

# Framework for integration of SOA and Web2.0

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**Abstract:** To avoid the isolation between the external and the internal information of enterprise information systems, a four-layer integrated framework is proposed on the basis of integrating Web2.0 and the service-oriented architecture (SOA), which contains the data layer, the service layer, the presentation layer and the collaboration layer. The presentation layer plays the key role, converging the external information from the collaboration layer to the inside of information system (IS), and diffusing the internal information from the service layer to public users. This framework can also illustrate how users contribute to producing new services, and how web services are integrated to collaborate with public users.

**Key words:** framework; information system; service-oriented architecture; Web2.0; integration

With the development of the enterprise informatization, enterprises want to catch up with the rapid development of their own business processes, and benefit from the investment in building information systems. With the economic globalization and newly developed information technologies, the information system (IS) has to be adjusted to meet demands of new business processes with such techniques. And now many enterprises have equipped themselves with certain legacy information systems. How to make those legacy systems work effectively coordinated with new ones is not an easy problem.

Generally, the service-oriented architecture (SOA) expresses a use of loosely coupled and independent software services that can be accessed without any knowledge of underlying platform implementation<sup>[1]</sup>. Web2.0 refers to a supposed second generation of Internet-based services concentrating on online collaboration and sharing among users. When information diffuses from the inside system to the external, Web2.0 may change to a global SOA<sup>[2-3]</sup>, and the SOA may become like an enterprise Web2.0 when it converges. Some semantic web tools such as ontology can also contribute to Web2.0<sup>[4]</sup> and the SOA.

## 1 Framework Hypotheses

Nowadays, more and more engineers realize that software is not only developing, but also a series of related services are also evolving. The SOA is an architectural concept for building the IS and focuses on the

application of B2B, while Web2.0 focuses on user participation and emphasizes B2C<sup>[5]</sup>. Based on those, a framework is constructed, as shown in Fig. 1.

## 2 Framework Research

### 2.1 Data layer

The data layer is the basic layer in the framework, which is similar to some traditional solutions, containing two major components: data storage and data access interface. In large information systems, there are many kinds of data which can be divided into two categories: structured data and unstructured data. Database systems and regular file systems belong to the former, while binary files such as images, audio, video belong to the latter. In general, data storage describes the way how data are organized. Data access interface defines the interface through which the service layer accesses the physical data. It is somewhat like the data bus in a physical computer system.

### 2.2 Service layer

The service layer is the controller in the whole framework, which takes the responsibility of generating formatted data from the data layer and supplying services to the presentation layer, consisting of two components as follows.

#### 2.2.1 Legacy systems and new applications

Many enterprises have already built their own information systems, such as CRM, SCM, ERP, etc., some of which are beneficial for their owners. Once the new business requirement is proposed, which may not be matched with the legacy systems, deigning such new applications should be followed in the SOA development processes. Its crucial idea is to integrate existing systems as service components and service-driven, so that the optimized business process can still run as usu-

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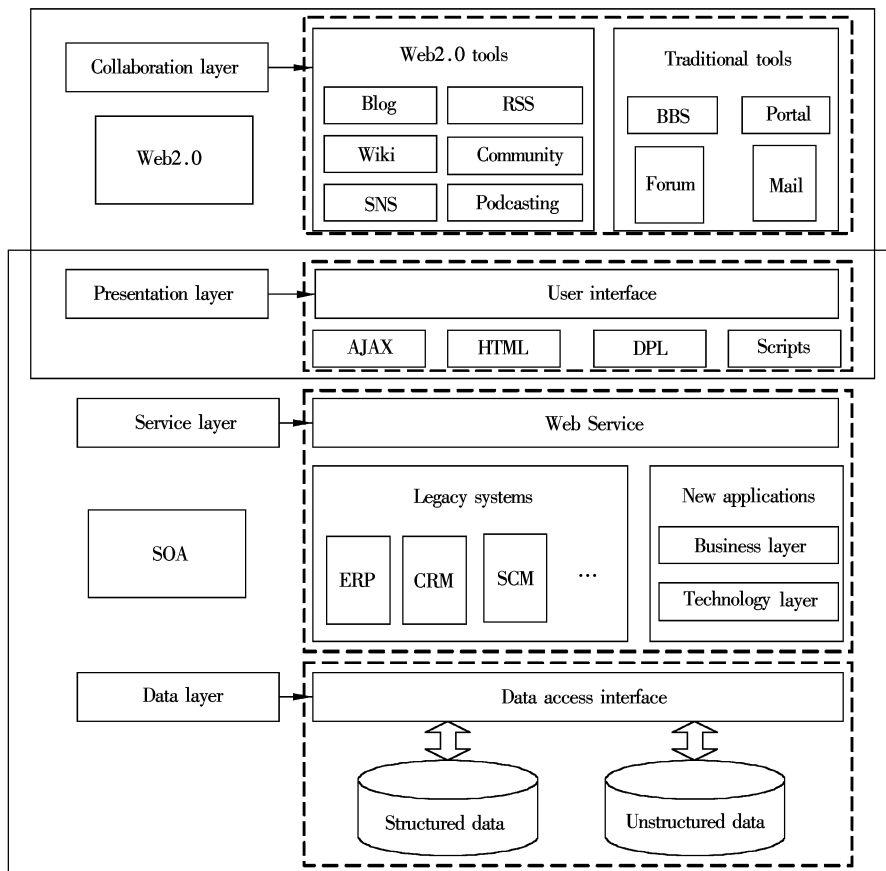


