

LISTEN.  
THINK.  
SOLVE.®

# ADVANCED ANALYTICS

How data analytics and digitalization is reducing operational costs and improving production efficiency'.

 **Rene Akkermans**  
Account Executive EMEA

*Lecture dinner meeting* AICHE NL/B

Zoetermeer  
Tuesday September 11<sup>th</sup>, 2018

# Rockwell Automation at a glance

**22,000**

employees



**80+**

countries



**\$6.2B**

fiscal 2017 sales



**World's Largest Company Dedicated to  
Industrial Automation and Information**

**20+**

industries



**Serving customers for  
113years**

- Technology innovation
- Domain expertise
- Culture of integrity and corporate responsibility



**2016** | **WORLD'S MOST  
ETHICAL  
COMPANIES™**  
[WWW.ETHISPHERE.COM](http://WWW.ETHISPHERE.COM)



# Enabling the Industrial Internet of Things (IIoT)

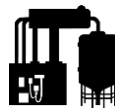
## The Connected Enterprise Customer Outcomes



Faster Time  
to Market



Lower Total Cost  
of Ownership



Improved Asset  
Utilization



Enterprise  
Risk Management

**INFORMATION SOLUTIONS CAPABILITIES** – Cloud | On-Premise | Edge



SCALABLE EXECUTION SYSTEMS



SCALABLE ANALYTICS



MOBILITY & COLLABORATION



CONNECTED SERVICES

AUTO DISCOVERY

ZERO CONFIG DASHBOARDS

ORCHESTRATION & WORKFLOW

PEOPLE IN THE IIOT

**ROCKWELL AUTOMATION IIoT INFRASTRUCTURE** – Integrated Architecture™

**SMART CONNECTED ASSETS** – EtherNet/IP Enabled Network



SENSORS & ACTUATORS



INTELLIGENT MOTOR CONTROL



CONTROLLERS



MOBILE / DISPLAYS



MACHINES & EQUIPMENT



REMOTE ASSETS

# Bringing you a world experience



**25+**

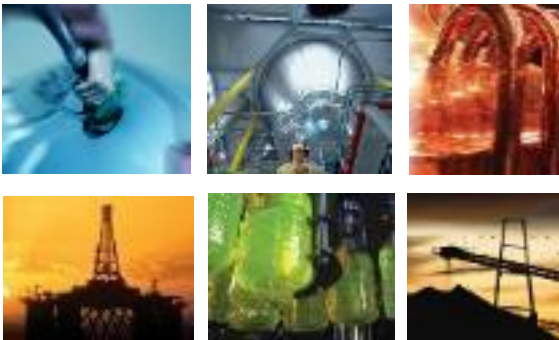
Years of  
Experience



Global & Local  
Top-Level APC  
Professionals

*Model-based software maximize profit.*

## Serving Industries Worldwide



## Serving Customers since 1991

- Commitment to Innovation
- Part of Rockwell Automation since 2007
- Industry experts leveraging more than **160+ patents** in the field of modeling, advanced control and optimization



