Mining Service Repositories for Active Service

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Abstract: Active Service, a new model for discovery and customization of Web service is first introduced. Based on the analysis of Active Service model and the pattern of mining service in Active Service, a mining service repositories method is proposed. The basic idea is making use of metrics to classify the services and assembly the service to match the customers' requirements.

Key words: Active Service, Web Services, service repositories, metrics, mining method, Internet

1   Introduction

For the past few years, Web service[2] technology grows rapidly and gets more applications. It uses extended markup language (XML) defines a group of Web service protocol stacks. Through the specification of SOAP, WSDL, UDDI, WSFL, BPEL4WS, SCDL, the Web service provides Internet application oriented uniform mechanism of service registration, discovery, binding and integration, which is the main mechanism of Internet interactive operation.

  Meanwhile, the requirement of applications and service on Internet is variable with the development of the Web services. The user's application demand trends to be intellectualization, personalization and integration. And Web service is becoming to be a kind of effective solution and new application platform for providing the more integrated and personalized Internet service to the customers. However, in terms of the core support technology and service pattern of Web service, it still has some important issues to research and resolve. For example, how to make the Web services changing with the customer's requirements, how to locate, correspond and communicate with the service provided by the Internet in the changing progress, evaluate and verify the executed result, secure the Qos and security of the new service. These problems are what Web services focus on. In the condition, [1] Active Service, a new model of service which computes based on Web service is advanced.

   Active service introduces new service discovery, customization, load and use mechanism, and advances the demand of service organization. Based on these observations, we propose a method which we call Mining Service Repositories of Active Service (MSRAS), it can help us change the traditional, static, record-keeping use of service repositories to a new, active, intelligent use for predicting and automating in Active Service. The rest of this paper is organized as follows: In section 2 ,we present a more concrete concept of Active Service. Based on this concept, we discusses the MSRAS which includes sketch map and definition in section3.Finally, we summarize this paper by drawing a conclusion.[1]

2   Active Service

2.1   Active Service Concept

Active Service bases on the Web Service primary protocols and framework models and depends on the existed industrial standards and service resources on the Internet. In order to make the customer choose suitable service according specified requirement and make the service adapt to the user demand automatically, Active Service increase the function of recognition and customer demand discretion. The initiative discovery, specification and application mechanisms are also important in the Active Service to alter the passive service model currently. The new application model is named Active Service in the Internet.

   Active Service model increases one role and three basic operations compared with the standard Web service model. The new increased role is Active Service Broker which is the interactive and

executive platform between the system and customer on the new service and focuses on the client. The customer requests service from system though the broker. System gains and analyzes the customer's demand by the way of the broker, composites the specification after the Web search and Program Mining[6],generates the new services and then handovers the new generated services to the service provider for publication and implement.

Active Service is proposed for the orderless situation in the progresses of creation, publication, deployment the Internet services. The main purpose is to resolve the confusion situations of service provision through the description, organization, classification, management, discovery, and reuse of Web services in an open and adaptive framework.

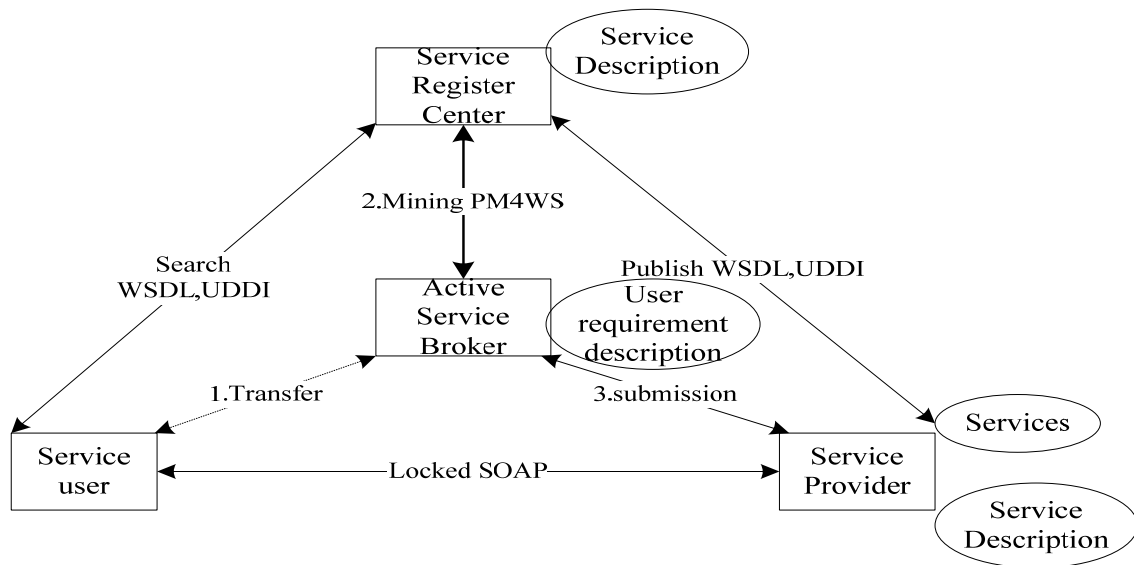Fig1 show the simple model of the Active Service.

