
AVEVAWORLD

AVEVAWORLD

APRIL 2025

Boliden: Insights of a conveyor

Presented by:

Greger Spetz, Technical Maintenance Manager, Boliden

Jonas Kemi, Partnership and Business Development Manager, SKF

Hans Otto Weinhold, Solutions Architect Lighthouse and Early Adopter Program, AVEVA

AVEVA

A century of exploration and innovation

100

BOLIDEN 1924–2024

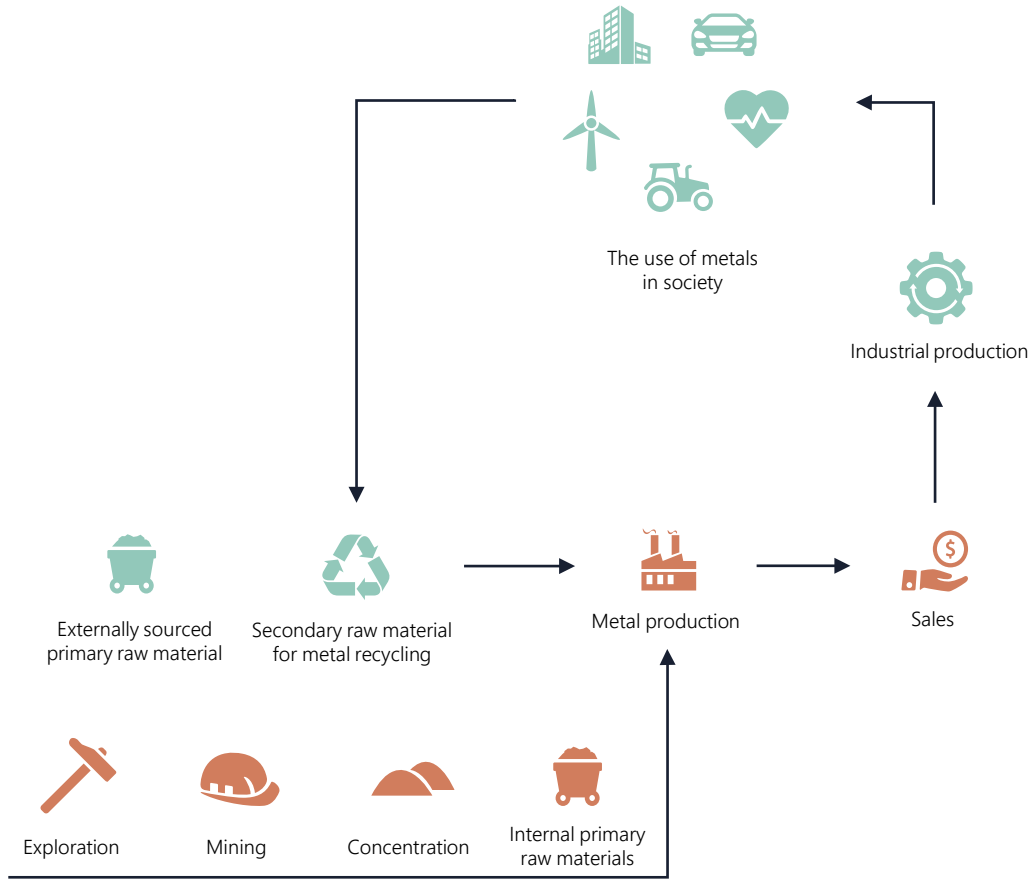
On a cold December day in 1924, gold fever struck near the village of Boliden in northern Sweden.

This marked the start of 100 years of challenging conventions while providing some of the most important building blocks for modern society.

BOLIDEN

About Boliden

- Provides metals made in Europe that are essential for the climate transition and modern society
- Conducts operations within exploration, mining, smelting and recycling
- Produces copper, zinc, nickel, lead, precious metals, tellurium as well as sulfuric acid
- Leads the industry in climate and sustainability performance
- Achieves world-class productivity through technical know-how and decentralized decision-making



Boliden in numbers

- Production of base and precious metals since 1924
- Five mining units and five smelters in Finland, Ireland Norway and Sweden
- Around 6,000 employees*
- Approximately SEK 80 billion in revenues*

