Intelligent Building BA Special Topic

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Reported by：Marco
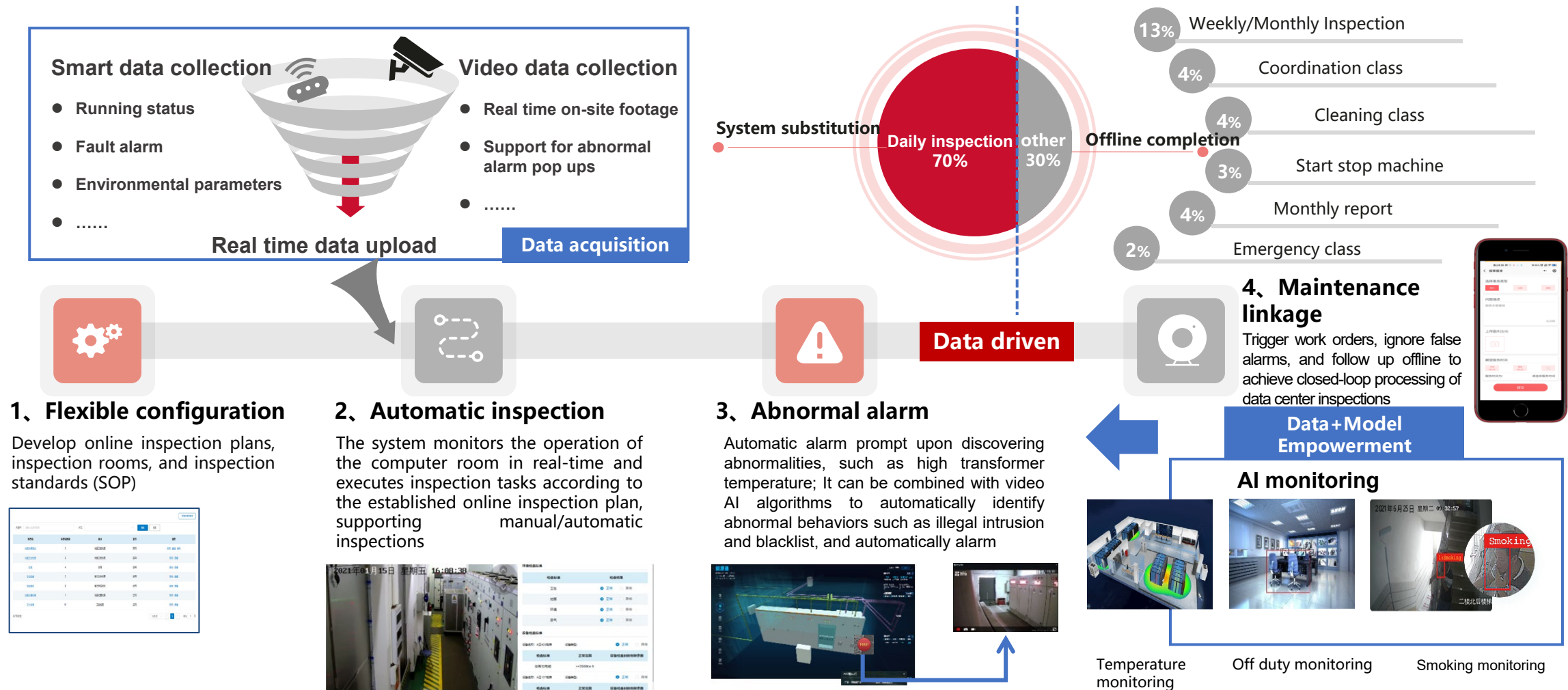
> **Industry pain points and issues**

> **The value of the platform**

> **Platform architecture**

> **Function Introduction**
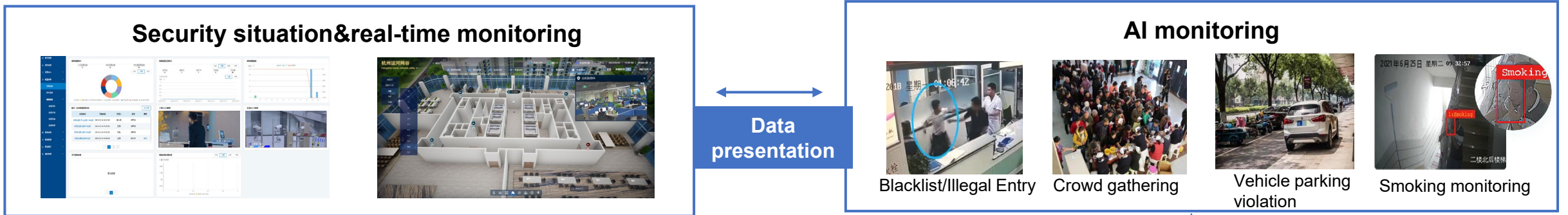
Intelligent device management

