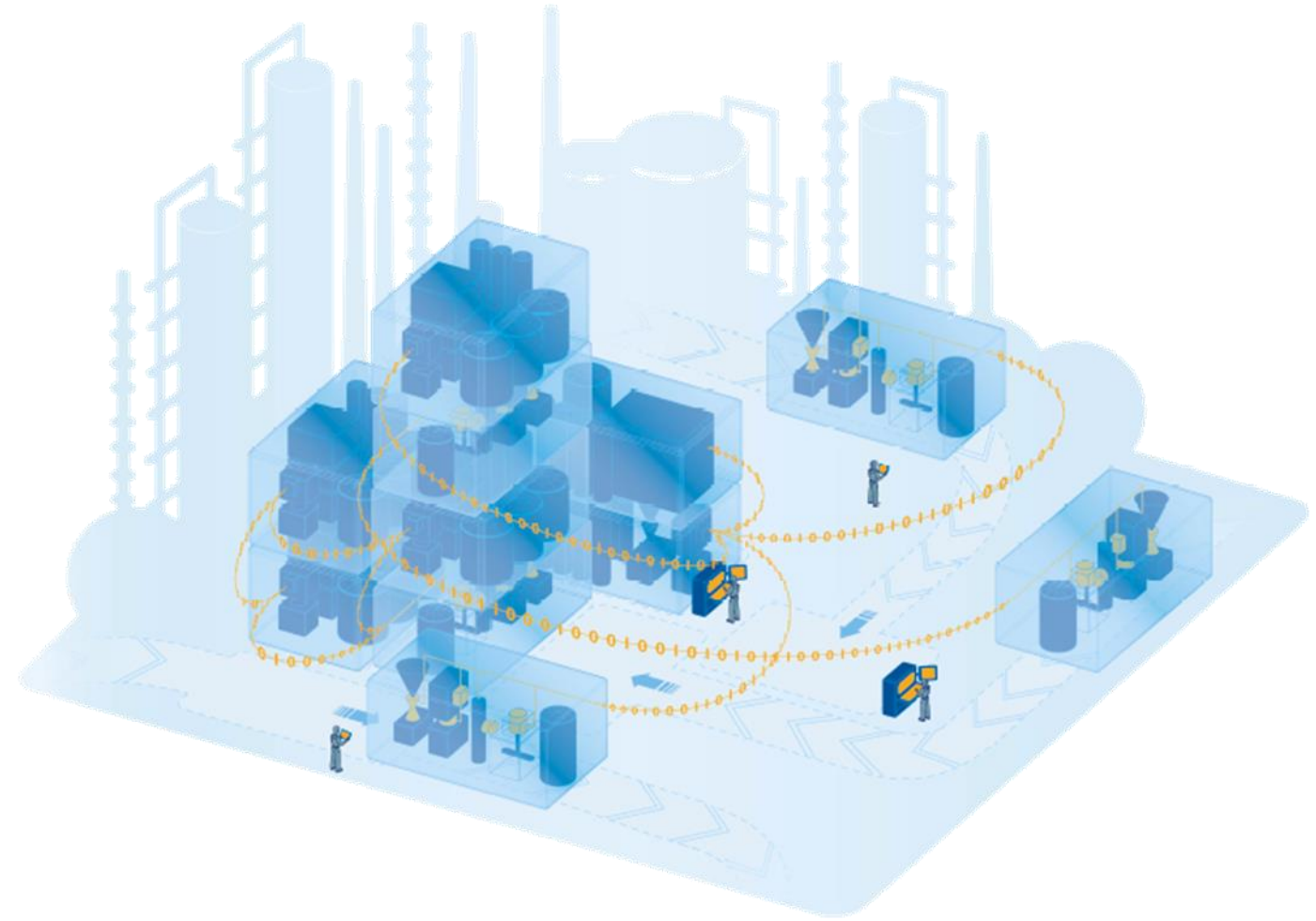


Modular plants technology for chemical plants – status update & perspectives

- **Motivation**
- **Proceeding**
- **The modular approach**
- **Status of implementation**
- **Outlook**



Dr. Frank Stenger

ProcessNet Working Group “Modular plants”

