"Distributed Order Management is changing the landscape in supply chain execution. If you want a concise primer on DOM functionality, application use cases, and how DOM delivers value in retail and beyond, this Little Book provides all that and more. A good read."

- Kevin Hume, VP Technology, Tompkins International

the Little Book of Distributed Order Management

by Dan Gilmore and Satish Kumar

DOM

How DOM Technology is Changing the Game for Order Fulfillment in Omnichannel and Beyond.

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Distributed Order Management

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The Little Book of Distributed Order Management

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Foreword

I first came upon **Distributed Order Management (DOM)** technology in the late 1990s when I was a supply chain analyst at META Group, a major research and analysis firm that was later acquired by Gartner.

This is the period when the whole notion of "dot-com" businesses first entered into our consciousness. The few early developers of DOM solutions were largely trying to solve a basic challenge: how does a virtual retailer or web storefront connect with disparate suppliers to monitor their ability to fulfill orders, and then pass consumer orders to the vendors based on the optimal fulfillment service and costs?

With the collapse of the dot-com bubble, DOM went into hiding for a few years, but started to make a comeback by 2007, then slowing again with the Great Recession. However, the growth of ecommerce in the following years created an environment in which DOM became not only a "hot" technology, but almost **essential** in winning at Omnichannel fulfillment.

I followed DOM pretty closely for 15 years in my role as editor of the on-line magazine Supply Chain Digest.

My eyes were really opened by my recent work with Softeon, a leading provider of DOM (and WMS) solutions. Softeon was implementing DOM not only at retailers, but in many other scenarios with businesses that are outside of the retail vertical.

In fact, my co-author of this book, Satish Kumar, led the deployment of Softeon's DOM at Sony DADC in a B2B use case that involved entertainment media - a very different use of the solution from retail and a proven success story. He has since joined Softeon, and has led the deployment of DOM in a wide variety of applications.

We tried to pack a lot of information into this book with the confidence that it will be a valuable resource in understanding DOM use cases, value, functionality, and keys to success – and do so in a relatively few number of pages.

We certainly hope this Little Book proves to be interesting and valuable to you.

Dan Gilmore

Intro

A relatively new (and certainly not well understood) type of software is having a dramatic impact on supply chain execution. This is especially true for ecommerce, but reaches well beyond.

It is called **Distributed Order Management** or **DOM** - a solution that is related to, but is in many ways different from, traditional order management systems.

In this Little Book, we'll take a look at DOM capabilities, the many use cases of DOM technology today along with the benefits of each, how DOM fits within other software systems, DOM implementation steps, the keys to success and more.

1 What is Distributed Order Management and Why Now?

Distributed Order Management was first developed at the end of the 1990s by a very small number of software firms, and with the primary intention of solving issues with the newly evolving ecommerce business model.

Many of the new “dot-coms” were only electronic storefronts which didn’t maintain their own inventories, relying instead on vendor drop shipping to fulfill orders. Therefore, they needed systems to check-on vendor inventories, communicate order information, and receive vendor acknowledgements, among other functions.

So Distributed Order Management software was born. With the bursting of the dot-com bubble in 2001, however, interest in DOM waned for a few years. It started to regain some momentum later in the decade - sometimes to support ecommerce, or to tie together disparate corporate order management systems in a B2B context.

Since about 2010, as Omnichannel commerce has exploded, DOM has become an essential tool for ideally managing efulfillment and more. This is equally true for DOM use in other non-retail applications, where it continues to expand (as we will explore shortly.)

We can simply define DOM as a platform that provides integrated planning and execution across multi-echelon, multi-node, multi-partner and multi-channel supply chain networks.

From a more comprehensive or hollistic perspective, Distributed Order Management system serves as a powerful hub that enables Omnichannel commerce, integrates the extended supply chain, optimizes inbound and outbound order routing, provides real-time network inventory visibility, allocation and management, automates complex channel and customer requirements, and maximizes profitability while meeting even the most demanding customer service commitments.

DOM, in fact, includes something of a “Swiss Army knife” of capabilities and is becoming the central force of the supply chain execution ecosystem.

2 DOM Fundamentals

Even though DOM has evolved over some 20 years, the fundamentals of DOM capabilities and benefits have largely remained the same. **At a high level, DOM solutions deliver:**

- Real-time visibility of inventory, orders, network capacities, constraints, and costs across an extended network
- "Orchestration" of order fulfillment - what does this really mean? Orchestration involves applying an automated set of dynamic rules to each order so that it is executed precisely according to the desired business logic
- A "rules engine" foundation that executes configured business strategies based on order fulfillment policies
- Connectivity to other internal as well as external systems
- Automation of order handling processes
- Flexibility to fulfill orders optimally based on accurate, real-time visibility

Later in this Little Book, we'll dive into DOM functionality with more detail.

3 the Difference Between DOM and Traditional Order Management Systems

As Distributed Order Management systems have gained market prominence in recent years, a natural question has emerged on how DOM differs from traditional order management systems that are used, at least in some part, by virtually every company.

The reality is that clear differences do exist. However, as we'll touch on later, some of those differences are being phased-out as systems converge to offer more comprehensive, single solutions. While there are some modest overlaps between the two categories, the central missions of DOM and traditional OMS differ *(see graphic next page)*.

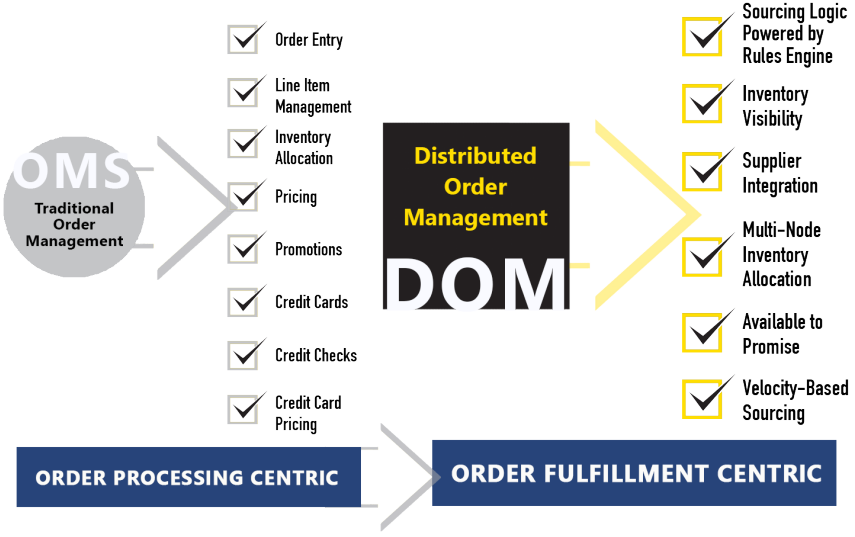
A traditional OMS is primarily focused on order processing and addresses all the items needed to successfully complete that task, including pricing, promotions, credit checks, credit card processing, and more.

A DOM system, by contrast, is order fulfillment centric, looking at how to source an order in a way that

meets customer service commitments at the lowest total cost (or some other objective). As noted above, the heart of a DOM system is a powerful, configurable rules engine that enables companies to define sourcing and fulfillment policies and logic in great detail.

As a further point of differentiation, a DOM system often sits on top of multiple traditional OMS solutions, which we will discuss later in more detail.

DOM vs. Traditional Order Management



4 DOM Use Cases

While the rise of Omnichannel commerce has pushed DOM into prominence, and is the domain that sees the greatest number of deployments, there are actually many diverse use cases for DOM in supply chain.

Omnichannel Enablement and Fulfillment Optimization

Omnichannel retail, at both true retailers as well as consumer goods companies and wholesalers selling direct to the consumer, has been the catalyst for recent DOM interest and deployment. For that reason, and because of its complexity, we will take a look at this use case in some detail, and how DOM provides a number of inter-related capabilities and benefits.

This is partly driven by the fact that there is something different about Omnichannel commerce and fulfillment: the predominant role that technology plays in executing strategies and satisfying customer needs and business process requirements.

If you are a retailer, for example, you either have sys-

tems that support buy on-line, pick-up in store (BOPIS) or you don't. The same is true with store-based fulfillment as well as many other examples, such as drop shipping from vendors for both retailers and manufacturers. It is a binary scenario: a company's systems can either support a given capability or they can't. Manual workarounds are often just not feasible.

