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Guidelines for the Construction of Industrial Internet Comprehensive Standardization System (2021 Edition) (Draft for Solicitation of Comments)

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In order to implement the deployment requirements of the Fourteenth Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the Outline of Long-Term Goals for 2035, to strengthen the top-level design of industrial Internet standardization work, the Ministry of Industry and Information Technology, The National Standardization Management Committee organized and compiled the "Guidelines for the Construction of Industrial Internet Comprehensive Standardization System (2021 Edition)" (Draft for Solicitation of Comments) (see Annex 1) and "Preparation Instructions" (see Annex 2).

In order to further listen to the opinions of all sectors of society, it is now publicized, and the deadline for publicity is August 5, 2021. If you have any comments or suggestions, please fill in the "Public Opinion Feedback Information Form" (see Attachment 3) during the publicity period and feed it back to the Science and Technology Department of the Ministry of Industry and Information Technology. Guidelines for the Construction of a Comprehensive Internet Standardization System (2021 Edition) Publicity Feedback).

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annex:

1. "Industrial Internet Comprehensive Standardization System Construction Guide (2021 Edition)" (Draft for Solicitation of Comments)
2. "Guidelines for the Construction of Industrial Internet Comprehensive Standardization System (2021 Edition)" (Draft for Solicitation of Comments) Compilation Instructions
3. Public opinion feedback information form

Department of Science and Technology, Ministry of Industry and Information Technology

July 7, 2021

Guidelines for the Construction of a Comprehensive Standardization System for the Industrial Internet (2021 Edition) (Draft for comments)

1. The status quo of technology and industry development

Industrial Internet is a new type of infrastructure, application model and industrial ecology that deeply integrates the new generation information and communication technology and industrial economy. Through the comprehensive connection of people, machines, thin systems, etc., a brand-new brand covering the entire industrial chain and the entire value chain is constructed. The manufacturing and service system provides a way to realize the digital, networked, and intelligent development of industry and even the industry. It has the ability to support the construction of a strong manufacturing country and a network power, improve the modernization level of the industrial chain, promote high-quality economic development, and build a new development pattern. Very important meaning.

(1) Network system

The network system is the foundation of the Industrial Internet. The industrial Internet network system extends the connection objects to the entire industrial system, the entire industry chain, and the entire value chain. It can realize all elements of people, objects, machines, workshops and enterprises, as well as design, research and development, production, management, and services. Ubiquitous and deep interconnection. The network system includes key technologies such as network and connection, "5G+Industrial Internet", logo resolution, and edge computing (network side).

1. Terminal and network

Network and connection technologies mainly include network interconnection technologies such as the internal network of the industrial Internet enterprise and the external network of the industrial Internet enterprise, as well as the interoperability and interoperability between heterogeneous protocol data. At present, my country's high-performance, high-reliability, high-flexibility, and high-security industrial high-quality external network has begun to take effect, and it has been extended to more than 300 cities across the country. The pace of enterprise intranet transformation is accelerating. Some leading companies are actively using 5G, time-sensitive networking (TSN), edge computing and other new technologies for intranet transformation, exploring new models for network transformation in vertical industries. Industrial Internet network technology standards are accelerating, and top-level design standards such as the overall network architecture and the overall requirements of the industrial Internet enterprise external network are gradually improved. Time-sensitive networks (TSN), industrial software-defined networks (SDN), deterministic networks (DetNET), and intelligent networks Research has been initiated in new areas such as management. On the whole, the network and connection technology industry as a whole is still in its infancy. With the gradual and in-depth integration of IT/OT networks and systems, industrial equipment network transformation, field equipment access and integration, intelligent network management, Information models and other aspects will present new standardization requirements.

2. "5G + Industrial Internet"

The "5G+Industrial Internet" integration innovation is to use the fifth generation of mobile communication technology (5G) to build a wireless network infrastructure that meets the needs of industrial intelligent development for wireless networks, and has the characteristics of large bandwidth, low latency, and large connections, which will give birth to integrated applications. , Technology and industrial innovation. At present, the deployment of "5G+Industrial Internet" is accelerating. As of the end of May 2021, more than 1,500 "5G+Industrial Internet" projects have been built. More than 32,000 5G base stations have been deployed for industrial Internet, covering steel, energy, aviation, Key areas such as automobiles. In the industrial scenario, 5G networking and 5G terminals are gradually developing in the direction of light weight and intelligent and research on standards such as scenario requirements and technical requirements for key industries has been carried out. On the whole, industrial development is in the cultivation stage of "construction and improvement, application and optimization", facing the complex production environment and special production requirements of factories, "5G+Industrial Internet" network technology and network "5G+Industrial Internet" "Adaptation enhancement technology, "5G+Industrial Internet" terminal, "5G+Industrial Internet" edge computing "5G+Industrial Internet" application, "5G+Industrial Internet" network management and other standardization needs urgent.

