PREPARE FOR THE NEW ERA OF AUTOMATION USING OPC UA

OPC UA Session 1

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June 2017
Plan to attend *Delivering Outcomes With The Connected Plant*, Shree Dandekar, VPGM, Honeywell Connected Plant and Jason Urso, CTP, HPS (Tuesday June 20th, 2017)

Plan to attend the second session on OPC Connectivity (Tuesday June 20th, 2017):

“Enable The Connected Plant with Matrikon® FLEX OPC UA SDK”
Agenda

Digital Transformation

The Industrial Internet of Things (IIoT)

Enablers of Digital Transformation : OPC UA

Next Steps…
How Does IIoT Work?

1990s

Connect process intelligence to business KPIs

Apply powerful analytics to detect and predict issues

Organize and visualize data in asset context

Capture real-time process and event data

VISUALIZATION

COLLABORATION Across Functions

Advanced Analytics
Smart and Secure Collaboration
Data Management and Onsite Control
Smart & Connected Assets and Devices
IIoT Demands Access To Data

IIoT Solutions are Powerful with Access to All Data

OPC UA: Diagnostics, Calibration, Process, Analytics

Field Devices

CONNECT CONTROL BUS

DCS

Private / Public Cloud

All Data

Maintain

Operate

Optimize

OPC UA: Diagnostics, Calibration, Vibration, Process

CONTROL BUS / OPC*

Non- Honeywell Equipment

OPC UA turns every field device into an edge device for direct cloud connectivity

Analysis + Outcome

Easy access to all plant data, combined with structured and unstructured data from other sources, allows optimization of the entire value chain
Honeywell Connected Plant

Deliver and Sustain Improvements in Our Customers’ Profitability by Increasing Throughput & Yield at Lower Cost via:

- Improved Process Reliability
- Increased Production Efficiency
- Integrated Safety & Cyber Security
- Optimized Supply Chain
- Workforce Competency
Introduction To OPC UA

Industry Standard Ethernet based Connectivity for Industries – “USB” for Industrial Data

- Developed and sold by Honeywell Matrikon
- Many competitors: OPC vendors, automation vendors, software vendors, etc.
  - Architecture components and data analytics offer value add beyond connectivity
  - Differentiators: Compliance with specification, ease of use, performance, robustness

Holger Junker, German Federal Office for Information Security, (BSI), Head of Division

“OPC UA is one of the most important modern standards for industrial facilities and many further scenarios in an intelligent and connected world. OPC UA is considered a central building block on the way towards Industrie 4.0. It is the first unified, worldwide recognized industrial protocol for a secure smart factory.”
Matrikon Flex OPC UA SDK

The first high-performance, scalable OPC UA SDK that quickly and easily enables any application, regardless of size or hardware platform.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tr>
<td>High Performance</td>
<td>Secure, reliable design built from embedded-first principles maximizes uptime.</td>
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<td>Smaller Footprint</td>
<td>Optimized memory and CPU bandwidth enables OPC UA in any hardware or software product.</td>
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<td>Scalable</td>
<td>Scalable to all products – from the smallest MCUs to the most powerful multi-core CPUs.</td>
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<td>Easy to Use</td>
<td>Faster to market with drop-in 'OPC UA Server &amp; Client Inbox' design.</td>
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Evolving Data Sharing Network Model

**How It’s Implemented**

- ERP
- Corporate Network
  - MES
  - Firewall
- Operations Network
  - HMI
  - DCS
  - Firewall
- Plant Floor Network
  - Controllers
  - Controllers

**How It’s Used**

- Connectivity to any end points
- Common semantic model

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*Figure 6: Demarcation between office floor and shop floor
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Cloud Based Data Collection A Reality

Edge to Cloud connectivity making it possible to:

- Reduce IT costs
- Improve diagnostic visibility
Today

- ISA 99/95 (Perdue Model)
- Many data islands
- Large middle-tier
- High infrastructure cost
- Complex setup
- OPC UA = Differentiator
Tomorrow

