

Research and Thinking on Smart Water Supply System for Urban and Rural Areas

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Objectives

Based on the characteristics of the water supply industry and the use of current hot information technology to build an smart water supply system for urban and rural areas, the purpose is to effectively supervise the operation and management of water supply engineering facilities, real-time grasp the water supply situation in the jurisdiction, supervise the service level of water supply enterprises, provide the public with water supply information inquiry and feedback channels, and rationally allocate water supply resources, make scientific decisions and plans. Finally improve the scientific and intelligent level of water supply industry management.

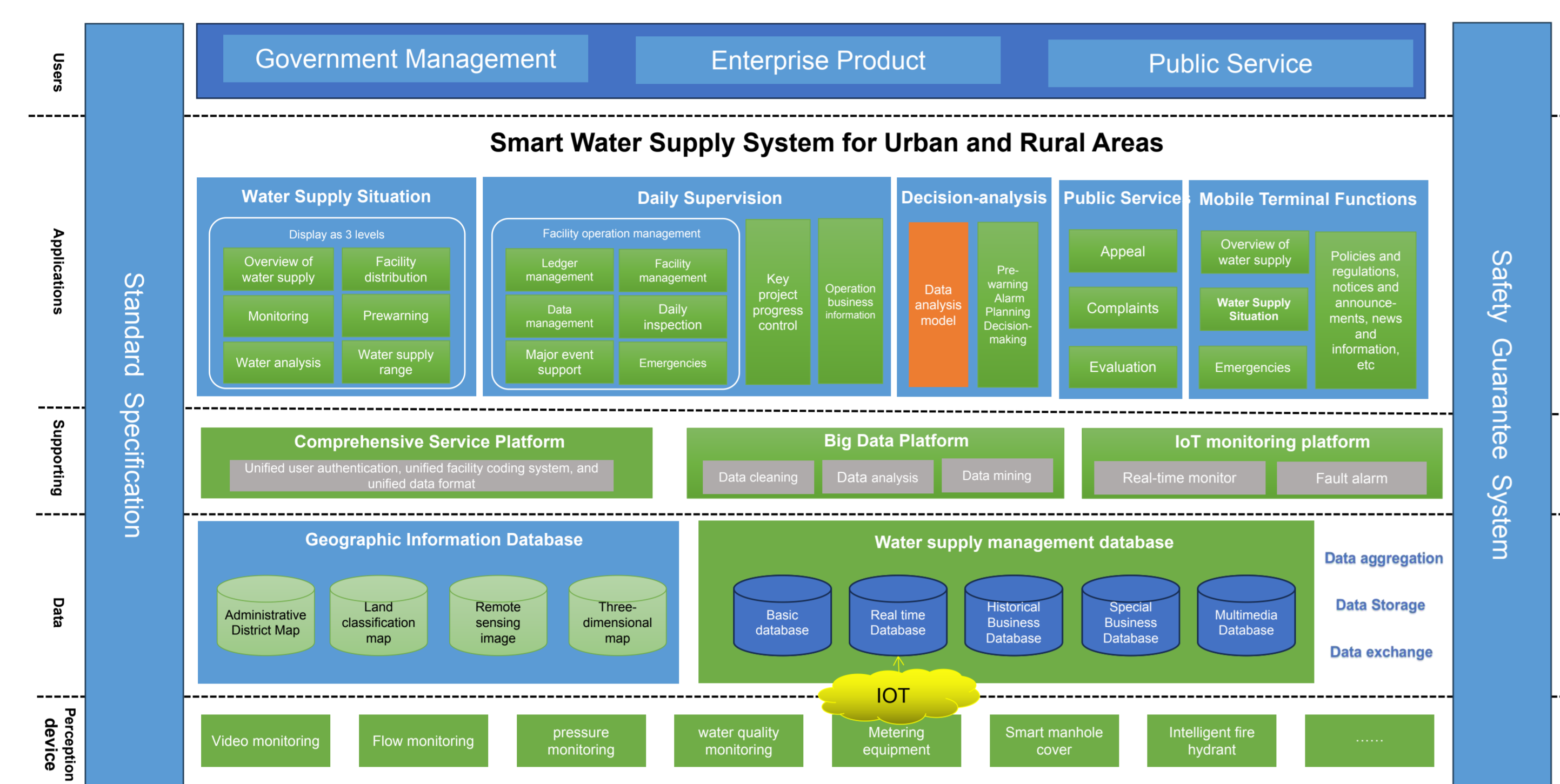


Fig1. Architecture diagram of smart water supply system for urban and rural areas

Methods

(1) Make up for the shortcomings of urban and rural intelligent equipment, achieve extensive coverage of online monitoring equipment for water quality, water pressure and flow data, and realize real-time convergence of monitoring data based on Internet of Things technology.

(2) Complete the basic urban and rural data ledger, improve the automatic collection and update mechanism of dynamic and static data, establish classified water supply databases, and realize scientific and intelligent management of water supply data.

(3) Build a smart management platform for urban and rural water supply , complete application programs integration, integrate the functions of module systems or data models such as GIS system, SCADA system, marketing system, customer service system, leakage control system and hydraulic model etc, realize the data interaction and sharing among system modules, and conduct in-depth data mining based on Big Data, Artificial Intelligence and other technologies. Then apply the analytical data to guide water supply production and decision-making.

(4) Create a map of water supply spatial data distribution, build four intelligent water supply management scenario applications including "water supply situation, daily supervision, decision-analysis, and public services" and develop corresponding functional modules, and meanwhile develop mobile terminal functions to open public services for the public.

(5) Establish and improve the policy system of intelligent water supply supervision and management, improve the ability of forecasting, early warning, and emergency handling of water supply events in all links and the whole chain of water supply, and promote the establishment of departmental collaborative working mechanism and the "take, supply, use and discharge" water cycle coordination mechanism.

