

CLM >>>>

Closed Loop Manufacturing

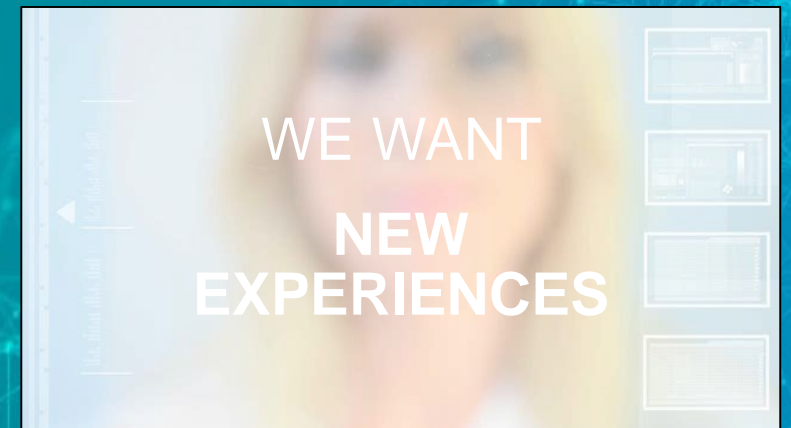
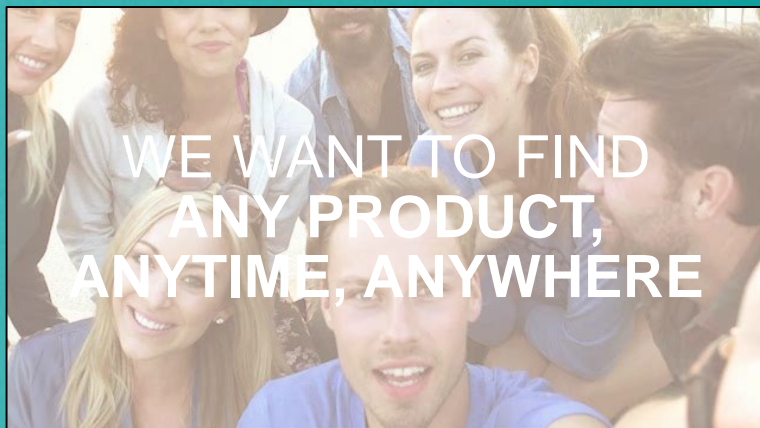
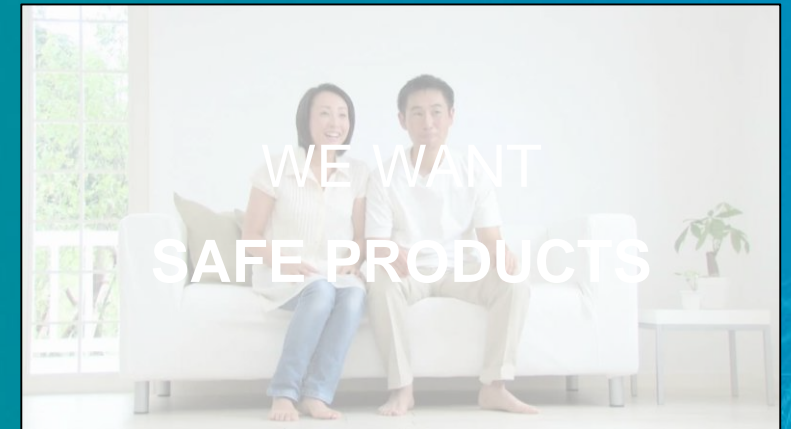
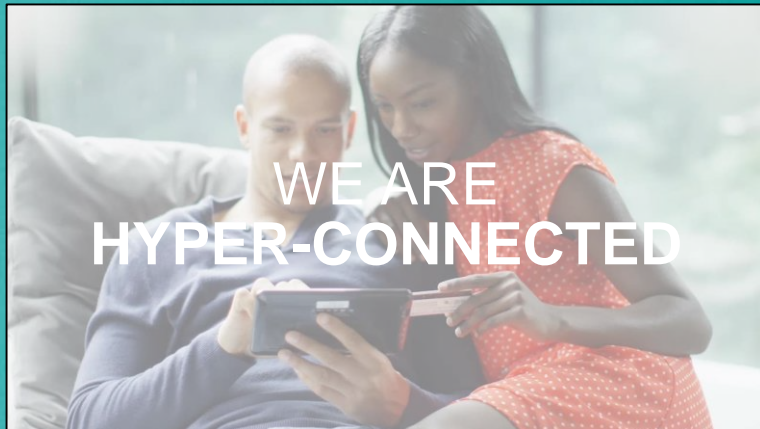


Closed Loop Manufacturing for Process

Frederik Verwimp - CLM Stockholm 29/01/2020

Digitalization is driven by Consumers

SIEMENS
Ingenuity for life



“Lots of companies don't succeed over time. What do they fundamentally do wrong? They usually miss the future.

Larry Page
Founder Google



New business models in the Internet age are disrupting complete markets

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From bookstore
to e-book



Amazon



Spotify

From record store
to streaming



From yellow pages
to marketplace



MyHammer



Uber

From taxi
to ride-sharing



Digital is transforming the CPG Industry

Personalizing products & services

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Mondelez enables
personalized packaging



Coca-Cola enables
custom formulations
from your smartphone



BluRhapsody provides
commercial service for
custom 3D printed pasta



Digital is transforming the Chemical Industry

Examples

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Increasing Compliance to
Regulations and
Environmental Sustainability



Increasing demand for a
variety of specialty products



Market Globalization raises
demand for Product and
Process Standardization



The key trends impacting the CPG segment

Food standards & regulatory compliance



Health-conscious consumers



Sustainable corporate identity



Demand for premium quality products



Different needs require huge packaging variety



Selling Trust



Key Trends in Fine & Specialty Chemicals

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Moderate growth of production volumes



Raise of Mergers & Acquisitions

Increasing regulatory and legal costs



Growing importance of the Green Chemistry

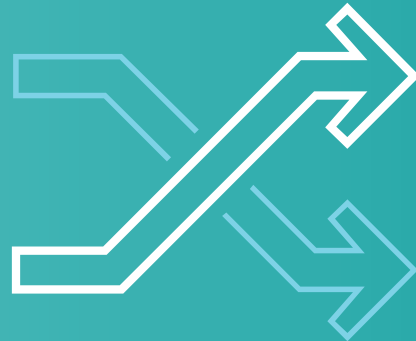
Our customers have essential requirements – throughout the industry

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Speed



Flexibility



Quality



Efficiency



Security



What is our Special Sauce?

Digital Twin

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1 Product design

2 Production planning

3 Production engineering

4 Production execution

5 Services



Digital Twin of the product

Holistic Digital Twin

Digital Twin of Performance

What is our Special Sauce?

Digital Twin

1 Product design

2 Production planning

3 Production engineering

4 Production execution

5 Services

Gain **foresight** by simulating products, people, processes and resources interacting in the virtual world

