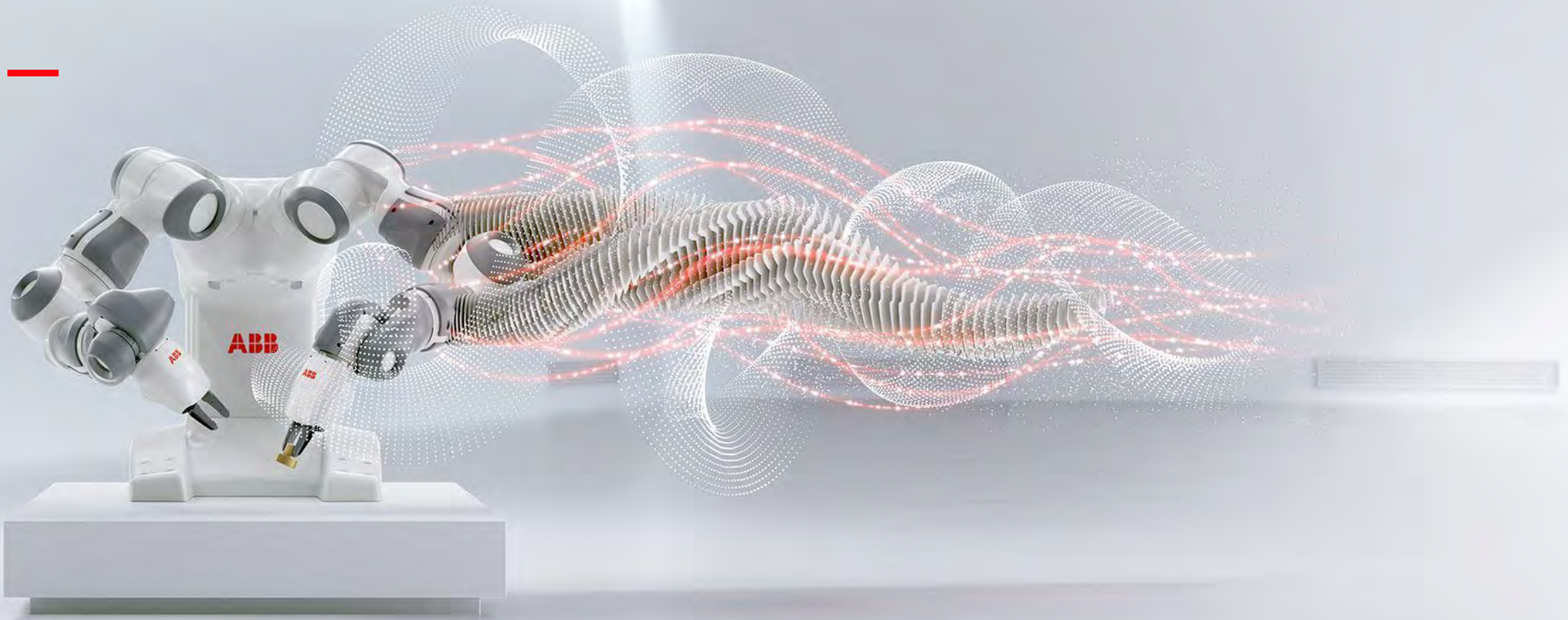


12 SEPT 2017

ABB Ability™ Collaborative Operations

Technical Focus Group, Energy & Environmental Committee Meeting

Rinol K. Pereira, Product Sales Manager, ABB

Unlocking the ABB potential in digital

ABB Ability™: industry-leading digital solutions built on a common set of standard technologies

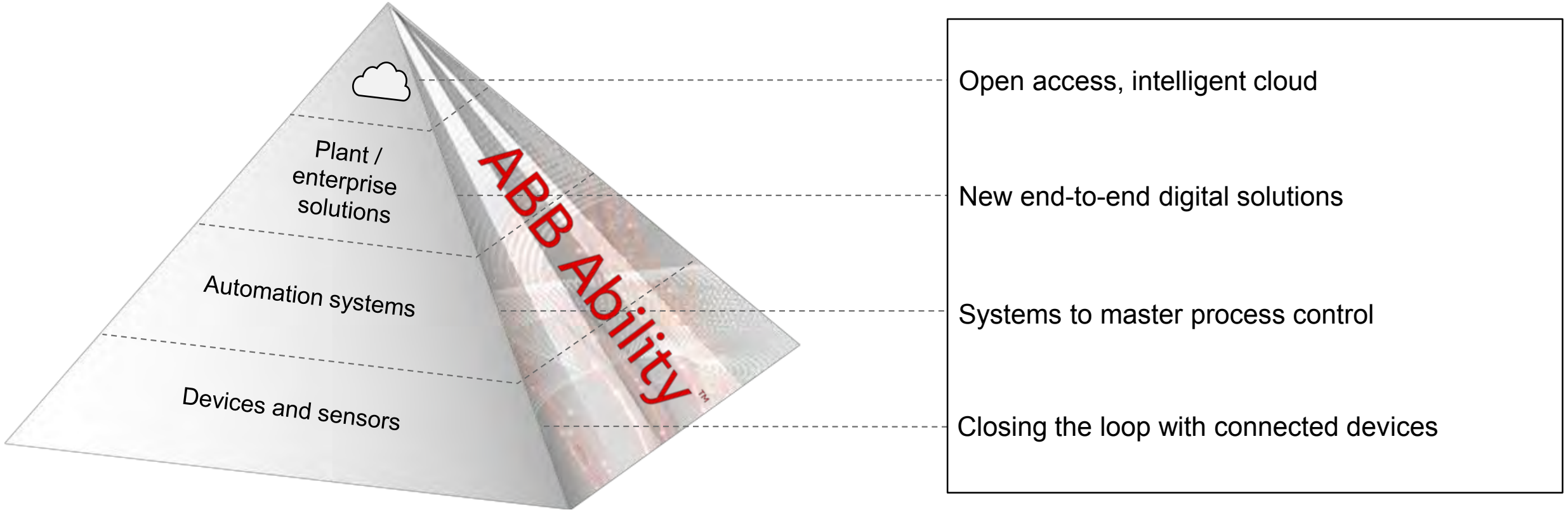
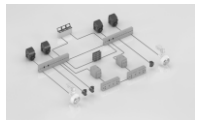


ABB Ability™ Collaborative Operations

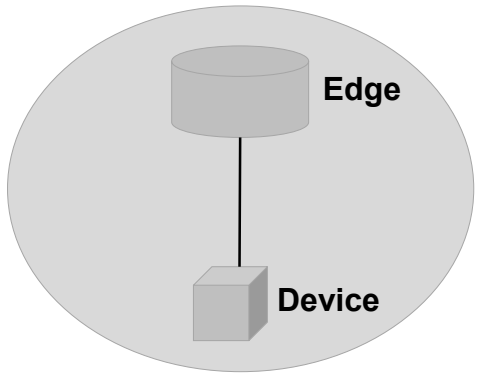
Digitalization is part of our vision for the future

