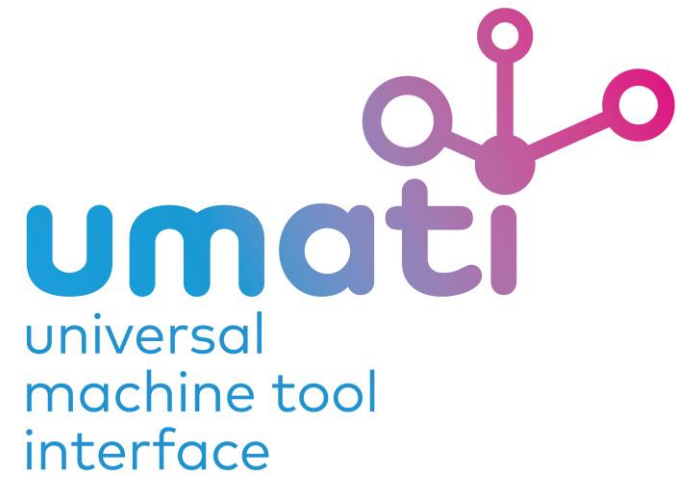


# connecting the world of machine tools

*EMO Forum "New Technologies -- Future Opportunities"*  
*Sep. 20<sup>th</sup>, 2019*  
*Dr. Alexander Broos, VDW*

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

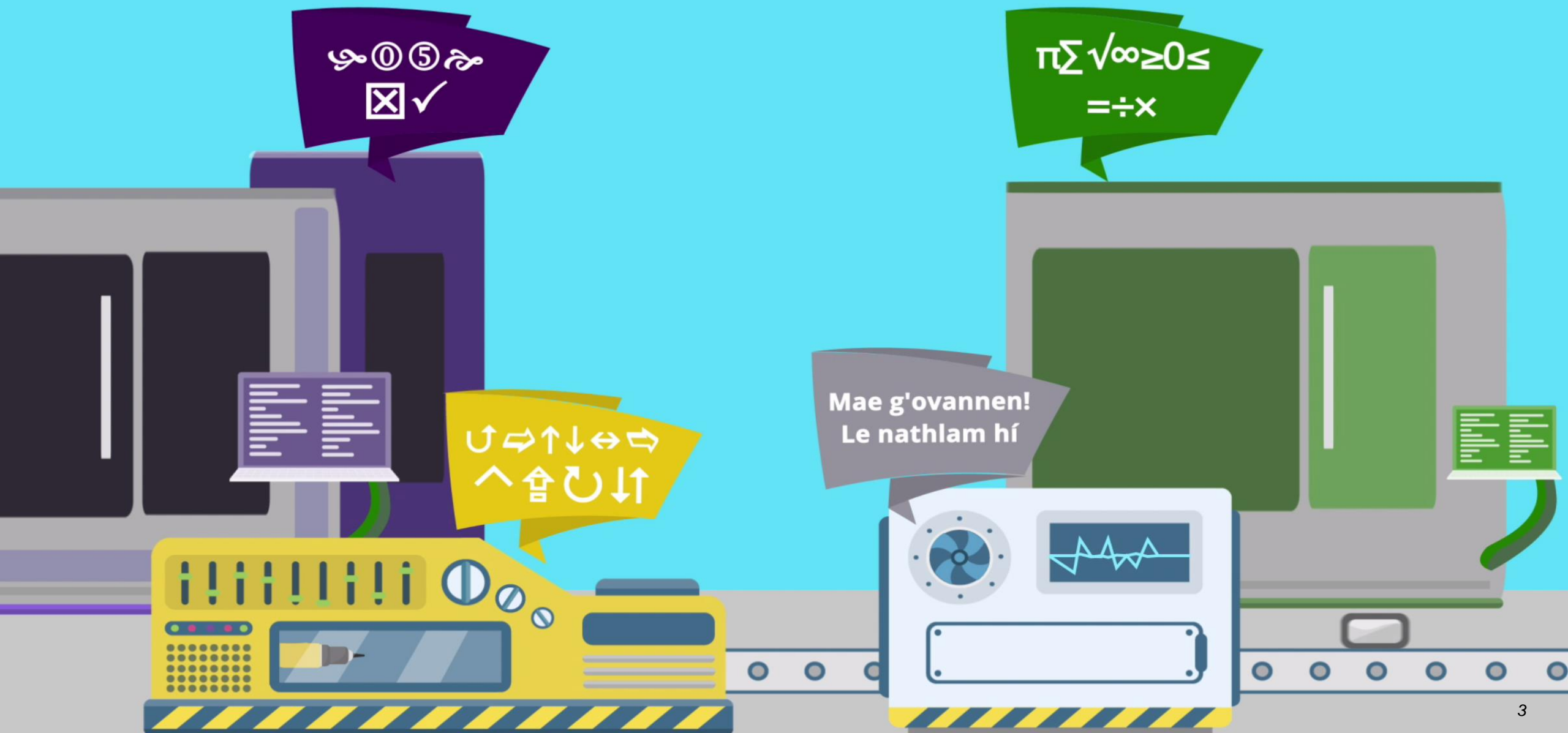
*Eine Initiative des*  
*An Initiative by* **VDW**



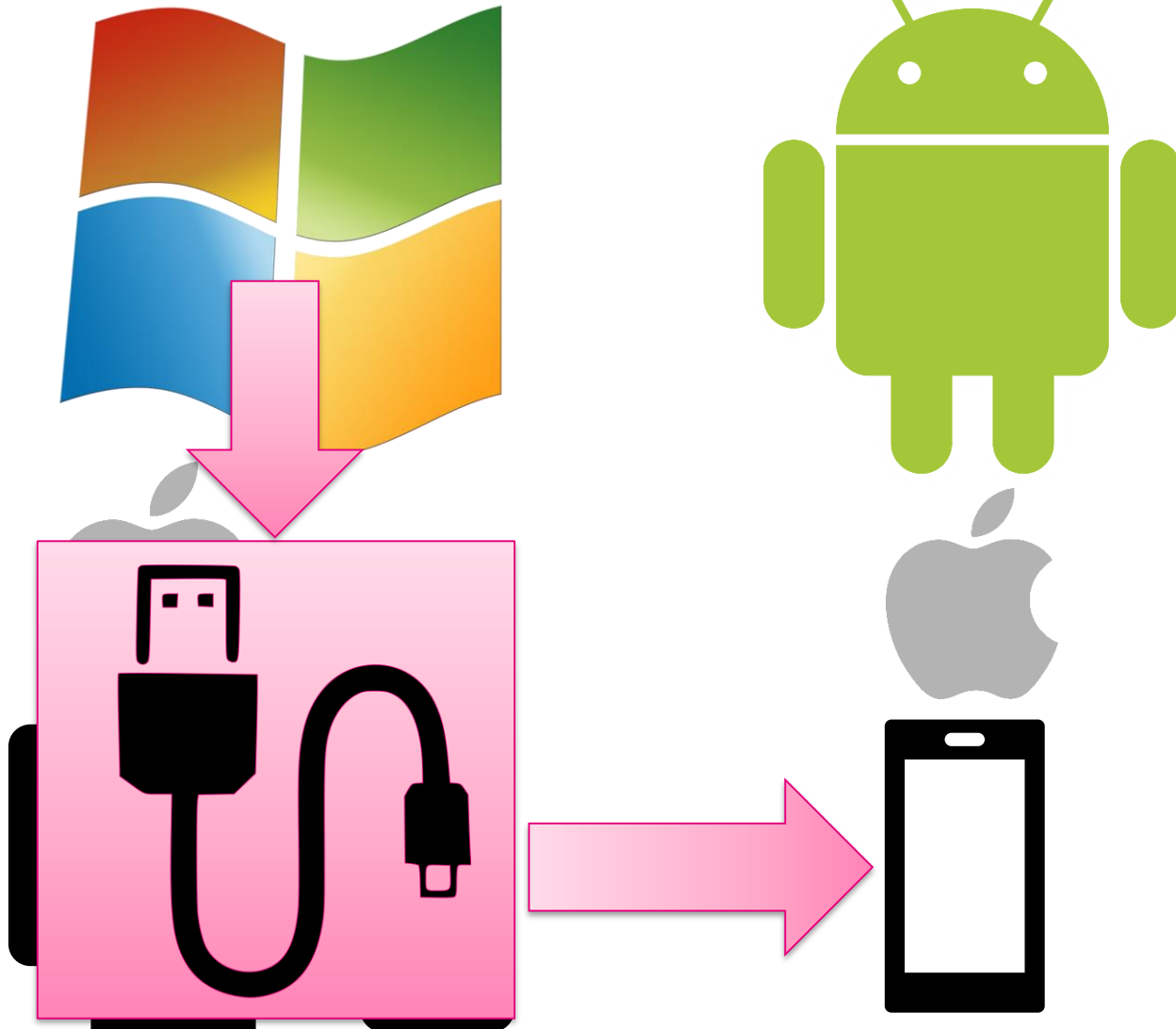
By the year 2017...



