newCommerce: eCommerce's effect on Supply Chain Strategies

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Topics

- Experience – “Why Listen”
- Some terms and definitions
- Network and facility strategies
- Design criteria trends…Big Data
- newCommerce – e-commerce effects on:
  - Equipment & systems inside the building
  - Logistics networks and facility equipment design
  - The demand for, and the demands of, the buildings themselves
- How the demands of e-commerce shape the Networks Outside the 4 Walls, affects the Design inside the 4 Walls, and even the very Nature of those Walls!

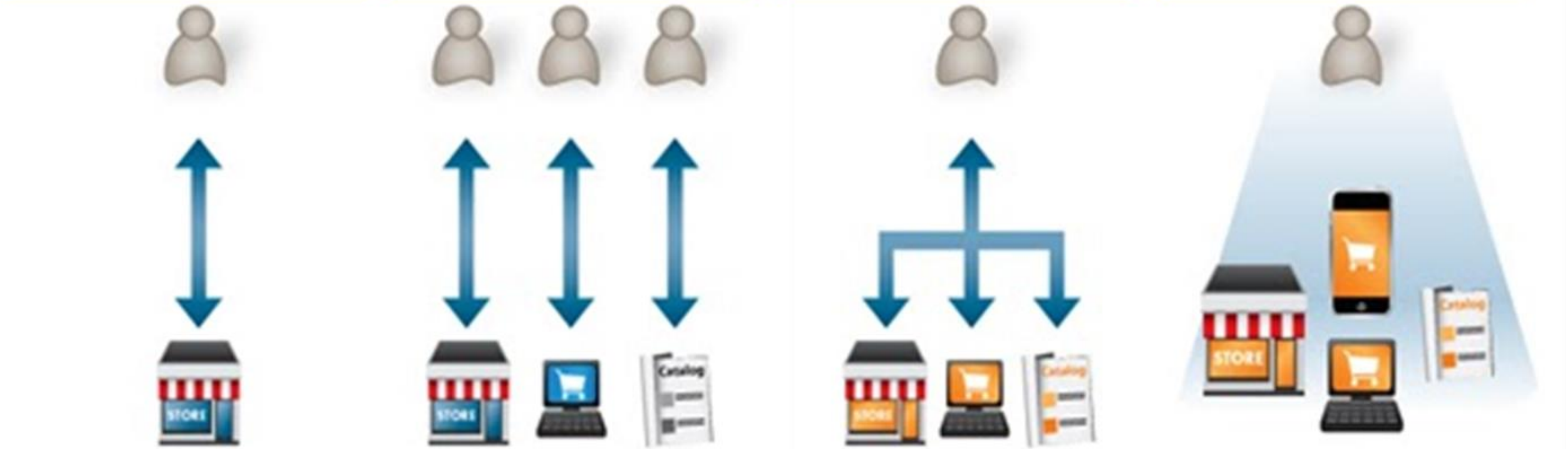
Fulfillment Experience

- H&M
- Finish Line
- The Children’s Place
- Sears
- Target
- HSN
- Shopko
- Zale Corp
- Netshops.com
- eFollet
- Walmart
- Golfsmith
- TJX
- Toys “R” Us

- QVC
- Gap Direct
- Home Depot
- Urban Outfitters
- Rue La La
- L.L. Bean
- David’s Bridal
- Staples
- Office Depot
- Office Max
- Sephora
- Ikea
- West Marine
- Liberty Interactive
- Zulily

- B&N.com
- Budgetext
- Petfooddirect.com
- LTD Commodities
- Nordstrom
- Williams-Sonoma
- S5A.com
- Dell
- Chico’s
- Scholastic Books
- Foot Locker
- Levi Strauss
- PetSmart
- JC Penney

Omni-channel: The current trend



Single Channel

- Customers experience a single type of touch-point
- Retailers have a single type of touch point

The Legacy

Multi-Channel

- Customer sees multiple touch-points acting independently
- Retailers' channel knowledge and operations exist in technical & functional silos

The Reality

Cross-Channel

- Customer sees multiple touch-points as part of the same brand
- Retailers have a single view of the customer but operate in functional silos

The Next Step

Omni-Channel

- Customers experience a brand, not a channel within a brand
- Retailers leverage their 'single view of the customer' in coordinated and strategic ways

The Goal

Okay so then what's "multi-channel"

There are several basic network types and configurations for servicing direct to consumer customers. Those that are pertinent to our discussion and are detailed in some of the slides that follow are:

- Combination Center - Stores and on-line customers serviced from same facility
- Dedicated Centers – Stores and on-line customers serviced from separate locations
- Store Distributed – On-line customers are shipped from stores
- Hybrid – Combination of the above strategies based on geography, SKU segment (type or velocity)

Network Types – Location Strategy

- Single vs. Multiple locations – Strategy complexion that can apply to any of the identified network types

Single Location

- Combination Center - Stores and on-line customers serviced from same facility
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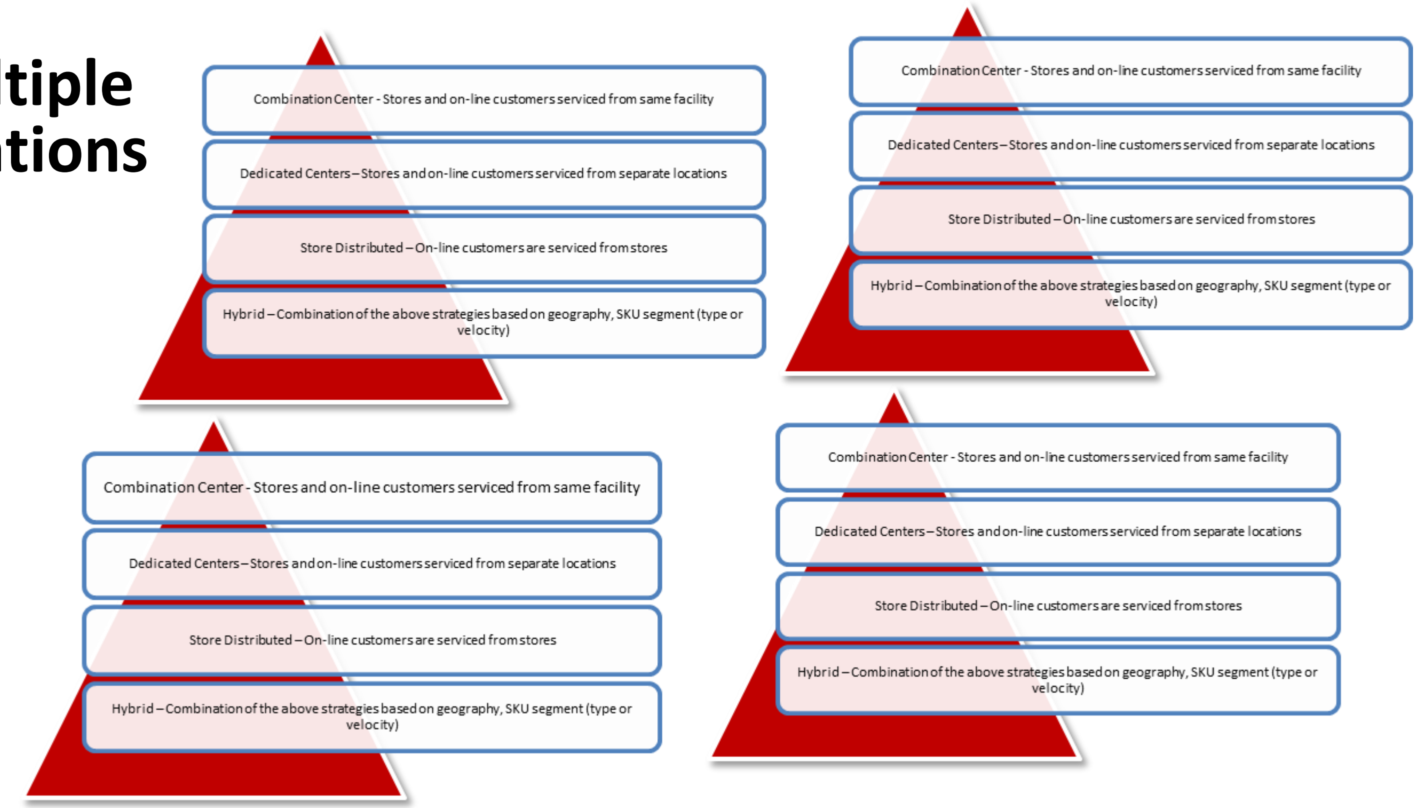
Network Types – Location Strategy

- Single vs. Multiple locations – Strategy complexion that can apply to any of the identified network types

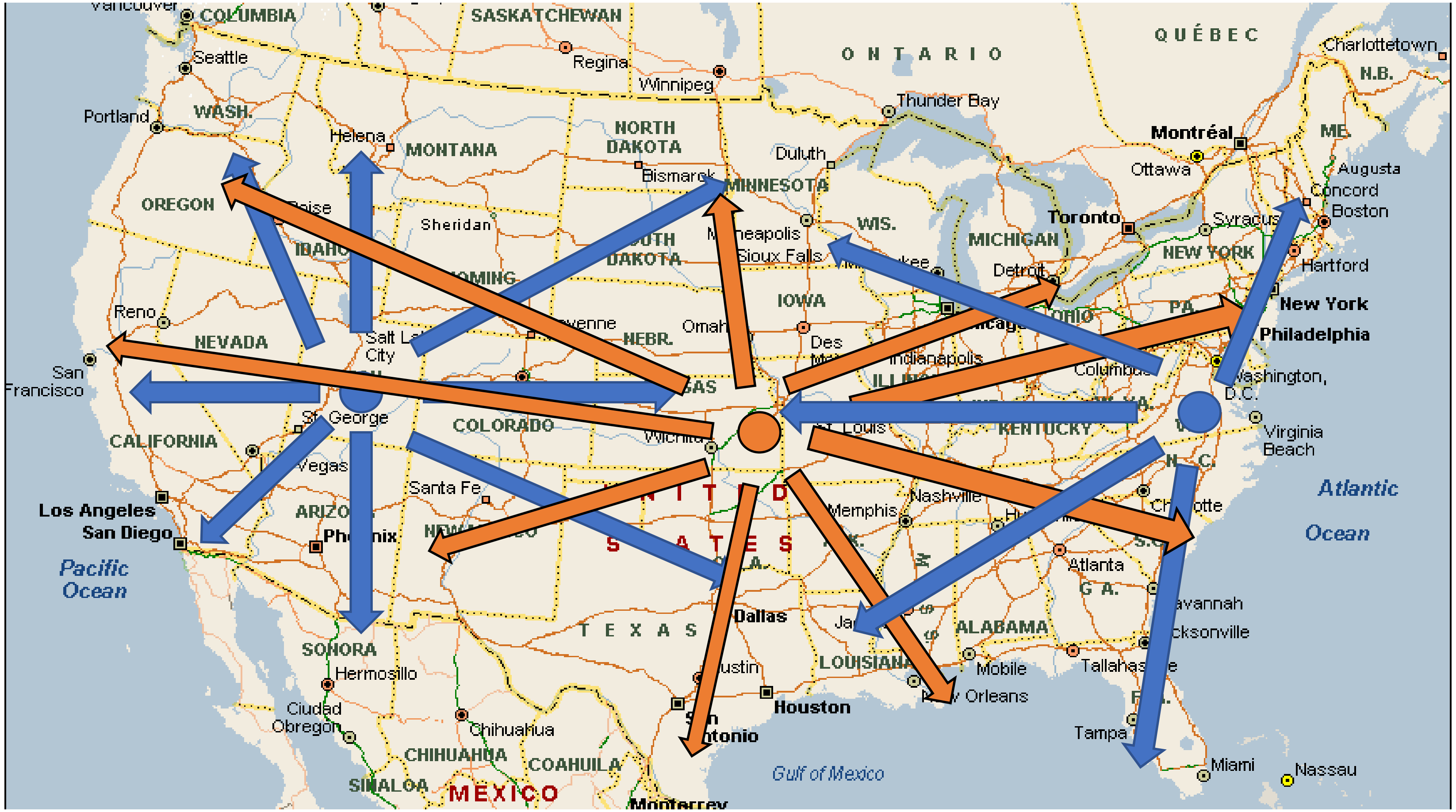
Multiple Locations



Dedicated Center(s)

