The Extension of Ethernet and Industrial IOT in Manufacturing

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PANDUIT™

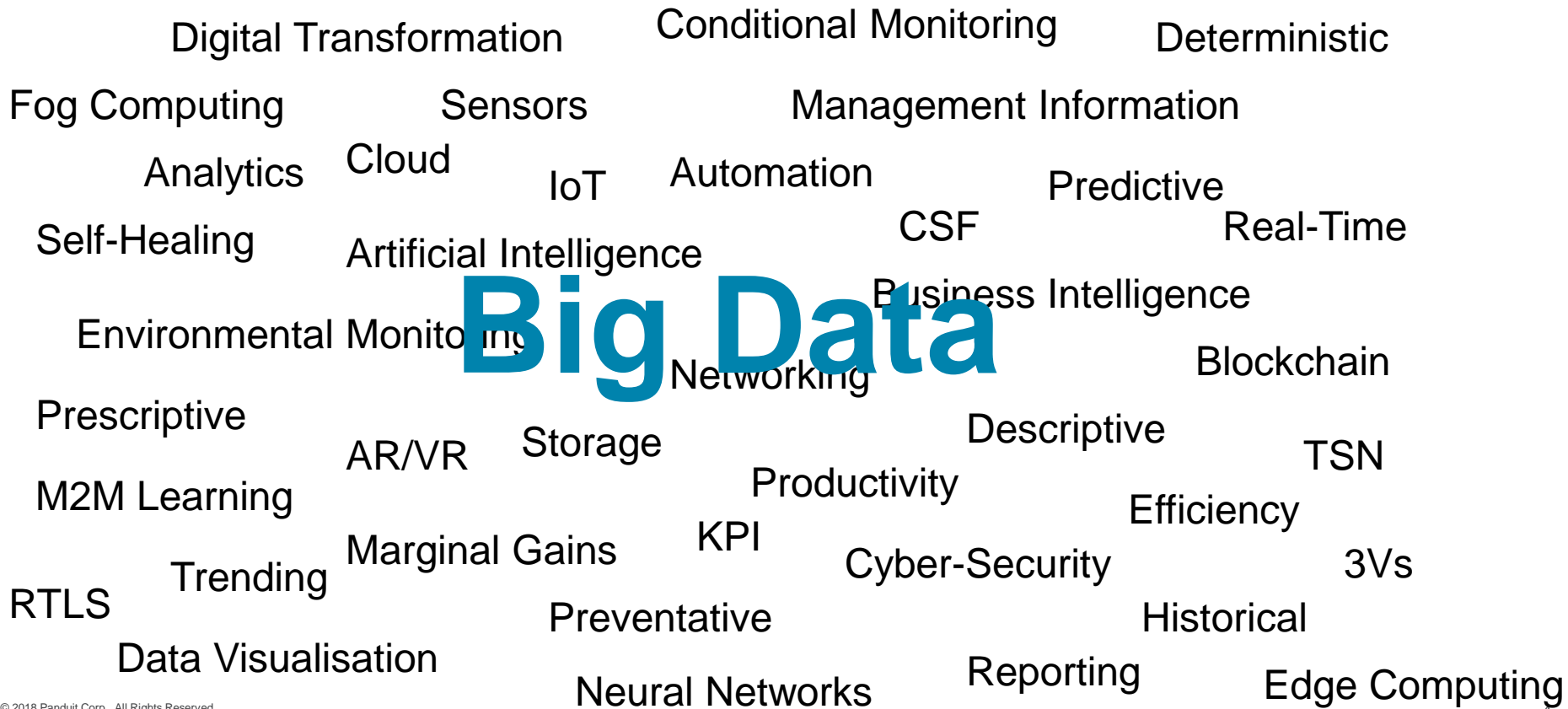# Agenda

- Big Data – A brief history lesson

- Standards
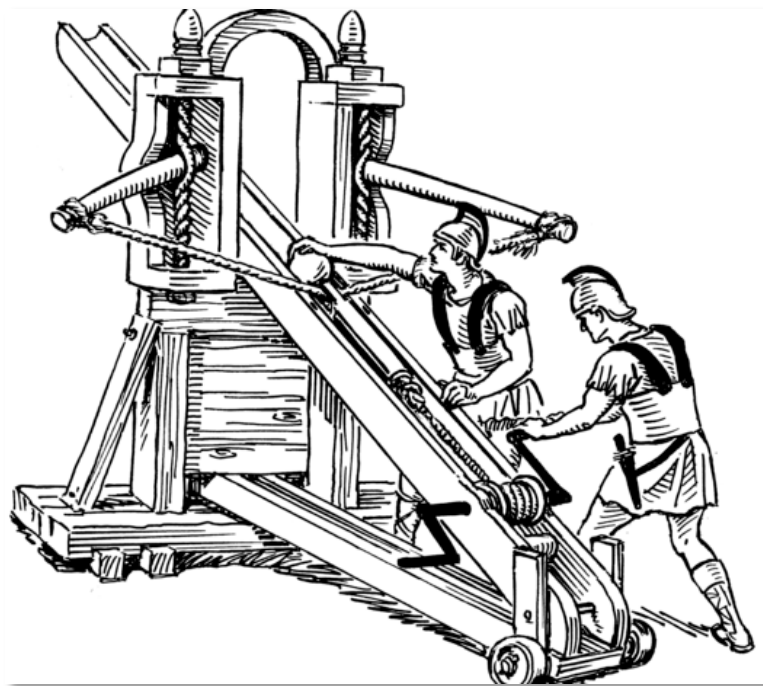
- Reference Architecture

- Summary

A Brief History Lesson

Big Data is Nothing New…..

- Resources:
  - Army
  - Artillery
  - Food/Water
  - Horses
  - Medicines/Medics
  - Shelter
  - Ships……

- Weather – Across a continent

- Competition (aka the enemy)

Why Now?

- Massive data explosion, stretching the limitations of legacy networks

- Manufacturing networks are migrating to switch-centric topologies

- Manufacturing intelligence PLUS real-time analytics and data mining

- IT based solutions migrating to the plant floor

Organizations are challenged to leverage technology and networks to connect the factory and enterprise boosting productivity, innovation and business agility.

"The productivity economy will reward 'do it smarter' companies that build a better business model."
The productivity imperative, McKinsey & Company

30B

Connected, autonomous, "things"

$3T

The potential market size

75%

Companies exploring or already using IoT technology

Internet of Things

Driving business for next 10-15 years

