

Accelerating Smart Manufacturing with Azure IoT

以智能制造 加速数字转型

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Industrial IoT and Strategic Engagement
Azure IoT Engineering





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Senior PM
Industrial IoT and Strategic
Engagement
Azure IoT Engineering

Transformation in manufacturing is a reality today beginning at the factories, products and the external value chains

1. Enhancing Smart factories



56% of manufacturers have invested over \$100M towards smart factories¹

2. Monetizing connected products



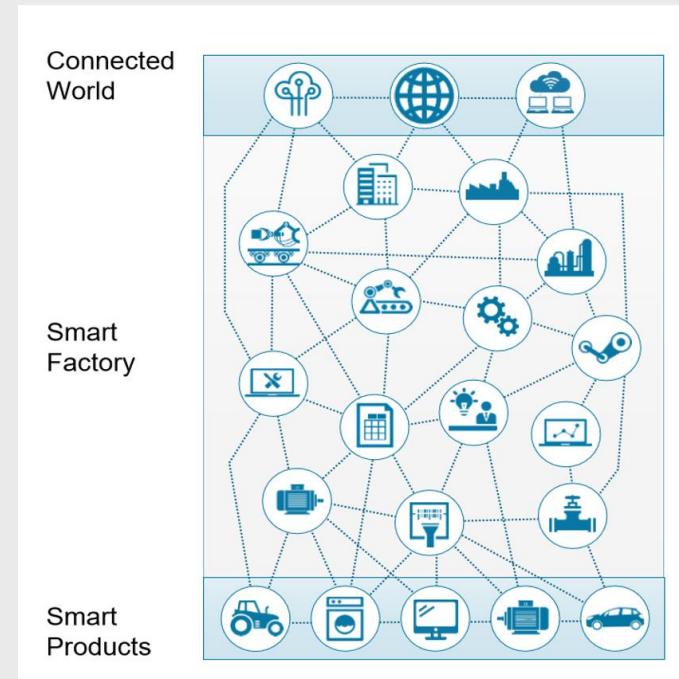
Manufacturers estimate that close to 50% of their products will be smart and connected by 2020²

3. Creating intelligent value chains



80% of manufacturers said that they would enter new sectors to achieve growth in the next two years³

The new World of Industry 4.0



Source: www.plattform-i40.de

 thyssenkrupp

 CLIMATEC
MERGING BUILDINGS & TECHNOLOGY

 CUMMINS

 JABIL

 ECOLAB®

 MAERSK

 Rockwell Automation

 Schneider Electric

 FUJITSU

 SANDVIK
Coromant

 MICHELIN
A better way forward

 GRUNDFOS

 Rolls-Royce

 ABT
RAAMS

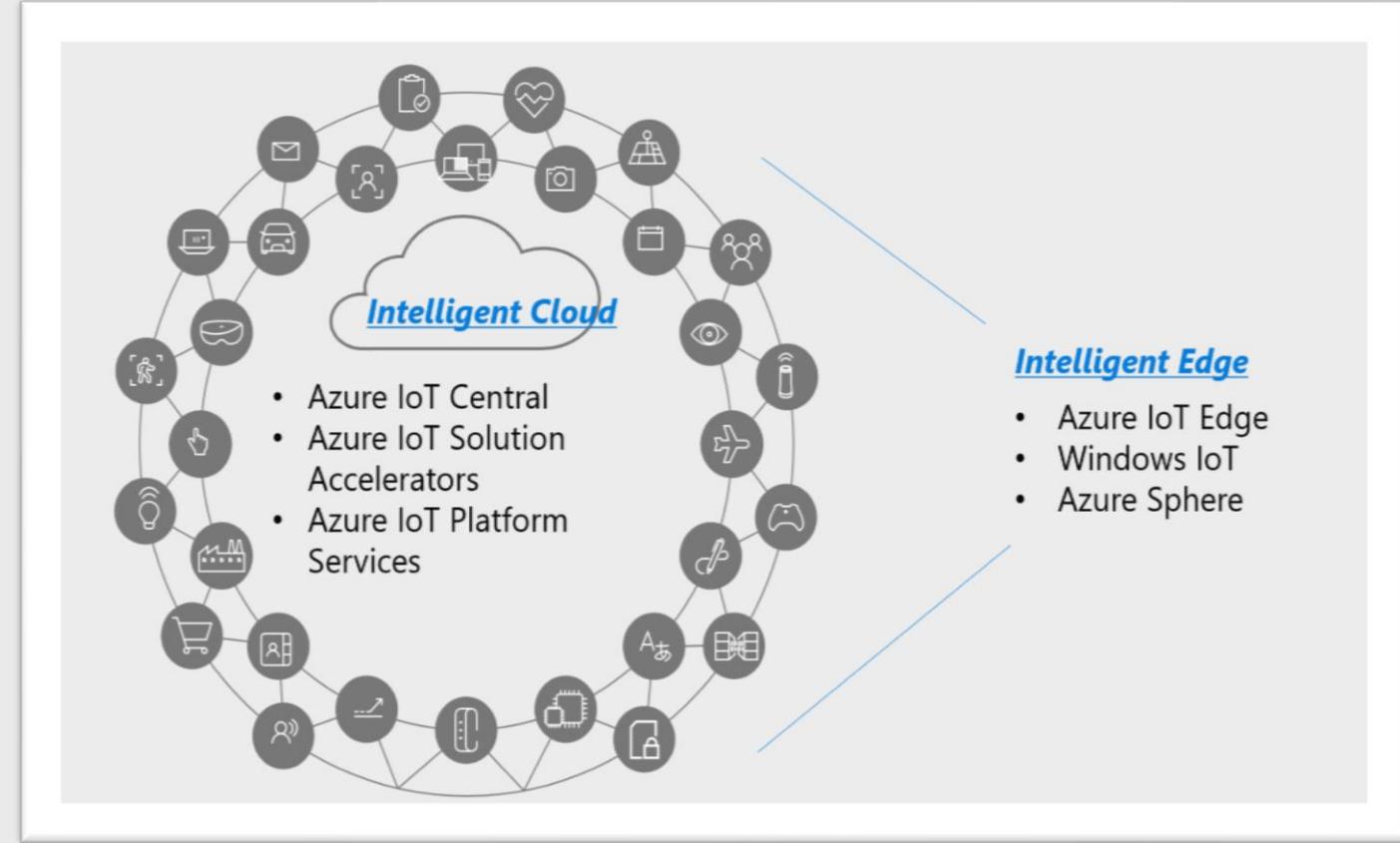
 KUKA

 BÜHLER

 BAE SYSTEMS

 Honeywell

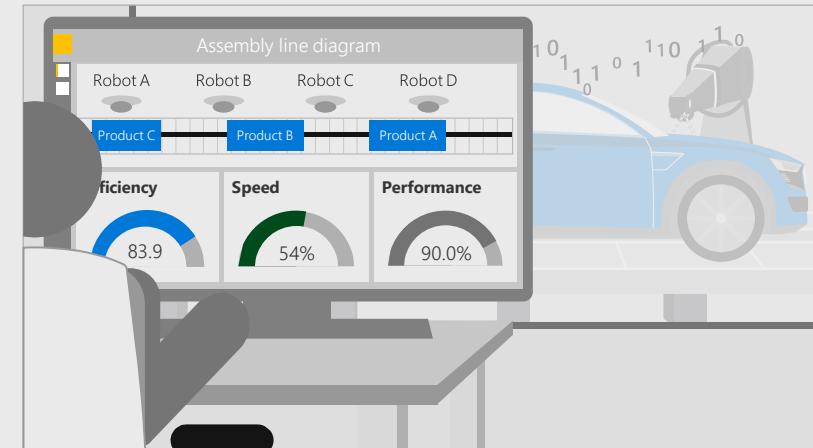
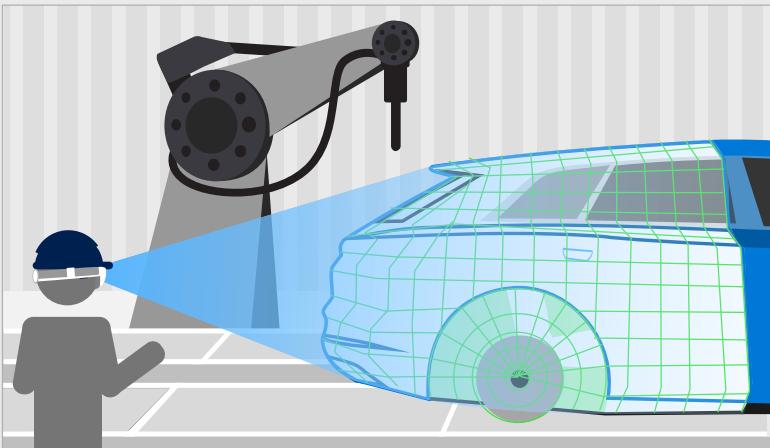
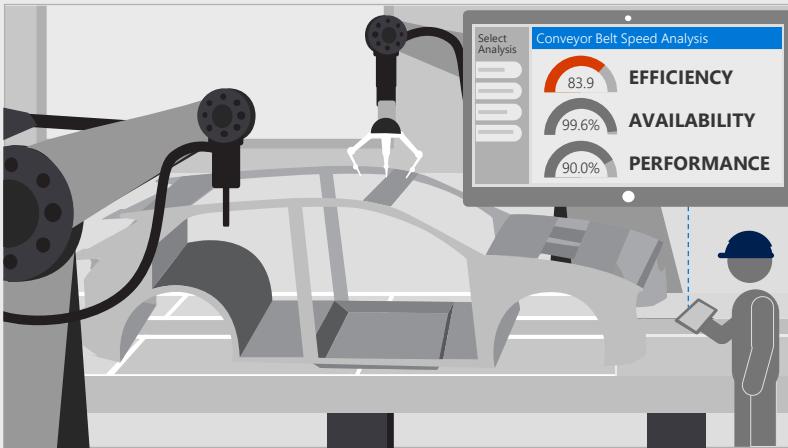
There are a Dim-Sum of offerings on Microsoft Azure Cloud and Edge but how can we support your transformation goals?



一盅两件配壶茶

一云两端供你用

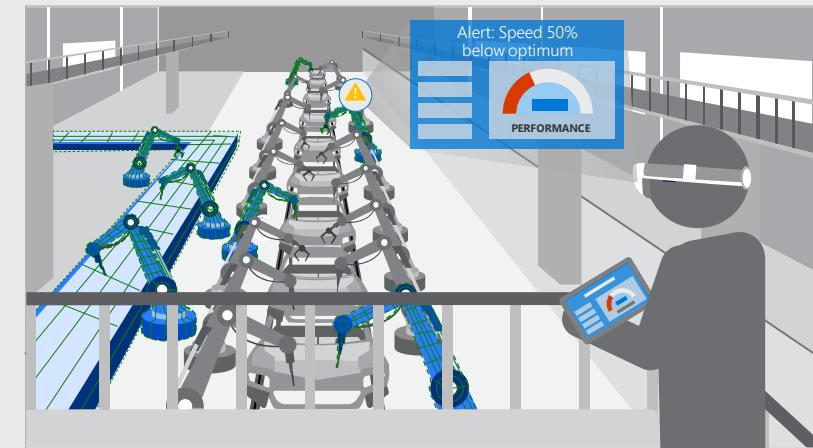
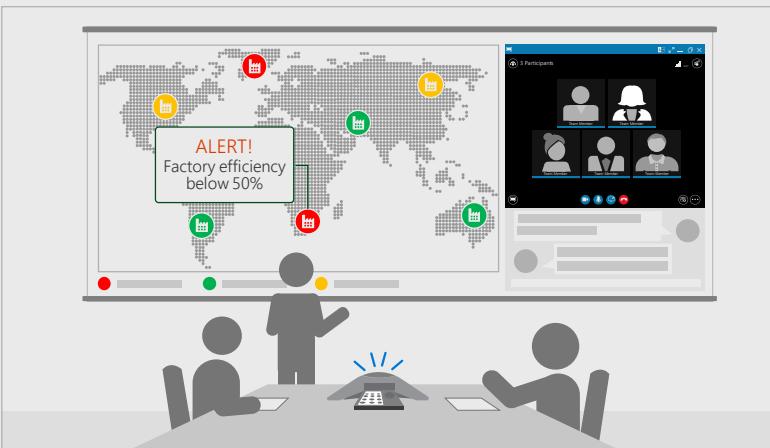
Let's examine what smart factories are...



Drive better decisions by arming workers with real-time insights in the office and on the factory floor.

Augment employee skills and empower first-line workers using AI and mixed reality interaction models.

Generate performance insights and drive operational excellence by connecting assets.



Detect defects and solve production problems in real time by using AI to create systems of intelligence.

Connect people with data and insights by harnessing the power of intelligent operational technology and IT.

Optimize factory design and production flow by using digital twins to identify bottlenecks and train assets



Asia Pacific manufacturers are looking at Smart Factories as a key enabler for innovation and growth.

ComputerWeekly.com IT Management Industry Sectors Technology Topics Search Computer Weekly

Nearly half of Asia-Pacific manufacturers will have fully connected factories by 2022

Study finds thinner margins and the desire for faster and higher quality production has driven manufacturers to modernise their operations through digital technology

Ai Lei Tao 12 Sep 2017 10:30

Some 46% of manufacturers in the [Asia-Pacific \(APAC\)](#) expect to support a fully connected factory by 2022, nearly triple what it is today, according to a study by Zebra Technologies.

Driven by the increasing expectations of faster and higher-quality production, along with tight margins, manufacturers are embarking on the process of becoming digital businesses. This is achieved through the use of digital technologies to change their business models to provide new revenue and value-producing opportunities.

