Delivering the Tire Plant of the Future Today

Can Digitization Help You Achieve Your Goals?

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Agenda

- Introduction
- Trends and Challenges
- Digital Transformation in Tire Industry
- Scalable Analytics
“Give me a lever and a place to stand ...and I will move the earth” - Archimedes
“Give me your data ... and I will move your entire company”
- everyone focused on Industry 4.0
“If my data is valuable and my assets are vulnerable, I will put them in a vault”

- temptation from an end users listening to I4.0
Your data will only add value if it is shared with the right people in your company

- Rockwell Automation’s The Connected Enterprise
Data Challenges and Operational Benefits

Processes & Systems

- Data Capture
- Infrastructure
- Data Management
- Analytics
- Visualization
- People & Skills

Operational & Business Decisions

Operational Benefits

- **Time to Market**
  - Faster prototype for new product introductions
  - Shorter cycle times
  - Mass customization make to order vs make to stock

- **Productivity**
  - Shorter setup and change over times
  - Improved quality
  - Reduction in downtime
  - Reduction in energy consumption

- **Supply**
  - Reduced inventory & waste
  - Improved planning & forecasting

- **Compliance**
  - Reduction in human errors and risk of product recall
  - Automated digital monitoring ensures accurate records

Data Challenges:

- Data integrity not **MAINTAINED**
- Data not **STREAMED / STORED**
- Data not **ACCESSIBLE**
- Data not **ANALYZED**
- Data not **COMMUNICATED**
- Data not **USED IN DECISION MAKING**
Digital Transformation

In Tire Industry
Improve business processes, increase manufacturing flexibility & improve supply chain integration in The Tire Industry.

Top Priorities
- Tire Quality
- Profitability
- Productivity
- Efficiency
- Machine Performance
- Industry Standards
- Regulatory Compliance

Industry Challenges
- 50% REVENUE Material Costs
- 70% Tire Mfg Systems Over 15 Years old

INNOVATION
- Lightweight Materials
- New Auto Business Models
- Smart Tire
- Expanded Markets
Digital Transformation of the Plant Floor

**Phase 1**
- Interoperable Line Integration
  - Improved OEE
  - Informed Decisions

**Phase 2**
- Line Digitization
  - Smart Machines
  - Predictive Maintenance
  - Mobility

**Phase 3**
- Digital Plant
  - Visibility
  - Collaboration
  - Efficiency
What about my Tire Production Sites - IOT enabled?

How do I integrate new and legacy control systems and devices?

How do I integrate multiple IT&OT applications and databases?

How do I contextualize the data?

What do I do about obsolete automation and low bandwidth networks?

How do I protect this information from walking out the door?

How do I improve standardization across machines, plants, processes and suppliers?

How do I re-use as much of my existing infrastructure as possible?

How do I provide a common solution for brownfield and greenfield projects?
Digitalization

Inflection Point For Unprecedented Productivity In Industry

50B
Number Of Devices On The Internet By 2020
Safe, Collaborative Robots & Equipment
Merging Physical & Virtual Worlds
AI & Machine Learning
Predict Failures and Reduce Downtime
Wearables & Mobile Devices Transform Work Flows
Enabling the Industrial Internet of Things (IIoT)

The Connected Enterprise
Customer Outcomes

- Faster Time to Market
- Lower Total Cost of Ownership
- Improved Asset Utilization
- Enterprise Risk Management

Scalable Execution Systems
Scalable Analytics
Mobility & Collaboration
Connected Services

Rockwell Automation IIoT Infrastructure – Integrated Architecture™

Smart Connected Assets – EtherNet/IP Enabled Network

- Sensors & Actuators
- Intelligent Motor Control
- Controllers
- Mobiles / Displays
- Machines & Equipment
- Remote Assets
Factory Talk Analytics
ANALYTICS VALUE
Increasing Intelligence & Improving Performance

Basic Analytics

- DESCRIPTIVE
  Historical Data
- DIAGNOSTICS
  Historical

Advanced Analytics

- PREDICTIVE
  Future
- PRESCRIPTIVE
  Future Action

WHAT HAPPENED?
WHY DID IT HAPPEN?
WHAT IS ABOUT TO HAPPEN? WHEN WILL IT HAPPEN?
WHAT CAN I DO TO AVOID IT?
**Scalable Analytics – A Key Differentiator**

**Enterprise**
- **Descriptive:** Which facility performed the best?
- **Diagnostic:** Why is Site A throughput behind plan?
- **Predictive:** I predict that Site A will be behind plan soon.
- **Prescriptive:** What action should I take to avoid Site A from falling behind plan?

**System**
- **Enterprise:** Is Line 1 running ok?
- **Diagnostic:** Why is Line 1 quality poor?
- **Predictive:** I predict that Line 1 quality is moving out of tolerance.
- **Prescriptive:** What action should the operator take to avoid poor quality?

