



<AutomationML/>

The Glue for Seamless
Automation Engineering

MTP as basis for plug&play for modular automation systems

Rainer Drath, Vincent Schmitt

Pforzheim University of Applied Sciences

What is MTP?

How to explain MTP?

www.siemens.com: Module Type Package (MTP) according to standard series VDI/VDE/NAMUR 2658 provides solution for modular production and effortless commissioning of new modules into process lines.

www.abb.com: Modular process plants will have pre-automated modular units that can easily be added, arranged and adjusted according to the production needs. This is achieved through the Module Type Package (MTP), a standardized methodology enabling interoperability between any module and orchestration system developed within the MTP framework.

www.semodia.de: **Was ist MTP?** MTP ist eine Beschreibungssemantik – vergleichbar mit einem Gerätetreiber – mit deren Hilfe Ihre Anlage, Labor oder Technikum **einfach und schnell rekonfigurierbar** gemacht werden kann.

IFF Fraunhofer: Der modulare Anlagenbau setzt auf das »Plug & Produce«-Prinzip, damit Ihre verfahrenstechnischen Anlagen schnell einsatzfähig und für Produktwechsel oder geänderte Marktgegebenheiten reibungslos umrüstbar sind – und das ohne hohen manuellen Aufwand bei Rekonfiguration, Programmierung und Integration in die POL (Process Orchestration Layer).

https://www.profibus.de/mtp-module-type-package:

Das sogenannten Module Type Package (MTP), beschreibt die Prozessmodulfunktionen herstellerunabhängig. Da es aus dem Automatisierungs-Engineering eines Moduls gewonnen werden kann, sind Modulhersteller in der Lage, es ohne großen Aufwand zu erzeugen. Den Betreibern wiederum gelingt es durch den Import der MTPs in eine übergeordnete Automatisierungsebene die Modulfunktionen mit geringem Aufwand zu nutzen.

Copadata: Modular production and module type package (MTP) provide a high-performance solution that has revolutionized production across multiple industries. Before examining the benefits of MTP and modular production, take a closer look at the challenges manufacturers face with agile production.

www.beckhoff.com: Mit modularer Automation lassen sich prozesstechnische Anlagen mit geringem Aufwand flexibel realisieren und anpassen. Starre Automatisierungssysteme, die jahrelang unverändert betrieben werden, gehören damit zunehmend der Vergangenheit an: Individualität und Flexibilität sind die Zukunft der Prozessindustrie. Das Module Type Package (MTP) bildet ein Konzept, welches in allen Phasen von der Planung bis zum Betrieb einer prozesstechnischen Anlage zur Ausschöpfung von Optimierungspotentialen beitragen kann. Somit stellt MTP einen entscheidenden Baustein für die Entwicklung modularer Automatisierungslösungen der Zukunft dar.

Imagine a large industrial plant as a Lego city. Every machine in it is its own module—for example, a mixing tank, a heating module, or a dosing unit. Each one is from a different manufacturer.

! The issue:

When a new module is installed, engineers usually must write a lot of software so that the control system understands how that module works. The Module Type Package (MTP) solves this problem.

👉 An MTP is like a digital user manual for a machine, which automatically explains to the control system :

- what functions the module has (e.g., “Heating,” “Mixing”)
- what sensors and values are available (temperature, pressure, etc.)
- which user interface should be displayed
- how the module communicates with the system

