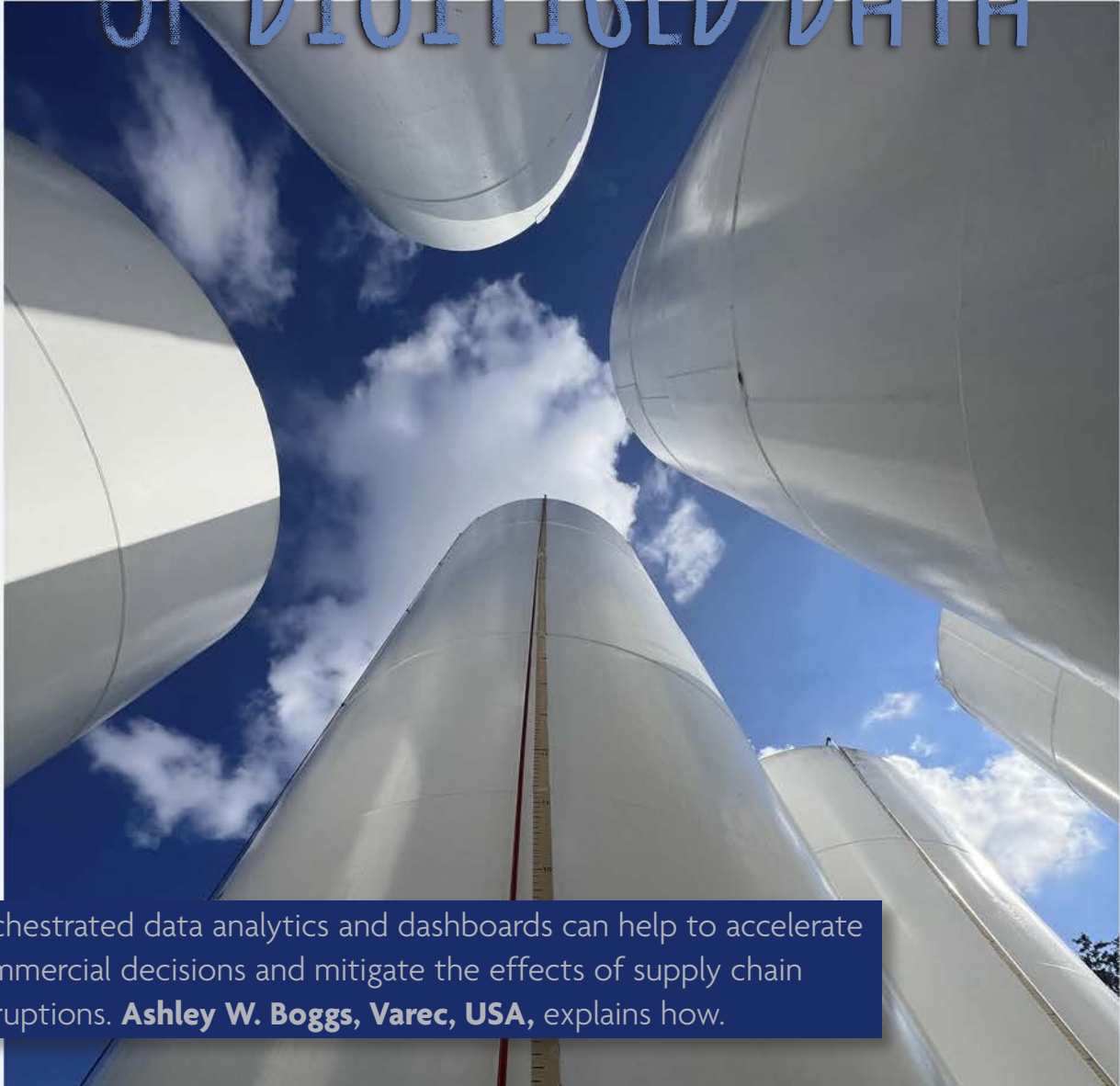


HARNESSING THE POWER OF DIGITISED DATA



Orchestrated data analytics and dashboards can help to accelerate commercial decisions and mitigate the effects of supply chain disruptions. **Ashley W. Boggs, Varec, USA**, explains how.

