

THE STUDY OF WEB 3.0 FRAMEWORK USING OBJECT APPROACH

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ABSTRACT

After the popularity of web 2.0, people are thinking what the next generation web, web 3.0, behaves and how to apply it. To prevent the major between web 2.0 to web 3.0 is to provide the business model to protect the privilege of every contributor of Internet. We summarize the previous works for web 3.0 and categorize it into four types: artificial intelligence technologies, the Semantic web, the Geospatial Web, and 3D web and propose our new definition of web3.0-the web service provide the capability object operations such as creation, construct, deconstruct,, and transferring. Once when the object has been created, the owner can publish it in the use of WSDL(web service description language) to introduce the functions and application of this object and register in somewhere in Internet. Through the UDDI (Universal Description Discovery and Integration), the description of this object can be found. The object can be transferred, exchanged and be further applied through SOAP(Simple Object Access Protocol). All message is in the format of XML so as to be easily transferred in Internet. The digital right management(DRM) can be deployed to protect the right of object creator.

Keywords—WSDL,web3.0,UDDI, SOAP,XML,DRM

1. INTRODUCTION

The popularity of Internet change the life of human being, especially the era of web. The web applications has be migrated from the first generation(web 1.0) to second generation(web 2.0)[1]. The most famous application of web 2.0 is blog. The web 2.0 aims to facilitate collaboration and sharing between users of this document. The phrase "Web 2.0" can also refer to the transition of websites from isolated information to interlinked infrastructure which acts like software to the user.

It being hard to find a profitable business model becomes major drawback of web 2.0. it still relies on the visiting number or traffic of the site to obtain advertisements. Because of the support of many people for Web 2.0, it resulted in a growing amount of companies that

emerged flaunting Web 2.0, but these web 2.0 companies not only lacked business models but also they lacked stability and practical services; after the boom, the Internet will once again enter into the bubble crisis. In the beginning of 2006, Jeffrey Zeldman [2] proposed the Web 3.0 concept in a blog for the first time, many people proposed it again later. Unfortunately, it could neither cause the evolution of the Internet era nor solve the problems facing Web 2.0. When people proposed Web 3.0, most people developed hope that Web 3.0 could create operating miracles, and that individuals could finally get the profit they deserved. This study explores the development of Web 3.0 that can be easily become the business model.

In continuation of the description of the research motivations of Web 3.0, the research goals of this study are as below: 1)explore the nature of Web 3.0 content, the practical applications, and meanings; 2) through reading and organizing the literature, and actual observations of Web 3.0.

Not a standard or an Internet agreement, Web 3.0 is just terminology used to describe integrated Internet technology. Its origin comes from a blog article by Jeffrey Zeldman [2]criticizing Web 2.0. It claimed that Web 2.0 is just a form of marketing, and it should now develop to Web 3.0 which combines applications. Web 3.0 has some key features:

1. Relatively smaller applications.
2. Concealed information.
3. The applications can be used on any device, for example personal computers or handheld devices.
4. The applications have fast speed and are personalized.
5. The applications spread like a virus.

Web 3.0 has also been described as an evolution of Internet artificial intelligence; this artificial intelligence will eventually become the web in a quasi-human fashion. But some people express pessimism, and believe that it is an unattainable vision. However, large companies like IBM and Google have already started to use new technologies to provide information, for example forecasting future hit singles through taking music from school music websites. At the same time it is raised that artificial intelligence systems will be the driving force behind Web 3.0, or the

intelligence will be in the form of a person, for example: Del.icio.us the cooperation testing services of this type of website, and the Internet resource services and the interaction between websites like Flickr and Digg. Sravana Mitra [3] thought the next generation of Internet should be the concrete manifestation of service-oriented architecture and Semantic Web. Phil Wainwright[4] also proposed another view separating Web 3.0 into three layers: API service is the foundation layer, aggregation services are the middle layer, and the top layer are application services. At the same time, New York Times technology journalist John Markoff [5] also defined Web 3.0 as a technology that can organize information and can draw conclusions through the Internet, which is saying the computer can think independently and not just simply follow orders, for example personalized financial investment portfolios, intelligent systems building family retirement plans, choosing the most appropriate university for senior high school students. In Table 1-1 we have listed the relevant literatures on Web 3.0 that this study explores:

Table 1-1: Web 3.0 Relevant Literature

Author	Research Discoveries
Jeffrey Zeldman [2]	Web 3.0 will ultimately been seen as applications which are pieced together. There are a number of characteristics: the applications are relatively small, the data is in the cloud, the applications can run on any device, PC or mobile phone, the applications are very fast and they're very customizable. Futhermore, the applications are distributed virally: literally by social networks, by email. You won't go to the store and purchase them.
Sravana Mitra[3]	Web 3.0 has also been linked to a possible convergence of Service-oriented architecture and the Semantic web.
Phil Wainwright[4]	Web 3.0 is divided into three (and a half) distinct layers: API services form the foundation layer. Aggregation services form the middle layer. Application services form the top layer.
John Markoff [5]	Web 3.0 is a technology that can provide a new method to allow the computer to organize information and draw conclusions from the web.
Wiki	Web 3.0 is a term that is used to describe various evolution of Web usage and interaction along several separate paths. These include transforming the Web into a database, a move towards making content accessible by multiple non-browser applications, the leveraging of artificial intelligence technologies, the Semantic web, the Geospatial Web, or the 3D web.

The web 3.0 therefore can be categorized into four types: artificial intelligence technologies, the Semantic web, the Geospatial Web, and 3D web.

Since Jeffrey Zeldman proposed the Web 3.0 in 2006, its concept has been consistently revised and explored by scholars. Now it has branched into the views proposed by this study, Web 3.0 has the following three main features:

1. Information (applications or objects) can directly be used and revised with other information (applications or objects), and it is not necessary to go through other platforms to accomplish.
2. The user can have a personalized object on the web, and can use it on different websites.
3. The browser can be used to complete functions that only complex system programs have.

A website not only can provide personalized services for the users, but it can provide services for other websites, which indicates the websites and applications can interoperate. From the object point of view, all the applications and web components can be treated as objects. Object oriented copencepts can be used to define the features of Web 3.0 as follows:

1. Deconstructing and structuring the smallest units of the object so that the information can interact. This means the Internet will be composed of various models.
2. The original information can be processed. The object can be deconstructed into a new object, and can be aggregated with other objects to become an object with new functions.

We propose our new definition of web3.0-the object oriented web provides the capability object operations such as creation, construct, deconstruct, and transferring[7]. Once when the object has been created, the owner can publish it in the use of WSDL(web service description language) to introduce the functions and applications of this object and register in somewhere in Internet such as UDDI servers. Through the UDDI (Universal Description Discovery and Integration), the description of this object can be found. The object can be transferred, exchanged and be further applied through SOAP(Simple Object Access Protocol). All message is in the format of XML so as to be easily transferred in Internet. The digital right management(DRM) can be deployed to protect the right of object creator.

This paper has been organized as follows: web 3.0 architecture (the protocols and web services such as UDDI, WSDL, and SOAP) which is used for web 3.0 object operation is introduced in the second section. System architecture and operation flows are proposed in the third section. In the forth section discussion is conducted. Conclusion is made in the last section..

2. WEB 3.0 ARCHITECTURE

Web Services

The term "Web service" is defined as "A Web service is a software system designed to support interoperable machine-to-machine interaction over a network[8]. It has an interface described in a machine-processable format (specifically WSDL)[9]. Other systems interact with the Web service in a manner prescribed by its description using SOAP messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards." [10]. The web service architecture can be plotted in Fig. 1.

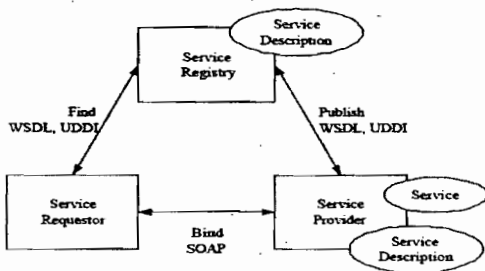


Fig. 1 web service architecture

The services can be introduced as follows

SOAP

SOAP is a protocol for exchanging XML-based messages over computer networks, normally using HTTP/HTTPS. SOAP forms the foundation layer of the web services protocol stack providing a basic messaging framework upon which abstract layers can be built[11]. The SOAP architecture can be plotted in Fig. 2.