...while in manufacturing...



But why...?



CNCs

10+

PLCs

20+

HMI

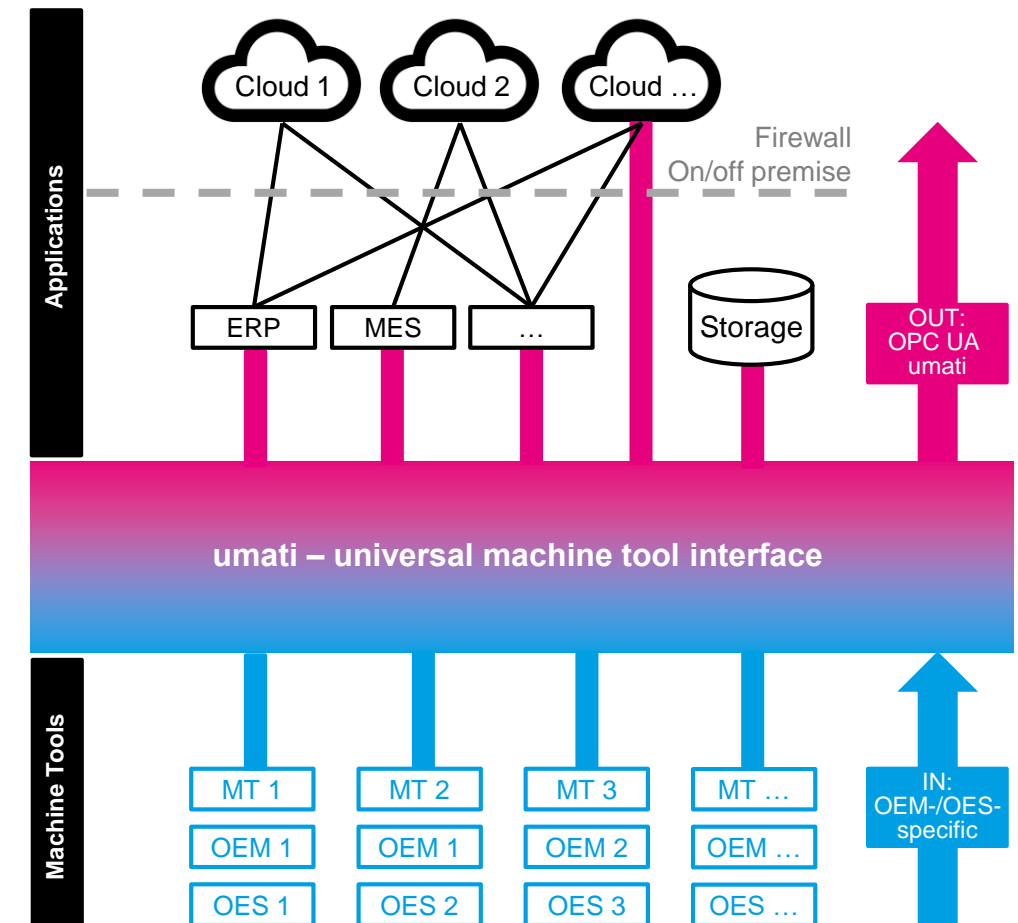
~∞



# umati mission

*There's no better connection than that of a common language – also for machine (tools)*

- enable machine tools and peripherals to connect to customer-specific IT ecosystems
- inside and outside the production environment
- via an open, universal interface
- easy, secure, and seamless
- create standardized **semantics**, embedded in an **information model** based on the **open communication standard OPC UA**.
- support **specific extensions** for manufacturers and customers of machine tools.
- establish a **worldwide standard** for the connectivity of machine tools.



MT = Machine Tool  
OEM = MT-manufacturer  
OES = Supplier (MT controllers etc.)

ERP = Enterprise Resource Planning (System)  
MES = Manufacturing Execution System

# More than just a specification

**umati =**

**OPC UA Companion Specification**



- OPC UA: Standardized communication platform („HOW to communicate“)
- Comp. Spec: Standardized „Dictionary“ („WHAT to communicate“)

**+ Communication Default Requirements**



- Standardized settings for the implementation of an OPC UA environment (e.g., encryption, authentication, server settings (ports, protocols))

**+ Quality Assurance**



- Provide testing specifications and tools
- Serve as ombudsman for supplier-client disputes („watchdog“ for brand/label abuse)

**+ Marketing**



- Global community of machine builders, component suppliers, and added value services
- Label for visibility in the market

# Purpose of umati as a label/brand

## Address

- 1) **CUSTOMERS** who buy machine tools or software
- 2) **SUPPLIERS** of components for machine tools or software

