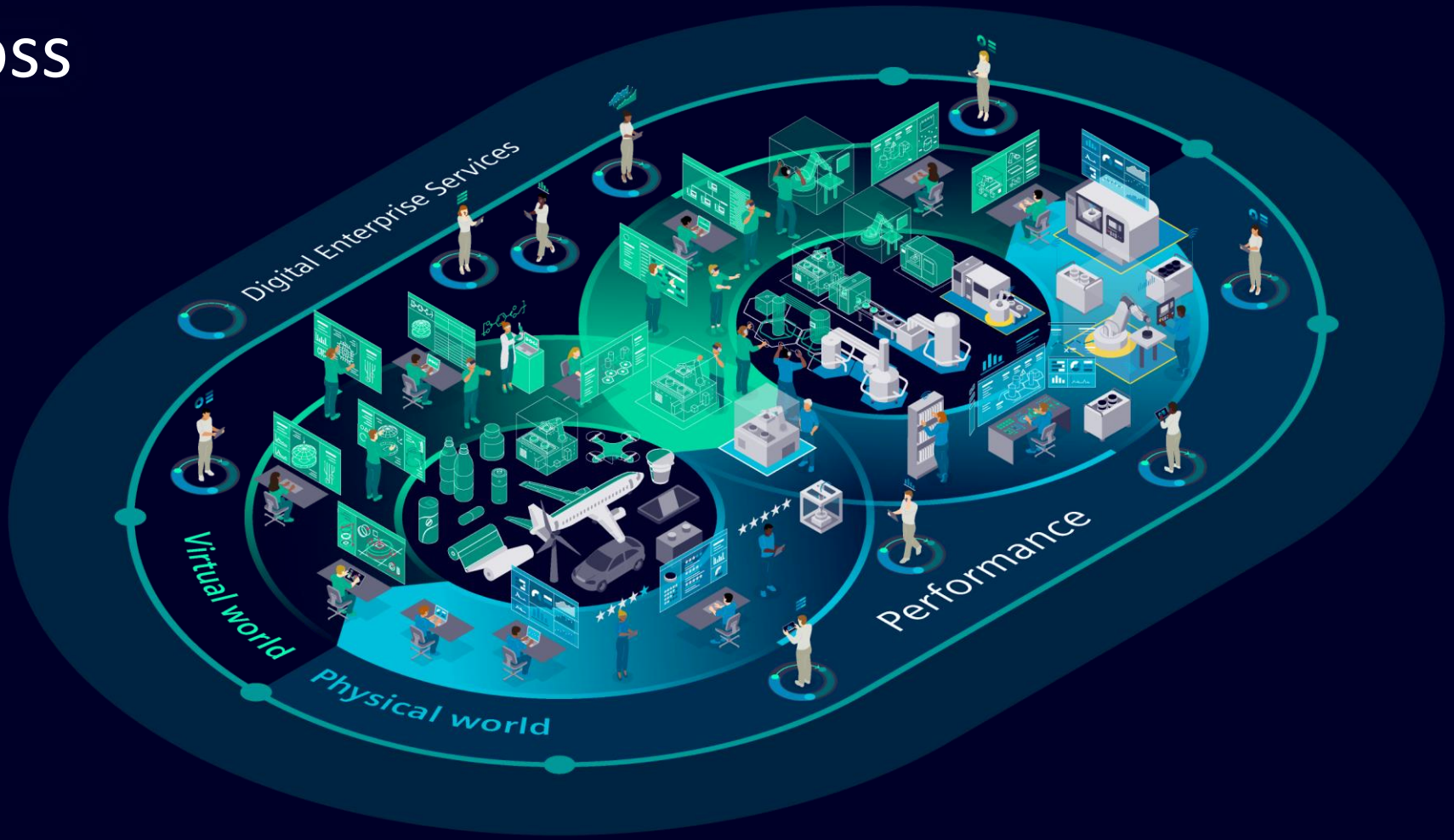
Jumpstart Digitalization Across the Value Chain

Start



SIEMENS

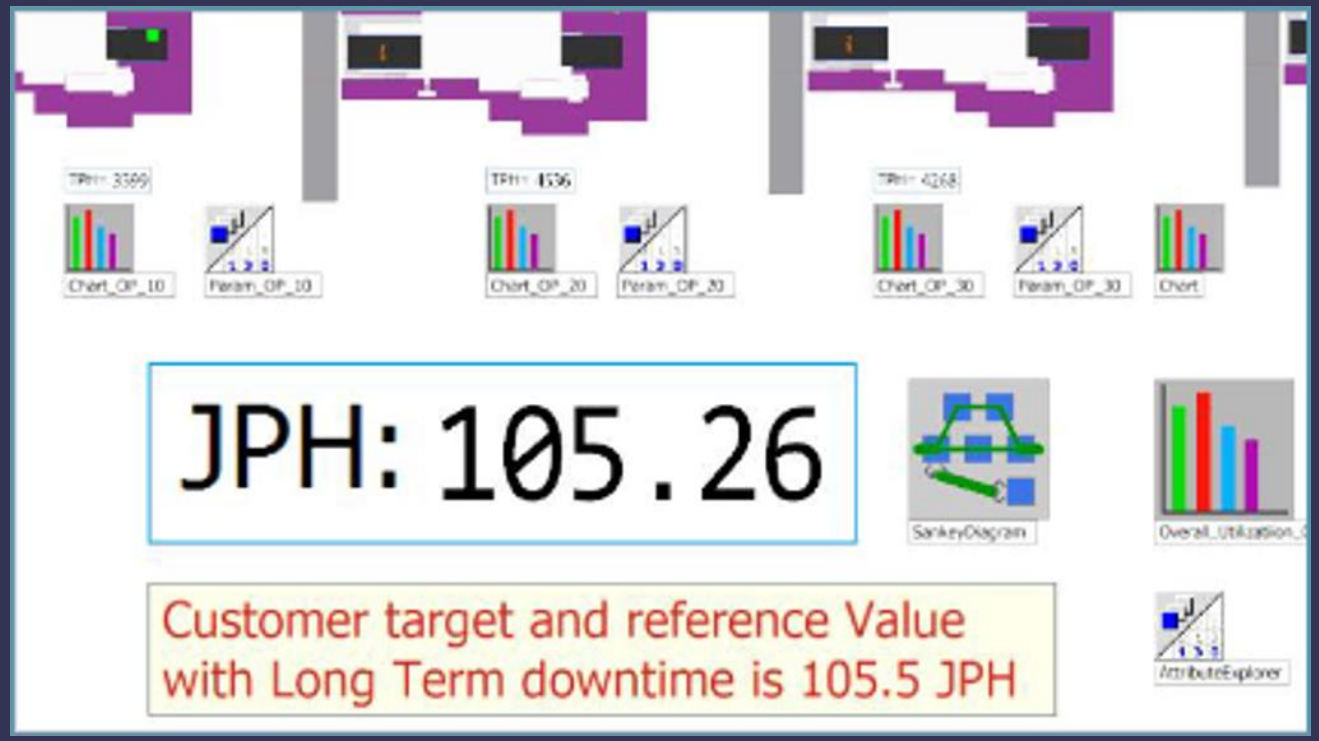
Challenges

- How to modify existing plants fast and efficiently?
- How to validate plant design changes before implementation?
- How to integrate new innovative technologies and processes for new products?
- How to minimize time required to add new process units or a completely new line?

Solution – Siemens Digital Twin Methodologies

The Siemens digital twin methodology enables precise insight for optimizing parameters which in turn **will maintain manufacturing KPIs.**

Solution – Siemens Digital Twin Methodologies



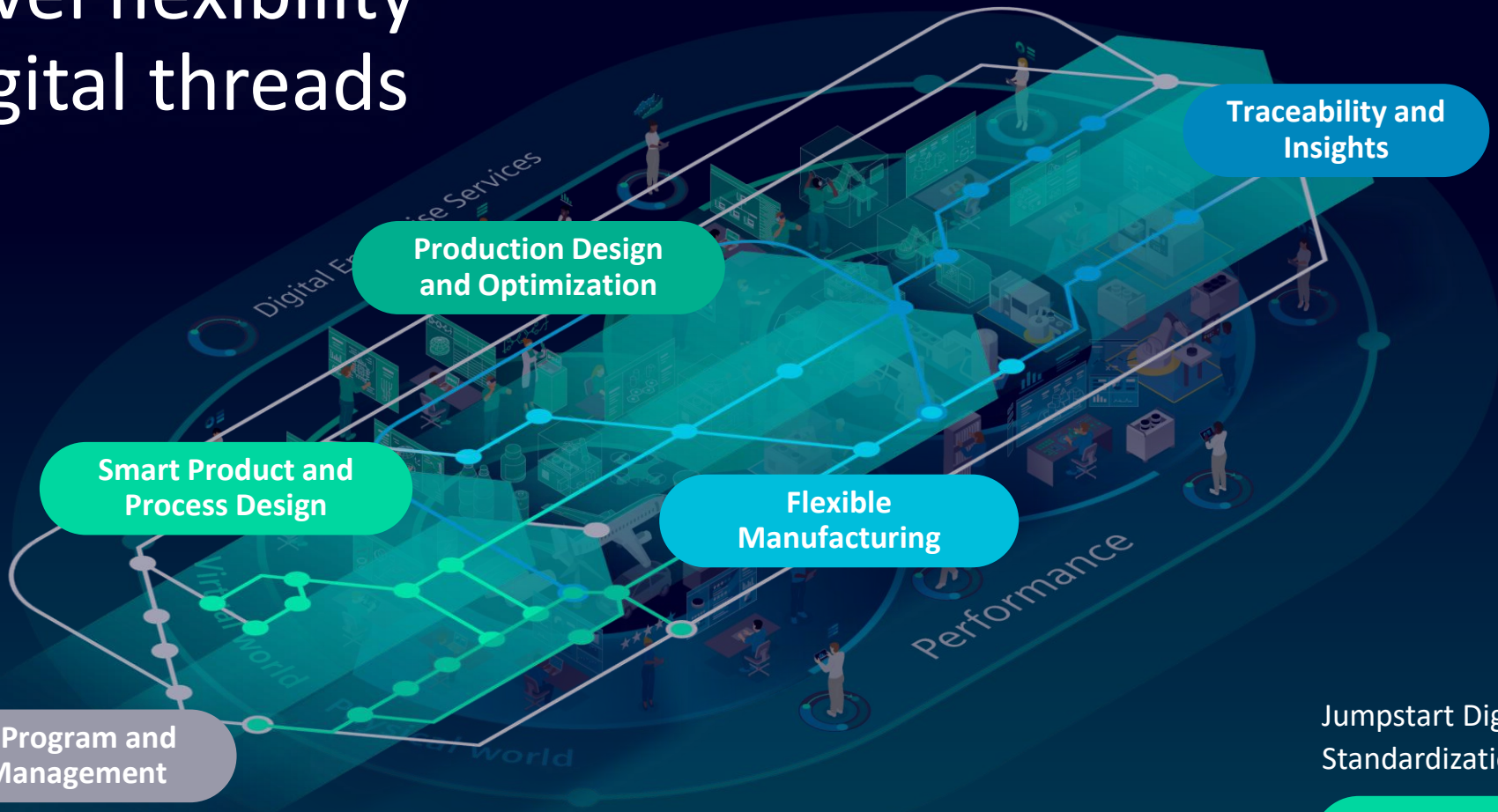
Where is the proof?

