

DON'T JUST GO WITH THE FLOW

Kevin Niles and Sandy Tiu, Emerson, USA, explain how choosing the right software can drive dramatic improvement in terminal operations, increasing efficiency and delivering return on investment.

The liquid commodities market is in a state of rapid growth. Exporters are expanding their operations to send LNG, as well as new types of low-carbon refined products and biofuels, from countries such as the US and Europe into South America and Asia. Simultaneously, crude oils are being imported to and exported from the US, while other critical feedstocks are imported to the US, Europe, and many other countries. As the market increases, the demand for terminals is growing. Large companies are acquiring existing terminal facilities, and venture capitalists are supporting greenfield projects by building new facilities around the globe.

Rapid growth and expansion can bring massive returns, but it can also present problems if organisations are not prepared. As companies introduce new products into their terminals and acquire new assets – or even attempt to do more with what they already have – they must find ways to optimise those assets to expand operations without needing to grow or overtax their workforce. To accomplish this, forward-thinking organisations are turning to digitalisation by using software to increase throughput and efficiency – ultimately increasing standardisation, safety, and performance while simultaneously delivering higher profitability.

Cultivating a cohesive digitalisation vision

In large ports around the world, the many vessels coming and going can choose a wide variety of terminals. The companies operating those vessels make decisions based on their own business objectives. They will select facilities that have a reputation for efficiently offloading their product, protecting it, and moving it through the terminal as quickly as possible. Doing so means more sales for their product, whether it comes from their own refineries, pumping stations, or other sources.

If one terminal can turn a vessel around in 12 hours and another takes 18, this time difference will be a significant factor in facility choice, as customers can use the extra time to turn their vessel around, get more product into it, and send it elsewhere. Increasing business often means capturing that time deficit, because terminal efficiency helps customers meet their own objectives.

To capture that difference, a facility needs to maximise its known throughput capacity. Downtime or slow time in operations leads to decreased throughput, making a facility far less competitive. Today, many organisations are eliminating downtime and slow time by implementing order-to-cash software, which digitalises operations by collecting the information surrounding a customer's order for the movement of product into, out of, or within the facility.

As the movements occur, the software automatically creates a movement ticket, providing visibility of the entire process, while tracking customer inventory by terminal, tank, or product. Following the completion of the movement, the software updates the contractual service charges, including leasing of tanks, the throughput itself, and even ancillary services, such as heating tanks and line flushes (Figure 1).



Although software tools, such as order-to-cash applications, have existed for some time, many organisations are just getting started on their digitalisation journey. The value of traditional investments, such as those into hardware and safety equipment, are easy to understand, as they are necessary to move product and protect personnel and the environment.

However, software investment is just as important. Once a team has a vision and an automation software solution in place, the terminal – or even a series of terminals - can operate as a cohesive, interconnected ecosystem for increased efficiency. With order-to-cash software in place, teams know what to move, where to move it, and how to do so, while minimising contamination and time-consuming line flushes. The terminal will increase throughput and optimise facility operations so that product moves faster for customers.

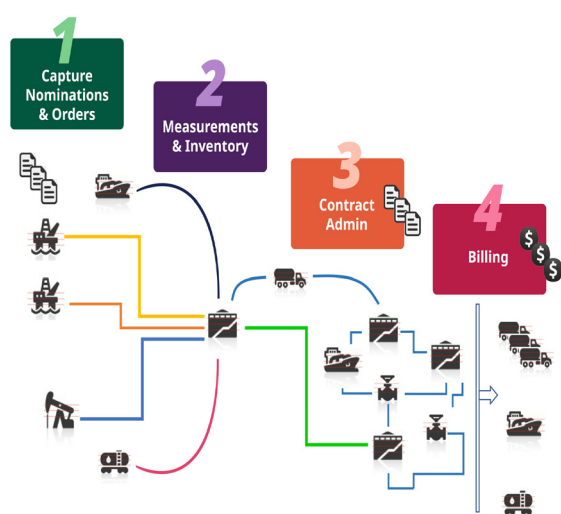


Figure 1. Terminals consistently move more product into and out of the facility and invoice for it with greater speed and accuracy using advanced order-to-cash automation.

