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SIMULATION BASED SOLUTIONS

Simulation & Optimization | Planning & Analytics

Summary

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- Brief Company Introduction
- Integrating AnyLogic with SAP Analytics Cloud Planning
- Connecting to other SAP LoB Solutions via SAP Analytics Cloud
- S&OP Business Case
- Process Description
- Step 1 – Prepare the Model Input data on SAP
- Step 2 - Run the Model importing data from SAP
- Step 3 – Analyze Output on SAP importing from AnyLogic
- The Results
- Live Demo

About ITE Consult

Enterprise Planning & Simulation Solutions

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Our Focus

20+ years of experience implementing SAP Planning & Analytic solutions and Developing AnyLogic Simulation Models to solve complex problems.

Today we focus on providing powerful **Simulation-Based Cloud Planning Solutions** enabling What-if, Risk Analysis and Optimization Scenarios on the fly, combined with modern analytics, predictive planning and machine learning capabilities.

Our next-generation Simulation-Based planning solutions-as–a-service (SaaS), allows business users to **discover, predict, and collaborate all in one place.**

Our Partners

anylogic

SAP Partner

GUROBI OPTIMIZATION

Some of Our Customers

LUPIN PHARMACEUTICALS, INC. · Bayer · NOVARTIS · MERCK · SANOFI

Aventis · ALPHIA · CJ FOODS · TENNANT · Whirlpool SENSING THE DIFFERENCE

Perfection PET FOODS · function of beauty · Cadbury · Masterfoods · kraft foods

Agri Star MEXICO · repsolypf.com · ATANOR · Albaugh Your Alternative · LVMH MOËT HENNESSY • LOUIS VUITTON

BELGO Grupo Arcelor · CIMAF · Acindar · MOLINOS · Conaprole

Cencosud · Coca-Cola · CHANDON · Coca-Cola FEMSA · MLC

TGS · vodafone · InterBarge · Liverpool · SBD

Simulation-Based Planning Solutions

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The core components and areas of our solutions include.....

Planning
- S&OP
- Demand
- Forecasting
- Predictive Analytics
- Supply Chain
- Finance
- WM & MM
- Inventory
- Transportation

Data Hub
- Historical Data
- Simulation Data
- Budget
- Forecast
- Master Data Management

Simulation
- Strategic & Operational
- Production RCCP
- Production Detailed Scheduling
- CPG DTC & Retail
- Barges Operation
- Pet Food
- Fisheries
- Beauty
- Venture Analysis
- Product Launch
- Linear Programing

Analytics
- Interactive Stories
- Data Analytics
- Machine Learning
- Excel add-in
- Comments & Collaboration

Digital Twins – Industry Specific Models

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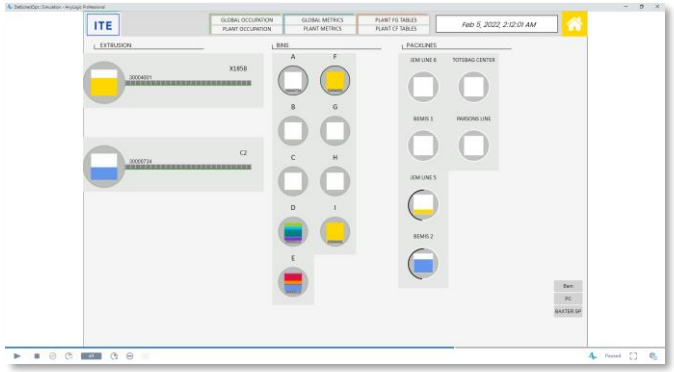
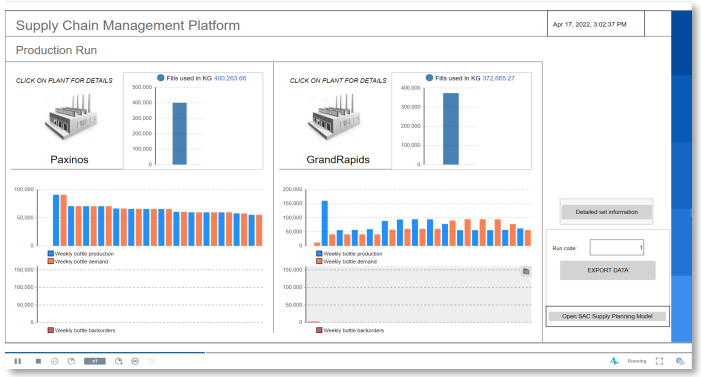
Industry Specific Digital Twins that can be tailored to customers needs and are already integrated to our SAP Cloud Planning & Analytic Platform.

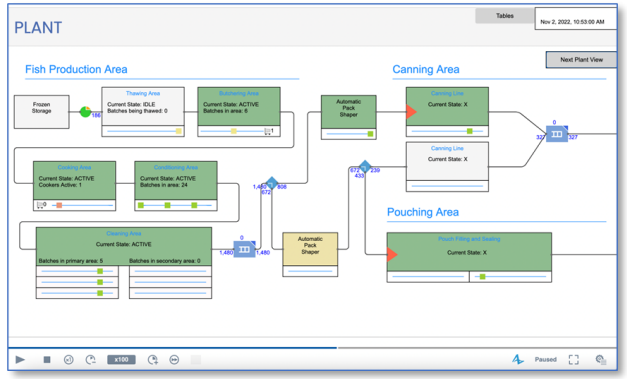
Pet Food Industry
Production Optimization & Detailed Scheduling



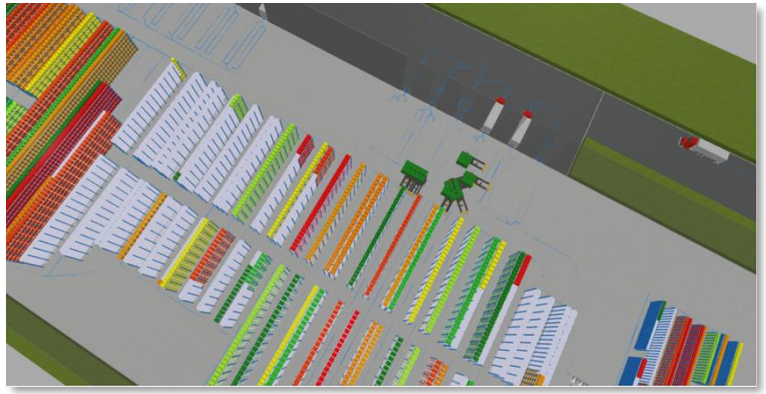
Beauty Industry
DTC & Retail Production & Inventory Optimization



Fishery Industry
Production Optimization

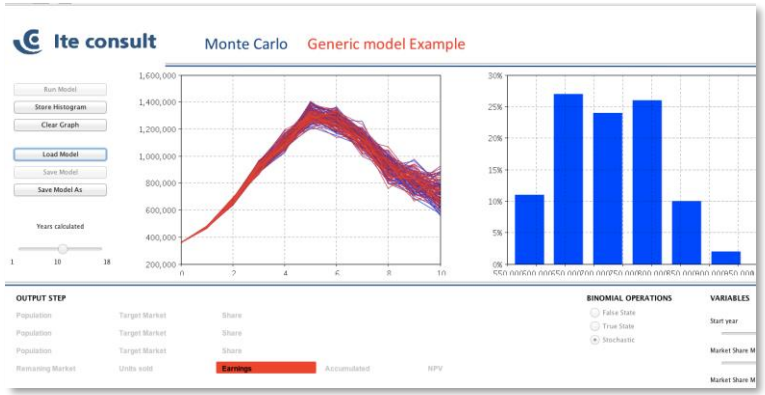


Warehouse Management
Testing Different WM Approaches



In-Land River Transportation
Barges Operation Optimization

Venture Analysis
P&L, NPV & ROI Risk Scenarios



The Integration with SAP Analytics Cloud

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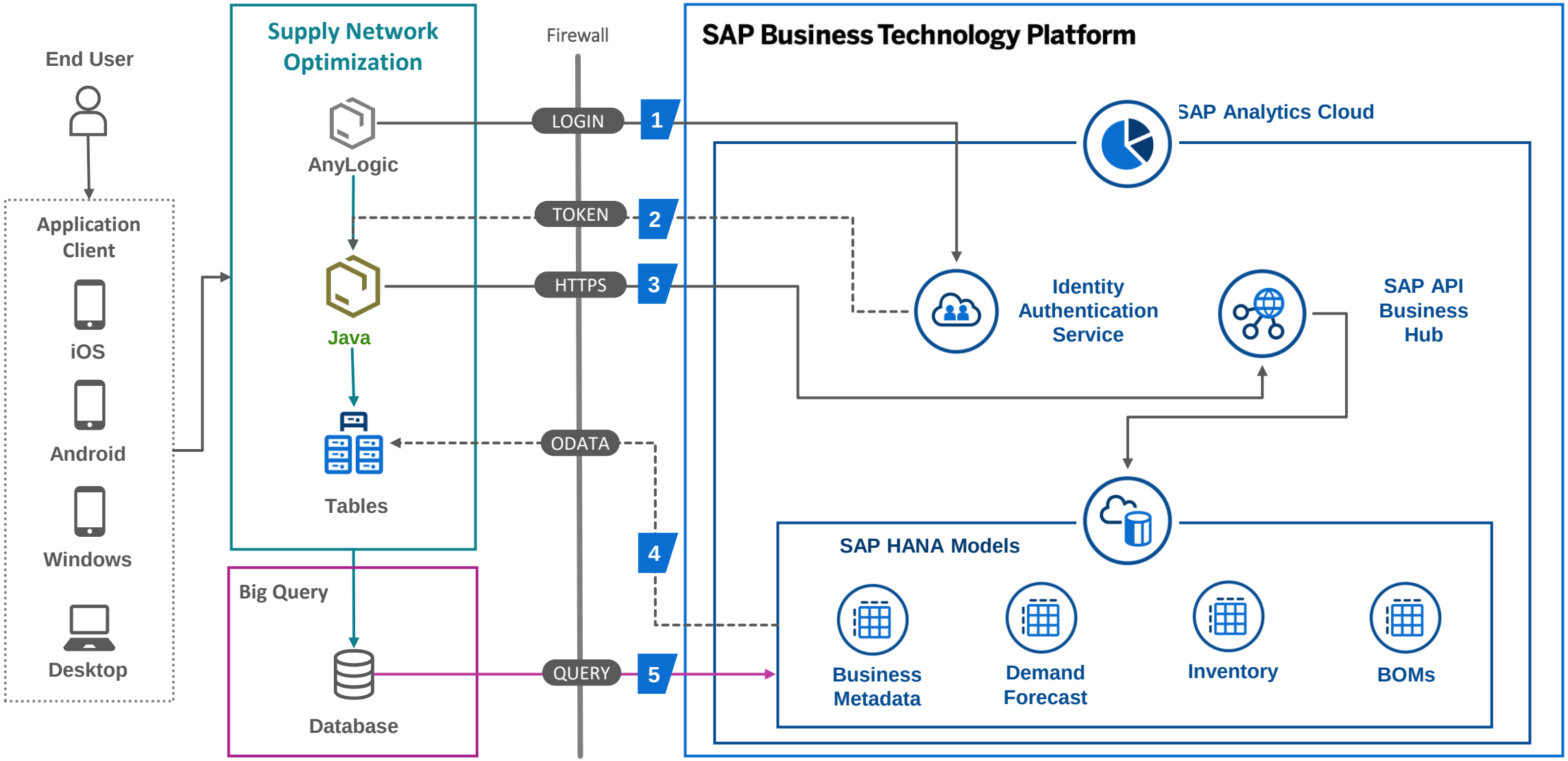

