A Modern Multi-Agent System for Brilliantly Composing Relevant Cloud Services

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ABSTRACT

The unbridled growth of cloud computing and its applications are facing economy and time based challenges, the cloud users also facing difficulties to finding the relevant cloud services, Agent based computing and federated concepts are take it to next level. Federation (single sign-on) mechanism used to give an ability to access cloud resource from different providers with single federated id. The multi-agent systems are used to compose variety of relevant cloud services and provide into single unified virtualized service. Cloudle the concepts 1.service reasoning, 2.similarity reasoning and heuristic optimization algorithm are used to select the relevant cloud services. The service level agreements are used to reduce the communication complexity between the agents.

***Keywords*—Cloud computing, multi-agent systems, software agent, service detection, service compilation, agreement, resource management, Agent based communication techniques.**

I. Introduction

The main feature of using multi-agent in cloud computing to deals with the new set of development of software agents for supporting cloud service composition. This concept introducing the agent based scenario for cloud resource management, this scenario includes the cloud service composition. The multi-agent negotiations process brilliantly done with the help of service level agreement, the cloud service composition enables the client agent dynamically selects the Cloud services from different cloud services providers and records the list of Cloud agents and services.

A. Cloud Computing

Cloud computing is a recently evolved computing terminology or metaphor based on utility and consumption of computing resources. Cloud computing involves deploying groups of remote servers and software networks that allow centralized data storage and online access to computer services or resources. Clouds can be classified as public, private or hybrid. [11][12]

Cloud computing, or in simpler shorthand just "the cloud", also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by

multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users. For example, a cloud computer facility that serves European users during European business hours with a specific application (e.g., email) may reallocate the same resources to serve North American users during North America's business hours with a different application (e.g., a web server). This approach should maximize the use of computing power thus reducing environmental damage as well since less power, air conditioning, rack space, etc. are required for a variety of functions. With cloud computing, multiple users can access a single server to retrieve and update their data without purchasing licenses for different applications.

B. Modern Multi Agent-System for Cloud Computing

A modern multi-agent system is a computerized system to compiling of multiple interacting intelligent agents within cloud environment. Multi-agent systems can be used to solve problems that are difficult or impossible for an individual agent or a monolithic system to solve.

The modern multi-agent systems have the following characteristics. [13] **Autonomy**: the agents are at least partially independent, self-aware, and autonomous. **Local views**: no agent has a full global view of the system, or the system is too complex for an agent to make practical use of such knowledge. **Decentralization**: there is no designated controlling agent (or the system is effectively reduced to a monolithic system). [14]

The multi-agent systems have contains many agents, they interact with one another. The interaction process needs an ability to co-operate and negotiate with one another. Cooperation needs when the many agent work together and the wide collection of their knowledge.

The management protocols of the agent adopted for automated the process of resource pooling as well as sharing in cloud Supporting autonomous resource mapping and dealing with changing requests accentuate the need for Cloud resource management systems that are capable of continuously managing the resource reservation process by monitoring current service requests, amending future service requests, and autonomously adjusting Schedules and price to accommodate, dynamically changing resource demands. The users need to make decisions to select suitable providers and negotiate with providers to achieve Ideal service contracts, providers need to make decisions for selecting appropriate requests to accept and execute depending on the availability of resources.

II. Related Works

The agent-based Cloud computing, cooperation, agreement, and coordination protocols of agents are adopted to automate the activities of resource pooling and sharing in Clouds. Supporting autonomous resource mapping and dealing with changing requests accentuate the need for Cloud resource management systems that are capable of continuously managing the resource reservation process by monitoring current service requests, amending future service requests, and autonomously adjusting schedules and prices to accommodate dynamically changing resource demands.

A. Federation based concepts

The ancient federation (single sign-on) mechanism gives an ability to sign-on different providers from by using single federated id. The mechanism have some drawbacks, the more number of message passing between the user to federation or user to provider and provider to

federation, so it takes time and network traffic. The Provider may deal with users to minimal details. That's the big drawbacks of using federated account. Federated account gives ability to the users to login to any provider with by using single federated id.

B. Agent Based Cloud Service Composition

Service composition in multi-Cloud environments must coordinate self-interested participants, automate service selection, configure distributed services, and deal with incomplete information about Cloud providers and their services. This paper proposes an agent-based approach to compose services in multi-Cloud environments for different types of Cloud services: one-time virtualized services, e.g., processing a rendering job, persistent virtualized services, e.g., infrastructure-as-a-service scenarios, vertical services, e.g., integrating homogenous services, and horizontal services, e.g., integrating heterogeneous services. Agents are endowed with a semi-recursive contract net protocol and service capability tables (information catalogs about Cloud participants) to compose services based on consumer requirements.

Empirical results obtained from an agent-based testbed show that agents in this work can: successfully compose services to satisfy service requirements, autonomously select services based on dynamic fees, effectivelycope with constantly changing consumers' service needs that trigger updates, and compose services in multiple Clouds even with incomplete information about Cloud participants.

