Digitization and Visibility: The Future of Supply Chain Operations

A Small Parcel Distribution Case Study

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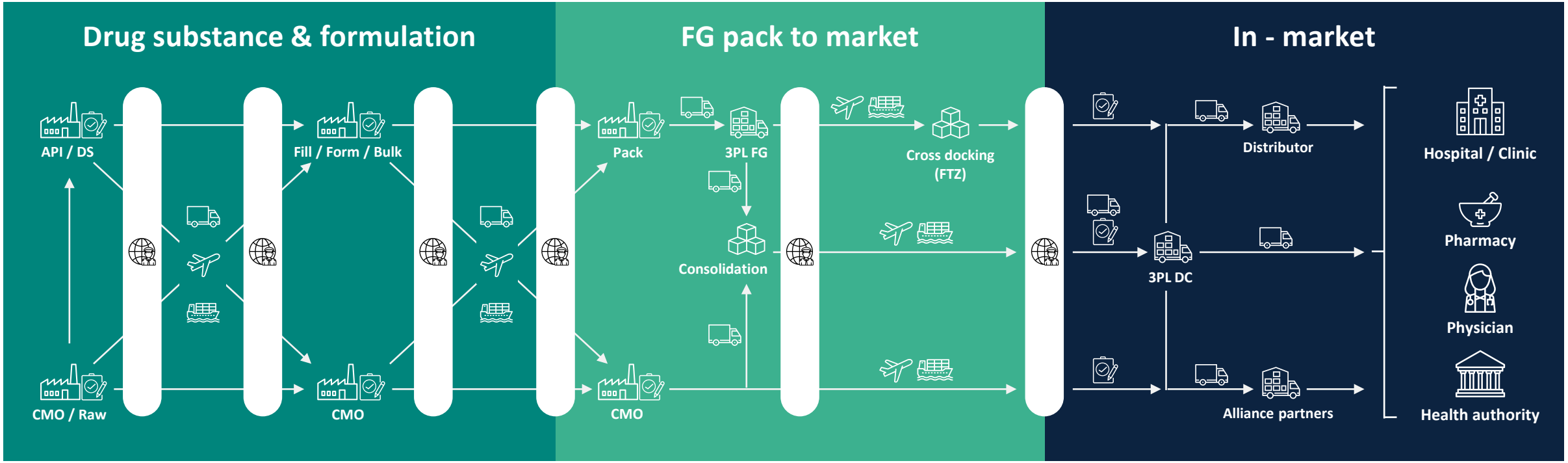
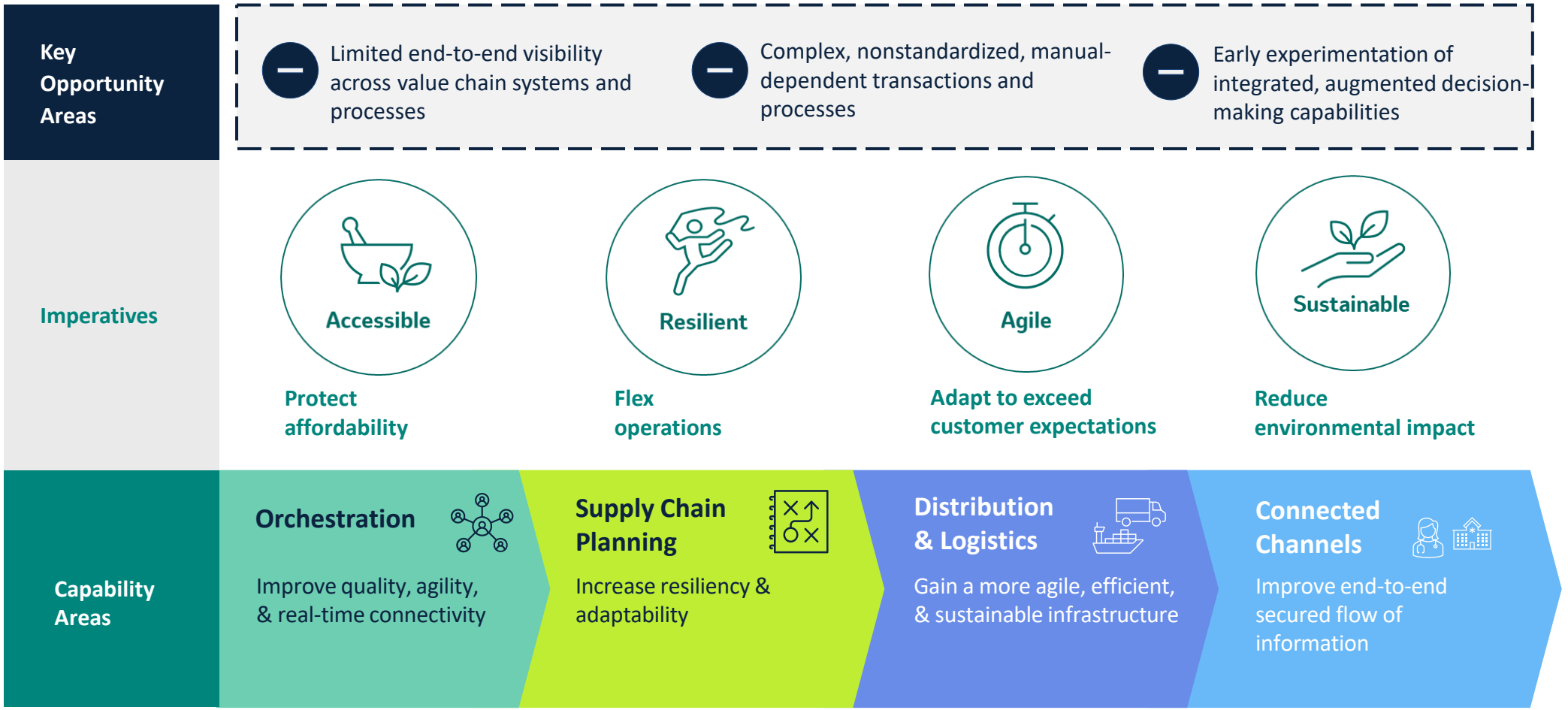
Pharmaceutical End-to-End value chains are complex