LANXESS

MERCK

 **Bayer**

 **BASF**
The Chemical Company

 **tu** technische universität dortmund

CLARIANT

 **EVONIK**
INDUSTRIES

 **invite**

 **Fachhochschule Südwestfalen**
University of Applied Sciences

 **DECHEMA**



Dr. Frank Stenger

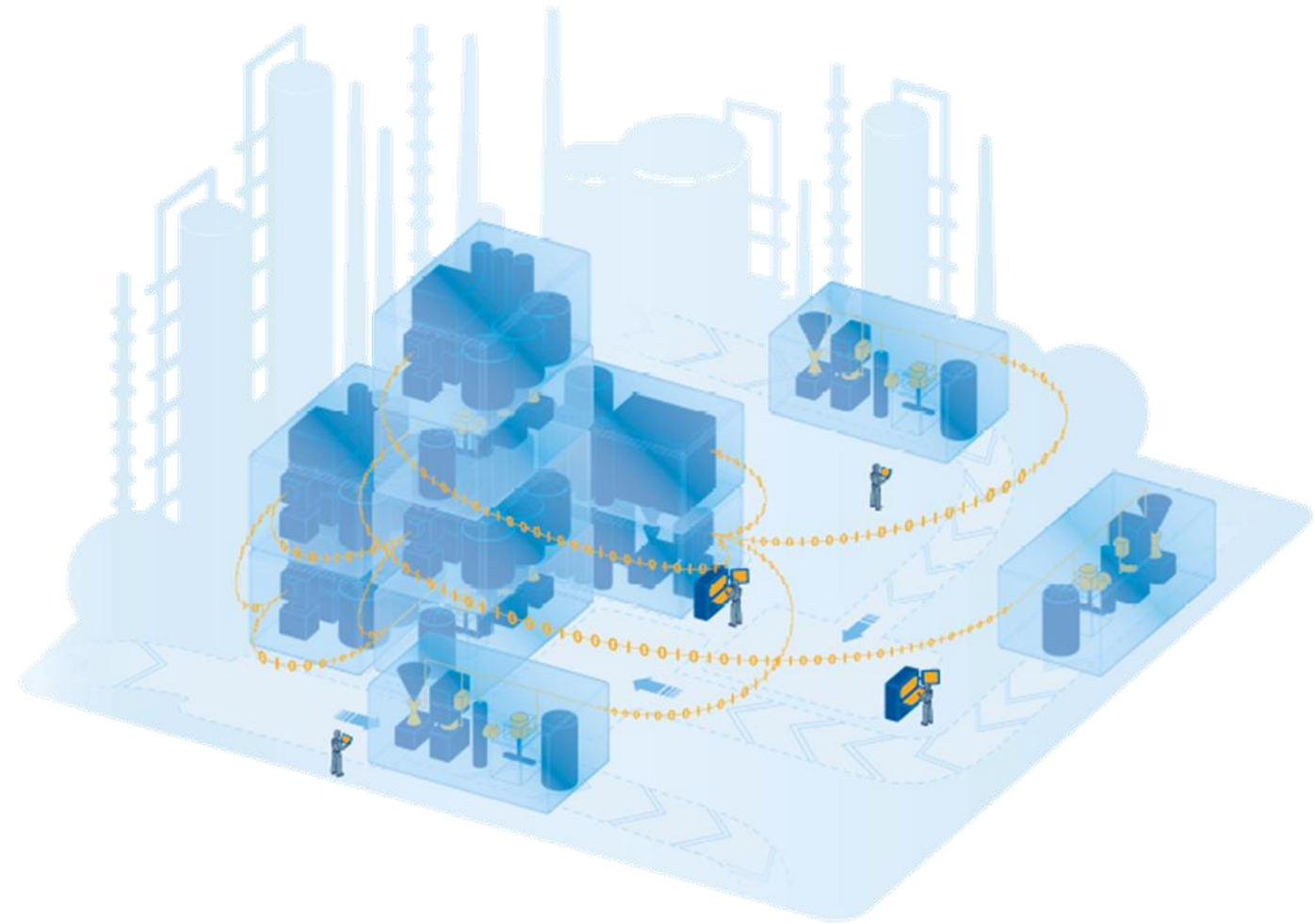
Process Technology & Engineering, Evonik Operations GmbH

Head of ProcessNet Working Group “Modular plants”

Head of standardization group VDI 2776 – Modular Plants

Modular plants technology for chemical plants – status update & perspectives

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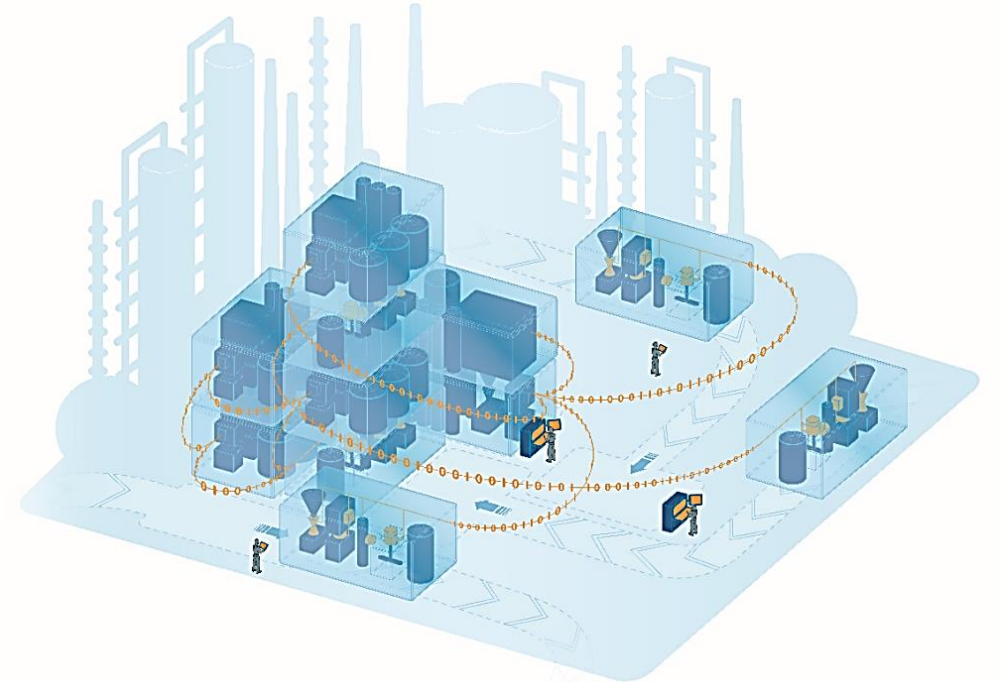
invite

