



DECEMBER 2018

Collaborative operations

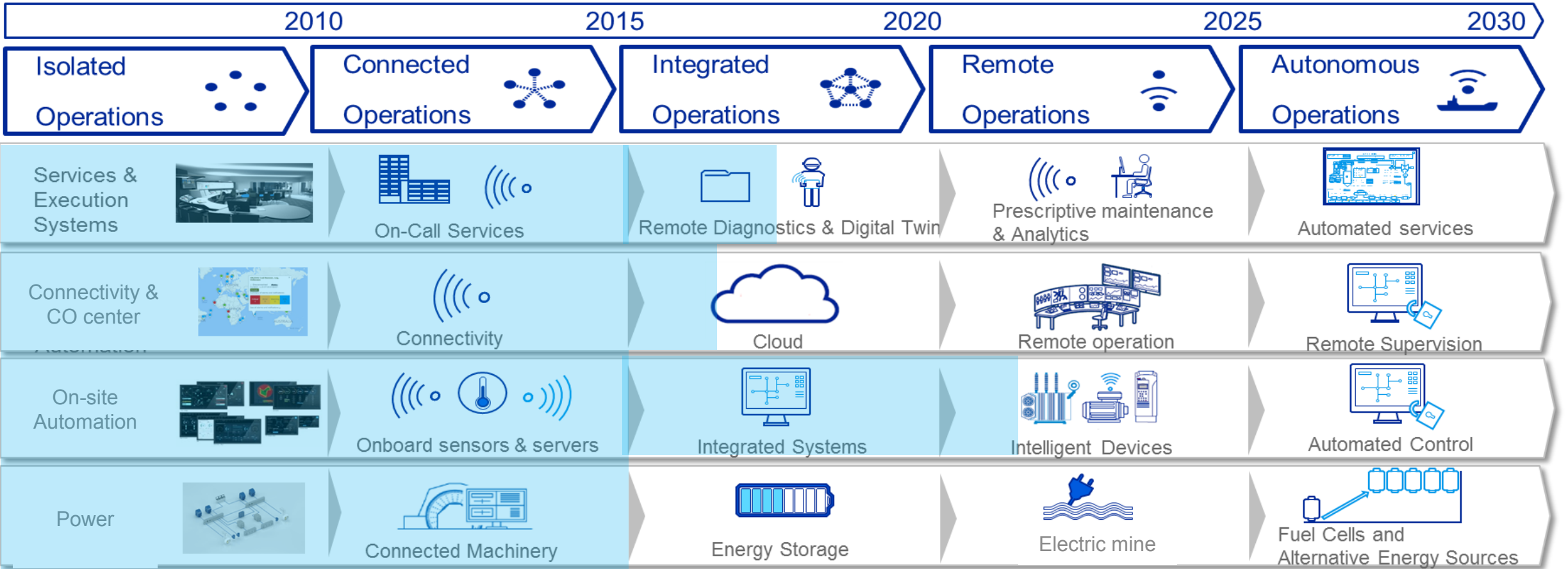
Digital transformation and its impact on mining industry

