AWS vs Azure vs GCP

Similarity and difference

Virtual Network

Term	AWS	GCP	Azure
Virtual Network	VPC	Cloud Virtual Networks	Azure VNets
Security Group	IAM Multifactor-Authentication	Google IAM Cloud Resource Manager Google Identity Toolkit Google Sign-in	Azure AD RBAC MultiFactor Authentication
Virtual Machine	EC2	Compute Engine	Virtual Machines (VMs)
Relational Database	RDS/Aurora	Cloud SQL	SQL Database
NoSQL	Dynamo DB	Cloud Datastore	Document DB
DNS	Route 53	Cloud DNS	Traffic Manager/DNS
Deployment tool	CLI/Cloud Formation OpsWorks	Cloud Deployment Manager	Resource Manager Automation VM Extensions

History

- Amazon Web Services (AWS) is the oldest and most experienced player on the market – it has 11 years in operation (established at the beginning of 2006). AWS has an extensive list of computing services with functions of deployment, mobile networking, and others.
- Google Cloud Platform (GCP) started their journey on October 6. 2011. For now, they've had 5 years during which they've managed to create a good presence in the industry. Initially, the push was done to strengthen their own services such as Google or YouTube. But they went further and created enterprise services – now anyone can use their cloud platform.
- Microsoft Azure was presented in February 2010, and since then it has shown a great promise among its rivals. This platform can easily be associated with AWS – both of them provide their custom with a full set of services.
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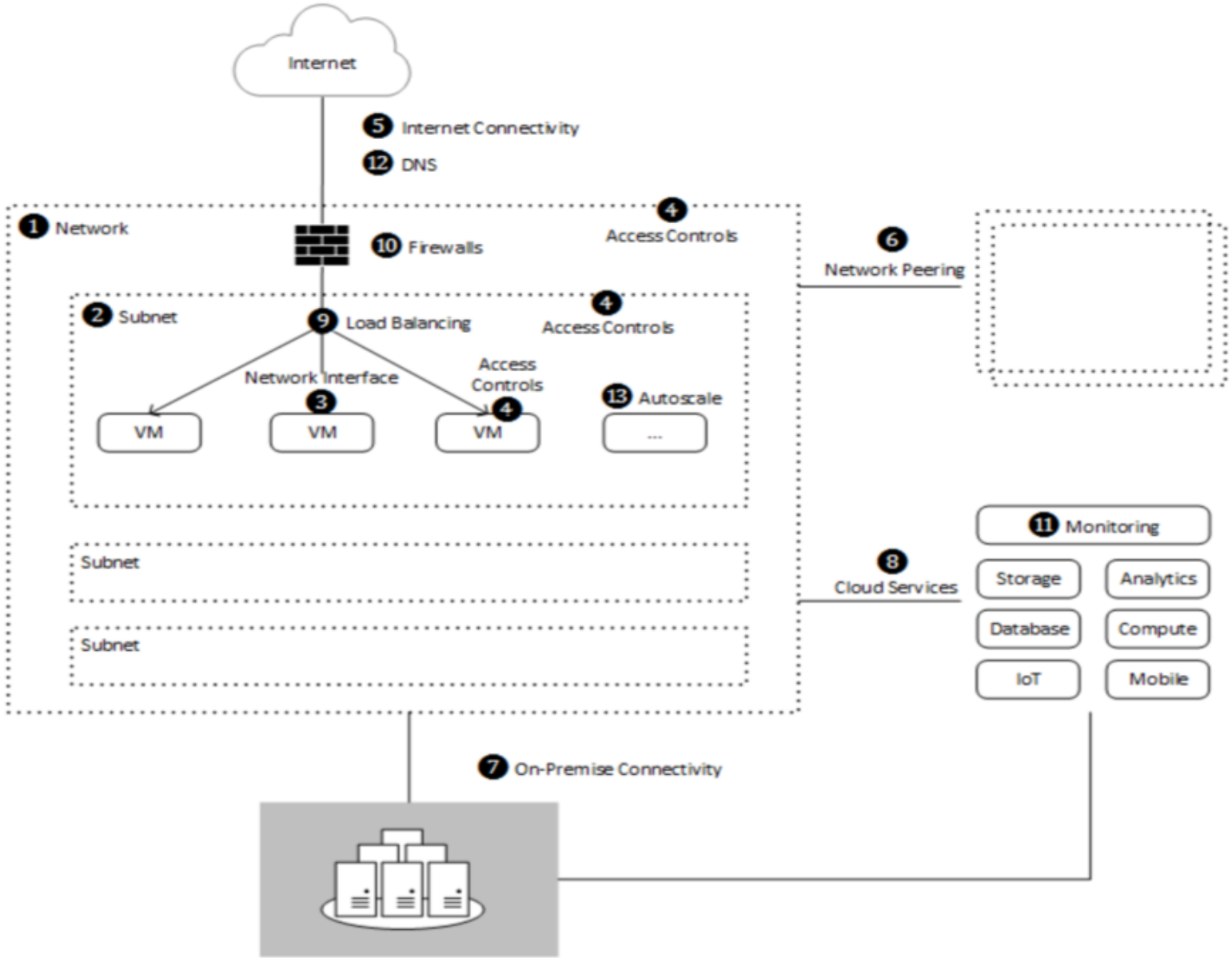
Internet
5 Internet Connectivity
12 DNS
1 Network
10 Firewalls
4 Access Controls
6 Network Peering
2 Subnet
9 Load Balancing
4 Access Controls
Network Interface
Access Controls
3
4
13 Autoscale
VM
VM
VM
...
Subnet
Subnet
11 Monitoring
8 Cloud Services
Storage
Analytics
Database
Compute
IoT
Mobile
7 On-Premise Connectivity