Simulation project with high expectations for precision and accuracy

- Customer project was for a high-volume production line – 75 machines, 25 pick & place robots, conveyor belts, complex material handling, and exact downtime parameters
- Simulation meets reality with **99.77% accuracy**

DIGITAL ENTERPRISE

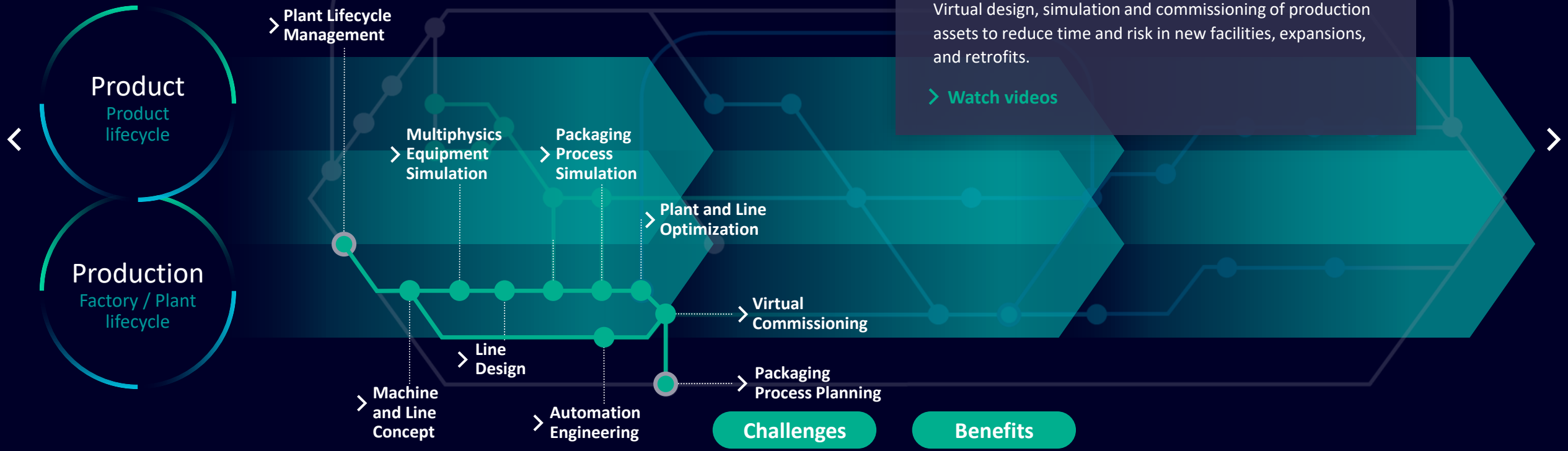
Next level flexibility with digital threads



Jumpstart Digitalization with Standardization and simulation

Standards & Functional Specifications

Digital thread
Production Design and Optimization



Production Design and Optimization

Virtual design, simulation and commissioning of production assets to reduce time and risk in new facilities, expansions, and retrofits.

Watch videos

Challenges

How to modify existing plants fast and efficiently?

How to integrate new innovative technologies and processes for new products?

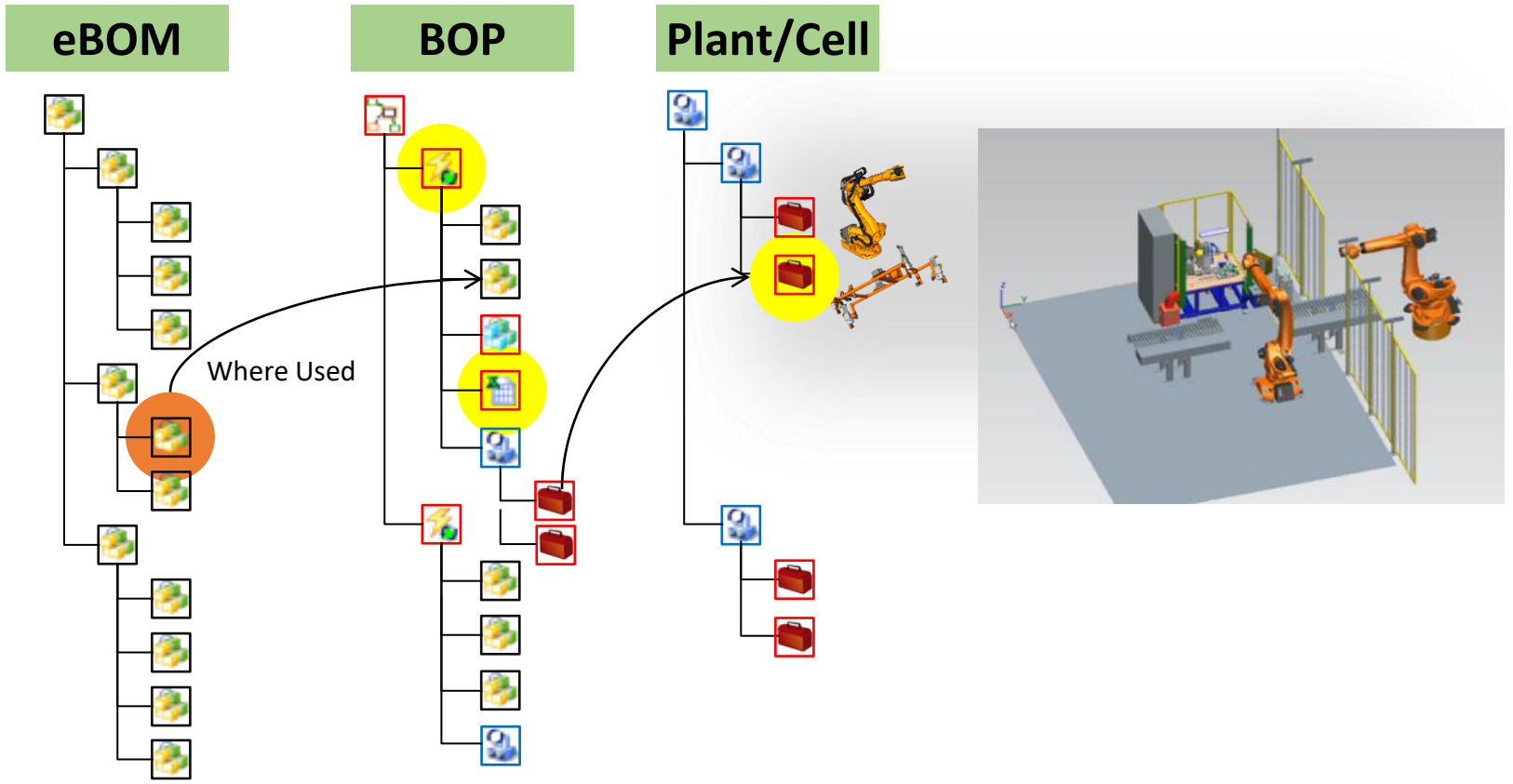
How to minimize time required to add new process units?

How to keep plant design data consistent and up to date?

How to enable effective collaboration between engineering disciplines?

How to validate plant design changes?

Benefits



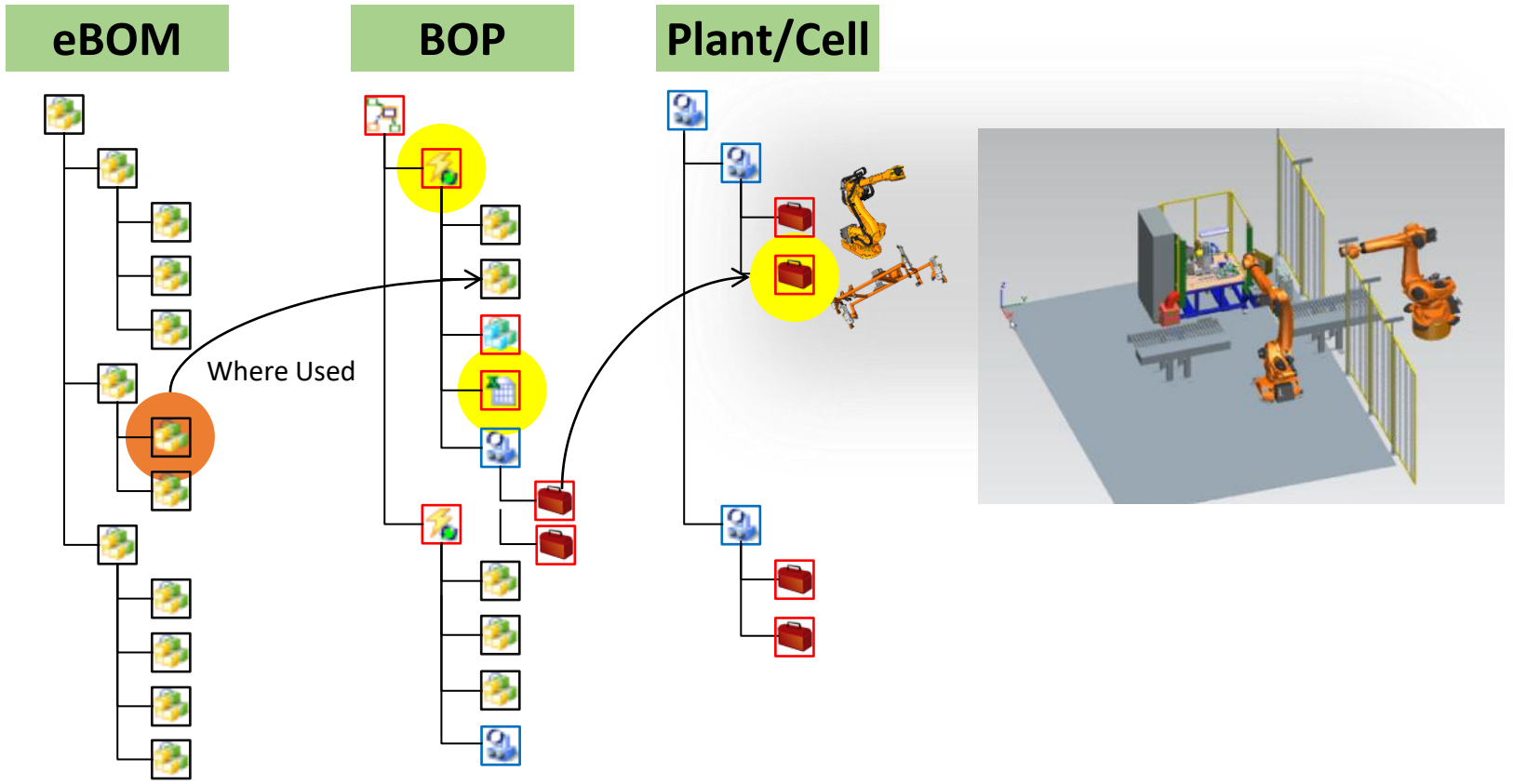
Production Design and Optimization

Plant Lifecycle Management

Centrally manage plant changes

Management of capital assets and production changes in the collaboration platform to maximize investments and maintain visibility of production facilities. Visualize all relevant engineering information while initiating required engineering tasks.

Teamcenter



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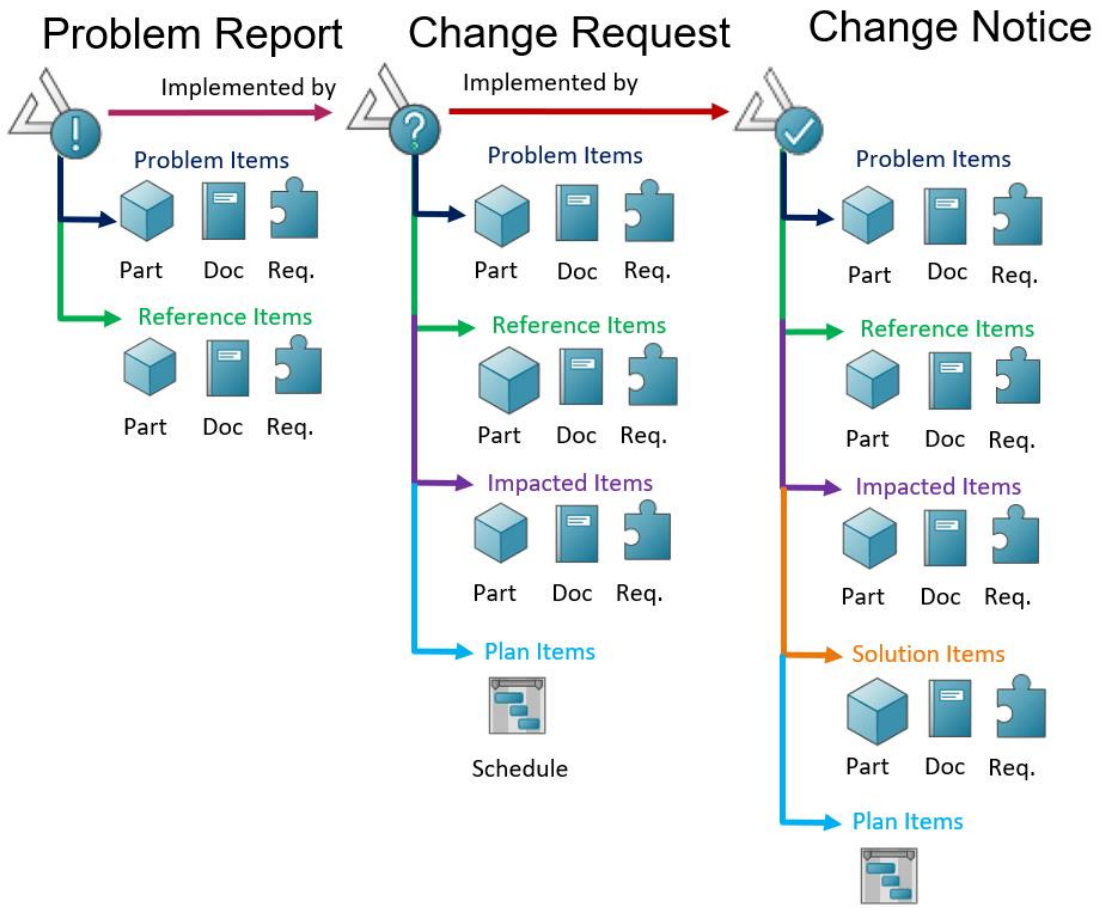


