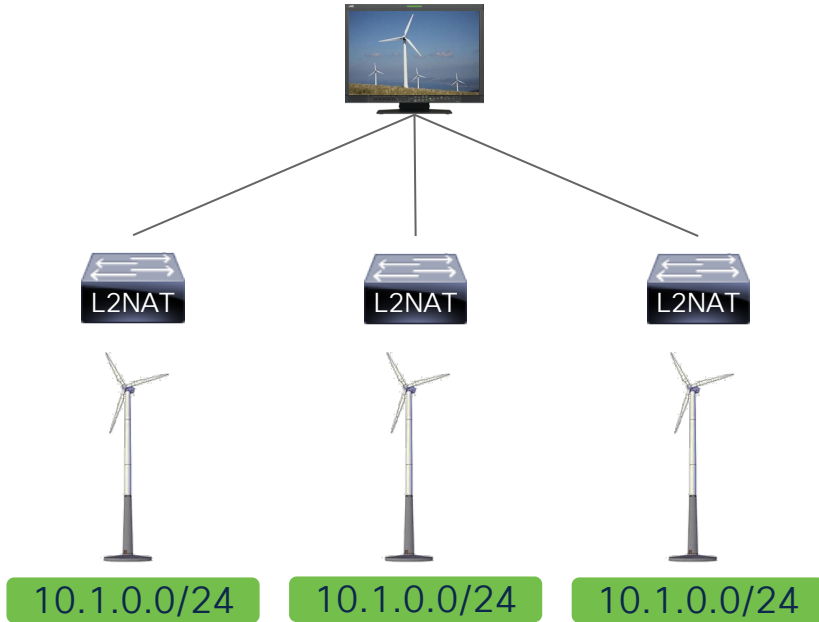
- Select models leverage FPGAs to support special IoT features at line-rate
- Future-proofing
- Examples:
 - L2NAT
 - PRP / HSR
 - IEEE 1588 PTP

“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

Certifications

TYPE EXAMINATION CERTIFICATE



Equipment or Protective System intended for use in Potentially Explosive Atmospheres
Directive 2014/54/EU

Type Examination Certificate Number: **DEMKO 19 ATEX 214EX Rev. 0**

Product: **Ethernet Switches, IE, IEM 3200/300/400 Modules**

Manufacturer: **Cisco Systems Inc.**

Address: **170 W Tasman Dr., San Jose, CA 95134 USA**

This equipment and any acceptable variant items is specified in the schedule to this certificate and the documents therein referred to.

UL International Demko A10 certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex 1 to Directive 2014/54/EU of the European Parliament and of the Council, dated 29 February 2014.

The examination and test results are recorded in confidential report no. **478869587.6.1**

Compliance with the Essential Health and Safety Requirements has been assessed by compliance with:
EN 60079-0:2012+A11:2013 **EN 60079-15:2010**

except in respect of those requirements listed at item 10 of the Schedule.

If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

This Type Examination Certificate relates only to the design of the specified product, and not to specific items of product subsequently manufactured.

The marking of the product shall include the following:

 **II 3 G** **Ex nA IIC T4 Gc**
for
IEM-3300-8T, IEM-3300-8T2S, IEM-3300-8P, IEM-3300-16P IEM-3300-8S, IEM-3300-14T2S, IEM-3300-16T, IEM-3400-8S, IEM-3400-8T

 **II 3 G** **Ex nA nC IIC T4 Gc**
for
IE-3200-8T2S, IE-3200-8P2S, IE-3300-8T2S, IE-3300-8P2S, IE-3400-8T2S

Certification Manager
Jan-Erik Borggaard


Certification Body UL International Demko A10, Boulevardg. 2A, 2750 Sløtterup, Denmark
Tel. +45 44 85 65 65 ul.ul.com www.ul.com



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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

IE 1000 – Entry Level, Web Managed

- ★ 4 models
- ★ Small form factor
- ★ 30s boot-time



For details, please refer to the [Datasheet](https://www.cisco.com/go/ie1000) on [cisco.com/go/ie1000](https://www.cisco.com/go/ie1000)

1G	Max. Uplink Speed
100M	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

IE 2000 – FastEthernet Access

- ★ 25 models
- ★ Conformal coating*
- ★ Alarm I/O



For details, please refer to the [Datasheet on cisco.com/go/ie2000](https://www.cisco.com/go/ie2000)

1G	Max. Uplink Speed
100M	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

IE 2000U – Special Features for Utilities

- ★ Purpose built for energy and utility industries
- ★ IEC-61850-3 and IEEE 1613
- ★ GOOSE



For details, please refer to the [Datasheet on cisco.com/go/ie2000u](https://www.cisco.com/go/ie2000u)