**ENHANCE**  
Profitability



**INCREASE**  
Production



**REDUCE**  
Mfg.Costs



**IMPROVE**  
Quality



**REDUCE**  
Environmental  
Risk

# Advanced Analytics

## Introduction



START YOUR  
**ANALYTICS**  
JOURNEY

# THE PERFECT STORM



GLOBALIZATION



INCREASED DEMAND



AGING WORKFORCE



VARYING REGULATIONS

# Survival in the New World Reality

## ACHIEVING BUSINESS OUTCOMES THAT MATTER TO YOUR BUSINESS



# Technology Can Help

Leveraging investments you have made will help you achieve your business goals



**INTELLIGENT  
DEVICES**



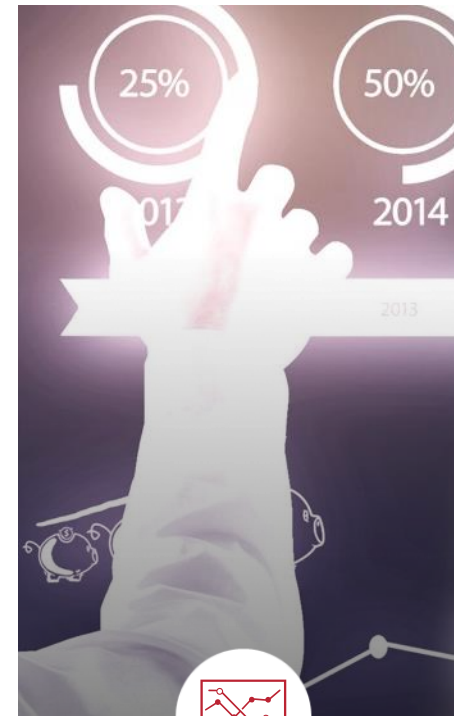
**NETWORKING**



**COMPUTING  
POWER**



**FIT FOR  
PURPOSE APPS**

