

THE DESIGN AND IMPLEMENTATION OF CONVERGENT SERVICE DELIVERY PLATFORM BASED ON CAPACITY OPEN SYSTEM

Lin Ma, Haihong E. and Lianru Liu

PCN & CAD Center, Beijing University of Posts and Telecommunications, Xitucheng Street, Beijing, China

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Abstract: Based on service capacity open system, the author designed and implemented the convergent service delivery platform. In this paper, the author first analyzed the current open status of domestic and overseas telecommunication service and Internet service, and pointed out that the capacity open and service fusion is the wave of the future; and then, he gave the architecture design and guideline supplements of the convergent service delivery platform; After that, he introduced the implement of this platform from both business processes and specific functions; Finally, he pointed out the application prospect of the platform based on the existing functions.

1 INTRODUCTION

With the network bandwidth increasing, the internet technology evolving, the user diversified and the rapid growth of individual needs, telecommunication services are suffering from a strong unprecedented impact. The internet businesses emerge in endlessly, which is full of aggressiveness, leading the telecommunication industry to a pretty passive situation; the whole network concept of telecommunication business and the standard process aiming at obtaining a large scale of industrialization, make the development of new telecom services very complex, research and development cycle very long. Consequently, it cannot compete with the internet business (Wuwei, 2010).

Thus, service integration and capacity open are the best means to break the barriers of network at this stage. On one hand, it realizes the telecom capacity to the internet, and provides telecommunication service a new scenario; on the other hand, a large number of business developers and service providers are brought into the telecommunication industry chain, attaining win-win interests, and bringing new development opportunities for the chain.

2 THE CURRENT SITUATION OF DOMESTIC AND OVERSEAS DEVELOPMENT

2.1 The Current Open Status of the Telecommunication Services

Since the 1990s in the 20th century, the Open status of the Telecommunication Services has become the focus of attention of operators. France Telecom (FT) raised the Orange Partner program in May 2004, which is a global partner program supported by a variety of third-parties, including over 60,000 members. In 2008, Telefonica proposed wIMS2.0 program which is based on the fusion of communication network and IMS, committing to provide web2.0 IMS abilities, with the introduction of web2.0 services to enrich their own telecommunication services. Betavine is an open community and a resource website created by Vodafone, in order to support and promote new applications in mobile and Internet communication developments. The website allows developers to upload their applications, and provides the channels in which members can share knowledge, provide feedback and mutual discussion. In 2009, AT & T proposed the dev Central and Apps Beta program, which allows developers to utilize its API to develop

new applications, and was tested with the help of users of wireless operators. Developers can get feedback from users to improve their own applications. China Mobile's WIMS is the ecological environment in which communication network capability is integrated into Web2.0, implementing the integration and mashups of communication services and Internet business, thus promoting the rapid development of new business applications (Lei Ming, 2009).

However, the capacity open of telecommunication services is still in its infancy. Considering either the development of open technology, or the mode of operation, it is not quite mature at present.

2.2 The Current Open Status of Internet Service

Open, sharing, free of charge have always been the main impetus of booming development of Internet. Compared with telecommunication networks, the opening up of Internet service has made considerable progress. The open of Google Maps API, is the inception of promoting the opening up of Internet. Following closely, Yahoo!, Microsoft released its own open API, expecting to enhance its own user stickiness in forms of embedding the third-party applications. With the leading of Google, Yahoo, Microsoft, Flickr, Youtube and other websites also release their open API to their own services for third-party developers one after another. In an environment with open API, we can reorganize some fragments of the original data, making it more associated. Considering the poor interoperability of different Internet service platforms, the users usually visit different service platforms in order to obtain various Internet services. On May 24, 2007, Facebook launched an open platform. Using this framework, the third-party software developers can develop the applications integrated with the core function of Facebook (JeffyWong, 2008).

How to integrate the Internet capacity and telecommunication capacity rapidly and efficiently, and implement the reopen of the ability after the fusion, has become a issue worthy of exploring.