Production Design and Optimization

Plant Lifecycle Management

Centrally manage plant changes

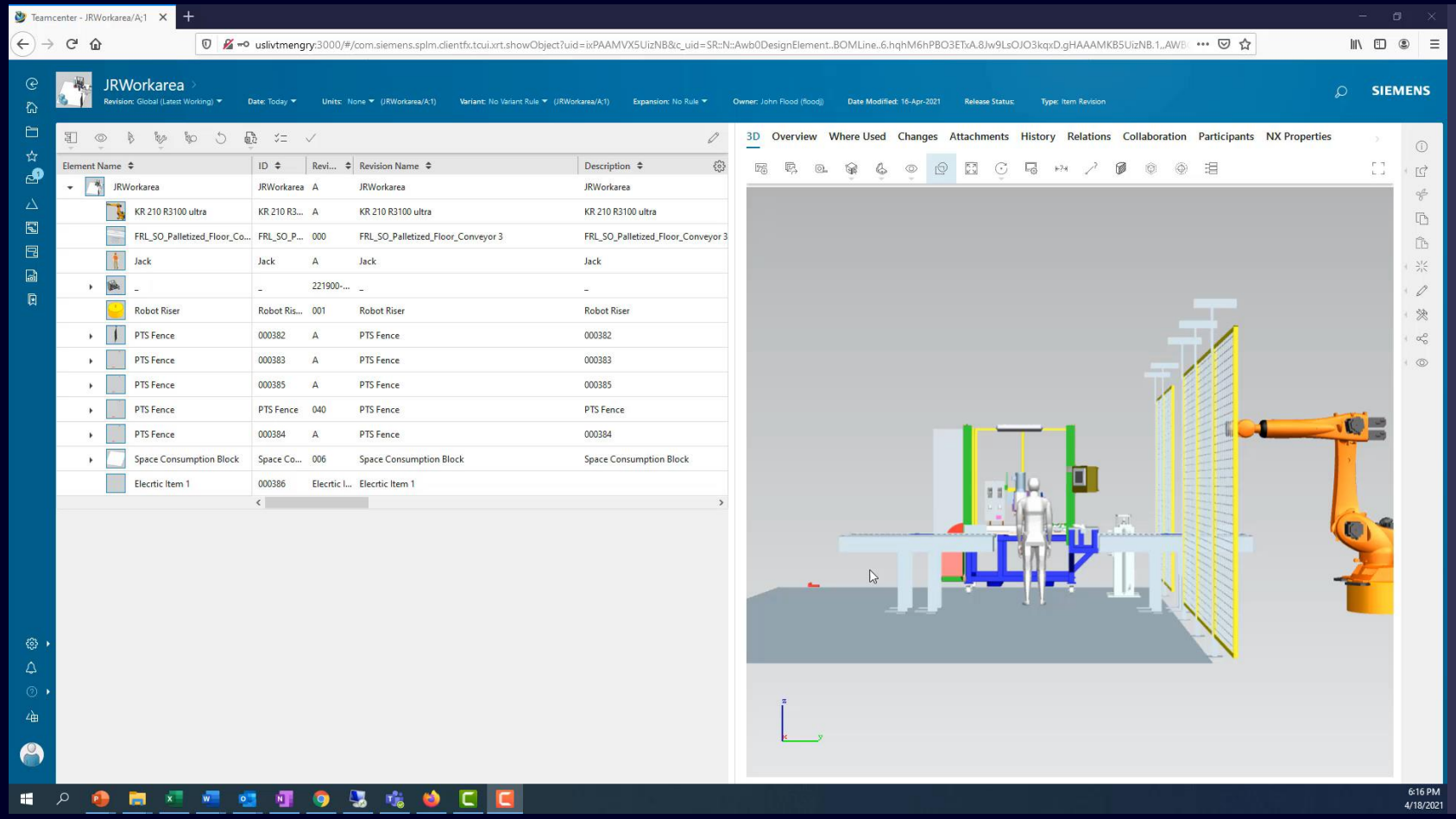
Problem Items are the items causing the change

Impacted Items are the old revision of items being revised or replaced

Solution Items are new revisions of content that are to be released by the Change

Plan Items contains schedules that define tasks in a work breakdown structure

Implements/Implemented by contains change objects referenced by the change



Production Design and Optimization

Plant Lifecycle Management

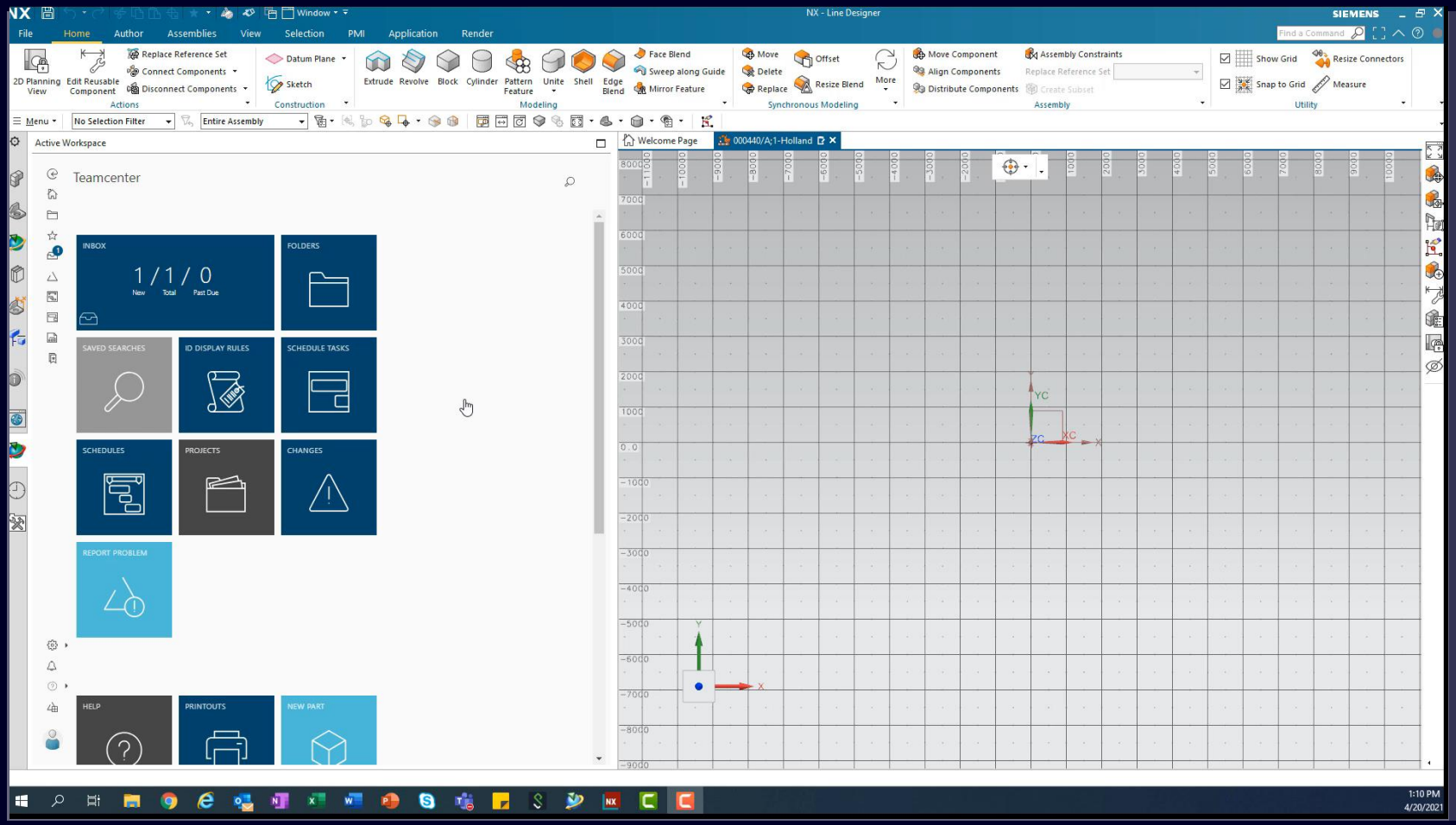
Centrally manage plant changes

Propagation of an engineering change through different models:

Example: Change the location of a robot or conveyor in the simulation, and see the change propagate to all other representations.

Create an engineering change request and change notice, and see how all affected people get notifications/approvals of the change.

Teamcenter as collaboration backbone



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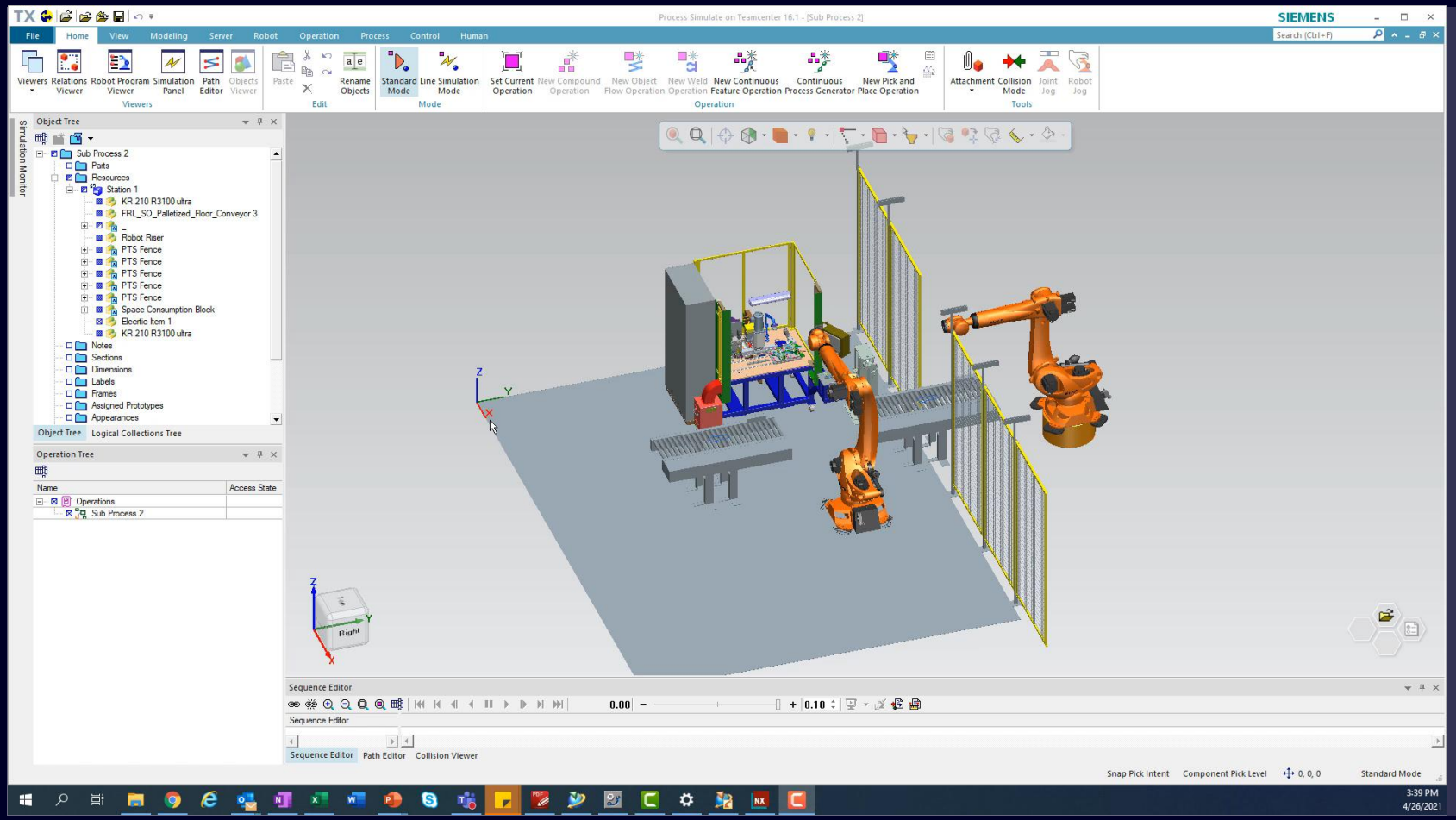
Teamcenter as collaboration backbone

Plant Lifecycle Management · Machine and Line Concept · Multiphysics Equipment Simulation · Line Design · Recipe Simulation · Packaging Process Simulation · Plant and Line Optimization · Automation Engineering · Virtual Commissioning · Plant Lifecycle Management



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Teamcenter as collaboration backbone