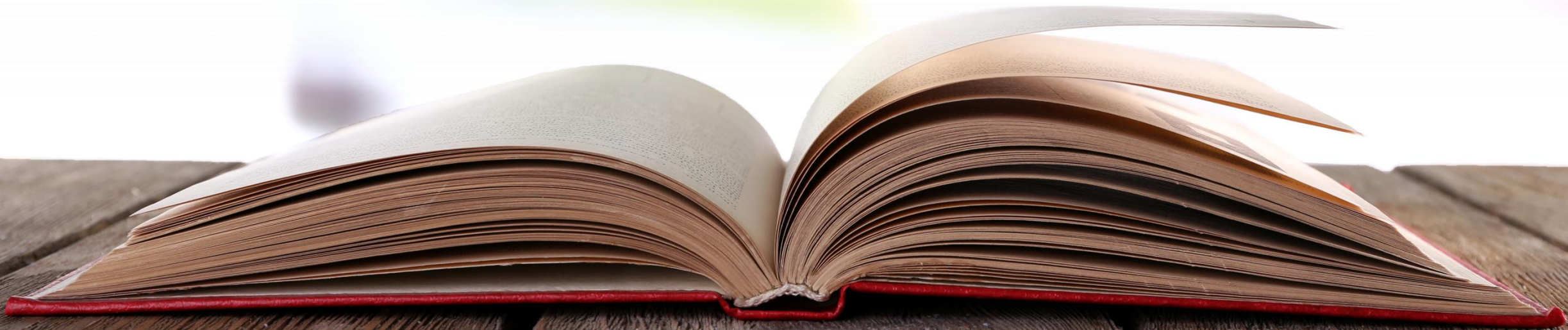


**ANALYTICS**

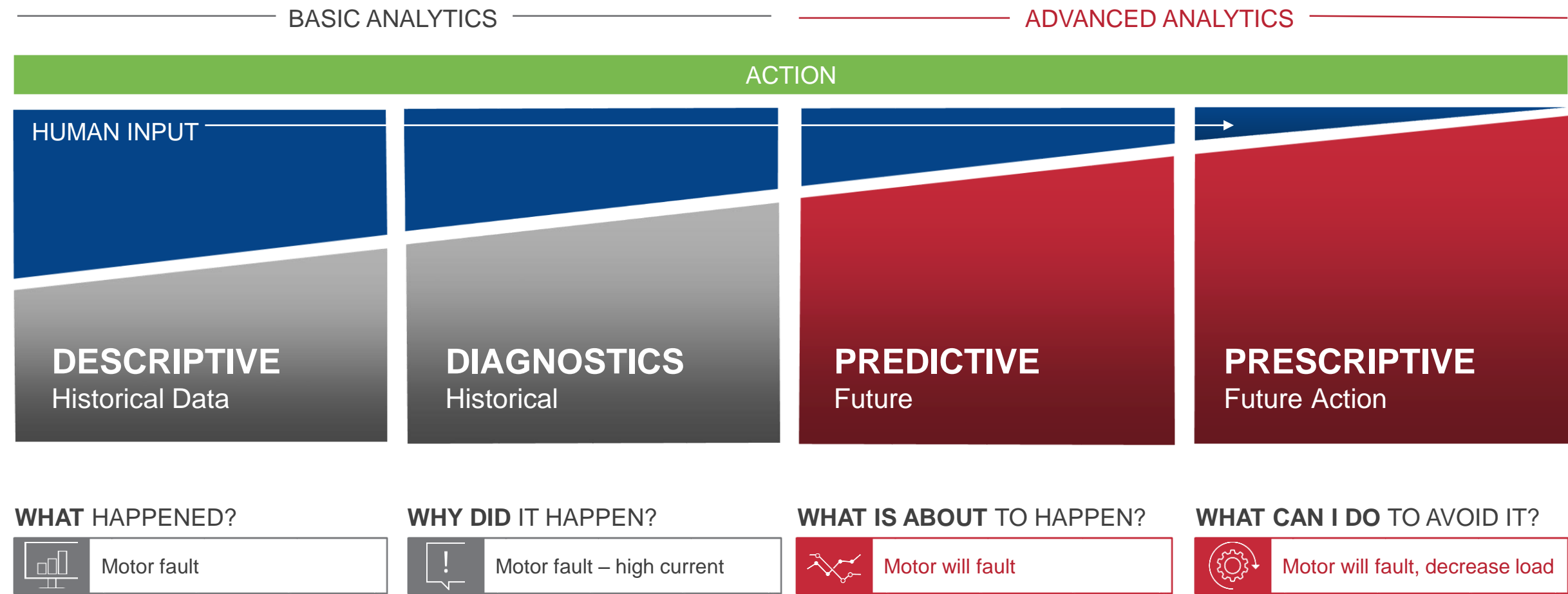


# ANALYTICS

The ***discovery***, ***interpretation***, and ***communication*** of meaningful patterns in data. Analytics relies on the application of statistics, computer programming and operations research to quantify performance.

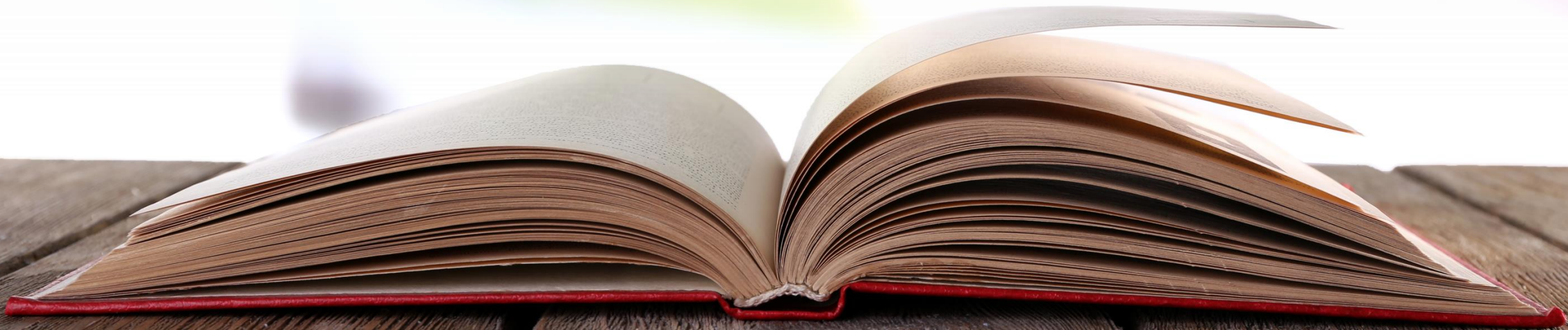


# Analytics Transform Data to Action

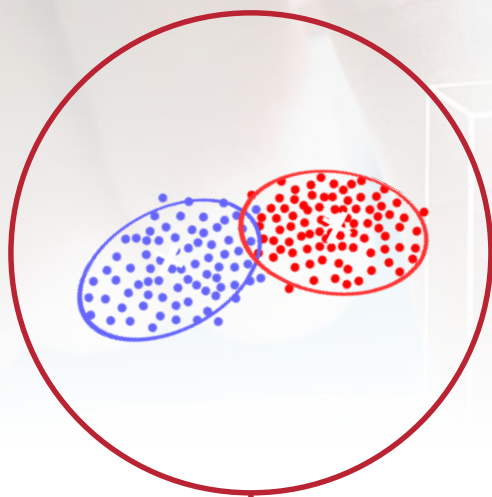


# MACHINE LEARNING

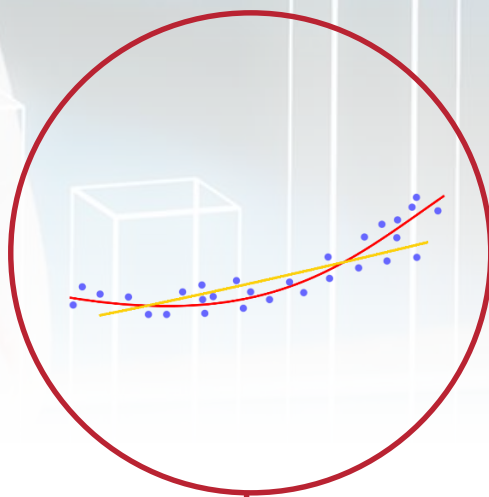
A field of computer science that uses statistical techniques to give computer systems the ability to **"learn" with data**, without being explicitly programmed.



