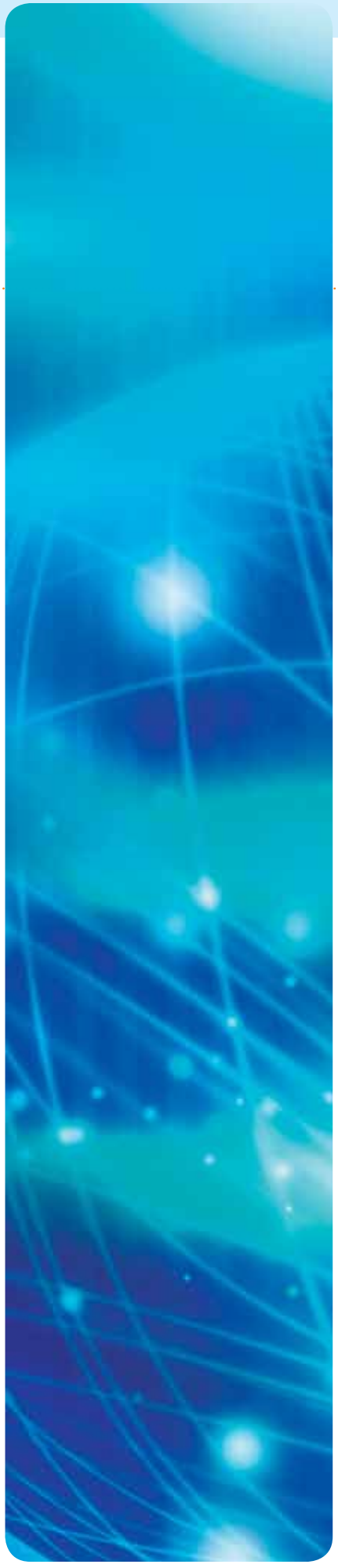


An Executive White Paper

Five Inventory Core Competencies That Can Make or Break Your Competitive Advantage

Key Best Practices in the New Inventory Optimization Center of Excellence

LOGILITY

An Executive Whitepaper

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Executive Overview

A key characteristic of best-in-class companies is their success in using inventory optimization (IO) and cash management techniques to free up working capital. The amount of a company's working capital trapped in inventory can be expressed as days inventory outstanding (DIO). As DIO rises due to factors such as slower sales, longer supply chains, SKU proliferation, and higher obsolescence, return on capital employed drops, which can hamper a company's ability to compete, especially when financing is hard to come by.

To combat these and other supply chain challenges, operations research experts developed a discipline called Inventory Optimization about a decade ago. Early adopters realized hundreds of millions of dollars in documented savings through smarter inventory reductions without sacrificing sales revenue or missing customer commitments. Other supply chains took notice and IO began its evolution from an algorithm-driven point analysis to a spectrum of integrated best practices.

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Inventory Optimization Transforms Best Practices

Inventory optimization was born as an advanced algorithmic approach to understanding and quantifying the propagation of demand and supply uncertainties across a multi-level supply chain. Today it is considered a core competency at both mid-size and multi-billion-dollar companies in a wide range of industries. Inventory optimization has proven to be a sustainable process to free up millions of dollars in working capital by reducing inventory without damaging service levels. Unlike traditional 'binge and purge' cycles of overproduction followed by brute-force reductions, savings are achieved and turns are increased while driving more profit to the bottom line.

As operational inventory excellence creates a sustainable competitive advantage, it transforms best practices within companies and changes everything from the expectations of CFOs to the stature of supply chain managers, from procurement practices to the effectiveness of sales and operations planning.

- Many organizations adopt sales and operations planning (S&OP) as part of their core supply chain operations. Inventory optimization brings much-needed clarity regarding the types and causes of multi-echelon buffer inventory to these regular demand and supply discussions.