Whatever the scale of an operation, harnessing the power of data is essential. It does not matter if there are a few terminals or a dozen, measurement and control have become crucial for ensuring reliable supply chains, security, and protecting human life and the environment.

Much like oil, data provides little value if it is unrefined. To enhance its resilience, minimise risks, and increase efficiency, a business must turn to digitisation and data solutions like the cloud.

The need for this change has never been more apparent, or so urgent. According to the American Petroleum Institute (API), the war in Ukraine, tight energy markets, and demand outstripping supply have escalated the bullwhip effect on the global supply chains for oil products, including LNG, LPG, and

other biofuels. In other words, even the smallest issues at the end of the chain are having a larger impact upstream.

The resulting supply and demand issues have pushed producers and distributors to consider new markets, innovative models, and novel ways of doing business with more sustainable and controllable outcomes.

A report by The Insight Partners estimates that the global fuel management system market will grow at a CAGR of 9.82% over the next few years, taking it from US\$1084.64 million in 2021 to US\$2089.56 million by 2028.¹

In the value chain, measurable improvements can be obtained rapidly by digitising and automating fuel system measurement and controls. The industry's latest visualisation tools, delivered by cloud providers, leverage artificial intelligence (AI) and machine learning (ML) to look inside the data.



Figure 1. KPI dashboard for multiple sites.

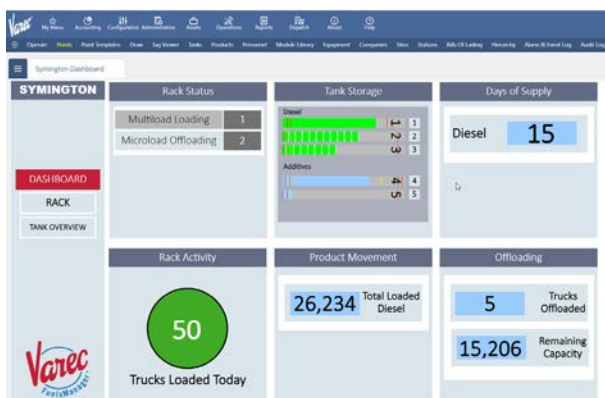
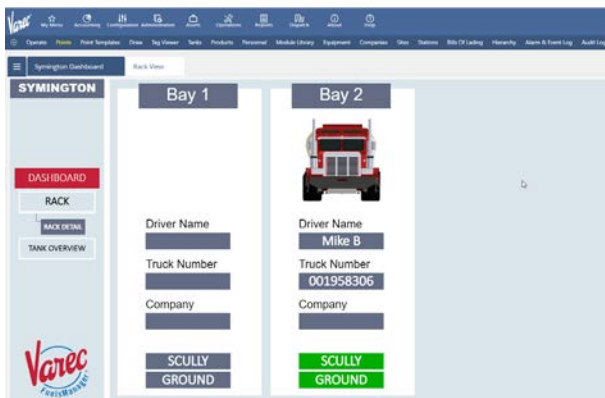


Figure 2. Tank, truck, and terminal graphical dashboards.

Data analytics and dashboards are unleashing powerful new capabilities for the world of measurement and control for liquid supply chains.

Digitised data: linking the supply chain from start to finish

Digitising data in the field can support better business outcomes with instrumentation in bulk storage facilities helping to enable data centralisation and visibility. Bulk measurement devices, including mechanical and radar gauging, temperature sensors, vibration sensors, and level indicators, all produce data that is digitised and transmitted through a communications interface such as a remote terminal unit (RTU). That information is then transferred back to an enterprise system via centralised and distributed software in the cloud.