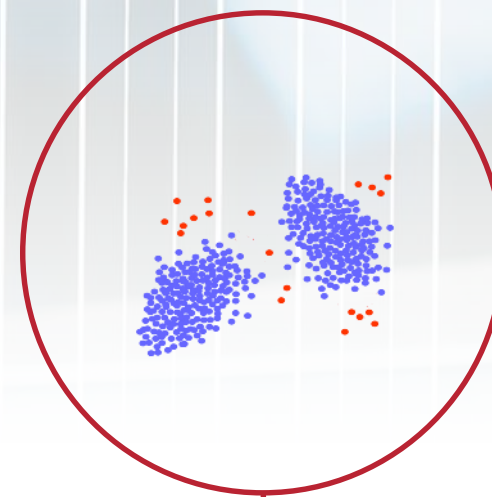
# Machine Learning Interprets Data into Knowledge



**PREDICT FUTURE  
STATES**



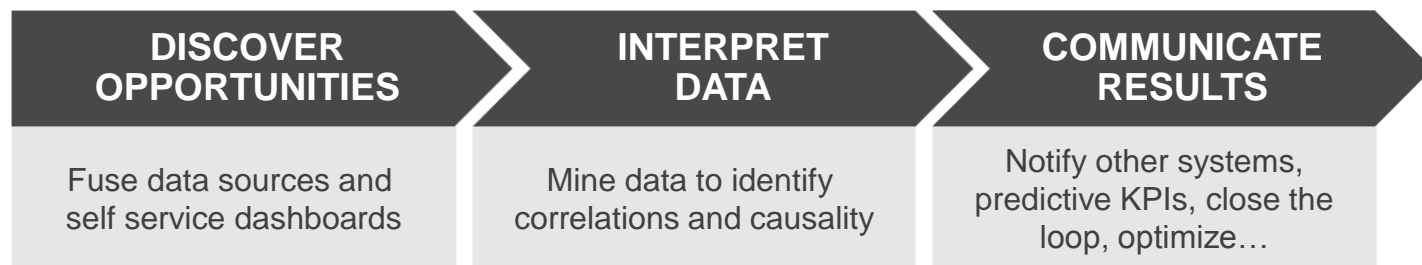
**PREDICT FUTURE  
KPIs**



**IDENTIFY ABNORMAL  
BEHAVIOR**



# How Analytics are Developed



## WHAT HAPPENED?



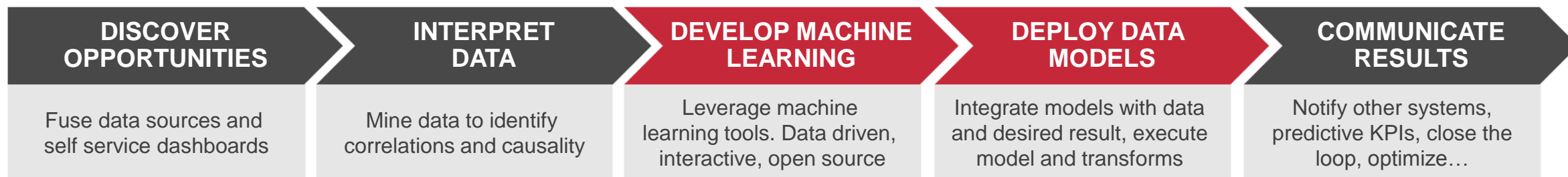
Motor fault

## WHY DID IT HAPPEN?



Motor fault – high current

# How Analytics are Developed



PREDICT

PRESCRIPTIVE

WHAT IS ABOUT TO HAPPEN?



Motor will fault

WHAT CAN I DO TO AVOID IT?



