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Survey on Different Cloud Platforms

Kiran Hingu[1], Sharmila Gaikwad[2]

B.E. Student, Dept. of Computer Engineering, Rajiv Gandhi Institute of Technology, Mumbai, India[1]

Professor, Dept. of Computer Engineering, Rajiv Gandhi Institute of Technology, Mumbai, India[2]

ABSTRACT: Cloud platforms are emerging with great potential to support developers to develop and deploy applications in the cloud. By conducting a survey on several typical cloud platforms we came to know about their potentials. We found that Amazon Web Services supports various types of applications, although it has minimum support for the development process. For batch processing programs Sun Grid Compute Utility is been used, but their services needs lot of improvements. For web applications, Google App Engine can be used which results in improved scalability and throughput. Microsoft Windows Azure provides similar environment and promises to become a strong player in the landscape.

KEYWORDS*:* Cloud Computing, Cloud Platforms.

I. INTRODUCTION

Cloud computing is defined as the use of computing resources to access data over the internet. This network of servers and connections is collectively known as 'cloud'. Cloud computing moves the data into large data centers. It allows the users to access services irrespective of their geographical location using computing device via internet. Using other access point, users can reach into the cloud for the resources as they need them. By using cloud computing, distributed resources are handled properly and also achieves higher throughput which solves large scale computation problems. Cloud platforms: A cloud platform provides cloud-based services for creating applications. The survey investigates cloud platforms with two broad categories of applications such as batch applications and interactive applications. Batch refers to programs that can run without human interaction in long process, and may involve handling large datasets. Interactive refers to plenty-of-short-user-requests apps, such as Internet-based OLTP web applications. The platforms chosen for the surveys are Amazon Web Services, a general environment able to support both types of applications, Sun Grid Compute Utility, a grid infrastructure mostly used towards batch applications, and Google App Engine, a platform for interactive web applications. Also it surveys on Windows Azure, a general platform recently introduced by Microsoft.

II. CURRENT CLOUD PLATFORMS

A. Amazon Web Services (AWS)

AWS provides web services platform in the cloud [1]. By using AWS one can compute power, storage, and other services according to his business demands. With AWS, one has the flexibility to choose from a number of development platforms or programming models the one suitable for the problems he's trying to solve. The user pays only for what he uses, with no up-front expenses or long-term commitments, making AWS the cost-effective way to deliver the application to customers and clients. With AWS, one can take advantage of Amazon.coms global computing infrastructure that powers their renowned online business over the years. Currently AWS consist of the following infrastructure services:

- Amazon Elastic Compute Cloud (Amazon EC2).
- Amazon Simple Storage Service (S3).
- Amazon SimpleDB.
- Amazon Simple Queue Service.

[1] AWS, particularly EC2 and S3, provides a simple interface for accessing infrastructure services in the cloud. The overall offering is quite basic and thus very general and doesn't impose any programming model. EC2 essentially provides Linux-based instances 4 in the cloud that layout the platform for running any type of Linux-supported applications. AWS itself basically doesn't provide any development support and doesn't care how you develop your

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app; you can use any tool/model/framework/skill of your choice, as long as the resulted program can run on the given Linux platform, you are good to go. S3 provides storage repository in the cloud that could be used alone as a data backup service or in conjunction with other services, as in our experiment in which it is used as a permanent storage of data of the EC2-based app. Large-scale web sites could be deployed with less pain at lower cost yet having good infrastructure scalability, high performance computing type batch jobs are no longer out of reach of low-budget groups.

B. Sun Grid Compute Utility

[2] Sun Microsystems provides access to a set of infrastructure Web services at http://network.com. One of the offerings here is the pay-as-you-go Sun Grid Compute Utility, which provides customer access to standardized parallel computing resources. An application developer accesses this service through the Web-based portal or through programs that invoke the sungrid API. Through the portal, developers can upload applications and data, or users can select an application from a catalog of pre-installed applications. Applications execute on a networked infrastructure of compute nodes and can distribute processing tasks across nodes, allowing execution to occur in tandem or in parallel. When execution completes, the user downloads run results, either through the Web-based portal or the API. Software developers can also provision application services on the Network.com infrastructure, enabling immediate access to services via the Internet. There are three use cases for applications that access the Sun Grid
Compute Utility:

• User applications: Developers can write or port applications in a local development environment, executing them through the Web-based portal interface or via the sungrid API.

• Catalog applications: Network.com offers on-demand access to a set of popular, preinstalled, and ready-to-use applications. Independent software vendors (ISVs) and other developers can make their applications available for shared use on Network.com. Optionally, they can restrict application access, compelling users to purchase and obtain license tokens prior to execution.

• Long-running services: Application providers can provision long-running services on Network.com to give customers ready access to business services.