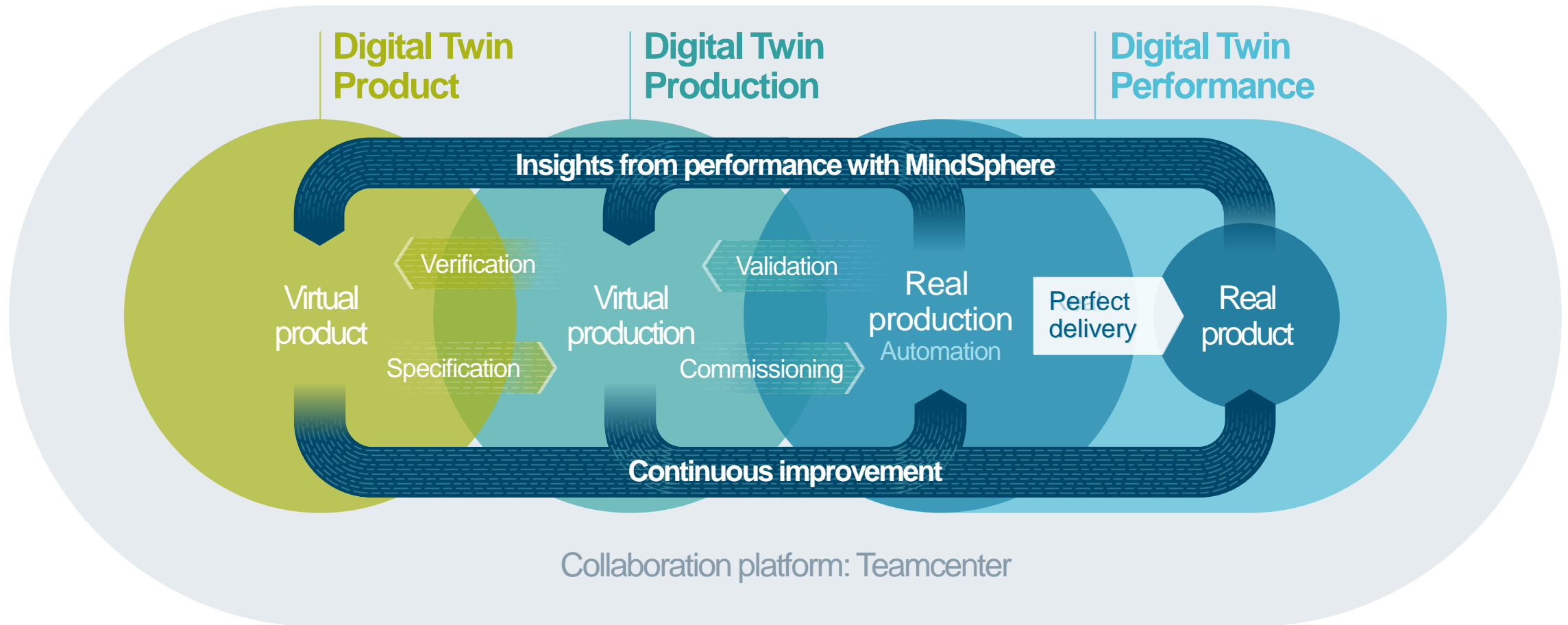


Holistic Digital Twin

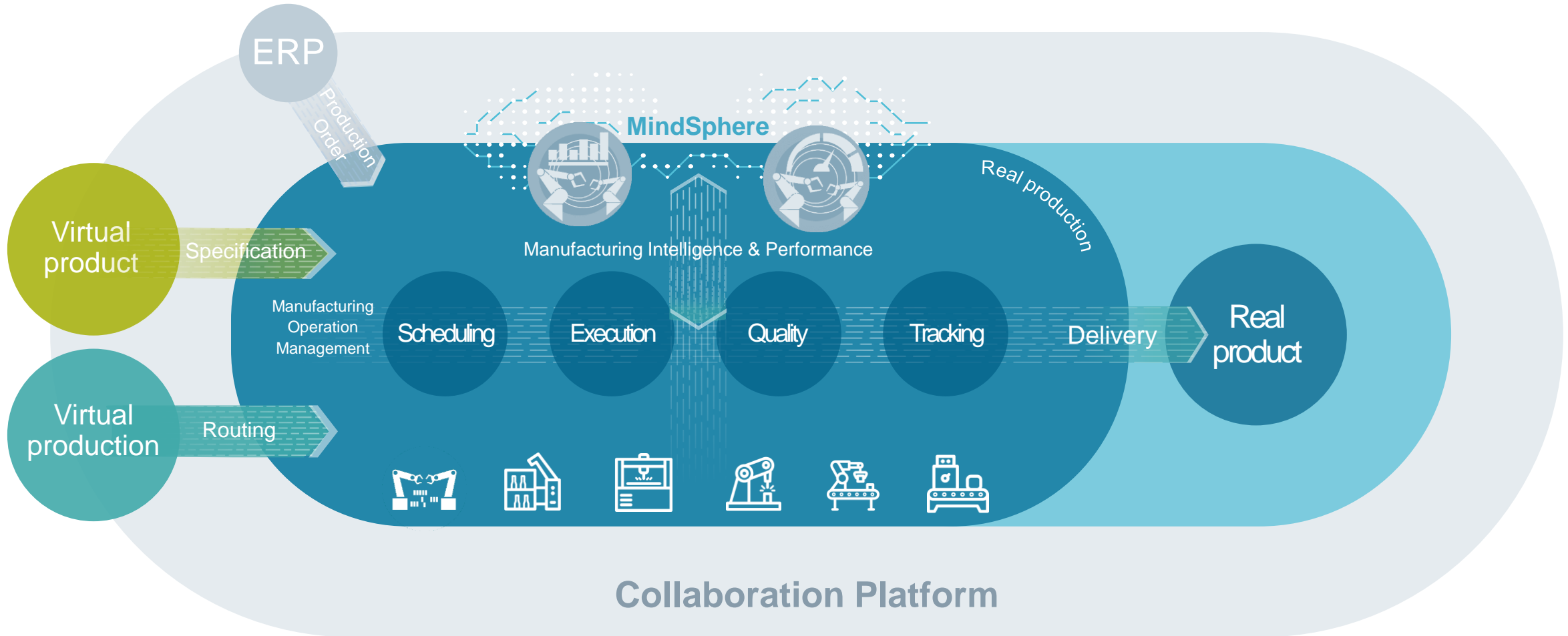
Gain **insight** by matching real-world performance to our predictions so we can drive continuous improvement

Siemens Digital Enterprise Suite

Realizing the full value of Digitalization in Process Industries



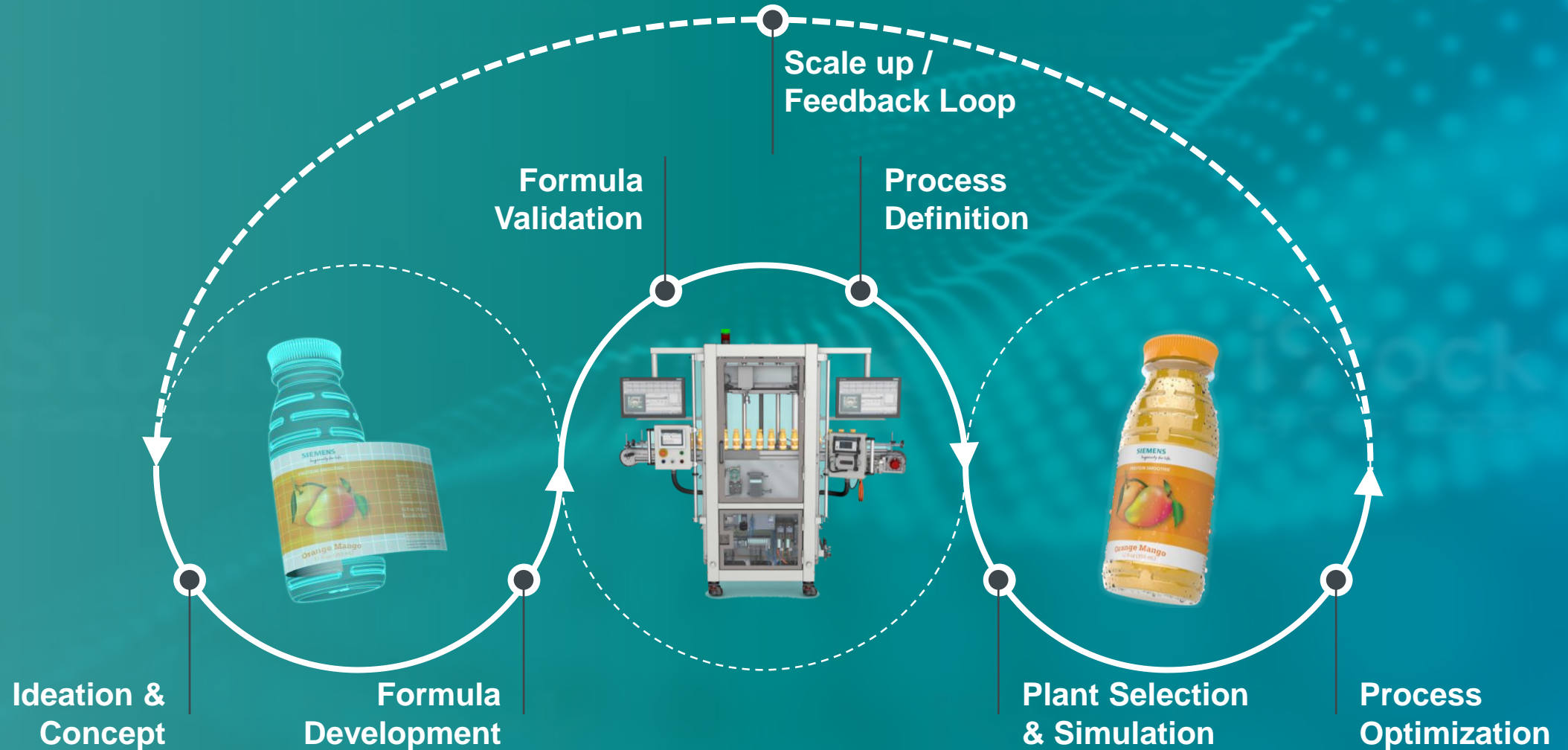
Integrated Manufacturing Operations for continuous improvement in the Digital Twin



Closed Loop Manufacturing in Process Industries

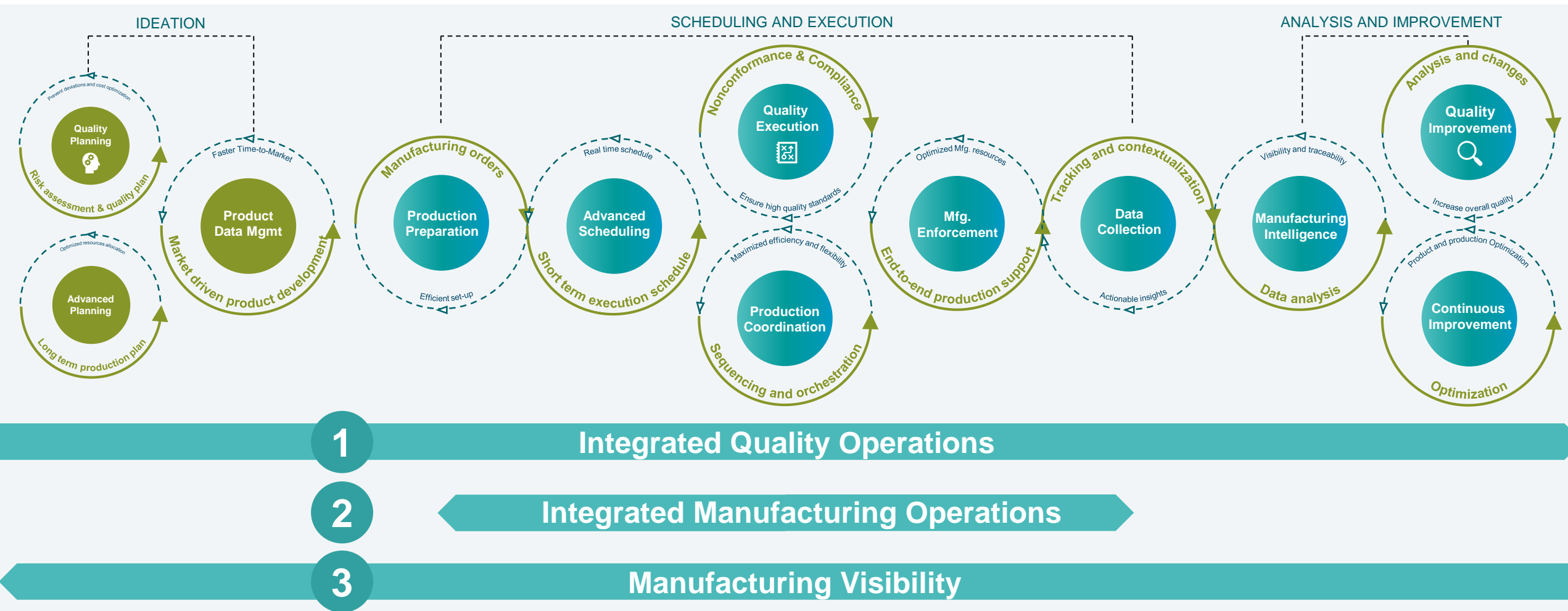
A Manufacturing Operations Management perspective

