Clouds Explained Using Use-Case Scenarios

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ABSTRACT
Cloud computing is clearly one of today’s most enticing technology areas due, at least in part, towards cost efficiency and flexibility. Cloud is a collection of virtualized resources. Cloud provides set of some basic services such as Infrastructure-as-a Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service(SaaS). This paper has made an attempt to find out the consumers and customers that uses the cloud and economic benefits of cloud computing which are based on the inferences derived from the use-case scenarios.

KEYWORDS
Cloud computing, cloud technology, clouds, user interactions in clouds, UML using clouds, private cloud.

1. INTRODUCTION
The global recession has created a disturbance in the normal routine of IT industries. The IT industries were forced to struggle against the economic imbalance. In order to escape from this economic imbalance they started squeezing the efficiencies from the existing systems. The squeezing of efficiencies and optimizing the existing resources had put forth unprecedented economic limitations which demanded for the new solutions which should be cost-effective and should not compromise with the efficiencies in usage of resources – Cloud Computing emerged. The Internet has always been leading us towards globalization. It’s an ocean of resources and information. The Internet has been the backbone on which various kinds of computing have been deployed such as grid computing, distributed computing and cloud computing.

2. WHAT IS IT ALL ABOUT?
Cloud computing is a term which includes other terms like infrastructure, platform and software. Cloud computing is the technology which is a metaphor for describing the internet. The cloud computing is the means of using the computing in the internet.

Cloud computing has inherited its features from various Internet-computing platforms such as grid computing, mainframe computers, peer-to-peer architectures.

A cloud computing is the convergence of 3 major trends as shown in below figure 1:

1. Virtualization
2. Utility components
3. Software as a service.

Fig. 1 Cloud in the Cloud Computing Environment

The cloud computing comes in various implementation model like, the cloud used for enterprise purpose, cloud used by the people, some by community and some are used by the all.

We can list out the deployment of cloud as:
1) Private Cloud
2) Public Cloud
3) Community Clouds
4) Hybrid Cloud

3. WHO USES IT?
The community of people varies from novice user to the expert users. The perceptions of the users, the way they interact with the application had led to understand how a user wants to interact or to use an application. This paper has made an attempt to develop a use case scenario in the world of cloud to know about how different users interact with the various services provided by the cloud computing. The use case scenarios demonstrate the performance and economic benefits of cloud computing and are based on the needs of the widest
possible range of consumers. The use case scenario is the study about different users, different resources, different services and the interactions between them. In cloud environment, the resources are the hardware as well as the softwares. The different users may be regarded as the actors and they are

1. **End user**: The ultimate user, who gets subscribed to a particular cloud, enjoys the services provided by the cloud.

2. **Cloud provider** is an organization which provides various kinds of cloud services and network features to the cloud subscribers.

3. **Charger** is a module of the cloud organization which charges the cloud subscriber for using the cloud services provided by the cloud provider. The charger charges the end user by credit card or by cheque.

4. **Identity provider**: An unknown user to a cloud may become a subscribed user after getting an identity by signing up to the cloud environment. The identity provider is a module which provides the identity as a subscribed user to the unknown user. It establishes and maintains the identity of the end user in digital form.

5. **Service developer** is the part of the organization that builds the different levels of functionality inside an entity and delivers it to end user directly via SaaS.

6. **Cloud management broker** is an entity which manages the whole processes taking place between the different present in the cloud environment. The cloud management broker handles the services provided by the different service providers as a commercial service apart from any provider or cross-provider services supplied by a cloud provider.

4. **HOW INTERACTION TAKES PLACE?**

   In any kind of deployment model of the cloud, the subscriber interacts with the cloud rather in a same way as shown below in the figure 2. The actors shown in figure 2 are explained under the heading III. All the interactions which are taking place between the actors and the use-cases in the Internet environment.

   **INTERACTION 1**: The unknown user who needs services should subscribe to the cloud provider. The subscription process is as normal as signing up for a new email account. The end user gets his identity checked by the identity provider by giving his credential and other information related to him.

   **INTERACTION 2**: The subscriber subscribes to various services like computing services, storage services and database services. These services are provided by the cloud provider and for each service the charges are metered and monitored by the charger.

   **INTERACTION 3**: The cloud provider provides his own cloud environment and the end user (subscriber) gets logged in into the environment. As soon as the subscriber gets logged in, the charger starts metering the session and keeps updating the record log of the charge. The user can create a new application using the application developer provided by the cloud provider. The application developer can be used in different ways with respect to the need of the user and what type of application is he willing to develop. The user can use or deploy the application which is been already provided by the provider.

