AVEVA

The big dig: Evolving digital tools to overcome **challenges from pit to port**

How miners can optimize the entire mining process using their industrial data

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The big dig: Evolving digital tools to overcome challenges from pit to port

Introduction

Like most miners, you've likely used a data historian or infrastructure to collect, store, and analyze real-time and historical data. But are you getting maximum value from the data you collect? As miners continue pursuing sustainability and production goals while facing new market and recruiting challenges, they must find new ways to uncover value from their industrial data.

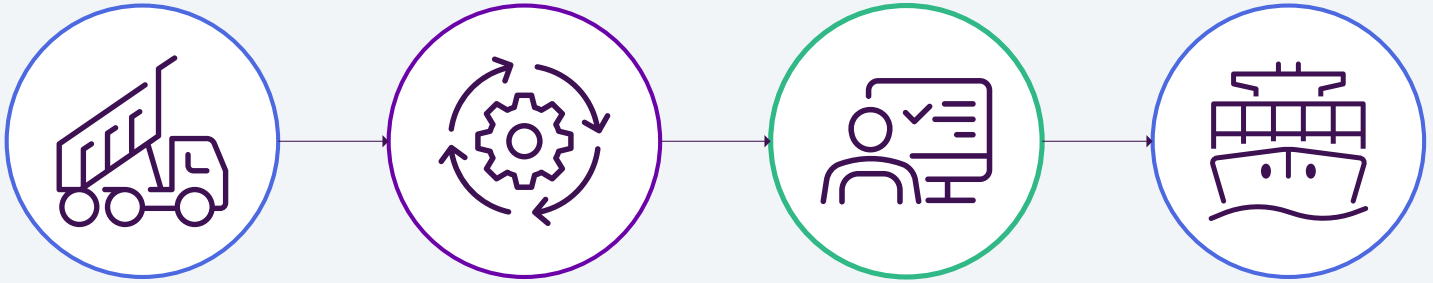
Data plays a key role in every part of mining operations, and the mining world is becoming even more complex. Now is the time to find new ways to extend the value of your industrial data in ways that optimize every step of the pit-to-port process and overcome both current and future challenges.

The big dig: Evolving digital tools to overcome challenges from pit to port

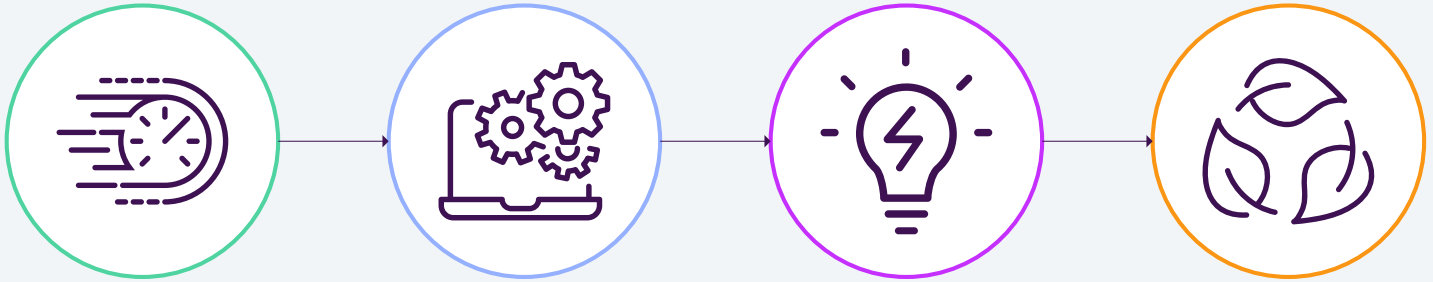
Optimize from pit to port

An effective mining operation doesn't stop at the dig. Miners must optimize every step of their complicated networks of assets and ore. By maximizing the value of industrial data, miners can give teams the visibility and insights they need to unlock production capacity, improve collaboration with remote and onsite teams, and increase quality and yield.

Uncover new opportunities at every step



Optimization requires a unified view



Optimize from pit to port

In response, many miners have turned to a data historian or infrastructure to collect, enrich, store, and access real-time and historical operations data. Acting as a single source of truth, these solutions give miners the visibility they need to make data-driven decisions to continually improve processes and asset performance.

According to a recent survey[1]

91% of respondents say that establishing a single source of truth was an 'important' or 'very important' activity' for 2023.

65% of business decisions are more complex than they were two years ago.[2]

Now, mining companies must do more with data to foster a collaborative environment that gets teams the right insights at the right times.

Pressures from all sides, every step of the way

Digital innovation can give miners better collaboration and insight – and many miners have already laid a good digital foundation. However, despite that digital foundation, the metals and mining industry, as a whole, is roughly 30% to 40% less digitally mature than comparable industries, such as automotive or chemicals.[3]

What's preventing miners from maximizing the value of their industrial data?