Fachhochschule Südwestfalen
University of Applied Sciences

DECHEMA

Drivers for Plug & Produce Concepts

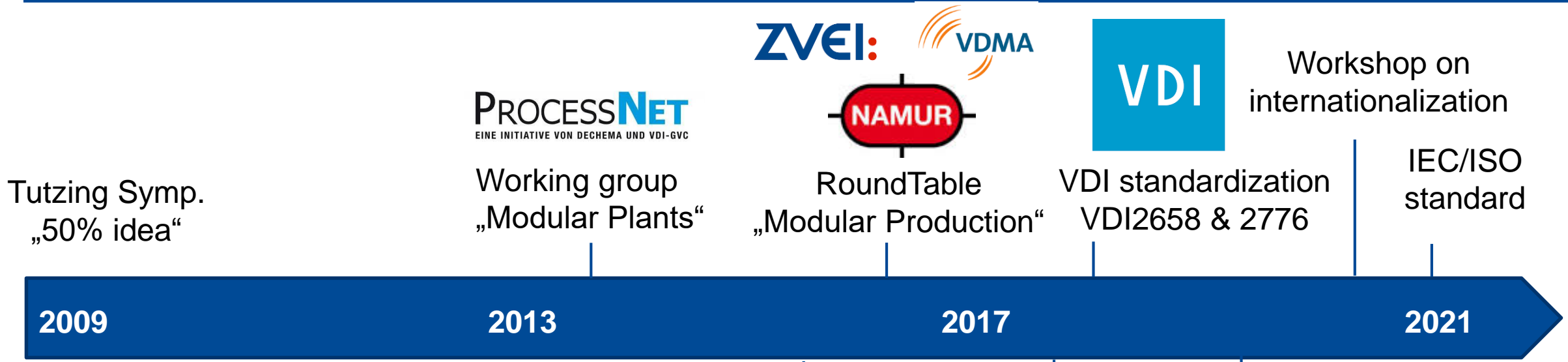
- Actual market & industry requirements ask for new technological solutions



- Modularisation as *the* breakthrough in designing future production plants, applicable to:
 - Flexibilisation of greenfield plants
 - Optimisation / Expansion of brownfield plants

Motivation

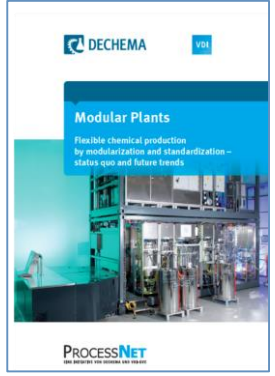
The “journey” started more than 10 years ago, more and more groups are joining and is still ongoing



European funded project



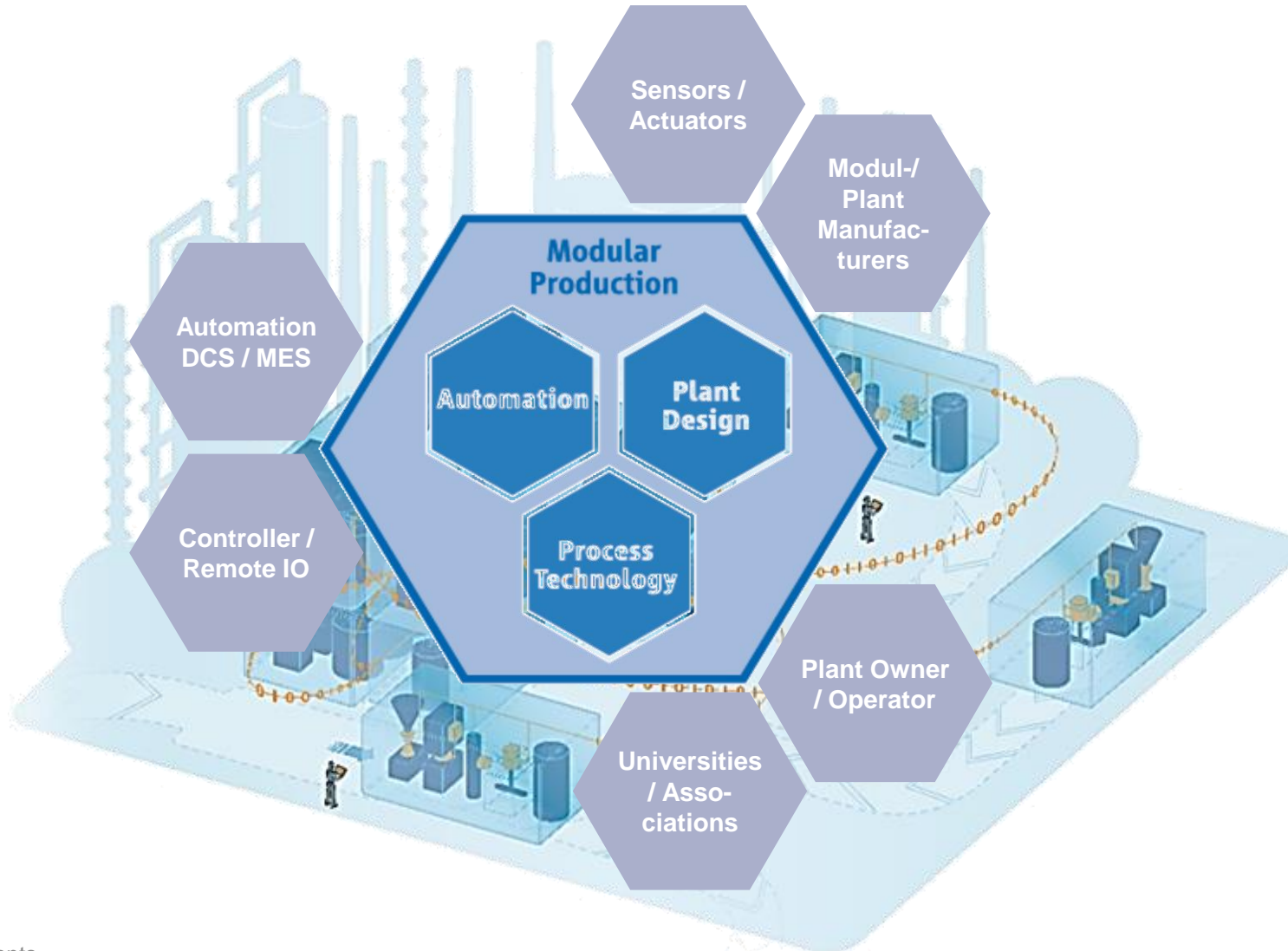
White paper



Hannover FAIR & ACHEMA

Tutzing Symp. „100% digital“

Modular production is a disruptive change in plant technology and needs the involvement of various disciplines