	2010	2015	2020	2025	2030
	Isolated Operations	Connected Operations	**Collaborative Operations**	Remote Operations	Autonomous Operations
Services		On-Call Services	Remote Diagnostics & Digital Twin	Prescriptive maintenance & Analytics	Automated services
Connectivity, Software & Shore-Automation		Connectivity	Cloud	Remote operation	Remote Supervision
On-Board Automation		Onboard sensors & servers	Integrated Systems	Intelligent Devices	Automated Control
Propulsion & Power		Connected Machinery	Energy Storage	Electric Ships	Fuel Cells and Alternative Energy Sources

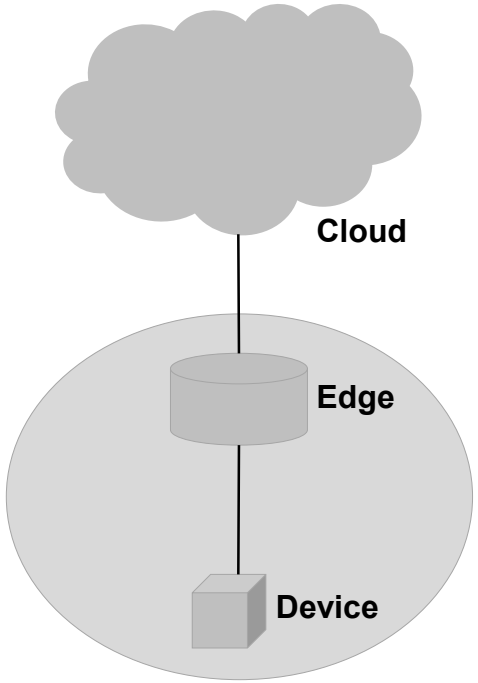
Leveraging the ABB Ability™ platform

On-premise, in the cloud, and in an ecosystem

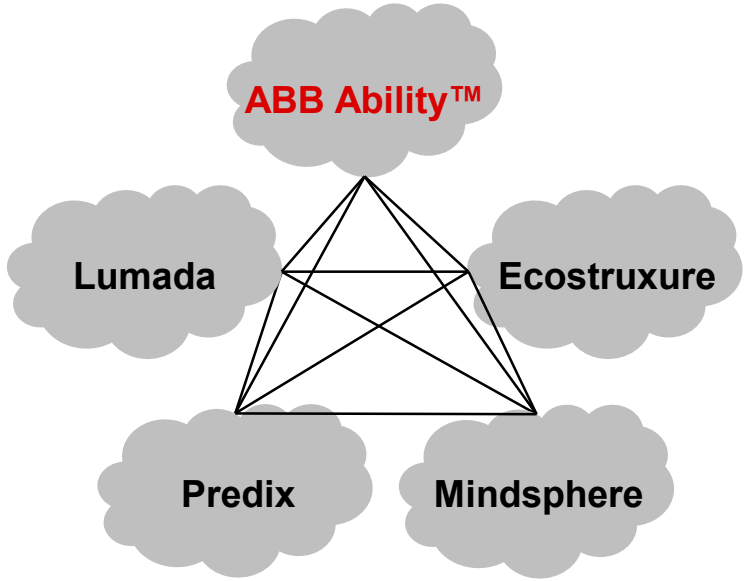
Fog



Cloud



Intercloud



Transforming the way we work with customers during operations

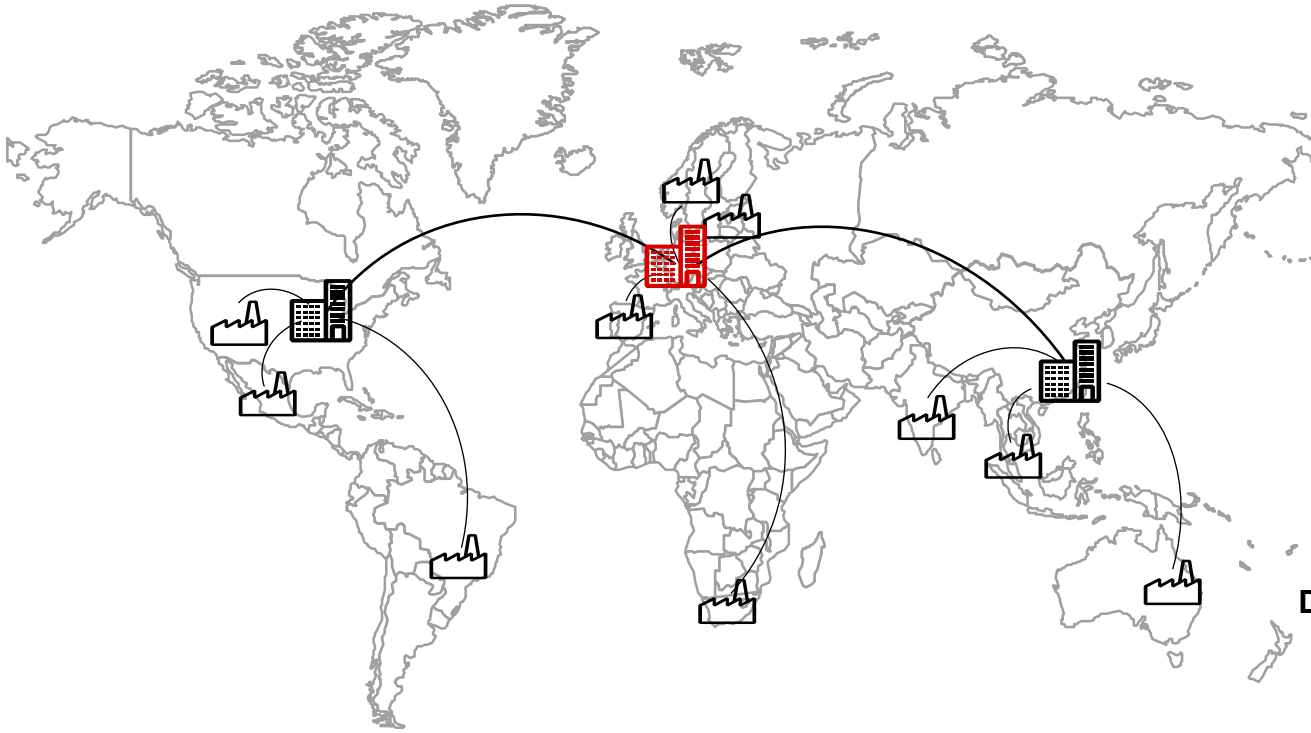
Customers collaborate with ABB domain experts 24/7

ABB Ability™ Collaborative Operations

Leading solutions portfolio for Collaborative Operations

ABB Ability™ Collaborative Operations partner for your enterprise

Competitive offering for all enterprise levels

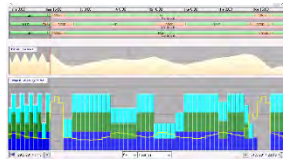


HQ

- With ABB Ability **Analytics and Visualization** Services the plant and enterprise status, KPI dashboards and other essential performance metrics is calculated and visualized automatically and in real-time

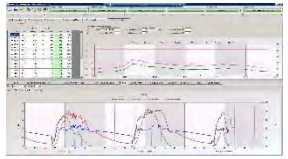
Ops. HQ

- Advanced analytics and expert support e.g. for **energy optimization** in your operations
- Energy production optimization based on production needs and energy prices to optimize profits



MES

- **Performance optimization** based on continuously collected data analyzed by special tools and experts
- 30% reduction in opex and improved safety due to increased transparency and real-time decision-making



DCS/SCADA

- Continuous access to **operative support** from world-class experts with best tools available
- Annual operational savings of $5 million and up to 50% energy savings in an underground mine

Device

- **Condition monitoring** of critical assets like automation system, drives, motors, electrical distribution and generation, valves and actuators for ABB and non-ABB assets

ABB Ability™ Collaborative Operations

Results across industries

Compelling numbers from early adopters

Average $350,000 savings per vessel

– in a marine fleet through optimized fuel management, as well as a 20% reduction in maintenance costs

30% reduction in operational expenditures

– and improved safety at an offshore platform in the North Sea, due to improved operating risk transparency and real-time decision-making

55% maintenance reduction at a fine paper mill

– as well as improved process availability and throughput by deploying digital service tools to guide engineers on maintenance procedures

Annual operational savings of $5 million

– and up to 50% energy savings by using digital technologies to unite previously segregated islands of information in an underground mine

ABB Ability™ Collaborative Operations

Ability™ IoT Stack. Modular digital Solutions. Digital Service Delivery centers for professionalism.

