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COMOS Modularized Engineering
Digitalize now 2019
Challenge yourself!

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What is it?

What's behind all this?

In real life?

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Functional Design

Variants

MTP

ETO

Subsystem -Modules

CTO

150% BOM

Scalability

ATO

Templates

SKID

Rule-Sets

Standardization

Equipment -Modules

Configuration

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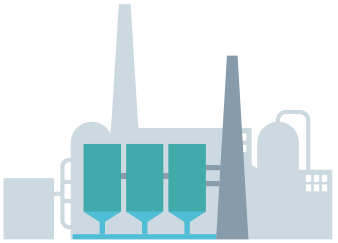
What was the initial idea?

Example

Customer

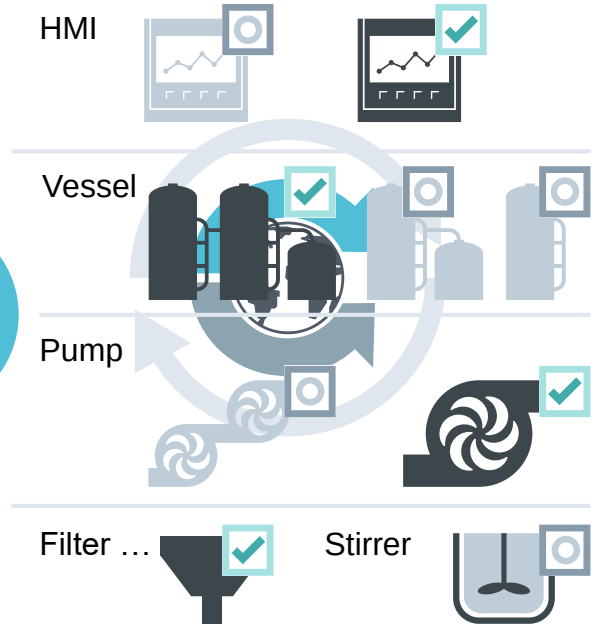


Customer requirements

Capacity
Environment
Regulations

RFP

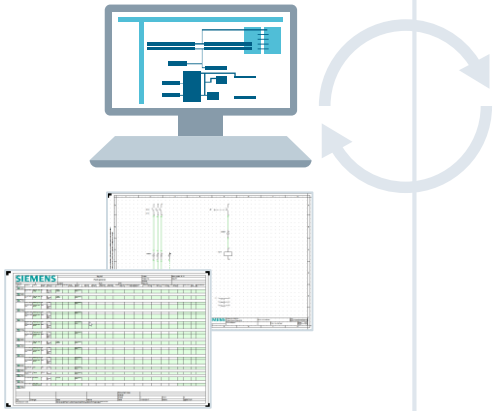
Modularized Engineering



Rule based configuration

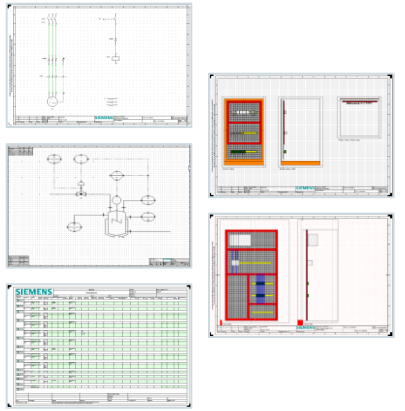
Sales
Bid Package

- Proposals
- Tech specifications
- 2D schemata drawings
- Bid-BOM



Engineering
Package

- Detailed 2D schematics
- Cabinet layout drawings
- Manufacturer data
- BOM’s
- Lists



Competitive offer

Shorter proposal and project time

Automated proposals, sales drawings, specifications

Automated 2D schematic design, BOM, 1D data

Who benefits?

OEM's - "Doing the same things in the same way!"

Design of complete plants or produce partial components of a plant which are found in similar form in different projects **(repetitive factor!)**

EPC's - "Doing the same things in the same way as far as possible!"

Site Engineering - "Reuse of project information and modules"

Optimization of the Engineering Workflow

“**Shorten the timeline** from engineering to fabrication, in order to **optimize time to market** and **optimization of the Proposal Workflow** to be **more competitive**”

Topics?

Build up an Engineering “knowledge base”

Why COMOS?

1

One configuration system through different engineering departments

Easy graphic configuration of the rule sets with high traceability

Company wide module- and data repository

Reduction of proposal lead time

Avoiding of over or under engineering

Strict following of company guidelines and rules

Value?

Build up knowledge base (fluctuation of employees)

Basis for guided engineering

Market?

Home grown solutions (e.g. based on Excel or custom programming)

Configure-Price-Quote (CPQ) Configurators*

Pure CAE systems with ETO/CTO enhancements*

ERP and BOM Configurators*

* **CPQ**-Configure-Price-Quote; **ETO**-Engineer-To-Order; **CTO**-Configure-To-Order; **ERP**-Enterprise-Resource-Planning

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Customer DNA?

