



工业互联网产业联盟
Alliance of Industrial Internet

中国工业互联网发展情况

Progress of China's industrial Internet

中国信息通信研究院 (CAICT)

工业互联网产业联盟 (AII)

余晓晖 Xiaohui Yu

Nov 16, 2018

All联盟- 总体情况

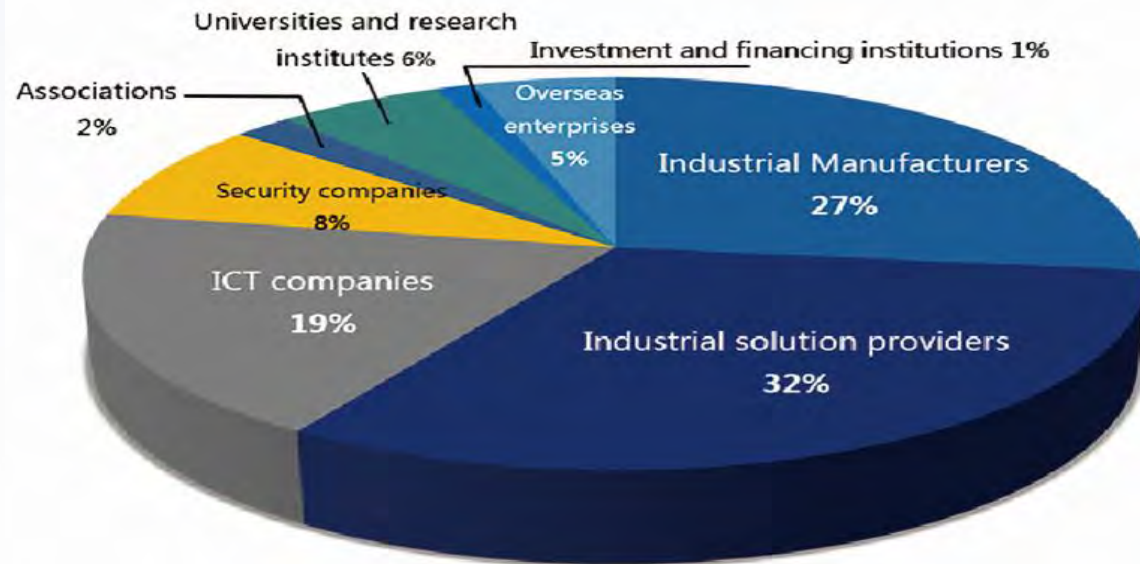
Alliance of Industrial Internet (All)

联盟目前有正式会员单位**834家**
834 Members

Membership Growth



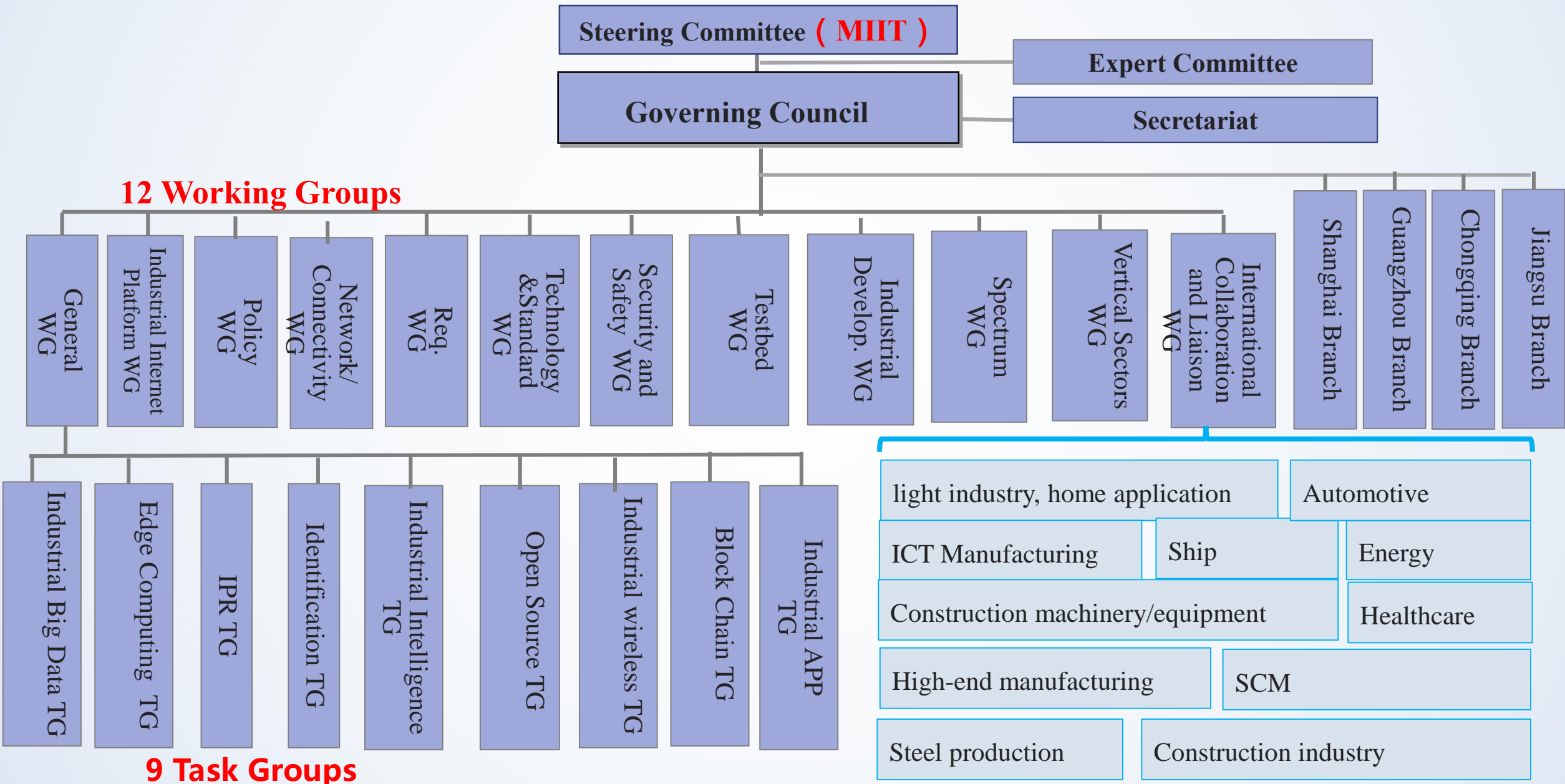
- **12 WG+9 TG +X Structure** 组织架构
- **32 Technical Reports** 研究成果
- **45 Testbeds** 测试床
- **49 Excellent application cases** 优秀应用案例



