

# Interoperability in machinery industry

The global production language

# Need of standardized interfaces



## The requirements of mechanical engineering:



Communication on an open platform



Security by design



Support of different Protocols



Semantical machine description



Global acceptance

# No replaceability due to OPC UA



Vendor Specific Extensions

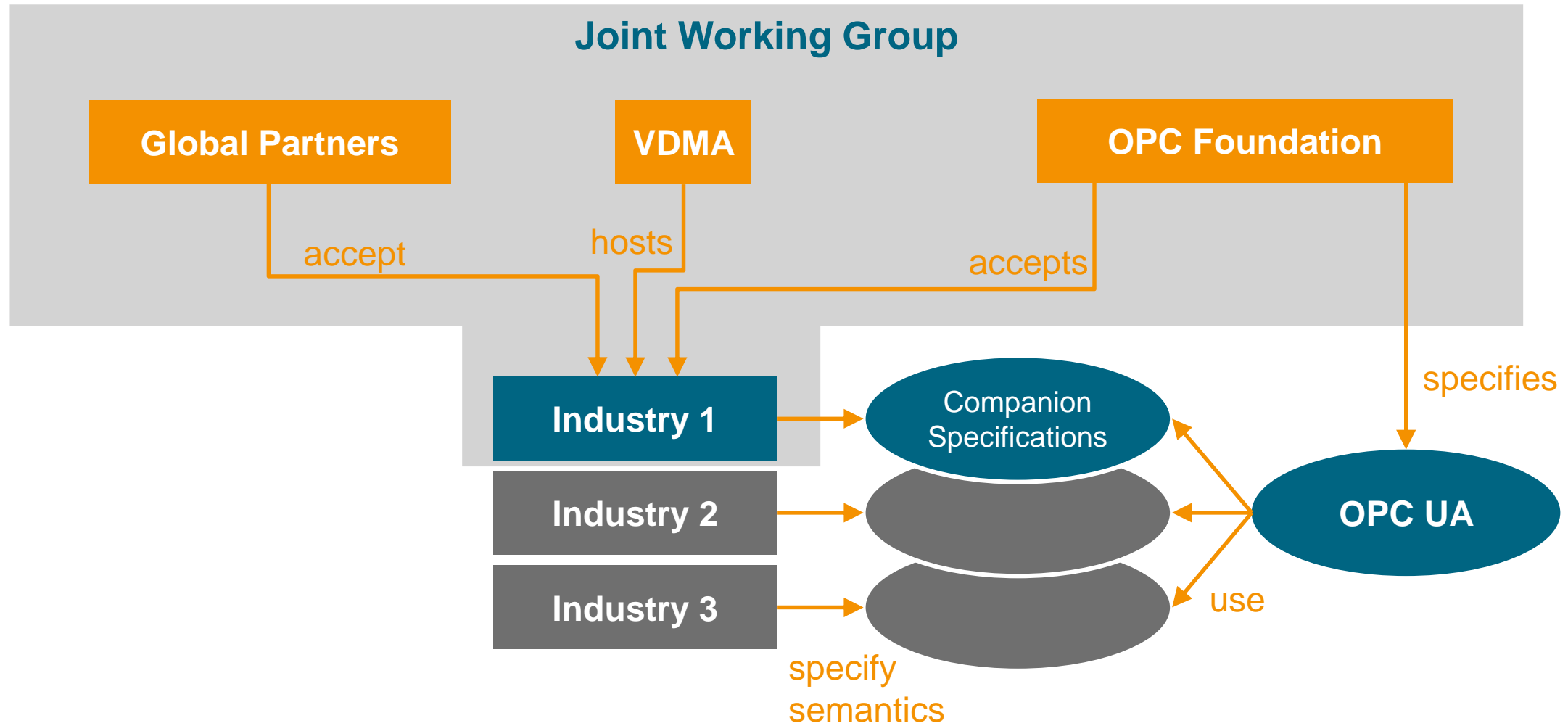
OPC UA Companion Specifications



OPC UA Technology



# Global Collaboration





# Todays Overview of OPC UA Working Groups inside the VDMA

- » Additive Manufacturing
- » Agricultural Machinery
- » Air Conditioning & Ventilation
- » Air Pollution Control
- » Automated Guided Vehicles
- » Battery Production
- » Building Control and Management
- » Building Materials
- » Ceramic Machinery
- » Cleaning Systems
- » Compressors, Compressed Air and Vacuum Technology
- » Construction Equipment
- » Continuous Conveyors
- » Cranes
- » Die & Mould
- » Drying Technology
- » Electronics, Micro & New Energy Production Technologies

- » Electrical Automation
- » Engines & Systems
- » Fire Fighting Equipment
- » Fluid Power
- » Food Processing and Packaging Machinery
- » Foundry Machinery
- » Glass Machinery
- » Hydro Power Plants
- » Industrial Trucks
- » Integrated Assembly Solutions
- » Intralogistic Systems
- » Lasers and Laser Systems for Material Processing
- » Length Measurement Technology
- » Lifts & Escalators
- » Machine Tools and Manufacturing Systems
- » Machine Vision