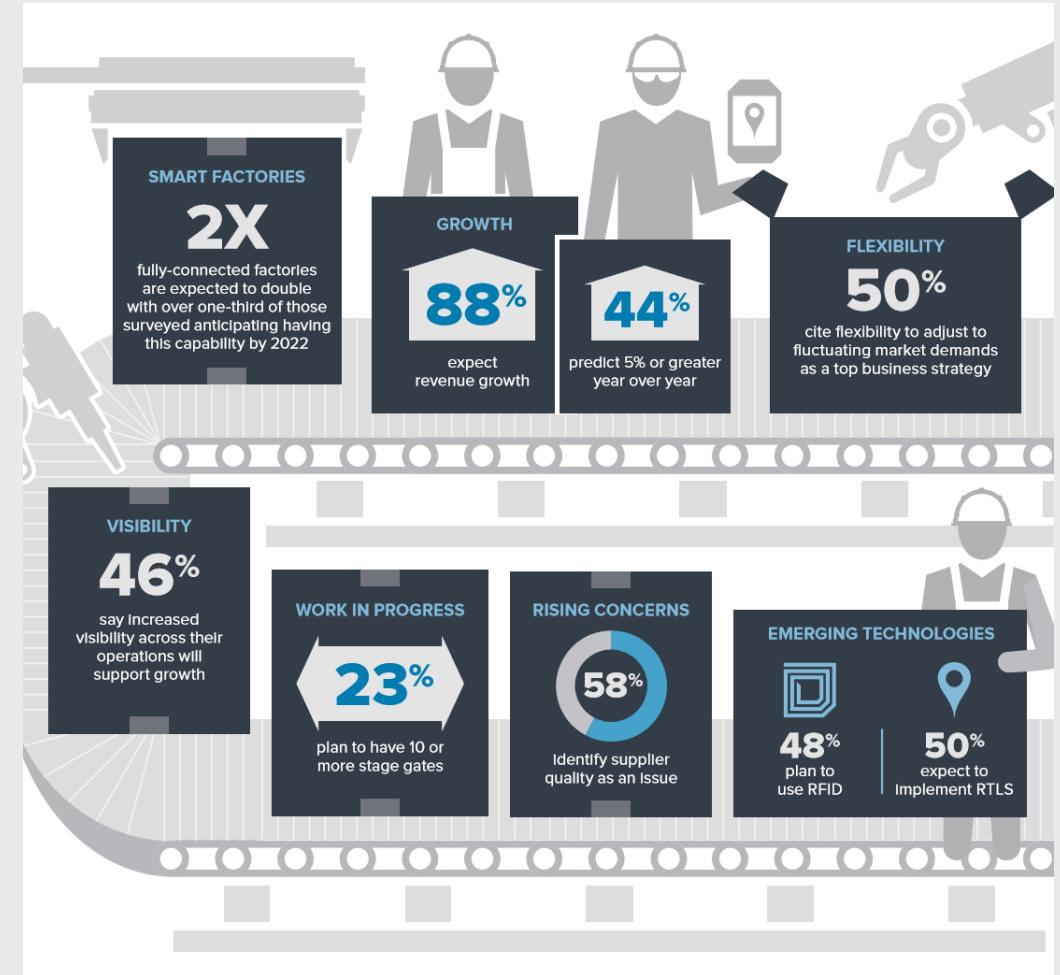
Make cloud adoption smarter, easier and secure. Grow your business with IBM Cloud.

REAL-TIME MONITORING ACROSS THE MANUFACTURING PROCESS

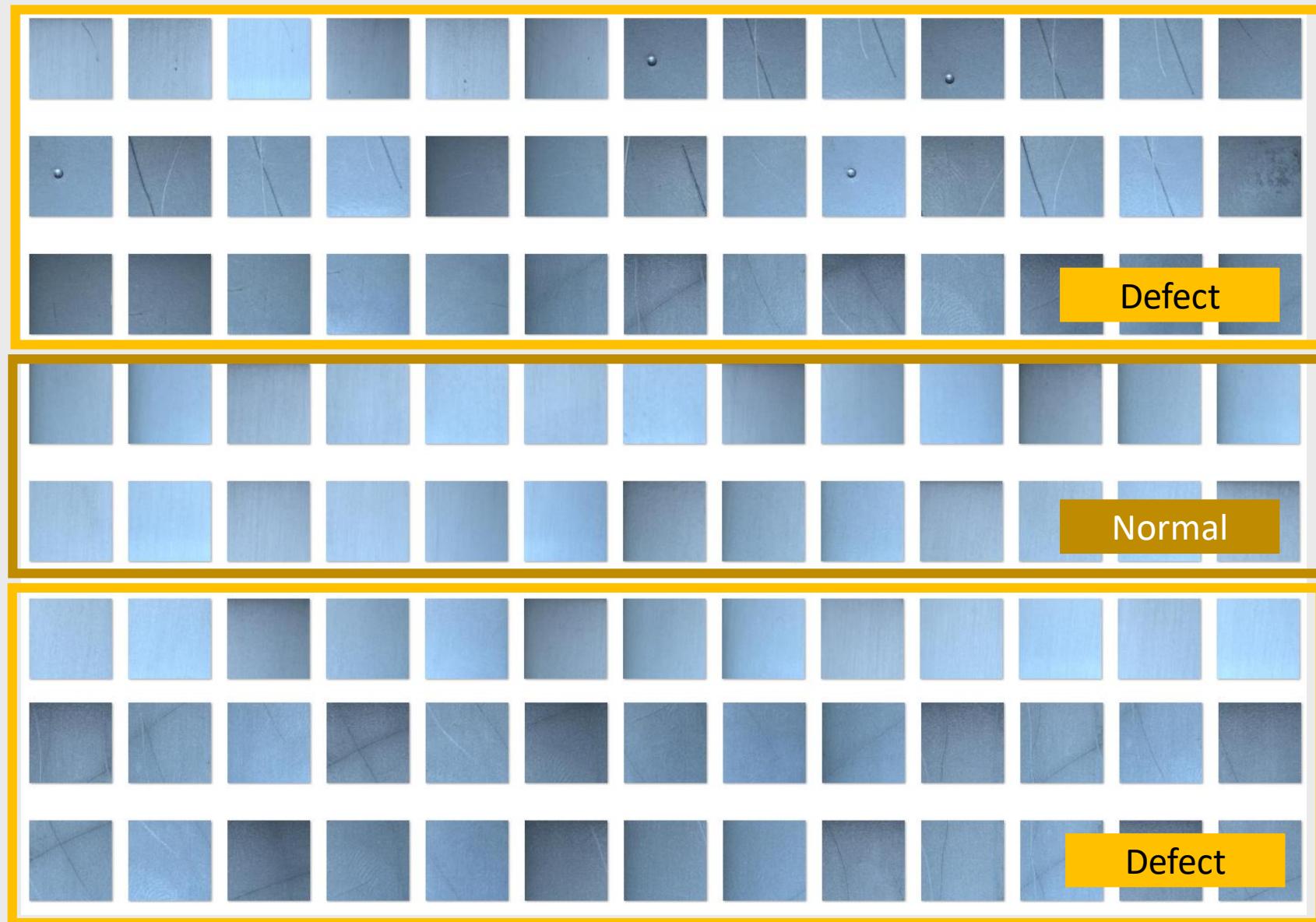
		2017	2022
GATES / POSITIONS	2 OR FEWER	15%	3%
	3-5	38%	10%
	6-9	23%	23%
	10 OR MORE	11%	23%

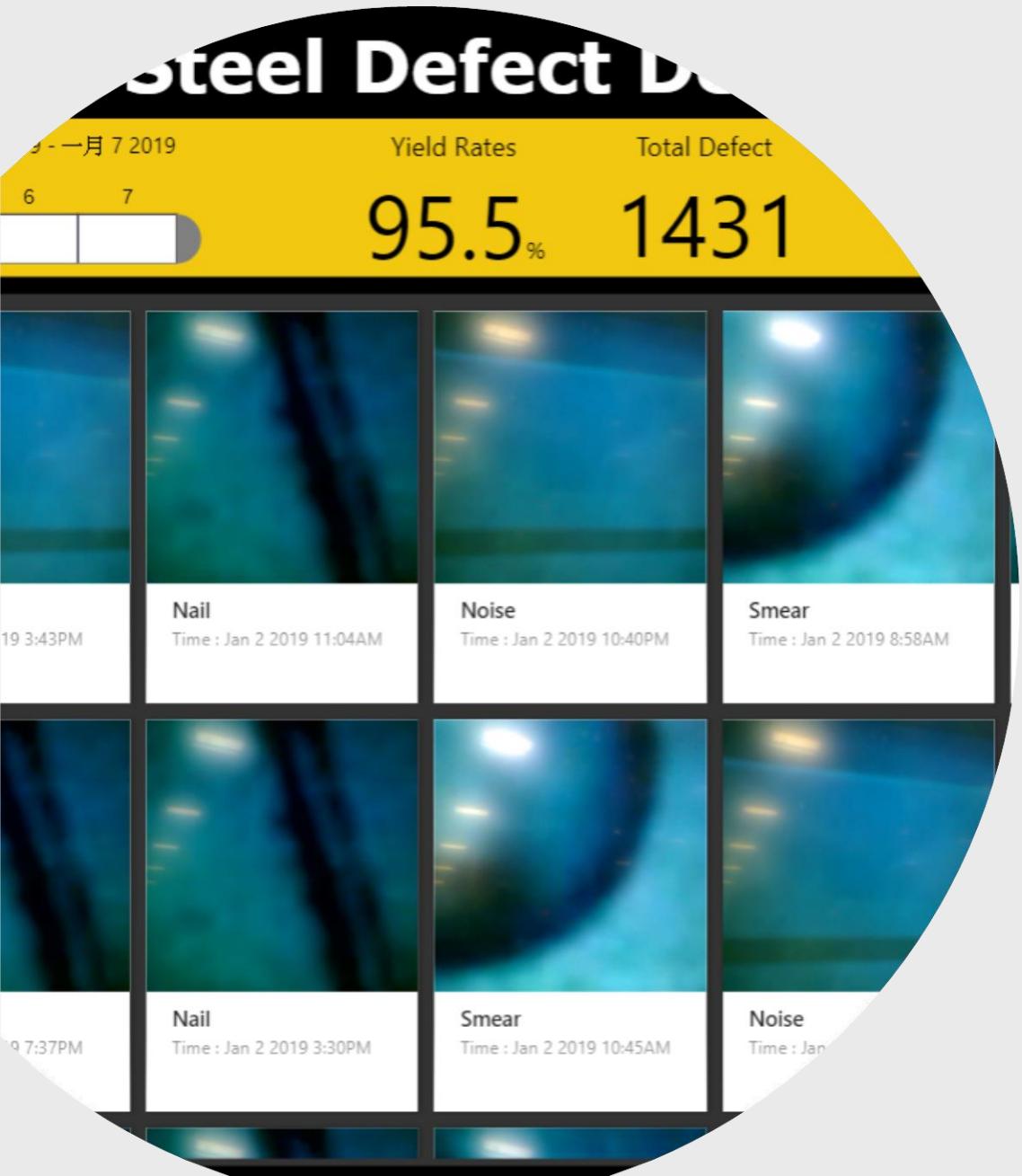
REAL-TIME MONITORING ACROSS THE ENTIRE MANUFACTURING PROCESS

		2017	2022
A MIXTURE OF GATES AND REAL-TIME MONITORING	6%	7%	
	12%	28%	



Eye test: How many defects/ 缺陷 are there?





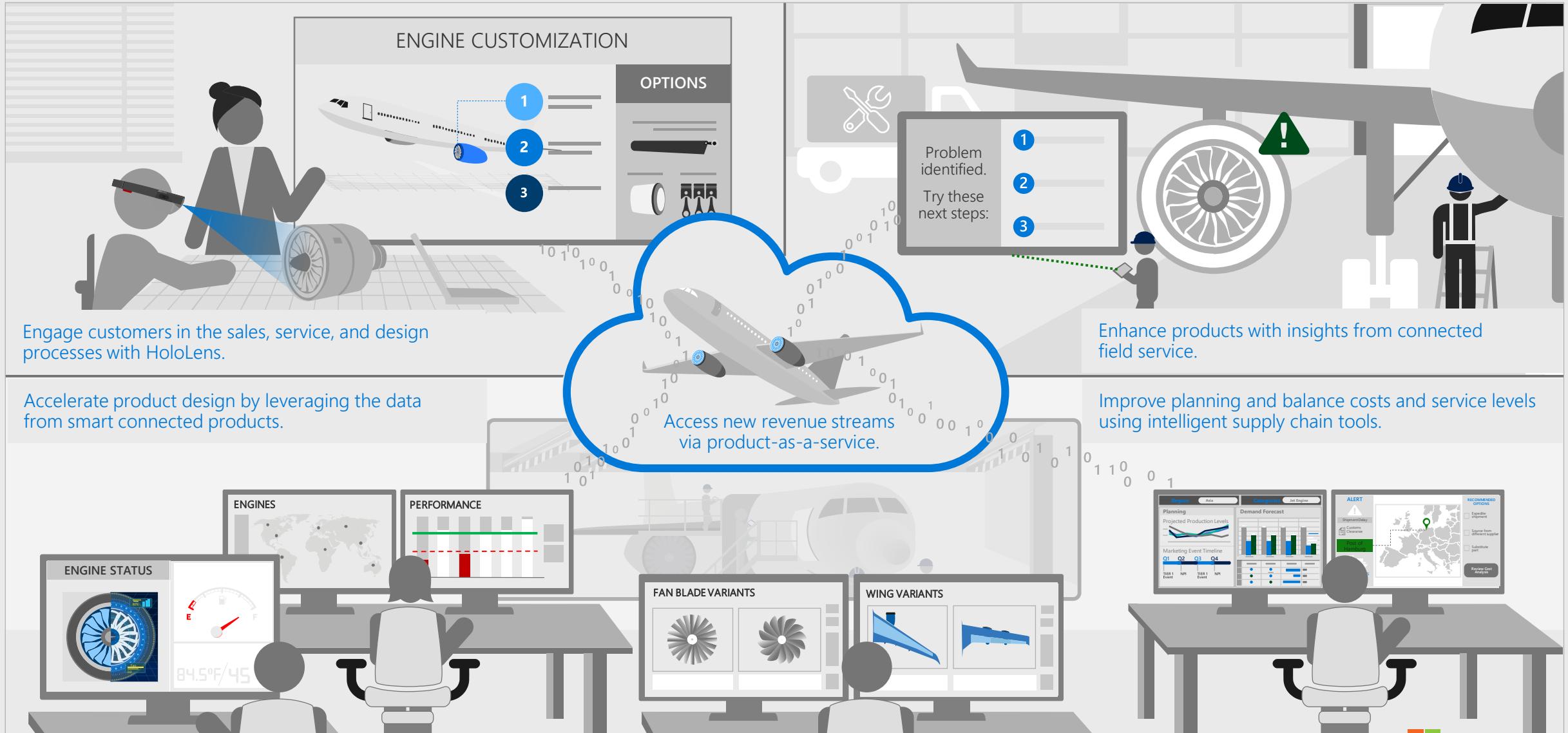
Think about your assembly line QC – how much human intervention are there?

