Federal Ministry
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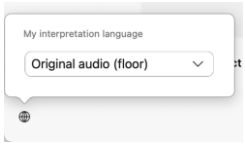
中国国家标准化管理委员会
Standardization Administration of the P.R.C.

中华人民共和国工业和信息化部

15th Meeting of SGSCC Sub-Working Group Industrie 4.0 / Intelligent Manufacturing

15 November 2024 | Bonn

Start: 13:30 CET / 16:30 CST



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Part 1:
Moderation by Ms. Nina Stock, BMWK

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Opening Remarks

Ms. Nina Stock, BMWK

Federal Ministry
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中国国家标准化管理委员会
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Opening Remarks

Ms. ZHAO Fengjie, MIIT

Federal Ministry
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中国国家标准化管理委员会
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Opening Remarks

Dr. Marvin Böll, SCI4.0

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Opening Remarks

Mr. Wenfeng Wang, IMSG

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中国国家标准化管理委员会
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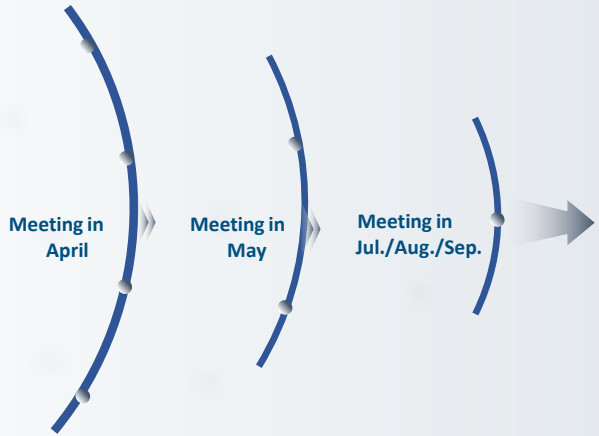
Report on
TEG Network Communications

Presented by:

Dr. Anja Simon LNI4.0

TEG NetCom – current status

Lead Experts
DEU: Dr. Dominik Rohrmus (LNI 4.0)
CHN: Dr. Duan, Shihui (CAICT)



Activities TEG NetCom 2024

→ Lead experts' exchanges taken place in a coordinated manner to collectively identify and refine prospective areas for future cooperation.

→ Finalised an agreement to unveil the areas of cooperation, study items, and provide a glimpse of what lies ahead.

TEG NetCom – Next steps

Study items the TEG wants to explore in the future:

Large-scale TSN networks

- **Both sides agree: Use cases** are the **driver for the market adaption** of TSN technologies， TSN is changing from standardization to practicality and gradually expanding the application range
- CHN and DEU focus on **production line use cases and Expand the its application range**
- Upcoming **requirements** addressed by large scale TSN networks:
  - Support of multiple applications on a single network
  - Promote the practical application of TSN technology
  - Solve the technical problems encountered in the process of TSN networking and further promote the standardization of TSN technology
- **Provision of guidance and testing abilities for these time-sensitive applications to achieve requirements**

LRP RAP (Resource Allocation)

- Link-local registration Protocol/Resource Allocation Protocol (**LRP RAP**) as additional option for TSN further developed and tested
- Each network uses **standards** for the **stream reservation protocol (RAP)**
- LNI 4.0 testbed contributes to draft version of **IEEE802.1Qdd (**with Resources Allocation Classes design) and its successor **IEEE802.1DD**
- **Both sides collaborate successfully on** TSN **standardised stream reservation protocols** and the requirements for this
- **Foster standardization activities in this field with IEEE and support the adaption by the markets, in particular manufacturing**

Outlook for 2025

In 2024 both sides worked on relevant topics for the further development of TSN standards. Both sides followed the roadmap that they agreed in 2023.

Both sides discussed in depth the following topics:

- Exchange of research achievements related to draft standards emanating from IEEE 802.1 Working Group and IEC SC 65C Working Group 18.
- Study Item 1: Large-scale TSN networks.
- Study Item 2: Link-local registration Protocol/Resource Allocation Protocol (LRP RAP) including Frame Replication and Elimination (FRER) functionality (in future this will be further developed in 802.1DD).
- Study Item 3: Time synchronization using IEEE 802.1AS.

Future collaboration work:

- Further elaborations on collaboration within these topics will be devised and formulated subsequently.

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Report on
TEG Asset Administration Shell (AAS)/Digital Twin (DTw) and Use Case Applications (UCA)

Presented in Bonn by:

Mr. Detlef Tenhagen, HARTING

Mr. Cheng Yuhang, CESI

TEG AAS/DTw & UCA– current status (1)

STANDARDIZATION COUNCIL INDUSTRIE 4.0

国家智能制造标准化总体组

Lead Experts

DEU: Mr. Detlef Tenhagen TEG/AAS DTw, HARTING & Professor Ulrich Löwen TEG/UCA (Siemens)

CHN: Mr. Yuhang Cheng, CESI & Ms. Lin Hu CESI

Activities TEG AAS/DTw & UCA 2024

- → The TEGs AAS/DTw and TEG UCA have been joined
- → Lead experts' exchanges taken place in a coordinated manner to collectively identify and refine prospective areas for future cooperation.
- → Finalised an agreement to unveil the areas of cooperation, study items, and provide a glimpse of what lies ahead.
- → Monthly Meetings
- → Goal: Digitalization of the Industry through international standards
- → Undertaken and ongoing work on joint technical report: "Digital Twin / Asset Administration Shell"

TEG AAS/DTw & UCA – Current Status (2)

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Key Message

"Fostering and driving common perceptions of China & Germany on the concept of the DTw and the concept of the AAS - including the standardization environment.

Existing international standards need to interpret and amend to cover these issues. – Serving as a baseline analysis for synchronization on further standardization of AAS and DTw concepts in participating SDO's"

Objective

Mutual support in international standardisation and standards implementation

IEC ISO ISO JTC1 IEC INFORMATION TECHNOLOGY STANDARDS

Milestone 2024

Undertaken and ongoing work on Joint Technical Report "Digital Twin / Asset Administration Shell / Use Cases"

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TEG AAS/DTw & UCA – Current progress

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Joint Report:

Topic:

- Information Flow between Digital Entity/ Information Exchange

Methodology:

- Describe it from business view, usage view and implementation view.
- Try to understand the entities associated with DT and AAS and the information exchanged between these entities.
- Explore how we can build applications on top of this common understanding.
- Discuss the implementation of these entities, collecting examples from both sides. Recognize the technologies required for implementation, and which standards support them.

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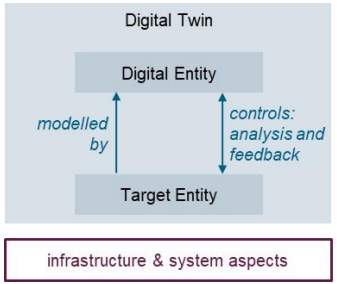
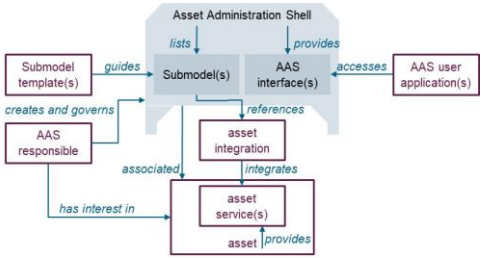
TEG AAS/DTw & UCA – Current Progress

Usage View

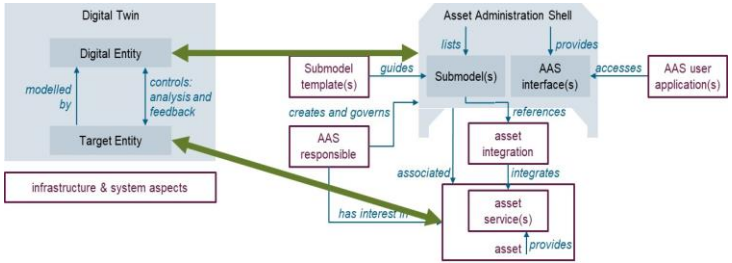
Elaboration of usage views for Information exchange



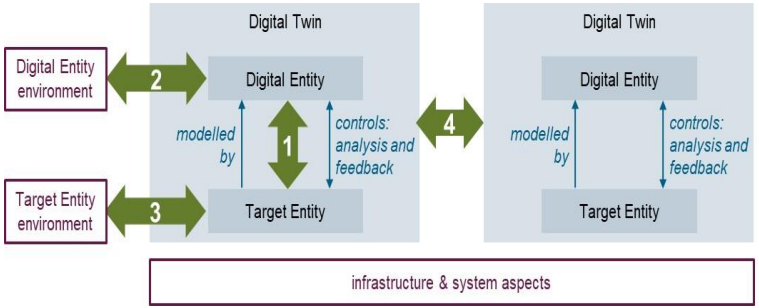
High level view of Digital Twin



Asset Administration Shell and related entities according to IEC 63278-1



High level comparison of Digital Twin and AAS



Information exchange:different kinds of interoperability of Digital Twins

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TEG AAS/DTw & UCA – Next steps (1)

Work Plan 2025 – adapting new challenges

Continuation of information exchange with regards to DTw and AAS

Future Topics

Discussion and **exchange** of similarities identified in the Joint Report and in how **far those standards relevant for AAS/DTw** are **implemented nationally**
(identically, modified, not equally, differences of Chinese standards to the IEC/ISO standards)

Work on a new potential report based on following potential new TEG topics:

- **Use Cases** – Collaboration to other SDOs, Interested Parties / Groups
- **Reference Architecture** (DTw in relation to Smart Manufacturing (IEC /TC65/WG23) and IIoT by (JTC1/SC41/WG3 - WG6)
- **Machine Digital Twin**: Virtual prototyping and virtual commissioning, Real-time Interface
- **Digital Twin Maturity** Model in Manufacturing, Engineering, Value Stream (focus i.e. by Customer Relationship Management)
- Specification for **Application of Data Elements of Twin Machines**

TEG AAS/DTw & UCA – Next steps (2)

Work Plan 2025 – adapting new challenges

Continuation of information exchange with regards to DT and AAS

Future Topics

Work on a new report based on following potential new TEG topics:

- To synchronize further analysis of the standardization activities on aspects of DT/AAS - in example as listed:
  - Future Enhancement by new key technologies (DLT-Blockchain / AI / Cryptography / Trustworthiness & Resilience)
  - Conceptual enhancement through: **Cloud-Federation** / DT-AAS **Repositories** / AAS-**Registry Processes** / DT **Ontologies & Semantics**
  - Considering activities of **Open-Source Technology Engagements on Digital Twin Development** (i.e., for Tools and Systems)
  - To **analyse** DT/AAS **standards under further development** like:
    - IEC 63278 Part1: 2023 Asset Administration Shell for industrial applications - Part 1: Asset Administration Shell structure (published)
    - IEC 63278 Part2: Asset Administration Shell for Industrial Applications – Part 2: Information meta model (ongoing)
    - IEC 63278 Part3: Asset Administration Shell for Industrial Applications – Part 3: Security provisions for Asset Administration Shells (ongoing)
    - IEC 63278 Part4: Asset administration shell for industrial applications - Part 4: Use cases and modelling examples (ongoing)
    - IEC 63278 Part5: Asset Administration Shell for industrial applications – Part 5: Interfaces (ongoing)

TEG AAS/DTw & UCA - Outlook

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Protocol

The following consensus has been reached:

- **Continue to follow up the standardisation work status of ISO, IEC, ISO/IEC JTC1 and IEEE in the DT/AAS field**
- **Cooperate in the ISO/IEC JTC1/SC41/WG6 Digital Twin Working Group and ISO/IEC JTC1/SC41/AG27 Digital Twin strategy advisory board in close collaboration with SC41/AG20 (SELG1: "Industrial Sector") and to extend their cooperation to following groups:**
  - **IEC TC 65 WG23 (Smart Manufacturing)**
  - **IEC TC 65 WG24 (AAS) – especially Part 1 -5 of IEC 63278**
  - **ISO/IEC JWG 21 Smart Manufacturing Reference Model(s)**
  - **JAG 28 (Joint Advisory Group) - JTC1 SC41 and IEC TC65**
  - **IEEE (on Digital Twin) – IEEE P2806&P2806.1**
- **Jointly work on a report on 'Information Flow between Digital Entities/Information Exchange'**
- **We want to achieve to finalize the report in 2025.**

Both sides agreed to further include new topics into the TEG scope (e.g. DTw Maturity Model) and to start work on a new joint report taking those topics into account

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Report on TEG IT Security

Presented by:

Dr. ZHAO Zitong, CESI

Dr. Karl Waedt, Framatome

TEG IT Security – current status

Lead Experts
DEU: Karl Waedt, Framatome
CHN: Zitong Zhao, CESI

Activities IT Security 2024

→ Lead experts' exchanges taken place in a coordinated manner to collectively identify and refine prospective areas for future cooperation.

→ Monthly Meetings have been conducted

→ Finalised an agreement to unveil the areas of cooperation, study items, and provide a glimpse of what lies ahead.

→ Goal: Digitalization of the Industry through international standards

TEG IT Security – current status

Study items the TEG was working on in 2024:

TOPIC 1: Justification / Need for standardization

- **Problem description**
  The most common and “bestseller” IT Security standards,
  like ISO/IEC 27001, ISO/IEC 27002, ISO/IEC 27005 do not feature any
  security grading

- **Current status (Of standards)**
  In some IT Security standards there is no grading
  In some IT Security standards grading can be represented, but there is no grading scheme
  In standards that cover grading the criteria have evolved historically
  The benefit of IT Security grading is becoming obvious when addressing certifications in an
  industrial context

TEG IT Security – current status

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Study items the TEG was working on in 2024:

TOPIC 1: Systematic Approach

- **Analysis**
  Identification and understanding of international grading schemes
  Popularity of national grading schemes (EU/Germany, China)
  Identification of related criteria, like Maturity Levels
  In-depth understanding of the grading criteria

- **Proposed amendments**
  Understanding the preferred use of national grading schemes / standards over international grading schemes
  Contributing to ISO/IEC standardization, e.g. to ISO/IEC 27404, IoT security and privacy — Cybersecurity labelling framework

TEG IT Security – current status

Study items the TEG was working on in 2024:

TOPIC 2: Types of Grading

- “Attacker Strength” based IT Security grading, changes over time:
  Sophisticated attacks, that were considered to be performed successfully by expert security staff may be feasible via powerful attacker tools, that can be handled by “Script Kiddies”.

- “Maturity” based IT Security grading may require prolonged use of IT and OT equipment, thus more suited in the context of OT.

- “Impact Based” related to the maximum risk for the industrial facility.

TEG IT Security – current status

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Study items the TEG was working on in 2024:

TOPIC 3: Approaches suited for horizontal application in OT

- **Grading according to IEC 62443 as horizontal guidance for OT**
  Security Level SL0 – No specific requirements of security protection necessary
  SL1 – Protection against casual or coincidental violation
  SL2 – Protection against intentional violation using simple means with low resources, generic skills and low motivation
  SL3 – Protection against intentional violation using sophisticated means with moderate resources, IACS specific skills and moderate motivation
  SL4 – Protection against intentional violation using sophisticated means with extended resources, IACS specific skills and high motivation

Addressed in ISO/IEC 15408-x (Common Criteria) and IEC 62443-x-x series (IACS)
“Horizontal” application for different industry domains needed

TEG IT Security – current status

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Study items the TEG was working on in 2024:

TOPIC 3: Approaches suited for horizontal IT application in IT

Grading according to ISO/IEC 15408 as guidance for IT components:

Evaluation Assurance Level EAL1 – Functionally tested
EAL2 – Structurally tested
EAL3 – Methodically tested and checked
EAL4 – Methodically designed, tested and reviewed
EAL5 – Semi-formally verified designed and tested; modular design
EAL6 – Semi-formally verified design and tested; semi-formal modular design
EAL7 – Formally verified design and tested

Linking the IT Security grading scheme with semi-formal representation frameworks, like ISO/IEC 27034-x with an Operation Normative Framework and a ANF (Appl. NF)

TEG IT Security – current status

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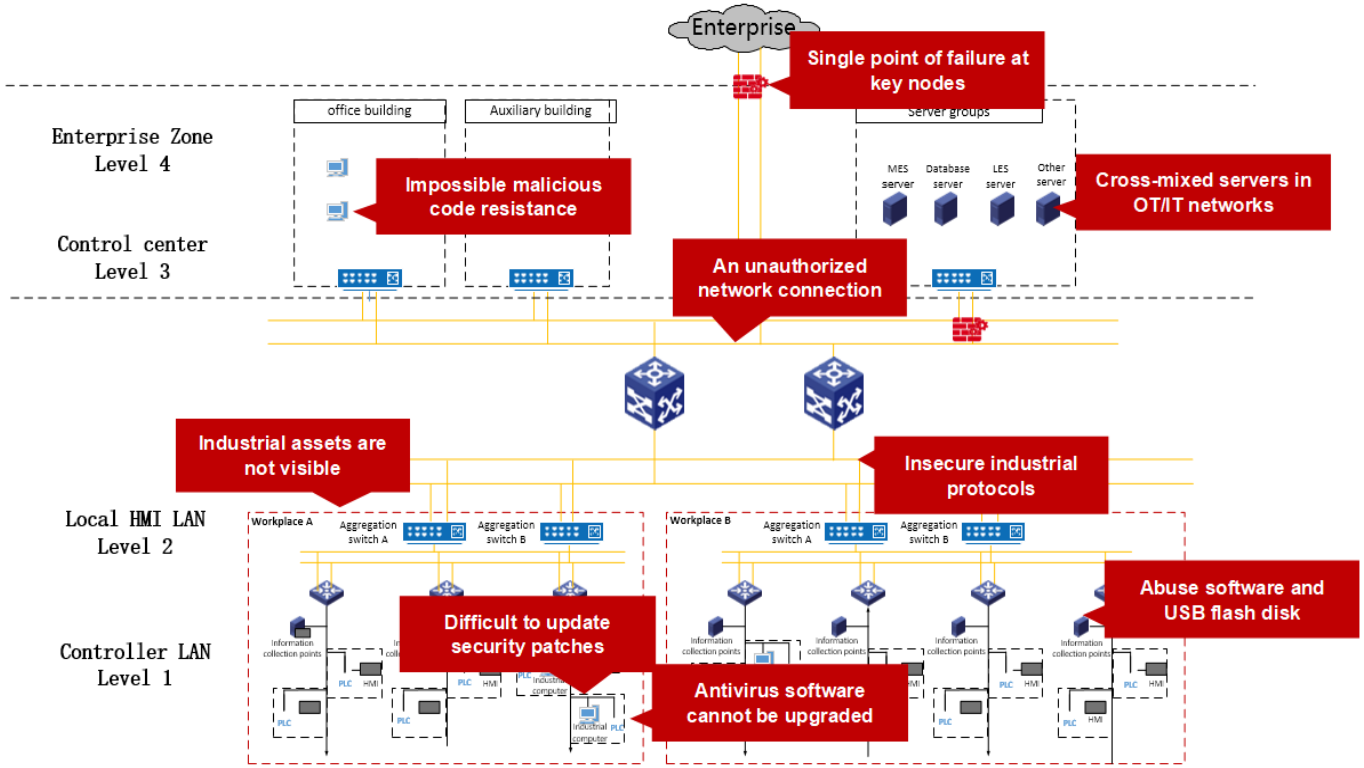
GB/T 41400-2022:
Example of a national / CN IT-Security standard with practical grading guidance



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Outlook for 2025 (1)

In 2024 both sides worked on relevant topics for the further development of standards.
Both sides discussed in depth and agreed on the following topics:

- Complete the IT Security Grading white paper within a few virtual meetings end of 2024 and beginning/mid of 2025
- Publish the new whitepaper on IT Security Grading by mid of 2025 / before the next plenary meeting
- Either update the IT Security Standards Whitepaper that was published in 4/2018, potentially in 2025, or to select a new topic in IT Security
- Joint consideration of the TEGs IT Security and Artificial Intelligence (AI) and Functional Safety may be a potential candidate for a next whitepaper

Outlook for 2025 (2)

