

Industrial Internet Architecture 工业互联网体系架构

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/ Activities related to Industrial Internet Architecture in AII



Industrial Internet Architecture v1.0



- "CONNECTIVITY" is the basis, the basis for the data collection, transmission, exchanging, etc.
- "DATA" is the core, data flow and data intelligence in the whole lifecycle of product.
- "SECURITY" is the prerequisite, ensuring the running of the industrial internet system

THREE CLOSED – LOOP OPTIMIZATION:

- Equipment operation optimization
- Enterprise management optimization
- Ecosystem optimization

✓ Development of Industrial Internet Architecture



1. Connectivity Framework of Industrial Internet



Factory Internal Network

Internal network connects industrial equipment, PLCs, products , enterprise Datacenter, Servers

Factory External Network

External network supports the scenarios with low latency, high reliability and customization.

Industrial Internet Connectivity Framework

2. DATA SYSTEM of Industrial Internet



Main Trends

- Data integration across layers& parts
- Data process with assistant of the edge
- Data integration management in cloud
- Advanced data analytics
- Data visualization as analytic tools

/2. Industrial Internet PLATFORM

IIOT PLATFORM is a service system that is based on the needs of digitalization, networking and intelligence in the manufacturing. It builds a service system based on mass data collection, aggregation and analysis, and supports the making of connections, flexible supply and efficient allocation of manufacturing resources.



Application layer—Formed to

meet different industries, different scenarios of industrial SaaS and industrial APP for the final value of industrial Internet

Platform layer—Building a scalable Open Cloud Operating System on the common PaaS with big data processing, industrial data analysis, and industrial microservices

Edge layer—Through a wide range of in-depth data acquisition, as well as heterogeneous data protocol conversion and edge computing, building a data foundation for industrial Internet platform 3. **Protection Management Viewpoint**: Security Objective, Risk Assessment, Security Policy



Key points and actions

IIoT Platform & data security

Security standards

Security best practices

security information sharing

2.Protection Measurement

Viewpoint:

3. SECURITY of Industrial Internet

- ✓Threat Protection
- ✓ Monitoring & Awareness
- ✓ Response & Recovery

Industrial Internet Application of Vertical Industries

A series of enterprise architecture based on implementation viewpoint and driven by business outcomes.



/Home Appliance Industry (Light Industry)

Architecture for home appliance industry is mainly designed for purpose of customized

service and smart products.

Goal

- Provide smart products.
- Access to the customer requirements agilely and accurately.
- Inject customer requirements into design and production process.

Outcome

Designing Air Conditioner with Customers

Sample

- 215,000 design ideas and feedbacks from customers
- Involve 35 designers, 6 modular suppliers interacting with customers





Security

Construction Machinery Manufacturing

Architecture for Construction machinery manufacturing is mainly designed for purpose of smart factory and Service-oriented manufacturing. EA for Construction Machinery Manufacturing

Goal Cross-**Products Partners** Product lifecycle intelligent service Enterprise **Business Domain Application** Industrial Improving Intelligent Manufacturing Asset Domain **APPs** Management logics and For Intranet Enterprise **Se** in production process rules Process users IVIC APIs and optimization For Internet Optimize technique and process by portal users networ new technologies (big data, AI etc.) **Data Platform** Industry Tech Digitalization Data Data Platform (specified model, algorithm Transition Analytics netw access etc Sample Outcome O Remote maintenance monitoring Practice **Control Domain** Edge Gateway Maintenance engineer service response loca ٠ Edge Specified Smart PLC/DCS Database time reduced by 95% Meters Sensor Specified Common Customer satisfaction increased by 30% Equipment Equipment Equipment

Steel Industry

Architecture for steel industry is mainly designed for purpose of digitalizing industry

EA for Steel Industry

Specified Equipment

technologies and managing complex equipment.

Business Domain Application Goal Domain Expert system Monitor and collect data from logics and New technique model Enterprise rules **Process optimization** various specified equipment. APIs and Design **Quality Control** portal Digitalize industry technologies, rvice **Operation Platform Data Platform** including knowledge, mechanism, Industry Tech Digitalization networ Synergy Operation experience etc. (specified model, algorithm Intelligence System Platform etc.) Optimize technique and process by Data Data Smart new technologies (big data, AI etc.) MES networ access Transition Analytics Logistics Sample Practice Outcome **Control Domain** Edge Gateway **Optimizing Rolling Mill** local Edge Vibration times decrease 50% by Specified Smart HMI PLC/DCS Database network **Meters SCADA** Sensor collecting and analyzing the ... equipment data. Equipment

Common Equipment

Why does AII define Architecture v2.0

The blossom of new technologies like Artificial Intelligence, edge computing and the industry' s needs for further operability and practicability urge to improve the architecture.



/ Developed upon a Comprehensive Methodology



Methodology of Industry

- **Process** : Production process and key activities
- **Hierarchy** : Vertical hierarchy
- **Standard** : Key standard and system mapping

Methodology of Software



- **Systematic** : Meta-model, Viewpoints
- □ **Need** : Needs-Pulling
- **Data** : Data function and data flow



Methodology of Communication

- Composition : Core components and function domains
- **Interaction** : Network interface

METHODOLOGY For Architecture 2.0

1, Comprehensive :

- Incorporates methodologies of industry, software and communication
- *condenses into three main elements: network, data and security*

2、Value-oriented:

- Need-driven , procedure-led
- Determine core functions and implementation
 - 3、Structured:
- Structurizes the data flow
- Establishes mappings from topdown

Initial Thoughts about AII Architecture 2.0



Mapping between IIRA and AII-Architecture



2.0





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