# Yan Whale-An Integrated Life Service Platform Design and Implementation for College Students

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**Abstract.** Smart campus is the latest campus model of intelligent service and management, and also the future trend of university informatization development. In the process of building a smart campus, some universities have designed and built a one-stop service platform. Through the platform, teachers and students can focus on efficient business, and further help build a smart campus. Based on the campus information portal platform of Peking University, this paper puts forward the design and construction scheme of an integrated life service platform for college students. This platform (system) is specifically for college students, which can provide more practical and convenient integrated life services for college students. At the same time, extract and improve the content related to student life services in the original campus information portal platform, and create the smart canteen function module; Integrate the original unnamed BBS, tree hole and other campus social platforms, and creatively build campus social network modules that support social networking and collaboration, so as to meet the various needs of college students in terms of life to the greatest extent.

**Keywords:** Smart Campus; Integrated Service Platform; One-stop.

## 1 Introduction

The development of informatization in colleges and universities has experienced the process from e-learning to digitization, and then from digitization to intelligence, and the state has issued policy documents on the construction of informatization in colleges and universities for many times, and the development of informatization in colleges and universities has been paid more and more attention[1]. In 2018, the state actively promotes the construction of "Internet+Education" in colleges and universities. Meanwhile, based on the General Framework of Smart Campus, colleges and universities in China have begun the construction and exploration of Smart Campus to create an integrated and intelligent campus life and learning environment, and to support the development of schools at a high level. Smart Campus is the latest campus mode of intelligent service and management, and is also the future trend of university informatization development[2]. In the process of building smart campuses, some universities have carried out the design and construction of one-stop service plaorms. However, since the


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construction of smart campus is still in the exploratory stage and there is no standard for reference, although the plaorm brings together a large amount of information and services, there are still problems such as cumbersome business systems, lack of clarity in the interface design, imperfect data interfaces, the need to jump to other plaorms for part of the business, and the burden on the users[3]. Based on the campus information portal plaorm of Peking University, this paper proposes the design and construction scheme of an integrated life service plaorm for college students (hereinafter referred to as the "service plaorm"). This plaorm (system) is specifically for college students, which can provide more practical and convenient integrated life services for college students. At the same time, extract and improve the content related to student life services in the original campus information portal platform, share some functions of the original campus information portal platform, and create the smart canteen function module; Integrate the original unnamed BBS, tree hole and other campus social platforms, and creatively build campus social network modules that support social networking and collaboration, so as to meet the various needs of college students in terms of life to the greatest extent.

## 2 Construction Objectives and Functional Design of the Service Platform

### 2.1 The Idea and Objective of Building A Service Platform

The service plaorm is based on the construction concept of cloud computing and data docking convergence[4], adopts distributed storage technology, is compatible with various types of heterogeneous storage devices, and can flexibly configure computing resources, elastically expand storage space[5]. Load-balancing technology is used to automatically balance various types of application access and requests, and to distribute services to multiple servers for execution, which is used to avoid the risk of downtime brought about by high concurrency and a large number of accesses, and to improve the stability and reliability of the system[5]. Web Service interface technology is adopted to build a unified resource access and call interface and open up resource exchange channels between application systems.

The service plaorm aims to build an unstructured data warehouse of school life service resources[6], integrating and deploying digital resource management functions such as resource entry, editing, cataloging, transcoding, publishing and pushing. Build a data resource cloud service center to effectively integrate all kinds of scattered life service resources into the service plaorm, solve the problems of convergence, sharing, storage and scheduling of life service resources, and provide students with efficient and fast resource application services. Docking and integration of school life service application system, support students to obtain service resources through the application system at any time and any place, to maximize the satisfaction of the various needs of college students related to life.

### 2.2 The Design of the Main Functionalities of the Service Platform

The service platform is designed to meet the various life needs of students, so its functions cover a wide range, which can be roughly divided into five modules: "E", "S", "P", "C" and "A".

"E", that is, eat, is mainly related to students' diet on campus. Based on the dining index of the campus information portal platform, this module combines all catering units in the campus to build a smart canteen subsystem. The system updates the types of dishes, number of diners, free seats, etc. in each canteen in real time, and can provide users with food recommendation, online ordering, communication, interaction, evaluation and feedback and other functions. For students, the system can provide convenient services, avoid queuing time, do not have to stand to eat, and enjoy a wonderful dining experience; At the same time, it can monitor and understand their own diet in real time, and carry out nutrition matching and recommendation according to the needs and existing meals, so as to achieve balanced nutrition and healthy diet. For school and canteen managers, it can reduce operating costs and logistics expenses; Through the evaluation and feedback function, guide the improvement of the canteen and create an intelligent and healthy college canteen[7].

"S", that is, shopping, is mainly related to students' shopping on campus. This module combines all stores on campus, including bookstores, souvenir supermarkets, Wumart, Ruixing, etc., to build a smart shopping subsystem. Users can click to browse and purchase the products they need, and select the time to use, which greatly saves time costs and labor costs.

"P", that is, play, is mainly related to students' sports and entertainment. Based on the smart venue of the campus information portal platform, this module adds functions such as century old lecture hall, online board game, outdoor, etc. to build a smart entertainment subsystem. It can provide users with real-time reservations of various sports and entertainment venues, traffic index, etc., and support the issuance and registration of various entertainment and competitive activities organized by the student union, Youth League Committee, various societies and students themselves, so that students can more conveniently organize and participate in various activities.