Connecting to other SAP Solutions from SAC

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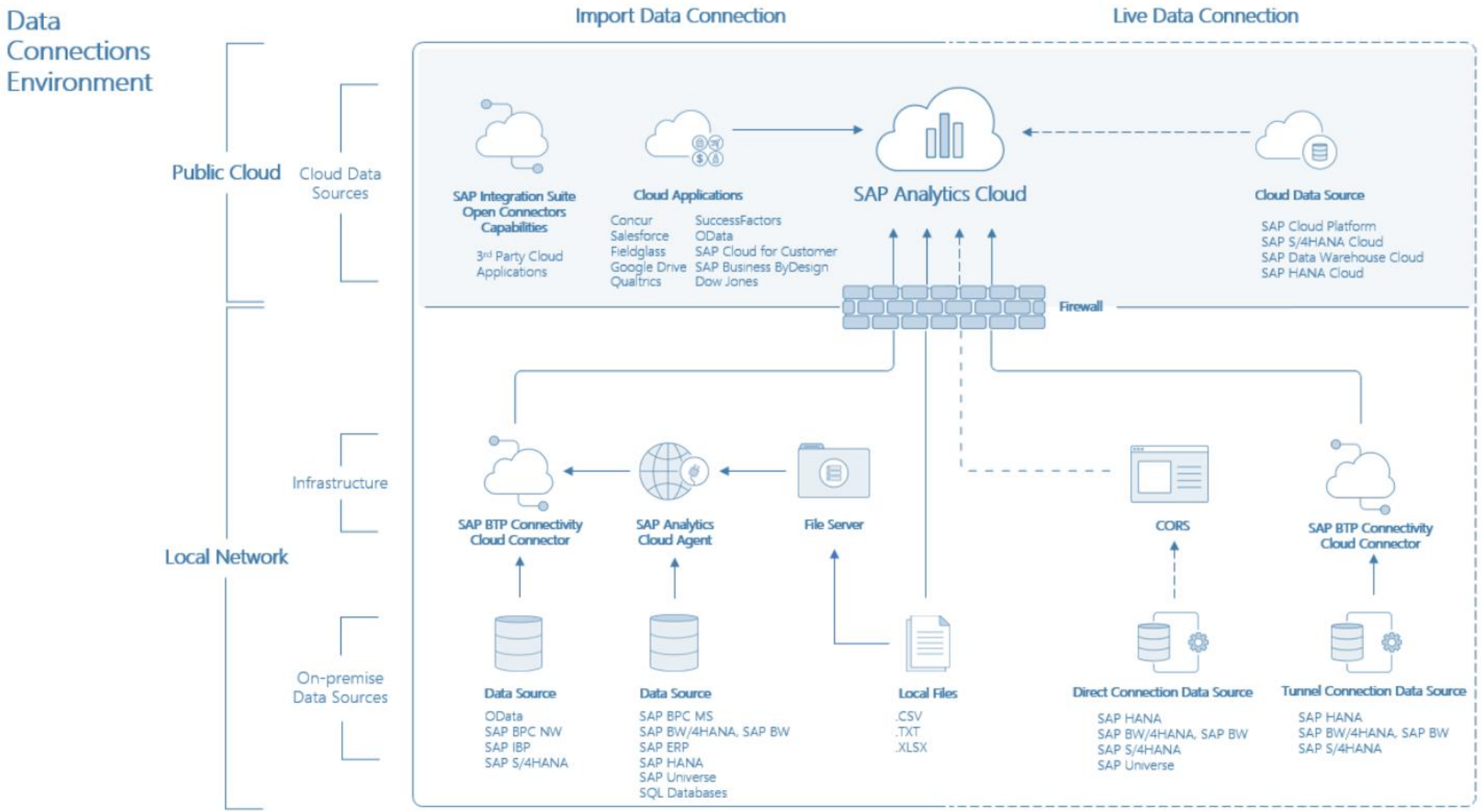

Business Case

Sales & Operations Planning

ITE Consult provides a **Simulation-Based S&OP Cloud Solution** as-a-Service, based on SAP Analytics Cloud, and seamlessly integrated with a **Supply Planning Simulation & Optimization** Model build with AnyLogic and Gurobi.

The Solution Components:

- **DATA HUB**: Provide a SPOT for all relevant data for the S&OP Process (Historical, Budget & Forecast Data)
- **PLANNING**: Provide all necessary S&OP process functionality for Demand Planning & Supply Planning
- **SIMULATION**: Provide a Supply Planning Simulation & Optimization Model to find a feasible RCCP plan for different Scenarios, based on most relevant variables:
  - Alternative Demand Inputs
  - Production capacity (Plants)
  - OEE (Lines)
  - Production Rates (SKU)
  - Labor Restriction (Shifts)
  - Inventory Policies (WOS)
  - Costs Valuation (Inventory Cost)

Digital Twin Integrated in the S&OP Cycle

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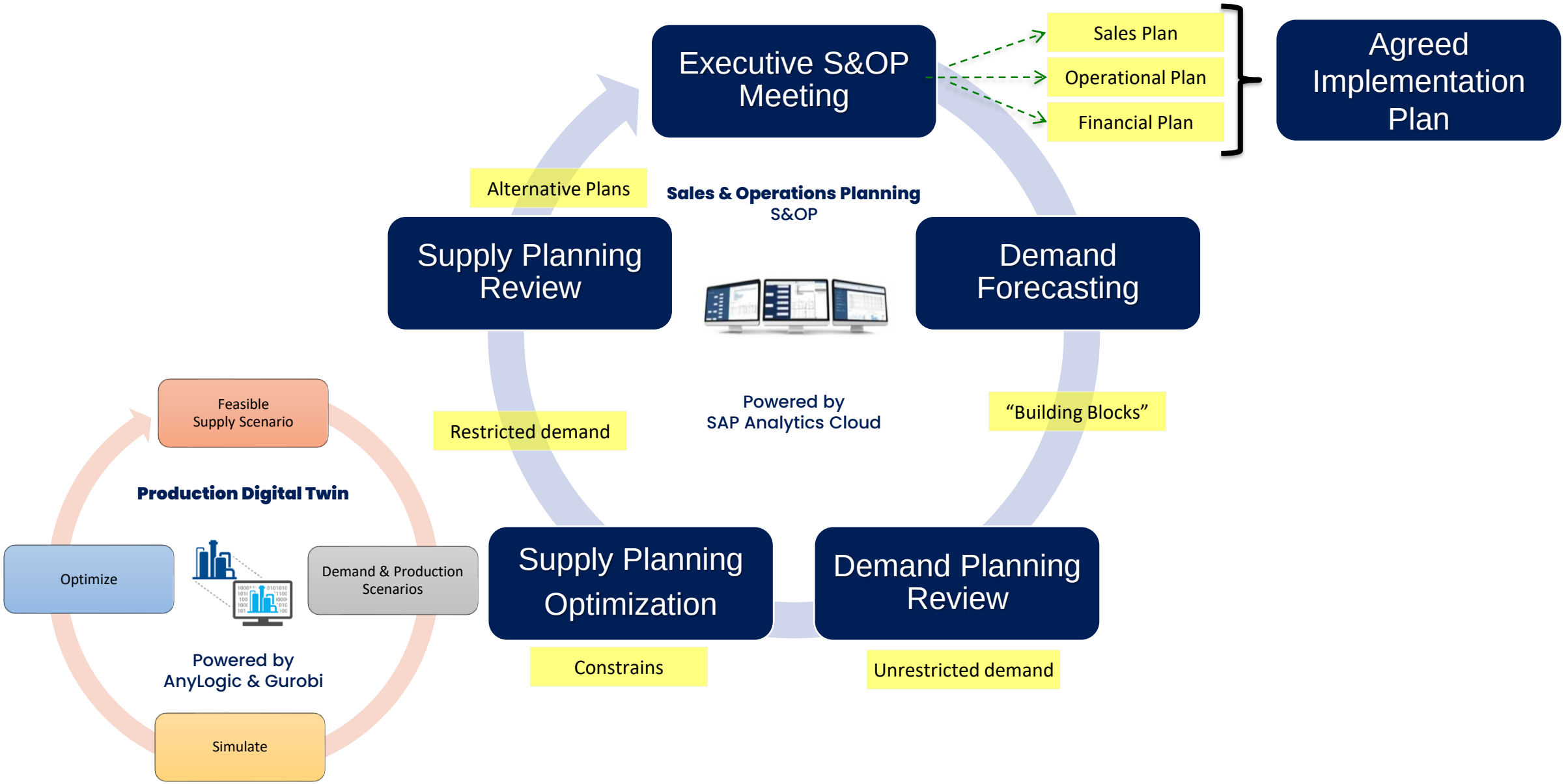