- Every supply chain team understands the impact of customer forecasts and demand planning on inventory investment. However, many are plagued by partial visibility or low-quality data. The advent of mature IO practices and credible inventory impact information has enabled supply chain teams to get ahead of, and stay ahead of, demand trends. Companies without proper discipline will always unnecessarily squander capital on the down turns and lose market share on the upturns. During the recent economic down cycle, "IO-embracing" companies gracefully brought down their inventories for a soft landing, rather than stuffing their channels. The same level of responsiveness during an economic recovery will provide a competitive advantage through better inventory preparation and utilization to manage the increase in demand.

- Inventory excellence also enhances the success of vendor-managed and customer-managed inventory programs by guiding the way to the lowest total supply chain cost. Leading companies seek to influence the stocking policies of their vendors and end customers as a way to bring collaboration to the overall supply chain. Inventory optimization allows the company to become an expert partner, recommending smart positions based on the realities of multi-level demand and supply uncertainty.

Five Best Practices, Now Inventory Core Competencies

Companies that want to remain competitive need to view inventory optimization as a business discipline with inherent best practices, not a technology or a onetime point analysis. While there are many best practices surrounding supply chain inventory excellence, a core set is coalescing out of the maturing discipline of inventory optimization. These include:

1. Multi-level Inventory Optimization: Integrate inventory optimization across raw material inventory (RMI), work-in-process (WIP) and finished goods inventory (FGI).
2. Synchronize Time-phased Business Cycles: Address business cycles, seasonality, and product lifecycles through time-phasing of inventory targets.
3. SKU Proliferation and Postponement: Manage SKU proliferation by postponing final product differentiation until later stages in the supply chain and pooling inventory to meet aggregated demand.
4. Strategic Outsourcing: Fully account for total landed costs across an entire portfolio of products prior to making outsourcing decisions.
5. Position Capital for Customer Service: Set multiple classes of customer service and manage ABC items for each class.

The knowledge of these best practices has been established and is built into the playbooks of the world's best-managed companies. The following takes a deeper look into each of these to help guide you in your adoption of them.

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"In practice, increasing RMI and WIP strategically can decrease FGI and produce net savings of 20% to 30% of total inventory invested."

1 Multi-level Inventory Optimization (Optimizing much more than just Finished Goods Inventory)

In many companies, raw material inventory, work-in-process inventory, and finished goods inventory are managed by entirely different functional groups. (See Figure 1.) These inventories should be viewed as an organic backbone of the supply chain, rather than separate silos in which one team may be motivated to buy in bulk, another to minimize the number of production set-ups and a third to hold enough FG to ensure 98% customer service at all costs.

Because the availability of raw materials inventory (RMI) impacts production lead times for work-in-process (WIP) and consequently finished goods inventories (FGI), inventory policy for all three must be coordinated. For instance, managers may attempt to minimize production costs by instituting longer frozen periods, thus creating relatively low raw material inventories and high finished goods inventories. But RMI is less expensive and typically has lower demand uncertainty (due to risk pooling across multiple end products). In practice, increasing RMI and WIP strategically can decrease FGI and produce net savings of 20% to 30% of total inventory invested.

Many organizations focus optimization efforts on their finished goods stockpiles, but this tip-of-the-iceberg approach is not sufficient to increase turns and stay competitive in the market today.

Multi-echelon supply chain modeling is required to reveal the full costs of policies that result in long frozen periods, extended lead times, excess safety stock, chronic expediting, among others.

Companies use mature inventory optimization analyses to transform their S&OP process, replacing emotions and rules of thumb with factual insights that support superior policies. Confident decisions are made regarding issues such as where to best position inventory, when to postpone value-add transformation steps, how to mitigate uncertainty by aggregating demand signals, and more. Companies have changed their organizational alignment, reward structures and KPIs to support a holistic inventory management approach using MEIO.

Inventory optimization techniques should be applied to the extended network of supplier-managed and vendor-managed inventories. Increasing inventory efficiency and improving service levels, at lower cost, builds better partnerships, greater trust, and win-win relationships between customers and suppliers.

Eliminate the "silo view" of raw materials inventory, work in process, and finished goods inventory



Figure 1. A typical setup has each level of inventory in silos.

