Advances in Computer Science and Information Technology (ACSIT)
Print ISSN: 2393-9907; Online ISSN: 2393-9915; Volume 1, Number 2; November, 2014 pp. 18-21

http://www.krishisanskriti.org/acsit.html

Cloud Computing

Jhanvi Rafalia[1], Vipul Ahir[2] and Shailee Shah[3]

[1,2,3]Institute of Technology Nirma University Ahmedabad
E-mail: [1]12bit010@nirmauni.ac.in, [2]12bit049@nirmauni.ac.in, [3]12bit035@nirmauni.ac.in

Abstract: *This paper describes the problems and scrutinizes potential solutions for providing long term storage and access to research outputs, concentrating mainly on research data. The ready availability of cloud storage and compute services provides a potentially interesting option for duration and preservation of research information. In contrast to deploying infrastructure within an organization, which normally requires long lead times and capital investment, cloud infrastructure is available on demand and is highly expandable. However, use of commercial cloud services in particular raises controversies of governance, cost-effectiveness, trust and quality of service. We characterize a set of in-depth case studies conducted with researchers across the sciences and humanities performing data-intensive research, which indicate the issues that need to be considered when preserving data in the cloud.*
We then describe the design of a repository framework that addresses these requirements. The framework uses hybrid cloud, combining internal institutional storage, cloud storage and cloud-based preservation services into a single integrated repository infrastructure. Appropriation of content to storage providers is performed using on a rules-based approach. The outcome of an evaluation of the proof-of-concept system are described.

Keywords: *Hybrid cloud storage; Fedora repository; Dura Cloud; Cost optimization; Rules engine.*

1. INTRODUCTION

Computing is being transformed to a model consisting of services that are commoditized and expressed in a manner similar to traditional utilities such as water, electricity, gas, and telephony. In such a model, users access services based on their compulsions without regard to where the services are hosted or how they are delivered. Several computing paradigms have promised to deliver this utility computing vision and these consist of cluster computing, Grid computing, and more recently Cloud computing.

The latter term stands for the infrastructure as a ‘‘Cloud’’ from which businesses and users are able to access applications from anywhere in the world on demand. Thus, the computing world is rapidly changing towards enhancing software for millions to consume as a service, rather than to run on their individual computers.

Cloud computing means that instead of all the computer hardware and software you're using sitting on your desktop, or somewhere inside your company's network, it's provided for you as a service by another company and accessed over the Internet, usually in a completely coherent way. Exactly where the hardware and software is situated and how it all works doesn't matter to you, the user—it's just somewhere up in the nebulous "cloud" that the Internet represents.

When you save your photos online instead of on your personal computer, or use webmail or a social networking site, you are using a “cloud computing” service. If you are an organization, and you want to use, for instance, an online invoicing service instead of updating the in-house one you have been using for many years, that online invoicing service is a “cloud computing” service. Cloud computing refers to the transmission of computing resources over the Internet. Instead of keeping data on your own hard drive or updating applications for your needs, you use a service over the Internet, at another location, to preserve your information or use its applications. Doing so may give rise to certain privacy implications.

The following definition of cloud computing has been developed by the U.S. National Institute of Standards and Technology (NIST):

“Cloud computing is a model for enabling convenient on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.”

2. EXAMPLES OF CLOUD COMPUTING

Most of us use cloud computing all day long without realizing it. When you sit at your Personal Computer and type a query into Google, the computer on your desk isn't playing much part in finding the answers you need: it's no more than a messenger. The words you type are smoothly shuttled over the Net to one of Google's hundreds of thousands of clustered, which dig out your results and send them promptly back to you. When you do a Google search, the actual work in finding your answers might be done by a computer sitting in California, Dublin, Tokyo, or Beijing; you don't know—and most likely you don't care!

The same applies to Web-based email. Hotmail came along and drifted email off into the cloud. Now we're all used to the idea that emails can be stored and processed through a server in some remote part of the world, easily accessible from a Web browser, wherever we happen to be. Pushing email off into the cloud makes it supremely favorable for busy people, constantly on the move.

Preparing documents over the Net is a newer example of cloud computing. Simply log on to a web-based service such as Google Documents and you can create a document, spreadsheet, presentation, or whatever you like using Web-based software. Instead of typing your words into a program like Microsoft Word or Open Office, running on your computer, you're using similar software running on a PC at one of Google's world-wide data centers. Like an email drafted on Hotmail, the document you produce is stored remotely, on a Web server, so you can access it from any Internet-connected computer, anywhere in the world, any time you like.

3. CHARACTERISTICS

Cloud computing has a variety of characteristics, with the main ones being:

3.1 Shared Infrastructure

Uses a virtualized software model, enabling the sharing of physical services, storage, and networking capabilities. The cloud infrastructure, regardless of deployment model, seeks to make the most of the available infrastructure across a number of users.

3.2 Dynamic Provisioning

Allows for the provision of services based on current demand requirements. This is done automatically using software automation, enabling the expansion and contraction of service capability, as needed. This dynamic scaling needs to be done while maintaining high levels of reliability and security.

3.3 Network Access

Needs to be accessed across the internet from a broad range of devices such as PCs, laptops, and mobile devices, using standards-based APIs (for example, ones based on HTTP). Deployments of services in the cloud include everything from using business applications to the latest application on the latest smart phones.

3.4 Managed Metering

Uses metering for managing and minimizing the service and to provide reporting and billing information. In this way, consumers are billed for services according to how much they have actually used during the billing period.

