

SIEMENS
Ingenuity for life

COMOS Modularized Engineering Digitalize now 2019

Challenge yourself!



What is it?

What's behind all this?

In real life?

Variants

**Functional
Design**

ETO

MTP

CTO

Scalability

**Subsystem
- Modules**

**150%
BOM**

SKID

**Rule-
Sets**

ATO

Templates

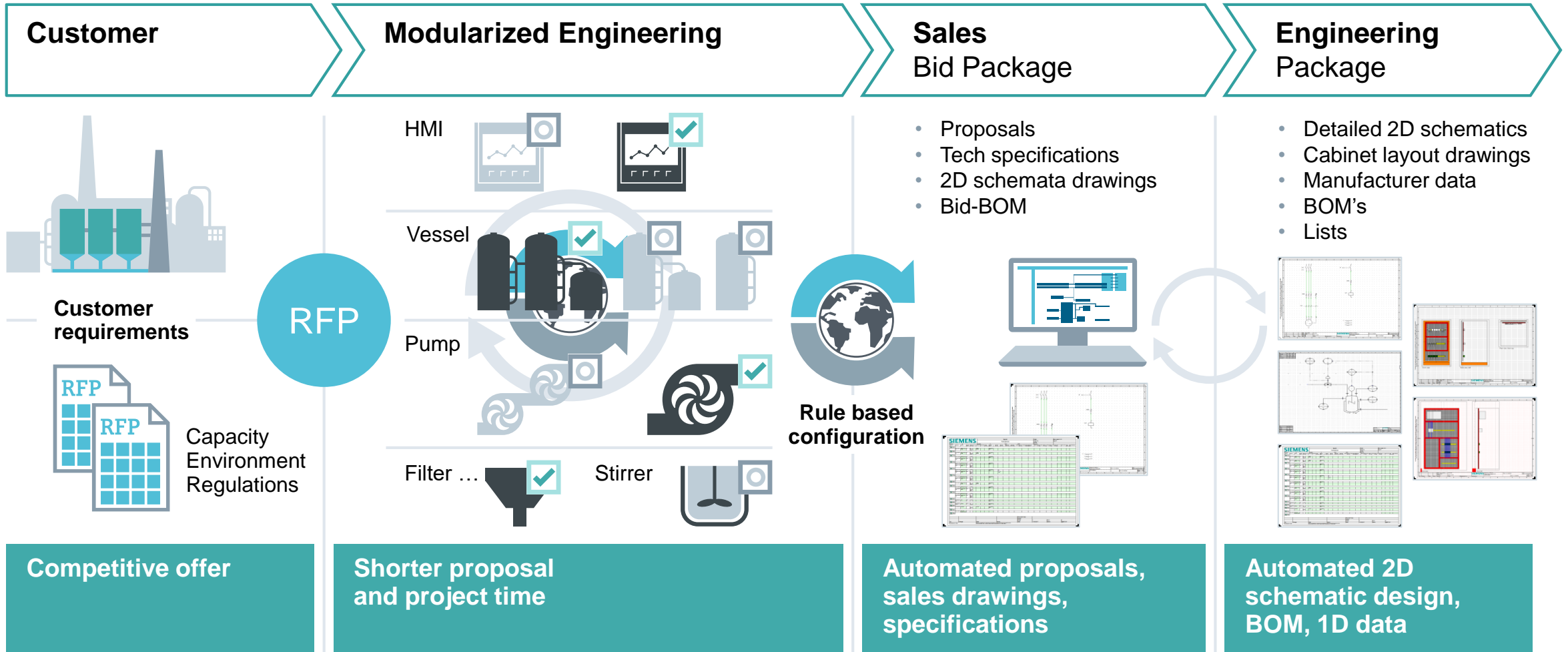
Standardization

**Equipment
- Modules**

Configuration

What was the initial idea?

Example



Who benefits?



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

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

Site Engineering - "Reuse of project information and modules"

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

Topics?



Optimization of the Engineering Workflow



Optimization of the Proposal Workflow



Build up an Engineering “knowledge base”

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

Why COMOS?