Data Flow Between SAC, AnyLogic & Gurobi

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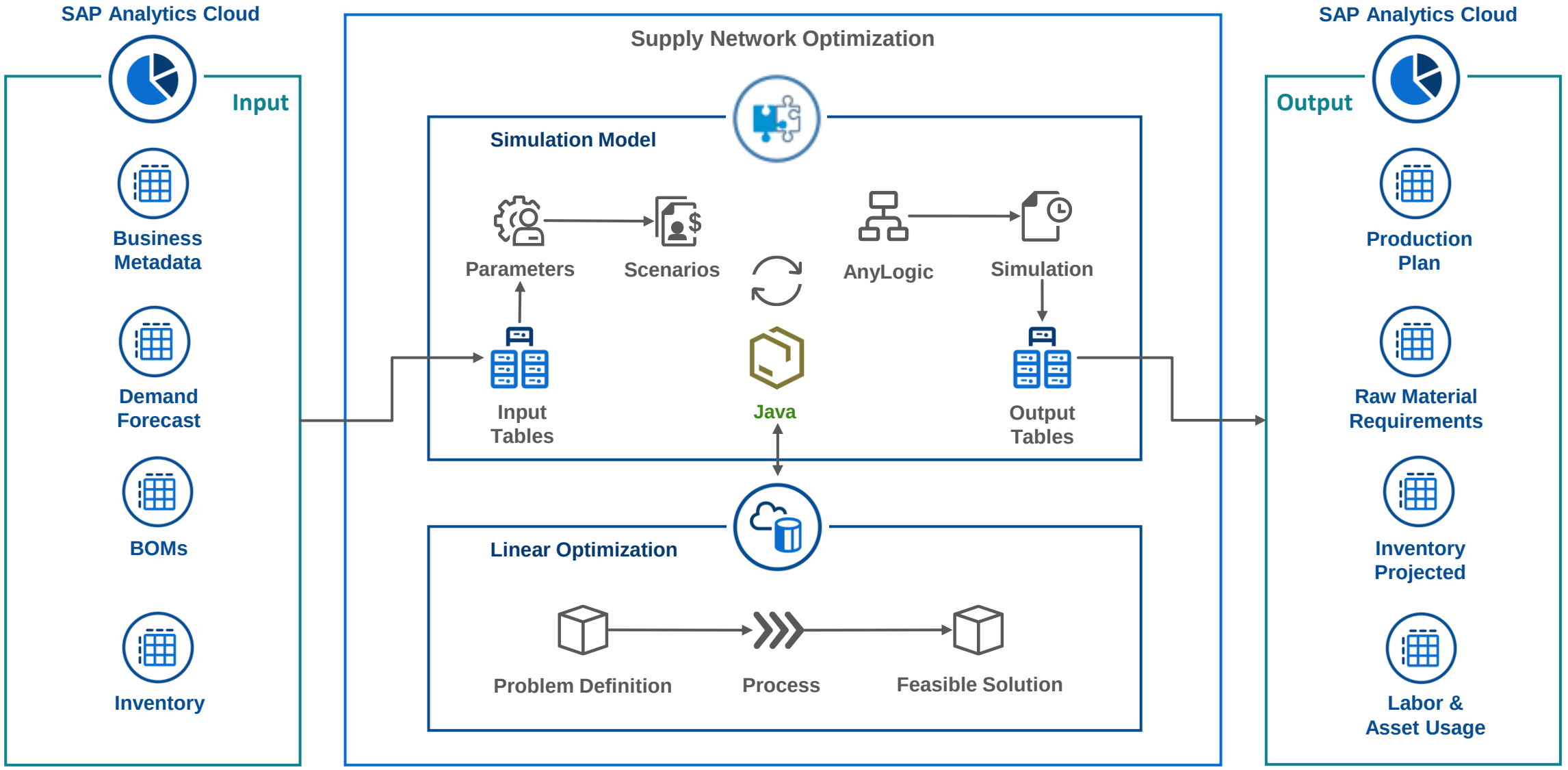


Solution Cloud Access

The cloud solution access is independent from the user's platform and can be configured for each user. The digital twin can run locally on User's machine. No IT technical skills or Software installation required.

End User

Application Client

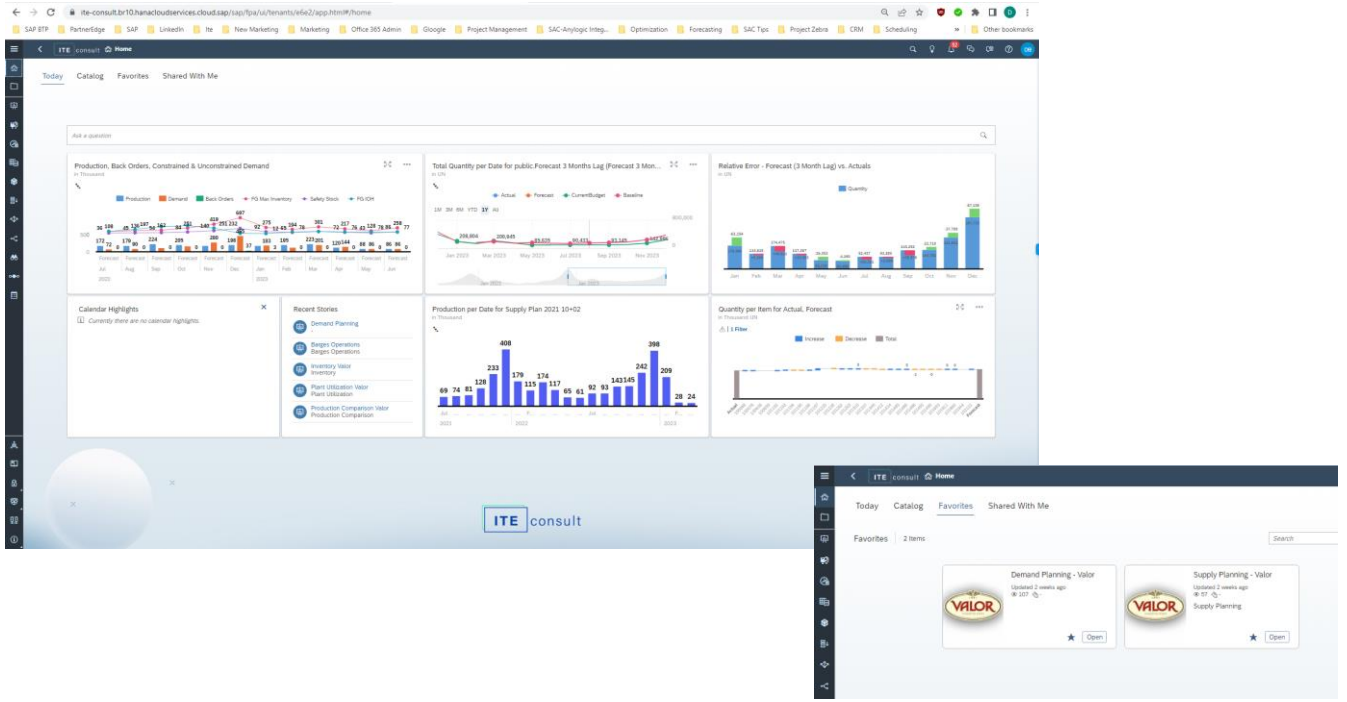
iOS

Android

Windows

Desktop

Web Browser Easy Access & Customized by Users



No Software Installation Needed - No Technical Resources Needed – No System Updates Needed

Data Hub & Single Point of Truth

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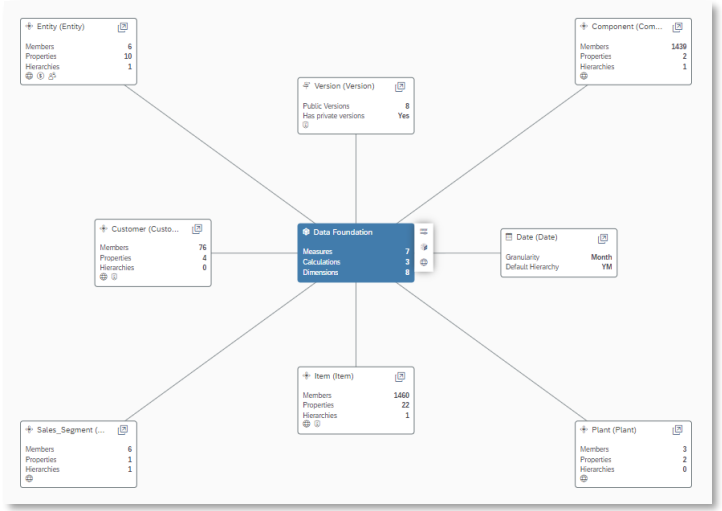
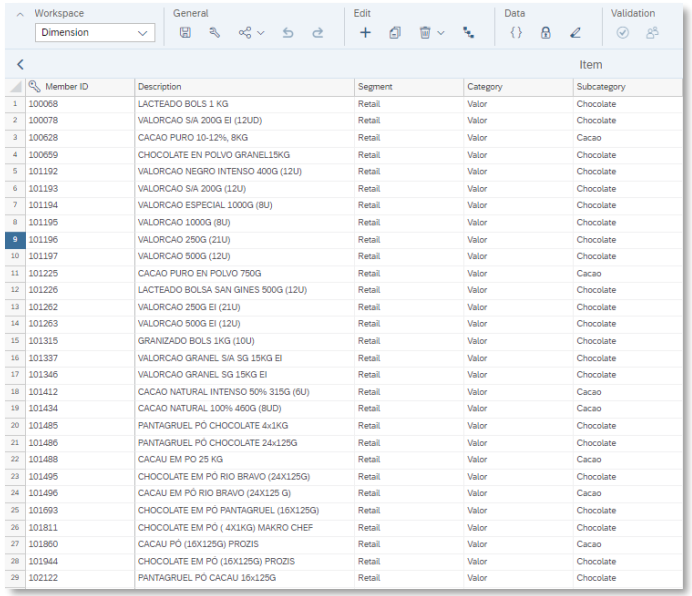
Load Historical, Budget & Forecast Data from multiple source systems. Handle Master Data and custom grouping attributes & hierarchies locally. Set metadata to dynamically build and control the model.

