

Public Cloud Adoption - AWS vs Azure : Common Reasons and Constraints

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ABSTRACT

The cloud consists of services as well as software that resides and operates on the Internet in place of a local computer or an on-premise network of servers. To improve the Internet-based database capabilities and make them scalable, enterprises use Cloud adoption as a strategy while reducing their risk and costs. There are three cloud platform providers mainly that are taking majority of the market share, these are Amazon Web Services, Microsoft Azure and Google Cloud Platform. This study entails an in depth focus on Amazon Web Services(AWS) and Microsoft Azure. AWS and Azure largely offer the same flexibility and basic capabilities around different parameters like compute, storage, networking and pricing. Businesses engage in the practice of AWS and Azure cloud computing to retain, manage, and process the critical data. These cloud services share common elements and fundamentals that a public cloud possesses such as security, autoscaling, pay-as-u-go pricing, compliance and self-service, identity access management features and many more.

Keywords : Cloud computing, Public cloud, Amazon Web Services, Microsoft Azure

INTRODUCTION

It is becoming common that enterprise companies are making the switch from self-hosted infrastructure to public cloud configurations around the world. There are various cloud service models that include public, private and hybrid cloud for use case applications differently offering unique tradeoffs and value propositions. Most of the enterprises are developing their applications directly in the cloud as this does not need the development team to support the application by working on the infrastructure but rather stay product focused. They have a physical infrastructure existing that gets maintained and updated continuously with the cloud. To transform businesses companies investment in cloud services based on segments that involve passing decisions around various factors like return on investment, security and innovation. Public cloud provides cost advantages along cloud infrastructure resource sharing between multiple tenants through acceptable security and availability Service Level Agreement (SLA).[6] The escalation of public cloud solutions is navigating business transformation towards agility in this world where there are growing uncertainties and rapidly changing market trends. The presence of public cloud

solutions for all sizes of organizations and industry verticals represents opportunities to discontinue their respective industries.[2] The technology empowers more firms to wrangle on the grounds of innovation against their larger counterparts which allows them to pivot on their core business offerings, and not making them invest significant time or resources for scaling the underlying technology infrastructure.

STEPS FOR PUBLIC CLOUD ADOPTION

Organisations of all sizes must observe a few vital steps in mind to make their transition to the cloud. These steps include :

1. **Assessment:** There is a need for organisational executives and IT decision makers to assess the opportunities and provocations of employing cloud computing in their marketplace. Business leaders with their technology teams should derive data on all the successes and challenges of the adopters in the past in their similar space. [1]
 2. **Planning:** After doing their research, organizations need to plan their cloud strategy specifically. Such platforms and services must be chosen that are well-known by IT leaders in their industry and are also quick to market.[1]
 3. **Adoption:** Organisation IT leaders should develop and enhance risk mitigation strategies during the adoption phase. An expert understanding of servers, software, and data stores should be present for reiteration in the future and scalability of their strategies.[1]
- **Optimization:** IT departments must also discuss the lessons learned in their strategies of cloud computing and create improved new solutions by regularly meeting with their executive team for further tasks and processes.[1]

METHODOLOGY

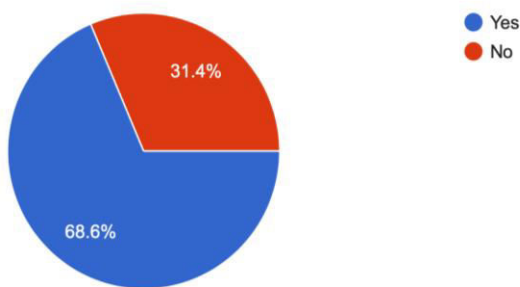
For our paper we have conducted primary and secondary research. Our primary research was done through gathering people's opinion on public cloud through circulating google forms among them. The form was passed onto people with different positions in different organisations. We could collect 51 responses, in total, of which people belonged to different positions in the organisation, some already using a public cloud and some not.

The secondary research was done through the reference of different papers and articles which were based on public cloud viz Amazon Web Services and Microsoft Azure.

