

AWS vs. MWA: A Review

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Abstract – Cloud Computing is the delivery of Computing and storage capacity as a service to a heterogeneous community of end recipients. It has emerged as a new paradigm for doing business over the Internet. Cloud computing is grabbing the attention of the business owners by offering several features such as on demand self service, broad network access, resource pooling, rapid elasticity, etc. There are several cloud computing platforms for providing cloud based services: the two most dominant cloud computing platforms are Amazon Web Services (AWS) and Microsoft Windows Azure (MWA). In this paper we present a survey of these two Cloud Computing platforms, highlighting their architectures, services, and growing trends.

Index Terms – Cloud Computing platforms, AWS, MWA, cloud stack

I. Introduction

Cloud computing is the delivery of computing and storage capacity as a service to a heterogeneous community of end-recipients. The name comes from the use of cloud shaped symbol as an abstraction for the complex infrastructure it contains in system diagrams. Cloud computing entrusts services with a users data, software, and computation over a network [1] [2].

Modern cloud computing offerings can be differentiated by the kind of services they offer [3].

Typically these services fall into three categories and vendors may provide one or more of them.

Infrastructure as a Service (IaaS): IaaS provides basic hardware as a service. Example: Firewalls, Load Balancers, virtual Machines, Network attached storage, etc.

Platform as a Service (PaaS): PaaS provides computing power to IaaS including Operating systems, Programming Language, execution environment, database servers, web servers, etc.

Software as a Service (SaaS): SaaS offers hosted instances of vendor applications to a client. Example: Salesforce.com, Quick books online, etc.

Cloud computing is often described as a stack [4], as a response to the broad range of services built on the top of one another. It mainly consists of five layers: Hardware, IaaS, SaaS, PaaS and cloud clients. A typical cloud stack is shown in Fig1. The two most popular cloud computing platforms are AWS and MWA. AWS operates on Hardware and IaaS layer of cloud Stack and MWA operates on Hardware, IaaS and PaaS layer of Cloud stack.

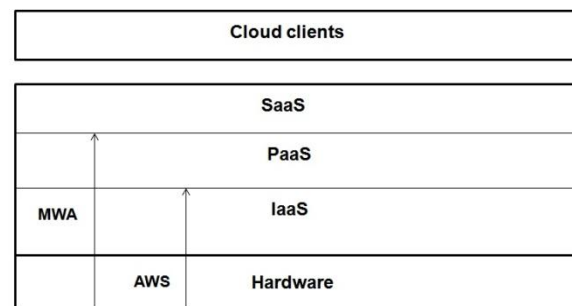


Fig 1. Cloud Stack

The rest of the paper is organized as follows: Section 2 gives some of the related works; Section 3 provides architecture of both AWS, and MWA; Section 4 discusses the services of AWS, and MWA; Section 5 lists the pros and cons of both computing platforms; Section 6 gives the growing trends, and finally Section 6 draws the conclusion.

II. Related Works

Cloud computing: state-of-the-art and research challenges in [5] provide a survey of cloud computing, highlighting its architectural principles, state-of-the-art implementation and research challenges. This paper discusses the cloud computing as a whole and provides a little spotlight on three cloud computing platforms i.e. Amazon Web Services, Microsoft Windows Azure, Google App Engine.

Cloud computing with the Azure platform in [6] sheds light on internals of Microsoft's Azure platform. They mainly discuss the component of Azure, their services, and creating a sample of application of cloud. This paper provides brief overview of the Azure platform.

In [7], a Comprehensive taxonomy is developed in cloud computing architecture (which includes cloud architecture, virtualization management, service, fault tolerance, security, etc.) and by using this taxonomy a brief survey of several existing cloud computing services (i.e. Amazon Web service, Flexiscale, Mosso, GoGrid) are provided. This paper presents only gist of information on cloud computing platforms.

Cloud Computing and emerging IT platforms in [8], provides a brief information regarding Amazon Elastic cloud compute (EC2) and Amazon Simple Storage Service (S3) and also about their pricing. In Amazon EC2 a user is allowed to create a new Amazon Machine Image (AMI) containing the application and data. Then the user needs to upload his selected AMI's to Amazon S3 before he starts the instances of uploaded AMI's. The Pricing mentioned to the user is for the time until the instance is alive.