* Financial year 2023

Aitik

Copper, gold and silver

The world's most productive open-pit copper mine

Large volumes and rational methods mean high productivity

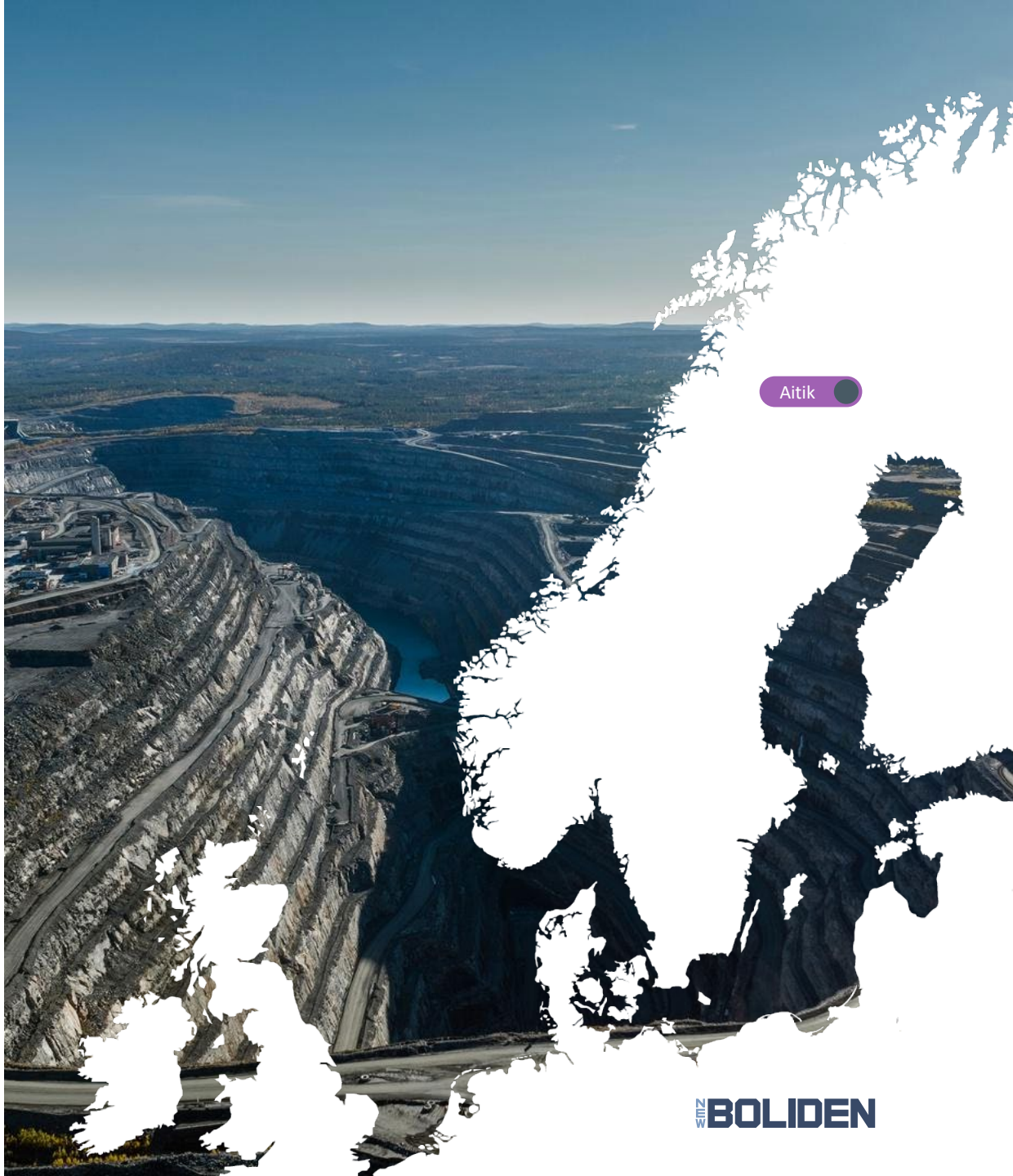
Electrification for climate-smart haulage

Milled tonnage: 40.7 Mtonnes*

Operating profit: SEK 1,419 m*

Average number of employees: 814*

* Financial year 2023



SKF

Founded in 1907

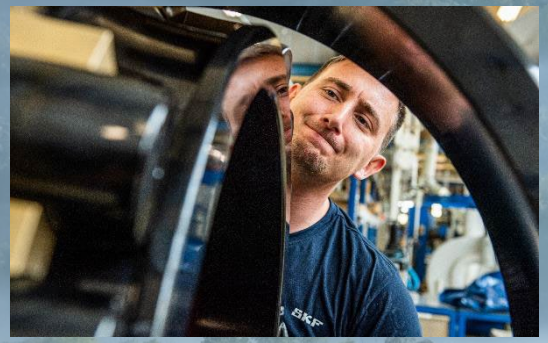
129 countries

40 000 employees

17 000 distributors

40 customer industries

Our combined offering



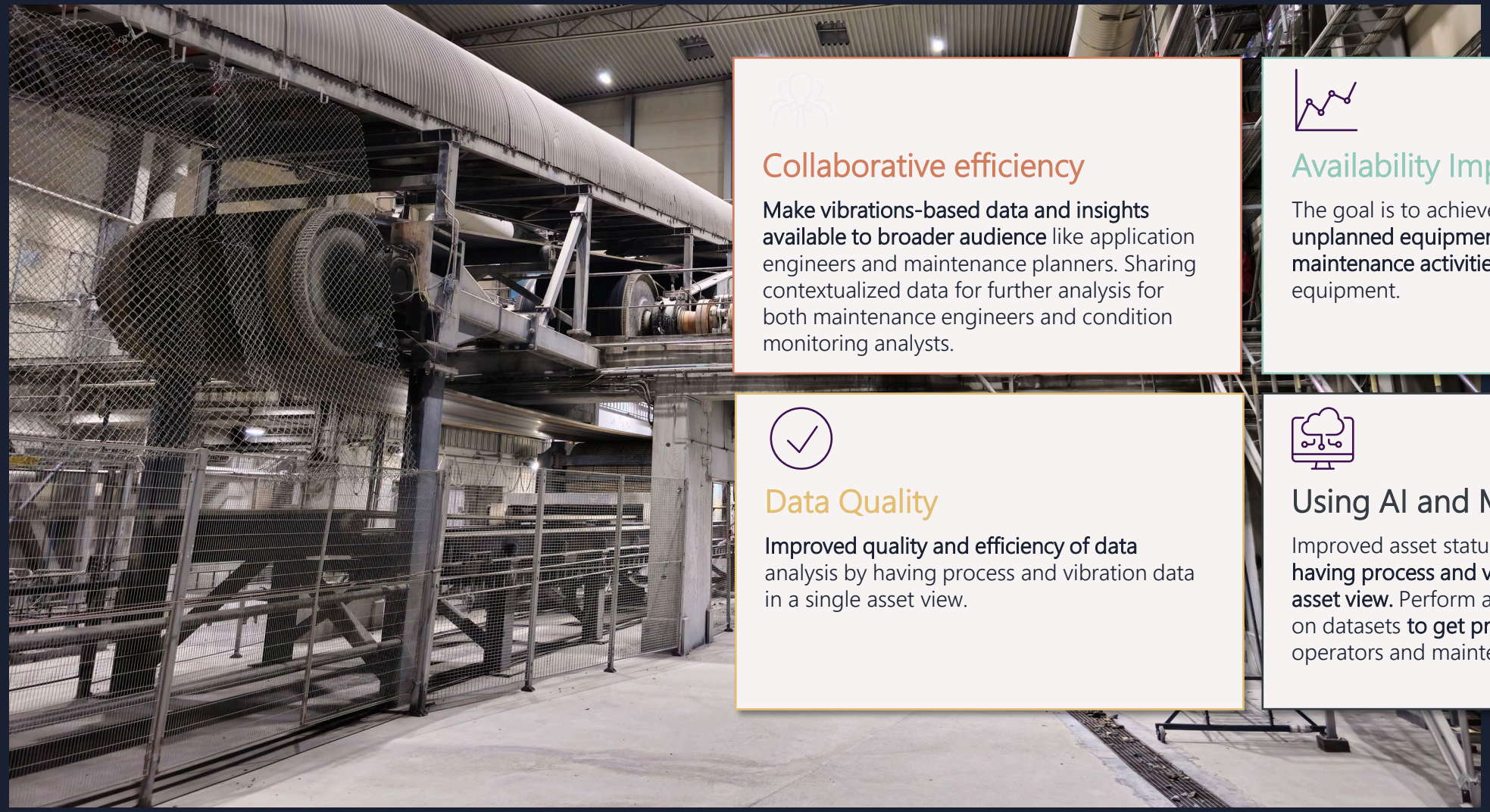
- Bearings and units
- Seals
- Lubrication
- Condition monitoring
- Services