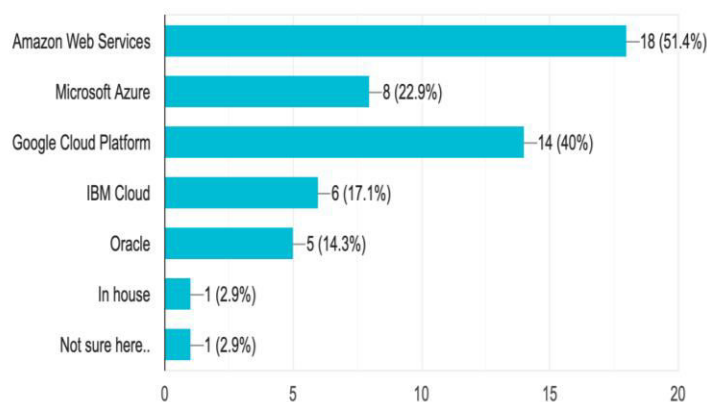
ANALYSIS OF PRIMARY RESEARCH

The information that we gathered through google forms can be summarised below.

Percentage of people using public cloud is given by the chart below:



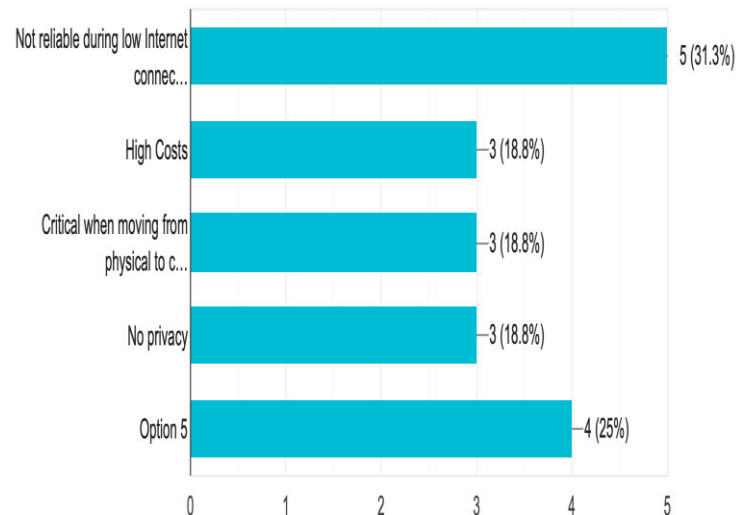
According to our research the public cloud service people currently using in their organization can be summarized as :



As there were few who weren't using public cloud already we found out the reasons why they weren't using it, which were:

1. Not reliable during low internet connectivity
2. high costs involved
3. Critical when moving from physical to cloud
4. No privacy
5. Others

It can be given as follows in the form of a bar chart:

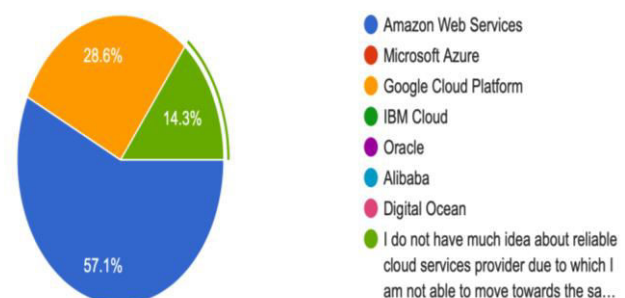


The ones who are not currently not using a cloud service were enquired on which cloud service would they shift to if they had a chance and majority wants to go for Amazon

Web Services. It can be summarized as follows:

Which type of Cloud Service do you plan to use?

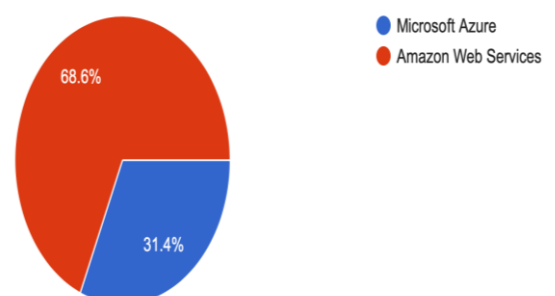
7 responses



Amongst Amazon Web Services and Microsoft Azure people prefer AWS.

