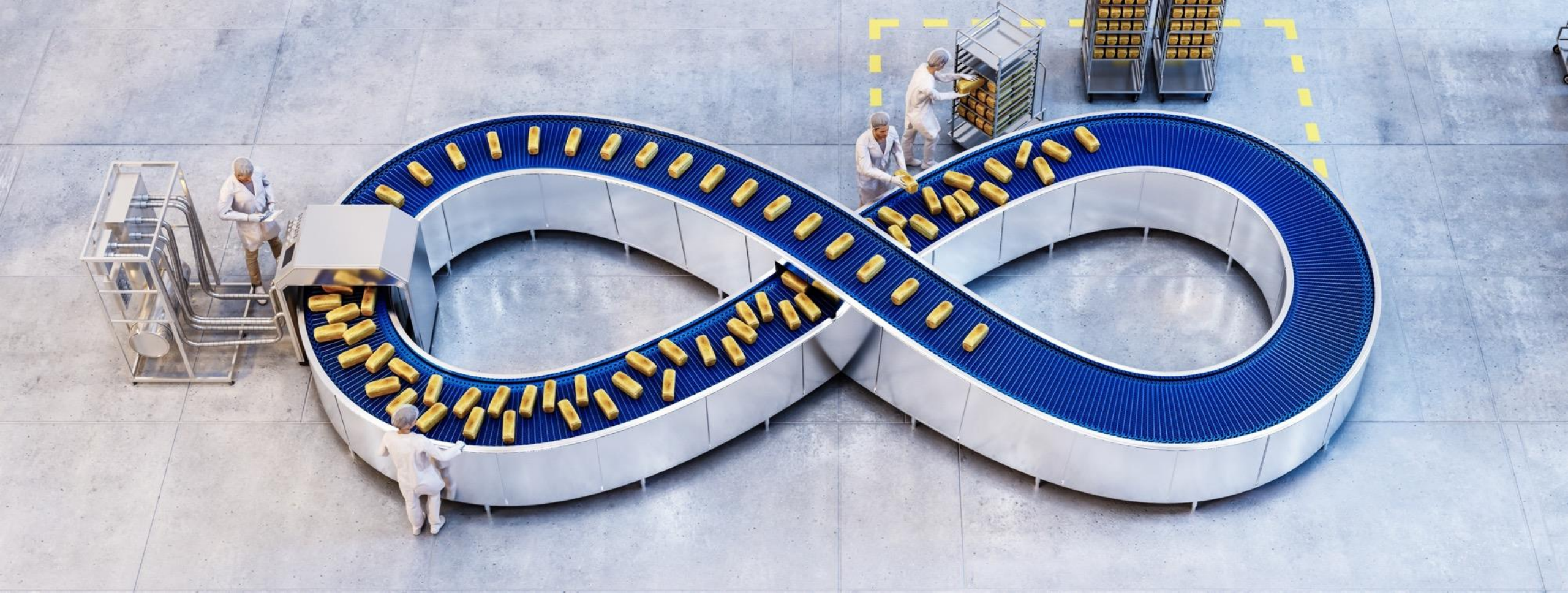

F&B CUSTOMER EVENT , MAKASSAR MARCH 28TH , 2019

Digitalizing Manufacturing processes

Online Remote Monitoring (Internet of Things – IoT) and enterprise software

ABB Ability MOM and ABB Ability CALM

1 **Digitalization**
General Overview

2 **Asset Management**
ABB Ability™ Ellipse CALM Overview

3 **Control System**
ABB Ability™ System 800xA Overview

4 **Live Demo**

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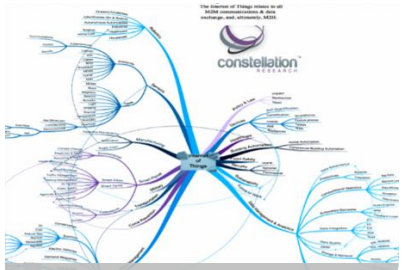
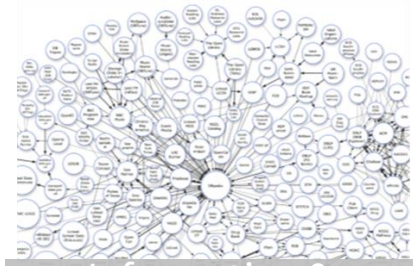
Digitalization

Key Drivers

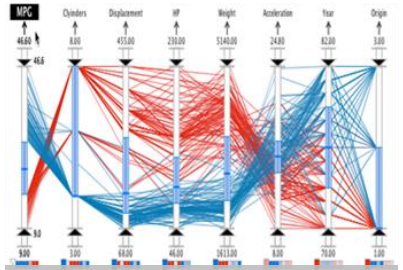


Internet of Things

Wireless Communication



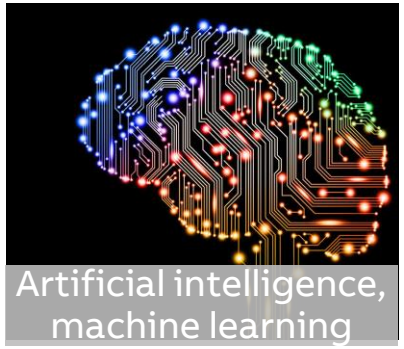
Information & Big Data Analytics



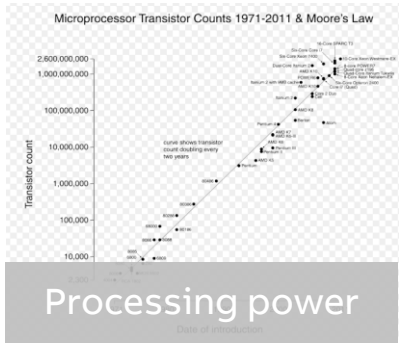
Visualization

Cloud

Mobility



Artificial intelligence, machine learning



Processing power

Price

Collaborative Robots

Anything Can Be Connected, Will Be Connected

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What is "Digital" and Why Digital matters

- **Digital** means different thing to different people. In ABB, it is about customer focus, data driven, close the loop of people, process, asset, with **technology**.

- The advancement of technology means very soon,
  - Almost any "thing" that can be connected – will be connected.

- Connected devices will change how the industry works,
  - Will disrupt the current business and enable new business models

- Digital topics are driving customer benefits in:
  - Decision Making
  - Innovation
  - Growth
  - Efficiency

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What can we do with LOTS of Digital Data?

- There is basically unlimited amount of data available, some digitally collected, but…

  … it is useless if they make no sense …

- How to create knowledge from the unknown:
  - Digitally collect data into Unified Data Storage
  - Visualization of information
  - Closing the loop of manufacturing operations
  - Algorithms approach (predictive analysis, machine learning, advanced statistics etc)
  - Prioritize data collection with domain knowledge
  - Prioritize action items using newly acquired knowledge!

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ABB Ability™ Powered Data Analytics

Analytics Enhanced by ABB Knowledge

Less data to process saves cost and improves accuracy.

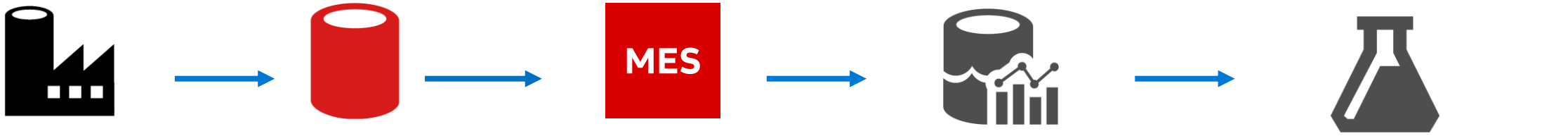

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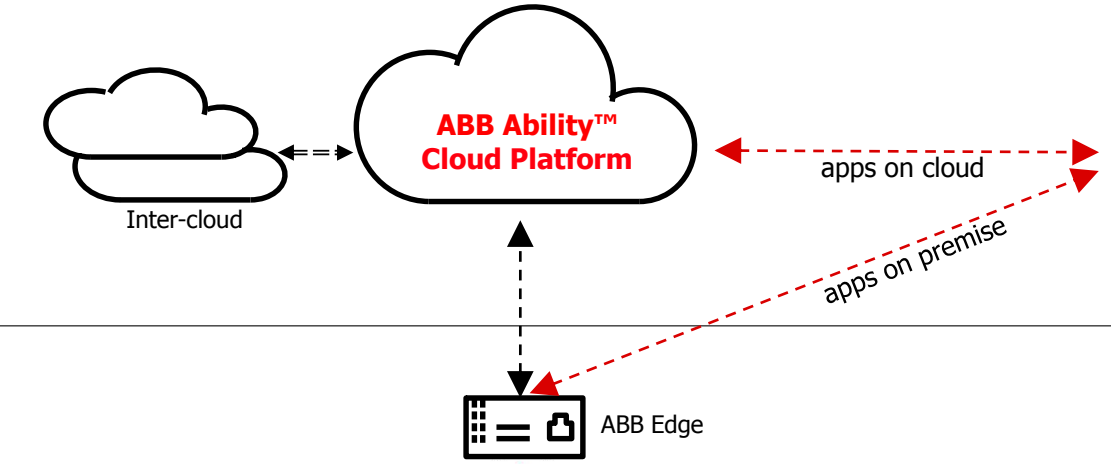
ABB Proposition & Digital Strategy



Business Planning & Logistics – Business Analytics, Advanced Visualization, Enterprise Asset Management Strategy, Operation Optimization, Service Strategy, …

Apps on premise and/or cloud

Manufacturing Operations – Dispatching Production, Quality Management, Materials, Track & Trace, Production Scheduling, Reliability Assurance, …

Plant Wide Extended Automation & Lifecycle Management – Process & Production Control, Electrical, Safety, Cybersecurity, Lifecycle Support, …