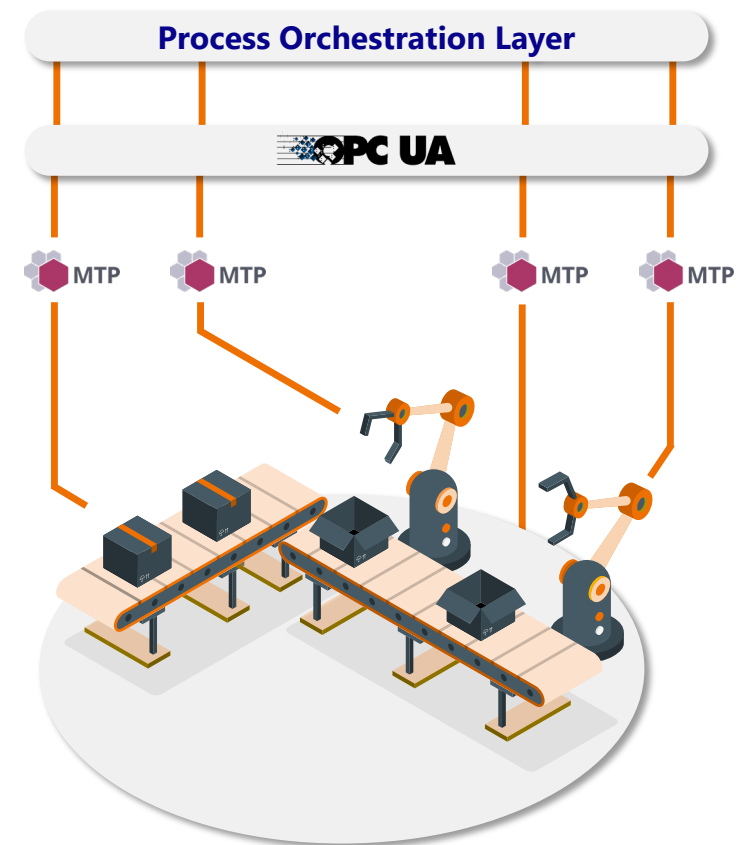
When a new module is delivered, it simply comes with its MTP file. The control system reads this file and immediately understands how to operate the machine.

✅ In a nutshell:

A Module Type Package is a standardized digital description of a machine that allows it to be quickly and automatically integrated into a system.

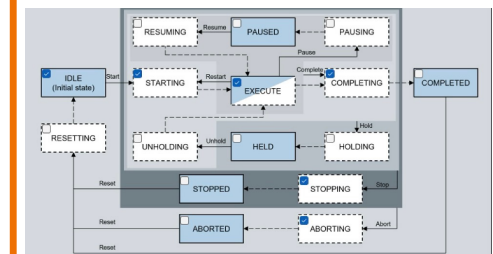
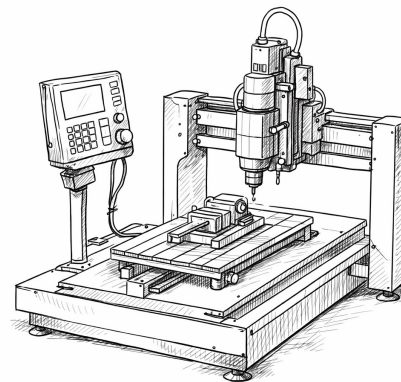
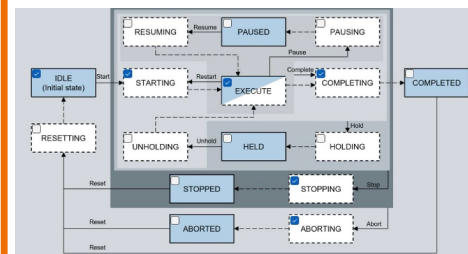
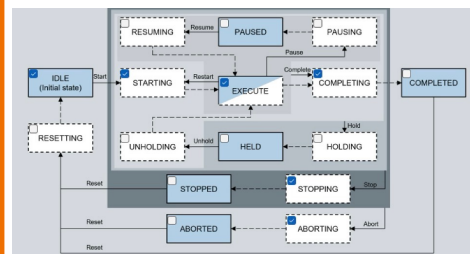
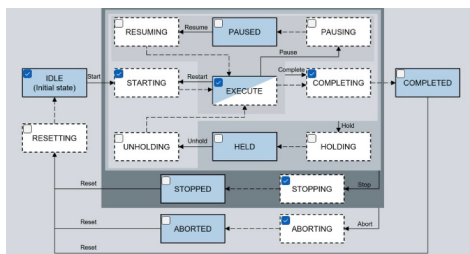
The Module Type Package (MTP)

- » **Plug&Play technology** for industrial modules
- » **Machine-readable and vendor-neutral description** of a module's services, interfaces, and lifecycle information
 - VDI/VDE/NAMUR 2658
 - Implemented in AutomationML
 - It is an IT interface for the interaction between PEAs ↔ POL
 - The POL orchestrates the System or Process
- » **Key-enabler** of Plug & Produce