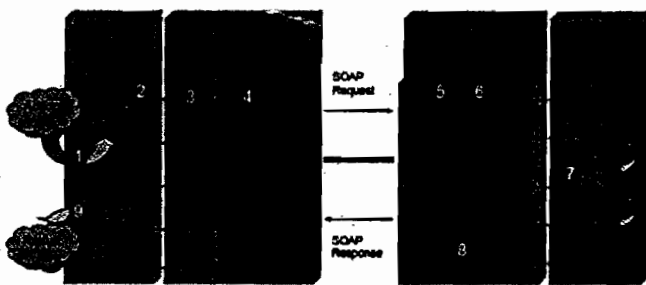


Fig. 2 SOAP architecture

SOAP makes use of an Internet application layer protocol as a transport protocol. Critics have argued that this is an abuse of such protocols, as it is not their intended purpose and therefore not a role they fulfill well. There are some advantages in the use of SOAP: SOAP is platform independent, SOAP is language independent, SOAP is simple and extensible[12].

Numerous commentators and specialists have discussed the technical advantages and disadvantages of SOAP relative to alternative technologies, and relative to the context of its intended use. Using SOAP over HTTP allows for easier communication through proxies and firewalls than previous remote execution technology.

SOAP is versatile enough to allow for the use of different transport protocols. The standard stacks use HTTP as a transport protocol. The using SOAP includes the following advantages

3. SOAP is platform independent.
1. SOAP is language independent.
2. SOAP is simple and extensible.

The SOAP message format can be described as Fig. 3.

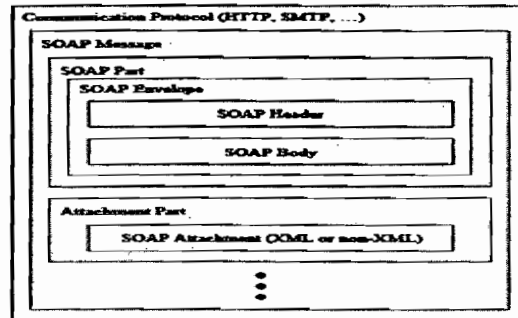


Fig. 3 SOAP message format

2.3. WSDL

The Web Services Description Language (WSDL) is an XML-based language that provides a model for describing Web services. The WSDL defines services as collections of network endpoints, or ports[13]. The WSDL specification provides an XML format for documents for this purpose. WSDL is often used in combination with SOAP and XML Schema to provide web services over the Internet. A client program connecting to a web service can read the WSDL to determine what functions are available on the server. Any special datatypes used are embedded in the WSDL file in the form of XML Schema[14]. The client can then use SOAP to actually call one of the functions listed in the WSDL. A typical WSDL document can be described in Fig 4.

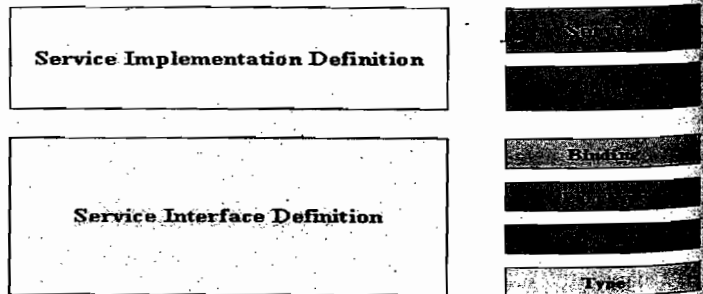


Fig. 4 WSDL document format

Each part in Fig. 4 can be described as follows:

1. Types which provides data type definitions used to describe the messages exchanged.
2. Message, which represents an abstract definition of the data being transmitted. A message consists of logical parts, each of which is associated with a definition within some type system.
- PortType, which is a set of abstract operations. Each operation refers to an input message and output messages.
- Binding, which specifies concrete protocol and data format specifications for the operations and messages defined by a particular portType.
- Port, which specifies an address for a binding, thus defining a single communication endpoint.
- Service, which is used to aggregate a set of related ports.

