Smart Yinchuan Practice in Aligning with TM Forum Smart City Maturity & BenchmarkingModel

Background

Yinchuan became a national pilot spot for smart city development in 2013. After 4 years of construction, it has formed its unique features in the development of 10 major fields and 13 modules including smart government, smart transportation and smart environmental protection to present a “Yinchuan model” of the smart city that can be copied and promoted. The “Yinchuan model” is based on the 3 core targets of “improving the urban management level, facilitating and benefiting the citizens, and promoting the industrial derivatives”, and supported by the “technical structure, business model, management model, full-time supervision, legislative protection, reform and innovation”.

Smart Yinchuan adopted an innovative top-level design of “one map, one network and one cloud”, and established a technical structure that can support the current development with the possibility of expansion in the future, a PPP+ capital market business model to solve the difficulty of investment and operation in building the smart city, a management mode with strong leadership and organization to solve the sharing of resources in the smart city, and a full-time supervision agent (i.e., the Big Data Bureau of the smart city) to ensure the safety specification of big data in the future smart city operation as well as the stipulation and supervision of standards regarding the sharing, openness and trade of data.

In order to promote the construction of the smart city, Yichuan took the lead in the development of local regulations for the promotion of smart city construction, propelled the innovation and application of the new generation information technology with legislation, and established the standard system of smart city construction. Yinchuan also carried out reform of the administrative approval system and the administrative management system to walk in the forefront of the country.

The construction of the smart city is an important strategic measure to strengthen the innovation of science and technology, to promote the transformation of the development mode and to optimize the economic structure. The fundamental purpose is to serve the development and needs of the people and facilitate and benefit the citizens so that they can enjoy more convenience, more peace of mind and more comfort. The focus of the construction is to apply the smart city model for the promotion of urban and economic development. We adhere to the orientation of urban modernization and development needs, to make useful experiments in social governance innovation and urban three-dimensional management, fine service of people's livelihood, exploit and utilization of big data and construction of ICT infrastructure etc., and achieved good

results.

On the journey of Smart City Construction, Smart Yinchuan refers TM Forum Smart City Maturity and Benchmarking Model and gained significant achievenment in align with the model. The Smart Yinchuan practice can be classied into Four Dimentions shown in the following chapters.

Chapter One - Leadership and Governance

In the process of building a smart city, Yinchuan focused on solving the "urban disease" and made full use of the analysis of **big data** for the judgment and prognosis of government, and changed the passive urban governance to active prevention to improve the efficiency of urban management.

Smart Transportation integrates the space geography information system with the real-time traffic data to carry out prognosis of traffic flow and traffic simulation, to solve the problem of urban congestion through real-time traffic control, tidal lane, green belt and dynamic traffic induction. The issuance of traffic cards (i.e., electronic license) helped to perceive the status of the traffic and achieve dynamic driving and parking induction to effectively alleviate the current traffic congestion. Traffic simulation helped the government to achieve scientific planning of the road network and the optimization of traffic resources.

So far, the city has installed 488 RFID monitoring devices and 2,678 high-definition videos, completed full coverage of Wifi on 1,673 buses and established 100 electronic bus stop boards. About 400,000 traffic green cards were distributed to collect 2 million auto data every day, while 1,481 sets of counters were installed on the bus to collect the 500,000 passenger flow everyday, providing data support for the rational allocation of capacity and the scientific planning of the road network.

Security Management - the face ID system is used to facilitate community residents to open the door with their face ID. The social security information system was improved by collecting the public face information and gradually forming a face ID database.

In addition, Yinchuan made bold innovation in its emergency command system via data collection and analysis before the event, during the event and after the event. This abandoned the previous practice of drafting an emergency scheme and putting it on the shelf, but showed the 6 steps of "**electronized and visualized plan**" "uniform reception and automatic response", "data collection and simulation deduction", "scientific decision-making and transformation program", "data collection, simulation deduction", "scientific decision-making and transformation program", "three-dimensional command and city linkage", "complex analysis and optimization program", to finally form a scientific emergency management system based on big data analysis with the combination of historical data and field data and the transformation of the emergency scheme to the implementation plan". This finally formed a scientific scientific emergency management system based on big data analysis with the combination of historical data and field data and the transformation of the emergency scheme to the implementation plan, and improved the efficiency of the emergency management while

reducing the loss brought about by incidences.

