



## E-Guide

# The future of **load planning**

Smarter planning through automation, optimization, and AI

For the modern manufacturer, optimizing logistics and transportation processes is no longer a luxury but a necessity for maintaining competitiveness. Every inch of truck space and every minute of transit time counts. Maximizing truck capacity and streamlining load planning operations are critical strategies that lead to higher efficiency, lower costs, and better sustainability.

### In this guide

In this guide, you'll explore how modern load planning technologies improve transportation efficiency and support more consistent execution.

# Introduction

Many companies struggle with inefficient load planning, leading to rising delivery costs and missed deadlines. This isn't just a logistical headache; it impacts the bottom line.

This guide addresses these challenges head-on, offering key insights into the current state of load building and how modern optimization technologies can address inefficiencies. We'll explore how AI-supported load planning can help organizations improve planning accuracy and efficiency. By automating and refining load planning, companies can optimize truck capacity utilization, minimize empty miles, optimize delivery routes, reduce waste, and streamline your supply chain.

Our exploration begins by presenting the current state of automated load planning and the persistent issues facing manufacturers, CPG producers, and distributors. Then, we will dissect four distinct optimization scenarios to highlight the operational advantages of carton, pallet, and load space optimization. These technologies offer promising pathways not only to achieve cost reductions but also to align with sustainability goals and improve service reliability.



We will also showcase a compelling case study from Benjamin Moore, demonstrating the tangible benefits of data-driven load building. By implementing ORTEC's AI-powered technology, Benjamin Moore surpassed its sustainability targets, significantly improved operational efficiency, and achieved outstanding ROI.

# The current state of automated load planning

New data reveals challenges in maximizing truck capacity, increasing delivery costs, and the need for AI-driven load planning solutions.

The results of our recent industry survey show that inefficient load optimization is a persistent challenge for many organizations, leading to higher operational costs and delivery inefficiencies. Consider these findings:



25%

of companies identified poor load optimization as a primary contributor to rising delivery costs.

40%

reported that their outbound trucks depart with less than 90% capacity utilization.

22%

stated that inefficient truck loading directly affects their ability to meet last-mile delivery commitments.

Presented to more than 2,500 manufacturing, logistics, retail, and transportation professionals, the survey highlights how maximizing truck capacity is becoming a major priority, as businesses navigate fluctuating fuel prices, increasing demand for faster deliveries, and mounting pressure to reduce carbon footprint. Organizations continue to struggle with key barriers to efficient load planning. The biggest obstacles to optimizing truck loads include:

- Inadequate load planning software
- Order processing delays
- Lack of real-time visibility into warehouse operations

The impact of these inefficiencies is considerable, resulting in wasted fuel, higher costs, and unnecessary environmental impact.

Despite these issues, many companies are still in the early stages of leveraging technology to improve load optimization. ORTEC’s findings reveal that while a quarter of organizations have successfully implemented AI-powered load planning solutions, a significant number are still relying on manual processes or outdated software.

With increasing adoption of automation and AI in logistics, businesses have an opportunity to improve utilization, reduce costs, and support better planning decisions by investing in advanced load planning technologies. AI-powered tools and real-time data analytics allow companies to maximize capacity utilization, minimize costs, and enhance overall supply chain efficiency.

”

Many companies are leaving money on the table due to inefficient load optimization. By utilizing AI-driven planning solutions, businesses can ensure better truck utilization, reduce empty miles, and improve delivery accuracy, ultimately leading to cost savings and greater operational efficiency.

# How can carton, pallet, and load **space optimization** add value for my company?

When engaging with companies regarding pallet and load optimization, companies typically focus on improving pallet and truck utilization, automate planning processes, and enhance warehouse efficiencies. While these goals are pivotal, it is essential to recognize the broad impact of carton, pallet, and load space optimization across various your operational processes.

By integrating optimization capabilities in the planning phase, companies can significantly enhance downstream activities, spanning supply, sales, logistics planning, pallet picking, warehouse layout, automation, staging, vehicle loading, safety protocols, unloading efficiency, and meeting customer-specific requirements.

Optimizing carton, pallet, and load space significantly enhances efficiency and cost savings. We explore how load optimization technologies help improve utilization, execution, and transportation efficiency.

Maximize your logistics efficiency with carton, pallet, and load optimization. Learn how optimization supports warehousing, transportation, and operational performance.