The platform utilizes real-time capture of park data and video data, combined with AI algorithms to automatically identify abnormal alarms. Through data empowerment and driving SOP for standard operating procedures, it achieves over 70% of daily management automation in the park, improving equipment work and maintenance efficiency.

Smart data collection

- **Running status**
- **Fault alarm**
- **Environmental parameters**
- **......**

Video data collection

- **Real time on-site footage**
- **Support for abnormal alarm pop ups**
- **......**

Real time data upload

Data acquisition

System substitution

Daily inspection 70% **other 30%**

Offline completion

- 13% Weekly/Monthly Inspection
- 4% Coordination class
- 4% Cleaning class
- 3% Start stop machine
- 4% Monthly report
- 2% Emergency class

Data driven

4、Maintenance linkage

Trigger work orders, ignore false alarms, and follow up offline to achieve closed-loop processing of data center inspections

Data+Model Empowerment

AI monitoring

1、Flexible configuration

Develop online inspection plans, inspection rooms, and inspection standards (SOP)

2、Automatic inspection

The system monitors the operation of the computer room in real-time and executes inspection tasks according to the established online inspection plan, supporting manual/automatic inspections

3、Abnormal alarm

Automatic alarm prompt upon discovering abnormalities, such as high transformer temperature; It can be combined with video AI algorithms to automatically identify abnormal behaviors such as illegal intrusion and blacklist, and automatically alarm

Temperature monitoring
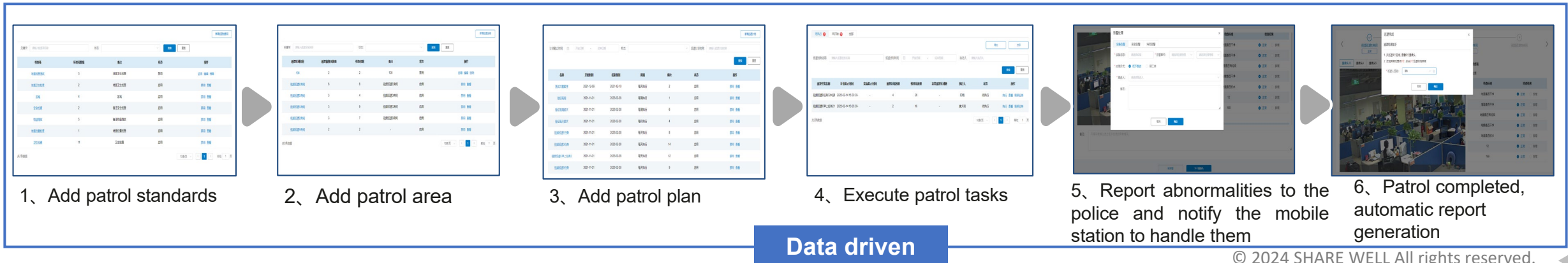
Off duty monitoring

Smoking monitoring

3

Intelligent Security

Through intelligent security scenarios such as security situations, video surveillance, and video patrols, the platform truly empowers enterprise park security services, providing timely and intelligent responses to various security needs, achieving pre warning, decision-making, and post analysis, and helping park security management shift from decision analysis to data-driven management, using technology to safeguard security.

◆ Real time monitoring and security situation: Display statistical indicators related to video security in the park, such as the number of daily alarm events and the proportion of different alarm types.

Security situation&real-time monitoring

AI monitoring

Blacklist/Illegal Entry   Crowd gathering   Vehicle parking violation   Smoking monitoring

Data presentation

◆ Video Patrol: Connect video data and achieve online patrol function through standardized operations to assist on-site patrols

Data Empowerment

1、Add patrol standards

2、Add patrol area

3、Add patrol plan

4、Execute patrol tasks

5、Report abnormalities to the police and notify the mobile station to handle them

6、Patrol completed, automatic report generation

Data driven

Energy management

The comprehensive control platform can statistically analyze energy data in the factory area from multiple types, dimensions, and levels. It provides real-time and historical data analysis functions for energy consumption and usage in categories, sub items, and zones. It can quantitatively analyze actual energy consumption data and indicator data from multiple dimensions and time zones, identify abnormal energy consumption, explore energy-saving space, assist energy decision-making, and reduce energy consumption costs.