- Multiple solutions from different vendors and integration issues
- Siloed operations
- Niche tools and technologies aren't scalable and become stagnant
- Inconsistent data model across the enterprise

Given these issues, it's no wonder that **30-50%**[4] of mining organizations are not where they want to be for data discovery and integrity.

But there's an even bigger problem.

Only 10%[3] of the industry views data as a corporate asset. Not only that, but 50% of surveyed companies rely on manual tools for supply chain visibility and 40% use manual tools to overcome sales and operations planning problems.[3]

It’s time for a shift

What do miners need to extract the most value from their industrial data? They need to connect people, expertise, and teams to data, assets, and systems.

Digital and data priorities in the mining industry

66%

need to integrate operations with other business functions

62%

want industry-specific management solutions

55%

need centralized real-time data and analytics dashboards for effective decision-making[5]

It's time for a shift

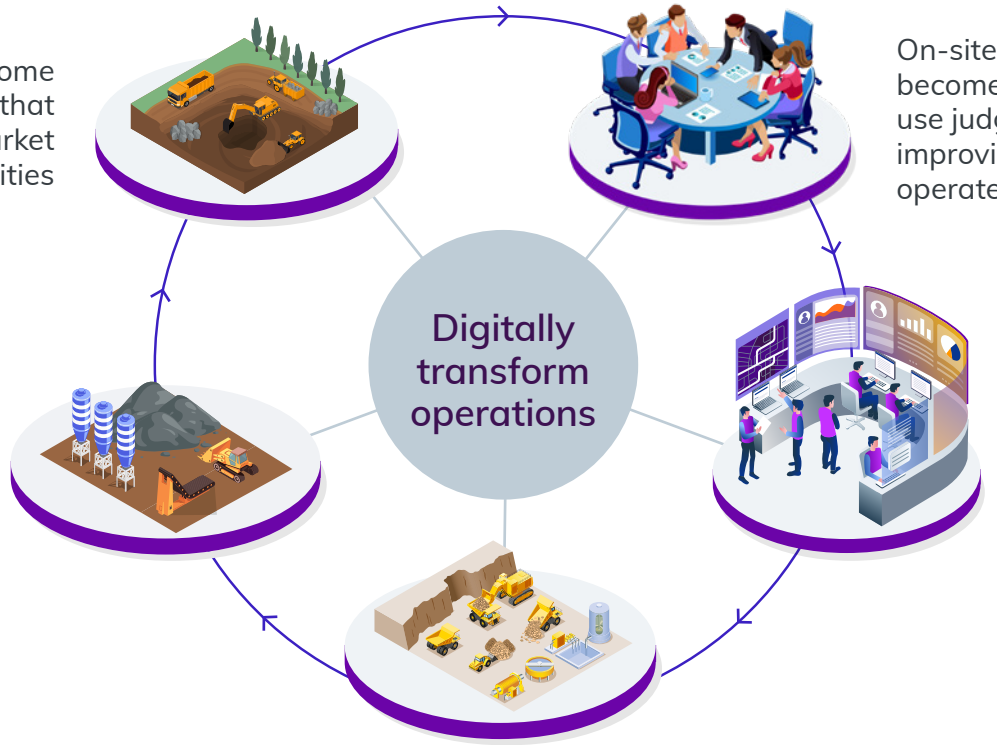
By focusing on real-time data management, operations management, and operations optimization – which means giving users the right information, with the right context, at the right time – miners can create a unified view from pit to port to improve overall operations and meet sustainability goals.

The benefits of digital initiatives

- **89%** of industrial companies are investing in digital solutions to drive sustainability, with a focus on collaboration tools, real-time data, and predictive analytics[6]
- Companies can gain **20-30%** in productivity through digital collaboration[6]

The digitally transformed mine

With the right tools, miners can digitally transform operations from pit to port.



Mining value chains become **digital nervous systems** that can quickly adapt to market opportunities

On-site and remote workers become **problem solvers** who use judgment, imagination, and improvisation to innovate and operate with agility

