



IEC ACADEMY WEBINAR Q&A DOCUMENT

(please note some duplicates and other comments will have been removed)

Webinar title:

IoT and Digital Twin Standardization (ISO/IEC JTC1/SC41 Webinar)

Day 1 = Tuesday 2022-04-26

Day 2 = Thursday 2022-04-28

Questions (Day 1)	Answers
Will the various presentations become available for the participants after the webinar?	The recording, slides and Q&A document will be shared after the event on https://www.iec.ch/academy/webinars . Recording and slides should be available early next week. All registrants will receive an email once the Q&A answers are also posted.
Could you tell me which TC covers AI?	ISO/IEC JTC 1/SC 42 Artificial Intelligence (https://www.iec.ch/ords/f?p=103:7:10539037612717::::FSP_ORG_ID:21538).
Can you please advise any relation between JTC1/SC41 and IEC 61499 that was developed a bit earlier. And its predecessor IEC 61131. Were there any other documents that went into a base of your work?	I am not aware of any relationship. JTC 1/SC41 has a JWG with IEC/TC65 and we are exploring how to cooperate further in this era of OT/IT convergence. More on this in the coming presentation on IoT.
Why do JTC/01 keep using DTw when all industry groups seem to use DT? It feels like an intentional divergence for what the real world is doing.	To avoid misunderstanding with "Digital Transformation" which is also used often/frequently in Context of Standardization. The DT acronym has also many meanings. See, for instance, https://acronyms.thefreedictionary.com/DT .
Strategic Approaches, trustworthiness, are we exploring requirements of validating/testing the DTw based on specific domains?	If we look at DTw as a software application, there is already a large body of knowledge and standards for validation and testing (published by ISO/IEC JTC 1/SC7). Generic trustworthiness issues are within the scope of SC41. Domain specific are not. More on SC41 work on DTw on Thursday.

Is it already known how are those Use Cases collected and documented?	They are collected through the participating countries and the liaisons. Documentation inspired from https://syc-se.iec.ch/deliveries/iec-62559-use-cases/. A first set was published in ISO/IEC TR 22417:2017. This work is ongoing.
How may I join WG 6?	You Can join through your national standardization organization or through a liaison. See https://www.iec.ch/dyn/www/f?p=103:29:16836252517461:::FSP_ORG_ID,FSP_LANG_ID:20486,25.
The IEC 61850 standard by TC 57 WG 10 enables interoperability through standardised semantics and communication services. What are the aspects of interoperability discussed by WG 4? Are there suggested methodologies defined by WG 4 to verify IoT interoperability?	live answered.
How are you collaborating with IEC SyC Smart Manufacturing and ISO TC 184?	This will be covered in a presentation at 13h05 UTC.
I did not see a liaison to ETSI (for what reasons if any)	Will be covered in my presentation about IoT/ Industrial Digital Twin later this afternoon.
I did not see a liaison to ETSI (for what reasons if any)	SC41 does not have yet a liaison with ETSI. https://www.iec.ch/dyn/www/f?p=103:29:16836252517461:::FSP_ORG_ID,FSP_LANG_ID:20486,25#4.
Why is WG3 working on a IoT and DT vocabulary standard (20924) when WG6 are working on a concepts and terminology standard (30173)? This feels like a big overlap!	The work is coordinated through a Vocabulary Rapporteur.
In the context of systems of systems and evolving architectures, there are good success stories from partnership projects. The mobile industry evolved from 2G to 5G+ (via 3GPP) while oneM2M has a Release 1 to Release 5 roadmap for IoT systems.	
Does the standardisation of IoT include robustness against unusual events, or run-away situations. Financial trading systems have become unstable when reacting to external feedback. Individual QA checks on the software itself may not be sufficient to protect against this, when the inputs come from many external sources.	This is in the scope of our work on 'trustworthiness' - topic of our closing panel today.

