

Interaction among Cloud Services on Common Software Application with Service Level Agreement

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Abstract—Nowadays the cloud computing has plays important role for larger organization, IT Industries, educational industries etc. Cloud computing is the complex infrastructure of software, hardware, processing and storage that are available as a service. It has huge number of advantages and also suffers lot of disadvantages. In the Cloud Service User (CSU) point there is no specific protocol, algorithm. There is no design pattern and interface for accessing a cloud services. The Cloud Service Provider (CSP) has to follow their own deployment model which is difficult to understand by the cloud service users or application user. There is no interoperability among the cloud services with different cloud service providers. The proposed work focuses on the interoperability among the cloud service providers with common deployment model in order to provide the effective, reliable and efficient services. The cloud specific services are categorized into cloud sensitive services and cloud insensitive services. In the cloud insensitive services which are more common services can be shared among the CSP services without maintaining the same services into their own deployment model. The services are shared with the help of Service Level Agreement (SLA). Each and every service has to establish the SLA with other services for reusing the services.

Index Terms— Cloud Computing, Service Level Agreement, deployment models, Web services.

I. INTRODUCTION

Cloud computing is the complex infrastructure of software, hardware, processing and storage that is available as a service. Grid computing is used to share the resources where as the cloud computing is to sharing the services. The services of cloud computing are classified into Software as a Service (SaaS), ii) Platform as a Service (Paas), iii) Infrastructure as a Service (IaaS) etc., The cloud services are heterogeneous in nature means that each CSP follows their own standard for satisfying the customers [1] [2]. These standards are difficult to understand by the cloud users which leads the problem of CSP which losses the customer using their own services [6]. In cloud insensitive services are the services which are common services to the entire CSP i.e., the cloud services are provided with the help of software applications. These software applications are maintained by the CSP in their own environment. Different service providers are using the same software applications without the knowledge of other cloud services i.e. two different providers offer the same service. For example the word processing application is common to some CSP which is used for

performing the word processing operation. Two different requests come from cloud customers for performing word processing operation. The CSP satisfies the customer with the help of their own word processing application likewise other CSP also provides the same service. Two different CSP provides the word processing to CSU with huge number of deviation in the response. This problem can be overcome by categorizing the cloud services into the cloud sensitive services and cloud insensitive services. In cloud sensitive services are the services which are available on the specific cloud environment. The proposed work focuses on the cloud insensitive services are which maintains in the separate layer called service interaction layer. Suppose two different request comes from the cloud users i.e., one for editing a word document and another for creating a excel with the help of interaction of services over the application. A SLA is a document which defines the relationship between two parties: the providers and the recipient [3] [10]. The cloud services are separated based on the demand of the Cloud Users which are classified into data processing services, cloud storage services and data processing and cloud storage services [2]. The existing work only focused on the service separation but it never gives upon how the services are interacted with the low level cloud services. This paper displays the concept of cloud service selection with the help of common deployment model which consists of all the available service for cloud users. The service interaction among the cloud service provider also established with the help of service level agreement among the cloud services.

Outline of Paper

Section 1 presents the overview of cloud computing and its services. Section 2 presents architecture diagram of the proposed model. Section 3 describes the flow diagram of the proposed model. Section 4 describes the deployment of the proposed model. Section 5 presents the algorithm for the proposed model. Section 6 presents the case study. Finally, Section 7 presents the conclusion and future work.

Architecture of the proposed system

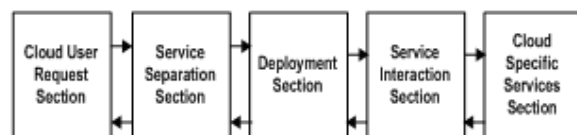


Fig 1. Architecture of the proposed model

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The cloud users want to access the services with the help of cloud user request section. In the service separation section as shown in fig.1, separates into data processing services, cloud storage services, data processing and cloud storage services. In the deployment section has all the services which are common to different service providers. The service interaction section provides the interaction between the services with the help of SLA. Once the services have been selected which are maps into the cloud specific services i.e. SaaS, PaaS, and IaaS ... XaaS etc. [2]