Fine monitoring of energy consumption → **Data statistical analysis** → **Assisting management decision-making**

Fine monitoring of energy consumption

Actual branch

Classification — Sub items — Partition

Virtual branch

Energy type
- Electricity
- water
- Cooling capacity
- Qi (O_2)

Energy sub item
- Air conditioning
- lighting
- Power
- special

Energy zoning
- Building
- Region
- Key equipment

Data statistical analysis

非电能流图

今日 本周 本月 今年 | 开始日期 至 结束日期

光伏供电量
光伏供电量-配电室 4kWh
电网供电量
配电室
用电系统01
用电系统02
用电系统03
用电系统04
用电系统05
用电系统06

日 期：2020-08-05 总电量 44,035.6 kW·h
日 期：2020-08-06 总电量 54,544.8 kW·h

Assisting management decision-making

Energy quota
Support setting energy consumption quotas for different sub items and zones on an annual/quarterly/monthly/daily basis
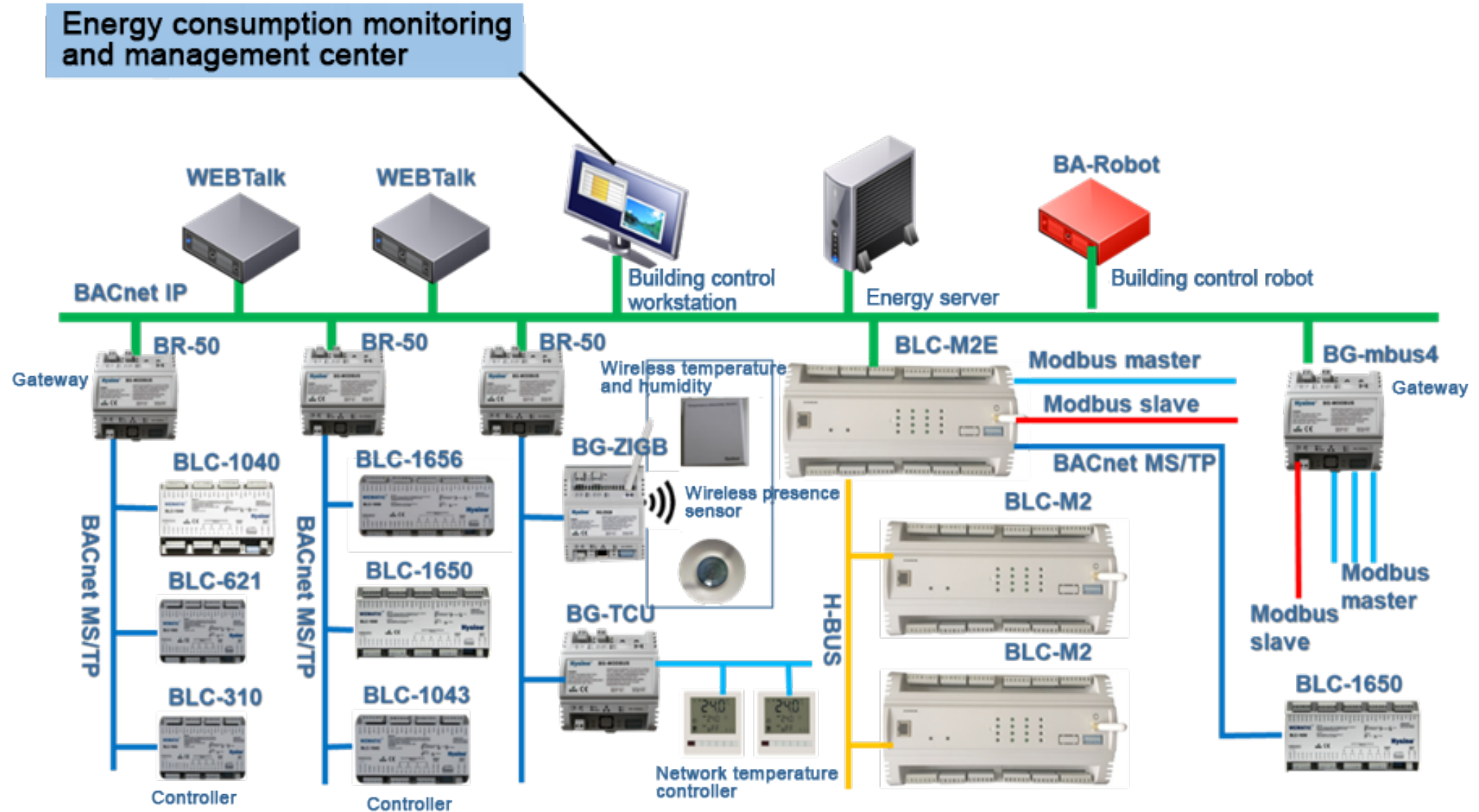
Energy alarm
Configure energy consumption alarm thresholds, automatically monitor energy consumption, and provide real-time alarms