Store service

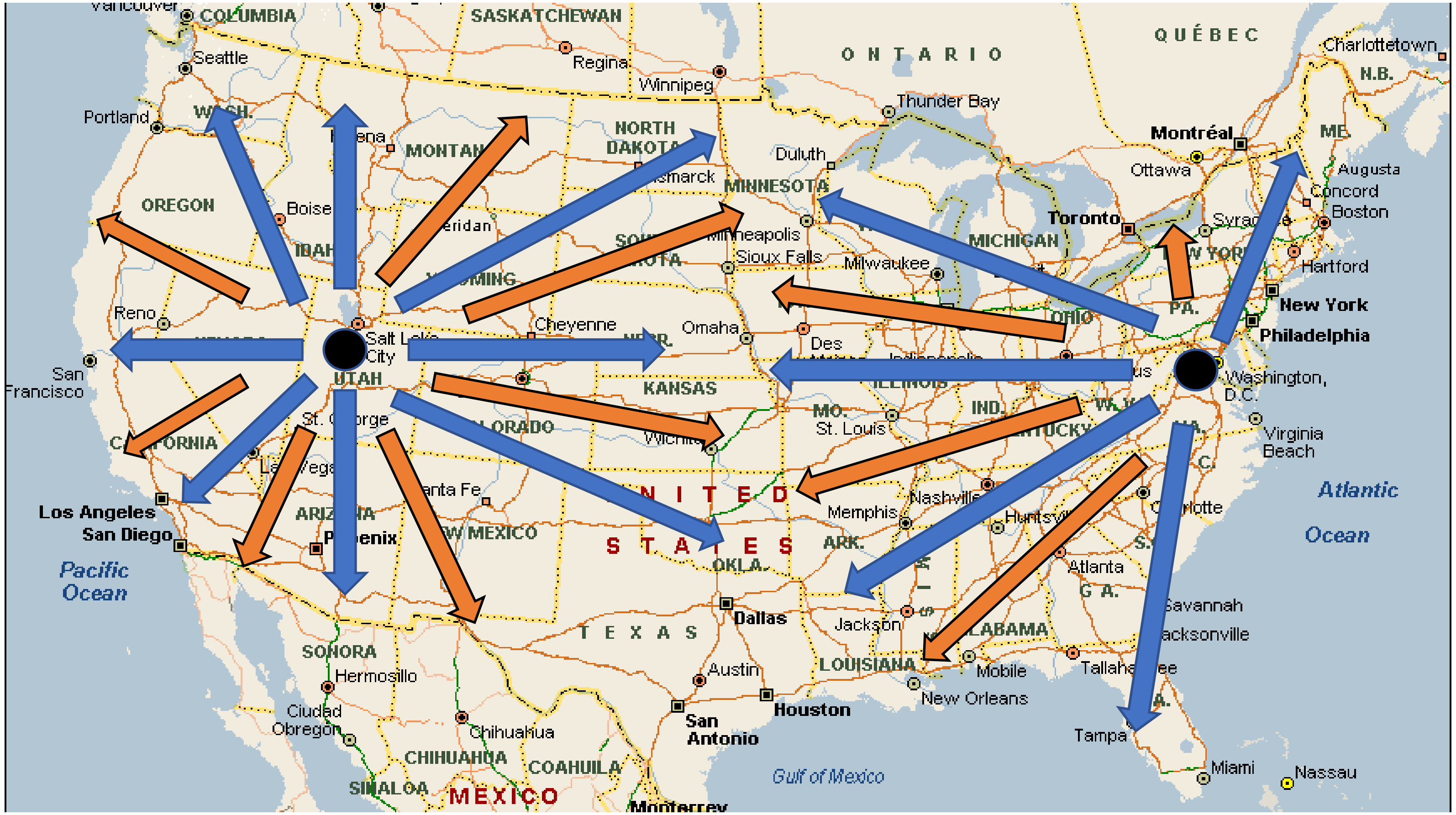
Direct to consumer



Multi-channel Center(s)

Store service

Direct to consumer



Facility Trends

Pre-Internet

Dedicated centers

Catalog fulfillment

Single Channel Center

(except for wholesale/ retail hybrids)

1990's – early 2000's

Growing Internet demand

Adding Multi-Channel Centers for faster delivery and to accommodate the smaller e-commerce volumes in its early stages

Current Trends

Volume driving some back to large single channel centers

Sophisticated designs with need for skilled operators

Delivery time promises driving the need for smaller, urban centers

What are you selling?

Apparel
- Bagged & Labelled
- Sort Friendly
- Imperfect Conveyability

Hard Lines
- Cartons
- Gentler Sorting
- Best Conveyability

Non-Sortables
- Oversized/Asymmetrical
- Too Small
- No AutoID

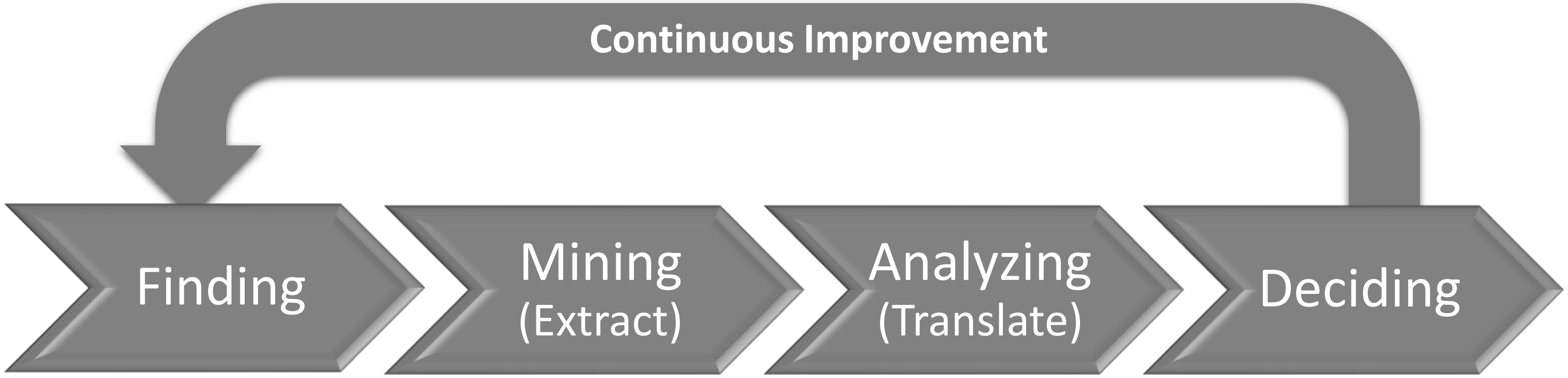
In what Unit of Measure?

Consumer Products
- Low SKU count
- Pallet in
- Pallet and case out

Retail
- Higher SKU count
- Pallet and case in
- Case and piece out

Direct to Consumer
- Higher SKU count
- Case and piece in
- Piece out

Using Big Data in the Supply Chain



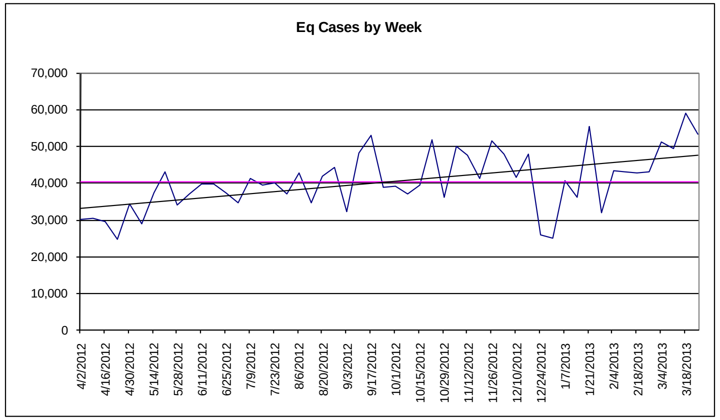
Finding
- ERP / WMS / WCS
- Backup/Archive Servers
- Websites
- Third party data sources

Mining (Extract)
- Proprietary Tools
- Third party analysts

Analyzing (Translate)
- Proprietary Tools
- Third party analysts

Deciding
- Designing
  - Facilities
  - Networks
- Scheduling
- Staffing
- Forecasting
- Sourcing

Order Analysis



Days	257				
Category	Total	Avg	Min	Max	Std
OrderNumbers	4,166	21	1	68	9
SKUs	240	72	2	111	21
ShipToIDs	541	17	1	43	6
Lines	32,676	127	2	270	51
Eaches	497,288,475	1,934,975	20,300	4,260,440	721,709
Eq Cases	2,101,175	8,176	73	18,456	3,027
Eq Layers	346,945	1,350	13	3,077	501
Eq Pallets	64,434	251	2	558	91
Loose Eaches	-	-	-	-	-
Full Cases	20,337	79	-	203	39
Full Layers	26,336	102	-	312	51
Full Pallets	58,838	229	1	514	85
Eaches On Cases	4,804,549	18,695	-	44,029	9,428
Eaches On Layers	43,088,654	167,660	-	518,478	85,456
Eaches On Pallets	449,395,272	1,748,620	9,900	3,895,412	664,445
Eq Cases As Eaches	-	-	-	-	-
Cases On Layers	164,703	641	-	1,933	324
Cases On Pallets	1,916,135	7,456	30	16,978	2,817
Eq Layers As Eaches	-	-	-	-	-
Eq Layers As Cases	3,159	12	-	30	6
Layers On Pallets	317,450	1,235	5	2,847	468
Eq Pallets As Eaches	-	-	-	-	-
Eq Pallets As Cases	622	2	-	6	1
Eq Pallets As Layers	4,974	19	-	57	10
Loose Each Lines	-	-	-	-	-
Full Case Lines	7,495	29	-	77	14
Full Layer Lines	11,644	45	-	133	23
Full Pallet Lines	19,250	75	1	170	31
Cube (cu ft)	6,103,901	23,751	221	53,381	8,671
Weight (lbs)	44,123,598	171,687	1,697	375,055	63,004

Line Type	Lines	%
Lines with EAs + Cases + Layers + Pallets	0	0.0%
Lines with EAs + Cases + Layers	0	0.0%
Lines with EAs + Cases + Pallets	0	0.0%
Lines with EAs + Layers + Pallets	0	0.0%
Lines with Cases + Layers + Pallets	860	2.6%
Lines with EAs + Cases	0	0.0%
Lines with EAs + Layers	0	0.0%
Lines with EAs + Pallets	0	0.0%
Lines with Cases + Layers	2,198	6.7%
Lines with Cases + Pallets	214	0.7%
Lines with Layers + Pallets	1,712	5.2%
Lines with EAs Only	0	0.0%
Lines with Cases Only	4,235	13.0%
Lines with Layers Only	6,918	21.2%
Lines with Pallets Only	16,539	50.6%
Extra Lines	0	0.0%

Order Type	Orders	%
Orders with EAs + Cases + Layers + Pallets	0	0.0%
Orders with EAs + Cases + Layers	0	0.0%
Orders with EAs + Cases + Pallets	0	0.0%
Orders with EAs + Layers + Pallets	0	0.0%
Orders with Cases + Layers + Pallets	1,777	37.6%
Orders with EAs + Cases	0	0.0%
Orders with EAs + Layers	0	0.0%
Orders with EAs + Pallets	0	0.0%
Orders with Cases + Layers	146	3.1%
Orders with Cases + Pallets	109	2.3%
Orders with Layers + Pallets	562	11.9%
Orders with EAs Only	0	0.0%
Orders with Cases Only	676	14.3%
Orders with Layers Only	159	3.4%
Orders with Pallets Only	1,297	27.4%
Extra Orders	0	0.0%

