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Continuous Re-planning with Cross-docks

in OTM Cloud

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Program Agenda

1. Business Context
2. The Challenge
3. Solution Overview
4. Reusing the Approach
5. Q & A

Business Context

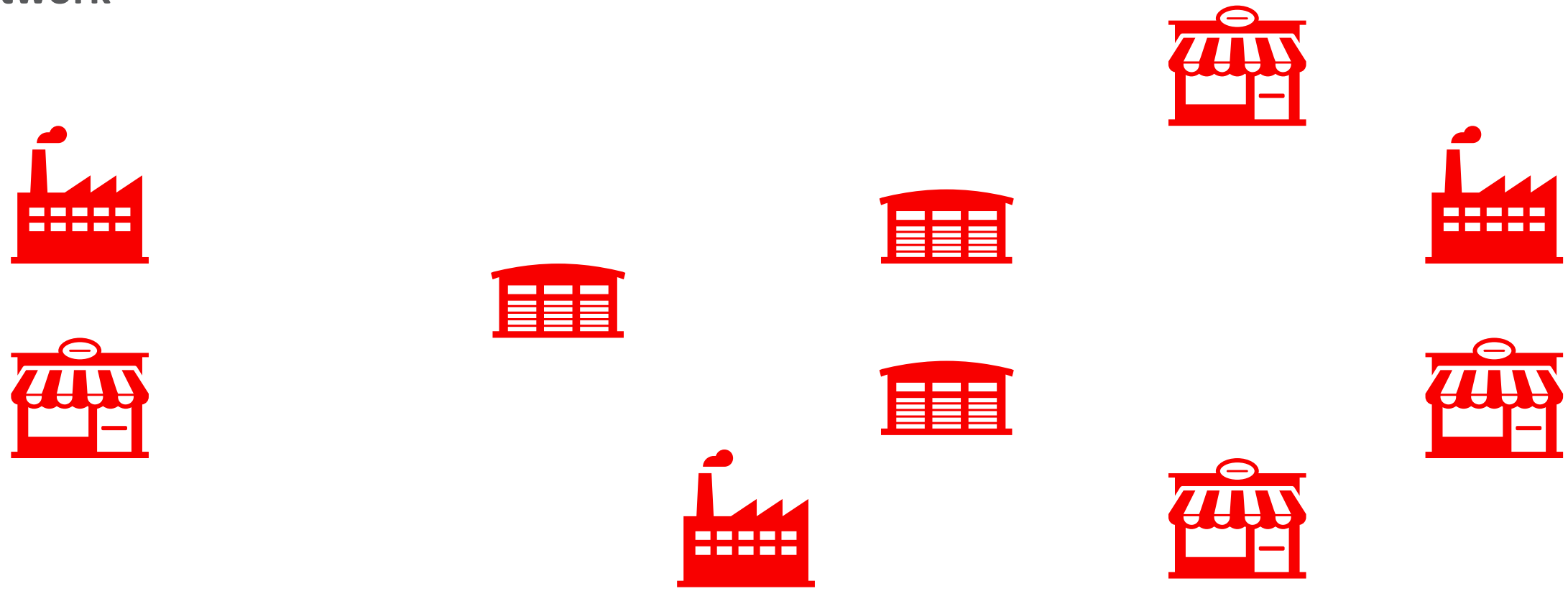
Business Context

Summary

- The Customer will use OTM Cloud to plan transport for their multi-tier retail distribution network with Orders to and from Suppliers, Distribution Centers and Stores
- They will use their Distribution Centers for both storage of goods and as cross-docking locations
- An Order is permitted to cross-dock through multiple DC locations in its routing
- Order routing must be re-evaluated during each planning cycle (multiple cycles per day) and consider consolidation and cross-docking opportunities given the total order volume in the network