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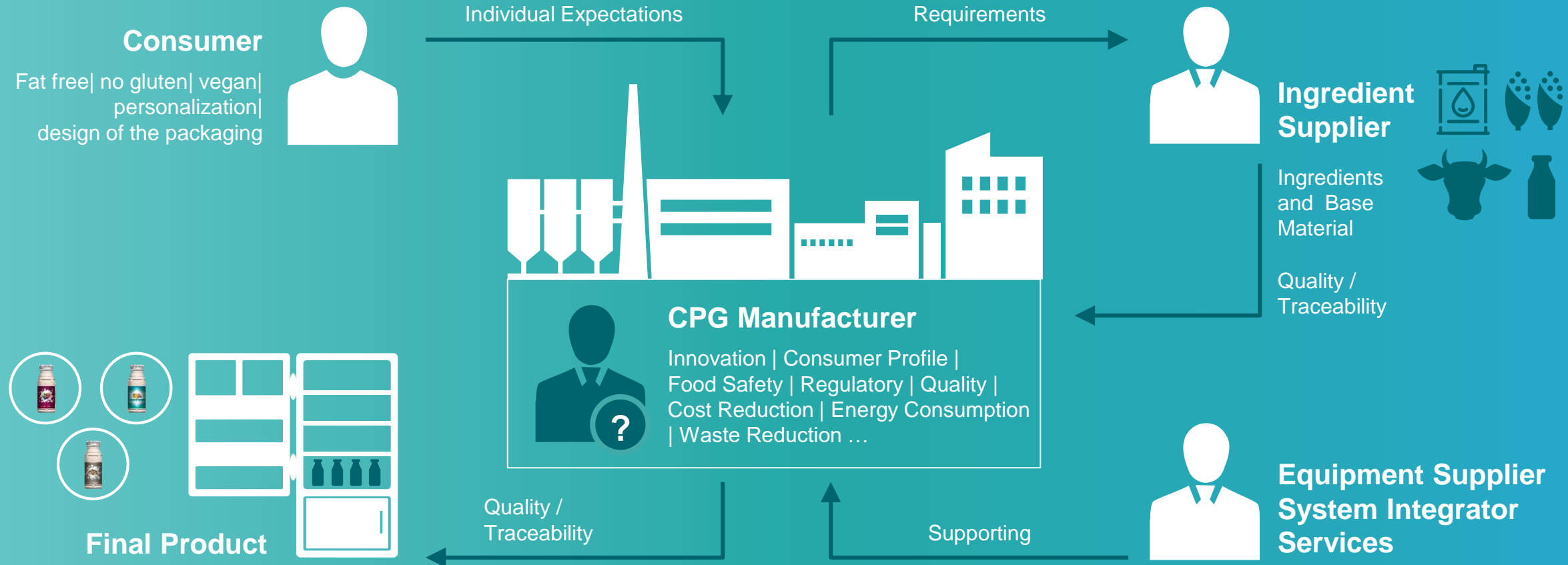
MOM in Closed Loop Manufacturing

What it does



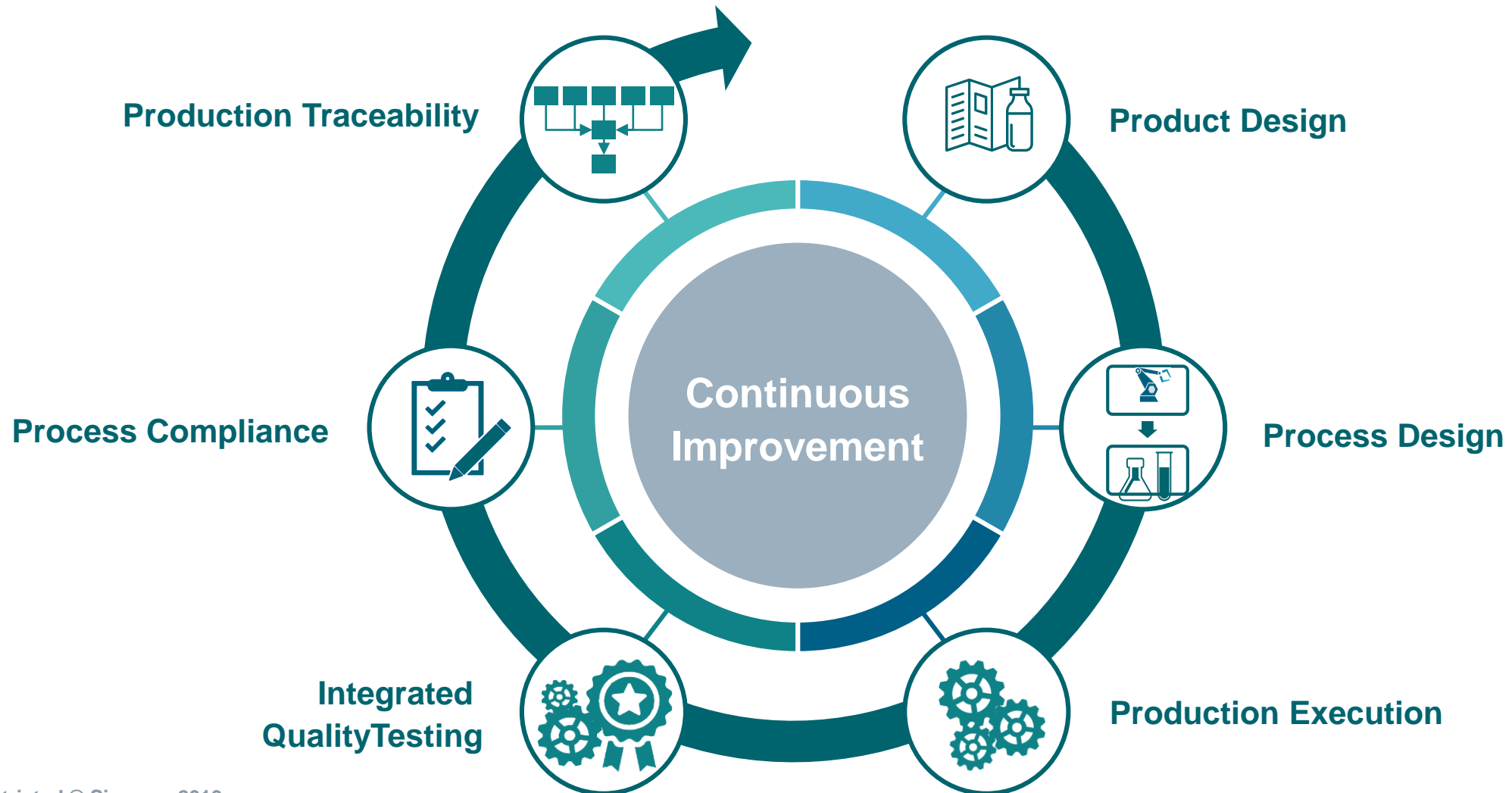
Increasing Product Variety – Flexibility in mass production

Many Facets & Challenges



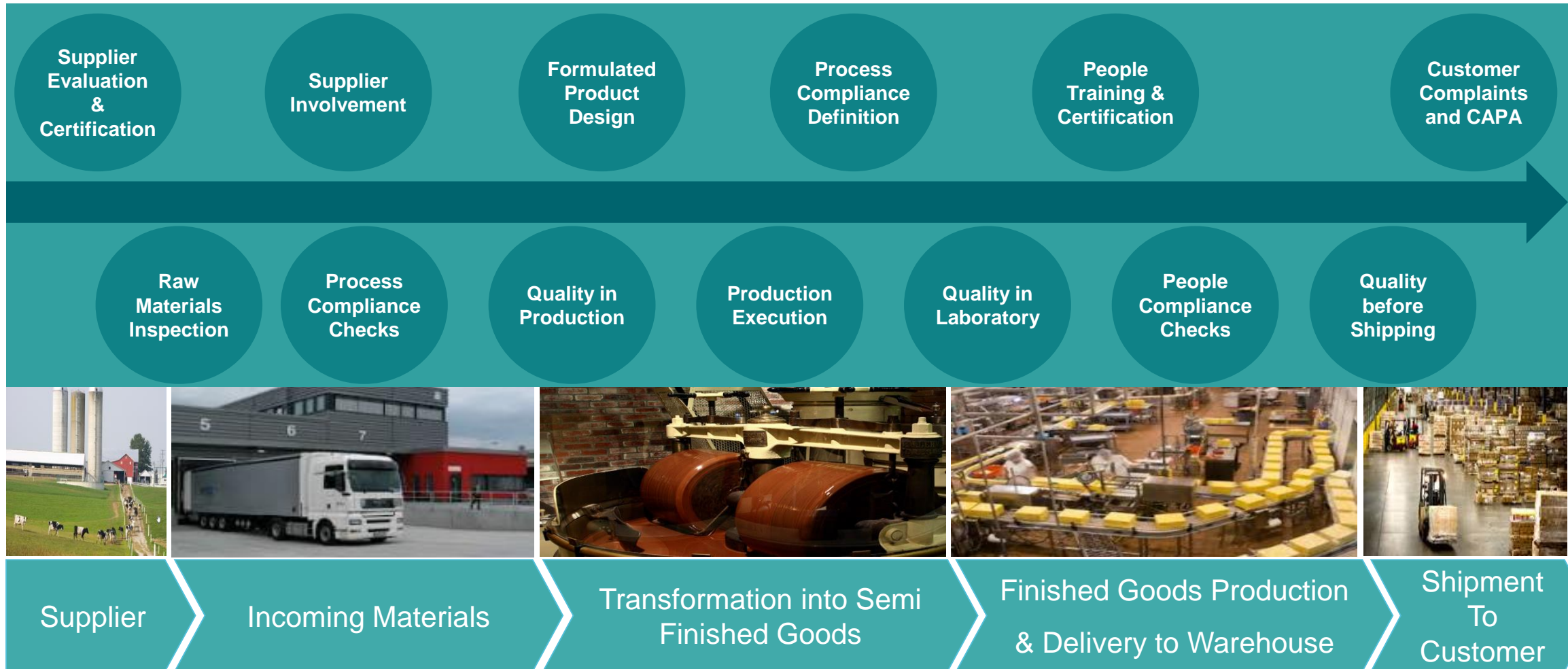
Integrated Quality Operations for Process Industry

