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MindSphere the Siemens Open Cloud Based Industrial IoT Operating System

Tran Vinh Thanh

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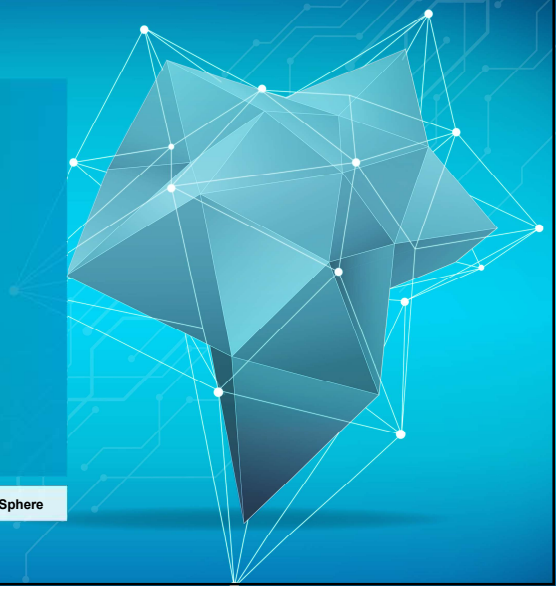
siemens.ltd/MindSphere



1

McKinsey estimates Predictive Maintenance has a Potential value gain of 10% - 40% cost savings

The financial benefits for companies that leverage connectivity and digitalization can be staggering. By the year 2025, the total economic impact of the IoT is forecast to be a minimum a **$1.2 trillion/year**, including...

	POTENTIAL ECONOMIC IMPACT	POTENTIAL VALUE GAIN
*Operations Optimization	$633b – $1.76t	5% – 12.5% cost reduction
*Predictive Maintenance	$240b – $627b	10% – 40% cost savings
*Inventory Optimization	$98b – $342b	20% – 50% cost reduction
*Worker Health and Safety	$65b – $226b	10% – 25% savings

** Hover over the term for explanation*

Source: McKinsey Global Institute

landout 1

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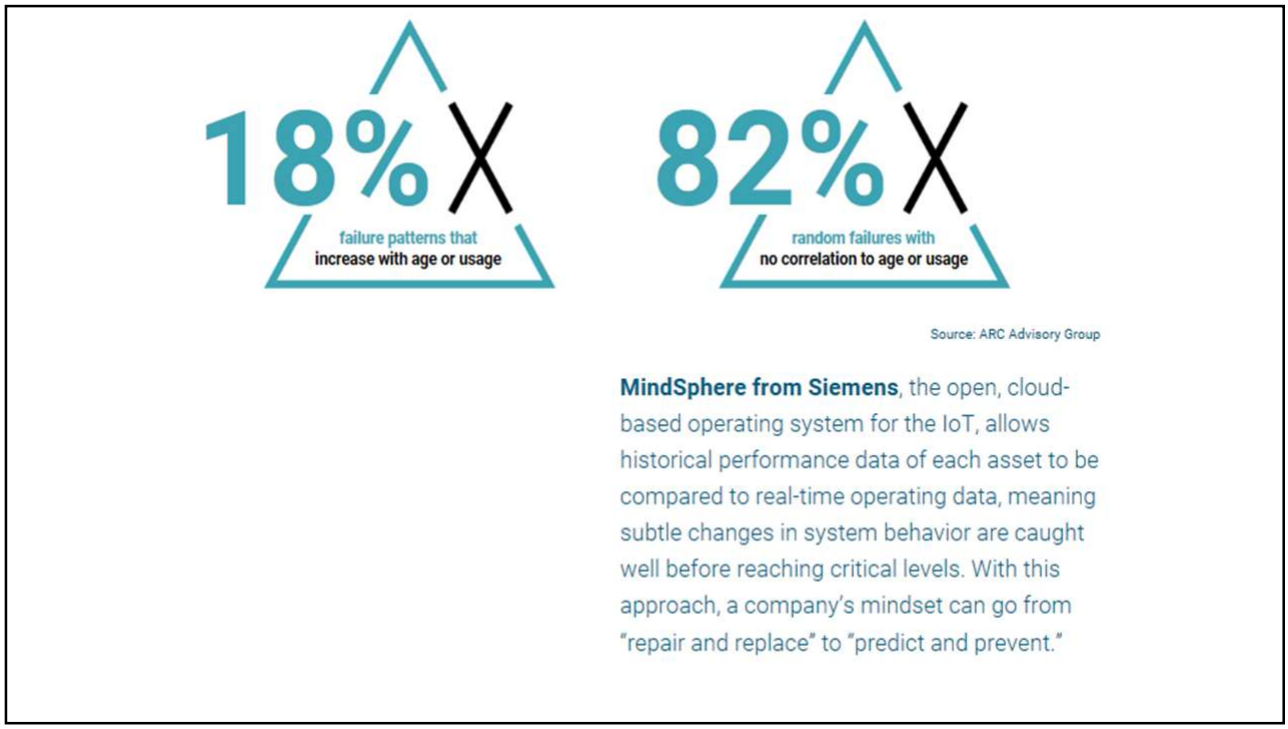
18%
failure patterns that
increase with age or usage
82%
random failures with
no correlation to age or usage
Source: ARC Advisory Group
MindSphere from Siemens, the open, cloud-based operating system for the IoT, allows historical performance data of each asset to be compared to real-time operating data, meaning subtle changes in system behavior are caught well before reaching critical levels. With this approach, a company's mindset can go from "repair and replace" to "predict and prevent."