3. Identification analysis

The industrial Internet identification analysis technology refers to the process of querying the network location or related information of the target object based on the identification code of the target object. The identification analysis system is one of the important infrastructures of the industrial Internet. At present, my country has established an industrial Internet identification analysis and integration technology system, and has built an identification analysis infrastructure of hierarchical authorization and hierarchical analysis. Among them, the top nodes of Beijing, Shanghai, Guangzhou, Wuhan, and Chongqing have been constructed and are operating stably. 1. The construction of two major disaster recovery nodes in Guiyang started. The number of secondary nodes continues to increase. As of the end of May 2021, 134 secondary nodes have been launched in 23 provinces (regions, cities) and cover 28 industries, forming typical products such as product traceability, supply chain management, and full life cycle management. The application model has developed a batch of basic technical standards for identification analysis which provides technical guidance for analysis software development, system deployment, basic data services, multi-system docking, and industrial coding uniformity. As the label analysis system continues to expand the breadth and depth of its application in the industrial field, industrial coding rules, new analysis architectures, node management, data mutual recognition, system intercommunication, security assurance, etc. need

further strengthen standardization work to support unified management and efficient operation, safe, reliable, and interconnected logic analysis infrastructure and industrial ecological development.

4. Edge computing (network side)

Edge computing is an important supporting technology for the industrial Internet network system and platform system. It effectively promotes the vertical integration and real-time processing of industrial data. It has become a key link in the industrial Internet cloud-end network-end collaboration. Various new products, new applications, and new business formats continue to emerge. At present, the edge computing standard system has been initially established, and a number of key basic standards have been formed around requirements, overall architecture, key node models and requirements. With the continuous acceleration of the edge computing research process, new technologies such as computing power network and edge intelligence continue to innovate, and new standardization requirements are put forward. At the same time, in order to promote the interconnection and interoperability of cross-vendor products, there is an urgent need to strengthen unified service requirements and resource packaging. As well as standardization work such as interface protocols, promote the evolution of edge computing towards intelligence and collaboration, and realize the unified coordinated scheduling and global optimization of multi-dimensional resources such as computing and network.

(2) Platform system

The platform system is the hub of the Industrial Internet. The industrial Internet platform system is a carrier for digitization, networking, and intelligence in the manufacturing industry. It builds a service system based on massive data collection, aggregation, and analysis, promotes the ubiquitous connection, flexible supply, and efficient configuration of manufacturing resources. The platform system includes key technologies such as platform and edge computing (platform side).

1. Platform

The industrial Internet platform is the hub of the entire industry, the entire industry chain, and the entire value chain. It is the core of industrial resource allocation in the process of digitalization, networking and intelligence in the manufacturing industry. It is a new industry on the background of the deep integration of informatization and industrialization. Ecosystem.

At present, my country has initially established a multi-level platform based on a general technology platform, with a cross-industry, cross-field comprehensive platform, a platform with industry and regional characteristics, and a professional platform in the technical field as the core and a vigorously developing multi-level platform for enterprise-level platform construction system. As of the end of May 2021, there are nearly 100 platforms with industry and regional influence, the number of industrial equipment connected to the platforms exceeds 73 million, and more than 1 million industrial companies have been on the cloud. The average number of connected devices for dual cross-platforms exceeds 2 million units/sets. Various types of microservice components, industrial mechanism models, simulation software tools, big data analysis platforms, low-code development tools, industrial APPs and other technical products continue to emerge, promoting the platform's development in resource management, modeling and simulation, data analysis, and application development. power enhanced. The development of a batch of standards such as platform testing and verification, platform interface model, platform application implementation guide, etc., provides guidance and reference for platform evaluation and evaluation, data integration, deployment and implementation. With the continuous improvement of the platform's comprehensive capabilities in industrial equipment connection, industrial mechanism modeling and analysis, industrial application development environment, industrial microservices, etc., there is an urgent need for standardization, and there is an urgent need to accelerate the construction of platform resource calls, industrial microservice frameworks, and data. Regulations such as dictionary, industrial APP development and verification, authority management, etc. promote the healthy development of platform industry ecology.

2. Edge computing (platform side)

In order to meet the real-time and safety requirements of industrial production, the platform functions need to be mapped on the edge side close to the data source for real-time data processing on the production site and rapid business optimization to meet the industrial real-time reliability, determinism, Virtualization and resource abstraction, low-latency data perception, edge-cloud collaboration, lightweight machine learning applications and other requirements. At present, in order to accelerate the compatibility of the platform and the underlying hardware equipment, create an edge ecology, and improve the level of edge application development, new technologies such as edge intelligence, edge real-time operating systems, and edge microservice frameworks have become the key directions of platform development, and new technologies are urgently needed to meet new needs. Carry out the development of relevant standards for edge computing platforms to accelerate the construction of edge ecology.

(3) Security system

The security system is the guarantee of the Industrial Internet. Industrial Internet security system is that industrial Internet companies adopt comprehensive measures such as technology and management in accordance with relevant requirements and standards of laws and regulations.

administrative regulations to protect key elements such as industrial Internet-related equipment and control, network and identification analysis platforms and applications, and data. Safely, effectively prevent and respond to network security incidents. The security system includes classification and hierarchical security protection, security management, and security application services.

At present, my country's industrial Internet security has achieved initial results. The pilot work of industrial Internet enterprise network security classification and hierarchical management has been steadily advanced, and a security management pattern of government guidance, departmental coordination, and business owner responsibility has been initially formed, and a perceptible security technology has basically been established. The monitoring service system, as of the end of May 2021, has covered 14 important industries such as aviation and electronics, monitored more than 136,000 industrial enterprises, monitored 165 industrial Internet-related platforms, and discovered nearly 9.1 million networked devices (sets). A number of safety technology products have been developed, a number of advanced safety demonstration projects such as the Internet of Vehicles, Industrial Internet, and the Internet of Things have been selected, and a number of public service platforms such as testing and verification and online training have been established. The supply of safety products and services has been continuously enhanced. With the development of my country's industrial Internet entering a new stage, it is urgent to continuously improve the industrial Internet security standard system based on the security classification and grading standards, accelerate the development of classification and security protection standards, security management, security application services and other standards, and improve industrial Internet security technology application and service capabilities.