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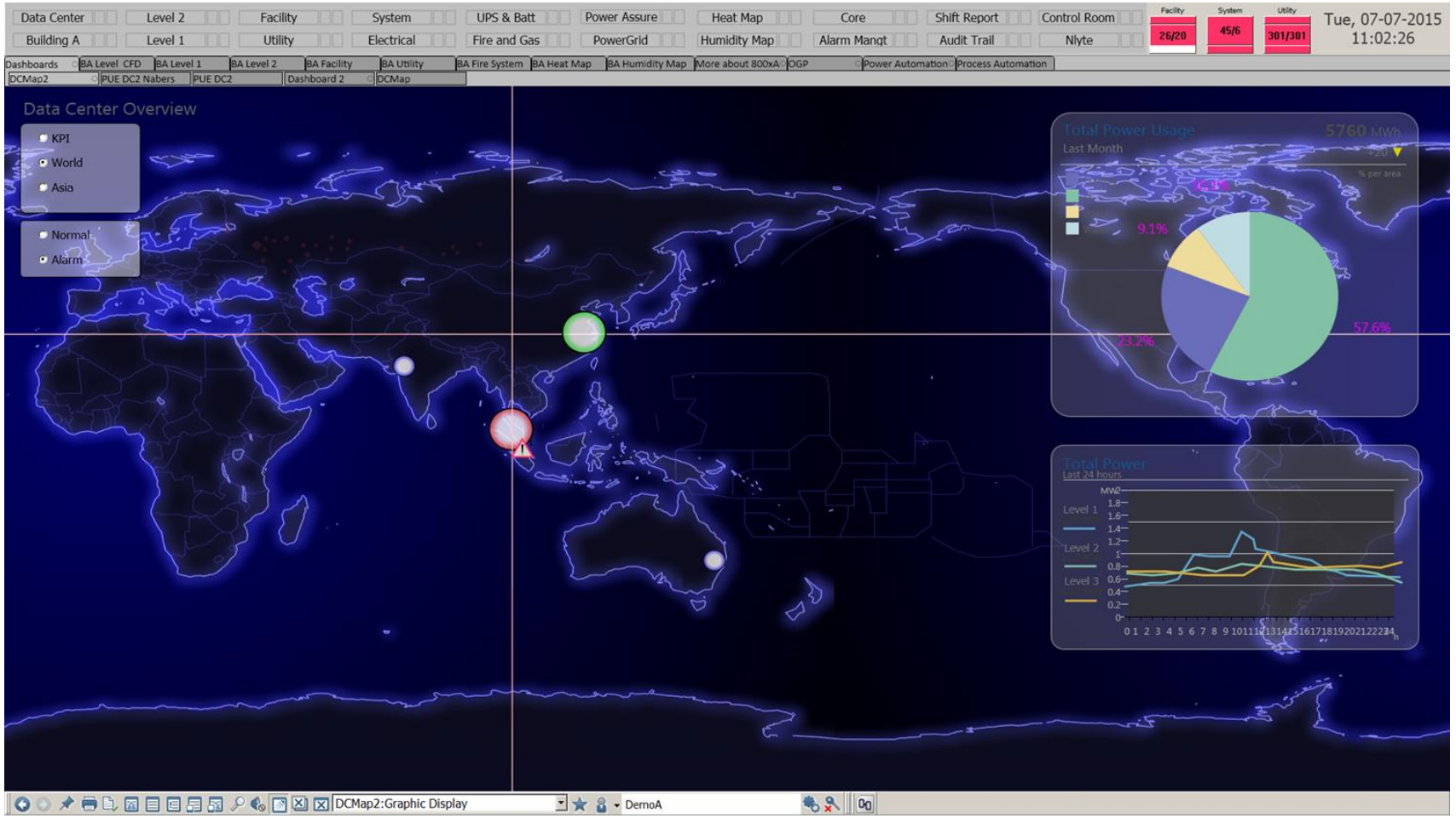
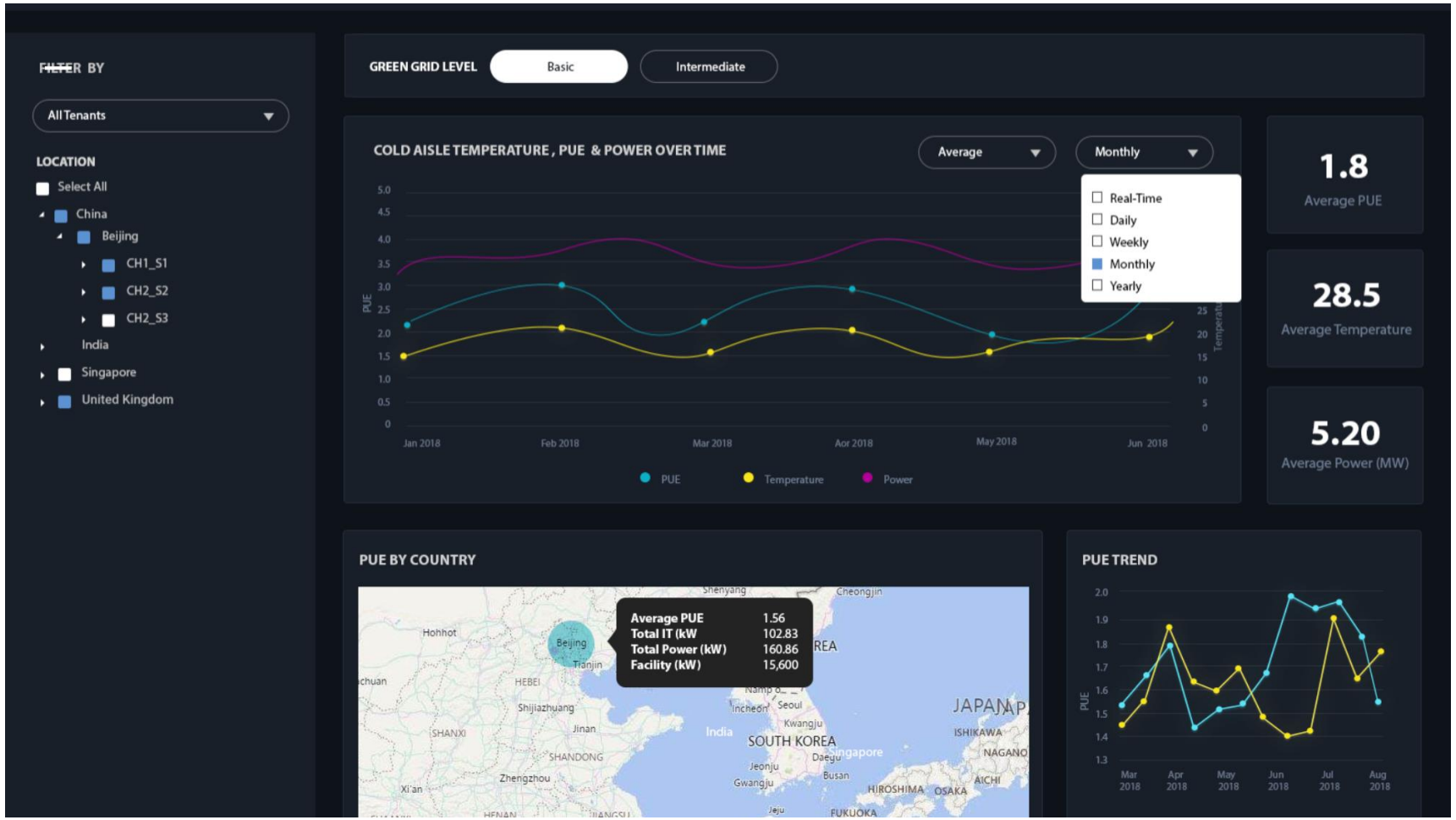
Global Multi Site Operations

Dashboard



Global Multi Site Operations

Energy Monitoring Dashboard



Global Multi Site Operations

Interactive instant reports and analysis

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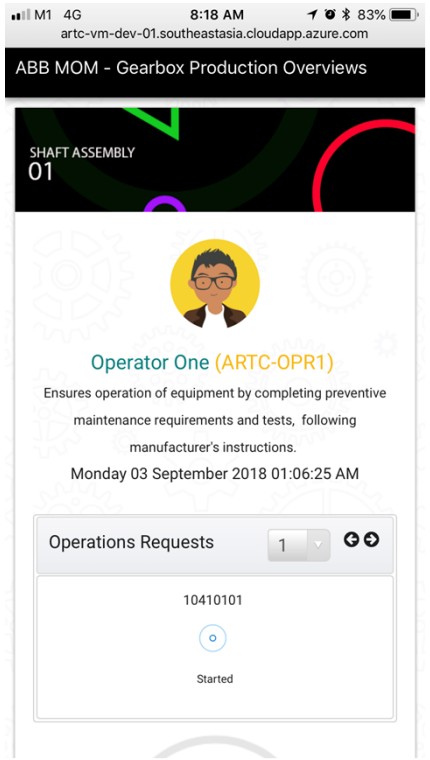
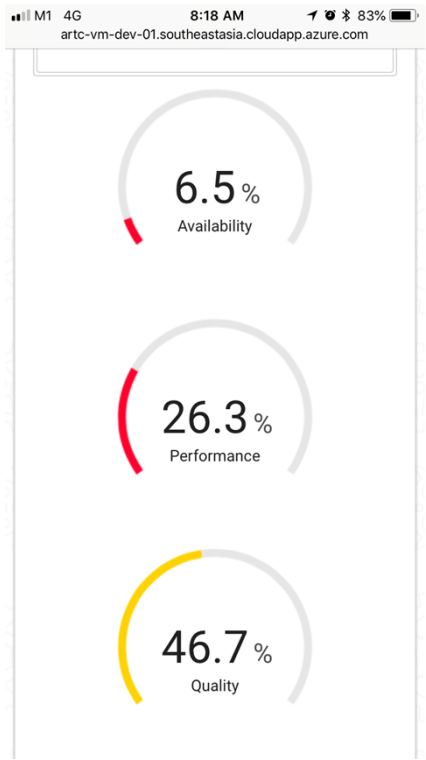
Manufacturing Operations Management

Remote Monitoring on your mobile

Operator



OEE



Material Consumption

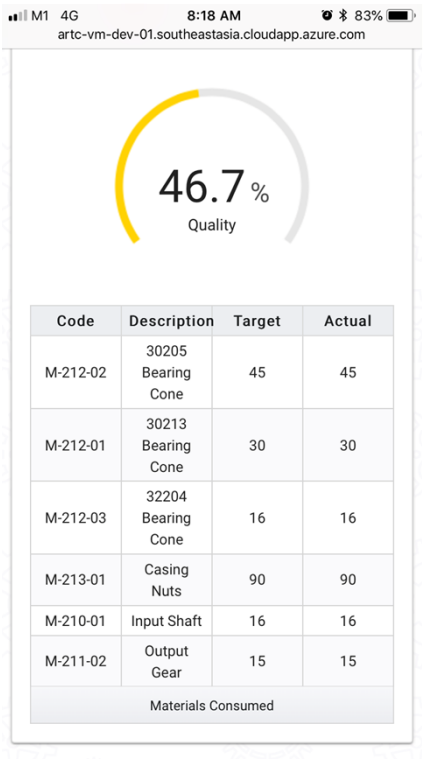


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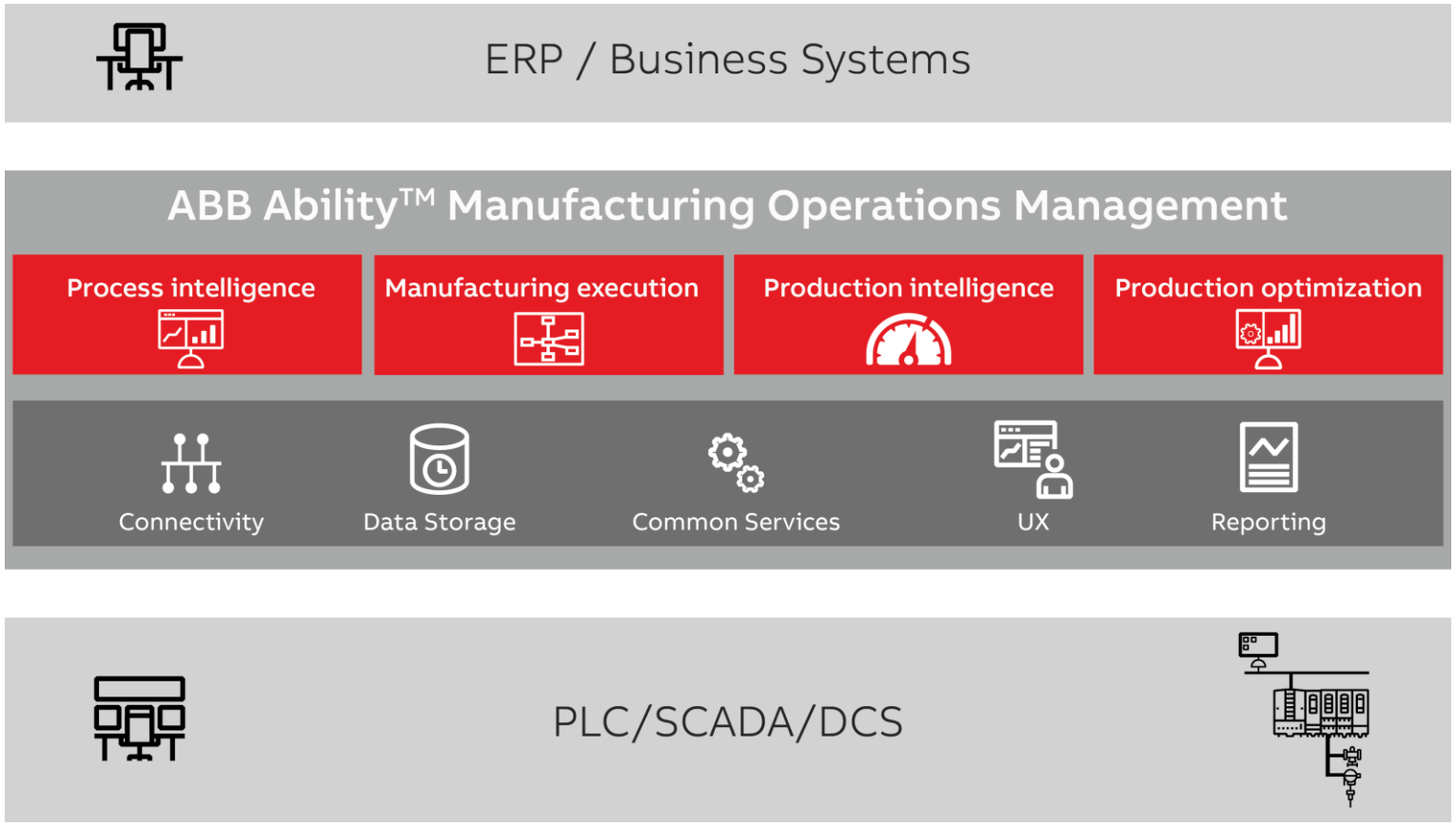
ABB Ability™ Manufacturing Operations Management

Overview



Scalable and modular suite:

- Process intelligence
- Manufacturing execution
- Production intelligence
- Production optimization