Membership Makeup



All联盟组织架构 All Organizational Structure – 12WG + 9TG + X



1. Industrial Internet Architecture v1.0
2. Industrial Internet Standard System v1.0
3. Industrial Internet Technology System White Paper V1.0
4. IPR trends of Industrial Internet White Paper
5. Implementation Architecture Of Vertical Industry Industrial Internet White Paper
6. Best Practices Of Industrial Internet (2016)
7. Best practices of Industrial Internet (2017)
8. Industrial Internet Maturity Assessment White Paper V1.0
9. Industrial Internet Network Connectivity White Paper
10. Guide for Device Intelligentization
11. Industrial Data Collection Research Report
12. Factory Internal Network, Technical Requirements of Industrial EPON
13. Industrial Wireless Electromagnetic White Paper
14. Wireless Application Scenario —Automobile Manufacturing
15. Network Solutions Of Industrial Internet
16. Industrial Internet Identification—Product Traceability White Paper
17. Edge Computing White Paper v2.0 (with ECC)

High-Level

Application

Network

18. Industrial Internet Platform White Paper(2017)
19. Standard System of Industrial Internet Platform V1.0
20. Industrial Internet Platform General Requirements (Standards)
21. Interface Model for Industrial Internet Platform
22. Application Management Interface Requirements for Industrial Internet Platform
23. Trustworthy Service Assessment Requirements of Industrial Internet Platform
24. Industrial Big Data Technology and Application White Paper
25. Technical Architecture of Industrial Big Data White Paper
26. Industrial Big Data Innovation Contest White Paper (2017)
27. General Security Requirements for Industrial Internet
28. Industrial Internet Security Architecture White Paper
29. Industrial Cloud Security Reference Solution
30. Security Protection Requirements for Industrial Internet Platform
31. Security Solutions Of Industrial Internet
32. China Industrial Internet Security Situation Report (2016)

Platform & data

Security and Safety

> 20 reports in drafting

AI联盟- 标准框架 Framework of Standards

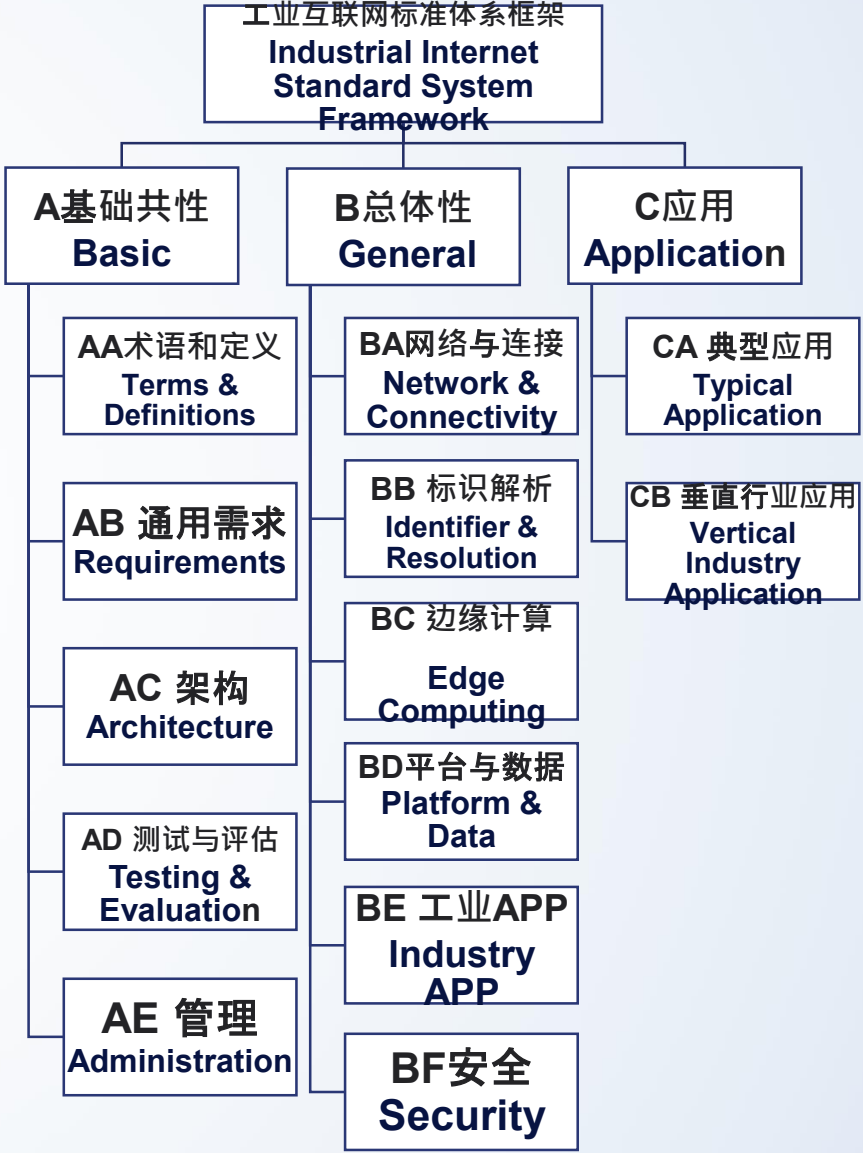
The work of Standardization is continue Promoted.

Feb. 2016 Established technical and standard working group to develop Industry Internet related standards

Feb. 2017 Released the “Industrial Internet Standard System Framework (Version 1.0)”

Feb. 2018 Released the “Industrial Internet Platform Standard System Framework (Version 1.0)”.

Till now According to the latest developments, the draft of the “Industrial Internet Standard System Framework (Version 2.0)” has been prepared.



