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Cloud Computing Services and Applications

B. Sai Karthik* *ECM&K L University, India.*
M. Nalini Sri *ECM&K L University, India.*

Abstract— ***Cloud computing refers to applications and services that run on a distributed network using virtualized resources and accessed by common Internet protocols and networking standards. It is distinguished by the notion that resources are virtual and limitless and that details of the physical systems on which software runs are abstracted from the user. Cloud computing environment provides a great flexibility and availability of providing computing resources at a lower cost. This emerging new technology opens a new era of e-services in different disciplines. In this paper, we explore cloud computing services and applications, we give examples for cloud services provided by most common Cloud Service Providers (CSPs) such as Google, Microsoft, Amazon and also in this paper we present innovative applications for cloud computing in e-learning and cloud computing for Drop box.***

Keywords— Cloud computing, cloud computing applications, cloud computing services, google cloud services, amazon web services.

I. INTRODUCTION

Cloud computing gets its name as a metaphor for the Internet. Typically, the Internet is represented in network diagrams as a cloud, as shown in Figure 1 .The cloud icon represents "all that other stuff" that makes the network work. It's kind of like "etc." [1] for the rest of the solution map. It also typically means an area of the diagram or solution that is someone else's concern, so why diagram it all out? It's probably this notion that is most applicable to the cloud computing concept.

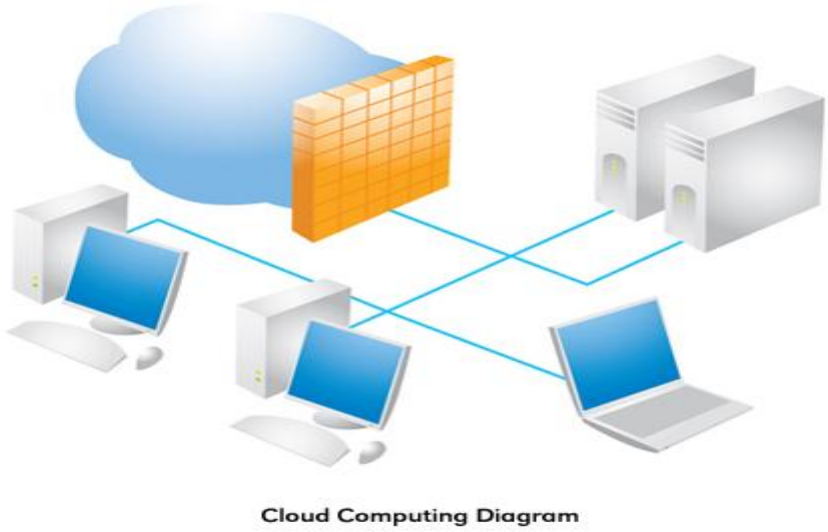

Fig. 1 Cloud computing concept

Cloud computing is a topic that received a great deal of attention by individuals and organizations from different disciplines in the last decade. This new environment implies great flexibility and availability of computing resources at different levels of abstraction at a lower cost.
These services are generally classified into three classes known as cloud service models such as shown in Fig. 2[2]:

A. Software as a Service (SaaS)

SaaS is a software delivery method [10] that provides access to software and its functions remotely as a Web-based service. Software as a Service allows organizations to access business functionality at a cost typically less than paying for licensed applications since SaaS pricing is based on a monthly fee. Also, because the software is hosted remotely, users don't need to invest in additional hardware. Software as a Service removes the need for organizations to handle the installation, set-up and often daily upkeep and maintenance. Software as a Service may also be referred to as simply hosted applications. Examples of SaaS providers are Soho, Google Apps etc.