2 Synchronizing Time-phased Business Cycles

All businesses have time-based cycles. Some are external and macroeconomic; others, internally generated. In some companies, much effort is spent with suppliers, partners, and customers managing seasonal demand fluctuations that are specific to markets and individual products. It is insufficient to look at the inventory that supports these cycles as a single tranche of time. For many, the level of demand is tied to cycles; presenting a different level of demand uncertainty during peak rather than non-peak periods. (See figure 2.)

Inventory optimization should focus on setting the best possible targets for every individual time period of the business cycle, taking into account the change in demand as well as the change in demand uncertainty over the course of the cycle. It is a mistake to assume that setting simple high and low limits around a smooth demand curve will provide adequate service levels over the course of the entire cycle. (See Figure 3.) A time-phased analysis will detect and account for changes in demand uncertainty, and create an envelope of varying width around the smooth demand curve. (See Figure 4.)

Once demand variability has been accounted for, optimized inventory targets can be generated for each period in the business cycle in order to maximize service levels and minimize inventory on hand at every stage. (See Figure 5.)

Factors other than demand alone influence changes in inventory policy, including availability of supply, production costs, logistics costs, and more. Inventory optimization best practices acknowledge that stationary targets are inappropriate for non-stationary business cycles. Time-phased optimization must account for all inventory drivers.

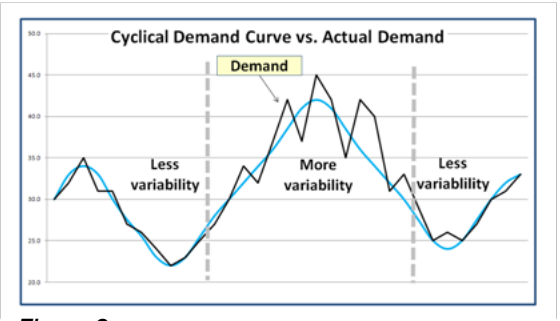


Figure 2

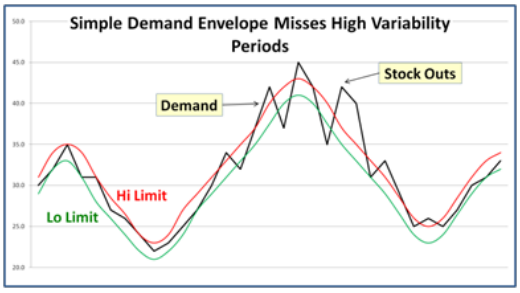


Figure 3

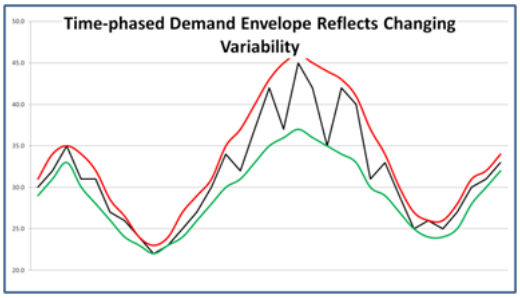


Figure 4



Figure 5

"It is a mistake to assume that setting simple high and low limits around a smooth demand curve will provide adequate service levels over the course of the entire cycle."

"Smart postponement strategies are a best practice for avoiding the runaway costs of finished goods and work-in-process inventory. Everyone from executive management to the supply chain team should make postponement a core competency."

3 Taming the Impact of SKU Proliferation with Postponement

New products, packaging, styles, bundling, promotions, and many other factors cause SKU counts to increase relentlessly. A "silo" organizational structure where multiple groups have different KPIs leads to a lack of "big picture" visibility and contributes to the problem. Sales is concerned only with revenue and anything that generates it, new product development teams exist solely to bring new items to market, while supply chain managers are measured on their ability to control and reduce costs. In almost every case, the pursuit of revenue wins out. However, a strategic IO team understands the working capital required to support, for instance, a new product. Inventory optimization experts bring real working capital numbers to the product planning process as well as expertise at trimming away excess while growing new, successful products.