Fig.1   Active Service Model

2.2 The Pattern of Service Mining in Active Service

The services on the Internet are sorted into two groups:

1. the service resource is fragmentarily deployed on millions of servers all over the world. Generally, It only provides a functional instruction based on natural language. The services are provided through the defined standard interface without further organization.

2. the services are registered in the enterprise UDDI database servers which have self-contained functional descriptions and are classified by the criterions of their UDDI register center.

Both of the two kinds of service resource are the mining objects of Active Service. But different web-pages development technology and skimble-scamble description specifications lead to the difficulty of mining services on the Internet.

Moreover, the publish mechanism based on the UDDI emphasizes particularly on the self-description of single service and is devoid of sustaining of the semantic relationship of function between the services.[6][9] So it is inefficient that using traditional search method to mine services on the Internet.

We propose a method based on Agent, which combine PUSH and PULL to actualize the service active mining.

PUSH: Publish the user related service information to some Agent on the Internet and according to the semantic relationship store them as an service catalog warehouse which is called   Web Service Information Center (WSInfo Center).

PULL: Mine the services published in the WSInfo Center using kinds of search technology.
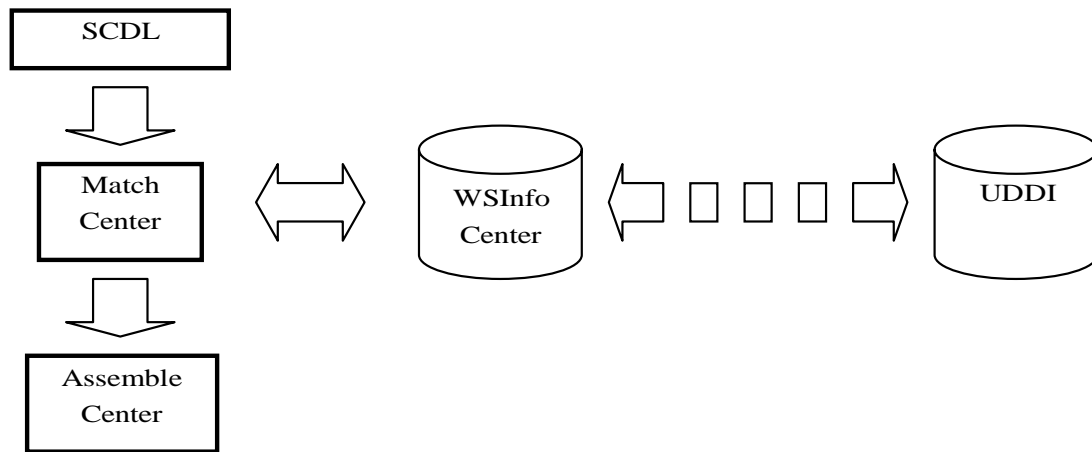
Fig.2   the sketch map of mining service repositories
an overview of MSRAS.

3   MSRAS Concept

MSRAS is similar to the traditional information search method in some aspects, but it is more complex and emphasize on the efficient use of semantic information and ontology [3][4].

3.1 Mining Service process

The service request (SR) is initialized by the SCDL. The local WS Info Center provide the Service Source (SS).And the mining result is delivered to the Assemble Center in order to generate the final Web Services. The Match Center is a key operation. Every Service Request corresponds a Service Description (SD) and so the Service Source does. Matching is comparing the SD of SR with the SD of each Service Member (SM)in SS and computing their comparability. First, match the SD of SM with the SD of SR and then sort these SM according to the comparability. Finally, Assemble Center integrates this Web Service into the ultimate Web Service. Fig.2 depicts the active process of service mining.

