

WEB SERVICES: A SURVEY ON CLOUD BASE WEB SERVICE PROVIDER

Rahis Dilawar Shaikh, Margret Anouncia, VIT university, Vellore*

rais137123@gmail.com

ABSTRACT

Cloud computing is a type of internet base computing, where different services such as servers, storage and applications are delivered to an organization's computers and devices through the internet. Cloud computing is a style of computing in which elastic IT-enabled capabilities are delivered as a service to external customers using internet technologies. In the recent decade large number of businesses and customers are using cloud based platform for storing the application and data. Web services are computing services over the cloud computing environment together make up the cloud computing platform. Web service is standard way to integrate web based application using SOAP, XML, UDDI and WSDL. Some of world's good technology companies have provided cloud service platforms including Amazon, Google, Microsoft and many more. Web services used for the cloud computing in the various cloud computing environment has several benefits as well as the risk and challenges, hence this challenges are detailed here and the how different cloud service provider solve these issues are compared here.

Key words- cloud computing, Web service, SOAP, XML, UDDI, WSDL

INTRODUCTION

A new dimension to the research computing landscape is added by the cloud computing business model [1]. Based on the economy of scale and advanced web service and networking technologies, cloud operators such as Amazon and Google aim to offer researchers as many resources as they need when they need them for as long as they need them. Cloud providers charge application for the use of their resources according to a fee structure. In addition to supporting on demand computing, clouds, which use virtualization technologies, enable application to set up and deploy a custom virtual environment suitable for a given application. Cloud based outsourcing of computing is attractive to science applications because it can potentially lower the costs of purchasing, operating, maintaining and periodically upgrading a local computing infrastructure. Cloud computing is a style of computing in which dynamically scalable and deployed resources are provided as a service over the network. User need not have knowledge of expertise in or control over the underlying infrastructure in the cloud that supports the services rendered to the users.

Cloud computing services are divided into three distinct classes of services [2]. These three classes are "SaaS", "IaaS" and "PaaS". Software applications that are only available online fall into the "Software-as-a-Service" category, also known as "SaaS". The simplest example of this service is

e-mail. On the opposite end of spectrum, the “Infrastructure as a Service” or “IaaS” allows to outsource the hardware. In such cases, it’s not just the computing power that user rent; it also includes power, cooling and networking infrastructure. Generally “IaaS” is combination of compute and cloud storage. In the middle of “IaaS” and “SaaS” there is “platform as a Service” or “PaaS”. At this service level, the vendor takes care of the underlying infrastructure for user, giving user only a platform with which user can host his applications. While this service level is the least known or discussed, some feel that this is the most powerful of the three. In summary, legacy machines, equipment and networking have been a burden for companies to maintain and manage, and one of the more difficult problems is to make good on the investment. Cloud computing reduces the burden on corporate IT organization and offers elasticity by letting firms outsource their computing needs and focus on their customers solutions.

Another important components used in the cloud computing environment is web services. Web services allow the way for accessing, processing and updating the resources present in the cloud computing environment. SOA is common web services standard. With solicited engineering and an enterprise requirement, SOA provides following profit to cloud computing such as [3]:

Interoperability between different Platforms: The web services standards use Extensible Markup Language (XML), which is related to the establishment and utilization of enclosed content, regardless of the development language used, these system can provide and cite services through familiar system.

Reutilizing component: with the advent of latest web service based technology, once and association has assembled a software component and presented it as a service, the rest of the group of people in the association, can subsequently exploit that service.

Industrial livens: SOA defines building blocks of software capability in terms of offered services that meet some portion of the organization’s requirement. These building blocks, once defined and dependable operated, can be recombined and integrated rapidly.

Cloud computing and web services change the view of customers about storing, computing and maintaining data and focusing on the customer’s requirement. There are different vendors come up with their own implementation of cloud computing environment some of them are: Amazon, Google and Microsoft. All of these vendors try to provide cloud platform with the different features and functionality.