Cloud Computing Issues and Challenges [9], Amazon EC2 is classified as an IaaS. Amazon S3 is stated as

example of Data as a Service (DaaS) i.e. as special type of IaaS is designed to scale out to store and retrieve a huge amount of data within a very compressed time frame often too large, too slow for most commercial RDBMS to cope with. While discussing the service models of cloud computing, this paper discusses only the core working principles of Amazon EC2 and Amazon S3 by taking as examples for IaaS and DaaS.

III. Architecture

In this section we discuss the architecture of AWS and MWA.

A. Architecture of AWS

Amazon Web Services [5] is more than a collection of Infrastructure services with the "pay as you go" model with no long term commitments. AWS is a collection of cloud services offering computing power, storage, content delivery, database, e-mail and other essential services provided by amazon.com over internet.

These web services offered by amazon.com can be used by other websites or business users by placing their application on the top of the Amazon stack. The Conceptual Architecture of AWS can be simplified and viewed as shown in Fig 2.

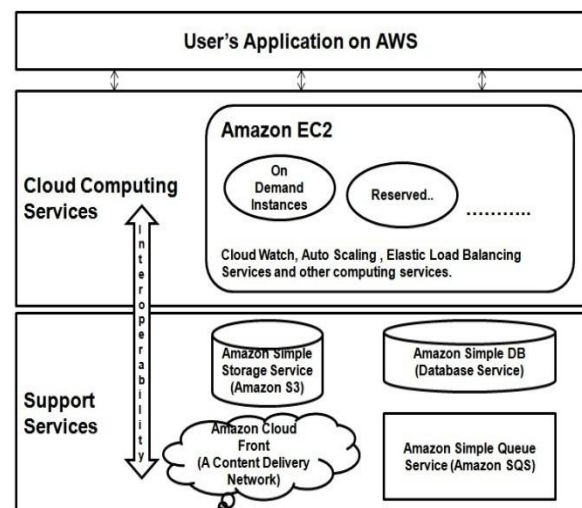


Fig 2. The architecture of AWS

The components of the AWS platform are:

- **Amazon Elastic Cloud Compute (Amazon EC2):** is a web-service, provides scalable compute capacity in the cloud.
- **Amazon S3 (Simple Storage Service):** provides web service based storage for storing and retrieving any amount of data at any time, from anywhere on the web.
- **Amazon Simple DB:** provides core functionality of a database, used by developers to run query on structured data sets.
- **Amazon Cloud Front:** provides content delivery network services to distribute content with low latency though global network to the edge locations.
- **Amazon SQS (Simple Queue Services):** provides a hosted queue service for storing messages that travel between computers / virtual machines.

B. Architecture of MWA

Microsoft's Windows Azure Platform is a group of cloud technologies, each providing a specific set of services to application developers [11]. Fig 3. Shows overall architecture of MWA platform.

The components of the MWA platform are:

- **Windows Azure:** provides a Windows-based environment for running applications and storing data and services in Microsoft's data centers.
- **SQL Azure:** provides data services in the cloud based SQL server.
- **Windows Azure platform AppFabric:** provides cloud services for connecting applications running in the cloud or on premises.

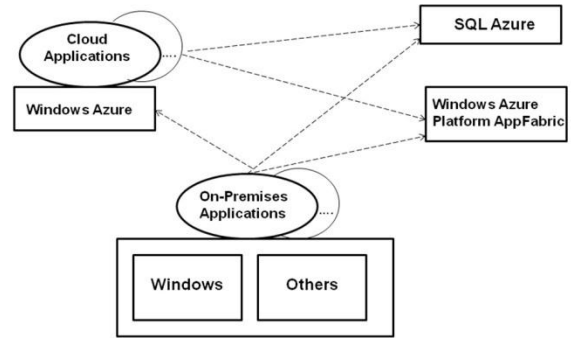


Fig 3. The architecture of MWA.

IV. Services

In this section we briefly discuss the services offered by AWS and MWA. Fig 4 provides taxonomy of AWS, and Fig 5 provides taxonomy of MWA services.

