Housekeeping notes

- Participant cameras and audio are switched off, this is to ensure the presenters do not have any disruptions.
- If you have issues with the audio or visual of the presentation please contact the moderator via the Q&A section in the bottom right hand corner of your screen
- Q&A for the presenters will be live throughout the session, please submit your questions via the Q&A section. Questions will be moderated and will be answered verbally at the end of the session.
- A post event survey will automatically pop up at the conclusion of the webinar, your feedback will be greatly appreciated.

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The presentation will start soon

While you're waiting:

- Test your sound.
- Locate the questions tab in your control panel and the 'hands up' icon
- Register for our IoT newsletter:
  https://iot.engineersaustralia.org.au/register

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Community members can register automatically for webinars

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Seeking presenters

It's YOUR community. Please share what you know about:

- **IoT technologies** from hardware to software
- **Functional applications** such as asset management
- Overviews of IoT in an **industry**

These can take the form of case studies, research studies or 101 introductions to the subject. Recommend others or deliver yourself. All presentation to be primarily educational in nature.

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CPD Online

Overcoming IIoT Data Interoperability Challenges with OPC UA

Darek Kominek

Marketing Director at Matrikon (Honeywell)

Host – Geoff Sizer

26 May 2020

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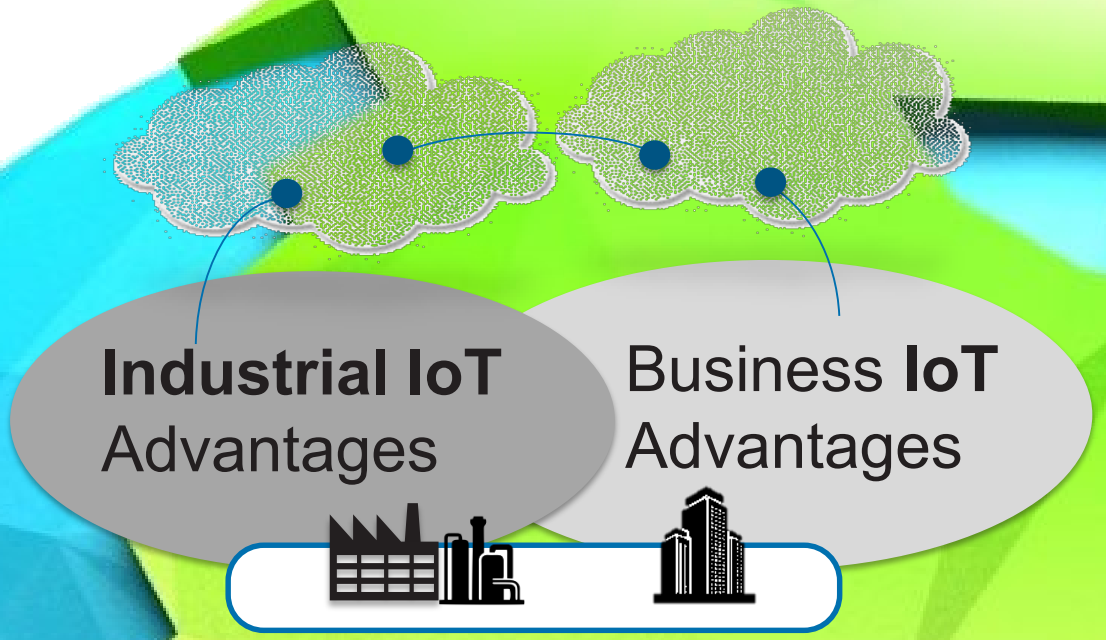
Digital Business Transformation

Matrikon®
Powering Interoperability.

IIoT/I4.0 Affects all aspects of a business:

- R&D
- Manufacturing/Production
- Maintenance
- Sales & Marketing

- Business Agility
- New Revenue Streams
- Cost Reduction
- Efficiency
- …



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Data Visibility & Interoperability Essential

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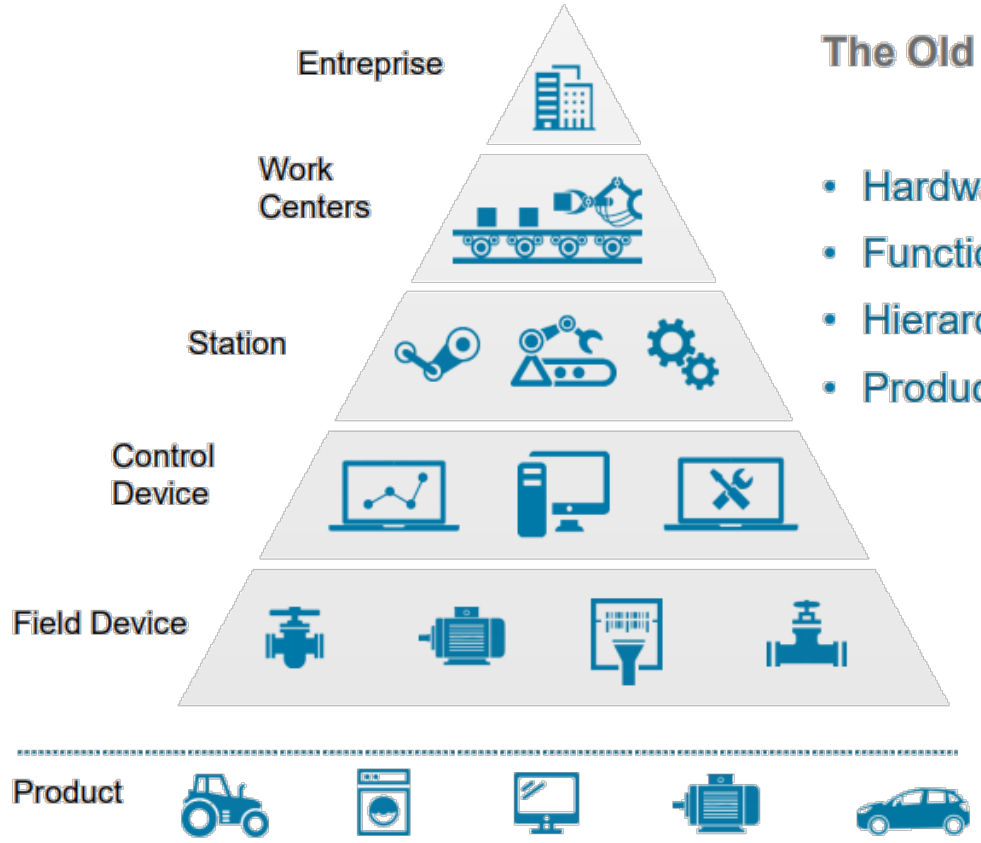

Graphics © Anna Salari, designed by freepik

The Old World: Industrie 3.0

- Hardware-based structure
- Functions are bound to hardware
- Hierarchy-based communication
- Product is isolated

Connected World

Smart Factory

Smart Products

Shift in how data is shared must include existing infrastructure!

