New Horizons®
Computer Learning Centers

SPECTECHULAR

UPGRADE YOUR SKILLS

Welcome

Cloud Computing: Amazon or Microsoft?

Robert Thompson

Technical Instructor, New Horizons

Share your feedback on Twitter: Include hashtag #NHspecTECH and tag @specTECHular to win a prize!

Sponsorship

Brought to you by Knowledge Ninjas

Real People. Real Answers. Real Fast.

Knowledge Ninjas, New Horizons Computer Learning Centers Microsoft Office support solution, allows you to get answers to your questions immediately. Knowledge Ninjas is a web-based service that allows software application end users to access a subject matter expert in real-time via a chat interface to resolve questions or problems they encounter in their specific software. Knowledge Ninjas will also assess whether additional computer training or consultative services are needed.

Charity

2017 Hurricane Harvey

Visit SpecTECHular.com to donate today to fuel Team Rubicon's response to hurricane relief. We'll match every dollar up to $1,500!

Since making landfall, Hurricanes Harvey and Irma have caused damage throughout the Southeast.

The veterans volunteering with Team Rubicon are responding to those in immediate need of assistance. Their response started with search and rescue operations and will be followed by debris removal and volunteer management.

http://bit.ly/Charity_Spec

TEAM RUBICON

Cloud Computing

Having secure access to all your applications and data from any network device

Cloud Computing Timeline

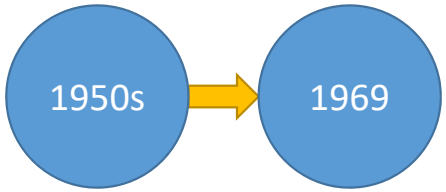
1950s

Mainframe computers were huge, occupied entire rooms

Cost to buy and maintain were out of reach of many organizations

Solution was to "time sharing" in which multiple users shared access to data and CPU time

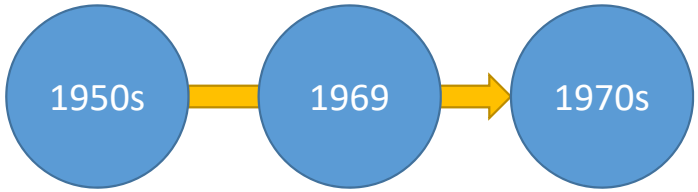
Cloud Computing Timeline



J.C.R. Licklider developed the ARPANET (Advanced Research Projects Agency Network) which became the basis of the internet

His vision was for everyone on the globe to be interconnected and accessing programs and data at any site from anywhere

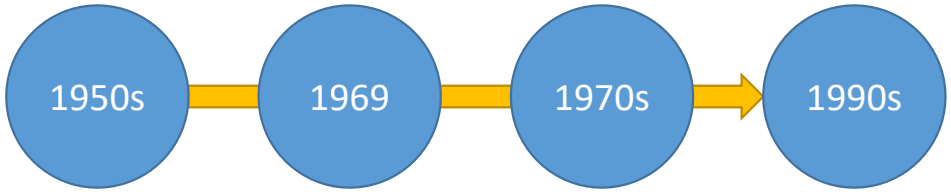
Cloud Computing Timeline



IBM released an operating system called VM that allowed admins to have multiple virtual systems on a single physical note

Took the "time sharing" model to the next level and most basic function of virtualization software can be traced back to this early VM operating system

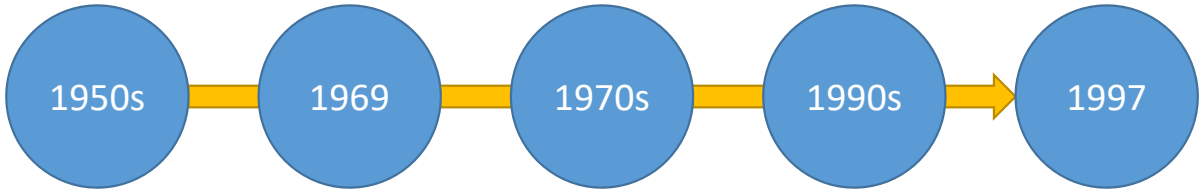
Cloud Computing Timeline



Telecommunications companies started offering virtualized private network connections which made it possible to allow more users to same physical infrastructure through shared access

