

Using RDF to Represent Electronic Service

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Abstract: E-service focused on providing via the Internet. E-service has been considered providing customers service base on Internet, and base on service-centric concept providing account management service of Internet. Due to many e-services on the Web, which are provided by different providers, they provide heterogeneous service processes. These e-services also do not have standards on the Web. Therefore, this research uses RDF (Resource Description Framework) to describe e-service. and uses e-service's features and describes it by using RDF. We hope it could reduce searching time, decrease costs, and enhance its' performance.

Keywords: Web service; e-service; XML; RDF

I. Introduction

Many companies create different service models, such as: Google search engine, Dell online sale, Facebook [3] social network, etc. Many enterprises initiate new business models by Internet service. However, in the past most services that the enterprises provided were manual services, for example, the personnel's face to face assistance and sales service. But the service can be upgraded to integrate service of enterprise through e-commerce applications nowadays. These use services of enterprise to create unique core values and capability so that enterprises have sufficient capability to face global competition.

Enterprises not only face global competition, but also must think about how to use convenient tools to achieve the goals of the enterprise. The quick development of the Internet in recent years promotes new concepts such as Web 2.0 and social networks such as Twitter or Facebook. These concepts and social networks realize the "Share" concept of the Internet. These concepts provide people convenient service thereby creating new business models. The enterprises can use mature skills and capabilities of networks that quickly achieve business' annual targets for enabling enterprises profit ability. Swift service has become the KSF (key successful factor) of all trades and professions. But, how to use management techniques with standardization and consistency to exchange services efficiently has become the challenge which enterprises must face. Therefore, XML related information for data expression, and Web service based on the transmission of HTTP technology have become

the direction of current industry, as well as academia, government and research.

In the long term, enterprise must face a competitive external environment. Many industries must continue to adjust enterprises objects and strategies to respond to variation of the external environment. So enterprise can't solve enterprise inner process integration problems by simple integration application flow and Enterprise Service Bus technique. Then enterprise assists to integrate internal processes that sometimes provide services flow by Internet. Web service and electronic service can provide enterprises different service processes based on diverse services, but these electronic services do not have unified standards and specifications.

This research can be used to develop related Web 2.0 mature technologies, such as XML(eXtensible Markup Language) and RDF(Resource Description Framework) because it describes electronic services character and related specifications. Service requesters, through our describing electronic service, can quickly understand service features based on their needs and more quickly find services that satisfy these needs.

In our search, section 2 of this research we use markup language and technique. In Section 3, we describe research methodology. In Section 4, we will start to implement and evaluate, and section 5 is conclusions.

II. Reference Works

Many experts and scholars provide different research methods in our collection of literature so there are not unified standards and procedure for entity services. But experts and scholars provide clear definitions for Web service and electronic service. We hope that enterprises using the Internet to provide electronic service will use our research definite electronic service features for clear descriptions of electronic service. It can reduce the cognitive gap between service providers and service requesters for electronic service. Service providers can provide more complete services to comply with service requesters. At the same time, service requesters can more quickly find services to satisfy their needs through our research results.

The emergence of the Internet changed many people's life habits. So many companies offer related services by Internet that it created new business models. Such as: Google, Youtube, Facebook and Twitter [14]. These famous sites provide Web services on the Internet that can sum up Web 2.0 product for specialist and scholar confirmation [14]. We collected related research and will introduce our research related technologies and concepts that find new research results and aspects. Our research results can contribute to future academic research and industry. The research will focus on related field discussion.

Web service

Web services are changing the method applications program which each other on the Internet [2]. Web service can hope to integrate business flow and enterprise can develop and maintain business progress on the Web. At the same time, Web service can reduce program development time and costs for program developers.