厉害的老师父们。 . .

JABIL

GLOBAL BUSINESS CENTRE

After looking at the factory, let's look at monetizing connected products



Connected Machines: Injection and Molding

Challenge

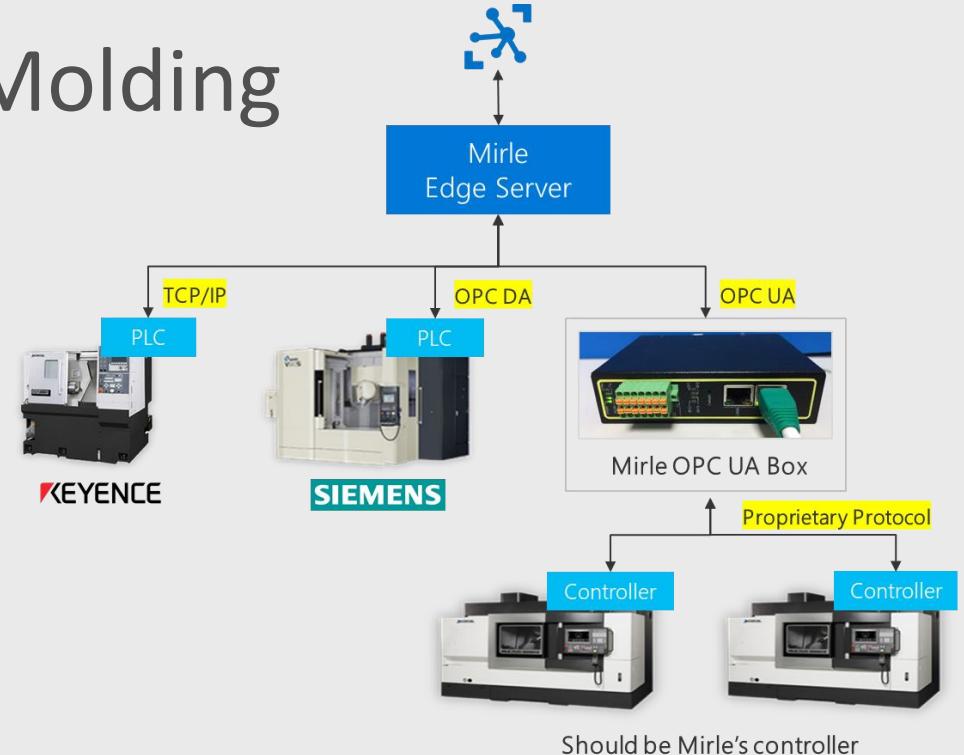
- Temperature and Humility are two factors to impact quality of plastic production with injection and molding system.
- For most shop floor environment of plastic manufacturing, it's hard to maintain a stable temperature and humidity. Usually it required experienced machinery to fine-tune the heating temperature of injection tube and molding machines.

Use Cases

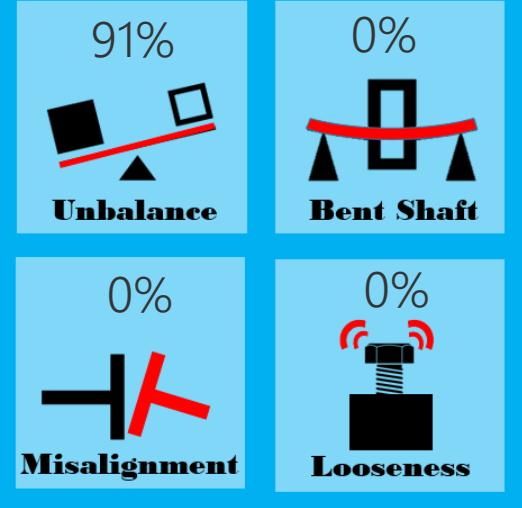
- Connected Factory: Connect injection/molding system and acquire/integrate data with MES through OPC UA
- Anomaly detection: On-time monitoring temperature data from environment and key components of injection and molding system.
- OEE monitoring: Combining health status of injection/molding system and production data of MES system to monitoring OEE.
- Adaptive recipe: By running correlation between temperature data and production information, to fine-tune the parameters of machine configuration in semi-automation matter.

Benefits

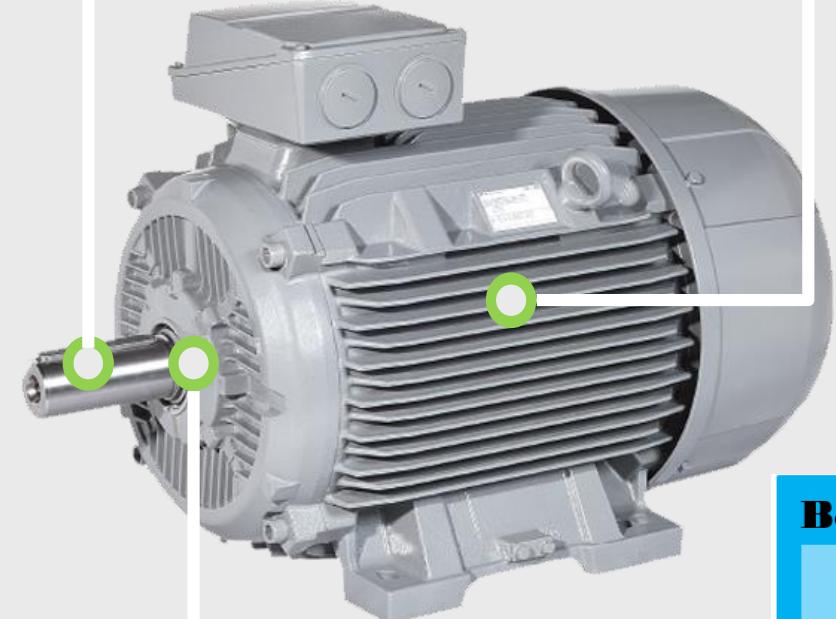
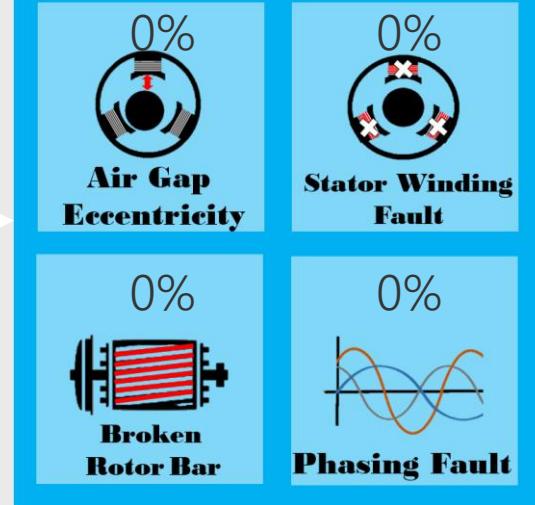
- Save on-site labors for system monitoring
- Increase OEE
- Fast-deployment by leveraging Azure IoT Edge and OPC UA components



Spindle



electric



Equipment Description



0.4

Health Index

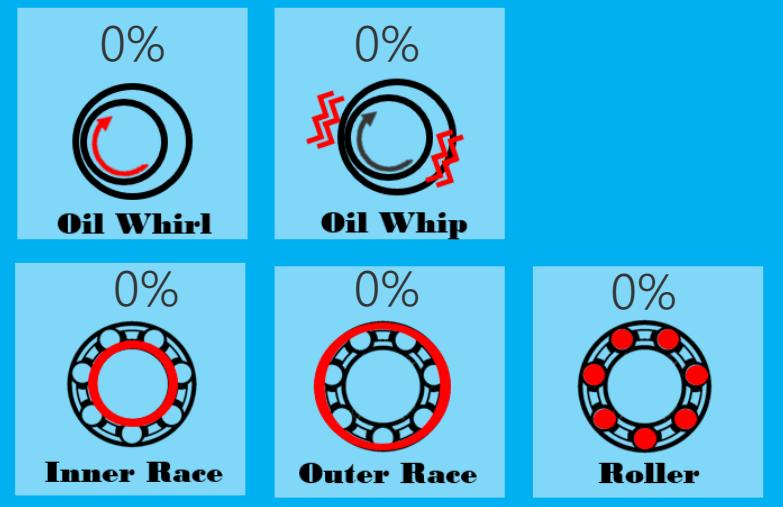
80

Remain Days

Ch1 CH2 CH3

Channel Filter

Bearing



Sandvik Coromant

Delivering remarkable field service

Challenge Sandvik Coromant wanted to take its services to the next level.

Solution Sandvik developed a solution that aggregated IoT data in the cloud with powerful cloud analytics that developed smart machine models.

Benefits

- Reduced the time needed to make emergency shutdown decisions from two seconds to 100 milliseconds
- Provided instant feedback to customers to improve efficiencies
- Delivered cost savings of millions of dollars

https://www.youtube.com/watch?time_continue=13&v=Oq6z3UALoYI



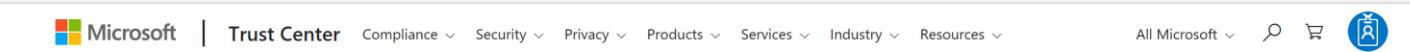
“

With this solution we are able to reinvent the art of manufacturing. Tools, machines, processes working together, all the way from the customer to the sales interaction, helping us deliver an unprecedented level of field service.

— Klas Forsström,
President, Sandvik Coromant

”

Best in class IP advantage on Azure





Azure IP Advantage program

Microsoft offers Microsoft Azure IP Advantage Benefits to Qualified Customers of Microsoft Azure products and services.

Azure IP Advantage program

Microsoft Azure customers now have access to best-in-industry protection against intellectual property (IP) risks in the cloud with Microsoft Azure IP Advantage program. One of the most comprehensive protection programs, it is designed to help customers protect their cloud-based innovations and investments against IP lawsuits and risks. We take seriously our responsibility to help ensure that the cloud is used for good. In partnership with our customers, we are working hard to help create an ecosystem where developers, entrepreneurs, enterprises, and customers can innovate with confidence.



"With Azure IP Advantage, we can operate and innovate more freely in the cloud while reducing our IP risk. Microsoft is uniquely able to provide such a comprehensive patent offering."

Shigeki Tomoyama, President of Toyota's Connected Company



"As we transform our business to create a more resourceful world, our ability to accelerate innovation in the cloud for the benefit of our customers is increasingly important. Azure IP Advantage delivers unique benefits that are important for us and our customers in this respect."

Greg Richards, Vice President, Global DevOps, Itron



"Mattel is a place of invention and imagination, and we aspire to spend as much of our time and energy creating as possible. Azure IP Advantage will let us focus on innovating and transforming our business, not fighting patent lawsuits."

Geoff Walker, Executive Vice President and Chief Strategic Technology Officer, Mattel



Azure covers 87 compliance offerings

Azure has the deepest and most comprehensive compliance coverage in the industry

Global

- ISO 27001:2013
- ISO 27017:2015
- ISO 27018:2014
- ISO 22301:2012
- ISO 9001:2015
- ISO 20000-1:2011
- SOC 1 Type 2
- SOC 2 Type 2
- SOC 3
- CIS Benchmark
- CSA STAR Certification
- CSA STAR Attestation
- CSA STAR Self-Assessment
- WCAG 2.0 (ISO 40500:2012)

US Gov

- FedRAMP High
- FedRAMP Moderate
- EAR
- ITAR
- DoD DISA SRG Level 5
- DoD DISA SRG Level 4
- DoD DISA SRG Level 2
- DFARS
- DoE 10 CFR Part 810
- NIST SP 800-171
- NIST CSF
- Section 508 VPATs
- FIPS 140-2
- CJIS
- IRS 1075

Industry

- PCI DSS Level 1
- GLBA (US)
- FFIEC (US)
- Shared Assessments (US)
- SEC 17a-4 (US)
- CFTC 1.31 (US)
- FINRA 4511 (US)
- SOX (US)
- 23 NYCRR 500 (US)
- OSFI (Canada)
- FCA + PRA (UK)
- APRA (Australia)
- FINMA (Switzerland)
- FSA (Denmark)
- RBI + IRDAI (India)
- MAS + ABS (Singapore)
- NBB + FSMA (Belgium)
- AFM + DNB (Netherlands)
- AMF + ACPR (France)
- KNF (Poland)
- European Banking Authority (EBA)
- FISC (Japan)
- HIPAA BAA (US)
- HITRUST Certification
- GxP (FDA 21 CFR Part 11)
- MARS-E (US)
- NHS IG Toolkit (UK)
- NEN 7510:2011 (Netherlands)
- FERPA (US)
- CDSA
- MPAA (US)
- FACT (UK)
- DPP (UK)