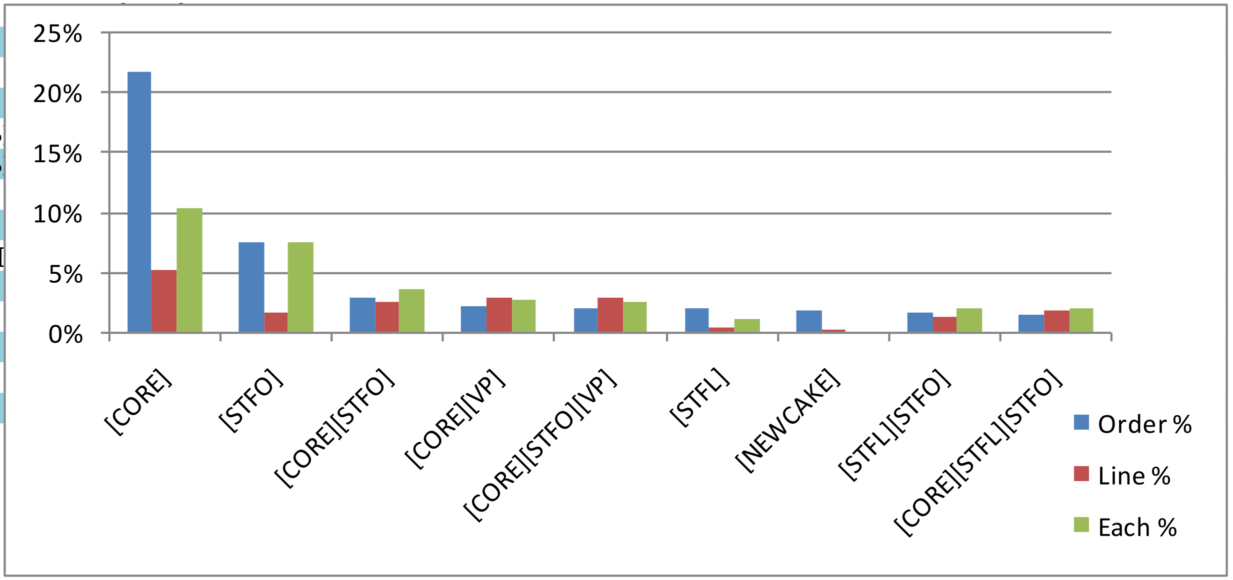
Day Of Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Min Lines	7.0	3.0	54.0	50.0	31.0	16.0	2.0
Avg Lines	7.0	153.9	134.5	141.3	106.1	117.5	7.3
Stdev Lines		56.0	40.0	39.2	43.1	41.3	7.6
Max Lines	7.0	270.0	240.0	226.0	217.0	244.0	22.0

Day Of Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TotalDays
Days Analyzed	1	49	49	51	51	50	6	257

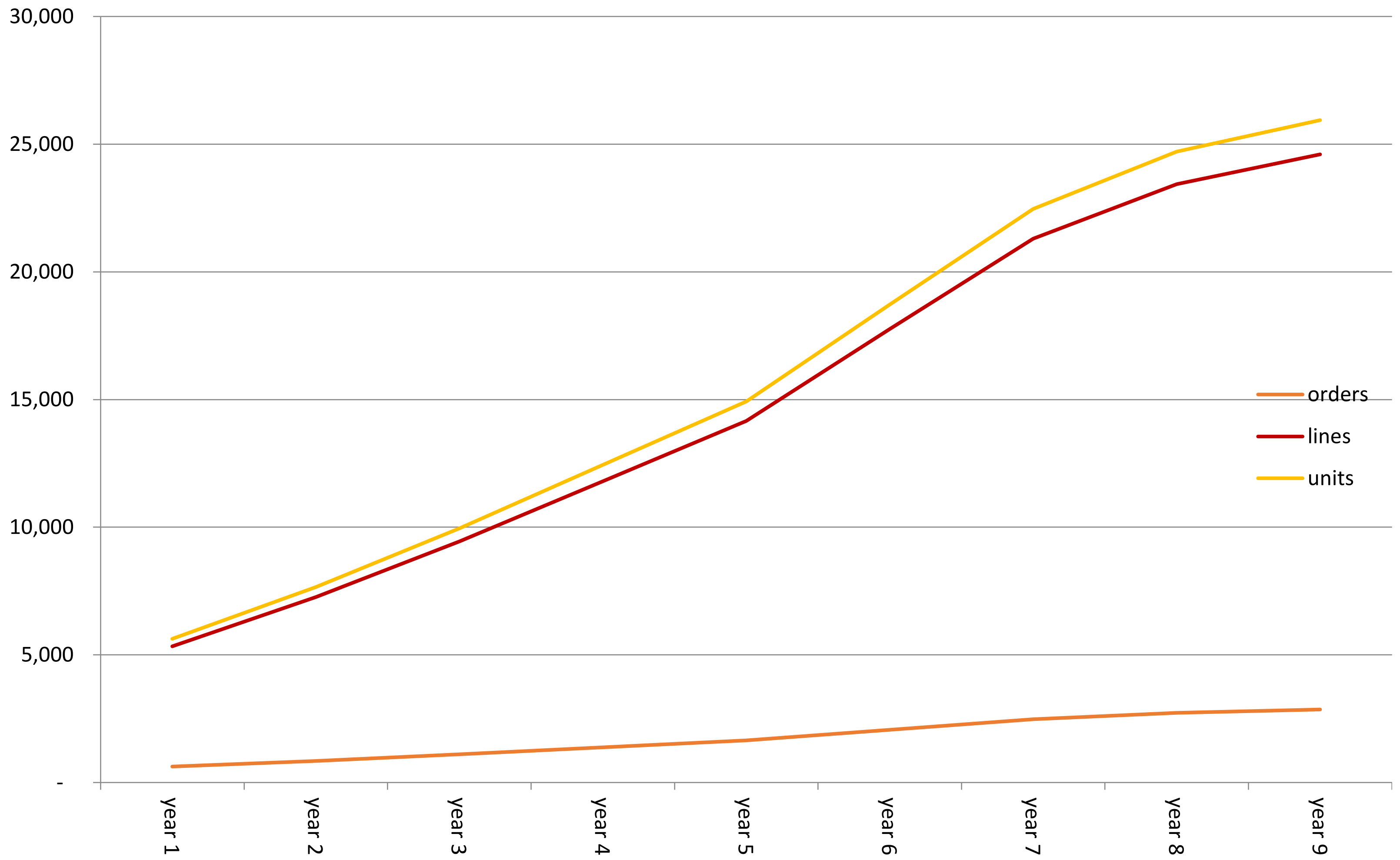
Order Commonality

For this analysis, the order groups were product families

Order Group	EachQtySplits	LineSplits	Orders	Order %	NumSKUs	TotalLines	Line %	Eaches	Each %
[CORE]	[100%]	[100%]	909	22%	137	1,713	5%	51,668,645	10%
[STFO]	[100%]	[100%]	313	8%	37	506	2%	37,086,160	7%
[CORE][STFO]	[49.3%][50.7%]	[72.5%][27.5%]	116	3%	108	797	2%	18,204,384	4%
[CORE][VP]	[77.4%][22.6%]	[81.5%][18.5%]	87	2%	96	915	3%	13,942,691	3%
[CORE][STFO][VP]	[59.5%][20.3%][20.2%]	[64%][17.6%][18.4%]	80	2%	100	944	3%	12,868,428	3%
[STFL]	[100%]	[100%]	80	2%	12	92	0%	5,480,700	1%
[NEWCAKE]	[100%]	[100%]	75	2%	13	78	0%	234,750	0%
[STFL][STFO]	[13%][87%]	[29.4%][70.6%]	69	2%	16	385	1%	10,407,330	2%
[CORE][STFL][STFO]	[47.6%][8.1%][44.4%]	[56.4%][15.1%][28.5%]	63	2%	96	564	2%	10,082,282	2%
[CORE][STFO][STFR]	[56.5%][35.6%][7.9%]	[66.9%][19.1%][14%]	59	1%	100	598	2%	10,621,962	2%
[STF52R3]	[100%]	[100%]	55	1%	1	63	0%	426,300	0%
[STFR]	[100%]								
[PL]	[100%]								
[SANDWEDGE]	[100%]								
[CORE][STFL][STFO][STFR]	[43.9%][7.5%][41.4%][7.3%]								
[CORE][STFO][STFR][VP]	[49.1%][26.7%][8.3%][15.9%								
[CORE][STFL][STFO][VP]	[40.7%][5.6%][40.9%][12.8%								
[FREEDS]	[100%]								
[STF202]	[100%]								
[CORE][STFL][STFO][STFR][VP]	[47.8%][5.9%][27.1%][5.6%][								
[CARCUP]	[100%]								
[CORE][STFR]	[75%][25%]								
[CORE][STFR][VP]	[68.5%][13.2%][18.3%]								
[STFL][STFO][STFR]	[22.8%][53.2%][24%]								
[VISIBLYFRESH]	[100%]								
[CORE][CRYSTALFRESH][VP]	[59.8%][19.5%][20.7%]								