To combat this, Merck is employing an accelerated digital supply chain strategy



Our goal is to never lose a dose… this requires alignment across the value chain

Visibility and predictability of performance between nodes that enables Merck to control the supply chain and ensure compliance at the best cost

Lack of visibility and control resulting in waste and discards!

Designing the right solution for now and the future!

Aligning the strategy and sponsorship at all levels!

Data connectivity (~10 sources)

End-to-end track & trace (location)

Real-time shipping conditions sensor (temp, tamper)

Proactive alerts & notifications before shipment hits the point of failure

Real-time intervention

Sustainability tracking & modeling

Logistics digital twin (ML & AI)

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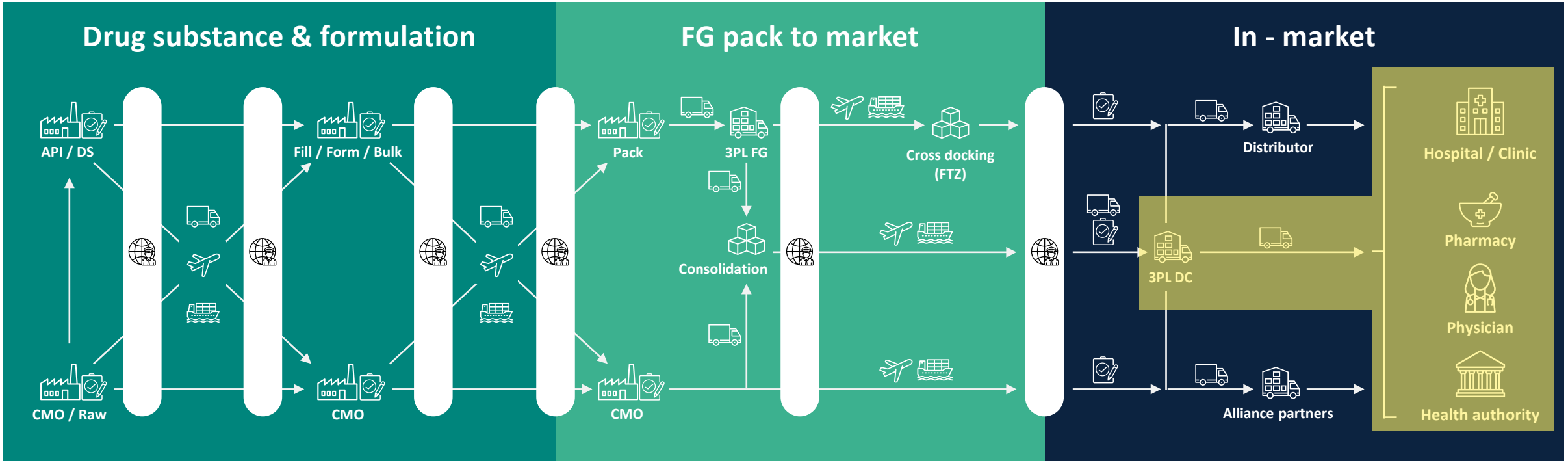