Environmental Governance - Yinchuan obtaines the data of the living environment and potential source by creating smart environmental protection spot and dynamic collection, used the big data analysis technology to find out the relationship between the dependent variables and the qualitative variables and offer an integrated solution for the environmental governance to solve environmental and ecological problems and create a "beautiful Yinchuan with clear water and blue sky."

Yinchuan uses information-based environmental monitoring equipment to make real-time monitoring of the ecological environment parameters of the "water, gas and sound", collected environmental data and made analysis to provide basis for the decision-making of relevant departments. So far, Yinchuan has completed the installation and debugging of all 63 devices in the smart environmental protection system and uploaded the data of various stations to the system platform, with an on-line rate of 100%. The alarm and maintenance mechanism were established for each device, and technical staff were arranged weekly to conduct routine maintenance on the field equipment. 15 sub-systems were developed to provide a total of 434 functions, all on-line in operation. Adjustments and optimization have been completed accordance to the suggestions of the Environmental Protection Bureau and the monitoring stations after their trial application.

Administrative Management - Yinchuan carried out the administrative approval system reform and the administrative management system reform respectively. Reform were made to the administrative approval system through three steps, i.e., separation of the approval procedures from the administration, improvement of regulations and the optimization of service reform to streamline administration and delegate more powers to the lower-level governments and to society. Reform were made to the administrative management system to change the hierarchical management to flat management, so that the functions of the city's 55 convenient service phones were incorporated into a 12345 hotline to understand the public demand, reallocate resources, improve administrative efficiency and close the gap between the government and the public.

Chapter Two - Stakeholder and Citizens Focus

Facilitating and benefiting the citizens are the major functions of smart Yinchuan, which was built to implement the policies so that more citizens can perceive the benefits of the smart city construction. The mass had more sense of gain, and their life was made more intelligent and convenient.

The construction of the smart community is most closely connected with the people, and offer the strongest sense of gain. So far, smart Yinchuan has built 80 smart communities, while another 500 smart communities are under way.

The citizens of Yinchuan can truly enjoy the following conveniences through the construction of the smart community.

One-stop service for community affairs - The citizens only need to submit the application at the community once and the community shall coordinate with various departments through the information platform. This can save time for citizens in their handling of subsistence allowances, employment, family planning and other community affairs.

Various life services at home - Community residents can have a quick understanding of the community's service agencies and public facilities through the mobile APP and the community service website, and make order and payment on line for various life services. In the future, the communities are to provide over 50 kinds of services in 6 major categories including house keeping, home maintenance, food delivery and vegetable distribution etc.. The community integrated self-service terminal, including the smart express box placed at the community shall help to achieve express collection to facilitate community residents and enhance community safety.

The community integrated service terminal shall combine with the citizen cards to be distributed to all to provide services like payment of water and electricity, inquiry of government information and handling of financial business. The community integrated service terminal shall also include an information screen to publicize all kinds of community information to the residents in a timely manner.

A community virtual nursing home for the elderly to enjoy emergency relief services and a variety of convenient aids through the rescue terminal. This elderly can live a comfortable life, while their children can work at ease. The community provides 18 free physical examination services through healthy huts, and offers health ring rental services which obtain real-time health status and make analysis and evaluation of the health data through cloud computing and big data etc. to give health advice.

Community Management -The monitoring and management of the noise, the water and the air and informed the residents of the real-time indicators of the air, the water and the noise through the integrated self-service screen at the community.

The **smart community** promotes the extension of public service and social information services to the grassroots level, accelerated the communication between the government and the people, and truly achieved the purpose of facilitating and benefiting the people.

The construction of the **Smart Government** has also brought practical convenience and benefits to the people. Through the development of the smart government system based on the big data cloud platform, the smart Yinchuan project promoted the cross-sector and cross-regional information exchanges and business collaboration, streamlined the approval procedures, optimized the process, and realized the implementation of one-stop management, one window reception and centralized payment to provide convenience to companies and citizens, so that the smart approval can help to improve service efficiency and public satisfaction.

