Industrial Internet of Things (IIoT)

For expert support
Not enough time...

- Data from equipment in plants collected automatically
- Central pool of experts: vibration, valves, corrosion, steam traps...

Fleet Management Center
- Your own corporate
- Third-party connected service
Topics Covered

- Not enough experts in the plant
- Connecting the plant to experts
- Industrial Internet of Things
Not Enough Experts in Plant

The case for change
Equipment Fail and Underperform

- Not enough experts to analyze the data
  - Rotating machinery (vibration)
  - Steam traps
  - Control valves
  - Heat exchangers
  - Relief valves
  - Analyzers
- Especially remote sites and offshore
- Equipment fail and shutdowns occur
Connecting the Plant to Experts

Connected Equipment
Industrial IoT (IIoT)

Industrial Internet of Things

- Monitor industrial equipment
  - Not home or office

- Remotely across the Internet
  - Not from within the plant itself

- Monitoring of the things themselves: equipment
  - Not the process, which is already automated
The Internet

Internet of People

*Human interfaces*
- Computers
- Tablets
- Smart phones

Internet of Things

*Networked autonomous devices*
- Refrigerator
- Car
- Aircon
Industrial Internet of Things (IIoT)

- Industrial things
  - Industrial equipment
    - Smart pump
    - Robot
    - Smart valve
  - Can also be instrument itself

- Using industrial protocols
  - WirelessHART
  - Fieldbus
  - PROFIBUS

- Unique identifier
  - IPv6 address
  - MAC address
  - Any other kind of unique ID
Internet Enables Centralized Monitoring of Equipment

- Enterprise level
  - Corporate technology center of operations
- By equipment manufacturer
  - Pump, valve, ACHX, CT, etc.
- By third-party plant services provider
IIoT is Different from SCADA
- Both Are Centralized But There Are Differences, Can Share Infrastructure

- SCADA is about **process** monitoring and operation
- SCADA typically use private networks (not across the Internet)

- IIoT provides the ability to drill down into the ‘Things’
  - Into equipment and devices
    - Monitor diagnostics
    - Configure
    - Update device firmware
    - etc.

![Smart Connected Pump](image1)

![Intelligent on-off valve](image2)
Digital transformation is mostly done on-premises
No internet connection or cloud required
IIoT can follow
Industrial “Things”

- Pumps
- Cooling towers
- Air cooled heat exchangers
- Blowers/fans
- Compressors
- Heat exchangers
- Valves
- Analyzers
Centralized Monitoring Across the Internet

- Centralized pool of experts to support plants around the world
  - Rotating machinery (vibration)
  - Steam traps
  - Control valve experts
  - Heat exchangers
  - Relief valves
  - Analyzers

- Experts provide reports:
  - Which equipment need overhaul
  - Which equipment need cleaning
  - Which equipment need replacement

- Corporate fleet monitoring center
- Connected services; by external third-party
IIoT Architecture
Architecture

Integrated
- Integrated through DCS or historian
- Special care with cyber security
- Applications
  - Control valves, analyzers, flow meters, DCS itself, equipment with process data

Separate
- No connection to the DCS or historian
- Dedicated Internet connection
- Applications
  - Steam traps, vibration (rotating machinery), corrosion, heat exchangers, relief valves, entire process equipment (pumps, compressors, fans/blowers, cooling towers, and air cooled heat exchangers)
Use Open Standards

- Owned and managed by multi-vendor organizations
- WirelessHART (IEC 62591)
  - Wireless sensor network
- FOUNDATION fieldbus (IEC 61158)
  - Instrument network
- OPC-UA (IEC 62541)
  - Software API

Caveat Emptor
If the technology is owned by a single company it is not ‘open’ even if other vendors can license it
Typical IIoT Architecture

- Ubiquitous sensors and pervasive networking is the foundation of IIoT
- The backbone and backhaul networks use the IP-version of the instrument protocols:
  - HART-IP
  - FF-HSE
Conclusion

Summary
Summary

- Not enough experts in the plant
- Connecting the plant to experts
- Industrial Internet of Things
I’m Listening...

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