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Design Your Supply Chain Run with Digital Twin

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Workshop Agenda

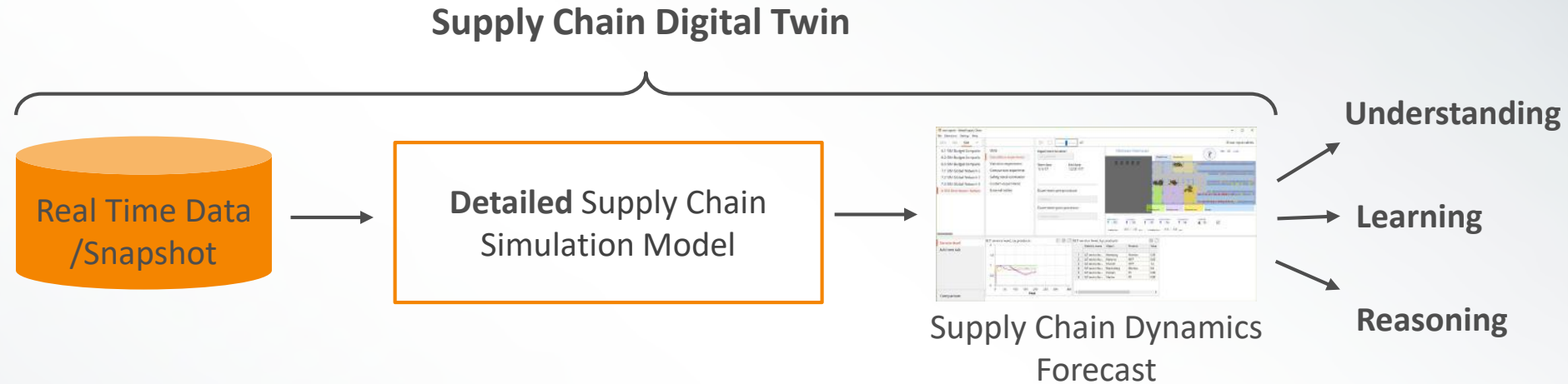Supply Chain Digital Twin with anyLogistix

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Q&A

What is a Digital Twin

- Definition by Gartner:
  - A **digital twin** is a digital representation of a real-world entity or system

- Some definitions from Wikipedia:
  - A Digital Twin is an integrated multiphysics, multiscale, probabilistic simulation of an as-built **vehicle** or system that uses the best available physical models, sensor updates, fleet history, etc., to mirror the life of its corresponding flying twin
  - Coupled model of the **real machine** that operates in the cloud platform and simulates the health condition with an integrated knowledge from both data driven analytical algorithms as well as other available physical knowledge
  - A dynamic virtual representation of a **physical object or system** across its lifecycle, using real-time data to enable understanding, learning and reasoning
  - ...

