Digitalization leads the new economy 5G enables smart port

数字引领新经济，5G赋能智慧港

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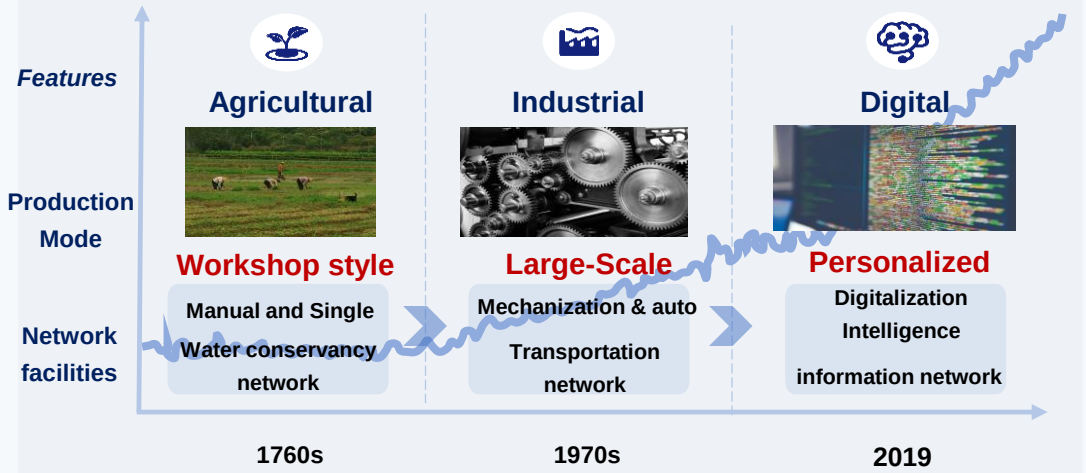
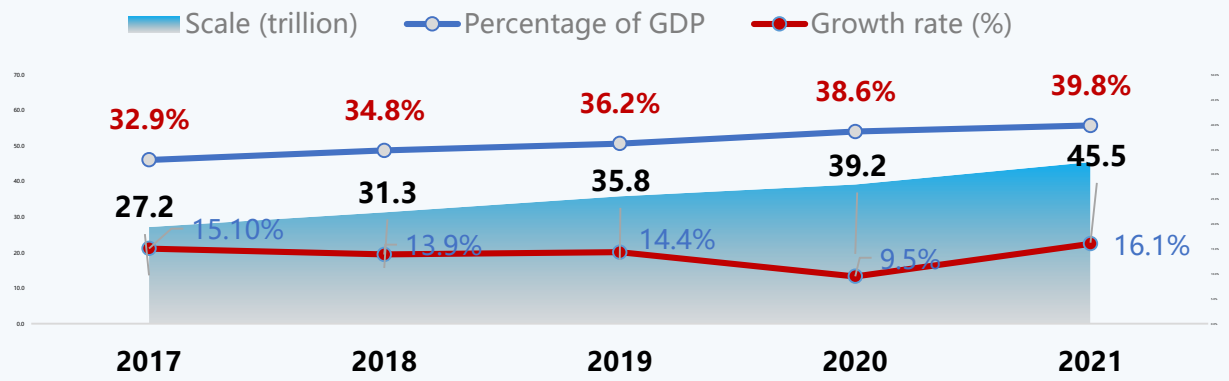
Macro Economy | 5G Becomes a Key Leading Force with Rapid Development of Digital Economy



By 2021, China's digital economy will grow to 45.5 trillion yuan , ranking No. 2 in the world. The compound annual growth rate (CAGR) will reach 13.6%, accounting for 39.8% of GDP.



Source: CAICT China Digital Economy Development Report (2022)

Solow Growth Model

$$Y = F(K, L, L, T, D)$$

Economic growth = Production relationship management (fund, talent, land , technology, and data)

High-quality economic development = **Digital production operation** + **5G-led New-Generation Information Technology** + **Standards + Openness + Flow + Transaction**

Economic Value Added	In 2021, 5G will directly increase the economic value by about **CNY300 billion** and indirectly increase the economic value by about **CNY1.23 trillion**, an increase of **39%** and **31%** respectively over 2020.
Employment contribution	By 2025, China's 5G will directly create more than **3 million jobs**.
Industry digitization	5G applications cover **40** of the 97 categories of the national economy.

