Case Studies & Tips for a Successful IIoT Implementation Strategy

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What Are Your Goals?

- Reduction of Manufacturing Costs
- Higher Machine Availability
- OEE
- Improved Asset Utilization
- Traceability of products & parts
- Improve Supply Chain
- Easily integrate new technology
- Improve product quality
- Reduce Scrap rates
- Reduce equipment damage
Those are the Goals of IIoT!
What is the Internet of Things (IoT)?

Network of physical objects or "things" which collect and exchange data.

Industrial Internet of Things (IIoT)
But Why Should I Pay Attention to This?
Modernization is Overdue

$65 B
Automation systems reaching end-of-life

1938
Average age of equipment in the U.S. industrial space is highest since 1938

4 in 10
Manufacturers have little to no visibility into the real-time status of their manufacturing processes

50%
Manufacturers become aware of a problem only after a breakdown occurs

< 5%
Revenue is spent on investments in capital equipment

Sources: ARC, Morgan Stanley, Ubisense, ManufacturingNet.com
Economic Effect on Automation

- Expect the automation industry to grow at a faster pace than GDP
- Capital budgets expected to grow 18% for IIoT type investments
- 73% of companies are already investing more than 20% of their overall technology budget on Big Data analytics.

Morgan Stanley & Automation World, GE & Accenture
Your Competitors Are Investing in IIoT.
Why Are They Investing?

1. Reduce costs
2. Optimize asset utilization
3. Improve worker productivity
4. Create new business models/new revenue streams
5. Enhance customer experience
6. Enhance worker safety
7. Improve sustainability
WHAT ARE "THINGS" ON THE SHOP FLOOR?
"Things" on the Shop Floor

Diagnostics in the Cloud or Local Server

- Using Historians and Data Logging

- Visible globally across the organization in real time.

- Laser focused information into individual operations

- Share metrics of success and/or failures.
"Things" on the Shop Floor

Diagnostics AT Devices

- Communicate clearly with maintenance
- Identify specific location of failure or issue
- Know the problem easily

Ethernet Controller

Info Display

Green = Signal
Red = Short

Power
Visibility Down to the Sensor

Does it make sense to have every sensor with an Ethernet connection?
Visibility Down to the Sensor

- Vendor Neutral & Open Standard (IEC 61131-9)
- Similar to USB "plug & play"
- Uses existing networks & controls
- Automatic Parameterization
- Standard Connectivity Components

IO-Link is NOT a Network!

For Computer Technology  =  For Automation Technology
OK… But Who is Actually Doing This?
Case Study – Coke IoT

Mass personalization

Share a COKE in a Whole New Way with Personalized Gear

CUSTOMIZE NOW

Breeze

43%  27%  30%

AUTOMATE • 2017
OK… But Who is Actually Doing This in Manufacturing?
Case Study – The "Lone Ranger" Engineer

- Limited support staff
- 24/7 production
- Machine level visibility
- Operation level visibility
- Sensor level visibility
- Mobile device visibility
Case Study – Automotive Tier Supplier
Case Study – Automotive Tier Supplier

- Management, Maintenance, Engineering & Operator Visibility
- What Job is running?
- What Job is being setup next?
- Production status
- Operator and quantity
- Job / Quota / Week / Balance
- Workcenter Log
- Preventative Maintenance
- Tooling Asset Management
- Lean & Process Improvements
Case Study – Automotive Tier Supplier

Nut Welder Poka-Yoke

- Quality Issue with Nut Presence
- Industry 4.0 Established in Plant
- Changeable fixtures
- IO-Link measurement sensor
- Integrated Poka-yoke in 20min
Case Study – Balluff Warehouse

Initial Goals of Project
- Supply Chain Center Expansion
- Improved Efficiency
- Increased Visibility
- Reduce Waste & Lost Time
Case Study – Balluff Warehouse

We had to specify what we want!

- Production Manager – Jeff:
  - 1 Week install time
  - "Get it running quickly!"

- AB Control Logix w/ EtherNet/IP

- IO-Link Smart Sensors

- Distributed I/O & power, QD connectors, no terminations
Case Study – Balluff Warehouse
IIoT IMPLEMENTATION IS A SERIES OF PURPOSEFUL DECISIONS EVERY DAY!
But Where Do We Even Begin?
But Where Do We Begin?

- Who has one of these?

- You are already implementing IIoT!
First Build a Team!

• Who needs what data?
  ▪ Interviews
    • Plant Mgr, Line Mgr, Engineers, Production Mgr, Quality Mgr, Operators, Maintenance, IT
  ▪ Questions to ask
    • What do you want to know?
    • What information would make you more productive?
    • What don't you need to know?
  • Build a strategy & action plan
The Team Should Start Here

1. Identify "Things" with Ethernet
2. Discover the data they possess
3. Find a way to manage the data
4. Navigate connectivity outages – Is it critical?
5. Integrate existing infrastructure with new strategies
Specify What You Want! – Efficiency & Visibility

- Diagnostics must be visible on the HMI

- The best devices provide health indication.

- IO-Link is the new USB for industrial automation. Think about it.
Specify What You Want! – Flexibility & Efficiency

- Plan for the future unknown…

- If you can make two sizes, you should be easily able to make three.

- Make it easy to adapt.

- Utilize the expandability of an industrial network.
You Can Start Small

- Plants are big! Begin laying the groundwork.

- Pick one operation or even one application.

- Prove success, then build on the success.

- Be willing to pay for the functionality!
What Do I Do Now?
BULLDOZE THE FACTORY!
No Really… What Do I Do Now?

1. Build a Team
2. Find the Data & Ask Questions
3. Identify a Strategy
4. Start Small
5. Make Daily Decisions
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BALLUFF - INNOVATING AUTOMATION

BALLUFF TECHNOLOGIES

ENABLE & SCALE

INDUSTRY 4.0 & IIoT IMPLEMENTATIONS

BY GENERATING DATA AT THE LEVELS OF AUTOMATION CLOSEST TO PRODUCTION.
Balluff - Innovating Automation

Balluff USA – Florence KY

- 24/7 Technical Support

- 4000+ materials stocked in US

- 180+ employees in US, 3000+ worldwide

- Linear position sensor manufacturing with 5 day delivery!
Thank You for Your Attention!

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Yeah, But There Was a Lot of Automotive...
Case Study – Appliance Manufacturer

Biggest Headache
- 3-4 times per year
- Die crashes or lock-up
- $80k per occurrence
  - Plus removal labor
  - Cut it out with a torch
- Commonly human error
  - Wrong shut height
  - Wrong recipe selected

• Solution: RFID Traceability Technology
Case Study – Appliance Manufacturer

Installation at the Press

ID Tag metal-free mounting on die

Antenna mounted on bolster
Case Study – Appliance Manufacturer

Installation at the Press

Processor Mounted on Column

Software/Controller Integration
Case Study – Appliance Manufacturer

• Industry 4.0 Implementation Results

• Implemented: Winter 2011

• To-Date: 0 crashes.

• "Press Failed to Operate!"
  • Incorrect die recipe
  • Would have crashed
  • Several times per year

• Annual Savings >$200k per year
Case Study – Appliance Manufacturer

• Handheld Accessibility in the Shop

Use/setup/predictive info in tool room

Known locations in storage racks
WORK IN PROCESS (WIP)
TUB TRACKING
FLEXIBILITY, EFFICIENCY & VISIBILITY