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华晟云联教育

# **Reliability and security experiment system of Industrial Internet**

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## 1.0/ \_\_\_\_\_ Product description

### 1.1/ Overviews

With the development of Industrial Internet, the degree of industrial automation is higher and higher, and the requirement of high-speed, reliable and safe factory network is higher and higher. Beijing Huasheng Yunlian's "industrial internet reliability and security experimental system" will play a very good role in how to make the students of information automation learn the relevant knowledge about industrial internet networking.

The system provides a complete network system and a network security protection system to meet the modern and complex demands of industrial integrated automation.

Its technical features include: a Comprehensive Factory Network Architecture; advanced voice, Network high-definition video surveillance and network fusion communications; and Secure Enterprise Information Data and control core data exchange equipment.

The overall system architecture is shown in figure.

"Industrial Internet reliability and security experimental system" includes the industrial scenarios of Ring Network, redundant network, bridge, routing, WIFI coverage, PLC and intelligent devices in control network, hardware-in-the-loop simulation and full simulation. Workshop Industrial Isolation net gate, industrial firewall.

Among them, the factory network system will be a very important foundation, and the factory network training system. It is an important part of the Industrial Internet and the IASYS integrated system that we promote.

The factory network security equipment system uses Qi Anxin industrial network equipment, 1 site-class Network Gate, 1 workshop-class Network Gate, 1 industrial firewall.



1.2/ Features of the product

- 1 Covers control networks, field networks, shop floor networks, and management networks, with the addition of an industrial cloud network. Clear structure.
- 2 have industrial characteristics, including industrial common ring network, redundant network, industrial cloud network.
- 3 New GPON technology, 4G, 5G technology, explosion proof grade Passive optical network communication have been introduced.
- 4 The technology of communication, control, video monitoring, voice and so on is introduced.
- 5 Network security and network reliability are the emphases of industrial communication.
- 6 The introduction of the industry’s Advanced Industrial Gateway and industrial firewall.

1.3/ Introduction to reliable network system

Provide Ring Network switches, optical link networks, network management redundant three-layer switches, routers; provide GPON, UNO, IP voice communications, video monitoring and other integrated communication equipment.

Control Network, Field Network, workshop network, and management network, clear structure. These include:

- 1 Control Network, provide PLC and IO control module between the Ethernet, RS485 communication.
- 2 Field Network, provide PLC and gateway, PLC and switch communication, as well as gigabit optical ring network.
- 3 Workshop Network, provides two-tier three-layer switching, integration of communication. Building a redundant network based on dual network and load sharing.
- 4 Management Network, provide wi-fi coverage, routing, VPN network, Internet audit, etc.
- 5 CLOUD NETWORKS: low-level wireless networks, and mobile networks. Various cloud gateways.



