



## **Ecom Fulfillment and the Physical Internet**

Some motivation and a persistent challenge

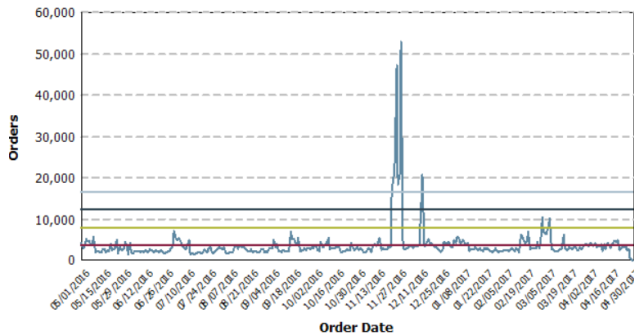
Russ Meller, VP, Solution Design and R&D

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# Daily Profile for a US Ecom Retailer

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

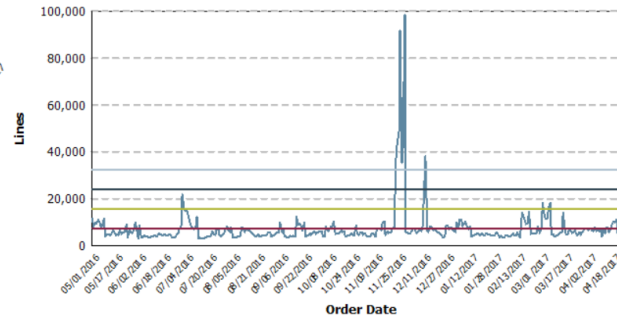
### Daily Orders



Avg Daily Orders	3,694
1 Standard Deviation	8,002
2 Standard Deviation	12,310
3 Standard Deviation	16,618
Maximum Daily Orders	52,897

**Max = 14.3 x Avg**

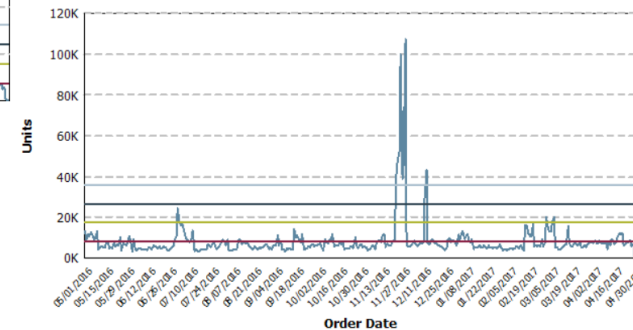
### Daily Lines



Avg Daily Lines	7,343
1 Standard Deviation	15,756
2 Standard Deviation	24,169
3 Standard Deviation	32,582
Maximum Daily Lines	98,149

**Max = 13.4 x Avg**

### Daily Units



Avg Daily Units	8,245
1 Standard Deviation	17,456
2 Standard Deviation	26,667
3 Standard Deviation	35,878
Maximum Daily Units	107,362

**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 ...

# Directional Storage Media

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

