



***FOCUS ON “PRESERVE AND
INNOVATE” TO NAVIGATE
THE DIGITAL FUTURE***

Focus on “Preserve and Innovate” to navigate the digital future



China Unicom resolutely shoulders the mission and responsibility of building a Cyber Superpower and Digital China, consolidates its network foundation and corporate advantages, promotes innovation in technology, products, models and systems with greater efforts, accelerates the transformation to a world-class technology service enterprise with global competitiveness, empowers the digital transformation of thousands of industries, and promotes the modernization of China with digital, network-based and intelligent transformation.



Measures adopted in 2023

- The Company accelerated the deployment of gigabit network, supported the creation of local gigabit cities, and continuously improved the coverage rate of gigabit business, in order to meet the needs of urban and rural gigabit business development.
- The Company continued to increase investment in R&D of core technologies, and focused on core technologies in the fields of next-generation Internet, industrial Internet, cloud computing, big data, artificial intelligence and network security.
- The Company vigorously promoted the digital and intelligent transformation, used digital tools to improve operational efficiency, shared its smart digital and intelligent capabilities and relied on Unicom Cloud to drive industry transformation.
- The Company continuously forged its core capabilities in network security, built basic network security platforms, supported major diplomatic, sports and cultural activities, and innovated on technologies to ensure the security of user data privacy.



Actions to be taken in 2024

- The Company will continue to improve network coverage, optimise network quality, focus on the implementation of data centres in core areas of computing power, strengthen the unified scheduling and dispatch of computing network resources, and provide computing network integration services.
- The Company will accelerate the monetisation of scientific and technological achievements, manage all achievements using information platform, strengthen the guidance of the monetisation and classification of achievements, and improve the overall efficiency of scientific and technological innovation.
- The Company will continue to develop digital and intelligent operation capabilities such as APP and digital middle platform, improve the platform capabilities of “cloud, Big Data, IoT, artificial intelligence, blockchain, security”.
- The Company will improve the core capabilities of network security, fully guarantee the communication security of major activities and emergencies, and ensure the multi-level and all-round security of data and privacy.

Consolidating the foundation of a Cyber Superpower

China Unicom implemented the strategic deployment of building a Cyber Superpower and Digital China, continuously strengthened the construction of digital information infrastructure, consolidated the foundation of the digital economy, and contributed our strength to the prosperity and development of the digital economy.

Construction of digital information infrastructure

China Unicom accelerated the construction of premium mobile networks, premium broadband networks, and premium government and enterprise network, consolidated the foundation of Computing and Digital Smart Applications capabilities, focused on building high-speed ubiquitous access capabilities and intelligent computing network integration capabilities, consolidated the network basis for high-quality development of enterprises, and built the network foundation for the construction of Cyber Superpower and Digital China.

Accelerating the construction of premium mobile network

China Unicom continued to promote the construction of premium mobile networks with wider coverage, stronger capabilities, better quality and richer experience, and built the Internet of Things with the coordinated development of 5G/4G to improve the breadth and depth of network coverage.

Over **1.21** million of 5G mid-band base stations

680,000 900 MHz base stations

Over **2.9** million of usable 4G base stations

Total number of IoT terminal connections reached **490** million

China Unicom Diqing Branch in Yunnan completed the first 5G premium network dedicated to trains serving Tibetans. The Lixiang Railway connects Lijiang City in Yunnan Province with Shangri-La City in Diqing Tibetan Autonomous Prefecture. It is the only railway in Yunnan Province that passes through the snow mountain with the highest altitude. China Unicom Diqing Branch overcame many difficulties such as plateau reaction, high seismic intensity, high geological risk, traffic inconvenience, difficulty in organising construction materials, and multiple points and long lines, etc., and realised the dual 4/5G network coverage for the entire Lixiang railway section, and ensured that travelers can have a non-lagging, non-dropout network experience on the high-speed train.



Cracking network coverage difficulties with leading technologies

Accelerating the construction of premium broadband network

China Unicom continued to promote the construction of broadband premium networks with all-optical access, all-area Gigabit, full-house Wi-Fi, and all round service.

- The total number of broadband ports reached 266 million, representing a year-on-year increase of 6.4%, and 10 GPON ports accounted for more than 70%, with broadband covering 540 million residential units and 188,000 commercial buildings.

- The Company carried out cooperation and construction with China Broadnet and private capital enterprises, with 54.64 million broadband ports, accounting for 21% of the total.

Accelerating the construction of premium government and enterprise network

China Unicom continued to promote the construction of a smart experience premium government and enterprise network with ultra-wide coverage, ultra-wide bandwidth, ultra-low latency and ultra-high reliability, and led in the industry in terms of scale.

- There were more than 40,000 multi-service access points in the Company's government and enterprise premium network.

- We launched premium inter-provincial smart OTN products for government and enterprises, and completed the testing of smart OTN products in some provinces.

Consolidating the foundation of Computing and Digital Smart Applications (CDSA) capabilities

As an advocate and pioneer of computing power network, China Unicom accelerated CDSA deployment, and continued to enhance resource supply capabilities, supporting CDSA business development. It has accumulated rich experience and fruitful results in computing power delivery, computing power dispatch, computing power supply, computing power service, etc.

- The Company built differentiated competitive advantages, and constructed new IDCs with China Unicom characteristics featuring reasonable distribution, abundant supply, advanced technology, low-carbon emission, and intelligent centralization, promoting all-round upgrading and high-quality IDC business development. A CDSA base has basically been formed.

- The Company optimised the computing power carrier network, created a new DC-centric "IP + Optical" synergistic carrier network, built an integrated scheduling platform of network and computing power, and created an integrated computing network service capability.

- The Company built a new ecosystem of computing network integration focused on computing power, provided integrated computing network services of "connection + perception + computing + intelligence", and formed a multi-level computing power facility system of digital network collaboration, digital cloud collaboration, cloud-edge collaboration, and green intelligence.

