# A cloud monitoring management architecture based on Artificial Intelligence

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**Abstract.** The Internet of things technology is used to realize the comprehensive perception of "people, machines, materials, methods and environment" on the project site, including access control system, personnel positioning, face recognition, shield machine monitoring, tower crane, gantry crane and other main construction equipment monitoring, environmental monitoring, etc., so as to provide technical support for project safety. During the construction and operation of the project, real-time dynamic monitoring of engineering geology, ground buildings, tunnels, pump houses, pumping stations, reservoirs, high-level pools, gates, water inlets, outfalls, etc., early warning, monitoring and management of project safety, and providing decision support for the safe operation and scientific dispatching of project water supply.

**Keywords:** IOT, AI, Dynamic monitoring.

## 1 Introduction

As a major water conservancy project in the new era, the object of water resources allocation project management in the Pearl River Delta is the main body of the project, and the object of service is social economy. The Pearl River Delta water resources allocation project has many points, long lines, wide areas, large quantities, many participants and difficult management. The economic and social development has high requirements for the safe and efficient operation of the project.

The traditional water conservancy management mode has been difficult to meet the professional, refined, information and intelligent management requirements put forward by the economic and social development in the new era, and build the infrastructure network platform of water resources allocation project in the Pearl River Delta to meet the new requirements of economic and social development in the new era. Adhere to high starting point, high standard and high quality in the whole life cycle of the project. Give full play to the role of water conservancy informatization in project construction and operation management[1], strive to take the lead in making breakthroughs in the country, greatly improve the intelligent management and service level of water

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conservancy projects, and radiate and drive the all-round development of modern water conservancy projects[2].

## 2 Objectives and ideas

### 2.1 Safe and practical, advanced and reliable

Taking the premise of safety, demand oriented and practical as the goal, we should scientifically use the new generation of information technology such as Internet of things[3], big data and artificial intelligence to ensure the foresight and advanced nature of the intelligent water conservancy project in the Pearl River Delta, and to ensure the network security and reliability from all aspects of infrastructure, IOT communication, data sharing, business application and so on.

### 2.2 Integrate resources and make intelligent decisions

Integrate the new generation of information technology[4], strengthen the integration and reuse of water conservancy information infrastructure, data resources and business applications, realize comprehensive interconnection and full sharing, promote big data applications, promote business process optimization and work mode innovation, and comprehensively improve the level of comprehensive intelligent decision-making.

### 2.3 Safe and practical, advanced and reliable

Through unified engineering planning, unified demand management[5], unified filing management, unified audit supervision and unified evaluation system, build a business coordination mechanism with standardized service and information sharing and a technical support mechanism with complete functions and open system.

The design, construction and operation shall be implemented in stages and according to the plan, followed the principle of urgent needs, construction first, easy first and difficult later, promoted by categories and stages, so as to ensure that the business development will not be affected, realize smooth transition and seamless connection, ensure the wisdom of the whole life cycle of the project, save resources and give full play to the investment benefits.

### 2.4 Unified and separate consideration and continuous improvement

Take the Pearl River Delta smart project as an organic whole and do a good job in top-level design. Both the construction period and the operation and maintenance period should be considered, both the individual requirements of each participant and the centralized and unified management requirements should be considered, so as to realize one scheme to guide the overall situation, guide the whole life cycle management of the project and make steady progress. At the same time, it should be implemented step by step, work solidly, constantly adapt to new requirements, new changes, continuous improvement and continuous iterative innovation.

### 2.5 Demand leading, urgent need first construction

The Pearl River Delta smart project is based on the contents of the preliminary design approval of the project, combined with the new requirements of smart water

conservancy and water conservancy project construction in the new era, and carries out optimization and improvement under the guidance of demand. Achieve high starting point, high standard and high quality, which can adapt to the actual situation and investment requirements of water conservancy project construction at the present stage. At the same time, advance deployment should be appropriately considered to avoid waste.

## 3 Overall architecture design

According to the characteristics of traditional monitoring and cloud monitoring, it is necessary to establish an exclusive monitoring cloud platform for the private cloud of the intelligent supervision information platform[6]. Cloud monitoring usually refers to the monitoring of CPU, disk IO, network IO, etc. of cloud resources. LB provides the monitoring of access times, delay information, connection number, etc. monitoring cloud is a complete monitoring system. However, considering the possibility of being included in the original monitoring system.

we provide external standard APIs to facilitate resource sharing and docking with other business systems. Monitoring indicators and alarm configurations are managed through configuration management to flexibly adapt to changes in monitoring requirements. Ensure the stability and availability of the platform through disaster recovery design.

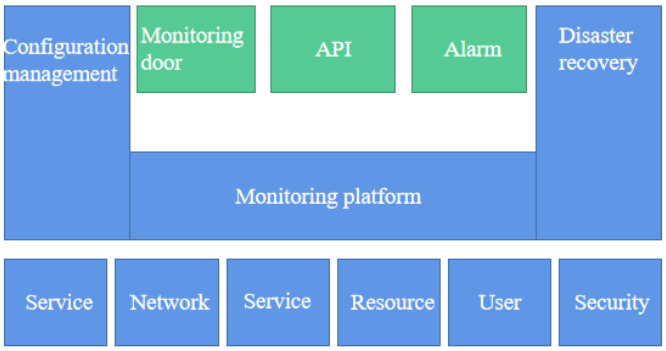


**Fig. 1.** Data resource model

Unified security protection system throughout the network, including unified security management, unified security defense, unified security operation and maintenance, unified disaster recovery center and unified identity authentication system. Strictly follow the three-level standard of equal assurance, improve the existing safety system and purchase additional safety equipment. Divide security areas and layered defense. Improve and supplement the required safety equipment. Improve safety management organization and relevant systems.