- » Metallurgical Plants and Rolling Mills
- » Micro Technologies
- » Mining
- » Photovoltaic Equipment
- » Plastics & Rubber Machinery
- » Power Transmission Engineering
- » Precision Tools
- » Printing & Paper Technology
- » Process Plant & Equipment
- » Productronic
- » Pumps & Systems
- » Refrigeration & Heat Pump Technology
- » Robotics
- » Security Systems
- » Software & Digitalization
- » Surface Technology
- » Testing Technology

- » Textile Care, Fabric and Leather Technology
- » Textile Machinery
- » Thermal Power Plants
- » Thermo Process Technology
- » Valves
- » Waste Treatment & Recycling
- » Weighing Technology
- » Welding & Pressure Gas Equipment
- » Wind Power Plants
- » Woodworking Machinery

- » OPC UA CS released
- » Release Candidate
- » Joint Working Group with OPC Foundation
- » OPC UA CS in work
- » Aware of OPC UA

# Today's Overview of OPC UA Working Groups inside the VDMA

» Additive Manufacturing

» Agricultural Machinery

» Air Conditioning & Ventilation

» Air Pollution Control

» Automated Guided Vehicles

» Battery Production

» Building Control and Management

» Building Materials

» Ceramic Machinery

» Cleaning Systems

» Compressors, Compressors and Vacuum Technology

» Construction Equipment

» Continuous Conveyors

» Cranes

» Die & Mould

» Drying Technology

» Electronics, Micro & New Energy Production Technologies

» Electrical Automation

» Metallurgical Plants and

» Textile Care, Fabric and Leather Technology

» Textile Machinery

» Thermal Power Plants

» Thermo Process Technology

» Valves

» Waste Treatment & Recycling

» Weighing Technology

» Welding & Pressure Gas Equipment

» Wind Power Plants

» Woodworking Machinery

» OPC UA CS released

» Release Candidate

» Joint Working Group with OPC Foundation

» OPC UA CS in work

» Aware of OPC UA

## Rapid increase of new OPC UA CS working groups

- » More than 23 VDMA sector branches under discussion
- » Over 25 VDMA sector branches in active (international) implementation
- » About 35 OPC UA CS working groups existing
- » Over 600 companies are involved
  - » ME, PA, ET, IT, Automotive, ...

» Machine Vision

» Surface Technology

» Testing Technology

# Phases of the development of an OPC UA CS



## Internationalization

- *Activities to reduce market barriers*
- *International trade fair activities and B2B events*

### 1. Preliminary work

- *Notification of demand from industry*
- *Involvement of all interested parties*

### 2. Content work

- *Unification of terms, functions and properties*

### 3. Design in OPC UA

- *Transfer of contents to OPC UA CS*

### 4. Publication

- *VDMA*
- *DIN*
- *OPC-Foundation*

### 5. Use in industry

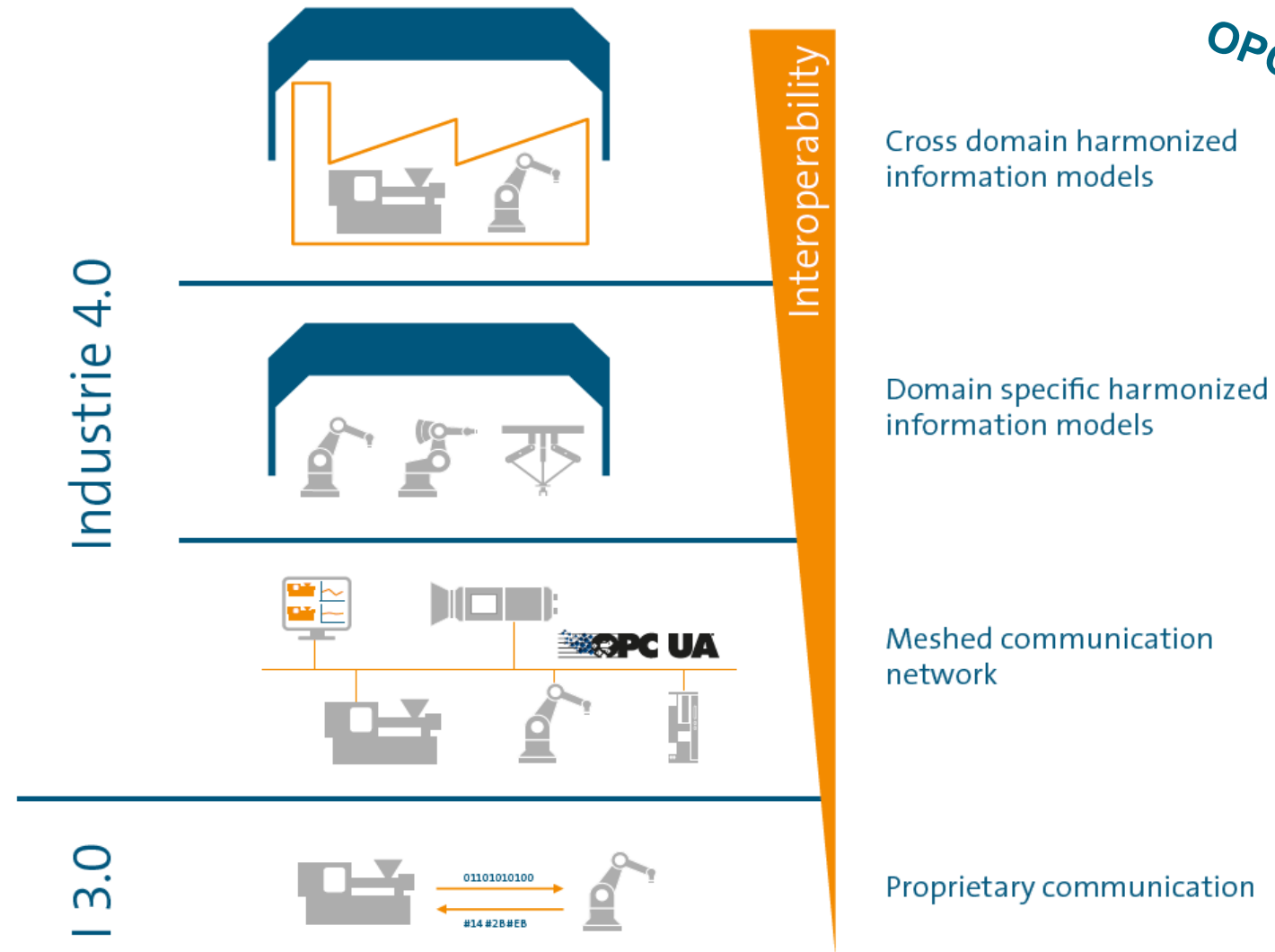
- *Implementation of OPC UA CS in products*



