technology profile

TEST THE MODULARIZED AND DIGITALIZED PLANT IN THE P2O-LAB

Ideas on utilisation

The Process-to-Order Lab (P2O-Lab) of TU Dresden addresses flexibility and agility as the current challenges of the process industry. Based on the *Modularization* and *Digitalization* approaches, we investigate how to compete in highly volatile markets with almost binary product life-cycles. Thus, we develop models, methods, tools and process modules in order to derive, implement and evaluate an appropriate production process directly from the characteristics of the requested product.

Lab environment of the P2O Lab

The P2O-Lab offers the infrastructure and expertise needed for *plug-and-produce*. This includes the design of standard process modules, intelligent infrastructures and innovative integration concepts, ensuring the agile and rapid establishment of research results on an industrial scale. The P2O-Lab bundles the methods, competencies and technologies of all our partners from mechanical, electrical and computer engineering as well as computer science. We provide a lab environment for applying and evaluating new concepts, technologies and products to industrial-scale modular plants.

Potential adopters of technology

The P2O-Lab addresses customers in the area of process industries which want to drive the market in the direction of modularization and digitalization. We support you to get ready for plug-and-produce regardless if you are an owner/operator of a process plant, an integrator of such plants, a manufacturer of (smart) modules or a supplier of equipment for those modules. We can provide support in wide range: from bringing you up to date to the current standardization over evaluating and qualification of your modules up to developing new concepts on top of the modular approach.

Advantages of technology

The modular approach of building plants has huge advantages in terms of flexibility. Since we are assembling a whole plant of readily available smart module, the engineering is incredibly fast and without much effort. Most of the effort of design, construction and test has been already done by the module manufacturer. The owner/operator has only select appropriate modules and connect them together. Furthermore, this allows also for easy modifications and adaptions of process by exchanging or adding new modules. Even the maintenance can be enhanced by simply exchanging faulty modules.

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Market and context of technology

Modularizing a plant is highly recommended in markets which require a high flexibility in terms of processes, innovations, volumes, locations, product characteristics.

The concept of modular automation heavily builds on a semantic description of the possibilities of a module. These are described in file called Module Type Package (MTP) which is currently in the standardization process and will be available in 2019 as VDI/VDE 2658. First pilot plants at owners/operators will also be available in 2019.

Preconditions in adopting enterprises

A requirement for a seamless introduction of modularization is the digital availability of engineering and operation information. This way, the necessary information can be directly transferred into the MTP or the data from the MTP can be integrated into the existing digital plant.

Although, the MTP is technology independent, all current implementations use OPC UA as communication protocol. Thus, experience and technology for OPC UA is highly recommended to get started. Furthermore, experiences with XML and especially AutomationML which is used inside the MTP are quite useful.

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