(4) Application

Application is a manifestation of the value of industrial Internet empowering the transformation and upgrading of manufacturing industry. My country's industrial enterprises and information technology enterprises have actively explored industrial Internet applications and many innovations, and gradually formed new models and new formats such as platform design, intelligent manufacturing, personalized customization, network collaboration, service extension, and digital management. At present, industrial Internet applications have covered 40 major categories in the national economy, gradually extending from peripheral links such as sales and management to core links such as design and production, and gradually transitioning from a single device and a single scene to a complete production system and management process. Data-driven new business models are accelerating, and a small number of standards have been formulated for typical application models such as intelligent manufacturing, supply chain management, and personalized customization. In order to promote the application of the industrial Internet in an orderly manner, it is urgent to unify the understanding of all parties, strengthen the formulation of common application models and implementation paths that can be replicated and promoted, and continue to promote different details such as automobiles, steel, electronic information, and light industrial appliances. Application standardization work by industry.

2. Overall requirements

Guided by Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, we will thoroughly implement the requirements of the Fourteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of Vision Goals for 2035 on the promotion of the construction of the industrial Internet standard system, and strengthen standards work. Top-level design, increase the effective supply of standards, coordinate the promotion of domestic and international standards, accelerate the construction of a unified, integrated, and open industrial Internet standard system, and enhance the overall support and leading role of standards in industrial transformation and upgrading.

(1) Basic principles

Overall planning and coordinated advancement. Improve the top-level design of the industrial Internet standard system, clarify the key areas and directions of standardization, guide the simultaneous implementation of standardization work in different areas, and strengthen the overall coordination of the development of industrial Internet standards.

Commonness first, urgent use first. Combining with the needs of industrial development, speed up the research and formulation of basic common and urgently-needed standards in the industry, realize the simultaneous advancement of standards and the development of the industrial Internet industry, and enhance the advancement, applicability and effectiveness of the standards.

Inclusive, cooperative and sharing. Actively participate in international standardization activities, strengthen exchanges and cooperation with relevant industry alliances, etc., and collaborate with all parties in industry, academia, research, and upstream and downstream companies in the global industrial chain to jointly formulate international standards.

(2) Construction goals

By 2023, an industrial Internet standard system will be basically formed. Formulate more than 15 basic common standards such as terminology, general requirements, supply chain/industrial chain, talents, etc., and more than 40 key technical standards such as "5G+Industrial Internet", information model, industrial big data, security protection, etc., for automobiles and electronic information, Steel, light industry (ho

appliances), equipment manufacturing, aerospace, petrochemical and other key industries have more than 25 application standards. Prom standards to achieve breakthroughs and be the first to apply in key industries (fields), and guide enterprises to achieve standards in R& production, management and other links.

By 2025, formulate more than 100 standards covering key technologies, products, management and application requirements of industrial Internet, basically establish a unified, integrated, and open industrial Internet standard system, and form standards that are widely u in enterprises and maintain the international advanced level Good situation of simultaneous development.

Three, construction ideas

(1) Industrial Internet standard system structure

The industrial Internet standard system is based on basic common standards and supports key technical standards such as networks, ec computing, platforms, security, and applications. A basic common standards include seven categories, including terminology definitions, gene requirements, architecture, testing and evaluation, management, supply chain/industrial chain, and talents. They are located at the bottom of industrial Internet standard architecture diagram. They are B network standards and C edge computing. Supported by standards: tfc standards, E safety standards and F application standards. The B network standard is the foundation of the industrial Internet s the platform standard is the core of the industrial Internet system, and the E security standard is the guarantee of the industrial Interne r. 1 C-edge computing standard is an important support and key hub for the collaboration of industrial Internet networks and plat Th application standard is located at the top of the industrial Internet standard system structure diagram. It faces the specific needs of Jus and refines the basic commonality of A, the B network standard, the C edge computing standard, the D platform standard, and the E secu standard. The industrial Internet standard system architecture diagram is shown in Figure 1.