The new challenges that Cloud computing poses to service composition, emphasizes the need for the gent paradigm. Agents are independent problem solvers (e.g., Cloud participants) that may collaborate to achieve global objectives (e.g., service composition) while simultaneously considering both individual goals and constraint. Cloud service composition may be augmented in two dimensions: Horizontal and vertical. Horizontal service composition deals with the combination and integration of heterogeneous services, e.g., storage, compute, cryptography services, etc. Vertical service composition involves the integration of homogenous services, e.g., augmenting storage capacity by adding new storage data centers.

C. Managing Concurrent Negotiation

Automated negotiation is a key form of interaction in agent-based systems and such negotiations exist in many different forms. This paper focuses on one such form, namely one-to-many negotiations in service-oriented contexts. Here, a service is simply viewed as an abstract representation of an agent's capability. This view is now widespread in a range of domains that we are targeting for our work, including the web, the grid, pervasive computing and e-business. In more detail, one agent is seeking to provision a single service (described by multiple attributes, such as cost, time, quality, etc.) from a number of potential providers. Traditionally, this type of encounter is handled via some form of single-sided (reverse) auction protocol.

III. Proposed Work

The proposed work of this project is to compose variety of relevant cloud services and provide unified virtualized service to cloud customers. The Automated cloud service will be provided by using Brilliant heuristic optimization algorithm with cloudlet methodologies, they are 1. Service Reasoning. 2. Similarity Reasoning. The service negotiation phase consists of message exchanges between consumers and brokers, and between brokers and providers for establishments of service level

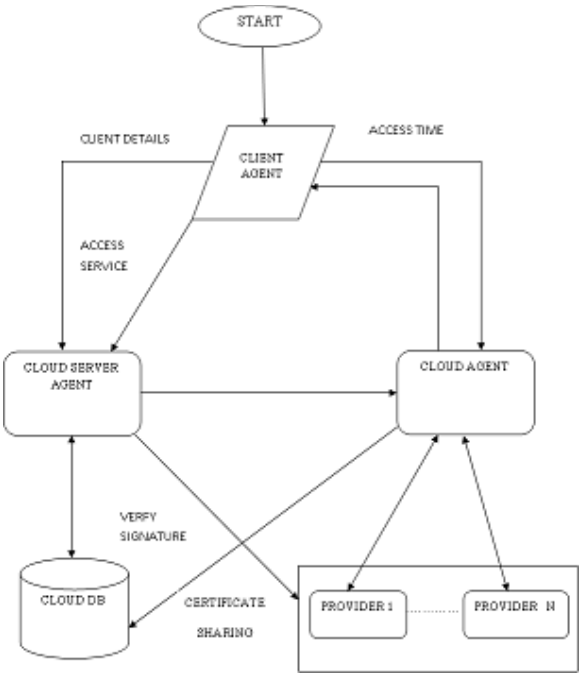
agreements. The federation account gives single sign-on ability to the cloud users. The federated servers send details that are required to the cloud service providers.

A. Multi-agent based Cloud Service Composition

The broker combines a set of services from multiple providers, and delivers the combined service as a single virtualized service to a consumer. All the users are provided with email, editor and storage service. To email the user needs to give the receiver id and message to send. In the editor the document the user type in, gets stored in the cloud drive that is in the Google drive. In order to storage a record from hard drive the storage feature can be used. A file id is received to acknowledge that the file is stored.

The registered users access the cloud service through the agent. The agent holds the details of all the cloud service available. These services are provided to the server as a whole. The login requires a key that was provided to the user during registration. Once the authentication is done the user is directed to the services page.

To access services in cloud the users need to have a personal login. The user's personal details like email id, designation are used for registration. The new user is directly connected to the server and is provided with a unique user key. The connection to the server is established through socket with the specific port number. It is only through this key the user can access the services then. All the user details are stored the server databases.



Fig[3.1] Dynamic Multi-agent cloud service composition

IV. Result

The simulation result shows the relevant cloud service composition. The selecting relevant cloud services by heuristics algorithm with brilliant selecting methodologies 1. Service Reasoning, 2. Similarity Reasoning

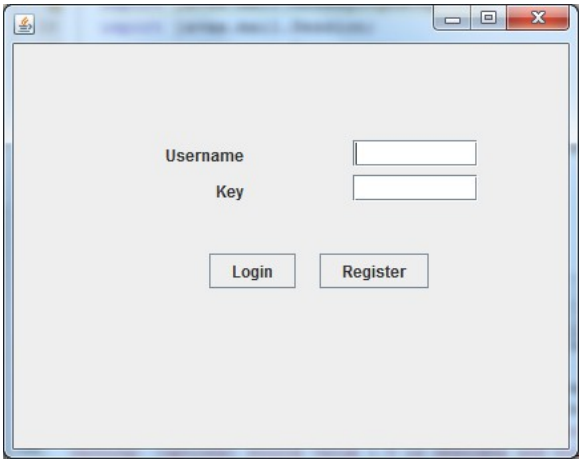


Fig. [4.1] Client side service login page

In this cloud service composite page shows the relevant cloud composition. The service reasoning approach used to find required services, the similarity reasoning approach help to choose top rated priver with help of heuristic algorithm used select the relevant cloud services (Email –service, Storage –service, Online –File Editor service).