Unified State Machine for Services

Each module provides services in the same way

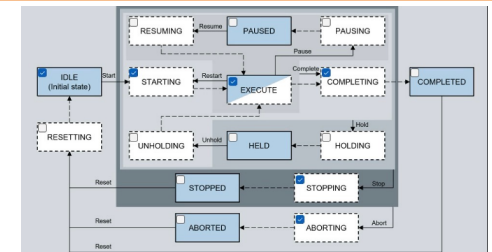


Unified State Machine for Services

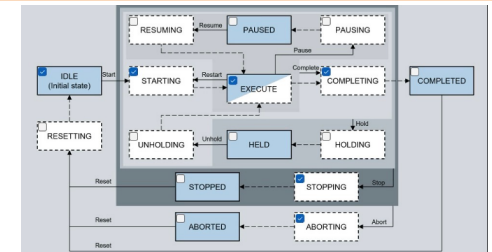
Each module provides services in the same way



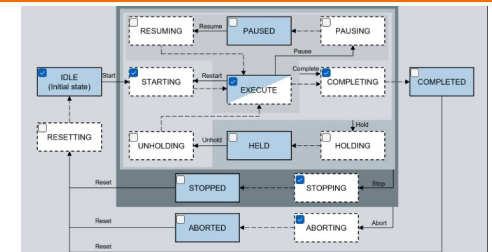