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Key Focus Areas From Ground UP

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Data Connectivity

- Visibility
- Context
- Security
- Reliability

Edge & Fog Computing

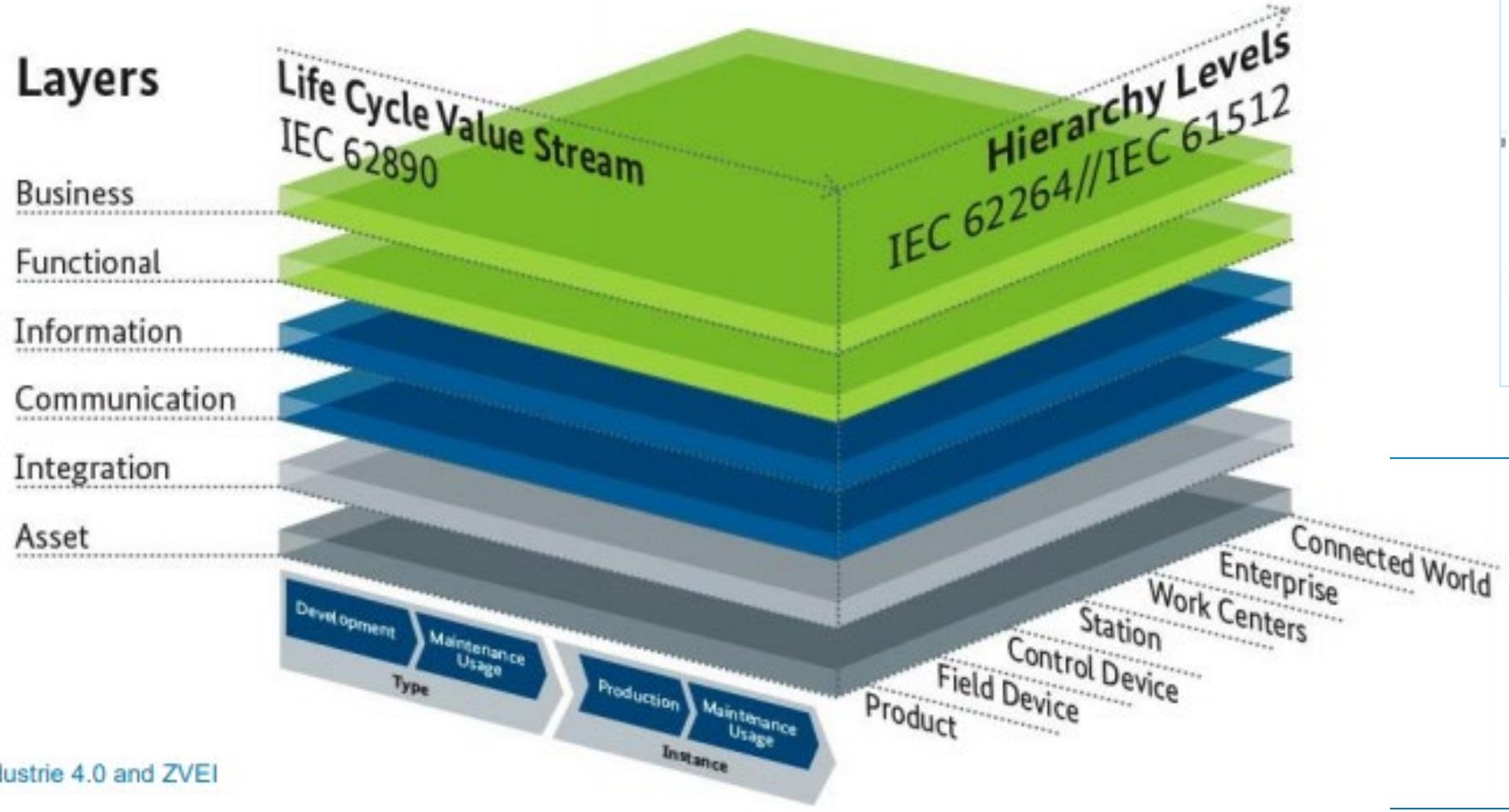
- Data Aggregation
- Basic Analytics
- Local Control

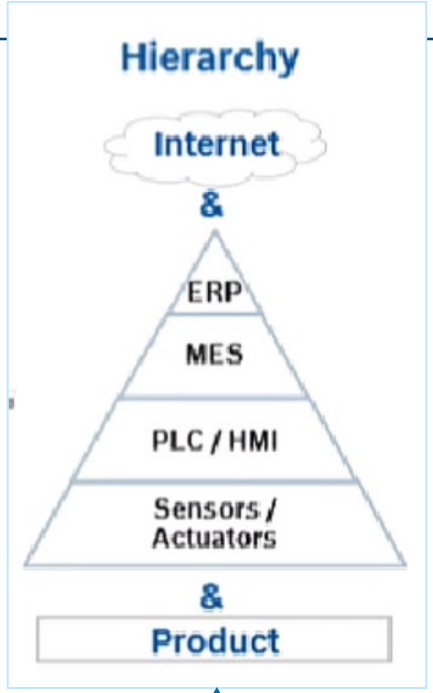
Cloud Computing

- Data Consolidation
- Advanced Analytics
- Smart and Secure Collaboration

I4.0: RAMI

Reference Architecture Model Industrie 4.0





Graphics © Plattform Industrie 4.0 and ZVEI

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Key OPC UA Highlights

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Open Platform

Data Security

Interoperability: Data

Interoperability: Services

Key OPC UA Highlights

Matrikon®
Powering Interoperability.

Open Platform

Connectivity Standards

Transports

Any Operating System

Any Hardware Platform

ARM®

OPC UA Is a Core Framework Standard

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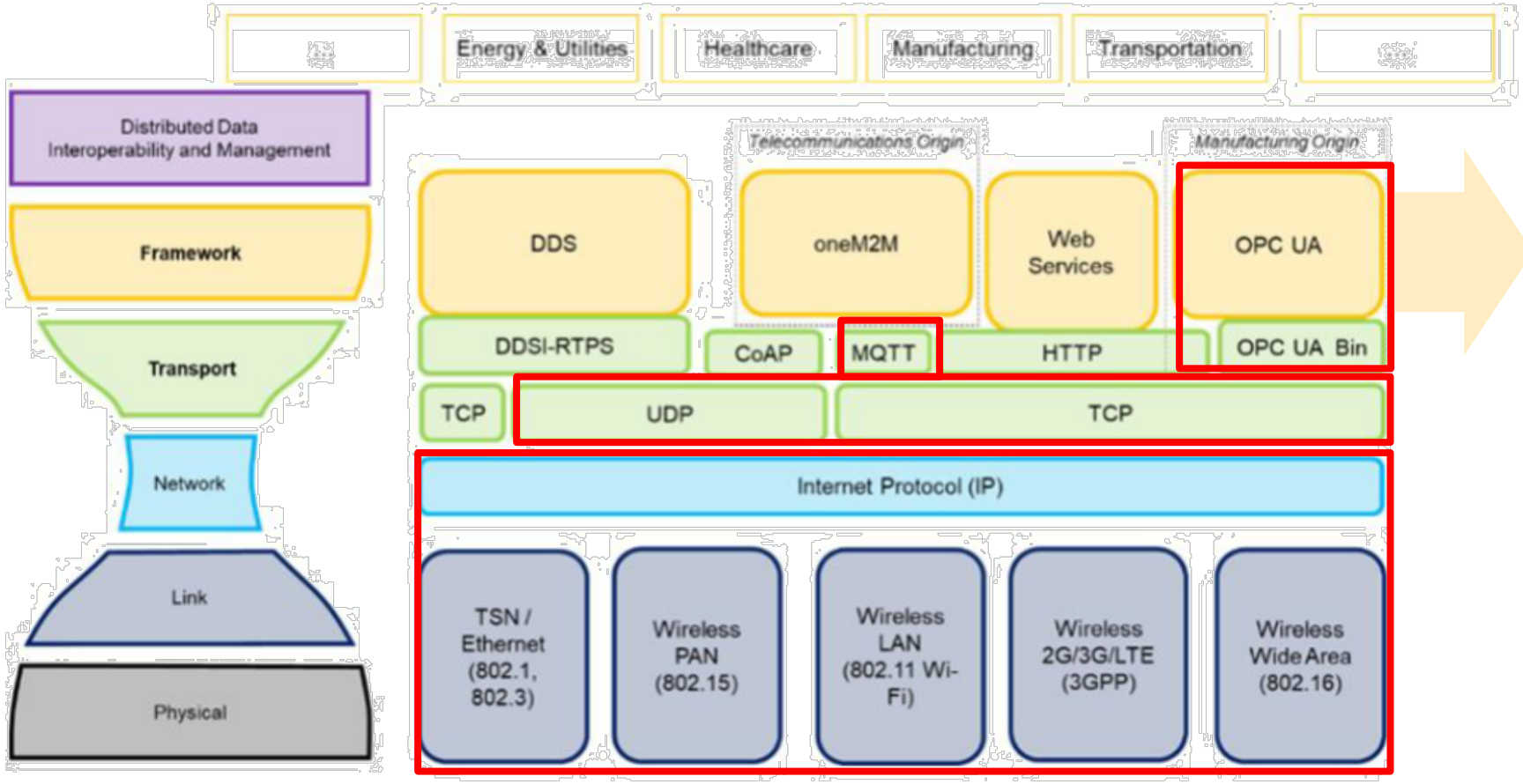
- Number of Core Data Standards kept as small as possible to minimize complexity



