



OPCF / OPC-UA

Sebastian Kaebisch

30 November 2021

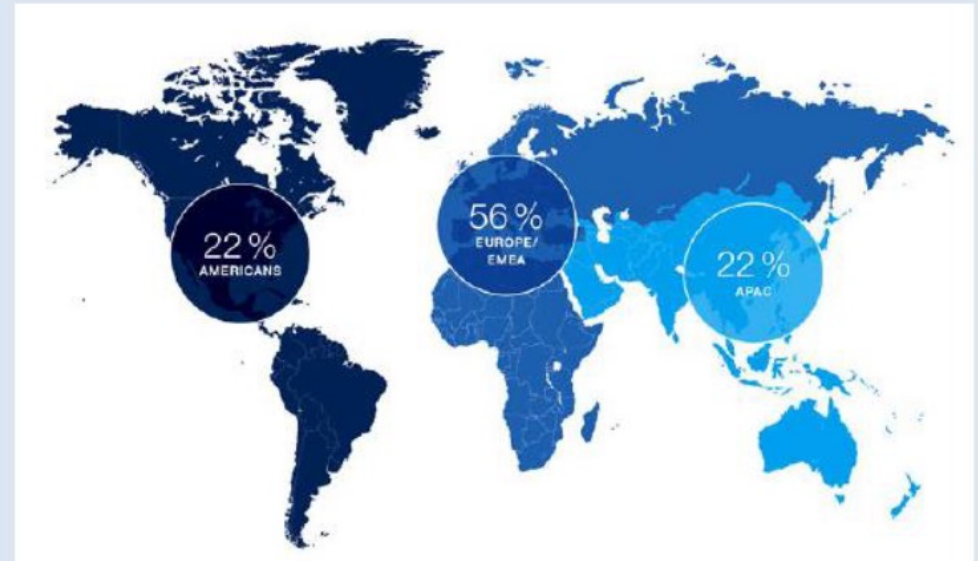
OPC Foundation <https://opcfoundation.org>

- ▶ Vision
 - Secure & reliable
 - Vendor, platform, and domain agnostic
 - interoperability from sensor to enterprise and beyond
- ▶ Global Profile
 - Non-profit organization (founded 1995)
 - Companies from Automation & IT
 - Internationally recognized: OPC UA is IEC62541
- ▶ Deliverables
 - Specifications: openly available
 - Tools and code examples: open source for faster, easier adoption (AnsiC/C++, C# .NET Standard, Java)
 - Certification: OPC Labs open to everyone
 - Marketing: Evangelize solution in various markets
- ▶ Ecosystem with toolkits and education
- ▶ Modern IPR policy



Organizational Overview

Membership: 820 (Status: June 8th, 2021)



Board of Directors (elected for 2021/2022)

Microsoft	Honeywell	Rockwell
SAP	Yokogawa	Schneider
Siemens	Mitsubishi	ABB
Beckhoff	Ascolab	Emerson

Liaison & Memorandum of Understanding between W3C WoT and OPC-UA

W3C and OPCF to integrate OPC-UA into the Web of Things

05/09/2016

2016 | April – At the Hannover Fair, Thomas J. Burke, President and Executive Director of the OPC Foundation and Dave Raggett, W3C lead for the Web of Things signed a Memorandum of Understanding in which both organizations agree to closely cooperate to ensure interoperability for the Internet of Things (IoT).

OPC and W3C have mutual goals, requirements and use cases developing an infrastructure to promote and facilitate across domain applications for open markets for horizontal integration along the value chain and supply chain, and vertical integration from manufacturing cells to enterprise management systems. These integration opportunities are the infrastructure necessary for IoT.

This unique collaboration between the OPC Foundation and W3C provides a complete solution as the essence of IoT connectivity horizontally and vertically across a multitude of domains. The collaboration provides the infrastructure for the Industrie 4.0 reference architecture facilitating the vision and execution of a “Smart Factory”.