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MindSphere
changes
everything

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IoT and IIoT, and Digitalization of Industries

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HOW…

…does Digitalization work?

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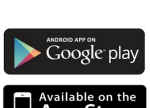
Apps



Operating System

Sensors

Handout 3

6

The fitness tracker for your drive system!

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SIMOTICS IQ

- Motor operating data
- Power and speed
- Operating status and operating hours
- Fleet management
- Electronic rating plate

Digital link through SIMOTICS Connect, a plug & play sensor box with communication via WLAN and integrated power supply.

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The new "IQ" user experience – scaling up your digital business

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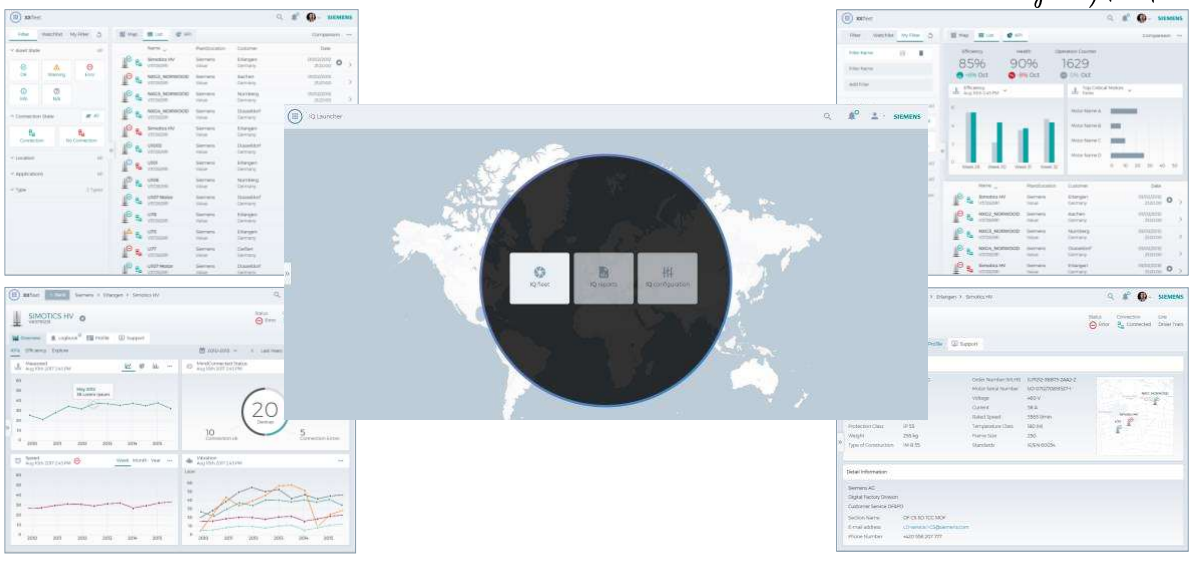