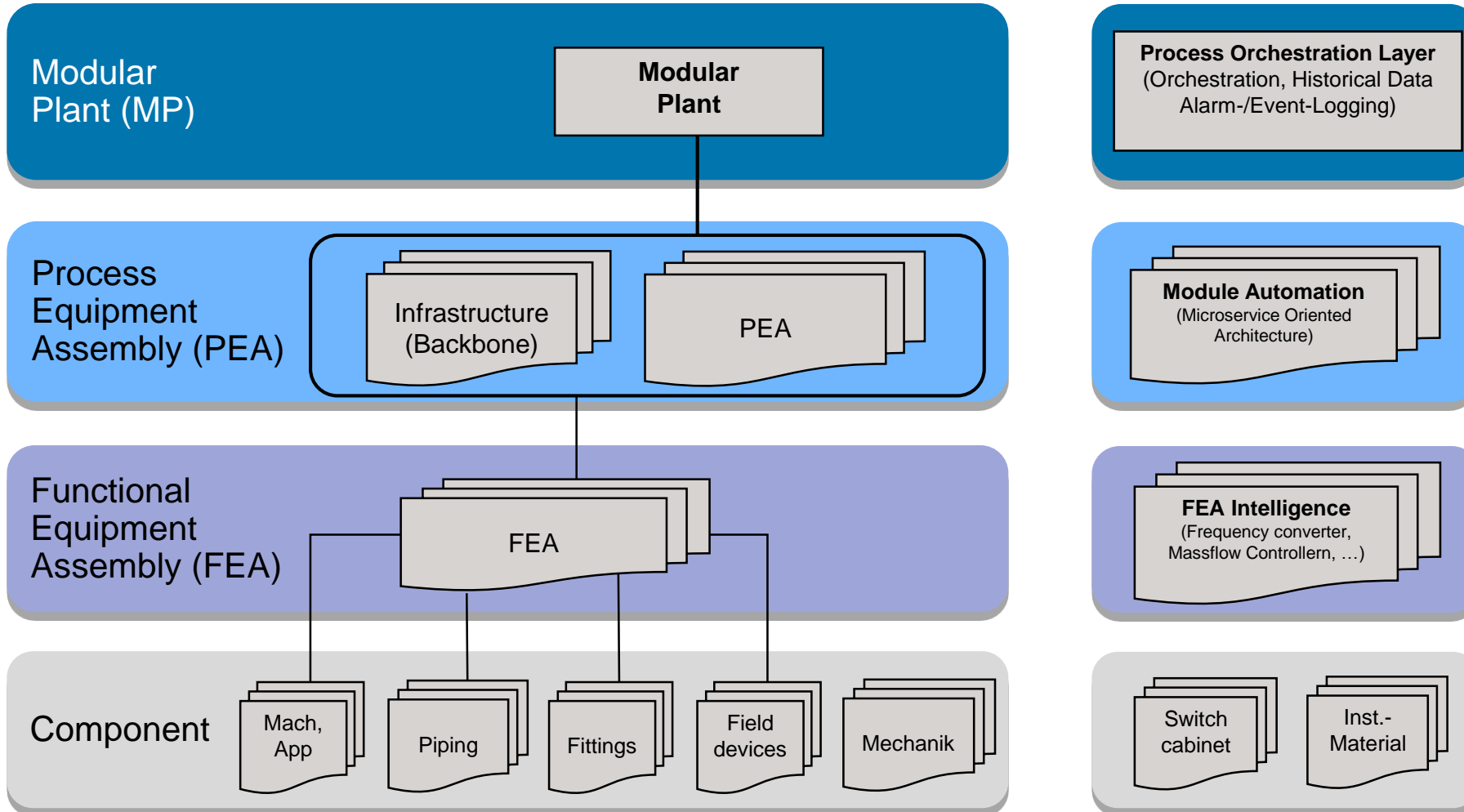
The number of involved companies and associations is constantly growing