Source: China Academy of Information and Communications Technology and MIIT official website

China Unicom Strategy | Adhere to the Strategic Business of Digital Economy

China Unicom comprehensively upgrades its corporate strategy, adheres to to promote the in-depth integration of the digital economy and the real economy, and continuously strengthens and expands China's digital economy.

New strategies

Reinforcement

Innovation

Integration

New positioning

Reinforcement	Innovation	Integration
A professional team in the operation and service of digital information infrastructure	A key force in the development of cyber strength, Digital China and smart society	An active player in the integration and innovation of digital technologies

5 strategic businesses

Connection	Computing	Data	Application	Security
Provide for the Digital Economy "First Connection Channel"	**Building for the Digital Economy "First computing engine"**	**Provide for the Digital Economy "First data service"**	**Building for the Digital Economy "First service provider"**	**Building for the Digital Economy "Security First Shield"**

Network Construction | Promoting New 5G Infrastructure Foundation for Digital Economy

China Unicom accelerates the construction of intelligent and comprehensive digital information infrastructure that has the following features: high-speed ubiquity, air-ground integration, cloud-network synergy, intelligence and agility, green and low carbon, as well as security and controllability.

Wider Coverage

In 2022, 5G Network
1 Million sites
Continuous coverage in towns

Better Experience

Gigabit Experience
Uplink: 450 Mbit/s
Downlink 3.2 Gbit/s

Ubiquitous Computing

Cloud-Network-Edge Integration
"5+4+31+X"
Computing Architecture

Intelligent Scheduling

Unified management and control
Intelligent scheduling
Computing network autonomy

Agile Service

High efficiency duplication via Innovation in any place

Safer Products

Highest priority option for the Country, Government and People

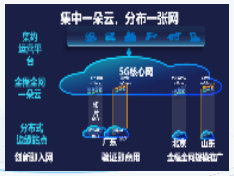
Application Achievements | Promoting Digital Technology Innovation Thousands of Industries

北京2022年冬奥会官方合作伙伴
Official Partner of the Olympic Winter Games Beijing 2022

Scaled 5G application in industries

500+ 5G lighthouse projects, 2000+ 5G dedicated industry networks, and 8000+ 5G commercial projects

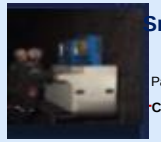
China Unicom 5G Private Network Plus Product: Three Leaps Accelerate Industry Data Intelligence Transformation

Stronger networks	Enhanced industry adaption	Improved services
		
1. Innovative: first commercial use of 10+ capabilities such as 5G LAN and high-precision positioning; replicable across the country	1. Scenario-specific applications: 400+ scenarios such as remote control, AI-assisted inspection, and converged positioning	1. One-entry subscription: 5G app store, a unified product subscription entry
2. E2E network-wide: 5GC One Cloud, 500+ edge sites	2. Baselined solutions: 20+ private network templates for 5G industries such as mines and steel	2. One-click provisioning: automatic orchestration of network slices, shortening order provisioning from months to days
3. Intensive operation: 5G private network operations platform	3. Script-based configuration: script-based configuration for 20+ essential capabilities such as high uplink bandwidth, MEC, slicing, and other	3. One-stop services: visible, available, maintainable, manageable, and controllable self-service capabilities

Two GSMA GLOMO awards

- **5G Industry Partnership Award**
- **Best Mobile Innovation for the Connected Human**

Cover 20+ segmented industries such as mining and steel.



Smart mining

Pangta, Zhang Jiamao, etc.

80+ Commercialization Project

Smart steel

Baosteel, WISCO, and Magang

70+ commercial projects

Home appliance manufacturing

Gree, Midea, and Haier

80+ commercial projects

Electronics manufacturing

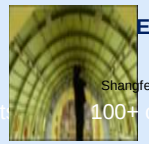
Foxconn, Dahe thermomagnetic, etc.