Which Cloud Service would you prefer?

35 responses

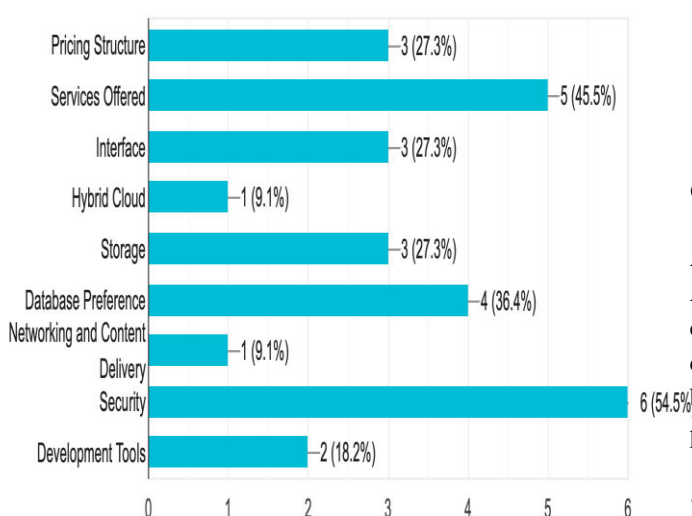


As from the above pie chart we all can see that people prefer AWS over Azure but there were some who even preferred Azure.

The reasons why people preferred AWS and can be listed as follows :

1. Pricing structure
2. Services offered
3. Interface
4. Hybrid cloud
5. Storage
6. Database preferences
7. Networking content and delivery
8. Security
9. Development Tools
10. Others

This can be graphically presented as follows :



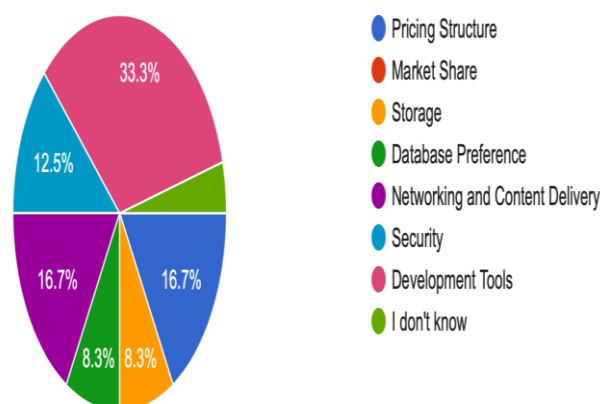
The reasons why people preferred Microsoft Azure can be listed as follows :

1. Pricing structure
2. Market Share
3. Storage
4. Database preferences
5. Networking content and delivery
6. Security
7. Development Tools
8. Others

Which can be graphically given as :

Why do you prefer Amazon Web Services over Microsoft Azure?

24 responses



COMPARISON OF AWS AND AZURE

As we all know both Amazon Web Services and Microsoft Azure are leading cloud platforms and each offers great capabilities and coverage to businesses and organizations. Many companies may prefer to use them together for better flexibility but there are always some differences between both the cloud platforms.

1) AWS vs Azure : Compute

The role of a computer fundamentally is to calculate, process and compute. The good choice available for organizations that require faster analysis of data or graphics rendering is to shift to the cloud. Public cloud services consider this as their goal.[3] EC2 is the primary solution for AWS for Compute. EC2 instances provide on-demand scalable computing and also provide customizations for different options. This also provides many related services which are EC2 container service, Autoscaling, AWS Lambda and Elastic Beanstalk all for different application deployment. Whereas Microsoft Azure's has compute offerings that are based on VMs along with multiple other tools like Cloud Services and Resource Manager.[5] These services of Azure help in deploying applications on the cloud. The largest range of services is offered by AWS which is close to 100 across compute, storage, database, networking, analytics, mobile, management tools, developer tools, IoT, security as well as enterprise applications.

