

Research based on the Sharing Cloud Platform of Video Networking

Junsheng Lin^{1, a}, Fan Yang^{1, b}, Wei Liu^{1, c}, Jingyun Zhou^{1, d}, Lin Wang^{2, e}

¹Beijing Institute of Radio Metrology and Measurement Beijing, China

²GUODIAN Estates Management CO., LTD Beijing, China

^alinjunsheng5588@163.com, ^b360399643@qq.com, ^csmart203@qq.com,
^d798308986@qq.com, ^e279354204@qq.com

Abstract. The highest value of intelligent video monitoring system application is the networking of urban video monitoring system, which is known as the one of the most complex monitoring system applications at present.

Keywords: video networking, cloud computing, sharing, big data.

1. Introduction

In the age of big data, with rapid development of urban construction, the scale of population and urban expand rapidly, social structure tends to more diversely, forms of public security become increasingly complex. Multi-department coordinated operations have become the norm. Therefore, the management of social security should be innovated and the construction of prevention and control informatization of social security should be vigorously promoted. However, all kinds of urban view data, whether they are traditional security data such as audio, video and pictures, or information data brought by information perception, have a low value density. And present the feature of information island, closed, low usage situation. Therefore, under the background of the big data constructed by government, view data as the most important sensory data in a city, It is especially important to better serve the public safety, social management, unified application integration, comprehensive control, deep application, and Innovation building " sharing cloud platform of video network ",to made the video data become indispensable part of the leapfrog development of science and technology center.

2. The Present Situations, Requirements

With the gradual popularity of large-scale projects such as safe construction and new smart city in China, video monitoring, as a core part of the security field, has also achieved rapid development. Vast and diverse data of explosive growth, but also directly impelled the storage, network and computing technology of change, in the face of vast amounts of data acquisition and storage, now there are many the bottleneck of urban architecture monitoring and control system, such as data storage, mass data storage system with no corresponding class extension ability, storage capacity need downtime, even brought serious impact on the business: networked sharing platform problem is missing, or unable to efficiently expand and adapt to the big problem such as concurrent application, directly bring problems to view data basis to use [2].

2.1 Access Requirements

City level of video surveillance camera thousands of, tens of thousands of road access (or more) and only video surveillance video, the amount of data every day alone thousands of PB, the accumulated historical data will be more big, plus league perception technology mature application, the type of data is becoming more and more and is no longer a single video monitor is given priority to, bayonet car data, face captured data, network equipment, RFID data, abnormal data such as article one hundred billion size. With the video structured application, the amount of feature data such as people and vehicles extracted from video will become larger. In addition, with the development of Internet technology and the promotion of snow bright project, people's awareness of security has been unprecedentedly high, and the number of clients of video monitoring system has increased greatly,

which makes the system need to have Internet mode to support concurrent access of massive client APP and PC client.

2.2 Storage Needs

With the development of IP network technology, video storage is evolving to centralized mode. Compared with the distributed storage of NVR, the back-end centralized storage is more focused on the centralized storage, data reliability and unified management of data, and has a good capacity expansion capacity. However, at present, security video system is developing rapidly towards mass, ultra-high definition, intelligence and fusion application. However, the memory capacity of 1080P resolution video of 10,000 channels exceeds 10PB (4M code rate, 24 hours of uninterrupted storage for 30 days) in one month, indicating that security video storage has entered the era of storage P level. With the emergence of massive storage requirements, the traditional back-end centralized storage has exposed many problems, and the storage device cannot achieve the linear growth of its performance and capacity. And use more than one way of SAN storage equipment and barely video access and image storage requirements, due to the lack of effective data among multiple storage devices integration and coordination capacity, so there are some additional questions: such as the unified management of storage devices, equipment performance and storage space cannot be Shared and utilization problems. At present, the inherent characteristics of cloud storage technology based on big data strategy, such as high expansion, high energy, high security and easy management, have brought opportunities to solve problems faced by traditional storage. The new cloud storage model has become an inevitable trend of storage development.

2.3 Application Requirements

With the wide coverage of video monitoring in the public domain, video monitoring system plays a more and more important role in social governance to prevent and combat crime. But as a result of video monitoring system construction initial lack of unified planning and technical standards, has been built system separate, independent construction, not form a whole advantage, no unified entrance and authentication system does not exist between the information interaction, lead to the emergence of the "information island" phenomenon, make full use of limited video image information, video monitoring of the existing application mode is more used in case of later check, did not form a closed posture, hard to do "the requirement of monitor, so response". The business combination of all departments and police types is relatively independent and cannot give full play to actual application efficiency.

