

Support of Siemens Line Designer & Automation Designer & Mechatronic Concept Designer with Digital Twin by CADENAS

Andreas Brandauer Siemens PL

Agenda:

Process Overview

Line Designer

Mechatronic Concept Designer

Automation Designer

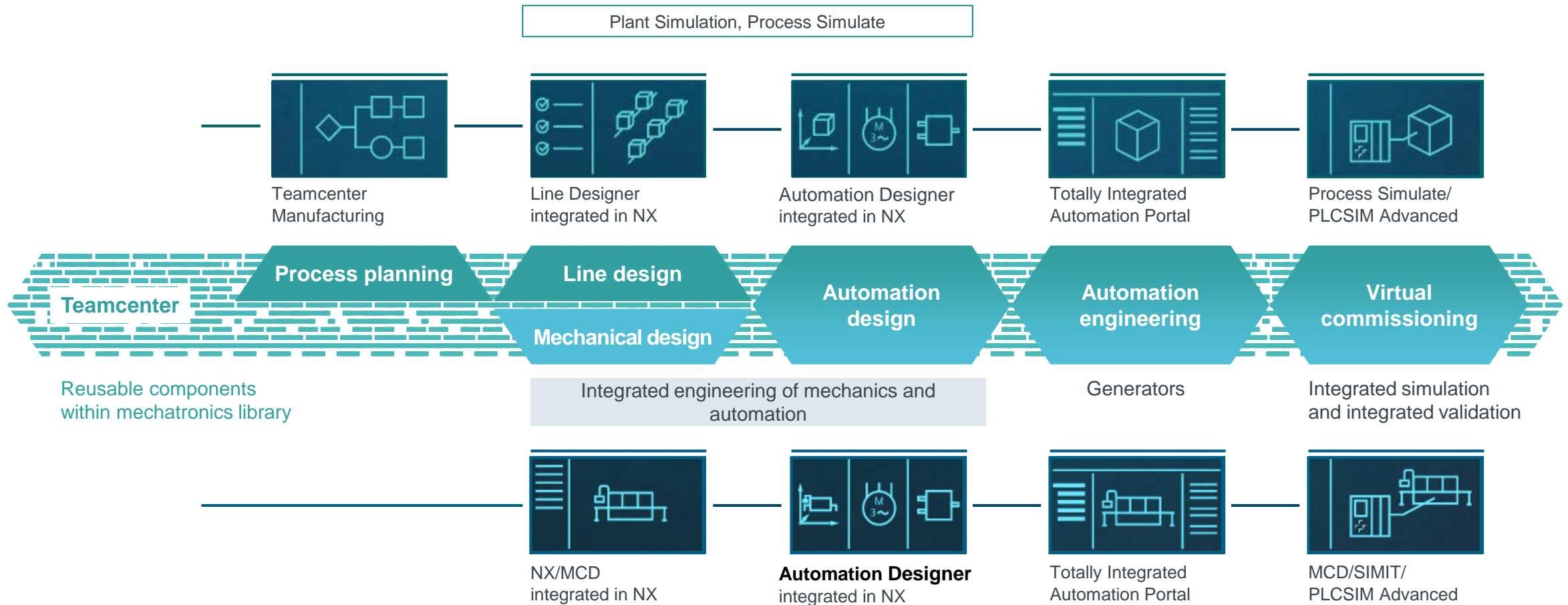
CADENAS PartSolution

2018

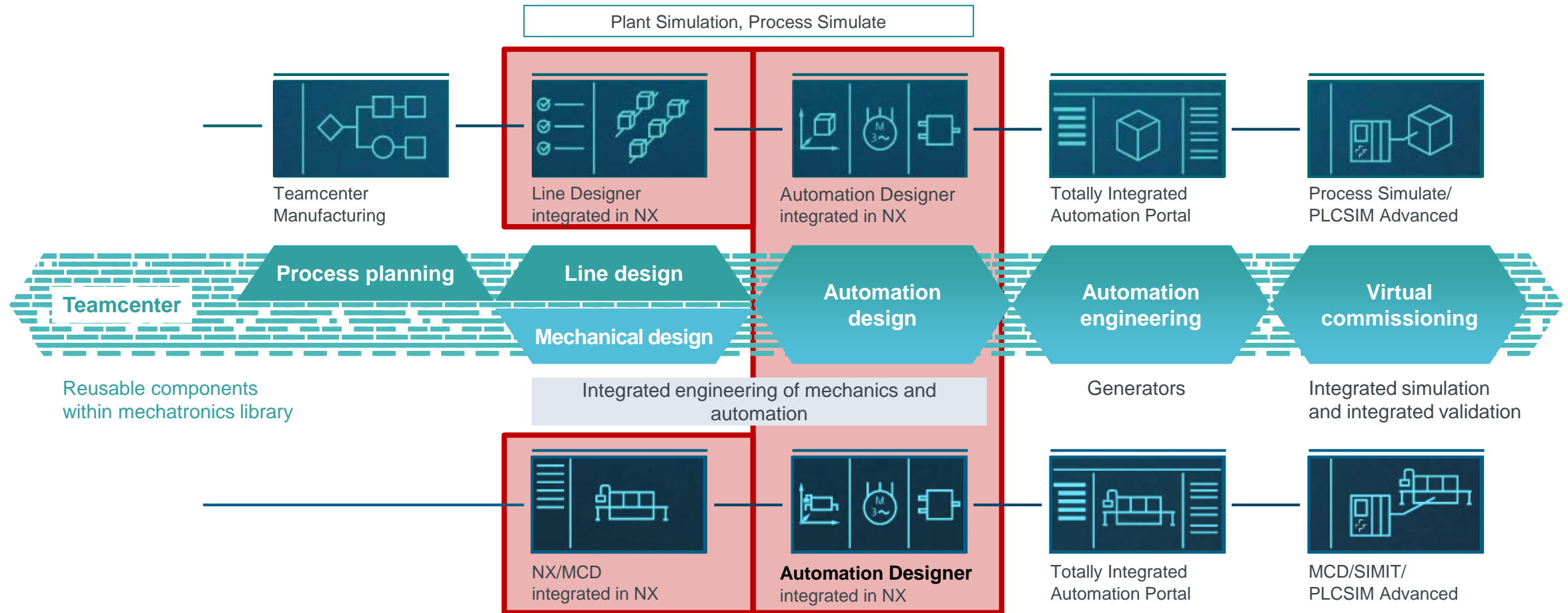
Deliver platform to digitalize entire innovation process



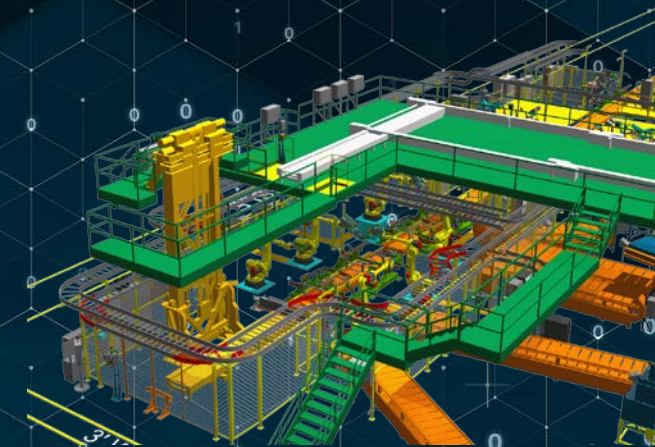
Process Overview integrates PLM with Automation