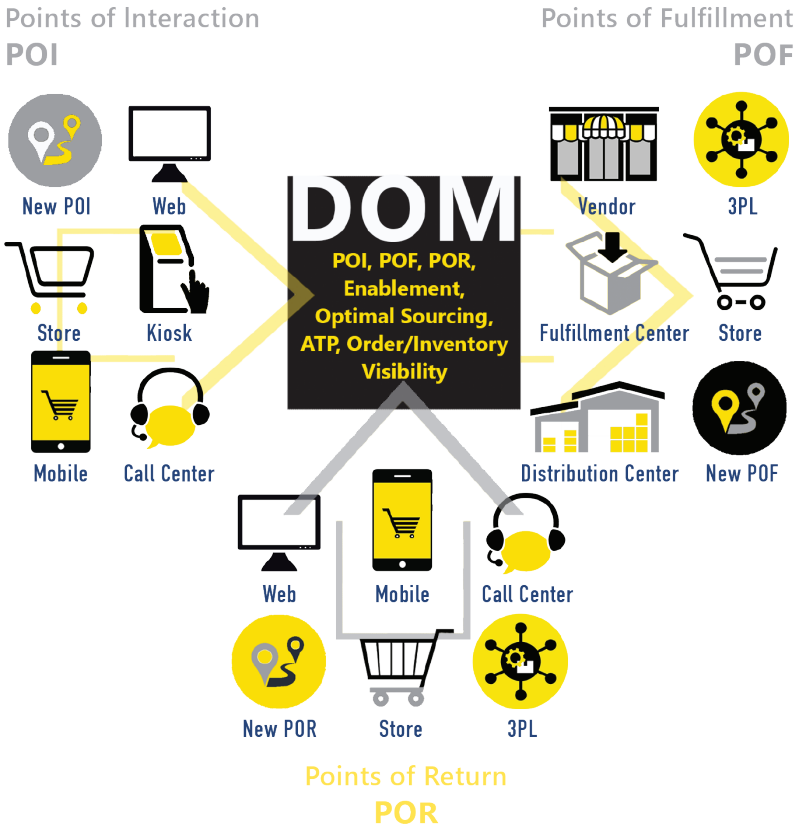
While people and processes are also important in Omnichannel success, strategy and technology generally take the lead here, changing the normal dynamics when it comes to technology planning and investments. This is simply the new reality, as thousands of companies are now coming to discover.

To understand how DOM drives Omnichannel process enablement, It is important to understand three key Omnichannel concepts:

- **Points of Interaction (POIs):** The physical or digital locations from which orders can be placed
- **Points of Fulfillment (POFs):** Locations from which a customer order can be shipped/fulfilled
- **Points of Return (PORs):** Physical or digital locations from which a customer can return all or part of an order

These concepts, equivalent to supply chain "nodes," all interact with each other, as illustrated here:

eCommerce Enablement + Optimization



A critical early step in the Omnichannel journey is to identify current or planned **Points of Interaction** and **Points of Fulfillment**. Obviously, this exercise is done in conjunction with the overall Omnichannel strategy

and (probably at some future point) more rigorous supply chain network optimization. **Points of Return** also need to be identified.

The next logical step is to map what Points of Interaction will potentially have customer orders fulfilled from which POFs.

This then provides a clear roadmap for which combinations of POIs and POFs need to be technically enabled. When Omnichannel leader Macy's undertook this exercise several years ago, it identified 16 such combinations that its systems would need to support – plus a couple more that would occur sporadically and that manual workarounds were feasibly able to handle without much technological investment.

Of course, other POIs, POFs and PORs will emerge over time and in new combinations that will also need to be technically supported. A key advantage of DOM is the flexibility it brings to changing strategies and policies over time, dramatically expediting the time it takes to effect such changes.

Given this situation, retailers and consumer goods companies have two high-level options: they can invest a lot of time and resources in modifying existing systems, or they can deploy DOM to provide these capabilities with integration to, but with little to no

modification of, existing systems. For many companies today, the choice is obvious – use powerful DOM capabilities to enable new processes needed for Omnichannel commerce.

Optimal Order Sourcing

Enabling Omnichannel processes is only part of the answer. Most retailers and vendors are struggling to make significant profits in ecommerce and are looking for new sources of revenue, as well as delighting on-line customers in this Amazon-driven world. This is where the order fulfillment optimization capabilities of DOM come into play.

When an order is received, across any channel/POI, the DOM will use its rules-engine logic to identify where to source that order from in a way that results in the lowest total cost *and* meets customer commitments *while still* considering network or node constraints.

Let's take a very simple example: say a retailer has several DCs in differing time zones across the US. As the day proceeds, orders from the East Coast may be routed by the DOM to DCs going further West in order to meet cut-off times for parcel carrier pick- up, depending on the service commitments to individual customers. So a customer that chose free ground shipping with somewhat loose commitments for order del-

ivery would be routed to the DC that would incur the lowest shipping cost, whereas the orders for customers paying for one or two-day delivery would have their sourcing points dynamically moved throughout the day to take advantage of later cut-off windows.

Below is an example of a more specific type of rule invocation for fulfilling a customer order:

Sourcing

1. Postal Code (3-digit)
2. 100% Inventory Availability at the Selected Node
3. Check the next Best Location for 100% Inventory Availability
4. Inventory (100%) Not Available - Split the Order
5. If Back Order is Managed in Web Storefront, Cancel Order
6. Freight Cost-based Sourcing
7. DC Capacity Rules

Carrier Assignment

If no Ship Method is defined, the Best Ship Method will be Assigned

Exception Handling

1. Ship Method (Pickup from Store) only processed from DC (A) if Store doesn't have the Inventory
2. All Ship Methods are not processed at a given DC
3. Gift Orders can't be split
4. Kit Orders can't be split

You can get the idea. Companies are using DOM to consider all kinds of scenarios, such as maintaining minimum in-store inventories even if a store is the least cost shipping location, the maximum number of orders a store can process over a period of time, support for vendor drop shipping and many more.

The result is not only lower fulfillment costs, but usually a bump in revenue as well, as items ordered on-line that are not in stock at a DC can often be fulfilled from store inventories. Support for vendor drop shipping is also a key process for many retailers, manufacturers and brand companies. This produces the "endless aisle" effect, where retailers can offer multiple times the number of items they carry in-store or even in focused ecommerce DCs by leveraging supplier inventories and shipping capabilities.

What's more, a DOM can play a key role in the returns management process, whether at a retail store, a DC, or a returns center. In fact, returns management is inherently a rules-based process, considering the type of product, the vendor, its returned condition and the rules for its handling based on those return attributes (kept at the store or DC, shipped to another node, sent for repair, sent to a returns center, etc.).

So in summation, in Omnichannel commerce, DOM technically enables key processes, executes fulfillment

logic to minimize costs, and provides a platform for supply chain agility long-term. For example, as a retailer opens and closes stores over time, the mapping of which store locations should support each zip code areas for store fulfillment can generally be updated in a matter of a few hours - or even minutes.

Specific benefits in these first two use cases include:

- Omnichannel process enablement without cost/effort of modifying existing systems
- Greatly accelerating the "idea-to-enablement cycle" as well as strategy/policy changes over time
- Faster time to market with new channels/services and sourcing options
- Profit optimization through the lowest cost fulfillment option within the defined constraints
- Multi-channel inventory visibility and control
- Automation of many existing manual processes relevant to order fulfillment
- Increased sales by making all network inventory available for order allocation

Optimal Order Sourcing Outside of Omnichannel Retail

Retailers and consumer goods companies aren't the only ones that can benefit from the ability DOM has to apply rules to optimally source orders.

Any company with some level of network complexity and that has constraints relevant to fulfillment is a potential DOM candidate.

For example, one major company performing pharmaceutical distribution services uses DOM to automatically route orders to one of more than a dozen potential distribution facilities based on a variety of attributes, including the fixed capacities at each facility for processing certain types of orders using automated picking systems.

In another example, a major industrial company is fundamentally rethinking its current fulfillment strategy. Right now, it handles some customers directly, while others are serviced through distribution channels based on customer size, industry, geographic location and other factors.

But these divisions are rigid: if a customer places a direct order and the normal sourcing DC is out of stock, the company risks losing the order, or shipping from a sourcing point much further from the customer and absorbing a much higher shipping cost.

The company is now having to rethink this model: perhaps for such orders, direct customers should actually be fulfilled from distribution partner locations that have the inventory needed on-hand.

While this clearly makes sense on one level, routing the direct order to distributors would have significant impacts on revenue and margins. It would also involve complex rules on when to route those orders to channel partners, as well as real-time visibility to partner inventories.

These are daunting challenges – but are the exact kind of requirements DOM systems are made for. This company is at the point of deploying a "proof of concept" system to test the technology – and assessing the impact it will have on its business.