Virtualization for PC-based system started in earnest, which led to virtualization online as the internet became more accessible

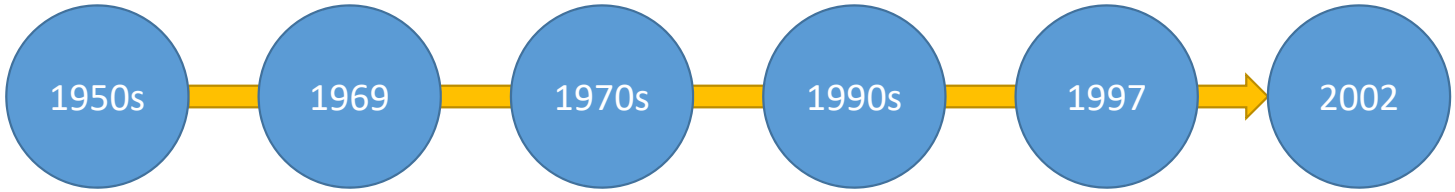
Cloud Computing Timeline



"Cloud computing" term coined by University of Texas professor Ramnath Chellappa

The term was more that likely used a year earlier in Compaq

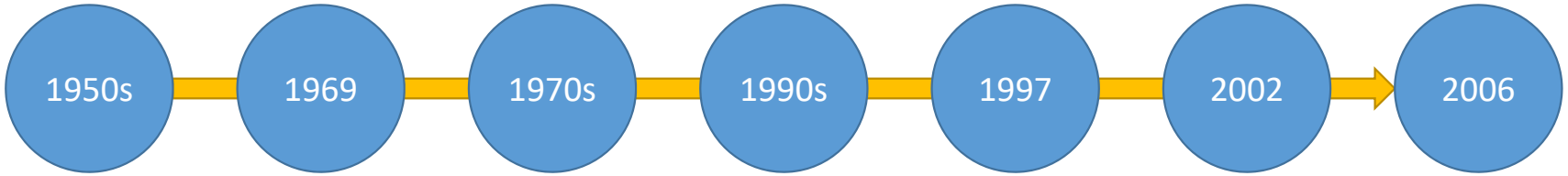
Cloud Computing Timeline



Amazon created Amazon Web Services (AWS)

Provided an advanced system of cloud services from storage to computation

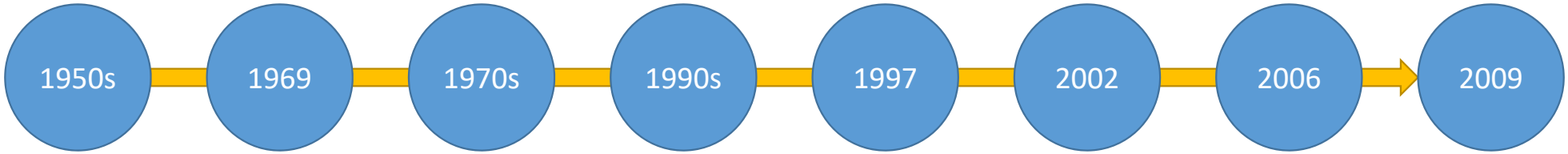
Cloud Computing Timeline



Amazon introducted the Elastic Compute Cloud (EC2) as a commercial web service

The EC2 let small companies rent computers on which they could run their own computer applications

