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INNOVATIVE CLOUD SERVICE SELECTION VERIFICATION SYSTEM TO ACHIEVE CHEATING FREE CLOUD SERVICE SELECTION UNDER A CLOUD BROKERAGE ARCHITECTURE

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Abstract:

Cloud service brokering is a new service paradigm that provides interoperability and portability of application across multiple Cloud providers. In this paper, we designed Cloud service brokerage system, any Broker, supporting integrated service provisioning and SLA based service lifecycle management. For the system design, we introduce the system concept and whole architecture, details of main components and use cases of primary operations in the system. These features ease the Cloud service provider and customer's concern and support new Cloud service open market to increase Cloud service profit and prompt Cloud service echo system in Cloud computing related area.

Keywords: Cloud service brokerage, multiple Clouds, Integrated service provisioning, SLA, network service.

1. INTRODUCTION

Cloud Computing is an emerging IT System solution and its fully service-based business model appeals to an overwhelming majority of decision makers. However, there are still several technological challenges to be addressed and current solutions are far from satisfying the needs of all stakeholders, such as cloud providers, services and applications developers and providers, as well as end-users . Moreover, cloud data centers are more and more constructed in diverse area and cloud-based services are getting rapidly increased. At the same time, cloud service consumer and provider's concern is increased. In aspect of cloud service consumers, finding appropriate cloud service is getting difficult. To find best-matching cloud, they should contact many cloud service portals. It is time-consuming job and not easy situation to make a decision. In aspect of cloud service provider, they will have difficulty to attract customers and to increase usage rate of their existing cloud infrastructure because competition among Cloud service providers is getting serious. To ease the upper described problems, Cloud service brokerage system is able to make open Cloud service market between Cloud service providers and consumers and it provides interoperability and portability of application across multiple Cloud providers [3]. A Cloud service brokerage system provides a single and common interface through which consumers can provision and manage their services on multiple clouds. In Cloud service brokerage, Cloud service provider, consumer and broker don't have complete control over actions of the others. Cloud service broker intermediates, rather than control in coordinating inputs and outputs of multiples services.

2. RELATED WORK

The NIST enhances the description of the roles and types of services that a Cloud service brokerage system may offer to cloud Consumers. A Cloud service brokerage system renders some

combination of services that can be divided into five architectural component categories, secure service aggregation, secure service arbitrage, secure service intermediation, secure Cloud service management, and secure Cloud ecosystem Orchestration . According to Gartner, Cloud service brokerage system is a role of intermediary, in which a company or other entity adds value to one or more cloud services on behalf of one or more consumers of those services. Cloud-enabled technology services are a prominent aspect of the cloud services supplied by a Cloud service brokerage system. The Cloud service brokerage system offering will also often include some combination of capabilities that fall under three primary roles, aggregation brokerage, integration brokerage, customization brokerage. Gartner's Intermediation encompasses these three primary roles. On cloud brokerage, the positive opinion of different cloud experts towards cloud brokerage confirms Gardner's trend that "Cloud computing will evolve from a one-to-one relationship to a one-to-many ecosystem" [8], [9]. Especially the argument of assisting companies in selecting the right cloud services and the argument of cost saving are important value adds of cloud brokerage. Furthermore, the experts see that cloud brokerage will be very interesting for small and medium-sized enterprises, whereas large companies in the field of cloud computing will themselves evolve towards cloud brokers. In [10], open source service brokerage solutions are compared, according concerns like, system category and type, core capabilities, core features and advanced features, architecture and interoperability, service languages, programming model and service engineering, and quality (scalability / Elasticity and SLA). In the research, the authors place emphasis on the emergence of cloud broker solutions on top of cloud management, the need for further separation of marketplaces and cloud broker solutions and service description mechanisms to commoditize the cloud. The authors proposes a taxonomy of Cloud services brokerage capabilities based on two orthogonal dimension of clouds brokerage space, Cloud service type (SaaS/PaaS/IaaS) and Cloud brokerage capabilities such as discovery, integration, aggregation, customization, quality assurance and optimization. And classify 30 current providers and enablers of Cloud service brokerage capabilities. This analysis shows that the majority of Cloud service broker service providers or enablers appear to focus on discovery, integration, aggregation, customization with a particular emphasis on SaaS services. For both kinds of offerings, PaaS is the least supported type of cloud services. IaaS appears to be the most commoditized category of cloud services today. Coverage of quality assurance and optimization capabilities is sparser.