As SKUs proliferate, so do inventory buffers. Smart postponement strategies are a best practice for avoiding the runaway costs of finished goods and work-in-process inventory. Postponement pools work-in-process and finished goods inventory to retain more flexibility in meeting demand while lowering manufacturing, packaging, and distribution costs. Pooling inventory can lower safety stock levels by aggregating demand signals that partially cancel each other out. (See Figure 6.) Postponement cuts obsolescence rates by delaying differentiating steps and late product fan-out in the form of packaging variants, branding, add-on components, etc., steps which can often be delayed until closer to the customer.

Everyone from executive management to the supply chain team should make postponement a core competency. Create fact-based decision models for the appropriate postponement strategy. Not all contractors and suppliers have fixed lead times and capacities. Work with them to model a comprehensive view of the extended supply chain and find opportunities for total supply chain improvement.

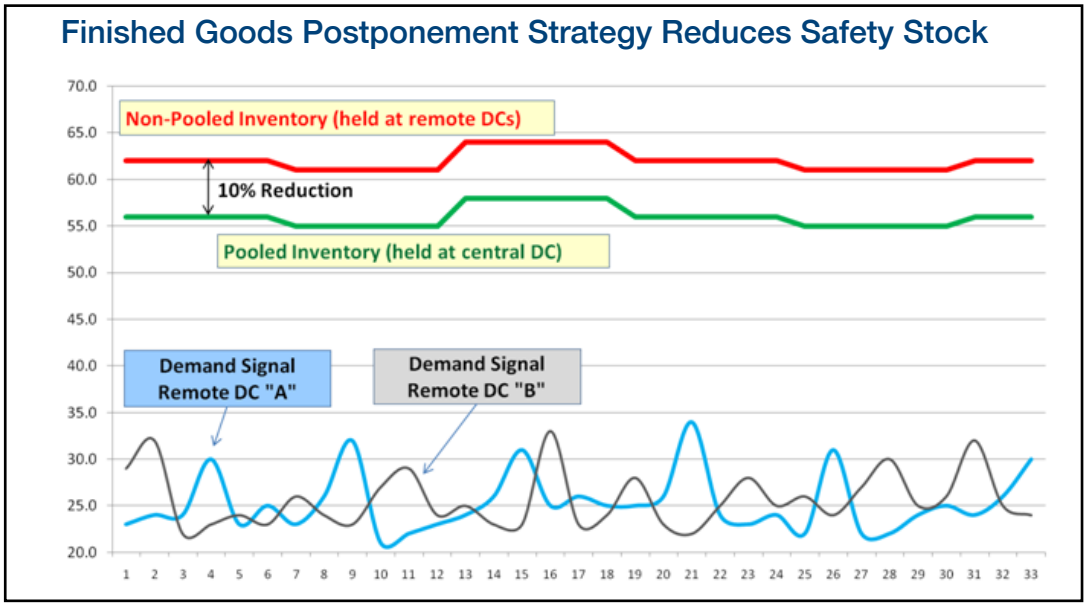


Figure 6. When demand is aggregated, a lower amount of pooled inventory meets service levels

4 Accounting for Total Landed Cost Impacts Before Making Outsourcing Decisions

Market-leading companies try to plan, rather than react. Setting inventory plans up front based on accurate evaluations of how alternative decisions could affect supply chain performance, achieves the best tradeoff between service levels and working capital. Inventory optimization as a core competency helps managers justify outsourcing strategies on much more than partial data estimates or "gut feel."

The most difficult part of an outsourcing evaluation is accurately assessing the impact of increased time in the supply chain. When manufacturing shifts to Asia, how does the impact of eight additional weeks of shipping compare to the material cost and production savings?

Multi-echelon supply chain modeling and "what if" analyses can determine the optimal outsourcing strategy for each product. Such a strategy frequently outsources higher volume, more mature, more certain products while keeping production of low volume, high-uncertainty products in-house. "Dual sourcing" allows a certain portion of a product's demand to be outsourced while responding to the variable portion with a more responsive local source. Flexibility and responsiveness are most important for highly seasonal and short lifecycle products. Long supply lines hinder quick adjustments to changes in the demand signal for these items.