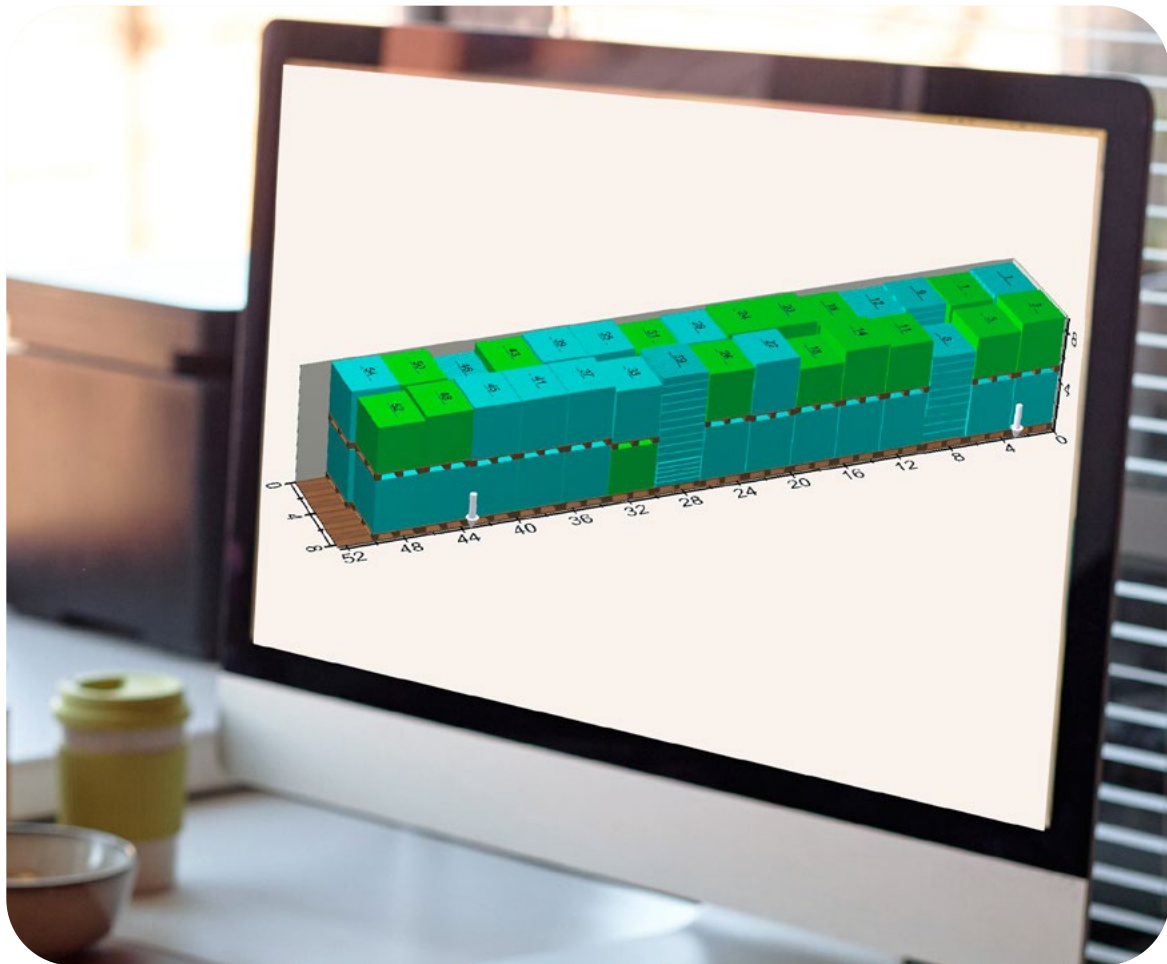
Advanced optimization helps organizations account for these variables more consistently and efficiently. This approach supports informed decision-making and operational excellence, aligning with overarching business objectives.

In this section, we explore four key areas where companies are leveraging ORTEC's pallet and loading solutions, shedding light on the operational advantages associated with each application.

# Carton, pallet, and load optimization scenarios

Carton, pallet, and vehicle optimization adds value across your supply chain. Implementing optimization in one area supports subsequent processes, impacting operational efficiency throughout the organization. Here are four scenarios where companies have used these technologies to reduce costs and improve operational performance. Keep reading for more information on how they did it.

**Implementing optimization adds value across your supply chain**  
Optimizing one area supports subsequent processes, impacting operational efficiency throughout the organization.



