Azure IoT Suite
Connected Factory
David Bojesen, Cloud Solution Architect
Christian Rytt, Senior Program Manager
Azure IoT Suite

- Secure device connectivity and management
- Data ingestion and command + control
- Rich dashboards and visualizations
- Business workflow integration
- Move beyond building blocks with pre-configured solutions
Internet of Things, People and Services

Device Connectivity & Management
- Gain visibility, access and control to machinery and processes
  - Connectivity
  - Device Management
  - Event Processing & Portal
  - Security and IP protection

Data management & Insights
- Manage KPIs to improve operational performance and decision making
  - Insight
  - Performance
  - Process Excellence

Advanced Analytics
- Anticipate problems and deliver new value added services
  - Predictive Analytics
  - Predictive Maintenance
  - Asset, Quality and Energy Mgmt

Business Productivity & Process Optimization
- Integrate People and Business Process
  - Engineering Services
  - Field
  - Manufacturing
  - Proactive upsell and cross sell
Enterprise & plant transformation

Enterprise & Plant Topology

Communication Layer

ERP-Level
Enterprise Resources

MES-Level
Manufacturing Execution Systems

Control-Level
Machine Controllers

Device-Level
Sensors, Devices

Information Systems

Responsive and dynamic cross-industry Value Networks

Cross-plant performance, coordination & flexibility

Production optimization & reduced process costs

Intelligent equipment with reduced failures & downtime

Enhanced
Operational excellence with improved visibility

Pump Manufacturer
Vision for Industrie 4.0

Product to be manufactured contains all necessary information on its production requirements

Flexible configuration of production steps

Flexible decision making on the basis of current situation

Human beings as essential decision-makers, creative planners and controllers
OPC UA for Industrie 4.0

**Open**

- **Vendor, Platform** and OS Independent
- **Scalability** for integrated networking from smallest sensors to mainframes
- **Services oriented architecture** (SOA) independent of the transport method
- Designed for **time-series data transfer**
- **Discoverable** for available UA data sources
- **Large installed base** and growing rapidly

**Extensible**

- **Data modeling** preserves source context
  - Vendors can provide complete data model of each product
- **Extendable** Support New protocol definition (Companion Specification)
- **BACNet | PLCopen | MDIS (Subsea standard) | Others . . .**
  - UA Clients can learn new structures from UA servers upon connection

**Secure**

- **Secure Design** from group-up
  - The **one and only recommendation** for 'communication' layer by RAMI 4.0
- Based on **Security standards**
- **Messaging signings | Encryption**
- **Evolves** as security technology evolves
  - Vendors/Users can choose level of security
  - Easily acceptable by IT departments
Microsoft and OPC-UA

**ENABLE** productivity with artificial intelligence

**ALIGN** partnerships around a new digital ecosystem

**DRIVE** platform interoperability across the cloud continuum

“What all this boils down to for users is easing the process of adopting IIoT and Industrie 4.0 initiatives.”

David Greenfield
Director of Content/Editor-in-Chief, Automation World
Azure IoT Suite

- Device Connectivity & Management
- Data Ingestion and Command & Control
- Stream Processing & Predictive Analytics
- Workflow Automation and Integration
- Dashboards and Visualization
- Preconfigured Solutions
  - Remote Monitoring
  - Predictive Maintenance
  - Connected Factory (new)
OPC UA Integration into Azure IoT Suite

On-Premise: Device Connectivity

Cloud: Data Ingestion & Processing, Command & Control

Cloud: Presentation

Industrial Devices (OPC-UA Servers)

- OPC UA Client Module
- Azure IoT Gateway SDK
- IoT Proxy Module
- OPC UA

Other Devices

- UA Binary

Firewall

OPC UA

Microsoft Azure

- OPC Clients, Servers, ERP Portals,
  OPC Graph Database and OPC UA .NET Standard Stack

Hot Path Analytics

- Azure Stream Analytics, Azure Storm, ...

Cold Path Analytics & Storage

- Azure HD Insight, Azure Storage, SQL, DocDB, ...