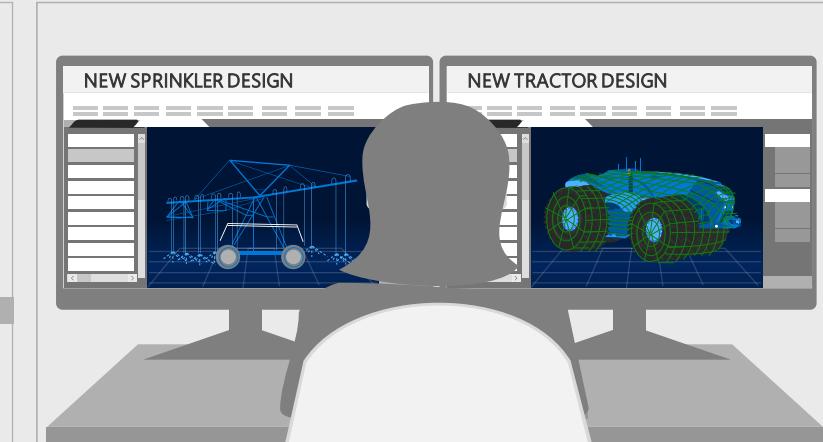
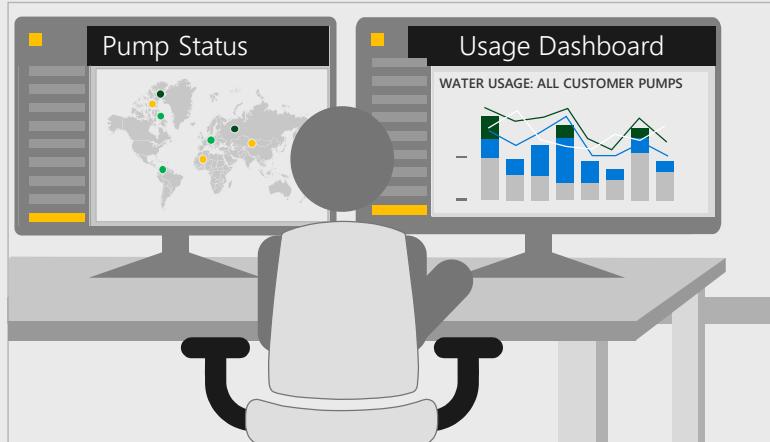
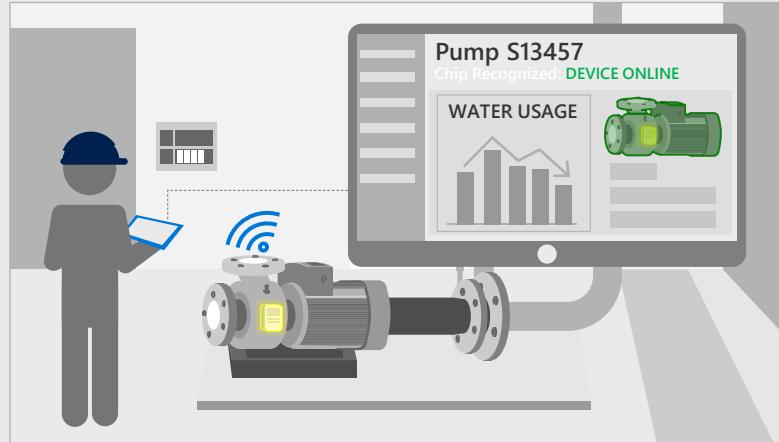
Regional

- Argentina PDPA
- Australia IRAP Unclassified
- Australia IRAP PROTECTED
- Canada Privacy Laws
- China GB 18030:2005
- China DJCP (MLPS) Level 3
- China TRUCS / CCCPPF
- EU EN 301 549
- EU ENISA IAF
- EU Model Clauses
- EU – US Privacy Shield
- GDPR
- Germany C5
- Germany IT-Grundsatz workbook
- India MeitY
- Japan CS Mark Gold
- Japan My Number Act
- Netherlands BIR 2012
- New Zealand Gov CIO Framework
- Singapore MTCS Level 3
- Spain ENS High
- Spain DPA
- UK Cyber Essentials Plus
- UK G-Cloud
- UK PASF



<https://aka.ms/AzureCompliance>

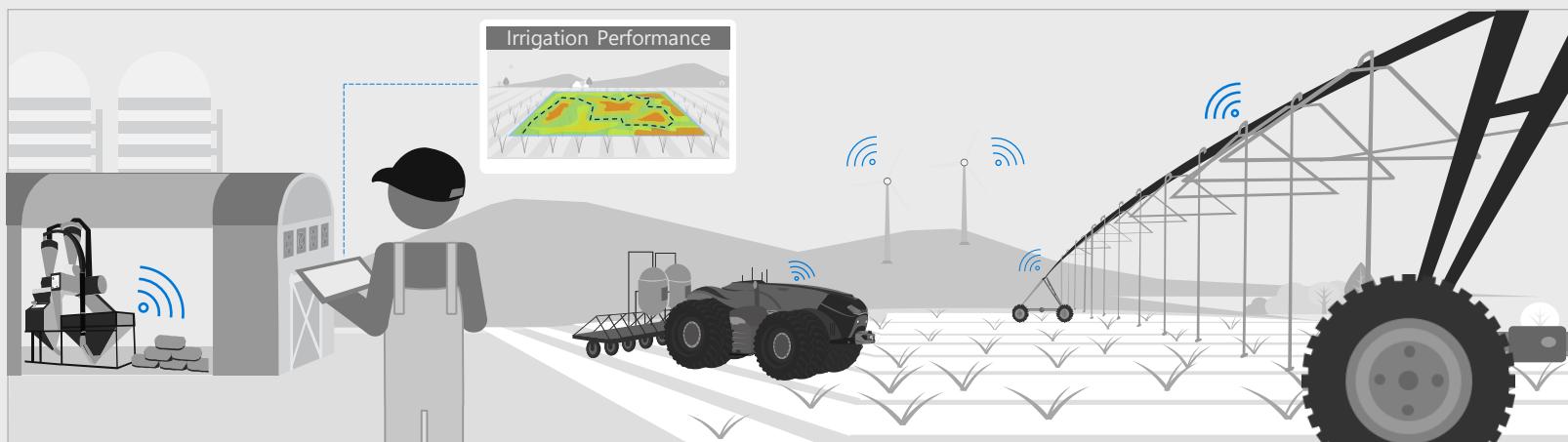
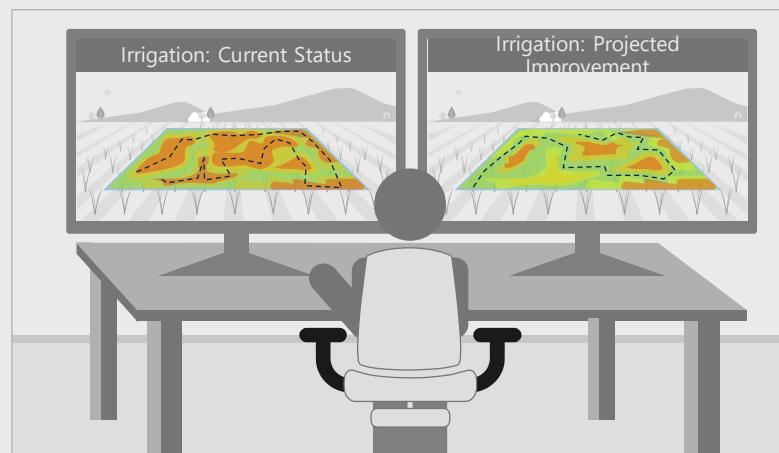
Beyond the factory and products, manufacturers are looking at their whole ecosystem/ value chain



Generate performance insights by leveraging data from securely connected products.

Expand manufacturing's leadership to other businesses using IoT technologies and product insights.

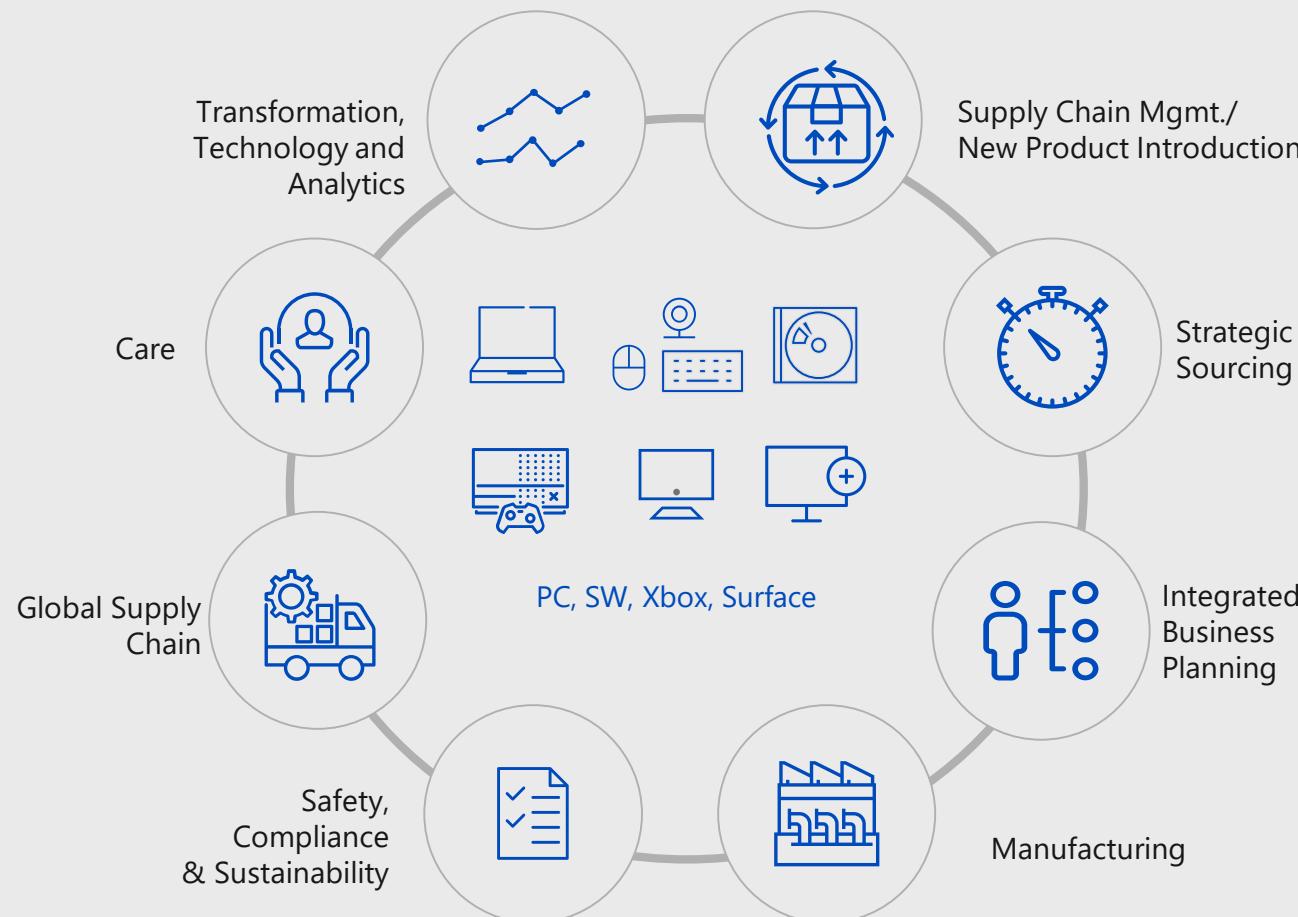
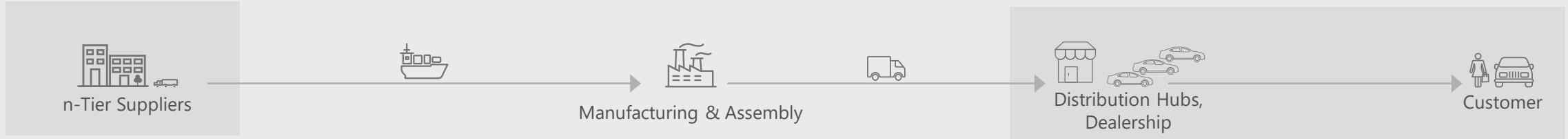
Develop sustainable products using cutting-edge cloud solutions that create new markets and opportunities.



Digitally simulate product performance by leveraging flexible and extensible hybrid infrastructure.

Leverage manufacturing's industrial IoT leadership and deliver social and economic impact to reduce waste in a resource constrained world while creating new revenue streams in new markets.

Microsoft's learning in transforming Supply Chain



Data flow:

1. Track & trace, logistics (inbound)
2. Connected Factory
3. Connected Product
4. Logistics (outbound), parts & Inventory

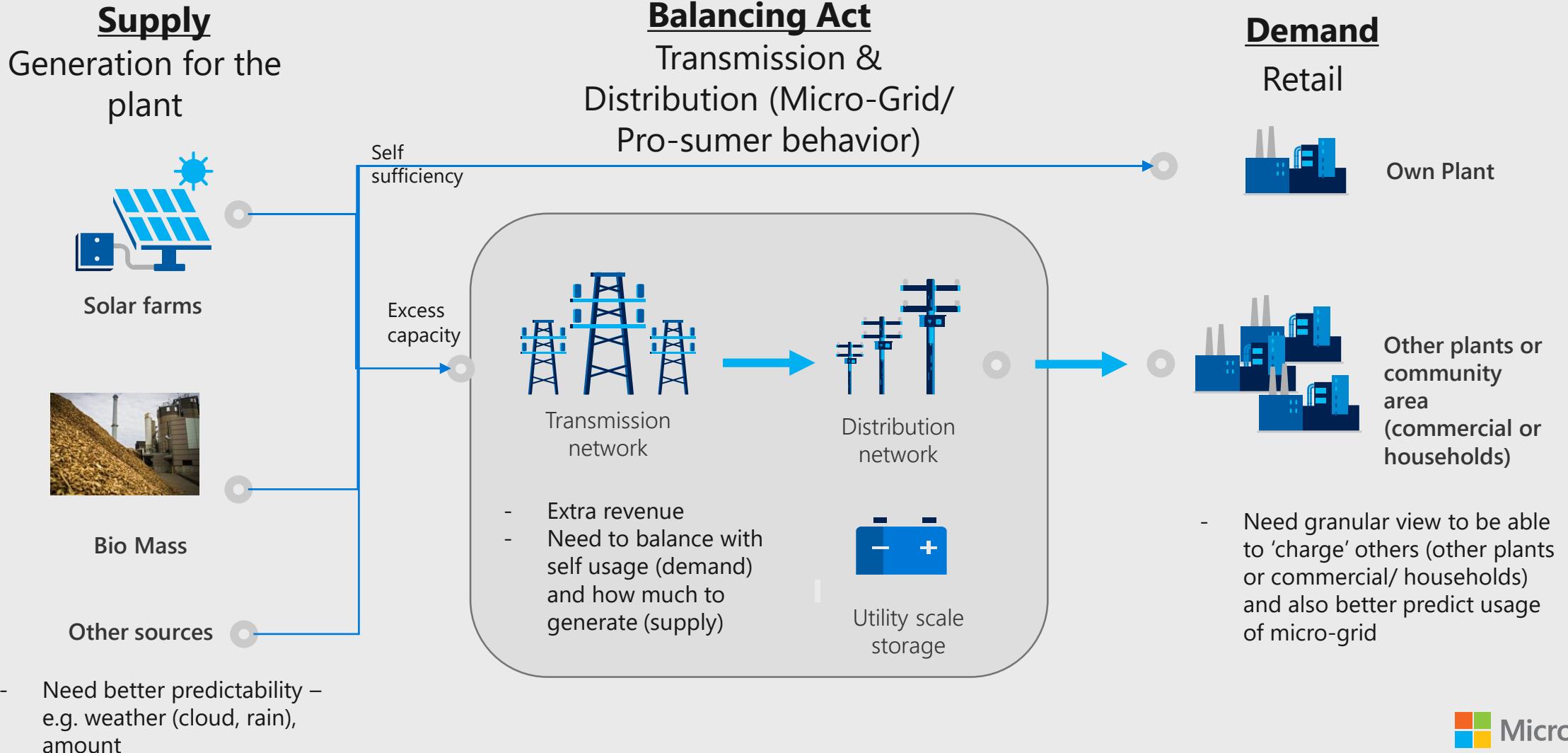
Impact to your company:

1. Time to market
2. Quality
3. Cost optimization
4. Reduce wastage
5. Real time insights vs after the fact data
6. Scale – little insights vs full visibility

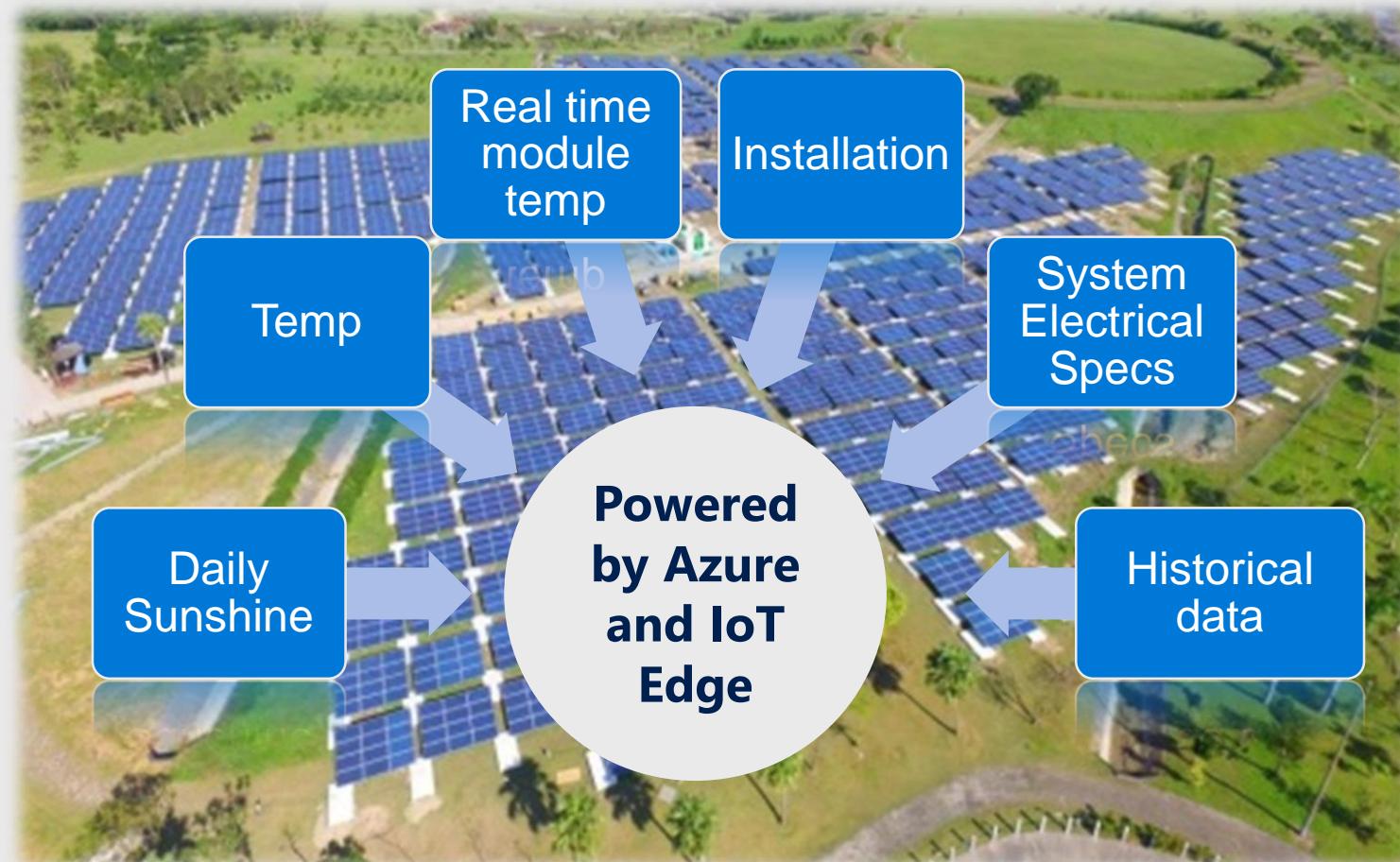
Reusable to your supply chain

1. Use cloud to connect, automate, visualize E2E view of business
2. Apply AI to drive optimization

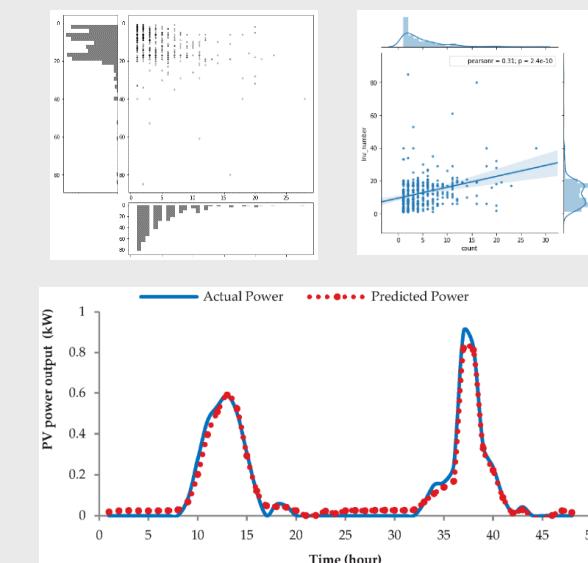
Energy is another critical supply chain to manufacturers...



AI forecasting of solar power generation in action



- Predict the output change of intermittent energy in advance
- Plan response measures,
- Reduce impact on power system
- Stabilize overall power supply and demand
- Abnormally detection

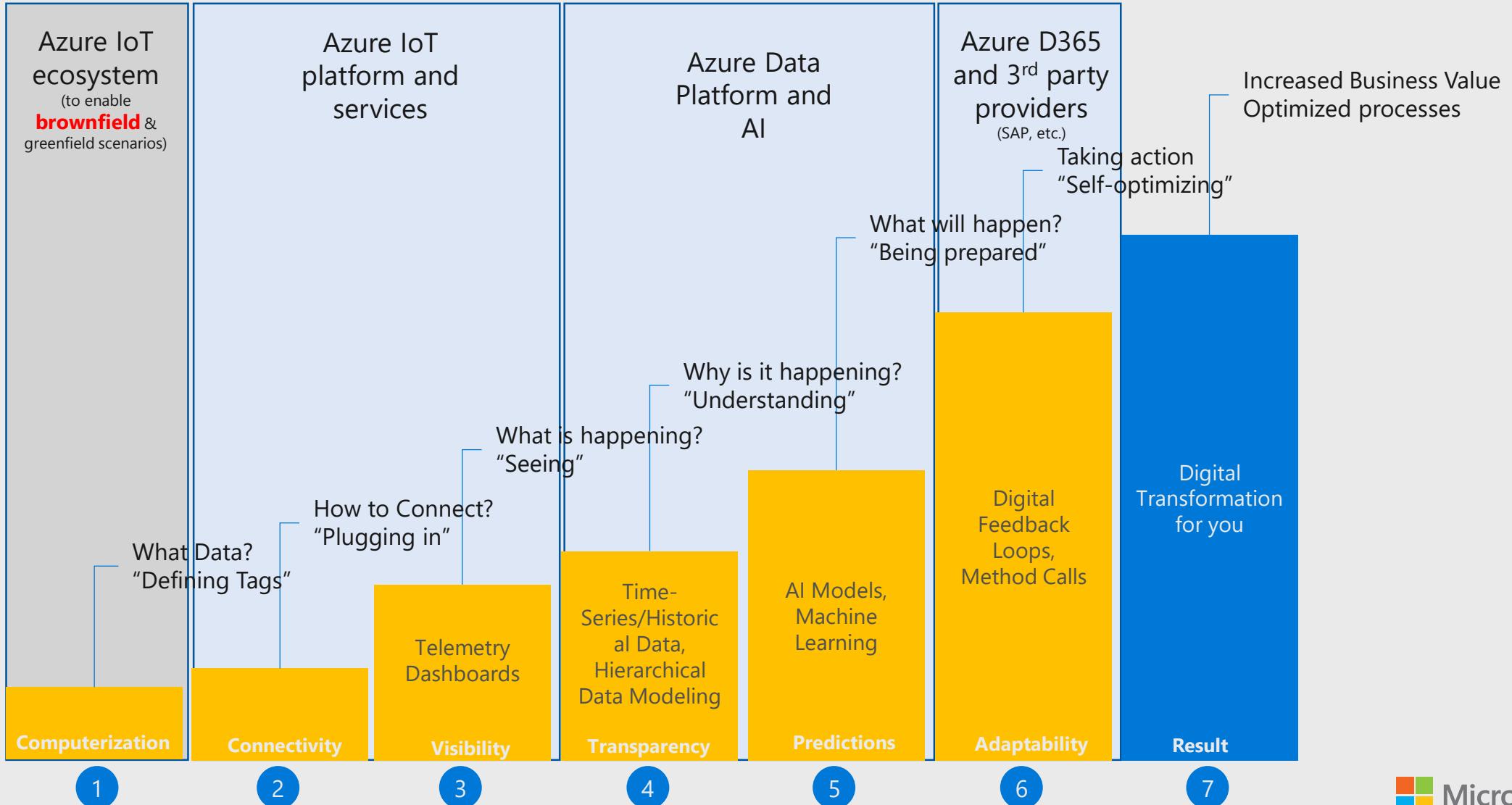


曹植有7步成诗，我们有7步成功 -7 steps to transformation

Things

Insights

Actions

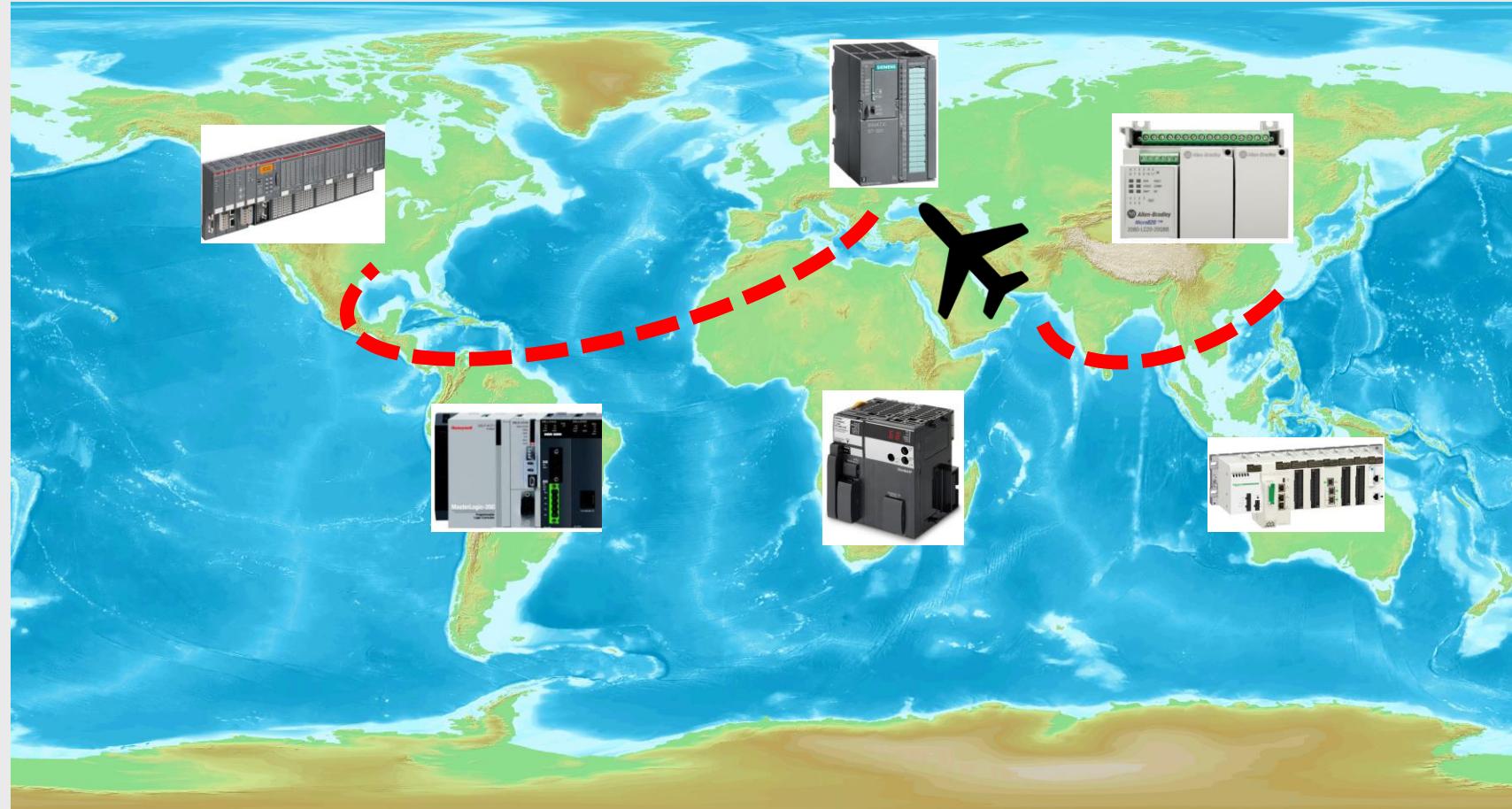


Great stories but unfortunately, many manufacturing plants have had years of investment in proprietary HW/ SW/ Protocols....and they are still running....