China Unicom (Huailai) Big Data Innovation Industrial Park has become one of the two “Eastern Data and Western Computing” scheduling platforms in China, which can meet the diversified and customised needs of various enterprises in network, computing, storage and disaster recovery. The industrial park has planned a total of 85,000 standard cabinet capabilities, which can provide 2,200 PFlops (1 PFlops equals to 1,000 trillion floating point operations per second) computing power services, with advantages such as large area, high construction standard, large scale of racks, and complete power supply, environmental impact assessment and energy-saving procedures.



China Unicom (Huailai) Big Data Innovation Industrial Park

Continuously improving the quality of network services

China Unicom actively implemented the special action deployment of the Ministry of Industry and Information Technology for “signal upgrading”, promoted the compliance of ten key scenarios, and continued to improve the quality of network services.

- The Company continued to build a mobile network with strong coverage, good quality and excellent experience. The average access speed of 5G uplink maintained an industry advantage throughout the year, and the average access speed of downlink exceeded 330 Mbps; The uplink and downlink access speed of 4G network is comparable in the industry, of which the downlink average access rate is superior in the industry.
- The Company comprehensively built high-quality smart broadband networks, and the average network access speed increased by 15.8% year-on-year.
- Focusing on government affairs, finance, enterprises and the Internet and other market segments, the Company carried out industry cultivation and matched needs; With resource utilisation as the driving force, we carried out precise construction and achieved network business synergy.
- We strengthened the construction of China169 backbone network, completed the latency optimisation of 34 inter-provincial directions, and the average latency of the entire network has an advantage in the industry.



China Unicom became the first domestic operator whose broadband network digital application products passed the self-intelligent network intelligent grading certification

In order to better improve the quality of the network, China Unicom Hainan Branch focuses on network capacity, network coverage improvement, network problem mapping, market service guarantee, and optimisation capability enhancement, etc., to overcome network pain points and improve user perception. The complaint rate of the mobile network decreased by 26.5% year-on-year, the resolution rate of the mobile network complaints was 93.91%, an increase of 6.91 pp from the beginning of the year, with subscribers being more satisfied with their Internet experience.

Promoting coordinated development of the main business

China Unicom focused on the main responsibility of building Cyber Superpower and Digital China, expanded the CC and CDSA businesses, continuously improved the sense of achievement, happiness and security of the people, and helped the construction of a modern industrial system. The Company accelerated the promotion of 5G, gigabit and integration, and optimised the product experience such as Unicom Home Surveillance, Unicom Assistant, Unicom Ultra HD, and 5G new communication to meet the needs of the people for a better digital and intelligent life. Focusing on the key direction of industrial digitalization, the Company promoted the deep integration of digital technology and the real economy with innovative practises in 5G+industrial Internet, digital government, smart city, smart cultural tourism, smart education, smart medical care, ecological and environmental protection and other fields.

Optimising CC and providing smart living experience

China Unicom promoted the acceleration of 5G and gigabit upgrades for all subscribers, comprehensively improved user perception and service satisfaction, and strived to connect people for a better smart life. The Company followed the principles of fair competition, integrity and transparency, and deeply integrated the concept of compliance into daily operations. We regulated market competition behaviour, strived to maintain a healthy and orderly market environment, and led the industry to accelerate the construction of a new landscape of high-quality development.

Upgrade the China Unicom Smart Home Experience

China Unicom upgraded and released the FTTR (Fibre to The Room) whole-house optical broadband product “China Unicom Smart Home”, which provided high-quality services of “leading gigabit optical fibre, leading delivery services and leading speed experience”, promoted the high-quality development of FTTR and guided the new life of digital home.

FTTR's subscriber base exceeded

6 million households



Unicom Cloud Drive leading a new digital life



China Unicom's "Cloud Acceleration" product helps accelerate the all-round scenarios

China Unicom "Cloud Acceleration": Through innovative AI+algorithm intelligent identification of acceleration scenarios, it can realise the best acceleration strategy on different network slices, meet the acceleration needs of games, education, conferences, e-commerce and other all-round scenarios, and solve the pain points of users around network acceleration in one stop.

Strengthening CDSA to help the construction of Digital China

China Unicom accelerated the implementation of the Overall Deployment Plan for the Construction of Digital China, focused on the key direction of industrial digitalization, and comprehensively promoted the deep integration of next-generation digital technologies such as 5G, cloud computing, big data, Internet of Things and artificial intelligence with the construction of economic, cultural, social and ecological civilization, so as to comprehensively empower economic and social development and accelerate the construction of Digital China.



Strengthening, optimising and expanding the digital economy

Building the No. 1 brand of "5G+Industrial Internet"

China Unicom fully implemented the spirit of the National Conference on the Promotion of New Industrialisation, and took the high-quality promotion of the 5G+Industrial Internet group-level strategic project as the key to vigorously promote the expansion of industrial Internet integrated innovation applications, creating more than 10,000 industrial Internet projects.

China Unicom continued to go deeper into the core production safety field of mines, and has built an integrated mine digital brain platform, personnel positioning and vital signs monitoring system, intelligent production safety risk monitoring system for coal mining enterprises, mine intelligent integrated management and control platform, 5G intelligent mine platform, mine digital factory platform, mine industrial Internet platform, "Fangtong" mine safety monitoring platform, and mine video Internet platform, etc. These products have been applied by Shanxi Coking Coal Group, Jinnen Holding Group, Shandong Energy Group, China Gold Group, Shandong Gold Group, China Steel Group (Shandong) and other customers, realising production assistance and intelligent control of the whole process of "people, machines, environment and management" in mining areas. For open-pit mining operation scenes, the Company cooperated with China University of Mining and other units to successfully complete the country's first verification of integrated sensing and communication for mining scenario in Erdos Tengyuan Coal Mine based on integrated sensing and communication technology, Beidou and 5G, realising the effective integration of intelligent monitoring, safety control and emergency communication.