Source: Industrial Internet Consortium (www.iiconsortium.com)

CRITERIA EXAMPLES:

- ✓ Syntactic Interoperability
- ✓ Secure
- ✓ Performant
- ✓ Scalable
- ✓ Reliable
- ✓ Resilient
- ✓ Open Standard
- ✓ International Adoption
- ✓ Vendor Agnostic
- ✓ SDKs Available (Open Source + Commercial)

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Key OPC UA Highlights

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Data Security

- Ground-Up Secure Design
- Based on latest security standards
- Encryption
- Recognized by 3rd Party organizations:
  - NIST
  - Industrie 4.0 (BSI)
  - MDIS
  - …

OPC UA: Successfully Passed Security Testing

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	Authentication	Authorization	Confidentiality	Integrity	Auditability	Availability
Message Flooding						X
Eavesdropping			X			
Message Spoofing		X		X		
Message Alteration		X		X		
Message Replay		X				
Malformed Messages				X		
Server Profiling	X	X	X	X	X	X
Session Hijacking	X	X	X			
Rogue Server	X	X	X		X	X
Compromise User Credentials		X	X			

Example: OPC UA Network Traversal

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OPC UA ReverseConnect

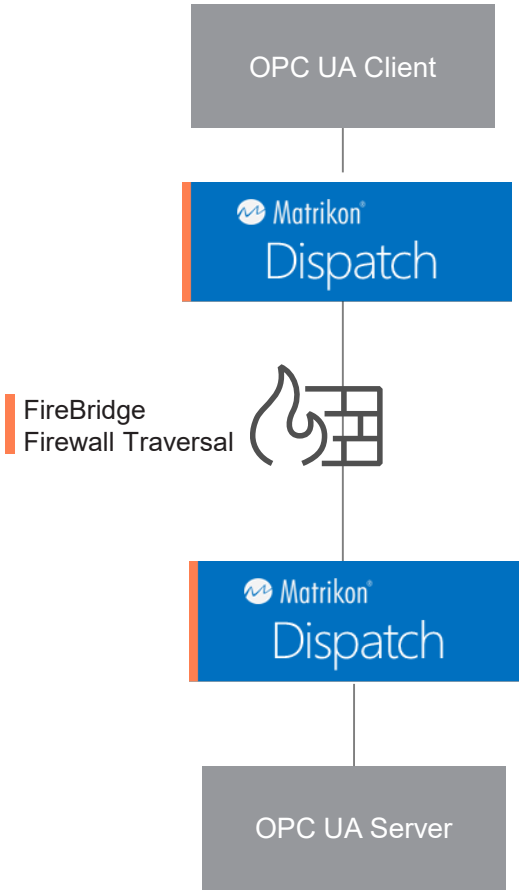
Key Benefits:

- **Follows IT firewall best practices**: No in-bound firewall port exceptions required.
- **OPC UA Compliant:** Works with other Reverse Connect enabled OPC UA Clients and Servers

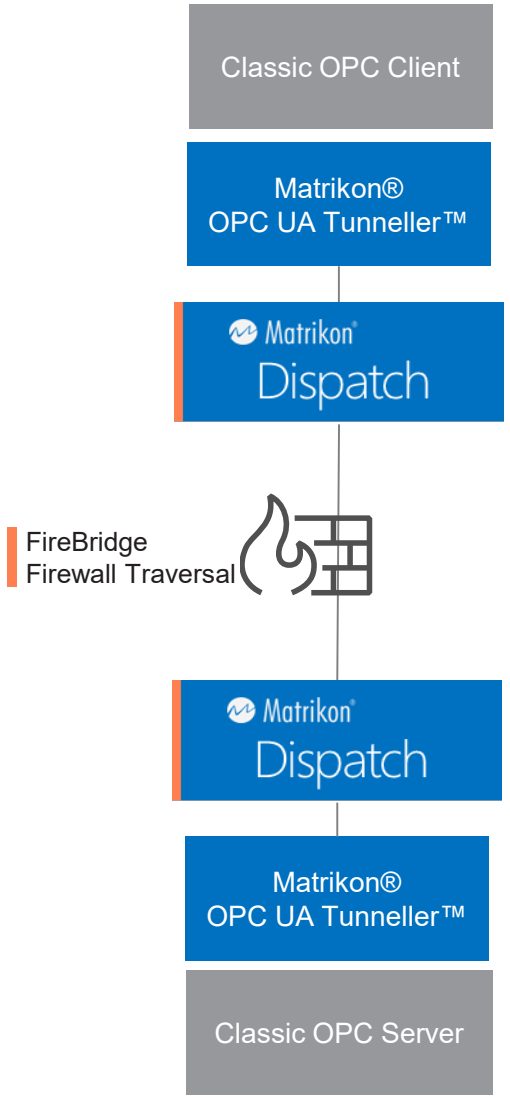
- If OPC UA Client and OPC UA Server do not support Reverse Connect