Robert Szczotka



Digital transformation

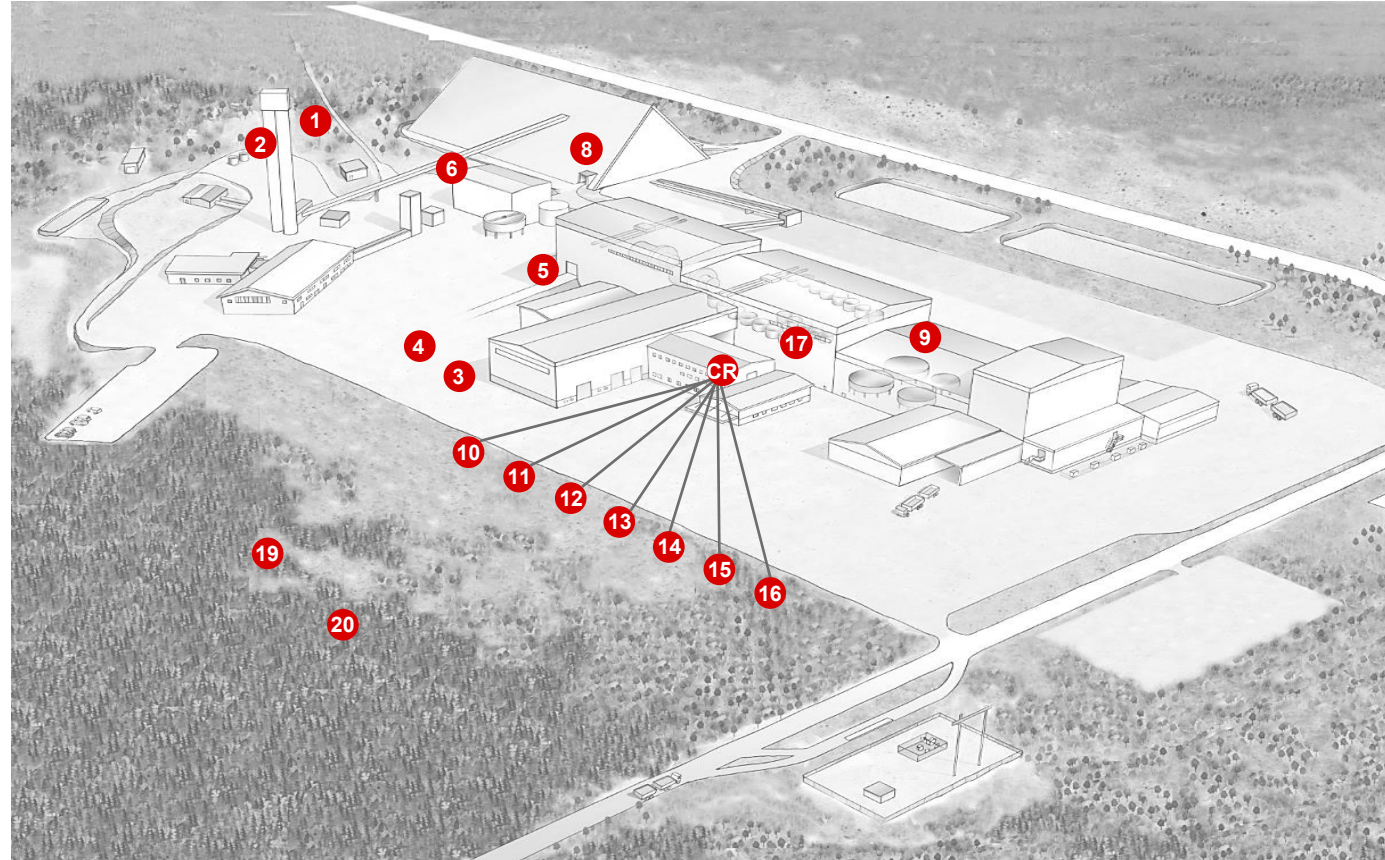
Underground mining



Boliden Mineral – Garpenberg 2.5

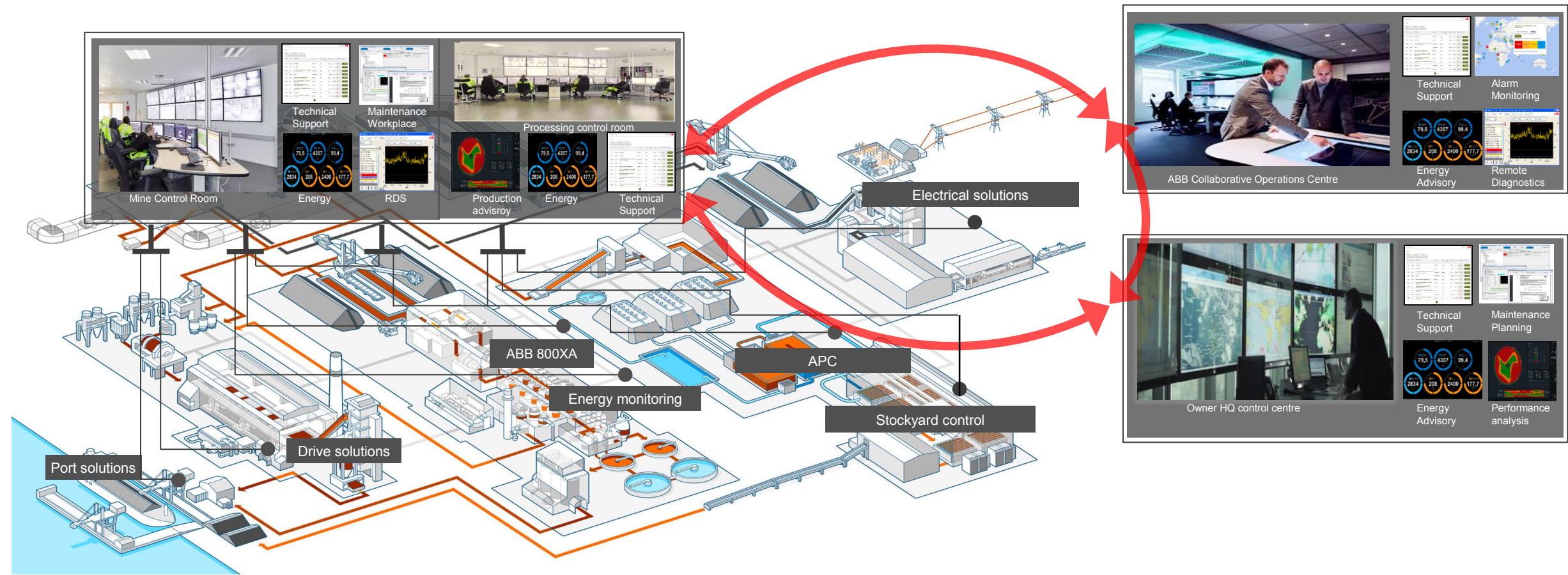
Many autonomous systems for different purposes in Garpenberg

1. Hoist machines
2. Mine ventilation
3. Dewatering and water system
4. Pressurized air system
5. Substations (LV, MV and HV)
6. Conveyors
7. Crushers
8. Ore storage (stockyard system)
9. Crushers
10. Energy monitoring
11. Power Management System (IEC61850)
12. Maintenance system
13. Document Management System
14. Stop/log reporting system
15. PA system (radio)
16. Video system
17. Facility/building automation (BAC)
18. Underground comm. network
19. Process instrumentations, positioners, valves
20. Motors & drive systems
21. Fleet management



Collaborative operations

Closing the loop

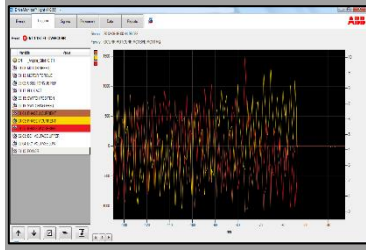


Solution offering

Solutions for availability