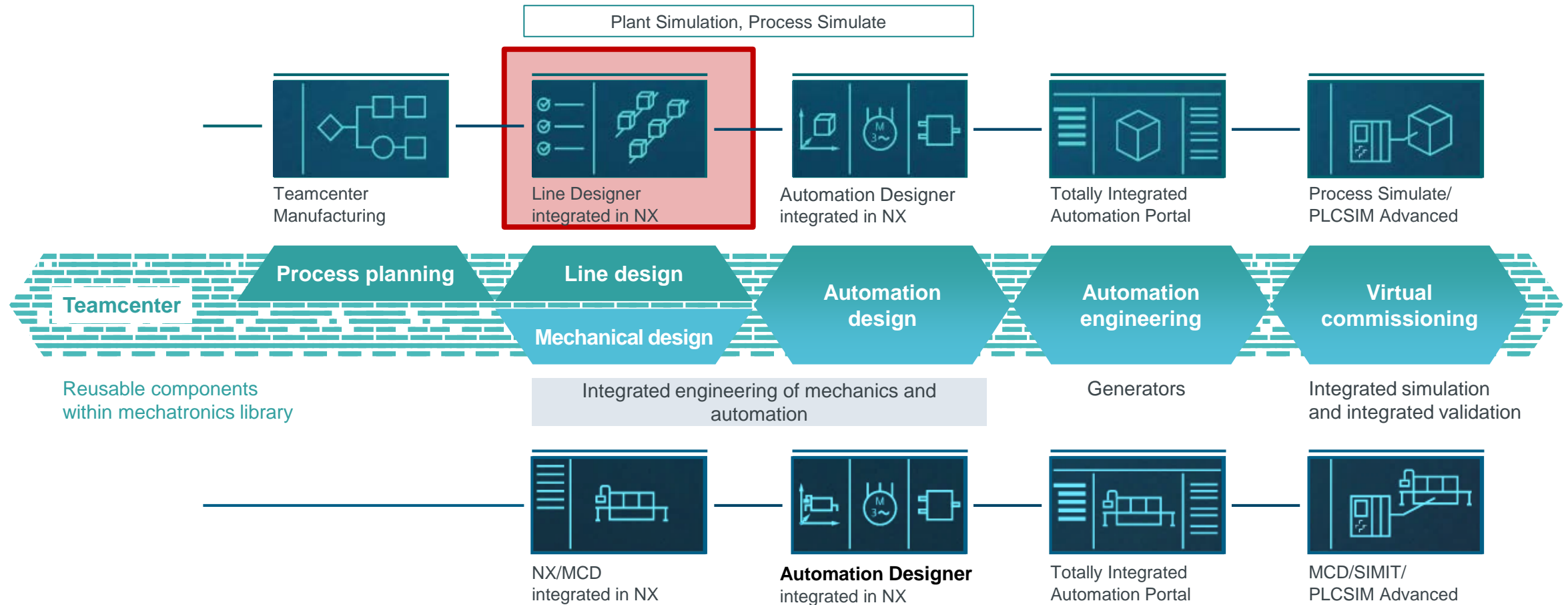
Automation Designer integrates PLM with Automation



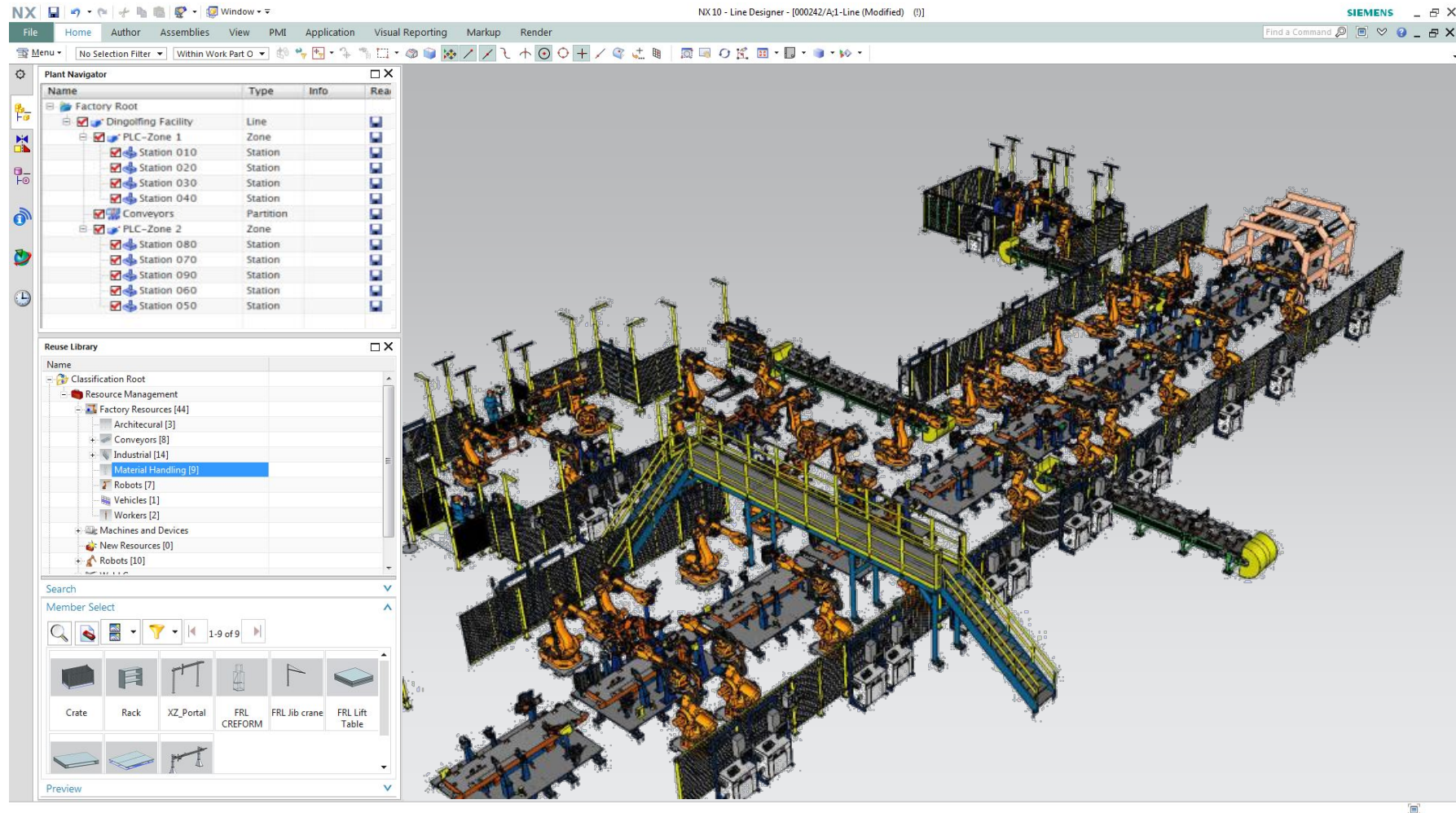
Line Designer Overview



Automation Designer integrates PLM with Automation



Goals of Line Designer



Goals of Line Designer

NX-based manufacturing layout solution for Manufacturing Engineers, integrated with Teamcenter

