Design of Framework for Mapping web services and Agent Technology

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ABSTRACT: Web services are the evolutionary steps towards the building of web related services like E-commerce-learning, E-government etc. Quality of Web service is playing a major role in building distributed and heterogenous web applications. But it is always an issue for discovering the best quality service as per customer requirement. Human interruption is always error prone and time consumingfor discovering the web service so agents are used with web services forautomatic discoveringthe best quality web services that satisfy user requirements. Hence, in this paper, a framework is to designed that will automatically discover and invoke web service using agent'stechnology.

KEYWORDS: *Web services, Agents, UDDI, DF, ACL, SOAP, QoS (quality of service)*

1.INTRODUCTION:Web services are software modules that is accessible via internet. It follows the xml-based standards like WSDL, SOAPand UDDI. With these standards many applications on web interact with other and make a composable application. We can also say that it as a software application that can be discovered, defined and described using xml tags. Webservices are good for heterogenous platform of interoperableapplication. W3C defines web service as "a software system that build on machine to machine interaction with interoperable feature over the network" [14]. web services use the architecture of SOA (service-orientedarchitecture) forcomposition,

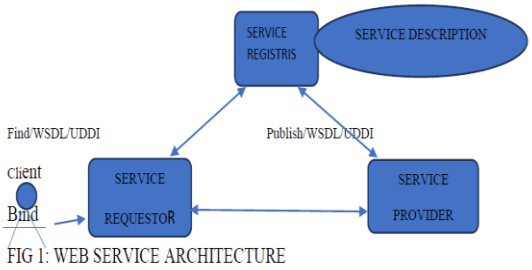

FIG 1: WEB SERVICE ARCHITECTURE

discovery, communication and distributing applications among different users of world wideweb.

Web service architecture is based on communication between three services :1. Service provider 2. Service requestor 3. Service registries.

1.Service provider: It provides or publish business services with description to service requestor or to service registries.as provider is owner of the service.

2.Service requestor: Itrequests for web service description and invocation from provider or from UDDI by using find method and finally use the service in business perspective. Requestor can be an internet user or a program. The bind method is used for binding service at run time.

3.Service registries: This is a searchable directory of web services where provider publishesthe servicedescription and requestors fetch the services at during static or dynamic development.

The open standards used by web services are:

a.WSDL (web service description language): It is used for describing service definition and this description is published in UDDI.

b. UDDI (Universal description, discovery and integration): It is used for searching or discovering web services described by WSDL.UDDI contain business entities, business services, binding template for end point access and T-model (technical model) that contain type of service and its associated platform.

c.SOAP (Simple object access Protocol): It is used for sending xml-basedmessage notation between services by using http Protocol. It supports all the operations like find, bind and publish in web service framework.

2.RELATED WORK: UDDI search isfullybased on Keyword search methods [2] and only functional aspects of the service. But these methods are not sufficient for client query of service invocation.Finally, client need a service that should be precisely searched with one of these nonfunctional parameters (qos parameters) like performance,security, availability, responsetime, reliability, accuracy, integrality, interoperability [4] etc. UDDI is divided in to three parts as white, yellow and green pages. But there is no provision to update the registry automatically when services are upgraded by service provider[3]. Searching web services using UDDI server was proposed by T Rajendran. et al [4]that verifies the check in and check out web services in UDDI.A test script is attached with a service to and client and server both check the test script before it registers with UDDI. But it is a time-consuming process as server and client both have to check the script. Keyword clustering and ontologies are used for quality

web service discovery [3]. Saba [9] provided an approach on matching client qos parameter against potential parameter of web service. But this approach does not provide accurate results.

UDDI does not provide qos parameter and there is no specification and storage of qos parameter in this directory [6]. Improper and ambiguous description of web services generate matching problem. There is no mandatory rule for constraints specification or indirect matching when no service matches [8]. Thesemantic web services upgrade the services more intelligently, automatedlyand dynamically by using ontology like OWL-S but it is suffering from lack of standards and reliability [9].So, to solve this problem, agents are introduced with web services [10].

3.SOFTWAREAGENTS:Like web services, software agents are capable of discovering and invoking web services dynamically.it provide solution to small software problem to complex problems. A software agent which is intelligent and autonomous agent is defined as a computer program that perform some specific function that sense the environment and perform tasks automatically as per user needs. It works as human agents and behave like an interface to solve interoperability issue different application composed by end user. Sometime, a single agent itself not able to complete user tasks in this case, these agents interact to each other to achieve user goals. That is called multiagent system. These multiagent help to solve complex problems with conflicting or shares goals of end user.