One configuration system through different engineering departments



Easy graphic configuration of the rule sets with high traceability



Company wide module- and data repository

Value?



Reduction of proposal lead time



Avoiding of over or under engineering



Strict following of company guidelines and rules



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

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

Brief product information

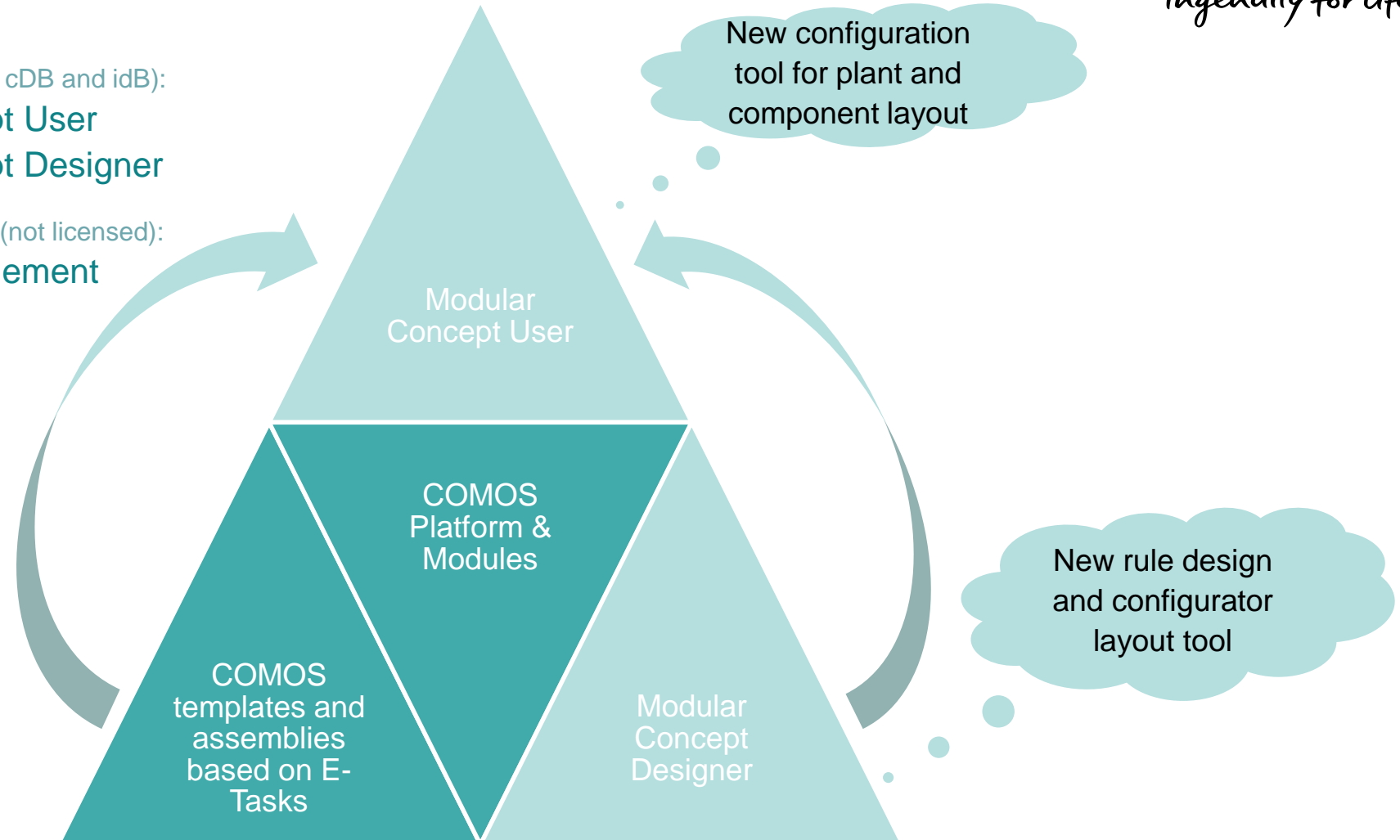
Architecture

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

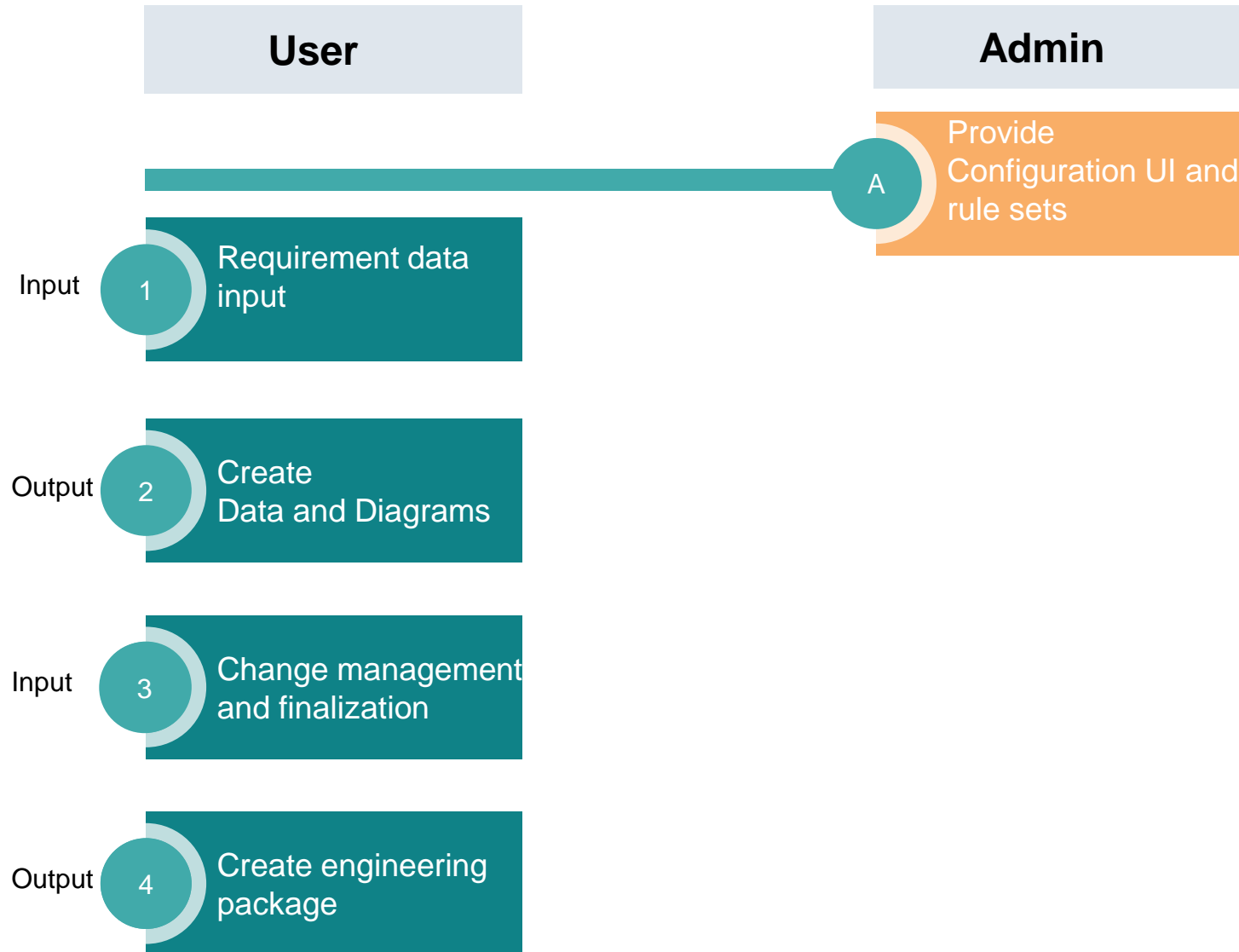
- COMOS Modular Concept User
- COMOS Modular Concept Designer