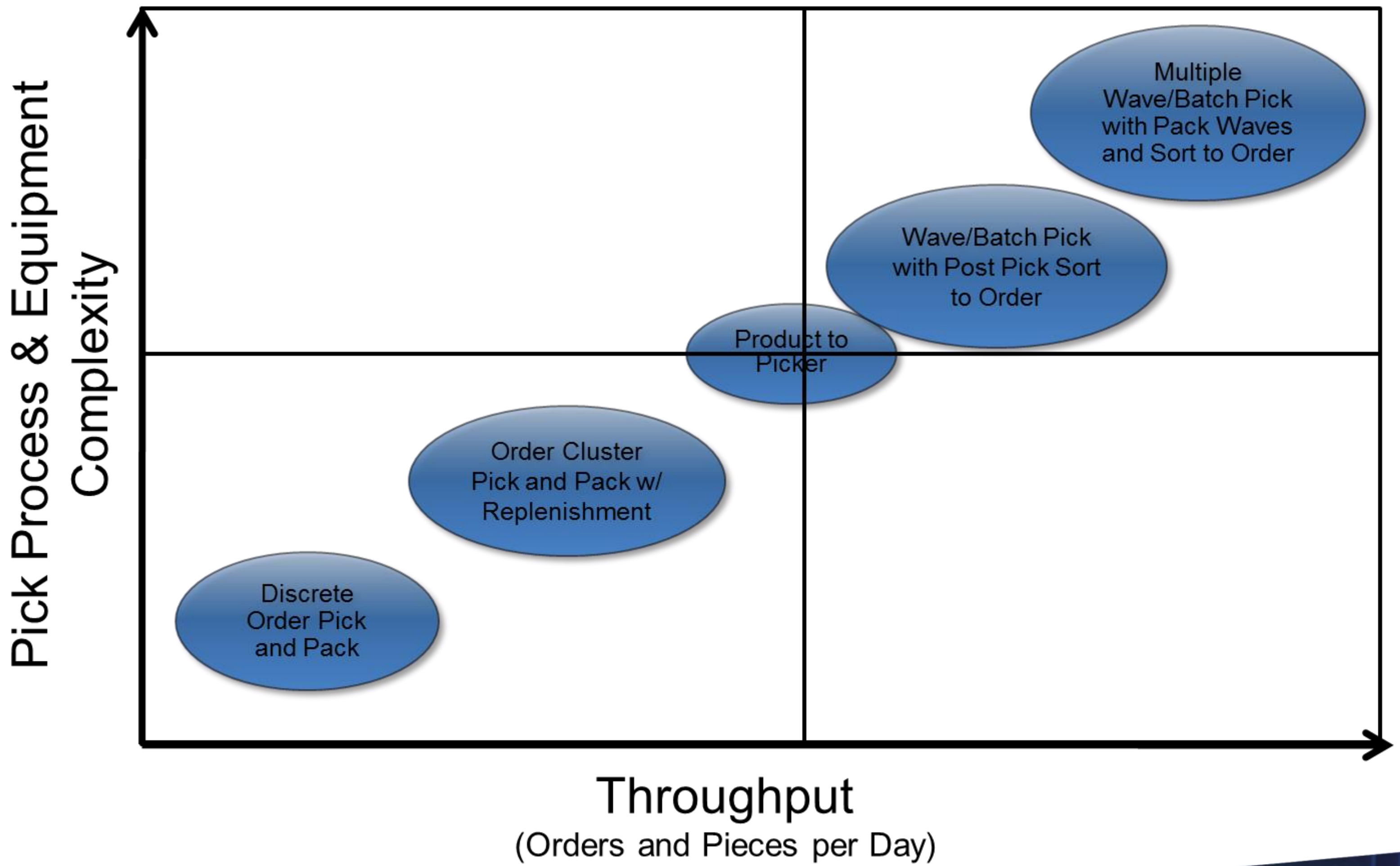


Growth Considerations

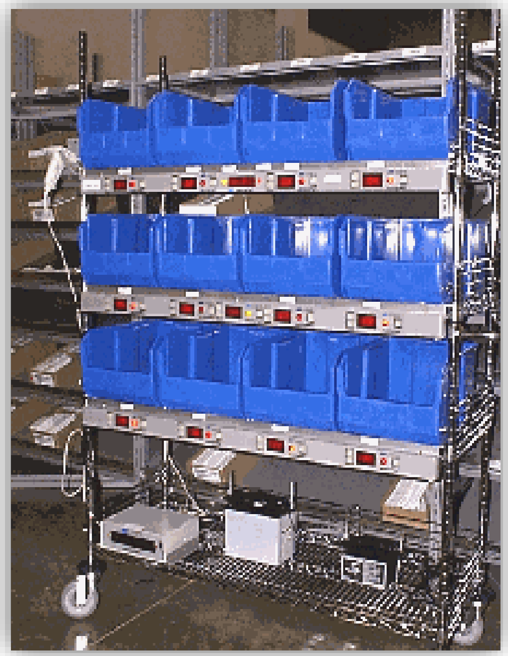


So what does newCommerce mean to the systems and equipment inside the building?

D2C Order Fulfillment Progression



Picker to Product



Are Zone Divert Pick & Pass Modules “so 1990’s”?