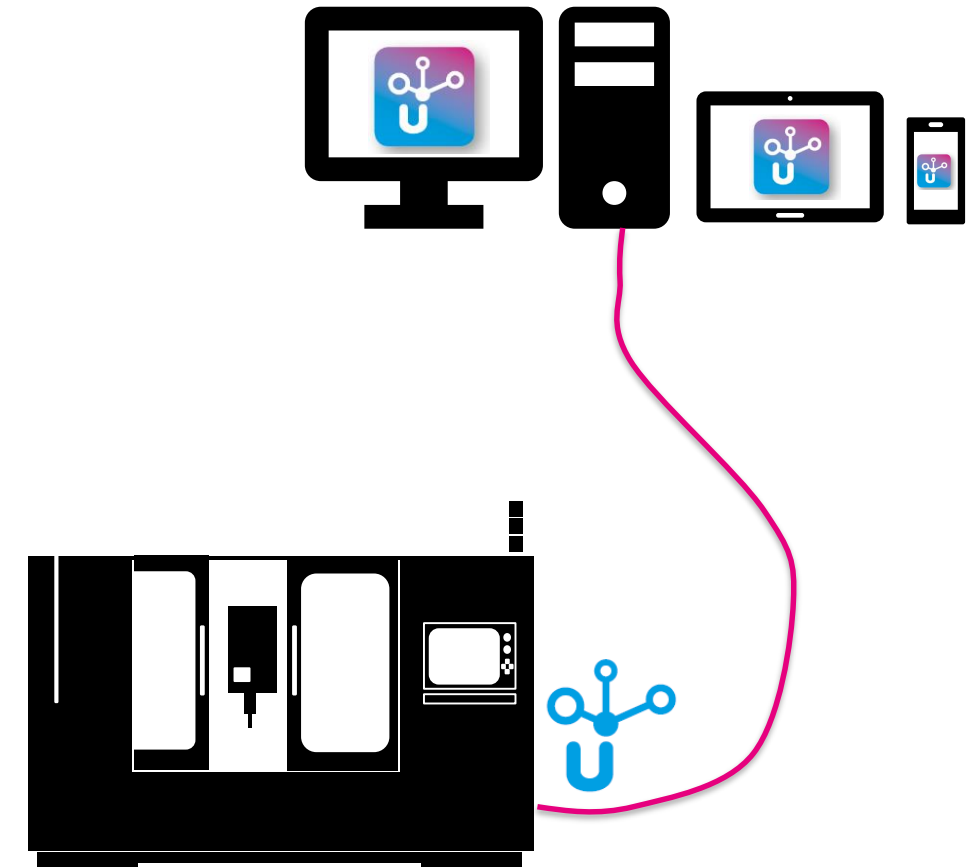
**The focus is on parties who are contract partners!**

- 1) The MT Builder or the software producer have a **contract** with the customer

**umati promise:** if both MT and Software have “umati inside”, there is seamless communication (plug and produce)

- 2) The MT Builder acts as **system integrator**, i.e., he buys components and integrates them, which includes customer specific components or subsystems (dito for Software producers, they include third party functionality (code, apps, programs, drivers, ...))

**umati promise:** components which are compliant to umati specifications facilitate system integration (preferred supplier)





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development up to now



# First steps

- Initiated by the board of **VDW**, the German Machine Tool Builders' Association (15 leading machine tool builders)
- Started by a core group of 10 machine tool builders + 1 research institution + VDW staff
- Vision:
  - exploiting data creates an **added value for customers**, thus leading to new, trendsetting business models for the sector
  - open interfaces to exchange data between machines and IT systems are the **basic requirement for Industrie 4.0 / IIoT**
  - specification of open interfaces **must be undertaken by the machine tool industry itself**, to cover the specific needs of its customers
  - collaboration yields no **competition**, does not oppose individual advantage in the market
  - get interested participants **from all over the world** involved from the start
- Announced at EMO Hannover 2017

**chiron**

**DMG MORI**



**HELLER +GF+**

**GROB**



**cPfflner**

**LIEBHERR**



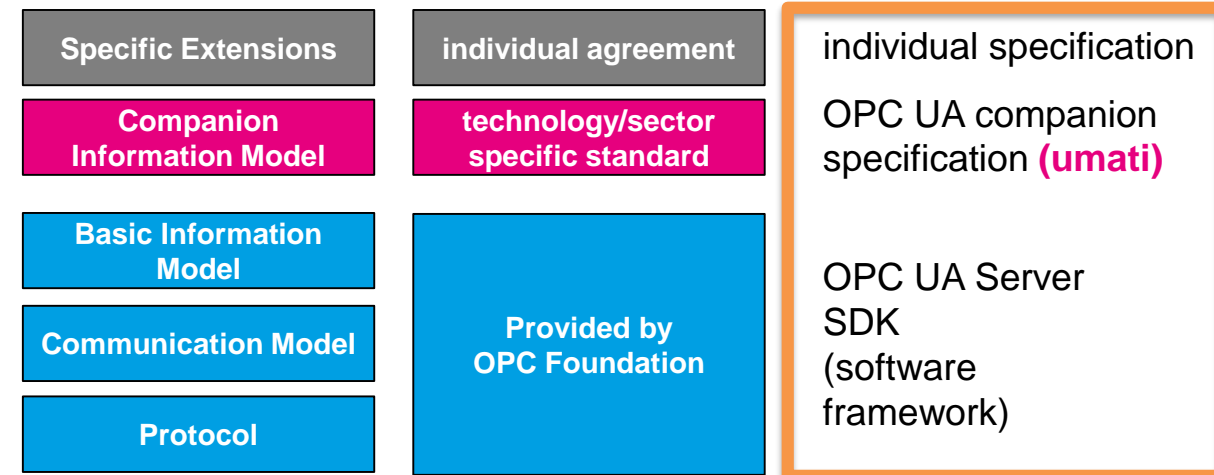
Eine Initiative des  
An Initiative by **VDW**