Inventory optimization can put difficult decisions back on a strong, fact-based footing by integrating working capital data into the decision process. For instance, closing a particular plant and outsourcing its production requires adjustments to maintain service levels for customers. Inventory optimization reveals the best way to shift inventory around the network to handle transportation differences and variability tradeoffs that result from the shift in sourcing.

5 Positioning Capital to Manage to Multiple Classes of Customer Service

Not all business is equal, nor are all products. Often only a handful of customers generate the majority of a business's revenue. Customers also have widely differing service expectations: large customers can dictate service requirements and impose significant penalties for failure to comply. Companies can use IO to manage a mix of service levels that realistically balances capital investment with the revenue opportunity, recognizing that service includes both fill rates and on-time delivery. Additionally, many companies differentiate between promotional demand and regular/replenishment trade demand.

For example, products that are already segmented by dollar volume using ABC macro-classifications can be managed to specific service level goals for each customer class, such as big box retailers, specialty retail, and so on. (See Figure 7.) Each class may have different service requirements, lead times, variability, and non-compliance penalties. Inventory optimization best practices can make the right recommendation as to how to deploy working capital across the extended network in the right mix to support the company's goals using the smallest practical inventory buffers.
Finally, educate suppliers, distributors and retailers

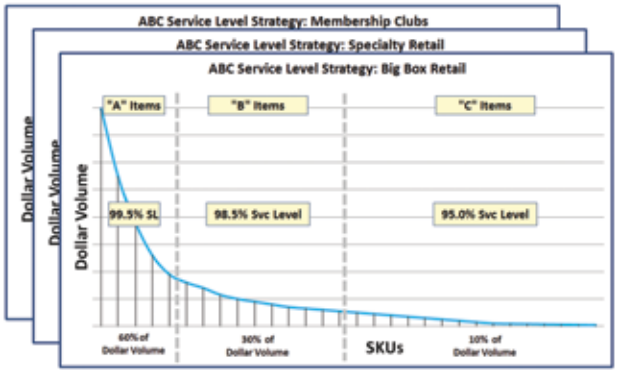


Figure 7. In addition to ABC product segmentation, tailor service levels for different customer classes

on the benefits to everyone of managing inventory at the SKU/location level. For instance, customers may supply detailed sales and inventory data that allow the manufacturer to use its forecasting capabilities to generate more accurate sales estimates and better position products at the customer's facilities to lift sales and reduce inventory for both parties.

"Inventory optimization can put difficult decisions back on a strong, fact-based footing by integrating working capital data into the decision process."

"Every inventory-related action taken by anyone in the organization is an investment decision that impacts both the working capital on the balance sheet and the top line on the income statement."

Inventory Optimization as a Center of Excellence

Inventory optimization has evolved into a portfolio of capabilities and best practices that have been enthusiastically—and very profitably—adopted by leading companies. Every inventory-related action taken by anyone in the organization is an investment decision that impacts both the working capital on the balance sheet and the top line on the income statement. Today it is evident that companies are largely competing on their supply chains, and treating inventory optimization as a point solution rather than a key internal discipline can be a competitive disadvantage.

Implementing an Inventory Optimization Center of Excellence increases competitive advantage. At every earnings call, the CFO fields analysts' questions about how inventory turns stack up against the competition. In companies that have embraced IO as a discipline the CFO knows exactly where the inventory is—and why—and can confidently defend the deployment of the company's assets.

Five key inventory best practices should become core competencies of your supply chain team:

1. Integrate IO across raw material inventory (RMI), work-in-process (WIP) and finished goods inventory (FGI). In other words, adopt multi-level inventory optimization (MEIO).
2. Address business cycles, seasonality and product lifecycles through time-phasing of ? inventory targets.
3. Manage SKU proliferation by postponing final product differentiation until later stages in the supply chain and pooling inventory to meet aggregated demand.
4. Fully account for total landed costs across an entire portfolio of products prior to making outsourcing decisions.
5. Set multiple classes of customer service and manage ABC items for each class.