4B Connected People ▪ **$4T** Revenue Opportunity ▪ **>25M** Embedded and Intelligent Systems ▪ **50T** GBs of Data

Main Global Ind. Ethernet Technology "Standards"

Ethernet	PROFINET	ETHERNET/IP	Modbus-IP
ISO/IEC 11801	ISO/IEC 11801-3 ISO/IEC 24702	ISO/IEC 11801-3 ISO/IEC 24702	ISO/IEC 11801-3 ISO/IEC 24702
	IEC 61784-2 CPF3	IEC 61784-2 CPF2/2	IEC 61784-2 CPF15

Subtle Differences on the Network Standards

Data Center

Plant Floor

	Data Center		Plant Floor
ISO/IEC 24764		ISO/IEC 11801	ISO/IEC 24702
EN 50173-1 EN 50173-5		EN 50173-1 EN 50173-2	EN 50173-1 EN 50173-3
ANSI/TIA 942		ANSI/TIA 568-C	ANSI/TIA 1005

IEC 24702/MICE Compliant Cabling

- Panduit can help you to get the right type of cabling. There may also be vertical-specific requirements to fulfil, for example in
  - food & beverage
  - pharmaceutical
  - oil & gas

- EN 50575:2014 Construction Products Regulation (CPR) in the EU Since July 1st, 2017 the fixed cabling used needs to comply,

- Panduit will help you to update your company standard: http://www.panduit.com/ccurl/510/394/construction-products-regulations-cpr-cotb12.pdf

Cable Selection Process

M.I.C.E. Describes Real World Challenges

Increased Environmental Severity

	M_1	M_2	M_3
Mechanical • Shock • Vibration			
Ingress • Water • Dust	I_1	I_2	I_3
Climatic **C**hemical	C_1	C_2	C_3
Electro-magnetic	E_1	E_2	E_3