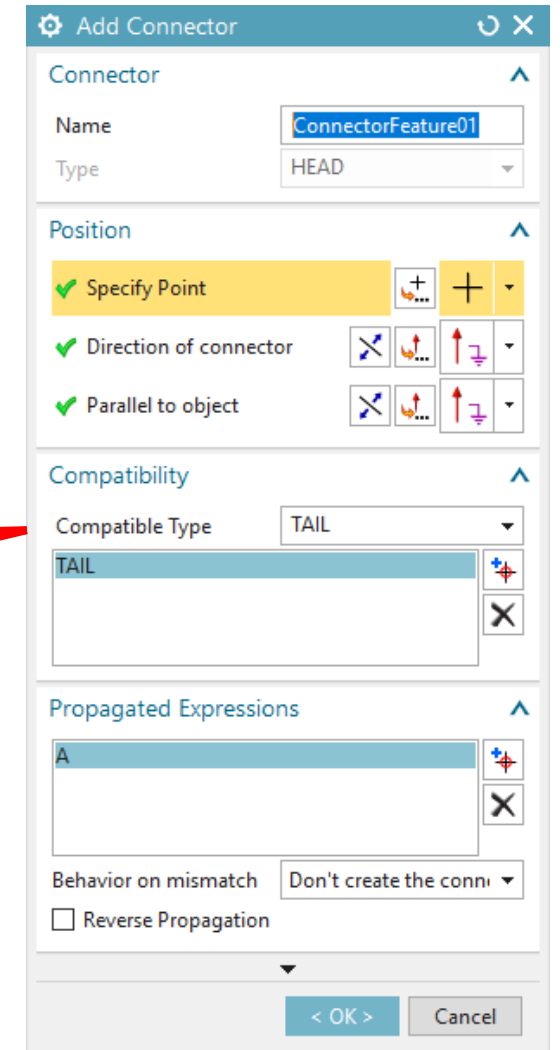
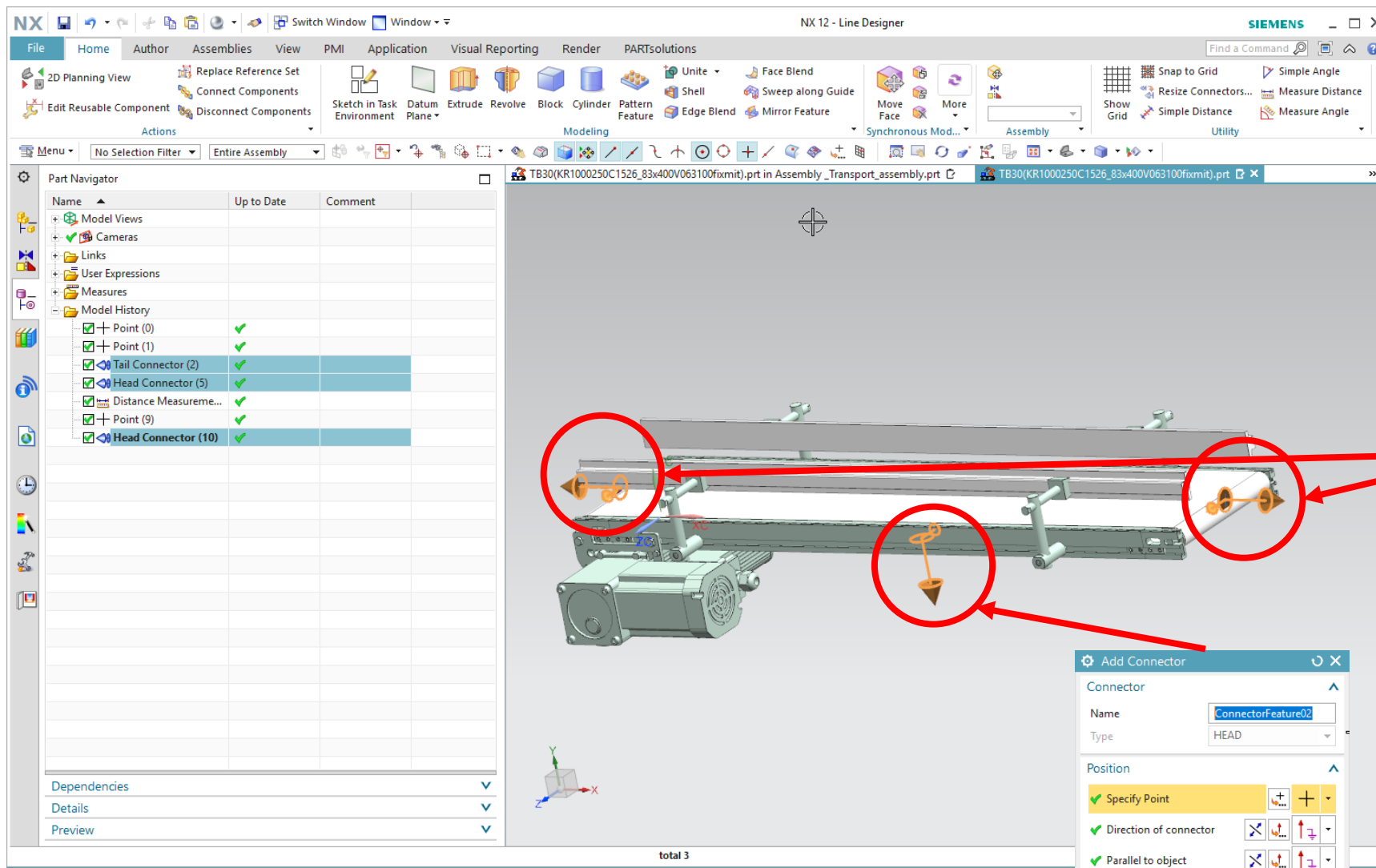
Production system design and change management from early requirements to production

Re-usable best-practices/libraries, synchronized across our PLM toolset

Same environment for product-, tool- and production system design

Migration from FactoryCAD to Line Designer

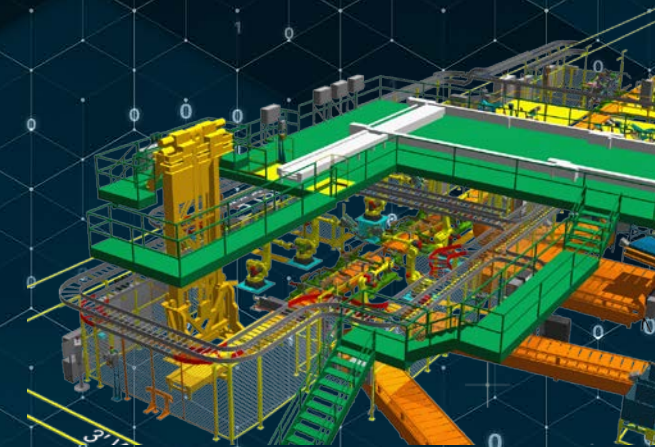
Parts / Assemblies for using Line Designer



