
Integrating the Retail Supply Chain

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helping you simplify supply chain planning



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Integrating the Retail Supply Chain

Since the mid 1990s, the rate of change in retailing has probably been more rapid than in any other sector. Nothing confirms this more than the emergence of the on-line retail sector, or as it's sometimes called, eTailing. While the growth potential of eTailing is substantial, a supply chain that is responsive to consumers is paramount for survival – regardless of the channel.

The Vision

One of the biggest issues facing retailers of all types is that of product delivery – consistent, on-time, reasonable cost delivery to the consumer. Whether you're an eTailer or a traditional retailer, getting product into consumers' hands consistently and at the lowest possible delivered cost is fundamental to success. This has long been understood by most supply chain professionals from the traditional retail channel ("bricks and mortar").

This paper outlines the concepts and principles for a new integrated supply chain process. The process is consumer driven and is completely integrated from point-of-purchase (be it a checkout counter in the store or a personal computer in the consumer's home) through to raw material supplier. The process will work for both traditional retailers and, importantly, for eTailers.

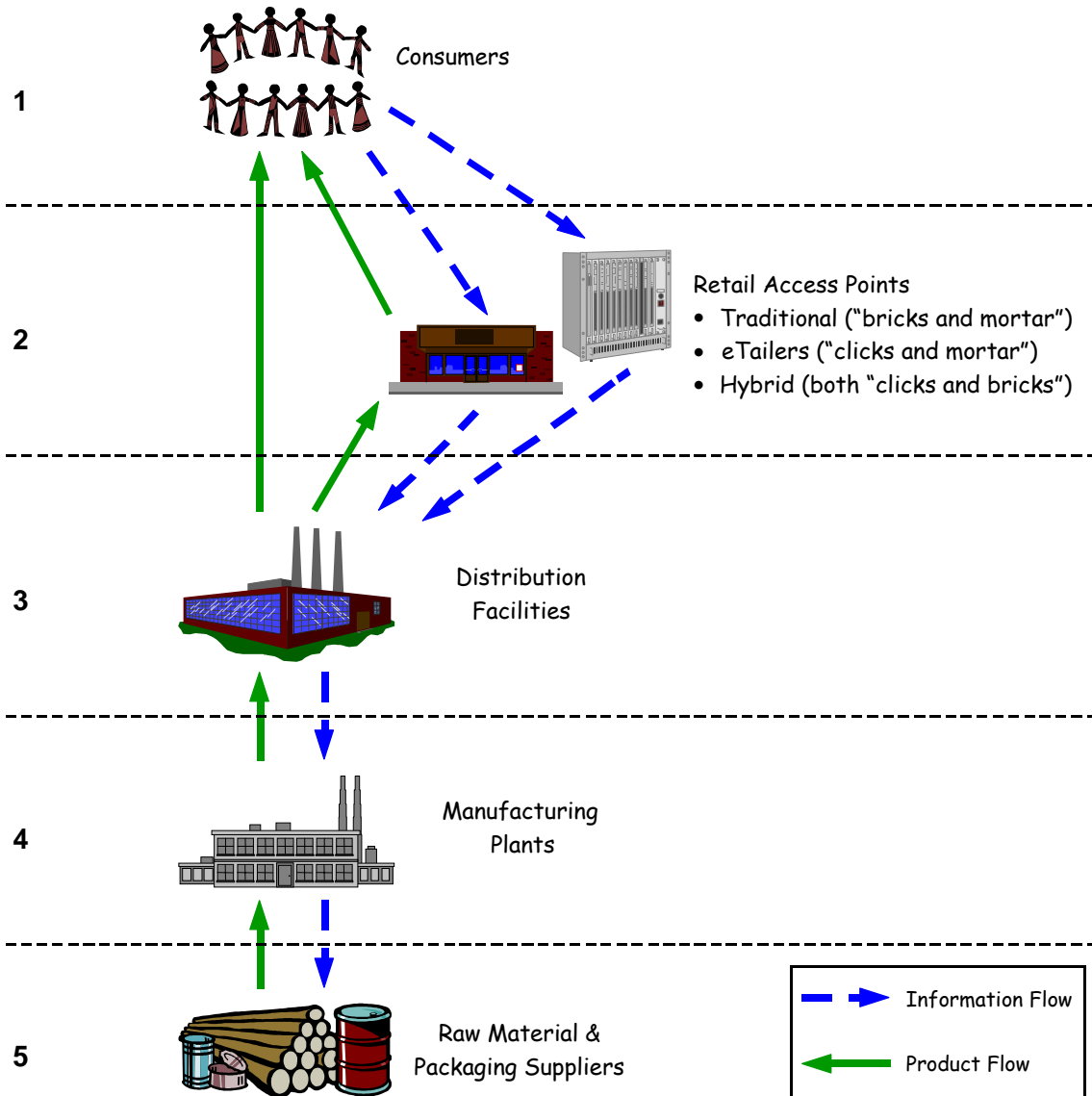
The retail supply chain follows essentially three models (although variations of each can be used):

