Design of Mobile Integrated Development Platform for Business System Based on B/S Architecture

Hui Lu, Shangfei Gao, Shaolong Li
Information Center of Yunnan Power Grid Corporation Limited, Kunming 650217, China

Abstract: With the popularity of intelligent devices, mobile application APP has become the most widely used application software at present. This paper analyzes the current situation of mobile development and data integration of business systems, and presents a platform design for mobile application development of business systems oriented to B/S architecture, which realizes independent and fast migration of mobile application functions of the original business systems under the specifications of user rights and business processes of the original business systems.

1. Introduction
With the rapid development of mobile Internet technology, the construction of mobile network infrastructure and the popularization of mobile intelligent terminals, mobile Internet has penetrated into people's daily life, profoundly changing the way of activities and thinking. With mobile payment, mobile shopping and mobile social networking are the most typical and extensive. In recent years, driven by the development of 4G network, mobile APP has become an important manifestation of enterprises around users. Mobile APP is mainly installed in users' mobile phones, and is an important medium for the company to publicize, promote and carry out business with users.

The B/S (Browser/Server) mode architecture based on HTTP protocol transmission has the advantages that the client can directly use the existing local area network or Internet network. It can operate on any software and hardware platform, using a unified standard browser interface, and the Web application program is centralized in the server for management and development, thus reducing the cost of system construction and client maintenance, and it is convenient and fast to connect [1]. The adoption of B/S technology architecture has become the current common architecture standard for enterprise-level business systems. Enterprise-level mobile informatization is the inevitable trend of the current development of mobile Internet, which promotes the convenience and efficiency of internal and external work of enterprises. At present, the slow development and application of enterprise-level mobile applications are due to objective factors such as system network security policy mechanism (e.g. internal and external network isolation) and complex operation of business systems. The main reason is that the migration of mobile application functions of business systems is restricted by the original system manufacturers. Most enterprise-level mobile applications are basically developed and built by the original manufacturers. The fundamental reason is that the original system manufacturers carry out system design according to their design specifications (mainly manifested in database design), bind relevant processes to a certain extent, and even are unwilling to open and share system data.
2. Analysis on the Current Situation of Mobile Development of Enterprise Business System

2.1 Mobile development analysis
Mobile platform-based operating systems have emerged in large numbers. Android and IOS operating systems are the dominant ones among the numerous and varied mobile operating systems and are recognized by the majority of users [2]. Applications or application software (referred to as APP) running on Android operating system or IOS operating system, the data interaction between them and background services are generally responsive APP, which can be run on Android, IOS or mobile tablet. The mobile terminal and background generally adopt HTTP protocol-based interface communication or socket connection. Then, since mainstream APP now adopts html5 development or mixed development mode, and the evolution process of mobile application development technology can be divided into three stages——from the early WAP (including WAP1.0 and WAP2.0) website to the currently popular Native Application, and then gradually turn to Web APP based on HTML5 standard [3]. Therefore, the data interaction between the mobile terminal and the server terminal is a common architecture design by providing the appAPI interface of the service. Through the server-side data request access based on HTTP protocol, the mobile terminal responds and returns the result data mainly in json or xml format. Finally, the mobile terminal analyzes and displays the format of the response result data.

2.2 Backend business system integration analysis
According to the requirements of business integration or data integration analysis, the integration between enterprise business systems is mainly based on data sharing achieved by integration interface specification. Second, when data interaction is not involved but only data query needs, the integrated access mode can also be authorized through the database layer account in the intranet environment; Third, for large enterprise groups, an internal enterprise-level information integration platform will be built to realize data integration and sharing. Among them, the integrated interface is the most widely used because of the simple use and clear division of labor of the service interface communication of Web Service. However, detailed data interface specifications including input and output parameters, are required. The account authorization connection of the database often provides data query in the form of constructing views at the table level of the existing database. Because the connection at the database level directly exposes the system database to the other party, the system database has a high security risk, so the method is not safe and controllable, and is rarely used in general. It is only used when it is dedicated inside and outside and the data security and confidentiality requirements are not high. The core of the system integration platform is to establish a hub platform of enterprise service bus. Each business system will register the data to be integrated on the platform to provide services to the outside in a unified, standardized and safe manner, and to carry out standardized management of safe use for registration and authorization of data providers and users.

In actual work, the workload of system integration promotion and coordination is too large, but it often fails to achieve the expected results. Besides the objective factors of data open sharing, there are subjective reasons for the original system manufacturers to keep the economic benefits of system construction. It is also a practical problem that enterprises and institutions have been facing with isolated information islands and difficulties in data fusion. The mobile informatization of enterprise-level business systems often cannot be separated from the original system developers.