New Database content layer for iDB (not licensed):

- COMOS Proposal Management



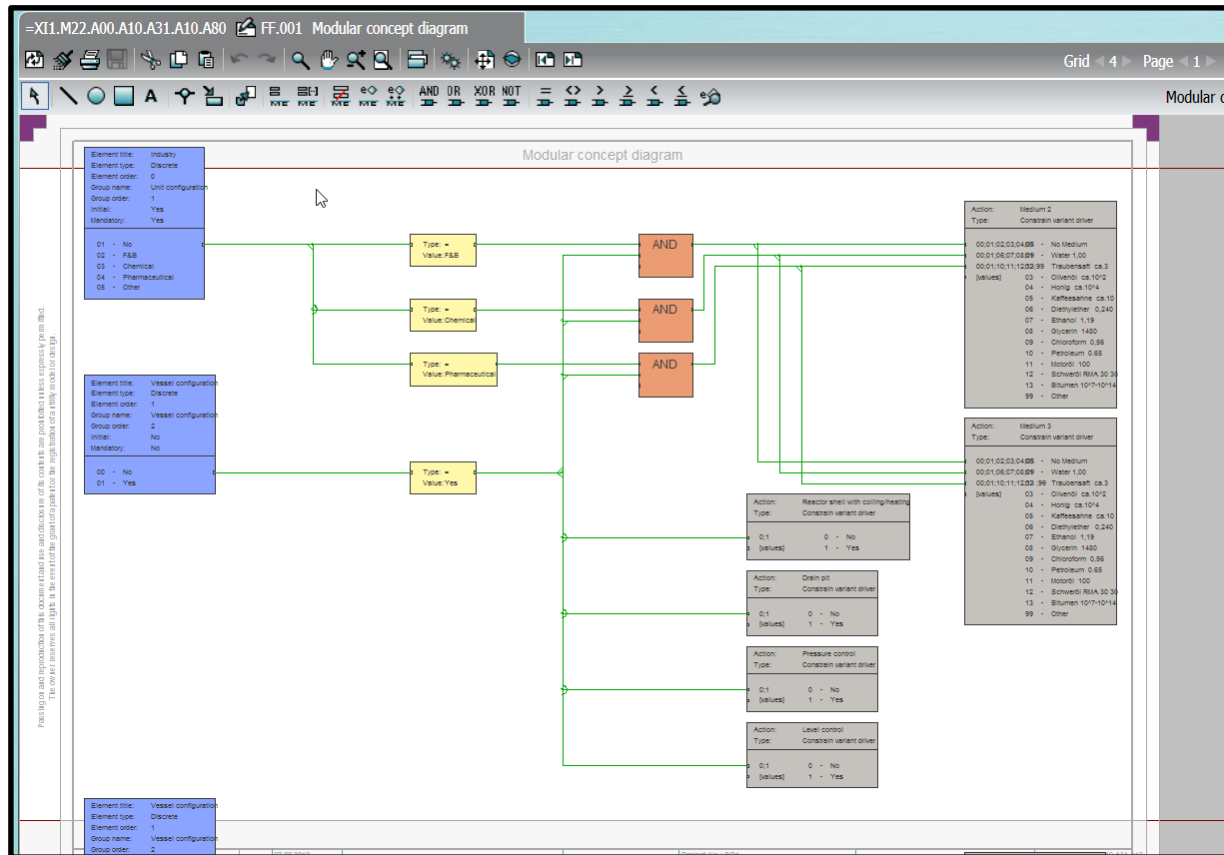
User - Admin - Workflow



Provide configuration UI and rule sets

A

Provide configuration rulesets



- Easy to use
- High transparency
- Intuitive
- ...way to store “Engineering knowledge”

Provide configuration UI and rule sets

A

Provide configuration UI

The screenshot shows the Siemens Modular Configurator interface. The title bar reads "Modular Configurator". Below it, the "Rules" section is set to "=P004 Vessel/Pump module configuration (ME)". The main area is divided into sections for configuration:

- Unit configuration**
 - Industry * Chemical
- Vessel configuration**

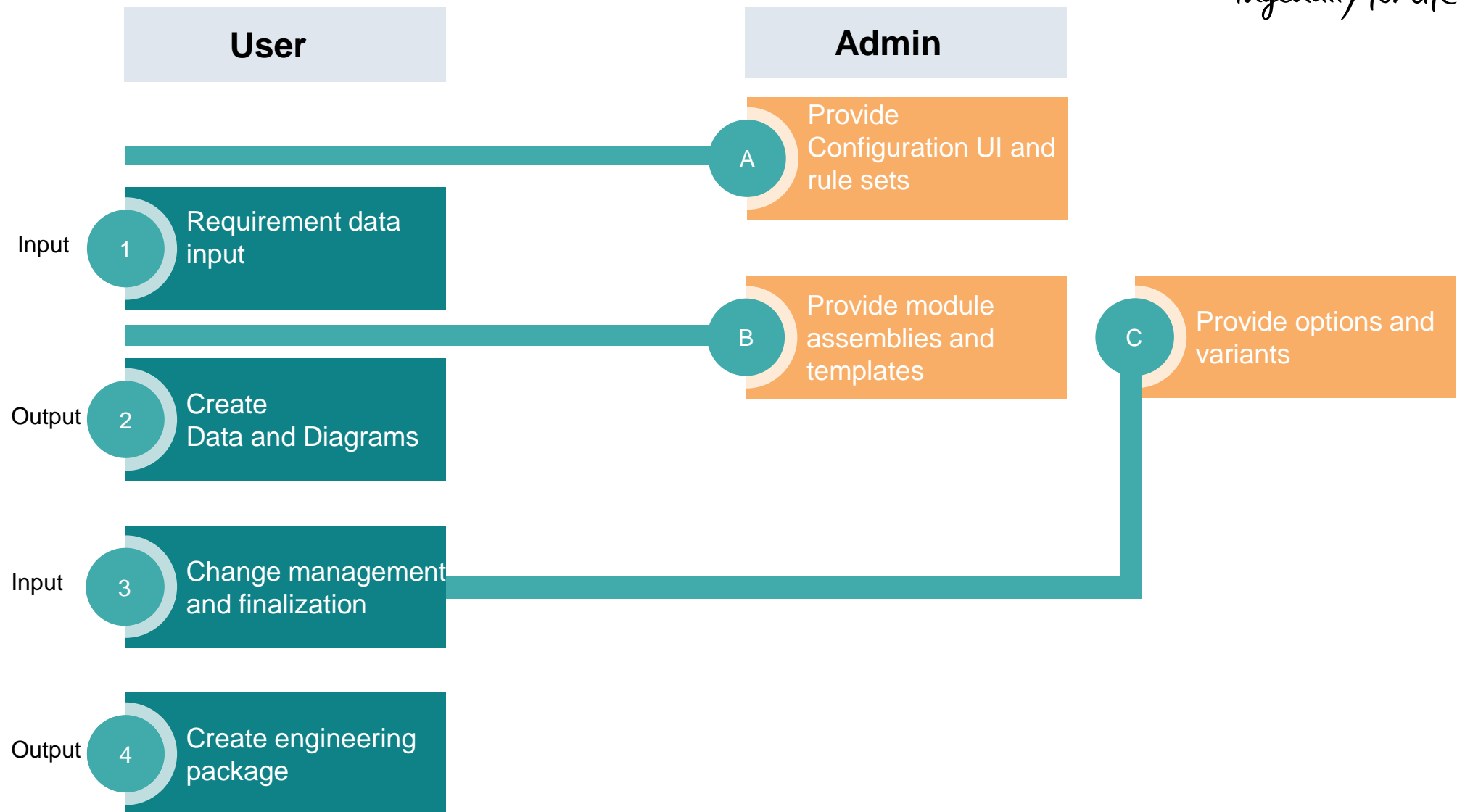
Vessel configuration	Yes
Medium 2 *	Water 1
Medium 3	Glycerin 1480
Agitators *	
Reactors mandatory stirring/heating	No
Drain pit	No
Level control	No
Pressure control	No
- Pump configuration**

Pump configuration	
Flow limiter - pump station	No
Exhaust - pump station	No
Colling - pump station	No
Dry run protection - pump station	No

An "Execute" button is located at the bottom right of the interface.