OEM: Product manufacturer & customer solution business

EPC: Product layout/design & customer solution business

Site Engineering: Basic layout of process modules & customer solution business

… familiar with configurable products or rule driven layout procedures

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Brief product information

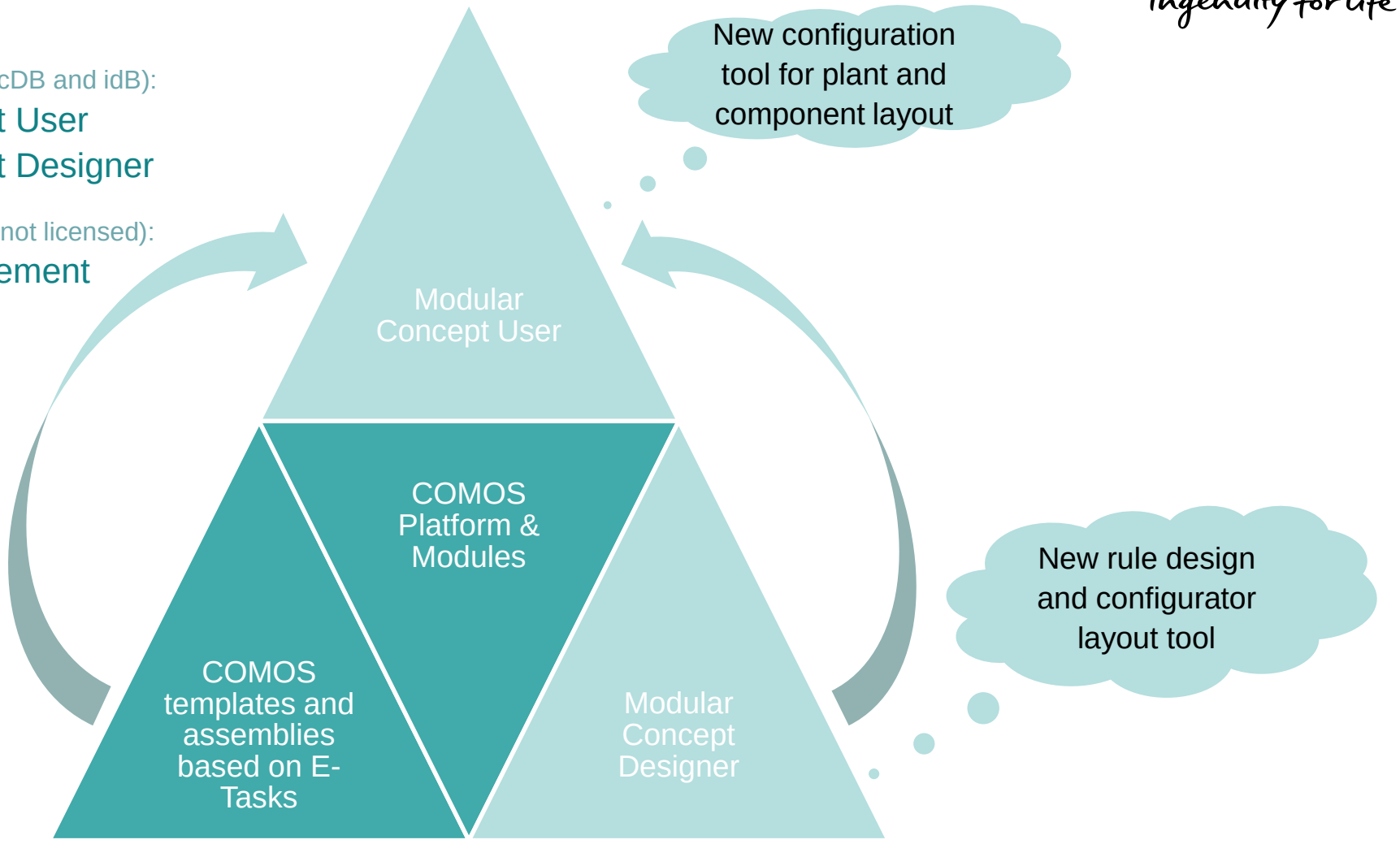
Architecture

New Modules and new Licenses (for cDB and idB):

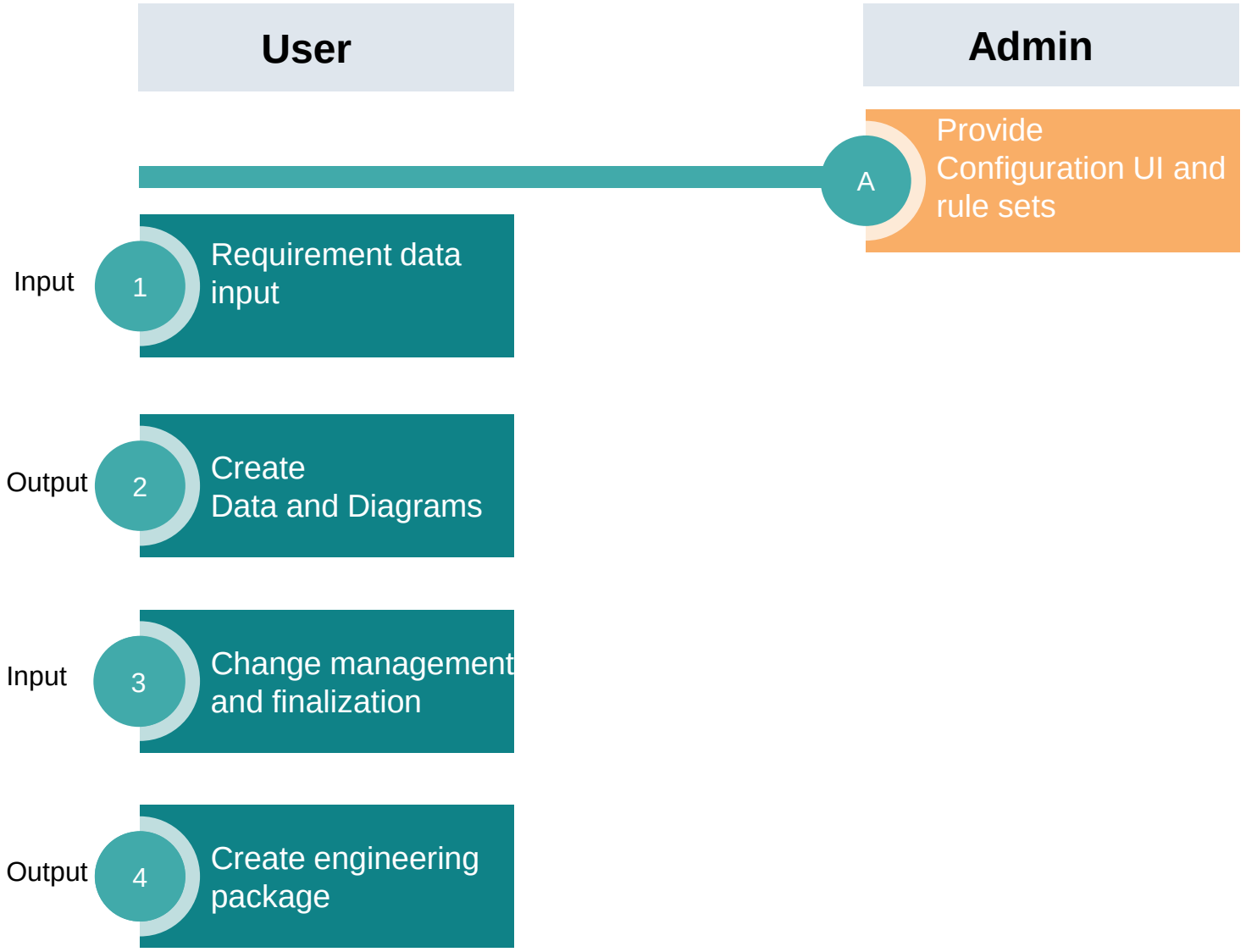
- COMOS Modular Concept User
- COMOS Modular Concept Designer

New Database content layer for iDB (not licensed):