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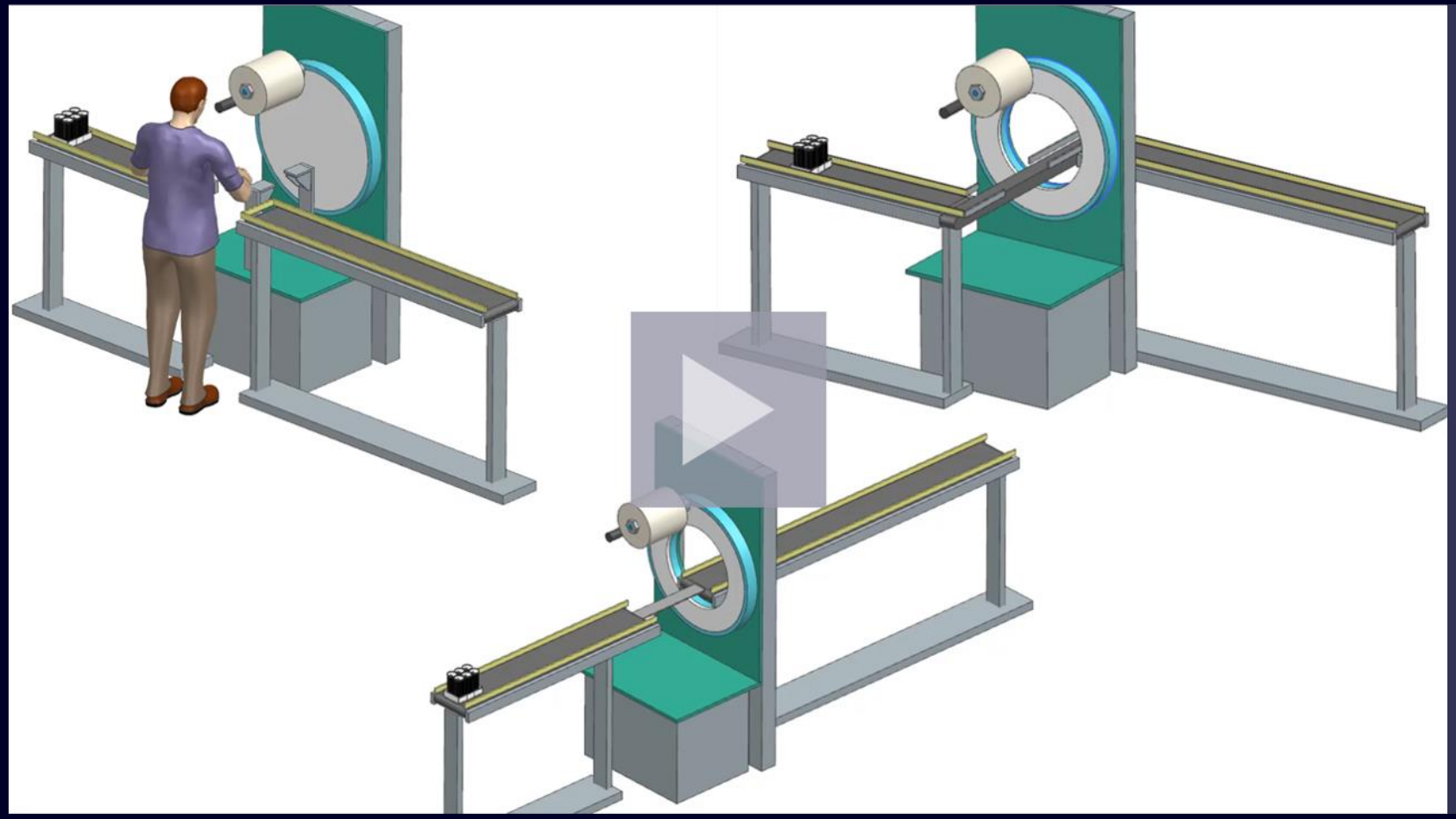


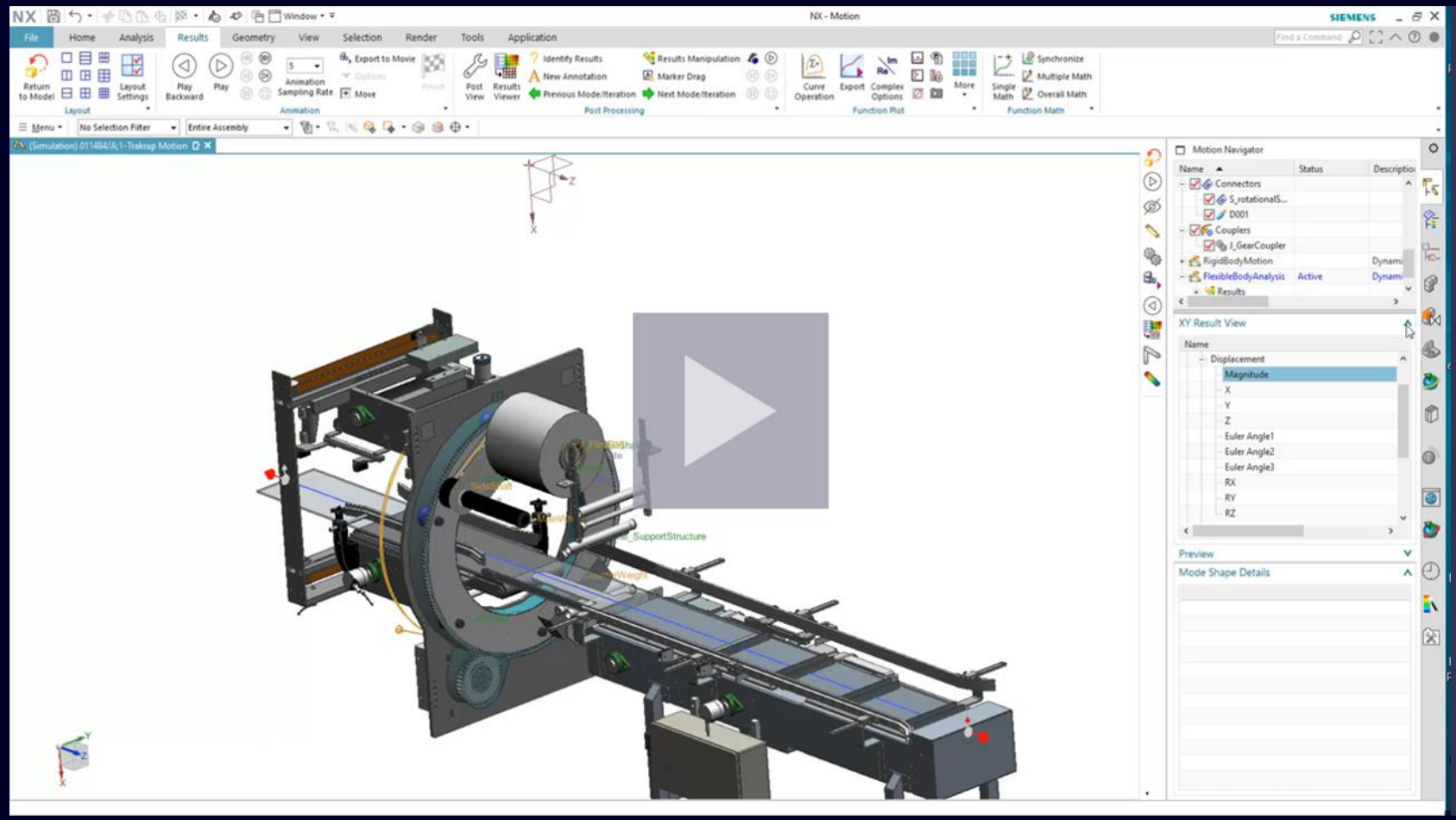
Production Design and Optimization

Machine and Line Concept

Evaluate equipment concepts

Physics-based simulation of machines to design and validate alternative machine concepts for specific requirements. Evaluate various options and select the best fitting machine for the required operations.

NX MCD



Production Design and Optimization

Multiphysics Equipment Simulation

Validate and optimize packaging equipment

Multiphysics simulation to validate packaging equipment and optimize operation for best performance of the equipment.

Simcenter3D

Plant Lifecycle Management
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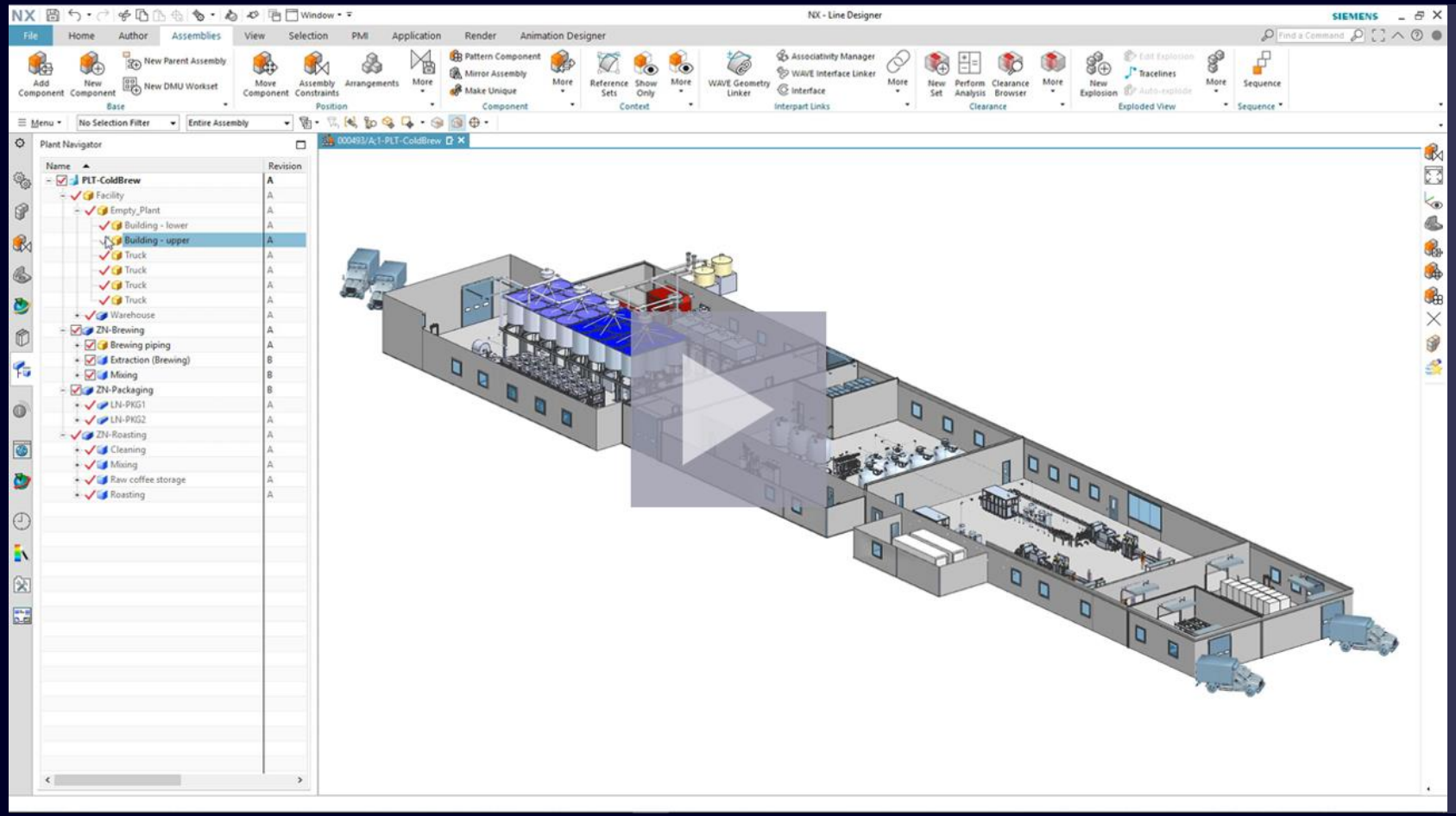

Production Design and Optimization

Line Design

3D design of new plant expansion

Evaluate design options and discover the optimal layouts for process plants and production lines from initial plant layout to full 3D environment definition. Easily drag and drop equipment from the re-use library and maintain the latest 3D model and hierarchy in the collaboration platform to use across the enterprise.