is the requirement to purchase standards having any effect on adoption? How are small and medium enterprises able to adopt the standards?	It probably has an effect - but it does not stop it. Internal standards can influence the body of knowledge in an area. They can also influence standards published by other standardization organizations and industrial consortia - which are in some cases freely available. Finally, foundational standards from SC41 influence sectors / domain specific standards that are widely used.
Question to Detlef regarding Digital Twin: Semiotics is in the abstract and mostly academic philosophical analysis of the source of meaning and its communication. All well and good for philosophers or linguists, but in the engineering digital twin domain, my question is whether semiotics is necessary to get into deep questions of epistemology or ontology?	Here's my email address and Jan deMeer and me are interested to discuss and explain after this session: detlef.tenhagen@harting.com Please refer to your text by COPY.
I would be very interested in the BioDigital Convergence (IEC/SEG12) topic. Is there any more detailed information available?	https://docs.google.com/presentation/d/e/2PACX-1vS5R2M9LHd7bEOnUEY34VNjccV7JABmvOO2jD2e9bobpdjyglL1c8FFEcWI4VMOjxd3r4_gF1w-IW3/pub?start=false&loop=false&delayms=3000
I would be very interested in the BioDigital Convergence (IEC/SEG12) topic. Is there any more detailed information available?	You can register on this page: https://www.iec.ch/ords/f?p=103:186:16836252517461:::FSP_ORG_ID,FSP_LANG_ID:27561 ,
What techniques could we apply in order to improve trustworthiness? Could we use techniques such as ethical hacking and similar?"	Please see: https://docs.google.com/presentation/d/e/2PACX-1vQtKHQVDAarBQ0Mn8Cru9Gu9DMmT56FAuAR2plsuXuNkv6bQxjkKBs4UVoHbL_iYxPGnoALUmgwoHYZ/pub?start=false&loop=false&delayms=3000
Have you ever worked with Latin American committees in order to develop new IEC standards?	Many Latin American countries are members of the IEC and participate in many projects.
What is the machine equivalent for a biometric that authenticates it with the overall system?	Work in this is done at https://www.iso.org/committee/313770.html
Do you consider Building Management Systems as a part of IoT? Which industry or field do you mark as your leading tractor in terms of impact, importance and general value?	Modern BIM are IoT (and OT) intensive. Some people also view Digital Twins as BIM 4.0.
Eric mentioned patterns forming the foundation of the architecture. Is trustworthiness being reviewed for each of the patterns	

No this is "pertaining to human beings to support interoperability and data interchange among applications and systems". I am asking about the equivalent of MACHINE biometrics, a non-human entity that needs to give nonchargeable device info, ownership, location, etc. info so the system and humans can trust "it". Thank you.	Are we talking about blockchains based architectures? ISO/IEC TR 30176:2021 Edition 1.0 (2021-11-04 Internet of Things (IoT) - Integration of IoT and DLT/blockchain: Use cases".
Thank you, Francois, I will check with IEC SC45 Nuclear about any activities on these topic. So far, most popular (and very commonly used) DTw for Nuclear are simulators and standards for testing and validation of them have fallen out of SC45 scope.	
Would you agree that good data requires accurate time/date stamps? Therefore, a distributed system of sensors will need a coordinated time-base or access to an accurate time reference.	I am not an expert - but it does make sense - especially for data streams.
What is the difference between availability and usability?	Availability: property of being accessible and usable on demand by an authorized entity [SOURCE: ISO/IEC 27000:2018, 3.7]. Usability: extent to which a system (3.3.9) product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. Note 1 to entry: The "specified" users, goals and context of use refer to the particular combination of users, goals and context of use for which usability is being considered. Note 2 to entry: The word "usability" is also used as a qualifier to refer to the design knowledge, competencies, activities and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, usability evaluation, usability heuristic.
Thank you, Francois. Yes, BC would be an aspect but not the entirety.	
For any further questions, please contact the IEC Academy: academy@iec.ch	

Questions (Day 2)	Answers
The draft for the use case document covers case studies, not uses cases. When will this be addressed?	Thank you very much for your question. The editor is working on a new version of 30172 now based on the comments collected in the CD stage. I will let the editor know your concerns after the meeting.