Energy decision-making
Explore energy-saving space, guide energy management strategy adjustment, and assist energy decision-making

Energy consumption management architecture

Building Control Architecture

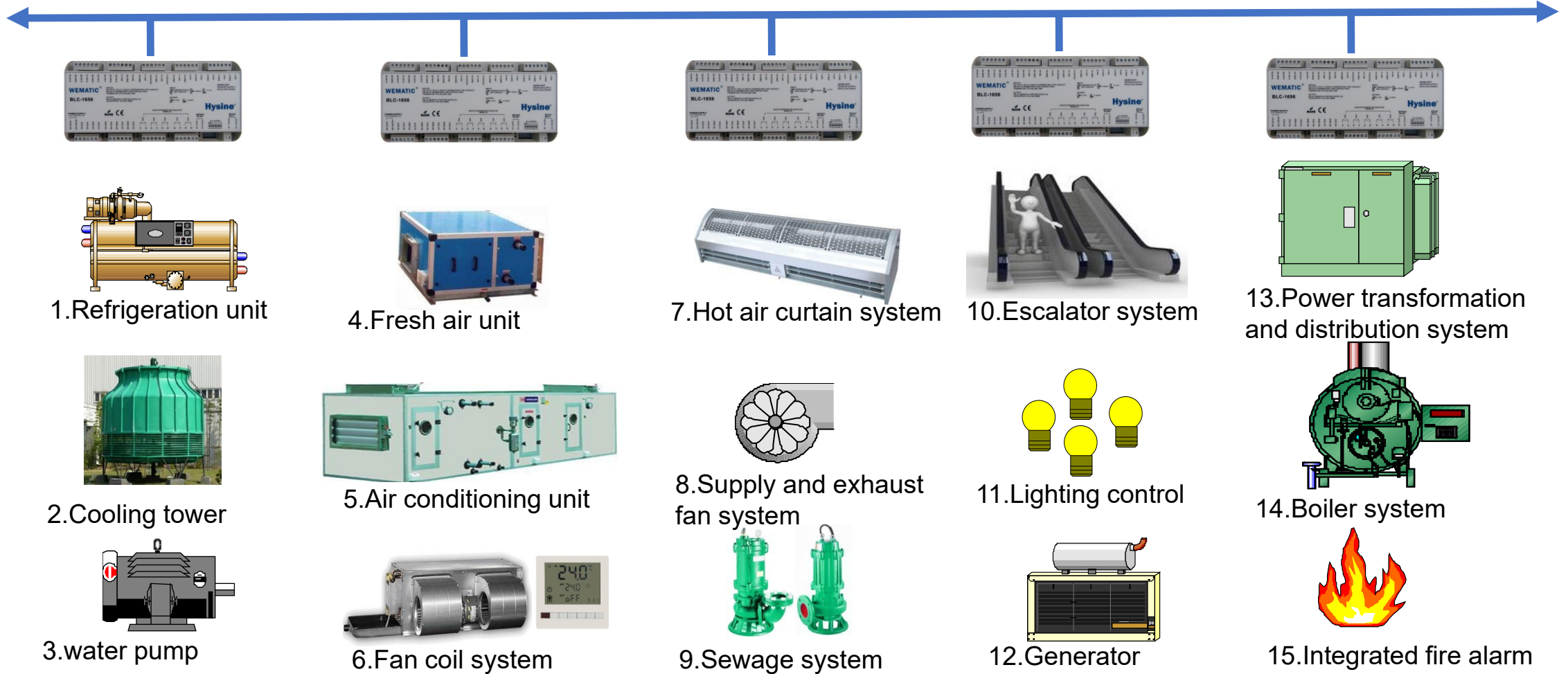Equipment monitoring and energy-saving management platform