Boliden and the Use Case

- Eliminate risks of breakdowns in the conveyor belt system.
- Critical Asset
  - Transport all ore from Mine to Concentrator
- Bearing failure
  - Direct costs
  - Indirect costs, resources, spares, logistics
  - Production disturbances
- Other unexpected happenings
  - Fire
  - Human errors

BOLIDEN

Business success objectives



Collaborative efficiency

Make vibrations-based data and insights available to broader audience like application engineers and maintenance planners. Sharing contextualized data for further analysis for both maintenance engineers and condition monitoring analysts.

Availability Improvements

The goal is to achieve a **reduction** in **unplanned equipment downtime and maintenance activities** on the critical conveyor equipment.

Data Quality

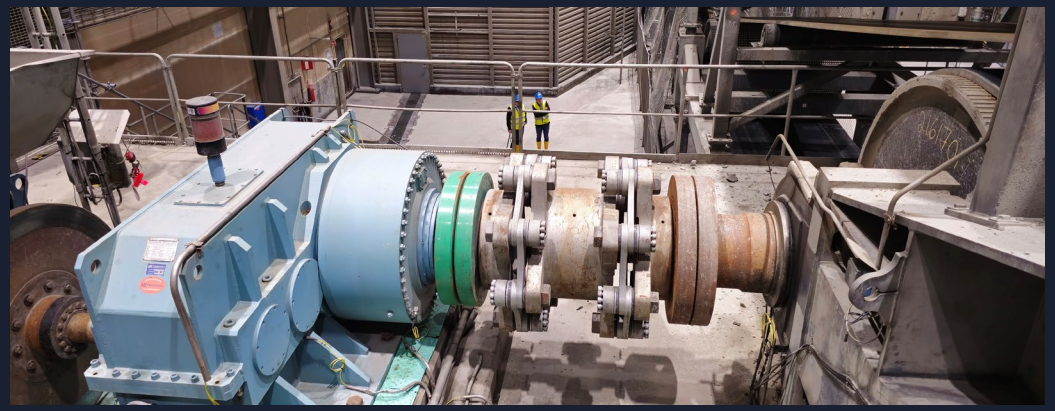
Improved quality and efficiency of data analysis by having process and vibration data in a single asset view.

Using AI and ML

Improved asset status understanding by **having process and vibration data in a single asset view.** Perform analytics using ML Models on datasets **to get pro-active alerts** to operators and maintenance technicians.

BOLIDEN

What are we talking about?



BOLIDEN

Use cases during the Lighthouse project

Use Case 1 - Collaboration enablement

1. **Combining and Contextualizing** data from BOLIDEN PI System and SKF Observer
2. **Centralizing** data in a global cloud-hosted repository to allow access for different stakeholders (BOLIDEN and SKF engineers can look at the same data at the same time)
3. **Sharing** data from Operations and Condition Monitoring between BOLIDEN and SKF
    - Make data available to from BOLIDEN PI System to SKF PI System using CDS
    - Data analytics (**AVEVA Advanced Analytics**)

Use Case 2 - Digital maintenance using AVEVA Advanced Analytics

- Using Anomaly Detection Model to track equipment performance and vibration data anomalies

