One Network Enterprises™

# Is Your Supply Network Really Shelf-Connected?

## How more accurate forecasts improve on-shelf availability, increase sales, reduce days of supply, and decrease supply chain costs

As W. Edwards Deming once said, “Without data you’re just another person with an opinion.” Over the past few years, the amount of available Point of Sale (POS) data has grown dramatically, increasing the urgency for all companies who sell through retail channels to leverage such information to drive decisions in their upstream supply networks. Access to retail data, down to the item, store, shelf, day, and shift level is powering a new level of decision-making which is completely transforming business processes in areas such as demand, replenishment, promotion, and new product planning.

Limitations in aging ERP computing platforms, both from a scale and cost perspective, have precluded many retail-driven channels from taking full advantage of the potential benefits of this trove of POS information. This is often coupled with the inability to reengineer related processes and decision-making across their supply networks.

## SHELF-TO-SOURCE CONNECTED NETWORKS

A new technology approach, the multi-party digital network platform, provides a highly scalable solution to the shelf-connected problem. These cloud platforms have been engineered from a detailed data representation on up to provide massively scalable performance and enable business processes that would otherwise be infeasible.

Using One Network as an example, cloud-based platforms have been deployed across many retail driven supply networks including Consumer Products (CPG), Electronics, Automotive, and Pharmaceuticals. Many of its customers have been leveraging One Network’s NEO Platform, doing store and daily-level planning, and managing the massive increases in data volumes (a 7-fold increase going from weekly to daily, and about a 100-fold going from DC to store-level).

Simply put, providing massively scalable cloud-based architecture is necessary given the large number of stock-keeping units (SKUs) in play across the multiple stocking locations within the supply network. As retail products are launched and new promotions rolled out, significant volumes of downstream data are produced. To gain insight into consumer demand (i.e. popular items versus slow moving ones), CPG companies need to have the ability to quickly analyze and react to point of sale data. Knowing that a shortage of inventory is the key reason for new product launch failures, it is crucial to ensure that retailers have the right mix, volumes, and locations of inventories to meet customer demand.

Today most CPG and retail companies lack the ability to generate either order or inventory visibility across their supply network. They also lack the ability to quickly respond to fluctuating consumer demands. This often results in sales promotions that run out of stock, which in turn leads to lost business and customers. They absorb increasing numbers of product launch failures, struggle with higher inventory costs, and are saddled with poor, and often negative, returns on trade promotions.

## FORECASTING IN A SHELF-CONNECTED SUPPLY NETWORK

A “demand-driven value network” (DDVN) oriented architecture is a good framework for building a shelf-connected system. DDVN’s seek to align and synchronize demand, supply, and product cycles, as well as enable the ability to sense and shape demand to generate a profitable demand response. It requires having a single view of the consumer for all members of the extended supply chain, including retailers, manufacturers, and logistics providers. It also requires that they be connected across a multiparty execution backbone which orchestrates a rapid and coordinated response to the end-consumer’s demand signal.

Unfortunately, today’s more popular forecasting and replenishment methods are based on a limited technology architecture that basically constitutes a “push” or ERP batch-oriented environment, where they try to collect and react to exceptions. The problem is this legacy architecture simply isn’t designed to resolve issues in a timely fashion (e.g. hourly or daily) given its long lead times and serially integrated nature. These technologies and outdated methods exact a price -- lost sales, lost customers, and excess and obsolete inventory. They also leave companies saddled with expensive and difficult to maintain systems that inhibit innovation and organizational agility.

The vision of the demand-driven value network is simply to design a process to drive the upstream supply network based on actual end-customer demand, basically the sell-through to consumers. This is far more effective than what is typically used, which is shipments, or the sell-in to distribution centers (DCs) and retail stores. By leveraging sell-through data rather than just sell-in, and minimizing the latency between actual consumer demand and its measurement, retailers and their suppliers can gain a more accurate understanding of market conditions. This enables them to optimize both their production and distribution plans to fully optimize the supply chain.

Going a step further, by using a single version of the truth and calculating a sell-in forecast that is mathematically based on the sell-through forecast (taking into account channel inventory and actual lead times), retailers and their suppliers can obtain a more accurate forecast of sell-in versus the traditional practice of forecasting the sell-in directly.

This greatly enhances visibility, since we are moving beyond the restriction of observing only shipments, to one of a direct relationship between consumer behavior and sell-in shipments. With this more accurate forecast, retailers can improve on-shelf availability, increase sales, reduce days of supply, and decrease overall supply chain costs.

Given these potential benefits, early adopters in the market have taken on the shelf-connected challenge and are driving responsive replenishment through short-term forecasts. Many of the methods being used depend on what is called a demand signal repository or DSR, which is core to One Network's Retail/CPG solution. DSRs are designed to leverage different types of downstream data, including POS data, to power more robust and dynamic forms of replenishment. Some of these more advanced forecasting approaches require a level of analytics that involve both prediction and prescription.