1G	Max. Uplink Speed
100M	Max. Downlink Speed
✓✓	Layer 2 / Layer 3
✓/-	DIN-RAIL / 19"
-	Modular / Stacking
IP30	IP Rating
✓*/-	PoE(+)/ 4PPoE
-	Flexible NetFlow
-	MACsec: 128 / 256
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-	L2NAT: Uplinks / All Int.
-	Profinet / MRP
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✓/-	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 IP67 – Very Harsh Environments

- ★ IE 2000 in IP67 form factor
- ★ Suitable for very harsh environments



For details, please refer to the [Datasheet on cisco.com/go/ie2000](https://www.cisco.com/go/ie2000)

1G	Max. Uplink Speed
100M	Max. Downlink Speed
✓✓*	Layer 2 / Layer 3
-/-	DIN-RAIL / 19"
-	Modular / Stacking
IP67	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

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



For details, please refer to the [Datasheet on cisco.com/go/ie3200](https://www.cisco.com/go/ie3200)

1G	Max. Uplink Speed
1G	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 3300 – Modular next-gen w/ IOS XE

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



For details, please refer to the [Datasheet on cisco.com/go/ie3300](https://www.cisco.com/go/ie3300)

1G	Max. Uplink Speed
1G	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

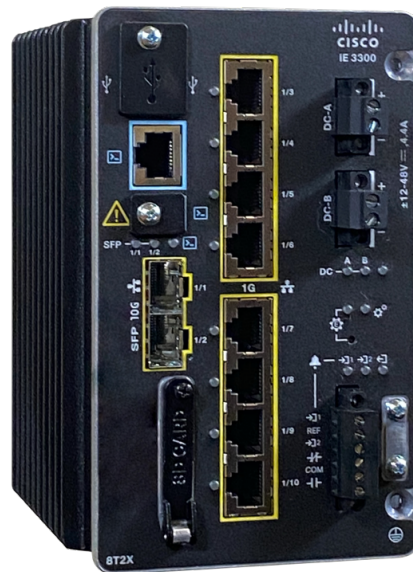
*select models

IE 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



For details, please refer to the Datasheet¹ on [cisco.com/go/ie3300](https://www.cisco.com/go/ie3300)

10G	Max. Uplink Speed
1G	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
-2/-	IEEE 1588 PTP / TSN
-	Timing Interfaces
✓✓	IOx / Cybervision
✓/-	SD-A. Ext. Node / PEN
-/✓	Classic IOS / IOS XE
✓✓	Mgmt: WebUI / CLI
✓✓	Mgmt: IND / DNA-C

¹select models

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)
- ★ Cybervision Sensor



For details, please refer to the [Datasheet on cisco.com/go/ie3400](https://www.cisco.com/go/ie3400)

1G	Max. Uplink Speed
1G	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

IE3400H – High-End IP67

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



For details, please refer to the [Datasheet on \[cisco.com/go/ie3400h\]\(https://www.cisco.com/go/ie3400h\)](https://www.cisco.com/go/ie3400h)

1G*	Max. Uplink Speed
1G*	Max. Downlink Speed
✓✓	Layer 2 / Layer 3
-/-	DIN-RAIL / 19"
-/-	Modular / Stacking
IP67	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 4000 – Advanced Features

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



For details, please refer to the [Datasheet on cisco.com/go/ie4000](https://www.cisco.com/go/ie4000)

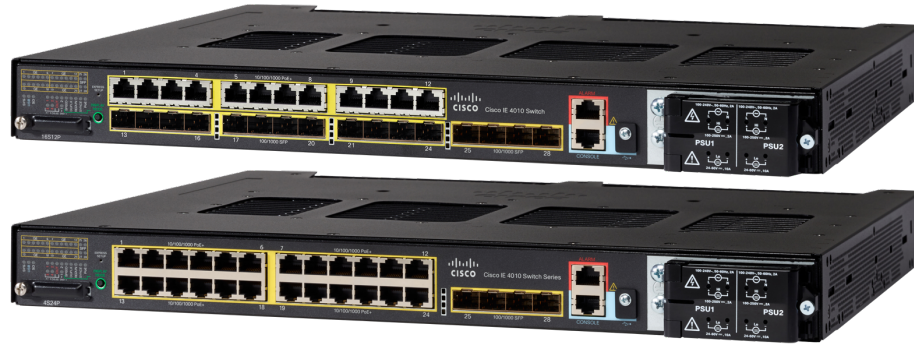
1G	Max. Uplink Speed
1G*	Max. Downlink Speed
✓✓	Layer 2 / Layer 3
✓/-	DIN-RAIL / 19"
-	Modular / Stacking
IP30	IP Rating
✓*/-	PoE(+) / 4PPoE
✓	Flexible NetFlow
✓/-	MACsec: 128 / 256
✓	Trustsec (SGT, SGACL)
✓/-	L2NAT: Uplinks / All Int.
✓✓	Profinet / MRP
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✓/-	SD-A. Ext. Node / PEN
✓/-	Classic IOS / IOS XE
✓✓	Mgmt: WebUI / CLI
✓✓	Mgmt: IND / DNA-C