- COMOS Proposal Management



User - Admin - Workflow



Provide configuration UI and rule sets

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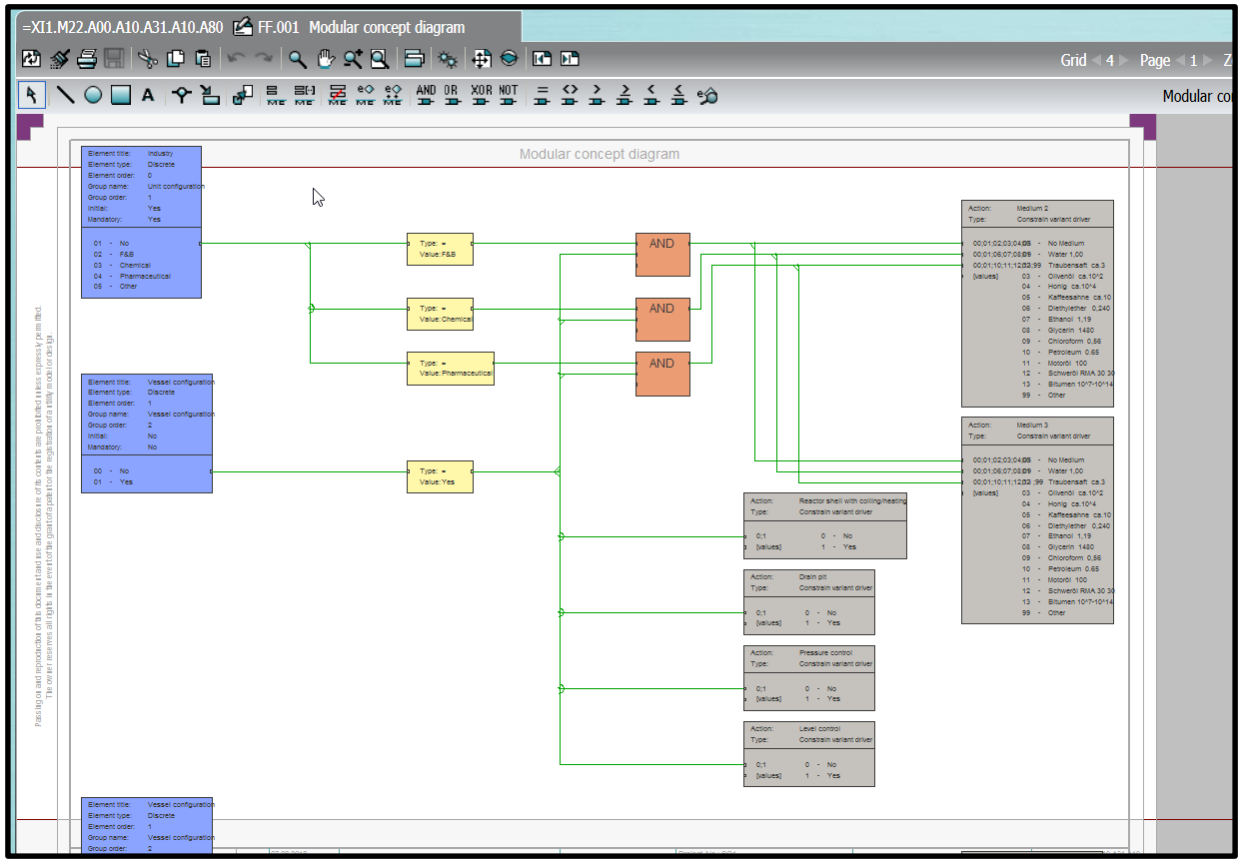
A

Provide configuration rulesets



- Easy to use
- High transparency
- Intuitive

…way to store “Engineering knowledge”

Provide configuration UI and rule sets

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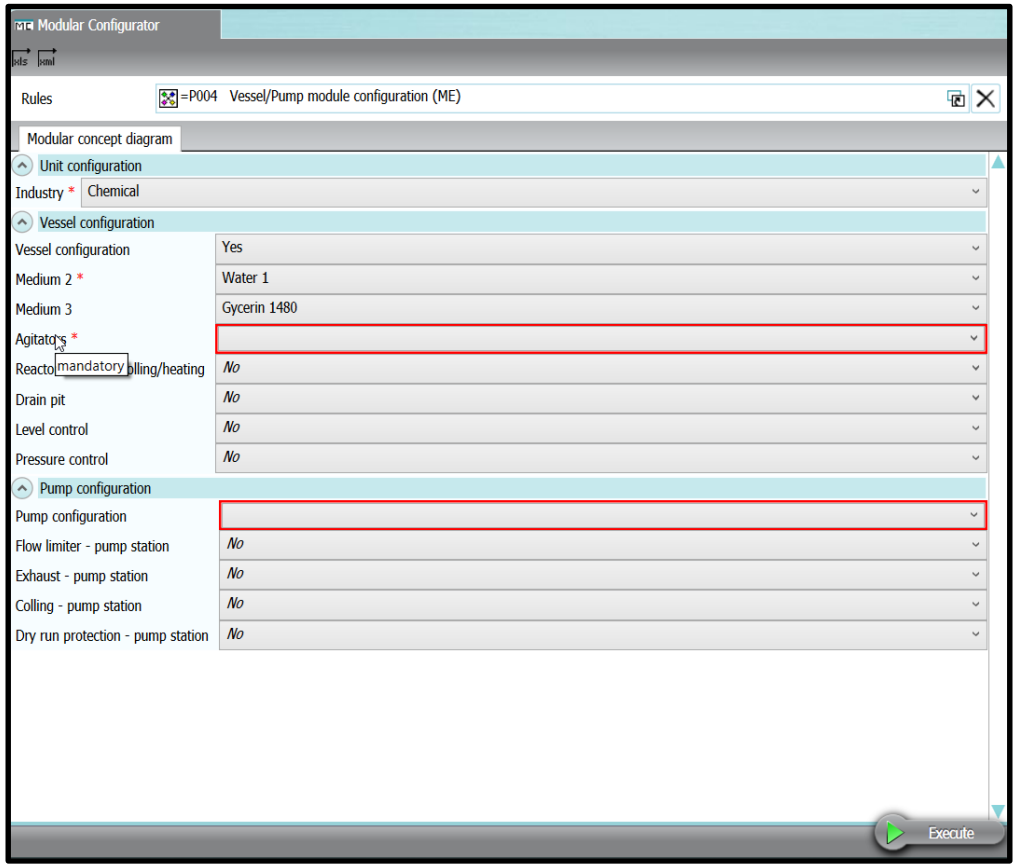
A