In this new data-driven world, the amount of information is now measured in petabytes, not terabytes. This increase in data has, in turn, increased the cost and security vulnerabilities associated with operating network servers.

The sheer amount of data collected can be overwhelming. Examples of the types of data collected at most terminals include:

- Tank gauging – automated collection and analysis of inventory level, temperature, and product movement in real-time.
- Inventory control analytics – analysis of inventory, turnover, receipts, and disbursements for predictive inventory control.
- Automated fuel management analytics – real-time visibility of stock to ensure efficient distribution, storage, and management.
- Terminal automation – real-time analysis of inventory systems, field instrumentation, and transactions to ensure efficient and safe loading.
- Tank farm maintenance – provides a view of operational efficiency to achieve optimal equipment performance and maintenance.

Other types of tank and terminal data include ambient temperature, vibration sensors, pipeline schedules, fuel prices, maintenance and labour schedules, maintenance and labour costs, weather, buyer and seller data, and other third-party data.

The cloud has reversed this paradigm, giving major cloud hosting providers the ability to store the data. The unlimited server storage has enabled data that has been collecting for years to finally be harnessed. Analytics tools enable services to be improved and can create a competitive advantage.

The purpose behind harnessing this data is to move from collecting information to using it for optimisation and foresight. Extracting maximum value from the data depends upon informed analysis. Prior to digitised data, this was a laborious process, often performed by a data scientist, which involved setting up a link to an FTP server, downloading data for hours, uploading data for hours, processing data for hours, and then starting to get some of the key indicators that inform analysis and findings.

The ability to combine third-party and vendor data to share supplier information has become commonplace with the emergence of software integration but remains a new frontier for many organisations. Nonetheless, cloud computing is here to stay, serving up massive economies of scale to those who embrace it.

Operating in the cloud means that data is shared – there is no data transfer or loss of data integrity, so overall errors are significantly reduced even as the speed of perception and insights are drastically improved. Better yet, the analysis can now be performed by all levels of management, no longer requiring advanced data science skills. The engineer and terminal managers are the new data scientists.

The connected cloud data creates a ‘data lake,’ making the analysis and management of data more secure, reliable, easier, cheaper, and faster. Additionally, the software to process this data has moved to the cloud with it, enabling even tighter security controls than can often be accommodated on company servers, helping to ensure that the processing and visualising of that data is performed only by authorised users.

Dashboards: helping to improve fuel system management

With visualisation and observation, using AI and ML, comes the ability to enhance and control outcomes that prevent disruptions.

Dashboards are the newest way for marketers, engineers, and company leaders to behave like data scientists, applying new strategies, planning, and analytics to grow their business.

Using dashboards has become a new strategy for visualising data, going beyond simple trends to help predict operational and supply chain failures before they can ever happen. Dashboard software has already accelerated the value chain for data by embedding existing algorithms for ML and AI.

Integration of data across the Enterprise has become scalable with the latest cloud computing advancements. By plugging data into new analytics and dashboard applications, different functions can more easily search and filter to view charts, scatter diagrams, trendlines and forecasts in time, seeing opportunities for new and improved outcomes.

Systematically leveraging historical data and applying it to new use cases also drives improved business decisions and allows for much greater planning capabilities. The ability to visualise inventory levels, temperatures, and product movements in near real-time, across all sites, terminals, and tanks, helps to ensure that the organisation is operating at its most efficient level.

Advanced planning, using this forecasting capability, can prevent an operator from running out of stock of a fuel asset at peak times, by applying seasonal trends to supply and demand quotients. Whether you are managing fuel for an oil company, airline, or defence agency, applying this analytical approach of automating analysis empowers terminal operators and key leadership to understand their business better, to make more informed process improvements for enhanced business outcomes and, hopefully, higher profits.

Conclusion: take advantage of the power that data analytics delivers

Harnessing the combined power of digitised data, the cloud, and dashboard software empowers business leaders and data scientists, making it easier to gain the insights needed to become the new saviour of business, as a forecaster of value.