- The words most often used to describe a Digital Twin
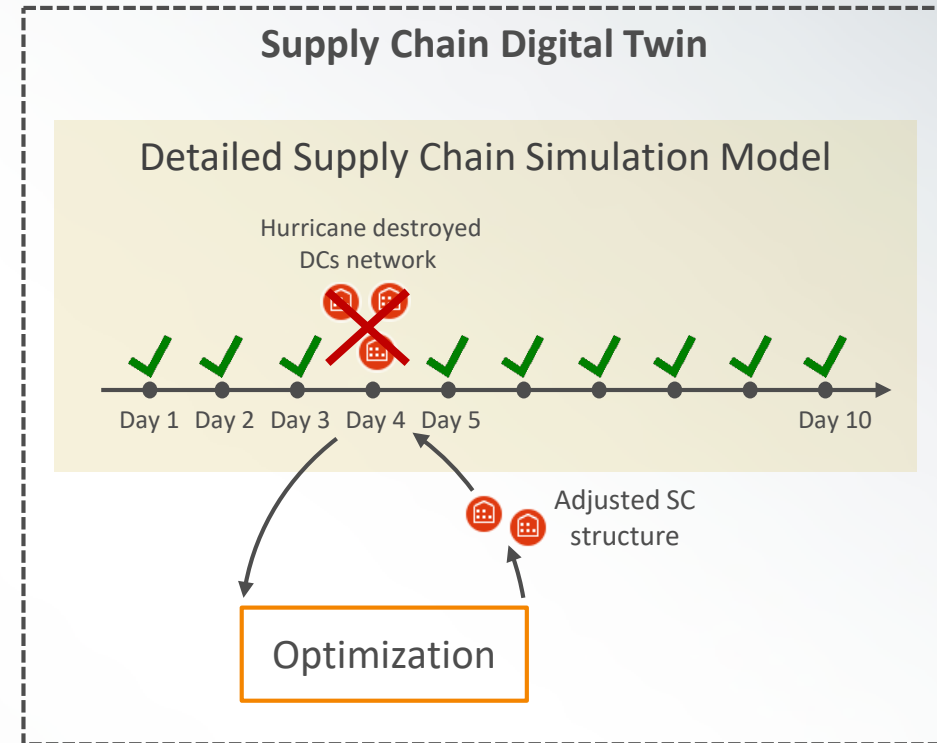 - Simulation, real-time data, dynamic, understanding, learning, reasoning

A Digital Twin in Supply Chain

Supply Chain Digital Twin

Real Time Data /Snapshot → **Detailed** Supply Chain Simulation Model → Supply Chain Dynamics Forecast → Understanding, Learning, Reasoning

- A supply chain digital twin is a detailed simulation model of an actual supply chain which predicts the behavior and dynamics of a supply chain to make mid-term/short-term decisions:
  - **Mid-term decisions** are mostly related to how a supply chain should work i.e. supply chain processes/resources/ logic. It may require you to simulate a **few months** of operations.
  - **Short-term decisions** are mostly related to the identification of problems and the analysis of solutions. It may require the simulation of a **few days or weeks**.

Digital Twin: Is There a Space for Optimization

- Optimization, analytics, and AI can be part of a digital twin

- Optimization, analytics, and AI can be used by a simulation model to make decisions in certain situations

- Simulation is used to forecast the dynamics of a supply chain

Supply Chain Digital Twin

Detailed Supply Chain Simulation Model

Hurricane destroyed DCs network

Day 1 Day 2 Day 3 Day 4 Day 5   Day 10

Adjusted SC structure

Optimization

What Makes a Supply Chain Simulation Model a Digital Twin

- A digital twin is a detailed simulation model of a supply chain
  - A digital twin should be able to predict the behavior of a supply chain

- Integration with IT infrastructure
  - In many cases a digital twin is part of a "bigger thing" e.g. a control tower, and should be able to integrate with its surrounding IT environment