工业互联网应用：3大路径和4大模式

Application：Three paths and Four modes

3大路径 Three Paths

路径3：面向开放生态的平台运营—工业互联网平台

Path 3: Platform Operation for Open ecosystem --Industrial Internet Platform

汇聚协作企业、产品、用户等产业链资源，实现向平台运营的转变

Integrated industrial chain resources, such as enterprises, products, users to achieve the transformation of platform operations

数据驱动的生态运营能力

Data driven Ecosystem operation capability

路径2：面向企业外部的价值链延伸—智能产品/服务/协同

Path 2: Value chain Extensions for external enterprise – Intelligent products, services and Coordination

打通企业内外部价值链，实现产品、生产和服务创新

Open up the value chain internal and external enterprise, implement products, production and services innovation

数据驱动的业务创新能力

Data Driven Service innovation capability

路径1：面向企业内部的生产率提升—智能工厂

Path 1: Productivity promotion for Internal enterprise— smart factory

打通设备、产线、生产和运营系统，获取数据，实现提质增效，决策优化

Open up Equipment, production line, production and operation system, get data, Improve quality and efficiency, decision optimization

数据驱动的智能生产能力

Data Driven Intelligent Production capability

服务化延伸 Service extension

- Product + service
- Machine as a service
- Manufacturing as a service
- Derivative financial services

个性化定制 Personalized customization

- Simple product
- Complex product

网络化协同 Network collaboration

- Collaborative Design
- Collaborative manufacturing
- Supply chain collaboration

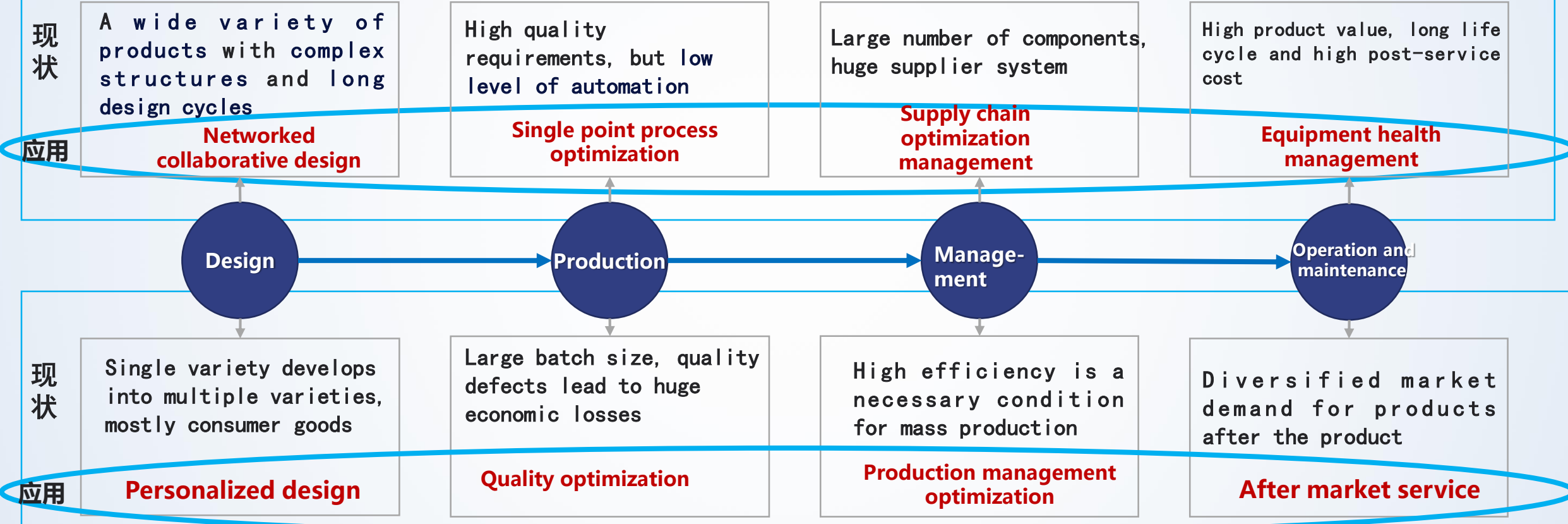
智能化生产 Intelligent production

- Workshop level
- Factory level

工业互联网应用-离散行业 Discrete Industry

1.多品种小批量离散行业 Multi-variety and small batch discrete industries

产品种类多、规模小、价值高、研制和生产周期长，零部件复杂、协同程度高。Products are diversified with small scale, high value but long development and production cycle, complex components and high degree of synergy.



2.少品种大批量离散行业 Small variety of large-volume discrete industries

产品种类少、规模大，对产品质量和生产效率要求高，产品种类向多样性发展。Few variety of the product but on a large scale, high requirement of quality and production efficiency, and the product types are diversified.

工业互联网应用-流程行业 Process Industry

提效率 Improve efficiency
减库存 Decrease inventory

保安全 Ensure Safety
降风险 Reduce risk

数据集成深度和广度不断提升

Path 1: **数据+模型驱动的全流程优化** Data + Model Driven Full Process Optimization

– Construction of smart factories with **digital twins** as the core

Model focused full data integration

Path 2: **以数据可视化为核心的HSE系统** HSE system with data visualization as the core

– Risk management and control, accident warning and simulation based on **digital 3D model**

Integration of manufacturing system data

Path 3: **基于数据的全供应链优化** Data-based full supply chain optimization

– Strengthening the docking of production and sales with **e-commerce** and other means to reduce inventory

Integration of information system data

效率问题 Efficiency problem

Drive the whole process optimization with the model as the core, realize the optimization of raw material ratio, process optimization, health management of equipment and equipment, etc.

安全问题 Safety Requirement

Based on real-time monitoring of the production process, avoid accidents such as leakage and explosion, and achieve full life cycle monitoring of dangerous goods.