NX Line Designer

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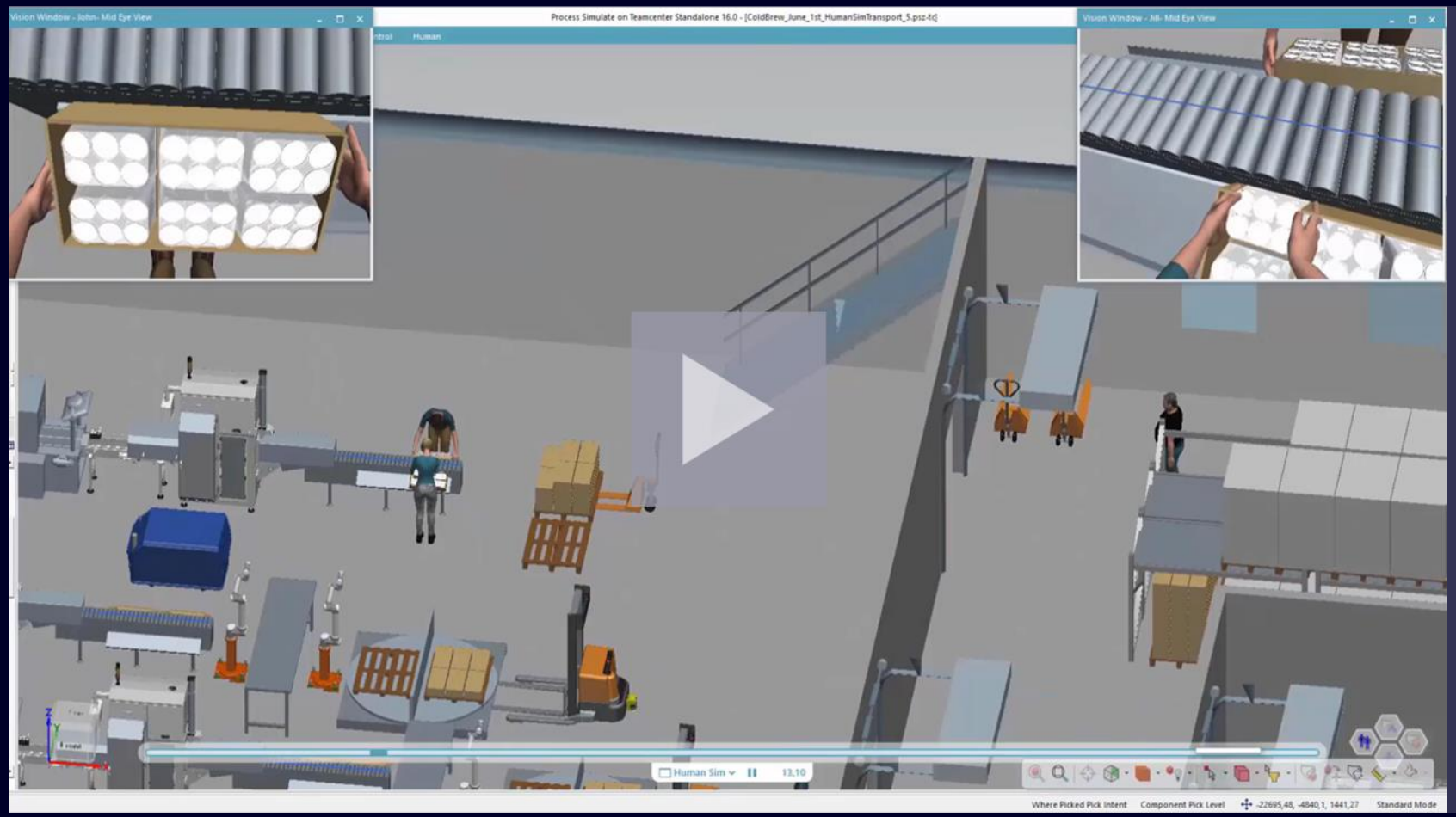

Production Design and Optimization

Packaging Process Simulation

Simulate robots and human operations

Simulation and analysis of manufacturing cells to evaluate different options of manual and robotic operations for optimal ergonomics and working conditions for operators.

Tecnomatix Process Simulate

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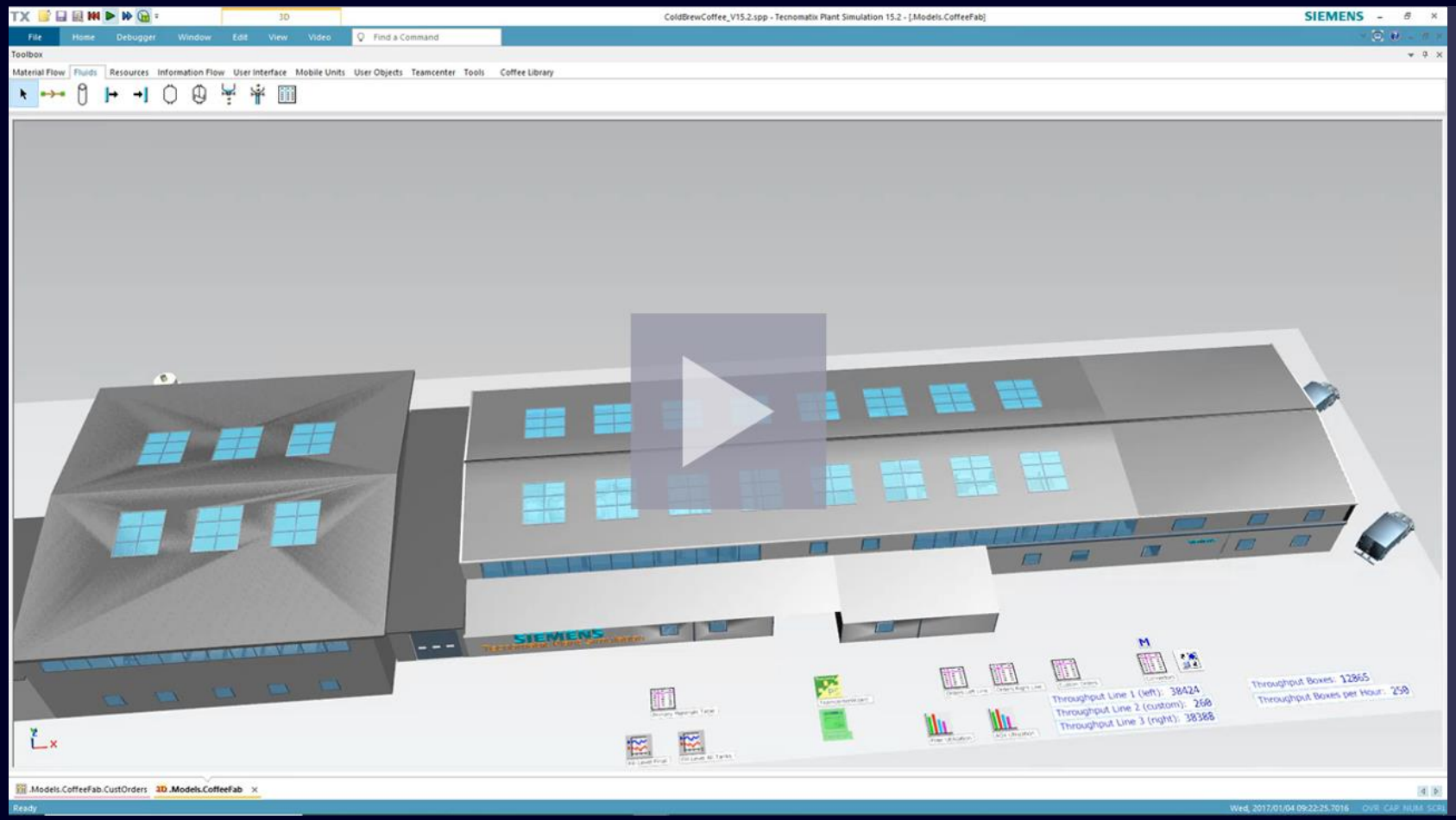


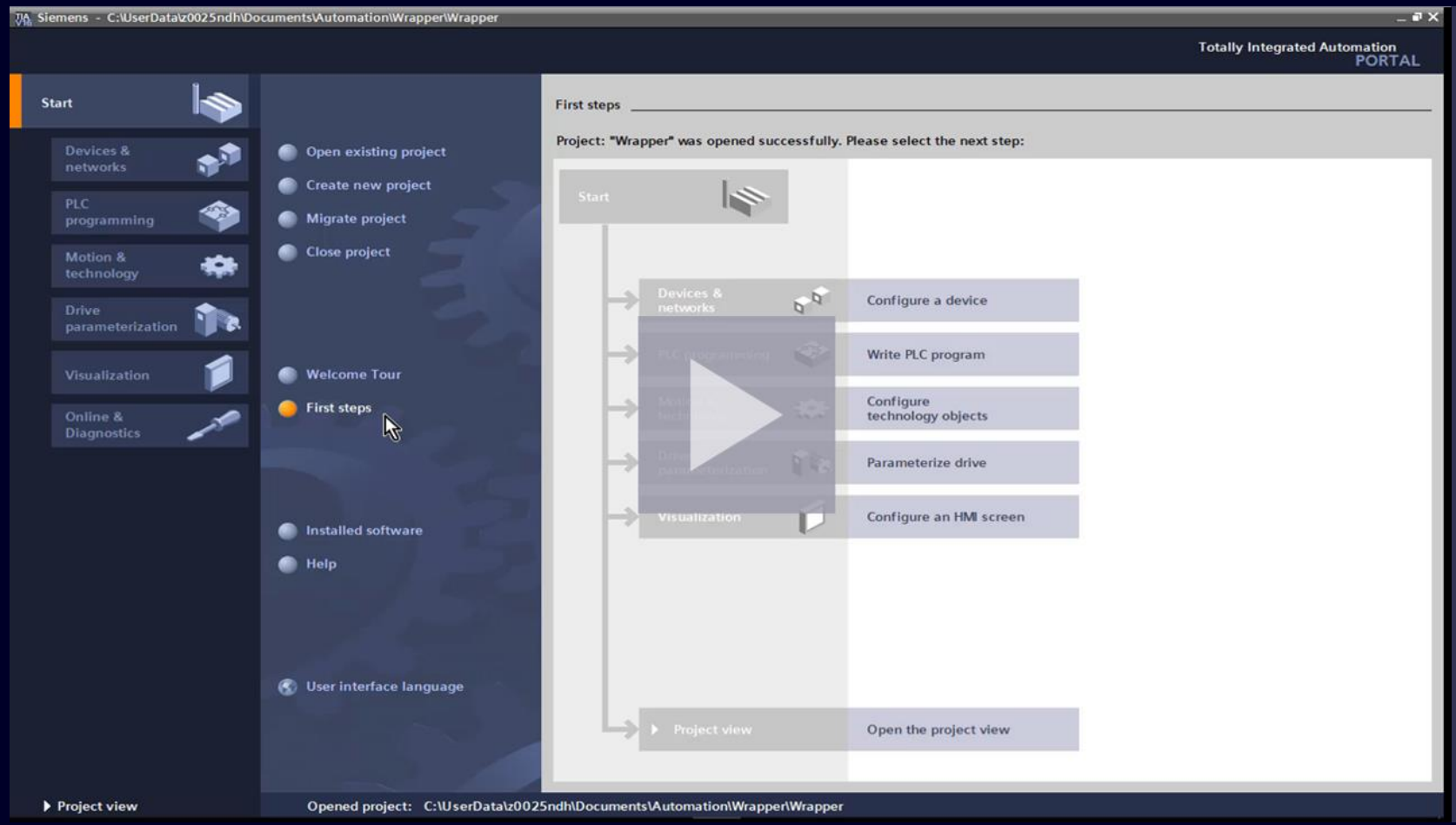
Production Design and Optimization

Plant and Line Optimization

Simulate and optimize the entire plant

Plant-level simulation to evaluate "what-if" scenarios and impacts of various plant designs to optimize production KPIs such as throughput and energy consumption and reduce operating cost.

Tecnomatix Plant Simulation



Production Design and Optimization

Automation Engineering

Automation engineering for packaging

Totally Integrated Automation into a single platform for the engineering of all automation hardware components, including motion, safety, and industrial security.

