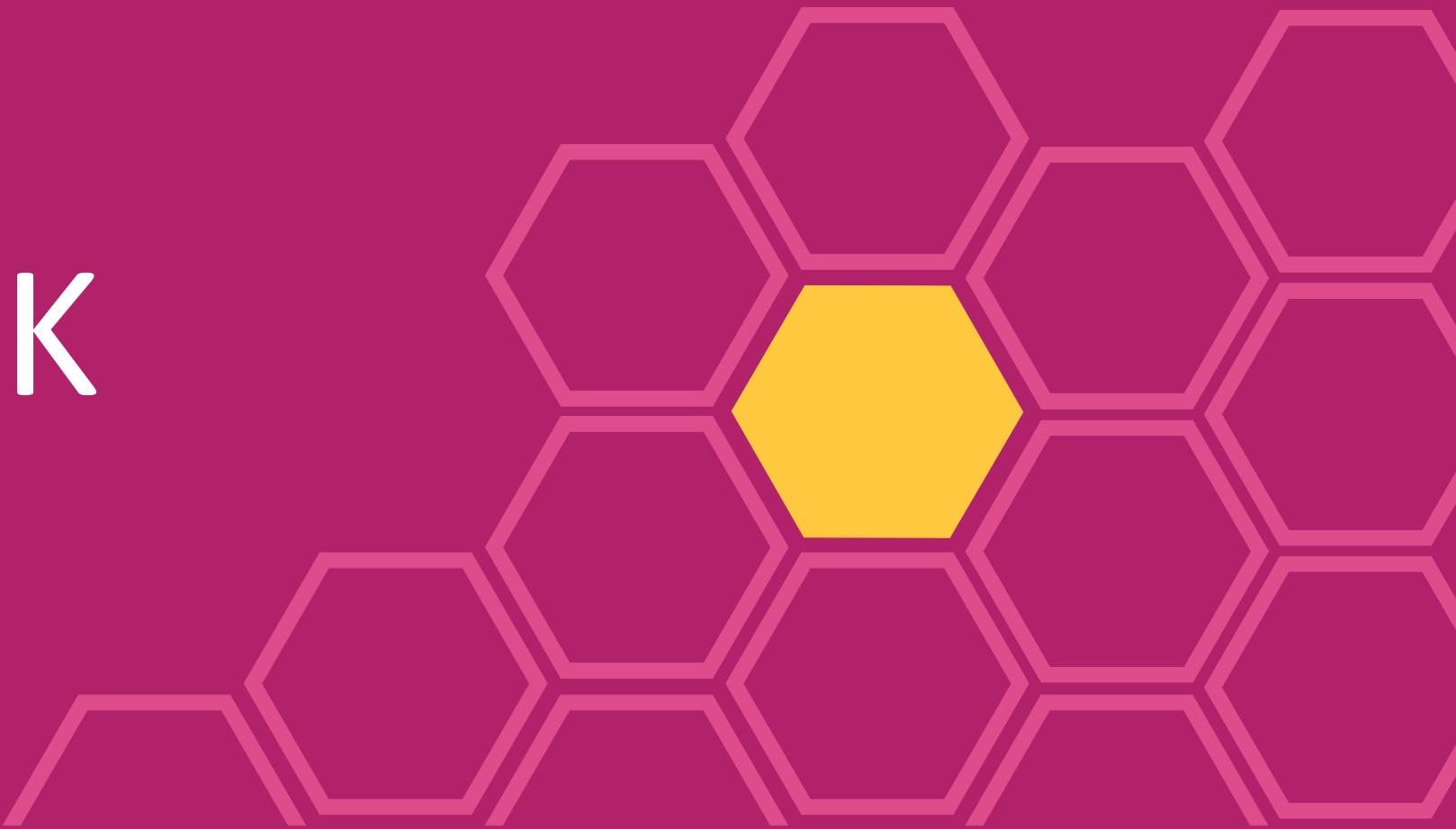


UNIVERSAL  
AUTOMATION.ORG

# PLAYBOOK



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6. [Why they joined us?](#)
7. [UAO as Technology Enabler](#)
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# What is UniversalAutomation.org?

# WHY

## Universal Automation?



### INNOVATION BARRIER

My digitization strategy is stalled because of the high cost to get data from my existing controllers



### SOFTWARE RE-USE

I'm obliged to rewrite my SW application when my HW reaches end-of-life



### MANAGING MULTIPLE SUPPLIERS

My maintenance teams have to learn multiple SW tools resulting in higher MTTR

Each new system is just “new legacy” 15 years later!



### ATTRACTING TALENT

It is difficult to attract talented young software engineers!

# WHY

## Universal Automation?



## SUMMARY

 **Vendor lock increases my costs & reduces my ability to innovate!**

# Automation Systems must become more Universal



Control application software must be **vendor-independent**



Shared technology to make **portability** a reality



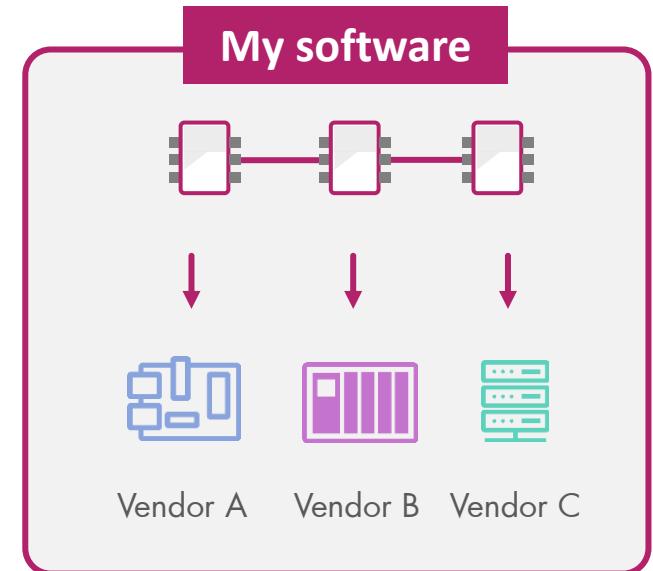
Facilitate re-use of software – **Plug & Produce**



Emergence of **edge compute/edge control architectures**



Appeal to **young software engineers** – Modern Tech



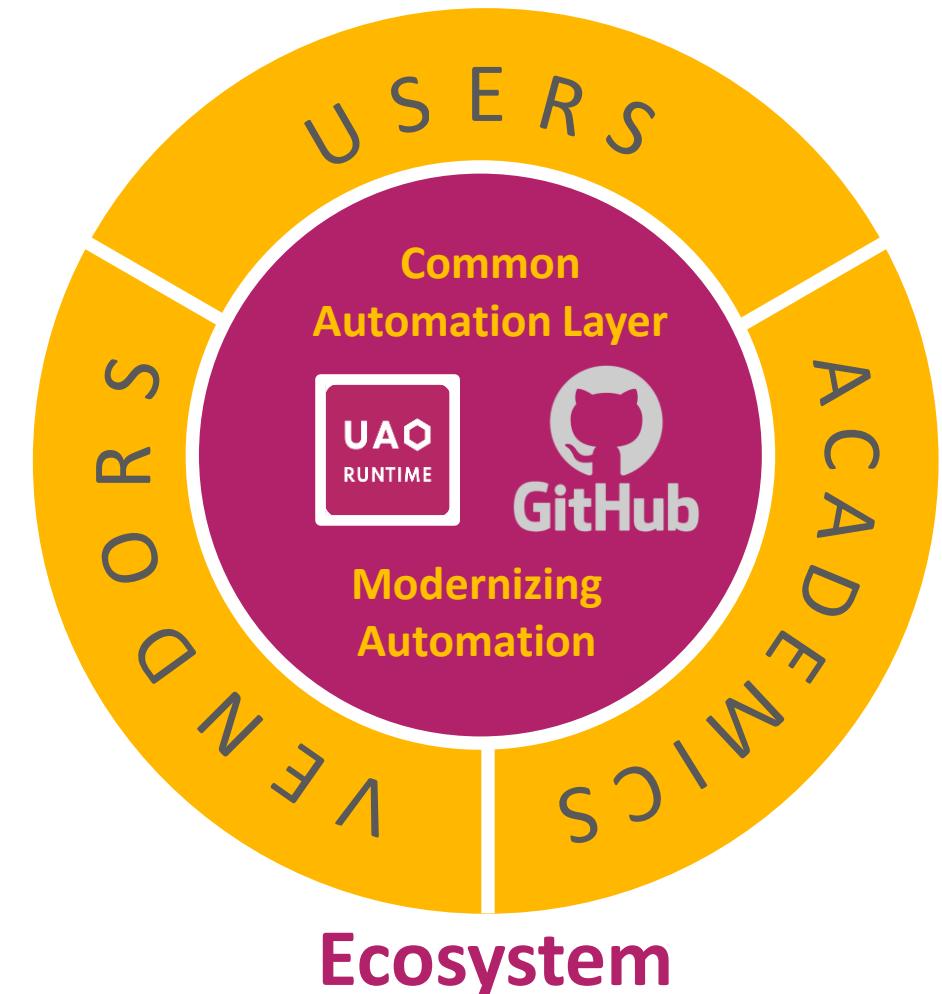
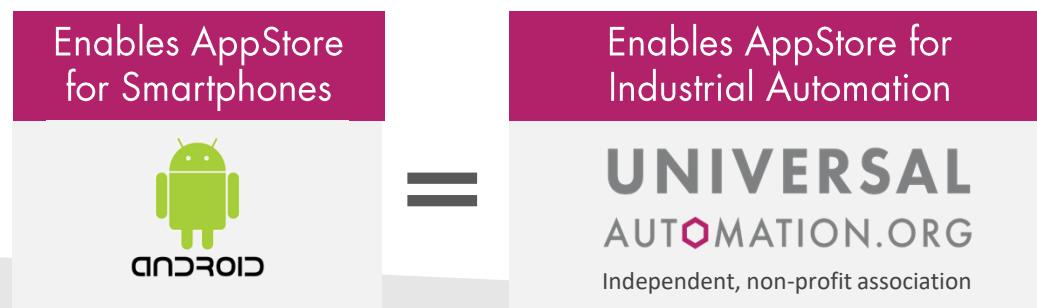
UniversalAutomation.org

## The Missing Link for Industry 4.0

1. A **common automation layer** based on IEC 61499

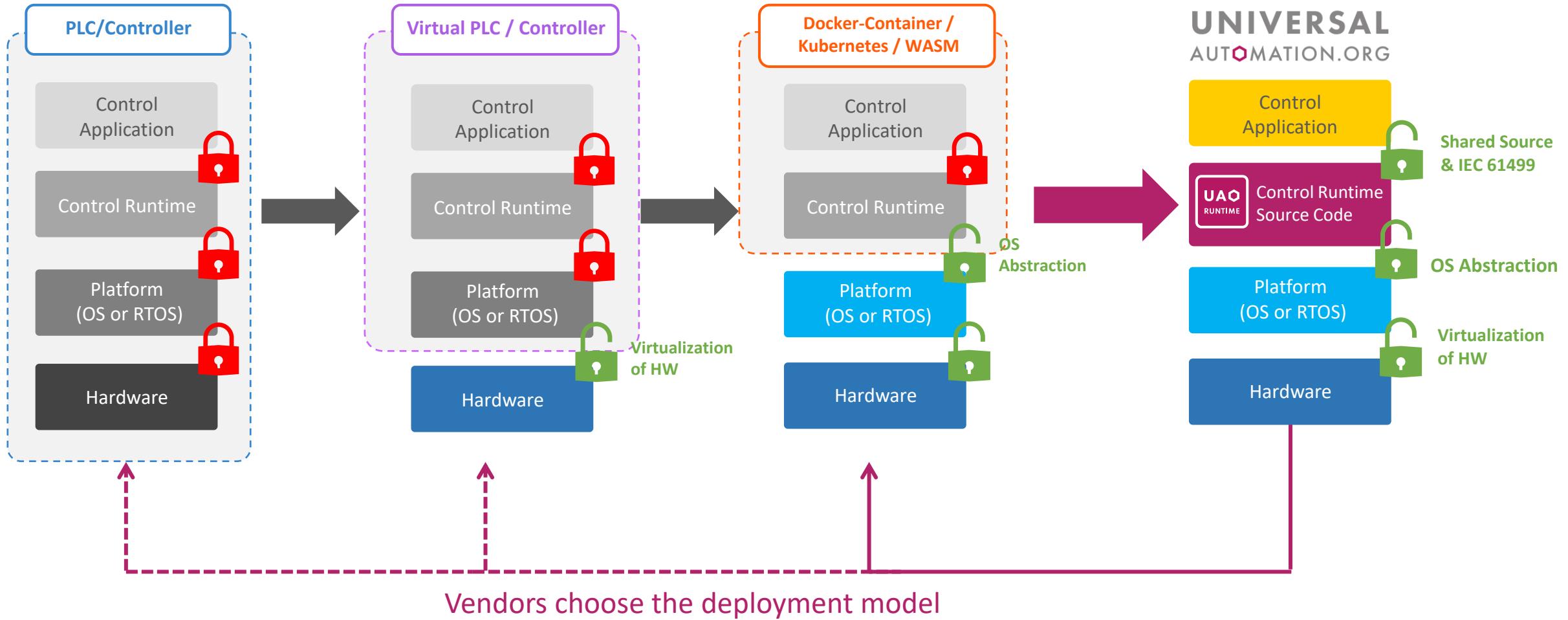


2. An **Ecosystem** of Users, Vendors & Academics



# HOW

## UAO breaks vendor lock



# A Community – Not a Standardization Body !

**WE  
are**

A community of users, vendors and academics organized around an independent non-profit association

**WE  
use**

Universal automation platforms that use a shared-source IEC 61499 runtime execution engine

**WE  
promote**

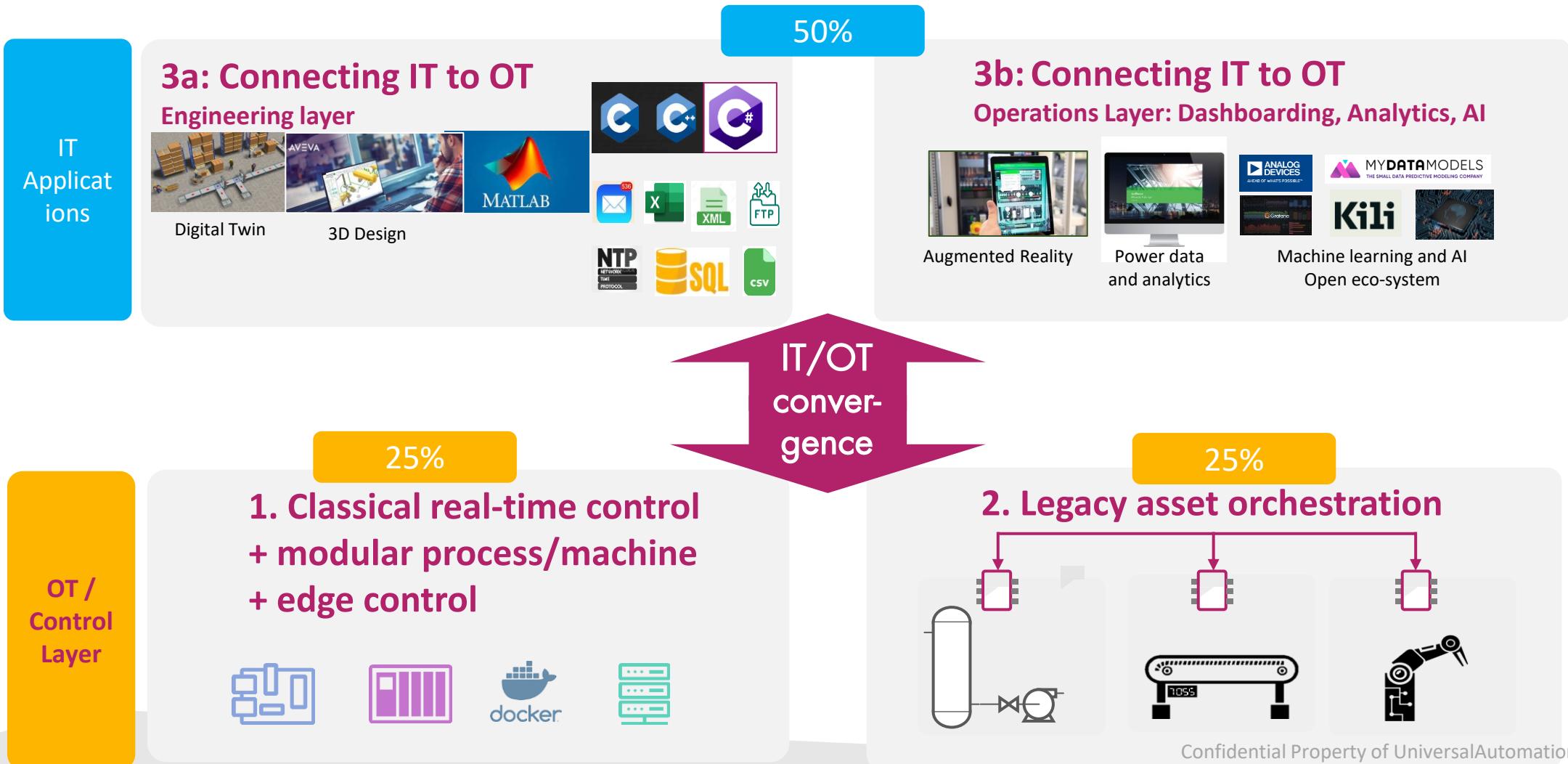
Portability/Reusability of vendor-independent automation application software



## Benefits

- ✓ Maximize application portability across vendor platforms
- ✓ Remove issues linked to « interpretation » of written standard
- ✓ Release universal automation offers in months rather than years

# Where is the UAO Technology Used?



# Getting Started with UniversalAutomation.org

Start benefiting from the technology right away

# Transform your Legacy Systems with IEC 61499

## Modernize Without Disruption: Unlock the Power of IEC 61499

Transform your existing systems without interrupting ongoing operations. By leveraging IEC 61499, you can modernize your automation infrastructure while maintaining business continuity.

### Key Benefits:

- **Non-Disruptive Modernization**

Upgrade legacy systems incrementally, ensuring continuous operation throughout the transition.

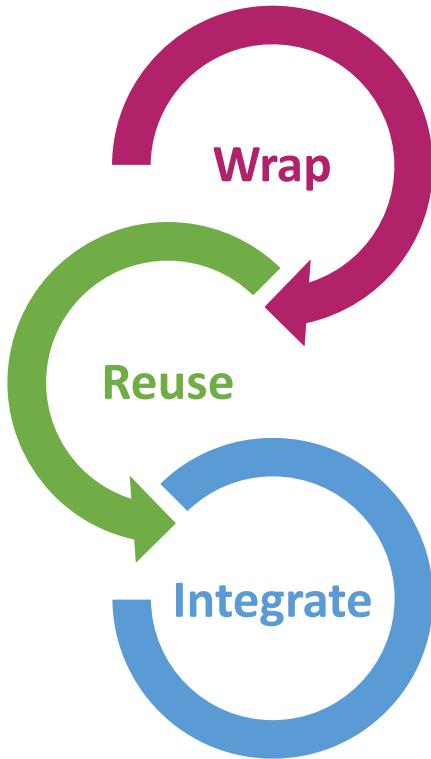
- **Enhanced Efficiency and Decision-Making**

Enable real-time data exchange between Operational Technology (OT) and Information Technology (IT) layers, improving responsiveness and insight-driven decisions.

- **Seamless System Integration**

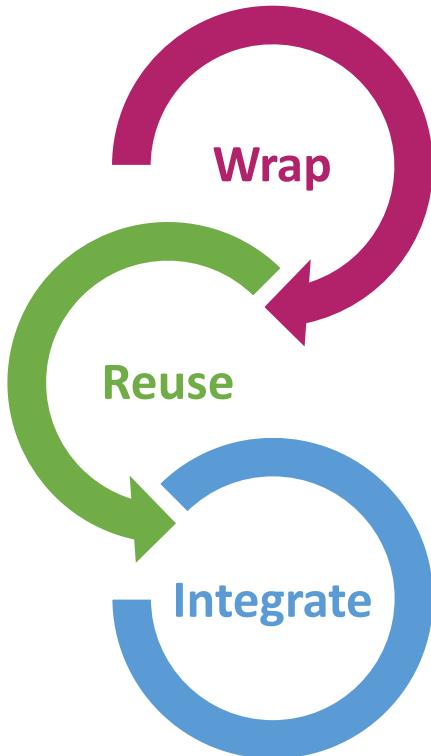
IEC 61499 facilitates smooth communication and coordination across diverse system components, regardless of vendor or platform.

# Integrate and Expand your Current Systems



- **Wrapping** legacy systems within a new interface that complies with the IEC 61499 standard allows these systems to continue operating while benefiting from advanced features.
- **Reusability** is achieved by encapsulating functionalities into Function Blocks, which can be adapted and reused, reducing development time and costs
- **Integrating** legacy systems into IEC 61499 system creates a cohesive, distributed control system and enables interoperability, data exchange, and coordinated control between new and old systems provided by the **IEC 61499 based Plant orchestration layer**.

# Integrate and Expand your Current Systems



## How it works:

- A wrapper function block is created in IEC 61499.
- This wrapper acts as a proxy or interface to the legacy system.
- Communication is typically handled via standard protocols (e.g., OPC UA, Modbus, MQTT).
- The legacy system continues to operate as-is but can now interact with modern components.

