The twin engines of 5g & AIoT drive the transformation and upgrading of manufacturing industry

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The manufacturing industry is facing new challenges , and the digital transformation of enterprises is imminent

The industrial economy as a whole presents the operational characteristics of "production slowdown and structural optimization", which shows that the growth rate of industrial production is slowing down, the level of enterprise earnings is declining, the conversion of old and new momentum is accelerating, and the demand for industrial structure optimization and upgrading is strengthened, forcing enterprises to accelerate digital infrastructure construction, promote industrial structure upgrading and digital transformation, and complete steady growth and employment;

Digital transformation requirements

Interconnected Industrial Equipment

Industrial Intelligent Computing

Credible Industrial Safety

Analysis of the pain points faced by the manufacturing industry

Rising Production Costs
Cost reduction space is large, energy management and environmental protection requirements are increased

Product reliability is lacking
Backward production and management methods, resulting in low one-time product pass rate and customer satisfaction;

Lack of innovation
Most enterprises to improve the level of information technology, innovation ability lack of driving force;

Safety and environmental protection to be strengthened
Reduce the risk of accidents by less humanised and unmanned operations, and to enhance green production guarantee by monitoring the production environment

Flexible production needs to be improved
Diversified, small-scale, highly controllable flexible production has become a new trend in the era of intelligent manufacturing;

Delivery capacity is not strong
Difficult for enterprises to meet the needs of personalised, customised, order delivery

The 5G-AIoT empowers the industrial Internet to accelerate high-quality development
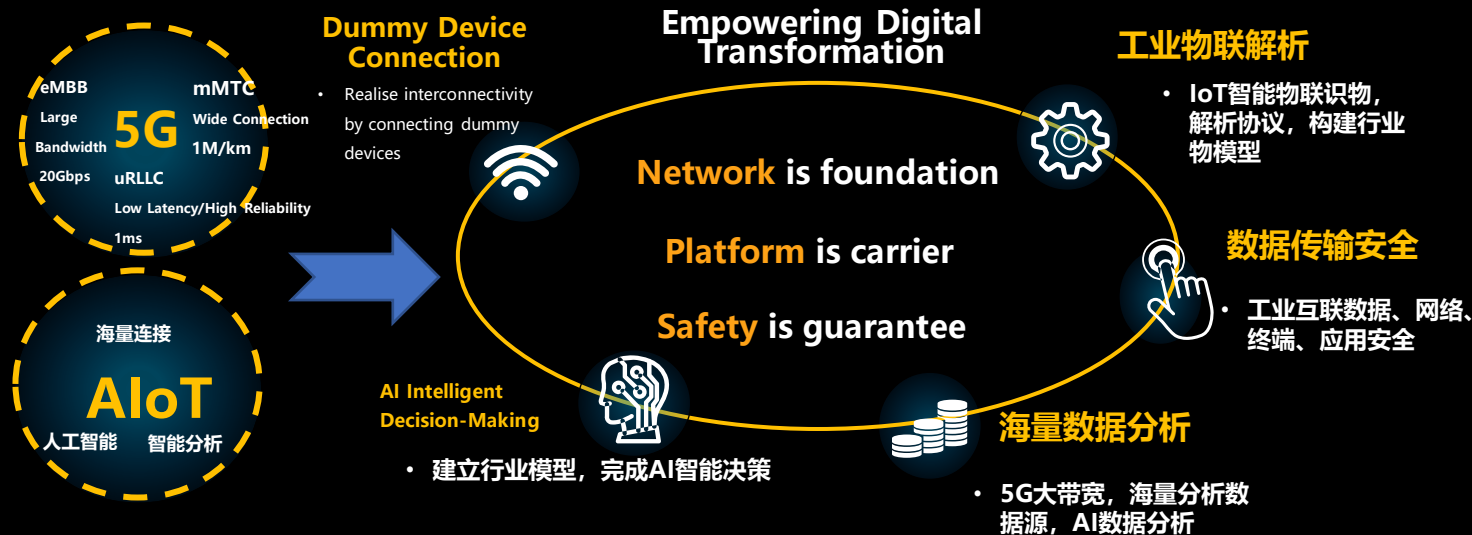
High-quality development puts higher demands on data sharing and digital transformation, and building an IoT industrial base and building a base of industrial capabilities is key.