The construction of the smart government system made the following effort in intensified management.

- The municipal library of administrative examination and approval items was established according to the national requirements of clearing and identifying the rights and the confirmed items after the sorting and first review of the "clearing" work.
- The smart service was realized in the government service hall by integrating government service portals, electronic service counter of application materials and smart navigation system of the approval services at the government service center.
- The government information resource library (legal library and license library, etc.) were established by connecting the data exchange business to the business system of relevant department for business & data integration and information sharing of parallel approval items. A new parallel approval model of "one-time application", "one window acceptance" and "one integrated permit" was built by realizing "one entry for utilization of multiple sectors". The linked service and supervision system of "linked registration, one stop citizen service, smart SMS and integrated assessment" was established.
- A standardized data exchange center was established to achieve the data sharing and interaction of parallel approval platform and the external system.
- Mobile approval applications were developed to improve the effectiveness of approval and provide the public with multi-channel government services. The fundamental supporting system of the government platform for the future large scale government data cloud computing was established.

Yinchuan integrated the offices of the social security, health insurance, housing fund,

land, real estate, immigration, vehicle management, fire control, state and local tax and public resource transactions which were scattered in more than 30 different locations of the city to the Yinchuan City Hall, the "super government aircraft carrier" with more than 700 windows.

Taking the opportunity of building a new modern "**Yinchuan Citizen Hall**", Yinchuan included over 300 public services including social security, health insurance and housing fund alongside with all the administrative examination and approval items into the hall, to realize the "one-stop service" of more than 500 administrative approval and public service matters. The public hall was turned into a "government supermarket", where the citizens can "enter and fulfill a package of things."

The construction of the **smart health care** brought great convenience to the public. Yinchuan created a smart medical module through a five level smart health care service system.

- The **first** level was the distribution of self-test equipment to the residents.
- The **second** level was the construction of community health service stations.
- The **third** level was the real-time intervention and health classification treatment of chronic patients through Health Yinchuan APP, Good Doctor Online and other Internet hospitals.
- The **fourth** level was to transfer the patient to Three-A hospitals in Yinchuan for treatment by online registration and appointment.
- The **fifth** level was to transfer some patients with severe illness to Three-A hospitals in Beijing, Shanghai and Gangzhou through real-time clinic system.

The optimization and upgrading of the health services brought about by smart health care can provide the public and patients with the following conveniences:

- The citizens can check the policies and regulations as well as the work guide issued by the health administrative departments online, know about the volunteer outpatient clinics, academic lectures, job recruitment and other activities as well as regimen and health care, disease prevention and other health information to improve their awareness of self-prevention and capability of identifying health risks.
- The citizens can inquire about the real-time information of medical institutions at all levels through the portal or mobile APP, including introduction of agencies, popular departments, doctor's schedule, expert recommendation, number of beds and community vaccination. Positioning and navigation is easy through the map so that they can quickly go to the doctor.
- The patients can make online appointment and registration through the portal, mobile APP and Wechat and make online payment of various expenses. The patients receive a timely SMS notifying him about the successful registration, and do not need to rush to the hospital or wait in a queue at all. Meanwhile, they obtain recommended waiting time according to their visit information and appointment time, and choose the appropriate time to wait. They pay for the test and drugs

through the phone, which greatly saves time. On the part of the hospital, the automatic generation of electronic treatment information reduces the workload and cost of the outpatient registration to a certain extent. Meanwhile, they can also optimize the shift according to the appointment registration statistics and conduct self-review according to the patient evaluation data to improve their service levels.

- In order to support the mobile health care of the hospital, free Wifi hot spots built by smart Yinchuan covered part of the hospitals. A three-dimensional indoor map was established to achieve hospital navigation with the phone and the patients can easily navigate to the corresponding departments according to their registration information.