Motor fault, decrease load

# YOUR ANALYTICS JOURNEY

1

## FOCUS

On the apps with  
immediate value

2

## LEVERAGE

The investments  
you have made

3

## CHOOSE

A partner for the  
journey

4

## CONTINUE


to build out apps  
for more value



# A SEGMENTED **MARKET**

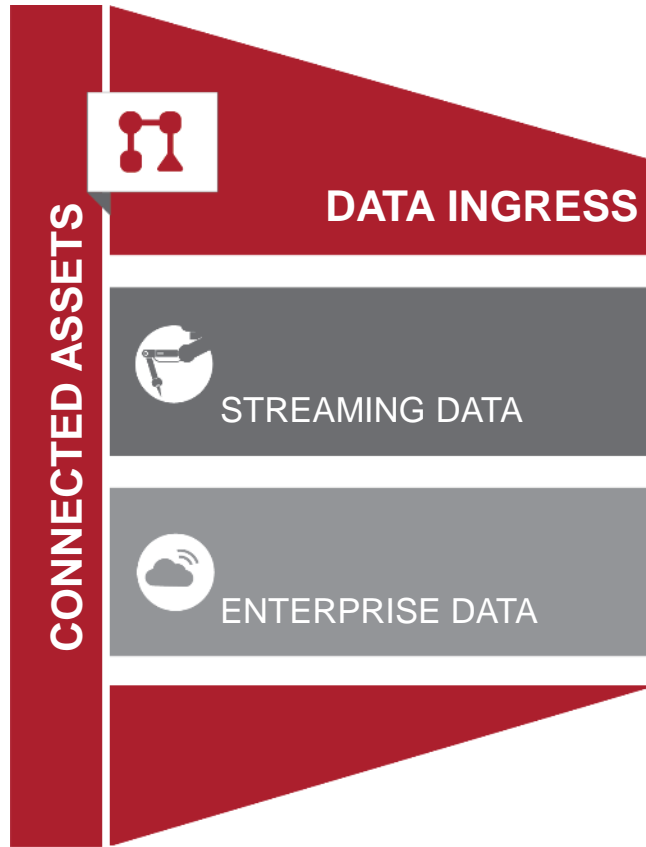
**High-level business  
analytics provide  
low-level context**

**Low-level analytics  
gives you isolated  
point solutions**



Customers what a platform  
that they can build on to solve  
business problems that  
allows them to start small and  
grow.

# FactoryTalk® Analytics



Edge  
FactoryTalk® Analytics



DataFlowML  
FactoryTalk® Analytics



DataView  
FactoryTalk® Analytics

# FactoryTalk<sup>®</sup> Analytics

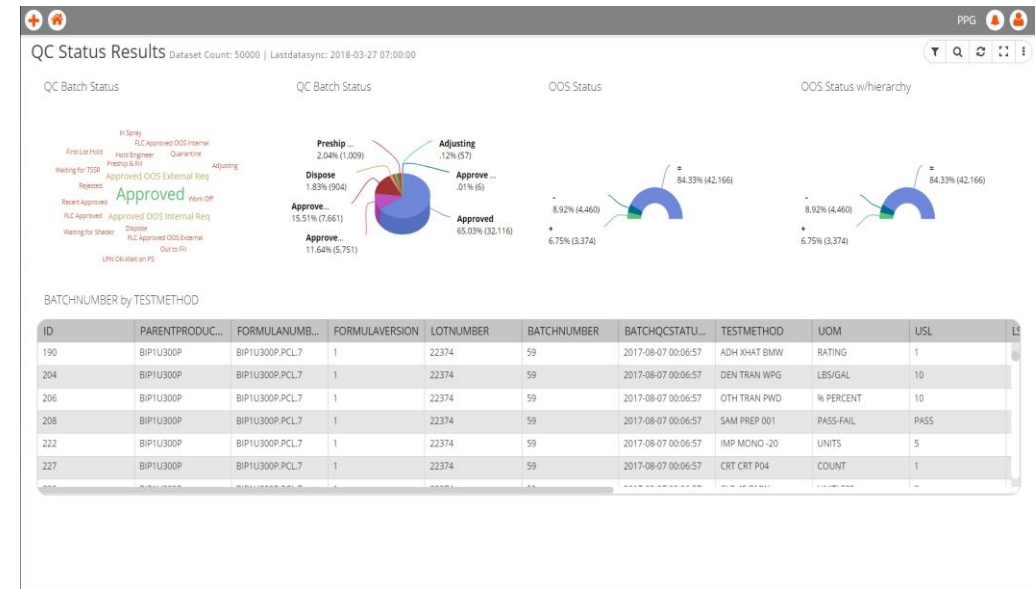
- Reduce the need for expensive infrastructure from traditional warehousing
- Reduce time to value by limiting dependence on data scientist and data architects
- Allow the users to interact and explore their data

## Key Features:

- Easily fuse data without relying on an IT workflow
- Elastic Search to replace a complex data schema
- Automatically find relationships in data
- Self service dashboards for collaboration
- Easily share data relationships with other in your organization