II. FLOW DIAGRAM OF THE PROPOSED SYSTEM

The flow diagram as shown in fig.2 focuses on the service separation and service interaction among the cloud service users and cloud service providers. The cloud users request the services for accessing the cloud with the help of service

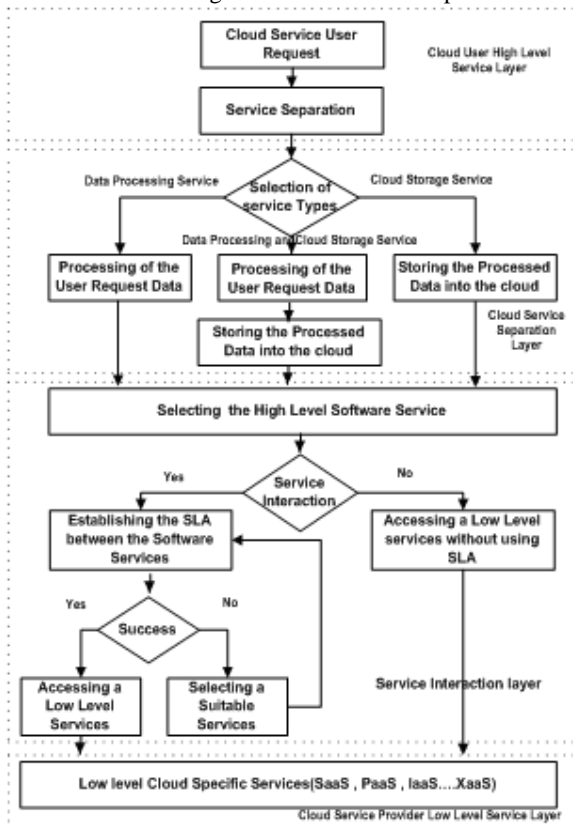


Fig 2.Flow diagram of the proposed model

separation. This service separation provides the high level service list which consists of three services i) data processing services, ii) cloud storage services iii) data processing services and cloud storage services. The Cloud service users can able to select the services with their request situation. Once the service has been selected then the service requests are segregated based on the suitable services at common deployment model. In this model the common services are interact each other for establishing the mutual agreement in order to select the required software services. This type of agreement can be established with the help of SLA. It is

success between the software models they can able to established the agreement and then to access the cloud specific services otherwise select suitable service for interaction. If there is no interaction needs between the software modules the service request directly selects the low level services, in this case no common modules available among the services for accessing the low level services.

III. DEPLOYMENT MODEL OF THE PROPOSED SYSTEM

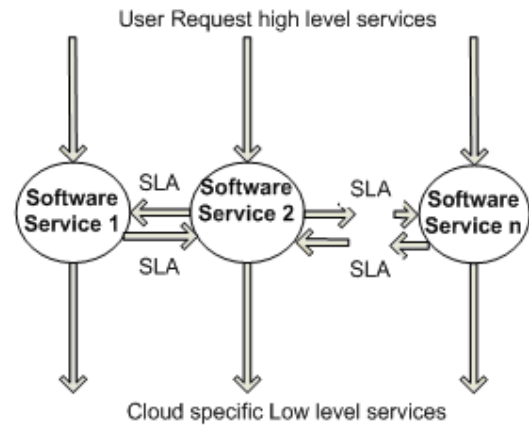


Fig 3.Deployment diagram of the proposed model

This deployment selection layer focuses on the software services which are establishing the agreements for accessing the services. The software services are categorized into different services such as software service 1, software service 2...software service n. Suppose the request comes from the cloud users for accessing the software service 1 it is not the intended software service 2. In this case the software module has to find out the suitable services among the remaining list service 2 then it waits for SLA response otherwise the SLA request goes to some other software services. Once the

Table 1 : Structure of SLA for the Software services

Name of the Software Service	
Contact Software Services	Name of the Sending Software Service Name of the Software Service recipient
SLA duration	SLA begin SLA end
Service description	Short description of Requested Service Costs for the provision of the Service Accounting method for the Service
Service accounting	Intervals for Service Request and Response

service response comes then the request service is select that services and then it access cloud specific low level services. The service exchange of the request services from one software service to another software service for providing the efficient service to the Cloud Service User with high

compatibility over the software application is expressed in Table 1.

