

# 2024

# INDUSTRY 4.0 FORUM AND ERP SHOOTOUT

August 13-14  
2024  
Cleveland, OH

logistics

14.0

ERP software

CMR

human  
resources

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# PLC Integration

Integrating your organization





plante moran | Audit. Tax. Consulting.  
Wealth Management.

# PLC Integration

Integrating your organization

# About Plante Moran

- Plante Moran is among the nation's largest certified public accounting and business advisory firms.
  - We provide clients with audit; tax; risk management; financial, technology, and business consulting; and wealth management services.
  - Whether you have a single, specific need or require comprehensive services on a worldwide scale, we have the knowledge, experience, and resources to meet your goals.
  - Our professionals specialize by industry. This means our clients benefit from the expertise and advice of teams that know their specific challenges and how to combat them. We bring the full resources of the firm to every client.





# Fast facts

1924 year founded

3,100+ total staff

350+ partners & affiliated entity members

approx. 1,300 number of CPAs

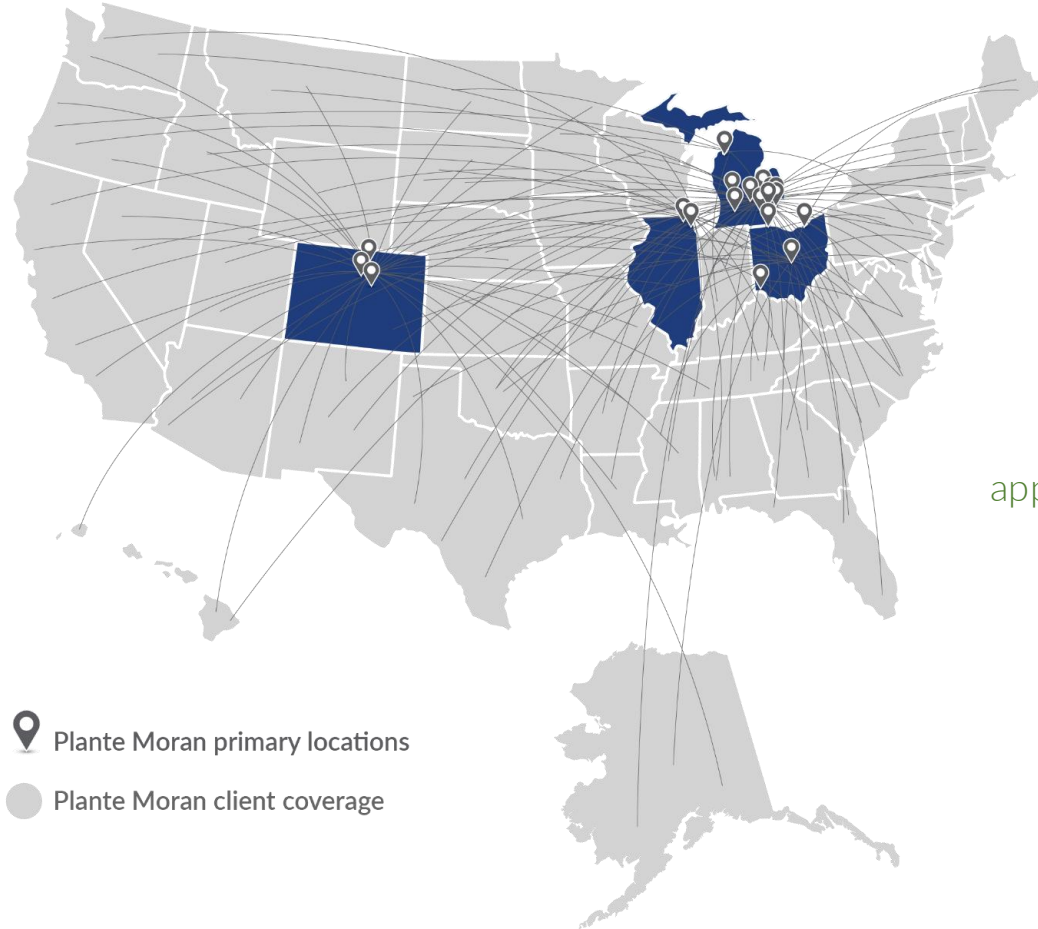
25 U.S. & global locations, including China, India, Japan, and Mexico