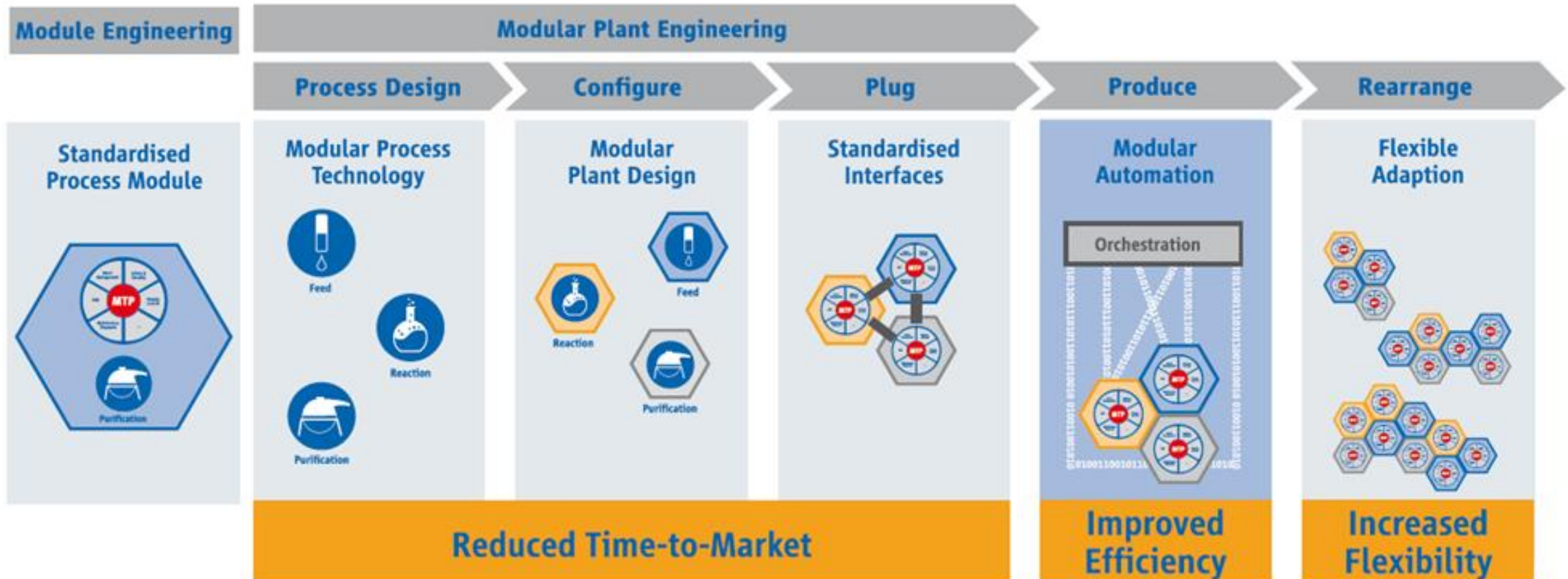
Four Levels for a Modular Process Technology ...

Process Technology (VDI 2776)

Automation Technology (VDI 2658)



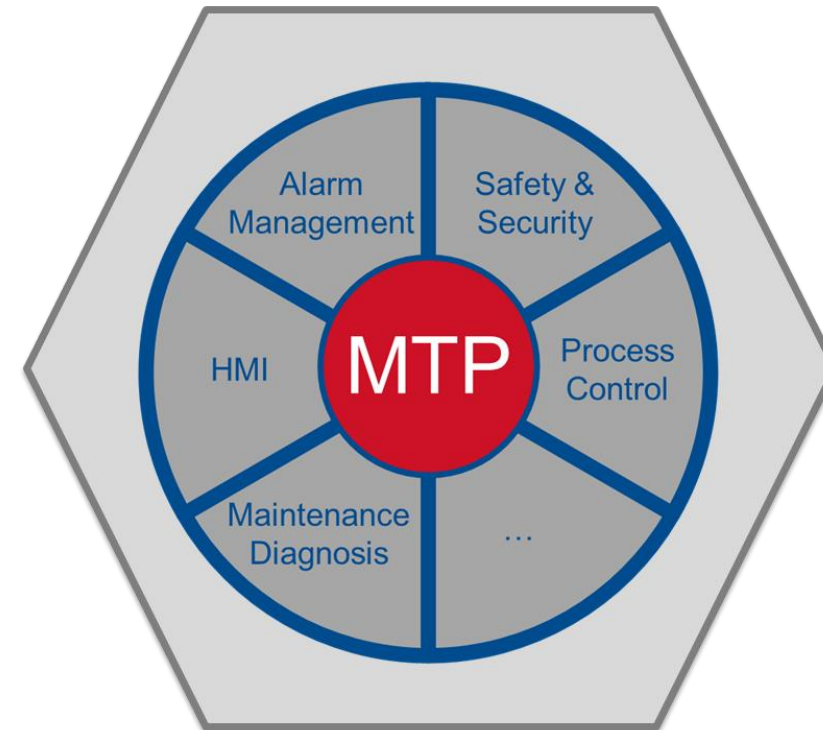
... allow for a new Modular Plant Engineering approach



Automation of Modular Plants with Module Type Package (MTP)

a standardized non-proprietary interface
description of process equipment
assemblies PEA:

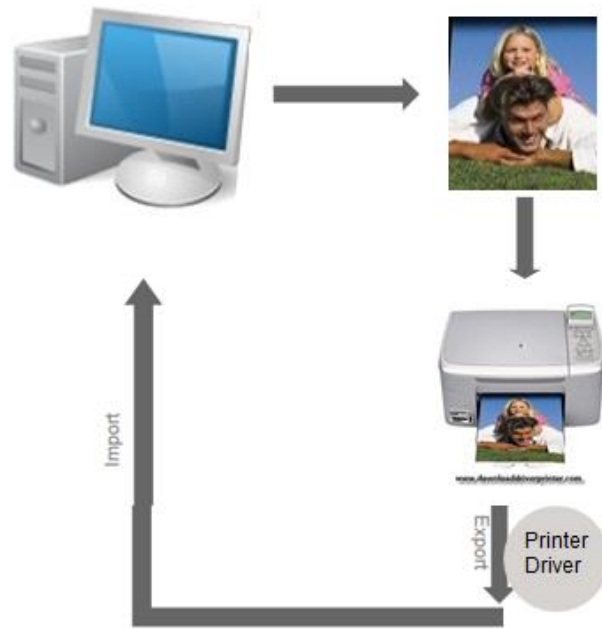
- HMI
- Process Control
- Alarm Management
- Safety & Security
- Maintenance & Diagnostics
- ...



