

DATA INTEGRATION

Vale achieves yearly benefit of \$600m

Global mining giant uses Qlik to enable optimized planning, logistics and sales





CUSTOMER STORY

“Once we saw its benefits on Centro de Operações Integradas (Integrated Operations Center or COI) we set Qlik Data Integration as our information integration architecture for the whole enterprise.”

Jordana Reis, Enterprise Integration Architect, Vale S.A.

An end-to-end industry giant

Brazil's primary economic sector comprises critical industries such as agriculture, forestry and mining, all of which act as key sources of food, fuel and raw materials. Business units range in size from subsistence smallholdings to global giants with worldwide operations. And at the apex of the mining industry sits Vale S.A.

Founded 80 years ago, the Brazil-based metals and mining corporation is the world's largest producer of iron ore and nickel. Vale is also the most valuable business in Latin America, with an estimated market value of \$111 billion and rising, and a presence in 30 countries.

While mining remains the core of its business, Vale's operations also encompass logistics, including an extensive network of railroads, ports and blending terminals, and shipping which distributes the company's products across the world. Also supporting its operations are Vale's own power plants and iron pelletizing facilities.

Vale's dry bulk supply chain is also a large-scale service, and one of the biggest transport and distribution operations in Brazil. Vale owns around 490 locomotives and more than 29,500 rail freight cars, and ships much of its iron ore and pellet output from Brazil, around the African coast, to China and Malaysia, often in its own or chartered vessels, including Very Large Ore Carriers (VLOCs).

Long distances and complex processes

Managing Vale's global operation involves a series of complex and resource-intensive distribution processes. These were placed into sharp focus in 2015 when the business faced falling commodities prices and an increasingly competitive market.

Solution Overview

Customer Name

Vale S.A.

Industry

Mining

Geography

Brazil

Function

Sales, Supply Chain Management

Business Value Driver

New Business Opportunities, Reimagined Processes

Challenges

- Improve visibility across previously manual and disconnected processes
- Deliver near real-time access to critical business information
- Enable staff across different functions to carry out integrated planning

Solution

Using Qlik® Data Integration to handle and automate ETL processes, Vale developed the Integrated Operations Center to provide a clear overview of the supply chain.

Results

- Qlik Data Integration enables low latency ETL processes and ease of use
- Business benefits topped \$300 million after just one month of operation
- Staff can now build their own custom dashboards in minutes

“The geographic distances we cover, from the extraction of iron ore to delivery to customers, are very long,” says Jordana Reis, Enterprise Integration Architect at Vale. “That becomes an even bigger issue when our main competitors are closer to our buyers than we are.”

Vale’s operations were managed by a series of manual and largely disconnected processes, with different departments handling their own functions and using their own methodologies, often with legacy systems. “There were people looking at the mining aspect, people looking at ports, people looking at sales, but we didn’t have an integrated view of these operations,” explains Richardson Nascimento, Data and AI Architect at Vale. “That was the process we needed to fix.”

This lack of an integrated view of the business was causing a range of challenges, including mismatches between production and transport capacity, logistical inefficiency and product quality management issues. “We were also missing out on valuable sales opportunities, simply because we didn’t know if we could fulfill them,” recalls Reis.

New ETL processes accelerate insight

Vale developed the Centro de Operações Integradas (Integrated Operations Center, or COI) as an operating model. One of its pillars is to provide a means of aggregating and processing the vast amounts of data it was generating but only partially using. The COI would then act as a central framework, updated in near real time, on which Vale could base decisions, better manage its production and supply chain and support its people and processes.

“When we realized how much data we would need to move to really enable COI, we started thinking about how we could automate the process,” says Nascimento. “The main driver was low latency replication. We had a target to move all this information in less than 15 minutes, and Qlik Data Integration was clearly the best option.”

Vale collaborated closely with both Microsoft and Qlik teams during the purchase process. “Both teams were very active and interested in making COI happen,” says Reis. “They gave us honest opinions and helped us to achieve our goals.”