# Why OPC UA?

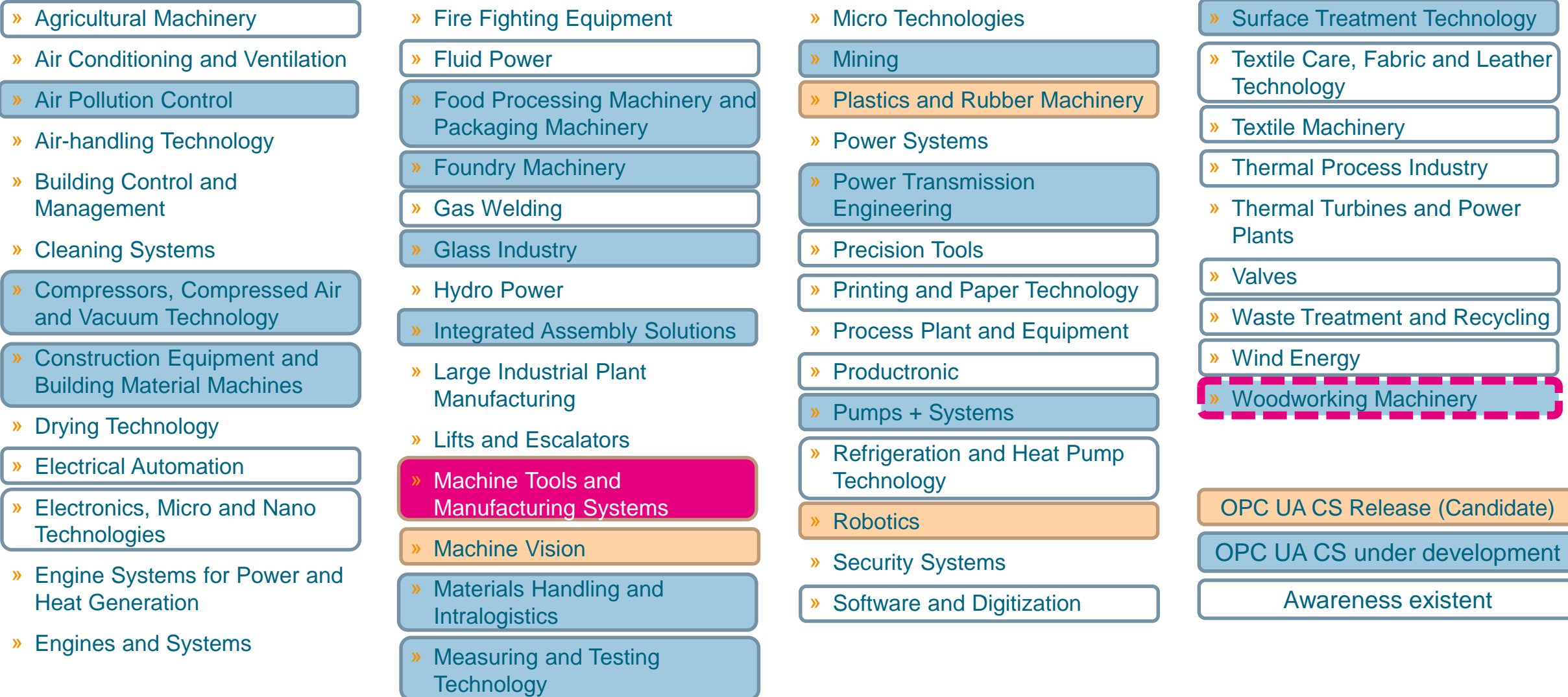


- OPC UA provides a **standardized communication framework** for connecting different systems within the automation environment (**HOW** to communicate)
- **Parameters and semantics** (**WHAT** to communicate) are defined differently for different applications via **OPC UA Companion Specifications** („standards“ → umati), which include data files for easy setup of OPC Server/Client systems

- **Standardization work** is done within the **OPC Foundation** (global community)
- OPC UA is making a **huge impact on the machinery industry in general**



# Multitude of OPC UA activities within the VDMA



# umati OPC Foundation Joint Working Group



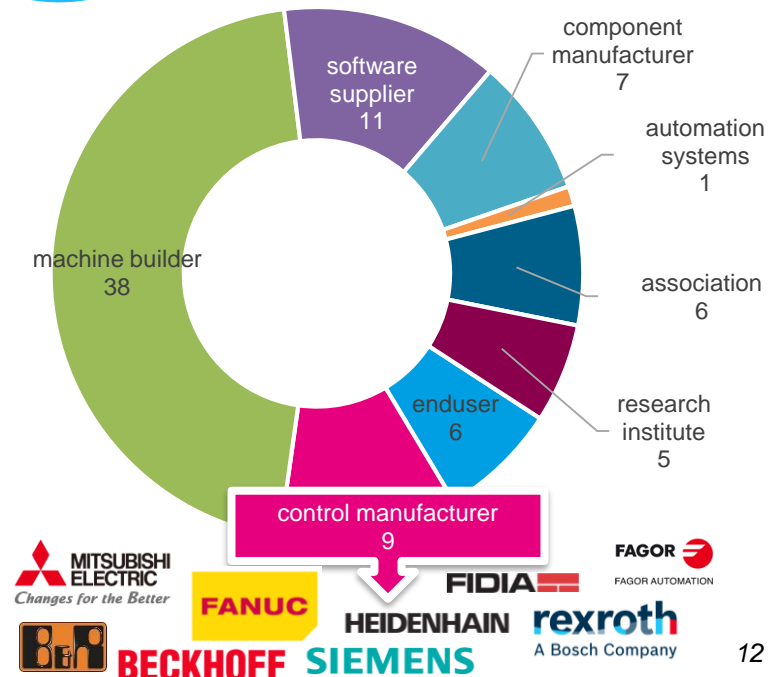
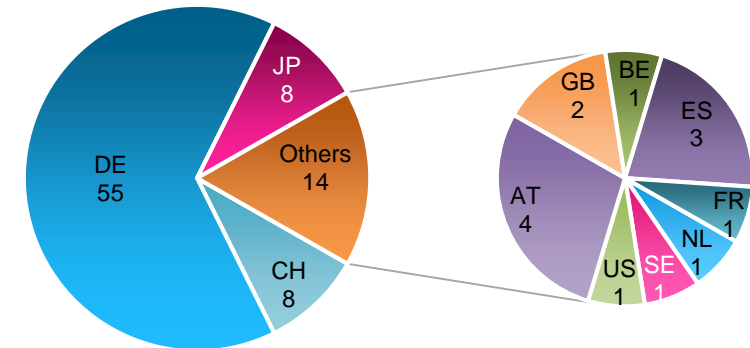
- 2019-02-22: Kickoff Meeting in Frankfurt  
→ 55 participants (1 from US, 1 from JP)
- Initialization of the JWG  
Election of Chairman (Götz Görisch, VDW)
- Various web and f2f meetings  
average 50+ participants
- **85 member companies (per August 2019)**



9/20/2019

umati | Connecting the world of machine tools

# of companies per country



MITSUBISHI  
ELECTRIC  
Changes for the Better



FANUC

BECKHOFF

HEIDENHAIN

SIEMENS

FIDIA

rexroth  
A Bosch Company

FAGOR  
FAGOR AUTOMATION

# First demonstration at AMB Stuttgart Trade Show (2018/09/18-22) – I



Partner	Hall/Booth	Machine type	Product name	Controller	Communication partner
Chiron	10/A51	Milling turning center	CHIRON FZ08 MT Precision+	Fanuc	IGH
DMG MORI	10/C11	Complete turning milling center	CTX Beta 800 TC	Siemens	ADAMOS, IGH
EMAG	4/B51	Vertical turning machine	VL2 10x (production)	Fanuc	EMAG MultiMachine Monitor
GF Machining Solutions	7/C31	Wire EDM	CUT P 350	Beckhoff	GFMS rConnect digital services, IGH
GROB WERKE	10/B11	Milling center	G352	Siemens	GROB-NET*Industry, IGH,
		Milling center	G352, G526, G550, G551 ...	various	GROB-NET*Industry, IGH, Siemens MindSphere
Heller	10/A31	Milling center	G352 (production)	Heidenhain	GROB-NET*Industry
		Milling center	CP 4000 (production) CP 5000, HF 5500	Siemens Siemens	Siemens MindSphere, IGH Siemens MindSphere
Liebherr-Verzahntechnik	5/C51	Gear hobbing machine	LC 280 DC	Siemens	Liebherr Manufacturing System LMS 4.0
		Gear grinding machine	LGG 280	Siemens	Liebherr Manufacturing System LMS 4.0
Pfiffner (FFG Group)	6/B11	Rotary transfer machine	Hydromat HC32-16 EPICplus	Bosch Rexroth	IGH
UNITED GRINDING Group	5/C12	Grinding machine	STUDER favorit	Fanuc	UNITED GRINDING Digital Solutions, IGH
Beckhoff	2/E23	Technology demonstrator		Beckhoff	Beckhoff TC3 OPC UA, IGH
Bosch Rexroth	2/C03	Technology demonstrator	Laser processing model	Bosch Rexroth MTX	Bosch Rexroth Active Cockpit, IGH
Fanuc	6/B51				
Heidenhain	2/D03				
Siemens	2/B03				
Trumpf	DW088				
IGH Infotec AG	DW088				
ISW	DW088				
VDW Forschungsinstitut	DW088				

