Construction of a Smart Service Cloud Platform for Readers in University Libraries

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Abstract: In order to improve the service level of university libraries, the cloud service mechanism based on cloud computing has met the needs of the vast majority of readers. The library industry has gradually introduced this model to build a cloud service platform, in order to provide readers with more convenient, efficient, and intelligent reading services. This paper introduces cloud computing and its core competitiveness, analyzes the outstanding advantages of cloud service platforms in reader services of university libraries, and proposes several feasible strategies for the construction of cloud service platforms. A cloud computing based network service platform allows users to experience digital reading through service structure design, function optimization, mode construction, and other links, building a bridge for communication and communication between readers and libraries. This platform can provide readers with one-stop information services such as literature search, borrowing, renewal, information release, and new book introduction. Users can access relevant literature resources and services through multiple carriers and forms of operation without time and space constraints. A cloud computing based network service platform can utilize the Internet and 5G communication technology to improve information transmission efficiency, expand literature information service channels, and provide readers with more efficient, stable, and fast cloud knowledge services.

Keywords: university library; Smart services; Cloud platform; structure

1 Introduction

University libraries are closely related to activities such as teaching, scientific research, and student self-directed learning. The size, characteristics, and information service capabilities of its collection of books have also become the basis for measuring the comprehensive strength of a school. Therefore, university libraries are regarded as the "heart of a university"[1]. In a smart environment, library services are a high-level knowledge service that not only provides users with more accurate and professional knowledge information, but also fully promotes the integration of people and knowledge resources, creating a green and harmonious knowledge service environment. The traditional university library is a physical library, with the collection resources mainly consisting of printed paper books and shrinking non book materials such as micro, machine readable, and audio-visual materials. The library manages and organizes the aforementioned materials, providing services through reading, lending, and simple reference services. Readers will receive library services at the library according to its opening hours. Under the traditional model, university libraries focus on book collection construction and

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provide services to readers based on their existing resources. The level and scope of service are limited by the size of the collection, and are a "book based" service model. Figure 1 shows the traditional business of the library [2].

For college students, reading is an important way to enhance their cultural literacy and professional skills. In the context of building a learning society in the country, university libraries should fulfill their responsibilities as literature and research centers, actively integrate modern science and technology, innovate reading promotion methods, and build cloud service platforms. The cloud service platform is mainly based on cloud computing technology, and achieves the integration and management of library resources, network services, and app applications through the construction of a cloud service architecture. After building a cloud service platform in university libraries, literature resources can be transmitted to readers' mobile devices through network transmission. Readers can download apps such as mobile phones and tablets to directly access relevant resources and read target literature. Currently, mobile digital reading has become a new norm for information browsing among students in universities. Building a cloud service platform has significant driving significance for improving the service level of university libraries' readers and deepening the effectiveness of reading promotion[3].

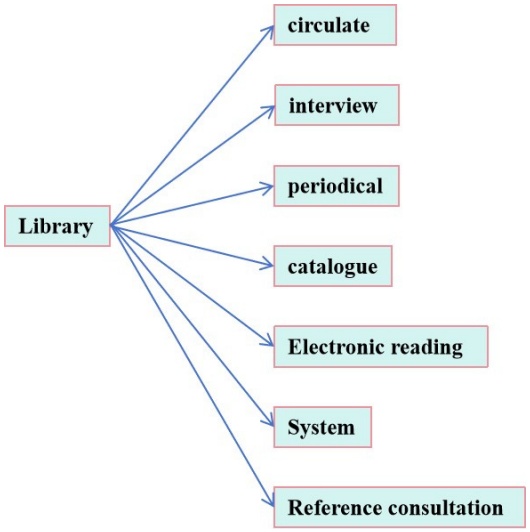

Figure. 1 Traditional Library business

2 Cloud computing and its core competitiveness

2.1 Concepts related to cloud computing

Cloud services have entered the global landscape and are rapidly being applied by more and more enterprises. The National Institute of Standards and Technology of the United States has provided a clear definition of cloud computing, which is composed of configurable shared resource pools that contain various hardware and software resources, such as servers, networks, applications, etc. This resource pool has self-management capabilities, allowing

users to obtain relevant resources according to their own needs[4]. Cloud computing includes the following layers: firstly, cloud computing is committed to providing users with resource sharing services to improve resource utilization; Secondly, cloud computing integrates multiple technologies, simplifies resource service processes, and improves intelligence levels; Once again, users can access relevant resources or services through the internet, which is convenient and fast. Currently, the main service modes of cloud computing include public cloud, private cloud, community cloud, and hybrid cloud. Among them, the operating entity of public cloud is the cloud provider, which mainly provides users with different types of digital resources and charges a certain service fee. This service model has the characteristics of low cost and good scalability, such as Alibaba, Tencent and other enterprises mainly applying the public cloud service model. Private clouds are mainly owned and operated by some large companies, while small and medium-sized enterprises often choose community clouds to provide network services. Hybrid cloud refers to a service model composed of two or more types of clouds, which can integrate the advantages of different service models, reduce network service costs, improve service targeting, and optimize its own service structure.