Enables the various stakeholders effective decision-making and production execution with fully integrated operations

Platform Independent encompassing core common services

Digitally Enabled Automation Systems

Enabling new values through Digital

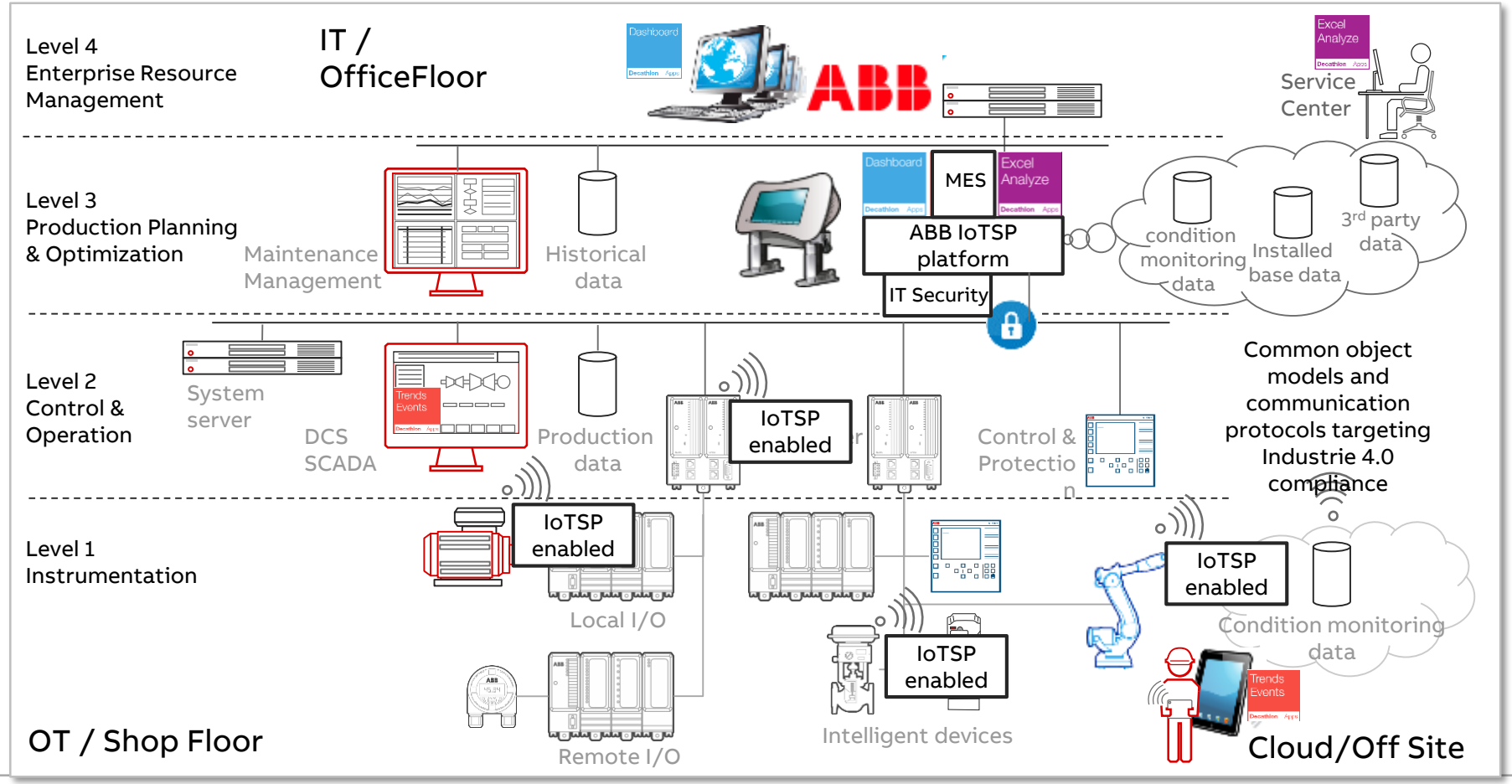


ABB Ability™ Manufacturing Operations Management

ABB Ability ™ System 800xA

Operator Effectiveness

– Full scope and features set including optimal collaborative environment through control room design based on human factors best practices

Electrical Integration

– Combines process and power automation in a common infrastructure for improved operations, maintenance and collaboration

Enterprise Asset Management

– Full scope asset monitoring that helps operators, maintenance and manufacturing operations management streamline procedures and become more predictive

Integrated Safety

– Combines basic process control and high integrity applications for improved control strategies and improved safety

Plant-wide consolidation, collaboration, and optimization!

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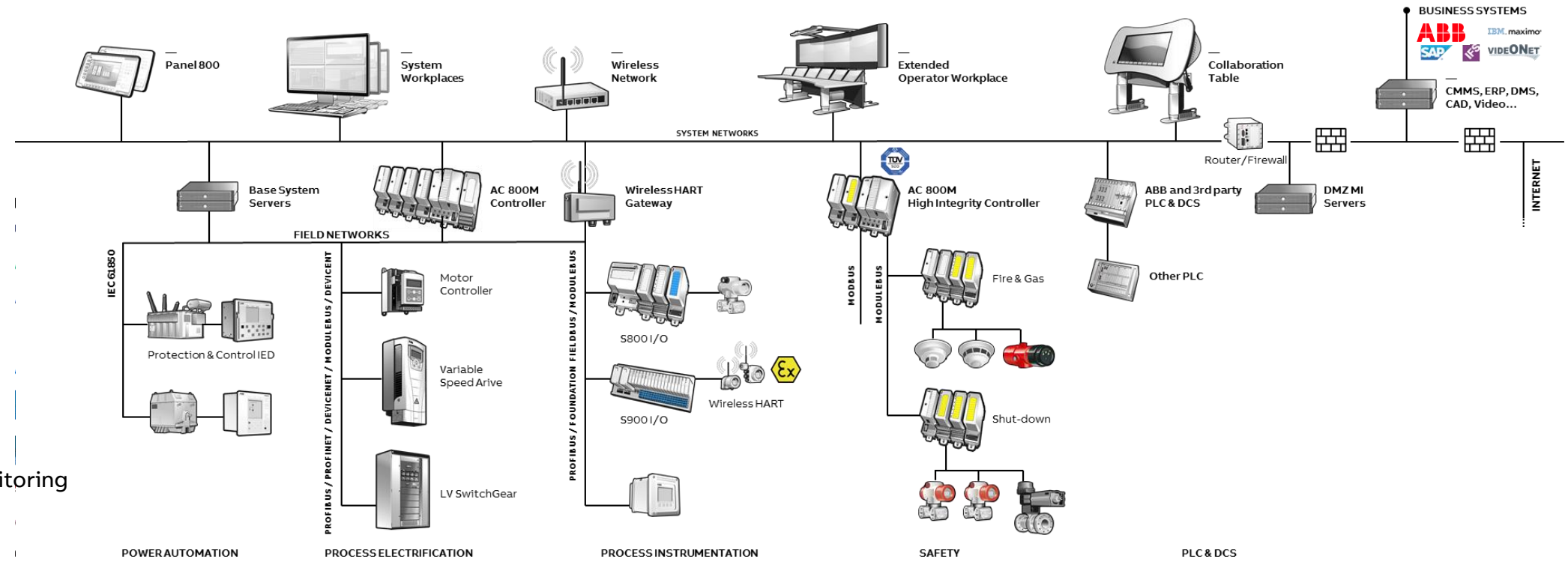
System 800xA

Extended Automation

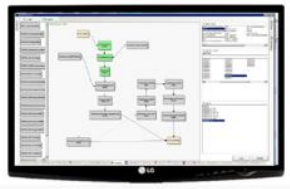
- Operations
- History
- Batch
- Cyber Sec
- Notification (SMS)
- Reporting
- Calculations
- Alarm Mgt.
- Video Integration
- Public Address
- Document Mgt.
- CMMS Integration
- Asset Condition Monitoring
- Loop Performance



See www.abb.com/800xA for more information!

ABB Ability™ Manufacturing Operations Management

Improve operating procedures, integrate existing plant equipment and control end-to-end production process



Production management
Plan, respond and change on demand: order and production buffers, workflow management, automatic mapping of routing from ERP

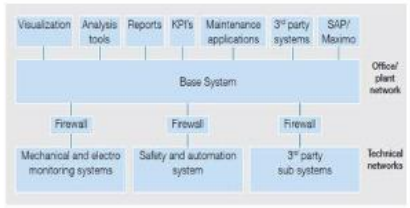
Labor management
Accurate management and tracking of staff attended hours (Join/Leave) and activities on a given product against defined production time

Material management
Tracking, tracing individual parts, lots, batches, assemblies. Material identification, real-time reporting of material consumed and produced, material compatibility and availability

Quality management
Quality data collection, test certificates, in-process quality control, automatic tolerance validation, non-conformities reporting, checklists

Genealogy
Comprehensive track and trace capabilities from raw material, intermediates to finished produ

Weigh and dispense
Improve productivity, safety and accuracy of weighing, integrate scales, bar code scanning and label generation



Enterprise connectivity
Seamless integration of ERP, SCM, MES, databases, applications, various production equipment and control systems from different vendors

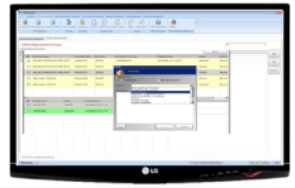
ERP / Business Systems

ABB Ability™ Manufacturing Operations Management

Process intelligence | Manufacturing execution | Production intelligence | Production optimization

Connectivity | Data Storage | Common Services | UX | Reporting

PLC/SCADA/DCS



Downtime management
Real-time downtime info to make immediate improvements, long-term data collection for investigation of production process problems

Equipment maintenance management
Plan, create and execute equipment maintenance with support of instructions, checklists and task tracking

Warehouse Management
Control storage locations & levels, movement within warehouses, compatibility, manage silos and containers, integrate with external warehouses / inventory management systems

Overall Equipment Effectiveness (OEE)
Out-of-the-box software based on the standardized method of measuring and improving productivity

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ABB Ability™ MOM

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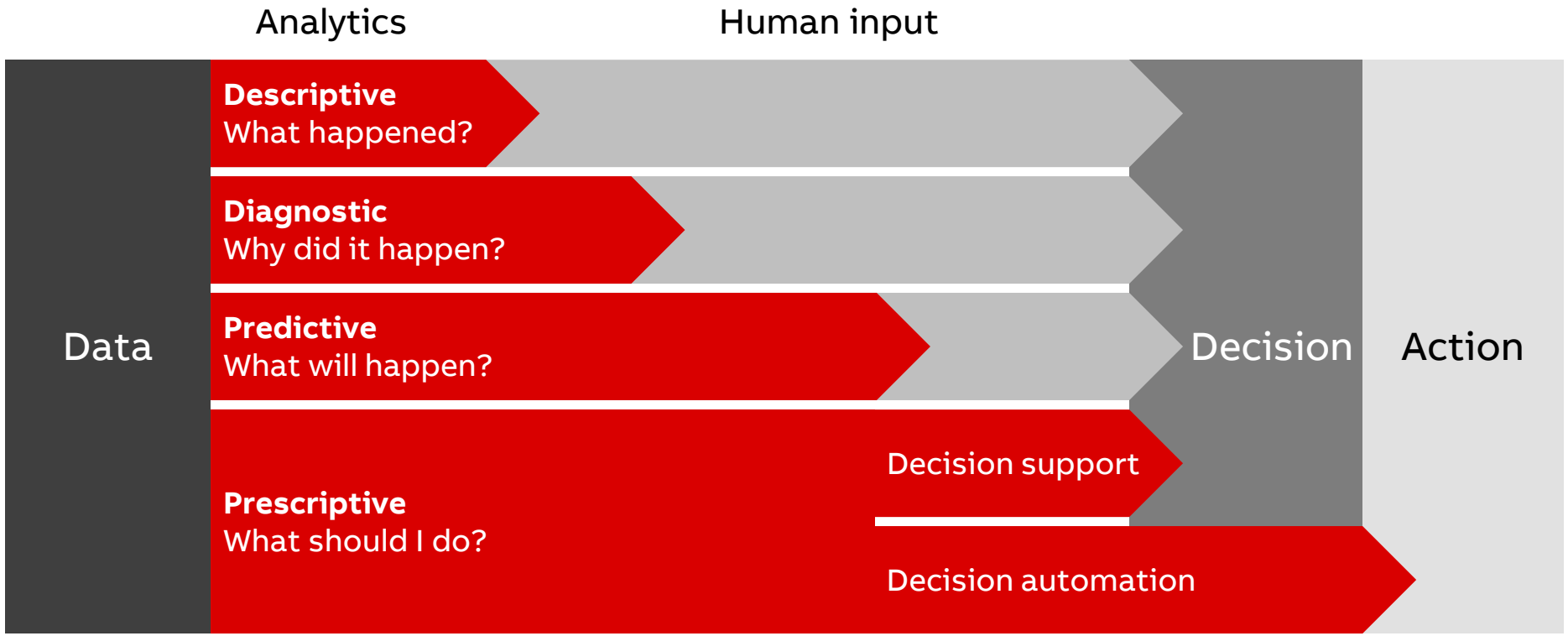
Evolution of digital business and analytics