The monitoring platform realizes the monitoring and control management of all mechanical and electrical equipment inside the building
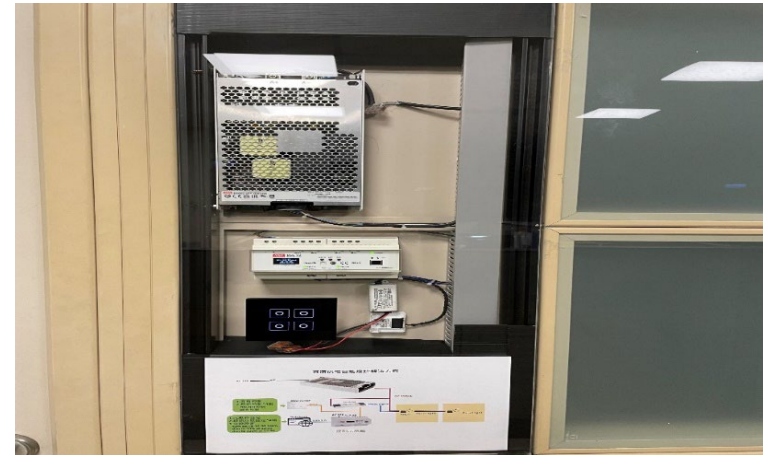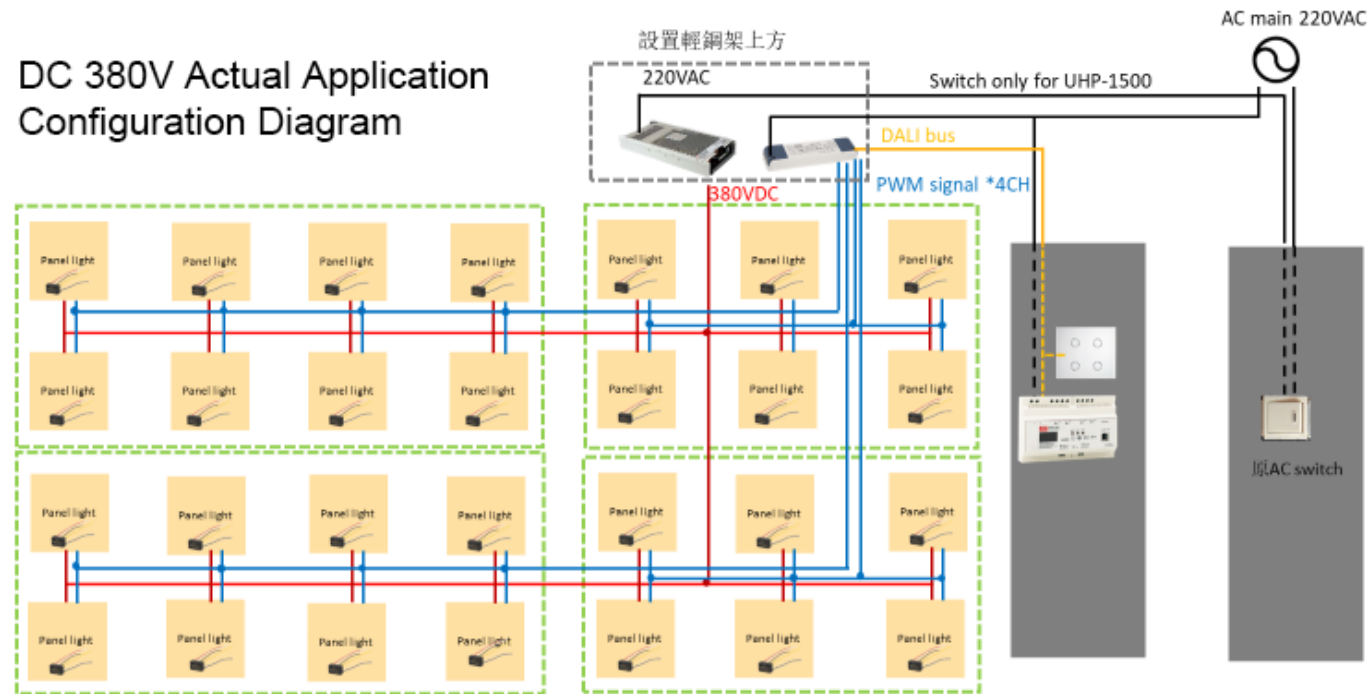
BACnet

