The "Multi-Planning Integration" Business Collaboration Platform Construction and Practice of Xiuyan Manchu Autonomous County

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Abstract: *With the continuous deepening of China's reform and opening up, some issues accumulated in urban and rural development and construction have become increasingly prominent, among which a major issue is the conflict between spatial planning. Each department formulates its own plan, leading to inconsistencies in planning entities, planning timelines, and technical standards, which in turn causes a lack of unity in the urban economy and social spatial layout, ineffective utilization of spatial resources, serious waste and inefficiency of land resources, and a lack of coordination in ecological land use, making it difficult to achieve effective protection. To address these issues, the government has proposed the "multi-planning integration" strategy, aiming to achieve the unity, coordination, and scientific nature of planning through the integration of various plans. Xiuyan Manchu Autonomous County, as an autonomous county in Liaoning Province, also faces problems such as spatial planning conflicts and land resource waste. In response to the national call and to promote the sustainable and healthy development of the local economy and society, Xiuyan Manchu Autonomous County has decided to build the "multi-planning integration" business collaboration platform. This paper will conduct an in-depth exploration of the construction and practice of the "multi-planning integration" business collaboration platform in Xiuyan Manchu Autonomous County.*

Keywords: *Multi-planning integration; business collaboration; information sharing; Xiuyan Manchu Autonomous County*

Introduction

With the acceleration of urbanization in China, the management of natural resources and urban and rural planning are facing increasing challenges. To resolve planning conflicts, promote information sharing and business collaboration among departments, Xiuyan Manchu Autonomous County has undertaken the construction of the "multi-planning integration" business collaboration platform. This paper aims to explore the construction process, key technologies, and practical application effects of the platform, providing insights for planning management in similar regions.

1. Research Background and Significance

1.1 National Policy Requirements

In recent years, China has continuously strengthened the construction of the spatial planning system and actively explored the establishment of a unified spatial planning framework. By integrating various plans and optimizing spatial resource allocation, a spatial governance system covering the entire region has been gradually formed, providing foundational support for the modernization of social governance, while promoting ecological environmental protection and coordinated urban-rural development. Guided by the scientific outlook on development, the strategic requirements of new urbanization are fully implemented, adhering to the principles of people-centeredness, optimizing layout, ecological civilization, and cultural heritage. In accordance with the requirements of integrated urban-rural management, full-area control, and departmental collaboration, comprehensive county (or city) urban-rural master plans are developed, achieving the integration of economic and social development, urban-rural planning, and land use planning, forming a unified, connected, and functionally complementary planning system. By integrating the outcomes of various plans, a "single blueprint" is created, enabling the integration and sharing of planning data across multiple departments, providing a

scientific basis for urban planning and construction [1].

1.2 Liaoning Province Construction Requirements

As an important province in Northeast China's old industrial base, Liaoning Province actively responds to the national call and promotes the "multi-planning integration" reform. Xiuyan Manchu Autonomous County, as an important ecological barrier area in Liaoning Province, also faces issues such as land use conflicts, ecological protection pressure, and spatial planning conflicts during urban-rural development. To address these issues, the "multi-planning integration" business collaboration platform construction project was launched. This project aims to integrate various plans through the construction of a business collaboration platform, establish a unified urban spatial planning system, optimize the allocation and effective utilization of spatial resources, and promote regional sustainable development. The goal of Xiuyan Manchu Autonomous County's "multi-planning integration" business collaboration platform is to collect data from the three districts, three lines, and "multi-plans," enabling the sharing of planning results, supporting the planning and generation of construction projects at both municipal and county levels, promoting the quick implementation of projects, and improving the speed and quality of engineering project approvals. Based on the overall planning of Xiuyan Manchu Autonomous County, the land use master plan, and national economic plans, this initiative integrates specialized plans for environmental protection, water conservancy, forestry, transportation, municipal services, and public facilities, establishing a unified blueprint database for the entire city and project generation functions. This will further optimize approval processes, transform government functions, deepen the "streamlining administration, delegating power, strengthening regulation, and improving services" reform, enhance the governance and service levels of new districts, and lay a solid foundation for the modernization of governance capabilities [2].