## DataView

FactoryTalk<sup>®</sup> Analytics



**Integrating with Existing Applications is a key element to consider to ensure value.**

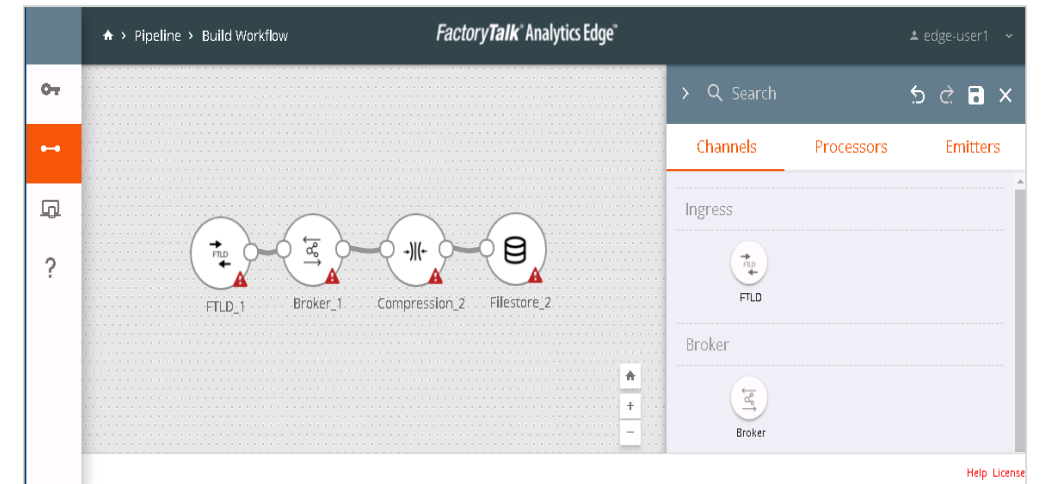
# FactoryTalk<sup>®</sup> Analytics

- Make rapid decisions close to the data and consumer
- Increase efficiency of closed loop manufacturing analytics
- Reduce information layer infrastructure costs

## Key Features:

- Access the data in your intelligent devices
- Egress to multiple destinations both on premise and cloud
- Pre-Process data for effective analytics
- Enable bi-directional transaction type data
- Execute closed loop edge level machine learning
- Support development of custom applications and connectors

Edge  
FactoryTalk<sup>®</sup> Analytics



**Accessing streaming data from IIOT devices is critical to extract the true power of analytics.**

# FactoryTalk® Analytics

- Execute predictive and prescriptive solutions
- Reduce risk by leveraging the right modeling tool for the application
- Reduce cost to re-use models and integrate existing systems

## Key Features:

- Connect many types of complex machine learning models with the data from intelligent assets
- Process data to be executed in machine learning solutions
- Re-use models across an enterprise
- Connect model results with multiple applications and your control system