3. CLOUD SERVICE SELECTION

Cloud services offer an elastic and scalable IT task force in terms of storage space and computing capabilities which is essential to most business owners, especially small and medium sized businesses . While this has fueled the large growth in Cloud services, the growing number of Cloud services make it difficult for the potential users to weigh and decide which options suit their requirements the best. There is clearly a need of an additional computing layer on top the base service provisioning to enable tasks such as discovery, mediation, and monitoring. This is the first task accomplished by GABE. The selection of Cloud providers requires addressing a number of interesting questions raised by the unique characteristics of the Cloud computing environments. First, Cloud services may seem to resemble but are in fact very different from Web-Services. For example, There is no standardized representation of the Cloud providers' properties. Also, the Service Level Agreements (SLAs) of Cloud providers often vary in format and content. Therefore, Web-Service selection algorithms cannot be directly applied to the Cloud domain. Secondly, a Cloud user may have a service requirement that cannot be fulfilled by any single service provider, thus requiring an aggregation of service providers. Aggregating service providers is very challenging in the Cloud due to complex relationship among Cloud service providers

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that are built via subcontracting. Bearing these challenges in mind, in this dissertation we propose a comprehensive

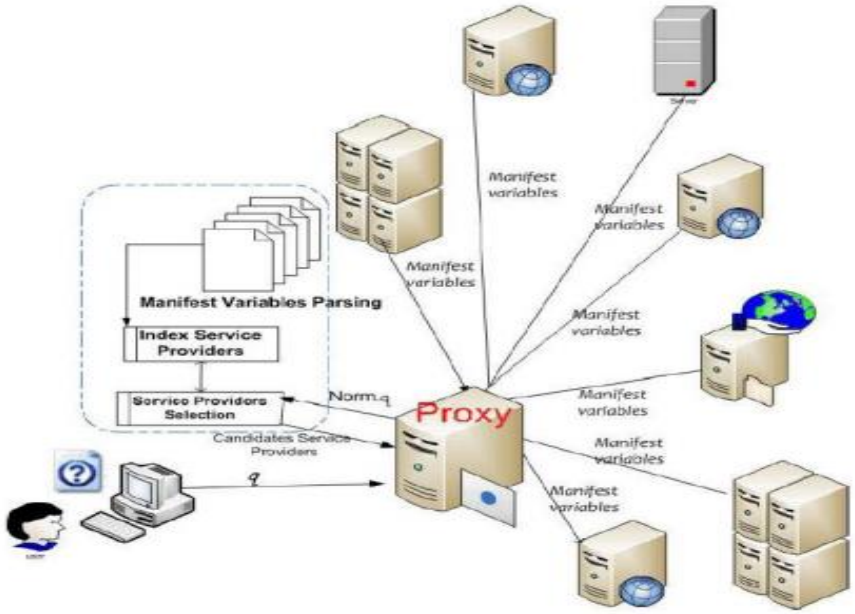

Fig.1.Service Selection Framework

brokerage-based architecture to support Cloud service selection. In particular, we propose an efficient indexing structure, the CSP (Cloud Service Provider) index, to manage the potentially large number of service providers. The CSP-index is built based on a novel encoding technique that captures similarity among various properties of service providers. With the aid of the CSP-index, we further design the service selection algorithm that considers aggregation of services and provides rankings of potential service providers. To evaluate our approach, we have collected real data from top 10 Cloud providers listed by Search Cloud Computing in . Our experimental study, presented in Chapter 7, demonstrates both efficiency and effectiveness of our approach.

4. CLOUD INFORMATION SYSTEM

To allay users' concerns, it is essential to provide an effective mechanism for users to monitor the usage of their data in the cloud. For example, users need to be able to ensure that their data is handled according to the service level agreements made at the time they sign on for services in the cloud. Conventional access control approaches developed for closed domains such as databases and operating systems, or approaches using a centralized server in distributed environments, are not suitable, due to the following features characterizing cloud environments. First, data handling can be outsourced by the direct cloud service provider (CSP) to other entities in the cloud and theses entities can also delegate the tasks to others, and so on. Second, entities are allowed to join and leave the cloud in a flexible manner The main responsibility of the outer JAR is to handle authentication of entities which want to access the data stored in the JAR file. In our context, the data owners may not know the exact CSPs that are going to handle the data. Hence, authentication is specified according to the servers' functionality (which we assume to be known through a lookup service), rather than the server's URL or identity. For example a policy may state that Server X is allowed to download the data if it is a

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storage server. As discussed below, the outer JAR may also have the access control functionality to enforce the data owner's requirements, specified as Java