Need for operational improvement steers analytics from descriptive to predictive



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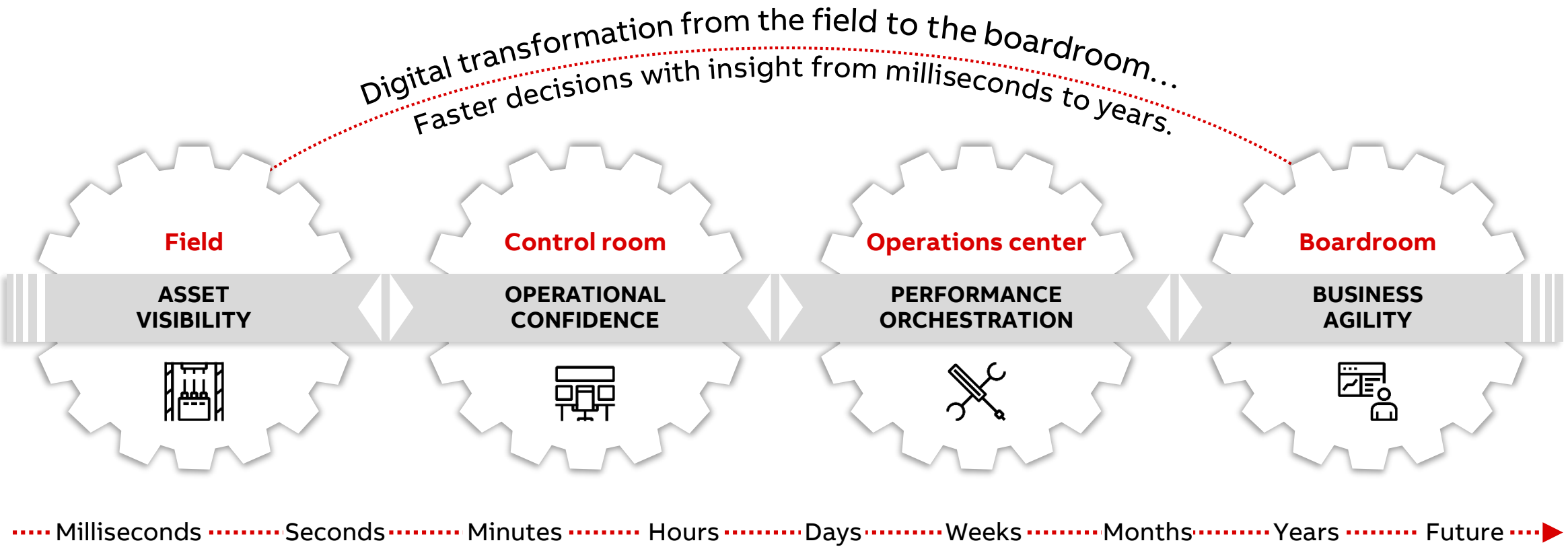
Source: Gartner (February 2015)

The dynamic digital world requires dynamic business operations



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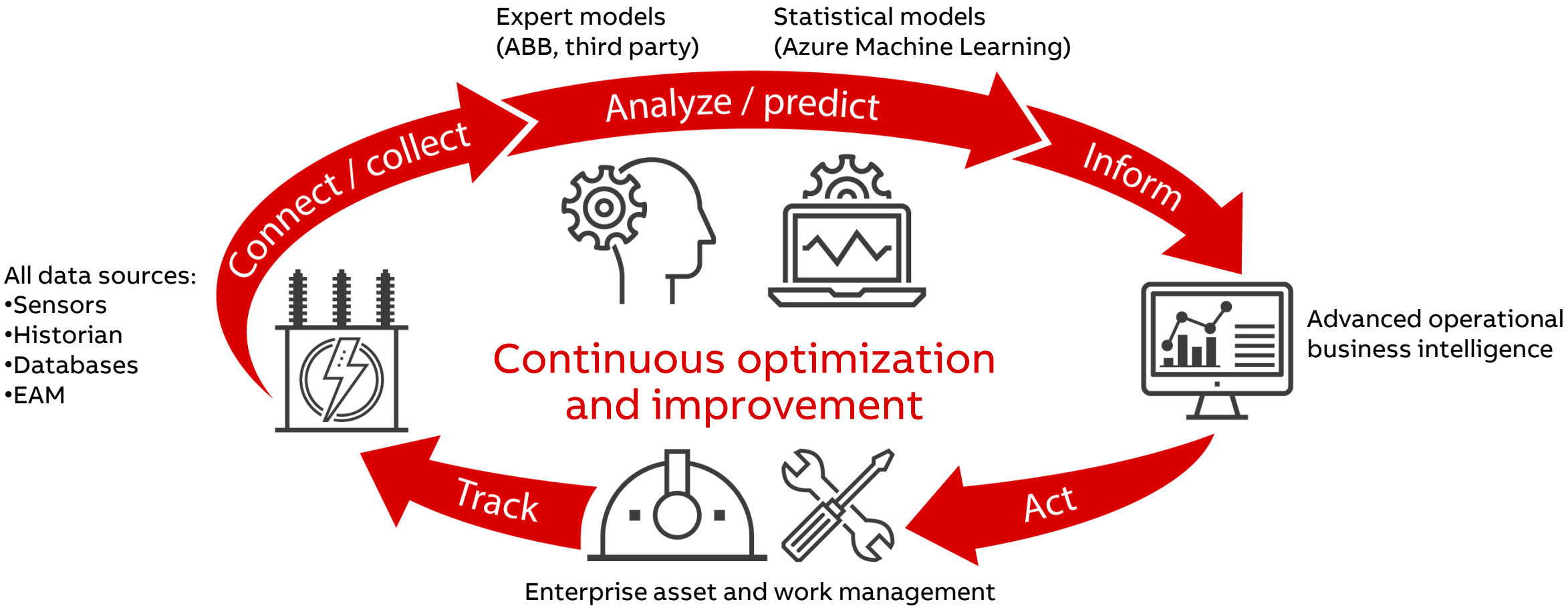
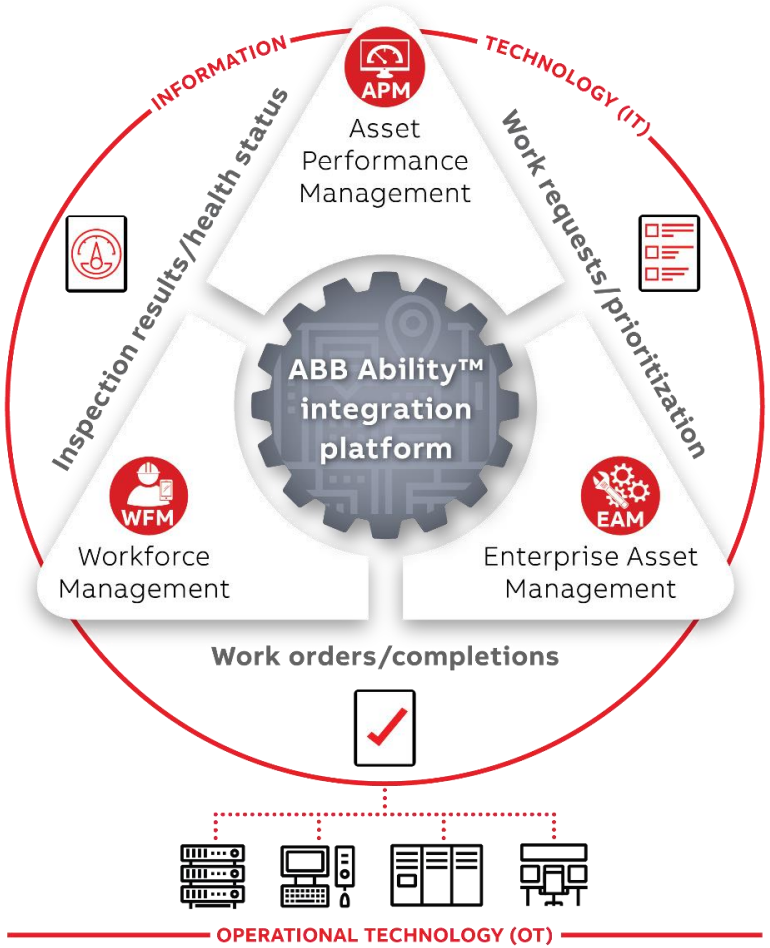
Continuous Improvement

Simple process, superb solution, extraordinary value



Leveraging digital transformation in asset management

ABB Ability™ Ellipse® – Connected Asset Lifecycle Management



The solution for next-generation asset management

- Unifies award-winning[1] functionality for asset performance management, enterprise asset management and workforce management
- Provides unprecedented orchestration of priority, process & people
- Proactively predicts, prescribes and prioritizes maintenance
- Enables planning based on risk of failure and operational criticality
- Utilizes expert data modeling for continual improvement
- Leverages real-time operations data for improved efficiencies
- Improves responsiveness by delivering the right work at the right time to the right people

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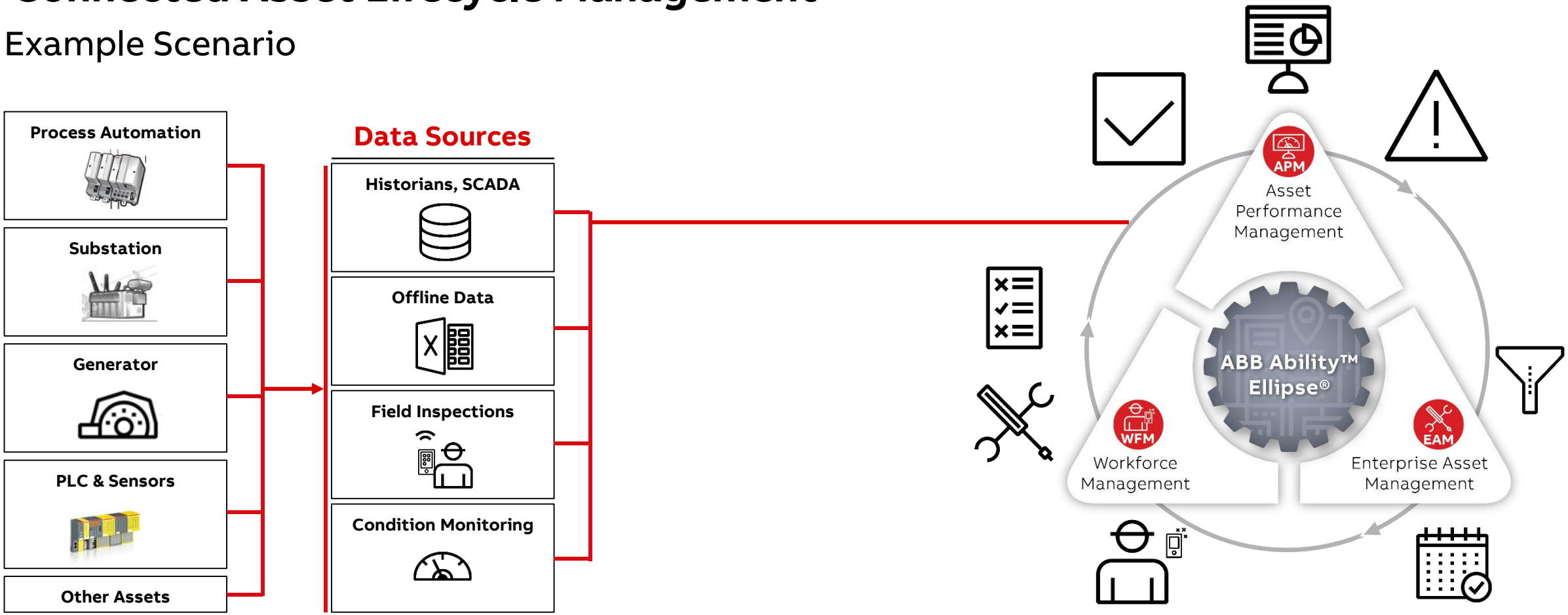
[1]**Navigant Research Leaderboard Report: Asset Performance Management, 2017**
Assessment of Strategy and Execution for 10 Leading Vendors of APM Solutions for Utilities