27 languages spoken





# Plante Moran overview



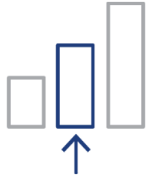
 Plante Moran primary locations  
 Plante Moran client coverage

- 1924 year founded
- 3,100+ total staff
- 350+ partners & affiliated entity members
- approx. 1,300 number of CPAs
- 25 U.S. & global locations, including China, India, Japan, and Mexico
- 27 foreign languages spoken





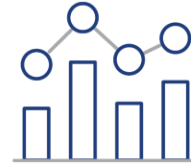
# Clients we serve



Middle-market companies



Family businesses & family offices



Publicly traded companies



Private equity



Nonprofit sectors



Public sector



Multinational corporations



Individuals



# Why Plante Moran

- Future-focused

- Your future is our priority. We partner with you to ensure you achieve your goals today and beyond.
  - We help you plan for the future with actionable thought leadership published every day.
  - Our experts are heavily involved in their industries at a national level, keeping you current on everything from regulations to market trends.
  - We consistently invest in technology and training to enable our staff to take a “10-years-out” approach.
  - We’re always thinking about your future. Every year, we conduct a free client service review with your engagement team and a member of our management team to make sure we’re serving you the best we can.
  - Ninety-six percent of our clients say our recommendations are innovative.

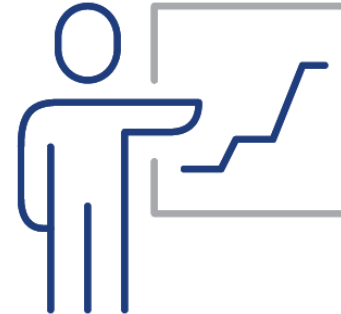




# Why Plante Moran

- Plante Moran is the right choice for business leaders who want a truly engaged partner who has the global coverage and depth of capabilities to address their future needs.

We demonstrate our commitment to the **long-term success of our clients** by providing value-added insights and informed suggestions every step of the way.





# International services

## A better approach to global growth

When it comes to navigating complex global markets, we simplify the complexity of doing business internationally. Our audit, tax, and consulting experts – and our carefully crafted relationships around the globe – will prepare you for the future.

## The power of choice

We'll develop a custom plan based on your country-by-country needs and select the right local resources to solve your unique issues and meet your goals.

- Our international concierge desk provides fast, accurate answers to country-specific questions.
- We have multilingual experts at home and abroad – including firm-owned offices in China, India, Japan, and Mexico
- We're a founding member of Praxity, AISBL, the world's largest global alliance of accounting firms, providing high-caliber service in 100+ countries.





# Industry specialization



## Manufacturing & distribution

Specialized expertise in automotive, transportation, metals, rubber and plastics, industrial, food and beverage, commercial machinery, and pharmaceuticals industry

400+

industry experts

2,500+

clients



## Service industry

Specialized expertise in technology, business process outsourcers, franchises, retail, and consumer goods and services

350+

industry experts

3,000+

clients



## Private equity

Service throughout the full private equity life cycle, including identifying the right investments, closing the transaction, increasing portfolio value, and exiting investments

350+

industry experts

525+

clients





# PLC Integration

# Speaker



Josh McDonald

- 14 years of combined experience in industry and consulting.
- Extensive experience in Plex, A&O (Mach 2), cloud integrations, operations, quality, material management, logistics, operations improvement, maintenance, tooling, and information technology.
- Deep knowledge of manufacturing execution systems (MES) with a focus on cloud integration solutions, hardware, and computer science.
- Implemented and supported numerous billion-dollar global manufacturing companies in the tier 1 automotive space.
- implemented Plex in many countries throughout North America and Europe, such as France, Germany, Slovakia, Czech, Mexico, Canada, and the U.S.
- Developed and implemented multiple-batch and real-time integration solutions between MES and ERP systems, also providing IT analysis and support for MES production and plant quality systems.