3 THE ARCHITECTURE DESIGN OF CONVERGENT SERVICE DELIVERY PLATFORM

3.1 Overview of Service Capacity Open System

"Service capacity open system" conducted a research from two aspects in depth, naming the network side open capacity and mobile terminal capacity, and established a "network side open service system" and "terminal side open service operation environment" accordingly, creating the comprehensive and three-dimensional integrated solution of "network to terminal" for the opening - up of mobile Internet capacity.

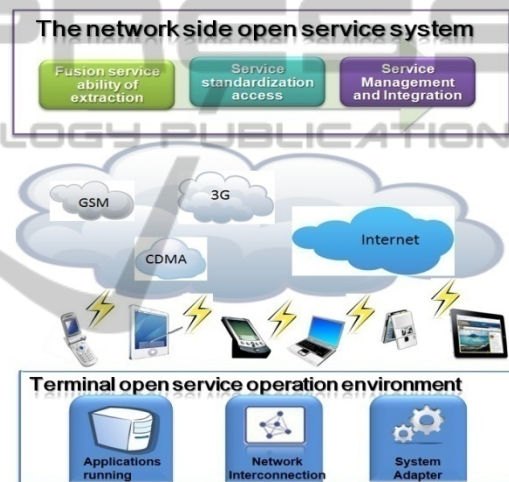


Figure 3-1: A service capacity open system.

The network side Open service system achieved the opening up of fusion capacity of Internet services and telecommunication services, set up the open architecture based on the entire service life cycle in the "network side", including the extraction of capacity (Kristofer Kimbler, 2007), the open service and the final management and integration. This chapter first proposed the two crucial criterion of mobile Internet open services, vertical open standards and horizontal integration standards; With these two standards, the author outlined the location and main functions of the open service system at network side further; Finally, the author introduce the Realization mechanism of corresponding modules in each level of this system architecture in details, meanwhile, each level can interact with each other through some certain ways, Thus implementing the Expansibility and maintainability

of open service system and building a Standardization system for open service capacity at mobile Internet “network side”.

3.2 The Architecture of Convergent Service Delivery Platform

Convergent service delivery platform is an important part of the network side of "service capability open system ".It is based on open infrastructure ,and realize the scalable, distributed, efficient, open architecture , support large-scale service delivery, and use the open and flexible "cloud storage" and "cloud deployment" function to achieve the management and support of the entire life cycle of service. Its main functions include:

- To achieve the rapid provision of services, deployment, implementation and operation of the dimensional ecosystems;
- To achieve the rapid discovery and integration of Service supply and demand;
- To open to continuous polymerization, continuously growing and developing business scale;
- To achieve network independence and device independence of service;
- To implement the aggregation of mass data resources and accurate capture of multi-dimensional users demands;

- To realize the visit of convergent service capacity security through the powerful Cluster effect.

The overall architecture of convergent service delivery platform was shown in Figure 3-2, including the following modules:

Release Delivery Center. Service delivery platform is mainly related to four kinds of roles, "service users, service providers, third-party developers and platform managers", mainly managing three types of objects, naming applications (which is directly available services), process (ie, services which need redevelopment) and Supply. Release delivery centers mainly realize the management function of four kinds of roles and the release and delivery function of three kinds of objects on the platform. Of which:

- User management functions are mainly related to basic user information management, user behavior statistics, the capture of user demands and the service delivery to users, etc.;

Application management, process management and supply and demand management realized the entire life cycle management of four flows, naming "application flow, process flow, supply and demand flow, user flow", and achieved the visible monitoring of business process with the use of BPEL (Business Process Execution Language) engine.