1. Intercompany, demand-based, and FTL planning



2. Order management



3. Multi-stop pallet and load optimization



4. Warehouse



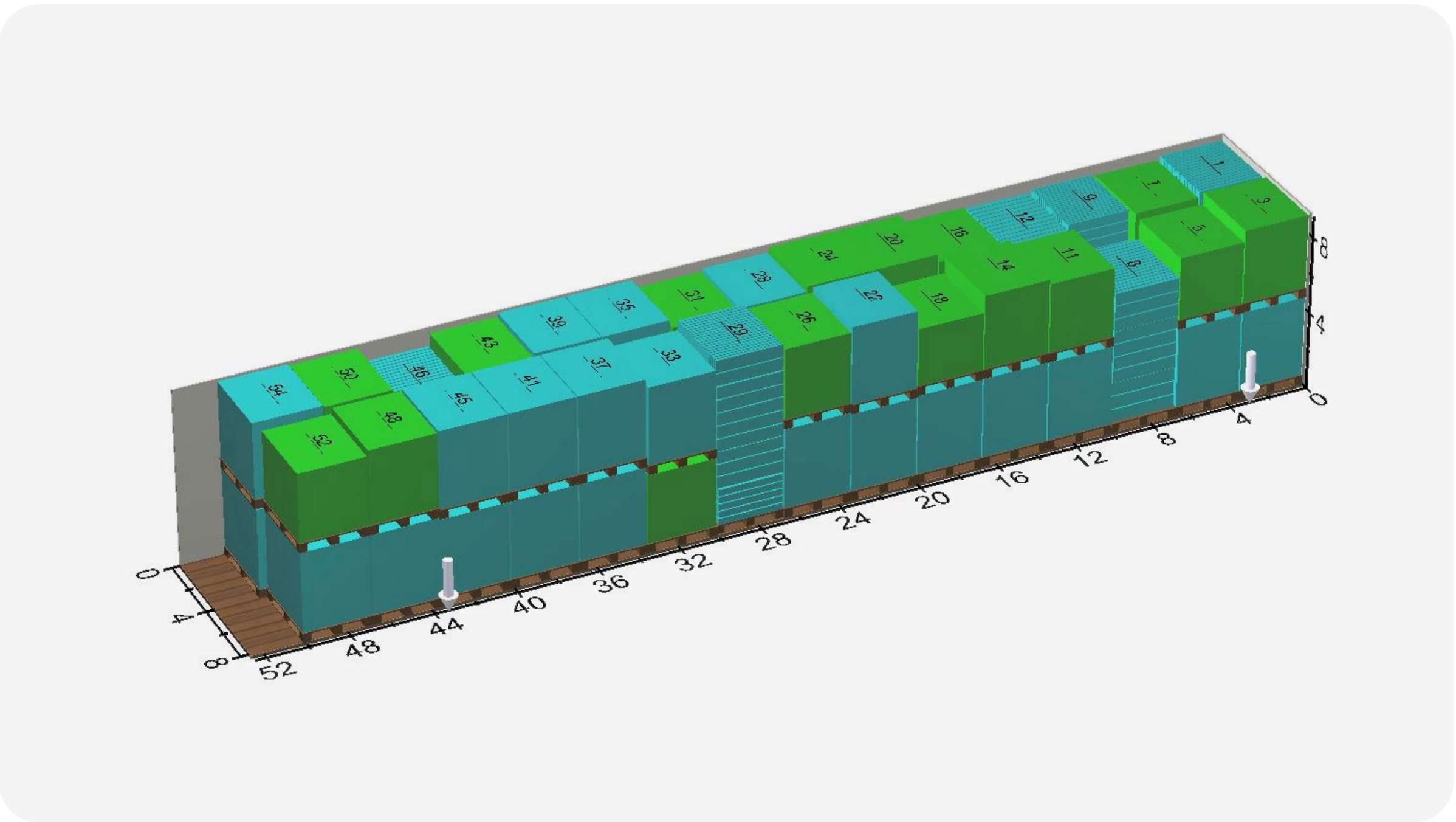
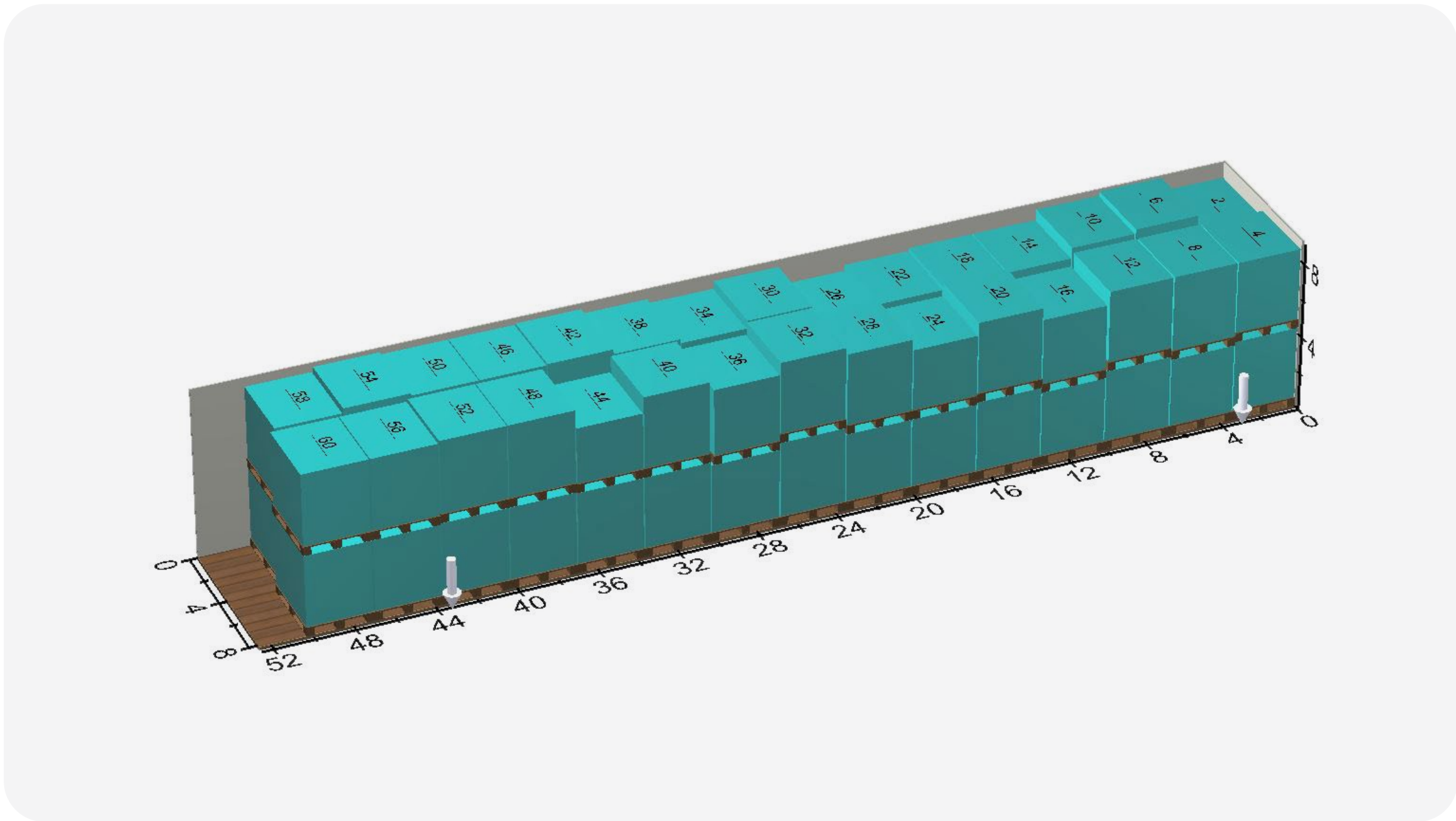
# 1. Intercompany, demand-based, and FTL planning