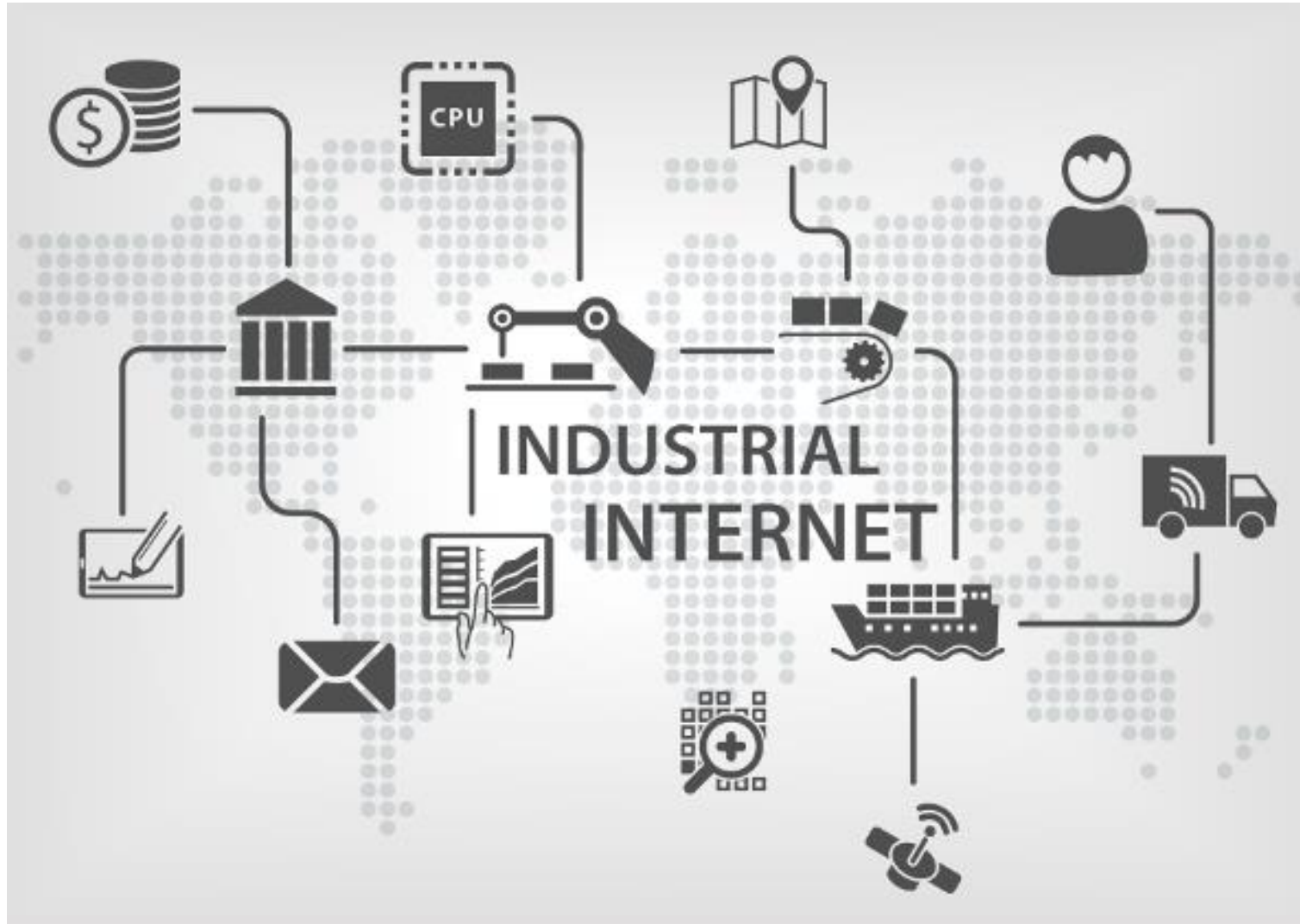
# Agenda

## PLC Integration

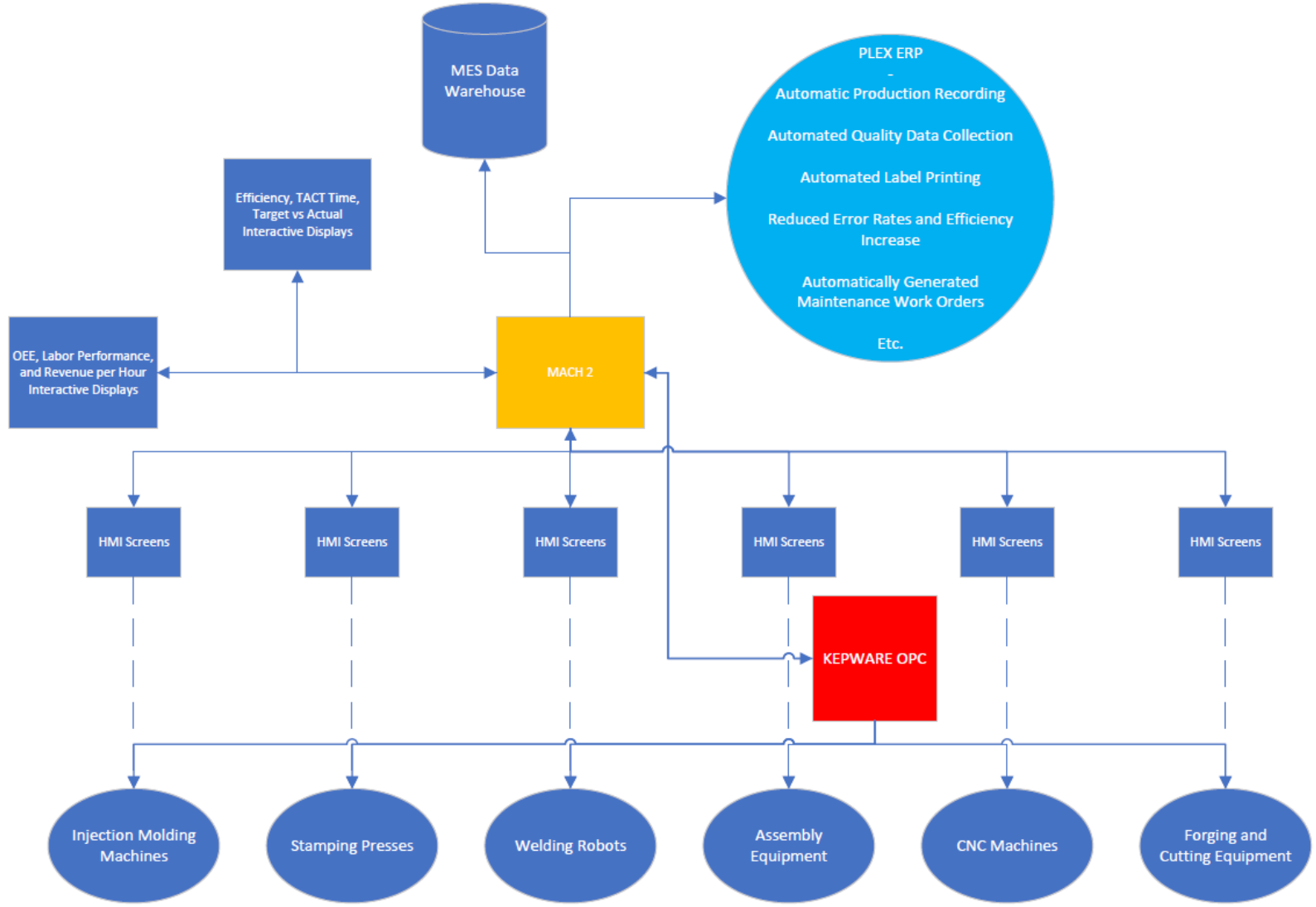
- Benefits of PLC Integration
- PLC Integration Requirements
- Datapoints/Questions to consider
- Plex A&O Example
- “To integrate or to not integrate”
- How to get started?
- Game Planning
- Continued Growth
- Case Studies
- Questions



# Industrial Internet



# PLC Integration





# Benefits of PLC Integration

- **Automated Production Recording**
  - Operators focus on making parts, not distracted by interacting with system
  - Automated label printing
  - Reduced error rate in transactions
- **Automated Data Acquisition**
  - Automatically record quality measurements with integrated sensors
  - Automatically log events based on machine triggers
- **Automated Event Triggering**
  - Automatically change status of work center based on events
  - Automatically trigger maintenance work orders based on events
- **Simplified Changeover and Automatic Recipe Loading**
  - Change over workcenter based on barcode scan
  - Program machinery automatically based on part number recipe stored and controlled in ERP



# Benefits of PLC Integration

- HMI (Human Management Interface) screens
- Streamline transactions in the ERP system
- Allow real time monitoring of machinery
- Summarized performance information and alerting in distributed environment
  - Interactive wall display, computer, tablet, cell phone, etc.
- Automated Alerting
- Email, SMS, Visual Display, etc.