Data Models

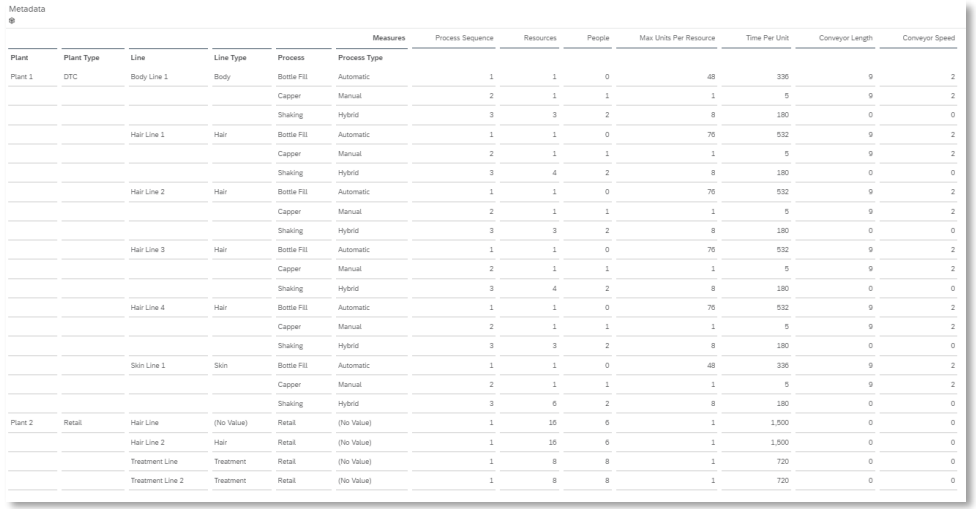


Dimensions & Attributes



	Member ID	Description	Segment	Category	Subcategory
1	100068	LACTEADO BOLS 1 KG	Retail	Valor	Chocolate
2	100078	VALORCAO S/A 200G EI (12UD)	Retail	Valor	Chocolate
3	100628	CACAO PURO 10-12%, 8KG	Retail	Valor	Cacao
4	100659	CHOCOLATE EN POLVO GRANEL15KG	Retail	Valor	Chocolate
5	101192	VALORCAO NEGRO INTENSO 400G (12U)	Retail	Valor	Chocolate
6	101193	VALORCAO S/A 200G (12U)	Retail	Valor	Chocolate
7	101194	VALORCAO ESPECIAL 1000G (8U)	Retail	Valor	Chocolate
8	101195	VALORCAO 1000G (8U)	Retail	Valor	Chocolate
9	101196	VALORCAO 250G (21U)	Retail	Valor	Chocolate
10	101197	VALORCAO 500G (12U)	Retail	Valor	Chocolate
11	101225	CACAO PURO EN POLVO 750G	Retail	Valor	Cacao
12	101226	LACTEADO BOLSA SAN GINES 500G (12U)	Retail	Valor	Chocolate
13	101262	VALORCAO 250G EI (21U)	Retail	Valor	Chocolate
14	101263	VALORCAO 500G EI (12U)	Retail	Valor	Chocolate
15	101315	GRANIZADO BOLS 1KG (10U)	Retail	Valor	Chocolate
16	101337	VALORCAO GRANEL S/A SG 15KG EI	Retail	Valor	Chocolate
17	101346	VALORCAO GRANEL SG 15KG EI	Retail	Valor	Chocolate
18	101412	CACAO NATURAL INTENSO 50% 315G (6U)	Retail	Valor	Cacao
19	101434	CACAO NATURAL 100% 460G (8UD)	Retail	Valor	Cacao
20	101485	PANTAGRUEL PÓ CHOCOLATE 4x1KG	Retail	Valor	Chocolate
21	101486	PANTAGRUEL PÓ CHOCOLATE 24x125G	Retail	Valor	Chocolate
22	101488	CACAU EM PO 25 KG	Retail	Valor	Cacao
23	101495	CHOCOLATE EM PÓ RIO BRAVO (24X125G)	Retail	Valor	Chocolate
24	101496	CACAU EM PÓ RIO BRAVO (24X125 G)	Retail	Valor	Cacao
25	101693	CHOCOLATE EM PÓ PANTAGRUEL (16X125G)	Retail	Valor	Chocolate
26	101811	CHOCOLATE EM PÓ (4X1KG) MAKRO CHEF	Retail	Valor	Chocolate
27	101860	CACAU PÓ (16X125G) PROZIS	Retail	Valor	Cacao
28	101944	CHOCOLATE EM PÓ (16X125G) PROZIS	Retail	Valor	Chocolate
29	102122	PANTAGRUEL PÓ CACAU 16x125G	Retail	Valor	Chocolate

Business Metadata

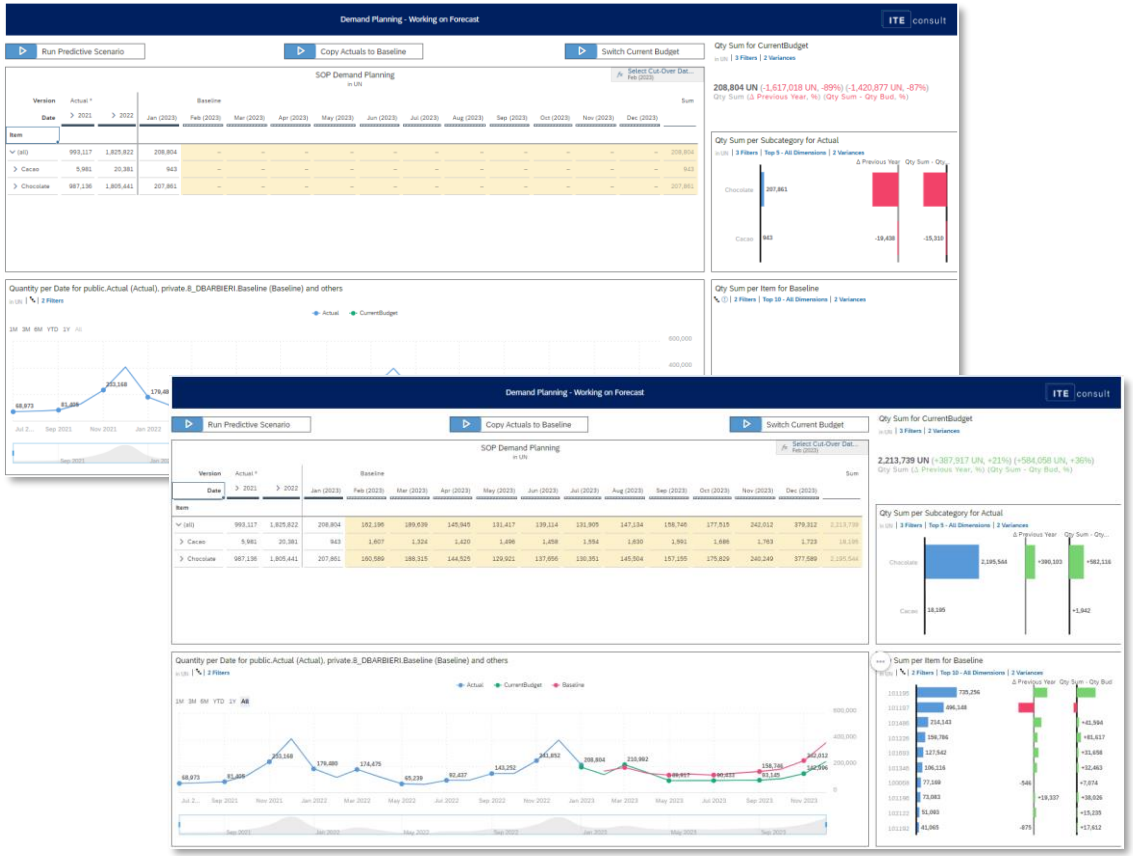


						Measures	Process Sequence	Resources	People	Max Units Per Resource	Time Per Unit	Conveyor Length	Conveyor Speed
Plant	Plant Type	Line	Line Type	Process	Process Type								
Plant 1	DTC	Body Line 1	Body	Bottle Fill	Automatic		1	1	0	48	336	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	3	2	8	180	0	0
		Hair Line 1	Hair	Bottle Fill	Automatic		1	1	0	76	532	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	4	2	8	180	0	0
		Hair Line 2	Hair	Bottle Fill	Automatic		1	1	0	76	532	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	3	2	8	180	0	0
		Hair Line 3	Hair	Bottle Fill	Automatic		1	1	0	76	532	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	4	2	8	180	0	0
		Hair Line 4	Hair	Bottle Fill	Automatic		1	1	0	76	532	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	3	2	8	180	0	0
		Skin Line 1	Skin	Bottle Fill	Automatic		1	1	0	48	336	9	2
				Capper	Manual		2	1	1	1	5	9	2
				Shaking	Hybrid		3	6	2	8	180	0	0
Plant 2	Retail	Hair Line	(No Value)	Retail	(No Value)		1	16	6	1	1,500	0	0
		Hair Line 2	Hair	Retail	(No Value)		1	16	6	1	1,500	0	0
		Treatment Line	Treatment	Retail	(No Value)		1	8	8	1	720	0	0
		Treatment Line 2	Treatment	Retail	(No Value)		1	8	8	1	720	0	0