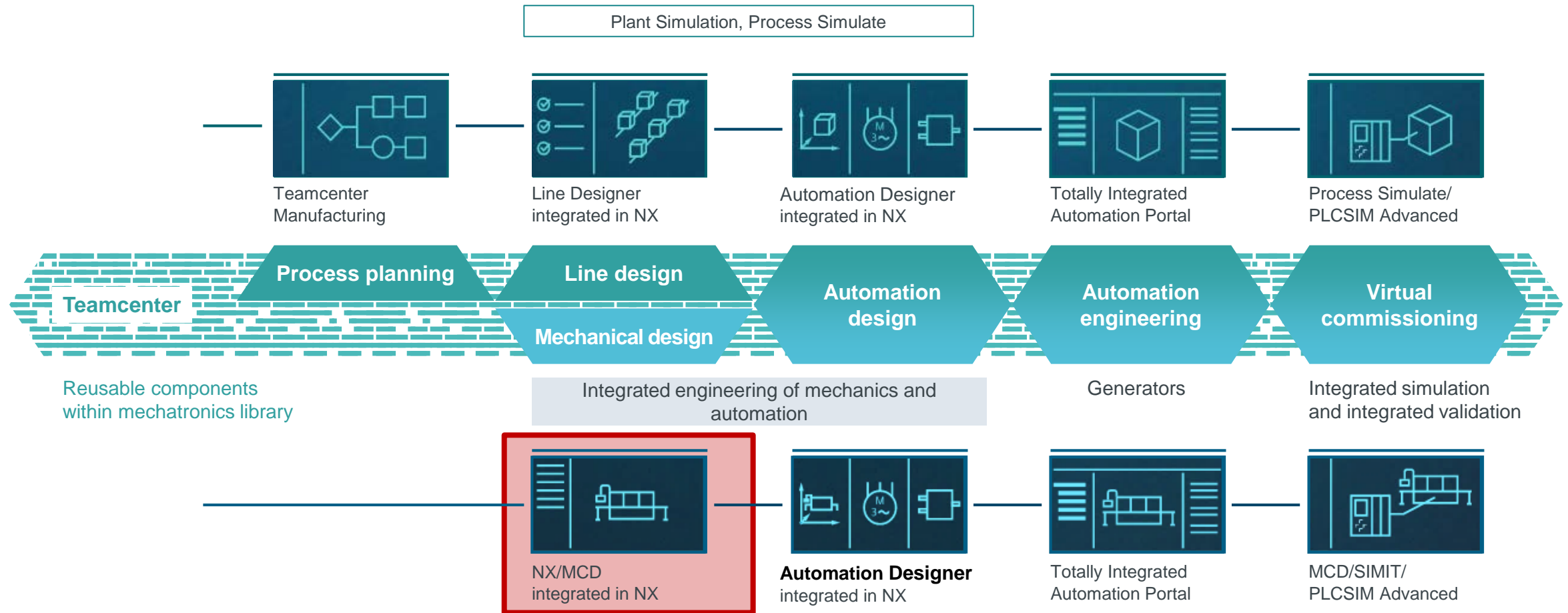
Small Impression from Line Designer



Mechatronic Concept Designer Overview



Automation Designer integrates PLM with Automation



Goals of Mechatronic Concept Designer

SIEMENS

genuity for life



Goals of Mechatronic Concept Designer

SIEMENS

genuity for life



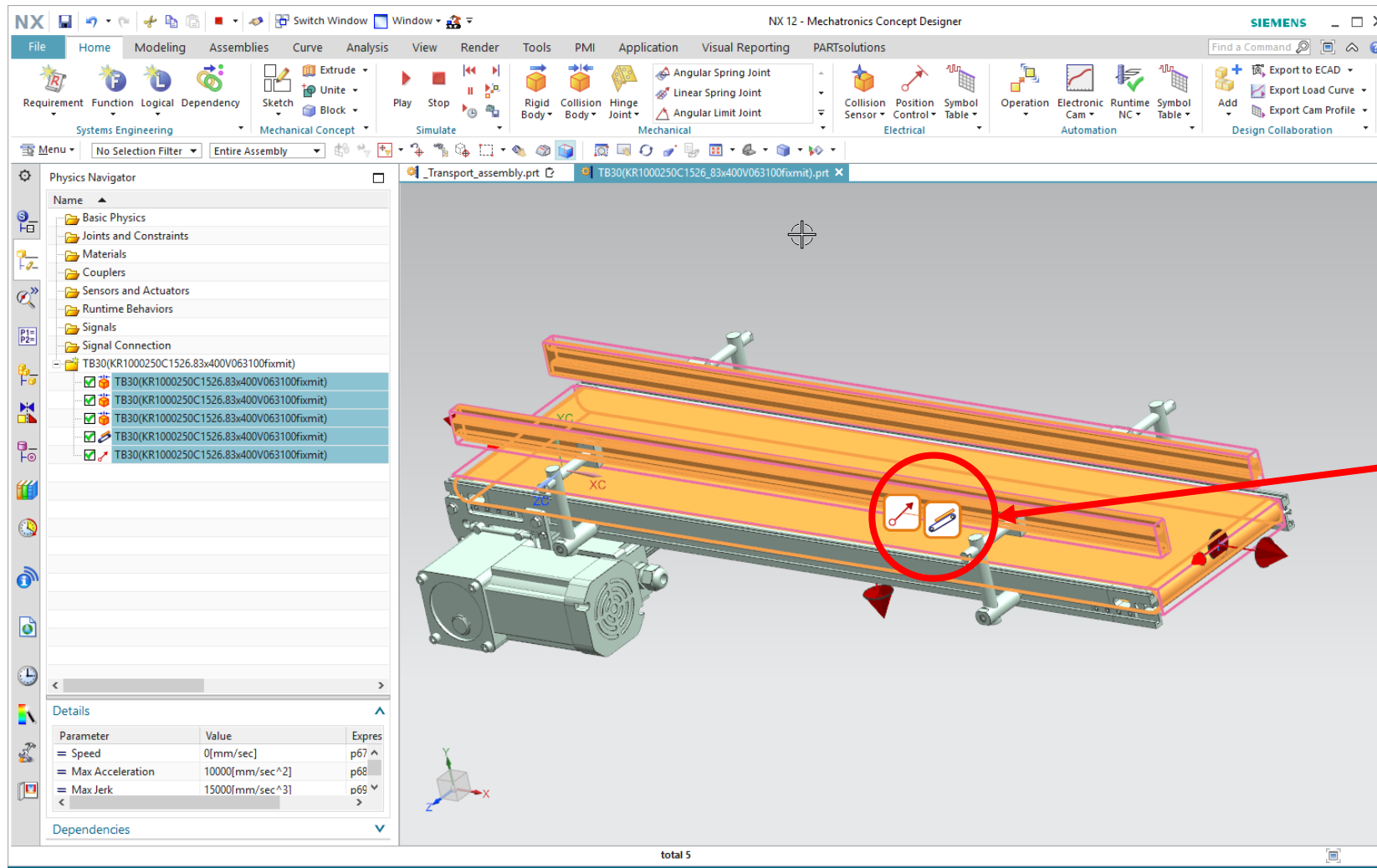
Goals of Mechatronic Concept Designer

SIEMENS

genuity for life



Parts / Assemblies for using MCD



Speed Control

Physics Object

Select Object (1)

Direction: Parallel

Constraints

Speed: 200 mm/s

Limit Acceleration

Max Acceleration: 100000 mm/s²

Limit Jerk

Max Jerk: 150000 mm/s³

Limit Force

Forward Force: 550000 N

Reverse Force: 550000 N

Select Signal (0)

Graph View

Name

TB30(KR1000250C1526.83x400V063100fixmit)

OK Cancel

Parts / Assemblies for using MCD

System Navigator

Name	Letter Code	Letter Code Description
Requirement		
Function		
Logical		
Transport Band	==W	Machine
Indizieren	=M1	Main Function
Indizieren	+F1	Field
Indizieren	-A1	Two or more purposes or tasks
Indizieren	-A2	Two or more purposes or tasks
Indizieren	-A3	Two or more purposes or tasks
Indizieren	-A4	Two or more purposes or tasks
Bewegen	=M2	Main Function
Bewegen	+C1	Cabinet
Antrieb	-A1	Two or more purposes or tasks
Antrieb	-A2	Two or more purposes or tasks
Antrieb	-A3	Two or more purposes or tasks
Antrieb	-A4	Two or more purposes or tasks
Abnehmen	==W	Machine
Verteilen	=M1	Main Function
Verteilen	+F1	Field
Antrieb	-A1	Two or more purposes or tasks
Antrieb	-A2	Two or more purposes or tasks
Antrieb	-A3	Two or more purposes or tasks
Antrieb	-A4	Two or more purposes or tasks
Antrieb	-A5	Two or more purposes or tasks
Antrieb	-A6	Two or more purposes or tasks
Antrieb	-A7	Two or more purposes or tasks
Greifen	-A8	Two or more purposes or tasks
Greifen	-A9	Two or more purposes or tasks