Read more [here](#)

<https://opcfoundation.org/news/opc-foundation-news/w3c-and-opcf-to-integrate-opc-ua-into-the-web-of-things/>

OPC Foundation and W3C agree to cooperate together to ensure interoperability for IoT

04/26/2016

For Immediate Release

OPC Foundation and W3C Sign Memorandum of Understanding at Hannover Fair

OPC Foundation and W3C agree to cooperate together to ensure interoperability for IoT

Hannover, Germany – April 26, 2016 – At the Hannover Fair, Thomas J. Burke, President and Executive Director of the OPC Foundation and Dave Raggett, W3C lead for the Web of Things signed a Memorandum of Understanding in which both organizations agree to closely cooperate to ensure interoperability for the Internet of Things (IoT).

OPC and W3C have mutual goals, requirements and use cases developing an infrastructure to promote and facilitate across domain applications for open markets for horizontal integration along the value chain and supply chain, and vertical integration from manufacturing cells to enterprise management systems. These integration opportunities are the infrastructure necessary for IoT.

This unique collaboration between the OPC Foundation and W3C provides a complete solution as the essence of IoT connectivity horizontally and vertically across a multitude of domains. The collaboration provides the infrastructure for the Industrie 4.0 reference architecture facilitating the vision and execution of a “Smart Factory”.

Based on this motivation, OPC and W3C will collaborate with a strong focus on semantic interoperability. Both organizations will share requirements and use cases for consideration in their joint work. The primary goal of this collaboration is to establish a common framework for semantic interoperability and secure services across platforms, that have broad applicability beyond digital automation. This collaboration will provide the underpinning necessary to achieve seamless interoperability in the IoT.

The OPC Foundation and W3C collaboration will result in the development of specifications, white papers, guidelines and processes that provide the infrastructure necessary for the two organizations to promote system wide interoperability as the foundation of IoT. Deliverables from the collaboration between the two organizations will benefit the members of both of the respective organizations in the pursuit of developing and achieving information integration across a multitude of domains. IoT is an exciting opportunity for connectivity and information integration across

<https://opcfoundation.org/news/press-releases/opc-foundation-and-w3c-agree-to-cooperate-together-to-ensure-interoperability-for-iot/>

Collaboration Work

achieve seamless interoperability in the IoT.

The OPC Foundation and W3C collaboration will result in the development of specifications, white papers, guidelines and processes that provide the infrastructure necessary for the two organizations to promote system wide interoperability as the foundation of IoT. Deliverables from the collaboration between the two organizations will benefit the members of both of the respective organizations in the pursuit of developing and achieving information integration across a multitude of domains. IoT is an exciting opportunity for connectivity and information integration across disparate systems and disparate domains; the collaboration between the OPC Foundation and W3C clearly provides the solution for the IoT.

"Industrie 4.0 integrates IIoT, IoT, and M2M as part of the reference architecture for the Smart Factory", says Stefan Hoppe, OPC Foundation Global vice president. "The collaboration between the OPC Foundation and W3C provides the solution for semantic interoperability for connected devices across the IoT spectrum, accurately realizing the vision of Industrie 4.0."

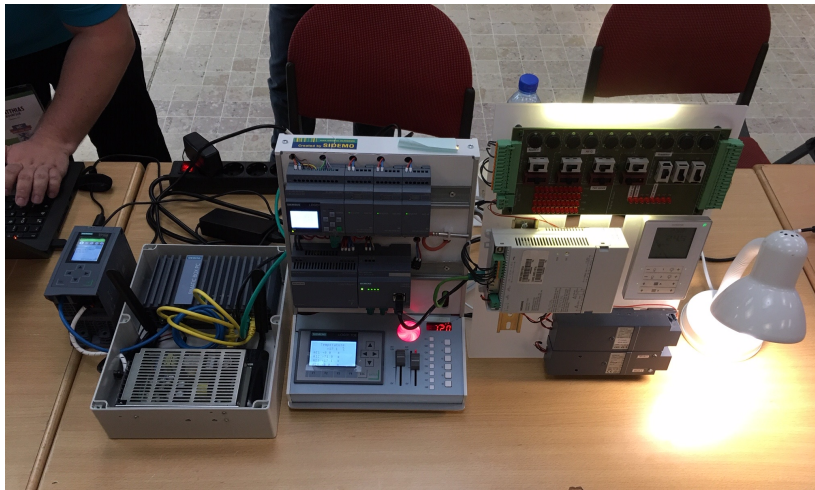
"There is huge potential for digital automation, but this is being held back by a lack of interoperability across different IoT platforms", said Dr. Dave Raggett, W3C lead for the Web of Things. "The collaboration with the OPC Foundation will help W3C in its efforts to develop inter-platform Web technology standards on semantic interoperability and end to end security"

Related Use Cases

- Cross Protocol Interworking
 - <https://w3c.github.io/wot-usecases/#X-Protocol-Interworking>
- Building Technologies
 - <https://w3c.github.io/wot-usecases/#smart-buildings>
- Industry 4.0 (wip)
 - <https://github.com/w3c/wot-usecases/pull/90>
- Digital twins
- ...

