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

Empowering Digital Transformation

Network is foundation
Platform is carrier
Safety is guarantee

Dummy Device Connection
- Realise interconnectivity by connecting dummy devices

5G
- eMBB
- Large Bandwidth
- 20Gbps
- uRLLC
- Low Latency/High Reliability
- 1ms

AloT
- 人工智能
- 智能分析

海量连接
海量数据分析

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

AI Intelligent Decision-Making
- 建立行业模型，完成AI智能决策

海量数据分
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

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

Virtual Network

Hybrid Network

Private Network

Create First “5G SA Dedicated Network”

Complete 5G Commercial Hybrid Network

Construction of the country's first “underground 5G network”

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

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

Covered 334 cities
One Point into Cloud, Elastic Network

20 Nationwide Home Network Connections
Platform: Industrial Internet AIoT Platform, Focusing on creating an industrial base

### 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

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<th>Network</th>
<th>Industrial controlled network (Industrial PON/5G)</th>
<th>Industrial Data Network (Industrial PON/5G/NBIoT/4G)</th>
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**Yanfei Industrial Hard Gateway**

**Yanfei Industrial Soft Gateway**

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**Platform**

**Industrial Internet**

**AIoT Platform**

Focusing on creating an industrial base

**IoT Monitoring**

- Lifecycle Management
- Equipment Monitoring & Operation
- Shadow Device

**IoT Analysis**

- Display
- Storage
- Compute
- Modelling

**Decision Making**

- Logical Reasoning
- Model Training
- AI Atomic Capacity

**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/...)

**Ecosystem Partnership**

**Devel-opment Module**

**Data Analy-sis**

**Data Analy-sis**

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**Platform Layer**

- Formulate industrial industry material model 200 plus
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**Access Layer**

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

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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.

- **Fully Connected CNC Factory (6l)**
  - 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+AIoT Application Innovation Excellence Award

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

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

Typical Metallurgical Scenario

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

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

Online Predictive Operations
- Predict new maintenance for large, important equipment

AI Behavioural Analysis
- Maintenance of construction personnel behavioural monitoring, early warning control

Troubleshooting Rate: 65% ↑
Failure Alert Rate: 90% ↑
Operation Time: 50% ↑
Safety Efficiency: 30% ↑
China Unicom joins hands with partners to build a new ecological environment for the industrial Internet

**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

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Attract and nurture new players for industrial Internet industry

- **Open Data Sharing**
- **Technology Sharing**
- **Cutting Edge Technology Empowerment**
联通5G+AIoT，驱动制造业未来

谢谢