Azure IoT Hub

Presentation & Business Connections

- Websites, Mobile Services
- Dynamics, BizTalk Services,
  Notification Hubs

Microsoft Dynamics

Microsoft BizTalk Server

Any

JSON/AMQP

UA Binary/AMQP

UA Binary

UA Binary/AMQP
Azure IoT Suite Connected Factory Architecture

Linux VM (with multiple assembly lines)

- OPC UA Server
- OPC UA Server
- OPC UA Server

Gateway SDK with OPC Proxy & OPC Publisher Modules

MES Simulation (OPC UA Client)

Telemetry path

Time Series Insights

Web App hosting Solution Dashboard & OPC UA Client

Telemetry path

Command & Control path

IoT Hub
6 steps for connected factory
# Steps to get started

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Determine your digitization objectives and use cases</td>
</tr>
<tr>
<td>2</td>
<td>Experiment with simulated data</td>
</tr>
<tr>
<td>3</td>
<td>Connect equipment without disruption</td>
</tr>
<tr>
<td>4</td>
<td>Contextualize and visualize manufacturing performance</td>
</tr>
<tr>
<td>5</td>
<td>Make operational changes based on data</td>
</tr>
<tr>
<td>6</td>
<td>Enable new scenarios and scale</td>
</tr>
</tbody>
</table>
Azure IoT Suite: Ready for the enterprise

**Secure**
End-to-end
From endpoint and connection through to data and the cloud

**Fast**
Start in minutes
Preconfigured solutions for the most common IoT scenarios

**Open**
Connect anything
Any device, OS, data source, software, or service

**Scalable**
Grow effortlessly
Millions of devices, terabytes of data, on-premises and in the cloud, in 30 regions worldwide
Microsoft Dynamics 365 “intelligent bridge”

Microsoft Dynamics 365 for Finance & Operations and Microsoft Azure Intelligent Services
A tale of 2 cities

Having a 360 view of all ‘Things’ an enterprise uses by combining transactional & intelligent data.
**Internet of Things** : Combining intelligent data with transactional business data enabling users to execute informed business actions based on intelligent insights.

**Connected Factory**
**Connected Products & Services**
**Transportation tracking & optimization**
**Remote Asset monitoring**
**Manufacturing execution**

**Machine Learning** : Leverage Azure ML capabilities combined with their operational data to accelerate their business decisions, provide better outcomes, gain unique business insights and ability to make decisions faster.

**Credit monitoring & collections probability**
**Supplier performance ratings**
**Retail product recommendations**
**Route optimizations**
**Manufacturing scheduling**

**Intelligent Analytics** : Enabling Cortana Intelligence to convert transactional & external data into intelligent action.

**Demand forecasting**
**Price optimization**
**Personalized Offer management**
**Product quality assurance**

**Azure Bot service** : Leverage Azure Bot Service into D365 applications to enhance the human-machine interactions for business applications.

**Information retrieval**
**Performing lightweight tasks**
**Guided learning**
**Customer and employee self service**

**Azure Big data** : Leverage Big data capabilities of Azure with D365 allowing organizations to capture, store and analyze massive amounts of data in multiple format.

**Social data capturing**
**External signals in multiple formats**
**Correlation of massive amounts of data**
**Improve product and services**

**AI & Cognitive services** : Enable natural and contextual interaction within D365

**Advanced SCM route logistics**
**Location insights for Transportation**
**Enterprise route optimization**
**Time and distance-based recommendations**
**Image recognition**

**Blockchain** : Build blockchain capabilities into D365 applications and business network

**Tracking & tracing**
**Product authenticity**
**Payments & receipts**
**Flow of products across distribution chain**
**Prevention of fraud**
Integration between Finance and Operations

Azure IoT

Finance and Operations
Dynamics 365 intelligent bridge for IoT – AppSource solution templates

D365 IoT bridge end to end solution template availability in AppSource. Provide discoverability & 1-click deployment as well as platform for ISV solution templates.
Get started today

Go to www.InternetOfYourThings.com

Download the whitepaper for framework to getting started on connected factory

Define your use case

Select a partner

Go through our Quick Start process