Both sides discussed in depth and agreed on the following topics (continued):

- In the context of the GI (German Society for Computer Science) Conference, 16th–19th September 2025 in Potsdam, at the Hasso Plattner Institute, invite two Chinese key-note speakers to the 10th GI/IACS Conference/Workshop on Sept. 18th
- Potentially plan a TEG IT Security meeting in Potsdam the day(s) before and/or after the 10th GI/IACS, similarly to the corresponding TEG IT Security meeting in Kassel in 2018

Additionally / alternatively plan a TEG IT Security meeting 7th – 9th of October 2025 at or in the context of the it-sa in Nürnberg, the biggest cybersecurity fair and congress in Europe

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Report on Artificial Intelligence in industrial applications in Intelligent Manufacturing / Industrie 4.0 (TEG AIAI2M)

Presented in Bonn by:

Pengda Hong

Prof. Dr. Christoph Legat, THA

TEG AIAI2M

Overview of progress

STANDARDIZATION COUNCIL INDUSTRIE 4.0

国家智能制造标准化总体组

Lead Experts
DE: Prof. Dr. Christoph Legat (THA)
CN: Dr. Li, Ruiqi (CESI), Penda Hong

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TEG AIAI2M

Flashback 11th SGSCC 2023 Working plan

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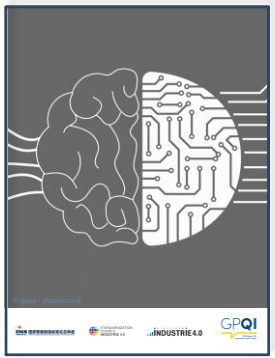
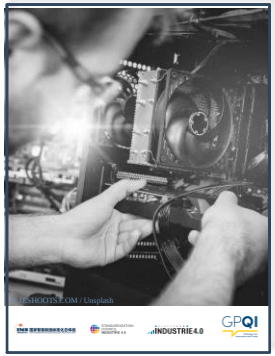
Perspectives on AI Regulation

Role and processes, differences and alignments, perspectives and the role of international standardization



Human-centered AI

A comparison of Chinese and German perspective – differences and communalities and their impact on international standardization



SME application and adoption of AI

Comparing the communalities and differences in the situation of SMEs, national initiatives to strengthen and transfer, the role of standardization

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TEG AIAI2M

Flashback 11th SGSCC 2023 – 2024 Perspective

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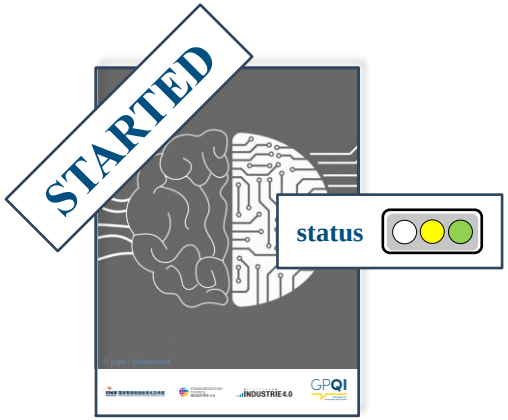
Perspectives on AI Regulation

Role and processes, differences and alignments, perspectives and the role of international standardization



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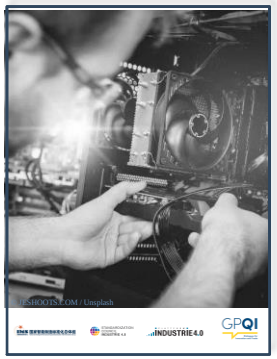

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TEG AIAI2M

Report on Standardization of Artificial Intelligence for Industrie 4.0

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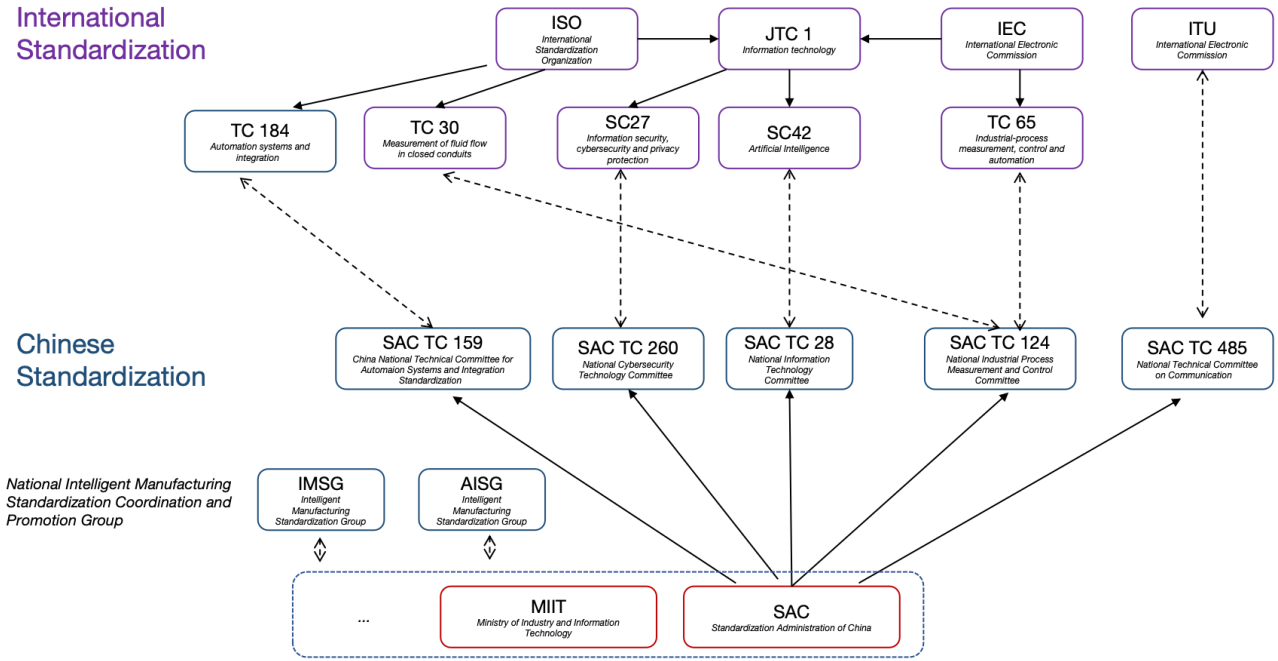
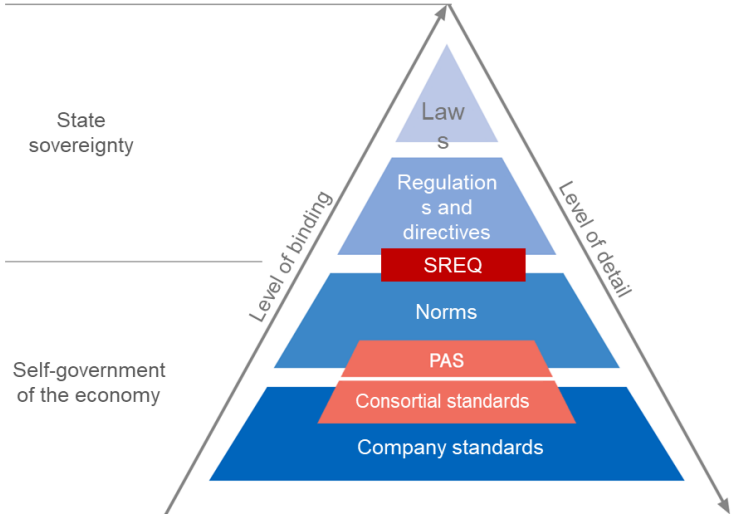
TEG AIAI2M

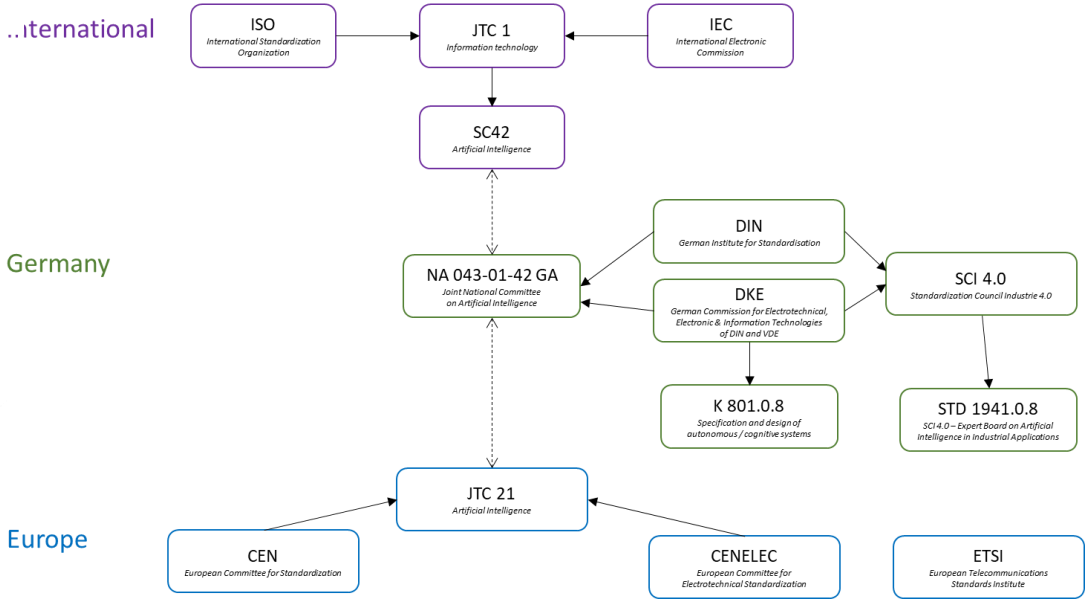
Standardization Actors for Artificial Intelligence in China



TEG AIAI2M

Actors in the NLF and its AI Standardization in Germany/Europe





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TEG AIAI2M

Topic Suggestions for Upcoming Reports

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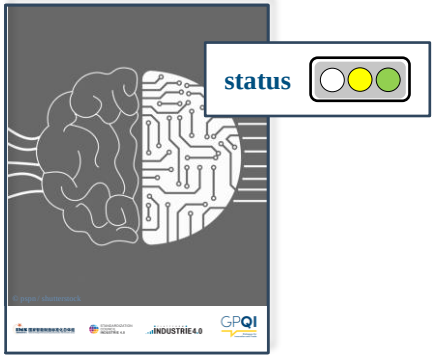