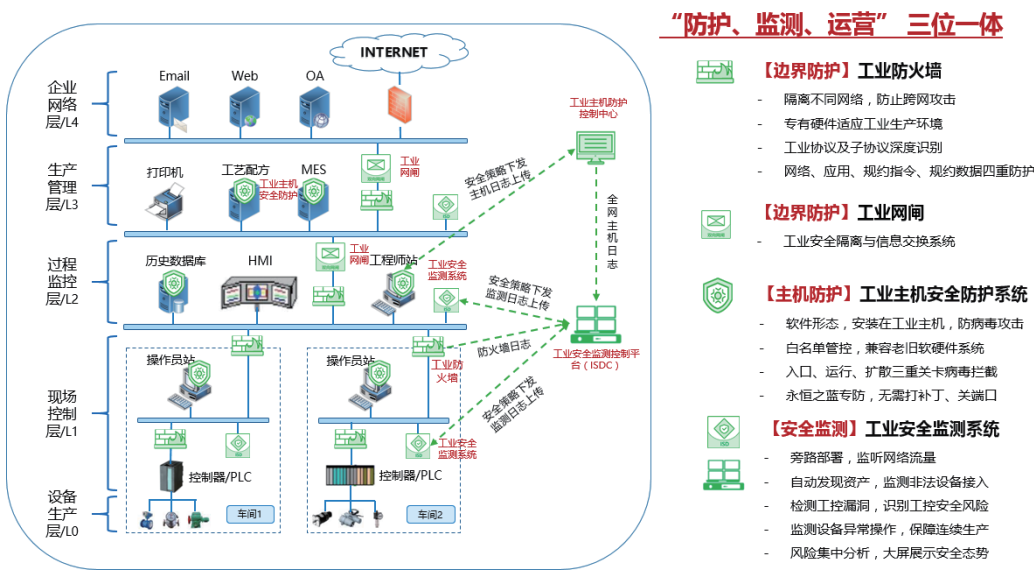
2.0/ Introduction to security system

Industrial Internet security to provide professional enterprises, “Qi Anxin” industrial-level gateway and firewall.

Difference Between Industrial Gateway and industrial firewall

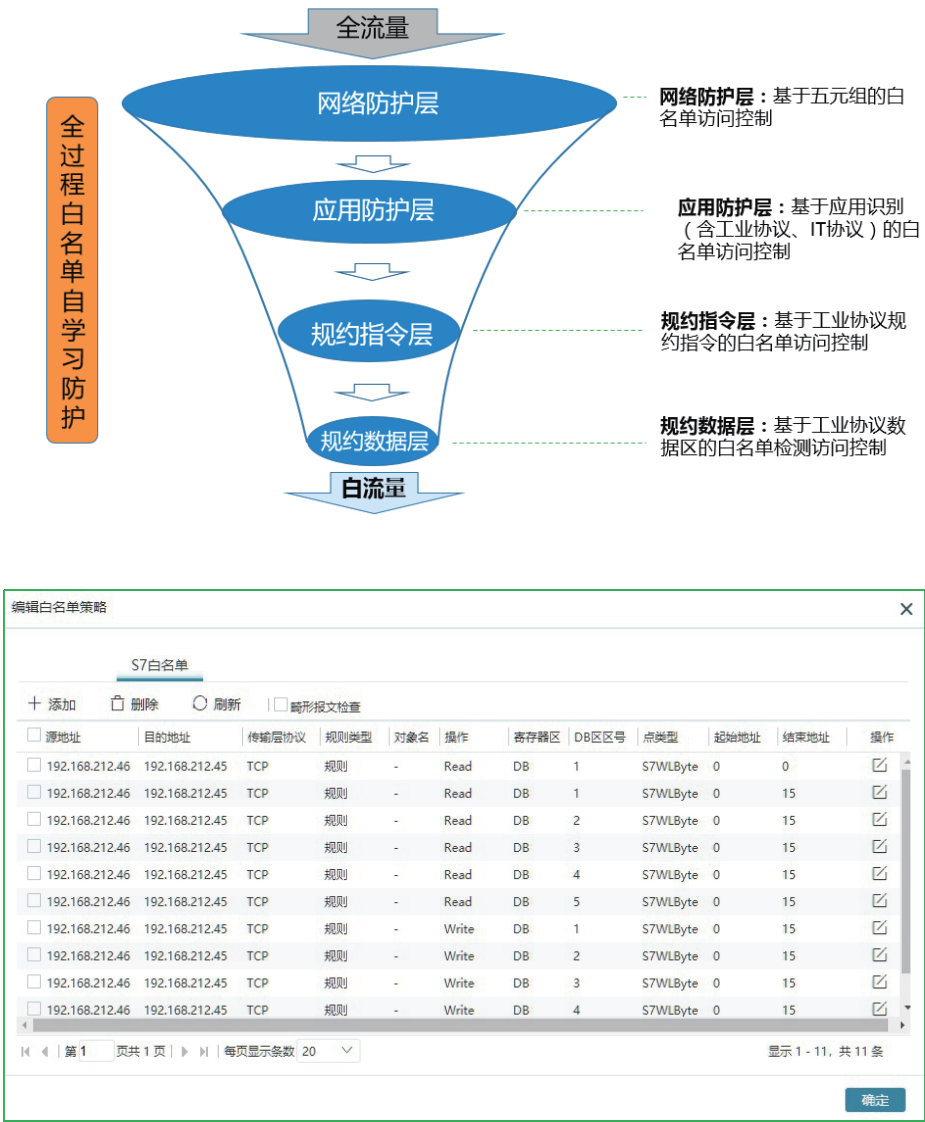
分类	工业网闸	工业防火墙
访问控制特点	基于物理隔离的白名单机制	基于连通网络的黑白名单控制
硬件特点	多主机形成纵深防御，保证隔离效果	单主机多宿主
隔离类型	专用隔离硬件	无专用数据交换硬件
软件特点	不允许TCP会话	允许TCP会话
访问类型	不允许从外到内的访问	允许从外多内的访问
安全性特点	可以最大程度防止未知攻击	不能防止未知攻击
性能与应用特点	确保安全性能所需的管理和维护工作量小	需要7*24监控，确保安全性能
数据通过性	性能适中	高性能
隔离方式	需要与应用系统结合	对应用透明