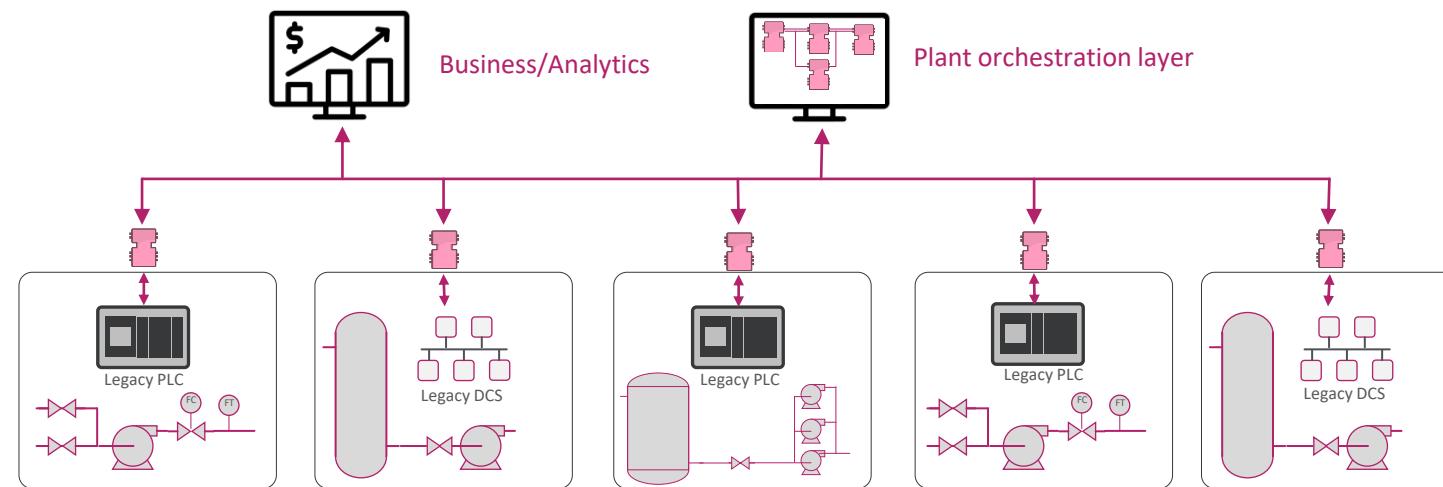
## Benefits:

- Preserves investment in legacy systems, no need to rewrite legacy code.
- Enables integration with modern, distributed systems.
- Improves flexibility and scalability
- Legacy systems can be monitored and managed using modern tools.
- Enables gradual migration to modern architectures

# Installed Base Strategy

**Principle 1:** wrap & reuse  
existing legacy systems

Build library of universal automation  
software components to interface  
legacy systems to site/enterprise-level  
orchestration



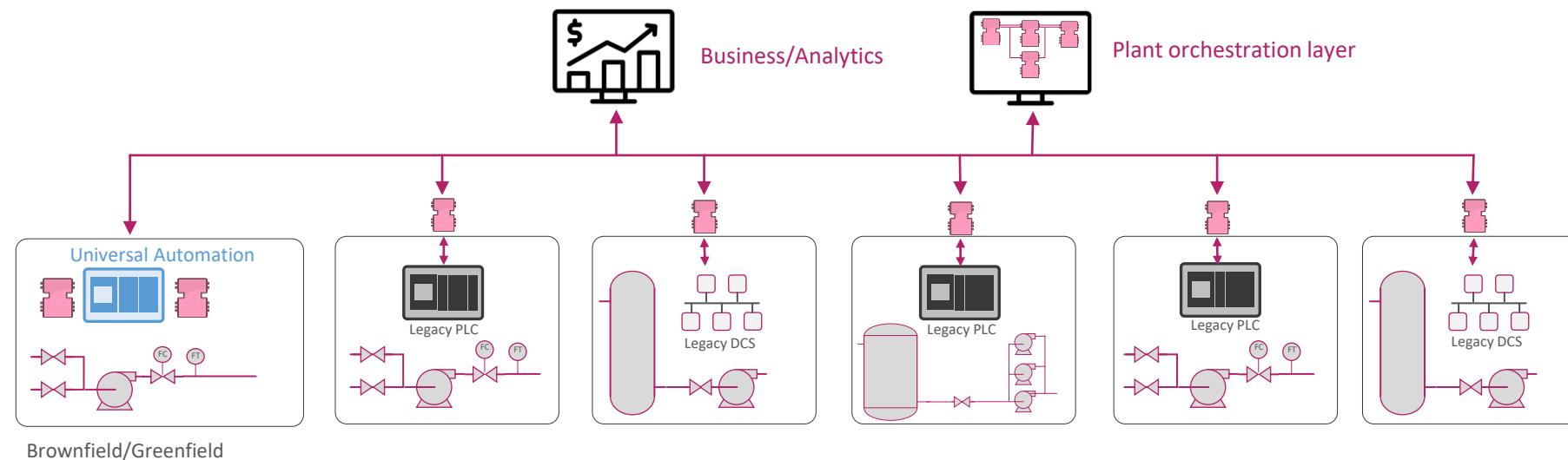
# Installed Base Strategy

## Principle 1: wrap & reuse existing legacy systems

Build library of universal automation software components to interface legacy systems to site/enterprise-level orchestration

## Principle 2: for new automation systems, stop installing “new legacy”

Universal Automation: multi-vendor, portable software components, flexible architectures



# Installed Base Strategy

## Principle 1: wrap & reuse existing legacy systems

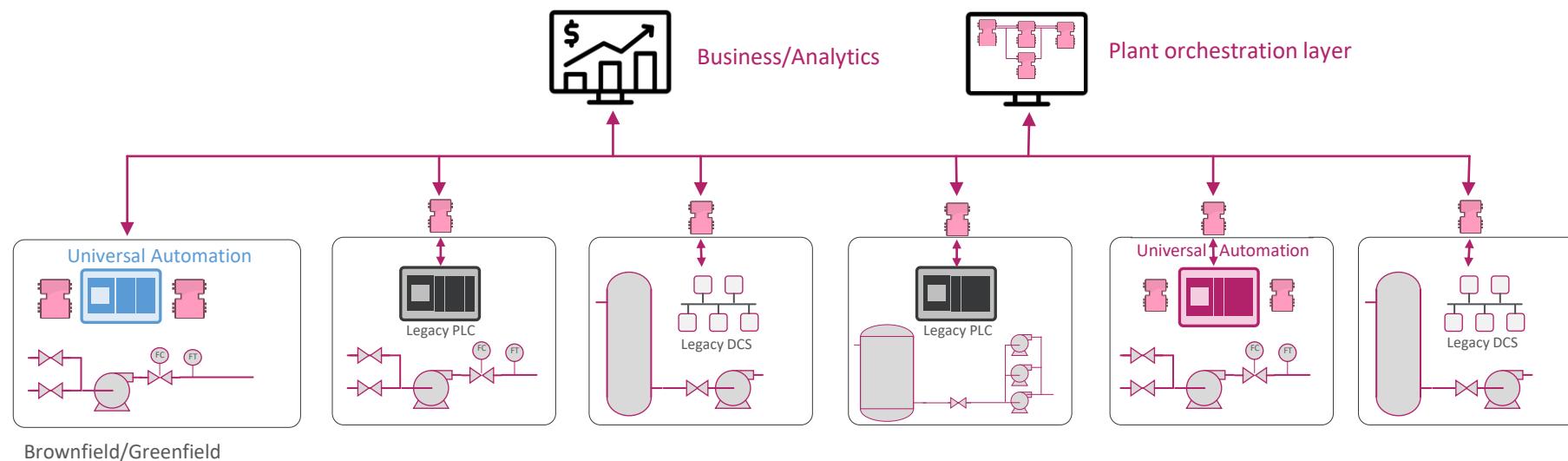
Build library of universal automation software components to interface legacy systems to site/enterprise-level orchestration

## Principle 2: for new automation systems, stop installing “new legacy”

Universal Automation: multi-vendor, portable software components, flexible architectures

## Principle 3: upgrade systems to universal automation as they become obsolete

If possible, replace CPU's while conserving IO and field cabling



# IEC 61499 as the Foundation for Orchestration

Implementing **IEC 61499 as the Plant Orchestration Layer** allows for distributed, event-driven control without disrupting existing production. Each machine or process retains its autonomy while participating in a coordinated, modular system - ensuring seamless integration, scalability, and optimal performance.

## Key Benefits:

- **Simplified Integration**

Seamlessly connects equipment from multiple vendors, reducing engineering complexity and integration time.

- **Increased Flexibility**

Enables process line evolution and reconfiguration without requiring direct support from each individual vendor.

- **Improved Coordination and Performance**

Enhances synchronization across machines, leading to more efficient operations and measurable performance gains.

## Begin with a Non-Critical System

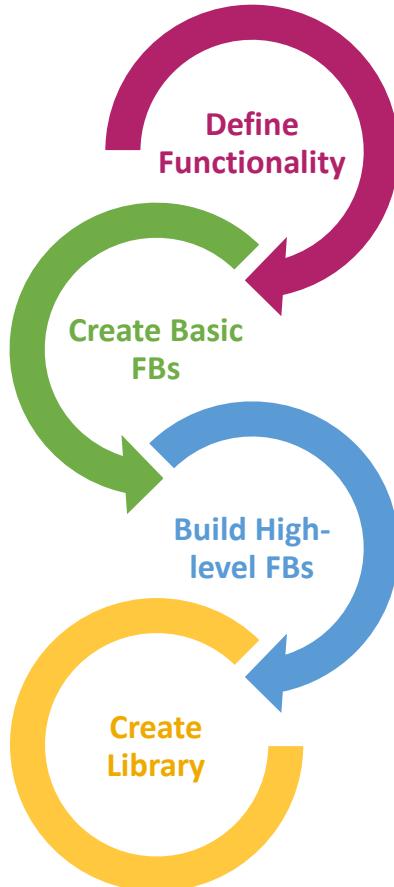
- To ease the adoption of IEC 61499, it is recommended to start by applying the technology to a non-critical system. This approach allows teams to explore and understand the framework without impacting essential operations.

Select a system such as:

- |                          |  |
|--------------------------|--|
| - Temperature monitoring | - HVAC (Heating, Ventilation, Air Conditioning)                        |
| - Humidity tracking      | - Compressed Air Monitoring (if not directly tied to production tools) |
| - Air quality sensing    | - Water Supply for Sanitation  |
- These systems are ideal for experimentation because they:
    - Operate independently of core production processes
    - Allow safe testing of event-driven function blocks
    - Provide a practical introduction to distributed control architectures

By starting with a low-risk application, teams can **build confidence and expertise in IEC 61499** before scaling to more critical systems.

# Begin with a Non-Critical System



## Define the Functional Description

Begin by decomposing the system into logical components based on its functionality and physical layout. This modular approach ensures clarity, scalability, and ease of maintenance.

## Create Basic Function Blocks (FBs)

Develop individual Function Blocks for each fundamental physical or logical element of the system. These FBs encapsulate specific behaviors or control logic, making them reusable and testable units.

## Build High-Level Function Blocks

Combine the basic FBs into more complex, high-level FBs that represent integrated subsystems or major functional units. This hierarchical structure supports abstraction and simplifies system integration.

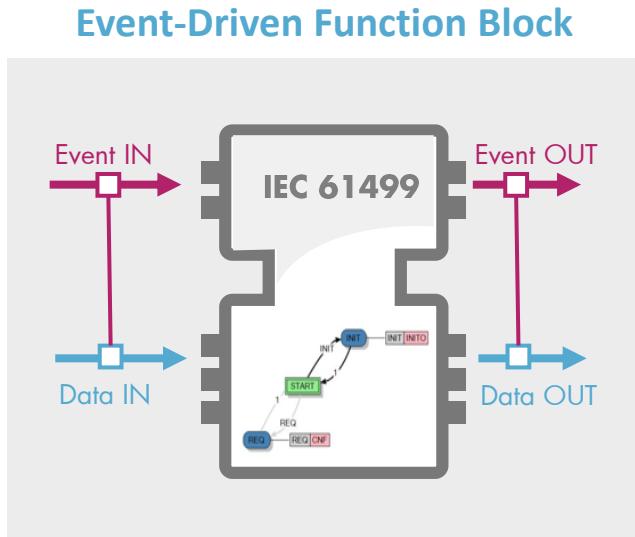
## Develop a Reusable FB Library

Organize all FBs into a structured library of reusable components. This library can be leveraged to efficiently program and integrate similar systems within the IEC 61499 environment, promoting consistency and reducing development time.

Deeper into UniversalAutomation.org

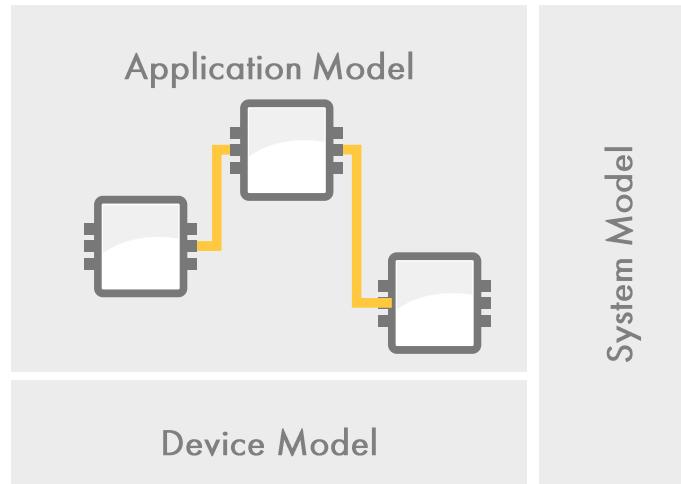
# IEC 61499

## The Technology Enabler of UAO

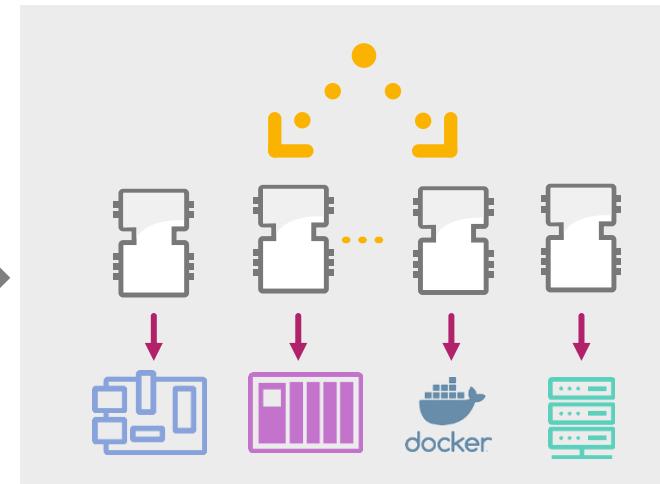


Self-contained SW component

### Software-Hardware Decoupling



### Distribution



Distribution of SW components to devices

“Plug & Produce programming using hardware-independent, proven-in-use libraries of software components”

# A Community – Not a Standardization Body !

**WE  
are**

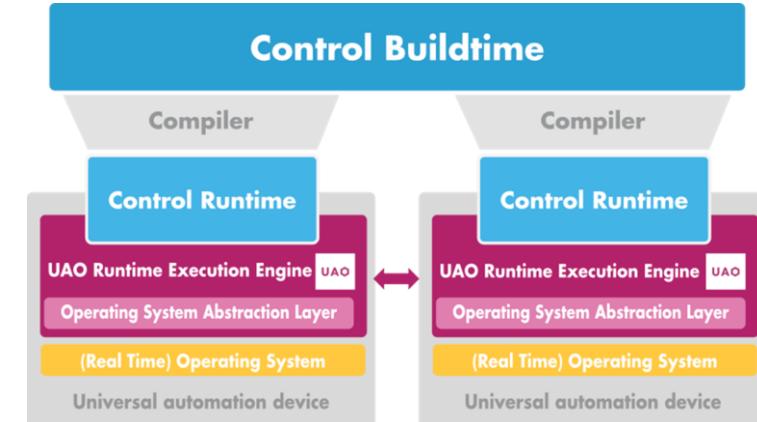
A community of users, vendors and academics organized around an independent non-profit association

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Universal automation platforms that use a shared-source IEC 61499 runtime execution engine

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Portability/Reusability of vendor-independent automation application software



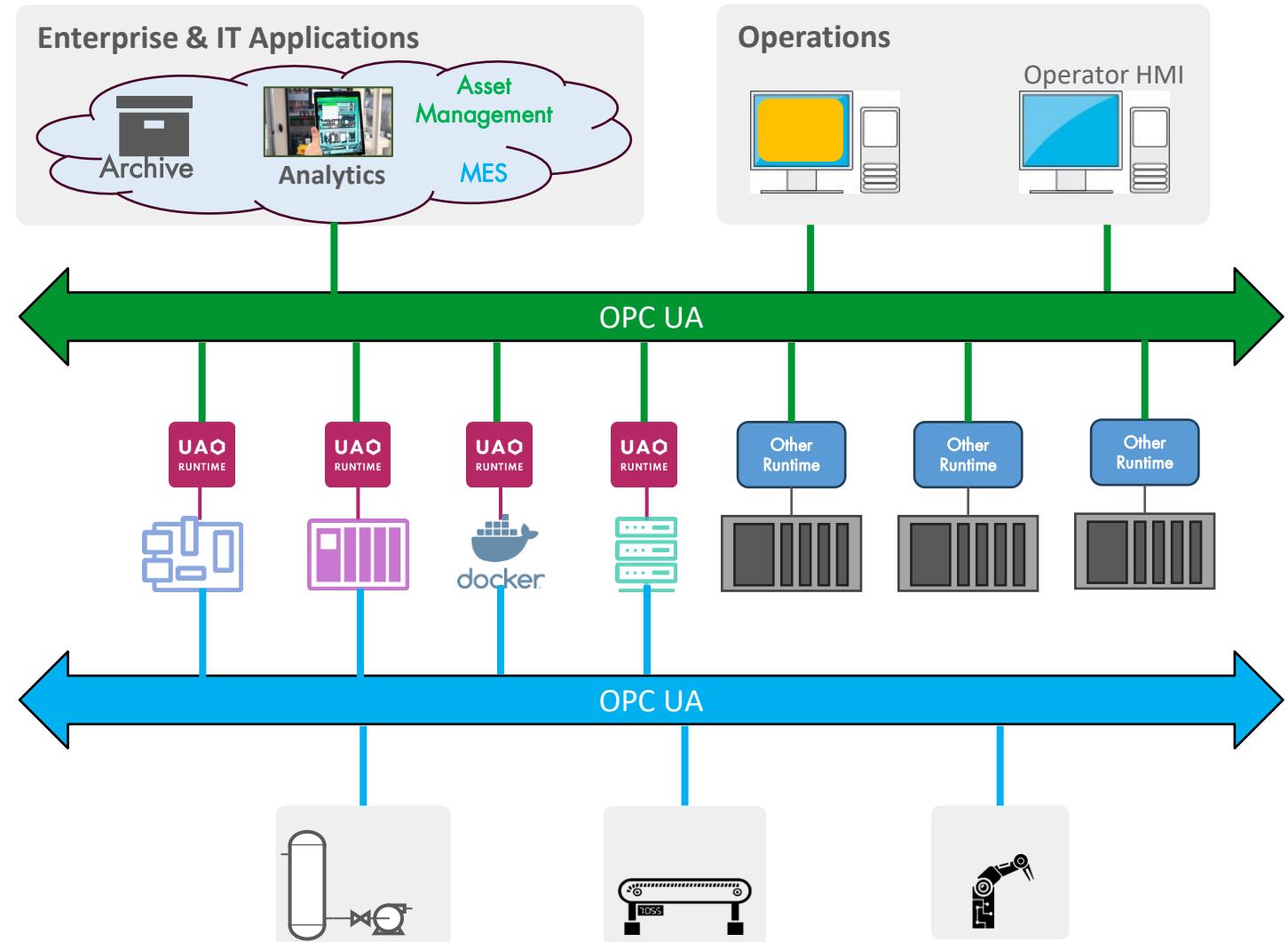
**GitHub**

## Benefits

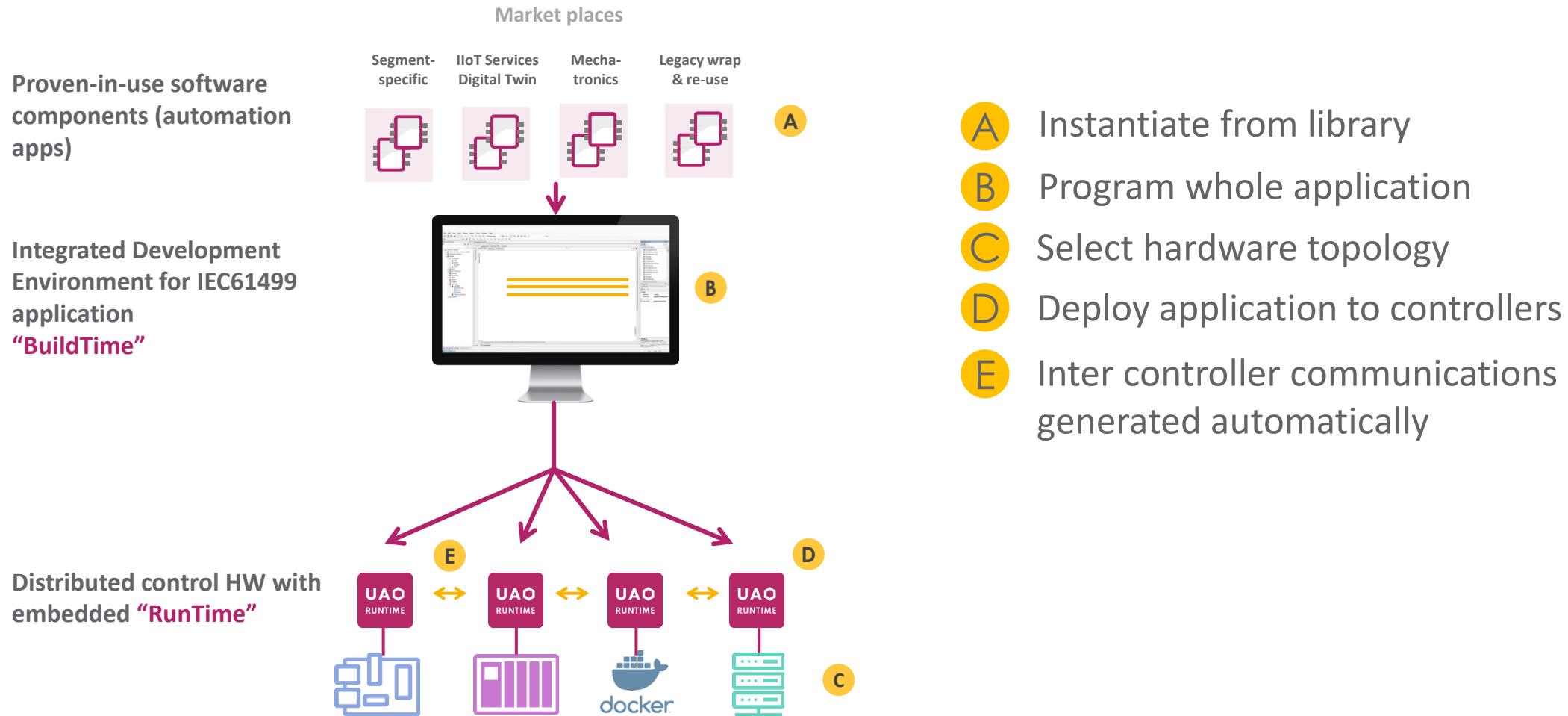
- ✓ Maximize application portability across vendor platforms
- ✓ Remove issues linked to « interpretation » of written standard
- ✓ Release universal automation offers in months rather than years

# UniversalAutomation.org Runtime & OPC UA

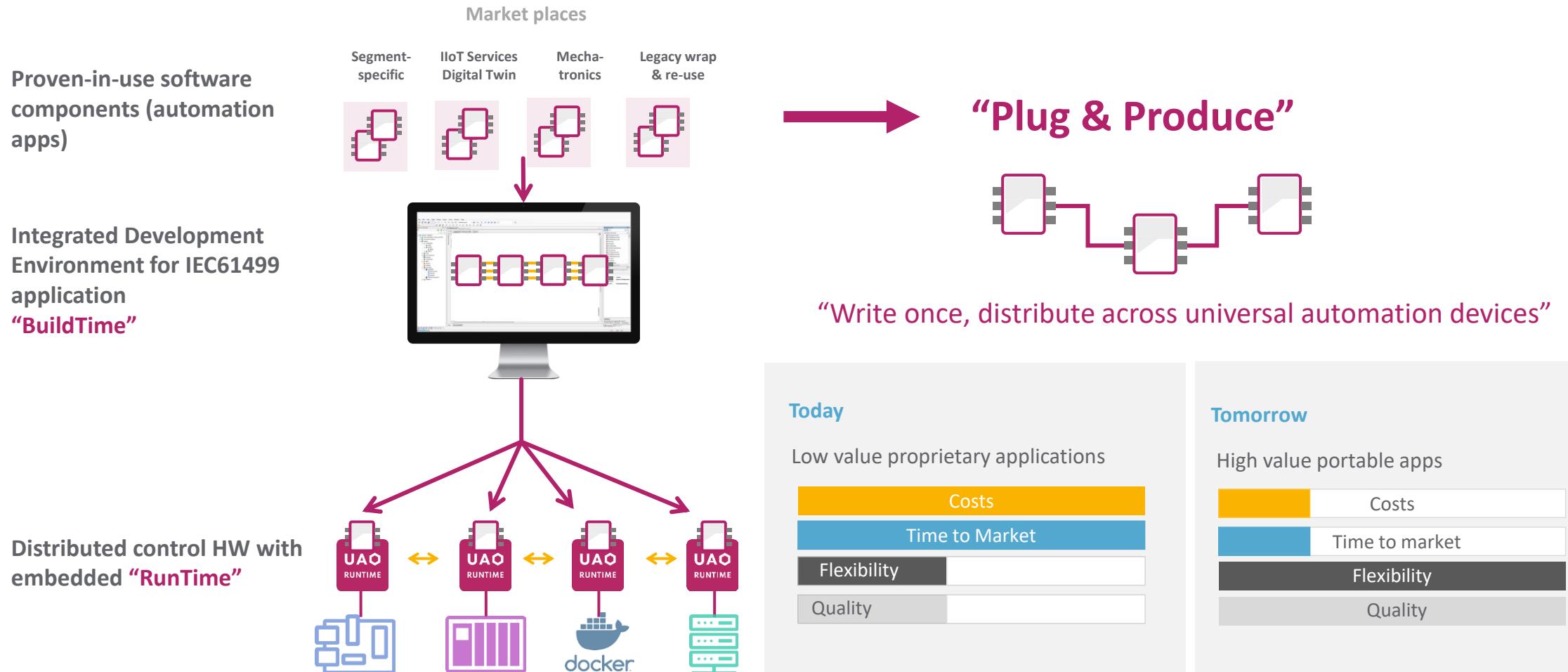
- Unified Automation High Performance Stack
- Both OPC UA Server and Client available
- Server Namespace – Modeled, Prepared and compiled in buildtime & deployed to runtime.
- OPC UA Client modeled as a set of Service Interface Function Blocks for use in application.



## Plug & Produce SW Components: The Missing Link for Industry 4.0



# Plug & Produce SW components



1. Integrated Development Environment

# How UAO Helps You Improve your KPI's

	Traditional objectives			Emerging objectives			
	Productivity	Lower TCO	Reliability	Programming Experience	Resiliency	Flexibility	Sustainability
<b>Plug &amp; Produce SW Components</b>	Low code/ no code		Proven-in-use application SW components		SW re-usability		Accelerate open standards (OPAF, MTP,...)
<b>Software/Hardware Decoupling</b>		BIC hardware- SW re-usability		Only one automation tool to learn	Easier supply chain & obsolescence mgt		
<b>Asset Centric Design (Object-Oriented)</b>	Lower downtime/ MTTR			Attractive to new gen of SW engineers		Modular process/ machines	
<b>Event/Data-Driven</b>	Automation + IT (Digital Twin, analytics, ...)					Automation + IT (Digital Twin, analytics, ...)	