**Device**
- **Descriptive:** Am I running ok?
- **Diagnostic:** Why did a fault happen?
- **Predictive:** I predict a fault will happen soon.
- **Prescriptive:** What action should be taken to avoid the fault?
Traditional Approach

Disparate Data

Historian
MES
LOG
Equipment

Data Integration Engineer

Data Warehouse

DBA

Data Architect

BI Engineer

STAR Schema, Views ETC

Analytics

Our Approach

Orchestration

• Event Ingestion
• Event Processing & Enrichment
• Streaming Analytics
• Data Hosting & Staging

Analytics

• Predictive Analytics
• Operational Analytics
• Real-Time Analytics
• Search Analytics
• Graph Analytics
• Applications

Self Service
Edge

- FactoryTalk Analytics Edge allows you to access all of the data in your intelligent devices and processing that data, making edge level decisions based on analytics and then making that information available to the rest the platform for additional analytics.
  - Features
    - Accessing the data in your intelligent Devices
    - Pre-Process data for effective analytics
    - Enable bi-directional transactional type data
    - Execute closed loop edge level machine learning
    - Allow the development of custom applications and connectors
  - Value
    - Making rapid decisions as close as possible to the data and consumer as possible.
    - Increased efficiency of manufacturing analytics
    - Reduced Information Layer infrastructure costs
    - Improved access to information instead of data for all systems
DataFlowML

FactoryTalk® Analytics
DataFlowML

- DataFlowML - Provides the ability to transform and prepare data for machine learning, execute machine learning models as well as connect the results for these models to various destinations in your architecture depending on your desired outcome.
  - Features
    - Connect multiple types of complex machine learning models with the data from your intelligent assets
    - Process data to be executed in machine learning models
    - Score and train models to ensure accuracy
    - Re-Use models across your enterprise
    - Connect model results with multiple applications
    - Close the loop with your control system
  - Value
    - Improve productivity
    - Remove inconstancy of the human decision process
    - Enable predictive solutions to help you understand what will happen
    - Enable prescriptive solutions to either prevent or ensure results
DataView

FactoryTalk® Analytics
FactoryTalk Analytics DataView provides the ability to ingest data from a variety of data sources with the intelligence to recommend correlations and offer initial storyboards. Data can also be processed or associated with your Plant Model to allow the fusing of that data without the need for complex database schemas. In addition, it provides a full suite of self service visualization tools to explore and visualize the data.

- **Features**
  - Easily fuse data together without relying on an IT workflow
  - Eliminate the need for a complex data schema
  - Automatically find relationships in data
  - Self Service Dashboards for collaboration
  - Easily share data relationships with others in your organization

- **Value**
  - Eliminate the need for expensive infrastructure associated with traditional warehousing.
  - Reduces time to value by reducing dependence on data scientist and data architects allow the users to interact and explore in a self service manner.
FactoryTalk® Analytics Platform
A full stack analytics platform

DATA INGRESS
- STREAMING DATA
- ENTERPRISE DATA

ORCHESTRATED DATA
- DATA MASHING
- DATA STAGING

APP MARKETPLACE
- ASSET MANAGEMENT & RELIABILITY
- OPERATIONAL PRODUCTIVITY
- ENTERPRISE RISK

CONNECTED SERVICES

Edge
DataFlowML
DataView

OPEN, SECURE
IIoT CONNECTIVITY
Digital Transformation of the Plant Floor

Phase 1
Interoperable Line Integration
Improved OEE Informed Decisions

Phase 2
Line Digitization
Smart Machines Predictive Maintenance Mobility

Phase 3
Digital Plant
Visibility Collaboration Efficiency
ANALYTICS VALUE
Increasing Intelligence & Improving Performance

Basic Analytics
- **DESCRIPTIVE**
  - Historical Data
  - **WHAT HAPPENED?**

- **DIAGNOSTICS**
  - Historical
  - **WHY DID IT HAPPEN?**

Advanced Analytics
- **PREDICTIVE**
  - Future
  - **WHAT IS ABOUT TO HAPPEN? WHEN WILL IT HAPPEN?**

- **PRESCRIPTIVE**
  - Future Action
  - **WHAT CAN I DO TO AVOID IT?**
What about Utilization of my Industrial Assets?

Variable speed Drive
Run a motor 1.5Kw
Report bit fault status

Data Escalation
Current consumption
Temperature
Overloads..
80+ parameters

Same Drive, IOT enable

Analytics Download
Settings
Optimization
Asset protection

Variable speed Drive
Run a motor 1.5Kw
Imagine If…

…you had software that oversaw operations and alerted your teams about abnormal situations.

…you had tools observing product quality that told you what caused issues without waiting on the lab.

…you were notified of equipment issues before unplanned downtime or catastrophic failure.

…you could leverage all of your data to increase capacity, reduce energy and improve quality.

…it all happened without an army of data scientists.
Please contact your local account manager or distributor for more information.

Thank You

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