Optimizing truck utilization upstream, before order creation, can create significant transportation efficiencies. A high degree of utilization can be achieved by not limiting planning based on predefined orders. Consider using an optimizer to maximize shipments based on demand, need-by-date, vendor managed inventory (VMI), or other priorities.

For example, the optimization algorithm is given a list of products that needed to be shipped over the course of a few days with varying priorities. The challenge for this company is that they have a high variance in weight through a broad product range. For example, heavy peanut butter and canned soups loaded alongside pasta and cereals. The algorithm can balance these factors achieving high volume and weight utilization, across multiple transports, while assuring that the transports are within legal limits.

The two models below illustrate how an optimizer tool calculates a more effective load – in just a few seconds. Items are color-coded according to need-by-date (Priority 1; Priority 2) and the loads are balanced in weight and volume.

- The first model includes only **Priority 1** items.  
Weight Utilization = 98.2%  
Volume Utilization = 87.5%
- The second model fulfills the “must-have” **Priority 1** items and then mixes in **Priority 2** items.  
Weight Utilization = 99.4%  
Volume Utilization = 90.3%





## 2. Order management

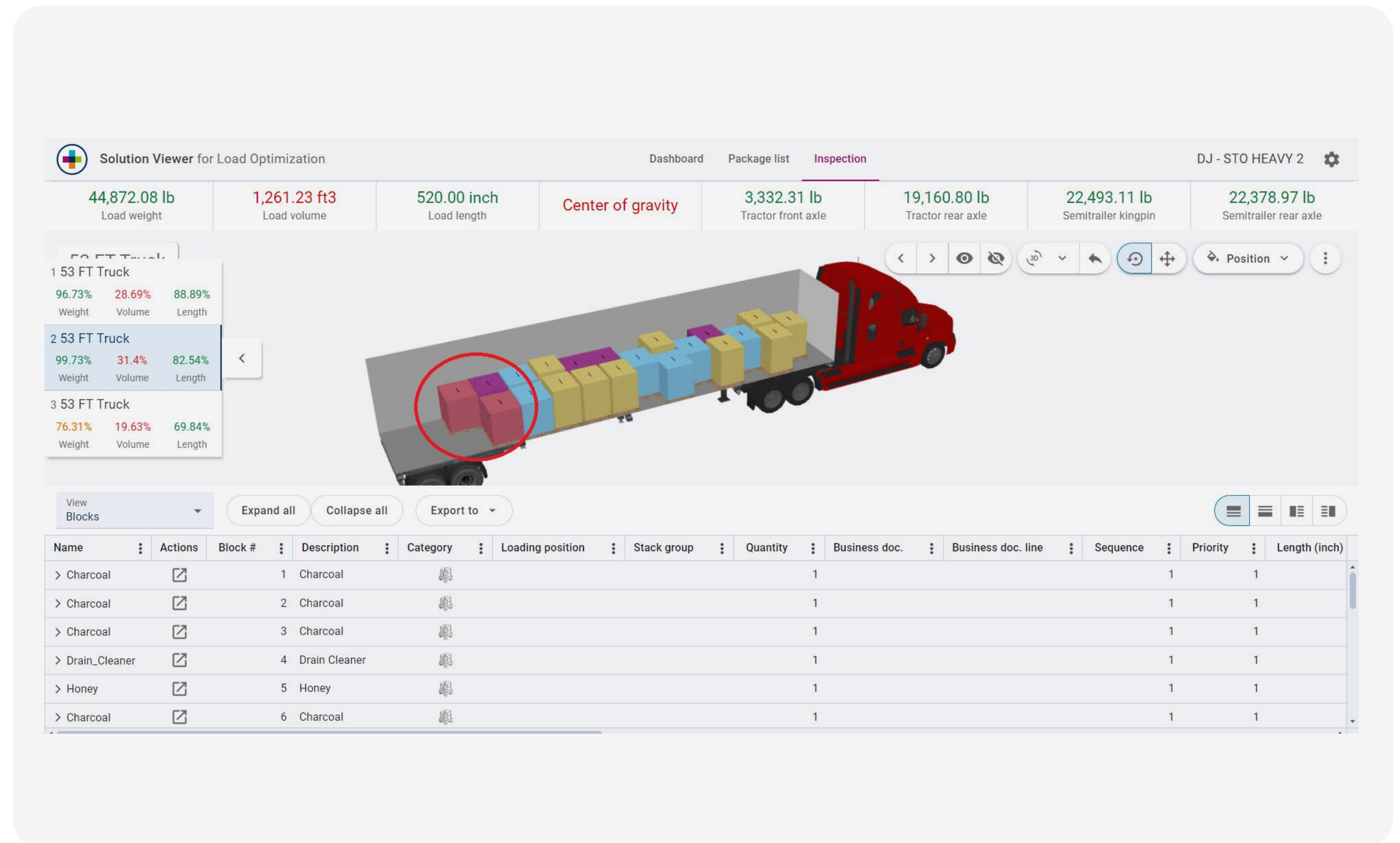
Implementing pallet and load optimization during the order entry phase helps businesses improve processes and efficiencies in several areas.