15+ Machine tools  
9 MT manufacturers  
5 Controller manufacturers  
10 Communication partners





# First demonstration at AMB Stuttgart Trade Show (2018/09/18-22) – II



**Live data acquired during the trade show: on-line for 5 days without interruption!**

# First demonstration at AMB Stuttgart Trade Show (2018/09/18-22) – III



Launching the brand „umati - universal machine tool interface“



A large, thick ring with a blue-to-purple gradient, partially visible on the left side of the slide.

connecting the world  
of machine tools @



110

machines

28

software  
solutions

70

companies

10

countries







a network  
of strong partners

core partners



association partners



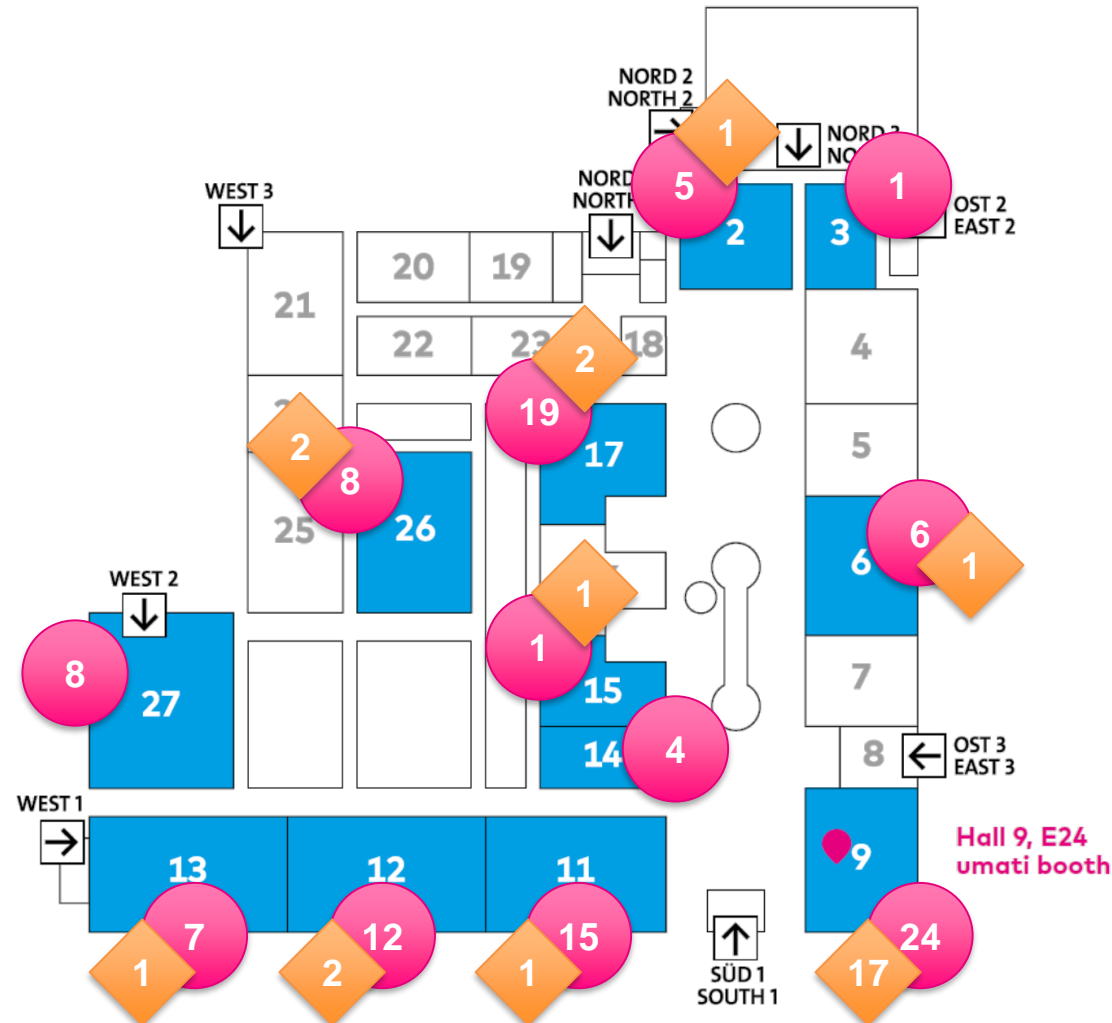
consortium partners





research partners



## Showcase participants across the fairground



 connected machines

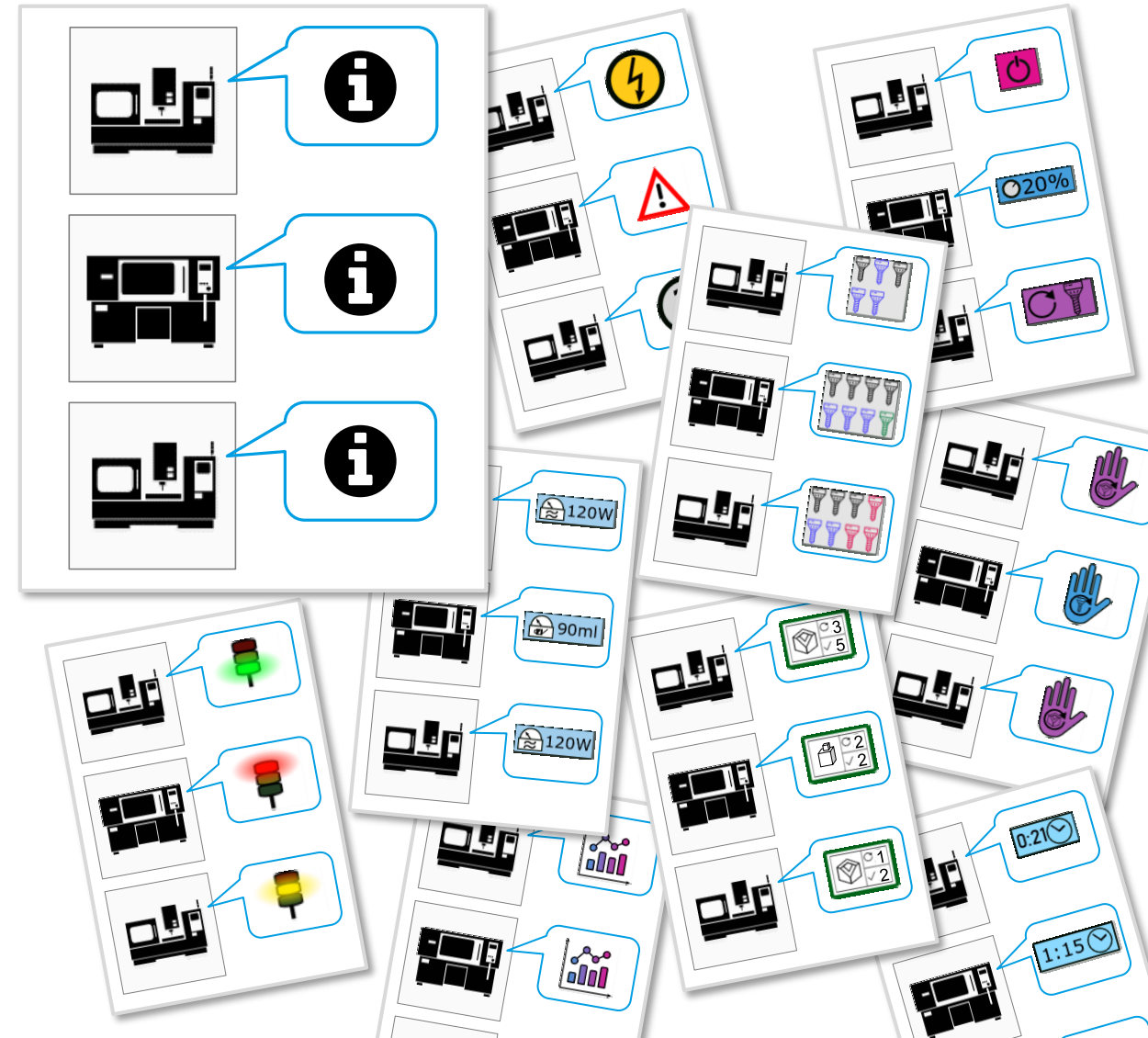