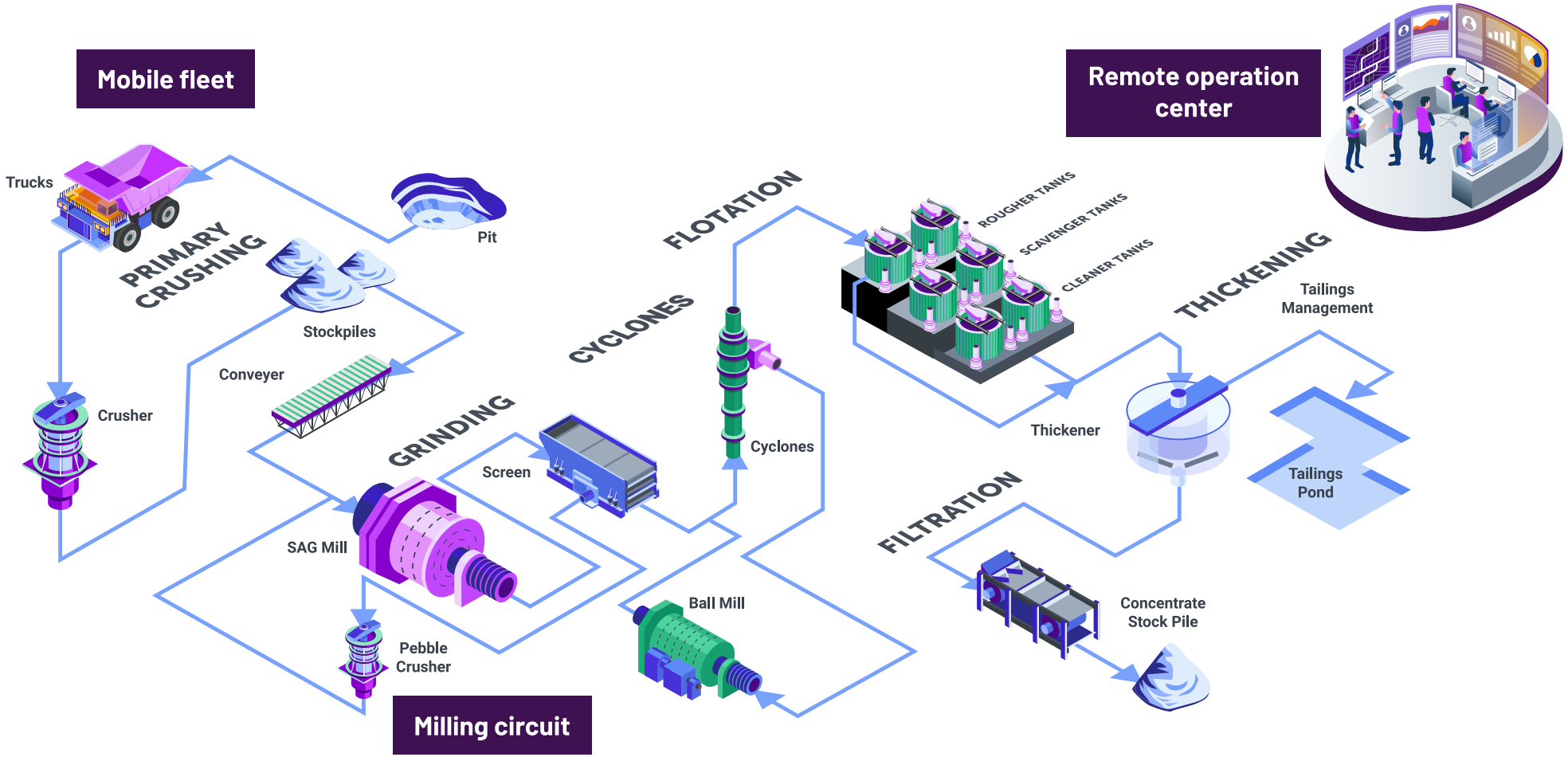
Material flows become **information streams**, creating transparency and traceability across the pit-to-port lifecycle

Mine-to-mill processes become **information loops**, enabling closed-loop feedback, precision control, and continuous improvement

Fixed and mobile assets become **information appliances** that are self-aware and increasingly autonomous

Mining data in action

Optimizing mine performance starts with real-time data. Once teams gain access to contextualized industrial data, mining companies can extend data management strategies to move to operations management and, finally, operations optimization.

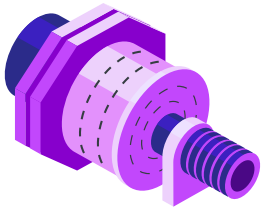


Mining data in action

Full visibility into fixed and mobile asset data improves performance and safety

Mobile fleet

- Maximize tonnage throughput and reduce unplanned fleet outages
- Track inventory and production data to improve the quality and grade of ore
- Improve maintenance planning, including scheduling and execution of work, eliminate routine inspections, and predict under-performance of mobile assets



Milling circuit

- Improve asset utilization and optimization
- Meet sustainability challenges with insight into dust generation, noise, and vibration, along with water and power consumption
- Understand material and grade in near-real time and spot market opportunities

Remote operations center

- Arm virtual experts with continuous improvement data from maintenance, inventory, scheduling, and planning
- Improve up- and downstream visibility by accessing near-real-time operational data, anytime and anywhere
- Bring together historical asset utilization with actual production data to get a holistic view of the entire process and improve predictive maintenance

Here's how you can do more with your existing mining data.