4. UDDI

Universal Description, Discovery and Integration (UDDI) is a platform-independent, XML-based registry for businesses worldwide to list themselves on the Internet. UDDI was originally proposed as a core Web service standard[15]. It is designed to be interrogated by SOAP messages and to provide access to Web Services Description Language documents describing the protocol bindings and message formats required to interact with the web services listed in the directory. UDDI nodes are servers which support the UDDI specification and belong to a UDDI registry while UDDI registries are collections of one or more nodes. A UDDI business registration consists of three components:

- White Pages — address, contact, and known identifiers;
- Yellow Pages — industrial categorizations based on standard taxonomies;
- Green Pages — technical information about services exposed by the business.

The purpose of UDDI is to allow users to discover available services and interact with them dynamically. The process can be divided into three phases: Searching (Discovery), Binding, and Executing. The registry message can be expressed in XML format. The data types can be composed by five elements: businessEntity, businessService, bindingTemplate, tModel, and tncAssertion. The businessEntity includes the profile of companies which provide web service.

Digital Right Management (DRM)

Digital rights management technologies attempt to control access to digital media by preventing access, copying or conversion by end users to other formats. Long before the

arrival of digital or even electronic media, copyright holders, content producers, or other financially or artistically interested parties had business and legal objections to copying technologies.

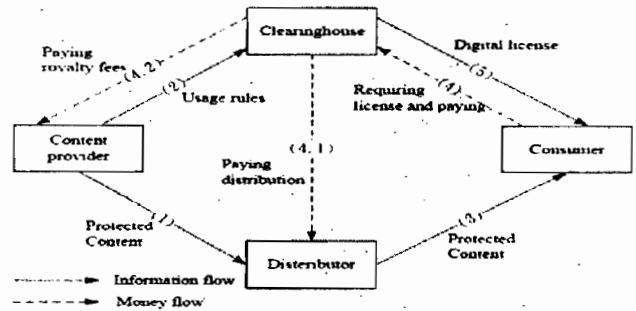


Fig. 5 The procedures of DRM

Since the DRM is used in variety of digital contents including digital media and applications. The procedures can be described as follows:

1. The contents builders protect the target with special technology such as water print, encryption, or other skills.
2. Save the protected contents in clearing house.
3. Once the customer gets the protected content from distributor, the customer should request the incense from clearing house.
4. The clearing house will negotiate the terms and conditions with provider. Once when the customers pay for the usage, the clearing house pay to provider. The license will be issue to customer through distributor so as to unlock the protection.

3. SYSTEM ARCHITECTURE

In the last section, we describe the standards and protocols which can be adopted to perform the web3.0 which we propose. Basically, the concept of web service concentrate on the components kept in owners' site. The parameters and results are transferred among webs following the protocols and standard formats(XML). We propose the object oriented web 3.0 which adopt not only the object operations such as object transferring among Internet, construction, deconstruction, and particular functions the object performing but also the characteristics of web service such as SOAP, UDDI, WSDL, and DRM.