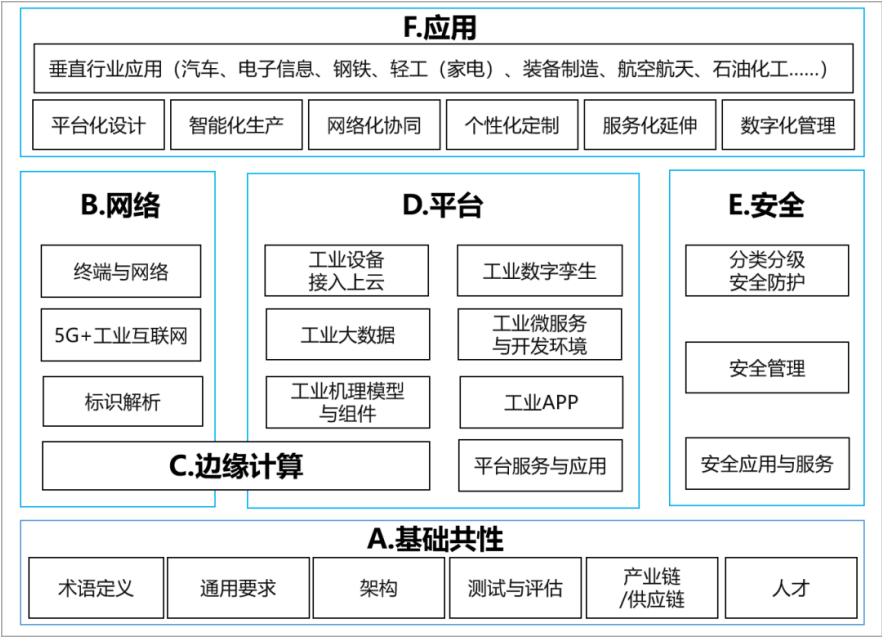


Figure 1 Industrial Internet standard system structure diagram

(2) Framework of Industrial Internet Standard System

The industrial Internet standard system framework includes six categories of standards including basic commonality, network, ec computing, platform, security, and application, as shown in Figure 2.

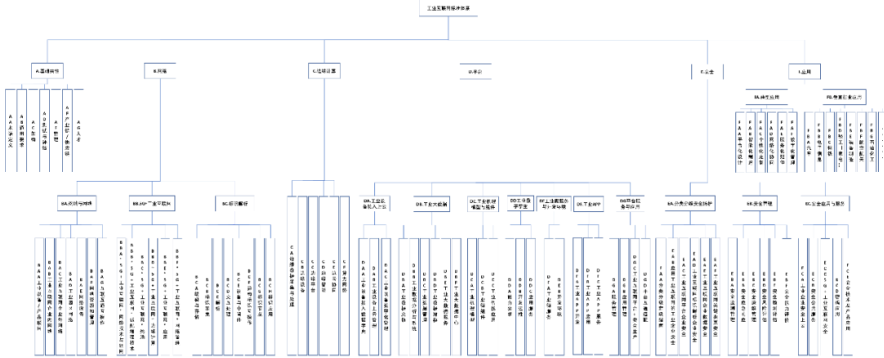


Figure 2 Framework diagram of the industrial Internet standard system

4. Construction content

(1) Basic common standards

The basic common standards mainly regulate the versatility and guiding standards of the Industrial Internet, including definitions of terminology, general requirements, architecture, testing and evaluation, management, supply chain/industrial chain, talents and other standards.

(1) Terminology definition standards: Mainly regulate the related concepts of the Industrial Internet, and provide support for the formulation of other parts of the standard, including the definition, classification, and relationship between major concepts such as industrial Internet scenarios, technologies, and businesses.

(2) General requirements and standards: Mainly regulate the general capability requirements of the Industrial Internet, including requirements and standards in terms of business, functions, performance, security, reliability, and management.

(3) Architecture standards: including the industrial Internet system architecture and the reference architecture of each part, to define the objects, boundaries, hierarchical relationships and internal connections of each part of the industrial Internet.

(4) Test and evaluation standards: Mainly regulate the test requirements of industrial Internet technology, equipment/products as well as industrial Internet, 5G+ industrial Internet application fields (including industrial parks, industrial enterprises, etc.) and requirements of application projects, including test methods, evaluation indicators, evaluation methods, acceptance methods, and pricing, etc.

(5) Management standards: Mainly regulate the management requirements of the responsible entities and key elements of industrial Internet projects/engineering construction and operation, including industrial Internet projects/engineering construction, operation, maintenance services, transactions, resource allocation, performance, organizational processes, etc. Aspect standards.

(6) Industrial chain/supply chain standards: Mainly include the supply and demand docking of upstream and downstream enterprises on industrial chain collaboration platform based on the industrial Internet, the coordinated operation of the upstream and downstream of industrial chain, the industrial chain collaboration platform and other standards, as well as supply chain data sharing and supply chain management, Supply chain performance evaluation, supplier management, supply chain security, supply chain early warning platform and other standards.

(7) Talent standards: It mainly includes standards for industrial Internet practitioners' ability requirements, ability training and ability evaluation. The Industrial Internet Practitioner Competence Requirements Standard is used to regulate the competence management practitioners, including requirements for comprehensive competence, professional knowledge, technical skills, and engineering practical capabilities. The industrial Internet talent capacity training standards are used to regulate the training requirements for practitioners, including standards such as training form, content, teaching materials, and class hours. The industrial Internet talent ability evaluation standard is used to regulate the ability level of industrial Internet practitioners, including standards such as evaluation content and methods.

(2) Network standards

1. Terminal and network standards

Terminal and network standards mainly include industrial equipment/product networking, industrial Internet enterprise internal network, industrial Internet enterprise external network, industrial park network, network equipment, network resources and management, interconnection and interoperability standards.

(1) Industrial equipment/product networking standards: Mainly regulate the transformation of dumb equipment network interconnection capabilities, the functions, interfaces, parameter configuration, data exchange, clock synchronization, positioning, equipment coordination, remote control management and other requirements involved in industrial equipment/product networking.

(2) Industrial Internet Intra-enterprise network standards: Mainly regulate the network interconnection requirements between industrial equipment/products, control systems, and information systems, including fieldbus, industrial Ethernet, industrial optical network, time sensitive network (TSN), deterministic network (DetNET), software-defined network (SDN), industrial wireless, IT/OT converged networking and other network technology standards.

(3) Industrial Internet enterprise external network standards: Mainly regulate the public network (Internet, virtual private network, etc.) and private network requirements that connect production resources, commercial resources, users and products, including FlexE-based, optical transport network, and software-defined network (SDN), segment routing IPv6 protocol (SRv6), mobile communication network, cloud network integration and other key network technology standards.