Experiences in WoT PlugFest

Example:



TPAC 2018, Lyon



WoT Event 2019, Munich

2021-12-23

W3C Web of Things (WoT) WG/IG



Protocol Support

- HTTP ✓
- HTTPS ✓
- CoAP ✓
- CoAPS ✓
- MQTT ✓
- Firestore ✓
- Websocket + (Server only)
- OPC-UA + (Client only) based on → **node-opcua**
- NETCONF + (Client only)
- Modbus + (Client only)
- M-Bus + (Client only)

Web of Things as Bridging Technology: A *Win-Win* Situation for OPC-UA and Web

OPC UA

World Wide Web

Industry specific
semantics

Rich tool
landscape

Industry
Expertise

OPC UA
Developers

OPC UA IM +
Companions

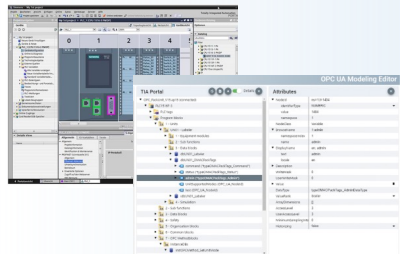
W3C[®]

Web
Technologies

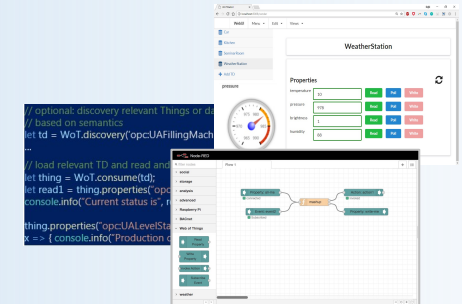
Web
Developer

Interoperability,
Usability

Web of Things



Professional Industrial Engineering



Simple and rapid App development

What is Missing?

HTTP Binding Template

W3C Editor's Draft 23 September 2021

▼ More details about this document

This version:
<https://w3c.github.io/wot-binding-templates/http>

Latest published version:
<https://www.w3.org/TR/wot-http-template/>

Latest editor's draft:
<https://w3c.github.io/wot-binding-templates/http>

Editors:
Michael Koster (SmartThings)
Ege Korkan (Siemens AG)

Other documentation
In the GitHub repository

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MQTT Binding Template

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CoAP Binding Template

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MODBUS binding template

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Latest editor's draft:
<https://w3c.github.io/wot-binding-templates/modbus>

Editor:
Cristiano Aguzzi (Invited Expert)

Other documentation
MODBUS ontology

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Defines formally how the *forms* in the TD should be set up for OPC UA based endpoints.
→ Not existing yet!

OPCUA binding

W3C Editor's Draft 15 October 2021

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<https://w3c.github.io/wot-binding-templates/opcu>

Editor:



idea / proposal

Proposed Idea



Setup new OPC UA companion specification

- defines OPC UA Binding Ontology for having metadata available for communication and security definition (namespace already exists for UA data modeling)
- guideline to transform UA NodesetFile to Thing Description (and vice versa)

Setup new W3C Binding Note for OPC UA

- Provide formal approach how TD *forms* should be designed for UA based endpoints based on OPC UA Binding Ontology (similar with, e.g., HTTP)
- organize PlugFest and design scenarios to evaluate working assumptions

<https://github.com/w3c/wot/tree/main/liaisons/opcf>

Proposed Next Step

1. Meeting with W3M / W3C Legal department
→ decide if a new MoU is needed
→ if there is an agreement, go to 2
2. Get in touch with OPC representants and OPC UA legal department
→ if there is an agreement, go to 3
3. Setup and declare joint working activity
→ if done, got to 4
4. Start activity (based on step 3) such as
→ start Companion specification at OPC UA side
→ start Note specification at W3C side