*select models

IE 4010 – Industrial Rackmount

★ IE4000 feature-set in 19" form-factor

★ 2 models



For details, please refer to the [Datasheet on cisco.com/go/ie4010](https://www.cisco.com/go/ie4010)

1G	Max. Uplink Speed
1G	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

IE 5000 – Stackable Rackmount w/ 10G*

- ★ Horizontal stacking
- ★ 1G or 10G uplinks
- ★ 2 models



For details, please refer to the [Datasheet on cisco.com/go/ie5000](https://www.cisco.com/go/ie5000)

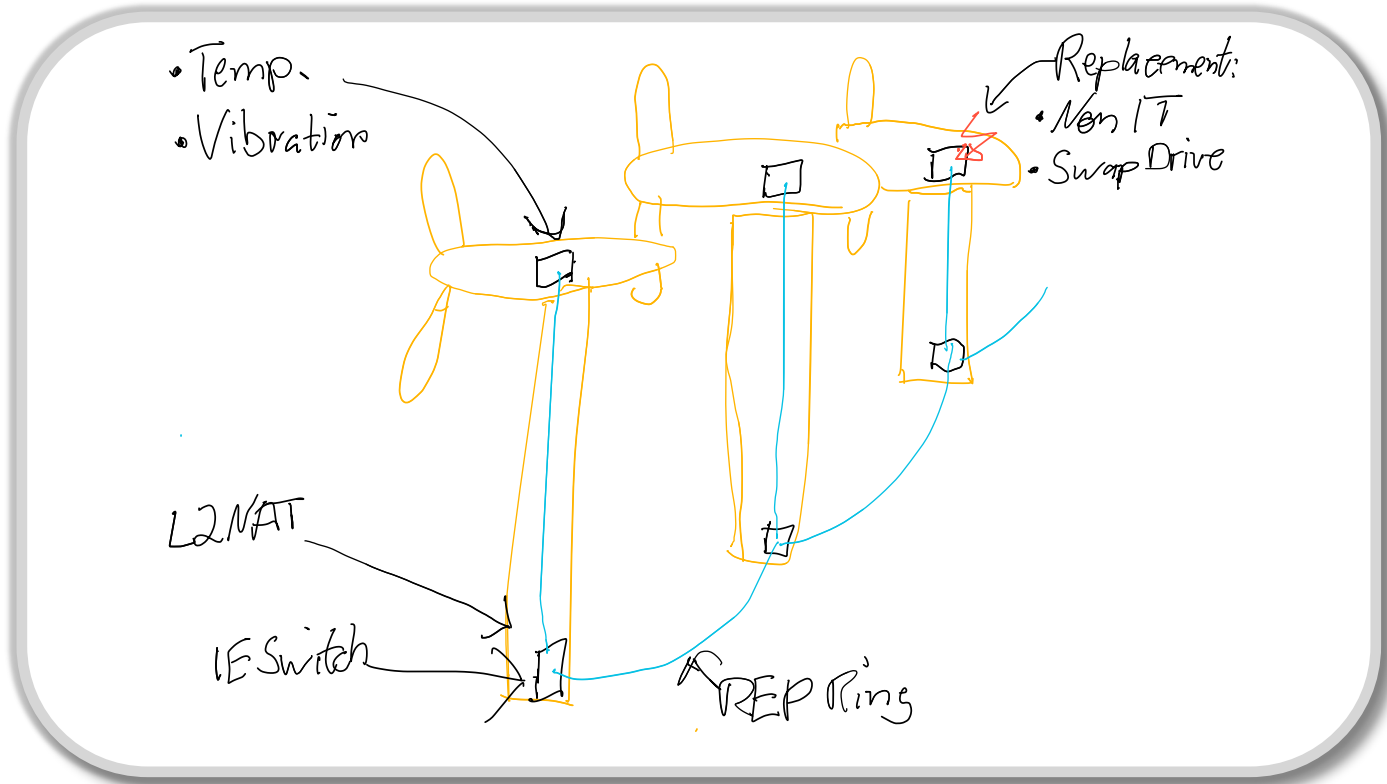
10G*	Max. Uplink Speed
1G	Max. Downlink Speed
✓✓	Layer 2 / Layer 3
-/✓	DIN-RAIL / 19"
-/✓	Modular / Stacking
IP30	IP Rating
✓*/-	PoE(+) / 4PPoE
✓	Flexible NetFlow
✓/-	MACsec: 128 / 256
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✓✓	Mgmt: IND / DNA-C

*select models



Vertical Examples

Example Vertical: Wind Farms



Other Vertical Examples



- Manufacturing
- “Rugged Enterprise”
- Oil and Gas
- Utilities
- Vehicles
- Railways
- Roadways & Intersections

Summary

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



Thank you

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