The benefits from DOM in this use case include:

- Visibility to inventory, capacities and constraints across an extended network
- Automated order routing based on a large number of order and product attributes
- Lowest cost transportation for orders while meeting customer service commitments and network constraints
- Flexibility to enact sophisticated business and logistics strategies with minimal effort

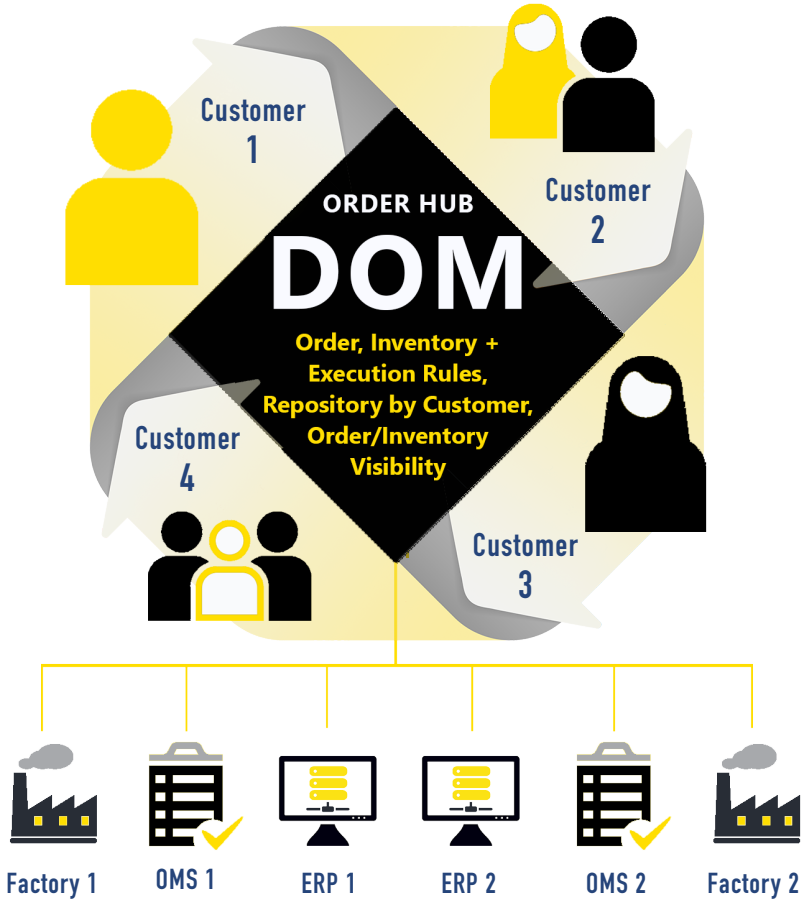
Enterprise Order Hubs

Many companies have a mish-mash of different traditional order management systems, often acquired as a result of mergers and acquisitions over many years. These order management systems can come from multiple ERP vendors, involve different versions of OMS from the same ERP vendor and/or come from legacy systems of all sorts.

In the past, a number of companies sought to address this scenario by trying to get all of their units and operations on a single ERP. But that is a long and expensive journey that is often never completed due to the extensive effort as well as additional mergers, de-mergers, and acquisitions getting in the way.

DOM is increasingly proving to be the answer instead. Rather than trying to get the entire company on a single OMS, the decision is made to implement DOM on top of the myriad of systems to provide a single repository for all orders, routing those orders to the appropriate OMS and providing visibility and rules-based decision-making *(see graphic next page)*.

Enterprise Order Hub Enablement



Often referred to as an "Order Hub," this DOM use case has a number of benefits:

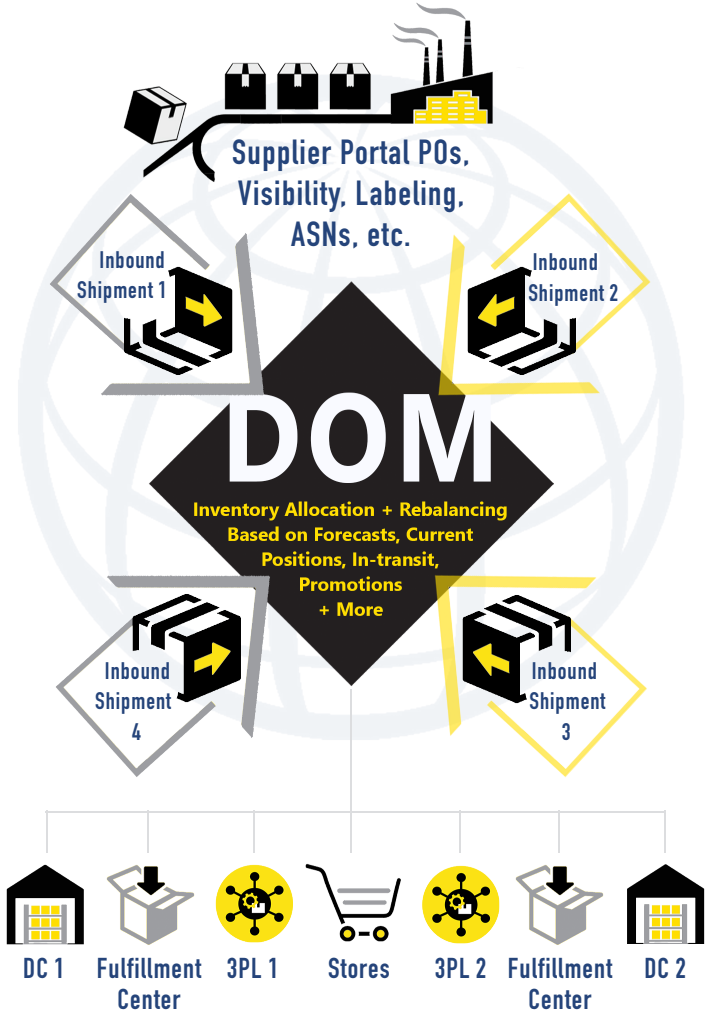
- Ability to more efficiently process orders across a disparate OMS environment without the need to migrate all locations to a common OMS
- Improved customer service
- Ability to take orders across business units in one place, and then generate a single invoice
- Improved visibility to order flow and fulfillment

Inbound Inventory Optimization

DOM is often generally viewed as a solution to fulfillment challenges - meaning outbound customer orders. But a small number of providers can also use DOM to reverse that same logic to handle optimization of inbound goods across many nodes in a distribution network. This is especially powerful for goods coming into domestic ports from offshore locations.

Based on information from an advanced ship notice (ASN), facilitated in many cases by a web portal for vendors, the DOM system determines where that merchandise should best be deployed, considering a number of variables, including on-hand inventory levels at each node, in-transit inventory, forecasts, upcoming promotions and more *(see graphic next page)*.

Inbound Inventory Deployment Optimization



Based on that intelligence, received goods are cross-docked at the import DC and shipped to the optimal node, whether that be a company's own DC, third-party fulfillment centers, or directly to the store.

The effect is to continuously balance inventories based on company-defined rules across the entire network.

One well-known Omnichannel retailer is using DOM in this way to automate decisions about inventory deployment, which it previously required two FTEs to manually make such decisions.

The benefits from the optimization of this inbound receipts use case include:

- Reducing total network inventories over time
- Increased sales resulting from the correct inventory being at the correct place
- Automation of inbound inventory decisions and eliminating the need for a planner/inventory manager to make all of the decisions
- Ability to allocate inbound inventory in-transit

Multi-Echelon Order and Returns Management

Many large companies operate multi-echelon inventory networks, with master DCs, regional DCs, local warehouses and, in the repair and maintenance

sector especially, inventory in the service technician's truck or van. While companies in several sectors operate these multi-echelon distribution networks, we will focus on the service parts supply chain - the principles of which should be relevant for those in other industry sectors as well.

There is first a basic sourcing question: **When a technician needs a part, from where in the network should it be allocated and shipped?**

This is a more difficult question than it might seem at first, similar to the Omnichannel sourcing challenge, as a number of factors need to be considered, including: current on-hand inventory by node, in-transit inventory, shipping costs, customer service commitments, customer expectations/urgency, as well as other factors.

For example, the rules may be configured such that in some cases, a part is sourced from a distribution point further away from the point-of-demand if that node has an excess of that SKU on-hand. Or, nearby inventory might be bypassed if customer service contracts commit a certain response time from the repair company that requires a certain local inventory must be maintained (common in the technology sector).