2) AWS vs Azure : Storage

Cloud service providers need to have a key functionality that is their storage capability. Data processing has the need to be saved sometime at least when running services in the cloud. The longest running storage services are given by AWS , however,

Azure's capabilities of storage are also exceedingly reliable.[4] AWS as well as Azure are well built and strong in the storage category as they encompass the basic features like REST API access and data encryption on server-side. The storage mechanism of AWS is Simple Storage Service (S3), whereas, Azure's storage mechanism is called Blob storage. AWS' cloud object storage solution proposes high availability and accessibility along with automatic replication across regions. In AWS' temporary storage, the functioning starts when an instance starts and it stops when the instance terminates. It also delivers block storage similar to hard disks which can be securely attached to any EC2 instance and it can also be kept separate. For VM based volumes, Azure also makes use of temporary storage and page blobs. Azure's The Block Storage option provided by Azure is identical to S3 used in AWS. The two storage classes offered by Azure are Hot and Cool. Hot storage is comparatively higher in pricing than cool storage. One also has to incur additional costs for read and write.[3]

3) AWS vs Azure : Pricing

Another important factor for organization to see when planning to move to cloud is cost. With the rise in competition, we can see a downward trend on prices in recent times. For first time users AWS and Azure have free introductory level which has restricted usage limit and allows the users to try their services before it can actually be bought.[2] Also, there are credits provided by both to attract the start-ups to their platforms. AWS and Azure have a similar pricing model of pay-as-you-go, but AWS charges per hour whereas Azure charges per minute. With this AWS helps in saving more along with increased usage. There are three models for purchasing AWS instances.[2] The first one is Reserved Instances, in this you can lay aside an instance for one to three years by payment of an upfront cost which is based on the usage. The second model is the On-demand Instances in which there is no need to pay an upfront cost but only pay for your usage. The third model is Spot Instances in which you bid based on availability for some extra capacity.[6] Azure puts forward short term commitments by giving users a choice between prepaid or monthly charges. When it comes to the pricing model, AWS provides more flexibility than Azure.

4) AWS vs Azure : Databases




Every software applications requires a database to store information. Both Azure and AWS extend database services, regardless of your need of a relational database or a NoSQL. Amazon's RDS (Relational Database Service) and Microsoft's parallel SQL Server database both are highly convenient and durable and they also provide automatic duplication. AWS provides a mature cloud environment for big data and works great with NoSQL and relational databases.[4] Azure also supports Big Data through Azure HDInsight and Azure table and is perfect with NoSQL and relational databases both. Amazon's

RDS supports six famous database engines – MariaDB, PostgreSQL, Amazon Aurora, Microsoft SQL, MySQL, and Oracle whereas Azure's SQL database service is merely based on MS SQL Server.[6] Various database operations can be easily performed in Azure due to friendly interface and tooling while AWS has more specimen types which can be delivered and gets additional control over DB instances.

5) AWS vs Azure : Content Delivery and Networking

There are multiple networks and partners provided by cloud service provider to interconnect the data centres through various products. AWS helps user create solated networks within the cloud through Virtual Private Cloud (VPC).[2] Within a VPC a user can create subnets, route tables, network gateways, and private IP address ranges. Likewise, Azure renders Virtual Network (VNET) for users to develop isolated networks. Firewall option is provided by both AWS and Azure to expand on-premise data centre into the cloud.

Table 1: Comparison Between Amazon Web Services and Microsoft Azure

		
Computer/ Virtual Machines :	EC2, Amazon Elastic Compute, 6 different types of machines from general purpose to GPU, Memory and CPU optimized	Azure Virtual Machines, 6 different types of machines from general purpose to GPU, Memory and CPU optimized
Machine type pricing/billing options :	On-Demand, Spot Instances, Reserved Instances and Dedicated Hosts	On-demand a.k.a. Pay as you Go and Reserved Virtual Machine Instances
Load Balancing/ Auto scaling :	Elastic Load Balancing, Auto Scaling	Azure Load Balancer and Auto Scale, VM Scale sets
Kubernetes / Docker :	EC2, Container Services, Firecracker, Fargate	Azure Kubernetes Service
Services :	Lambda	Azure Functions
Managemnt, monitoring and automation	AWS Management Console, CLI, API, CloudWatch, CloudTrail, CloudFormation	Resource Manager, Cloud Shell, API, Azure Monitor, Log Analyses, Network Watcher,