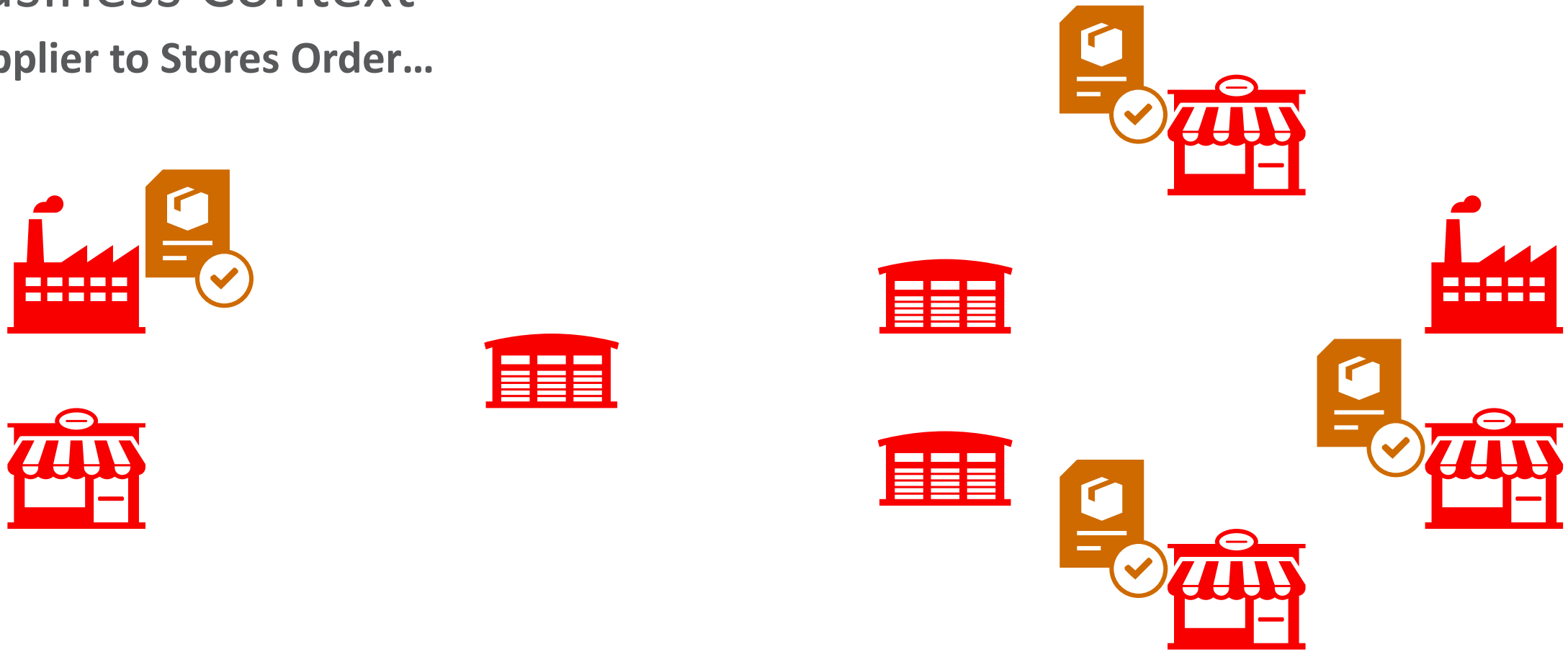
Business Context

Network



Business Context

Supplier to Stores Order…

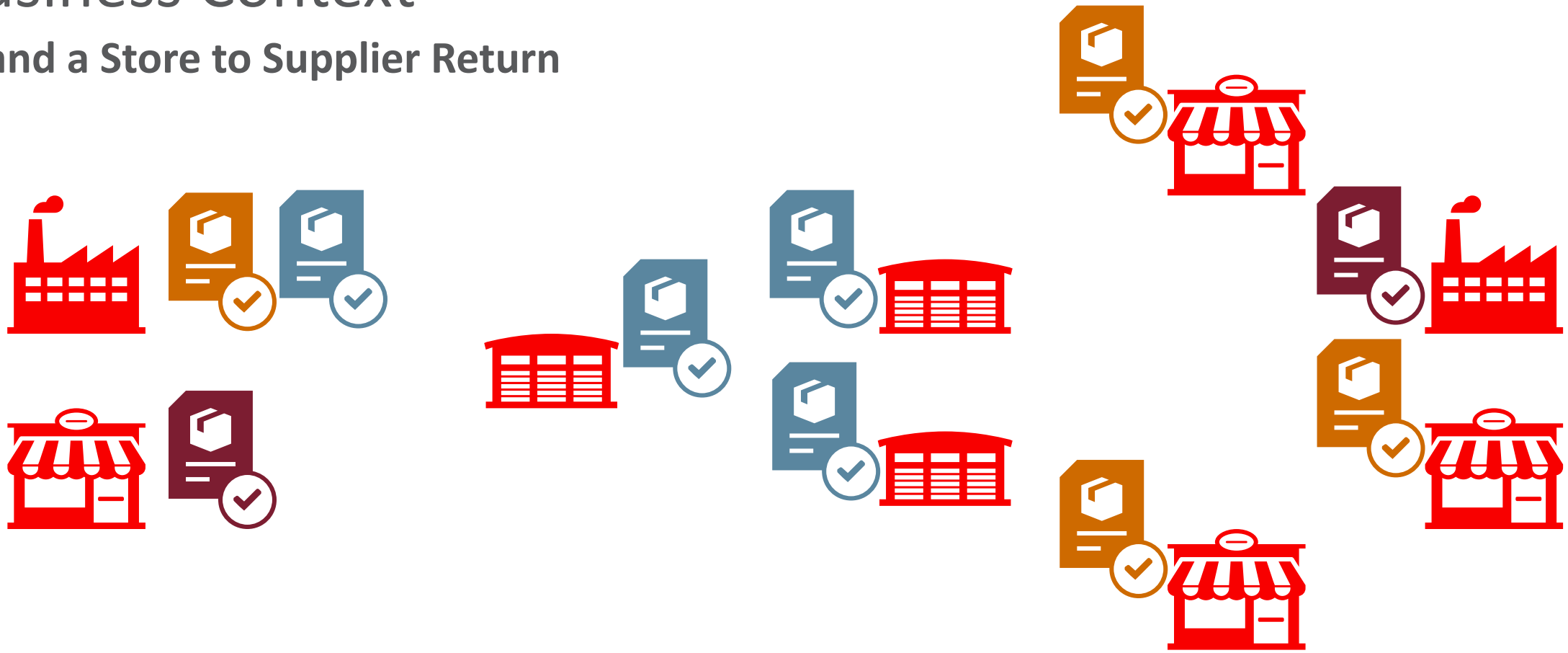


Business Context

… and DC Replenishment Orders…

Business Context

… and a Store to Supplier Return



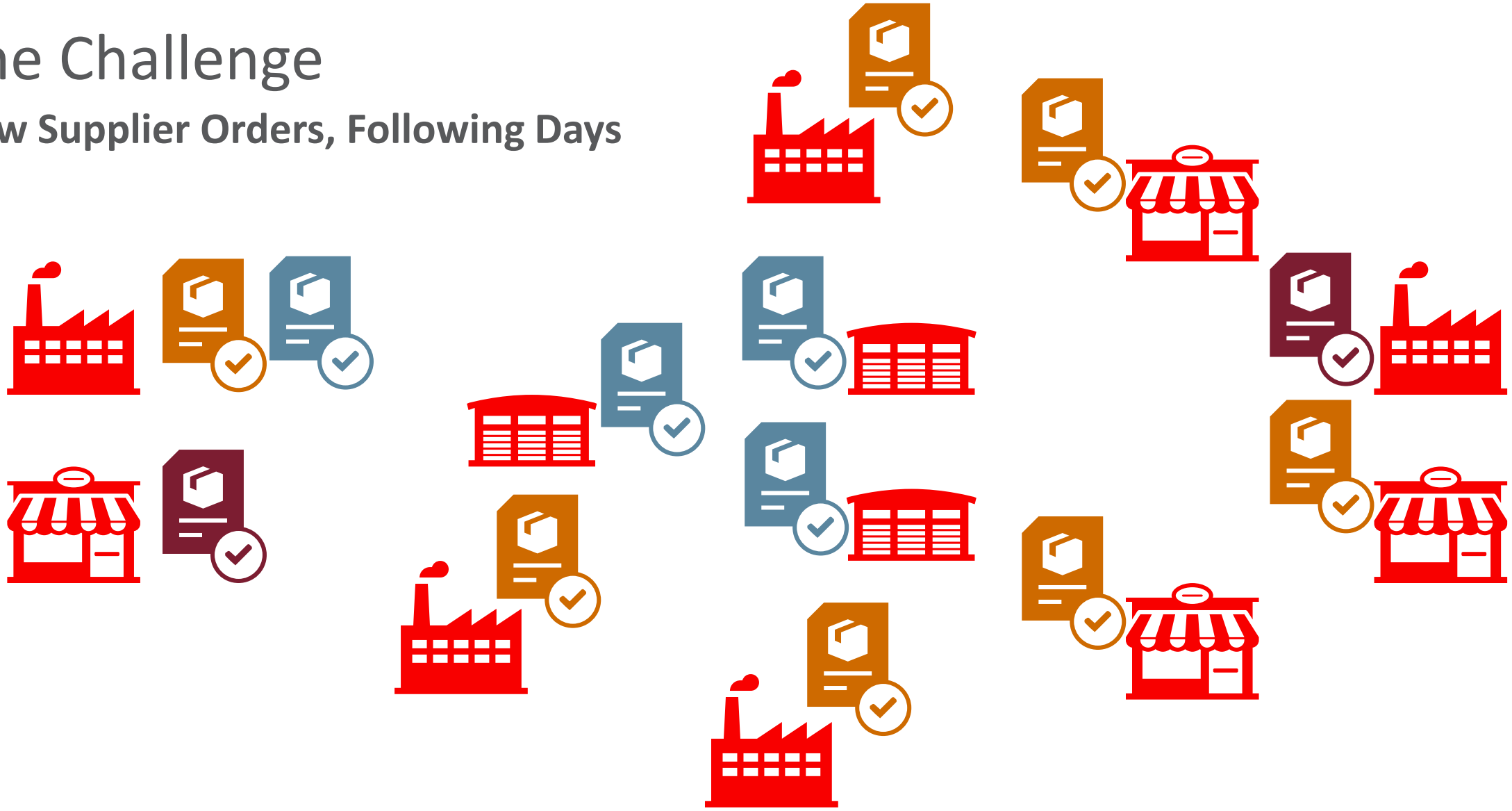
Thought Experiment

- Imagine you are an OTM planning engine
- Visualize the network in your mind
- Contemplate the order scenario just shown
- Using any combination of rate structures and order volumes you'd like, decide that the low-cost transport plan requires cross-docking at multiple DCs

The Challenge

The Challenge

New Supplier Orders, Following Days



Re-Planning Approaches Considered

Two-leg Itineraries with Network on Second Leg

Description	Configuration	Process	Advantages	Disadvantages
Two-leg Itineraries with Network on Second Leg	A two-leg Itinerary is created for each Distribution Center in the Network. The first leg of the itinerary ends at the Distribution Center. The second leg contains a Network having Direct legs (Region->Region) and legs to and from all other Distribution Centers. A single-leg direct Itinerary is also created.	T-0: Network-routing-based Bulk Planning is performed; immediate leg and direct shipments are approved and executed; future leg shipments are deleted T+1D: New Order Releases are bulk planned to Order Movements; new Order Movements are Bulk Planned to Shipments with the Network Routable Order Movements from T-0	Standard workflow; Low Transport Planner effort required; Support for re-planning at a single future stage	Multiple optimizations required; T+1D routing decision (cross-dock vs. direct) does not consider T-0 future leg consolidation opportunities; No support for multiple future stage re-planning

