Module Type Package (MTP)

The Way to a Modular System

Overview

Decentralized Intelligence for Modular Applications

Modular systems are becoming increasingly common in manufacturing and process engineering. Fluctuating quantities and highly specialized products require efficient production in small quantities. In other industries as well; e.g., shipbuilding, modular systems are used where simple integration into higher-level systems is the key to success.

The following requirements must be met:

- Rapid creation of new systems by reusing ready-made modules
- Simple adaptation of existing systems to changing operating conditions (plug & produce)
    - Product change requires, e.g., other modules.
    - Capacity change requires, e.g., more or less modules of the same type.
    - Maintenance/repair, e.g., requires module replacement.
- Interface standardization

NAMUR ZVEI VDMA

The VDI/VDE/NAMUR 2658 standard adopted jointly by NAMUR, ZVEI and VDMA addresses these requirements. It makes it possible to meet the increasing requirements of digitalization within Industry 4.0 by defining how to describe system modules and how to integrate these into the process control technology of the entire system in a standardized manner.

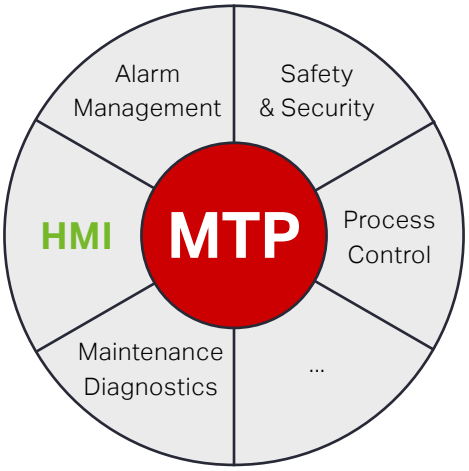
Solution: MTP

With the Module Type Package (MTP), properties of process modules are functionally described – regardless of manufacturer and technology. The self-contained modules, which can come from different manufacturers, are easily reused and interconnected into complex overall systems with little effort. Functionalities encapsulated within the modules reduce dependencies among each other, ensuring largely interference-free behaviors.

An MTP includes the following information:

- Description of the data objects
- Description of the control image
- In the future: Description of services, etc.

This description file can be read in and processed by higher-level systems, such as visualization or process control systems, called “Process Orchestration Layer” (POL) in the following.



Advantages:

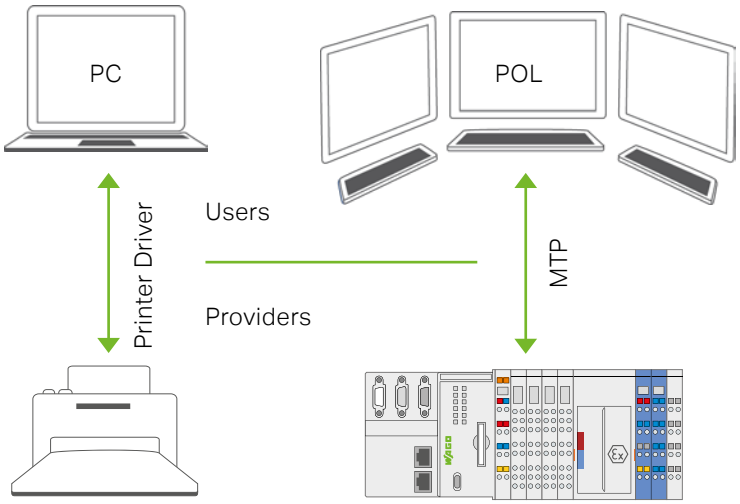
- Simple integration of system modules into control and visualization systems
- Dynamic adaptation without extensive engineering required
- Uniform look and feel – even with modules from different manufacturers

Workflow

Plug & Produce

The MTP concept within industry is best compared to a home or office printer:

- The printer manufacturer provides a printer driver.
- It contains the requisite information about the printer and can integrate it, along with its properties, into any Windows PC.
- When transferred to a production setting, the printer corresponds with the module, the printer driver with the MTP, and the process control technology with the PC.