Smart Tourism provides convenient travel services to the public. Smart tourism provided considerate and customized experience for the tourists by building in 300 electronic guides and 100 electronic navigators in a series of scenic spots in Yinchuan to provide smart scenic services. The tourists can experience the whole set of customized service before the tour, in the tour and after the tour. The tourists can obtain tourism services from the smart travel mobile APP and the official website of smart tourism.

Smart transportation provides the public with integrated transportation services. 400,000 traffic cards were distributed to cover all the motor vehicles in the city and achieve real-time traffic flow detection, to create "a smart transportation system based on RFID traffic card. Multiple information dissemination channels including Yinchuan pass, travelling websites and electronic signs were used to provide the public with transportation information at anytime, to provide the citizens with "a unified release portal."

The final aim was to realize the great vision of "buying tickets online at home, online traffic map, planning to avoid congestion, real-time bus, community bus, optimized taxi, notified parking, coordinated moving, portable travelling guide and information sharing", to bring the public to new perceptions and experience of travelling.

Chapter Three: Effective Use of Data

The big data is the treasure of the new era and the core asset of the government. Yinchuan relied on the first city-level data operation center in China to provide big data support and services for Yinchuan's government administration, public service, economic development as well as games, banking and other industries.By connecting with Yinchuan government at all levels, smart Yinchuan collected data and achieved the sharing of big data of the city, leading the industry in China. By analyzing big data and activating the data value, it created a big data industry cluster and nurtured the new engine for the economic development of Yinchuan.

In terms of data privacy and security, in order to protect the healthy and sustainable development of big data in Yinchuan City and ensure the privacy and security of government and social data, Yinchuan municipal government established special departments, issued relevant laws and used rational safety technologies to cover the security issues of the system and the technologies.

In November, 2016, Yinchuan Municipal Big Data Social Service Management Bureau was established with 6 main responsibilities:

- Research, organize and implement the smart Yinchuan project and big data strategy, planning and policies to guide and promote the construction of smart Yinchuan and the research and application of big data as well as to coordinate the interconnection and resource sharing of information resources.
- Coordinate, organize and implement the national and local data technology standards, and conduct research on the sharing exchange directory, technical specifications and scope of basic information resources.
- Organize the implement the big data standard system and assessment system to promote the establishment, development and application of big data formation mechanism.
- Organize and implement the standard specifications of the collection, management, opening, trade and application of the big data.
- Organize and implement the smart Yinchuan operation management standards and component standards;
- Coordinate the construction of the city's information security system.

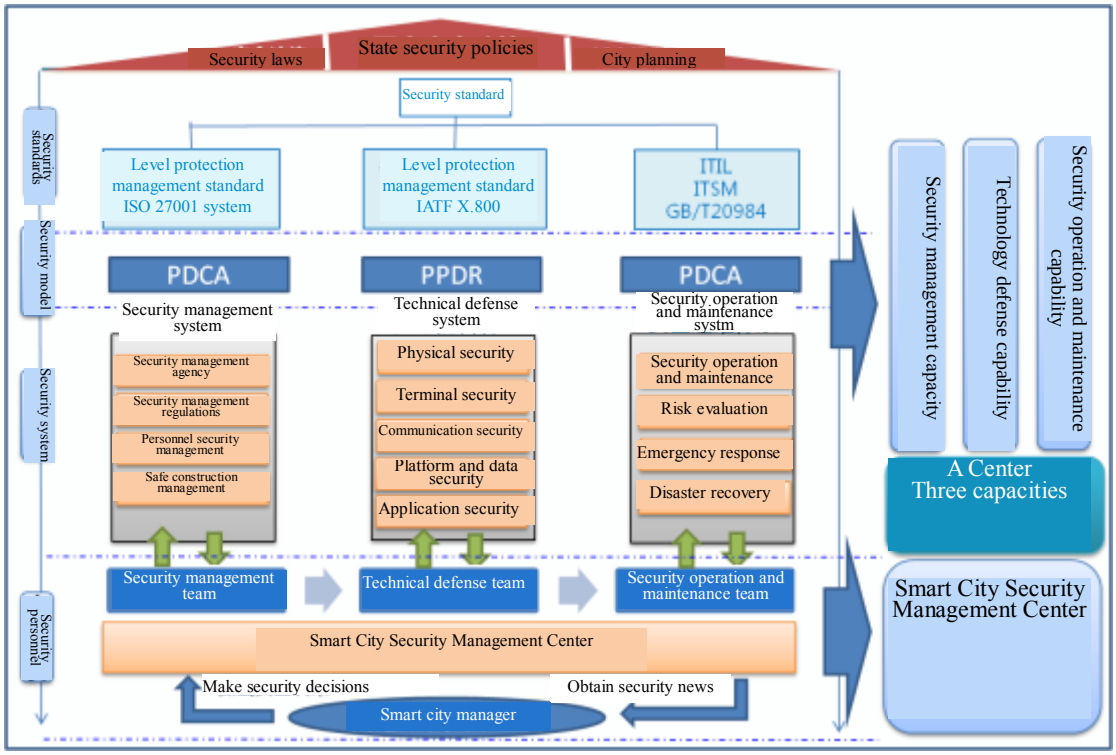
The 26th Meeting of the Standing Committee of the 11th People's Congress of Ningxia Hui Autonomous Region on September 1, 2016 approved the promulgation of the Regulations on the Promotion of the Construction of Smart City of Yinchuan (hereinafter referred to as the Regulations), in which Chapter IV and Chapter VI made clear stipulations on the collection, sharing, disclosure, utilization of data.