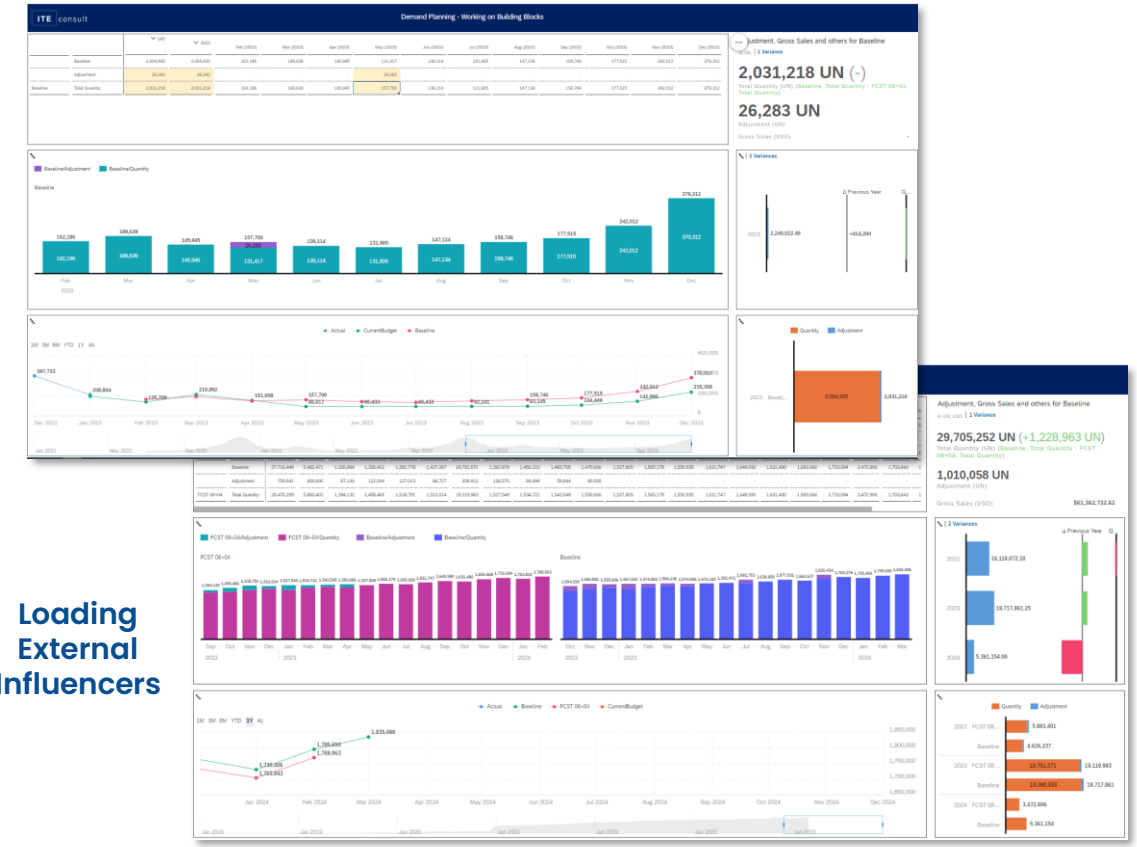
Forecasting & Demand Planning Functions

Use Predictive Analytics to generate statistical baselines, based on historical data and external influencers, add top-down lifts to create the new forecast, while comparing to Actuals, Budget and Previous Forecasts.

Running Predictive Demand Models



Loading Building Block Lifts

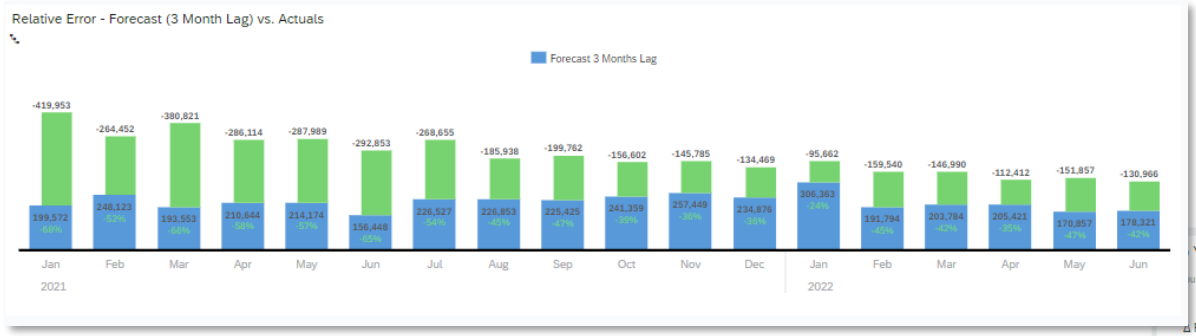


Loading External Influencers

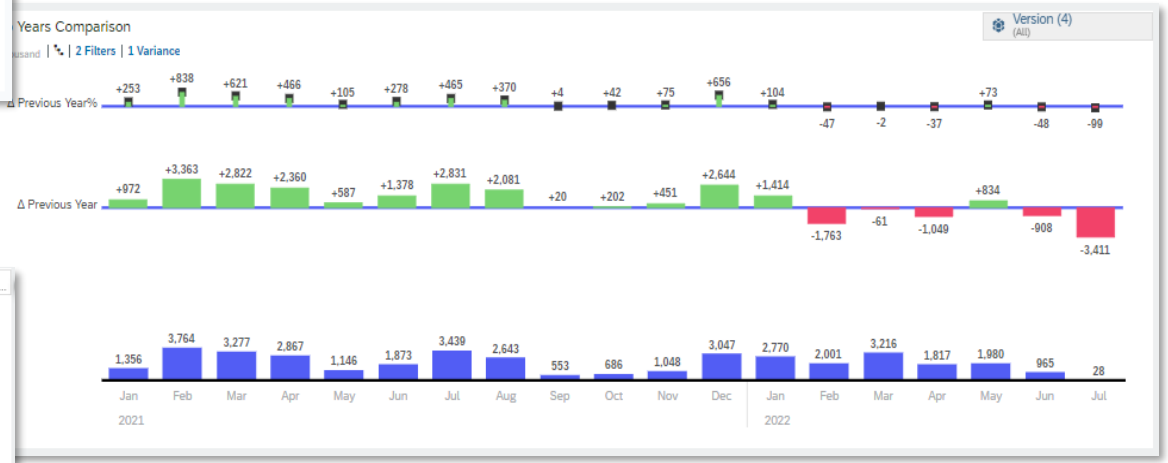
Demand Planning Analytic Capability

Use Demand Plan analytic interactive stories, use Machine Learning to find more insights, and share with other users, allowing commenting and collaboration