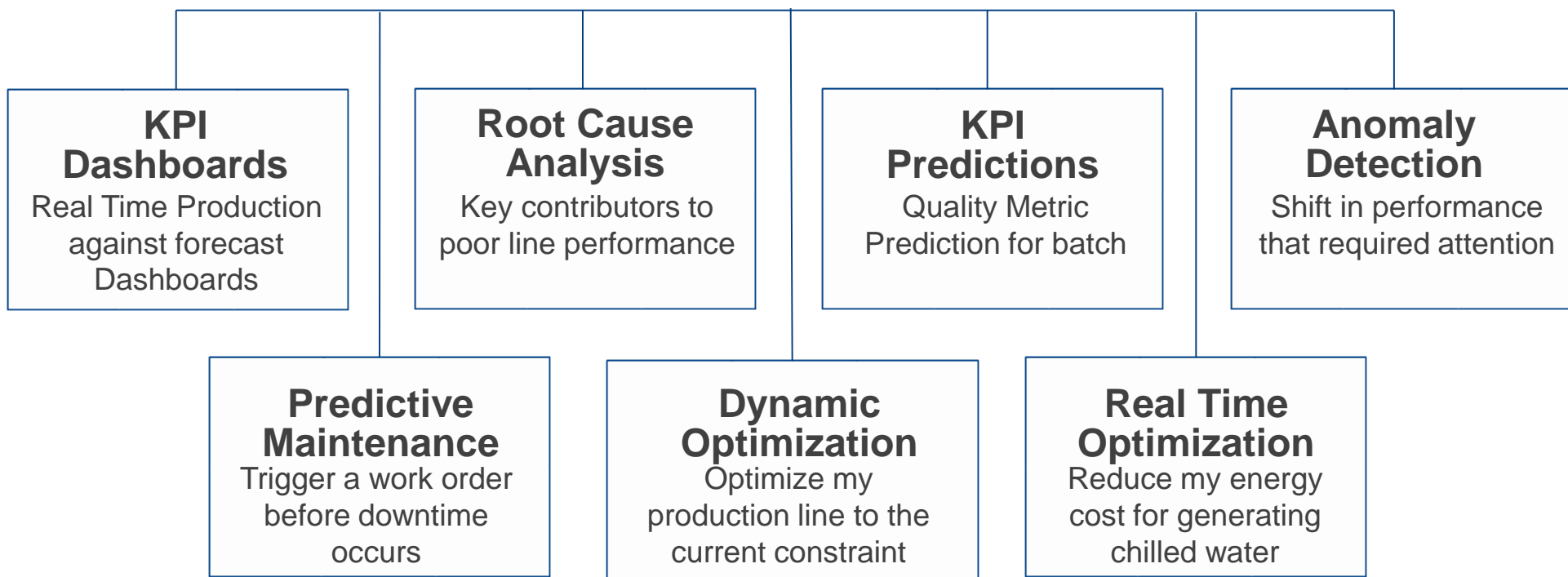
## DataFlowML



**Different modeling tools are leveraged for different applications.  
It is key to be able to leverage open modeling standards to future proof your solution.**