 software services



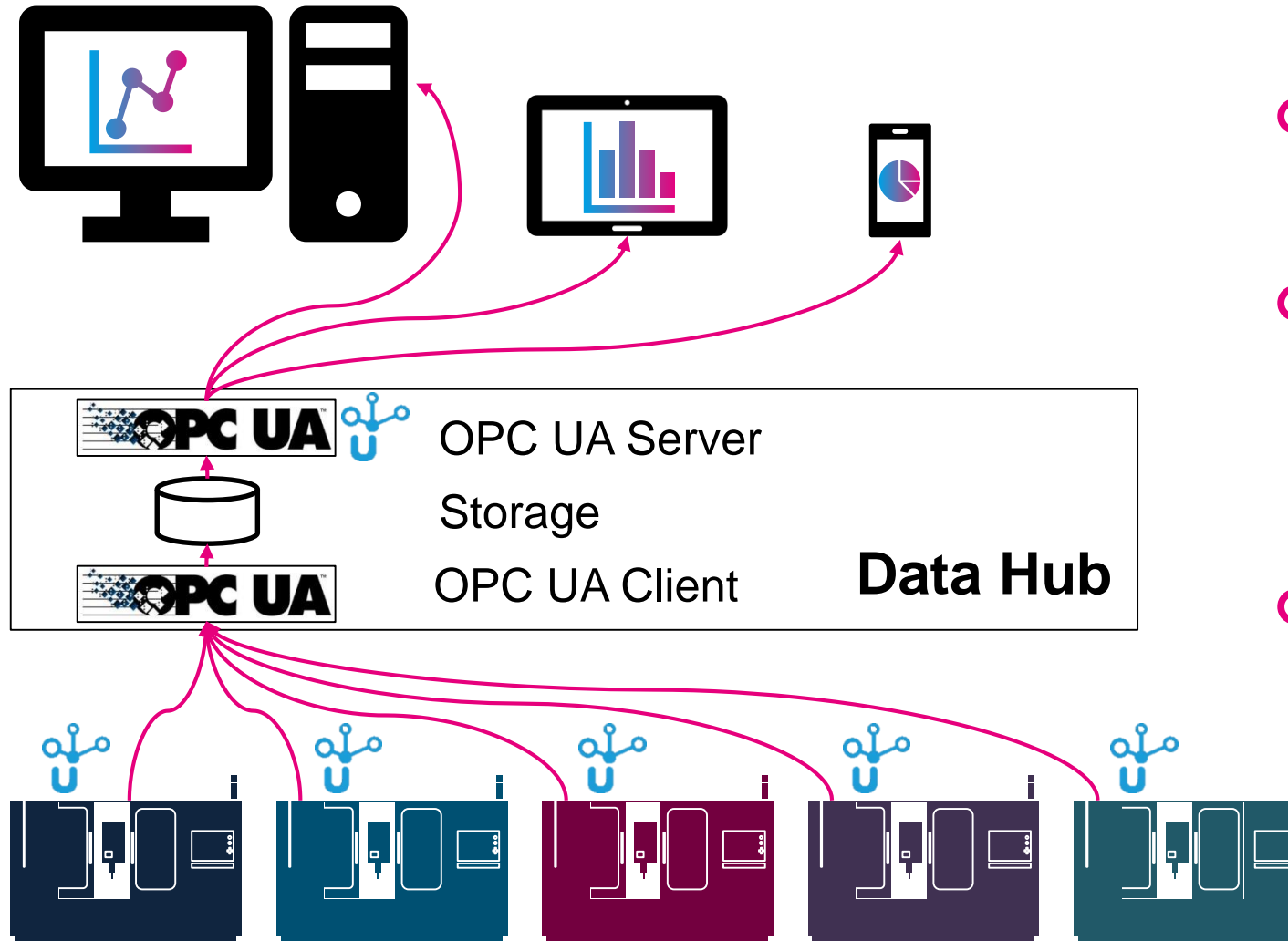
# umati Use Cases @ EMO demonstration



- 1 Identify machines of different manufacturers
- 2 Overview if production is running
- 3 Overview of parts in a job
- 4 Overview of runtimes for a job
- 5 Overview of machine tool state
- 6 Overview of upcoming manual activities
- 7 Overview of errors and warnings
- 8 Providing information for KPI calculations
- 9 Providing data for media and energy usage statistics
- 10 Providing an overview of tool data

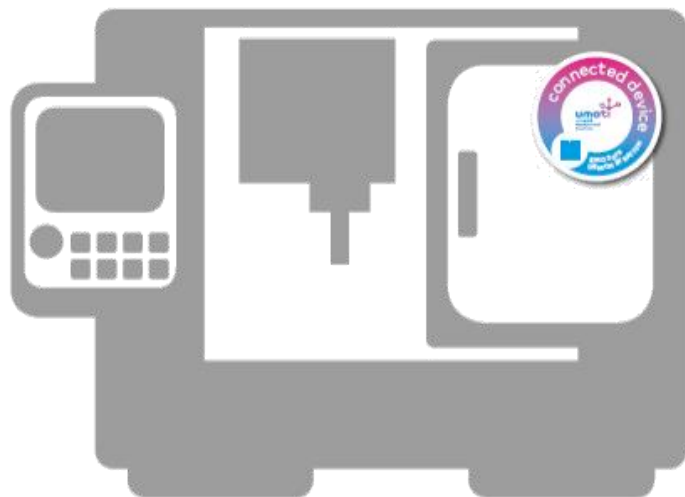


# EMO showcase connectivity scheme



- All connected machines support the OPC UA Specification „umati for EMO“
- The Data Hub gathers and stores the machine data and makes it available via an OPC UA Server using the OPC UA specification „umati for EMO“
- All software using the showcase data connects to the Data Hub with an OPC UA Client