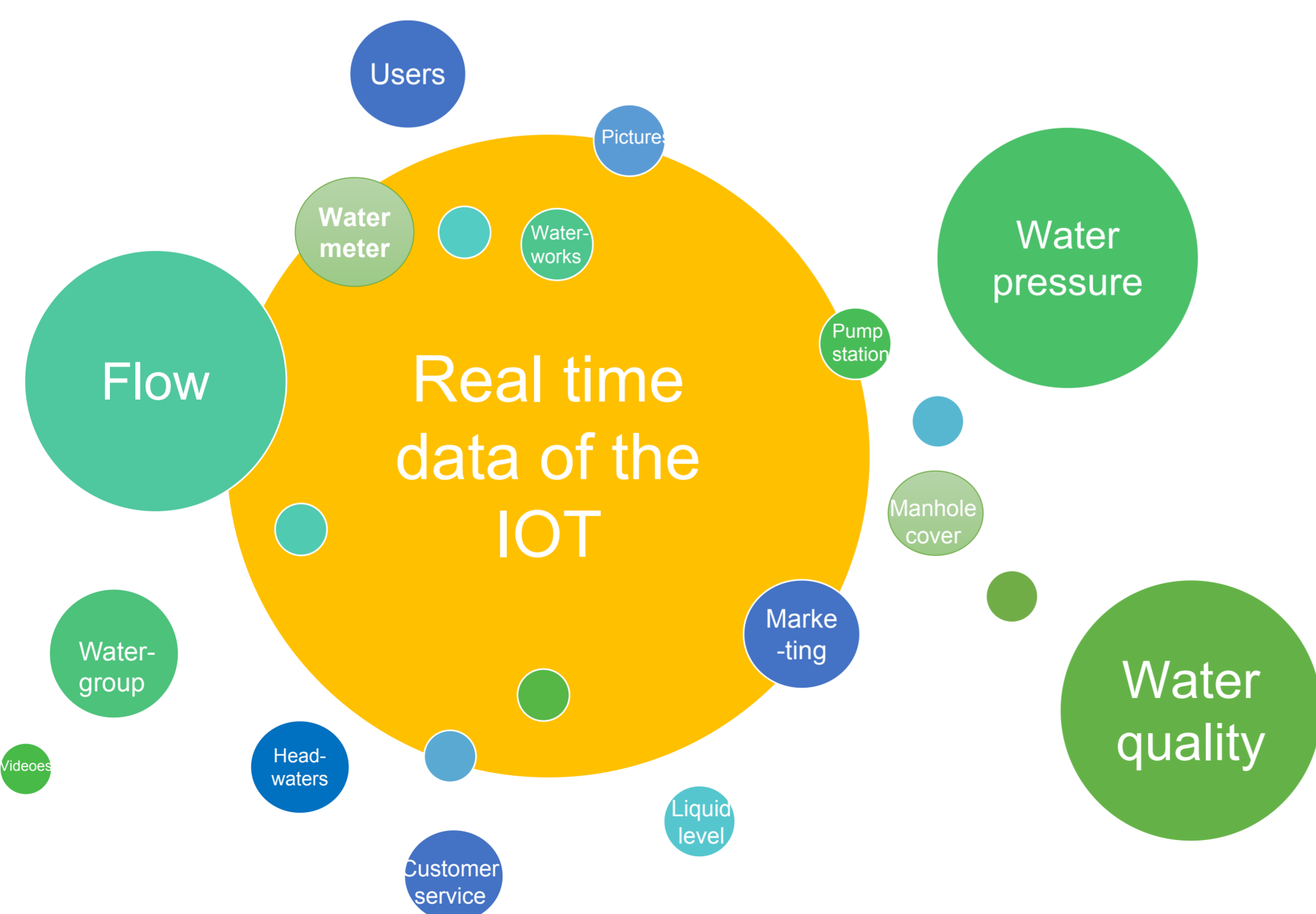


Fig2. Real time data of the IOT for water supply management

Results

(1) The system can gather water supply data with high quality and efficiency, help to quickly clarify the water supply ledger, and provide reliable data support for making accurate and reasonable water supply managements and decisions.

(2) Spatio-temporal data A Map can more intuitively display the dynamic data of water supply, and provide chart tools to assist analysis, which can help managers quickly obtain the required information and improve work efficiency.

(3) The system can carry out multi-directional analysis of water supply situation, display of water supply overview, early warning information and "access to use" comparison trend for the city, administrative district, township three level ,and supply convenience to fully master the water supply work situation for the managers.

(4) It provides leakage alarm, pipe burst warning, abnormal water quality alarm and other problem reminders based on water supply monitoring data and historical data analysis, and can quickly locate the problem location information, after background analysis provides reference solutions, thus improve the emergency response speed and problem solving efficiency.

(5) It can assist daily supervision and water supply decision-making, provide tools for ledger data management, operation status monitoring and daily supervision and inspection of various water supply facilities, and help to realize the whole process management of the implementation progress of key projects. and It can supply the function to conduct spatio-temporal analysis of supply and demand based on the information of water supply facilities and users, which can help to reasonable planning of new site selection of water supply facilities, and controlling the water supply pressure.

(6) It can integrate the information of the user hotline and the government public service platform, draw a heat distribution map of the water supply problems, and help to prioritize the hot issues that are centrally reflected. And it will open the mobile terminal service functions, provide social users with water supply data query window and problems reflection message board, to improve the users' sense of service acquisition.

(7) Integrating water supply management with water intake, use and drainage, that can realize the intelligent supervision of the whole process of water resources circulation, contribute to the scientific formulation and effective implementation of policies such as rational allocation of water resources and water conservation, and comprehensively improve the refined, intensive and collaborative management of regional water.