效益问题 Best Benefit

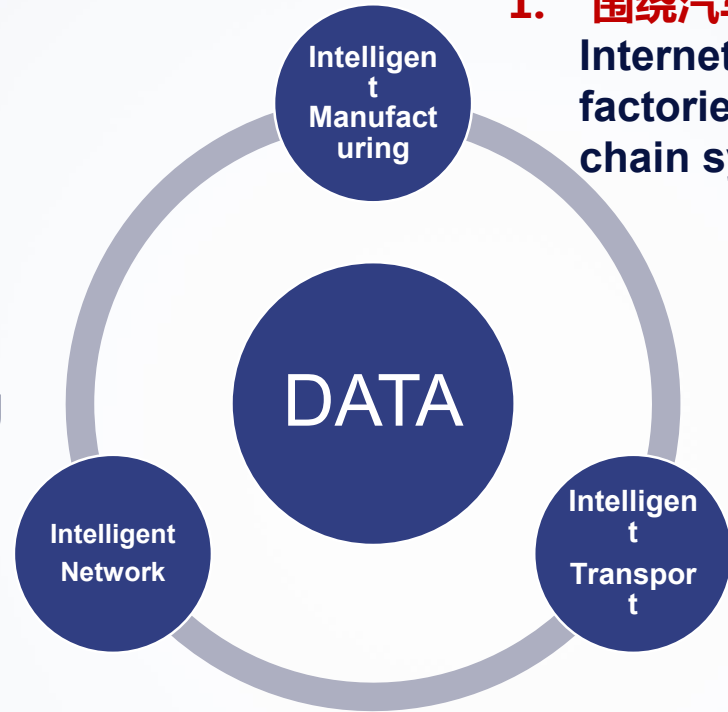
From the procurement of raw materials, inventory to sales, the entire process is optimized, the most suitable raw materials are bought at the lowest price, and at the high price of the finished product, the small price is guaranteed.

工业互联网应用-汽车行业 Automotive Industry

2. 围绕汽车产品 , The new information and communication technology such as 5G, artificial intelligence promotes the intellectualization and networking of products



“人车路云”高度协同的车联网 , Daimler proposed a strategic development plan for network linking. Huawei, Qualcomm, Datang, etc. released automotive network products.



智能网联汽车参考架构 , CHANGAN and Baidu develop and test autonomous vehicles

1. 围绕汽车生产制造环节 , Utilize the Industrial Internet to carry out intelligent upgrades in factories and intelligent management of supply chain systems



一汽等OEM采用 SaaS加强汽车供应链管理
FAW adopts SaaS to strengthen automobile supply chain management

3. 围绕以汽车为载体的出行服务 , Big data , cloud computing and other technologies enhance users' travel experience and traffic management capabilities

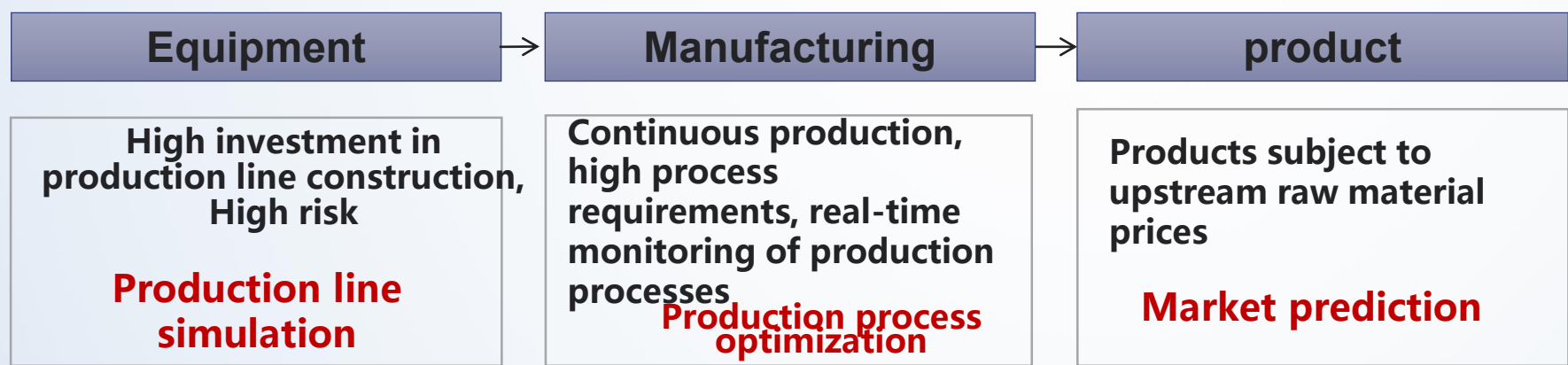
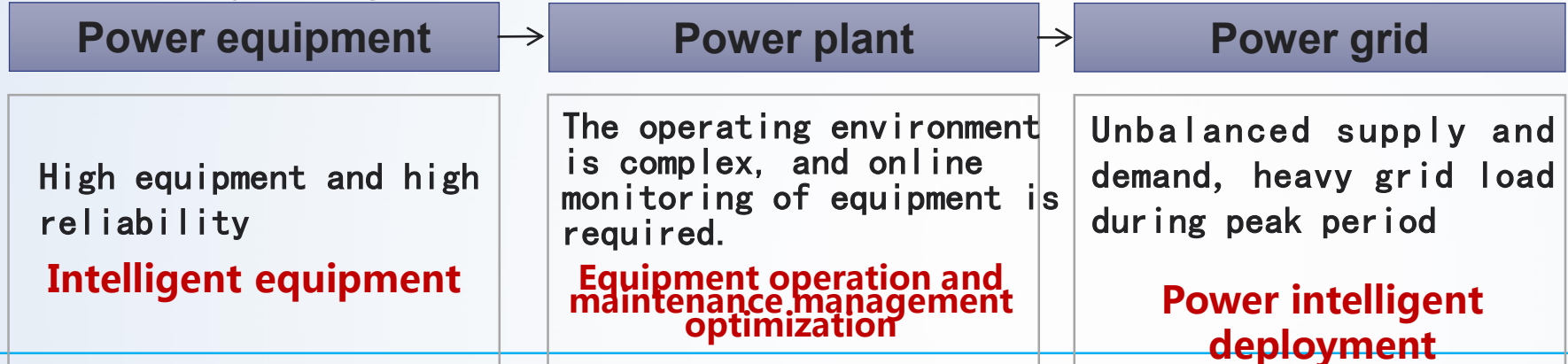


滴滴、吉利曹操等共享出行 ; 上汽车联网保险等新服务
DiDi and CAOCao : Smart sharing mobility ;
FAW : Internet of Vehicles

工业互联网应用-能源行业 Energy Industry

1.可再生能源 Renewable energy (Photovoltaics, Wind power, Hydropower, etc.)

