Ecom Fulfillment and the Physical Internet

Some motivation and a persistent challenge

Russ Meller, VP, Solution Design and R&D

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Daily Profile for a US Ecom Retailer

US Ecom typically has a very significant peak – where to set design capacity?

Even with extended operating hours and relaxing the service-level agreement (SLA), there is significant excess capacity designed into the system.
Thought Exercise

With baseline data

• Non-peak average orders per day = 3,000
• Peak hour during non-peak to meet SLA = 600
• Non-peak hour during non-peak = 327

• Peak orders per day = 53,000
• Peak hour during peak to meet relaxed SLA = 3,180*

So, during a non-peak hour, during the non-peak period of the year, we are using 10% of the facility’s capacity

But what about growth?

* Peak hour orders in peak period exceeds average daily orders in non-peak
Thought Exercise

Extended with 10% YOY Growth for 5 Years (61% cumulative growth)

• Non-peak average orders per day for Baseline = 3,000
• Peak hour during non-peak to meet SLA for Baseline = 600
• Non-peak hour during non-peak for Baseline = 327

• Peak orders per day for Design Year = 85,400
• Peak hour during peak to meet relaxed SLA for Design Year = 5,121

So, during a non-peak hour, during the non-peak period of Year 1, we are using 6% of the design capacity of the facility
So, why aren’t Fortna Clients interested in the PI?

It seems there would be great financial motivation!

- The peaks are overlapping
- All SLAs are being driven to next day*
- They don’t believe there is a market a la the PI for their excess capacity
- They are all unhappy with the cost-service provided by existing 3PLs
- Our Clients view their supply chain as a competitive advantage

So, to me, the biggest research question around PI for Ecom fulfillment is **still** around PI “business models”

- How do we design facilities to enable order-of-magnitude cost avoidance, which requires synergistic operations?
- Especially in light of overlapping peaks with the same SLAs

* Companies are actively trying to counteract this one ...
### Directional Storage Media

Points represent a SKU’s average-day demand – which media to provide?

- **Small SKUs and Slow Velocity**
  - Assign to Bin/Wire Deck
  - Evaluate trade-off for GTP solution

- **Small SKUs and Faster Velocity**
  - Assign to Carton Flow (or equivalent media to hold proper DOH and maintain pick path density)

- **Larger SKUs and All Velocities**
  - Assign to Pallet (of multiple slot heights)
  - Evaluate picking trade-off for floor level vs upper level with order picker, dedicated picking aisles and different media configurations

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**Material Volume (in3)**

- **Small SKUs and Slow Velocity**
  - Average Lines per Day
  - Assign to Bin/Wire Deck
  - Evaluate trade-off for GTP solution

- **Small SKUs and Faster Velocity**
  - Assign to Carton Flow (or equivalent media to hold proper DOH and maintain pick path density)

- **Larger SKUs and All Velocities**
  - Assign to Pallet (of multiple slot heights)
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**6,385 SKUs (100%) | 41,206 Lines/Day (100%)**

**6,341 SKUs (100%) | 6,341 Lines/Day (99%)**

**0 SKUs (0%) | 0 Lines/Day (0%)**