A. AWS

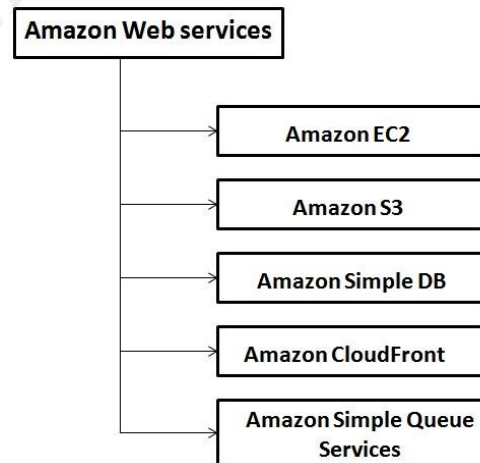


Fig 4. Taxonomy of AWS

The services [12] that have been announced so far include the following:

1) **Amazon Elastic Cloud Compute (EC2):** a web service to provide full compute capacity in the cloud.

- EC2 allows users create, maintain and terminate virtual server **instances** as needed

on a pay as you use model. (Here, An instance is a virtual computer which user can take for rent and run their own applications these virtual computers.)

- EC2 provides an easy way of web scale computing for users where a user can deploy their applications through its web service by booting an image to create a virtual machine / **instance** containing any software desired.
- EC2 provides various features to users like **Amazon Load balancing, Auto scaling, Cloud Watch** for monitoring AWS could resources and to build failure recoverable elastic applications.

2) Amazon S3 (Simple Storage Service): provides web service based storage.

- EC2 instances have attached storage but it is temporary i.e. as the instance is shutdown memory will be lost. So to save data user will be provided with S3.

3) Amazon Simple DB: provides core functionality of a database, used by developers to run query on structured data sets.

- Simple DB works jointly with Amazon S3 and Amazon EC2 to provide the ability to store, process and query data sets in the cloud.
- Simple DB is very easy to use providing core functionality of a database without operational complexity. Also provides useful tools to migrate user's database from existing solutions.

4) Amazon Cloud Front: provides content delivery network services.

- Amazon CloudFront works with other AWS to give users a easy method to distribute their content to their end users with high data transfer speeds and low latency.

- Using the Global Network the Amazon CloudFront is able to deliver user's content to any edge location.
- Amazon S3 helps Amazon CloudFront in storing User's original and definitive versions of Data (usually files).

5) Amazon SQS (Simple Queue Services): provides a hosted queue service for storing messages that travel between computers / virtual machines. Using the Amazon SQS the users / developers can move their data between their applications that perform different tasks, without losing messages.

B. MWA services

The services [6] [11] that have been announced so far include the following:

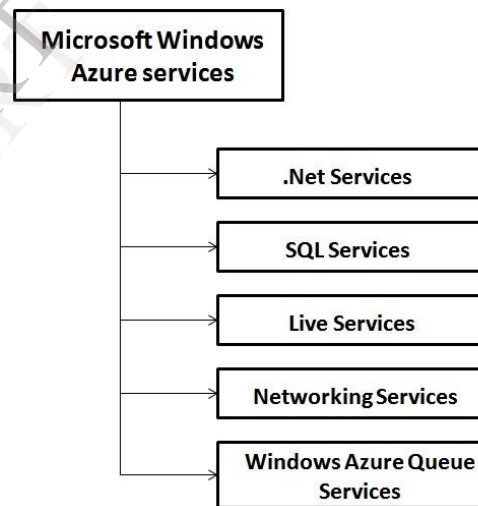


Fig 5. Taxonomy of MWA services

1) .Net Services: is to address common infrastructure challenges in creating distributed applications. The .Net services include three sub services. They are:

- **Access Control Service:** The Access Control Services is Security Token Service (STS) running in the cloud. The purpose of an STS is to act as a layer between an application and its uses.

- **Service Bus:** The Service Bus discovers and exposes the service end points in the internet. An application needs to register one or more end points with the service bus. The Service Bus then exposes them on application's behalf.
- **Workflow Service:** It is the last sub service provided by the .Net services. It allows creating workflow-based applications running in the cloud.

2) SQL services: provides cloud based services for storing different kinds of data.

- These are the same data services Microsoft offers on premise that have been extended to the cloud.
- For data storage, Azure does not use a relational model. Instead, the SQL data services provide a hierarchical data model.
- The goal of SQL services is to provide a set of cloud based services for starting and working with many kinds of data.
- The SQL Data services provide a database in the cloud. It lets the cloud applications to access the data on Microsoft's services housed in data centers. This result in several benefits like reduced Infrastructure cost, increased reliability, reduced backup overhead, etc.

