



NAMUR - User Association of Automation Technology
in Process Industries

WG POSITION

Requirements for the Implementation of MTP Technology in DCS

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Working Group 2.1 DCS and PLC

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Note on further alignment: This document stems from an exchange with NAMUR, PAUG (Process Automation User Group), the Open Group (Open Process Automation Forum).

AK POSITION reflects the experience gathered by the members of WG 2.1 and has been agreed within the Working Group. This document does not enjoy the same degree of consensus as a NAMUR Recommendation or NAMUR Worksheet. By publishing an AK POSITION, the Working Group can almost immediately inform interested readers of their own experience.

Foreword

This document is to highlight the need for an increased spread and implementation of MTP technology within control systems. It is intended to serve as basis for the discussion with system integrators and suppliers. To this end, it describes requirements for both the integration of modular units into a control system (which is the typical scenario referred to as “modular production plant”) as well as the vertical integration of complete systems into orchestration layers. In particular, the MTP technology will be a key enabler for the transition of today’s systems into a world as described for example by the Open Process Automation Standard O-PAS.

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1 Introduction

Vertical and horizontal integration of systems are core enablers for many scenarios of digitization. One of the solutions on the rise in this context is the MTP (Module Type Package). This technology has originally been developed for the purpose of package unit integration and modular plants. In this case, large benefits come from plug & produce features (see also NE 148 and VDI 2658).

Meanwhile, it has been acknowledged that the vendor-agnostic nature of MTP and features such as the generic HMI description is also of interest for other initiatives, such as the Open Process Automation Standard (O-PAS). Here, the benefits come from migration scenarios, interchangeability, and portability. Also, in pharmaceutical and bioproduction, MTP is under vivid discussion (see for example ISPE organization and BioPhorum) with advancements for the GMP qualification of equipment.

Key message of this paper is that the current level of MTP technology integration into distributed control systems (DCS) is insufficient from an end-user perspective. In view of the working group 2.1 DCS and PLC the accelerated distribution of this technology is vital for the future integration in both directions: Integration of units into DCS systems and integration of DCS systems into superordinate systems. In the final scenario, we expect manufacturing execution systems or a kind of hybrid with control systems to serve as manifestation of the Process Orchestration Layer (POL) in the overall architecture rather than the classical DCS as of today.

2 References and Further Literature

MTP:

- First described in NE 148 and VDI 2658 with different parts for in HMI integration, alarms, etc.
- Process related use case examples can be found in VDI 2776
- <https://www.namur.net/de/fokusthemen/automatisierung-modularer-anlagen.html>
- <https://www.arcweb.com/blog/industry-standards-groups-converge-their-work>

O-PAS:

- Host organization opengroup.com
- [Open Process Automation™ Forum | The Open Group Website](https://www.openprocessautomation.com/)

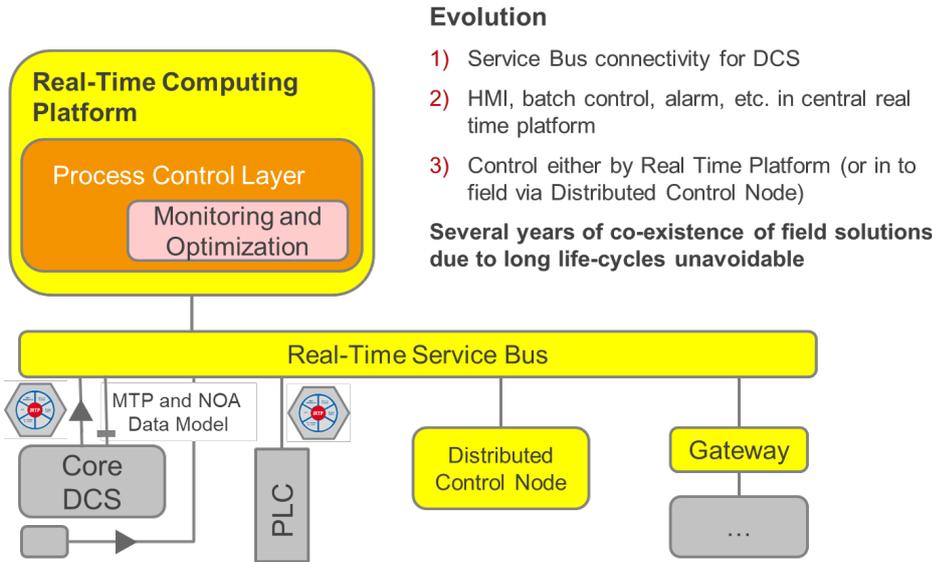
3 Concept for Overall Architecture in Context O-PAS

In future, we expect significantly more open control systems as it is the case today. This vision is, as already said, outlined by the Open Process Automation Standard O-PAS. Looking at the massive amount of already installed systems, no overall disruptive change is possible to happen, but instead an extended transition period will take place. Such a period needs to be well managed and thought through which requires additional effort exceeding the pure definition of new systems. Here, we see an important role for MTP: If a control system is equipped with sufficient export capability concerning its services and parameters, it can be integrated in an open control ecosystem along with other plants or plant sections, which are already automated according to upcoming standards on all levels of the system.