# Who are the Members ?

## Overview of Today's Members:

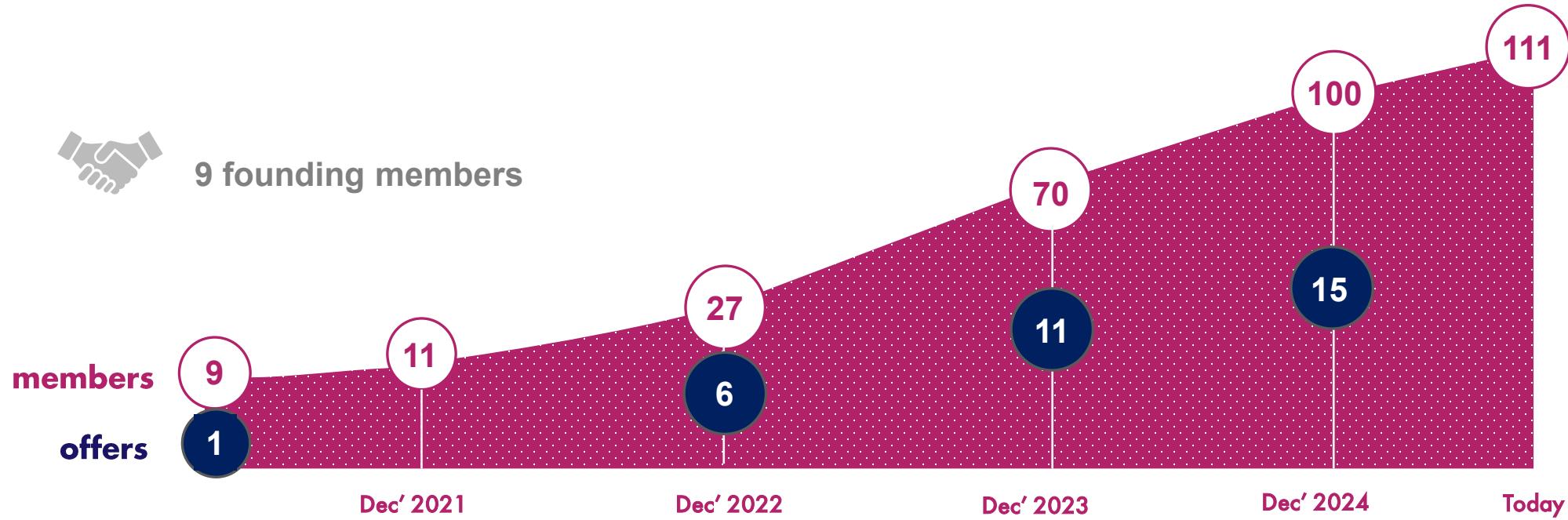
**26 Vendors, 47 Users, 31 Academics/Institutes, 7 Startups**

Vendors (1/2)	Vendors (2/2)	Users (1/3)	Users (2/3)	Users (3/3)	Academics (1/2)	Academics (2/2)
Advantech	Odot	Accenture	Enterprise Automation	Platinum Engineering	Aalto University	NMIS
Analog Devices	Omron	Alten	ExxonMobil	Radical	Carl von Ossietzky Universität Oldenburg	Postech
<b>ASRock Industrial</b>	<b>Phoenix Contact</b>	All About Control	Fare Engineering	Rovisys	Edith Cowan University	SUPSI
<b>Belden Group</b>	<b>R. Stahl</b>	AB InBev	Gr3n	Summit Electric Supply	Ernst-Abbe-Fachhochschule Jena	The University of Queensland
Bühl + Wiedemann	<b>Schneider Electric</b>	Actemium UK	Graybar	Tenlink	ESME Sudria	Technical University of Kosice
Bucher Automation	Sciyon	AFRY	Hyundai	TriSystems	HBLFA Francisco Josephinum	Universidad Nacional de Colombia
Cognex	<b>Penguin Solutions</b>	Armony System	ICT Group	Upstate Automation	HUST	University of Jaume I
Endress+Hauser	<b>Unionscience</b>	Autodriver	<b>IDA Control Engineering</b>	Veolia	HWK München	University of León
FLSmidth	Wilo	BASF	Indeff	Westcon	ISAE Supmeca	University of Reims
HNAC	Yokogawa	Bilfinger	Isaac Engineering	Wood	INSA Hauts-de-France	University of Tours
<b>Honeywell</b>		BPX	J&W		INSA LYON	University of Sevilla
Inovance		Can-Technologies	KPI Automation		Javeriana University	University of Warwick
Intel		Cargill	Laplace Solutions		Johannes Kepler University Linz	UFCG – Universidade Federal de Campina Grande
<b>Kongsberg Maritime</b>		Crescent	Master Systemes		Luleå University of Technology	Universidade Federal do Rio Grande do Norte
<b>Kyland</b>		Dhandy Mecha	Mayer		Meisterschulen am Ostbahnhof	
<b>Matribox</b>		EDF	Neodyne			<b>Institutes</b>
		Ematics	Nestlé			Korea Testing Laboratories
		ENGlobal US	Novo Nordisk			SIMTech
			Onify			
<b>Offers launched</b>		<b>New members</b>		<b>Start ups</b>		
				AIMIRIM		
				Barbara		
				Dynamic Process		
				<b>Flexbridge</b>		
				<b>OpenEmbed</b>		
				Sinapsi		
				<b>Taotech</b>		

Offers launched    New members

111 fully signed-up members!

# We are Growing Fast



# Overview of Today's Members

## Vendors



## Users



## Academics, Institutes & Startups



# Universal automation Offers are Ready for Test Today!

The first member offers are ready to use.

Based on a shared automation runtime, the offers allow users to test the benefits of the UAO technology for themselves.



[More about the universal automation offers](#)

**ADVANTECH**

*Enabling an Intelligent Planet*

 Belden



OpenEmbed



KONGSBERG

**MatriBox**

 **PHOENIX  
CONTACT**

**STAHL**

 **TAOTECH**

道莅智远科技

**PENGUIN  
SOLUTIONS**

**LicOS**

 **UNIONSCIENCE GROUP**

**KYLAND**

# End Users are Using the Technology



- Using UAO runtime execution engine in Lighthouse O-PAS based project commissioned since Dec 2024 :
  - Replace existing DCS/PLC's
  - 2000 IO points, 90+ loops
  - UAO runtime + OPC UA



ExxonMobil



KONGSBERG

- Orchestration layer above existing legacy controllers
- Additional IT/OT applications



- Objective – decouple application library from vendor platforms
- Ongoing food oil unloading application with EcoStruxure Automation Expert



- Built “Reference IEC 61499 application”
- Multi-vendor system commissioned:  
R. Stahl, Schneider Electric, ESA



- Real-time process control
- Predictive maintenance
- Improved automation scalability
- Reduced machine stoppages
- Consistent product quality

# How about Academics?

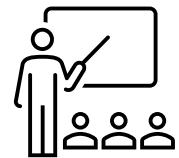
UniversalAutomation.org Academic Program

# UAO PORTAL

Access to IEC 61499 learning materials

- **12-modules IEC 61499 Curriculum**

11 training modules + 1 project work module, major languages



IEC 61499 Curriculum  
can be accessed through  
**UAO Portal**

<https://universalautomation.org/portal>

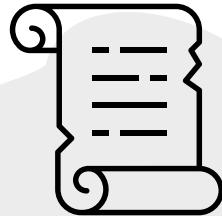
- **Video companion** to 11 training modules in English

- All-way **support** to the academics while setting up the IEC 61499 course

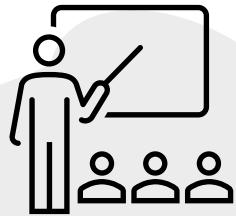
Q&A session, workshops, academics community exchanges etc.

# SOFTWARE

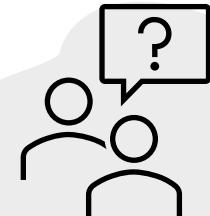
## Training and Certification



**Free software**  
**LICENSES** for students  
and lecturers

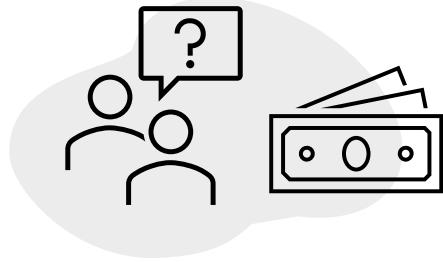


**Free TRAINING**  
on the software and  
access to free training  
materials

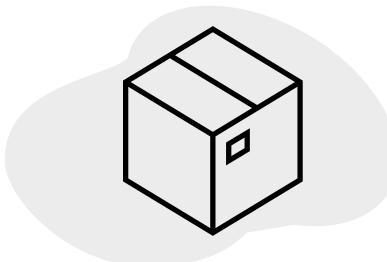


**SUPPORT**  
to integrate universal  
automation course in the  
regular curriculum as  
mandatory or elective

## Hardware INTEGRATION, SIMULATION and PROJECTS



**Support** to plan the **hardware architecture** for real time simulation with advice on purchase of relevant **hardware at special academic prices**



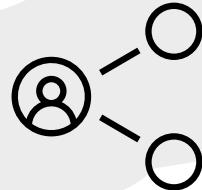
Purchase of **standard didactic package**



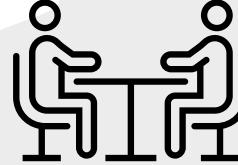
**Link academics to business** to do projects and proof of concepts, case studies

# WHY IS IT ATTRACTIVE

for young talents?



**Sharing** the application  
**examples** and libraries  
with UAO Community

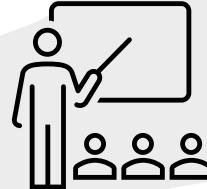


Support in **Internships**  
**search** within UAO  
Community



**Networking**

opportunities with the  
Industry UAO Members



**Floor for presenting** your  
Projects & Research to the  
UAO Community

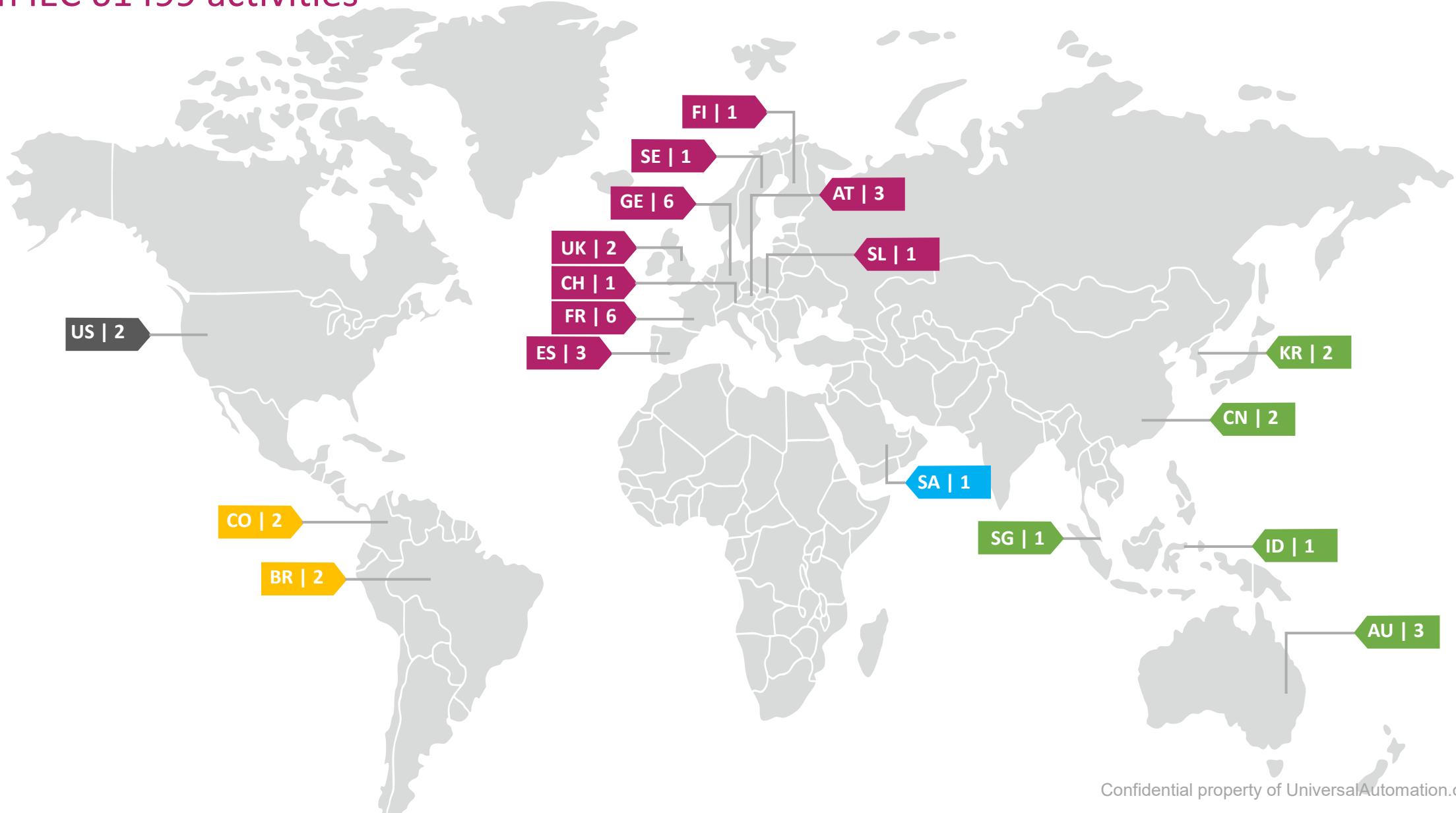


Access to dedicated  
**UAO fairs and events**

# UAO ACADEMIC PARTNERS

with IEC 61499 activities

UNIVERSAL  
AUTOMATION.ORG



## Why should ACADEMICS join UAO?



**Stay up to date** with Next Gen automation systems Sponsor the initiative



**Network** with other companies & academics to learn & drive standardization



**Influence** the next development of the runtime execution engine



**Get trained** on the technology, interact with UAO Ecosystem



# Why They Joined Us?



“

We are excited to be part of UniversalAutomation.org because it promises to be a complete game changer. It opens up a new world of possibilities for organisations like ours. Unlocking valuable data currently buried in proprietary systems, making the connectivity and deployment of new technologies like Artificial Intelligence quick and simple. **As part of UniversalAutomation.org we are actively collaborating with and supporting like-minded organisations to create an exciting new open era in operations and automation.**



**Valeriy Vyatkin**

*Professor of Electrical Engineering at Aalto University*

“

**ADVANTECH**

*Enabling an Intelligent Planet*

Advantech is growing really fast and I believe if you want to keep on growing in the future, you need to be able to innovate. And when I see the universal automation approach, it is exactly the way of innovation we need to go with.

Who is inside Universal Automation? You have institutions, you have academics, you have OEMs, manufacturers and users. This means that you have **all the voices of the market on one platform**, no one is pushing in one direction. We are just finding the way to grow together to the next level.

**Universal Automation is really the concept you want to push today.** In the past there was one piece of hardware with one task, but we have to move on, we have to evolve. The evolution is that the hardware can have different kinds of software and everything can run on top of it. The hardware itself is not so important anymore.



**Marco Zampolli**

*Industrial IoT Product Sales Director*

“



I think now is a great time to disrupt the industry, really **become hardware agnostic** and let the end user decide what hardware they want to use.

Customers can basically choose the hardware they want using just one automation platform, so they become very versatile and are not bound to one particular vendor.

Universal Automation provides precisely the level of flexibility that a competitive and sustainable industry requires. For our customers, this is exactly what they are looking for today.



**Nicholas Holland**

*Managing Director - EMEA Broad Market*

“ barbara

There is a huge room for improvement on the way runtimes are managed and orchestrated today. By joining UAO we aim to contribute to **make large runtime deployments more scalable and secure through modern Edge Management functions**. Our participation in UAO represents another significant step in our commitment to delivering **open and flexible solutions** based on industry standards, enabling industrial organizations to innovate more rapidly and with reduced risk.



**David Puron**

*CEO and Co-founder at Barbara*

“



We joined UAO because we strongly believe that we have  
**to decouple the application from the hardware.**

The value of our automation is not in the hardware and  
(yet today) we design every plant in hardware-centric  
way. That is no longer possible with the regional  
complexities of cyber security, more maintenance, more  
complex software requirements. On our current path  
towards Industry 4.0 that hardware-centric approach no  
longer good. So in short, we must decouple hardware &  
software to make sure that we are able to survive as an  
industry in Europe.



**Dominic de Kerf**

*Plant Systems and Controls COE*



“

On our hydroelectric power plants, we have technology from the 1950s that we need to modernize it. UAO's technology will allow us to **decouple software from hardware** and create **portable libraries of functions to replicate across our assets, independent of the automation hardware.**

We want to completely change our approach, focusing on functions rather than hardware constraints. This functional approach from design to implementation is a revolution for us.

Our automation teams were quickly impressed with this new approach and have understood it very quickly.



**Laurent Bacon**

*Head of Industrial Information and Control*

“



**flexbridge**

The creation of UniversalAutomation.org is the dawn of a new era within automation technology; over the course of the next five years, it will create a sea change for the future of automation software development. We are delighted to be a part of UniversalAutomation.org, driving the **development of a “plug and produce” system** which will help the industry keep up with the increasing demands of **flexible manufacturing**. There is no doubt that as members continue to join the organization and reap the benefits of collaboration and openness, that industry-wide change will follow.



**Dmitrii Drozdov**

*Chief Technology Officer at Flexbridge*

“



Open Automation technologies like UAO's will allow us to deliver innovative automation systems **faster** and at **lower cost**. That enables more **efficient manufacturing** and **faster time to market** for green solutions. We plan to starting using IEC 61499 to innovate on top of existing infrastructure and technology as our first use cases. Longer term, more efficient integration of technology from different OEM machine and automation suppliers will have a major positive impact.

To those considering joining UAO, don't join if you like being locked into expensive proprietary PLC platforms and enjoy using the same old thing!



**David Campain**

*Global Product Manager, Process Control Systems*

“



I joined UAO because by being open, by being an international standard, by being already supported by quite a certain number of relevant companies, it paves the way for a new generation of not just automation systems, but a **new way of conceiving automation systems**. Because in the end it leaves behind the problem of hardware and unleashes the power of software, which has not yet happened in automation.



**Franco Cavadini**  
*Chief Technical Officer*

“



KONGSBERG

I like to have a system that is based on an open standard instead of a system that is defined by just one vendor.

So for us, 61499 is one way of opening up our system and make it future ready and that's why we joined the UAO.

Today there are a lot of obsolescence issues in the industry so you can end up in a corner where it's hard to move out from. Instead, **by using an open standard, you're having the opportunity to select the best vendor.**

A standard is always good but it's even better to also have an implementation of a standard. And that's exactly what UAO provides.

It's not an open-source, but a **guarded-source-community**. And that's very important because then there is **someone behind it to make sure that the quality of the software is good.**



Sølve Raaen

*Principal Architect OT*

“



When we came to UniversalAutomation organisation, they offered us a stable solution with the IEC 61499 standard as the future of open automation. This **standard eliminates the need for code conversion**. This means that customers can use only **one programming for our PLCs on different machines**. This also helps them to increase their efficiency, reduce their costs and run more stable machines.

We are very optimistic about our cooperation with Universal Automation because there are so many different types of machines and PLCs in China, and it takes a lot of engineering to make different machines talk to each other. We joined this ecosystem to make every machine and PLC talk in one standard.

In fact, we are the first local company in China to offer large scale IEC 61499 compliant hardware.



**Raphael Xiong**

*Sales Manager*

“



THE STRONGEST LINK.

We want to have an open system because our customers ask for it. It will also make our life much easier if there's only **one product with one interface that basically works with every controller.**

You can run the application on our system. You can also use another system. You can mix and match different systems. So literally a part of the system can be installed here and the other part can be installed in Australia and it will work together.

Most of our customers in process automation are pretty conservative, they never want to change a running system. But now, we see a new generation coming up that is used to new technologies. They are open to test and try these new functionalities and I think most of them pretty well understand the advantages on this. I'm doing this for 20 years now and I think over the years, this is the most exciting change.



**Andre Fritsch**

*Senior Product Manager*

“



The change to Universal Automation is really enabling the industries of the future.

Business data, coming from the automation level, is the foundation to make much more conscious decisions. Universal Automation is an ideal prerequisite for efficiently obtaining this data and performing valuable analyses.

Universal Automation of course is much closer to the IT-thinking and therefore young talents are more attracted to work in this environment.



**Barbara Frei**

*Executive Vice President Industrial Automation*

“



Penguin Solutions, a proud member of UniversalAutomation.org, is committed to advancing open, vendor-independent automation. By creating open ecosystems, UniversalAutomation.org enables users to choose the **best hardware and software combinations for optimal performance**. The Universal Automation Open approach allows users the ability to pair their software with a hardware platform that brings **reliability, security, and simplicity** to the forefront. With built-in virtualization, OT supportability, high availability and fault-tolerance, Penguin Solutions platforms enable users to deploy UAO projects with confidence in their mission critical operations. By aligning with UniversalAutomation.org, Penguin Solutions empowers businesses to scale, innovate, and accelerate time to market with reliable, secure solutions across multi-vendor environments.



**Rudy de Anda**

*Head of Strategic Alliances*

“



We operate several thousand third-party installations, so we find ourselves with a large volume of equipment from different brands. This requires great complexity of skills to maintain them. This is why the association's approach interests us greatly: to **simplify the multi-vendor complexity**. Pooling the skills of our employees on a limited number of platforms is a guarantee of operational efficiency, and a vector of success for the dissemination of standards.



**Michel Arroyo**

*Operations and Performance Director*

“

wood.

Wood is excited to be part of defining the future of automation and transforming profitability and productivity for the customers in our industrial markets. UniversalAutomation.org technology will enable business innovation, increase digital adoption and agility with its **open, interoperable and portable solutions- building business resiliency** and empowering our clients to be future-ready.



**German Carmona**

*Global President of Wood's Digital Consulting  
business*

# UAO as Technology Enabler

# UAO is an accelerator of other open standards

Implementation of standards using proven-in-use software components



UAO Library components accelerate implementation of open standards



OPAF/UAO Liaison Agreement already effective

OPAF library



# UAO is an accelerator of other open standards

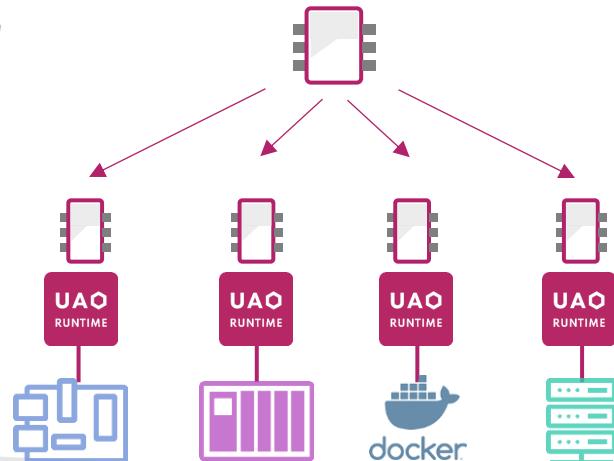
## Implementation of standards using proven-in-use software components



Defines Dosing Service

**UNIVERSAL**  
AUTOMATION.ORG

Implements “Dosing” as a  
software component



### BENEFITS

Test “Dosing” software component once (vendor independent), run on multiple UAO devices.