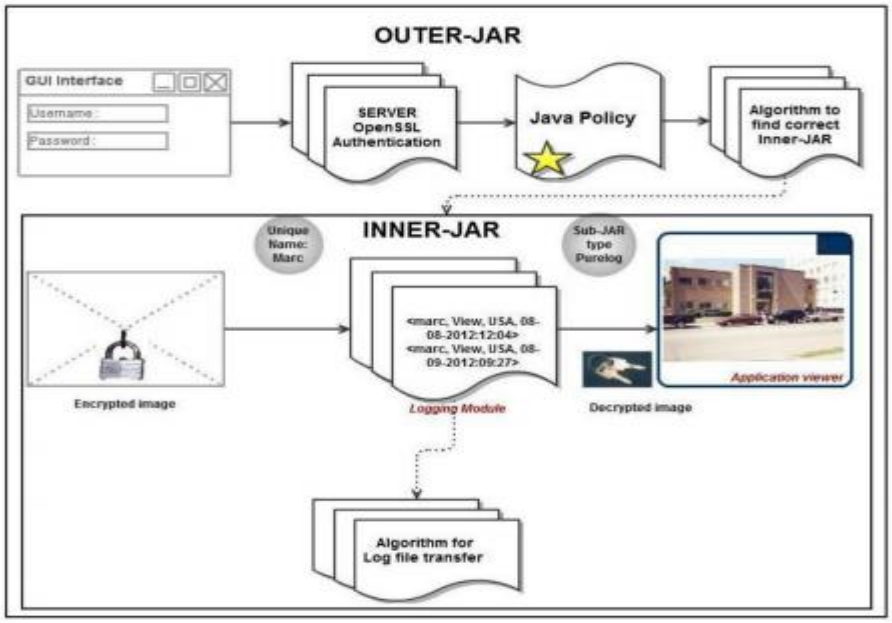

Fig.2.Structure of JAR File

policies, on the usage of the data. A Java policy specifies which permissions are available for a particular piece of code in a Java application environment. The permissions expressed in the Java policy are in terms of File System Permissions. However, the data owner can specify the permissions in user-centric terms as opposed to the usual code-centric security offered by Java, using Java Authentication and Authorization Services. Moreover, the outer JAR is also in charge of selecting correct inner-JAR according to the identity of the entity who requests the data.

5. SYSTEM ANALYSIS

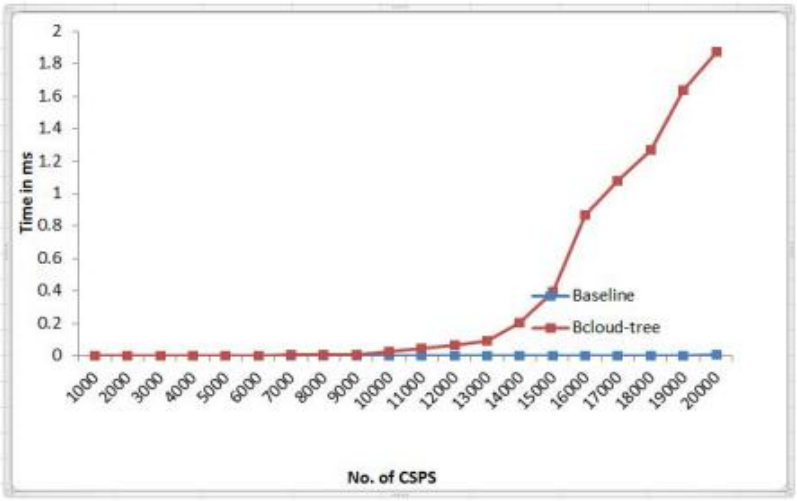

Fig.3. Average processing time for interval queries in the Bcloud

We calculate the time taken by the Bcloud-tree to find a comparable match to the query both when the query is expressed in terms of fixed values, and in terms of a range of desired values. To check the performance of the Bcloud-tree in terms of time taken, we increase the number of CSPs being checked from 100 to 20000 and measure the system time in milliseconds. This is compared with the optimal approach for time, which is the greedy approach. We then measure the accuracy of the Bcloud-tree for both fixed value queries and interval queries by comparing the number of properties in which the CSP returned by the Bcloud-tree differed from an exhaustive match of the queries. We find that the accuracy of the Bcloud-tree is very high for the interval queries.

CONCLUSION

In this paper, we described and showed the design concept, detailed architecture and its main components of anyBroker. These features ease the Cloud service provider and customer's concern and support new Cloud service open market to increase Cloud service profit and prompt Cloud service echo system in Cloud computing related area. Current anyBroker is focused on Infrastructure as a service (IaaS) brokerage and we will extent the coverage to PaaS, SaaS and specialized service area in future.

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