Realizing this approach offers advantages for both end users and system suppliers. End users can make best use of the available lifetime of their systems and approach the transition in an individual manner depending on their needs. For suppliers, it also means to strengthen the own market position and to continuously offer services for existing systems and develop the own organization in an organic manner.

This point has also been addressed in several publications and presentation, see for example in the journal Process Automation Practice (“Open Process Automation: A standards-based open, secure, interoperable process control architecture”) and the following graphic out of presentation at NAMUR general assembly 2017.

This graphic combines features of NAMUR Open Architecture, Module Type Package (MTP) and the Open Process Automation Standard (O-PAS). Here, the additional monitoring and optimization features of NOA are transferred to the Advanced Computing Platform of O-PAS and the MTP is used as the interface technology between existing DCS and PLC and the O-PAS world via its Connectivity Framework (a real-time service bus).



4 Requirements

- DCS needs the capability to integrate package units with a specification according to MTP standard
- This integration should be possible both on HMI level as well on the controller level
- For this, there needs to be sufficient OPC UA connection capability in these levels of DCS
- A suitable state machine (including parameterization) needs to be present to mirror the state of units
- DCS need an **MTP export** capability to be fit for integration into process orchestration layers

5 Current Status and Outlook

The work on defining the MTP standard is structured in waves, so it is possible to parallelize the development of different aspects and to set focus and priorities according to needs. Therefore, different parts of the standard have reached different levels of maturity. The following graphic captures the status as of April 2022:

Status VDI/VDE/NAMUR 2658



2658-X	Title	WG	CP	CD	PD	IR	PR	Comment
1	Basic Concept				✓		✓	Released 10-2019
1:2022	Basic Concepts Revision							CD released to VDI, PD to be published 02-2022
2	HMI Concept				✓		✓	Released 11-2019, Erratum to be published 02-2022
3	HMI Interfaces				✓		✓	Released 09-2020, Erratum to be published 02-2022
4	Process Control w Services				✓			PD released 08-2020, IR released to VDI, PR 02-2022
4.2	OPC UA Method Interface							Task Force established
4.3	Service Relations							Task Force established
4.4	Cross Communications							New Work Item Proposal
5	Runtime Concept							CD released to VDI
5.1	Runtime OPC UA							CD WIP final editing round
6	Alarm Mgmt Concept				✓			IR WIP, IR planned for 12-2021
7	Alarm Mgmt Models				✓			PD released 02-2021, IR planned for 12-2022
7.1	Alarm Mgmt OPC UA							CD WIP, CD planned for 12-2021
8	Safety Concept							CP WIP in NAMUR AK 4.5.1, CD release 02-2022
9	Safety Interfaces							Follow up to Sheet 8 in NAMUR AK 4.5.1
10	Diag & Maint – PEA							CP WIP in NAMUR AK 4.1.1
11	Diag & Maint – Plant							CP WIP in NAMUR AK 4.1.1
12	PEA Qualification							CP WIP in NAMUR AK 2.4.1
14	MTP Certification Process							New Work Item Proposal

An important goal is the ongoing internationalization of the MTP as IEC 63280 standard. Unfortunately, no significant progress has been made here as of today. A boost is expected now with the transitioning of MTP into the new host organization Profibus International (PNO, Profibus Nutzerorganisation, respectively).

Another issue which we currently see is that vendors and end-users wait for each other: End-users would prefer to have everything around MTP finalized. However, reaching that status might still takes years. On the other hand, vendors wait for end-users to make use of the existing parts, also in a sense of valuable feedback to improve the other papers.

The target in view of the working group is to make use of the existing parts now and thus develop the use cases. Today, the integration capability of package units is already given for some systems. A huge gap is however existent when comes to integrating DCS systems.

A key to moving forward with unifying the efforts of MTP and O-PAS is the collaboration of the different parties from end users, suppliers, and organizations. One twist on this might be that the DCN could also offer MTP as an integration method: When considering an automated asset for integration, one can consider that it is a complete DCS, a PLC (Skid) system, or even a single DCN with associated I/O. MTP can help with all these.

The discussion of aspects such as a joint information model between O-PAS and MTP needs to be complemented by more pilots and field trials to avoid solutions without a real-life value.