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Improving Customer Service Levels at the Shelf – What Am I Missing?

How to improve service, lower inventories, and boost revenues

By Joe Bellini, COO One Network Enterprises

Have you found that your current software infrastructure has hit the law of diminishing returns? Are you no longer able to drive further improvements in customer service levels, "on time in full" deliveries, inventory performance and overall cost performance? It's easy to become frustrated with the lack of visibility in legacy systems, inability to make effective decisions, and the lack of control that we need as operating directors to improve our target metrics.

In this paper, we look at new techniques, new processes, artificial intelligence, automation, and advanced technologies designed to break through performance barriers and help us deliver on our target metrics.

UNDERSTANDING THE PROBLEM OF VARIABILITY

First, we must understand the basic math behind why we have hit diminishing returns with our current infrastructure. Otherwise we run the risk of a generating a new round of costly activity without the expected productivity or outcomes.

We know that variability causes a number of issues:

- Revenue erodes at the retail level due to in-store/in-stock issues
- Inventory is planned at higher levels than needed, due to issues around mix, timing, and volumes.
- Warehouse and DC capacity is being consumed by the wrong inventory mix.
- Carrier appointments/slots are consumed by late shipments containing inventory based on stale demand data.
- Finally, some suppliers are cutting cases due to demand variability, lead time to react to order variance, and inability to schedule appointments for variance in shipment demand.

HOW VARIABILITY DRIVES UP COSTS

Optimizing inventory and achieving customer service levels (CSLs) at a minimum total cost from an end-to-end supply chain perspective, will maximize the shareholder value of each participant within the supply chain network. Yet research indicates that very few companies within extended supply chains have been able to adequately resolve variability and inventory issues.

Inventory costs are largely influenced by customer demand and the lead times to move material between each successive stage of a supply chain network. Uncertainty is generally characterized by demand variability and lead-time variability, both of which result in increased inventory expenditures.

As demand and lead-time variability increase, there is a need to increase the amount of safety stock in order to achieve the desired CSLs. The safety stock acts a buffer to multiple sources of nervousness in a supply chain network.

Variability adds cost to the supply chain network. There is variability in demand, lead-time, transportation, order processing, and purchasing - all adding costs to the supply chain network. Of particular interest is informational lead-time. Informational lead-time is the duration of time for information to move between supply chain network participants. Information is critical for planning. The longer it takes to communicate between supply chain network participants the more inventory is needed.

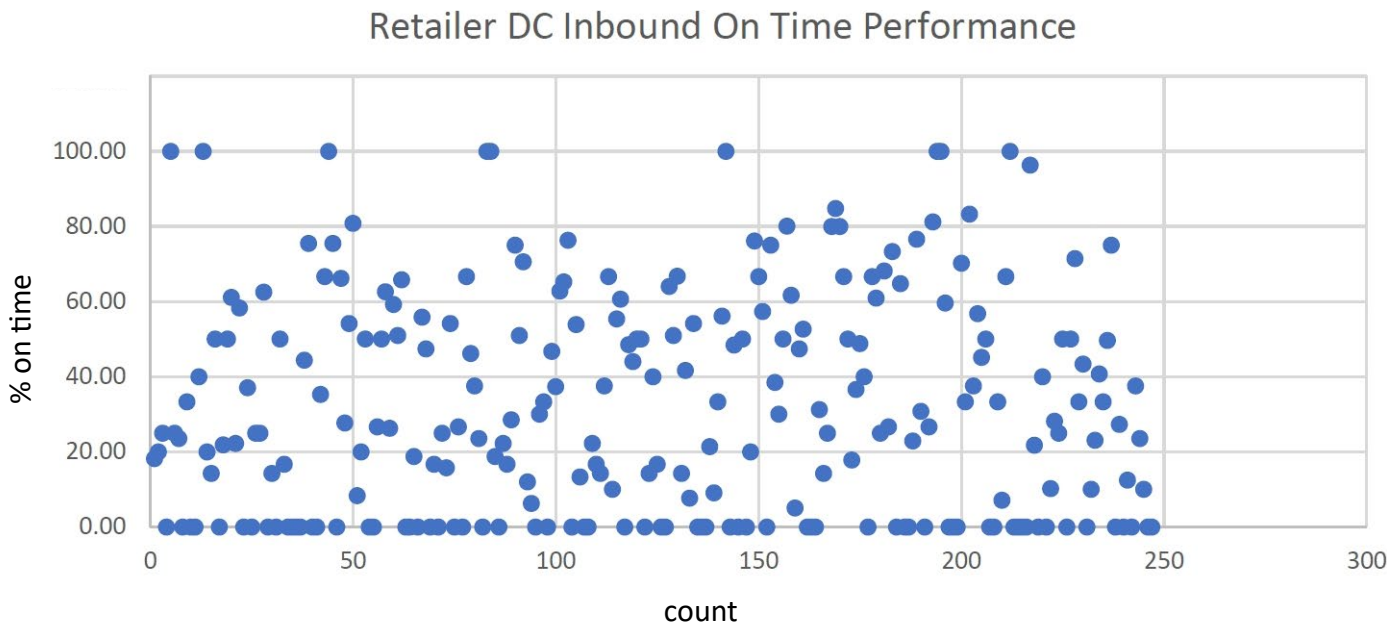
Informational lead-time variability further pushes the need for more inventory. Reducing informational lead-time has the potential to improve profit margins for the supply chain with no negative impact on CSLs.