Dispatch FireBridge can be used with OPC Classic components via UAT

OPC UA Only



OPC Classic



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Key OPC UA Highlights

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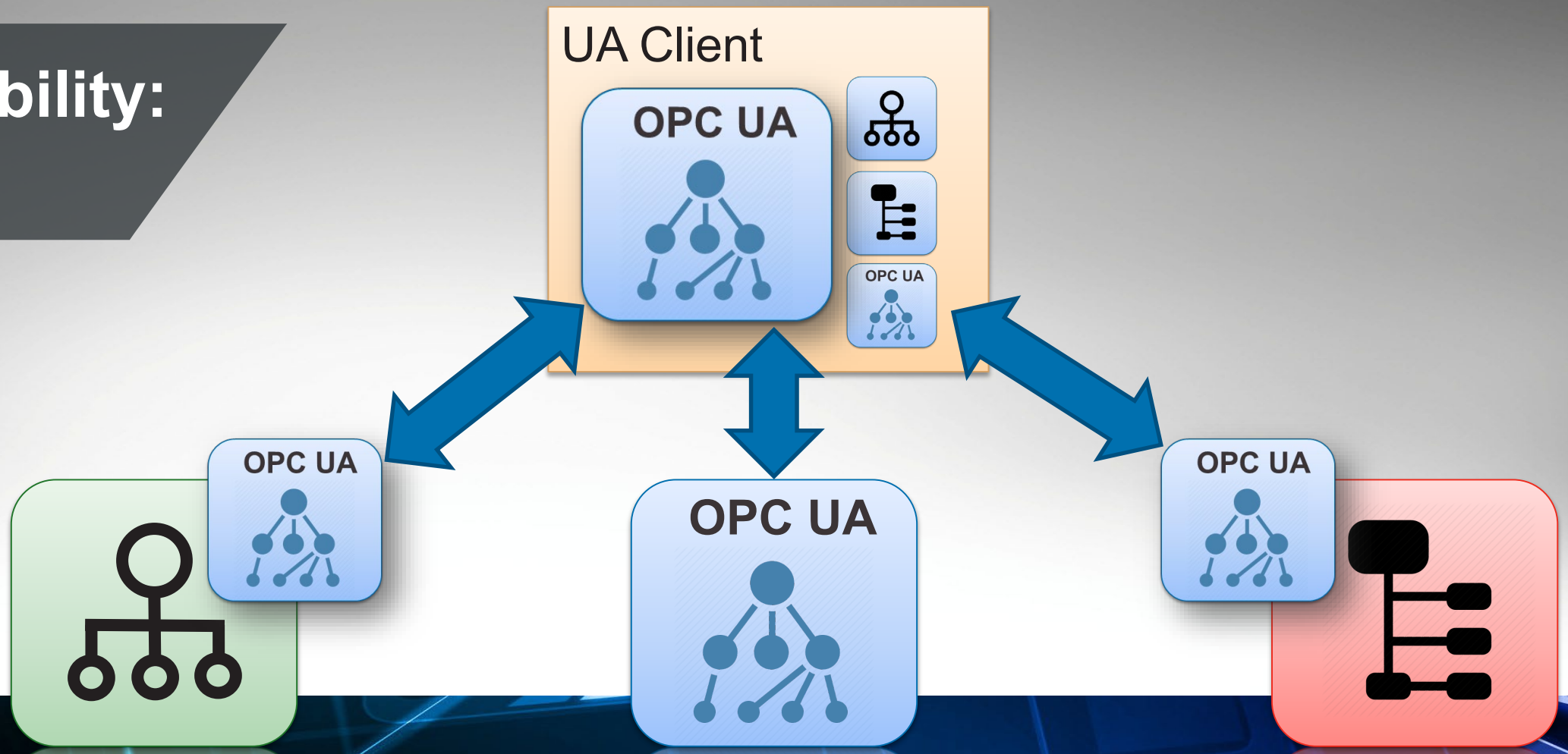
Interoperability: Data



Key OPC UA Highlights

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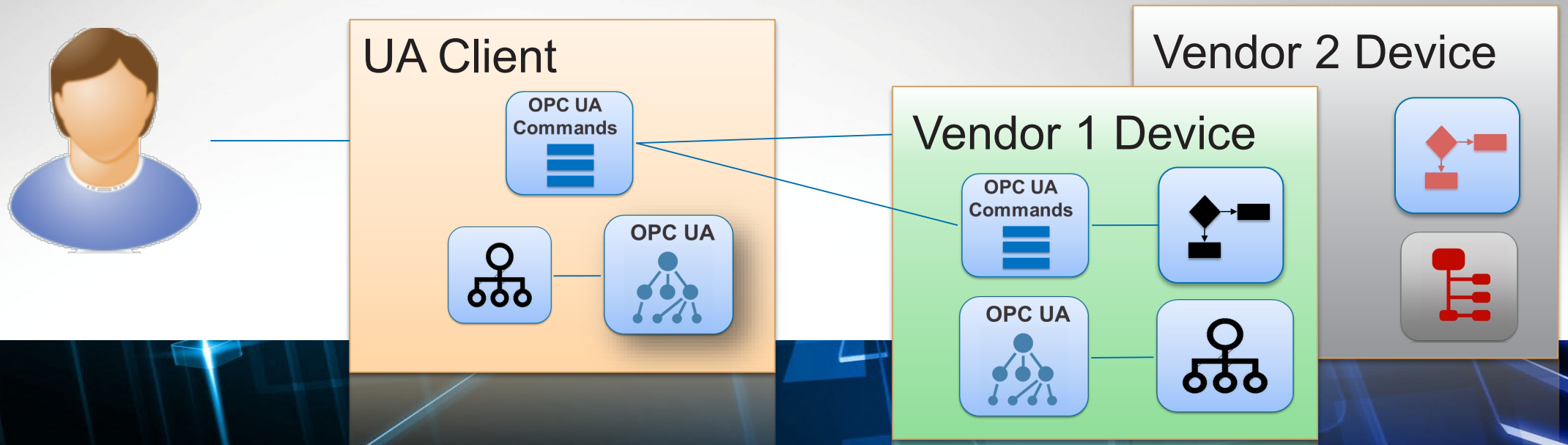
Interoperability: Services

- OPC UA enabled devices can securely expose Services
- Use common service names instead of vendor specific commands