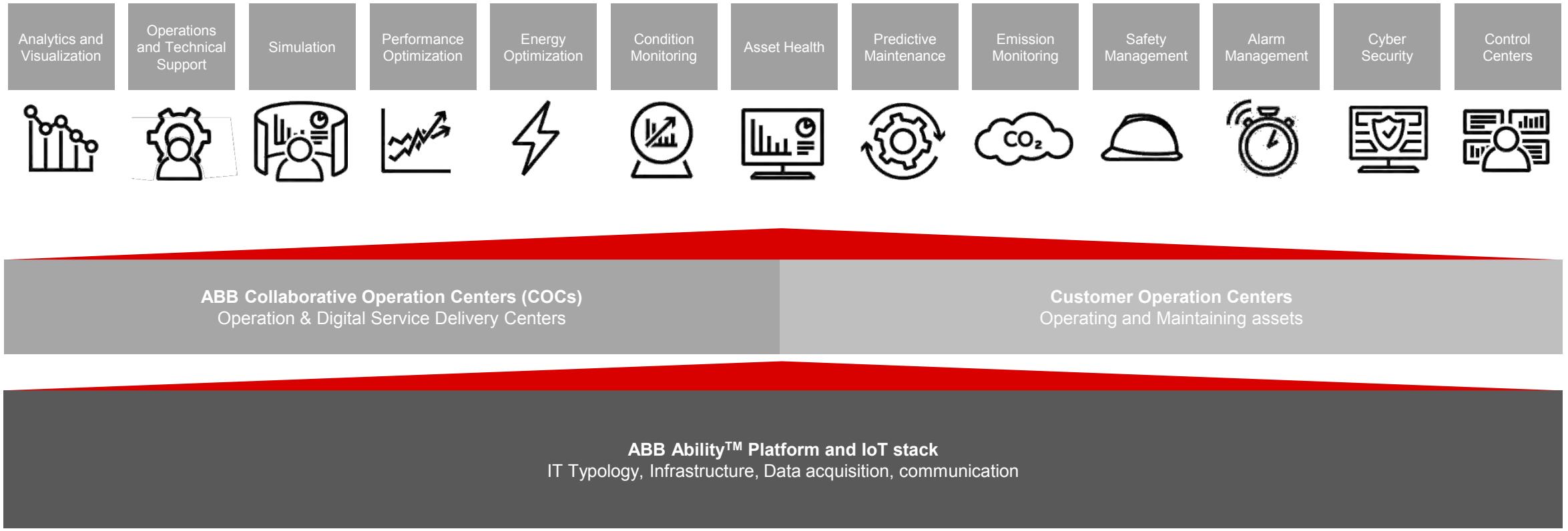


ABB Ability™ Collaborative Operations

Analytics and Visualization – ABB and Microsoft Partnership

Analytics and Visualization

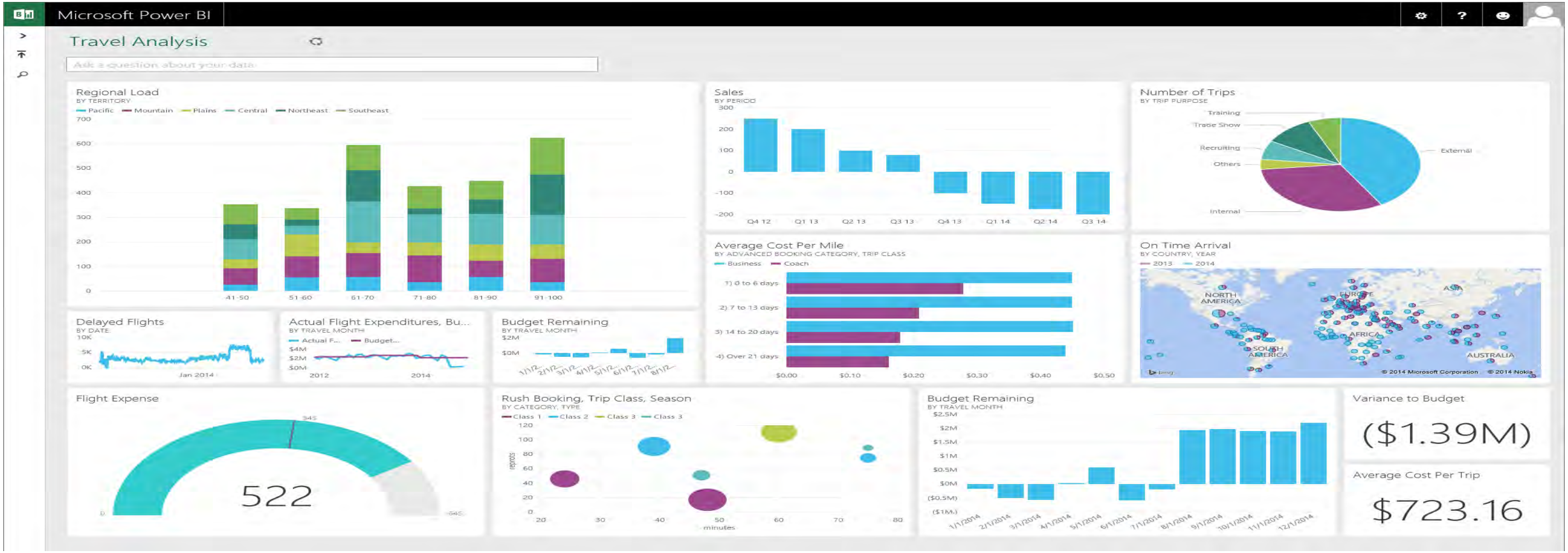


ABB Ability™ Collaborative Operations

Analytics and Visualization

Analytics and Visualization

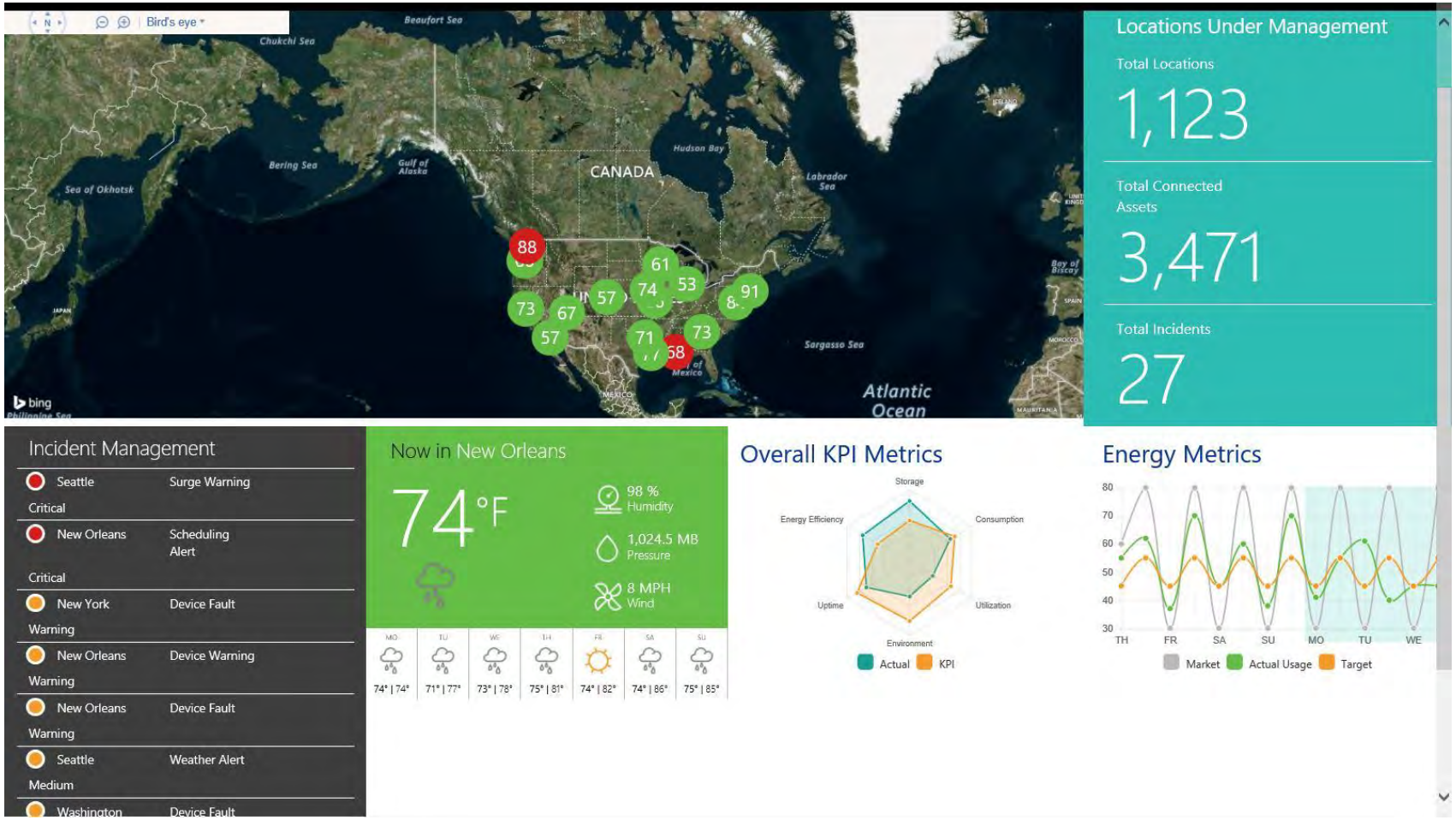


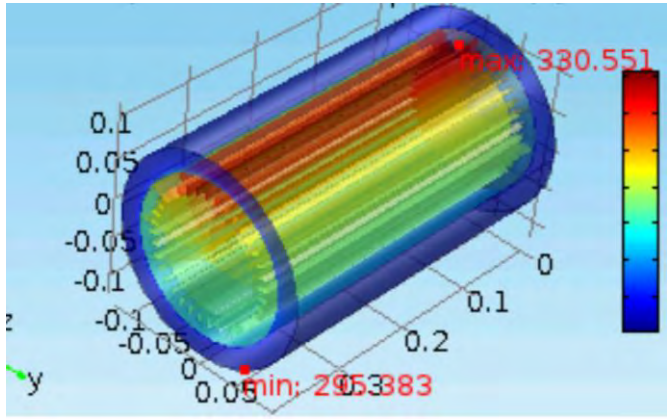
ABB Ability™ Collaborative Operations

Digital Twin – analyzing asset operation to improve performance and life

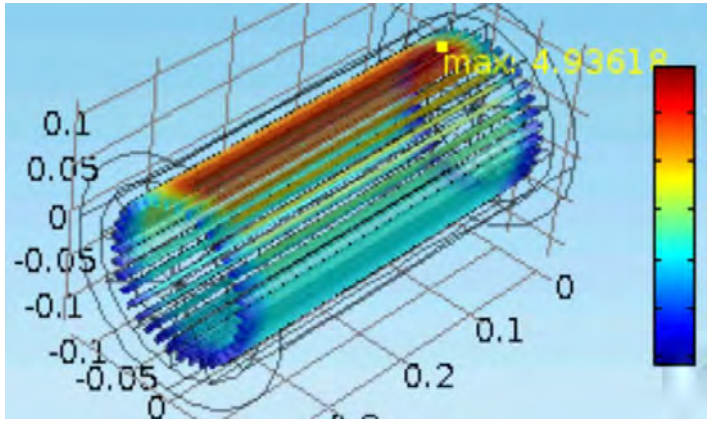
Simulation

Physical

Digital - Thermal Twin



Digital - Structural Twin



- **Digital Twin:** Capable of evaluating structural/thermal condition.
- Comprehensive *3 dimensional analysis* for defect diagnosis. e.g.
  - Thermal penalty
  - Structural effects
  - Electromagnetic field

ABB Ability™ Collaborative Operations

Chemicals customer case study

Performance Optimization

Trinseo, Global Installations, Global collaborative production

Customer's Situation: Faced with aging infrastructure, tight O&M budgets and manual interaction between shop floor and ERP. Looking to maintain competitive edge and increase production efficiency by having the right information at the right time to the right people.

ABB's Solution: Our collaborative operations environment enabling IT/OT integration which allows optimization of production across the globe, at the same time lowering the cost of ownership. Over 30 sites around the globe with a total of 100,000 I/Os are integrated with production management and business processes & systems.

Outcome: A modern collaborative infrastructure with a low cost of ownership that supports integration of IT/OT. This provides increased real-time visibility to global production while minimizing manual interaction to adapt to the changes in business environment.

Improved productivity, increased visibility with enhanced remote operations

ABB Ability™ Collaborative Operations

Energy optimization

Energy Optimization

Buy/Sell Optimization

Energy consumption optimization of large consumers (TMP) as well as energy production based on production needs and energy prices to optimize profits

- Demand forecasting
- Consumption scheduling
- Buy/sell optimization of varying power producers.