Cloud Computing Timeline



Google and Microsoft enter the cloud computing playing field

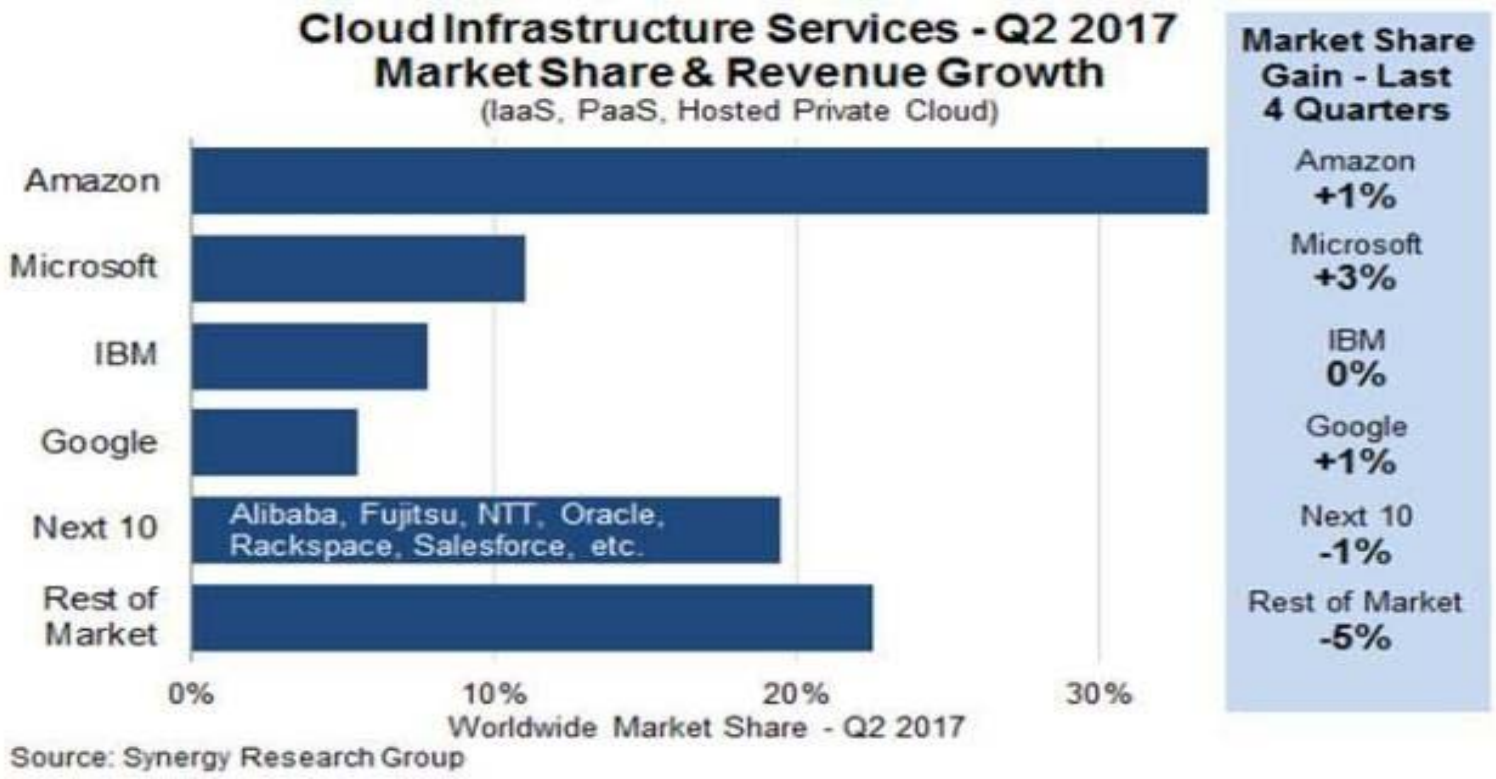
The Google App Engine brought low-cost computing and storage services

Microsoft followed suit with Windows Azure

Cloud Computing Providers

Approximately 90 cloud computing companies in the work

Cloud Computing Providers



Cloud Computing Providers

Cloud Computing Providers Game Plan

Make these clouds to both independent software developers and big companies

Developers might dip their toe in the water with a single app — but as their business grows, so will their usage of the cloud