Three popular examples of these short-term forecasting techniques are as follows:

1. Flowcasting means generating a store-level forecast for each SKU which is then propagated upstream in the supply chain and aggregated into replenishment requirements.
2. Mirroring store-level ordering policies with algorithms that estimate store order policy logic at the DC so that CPG companies can optimize both replenishment and transportation.
3. Taking demand data and applying pattern recognition algorithms to fine-tune demand for different short-term periods such as week-to-week across various supply chain nodes. Data to be leveraged includes store level days of supply, store level forecasts, DC shipments, DC inventory positions, DC inbound shipments, and DC open orders.


Which is best? Given all the data that is available to develop both short- and long-term forecasts, a weighted approach considering a combination of order information, DC shipments, POS data, and geo-demographic considerations can make the most sense.

**The key to improved performance is to reduce variability and forecast error.** This greatly minimizes the classic "bullwhip" effect throughout the supply network. Today we can actually solve the problem. Advanced algorithms for autonomous forecast management, or AFM, support multiple methods of short-term forecasting, including those mentioned above, as well as predictive analytics and prescriptive analytics.

**The role of demand sensing and autonomous forecasting.** Traditionally, forecasting models have been based on time-series techniques that create a forecast based on prior sales history. However, where past sales are sufficient for predicting future forecast levels in mid- and long-term planning horizons, they have shown to be less accurate for short-term planning. The promise of Demand Sensing is that we can do better. In plain English, the premise is this: If the past is the best predictor of the future, it follows that the very recent past is the best predictor of the very near future.

The One Network solution uses Point of Sale data or location-specific consumption data to create an item and distribution center level forecast as often as needed. Results are then exploded back to the location level based on a smart pattern recognition agent that apportions forecast values according to the sales profile registered in the POS data. NEO intelligent agents have the unique ability to automatically monitor the POS demand signal for any anomalies, and continuously make autonomous demand and supply adjustments on an hourly or daily basis to ensure that customer service levels are maintained.

## REPLENISHMENT IN A SHELF-CONNECTED SUPPLY NETWORK

While the NEO Platform supports these advanced methods, it goes a step further. Because the platform enables both planning and execution in a seamless transactional flow, there is no disconnect between planning to do something and then actually doing it! This disconnect has been limiting the success of these more advanced forecasting methods for many years.

With full execution control, it is possible to actually reallocate both mix and volume for product that is in motion during replenishment. This is especially important given that we are now able to react to store-level inventory and POS data updates within physical shipment lead times based on today's rapid replenishment programs.

Furthermore, while the goal in forecasting is to reduce variability and forecast error, we all know it cannot be completely eliminated. With full execution control, any remaining forecast error can be managed in such a way that minimizes its impact on customer service levels as well as replenishment costs, without over-investing in inventory.

Given the availability and accuracy of store data from Big Box retailers, market leaders are moving forward with planning at both a store and daily level. Here are a couple of examples from CPG companies:

- From a retailer or manufacturer's perspective, many are executing store-level replenishment or shipping to retail DCs by leveraging a cross-dock schedule. Typically, they had been forecasting using store-level shipments or orders, or alternatively planning was done at an aggregate DC level. Today with the availability of store-level POS data and technical ability to generate store-level forecasts with low error rates, along with optimized replenishment plans, companies are able to optimize service and inventory levels. Promotional events and holidays become much easier to optimize, particularly if there are multiple store deliveries per week.

- If the supply network is not yet structured to perform store-level replenishment, companies still want to take advantage of the new technologies and improve DC-level forecasts based on insights and information available only at the store level, including consumer behavior and store inventory. Demographic data is extremely valuable at the store level and is a must for accurate modeling in high mix and volume scenarios. Accurate store inventory data is required to forecast shipments with low error rates. Using store-level forecasts and inventory plans we can improve DC-level forecasts, planned assortments, and inventories.

Using DDVN-based inventory replenishment policies enables retailers and their suppliers to reduce supply chain variability, optimize inventory levels, and minimize freight expense. Typical measurements include inventory turns, truck utilization, and premium freight reduction.

While cloud platforms like One Network's provide these integrated policies as a seamless capability across the multi-party network, most ERP vendors must use plug-ins that are not integrated as part of the transactional flow. Thus, various replenishment policies may well be listed as a capability, but given the batch architecture they simply can't be engaged on a real-time, exception-oriented basis, which is what is really required in today's rapid replenishment environments.

Different approaches are available for computing target safety stock levels, including using forecast error and desired service levels, days of supply coverage, lead time coverage or a fixed percent. For example, using a combination of safety stock targets, sell-in forecasts, minimum and maximum inventory constraints, in-transit inventory positions, and on order quantities, **One Network's Solution is able to generate a time-phased, multi-echelon inventory and replenishment plan**, rather than being limited to the single-tier replenishment plan that ERP systems typically use to feed the enterprise execution systems.