(4) Industrial park network standards: Mainly regulate the relevant requirements of the industrial park network, including technical standards such as network architecture, functions and performance, networking technology, and operation and maintenance.

(5) Network equipment standards: It mainly regulates the key technical requirements of network equipment functions, performance and interfaces used in the industrial Internet, including industrial gateways, industrial switches, industrial routers, industrial optical network equipment, industrial wireless access and other standards.

(6) Network resources and management standards: It mainly regulates the management requirements for the use of addresses, wireless spectrum and other resources involved in the industrial Internet, as well as the requirements for network operation and management, including standards for industrial Internet IPv6 address planning, application, implementation, and management, which are used in industrial environment. Standards such as wireless spectrum planning, as well as industrial Internet enterprise internal network management, industrial Internet enterprise external network management, industrial park network management and other standards.

(7) Interconnection and interoperability standards: mainly regulate the technical and management requirements for cross-network and cross-domain network interconnection (such as industrial Internet exchange centers, etc.), and the interoperability of multi-source heterogeneous devices (such as interfaces, protocols, information models, etc.) Architecture and technical requirements, specifications and guidelines for development and cross-system interoperability (such as protocol interaction, etc.).

2. "5G+Industrial Internet" standard

"5G+Industrial Internet" standards mainly include "5G+Industrial Internet" network technology and networking, "5G+Industrial Internet" adaptation and enhancement technology, "5G+Industrial Internet" terminals, "5G+Industrial Internet" edge computing, and "5G+Industrial Internet" applications, "5G + Industrial Internet" network management standards.

(1) "5G+Industrial Internet" network technology and networking: It mainly stipulates the key technologies and network architecture standards for the integration of 5G and industrial Internet, including customizable core networks, industrial small base stations, 5G-LAN, NPN, and Standards such as private network architecture for industrial enterprises.

(2) "5G+Industrial Internet" adaptation and enhancement technology: It mainly regulates 5G's enhanced technical standards for industrial Internet requirements, including 5G uplink enhancement, high-precision time synchronization, high-precision indoor positioning, and other network protocol docking standards.

(3) "5G+Industrial Internet" terminal: It mainly regulates the technical standards of fusion terminals for different industries and scenarios including industrial 5G communication modules, industrial 5G communication terminals (such as instrumentation sensors, AGV, monitor equipment, AR/VR equipment, etc.)) And other standards.

(4) "5G+Industrial Internet" edge computing: It mainly regulates the relevant requirements of 5G multi-access edge computing (MEC) facilities, including deployment architecture for industrial scenarios, infrastructure (network, computing power, storage, etc.), platforms, and interfaces And other standards.

(5) "5G+Industrial Internet" application: It mainly regulates standards for the integration of 5G and industrial Internet application scenarios and technical requirements for different industries, including mining, steel, electronics, equipment manufacturing, power, petrochemical, light industry, building materials and other industries. Integrate application standards.

(6) "5G+Industrial Internet" network management standards: Mainly standardize 5G convergence basic network management, 5G multi-access edge computing management, 5G slice network management and other standards.

3. Logo resolution standards

The identification analysis standards mainly include encoding and storage, identification collection, analysis, interactive processing equipment and middleware, heterogeneous identification interoperability, identification nodes, identification applications and other standards.

(1) Coding and storage standards: Mainly regulate the coding scheme of the industrial Internet, including coding rules, registration operation procedures and other standards, as well as identification codes in passive identification carriers (such as bar codes, QR codes, radio frequency identification tags, etc.), active identification carriers (Such as UICC, communication modules, chips, etc.) and other standards for storage methods of identification carriers.

(2) Identification collection standards: Mainly regulate the collection methods of industrial Internet identification, including various standards involving communication protocols and interface requirements between identification collection entities.

(3) Analysis standards: Mainly standardize the hierarchical model of industrial Internet identification analysis, implementation process, analysis query data message format, response data message format and communication protocol, analysis security and other standards.

(4) Interactive processing standards: The main specifications identify data modeling methods and interactive service mechanisms, include data models, semantic descriptions, product information metadata, and standards for interactive protocols and interfaces, data sharing and services, and data security.

(5) Equipment and middleware standards: Mainly regulate the functions, performance, interfaces, protocols, synchronization and other standards involved in industrial Internet identification collection equipment, analysis service equipment, data interaction middleware, etc.

(6) Heterogeneous identification interoperability standards: Mainly regulate the interoperability between different industrial Internet identification analysis services, including standards for implementation methods, interactive protocols, and data mutual recognition.

(7) Identification node standards: Mainly regulate the system capabilities and intercommunication interfaces of industrial Internet identification analysis nodes (such as root nodes, national top nodes, secondary nodes, enterprise nodes, recursive nodes, and nodes combined with blockchain technology, etc.), Operation and management, distributed storage and management standards.

(8) Identification application: It mainly regulates identification application technical standards based on specific technologies (such as artificial identification carriers, blockchain, etc.) and specific scenarios (such as product traceability, warehousing logistics, supply chain finance

(3) Edge computing standards

Edge computing standards mainly include standards for edge data collection and processing, edge devices, edge platforms, edge computing, edge-cloud collaboration, and computing power networks.

(1) Edge data collection and processing standards: Mainly regulate the data collection technical requirements of various equipment/products, including standards such as protocol analysis, data conversion, data edge processing, data storage, data and application interfaces, and related application guidelines.