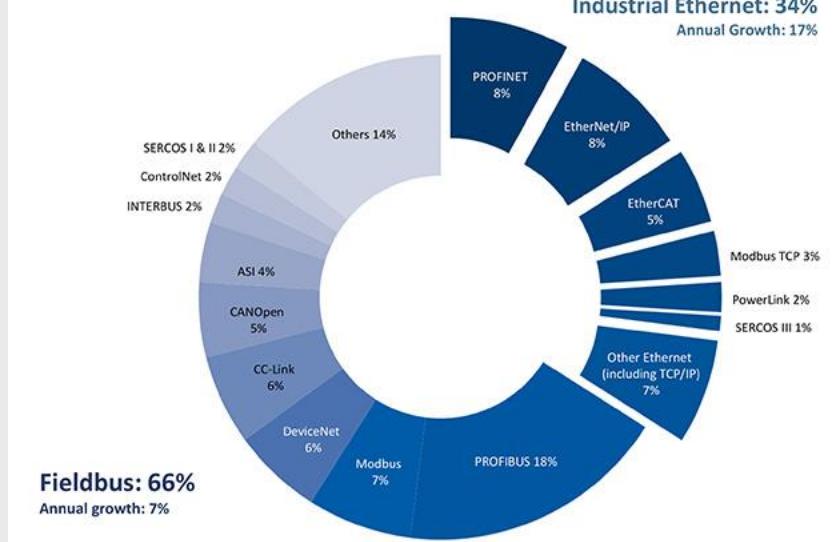
老中青的混搭



Compounded impact: What if you look at this at scale across all your plants across the globe? Brownfield is everywhere

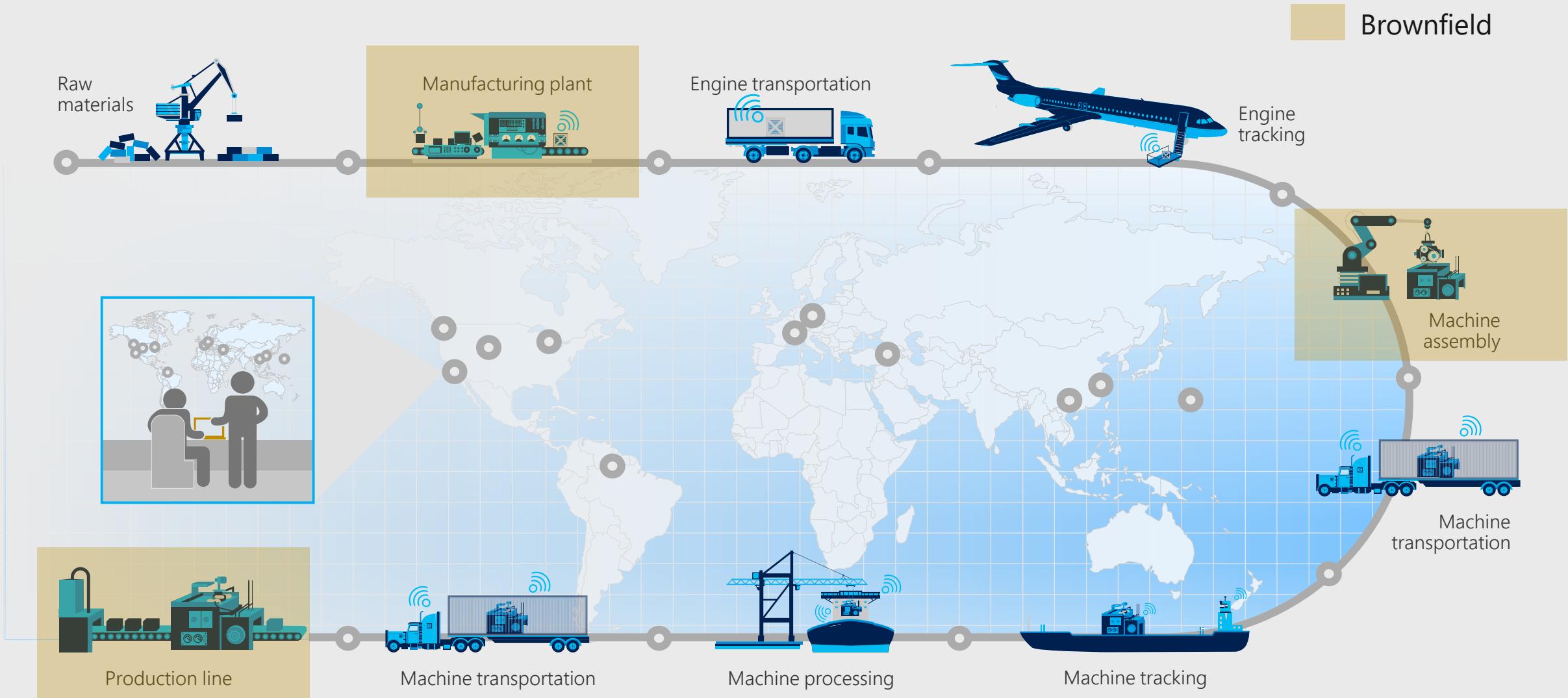


Fieldbus vs. Industrial Ethernet



No winner in the field bus/industrial ethernet war!

And Brownfield is common in a manufacturer's value chain



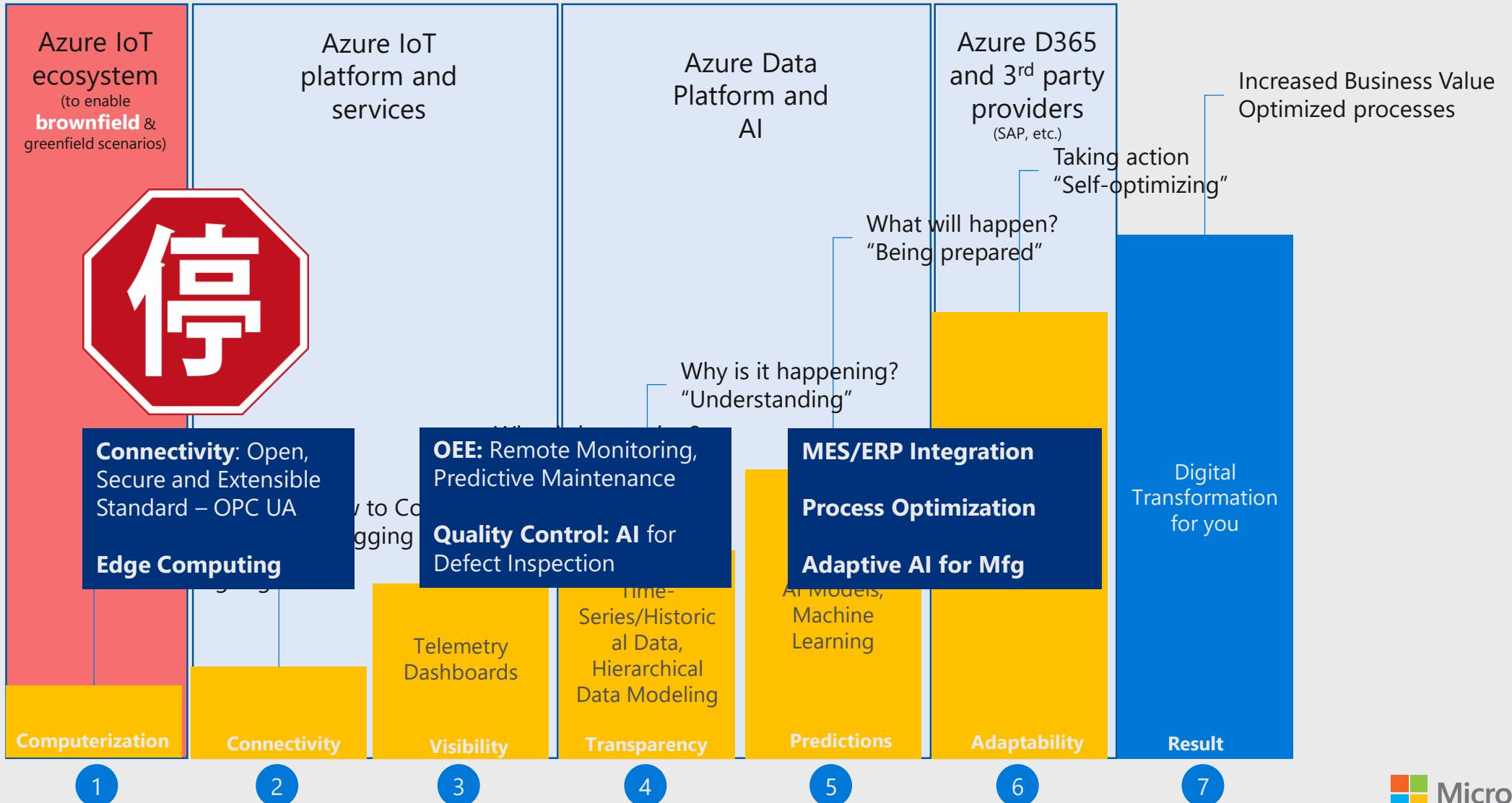
Okay... it's there so what?
有什么大不了的?

It's a huge hurdle unless you don't want to go anywhere

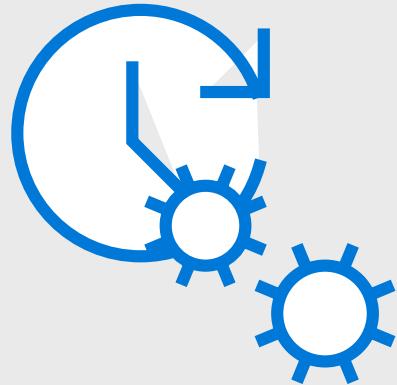
Things

Insights

Actions



Shop Floor Connectivity



Problem:

Customers cannot focus on building the applications that solve business problems. Instead, they have to configure gateways, telemetry streams and data models to bring shop floor machine data to the cloud.

→ A very manual and time-consuming process.

Shop Floor Connectivity Solution: OPC Twin

An IIoT component that abstracts any machine with built-in OPC UA support as a “digital twin” in the cloud, enabling access and control from the cloud.

→ Dramatically simplify secure connectivity and data access so customers can focus on building applications.





Security Solution: OPC Vault

A cloud service that can configure,
register and manage certificates for OPC
UA applications.

Azure leads with open standards – OPC UA

Azure provides OPC UA Pub/Sub reference communication stack

- telemetry data to the cloud
- non-intrusive data collection
- Uploading entire data models

Azure enables OPC UA Client/Server communication to the cloud **and back**

- service-assisted communication
- browsing UA data model
- command execution

Native OPC UA Data Models in Azure

- Efficient data modelling

ISO/OSI Model	OPC UA Client/Server	OPC UA PubSub
Application	UA Application	UA (Cloud) Application
Presentation	UA Binary	UA Datagram JSON
Session	UA Secure Channel HTTPS	MQTT AMQP
Transport	TCP	UDP TCP
Network	IP	IP
Data Link	Ethernet	DSL/5G/TSN/Ethernet/etc.
Physical	CAT5/6/etc.	CAT5/6/etc.

Working and powering Industrial IoT Edge Gateways and Solutions that you commonly find in plants

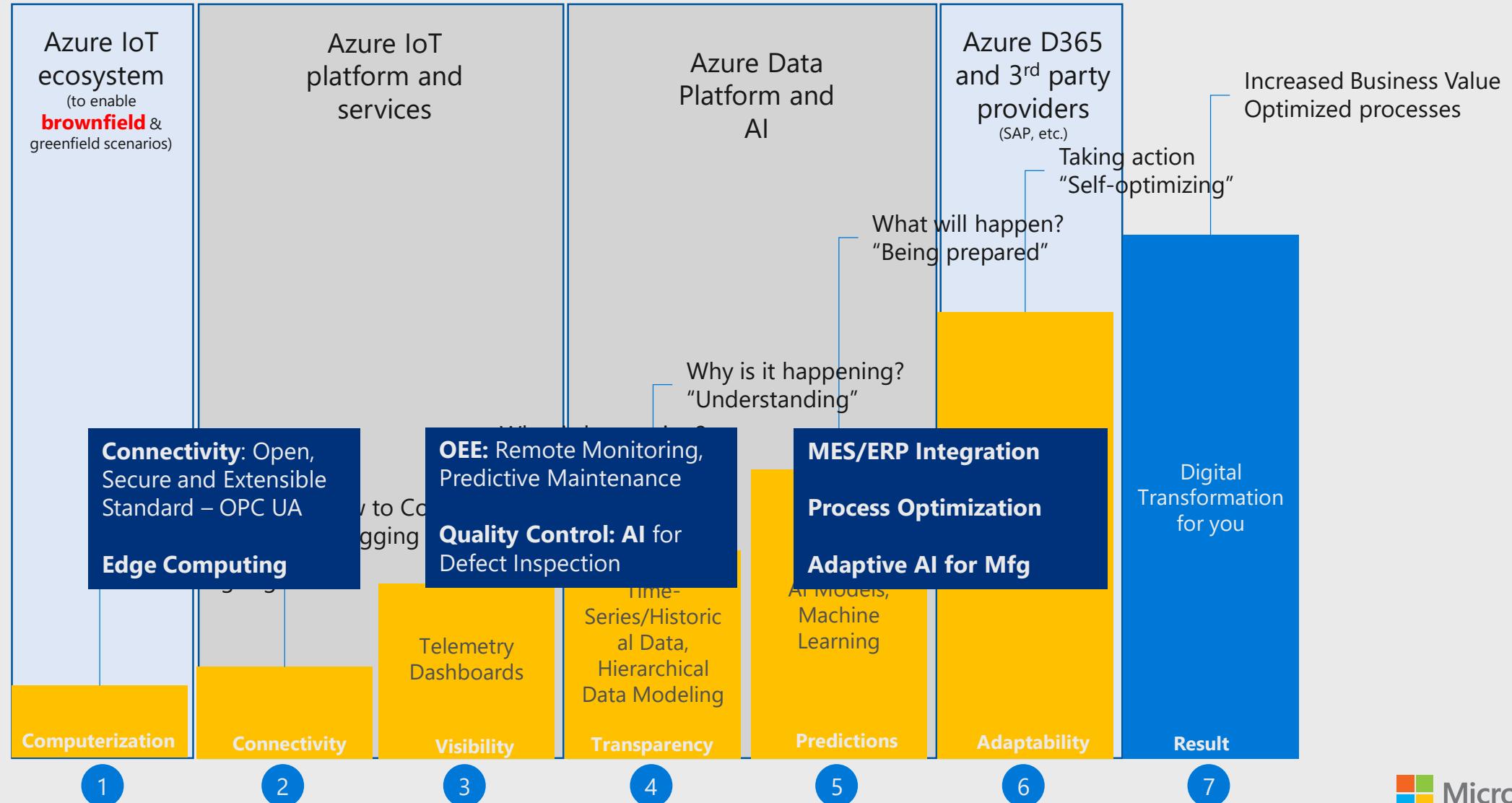


After getting the info out from your things –it's time for the data

Things

Insights

Actions



Management wants to have this...

