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An Agent-Based Service Ranking for Cloud Service Providers (CSP) selection in Cloud Environment

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Abstract
Agent-based modelling is designed for the execution of the computing part of the software as a service (SaaS). The software services can be provided by any cloud service provider(CSP) have to perform computation on the data, which is stored on the cloud servers. The level of data security provided by the service provider is not that acceptable and trustworthy. The agent selects the service provider based on the trustworthiness computed on time. The trustworthiness is computed based on the factors like completeness, data leakage, reliability and availability of service. The TPA not only maintains the identity of users but also the histories about the service access which are automatically generated.

Index Terms
Cloud Security, Agent Model, personalized data, Cloud Computing, Service Ranking Algorithm.

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I. Introduction

The increased growth in internet technology provides a path forcloudusers to access valuable sources through a set of services. The source may be infrastructure, platform, software and storage. For example, an organization or a user have a huge instruction set that has to be executed for the completion of a process but needs a more capable processor or RAM or memory etc. which cost more. Affording more cost for the purchase of super resources is not possible for the users to overcome these cloud service providers afford these resources with a little charge to access.

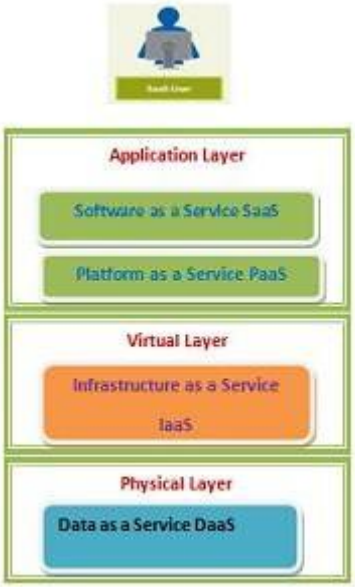

Figure 1: Four Layer Architecture of Cloud Environment

The cloud environment provides various services at various layers. In the application layer, it provides Software as a Service(SaaS) and Platform as a Service (PaaS), in the virtual layer it provides Infrastructure as a Service(IaaS) and in the Physical layer, it provides Data as a Service (DaaS) [1].

The cloud is an environment where the user identity is unknown and managed by a Third Party Auditor so that the service provider or data owner doesn't know about the user.[2].

II. Proposed System for "An Agent-Based Service Ranking for CSP Selection in CloudEnvironment"

The agent-based service selection model consists of the following components namely Agent Controller, TPA, Cloud Server, Sensor Node etc. whenever a service request arises at the application layer it transforms the request to the agent container, the agent container sends an agent to the Third-party auditor with the identity of the user and the agent performs the Service Ranking algorithm to select set of service to complete the request. After identification of service the agent comes back home then it invokes the cloud serviceselected.

2.1 AgentController

This component generates a dynamic agent for each service request and the agent is composed of service parameters and user identity details etc. once the agent is created it communicates with the third partyauditor which is residing in a remote location. The third-party auditor maintains the user identity and verifies the identity of the user whenever a service request arises. The TPA extracts the user identity details from the agent request and verifies its signature. If the verification process is successful or itpasses the verification process then the agent can access further services. Every agent will be assigned an agent identification code by the TPA and it will be updated with the cloud service providers and the proposed architecture is shown inFig.2.

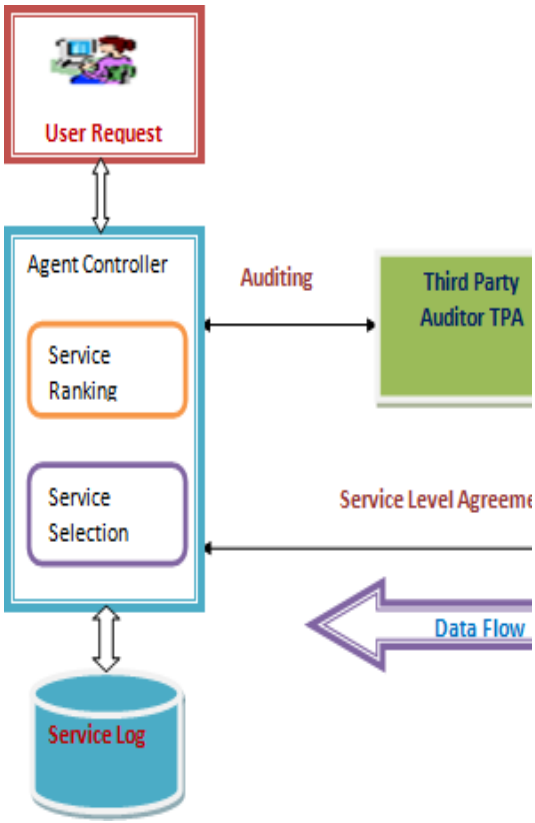

Figure 2: Proposed System Architecture.

2.2 Third-Party Auditor

The TPA maintains the identity of the user; it maintains the public and private keys generated for each user in the cloud by the cloud service provider. Whenever a user registers to the cloud service provider, it generates both public and private keys using which the user identity is computed. It uploads the key generated to the third-party auditor and user. Upon receiving the request from the user it receives the public and private keys from the user and it computes the signature for the key and verifies the signature. If the user signature verification passes, then the user will be allowed to access the service. Upon successful signature verification, it assigns an agent identification code and the same will be sent to the cloud service provider also. The agent identification code will be used to identify the agent by the cloud serviceprovider.

2.3 Service Ranking andSelection

The agent container maintains the service details, service provider details and previous history of service access in a database. It reads the previous log from the database and identifies the set of locations available. It identifies the set of providers who provide the service. Then itcomputes the service weight using reliability, completeness, time is taken, and data leakage. Based on these metrics the service weight is calculated

and from the weight computed a minimum set of service providers with more weight will be selected. To reduce the load, in particular, the service provider interface, from the selected set of CSP's one is selected which has a low workload.

III. Related Work

A broker-based system is described in where the authors proposed a multi-attribute negotiation to select services for the cloud consumer. The quality data is collected during predefined intervals and analyzed to detect any quality degradation, thus allowing the service provider to allocate additional resources if needed to satisfy the SLA requirements. Another broker-based the framework was proposed to monitor SLAs of federated clouds with monitored quality attributes measured periodically andchecked against defined thresholds.Additionally, the authors proposed a centralized broker with a single portal for cloud services, CSP, and cloud service users. The authors proposed a distributed service composition framework for mobile applications. The framework is adaptive, context-aware and considers user's QoS preferences. However, this framework is not suitable for cloud service selection due to heterogeneity and the dynamic nature of the cloud environmentapplications. The framework is adaptive, context-aware and considers the user's QoS preferences. However, this framework is not suitable for cloud service selection due to the heterogeneity anddynamic nature of the cloud environments.

IV. Conclusion

The agent-based service ranking produces efficient results. Service weight is computed to select the particular service provider. The selection of service providers is not only based on the weight and also based on the load on each service provider. This handles the load balancing efficientlyto increase the efficiency of the framework. The overall time to complete the service request is reduced because of the dynamic nature of the agent generation. For each request, an independent agent is generated and each agent is identified with a unique agent id so that the overall processing time of the service request is reduced hugely. The autonomic nature of the agents helps to reduce the time taken to process the request and increases the efficiency f the framework.

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