(2) Edge device standards: Mainly regulate the technical requirements of edge computing devices such as functions, performance, interfaces, including standards for edge servers/all-in-ones, edge gateways, edge controllers, and edge computing instruments.

(3) Edge platform standards: Mainly regulate the technical requirements of edge cloud and edge computing platforms, including standards for computing, storage, network resource management, equipment management, application management, and operation and maintenance management.

(4) Edge intelligence standards: Mainly regulate the relevant standards for the realization of edge computing intelligent process capabilities, including virtualization and resource abstraction technology, real-time operating systems, distributed computing task scheduling strategies and technologies, and open edge intelligent services.

(5) Edge-Cloud Collaboration Standards: Mainly regulate the technical requirements of edge-cloud collaboration architecture, including standards such as resource collaboration, application collaboration, service collaboration, data collaboration, and other interfaces and protocols.

(6) Computing power network standards: It mainly regulates computing power network architecture and other technical requirements, including computing power traceability, computing power measurement, computing power credibility and other standards.

(4) Platform standards

Platform standards mainly include industrial equipment access to the cloud, industrial big data, industrial mechanism models and components, industrial digital twins, industrial microservices and development environments, industrial apps, platform services and applications and other standards.

1. Industrial equipment access to the cloud standard

Industrial equipment access cloud standards mainly include industrial equipment access data dictionary standards, industrial equipment cloud management standards, and industrial equipment digital management standards.

(1) Industrial equipment access data dictionary standard: It is mainly used for the structured description of industrial equipment data in different industries, including the classification of industrial equipment metadata, the construction of metadata models, and the unification of industrial equipment data description methods and formats to realize equipment, Mutual understanding and interoperability of data between systems and platforms.

(2) Industrial equipment cloud management standards: Mainly regulate the relevant requirements of the industrial Internet platform industrial equipment cloud, including general management requirements for industrial equipment cloud, basic capability requirements, application scenarios, implementation guidelines, effect evaluation and other standards.

(3) Digital management standards for industrial equipment: Mainly regulate the requirements for digital management of industrial equipment based on the industrial Internet platform, including standards for industrial equipment operation monitoring, intelligent scheduling, predict maintenance, and full-process quality control based on the industrial Internet platform.

2. Industrial Big Data Standard

Industrial big data standards mainly include industrial data exchange standards, industrial data analysis and system standards, industrial data management standards, industrial data modeling standards, industrial big data service standards, industrial big data center standards, etc.

(1) Industrial data exchange standards: Mainly regulate the data exchange system architecture, interoperability, performance and other requirements between different systems in the industrial Internet platform.

(2) Industrial data analysis and system standards: Mainly regulate the process and methods of industrial Internet data analysis, including general data analysis processes and standards that can be used for data analysis in typical scenarios, big data systems and other standards.

(3) Industrial data management standards: Mainly regulate industrial Internet data storage structure, data dictionary, metadata, data quality requirements, data life cycle management, data management capability maturity and other requirements.

(4) Industrial data modeling standards: Mainly regulate the mapping and interrelationship of physical entities (work-in-process, production lines, products, etc.) in cyberspace, including the description of static attribute data, the description of dynamic data such as status, and the physical Standards such as the description of the interaction between entities and the rules of incentive relationships.

(5) Industrial big data service standards: Mainly regulate the services provided by industrial Internet platforms using big data capabilities including big data storage services, big data analysis services, big data visualization services, data modeling and data opening, data sharing and other standards.

(6) Industrial big data center standards: Mainly regulate the functional architecture, infrastructure, sub-centers, resource management, platform operation and maintenance, user authorization, data security monitoring, data aggregation, data exchange and sharing, data applications and data of industrial big data centers. Service, data interconnection and other requirements.

3. Industrial mechanism model and component standard

Industrial mechanism model and component standards mainly include industrial mechanism model standards, industrial micro-component standards, industrial intelligent application standards, etc.

(1) Industrial mechanism model standards: Mainly regulate the development, management, application and other related requirements of industrial mechanism models, including standards for industrial mechanism model development, application implementation, model classification, model recommendation, and model adaptation.

(2) Industrial micro-component standards: Mainly regulate the development, management, application and other related requirements of industrial micro-components, including standards such as industrial micro-component reference architecture, development guidelines, application implementation, and component classification.

(3) Industrial intelligent application standards: Mainly regulate the technology, management, evaluation and other related requirements of industrial intelligent applications, including industrial knowledge base, industrial vision, knowledge graph, deep learning, human-computer interaction applications, industrial intelligent scenarios, functions and performance Evaluation and other standards.

4. Industrial Digital Twin Standard

Industrial digital twin standards mainly include industrial digital twin capability requirements standards, development operation and maintenance standards, and application service standards.

(1) Capability requirements standards: Mainly regulate the related requirements of the industrial digital twin architecture, technology and system, including the functional requirements of the industrial digital twin reference architecture, development engine and management system. The digital twin is in terms of speed, accuracy, scale, breadth and safety, Reliability, stability and other aspects of performance requirements, as well as digital support technology, digital main line, digital twin modeling and other standards.

(2) Development and operation and maintenance standards: Mainly regulate the development, construction, and operation and maintenance of industrial digital twins, including the development process, development methods, construction guidelines, management operation and maintenance of products, equipment, production lines, factories, etc. Data interaction and interface standards.