- Traditional Retailer ("Bricks and Mortar")
- Internet eTailer ("Clicks and Mortar")
- Hybrid (retail stores augmented with Internet shopping)

A traditional retailer is a company that chooses to satisfy consumer demand through retail stores. An Internet retailer receives online orders and satisfies them via warehouses or fulfillment centres (owned by the eTailer, supplier or third party distributor) that deliver directly to consumers' homes. The hybrid allows the consumer to acquire product either at the store or on-line. The acquisition/delivery is then customized as required by the consumer, and may use any part of the retail supply chain infrastructure.

Regardless of the model, all supply chain activity begins with consumers. The following diagram outlines the integrated nature of the process and depicts how products and information can flow throughout the retail supply chain for consumer packaged goods.

Integrating the Retail Supply Chain



This diagram illustrates a simple example with only 5 levels or echelons, but it can be easily expanded to represent any retail supply chain. Note that this supply chain construct (and supporting process) is valid regardless of the number of companies involved.

Consumer Processes

Traditional Retailer ("bricks and mortar")

In the traditional retailer example, consumers purchase products from retail stores who, in turn, receive product from retail distribution centres. The distribution centres order and receive products from manufacturing plants. The raw materials suppliers provide the plants with everything they need to produce finished goods for the distribution centres.

Internet eTailer ("clicks and mortar")

The eTailer's challenge is to satisfy consumer demand without the retail stores echelon. Essentially, demand is collected from an online catalogue and mapped to the appropriate distribution centre/facility (using postal codes, for example). Product is delivered directly to consumers' homes from strategically located facilities.

Hybrid (both "clicks and bricks")

A hybrid retailer is essentially a traditional retailer that also sells products online. A key advantage the hybrid retailer has over the eTailer is that it already has a delivery infrastructure in place to distribute product close to consumers' homes.

Satisfying the Consumer Demand

How an organization chooses to satisfy consumer demand (traditional retailer, eTailer or hybrid) is part of its supply chain strategy. Regardless of the format, consumer purchase history can be used to predict future consumer behaviour.

A traditional retailer would determine how many units of a particular item a particular store would sell and would calculate a time-phased replenishment plan to support these projected sales. The replenishment plan would be based on stock levels required in the store and additional factors. Simply adding up the time-phased plans from the stores yields the demand on the distribution centre (DC). Using this, the DC can calculate a time-phased plan for its own requirements. This plan then becomes the demand on the manufacturer. This process continues up the supply chain with each entity providing a time-phased schedule to its supplier.

We illustrate this process with the example of a traditional retailer. For simplicity, let's say that this retail supply chain has two retail stores, one DC and only one product, Deluxe Widgets.

Deluxe Widget

Safety Stock	35
Leadtime	1 Week (Store to DC)
On Hand	60
Order Quantity	12



	Time (Weeks)							
	1	2	3	4	5	6	7	8
How much will we sell?	16	29	31	18	67	22	13	18
What will we have on hand?	44	39	44	38	43	45	44	38
What is the minimum we need to have?	35	35	35	35	35	35	35	35
How much do we need to arrive?	0	24	36	12	72	24	12	12
How much do we need to order?	24	36	12	72	24	12	12	12