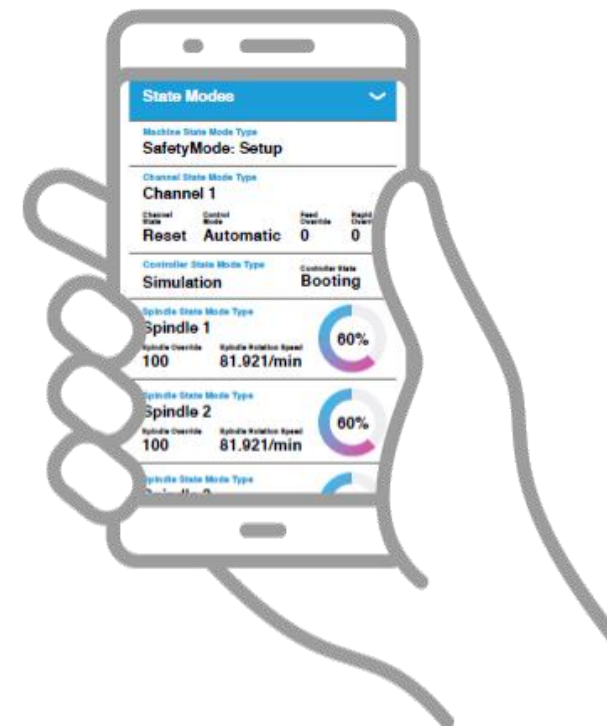
# Visibility across the fairground



Every connected machine features a sticker.