In fact, these flexible modeling hierarchies and configurability enable consumption-based planning for heterogeneous distribution channels, in which products are distributed through multiple channels with different levels of hierarchy. Companies can sell through their own stores (physical and online), through third party retailers (shipping to both retail DCs and direct to store), or through distributors (both with and without sell-through data available).

## COLLABORATION IN A SHELF-CONNECTED SUPPLY NETWORK

While these advancements around forecasting and replenishment are radical improvements, similar gains are being made around retail-based collaboration and planning as well. The basic definition of a supply "network" implies collaboration versus a supply chain which of course is serial in nature. **Network participants collaborate and plan in real time, eliminating latency related to both information flows as well as order lead times**. When coupled with the DDVN advancements described above, this can virtually eliminate the bullwhip effect across the supply network, enabling both planning and execution using a single version of the truth across all network participants.

In addition to improved performance, companies that extend into a DDVN environment will also enjoy full internal and external visibility of component parts (at retailer DC's, supplier DC's, export hubs, etc.). This is enabled by the NEO Platform which supports both an autonomous and an interactive collaboration capability to enable fully digital commerce, including communicating replenishment signals across the global supply network in real time. For example, this would provide the ability to optimize truckloads simultaneously with inventory positions across the entire

supply network using dynamic replenishment policies that employ both temporal and volumetric triggers. Exceptions are presented in role-based workbenches enabling network participants to collaborate in real time to resolve any issues not handled automatically by the system's replenishment policies.

## INTEGRATED BUSINESS PLANNING/S&OP IN A SHELF-CONNECTED SYSTEM

Another logical use of consumer data is to leverage it in the execution of longer-range integrated business plans across multiple departments and network participants. In the past, deploying an integrated planning and execution environment has been difficult due to the lack of a platform which can enable consensus-based collaborative forecasting and planning.

As pioneers of platform as a service (PaaS) and cloud infrastructure, One Network has mastered data scalability, permission-based access, and data level security, enabling today's supply chain leaders to confidently deploy a proven cloud-based planning layer over their core ERP. This planning layer enables the sharing of S&OP data across key stakeholders within the retail supply network. It enables collaborative and iterative simulation planning that takes into consideration pertinent factors such as current demand, projected sales scenarios, and supply constraints like lead time and capacity.

Once consensus has been achieved on the forecast and the upstream planning of materials and capacity have been agreed to by all concerned stakeholders the plan can then be adopted by the respective ERP systems to generate lower-level planning like material planning systems (MPS) or manufacturing resource planning (MRP). To achieve best in class performance, the cloud platform can be deployed at both the planning and execution layers, eliminating the need to integrate across multiple ERP silos. This means significantly reduced lead times across the retail supply network.

From a process perspective, cloud platforms like One Network's capture the high-volume POS data that drive both the sell-in forecast designed to maintain target inventories, as well as the DOS and weekly supply targets for the sell-through forecast. Once captured, this downstream data is available for analysis in workbenches, dashboards, and various reports along with rolling up into the S&OP process. Standard API's are available for ease of integration of any external data sources to the cloud-based platform.

Within the S&OP process itself, new product introductions are supported as well as the phasing-out of old products, along with introduction timing control and the ability to model product life cycles either globally or at varying levels of granularity, including store level. New products can be modeled based on existing products and will inherit both their data and store association.

Once a statistical sales forecast (a single version of the truth) is generated, it can be seamlessly incorporated into the overall shelf-connected solution to ensure a more accurate planning process. The consensus planning functionality enables different organizations, such as Sales, Marketing, Operations, and Finance to come together in a common environment, along with any appropriate trading partners, and generate an Integrated Business/S&OP plan as well as a consensus forecast.

## THE NEO PLATFORM: CONNECT, COORDINATE AND COLLABORATE ACROSS YOUR SHELF-CONNECTED NETWORK

In a shelf-connected system, virtually all information latency between trading partners, from the downstream retailer all the way upstream to the tier 2 supplier can be eliminated, along with greatly reduced supply variability and associated inventory and transportation costs. Yet, due to the architectural difficulties inherent in legacy technologies, and although there are many potential benefits of a shelf-connected system, there are few real-time multi-party, multi-echelon retail solutions in the market that can enable such a process. One Network's proven NEO Platform is a pioneer in this regard.

Industry analysts have praised One Network's innovation in supply chain visibility, collaboration, and automation. In 2018, Gartner recognized One Network Enterprises as a Leader in its "Magic Quadrant for Multi-enterprise Supply Chain Business Networks" report. The company also ranked highest for the fourth consecutive year in Nucleus Research's "Control Tower Technology Value Matrix for 2019."

## 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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