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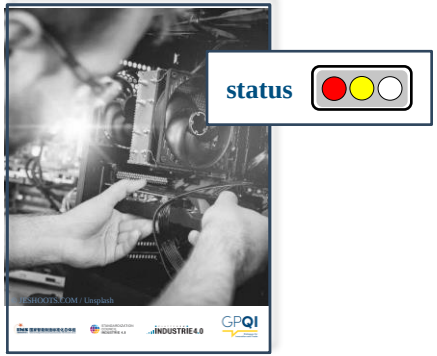

SME application and adoption of AI

Comparing the communalities and differences in the situation of SMEs, national initiatives to strengthen and transfer, the role of standardization

Generative Industrial AI

Requirements of industrial applications on GenAI, comparison of current applications in Germany and China, identification of potentials in standardization collaboration

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TEG AIA2M

Working plan 2025 and Protocol

The following consensus has been reached:

- Publish the joint report on Human-centered AI in 2025
- Based on the findings of the report:
  - Both sides agreed to continue the monitoring of the standardization work of ISO, IEC, ISO/IEC JTC1 and IEEE in the AI in I4.0/IM related field
  - Both sides agreed to identify cooperative initiatives and intend collaboration in relevant standardization committees ISO/IEC JTC1/SC42 and IEC/TC65
- Discussion of national differences on Use Cases to derive common standardization activities
  1. Properties of AI, e.g., Privacy, Safety, Trustworthiness, robustness, etc.
  2. Value creation with AI, based on data and model sharing – applications enabled by digital twins/AAS and other related technologies, e.g., collaborative, federated learning
- Strengthen the collaboration on further levels (educational, scientific) to facilitate standardization cooperation
- Identify and discuss potential and valuable topics of a new joint report on AI standardization

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Break

Please be back in 20 Minutes.

We'd appreciate your Feedback!

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Dialogues for Innovation and Trade

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Part 2:
Moderation by Mr. Wang Yu, SAMR

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中国国家标准化管理委员会
Standardization Administration of the P.R.C.

Report on TEG Functional Safety and Predictive Maintenance

Presented by:

Mr. Wenze XIONG, ITEI

Mr. Marco Turdo, HIMA

TEG Functional Safety & PM – current status

Lead Experts
DEU: Peter Sieber (HIMA), Marco Turdo (HIMA)
CHN: Wenze Xiong (ITEI)

Activities TEG Functional Safety & PM 2024

→ Lead experts' exchanges taken place in a coordinated manner to collectively identify and refine prospective areas for future cooperation.

→ Finalised an agreement to unveil the areas of cooperation, study items, and provide a glimpse of what lies ahead.

→ Goal: Digitalization of the Industry through international standards

→ Work on a Joined report.

TEG Functional Safety & PM – current status

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国家智能制造标准化总体组

Study items the TEG was working on in 2024:

Manage Safety Risks

- **Problem description: Complexity of Functional Safety is requiring a lot of technical expertise.**
  - Support processes are not being followed, accidents are not being caused by technical malfunctions, but human factors.
  - Typically caused by human error, e.g. missing maintenance, systematic root cause, lack of repeatability etc.
  - Right interpretation of information due to e.g. missing pattern, insufficient description etc.
- **Current status: Complex processes are handled manually causing high effort.**
- **Proposed amendments:**
  - A Digitalization strategy for Functional Safety driving conformity reducing risk and effort is needed. In the Process industry this would be IEC 61511. For the machinery industry this would be ISO 13849 and IEC 62061.
  - Security impact created by digitalization. This would affect the digitalization strategy and is affected by the IEC 62443 series.

TEG Functional Safety & PM – current status

Study items the TEG was working on in 2024:

Functional safety and predictive maintenance aspects

- **Problem description:**
  - Proof test requires a lot of experiences causing a lot of effort.
  - When using (partial) proof test coverage of automated testing, the only electrical part of the equipment is tested. The failures of non-electrical parts (e.g. valves) cannot be fully detected by the electrical tests.
- **Current status:**
  - Offline proof testing is currently defined based on fixed expectations.
  - NAMUR NA106 is giving some recommendations on the flexibilization of the proof testing and intervals. A new revision is under preparation.
  - Available standards for Predictive Maintenance (PM)
    - ISO/TR 9839:2023 Road vehicles — Application of predictive maintenance to hardware with ISO 26262-5
    - IEC 63270-1 ED1 (draft) – Predictive Maintenance of industrial automation equipment and systems – Part 1 General Requirements.
- **Proposed amendments:**
  - Adaptation based on operational experiences will allow optimized proof test intervals.
  - Repeatability of test
  - NAMUR NA106
  - Affected standards IEC 61511
  - Affected standards, the work on an IEC 63270-1 ED1 (draft)
  - Coordination of IEC 61511 and ISO 13849 is needed

TEG Functional Safety & PM – current status

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国家智能制造标准化总体组

Study items the TEG was working on in 2024:

Cybersecurity risk concerns of the functional safety digitization

- **Problem description:**
  - Digitalization of Functional Safety will unify procedures and processes handled separately so far, and by doing so providing additional attack vectors.
- **Current status (Of standards)**
  - In IEC 62443 ED3 Functional Safety will be looked at. In the current ED2 Functional safety is no considered. In ED3 only the essential functions are covered
  - IEC TR 63069 coordination of Functional Safety and Security. Revision to be able to make a TR and a TS. The TS could become an additional part of the TR 63069.
  - IEC 62859:2016 - Nuclear power plants -Requirements for coordinating safety and cybersecurity.
  - IEC TS 63074 - Safety of machinery - Security aspects related to functional safety of safety-related control systems
  - IEC 63270-1 predictive maintenance of industrial automation equipment and systems – Part1: General requirements

- **Proposed amendments to the international standardiziation / International standards to avoid the implementation of national standards**
  - Harmonization of the recommendations of the process and machinery industry.
  - Coverage of all life cycle activites to be protected

Outlook for 2025

In 2025 both sides worked on relevant topics for the further development of standards.

Both sides discussed in depth the following topics:

- Continuously discuss safety issues in I4.0/IM and conduct research on how to achieve digital safety lifecycle in industry
- Joint research on Digital Safety Lifecycle Management with TEG CMPM
- Continue to promote the research content of the functional safety TEG to the international standardization organizations such as IEC/TC65, TC44 and TC45
- Coordination of functional safety standards for different industry sectors is needed
- Finish the white paper digital safety lifecycle before December in 2025

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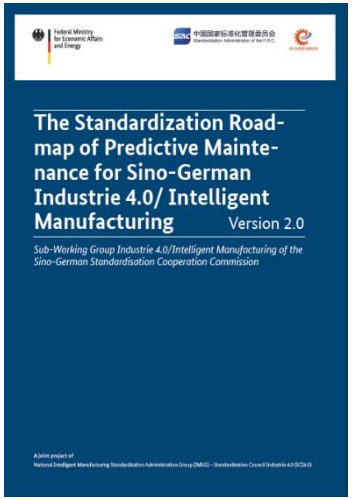
Report on TEG Condition Monitoring and Predictive Maintenance

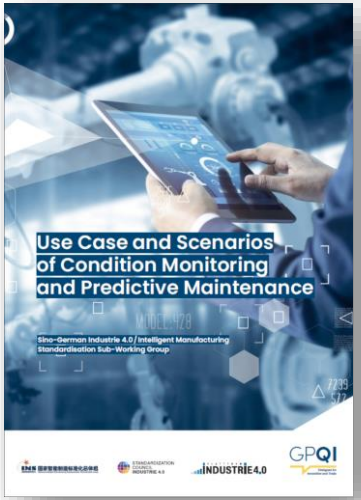
Presented by:

Mr. Chengcheng WANG, ITEI

Review

- Version 1.0 and 2.0 of the Standardization Roadmap of Predictive Maintenance has been officially launched in 2018 and 2019.
- Use Case and Scenarios of Condition Monitoring and Predictive Maintenance





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TEG Condition Monitoring and Predictive Maintenance

Activities 2024

→ Lead experts' exchanges taken place in a coordinated manner to collectively identify and refine prospective areas for future cooperation.

→ Finalised an agreement to unveil the areas of cooperation, study items, and provide a glimpse of what lies ahead.