Printer Function
Configuration Options

Module Automation
Module Control Images

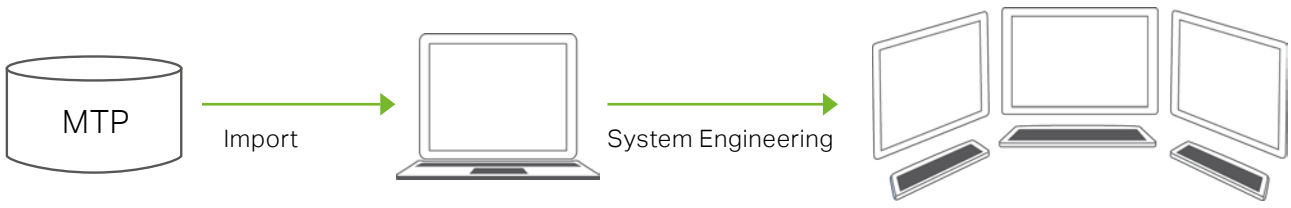
The engineering of a system modeled with MTP occurs in two steps:

Module engineering (project-independent)

- Defining information technology interfaces (process control points)
- Creating the control logic
- Creating the control images

System engineering (project-related)

- Integration of the modules into the POL
- Parameterization of the modules
- Network engineering
- Coordination and procedure control of the modules among themselves (orchestration)

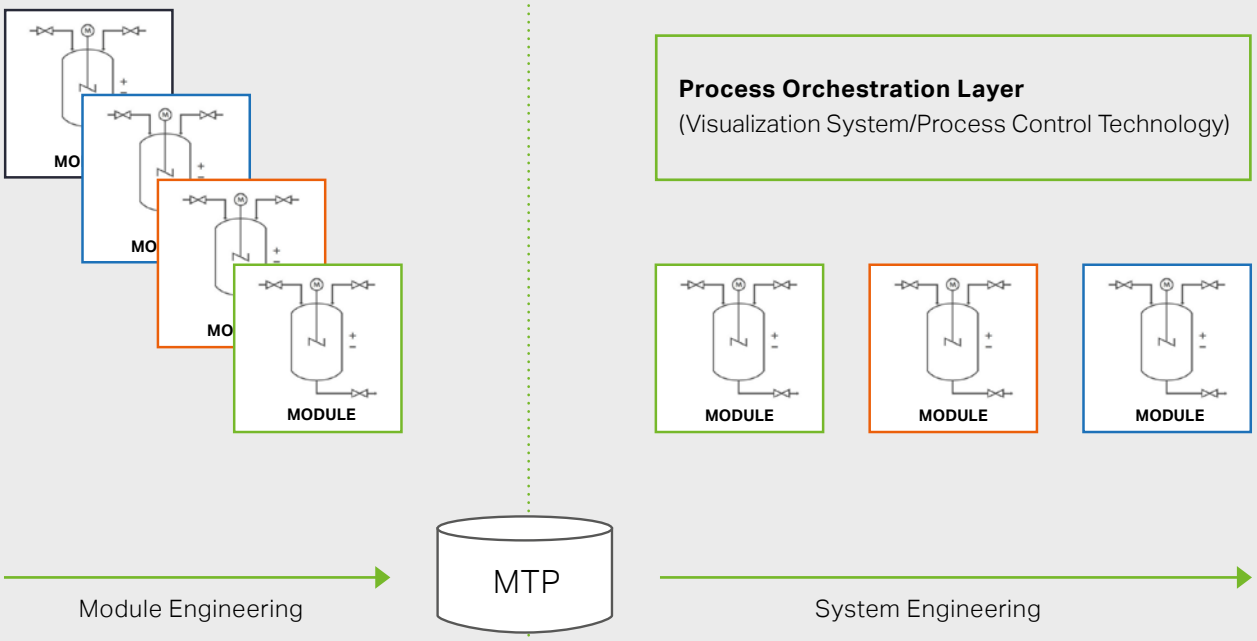


Advantages

- Module engineering is only done once. > Reusable
- Now tasks that were previously performed in the process control system can now be done in the module engineering. > Reaction to changes in the system structure is rapid.
- A module becomes fully automated with just one click.

Engineering in Detail

Module Type Package (MTP) Provides Maximum Flexibility.



Module Engineering

A library with a multitude of prepared functions is available for module engineering. In addition to the normal functions, it also contains a control image description. This image can be used to easily build a library of reusable modules. This allows the module manufacturer to specify which information and services are available externally. After the module is created, the MTP is generated automatically.

