Ecom Fulfillment and the Physical Internet

Some motivation and a persistent challenge

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Daily Profile for a US Ecom Retailer

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

**Daily Orders**

Max = 14.3 x Avg

**Daily Lines**

Max = 13.4 x Avg

**Daily Units**

Max = 13.0 x Avg

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 ...
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

### Material Volume (in3)

- **Small SKUs and Slow Velocity**
  - 6,385 SKUs (100%) | 41,206 Lines/Day (100%)

- **Small SKUs and Faster Velocity**
  - 6,341 SKUs (100%) | 6,341 Lines/Day (99%)

- **Larger SKUs and All Velocities**
  - 0 SKUs (0%) | 0 Lines/Day (0%)