MAPE & BIAS Analysis



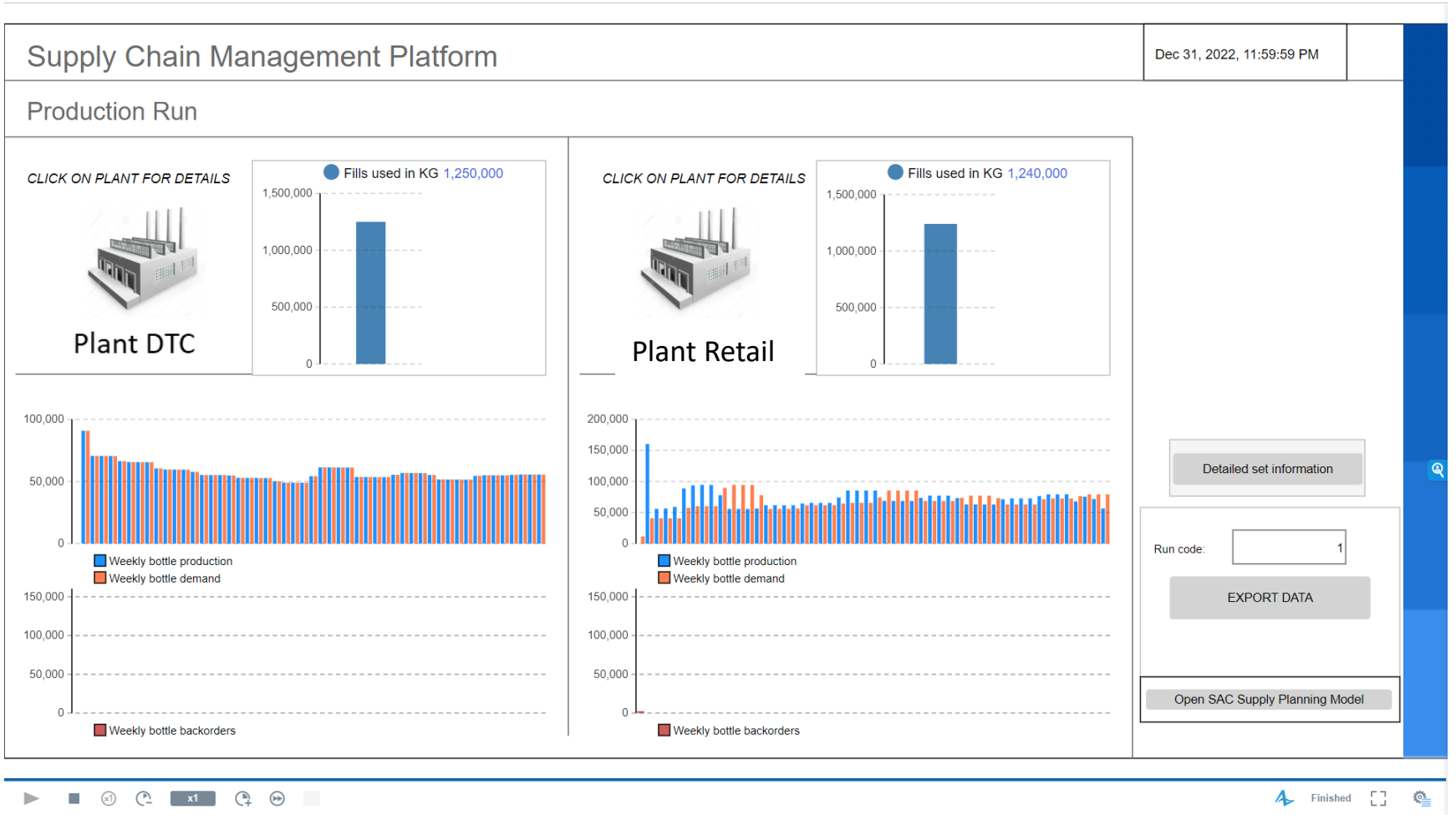
Actual vs Last Year Analysis



Actual, Budget & Forecasts Analysis

Supply Network Optimization Integration

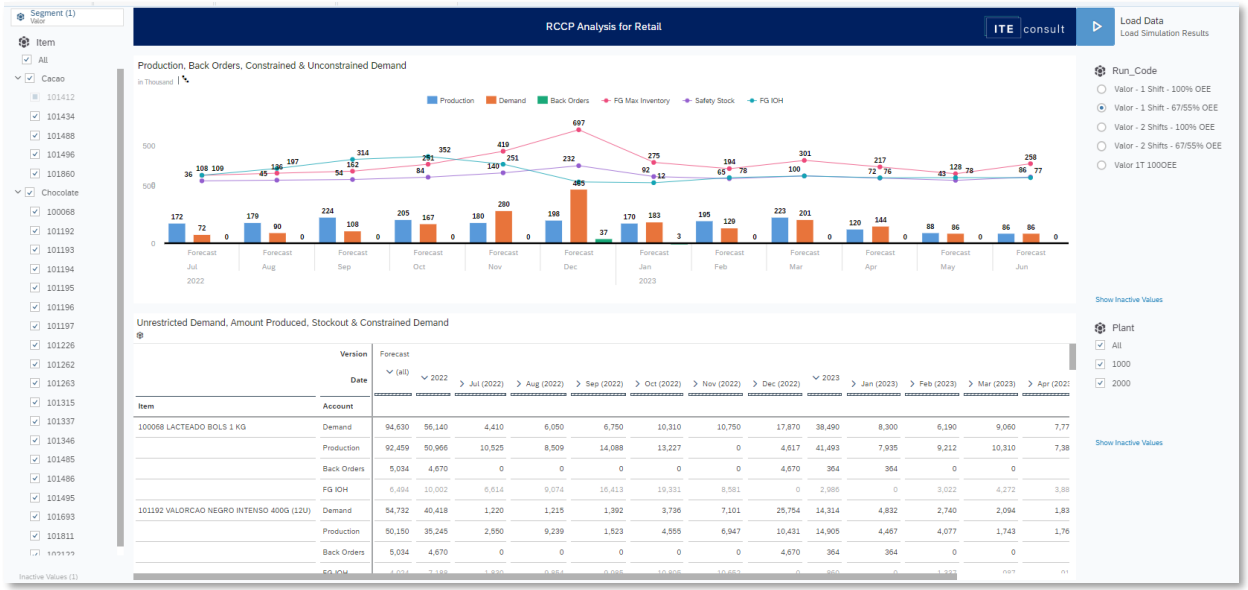
Run 12-18RM RRCP scenarios based on the Demand Plan and current Inventory, optimizing the production capacity, inventory levels, and labor. For Make-to-Stock and/or Make-to-Order.



Analyzing Supply Planning Scenarios

Analyze the multiple RCCP scenarios generated by the Simulation & Optimization Tool, including FG Production Plan, RM Requirements and optimized Inventory Levels Projected

FG Production Plan and Inventory level compared to Safety Stock, Min/Max WOS

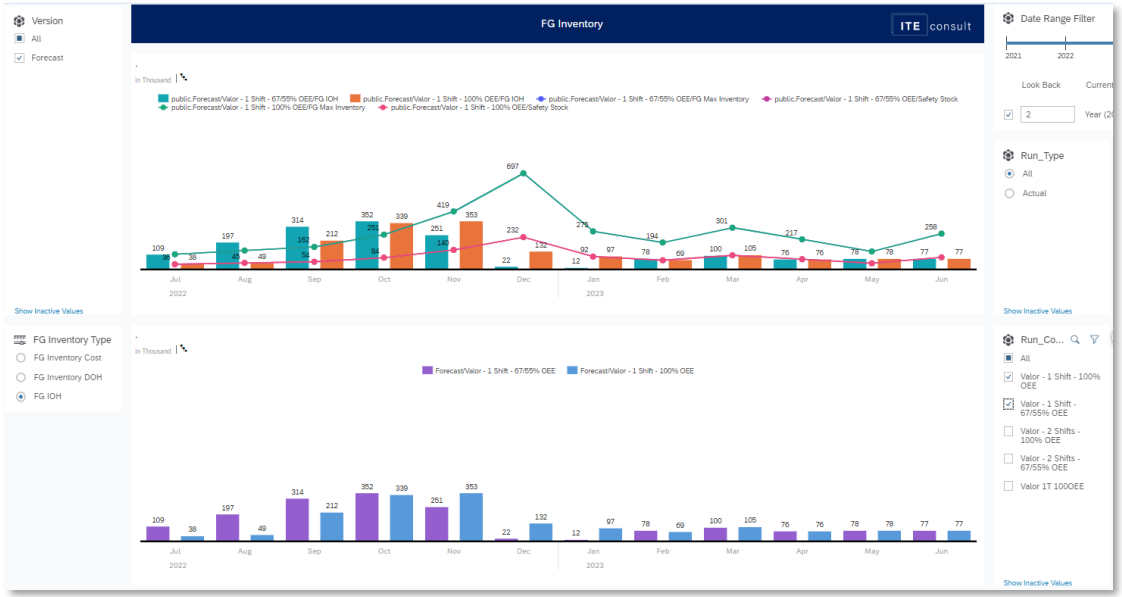


Compare multiple FG Projected Production Plan Scenarios

Analyzing Inventory & Plant Utilization

Analyze inventory KPI's (IOH, DHI and Inventory Costs), Plant and Labor Utilization from the multiple scenarios generated by the Simulation & Optimization Tool

Projected FG IOH, DOH and Cost



Plant Time, Labor & Shifts Utilization for different RCCP Scenarios

Business Case

Sales & Operations Planning

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The Results

1. Data Hub
   - Validated Historical Data from multiple Source Systems and Files
   - Master Data Management by Business Users

2. Demand Planning
   - Monthly Statistical Baseline for 18 Rolling Months
   - Marketing Lifts managed as Building Blocks
   - MAPE & BIAS Improvement

3. Supply Planning
   - Weekly Production Plan for 18 Rolling Months with no Stock-Outs & optimized Inventory
   - Material Requirement projected, considering Lead Time & Min batch sizes
   - Huge Reduction of Inventory costs projected, optimizing to safety stock (WOS) Levels
   - Labor restriction projected
   - Machine Usage Projected

Benefits of Cloud Solutions
Compared to Traditional In-House Applications

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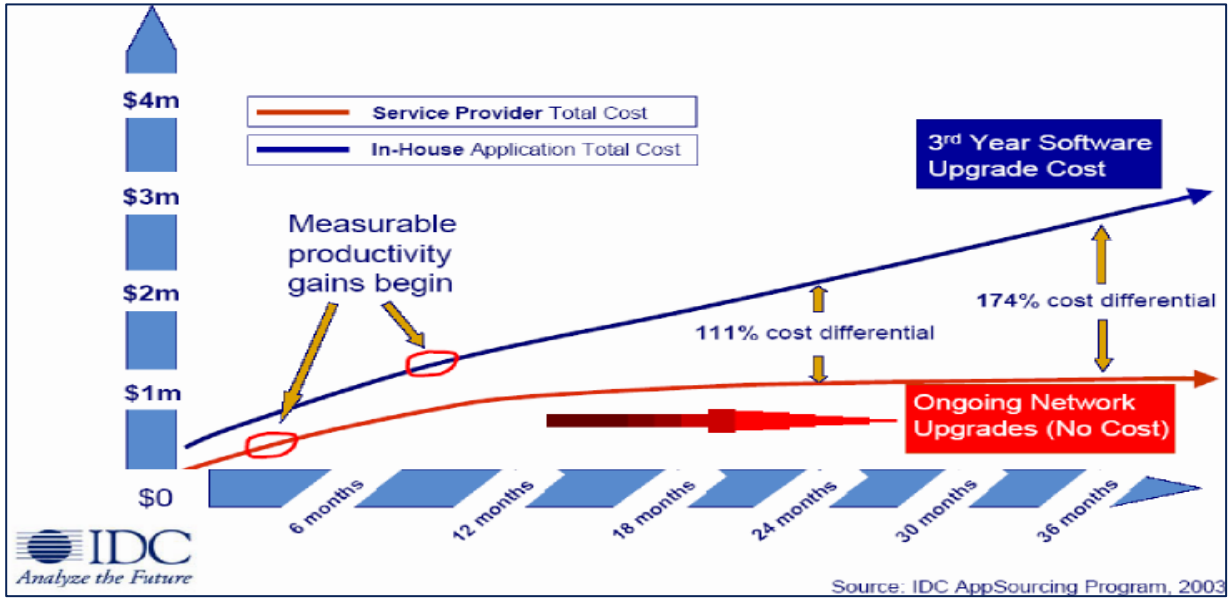
Benefits of Cloud-Managed Solutions compared to Traditional In-House Applications

- ✓ **Lower Total Cost of Ownership (TCO)**
  - Avoid cost and delays associated with buying and installing hardware and networks, and yearly upgrades
- ✓ **Faster Time to Value**
  - Avoid traditional extended project timeline to accommodate extensive customization
  - Start agile and expand to other areas improving measurable results and optimizing resources
  - Integrate Planning & Simulation/Optimization modeling tools for scenario analysis
  - Get on-going support for the entire planning cycle, from data preparation to key LOB planning functionality



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LIVE DEMO!