But there is also a second dimension to this DOM use

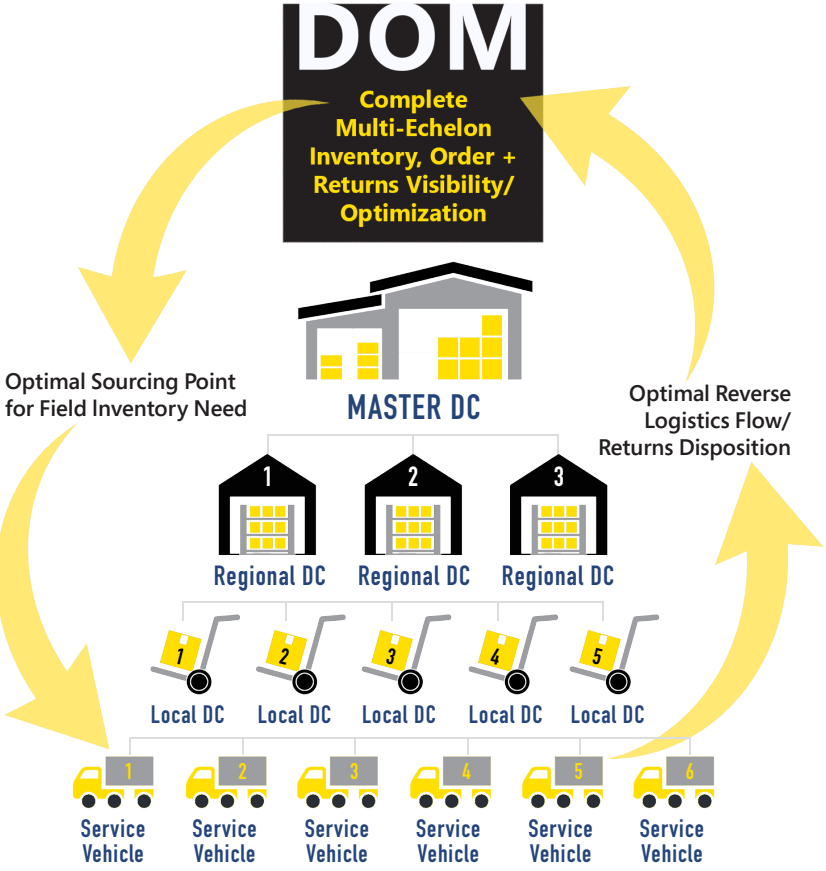
case, which involves reverse logistics processes. More specifically, what happens when a technician has a part that needs to be returned, either because it wasn't required, is damaged, or for many other reasons.

Where should that part be sent across the company's network? That depends on many variables, including the part's condition, on-hand inventory at each node, forecasts, existing orders, shipping costs and more.

In the same way DOM makes decisions about where to optimally source inventory for an order based on these factors, the same basic logic can be applied to determine to which location a product should be returned (*see graphic next page)*.

So here again, in both dimensions of this use case, the visibility and rules-engine foundation of DOM proves essential to delivering significant business value.

Multi-Echelon Order and Returns Management



The benefits of DOM for multi-echelon distribution networks, especially in the repair parts business, include:

- Granular visibility and control of inventory across a complex network
- Optimal sourcing for customer/tech orders to reduce logistics costs and time
- Inventory balancing across the network
- Lower inventory costs/improved customer service by sending returned inventory to the optimal node in the network
- In the service parts sector, improving efficiency of the local service technicians and/or improved job satisfaction

Complex Customer Requirements Management

Many companies have complex processing requirements by individual customers. This is especially common in the third-party logistics (3PL) sector, but is true for other types of companies as well.

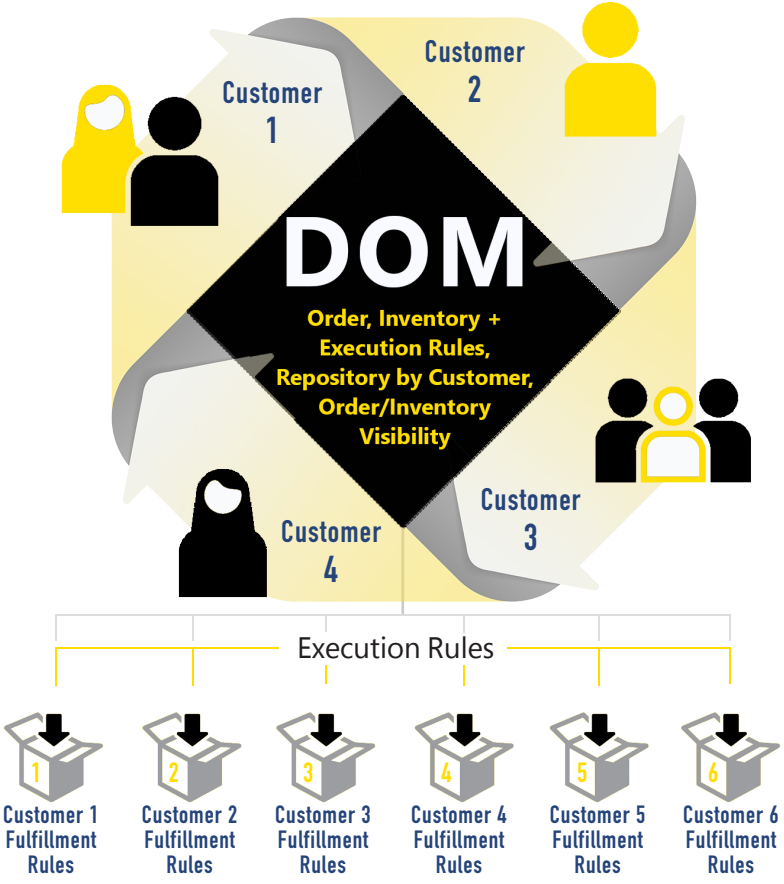
Some of the processing requirements could potentially be handled by the Warehouse Management System (WMS). Customer-specific bar code labels or shipping documentation would be examples of customer-specific functionality that generally resides within the WMS. But for other requirements, especially those that deal in rules for inventory allocation, shipping requirements and other fulfillment requirements, DOM can be the best place to store and execute those rules, often with integration to the WMS *(see graphic next page).*

A bit later in this Little Book, we will provide an example of how Sony DADC – operating as a 3PL – dramatically improved customer service and on-boarding by using DOM in this manner.

Benefits of DOM in this use case include:

- Ability to manage complex customer requirements systematically and flexibly over time
- Rapid on-boarding of new customers at lower costs
- Improved visibility for customers

Complex Customer Requirements Management



Summing-up the Use Cases

So those are the top seven use cases for DOM, led by its almost essential role in Omnichannel commerce and fulfillment optimization - but with several other powerful applications outside of retail.

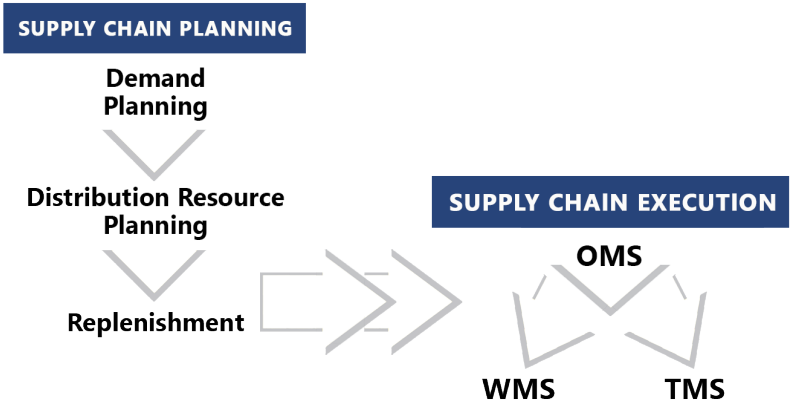
There are a couple of other use cases that are worth mentioning. One is for companies with multiple branch offices or that have independent dealer networks, where DOM can be used to achieve visibility across the entire network, source/transfer inventory across company-owned or channel partner businesses, support automatic replenishment and more.

Another use case involves the management of “digital distribution,” meaning the release of digital products, such as movies, music, games, software and more. The producers of these products can have very complex rules about how and when their electronic SKUs are released into downstream distribution channels – perfect for the definition and execution provided by a DOM system’s rules-engine logic.