Use Case 2a – Gain Insights

- Enable BOLIDEN and SKF experts to better collaborate on a regular basis

Success criteria

Rapid Data Integration from On-Premise to Cloud

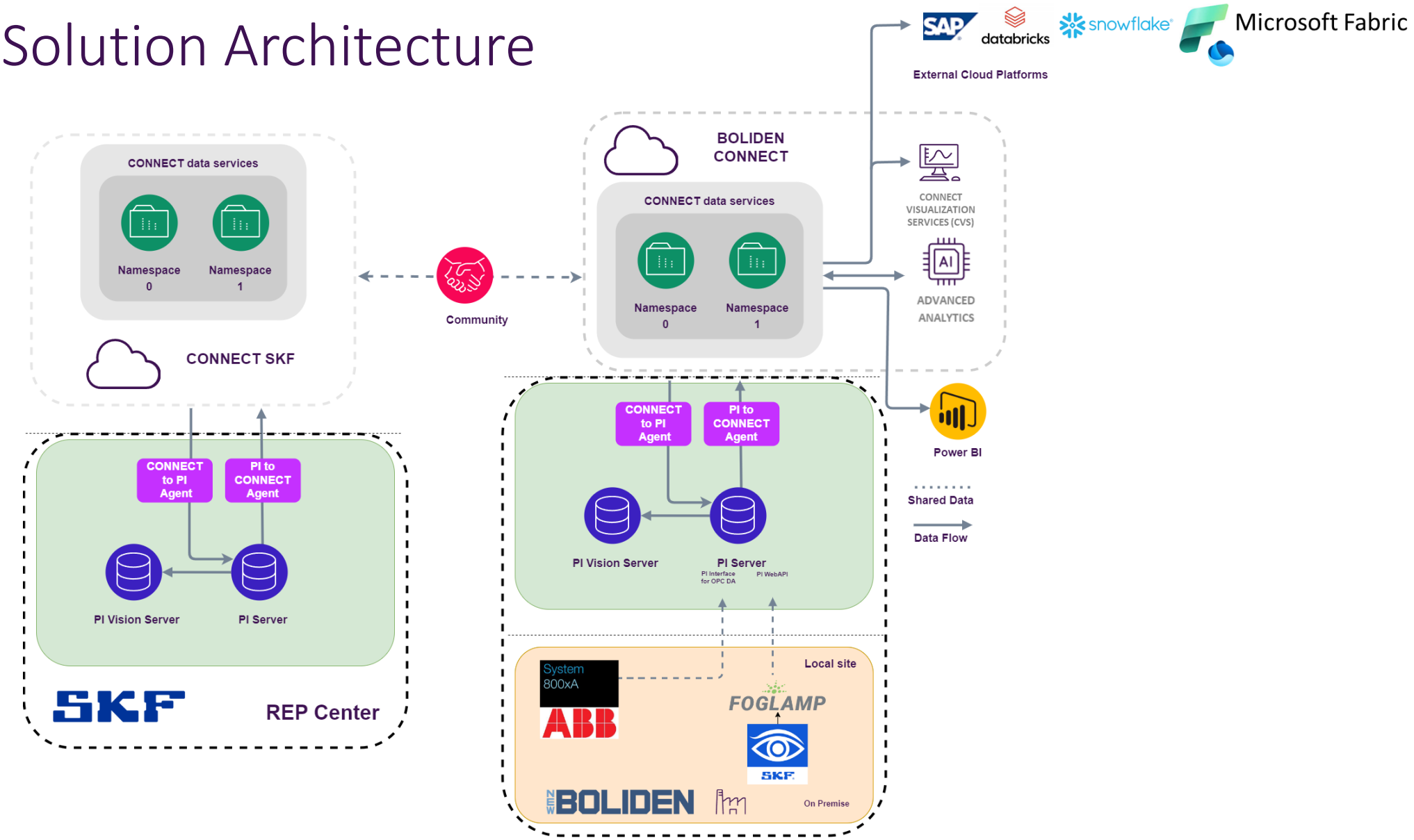
Contextualization of Vibration Data and Process Data

Implementation of AVEVA Advanced Analytics to find Anomalies in process and vibration data

Improve overall equipment availability and minimize downtime

Achieve rapid deployment and scale-up to production

Solution Architecture

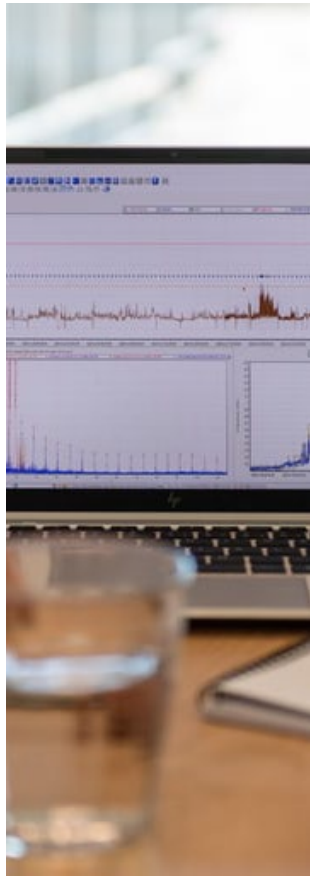


AVEVA

Why Connect SKF Observer and PI

- By using vibration-based the refined vibration data (MCIs) is made available for also non vibration experts both from SKF and customer. This increases value created by condition monitoring by improved utilisation of technical competence.
- The combination of vibration-based MCIs and other operational data (“process data”) creates new insights and improve quality and efficiency of condition monitoring.
- PI make vibration data available for “non-maintenance” applications and hence increase value created from the data.
- Data consolidated in PI enables use of ML/AI applications.