(3) Application service standards: Mainly regulate the application, service and evaluation requirements of industrial digital twins, including industrial digital twin application scenarios, digital simulation, application implementation, service models, and mature applications of products, equipment, production lines, factories, etc. Standards such as degree, management norms and so on.

5. Industrial microservices and development environment standards

Industrial microservices and development environment standards mainly include industrial microservices standards and development environment standards.

(1) Industrial microservice standards: Mainly regulate the microservice functions and access operation requirements of the industrial Internet platform, including standards for architecture principles, management functions, governance functions, application access, and architectural performance.

(2) Development environment standards: Mainly regulate the technical requirements for application development docking and operation management of industrial Internet platforms, including application development specifications, application development interfaces, service release, service management, development and operation resource management, open source technology and other standards.

6. Industrial APP Standard

Industrial APP standards mainly include industrial APP development standards, industrial APP application standards, and industrial APP service standards.

(1) Industrial APP development standards: Mainly standardize industrial APP reference architecture, industrial APP class classification, industrial APP development methods and processes, industrial APP development environment and tools, industrial development language and modeling language, industrial APP interface and integration, industrial APP component packaging and standards.

(2) Industrial APP application standards: Mainly standardize the application requirements, business models, application modes (including independent application mode and assembly application mode), application evaluation and other standards of industrial APP.

(3) Industrial APP service standards: Mainly regulate industrial APP's intellectual property rights, implementation and operation maintenance, service capabilities, quality assurance, circulation services, security protection, application stores and other related standards.

7. Platform services and application standards

Platform service and application standards mainly include service management standards, application management standards, industrial Internet platform + safety production standards, and platform interoperability and adaptation standards.

(1) Service management standards: Mainly regulate the selection, service, evaluation and other requirements of industrial Internet platform including system architecture, selection guides, monitoring and analysis, solutions, regional collaboration, service provider evaluation, quality management requirements, measurement and pricing, etc. standard.

(2) Application management standards: Mainly regulate the application, management, and evaluation requirements of the industrial Internet platform, including application implementation, application evaluation, and platform-based design, intelligent manufacturing, network collaboration, and personalized customization based on the industrial Internet platform. Service-oriented extension, digital management and other application model standards.

(3) Industrial Internet platform + safe production: It mainly includes new infrastructure for safe production, new management and control capabilities, and new application model standards based on the industrial Internet platform. It mainly includes implementation methods and standards for typical integrated applications of "Industrial Internet + Safe Production" such as digital management, networked collaboration, and intelligent management and control; and the implementation of "Industrial Internet + Safe Production" for key industries such as mining, steel, petrochemical, chemical, petroleum, and building materials "Construction planning, specific technological transformation, application solution management and control, data application and other application standards.

(4) Platform interoperability and adaptation standards: Mainly regulate the data flow, business connection and migration between different industrial Internet platforms, including interoperability, sharing, conversion, migration, integrated data interface and application interface, data and service transfer requirements and other standards.

(5) Safety standards

Safety standards mainly include classification and grading safety protection, safety management, safety application and service standards.

1. Classification and classification of safety protection standards

Classification and classification security protection standards mainly include classification, classification and grading guidelines, industrial enterprise security using industrial Internet, industrial Internet platform enterprise security, industrial Internet identification analysis enterprise security, and industrial Internet key element security standards.

(1) Classification, grading and grading guide standards: Mainly regulate the classification and grading requirements of industrial Internet companies and key elements, including the classification and grading methods and procedures of industrial Internet companies, platforms and identification analysis systems and other standards for grading and filing requirements.

(2) Security standards for industrial enterprises that apply the Industrial Internet: Mainly regulate the different levels of security protection technical requirements and other requirements of industrial enterprises that apply the Industrial Internet, including the security management and technical requirements that enterprises should follow in the process of industrial Internet-related business applications.

(3) Industrial Internet platform enterprise security standards: mainly regulate the different levels of security protection technical requirements and other requirements of industrial Internet platform enterprises, including the security management and technical requirements that enterprises should follow in the process of building and operating industrial Internet platforms.

(4) Industrial Internet logo analysis enterprise security standards: mainly regulate the different levels of security protection technical requirements and other requirements of industrial Internet logo analysis enterprises, including the security management and technical requirements that enterprises should follow in the process of providing industrial Internet logo registration services and analysis services.

(5) Data security standards for industrial Internet companies: Mainly regulate the technical requirements and other requirements for security protection of data generated or used by industrial Internet companies in the new model of the industrial Internet, including data classification and classification, and full life cycle security protection. And other safety management and technical requirements.

(6) Security of key elements of the Industrial Internet: It mainly regulates the technical requirements for safety protection and other requirements of the key elements involved in the industrial Internet in the process of design, development, construction and operation, including equipment and control security (edge equipment, industrial field equipment, CNC system, etc.), network and identification analysis security (factory internal and external networks, industrial park networks, identification carriers and terminals, identification nodes and architecture, etc.), platform and application security (edge platform, cloud infrastructure, application development environment, industrial APP, etc.) standard.

2. Safety Management Standard

Security management standards mainly include industrial Internet security monitoring and management, security emergency response operation and maintenance management, risk assessment, testing and evaluation, and security capability evaluation.

(1) Security monitoring management standards: Mainly regulate the technical requirements of industrial Internet security monitoring, including standards such as industrial Internet application industrial enterprises, logo analysis enterprises, platform enterprises, and other security monitoring technical requirements or interface specifications.