TIA Portal

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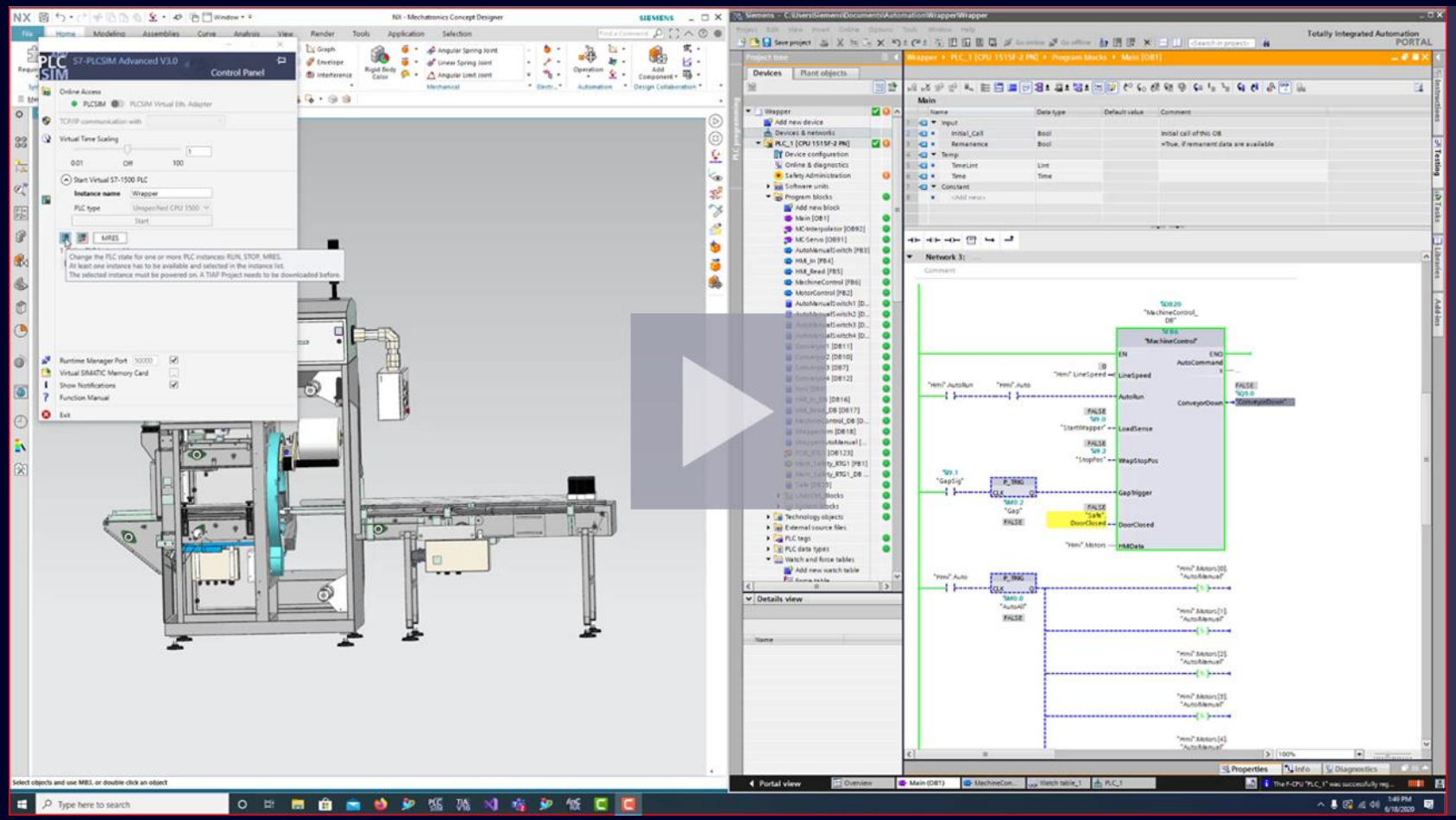

Production Design and Optimization

Virtual Commissioning (1/2)

Reduce start-up for packaging equipment

Seamless connection of the equipment CAD model with the virtual controller to debug the automation code, visualize and interact with the HMI, and troubleshoot safety procedures.

NX MCD, PLCSim Advanced

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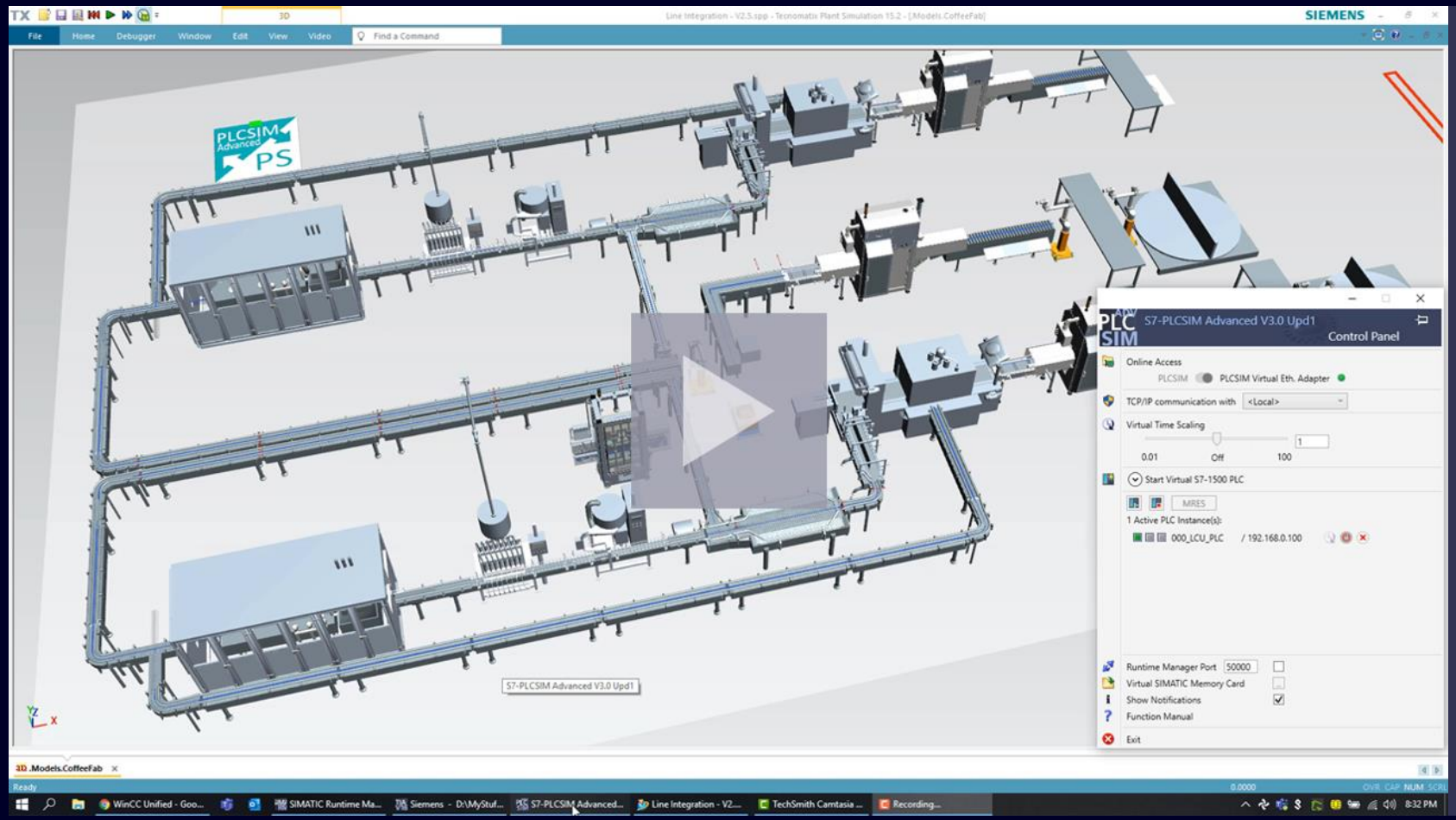

Production Design and Optimization

Virtual Commissioning (2/2)

Reduce start-up for the entire plant

Seamless connection of the plant model with the virtual controller to debug the automation code, simulate the entire process and interact with the HMI.

Plant Simulation, PLCSim Advanced

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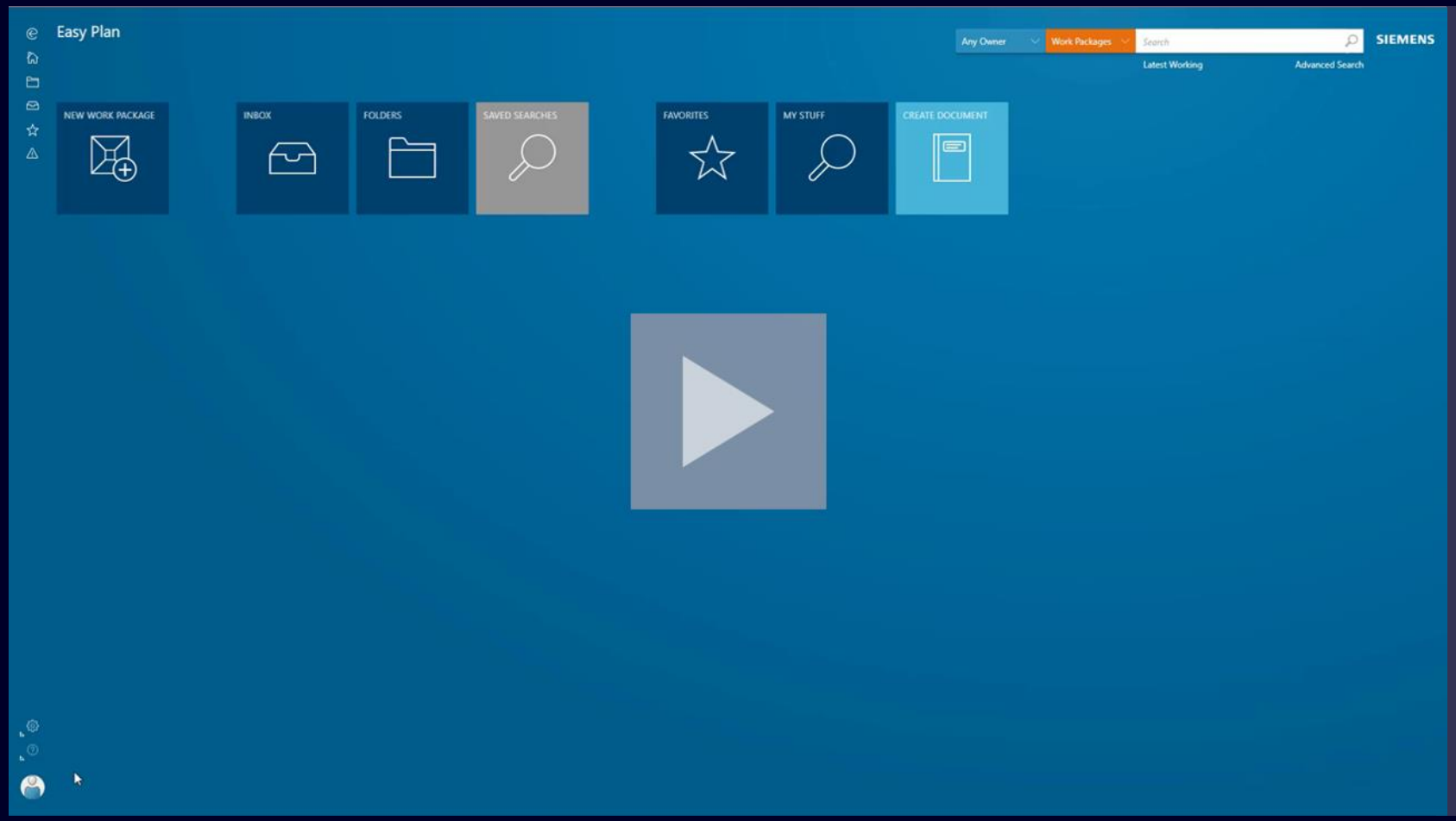


Smart Product and Process Design

Packaging Process Planning

Create a site-specific manufacturing plan

Standardized method to define the filling and packaging processes based on plant-specific capabilities and create straightforward EWIs, bridging the gap between R&D and manufacturing to ensure rapid scale-up.

Easyplan

Formula Design
Laboratory Quality Control
Package Design
Artwork and Labeling
Recipe Planning
Recipe Simulation
Packaging Process Planning
Packaging Process Simulation