Handout 4

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To make use of industrial data within machines industry expertise is key to success in IIoT vs. IoT

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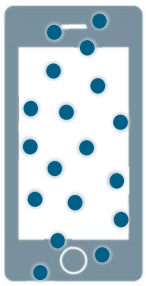
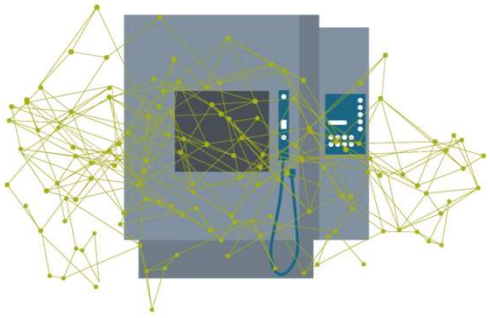
Simple consumer applications vs. complex industrial applications





Industry expertise is key to success

20 sensors

2000 data points

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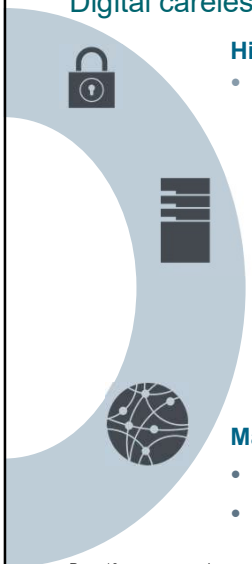
MindSphere – Highest IT Security standards

Digital carelessness



Highly scalable, cost efficient

- Highly scalable, cost efficient cloud-infrastructure based on Cloud Foundry

Highest security standards

- MindConnect Elements based on ICS (Industrial Controls System) Security oriented to industry standard IEC 62443
- MindSphere Platform IT Security oriented to industry standard ISO 27001, IEC 62443, BSI
- Data in rest is located on SAP datacenters that comply to all required certificates
- Data in motion is always at least 256 bit SSL/TLS encrypted

Maximum confidentiality

- The customer controls these authorization levels and is the owner of this data
- Siemens acts a data custodian

Technology & Portfolio
Connectivity

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Apps

Platform

Connectivity

- MindSphere Connectivity Suite
- Siemens Products Ready for MindSphere
- Edge Analytics with On-Site Pre-Processing Tools
- Connectivity to non Siemens assets
- Connectivity to cloud based and on premise data such as ERP, CRM, Historians, MES

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Connecting Assets to MindSphere: MindConnect

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With the **Connectivity** offerings, MindSphere provides **multiple**, varied and **easy-to-implement connectivity** solutions (both, hardware and software based) to be able to **onboard** a **wide range** of **assets** (Siemens and 3rd-party) in both brown- and greenfield environments.