6 Pillars for a Configurable Solution



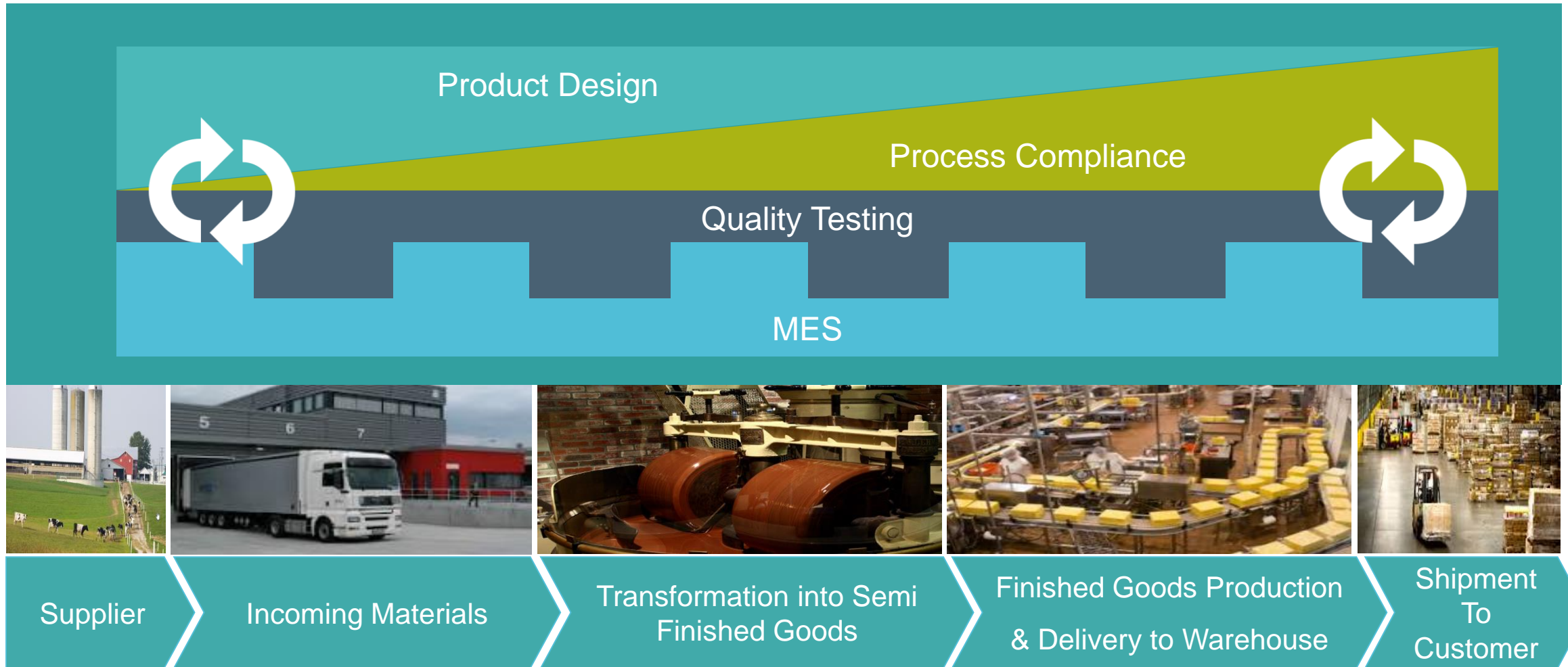
Integrated Quality Scenario in a Process Plant

Holistic Quality Approach throughout the whole Supply Chain



Integrated Quality Scenario in a Process Plant

Solution & Portfolio



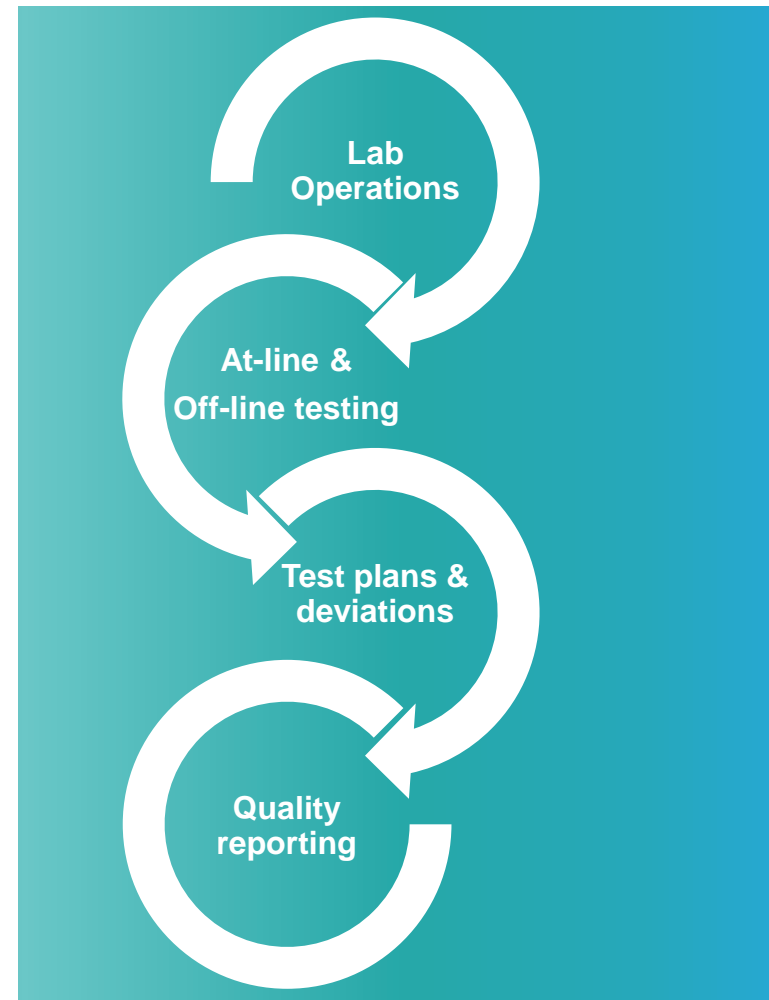
Integrated Manufacturing Operations Quality Execution

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Siemens PLM Software - R&D SUITE SIEMENS

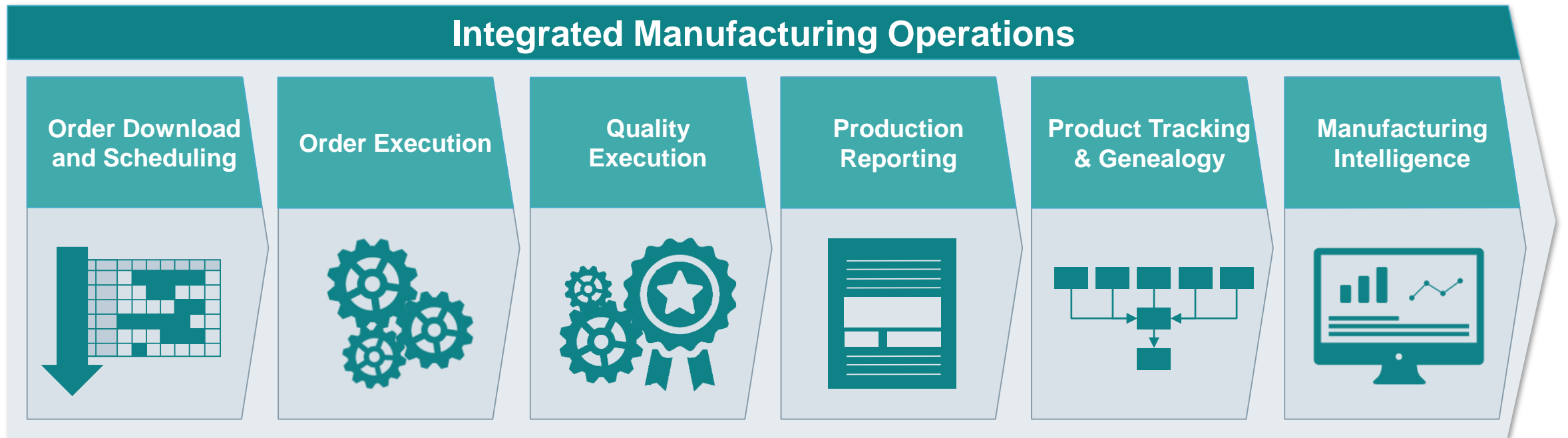
Home Workspaces Edit Launchpad Refresh Shortcuts