Virtual Network

Provides an isolated, private environment in the cloud. Users have control over their virtual networking environment, including selection of their own IP address range, creation of subnets, and configuration of route tables and network gateways.

Similarity:

Difference:

GCP virtual network can encompass resources deployed across multiple regions and reduce the need for complex VPN and network peering configuration.

AWS allows up to 5 VPCs per region.

Route Table & Subnet

By default, every network has routes that let instances in a network send traffic directly to each other, even across subnets. But you can override custom routes to route table

AWS	GCP	Azure
A subnet can only be associated with one route table at a time, but you can associate multiple subnets with the same route table.	Forward traffic from one instance to another instance within the same network, even across subnets, without requiring external IP addresses.	• Override with custom routes, and add additional custom routes to route tables. • Azure routes outbound traffic from a subnet based on the routes in a subnet's route table.
Subnets may be configured to group related EC2 instances within a VPC.	Google do not constrain the private IP address ranges of subnets to the address space of the parent network.	• Similar to AWS

Security Group

- Similarity: IAM
- Difference:

- AWS & Azure: Multifactor – Authentication
- AWS Organizations: offers policy-based management for multiple AWS accounts.
- GCP Cloud IAP: verifying a user's identity and determining if that user should be allowed to access the application. Cloud IAP is a building block toward BeyondCorp, an enterprise security model that enables every employee to work from untrusted networks without the use of a VPN.
- Active Directory: provides secure single sign-on to cloud and on-premises applications including Microsoft Office 365 and thousands of SaaS applications

Virtual Machine

---Virtual servers allow users to deploy, manage, and maintain OS and server software. Instance types provide combinations of CPU/RAM. Users pay for what they use with the flexibility to change sizes.

- Similarity: All three Company provide various options on “Machine Type”. These are grouped into several categories (standard, high CPU, and high memory), with multiple sizes within each category

Comparison

	Amazon EC2	Google CE	Microsoft Azure VM
Number of instance templates available	39	18	40
GPU acceleration	Yes	Yes	Yes
Custom instance creation feature	Yes	Yes	Yes
CPU Limits	1 – 40	1 Shared – 32 dedicated CPU	1 – 32 CPU
Memory Limits	0,5 – 244 GB	0,6 — 208 GB	0,75 — 448 GB
Temporary Storage Limits	Up to 48 TB (Multiple Disks)	3 TB	4 TB
Network features supported	CDN, Direct connection, DNS, Load Balancing, Virtual private cloud network, VPN Gateway		

Database

–All three platform provide storage solution for relational database and NoSQL

	AWS	Azure	GCP
Relational Database	RDS	Cloud SQL Cloud Spanner	SQL Database Database for MySQL Database for PostgreSQL
NoSQL (key-Value)	DynamoDB SimpleDB	Cloud Datastore	Table Storage
NoSQL (index)	DynamoDB	Cloud Datastore Cloud Bigtable	Cosmos DB