Solution – Siemens Digital Twin Methodologies

Efficient and inter-disciplinary engineering workflow

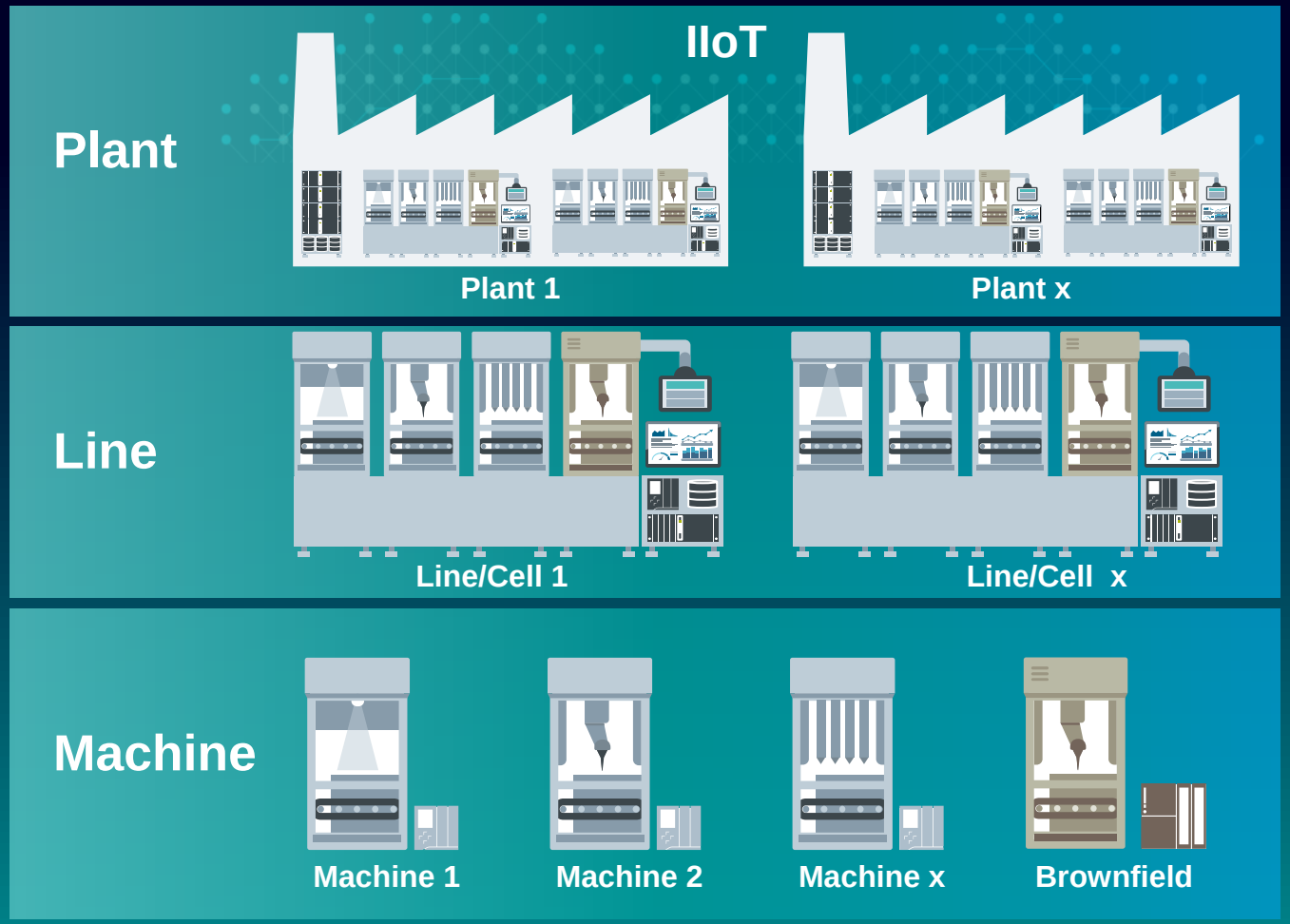
Teamcenter digital threads support reusability, accuracy and traceability

Faster commissioning and error-free start up of real production by pre-testing, simulation and virtual commissioning

Shorter time-to-market when launching new products

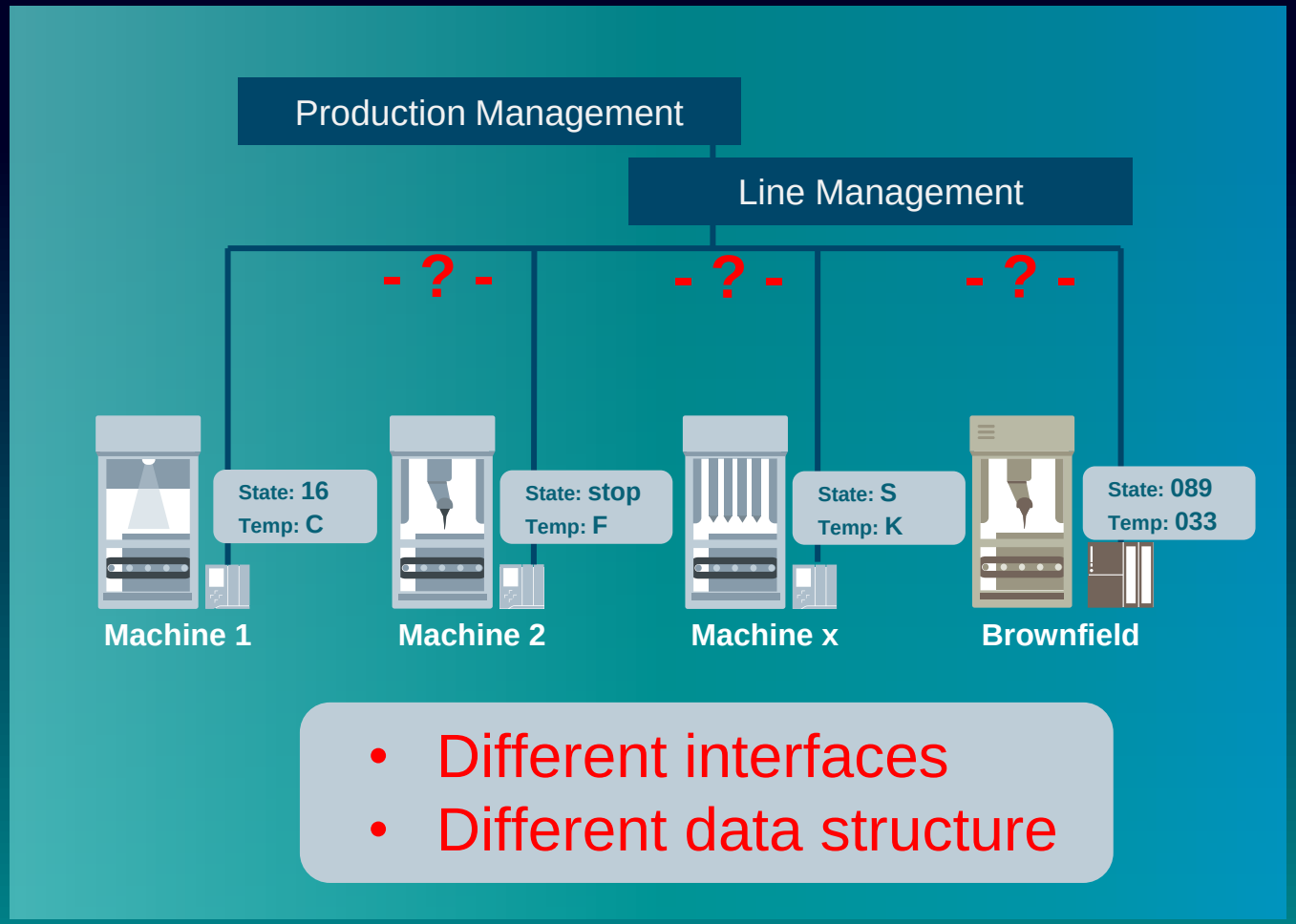
Challenges

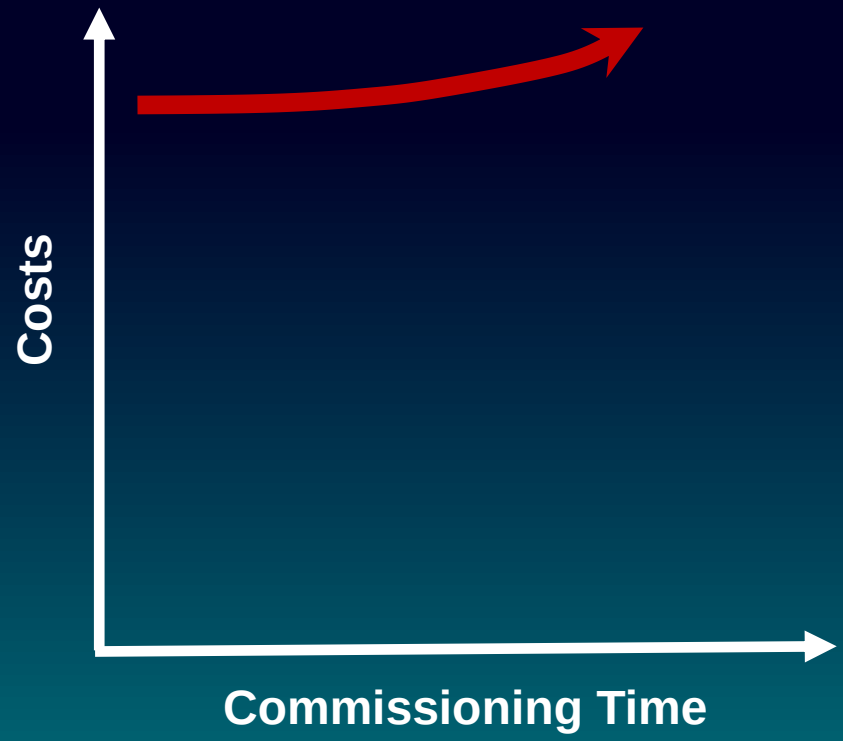
Challenges for integrating machines into a line



- Seamless communication from shop floor up to top floor
- Different machines must work together in one line/cell
- Different machine builders with different development philosophies

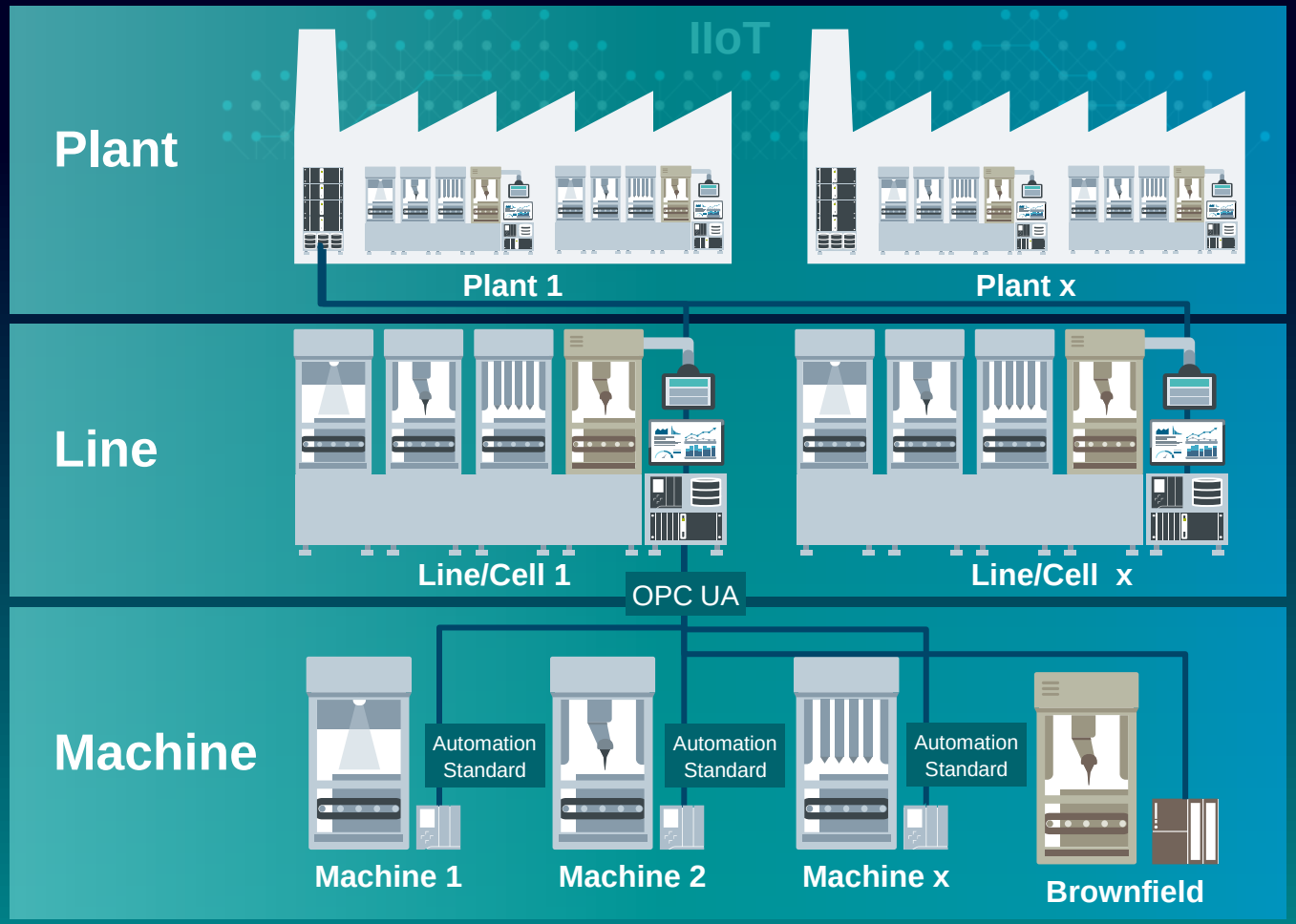
Cost driver by integrating machines into a line