Monitoring station

Operation Station

1.Refrigeration unit

4.Fresh air unit

7.Hot air curtain system

10.Escalator system

13.Power transformation and distribution system

2.Cooling tower

5.Air conditioning unit

8.Supply and exhaust fan system

11.Lighting control

14.Boiler system

3.water pump

6.Fan coil system

9.Sewage system

12.Generator

15.Integrated fire alarm

DC intelligent lighting

DC 380V Actual Application Configuration Diagram

設置輕鋼架上方

220VAC

Switch only for UHP-1500

AC main 220VAC

DALI bus

PWM signal *4CH

380VDC

Panel light

原AC switch

Scene content

Common subsystems	Equipment category	Visualization function	Remarks
Air conditioning management system	Cooling tower (or outdoor unit)	Display the distribution of cooling tower (or outdoor unit) equipment locations by building and floor; Present the real-time running status of the outdoor unit.	Based on the actual air conditioning type of the project
	Indoor unit	Display the distribution of indoor unit equipment positions by building and floor; Present the real-time running status of indoor units; Support air conditioning start stop control, wind speed regulation, temperature setting, and mode switching.	
	Chiller unit	Display the equipment distribution, equipment correlation, and pipeline distribution of the chiller unit; Display the operating status of the unit according to real-time operating conditions.	
Fire alarm system	Water pump room	Display the equipment distribution, equipment correlation, and pipeline distribution of the water pump room; Support displaying the operating status of the unit based on real-time operating conditions.	
	Temperature sensing, smoke sensing, and manual reporting	Display the location distribution of temperature sensing, smoke sensing, and manual reporting equipment by building and floor; Present real-time device alarm status.	
Water supply and drainage system	Sump pit	Display the distribution of catchment pit locations; Support highlighting alarm pits in 3D space; Present the offline and alarm status of the device。	
	Water pump room	Display the pipeline and equipment distribution of the water pump room in a 3D visualization environment.	
Energy storage management system	Energy storage cabinet, energy storage box transformer	Present the distribution of device points in a 3D visualization environment; Perform data and 3D visualization of battery packs.	
Photovoltaic management system	Photovoltaic panels, inverters	Present the point distribution of photovoltaic panels and inverters in a 3D visualization environment; Visualize the data display of photovoltaic operating parameters; Support displaying the correlation between photovoltaic panels and inverters.	
Power transformation and distribution system	High and low voltage cabinets, transformers, DC cabinets, metering cabinets	Restore the distribution of equipment locations in the power supply and distribution room; Support real-time display of voltage, current, power consumption and other information of power supply equipment, and support real-time display of power system equipment alarm information.	
Charging pile system	Parking space, charging gun, charging station	Present the location distribution of charging station equipment; Support the statistics of total charge and discharge data, installed capacity/total capacity/total loss data, etc.	
Elevator monitoring system	Elevator drum and elevator car	Restore the distribution of elevators; Support displaying and monitoring the operation of elevators, including running speed, up and down, stopping at floors, etc.	
Video surveillance system	Camera	Present camera point distribution in 3D visualization scenes; Supports real-time camera viewing.	
Access control management system	Card readers, door locks, and barrier gates	Restore the location distribution of card readers, door locks, and barrier devices; Support remote door opening and real-time display of device operation status.	
Intrusion alarm system	Intrusion detector	Display the equipment location distribution of intrusion detectors by building and floor; Present real-time alarm status for intrusion detectors.	
Intelligent lighting system	Lighting equipment	Display the distribution of lighting system equipment positions by building and floor; Present the real-time on/off status of the lighting circuit, supporting remote control of the circuit switch.	
Parking lot management system	Parking spaces and barriers	Restore the location distribution of parking spaces; Conduct statistical analysis on the data of vehicles entering and exiting the gate.	
Energy management system	Outline of control area for electricity and water meters	Display equipment or control area location distribution by building or floor; Support data visualization of the total amount and status of the control area.	
Computer room environmental control system	UPS、 Environmental detector	Restore the distribution of equipment locations in the data center; Support data visualization of equipment parameters and operational parameters in the data center; Support real-time display of system device alarm information.	
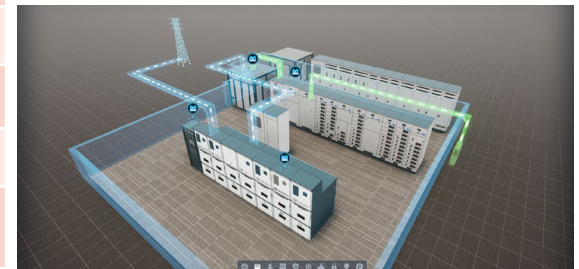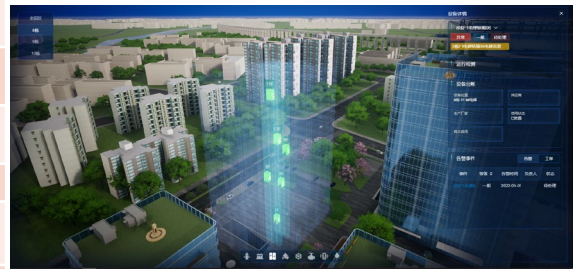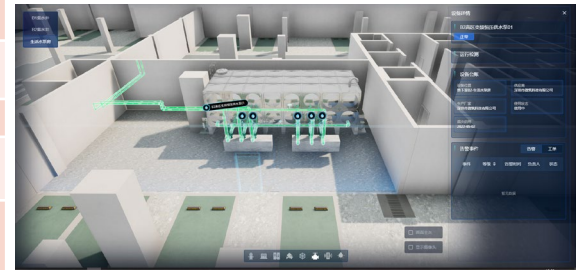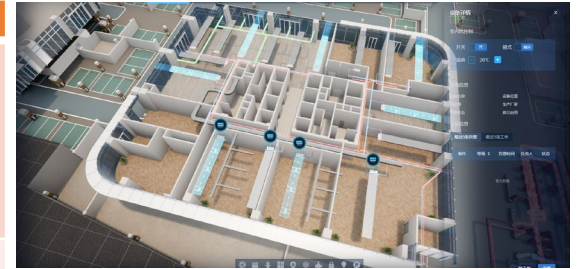
Data interface docking