3. Design of Mobile Integrated Development Platform
Mobile Integrated Development Platform (MIDP) is a platform-level middleware that provides rapid porting of PC business system functions to mobile terminals for enterprise mobile informatization construction. It is used for mobile informatization of B/S architecture business systems for mobile phones, tablets and portable terminal devices. It does not need to modify the original business or require providing data interfaces to realize independent and rapid porting, integration and reconstruction of existing business system functions.
3.1 Logic principle

The logic principle of MIDP implementation is through the service program running on the MIDP platform. After the AAP terminal initiates a request to MIDP, the MIDP service initiates a request to Enterprise Business System through the appropriate back-end service URL address after receiving the request. According to the back-end service response, after returning the response data to MIDP, MIDP transfers the data to APP terminal according to the API specifications of APP terminal and MIDP, thus realizing the application of APP terminal business functions. The logic implementation principle is shown in Fig.1 MIDP logic schematic diagram.

![Fig.1 MIDP Logic Schematic Diagram](image1)

3.2 Overall technical architecture design

The overall architecture of MIDP mainly includes three parts——client, mobile integrated development platform and business system. The overall architecture design is shown in Fig.2.

![Fig.2 Overall Architecture Design](image2)

As shown in the above figure, the APP terminal belongs to a part of MIDP, and 1 indicates the communication between the APP terminal and the MIDP intermediate development platform. This uses common interface communication for data transmission and supports access to common 3G/4G, Wifi and other wireless networks. It realizes data access and response by accessing the service interface of MIDP. 2 indicates the communication rules between MIDP and the business system. This is the core of the development platform. In addition to supporting the common business system webservice interface and database connection, the platform also supports the core web page data collection and analysis to automatically obtain the data of the business system. By analyzing the request URL of the business system, the platform can meet the data interaction between the APP terminal and the business system and realize the rapid development and transplantation of the APP terminal functions of the business system functions.

MIDP mainly includes the core function modules of message management, application access, function design and system configuration management, among which message management mainly
includes the management functions of APP application such as message push, notification announcement and terminal equipment. Application access includes web page adaptation configuration, service access and single sign-on. The function design mainly provides general functions of APP, such as window selection, video operation, photo selection, etc. The system configuration includes system support configuration for APP operation such as user management, menu management and permission role assignment.

3.3 Analysis of web page data adaptation
Business system Web page data adaptation collection and analysis, through the establishment of a proxy service between the client and the service period, monitoring the request sent by the local machine and the response result returned by the server, obtaining the request URL and parameters of the business system Web page form, further analyzing the response result data to realize integrated operation. Web page data adaptation analysis is shown in Fig.3 Web page data adaptation analysis flow chart.

![Web Page Data Adaptation Analysis Flow Chart](image)

Data collection and analysis are carried out with the aid of Fiddler tool. The Fiddler package grabbing tool is operated to monitor the request sent by the machine and the response result returned by the server. The URL address and request parameters requested by the service system are obtained. The request URL and parameters are configured on the MIDP platform. The MIDP platform assembles a request message based on HTTP protocol to initiate a request to the service system. The server responds to the request and returns the result. The platform analyzes the response data (such as JSON format) and stores or displays the response data to realize the integrated interaction of web page data of the service system.

When the APP terminal requests access, the access request first goes to the MIDP platform, which forwards the request according to the configured form service system request URL. After the service system server responds, the MIDP platform analyzes the response message data and forwards it to the APP terminal to complete the data interaction process between the mobile application APP and the
service system. The whole data processing process is hidden, which is beneficial to data security, prevents leakage, and improves the security and reliability of the platform.

4. Conclusion
This paper designs the MIDP integrated development platform by analyzing the web page form information of the enterprise-level business system, the data access and transmission specification based on HTTP protocol, obtains the URL address and relevant parameters of the business system's request to the service by using Fiddler's web page data grabbing tool, initiates the request to the business system by assembling HTTP request message, and analyzes the data according to the business system background service response message. The MIDP platform is responsible for data request forwarding, response analysis and forwarding in the whole process, realizes data integration and interaction between mobile applications and service systems, effectively solves the defect that the data interface of the original service system needs to be integrated when the mobile informatization function of the service system is transplanted, and realizes independent and fast mobile end function transplantation integration operation of the enterprise service system within the scope of functions and data authority only through legal users of the service system, thus having wide applicability.

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