OPC UA Business Value

Bill Lydon
• Chairman of PLCopen North America

PLCopen
for efficiency in automation

• Editor of Automation.com & InTech Magazine

• Automation Consultant
Bill Lydon Background

Entrepreneur

Hardware & Software Design

Applications

Controls & Automation
Manufacturing systems NOT advancing at the rate of other business systems.
Cumbersome & Slow Architecture

ERP

MES/Historians/HMI

Local HMIs

Automated Controls

Hardwired, Proprietary; Semi Proprietary

Low Quality Data Sources

Sensor/Actuators

Multiple Databases
Historians, Batch Records, LIMs etc.
DUPLICATION

Crude Data
Non-Standard
Low Refinement
Poor Syntax
No Context
Cumbersome & Slow Architecture

- Duplicated Data
- Multiple Layers
- Throughput Bottlenecks
- Communication Translators
- Complicated Routing
- Low COTS Adoption
- Configuration Control Challenges
- Holding back innovation
- Holding back productivity

Complicated & creates a great deal of cost, ongoing configuration control and lifecycle investment.

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  Historians, Batch Records, LIMs etc.
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Local HMIs

Automated Controls

Hardwired, Proprietary; Semi Proprietary

Multiple

Proprietary

Semi Proprietary
Striving for Manufacturing Success
Creative & Innovative Automation

Low labor cost is not a winning manufacturing strategy…
The Big Ideas: Real-time Digital Factory

**continuous real-time business optimization**

*Synchronize:* Customer, Supply Chain; Manufacturing

*Make to Order Manufacturing*

*Increase Factory Throughput*

*Increase Quality*

*Frictionless Communication*

*Reduce Application Engineering Time*

*Simplify Enterprise Software Interfaces*

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**Precision & Efficiency**
Increased Computing & Communications

Macro Level
Processes, Machines & Plants
Embedded Computing - Sensors, Actuators, Pumps, Flow Sensors, …

Control & Automation Driving to the Edge

“the internet of things”

32/64 bit CPUs, Integrated Communication (Wired & Wireless), Embedded Real-time Operating System, Web Server, Email, Web Services
Analytics

Methods Understood - Model Based Control * Model Free * Self Learning
Limiting Factors – Processing Power, Communications, & Weak Software Platforms

Wider Application Possibilities
Machine • Multi-Process • Multi-plant • Supply Chain • Energy

Macro Level
Wider Application Possibilities
Machine • Multi-Process • Multi-plant • Supply Chain • Energy

Macro Level
Processes, Machines & Plants

Micro Level
Drives, Controls, Sensors, Actuators, Etc…

Embedded Computing - Sensors, Actuators, Pumps, Flow Sensors, …

Control & Automation Driving to the Edge
Refinement • Analytics • Web Server • Email • Web Services • OPC UA
Lean & Responsive Architecture

the cloud

ERP

Automation & Controls

Sensor/Actuators
Open Standards Deliver Interoperability
Device to Device and Device to the Enterprise

- ISA-95
- ISA-88
- B2MML
- IEC 61131
- MTConnect
- PackML
- OPC UA
- OPC UA ADI
- OPC UA - WITSML
IEC 61131-3 Global Standard

IEC = International Electrotechnical Commission
Founded in 1906 • Over 50 participating countries
Common Industrial Control Programming Standard

PLCopen

Founded in 1992 • Worldwide
Vendor Independent • Not for Profit
Focus – Open Architecture Controls Programming
Open Controls Programming Standards

STRONG DATA TYPES

- Ladder Diagram (LD)
- Function Block Diagram (FBD)
- Sequential Function Chart (SFC)
- Structured Text (ST)
- Instruction List (IL)
• XML Interchange Standard

• Transparent Access
• Transparent Communication
Goal: to define a set of FBs for UA Client communication

Basis for Machine-to-Machine communication
Lean & Responsive Architecture

the cloud

ERP

Automation & Controls

Sensor/Actuators
The Big Idea: Real-time Digital Factory

continuous real-time business optimization

Synchronize: Customer, Supply Chain; Manufacturing

Make to Order Manufacturing

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Frictionless Communication

Reduce Application Engineering Time

Simplify Enterprise Software Interfaces

Precision & Efficiency
OPC & PLCopen
Improves Utility & Life Cycle Cost

Design
Specification
Risk Analysis
Verification
Coding
Testing
Refining
Integration
Commissioning
Maintenance
Open Standards Simplify Automation
(Just as it has in other applications.)
Mapping between BACnet and OPC-UA Building Automation Function Block Libraries
Use Case: Building Automation

Microsoft Headquarters, Munich, Germany

- Standard IEC 61131 Programming
- 230 Beckhoff BC9000 Controllers
- HMI: Webpage/Internet Explorer
- Ethernet TCP/IP I/O
- 27,500 I/O Points
- Room Control via Internet

Courtesy of OPC Foundation/PLCopen Member Beckhoff
OPC UA Business Value
Building Blocks
Real-time Digital Factory
continuous real-time business optimization

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