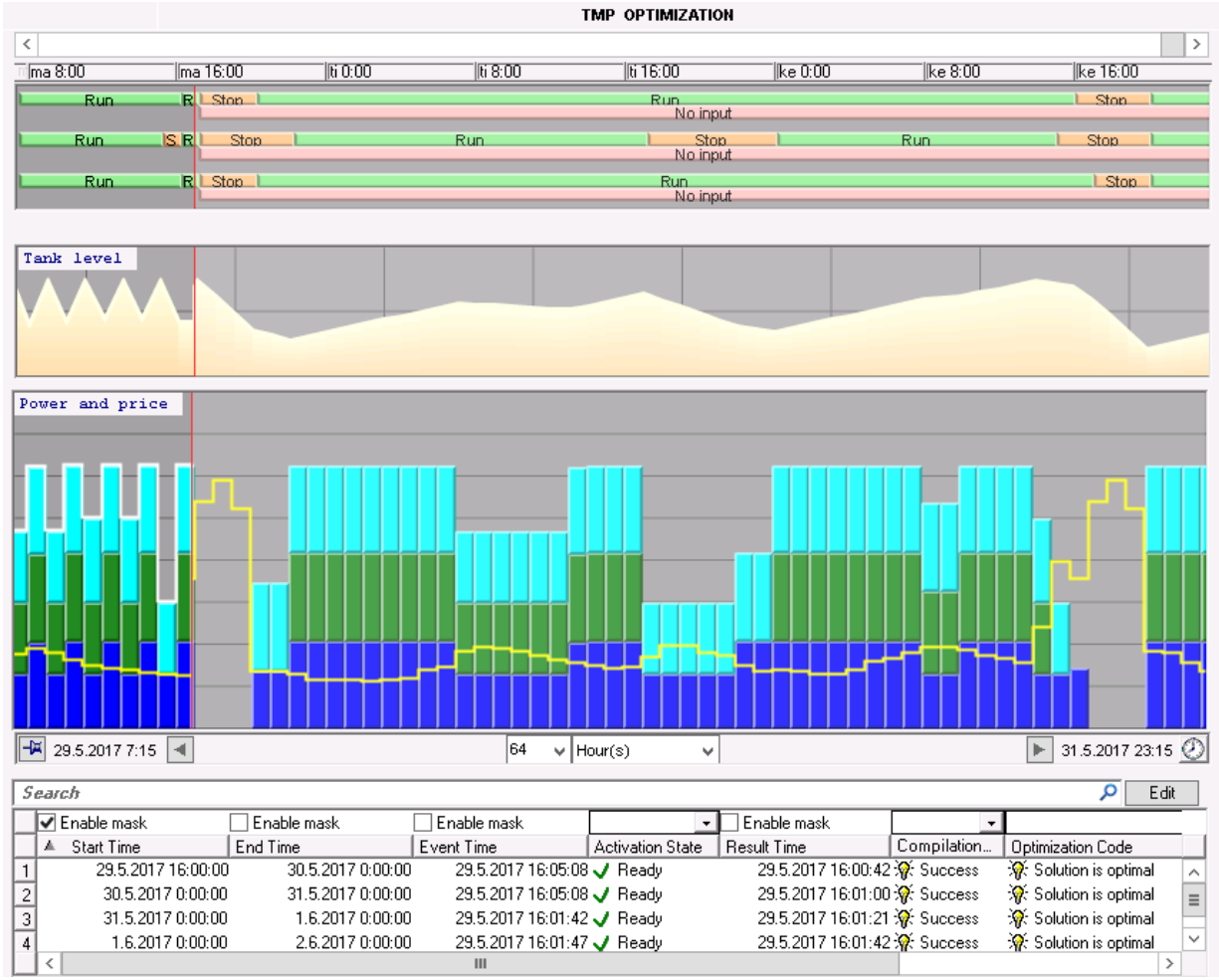


ABB Ability™ Collaborative Operations

Condition monitoring

Condition Monitoring

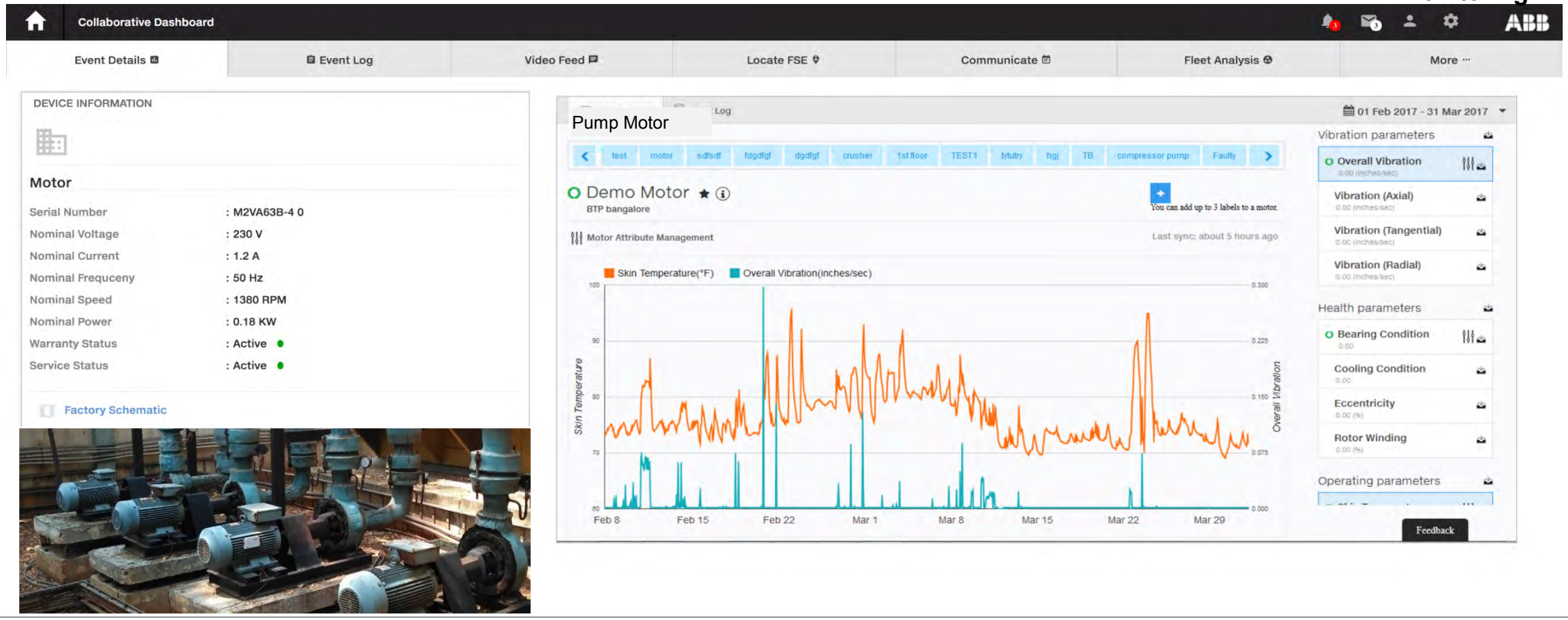


ABB Ability™ Collaborative Operations

Power Generation customer case study

Asset Health

DTE Energy, USA

Customer Situation: This diversified energy development and management company that provides electric and gas services to more than three million customers agreed to perform remote enabled health assessments on all of their control systems.

ABB's Solution: ABB provided health assessments for their control systems and cyber security system.

Outcome: Diagnostic audits detected potential system vulnerabilities before they could affect production. Having ABB engineers conduct the audit allowed system engineers on site to focus on analytical work.