→ Goal: Digitalization of the Industry through international standards

New achievements

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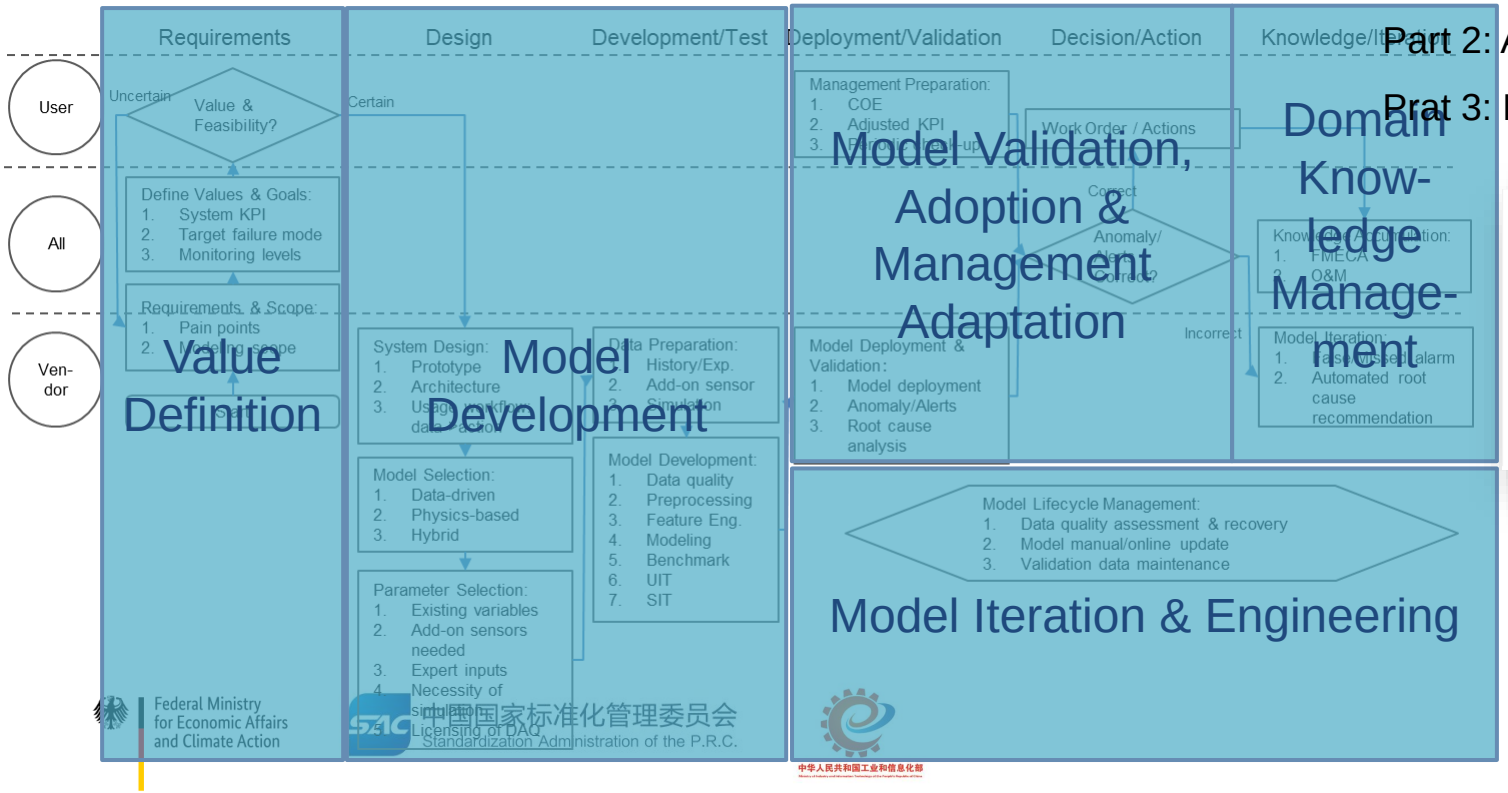
Part 1: General requirements

Part 2: Algorithm evaluation

Prat 3: Efficiency evaluation



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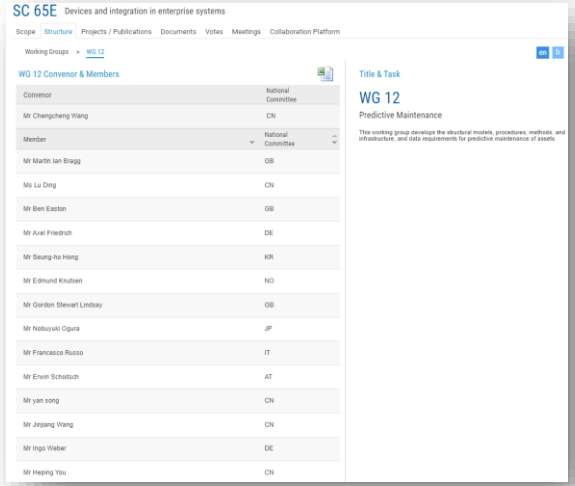
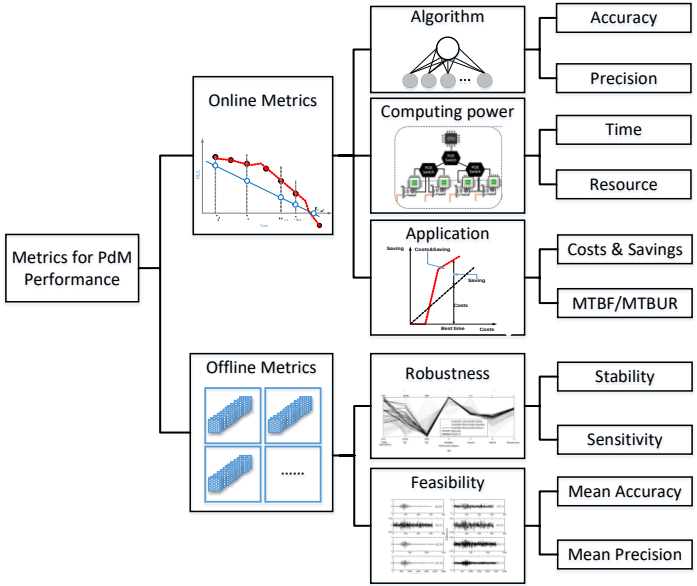
New achievements

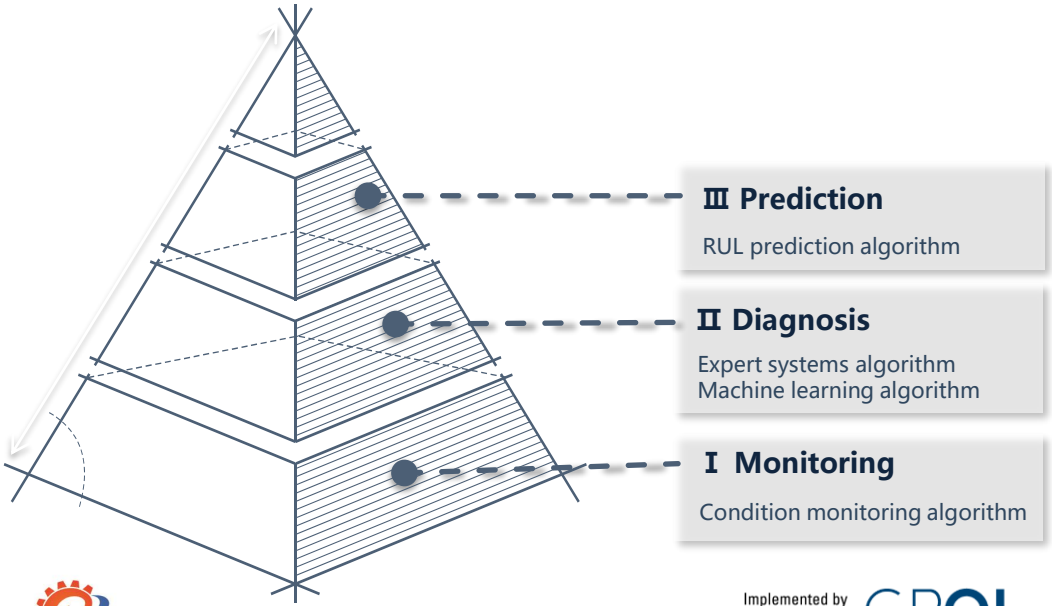
- IEC 63270-1 Predictive maintenance of industrial automation equipment and systems – Part1: General requirements



New achievements

- IEC 63270-2 Predictive maintenance of industrial automation equipment and systems – Part1: Algorithm verification methods





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Future work

Action Plan for 2024/2025

- New publication will continue to be updated, more scenarios of CMPM from both sides will be added.
- Support the work of IEC SC65E WG12 (CDV for Part1, NP for Part2)
- TEG FS and TEG CMPM agreed to joint research on Digital Safety Lifecycle Management

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Keynote

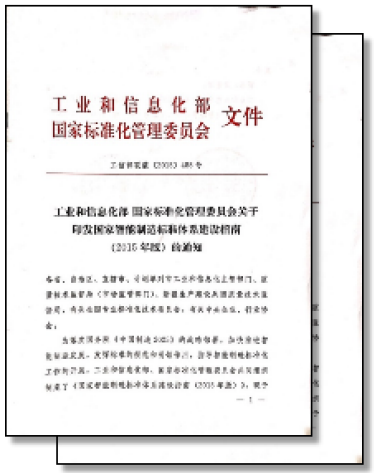
Pilot Latest progress of Standardization for Intelligent Manufacturing

Dr. Yan Liyue, CESI

CATALOGUE

Iterative updates of the standards system.

- 《Guidelines for the construction of national intelligent manufacturing standards system（2015）》
- 《Guidelines for the construction of national intelligent manufacturing standards system（2018）》
- 《Guidelines for the construction of national intelligent manufacturing standards system（2021）》



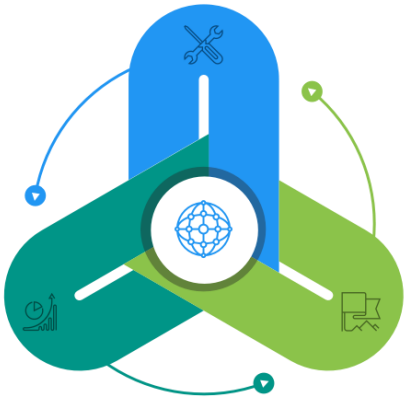
Main Function

- Building a comprehensive national intelligent manufacturing standard system
- Guide the standardization work of intelligent manufacturing in the current and future
- Clarify the urgent need for standards; Guide the establishment of standards, and Solve the problems of integration and integration of the standard system and the lack of basic standards
- Provide decision-making reference

Basic principle of the Iterative updates

- Strengthen overall planning;
- Implement categorized strategies.

- Solidify foundations;
- Enhance collaboration.



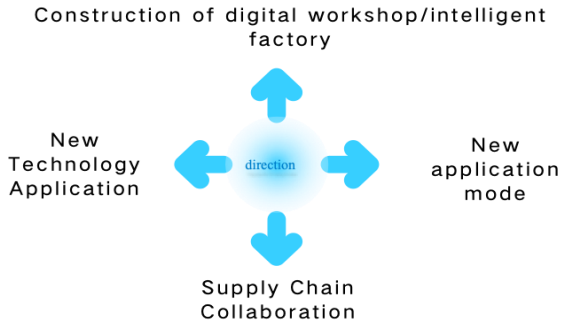
- Base actions on national conditions;
- Promote open cooperation.

Standard Development and Pilot Projects

Standard Development: We organized and promoted the establishment of intelligent manufacturing standards, which includes key technologies of intelligent manufacturing such as factory construction, application of new technologies, and new models, which have essentially resolved the core issues in the process of intelligent upgrading of the manufacturing industry.