Seeing is believing, so with the increasing prevalence of dashboard solutions, it is no wonder that most companies – upstream, downstream, or in between – are looking to leverage

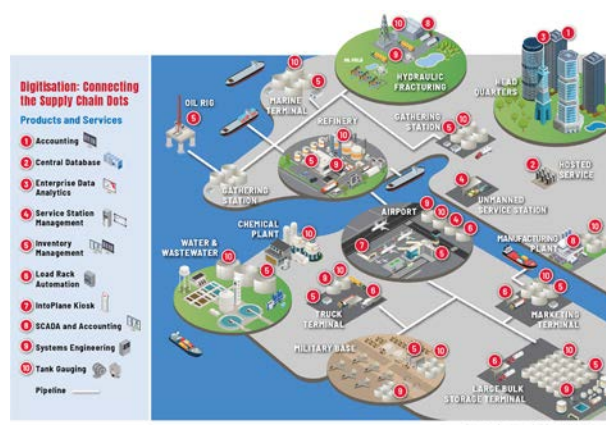


Figure 3. Digitised fuel management supply chain.

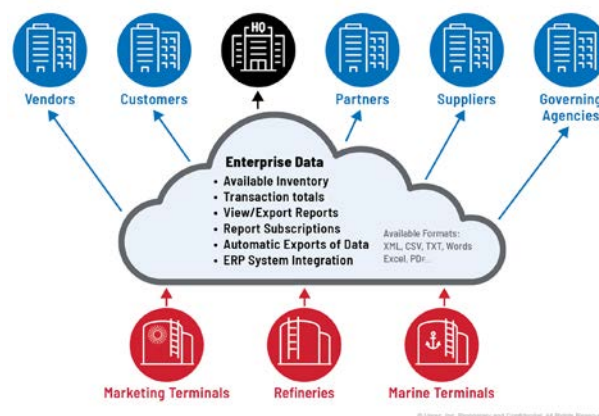


Figure 4. Enterprise data for fuel management.

dashboards to understand the most important facets of their products. Viewing inventory, movement, temperature, vibrations, frequency, or other key performance indicators (KPIs) is essential to measurement and control, especially when data is viewed in virtual real-time.

Currently, most staff probably set aside at least a day or two for ongoing reporting each month, possibly every week. Imagine a new realm of sitting down to a dashboard with every metric that you have been trying to analyse across product, time, and vendor, with the simple click of a button.

New dashboards provide a revealing look. The more questions one asks of it, the more the technology makes analysis a relatively fast process with many flexible options for filtering, searching, trending, and displaying data across multiple sites, products, and time periods.

Finding informed answers to the ‘what if’ questions about business becomes possible, allowing the exploration of innovative solutions to the challenges currently facing supply chains. AI-powered solutions will help to effectively measure and track fuel stocks, controlling the gap between supply and demand.

The advantages are truly worthwhile: significant savings in time and cost, and the ability to focus and invest in more strategic growth initiatives with tighter control and enhanced security. ¹^{T&T}

Reference

- <https://www.theinsightpartners.com/reports/fuel-management-system-market>



Key Software Features:

- Browser-based Application
- Intuitive Interface
- Kiosk View Mode
- Automatic Alarm Notifications
- Enhanced SCADA Functionality
- Compatible with PLC, DCS and Remote I/O Devices
- Extended Tank Functionality
- Modify Standard Templates
- Tank Group
- Tank Details
- Enhanced Archiving and Trending
- Audit Trail
- Imports/Exports
- OPC UA Integration
- Event Based Data Collection
- Alarm Management
- Tank Transfer Management
- Point Calculator
- Tank Trends and Configuration
- Automated Print Scheduler
- Gauge Commands/Status
- Customized/Standard Inventory Reports
- Configuration Data Imports/Exports
- Audit Trail

For more information or a demo of FuelsManager software, email sales@varec.com or call Jerry Kingston, Software Sales at 817-201-1058