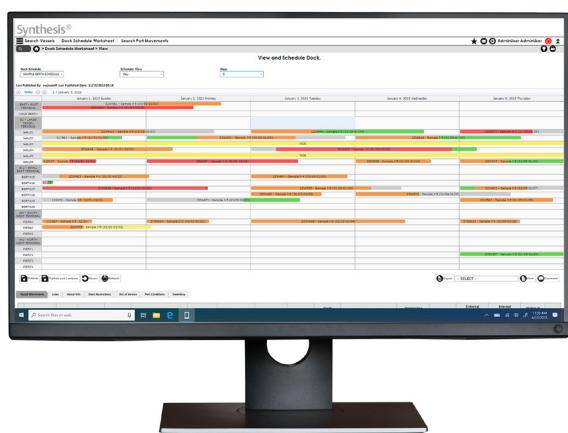


Figure 2. The dock worksheet within Emerson's synthesis software colour codes orders in the system to provide users with a consolidated view of dock activity by terminal.

Embracing such a digitalisation vision leads to dramatic improvements across the facility and, potentially, across the enterprise.

Improved visibility and efficiency

At its most basic level, order-to-cash software helps an organisation improve visibility across the facility. A complex network of pipes, valves, and tanks dominates any terminal, and finding a way to navigate that web takes time and expertise – two things that are often in short supply. In fact, scheduling these transactions is one of the leading causes of excessive downtime and slow time in terminal facilities. Teams scheduling transactions manually often take too long to stop one process and start the next.

For example, teams often must flush lines to facilitate product movement without contamination. The flushing process can easily take hours, which is downtime where the terminal is not generating revenue.

Order-to-cash software can automatically plan movements so that they pass through the most efficient routes without mixing products. Built-in algorithms track the products, bringing in a batch, splitting it into different pieces, and moving those pieces through different tanks – avoiding mixing where necessary, and automatically mixing where desirable. Movements are optimised to make the most of every hour of each day, and they are automatically tracked all the way back to the original batch, so that operators have a complete, reliable paper trail for auditing.

Because actions are recorded in near real-time, operators have continuous visibility of what is happening across the facility, helping them to make better decisions. With cloud connectivity, these reports can be made available securely and remotely, helping members of a lean staff monitor their critical activities from anywhere, empowering them with more mobility and easier collaboration (Figure 2).

However, improved visibility does not stop at the facility level. Easy scalability enables an organisation owning a series of terminals in different parts of the world to still view them within a single instance, hosted in the cloud or on premises. Digitalisation tools support a boundless automation vision where teams eliminate data siloes and enterprise personnel can see everything that is happening across their fleet from a single view, from anywhere. Enterprise teams can monitor inventory or follow up on problems as they occur. Transactions are updated in real time in the system, from ordering and processing, all the way to invoicing, and everywhere in between.

With the most advanced order-to-cash software and the required connectivity, organisations can even extend visibility to their customers' customers. A customer can instantly see how much inventory it has and where it is, so that business decisions can be made about how and where to ship product.

Efficiently navigate external hurdles

Every region has unique elements to its operations, and fit-for-purpose digitalisation solutions will take these nuances into account. For example, European operations must navigate the complexity of customs clearance as products are exported and imported between countries.

Using manual processes, customs delays are a common occurrence. Between phone calls, faxing and emailing,

documents can easily get lost, thus causing delays. If customs processes are delayed, vessels are stranded. Those stranded vessels block other vessels trying to move in or perform operations, ultimately creating a chain reaction that leads to missed deadlines and confused schedules for both the terminal and its customers. In the worst scenarios, that chaos can lead to demurrage that can generate tens of thousands of dollars in fees.

Order-to-cash solutions streamline the customs process through business-to-business connections with the customs authority. As a batch is processed through a terminal, order-to-cash software can process the customs application and automatically submit the data to the proper customs authority.

Customs can then digitally return clearance, at which point the order-to-cash software automatically updates status and documentation, allowing the vessel to depart whether clearance was granted in the middle of the afternoon or the dead of night.