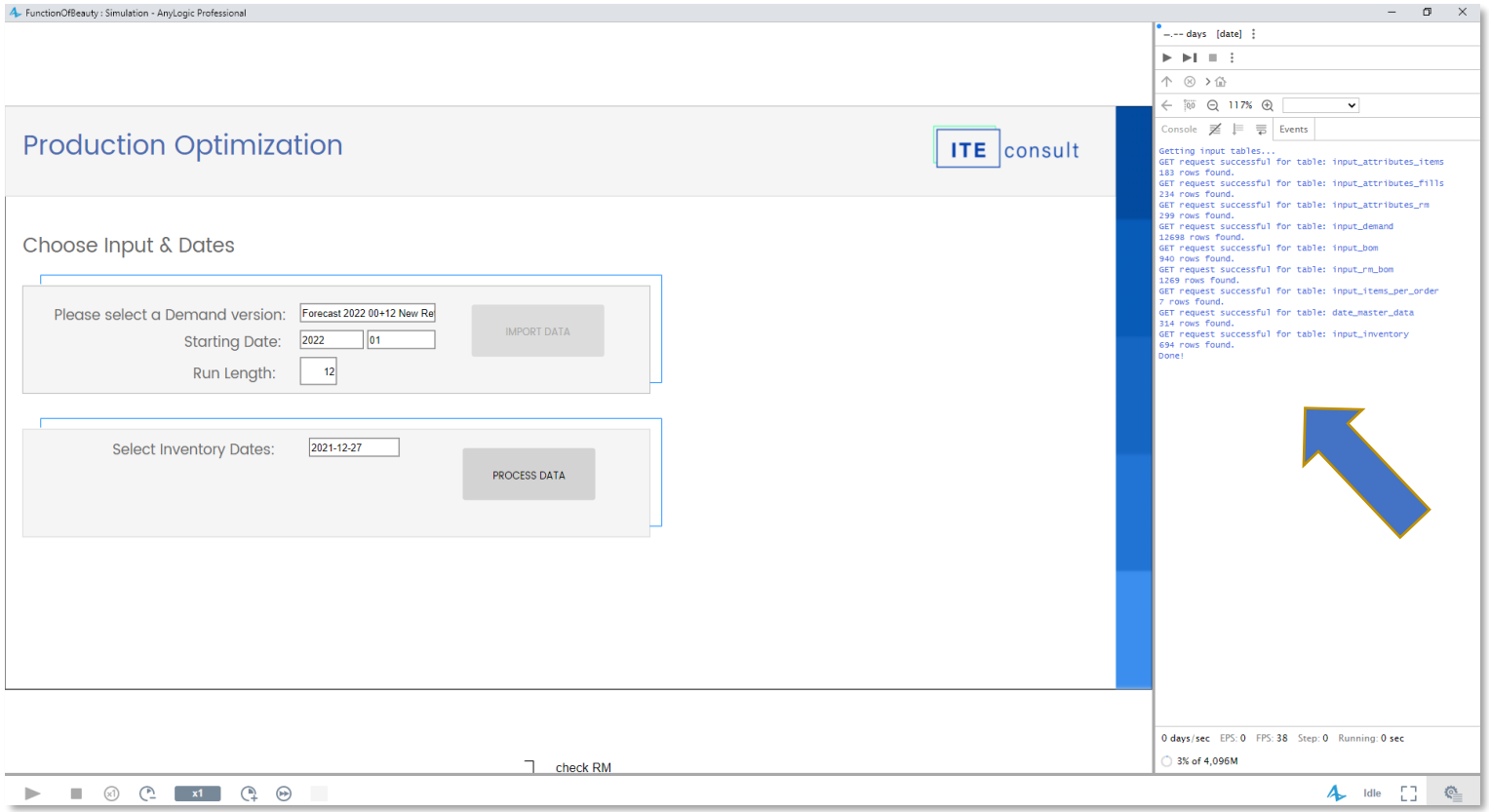
SIMULATION BASED SOLUTIONS

Simulation & Optimization | Planning & Analytics

AnyLogic Seamless Integration with SAP

After opening the Model, a connection is established with SAP Analytics Cloud, and all the master data and business metadata is downloaded generating the objects in the model.

Selecting the Demand Planning Version to process



Connecting to multiple data models on SAP to read the the Demand Plan, BOM, Inventory and all necessary Master Data

AnyLogic Seamless Integration with SAP

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All Information to dynamically create the model elements and control the behavior are set in SAP Analytics Cloud Data. Users can change or add new Plants, Production Lines or Production Process steps, and set the default model parameters.

Business Metadata On Sap Analytics Cloud Planning

Metadata

Table Information

Plant	Plant_Type	Line	Line_Type	Process	Measures / Process_Type	Process Sequence	Resources	People	Max Units Per Resource	Time Per Unit	Conveyor Length	Conveyor Speed
Plant 1	DTC	Body Line 1	Body	Bottle Fill	Automatic	1	1	0	48	336	9	2
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	3	2				
		Hair Line 1	Hair	Bottle Fill	Automatic	1	1	0				
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	4	2				
		Hair Line 2	Hair	Bottle Fill	Automatic	1	1	0				
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	3	2				
		Hair Line 3	Hair	Bottle Fill	Automatic	1	1	0				
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	4	2				
		Hair Line 4	Hair	Bottle Fill	Automatic	1	1	0				
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	3	2				
		Skin Line 1	Skin	Bottle Fill	Automatic	1	1	0				
				Capper	Manual	2	1	1				
				Shaking	Hybrid	3	6	2				
Plant 2	Retal	Hair Line	Hair	Retail	Automatic	1	16	6				
		Hair Line 2	Hair	Bottle Fill	Automatic	1	16	6				
		Treatment Line	Treatment	Bottle Fill	Automatic	1	8	8				

Metadata

Plant	Plant Type	Line	Line Type	Process	Measures / Process Type	Process Sequence	Resources	People	Max Units Per Resource	Time Per Unit	Conveyor Length	Conveyor Speed
Plant 1	DTC	Body Line 1	Body	Bottle Fill	Automatic	1	1	0	48	336	9	2
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				Shaking	Hybrid	3	3	2	8	180	0	0
		Hair Line 1	Hair	Bottle Fill	Automatic	1	1	0	76	532	9	2
				Capper	Manual	2	1	1	1	5	9	2
				Shaking	Hybrid	3	4	2	8	180	0	0
		Hair Line 2	Hair	Bottle Fill	Automatic	1	1	0	76	532	9	2
				Capper	Manual	2	1	1	1	5	9	2
				Shaking	Hybrid	3	3	2	8	180	0	0
		Hair Line 3	Hair	Bottle Fill	Automatic	1	1	0	76	532	9	2
				Capper	Manual	2	1	1	1	5	9	2
				Shaking	Hybrid	3	4	2	8	180	0	0
		Hair Line 4	Hair	Bottle Fill	Automatic	1	1	0	76	532	9	2
				Capper	Manual	2	1	1	1	5	9	2
				Shaking	Hybrid	3	3	2	8	180	0	0
		Skin Line 1	Skin	Bottle Fill	Automatic	1	1	0	48	336	9	2
				Capper	Manual	2	1	1	1	5	9	2
				Shaking	Hybrid	3	6	2	8	180	0	0
Plant 2	Retail	Hair Line	(No Value)	Retail	(No Value)	1	16	6	1	1,500	0	0
		Hair Line 2	Hair	Retail	(No Value)	1	16	6	1	1,500	0	0
		Treatment Line	Treatment	Retail	(No Value)	1	8	8	1	720	0	0
		Treatment Line 2	Treatment	Retail	(No Value)	1	8	8	1	720	0	0

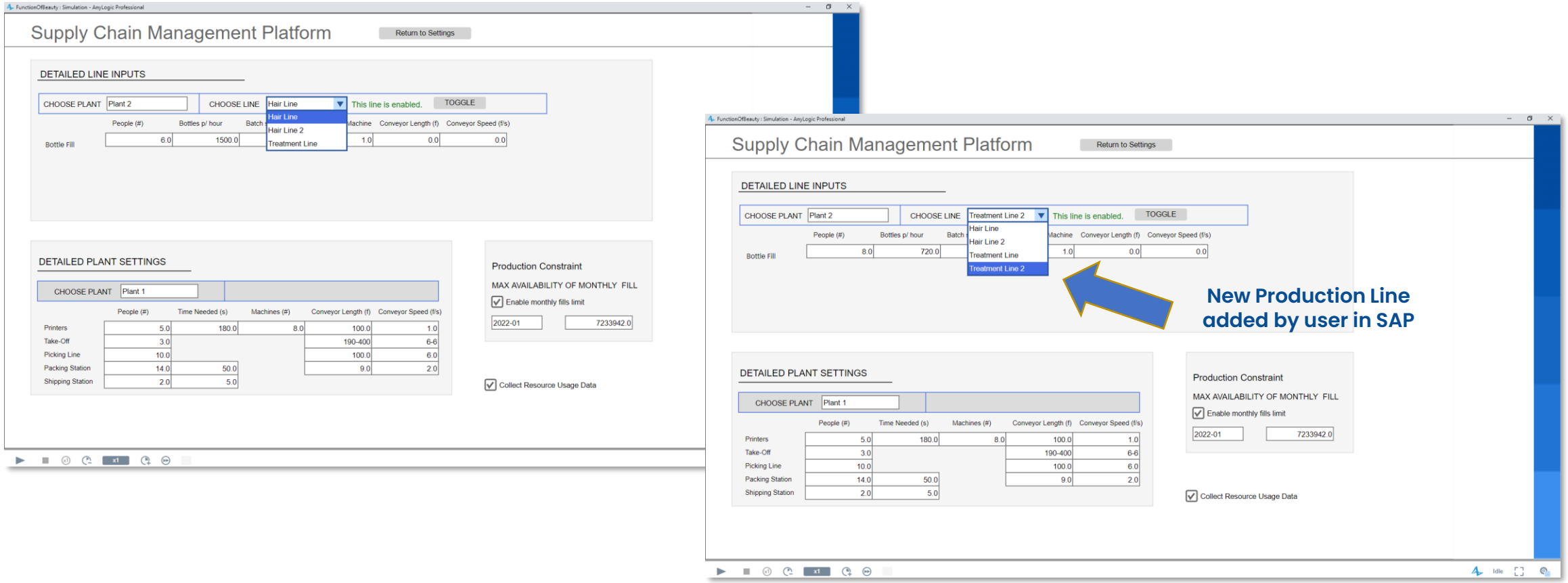
Adding a New Production Line in Plant 2

AnyLogic Seamless Integration with SAP

ITE consult

All definitions defined in SAP Analytics Clod are loaded in AnyLogic, and users can view or modify the parameters that influences the model behavior, like rates, capacities, resources, etc.