Availability

Remote Diagnostics



Remote Diagnostics

- Reactive and predictive
- Inform in case of failure
- Diagnose root cause
- Repair remotely
- Report

Condition Monitoring



Condition Monitoring

- Monitor critical assets
- View status of condition
- Receive alarms
- Receive reports, documents
- Optimize condition

Cyber Security



Cyber Security

- Network monitoring
- Providing safe and secure infrastructure
- Patch fixing
- Support

ARMOR Room



ARMOR room for remote support

- High security room at ABB premise
- Your room, only in your own network
- Simulate changes and safely implement
- Back-up and control in case of emergency

Solution offering

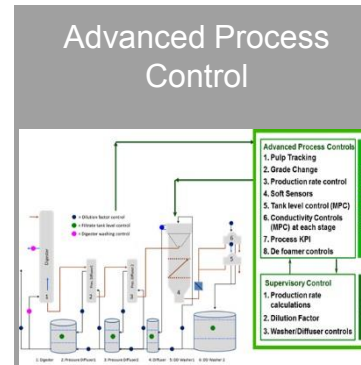
Solutions for productivity

Productivity



Performance Monitoring

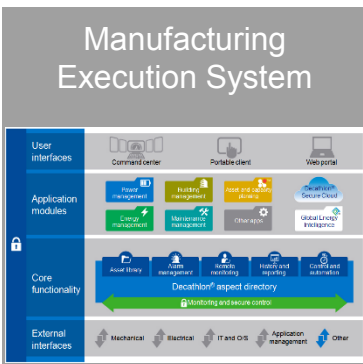
- Monitor production processes
- Identify improvements
- Implement improvements