5 DOM Functionality Overview

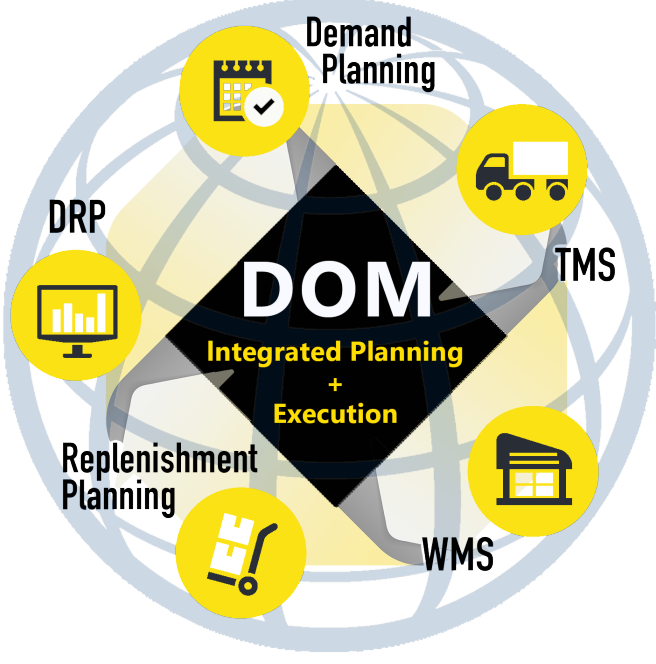
So far, in describing the growth of DOM and its use cases, we've touched on some of the functionality you should look for in a system.

In this chapter, we are going to take a deeper dive. But first, it's worth noting an important trend that is happening in supply chain software. **Traditionally, Order Management Systems were a step in a largely linear flow, from planning through order fulfillment, as illustrated here:**



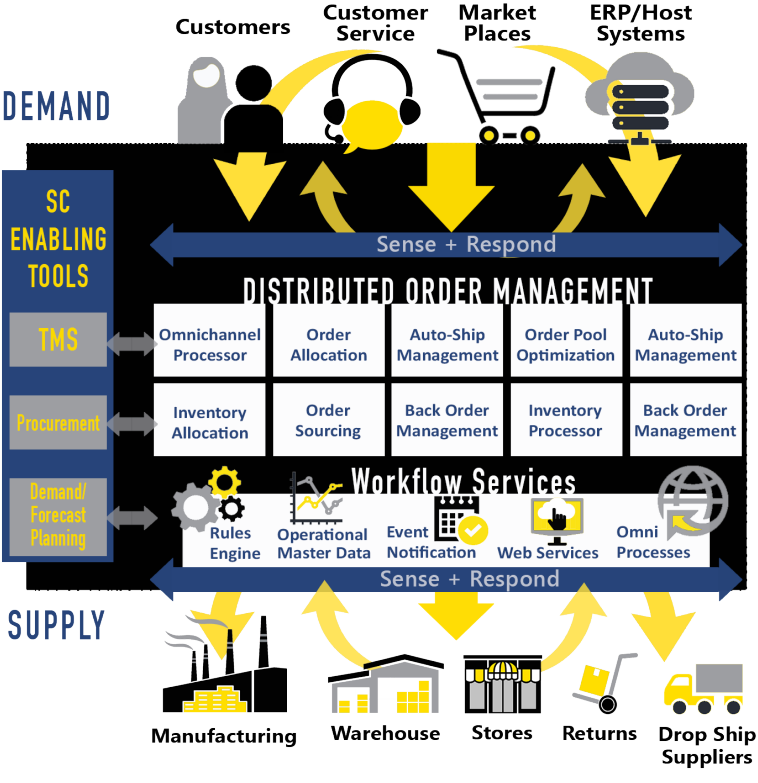
This long-time paradigm is changing with the rise of Distributed Order Management. Now, DOM is increasingly the central hub of a network that integrates planning and execution, seamlessly integrating with a variety of other applications to **orchestrate fulfillment processes and provide centralized supply chain visibility, as shown in the graphic below:**

DOM as Supply Chain Orchestrator



An example diagram of typical DOM functionality components (along with common integration points) **is shown here**. Every DOM vendor's architecture is a bit different, but this one, from Softeon, is representative enough to discuss **key DOM capabilities** *(see graphic below)*.

Example of DOM Components



Here, we can offer a more detailed explanation behind some of the functional components illustrated above. A comprehensive review of these functionalities would take many pages, or a half of a day to demonstrate within the software application. **That noted, below we summarize the kinds of granular capabilities leading DOM solutions provide:**

Omnichannel Processor:

- Provides a variety of capabilities, including real-time, available-to-promise (ATP) functionality, store reservations, Omnichannel processes such as Buy On-line, Pick-up in Store (BOPIS), Ship from Store (SFS), Returns, etc.
- Other key functions include automatically generating store replenishments based on POS data in conjunction with min/max or signals from the planning systems
- Includes the ability to automatically re-source a store-fulfilled order if it wasn't executed in a given time frame, ensuring a timely delivery

Inventory Allocation:

- Manages inventory allocation and availability by channel, store, customer/Bill-to, Ship-to, SKU or SKU groups as required
- Validates inventory availability in real-time for each order - if inventory is not available, it will apply defined back order logic, such as "fill-or-kill"

- Has the capability to allocate inventory against incoming POs, or in-transit (ASN) inventories
- "Mortgage" expected inventory from open POs

Order Allocation:

- Used primarily in B2B scenarios, including consumer goods to retail, this function works with inventory allocation
- Orders can be automatically re-routed if enough inventory is not available based on customer priority and ship date
- Future dated orders - a B2B construct - will be held either with inventory allocated or allocated at the time of order release
- Supports different order holds based on order/line value, fraud hold, customer hold, etc.

Order Sourcing:

- Applies the rules for where to source inventory for each order, and after checking with the results of the inventory and order allocation functions, executes order sourcing considering costs, capacities and constraints (e.g., store labor or DC automation system capacity)

Autoship Management:

- Automatically processes subscription orders in which a consumer places an identical order every month (or within any other defined period)

Back Order Management:

- Provides a variety of capabilities for how to manage orders that can't be immediately fulfilled, generally for lack of inventory
- Includes consolidation of multiple back orders for picking and shipping efficiencies (generally for B2B, not B2C orders)

Order Pool Optimization:

- Mostly a B2B function, this capability consolidates multiple orders to the same Ship-to address to gain transportation efficiencies, such as moving from parcel to LTL, or LTL to truckload

Inventory Processor:

- Processes inventory-related transactions in real-time from WMS, POS, drop ship, stores, and ecommerce systems - this component can also provide and publish inventory snapshots, though the timing of those updates (once per day, continuous) depends on a variety of factors

Event Management:

- Provides a variety of user-defined alerts, based on configurable triggers and business activity monitoring (BAM), to notify appropriate staff of execution issues - examples include a ship confirmation not being received from a drop ship vendor, invalid ship dates in an order, shipping address issues,

inventory falling below safety stock levels, etc.

Workflow Services:

- Components that allow the configuration of process flows related to order fulfillment - some vendors have moved to visual process modeling to allow non-IT users to create these workflows in a "drag-and-drop" environment.
- Workflow templates can be created at the customer level, or by channel or order segment, such as for a new product release or standard (catalog) item

Templates Overview:

With that review of key DOM functional components, it is also important to now introduce the concept of templates. In DOM, templates for business rules and workflow are user-defined and reusable, making each subsequent set-up much easier. Rules can be defined by business and operational functions such as:

- by Customer
- Orders including Channels
- Inventory
- Transportation
- Compliance related including Fraud Detection
- Master Data

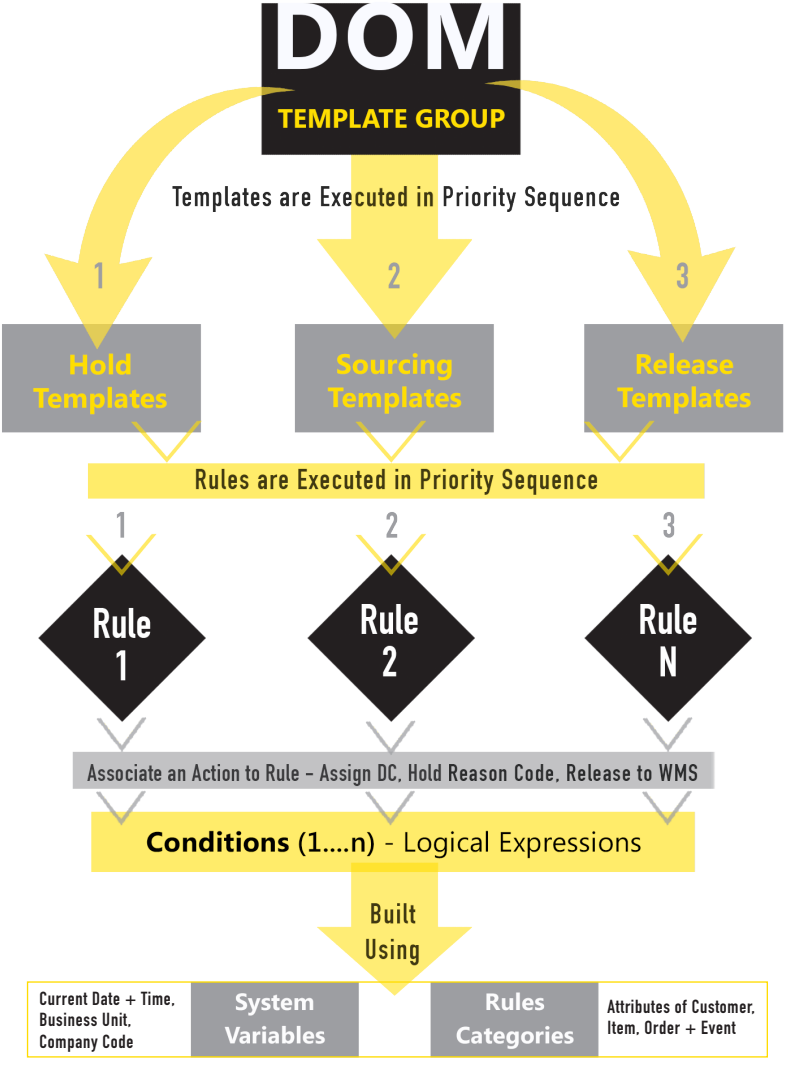
There are also action-based rules, where one action can trigger another or they can be executed sequentially. Business rules can also be applied dynamically based on conditionals and be set-up with expiry dates.