《On the establishment and improvement of government data sharing coordination mechanism to speed up. Advance the idea of orderly sharing of data》

- Build and improve coordination mechanism for data sharing with government, and adhere to safe and controllable；
- Strengthen technological innovation, application innovation, model innovation, to promote more accurate and smooth data sharing

《Action plan to build a high standard market system》

- Build various IoT industry base;
- Drive the market infrastructure interconnectivity
- Strengthen application of a new generation of information technology in railway, highway, water transportation, civil aviation, postal service and other fields

Dummy Device Connection

- Realise interconnectivity by connecting dummy devices

Empowering Digital Transformation

eMBB
Large Bandwidth
20Gbps

mMTC
Wide Connection
1M/km

5G

uRLLC
Low Latency/High Reliability
1ms

海量连接

AIoT

人工智能　智能分析

Network is foundation

Platform is carrier

Safety is guarantee

工业物联解析

- IoT智能物联识物，解析协议，构建行业物模型

数据传输安全

- 工业互联数据、网络、终端、应用安全

海量数据分析

- 5G大带宽，海量分析数据源，AI数据分析

AI Intelligent Decision-Making

- 建立行业模型，完成AI智能决策

Network： Build a Boutique 5G Network, High Quality Industrial Intranet & External Network and the Foundation of Industrial Interconnection

Business Traction, Provide 5G+Edge Cloud (MEC) + Network Slicing，

Launch Three 5G Networks of Industrial Intranet

Take advantage of cloud network collaboration and use cloud networking to create high-quality industrial extranets

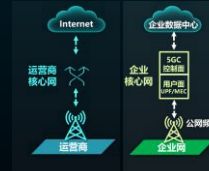**Industrial Intranet：5G+Edge Cloud (MEC) + Network Slicing**

Virtual Network

Create First "5G SA Dedicated Network"

Hybrid Network

Complete 5G Commercial Hybrid Network

Private Network

Construction of the country's first "underground 5G network"

External Network

Covered 334 cities One Point into Cloud, Elastic Network

Cloud Network

20 Nationwide Home Network Connections

Industrial virtual network:
- Through network slicing to achieve isolation, distinguish the slice ID, to solve the needs of the wide area network