The operating environment is complex, the product is single, and the equipment reliability is high.



2.非可再生能源 Non-renewable energy (Oil, Coal, etc.)

Continuous production, high requirements on product quality and production efficiency, product value needs to be improved

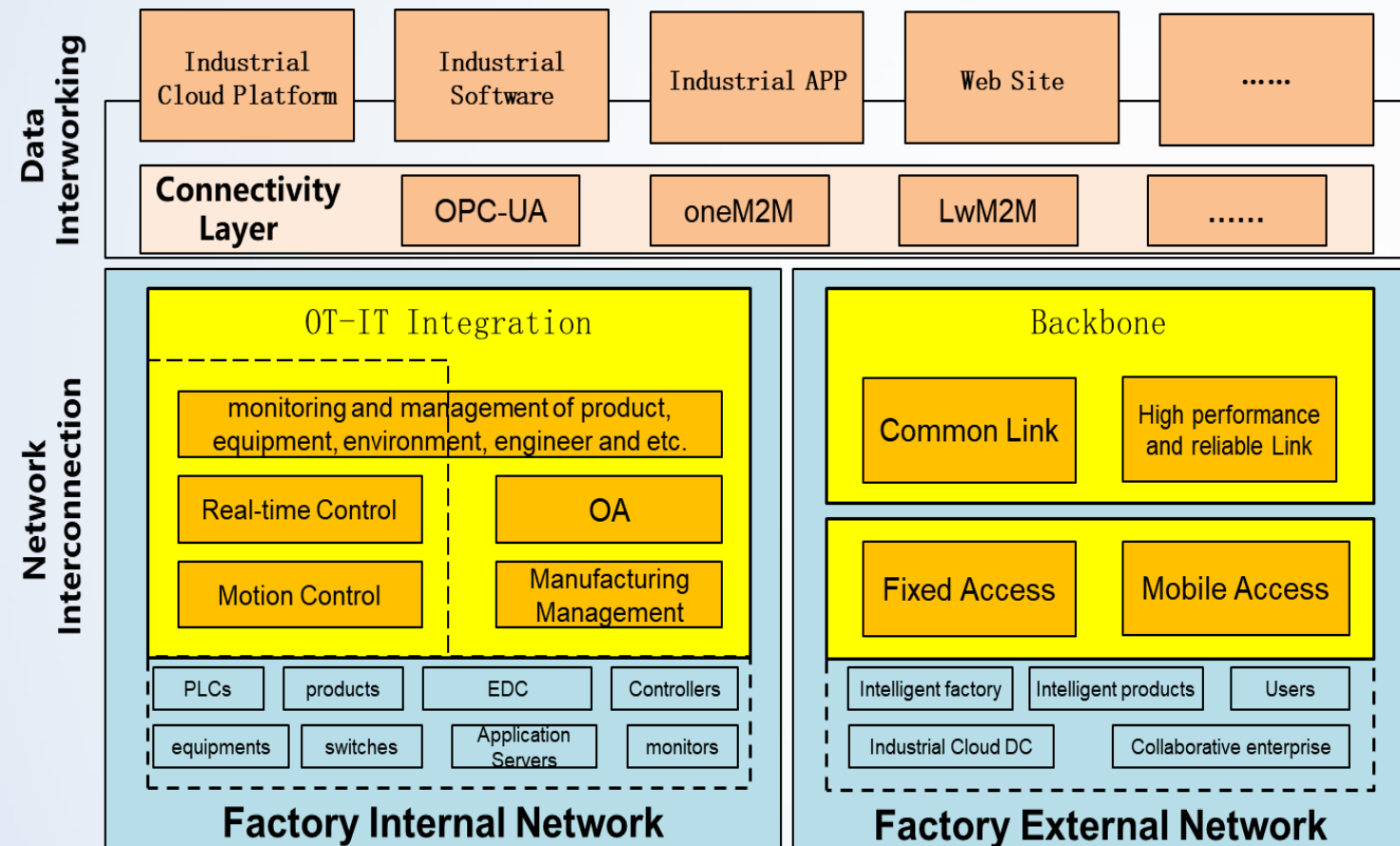
State Grid Qinghai Green Energy Industrial Interconnect Platform



Personnel costs are reduced by 20% and power generation is increased by 1% to 5%.

工业互联网网络架构和趋势

The framework and trend of Industrial Internet networking



Factory Internal Network

- 融合 Integrated
- 开放 Open
- 灵活友好 Flexible

Factory External Network

- 普遍化 Universalization
- 精细化 Diversification
- 灵活化 Flexibility

基于TSN的IT-OT融合试验床
TSN-based IT-OT integration Testbed



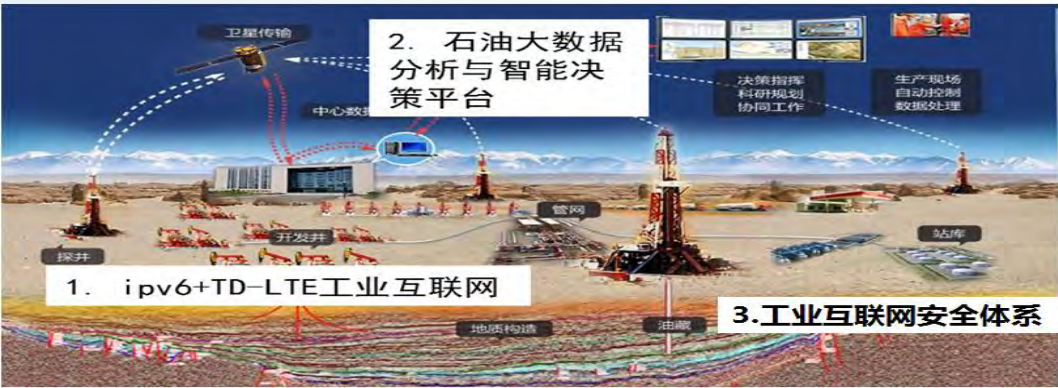
信通院、华为、沈自所、工业互联网创新中心（上海）
CAICT, Huawei, SIA, 3IN

基于Multefire的港口自动化应用
Port automation application based on Multefire



振华重工、华为
ZPMC, Huawei

IPv6+LTE在石油开采现场应用
IPv6+LTE application in oil exploitation field



红有、中国移动、信通院
Hongyou, ChinaMobile, CAICT

NB-IoT在电子制造流程的信息采集应用
Information collection application based on NB-IoT



爱立信、中国移动
Ericsson, ChinaMobile

The development mode of China's industrial Internet platform

Chinese enterprises actively build platforms



Form a series of unique innovation models

(1) Manufacturing companies optimize production operation by building platforms.



