

# **IDC CUSTOMER SPOTLIGHT**

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Exxaro Resources understood that enabling its digital transformation agenda required a major communications upgrade. Working with Tech Mahindra, Exxaro has transformed its corporate and operational networking, delivering improved efficiency and productivity as well as major cost savings.

# Exxaro's Path to Improving Productivity Through Connectivity

January 2020

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# Introduction

Exxaro, one of Africa's largest coal and heavy minerals companies, was formed in 2006 when Kumba's coal and other assets merged with Eyesizwe Coal. Since then, Exxaro has grown, diversifying its asset portfolio in Europe, the United States, and Australia. Today, the company includes coal operations and investments in iron ore, pigment manufacturing, renewable energy, and residual base metals. Although a large proportion of Exxaro's production is consumed by the domestic market, the company continues to expand its international sales year on year.

Since 2016, Exxaro has been on a major transformation journey. The company's objective is to improve safety, operational productivity, and sustainability through investment in infrastructure, driving process improvement and facilitating education and training. Exxaro is leveraging several international partners, and the technology investments it is making include core platforms and data insight management delivered through an agile methodology.

Exxaro recognized early that its communications infrastructure was a limiting factor to the effectiveness of its transformation. With Tech Mahindra, Exxaro has undertaken an upgrade of the corporate software-defined WAN (SD-WAN) to fully connect its many locations across Africa and an investment in a wireless pit network to support deployment of autonomous vehicles and improve data collection and utilization across many aspects of mine operations asthe foundation of process improvements.

### SOLUTION SNAPSHOT

#### **ORGANIZATION:**

Exxaro Resources

#### ORGANIZATIONAL CHALLENGE:

Exxaro needed a communications platform to support its organizational transformation, reduce costs, and improve efficiency.

#### **SOLUTION:**

A corporate network (SD-WAN) and an eLTE wireless network in the pit supporting fleet management, autonomous/semi-autonomous operation, and remote control

#### **PROJECT DURATION:**

- » Two-month implementation of SD-WAN
- » Five-month implementation of LTE-based network and systems

#### **BENEFITS:**

- » 30% cost reduction in corporate communication network and services and 200–300% increase in productivity
- » Increased operational efficiency across many aspects of business and operations (e.g., fleet management improved productivity by more than 50%)
- » Improved visibility and fact-based decision making as basis for process improvements and improved accountability

# **Business Challenges**

Exxaro operates across 13 locations spread in South Africa. Its communications network infrastructure was aging, which limited its ability to scale and meet the demands of the company's transformation agenda. Exxaro's network delivered poor application performance, reliability, and availability, and because application performance depended on dedicated MPLS VPN technology, the network was very expensive to operate. In the mine, the story was similar. As mine management looked at the opportunities for digital transformation as part of their modernization plans across operational safety, productivity, efficiency, sustainability, and yield management, it was clear that communications networks required a major update.

In the past, network upgrades had been a challenge for Exxaro, sometimes taking up to three to four years. The company also had to deal with a lack of resource availability, knowledge, and skills. Given the scale of the transformation Exxaro was seeking to undertake, the company recognized the need for external help to design, implement, and commission a new fit-for-purpose network for the enterprise and in the mine.

Like many mining companies, Exxaro took a traditional approach to business, which was deeply engrained in the company's culture, processes, and mindset. The support of the CEO and his management team in removing roadblocks was important to ensure that these projects were viewed as the first of many new processes and practices that would bring change and new value on the journey to becoming more agile across the enterprise.

### Implementation

Exxaro executives decided initially to tackle the corporate network. The idea was to provide visibility of the benefits of improved communications to staff firsthand. Then, in the second stage, the company could focus on the larger and more complex transformation of mine operations, even though the operational network and systems yielded greater transformational value from improved communications capabilities.

#### Phase 1: Corporate WAN

During the procurement process, Exxaro had detailed discussions with both local and international companies and ultimately selected Tech Mahindra. This decision was based on the vendor's technical knowledge, experience with successful deployments of similar projects, and modern architecture, technology, and delivery proposal. Tech Mahindra's design proposition included a central controller (Huawei SD WAN Controller) at Exxaro's corporate office and replacement of customer premises equipment at all major sites with Huawei AR1610-X6 routers. Exxaro's MPLS VPN was replaced by internet links, and internet links from four internet service providers were also retired. Bandwidth optimization across the entire network was delivered to provide low-cost maintainability. Exxaro leveraged a rightshoring model for delivery and support, enabling significant cost savings.



The increased speed and efficiency of the network significantly improved individual staff productivity by enabling new processes and practices. In many cases, the project doubled and sometimes tripled productivity for transaction processing between sites. Compute upgrades included in the implementation further contributed pull-through benefits (e.g., hyperconversions allowing aggregation at the server level and then backup of critical information to the cloud for further dissection and analysis).

Change management was an important part of the implementation. Tech Mahindra's expertise, methodology, and implementation experience ensured a smooth transformation. Insightful training and coaching were critical parts of that process. Another significant element of the implementation was the partner's focus on outcomes and on where and how it could add value rather than simply make money. That approach won Tech Mahindra the approval of and engagement with staff and management alike, who saw a genuine partner that was vested in leveraging their experience to deliver Exxaro's success. The project was delivered in just under two months with minimum disruption and few crossover challenges, accelerating user acceptance.

# **Corporate and Cultural Challenges**

Within Exxaro, many staff members did not understand the concept of digital transformation and how the transformation could improve their daily work lives as well as the productivity and success of the company. A fear of the unknown figured high on the list of challenges facing management. This made unifying people across the organization a critical success factor. Exxaro's CEO, Mxolisi Donald Mbuyisa Mgojo, personally sponsored this digital initiative as pivotal to Exxaro's growth and modernization strategy. He recognized that all members of the Exxaro family needed to understand and embrace these initiatives if they were to maximize outcomes. He therefore ensured that his management team was fully supportive and communicated the vision so that it would resonate with teams across the business.