The construction of the information security system and the technical defense system

of the smart city of Yinchuan is based on the information security level protection standards, IATF, X.800 and other safety standards, to build a comprehensive, end-to-end technology protection system for the security protection of the city's physical environment, perception terminal, network communications , system and application and data.

The **management security system** is based on the information security level protection standards and ISO27001 standard to provide management and standardization in security agencies, security systems, security personnel and security construction and other aspects. ITIL, ITSM and other international standards are used together with the technology, management, operation and maintenance processes at UOC city management center to protect the operation of smart city.

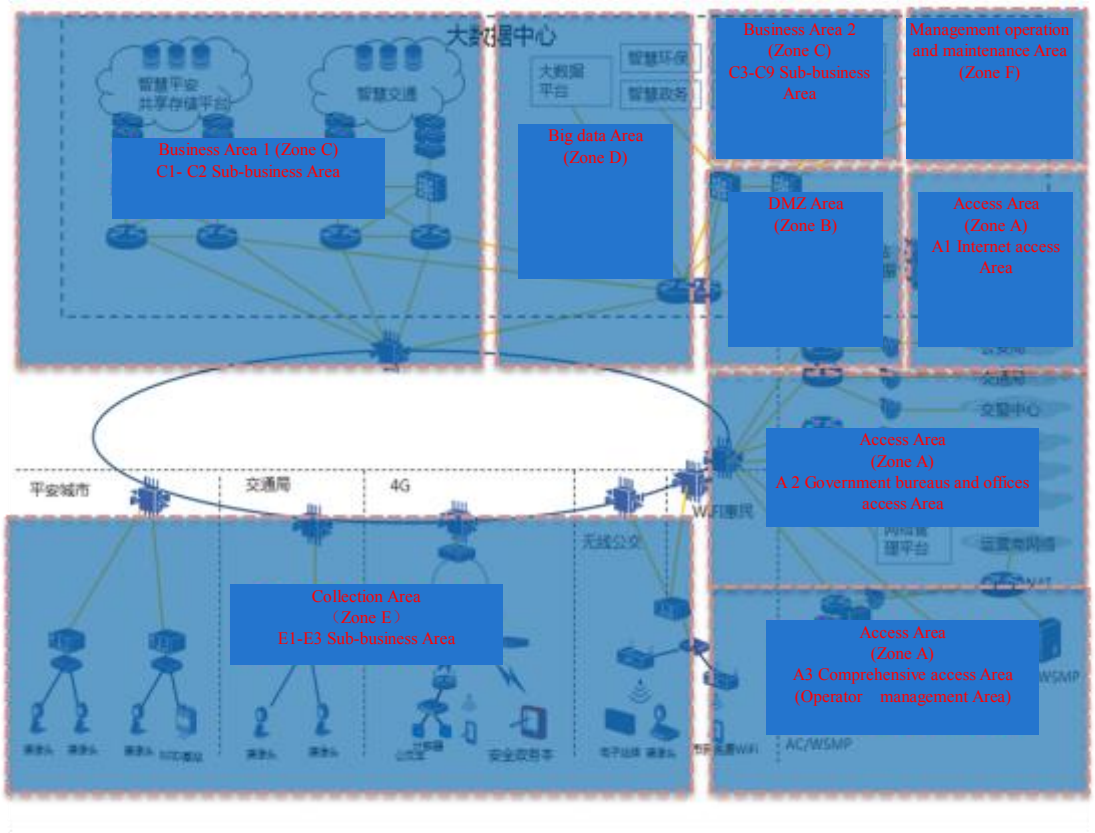
The smart city of Yinchuan generally referred to the third level protection to construct "a center with three capabilities", i.e., the smart city information security management center as the core with the security management capability, the technical defense capability and the security operation and maintenance capability.