ADDRESSING THE ROOT OF THE VARIABILITY PROBLEM

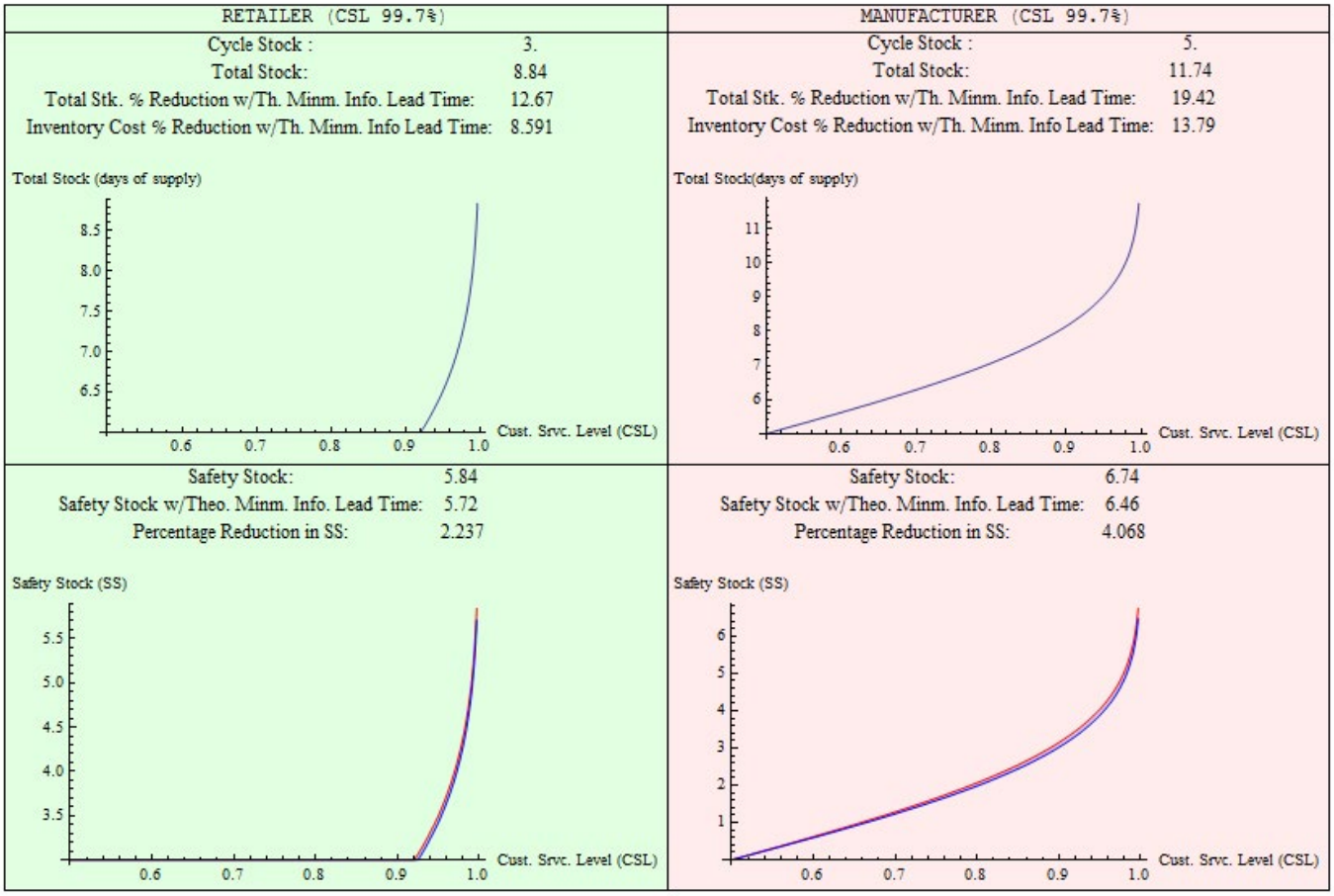
This then brings us back to our original question, is there a solution available in the market that solves the root cause issues preventing us from hitting our target metrics?
For information lead time, we clearly require a control tower on a network platform in order to drive a real time demand signal through all trading partners. This will drop the information lead time to its theoretical minimum, or near zero, i.e., near real time. The network solution also solves for the typical lack of trust between trading partners that can result in excessive delays and variability.