Drill



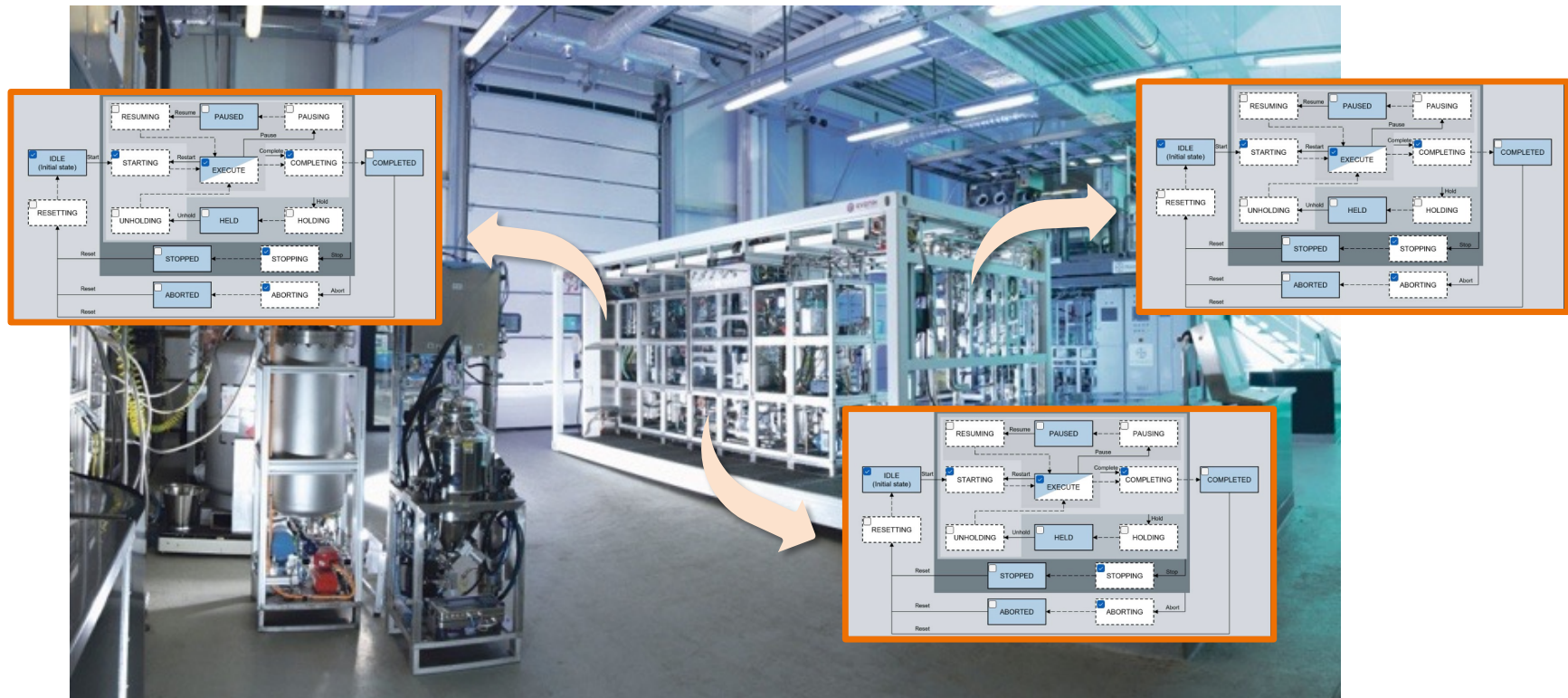
Weld



Package



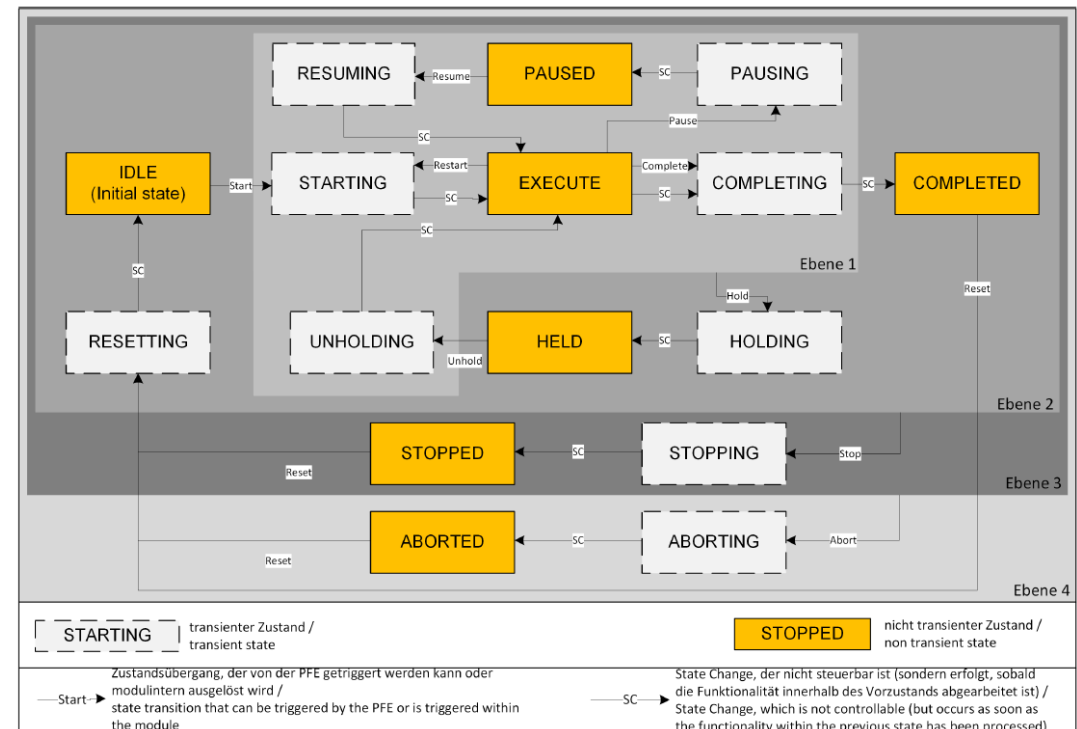
The State-Machine(s)



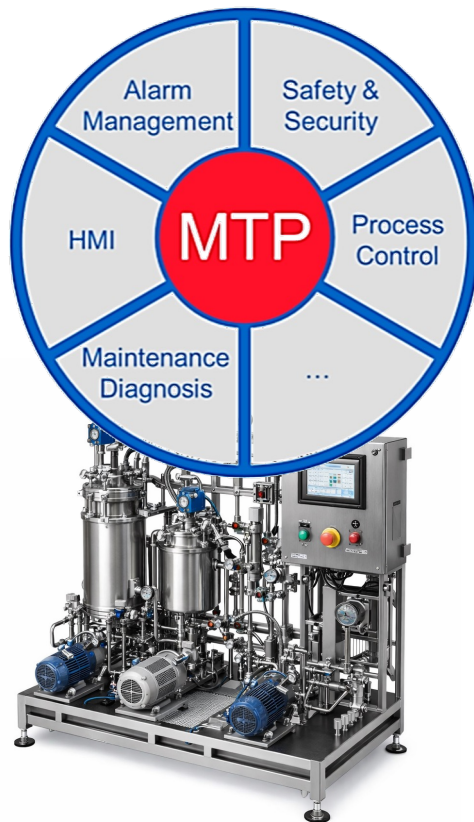
seen at: <https://chemanager-online.com/de/themen/modulare-produktion-fuer-die-smarte-chemiefabrik> (01.08.2026)