2.4 Operational Requirements

In the process of the construction of ping an, the scale of video monitoring system is constantly expanding, with tens of thousands of monitoring points frequently. The workload of system equipment maintenance and maintenance management is greatly increased, and the requirements for operation and maintenance are also constantly improved. Of the communication protocol between different products has not fully open, the equipment can vary between different companies, on the other hand, the public video monitoring items for all of the source, storage, and application system has strict management requirements, must be available 24 hours a day, in any event must be able to play Hd video monitoring utility in a timely manner, timely for advance and maintenance, existing human inspection alone has been unable to meet the needs of the business. Therefore, it is necessary to establish a professional and marketable operation and maintenance service system to meet the objective demands of security market and party a's users.

2.5 Security Requirements

From Internet information leakage to the video cameras were illegally logged in, the indications are that for China is to develop the informationization construction, information security problem is imminent, the user for data acquisition, storage, management and use in the process of the lack of specification, more the lack of regulation, security hidden danger everywhere. With the rapid

development of video monitoring system construction, it brings a lot of convenience for government staff to fight crime and manage social security. Meanwhile, it also faces a lot of troubles in protecting information security. Video monitoring system is faced with the risk of information leakage from front-end camera acquisition, network transmission, data storage, operation of business system and final customer application, mainly in the following aspects.

The quantitative data set security risks. The camera is the source of video image collection, and the hijacking camera loses the first line of defense for video data security. The weak password of the camera brings opportunities to the criminals.

Data transmission security face wind. With the development of camera technology, IP network camera becomes the main force of the front-end data acquisition of video monitoring system. IP network camera can transmit the front-end video data to each data center or client through the network system. Although video special network is adopted in the construction of video monitoring system in domestic cities, there are still hidden dangers in intercepting sensitive video information by means of network data packets.

Data storage safe hidden trouble. Security risks of data storage mainly reflect two aspects. On the one hand, after data storage, will it be illegally accessed and tampered? On the other hand, if the hard disk or storage node fails, can it guarantee the normal storage of video related data of the filament, without affecting business operation; Early NVR and IPSAN centralized storage methods are easy to face data tampering and data loss, which brings great risks to public video system data application.

Business operation safety hidden trouble. With the increasing demand of urban business, there are more and more back-end business systems and the operating state of the back-end service of the business system lacks unified supervision.

3. General Design

The sharing cloud platform of video network is a centralized and unified cloud service center which is based on cloud computing architecture, adopting cloud storage, cloud analysis, big data, virtualization and other technologies. The sharing cloud platform of video network provides users with professional video services, common cloud storage services and unified resource management services.

4. General Framework

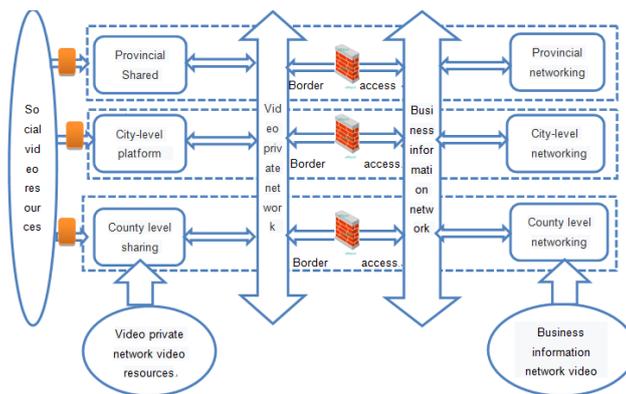


Fig 1. The overall architecture for the sharing cloud platform of video networking

The sharing cloud platform of video networking is a cloud architecture platform with video as the core of the scene of intelligent objects, based on technical systems such as big data, cloud computing and virtualization, it undertakes the construction of the infrastructure of the IoT Shared cloud platform and solves the problems of IoT perception and data access, storage, aggregation and fault tolerance in the big data scenario.

Network platform construction: It takes government business information network as the carrier network to build a network platform conforming to national standards, integrate image resources in

the business information network, connect image resources of video private network through border security equipment, and rely on vertical cascade of business information network.

Construction of sharing platform: video private network is used as the carrier network to build a sharing platform conforming to the national standard, to share and manage the image resources and social image resources of video private network, and to connect with the networking platform of the same level.