(2) Security emergency response standards: Mainly regulate the technical requirements for industrial Internet security emergency response, including standards such as industrial Internet security emergency drills and emergency plans.

(3) Security operation and maintenance management standards: It mainly regulates the security management requirements in the process of industrial Internet security operation and maintenance, including industrial Internet security auditing, disaster recovery and other standards.

(4) Security risk assessment standards: Mainly regulate the requirements of industrial Internet security risk assessment processes and methods, including industrial Internet equipment, control systems, platforms, identification analysis systems, industrial APPs and other risk assessment standards.

(5) Security testing and evaluation standards: Mainly regulate the technical requirements and other requirements of industrial Internet security testing and evaluation agencies, including industrial Internet equipment, control systems, platforms, identification analysis systems, industrial APP and related network security product testing, and industrial Internet security assessment agency specifications and other standards.

(6) Security capability evaluation standards: Mainly regulate the industrial Internet security capability evaluation requirements, including standards such as industrial Internet companies, key identification analysis nodes, platforms and data and other security capability reference frameworks, evaluation models, and index systems.

3. Safety application and service standards

Security application and service standards mainly include industrial enterprise cloud access, secure public services, "5G+Industrial Internet" security, password application, security technology and product application standards.

(1) Industrial enterprise security cloud access standards: It mainly regulates the security technical requirements and other requirements in the process of industrial enterprises accessing the industrial Internet platform, mainly including industrial equipment, systems, products, data and other security cloud standards.

(2) Security public service standards: Mainly regulate the technical requirements and other requirements of industrial Internet security public service providers, including threat information sharing, security crowd testing, and security capabilities microservices.

(3) "5G+Industrial Internet" security standards: Mainly regulate the security technical requirements and other requirements in the process of integrating 5G and industrial Internet applications, mainly including "5G+Industrial Internet" network technology and networking, "5G+Industrial Internet" adaptation enhancements Technology, "5G+Industrial Internet" terminals, "5G+Industrial Internet" edge computing, "5G+Industrial Internet" applications, "5G+Industrial Internet" network management and other security standards.

(4) Cipher application standards: Mainly regulate the technical requirements and other requirements in the process of industrial Internet application encryption, including equipment, control systems, identification analysis systems, platforms and other password application standards.

(5) Security technology and product application standards: Mainly regulate the technical requirements and other requirements for security technology and product applications in the industrial Internet field, including boundary protection, security analysis, detection and response, security audit and operation and maintenance, endogenous security, etc. Product technical requirements and security standards for the application of emerging technologies such as artificial intelligence, trusted computing, and privacy computing.

(6) Application standards

Application standards include typical applications and vertical industry applications.

1. Typical application standards

Typical application standards include application standards such as platform design, intelligent manufacturing, personalized customization, networked collaboration, service extension, and digital management.

(1) Platform-based design application standards: mainly for product design, simulation verification, process design, sample manufacturing and other scenarios, formulating general business application standards.

(2) Intelligent manufacturing application standards: mainly for the production and manufacturing links of industrial enterprises, formulating general business application standards.

(3) Personalized customized application standards: Mainly oriented toward personalized and differentiated customer needs and other scenarios, formulating general business application standards.

(4) Networked collaborative application standards: Mainly for collaborative design, collaborative manufacturing, supply chain collaboration and other scenarios, formulate common business application standards.

(5) Service-oriented extended application standards: mainly for scenarios such as remote product operation and maintenance, predictive maintenance, and value-added services based on big data, and formulate general business application standards.

(6) Digital management application standards: It is mainly for various management links such as the visualization of enterprise internal management and control, timely response to market changes, and optimization of dynamic allocation of resources, and formulate general business application standards.

2. Vertical industry application standards

Vertical industry application standards: based on basic common standards, network standards, edge computing standards, platform standards, security standards and typical application standards, for automobiles, electronic information, steel, light industry (home appliance equipment manufacturing, aerospace, petrochemicals, etc. For industrial Internet applications in key industries/fields, formulate industrial application guidelines, specific technical standards and management practices.

Five, organization and implementation

Strengthen overall coordination. Relying on the National Industrial Internet Standards Coordination and Promotion Group, the General Group, and the Expert Advisory Group, coordinate the construction of the industrial Internet standard system, coordinate the national standard and industry standard projects, and strengthen the coordination of various industries and fields to form a joint force and accelerate the progress.

Speed up the development of standards. Gather all forces in the industrial Internet industry ecological chain in accordance with the planning and design of the "Industrial Internet Comprehensive Standardization System Construction Guide (2021 Edition)", vigorously promote the development of standards urgently needed for industrial development, and focus on the organic combination of industrial Internet standardization work and industrial Internet innovation projects. Promote the establishment and improvement of standard test and verification platforms and environments.

Strengthen publicity and implementation. Give full play to the role of localities, associations, alliances, professional institutions and standardization technology organizations, publicize typical cases and outstanding achievements of industrial Internet standardization through multiple channels, and carry out targeted standardization training for enterprises, especially small and medium-sized enterprises. Closely focus technology and industrial development trends, and revise the "Guidelines for the Construction of an Integrated Industrial Internet Standardization System" in due course.

Deepen international cooperation. Continuously deepen the standardization exchanges and cooperation with foreign industrial Internet related organizations, actively participate in the activities of the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the International Telecommunication Union (ITU) and other international standardization organizations and development of international standards, and provide Chinese industry Research results of Internet standardization work.

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