Other complexities can be tied to product types. For example, transporters of LNG need the flexibility to track product in different ways, including both volume and calorific value. The most advanced software solutions can convert from mass to volume to British thermal units in support of liquefaction and regasification.

Improved safety

In any terminal, when product is moving from tank to tank, or moving out of the facility, teams need to follow essential safety precautions. In fact, any time the team operates a pump or opens a valve, a series of safety protocols must be followed. Safety procedures typically consist of a checklist of operations to perform critical tasks safely, and those checklists must be monitored by supervisory personnel, often needing sign-off. Many operators are still performing these tasks on paper, which not only leads to inefficiencies in the process, but also risks creating safety hazards due to oversights.

Terminals can dramatically improve their safety and efficiency through digitalisation, taking advantage of the automated safety tools built into order-to-cash software.

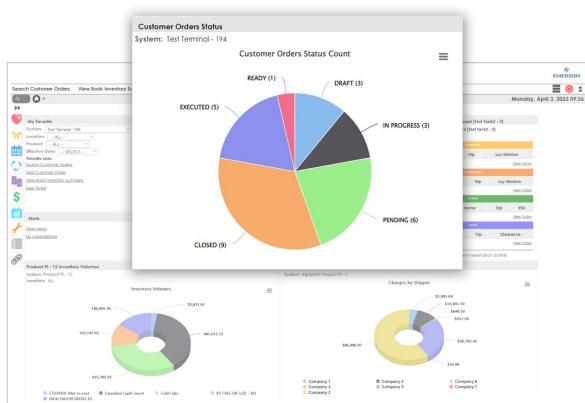


Figure 3. Terminals can easily track and confirm order status by customer using the comprehensive dashboard with Emerson's synthesis order-to-cash software.

Using a supported and intrinsically safe handheld device, operators and technicians can perform safety checks in real time, and those checks – and their results – will be instantly available to others in the facility.

Supervisors can oversee operations from anywhere, and they can sign off digitally to ensure operations are not interrupted because a critical person is off duty or hard to find, for example. Moreover, those same safety reports can be instantly and automatically transferred to the enterprise, where personnel can use the data to track and trend safety and reliability issues across the whole fleet.

Digitalisation in action

One terminal operator needed to improve visibility and efficiency for servicing a customer that was sending hundreds of trucks into the terminal each day to lift petrochemical products. The company only had two customer service representatives, and needed a way to streamline the transaction process to move product more efficiently and effectively.

Using its order-to-cash software, the terminal was able to use application programming interfaces to connect directly to the customer's enterprise resource planning software to create a round-trip business-to-business software system for faster transaction processing. Today, the customer simply submits hundreds of truck lifting orders electronically on a daily basis.

The automation software at the terminal then schedules and executes the process. Once the operation is complete, an invoice automatically goes back to the customer to let them know what was moved and how much it cost. The entire process is hands-off, and the terminal operator can easily complete all operations with their lean staff.

Such an automation configuration is advanced but is also entirely possible – especially when terminal organisations work closely with a trusted automation partner to select and implement order-to-cash solutions. Even after the software is live, a trusted partner can continue to support customers, for example by helping a terminal operator set up new contracts, along with automation that has never been attempted before, helping customers to stay nimble and efficient, even as operations change (Figure 3).

Moreover, software and cybersecurity continuously evolve. The best automation suppliers will regularly update their order-to-cash software with new features to improve cybersecurity and functionality.

Moving to the digitalisation mindset

Digitalisation of a terminal's processes is about more than simply implementing software and technology; it requires a mindset change. A terminal can continue to run the traditional way – emailing records, manually scheduling transactions, and keeping individual terminals siloed from each other. However, the organisations that will best compete as the industry evolves with newer products and increased economic pressures will be those that implement software solutions to help them better manage efficiency and maximise throughput.

Just as with operational and safety equipment, software is an investment, but it is one that will pay significant returns in the decades that a terminal operates, not only through increased revenue, but also in improved goodwill and loyalty from customers. 