## Consistency

- *Development of a generalizing architecture*
- *Interaction of the industry-specific CS*

# Levels of Interoperability



*OPC UA for Machinery*



- The VDMA organizes the development of Companion Specifications for various sectors:



Plastics & Rubber Machinery



Robotics



Machine Tools



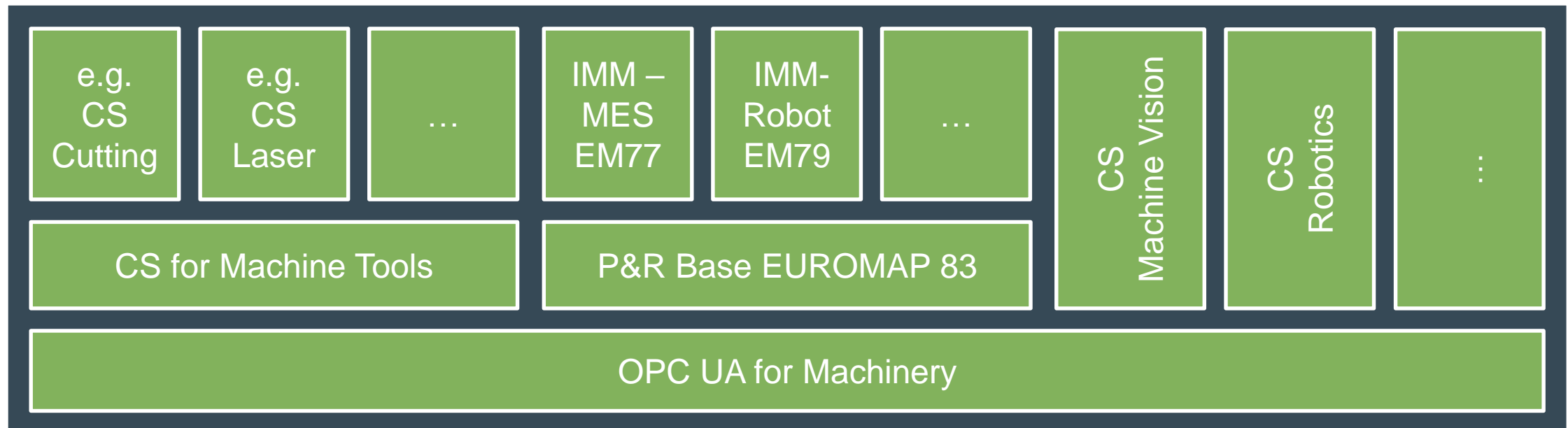
Many more

→ The usage of OPC UA in the context of the mechanical engineering industry needs to be harmonized.

## → OPC UA for Machinery

- OPC UA Companion Specification for Machines & Components of Machines in the discrete manufacturing.
- Addressing specific Use Cases

- **OPC UA for Machinery** defines building blocks for specific Use-Cases
  - Building Blocks can be used if seen fit
  - Companion Specs use required Building Blocks



- Part of the Project **II4IP** - Interoperable Interfaces for Intelligent Production
- Objective:
  - Harmonized Interoperability for OPC UA Companion Specifications  
→ **OPC UA for Machinery**
  - Integration of other Sectors
  - Transfer of Knowledge
  - Internationalization

