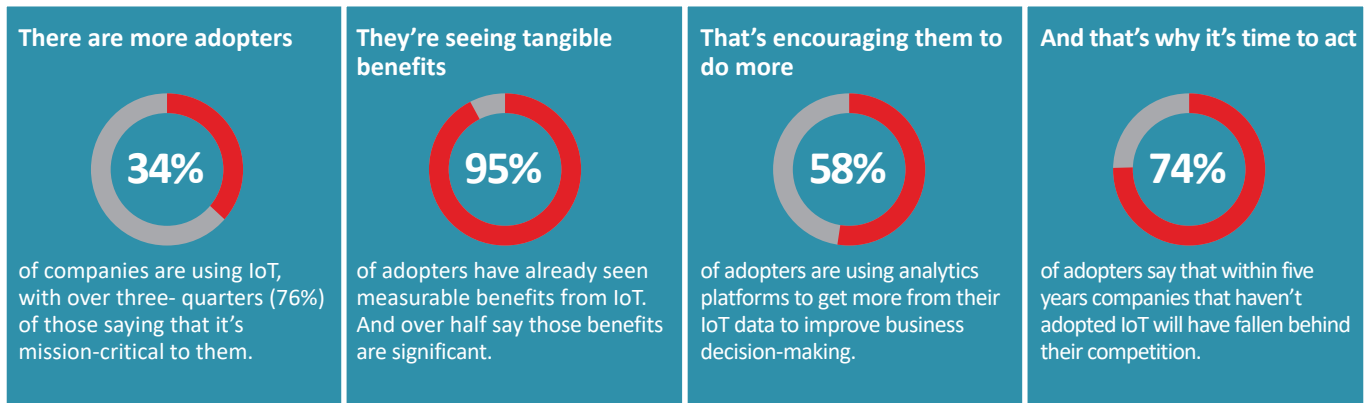


The connected mine: Asset management, maintenance assessments, productivity and safety converge.



Legacy and disparate systems in mining create a failed state of interconnectivity, where key data is not shared leading to frustration and real silos of operation.

Advancements in the form of IoT and the multitude of sensor technologies available have resulted in a fundamental shift which is closing the gap between the edge and the core of mining organisations, adding intelligence into the process to further streamline the relevance of interpreted data.

Correctly implemented, our solutions can increase the efficiency, productivity, safety and overall market performance of a mine. IoT.nxt offers companies the ability to create interconnected, interoperable business operations and improve performance across their business ecosystem.

When combined with a well-designed and executed solution, these technologies can address the following industry challenges:

- Lack of visibility into mass flow across the mine from pit to port.
- Legacy systems on equipment is dated: Modern methods seem out of reach because legacy systems are entrenched and often proprietary, resulting in a lack of insight into mining assets.
- System downtime is crippling: Downtime caused by unscheduled equipment maintenance causes extremely high overtime and maintenance costs.

Utilising Microsoft Azure, IoT.nxt and Dell have joined forces to create an IoT solution that can transform any ecosystem. By creating horizontal interconnectivity with the IoT.nxt Raptor™ intelligent edge gateway and Commander platform visualisation dashboard and Dell's gateway hardware, integration into all mining assets and critical systems are enabled. This gives users insight into critical systems such as water, air quality and location of personnel and equipment in real-time, aiding the ultimate goal of improving operational efficiency.

Knowing where things are, who is using them, and for what purpose they're being used are critical pieces of information. This improvement on a legacy state of affairs shows proven benefits in terms of in-shift optimisation and improved profits.