Connected Asset Lifecycle Management

Example Scenario

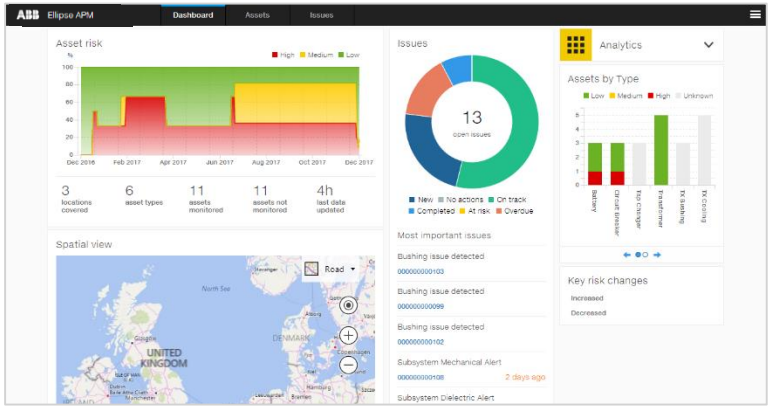


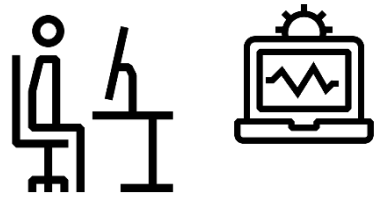
Combining data from different sources to drive work based on asset condition

ABB Ability™ Ellipse®

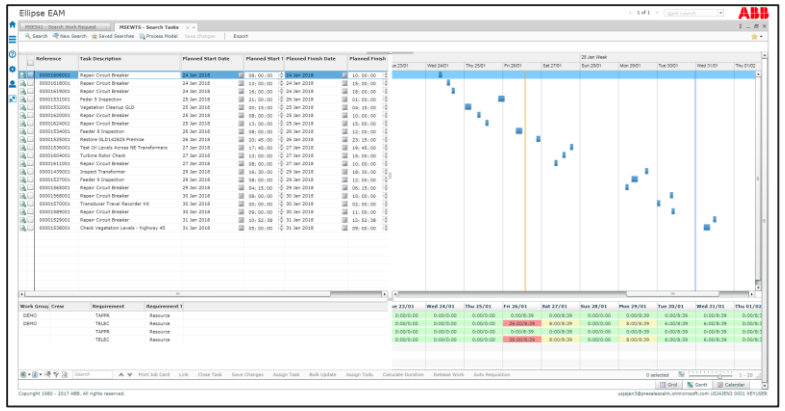
Core Solution Applications

Asset Performance Management

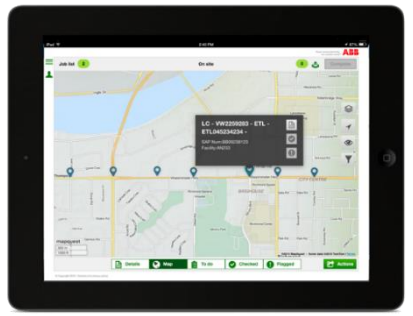


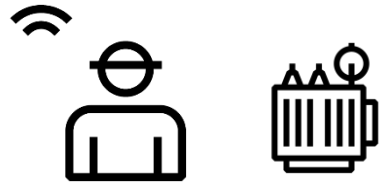


Enterprise Asset Management



Workforce Management





Effective Asset Management Requires Engineering, Maintenance, and Operations Working Together

ABB Ability Ellipse APM (UI)

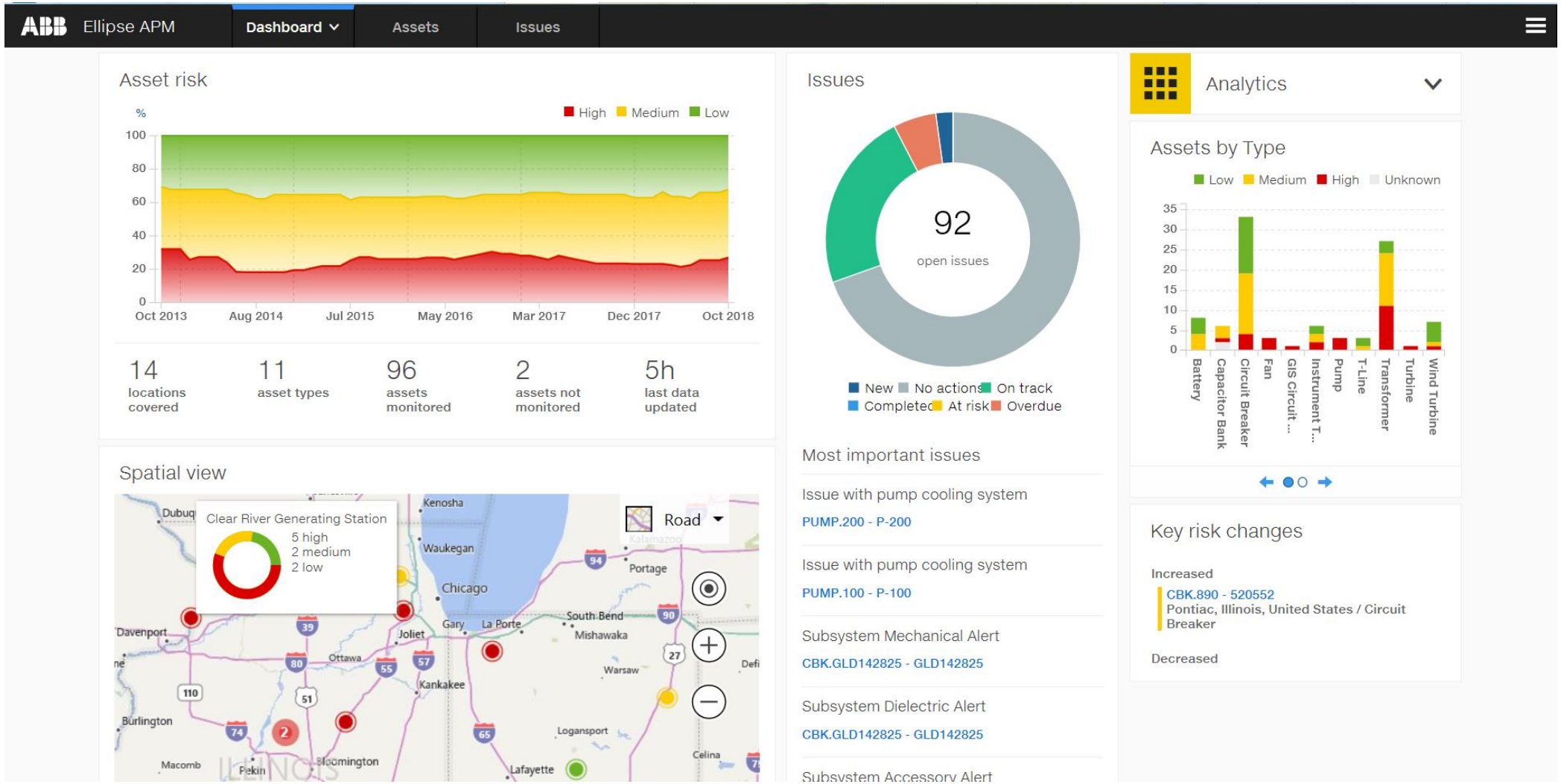


ABB Ability Ellipse APM (UI)

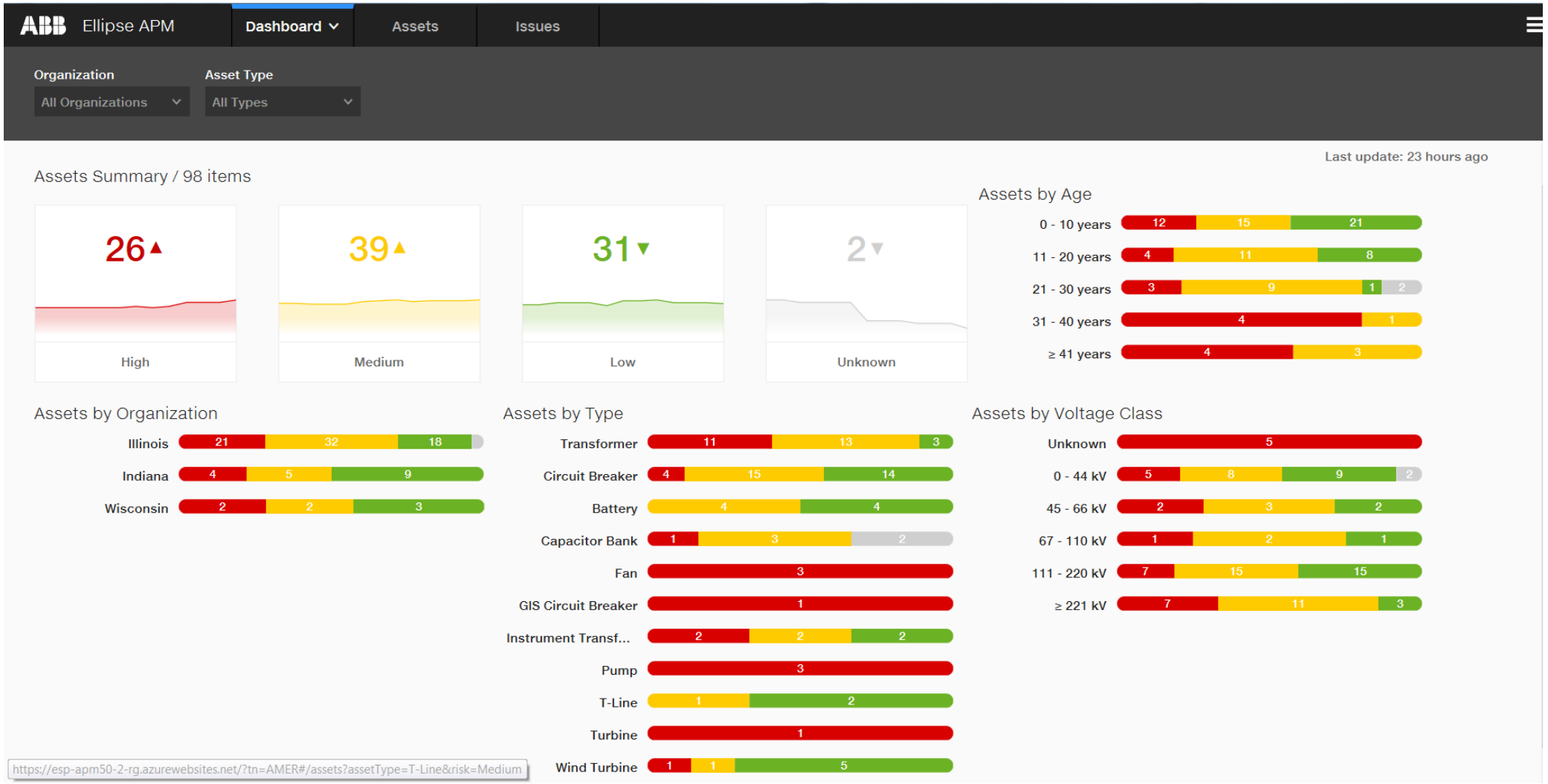
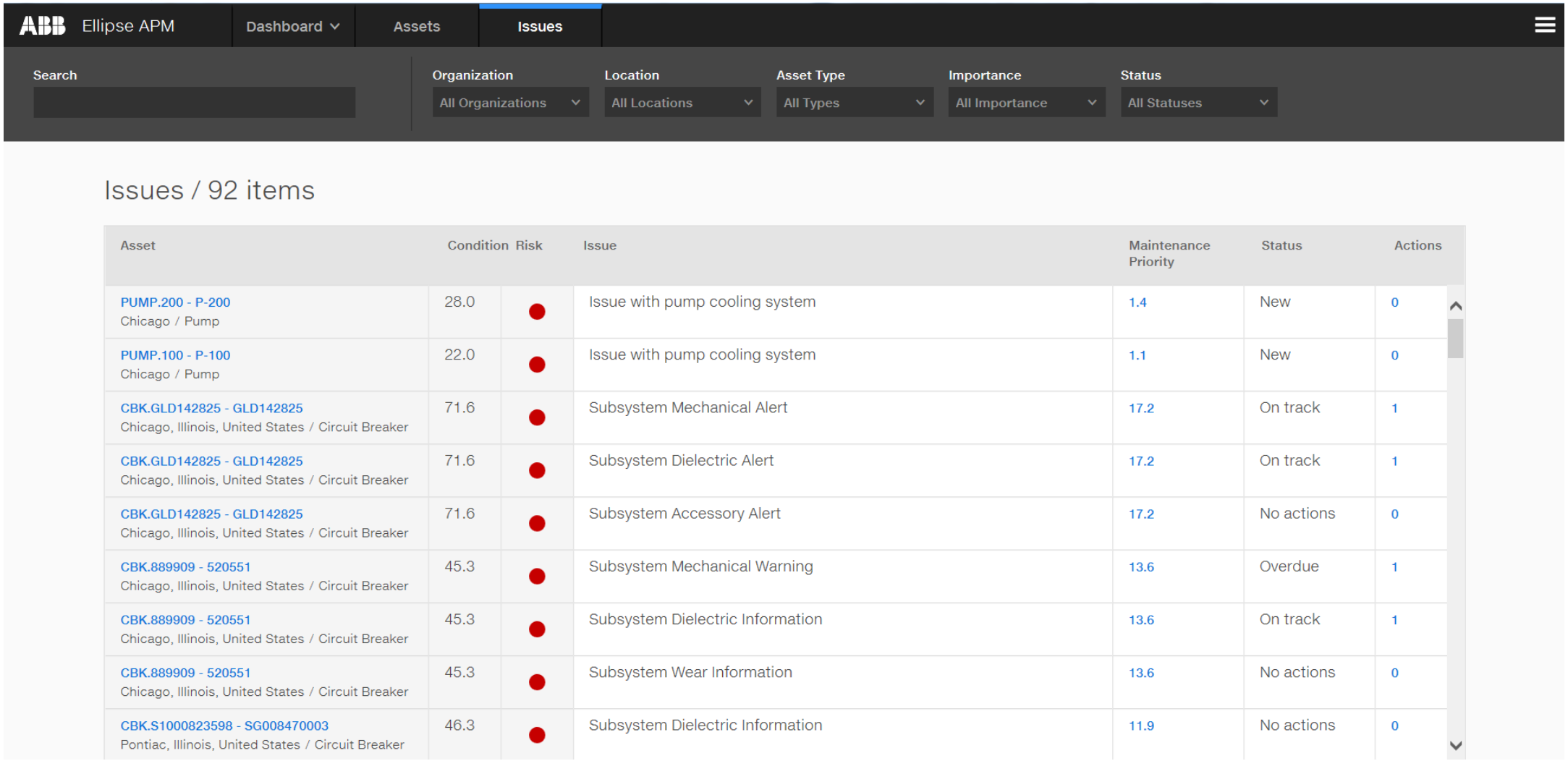