Assesses system health remotely, uncovers vulnerabilities, improves personnel productivity

ABB Ability™ Collaborative Operations

Predictive Maintenance

Predictive Maintenance

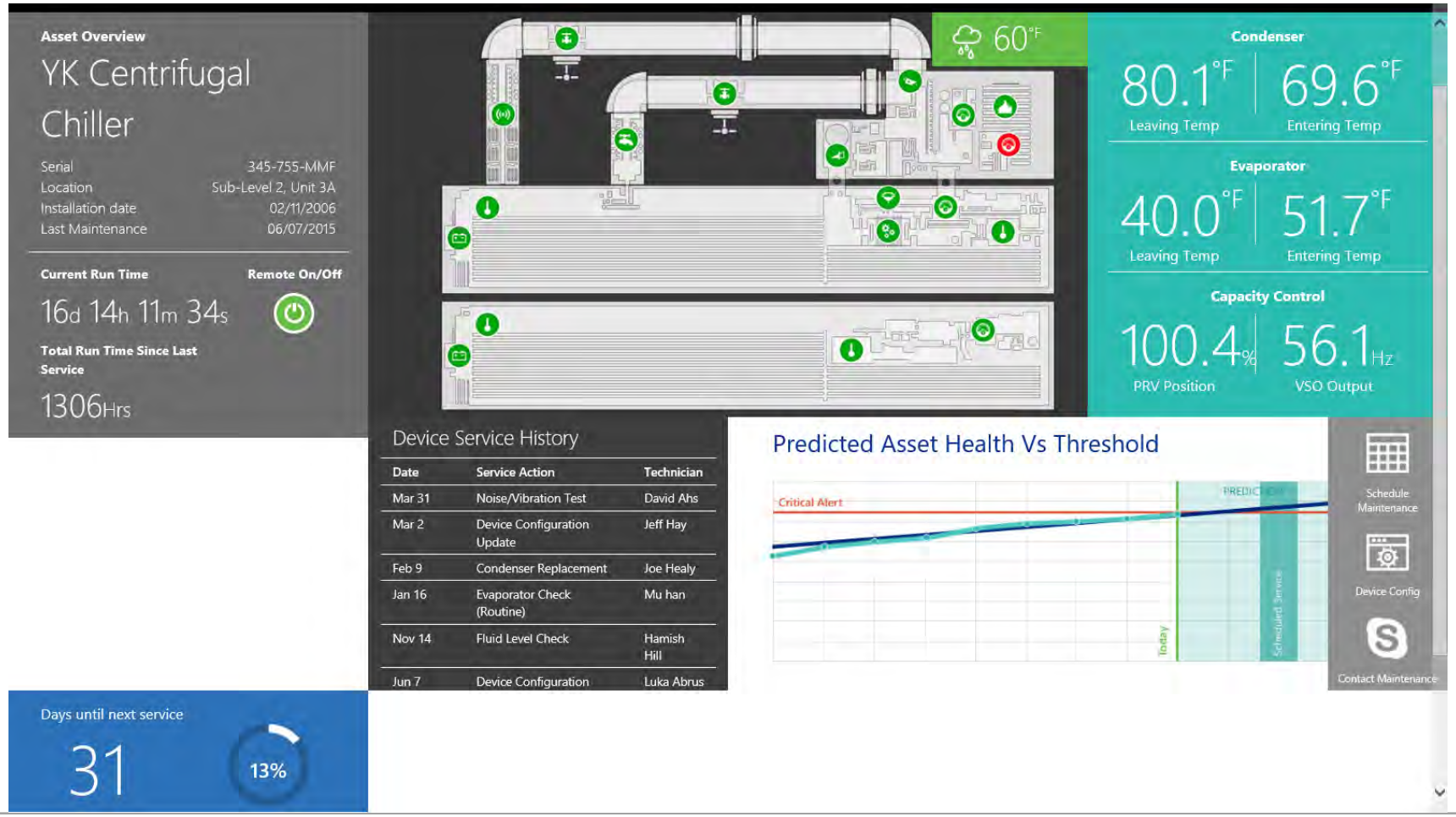
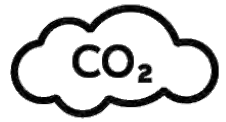


ABB Ability™ Collaborative Operations

Emission monitoring



Emission Monitoring

Description

Increasingly more stringent requirements on pollution sets high demands on the operations - to reduce emissions, while at the same time reduce fuel costs. In addition, the regulatory reporting needs to be accurate in order to retain operational permits.

With ABB Ability Emission monitoring services, real-time information based on measurements or analytics from secondary measurements is used to ensure compliance as well as for optimization of e.g. the fuel mix.

Features

Physical measurements and soft sensors based on analytics from secondary measurements to measure emissions

Automated reporting

Used for process optimization through e.g. APC's

Benefits

Regulatory compliance

Reduced work for reporting

Optimized fuel usage

Prerequisites

ABB Ability infrastructure and ABB Collaborative Operations implemented

ABB Ability™ Collaborative Operations

Safety Management

Safety Management

Description

Safety Instrumented Systems (SISs) are applied in many industries to protect against hazards to personnel, the environment and equipment.

Before a plant can secure a license to operate, it must demonstrate compliance to SIS best practices, generally considered as following IEC 61511.

ABB Ability Safety Management services helps you better manage your safety systems throughout the life of your facilities in compliance with the standards. It can increase productivity, reduce maintenance costs while also providing health status and gives decision support to ensure safety systems remain effective