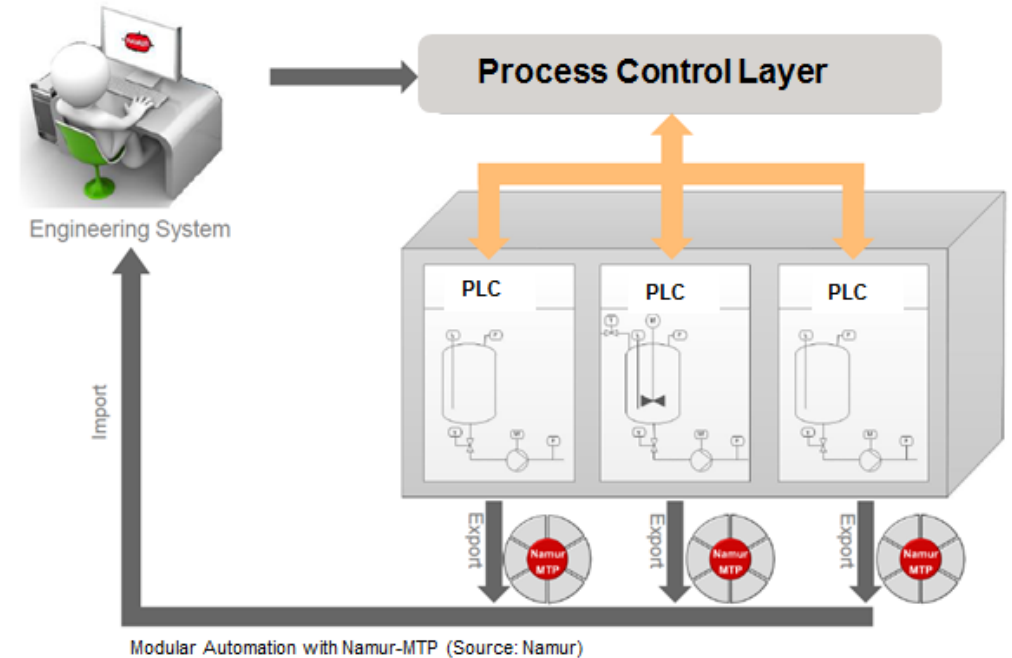
The modular approach

MTP standard serves as central element for fast & easy connection and re-arrangement of modules

Module Type Package (MTP) analogy to a printer driver



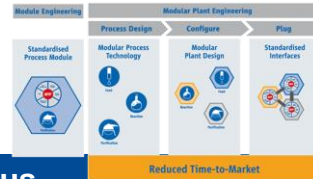
Printer driver is a piece of software that converts the data to be printed to a format that a printer can understand.



MTP is a device description that enables a Process Control Layer to implement the functions and services of the Module (HMI, Process Control, Alarm Management...)

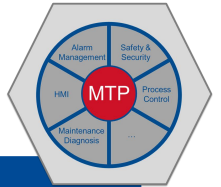
Two national standardization guidelines are under development, allowing for first commercial products & implementations

VDI 2776



Page	Description	Status
2776-1	General concept	White print DE expected Q4/2020
2776-2	Design guidelines	Green print expected Q2/2021
2776-3	Safety concepts	Green print expected Q2/2021
2776-4	Operation & maintenance	In preparation
2776-5	Authority engineering	In preparation
2776-6	Modular analytics	In preparation