IV. ALGORITHM OF THE PROPOSED SYSTEM

```

Algorithm service_interaction_using_SLA()
begin
  Let Service_Status = empty
  Cloud Service Users request the services from
  Cloud Service Providers
  Service_Separation();
  If (Service_Interaction ()==Yes)
  {
    SLA_Establishment();
    L1: If ( Service_Status==Success )
    {
      Assign the service type into suitable
      cloud specific services i.e., SaaS, Paas,
      IaaS ... XaaS
    }
    else
    {
      Service_Status=Service_Selection();
      goto L1;
    }
  }
  else
  {
    Cloud specific services they directly
    accessing a specific services without the
    need of SLA.

    Assign the service type into suitable cloud
    specific services i.e., SaaS, PaaS, IaaS ... XaaS
  }
end

procedure Service_Separation()
begin
  The service separation layer separates the
  services;
  If (service_type == Data processing) then
    Processing is based on request.
  else if (service_type == Storage) then
    Stores data into the cloud storage services.
  else if (service_type == Data processing
           and Storage) then
    Process the data and stores data into
    the cloud storage
end

procedure Service_Interaction()
begin
  boolean service_exchange=false;
  ie., the service to be exchanged to the some other
  service for service handling.
  if (service_enchange==true)
    return Yes;
  else

```

```

return False;
end

procedure SLA_Establishment()
begin
  Getting the status of the neighbouring services;
  Service_Selection();
  Pass the request to the selected services for response;
end

procedure Service_Selection()
begin
  let S={S1, S2, ... ,Sn} the requesting services;
  P(S) is the probability of Si will be selected;
  Generate the random number R;
  for i = 1 , ... ,n do
    Find the  $P(S_i) = \frac{S_i}{\sum_{i=1}^n S_i}$ ;
  if(P(Si)<R)
    Status=Success;
  else
    Status=empty ;
  repeat
  return Status;
end

```

VI CASE STUDY

A word processor on the internet has provides as a Software as a Service (SaaS) for various organizations. Word processing operation includes creating a document, modifying a document, uploading a document and downloading a document from the cloud. These operations are common to various cloud service providers which are following a different software application for their own cloud. Every cloud service provider has to maintain the separate software applications in order to provide a service to the cloud service users. The separation of the same service leads us lot of deficiencies which are listed in the Table 2. The Google Docs, Microsoft Office Web Apps, Zoho Writer, Sheet, Show are providing a word processing application. This maintains a separate software application for word processing application which has a lot of controversies with each other [4]. Table 2 describes the difficulties over the word processing applications which are overcome by using the common word processing application for the different cloud service providers. The CSPs have using common application with the help of SLA between each other CSP. For example, the consistency in appearance is maintaining over the word document with the help of SLA between other providers.

Table 2. Comparative Study

Service provider name	Application support	Features Support	Consistency across application	Formatting	Printing
Google Docs	Word processing	User interface ,Chronological view of documents	No	Never gives original format	Unreliable
Microsoft Office Web Apps	Word processing	Reproduces word and power point file.	No	Cannot edit the documents	Reliable
Zoho Writer, Sheet, Show	Word processing	Can insert HTML and CSS from the online	No	Import documents are better than the Google Apps	Unreliable

VII CONCLUSION AND FUTURE WORK

The cloud service providers are maintaining the separate software applications in order to provide the reliable service to the cloud service users. The separate usage of application gives the complexity over the providers which are not providing reliable services to the cloud users. This paper proposed a technique called the common software application for all the CSP in order to give reliable service to the customers. The common services can handle with the help of service level agreement established between the cloud service providers. In future all types of service which belong to the cloud arena is implemented over the common set of protocol, standards and models which provides to the cloud users are feel more comfortable to the cloud usage.

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