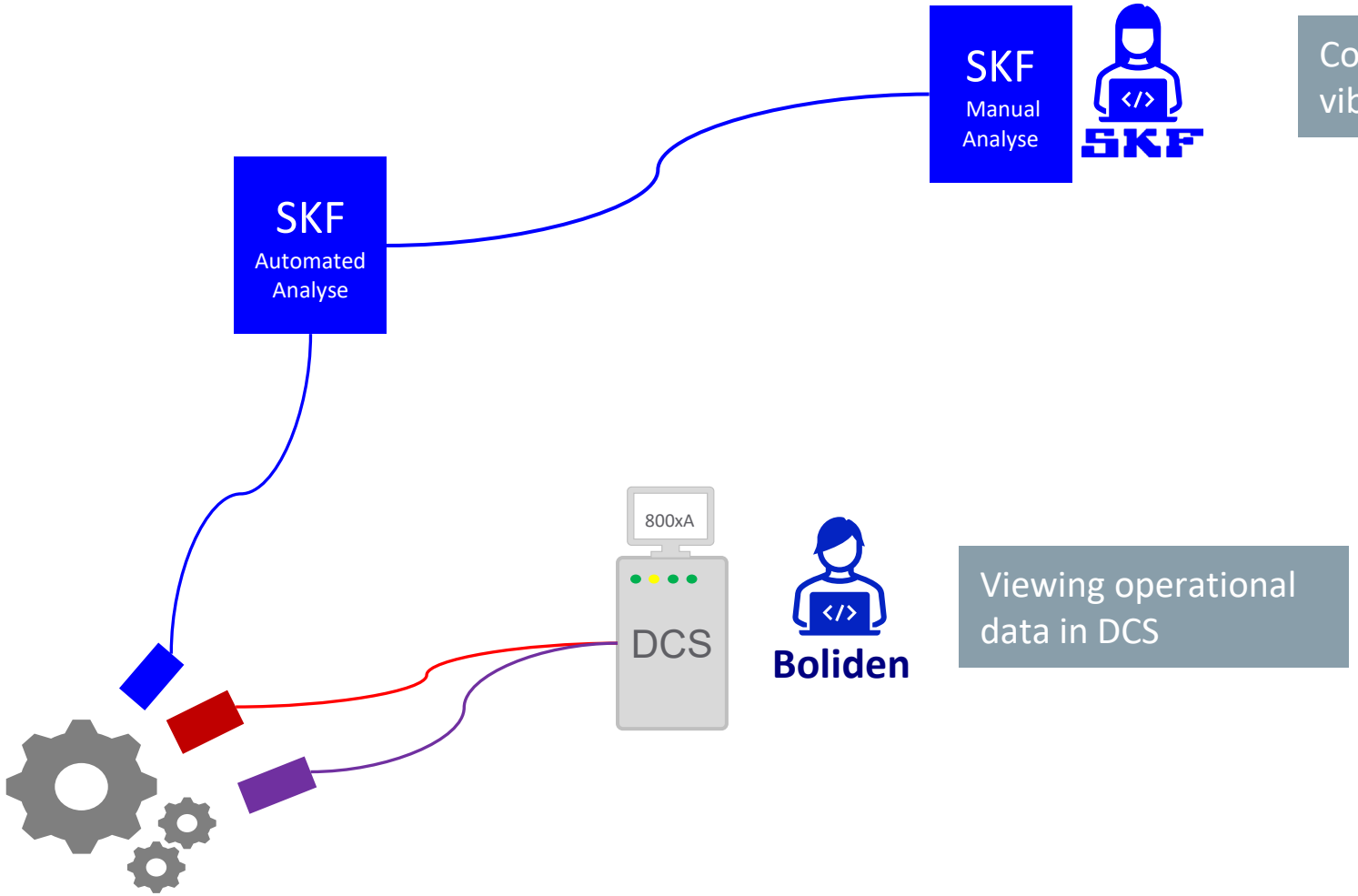
SKF Observer Connector to the AVEVA PI System



- SKF Observer Connector to the AVEVA PI System is based on **Dianomic FogLAMP**. It has been **developed in collaboration** with AVEVA.
- The connector **uses the existing Phoenix REST API** in Observer.
- **Historical data** from Observer DB can be made available to PI
- In combination with vibration data, the connector also transfers **asset data structure** from Observer making the hierarchy available in PI Asset Framework.
- Possible to deploy **on-prem, cloud or hybrid** setup.
- **No-code configuration.** The goal is that “IT-competencies” will only be needed for initial setup

Step 1 – Tear Down Silos

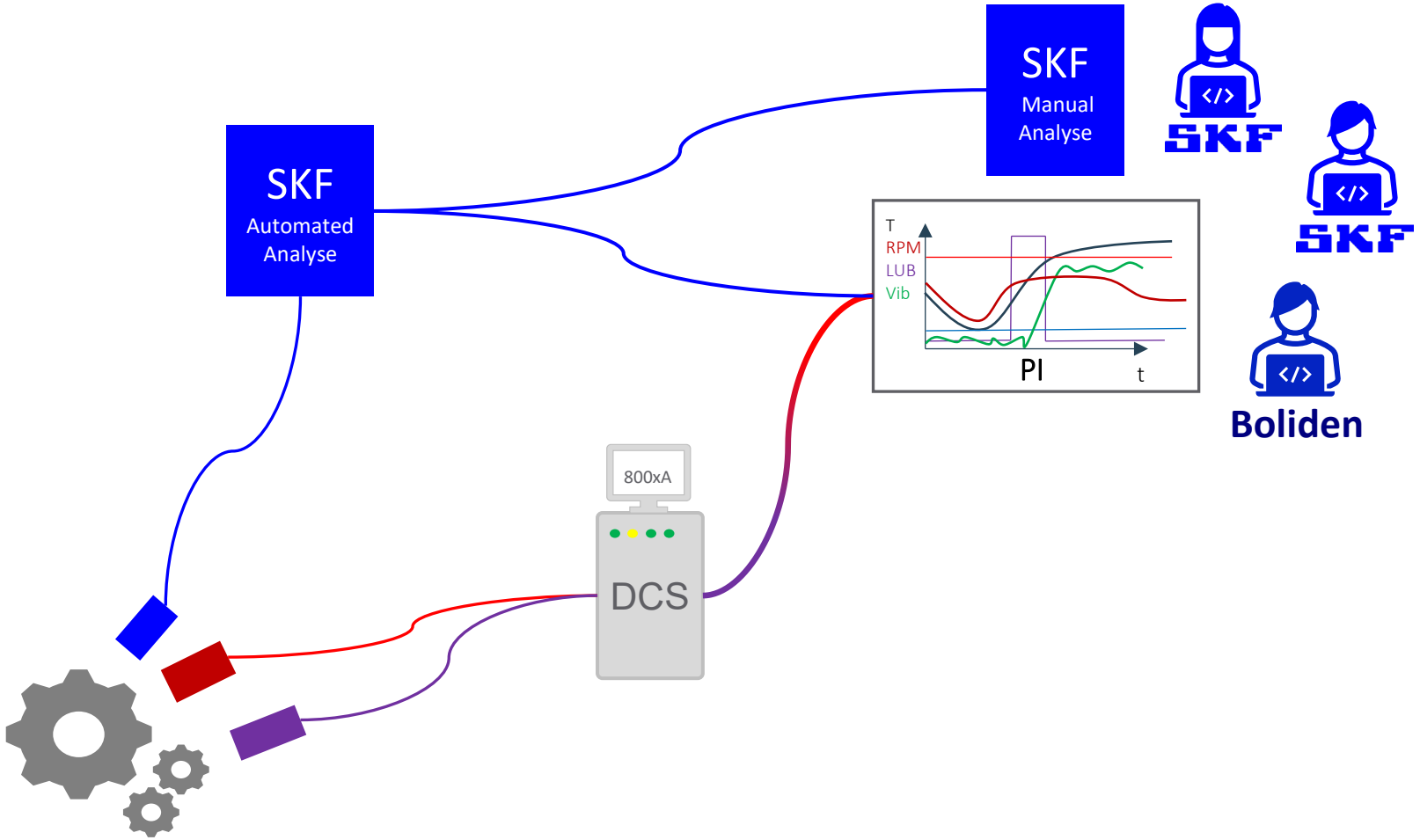
Traditional Condition Monitoring in a Silo