# PLC Integration Requirements

- Ethernet communications with PLCs
- Model numbers of PLC devices to validate communications ability
- Connectivity to machinery via ethernet cable
- Basic understanding of PLC Program
- Support from maintenance staff or PLC programmers
- Middleware / OPC Industrial Connectivity Solution
- Server to host middleware and Kepware



# Data Points/Questions

- What are your customer requirements for data collection?
- If you have customer requirements that are not currently met, what is your timeline for meeting those customer requirements?
- Do you have internal data collection requirements that are currently handled manually or that are troublesome?
- What projects do you currently have in process related to PLC work or upgrades?
- What auxiliary systems do you have on the shop floor that interact with the PLCs? (X-Ray, pressure test, etc.)



# Data Points/Questions

- Please describe your internal resources related to PLC and Network Communications
- Do you modify PLC programs using internal resources or through a third party?
- How are your PLC program revisions controlled?
- Do you manage your network wiring internally or through a third party?
- Do you manager your own firewalls/routers internally or through a third party?
- How many hours per week do you believe your resources could reasonably contribute to a PLC integration initiative?



# Data Points/Questions

- Are your PLCs Ethernet capable?
- Do you have an inventory of PLCs by Manufacturer/Model?
- Do you have existing network connections to PLCs?
- Do the network segments that connect your PLCs have access to the subnets where a server would be located?
- Do you have servers available to host Mach2?
- Would we be installing middleware on a physical server or a VM platform?
- What type and speed are the network connections between the locations where the PLCs are located and where the servers are located?



