Chapter 9
Service Cluster Approach in Enterprise Service Bus

Jayashree K
Rajalakshmi Engineering College, India

Chithambaramani Ramalingam
Rajalakshmi Engineering College, India

ABSTRACT
Enterprise Service Bus is an infrastructure to facilitate Service Oriented Architecture (SOA). SOA has gained a lot of attention over the most recent years and has become the de-facto standard for web application and software component integration. Web services are the prominent model for interoperable applications across heterogeneous systems and electronic business which use SOA and it has been used in various applications. The web services available on the web is increasing day by day, hence web service discovery is becoming a difficult and time consuming task. To discover services, clustering web services is an efficient approach. It is also necessary to compose several web services in order to achieve the user’s goal. The chapter presents the background of web services and the various data mining techniques used for clustering web services. The chapter presents the various web services clustering method and the related work that discusses the various techniques to cluster the web services will also be addressed.

INTRODUCTION
Various enterprises put forward their distributed web services as interfaces for their basis commerce systems by means of Service Oriented Architecture (SOA). SOA is a set of principles such as standardized service contract, service abstraction, service reusability, service discover-ability, services composition, Interoperability, service loose coupling, and methodologies that have been used for designing and developing software in the form of services, to increase IT adaptability and efficiency in the applications.

Enterprise Service Bus (ESB) is a standard which integrates software applications that are loosely coupled in middleware infrastructure. The core characteristic of an ESB includes standards based application integration, support for web services, publish and subscribe integration and message based transport, transformation and intelligent routing. The system implementation environment used for the

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web services has been created by the ESB for exchanging messages, routing the contents and integration. It also enhances connectivity and includes flexibility and controls the significant binding resources. The ESB architecture is shown in Figure 1.

Web services have brought dramatic change in IT system architecture and application paradigms. It is used in variety of applications such as banking, process control, groupware, stock trading, government, automotive systems, multimedia services, telecom, digital imaging, health and a lot of other domains. These applications are highly reliant on discovering correct web service. Since the number of web services usage has been increased over the web, it becomes difficult to select the correct service from the large number of web services becomes a challenge; hence web service discovery is the most important task.

Priyadharshini et al. (2013) have defined web service discovery as the method of matching service user requirements with the existing web services. The discovery method is made easier by the web services description. Services have been described by the use of WSDL and each web service can be identified with specific service name. Several approaches have been suggested to increase the correctness of web service discovery by applying numerous techniques such as data mining, graph based methods, ontology based discovery frameworks, singular vector decomposition, agent based and logic based methods.

Data mining is a method of mining useful information and patterns from large volumes of data. Various algorithms and techniques like classification, clustering, neural networks, regression, evolution, pattern matching, association, decision trees, Nearest neighbor method, genetic algorithm are used for knowledge discovery from databases. According to Madhuri et al. (2013) a descriptive or a predictive mining model can be constructed using data mining. Descriptive mining model is used to summarize the general properties of the data by analyzing the past history of data. Predictive mining model is the process of predicting future response of interest based on data evaluation with the help of statistical or neural methods.

Computational time and complexity is reduced due to the categorization of web services, because the execution procedure is done only on the matching group and not on the whole existing web services. Clustering and classification are the two methods used for the categorization of web services. Clustering is the method of automatically gathering correlated records together as a group called cluster. Cluster-
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