Integrating the Retail Supply Chain

Store #1 has determined that they will sell 16 widgets in week 1, 29 in week 2, and so on. This forecast of consumer demand can run for 26 or more weeks, possibly 52. The store wants to keep at least 35 widgets in inventory at any point in time (the safety stock). They currently have 60 widgets on hand. When they order, they order in multiples of 12 (the minimum the DC will ship them). Also, the orders are just large enough to ensure the on hand level stays above the safety stock. Notice that "What will we have on hand?" is never below "What is the minimum we need to have?" This is often called DRP (Distribution Resource Planning) logic. The store will need 24 widgets to arrive in week 2, 36 to arrive in week 3 and so on. Since the lead-time (the time from order to receipt) from the Store to the DC is 1 week, the store will need to commit to the 24 in week 1 in order to receive it in week 2¹. Thus the line, "How much do we need to order?" is the requirements that this store will place on the DC for deluxe widgets. This time-phased requirement is communicated back to the Distribution Centre.

Deluxe Widget

Safety Stock 4
Leadtime 1 Week (Store to DC)
On Hand 12
Order Quantity 12

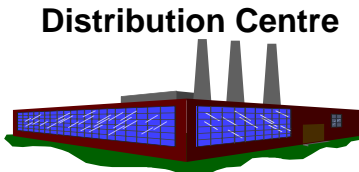


	Time (Weeks)							
	1	2	3	4	5	6	7	8
How much will we sell?	2	3	9	3	14	3	7	4
What will we have on hand?	10	7	10	7	5	14	7	15
What is the minimum we need to have?	4	4	4	4	4	4	4	4
How much do we need to arrive?	0	0	12	0	12	12	0	12
How much do we need to order?	0	12	0	12	12	0	12	0

Store 2 has a different consumer demand forecast and safety stock. The figure above illustrates the scenario for Store 2.

Deluxe Widget

Safety Stock 96
Leadtime 2 Weeks (DC to Plant)
On Hand 244
Order Quantity 72



	Time (Weeks)							
	1	2	3	4	5	6	7	8
What are the stores' requirements?	24	48	12	84	36	12	24	12
What will we have on hand?	220	172	160	148	112	100	148	136
What is the minimum we need to have?	96	96	96	96	96	96	96	96
How much do we need to arrive?	0	0	0	72	0	0	72	0
How much do we need to order?	0	72	0	0	72	0	0	72

At the Distribution Centre, the demands are easy to calculate. "What are the stores' requirements?" is easily derived by adding up the demands ("How

¹ We used a lead-time of 1 week in our example because, for simplicity, we broke out our data into weekly time buckets. Typically, DC to store lead-times are between 1 and 3 days for most retailers.

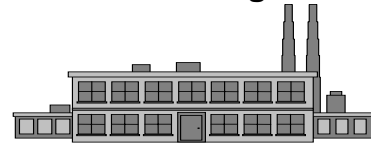
Integrating the Retail Supply Chain

much do we need to order?") from each of the 2 stores. The demand placed upon the DC is commonly referred to as dependent demand – that is, it is calculated rather than independently forecasted. Again, similar logic is used to determine the time-phased plans for the DC based on their safety stock requirements and their lead-time to the manufacturer. This requirement ("**How much do we need to order?**") is communicated back to the manufacturer.

Deluxe Widget

Safety Stock 144
Leadtime 2 Weeks (Mfg Time)
On Hand 256
Batch Size 144

Manufacturing Plant



	Time (Weeks)							
	1	2	3	4	5	6	7	8
What are the DC's requirements?	0	72	0	0	72	0	0	72
What will we have on hand?	256	184	184	184	256	256	256	184
What is the minimum we need to have?	144	144	144	144	144	144	144	144
How much do we need to have made?	0	0	0	0	144	0	0	0
How much do we need to make?	0	0	144	0	0	0	144	0

The manufacturer receives the time-phased requirement from the retailer for deluxe widgets and consolidates these needs with other retailer needs by adding up the time-phased requirements for each retailer ("**What are the DC's requirements?**"). This forms the basis of what must be manufactured and when. Material requirements ("**How much do we need to make?**") are derived from this and these are also communicated to the appropriate raw material suppliers.