- Perdue/IIoT Model
- Greater data visibility & context
- Shrinking middle-tier (Fog Computing)
- Cost savings
  - Infrastructure
  - Efficiencies
- OPC UA = Migration
Future

- IIoT Model / Perdue Model
- Data As Intelligence (Fog + Cloud)
- Optimized middle layer (Fog Computing)
- Cloud Historians collecting contextualized data
- Minimized costs
- OPC UA = Norm
Coming Soon: OPC UA Publish-Subscribe

- OPC UA Part 14 adds native PubSub capabilities
- Enables:
  - Highly scalable infrastructure
  - Secure cloud connectivity using AMQP
  - High Speed data exchange

Cloud Application: AMQP

Local Application: UDP
Example PoC: Data Connectivity

Scalable Cloud based data collector:
• Preserved Data Context = easy reference, fast setup, reduced errors:
  • Device X
    • Temp: 120
    • EU: F
    • Min: 80
    • Max: 250

Benefit: Cost Reduction & Security
• Eliminate Middle ware PC
• Eliminate Windows Patching & Antivirus upkeep costs
• Eliminate IT engagement
• Eliminate use of wrong data registers using on-board human readable values
• Maximize Device ROI by extending device lifespan
• Secure legacy devices that have no built in security
Putting OPC UA To Work

OPC UA Tunneller Software

OPC UA

Windows PC + Classic OPC

Native Proprietary Protocol

Proprietary

Industrial Data Logger

UA Modbus Gateway

Modbus

“Dark” Devices

OPC UA

Custom Gateways & Sensors

OPC UA

OPC UA Enabled Devices

Phased Migration / Adoption

PoC

OEM
Migration from OPC To OPC UA using UA Tunneller (releasing in Q3 2017)
Classic OPC Client ↔ UA Server

Windows (COM/DCOM)

Historian

OPC Classic Client

UA Tunneller (client side)

OPC UAServer

OPC.UA Client

HMI

OPC UA

OPC UA

HMI

OPC UA

OPC UAServer

OPC UAServer

PLC

Modbus TCP

OPC UA Server

PLC

Serial / TCP

Opc.tcp://192.168.10.2:4840

Opc.tcp://192.168.10.1:4840
UA Client ↔ Classic OPC Server

- UA Client
- Classic OPC Server
- HMI
- OPC UA Client
- UA Tunneller (Server side)
- OPC Classic Server
- PLC
- Serial, TCP, etc.
- OPC UA
- Windows (COM/DCOM)
- Classic OPC

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Migrating Toward True Digital Business Transformation

Emerging Challenges
• Digital Business Models
• Integrated Cloud + Edge (Fog Computing)
• From ‘Me’ to ‘We’ Ecosystems
• Smart Workforce - Augmented

Existing Infrastructure
• Legacy ROI + Migration
• Industry vertical silos
• Open data connectivity
• Data Security

Today

Emerging Challenges

Existing Infrastructure
Conclusion

OPC UA Data Connectivity benefits:
- Extended & secure visibility to Field/Shop Floor
- Context rich Data
- Ease of deployment and maintenance
- Reduction in IT and middleware costs
→ NEXT STEP: Start Phased Migration

- Digital Business Transformation is a multistep process
  - Fog Computing @ Edge
    - Local Analytics
    - Local Filtering – reduction of data noise/volume
  - Cloud
    - Improved Analytics
    - Improved access across enterprise and eco system
    - Workforce training/alignment
→ NEXT STEP: Start Your IIoT PoC

• UA Tunneller
• UA Modbus Gateway
• Industrial Data Logger
• Matrikon FLEX OPC UA SDK

• Industrial Data Logger
• IIoT Cloud collector
• IIoT HUB
Please visit www.MatrikonFlex.com for more information and contact information
Q&A

Thank you for your time