Smart Yinchuan Information Security System

To ensure the security of data collection, access and application, the security areas were divided according to the logical structure:

- Access area (Zone A)
- DMZ area (Zone B)
- Business Area (Zone C)
- Big data area (Zone D)
- Collection area (Zone E)
- Management area (Zone F)



Division of the smart city security zones in Yincuan

Basic principle:

- The external flow must be cleaned and handled by the access area (Zone A).
- All external services are in Zone B.
- All core business are in Zone C.
- Data exchange can only be performed in Zone D.
- All management operations are in Zone F.
- The flow of each area must go through the cleaning and handling of their respective import and export.
- The data exchange between various governments and the data center requires internal security isolation.

Big data inter-operability and sharing - a big data cloud platform was established based on the Yinchuan's big data center in order to maximize the collection of urban data. Within this cloud platform is the data sharing exchange subsystem, which is responsible for the storage and shared management of various types of shared data provided to the outside; the urban infrastructure database subsystem, which is responsible for the storage and management of external systems and the collection and information management of related basic data.

The urban population library, legal library, macroeconomic library, space and geography library and construction library as well as the business data models of smart government, smart transportation, smart environmental protection and other sectors

were established and improved to connect the information systems of various departments for better work cooperation and efficiency.

The big data center obtains the population, legal persons, space and geography, macroeconomic and construction data from various discrete sources through directory management, open interface and other methods, and stores the data into the public basic database after data comparison, cleaning and other technical means.

The big data capacity opening platform was established to provide unified data visit interface and allow third-party developers to subscribe to data services. Third-party developers were provided with capacity groups and development environment to publish their own applications and complete access control and billing.

Big data analysis subsystem - In order to maximize the value of the data, a big data analysis subsystem was established for the real-time analysis of structured data and unstructured data based on the foundations and the provision of final analysis results to the shared exchange subsystem for data sharing.

Yinchuan City Management and Command Center, for instance, is focused on "enhancing social management, improving social governance and optimizing social services" as the starting point to carefully plan and make top design in accordance with the principles of "overall planning, pioneering, step by step, and steady progress" and relies on the construction of the "smart Yinchuan" and big data, video surveillance, Internet of Things and other information technologies to create a smart city management command service platform integrating the three functions of "social governance, emergency command and convenience services".

The center presentes the traffic simulation decision support, transportation decision making system, smart traffic accident vehicle smart identification and inspection system, smart traffic integrated control system, population comprehensive analysis, air warning system and air quality warning system etc..

At the same time, Yinchuan City uses the big data innovation urban management model to change the "passive remedial" mode to the "active, forward-looking, preventive" management mode. Yinchuan emergency command system put forward the 6 steps of "electronized and visualized plan", "uniform reception and automatic response", "data collection and simulation deduction", "scientific decision-making and transformation program", "data collection, simulation deduction", "scientific decision-making and transformation program" , "three-dimensional command and city linkage", "complex analysis and optimization program" through data collection, analysis and application before the event, during the event and after the event.