System Engineering

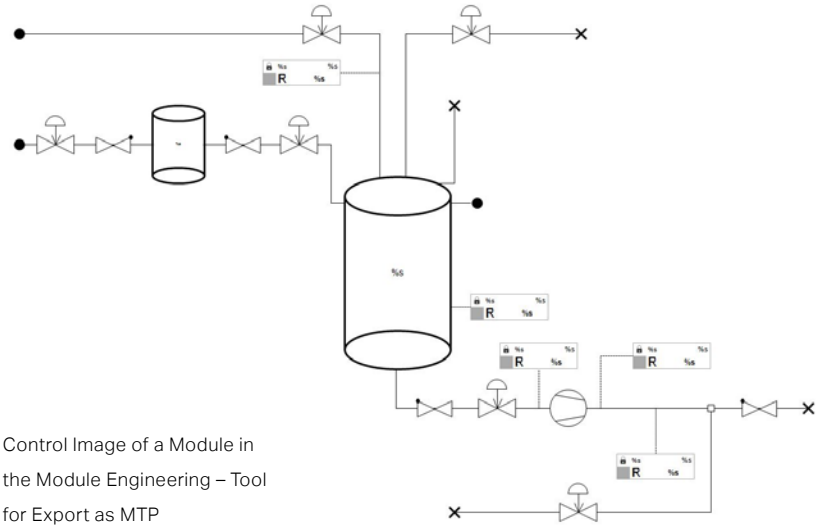
Since the corresponding MTP files are imported, system engineering relies on predefined modules. One or more different modules can be used and connected with each other to suit any required system configuration. The modules come with all information about the configuration options so during system engineering, they can be offered by the respective tool – regardless of the system module manufacturer. Therefore, both the process control and the entire system image are easy to create.

Describe Instead of Program

Interpreting Information from the MTP

The description, based on "Automation Markup Language" (AML, IEC 62714), is generated from the module automation engineering data and provided to the higher-level automation system. It contains:

- the description of the process variables
- the description of the services and
- the description of the complete control images

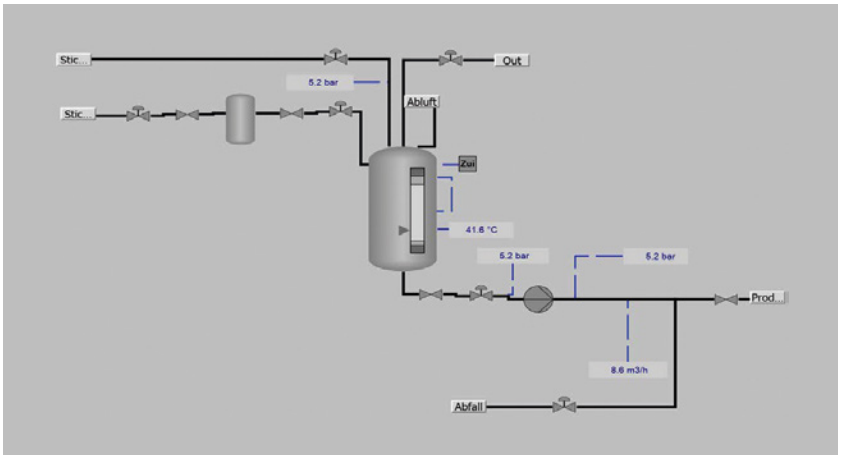


Control Image of a Module in the Module Engineering – Tool for Export as MTP

With this information, the control system can:

- display the variable lists/process control points and, if necessary, offer input options
- interpret the pictures and display them in their respective styles

Processes can be modified without much engineering effort and production quantities can be easily adapted by adding or removing modules.