Condition monitoring using mainly vibration data.

Viewing operational data in DCS

Combining Condition Monitoring and Process Data



Condition monitoring supported by broad data-set.

Analysis of operational data including SKF vibration data

Step 2 – Build equipment dashboards for maintenance people and bearing application engineers

BT1490 TR6 (Belt Conveyor 1490, pulley #6) 2024

Note how right/left temperature difference is shifting during the year.

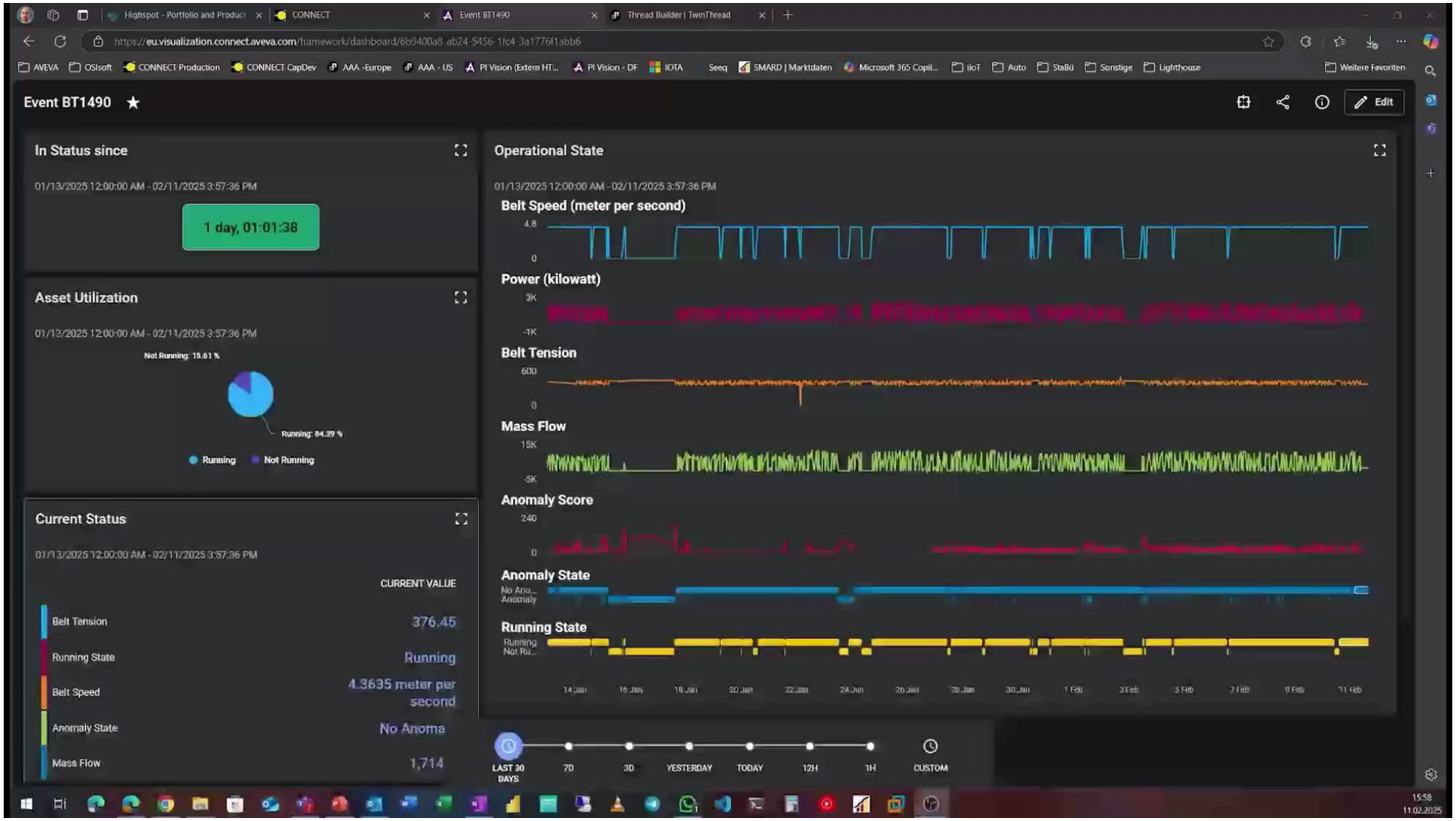
Bearing temperature, blue-left, red-right