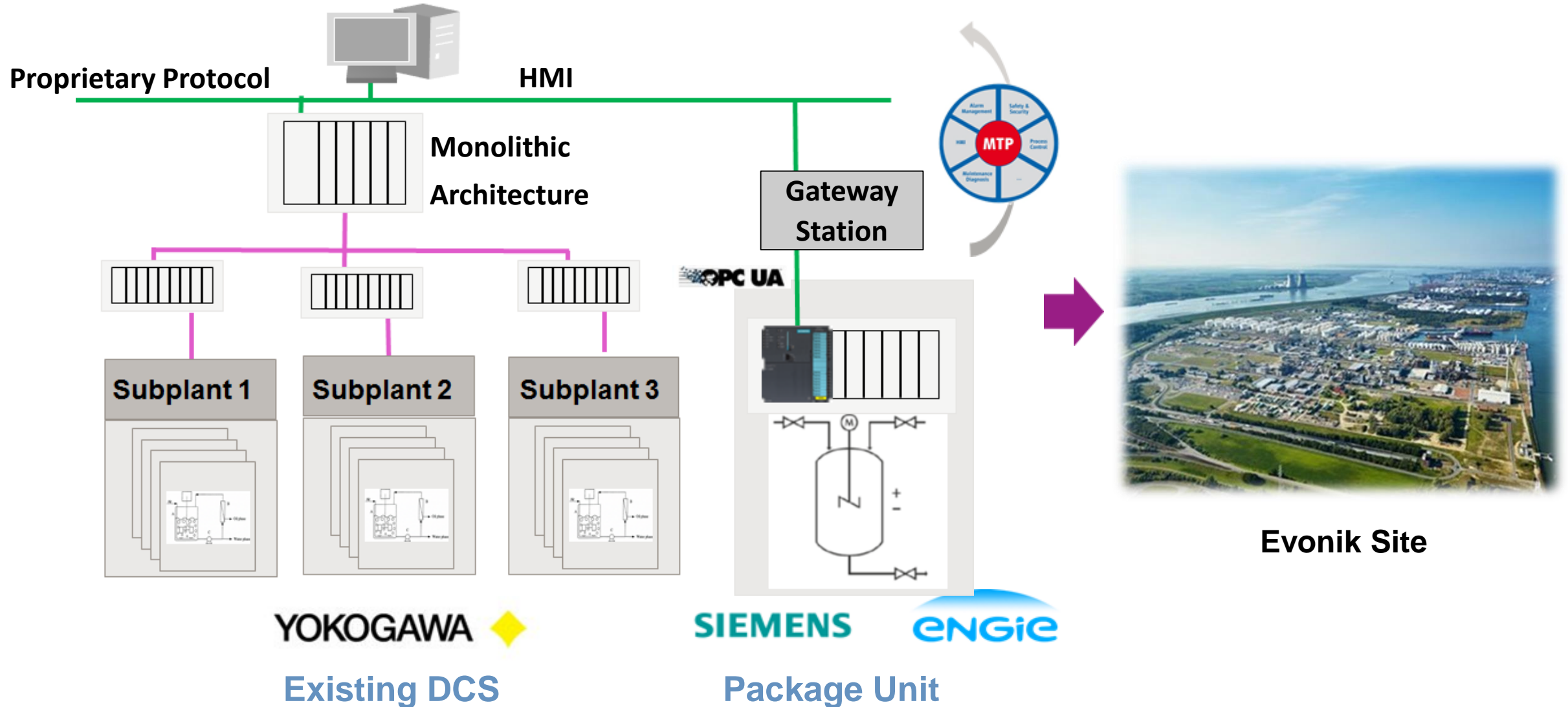
VDI/VDE/NAMUR 2658



Page	Description	Status
2658-1	Basic Concept and Interfaces	White print DE/EN
2658-2	HMI concept	White print DE/EN
2658-3	HMI Interface	White print DE/EN
2658-4	Process control	Green print available
2658-5	Run Time concept	Under specification
2658-5.1	Run time OPC UA	Under specification
2658-6	Alarm Mgmt Concept	Green print - Q4/2020
2658-7	Alarm Mgmt Modelle	Green print – Q4/2020
2658-7.1	Alarm Mgmt OPC UA	Under specification
2658-8	Safety Concept	Under specification
2658-9	Safety Interfaces	Under specification

Status of implementation

A first MTP- use case was successfully realized at the Evonik production site in Singapore with Engie, Siemens and Yokogawa



News Release



LANXESS starts series production of modular X-Biomer plants

- Cooperation with Hüni as technology partner for engineering and asset realization
- In situ production improves sustainability profile

Cologne, August 28, 2020 – With its modular plant concept ReelL (resource-efficient manufacture of leather chemicals), the specialty chemicals company LANXESS is embarking on the next phase of

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Page 1 of 3

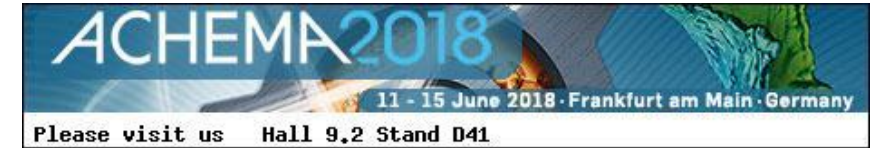


<https://lanxess.com/en/Media/Press-Releases/2020/08/LANXESS-starts-series-production-of-modular-X-Biomer-plants>

Status of implementation

“INDUSTRIE 4.0: The age of modular production“: Joint activities at Europe´s major fairs for process industry

PROCESSNET
EINE INITIATIVE VON DECHEMA UND VDI-GVC



- > 20 participants
- 3 Hardware Demonstrators
- 8 Software Demonstrators
- Panel discussions



An international alignment of the topic started

The RAPID institute

The screenshot shows the RAPID institute website. At the top, there is a navigation bar with 'RAPID' and links for Projects, Membership, Events, News, Education, About, and Contact. Below this, a sidebar lists various process categories like 'Chemical & Commodity Processing' and 'Intensified Process Fundamentals'. The main content area is titled 'About RAPID: Institute Roadmap' and features a large image of an industrial plant. Below the image is a section for 'Founding Members' with a grid of logos for various organizations and universities, including Chemstations, DuPont, Fluor, gti, INEL, Lubrizol, WPI, Praxair, Dow, INL, Intramicon, Auburn University, and others.