   **Copy data to cloud.**

   This process is basically uploading some information to the cloud from the client’s system. The information which is being uploaded to the cloud may be confidential. The encryption technology can be used to secure the information being uploaded. The operation done may give feedback to the user through the status bar. The cloud-provider charges the cloud-subscriber for the transfer according to the terms of the SLA, and begins accruing storage charges.
Copy data from cloud
This process is same as downloading from Internet to the client’s system. Cloud subscribers will be charged for downloading as per Service Level Agreements. When an unidentified user tries to access the data in the cloud, the security manager should check for the security level of the data and then should take action according to the level recognized. For ex., if the data security level is set confidential, the data is in encrypted form and the unidentified user will not be able to access the data. If the data security level is medium or low then the unidentified user is only able to read the data and can’t perform any other file operations.

Deleting data from cloud
Whenever the data is been uploaded into the cloud and identifier is set with respect to that particular data and the data is indexed under the cloud-subscriber’s account. The subscriber should give the name of the object or data to be deleted. It is the responsibility of the cloud that the space which has been freed after deleting the data should be given for the further use by the subscriber.

Up-grading the application
The applications provided by the cloud provider have their own version numbers and after up-gradation of the application the version numbers can be verified for the successful up-gradation process. The up grading of the application is done by the cloud-provider.

Deleting the account
At the time of signing up a new account, the subscriber is given a valid time period for the usage of the account. If the account holder wants to delete his account before the expiry date, then he needs to check the account management settings. The account management module will put forward some options before the holder such as:
- Data & information in your cloud database is to be deleted or,
- Data & information in your cloud database is to be copied to your system or
- Data & information in your cloud database is to be transferred to other cloud provider.

The above three options may be displayed at the time when the subscriber wants to delete his account, and the user can select any of the options listed above to save the file.

5. USERS - CLOUDS INTERACTION
The clouds environment can be deployed in three different ways as said earlier.

Public Cloud: It is almost like the Internet. The services provided by this cloud model is similar to the services provided by the Internet. It is accessible to each and every person on Internet. There is no boundary on the scalability and the resource taping. Even the other kinds of cloud models can access this cloud but vice-versa is not possible without authentication and authorization which is shown below in the figure 3. On the other hand, it carries a serious concern of security and privacy of data.
4 Private Cloud Interaction
The private cloud interaction is shown in the above figure 4 in which dedicated servers has been considered as an actor which is associated with Infrastructure-as-a-Service provided by the private cloud to the enterprises. There may be multiple dedicated servers for an enterprise depending on the size of the organization.

Hybrid Cloud: Internet itself is a hybrid model since various computing technologies, platforms, and resources are being used on daily basis. The hybrid cloud model is the combination or composition of public or private clouds that works or acts at their own places but is bounded together by the technology.

Public-Private Cloud Interaction:
The private cloud lies within the organization. The unidentified user who is a subscriber of the public cloud can’t access the private cloud until and unless he is accessing the private cloud with an authentication and authorization procedure. The user within the organization can use the private cloud in order to fetch data and information from the public cloud. The control over the transfer of the data and accessing any information in both directions is in the hand of private cloud.

Public-Public Cloud Interaction
6.CLOUD INTERACTIONS
Different types of deployed clouds may interact with each other for borrowing the services and applications as per their own needs. These clouds keep track of their services and applications being provided by themselves as well as those which are borrowed from others. The cloud providers have to pay to other providers from whom they had borrowed applications and services. This whole management of services and applications and the charges applied for the use of the same is monitored and managed by the cloud management broker.

Fig. 4 Private Cloud Interaction

Fig.5 Hybrid Cloud Interaction

Fig. 6

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Public – Private Cloud Interaction

**Hybrid Cloud Interaction:**
The hybrid cloud can be delivered by a federal cloud provider that combines its own resources with those of other providers. A broker can also deliver the hybrid cloud. The provider of the hybrid cloud must manage cloud resources based on the consumers’ terms. The consumers of the hybrid cloud; this use case is no different from user-hybrid cloud interaction use-case discussed earlier.

7. **EFFECTS ON ECONOMY**

When the user purchases a new application or new software for his personal purpose or when an organization purchases a large-scale application for its organizational work whether they use it or not they have to pay for the purchasing and maintaining of the same. These applications provide services which may require servers to store the information and to provide the results with huge cost involved in it. Cloud computing is useful in reducing the cost by charging only for the use of applications and services. The user just has to pay to the cloud providers only for the session he has utilized applications and services. Cloud computing also reduces the number of servers used by the organization since the scalability and the performance of the cloud computing technology can be increased with minimal expense.

**CONCLUSION**
The above paper has mad an attempt to show user interaction with the cloud computing and the economic and performance benefits of the cloud computing. Activities in the cloud computing should be custom-driven and the existing standards should be followed and at last the users should work together are the principals which are attempted to achieve here.

**FUTURE SCOPE**
This paper can be used to view the interaction between the different users and the various clouds. In future it may be helpful in designing the graphical user interface for the cloud applications. It may be also helpful in establishing the standards and the principles of designing a new cloud.

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