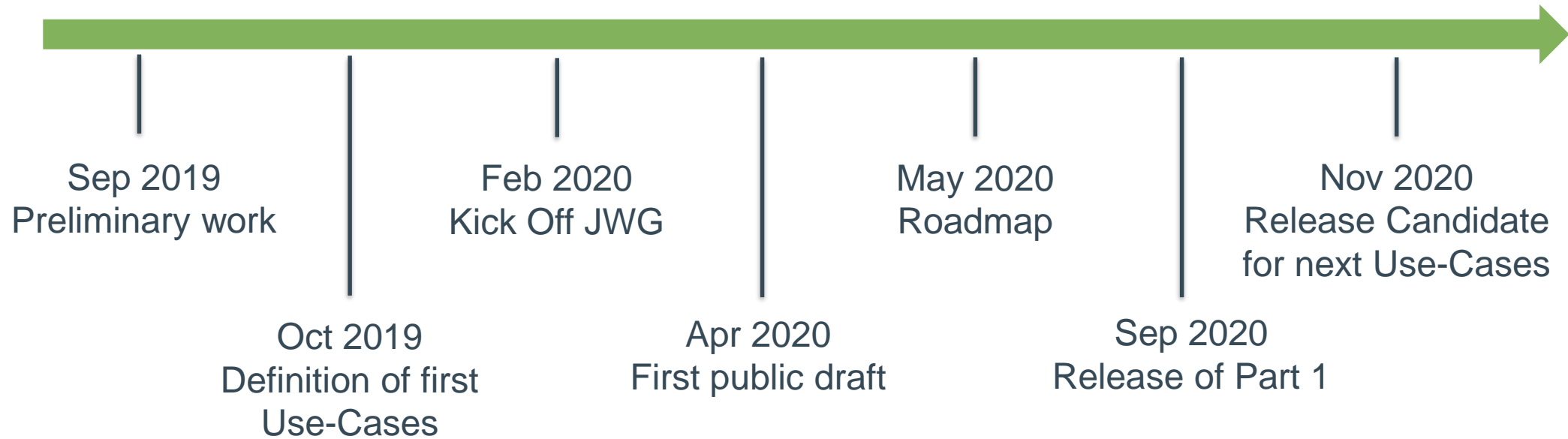
Supported by:



Federal Ministry  
for Economic Affairs  
and Energy

on the basis of a decision  
by the German Bundestag

# General Informations

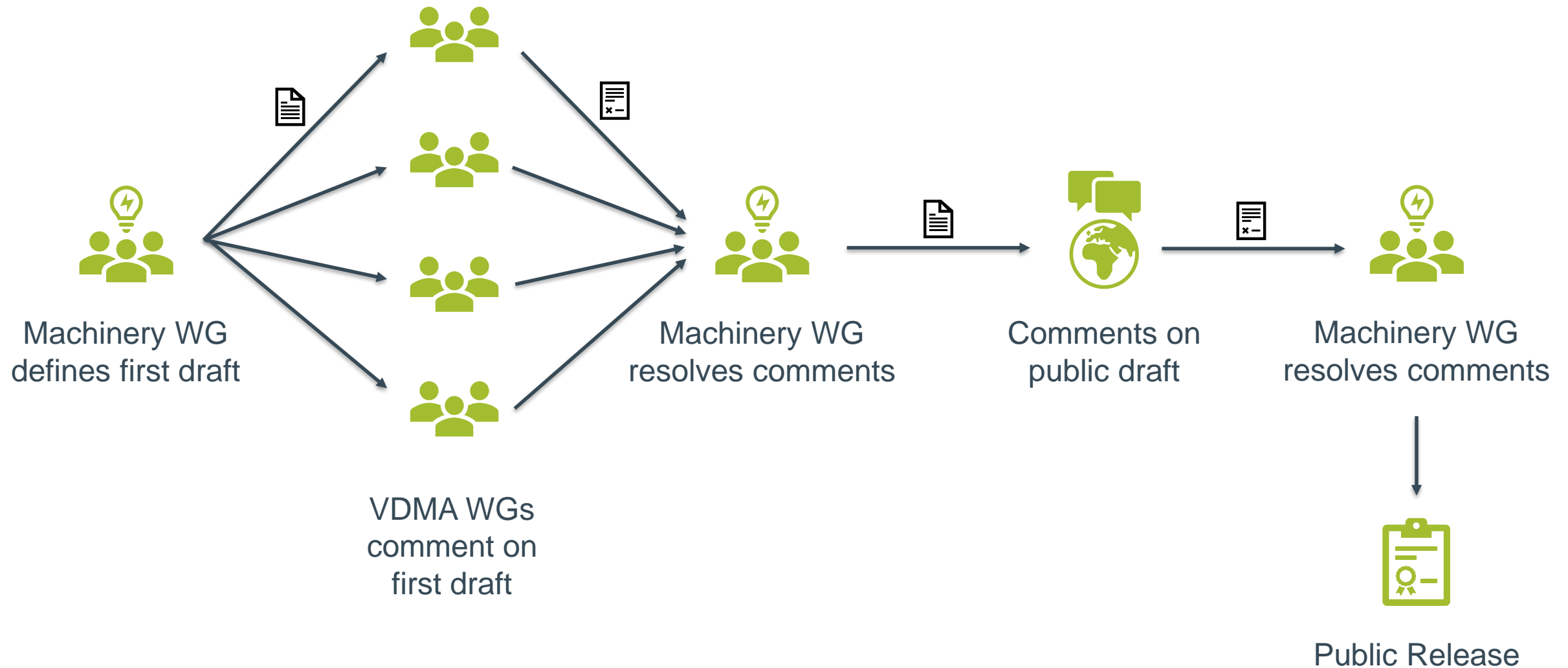


Modelling Expert: Dr. Wolfgang Mahnke

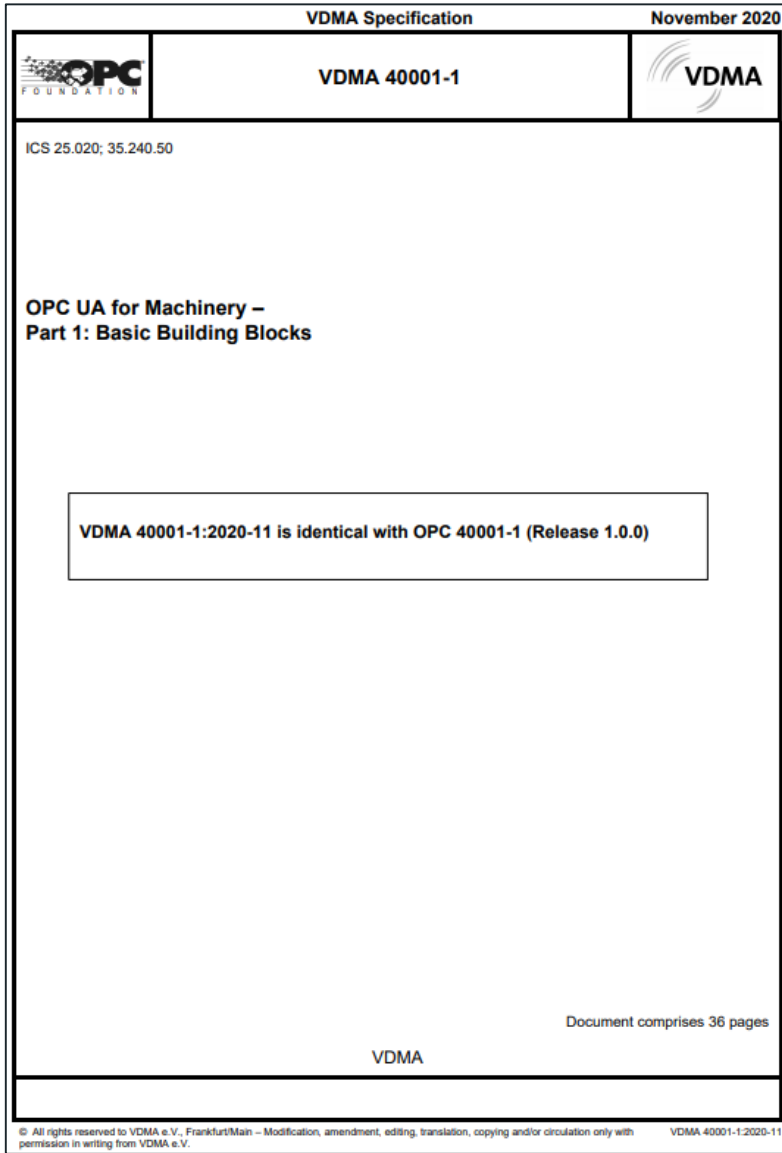
Representatives from: Robotics, Machine Tools, Metallurgy, Drives, Plastics & Rubber Machinery

Recently added: Machine Vision, Woodworking Machinery, Weighing, Food & Packaging

# Feedback on Draft







## First Building Blocks already released:



Machine Identification & Nameplate



Finding all machines in a server

## Next Building Blocks published as draft:

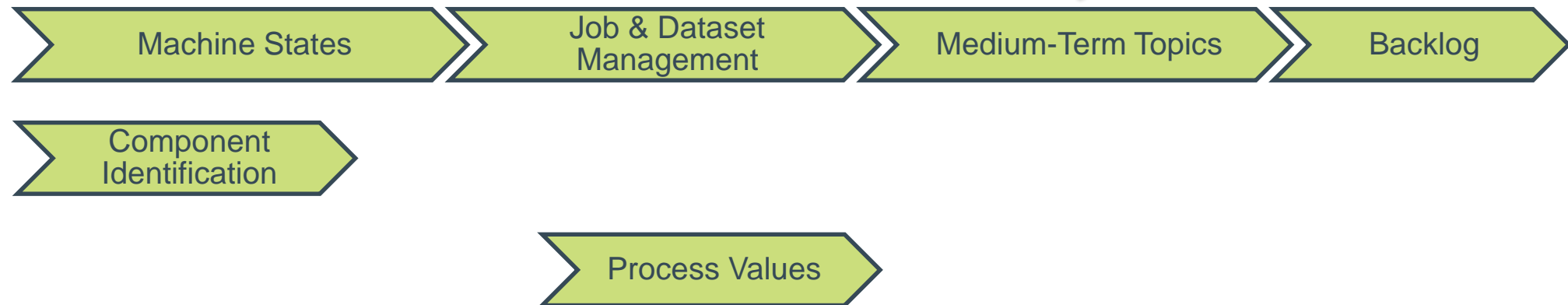
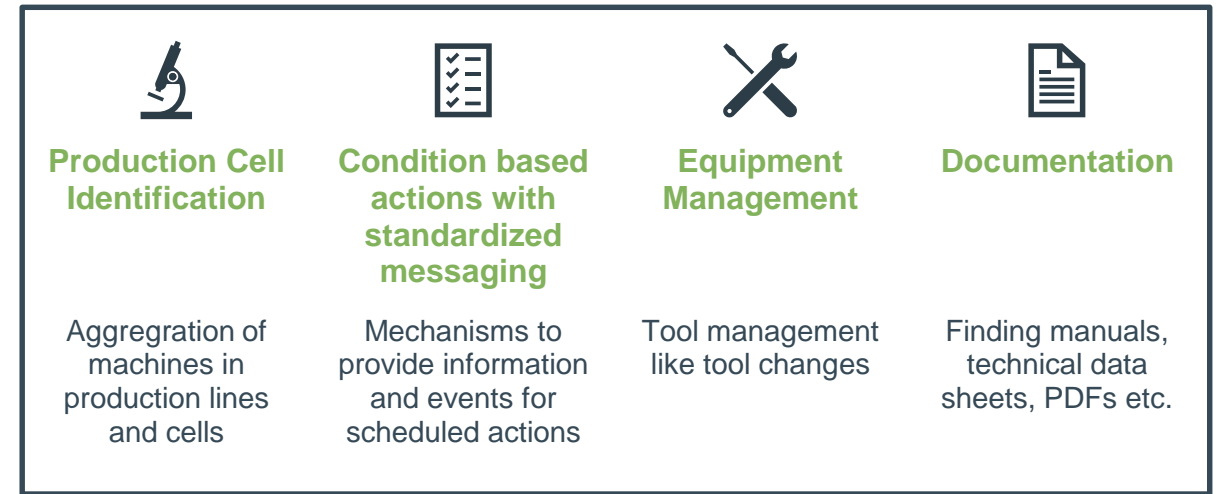