Business Metadata On Sap Analytics Cloud Planning

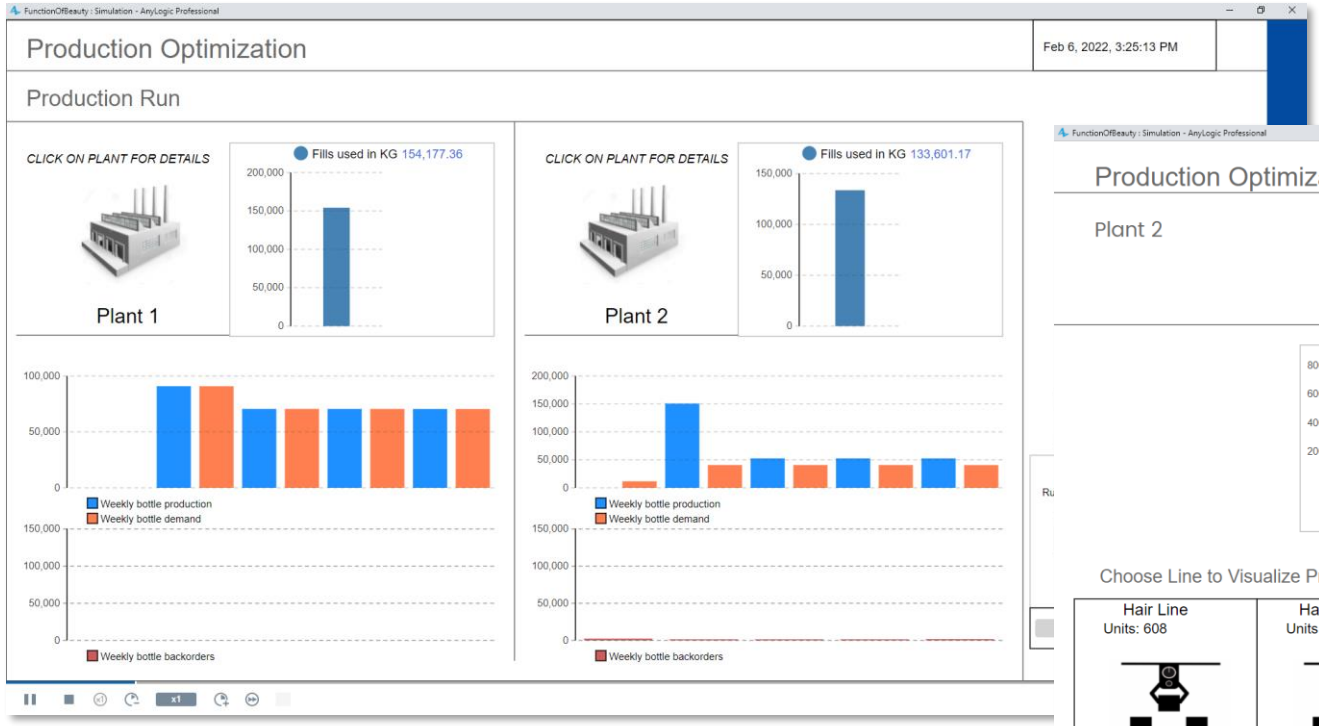


AnyLogic Seamless Integration with SAP

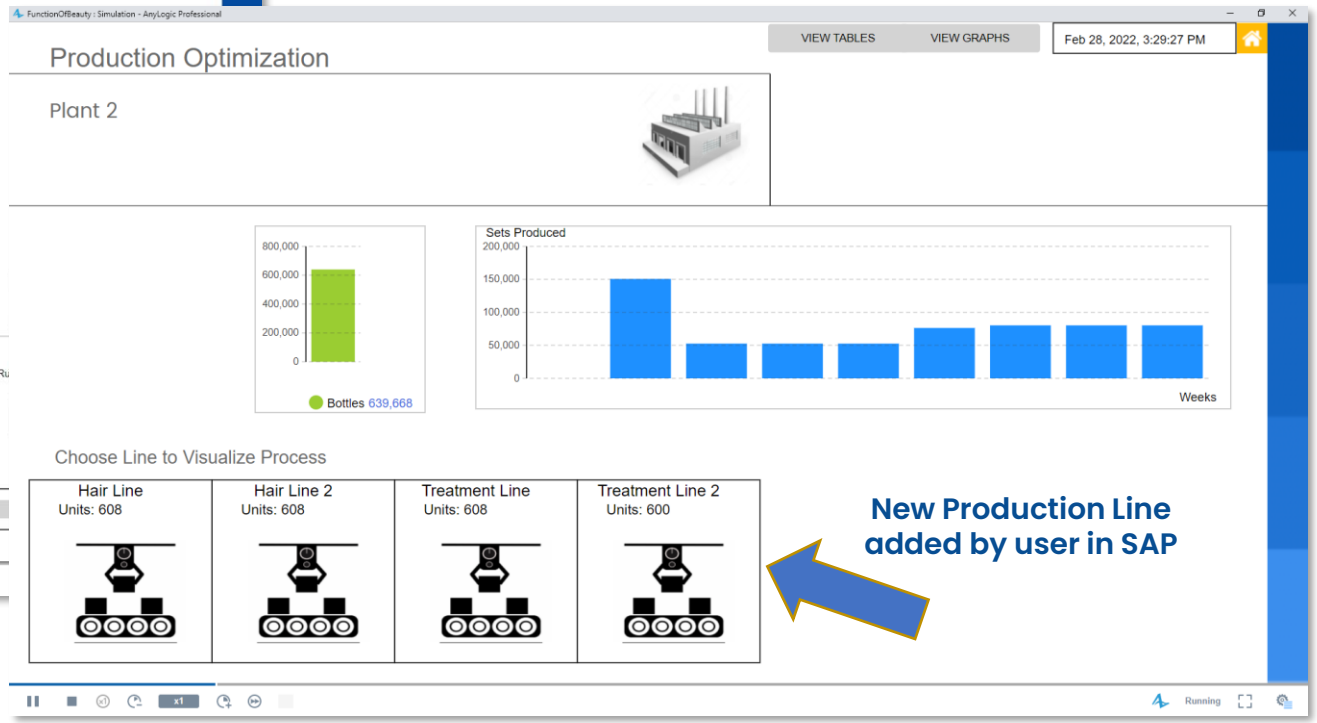
ITE consult

During the Model execution, there are multiple views and chart available on Plant, Production Line, Process Step, and Product Levels.

Plant View during the process



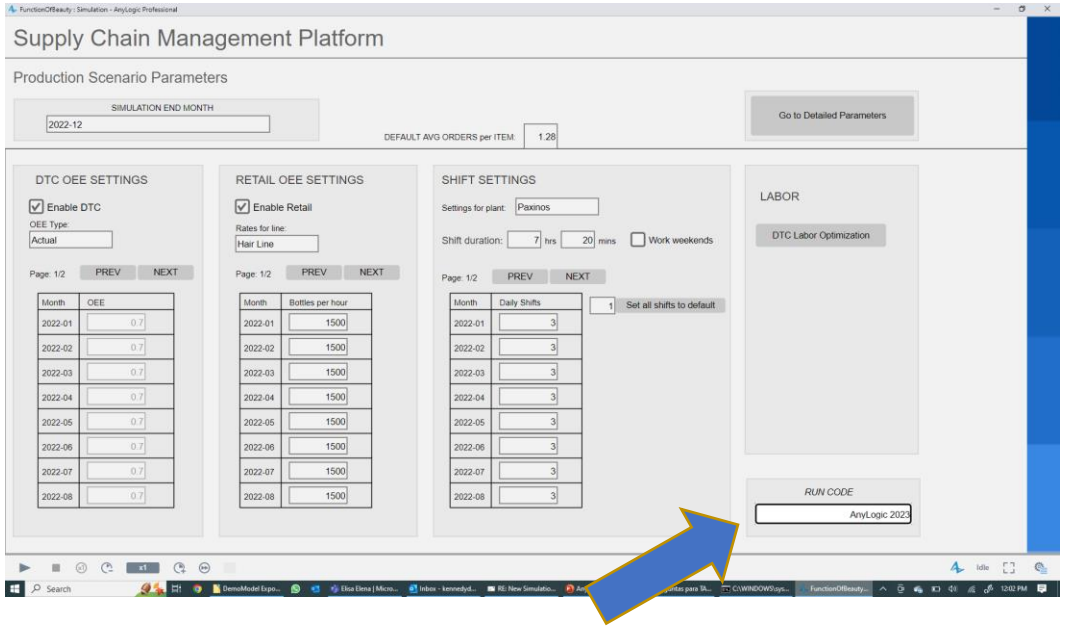
Production Line View during the process



AnyLogic Seamless Integration with SAP

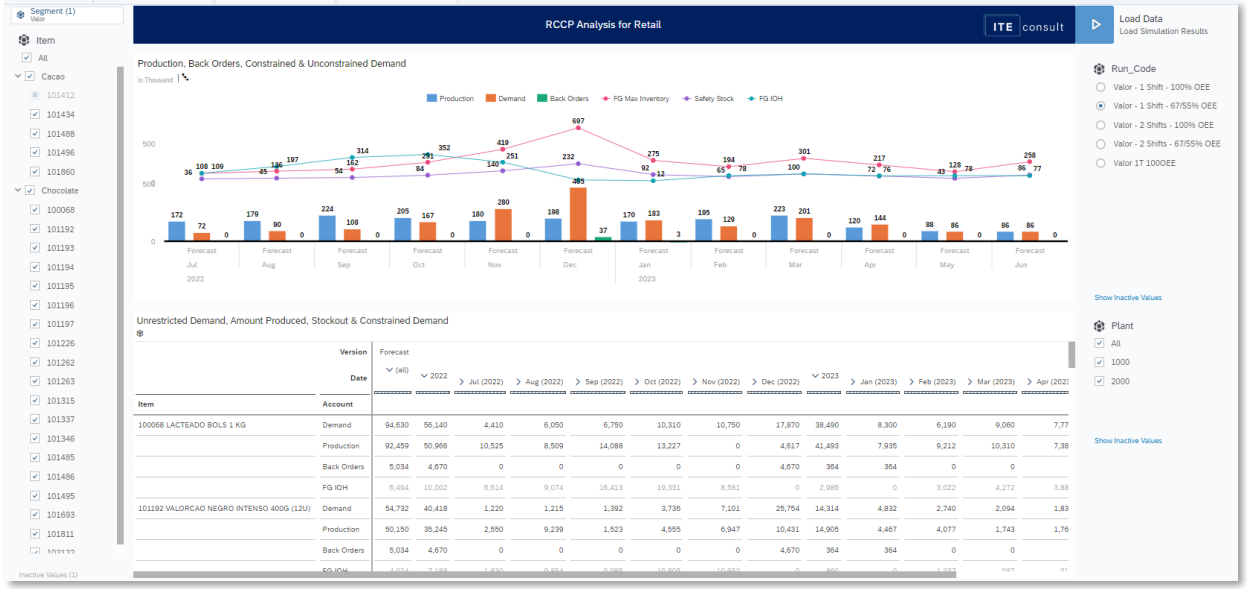
When setting the Scenario Parameters, users can name the scenario, to identify it in SAP Analytics Cloud, after running the model and compare between multiple scenarios.

Scenario Setting in AnyLogic



Naming the Scenario

Select Scenario using filters in SAP Analytics Cloud, to analyze and compare with other scenarios



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For additional information please contact:

David Barbieri Kennedy
Partner | ITE Consult

Phone: +1 (646) 969-0846 (USA)
Phone: +54 (11) 4793 2080 (Argentina)

kennedydb@ite-consult.com
www.ite-consult.com

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• • • Thank You!