Features

Demand Reporting

Bypass Management

Instrument Reliability capture

Benefits

Minimizes lost production time by faster startup following an unplanned shutdown

Reduces planned maintenance through the ability to reschedule proof tests

Helps you better manage your safety risk throughout the life of your facility

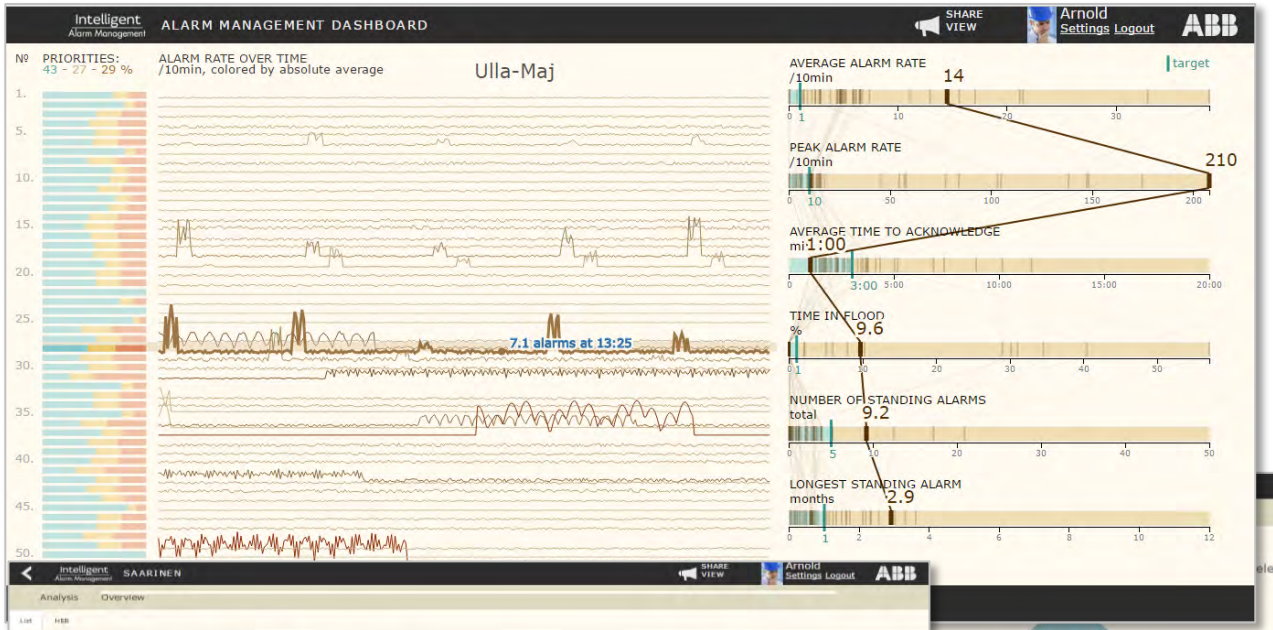
Prerequisites

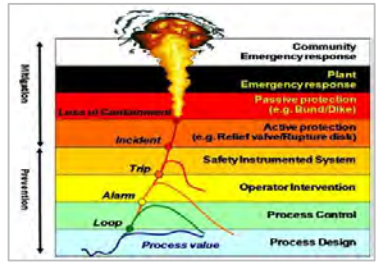
ABB Ability infrastructure and ABB Collaborative Operations implemented

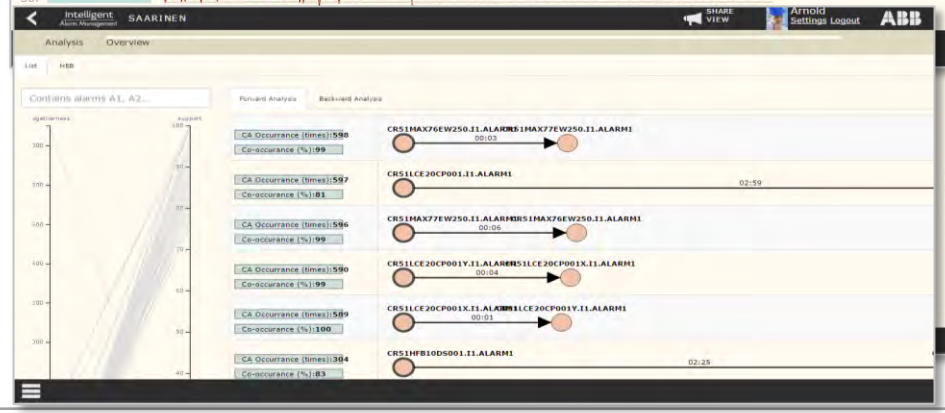
ABB Ability™ Collaborative Operations

Alarm management – Intelligent Alarm Analytics

Alarm Management







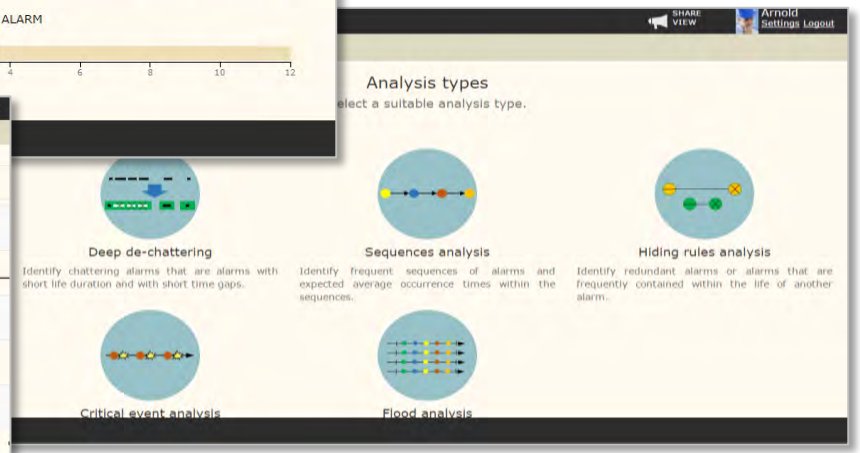
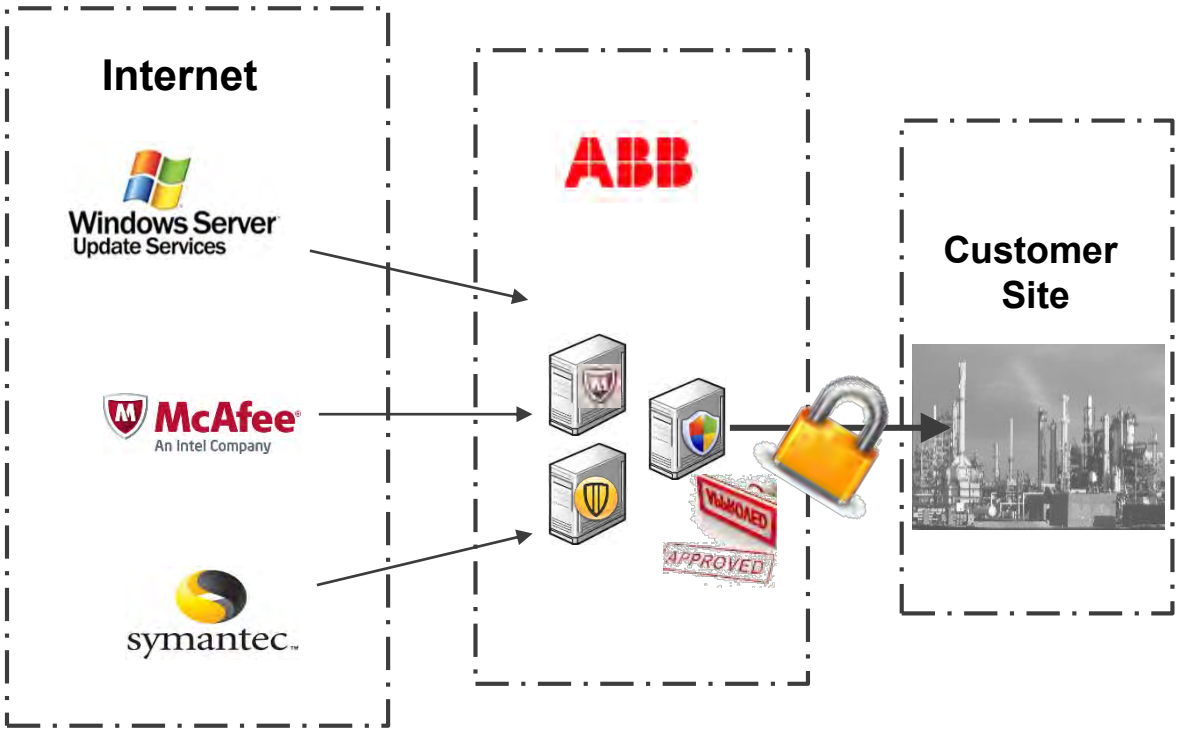


ABB Ability™ Collaborative Operations

Cyber security

Cyber Security

Description



Features

Regular identification of potential threats

Reporting of installation status

Installation of patches and virus scan updates

Benefits

The availability of the installation and the confidentiality of data is secured

Minimized risk for data loss

Prerequisites

ABB Ability infrastructure and ABB Collaborative Operations implemented

ABB Ability™ Collaborative Operations

Oil & Gas customer case study

Cyber Security

South American Oil & Gas firm

Customer Situation: This major oil and gas company sought ABB services to optimize control system life, improve control performance and protect against cyber-security intrusion.

