Ecom Fulfillment and the Physical Internet

Some motivation and a persistent challenge

Russ Meller, VP, Solution Design and R&D

23 July 2018
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

<table>
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<th>Material Volume (in³)</th>
<th>Average Lines per Day</th>
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<tbody>
<tr>
<td>0</td>
<td>0 SKUs (0%)</td>
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<tr>
<td>1,000</td>
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</tr>
<tr>
<td>9,000</td>
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</tbody>
</table>

6,385 SKUs (100%) | 41,206 Lines/Day (100%)