Advanced Process Control

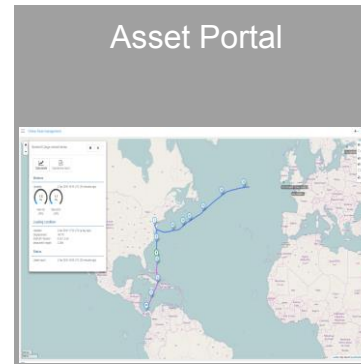
Advanced Process Control

- Monitor process
- Include data from all necessary sources
- Apply algorithms
- Implement changes



Manufacturing Execution System

- Overview of productivity
- Overview of site processes
- Visibility of production schedule
- Planning of production



Asset Portal

Asset Portal

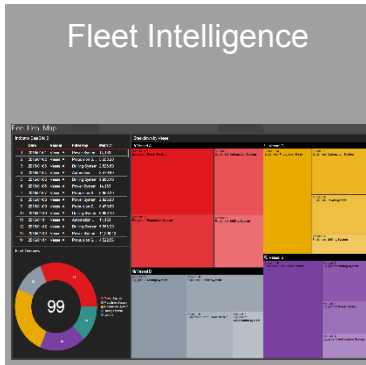
- View all assets via online portal
- View status of condition
- Receive alarms
- Create reports, documents
- Track case management information

Solution offering

Solutions for quality of operations

Quality of Operations

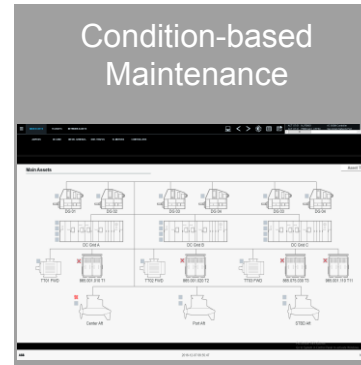
Fleet Intelligence



Fleet Intelligence

- Heatmap of all assets and their condition
- Benchmarking with other assets
- Tells which assets need attention
- Tells which employees need training
- Available as report or dashboard

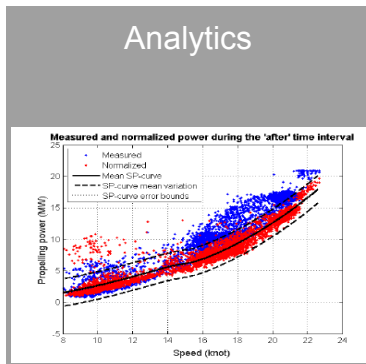
Condition-based Maintenance



Condition-based maintenance

- Digital twin
- Condition monitoring log
- Maintenance log
- Maintenance planning
- Execution

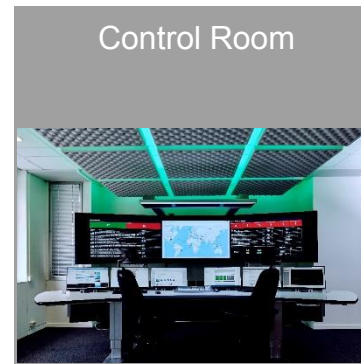
Analytics



Analytics

- Datalake
- Analytics toolkit
- Dashboards
- Custom analytics

Control Room



Control Room

- Design
- Hardware
- Software
- Integration



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Mining localization



Mine ventilation control

Three levels of function

- Basic control as remote, event, sensor and time control
- Ventilation on demand control
- Energy optimization of fans for autonomy