80+ Commercialization Project

Automobile manufacturing

FAW, Geely, and GAC

50+ commercial projects



Equipment/Manufacturing

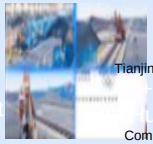
Shanghai Zhenhua Heavy Industries, Xifei, Jiangnan Shipbuilding

100+ commercial projects

Clothing

Youngor, Red Bean, and Yichun

50+ commercial projects



Smart port

Tianjin Port, Guangzhou Port, and ports such as Guanghua Port

Commercialization Project

Smart port

Datang International, SGCC, and CSG

50+ commercial projects

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9 industry teams

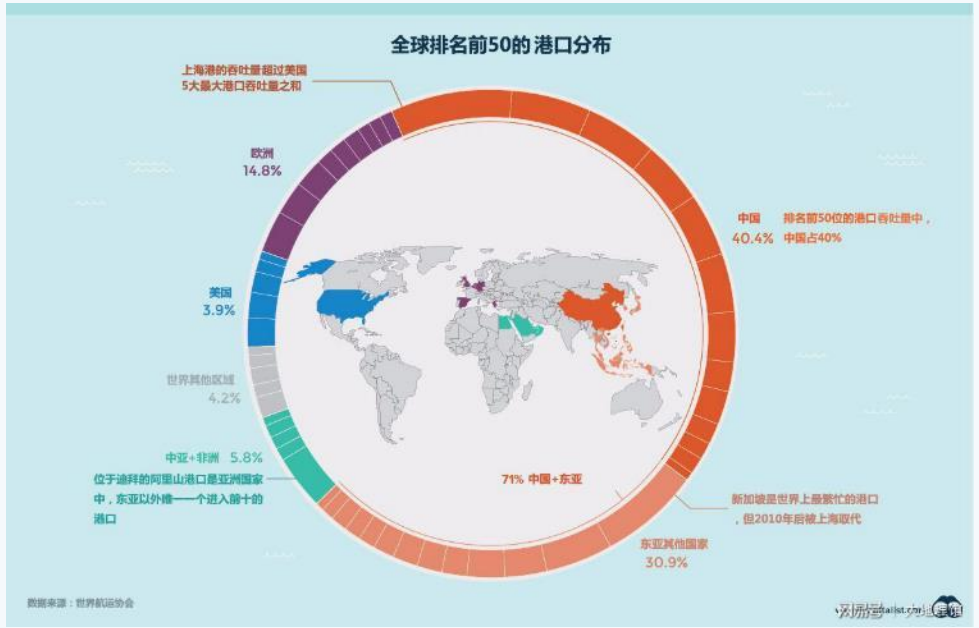
19 Internet companies

17 professional subsidiaries

Port Status | Shipping Carries 90% of Global International Trade, and China's Port Transformation Is Inevitable

Shipping Carries 90% of Global Trade

- Shipping is the major means of transportation in international logistics, accounting for 90% of the total transportation volume and 70% of the international trade volume.
- China's port scale ranks No. 1 in the world. In 2019, the national container throughput was 260 million TEUs, a YoY increase of 4.4%.
- China ranks No. 1 in the world in terms of sea transportation volume: 26% in the world;



China's port ranks No. 1 in the world, Urgent request of port labor

- The number of ports in China is 200+, and the number of container ports is about 1/6. The total number of freight ports is 145 (55 sea ports and 90 river ports).
- Ports are labor-intensive and require a large amount of manpower. Currently, only 3 automated ports have been built in China (Xiamen， Qingdao， and Yangshan).

Industry Pain Points | Port Terminals Face three Pain Points

High efficiency requirements

- 365x24 uninterrupted operation, high ship rent (millions/day). Large ships tend to park at docks with high efficiency.
- one hour waiting results in tens of thousands yuan waste, losses can reach millions CNY in one day.

Difficult to improve manual container loading and unloading efficiency

- The manual operation efficiency of traditional container terminals is 25-27 containers/hour, and that of excellent container terminals can reach 30 containers/hour.
- Automated docks can significantly improve the pickup efficiency by more than 30%.