Microsoft Azure IoT Suite - Connected factory

Dashboard

Factory Locations

STATUS	LOCATION	CURRENT PRODUCTION
Normal	Munich	Braking system
Error	Cape Town	Fuel supply system
Error	Mumbai	Exhaust system
Error	Seattle	Bearings
Error	Beijing	Air conditioning system
Normal	Rio De Janeiro	Suspension system

Alarms

Event Type	Description	Timestamp
Value above maximum	Cape Town, Production Line 1, Assembly, P...	10:56 AM-11/22/2017
Value above maximum	Mumbai, Production Line 1, Assembly, Pres...	10:56 AM-11/22/2017
Value above maximum	Seattle, Production Line 1, Assembly, Press...	10:56 AM-11/22/2017
Value above maximum	Beijing, Production Line 3, Assembly, Press...	10:56 AM-11/22/2017
Value above maximum	Beijing, Production Line 2, Assembly, Press...	10:14 AM-11/22/2017
Value above maximum	Rio De Janeiro, Production Line 1, Assembl...	10:14 AM-11/22/2017
Value above maximum	Beijing, Production Line 1, Assembly, Press...	10:09 AM-11/22/2017

Overall Equipment Efficiency

Key Performance Indicators

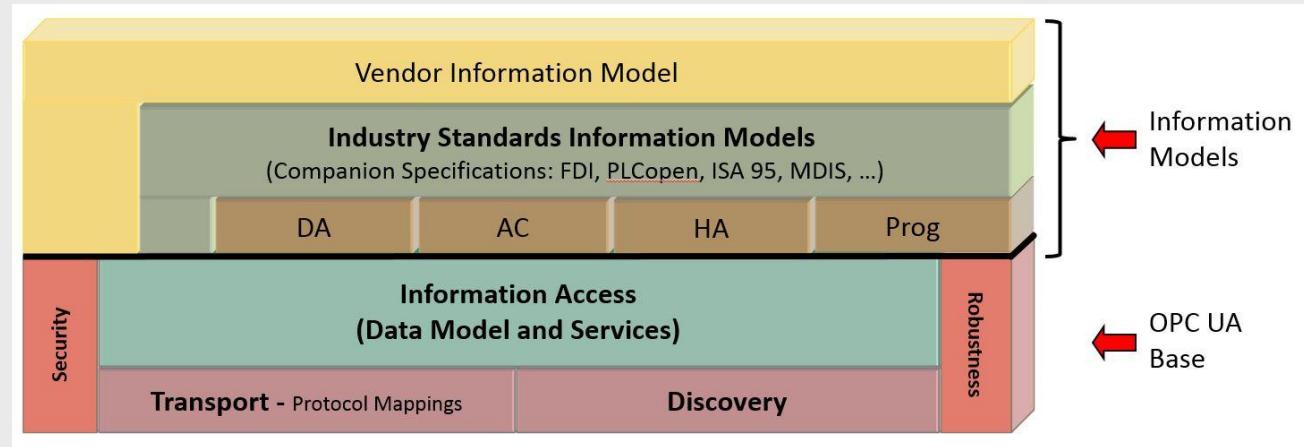
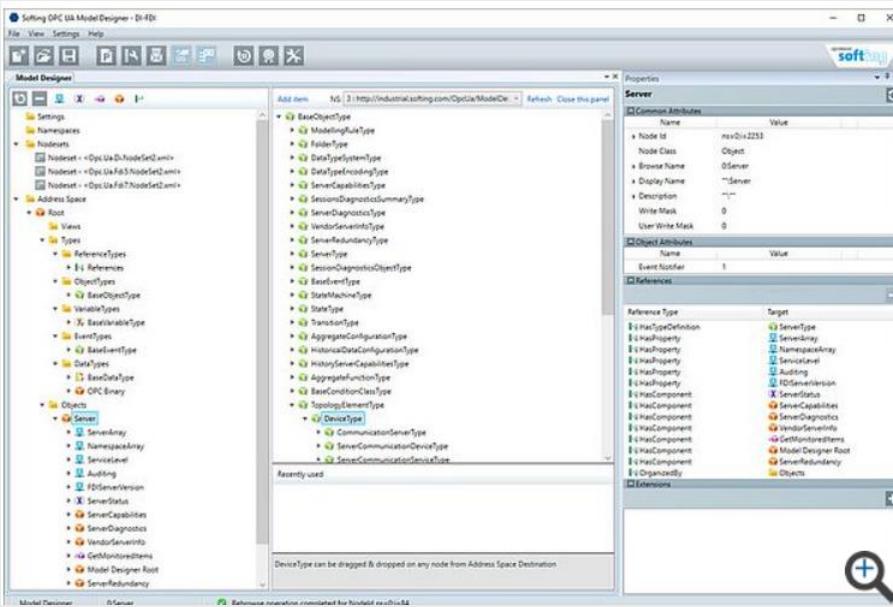
Metric	Value
Overall Efficiency	83.4%
Availability	99.9%
Performance	89.9%
Quality	92.9%
Units per hour	2450
kWh per hour	2120.7

Bing

© 2017 Microsoft Corporation

... I need to ensure Data Concepts – Device and data models are consistent

In industrial automation scenario, the data semantics and structure may be based on the OPC Foundation's information modeling framework



OPC UA Information Modeling GUI tool example

– *Softing UI Model Designer*

- ✓ Modern and Intuitive GUI to Work on OPC UA Information Models
- ✓ Use and Extension of Information Models from OPC UA Companion Specifications
- ✓ Online Change of OPC UA Server Address Space
- ✓ OPC

Semantic Interoperability via Companion Specs



VDMA has 3200 member companies

- » Agricultural Machinery
- » Air Conditioning and Ventilation
- » Air Pollution Control
- » Air-handling Technology
- » Building Control and Management
- » Cleaning Systems
- » Compressors, Compressed Air and Vacuum Technology
- » Construction Equipment and Building Material Machines
- » Drying Technology
- » Electrical Automation
- » Electronics, Micro and Nano Technologies
- » Engine Systems for Power and Heat Generation
- » Engines and Systems
- » Fire Fighting Equipment
 - » Fluid Power
 - » Food Processing Machinery and Packaging Machinery
 - » Foundry Machinery
 - » Gas Welding
 - » Hydro Power
 - » Integrated Assembly Solutions
 - » Large Industrial Plant Manufacturing
 - » Lifts and Escalators
 - » Machine Tools and Manufacturing Systems
 - » Machine Vision
 - » Materials Handling and Intralogistics
 - » Measuring and Testing Technology
- » Metallurgical Plants and Rolling Mills
- » Metallurgy
- » Micro Technologies
- » Mining
- » Plastics and Rubber Machinery
- » Power Systems
- » Power Transmission Engineering
- » Precision Tools
- » Printing and Paper Technology
- » Process Plant and Equipment
- » Productronic
- » Pumps + Systems
- » Refrigeration and Heat Pump Technology
- » Robotics
 - » Robotics + Automation
 - » Security Systems
 - » Software and Digitization
 - » Surface Treatment Technology
 - » Textile Care, Fabric and Leather Technology
 - » Textile Machinery
 - » Thermal Turbines and Power Plants
 - » Thermo Process Technology
 - » Valves
 - » Waste Treatment and Recycling
 - » Wind Energy
 - » Woodworking Machinery

OPC UA CS progressed

OPC UA CS under development

OPC UA awareness existent

Robotics condition monitoring dashboard demonstrates vendor-independence

A screenshot of a Microsoft Azure IoT Suite dashboard titled "Verbundene Factory". The top navigation bar includes "Microsoft", "VDMA Robotics + Automation", "Dashboard", "reinhard.heister@vdma.org", and "IMPLIZIT SCHREIBGESCHÜTZT". On the left, there's a sidebar with brand logos for ABB, ENGEL, KEBA, KraussMaffei, KUKA, MITSUBISHI ELECTRIC, SIEMENS, and YASKAWA. The main content area shows "ABB Details" for "Motion Device ROB_1". The device information table includes:

NAME	WERT
Motion Device ROB_1	
Manufacturer	ABB Ltd
Model	IRB 1200
Serial Number	1200-509874
Device Class	Articulated Robot
FlangeLoad Mass	0 kg
Axis j1	
Motion Profile	Rotary
Actual Position	-34.00 deg

A large image of an ABB IRB 1200 articulated robot is displayed on the right. Below the table, operational status indicators are shown: "Motion Device System Name" (ABB Robot 1200-509874), "OperationalMode" (Manual Reduced Speed), "EmergencyStop" (grey circle with red arrow), "ProtectiveStop" (grey circle with triangle), "UnderControl" (green circle), and "Speed" (a gauge meter showing 25).

ABB Details

Alle

NAME WERT

Motion Device ROB_1

Manufacturer ABB Ltd

Model IRB 1200

Serial Number 1200-509874

Device Class Articulated Robot

FlangeLoad Mass 0 kg

Axis j1

Motion Profile Rotary

Actual Position -34.00 deg

Motion Device System Name ABB Robot 1200-509874

OperationalMode Manual Reduced Speed

EmergencyStop

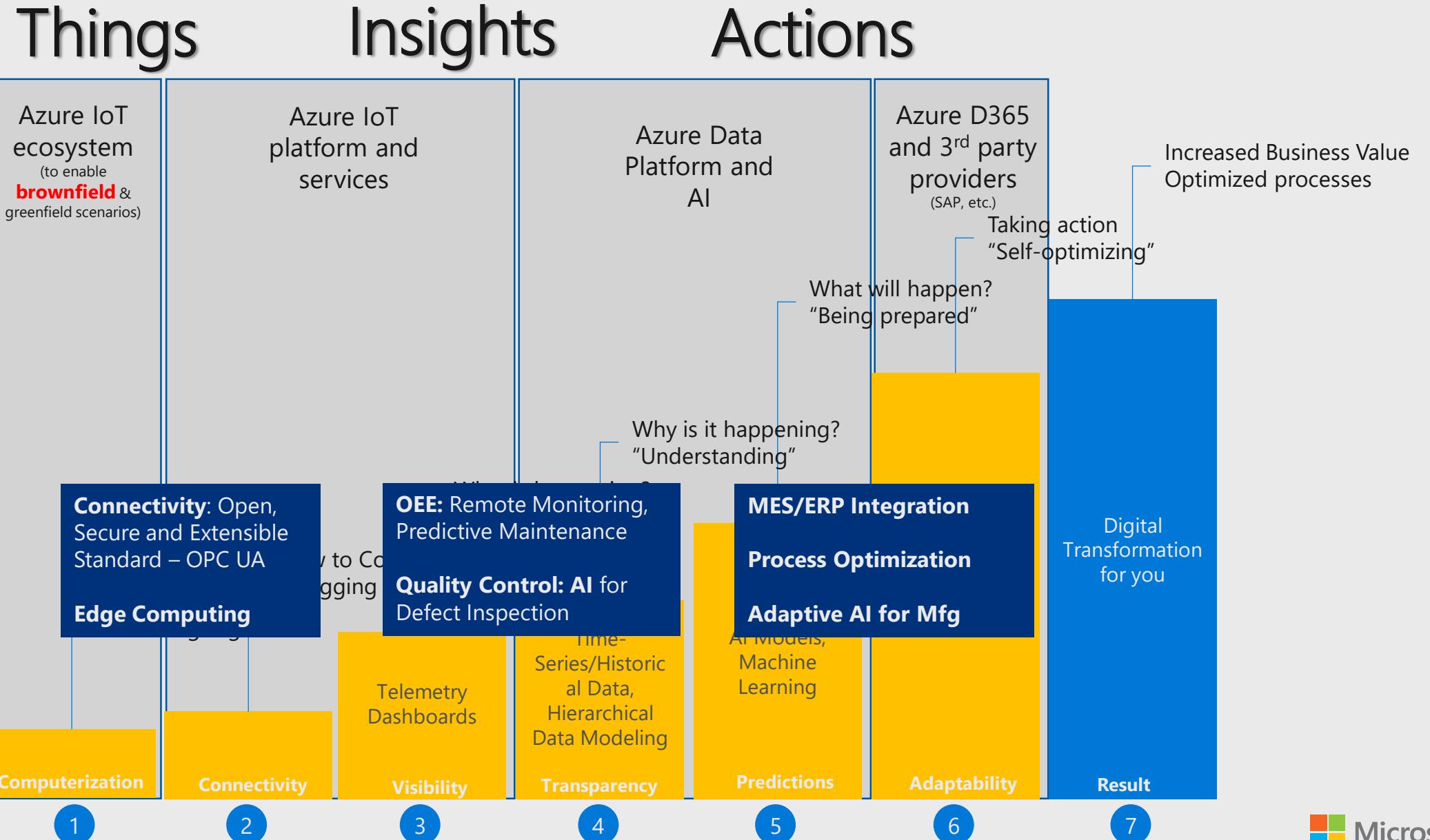
ProtectiveStop

UnderControl

Speed 25

Access any of your robots,
of any robot brand, at any time,
anywhere in the world!