Exxon Mobile Open Process Automation

Open Process Automation Forum of The Open Group

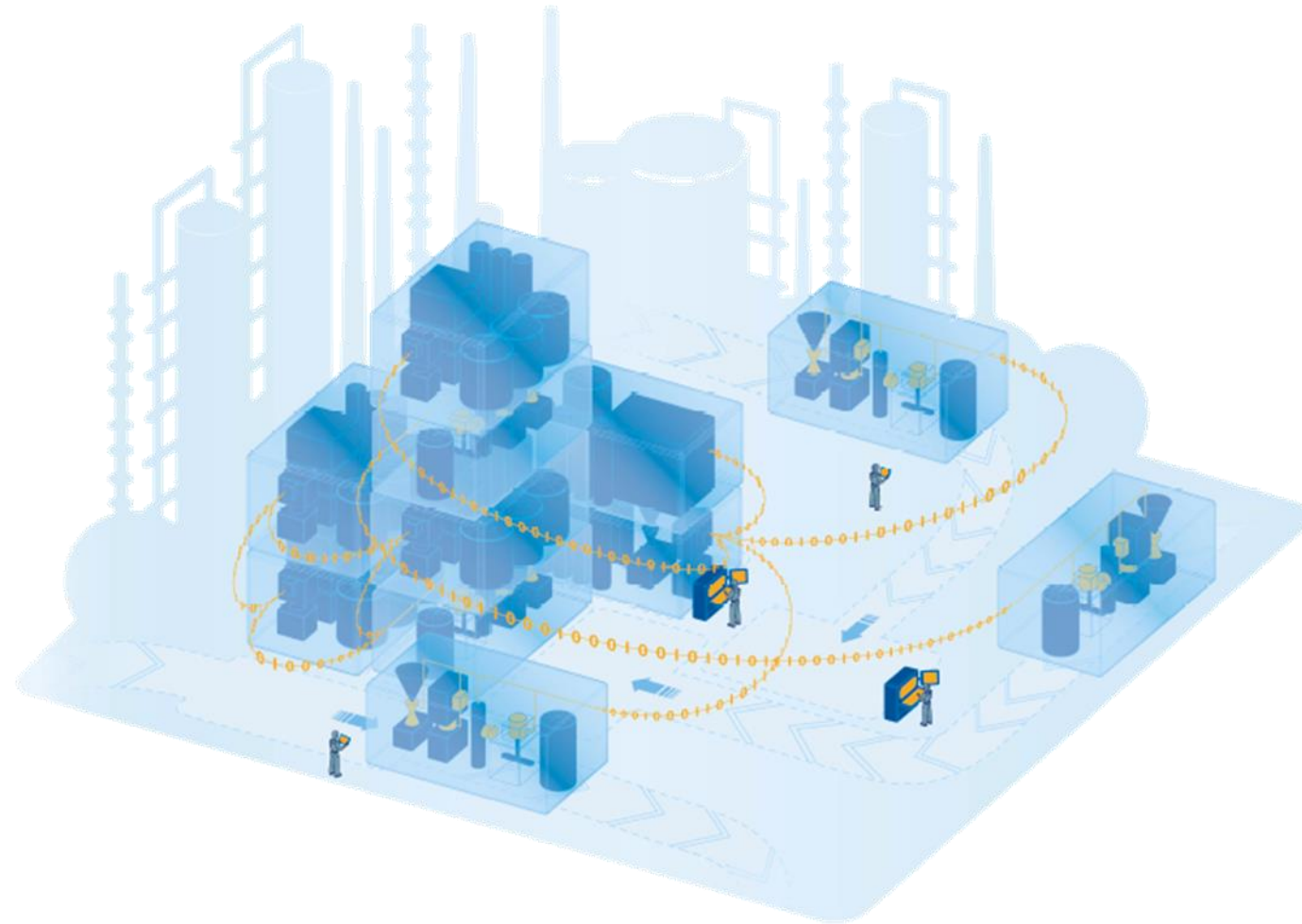
The screenshot shows the website for the Open Process Automation Forum of The Open Group. The header includes the Open Group logo and the forum title. Below the header, there is a navigation menu with options like 'Home', 'Login', 'Search', and 'About Us'. The main content area is divided into several sections: 'Subject Areas' with a list of topics, 'Forum' with a description of the forum's focus, 'Vision' with a statement about the forum's goals, 'Events' with information about upcoming events, and 'How & Why to Join' with details about membership. The ExxonMobil logo is visible at the bottom of the page.

- End User / Supplier / System Integrator consortium for standards selection and conformance certification
- Contact: Mike Hickey (m.hickey@opengroup.org); +1 512-343-9159
- First official members meeting: 16-18 Nov 2016; San Francisco, co-located with AIChE Annual Meeting
 - Open Group Paris Conference; 24-27 Oct 2016
 - ARC Forum; 6-9 Feb 2017
- Members as of 12 Sep 2016 (open 1 month)
 - ExxonMobil
 - Koch Industries (Invista, Georgia Pacific)
 - Praxair
 - Schneider Electric
 - Accenture
 - Hewlett Packard Enterprise

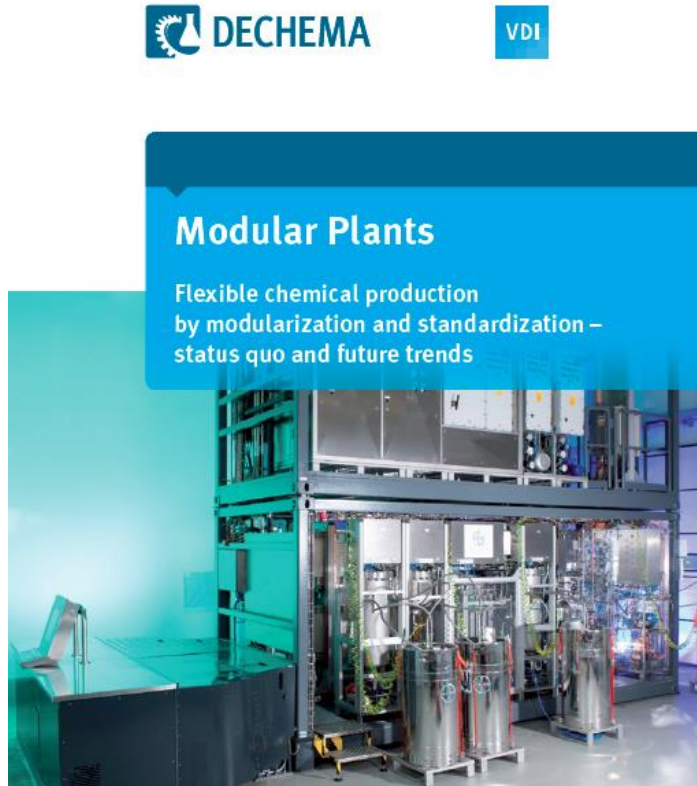
Remaining Challenges

- A disruptive technology requires a mind change in the whole community (management as well as staff personal)
- Hybrid systems – modular in conventional plants
- Still open development tasks
- „Authority engineering“ for flexible, modular plants is necessary (e.g. permits, GMP approval, ...)
- Standardization & harmonization remains challenging
- Internationalization
- New business models possible
- ...

Thank you very much for your attention!



White Paper “Modular Plants”



Published in December 2017
by the

Temporary ProcessNet
Working Group
“Modular Plants”

Download at
(free of charge):



or

<http://processnet.org/en/posis>