3) Live Services: is a group of Services combined together to allow access to data stored by Microsoft's live application family.

- Live application includes such well known software as Windows Live Messenger. In addition to being able to access Live Services data, application can also rely on Live Framework to synchronize this data across different parties involved.
- These services include a framework intended to integrate, connect, and synchronize code.
- At the core of synchronization is an Idea of being a part of mesh. Once joined to a mesh, a Live Services data is automatically synchronized between joined parties.

- The platform also includes support for different programming languages and allows all resources to include a URL address.

4) Networking Services: Windows Azure provides several networking services which provide several benefits like increased performance, improved manageability and authentication for hosted applications, etc. These services include the following:

- **Content Delivery Network (CDN):** allows to cache publicly available static data for applications at strategic locations that are closer to end users.
- **Virtual Network connect:** This service allows to configure roles of an application running in Windows Azure and computers on premises network, so that they appear to be on the same network.
- **Virtual Network Traffic Manager:** Typically Traffic Manager maximizes the performance by redirecting requests from users to the instance in the closest data center using the Performance, Round Robin or Failover methods.

5) Windows Azure Queue Services (WAQS): WAQS facilitates the communication between the disconnected systems. Queues are used for reliable, persistent messaging between applications. We can Queues to transfer messages between applications or services in Windows Azure.

V. Pros and Cons

In this section we are listing the Pros and Cons of both AWS and MWA.

A. Pros and Cons of AWS

Pros

- * AWS gives great flexibility in terms of what user can do with the environment. Users can create virtual machines called AMI's (Amazon Machine Images) and the options are virtually endless.

- * AWS gives an opportunity to build applications in any language as long as the AMI's can be built to support them.
- * AWS gives complete control to the User on the Hardware and everything runs on it.
- * AWS are highly available. Here services are guaranteed to stay up and be fault tolerant.
- * AWS consists of simple pricing structure, pay as you use model.

Cons

- * AWS has big learning curve to the users as they go on using it.
- * Users/Developers using AWS have to jump through lot of hoops to get things done.
- * AWS provides lots of options, which makes users / developers to figure out everything by themselves.
- * Deployment and management is not easy as compared to other Cloud services.
- * As AWS gives full control on the hardware, users need to take lots of responsibility to maintain the servers.

B. Pros and Cons of MWA

Pros

- * Faster Deployment times and client adoption.
- * Greater pool of development resources.
- * Lower application life cycle costs and Azure may be cheaper than EC2 in the long run.
- * Improved margin for differentiated IP.
- * Scalability with Windows Azure is seamless.

Cons

- * Increased competition for development resources and, potential loss of account control.
- * Shift to volume business.
- * Decline in upfront profit and revenue collection.

- * Accelerated globalization and market competition.
- * Increased self-hosting and integration cost.

VI. Growing trends

There is no longer a debate which is the choice between AWS and MWA, because users/developers have great advantages from both of these services . The real great advantage here is getting access into the expected environment that was managed as possible, so users are spending their time and money focusing on solving their business problem instead of creating and managing their own environments. And also building up the operational capability to provide a service like AWS or MWA is a very difficult task. Both AWS and MWA provide multiple locations and pay-by-the-hour capability.

Users in MWA enjoy the reduced labor costs and faster response times associated with having a direct connection between development and production environment, as there are no “production operations” team responsible for the health of the OS, ping, and power.

But AWS provides entire suite of platform based services that are too close to the solutions provided by the MWA. However, AWS doesn't provide .Net support that MWA already has. The big advantage from the AWS is, a user can get the platform capabilities and the freedom to easily deploy brand new technologies before they become a part of the platform.

VII. Conclusion

Cloud computing is a promising platform for delivering IT services over the Internet. The two most dominant services are: AWS and MWA. Both of these cloud computing platforms provide an efficient and reliable cloud based services in their own ways. Although these two platforms provide several advantages, these are some drawbacks which should not be ignored, still more research need to be done w.r.t services, security, architecture and fault tolerance: so that they provide an eminent cloud based service to the customers.

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