2.2 Core Competitiveness of Cloud Computing

After long-term technology integration and development, the core technologies in cloud computing, such as edge computing and distributed computing, have become more mature, and the commercialization model of cloud services has gradually become clear. The perfect integration of core technology and service models has subverted traditional business service models, and the benefits and efficiency of cloud services are becoming increasingly prominent. Compared to traditional business service models, cloud computing based service models have higher flexibility, reduced service costs, and significantly improved service efficiency. In terms of service flexibility, cloud computing has better service flexibility compared to traditional services, and can optimize its own resource configuration based on a large amount of computing to improve service flexibility; In terms of resource utilization, cloud computing can utilize current virtualization technology to reshape data information service processes, innovate service models, and improve the utilization rate of data resources; In terms of operating costs, cloud computing based services can save more than 60% of operation and maintenance expenses compared to traditional service forms, significantly saving costs, and enhancing industry competitiveness. Against the backdrop of high labor costs and low automation service levels in China, cloud computing based services have strong competitive advantages and promising development prospects[5].

3 Analysis of the Application Advantages of Cloud Service Platform in Reading Promotion of University Libraries

3.1 Provide massive digital collection resources

Rich networked digital resources are the foundation for libraries to provide high-quality reader services. The purpose of building a cloud service platform for university libraries is also to provide more abundant and easily accessible literature resources for students. Cloud service platforms can leverage their powerful computing and storage capabilities to integrate the digital resources of university and research institute libraries and build a huge pool of network

resources. The completed university library cloud service platform has a database of electronic resources purchased by various universities, with rich resource systems and diverse types, including electronic journals, electronic books, video resources, etc. In addition, the cloud service platform of university libraries can also collaborate with global electricity resource suppliers through the internet, providing readers with multi-channel sources of electricity resources. The electronic resources from different channels are summarized and organized through cloud platforms to form a structured collection of resources in university libraries. By formulating relevant usage rules, management departments can achieve digital resource sharing between libraries and between libraries and readers. A cloud computing based network service platform can also digitize its inherent paper resources and campus characteristic resources, such as local ancient books and excellent academic theses of students, and integrate them into a part of online resources[6].

3.2 Building an accessible knowledge exchange and sharing platform

A cloud computing based network service platform allows users to experience digital reading through service structure design, function optimization, mode construction, and other links, building a bridge for communication and communication between readers and libraries. This platform can provide readers with one-stop information services such as literature search, borrowing, renewal, information release, and new book introduction. Users can access relevant literature resources and services through multiple carriers and forms of operation without time and space constraints. A cloud computing based network service platform can utilize the Internet and 5G communication technology to improve information transmission efficiency, expand literature information service channels, and provide readers with more efficient, stable, and fast cloud knowledge services. At the same time, with the help of Web2.0, the personalized service characteristics of cloud service platforms are more prominent, and the service forms are more diverse. The core technology of cloud service platforms and artificial intelligence is integrated and used to record readers' borrowing data and browsing traces, based on which potential information can be mined, predict readers' reading needs, optimize their own service processes, add online service modules, and accurately push relevant information for users. The cloud service platform can also be well embedded in social software, providing readers with more convenient knowledge services.

3.3 Cultivating high-quality cloud platform management talents

The construction of cloud service platforms can cultivate a group of high-quality professional service talents for university libraries, who can screen network information, provide readers with more high-quality personalized information and construction guidance, and form a structure with service characteristics. When readers are unable to access knowledge resources on the cloud service platform, they can contact the administrator through literature help. The administrator provides readers with richer and more comprehensive network resources by editing new literature publication information. A professional team of librarians can provide virtual services and guidance to readers through cloud service platforms, and readers can obtain the literature information they need through communication with librarians. The construction of a cloud service platform brings together new concepts, technologies, and models. During the construction, operation, and maintenance of the platform, a group of high-quality service management talents will be cultivated[7].