High labor costs and harsh operating environment

- Labor-intensive industry, the gantry crane driver is a special type of work, even the driver's salary is high, it is difficult to recruit workers.
- Harsh operation conditions (noise and vibration on site). 30 meters high driver’s room, long-time head-down operation, prone to fatigue and cervical spondylosis.

High labor cost and high growth rate

- Automated ports can reduce manpower requirements. Employees required for two berth operation stations: 60 to 9.
- Remote control of port aircraft in semi-automatic ports can reduce manpower. Each port aircraft is equipped with three to four drivers. One person can control four port aircrafts.

Difficult to build a communications system

- It is difficult to excavate pipes and lay out optical cables at ports.
- Strong Wi-Fi interference, frequent disconnection, and high delay;
- Difficult construction of waveguides and optical fibers, high costs.

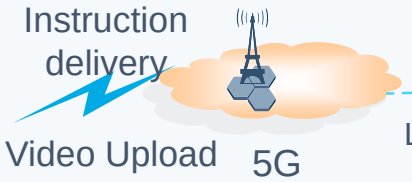
Multi-network and multi-RAT wireless communication, complex maintenance

- Multi-RAT 5.8 GHz/2.4 GHz Wi-Fi, 1.4 GHz private network coexist, failing to meet service growth requirements.
- The number of access terminals is limited, failing to meet the terminal application requirements.
- Wi-Fi does not meet industrial production requirements: 2.4 GHz and 5.8 GHz public spectrums have poor anti-interference performance and stability.

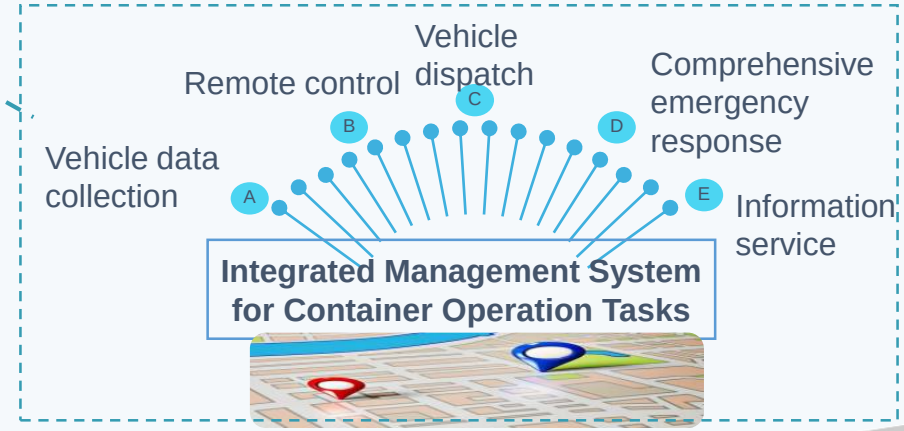
Industry Solution | China Unicom Provides a 1+2+N Smart Port Panoramic Solution

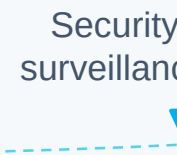
The 1+2+N mode is used to build a 5G fully-connected port, that is, one network, two layers of clouds, and N applications, implementing integrated management of people, vehicles, ships, goods, yards, and environment.