- Test an action plan
  - A digital twin should allow you to test actions to efficiently manage your supply chain
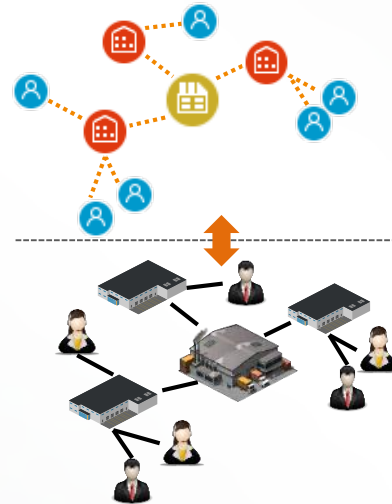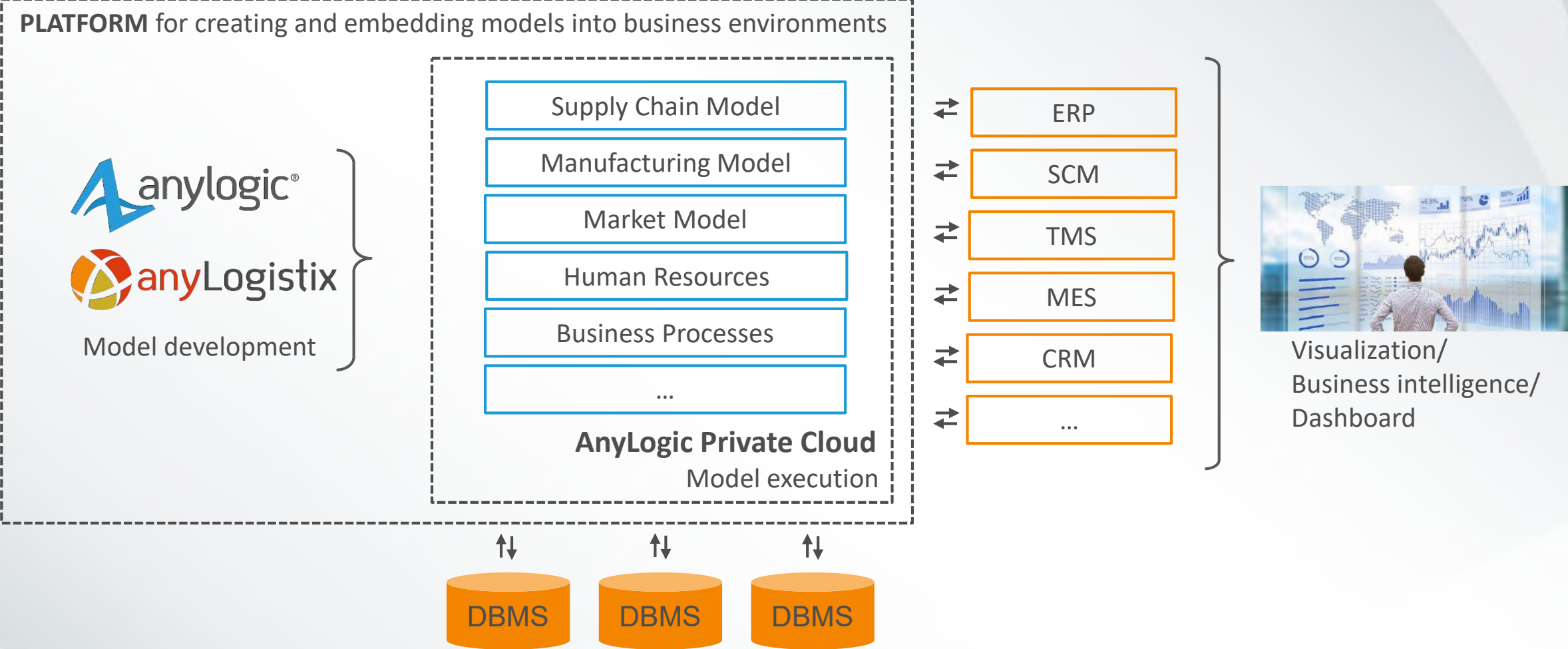
- Real Time Data/Snapshot
  - A digital twin uses real time data to make forecasts

- Notifications/alarms/alerts about abnormal situations
  - A digital twin should allow you to define what abnormal behaviour is and send notifications about critical/abnormal situations

- Triggers
  - A digital twin should allow the definition of automatic actions for some events

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PLATFORM for creating and embedding models into business environments

anylogic®

anyLogistix

Model development

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- Supply Chain Model
- Manufacturing Model
- Market Model
- Human Resources
- Business Processes
- ...

Model execution

- ERP
- SCM
- TMS
- MES
- CRM
- ...