Specification Management	LIMS	Configuration
<ul style="list-style-type: none"> Specification: Create Specification Specification: Open Specification List Specification: Approve Specification Material: Open Material List Spec report: Spec report Specs for Approval: Specs waiting for Approval (0) 	<ul style="list-style-type: none"> Request: Create Request Request: Open Request Sample: Create Sample Sample: Open Sample Work Sheet: Create Work Sheet Work Sheet: Open Work Sheet Charts: Open Chart List Work List: Open Work List Equipments: Open Equipment List LabMgtReport: Lab Management Report 	<ul style="list-style-type: none"> Quality: Setup Configuration Specification: Setup Configuration Request Classes: Setup Configuration Specification Types: Setup Configuration Equipment: Setup Configuration Location Types: Setup Configuration Locations: Setup Configuration Charts & Trends: Setup Configuration Locations: Setup Configuration Layouts: Setup Configuration Attributes: Setup Configuration Tasks: Setup Configuration Life Cycles: Setup Configuration User & Contact: Setup Configuration
Product Development	Integration	Prices
<ul style="list-style-type: none"> Project: Create Project Project: Open Project Experiment: Create Experiment Experiment: Open Experiment Formulation: Create Formulation Formulation: Open Formulation Batch: Create Batch Batch: Open Batch Projects Started: Projects Started (0) 	<ul style="list-style-type: none"> Unilink: Upload Unilink File Uniconnect: Upload Uniconnect File 	<ul style="list-style-type: none"> Pricebook
Documents		
<ul style="list-style-type: none"> Documents: Upload Document Documents: Open Document 		

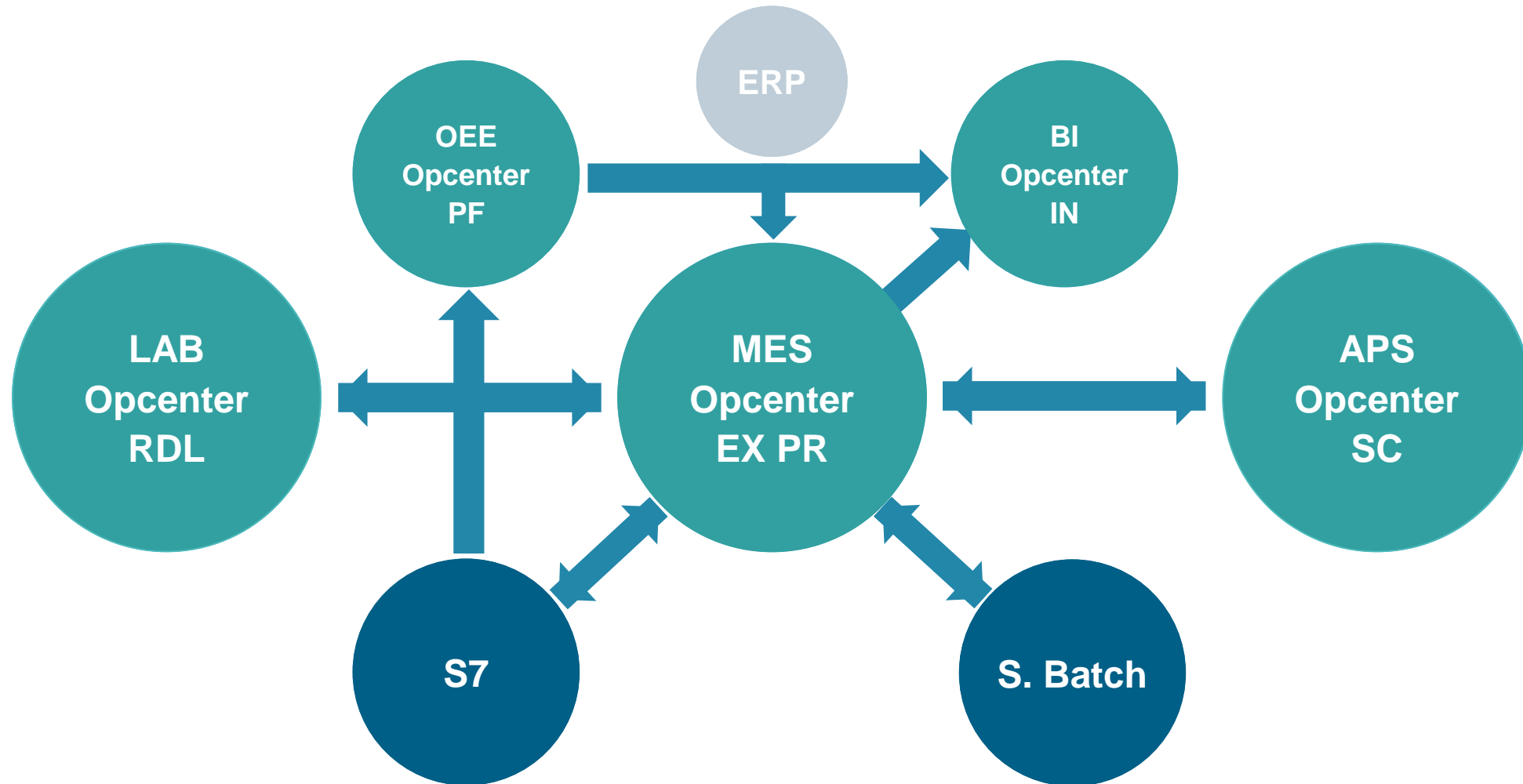


Integrated Manufacturing Operations

The 6 Pillars of our Configurable MOM Solution Portfolio



Integrated Manufacturing Operations for Process Industry



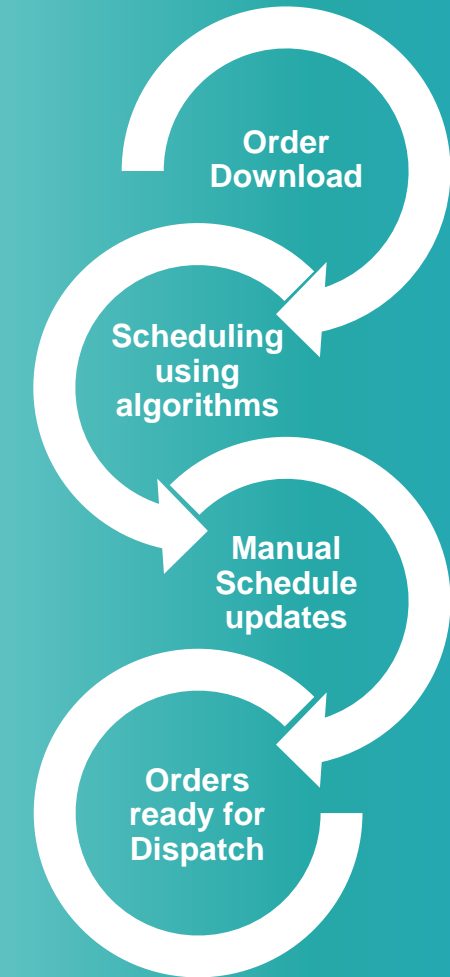
Integrated Manufacturing Operations

Order Download and Scheduling

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The screenshot displays the Siemens Work Order Management interface. On the left, a list of work orders is shown, including WO_Dairy12, WO_Dairy11, WO_Dairy10, WO_003_Ord014_Cho..., WO_002_Ord014_Cho..., and WO_001_Ord014_Cho... The main area shows a detailed view of a work order with the following parameters:

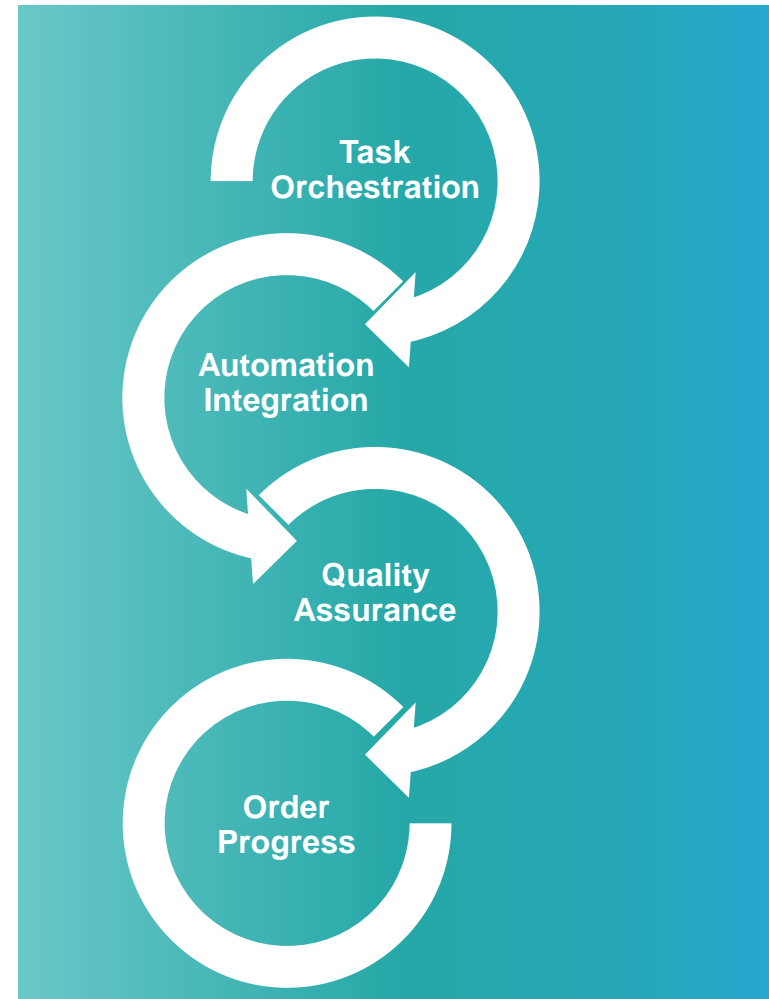
Overview	Parameter	Work Order Operation
Name	WO_002_Ord014_ChocoDrink	
Description	Protein Drink 7.6 % Chocolate Flavour	
Type	Protein Drink 7.6 % Chocolate Flavour	
Status	Initial	
Priority	Initial	
Material	ChocolateProteinDrink	
Material Revision	1	
Equipment		
Qty	1000	
UoM	Liter	
Actual Qty		
Actual Qty UoM		
Planned Start Time		
Planned End Time		
Actual Start Time		
Actual End Time		
Order	Ord014_ChocoDrink	
Work Master	ChocolateFlavourDrink	
Work Master Revision	1	
Is Frozen	false	



Integrated Manufacturing Operations Order Execution

SIEMENS
Ingenuity for life

The screenshot displays the 'Work Order Management' interface. On the left, a list of work orders is shown, including 'WO_002_Ord16_Choc...', 'WO_004_Ord16_Choc...', 'WO_005_Ord16_Choc...', 'WOrderDairy10', 'WOrderDairy11', and 'WOrderDairy12'. Each entry includes details like Name, Material, Status, and Priority. On the right, a detailed view for a selected work order is visible, with tabs for 'Overview', 'Parameter', and 'Work Order Operation'. The 'Overview' tab is active, showing fields such as Id, Name, Description, Type, Status, Priority, Material, Material Revision, Equipment, Qty, UoM, Actual Qty, Actual Qty UoM, Planned Start Time, Planned End Time, Actual Start Time, Actual End Time, Order, Work Master, Work Master Revision, and Is Frozen. The Siemens logo is in the top right corner of the interface.