COI uses Qlik Replicate IaaS with Microsoft Azure in tandem with a range of data repositories such as Azure SQL Database and Azure Synapse, with Qlik Replicate acting as the principal enabler of the process. Another key factor in the choice of Qlik Data Integration was agentless operation, and its efficiency in reading application databases and transaction logs without impacting their activity.

COI’s main data sources are Vale’s in-house Manufacturing Execution Systems (MES), responsible for each stage of the value chain (Mining, Rail, Ports and Pelletizing), all based on Oracle databases; the chartering system Softmar and VesselOps, based on SQL Server; and Vale’s in-house value chain optimization systems, also based on Oracle databases.

Nascimento also points to Qlik Data Integration’s importance in supporting tools such as Azure Databricks as part of Vale’s strategy to use machine learning and artificial intelligence to augment human decisions. Vale is using several tools for big data processing, such as Azure Machine Learning. “That’s one of the tools that we’re trying to leverage more,” he notes. “Azure Machine Learning is simple to use and easy to teach.”

Importantly, Reis highlights Qlik’s ease of use and speed of implementation and operation. “It changed our extract, transform and load (ETL) process and how we make data available,” she notes. “We reduced the effort to make data available to build less complex dashboards, for instance, from four weeks to just four hours.”

Velocity and visibility of information

COI began to deliver benefits almost immediately on its launch in 2017. It enabled a new integrated planning process, giving staff across the business full visibility into the supply chain improving the ability to manage their respective operations in a collaborative environment.

“Everything related to operations is now under COI’s umbrella,” says Nascimento. “It covers the mines, the ports, railroads, shipping and sales and freight negotiations. COI enables planning and optimization across the supply chain.”

Users can now define and build their own dashboards, while corporate dashboards also enable insights and support decisions at board level. COI’s value is neatly encapsulated in Vale’s videowalls, giant room-sized panels featuring custom dashboards that enable cross-functional collaboration. “Everybody’s in the same place,” says Reis.

“They can talk to each other and see the same information on different dashboards updated in near real time. That’s the kind of interaction Qlik is enabling.”

Nascimento also highlights Vale’s asset monitoring center, which uses a similar and connected operating model to COI that combines with other tools to provide insights into asset lifecycles, enabling preventive maintenance and extending the efficiency and working lives of machinery, plant, vehicles and more.

“It’s not just about the speed of the decisions, but that we can make different types of decisions,” Nascimento explains. “We can now adjust production in line with logistical capacities, for example. And that’s transformational.”

Multi-million dollar savings

The initial launch of COI in 2017 delivered staggering results almost immediately, enabling business benefits in terms of sales won, costs saved and efficiencies gained totaling \$300 million after just one month of operation and \$600 million annual savings.

This, however, is just the start. COI is what Reis describes as “a lighthouse project”, with the data architecture implemented by the Integrated Operations Center and enabled by Qlik now used across multiple other projects covering areas such as safety, geotechnical methods and autonomous machinery.

“Our long-term strategy is based on Qlik and Microsoft Azure. Once we saw the benefits on COI, we set Qlik Data Integration as our target information integration architecture for the whole enterprise,” concludes Reis. “We also have a program to migrate as many systems as possible to Microsoft Azure, including our data repositories for analytics. And of course, we will use Qlik Data Integration and Qlik Compose there too.”

The keys to success



\$300M

in business benefits achieved
in just one month



\$600M

benefits
per year

“Everybody’s in the same place. They can talk to each other and see the same information on different dashboards updated in near real time. That’s the kind of interaction Qlik is enabling.”

Jordana Reis, Enterprise Integration Architect, Vale S.A.



About Qlik

Qlik’s vision is a data-literate world, where everyone can use data and analytics to improve decision-making and solve their most challenging problems. A private company, Qlik offers real-time data integration and analytics solutions, powered by Qlik Cloud, to close the gaps between data, insights and action. By transforming data into Active Intelligence, businesses can drive better decisions, improve revenue and profitability, and optimize customer relationships. Qlik serves more than 38,000 active customers in over 100 countries.

[qlik.com](https://www.qlik.com)