Conceptual: OPC UA Information Models

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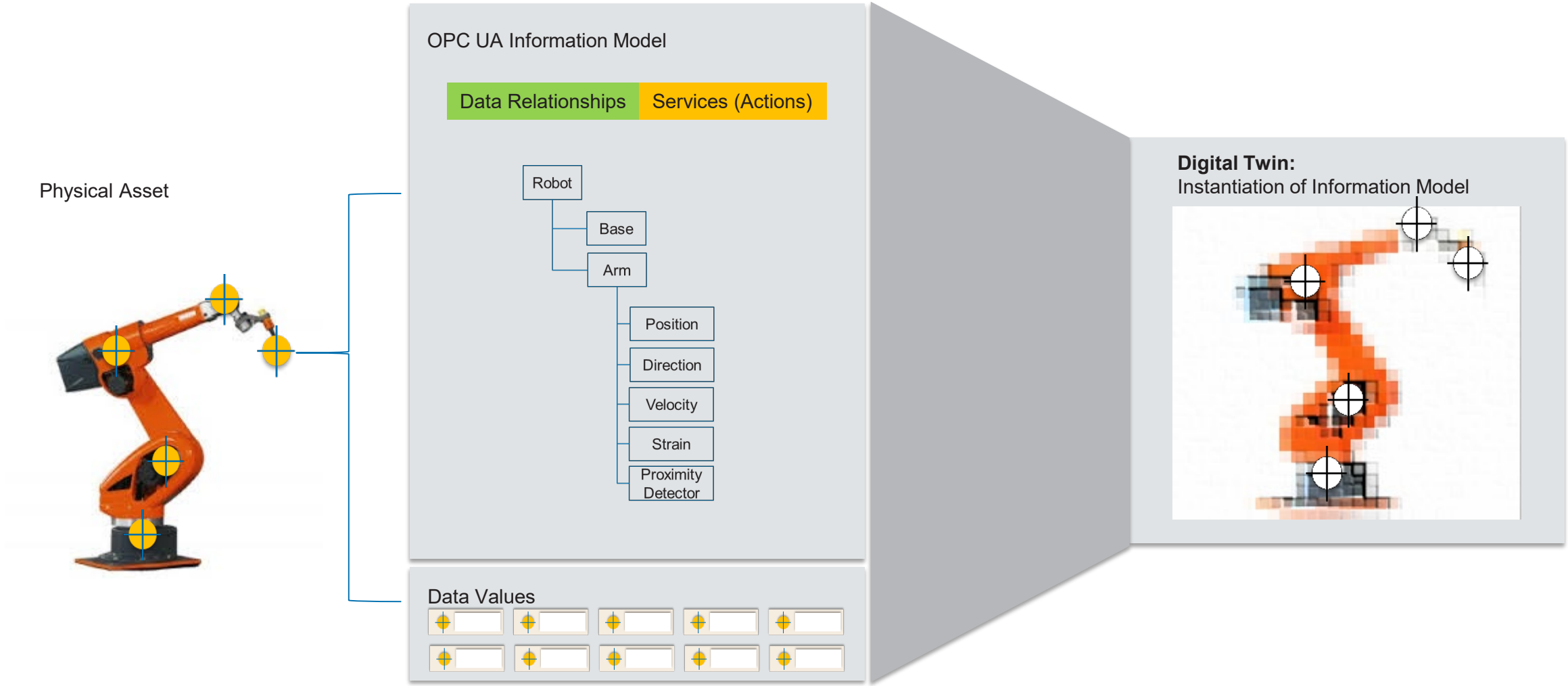
- Interoperability is facilitated by interactions between components' IM based "digital twins"



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OPC UA Companion Specifications

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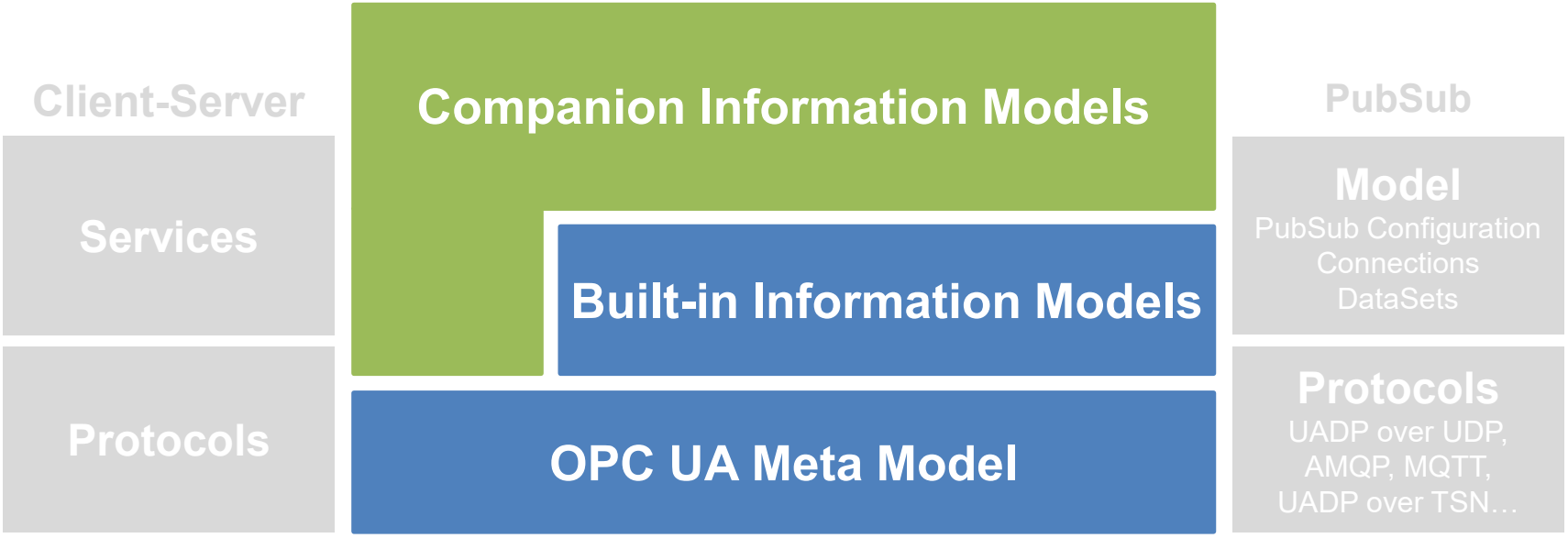
- OPC UA defines HOW to create universal Information Models (IMs)
- Domain experts define WHAT the IMs are in their respective domains
- OPC UA based IMs are standards-based: can be shared among 3rd party OPC UA components



Source: OPC Foundation

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OPC UA Companion Spec. Collaborations

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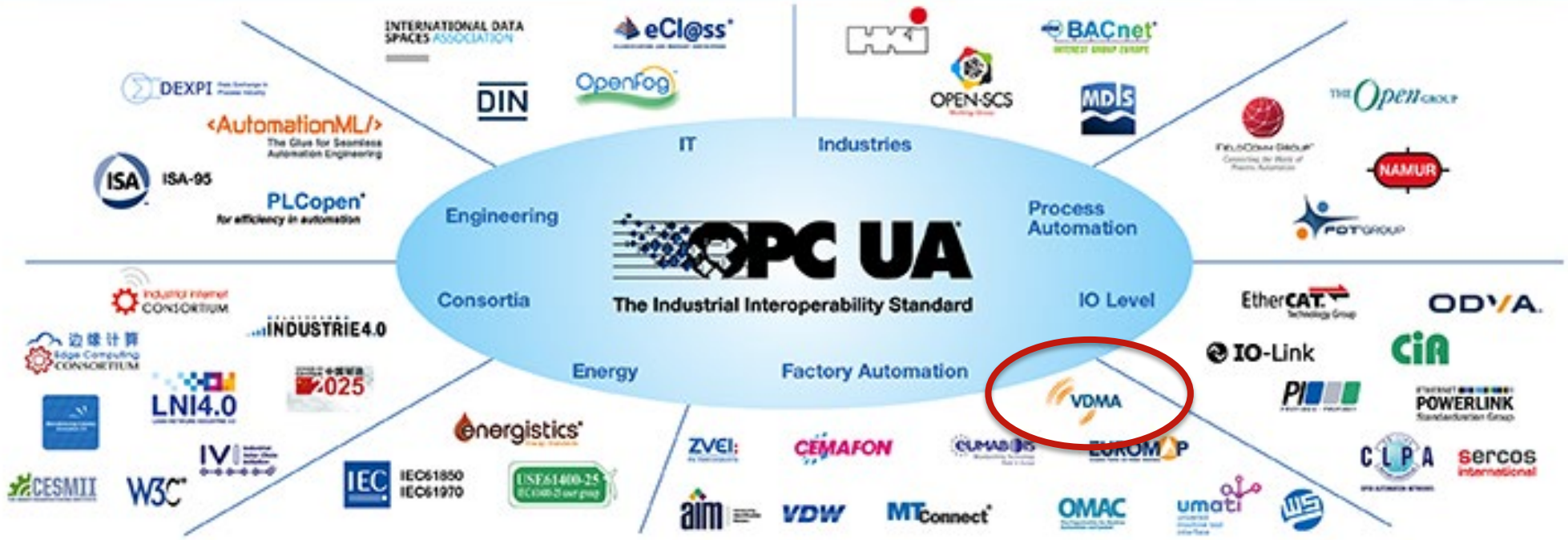
Collaboration Domain Specific Information Models

The OPC Foundation closely cooperates with organizations and associations from various branches.
Specific information models of other standardization organizations are mapped onto OPC UA and thus become portable.