Sun Grid is a promising grid infrastructure for developers to exploit the compute power in the cloud [2]. The current offering suits compute-bound applications whose hardware demand, particularly CPU demand, exceeds one's infrastructure capability. Compute Server is a software framework built upon Sun Grid and provides a simple yet powerful programming model for applications to exploit the parallel nature of the grid. Developer finds this tool easy to approach, but it mostly targets compute-intensive applications only.

C. Google App Engine (GAE)

One can run web applications on Google's infrastructure by using GAE [3]. App Engine applications are easy to build, easy to maintain, and easy to scale as traffic and data storage needs grow. With App Engine, there are no servers to maintain: one just uploads the application, and it's ready to serve users. The GAE environment includes the following features:

• Dynamic web serving, with full support for common web technologies.
• Persistent storage with queries, sorting and transactions.
• Automatic scaling and load balancing.
• APIs for authenticating users and sending email using Google Accounts [3].
• A fully featured local development environment that simulates GAE on the developer's computer.

Currently Python is the only programming language supported by GAE. Google App Engine presents a small and compact offering that targets a specific group of applications, namely web applications. The service aims at simplicity for developers. Development, deployment and administration of applications are straightforward, enabling teams to quickly introduce new apps/new versions to customers. Given the very specific and narrowly scoped of the offering, applications that require more flexibility at the server side, such as interaction with the file system, backend processing of data, do not seem a good fit. It'd be interesting to see how Google addresses this with the evolution of the platform, for example with more languages support. Thus, applications suitable for Google App Engine have the potential to scale to a very large number of users while still maintaining reasonable integrity and consistency. However, the potential does not free application designers from employing certain good practices if they want their apps to fully reach that potential.

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D. Microsoft Windows Azure

Microsoft recently released the Azure Services Platform for limited preview, called the CTP period. It's a cloud computing environment that consists of the foundational Windows Azure and add-on services. [4] Windows Azure can be thought of as a cloud services operating system that abstracts Microsoft data centers into a cloud computing platform that provides customers with on-demand compute and storage to host, scale, and manage internet or cloud applications and services. Several add-on services are also included with Azure. Connection between two users is expressed by a channel. Channels may also be used to connect load balancers together or with roles. An endpoint is a generic network endpoint, either internal or external, for serving requests. An interface is an externally accessible endpoint. Supported protocols include HTTP(S), SMTP, ATOM, and SOAP. Currently Azure runs in a single data center on the US west coast. In the commercial release, it is expected to have multiple centers functioning and customers may have some control over geodistribution and georeplication, such as where and how their services and data live. Besides the foundational Azure, the CTP provides three storage services that run on top of the Azure fabric. They are tables, queues, and blobs. In the commercial release, they'll be joined by lock and cache services. All of these services are intended to be simple and massively scalable. Each storage service has a programmatic .NET API and an HTTP REST API. Additionally, there are command-line utilities for browsing and modifying data in each service except for tables currently. Azure tables are schemaless, like the Google App Engine datastore. There's a built-in Tables table that stores the list of tables in an account, but not the properties or their types. It's queryable the same way as normal tables.

Microsoft, who came out later in this business, takes a different approach. [9] They build everything from the ground up, from the data centers, the system governing those centers, to add-on services interfacing users. All are built with a cloud-oriented, external users-serving mindset right from day one. At a high level, Windows Azure does impose its own programming/deployment model, with application components and configuration represented as roles, channels, load balancers, endpoints. From a developer perspective, current offerings from Microsoft are roughly similar to what are available in the market.

TABLE1: **Cloud Platforms and Their Key Features**

Platforms	**Programming framework**	**Key features**	**Services**
Amazon EC2	Microsoft and Linux based, map Reduce	Persistent storage through simple storage services(S3), Amazon cloudwatch, elastic IP addresses, automated scale, uses Xen virtualization	IaaS
Google App Engine	Python, Java, PHP and Go	Google cloud SQL, Modules, Map Reduce Sockets, Google Cloud Storage Client Library	PaaS
Microsoft Azure	ASP.Net, Node.js and PHP	Can run windows as well as Linux systems	PaaS, IaaS

III. CONCLUSION

A new kind of application platform doesn't come along very often. But when a successful platform innovation does appear, it has an enormous impact. Think of the way PCs and servers shook up the world of mainframes and

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minicomputers, for example, or how the rise of platforms for N-tier applications changed the way people writes software. While the old world doesn't go away, a new approach can quickly become the center of attention for new applications. The attractions of cloud-based computing, including scalability and lower costs, are very real. If you work in application development, whether for a software vendor or an end user, expect the cloud to play an increasing role in your future. The next generation of application platforms is here.

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