Details

Dependency





Name	Description
Indizieren	
Mechanical	
SICK VL18L-3P324-Bestell-Nr_6027596 ...	
SICK VL18L-3P324-Bestell-Nr_6027596	
Electrical	

HD3D Tools

Visual Reporting

Results: Reference_Designator

Legend Style: Tile

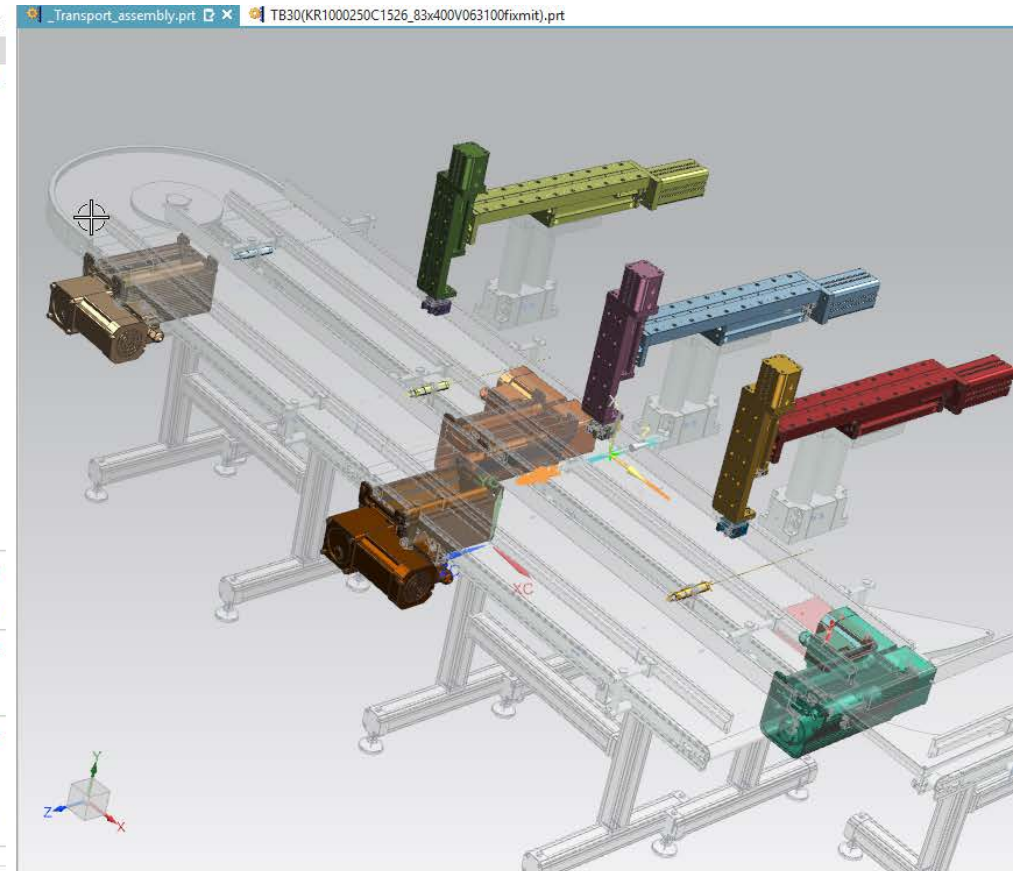
Name	Count	Tag	REFERENCE_DESIGNATOR (Part Attribute)
			REFERENCE_DESIGNATOR===W=M1+F1-A1 Component Count: 17, Part Count: 12
			REFERENCE_DESIGNATOR===W=M1+F1-A2 Component Count: 15, Part Count: 11
			REFERENCE_DESIGNATOR===W=M1+F1-A3 Component Count: 13, Part Count: 11
			REFERENCE_DESIGNATOR===W=M1+F1-A4 Component Count: 18, Part Count: 12

Report: Reference_Designator

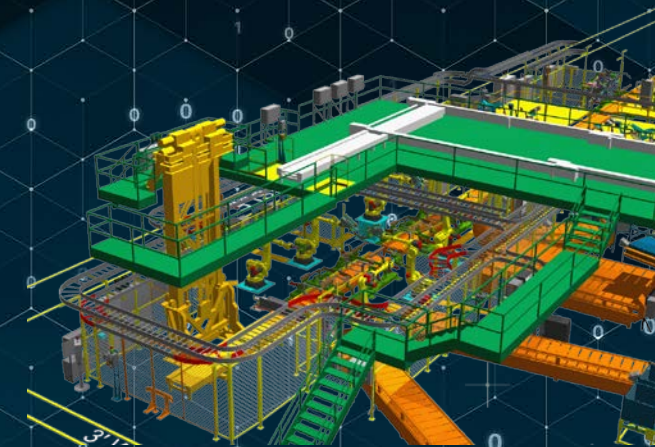
Controls

Setting: Reporting Style: Color Objects

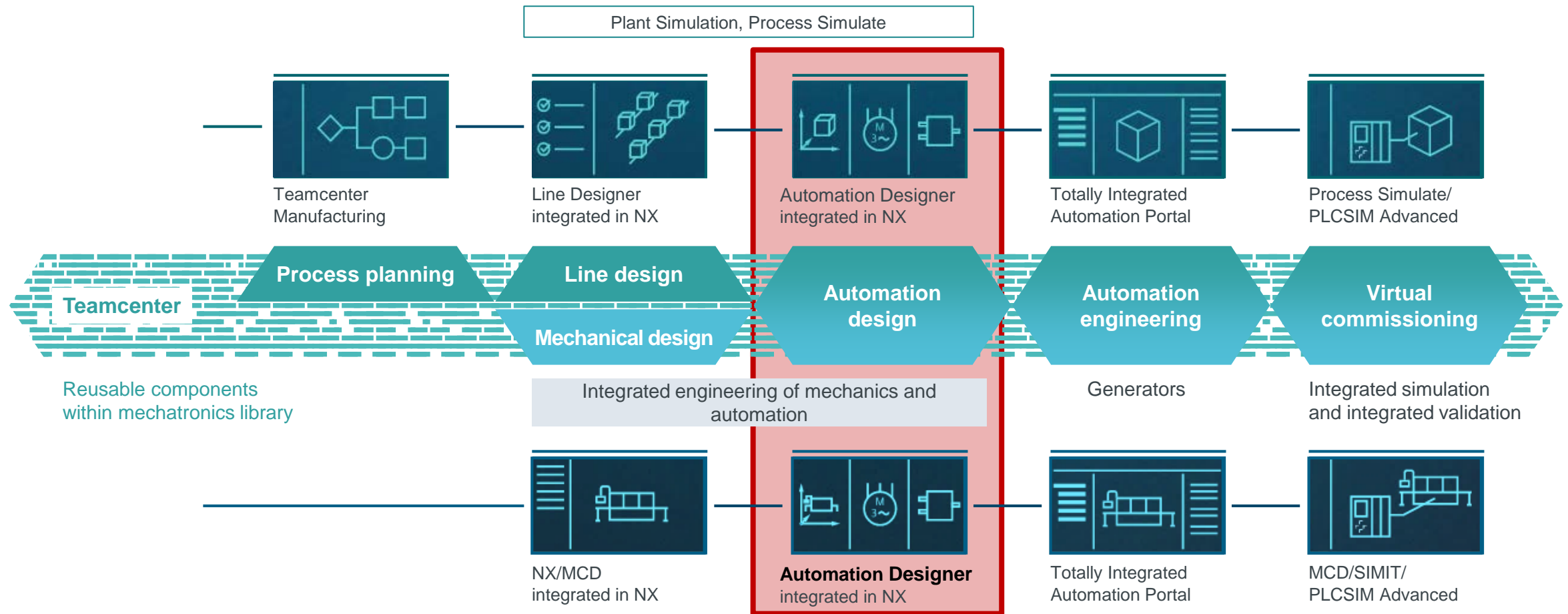
HTML Report Output Directory: C:\Users\brandau\Desktop\