Use case showed 54% reduction of energy consumption and 21% reduction of heating

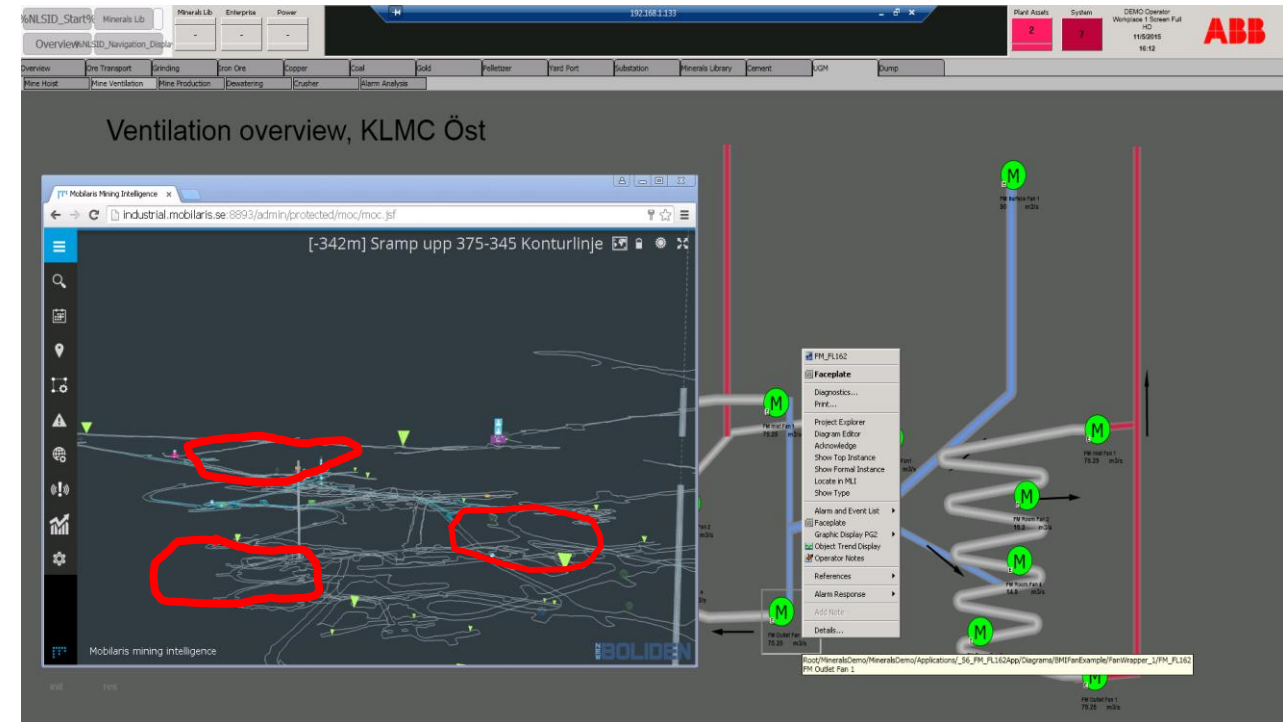
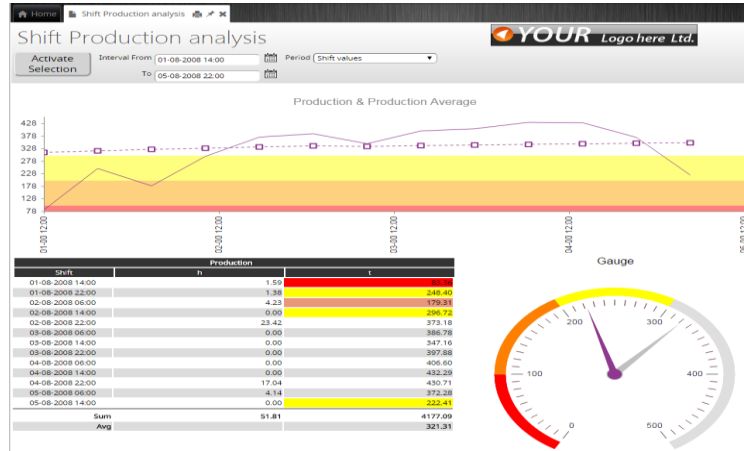


ABB MinelInsight

Execution manager - Performance monitoring



Process and production monitoring

- Calculations and data consolidation
- Multiple periods like shift, daily, weekly, monthly

KPI overview

- Throughput, actual vs. planned, productive time, efficiencies



Electrical energy cost tracking:

- Individual equipment counters
- Plant sections totals
- Plant totals

Specific energy consumption calculations per

- Production unit (eg, tons)
- Product

Robotizing

Increased automation of complex geometrical operations



ABB Ability?