Development of efficient and collaborative digital government affairs

Digital government

China Unicom thoroughly implemented the Guiding Opinions on Strengthening the Construction of Digital Governments, the Guidelines for the Construction of National Integrated Administrative Big Data System, the Opinions on Building Basic Data Framework to Make Better Use of Data Elements and other requirements, actively participated in and served the digital transformation and development of governments at all levels, created core self-developed products such as “Zizhi” administrative big data Platform, Economic Brain 4.0, etc., upgraded 151 products, and provided more than 500 multi-scenario and intelligent comprehensive solutions. “Sichuan provincial government cloud and remote disaster recovery service project” and “Ningxia government cloud platform construction project based on dual engine base” won the “Excellent Case of Government Cloud Innovative Practice” in 2023.

The Company built an economic operation monitoring system for the Hebei Provincial Development and Reform Commission. In accordance with the characteristics of Hebei Province, the national strategy of Beijing-Tianjin-Hebei coordination integration, and the planning and deployment of the coastal economy of the province, the Company built three major business systems, namely macro-economy monitoring, economic alerts and special topics, and nine core sections based on more than 1,000 major indicator systems, which met the needs to monitor the economic leading effect of local development on key industries and major strategies, helping improve the digital level of government economic adjustment.



Economic operation monitoring system

Smart city

China Unicom continued to optimise and deepen smart cities, upgraded the unique capabilities of the “Urban Digital Intelligence Brain” base such as universal perception and time-space twinning, and helped the construction of urban data resource system, and formed 45 self-developed products and 20 solutions covering digital infrastructure, urban operation “unified management with one network”, social refined governance, intelligent parks, smart communities and other fields, providing services for nearly 700 projects across the country.

China Unicom Sichuan Branch and Yunjin Smart Technology Company worked together to create the “112N” Smart Xinjin Architecture for Xinjin District in Chengdu City, empowering urban public safety, public management, public services and digital economic development. By giving full play to the ability of China Unicom’s “Urban Digital Intelligence Brain” to collect, treat and dispatch urban operation data and the event processing and scheduling of the city event hub, the data can be automatically captured, the data collection process can be simplified, and the 10-hour reporting time in the community can be reduced every week



The Smart Xinjin case was selected as an excellent case of government data sharing by the E-government Office of the General Office of the State Council

China Unicom used the base of the “County Smart City Public Service Platform” to build four capabilities of “monitoring, command, coordination and handling”, and realised the “one-screen unified overview and one-screen scheduling” of the Emergency Command Centre of Danjiangkou City and the Water Quality Safety Assurance Command Centre of Danjiangkou Reservoir Area, so as to improve the efficiency of urban governance such as the overall urban emergency management of Danjiangkou City and the water quality safety guarantee of the reservoir area.



Intelligent Danjiangkou Comprehensive Command Centre

Transportation

China Unicom adhered to the strategy of “Transportation Strengthening the Nation” as a guideline. Relying on its own entrepreneurial expertise, China Unicom integrated the innovative CDSA capabilities such as vehicle-road coordination, traffic big data and intelligent analysis of traffic AI, and focused on the sub-division of highways, civil aviation, ports, logistics and other areas, so as to empower the construction of intelligent transportation through technology.

China Unicom empowered the Department of Transportation of Jilin Province to build a traffic and transportation big data centre and an “Internet+Transportation” command centre. The big data centre was based on aggregated and processed traffic data resources, and built a shared and open management platform to achieve effective data sharing and openness, while the command centre coordinated the monitoring of highway and waterway operations and emergency response, strengthened “intelligent monitoring, systematic investigation, and digital judgement”, and realised “intelligent monitoring, accurate supervision, scientific judgement, and efficient coordination”.

Building a confident and prosperous digital culture

Culture and tourism

China Unicom thoroughly implemented the policy requirements of “Internet+Tourism” and the cultural digitalization strategy. The “Innovation Centre for Tourist Behaviour Monitoring and Decision-making Services” led by the Company was awarded the Technology Innovation Centre of the Ministry of Culture and Tourism, and four solutions were selected as the first batch of national top ten and excellent solutions for “cloudification, digital empowerment and intelligence” for smart tourism by the Ministry of Culture and Tourism, and eight projects were selected as “5G+smart tourism” application pilot projects by the Ministry of Culture and Tourism and the Ministry of Industry and Information Technology.

China Unicom Digital Technology Company has built the Welcome Pine Mobile Command and Dispatch System for Huangshan scenic area, including the basic cloud platform and the mobile command centre APP. We realised the unified access and integration of 35 system data, and the level of data governance was greatly improved. For the first time, we adopted modelling methods such as big data monitoring-forecasting, and through the establishment of a data prediction model for blockages, we achieved accurate prediction of the status of each congestion point in the scenic spot one hour in advance, which improved the level of tourism supervision and information public services, and promoted the high-quality development of Huangshan scenic area.



Welcome Pine Mobile Command and Dispatch System

Smart education

China Unicom actively participated in the national education digitalization strategy and built a digital intelligence education capability system with the core of “computing network integration, digital intelligence empowerment, panoramic application, security and credibility, and operation services”. Leveraging the “cloud, Big Data, IoT, artificial intelligence, security and blockchain” and 5G technology capabilities, China Unicom has created more than 700 benchmark projects for digital applications such as 5G smart teaching and education big data, serving education departments in 31 provinces across the country, more than 2,000 higher vocational schools, 100,000 primary and secondary schools, and more than 30 million teachers and students, empowering the high-quality development of national education.

Based on 5G+cloud+digital twinning technology, China Unicom Hunan Branch has created a new training model of “Cloud-operation + Real-action” under the 5G environment for Hunan Automobile Engineering Vocational College, and built an interactive intelligent learning space integrating “virtual scenes” and “physical scenes”, which effectively solved the practical training problems such as the high procurement cost of the digital production line of intelligent manufacturing at the school and the low frequency and number of teaching students.



