

## Breakout Session A-3: Digital Continuum in Logistics

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### Summary of key ideas discussed

Primary topic: Defining the Digital Continuum

1. How is the human involved in the digital space - defining the system, identifying the disruptions and states, defining and updating needs/objectives
2. What is the value of the continuum beyond traditional simulation?
  - a. Real time and quality of data
  - b. Physical control
  - c. Operational control
  - d. Financial control
  - e. Control is dependent on the system level (e.g. robot vs SC) and data accessibility
  - f. Design vs. Operations - we focused on operations and management instead of design influences
3. Extensions and value beyond a warehouse
  - a. Identifying disruptions in supply chains
  - b. Capturing SME inputs and decisions

### Additional notes and details of discussion

1. "Digital Continuum"
  - a. Continuum - sequence of elements that follow each other, limits are different, but similar elements
  - b. Digital continuum - connects physical and virtual worlds, such that the virtual and real worlds are indistinguishable. Virtual world decisions control physical world.
2. What objects do we need to imitate - defining state changes - is this necessary? Have ML learn the process. Needs to dynamically learn the system and behavior.
3. Human involvement
  - a. Defining of the system
  - b. Identifying potential disruptions
  - c. Control mechanisms - e.g. create a copy to then run a predictive model
  - d. Defining the actions and action space of the system - different levels of inputs, e.g. system level or object level decisions
4. Simulation vs Digital Twin
  - a. Model creation is continuous and accurate
  - b. Information flows both directions
5. Identifying difference between DT and CPS - MLA
6. What data is really needed for logistics, states
7. Related work
  - a. Capturing SME feedback

- b. SCM stress tests - identification and decision making
- 8. "Financial Digital Twin"
  - a. Determine the costs of each action
  - b. Live view of the current costs
  - c. Feedback loop for pricing negotiations
  - d. Rules of engagement - decisions for market bidding
- 9. How do we use the live data?
  - a. Parameter optimization vs. policy optimization (e.g. changing the values of S,s vs changing from S,s to Q,R)
  - b. Updating regulations
  - c. When to make decisions? How many simulations should run? - Goes back to defining disruption points.