The Rules Engine

Let's look more closely at one of these components already referenced a number of times thus far: **the rules engine.**

The next graphic illustrates the way in which a DOM rules engine operates. The key to this is the notion of templates, as discussed above, and the hierarchical/dynamic manner in which those templates interact *(see graphic next page)*.

DOM Rules Engine Hierarchy



You can think of a rules engine as empowering a near infinite set of "if-then" logical steps. Examples are easy enough to discuss – but to implement this concept and to make what are often rather sophisticated supply chain decisions requires a powerful DOM platform.

Let's take an example of store-based fulfillment. A given store may be the default source for orders coming in from a given zip code or geo radius, such as 100 miles from the location of the store (the same basic idea holds true for customer orders and DC fulfillment in a B2B scenario).

If an order is placed for two different items, however, you start to see the complexity in what might seem like a simple process. **Does the store have both needed SKUs? If it does, would the order take store inventories down below some pre-defined limit that is desired for in-store presentation for either SKU?**

Does the store have the labor capacity to fulfill the orders? Many retailers put a daily, or even more granular, limit to how many orders a given store can pick, pack and ship, either as a default value or based on how many associates are on staff for a given shift. **What if the store has one of the two SKUs in stock, but not the other? Should the order be split so that the default store ships one SKU and another store or DC the other one? Or is it more advantageous based**

on cost to move both line items to another store or DC to gain shipping efficiencies?

There are no right or wrong answers to these questions. One company may choose one way to handle order splits, while another handles it in a completely different way. One retailer may be indifferent about minimum in-store inventories while it can be a top concern for another.

The key point is that a DOM system allows retailers, consumer goods companies, and many other types of enterprises to determine for themselves what those business rules should be - easily and flexibly enable the rules, and then make rapid adjustments over time given the inevitable supply chain network changes, evolving business strategies, and more.

Lastly, we will note some DOM providers have the ability to add other components beyond the core DOM functionality. Examples might include advanced cartonization logic – what size box to use, and what should go in each box if there is more than one.

Another example of additional components might include parcel shipping functionality to enable rate shopping to select the right carrier and service.

In addition to the returns functionality discussed early in this Little Book, some DOM vendors can also provide a "WMS Lite" solution to manage pick, pack-and-ship processes in-store. There, for example, it can be useful to provide associates "pick paths" similar to those used in distribution centers to minimize walking time, scanning with wireless terminals to confirm picks, and/or showing the associate a picture of the SKU to be picked for an order (as a store does not have the type of structured SKU-location control found in a DC).

And, perhaps surprisingly, we'll note a growing number of companies are selecting DOM and traditional WMS for their DCs concurrently, with a number of synergies to be gained from having both systems provided from one vendor.

Next, we'll take a look at a few real-world DOM case studies.

6 DOM in Action – Real-World Case Studies

DOM is being successfully used today in hundreds of organizations. This is especially true in the retail/Omnichannel world, but reaches far beyond as well - consistent with the varied use cases presented earlier in this book.

One leading Omnichannel retailer provides a great example. This company began with an on-line/catalog business model, but in the past three years developed the strategy to build a network of physical stores. Now, just a few years later, the stores number more than 40 with additional growth already planned.

The company wanted to be able to fulfill orders from stores as well as from DCs. So as on-line orders are received, its new DOM system identifies the best sourcing location between its own distribution center, another DC run by a 3PL, or any of its stores, based on a variety of factors and rules. The company was able to support this new fulfillment model as well as launch a buy on-line, pick-up in store (BOPIS) process rapidly

through the DOM capabilities with very little modifications to the existing systems, accelerating its ability to bring these offerings to its customers. DOM also provides granular visibility to orders, inventory, store labor and more across the network.

It also provides a platform for making changes to sourcing logic in real-time, especially in peak periods, as order patterns and inventory levels fluctuate.

The retailer also uses DOM to optimize the inbound flow of goods. As merchandise is received into West Coast ports, the DOM system considers on-hand inventory, in-transit inventory, demand forecasts, promotions and more to determine where the inventory should be shipped to and stocked.

This continuously rebalances inventory across the network and ensures inventory is positioned optimally versus demand, automating a process that managers once did manually using spreadsheets.

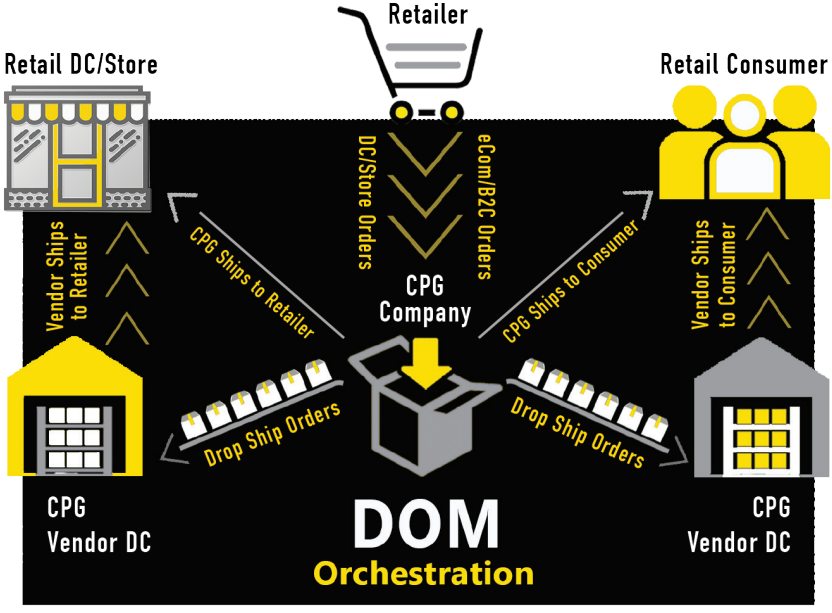
The retailer also used extended DOM modules to allow orders to be placed in store, manage store-based fulfillment (pick, pack, ship) and handle in-store return processes as well.

In another Omnichannel example, a well-known consumer packaged goods company uses DOM for enter-

prise order management, combining traditional order management with DOM-specific functionality. This means not only handling orders from retailers for shipments to their distribution centers and ultimately the stores, but also retail orders that can be shipped directly to customers.

This drop shipping process can be at multiple levels, as shown in the graphic below:

DOM Enabling Multiple Drop Ship Processes



If the manufacturer is short on inventory, orders from retailers are routed directly by the DOM to vendors for shipment, maybe to a Target DC or to a Costco store.

The DOM system also manages drop ship orders from retailers that will be shipped directly to consumers from its own distribution center.

But it also sends some drop ship orders to several dozen of its vendors for SKUs it either doesn't carry in its DC or for which it is temporarily out of stock.

This might be considered a "double drop ship" – a retailer places a drop ship order, which the consumer packaged goods company then sends to one of its vendors for fulfillment.

In either case, the orders sent to vendors require first order acknowledgement and then ship confirmation messages from the vendors, which are managed electronically for larger vendors and via email from the "mom and pop" stores that aren't EDI capable.

Larger vendors are also able to send to the CPG company 947 inventory adjustment EDI messages as to their inventory by SKU that support DOM allocation processes.

Sony DADC provides a much different DOM use case outside of Omninchannel fulfillment. This business unit had traditionally provided production, packaging and distribution services for DVDs, CDs, games and other disk-based products for various Sony entertainment businesses.