1.3 Significance of Construction

"Multi-planning integration" is a method and platform for using information technology to establish a unified urban spatial planning system, aiming for coordinated development. "Multi-planning integration" is a means, not an end. The real goal of the reform is to promote the scientific development of cities. The fundamental approach to scientific development is to balance all aspects, with space serving as a critical platform for coordinating various developments and constructions. The "multi-planning integration" platform can promote the orderly balance of spatial layout and utilization, thus fostering balanced development, enabling intensive resource use, reducing the cost of resource consumption, and addressing the imbalances, disharmony, and unsustainability issues in urban development.

The "multi-planning integration" reform is a practical exploration to advance the modernization of urban governance systems and governance capabilities. Modernizing urban governance systems and governance capabilities is an important part of modernizing the national governance system and governance capabilities. The "multi-planning integration" reform is a vital initiative in exploring the modernization of urban governance systems and capabilities, focusing on solving issues such as planning conflicts, resource and environmental protection, improving administrative approval efficiency, and enhancing public participation and supervision. It aims to realize rule of law at the county level, transform management models from departmental management to integrated management, and shift government functions from management-oriented to service-oriented.

2. Project Construction Plan

2.1 System Introduction

The construction of the "multi-planning integration" business collaboration platform is an important step in advancing the new urbanization development path and a key approach to implementing efficient county-level management. It helps to streamline the relationships between various plans, such as national economic and social development planning, urban and rural planning, land use master planning, and environmental ecological planning, promoting the organic connection of these plans. Ultimately, it supports a major breakthrough in new urbanization construction, with a focus on coordinated urban-rural integration development.

The "multi-planning integration" business collaboration platform will gradually promote data

sharing, information linkage, and business collaboration for project approvals across various departments. It will integrate and analyze the planning results from multiple departments into a "single blueprint," supporting coordination and integration of planning conflicts on a unified platform. This will facilitate the smooth implementation of major projects. The platform, supported by information technology, analyzes differences in development goals, land use indicators, development scale, spatial layout, and other aspects of different plans, creating conditions for the orderly implementation of government investment projects, key construction projects, and land reserve projects. It will provide rich data support and technical assurance to enable parallel project approvals, significantly shorten approval timelines, improve administrative approval efficiency, and integrate planning data from multiple departments. This will help government departments identify conflicts between various plans and provide informational references for resolving these conflicts, improving the efficiency and accuracy of multi-plan coordination work [3].

The "multi-planning integration" business collaboration platform is not an isolated platform, but an interdepartmental, cross-level, cross-network platform for information and business collaboration.

At the county level, the "multi-planning integration" platform horizontally connects the business systems of county departments and vertically links to the district-level "multi-planning integration" platform.

At the county level, the platform enables information linkage, allowing "multi-planning integration" results to be easily accessed by departments such as the Development and Reform Commission and the Natural Resources Bureau. Based on planning data sharing, real-time linkage of department approval information is realized, ensuring that result data can be sustainably updated and upgraded.

At the district level, many district governments are currently piloting the "multi-planning integration" platform, and the county-level platform needs to integrate county and district collaboration requirements in its design to ensure seamless connection between county and district platforms. This promotes county-district collaboration and ensures the full coverage of "multi-planning integration" work.

2.2 Overall Architecture Design

In line with the project construction goals, the "multi-planning integration" business collaboration platform is built using a service-oriented architecture (SOA), utilizing an Enterprise Service Bus (ESB) to integrate and manage services flexibly. Since the system involves interconnecting systems between multiple departments and exchanging and sharing spatial data, message middleware is used to intelligently route and transmit messages. The overall architecture of the platform consists of six layers: the operational support layer, data layer, component layer, service layer, application layer, and interface layer, along with a security guarantee system, operation and maintenance management system, policy and regulatory system, and standards and specifications system. The role of each layer and the supporting relationships between them form a stable foundation for the platform's operation.