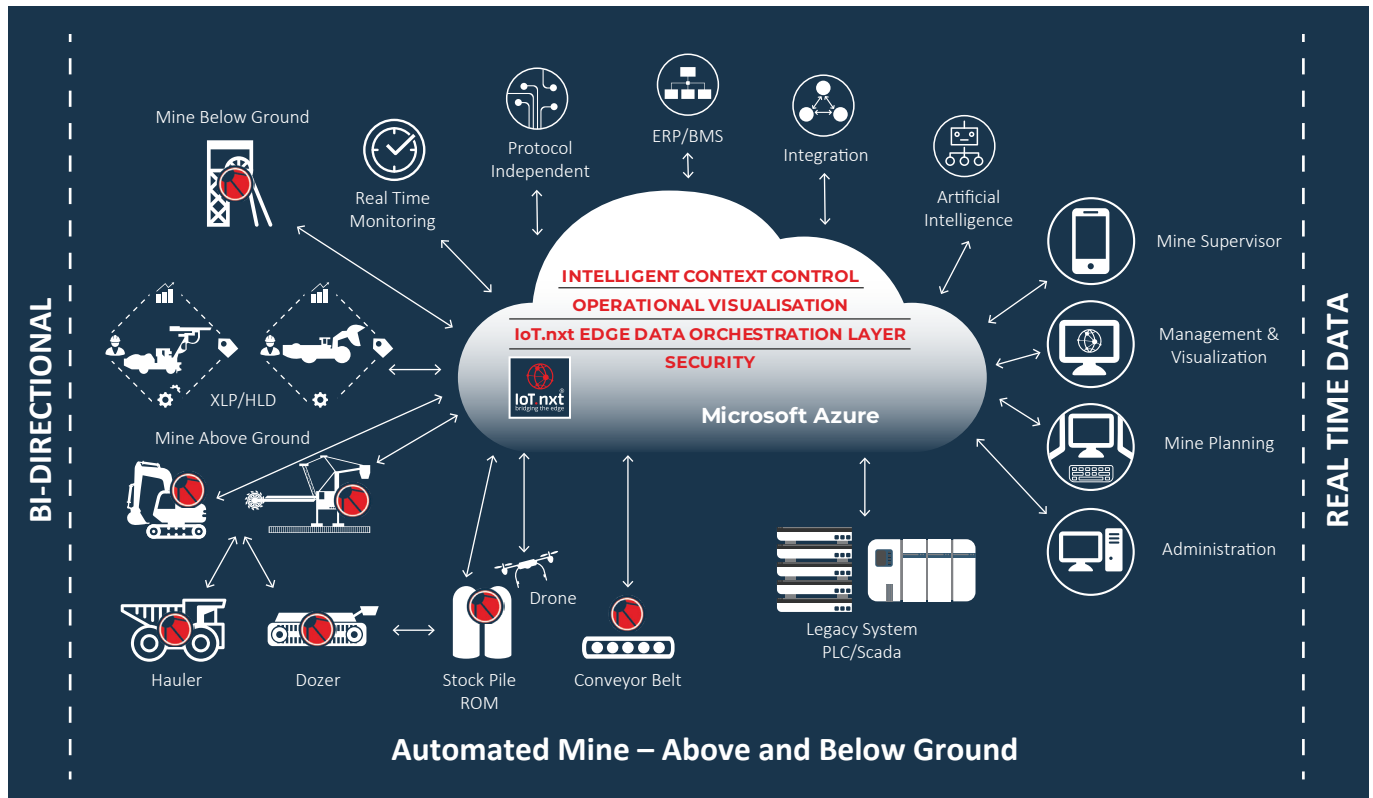
The IoT.nxt solution enhances existing ecosystems and enables companies to experience powerful resurgence with compelling benefits:

- Connecting Raptor™ into mining assets allows the mining operations center to have real time visualisation to all aspects of the mine.
- By supplementing existing legacy systems with sensors, we are able to, for example, measure all critical components such as equipment, water flows, air quality and personnel position and even health.
- Knowing the status of all equipment, suppliers, people and things in the ecosystem in real-time and building non-discretionary logic into this ecosystem fundamentally improves productivity at the source. Integrate, measure, analyse and actuate - the impact of this across the expansive value chain can be profound when iterated.

Solution Diagram

Offering a solution that has the flexibility to work with existing devices and services, means the customer will derive immediate value. The following diagram illustrates how, correctly implemented, components of this solution can be used to unify an entire business ecosystem to achieve optimal results organisation-wide. Our core digitisation technologies lay the foundation required for true transformation, obviating risks and potential data overload on networks.

Open IoT and Digital Experience Platform Components



6 Steps: The path to success

1 | Reimagining business processes

Applying business analytical best practice, consider current SOPs, process and workflows that are performed across your business ecosystem to identify areas where standards and processes have not been optimised.