Pilot projects: It guides enterprises to clarify their path towards intelligent upgrading, improve their production methods, optimize their business management models, enhance the comprehensive capabilities of the industrial chain, and significantly increase both production efficiency and the efficiency of resource allocation.

The key application directions include:



Standard Development and Pilot Projects

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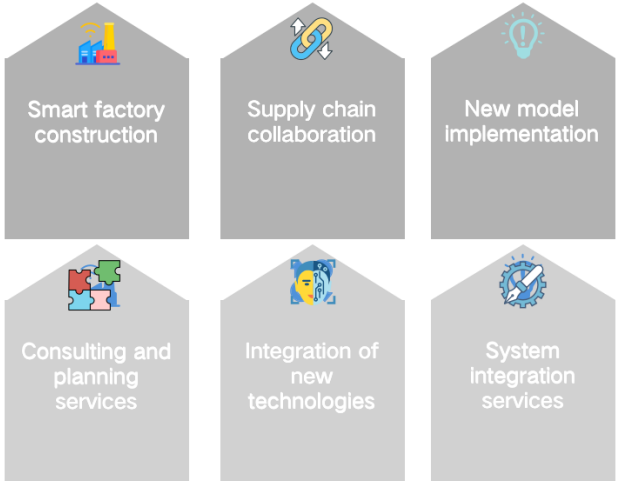
国家智能制造标准化总体组 National Intelligent Manufacturing Standardisation Administration Group

Purpose:

Fully leverage the supporting and guiding role of standards; encourage manufacturing enterprises to adopt standardized methods for organizing production, operations, management, and services, forming a series of standardized, high-level system solutions to promote the high-end, intelligent, and green development of the manufacturing industry.



- **Regional coverage:** 28 provinces, autonomous regions, municipalities, and separately planned cities.
- **Industry coverage:** general equipment, automobile manufacturing, electrical machinery, telecommunications electronics, rail transit, chemicals, and more.

- **Number of applications: 100+ projects**
- **Number of standards: 300+**

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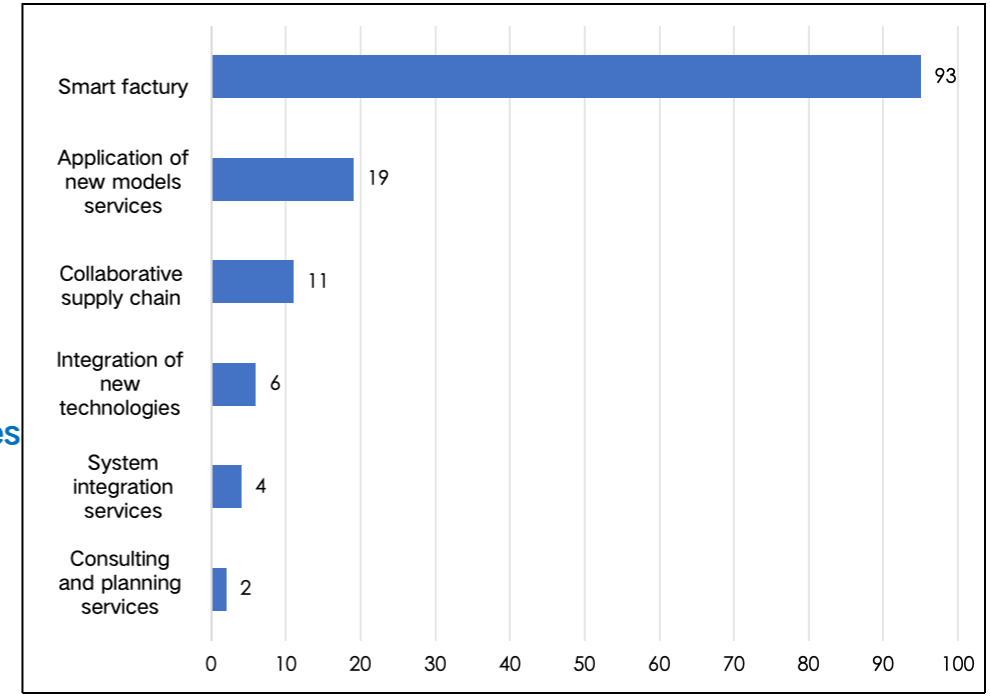
Standard application of Pilot projects

- **Providing guidance and support for the transformation of the manufacturing industry**
  - ✓ Digital workshop
  - ✓ Intelligence factory
- **Standards have become a powerful tool for achieving interconnectivity and integration**
  - ✓ system integration
  - ✓ Equipment interconnection and interoperability
- **Establishing standardized successful experiences**
  - ✓ Capability maturity Model
  - ✓ Capability Maturity Assessment Method



Key of pilot projects construction

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01 Clarify the relationship between core standards and other standards----Diagram of Standard Relationship Architecture

02 Integrate own business, clarify the problems to be solved or goals to be achieved, including production efficiency, delivery time, product quality, production efficiency, and other aspects--Economic benefits

03 What needs to be done-The construction plan should be implementable, including equipment and system upgrades and renovations,suggestion implementing in specific scenarios

04 What supporting measures are needed-----safeguard measures

05 Form typical cases of scenario based standard application with industry characteristics,Copy and promote the experience of upstream and downstream of the industrial chain, as well as small and medium-sized enterprises----Social Value

06 Propose standard revision suggestions or new industry application standards Based on the characteristics of the industry----Enhance the brand value of the enterprise

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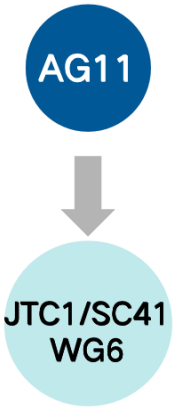
CATALOGUE

Key Technology Standards
——Standardization work of digital twin



The 8th Plenary Session of ISO/IEC JTC 1/SC 41 decided to establish the WG6 Digital Twin Working Group from November 9th to 20th, 2020,; Meanwhile, the name of SC41 has been changed from "Internet of Things and Related Technologies" to "Internet of Things and Digital Twin".

work extent: International standardization of digital twins.
Including but not limited to:

1. Basic standards: terminology and concepts, reference architecture and framework, etc;
2. Implementation of digital twin technology: functional requirements, digital twin lifecycle, digital threading, and interoperability;
3. Integration and collaboration between digital twin systems: resources, data, information models, and interfaces, etc;
4. Testing and evaluation: performance evaluation, maturity evaluation, and qualification testing, etc;
5. UseCases and Applications: Digital Twin Applications in Different Industries.For example, smart manufacturing, smart cities, smart buildings, smart agriculture, smart healthcare, etc.

Key Technology Standards
——Standardization work of digital twin

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☐ List of international standards in ISO/IEC JTC 1/SC 41/WG6

Project Number	Standard project name（statuses）	Leading countries
ISO/IEC TR 30172：2023	**Digital Twin – Use Cases（released）**	China
ISO/IEC 30173：2023	**Digital Twin – Concepts and Terminology（released）**	China
ISO/IEC 30186 ED1	Digital twin – Maturity model and guidance for a maturity assessment	Korea
ISO/IEC WD 30188	Digital Twin - Reference Architecture	China
PWI JTC1-SC41-17	Guidance on the integration of IoT and digital twins in data spaces	French
PWI JTC1-SC41-11	Digital Twin - Correspondence measure of DTw twinning	Korea
PWI JTC1-SC41-16	Digital Twin – Extraction and transactions of data components	China
PWI JTC1-SC41-19	Digital Twin- Guidelines for digital entity modeling	China

Key Technology Standards
——Standardization work of digital twin

☐ List of Chinese national standards in SAC/TC 28/SC 41

Project Number	Standard project name	statuses
GB/T 43441.1-2023	Information Technology — Digital Twin — Part 1: General Requirements	Published
20230976-T-469	Information Technology — Digital Twin Capability Maturity Model	Under development
20230710-T-469	Information Technology — Equipment Digital Twins — Generic Requirements	Under development
20240840-T-469	Information Technology — Digital Twin — Part 2: Digital Entities	Under development
20240841-T-469	Information Technology — Digital Twin — Part 3: Information Interaction	Under development
20241796-T-469	Information Technology — Workshop Digital Twin — Reference Architecture	Under development

CATALOGUE

Key Technology Standards:
Standardization work of machine vision online inspection

STANDARDIZATION COUNCIL INDUSTRIE 4.0

国家智能制造标准化总体组 National Intelligent Manufacturing Standardisation Administration Group

- Continue to carry out industrial research, standardization work, and public services
- Promote the national standard of machine vision at home and abroad
- Help the continuous optimization of industrial ecology

A public service platform for machine vision standard verification and testing has been built to **provide public services such as standard verification, testing and consultation** for equipment suppliers, system integrators, user enterprises and research institutions in different industries.

Machine Vision Development White Paper (2021 edition)

Intelligent inspection equipment industry development research report: machine vision (2024)

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Key Technology Standards:
Standardization work of machine vision online inspection

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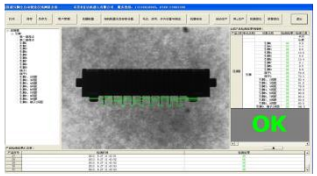
Typical Industry Applications

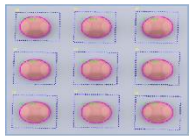
- Precise measurement of part dimensions
- detection of Vehicle assembly、Surface defects of workpieces and clearance

Automotive industry



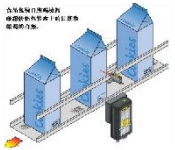
- PCB board drilling positioning and measurement
- AOI optical inspection
- Semiconductor packaging pin detection
- Semiconductor alignment and identification

Semiconductor industry



- Defect detection of drug bottle packaging, quality inspection of capsule packaging, and appearance inspection of drug particles
- Production date code recognition, tablet color recognition

Pharmaceutical industry



- Packaging appearance inspection, food packaging defect inspection, appearance and internal quality inspection

Food packaging

- Printing quality inspection, printing character inspection
- Barcode recognition, character recognition, color difference recognition and detection

printing

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CATALOGUE

Key Technology Standards:
Standardization work of Smart Supply Chain

No.	Title	Type	Initiating company	Stage
1	Intelligent Manufacturing Smart Supply Chain System Architecture and Reference Model	GB/T	Changan Automobile	NP Ballot (In WG)
2	Intelligent Manufacturing Smart Supply Chain System technical requirements	GB/T	ORDINS	NP Ballot (In WG)
3	Intelligent Manufacturing Smart Supply Chain Vendor evaluation specification	GB/T	GONGNIU GROUP CO., LTD	NP Ballot (In WG)
4	Intelligent Manufacturing Smart Supply Chain Technical requirements for risk management systems	GB/T	IIE,CAS	NP Ballot (In WG)

Key Technology Standards:
Standardization work of Smart Supply Chain

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国家智能制造标准化总体组 National Intelligent Manufacturing Standardisation Administration Group

In December 2023, Working Group (TC28/WG32) officially released the "Smart Supply Chain Research Report".