As everyone knows, nothing goes exactly according to plan. So, as the sales actually happen and inventories change the plans refresh and adjust. New plans are determined based on the changes and where they took place (e.g., Store 1 may determine a new plan based on actuals, while Store 2 may have little change to its plan). Up-to-date plans can be communicated throughout the supply chain as frequently as required (e.g. real-time, hourly, daily or weekly). Even more importantly, the time-phased plans are tailored exactly to the needs of each supply chain partner – all parties see the effects of the plans based on the latest information.

Comparing Tomorrow with Today - True Integrated Planning

Traditionally, the retail supply chain has been characterized by a lack of integration and trust among supply chain partners. Typically, there is one replenishment system in the retail stores, another system at DC level and yet another system for manufacturers. What's worse, each supply partner creates a forecast for its own needs, independent of its partners.

Integrating the Retail Supply Chain

Recent improvements have seen the sharing of forecasts between trading partners, with the goal of better collaboration throughout the supply chain. Yet in many examples, sharing of these forecasts has only created more confusion. This is because each supply chain partner has different requirements for a replenishment forecast. Sharing a point-of-sale (POS) forecast between a retailer and a manufacturer can be enlightening for marketing purposes, but the POS (both quantity and timing) bears little resemblance to what the manufacturer needs to produce in order to satisfy this consumer demand.

So why is this new process, grounded in the principles of time-phased planning, superior to the traditional retail supply chain model?

Forecasting activity is in one place

The only unknown in any supply chain is consumer demand. Once this has been forecasted, all other demands in the supply chain are dependent demands. In other words, they can be calculated in a simple and straightforward manner. Sharing dependent demand between players integrates the supply chain. All participants in the supply chain are serving one master: the end consumer.

The supply chain is constantly re-calibrating itself to changes in the market

The integrated supply chain provides another distinct advantage: re-calibration. When things don't go according to plan, the entire supply chain is re-planned quickly. Because each participant in the supply chain is providing *actionable* information to its suppliers, the correct response to changes in true (consumer) demand is automatic and immediate.

Visibility

Realistic Order Lead-times

This integrated process provides a constantly updated projection of demand, supply and inventory levels, by item, throughout the supply chain. Since visibility is supplied in the form of actionable information, realistic ordering lead-times can be established. This is because suppliers are no longer waiting to be surprised by the next order. Instead, they are given estimates of requirements for the next several months, updated every week (or every day, or in real time - whatever is required). Uncertainty has been driven out of the supply chain through process integration, and lead-times no longer require buffers.

Proactive Replenishment Planning

Total supply chain visibility also offers replenishment planners at all echelons of the supply chain (store managers, buyers, production schedulers) the ability to work by exception to resolve *potential* problems before they become firefighting situations. Now that planners have demand, supply and inventory levels

Integrating the Retail Supply Chain

projected into the future, they can detect *potential* stockouts and call their suppliers for early shipments *before* the inventory drops to zero.

Proactive Capacity and Financial Planning

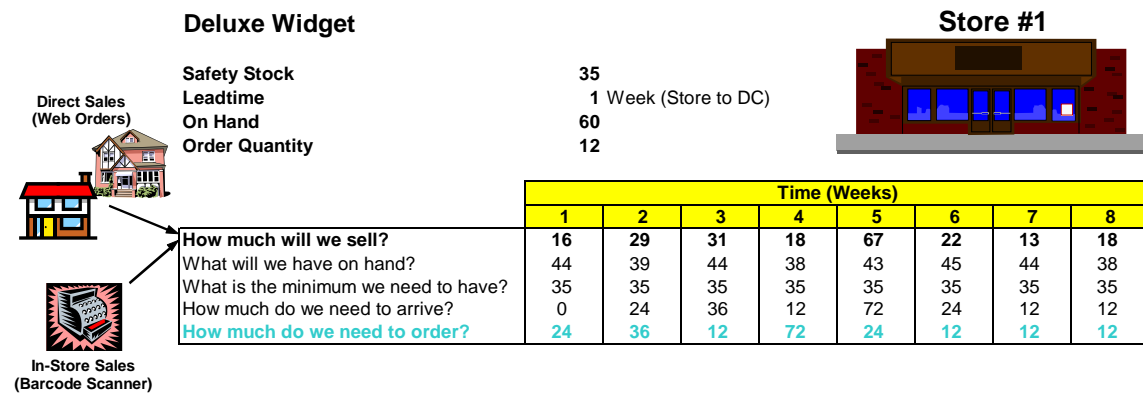
A key advantage of having a forward-looking system for replenishment planning is that it provides valuable planning information to other areas of the organization. The unit demand forecasts, projected inventory balances and supply schedules can be easily converted to cubic feet and summarized by facility to do rough cut capacity scheduling and inbound/outbound planning. Similarly, using pricing and cost data by item, each supply chain partner can plan cash flow and analyze margins into the future.