Provide configuration UI



- Easy to use
- High User Guidance
- Low implementation effort

User - Admin - Workflow

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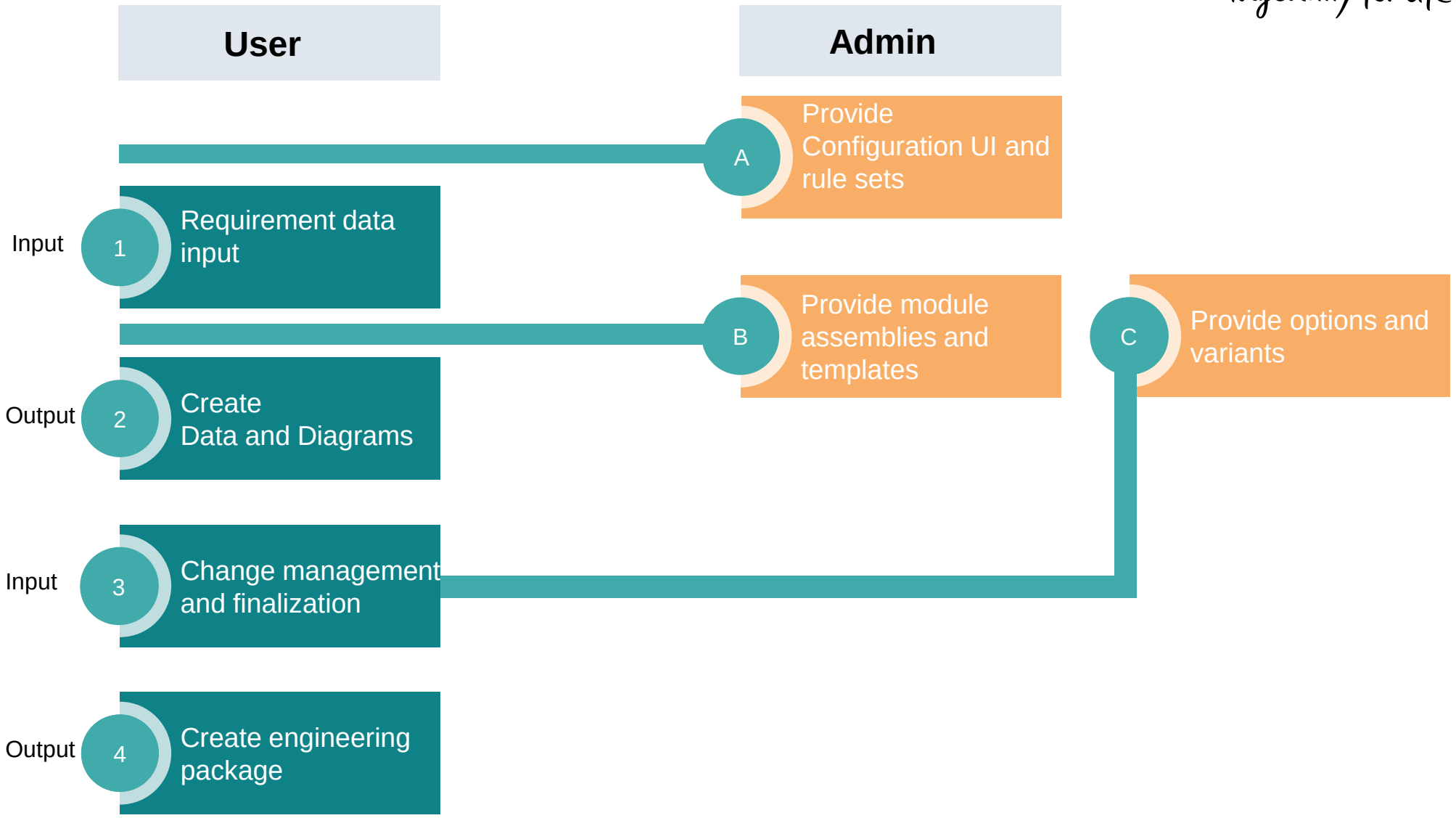

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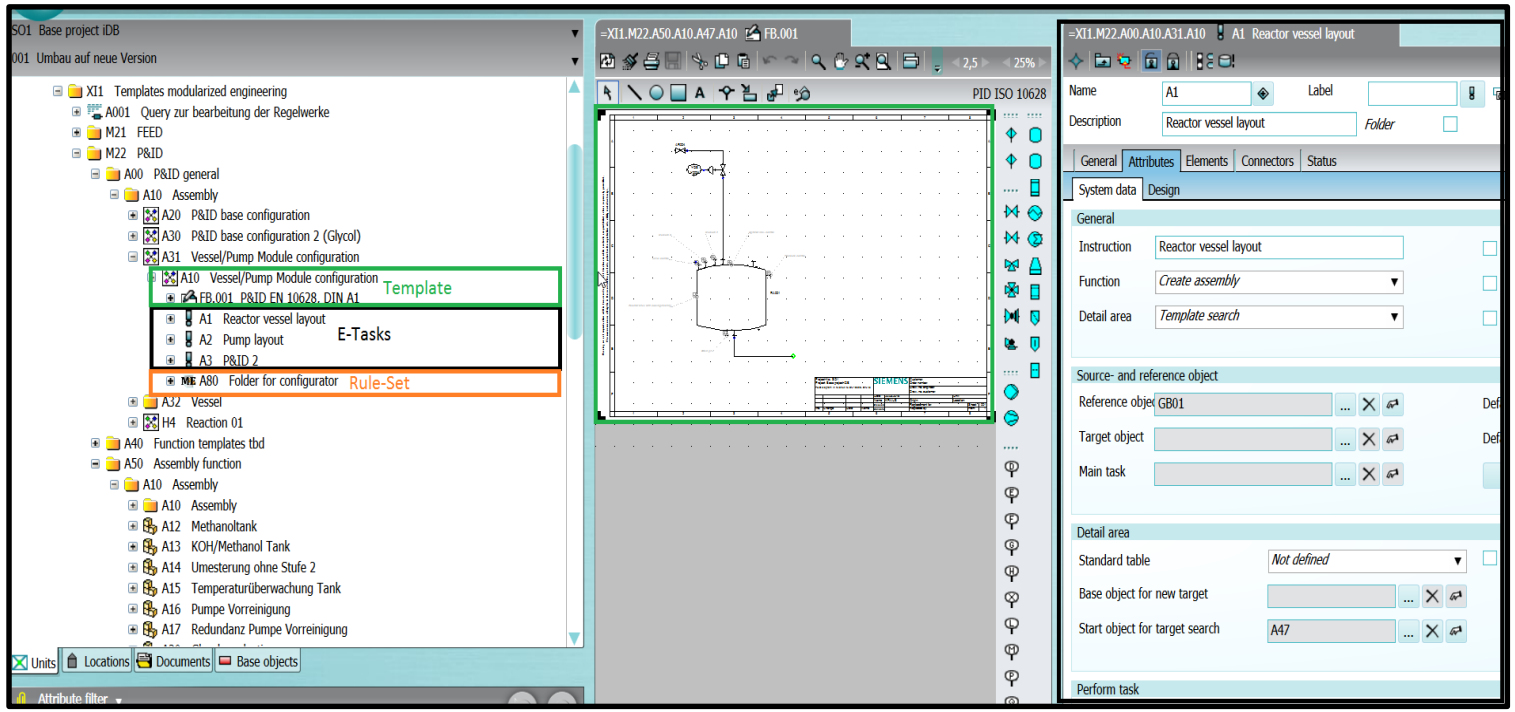
B

Provide module assemblies and templates



- Reliable and mature technology
- High automation degree
- Easy way to combine: Rulesets, Value driver and Assemblies

