PROJECT CHARTER	**Project Name:** Intelligent Curtain Wall System Architecture, Operation and Maintenance, and Dataset Management Platform
Project Start Date: September 2024	**Project End Date:** June 2025
Project Manager: Jishen Lin	

Project Description

➢ Project background: With the development of building intelligence, intelligent curtain walls, as a curtain wall system that integrates perception, regulation, and control functions, have gradually become an important component of modern architecture. Intelligent curtain walls can achieve real-time monitoring of environmental parameters through sensors, control systems, and data analysis, and automatically adjust curtain wall components to optimize indoor environments, improve energy efficiency, and enhance comfort. Intelligent curtain wall systems typically include multiple subsystems, such as burst curtain wall monitoring, curtain wall stain detection, etc. Each subsystem generates a large amount of data. In order to ensure the stable operation and data security of these subsystems, and provide a convenient dataset management platform, this project was born.

➢ Facing challenges:

1. Data processing and storage: Intelligent curtain wall systems need to process large amounts of real-time data, and how to efficiently store, manage, and analyze this data is an important challenge.

2. Remote control and security: The system needs to support remote monitoring and control, while ensuring the security of data transmission to prevent data leakage.

3. Server operation and maintenance cost control: It is necessary to optimize server resource utilization and reduce operation and maintenance costs while ensuring efficient system operation.

➢ Desired goal:

1. Building a stable and efficient system architecture: Adopting containerized design to improve the scalability and stability of the system, ensuring the long-term reliable operation of the intelligent curtain wall system.

2. Optimize data processing capabilities: Adopt streaming processing technology and big data storage solutions to achieve efficient data collection, analysis, and storage, providing precise data support for intelligent regulation.

3. Improve server operation and maintenance efficiency: Through automated deployment, log output and other technologies, intelligent operation and maintenance can be achieved, reducing manual intervention and improving server performance.

4. Strengthen security: Adopt security measures such as encrypted communication,

access control, and log auditing to ensure the security of the system and data.

Measurable Organizational Value (MOV)

➤ Business value:

1. Improve the stability of the intelligent curtain wall system and achieve a system availability rate of over 99.9%.

2. By optimizing data processing capabilities, the efficiency of data storage and analysis has been significantly improved.

3. Adopting automated operation and maintenance methods to reduce manual intervention costs.

➤ Customer value:

1. Provide a visual data management platform that significantly reduces data query and analysis time.

2. By optimizing user experience, ensure that user satisfaction reaches over 90%.

➤ Financial value:

1. By optimizing the utilization of server resources, the operation and maintenance costs have been reduced by%.

2. Adopting containerization and cloud computing resource elastic scaling strategies to reduce computing resource costs.

➤ Competition value:

1. By using a unified data management platform, we can improve the efficiency of data exchange among various subsystems and enhance market competitiveness.

2. Adopting the latest security measures to ensure system compliance with industry standards and enhance data security.

Project Scope

➤ The scope of the project includes:

1. Operation and maintenance management:

   1) Unified monitoring platform: provides the ability to monitor the real-time operation status of all subsystems.

   2) Log management and fault diagnosis: Automatically collect and analyze system logs, provide fault alarm and fault location functions.

   3) Server resource optimization: Using automated deployment, load balancing, and elastic scaling technologies to optimize server performance and cost.

   4) Remote maintenance and updates: Provide remote operation and maintenance capabilities to achieve software system updates and patch management.

2. Dataset management:

1) Data storage and access: Build a unified data storage architecture that supports data access, storage, and management for various subsystems.

2) Data cleaning and preprocessing: Implement data deduplication, formatting, anomaly detection, and improve data quality.

3) Data rights and security management: Provides identity authentication, access control, and encrypted storage to ensure data security.

4) Data visualization and analysis: Develop a data visualization interface that supports users in querying, analyzing, and downloading data.

3. System integration and security:

1) Unified user authentication system: Provides Single Sign On (SSO), permission management, and log auditing functions.

2) API management and data sharing: Develop standard APIs to support data exchange between subsystems.

3) Security measures: Adopt encrypted communication, firewall, intrusion detection and other technologies to ensure data and system security.

➢ Considerations beyond the scope of the project:

1. Specific functional development of subsystems:

1) This project is not responsible for algorithm optimization or hardware upgrades of subsystems such as metal curtain wall corrosion detection, stone crack detection, and glass curtain wall flatness detection.

2) This project does not involve the development of drone 3D modeling technology, only supports its data access and management.

3) This project is not responsible for the development of specific detection functions such as glass curtain wall burst detection and stone curtain wall stain detection, and only provides data storage and management support.

2. Hardware equipment maintenance: The maintenance and replacement of physical hardware such as curtain wall detection equipment, sensors, and drones are not within the scope of this project and only provide data docking and operation support.

3. Non intelligent curtain wall related systems: This project does not cover other systems related to building intelligence, such as HVAC, intelligent lighting, or security monitoring systems.

Project Budget

1. Labor cost: The project team consists of project managers, developers, operations personnel, and testers, with an estimated labor cost of 500000 yuan, covering salaries and benefits throughout the project lifecycle.

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4. Resource cost: The front-end server rental fee is 400 RMB/month, the back-end server rental fee is 10000 RMB/month, the project period is 12 months, and the total resource cost is 10400 RMB.

5. Development cost: Including the cost of development tools, software licenses, third-party services (such as cloud services, API calls, etc.), estimated to be 200000 RMB.

6. Maintenance cost: After the system goes online, maintenance, updates, and technical support are required, with an estimated maintenance cost of 100000 RMB.