4 Strategies for Building a Cloud Service Platform in University Libraries

4.1 Building a hybrid cloud service approach

As the main body of cloud service resource construction, university libraries should strengthen cooperation with libraries of similar universities, local libraries, and other research institutes, as conditions permit. They should also cooperate with literature resource suppliers, publishing houses, and knowledge service enterprises to increase the channels of literature sources. However, the funding source for the construction of cloud platforms in university libraries is limited, and it is currently not suitable to carry out private cloud construction. Due to the service needs of the audience, libraries can try to carry out hybrid cloud construction, fully utilizing the low-cost, standardized, flexible, and adaptive advantages of hybrid cloud service platforms. Hybrid cloud is a large cloud resource storage center at the national or regional level, which gathers the advantageous resources of different platforms through a federated platform, forming a service mode of shared cloud and private cloud resource sharing.

Under the hybrid cloud service model, digital resources provide services to the public in a unified and transparent manner, improving the scalability of platform resources and services, reducing the cost of resource and service acquisition, expanding the influence of reader services and reading promotion, and forming a win-win situation for university libraries, regional libraries, data suppliers, and publishing houses. Tables 1 and 2 show the architecture of the smart service platform [8].

Table 1 Intelligent Service Platform Architecture (1)

Application layer	Wisdom management	Intelligent retrieval	personalized customization
	Wisdom recommendation	Wisdom librarian	.....
Service layer	Big data mining	semantic analysis	cloud computing
	Visual analysis	Data standardization	Decision service

Table 2 Intelligent Service Platform Architecture (2)

Data layer	data warehouse	knowledge base	Cloud resources
Perceptual layer	video surveillance	network monitoring	sensor
	Temperature and humidity regulation	Seating system	Lighting illumination

4.2 Deepening the Utilization of Web 2.0 Technology Service Advantages

Since its birth, Web 2.0 has played a huge role in various industries, promoting the development of different industries. University libraries should also fully leverage the outstanding technological advantages of Web 2.0 in the construction process of cloud service platforms to better serve platform construction. The construction of cloud service platforms in university libraries should fully draw on the literature retrieval mode of current large-scale network knowledge service platforms, and strive to design a convenient, clear, intelligent, and fully functional information retrieval interface that can output search results in the form of

RSS, personal space, and other forms. University libraries with strong technological capabilities can use RSS customization to determine reader needs through preliminary data surveys, striving to provide accurate information push services for readers, improve retrieval efficiency and accuracy, and optimize their reading experience. The mature development and application of SNS technology can assist in building a communication platform between university libraries and readers, allowing readers to better understand and utilize the library; Tag technology can effectively improve the efficiency of organizing electrical resources, classify various data resources reasonably, and provide tag services. Readers can quickly find target literature based on tag information. After downloading the literature, readers can customize and label the digitized literature in their personal space for future use. IM, Wiki, Blog and other technologies can also be applied to the construction of library cloud services, making services and technologies highly integrated, providing readers with more available network information service scenarios [9].

4.3 Ensuring the Security of Cloud Service Platform Information Resources

Currently, online knowledge services in university libraries account for a large proportion. Faced with the massive amount of network information resources, libraries should strengthen their own security management functions, ensure the security of platform information resources, and prevent and control information security threats caused by internal and external factors in advance. With the gradual deepening of network applications, some illegal individuals have started to use loopholes in library management systems and platform supervision to steal literature information from resource libraries and engage in illegal activities. Therefore, university libraries should increase their efforts in information resource supervision, use technological means to improve the level of network information resource control, and maintain a good network service environment. In the corresponding service practice process, the library can set up a firewall between the internal network and the external network to ensure that various critical digital resources are included in the supervision scope of the firewall and prevent the occurrence of data theft. In order to prevent illegal access, the backend system of the service platform needs to view the detailed information of visitors, and the facilities have dual or multiple access permissions. Only fully audited users can access the platform, and illegal access behavior is strictly controlled. Meanwhile, in order to prevent the impact of force majeure emergencies, cloud service platforms should utilize their storage space advantages to regularly backup and update resource pool data, ensuring the recoverability of network space data [10].

5 Conclusion

This paper proposes the construction of a reader smart service cloud platform for university libraries. As the main body of cloud service resource construction, university libraries should strengthen cooperation with libraries of similar universities, local libraries, and other research institutes, as conditions permit. They should also cooperate with literature resource suppliers, publishing houses, and knowledge service enterprises to increase the channels of literature sources. However, the funding source for the construction of cloud platforms in university libraries is limited, and it is currently not suitable to carry out private cloud construction. Due to the service needs of the audience, libraries can try to carry out hybrid cloud construction,

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