MindConnect Nano

MindConnect IoT2040

MindConnect API/LIB

MindConnect Edge Analytics

MindConnect IoT Extension

MindConnect Integration

Handout 6

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Technology & Portfolio
Platform

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Apps

Platform / Operating System

- Architecture based on **Cloud Foundry**
- APIs/App Development Offering
- Deployment Options on AWS and Azure
- Security
- Scalability

Connectivity

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MindSphere Platform - Characteristics of different platform models

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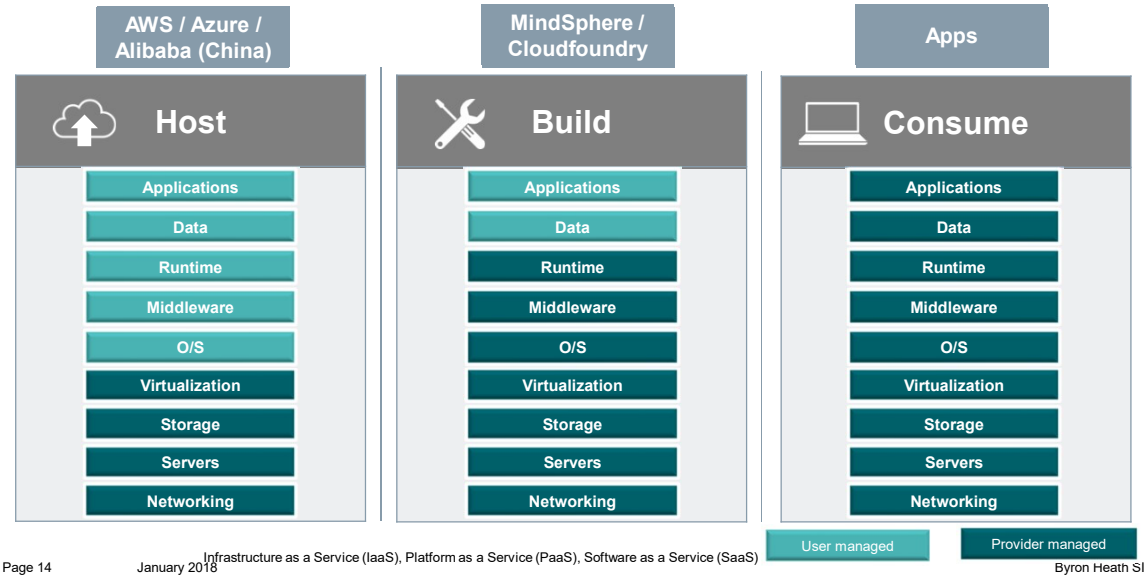

Handout 7

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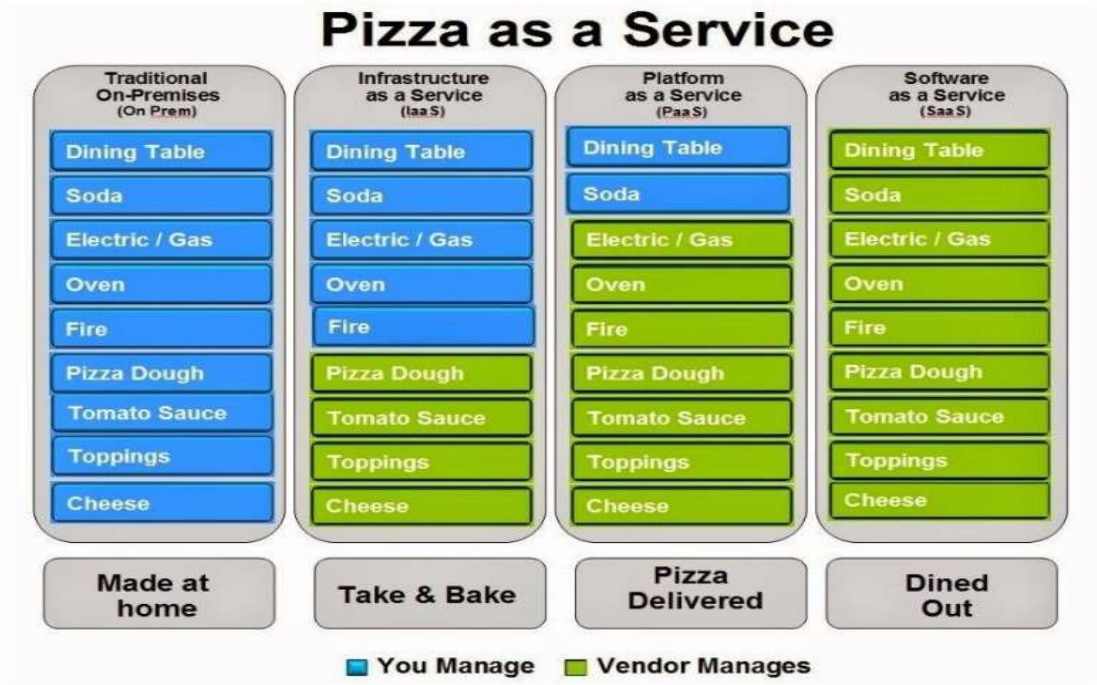