ABB Ability Ellipse APM (UI)



Asset	Condition Risk	Issue	Maintenance Priority	Status	Actions
PUMP.200 - P-200 Chicago / Pump	28.0	Issue with pump cooling system	1.4	New	0
PUMP.100 - P-100 Chicago / Pump	22.0	Issue with pump cooling system	1.1	New	0
CBK.GLD142825 - GLD142825 Chicago, Illinois, United States / Circuit Breaker	71.6	Subsystem Mechanical Alert	17.2	On track	1
CBK.GLD142825 - GLD142825 Chicago, Illinois, United States / Circuit Breaker	71.6	Subsystem Dielectric Alert	17.2	On track	1
CBK.GLD142825 - GLD142825 Chicago, Illinois, United States / Circuit Breaker	71.6	Subsystem Accessory Alert	17.2	No actions	0
CBK.889909 - 520551 Chicago, Illinois, United States / Circuit Breaker	45.3	Subsystem Mechanical Warning	13.6	Overdue	1
CBK.889909 - 520551 Chicago, Illinois, United States / Circuit Breaker	45.3	Subsystem Dielectric Information	13.6	On track	1
CBK.889909 - 520551 Chicago, Illinois, United States / Circuit Breaker	45.3	Subsystem Wear Information	13.6	No actions	0
CBK.S1000823598 - SG008470003 Pontiac, Illinois, United States / Circuit Breaker	46.3	Subsystem Dielectric Information	11.9	No actions	0

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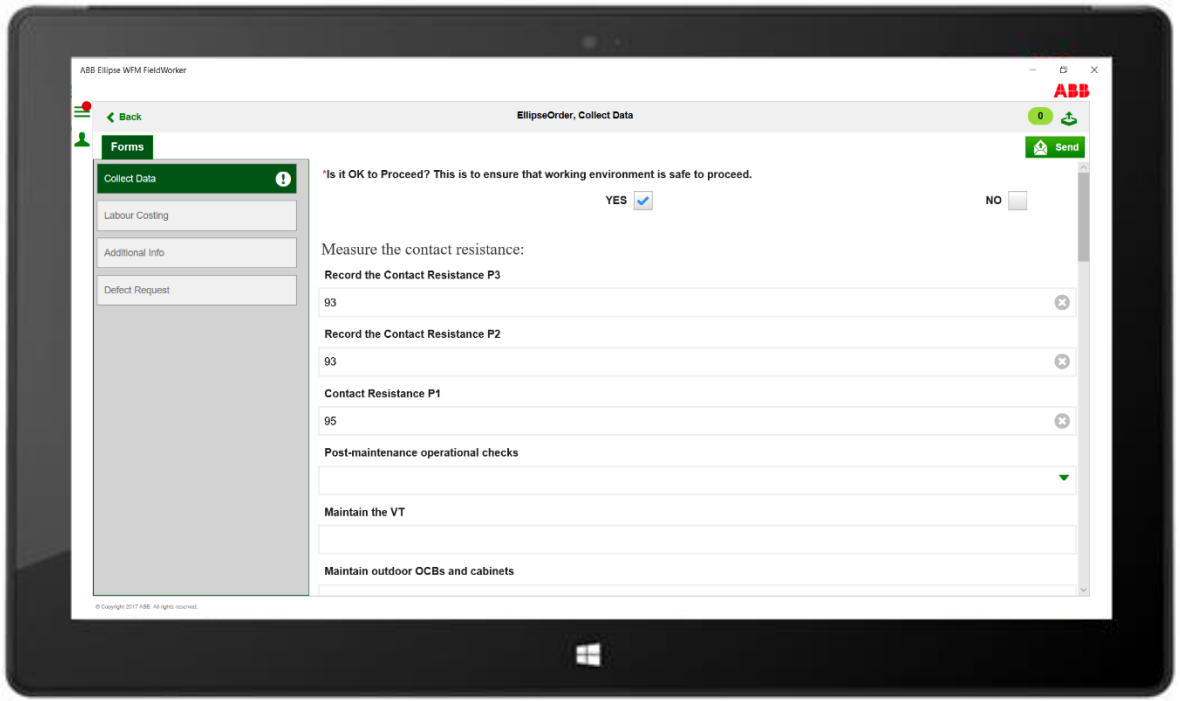
Manual Inspection Results -> APM

Measurements gathered in the field can be used as inputs to asset performance models

INSPECTION RESULTS GATHERED ON THE MOBILE DEVICE



COMBINED W/ DATA FROM OTHER SOURCES IN APM TO CALCULATE RISK OF FAILURE

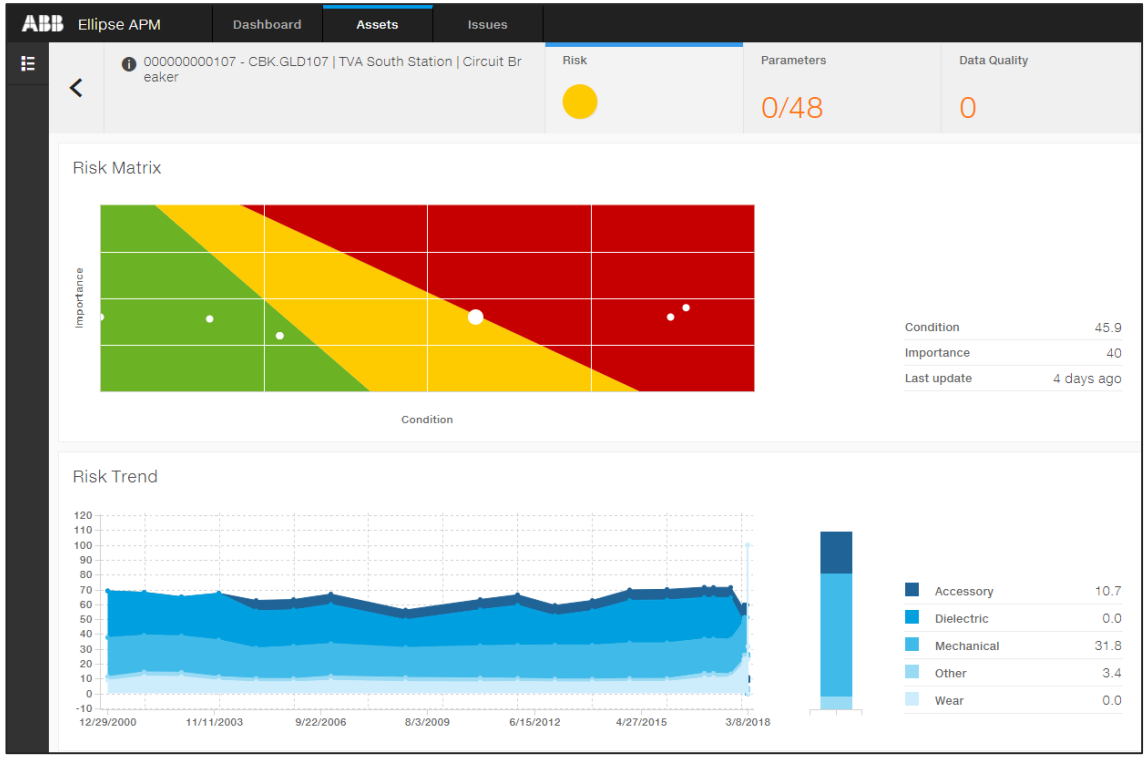


ABB Ability Ellipse EAM

A complete Asset management Solution

Assets

- Capital and expense projects
- Construction works management
- Maintenance strategy
- Equipment costing & performance

Work

- Plan, schedule
- Execute, complete
- Job & project costing / analysis

Materials

- Requirements determination
- Vendor management
- Inventory management
- Contracts & procurement

Finance

- Budgeting and forecasting
- Project costing
- AR / AP
- CPR / fixed assets

People

- Organization & people management
- Time, attendance & payroll
- Training
- Health, safety, security and environment (HSSE)

Analytics

- Asset & operations insight
- Construction through operations
- Informed decision making
- Improves outcomes