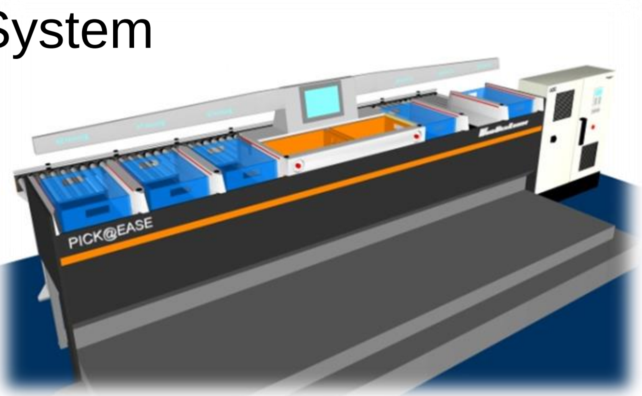
Product to Picker

Vertical Lift
Module

Carousel

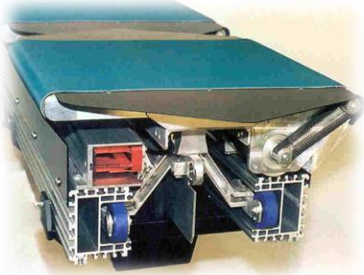
Shuttle
System

Mini-load



Unit Sort
Order Consolidation

Bombay



Cross
belt

Tilt tray

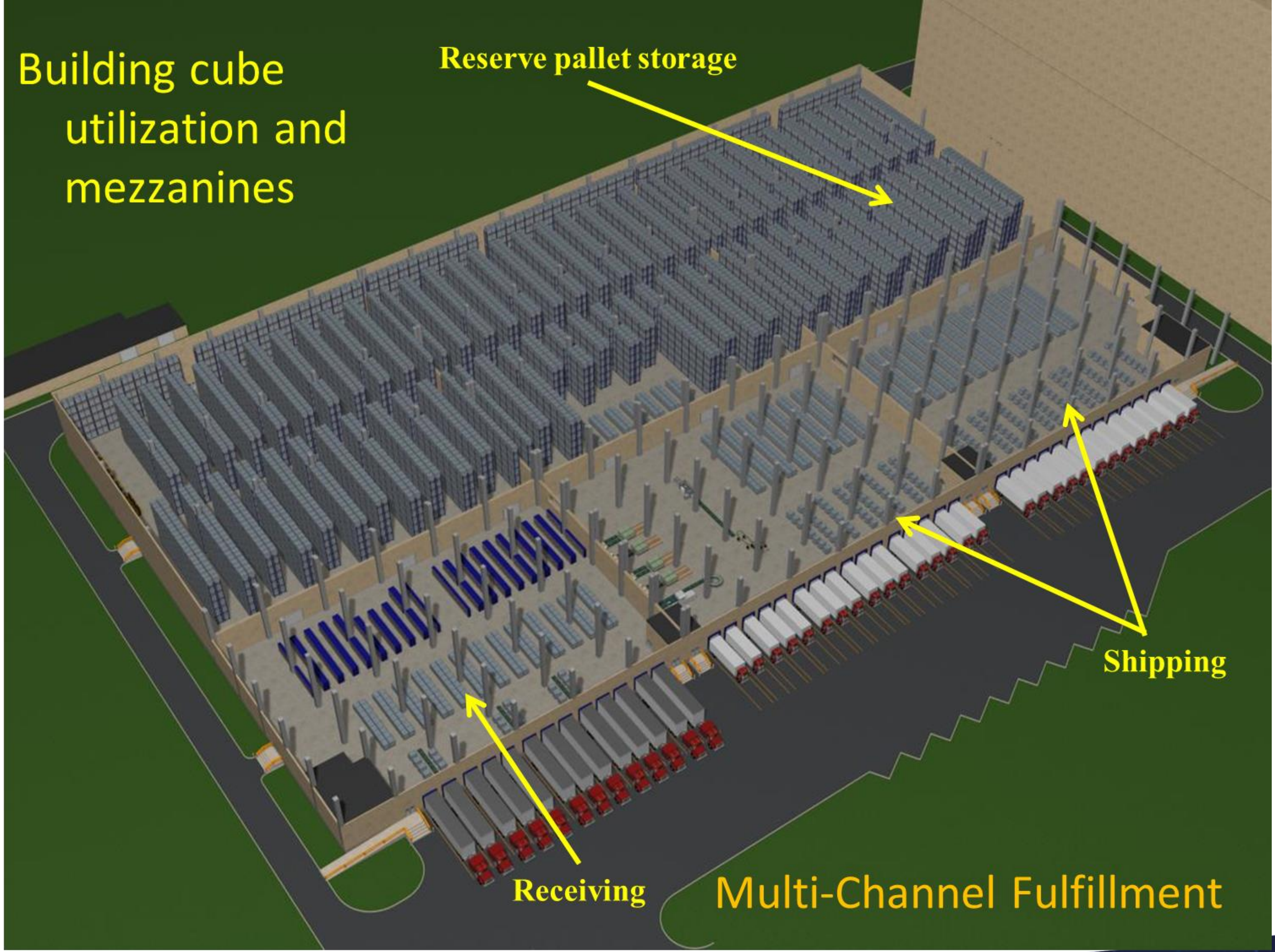
Sort to Order

1 sort vs. 2-pass sort

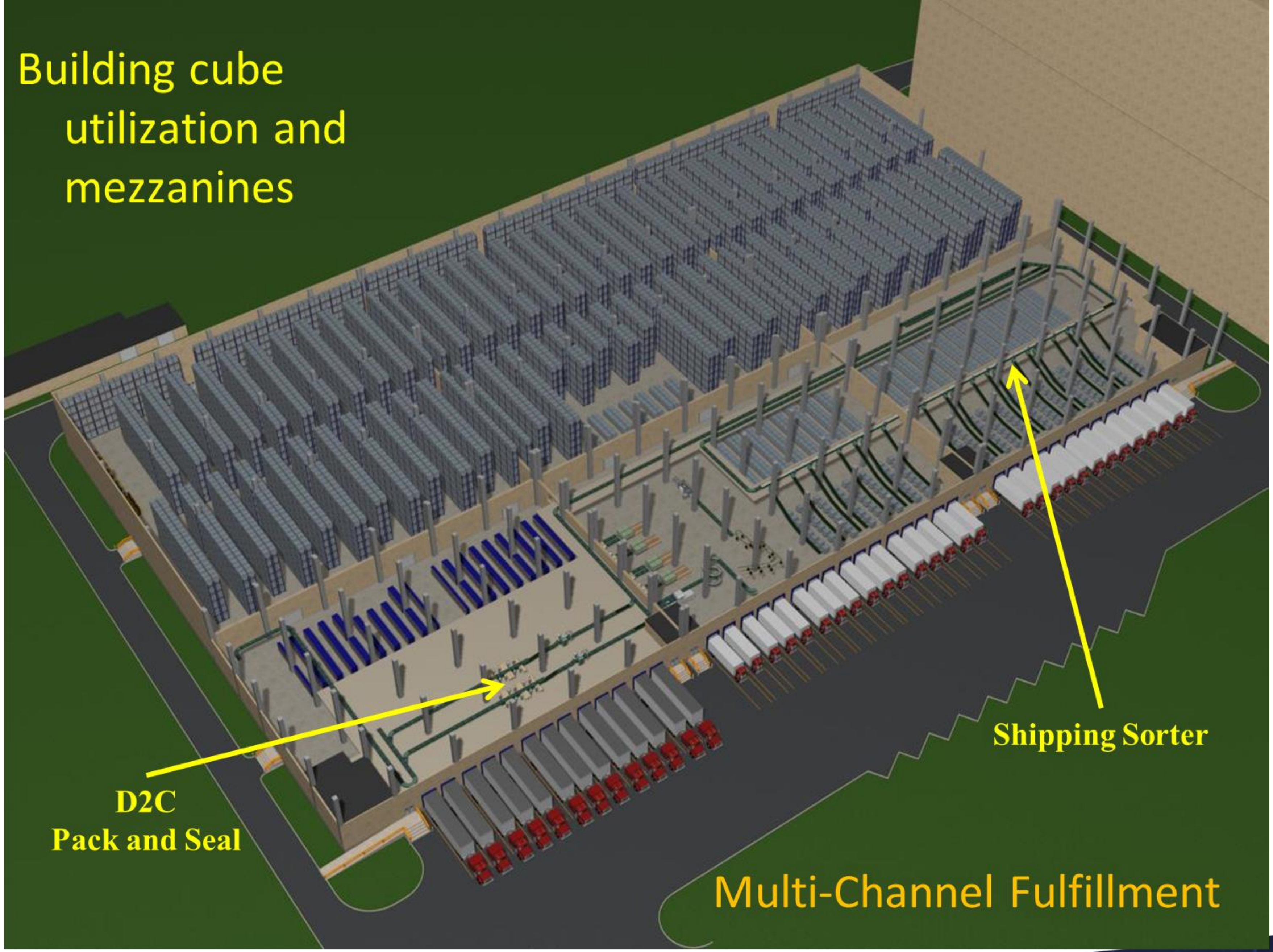
automated

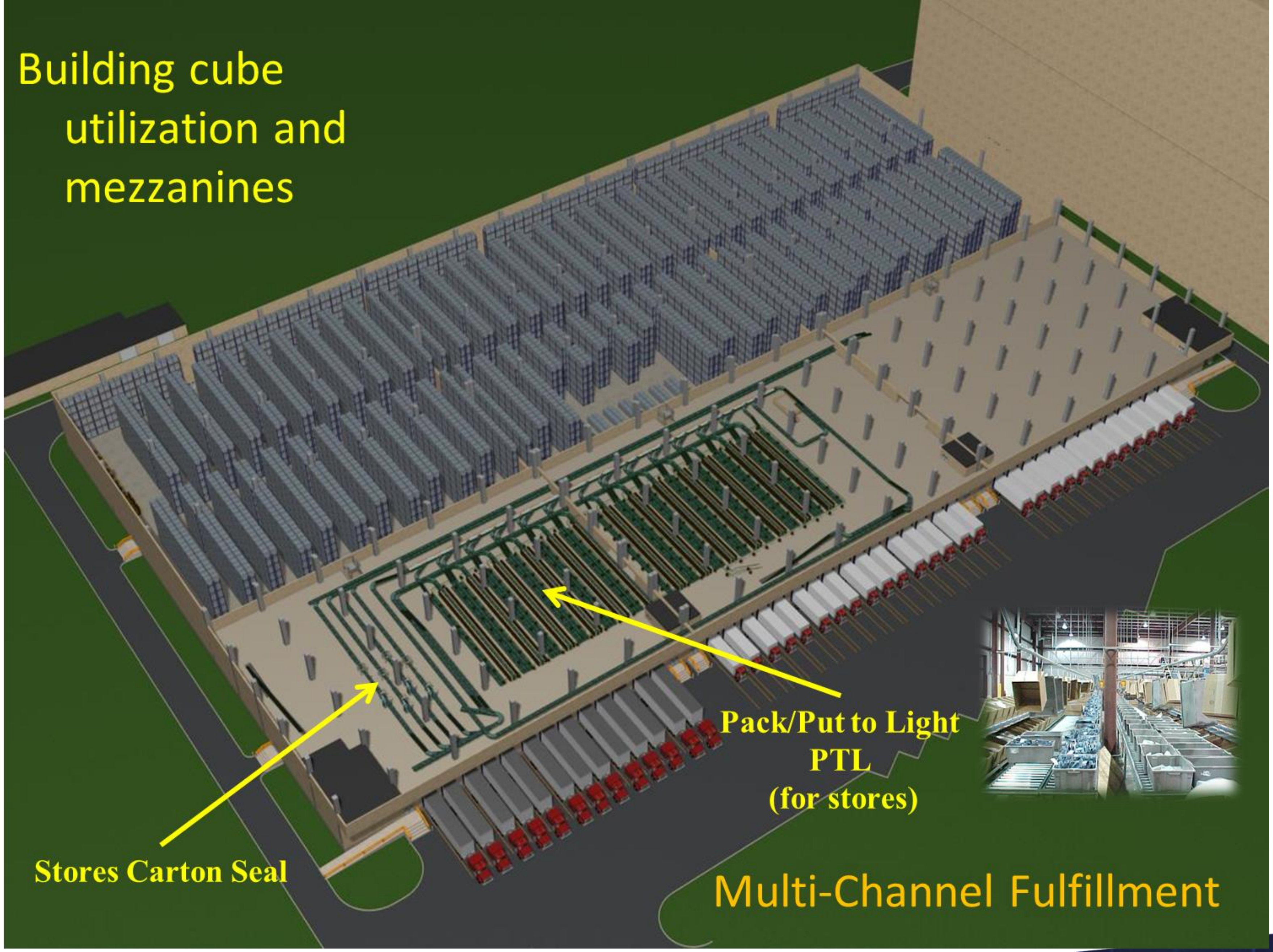
manual

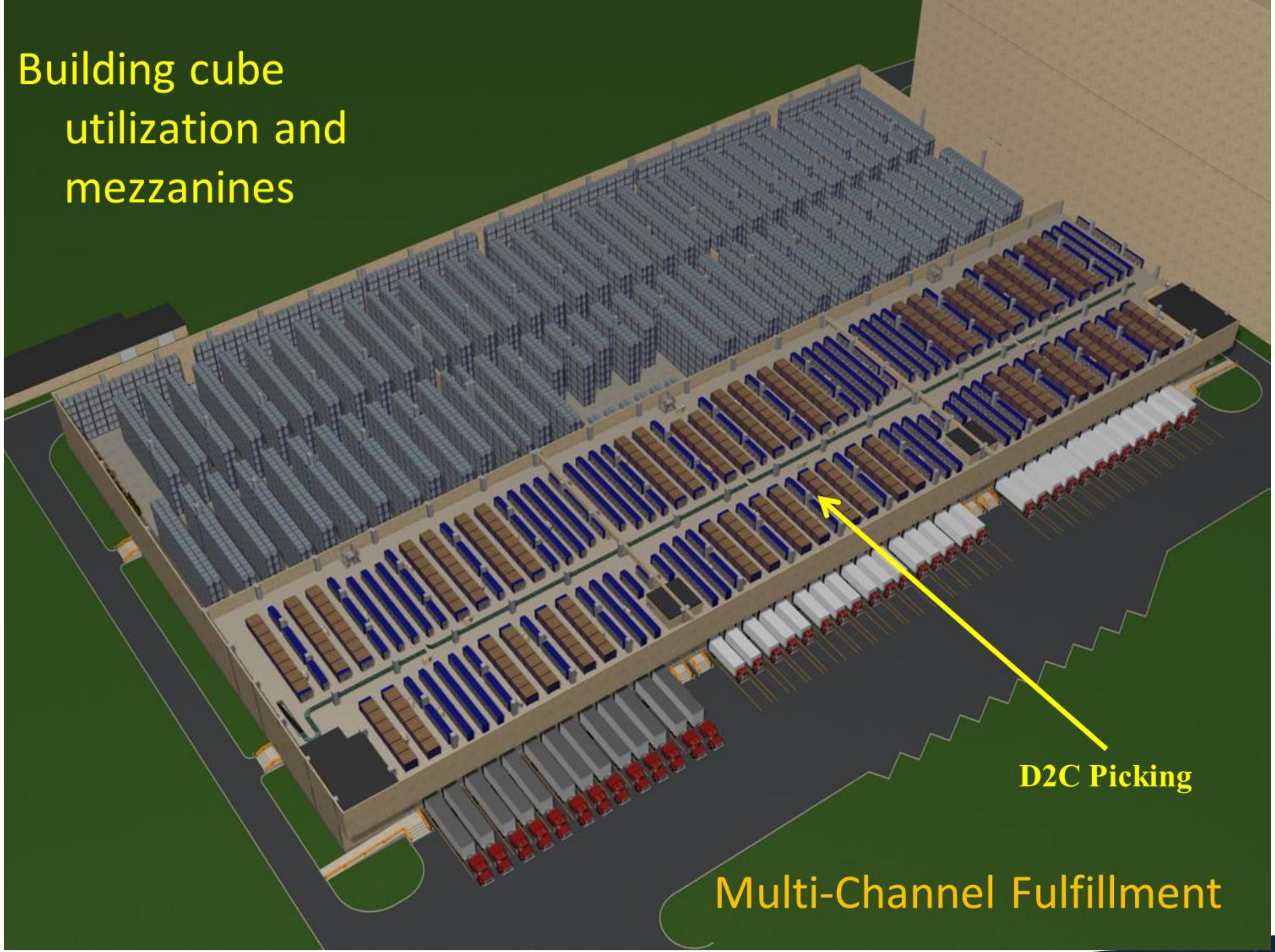
Building cube utilization and mezzanines



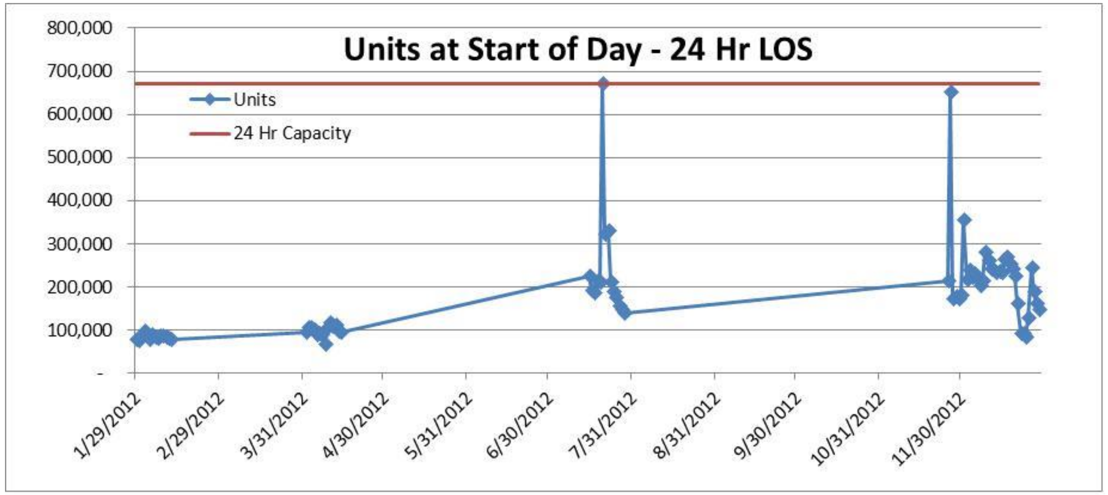
Multi-Channel Fulfillment

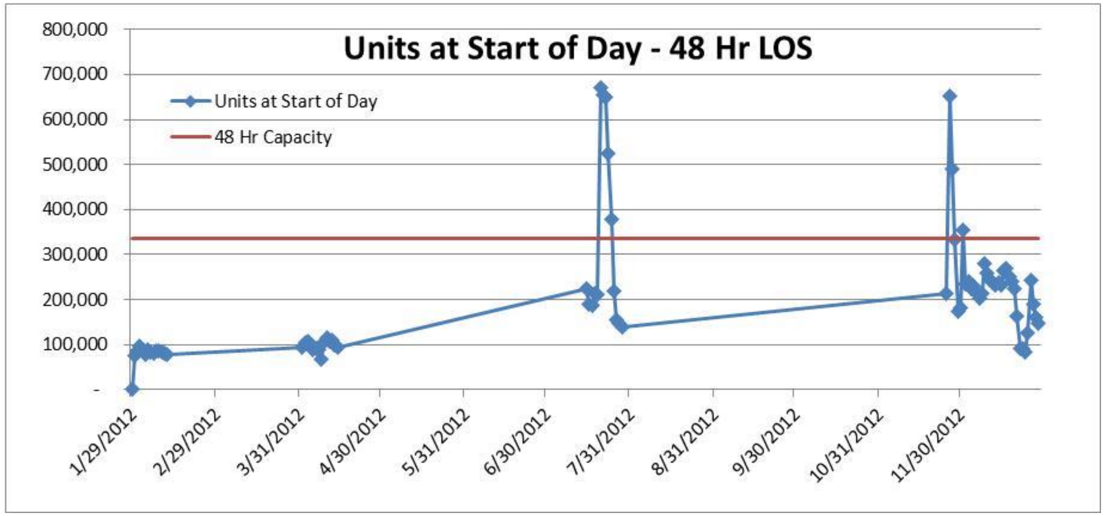

Building cube
utilization and
mezzanines
D2C
Pack and Seal
Shipping Sorter
Multi-Channel Fulfillment


Building cube
utilization and
mezzanines
Pack/Put to Light
PTL
(for stores)
Stores Carton Seal
Multi-Channel Fulfillment