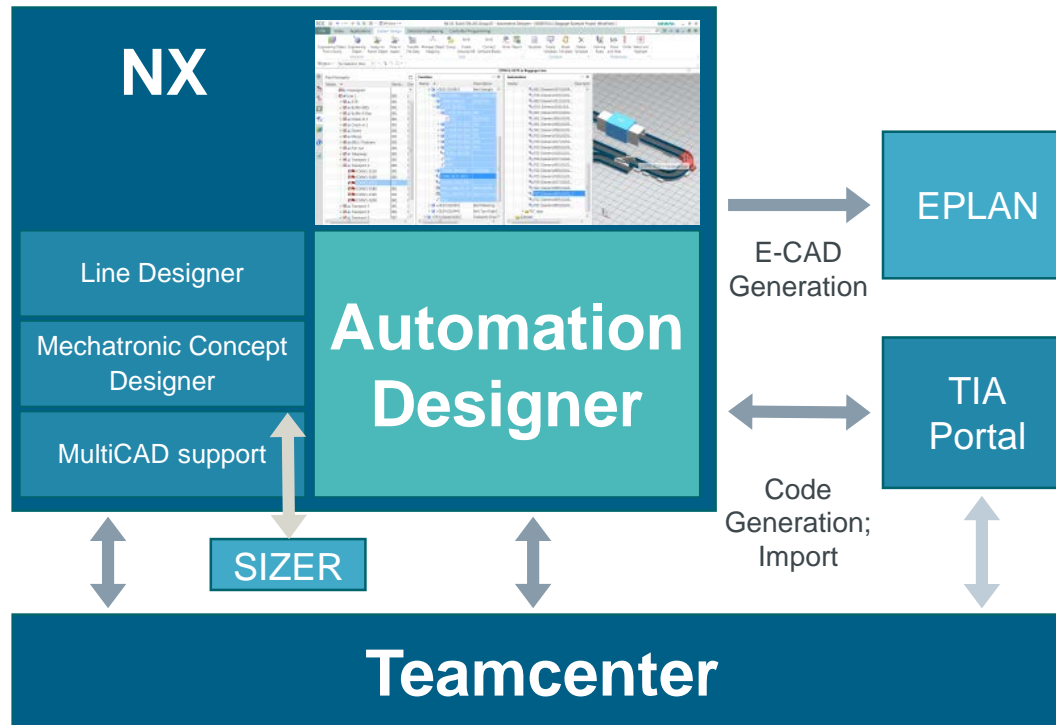
Automation Designer Overview



Automation Designer integrates PLM with Automation

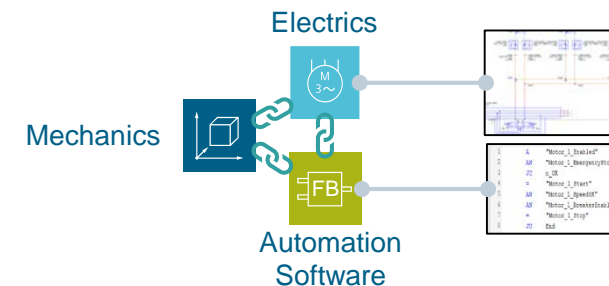


Automation Designer integrates PLM with Automation



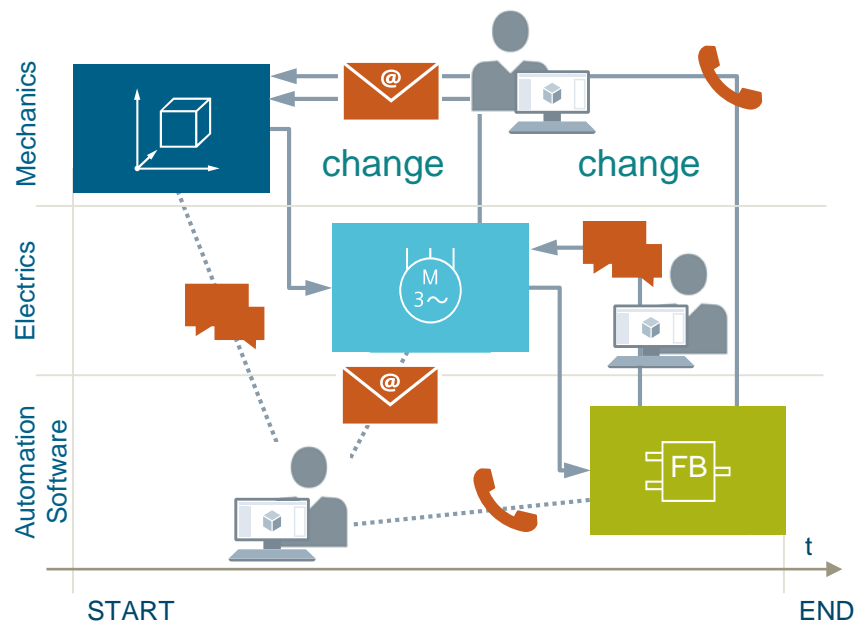
How?

- Application within NX
- Teamcenter as backbone
- Strong integration with TIA Portal
- EPLAN integration



Engineering today

- Sequential engineering
- Manually synchronized
- Supported by home grown IT applications



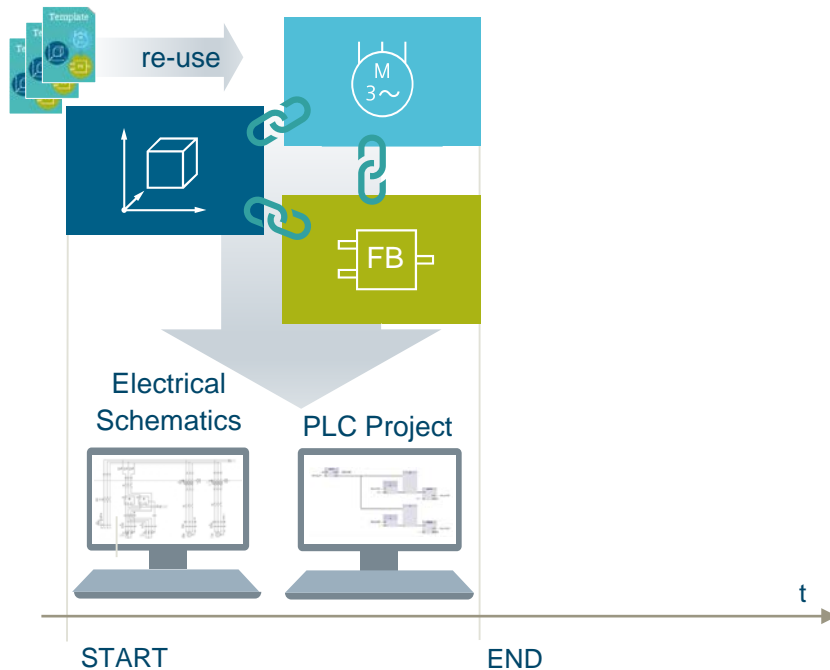
Business challenges

- **Increasing degree of automation**
- **Increasing number of changes** for production engineering driven by customized mass products
- Cost pressure to **reduce production downtime for commissioning**
- Enhanced needs for flexible production lines and machines **increases the complexity of engineering solution**
- Shorter time to market for products also **reduces time for production engineering**
- More complex, home grown IT applications, need to be maintained within decreasing IT budget.