Graphic: OPC Foundation (www.opcfoundation.org)

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Today‘s position of OPC UA inside the VDMA
目前OPC UA在VDMA的推广情况

- Agricultural Machinery
- Air Conditioning and Ventilation
- Air Pollution Control
- Air-handling Technology
- Building Control and Management
- Cleaning Systems
- Compressors, Compressed Air and Vacuum Technology
- Construction Equipment and Building Material Machines
- Drying Technology
- Electrical Automation
- Electronics, Micro and Nano Technologies
- Engine Systems for Power and Heat Generation
- Engines and Systems
- Fire Fighting Equipment
- Fluid Power
- Food Processing Machinery and Packaging Machinery
- Foundry Machinery
- Gas Welding
- Glass Industry
- Hydro Power
- Integrated Assembly Solutions
- Large Industrial Plant Manufacturing
- Lifts and Escalators
- Machine Tools and Manufacturing Systems
- Machine Vision
- Materials Handling and Intralogistics
- Measuring and Testing Technology
- Micro Technologies
- Mining
- Plastics and Rubber Machinery
- Power Systems
- Power Transmission Engineering
- Precision Tools
- Printing and Paper Technology
- Process Plant and Equipment
- Productronic
- Pumps + Systems
- Refrigeration and Heat Pump Technology
- Robotics
- Security Systems
- Software and Digitization
- Surface Treatment Technology
- Textile Care, Fabric and Leather Technology
- Textile Machinery
- Thermal Process Industry
- Thermal Turbines and Power Plants
- Valves
- Waste Treatment and Recycling
- Wind Energy
- Woodworking Machinery

OPC UA CS Release (Candidate)

OPC UA CS under development

Awareness existent

I4.0: The Administration Shell

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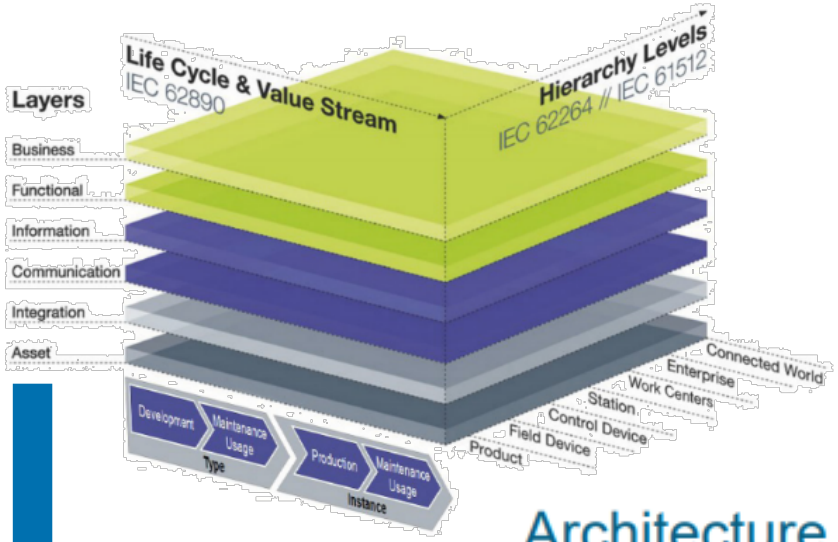