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Technology & Portfolio
Apps

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Apps

- MindSphere App Store
- Core Apps / MindApps
- Develop your own application thanks to APIs
- Partner ecosystem for app development and more
- Analytics and machine learning

Platform

Connectivity

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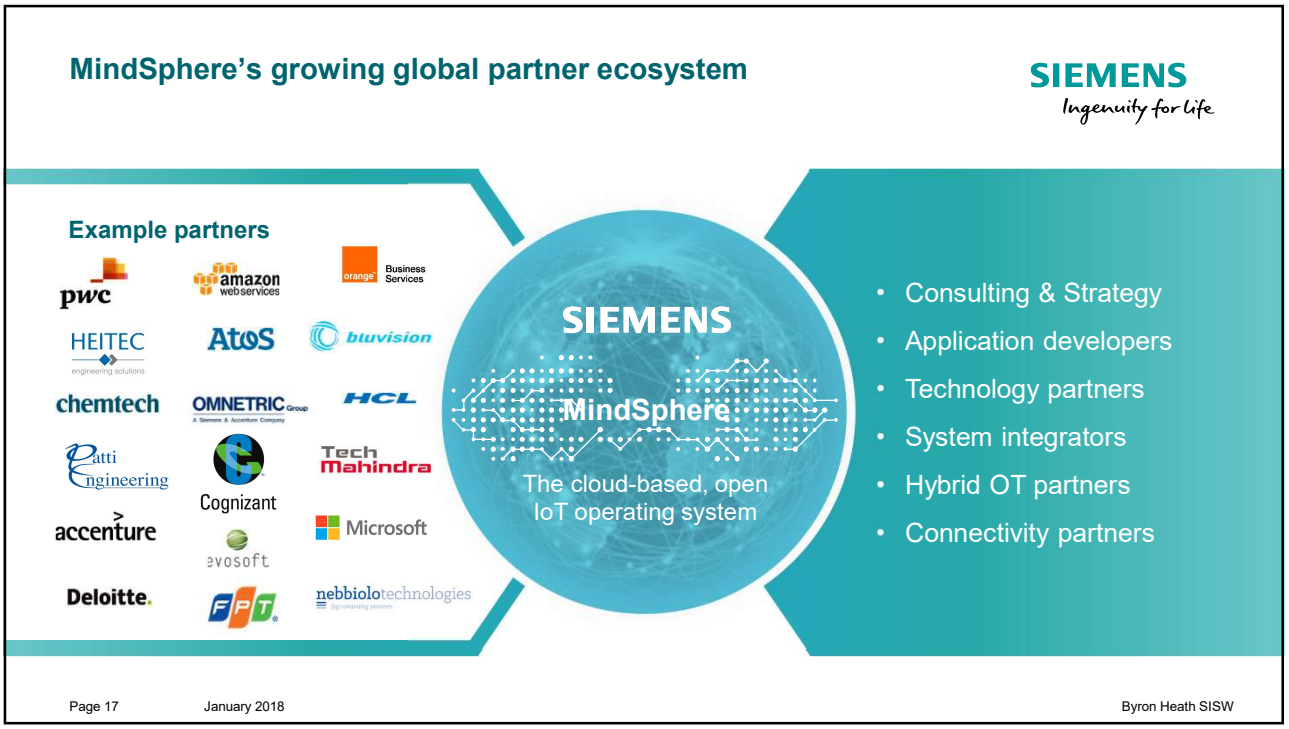