Standardized Access to Services

Codierung:							
States (CurrentState) 32Bit			Commands (Command) 32Bit			CommandEn (32Bit)	
Bit No.	Int	Definition	Bit No.	Int	Definition	Bit No.	Definition
0	1	Undefined	0	1	Undefined	0	Undefined
1	2	Not Used	1	2	Reset	1	ResetEnabled
2	4	Stopped	2	4	Start	2	StartEnabled
3	8	Starting	3	8	Stop	3	StopEnabled (true)
4	16	Idle	4	16	Hold	4	HoldEnabled
5	32	Paused	5	32	Unhold	5	UnholdEnabled
6	64	Execute	6	64	Pause	6	PauseEnabled
7	128	Stopping	7	128	Resume	7	ResumeEnabled
8	256	Aborting	8	256	Abort	8	AbortEnabled (true)
9	512	Aborted	9	512	Restart	9	RestartEnabled
10	1024	Holding	10	1024	Complete	10	CompleteEnabled
11	2048	Held	11		Reserve	11	Reserve
12	4096	Unholding	12			12	
13	8192	Pausing	13			13	
14	16384	Resuming	14			14	
15	32768	Resetting	15			15	
16	65536	Completing	16			16	
17	131072	Completed	17			17	
18...31		Reserve	18...31			18...31	



Fundament of MTP



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The MTP file is like a **"digital machine ID-Card"**

Early 2015: Launch of ad hoc working groups by NAMUR & ZVEI

Mid-2017: Published as VDI/VDE/NAMUR 2658

2021: MTP officially becomes a submodel of the Industry 4.0 management shell

2026: MTP 2.0, IEC standardization is in work

MTP in a Nutshell

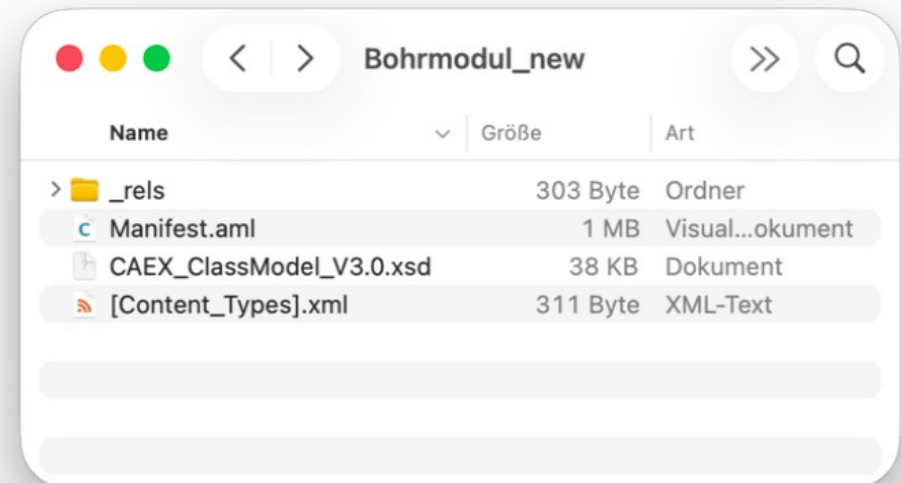


- » **MTP** applies Plug&Play concept from the IT world to industrial production modules
 - **Analogy:** Printer driver
 - Digital **information model** for machine-readable self-description
 - **Capabilities** instead of signals
 - **Standardized** (VDI/VDE/NAMUR 2658): State model, communication, function blocks, etc.
 - PEAs can be **automatically integrated** into a higher-level POL across different manufacturers and operated there immediately

Getting the AML-Editor ready for MTP

Prerequisites

- » MTP is a **container** format, not an XML-file
 - Can be converted to a standard archive and unpacked
- » Embedded inside is the AML **manifest**
- » Editor can't open the **MTP format** natively



Recap: The AML-Editors Plugin-System

1. Reference the contract

- **Aml.Editor.Plugin.Contract**, interface classes that define the API for accessing the data being edited and for calling editor commands

2. Implement an interface

- Must implement one of the **interface classes** defined in the contract
- Optional helpers include **Aml.Toolkit** for the AML tree control and **Aml.Skins** for the editor's icons and dark/light theme colors