3.2 The MSRAS

MSRAS takes effort in the Match Center. MSRAS includes three major phases: metrics definition, metrics collection, metrics analysis. Figure 3 shows

Metrics definition

Metrics definition is MSRAS's first step. As a general guideline, metrics definition should be specific, measurable, attainable, relevant, and time-bound. The metrics are defined beforehand based on the semantic taxonomy.

Metrics collection

As a general guideline, metrics collection should be relevant, adequate, valid, and easy. It has two steps:

1. Extract data from repositories. The data always be the key words of the services stored in the repositories.

2. Process data to determine metrics. The data that extracted in the step one will be assembled into a new single keyword to determine which metrics should be use to mining service.

Metrics analysis

Visually analyzing metrics to identify opportunities is MSRAS's third step. We use the key word generated in Metrics collection for all figures for demonstration purposes.
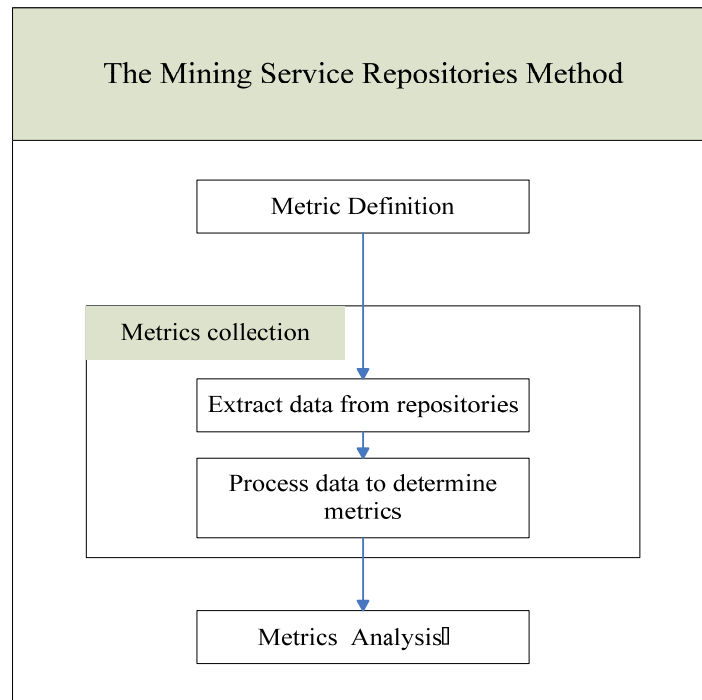
Fig.3   An overview of MSRAS method

4   Conclusion

Automation and intelligence are the main purpose of Mining Service Repositories Method. And in a demo system which is developed for test the method, the MSR method has been validated.

Future work focuses on detailing the general model and the metrics specified by the semantic ontology to improve the efficiency of service repositories mining.

References:

[1] ZHANG Yao-xue, FANG Cun-hao. Active Service—Concept, Structure and Implement[M]

Beijing：The Publish of Science, 2005

[2] HEATHER Kreger, IBM Software Group. Web Services Conceptual Architecture (WSCA1.0)[M]

[3] TALIA D. The Open Grid Services Architecture: where the grid meets the Web. IEEE Internet Computing, 2002, 6:67-71

[4]HU Zai-jun, KRUSE E, DRAWS L. Intelligent binding in the engineering of automation systems using ontology and Web services. IEEE Transactions on Systems, Man and Cybernetics, Part C. 2003, 3:403-412

[6] WEI Li, FANG Cun-hao, Zhang Yao-xue," Semantic Description Model for Active Services", Computer engineer and applications

[7] DOU Yu-hong, ZHANG Yao-xue, LI Xing. An XML-based Software Component Description Method for Program Ming. Chinese Journal of Electronics Vol.13, No.1,2004. pp100-104

[8] W3C. Web Service Description Language (WSDL). http://www.w3.org/TR/wsdl,2003

[9] Berners-Lee T. Services and semantics：Web architecture. http://www.w3.org,2001-04-30-tbl