Component Identification



Finding all components of a machine

1. Component Identification
2. Machine States
3. Job & Dataset Management
4. Process Values
5. Medium-Term Topics
6. Backlog-Topics



**Thank you**  
Thank you  
for your attention!



# connecting the world of machinery

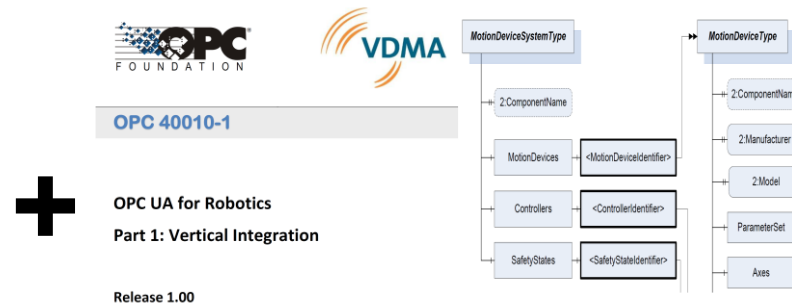
Briefing for Companies

v1.2 2020-09-21

[www.umati.org](http://www.umati.org)



# Plug and Play Powered by a Global Community



= semantic interoperability

Communication technology  
and basic functionalities  
universal with open options  
→ **HOW** to communicate

Companion Specifications defining  
contents for different applications  
→ **WHAT** to communicate

## Plug & play

Identical Implementation  
of Companion Specifications  
for the machinery sector