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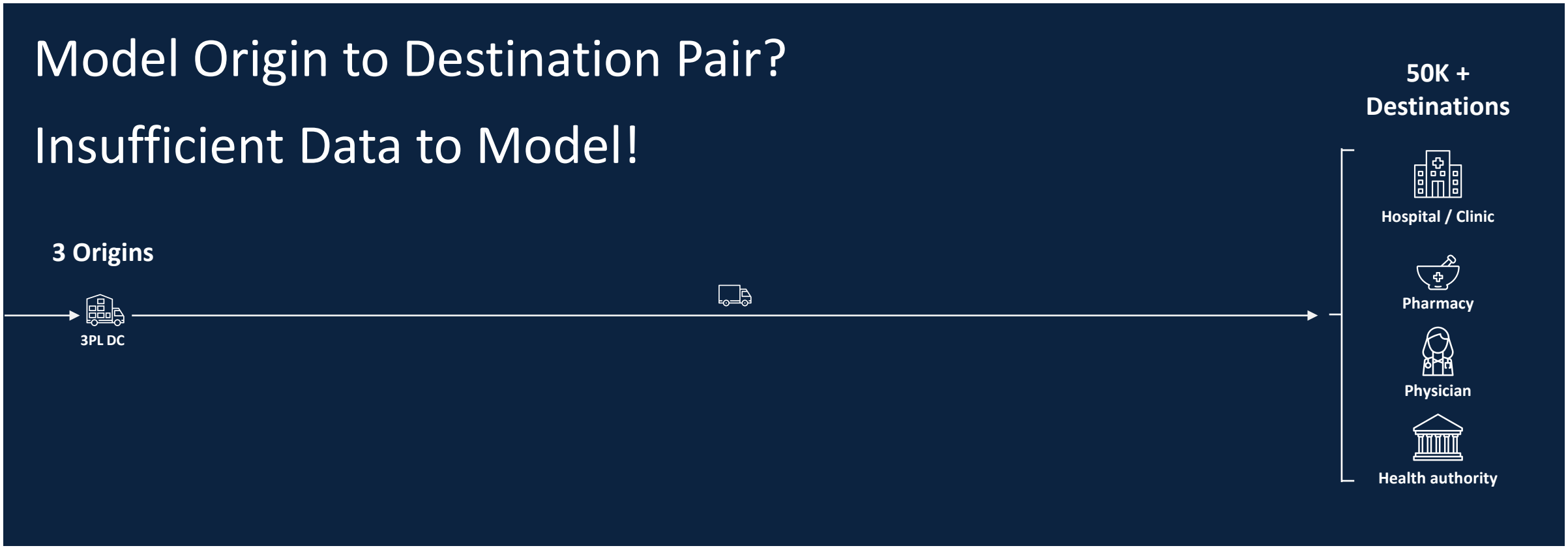
Model Origin to Destination Pair?

Insufficient Data to Model!