The report comprehensively

1. Elaborates on the connotation and typical characteristics of smart supply chains,
2. Corporate practice cases of smart supply chains;
3. Provides a perspective on the development of smart supply chain construction.

In this report, focusing on enhancing the intelligence of supply chain management, we have innovatively distilled several fundamental characteristics of a smart supply chain. These include:

a) **Data sharing;**
b) **Global visibility;**
c) **Multi-party collaboration;**
d) **Intelligent decision-making;**
e) **Controllable resilience.**

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CATALOGUE

1. Chinese Intelligent Manufacturing Standard System and Pilot projects

2. Key Technology Standards

——Standardization work of digital twin

——Standardization work of machine vision online inspection

——Smart Supply Chain

——Large scale personalized customization

——Intelligent Manufacturing Service

——(Digital Product Passport) DPP

Key Technology Standards:
Standardization work of Large scale personalized customization

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With the deep integration of emerging technologies and manufacturing, various development paths have been formed in the fields of equipment manufacturing, consumer goods manufacturing, etc., based on their own industry characteristics.New models such as network collaborative manufacturing, remote operation and maintenance, and personalized customization have emerged.which solve the common problems of industry transformation and upgrading, leading the deep development of intelligent manufacturing in segmented fields effectively。

1. 《Intelligent Manufacturing Large scale personalized customization Term》 GB/T 42134-2022
2. 《Intelligent Manufacturing Large scale personalized customization General requirements》 GB/T 42202-2022
3. 《Intelligent Manufacturing Large scale personalized customization demandInteraction requirements》 GB/T 42198-2022
4. 《Intelligent Manufacturing Large scale personalized customization design requirement》GB/T 42199-2022
5. 《Intelligent Manufacturing Large scale personalized customization Production requirements》GB/T 42200-2022

Large scale personalized customization

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CATALOGUE

1. Chinese Intelligent Manufacturing Standard System and Pilot projects

2. Key Technology Standards

——Standardization work of digital twin

——Standardization work of machine vision online inspection

——Smart Supply Chain

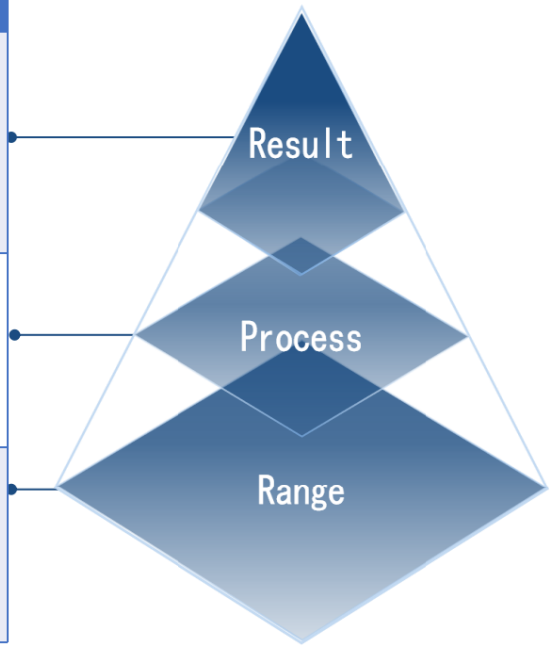
——Large scale personalized customization

——Intelligent Manufacturing Service

——(Digital Product Passport) DPP

Key Technology Standards: Standardization work of Intelligent Manufacturing Service

Name	Scope of application	Main problems solved	State
Evaluation specifications of intelligent manufacturing system solution suppliers 20231208-T-339	Suitable for manufacturing enterprises, intelligent manufacturing system solution providers, and third parties to identify and improve supplier service capabilities.	Resolve the problem of poor competition among suppliers of integrated solutions for intelligent manufacturing systems and the lack of evidence for manufacturing enterprises to select suppliers. By grading, suppliers can identify and enhance their own capabilities, helping manufacturing enterprises select high-quality suppliers.	WD
Intelligent manufacturing service—General requirements GB/T 43554-2023	Applicable to guiding intelligent manufacturing service providers to provide standardized services, the demand side to select and constrain suppliers, and also applicable to third-party organizations to evaluate and recognize intelligent manufacturing services.	Resolve the issue of standardizing the process of intelligent manufacturing services, and improve service quality by constraining the service process.	published
Services for intelligent manufacturing—Classification and code 20240609-T-339	Applicable to government regulatory departments to guide, cultivate, manage, and select suppliers according to categories, and applicable to intelligent manufacturing service providers to carry out planning, scientific research, implementation, and other work.	Resolve the issue of missing statistical caliber in intelligent manufacturing services, clarify the positioning and development direction of service providers, and address the lack of basis and reference for users to choose service providers.	WD



CATALOGUE

Key Technology Standards:
Standardization work of (Digital Product Passport) DPP

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■ （ DPP）Chinese national standards

SAC/TC28/SC31——Automatic indetification and data capture——ISO/IEC/JTC1/SC31

Relevent China's national standards

#		STANDARDS	DATE	Implementation date
1	GB/T 41802-2022	Information technology—Requirements of verification code program	2022/10/12	2023/5/1
2	GB/T 38961-2020	Personal health information code-Reference model	2020/4/29	2020/4/29
3	GB/T 38962-2020	Personal health information code-Data format	2020/4/29	2020/4/29
4	GB/T 38963-2020	Personal health information code-Application interface	2020/4/29	2020/4/29
5	GB/T 16829-2003	Information technology--Automatic identification and data capture techniques--Bar code symbology specifications--Interleaved 2 of 5	2003/7/25	2003/12/1
6	GB/T 11383-1989	Information processing--8-Bit code for information interchange--Structure and rules for implementation	1989/6/12	1990/1/1

Key Technology Standards:
Standardization work of (Digital Product Passport) DPP

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■ （ DPP）Chinese national standards

SAC/TC28/SC31——Automatic indetification and data capture——ISO/IEC/JTC1/SC31

Relevent China's national standards

#		STANDARDS	DATE	Implementation date
1	GB/T 41802-2022	Information technology—Requirements of verification code program	2022/10/12	2023/5/1
2	GB/T 38961-2020	Personal health information code-Reference model	2020/4/29	2020/4/29
3	GB/T 38962-2020	Personal health information code-Data format	2020/4/29	2020/4/29
4	GB/T 38963-2020	Personal health information code-Application interface	2020/4/29	2020/4/29
5	GB/T 16829-2003	Information technology--Automatic identification and data capture techniques--Bar code symbology specifications--Interleaved 2 of 5	2003/7/25	2003/12/1
6	GB/T 11383-1989	Information processing--8-Bit code for information interchange--Structure and rules for implementation	1989/6/12	1990/1/1

Key Technology Standards:
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——Important product traceability standards

#		STANDARDS	DATE	Implementation date
1	GB/T 38155-2019	Important product traceability—Traceability terminology	2019/10/18	2019/10/18
2	GB/T 38154-2019	Important product traceability—Core metadata	2019/10/18	2019/10/18
3	GB/T 38159-2019	Important product traceability—General requirements for traceability system	2019/10/18	2019/10/18
4	GB/T 38157-2019	Important product traceability—Specifications for traceability management platform construction	2019/10/18	2019/10/18
5	GB/T 38158-2019	Important product traceability—General requirements for product traceability system	2019/10/18	2019/10/18
6	GB/T 38156-2019	Important product traceability—General requirements for transaction record	2019/10/18	2019/10/18

Key Technology Standards:
Standardization work of (Digital Product Passport) DPP

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——Unique identification standard (OID has already been applied in various industries such as agriculture, forestry, industry, transportation, and drones)

#		STANDARDS	DATE	Implementation date
1	GB/T 17969.8-2024	Information technology—Procedures for the operation of object identifier registration authorities—Part 8: Generation of universally unique identifiers(UUIDs) and their use in object identifiers	2024/5/28	2024/5/28
2	GB/T 41300-2022	Unique product identification code for civil unmanned aerial vehicle	2022/3/9	2022/10/1
3	GB/T 36461-2018	Internet of things identification system—Guideline for OID application		
4	GB/T 37695-2019	Intelligent manufacturing—Object identification requirements		
5	GB/T 42024-2022	Intelligent manufacturing—Interoperability function requirements of heterogeneous system based on OID		
6	GB/T 36904-2018	Electronic certificate—Identifier specification		

Key Technology Standards:
Standardization work of (Digital Product Passport) DPP

Suggestions for the next step

- Strengthen top-level design, and coordinate overall planning
- Solidify the technical foundation, and advance the research, development, and application of standards
- Promote international cooperation, and explore adaptable pathways

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中国国家标准化管理委员会
Standardization Administration of the P.R.C.

中华人民共和国工业和信息化部

Keynote

Semantic vocabulary as the base of Industry 4.0 Smart Manufacturing

Mr. Matthias Gommel, Siemens

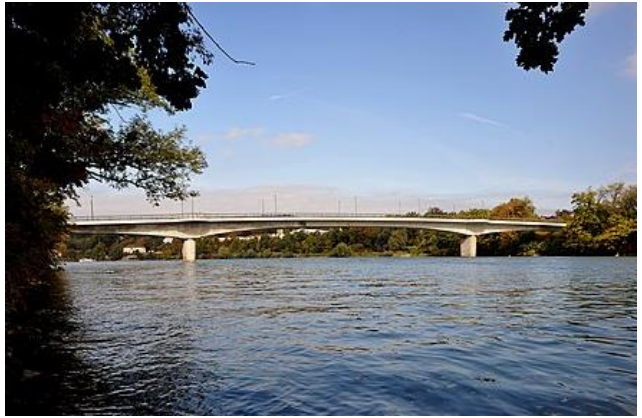
Why is human interaction sometimes helpful?

