A Study of Logistics Park Information Platform Based on Cloud Computing

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Abstract. The construction of logistics information platform based on cloud computing plays an important role in resource integration, information sharing and logistics operation efficiency of logistics park. According to the logistics development situation, the demands and plan of logistics park information platform of Junlian county, through the system function design and construction analyses, we develop a logistics information platform based on cloud models, which will provide an idea and reference for Junlian county to accelerate the construction of logistics information and regional economy development.

Introduction

A logistics park is a logistics organization and management nodes with a variety of different types of logistics facilities and logistics enterprise in space focused on the layout of places, also a certain scale and have a variety of services function of logistics enterprises in an industrial development zones. In recent years, China's logistics park information technology has made rapid development, and effectively promoted the development of China's economy, but compared with the developed countries in Europe and America, there are still some problems, for example, resources waste seriously, the function of service is single, competitiveness is not strong, poor information flow, logistics park work in isolation, etc. The park development is still unable to meet the fast-growing market demand. In particular, the construction of logistics information platform remains in the initial stage, therefore, the use of modern information and management technology, in-depth study of key technologies of logistics information platform, developed a scalable, sustainable logistics information platform is the focus of current research.

Recently the study of the logistics information platform has made some achievements. Current coastal countries have gradually established a port logistics public information platform [1]. Logistics public information platform mainly constructed by enterprise and linked with e-government systems in European and American [2]. Pietro Romano pointed out that coordination of logistics information system has an important role to the development of the logistics industry [3]. According to Singapore YHC logistics business processes, Ramani designed warehouse management systems, logistics and freight management system and linking it to the county's electronic data interchange network, which provides customers with integrated logistics services [4]. With the development of information technologies, cloud computing applications in the supply chain is developing fast [5-12]. Dang et al. summarized the planning method of logistics park information platform, the classification of logistics park and the information technology used in the construction, and predict the future research direction [1].

According to the plan of Comprehensive Reform and Experimental Area for Coordination of Urban-Rural Development between Chengdu and Chongqing and the 13th Five-Year Plan for Economic and Social Development of China, and the plan of of Sichuan, and logistics industry
adjustment and revitalization plan of the State Council, this work do some in-depth study of the Junlian county logistics park public information platform based on cloud computing technology, which will help to integrate and optimize the logistics resources and promote the healthy development of modern green logistics in Junlian county.

1. Cloud Computing

Cloud computing is a commercial implementation of the concept of computational science of parallel computing, distributed computing, and grid computing, and hybrid evolution and jump of virtualization, utility computing, infrastructure as a service (IaaS), the platform as a service (PaaS) and software as a service (SaaS) concepts. In 2006, Google CEO Eric Schmidt first proposed the “cloud computing” concept at the search engines Conference (SES San Jose 2006), and spread widely through the mass media [13].

Cloud computing has a different definition at current research, many did not include all the functionality of cloud computing, which is not a precise and uniform definition of standard [14]. Vaquero et al. try to extract a comprehensive definition from 22 different expressions [15]. According to National Institute of Standards and Technology (NIST), cloud computing is a model, it can be anywhere, anytime, quickly and easily, on demand obtain the required resources from a configurable shared pool of computing resources(for example, network, servers, storage, applications, and services), resources can be supply and release quickly, which will be made the manage resource workloads and interactions with a service provider reduce to a minimum [16].

Cloud service model is based on three major types of cloud computing: SaaS, PaaS, and IaaS [8,14,17]. They are popular, effective, flexible, and user-friendly.

**SaaS.** The service offered to the user is to use the software or applications running on a vendor’s cloud infrastructure that the user has limited permission to access. The applications are accessible through a thin client interface, such as a web browser, or an app interface. The user does not know the application vendor’s infrastructure and does not control operating system, hardware or network infrastructure. It is available through the Internet software model, users do not need to purchase the software, but providers lease web-based software to manage business activities. For example, the Sun cloud servers.