3. Package sharing and install

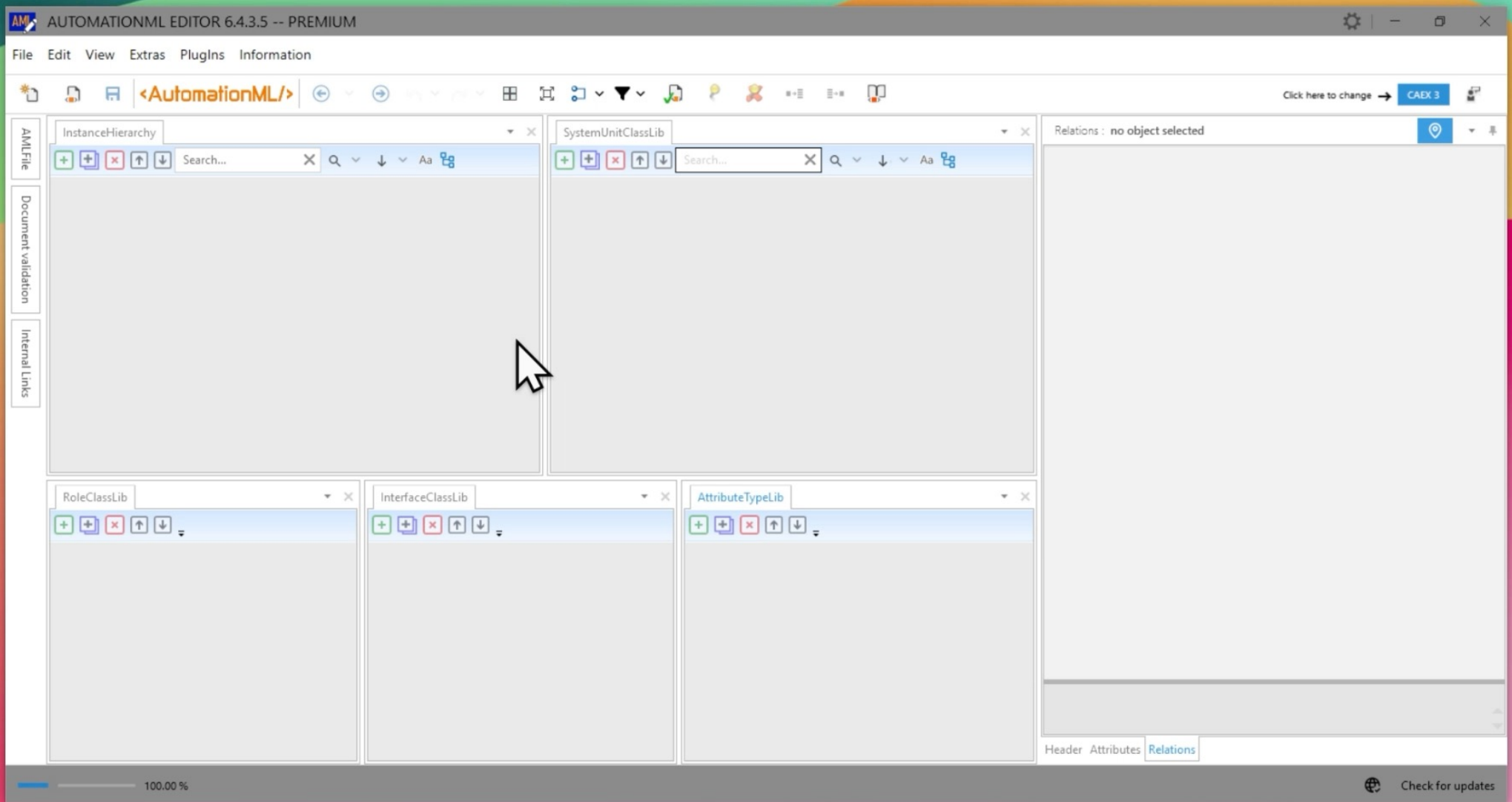
- The editor's **Plugin Manager** installs plugins deployed as NuGet packages
- Publish it on **NuGet** under a name starting with the prefix **Aml.Editor.Plugin**



MTP Plugin Suite

» MTP-Verification

- **View** MTPs directly inside the AML-Editor
- **Check and Verify** MTPs as part of the workflow
- Built using the MTP-API from Semodia