Service requesters can use the internet for finding satisfactory services for their demand, however, Web services use the Internet for providing convenient service too. How to efficiently communicate between Web service and service requesters? It needs some technology linking the two sides. We introduce John Domingue to provide basic communication architecture between Web service and service requesters [8]. It can efficiently connect service providers, service requesters and Web service. However, most Web service technology is based on XML for standard, so we introduce XML features (eXtensible Markup Language) below.

eXtensible Markup Language , XML

XML (eXtensible Markup Language) was released as a set of standards by W3C in 1996. XML focuses on extending markup language that uses flexibility syntax and allows user to introduce definition tags by themselves. It lets users browse Web pages that have an error from different browsers. So XML provides easy understanding and a unified specification markup language format. Due to XML's features of markup language, it can develop different markup languages based on different user needs, and XML has ability of self-description, so it offers considerable advantages for the Internet. Web service is provided using standards and markup language which are development standards based on XML. Such as: SOAP (Simple Object Access Protocol), BPEL (Business Process Execution Language) etc. Our research using RDF (Resource Description Framework) markup language was developed based on XML, and basing on different demand extends RDF/S (RDF Schema), OWL (Web Ontology Language) etc. semantic technology that provides more terms to describe electronic service flow. These semantic technologies can provide in-depth discussion and development for future research.

Liliana has a clear definition for Web service [11]. Web service is packaged structure by Web-oriented standard, and it includes re-use software components in the package. The software components can use well defined working model framework that it discovers and open many component choreography as a service process.



Figure 1 Web service markup language and standards base on XML

In figure I, we clearly present SOAP, WSDL, UDDI and BPEL4-WS (Business Process Execution Language for Web services) and the Web service standard is developed based on XML/S.

XML has important roles in process and framework of Web service because it is based on different needs for developing other standards and markup languages in Web service. We propose adopting RDF also based on XML architecture development for description of network resource of markup language. There is no detailed description of the characteristics of electronic service. So our research use RDF characteristics of description network resource that it describes electronic service, not only it to save network user search service time but also can improve the lot of efficiency.

Resource Description Framework , RDF

RDF (Resource Description Framework) is based on XML of framework language so that it can describe network resources. RDF describes resources that are not only Machine-readable but also Machine-understandable [15]. Now, it is a challenge to automatically distribute and sort resources among the Web's disorderly resources. Many experts and scholars suggest orchestrating the Web's resources and providing metadata of Web resource. This can provide enough information so that machines can clearly understand information then automatically distribute resources [9] [10].

RDF has three base components that include two nodes and one edge. RDF provides a common framework for different application of metadata exchanging so that users do not miss

any messages. RDF was based on three components to form a triple structure. They are Subject, Property and Object. We will describe them in detail.

- ◇Subject: The resource being clearly described.
 - ◇Property: The property that is being described in a statement of Web resource.
 - ◇Object: The value of the property based on this statement.
- RDF's set of triplets is called a graph. It uses the property that describes the resource relationship of object and can link other resources by subject. RDF base example as follows:

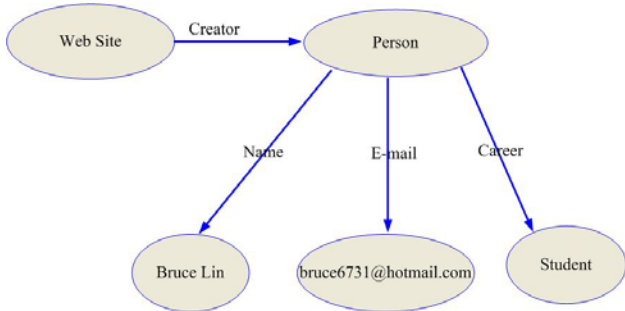


Figure 2 Graph example of RDF

As shown in figure II, there is a resource named Web Site that it is a Web Site, Web page or portal for providing service. It is established by one person and this person's information can use RDF to be described. We can understand created Web Site resource information about name, E-mail and career. This way will let users understand detail information of resource and users can more quickly and easily find resources.

Nowadays, in order to face rapidly changing external environments, enterprise must flexibly use internal service. However, as enterprise develops new service processes they sometimes need to consider compatibility of old systems, and enterprise invests high labor costs and R&D costs. Our research uses some mature technologies of Web services that RDF describes network e-service. This allows enterprise to use existing services on the Internet to reduce enterprise service exploitation cost.