Meine Frau schreibt mir eine SMS: „In der Küche stehen Kartoffeln. Schäle bitte die Hälfte und stelle sie auf den Herd“

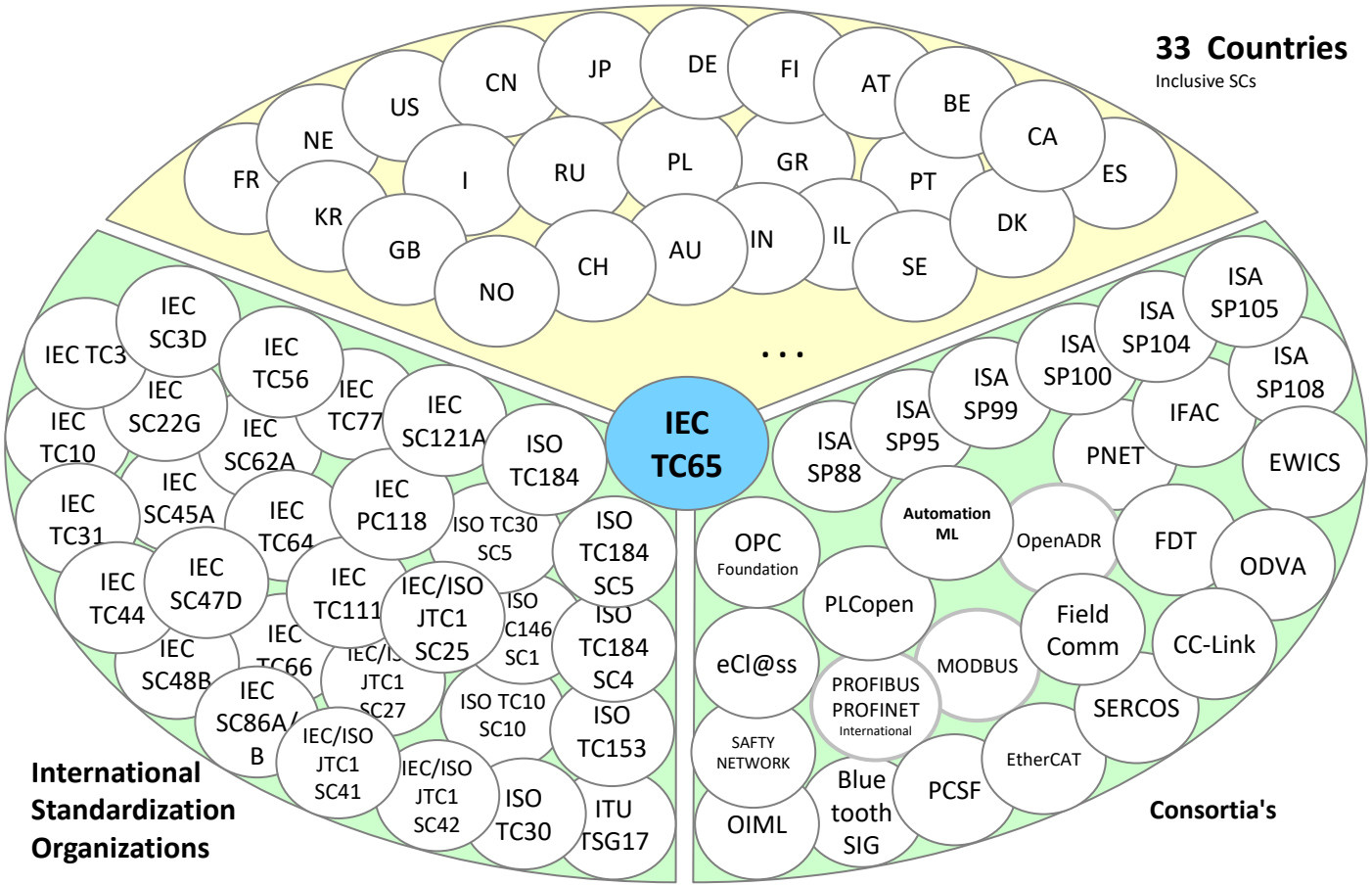
My wife sends an SMS „The potatoes are in the kitchen. Please peal half of it and put it on the stove“

Why is human interaction sometimes helpful?

Example Hochrheinbrücke between Germany and Switzerland,
Normalhöhennull NHN with 27 cm difference to Repère Pierre du Niton

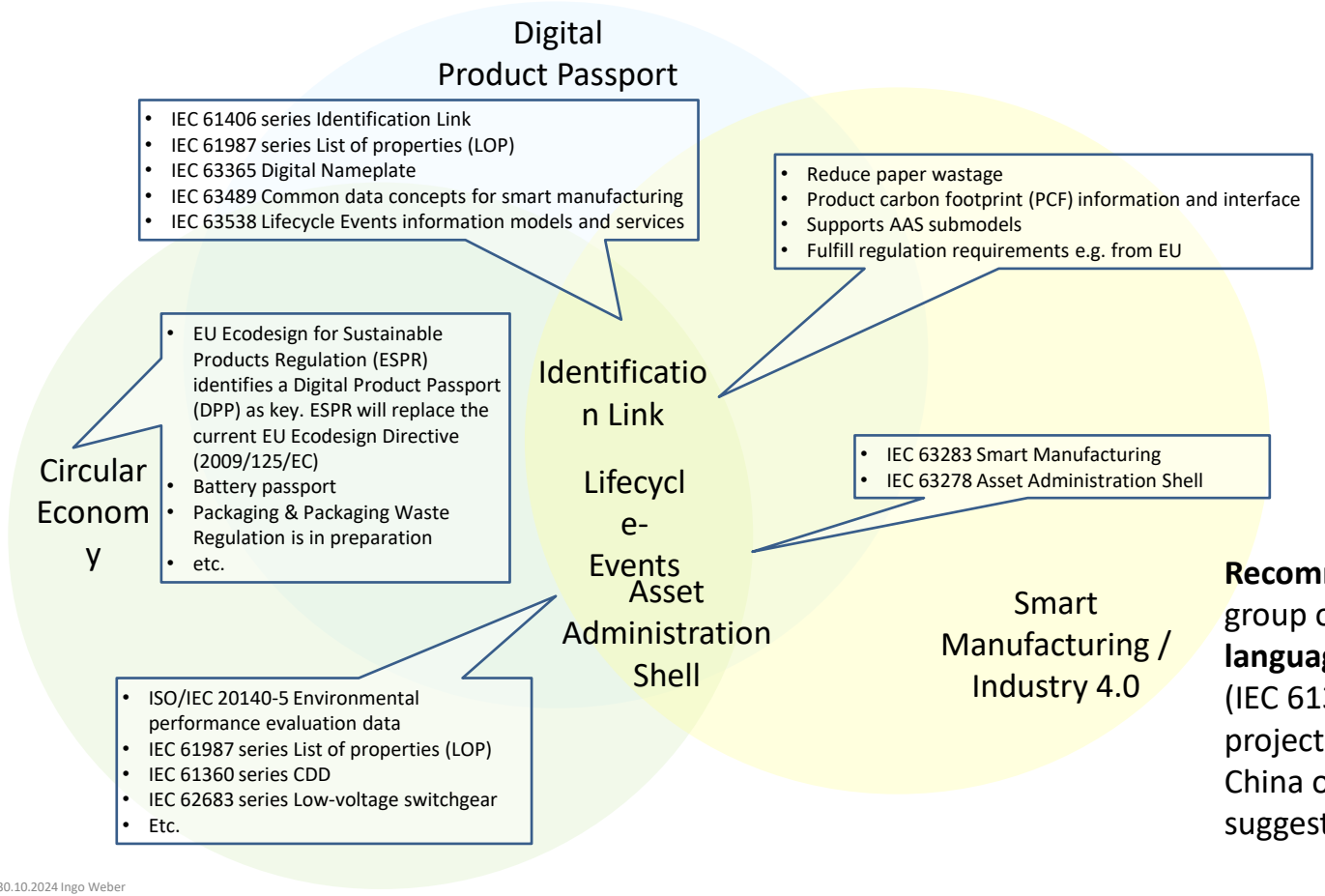


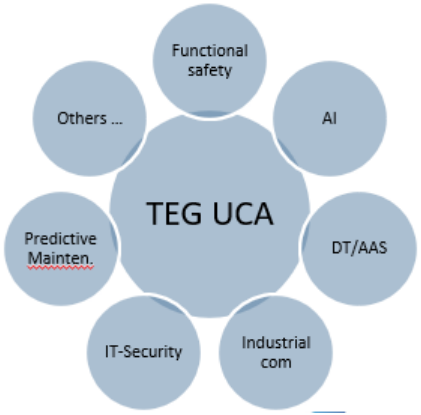
IEC TC65 overview of todays Member Countries and Liaisons



IEC 63538 Lifecycle-Events information models and services:

Project is handled by IEC TC65 SC65E WG2. NP is approved.





Recommendation: DCKN TEG Subworking group on definition of a **common language for SM/industrial automation** (IEC 61360, 61987, 63489, 63538, COMDO projects);
China organisation mirror to IEC/TC 65 suggested to lead.

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Standardization Administration of the P.R.C.

Virtual Protocol Signing Ceremony

16 Oktober 2024 I Bonn

Mr. Wang Yu, SAMR

Dr. Marvin Böll, SCI 4.0

Federal Ministry
for Economic Affairs
and Climate Action

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中华人民共和国工业和信息化部

Closing Remarks

Mr. Wang Yu, SAMR

Federal Ministry
for Economic Affairs
and Climate Action

中国国家标准化管理委员会
Standardization Administration of the P.R.C.

Closing Remarks

Ms. Nina Stock, BMWK

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Thank you!
Danke!
谢谢！

We'd appreciate your Feedback!

GPQI
Dialogues for Innovation and Trade