(TIA-1005)   **Office**   **Industrial**
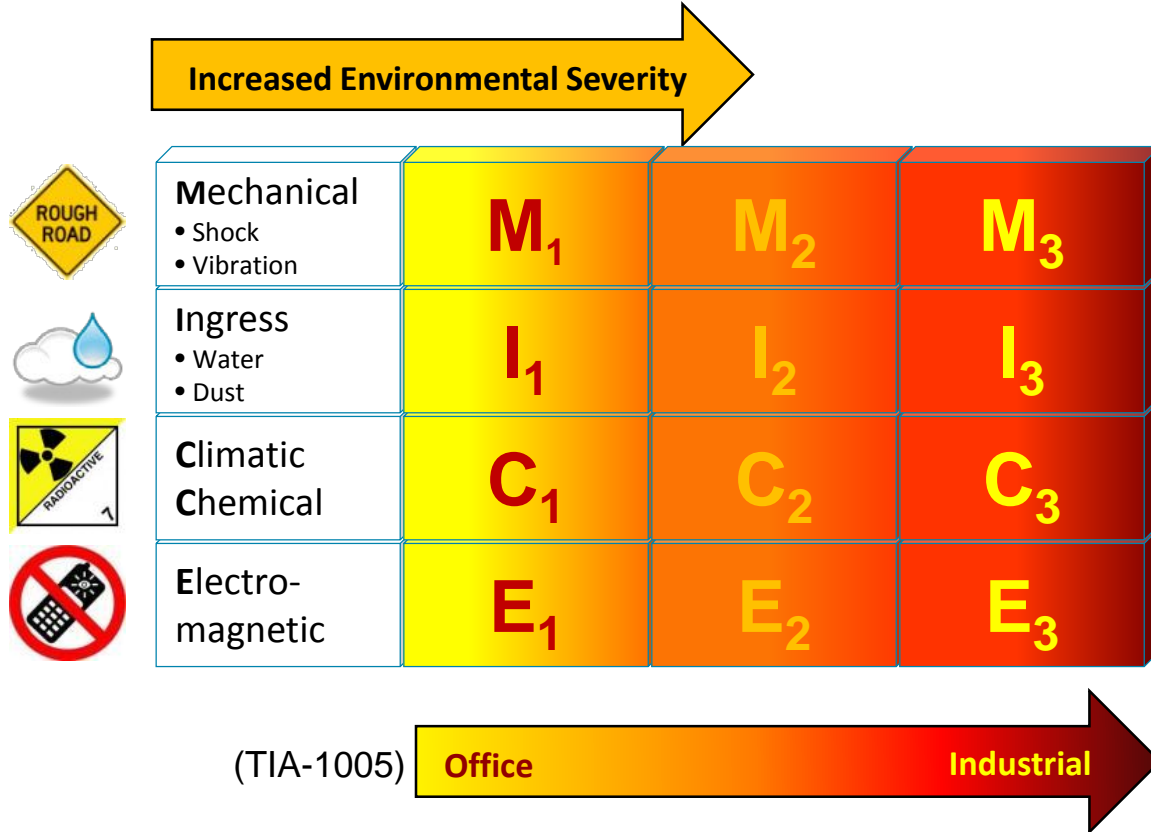
Reference Architecture

An architecture that provides network services to Industrial Automation Control Systems (IACS) devices and equipment