III. Research Methods

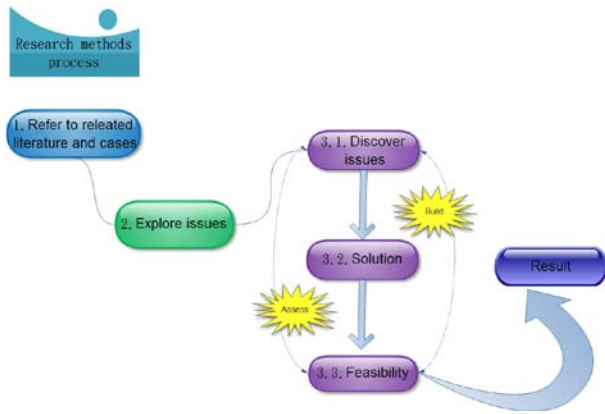


Figure 3 Research methods process

In figure III, it is the inferred process of our research, we first collect relevant literature and cases then explore the problem and based on this problem then proceed to correlate research and purpose solutions. We provide details as follows:

1. We will focus on relevant Information technology literature for our research and refer to keywords of relevant famous journals, such as: e-service, Web service, RDF, XML and Web 2.0 [12] etc. This way we not only take advantage of the accumulated knowledge and specific background of the researchers, but also understand different technology, as well as the strengths and weaknesses of Web service. These concrete facts are used in the further research and careful analysis of relevant issues, thus increasing research benefits.
2. To explore issues by reviewing related literature and exploring existing information technology and enterprise business process issues. We compared and studied these problems at same time and explored correlation solutions in depth. We will find by the collection of related literature that the Internet can be provided with standards and agreements which allow Internet users to find related services. However this service does not provide more accurate information for Internet users, after Internet users usually use service process, they determine whether these service meet their demands, so this will be an invisible loss of time.
3. Following the above issues to explore, our research discovers that there are standards and agreements for finding services on the Internet, but these service processes are not definite standards and formats. In order to overcome this question, our research used Web service relevant technology that describes resources of network service, so our research project is using RDF to describe electronic service processes. Our research proposes an inference flow of Web services and XML-based platform, we provide user related information about network resources using Web service and mature technologies of Web 2.0.
4. We derived our Research methods process to analyze and integrate service processes by Web service through continuous derivation, circulation and change until emergence electronic service process and electronic service value-added service of sense and commerce value for enterprise. We use RDF to describe the process of electronic service. This will be our research's final result and bring business profit for enterprise.

IV. System Implementation And Evaluation

Our research used Protégé [9] to design electronic service description. Protégé is a free open software that was

developed by a Stanford University professor. The development of language is used JAVA and is currently the most widely developing ontology editor, using its own many plug-ins to assist the development of ontology. The current version is 4.0. In the figure IV, we used Protégé's screen of describing an electronic service process.

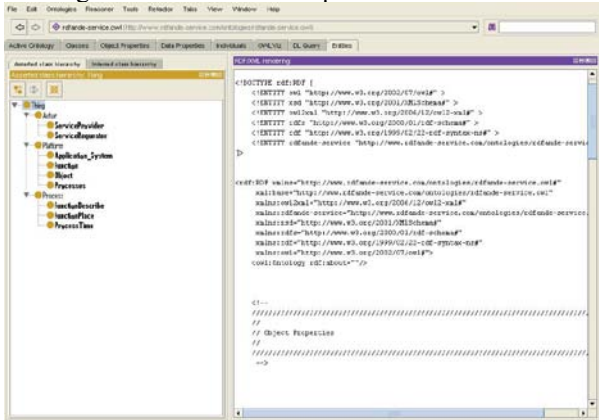


Figure 4 Protégé development screen

We collected [9] [16] most of use Web service to transmit e-service processes and describe the communication standards and technologies. Also compare past and present semantic electronic service but there is no documentation to indicate characteristics of electronic service processes. So our research uses ontology software Protégé to describe electronic service. The users can use Web service technologies and standards more quickly find the needs service.

V. Conclusion And Future Works

Due to the rapid development of the Internet, many scholars proposed the theories of Web 2.0. The web 2.0 has been considered a mature concept of theory so far and has helped the development of many mature technologies based on these theories, such as: RDF, Ontology related technology of semantic web. These mature technologies allow business and individual users to find the congruence of services they need through Web services providing related standards and technologies. Enterprises and users organize their own community and service network using the Web 2.0 concepts of "Share" and "Create".

Due to Web service technology maturity, Web service provides some standards and technologies to describe, search and register related services on the Internet. This could allow network users and enterprises to use these related services for their demands. Enterprise can use these network services to reduce internal development process time and cost of enterprise, enterprise can enhance flexibility by using these services to adjust the orchestration of internal processes and increase enterprise's competitive advantage.

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