Author	Title	Ideas Discussed
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Karampelas, P.	Cloud Computing learning	Cloud computing and comparison of cloud computing with Grid Computing distributed computing
Celesti, A.; Tusa, F.	An Approach to Enable Cloud Service Providers to Arrange "IaaS", "PaaS", and "SaaS"	Classification of cloud computing services in three categories
Strosnider, J.K.; Nandi, P.; Kumaran, S.; Ghosh, S.; Arsnajani, A.	Model-driven synthesis of SOA solutions	Designing approach using SOA, and Benefits of SOA architecture

LITERATURE SURVEY

The technology of Cloud computing entails the convergence of Grid and cluster computing, virtualization, Web services and Service Oriented Architecture (SOA) - it offers the potential to set IT free from the costs and complexity of its typical physical infrastructure. While there are several benefits of using the cloud computing environment there are several challenges for implementing this environment exists as well. Below section explains the details of those cloud computing services in terms of three categories "SaaS", "PaaS" and "IaaS" [4]:

Software as a Service (SaaS) is a model of software deployment whereby a provider licenses an application to customers for use as a service on demand. An amount of leading companies are providing cloud services, such as Joyent, Grid Player, AT&T and Media Temple and so on. Most of them provide hosting services such as Grid Player, Hosting.com, AT&T and Media Temple [5].

- **Media Temple:** Media Temple's Grid- service is a web hosting service. It has eliminated roadblocks and single points of failure by using hundreds of servers working in tandem for customer's sites, applications and email. The on-demand scalability means its customers are always able to make the system work for intense bursts of traffic and growing audience.
- **Hosting365:** It is the hosting company in Ireland. It also provides services like VMware virtualization software and HP blade servers.
- **AT&T:** AT&T is the hosting service which provides the complete hosting package for LAN, security, managed servers and storage with account support by holistic service level agreement. Customers are charged according to the use of server.
- **Gridlayer:** Gridlayer is division of Layed Technoloeis, a web hosting company. Using Tera's AppLogic Grid OS, it is able to provide grid computing solutions. In a utility computing manner, customers are adjusting processing power, bandwidth, storage capacity and etc on demand. The property is achieved by harnessing the power of data centers. Thus, customers have no hardware to deploy, configure or maintain, which are provided by GridLayer over the Internet. The grid assembles all the infrastructure pieces needed on demand.

Above hosting services have similar security properties [8]. In case of AT&T it implements a layered security model, which provides for multi-level protection of all information, data and physical assets including data center environments. The layered security model includes: physical security, network security, intrusion detection, firewall management, environment hardening, virtual guest security, virus and patch management, and access controls and data security.

There are some other companies providing services besides hosting, such as virtualized servers, storage. Joyent, Flexiscale, 3Tera, AppNexus, Terremark Enterprise Cloud, NewServers etc. Above visualized services may also raise several security issues, like lack of verifiable identity control or access management, confidential and commercially sensitive information disclosure, sensitive to brand and reputation issues and so on, according to Gartner's analysis.

Platform as a Service (PaaS) [10] is a paradigm for delivering operating systems and associated services over the Internet without downloads or installations. An amount of leading companies are providing Cloud platforms, such as Microsoft, Google, Salesforce, Engine Yard and so on. Their platforms are briefly introduced in this section as well as their security procedures.

- **Azure:** Azure service platform [11] allows applications to be hosted and run at Microsoft data centers. It serves as a runtime environment for the applications and it also provides a set of services that allows customers to develop, manage and host their own applications off-premises. However, all Azure services and applications built on top of Windows Azure platform. The platform also has load balancers which keep the servers from becoming hot spots in a highly automated virtualization environment. Again, everything belonged to .net security applies to Azure.

- **Google App Engine:** Google App Engine [6] lets customers run their web application on Google's infrastructure. App Engine applications are easy to build, maintain scale as traffic and data storage need grow. Uploading applications to App Engine and starting to server no servers are needed to maintain. Google App Engine [7] uses a principle called defense in depth to secure the App Engine and is not relying exclusively on secure interpreter, or any other single security layer to protect their users. However, its details are not diverged.
- **Force.com** Force.com [9] developed the first service allowing developers to build multi-tenant applications that are hosted on Salesforce's servers as a service. The company also pushes the development as a service in the market, while this has not yet gained acceptance outside of their offering. However, the platform as a service is used by many other vendors to enter the market without any upfront investment. Force.com concerns three aspects of security [12], it watches the user security about how users are authenticated programmatic security which audits any software client to log in to the platform and platform security framework.

Infrastructure as a Service ("IaaS") [13] means a set of hardware components here including storage capacity, CPU cycles, memory capacity, network bandwidth and so on. These components are delivered as services over the internet by an amount of leading companies since they have superfluous hardware investment, such as Amazon, Mosso, ServePath, Sun and so on, and charged In terms of customer usage [15].

- **Amazon Web Services (AWS):** Amazon is the pioneer of cloud computing service provider. AWS provides the utility computing by charging a set of infrastructure offering in terms of customer usage. For computation it has EC2 (Elastic Compute Cloud), Elastic MapReduce [13] and Auto scaling. For storage, AWS has S3 (Simple Storage Services), SimpleDB (database), Elastic Block Storage (EBS), Cloud Front. For network, it has Virtual Private Cloud (VPC) and Elastic Load Balancing and others like Simple Queue Service and etc.