- Lower engineering cost
- Faster commissioning
- More reliable (Proven-in-use components)
- One software environment to learn

Execute “Dosing” on UAO devices  
UAO device = MTP-compliant device

# Benefits

## Driving Significant Benefits for...

### Users

- **More cost-effective** – write once, re-use regardless of vendor
- **More reliable & safer** using proven-in-use, reusable software libraries
- **Incrementally improve** over the lifecycle
- **End-of-life proof** - re-use software, even when automation hardware is obsolete
- **Embed & reuse IP** to protect competitive edge or to get better ROI on increasing software investment

### Vendors

- **Grow software revenues**
- **Access new end users/segments** with new offer
- **Shape state-of-the art software technology**
- **Decreased costs/risks** thanks to platforming

## Why should END USERS join UAO?



**Network** with other members to learn, exchange and collaborate



**Get your employees trained** on the technology



**Be invited to world-leading industry events** on behalf of UAO to share your unique Point of View



**Be invited to exclusive live events** to network with other industry leaders and relevant thought leaders



Leverage UAO's **network and community** to advance your business goals



**Sponsor the initiative**  
Without users we will NOT attract vendors



**Influence** the next development of the runtime execution engine

# Why should SIs/EPCs join UAO?



Get access to key **End Users & Projects**



**Get trained** on the technology



**Embed your knowhow/IP** in software component libraries



**Be promoted** by the association (social media, webinars, fairs...)



**Be invited to world-leading industry events** on behalf of UAO to share your unique Point of View



**Be invited to private events** to network with other members and relevant thought leaders



**Promote your experience and skills within the community**

# Why should VENDORS join UAO?



**Obtain license** for UAO runtime execution engine - **create a new category of automation device** in months rather than years



**Share R&D costs** with platforming approach



**Influence** the next development of the runtime execution engine



**Get access** to key End Users looking for IEC 61499-based systems



**Position** your company as thought-leader/innovator



**Get trained** on the technology



**Be invited to world-leading industry events** on behalf of UAO to share your unique Point of View



**Be invited to private events** to network with other members and relevant thought leaders



**Promote your experience and skills within the community**

# Membership Pricing

# Membership structure

Membership Level	Yearly Fee €k	Voting Rights		Runtime Access
		General	Roadmap <sup>1</sup>	
Platinum	150	1	10	Yes
Gold	75	1	4	Yes
Silver	25	1	1	Yes
Sponsor Voting	18	1	0	No
Sponsor Non-Voting <sup>2</sup>	2-8	0	0	No
Startups <sup>3</sup>	6	0	0	TBD <sup>4</sup>
Academics	2	1	0	TBD <sup>4</sup>

1. Roadmap voting rights applicable in phase 2
2. Revenue dependent: <€10m = €2k, €10m-€100m = €5k, >€100m = €8k
3. Conditions (duration, revenue levels, etc.) determined by Board
4. Access to source code determined on case-by-case basis by Board

# The Benefits of UniversalAutomation.org

---

There is more

## Summary of benefits/UVP's

		Unique Value Proposition					
		<i>Operational Excellence</i>				<i>Digital Transformation</i>	
	<b>Feature</b>	<b>Benefit</b>	Vendor-independent Plug & Produce SW components	Flexible Architectures	Asset-centric Control - Modular machine/ process	IT/OT convergence	Wrap & Reuse/ Orchestration
IEC 61499	Event-driven Function Bloc	Self-contained SW component					
	Service Interface FB	Integration with IT/OT systems					
	Adapters	Hide complexity single-line eng					
	System model	Mapping of FBs to devices/ resources					
	App Model	Decoupling of app software from hardware					
	Device/Resource Model						
UAO	Shared runtime execution engine	Multi-vendor app software portability					
	IP Policy	Member freedom-to-operate					

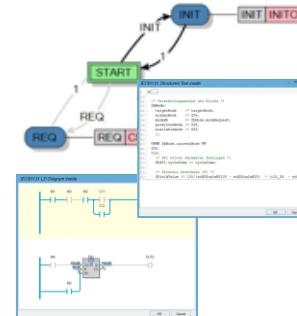
# Features / Benefits

# Summary of benefits/UVP's

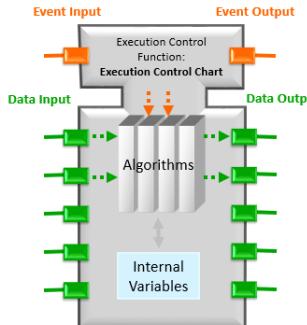
		Unique Value Proposition					
		<i>Operational Excellence</i>			<i>Digital Transformation</i>		
<b>I E C 6 1 4 9 9  U A O</b>	<b>Feature</b>	<b>Benefit</b>	Vendor-independent Plug & Produce SW components	Flexible Architectures	Asset-centric - Modular machine/ process	IT/OT convergence	Wrap & Reuse/ Orchestration
	Event-driven Function Bloc	Self-contained SW component					
	Service Interface FB	Integration with IT/OT systems					
	Adapters	Hide complexity single-line eng					
	System model	Mapping of FBs to devices/ resources					
	App Model	Decoupling of app software from hardware					
	Device/Resource Model						
	Shared runtime execution engine	Multi-vendor app software portability					
	IP Policy	Member freedom-to-operate					

# IEC 61499 – Event Driven Function Block

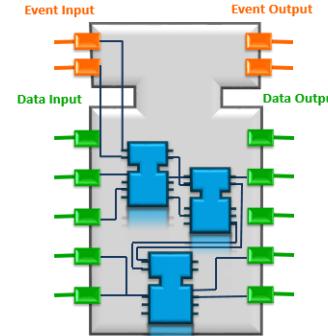
- Self-contained SW component providing functions ***through defined interface***
- Programmed in any language
- Real-time + Right-time
- SFB: FB interface to functionality beyond IEC 61499, e.g. comms networks, device hardware, etc.



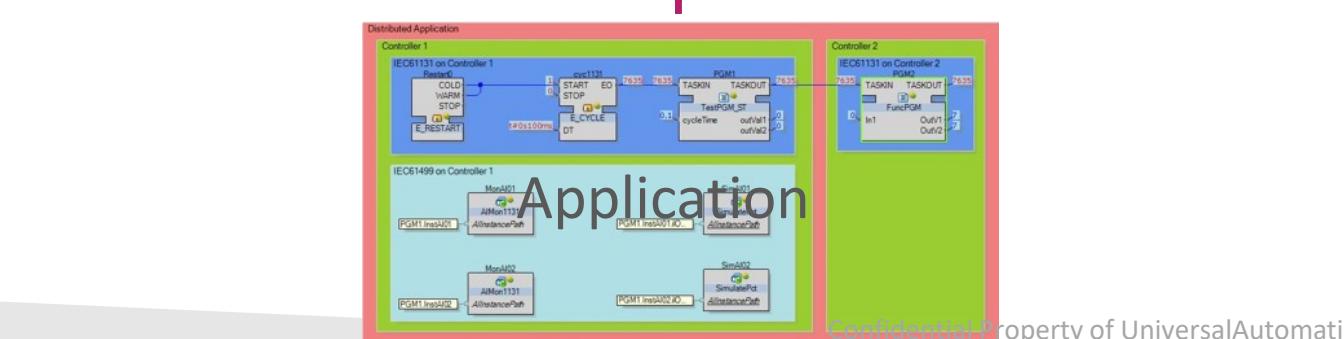
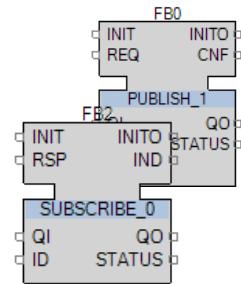
**Basic FB**  
e.g. Motor  
+ Execution Control Chart  
+ Algorithms (ST)



**Composite FB**  
e.g. Conveyor line  
Composed out of Basic FB,  
Composite FB, Service FB

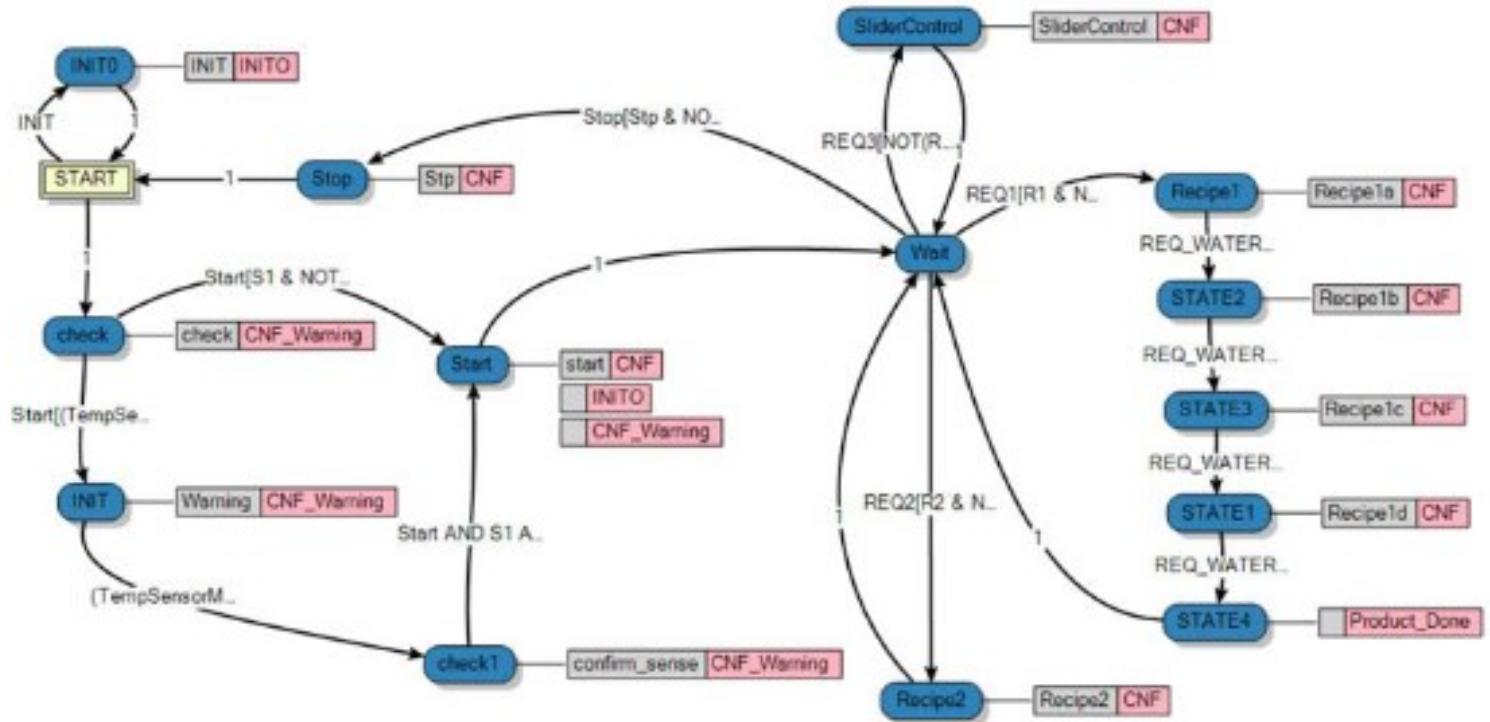


**Service FB**  
e.g. I/O access (Data, HMI,  
Communication ...)  
Provided by the System



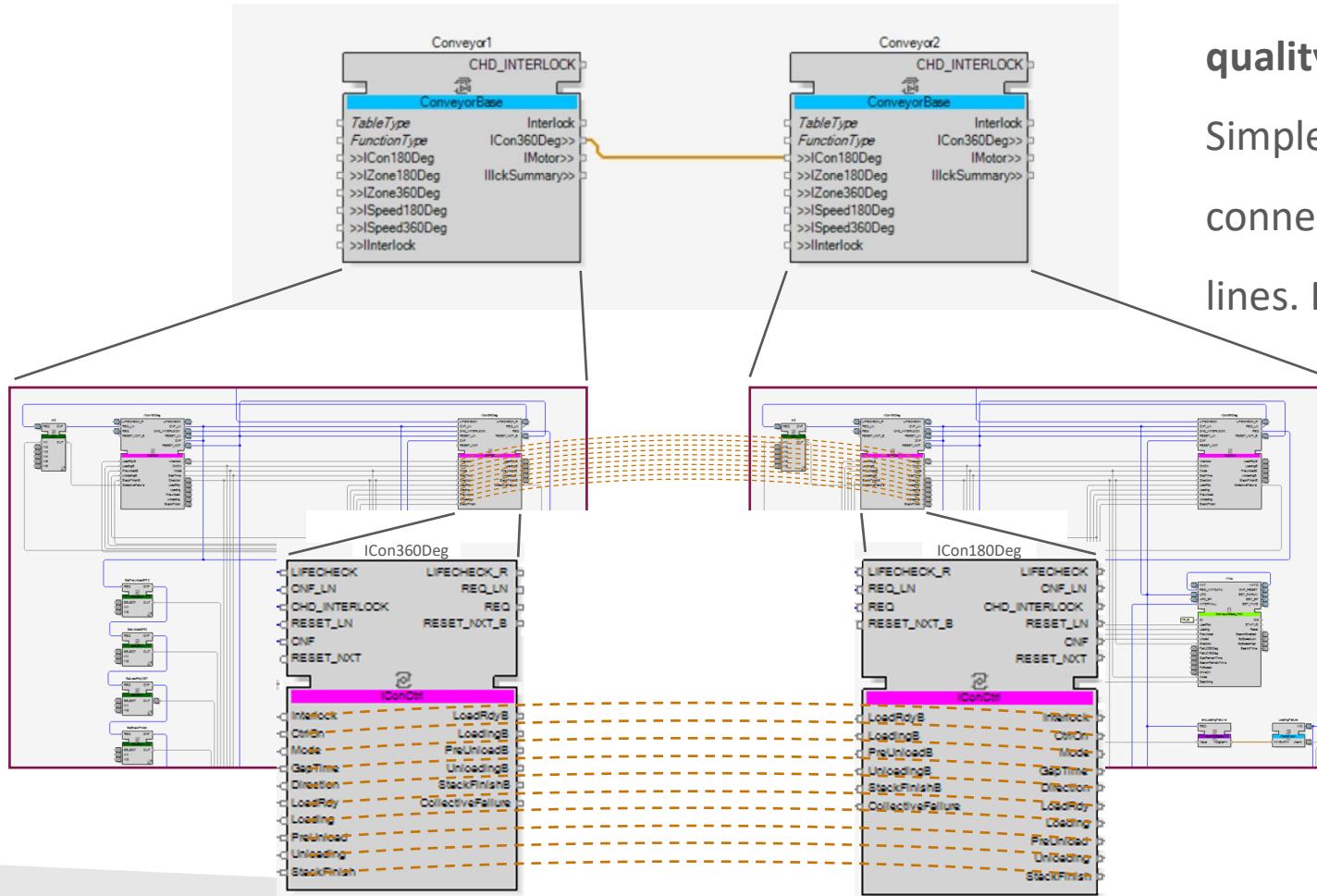
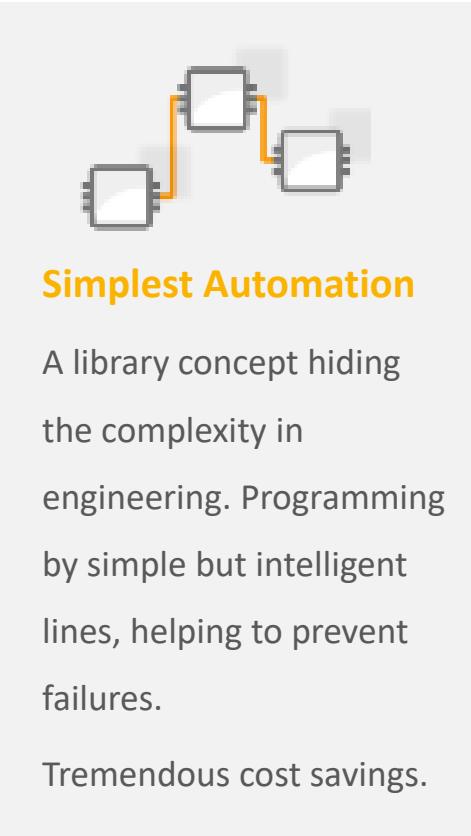
# IEC 61499 – Execution Control Chart

- State-transition machine
- Structured approach to programming
- Small programs easy to read
- Debug & commissioning simplified



Example recipe controller (Valeriy Vyatkin)

# IEC 61499 – Adapters



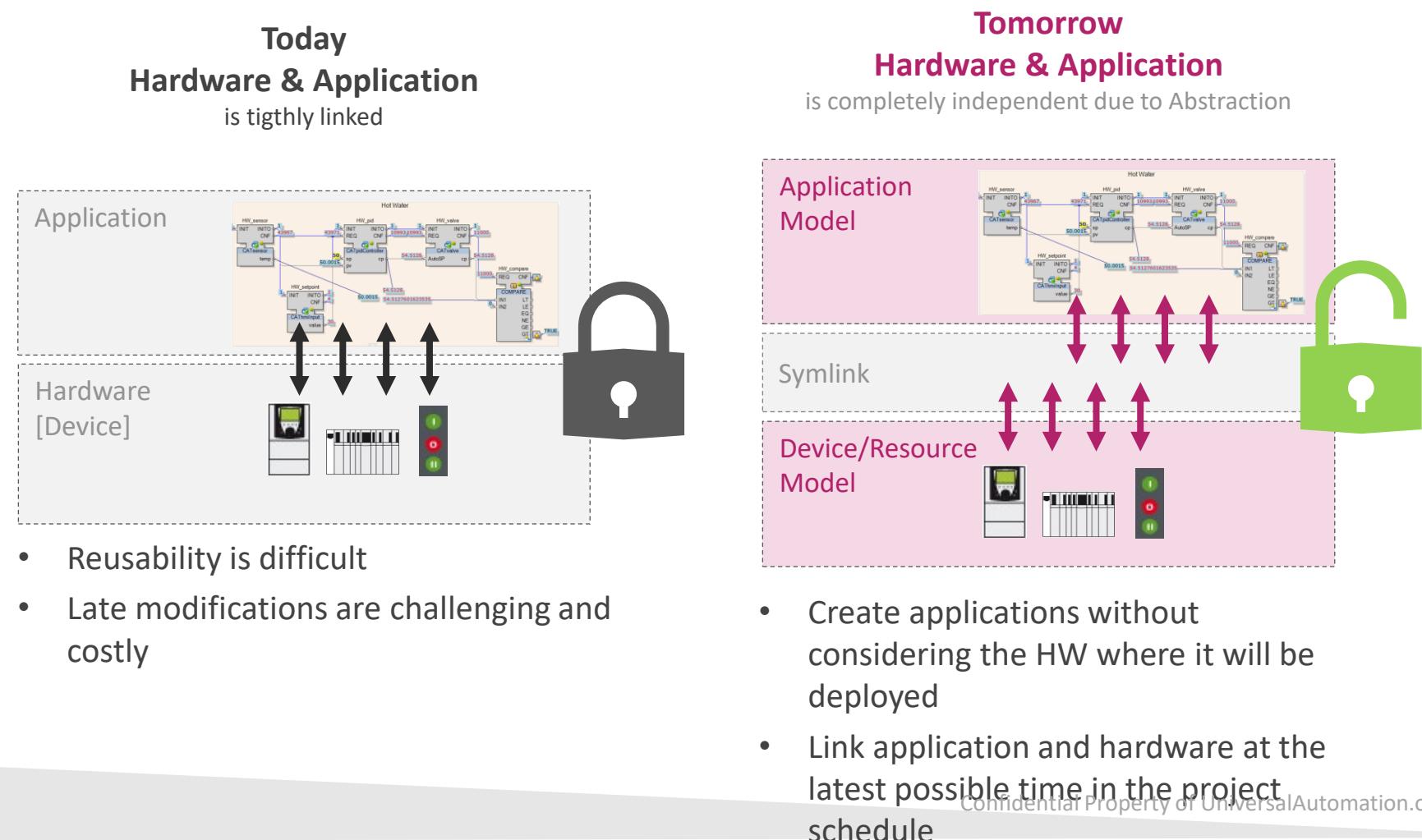
Simplest engineering possible  
enabling **savings** and **consistent**  
**quality**.  
Simple **ready-to-use objects**  
connected together by simple  
lines. Forget events.

# IEC 61499 – Application and Device/Resource models

## Decoupling of Application software from hardware

- **Application Model** defines how to create application using FB networks

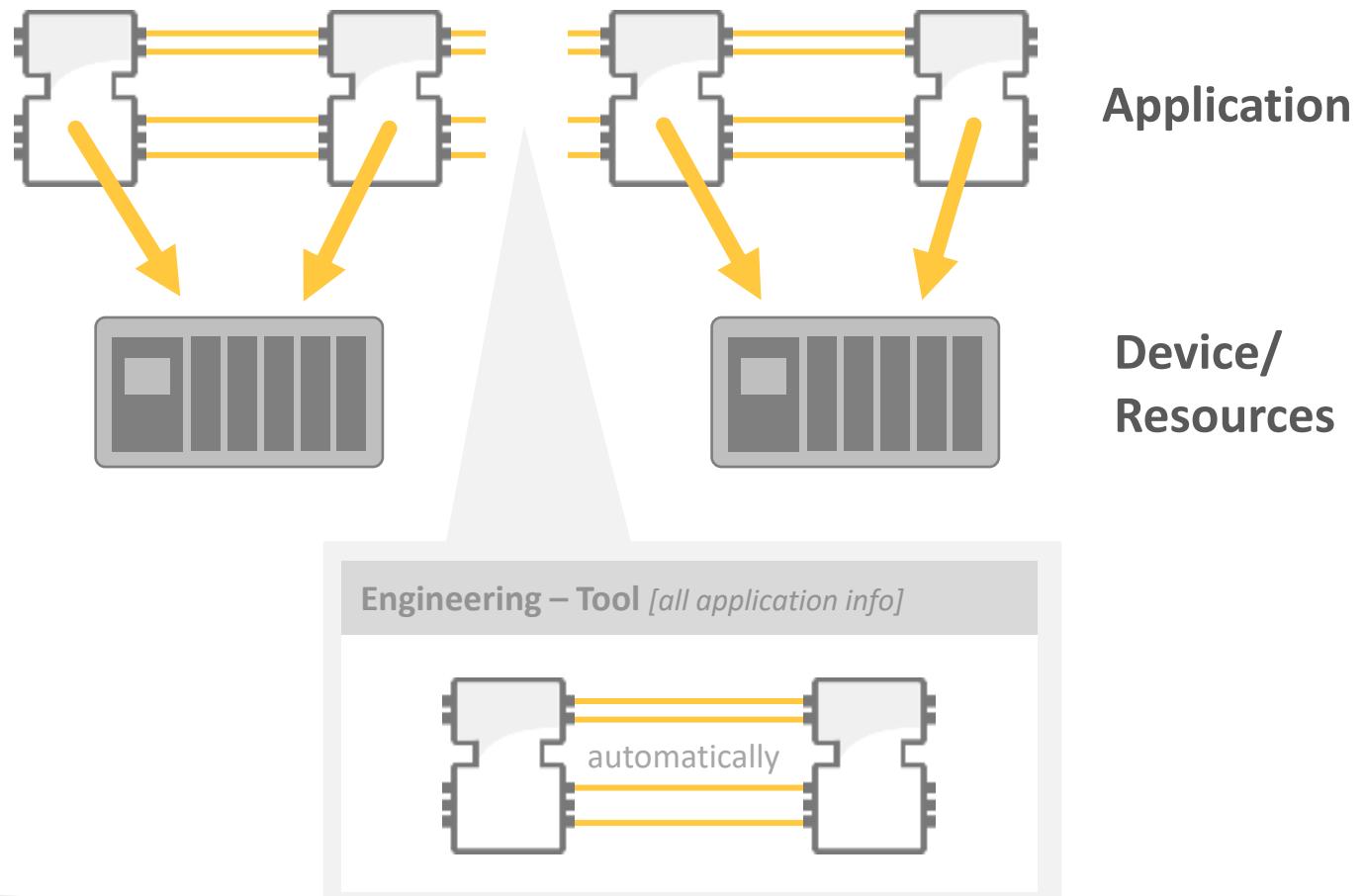
- **Device/Resource** models define the compute resources on which the application will execute



## IEC 61499 – System Model

### Mapping of FBs to Device/Resources

- **System model** maps FBs to hardware on which application will execute
- **Event-driven** structure allow automatic establishment of comms paths across networks



## Shared runtime execution engine

WE  
are

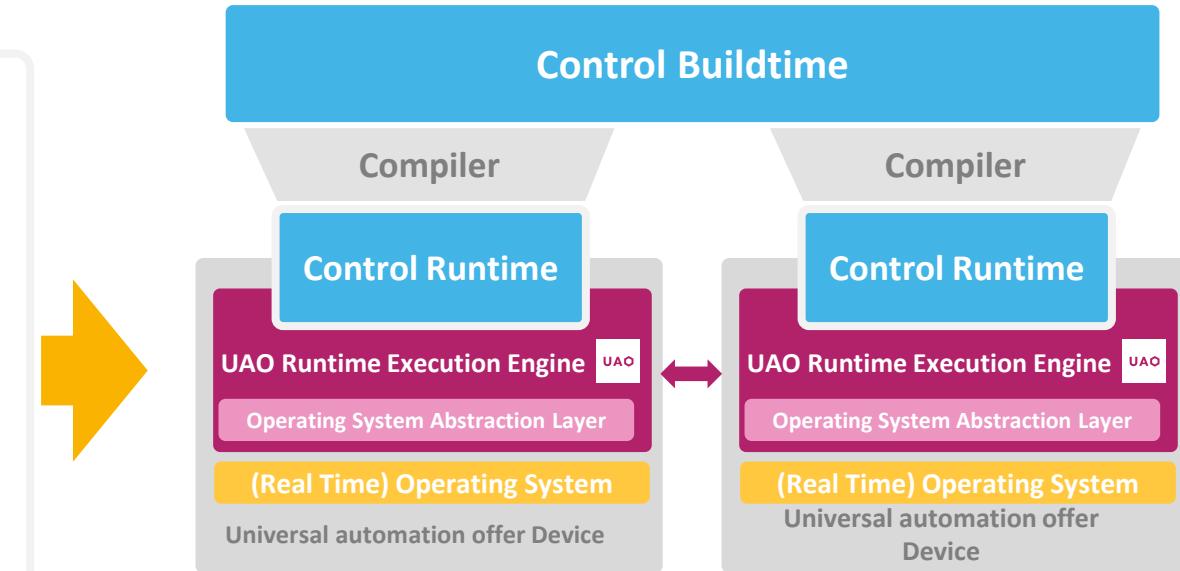
A community of users and vendors  
organized around an independent non-profit  
association