ABB Ability™ : creating one common offering for digital end-to-end solutions

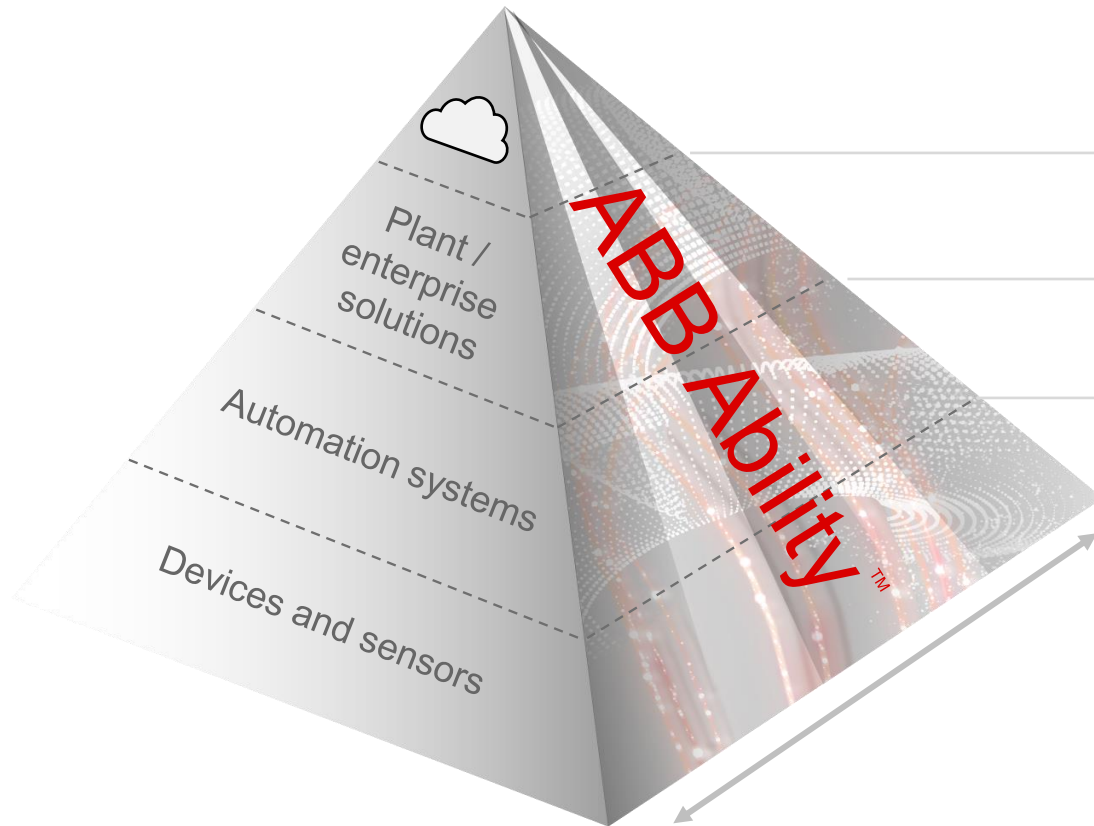


ABB Ability categories:

ABB Ability cloud platform and services:

Integrated Operations centers, Remote monitoring solutions
EV fast-charging apps

ABB Ability plant and enterprise solutions:

Mining solutions, Marine solutions, power generation solutions
Network management systems, Substations, HVDC stations

ABB Ability automation and control systems:

DCS systems: 800xA, Symphony+
Substation automation systems

ABB Ability products, devices and sensors:

Robots, motors, drives, solar converters, EV charging stations
MV breakers, LV breakers, Transformers, GIS, Generator circuit
breaker, HV breaker
Sensors, analyzers



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