5G smart teaching platform of Hunan Automobile Vocational College

China Unicom Zhejiang Branch and Jinhua Education Bureau worked together to build the “Double Reduction” platform. Focusing on the problems of overburdened primary and secondary school work, insufficient supervision of after-school training institutions, and common anxiety of social families, the school effectively solved them through cloud, big data, IoT and other digital technologies, and strengthened the main role of schools in education. All 1,124 for-profit academic training institutions in the city underwent “two shifts and one stop”. After-school study hours decreased by 69%, and academic training expenses decreased by 91%, greatly reducing the burden on students and parents.



The “Double Reduction” platform project was selected as the digital transformation case of the World Digital Education Conference and the annual best application of the digital social system in Zhejiang Province, ranking first in the “Best Application” list of digital reform in Jinhua City.

Building an inclusive and convenient digital society

Smart healthcare

China Unicom gave full play to the advantages of digital health integration and innovation, provided universal health big data solutions for the medical and government fields, and assisted in the sharing of high-quality medical resources and the improvement of primary-level diagnosis and treatment service capabilities; For hospitals at all levels, we provided integrated smart hospital solutions to facilitate medical business collaboration and scenario-based application innovation.

China Unicom built a health big data platform with an integrated structure in the Third Hospital of Sun Yat-sen University, which gathered 77 business system data of the hospital, established a unified data standard, and created a digital and intelligent application service system for the hospital that is manageable, accessible to doctors and visible to patients, so as to realise the homogeneous and coordinated development of multiple hospital branches. It has created a national leading benchmark demonstration that uses big data technology to serve smart diagnosis and treatment, smart management and smart services of the hospital, and the project was selected as an excellent typical case of smart hospitals by the National Health Commission.



Sun Yat-sen University Third Hospital Health Big Data Platform

China Unicom joined hands with Shanghai Ruijin Hospital to jointly build the first key medical project of the national 5G new infrastructure, and constructed a national 5G emergency rescue demonstration system of “one private 5G network + one emergency rescue platform + multiple terminal collaboration”, realising the unified command and dispatch of first-aid resources.



5G helped Ruijin Hospital to build an ultra-large emergency rescue demonstration system

Building a green and smart digital ecology

Ecology and environmental protection

China Unicom focused on water conservancy, environmental protection and other sub-sectors, supported the construction of a beautiful China with the integration and innovation of digital technology, and empowered the construction of digital ecological civilization with technology relying on its own enterprise endowment and innovation capability.

China Unicom Zhejiang Branch strengthened the top-level design of the digital reform of the ecological environment, constructed the “ecological environment brain” project in Zhejiang Province, built a “Beautiful Zhejiang” ecological management platform, covering core elements of ecological environment management such as water, air, soil and solid waste, and realised the collection and sharing of more than 16.4 billion ecological environment data from 52 units, 118 systems, which effectively improved the modern capability of ecological environment governance in Zhejiang and promoted the construction of beautiful Zhejiang.



“Beautiful Zhejiang” ecological management platform

Stimulating the vitality of technological innovation

China Unicom implemented the deployment of strengthening the country with science and technology, and pioneered in the integration and innovation of digital technologies to improve the comprehensive strength of scientific and technological innovation on all fronts.

Developing strategic emerging industries

China Unicom accelerated the deployment of 3 strategic emerging industries, including next-generation mobile communication, artificial intelligence and new energy vehicles, and cultivated 2 future industries, including future networks and future information. Focusing on next-generation Internet, next-generation mobile communication, smart broadband and leased line networks, cloud computing and computing networks, artificial intelligence, big data, Internet of Vehicles, Digital Smart Applications, network security and other directions, China Unicom carried out R&D on critical core technologies, actively built a sound industrial ecology, and accelerated the formation of new quality productivity.

Focusing on national strategies and developing emerging industries

Based on the urgent needs and long-term requirements of the state, China Unicom actively deployed strategic emerging industries.

- **Next-generation mobile communication:** The Company promoted the technological innovation and application of 5G under complex and extreme conditions. We completed the fifth-generation mobile communication technology innovation and application project under the complex and extreme conditions of the Winter Olympics, achieving breakthroughs in key technologies such as rapid perception and precise modelling of electromagnetic transmission environment, high-reliability and large-capacity transmission, and multi-dimensional coverage network under complex scenarios, and won the “Major Technological Progress in China’s Information and Communication Field” award.

- **Cloud computing and computing network:** The Company comprehensively upgraded “Unicom Cloud” to security digital intelligence cloud, and launched a total of 106 products, with its comprehensive capabilities basically reaching the mainstream level of the industry, and was selected as the “2023 Digital Government Industry Map” by the CAICT. In terms of key technologies for computing network integration, China Unicom built the first domestic intelligent computing platform.

- **AI:** We launched the construction of the AI endogenous security tool chain, management system and ecosystem, self-developed and completed the value alignment of language models, and reached the mainstream level in the industry in the TruthfulQA data set evaluation.

- **Big data:** We continued to strengthen the real-time trillion-level data processing capacity, with 17 base capability components, fully covering the entire life cycle of data, and our data management capability passed the DCMM5 certification with the highest score in history.

- **Blockchain:** The Company promoted the integration of blockchain and homologous encryption and other technologies to realise cross-domain networking. We realised block data consolidation and compression technology, reducing storage by 30%, and underlying platform performance exceeding 20,000 TPS. Unicom Chain ranked 4th in IDC’s “China’s Government Industry Blockchain Software Market Share 2022”.

- **Internet of Vehicles:** The Company built the core capabilities of new digital infrastructure for Internet of Vehicles, provided new Internet of Vehicles products and services featuring integrated sensing and communication for autonomous driving, and covered the full-chain and full-scenario services of “terminal-management-service-cloud” of the Internet of Vehicles, so as to help the high-quality development of automobile enterprises. We won more than 60 awards, including the “First Prize of the China Institute of Communications”, the “First Prize of the China Communications and Transportation Association”, and the “International Green Design Award of the World Green Design Organisation (WGO)”. Many cases were selected as typical cases of IoT and Internet of Vehicles by the Ministry of Industry and Information Technology.