Fig. 1 Framework for the integration of SOA and Web2.0

al. New applications should be carried out in two layers: the business layer and the technology layer.

### 2.2.2 Web service

Web services are becoming the prominent paradigm for distributed computing and electronic business that creates new opportunities for software providers to develop more valuable services to combine the existing services<sup>[6]</sup>.

Web service is the basic principle in the SOA, especially in integrated enterprise systems and business process modeling<sup>[7]</sup>. Following the W3C's standards such as SOAP, WSDL, UDDI, etc., it supplies both the communications and the interface between services and the presentation layer. Thus users can invoke web services and utilize the enterprise information system more conveniently.

### 2.3 Presentation layer

The presentation layer is the closest layer to public users, containing some technical factors in the internal side, such as AJAX, HTML, DPL (dynamic programming language), scripts, flash, etc., where designers may combine some layout components together to make the sites more attractive. With direct operation on this layer, users can interact between the collaboration and the service layers on the portal easily.

### 2.4 Collaboration layer

The collaboration layer consists of the following two components: traditional and Web2.0 tools, which is the most attractive factor for user participation. Users can use various tools to collaborate with others actively.

Traditional tools are sometimes known as Web1.0 tools, such as BBS, portal, forum, mail, etc., which transfer the content through the Internet to the users. On the contrary, Web2.0 tools including Blog, Wiki, SNS, RSS, online communities, Podcasting, virtual learning communities<sup>[8]</sup>, etc. are applied to ensure user focus not only on themselves, but also on what others are doing.

### 2.5 Integration of two concepts

Web2.0 concentrates on the web collaboration, where the user information will be presented and shown through the presentation layer, then collected and classified by the collaboration tools. On the other side, the SOA concentrates on the business process. Information will be integrated to the web services through the presentation layer. It plays an important role in the integration of the SOA and Web2.0. It works like an intelligent user agent<sup>[9]</sup> which can classify, organize the vast user data to the services' needs.

This kind of metadata will be sorted and categorized by semiotic dynamics and collaborative tagging<sup>[10]</sup>. As the collaboration and the service layer can be considered as two separated systems, the presentation layer will take the responsibility of analyzing user behavior, filtering, searching for suitable services, and monitoring user processes, as well as inputting and outputting data. All the user requests and selections will be assigned to related services, making the services redesign or learn to be self-adaptive. And what's more, the information of services will also be rapidly and accurately diffused to the users, which will make them learn to present their information more accurately.

So, in this framework, Web2.0 can help designing the function modules such as customer service module, knowledge management module, product development module, etc., which need user frequent participation. Obviously, the user originality in Web2.0 may produce new web services.

### 3 Conclusion

This paper presents a framework, which illuminates the integration of the SOA and Web2.0 according to four layers: the data layer, the service layer, the presentation layer and the collaboration layer. Generally, the data layer is a basic component; meanwhile, the service layer and the collaboration layer belong to the scope of SOA and Web2.0 respectively, with the presentation layer being defined between them to transfer services for collaboration contributing to the integration of SOA and Web2.0. Further studies will focus on how to build the presentation layer and prototype systems.

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## SOA 和 Web2.0 的一个集成框架

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**摘要:** 为了避免企业信息系统外部和内部信息之间出现信息孤岛, 将 Web2.0 和 SOA 的思想结合起来, 提出了一个 4 层次的集成框架. 该框架包括: 数据层、服务层、展示层和协作层. 其中展示层扮演了一个关键角色, 它负责将外部信息从协作层聚集到信息系统中, 也将系统内部信息从服务层扩散给公共用户. 该框架用来描述外部用户如何对企业信息系统产生贡献和新的服务, 以及企业 web 服务如何集成起来与用户进行协作.

**关键词:** 框架; 信息系统; 面向服务的架构; Web2.0; 集成

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