(2) Industrial equipment provider build platform to output equipment management service.



(3) Industrial software enterprise build platform to realize business capability development.



(4) Information and communication enterprise build platform to empower industrial transformation.



Industrial Internet Platform

Predictive maintenance of equipment

Quality optimization

Process optimization

Supply chain optimization

Mass customization

Collaborative Manufacturing

⋮

Unique application model based on platform device connectivity and data analysis capabilities



Insurance

Accurate pricing of insurance based on equipment data



Credit

Credit risk assessment based on actual operating rate data



Order

Precise docking of manufacturing capability based on product deconstruction



Education

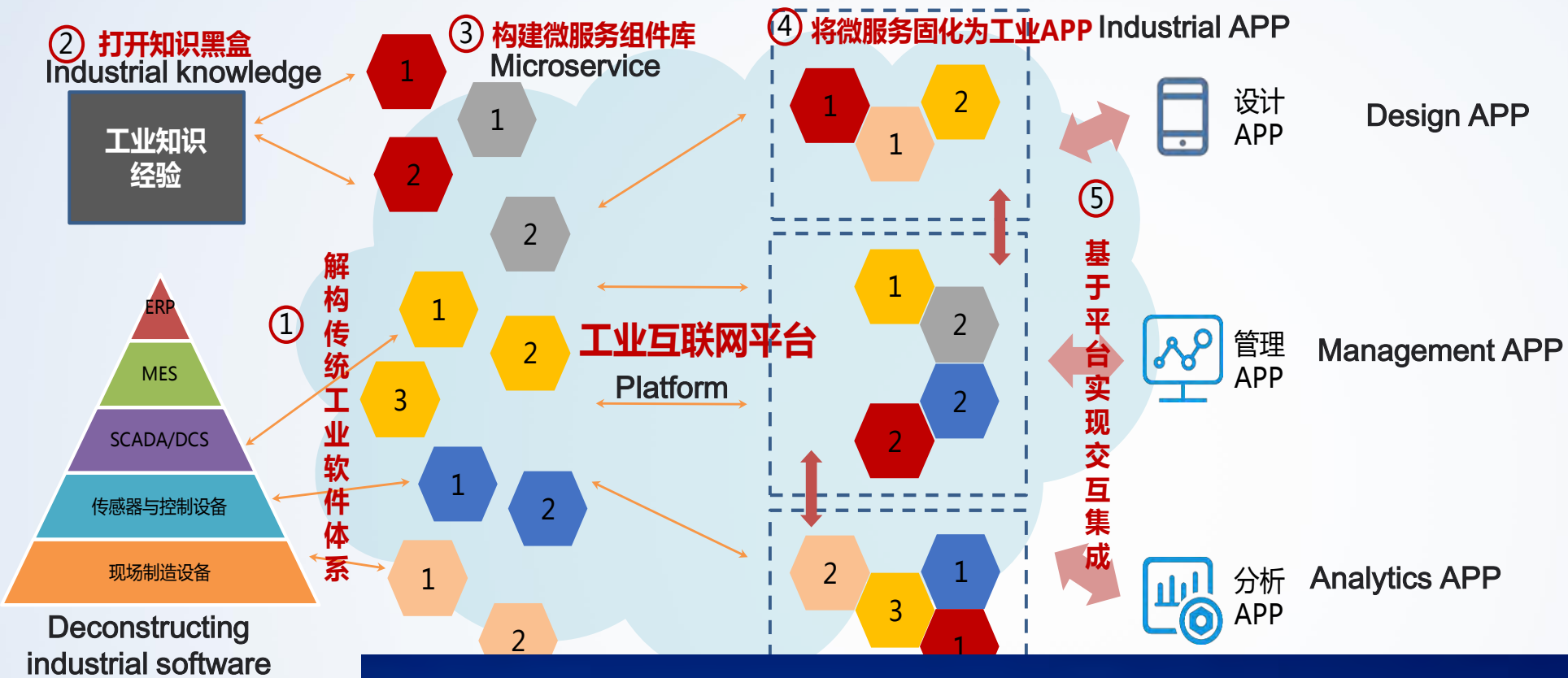
Mechanic training based on actual production data