The more customers a cloud platform gets, the more servers it can afford to add

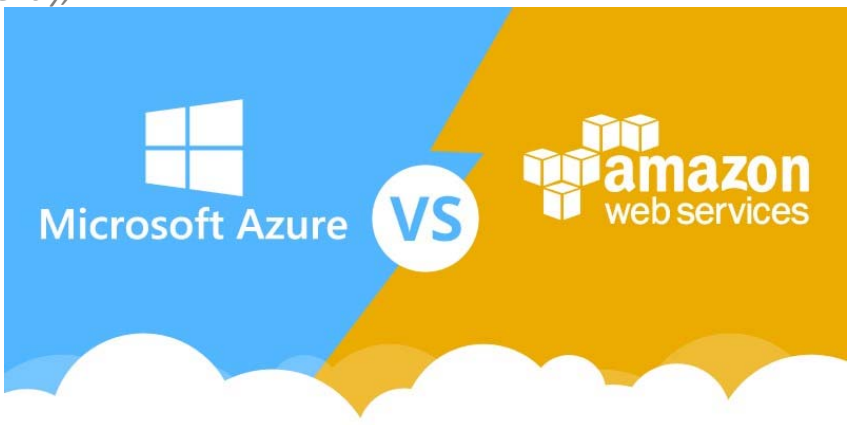
The more servers they have, the better they can take advantage of economies of scale, and offer customers lower prices for more robust features with more enterprise appeal

The lower their prices and the better their products, the more customers they get, and the more new customers switch over the cloud.

Chosing Cloud Computing Provider

Things to consider:

- *How understandable are the public cloud offerings to new customers?*
- *How much do the products cost?*
- *Are there adequate customer support and growth options?*
- *Are there useful surrounding management tools?*
- *Will our DevOps processes translate to these offerings?*
- *Can the PaaS offerings speed time-to-value and simplify things sufficiently, to drive stickiness?*
- *What security measures does the cloud provider have in place?*



Similarities

Flexible compute, storage and networking.

Self-service and instant provisioning, autoscaling, plus security, compliance and identity management features.

Heavy investment in their cloud services, and have sizable parent companies to do so.

AWS still offers the largest range of services with nearly 100 across compute, storage, database, analytics, networking, mobile, developer tools, management tools, IoT, security and enterprise applications. But it has been around the longest.

Both have added machine learning tools and a number of features targeted at cutting edge technology areas like the Internet of Things (IoT) and serverless computing (Lambda for AWS, Functions with Azure and Google).

Both are strong in machine learning as they can draw on deep wells of internal expertise.

All three providers take a pretty open approach to partnerships, allowing customers to run various apps and services in their cloud environments.

Compute Offering

AWS' main offering is its EC2 instances, which can be tailored with a large number of options. It also provides related services such as Elastic Beanstalk for app deployment, the EC2 Container service, AWS Lambda and Autoscaling.

Azure's compute offering is centred around its Virtual Machines (VMs), with other tools such as Cloud Services and Resource Manager to help deploy applications on the cloud, and its Azure Autoscaling service.

Storage

Both support relational databases - that's Azure SQL Database, Amazon Relational Database Service, as well as NoSQL databases with Azure DocumentDB and Amazon DynamoDB.

AWS storage includes its Simple Storage (S3), Elastic Block Storage (EBS), Elastic File System (EFS), Import/Export large volume data transfer service, Glacier archive backup and Storage Gateway, which integrates with on-premise environments.

Microsoft's offerings include its core Azure Storage service, Azure Blob block storage, as well as Table, Queue and File storage. It also offers Site Recovery, Import Export and Azure Backup.

Both offer excellent networking capabilities with automated server load balancing and connectivity to on-premise systems.

Pricing

In general terms prices are roughly comparable, especially since AWS shifted from by-the-hour to by-the-second pricing for its EC2 and EBS services recently, bringing it into line with Azure and Google.

However, making a clear comparison can be tough as both offer slightly different pricing models, discounts and make frequent price cuts.

Both provide a price calculator.

Both offer free introductory tiers before beginning to charge customers, and typically offer credits to attract innovative startups onto their platforms.

Customers

A strong point of AWS. It has increasingly taken on large customer deals.