B. Platform as a Service (PaaS)

In PaaS, a CSP provides, runs and maintains both system software (i.e., the operating system) [10] and computing resources. The customer manages and runs the application software under the operating system and on the virtual resources provided by the CSP. The customer has little or no control over the operating system and hardware resources [26].Unlike SaaS that provides the customer with complete (ready to use) applications, PaaS gives him/her the opportunity to design, model, develop and test applications directly on the cloud; therefore, he/she can control the software lifecycle [27]. PaaS supports collaborative work between members of a project team. For instance, a number of users located in different countries can collaborate in developing a website using a PaaS cloud service. Examples of PaaS providers are windows Azure, Google Apps Engine and Aptana cloud.

C. Infrastructure as a Service (IaaS)

In this model, the CSP provides a set of virtualized computing resources (e.g., network bandwidth, storage capacity, memory, and processing power) in the cloud. It is the responsibility of the customer to run and maintain the operating system and the software applications on these virtual recourses. IaaS uses virtualization technology to convert physical resources into logical resources that can be dynamically provisioned and released by customers as needed. Examples of IaaS providers are Drop Box, Amazon EC2 and Akamai. Table 1 shows the assignment of running and maintaining cloud resources to CSPs and cloud customers in different service models.

The cloud services described above can be provided to cloud customers By CSPs through different applications. In this paper, we explore cloud computing services and applications services and applications, we give examples for cloud services provided by the most common CSPs such as Google, Microsoft, Amazon, HP, and sales force and we present innovative applications for cloud computing in e-government; e-learning and Enterprise Resource Planning (ERP).

D. Network as a Service (NaaS)

A category of cloud services where the capability provided to the cloud service user is to use network/transport connectivity services and/or inter-cloud network connectivity services. NaaS involves the optimization of resource allocations by considering network and computing resources as a unified whole. Traditional NaaS services include flexible and extended VPN, and bandwidth on demand. NaaS concept materialization also includes the provision of a virtual network service by the owners of the network infrastructure to a third party (VNP – VNO). Examples of NaaS are Microsoft, Amazon and IBM etc.

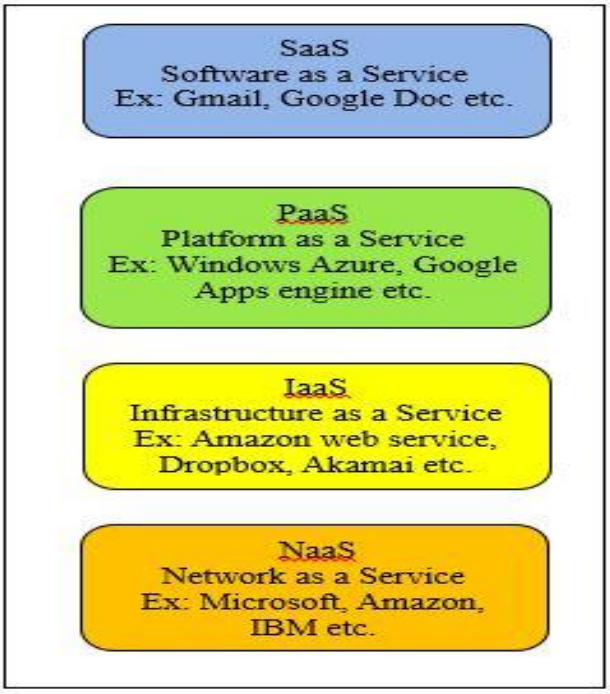

Fig. 2 various cloud service models

II. ANALYSIS OF CLOUD COMPUTING SYSTEMS

Cloud computing systems are classified as follows [5]:

A. *Public Cloud*

A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model. [5] Many popular cloud services are public including Amazon EC2, Google App Engine and Salesforce.com.

B. *Private Cloud*

In private clouds the computing resources are operated exclusively by one organization. It may be managed by the organization itself or a CSP. Private clouds are considered to be more secure than public clouds since their users are trusted individuals inside the organization. The other two deployment models, community clouds and hybrid clouds, fall between public and private clouds [12].

