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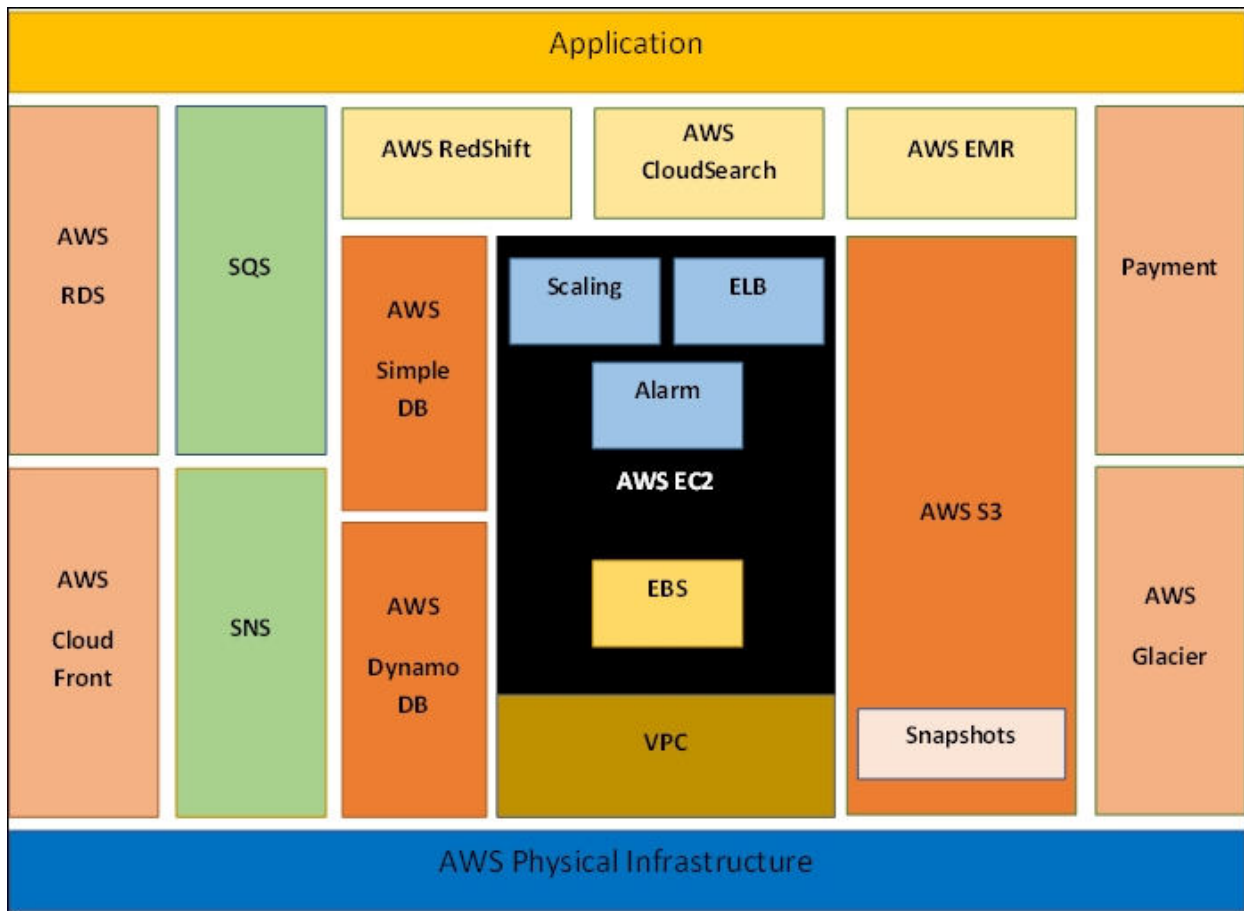
# AWS REGIONS AND AVAILABILITY ZONE

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By HadoopExam.com in association with QuickTechie.com

In this Module, we will cover the following points:

- What is AWS services?
  - The AWS global infrastructure
  - Understand the Regions and Availability Zones
1. AWS Service is an infrastructure with built in software.
  2. On AWS you can deploy your enterprise, Big Data, web etc applications.
  3. Highly-scalable and fault tolerant
  4. You pay only if you use its services (kind of services on rent)
  5. Below diagram shows various AWS services and How they can interact with each other.