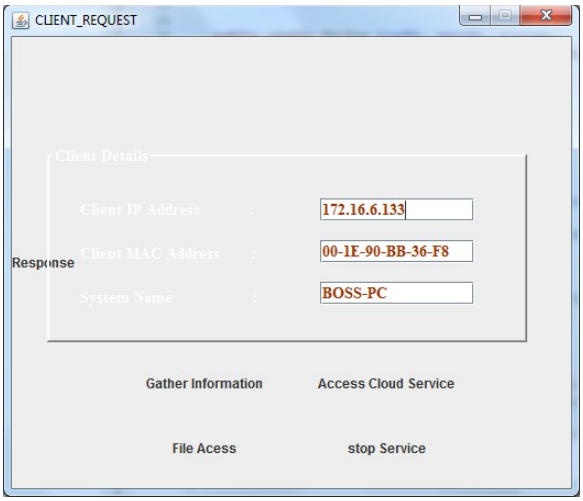


Fig. [4.2] Service management client side

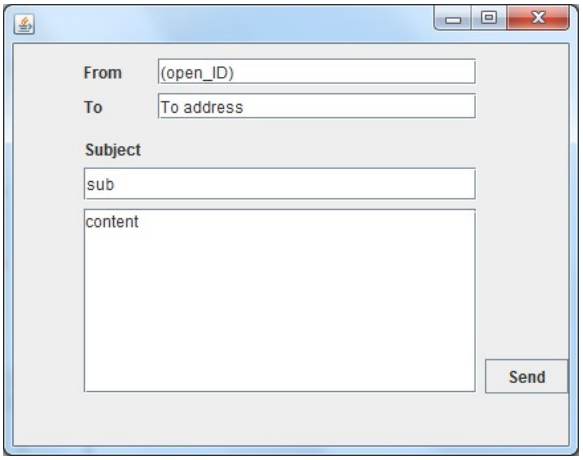


Fig. [4.3] Email Service Integration

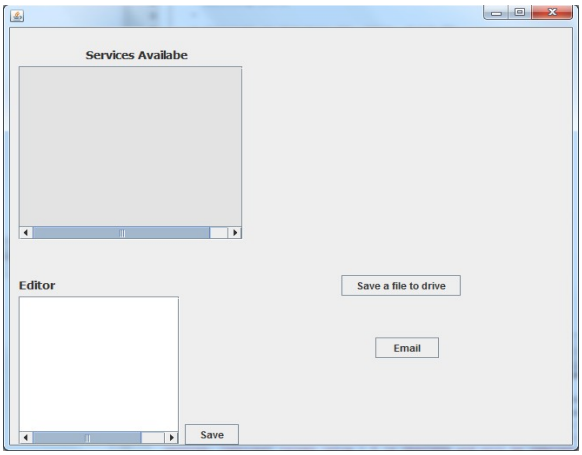


Fig.[4.4] Cloud Service Composite Page

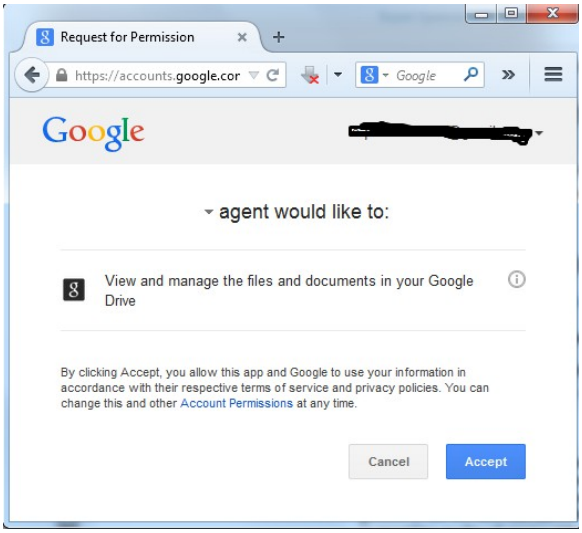


Fig.[4.5] Cloud Service Level agreement(SLA)

V. Conclusion and Future work

This work introduces an agent based standard for Cloud resource management. Cloud negotiation mechanism facilitates the negotiation activities between consumer agents and broker agents and between broker agents and provider agents. It reduces the complexity of the cloud users.

The future work is to develop the system without the usage of the test bed and to compose the cloud services other than the registered services in the test bed to the users.

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