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Digital networks are making mining safer and smarter

The advent of fast, secure wireless and sensor networks is enabling smarter mines where intelligence is everywhere

Introduction

The mining sector and health & safety have always gone hand in hand. Over many years, the hazards of excavation have led to many attempts to mitigate risks both on a small, everyday scale and in actions encompassing large-scale measures such as the Mining Safety and Health Administration Act, created by legislation in 1978. Today, as miners seek to automate and apply data intelligence to their efforts, one constantly advancing area is having a huge effect: ubiquitous communications.

We shouldn't underestimate the scale of challenges associated with mining. Miners obviously continue to face a range of obstacles from dust inhalation and harmful (and potentially inflammable) gases to the dangers of physical collapses and high noise levels. But connectivity, and technology more broadly, are helping to make mines smarter and safer environments.

Specifically, networking is changing mining in two ways: connecting to the outside world via WANs and remote monitoring of internal operations. These are equally being enhanced by the rapid improvements in speed, scalability and value in Wi-Fi and cellular communications we have all seen. Today's miners can receive advice and assistance through video-augmented calls that can act as a visual tutorial. Instrumented objects with attached sensors can transmit status updates across Internet of Things networks. These are vast improvements in areas where laying network cables is practically impossible.

Sensor networks are enabling a new age of mining where everything from weather, the health of the dam for tailings, moisture, vibration, structure stability, dust, and the condition of vehicles and equipment can be monitored. These are opportunities that need to be taken with both hands.

From reactive to proactive

Mining in general today has become smarter and much more digitally enhanced.

From a reactive industry for operations, it has moved onto a predictive, proactive. and prescriptive arena where OT and IT are converging.

The maintenance is automated and potential risks are mitigated, so that modern mining operations ensure as minimal exposure as possible of humans to danger.

An example here lies in the area of Virtual Twins and Digital Twins where we can augment visibility of operations to create simulations, ‘see’ into mines, and adapt operations without placing our people in danger. In short, connectivity is taking more people into remote operations centers and out of harm’s way inside the mines themselves.

Transferring data and voice via physical cabling can be hugely challenging in many mining environments and scenarios. This is why wireless networks with its regular throughput and capacity increase has been a welcome boon to miners. Today, Wi-Fi is widely deployed in short-range networks and 4G, 5G, LTE, Mesh, LoRaWAN and other technologies are ideal for longer-range connections.

Satellite links such as SpaceX’s Starlink, operating in low-earth orbit (LEO), have also grown rapidly in recent times to provide another tactical opportunity for communications, especially in data analysis from the field in very remote locations, or for managing supply chains.

Questions for your connectivity supplier

As presented above, there is a world of opportunities available for miners who are seeking to use digital tools and networks to transform operations. Given that, what should miners ask of connectivity suppliers?

Cost is always key, and flexible, usage-based tariffs are needed, backed by service-level availability guarantees. Also consider the future and whether a service provider can scale to meet your needs by providing a global presence with support and understanding of local cultures to match.

Furthermore, seek providers that are not merely transactional suppliers of building blocks but can provide a clear commitment to innovation and the ability to work as a true partner. Ask for examples and blueprints that can be the basis of your own transformation.

Talk of partnering is common of course, but what is a good partner? A trusted partner should be more than a provider of technology tools. The partner should also participate in transformation journeys and recommend ways to operate smarter in ways that are supported by data analytics. It should also be able to apply knowledge gleaned from working across the mining sector and other verticals, bringing insights into OT-IT integration, resiliency, high availability, cybersecurity, sustainability, safety and the most profitable operational models with highest levels of utilisation to unlock value.

Of course, change can't happen overnight. Old mines are hard to retro-fit and miners will continue to optimise and make optimal use of their existing assets. But the mining industry is no different from other sectors in that the decision-makers need to obsess over data to make safer and smarter decisions for their miners tomorrow. Networks will play a large part in helping them to do that.

Seek suppliers that aren't merely transactional but can scale to meet your global needs, provide a clear commitment to innovation, and act as a true partner

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