Application Note

CLOUD-ENABLED MINING OPERATIONS

Digitalisation is a key initiative for the mining sector, with industry spend on digital solutions expected to reach $9.3B in 2030[1]. New technologies such as Industrial Internet of Things (IIoT)-enabled sensors, embedded programmable logic controllers and simulation models promise improved performance across all mining functions, as well as enhanced crew safety and higher returns on exploration investment.

As the sector contends with volatile commodity prices, pressure to implement sustainability initiatives and resource depletion, cloud computing represents a path towards transforming the industry's historically siloed information and operational technology (IT/OT) systems. The elasticity of the cloud means mine operators can access storage and compute resources as they're needed, providing a more cost-effective and efficient way to implement new digital technologies that can improve asset performance and optimise their operations:

- Remote monitoring systems that leverage advanced algorithms to predict upcoming maintenance needs and warn of possible equipment failures
- Simulation-based planning that enables them to virtually analyse their processes and execute "what-if" scenarios that can reduce time and cost during operations
- Advanced sensor technology that can enable more precise extraction, reducing waste and processing time
- Automation of mining equipment to improve worker safety and reduce labour costs
- Drones for faster site surveying and maintenance

While the adoption of cloud-based digital technologies has the potential to improve mine profitability by up to 45% within two to three years[2], this transformation depends on the presence of cloud-optimised connectivity with ore depletion forcing mining companies to push into increasingly remote locations, the limit of terrestrial networks means access to that connectivity becomes less feasible.

As the only satellite-enabled network services provider with a commercially proven multi-orbit fleet, SES is breaking through those limitations. We're able to deliver private, dedicated connectivity to the cloud over both Medium Earth Orbit (MEO) and Geostationary Earth Orbit (GEO) links, ensuring that mine operators can access the cloud services they need to execute on their digitalisation initiatives. Even the most remote mine sites are just one hop from major cloud data centres, providing mining companies with the high-quality connectivity they need to cloud-enable their operations.

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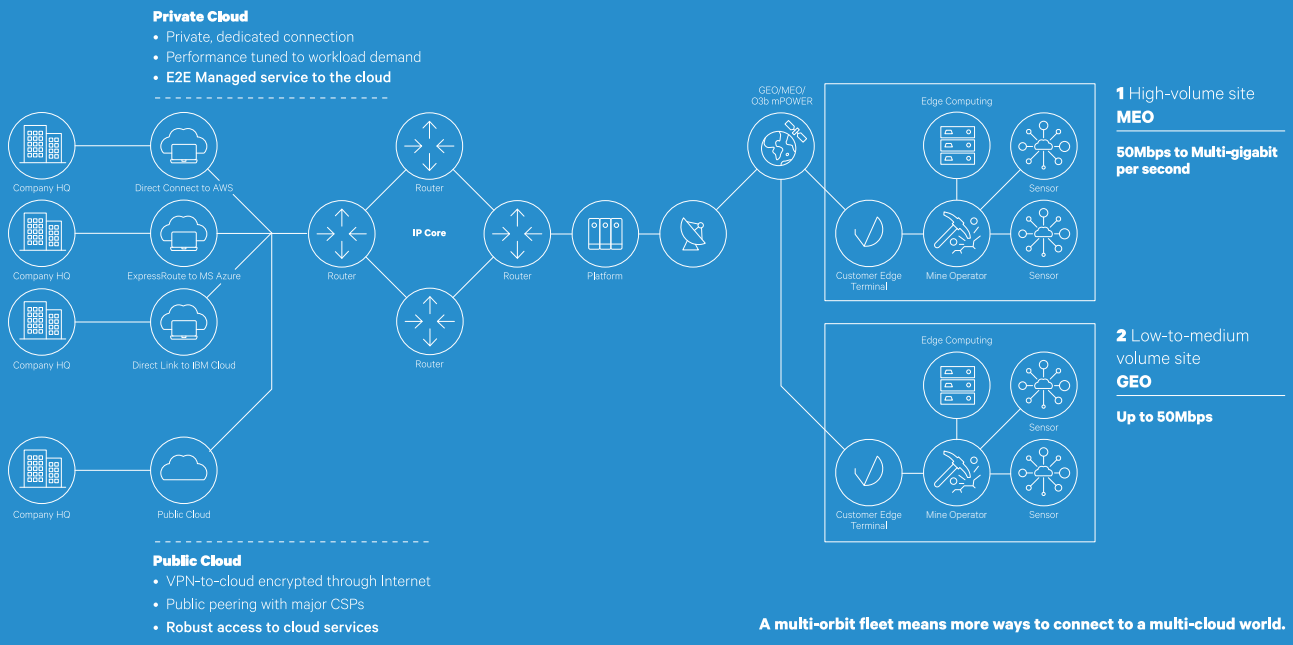
1 "Digital Transformation in the Mining Industry," ABI Research (3Q, 2021)
2 AT Kearney analysis



A multi-orbit fleet means more ways to connect to a multi-cloud world.

Support for terabyte-scale data volumes

The cloud enables mining companies to derive actionable value from the terabytes of data that a single site can generate each day. Our advanced satellite network can transfer high volumes of data from any site to the cloud, with the ability to support performance requirements for specific use cases.

Global reach

Mine operators are expanding into previously unexplored regions, where the economics of extraction has been historically challenging—a paradigm that cloud-based digital technologies have the potential to change. Our multi-orbit, global fleet of interlinked high-throughput and widebeam satellites ensure any mining site can access reliable, cloud-native connectivity, regardless of location.

Scalability throughout a mine's lifecycle

Mine operators may opt to deploy specific digital solutions for each stage of a mining site, from exploration to reclamation, and each of these solutions may have distinct connectivity requirements. We enable a consumption-based model that lets mining companies scale up their bandwidth investments easily and cost-effectively throughout the lifecycle of a mine.

Optimised connectivity for edge workloads

Use cases such as autonomous vehicles and drone operations can dramatically improve mine safety and efficiency but require edge compute functionality that can process large volumes of data quickly. That data can then be sent to powerful machine learning systems in the cloud, resulting in insights that can be delivered back to the edge for continuous performance improvements. Our advanced software capabilities allow us to combine multiple satellite links to create application-aware network services, ensuring that critical edge node workloads receive the connectivity they need to operate effectively.

A next-generation network evolution

As the mining sector adopts digitalisation, our network is evolving to meet its new requirements. Our next-generation O3b mPOWER system builds on our market-proven MEO capabilities, delivering the flexibility, performance, and scale essential for cloud services. Dedicated, private connections from remote sites to the nearest cloud data centre ensure the performance, latency and reach that mining companies need for their cloud applications.

Learn more about SES's full portfolio of services and solutions.
Website: **ses.com**