Less time and more complex exchange
between all disciplines

Automation Designer approach

- Parallel engineering with a central application
- Mechatronic collaboration / consistent data
- Knowledge re-use



Business challenges addressed

- **Reduced effort** through knowledge re-use
- **Faster engineering change** allows more time to **improve engineering solution quality**
- **Reduced risk** through consistent mechatronic data model and rule-based engineering **keeps control of complex engineering solutions**
- **Reduced preparation effort** with enhanced digital twin for Production **speeds up virtual commissioning**
- **Reduced Cost of Ownership** with use of OOTB software products **saves IT maintenance costs**



time saving



complex solutions
under control



Digital twin for
Production
enhanced

More complex engineering solutions with
higher quality in less time

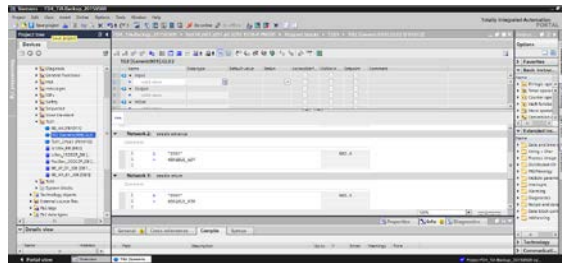
Enhanced Digital Twin for Production

Typical design stages in Automation Designer

1

Multidisciplinary initial system design

- Enhance 3D-model with electrics and automation data
- Structuring and organization of components

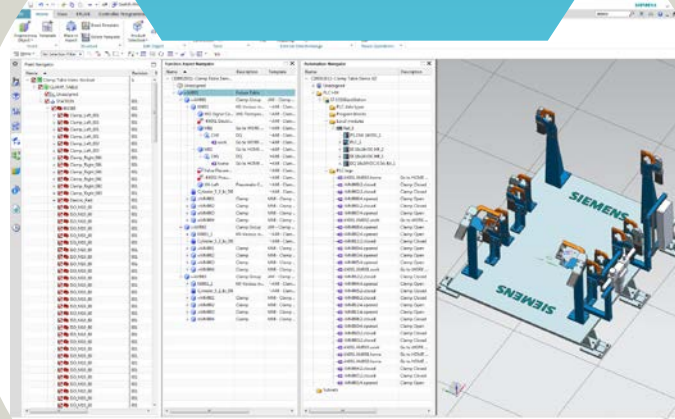


4

Develop PLC software

- Manage network configurations
- Assign control functions
- Rule-based PLC program creation

Automation Designer



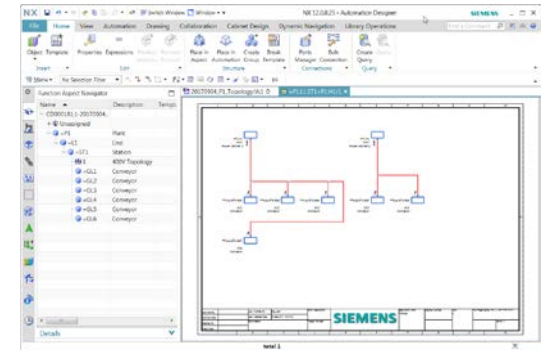
Mechatronic Templates / Libraries

Teamcenter

2

Functional design

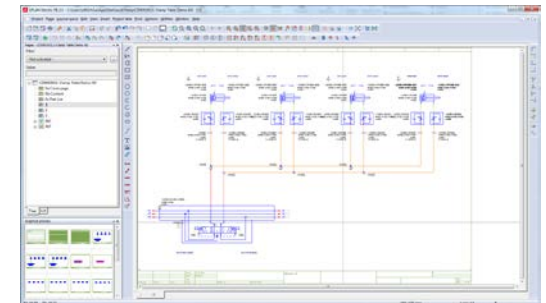
- Create electrical devices and templates
- Specify electrical devices
- Create topology diagrams (networks, power)



3

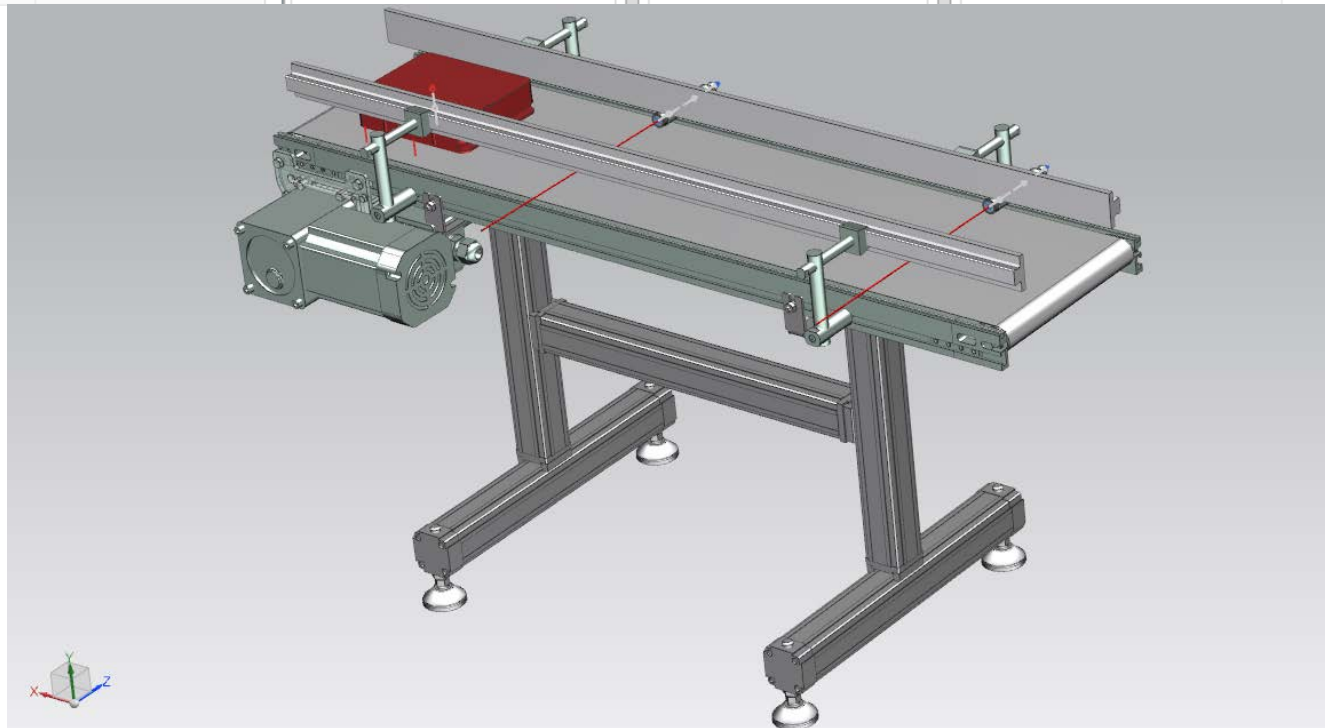
Electrical design

- Choose and configure automation HW devices
- Connect field devices to automation system
- Rule-based electrical schematic creation