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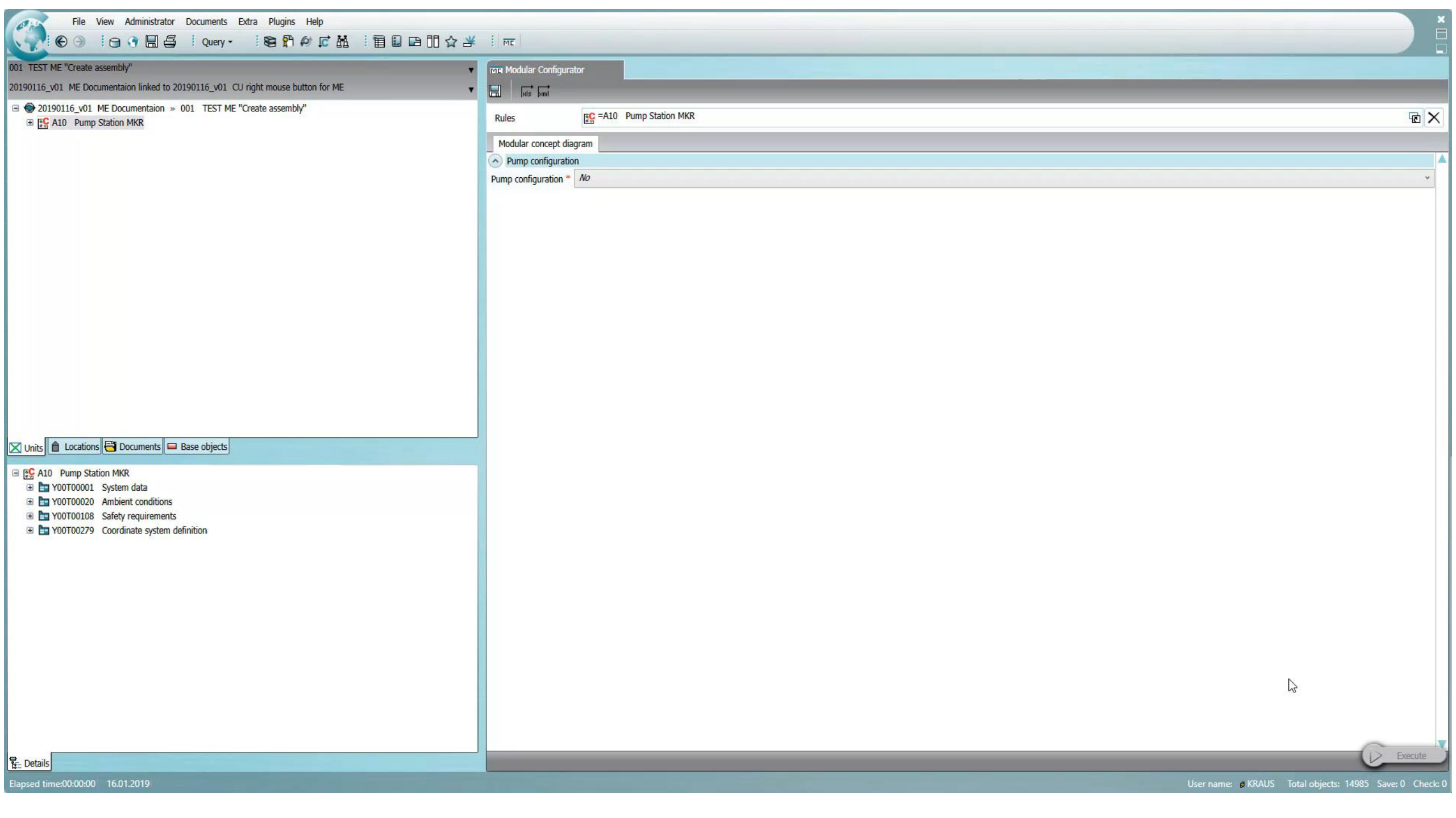
Example Rule Creation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A10 Pump Station MKR
Units
Locations
Documents
Base objects
A10 Pump Station MKR
Y00T00001 System data
Y00T00020 Ambient conditions
Y00T00108 Safety requirements
Y00T00279 Coordinate system definition
Details
Modular Configurator
Rules
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Modular concept diagram
Pump configuration
Pump configuration *
No
Execute
Elapsed time:00:00:00 16.01.2019
User name: KRAUS Total objects: 14985 Save: 0 Check: 0

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Proposal Management

One System for the Sales and Engineering Phase:

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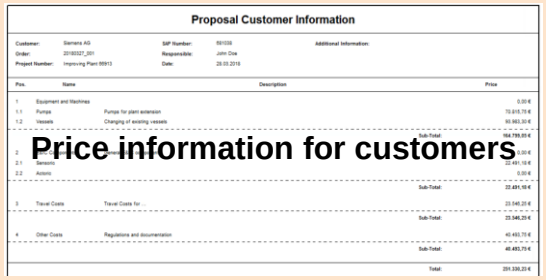
Mapping

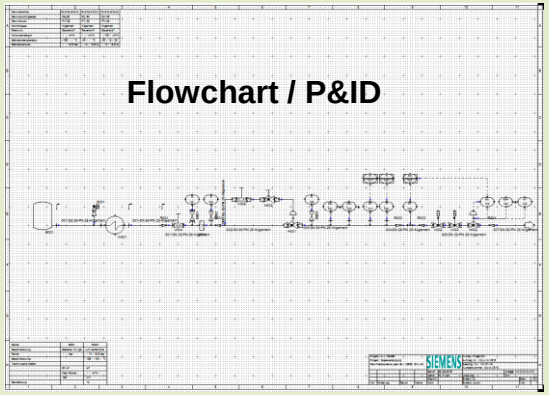
Proposal Management

- A10 Plant (general)
  - PM001 Proposal Manager
    - PM.01 Proposal Management Overview
    - PM.02 Proposal Management Customer Info
    - 1 Equipment and Machines
      - 1.1 Pumps
      - 1.2 Vessels
      - A90 Cost category
    - 2 E&IC Components
    - 3 Travel Costs
    - 4 Other Costs
    - A30 Assign position
    - A90 Cost Categories Proposal Manager



Modularized Engineering

- A10 Unit
  - A10 Subunit
    - FB.001 P&ID diagram in relation to EN 10628, DIN A2
    - A10 Equipment
      - B001 Vessel with dished heads, with optional agitator
      - B002 Vessel with dished heads, with optional agitator
      - B003 Vessel with dished heads, with optional agitator
    - A20 Machines
    - A30 Valves
    - A40 Pipes
    - A50 EI&C
      - 001 Flow
      - 002 Flow
      - 003 Flow
      - 004 Flow



- Bid structure to align costs and engineering data
- **Cost Positions** representing the proposal structure
- Mapping between costs and engineering data
- **Cost Objects** might exists on every structure level

Based on design rulesets and engineering templates

Generate design and engineering data as well as documentation automatically

ME in a nutshell!

According to customer requirements

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Customer Use Case

MAN Energy Solutions
Future in the making

Comos ME

@ MAN Energy Solutions SE

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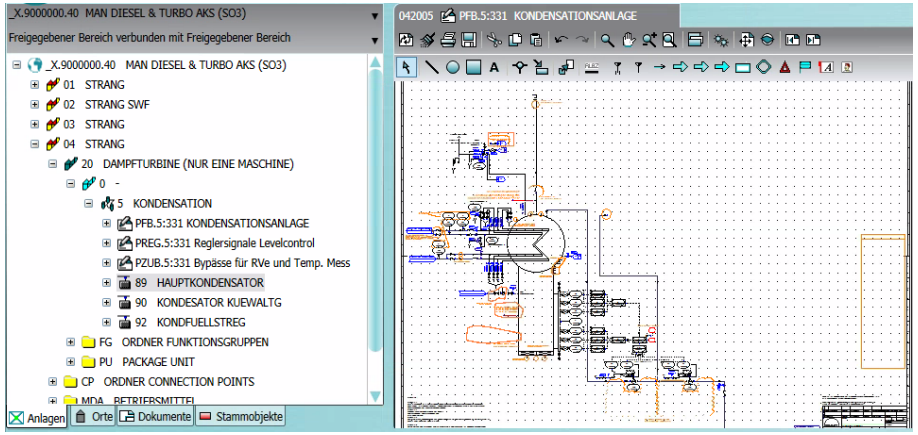
Verwendung modularer Kopiervorlagen im P&ID-Bereich (Typ 1, 2, 3)