C. *Community Cloud*

In the community deployment model, the cloud infrastructure is shared by several organizations with the same policy and compliance considerations [4]. This helps to further reduce costs as compared to a private cloud, as it is shared by larger group. An example of a community cloud is the educational cloud is the educational cloud used by universities and institutes around the world to provide education and research services.

D. *Hybrid Cloud*

This deployment model helps businesses to take advantage of secured applications and data hosting on a private cloud, while still enjoying cost benefits by keeping shared data and applications on the public cloud. This model is also used for handling cloud bursting, which refers to a scenario where the existing private cloud infrastructure is not able to handle load spikes and requires a fall back option to support the load. Hence, the cloud migrates workloads between public and private hosting without any inconvenience to the users [4].

III. CLOUD COMPUTING SERVICES

A. *Google Cloud Computing Services*

Google Cloud computing provides various services including dozens of critical security features specifically designed to keep data safe, secure and in control [6]. It also saves money and time since developing and maintain software to provide all of these services and applications require more money and also time consuming process. The services provided by Google cloud includes:

1. Gmail:

Gmail is a service provided by Google to send and receive emails. Presently it offers approximately 25GB storage. Gmail now provides SMS facility which as an update to Gmail. Gmail has integrated chat applet that stores conversations in the form of e-mail [21].

2. Google Docs:

Google Docs allows users to edit there documents online and view the documents. They are stored in Google cloud servers which are easily accessible to edit or to view the documents. This feature allows users such as team members located in different countries to cooperate in completing their work.

3. Google Drive:

Google drive lets you store and access files anywhere on the web, on hard drive, or on the go. When the device is connected to internet, it checks in with Google drive. That ensures files and folders to always be up to date. Changing something on one device will change everywhere.

B. *Microsoft Cloud Computing Services*

1. Windows Azure:

Windows Azure is Microsoft's public cloud computing platform [7]. It's a place to run your applications out on the internet, at scale. With geographically distributed datacentres worldwide, applications can be built, hosted and managed around the world. With Windows Azure, you can extend and even move your datacentre services off-premises or beyond a hosted environment, paying only for the resources you use at any given time. The flexible cloud computing platform of Windows Azure lets you focus on solving business problems and addressing customer needs, not on the infrastructure.

2. Windows Office 365:

Windows office 365 is a subscription based service which offers access to various services and software built around the Microsoft Office Platform. Business and enterprise-oriented plans for Office 365 offer access to cloud hosted versions of Office's server platforms on a software as a service basis, including Exchange, Lync, SharePoint, and the browser-based Office Web Apps suite.

C. *Amazon Web Services (AWS)*

AWS provides a cloud computing platform for all business sizes [20]. With AWS companies can provision a flexible and cost-effective IT infrastructure and services that can be scaled up and down based on their needs. AWS helps companies select the platform that is suitable for the problem they have and pay only for what they use. In addition, AWS applies advanced physical security and data privacy techniques to protect users' data. AWS has security certifications and audits such as ISO 27001, FISMA moderate, HIPAA and SAS 70 Type II. AWS is a comprehensive cloud service platform which provides many web services such as:

1. Amazon Elastic Transcoder (ETS)

Amazon Elastic Transcoder (ETS) provides video transcoding of S3 hosted videos, marketed primarily as a way to convert source files into mobile-ready versions [20].

2. Amazon Flexible Payments Service (Amazon FPS)

Amazon FPS (Flexible Payments Service) is an Amazon Web Service that allows the transfer of money between two entities. Some of the features of Amazon FPS are [17]:
Support for micropayments by grouping several small transactions into a larger one paid for by traditional e-commerce means. Ability to pay by credit card, bank account, and Amazon Payments account balances. Programmatically define payment instructions on each transaction. Support for multiple, recurring and three-party marketplace payments.

3. Amazon Simple Email Service(Amazon SES)

Amazon Simple Email Service (SES) is part of Amazon.com`s cloud computing platform, Amazon Web Services (AWS) [18]. SES provides AWS users with infrastructure for sending outbound bulk email correspondence. The service is ranked sixth 6th in email marketing.