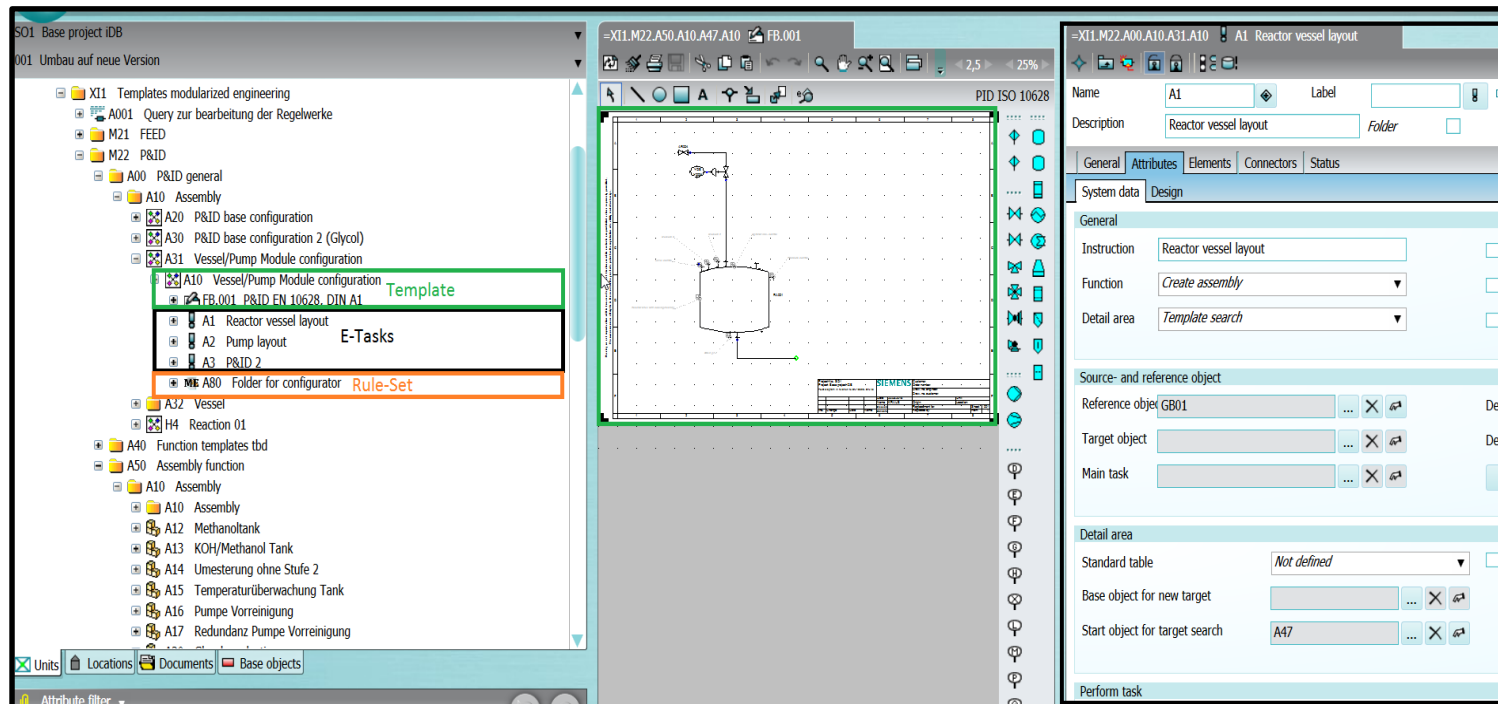
- Easy to use
- High User Guidance
- Low implementation effort