Industrial Hybrid Network:
- Public, Private Shared Network， locally unloaded data
- Deploy a user-specific, on-site MEC platform on demand
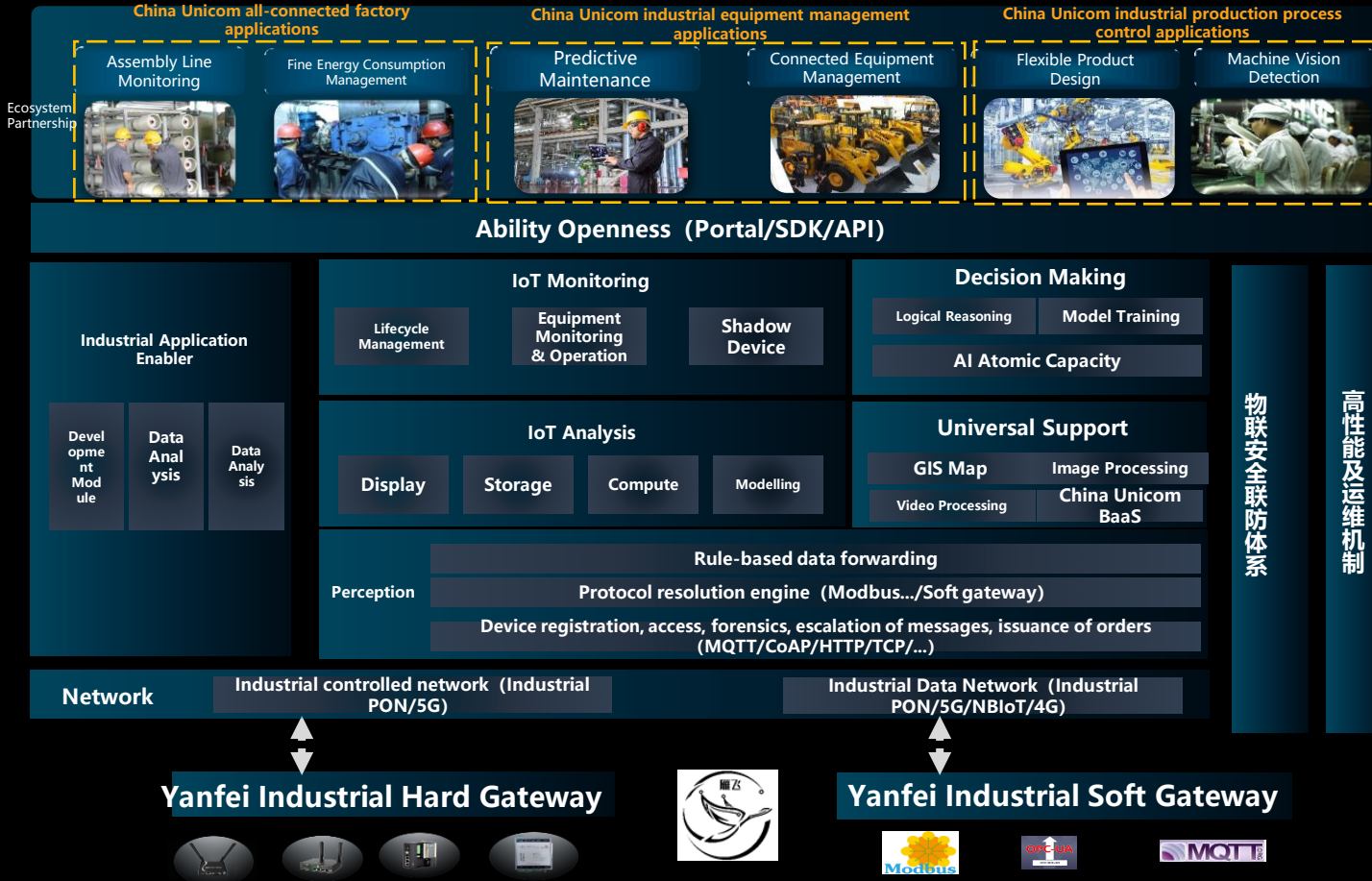-

Industrial Private Network:
- Special industry base stations, physical isolation, breakthrough mines, steel and other special scenes
-

Industrial Cloud Networking:
- Elastic networking plus flexibility into the cloud
- Lower latency, high reliability and wide coverage
-

Platform: Industrial Internet AIoT Platform, Focusing on creating an industrial base

China Unicom all-connected factory applications

Ecosystem Partnership

Assembly Line Monitoring

Fine Energy Consumption Management

China Unicom industrial equipment management applications

Predictive Maintenance

Connected Equipment Management

China Unicom industrial production process control applications

Flexible Product Design

Machine Vision Detection

Ability Openness (Portal/SDK/API)

Industrial Application Enabler

Development Module	Data Analysis	Data Analysis

IoT Monitoring

Lifecycle Management	Equipment Monitoring & Operation	Shadow Device

Decision Making

Logical Reasoning	Model Training
AI Atomic Capacity	

IoT Analysis

Display	Storage	Compute	Modelling

Universal Support

GIS Map	Image Processing
Video Processing	China Unicom BaaS

Perception

Rule-based data forwarding

Protocol resolution engine (Modbus.../Soft gateway)

Device registration, access, forensics, escalation of messages, issuance of orders (MQTT/CoAP/HTTP/TCP/...)