With above service components, AWS enable a web scale computation by providing access to an established infrastructure which resides on thousands of commodity PCs, and gives costumers flexibility to run their business. All these services are able to construct an entire system delivering utility computing services. Additional security concerns are also critical for customers to use these offerings. Amazon issues a white paper [14] to overview its security process in Amazon Web Services. Several strategies are provided to secure their infrastructures. As for physical protection, Amazon hosts AWS data centers in nondescript facilities, and let critical facilities have extensive setback and military grade perimeter control as well as other natural boundary protection and consequently result in the protection from physical attack. For example in EC2 multi level security strategies are offered, security for host operating system, security for virtual instance operating system, security for virtual instance operating system or guest operating system, security for state full firewall and signed API calls

and security for a state full firewall and signed API calls and security for the network communication. For security in S3, S3 APIs provide both bucket and object level access controls, with defaults that only permit authenticated success by the bucket and object creator. SimpleDB APIs provide domain-level controls that only permit authenticated access by domain creator, therefore the customer maintains full control over who has access to their data.

- **Mosso:** Mosso is a division of Rackspace, which is well known for its reliable dedicated web hosting across the world. Its services are called cloud sites. In addition, it also provides cloud file for hosting service and cloud server for computation service. Load-balancing, clustering and redundant storage are all inherited by customer's applications automatically, without any additional effort. By deploying the Windows Web Server 2008 operating system and Internet Information Services 7.0, Mosso enhances its security in hosting service.
- **GoGrid:** GoGrid [16] is division with dedicated hosting company and provides the world's first multi-server control panel to help end users to deploy Cloud servers in just a few minutes as well as manage its load balance between servers. GoGrid's hosting service provides the so called control in the cloud for hosting service, which combines many features of dedicated server to achieve the availability, scalability and reliability. For security concerns, GoGrid needs to interrupt services to maintain the systems or to address and mitigate the effects of security breaches, virus attacks, denial of service attacks and other intentional interferences by third parties [17]. GoGrid claimed not to be responsible for the use or misuse of data by any third party, including without limitation to the operator of any website linked to GoGrid's website, or any GoGrid customer, even if GoGrid's hosts such customer's website. Hence, GOGrid provides low level security and privacy guard.

The cloud services provided by top leading companies, as well as their considerations or procedures on different issues, in terms of three service categories are enlisted in paper.

Author	Title	Ideas Proposed
Minqi Zhou.	Services in the Cloud Computing Era	Cloud computing classification.

M. Armbrust, A. Fox, R. Griffith, A. Joseph, R. Katz, A. Konwinski,G. Lee D. Patterson, A. Rabkin	Above the clouds: A Berkeley view of cloud computing	“SaaS” service providers, benefits and security management in providers company.
S. Ghemawat, H. Gobioff, and S. Leung	Google file system	Google File system and architecture
Malawski, M. ; Kuźniar, M.	How to Use Google App Engine for Free Computing	Developing and deploying apps on google App Engine
Almorsy, M. ; Grundy, J. ; Ibrahim, A.S.	A Tenant- Oriented SaaS Security Management Architecture	Security management by hosting service provider
Fujii, T. ; Kimura	Analysis Results on Productivity Variation in Force.com Applications	Force.Com hosting management and its security related information
Sandikkaya, M.T. ; Harmanci	Security Problems of Platform-as- a-Service (PaaS) Clouds	Problems in the PaaS cloud services. List of Companies and their security structure in

		Hosting environment
Tajadod, G. ; Batten, L.	Microsoft and Amazon: A comparison of approaches to cloud security	Comparison of Microsoft Azure and Amazon S3 service. The comparison is done in different ways like availability, pricing etc.
J. Dean and S. Ghemawat	MapReduce: simplified data processing on large clusters	MapReduce structure used in Big data Cloud computing service.

CONCLUSION

Cloud computing becomes a buzzword nowadays. More and more companies start to step into Cloud era and provide services for public user, partially because of the nature of Cloud Systems, i.e. reduced upfront cost, expected performance, high availability, infinite scalability, tremendous fault tolerance capability and so on. Base on the long list services provided by leading companies, the Cloud computing era is coming. It is good for user, since there are lots of alternatives they can choose from. There will be more prosperity in Cloud Computing literature , if more security concerns and procedures are added by these leading companies.

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