Re-Planning Approaches Considered

Manual Re-Planning

Description	Configuration	Process	Advantages	Disadvantages
Manual Re-Planning	A two-leg Itinerary is created for each Distribution Center in the Network. The first leg of the itinerary ends at the Distribution Center. The second leg contains a Network having Direct legs (Region->Region) and legs to and from all other Distribution Centers. A single-leg direct Itinerary is also created.	T-0: Network-routing-based Bulk Planning is performed; immediate leg and direct shipments are approved and executed; future leg shipments are retained T+1D: New Order Releases are moved to existing future leg shipments where optimal, using the 'Move Order To Existing Shipment – Optimize' User Action, or the 'Insert Order' Automation Agent Action; remaining Order Releases are Bulk Planned to new Shipments	Standard workflow; Support for re-planning at a single future stage	Minimal optimization opportunities evaluated; No support for multiple future stage re-planning; High Transport Planner effort required; Neither optimization action works with Network Routing

Re-Planning Approaches Considered

Future Leg Order Release Generation

Description	Configuration	Process	Advantages	Disadvantages
Future Leg Order Release Generation	A single-leg Itinerary is created for the entire distribution network. The Itinerary leg contains a Network having Direct legs (Region->Region) and legs to and from all Distribution Centers.	T-0: Network-routing-based Bulk Planning is performed; immediate leg and direct shipments are approved and executed; automation workflow (1) generates new Order Releases for future legs and (2) removes the future leg Shipments T+1D: New Order Releases are Bulk Planned with the OTM-generated future leg Order Releases	Support for multiple future stage re-planning; Low Transport Planner effort required; All optimization opportunities evaluated;	Non-standard workflow; Potential performance impact from Order Release generation automation

The Solution

Future Leg Order Release Generation

Workflow Process

- Initiate Order Release to Buy Shipment Bulk Plan (User)
- Raise ‘Bulk Plan – Completed’ Event (System)

- On ‘Bulk Plan – Completed’
- For Each: Future Leg Shipment, Raise Custom SHIPMENT-type Event

- On Custom Event defined in Agent #1
- Direct SQL Update to Restrict Re-Planning of Related Order Movements
- Delete Shipment

- On Immediate Leg Shipment Approved for Execution
- Send PlannedShipment Integration to Own-System Integration Servlet Using XSLT To Create Individual GLogXMLElement’s for Each Release with Destination Location not a Delivery Stop
- XSLT will generate a new Order Release ID
- XSLT will change Early Pickup Date to equal Immediate Leg Shipment Delivery Departure and change Source Location to equal the Immediate Leg Shipment Delivery Location

- New Order Releases and System-Generated Future Leg Order Releases Bulk Planned Together onto Buy Shipments (User)
- Raise ‘Bulk Plan – Completed’ Event (System)
- Repeat cycle of Automation Agents #1, #2 and #3

Future Leg Order Release Generation

Things we do to the PlannedShipment with the stylesheet

- Filter for only Release elements which continue through the cross-dock
- Replace the Release Source Location with the corresponding Delivery Shipment Stop Location
- Replace the Release Early Pickup Date with the corresponding Delivery Stop Departure Date-time
- Prefix Release, Ship Unit and Line XIDs with the Shipment XID
- Replace Release Ship Units with Shipment Ship Units
- Remove a lot of unwanted/incompatible Release and Ship Unit elements

Future Leg Order Release Generation

Strengths

- Enables unlimited stage planning
- All planning from Order Releases
- Same workflow for Actuals updates
- No manual processes for end-users

Weaknesses

- Loss of native re-drive downstream functionalities
- Custom code required in XSL(T)
- Multiplication of Order Releases may impact other processes in an existing solution (cost allocation, reporting, etc.)

Reusing the Approach

Other Potential Use Cases

- Multi-tier International Inbound Planning
  - Middle-East retail group example
- Automatic, Template-based Order Release Generation
  - AgentService request or Scheduled Process for Order Release generation
- Automatic Empty Packaging Order Release Generation
  - User-initiated generation of empty packaging return Order Releases

Q & A

Integrated Cloud

Applications & Platform Services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