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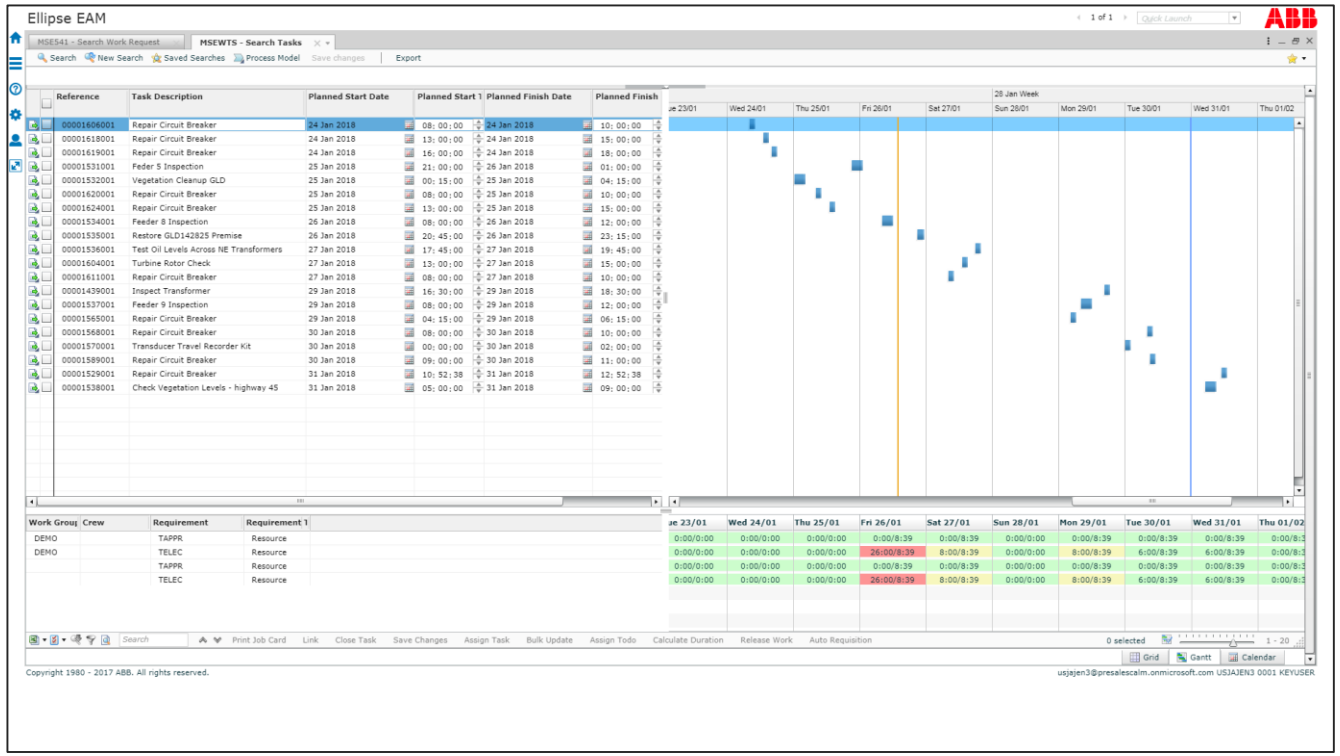
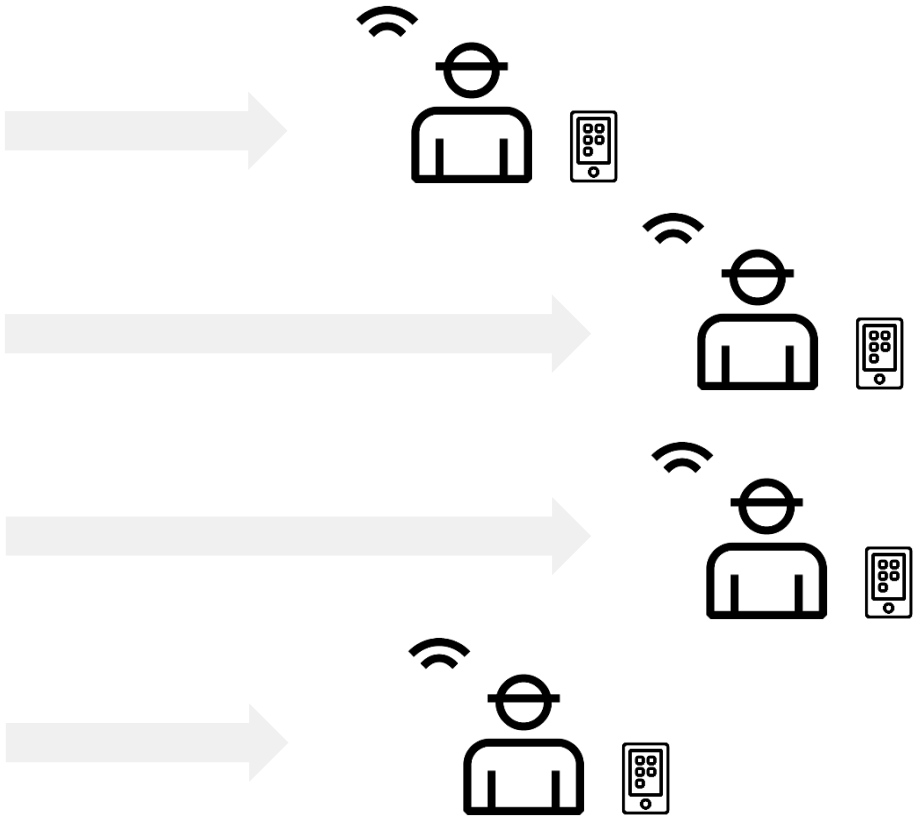
Work -> Mobile Execution

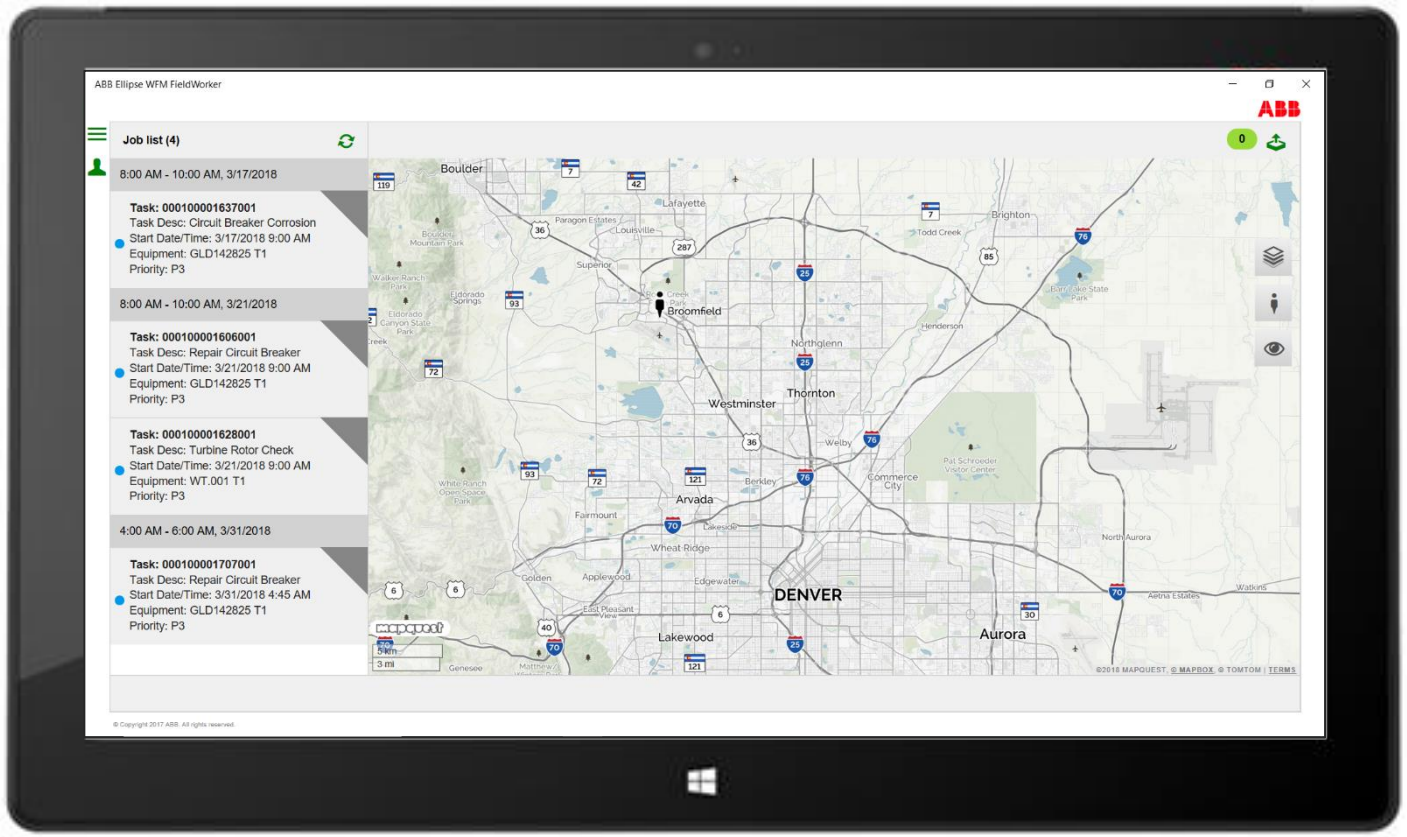
Schedule and Assign Work Orders -> Release Updates to Field Technicians