Visualization/
Business intelligence/
Dashboard

DBMS DBMS DBMS

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Example: Control Tower

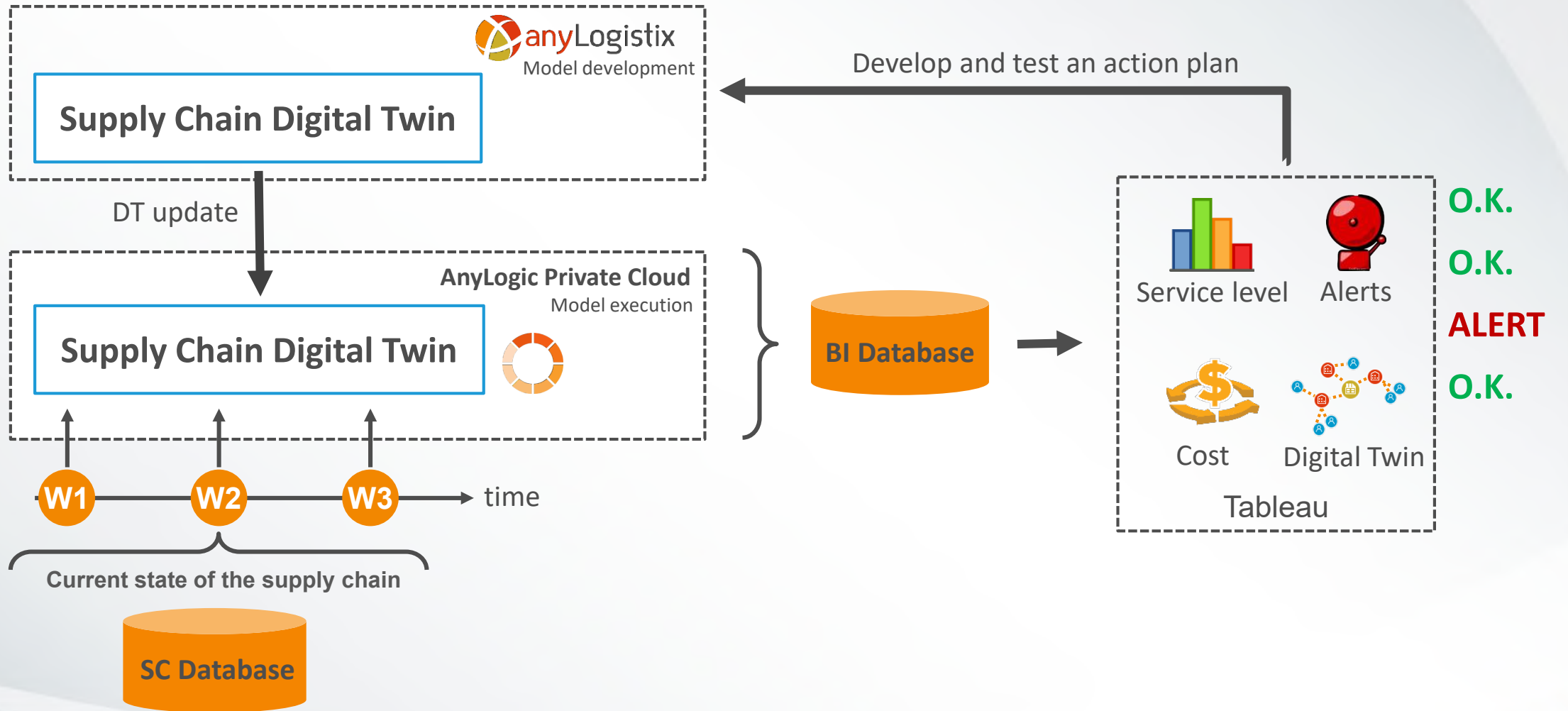- A control tower –

  a central hub with the necessary technology, organization and processes for capturing and using data to provide enhanced visibility for short-, mid- and long-term decision-making, in alignment with company objectives.