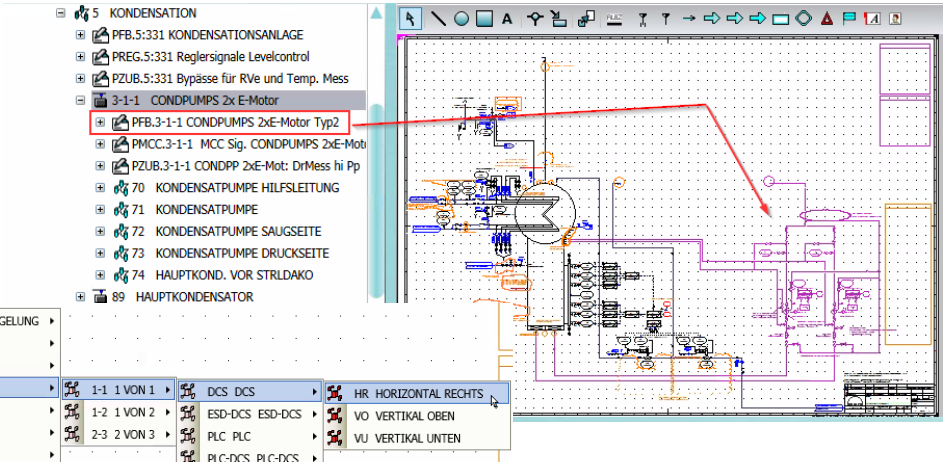
Kopiervorlagen Typ 1

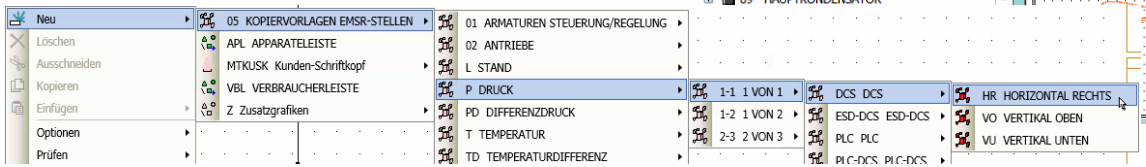
- Grunddokument mit Strukturen, Objekten, Grafiken etc.
- Basis für Kopiervorlagen Typ 2+3



Kopiervorlagen Typ 2

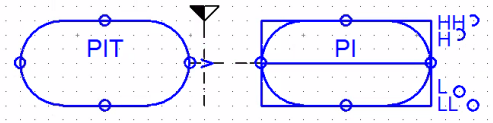
- temporäres Teildokument mit Strukturen, Objekten, Grafiken etc.
- ergänzt / baut auf Kopiervorlagen Typ 1 auf





Kopiervorlagen Typ 3

- positionsunabhängige Kopiervorlagen mit Struktur, Objekten, Grafiken etc.
- Werden je nach Einsatz der entsprechenden Position zugewiesen



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Ist-Situation P&ID: Verwendung vorbereiteter Kopiervorlagen (Typ 1, 2, 3)

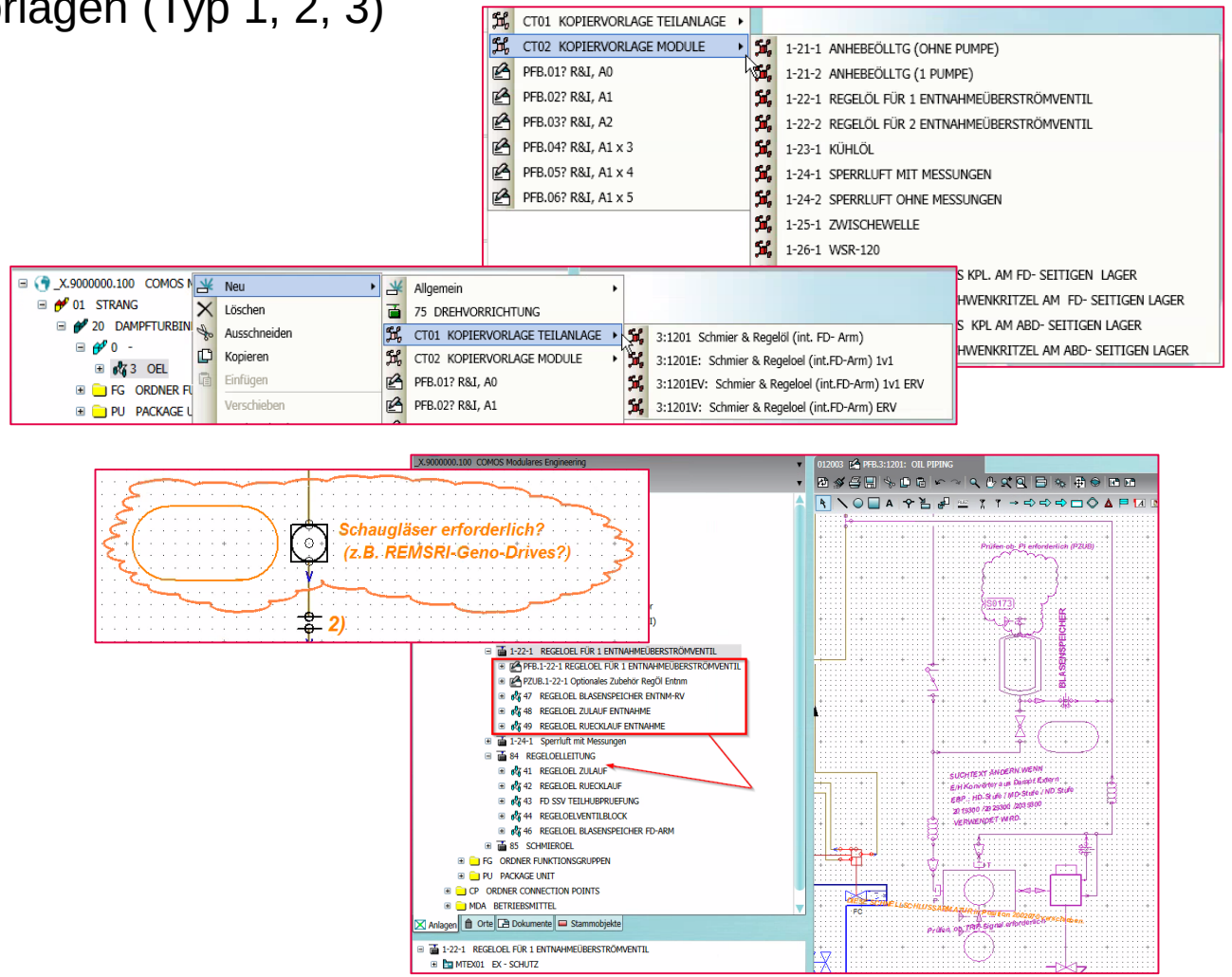
– Manuelles Anlegen der vorbereiteten Kopiervorlagen in den jeweiligen Strukturen

– Manuelles Zuordnen welche Kopiervorlagen zueinander konsistent sind (keine Plausibilitätsprüfung)

– Manuelles Zusammenfügen der Dokumente

– Manuelle Nachbearbeitung der einzelnen Dokumente gemäß Varianz / Definition

– Ggf. manuelle Bearbeitung / Verschieben von Strukturen



Bei der Erstellung der P&IDs werden manuell die einzelnen Kopiervorlagen (Schnipsel) zusammenkopiert und nachbearbeitet – eine Plausibilitätsprüfung / Führung des Mitarbeiters findet systemtechnisch nicht statt!