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Handout 9

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MindSphere is your entry point to develop or consume apps and digital services

Enabler…

…for digital transformation

Foundation…

…for development of applications & digital services

Multiplier…

…for your digital business

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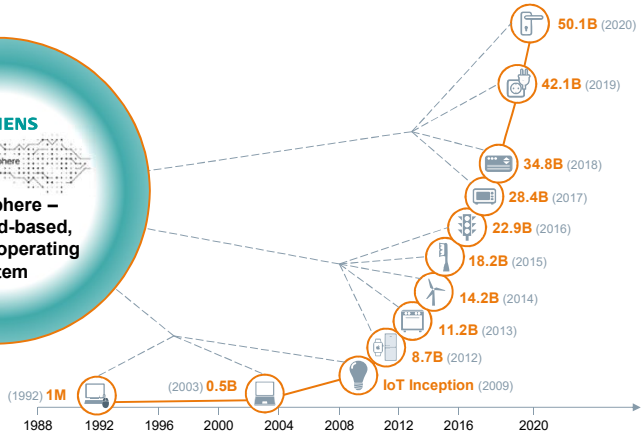
MindSphere

MindSphere – The cloud-based, open IoT operating system



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MindSphere and MindApps to increase business values for OEMs and end customers

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OEM

Value Proposition

- Increase Service efficiency / lower warranty expenses
- Offer additional services (e.g. availability)
- Enable new business models
- Product enhancement via feedback loop to R&D

End customer

Value Proposition

- Increased uptime / asset availability
- Asset optimization
- Maintenance efficiency

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Transparent Operation – Flexible connectivity for various IT infrastructures

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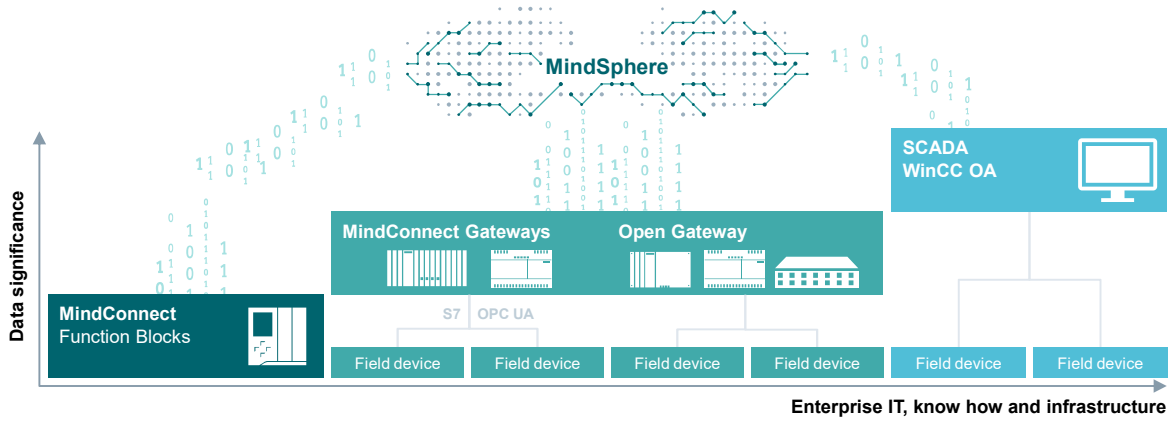
What are my possibilities to connect to MindSphere?