Optimization enables sales teams and customers to make decisions on order quantities based on accurate utilization. Visualizing truck and pallet utilization provides a clear view of capacity. Shipping quantities can be decreased to avoid overloading or increased to reduce empty space. ORTEC's loading algorithm may also be used to suggest additional product quantities to fill remaining space/weight.

Optimized shipments also add value through improved customer service and improved efficiencies in subsequent processes. For example, having a clear view of transportation requirements when an order is entered supports capacity planning for transportation, transport procurement, and warehouse processes.

Optimized shipments also add value through improved customer service and improved efficiencies in subsequent processes.

For example, having a clear view of transportation requirements when an order is entered supports capacity planning for transportation, transport procurement, and warehouse processes.



*In this model, the optimizer identifies three additional items ○ for a trailer load, with no resulting axle violations.*

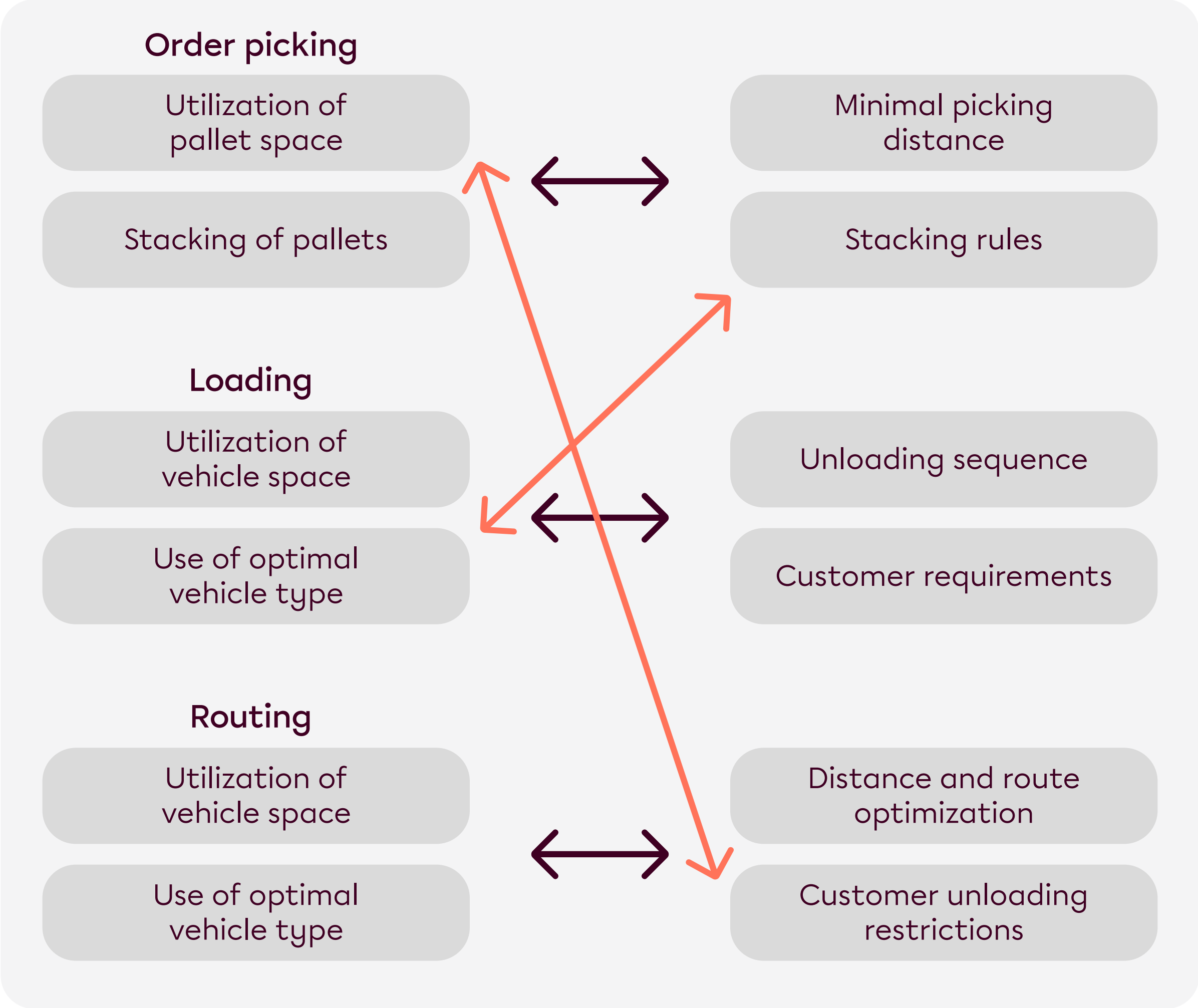


## 3. Multi-stop pallet and load optimization

Consolidating multiple deliveries on a single truckload or transport for multi-stop routes can be a challenging task.

There are many goals to consider – some of which may conflict – to find the most optimal solution for packing pallets and loads, such as:

- Can all products be stacked on one another?
- What about individual customer requirements?
- Do certain products need to be held together or separated on a load?
- What is the best delivery sequence?
- Is the optimal truck size/type being used for the load and customer?
- Will the truck or axles be overloaded?
- Can more products fit on the truck?
- Are the products staged efficiently for loading?



*This illustration highlights examples of conflicting goals in the planning process.*

A pallet and load optimization solution automates the planning process while accounting for business rules and considering best practices from your experienced team members.