Won the first prize in the solution category of the 3rd China Blockchain Security Competition of CAICT in 2023

Unicom Cloud’s product technology capabilities continued to improve and won many industry awards.

- Unicom Cloud entered the fourth place in the IDC private cloud industry, won two awards at the 2023 Cloud Edge Collaboration Summit and passed two trusted cloud certifications.

- Unicom Cloud’s PaaS platform passed the advanced evaluation of “Cloud Native Middleware Management Capability” of the ICT China 2023 High Level Forum, becoming the first operator to pass this certification.

- Unicom Information Innovation Cloud Platform for Government Affairs passed the “Government Cloud Ecological Compatibility Assessment” at the 2023 Digital Government High-Quality Development Forum.

- Unicom Private Cloud Platform for Government Affairs passed the “evaluation of private cloud model for government cloud services”.



Focusing on future technology and cultivating future industry

China Unicom actively deployed in the fields of cutting-edge technologies such as next-generation Internet, quantum communication and 6G to accelerate the cultivation of new momentum and new advantages for development.

- Next-generation Internet: The Company proposed a technical protocol and a new service structure for IPv6 evolution of carrier network under the scenarios of computing network collaboration, and worked with Huawei to develop a series of IPv6 evolution equipment and management and control systems that are independent and controllable in key technologies. The Company won the first prize of the 2023 China Institute of Communications Science and Technology Award, which strongly promoted the progress of China's next-generation Internet technology and industry.
- Quantum information technology research: The Company continued to carry out the standardisation of quantum information at home and abroad, and actively participated in the quantum communication industry alliance. We constantly promoted the application research in industrial Internet, Internet of Things and traditional core networks, and initially carried out the application research of quantum computing in artificial intelligence, big data and network optimisation, so as to promote the development of quantum information technology industry.
- 6G: Keeping up with the pace of 6G promotion in China, the Company set up a joint research team for 6G key technologies, and secured more than 100 6G patents. We released white papers such as 6G business, integrated infrastructure for sensory computing and green network, and applied the network characteristics such as "intelligence, integration, elasticity, green and credibility" proposed in the *China Unicom 6G White Paper V1.0* to the vision architecture of ITU-R (ITU Radiocommunication Sector). We applied the research results of credible sharing solutions and 6G indicators to the ITU technical report, and some contents have become industry consensus. We undertook the key project of 6G international cooperation of the Ministry of Science and Technology, and completed the *Research on Application Scenario of THz Communications* and the *Research, Analysis and Suggestions on Frequency of 26GHz/40 GHz*, which won the "Excellent Research Achievement Award" of the 2023 CCSA.

Focusing on key areas and breaking through core technologies

China Unicom developed a number of core technologies in key areas, led and supported the high-quality development of key industries, and helped achieve high-level technological self-reliance and self-improvement.

- 5G+Beidou field: The Company has developed a spatial-time functional module, a time-frequency chip, a synchronised network management and control platform, a channel-guided integrated base station and a high-precision positioning terminal, promoting the application of "5G+Beidou" to empower various industries, and improving the support capability of high-precision time positioning business.
- AI computing power service field: The Company carried out key technical research on independent and controllable AI computing power service, developed an AI computing power service system based on Feiteng, promoted the service of AI computing power, and effectively reduced supply chain risks.
- Key technical field of space-air services: The Company carried out research on 5G+inertial integration of indoor integration positioning technology and 5G positioning error correction method based on deep conversion of self-codec, upgraded the 5G positioning business service platform, and improved the positioning effect in industrial Internet scenarios. The Company won the second prize of the national finals of the 6th "Blooming Cup" 5G Application Competition, the second prize of the Science and Technology Progress Award of the Communications Association in 2023, and the Gold Award of Satellite Innovative Application of the China Satellite Navigation and Positioning Association.
- 5G RedCap field: The Company carried out systematic technology research on RedCap terminal network business collaboration for real scenarios, and pioneered in RedCap standard system linking the international, industry and enterprises, achieving leading technical standards.

Improving the scientific and technological innovation system

China Unicom continued to promote the construction of technological innovation mechanism, enhanced technological innovation capabilities and stimulated the innovation vitality of talents.

Improving system and mechanism guarantee

Focusing on the management of R&D projects, the application of scientific and technological achievements, the management of R&D expenses, the management of data security laboratories, and the protection of intellectual property rights, the Company issued a number of rules and regulations such as the *Guiding Opinions of China Unicom on Scientific and Technological Innovation* and the *Guiding Opinions of China Unicom on Compliance Management of R&D Projects* to activate the scientific and technological innovation mechanism and promote the application of achievements.

- The Company held the founding meeting and the first meeting of the China Unicom Science and Technology Association, and signed a comprehensive strategic cooperation agreement with the China Association for Science and Technology. The Company improved the organisational structure of the China Unicom Science and Technology Association, established 5 working committees and 32 secondary unit branches, established vertical science and technology association organisations of branches, and formed a joint mechanism of science and technology cooperation between the upper and lower levels.
- 16 academicians were appointed as distinguished experts of the Science and Technology Committee, and the China Unicom's standard expert was elected as the vice chairman of the 3GPP SA1 core network for the first time. The number of CCSA positions in China reached the highest level in history, and the technological innovation power was stronger.

Increasing investment in R&D

- The Company continued to increase investment in R&D to RMB15.12 billion, of which core technology research focused on the next-generation Internet, industrial Internet, cloud computing, big data, artificial intelligence, network security and other fields.
- The Company greatly improved the reward for scientific and technological innovation, and awarded certificates and bonuses to outstanding organisations for core technology research and projects winning special and first-prize awards in scientific and technological progress on the open day of state-owned enterprises, creating a good atmosphere for encouraging innovation and stimulating the innovation vitality of enterprises.