- Defines a **framework**

- Strict **traffic segmentation**

- **Industrialized Demilitarized Zone (IDMZ)** was established
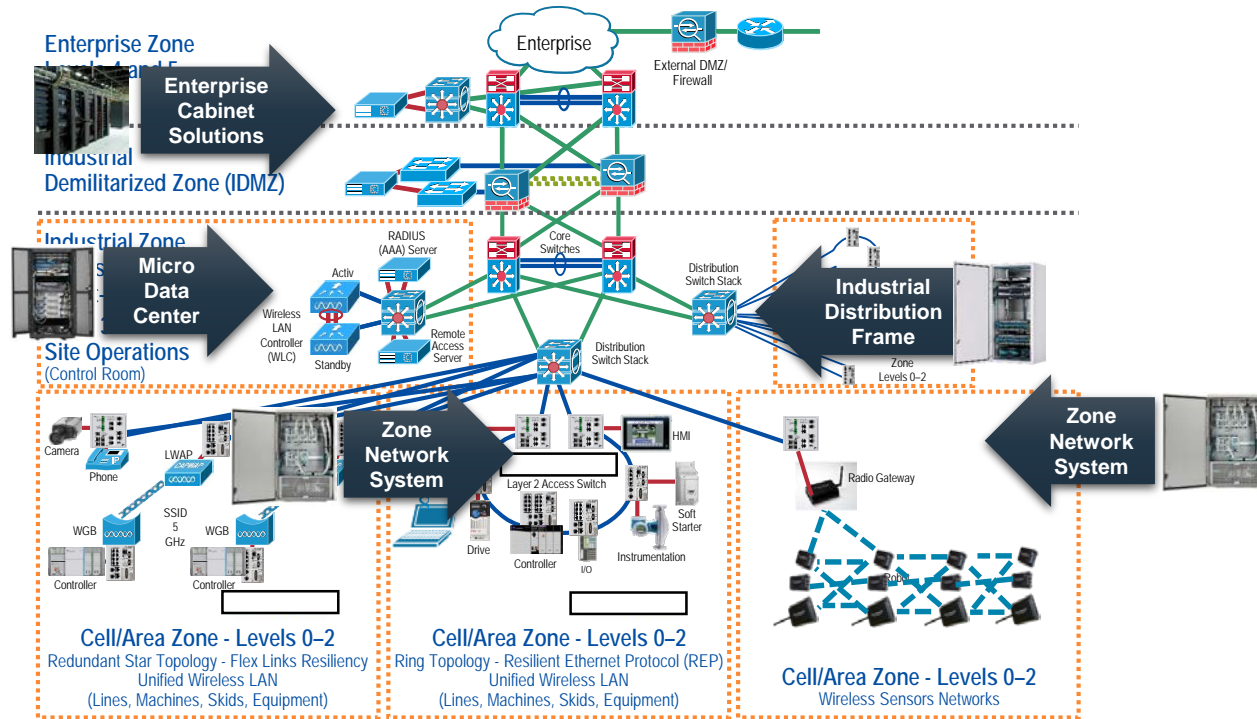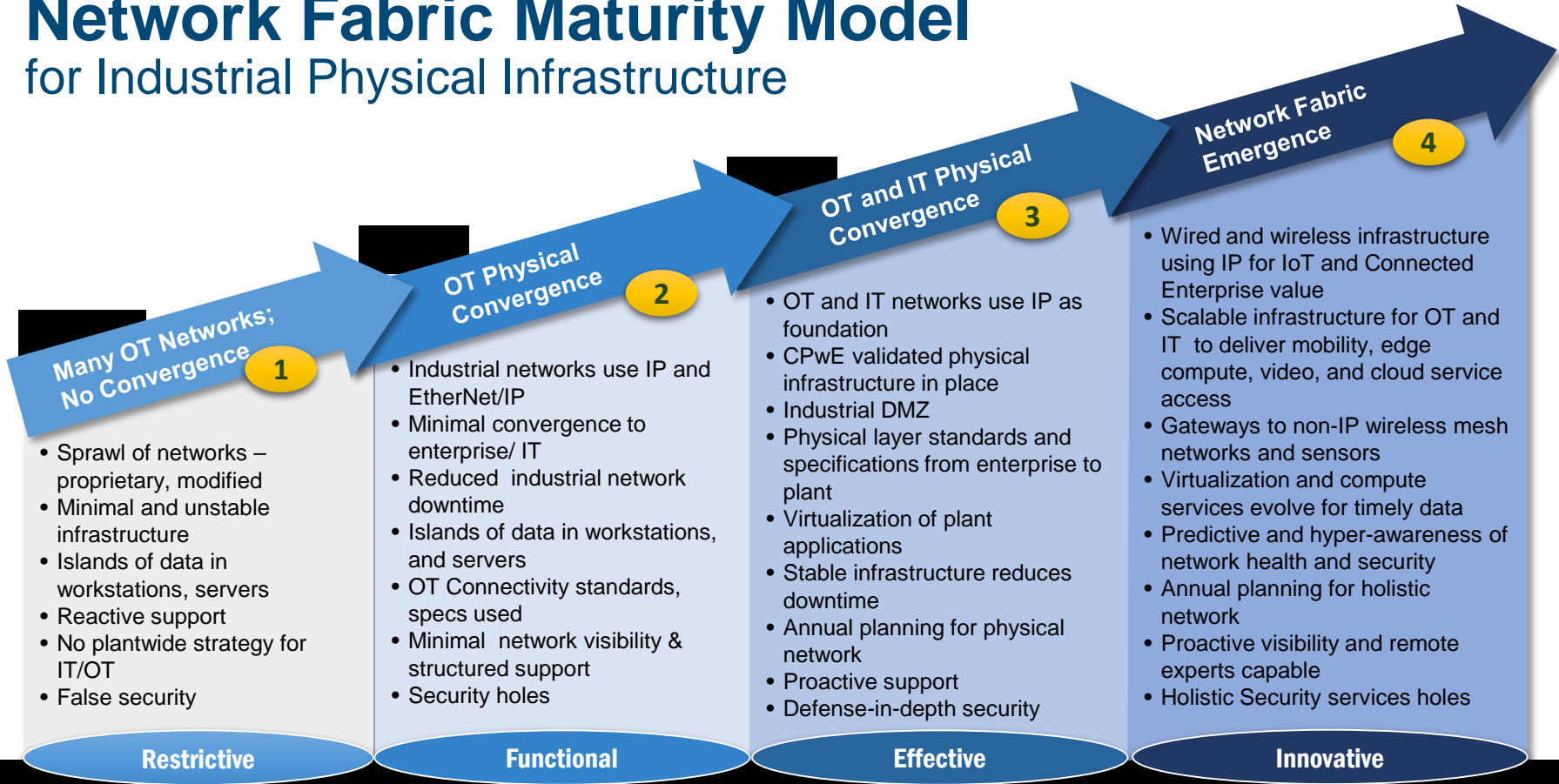
- Levels 4-5 of the Enterprise Zone are **similar to traditional enterprise networks**