Incalculable risks and costs without standardized interfaces

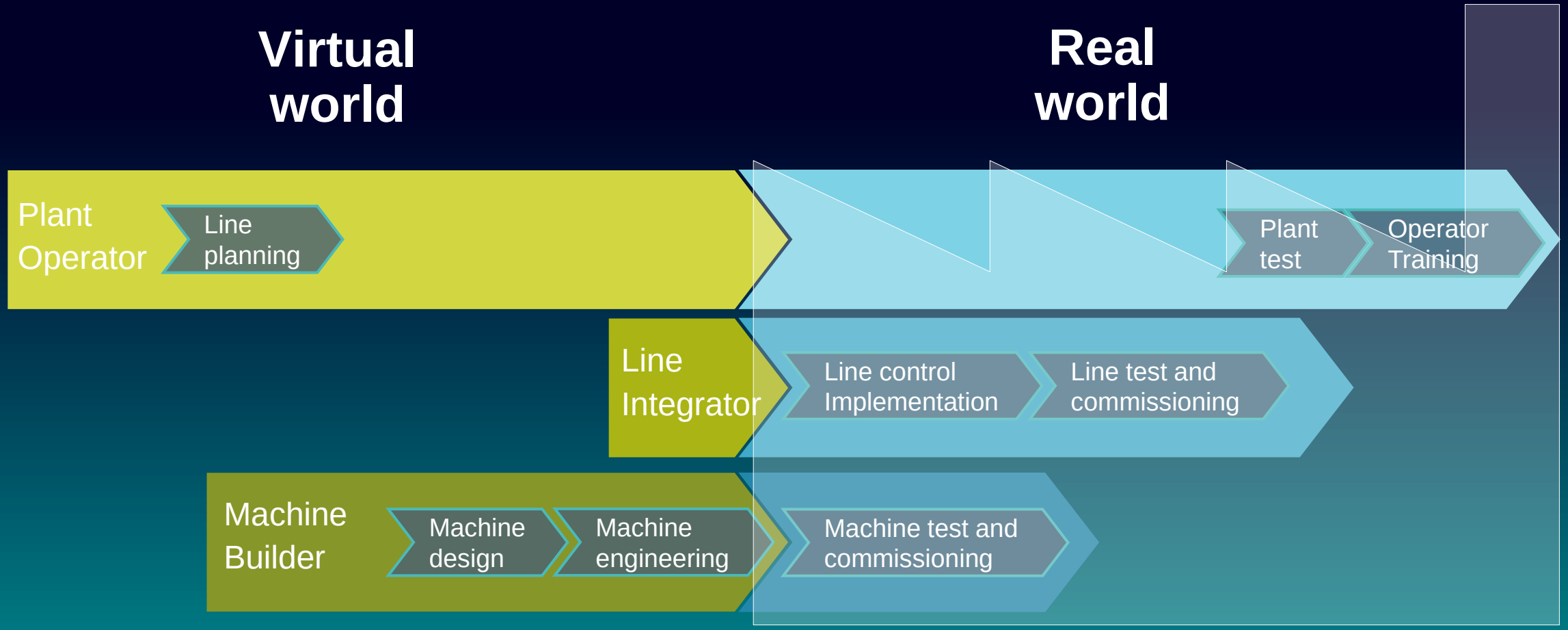
Standardization as foundation



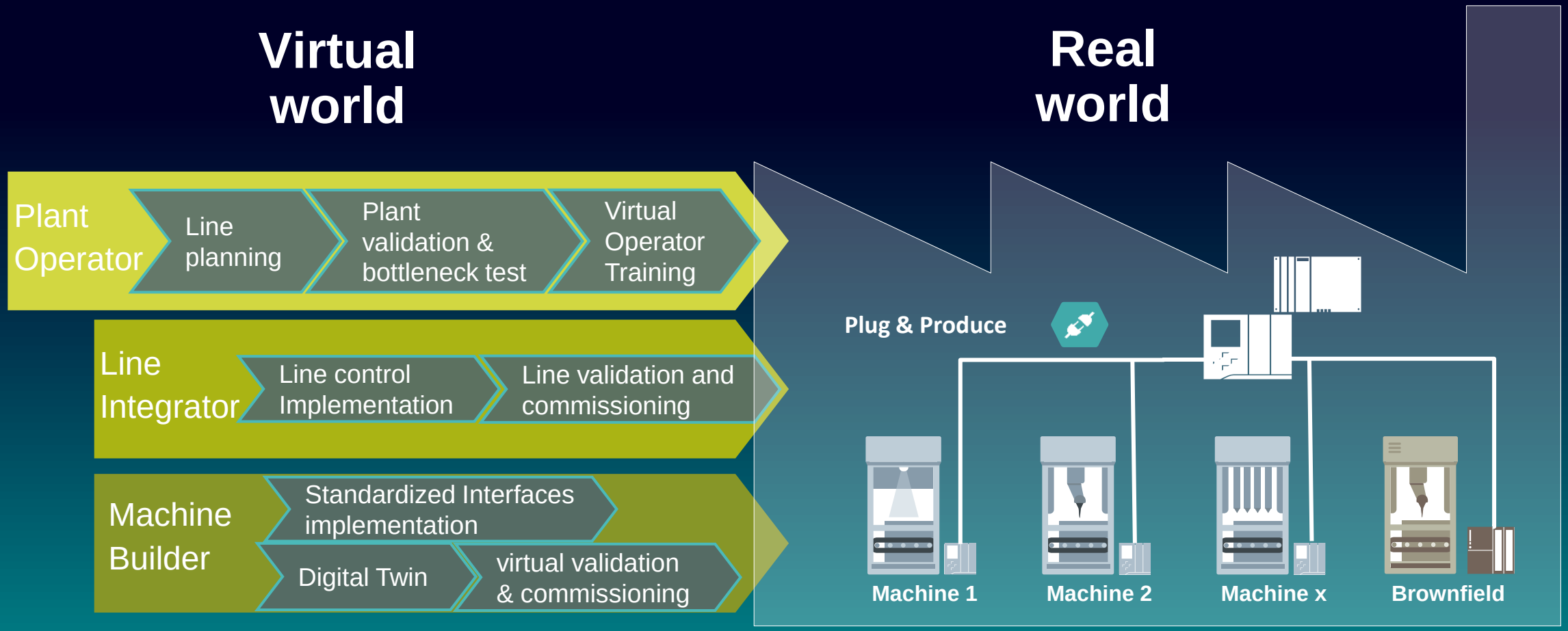
Standardization provides the basis for competitiveness, virtual commissioning and “plug and produce” factory functionality!

- OPC UA
- Companion Specification

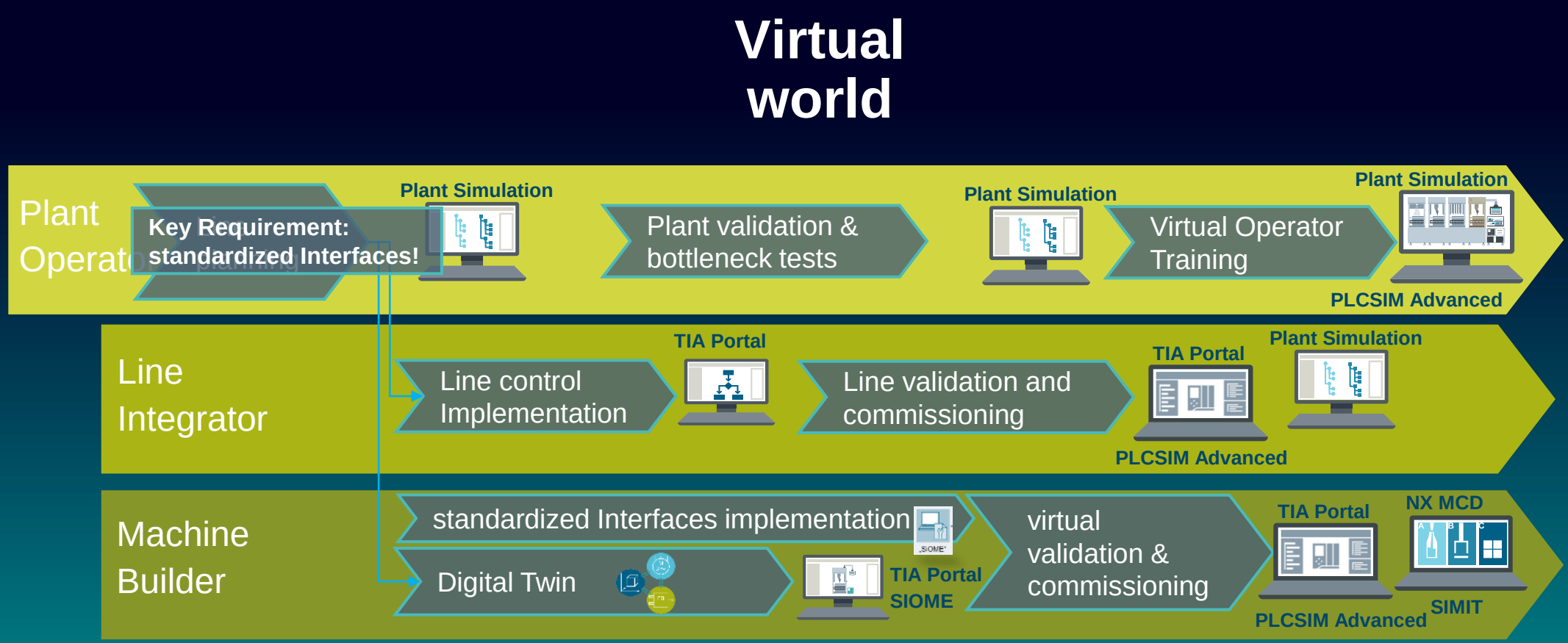
Line Integration without standardization and simulation



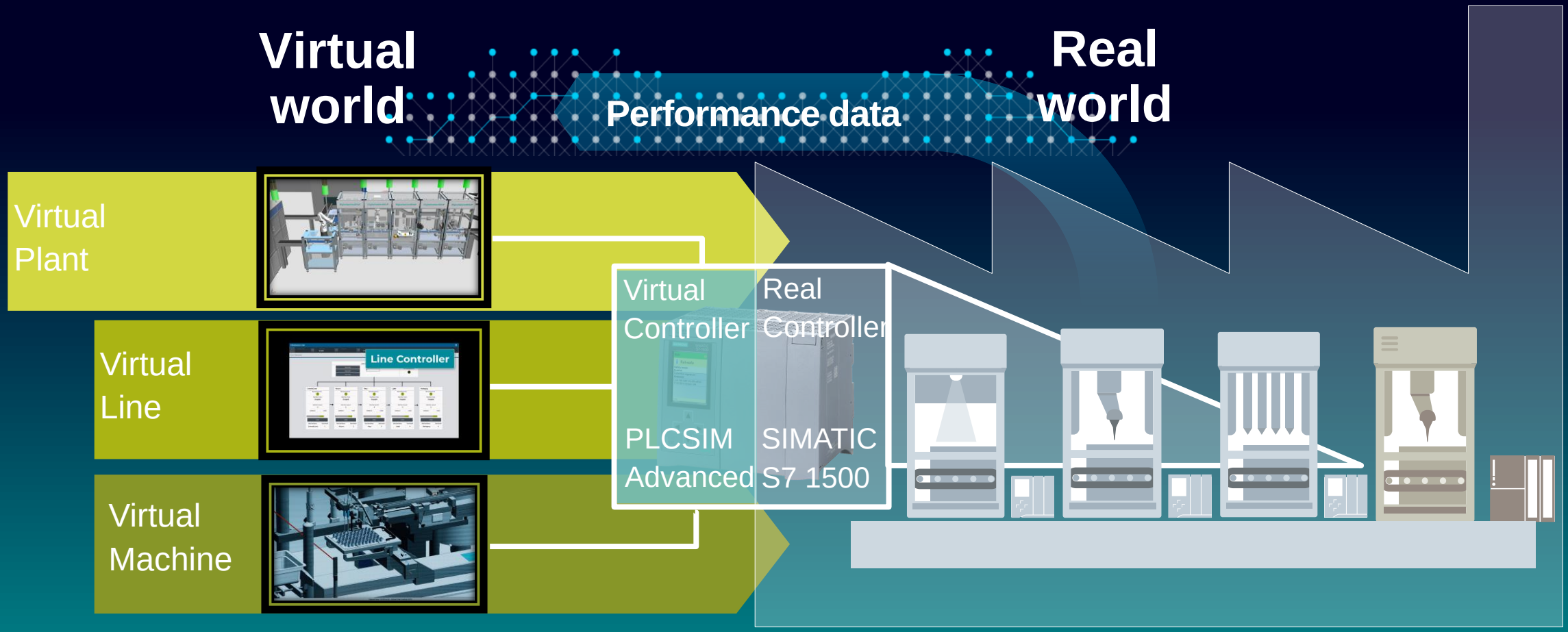
Line Integration with standardization and simulation



Seamless portfolio for realizing plug & work



continuous optimization based on standardization and simulation



5 steps for a successful integration

1. Define information flow from shop floor to top floor.
2. Define data and interfaces. Clear definition of needed data.
3. Standardize data and interfaces.
4. Standardize machine behavior and operations.
5. Define your targets in functional design specifications

With Siemens solutions & consulting...

- Siemens is defining a general and open standardization approach for the industry
- Based on a modern, efficient, and future-proof system platform
- Standardization has to be driven by the **Plant Operator** directly to get the best benefits.

… produce earlier and save costs.