Going all the way to act on the insights now



Example - Predictive Analysis

IN FACTORY OF THE FUTURE AT JABIL

- Improving Quality
 - Predict downstream defects products in upstream processes and evaluate the impact to production BEFORE they happen
 - Advanced statistics for early warning detection of quality processes going out of control long before they happen
- Equipment Optimization
 - Machine learning algorithms used for autonomous equipment adjustments and M2M with no operator intervention
- Increasing Equipment Uptime
 - Avoid unplanned downtime by predicting future equipment failures
 - Optimize maintenance schedules and reduce costs

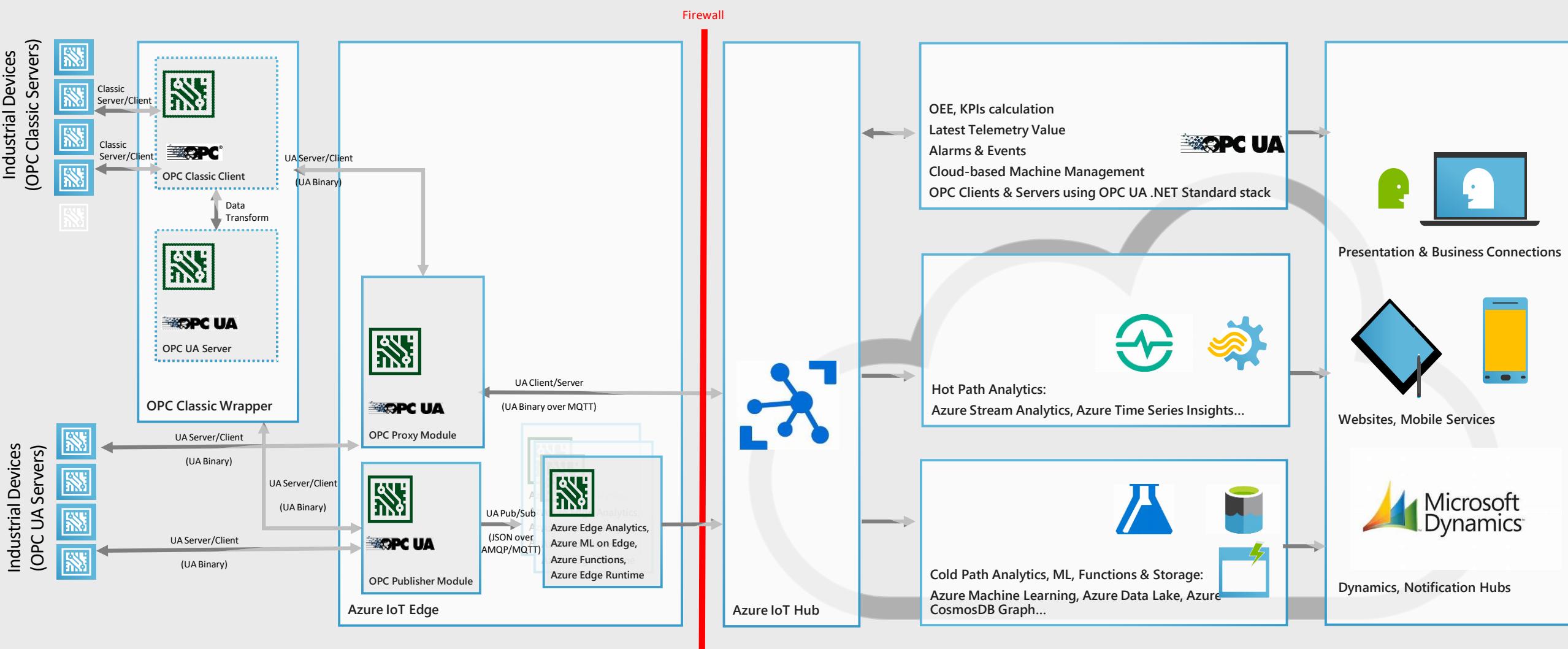
The top half of the image shows a 3D rendering of a factory floor. The floor is labeled with various inspection stations: SPI (Screen Print Inspection), Paste, SMT - Pick and Place, Reflow - Oven, AOI - Automatic Optical Inspection, AXI - Xray Inspection, ICT - In Circuit Test, and FVT (Functional Verification Test). Workers in white lab coats are shown operating the machinery. The Microsoft Azure Machine Learning logo is in the top left corner.

The bottom half of the image is a screenshot of the Jabil Inspection Monitor & Predictive Failures dashboard. It features several data cards:

- Board Processed:** Koh Young SPI. Serial Number: JAD20010075. Assembly: SPYKER TOP. Using Job: GDL-SPYKER_TOP_JOB_S26B557719. Processed At: 2015-12-30 17:23:20.
- Predictive Accuracy:** Predicted Fail: 100% confidence rating. 8 passed, 1 failed, 88.9% yield.
- Axis Metrics:** A scatter plot showing data for 60 Boards across x-axis (-0.09 to 0.09) and y-axis (-0.09 to 0.09). Current Board values are -0.012 and 0.058.
- Volume Metrics:** A line chart showing volume metrics from 0 to 200. UCL: 184.6%, Target: 100%, LCL: 17.6%.
- Height Metrics:** A line chart showing height metrics from 0 to 250. UCL: 212, Target: 140.8, LCL: 50.4.
- Area Metrics:** A line chart showing area metrics from 0 to 200. UCL: 158.4, Target: 100%, LCL: 31.7.

The dashboard also includes a "Settings Panel" button, a navigation bar with Production, Favorites, and Configuration options, and a note that Predicted Maintenance Required in 7 week 5 days.

Azure Industrial IoT Reference Architecture



On-Premises: Device Connectivity

Azure Cloud: Data Ingestion & Processing, Command & Control

Azure Cloud: Presentation



Ying & Yang 阴和阳: IT & OT converging in Industrial IoT

Azure Partner

Applications that **Solve Business Problems**

Services for Specific Use Cases

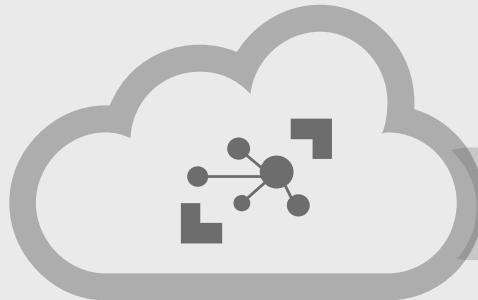
Open Industrial IoT Reference Platform based on **Industrial Standards**

Scalable, Managed Services for **Common Patterns**

Globally Available Edge/Private/Public Cloud **Infrastructure**



It takes a village to raise children, it takes an ecosystem to solve Industrial IoT



Azure enables scale through IoT PaaS services



Automation Companies



Machine Builders



Gateway and SI



Manufacturers

- Azure enables Top 10 automation companies to leverage secure-by-default Azure IoT PaaS and focus on value creation
- Our partners (just a few):

SIEMENS **ABB**

GE **EMERSON** **BECKHOFF**
Honeywell

- Azure partners with builder ecosystem to offer predictive maintenance solutions, bundled with machines
- Our partners (just a few):

KUKA TAPIO

Leuze electronic

HC HOMAG

- Azure leverages specialized solutions integration to focus on process optimization; connectivity specialist for OT/IT interoperability.

Hewlett Packard Enterprise

BLUETRANS

MESH SYSTEMS

Cognizant

softing

robotron

ADLINK
MOXA

ADVANTECH

Microsoft

Industrial IoT Partnerships (Top Automation Companies) runs on Microsoft Azure IoT

Mindsphere runs on Azure IoT

Ability runs on Azure IoT

Plantweb runs on Azure IoT

EcoStruxure runs on Azure IoT

FactoryTalk runs on Azure IoT

Predix runs on Azure IoT

Sentience runs on Azure IoT

Yokogawa's IIoT Platform runs on Azure IoT

Hana runs on Azure IoT

SIEMENS

Ingenuity for life

ABB


EMERSON


**Schneider
Electric**


**Rockwell
Automation**




Honeywell


YOKOGAWA


SAP

Example of manufacturing partnerships - Volkswagen



Microsoft's vision for Industrial IoT

Our vision: Microsoft to provide the first-class IIoT platform, our ecosystem to enable use cases

Business Principles

- **"No vendor lock-in"**
Smart Manufacturing requires open standards to be successful and meaningful
- **Interoperability is a must**
No tolerance for proprietary solutions, protocols or code
- **Scale through Ecosystem**
Only a large partner network can solve the complexity of smart manufacturing

Technology Principles

- **"Secure by Default"**
Our reference platforms always have security top of mind and ensure compliance
- **Protocol independent, platform independent**
Works just as well with AMQP/MQTT and Linux or Windows
- **Based on Open Standards**
Industrie 4.0 and OPC UA

Microsoft invests USD 5 Billion in IoT!



Our goal is to give every customer the ability to **transform** their **businesses**, and the world at large, **with connected solutions**

<https://blogs.microsoft.com/iot/2018/04/04/microsoft-will-invest-5-billion-in-iot-heres-why>

... and Microsoft is the first hyperscale cloud provider to:

- Deliver IoT solution accelerators | SaaS and PaaS for IoT | AA/AI at the edge
- Solve device provisioning at scale | Support OPC UA for manufacturing



FORRESTER®

Microsoft is a leader in the Forrester Wave for IoT Software Platforms



IDC
Analyze the Future

Microsoft is a Leader in the IDC MarketScape for IoT platforms across various use cases



NAVIGANT

Microsoft is a leader in the Research Leaderboard assessment of strategy and execution for 15 IoT platform providers



CXP GROUP
A CXP GROUP COMPANY

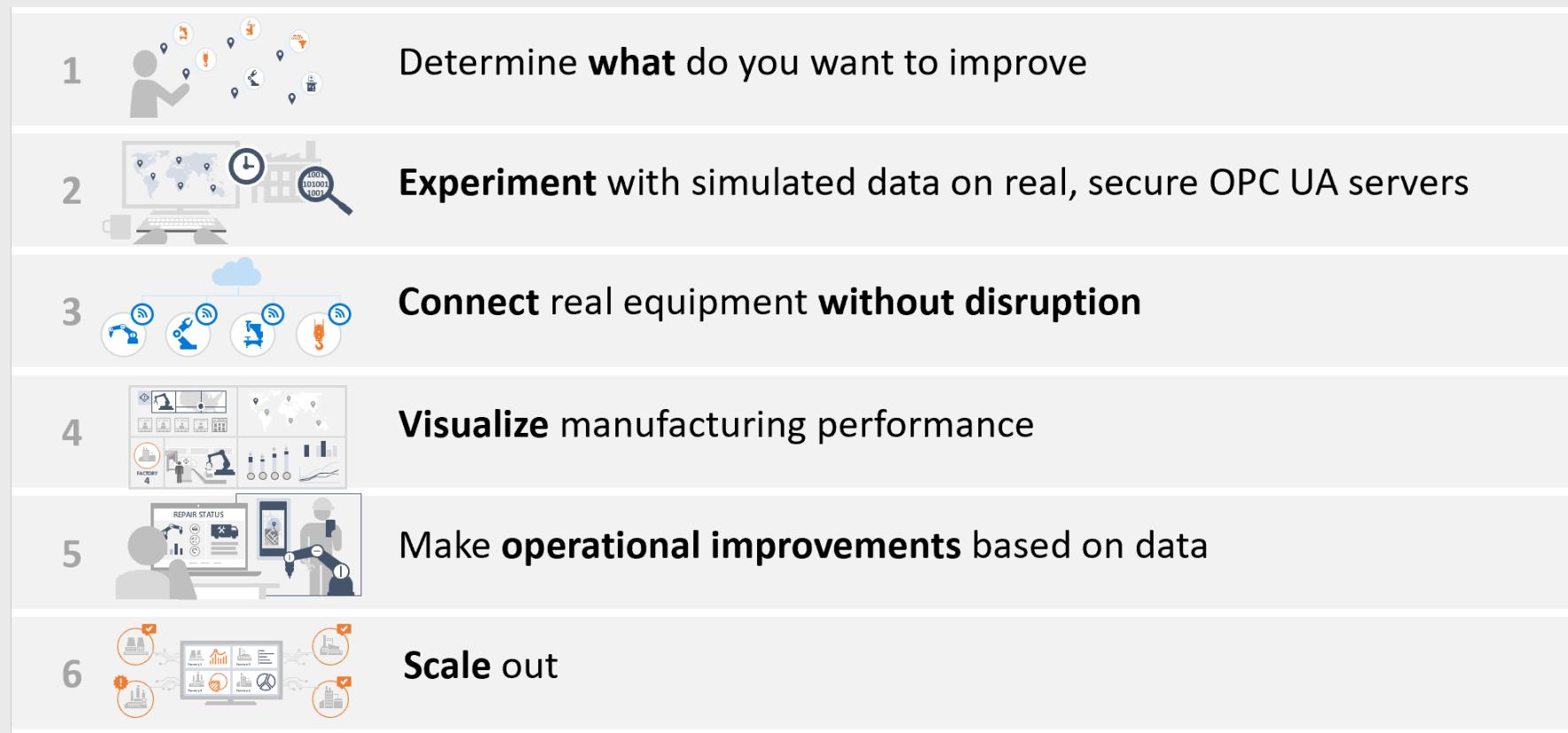
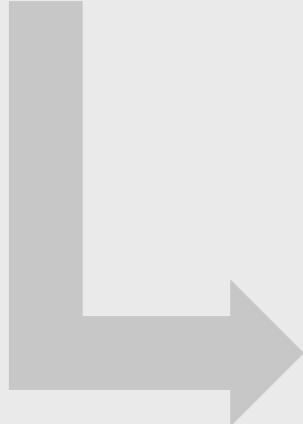
Azure IoT is the only cloud platform that was determined as best in class in every category



Contact your MS Personnel on how to get started

<https://cloud-platform-assets.azurewebsites.net/connected-factory>

Firstly, Contact Microsoft Personnel for follow up





Microsoft

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