Siemens' Manufacturing Visibility solution landscape

Creating a single source of truth



Opcenter Connect (CON)

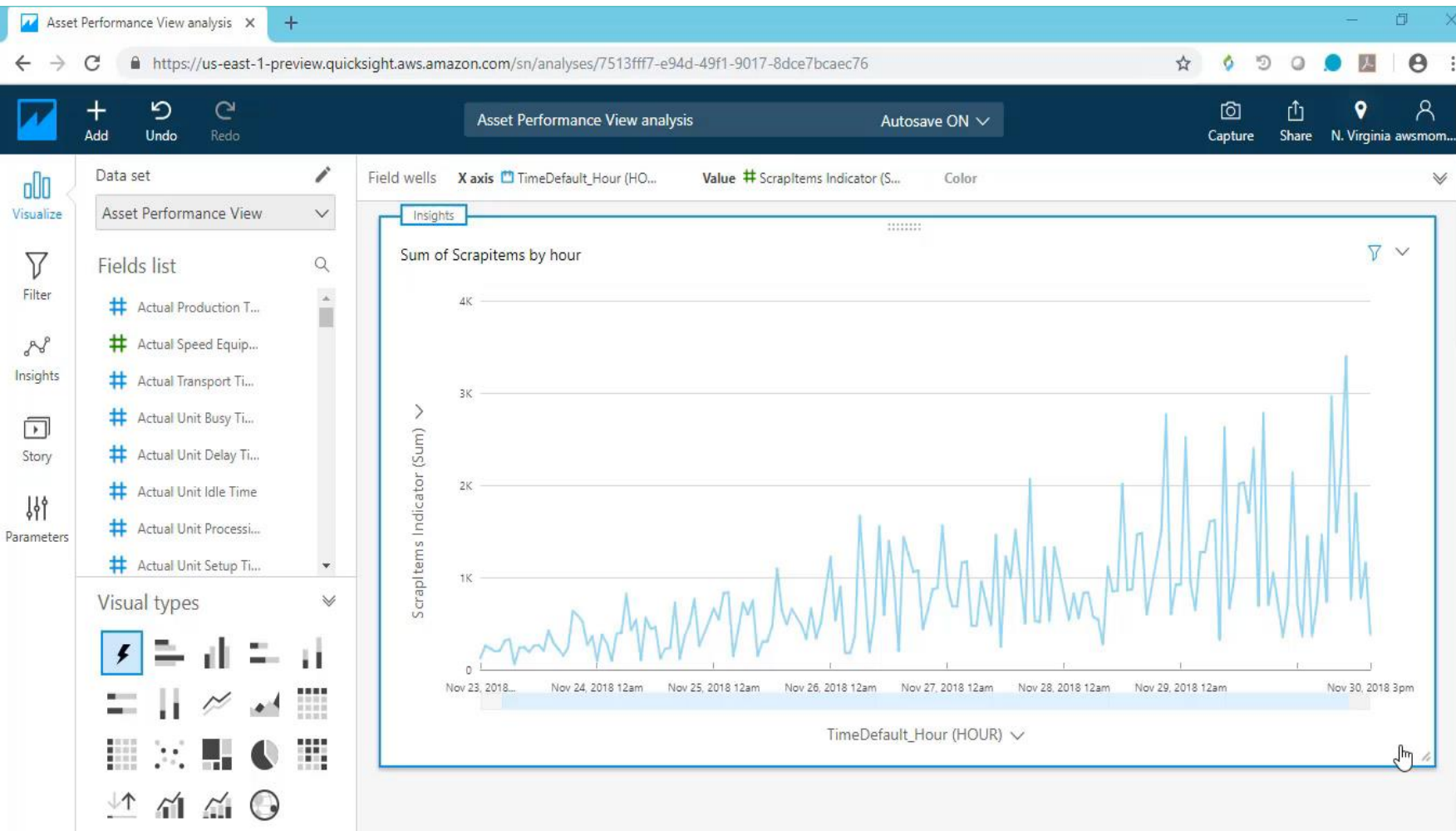


Shopfloor



From IOT to Manufacturing Insight

Manufacturing Intelligence for Data Analysis

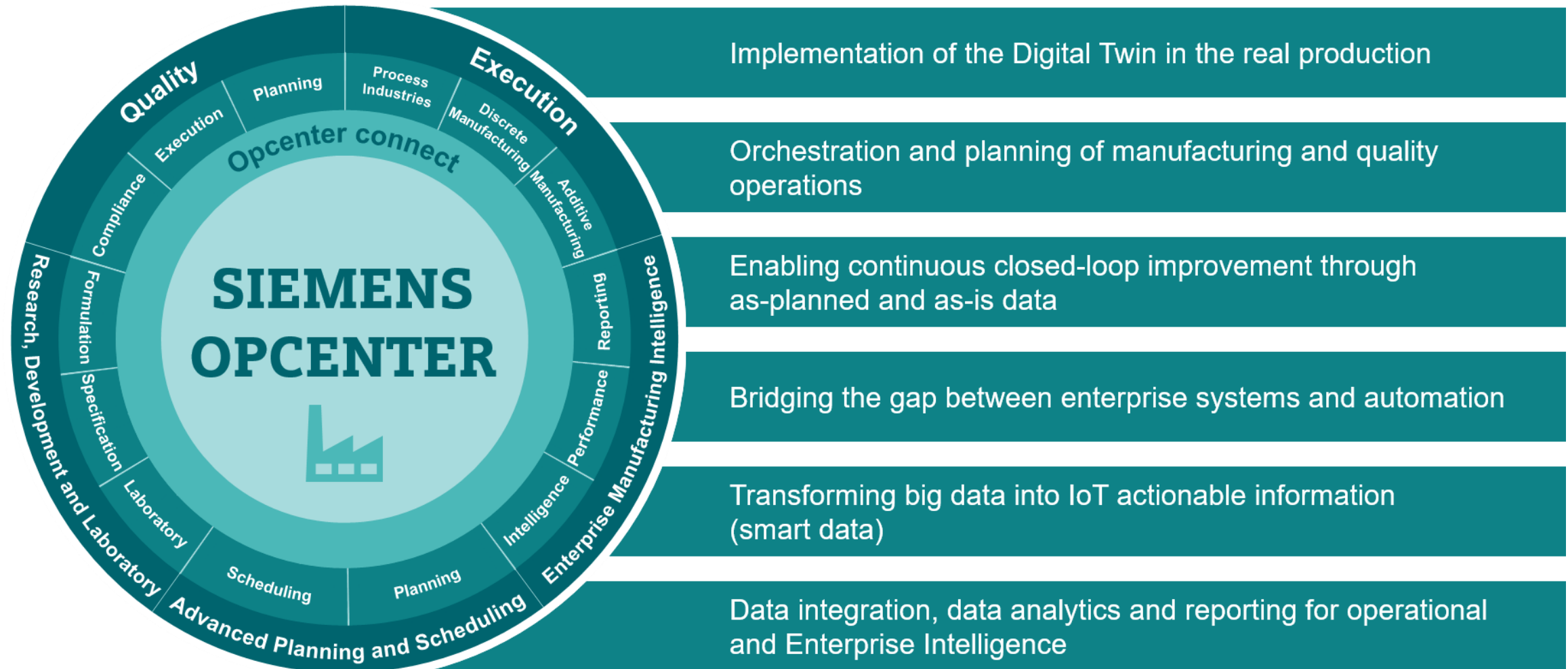


Insight and Root Cause

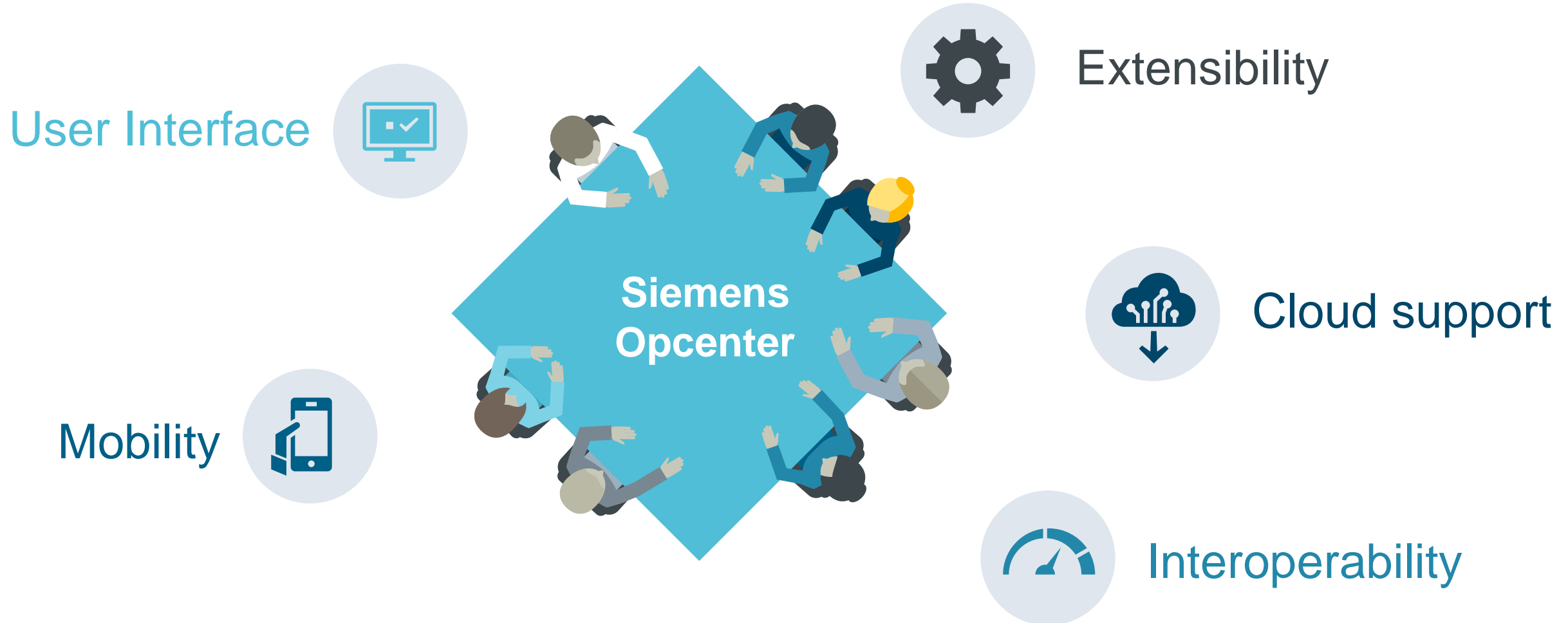
- Machine learning makes it easy to find out new insight across all the data
- Anomaly Detection, forecast analysis and narrative language