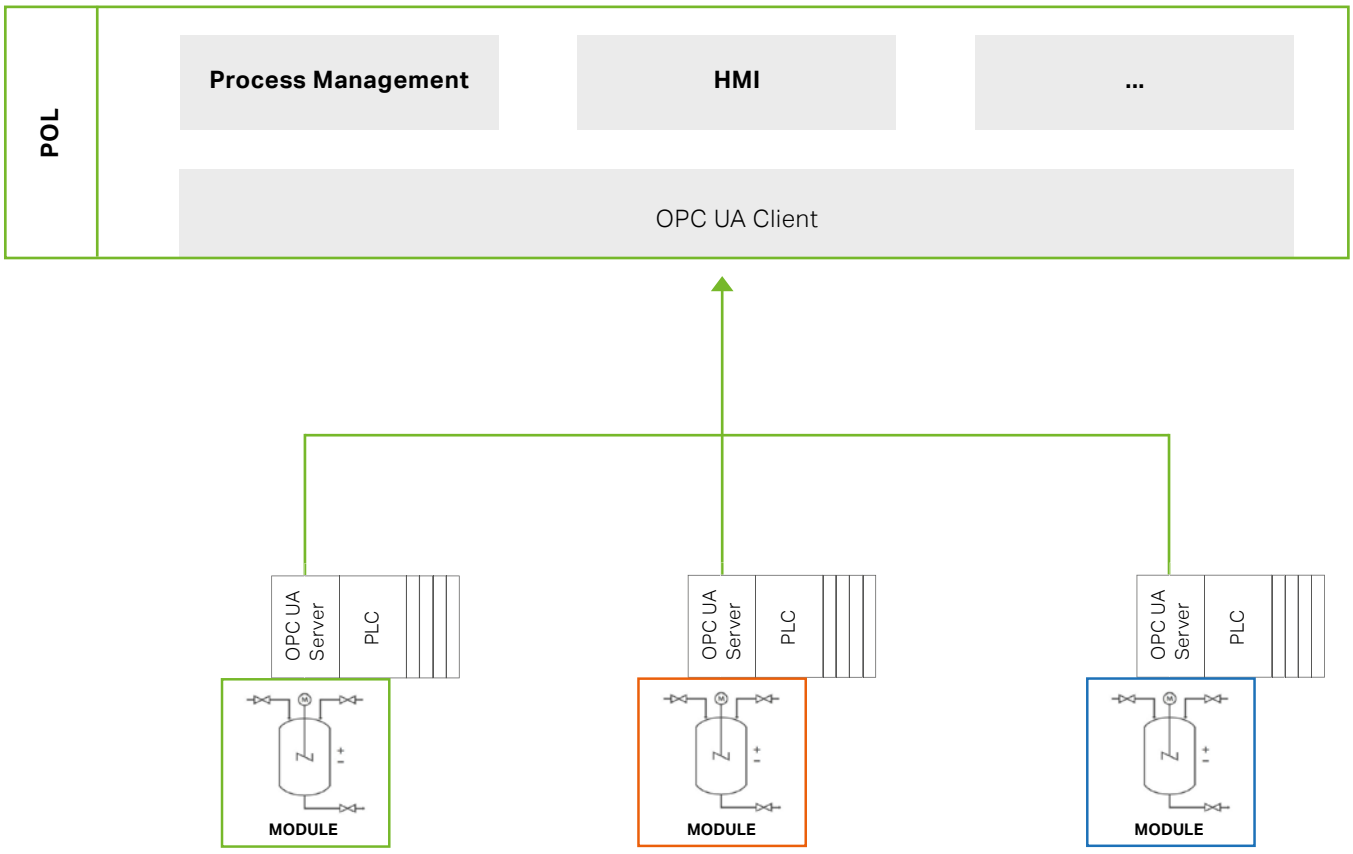
Control Image with Dynamic Values in the System Engineering Tool, Imported from an MTP (Source: VDI 2658-2)

Communication

OPC UA

OPC UA, for example, has become a service-oriented communication standard in many industrial sectors. It enables standardized, manufacturer-independent communication via ETHERNET. The modules furnish an OPC server that both provides data and writes it semantically. The control system is the OPC client that the OPC servers of the different modules can access.

By combining the proven OPC UA with new ETHERNET standards (TSN) in the future, OPC UA will reach a level of quality in real-time communication comparable with classic fieldbuses. In the future, determinism and isosynchronicity will be provided by standard ETHERNET mechanisms without special hardware connections. This makes OPC UA an ideal basis for communication from MTP to POL, as well as between MTPs.



Advantages

- Standardized ETHERNET-based bus system
- Independent! Not tied to any particular manufacturer or manufacturer-associated user organization
- Future-proof, thanks to modern technologies for real-time communication

Product Selection

Controllers

Product	Description
	**750-821x** Controller PFC200 2nd generation
	**750-821x/000-040** Controller PFC200 XTR 2nd generation
	**762-4xxx** Touch Panel 600; Standard Line*)
	**762-5xxx** Touch Panel 600; Advanced Line*)
	**762-6xxx** Touch Panel 600; Marine Line*)

Software Licenses

Item number	Product
2759-101/ **1110-xxxx**	***e!****COCKPIT* Engineering tool for module engineering
2759-120/ **1120-1000**	***e!****COCKPIT* MTP ***e!****COCKPIT* add-on for generating MTPs
2759-208/ **210-1000**	MTP Library Library to easily create programs for modules to be exported as MTP
2759-216/ **210-1000**	***e!****RUNTIME* PLC 600 License to upgrade a Touch Panel to a Control Panel*)

*) Depending on the factory license, an additional ***e!****RUNTIME* PLC 600 license may be required.
For details of the products presented here – along with the I/O modules, power supplies, etc., that complement them – see our Full Line Catalog, Volumes 3 and 4, and the supplemental volumes.

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