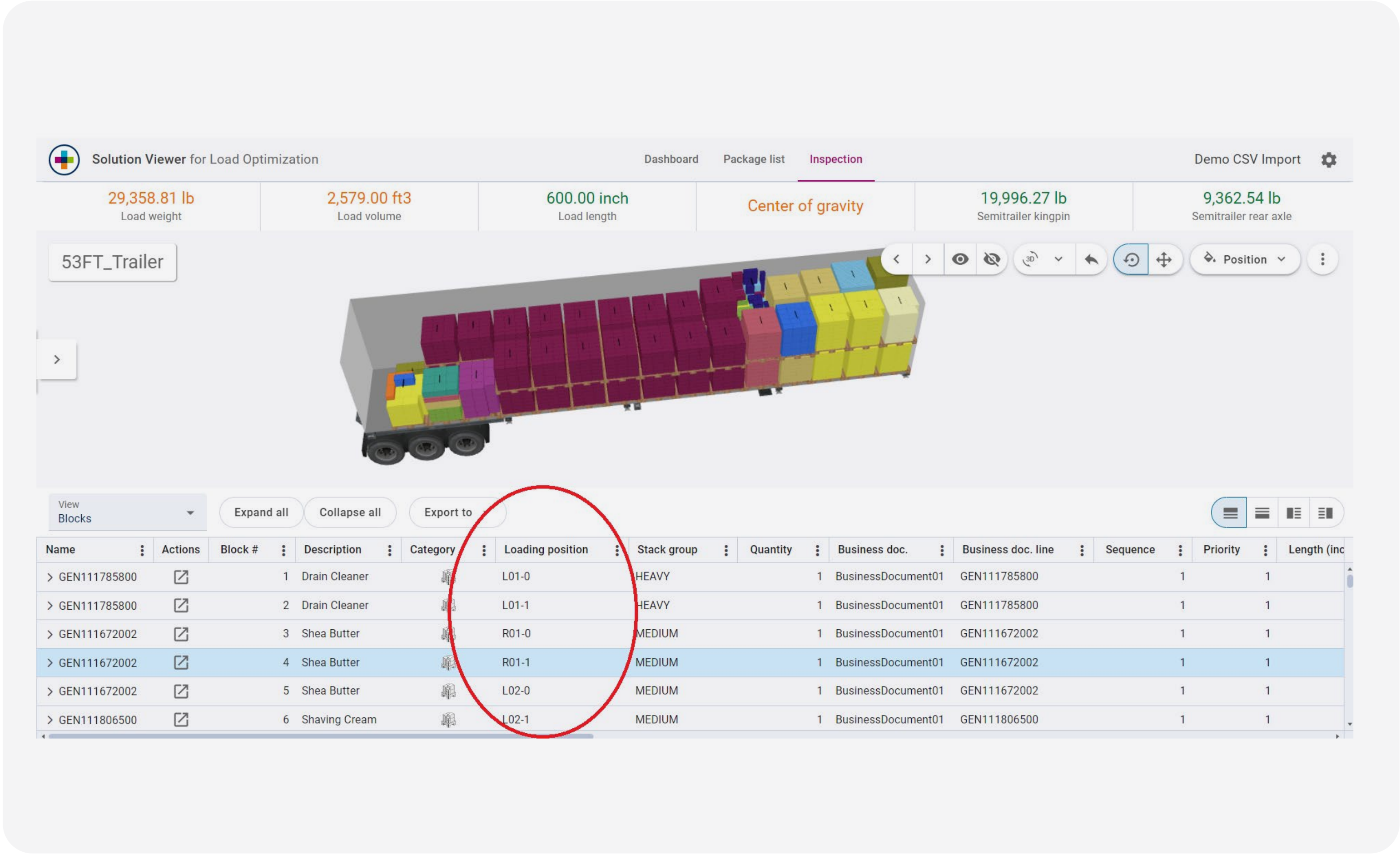


## 4. Warehouse

Using an optimizer for pallet and load optimization provides a sustainable way to produce more consistent, scalable, and efficient results.

In non-automated warehouses, a veteran picker works through aisles, placing products on pallets like a puzzle. Forklift drivers place pallets in a pre-stage area before reorganizing products for proper loading. In most cases, however, the picking and loading quality is not consistent and typically varies from employee to employee.

With an optimizer, the planning process is automated to create clear plans for pickers, forklift drivers, and AWSs. Products can now be staged correctly the first time, with fewer product movements. New and seasonal hires have tools to build pallets and load trucks optimally using predefined business rules. Pallet and loading optimizers streamline the planning process to produce optimal, standardized, and sustainable results.



53FT\_Trailer

>

<>👁️🔍🔄↶↷⌂⛶Position⋮

>

View Blocks

Expand allCollapse allExport to

| Name           | Actions | Block # | Description   | Category | Loading position | Stack group | Quantity | Business doc.      | Business doc. line | Sequence | Priority | Length (inc |
|----------------|---------|---------|---------------|----------|------------------|-------------|----------|--------------------|--------------------|----------|----------|-------------|
| > GEN111785800 | 🔗       | 1       | Drain Cleaner | 📦        | L01-0            | HEAVY       | 1        | BusinessDocument01 | GEN111785800       | 1        | 1        |             |
| > GEN111785800 | 🔗       | 2       | Drain Cleaner | 📦        | L01-1            | HEAVY       | 1        | BusinessDocument01 | GEN111785800       | 1        | 1        |             |
| > GEN111672002 | 🔗       | 3       | Shea Butter   | 📦        | R01-0            | MEDIUM      | 1        | BusinessDocument01 | GEN111672002       | 1        | 1        |             |
| > GEN111672002 | 🔗       | 4       | Shea Butter   | 📦        | R01-1            | MEDIUM      | 1        | BusinessDocument01 | GEN111672002       | 1        | 1        |             |
| > GEN111672002 | 🔗       | 5       | Shea Butter   | 📦        | L02-0            | MEDIUM      | 1        | BusinessDocument01 | GEN111672002       | 1        | 1        |             |
| > GEN111806500 | 🔗       | 6       | Shaving Cream | 📦        | L02-1            | MEDIUM      | 1        | BusinessDocument01 | GEN111806500       | 1        | 1        |             |

In this model, the optimizer shows each item’s loading position ○, so warehouse employees can work more efficiently.



# Unlocking **efficiency**: The advantages of carton, pallet, and load **optimization** technologies

Using ORTEC solutions presents measurable benefits across transportation and warehouse operations. The cases above are only some examples of how optimizers have been implemented at companies. There are many more. The list below highlights the potential benefits achieved when optimizing cartonization, pallet building, and load planning processes.