Could you share a link to participate in such a workshop.	The workshop was held in September 2021.
Do you have any collaboration with CIGRE organization regarding the development and application of digital twins? FYI a new CIGRE WG A2/D2.65 on "Transformer digital twin" was initiated a couple of months ago, and some preferential subjects in conferences are also related to Digital Twins. A liaison with your work is certainly mostly recommended.	CIGRE has a liaison arrangement in place with IEC regarding several IEC technical committees (https://www.iec.ch/dyn/www/f?p=103:46:0::::FSP_ORG_ID:3279).
Is there a reason why topics like engineering, design and testing are not mentioned for the problems to be solved? Same for KPIs like performance characteristics in case of simulation or real-time behaviour?	Thank you very much for your question and suggestions. We have included the topics on design and testing in ISO/IEC CD 30173. And the KPIs identified in 30172 are being updated. I will let the editors know the aforementioned considerations on engineering, as well as KPIs in case of simulation or real-time behaviour after the meeting.
Very often Digital Twins are represented in 3D. What would be the upsell of using 3D models (which are usually more up front effort to create and update and need specialized tools) over 2D representations (which are easier to create and render)?	In contrast to 2-D representations, 3-D representations of digital twins often allow the inclusion of dynamic/physical functions and time-related processes in the virtual twin part, especially in modeling, as well as the derivation of 2-D views and 3-D subviews to represent the real twin part. Thus, despite higher effort, you get multiple additional benefits compared to a pure 2-D representation. Corresponding viewers for 3-D models are freely available in open source.
Are those workshop materials or outcomes published and available somewhere?	They are available to members of SC41 and liaisons organisations.
Most of the DT concepts/use cases from the previous workshop presented seem to be on the topic of providing situational awareness within a single twin. Will JTC1/SC41 address issues related to using Digital Twins to forecast multiple planning / simulation futures?	Thank you very much for your question. We will address issues related to using Digital Twins to forecast multiple planning/simulation futures in reference architecture and maturity models. Specifically, in the current proposed maturity models, the L4 Collaborative is about cooperation between/among digital twins.
What you call ,DT' isn't it simply ,IT'?	If I may: maybe 'digital twin precursors' in some cases?
When is a digital representation of an entity not a 'digital twin' of the entity?	Depends how you define 'Digital Twin'. Also, some people refer informally sometimes to pre-operation simulations/ models as 'baby digital twins'.

I am interested in the current status of the degree of interoperability between IEC61850 and CIM, including the real issue and gaps.	IEC 61850 is an international standard defining communication protocols for intelligent electronic devices at electrical substations. If CIM here is for city information modelling, you can access more information through https://www.iec.ch/basecamp/city-information-modelling-and-urban-digital-twins. If CIM designates the Common Information Model (IEC 61968. 61971.62325 series), then some activities have already started to address the interoperability between both “semantic domains”, under the IEC 62361-102. A new edition is under preparation
Also, it seems to be good to note here that CIM here in these slides prepared by Laurent is totally different from CIM appeared in the slides prepared by the presenters today until now.	CIM can mean many things - see https://acronyms.thefreedictionary.com/CIM like DT https://acronyms.thefreedictionary.com/DT (This is why SC41/WG6 has retained DTw for Digital Twin.). CIM has been used for more than 20 years in the Energy sector to designate the Common Information Model (IEC 61968. 61971.62325 series).
What is the status of digital twins in the distribution network? I did not see anything in your presentation and wonder what is needed to complete this?	Please refer to the presentation made on April 28th on DT on the Energy sector. As a summary, most of the assets of the distribution network are currently supported by standardized digital twins' interfaces through models and communication from either the 61850 or CIM series. These DTs are today mostly function DTs and not physical/mechanical ones, however they cover most the asset life cycle (except purchasing which is an area of current works). A work is starting at IEC TC17 to get even further on High Voltage equipment to better support relationships between customers (users) and suppliers, i.e to have a set of in-depth standardized properties to describe such asset DT.
I'm coming from Smart Buildings (also called Building management). Which WG or TC would you recommend to participate in?	In ISO there is: https://www.iso.org/committee/656967.html See https://www.iso.org/standard/69259.html For the IEC, see https://www.iec.ch/cities-communities/smart-buildings
Dear Dr. Guo, thank you for your information. I am afraid CIM in TC 57 is common information model.	Please see https://www.iso.org/standard/69259.html. It is true however that the CIM acronym has been used for more than 20 years in the Energy sector to designate the Common Information Model (IEC 61968. 61971.62325 series),

Assume the definition of 'digital twin' is that provided by WG6. Why would we use the term 'digital twin' when it does not conform to that definition? Certainly the 'appropriate rate of synchronization' can vary widely, including both automated and manual means; however if synchronization cannot occur, then no twinning of a digital representation and its target is possible - using the term digital twin is not appropriate because a predicate condition does not exist. I observe that using the term 'digital twin' without synchronization is confusing developers and users of this technological advance.

Please note that the WG6 definition is still in a draft standard. It should be finalized within the next 6 months.

Note that rate of synchronization can occur :

- at “asset” type level, i.e the design of the asset has changed -> the DT of corresponding asset “type” (possibly used during specification) must evolve. This can result from a new firmware being available for example.
- at “asset” instance level, i.e the asset could have been changed by a new asset of same type. But this can also result from a firmware update of this asset. Then the DT of corresponding asset “type” instance must evolve (its serial number, or its firmware version, and functional behavior for example)
- at “asset” environment level, i.e the environment (includes inputs/parameters but may be just the environment characteristics (time, temperature, ..) has changed, then the DT may evolve as well

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