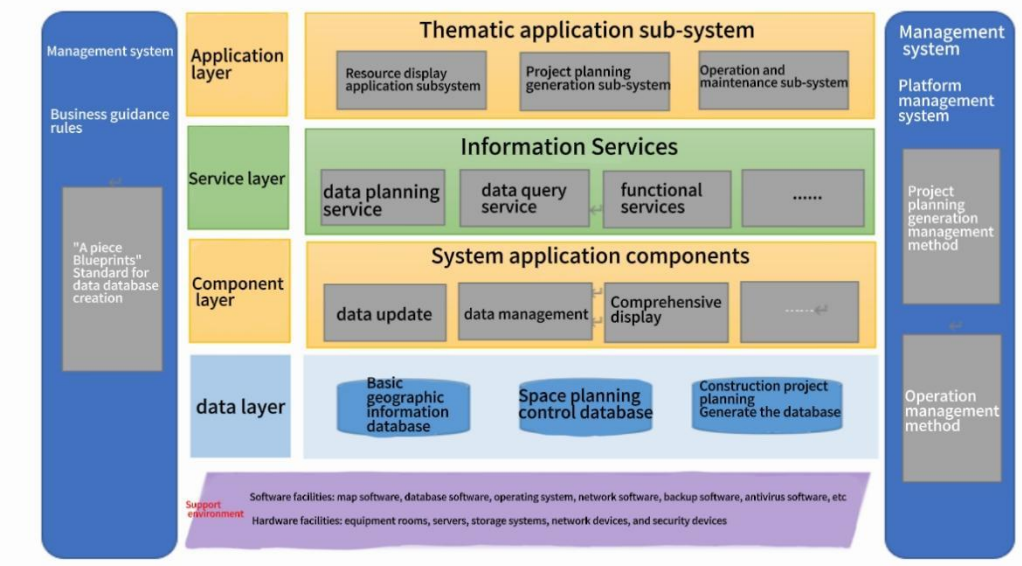

Figure 1: Overall Framework Diagram

2.3 Platform Development Standards and Norms

To ensure the smooth operation of the platform and the accuracy of data, Xiuyan Manchu Autonomous County has established relevant standards and norms, providing strong institutional guarantees for the platform's operation.

2.4 Interface Integration Development

To achieve interoperability with other systems, Xiuyan Manchu Autonomous County's "multi-planning integration" business collaboration platform has also carried out interface integration development. This includes integration with the municipal engineering project approval management system, integration with national and provincial engineering project approval management platforms, and integration with the Natural Resources Bureau for unified blueprint data. The completion of these interface integration tasks has provided strong support for the platform's interoperability.

2.5 Key Technologies and Applications

2.5.1 Efficient Multi-Source Heterogeneous Data Management

A multi-source heterogeneous data management platform is used to support multi-user concurrent access and editing. It allows for easy management of a shared, multi-user spatial database within a DBMS, enabling the integration and unified management of multi-source heterogeneous data.

2.5.2 Service-Oriented Architecture

An Enterprise Service Bus (ESB) is implemented to promote the integration and coordination between different subsystems, providing standard interfaces and data services. The ESB serves as the central connection hub in the network, a necessary component for constructing the enterprise's "nervous system." The introduction of ESB changes traditional software architecture by offering more cost-effective solutions than conventional middleware products. It also eliminates technical differences between different applications, allowing them to work together seamlessly and enabling communication and integration across different services [4].

2.5.3 Geographic Information Sharing

Using GIS service technologies based on OGC standards, the platform provides map services, raster services, geocoding services, and more, supporting information sharing in a distributed environment.

2.5.4 Integrated J2EE Architecture

By adopting advanced information technology to develop application systems, enterprises can collaborate efficiently with vendors, improve internal operational efficiency, and maximize customer satisfaction. J2EE, known for its "security, stability, and reliability," has quickly become an effective approach to implementing e-commerce systems. J2EE provides a solid framework for building scalable, flexible, and easy-to-maintain application systems. The e-commerce system development model based on J2EE shortens the development and implementation cycles, effectively manages the complexity of application systems, enhances system interactivity, scalability, and integration, and reduces the overall cost of system development.

3. Platform Practical Application

The platform provides three major application subsystems: resource display subsystem, project planning and generation subsystem, and operation and maintenance subsystem, supporting the planning, approval, management, and display of all county projects.