Secure boundary access: for image information access to business information network of video private network, it is necessary to comply with the requirements of technical specifications such as security specification for boundary access platform of information communication network (trial) -- video access part and adopt boundary access platform to ensure data security of business information network platform and other application systems. It is required to build boundary access platforms in municipal and conditional district and county-level government organs. For district and county-level government organs without conditional boundary access platforms for the time being, indirect access shall be provided through municipal government organs [4].

5. Logical Architecture

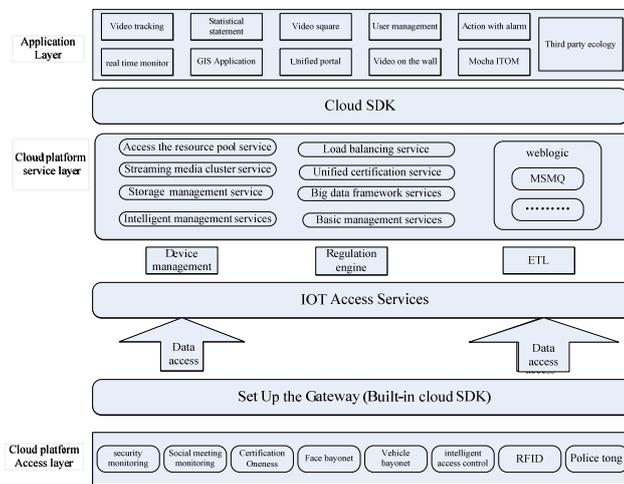


Fig 2. Logical architecture of the sharing cloud platform of video networking [1]

6. Key Technologies

Cloud architecture. System adopts hierarchical design principle of the standard cloud architecture, providing infrastructure, different business services such as video platform, industry application, can be compatible with existing resources for unified management, and have on-demand expansion ability to upgrade and expand, smooth, can be unified view existing and new data resources, provide unified application of processing data and services.

Unified access. Video networking and sharing cloud platform provides various compatible modes such as open standard protocol, manufacturer private SDK development package, and support national and industrial standards such as GB/T 28181, Onvif and PSIA. The platform adopts the componentized development technology, which can realize the fast access of equipment and ensure the stability of the system. The modification and upgrading of any component will not affect the completed functional modules. For security management platform customization demand, according to different types of business, support the development of multi-level model, system support GAT 1400.4-2017 standard protocol interface, and can customize according to different requirements, using the system to provide some combination of the specific functions of interface, to meet the needs of the business functions, including a Restful interface, PlatformSDK secondary development interface, etc.

Resource pooling. It provides resource pooling technology for access, forwarding, convergence and storage of all key services to meet the service demand at the time of concurrency, and can increase

elastic expansion according to user demand, simplify the degree of complexity of user's use of resources, and realize service scheduling and elastic extension on demand.

Micro service design. Each micro service in the system can be independently deployed, each service can be loosely coupled, with low complexity. Each micro service only focuses on completing one piece and completes the task well. Practical implementation is simple, flexible, plug-in type development, which it can be extended as required, supporting secondary development.

Open platform. The system provides an open and high-performance application API programming interface, providing a personalized application and management interface. Support online upgrade and maintenance. For system maintenance and upgrade operation, it can be completed by the system administrator.

The construction of video networking and sharing cloud platform is an important guarantee for the development of urban big data infrastructure in the new mode. Sharing cloud video network platform construction, to draw lessons from various industries latest technology, to speed up the transformation and application of scientific and technological achievements, with an emphasis on strengthening the construction of large data, driven by service and technical support for the main line starting from the actual demand of the city edge application, promote the city big data industry effectively promote, constant value, continuously improve the city management level of informatization, intellectualization modernization level.

References

- [1]. Dong bin Xu, Study on video networking scheme for national highway network monitoring [journal paper] (China ITS Journal) No.5 2017.
- [2]. Ping chuan Ai, Urban development and reform. Video monitoring network sharing platform to build urban security [journal paper] (China public security) No.10 2017.
- [3]. Jiang tie Gang, Application analysis of urban multi-level video sharing platform [journal paper] (China Security & Protection) No.2 2014.
- [4]. Liju Chen, Discuss the technical essentials and application trends of video networking sharing platform [journal paper] "Chinese public security (China Public Security) No.24 2012.
- [5]. Xuan Zhao Status analysis of urban multi-level video networking sharing platform [journal paper] (China Public Security) No.22 2012.