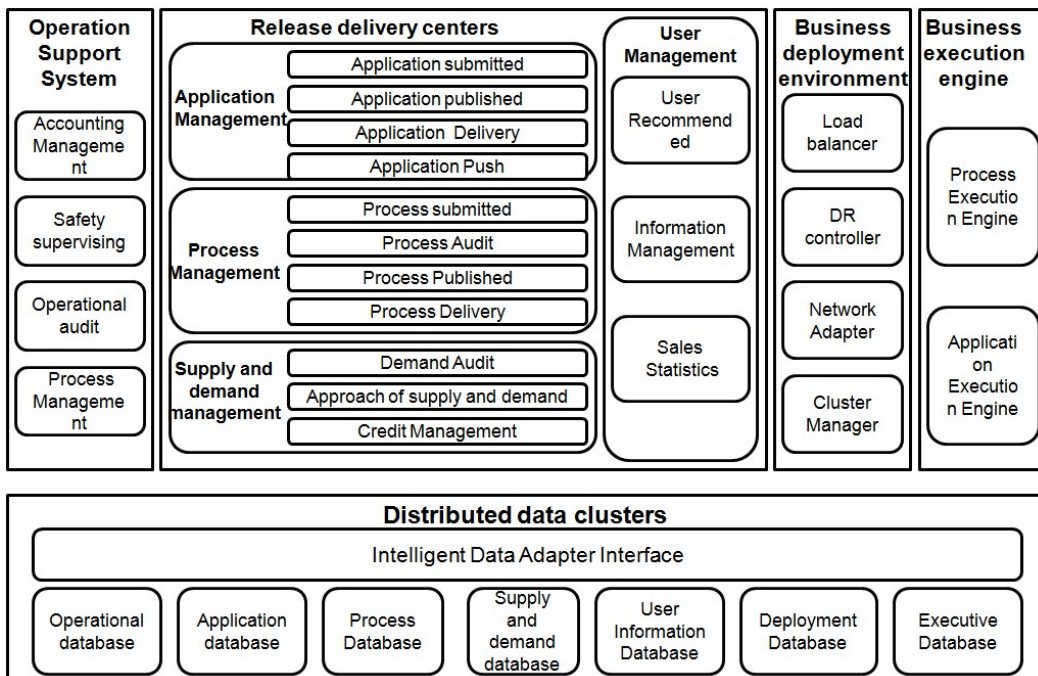


Figure 3-2: Convergent service delivery platform architecture.

Business Deployment Environment. Business deployment environment adopts the distributed cluster to achieve the fusion at multi business level and the dynamic migration for business. Through the standardized business engine mapping to various network protocols, providing the capacity to connect with a variety of networks, you can create applications independent from the network in this type of network abstraction, enabling different networks to provide the same service. The supported services include the traditional SOAP Web Services, RESTful Web Services, SOA Web Services and local telecommunication interface. SOAP Service Interface adapter supports the application interfaces based on Parlay X 2.1/3.0, and the expansion of Web Service (EWS) for those does not support those interface in Parlay X. SOA Service Interface adapter is deployed in the service bus, and application interface exposed by the interface adapter is identical with that of the SOAP Service. Restful Service Interface Adapter expose the HTTP-based interface with JSON-based data types, so that Web 2.0 and rich Internet applications (RIA) can easily integrate communication capabilities. Disaster recovery controller is mainly realizing backup support, error control, power off and other disaster management functions in the process of service deployment. As for the phenomenon that multiple services are simultaneously deployed on the same server, you need to set the load balance mechanism to achieve cluster collaboration in the case of existing large quantity of deployment.

Business Execution Engine. Business execution engine includes the process execution engine and the application execution engine, and each type of engine includes one or more business execution environments, such as the standard Java EE Application Servers (usually with real-time Java virtual machine) and telecom specific business Platforms.

Business execution environment achieves the implementation of all business management capacity sets, specifically including: service application managements such as layout, activation, cancellation and configuration as well as other services like fault management, redundancy management.

Operation Support System. Convergent service delivery platform learn from the mature experience of Telecommunication level operation support system providing a complete set of service operations management functions, and establishing a strong support guarantee for the platform. Including: the business process managements (using the SOA

mechanism) associated with the service provisioning, implementation, operation, maintenance etc; The implement of accounting management with the rules of Dynamic configuration based on the service characteristics, while achieving the uniform of Authorization, Authentication and Accounting (AAA); With large operating information, the use of data mining technology, and operation auditing functions, providing operation status consulting of the reliable services for service providers and platform operators; With Concentrated log data management, implementing the real-time security monitoring function for early warning and safe condition.