WE  
use

UAO-compliant platforms that use a **shared-source IEC 61499 runtime execution engine**

WE  
promote

**Portability/Reusability** of vendor-  
independent automation application  
software



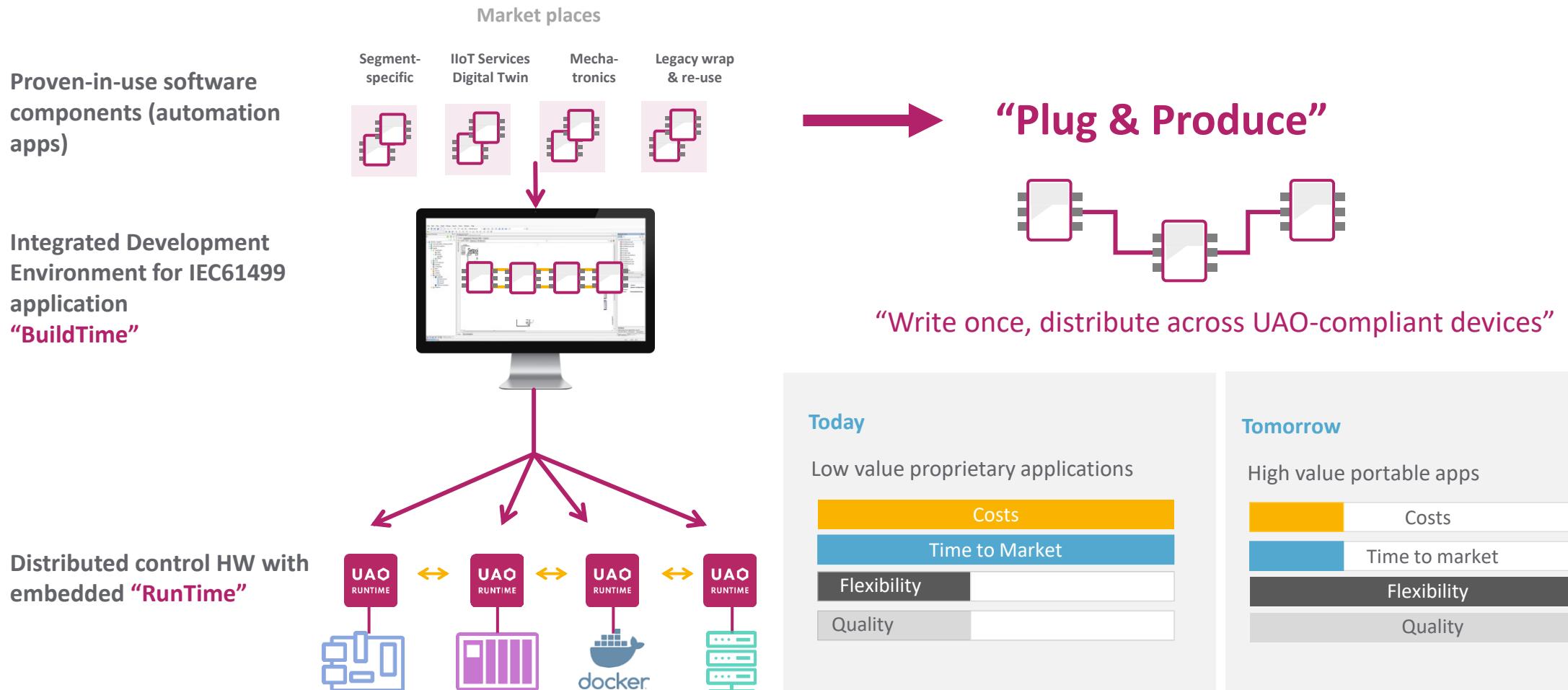
- Initial source code contribution from Schneider Electric
- Member contributions will shape the technology moving forward
- **Common IP Policy** to ensure single RT, manage member contributions & protect member interests

# User Value Propositions

## Summary of benefits/UVP's

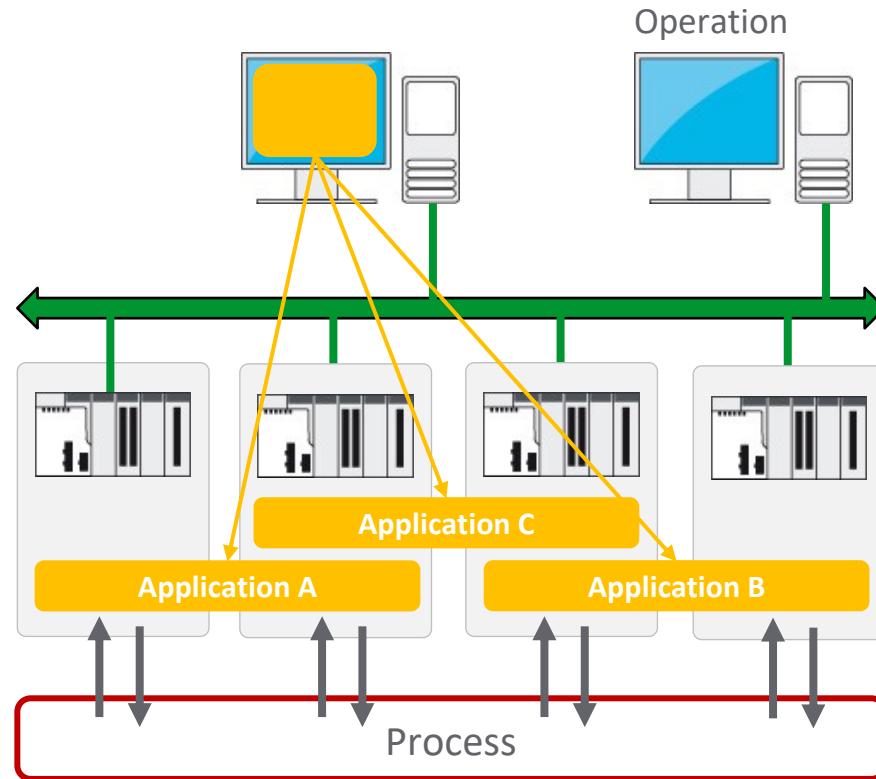
		Unique Value Proposition					
		<i>Operational Excellence</i>			<i>Digital Transformation</i>		
	<b>Feature</b>	<b>Benefit</b>	Vendor-independent Plug & Produce SW components	Flexible Architectures	Asset-centric control - Modular machine/ process	IT/OT convergence	Wrap & Reuse/ Orchestration
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UAO	Shared runtime execution engine	Multi-vendor app software portability					
	IP Policy	Member freedom-to-operate					

# Plug & Produce SW Components: The Missing Link for Industry 4.0



## Flexible Architectures: Centralized to distributed

- Distribute the control logic of a complete system to several controllers by drag & drop
- Automatically generated cross-communication
- Late-binding
- Distributed, centralised or hybrid

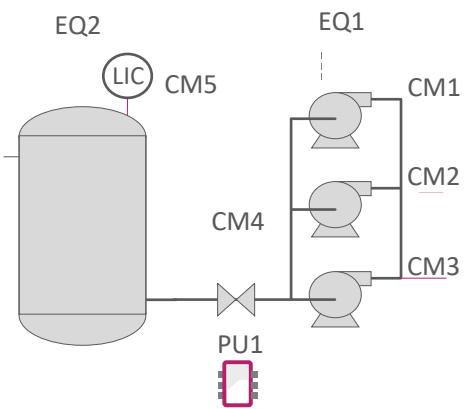


Centralised – edge computer

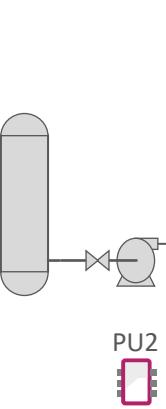


Distributed Control Nodes

# Asset Centric Automation-Modular machine/process



Single line engineering with adapters

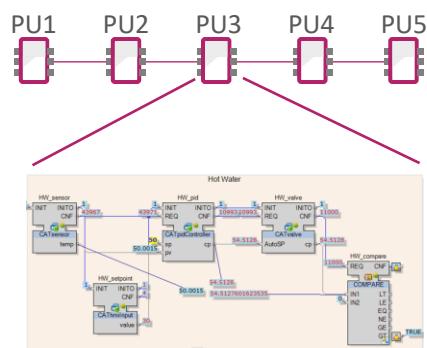


## Master complexity

- Representing real devices as ready-to-use software objects, encapsulating all their aspects - Building block for CPS.
- Complexity hidden from users.

## Efficient engineering

- Using proven-in use library instances
- From process specification (P&ID) to detailed control program very quickly
- Maintain one software library Independent of control hardware
- Quicker commissioning



Process Engineer Commissioning

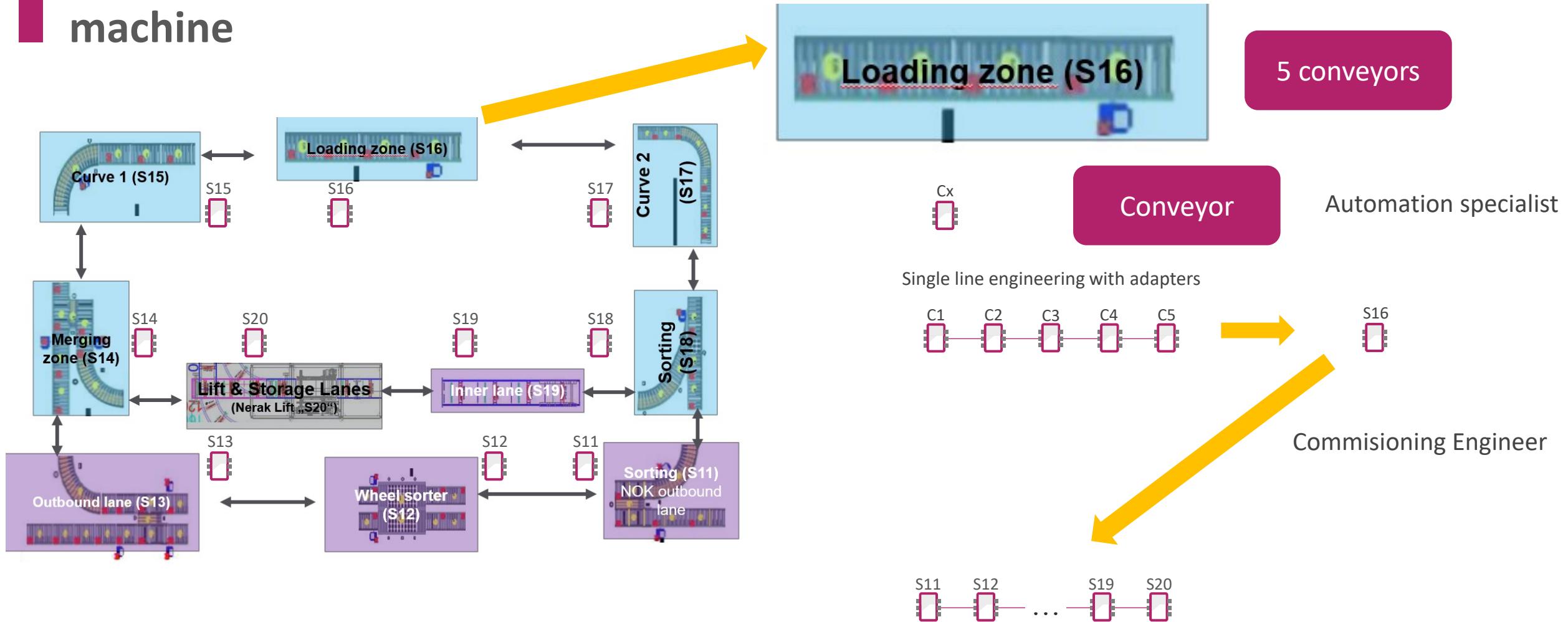
Automation specialist

## Modular Machine Process

- Match control modularity with mechanical/electrical modularity
- Expand by adding modules

## Embed IP/know-how libraries

# Asset Centric Automation-Modular machine



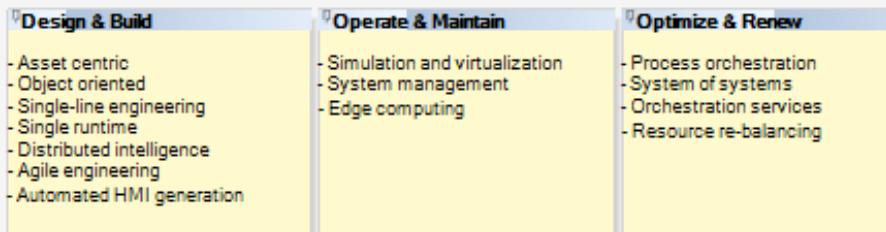
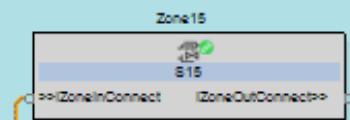
Zone16

## Loading Zone



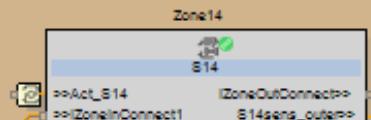
Zone15

## Curve 1



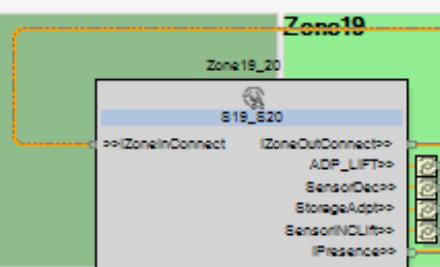
Zone14

## Merging

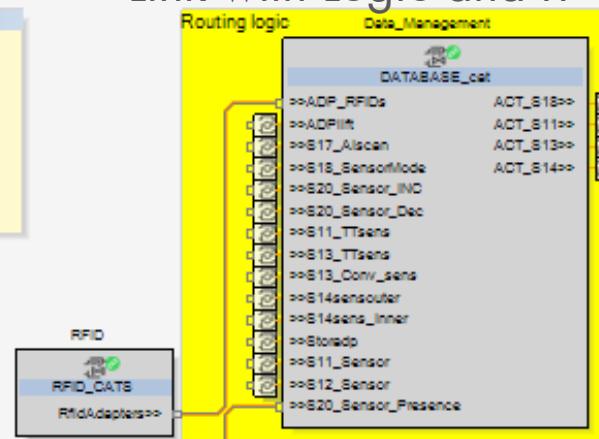


Zone20

## Lift and storage



## Link with Logic and IT



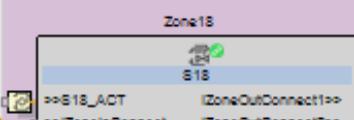
Zone17

## Curve 2



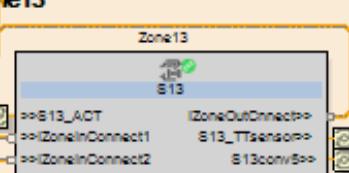
Zone18

## Sorting



Zone13

## Outbound Lane



Zone12

## Wheel Sorter

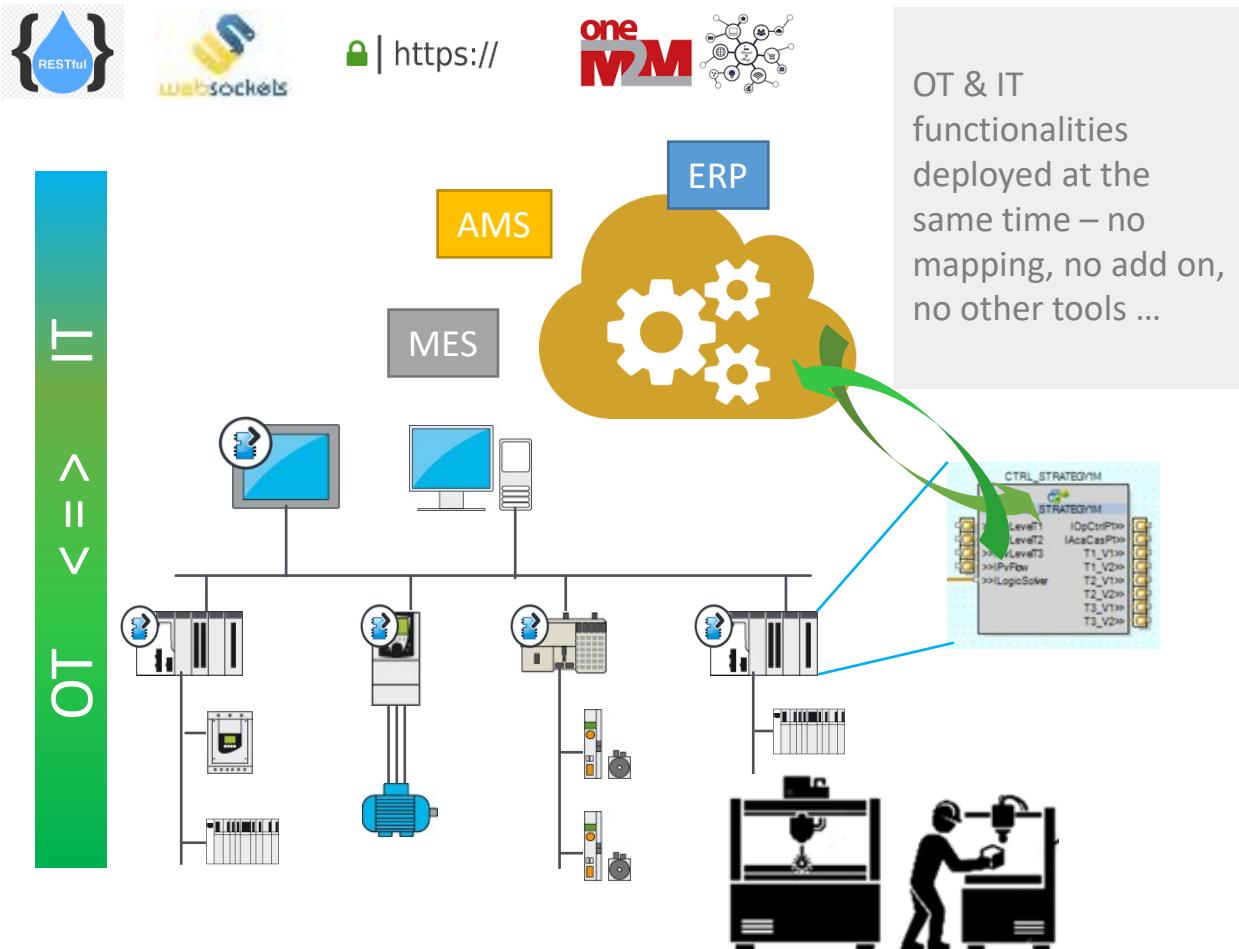


Zone11

## NOK Outbound Lane



# IT/OT Convergence



**Utilizing well known and accepted IT concepts, practices & standards**

## Same concepts:

- Event driven execution
- Methods with parameters
- Service oriented & blackbox design

## Usage based connectivity:

- Register and establish connectivity when needed
- Close connection/unregister when done

## Use cases:

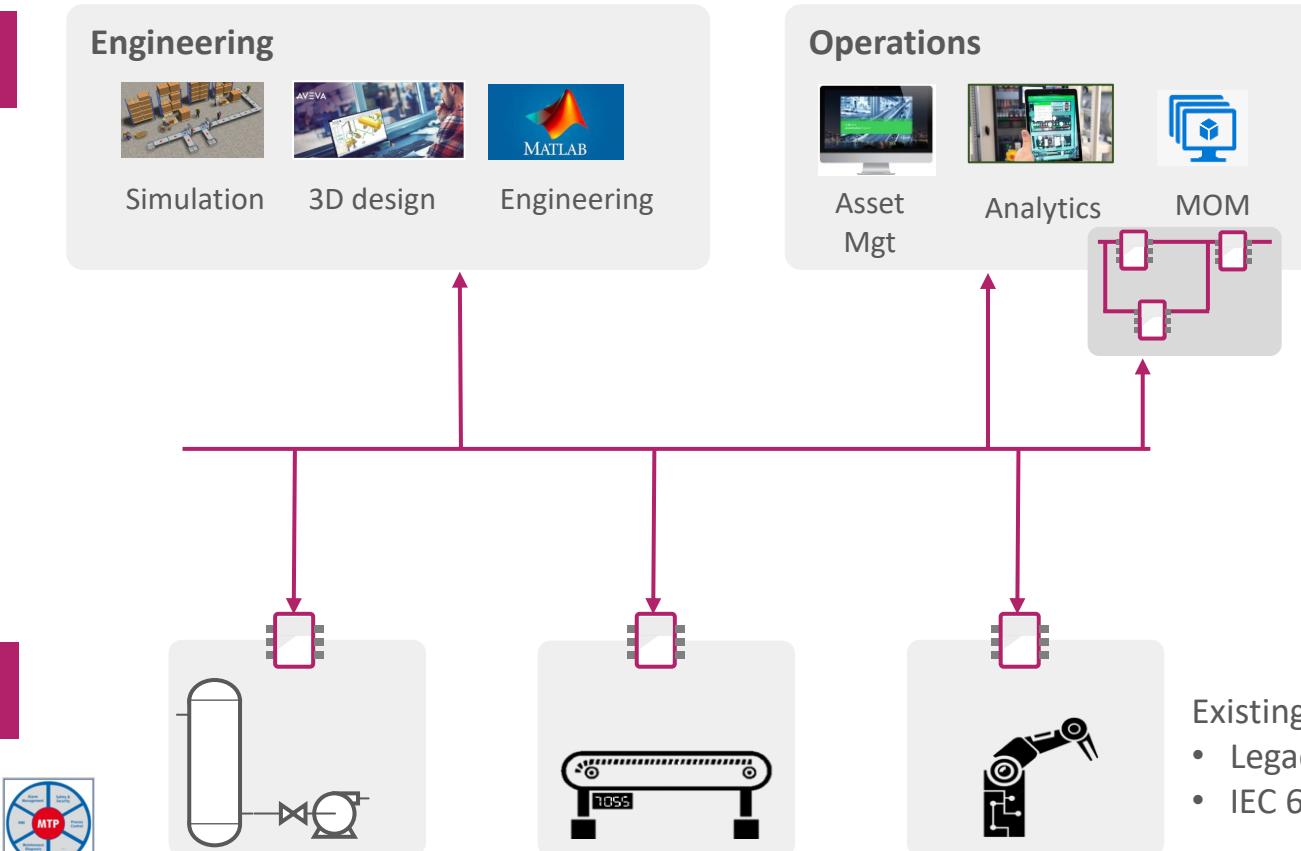
- Query/update datasets from IT level
- Connection to MES, ERP, AMS ...
- Trigger tickets in CMMS, provide root cause information ...
- Multi-level & shared control strategies (Cloud, Fog, local)
- Enabler for
  - Decision support/process optimisation, autonomous operation
  - Pay per use services/control strategies

# Wrap & Re-Use/Orchestration

IT



OT



## *Two main orchestration use cases*

- Close coupling IT and OT systems to implement Industry 4.0 Use Cases, e.g., Digital Twin**
- Application orchestration of complete process or multiple machines (additional OT functions)**



KONGSBERG

- Pipeline leak detection
- Well test automation
- One Button Startup

# Reference Examples

# Use cases Summary (1)

	Operational Excellence			Digital Transformation	
	Vendor-independent Plug & Produce SW components	Flexible Architectures	Asset-centric control – Modular machine/ process	IT/OT convergence	Wrap & Reuse/ Orchestration
<a href="#">Oil &amp; Gas Refining: ExxonMobil</a>	X				
<a href="#">Waste Treatment – Royal HaskoningDHV</a>	X				
<a href="#">Mining</a>	X	X			
<a href="#">HVAC Industrial Air Cleaning</a>	X	X	X		
<a href="#">Logistics – Automated warehouse 2</a>	X		X		
<a href="#">Mobile Stone Crusher machine</a>	X		X		
<a href="#">Gr3n</a>	X		X	X	
<a href="#">Logistics – Automated warehouse 1</a>			X	X	
<a href="#">WWW - Smart Plant</a>				X	X
<a href="#">Consumer Packaged Goods – Master Systèmes – Sophim</a>	X				X
<a href="#">Kongsberg Maritime</a>					X
<a href="#">Packaging OEM</a>			X	X	
<a href="#">Food &amp; Bev</a>	X	X			X
<a href="#">Facility Management</a>		X			
<a href="#">Carbon Capture</a>					X

# Use cases Summary (2)

	Operational Excellence			Digital Transformation	
	Vendor-independent Plug & Produce SW components	Flexible Architectures	Asset-centric control – Modular machine/ process	IT/OT convergence	Wrap & Reuse/ Orchestration
Tobacco : AIMIRIM & ASRock Industrial				X	XX
J&W Smart Logistics Center with ASRock Industrial					
E2COMATION				X	
MODUL4R			X		
METAWAVE	X			X	
HVAC : Air Handling Units	X			X	X
Autodiscovery with HSOL	X	X		X	

# Vendor-independent Plug & Produce Software Components

## Segment - Oil & Gas Refining: ExxonMobil

### Challenge

I would like to build my application using best-in-class software components from different suppliers.

