Northeastern

AWS vs Google Cloud vs Azure

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Network

- AWS

Virtual Private Cloud (VPC) is the marketing term given to the set of core networking services in AWS. A VPC represents a single network with dedicated IP range containing EC2 instances and other network resources. AWS allows up to 5 VPCs per region, although this can be increased by request.

- GCP

Cloud Virtual Network is Google's answer to networking in the cloud. Cloud Virtual Networks can contain up to 7000 virtual machine instances. Unlike AWS and Azure, networks can encompass resources (subnets) deployed across multiple regions and reduces the need for complex VPN and network peering configuration.

- Azure

Subnets may be configured to group related EC2 instances within a VPC. Traffic between instances and subnets is governed by route tables that define the set of rules determining the flow of information between components with the VPC. Up to 200 subnets can be configured per VPC by default, this limit can also be increased by request.

Subnet

- AWS

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- Google Cloud

Unlike AWS and Azure, Google do not constrain the private IP address ranges of subnets to the address space of the parent network. It is therefore possible to have one subnet with a range of 10.240.0.0/16 and another with 192.168.0.0/16 on the same network. While the network can span multiple regions, individual subnets must belong to a single region. Default network routes allow connectivity to/from the internet to each subnet and between subnets. Additional routes can be added to override these defaults where required.

- Azure

As you would expect, network resources can be grouped by subnet for organisation and security. Each subnet can be assigned a route table to define outgoing traffic flow, for example to route traffic through a virtual appliance.

DNS

- AWS

Route 53 is a DNS service that resolves user requests and ensures they are directed to the correct infrastructure. 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.

- Google Cloud

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).

- Azure

Azure DNS is an authoritative DNS service that allows users to manage their public DNS names. Being an Azure service it allows network administrators to use their organisation identity to manage DNS while benefiting from all the usual access controls, auditing and billing features. Pricing is based on the number of DNS zones hosted in Azure and the number of DNS queries received.

Access Controls

- AWS

Route tables define the rules which govern whether traffic can flow between specific subnets and other VPC resources. If a matching route is not explicit specified, traffic will not be permitted between the source and destination.
Network ACL (Access Control Lists) control inbound and outbound traffic to a specific subnet. Assuming a route has been defined, traffic must then satisfy the collection of rules (protocols and ports) defined in the ACL for the subnet.
Security Groups provide an additional layer of security at the instance level. Security Groups are assigned to ENIs and define the traffic permitted to reach the target instance. Each ENI can have up to 5 Security Groups.

- GCP

Each network comes with a firewall that can be configured with rules to control the traffic that is accepted by a resource or set of resources within the network. Each rule (ACL) defines permitted traffic according to source IP, destination IP, ports and protocol. It is also possible to tag specific resources and define rules against these tags.

- Azure

Traffic can be permitted or denied at the NIC or subnet level via Network Security Groups (NSGs). An NSG contains a set of prioritized ACL rules that explicitly grant or deny access. Each subnet, NIC or role instance can have up to 1 NSG. Rules are defined according to the direction of traffic, protocol, source port, destination port, and IP address suffixes. Each region per subscription can have up to 400 NSGs, and each NSG can have up to 500 rules.

Instances

Cloud Platform	Instance Families	Instances Types	Regions	Zones
AWS	7	38	Yes	Yes
Microsoft Azure	4	33	Yes	
GCP	4	18	Yes	Yes

Computer Services

Vendor	Compute Services
AWS	• EC2 • Elastic Container Service • Elastic Container Service for Kubernetes • Elastic Container Registry • Lightsail • Batch • Elastic Beanstalk • Fargate • Auto Scaling • Elastic Load Balancing • VMware Cloud on AWS
Microsoft Azure	• Virtual Machines • Virtual Machine Scale Sets • Azure Container Service (AKS) • Container Instances • Batch • Service Fabric • Cloud Services
Google Cloud	• Compute Engine • Kubernetes

Services

Vendor	AI/ML	IoT	Serverless
AWS	• SageMaker • Comprehend • Lex • Polly • Rekognition • Machine Learning • Translate • Transcribe • DeepLens • Deep Learning AMIs • Apache MXNet on AWS • TensorFlow on AWS	• IoT Core • FreeRTOS • Greengrass • IoT 1-Click • IoT Analytics • IoT Button • IoT Device Defender • IoT Device Management	• Lambda • Serverless Application Repository
Azure	• Machine Learning • Azure Bot Service • Cognitive Services	• IoT Hub • IoT Edge • Stream Analytics • Time Series Insights	• Functions
GCP	• Cloud Machine Learning Engine • Dialogflow Enterprise Edition • Cloud Natural Language • Cloud Speech API • Cloud Translation API • Cloud Video Intelligence • Cloud Job Discovery (Private Beta)	• Cloud IoT Core (Beta)	• Cloud Functions (Beta)

Storage

Vendor	Storage Services	Database Services	Backup Services
AWS	• Simple Storage Service (S3) • Elastic Block Storage (EBS) • Elastic File System (EFS) • Storage Gateway • Snowball • Snowball Edge • Snowmobile	• Aurora • RDS • DynamoDB • ElastiCache • Redshift • Neptune • Database migration service	• Glacier
Azure	• Blob Storage • Queue Storage • File Storage • Disk Storage • Data Lake Store	• SQL Database • Database for MySQL • Database for PostgreSQL • Data Warehouse • Server Stretch Database • Cosmos DB • Table Storage • Redis Cache • Data Factory	• Archive Storage • Backup • Site Recovery
GCP	• Cloud Storage • Persistent Disk • Transfer Appliance • Transfer Service	• Cloud SQL • Cloud Bigtable • Cloud Spanner • Cloud Datastore	• None

THANK YOU!