**AWS Has Various Regions (Geographic locations):** It is always good to have an option to place apps as close as possible to your customers and end users when you create and deploy apps, which will help you to get best possible lowest latency and performance.

- US East (Northern Virginia) region
- US West (Oregon) region
- US West (Northern California) region
- EU (Ireland) region
- Asia Pacific (Singapore) region
- Asia Pacific (Sydney) region
- Asia Pacific (Tokyo) region
- South America (Sao Paulo) region
- US GovCloud

Regions and Availability zones:

- Region-> Geographic location worldwide
- Each region is completely insulated from another region (Regions are not connected with each other).
- **So if you create a resource in one region (e.g. an AMI) by default it will not available in another region. You have to copy is manually from source region to target region.**
- Out of all region one region is only for US Citizens , which is GovCloud
- In the following screenshot, you can see the eight currently available regions now over the globe, which can accessible from anywhere.



- It is good to deploy your apps as close as possible to your end users. For example, if the majority of your users are from the UK, it would be best to go with the EU (Ireland) region because it is the nearest one. Other points you need to consider when choosing the regions are legal clauses and costs.
- All major AWS services (with the exception of CloudFront and Route 53) allow you to choose a region that you would like to work with.
- The default region will be N. Virginia.
- While working with an instance using the **command-line interface (CLI)** or API actions, you have to declare the regional endpoint.

Region name	Endpoint
US East (Northern Virginia)	<a href="https://ec2.us-east-1.amazonaws.com">ec2.us-east-1.amazonaws.com</a>

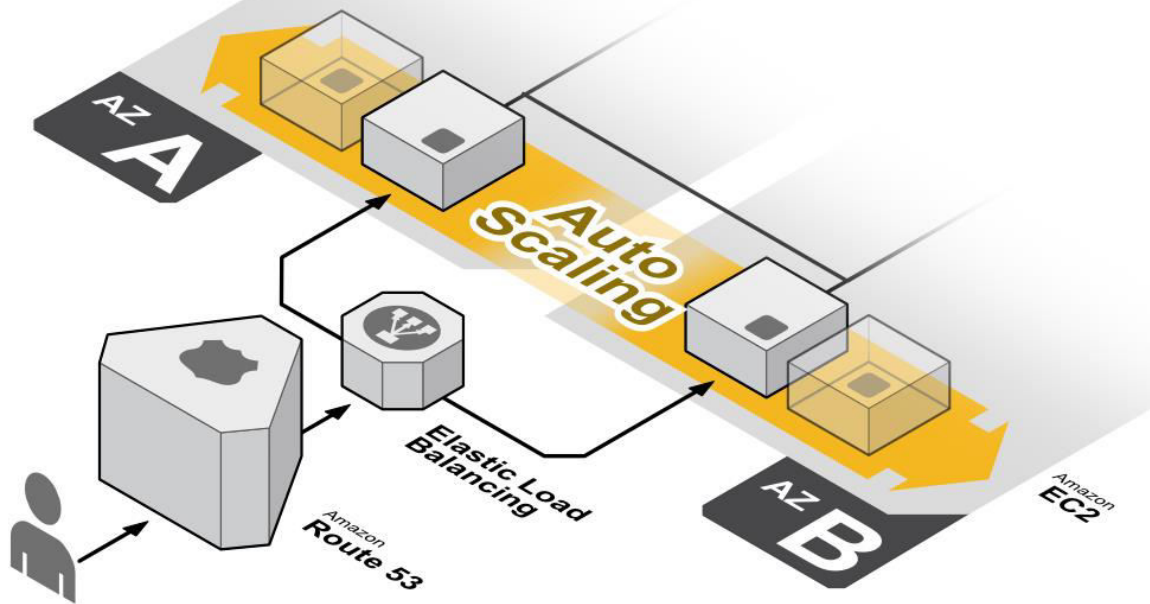
- if you are launching an instance, you have to select an **Amazon Machine Image (AMI)**, which resides in the same region. If your AMI is in another region, you have to first copy that AMI to your existing working region to launch it.
- We can copy both types of AMI, AWS EBS-backed AMIs and instance-store-backed AMIs.

