OPC UA in the process industry IoT and Edge solutions
SPEAKER

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Father of three, husband of one, outdoor and science minded, reads and renovates.
Working with #sustainability #renewable #SW #AI #ML #IIoT @napconsoftware

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PRODUCT MANAGER, NAPCON UNDERSTAND

Product professional with holistic vision of business and customer needs. Excessive competence on product, processes and software development.

Building awesome products with deep insight in the fields of Artificial Intelligence / AI, Machine Learning / ML, IoT / IIoT and Big Data / Data / #Prescriptive Analytics, software products and quality for tomorrows solutions.


Education

Tampere University of Technology
Master of Science (M.Sc.), Learning and Intelligent Systems, Automation and control technology, Good
1997 – 2003

Main subject: Automation and Control Engineering
Subsidiary subject: Measurement and Information Technology
Degree thesis: Soft-sensor based viscosity control of rubber mixing process
(http://ae.ae.tut.fi/research/AIN/Publications/tomi_lahti_dtyo.pdf)
Other: Object oriented programming, information network technologies, energy technology
Neste Engineering Solutions

World-class know-how in industrial investment projects

Deep cooperation with strategic customers
1500 PROFESSIONALS REPRESENTING 40 NATIONALITIES

NES 2017:
NET SALES 183M€
PROFIT 8,9%
PERSONNEL 1500
TO ERR IS HUMAN, TO IMPROVE IS NAPCON.
WHAT IS NAPCON?

- NAPCON is a business unit of Neste Engineering Solutions that improves production, quality, energy and safety for process industries.
- 70 professionals
- More than 170 applications delivered to 11 countries since 1986
- Our tools are independent of automation and ICT platforms
NAPCON WAS BORN FROM THE NEEDS OF AN INTEGRATED PLANT IN PORVOO, FINLAND
NAPCON - TYPICAL CUSTOMER INDUSTRIES

- Petrochemicals
- Gas: Natural Gas – Biogas - LNG
- Industrial Infrastructure
- Petroleum Refining
- Biorefining
- Food Industry
OUR SUCCESS STORIES

Borealis
$100M MORE PROFIT

Neste
50% REDUCTION IN C6 PRODUCT QUALITY VARIANCE CONTENT
10% OF THE TOTAL BENEFIT CAME FROM ENERGY SAVINGS

Neste
78% LESS WORKING HOURS SPENT

Valio
+8% MORE MILK POWDER PRODUCTION

Forchem
17% INCREASE IN TALL OIL PRODUCTION
IOT & EDGE IN PROCESS INDUSTRY
HOW TO COMMUNICATE – THERE IS A PLETHORA OF WAYS TO DO IT
IIoT – DATA ANALYTICS TO CLOUD AND BACK TO EDGE

- **Cloud** connected sensor data to central database where is also calculation capability and intelligence

- Due to massive increase in amounts in raw data, lately trend has been moving decision support and analytics capabilities near equipments/to **Edge**: back to near sensors and actuators
  - Move only refined information to cloud (bandwith)
  - Enable fast decision making (need for low latency)
  - Enable Edge Analytics & Edge Intelligence
A DIGITAL REFINERY – HOW?

IIoT enables digitizing of physical objects (information related to those)

- **Digital supply chain**: Enables data collection and for example optimization of whole supply chain
- **Real time operational information** and estimations of interesting business KPI’s of production enable operational visibility and predictions
- That is **Operational Intelligence**: real time full visibility and steering for optimal production.
STEPS TOWARDS YOUR DIGITAL REFINERY – SELECT COMMUNICATION PROTOCOL FOR YOUR COMMON INFORMATION HIGHWAY

- DATA SEARCH
- REPORTING
- ENTERPRISE OPTIMIZING
- OFFICE DATABASE
- PLANT OPTIMIZING
- LIMS
- OPERATIONAL DATABASES
- OPERATORS DATABASE
- ADVANCED PROCESS CONTROL (APC)
- VALIDATING MEASUREMENTS
- INFERENTIAL CALCULATIONS
- NAPCON Informer OPC UA
- DATA ANALYSING
- PROCESS OPTIMIZING
- ANALYZER NETWORK
- SOFT SENSORS

Instrumentation & Distributed Control System

ERP
A DIGITAL REFINERY – WHAT WOULD BE THE ULTIMATE GOAL?

Key features of a modern digitalized plant – to achieve Operational Intelligence

• Current state of plant is transparent and visible to every stakeholder

• Information gathered is transformed to wisdom and served up to different stakeholders at easy to use format, e.g:
  • AI co-operator for production operators
  • Intelligent dashboards and automated decision support for management

• Operations are Cyber Secure in every aspect

• Production is Optimized on every level of the Enterprise and Plant
**OPC UA IN IIoT AND EDGE**

- OPC UA have several benefits for IIoT and Edge:
  - Service oriented architecture
  - Context awareness and data models fastens application development
  - Future interoperability secures today’s investments
  - Secure information transport
  - Supplier independence
- Security plays essential role
  - Especially at Edge, transferred information has high business value
  - Device system management (authentication, authorization, scalability and upgradability/maintainability) needs remarkable attention

**IIoT-enabled edge devices embedded with OPC UA can help organizations maximize their return on assets (ROA) by helping ensure that their automation investments are scalable, future-proof, adhere to open standards, and integrate with existing assets.**

(Sources: ARC View, January 10, 2018)

“OPC technology has become a de facto global standard for moving data from industrial controls to visualization up to MES/ERP and IT cloud levels.”

➢ Craig Resnick, Vice President of ARC Advisory Group
ONBOARDING IIOT IN PROCESS INDUSTRY

HOW TO DO IT THEN
STEPS TOWARDS YOUR DIGITAL PLANT – KNOW WHERE YOU ARE

Take at least an in-depth look at the following ones:

- Level of Instrumentation
- Maturity of Automation
- Cyber Security and systems integration
- Analyzers, analyzer validation systems and the analyzer network
- Laboratory System
- Level of advanced automation, maturity for optimization

Conduct a Maturity Assessment based on the future need, reflecting the situation of today.
EXAMPLE SETUP
STEPS TOWARDS YOUR DIGITAL PLANT – LAY THE FOUNDATION

1. Work Instructions and Design Specifications
2. Enable way of working with a holistic view, not decisions project per project.
3. Create alternative solutions for plants to pick from

These are really important, otherwise one will not succeed!
EXAMPLE: NAPCON IIOT DEMO – SUSTAINABLE AIRPORT
**EXAMPLE: NAPCON IIOT DEMO – PREDICTIVE MAINTENANCE**

![Preditive Maintenance Dashboard](image)

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