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Transparent Operation – SIMATIC Performance Insight – User specific plant insights for a more efficient production

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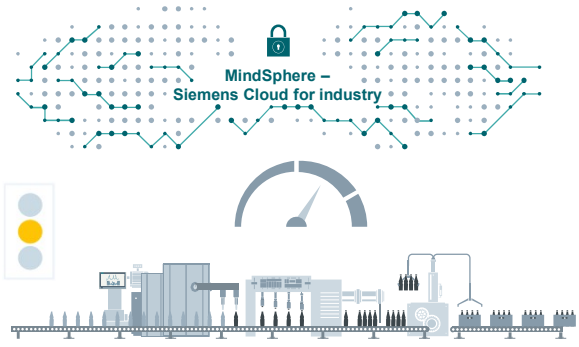
How to increase transparency over machines, lines and sites?



Operator
- Machine Status
- Machine Output

Line Manager
- Line Performance
- Shift performance
- Quality information

Manufacturing Manager
- Plant performance worldwide
- Do I meet my targets?

Target – Provide fitting information for each person for a solid decision base

andout 11

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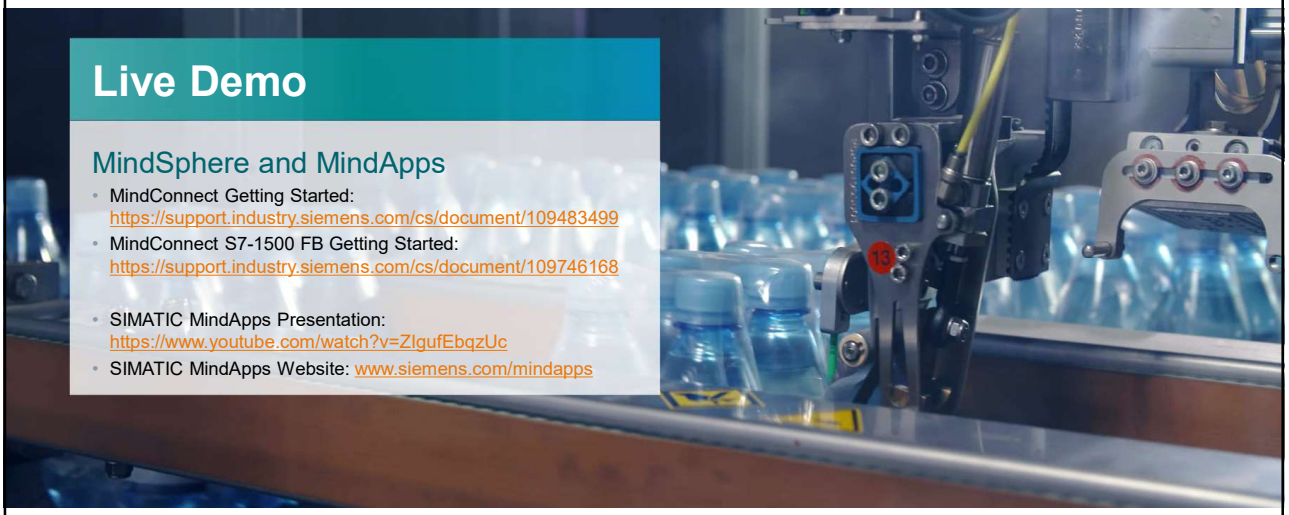

Live Demo

MindSphere and MindApps

- MindConnect Getting Started: https://support.industry.siemens.com/cs/document/109483499
- MindConnect S7-1500 FB Getting Started: https://support.industry.siemens.com/cs/document/109746168
- SIMATIC MindApps Presentation: https://www.youtube.com/watch?v=ZIgufEbqzUc
- SIMATIC MindApps Website: www.siemens.com/mindapps