Data from ABB 800xA SCADA and SKF Observer united for the first time

Bearings replaced twice during 2024

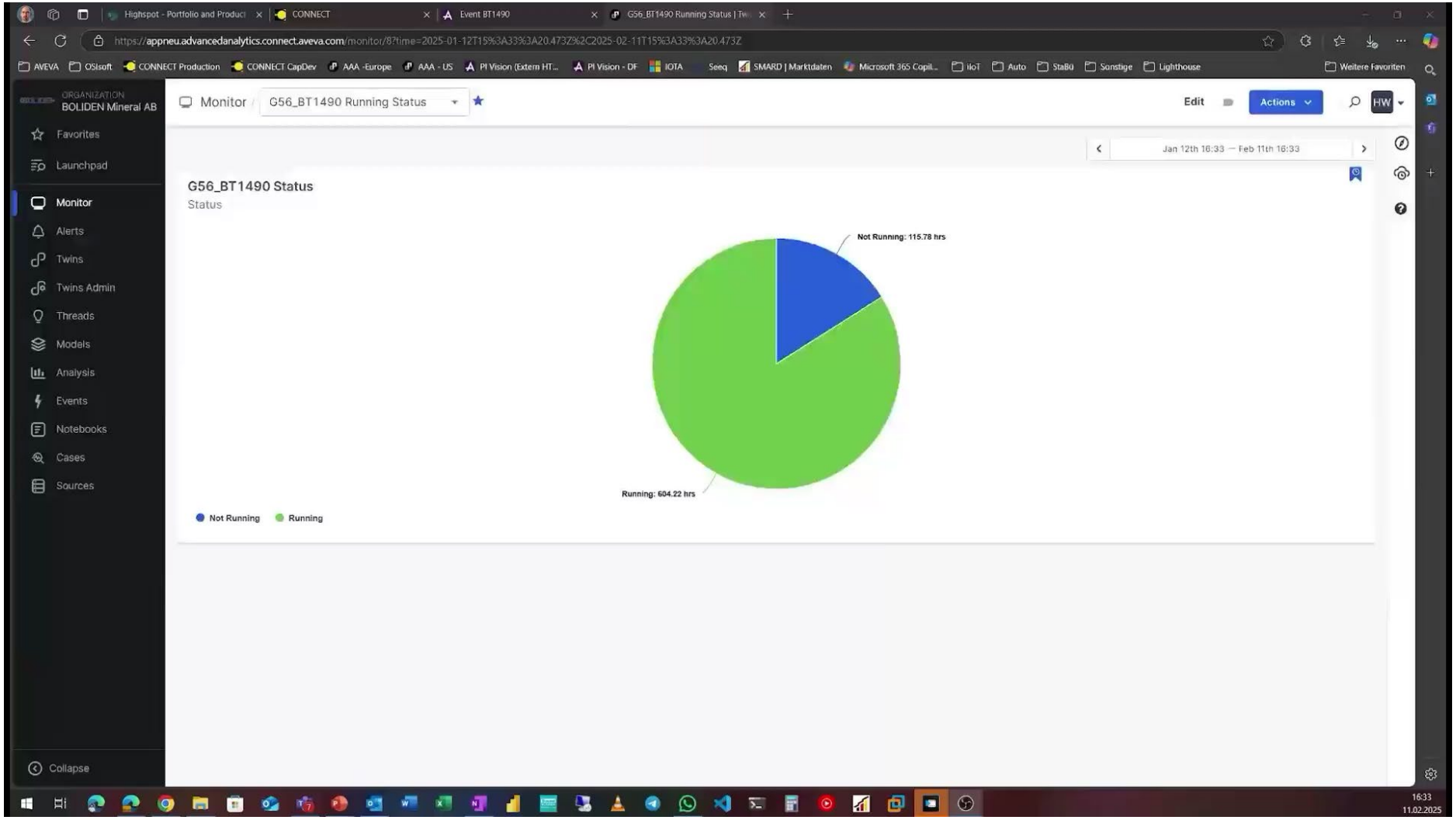
Vibration overall acceleration, blue-left, red-right