> *For example, although the US Central Intelligence Agency eventually signed a contract with IBM, it awarded AWS a contract to build its private cloud in a one-off deal in 2013, which could be seen as a symbolic moment for potential buyers.*

Major customers include: NetFlix, AstraZeneca, NewsCorp, AirBnB, Aon, Channel 4, Financial Times, Dow Jones, Kurt Geiger, Lonely Planet, Nasdaq, Nike, Nisa Retail, Pfizer, and the Royal Opera House.

> *Microsoft perhaps has less high profile Azure users, with most of the messaging from the vendor appearing to be around its widely used software-as-a-service (SaaS) tools. But the Redmond firm has also notched up some notable customer wins such as Pearson, Ford, NBC News and Easyjet, to name but a few.*

Infrastructure as a Service

AWS
Four categories: Compute, Storage and Content Delivery, Database, and Networking

All are subject to Amazon's security and identity services, which include Amazon hosted Active Directory, AWS Identity Management, AWS Certificate manager for managing SSL/TLS certificates, and even hardware-based key storage and management through AWS CloudHSM.

You can monitor your infrastructure resource usage through management tools like Amazon CloudWatch, AWS Cloudtrail for tracking user activity and API usage, and AWS Config for tracking resource inventory and changes.

You are automatically charged for licenses you use based on usage

Azure
Three categories: Compute, Data Management (which includes database) and Performance, and Networking

Services secured using a combination Azure Active Directory, Active Directory Federation Services, Multi-Factor Auth, and a sophisticated Role Based Access control model that it uses to extend a modern security architecture into the cloud where Group Policy doesn't always make sense

Azure also has a number of services and integrations for in-depth monitoring and alerting on infrastructure performance metrics and logs.

You are automatically charged for licenses you use based on usage

Microsoft offer license mobility for qualifying application servers (Windows Server itself is not)

Hybrid Cloud

For most enterprises the move to the cloud is a transition, and many of them simply have no plans to run everything entirely in the cloud

Microsoft has seen this pattern and responded with strong support for hybrid cloud configurations.

- *With a hybrid cloud you can run cloud applications and deploy infrastructure assets and applications using a cloud model, but you can choose to use your on-premises compute resources when appropriate and use the cloud when needed*
- *A hybrid cloud allows you to transition between the two seamlessly.*

With platforms like Azure StorSimple, Hybrid SQL Server, Azure Stack and others, Microsoft clearly has the advantage in the Hybrid Cloud space.

Amazon knows they need to make headway here (Fortune quotes Amazon CIO acknowledging work to be done), but they're still playing catch up. Amazon does offer a few hybrid solutions like Storage Gateway, DynamoDB Local, and OpsWorks, but for now, the Microsoft has the upper hand.

Government in the Cloud

Both Amazon and Microsoft have dedicated Government areas of their respective clouds, cordoned off from the rest of their workloads, to ensure that your strict compliance needs can be met.

Both tout their compliance with ITAR, DISA, HIPAA, CJIS, FIPS, etc., etc., and both are physically accessible only by screened U.S. persons.

Amazon's Gov cloud offering may have a slight edge just because it's been operating longer and has more government clients that know how to deal with them. In this business, people that know how to shuffle the proper paperwork to get a request approved is no small matter, and Amazon has that relationship with more agencies than Azure right now.

That being said, Azure does have the proper certifications, and some agencies have made the jump with them, so it can definitely be done.

Microsoft Shops

Microsoft has always had a focus on Enterprise customers, and as the people who write Windows and most of the other platforms these clients are using, it makes sense that their Azure integration story is good.

Microsoft is also ensuring that Visual Studio and TFS integration are excellent and that Active Directory integrates well.

You can use the same Active Directory accounts you have now to sign in to the Azure cloud offerings like Office 365 or your Azure SQL instances, seamlessly.

Open Source

For Open Source shops, until recently the thought of using Azure as your cloud vendor was either impossible or at least a little odd. Microsoft hasn't always had a great, or even a good, relationship with the open source community, but recently you might have noticed that relationship is changing.