## Cost reduction

Decreasing shipments, reducing labor, streamlining planning, and supporting strategic decisions can reduce operational costs while improving utilization.

- Decreased number of shipments and better truck utilization
- Lower transportation costs and reduced fuel costs
- Increased pallet utilization and reduced number of pallets
- Fewer warehouse man hours for pallet and load planning
- Faster planning time/implement later order cutoff times
- Decreased picking and staging time in warehouse/DCs and shorter loading times
- Improved pallet organization to support warehouse picking processes (e.g., layer line vs. picked)
- Higher driver and warehouse efficiency
- Reduced administrative processes, streamlined planning tasks, and more efficient utilization of planning resources
- Better strategic logistics-based decision making

## Quality

- Creating consistent processes improves consistency and reduces damage, while supporting more consistent planning and execution
- Standardized palletizing and loading create a consistent and repeatable process
- Reduced learning curve for new and temporary staff
- Decreased damage to goods from improper stacking and loading issues
- Increased transparency in the execution (supply) chain
- New possibilities for strategic usage of the staging area and new ideas for innovations in planning
- Optimized planning of resources such as personnel and equipment

## Reporting

- Gaining more visibility helps identify areas for improvement and enable more informed decision-making
- Detailed utilization information (pallet, vehicle, etc.) and data-based analysis to identify areas for improvement
- Service: Optimizing standards boosts efficiency while it supports customer requirements for consistent service
- Reduced pallets for customers to receive and handle
- Automated pallet builds to customer specific needs (e.g., pallet types, heights, and consolidation rules)
- Streamlined process for providing container breakdown for distribution
- Increased access to KPIs for measuring optimization to highlight potential savings

## Sustainability

- Lowering the number of trips and resources used through optimization supports corporate initiatives for environmental impact
- Reduced carbon footprint from fewer trips
- Decreased pallet materials required for shipments

## Safety

- Managing rules and guidelines ensures safer operations and fewer non-compliance fines.
- Improved safety through better axle weight and center of gravity calculations
- Increased load stability with standardized business rules for pallet/load building
- Elimination of overloaded trucks and ensured load compliance for hazardous goods restrictions



Customer Case

# Benjamin Moore

ORTEC’s Load Building solution provides AI-driven recommendations and data analytics to improve efficiency, reduce shipping and labor costs, and raise sustainability.