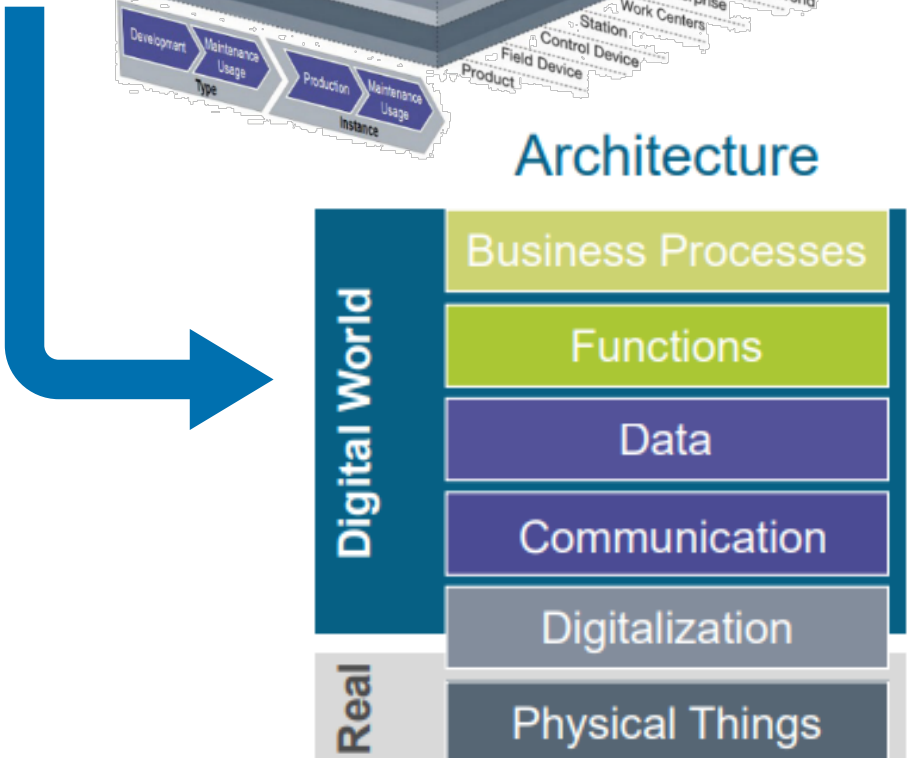

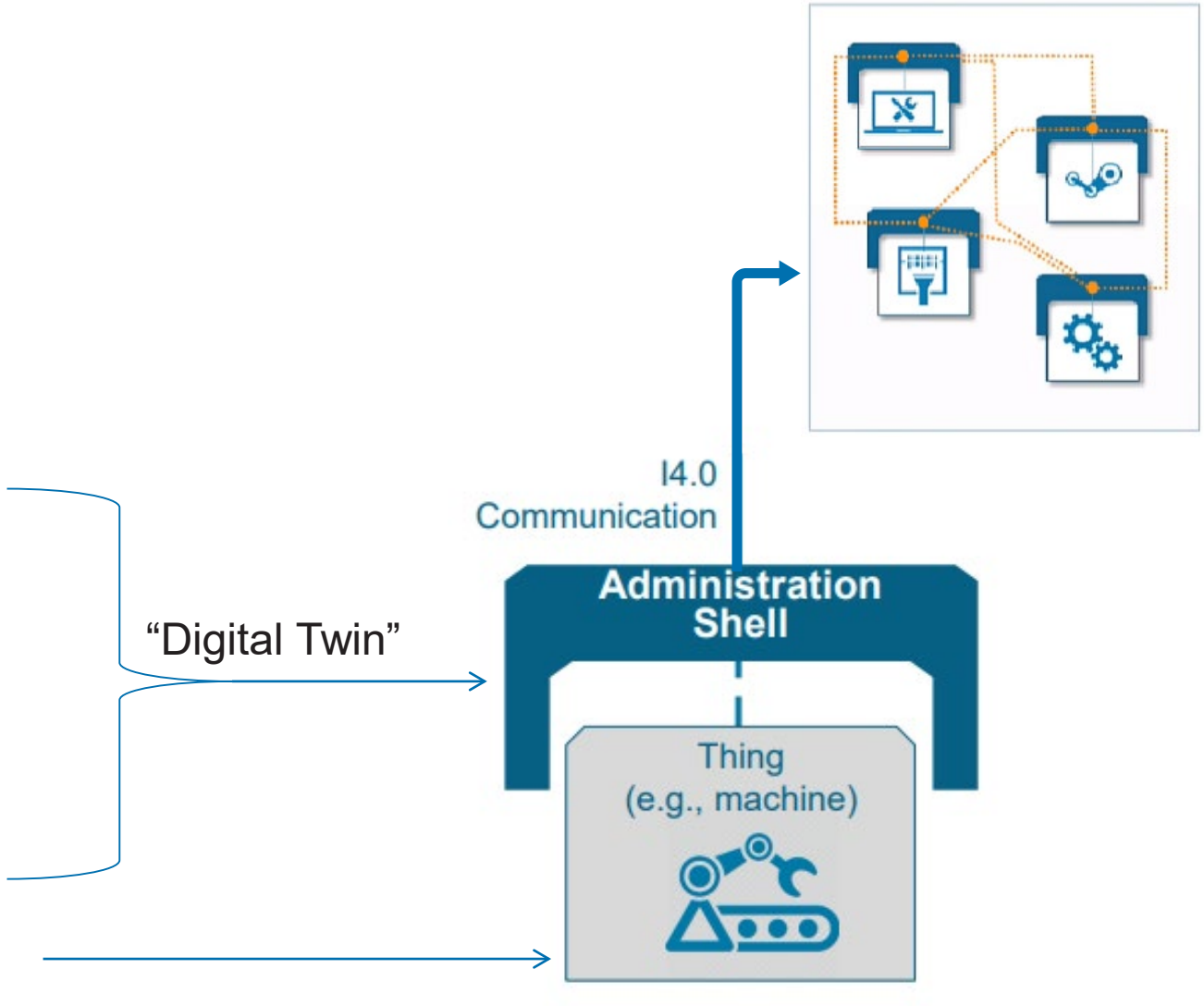

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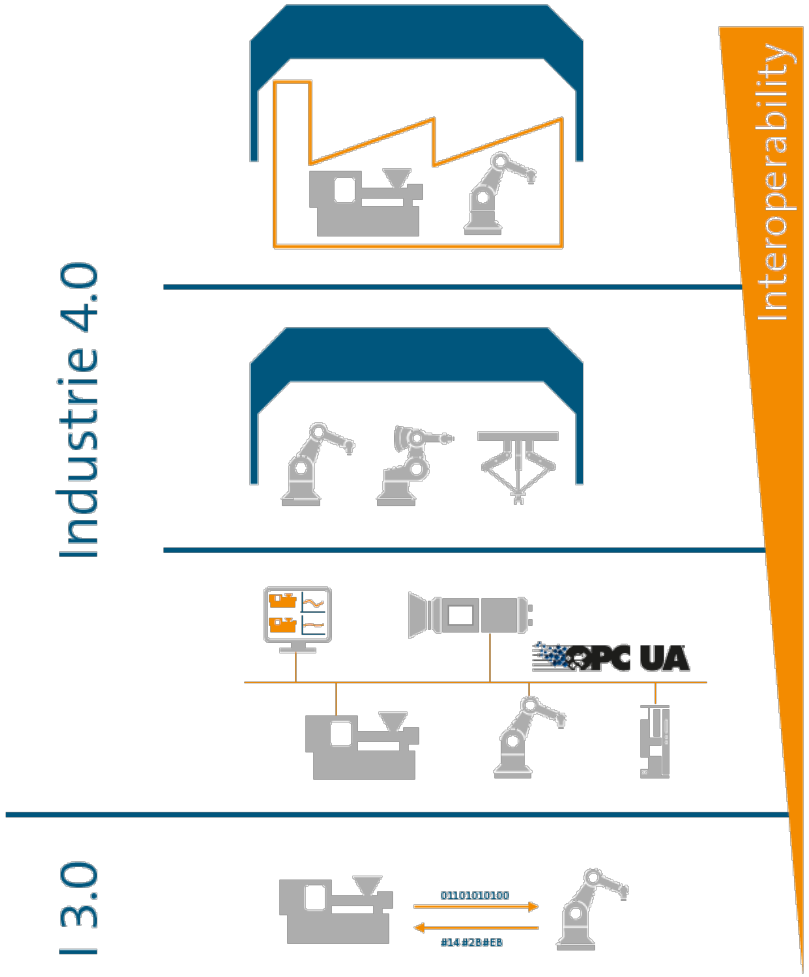

Cross domain harmonized information models	▸ Cross-industry interoperability ◦ OPC UA with industry standard Companion Specifications
Domain specific harmonized information models	▸ Cross-vendor interoperability in the industry ◦ OPC UA with industry-specific Companion Specs
Meshed communication network	▸ Industrial activities without modelling ◦ OPC UA for individual use cases
Proprietary communication	▸ Proprietary solutions

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Example: Matrikon® Data Technology In Action

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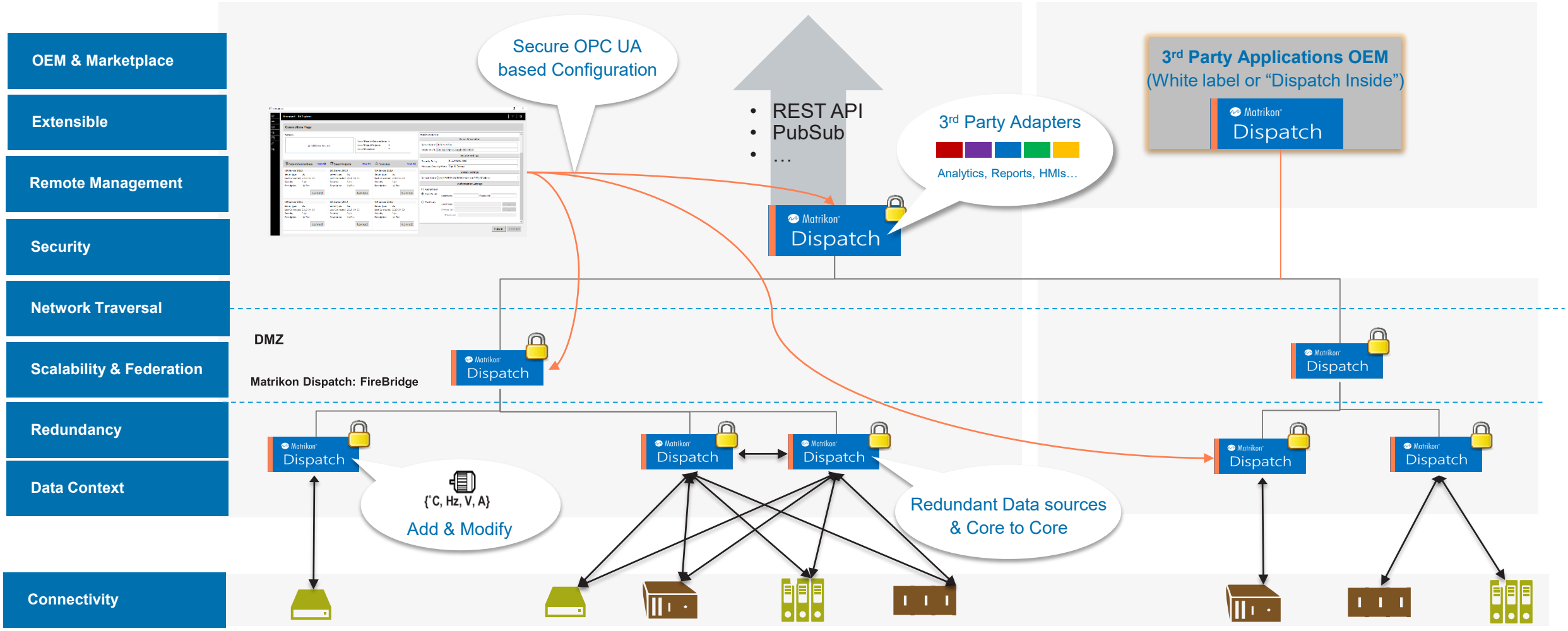