That bad relationship allowed Amazon AWS to open up a significant lead over Azure in the Open Source cloud hosting space. AWS has been Linux-friendly from the start and didn't come from a history that was suspicious of open source. So if you're an open source user, you're probably going to be pretty comfortable with AWS and with all of the open source tools integrations it offers.

PowerShell and .NET Core are open sourced and taking pull requests on GitHub. SQL Server runs on Linux and Hyper-V will be running Docker. The trend continues in Azure where you can now run Red Hat Enterprise Linux and Apache Hadoop clusters. Azure and Microsoft, in general, are really trying to embrace open source in one of the biggest strategy shifts we've seen out of Redmond in a long time.

Amazon probably still has the upper hand here since it's history with open source is long, and because Azure really does work so much more seamlessly if you are using Microsoft development tools than without them.

Costs

Any cloud platform vendor is going to argue that you can save money moving to the cloud.

Unfortunately, making meaningful predictions of the actual cost of any actual workload can be fiendishly complex, and some of the considerations have as much to do with user behavior (shutting down VMs when not in use) as the actual workloads you want to run.

Trying to make cost generalizations to help you estimate costs would probably be meaningless at best.

Both Amazon and Azure have come up with cost calculators.

AWS pros and cons

The breadth and depth of the AWS offering is seen as a plus for AWS.

AWS had a head start on the competition, building out its suite of cloud services since 2006. All of these are built to be enterprise-friendly so that they will appeal to CIOs as well as its core audience of developers.

The vendor ranks highly on platform configuration options, monitoring and policy features, security and reliability. Its partner ecosystem and general product strategy are also seen as market leading, and its AWS Marketplace has a large number of third-party software services.

Another of the benefits of the AWS cloud is its openness and flexibility.

AWS falls short to some degree is with its hybrid cloud strategy. Unlike Microsoft, AWS has tended to be dismissive of the benefits of on-premise private clouds. Many organisations prefer to keep sensitive data within their own data centres - such as those in the financial sector - using public clouds for other purposes.

At the same time, this clearly has not deterred many customers from using AWS as part of their cloud strategy, regardless of whether they plan to move all systems to the cloud or not.

Another downside to AWS is the scale of its offering. While this is an attraction in many senses, it can be difficult at times to navigate the large numbers of features that are on offer, and some see AWS as being a complex vendor to manage.

Azure pros and cons

The big pull for Azure is where Microsoft already has a strong footing within an organisation and can easily play a role in helping those companies transition to the cloud.

Azure naturally links well with key Microsoft on-premise systems such as Windows Server, System Center and Active Directory.

In addition, while both AWS and Azure have PaaS capabilities, this is a particular strength of Microsoft's.

A downsides has been a series of outages over the years. Gartner analyst Lydia Leong has recommended considering disaster recovery capabilities away from Azure for critical applications hosted in the cloud. AWS isn't immune to downtime, though, suffering a major S3 outage of its own in March 2017.

Clients have had issues with "technical support, documentation, training and breadth of the ISV partner ecosystem" - but the company has been steadily working on these areas.

Microsoft has been willing to embrace open source platforms, if a little slowly. For example, the company has been busy extending its support for Linux operating systems in 2017.

Summary

Things to consider:

- *Cost*
- *Support*
- *Tools*
- *Security*

In very broad terms, AWS continues to lead the way in terms of offering the widest range of functionality and maturity. It continues to be the clear market leader, but the gap is closing.

Its expansive list of tools and services, along with its enterprise-friendly features make it a strong proposition for large organisations. Meanwhile its huge and continuously growing infrastructure provides economies of scale that enable aggressive price cuts.

But it appears that Microsoft has started to bridge the gap between the two, and will continue to do so with its ongoing investment in building out the Azure cloud platform and further plans to strengthen ties with its on-premise software.

For organisations already heavily invested heavily in Microsoft in terms of technology and developer skills - of which there are undoubtedly many - Microsoft Azure will continue to be a strong proposition.


New Horizons
Computer Learning Centers
#NHspecTECH