## Global community

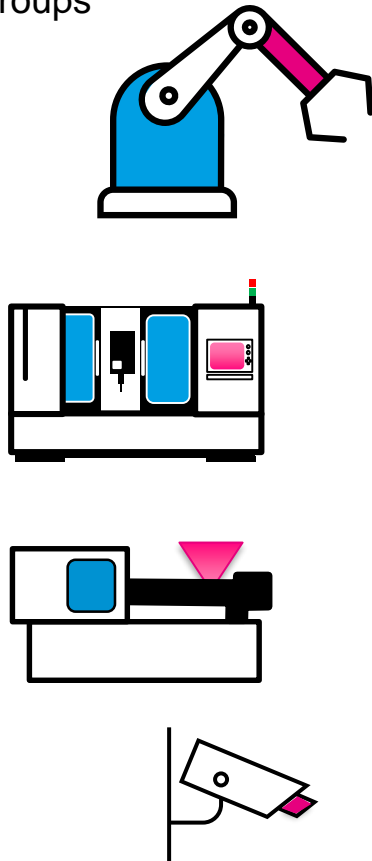
Promoting the use  
of common standards



# Bringing Machine Builders and Users Together

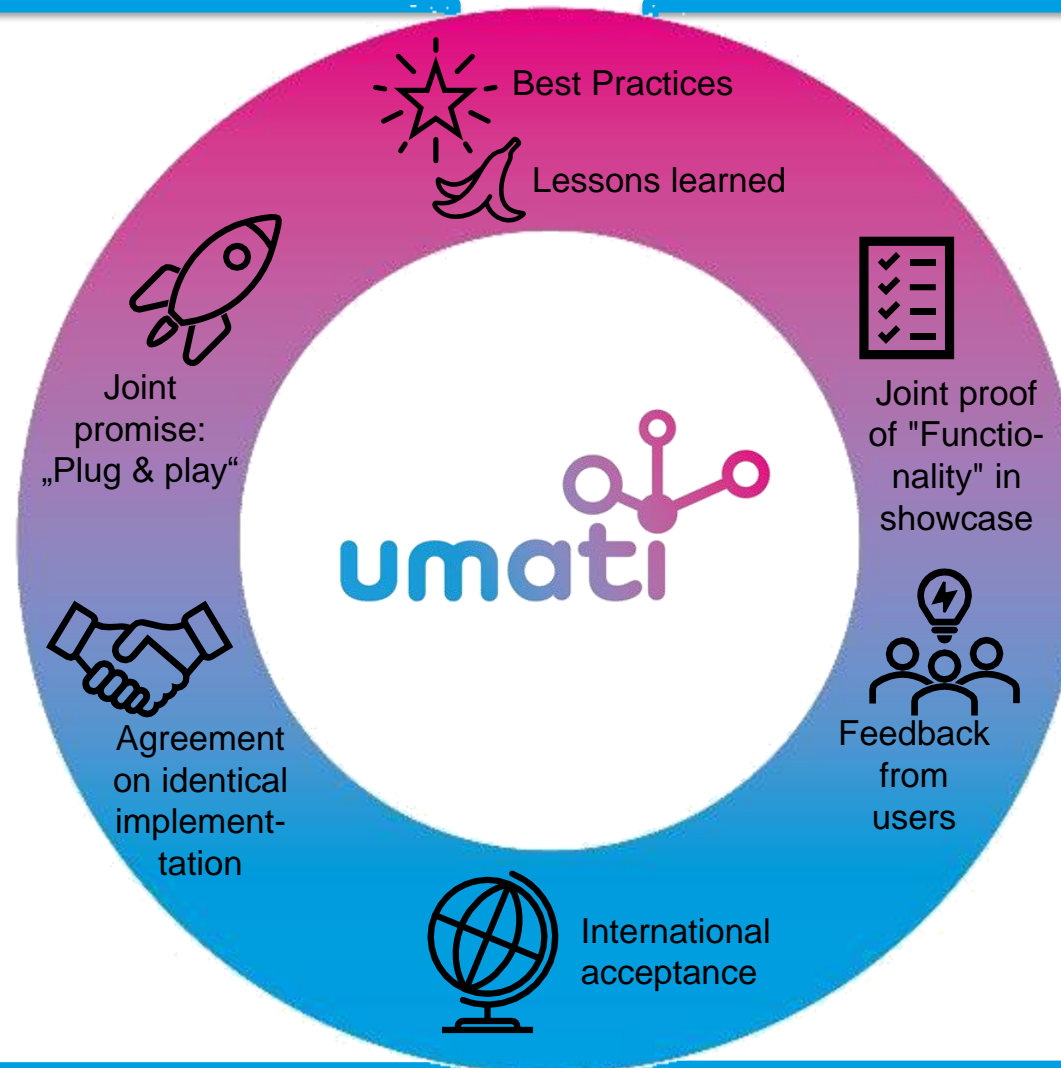
## Machine Builders

Associations  
Working Groups



## Users

Various Sectors  
Multiple Machinery



# a network of strong partners

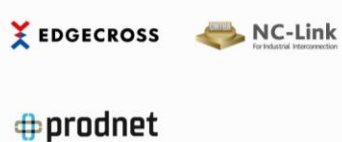
## core partners



## association partners



## consortium partners



## research partners



→ 130 Partner (Sept `20)

# What is the „umati live demonstration“

- One of the most important aspects of umati is to make the data flow a “user experience” for customers and interested parties
- This is achieved through live demonstrations at trade fairs
- E.g., at EMO Hannover 2019: 70 partners from 10 countries; 110 machines connected 28 software solutions
- Infrastructure (DataHub with T-Systems) and a neutral dashboard (web app) have already been developed
- This can be used and refined by all partners
- The aim is to bring the umati community to trade fairs worldwide
- Permanent operation is planned in order to demonstrate the efficiency of the community

➤ Experience connectivity live :



Every connected machine features a sticker.

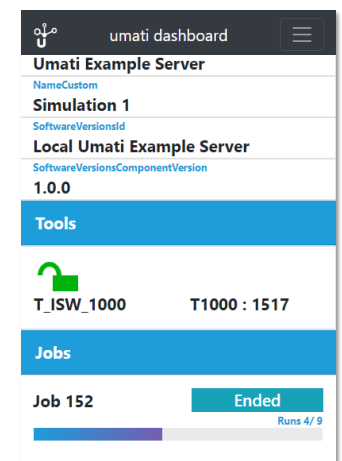
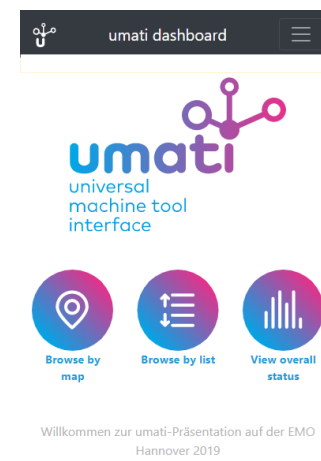


Scan the QR code or type the shortcut link to access the live data streaming from the machine.