### Solution

ExxonMobil research published an IEC 61499 adapter interface for PID control and asked their suppliers to provide components using the adapter. XOM were then able to program a cascaded control loop using different blocks from different suppliers in a Plug & Produce fashion

### Benefits

- **Reduce engineering time** & shorter commissioning using proven-in-use software
- **Increased innovation** using best-in-class software components
- Continuous improvement enabled by swapping out existing components with improved ones sharing the same adapter interface.



# Vendor-independent

## Plug & Produce Software Components

### Segment - Waste Treatment – Royal HaskoningDHV

#### Challenge

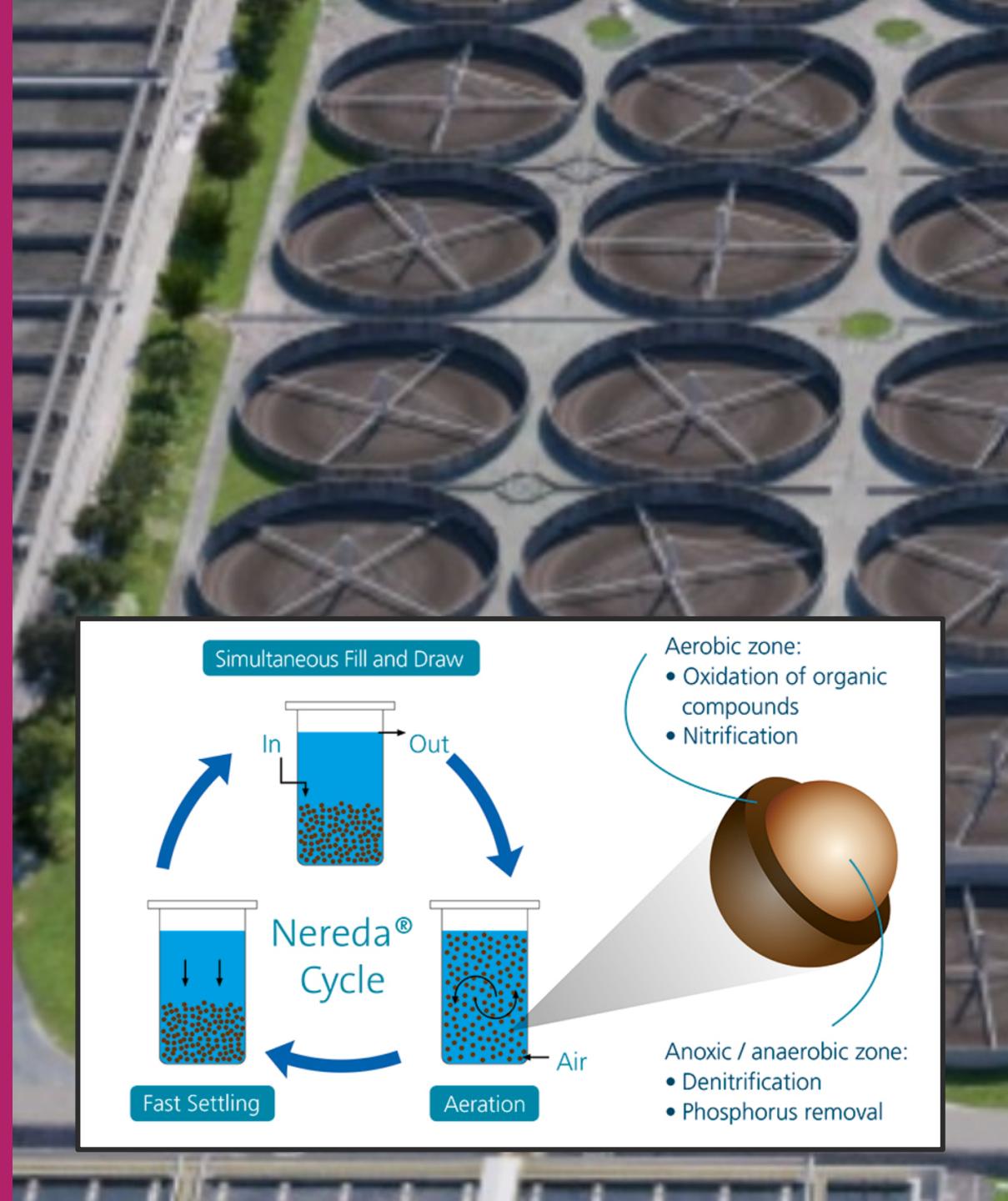
AquaSuite Nereda Controller, a smart, integrated process controller for Nereda for waste-water treatment requires easy integration to the real-time control systems

#### Solution

A library of IEC 61499 software components to easily integrate with the PC-based Nereda controller

#### Benefits

- Reduced engineering time & shorter commissioning using proven-in-use software library
- The promise of **vendor-independence**



# Flexible Architecture

## Vendor independence

### Segment - Mining

#### Challenge

- Many variants of the same machine due to Machine options requiring hardware/software changes
- Final end users asking for specific brands
- Complexity and costs along life cycle (construction and maintenance of the machine)

#### Solution

- Standardize application software
- PC based automation for **scalability** (Linux)
- Free to select hardware matching end user specifications
- Orchestration of installed based for retrofit

#### Benefits

- Division by 3 of number of variant per machines (ca. 250k EUR/year savings)
- Scalable controller, change simply CPU and RAM



# Flexible Architecture

## Vendor independence

### Segment – HVAC – Industrial Air Cleaning

#### Challenge

- Aggregation of many technologies to address a large scale of machine variants
  - Small to medium PLC / Homemade control
- Huge level of modularity
  - 1 to N fans / 1 to N dust handling or cleaning systems
- Sell added value service for machine process and energy consumption optimization

#### Solution

- From VSD to small PLC to IPC
- Asset library to easily manage
  - Machine modularity
  - Standardize application

#### Benefits

- Rationalize SW solution VS all machine variants
- Vendor independent



Combustible Dust



Oil Mist Filtration



Dust Collection and Housekeeping



Welding Fume Extraction



Wood Dust Collection

# Modular Machine Vendor independence

## Segment - Logistics – Automated warehouse 2

### Challenge

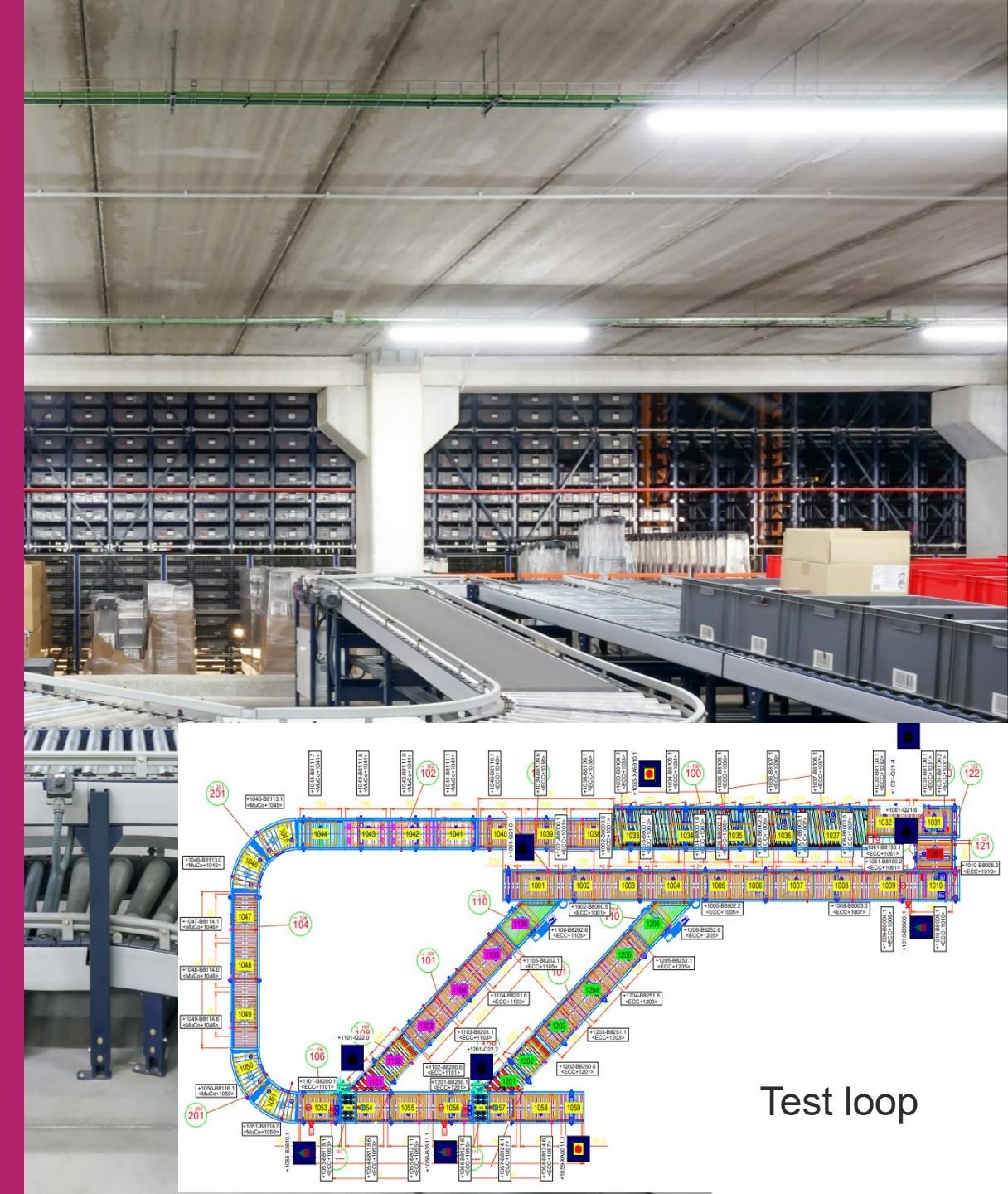
- Looking for multi source solution
- Optimize his production workflow to become more competitive
- Value add services to differentiate vs competition

### Solution

- PC based control + Distributed to variable speed drive
- OPC UA connection to existing Warehouse Management System
- Profinet to connect to existing field devices
- Asset application library

### Benefits

- Flexibility of choice of control solution
- Faster to design the application by reuse of functional unit models (eg conveyors)
- Easier to integrate diagnostic information's
- Easier to combine IT based added value services



# Asset Centric Control

## Plug & Produce SW components

**Segment** – Mining – Mobile Stone Crusher Machine

### Challenge

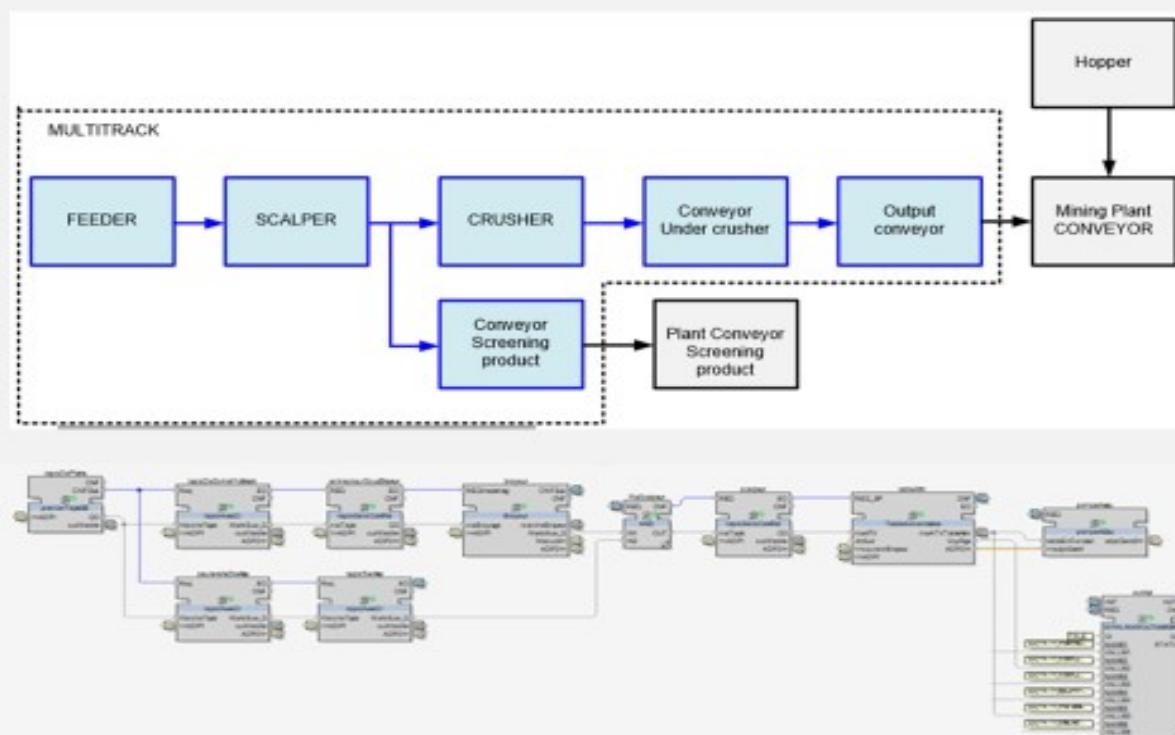
- Reduce Time to Market
- Better and faster fit to European Union Domain

### Solution

- Based on machine PLC with analog & digital IP
- Asset application library

### Benefits

- Faster to design the application by reuse of asset models



# Modular machine, IT/OT convergence

## Segment - Logistics – Automated warehouse 1

### Challenge

- Due to different requested shapes and performance, conveying systems require many variants.
- Usual solution is a central (large) PLC with multiple application code – however it is complex and expensive along lifecycle

### Solution

- Principle is to create different modules – each of them controlled by a simple PLC - an iPC bridges the OT (Soft controller & HMI) with the IT (AI, Northbound connectivity, Scada)
- Digital Twin solution simplifies the tests, visualization and the setup – allowing drastic reduction of the commissioning
- A specific AI algorithm is trained on Visual Inspection to perform quality control on the transported items

### Benefits

- Modular control system, no need to rethink application code
- Ease to scale up or down, reconfigure along lifecycle
- CapEx reduced by ca. 35% and downtime cut by ca. 25%



# IT/OT Convergence, Wrap & Reuse

## Segment – WWW – Smart Plant

### Challenge

- Common platform for telemetry and process optimization of hundreds of plants
- Vendor independence of the solution
- Edge computing & Scalability

### Solution

- Barbara for high scale deployment
- IPC & containerized UAO Runtime

### Benefits

- Plant performance optimization by adding control strategies on top of the existing automation system
- Virtual Sensor (AI)
- Software based plc able to manage the update of the application using standard IT mechanisms



# Wrap & Reuse, Vendor Independence

**Segment** Consumer Packaged Goods – Master Systèmes – Sophim

## Challenge

- Modernize legacy automation systems to an Industry 4.0 solution in a managed, low-risk, and agile manner
- Clean integration of IT technologies, focusing on predictive maintenance
- Leverage external engineering expertise without introducing project or solution complexity

## Solution

- UAO runtime runs on a Linux iPC & PLC to manage the control (drives, actuators...)
- Dedicated software for CPG also runs on iPC

## Benefits

- Reduced design time and faster time to production
- Increased operational efficiency through maintenance improvements that enable rapid configuration of the system, reassignment of resources, and updates to human and machine interfaces
- More flexibility in the choice of automation platforms, and easier integration of analytics or other software solutions in the future thanks to the edge computing capabilities



*"This is a game-changer for us. EcoStruxure Automation Expert's advanced engineering tools will help us reduce the time to develop an application and supports easy integration of IT technologies, including predictive maintenance. This translates into faster time-to-market with an easier to maintain solution for our end users."*

**Maurice Re, Automation Director,  
Master Systèmes**

# Wrap & Reuse, IT/OT Convergence

## Segment – Tobacco Industry – Aimirim & ASRock Ind

### Challenge

British American Tobacco faced operational inefficiencies in their manufacturing facilities, including frequent machine stoppages and inconsistent product quality.

### Details

ASRock Industrial collaborated with Aimirim to deploy an AI-driven solution. The AI agents provided instant, intelligent recommendations to address production inefficiencies, ensuring smoother operations and higher efficiency.

### Benefits

The implementation of ASRock's iEP-6010E edge AI device and Aimirim's Shaman software led to:

- Real-time process control
- Predictive maintenance
- Improved automation scalability
- Reduced machine stoppages
- Consistent product quality



# IT/OT Convergence, Modular machine

## Segment – J&W Smart Logistics Center with ASRock Industrial

### Challenge

Manual processes led to errors, delays, and low throughput. The system was inflexible and poorly integrated, making updates slow and decision-making inefficient.

### Details

J&W implemented a **hybrid automation system** using ASRock Industrial's **iEP-5000G Industrial IoT Controller** running **IEC 61499** from UniversalAutomation.org.

#### The system includes:

- **Human-cobot collaboration** at picking stations.
- **Modular conveyor loops** with smart sensors and RFID/NFC readers.
- **Vision-based control gates** for real-time item recognition.
- **Autonomous Mobile Robots (AMRs)** for bin transport.
- A **maintenance station** for non-disruptive system updates.

The infrastructure enables **real-time coordination** across all components.

### Benefits

- Increased operational efficiency and scalability.
- Reduced error rates and labor dependency.
- Future-ready flexibility with modular, reconfigurable logic.
- Improved energy efficiency and system uptime



# IT/OT Convergence

## Segment – Energy Efficiency – E2COMATION

### Challenge

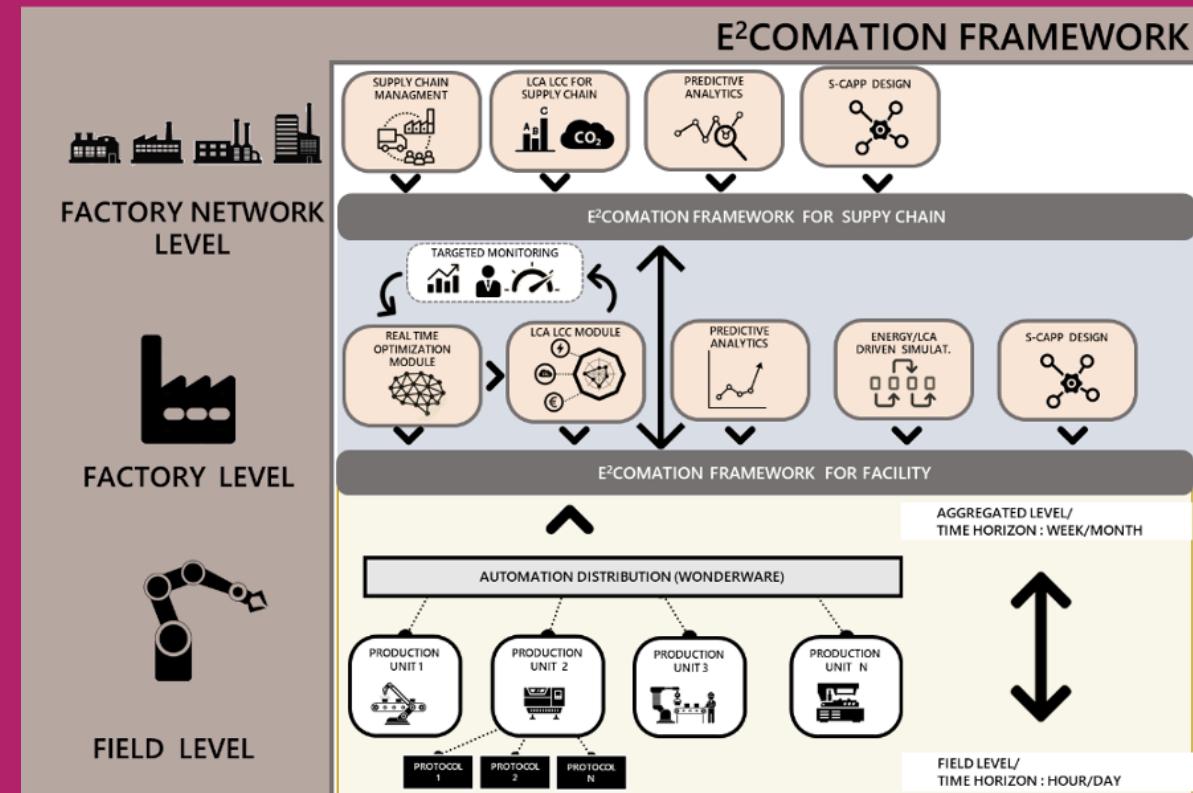
The E2COMATION project aims to optimize sustainability and energy efficiency in the manufacturing industry through a comprehensive framework. This framework integrates various subsystems to manage and analyze energy-related data from production environments.

### Benefits

- **Energy Monitoring (EMon):** Collects and analyzes data from sensors.
- **MQTT Protocol:** Facilitates communication between devices.
- **APAMA Stream Analytics:** Analyzes data streams for performance forecasting.
- **Digital Twin:** Simulates and monitors production processes for optimization.

### Solution

The project leverages advanced tools and methodologies to enhance energy performance and sustainability in manufacturing.



# IT/OT Convergence, Modular machine

## Segment – Discrete Manufacturing – MODUL4R

### Challenge

The MODUL4R project focuses on advancing manufacturing through robust and autonomous modular production lines and resilient supply chains.

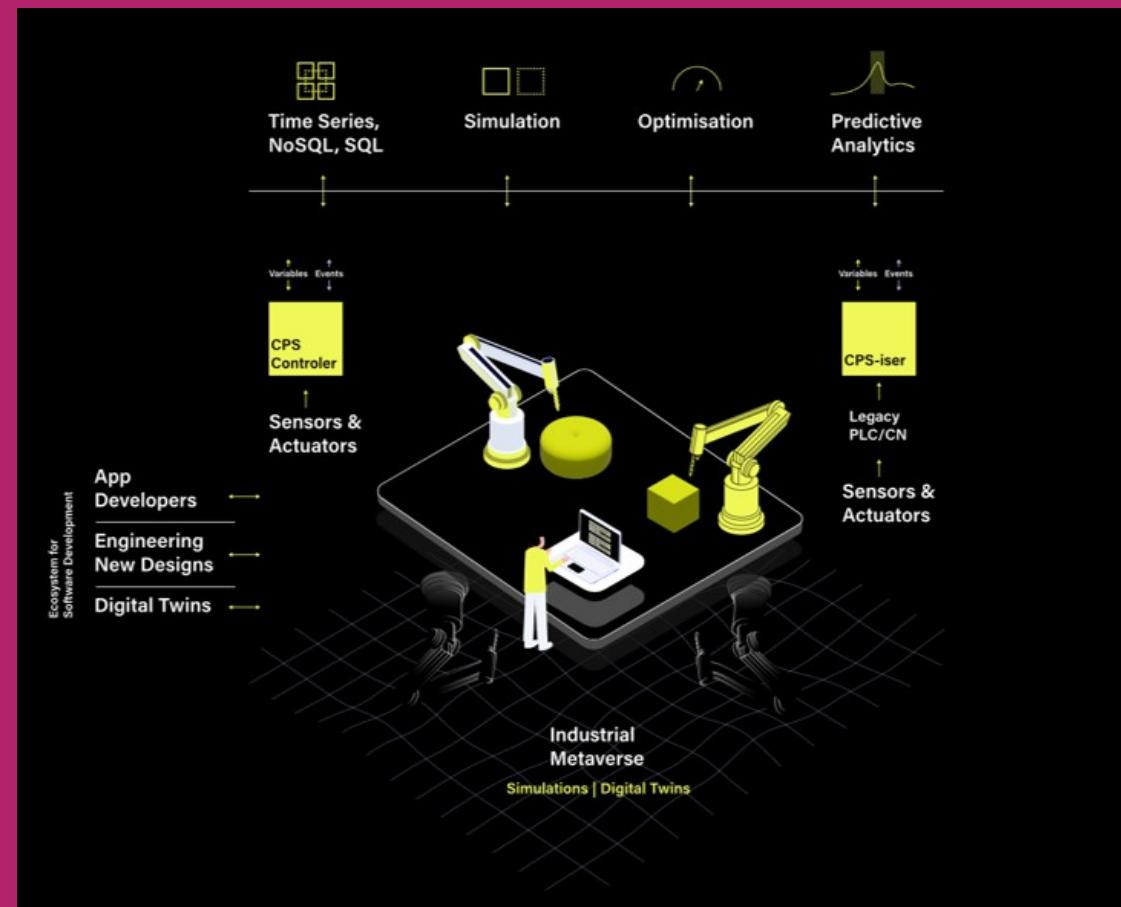
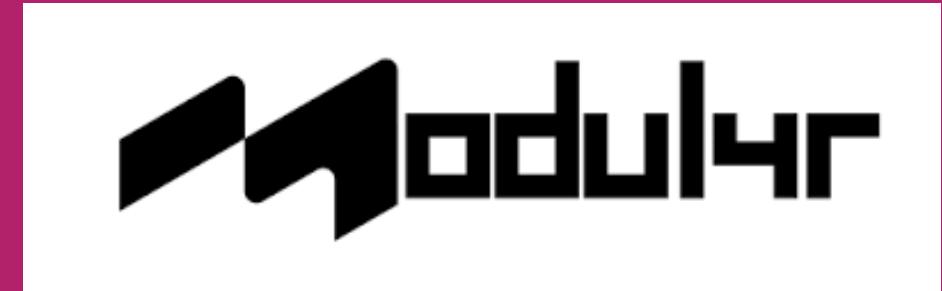
### Benefits

- Resilience:** Adapting to changes in customer demands and supply chain disruptions.
- Modular Technologies:** Enhancing flexibility in manufacturing operations.
- Simulation and Interfaces:** Integrating with the Industrial Metaverse.
- Human-Centered Technologies:** Upskilling workers for new manufacturing environments

### Solution

The project aims to support low-volume production and rapid adaptation to unexpected situations.