Distributed Data Clusters. In order to prevent business interruption caused by a single point of failure, provide the availability and reliability of services, achieve the integration of business resources, enhance the comprehensive service and achieve user value, we need to create a user centered, distributed data cluster. So that we can bring together the application, process, basic supply and demand, and basic user management data, as well as deployment, implementation and operation data in the convergent service delivery platform. At the same time, with massive data mining techniques, convergent service delivery platform builds a powerful knowledgebase, and use the intelligent machine learning, to achieve the comprehensive analysis from four dimensions, "application, process, supply and demand, user". Consequently, it enhances the novelty of the business design, the initiative of service delivery, the accuracy of advertising service and the rationality of network planning, and then makes the transition from "extensive marketing "to" precise marketing".

4 IMPLEMENTATION OF CONVERGENT SERVICE DELIVERY PLATFORM

Convergent service delivery platform adopts the architecture mentioned above, polymerizing three management objects: process, application, supply and demand, Catering to four kinds of users (ordinary users, third-party developers, service providers, and platform administrators), and providing the supervision of management, deployment, implementation and operation of the full life cycle. We will show the concrete implementation of the platform from the following three aspects, and specifically they are the business

process, the specific function and network topology from the platform.

4.1 Business Process Instructions

In the process of implementing convergent service delivery platform, we considered four kinds of users involved in the platform, which is the ordinary users, third-party developers, service providers, and platform administrators, and followed process retroactive characteristics. Starting with the coarse-grained analysis of the system, the author unfolded the business demands Step by step, and combined with three management objects, that is "process, applications, supply and demand". Finally, he determined the authority and function division of each type of user in the platform, and then obtained the use cases view of the platform.

Four business processes are involved in convergent service delivery platform, and they are Application Lifecycle Management, Process Lifecycle Management, Supply and demand lifecycle management and Audit process management. They are specifically shown in the form of timing diagram:

Application Lifecycle Management(as is shown in Figure 4-1) mainly involves a set of application dealing processes including the application inquires , read of application list, application chosen, purchase confirmation and application download ,all of which the ordinary users conducted when dealing with the applications on SDP.

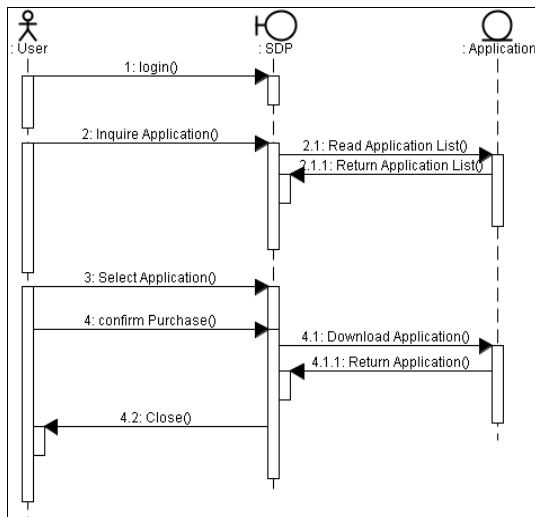


Figure 4-1: Application Sequence Diagram.

Process lifecycle management (Figure 4-2) is mainly related to two types of roles: the third-party developers and service providers. The third-party

developers need to accomplish the functions, such as the process submission, the check of process, and the online exchanges with service providers, etc. Service providers need to accomplish the functions, such as the query process, the selection process, the obtainment of process information, and the communication with open person, purchase confirmation, process download, and evaluation process, etc.

Supply and demand lifecycle management is mainly related to two types of roles: the third-party developers and service providers. Service providers need to accomplish the functions, such as the submission demands, inquires demands, inquires responses, the developers qualifications inquires, online communication with developers, developer confirmation, project download, developer evaluation, etc. The developers need to accomplish the functions, such as inquires demands, responses demands, online communication with service providers, project submission, etc.

Audit process management (as is shown in Figure 4-4) mainly refers to the process that platform administrator conducts the inquiries and audit process as for the submitted application, process and requirements.

4.2 Specific Function Instructions

Convergent service delivery platform can be divided into four plates, that is application, process, requirement, and community (shown in Figure 4-5), making it quickly and clearly to find the target satisfying the personalized needs for different roles of users, which increases the friendliness of the platform.

Application, process and requirement can be divided into four subdivisions according to different categories: Life Information, Amusement & Recreation, Business & Office, Development Tool (as is shown in Figure 4-6).