New Energy

Guide model production based on vehicle charging data

工业APP与工业互联网平台 Industrial APP & Industrial platform



AI首届工业APP 开发与应用创新大赛

1ST INDUSTRIAL APP DEVELOPMENT AND APPLICATION INNOVATION COMPETITION

主办单位：工业互联网产业联盟

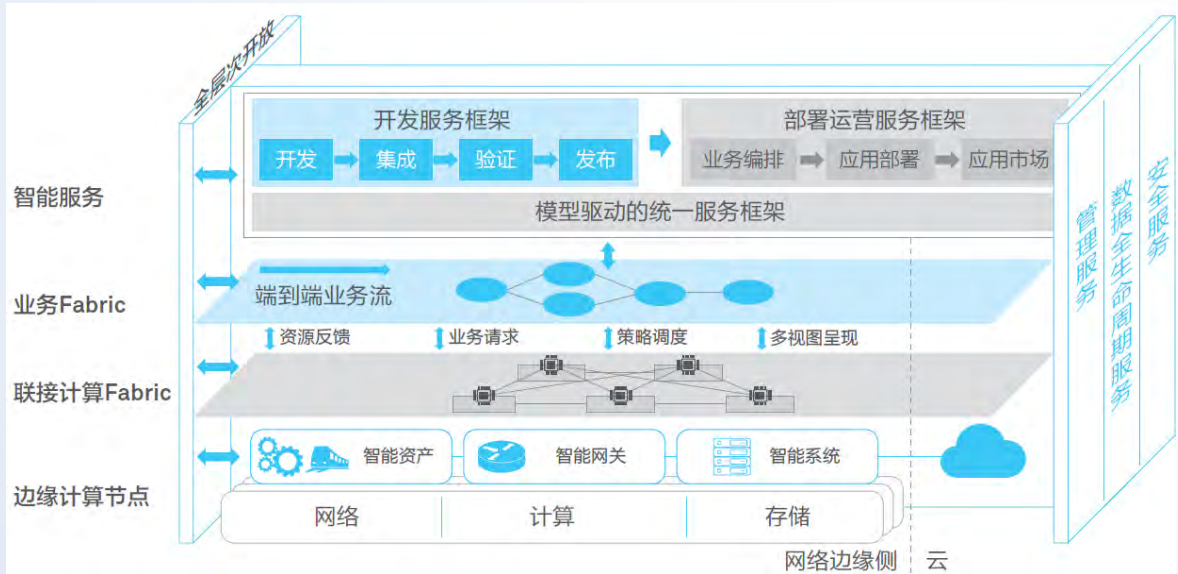
承办单位：中国信息通信研究院

华为技术有限公司、北京索为系统技术股份有限公司、沈机（上海）智能系统研发设计有限公司、北京寄云鼎城科技有限公司

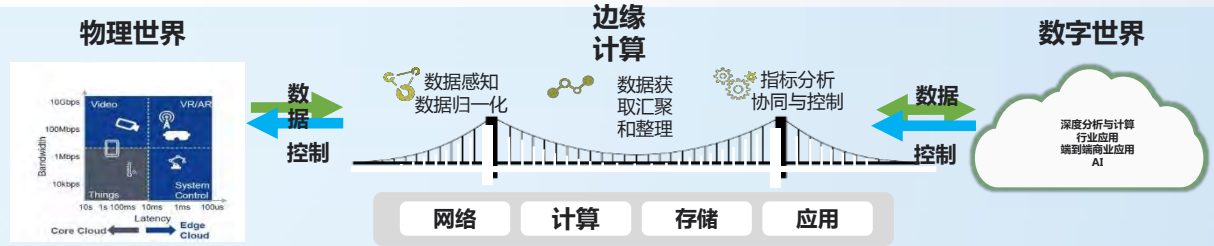
边缘计算 Edge Computing(EC)

- 边缘计算是AII中会员普遍关注的重点技术方向之一。为了推动边缘计算的技术和产业发展，AII成立了边缘计算特设组，组织会员共同开展相关研究。目前已经发布了“边缘计算参考架构2.0”白皮书。目前正在围绕边云协同开展研究工作；
- 为了引导和规范工业互联网边缘计算的发展，AII正在开展标准化工作，围绕技术架构、设备功能、性能等方面开展标准制定。
- Edge Computing is one of the key technologies that members pay close attention to in AII.
- In order to guide the development of the EC in Industrial Internet, AII is developing standards including technical architecture, equipment functions, performance and other aspects of EC.