Funded by the European Union



# IT/OT Convergence, Vendor Independence

**Segment – MMM - METAWAVE**

## Challenge

The METAWAVE project aims to revolutionize high-temperature industrial heating processes using microwave-based heating systems.

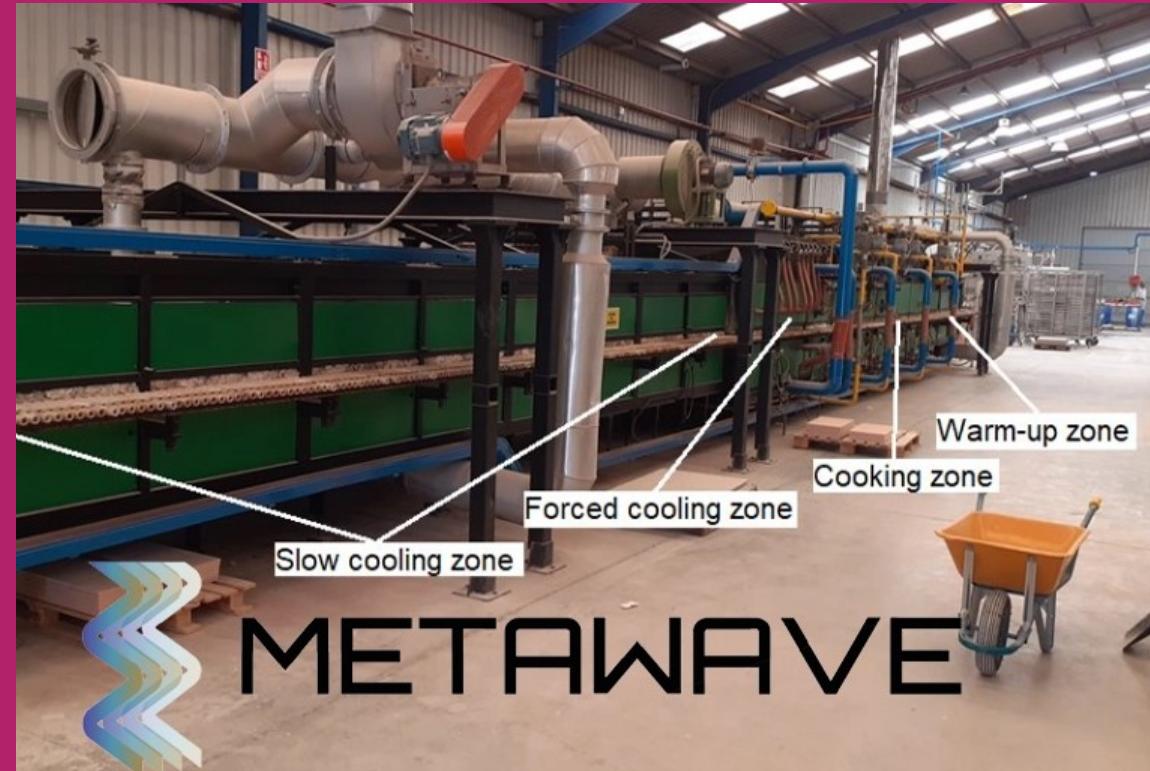
## Benefits

- **Efficiency:** Improving energy efficiency and reducing consumption.
- **Sustainability:** Lowering greenhouse gas emissions.
- **Productivity:** Increasing productivity through innovative technologies.
- **Integration:** Utilizing renewable energy sources and advanced digital systems for process optimization

## Solution

The project targets sectors like ceramics, asphalt, and aluminum, demonstrating the benefits of these technologies in real industrial settings.

*Funded by the European Union*



# IT/OT Convergence, Wrap & Reuse

## Segment – HVAC – Air Handling Units

### Challenge

The development of an application model to standardize the management and optimization of Air Handling Units.

### Benefits

- Can be used in both Brownfield and greenfield
- Vendor independent solution
- Encapsulation of main functionalities
- Scalable solution
- Reusability of the object and libraries created
- Fast integration & commissioning of new units
- Connectivity with IT models for data collection & optimization

### Solution

- IPC based solution with containerized runtime
- 10% more energy efficient
- 50% more scalable



# IT/OT Convergence Modular machine/ process

**Segment** – Consumer Packaged Goods

## Challenge

- Detect automatically wrapping defaults during process

## Solution

- Algorithm running on an iPC analysing images from camera connected to this iPC
- Machine-learning technology for detecting "good" and "bad" wrapping

## Benefits OEM

- Strong differentiations vs other OEMs
- New dimension for machine optimization
- Quality improvement – ensuring End-User satisfaction
- Financial gain – saving penalties from EU

## Benefits EU

- Waste reduction
- Avoiding non-conformity process



# Vendor Independence Wrap & Reuse

## Segment – Food & Beverages

### Challenge

- Control and manage the receiving and transferring of Soda to the factory
- Exchange data with different PLC manufacturers (Siemens and Rockwell) for manage and interlock the Soda transfer for each area of the plant. Also manage he Soda consumption for the area.
- Innovation and agnostic solutions to run on industrial PC, where in the future the control can be moved to the datacenter

### Solution

- UniversalAutomation.org runtime running in the Harmony iPC and Harmony HMI
- EAE runtime communicates with the third-party IOs and third-party PLCs to manage and control the Soda system.

### Benefits

- Breaking down automation silos, achieving greater efficiency and greater process safety.
- Developing a standard solution ready for the future that can be replicate in other factories



# Flexible architectures Vendor Independence

## Segment – Automotive

### Challenge

- Frequent data interactions between subsystems and tedious communication interface programming are common
- Non-modular equipment design leads to repetitive tasks and higher error rates
- Traditional PLCs use closed protocols, making integration with enterprise systems costly and inefficient.

### Solution

- Modular design improves program reusability
- Distributed programs manage the entire plant system, and a variety of IT interfaces provide flexible access to the upper system

### Benefits

- Reduce downtime by 20% and save approximately 15% on maintenance costs
- Improved engineering efficiency by 20% through modularization and system level simulation
- Establish an asset library to standardize the engineering and application development process



# IT/OT Convergence Wrap & Reuse

## Segment – Carbon capture

### Challenge

- Find a mature open automation solution to move from initial PoC to a commercial demo plant

### Solution

- IEC 61499 with UniversalAutomation.org runtime
- Integration with SCADA & IT
- Drives included in scope of delivery

### Benefits

- Standard based solution
- High level of reusability in upcoming commercial plants
- Efficient upscaling



# Plug & Produce, IT/OT Convergence Flexible Architectures

## Segment – Mining – Hovering Solutions / Flexbridge

### Challenge

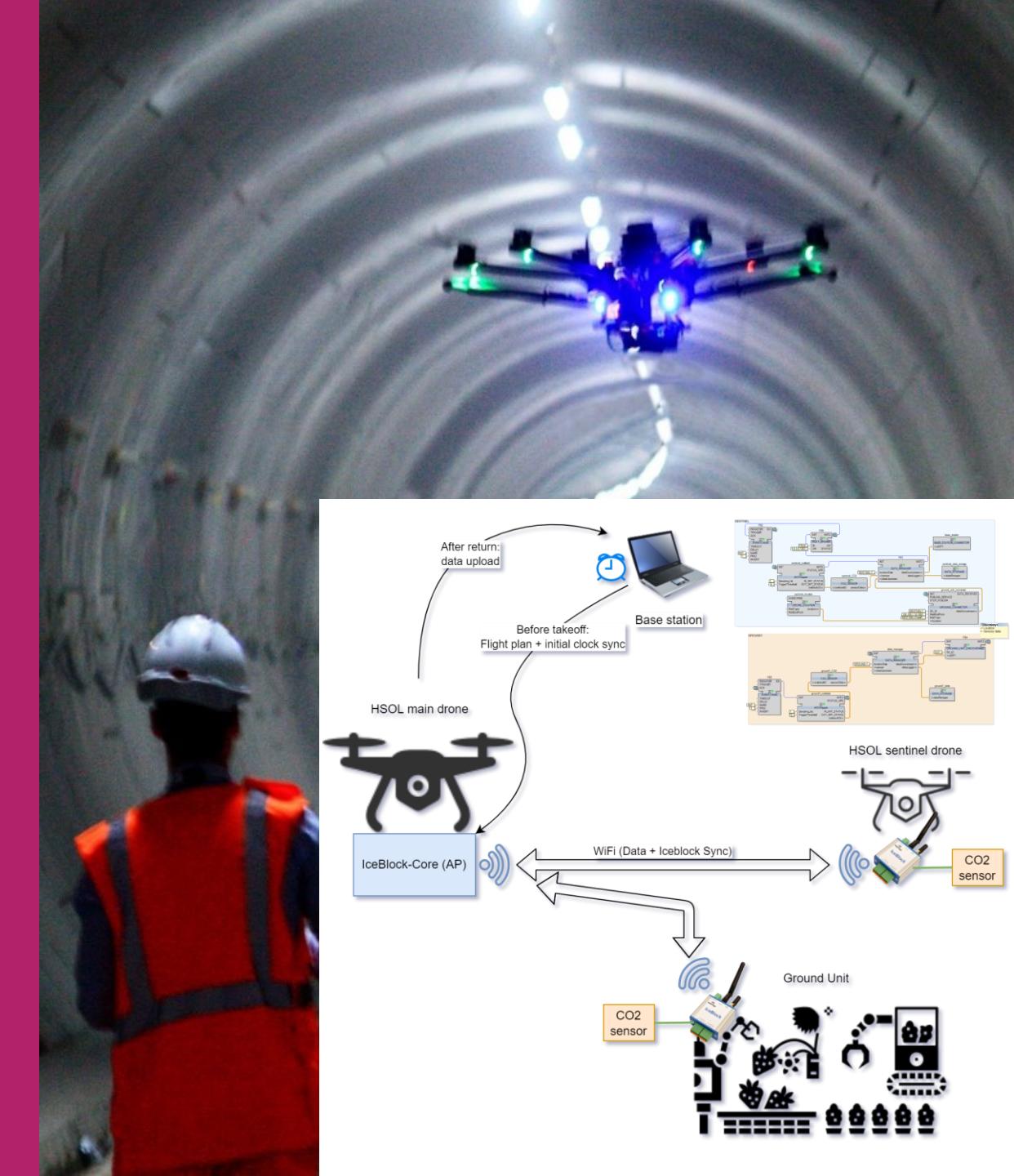
- Challenging environments hinder autonomous system deployment
- Manual setup is slow and error-prone
- Real-time anomaly detection and efficient data collection needed

### Solution

- IEC 61499 + mDNS/MQTT for auto-discovery and communication
- Hovering Solutions drones with IceBlock from Flexbridge linked with sensors for anomaly detection
- Flexbridge's application using IEC 61499 enables plug-and-produce and scalable deployment
- Autonomous swarm with localization and wireless communication

### Benefits

- Real-time detection boosts safety
- Auto-discovery cuts deployment costs
- Faster data & missions in underground operations



# Vendor independence, Flexible Architectures, IT/OT Convergence

**Segment** – Energy & Chemical - Exxon Mobil  
Open Process Automation Lighthouse Project

## Challenge

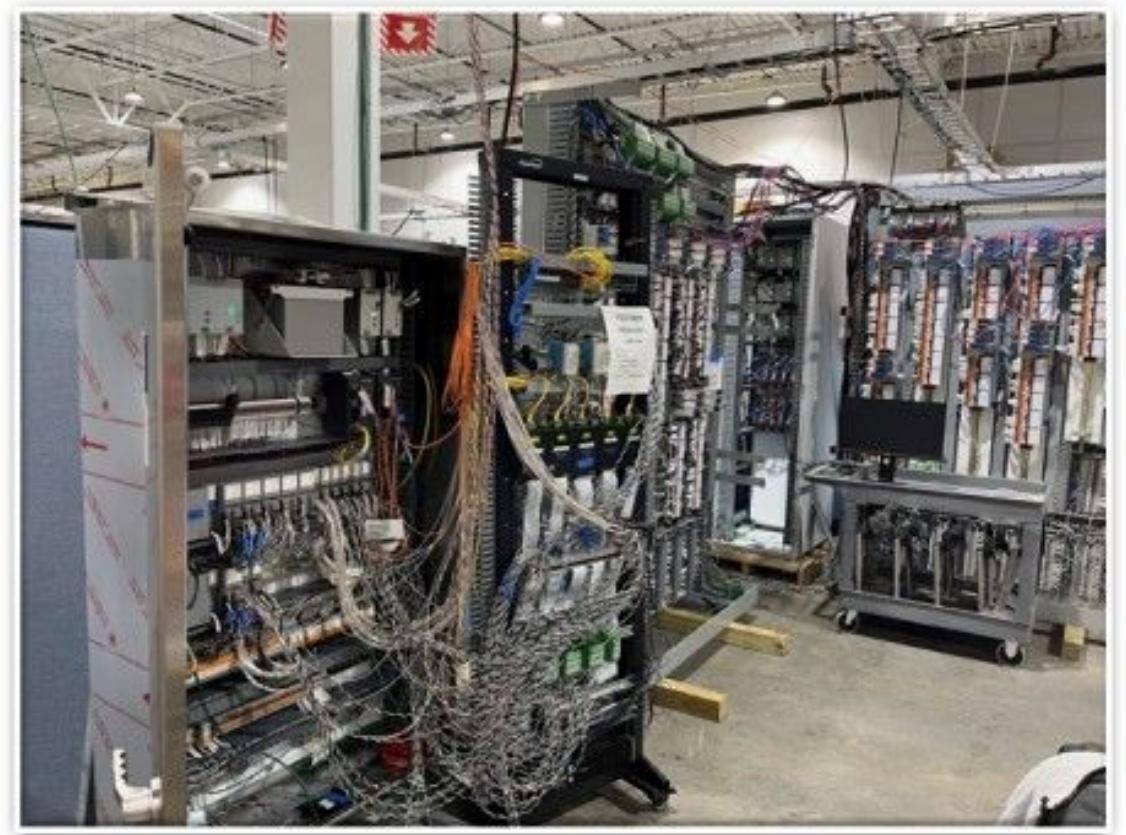
- Deploy an OPA System at a commercial operation to become vendor agnostic

## Solution

- Embed the UniversalAutomation.org runtime as one of the technology enablers for having an OPA System

## Benefits

- Reduce costs of at least 20% compared to traditional industrial control systems
- Improved efficiency and flexibility
- First facility operating OPA and embedding the UniversalAutomation.org runtime proving the functionality



# Kongsberg Maritime

# Wrap & Reuse Orchestration

## Segment - Offshore platforms – Kongsberg Maritime

### Challenge

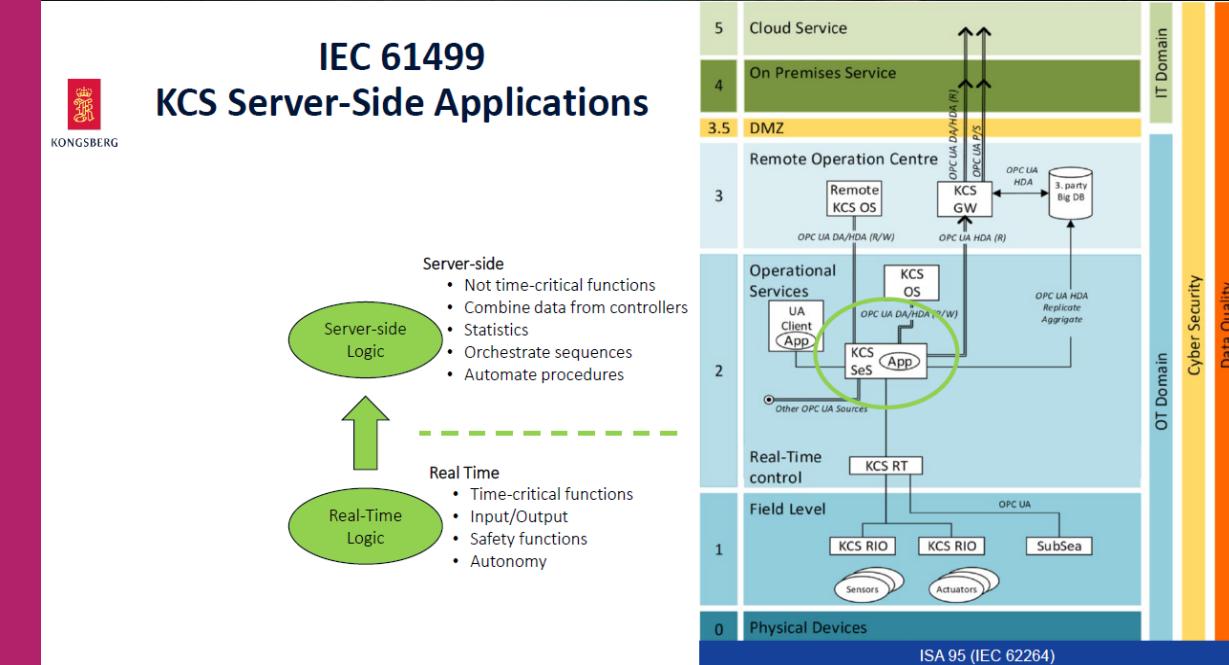
Legacy automation systems have limited capacity to support new functions, expansion.

### Solution

UAO runtime runs at server level above real-time controls

### Benefits

- Offload real-time legacy controllers to allow systems expansion
- Add new advanced multi-controllers automation functions without stopping running systems
- Automation complex operator procedures



# OBS – One Button Startup

## Start as by the most experienced operator

One Button Startup (OBS) describes the high level functions used to automatically start and stop systems/equipment without other operator intervention than

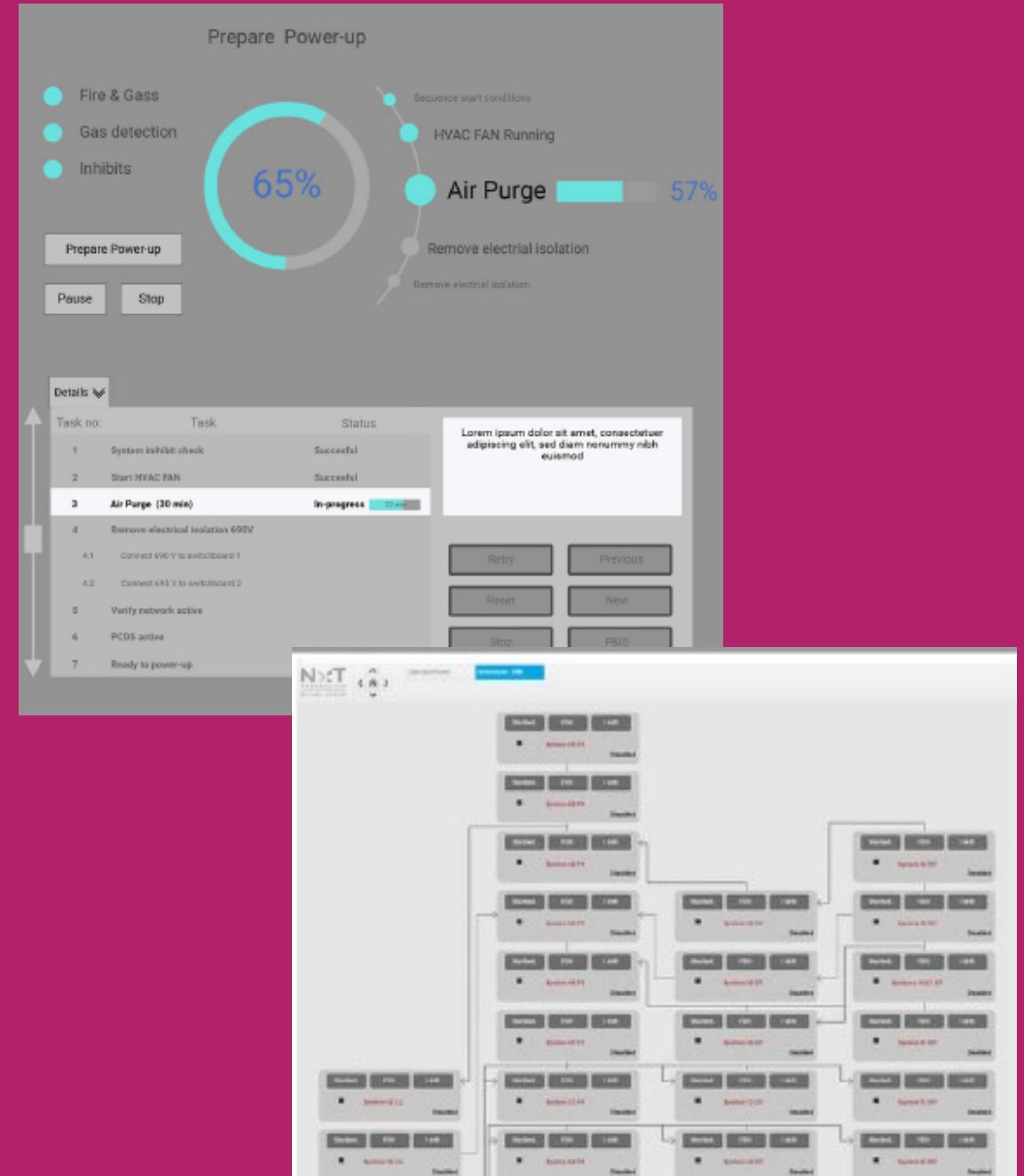
- initiating the OBS
- monitor progress and technical system
- observe the progress



KONGSBERG

Server-Side Application (IEC 61499)