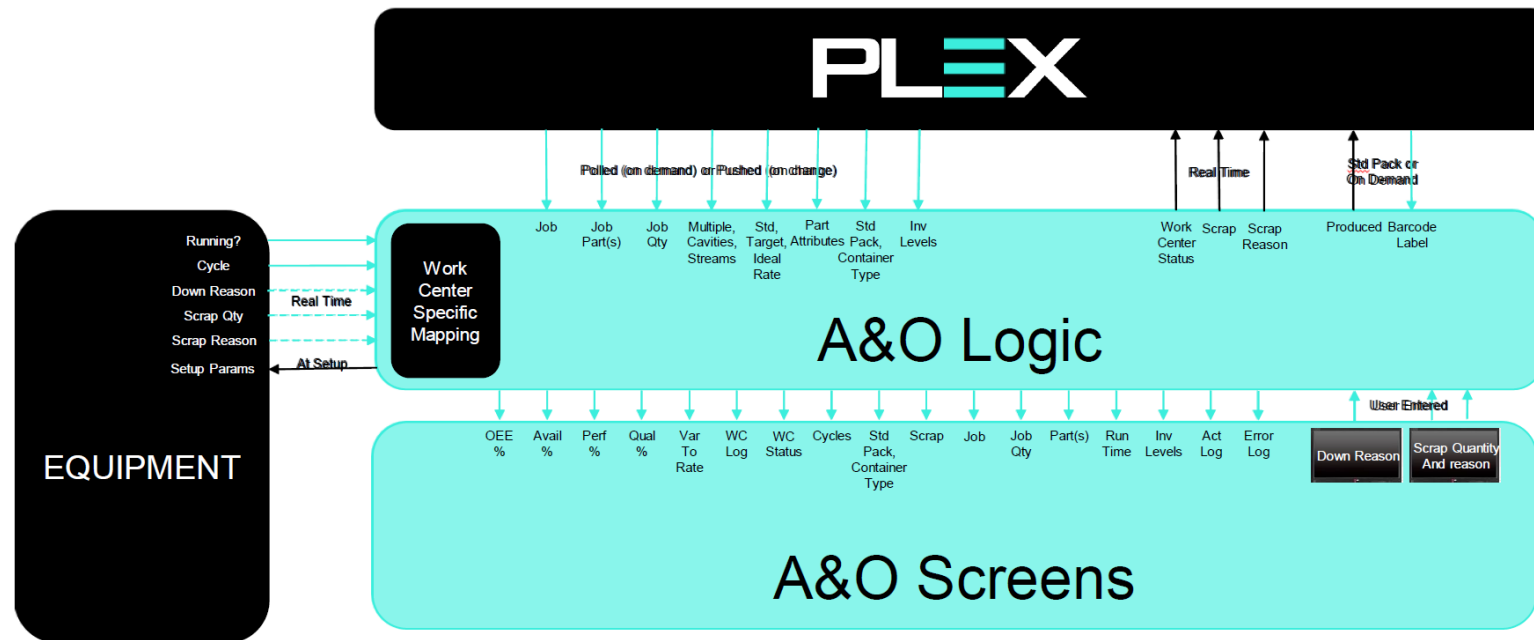
# Data Points/Questions

- Do you have an existing MES system that gathers information from PLCs or controls recipes?
- Are your machines aware of different part numbers and how are machine setups for part changes done?
- Where are your machine recipes stored and how is this information controlled?
- What data are you currently collecting regarding the operation and performance of your machines and workcenters?
- Do you report on metrics like OEE now and if so, how is this data acquired?
- What type of visual displays do you use on the shop floor and in the office area?



# Example: Plex A&O Overview

- Understanding A&O
- Quick overview on what A&O is and how it works





# “To integrate or not to integrate”

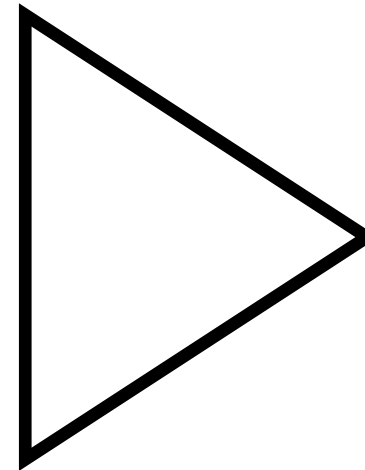
- Are we mature enough in our journey with ERP to integrate?
- Do we have the right resources to support?
- Is our infrastructure and equipment ready?
- What requirements/needs we are trying to fulfil?
- Keep it logical.



# How to get started?

- **Make a plan**

- Start with low hanging fruit
- Decide on processes that make sense
- Do first, think second!
- Provide visibility to the company on new initiatives
- Get more people involved
- Continue to think “What’s next?”
- How can we add value
  - Operator Reduction
  - Process Improvement
  - Better Data to make decisions from



# Game Planning

- When should we start?
- Where should we start?
- When/where should we end?
- How to validate if integration helps a process or not?
- Should we integrate everything?



# Continued Growth

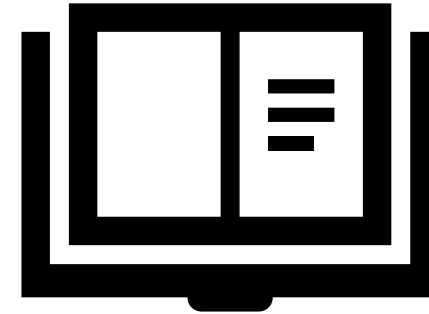
- **Start with the right partner to guide your journey**
- **Build your internal resources**
- **Get IT and the Business BOTH engaged**
  - Capabilities
  - Engineering not segregated from IT and Business
- **Talk with others who have done this before**
- **Don't be afraid to try new things!**



# Case Studies

## • Case Study 1 – Freezer Integration

- Aerospace and Defense
- Material Time Sensitive
- Closed Loop
- Simple things to support operators
- Custom Screens



## • Case Study 2 – MES Integration with A&O

- Short Timeframe
- Very Complex MES and Customer Requirements
- Safety Products – Instrument Clusters
- Repack
- Lessons Learned



# Questions