By information collection based on the Internet of things and perception of diversification and collection technologies including the unmanned aerial vehicles,

emergency command vehicles and single solider devices, a scientific emergency management system based on big data analysis with the combination of historical data and field data and the transformation of the emergency scheme to the implementation plan"was finally formed.

Chapter Four: Integrated ICT infrastructure

In promoting the construction of urban information, Yichuan changed the traditional mode of decentralized construction and focused on the top design and overall planning of the city, to creatively put forward the overall implementation structure of "a cloud, a network and a map". In the promotion of basic information resources to meet the functional requirements of various departments, it relied on the big data cloud platform, smart network and urban spatial and geographical information (ONE Cloud, ONE Network and ONE Map) to achieve the resource sharing and business collaboration between the heterogeneous systems of different departments of the city.

ONE CLOUD Promote the centralized sharing of resources

Yinchuan big data center was established to form a foundation for the pattern of “large-scale application, big data sharing,and unified management”. A unified smart Yinchuan big data center was built by combining the actual situations of Yinchuan and taking the advantage of the advanced technologies and low electricity cost. The big data center is located in the southwest of Jinghe Road and northwest of Junchi Road in Binhe New District of Yinchuan city, with a planned total land area of 33,124 square meters and a planned total construction area of 26,634 square meters. The ground construction area is 26,581 square meters while the construction area of the cooling tower is 53 square meters.

Through the intensive construction of IDC, a pattern of “large-scale application, big data sharing,and unified management” is created to realize the smart urban management and smart government process. The big data center carries the smart city applications and shall be built into a western big data center in the future to introduce new smart industries. The first phase shall install 300 cabinets and the second phase shall install a further 200 cabinets to finally build a data center with 1,000 cabinets. At present, the smart Yinchuan big data center has built 508 cabinets and related facilities, with the ability to host 10,000 groups of servers. The software installation and the debugging of various modules have been completed , and the equipment management software of the big data has been deployed.

So far, the smart Yinchuan big data center has collected data from 26 bureaus and offices of Yinchuan City, including the dynamic data of 13 bureaus and offices and the static data of 13 bureaus and offices. As of December 11, 2016, the big data center has accumulated a storage of 28.8 PB. The total capacity of the big data cloud platform is 900T, with 247T occupied now, accounting for 27.44% of the total, accumulating over 14 billion messages.

In order to improve the data sharing of the bureaus and offices, the big data cloud

platform is composed of the supporting data, the operation and maintenance management service system, the directory management and service system, the data exchange service system, the data integration service system, the portal system, the interface and the service system.

ONE CLOUD to ensure the concentration and open sharing of resources. The available data resources of the city are concentrated to the cloud to achieve the basic data integration of cities and the exchange of multiple business data. This helps to solve the problem of data island between government departments, and build a "urban operation center"on this basis to enhance the smart management level of the city.

The smart Yinchuan big data center connects with the data of various bureaus and offices of Yinchuan City to break the information island for unified collection, storage, release of data to avoid duplication of construction and error, and thus enhance government credibility.

The data will be aggregated, compared and cleaned before the smart application realize the visit of the public data base resources through a unified interface services, to enhance the openness of information resources.

The big data integrate the great amounts of data into the public library, enterprise library, macroeconomic library, space and geography library,construction library, and the business data library of various bureaus and offices and the smart Yinchuan through the system platform. After the technical processing of cleaning, conversion, storage sharing etc., the data shall provide the following conveniences. The big data group began to provide data services to smart city personnel sinc March 1, 2016, and has provided a total of 41,182 data services to 7 groups of government affairs, security, environmental protection, community, citizen card, transportation and 12345 hotline.

ONE NETWORK supports the efficient exchange between the systems

One network supports the efficient exchange between the systems. Yinchuan build a special network shared by multiple sectors, and realized the direct dialogue between the "ground" and "cloud" through a high-speed, universal network connecting urban parts, crowds and application systems. The city’s 8,000G speed optical network ensured adaptability and flexible end-to-end expansion, while a special network ensured security. The wavelength physical isolation light did not go outside the building to ensure physical security. The mobile Internet architecture 4G or free Wifi ensured the utilization by companies and people free of charge.