"C", namely chat, is mainly related to students' social networks[8]. This module builds a smart social subsystem by integrating anonymous BBS, tree hole and other campus social platforms. Users in the smart social subsystem can log in by real name and anonymity. Users can not only contact people they know, but also have more opportunities to meet new friends and share various information after authorized to collect their own information. The system is mainly divided into two sub modules: individual and group, which can realize social and collaboration functions[9]. In the personal module of the campus social network, the analysis of the common points between users (hobbies, work and rest habits, etc.) is strengthened to help users better expand their personal social network. The group module in the campus social network strengthens the collaboration function. It not only supports users to customize or apply to join groups, but also can pre establish groups and join related users through the analysis of user attributes [10], to facilitate better communication and collaboration among users with common interests.

"A", namely accommodation, is mainly related to student accommodation, bathing, laundry and payment. This module integrates life payment, laundry, bathhouse, etc., and can realize online life payment of all kinds, such as campus card and bath card recharge, accommodation fee payment, etc; Update the use of bathrooms, washing machines and school laundry in real time, users can make an appointment online, and then carry out relevant services according to the appointment time after success, so as to achieve the goal of "less users walk, more data run".

At the same time, the service platform also provides intelligent search, active recommendation, problem feedback and other functions, forming a complete closed-loop system.

# 3 Construction and Realization of the Service Platform

## 3.1 Service Platform Architecture Design

The overall architecture of the service plaorm is mainly divided into four layers, namely, application layer, access layer, service layer and storage layer. Logically, each layer has a progressive relationship, the storage layer provides storage space for data and resources, and the service layer provides data and resource services for the application layer through the access layer[11].

The application layer is a user oriented front-end page (system), which is also the front-end application presentation of the resource platform, including five application systems "E", "S", "P", "C" and "A", and auxiliary functions such as intelligent search, active recommendation, problem feedback, etc., adapting to multi terminal application forms such as PC, mobile phone, Pad, etc.

The access layer is a bridge connecting application systems and service platforms, providing standard API interfaces and middleware services, supporting each application system to access the school computing center, and providing data link channels between systems through the data exchange engine.

The service layer is the core of the service platform, responsible for responding to the requests sent by the application system through the access layer, processing and scheduling the required data resources in the storage layer, returning the data and resource services required by the application system, and meeting the real-time requirements of the application system for the acquisition of data resources. It includes four modules: basic service, business service, service communication and service management.

The storage layer uses virtualization technology to provide storage space for various data resources, which is the foundation of unstructured resource cloud storage center. The distributed storage technology is used to support the integrated access of distributed storage servers, personal computers, NAS, DAS, SAN and other heterogeneous devices, and solve the unified management problem of distributed heterogeneous storage devices[12].

### 3.2 Service Platform Infrastructure and Data Connectivity

Service platform construction in the school application service cluster and the basis of the data center, the student life needs in the scene access integrated school data center platform, the use of distributed bus technology, the integration of existing school computing and storage resources, build video, pictures, documents and other resources of the unstructured storage center, to achieve multi-dimensional and heterogeneous data storage management, through the integration of the school data exchange platform, docking, and provide resource services for the application service cluster. Provide resource services for application service clusters.

The service platform is connected with the campus information portal platform to realize the connection and exchange of basic data with each application system, share basic data of personnel life service information, and achieve unified identity authentication. The service platform adopts standard API interface, intermediate library, intermediate table and other technical methods to realize the connection and exchange of data between systems, including the docking with the school computing center, localized application system, and cloud application system. It supports Oracle, MySQL, SQL Server and other database types, as well as Java, PHP Net and other programming languages.

## 4 Conclusions

The integrated life service platform for college students is a practical exploration of the construction of one-stop service platform for colleges and universities. The construction of the service platform realizes one-stop storage and management of students' life resources, innovatively builds the on-campus social network module and smart cafeteria module to support socialization and collaboration, effectively solves the problems of redundancy of business and cumbersome system of the original information portal platform, and realizes the goal of "less walking for users and more running for data", which maximally meets the various needs of college students related to their life. It can effectively solve the problems of redundant business and cumbersome system of the original information portal platform, realize the goal of "users walk less and data run more", and maximize the satisfaction of the various needs of college students' life. The platform also has shortcomings: 1, due to time, this platform covers less functionality, only by the author's personal imagination, the next step to take the questionnaire to improve the design of the functional modules; 2, due to the lack of comprehensive research, the implementation of the service platform mentioned in this paper needs to be further docking with the university data center and the application system; 3, taking into account the user's privacy and school data security, the service platform in this paper has not access to business applications (e.g., the data center and the data center). Considering user privacy and school data security, the service platform in this paper is not connected to business applications (such as Meituan, GaoDe, barley, etc.), which can be improved after further soliciting users' wishes and consulting with schools and local companies; 4. At present, the platform is only for students, and the next step will be to differentiate the functional modules according to the personnel categories, and

open a version for staff and visitors to realize a platform to meet the needs of a variety of personnel categories.

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