With the now prevelant digital entertainment, the volume of traditional entertainment media has been falling in the face of on-line delivery. So the company decided to become a third-party manufacturing and distribution provider for others in the industry - many of whom were competitors in the entertainment business for Sony itself.

To succeed, Sony needed to be able to provide its third-party clients dramatically improved levels of speed, capabilities and flexibility - and key to that strategy was DOM.

It turns out the rules about when and how a new product can be released via numerous channels are quite complex and vary significantly. What's more, to provide the service to these clients requires significant integration with their ERP, order management and other systems.

At Sony, DOM became the foundation to deliver these capabilities. DOM is the repository in which customer-

specific order processing rules are configured and then executed as products are introduced into the system and customer orders are received.

With its inherent design to be integration-ready, Sony has connected more than 40 clients to its DOM system across a wide variety of their packaged and legacy systems.

As a result, Sony has dramatically reduced the time spent to on-board a new client from many months to as little as just a few weeks in some cases. DOM also provides a flexible platform for adapting those requirements over time. Additionally, Sony can execute those complex rules with complete accuracy as new products and orders are received.

Sony also uses the same DOM system to provide digital distribution services for clients, managing the release and electronic delivery across channels for digital products.

Sears Home Services provides repair services for home appliances and more. While its parent company struggles on the retail side, the Sears Home Services business unit has been thriving. The company operates a complex, multi-echelon network, with master DCs, regional facilities, and a network of some 7000 technicians with vans that also contain parts inventory.

Sears uses DOM to provide real-time visibility of those parts anywhere across the network. It then uses sophisticated order sourcing logic to determine where to fulfill an order for a needed part, which could be from any level or node in the network, minimizing logistical costs and helping to reduce overall network inventories needed to support service requirements.

Importantly, the Sears DOM also optimizes reverse logistics processes. As parts are obtained by the technicians in the field, (replaced, not required, etc.) the system determines how those parts should be handled.

For example, a given part might be kept by the technician, shipped to a stocking DC, to one of a number of Sears repair centers nationwide, to the original manufacturer, another technician, or other destination. This would be based on such factors as the part's condition, on-hand levels at each node, demand forecasts and shipping costs, etc. - logic just as complex as that for the order fulfillment requirements.

Sears stated that the system improved service order cycle time, first time completes, inventory utilization, customer visibility of their service experience, accuracy of repair service orders to track parts, and overall process productivity. The DOM also allows Sears to easily change its rules for part sourcing or reverse lo-

gistics without the need for IT staff involvement.

So there you have four interesting and diverse real-world applications and the resulting benefits from DOM technology, and there a many more success stories out there.

It should be clear that DOM is solving problems for which there were often no viable solutions before this technology, allowing new levels of network visibility, the ability to automatically execute complex business logic and decision-making, and providing the flexibility to easily make changes as the network, business or supply chain strategies dictate.

In almost every industry sector, DOM is delivering significant results.

7 the Keys to Implementation SUCCESS

We hope that by now you have been encouraged by the potential benefits of Distributed Order Management in orchestrating order fulfillment, across a number of use cases in Omnichannel retail and beyond. We've also taken a fairly deep dive into the functional components of a DOM solution.

But, as always, it's really about people, processes and technology. So in this chapter, we are going to look at the process of implementing DOM and discuss some of the keys to success. While every company's situation and use cases are different, our experience is that there are plenty of commonalities in the steps and approach across most implementations that can provide useful insight for all.

Step 1 – Get Educated about DOM

Distributed Order Management is a still somewhat new and clearly not widely understood technology. It is important to enable a broad array of managers

across functions to become familiar with the key concepts and capabilities typically available in DOM solutions. Obviously, this Little Book can be part of that educational effort. There are also many white papers available from DOM vendors and consultants that provide education on DOM. The same is true for new and archived webinars on the topic, which can also be found with simple web searches.

There are some articles on DOM in trade magazines that can also be useful. Still, in general, DOM has not received a great deal of trade media attention to date.

However, if you belong to an analyst service such as Gartner, Forrester, or IDC, you will find that they have published a number of high-quality research notes on DOM in recent years.

We have consistently found when coming into new DOM sales opportunities that companies have (at best) a modest understanding of DOM capabilities and use cases.

Getting yourself, team members and executives up-to-speed will reduce evaluation, approval and deployment cycle times and generate more value from the DOM implementation.

Step 2 – Start with the End in Mind

As with almost every technology, DOM success starts by clearly defining the business and supply chain objectives that are driving the DOM initiative. **What is the business trying to accomplish, both now and over some time horizon? What are the supply chain capabilities required to get there?**

Is the DOM initiative a strategy to gain competitive advantage – or to play catch-up with the competition? What are the business process achievements and metrics that will define success?

These and related questions, in turn, necessitate a collaboration between senior executives and middle management in moving the DOM solution forward, and between different functional teams such as supply chain, finance, sales & marketing, store operations (if that is a factor), IT, and other relevant departments. Everyone needs to "get on the same page" as to the purpose and objectives for leveraging DOM technology.

Another important question is related to the long-term view: **is DOM being considered or implemented to solve current specific problems, or as a platform for driving change over time?**

Our view is that companies that take a long-term view and think about DOM from a strategic perspective from the outset will generally drive more value from DOM solutions than companies taking a more tactical approach.

Step 3 – Identify the Project Leader

The key here is not only finding the right person for this role, but in deciding which organization will take the lead in managing the DOM deployment. While the supply chain/operations team most commonly leads the effort, we have seen this leadership role also fall to the marketing staff, IT team and other functional groups.

There is no correct answer here, but the decision needs to be given due consideration - not just made by who has the bandwidth at a given point in time.

Step 4 – Identify the Data Sources

As we have made clear, a DOM system is really in part an integration hub, bringing in data from a variety of internal and, in some cases, external systems to provide real or near real-time visibility.

When a DOM project has received the green light, one of the first steps is to identify the sources of key

data that will be required. That will generally include:

- Master data, which will typically include SKUs and all their attributes, customer data, etc.
- Orders from all sources, including traditional OMS, ecommerce front-end systems, EDI, even spreadsheets for orders coming in via email or other paths, say from “mom and pop” customers
- Inventory data sources from a variety of systems, including the company’s Warehouse Management System, the WMS from any 3PLs used, store perpetual inventory systems and more - for retailers, this can also include point-of-sale (POS) data
- Purchase order and/or advanced ship notice (ASN) data – this is critical for companies that want to be able to allocate in-transit inventories

There is potentially much more, including data on capacities and constraints, carrier rate tables, inventory feeds from drop ship vendors (EDI 947 transaction), even weather feeds, as one company is using to assess how many cool gel packs are needed in shipping cartons based on expected transit times and temperatures.

Often, it is best to leave some of these other data feeds to Phase 2 of the project, unless clearly required from the start, as something like transportation rates may be.

After identifying the sources of the data, decisions need to be made about how and when the data will be communicated to the DOM system. Here, it is important in the DOM vendor selection process to assess how flexible different providers are in terms of integration. While being in the DOM business necessitates a certain level of integration expertise, you will find some providers are very rigid in terms of how they can receive and send data – and that deviating from those standards often comes at a high price.

Other DOM vendors will be more flexible.

Now the good news: in our experience, all that integration can usually be achieved in 3-4 months, and can be accomplished in parallel with defining the business logic.

Step 5 – Identify What Data DOM Needs to Send

The other side of the integration question is what data DOM needs to send to internal or external systems. Often, DOM also serves as a repository for operational master data entities such as SKUs, carriers, nodes, etc. This approach can enable high levels of data integrity in the supply chain execution ecosystem. All systems "subscribing" to the DOM will be in sync on these data

elements, such as the dimensions and weights of each SKU.

The most critical here is the "inventory snapshot" – DOM's view of what inventory is where across all the nodes. This will then generally trigger a reconciliation of the inventory the ERP believes is across the network with the updated DOM totals.

While some look to do this multiple times per day, once per day at the end of the day seems to be the most common approach.

Common DOM integration points beside the ERP/host and Warehouse Management Systems are data warehouses, shopping cart systems for real-time inventory or back-order available dates, and forecasting/other planning systems to communicate inventory levels.