4. Amazon Simple Queue Service (Amazon SQS)

Amazon Simple Queue Service (Amazon SQS) is a distributed queue messaging service introduced by Amazon.com in April 2006. It supports programmatic sending of messages via web service applications as a way to communicate over the Internet. SQS is intended to provide a highly scalable hosted message queue that resolves issues arising from the common producer-consumer problem or connectivity between producer and consumer. Amazon SQS provides authentication procedures to allow for secure handling of data. Amazon uses its Amazon Web Services (AWS) [19] identification to do this, requiring users to have an AWS enabled account with Amazon.com. Amazon SQS guarantees at-least-once delivery. Messages are stored on multiple servers for redundancy and to ensure availability. If a message is delivered while a server is not available, it may not be removed from that server's queue and may be resent. SQS does not automatically delete messages once they are sent. When a message is delivered, a receipt handle is generated for that delivery and sent to the recipient. These receipts are not sent with the message but in addition to it. SQS requires the recipient to provide the receipt in order to delete a message.

5. Amazon Simple Notification Service (Amazon SNS)

Amazon Simple Notification Service (SNS) provides a hosted multiprotocol "push" messaging for applications [20].

6. Amazon Simple Workflow (Amazon SWF)

Amazon Simple Workflow (SWF) is a workflow service for building scalable, resilient applications [20].

IV. CLOUD COMPUTING APPLICATIONS

A. *Cloud Computing for E-learning*

E-learning is a new trend in education that tries to make the best use of information technology (IT). Cloud computing is an attractive environment for students, faculty members and researchers. As an emerging IT, cloud computing can provide universities and research centres with powerful and cost-effective computational infrastructure. Students can connect to campus educational services through their personal mobile devices from anywhere. Faculty members can have efficient and flexible access to their course material in their class rooms. Researchers can find articles, models and run their experiments on the cloud faster than ever [8]. Fig. 3 shows services provided by an e-learning cloud.

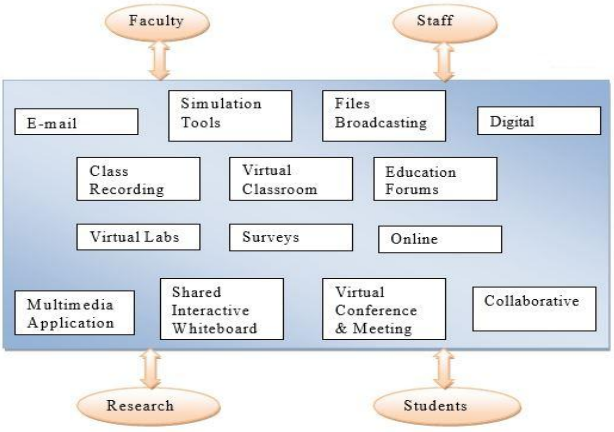

Fig. 3 Cloud computing for E-learning

B. *Cloud Computing for Drop Box*

Dropbox is a file hosting service operated by Dropbox, Inc., [11] that offers cloud storage, file synchronization, and client software. Dropbox allows users to create a special folder on each of their computers, which Dropbox then

synchronizes so that it appears to be the same folder (with the same contents) regardless of which computer is used to view it. Files placed in this folder also are accessible through a website and mobile phone applications as shown in Fig. 4.