DNS

AWS Route 53	GCP Cloud DNS	Azure DNS /Traffic Manager
Amazon Route 53 effectively connects user requests to infrastructure running in AWS, and can also be used to route users to infrastructure outside of AWS. Route 53 is a Start of Authority naming service, meaning it is the authority for mapping domain names to IP addresses. As discussed above, Route 53 also provides a range of configurable routing strategies.	Like AWS and Azure, Cloud DNS allow organizations to manage their DNS and associated records along with the rest of their cloud services. Pricing is based on the number of zones and queries (per billion). Cloud DNS translates requests for domain names like www.google.com into IP addresses like 74.125.29.101.	Azure DNS is a hosting service for DNS domains, providing name resolution using Microsoft Azure infrastructure, managing your DNS records using the same credentials, APIs, tools, and billing as your other Azure services. Traffic Manager uses DNS to direct client requests to the most appropriate endpoint based on a traffic-routing method and the health of the endpoints. Traffic Manager provides a range of traffic-routing methods and endpoint monitoring options to suit different application needs and automatic failover models.

Deployment Tools

AWS	GCP	Azure
AWS CloudFormation allows you to model your entire infrastructure in a text file.	Deploy many resources at one time, in parallel.	runbooks—help you work smarter by handling the creation, deployment, monitoring, and maintenance of Azure resources and partner applications.
This template becomes the single source of truth for your infrastructure.	Python and Jinja2 template to programmatically control what gets deployed.	Use the Runbook Gallery to browse and import runbooks to your Automation account without leaving the Azure portal
without having to perform manual actions or write custom scripts	Add, delete or change resources in the deployment.	Easy-to-read dashboard charts and log records make runbooks easier to monitor.
	JSON schema for defining and constraining parameters.	Use Azure Configuration Management to monitor and automatically update

Conclusion- AWS

- AWS has the widest range of services, the “Big Three” war is discussed in all cloud circles. Differences in pricing systems and additional sets of tools engender more disputes every year. "AWS has been the market share leader in cloud IaaS for over 10 years."
- Amazon's big weakness relates to cost. While AWS regularly lowers its prices, many enterprises find it difficult to understand the company's cost structure and to manage those costs effectively when running a high volume of workloads on the service.
- In general, however, these cons are more than outweighed by Amazon's strengths, and organizations of all sizes continue to use AWS for a wide variety of workloads.

Conclusion- Azure

- Microsoft came late to the cloud market but gave itself a jump start by essentially taking its on-premises software – Windows Server, Office, SQL Server, Sharepoint, Dynamics Active Directory, .Net, and others – and repurposing it for the cloud.
- A big reason for Azure's success has to do with the fact that so many enterprises deploy Windows and other Microsoft software. This builds loyalty for existing Microsoft customers. Also, if you are already an existing Microsoft enterprise customer, expect significant discounts off service contracts.
- On the con side, Gartner finds fault with some of the platform's imperfections. "While Microsoft Azure is an enterprise-ready platform, Gartner clients report that the service experience feels less enterprise-ready than they expected, given Microsoft's long history as an enterprise vendor," it said. "Customers cite issues with technical support, documentation, training and breadth of the ISV partner ecosystem."
- In addition, Gartner said that Azure doesn't offers as much support for DevOps approaches as some of the other cloud platforms. For example, it doesn't have as much integrated automation, requiring staff to perform many management tasks by hand.

Conclusion- GCP

- Google has a strong offering in containers, since Google developed the Kubernetes standard that AWS and Azure now offer. GCP specializes in high compute offerings like Big Data, analytics and machine learning. It also offers considerable scale and load balancing – Google knows data centers and fast response time.
- On the downside, Google is a distant third in market share, perhaps because it doesn't offer as many different services and features as AWS and Azure. It also doesn't have as many global data centers as AWS or Azure, although it is quickly expanding.
- Gartner said that its "clients typically choose GCP as a secondary provider rather than a strategic provider, though GCP is increasingly chosen as a strategic alternative to AWS by customers whose businesses compete with Amazon, and that are more open-source-centric or DevOps-centric, and thus are less well-aligned to Microsoft Azure."