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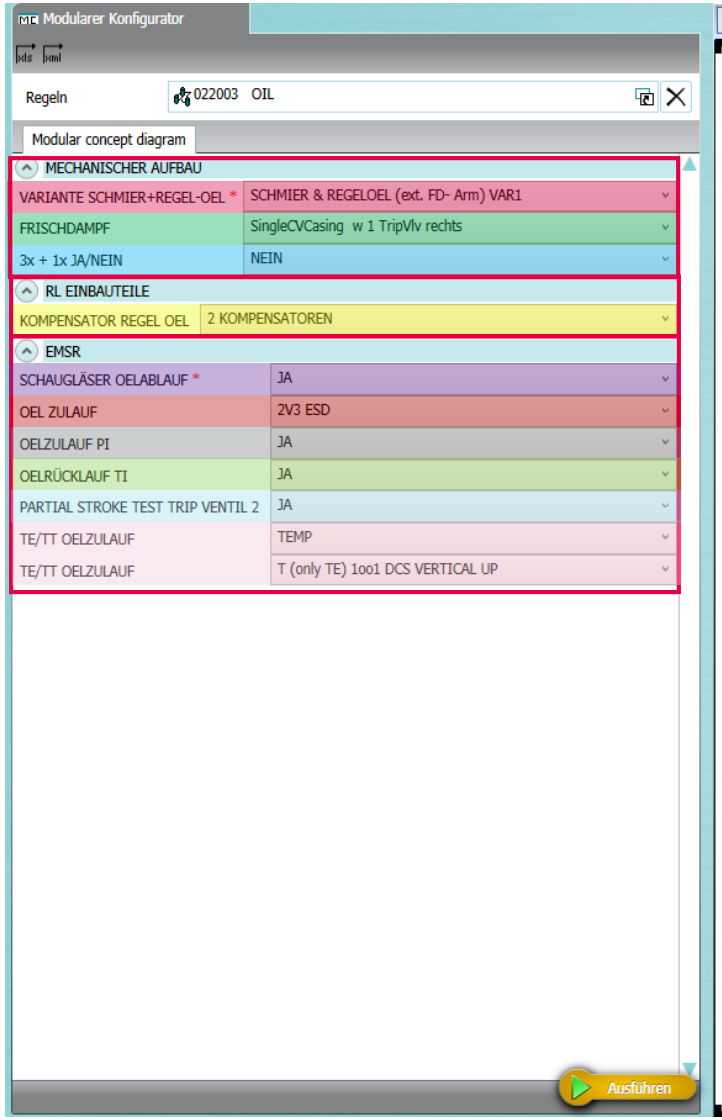
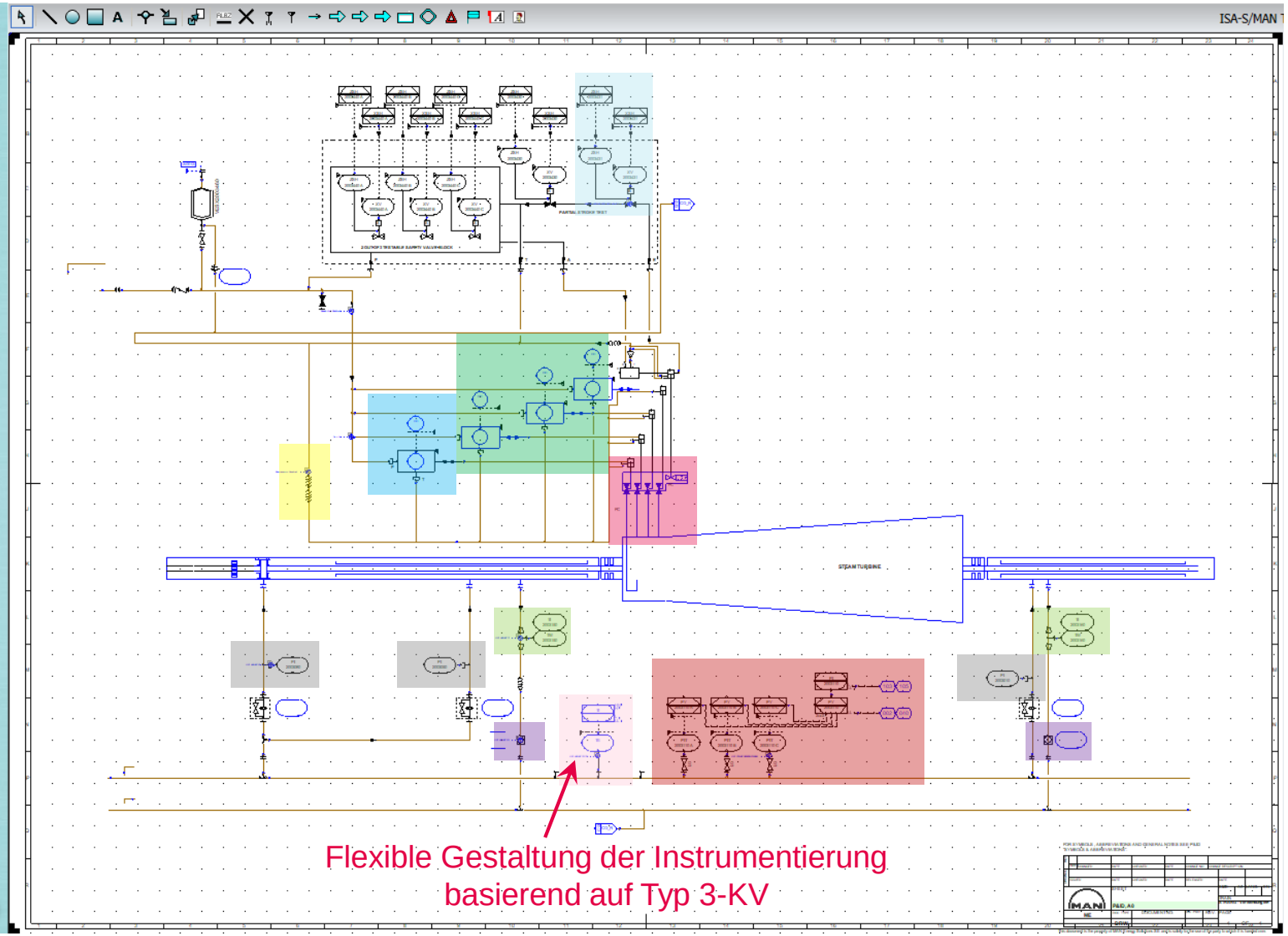
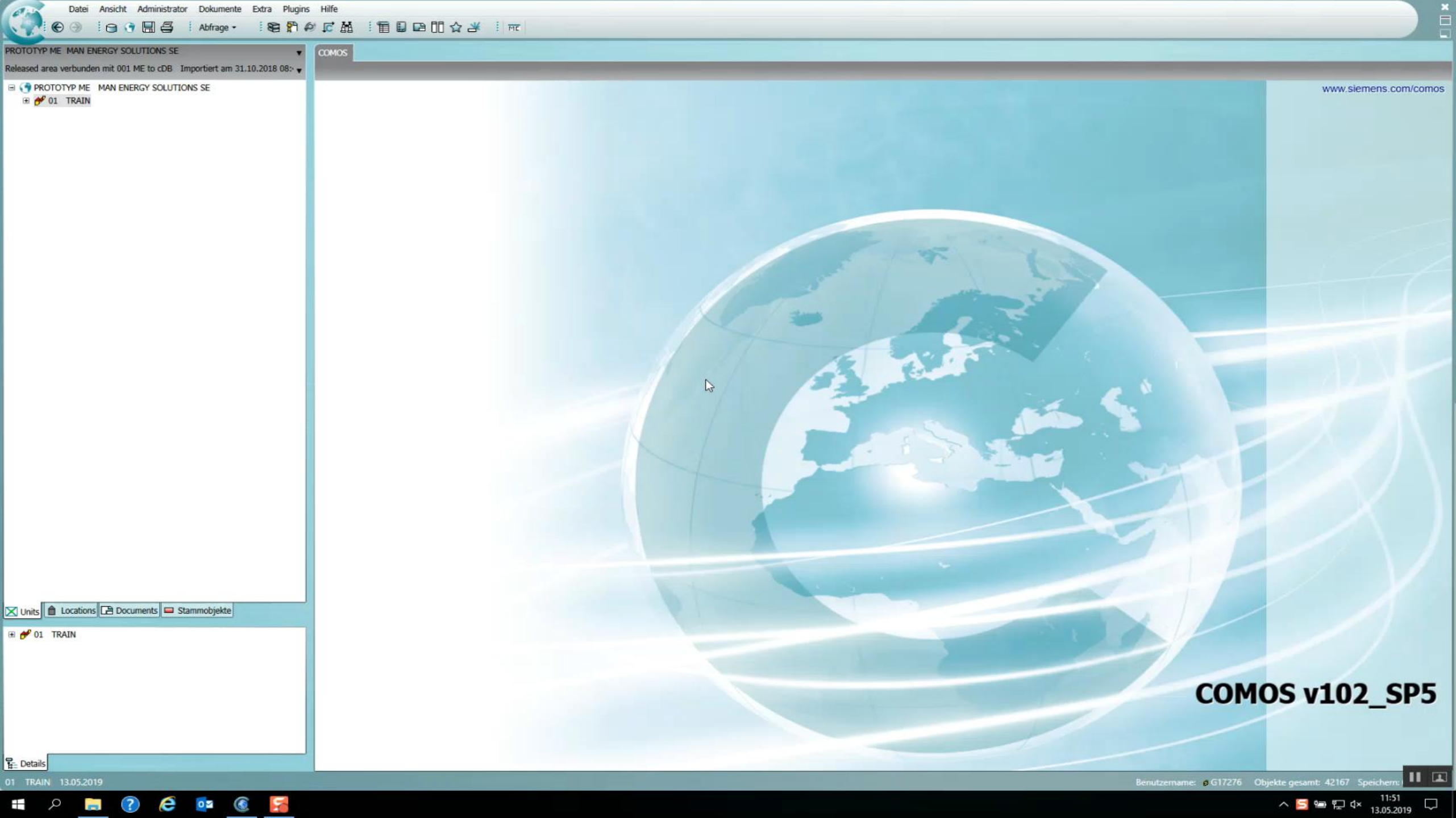
Welche Möglichkeiten bietet die Verwendung des Modulares Engineerings (Konfigurator)