Panduit Building Blocks in a Logical Architecture

Network Fabric Maturity Model
for Industrial Physical Infrastructure

Many OT Networks; No Convergence — 1

OT Physical Convergence — 2

OT and IT Physical Convergence — 3

Network Fabric Emergence — 4

Restrictive (1)
- Sprawl of networks – proprietary, modified
- Minimal and unstable infrastructure
- Islands of data in workstations, servers
- Reactive support
- No plantwide strategy for IT/OT
- False security

Functional (2)
- Industrial networks use IP and EtherNet/IP
- Minimal convergence to enterprise/ IT
- Reduced industrial network downtime
- Islands of data in workstations, and servers
- OT Connectivity standards, specs used
- Minimal network visibility & structured support
- Security holes

Effective (3)
- OT and IT networks use IP as foundation
- CPwE validated physical infrastructure in place
- Industrial DMZ
- Physical layer standards and specifications from enterprise to plant
- Virtualization of plant applications
- Stable infrastructure reduces downtime
- Annual planning for physical network
- Proactive support
- Defense-in-depth security

Innovative (4)
- Wired and wireless infrastructure using IP for IoT and Connected Enterprise value
- Scalable infrastructure for OT and IT to deliver mobility, edge compute, video, and cloud service access
- Gateways to non-IP wireless mesh networks and sensors
- Virtualization and compute services evolve for timely data
- Predictive and hyper-awareness of network health and security
- Annual planning for holistic network
- Proactive visibility and remote experts capable
- Holistic Security services holes

Summary

- **Drop by our stand to discuss further**

- **Run a self-assessment for the network maturity: www.panduit.com/mapyourjourney**

- **Use IntraVUE to document the manufacturing IT and network on its performance level. Also test it on existing problems**

- **Plan with Panduit your corporate spec according to the cross-regional and application specific standards**

Thank You for Listening

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