For intelligent subsystems and IoT devices, through the provided interface protocol, the relevant data is unified and converted to the application platform for analysis and use, thereby achieving the functions of data collection, protocol conversion, and data upload and release.

- • Subsystem access

The interface functions provided by the subsystem must meet the requirements of the upper layer application, including but not limited to alarms, real-time data, command control, etc

- • Provide external interfaces for its on-site system, such as API, OPC, BACnet, Modbus, etc
- • Provide detailed address configuration data for on-site data, such as point tables and point drawings

The servers, control modules, collectors, etc. of each subsystem must meet the Ethernet networking requirements and communicate with the IoT platform using standard TCP/IP protocols

Functional requirements

Interface requirements

Network requirements

Explanation: If the subsystem manufacturer provides RS485/232 serial port, the manufacturer needs to convert its physical interface to TCP/IP and connect it to the project LAN to achieve network communication with IoT

Common subsystems	Common protocols	Physical interface
Building automation system	BACnet、OPC	TCP/IP
Multi line system	Modbus、API	TCP/IP
Refrigerator group control system	Modbus、BACnet	TCP/IP
Water supply and drainage system	BACnet、OPC	TCP/IP
Elevator system	webapi、Private Agreement	TCP/IP
Power transformation and distribution system	Modbus、104 protocol	TCP/IP
Intelligent lighting system	Modbus、OPC、KNX	TCP/IP
Access control management system	SDK、API、ODBC	TCP/IP
Anti theft alarm system	Modbus、SDK、Private Agreement	TCP/IP
Video surveillance system	SDK、API	TCP/IP
Parking lot management system	webapi、HTTP、UDP	TCP/IP
Parking guidance system	API、HTTP	TCP/IP
Guard tour system	SDK、ACCESS、SQLServer	TCP/IP
Background music system	SDK、Modbus、webapi	TCP/IP
Information publishing system	SDK、HTTP	TCP/IP
Intelligent meter reading system	Modbus、API、SQLServer	TCP/IP
Computer room dynamic environment system	API、Private Agreement	TCP/IP
Smart Count	SQLServer、API	TCP/IP
Fire alarm system	API、Private Agreement	TCP/IP

Visual instance display