User - Admin - Workflow



Provide module assemblies and templates

B Provide module assemblies and templates



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

Example Rule Creation

001 TEST ME "Create assembly"
20190116_v01 ME Documentaion linked to 20190116_v01 CU right mouse button for ME
20190116_v01 ME Documentaion >> 001 TEST ME "Create assembly"
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

Modular Configurator

Rules =A10 Pump Station MKR

Modular concept diagram

Pump configuration

Pump configuration * No

Proposal Management

One System for the Sales and Engineering Phase:



Mapping

Proposal Management	<ul style="list-style-type: none"> [-] A10 Plant (general) <ul style="list-style-type: none"> [-] PM001 Proposal Manager <ul style="list-style-type: none"> [+] PM.01 Proposal Management Overview [+] PM.02 Proposal Management Customer Info [-] 1 Equipment and Machines <ul style="list-style-type: none"> [+] 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 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Proposal Customer Information</th> </tr> </thead> <tbody> <tr> <td>Customer:</td> <td>Siemens AG</td> <td>S&P Number:</td> <td>00100</td> </tr> <tr> <td>Order:</td> <td>20180207_261</td> <td>Responsible:</td> <td>John Doe</td> </tr> <tr> <td>Project Number:</td> <td>Improving Plant 0011</td> <td>Date:</td> <td>20.03.2019</td> </tr> <tr> <td colspan="4">Additional Information</td> </tr> <tr> <th>Pos.</th> <th>Name</th> <th>Description</th> <th>Price</th> </tr> <tr> <td>1</td> <td>Equipment and Machines</td> <td></td> <td>0.00 €</td> </tr> <tr> <td>1.1</td> <td>Pumps</td> <td>Pumps for plant extension</td> <td>10.000,00 €</td> </tr> <tr> <td>1.2</td> <td>Vessels</td> <td>Changing of existing vessels</td> <td>60.000,00 €</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">Sub-Total</td> <td>70.000,00 €</td> </tr> <tr> <td>2</td> <td>Services</td> <td></td> <td>22.491,10 €</td> </tr> <tr> <td>2.1</td> <td>Services</td> <td></td> <td>0,00 €</td> </tr> <tr> <td>2.2</td> <td>Person</td> <td></td> <td>22.491,10 €</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">Sub-Total</td> <td>22.491,10 €</td> </tr> <tr> <td>3</td> <td>Travel Costs</td> <td>Travel Costs for ...</td> <td>23.048,20 €</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">Sub-Total</td> <td>23.048,20 €</td> </tr> <tr> <td>4</td> <td>Other Costs</td> <td>Regulators and instrumentation</td> <td>40.493,70 €</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">Sub-Total</td> <td>40.493,70 €</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">Total</td> <td>136.039,00 €</td> </tr> </tbody> </table> <p style="text-align: center;">Price information for customers</p>	Proposal Customer Information				Customer:	Siemens AG	S&P Number:	00100	Order:	20180207_261	Responsible:	John Doe	Project Number:	Improving Plant 0011	Date:	20.03.2019	Additional Information				Pos.	Name	Description	Price	1	Equipment and Machines		0.00 €	1.1	Pumps	Pumps for plant extension	10.000,00 €	1.2	Vessels	Changing of existing vessels	60.000,00 €			Sub-Total	70.000,00 €	2	Services		22.491,10 €	2.1	Services		0,00 €	2.2	Person		22.491,10 €			Sub-Total	22.491,10 €	3	Travel Costs	Travel Costs for ...	23.048,20 €			Sub-Total	23.048,20 €	4	Other Costs	Regulators and instrumentation	40.493,70 €			Sub-Total	40.493,70 €			Total	136.039,00 €
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- Bid structure to align costs and engineering data
- **Cost Positions** representing the proposal structure
- Mapping between costs and engineering data
- **Cost Objects** might exist on every structure level

ME in a nutshell!



Based on design rulesets and engineering templates

Generate design and engineering data as well as documentation automatically

According to customer requirements