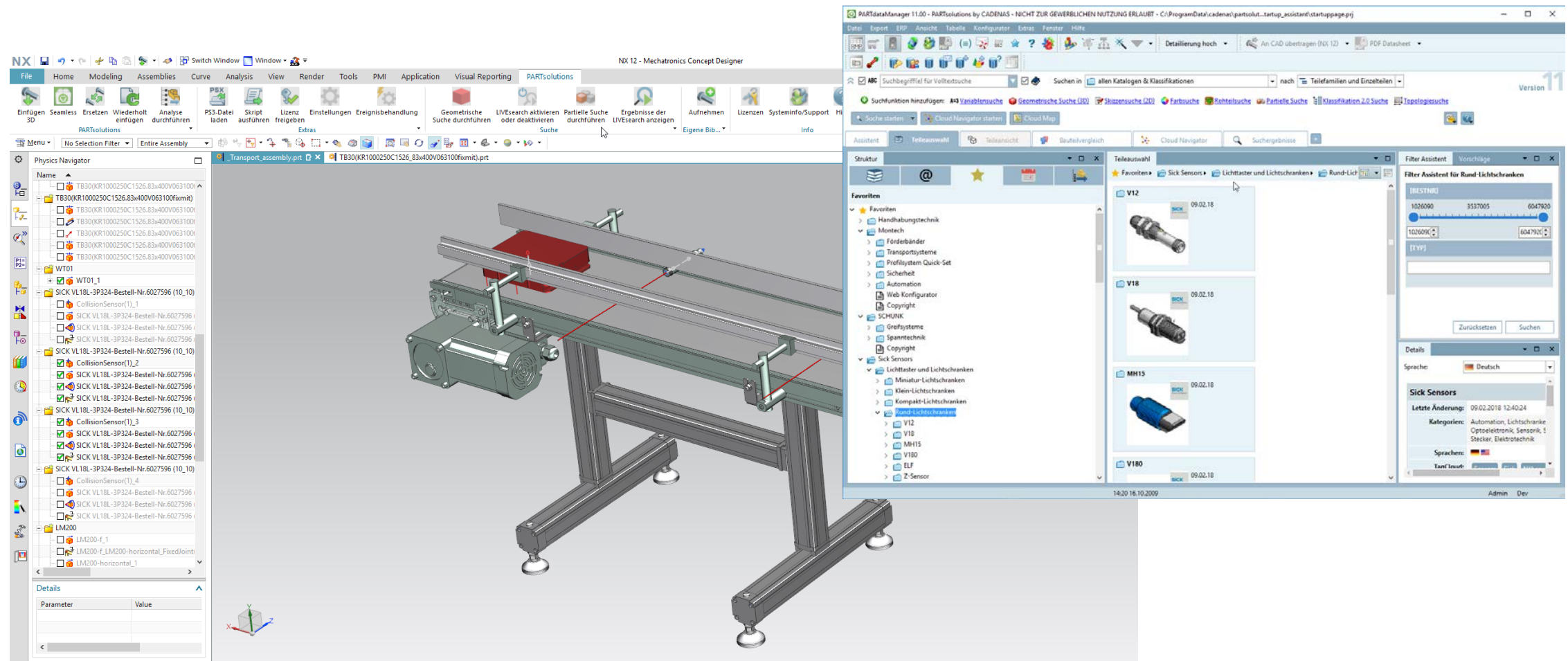
Parts / Assembly

Function Aspect Navigator		Location Aspect Navigator		Product Aspect Navigator		Automation Navigator		
Name	Description	Name		Name		Name	Description	Tem
Conveyor_user1		Conveyor_user1		Conveyor_user1		Conveyor_user1		
Unassigned		Unassigned		Unassigned		Unassigned		
=GL01	Conveyor	+GL01		-GL01		QA_DB [DB2]		
IDB_Conveyor		GL01QA01		-QA01		Field Devices		
=QA01	Motorstarter	MA		-MA01		GL01_Station		
MA	Motor 3.0 kW	GL01TA01		-TA01		PLC Rack		
=TA01	TA-Electrical energy ret...	BG		-BG01		GL01TA01	TA-Electrical energy r...	
=BG01	Sensor description	BG		-BG02		GL01QA01	Motorstarter	
=BG02	Sensor description							

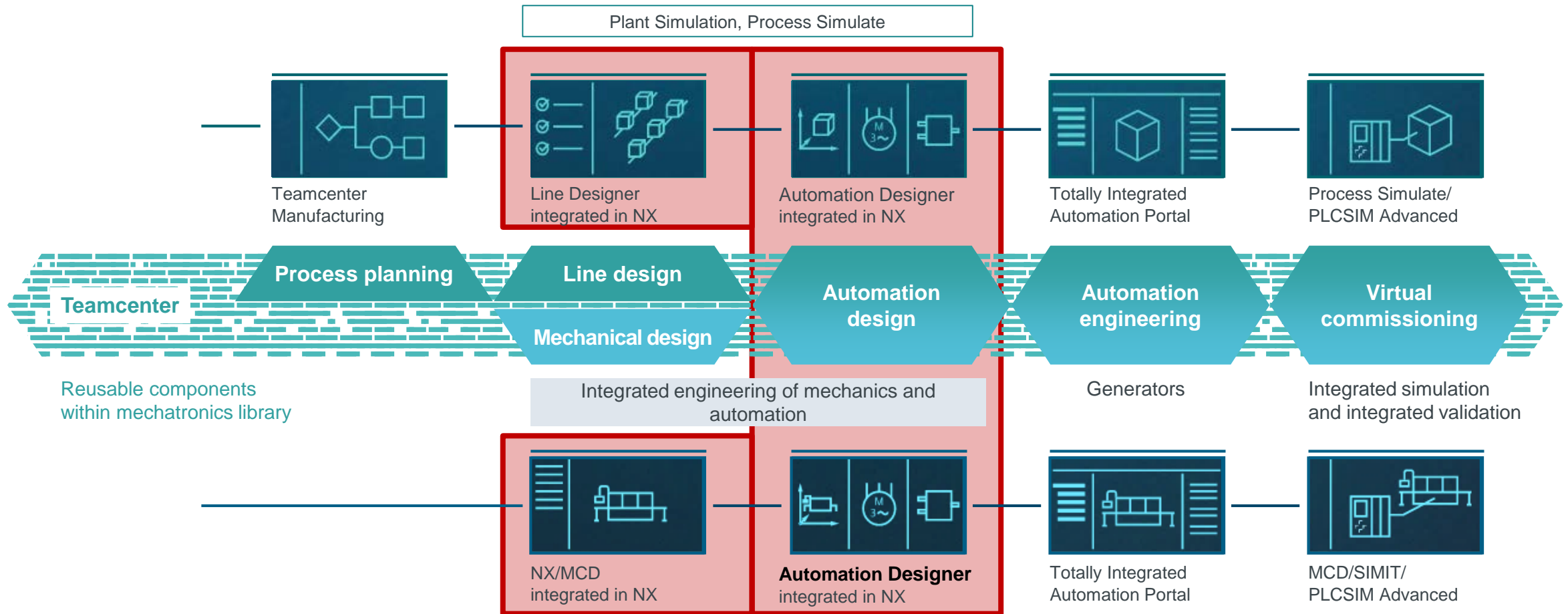


CADENAS Part Solution as a Backbone

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Ingenuity for life



Holistic View over Line Designer / MCD / Automation Designer / PLM with Automation



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