物联安全联防体系

高性能及运维机制

Network

Industrial controlled network (Industrial PON/5G)

Industrial Data Network (Industrial PON/5G/NBIoT/4G)

Yanfei Industrial Hard Gateway

Yanfei Industrial Soft Gateway

Modbus OPC-UA MQTT

Application Layer:

✓ 6I all-factor connected plant for personnel, equipment, materials, production, environment and quality
✓ Converge ecosystem, manufacturing industry chain-related scenarios, has pulled ecological partners 500 plus
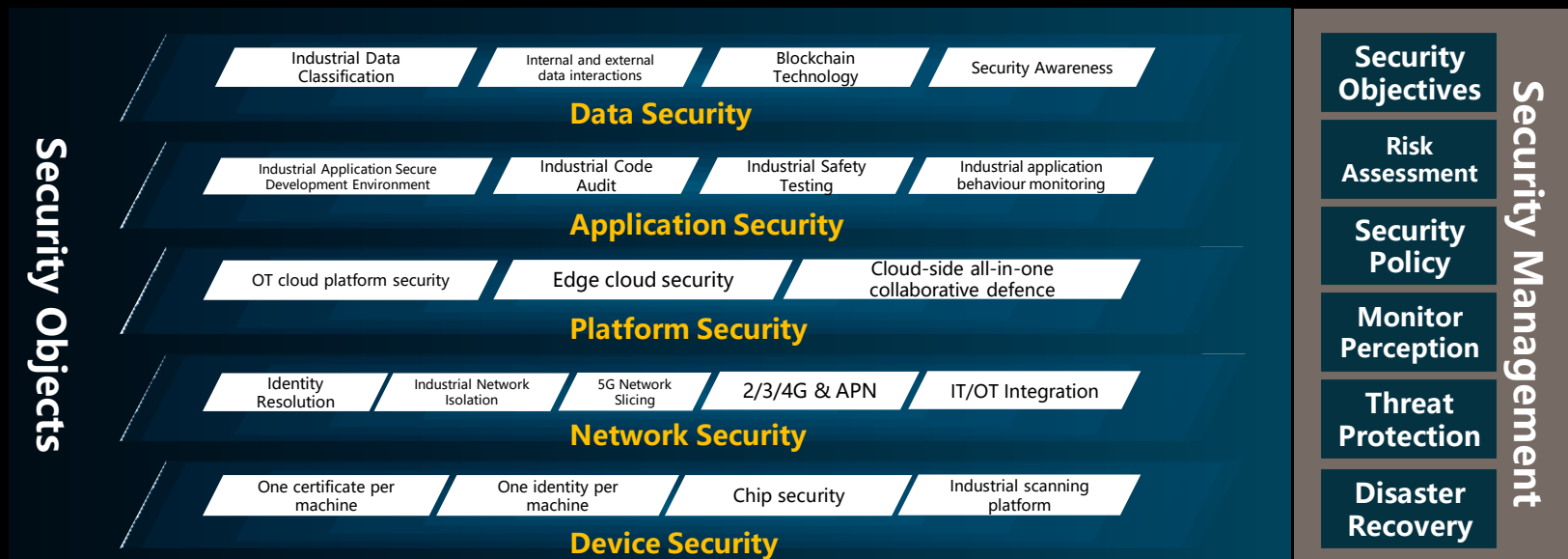✓

Platform Layer:

✓ Formulate industrial industry material model 200 plus
✓ Empower 9+1 industrial sectors: electric power heat, automotive, coal, electricity, steel, computer electronics, special equipment, ship railways, textiles and clothing, industrial clusters

Access Layer:

✓ Cover more than 95% of industrial agreements
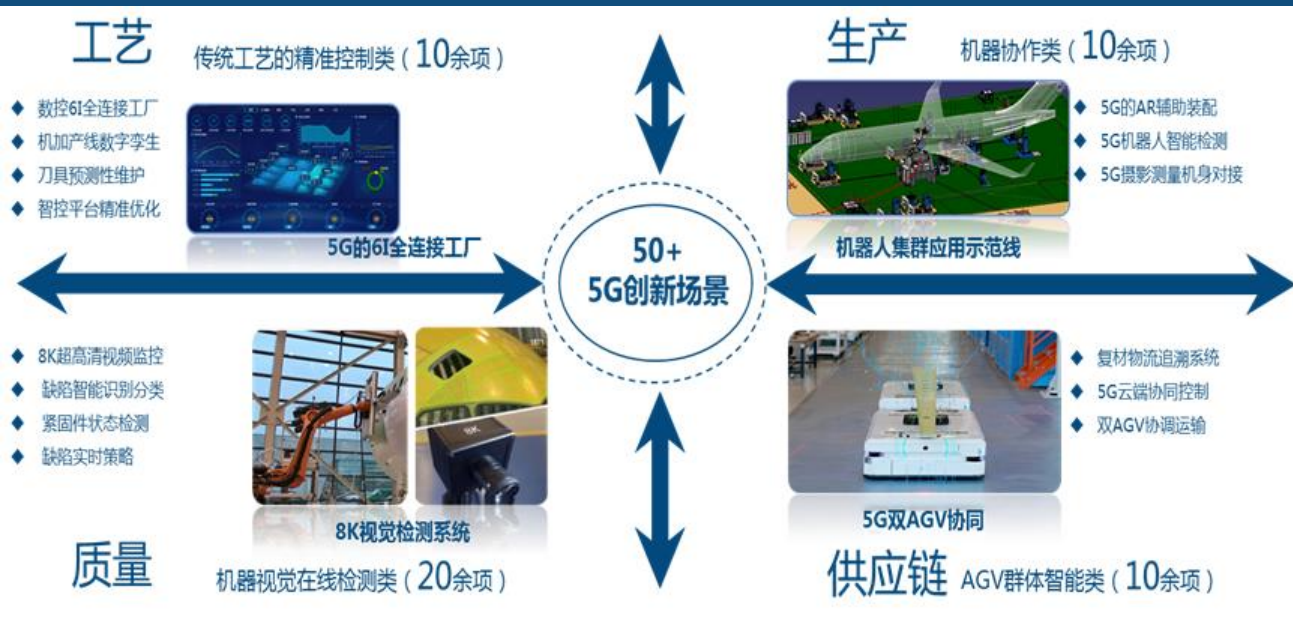✓ Identify more than 6000 brands of industrial equipment and protocols

Security: Around the object, network, number, tube, with the creation of a 5-dimensional security management, the formation of end-to-end industrial Internet security protection system

With "5-plus" security framework, in which "5" is the object of security protection: equipment, network, platform, application, data, and "1" is security management, through security objectives, security policies, risk assessment, monitoring and disposal, and gradually build an industrial Internet security defence system.

Case Study：5G+AIoT China Unicom all-connected factory, to help Shanghai businessmen fly flying blue sky

Explore a total of approximately 50 smart manufacturing applications in the aerospace space, starting with top-level design and floor-to-ceiling scenario planning.

工艺
传统工艺的精准控制类（10余项）
- 数控6I全连接工厂
- 机加产线数字孪生
- 刀具预测性维护
- 智控平台精准优化

5G的6I全连接工厂

生产
机器协作类（10余项）
- 5G的AR辅助装配
- 5G机器人智能检测
- 5G摄影测量机身对接

机器人集群应用示范线

8K超高清视频监控
缺陷智能识别分类
紧固件状态检测
缺陷实时策略

8K视觉检测系统

50+
5G创新场景

复材物流追溯系统
5G云端协同控制
双AGV协调运输

5G双AGV协同

质量
机器视觉在线检测类（20余项）

供应链 AGV群体智能类（10余项）

Fully Connected CNC Factory (6I)