Responsibility performance indicators	2021	2022	2023
Number of patents applied (item)	2,224	2,672	4,398
Number of patents granted (item)	1,128	1,666	2,287

Promoting the application of research results

- The Company improved the institutional norms, revised the systems related to the application of scientific and technological achievements, launched the China Unicom scientific and technological innovation achievements application management platform, and established a management closed loop from project initiation, planning, execution, closure to application of results. The Company completed the overall management of all scientific and technological achievements, subdivided the achievements in different stages such as initial application, replication and promotion, and introduced different guidance and application policies.
- The Company promoted the exchange and implementation of independent scientific and technological R&D achievements across the country, held seven sessions of “Wotu • Achievements Exchange Conference”, and set up seven sessions of “Wotu • Achievements Classroom”.
- The Company established the China Unicom’s independent scientific and technological achievements promotion catalogue and supporting policies, and strengthened the application and classification of achievements. For customer-oriented products and platform-based technological achievements, we promoted more application in self-developed products by government and enterprises and market departments; For products and platform-based technical achievements oriented to network construction, enterprise operation and services, the Company improved the internal application and sharing mechanism, and enhanced operational and service efficiency. We actively fostered major scientific and technological achievements, applied for and participated in various activities organised by the government and industry associations, and promoted the publicity and application of achievements on a larger platform.
- A number of iconic achievements have been made, and technological innovation has become more brilliant. We promoted the value-driven output of R&D achievements from the National Engineering Research Center for Next-generation Internet Broadband Business Applications. The “Big Data Analytics for Management-Business Correlation Methods and Systems” won the Silver Award of the twenty-fourth China Patent Award. Two self-developed products were included in the Recommended Catalogue of Scientific and Technological Innovation Achievements of Central State-owned Enterprises. A project led by the Company obtained a first prize of scientific and technological progress from the China Institute of Electronics and 2 first prizes of scientific and technological progress from the China Institute of Communications. The Company won 2 World Internet Leading Scientific and Technological Achievement Awards. 133 projects were selected as “ICT China (2023) cases”, 2 projects were selected as “Top Ten Scientific and Technological Progress in the Information and Communications Field in 2022”, and 13 projects were shortlisted in the “4th Bright Star Competition Innovative Projects”.

Consolidating the advantages of digital intelligence transformation

Strengthening the internal Digital Smart Applications

China Unicom implemented the strategy of strengthening enterprises with digital intelligence, maintained the leading position among central state-owned enterprises in terms of digital capabilities, and the smart operation system, through the integration of individual components into a comprehensive framework, consolidated the core advantages of “One China Unicom with integrated capabilities and operating services”. It established a benchmark for digital transformation among central state-owned enterprises, and ranked first among central state-owned enterprises in terms of special actions for the improvement of digital intelligence of state-owned assets supervision. Its data management capabilities entered the first echelon of the state. It has passed the DCMM Level 5 Certification with the highest score in history, won the “Top Ten Famous Data Management Enterprises”, and was awarded 2 TMF (TeleManagement Forum) Excellence Awards and 3 Catalyst Awards. It was fully affirmed by superior ministries and commissions, international organisations and industry alliances.



Won “Top Ten Famous Data Management Enterprises”



Passed the DCMM Level 5 Certification



2 TMF Excellence Awards and 3 Catalyst Awards

Smart Brain continued to maintain the leading position among central state-owned enterprises

- **Bringing up perceptions through five major APPs.** China Unicom APP 11.0 version was newly launched, with a successful business sign-up rate of over 97%. For Unicom Public APP, the Company built smart home engineer, channel manager and other working platforms, realizing data centralization for more than 50,000 smart home engineers. For Unicom Government-enterprise APP, it built a small CEO working platform, which realised the full view of four-tier list of customers and revenue data. Unicom Network APP completed centralization of more than 140 applications, and 220+ KPIs can be viewed through a single portal. Unicom Office App was equipped with commercial encryption and other capabilities.
- **Controlling risks and improving efficacy through five major operation platforms.** The public operation platform integrated products, orders and 170+ other multi-functional domain systems. Digital sand table achieved visualisation of key indicators of communities and double-optimal townships. The number of grid orders exceeded 16 million, and the number of contacts exceeded 4.3 million, representing a year-on-year increase of 285%. The government-enterprise operation platform had more than a thousand centralised processes for contracts, acceptance, accounts and comprehensive affairs.
- **Strengthening innovation and improving efficiency through five middle platforms.** CBSS1.0 was upgraded to 2.0 full cloud-based architecture, enabling continuous deployment without service interruption. The network middle platform aggregated more than 2,800 open capabilities. The rate of real names of valid work numbers in the user center of the management platform reached 100%. The data warehouse platform's integrated multi-engine fusion technology architecture was improved, a BMO unified data asset catalogue was established, and more than 30,000 data assets were available. The cloudification rate of internal applications on the Unicom Cloud reached 68%, the scale of computing power increased by 13%, and the CPU utilisation rate exceeded 37.5%.

Smart operation penetrating production scenarios

- **Intelligent production operation.** Digital technologies were embedded in various production processes with more centralised operation of new and existing customers. The centralization ratio of 12 digital scenarios exceeded 78%, and the broadband order conversion rate improved by more than 19 pp; The precision marketing of government-enterprise customers was more agile, the targeted coverage rate of commercial enterprises exceeded 86%, and the targeted coverage rate of key customers increased by 15 pp.
- **Integrated operation and management.** The Company smoothed the digital connectivity with employees, millions of channels, tens of millions of network elements, and hundreds of millions of customers, strengthened combat capabilities of elite troops, achieving a 74% increase in the equivalent development volume of the marketing "iron army" with a budget of RMB100 per month, enhancing digitalization of risk prevention and control capabilities, and significantly improving employee satisfaction.
- **Agile service.** All-service online marketing became more convenient, and the Unicom APP integrated 420 online services with monthly active users of more than 100 million; Intelligent customer service became smarter, and the intelligent customer service ratio exceeded 84% with leading hotline intelligent service level among operators.

China Unicom Hebei Branch has built a vertical and horizontal operation system, focusing on improving personnel efficiency, material efficiency, salary efficiency and work efficiency, horizontally connecting various specialties, vertically penetrating into multiple levels, and forming integrated empowerment capabilities, with the production capacity of the front-line team increasing by 43% on average.