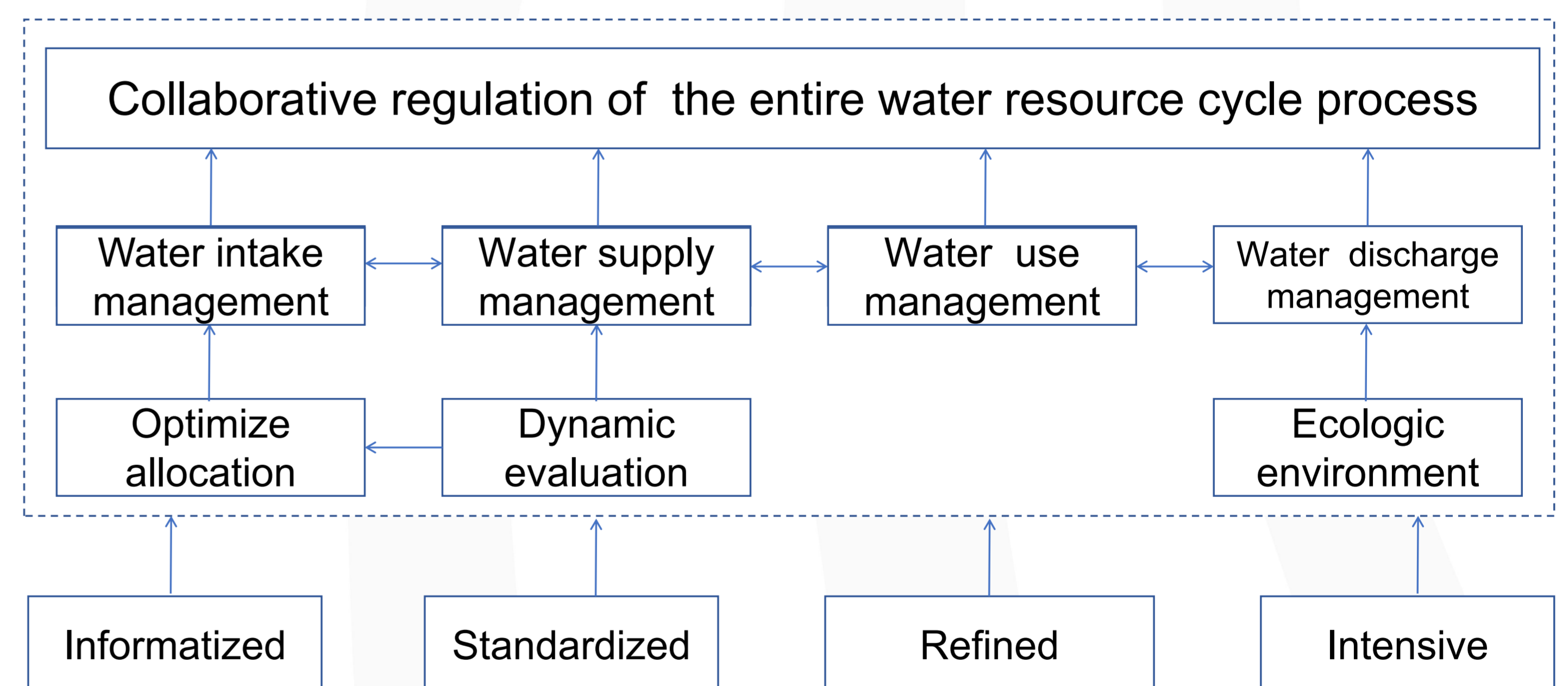


Fig3. Collaborative regulation of the entire water resource cycle process

Conclusions

The establishment of an smart water supply system for urban and rural areas will help improve rural water supply conditions, reduce the gap between urban and rural water supply, and comprehensively improve the level of water supply services. In the future, with the continuous development of information technology, the intelligent water supply system will continue to be improved, convenient and more user-friendly , solve more problems in the operation and management of water supply, and provide more diversified and effective solutions for improving the quality of water supply, optimizing the allocation of water resources and saving energy.