**PaaS.** In this service model, the service provider affords moderate basic elements, including the operating system, network, and servers, and development tools in order to enable consumers to develop and access to applications or manage their configuration settings. Actually, PaaS makes the software development platform as a service, and sends it to user as SaaS model. Therefore, PaaS is an application of SaaS model. However, the emergence of PaaS can be speeded up SaaS development, especially accelerating the SaaS applications development. For example, software customization and development.

**IaaS.** Users have developed the required applications and need just a basic infrastructure. In this case, processor, network, and storage services provided via vendors according to user requirements. Consumer can be obtained services from comprehensive computer infrastructure using internet. For example: hardware server leasing.

2. Junlian Integrated Logistics Park Information Platform Based on Cloud Model

2.1 Logistics public information platform construction

According to the plan of logistics park information platform and the current park operations, operation process, infrastructure and business needs in Junlian county, this work builds a logistics park information platform based on cloud computing combining the cutting-edge cloud computing technology (Fig.1).

Junlian logistics park information services cloud platform includes park management cloud platform, information portal and transaction management platform. Relevant departments of the
Government, logistics infrastructure vendors, hardware and software of cloud computing providers, expert system of institutes, colleges, as well as logistics enterprise will be linked via internet [18].

2.2 Logistics park public information platform function modules design

Logistics business information platform is the core part of the logistics park information platform construction, which offer a unified and efficient communication interface for enterprises and customers in the park, and comprehensively integrate their demands information and logistics resources to meet the needs of integration of logistics through the optimal resources allocation. Its general functions include: data collection, sorting, transport, storage, statistics and analysis; full range of customer relationship management, logistics service monitoring, the whole process management, full interaction and information sharing, reduce delays and financial losses due to information asymmetry, reasonable integration and scheduling all logistics resources within region and improve equipment utilization. Logistics information platform is combined with all the logistics information of logistics Centre and distribution center and process all information within the scope of the Centre's operation based on interior network. Junlian logistics park information cloud platform consists of three major sections and ten modules, each module also includes many small modules (Fig. 2).

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Figure 1. Logistics park information cloud platform construction model.

Figure 2. Junlian logistics park information platform function modules.
2.3 logistics park public information cloud platform architecture design

Architecture of logistics information Cloud platform refers to the linkages between the logistics information platform components and each component themselves, cloud platform logical structure will be specified and instantiated during the system designed. Logistics industry service scope is related to manufacturing, policy, procurement, warehousing, distribution, transportation and so on, therefor, the design and construction of the architecture of the cloud platform should be matched with the needs in the field of logistics services, and the SaaS, PaaS and IaaS layer should be associated with logistics business related functions, modules, and hardware respectively and formed a tightly coupled logistics information platform architecture [19].

Junlian logistics information platform based on cloud adopt four-layer application system platform including SaaS, PaaS, IaaS and the data layer (MaaS), which satisfied with the information resources needs in the platform with system expansibility, personalized application requirements and a variety implementation way (See Fig.3). Among them, the application layer provides service for variety logistics business systems which include industry general application system and enterprise-level business management systems, such as vehicle tracking and monitoring systems, supply chain management systems. Data interface of the application service layer as an important extension of the platform should support mature, general electronic information message protocol and interface specifications, interface modules should be loosely coupled to the application system. With the help of middleware interface, service layer provides the general service interface components for application system. Resources layer aggregate the information resources and software application to support the system running normally, which unified manage the various kinds basic hardware facilities including terminal equipment of Internet of things and physical equipment of data center provided from hardware layer by virtual technology of cloud computing, and packaged as interface unified logic resources to eventually user and upper layer [20]. Data layer save configuration information, operational data, system running status and other information and formed the data resource pooling to ensure data integrity, reliability, and security.

![Figure 3. logistics park public information cloud platform architecture.](image)

**Summary**

Junlian logistics park public information platform based on the cloud computing architecture technology will help to boost and optimize logistics park enterprise management mode and operation.
philosophy, improve the quality of products services and operation of logistics enterprises in the park, integrate industry resources, enhance the overall quality of Junlian logistics platform and provide a whole new set of applications for promoting the whole Junlian logistics business development.

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References