To understand the math, I'm going to use a simple simulation model to discuss the variables in play and explain why understanding their nature really matters in defining the problem you are trying to solve. Done properly, you can generate a step function gain in performance and move away from the law of diminishing returns.

Since variability is the enemy, lets first look at calculating our standard deviation. If we look at a typical due date performance profile, many times we will see the following;



THIS SCATTER DIAGRAM IS ACTUAL DUE DATE PERFORMANCE DATA BY A SUPPLIER. THE AVERAGE % ON TIME DELIVERY IS 57% WITH A STANDARD DEVIATION OF 29%.



Case 1: A Baseline

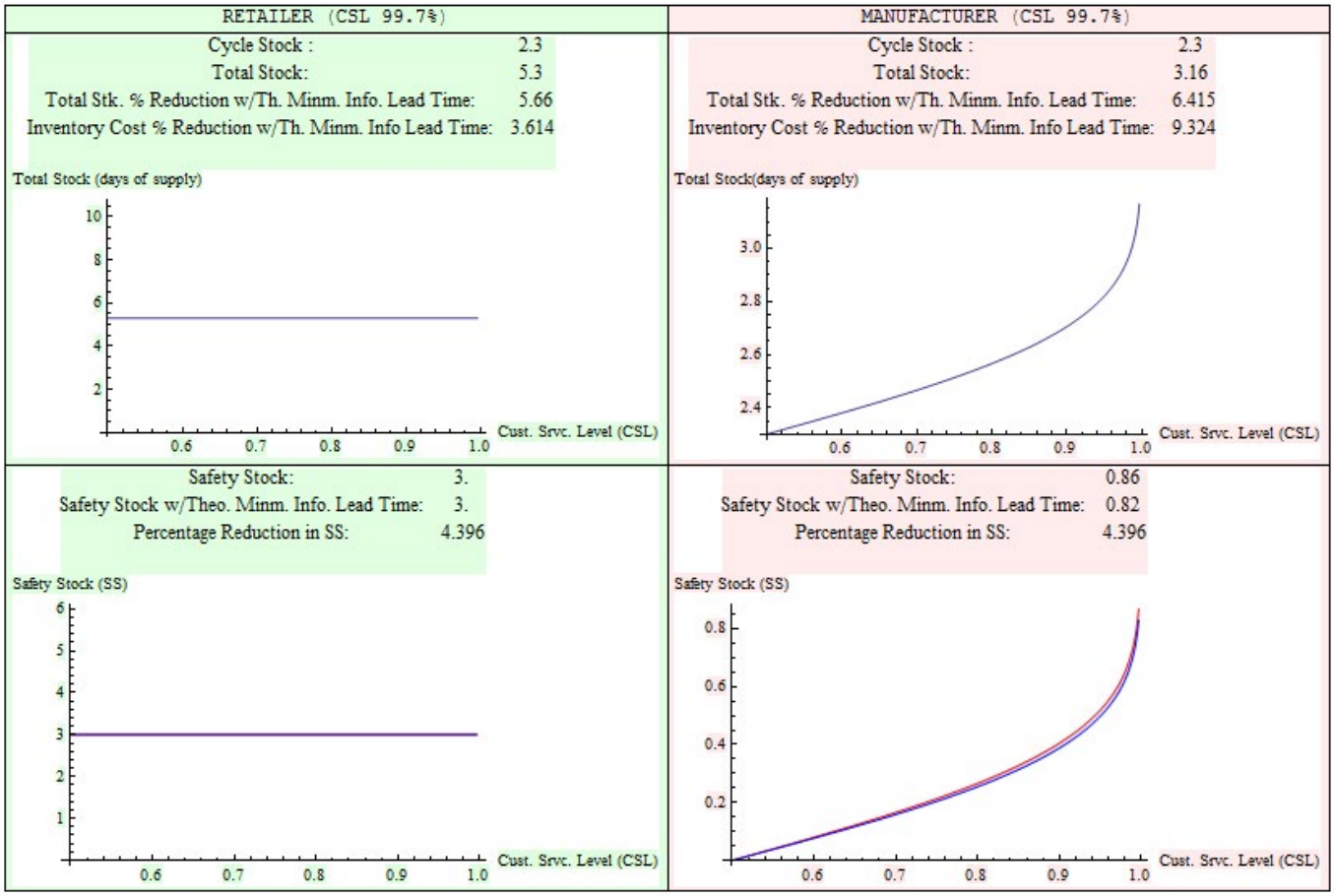
For the purposes of this example we assume the following;

Retail - A daily demand of 50 units; a forecast accuracy of 60% with 70% confidence in that forecast accuracy – resulting in a standard deviation of 20 units; and an information lead time from retail to DC is 1 day with standard deviation of 0.2 days.

Manufacturing - Information lead time from DC to Manufacturing is 2 days with a standard deviation of 0.4 days; Physical lead time to ship complete order from Manufacturing to DC is 3 days with standard deviation of 2.25 days based on the variance in the sample OTD data.

Looking at the simulation results on this baseline model, we can see the cost of our variability. **We are stuck carrying about 21 days of inventory between Retail, the DC, and Manufacturing in order to maintain customer service levels**.

The good news is that by applying a real time, demand driven network approach to the information lead time problem the simulation shows that there is a potential to reduce total stock by 12% at the retailer and 19% between the DC and the Manufacturer.



Case 2: With a Network Control Tower

Moving forward, let's improve our operations by applying a mix of the go-forward options mentioned at the beginning of this paper. Given that most successful projects today follow an agile implementation approach focused on value, let's estimate what we would expect after phase 1 of a project focused on a real-time, demand-driven, network control tower. The assumptions now become:

Retail - A daily demand of 50 units; a forecast accuracy of 80%, with 80% confidence in that forecast accuracy – resulting in a standard deviation of 8 units; and an information lead time from retail to DC is 0.3 days with negligible standard deviation.

Manufacturing - Information lead time from DC to Manufacturing is 0.3 days with negligible standard deviation; Physical lead time to ship complete order from Manufacturing to DC is 2 days with standard deviation of 0.2 days.

