A Framework of Information Service Platform in E-Government

GAN Renchu, DU Ding
(School of Management and Economics, Beijing Institute of Technology Beijing 100081 China)

Abstract For exchanging and sharing information and services in e-government, a framework of information service platform (ISP) is presented. The multi-layer architecture of the ISP is introduced. They are: user’s requirement layer, business service layer, business process layer, business function layer and data layer. The lower layers are based on the architecture of Web Services and the upper layers are related to the institutional and organizational issues. In order to deal with the variation of user’s requirements and changing environment, the matching and mapping processes with adaptive mechanism are illustrated.

Key words e-government; ISP; Web Services; adaptive mechanism

The capacity of exchanging and sharing information and services is of essential for the e-government to improve the efficacy, efficiency and quality of the governance and provide better services to the public[1]. Nowadays, the information service platform (ISP) plays an important role to achieve the goals of e-government. An ISP is an information system based on the architecture of web services to integrate the distributed information resources in a certain functional area. However, the impediments to the integration are critical in the development of e-government systems. For instance, “information islands” and isolated information processing units exist in the legacy systems, which are still in operation in governmental institutions. Lack of unified standards for information description and exchange administrative regulations and rules is one of the fundamental impediments for sharing and exchanging information and services among governments. The requirements from users of e-governments including officers, business institutions and citizens may various and changing. Security and confidence risks are increasing with the extension of the scope of integration. Furthermore, the political and organizational structures, authorities, responsibilities of the governments are in changing along with the social and economical reformation and development in the country[1,2].

The development of e-government is a gradually evolitional process with the progresses of institutional and organizational changes and technical innovation.

The main shortcomings of a number of existing ISPs developed for e-business or e-government are partially related to the rigidity and inefficiency of their performance even though they are based on the architecture of the web services since the technical issues are oversold and the organizational and managerial ones are ignored. This paper is devoted to a framework of ISP in e-government in order to deal with the variation of user’s requirements and the changing environments. A multi-layer architecture of the ISP is proposed in Section 2 of the paper. User’s requirement patterns (URPs) and service patterns (SP) in the ISP are defined. Section 3 is concerned with the matching process of URP and the mapping process from the upper layer to the lower layer. Adaptive properties of the proposed ISP are illustrated. Conclusions of the work are presented.

1 Multi-layer Architecture of the ISP

For the users being convenient and comfortable of
To access the e-government systems in a certain administrative area, the user’s requirements should be easily and clearly described with a unified User’s requirement description language (URDL). According to the requirements analysis, some user’s requirements are frequently encountered. They may form a series of patterns. While a user’s requirement pattern (URP) is defined, it may need one or more administrative services to fulfill. An administrative service is provided by a unit of a governmental institution.

A group of services that frequently appears form a SP. A URP is corresponding to one or more SP. A service is described by a unified business service description language (BSDL).

Similarly, a business service is corresponding to one or more business processes described by a unified business process description language (BpDL) and implemented in terms of business process execution language (BpEL), which are in developing. Furthermore, a business process is corresponding to one or more function patterns and data schemes[3].

As illustrated above, a multi-layer architecture of the ISP in e-government is shown in Fig.1. The lower layers of the ISP are based on the architecture of Web Services and more technical oriented[7]. The upper layers should deal with not only technical but also organizational and institutional issues in the development of e-government.

![Fig.1 Multi-layer architecture of ISP in e-government](image)

2 **Matching and Mapping Mechanism in the Adaptive ISP**

When a user issues a requirement specification to the ISP, the search engine will search the base of user’s requirement patterns for a corresponding URP or a combination of a few URPs to match with the new requirements. In case the matching process fails, the new requirements should be analyzed. If they are out of the functional scope of the ISP, they will be rejected; if they are still in the scope, a new user’s requirement pattern should be created and functionalized. A mapping engine is used to deal with the mapping process from URP to SP. If the institutional, organizational situation is stable, the corresponding relations between URPs and SPs are explicitly defined and stored in the pattern base. The user’s requirements are fulfilled by providing the services described in the
corresponding SP(s). In order to adapt the variation of
user’s requirements and changing environment, a case
base and rule base related to the functional area of the
ISP should be established and gradually revised and
improved. Case-based reasoning (CBR) and rule-based
reasoning (RBR) are implemented in matching and
mapping processes to create new URPs and new SPs
define the relations among them. The matching and
mapping mechanism mentioned above makes the ISP
in e-government flexible and adaptive. Fig. 2 and Fig. 3
show matching and mapping processes respectively).
The mapping processes from business service to
department and from department to business
processes are in similar manner as mentioned above.
The mapping processes in the lower layers are based
on the web services [4,6].

The URDL, BSDL, BpDL and BpEL for
e-government are fundamental in the development and
operation of an adaptive ISP. Careful investigation,
identification and analysis of administrative procedures,
rules, regulations, standards, legal issues and typical
cases related to the functional area of ISP in
e-government are necessary in order to make them
rational and suitable [5].

3 Conclusions

1) Integrated ISPs is of vital importance for
exchanging and sharing information and services in
E-government development.

2) Rigidity and inefficiency are main
shortcomings in existing ISPs even they are based on
the architecture of web services.

3) A framework of adaptive ISP with multi-layer
architecture is presented to deal with the variation of
user’s requirements and changing environment.

4) Besides the web service architecture with a
group of protocols, the key components of adaptive
ISP are matching and mapping engines and
information bases including case and rule bases in each
layer and URDL, BSDL, BpDL and BpEL in
e-government.

5) Technical and security risks in the ISP
development are rapidly increasing along with the
extension of integration scope.

6) Social, institutional and organizational issues

strongly affect the development to achieve a perfect integration with ISP, we still have a long way to go.

References


Brief Introduction to Author(s)

GAN Renchu is now a professor in the School of Management and Economics, Beijing Institute of Technology. His research interests include: the theory and methodologies of information systems and modeling, optimization and simulation of complex systems.

DU Ding was born in 1976. He is a Ph.D. candidate in the School of Management and Economics, Beijing Institute of Technology. His research interests are in the area of the theory and methodologies of information systems.