- The smart network construction covers the wireless broadband network of the three core areas of Xingqing District, Jinfeng District and Xixia District of Yinchuan, the airport and airport express way and 3 tourist attractions (i.e., the national defense education base, Shuidonggou and Helan Mountain rock paintings) based on TD-LTE (1.4G frequency band), and provide advanced, efficient and

secure multimedia cluster business for the administrative law enforcement of the government as well as wireless data network support for the mobile office of government staff.

- The smart network construction covers the WLAN network in three core areas of Xingqing District, Jinfeng District and Xixia District of Yinchuan to provide Yinchuan citizens with free wireless Internet access . WLAN network was developed in accordance with business development and completed in phases. The first phase was themed by public travel, and was installed at bus stations, buses, long-distance bus stations, commercial streets, tourist attractions and other places to meet the public demand of Internet access in the travelling, shopping and tourism.
- The smart network constructed at a time a backbone network with sufficient bandwidth to lay foundation for the smart Yinchuan in the next five years. In order to ensure security and meet the delay requirements, the backbone network used the OTN ring network structure. The network has a carrying capacity of not less than 100G ensure the bandwidth of all business nodes.
- Taking the safety into account, the smart network built a separate wired access network for the safe city business, traffic police business, traffic and other business to achieve maximum isolation. For some business that cannot be wired, TD-LTE / WLAN network was used for wireless access. VPN shall be used to isolate different services that use wireless access. For business services that cannot be covered by TD-LTE / WLAN network, wireless network of the carrier shall be considered, to be gradually replaced by our network in the future.

ONE MAP achieves the visualization of management

One map to achieve the visualized, dynamic and streamlined management of the city's information. The applications of various industries within 576 square kilometers of urban area were presented on a map, which included the three-dimensional detail of the above-ground, ground and underground situations. The two dimensional and three-dimensional map are integrated to present an integrated intuitive map service of the above-ground and the under-ground, indoor and outdoor space.

The people were provided with more diversified life services, and the visualized and dynamic management of a complex big city was realized. The high-resolution aerial map, navigation map, real three-dimensional map, multi-angle 2.5D map, street and panoramic map of Yinchuan City were developed to meet the public travel and life service demand on map and location as well as the demand of the government administrative management on map and geographic information.

A complete spatial information data library of Yinchuan was established, and the collection and processing of spatial information was completed to facilitate the management of the city.

- The construction of the platform collected five commonly used spatial data

including the vector, the image, the three-dimensional, the street map and the indoor map, for better serving the construction of smart Yinchuan and providing basic spatial data support for industrial applications. These data types can give an intuitive representation of urban real space information on different spatial scales. The collection of each type of data has adopted the new technologies in China and the world, and can ensure data quality and collection efficiency.

- The construction of urban spatial information service platform includes the basic map service, the industry application interface and the urban spatial information portal. The underground pipe network smart management system was developed according to the actual situation of underground pipe network in Yinchuan City.
- Provide a variety of map services, including two-dimensional maps, three-dimensional real map, real three-dimensional maps, street maps, indoor maps etc. To give an intuitive expression of the urban information.
- Provide basic spatial data service interface, map API interface, REST interface, Internet of things interface and other rich map interfaces according to the application needs of different industries, to meet the map service demand of various levels of smart city industry applications and enrich the form of the smart application system.
- According to the basic needs of government and public users, the smart Yinchuan information portal was provided. The information portal consists a separately developed government network and a public network, to provide the users with basic space and geography information services. The portal can be used both on PC and mobile phone, and provided development interface in data and application to allow real-time access of various government offices, enterprises and the public.

Conclusion

Smart Yinchuan becomes the leading Smart City pioneer after years of experience in constructing Smart City.

Yinchuan has succesfully built a successful Smart City in accordance with TM Forum Smart City Maturity & Benchmarking model as well as contributed its best practice to the model. The close cooperation between Yinchuan and TM Forum will bring more benefits to the industry and other Smart Cities around the world. Yinchuan is committed to continuing the contribution to the global smart city society.