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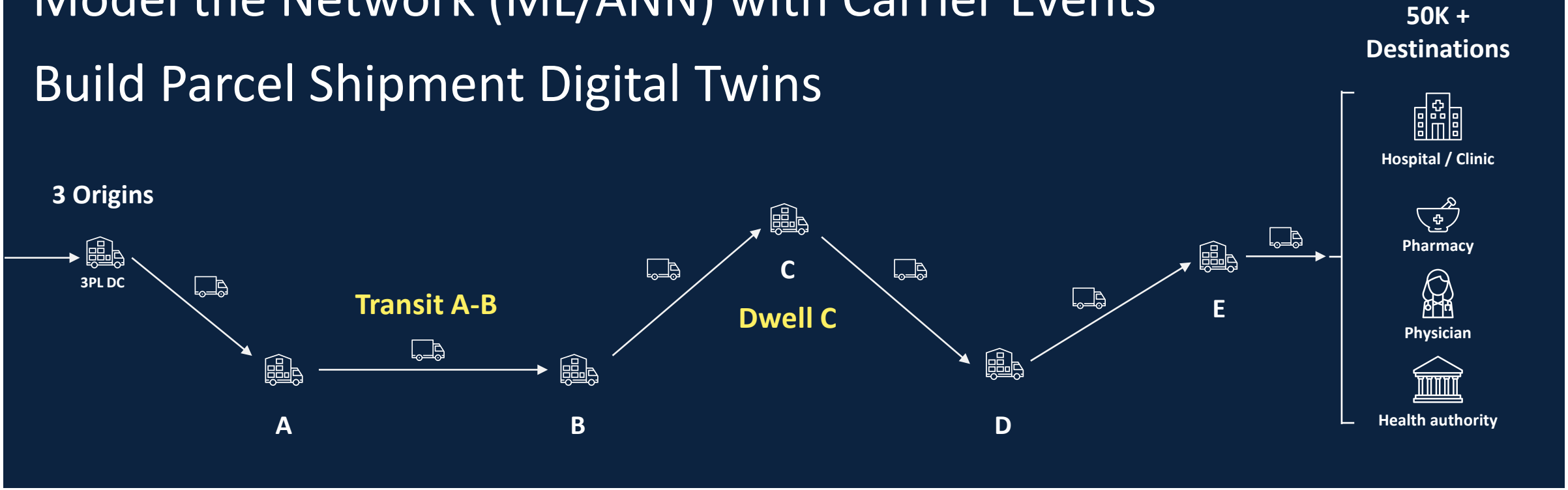
Model the Network (ML/ANN) with Carrier Events

Build Parcel Shipment Digital Twins



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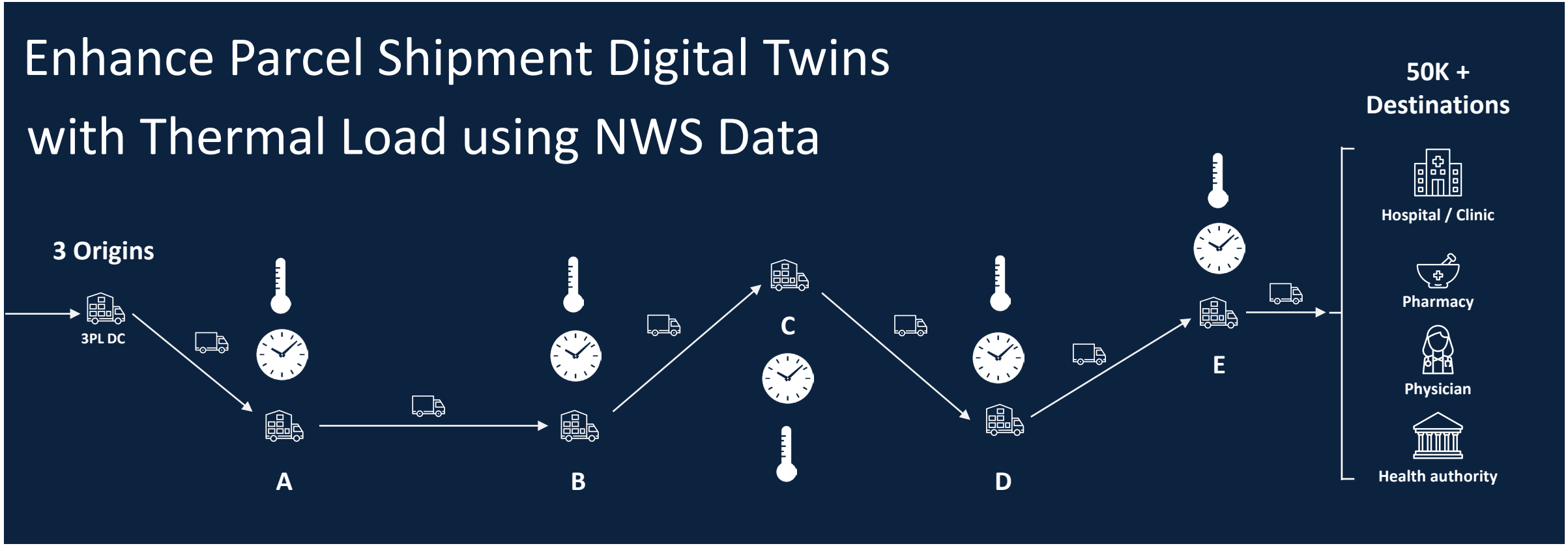

