THE MINE OF THE FUTURE: FROM SUBTERRANEAN TO THE CLOUD

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Navigate your next

State of a legacy mine: remote terrain, extreme weather conditions, and unsafe work environments result in sub-optimal operations. Further, declining ore grade, volatility in commodity prices, and relentless pressure to improve efficiencies compound business challenges.

Mine of the future: autonomous load, haul and dump equipment controlled by professionals in a control room ferry ore from surface as well as sub-surface mine sites. Simultaneously, teams at remote operations centers monitor transportation and manage inventory at shipping terminals.

Digital technologies are transforming operations in terms of improved safety and increased production output at lower costs. 'Connected mine' programs realize the vision of futuristic mining through Industrial Internet of Things (IIoT) and Artificial Intelligence (AI)-driven applications. A combination of sensors, drones, self-driving machinery, and Machine Learning (ML) models are making mining operations more sustainable. However, data-based connected mine solutions require infinitely scalable computational resources to be functional.

Migrate to the cloud

The cloud offers a robust foundational infrastructure for minerals and metals mining enterprises to integrate the supply chain, fulfill demand, and drive growth through acquisitions and joint ventures. It boosts enterprise capabilities with multi-level support.

At a global mining enterprise, the cloud seamlessly incorporates innovative production systems, operational assets and even newly acquired companies. It provides the computing power to develop proof of concepts, prototype designs, and test new methods to accelerate discovery, maximize output, and reduce the carbon footprint.

At the enterprise level, cloud Enterprise Resource Planning (ERP) solutions for supply chain and financial management, inventory and workforce management, and other mission-critical business functions improve efficiency.

At the operational level, cloud-based applications and platforms integrate real-time data streams from digital systems for exploration, production, field services, and transportation, which helps managers develop strategies to address industry as well as enterprise-specific challenges.

At the infrastructure level, cloud adoption capitalizes on a multi-cloud estate as well as advanced digital tools without long-term investment in hardware or software. Cloud-based systems enable dynamic scaling to manage workloads. In addition, it supports onboarding of partners, platforms and devices, which enables co-development of frameworks to improve performance or build new functionality.
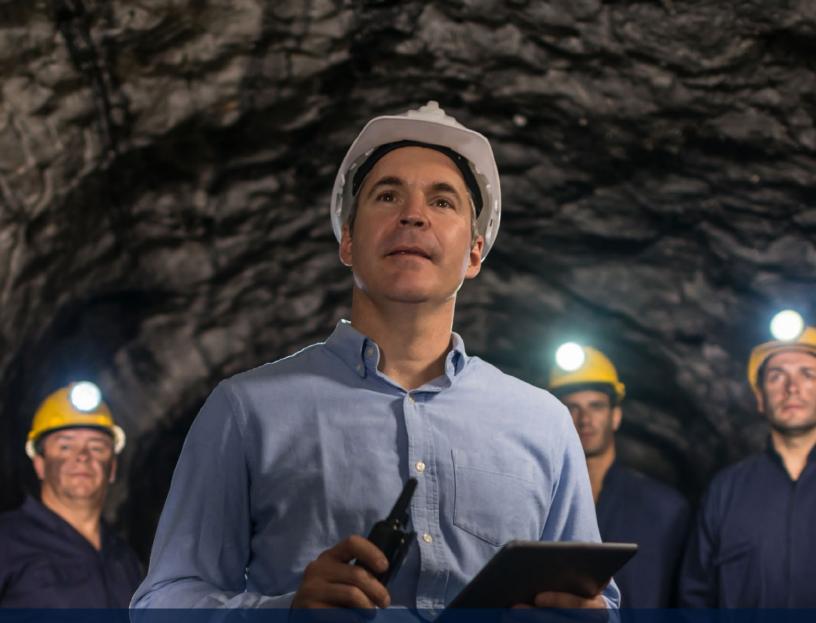
Access seamless cloud services

Mining enterprises can avoid both technology obsolescence and recurring capital expenditure by consuming IT resources as a managed service on a subscription basis. The cloud provides cost-effective infrastructure for development, testing, storage, disaster recovery, and global operations. Further, software for ERP, design, CRM, supply chain management, and business intelligence can also be consumed in a pay-as-you-go model.

Typically, cloud resources are available in three formats: Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS). In addition to basic services, cloud service providers provide identity and access management, change management and data security as managed services. The bouquet of services ensures a secure and reliable IT environment as well as compliance with regulations for data management.

Robust Application Programmer Interfaces (APIs) drive the success of cloud apps and platforms. APIs integrate ERP systems, mobile applications, databases, and IIoT software in real time, which enables seamless data sharing and collaboration. It smartly connects the IT-OT infrastructure with backend systems and data, thereby empowering enterprises to adopt technology for navigating business challenges as well as cyclical economic issues.