Remote Control of 5G Port Aircraft



Local traffic steering

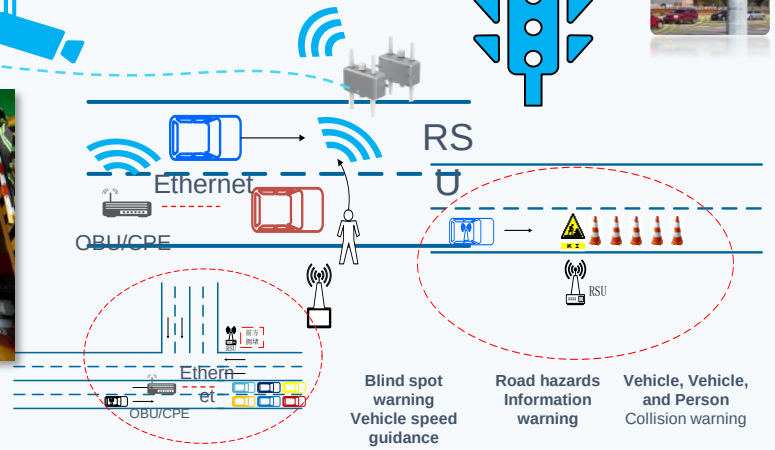




5G smart unmanned container truck

5G intelligent tally

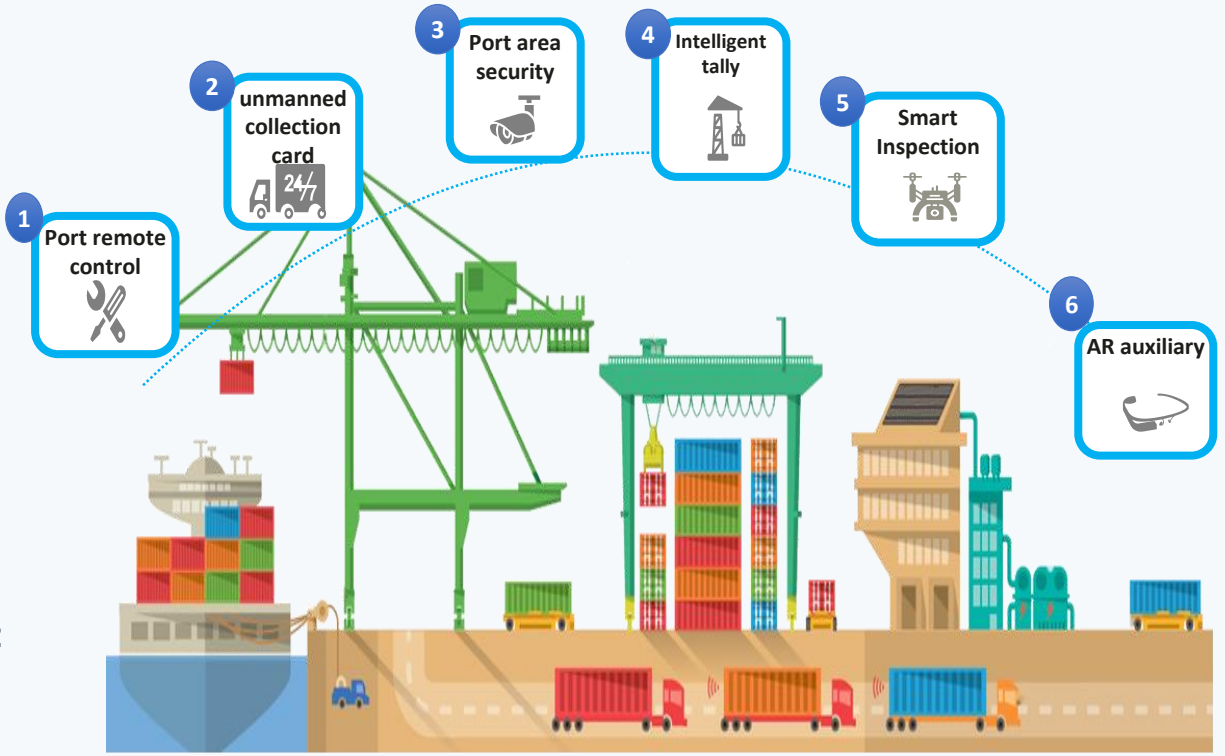
5G smart locking and unlocking site



Industry Achievements | Commercial Achievements of China Unicom in Smart Ports

5G smart ports have been put into commercial use at 35+ ports

6 types of 5G smart ports have been put into commercial use and 20+ industry scenarios



Industry Case | Tianjin Port - 5G Helps Upgrade Local Traffic Distribution and Remote Operations

5G smart unmanned container truck

- Normal operation **> 110,000 hours**
- Accumulated Mileage **> 200,000 km**
- Job Cycle **> 70,000**
- Safe transportation **> 150,000 TEUs**