“Edge Computing Reference Architecture 2.0”
jointly released by AII and ECC



Chinese enterprises actively explore the application of Edge Computing

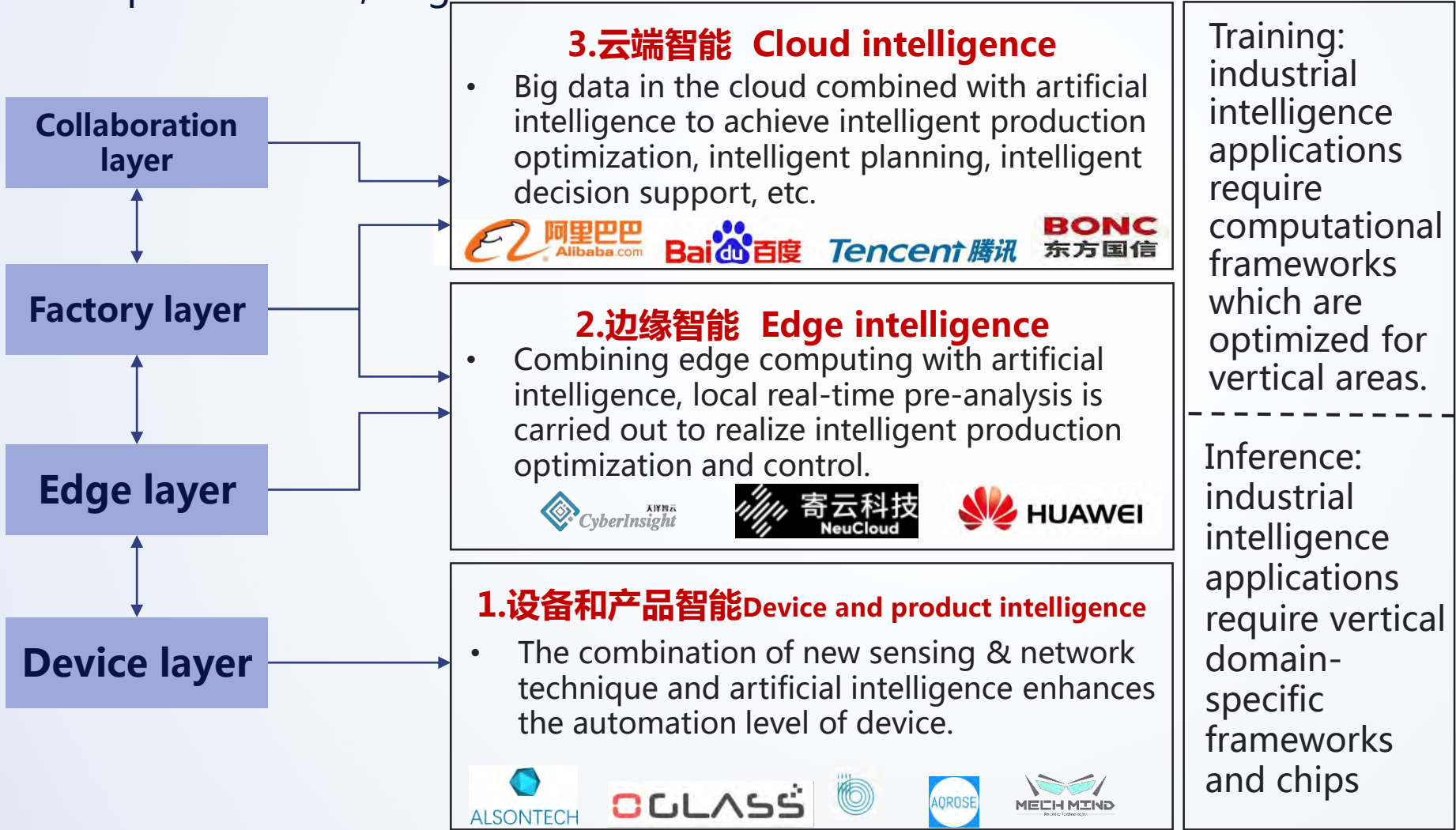


1. Intelligent Industrial robot collaboration based on EC (Shenyang Institute of Automation Chinese Academy of Sciences)
2. Tool monitoring and life prediction based on EC (99Cloud.Inc)
3. Flexible quality inspection of industrial products based on EC (China Unicom)



工业智能 Industrial Artificial Intelligence

新一代人工智能从设备、边缘和云端三个层面加速向工业渗透
The new generation of artificial intelligence rapidly infiltrates into industrial from three aspects: device, edge and cloud.



Three core issues

Real time

Existing artificial intelligence frameworks can not meet the computing requirements brought by the real time demand of industrial.

Reliability

Reliability is not the point of existing artificial intelligence algorithms and frameworks.

Interpretable

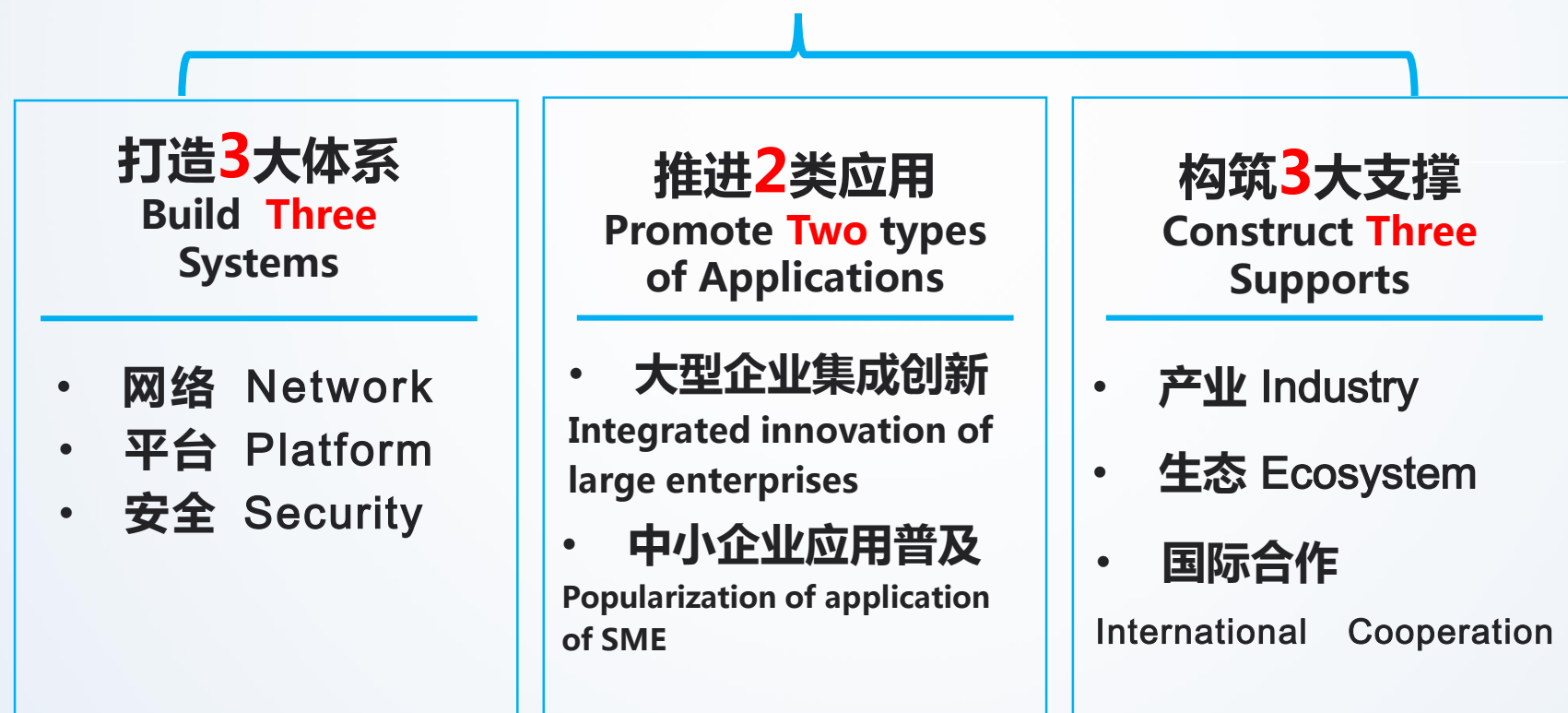
Probability based algorithms can not provide clear mechanism explanation.

下一步发展：工业互联网“323”战略行动 “323”Action of Industrial Internet

2017年11月27日，中国国务院发布《关于深化“互联网+先进制造业”发展工业互联网的指导意见》

In November 27, 2017, the State Council issued “Guidance on Developing Industrial Internet to Deepen Internet Plus Advanced Manufacturing

“323” 行动 (“323” Action)



深化与IIC的合作 Cooperation with IIC



创新·融合·协作·共赢
Innovation· Convergence · Cooperation· Win-Win
共同把握工业互联网的历史机遇/



联盟公众号：工业互联网产业联盟

联盟网址：<http://www.aii-alliance.org/>

联盟邮箱：aii@caict.ac.cn