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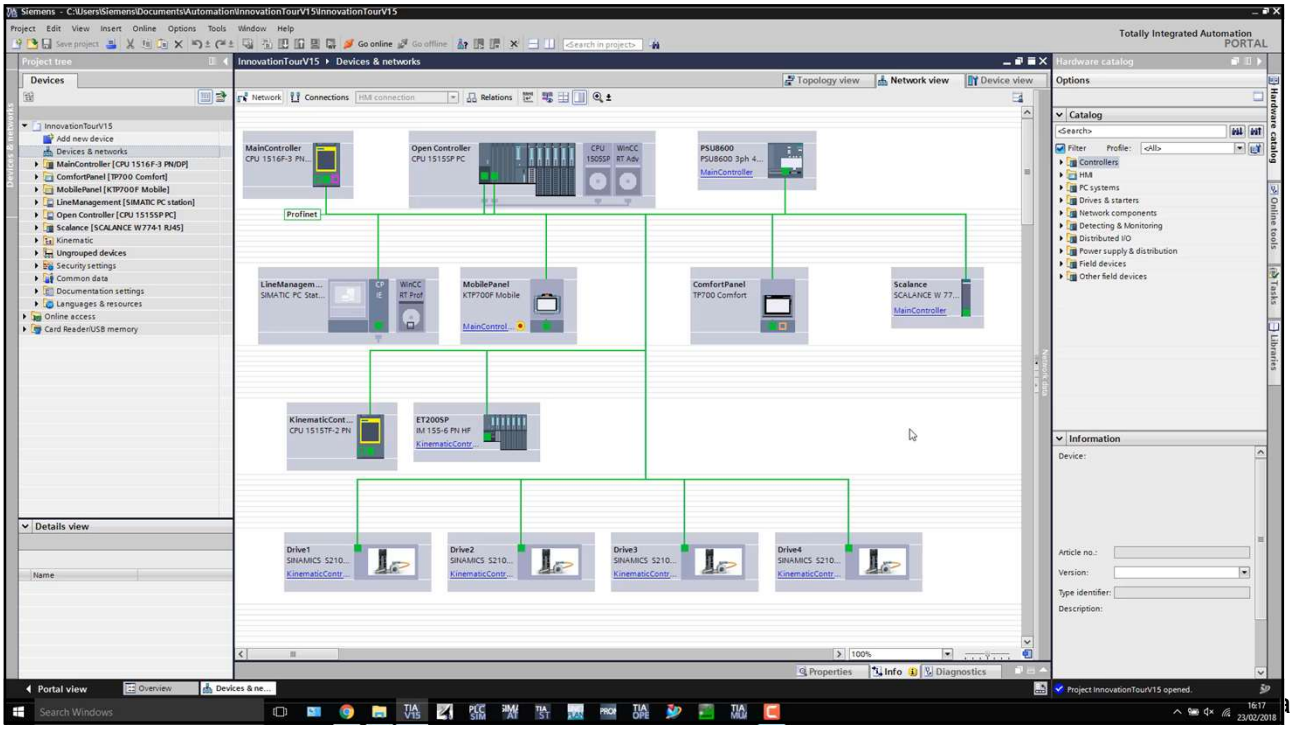

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Thank You

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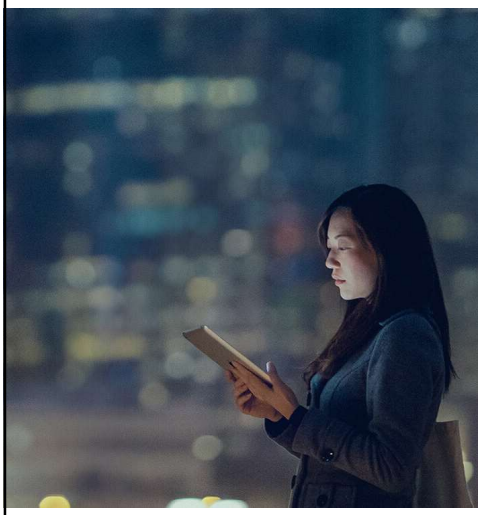

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