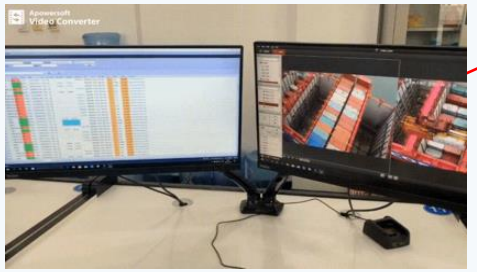
Tianjin Port Terminal

5G remote container crane control

- Operation Delay **<20ms**
- Job Height **50m**
- access through multiple types of terminals. **50**
- Efficiency improvement **20%**

5G intelligent tally

- Stable running **500h↑**
- Large-scale deployment **Four container cranes**
- Uplink rate **> 70m**
- Manpower saved **75%**

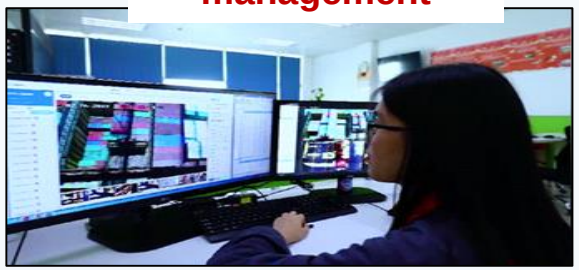


5G smart locking and unlocking site

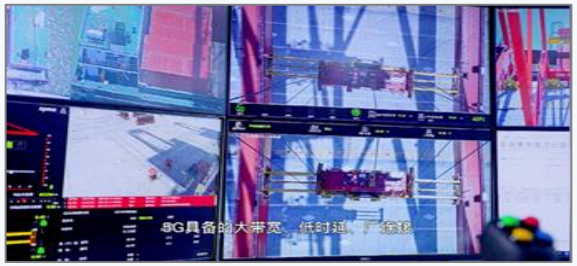
- Recognition speed **6s→3s**
- Recognition Rate **95%**
- Mainstream Locks **> 20 types**
- Efficiency improvement **10%**

Industry Case | Guangzhou Port - Building a New Benchmark for 5G+ Smart Ports

Intelligent management



AI-based intelligent tally



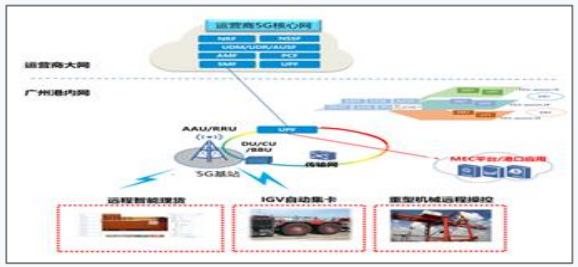
Remote control of container cranes and rail cranes

Secure production

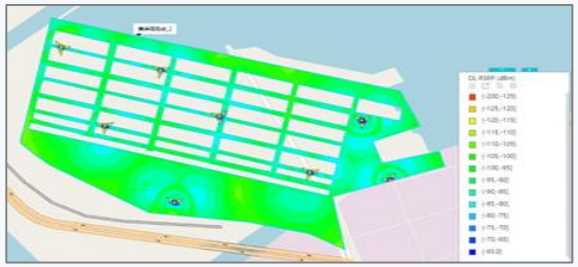
5G+smart security helmet

IGV container truck

Intelligent Campus



5G+dedicated slice



5G private campus network

1 (private network) + 1 (MEC) + 1 (platform) + N (smart application) to build 5G smart ports

Network rate	Freight efficiency	Accident Rate	OPEX
10Mbps→80Mbps	32% ↑	90% ↓	36% ↓

Ecosystem Construction | China Unicom Will Work with Partners to Explore New Digital Economy

A New Chapter of the Ecosystem

- Solving technical problems
- Standard guidance
- Regional development
- Device upgrade

Technological Innovation

Gravitational field

Application innovation

Group Competition

- Capability openness
- Testing and certification
- Channel promotion
- Commercial use


THANKS