Asset Dashboard for BT1490 and AI Assistant



Step 3 – Implementation of threads and models based on visual analysis in AAA

Threads and Anomaly Model in AVEVA Advanced Analytics



Step 4 – Data sharing – PI Cloud Connect next generation

Sharing Data between BOLIDEN and SKF

CONNECT to PI Agent now supports community streams

CONNECT enables BOLIDEN and SKF to accomplish smart Maintenance

Challenges

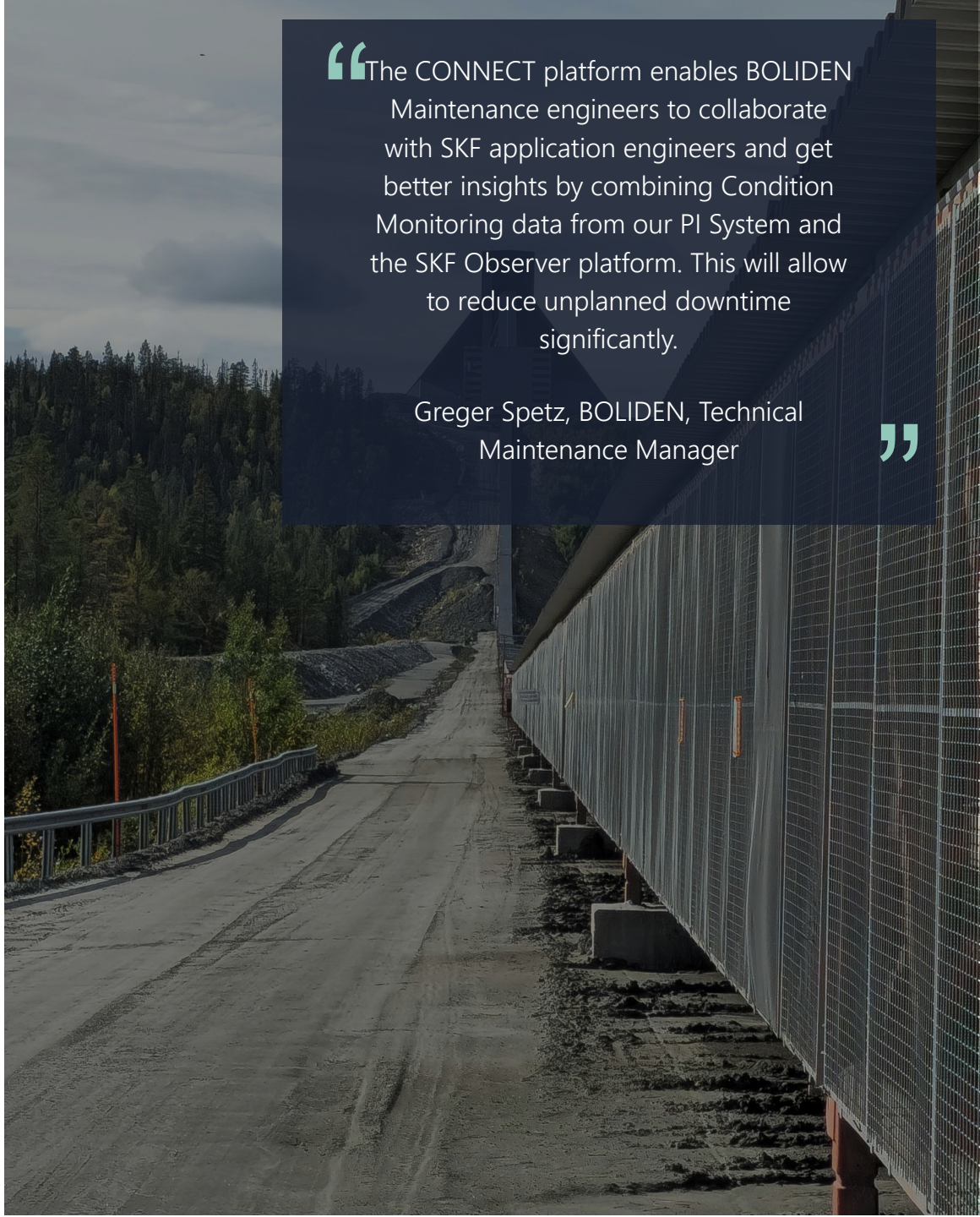
- **Low availability and high maintenance cost** on critical belt conveyors resulting in high TCO and low productivity.
- Conveyor Belts have currently **high failure rates on bearings** – causing **unplanned downtime**
- BOLIDEN Maintenance Engineers traditionally only worked with a **limited dataset from SCADA**
- SKF Vibration analysts **only looked on Condition** Monitoring data from their expert system (SKF Observer) – no process context

Solution

- Integration and contextualization of SCADA and SKF Observer data in BOLIDEN PI System
- Leverage CONNECT Data Services as **industrial** data enablement infrastructure
- **Continuous Data Sharing** between BOLIDEN and SKF
- Leverage **AVEVA Advanced Analytics** for rapid implementation of self-service data analytics
- **Partnership approach:** Client – Solution Partner - Vendor

Results

- End-to-End data availability
- Connecting process with condition monitoring data **empowers collaboration**
- Gaining **new insights on both ends** (BOLIDEN Maintenance Engineer and SKF Vibration Data Analysts)
- Potential reduction by of Downtime as a result by being able to react on equipment behaviour proactively



> "The CONNECT platform enables BOLIDEN Maintenance engineers to collaborate with SKF application engineers and get better insights by combining Condition Monitoring data from our PI System and the SKF Observer platform. This will allow to reduce unplanned downtime significantly."
>
> Greger Spetz, BOLIDEN, Technical Maintenance Manager

Lessons learned

1

Data Engineering is fundamental at the very beginning:
Data selection, data quality, data governance, data contextualization

2

Process to discuss and **create insights** for the people on the equipment from the different experts **across BOLIDEN and SKF**

3

Provide a common data set across different Organizations within BOLIDEN and across companies towards SKF

4

If you want to do machine learning, you need to learn the machine

5

It is also all about safety and security

6

Think big, start small: Lighthouse Project architecture as blueprint for BOLIDEN Industry 4.0 Roadmap

7

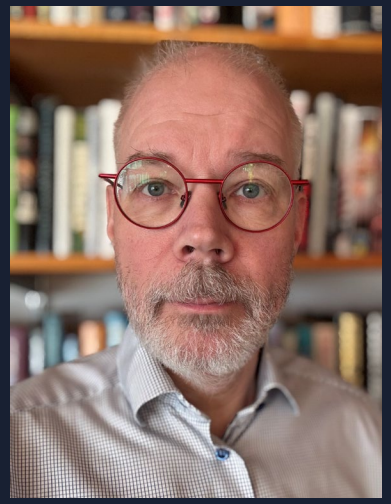
Experience of **Build vs. Buy**

BOLIDEN

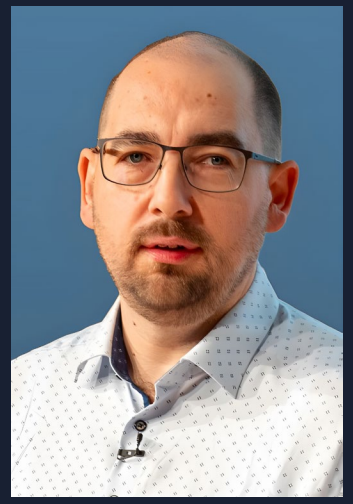
Thank you for your attention!

- Greger Spetz
- BOLIDEN Mineral AB
- Technical Maintenance Manager
- Greger.Spetz@BOLIDEN.COM

- Jonas Kemi
- AB SKF
- Partnership and Business Development Manager
- Jonas.Kemi@SKF.COM



- Hans Otto Weinhold
- AVEVA
- Solutions Architect
- Hans-Otto.Weinhold@AVEVA.COM



Questions?

Please wait for the microphone.

State your name and company.

Please remember to…

Navigate to this session in the mobile app to complete the survey.

Thank you!

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com