Once it becomes known that the replenishment forecast is the one forecast that drives activity in the supply chain, the replenishment system quickly becomes the source of all projections. Thus, a *single set of numbers* drives all supply chain activities.

eTailing is Retailing!

Obviously, the previous illustration is an example of the process in action for a typical bricks and mortar retailer. However, from a process perspective, the planning challenges are the same, whether you are a traditional retailer, an eTailer or a hybrid. The process would work in exactly the same way, regardless of the method of consumer acquisition and the method of satisfying this demand.

The following diagram depicts the hybrid model. The retailer already has physical stores, and demand from the "cyber store" is mapped to them (e.g. using a zip/postal code as a key).



From a planning perspective, online orders are just another form of point-of-purchase demand - whether the consumer demand information ("How much will we sell?") comes from a barcode scanner in the store or from a web-based ordering form, the basic process and planning is the same. The key difference is

Integrating the Retail Supply Chain

how a company decides to capture consumer demand and how they plan to satisfy it. For example, instead of capturing and satisfying the consumer demand through a conventional bookstore, Amazon.com chose to entirely capture consumer sales via the Internet (i.e. the pure eTailer model) and to satisfy the demand from a fulfillment centre, skipping the retail store altogether.

The following chart summarizes the similarities and differences between the models:

Model	Demand Forecast	Map Demand to	Satisfy Demand from
Bricks & mortar	Consumer demand	Retail store	Retail store
eTailer	Consumer demand	DC (regional or central)	DC where demand is mapped
Hybrid	Consumer demand	Retail store or regional DC	Retail store/regional DC where demand is mapped (closest stocking location)

While the process is the same, the “correct” number of echelons and their locations is a tricky question to answer. Typically this is at the heart of a retailer’s overall strategy and, at the very least, its supply chain strategy.

Regardless of the number of supply chain partners utilized to satisfy consumer demand, each participant in the retail supply chain would be required to provide visibility of future product requirements to their supplier. These plans would be updated based on the latest information in the marketplace and would be the demand forecast that would drive all operational activity for that supply chain partner.

Making the Process Happen

This is a completely new approach to managing the retail supply chain. While the conceptual overview of the process is easy to understand, the technology to support this process is now also available. Until recently the large number of items needed to be processed at store level (usually in the tens of thousands) made this option prohibitive. However, recent advances in computational power have made time phased store level and integrated retail planning possible.

This retail planning technology is available today. The Vermont-based Retail Pipeline Integration Group has developed such a system and have tested it in the field for a variety of retailers. In a test for one of the largest retailers in America, the following results were achieved using this approach:

Integrating the Retail Supply Chain

- Customer service increased from **92.9% to 99.1%**
- In-store inventories were reduced **by 15%**
- Lost sales were reduced **by 20%**
- In-store back orders were reduced **by 10%**
- An **additional 40% reduction in supply chain inventories** was identified.

Why is this process so much better? The process is consumer focused, moving products quickly to the ultimate point of sale based on the most current marketplace knowledge. The process is a seamless integration of the retail supply chain and all members of the supply chain are working towards a common goal (i.e., satisfying the consumer). The plans for all supply chain partners are exactly tailored for their specific needs, are completely relevant and are continuously kept up-to-date.

The result? Order of magnitude improvements in customer service, order fulfillment times and cost reduction (particularly inventories) throughout the supply chain.

And that spells good news for consumers.[†]

[†] About Demand Clarity: Demand Clarity Inc. is a focused consulting firm whose mandate is to simplify supply chain planning. For more information on this topic or others, please phone us toll free at 1-877-877-9769, send an email to info@demandclarity.com, or visit us on the web at www.demandclarity.com.