Looking at the results based on implementing phase 1 of our control tower model, we can see significant improvement. **Our total stock requirement has dropped to 8 days given our improvements in variability and lead times based on having a real time, multi-party trading network**.

For this model we've kept our customer service levels at 99.7% since that is a clear competitive differentiator for most companies. All numbers discussed are what is required to maintain this 99.7%.

The important conclusion here is that a platform investment at the network level generates a profound improvement in the inventory required to meet this service level objective, along with all the associated improvements in waste, logistics, distribution, and warehousing.

BENEFITS OF THE MULTIPARTY PLATFORM

As your enterprise continues its agile rollout of a business network platform across multiple phases, the performance metrics will continue to improve and you will never be bound by the law of diminishing returns again. From an infrastructure perspective you will have a never legacy platform environment which means you can continue to evolve your business model as the market continues to shift. In other words, with an extensible, adjustable platform, you'll never have a business operating system that becomes out-of-date.

Another big benefit area is in your organizational structure. There is a significant amount of tension in a supply chain network that lacks visibility, joint decision making, and the ability to execute decisions on a real time basis. All this tension requires quite a few arms and legs at every node in the network to hold it together. Once this tension is released and a new collaborative environment is established, the people whose job it was to combat what the long lead times and variability were doing to their company can now move on to other value-added areas of the business.

GETTING THE MOST FROM AN IMPLEMENTATION

When investigating new techniques, new processes, artificial intelligence, automation, and advanced technologies that are designed to help us deliver on our target metrics, let's make sure we understand the sensitivities in the model in terms of activity versus productivity.

There seem to be an endless stream of options to select from in order to try and improve performance and generally make things better. Wouldn't it be better to understand which variables would have the greatest impact on your current situation, along with how changing one variable in your performance might affect others, both positively and negatively?

As a mathematician I have studied most of our traditional analytical techniques along with our newer AI/ML/DL options. We need to keep in mind that applying a different math algorithm to improve forecast accuracy by 5 or 6% doesn't help much if the information lead time and variability are key drivers in our current cost profile. They almost always are, so it is imperative that we understand the interaction and priority of these variables as to how they impact our outcomes.

My advice to everyone before embarking on the great adventure offered by today's technologies is to understand the underlying business math at the detailed process level before making any big budget commitments. You will save yourself much pain and suffering along with having the ability to structure an agile rollout focused on business value and to establish a set of target project metrics based on business outcomes. This will help you maximize your return on your investment and see results much faster.

About the Author

Joe Bellini is Chief Operating Officer at One Network Enterprises. Joe's experience extends across some of today's leading technology companies, including General Electric, HP/EDS, Brooks Automation, IRI, R1 and Oracle. Joe was granted patents in Supply Chain Planning and is the co-author of the business strategy book, "The Real-Time Enterprise." Joe holds degrees in Mechanical Engineering, Applied Mathematics and Statistics, is an alumnus of Harvard Business School, and is certified in Artificial Intelligence and Machine Learning from the MIT Sloan School.

ABOUT ONE NETWORK

One Network is the intelligent business platform for autonomous supply chain management. Powered by NEO, One Network's machine learning and intelligent agent technology, this multi-party digital platform delivers rapid results at a fraction of the cost of legacy solutions. The platform includes modular, adaptable industry solutions for multi-party business that help companies lower costs, improve service levels and run more efficiently, with less waste. This SaaS and aPaaS platform enables leading global organizations to achieve dramatic supply chain network benefits and efficiencies across their ecosystem of business partners. One Network offers developer tools that allow organizations to design, build and run multi-party applications. Leading global organizations have joined One Network, helping to transform industries like Retail, Food Service, Consumer Goods, Automotive, Healthcare, Public Sector, Defense and Logistics. To date, more than 75,000 companies have joined One Network's Real Time Value Network™ (RTVN™). Headquartered in Dallas, One Network also has offices in Japan, Europe, and India. For more information, please visit www.onenetwork.com.

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