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

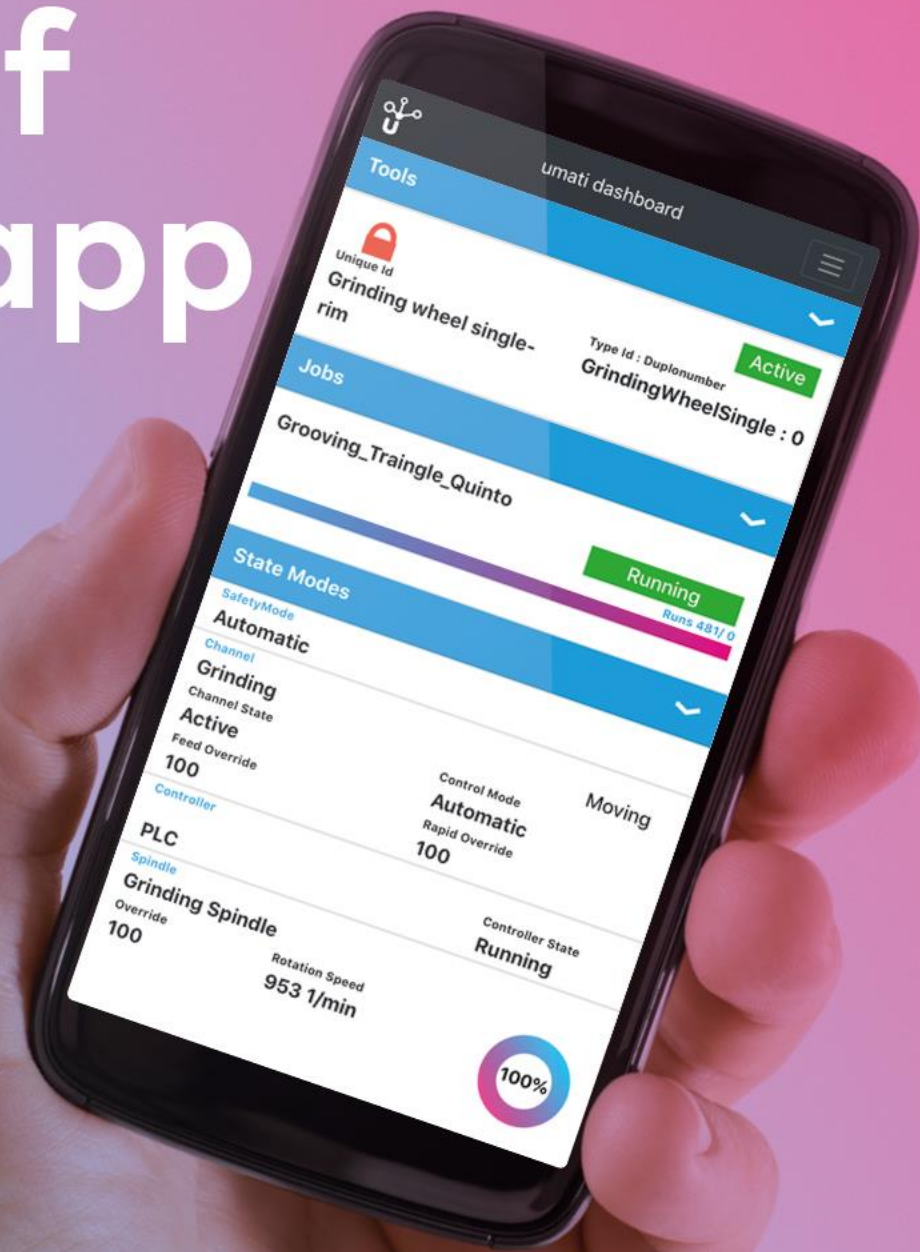


Get an overview of all the connected machines at <https://umati.app>



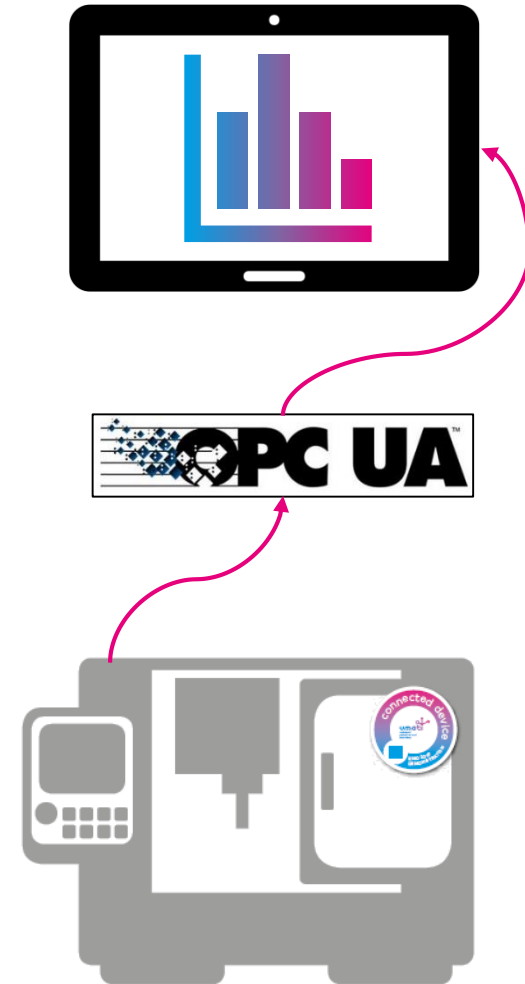
# See for yourself

<https://umati.app>



## umati@EMO Showcase Takeaways

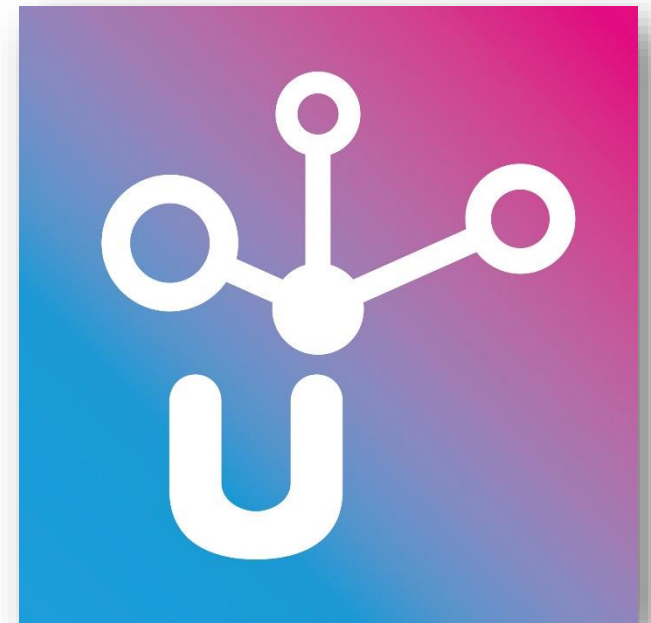
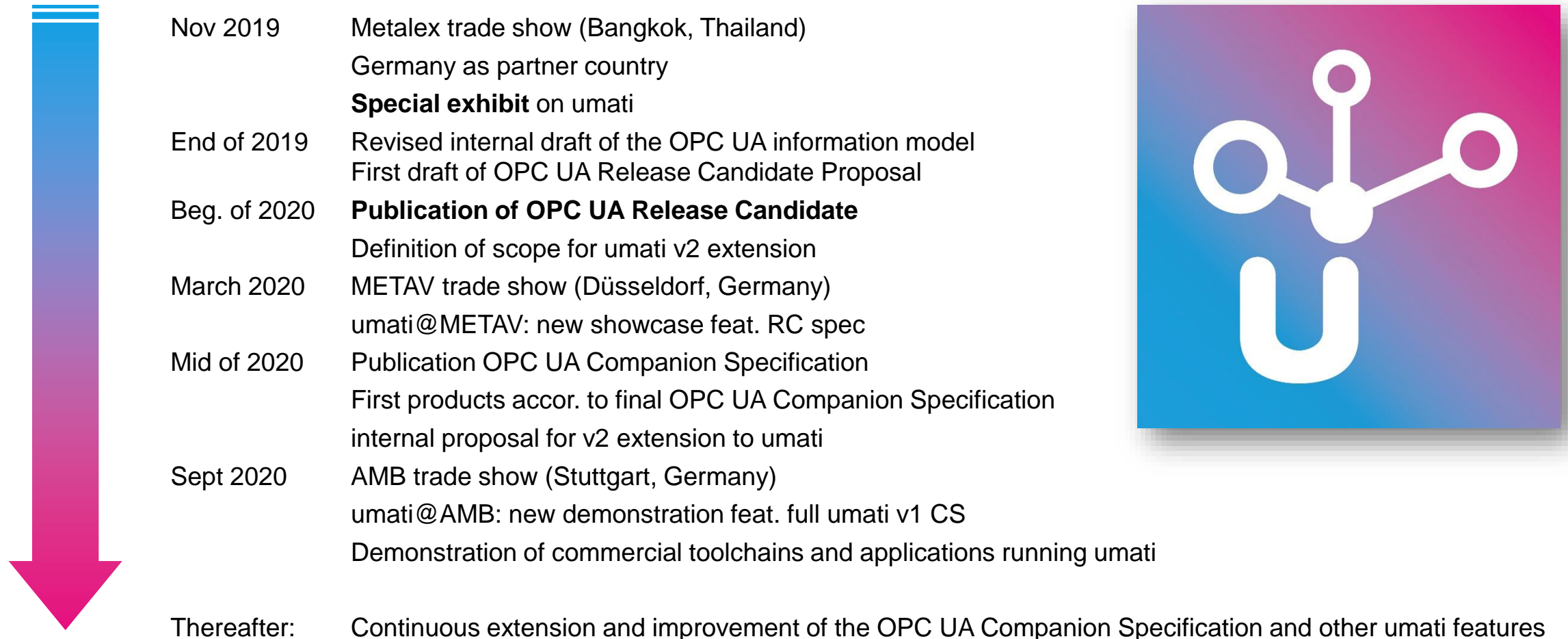
- Connectivity realized in OPC UA
- Showcase uses an example out of the current standardization work
  - Model applicability: all exhibitors can use the data model
  - Keep in mind: Standardization is still in progress, the final umati model will differ from the EMO showcase
- In the few weeks of fair preparations, the participants in the showcase were able to connect their machines/software interfaces while preparing their own booth as well!



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into the future

## Moving On...



# How Can I Participate?



## ○ End user (buyer, operator)

- express interest in umati to suppliers (MT builders, software suppliers, etc.)

## ○ Machine tool builder or software system supplier

- wait until the release candidate for umati v1 is available. Study the document, prepare for roll-out.

## ○ Component supplier (controllers, software routines, etc.)

- make sure the equipment is ready to load and use an umati information model.

## ○ Put in additional effort

- consider joining the OPC UA JWG\*

\*) Restrictions may apply, e.g., being a member of OPC Foundation



# Want to be part of it?



If you are interested in

- Getting involved in the OPC Joint Working Group
- Participating in future (trade fair) showcases with umati
- Getting updates on umati development

please register by emailing to [info@umati.info](mailto:info@umati.info)



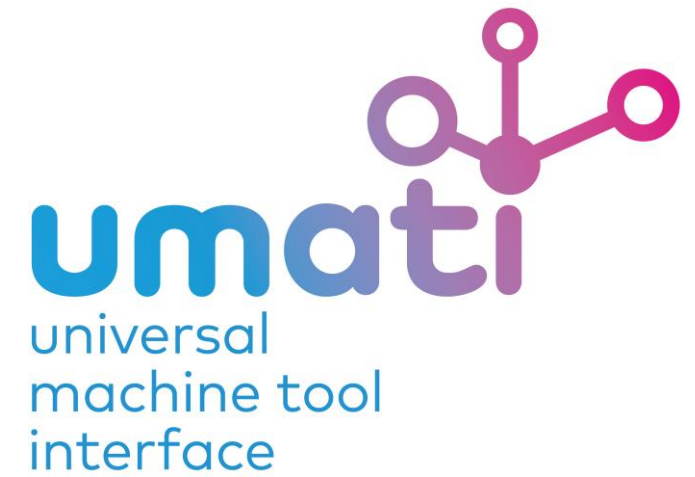
## Further Information

Dr. Alexander Broos  
umati Chief Project Manager  
Director of Research and Technology

German Machine Tool Builders' Association (VDW)

[a.broos@vdw.de](mailto:a.broos@vdw.de)

+49 (0)69 756081-17



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

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

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