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# Well Barrier Testing

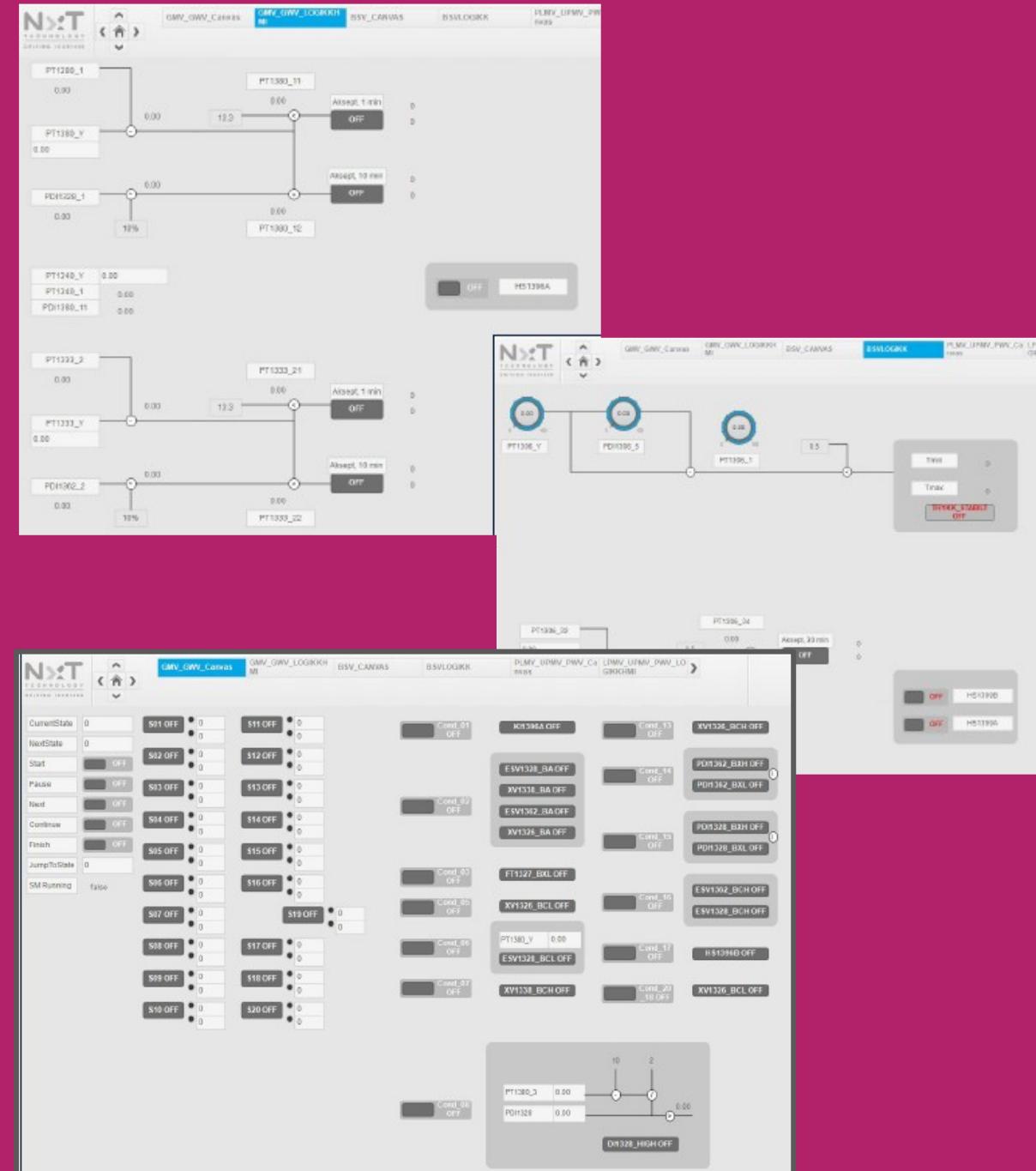
- Periodical testing
- Release/spare capacity on the RCU (Real-Time Controllers)
- Release work-load for the operator by automating the procedure. Less pressure not to make manual mistakes.
- The test is executed in a minimum of time and consistent (no manual failure)



KONGSBERG

Server-Side Application (IEC 61499)

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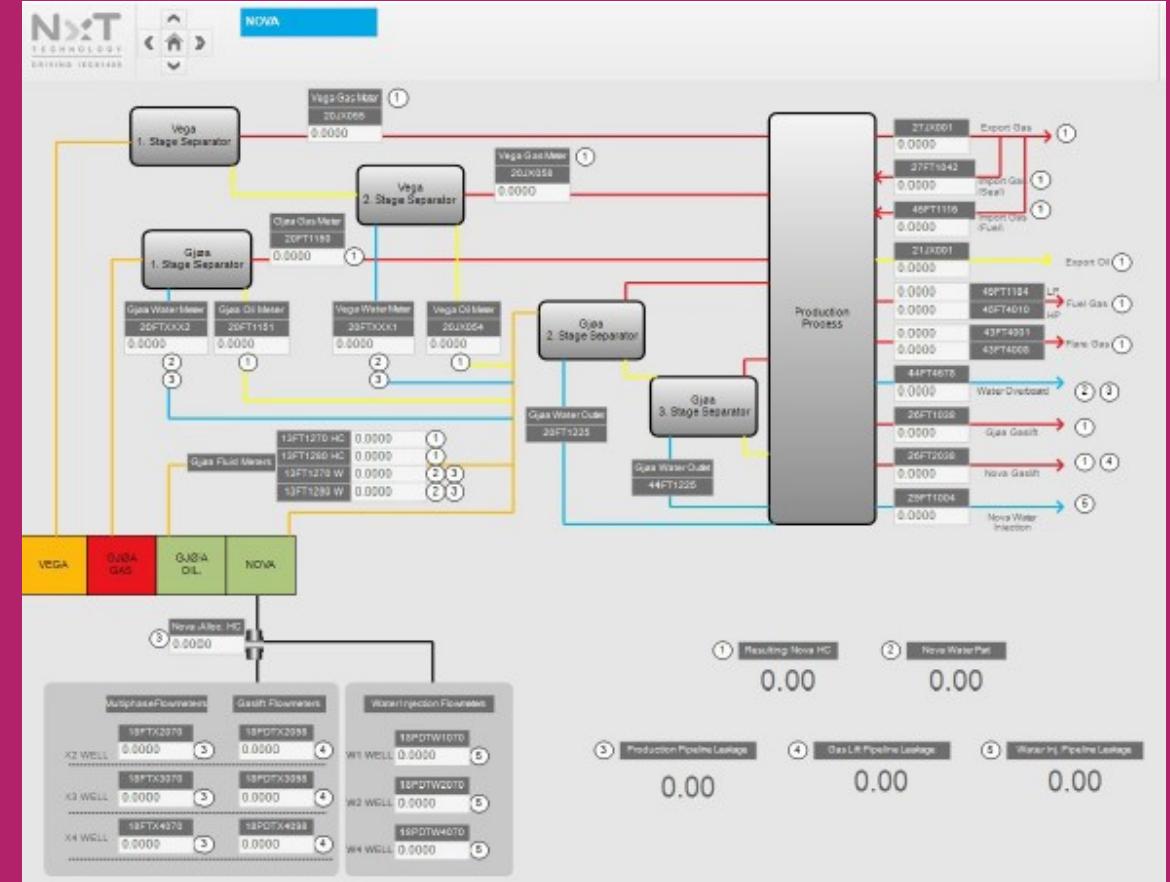
# Pipeline Leak Detection

- Pipeline Leak Detection for
  - Production
  - Gas Lift
  - Water Injection
- The application detect any leakage by calculations
- Alarming
- Trending
- Warn the operator and give advise on action to take
- Save the environment
- Call for maintenance
- Save cost



KONGSBERG

Server-Side Application (IEC 61499)



Gr3n

# Asset-centric, Modular machine/process, IT/OT convergence

## Segment - PET Plastic Recycling: GR3N

### Challenge

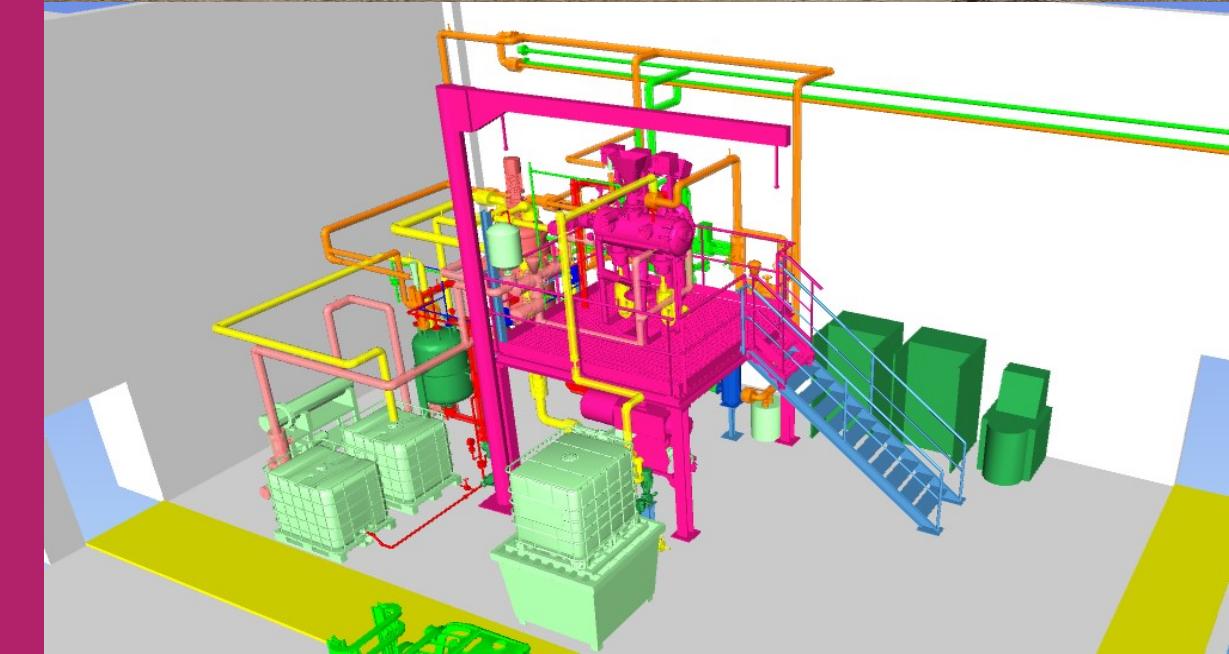
Easily expand production using modular mechanical/electrical/control components

### Solution

- Reactor unit controls designed as an intelligent vendor-independent automation object
- Object includes not only process automation & HMI, but IT services such as track & trace

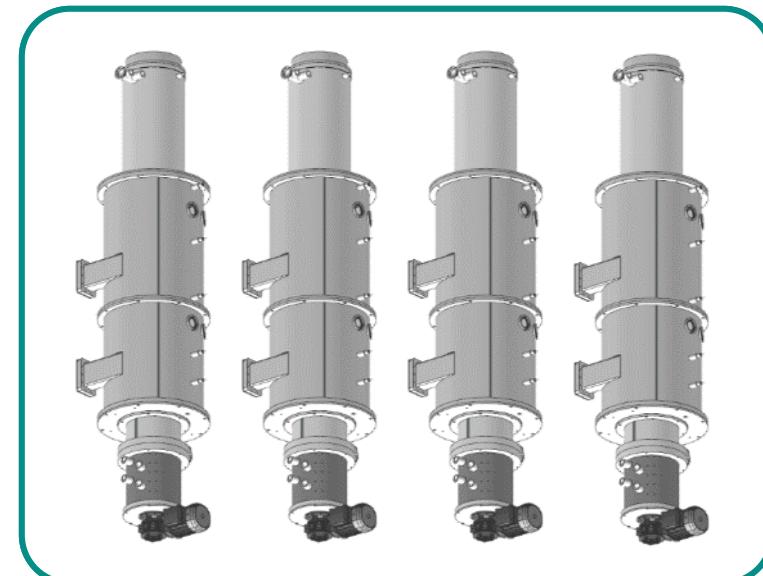
### Benefits

- Expanding capacity of process with no additional programming resulting in vastly reduced engineering time and time-to-market
- Vendor-independence allows controls to be distributed or centralized. Current project using Stahl ATEX controllers used
- Automatic reporting/logging of recycled waste



# Technical foundation for modularity in Gr3n

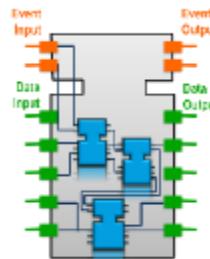
GR3N



REACTIVE UNIT

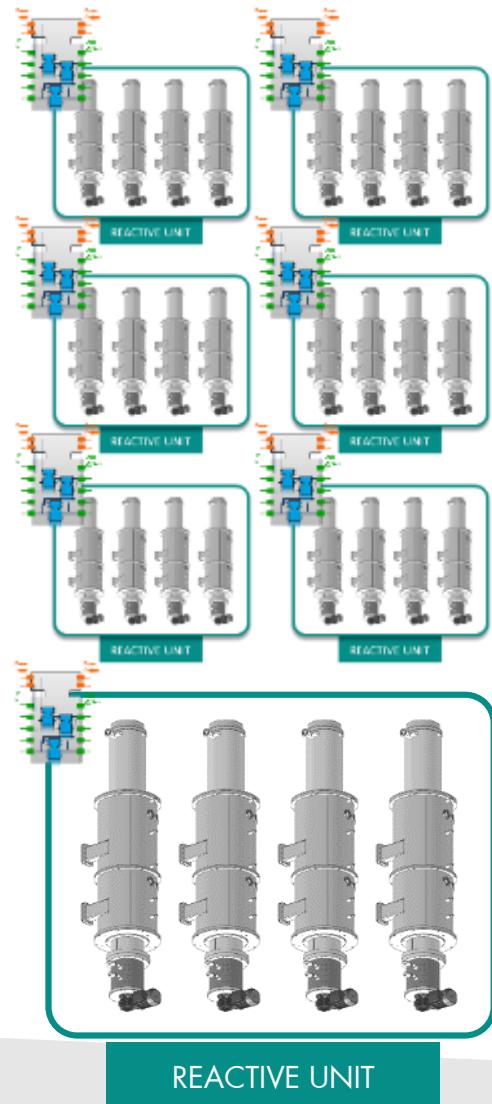


Intelligent  
Automation  
Object



# Technical foundation for modularity in Gr3n

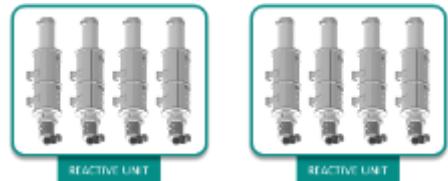
 GR3N



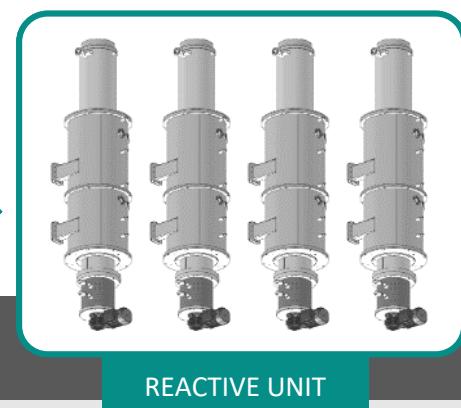
Synergistic distributed  
automation management of  
independent Reactive Units  
based on IEC-61499

Full-scale plants composed  
of intelligent units ...

GR3N



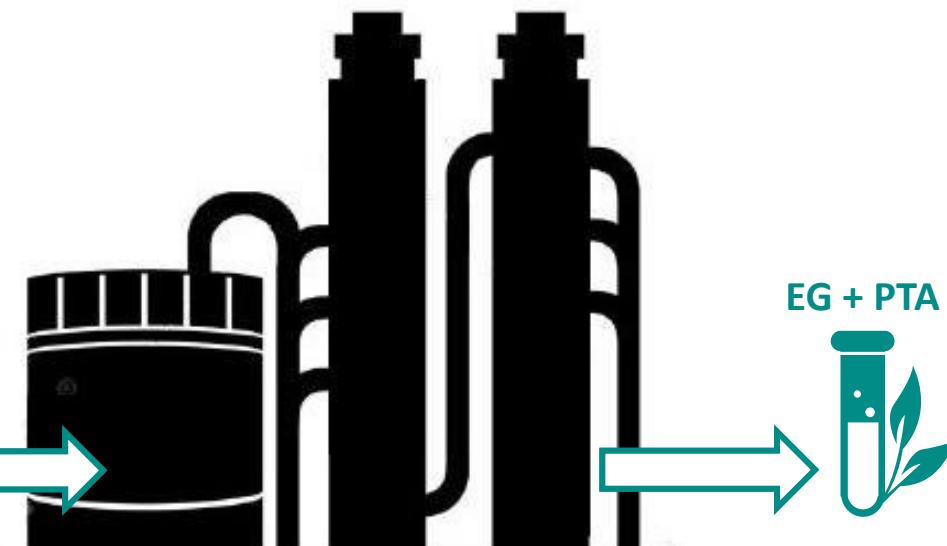
PET Waste



REACTIVE UNIT

Intrinsic adaptability of the process to varying  
input streams

PURIFICATION PROCESS



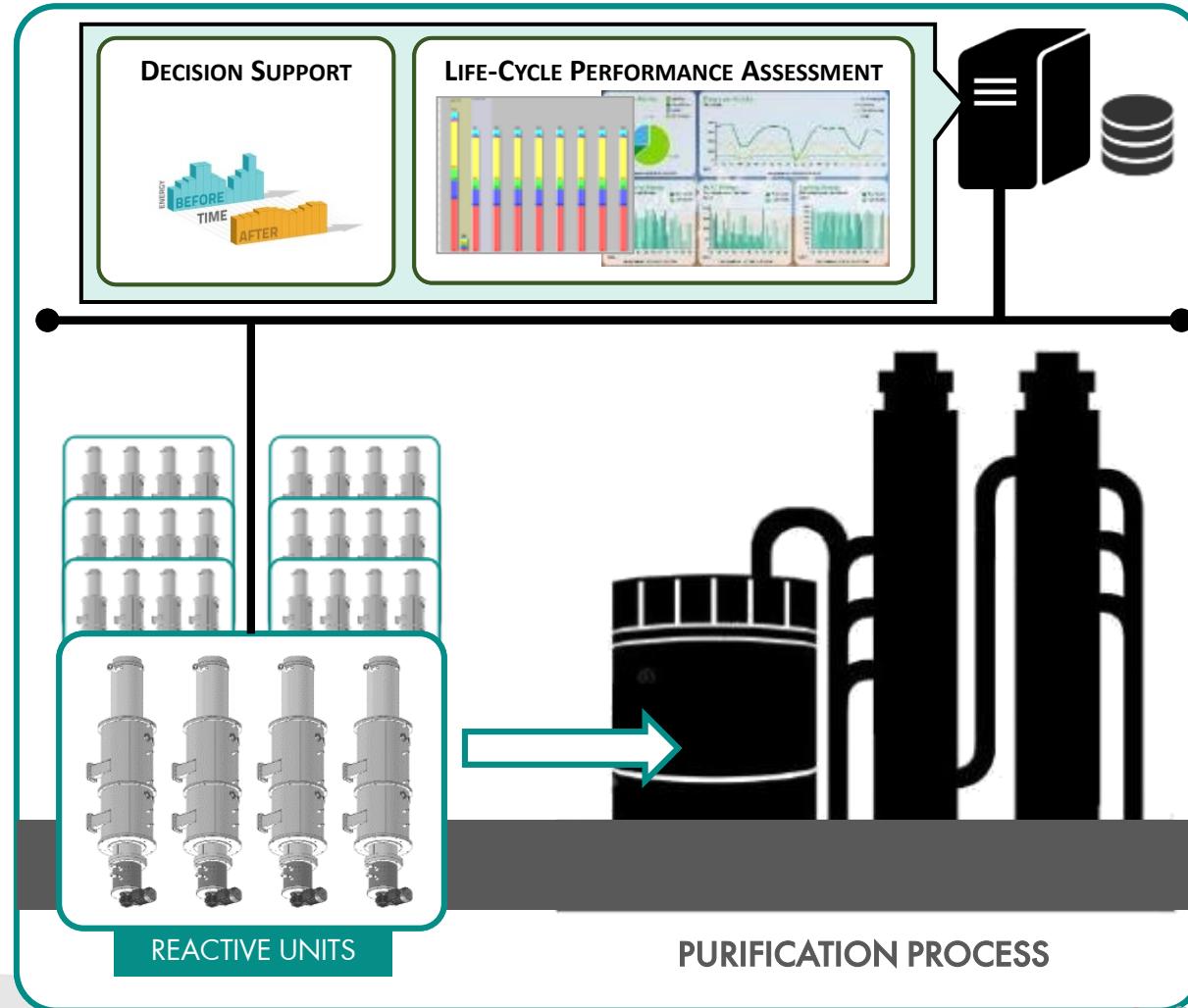
EG + PTA



... with seamless integration with  
IT functionalities

GR3N

- Thermal Energy 
- Electricity 
- PET Waste 
- Water 



# HW topology according to System topology



Visualization and Data Analytics

*Edge Server with Hypervisor OS and  
virtualized runtime*



Operator HMI

*Windows PC with  
EcoRT HMI runtime*

Supervisory  
Control Logic



*iPC with  
soft-PLC runtime*

MW Reactor



*Distributed IOs  
With local CPU*

MEG Feed



*VSD with  
integrated CPU*

NaOH Feed



*VSD with  
integrated CPU*

Extractor



*VSD with  
integrated CPU*



Schneider  
Electric

Schneider  
Electric

Schneider  
Electric

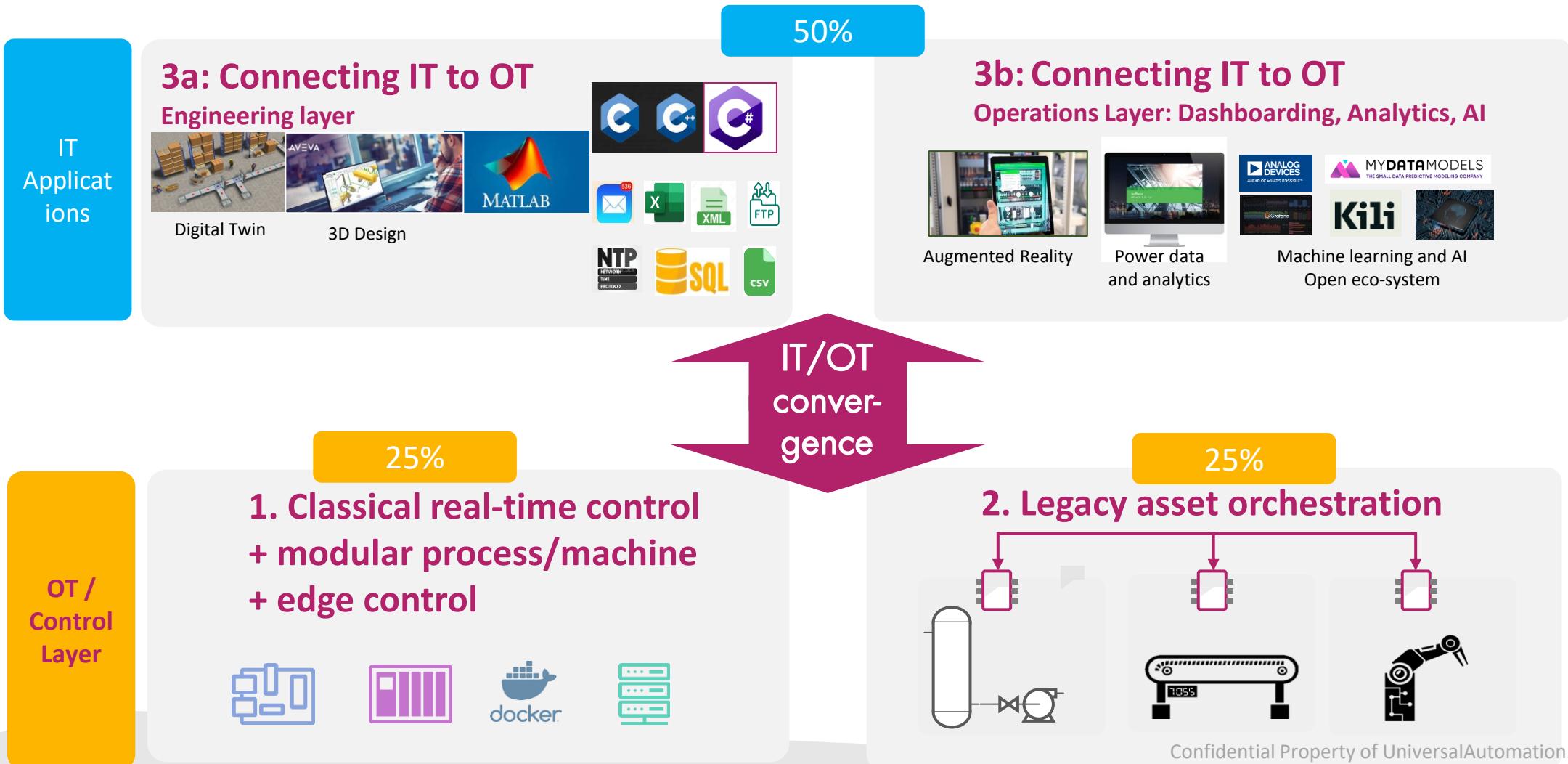
IEC-61499/ETH

## Opportunities for Gr3n in UniversalAutomation.org

- **Modular engineering** of plant automation according to process modularity
- Reduction of **engineering costs** during market scale-up
- Improvement of **TCO for automation** in our plants
- New **IP protection routes** for our Reactive Units for depolymerization
- Additional optimization by means of **advanced Data Analytics**
- **OT-IT integration** translating into new value chain opportunities

# Cases Split

# Where is the UAO Technology Used?



# UAO Organization

# UAO Organization



## CONTACTS

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- **Raquel Torres** – President
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- **Chase Yu** – Asia Pacific Representative



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# Resources

# Resources



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