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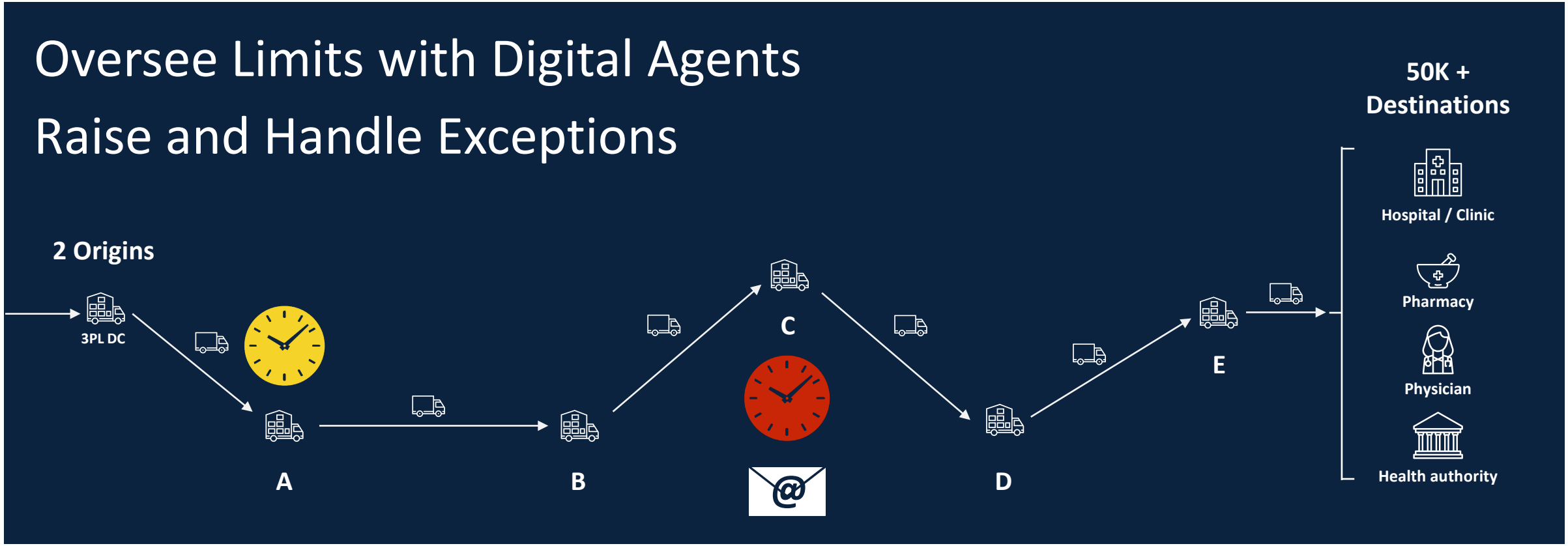

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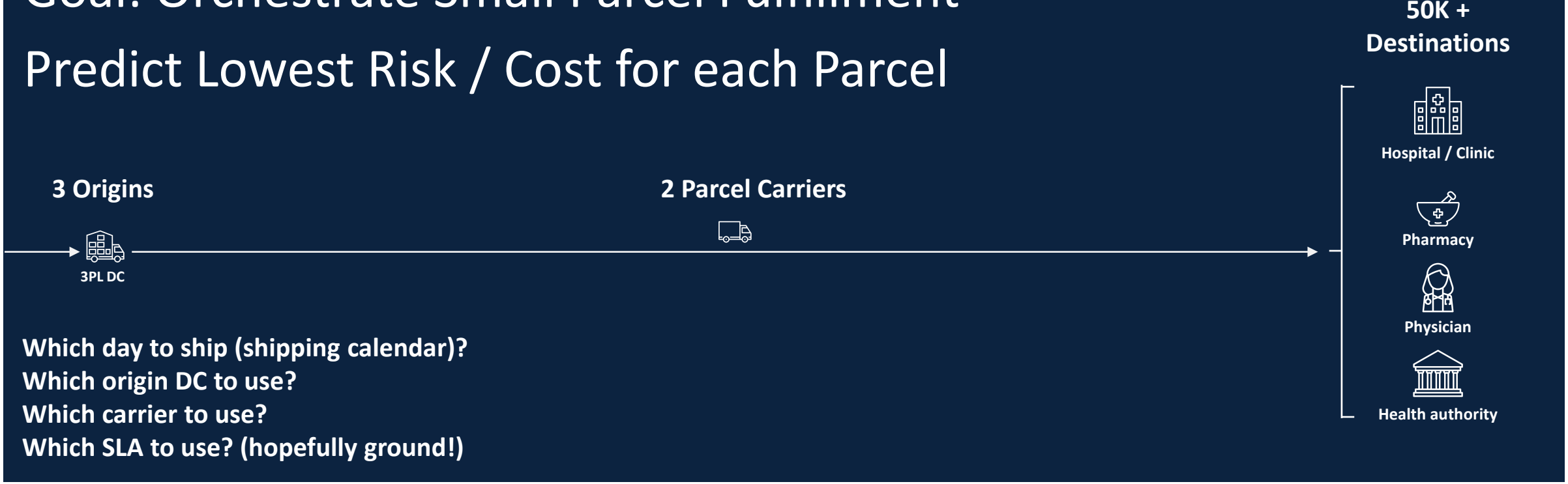
Goal: Orchestrate Small Parcel Fulfillment

