Issues and Challenges in Cloud Provisioning

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I. Issues in Discovery [1].

- One of the main issues regarding service discovery in a multiple-cloud deployment is the lack of an integrated repository of cloud services.[5]
- Another issue is that cloud providers describe their services with diverse languages, terms, and names.
- States of a large part of services in clouds change constantly and are dynamic in nature.The situation is even worse in interconnected cloud environments. Consequently, dynamic attributes should be added to cloud services and a web service based resource.

II. Challenges in Discovery

- **Scalability, Performance and reliability:** Centralized approaches for an integrated service catalog are not appropriate due to concerns of scalability, performance, and reliability arising from a large volume of service requests.
- **Complexity:** a point-to-point discovery architecture results in the n2 complexity problem, and it can be solved by Inter cloud Root Instances and Inter cloud Exchanges.[2]
- **Common Understanding:** There is not a common understanding regarding service functionalities, their QoS, and metrics among providers and customers.
- **Lack of Standard syntax:** In a heterogeneous environment such as Inter-cloud, it is difficult to enforce a standard syntax on service description or common metrics.
- The Web Service Description Language (WSDL), which is used by UDDI, does not support modeling of QoS properties and it is difficult to add them.[2]

III. Issues in Selection [1]

- Cloud service selection did not receive much attention in the literature mostly due to the lack of reliable data on cloud services QoS criteria
- In multiple cloud application deployment scenarios, selection is not a trivial task due to the diversity of cloud services characteristics and QoS.
- Currently, selection is performed manually by cloud customers based on their requirements or through consultant companies.
- The selection process can be performed either based on static information on the service quality provided by cloud providers or through dynamic negotiation of SLAs. Limited support is currently available for dynamic negotiation of SLAs. [3]

IV. Challenges in Selection

- Limited support is currently available for dynamic negotiation of SLAs.
- **latency, reliability, throughput, data transfer, and cost:** Implementation of an automated selection procedure to optimize these constrains is difficult.
- Migration of web application from one cloud provider to another is difficult.

V. Issues in Allocation [1]

- As the number of resource consumers is increasing, clouds need to share their resources with each other to improve their quality of service.In general, such a collaborative cloud computing system (e.g., cloud federation) is prone to contention between user requests for accessing resources.[4]
- Physical resources in clouds are shared between cloud users. Therefore, allocation strategies are needed to allocate resources to the requests in a portable manner while fulfilling requests QoS requirements.
- Cloud providers usually offer their virtualized resources based on different QoS levels.

VI. Challenges in Allocation

- An efficient allocation mechanism requires to minimize contention.Contention happens when a user request cannot be admitted or cannot acquire sufficient resources because resources are occupied by other requests.
- Security is a big challenge. As resources are allocated in different cloud providers, a proper protocol should implement to offer security.
- As resources are allocated in different cloud providers an optimal allocation algorithm requires to overcome delay.
- Data transfer in such an environment is also an big challenge.

VII. Conclusion

As the adoption of cloud as the main technology for provisioning of infrastructure, platform, and service for users grows continually, the need to aggregate services and functionalities from different providers arises. This aggregation can happen in any of the delivery models (IaaS, PaaS, or SaaS) and can be enabled by different approaches and technologies. Inter cloud raises many more challenges than cloud computing. Here, we discuss the three main challenges arises in inter cloud provisioning. We have discussed many aspects of issues and challenges in cloud provisioning discovery, selection and allocation.

References

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