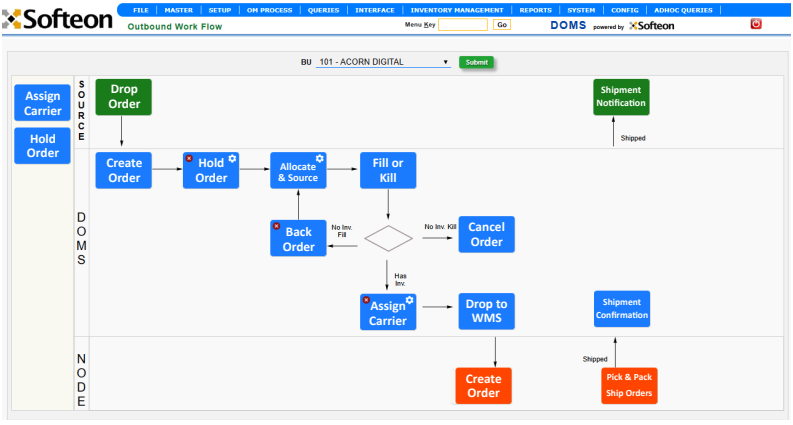
Step 6 – Define the Business Rules

With a solid understanding of DOM capabilities and business objectives, it's time to craft the rules – starting on paper or with another simple tool – for how the business or fulfillment logic should work.

There is no one right way to do this: it requires careful planning, with cross functional input, to define the

hierarchical business logic that will be executed by the DOM. **What types of orders will be fulfilled by which locations, while considering capacities and constraints?**

That said, the graphic below may be of use. It illustrates a typical process flow for DOM order orchestration. For example, after an order is received, it is logical that the first question to be answered is whether the order can flow through to execution or must first be put on hold for any number of reasons.



We will also note that this process view is actually part of the type of visual process modelling tools referenced earlier. With such a tool, process steps can be dragged and dropped to create the workflow desired and easily changed over time. Just clicking on any step

then exposes the configuration and/or rules template for that step, providing an easy-to-use, end-to-end set-up process.

Important here will be the decisions made about what steps or processes you want to automate with the DOM system and which you still want to handle manually. One Omnichannel retailer, for example, may change sourcing rules once per hour on very busy days, as it sees how orders and fulfillment requirements are flowing across the network.

While much of this could be automated in the DOM system, this specific retailer has not systematized certain DC and store constraints, so they are still handled by knowledgeable managers. For example, the managers might switch sourcing for certain areas of the country from a store that is reaching capacity to other stores or to a DC that is not at capacity levels.

Step 7 – Simulate the Order and Fulfillment Flows

No one is going to get all of this right the first time. So it is important to create a test environment through which orders can be brought in and you can then observe how fulfillment is executed - and whether it is consistent with the expectations prior to go-live.

Leading DOM vendors will provide tools to help companies with this sort of analysis, both prior to go-live and then over time. For example, when the system makes any decision, managers should be able to see the specific rule that triggered that logic to execute. This will help users understand why specific system decisions were made and give the insight needed to make adjustments if the results are not as expected.

Step 8 – Expand and Maintain the DOM Over Time

It is important to consider the staffing of "super users" responsible for maintaining and expanding the business rules.

There are several key points to consider. First, in general, this only requires a single full-time equivalent to manage this role, and in some cases less than an FTE.

Second, most companies begin with a basic set of rules and then add complexity and sophistication over time, based on experience and better understanding of the cause and effect.

Third, it is critical to formally document the triggers and processes for making adjustments to the rules.

Other keys to DOM implementation success include:

- **Keep the Focus on the Customer Experience:** In the periods of fog that accompany any implementation of a significant new technology, keeping a focus on how the new DOM capabilities will enhance the customer experience can point to the right direction when business and technical decisions need to be made.

- **Build the Technical Foundation Early-On:** Completing the key integrations and one rules template (e.g., sourcing) early will provide a foundation that makes the rest of the deployment fairly easy and straightforward. Be very attuned to this dynamic when selecting DOM technology partners. Different approaches can lead to wildly different results in terms of the time it takes to complete the system integration – accelerating or delaying the time to value.

- **Have a Plan for Knowledge Transfer:** DOM system vendors will often take the lead in terms of driving system configuration, but it is essential that there is a documented plan for how the vendor will train "super users" in becoming self-sufficient. Ask how the vendors have achieved this with other customers, and fully review expectations on both sides for the depth and duration of the knowledge transfer process.

As with any major technology deployment, there are inevitable challenges in implementing DOM system. But it is important to remember that DOM is more like a software execution engine that has relatively few “screens” that users interact with, making training, testing and other aspects of system deployment significantly easier than with even traditional order management or an application such as a WMS.

Final Thoughts

In 1992, Benson Shapiro, Kasturi Rangan, and John Svioloka published an influential article in the *Harvard Business Review* titled, "Stapling Yourself to an Order." The piece has since been republished several times and deemed a "classic" by HBR.

"The truth is that every customer's experience is determined by a company's 'order management cycle' - the ten steps, from planning to post sales service, that define a company's business system," the article notes early-on.

It later makes the axiomatic point that, "every time the order is being handled, the customer is being handled at the same time," and recommends companies follow an order across all 10 steps the authors define that represent the order management cycle.

We've come a long way in order management processes and technology over the past 30 years since that article was written. But at the same time, the environment of order management has also changed dramatically - transformed by globalization, ecommerce, mobile technologies, new and varied channels of distribution, and much more.

For many companies, there may be an insightful opportunity to re-staple yourself to a multi-channel order and once again see firsthand how the order and customer are being handled, from initial engagement to after sales support and all the critical steps in between.

It makes sense that in such a changing environment, a new approach to order management technology is needed. That is exactly the role of Distributed Order Management, initially developed for the new needs of the ecommerce era, but also going beyond that into many other applications - as we have detailed in this Little Book.

The ability to orchestrate order capture and fulfillment according to rules that are precisely defined, yet highly flexible, is a real breakthrough in supply chain execution - and one which can deliver significant value to companies in many sectors, with DOM serving as the central hub to coordinate supply chain sense and response.

Companies of all sorts are seeking greater supply chain agility, and DOM can play a critical and differentiated role here, both at a “macro” and “micro” levels.

What do we mean by that? From a macro view, DOM enables agility at a business level, providing tools to

of this macro agility in action (cited in this Little Book) include the Omnichannel retailer that quickly launched new store fulfillment and optimal sourcing capabilities, Sony DADC successfully transforming itself into a third-party logistics provider for other companies in the entertainment media sector, and a major industrial company testing a strategy of re-routing some of its customer-direct orders that could not be fulfilled in a timely basis to its distribution channels.

“Idea to action” is one way to phrase it.

DOM by definition also provides micro flexibility: **how should each and every order be optimally sourced and fulfilled based on clear and definable rules at this moment?**

If there are any issues or glitches in the network, DOM sees those problems and finds another way to fulfill the customer’s order while positively enhancing their experience.

In closing, we expect continued changes in DOM technology for the future. The most obvious is that there will inevitably be some merging of traditional order management and DOM capabilities over time, from both directions.

Therefore, what companies should look for are flexible

solutions in which the specific functional components across both traditional OMS and DOM systems can be deployed as needed.

“The Order is King” was a phrase once used relative to supply chain.

While that specific saying isn’t heard much today, its a fundamental truth that lives on.

DOM will continue to drive important changes in supply chain planning and execution for many years to come.

about the Authors

Dan Gilmore is the founder and editor of Supply Chain Digest, a leading on-line supply chain newsletter and web site and a recognized industry thought leader. He is also Chief Marketing Officer at Softeon, a leading provider of Distributed Order Management, Warehouse Management and a variety of other supply chain software solutions.

Satish Kumar is responsible for delivering an unrivaled customer experience of supply chain transformation, intelligence and logistics at Softeon. Prior to Softeon, he worked in a global management role at Sony DADC, where he was responsible for digital and physical supply chain systems and leading IT implementations. Many solutions were differentiators such as DOM, SC Planning Workbench, and Integrated TMS. Satish has broad experience including Automotive, Hi-Tech Manufacturing, Distribution & Warehousing, 3PL, CRM, SC Intelligence, and Environmental Services.

From Omnichannel commerce to industrial distribution, order fulfillment is changing, driven by the relentless growth of ecommerce, evolving business strategies, mergers and acquisitions and more.

For Omnichannel fulfillment in particular, technical enablement and connectivity features across a myriad of Points of Interaction (POIs), Points of Fulfillment (POFs) and Points of Return (PORs) are paramount.

In addition, both Omnichannel retailers and companies in virtually every sector are looking to optimize order sourcing in a way that minimizes logistics costs across complex supply chain networks, while still meeting customer service commitments.

Distributed Order Management (DOM) has emerged as a core solution to these and many other supply chain execution challenges, becoming an essential technology for Omnichannel fulfillment optimization. But DOM has proven to have a significant impact on order and fulfillment orchestration in virtually every other sector as well.

In this Little Book, you will learn what DOM is all about – its primary use cases, key functionalities, real-world examples of DOM adoption, keys to deployment success and much more.

It may be a "Little Book," but it's packed with the information you need to understand Distributed Order Management.

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