**The challenge: Optimizing dynamic load building**

Benjamin Moore, a global leader in paint and coatings, sought to enhance its load building and distribution efficiency. Committed to innovation and sustainability in manufacturing, the company aimed to optimize its truck loading and distribution processes from plants to distribution centers. The primary challenge was the dynamic nature of their operations, where products move directly from production lines to trucks, requiring real-time optimization. Lacking a robust system to maximize pallet and weight efficiency during shipments, they experienced under- and over-shipments, costly errors, increased costs, and diminished customer satisfaction.

## ORTEC’s value proposition: AI-driven integration

To overcome these obstacles, Benjamin Moore partnered with ORTEC, implementing the ORTEC Load Building for SAP® solution. This certified SAP add-on provided advanced AI-driven recommendations and data analytics for optimizing carton, pallet, and truck loading. Seamlessly embedded within their SAP environment, ORTEC’s solution facilitated their unique staging process, improving pallet and load stability, maximizing truck capacity, and reducing transportation costs and carbon footprint. With these enhancements, Benjamin Moore benefited from ROIs within one year and improved both internal and external customer satisfaction.

## Impact across the supply chain

Partnering with ORTEC enabled Benjamin Moore to implement a comprehensive supply chain integration strategy, optimizing deliveries and refining supply chain operations. The goals included elevating customer satisfaction, driving sustainability efforts by minimizing shipments, and achieving cost efficiency. Key features of ORTEC’s 3D load building solution included automated load planning, flexible adjustments for variations, and enhanced load stability through optimized sequencing.

## Tangible benefits and rapid ROI

The project yielded significant benefits, including ROI in less than one year. Benjamin Moore experienced increased customer satisfaction, improved fulfillment rates, and reduced labor and shipping costs. Furthermore, the optimized load building contributed to their sustainability goals by minimizing the number of required shipments. Post-go-live analysis confirmed the accuracy and safety of ORTEC’s solution, with the system flagging potential compliance issues.

## Partnership and long-term impact

The collaboration between Benjamin Moore and ORTEC resulted in a robust logistics solution, achieving desired outcomes that exceeded project goals. ORTEC provided exceptional support throughout the complex implementation, demonstrating a commitment to continuous improvement. Benjamin Moore lauded ORTEC’s approach, noting their exceptional support and resource allocation, which solidified ORTEC as a trusted partner.

# Embracing the future of load building

Effective load planning and optimization play an increasingly important role in transportation and warehouse performance for manufacturers, CPG, and distributors. In this e-guide, we explored the pressing challenges of modern load planning, from rising costs to sustainability demands. The data is clear: inefficient processes hinder operational success. Many organizations are finding that advanced planning technologies help address these challenges. Leveraging AI-driven load planning solutions presents a powerful avenue for businesses to streamline operations, reduce delivery inefficiencies, and adapt to evolving market pressures.

By implementing advanced load building solutions, you can improve transportation and warehouse operations with strategic optimization, from streamlined order management to maximized warehouse efficiency. Organizations that embrace innovative algorithms and data analytics see a multitude of benefits – including operational cost savings, enhanced customer service, improved sustainability, and safer transportation practices.



The Benjamin Moore case study vividly illustrates these advantages. Real-world results demonstrate the power of data-driven decisions, leading to significant ROI, enhanced customer satisfaction, and a reduced carbon footprint. Such success stories highlight the broader potential of data-driven optimization across manufacturing and logistics operations.

Load building continues to evolve. It’s about more than just filling trucks; it’s about more efficient, sustainable, and data-informed operations and the potential of technology in overcoming barriers like inadequate software, order delays, and insufficient operational visibility. Businesses poised to invest in these innovative solutions are better positioned to improve efficiency and adapt to changing business requirements.

Modern load planning is about making better decisions with better information. If you’re looking for practical ways to improve transportation efficiency, increase utilization, and create more consistent execution across your operation, we’d be happy to continue the conversation.

## About ORTEC

ORTEC helps organizations improve operational performance through advanced optimization, analytics, and AI.

Working across industries including Foodservice and Beverage Distribution, Manufacturing and CPG companies, Retail and Home Delivery, and Transportation organizations, we help companies make better decisions, improve resource utilization, reduce costs, and support sustainability goals.

Trusted by some of the world’s largest and most complex supply chains, ORTEC combines operational expertise with data-driven technology to help teams simplify complex planning challenges and improve execution across their logistics and delivery operations.

Contact us to get started



• • ORTEC