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Units
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Documents
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www.siemens.com/comos
COMOS v102_SP5
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Benutzername: G17276 Objekte gesamt: 42167 Speichern:
11:51
13.05.2019

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Welche Möglichkeiten bietet die Verwendung des Modulares Engineerings (Konfigurator)

– Systemgeführte Konfiguration – Anwenderführung (somit keine Inkonsistenzen)

– Nachträgliche Umkonfiguration möglich (Änderung der Konfiguration)

– „Move & Merge“ – „Verschmelzen von identischen / schon vorhandenen Strukturen“

– Variabler Aufbau der Messstellen basierend auf Typ 3 – KV möglich (siehe Temperaturmessung)

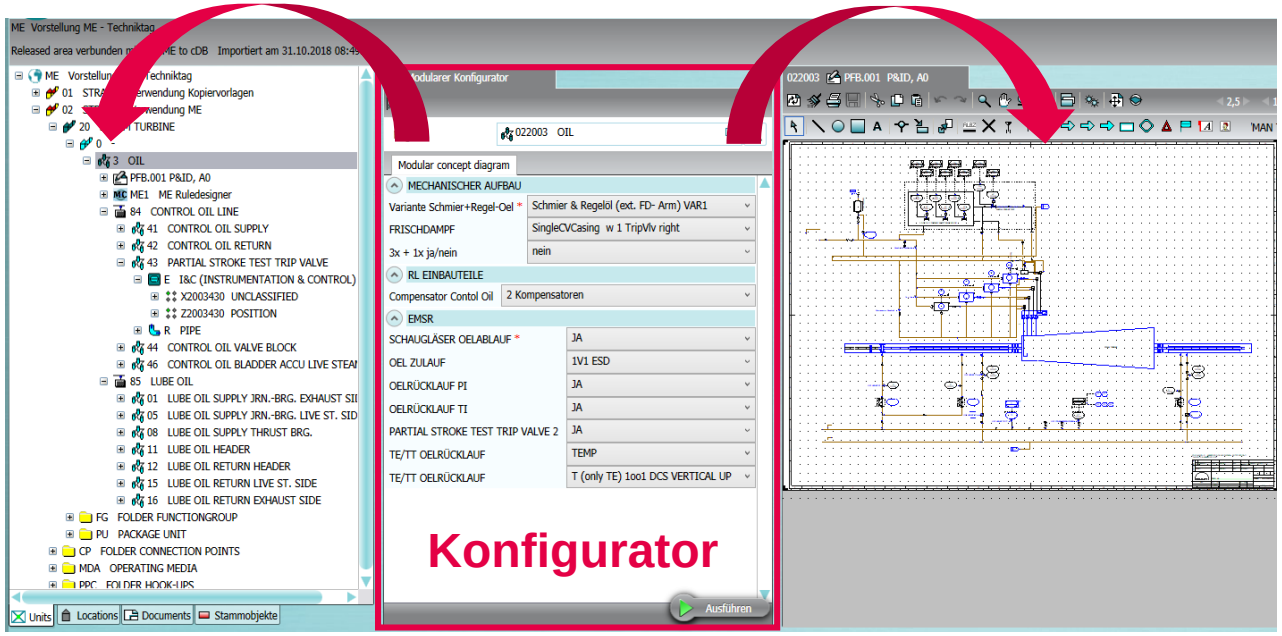
– „Gleiches Erscheinungsbild“ der Dokumentation

– Manuelle Weiterbearbeitung möglich

– Auf Verdrahtungsdokumentation etc. ausbaubar

– Vereinfachte Administration / Aufbau gegenüber Comos-internen TurboDesigner (MAN) - (kein Scripting nötig)

– ETO -> CTO



Disclaimer

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This data serves informational purposes only and is especially not guaranteed in any way.
Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

MAN Energy Solutions
Future in the making

Thank you very much!

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15.05.2019

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