Budget Item	Cost	Description
Labor cost		Including salaries and benefits for project managers, developers, operations and maintenance personnel, testers, etc.
Resource cost	13,000 RMB	Including the rental fees for front-end servers, back-end proxy servers, and back-end computing power servers.
Development cost	8 Person-hours/week	Including the cost of development tools, software licenses, third-party services (such as cloud services, API calls, etc.).
Maintenance cost	4 Person-hours/week	Including maintenance, updates, technical support, and other expenses after the system goes live.
General budget		The total budget of the project is 810400 RMB, and it is expected to complete all expenses within the project cycle.

Core Success Criteria for Projects

1. The project is completed within the expected time and all key functions are achieved.

2. The system architecture design supports rapid expansion of future functionalities without the need for large-scale refactoring.

3. After the system was launched, user satisfaction reached over 90%.

4. The total project cost shall not exceed 10% of the budget.

Core Methods of Project

➢ Project management methodology: Agile development. Agile development is a project management approach centered around iteration and increment, emphasizing fast delivery, continuous improvement, and flexible response to changes.

➢ Technical implementation method: The front-end uses Vue.js to build the user interface, the back-end uses Spring Boot to build efficient and scalable back-end services, uses GitHub Actions to implement workflows, and adopts a containerized architecture design.

➢ Communication and collaboration methods: Git is used for version control, GitHub is used for code hosting and collaboration, Feishu is used for daily team communication, file sharing, and task management, and Tencent Meeting is used for daily site meetings, iteration reviews, and retrospective meetings.

Resources Required for Project

1. Human resources: The project requires experienced project managers, developers, operations and testing personnel to ensure timely delivery and stable operation.

2. Front end server resources: Front end servers are used to host user interfaces and front-end applications, ensuring smooth system access for users.

3. Backend server resources: Backend servers include proxy servers and computing power servers, which are used to process data storage, computation, and business logic, ensuring efficient system operation and data processing capabilities.

Resource Type	Detailed Description
Human resources	1) Project Manager: Responsible for overall project planning, schedule management, resource coordination, and risk control. 2) Development team: responsible for system architecture design, front-end and back-end development, and system integration. 3) Operations team: responsible for server operations, monitoring, and troubleshooting. 4) Testing team: responsible for system testing, performance optimization, and security testing.
Front end server Resources	The front-end server is used to host the user interface and front-end applications, with an estimated rental cost of 400 RMB and a total cost of 400 yuan during the project period.
Backend server resources	The backend server includes proxy servers and computing power servers, which are used to process data storage, computation, and business logic. The estimated rental cost is 1000 RMB/month, and the total cost during the project period is 12000 RMB.

Project Management

➢ Communication plan: In order to ensure the smooth implementation of the intelligent curtain wall system architecture design and server operation and maintenance project, an effective communication plan is developed to ensure that all relevant parties can timely obtain project information, provide feedback on issues, and collaborate to solve them.

    1. Communication objectives:

        1) Ensure that team members, clients, and other stakeholders are kept informed of project progress in a timely manner.

        2) Timely identify and solve problems to reduce communication barriers.

        3) Ensure that the technical team, operations team, and management reach consensus on key decisions.

    2. Communication targets and responsibilities:

Role	Major	Contents	Communication System
Project manager	The origins of the hosts	The exhibition of the foundation and the appearance of the success	Meetings and emails
Development team	Responsible for system development	Task progress, technical issues	Standing meeting, code review
Operations team	Responsible for server operation and monitoring	Server status, fault response	Operation and maintenance meetings, alarm notifications
Customer / Business operator	Demand side, provide feedback	Requirement changes, system status	Requirement meeting, report

➢ Quality management plan:

    1. Quality objectives:

        1) Ensure that the system architecture has high availability (99.9% or more of the system's normal operating time).

        2) The server operation and maintenance solution can meet the requirements of automated deployment, monitoring, and alarm mechanisms, ensuring operational efficiency.

        3) Data transmission and storage security comply with industry standards to prevent

security vulnerabilities and data leaks.

4) The code quality meets the standards and reduces maintenance costs in the later stage.

2. Quality control measures:

Quality Control Points	Specific Measures	Person in Charge	Frequency
System architecture review	Conduct architecture review during the design phase to ensure high availability and scalability	Architect	Design phase
Code quality inspection	Code Review to ensure compliance with development standards	Development team	Every submission
Unit Testing	Adopting an automated testing framework, unit testing coverage rate ≥ 80%	Development team	Sustain
Unit Testing	Conduct interface testing, stress testing, and anomaly handling testing	Test team	Every version release
Operation and maintenance monitoring	Configure server monitoring, real-time alarm, log analysis	Operations team	7×24 hours
Safety testing	Perform vulnerability scanning, permission testing, and anti attack testing	Security team	Every quarter
Customer acceptance testing	Provide a user testing environment and collect feedback	Business party	Milestone phase

3. Quality assurance tools and methods:

1) Code management: Git (GitHub) is used for version control to ensure traceability of code changes.

2) Automated testing: Conduct continuous integration and automated testing.

3) Change management process: All architecture adjustments and code changes must go through a review process (PR and Code Review).

Main Responsibilities of Members

Name	Identity	Responsibility	Contact Information

Jishen Lin	Project manager	Responsible for overall project planning, schedule management, resource coordination, risk control, development of technical standards, and system integration.	2250758@tongji.edu.cn
Shuyi Liu	Project members	Responsible for technical implementation, system operation and maintenance, testing, ensuring system functionality and stable operation.	2251730@tongji.edu.cn
Amane Nakatani	Project members	Responsible for system optimization, performance tuning, and document writing to ensure efficient system operation and complete project documentation.	2256225@tongji.edu.cn

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