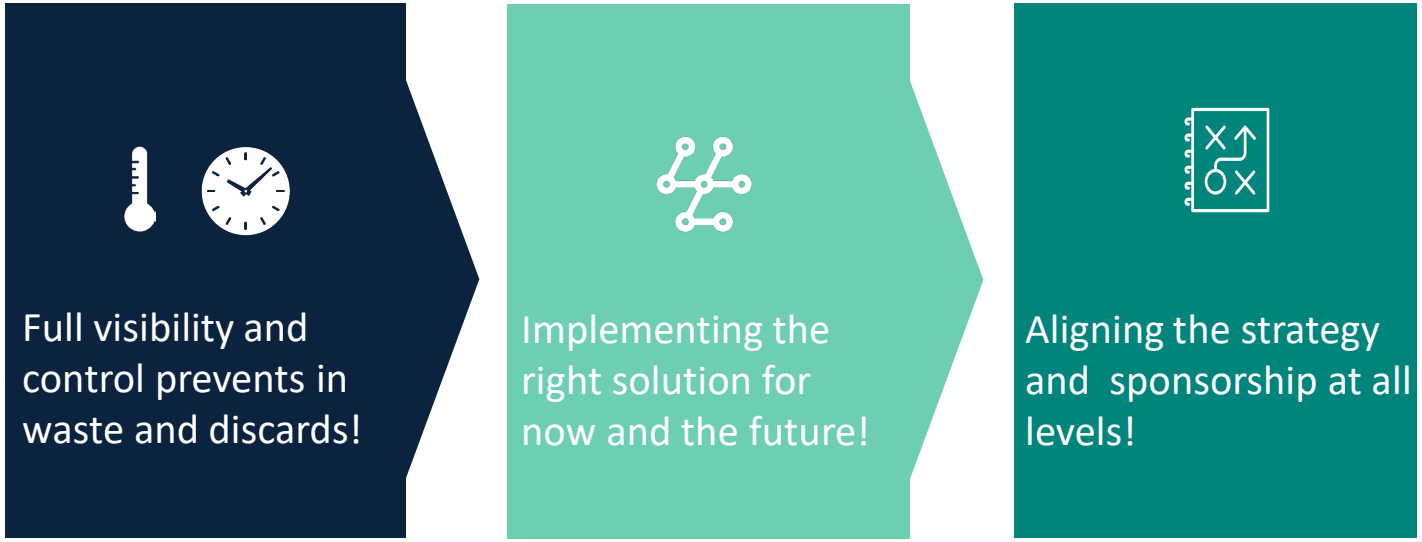
Predict Lowest Risk / Cost for each Parcel



Which day to ship (shipping calendar)?
Which origin DC to use?
Which carrier to use?
Which SLA to use? (hopefully ground!)

Our parcel goal is to never lose a dose *while managing distribution costs*

Visibility and predictability of performance between nodes that enables Merck to control the supply chain and ensure compliance at the best cost



- Choose lowest risk/cost for each parcel
- Automate oversight of every parcel shipment
- Ensure thermal loads are managed
- Automatically raise exceptions for dwells
- Automatically contact carriers to act
- Reduce sustainability impacts (no sensors!)
- Parcel digital twins AND agents (ML & AI)