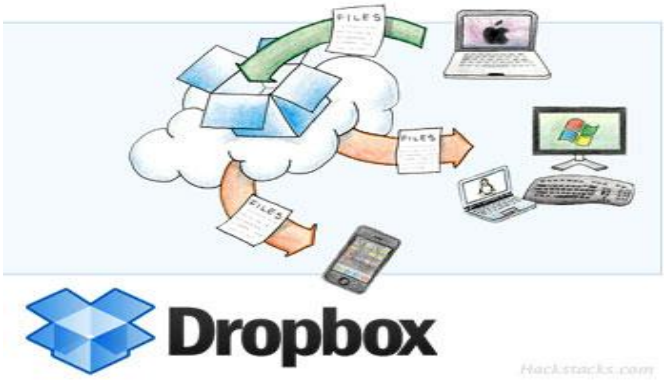

Fig. 4 Cloud Computing for drop box

V. CONCLUSION AND FUTURE SCOPE

Cloud computing is a new emerging technology which is expected to significantly change the field of IT in near feature. Many number of services and applications can be provided in the cloud due to its characteristics. In this paper, we explored some of the services and applications and we are certain that many others will develop and use cloud technology. Cloud services are already playing a major role and many companies are now understanding the importance of cloud in this global world. However security and privacy issues [12] also play a major role in cloud computing that is needed to be taken care. The multi-tenancy nature and resource and data outsourcing plays vital role in security issues in cloud computing. Companies and individuals still bothers about the storing and processing of their data in cloud. It is not surprising that the future work mainly give its attention on security of cloud computing. Many approaches now focus on identifying cloud security risks in various areas and providing recommendations and guidelines for security. In our future work, we would lie to investigate on security problems [16] in cloud computing and how to handle those security risks associated with cloud.

REFERENCES

[1] GTSI Group, "Cloud Computing- Building a Framework for Successful Transition," White Paper, GTSI Corporation, 2009.
[2] L. Vaquero, L. Rodero-Merino, J. Caceres, and M. Lindner, "A Break in the Clouds: Towards a Cloud Definition", ACM SIGCOMM Computer Communication Review, Volume 39 Issue 1, pages 50-55, January 2009.
[3] M. Boroujerdi and S. Nazem, "Cloud Computing: Changing Cogitation about Computing" World Academy of Science, Engineering and Technology, 2009.
[4] Cloud computing bible by Barrie Sosinsky.
[5] Cloud computing: A practical approach by Anthony T. velte, Toby J. Velte, Ph.D., Robert Elsenpeter.
[6] http://www.google.com/apps/intl/en/business/cloud.html
[7] http://www.windowsazure.com/en-us/
[8] Abdulaah Alshwaier, Ahmed Youssef and Ahmed Emam "A New Trend for E-Learning in KSA Using Educational Cloud", Advanced Computing: An International Journal (ACIJ), Academy & Industry Research Collaboration Center (AIRCC), 2012.
[9] Andrew Joint and Edwin Baker, "Knowing the past to understand the present- issues in the contracting for cloud based services", Computer Law and Security Review 27, pp 407-415, 2011
[10] Vania Goncalves and Pieter Ballon, "Adding value to the network: Mobile operators' experiments with Software-as-a-Service and Platform-as-a-Service models", Telematics and Informatics 28, pp 12-21, 2011
[11] http://www.dropbox.com
[12] Cloud Security Alliance "Top Threats to Cloud Computing V1.0", March 2010.
[13] Michael Miller, "Cloud Computing Pros and Cons for End Users", microsoftpartnercommunity.co.uk, 2009.
[14] http://en.wikipedia.org/wiki/Cloud_computing.
[15] M. Armbrust, A. Fox, R. Griffith, A. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica, and M. Zaharia, "A View of Cloud Computing", Communication of the ACM, Vol. 53, No. 4, April 2010.
[16] Kresimir Popvoic and Zeljko Hocenski, "Cloud Computing Security Issues and Challenges", MIPRO, Opatijia, Croatia, May 24-28, 2010.
[17] http://en.wikipedia.org/wiki/Amazon_Flexible_Payments_Service.
[18] http://en.wikipedia.org/wiki/Amazon_Simple_Email_Service .
[19] http://en.wikipedia.org/wiki/Amazon_Simple_Queue_Service.
[20] http://en.wikipedia.org/wiki/Amazon_Web_Services.
https://mail.google.com/mail/help/intl/en/about.html.