Has your company embraced inventory optimization as a mature discipline? Are you taking steps to create these core competencies within your supply chain team? If not, one of your competitors may be poised to show you how it's done. In the meantime, building out an Inventory Optimization Center of Excellence could be the best idea you'll hear this quarter.

Evolution of Inventory Optimization

Multi-Echelon Inventory Optimization (MEIO) was once the purview of a few very-well-educated operations research experts.

Around 2001, pioneering companies began to exploit the mathematical discipline of operations research to accurately model the behavior of stocks throughout a global supply chain. It unraveled complex interdependencies among myriad components across multiple stages and locations of a modern manufacturing and distribution network.

Supply chain strategists applied operations research techniques to examine how lead times, inventory levels, stock locations, transportation links, distribution channels, forecast uncertainty, supply volatility, and other factors sent internal ripples through the supply chain. No single department could see the full impact its decisions had on the entire interconnected system.

New software tools emerged to harness this math for supply chain managers—tools and analysis that organized data collection, depicted the supply chain graphically, and helped practitioners explore alternative scenarios to find their best option.

Early adopters saved hundreds of millions by implementing smart inventory reductions without sacrificing their service levels. After more than a decade of development, inventory optimization has evolved from an algorithm-driven point solution into a spectrum of integrated best practices.

Appendix: The IO Portfolio of Best Practices

Inventory Optimization has matured into a cross-functional portfolio of best practices, including:

- Inventory Profiling. Inventory optimization tools provide the supply chain team a way to quantify the baseline sources of the entire inventory investment—the "causes of inventory," so to speak.

For the first time, all supply chain stakeholders can obtain exact numbers on how much inventory is being held in different locations for reasons such as demand uncertainty, supply variability, batching, lead times, review periods, seasonality, and others.

When the cross functional team has this fundamental understanding of the full inventory picture, it quickly takes the emotion out of S&OP discussions. Now the operations teams can stop pointing figures and prioritize their attack on the real problems in the supply chain.

- Customer and Service Profiling. How much investment, across all levels in the supply chain, is actually required to support a key customer's service level requirements?

What is the real cost to meet established distribution service level requirements? Inventory optimization tools can quantify exactly what it costs the organization to live up to its commitments, and shine a light on what it will really cost to reach service level goals that are part of a new "operational excellence" mandate.

Knowing the cost impact in advance can remove counter-productive emotions from the service discussion and foster controllable business decisions that successfully balance assets and revenue.

- SKU Rationalization. It is an axiom that most product marketing teams never met a SKU they didn't like, but what is the "right" mix of products that best balances inventory cost with sales? Can stocking policies be tweaked to reduce the number of underperforming items? Managers must quantify the assets committed to SKU proliferation across the global supply chain and have confidence that eliminating underperforming SKUs will not adversely impact important business goals. Companies should have the capability of performing effective SKU Rationalization on an ongoing basis, with decisions supported by solid data.
- More Responsive Target Setting. Many companies have become more agile, resilient and competitive by speeding their review cycles for inventory targets. This keeps inventory practices more in line with the dynamics of today's markets. Inventory optimization tools convert episodic and periodic reviews of stocking positions and policies into a regular operational planning process.
- Postponement Strategies. Corporate leadership is crucial to bringing silo'd functions together. Postponement maintains lower overall inventory costs by positioning more stock at supply chain stages prior to big value-adding manufacturing steps. In addition, fluctuating demand signals from different endpoints often cancel each other out, so pooling inventory prior to differentiation covers the aggregate demand using a lower quantity of stock.

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About Logility

With more than 1,250 customers worldwide, Logility is a leading provider of collaborative, best-of-breed supply chain solutions that help small, medium, large and Fortune 1000 companies realize substantial bottom-line results in record time. Logility Voyager Solutions™ is a comprehensive supply chain management solution that features performance monitoring capabilities in a single Internet-based framework and provides supply chain visibility; demand, inventory and replenishment planning; sales and operations planning (S&OP); supply and inventory optimization; manufacturing planning and scheduling; transportation planning and management; and warehouse management. For more information about Logility, call 1-800-762-5207 or visit www.logility.com.

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