Such strong leadership from the top is critical to overcome traditional values and views about the future of mining. The reality is that every staff member needs to participate if change on this scale is to be delivered successfully.

#### **Phase 2: Operations Wireless Network**

The enterprise network (SD-WAN) project delivered enough savings to fund the beginning of the second project — the update of the pit network solutions called PUT. Tech Mahindra was contracted, starting in September 2018, to design and roll out a new pit network at Exxaro's Leeuwpan mine.

The existing mine network solution provided inadequate bandwidth to support modern applications such as fleet management and equipment automation, which were critical elements of Exxaro's mine digitization strategy. In addition, the existing communications system suffered from many connection failures. Further, the opportunity to improve connectivity across the mine meant fewer areas where mine staff and equipment were not tracked and monitored, and this meant a safer workplace.

Tech Mahindra delivered network coverage across four areas of the mine: roads, mining, coal wash, and offload. The solution utilized a Huawei eLTE-based wireless pit network, which consisted of 8 base stations with microwave backhaul connectivity, power backups, and connectivity to 36 mobile mine production vehicles. The deployment included Internet of Things (IoT) solutions covering fleet information, fleet management, autonomous vehicle operations, semi-autonomous vehicle operations, and remote control capabilities. The eLTE provided voice, video, data connection, location-based services, and IoT in a single unified network with industrial-strength stability. The design utilized 15 meter



towers and backhaul capabilities utilizing microwave via two point-to-multipoint links and five point-to-point links. Power backup was achieved through a combination of state power electricity, solar array, battery bank, and diesel generator. Steady-state operation was delivered with 24 x 7 remote monitoring and incident, problem, and change management L1 and L2 support to ensure maximum operational efficiency and service levels.

# **Benefits**

#### Improved Coverage and Bandwidth

The new networking infrastructure delivered significant improvements in safety and resource tracking across the entire site. Improvements included an increased volume of process tracking of people and plans as well as improved access to operations data for management. Early success opened up the opportunity to start collecting additional data across the operation (e.g., engine temperatures, tires pressures, heat, and wear as well as increased vibration caused by poor road condition or grading). The operation could therefore be alerted to operating conditions across the plant and equipment, enabling proactive remediation. Improvements included maintenance of vehicles or roads or the upgrading of operator skills and training as well as how to optimize plant operation, productivity, and costs.

To date, Exxaro has increased the amount of data collected daily in its operations by 200%. This has equated to significant value for the business, although Exxaro has not been able to quantify that value fully as of yet. Improved visibility has helped in the area of accountability. Operators and managers are now responsible for increases or decreases in performance due to the consistent availability of timely data. The data means that when haul rates drop from 10 loads per hour to 5 loads per hour, management can quickly review and discuss this issue with operators, understand the reasons for the drop, and ensure that performance can be improved in the next hour. This accountability has improved management's ability to define productivity consistently and has led to better work behavior from staff. The mine is now delivering on production and productivity KPIs much more consistently.

#### Increased Availability and Reliability

The improvement in networking reliability and availability has meant that operations can execute continuously and run to plan much more consistently. The mine has reduced productivity loss from idle time or nonavailability of equipment. Operations are now more effectively able to manage the dynamic volatility of demand and hence deliver improved utilization overall. Centralized remote monitoring has significantly reduced operating costs and at the same time improved the reliability and service delivery levels to operations staff, which has led to increased productivity across the mine.

#### Leveraging International Experience

By leveraging overseas expertise and procurement capabilities, Exxaro has saved about 30% on the hardware costs of its project. A "rightshoring" model for delivery and support has also achieved significant cost savings over local alternatives while ensuring the comprehensive upskilling of local staff to fully utilize the capabilities of the new network and applications. With all of the proposed applications deployed and 38 autonomous vehicles in service, the solution is utilizing only 20% of network capacity. This provides enormous scope for the operations team to quickly add new applications and capabilities. For example, video surveillance, driver management, mine monitoring, machine guidance for drilling and blasting, and equipment maintenance and health monitoring are planned over the next four to five years. The success of and lessons learned from the first phase of the project have positioned the operations team to focus 100% on where it can deliver value



next rather than having to see each innovation request as another major new project. The new network simplifies the path to digital mining significantly and hence engages both the appetite for and the success of future projects.

A further benefit from leveraging overseas skills and experience came in speed of deployment, with this project taking only five months from signing to full operation. The ability to draw on global experience was invaluable in the creation and delivery of high-quality operating procedures and processes for field staff. In addition, the increased availability of the network and communications allowed for new ways of delivering situational training and coaching support for operators. Now they can access operating procedures online while in the mine and secure a call with an instructor to walk through new practices and processes. Previously, all training had to be desk based; the new network made a very big difference, reducing ongoing training costs and improving skills and implementation adoption as it gave operators the tools and opportunity to self-improve with instructor assistance at any time they felt that they or their supervisors needed it. Operators were extremely positive about these changes and supportive of how the company was investing in the improvement of their capabilities and skills development in a very personalized and effective way.

This leveraging of overseas expertise brought the additional opportunity to review, measure, and update operational KPIs and then more effectively track and manage them. It also ensured that 100% of operation staff involved in this project fully understand and support the importance, scale, and value of opportunity available from the adoption of digital.

# Methodology

This project and company information contained in this document was obtained from multiple sources including information supplied by Tech Mahindra and Exxaro in discussions with IDC and key stakeholders as well as corporate documents made available to IDC.

# **About the Analyst**



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