Qi Anxin Industrial Safety (enterprise level) overall program



The first line of Defense of Industrial security—the last line of defense—the industrial firewall, the four-fold white-list integrated protection, the construction of industrial security border defense.





## 2.1/ Training Program

### Industrial Ring Network switch

- 1 Cognition and basic operation of ring network switch
- 2 Redundant configuration of ring network switch
- 3 Partition Isolation (VLAN) for ring network switches
- 4 Security settings for ring network switches (static Mac)
- 5 Dual-channel redundancy configuration (link aggregation)

### Router

- 1 Cognition and basic operation of router
- 2 Ip Address configuration
- 3 Static routing experiment in industrial environment
- 4 Communication Quality Assurance
- 5 Routing Protocol routing experiment
- 6 Industrial routing security control
- 7 Shop-level network layer server mapping
- 8 ACLExperimental ACL
- 9 Shop-level network layer server mapping

### Xpon system

- 1 Introduction of key technologies of XPON optical access
- 2 Xpon basic configuration experiment
- 3 Basic business load configuration
- 4 Basic function test and verification experiment
- 5 Protocol configuration experiment

### Other network devices

- 1 Voip voice telephony networking and integrated communication
- 2 Wifi manager

### Industrial Gateway

- 1 Experiment of Network Gate configuration
- 2 Industrial Protocol testing
- 3 Anti virus test
- 4 Content filtering

### Industrial Firewall

- 1 Firewall configuration
- 2 Multi-level white list access control
- 3 Three-phase operation mode verification

### Video surveillance system

- 1 The connection and configuration of various cameras
- 2 The installation, connection and setup of the decoder of the ball head
- 3 Connection and debugging of hard disk video recorder
- 4 The network remote monitoring of the system
- 5 System Fault diagnosis and treatment

- 3 Wifi plan

- 4 FTP, HTTP, etc.

- 5 White List Control

- 6 Five-tuple control

- 7 Centralized management

- 4 Centralized management

- 5 White List self-study

## 2.2/ A list of equipment for the system

According to the customer focus, provide different equipment list, general equipment as follows:

No	Name	Quantity	Purpose
1	Ring Network switch with optical module, Optical cable	3 sets	Ring Network and redundant network, VLAN configuration
2	Router	2sets	Router experiment and ACL etc.
3	WIFI AP 3 and AP Manager 1	1sets	
4	Chianxin industrial firewall	1sets	Black and white lists, cyber security
5	Qianxin industrial gateway	2sets	
6	Ten gigabit GPON core switch with 4 ONU terminals, splitter, fiber optic cable	1sets	GPON network
7	Voip voice switch and SIP phone	1sets	Voice System and fusion communication
8	Video surveillance cameras and network cameras	1sets	Video system and fusion communication
9	Acquisition Gateway based on Wifi	2sets	Data acquisition system based on wireless network

No	Name	Quantity	Purpose
10	Acquisition Gateway based on Mobile Communication	2sets	Construction of data monitoring system in mobile network
11	Industrial Protocol Gateway Based on cloud platform	1sets	Industrial Protocol Gateway for Cloud
12	Siemens PLC Ethernet IO module	1sets	Provide control network equipment and work with the Protocol Gateway to provide control system to the cloud.