Become future-proof

A cloud-first strategy is a business imperative in the low-carbon circular economy. As the London Metal Exchange (LME) rolls out specialized markets and trading platforms for sustainable metal products, producers will be required to reveal the energy-intensity of production and disclose the carbon footprint of output. LME also proposes a digital passport for metals to log the 'green' trail for sourcing and trading.

On-demand resources modernize mining processes, and support solutions to address data traceability requirements for establishing responsibility and accounting for recycled goods. The cloud is effective to host advanced digital services for seamless e-Commerce, including distributed ledgers, e-Business registers and e-Tax filing. Tracking and traceability are more accurate with cloud applications due to the elimination of connectivity issues.

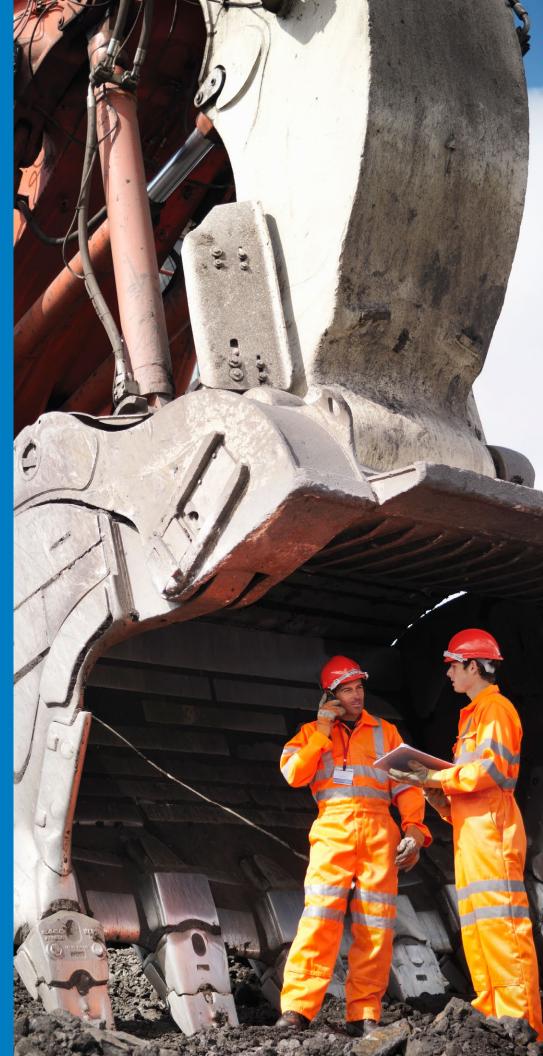Cloud solutions facilitate real-time information and financial data flow for transparency in cost management and monitoring of assets in a global network. Real-time visibility into equipment, facilities, supplier networks, batch-level inventory, and KPIs across business processes helps mitigate risks in supply chain, quality, productivity, and EHS. Further, cloud-hosted tools track and analyze the health of machinery to gauge Overall Equipment Effectiveness (OEE). Proactive equipment monitoring and insights into OEE enable predictive maintenance to avoid unplanned downtime and safety risks.

Maximize data harvesting

Digitization creates a huge volume of structured, unstructured and semi-structured data. Converting data residing in various sources and formats into a single source of truth with minimal human intervention is the highlight of cloud systems. Automated data processing and synchronization eliminate errors and bottlenecks in data flow to analytical models and AI / ML applications. Moreover, the migration of legacy systems and databases to cloud platforms upgrades processing speed, improves the performance of mobile apps, and standardizes data management practices across the enterprise.

Cloud-based line of business applications ensure interoperability of data across platforms while eliminating latency issues in remote management of open pit and underground mining sites. Further, it supports unified tools for analytics, reporting and monitoring. Digital-first enterprises leveraging cloud computing use advanced data analytics to become sentient, productive and efficient. Use cases range from applying positional and geophysical information for collision warning and driver assistance systems to using imagery from 5G cameras to guide blasting plans and real-time drilling.

A cloud database environment ensures availability of upstream and downstream data to stakeholders anywhere, at any time, on any device. It also drives data consumption and application adoption. The user interface of cloud applications can be configured for specific deployments, and provides a consistent user experience across devices. Cloud-based visualization dashboards and ready access to contextual information enable business and operations teams to take timely decisions and actions. In addition, teams can use AI / ML models to anticipate shifts in demand, optimize blasting and drilling schedules, and manage inventory across locations.

Polycloud platforms such as the Infosys Cobalt navigate the complexities of mining and drive sustainable operations. It addresses the service, maintenance and security requirements of hardware and software across deployment conditions. The Infosys Cobalt ecosystem enables mining enterprises to combine 5G mobile technology, AI and analytics with the cloud to maximize efficiency and yield. A rich portfolio of industry-specific cloud solution blueprints facilitates the migration of workloads to the cloud. Significantly, learning, business, engineering, and knowledge assets simplify co-engineering of connected mine solutions for dynamic planning, supply chain efficiency, and operational excellence.

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