# Manufacturing Focused Applications

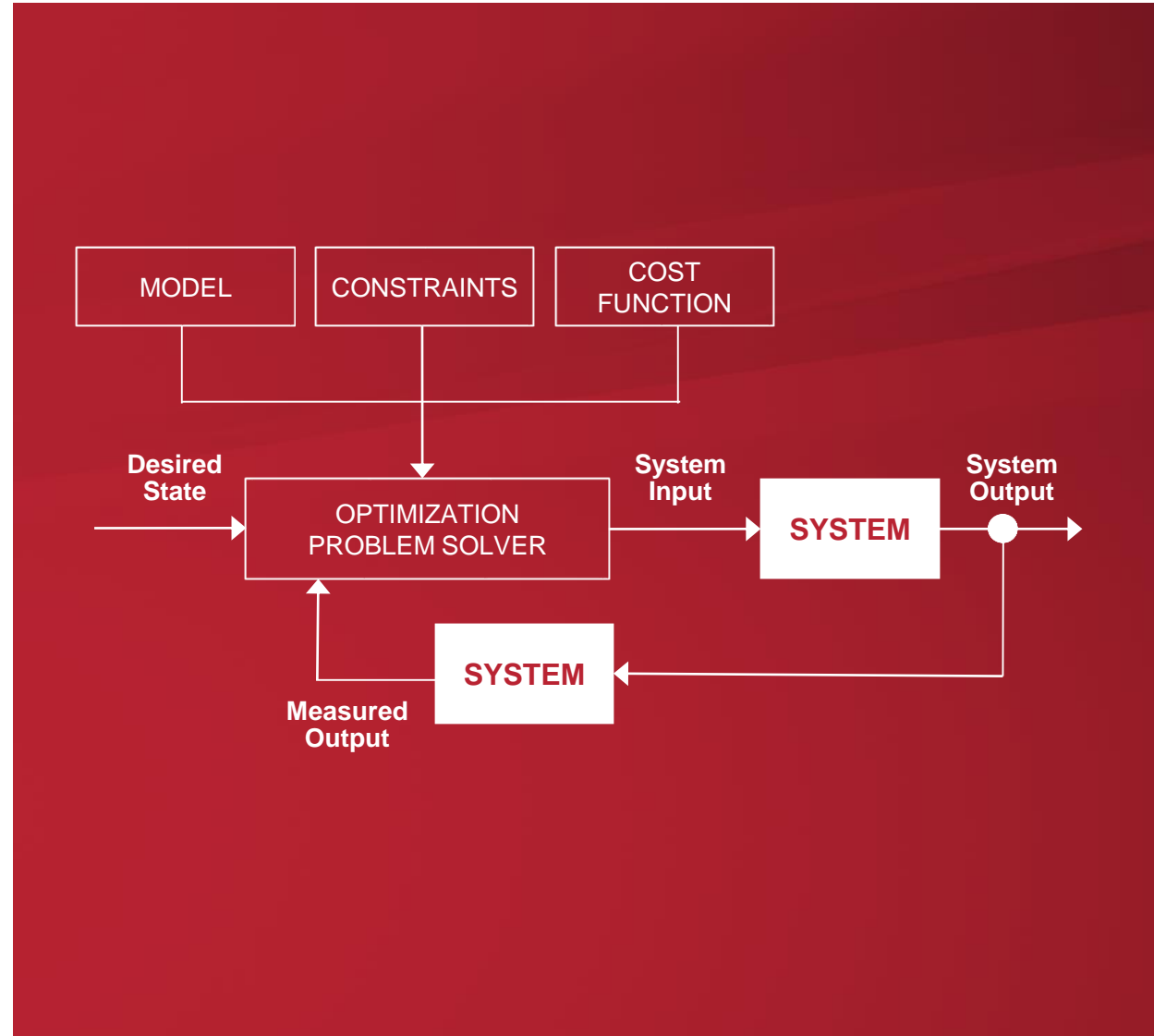
## Analytic Outcomes



# Dynamic Optimization

## Closed Loop (MPC)

- **Predictive Models:**
  - Here are my inputs
  - What will be the result (output)?
- **Predictive Control:**
  - Here is my desired result (output)
  - How should I set my inputs to achieve it?
- **Optimization:**
  - Given a set of economic information.
  - What is the most profitable (optimal) output?



# Flexible and Open Deployment Options

- Reduced infrastructure cost
- Reduced time to value for closed loop applications
- Reduce risk and future-proof with open deployment options

## Key Features to Look for:

- Leverage your existing computing infrastructure
- Can be deployed with all major cloud platforms
- Can be deployed on premise
- Can be deployed on industrial computers
- Can be deployed all the way to the control system



Cloud



On-premise



Edge



Embedded

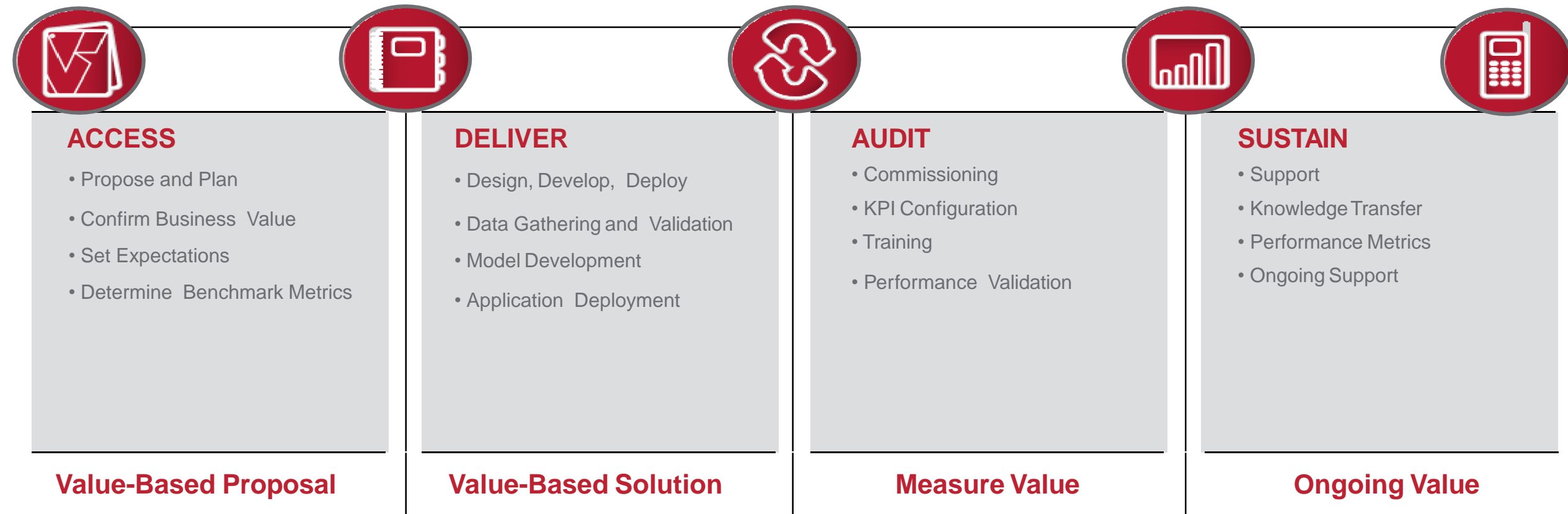
**Analytics platform system dependency is key to align with your corporate strategy for edge, on premise and cloud.**

# Project Execution Methodology

Bringing you a world of experience

# ValueFirst™ Project Methodology

## Next Steps



# ValueFirst

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SOLVE.®

# Thank you

Learn more: [FactoryTalkAnalytics.com](https://www.factorytalkanalytics.com)

 Connect with us.

[www.rockwellautomation.com](https://www.rockwellautomation.com)