Building cube
utilization and
mezzanines
D2C Picking
Multi-Channel Fulfillment

Level of Service (Order Cycle Time) Will Drive Equipment Utilization/Needs



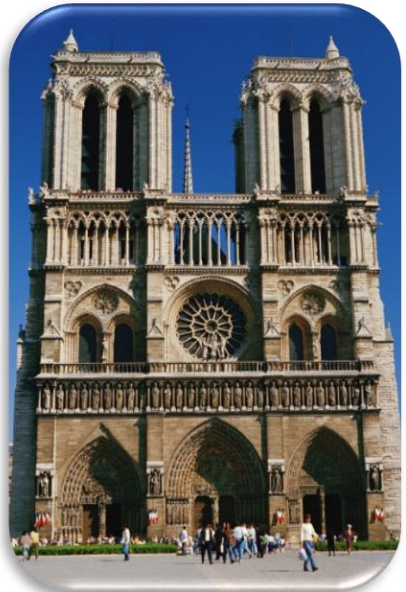


- 48 hour Level of Service achieved with 50% reduction in total facility throughput capacity
- 72 hour Level of Service achieved with 60.6% reduction in facility throughput capacity (graph not depicted)

Technology Rises to Meet the E-commerce Fulfillment Demand (and tay there)

- Investing to accommodate D2C peaks is significant
- Peak to Average ratios for a brief period do not payback investments to cover those peaks

Any Sunday



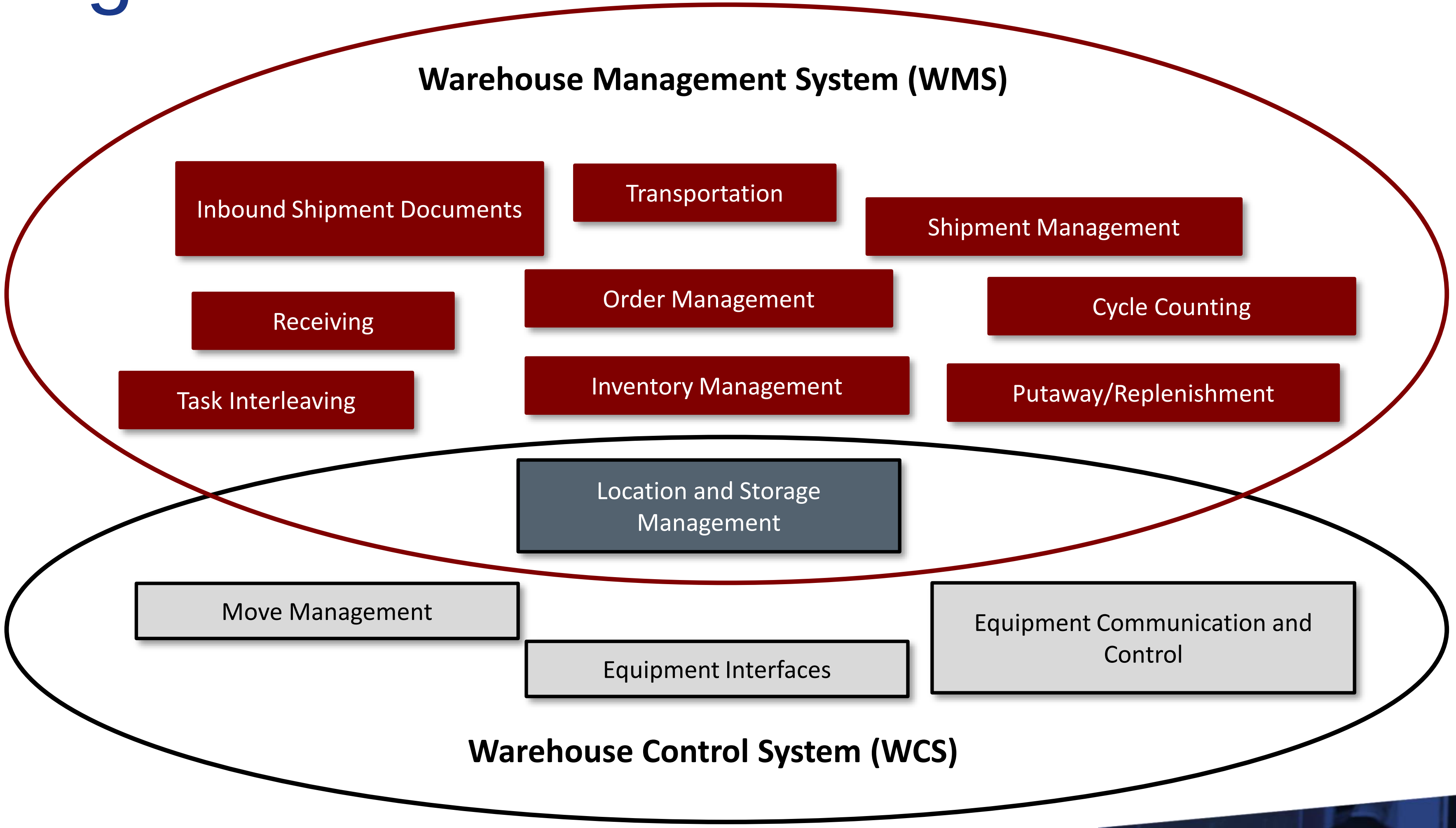
Easter Sunday

- The Dilemma – How to maintain service for a significant peak and maintain profitability
- **The Answer – Balance (1) CAPEX (2) Throughput Capacity and (3) Labor**

Technology Rises to Meet the E-commerce Fulfillment Demand, finds common sense…

- Unit sorter
  - One sorter for 10 months
  - Active put walls in peak season
- AS/RS
  - Cranes based on average single pass/seasonal two part put process
  - Use two pass put wall in season
- Manual Solution
  - Cart pick to single put wall out of season
  - Use two pass put wall in season
- Coupled with additional shifts, the same site can support 4x to 10x peak to average demand, while only driving labor up 2x to 3x

In or Out of Control?
Blurring lines between WMS and WCS

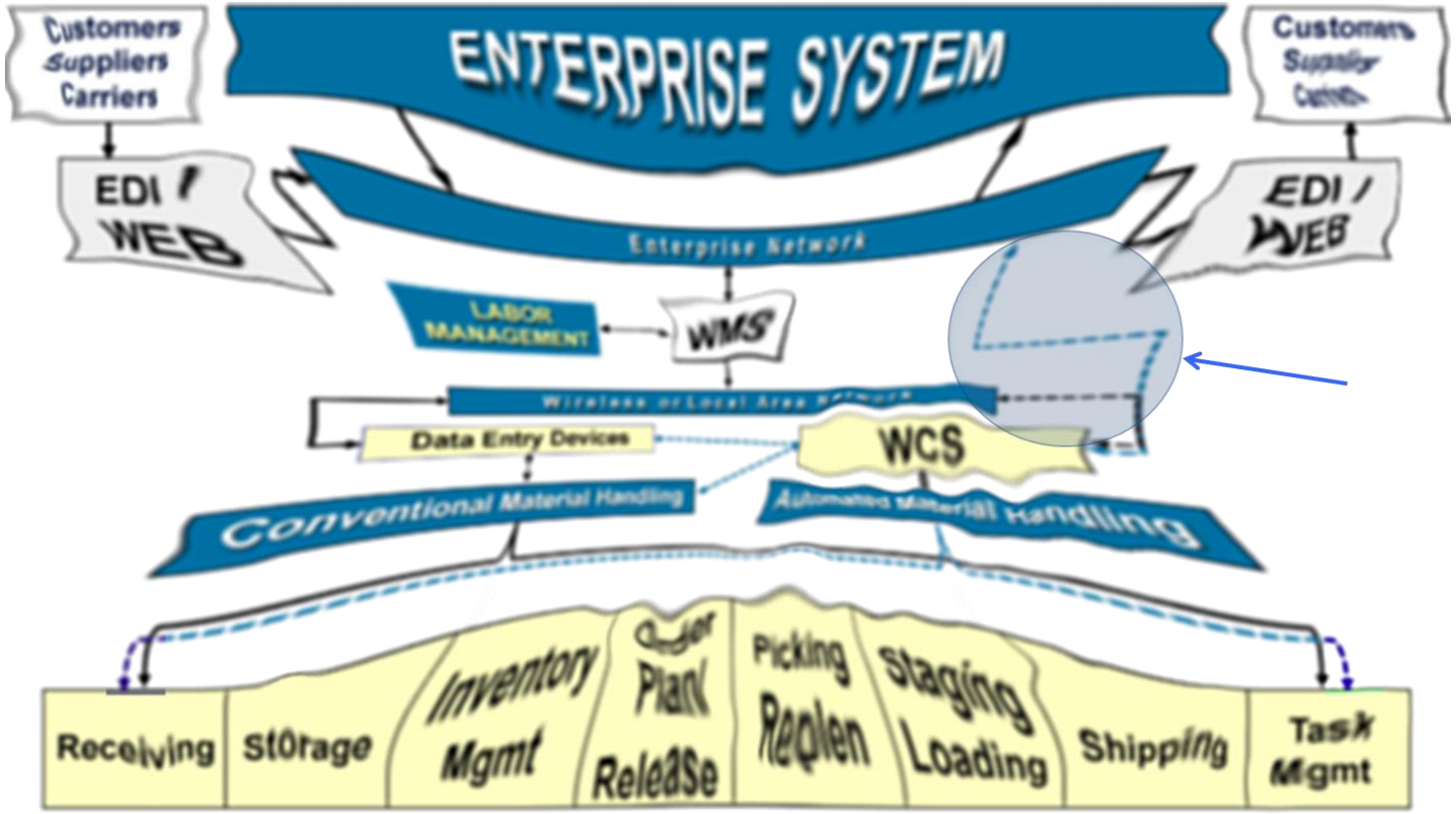


WAREHOUSE CONTROL SYSTEMS

1990's: PLC's for material handling storage & conveyor equipment control & diagnostics to speed item flow from receipt to order release, picking & shipment.

Today: PC's & expanded functionality including order analysis, release & status monitoring, AIDC management & a host of additional equipment interfaces coupled with line & activity balancing .

THE LINES ARE BLURRING

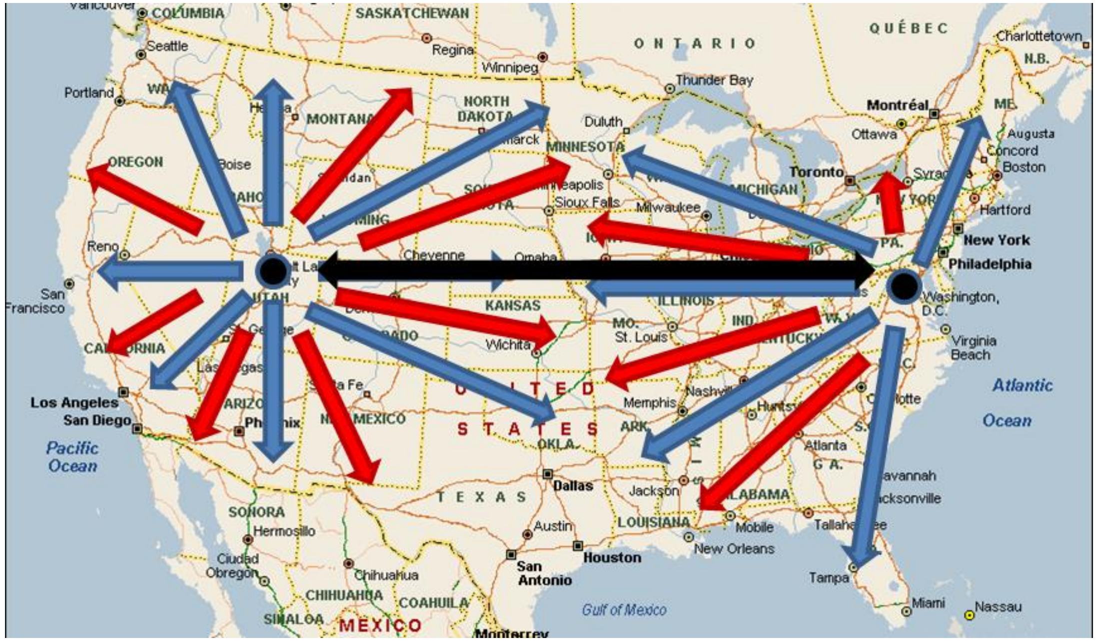


WMS or WCS? Regardless…

- Make sure the layout and processes are fixed first. Don't overlay any WMS or WCS on flawed layouts & processes.
- If both make sense for your requirements, develop detailed specifications that define which system controls which functions, data synchronization processes and timing, exception handling – AND, who is accountable for overall system performance.
- Avoid customization – it adds cost, lengthens implementation time & increases risk.
- WMS and WCS have complementary solution sets that need to work together. Instead of looking at this as a battle between WMS & WCS, solutions providers need to look at finding the right balance of both that results in the best answer for the customer's operational needs.