Siemens Opcenter

A result of continuous evolution



Technological Innovations – The base for Siemens Opcenter introduction

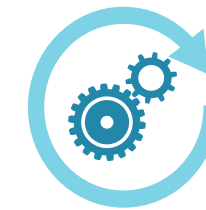
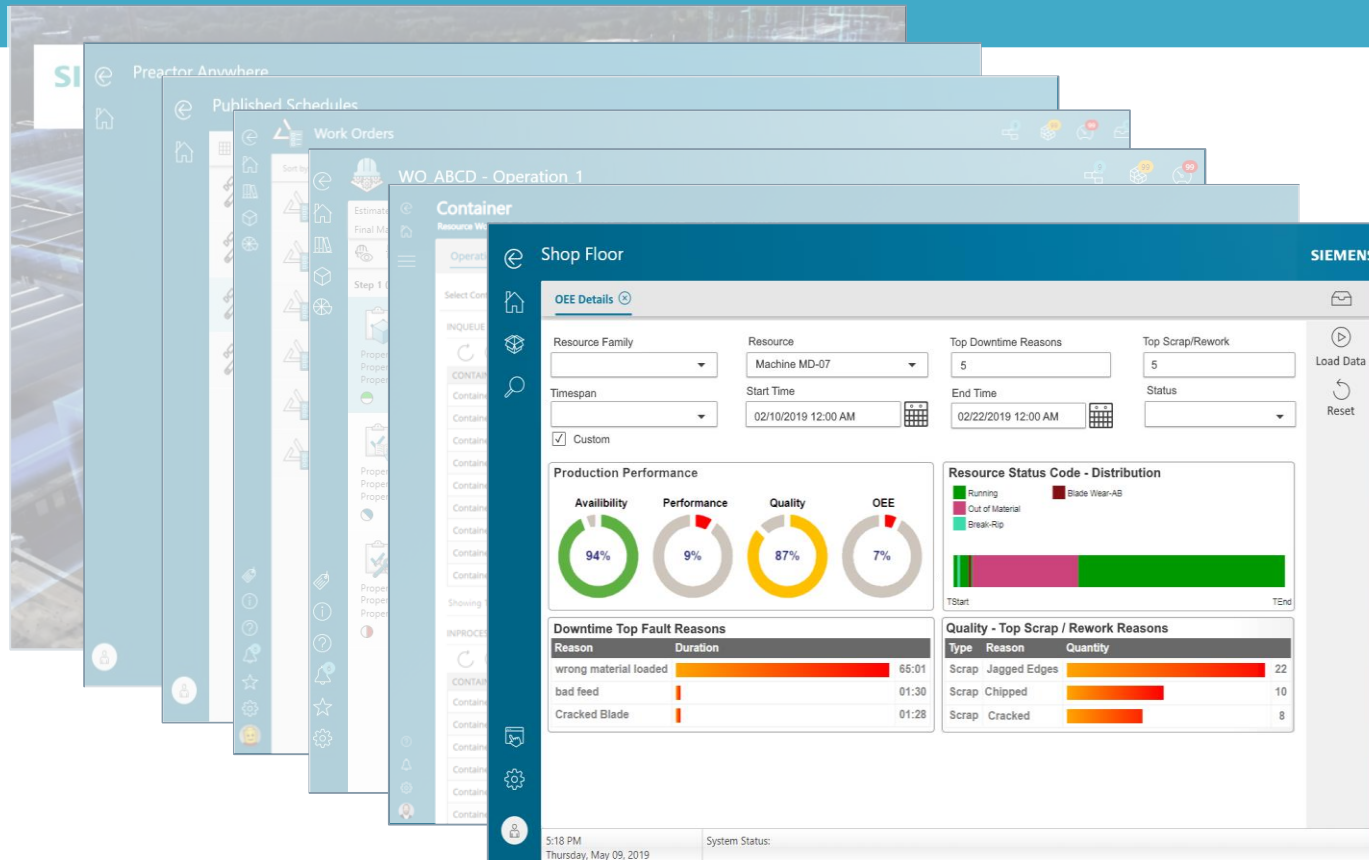


Harmonize our user experience while differentiating capabilities

SIEMENS
Ingenuity for Life

Goals

Benefits



**Common
Siemens
look & feel**



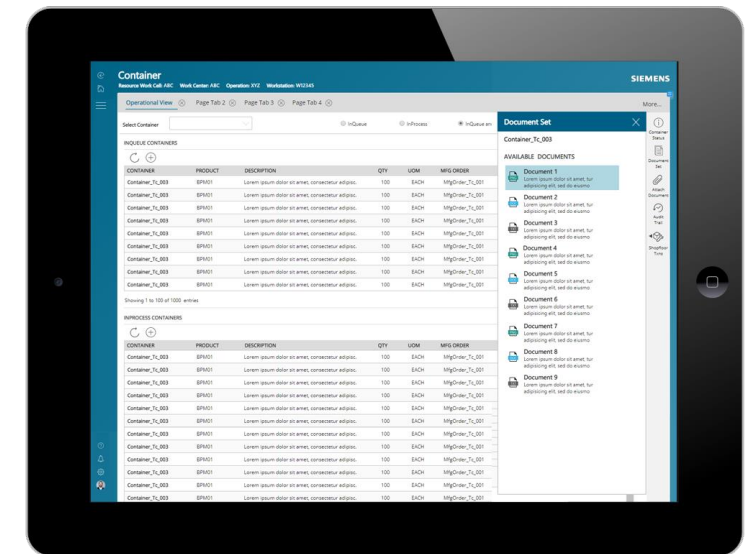
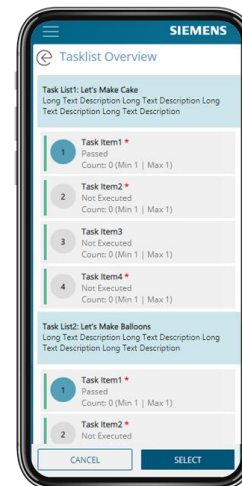
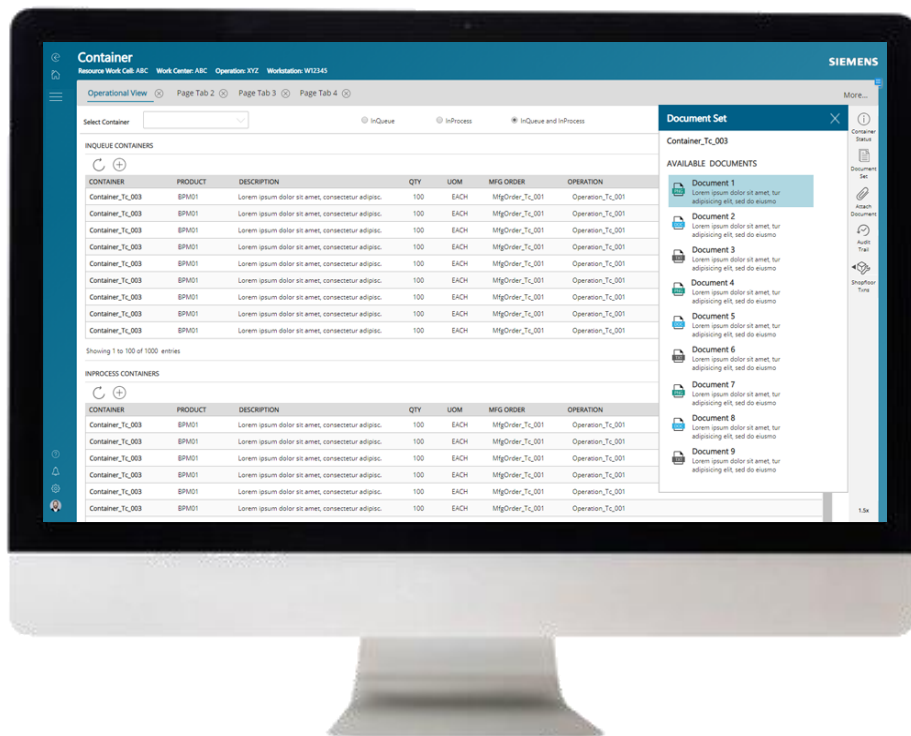
**Harmonized
user interface**