:	(YAML / SON)	Application Insights, Automation (JSON)
Authentication/authorization :	Identity and Access Management, Active Directory	(Azure) Active Directory, Active Directory Premium
Object based storage :	S3 (Buckets), Simple Storage Service	Object based Blob Storage
Block based storage :	EBS, Elastic Block Storage	Storage Disk Page Blobs, Premium Storage Disks
File based storage :	Elastic File System	Azure Files
Archive storage :	S3 Infrequent Access, Glacier, Data archive	Cool Storage, Storage (Standard Archive)
Hybrid storage options :	Storage Gateway	Store Simple, Data Box
Data encryption :	Server and Client-side encryption options (key management), EBS Volume Encryption (Disk), TLS/SSL	Server and Client-side encryption options (key managed), BitLocker (Disk), Azure Storage Service Encryption, TLS/SSL
(Bulk) Data transfer options :	Snowball (Edge (GPU) and Mobile), Import/Export Disk, CLI, PowerShell, Rsync, Transfer Acceleration, DataSync, partner options	Azure Data Box, Import/Export Disk, AzCopy, PowerShell, Azure CLI, plus various partner options
Disaster Recovery / backup:	Various best practices and setups: Backup & Restore, Pilot Light, Warm Standby and Multi-Site, Partner options available	Azure Site Recovery, plus various partner options
Database options :	SQL, MySQL, PostgreSQL, Oracle, MariaDB, DynamoDB, Neptune	SQL, MySQL, PostgreSQL, Cosmos, Table Storage, MariaDB
Data Warehouse :	Amazon Redshift	SQL Data Warehouse

Caching :	ElastiCache (Redis and Memcached)	Redis Cache
Virtual network options :	VPC, Virtual Private Cloud and subnets, API, NAT and Transit Gateway, VPN options available, network Peering	Virtual Network and subnets, API Management, VPN Gateway, Network Peering
Firewall options :	Web Application Firewall, AWS Shield (DDOS), Firewall Manager, Security Groups	Web Application Firewall, DDOS Protection, Azure Firewall, Network Security Groups
Content Delivery Network :	CloudFront	Content Delivery Network
Dedicated private Network :	Direct Connect	Express Route
Domain name system :	Route 53	Azure DNS, Traffic Manager
Regions / Zones :	18 Regions and 55 Availability Zones (AZ's)	54 regions. They started rolling out AZ's in March of 2018
Availability / SLA :	Depends on service and configuration. Up to 99.95 for EC2	Depends on service and configuration. Up to 99.95 for VM's

INTERPRETATION

In our paper we have thrown light on the comparison of AWS and Azure. we cannot choose a winner amongst them as they are both capable of providing great features to enable a multi-cloud strategy. As both are continuously launching new pricing structure, new products and new integrations, it is very difficult to compare them. It's on the organization to decide which cloud platform suits their organization more. Regardless of the comparison, to decide which is the right public cloud service provider we need thorough research on what is really needed and also what the service provider is offering. AWS and Azure are always luring its customers with expanded offerings at affordable cost which is beneficial for the users and they come out as winners in this battle between AWS and Azure. The basic features of these cloud platforms are:

- Instant Provisioning
- Self Service
- Security
- Autoscaling

- Identity management features.
- Compliance

CONCLUSION

Established in the beginning of 2006 Amazon Web Services is one of the oldest and most experienced in the market. AWS has a huge list of services in computing with many areas of deployment, networking, and many more. Microsoft Azure launched in early 2010, and since then it has been at par with its rivals. Both these platforms provide their customers with a full set of services.

Our survey done on google forms shows which cloud platform they prefer. We gathered responses from 51 people out of which 35 out of 51 went for either AWS or Azure. Out of those 35 68.6% that is 24 people prefer Amazon Web Services over Azure.

AWS is the largest, oldest and most experienced cloud computing software and also most preferred by people. It commands the largest market share which is more than the market share of its three biggest competitors all together. The deployment time of AWS is also impressive.

As we all know AWS and Azure offer almost the same basic capabilities. Some organizations may go for Amazon's cloud platform because of its better deployment time but it is also not wrong for an organization to prefer both the cloud platforms for better flexibility.

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