So what is newCommerce driving in logistics networks and the MHE within the buildings that populate them?

Pragmatic Combination Centers Specialty Retail



- Stores and on-line customers are serviced from same facilities
- Both store replenishment and e-com fulfillment require pick and pack operations
- Bi-weekly transfer shuttles between DCs to balance inventory serve as an option to drive single parcel order shipments

- **A good mix of minimized cycle time to the customer, operating costs advantages and minimal inventory penalty drives this network**
- Order volume is low enough, and inventory cube is small enough that the direct to consumer channel does not really demand its own facility
- Like order processing operations (pick and pack for both stores and e-com) allows for processing economies

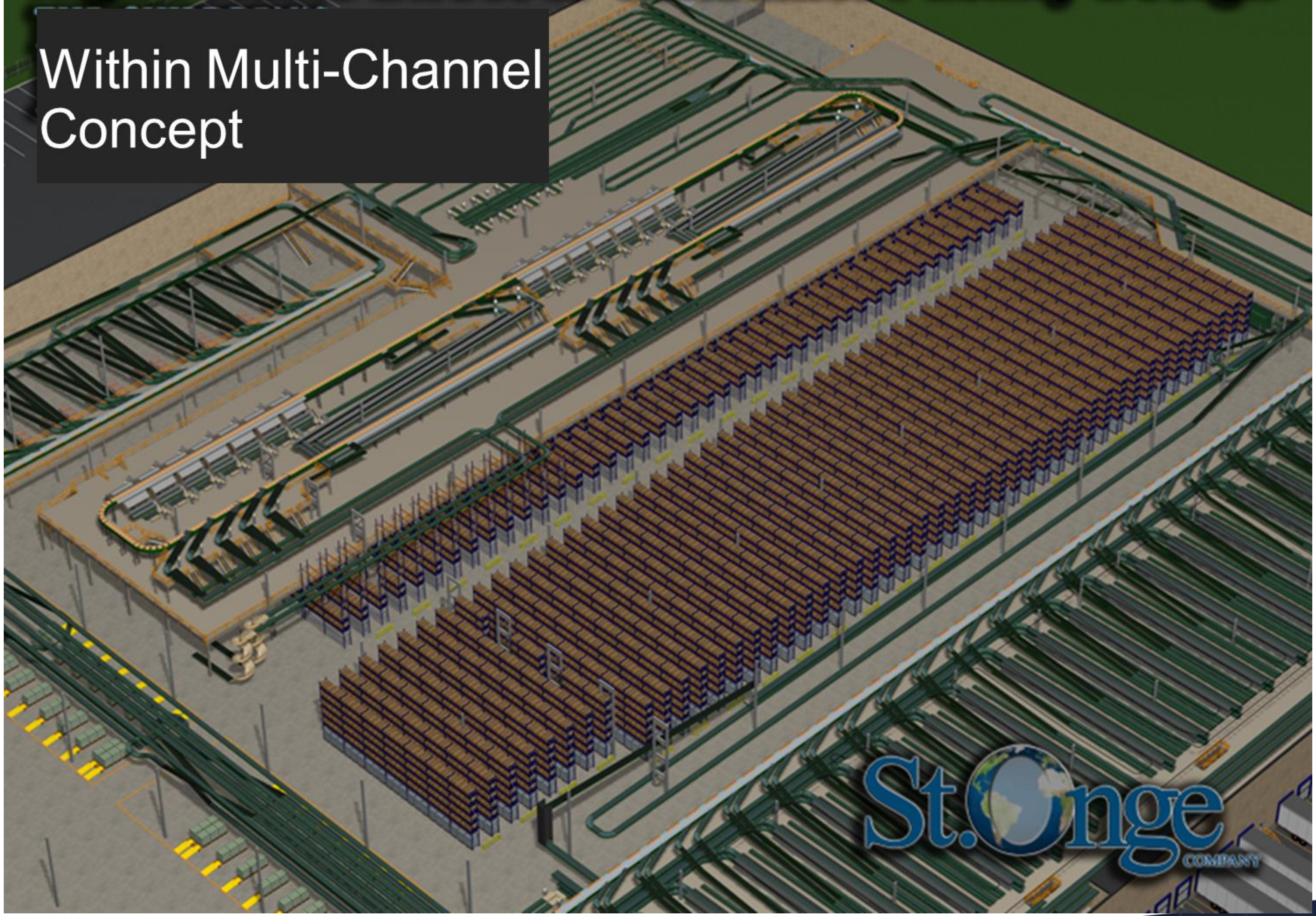
Store service

Direct to consumer

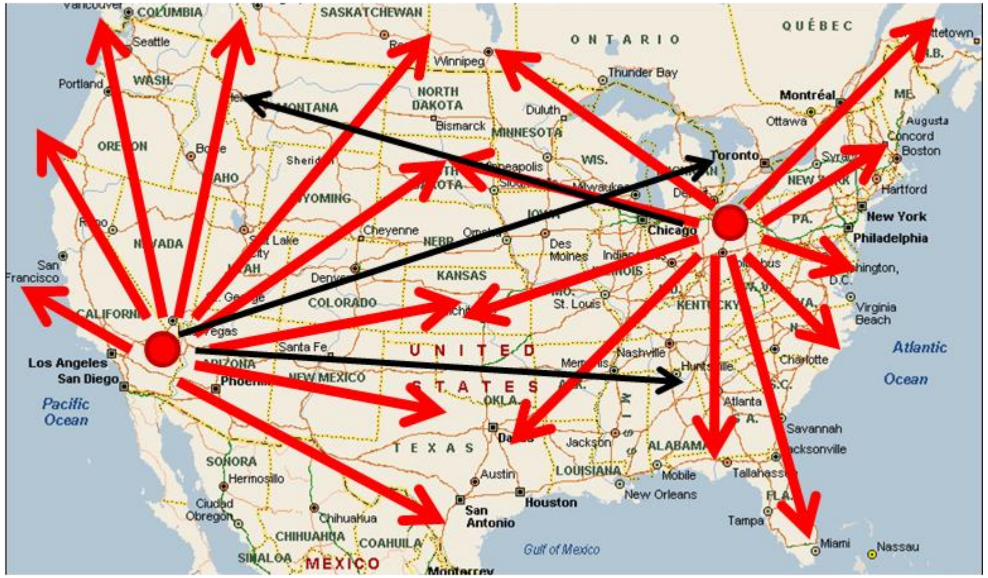
Transfer Shuttle

High Volume Direct to Consumer Facility Design

Within Multi-Channel Concept



Pragmatic Dedicated Centers Garment Retail



- Stores and on-line customers serviced from dedicated facilities for each channel
- Multiple e-com locations serve customers by geography as shown on map to the left (Retailer's store DCs not shown illustrative simplicity)
- Service areas for customers can overlap

- **This network was driven by the size of the D2C and Store DC network demands. Demand was too large for the channels to effectively be in the same building, and D2C demand eventually drove the need for a second fulfillment center**
- Inventory location is an issue. A decision making tool addresses the alternatives to supplying the customer when all items are not in stock in the same DC by comparing the options below
  - Ship two packages
  - Ship one package from the suboptimal facility
  - Ship the out of stock item from one facility to the other and ship a single order to the customer
- The decision making can be influenced by customer preference (They want one package)

Direct to consumer

Out of service area direct to consumer

Single channel E-Commerce concept
Lower capital peak season solution

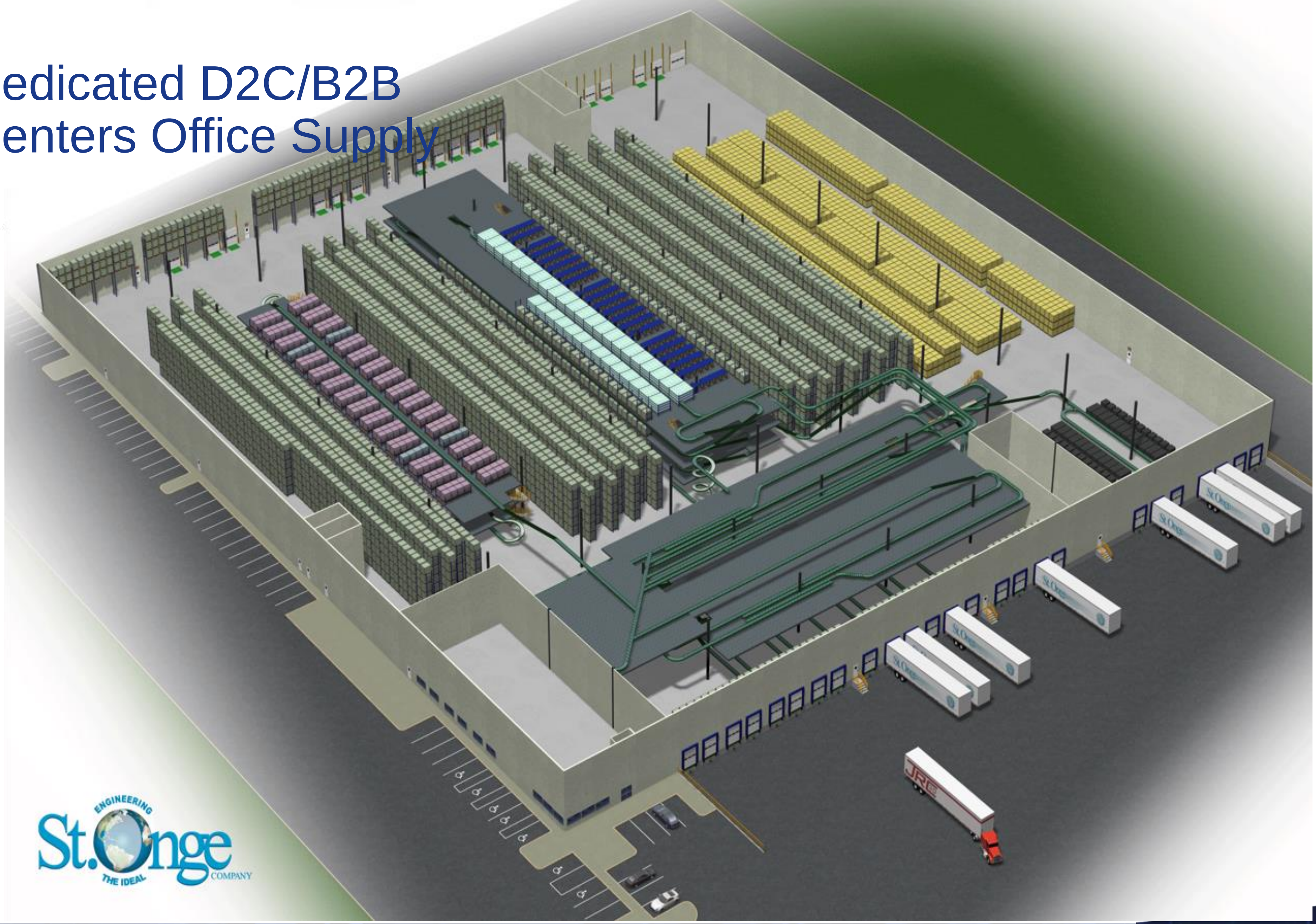
Pragmatic Dedicated Centers Office Supply

- Numerous dedicated direct to consumer and business to business centers
- Map is illustrative only, there are over 30 such centers
- Multiple e-com locations serve customer by geography as shown on map to the left