3.1 Project Organizational Structure and Team Building

To ensure the smooth implementation of the project, Xiuyan Manchu Autonomous County established a dedicated project team responsible for the overall planning, organization, coordination, and execution of the project. The project team consists of several subgroups, including demand analysis, system design, and development and implementation groups. Each subgroup has clear responsibilities and collaborates effectively to advance the project. At the same time, the project team places great emphasis on team building, providing regular training, communication, and assessments to enhance the

professional skills and teamwork abilities of the members [5].

3.2 Demand Survey and Analysis

Before the implementation of the project, the project team conducted in-depth demand surveys and analysis. Through close communication and discussions with various committees and departments, the project team comprehensively understood the business needs and expectations of the "multi-planning integration" business collaboration platform. Based on this, the project team organized, summarized, and classified the demands, providing strong support for subsequent system design, development, and implementation.

3.3 System Design and Development

Based on the demand survey and analysis, the project team carried out system design. The system design includes overall architecture design, functional structure design, application security design, network structure design, and other aspects. During the design process, the project team fully considered the system's scalability, stability, and security requirements to ensure the system's reliability and practicality. The team then proceeded with the system development according to the design requirements, including system development, interface development, database design, and other stages. During development, the team focused on code quality and standardization, ensuring the system's stability and maintainability [6].

3.4 System Testing and Deployment

Once system development was completed, the project team conducted system testing. The testing process included unit testing, integration testing, validation testing, system testing, and emergency handling testing. Through testing, the project team identified and resolved some issues and defects in the system, ensuring its normal operation and stability. The team then proceeded with the deployment, which included hardware integration, software installation, network configuration, and other steps. During deployment, the project team paid attention to communication and coordination with the client to ensure smooth deployment and the system’s normal operation.

To ensure that various departments are proficient in using the "multi-planning integration" business collaboration platform, the project team also conducted training. The training covered system operation, business process training, and other areas. Through the training, the departments gained a deep understanding and mastery of the system's functions and operational processes.

3.5 Practical Application Case

Through the platform’s actual use in departments such as the Natural Resources Bureau, Development and Reform Commission, Administrative Approval Service Center, and Environmental Protection Bureau, the platform’s effects on information sharing, approval process optimization, conflict detection, and resolution were demonstrated. Through data analysis and user feedback, the platform’s practical effects on promoting inter-departmental information sharing, improving approval efficiency, and optimizing resource allocation were evaluated.

Conclusion and Outlook

The "Multi-Planning Integration" business collaboration platform of Xiuyan Manchu Autonomous County has integrated planning data from multiple departments, creating a comprehensive management system that covers the entire process of planning preparation, project approval, and spatial control. The "Multi-Planning Integration" business collaboration platform is not an isolated platform, but an information-sharing and business platform that connects across departments, hierarchical levels, and networks. After the project preparation, system establishment, and system operation phases, the "Xiuyan Manchu Autonomous County 'Multi-Planning Integration' Business Collaboration Platform" project has been completed, and the system is currently operating stably. The successful construction and practical application of the "Multi-Planning Integration" business collaboration platform in Xiuyan Manchu Autonomous County provides a feasible solution for planning management in similar regions. Significant achievements have been made in areas such as information sharing, approval process optimization, and conflict detection and resolution. Practice has proven that through this platform, the

"one blueprint throughout" working model has been established, truly achieving the integration of land spatial planning, inter-departmental information sharing, optimization of approval processes, and enhancing urban governance modernization.

The "Multi-Planning Integration" business collaboration platform of Xiuyan Manchu Autonomous County is based on the national economic and social development plan, strengthening the connection between various types of planning, including urban and rural construction, land use, environmental protection, cultural heritage protection, forest land protection, comprehensive transportation, water resources, cultural tourism, and social services. It ensures that "multi-planning" has consistent critical spatial parameters such as protected space, development boundaries, and urban scale, and establishes a control line system on a unified spatial information platform to achieve the goal of optimizing spatial layout, effectively allocating land resources, and improving government spatial control and governance capabilities.

Based on this, the "Xiuyan Manchu Autonomous County 'Multi-Planning Integration' Business Collaboration Platform" project, after completing stages such as demand research, platform design, development, testing, user training, and trial operation, is now operating stably and is ready for acceptance. In the future, the platform will continue to improve its functionality and enhance user experience and service quality.

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