TABLE 3: Properties of Software agents

1.Autonomous	Agent work without human interference.it operate directly and has a control over its states.
2.Social	It helps human or other agents to achieve their goals. So, its social.
3.Reactive	It senses the environment and reacts timely to changes occur.
4.Proactive	Agents not simply react to problem but take initiative to solve to dynamically
5.Mobile	Agent has a mobility to travel between different network nodes.
6.Truthful	it should not provide the false information purposely.
7.Benavolent	they always try to do what kind of tasks has been given to them.
8.Rational	agents always try to achieve its goal, never avoid their responsibilities to divert or skip
9.Learn	They learn and adept themselves in the environment and behave accordingly.
10.Cordination	agent interact with each other he achieves their own goals or the help to achieve goal of other agent by agent communication language (ACL)

3.1FIPA (Foundation for Intelligent Physical Agents):FIPA [3, 15] is an IEEE based computer organization that enhance agent technology and resolve interoperability issue of heterogenous agents with other agents. FIPA-ACL provides a set of communicative lawforagents, so that they communicate each other with the following actions like Accept, Agree, Cancel, Confirm, disconfirm, Failure etc. It also provides set of message parameter that is important for communication like performative is the mandatory parameter of communicative law. In every agent communication this parameter is to be included. The other FIPA-ACL parameters are sender, receiver, reply-to, content, language, ontology, encoding, protocol etc.

The main scope of FIPA- ACL Messages are [15]:

1.To ensure inoperability issues between different applications by providing FIPA-ACL Standards.

2. It provide a well-defined rules and guidelines to maintain operations used by agents.

Federated system: every agent supply and share information to another agent about their needs and capabilities' direct communication between agents, there are two problems evolved:

a) Costfactor, as the number of agents is more on internet, cost of broad casting is high. in this case organize the agents in a way that avoid broadcasting [11].

b) Second is the implementation complexity between agents. At run time each agent negotiates with other agent as it contains all the code complexity that is needed by other agent.

4.Federated Agent Architecture:Federated agent architecture overcome these two problems and make possible for the direct agentsto communicate. As in figure shown agent do not directly communicate with each other, they use facilitator or intermediatorto communicate. Agent uses ACL to pass message between facilitators. Agents share their autonomy to local facilitator and build a federated system by communicate with global facilitator. In this way agents share their needs to solve the complex problems [10].

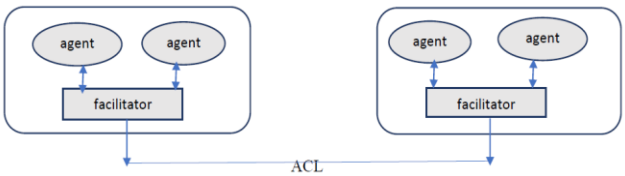

FIG 4: Agent Architecture

4.1 MAPPING OF WEB SERVICES AND SOFTWARE AGENTS: An interface is to be built for mapping of web services andagents. This architecture enables dynamic discovery of quality web service using agent platform.As this architecture is hybrid of web service structure and multiagent frameworks. To search an effective web service from UDDI, agent play a major role. UDDI is a directory that is containing web service description, Specification, t-model data structure of business entities [13].

In UDDI information is provided about web services or business objects in XML form.

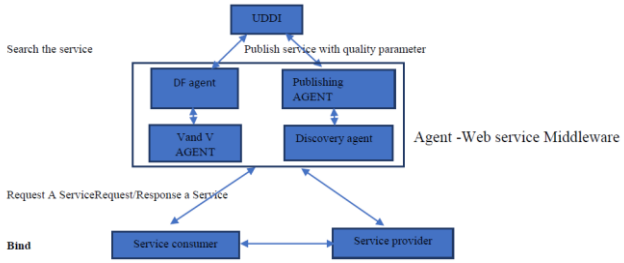

FIG 4.1: Mapping of web services andsoftware agents

In thismodel, following steps are performed while fetching a qos based web service:

1) A service like check the availability of flight with cheapest rate is requested by a service consumer to service provider. Then service provider checksthe consumer requirements and pass the request to agent web service middleware.

2) If the service is available with provider, it returned the service to consumer otherwise it requests to middleware.

3) In middleware, the discovery agent searches the UDDI directory with keywordsand find the best suitable web service of availability oflow-cost flights (if more than one flight matches) as per user requirements and constraints.

4) Service publisher publish the service returned from UDDI and pass it to service provider. A service publisher can update the UDDI, publisher also has a feature of adding and delete services fromUDDI. The service provider registers with publishers and fetch the required service from publisher.

5) DF agent play a major role in agent technology. Every agent platform must have one DF. It provides yellow page service to other agents. Agents quarry or search in DF about what kind of services are given to other agents.

6) But before given to service consumer this service is validated and verified (service testing) by vand v agent. If the service is matching as per user requirements then a copy of the service id is also kept in DF (directory facilitator).DF is an agent directory having agent description like UDDI. If the web service does not find in UDDI, then agent search service id in DF also or vice versa. Finally, a reference of the searched web service is maintained in both directory for convinces of agents or service consumer.

7) Rajendra andBalasubramanian [7] follow the best method. They use the test cases for verification of web services. They done the qosverification at three levels 1) web service information checking 2) verification of WSDL file of web service 3) qos parameter verification. Finally, after verification services are categorized according to their success rate and failurerate. The successful top M matching service(s) are returned to the consumer with highest ranking score.

In this way web services are mapped with agent technology by using agent web service middleware.

5.CONCLUSIONS: Agent play an important role in finding web service. Agents are associated with number of features but important feature is coordination amomg them .by this feature they can win easy to complex tasks. Finding a web service has proposed by many researchers with number of methods but the best method is done by software agents. Integrating web service with agent technology helps in making different interoperable application in different technologies. So, mapping of both makes the things different and better than others.

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