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OPC UA Is At The Heart of Interoperability

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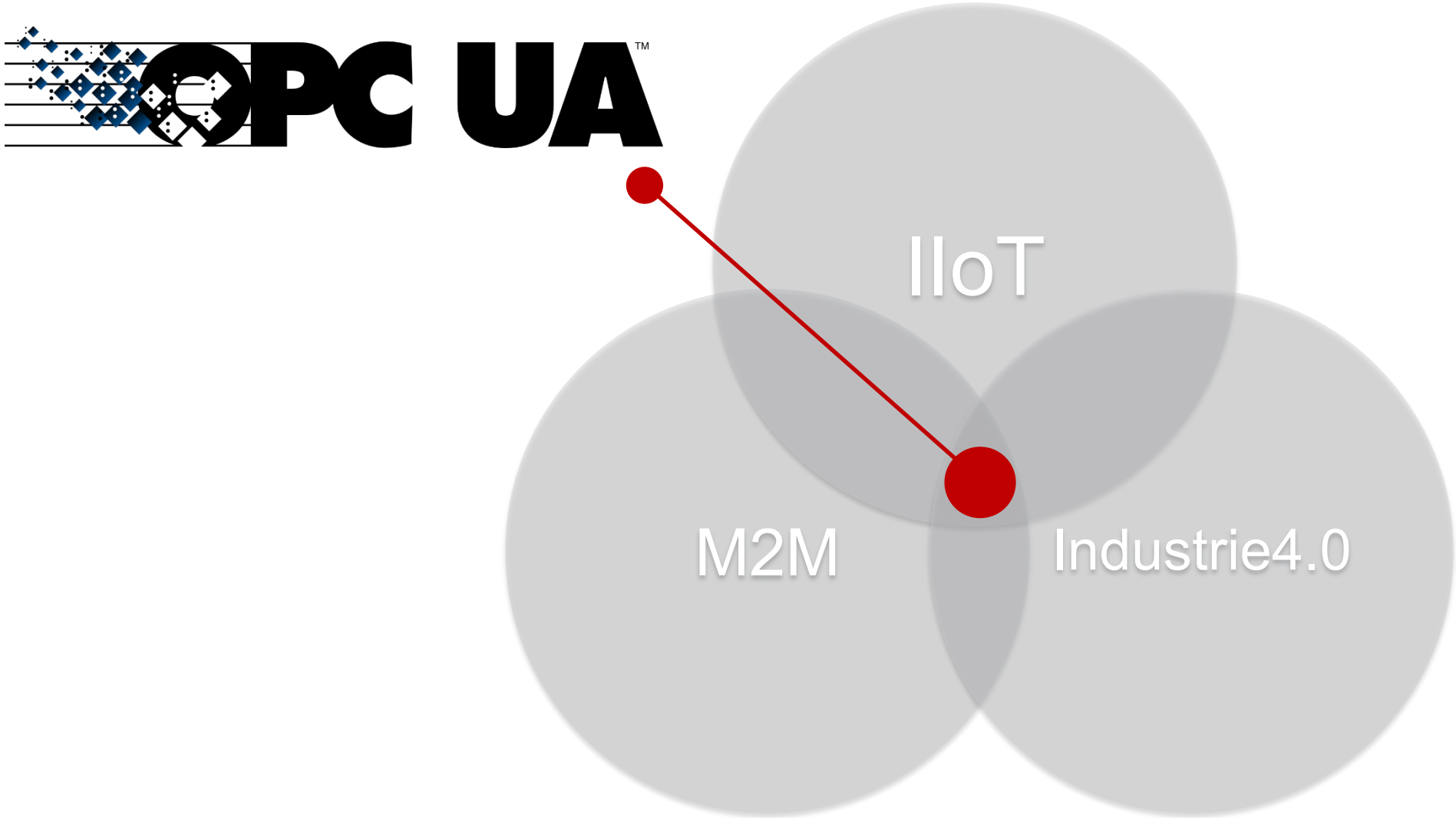

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Thank You

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Q&A

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Questions

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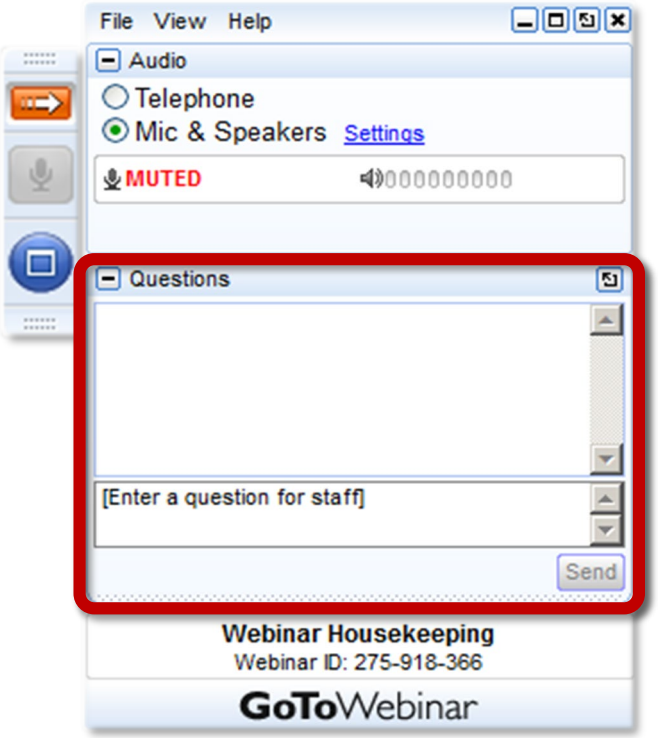

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Upcoming Webinars

- **9 June:** Artificial Intelligence and Machine Learning
- **7 July:** Practical Industrial IoT

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Thank you

Today's presenter:

Darek Kominek –
darek.kominek@matrikonopc.com

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