Get an overview of all the connected machines at <https://umati.app>

➤ Follow the data flow at <https://umati.app>:



# How do I connect to the „umati live demonstration“

## ○ Machines

- must be equipped with an OPC UA server according to an OPC UA specification\* “endorsec” by umati
- connect 1:1 to the data hub
- Connection currently via VPN, OPC UA Reverse Connect in planning

## ○ Data openness

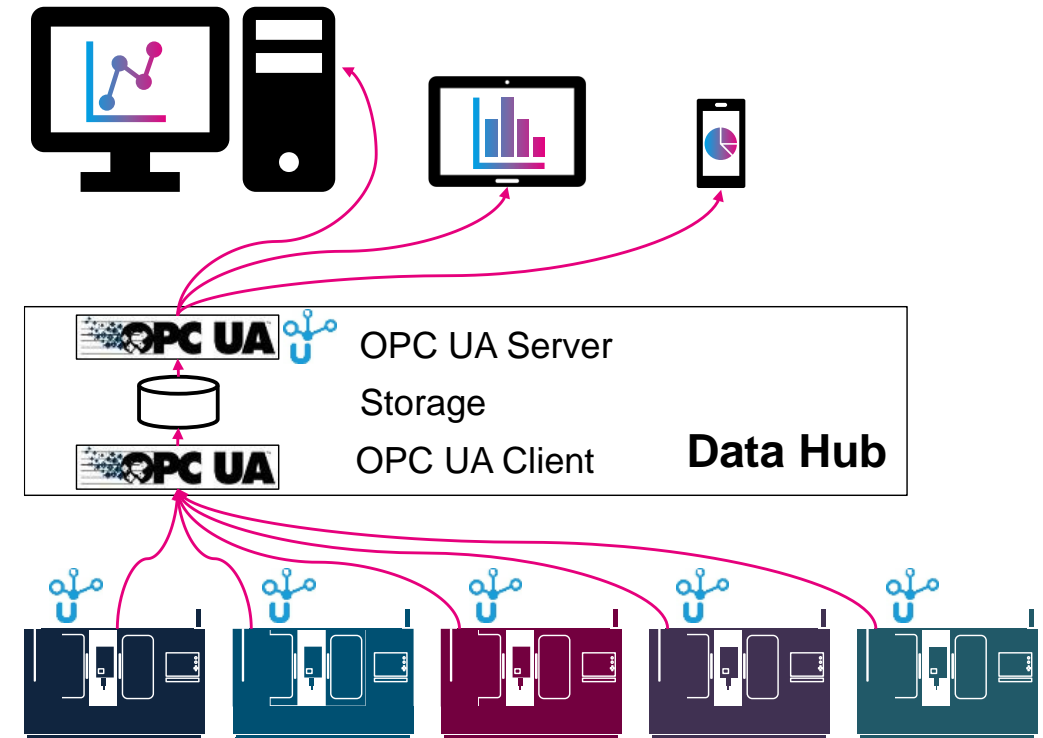
- the data of all connected machines is currently available to all partners for use in dashboards or software

## ○ Architecture

- At the heart of this is the "Data Hub" with T-Systems,
- this serves the data handling,
- it aggregates the incoming data of all connected machines and
- makes the data available to all connected clients.

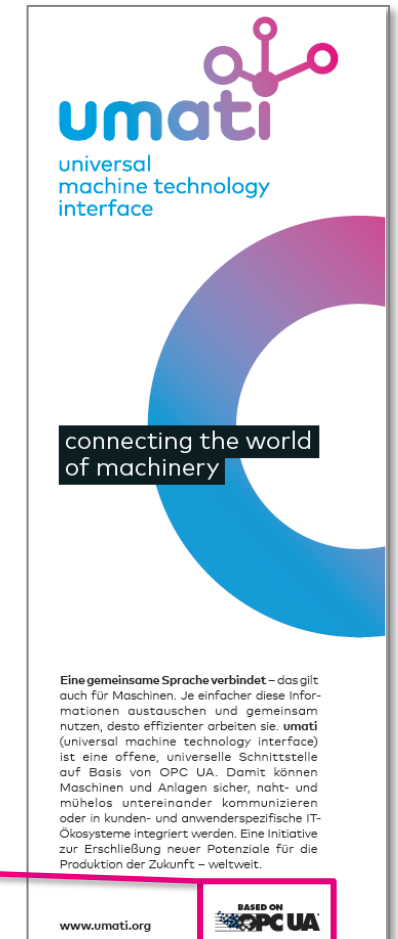
## ○ Showcase Specification is available at <https://showcase.umati.org>

*\* At this point in time (Sept 2020), the infrastructure currently capable for OPC UA for Machinery and Machine Tools. The plan is to make OPC UA for Machinery and the specifications currently developed by VDMA and its affiliated groups available as soon as possible.*



# How does umati affect OPC UA standardization?

- The **standardization work** in the existing working groups or joint working groups **continues in parallel** as before.
- OPC UA standards remain **freely available** to the public.
- No **"obligation"** for participating companies to use umati.
- umati represents an **offer for common visibility**.
- **Closer interaction** of the individual groups through **comprehensive feedback** from the market to be expected.
- **Internationalization** is strengthened by the visibility of a common brand (e.g., with/towards partners and competitors in America and Asia)
- The **relationship to OPC UA** visible through logo "based on OPC UA" in the brand communication





# Contact Information

*Contact the umati team:*

Andreas Faath  
[andreas.faath@vdma.org](mailto:andreas.faath@vdma.org)  
Tel. 069-6603-1495

Dr. Alexander Broos  
[a.broos@vdw.de](mailto:a.broos@vdw.de)  
Tel. 069-756081-18

Götz Görisch  
[g.goerisch@vdw.de](mailto:g.goerisch@vdw.de)  
Tel. 069-756081-64



[www.umati.org](http://www.umati.org)

[info@umati.org](mailto:info@umati.org)

 [#umati](https://twitter.com/umati)