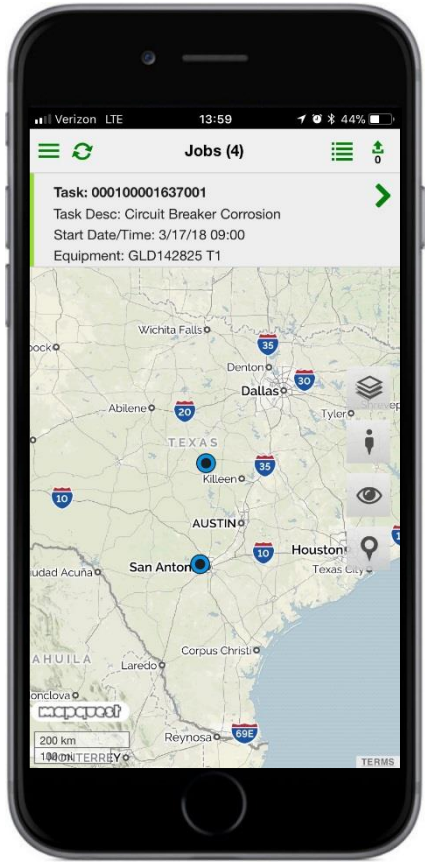


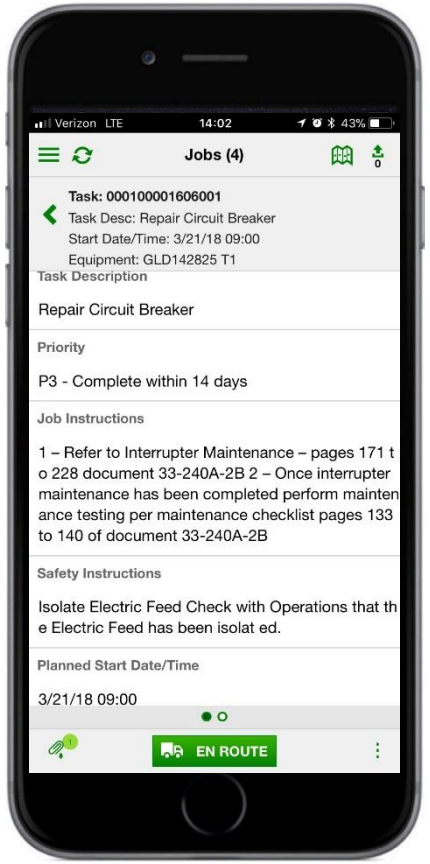


Work -> Mobile Execution

Field Work Execution via Mobile Application

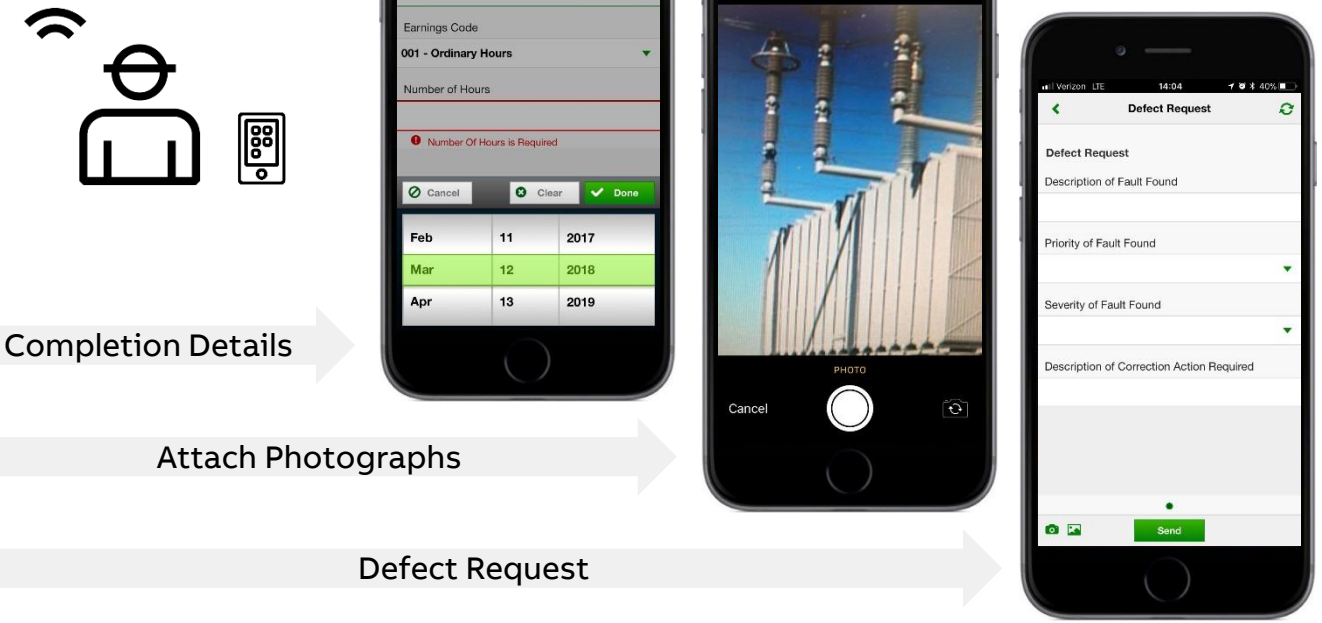






Work -> Mobile Execution

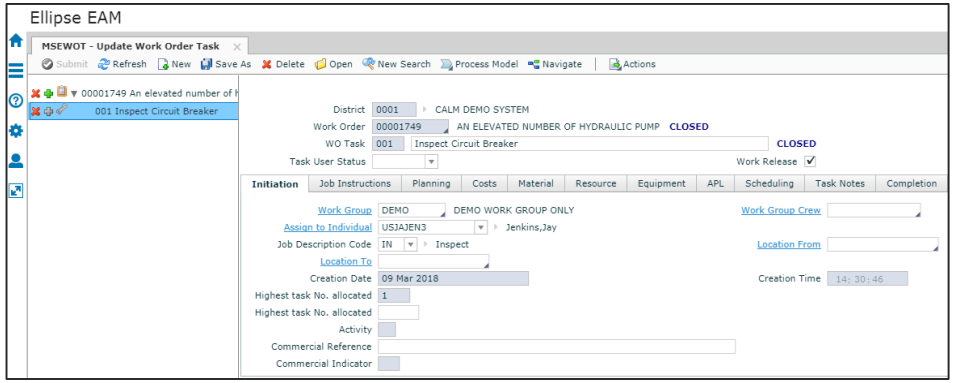
Work Order Updates from the Field



Completion Details

Attach Photographs

Defect Request



WORK ORDER RESULTS ARE STORED IN THE EAM SYSTEM

WFM and the RealWear HMT-1: Hands Free Work in the Field

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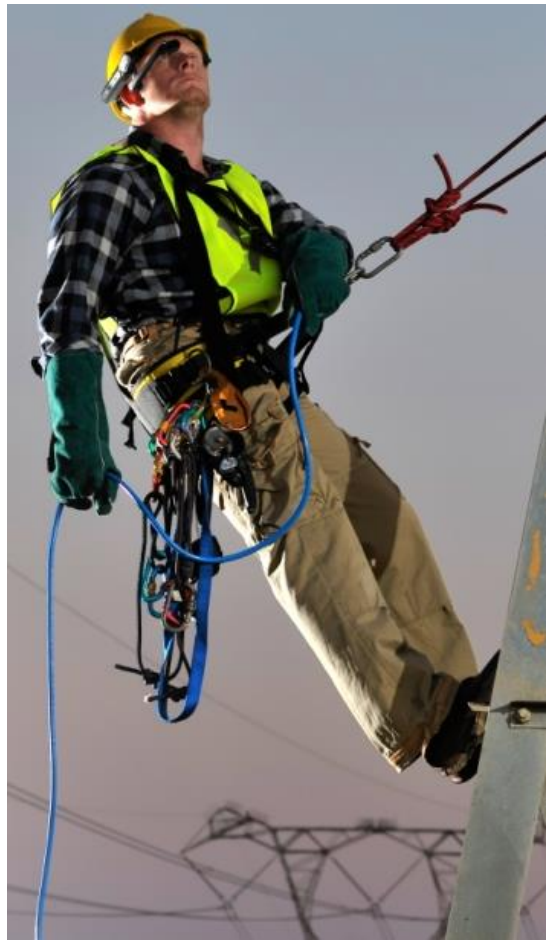
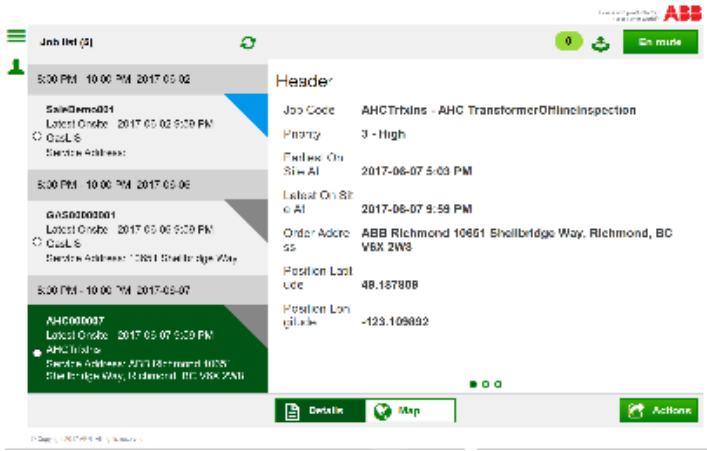
Use Cases



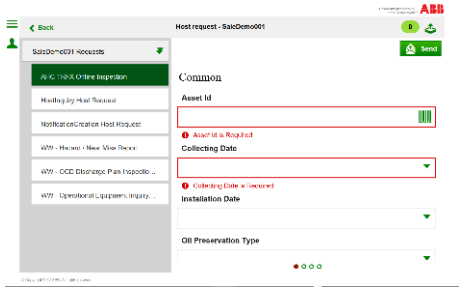
Today → **Coming in 2H 2018**

Remote Mentoring/Collaboration

View Order Details

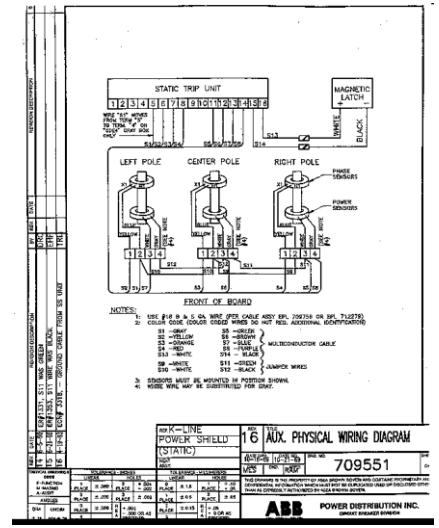


Form Completion



Chatbot Order Creation

View Schematics



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1 **Digitalization**
General Overview

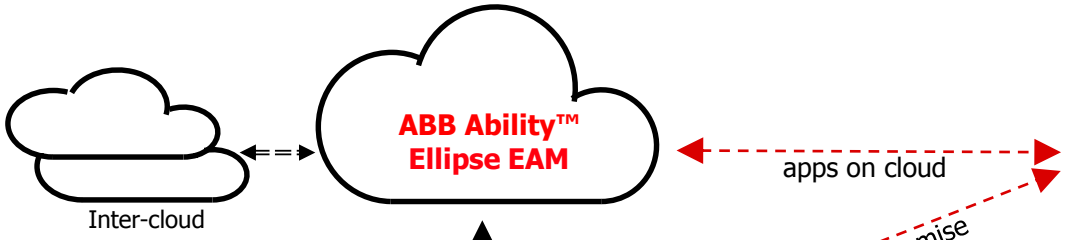
2 **Control System**
ABB Ability™ MOM

3 **Asset Management**
ABB Ability™ Ellipse CALM Overview

4 **Live Demo**

©ABB

Live Demo Scenario



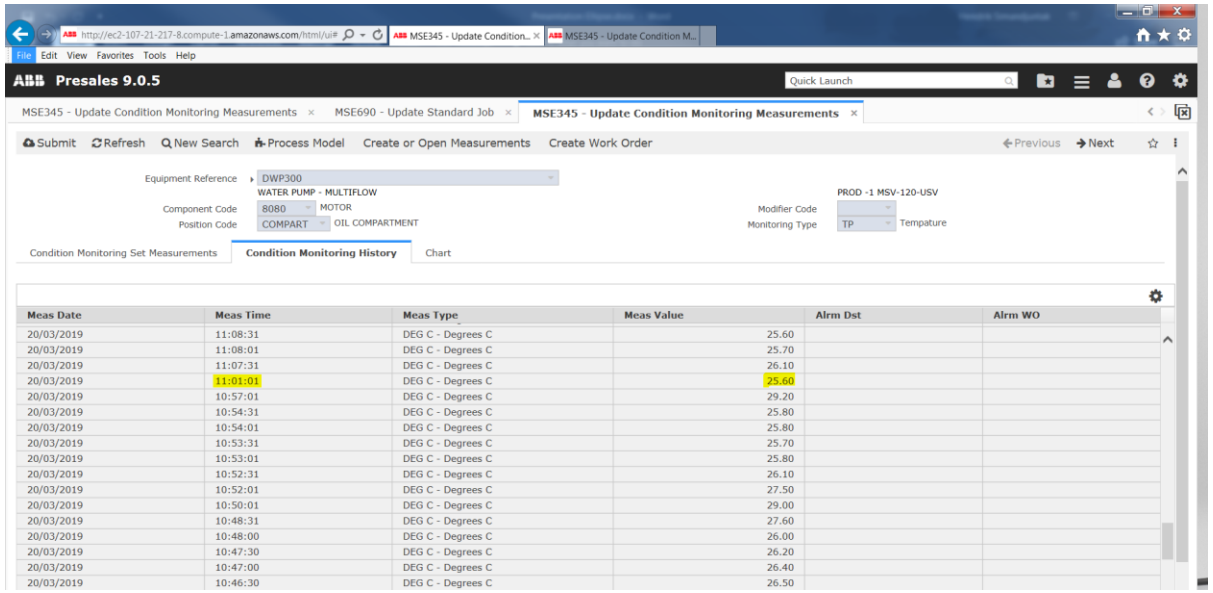
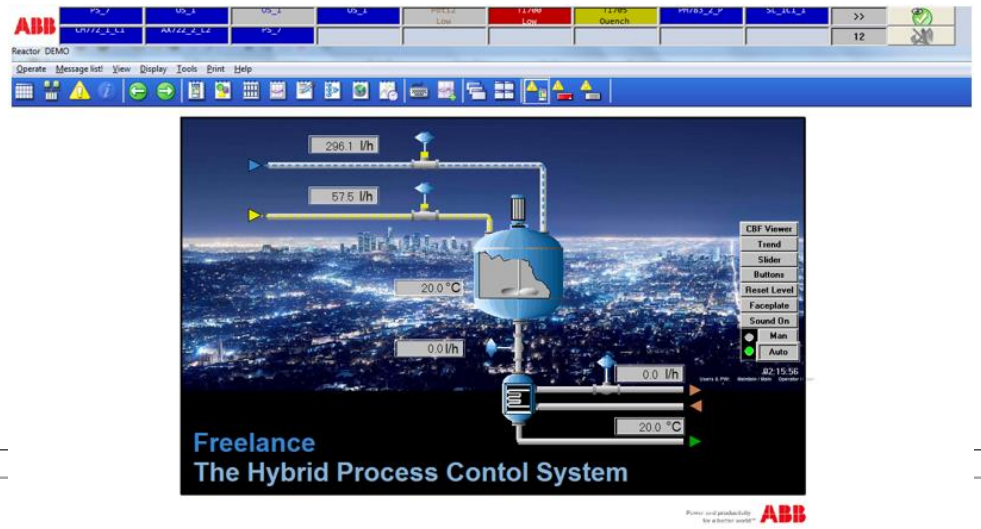


ABB Freelance



OPC DB

Results | Messages

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40	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25.3	2019-03-20 10:58:31.100	192	SUCCESS
41	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25.3	2019-03-20 10:59:01.107	192	SUCCESS
42	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	24.9	2019-03-20 10:59:31.107	192	SUCCESS
43	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	24.6	2019-03-20 11:00:01.110	192	SUCCESS
44	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25	2019-03-20 11:00:31.117	192	SUCCESS
45	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25.6	2019-03-20 11:01:01.120	192	SUCCESS
46	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	24.4	2019-03-20 11:01:31.123	192	SUCCESS
47	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25.2	2019-03-20 11:02:01.133	192	SUCCESS
48	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25.1	2019-03-20 11:02:31.137	192	SUCCESS
49	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	25	2019-03-20 11:03:01.137	192	SUCCESS
50	2...	ABB OPC.ABB Freelance 700F.PS_7.Temp721	0	24.8	2019-03-20 11:03:31.147	192	SUCCESS

Query executed successfully. | ID-L-7000943\SQLEXPRESS (12... | ellipse (56) | DemoDB | 00:00:00 | 84 rows

ABB