The system architecture and working flows can be described in Fig.6

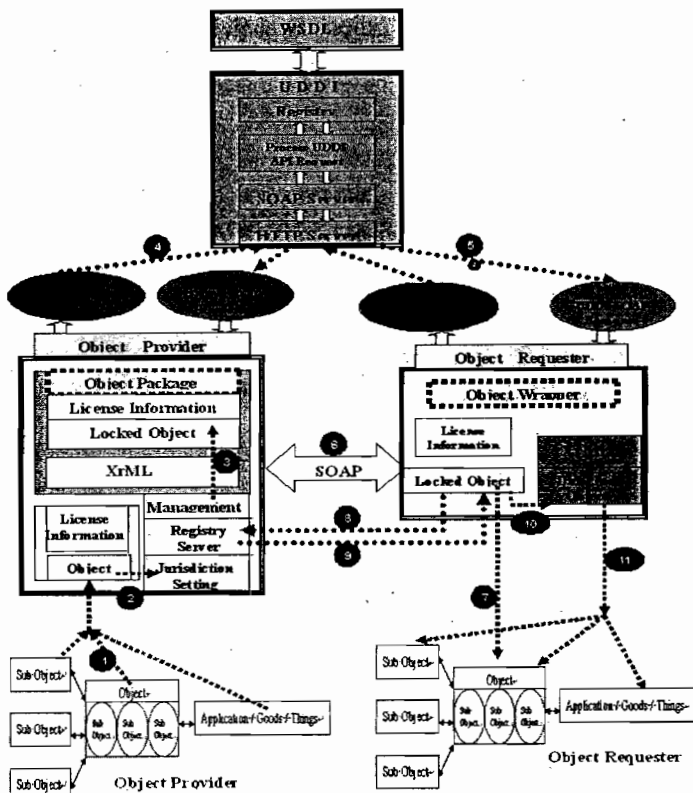


Fig. 6 System architecture and working flows

The architecture can be described as follows :

1. The objects can be constructed and deconstructed as basic operation.
2. Before the object published to Internet, the DRM procedures are conducted to protect the right of creator.
3. Once when the right of object is defined, the object is treated as new non-authorized object, or locked object.
4. The creator registers to UDDI database with description of the functions and the definition how to use this object, e.g. function name, parameters, and format.
5. Remote users can find the object through searching from UDDI and find the target object. After finding the encrypted object, the download request will be issued through the path indicated in UDDI server.
6. The non-authorized object can be delivered to remote user through SOAP protocol.
7. The object can not be used before unlock it through DRM procedures.
8. Remote user issues request to registry server through SOAP protocol .
9. After receiving the request, Registry Server check the license information field in the object. Once confirm the validation, the registry server issues the authorization.
10. The object is unlock to be used after receiving the

11. The object is ready to be used, deconstructed, and constructed after unlock and being decrypted.

The system working flows can be described in Fig.7

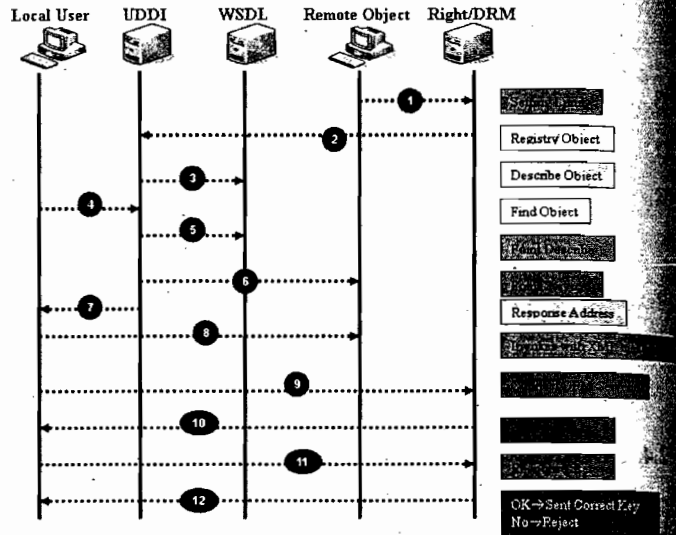


Fig. 7 System architecture and working flows

The Fig. 6 can be described as follows

1. Once the object creator generates the new object, the DRM is soon adopted to protect the object.
2. The new object is also published in UDDI server.
3. The WSDL is adopted to describe the characteristics of the new object.
4. Someday, when Internet user search the object through searching by key words which are included WSDL. The object will be confirmed if this is the one local user needs.
5. The WSDL provide the efficient and convenient way to match the request of local user.
6. The object is confirmed by UDDI.
7. The object address is delivered to local user from UDDI.
8. The local revokes the object from remote
9. Local users negotiate authorization of digital right from the previous definition in XML format.
10. Once when local get the license. The DRM will check the license.
11. The checking result will return to DRM server.
12. If the license is legal, the object will be unlocked.

4. CINCLUSION

The concepts of web 3.0 have been proposed in different aspect. We in this study propose a object base concept which can comply with the previous studies. The architecture and work mechanism adopt the existing

standards such as UDDI, WSDL, SOAP, and DRM. Through the operations, the contribution of object generator can be secured. Therefore the profitable business model can be realized.

5. REFERENCE

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