China Unicom Hebei Branch has built a vertical and horizontal operation system

China Unicom Inner Mongolia Branch focused on the whole process of broadband integration orders, and reconstructed 9 points of change, so as to improve front-line satisfaction and customer service perception.

Based on the Group's "1555N" unified capability system, China Unicom Guangdong Branch created digital employees in multiple scenarios such as Q&A, order recording and scheduling, accepted more than 700,000 work orders in total, saved 597 person-months, and created digital products with the characteristics of China Unicom.



China Unicom Guangdong Branch AI-RPA Digital Employee Production System

Accelerating external digital intelligence services

China Unicom is committed to creating open and sharing digital capabilities for the whole industry, providing industry-leading platform capabilities such as Internet of Things, big data and network security, and creating an open platform for capabilities such as Gewu, Mogong and Zizhi, so as to empower innovation with openness and jointly build a prosperous digital ecology.

Gewu Platform to help IoT ecosystem prosperity

Relying on the dual driving forces of Yanfei-zhilian Connection Management Platform and Yanfei-gewu Device Management Platform, China Unicom has built the integrated 5G+AIoT core capabilities of network softwareization, software hardwareization and hardware intelligence, forming a centralised dual-engine IoT platform based on “cloud network” and centred on “things”, and realising end-to-end solutions from equipment cloudification, data collection, data processing and intelligent application.

- Gewu Connection Management Platform (CMP) undertakes the core digital capability base of China Unicom’s IoT. Based on the industry-leading technical architecture, it is committed to providing enterprise customers with safe, convenient, intelligent and efficient IoT connectivity management services. The platform has built core advantages such as centralised 5G operation, international services and consumer operation, with the carrying connection scale exceeding 350 million.

- Gewu Device Management Platform (DMP) is designed for the smart connection of all things, connecting and managing devices of thousands of industries, and providing standard APIs and development tools for IoT application development to support the rapid launch and operation of industry applications. The platform has successfully built industry benchmark projects such as Delightful Home Textile, Fujian Nanping Sponge City, and Xiamen Free Trade Zone.

Mogong Platform to promote security capability sharing

The “Mogong” means that the security system is both offensive and defensive. China Unicom independently developed a “Mogong” security operation platform, sharing China Unicom’s security capabilities and data resources, and providing innovative operation service models such as end-to-end risk assessment and real-time monitoring and early warning. The platform managed a total of approximately 180 security products, which are permanently collected by the National Museum.



Mogong security operation service platform

Zizhi Platform to serve the construction of administrative big data

China Unicom’s full-stack self-developed “Zizhi” administrative big data platform focuses on the pain points of administrative big data applications, accumulates more than 100 scenario-based applications, and provides low-code visualisation tools for out-of-the-box use. The platform achieves 100% localization and has the ability to analyze trillions of data in real time, as well as the key capability of multi-source, heterogeneous and domain-wide data resource integration.



“Zizhi” administrative big data platform

Fortifying cybersecurity barrier

China Unicom adheres to the overall national security concept, bravely assumes the responsibility of the chain leader of the modern cybersecurity industry chain, serves the national strategy, leads the development of the cybersecurity industry chain, and fulfils the responsibility of a state-owned central enterprise with practical actions.

Forging core security capabilities

China Unicom strengthened its responsibility as the chain leader of the modern cybersecurity industry chain, focused on the main support of hard strength, the driving force of scientific and technological innovation, and the driving force of integration, comprehensively improved the core capabilities of cybersecurity, and empowered the development of the industry chain.

Strengthening the protection of critical information infrastructure

We continued to build a solid cybersecurity foundation, further promoted the construction of an active defence system for the protection of critical information infrastructure, formed a security protection mechanism for critical information infrastructure, and built DDoS defence, APT monitoring, attack traceability and other capabilities to ensure the secure and stable operation of information infrastructure.

Jointly building a modern cybersecurity industry chain

Focusing on the difficulties in the modern industrial chain of cybersecurity, we deeply promoted core technology research, built a security product capability system, actively explored the industrial integration development model, comprehensively built a shared community for industrial chain development, and jointly built a new landscape of industrial integration and development.

Shaping cybersecurity technology innovation capabilities

- The Company built basic cybersecurity platforms, including asset mapping, threat monitoring, threat early warning, threat disposal, threat intelligence, attack traceability, and joint prevention and control platforms, to empower system protection in all aspects.
- The Company shaped a national-level innovation carrier, continued to build a national-level innovation carrier in collaboration with scientific research institutes, established cybersecurity intellectual property operation centres, and built a series of national key security laboratories such as security attack and defence laboratories (5G security lab) and information technology application innovation laboratories.
- The Company delivered high-quality scientific and technological innovation achievements, promoted the formulation of cybersecurity standards, actively undertook 12 national key projects around major national strategies, and took the lead in researching 27 international standards.
- The Company improved the comprehensive defence level of cybersecurity, carried out SOC1.0 compliance certification, and realised the transformation of SOC virtualization operation to physical operation.

Building a secure product capability system

- The Company deeply cultivated the construction of cybersecurity system to create a security product capability system with industry-leading technology, both attack and defence, and rich scenes, and formed the China Unicom Security Product Map, covering seven major product fields and 84 products, as well as the mainstream security products of industry security manufacturers.
- The Company built a “Security Hub” cloud market integrating online and offline operations, introduced 22 partners in the upstream and downstream of the industrial chain, launched 100 security products, and deeply integrated with industrial chain enterprises to co-create products, so as to empower the development of small and medium-sized enterprises and strive to be a leader in the security product ecology.
- The Company supported the construction of the ultra-large city digital security operation centre, gave full play to the advantages of “Mogong security operation service platform” and “Security Hub” security cloud market capabilities, and successfully built more than 50 integrated security operation service demonstration cases in the fields of digital government and central state-owned enterprises in the country, accelerating the large-scale development process of “China Unicom Model” for security operation services.