In short, cloud computing allows for the sharing and extensible deployment of services, as needed, from almost any location, and for which the customer can be billed based on actual usage.

4. SERVICE MODELS

Once a cloud is entrenched, how its cloud computing services are deployed in terms of business models can vary depending on requirements. The primary service models being deployed are commonly known as:

4.1 Software as a Service (SaaS)

Consumers purchase the ability to access and use an application or service that is hosted in the cloud. A standard example of this is Salesforce.com, as discussed previously, where necessary information for the interaction between the consumer and the service is hosted as part of the service in the cloud.

4.2 Platform as a Service (PaaS)

Consumers purchase access to the platforms, sanctioning them to deploy their own software and applications in the cloud. The operating systems and network access are not managed by the consumer, and there might be constraints as to which applications can be deployed.

4.3 Infrastructure as a Service (IaaS)

Consumers control and manage the systems in terms of the operating systems, applications, storage, and network connectivity, but do not themselves regulate the cloud infrastructure.

Also known are the different subsets of these models that may be related to a particular industry or market. Communications as a Service (CaaS) is one such subset model used to portray hosted IP telephony services. Along with the move to CaaS is a shift to more IP-centric communications and more SIP trucking deployments. With IP and SIP in place, it can be as easy to have the PBX in the cloud as it is to have it on the premise. In this situation, CaaS could be seen as a subset of SaaS.

5. DEPLOYMENT MODELS

Deploying cloud computing can differ depending on needs, and the following four deployment models have been identified, each with specific characteristics that support the needs of the services and users of the clouds in particular ways.

5.1 Private Cloud

The cloud infrastructure has been expanded, and is maintained and operated for a specific organization. The

Operation may be in-house or with a third party on the premises.

5.2 Community Cloud

The cloud infrastructure is shared among a number of organizations with similar interests and requisites.

This may help limit the capital expenditure costs for its formation as the costs are shared among the organizations. The operation may be in-house or with a third party on the premises.

5.3 Public Cloud

The cloud infrastructure is available to the public on a commercial basis by a cloud service provider. This enables a consumer to develop and deploy a service in the cloud with very little financial expense compared to the capital expenditure prerequisites normally associated with other deployment options.

5.4 Hybrid Cloud

The cloud infrastructure consists of a number of clouds of any type, but the clouds have the ability through their interfaces to allow data and/or applications to be moved from one cloud to another. This can be a combination of private and public clouds that support the requirement to retain some data in an organization, and also the need to offer services in the cloud.

6. BENEFITS

The following are some of the possible benefits for those who offer cloud computing-based services and applications:

6.1 Cost Savings

Companies can reduce their capital expenditures and use operational expenditures for elevating their computing capabilities. This is a lower obstacle to entry and also requires fewer in-house IT resources to provide system support.

6.2 Scalability/Flexibility

Companies can start with a small deployment and grow to a large deployment quite rapidly, and then scale back if necessary. Also, the flexibility of cloud computing allows companies to use extra resources at peak times, sanctioning them to satisfy consumer demands.

6.3 Reliability

Services using multiple superfluous sites can support business continuity and disaster recovery.

6.4 Maintenance

Cloud service providers do the system maintenance, and access is through APIs that do not need application

Installations onto PCs, thus further contracting maintenance requirements.

6.5 Mobile Accessible

Mobile workers have expanded productivity due to systems accessible in an infrastructure available from anywhere.

7. CHALLENGES

The following are some of the conspicuous challenges associated with cloud computing, and although some of these may cause a slowdown when delivering more services in the cloud, most also can provide opportunities, if resolved with due care and attention in the planning stages.

7.1 Security and Privacy

These issues are generally attributed to slowing the deployment of cloud services. These challenges can be addressed, for example, by storing the information internal to the organization, but allowing it to be used in the cloud. For this to occur, though, the security mechanisms between organization and the cloud need to be hefty and a Hybrid cloud could support such a deployment.

7.2 Lack of Standards

Clouds have documented interfaces; however, no standards are associated with these, and thus it is unlikely that most clouds will be internally operable. The Open Grid Forum is establishing an Open Cloud Computing Interface to resolve this issue and the Open Cloud Consortium is working on cloud computing standards and practices. The conclusion of these groups will need to mature, but it is not known whether they will address the needs of the people deploying the services and the specific interfaces these services need. However, keeping up to date on the latest standards as they evolve will allow them to be leveraged, if applicable.

7.3 Continuously Evolving

User requisites are continuously evolving, as are the requirements for interfaces, networking, and storage. This means that a “cloud,” especially a public one, does not remain static and is also continuously expanding.

7.4 Compliance Concerns

The Sarbanes-Oxley Act (SOX) in the US and Data Protection directives in the EU are just two among many compliance challenges affecting cloud computing, based on the type of data and application for which the cloud is being used. The EU has a senatorial backing for data protection across all member states, but in the US data protection is different and can differ from state to state. As with security and privacy mentioned above, these typically result in Hybrid cloud deployment with one cloud storing the data internal to the organization.

8. ACKNOWLEDGEMENTS

We are thankful to Institute of technology ,Nirma University and the faculties for guiding and supporting throughout the research work. We are thankful to Jawaharlal Nehru University for providing such an opportunity for sharing knowledge on this huge platform.

REFERENCES

[1] www.google.com
[2] www.webopedia.com
[3] www.wikipedia.com
[4] www.infoworld.com
[5] www.dialogic.com
[6] www.explainthisstuff.com