ABB's Solution: ABB identified control system's vulnerabilities using ABB's Performance Service and Loop Performance Monitoring Service. ABB also identified areas of improvement in their cyber security strategy using ABB's Cyber Security Monitoring Service. ABB then created a customized plan that categorized and prioritized issues in their control system and cyber security strategy.

Outcome: These efforts led to increased system availability and improved cyber security.

Identifies system vulnerabilities, improves performance, increases cyber security

ABB Ability™ Collaborative Operations

Oil & Gas customer case study

Cyber Security

Middle Eastern refinery

Customer Situation: This customer wanted to ensure that comprehensive cyber security policies and procedures were applied to its process control systems.

ABB's Solution: The refinery chose ABB's Cyber Security Services to identify strengths and weaknesses of their plant's automation systems. The non-invasive service gathers data from all computers associated with the facility's control systems and key personnel, compares them to cyber security best practices, and provides recommendations on how to mitigate cyber security risks.

Outcome: Even though extensive security measures were already in place, ABB's Cyber Security Service found opportunities to improve control system security. Outdated and unnecessary software were removed and security patches for several software versions were updated.

Improves cyber security, enhances processes, increases asset availability

ABB Ability™ Collaborative Operations

Implementing a new operating model in 2017 to deliver connected expertise

ABB Ability™ Collaborative Operations

Customer engagement from leads to operations

Ability Customer Experience (ACE) Center

Accelerate solution sales and digitalization

– Staffed with business development and Design thinking experts
– Collect and understand customer needs
– Find and propose solutions matching customer needs
– Lead ABB Internal cross-BU/Division collaboration and organizational transformation

Gather customer insights, facilitate and create demand

- Customer workshops
- Design Sprints (ideation-prototyping)
- Showroom demonstrations

Collaborative Operations (CO) Centers

24/7 service operations

– Staffed with product and system specialists
– Operations center that combines information technology and operations technology experts to deliver digital solutions
– Interacts with customers and other ABB centers
– Facilities and platforms to analyze live customer product and process data across industries

Deliver and scale advanced digital services

- Continuous operations support
- Advanced services e.g. predictive maintenance
- Advisory services

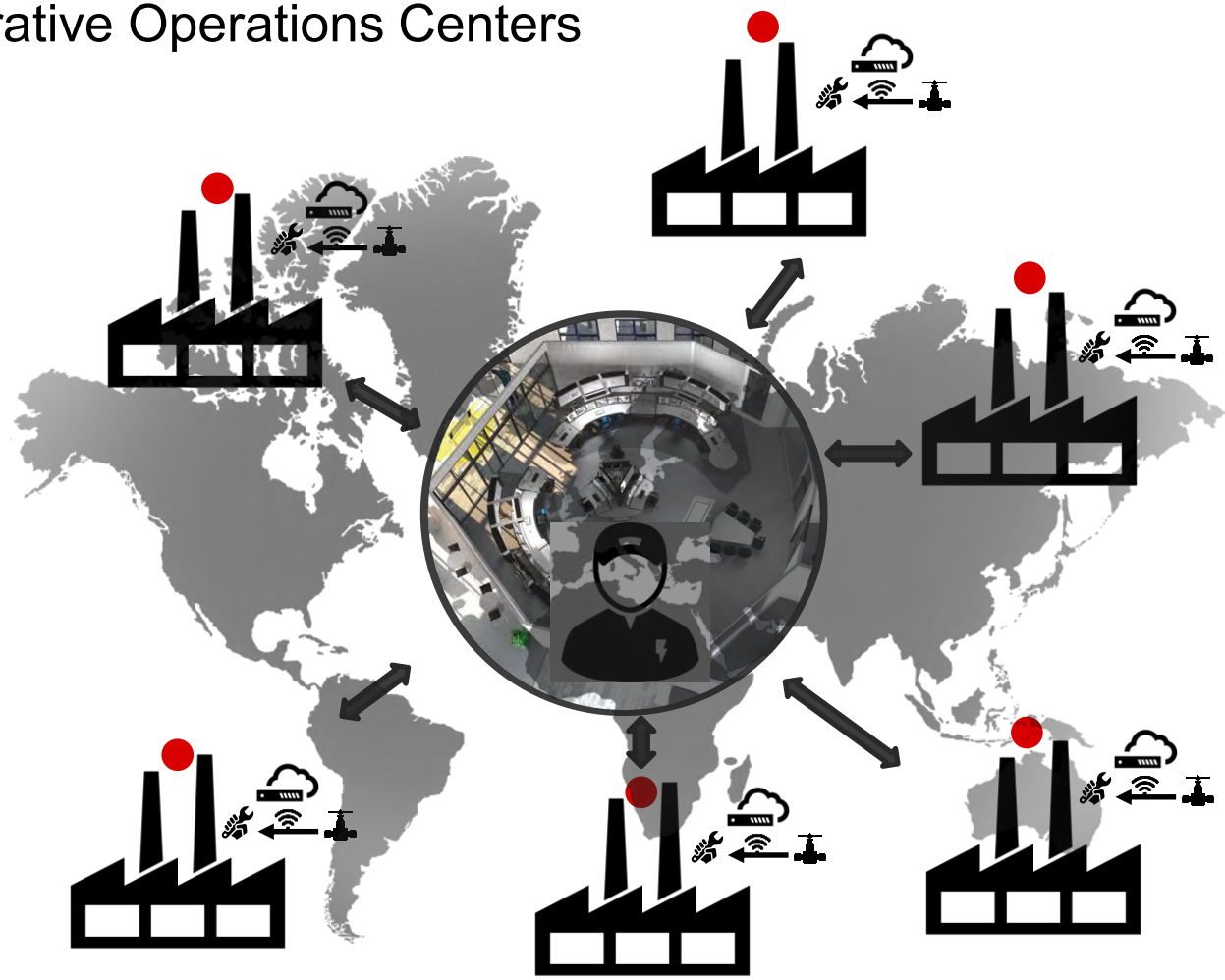
ABB Ability™ Collaborative Operations

Addressing the needs of future generation in Collaborative Operations Centers

Future control room

*"Personal ergonomics are becoming more and more important in order to improve health and well-being in the control room working environment. Human Factors involvement in the early stage of design layout is even more important in future control rooms or control centers considering the entrance of the next generation into the industrial field. We must seriously consider the needs, requirements, behaviors and values of the next generation of operators that need to be attracted to the industrial world."**

*"Previously isolated control rooms become networked control centers for the Industry 4.0 high performance work force. Work environments must support collaboration at all levels and support high performance work around the clock."***



*** Welcome to the future Control Room Working Environment (2017,** white paper written by Jeton Partini, Human Factors at CGM)

**** Process Operation 4.0, Collaborative operations in highly digitalized integrated work environments**
Martin Hollender, ABB Corporate Research Center Germany
Tone Grete Graven, ABB AS
Jeton Partini, Pierre Schäring, CGM