Different security areas are divided within the Pearl River Delta project, including: outreach area, neutral area, user access area, application server area, database server area, centralized storage area, etc.

A firewall is deployed in the outreach area to protect the boundary of all exits of the WAN, including Internet exits. Establish a neutral zone (DMZ) in the Internet exit area and deploy the system directly communicating with the Internet in this area. Firewall is used for logical isolation between application server area and database server area to protect core data. Deploy virus protection system in user access area, database server area and application server area. Deploy desktop security management system in user access area. Deploy server security reinforcement system in database server area and application server area. Deploy the database audit system in the database server area. Deploy network audit system and vulnerability scanning system. Deploy the Internet behavior management system and traffic cleaning system at the Internet outlet.

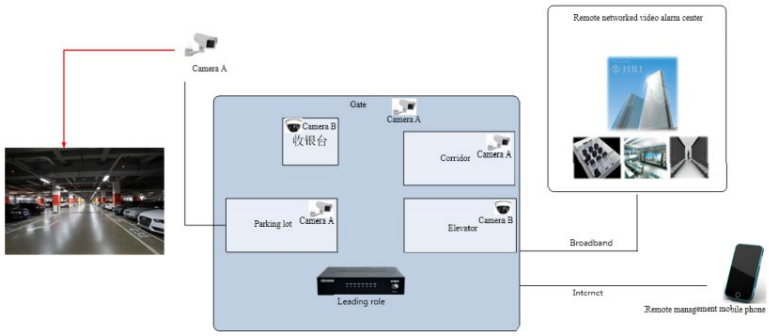


**Fig. 2.** Hardware system

The firewall acts between the center and each security area of each unit, implements strict access control policies, restricts access between each security area, so as to eliminate illegal and unauthorized access, and provide a good data access and transmission platform for the information network. The firewall formulates reasonable access policies according to different data flows, so as to reject illegal access requests. Its access policies are as follows:

Through strict access control rules, firewall system restricts internal users' access to internal data and internal users' access to internal service area only; Restrict external users from accessing external service areas only; Restrict each unit to submit data to the center only; At the same time, it also restricts the internal and external services of the center to only access the data processing and data storage of the center; Any other access is prohibited.

As a useful supplement to the firewall, intrusion detection system can help the network system quickly find network attacks, expand the security management ability of system administrators (including security audit, monitoring, attack identification and response), and improve the integrity of information security infrastructure. Intrusion detection system is considered as the second security gate behind the firewall. It can monitor the network without affecting the network performance, so as to provide real-time protection against internal attacks, external attacks and misoperation.

Through the intrusion detection system, the following security policies will be realized:

External detection strategy: the main task of intrusion protection system is to prevent external attacks, including those of internal and external sharing users. Giving an alarm to abnormal data packets will help system managers find and solve problems, and ensure the stable operation of information sharing platform.

Network detection strategy: in the detection process, the intrusion detection system comprehensively uses a variety of detection means, uses appropriate detection methods in each part of the detection, adopts feature-based and behavior-based detection, analyzes the characteristics of data packets, and effectively finds abnormal access behavior and data packets in the network.

Security linkage strategy: similar to the firewall security linkage strategy, the firewall can be linked with the intrusion detection system through the security linkage strategy. When the intrusion detection system finds an attack, it will notify the firewall in time. After receiving the information, the firewall will dynamically generate security rules to block the attack source, so as to

Monitoring and management strategy: the intrusion detection system provides a user-friendly console, and provides the initial installation of detector wizard, detector advanced configuration wizard, report customization wizard, etc., which is easy for users to use. Provide a one-stop management structure to simplify the configuration process, and users can customize queries and reports.abnormal alarm strategy: the intrusion detection system defines what kind of events and how to alarm through the formulation of alarm types. The optional alarm methods include voice, e-mail, SMS and linkage with firewall.

Online upgrade strategy: the built-in detection Library of intrusion detection system is the key factor to determine the detection ability of the system, so it must be upgraded regularly to ensure the integrity and effectiveness of intrusion detection library. The detailed strategy of intrusion detection system is closely related to the specific application and business process of the protected object. The detection strategy and linkage strategy of intrusion detection system will be refined according to the specific application and service. Intrusion detection system is used to detect internal and external system intrusion, deploy network intrusion detection system on the shared service area, listen and analyze the access data packets flowing through, and give timely alarm in case of abnormality.

## 4 Conclusion

The Pearl River Delta project has a long construction time span and many external factors, which are strictly limited by many constraints such as investment, land acquisition and relocation, safety, quality and so on. Many project sections and participants increase the difficulty and uncertainty of project management. Pearl River Delta project management is to manage the whole process and all fields of the project, mainly including: project, preliminary work, design, land acquisition and relocation, safety,

quality, investment, equipment, construction, progress, acceptance, integrity, etc. Funds, personnel, materials and equipment during project construction

And other resources, which need to be adjusted in time according to the project progress at different stages. Respond quickly to various problems during project implementation to meet the requirements of project time, quality and other objectives. It is of far-reaching significance to improve the project construction management level in the Pearl River Delta, ensure the project quality, control the project cost and improve the investment efficiency. It is also the key factor to determine the success or failure of the project construction.

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