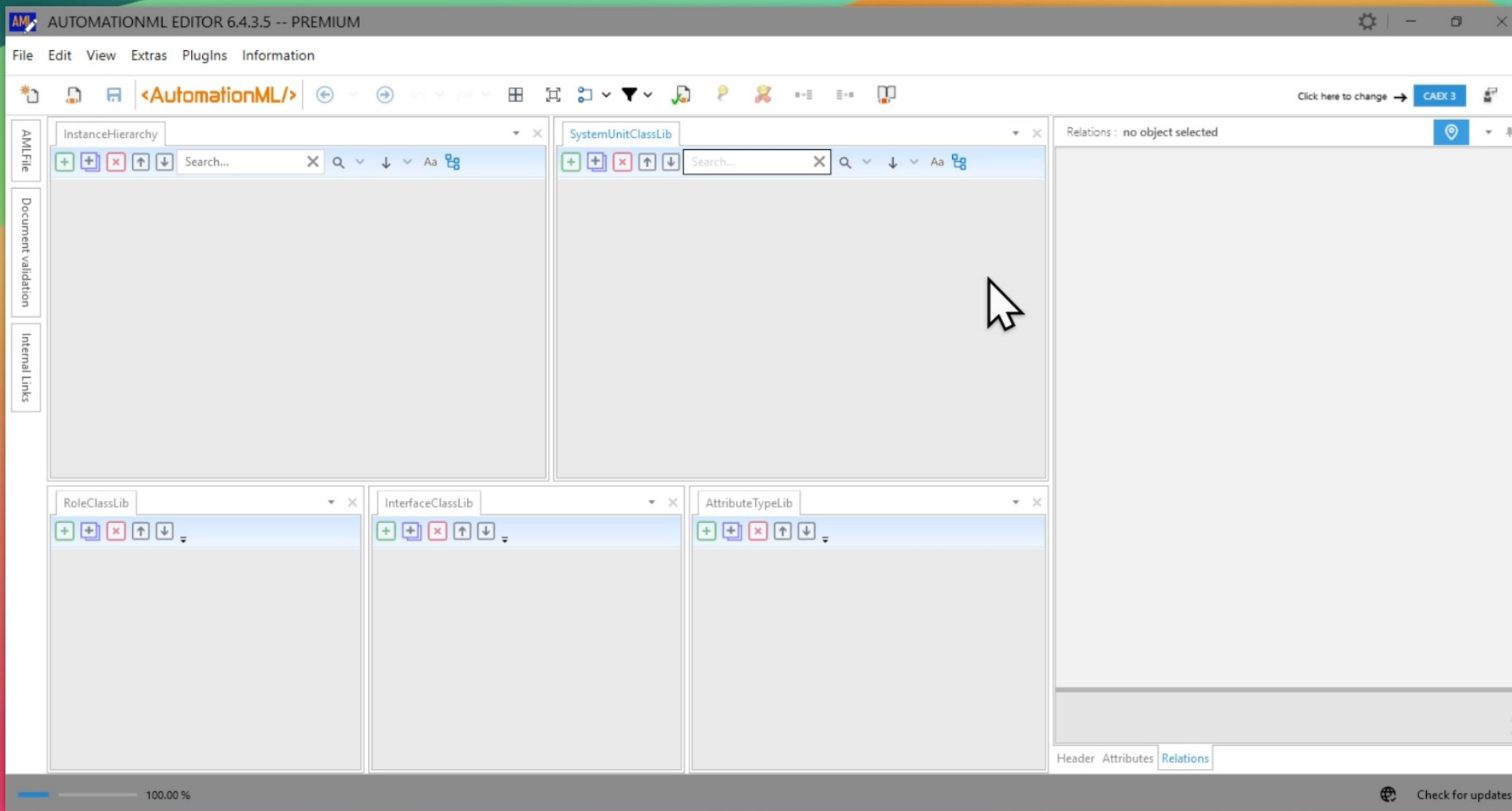
MTP Plugin Suite

» MTP-Verification

- View MTPs directly inside the AML-Editor
- **Check and Verify** MTPs as part of the workflow
- Built using the MTP-API from Semodia

» MTP-Control

- **Control PEAs** directly inside their respective MTP-file
- **Quick monitoring and control** as part of the workflow
- Configuration gets done automatically (works out-of-the-box)



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AutomationML e.V. c/o IAF
Universitätsplatz 2
39106 Magdeburg
office@automationml.org



Pforzheim University of Applied Sciences
Tiefenbronner Straße 65
75175 Pforzheim
rainer.drath@hs-pforzheim.de