Modern Cybersecurity Industry Chain Action Plan and Strategic Emerging Co-innovation Launching Ceremony

Exploring industrial integration development model

The Company gave full play to its role as a chain leader in promoting integration, innovated the integration driving model, and held the high-quality joint chain action conference. The Company cooperated with a total of 28 units of government agencies, universities and colleges, and cooperative enterprises to sign the joint chain ecological contract, and announced six major actions such as the "Security Hub" linkage bridge co-creation action, the Mogong ecology co-construction action, and the achievement application win-win action, forming a new industrial chain landscape orderly driven by central state-owned enterprises with the integration and development of large, medium and small enterprises.

Safeguarding major security activities

- We successfully completed the communication support tasks for 160 major national events, including the 2023 "Belt and Road" Summit Forum, the Hangzhou Asian Games and the Asian Paralympic Games, the Chengdu Universiade, the China-Central Asia Summit, the Boao Forum for Asia, the Davos Forum, the Shanghai International Import Expo, the World Internet Conference, and the launch and return of Shenzhou-series rockets.
- The Company successfully completed 27 "cloud diplomacy" communications support missions for central leaders such as the Chief Council of the member countries of the Shanghai Cooperation Organisation and the BRICS Summit on Special Issues.
- The Company successfully completed the communications support tasks for emergency and disaster relief such as Typhoon Dусurui, Northeastern China heavy rainfall, Northeast China heavy snow disaster, and Gansu Linxia Jishishan 6.2 earthquake, which were highly praised by the provincial and municipal governments of Beijing, Tianjin, Hebei and Heilongjiang.

Communication support tasks for
160 major events
242,000 emergency communication support personnel



Provided communications support services for the 3rd "Belt and Road" International Cooperation Summit Forum



China Unicom Gansu Branch opened communications "lifeline" for earthquake relief



China Unicom Henan Branch set up a rescue team to help schools in flood relief

Creating a clean cyberspace

Combating telecommunication fraud

China Unicom cooperated with various industries to crack down on telecommunication network fraud and promoted the high-quality development of business.

- The Company established the China Unicom Anti-Fraud Centre to strengthen technology R&D and improve the precise governance capability with big data.
- The Company deepened police cooperation and assisted public security authorities in breaking 7,015 criminal spots, representing a year-on-year increase of 209%.

China Unicom's anti-fraud centre has realised the one-point aggregation, one-point processing and one-point analysis of national anti-fraud basic data, and has built more than 64 new fraud identification models, among which many self-developed innovation projects have been selected as pilot fraud governance innovation projects by the Ministry of Industry and Information Technology; We carried out special governance of harassing calls and spam messages, intercepted more than 900 million point-to-point and port spam messages. The anti-fraud centre gave full play to the advantages of operators and big data, assisted the public security to crack down on 7,015 fraud spots, seize 14,001 suspects of crimes, and confiscate 14,346 fraud-related devices.

In close coordination with the public security authorities, China Unicom Guangxi Branch launched an operation to combat telecom network fraud in the border areas. Utilising technical means such as local network kick restrictions, data model detection and shutdown, public network security threat monitoring and disposal capacity building, and optimization of international roaming anti-fraud models, we assisted the public security authorities in detecting a number of fraudulent dens using overseas roaming numbers and cards, and built a strong anti-fraud firewall.

Protecting user data security

China Unicom innovatively created a data security operation mechanism with operator characteristics, and issued management measures and enterprise standards such as the Data Security Classification Management Measures, the Data Security Management Measures of China Unicom, and the Personal Information Protection Management Measures of China Unicom, covering data security protection policies, the handling mechanism for major information security incidents, and measures to monitor information security risks and threats, so as to continuously improve the level of data security governance.

Effective prevention of harassing calls

China Unicom further strengthened the R&D of full-scenario security products based on calls, text messages, Internet, etc., to assist subscribers in effectively identifying sources of calls and curbing the spread of spam information. On the basis of Unicom Assistant, mobile phone housekeeper, anti-fraud business card and other products, the Company launched Unicom Security Housekeeper products to provide subscribers with services such as call denial, intelligent answering, anti-fraud business cards, mobile phone internet protection, and home internet guard, so as to create a good communication network environment and protect the legitimate rights and interests of subscribers. The number of subscribers of security products for individual subscribers exceeded 90 million.

Spreading cybersecurity knowledge

Focusing on areas such as cybersecurity, data security, cloud security, 5G+industrial Internet security, personal information security, and prevention and governance of telecommunication network fraud, China Unicom carried out customised publicity and education activities, demonstrating the responsibility of China Unicom as the leader of the cybersecurity industry chain to serve the national cybersecurity and drive industrial development.

- 6 billion cybersecurity text messages were sent to subscribers, advocating the public to pay attention to cybersecurity and improving subscribers' awareness of fraud prevention.
- We carried out anti-fraud publicity and education for all and raised the awareness of online fraud prevention. With activities such as the "National Cybersecurity Publicity Week", "National Security Education Day" and "Anti-fraud Publicity Month", more than 500 activities with the theme of "entering communities, villages, campuses, enterprises and families" were carried out. 90 anti-fraud public welfare publicity videos and 26 live broadcasts were produced, and anti-fraud special columns such as the *CU Anti-fraud Theater*, *Cyber Security in Action* and *Unpredictable Defense* were launched, with more than 100 million views. Many video clips were reposted by the People's Daily, the SASAC, the People's Post and Telecommunications News, the Criminal Investigation Bureau of the Ministry of Public Security, the National Anti-fraud Centre and other media.
- At the cybersecurity expo held in Fuzhou, China Unicom exhibited innovative applications such as the cyberspace security situational awareness platform, the telecommunication Internet fraud governance platform, the 5G Internet of Things National Encryption Unified Identity Certification System, and local applications in Fujian. The vivid cases and real data entered the public and drew coverage by more than 1,600 media.



China Unicom Anti-Fraud Publicity



Free "anti-fraud business card" for subscribers over 60 years old