**Easy-to-use
user experience**

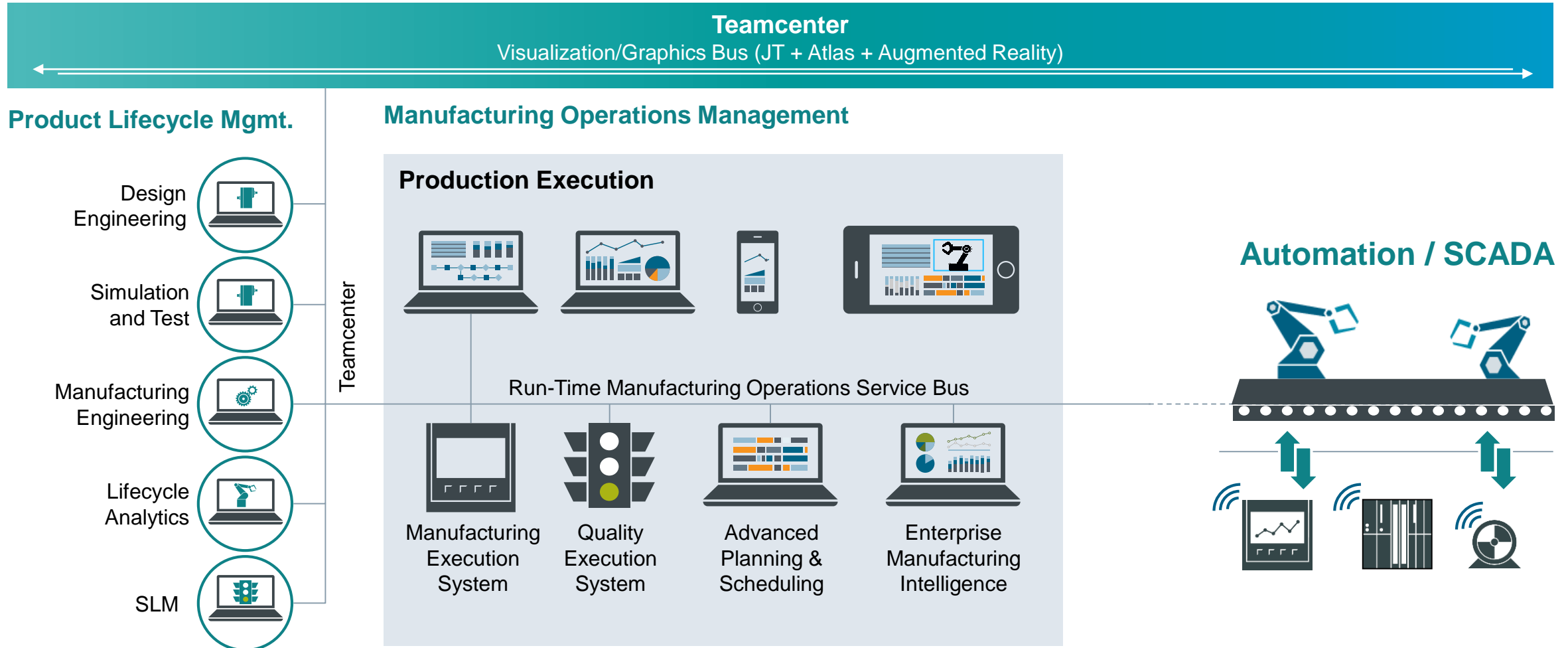
Responsive UI for smart devices

Siemens MOM solutions are smart devices ready



Digital Enterprise Architecture

Role of Manufacturing Operations Management



MOM portfolio – Covering all manufacturing disciplines



Siemens Opcenter Portfolio

R&D and Laboratory



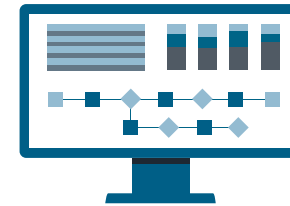
- Advanced product Quality planning
- Supplier Quality
- Production Quality
- Laboratory Management
- Complaint management
- Audit management

Planning & Scheduling



- Long and mid-term Planning
- Resource capacity
- Order prioritization
- Sequencing and Synchronization
- Production change

Execution



- Order Management
- Inventory and internal logistics
- Tracking and Tracing
- Task management
- Performance Monitoring
- Interoperability
- Specification and Recipe Management

Intelligence



- Enterprise and multi-plant visibility
- Self-Service data discovery and dashboards
- KPI calculation, root-cause and advanced analytics

CHALLENGE:

- Implement an efficient scheduling system
- Control all process operations
- Minimize the travel between wine storehouses
- Need to guarantee on time delivery

INTEGRATED SOLUTION: OPCENTER SCHEDULING

12% PRODUCTIVITY INCREASE

20% TIME SAVINGS in PLANNING

0% LATE DELIVERIES

“We needed a tool to plan and schedule the work of our teams by minimizing the travel between the wine storehouses by optimizing the filling and the routes of the truck tanks between various sites. Most importantly, we wanted to guarantee that the eau de vie were delivered by the required deadlines.”

Lydie Bardeau Planning Manager EDVMartell



CHALLENGE:

Create High Level Standards
Carefully Manage the Vineyards
Optimize Complex Sensitive Processes

INTEGRATED SOLUTION: OPCENTER EXECUTION

100% PROCESS
STANDARDIZATION

12,7 SQUARE Km of
VINEYARDS
Managed by
SIMATIC IT

0 PAPER

“Traditionally, the grape quality and vintner’s skills were the deciding factors. With the help of Siemens’ digital technologies, we have standardized the overall production process management.”

Li Zefu Chief Engineer
Great Wall Wine Yantai Winery



“Dairy Industry 4.0”: the future is now

BUSINESS CHALLENGES

Growing productions and strict quality standards

Urgent need to upgrade traditional manual quality control to a digitized system

Regulatory compliance



KEY TO SUCCESS

Smooth integration between different elements of Siemens portfolio (LIMS and TIA)

OUTCOME

One central LIMS for all labs

34 Quality Control Labs and 2 R&D Labs equipped

Over 90% of test data collected and uploaded automatically

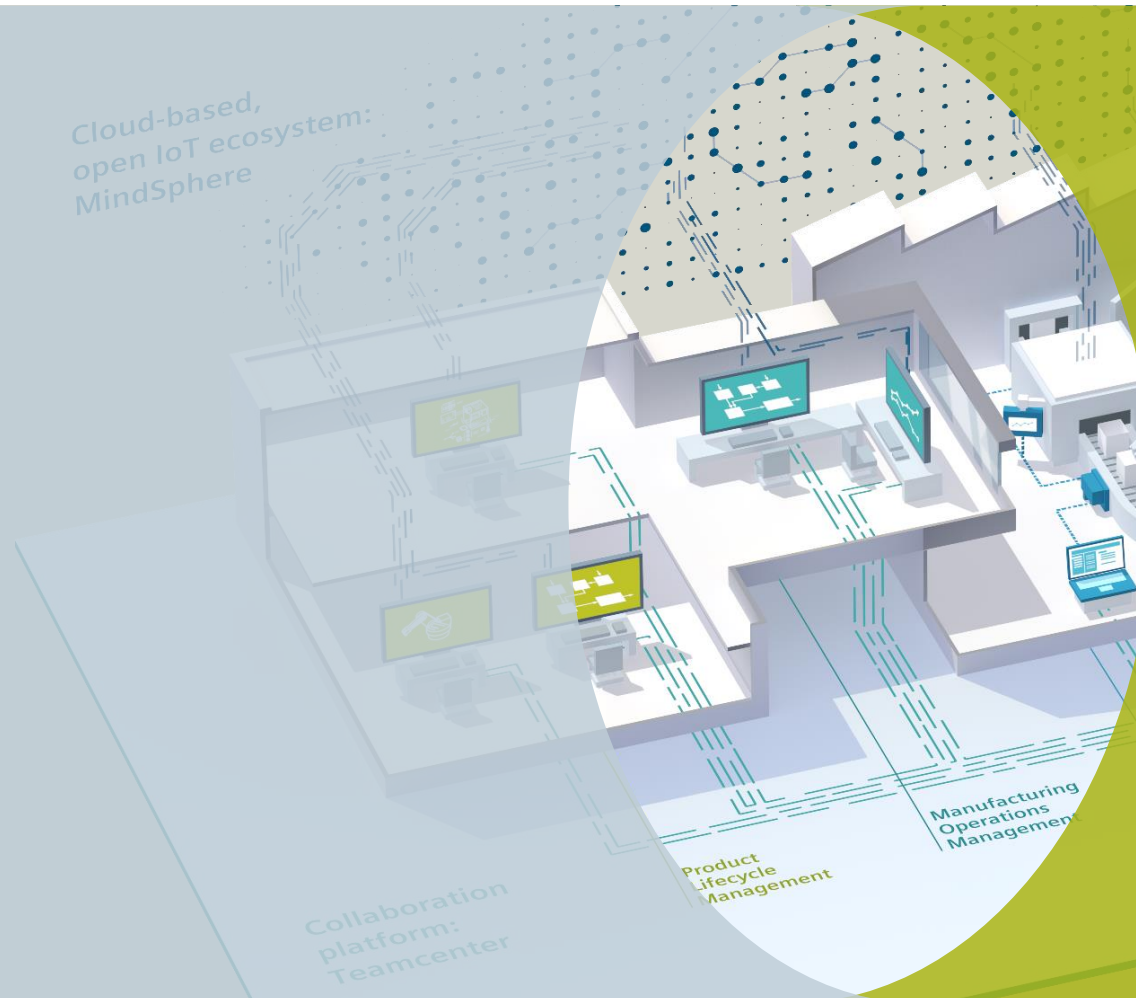
1400 test methods standardized
Test time saved by 10% - 25%

Integration with test instruments

“At Mengniu, quality control has undergone radical changes. The job has become easier while the efficiency and accuracy have increased in leaps and bounds.”

Driving Realization Efficiency

Benefits of Integrated Manufacturing Operations



- **Faster Time to Market with fast NPDI**
- **Higher efficiency due to structural savings in collaboration, process optimization and data consistency**
- **Increased flexibility, transparency and control, with reduced process complexity**
- **Regulatory compliance and quality assurance due to integrated quality and product recall capability**

Frederik Verwimp

Industry Manager CPG
MOM

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Thank you.