Realise real-time connectivity of shop floor production resources, **increase productivity by 15%**。

A composite sewn detection system based on machine vision

Manual measurement changed to AI vision real-time detection complex stitching, **300% increase in efficiency.**

Case Study: 5G+AIoT, Help Bao Gang Zhanjiang Steelmaker to Build a World-Class Intelligent Steel Mill

Realise unmanned equipment transformation, improve the reliability and safety in production

- Ministry of Industry & Information "5G+Industrial Internet" 512 Project
- Ministry of Industry & Information – The 3rd "Blossom Cup" 5G Application Collection Contest National First Prize
- Provincial 5G Industrial Demonstration Park
- China Unicom 5G+AIoTApplication Innovation Excellence Award

China's first independent 5GC core network of industrial network

Typical Metallurgical Scenario

5G Intelligent AR Inspection

IoT Network Management

Online Predictive Operations

AI Behavioural Analysis

Deploy over 40 base stations, covering 12.5 sqkm, real physical isolation, 10ms end-to-end latency, over 30 sub-scenes

- 5G transmission analyses the hidden dangers of the fault and coordinates the fault treatment

- Large-scale blower joint analysis of the number of mining, to achieve fan awareness and network management

- Predict new maintenance for large, important equipment

- Maintenance of construction personnel behavioural monitoring, early warning control

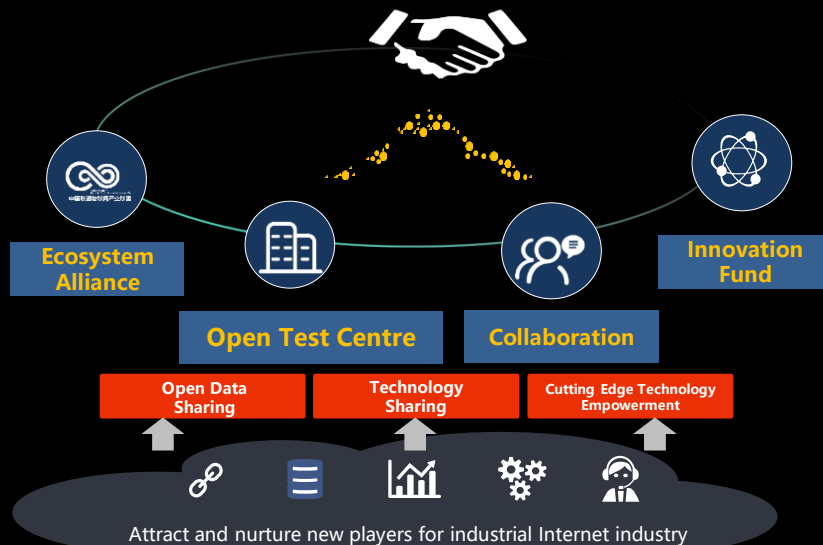| Troubleshooting Rate	Failure Alert Rate	Operation Time	Safety Efficiency
65% ↑	**90%** ↑	**50%** ↑	**30%** ↑

China Unicom joins hands with partners to build a new ecological environment for the industrial Internet

中国联通 China unicom | 联通数科 Unicom Digital Tech

Ecosystem

China Unicom 5G industry terminal committee, jointly promote industrial upgrading

Partnership

Open the cooperation through train, through the test center certification after Unicom 3D promotion

Openness

Promote industry terminal testing, certification, and jointly improve the quality of industrial terminal services

Capital Investment

With the help of China Unicom's 10 billion 5G Innovation Mother Fund, support the 5G industry end product innovation incubation

Ecosystem Alliance

Innovation Fund

Open Test Centre

Collaboration

Open Data Sharing

Technology Sharing

Cutting Edge Technology Empowerment

Attract and nurture new players for industrial Internet industry

联通5G+AIoT，驱动制造业未来

谢 谢