Industry 4.0 and IIoT
Stories from the trenches

2019 ISPE-CaSA Education
Automation Forum
Industry X.0

Industry 1.0
- Mechanization, steam power, weaving loom

Industry 2.0
- Mass production, assembly line, electrical energy

Industry 3.0
- Automation, computers and electronics

Industry 4.0
- Cyber Physical Systems, Internet of Things, networks
Industry 4.0
Driving Outcomes

IIoT
I4.0/IIoT Continuum

- **Legacy Automation**
  - Mix of Legacy and Modern Automation
  - Minimal investments
  - Requires retool/recontrol to move

- **Islands of Automation**
  - Islands of Information
    - Highly connected systems | Disjointed Information
    - No Vertical/Horizontal data flow
  - Integrated Automation
    - Highly connected systems/networked
    - Built/Recontrol in 21st century

- **Connected Enterprise**
  - Vertical/Horizontal Data Flow
  - Beginning to invest in Industry 4.0

- **Prescriptive Enterprise**
  - Leveraging Analytics and AI
  - Investing in multiple areas of Industry 4.0

- **Need for digitization – Blind Operations**
  - Lack of System Connectivity
  - Visibility - “What”
  - Understand – “Why”
  - Predict – “When”
  - Adapt
IloT Examples
Real world applications

1. Safety
2. Security
3. Compliance
4. Data Integrity
5. Quality
6. Productivity
7. Maintenance
Security

Major Chemical Manufacturer

1. Physical
2. Network
3. Cyber

Why don’t I recognize that IP Address?

“Because I don’t want you to…”
Compliance

Major metal producer

1. Regulatory
2. Environmental
3. Genealogy, track and trace

“Show us your data”

“Our data, it was right here last week? Dang, did I throw that out?”
Data Integrity
Major Beverage Bottler

1. Timely
2. Secure
3. Accurate
4. Credible/Reliable
5. Backed up and accessible

We have 25 OEMs that need access to networks in 15 different plants!

I don’t trust my data and the data we have doesn’t connect to relevant systems.
Data = Money

Downtime, Waste or Recalls (ROI)
Questions

Low-hanging fruit

1. What are your Risk Mitigation Initiatives?
   - Safety, Security, Environmental

2. What are your Operational or Cost Challenges?
   - OEE, Maintenance, Quality, Waste, Energy
   - Flow alignment (labor, material, info., schedule)
   - Stability & Predictability (Span, Golden Batch)
   - Demand vs. Capacity, Regulation?

3. Are OT networks as secure/reliable as IT networks?

4. Is Data integrity an issue?
   - Accuracy, Timeliness, Security, Storage
Where is this headed?

Can you search your data?
Can you talk to your data?
Can your data predict the next event?
Is your data connected to your BPM?

**Good morning Jacques, this is Bennit, your virtual production assistant here for your morning update.**

**Bennit, please provide status for order #87656632.**

**Jacques, order #87656632 is in process at distiller #4 and expected to be completed at 3:02 pm and ready to ship.**

**Thanks Benit, email jon.rust@abc.com order status.**