Maximize mobile fleet performance

Build a foundation with real-time data management

- Collect data from trucks, including times, weights, engine and tire sensors, and distance

Use existing historian data to manage operations

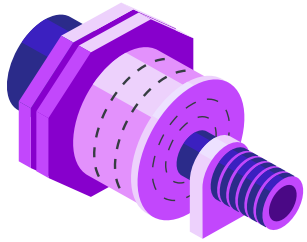
- Collect and analyze inventory, production, quality, and truck dispatch system data
- Extract truck production insights and inventory data from the data infrastructure to understand ROM quality and how it affects downstream processing
- Be a master of delay-accounting by classifying equipment utilization (OEE) while understanding performance issues and bottlenecks

Gain a comprehensive, real-time view to optimize operations

- Use real-time engine and fleet performance data to optimize usage and maintenance
- Maximize fleet uptime with proactive asset health management, including long-term forecasting
- Leverage multiple maintenance plans for truck components, such as tires and brakes, and improve repair-scheduling and planning

> “AVEVA Production Management enabled us to optimize our entire plant performance. By identifying and analyzing repeated small downtime events, we could build up a clear view of our daily and weekly performance. This enabled us to identify and swiftly resolve longstanding challenges, moving to secure production and boost performance of the whole plant.”
>
> **Talison Lithium**
> Executive

Optimize milling circuit operations



Collect, centralize and manage all relevant asset and process data

- Collect asset and production data for tonnage, bearing temps, and mechanical and hydraulic processes
- Understand material movement between assets throughout the milling circuit
- Gain visibility in the process and production of material flows, including consumables, such as water and energy

Increase visibility to make more informed decisions

- Get data and visibility on tonnage, ore sizings, material types, consumables, downtime, energy, and water consumption
- Use operations data in conjunction with the mine's systems for inventory, production, quality, and truck dispatch to gain a deeper understanding of all mine operations
- Be a master of delay-accounting by classifying equipment utilization (OEE) while understanding performance issues and bottlenecks
- Deliver sustainability reports for WAGES tracking and analyses in a production context

Go deeper with insights to find new ways to optimize operations

- Use real-time sag and ball mill data to optimize asset performance
- Prevent mill downtime with proactive asset health management
- Enable long-term forecasting and predict milling circuit failures before they occur
- Leverage multiple maintenance plans for components such as pumps, motors, and bearings

Nexa Resources used predictive analytics in its zinc smelter to improve asset reliability and reduce unplanned downtime by **75%.**

Enable real-time multi-site monitoring and collaboration with a remote operations center

Get an end-to-end view of operations with real-time data

- Gain a complete view of enterprise operations and the data that underpins remote and autonomous operations at multiple sites, including both environmental and asset data

Improve operations across sites

- Get pit-to-port visibility of material movements, downtime and availability management, inventory balances, and quality across the mining value chain
- Integrate production data with external data sources, such as ESG, financial, health and safety data to improve supply chain visibility
- Run multi-site optimization programs that improve maintenance and reduce water and energy consumption

Give users the tools and insights they need to make data-driven decisions

- Empower remote workers with the data and reports to support site diagnosis of failure events ahead of time
- Establish multi-site benchmarks to realize maintenance strategy effectiveness across fixed and mobile assets
- Leverage operations management data to enrich predictive analytics models

Quebec Iron Ore (MFQ) built upon its existing data infrastructure to show operations control and predictive maintenance data in context, giving managers **pit-to-port** visibility.

> “Having a solid data foundation improves the availability of our data and gives operators the power to visualize the analytics.”
>
> **Nicolas Toupin**
> Programmer, Business Intelligence

Extend the value of your existing AVEVA PI System to support your pit-to-port value chain

Give miners the visibility they need to make data-driven decisions, optimize operations, and utilize real-time monitoring

Geology and mining

Mine to mill

Concentration

Smelting and refining

AVEVA™ Predictive Analytics

Eliminate unplanned downtime and maximize asset reliability with no-code analytics. Identify asset behavior anomalies-weeks or months before failure and get prescriptive guidance to remediate the failure.

AVEVA™ Production Management

Inventory

Model your entire value chain to visualize stock levels and quality. Highlight areas of quantity and quality concern before they propagate downstream. Reduce penalties and take advantage of spot market opportunities.

Performance

Contextualize and account process delays across the supply chain. Monitor performance KPI's and perform rate loss root cause analyses to continuously improve operational efficiency and asset utilization.

Sustainability

Democratize the sustainability commitment to your operations. Empower your workforce with real-time visibility and root cause analysis into sustainability and environmental incidents to enable corrective actions and continuous improvement.

AVEVA™ PI System™

The leading solution for collecting, enriching, storing, and accessing reliable, real-time operations data.

AVEVA™ Data Hub

Share real-time industrial data securely with authorized users inside and outside your organization.

Talk to an expert today

Sources:

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About AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com