Community plate is mainly intended to provide an exchange site for various types of users in the platform. In this plate, a number of forums are set, and each topic can be dynamically set on multiple topics. Consequently, social networking groups are formed with one topic as the centre.

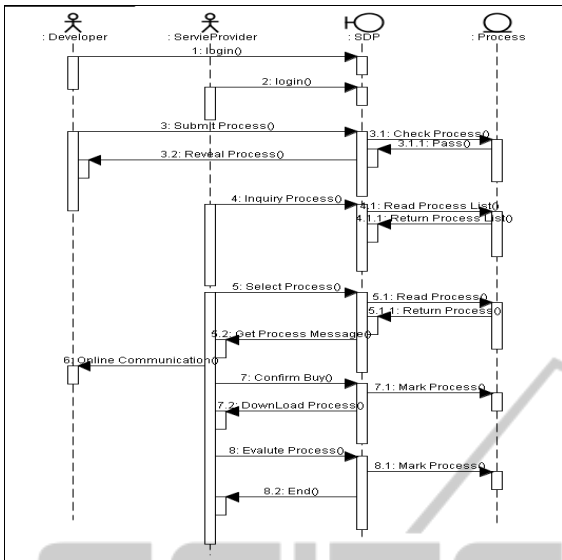


Figure 4-2: Process Sequence Diagram.

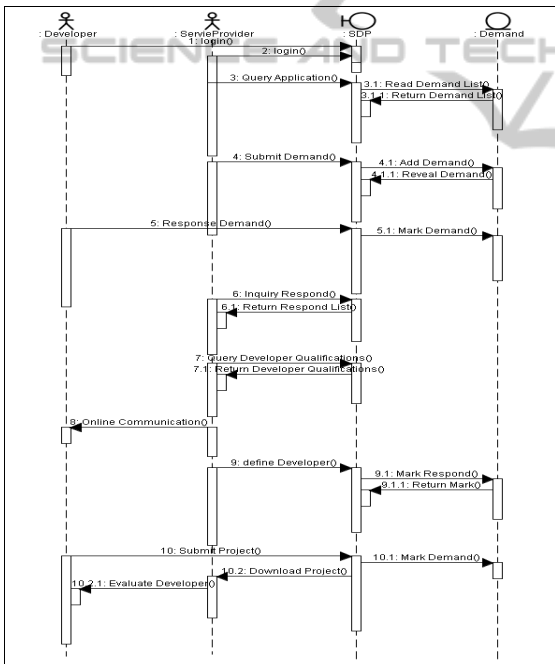


Figure 4-3: Demand Sequence Diagram.

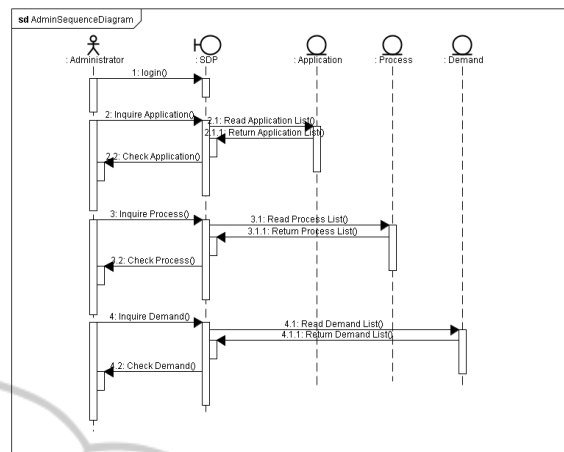


Figure 4-4: Examination Sequence Diagram.



Figure 4-5: SDP Function Description Diagram.



Figure 4-6: Subsection Diagram.

5 CONCLUSIONS

Convergent service delivery platform is an important part of the network side of "service capability open system", upholding the concept of "service fusion, capacity open", polymerizing three management objects (that is process, application and supply and demand), catering to four kinds of users (that is ordinary users, third-party developers, service providers, and platform administrators), providing the supervise of full life cycle of the management, deployment, implementation and operation,

achieving the continuous polymerization of open capacity ,the continuous expanding of business maternal, the rapid discovery and integration of Service supply and demand as well as accurate capture of multi-dimensional users' demands.

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