Control Tower

Visualization/Business Intelligence/Dashboard

Current state of the supply chain	Supply Chain Digital Twin	Tasks
Current state of facilities	Manufacturing Digital Twin	Cases
Finances	Analytics	Actions
…	…	Collaboration
		…

| Current State/ History | Decision Support/ Forecast | Task and Case Management |

Data

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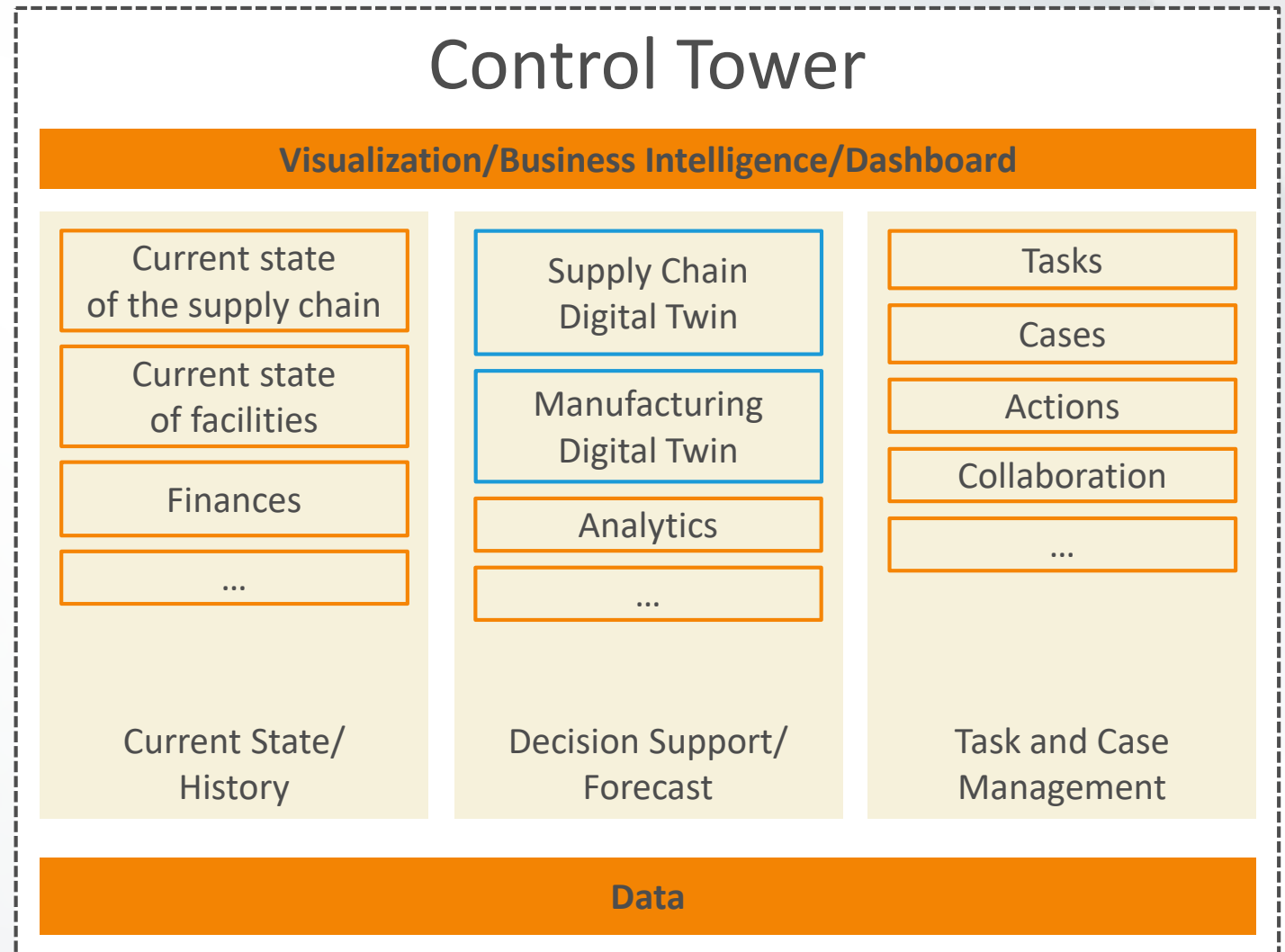
DEMO: Supply Chain Digital Twin

Demo Configuration

AnyLogic Private Cloud

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