- Provide relevant insights and operational functionality to users.
- Leverage automation and integration to create a complete company overview and reliable, precise data collection.
- Enable primary business functions while accommodating anomalies that can cause down time.

2 | Avoiding an information overload

As businesses digitalise, caution should be paid to not overloading operators with information. Having insight into down-the-line effects of activity may boost efficiency and the business bottom line. To ensure effectiveness, work to provide the right information to the right people to drive better decision making and improve employee accountability.

	IoT	Operational	Transactional
Example	Mining asset position and vehicle telematics, operational data in-shift, monitor air quality, water pressures, doors, gates, CCTV, weight meters, weigh bridge, security	Horizontal real-time views into the mining operation as a holistic ecosystem	Real time measurement of all mining activities and people event-driven alerts generated. Scheduled maintenance events generated.
Sources	Mining machines, Raptor™ on equipment, various sensors	IoT.nxt Commander visualisation, ERP integration, Analytics	Fully automated
Destinations	Mine planning, HR, asset management, health & safety, maintenance	IoT.nxt Commander, analytics, actuation components, DELL Raptor™	ERP

3 | Ready, set, configure

Ruggedised to suit an industrial environment, designed to endure even the harshest condition and proven effective in the fields, the IoT.nxt technology stack is the answer to ensuring competitiveness, and relevance, in the years to come. Quick to install and easily customisable in any industry, an entire business ecosystem is connected into a centralised Commander dashboard and accessible remotely enabling real-time visibility and in-shift optimisation without disruption.

4 | Connected your way, from edge to cloud

This flexible end-to-end solution connects non-IP based devices (2-wire and similar) through Raptor™, our intelligent edge gateway, and connecting IP enabled devices directly to our IoT platform, Commander. Once connected, data is consolidated from all devices and systems to provide a single horizontal view of your systems and devices entire business ecosystem.

Raptor™ technology creates a normalised, edge layer of physical and virtual intelligence that can be retrofitted, deployed and connected seamlessly into an ecosystem of existing technologies and things, radically reducing the cost of having to develop multiple edge integrations into disparate cloud applications.

Being able to retrofit onto all deployed devices, whether analog-, or IP-based reduces

- disruption to business processes
- cost of implementation
- cost of training
- cost and impact of enterprise-wide change management
- vulnerability at the edge
- technology disparity at the edge
- data strain on - and therefore costs of - networks
- processing required at the cloud platform level
- cost of edge integrated gateway maintenance

Real-time subsystem integration allows cloud platforms to be leveraged as the up-, and down- stream effects of an event-triggered occurrence are recalibrated throughout all edge-connected devices. The pieces of any business puzzle are in the box, and ready to be pieced together to create a big picture.

5 | Operationalise and reap the benefits

Surpassing industry benchmarks globally, this technology-agnostic solution can be implemented in any industry, on any system and in any process leading to the collection, normalisation and aggregation of unbiased, actionable data and real-time business intelligence. The knock-on effect of complete visibility into all operations, the knock-down of operational silos and minimisation of down-time and incidents across the business ecosystem can be felt almost immediately.

Implementing without disruption

IoT.nxt technology can be overlaid onto organisational infrastructure, underpinning rapid digitalisation and ROI, without disruption to operations.

An entire ecosystem, in your hands

IoT.nxt is a unique rapid digitisation technology enabler that future-proofs enterprises, helping them leverage existing infrastructure investment and integrate into new technologies. The resulting interoperability and interconnectivity break down data silos and cuts out vendor lock-in.

Our IoT solution allows our clients to rapidly transform their businesses and move into the digital age quickly, and without disruption to operations.

Together with our solution partners, we work with businesses to design digitalisation strategies that are deployed in line with business goals, harnessing the magic that makes each organisation unique.

6 | Repeatedly measure for constant improvement

The solution is not designed to set up and leave alone, it is designed to allow you to continuously improve by receiving relevant data in real-time and to continuously analyse and change the rules by which you operate as becomes necessary. Energy partners at Minimise USA can facilitate ongoing analysis and recommendations for optimisation.

It's your business. Only better.

To learn more, visit www.iotnxt.com

Contact IoT.nxt Sales to learn more about our ecosystem and to deploy this solution today.