**AWS Assignment 4**

1. Explain the Snowball concept.

AWS Snowball, a part of the [AWS Snow Family](https://aws.amazon.com/snow/), is an edge computing, data migration, and edge storage device that comes in two options. Snowball Edge Storage Optimized devices provide both block storage and Amazon S3-compatible object storage, and 40 vCPUs. They are well suited for local storage and large scale-data transfer. Snowball Edge Compute Optimized devices provide 52 vCPUs, block and object storage, and an optional GPU for use cases like advanced machine learning and full motion video analysis in disconnected environments. You can use these devices for data collection, machine learning and processing, and storage in environments with intermittent connectivity (like manufacturing, industrial, and transportation) or in extremely remote locations (like military or maritime operations) before shipping them back to AWS. These devices may also be rack mounted and clustered together to build larger temporary installations.

Snowball supports specific Amazon EC2 instance types and AWS Lambda functions, so you can develop and test in the AWS Cloud, then deploy applications on devices in remote locations to collect, pre-process, and ship the data to AWS. Common use cases include data migration, data transport, image collation, IoT sensor stream capture, and machine learning.

1. Make a distinction between NAT Gateways and NAT Instances.

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| Attribute | NAT gateway | NAT instance |
| Availability | Highly available. NAT gateways in each Availability Zone are implemented with redundancy. Create a NAT gateway in each Availability Zone to ensure zone-independent architecture. | Use a script to manage failover between instances. |
| Bandwidth | Scale up to 45 Gbps. | Depends on the bandwidth of the instance type. |
| Maintenance | Managed by AWS. You do not need to perform any maintenance. | Managed by you, for example, by installing software updates or operating system patches on the instance. |
| Performance | Software is optimized for handling NAT traffic. | A generic AMI that's configured to perform NAT. |
| Cost | Charged depending on the number of NAT gateways you use, duration of usage, and amount of data that you send through the NAT gateways. | Charged depending on the number of NAT instances that you use, duration of usage, and instance type and size. |
| Type and size | Uniform offering; you don’t need to decide on the type or size. | Choose a suitable instance type and size, according to your predicted workload. |
| Public IP addresses | Choose the Elastic IP address to associate with a public NAT gateway at creation. | Use an Elastic IP address or a public IP address with a NAT instance. You can change the public IP address at any time by associating a new Elastic IP address with the instance. |
| Private IP addresses | Automatically selected from the subnet's IP address range when you create the gateway. | Assign a specific private IP address from the subnet's IP address range when you launch the instance. |
| Security groups | You cannot associate security groups with NAT gateways. You can associate them with the resources behind the NAT gateway to control inbound and outbound traffic. | Associate with your NAT instance and the resources behind your NAT instance to control inbound and outbound traffic. |
| Network ACLs | Use a network ACL to control the traffic to and from the subnet in which your NAT gateway resides. | Use a network ACL to control the traffic to and from the subnet in which your NAT instance resides. |
| Flow logs | Use flow logs to capture the traffic. | Use flow logs to capture the traffic. |
| Port forwarding | Not supported. | Manually customize the configuration to support port forwarding. |
| Bastion servers | Not supported. | Use as a bastion server. |
| Traffic metrics | View CloudWatch metrics for the NAT gateway. | View CloudWatch metrics for the instance. |
| Timeout behaviour | When a connection times out, a NAT gateway returns an RST packet to any resources behind the NAT gateway that attempt to continue the connection (it does not send a FIN packet). | When a connection times out, a NAT instance sends a FIN packet to resources behind the NAT instance to close the connection. |
| IP fragmentation | Supports forwarding of IP fragmented packets for the UDP protocol. | Supports reassembly of IP fragmented packets for the UDP, TCP, and ICMP protocols. |

1. Describe the essential components of Amazon Web Services (AWS).

There are different components of AWS, but only for key components.

* Amazon Cluster
* Storage
* Databases.
* Management and security
* Networks
* Analytics
* Application services
* Implementation and management

1. When should you utilize a spin-up server? Use examples to demonstrate your point.

t is a general term relating to starting a new instance of particular service on Amazon Web Services. Let’s say that you need a Linux based server to host your WordPress website. One way you might do this is to “spin up” a new EC2 instance (a virtual machine running Linux). Through the Amazon console, **you would be reserving a part of a physical server** where you could install your own software and start that server as you wish.

Since Amazon has literally hundreds of different types of services (EC2, RDS for databases, Elastic ache for caching, etc) to “spin up” an AWS instance refers to starting any of those services offered on AWS.

1. Explain the concept of outlier car scaling.

Amazon QuickSight uses proven Amazon technology to continuously run ML-powered anomaly detection across millions of metrics to discover hidden trends and outliers in your data. This anomaly detection enables you to get deep insights that are often buried in the aggregates and not scalable with manual analysis. With ML-powered anomaly detection, you can find outliers in your data without the need for manual analysis, custom development, or ML domain expertise.