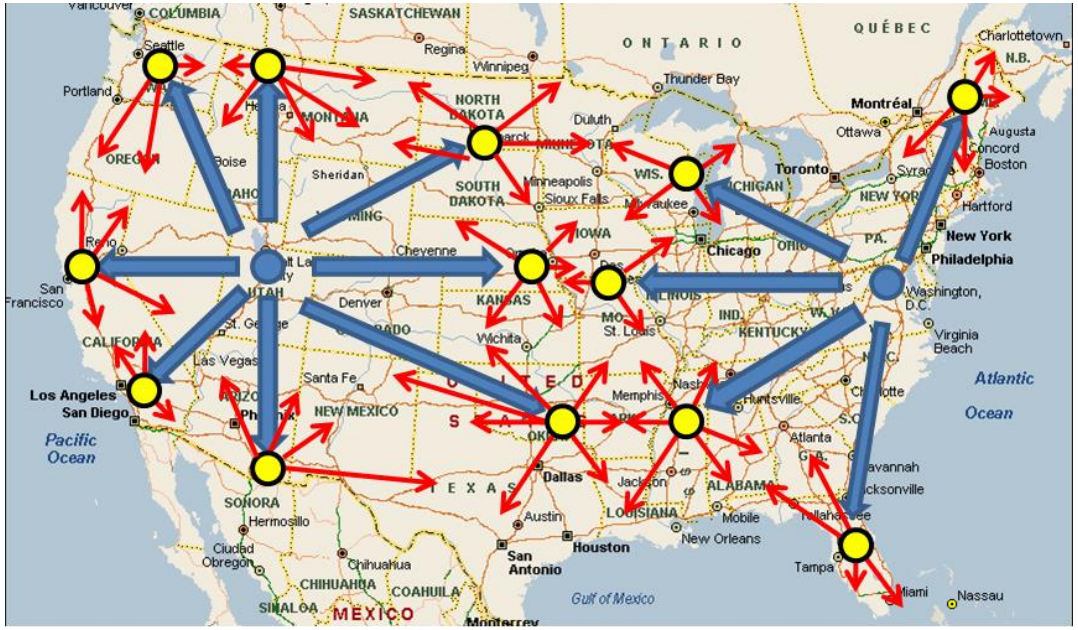
- **Speed to the customer is paramount above all other considerations**
- Allowing a customer to place their order even one hour later for next day delivery is considered a significant competitive advantage for this specialty direct to consumer retail channel
- While overall volume is significant (over 500,000 orders per day on a light day across the network) no one facility processes more than 5% of the broken pack volume.

Direct to consumer

Dedicated D2C/B2B Centers Office Supply



Pragmatic Store Distributed Specialty Retailer

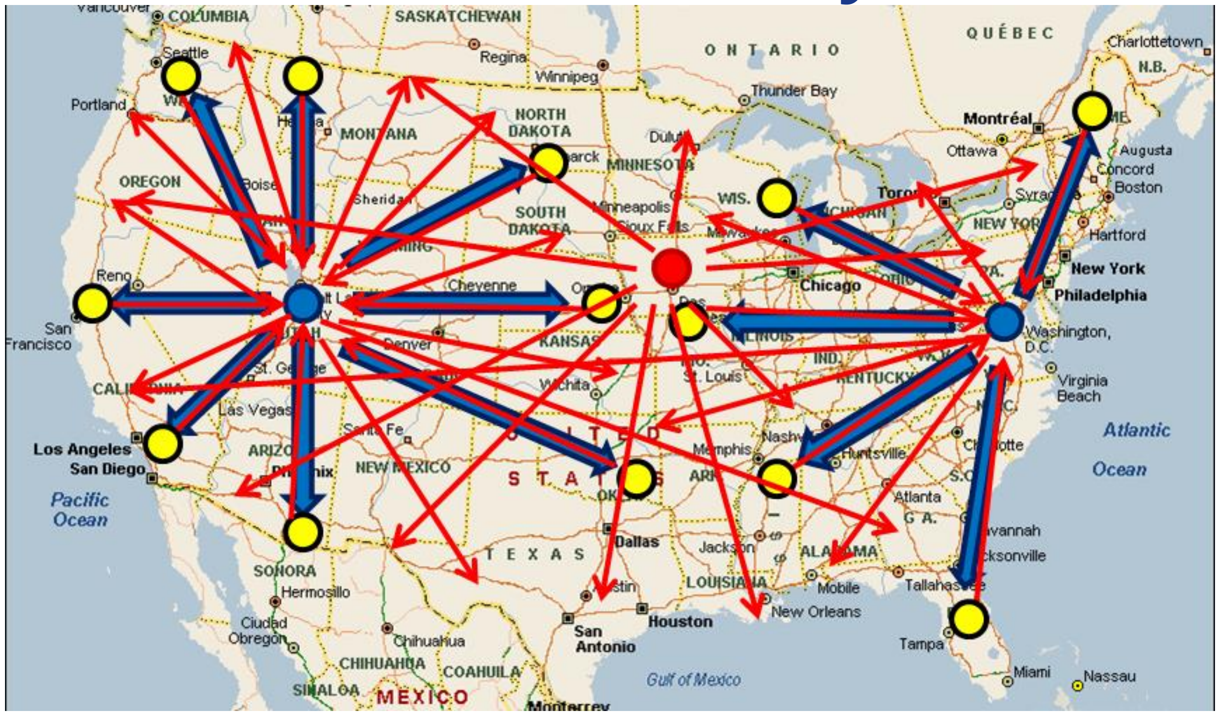


- This network allows for direct to consumer customers to be serviced from stores
- The servicing store is selected based on inventory availability and proximity to the customer
- Service areas overlap extensively based on where inventory is available

- **Allowing maximum customer access to even the smallest of inventory quantities is the main strategy driver in this case**
- There are lower volumes of e-com demand
- Inventory visibility by store is critical and focused on to ensure product is truly available
- Did not increase inventory at the store level (inventory is not stocked at the stores solely for direct to consumer business)

Store service
Direct to consumer
Store Locations

Store/e-com DC Hybrid



- This network is a hybrid utilizing all three network types
  - One direct to consumer facility
  - Multiple DC store replenishment centers
  - Hundred plus stores
- Consumer orders can be shipped from the D2C
- If not available in the D2C facility and available at ANY store product is sourced from the store
- The servicing store selected based on inventory availability and proximity to the customer
- Service areas overlap extensively based on where inventory is available

- **Allowing maximum customer access to even the smallest of inventory quantities while ensuring the customer receives the absolute maximum in customer service is the main strategy driver in this case**
- This type of network has been combined with free standard shipping on every order to drive maximum customer satisfaction and lowered bar for transit time on standard shipping

Store service
Store Locations
Direct to consumer

So what does newCommerce mean to the building to be filled with equipment or positioned in the network?

Industrial vacancy rates are at all time lows…

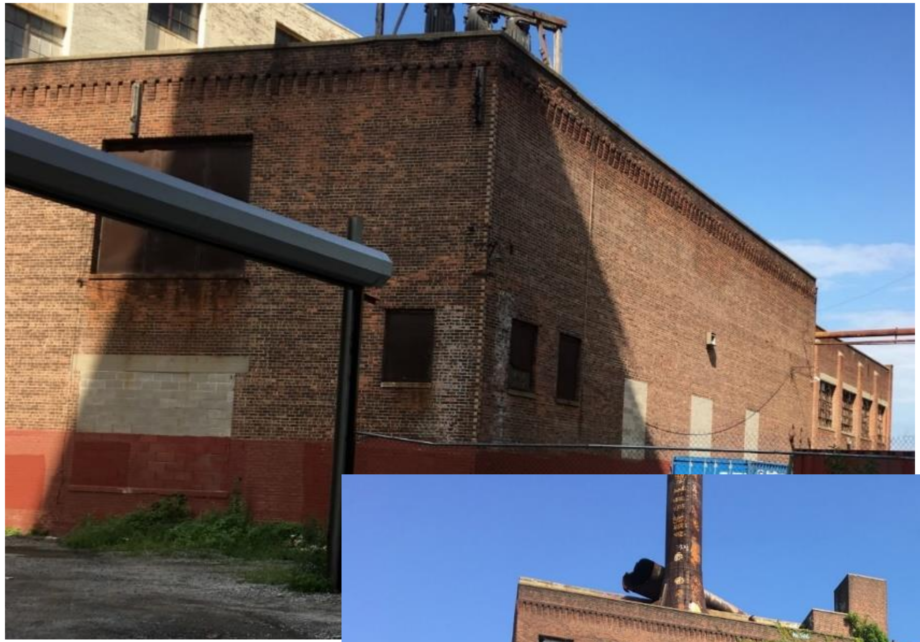
There are big boxes being developed as fast as possible…

For Distribution Assets given new customer demands – newCommerce is a bit like time travel…

BACK TO THE FUTURE

…but better thought of as "Everything old is NEW again."

In light of newCommerce, what is this?



In light of newCommerce…

What is this? A backlot set for a 1970’s Gang film?

THE WARRIORS

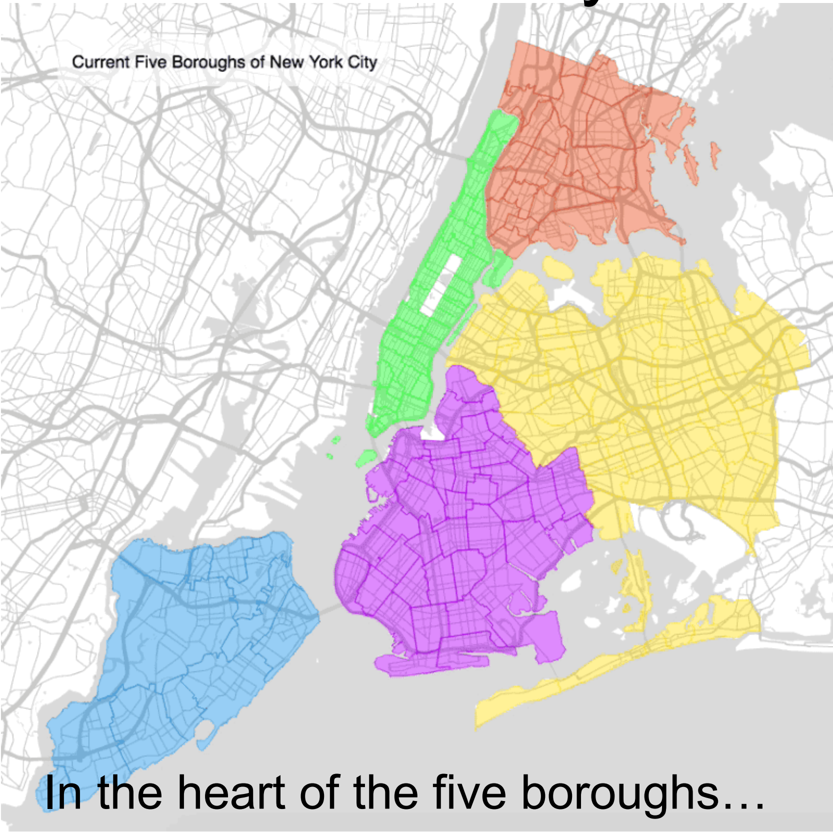
In light of newCommerce…

What is this? The direct result of ‘safe’ nuclear power?

In light of newCommerce…

That was a seven story prime distribution asset…

Optimally located for last mile delivery…



In the heart of the five boroughs…

Recap – The Supply Chain…

OUTSIDE the Four Walls….

- Logistical Options Driven by the Supply Chain at Hand

Drives the available options INSIDE the Four Walls…

- Facility, Equipment, System and Process Options Driven by the Pragmatics of the location's Design Criteria

The need for the building locations, and the acceptance of configurations, of those WALLS…

- Urban locations supporting same day delivery utilizing unconventional configurations

All of which is Driven by

- Suppliers and Customers - AKA the Alpha and Omega of the "Supply Chain"

…of newCommerce

Questions?

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