#### **Availability zones (Similar to single datacenter)**

- Each region can have multiple Availability zones
- The biggest advantage of, deploying your apps across multiple AZs make your architecture ready and fault-tolerant for unexpected outages.
- So if a breakdown occurs in a single Availability Zone and you deployed your app in multiple AZs, your app will remain accessible from different AZs.
- Every AZ will be running on its own infrastructure environment, with self-governing cooling, network with security, and power
- The great advantage of AZs is that they are physically separated so that disasters such as fire, floods, and tornadoes won't affect more than one AZ.
- Every AZ may have a single or multiple data centers internally as per the infrastructure availability.
- **To map an IP address with AZs, you can use the Elastic IP addresses.**

#### **Always be redundant across availability zones (AZs).**

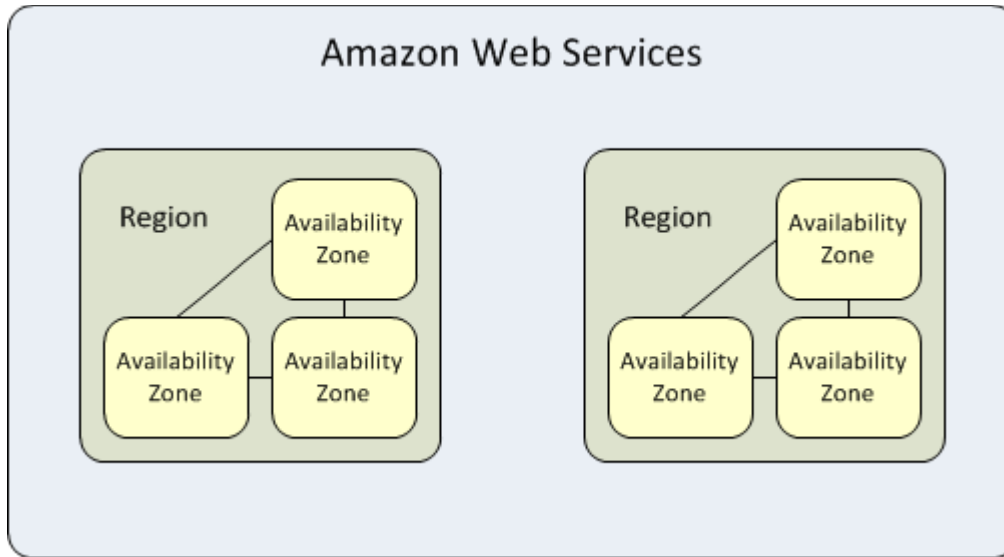
AZs can have outages, it's happened in the past that certain things in an AZ have gone down. Spreading your application into multiple AZs is as simple as adding a new AZ to your load balancer and starting an instance in that AZ. You should spread your load over two AZs at the very least! If you can afford it, being redundant across regions can also be well worth it, but this generally has a more complex set up cost and isn't always necessary. You can now copy AMIs between regions, and you can set up your Route53 records to balance traffic between regions, but you can't use a single ELB across regions.



- When you launch a single EC2 instance, you are launching a virtual machine running on a physical server at one of Amazon's data centers.
- That means any of the following events could take down your instance:
  - Your instance itself could fail, or its underlying hard drive volume (Elastic Block Store volume) could become corrupted
  - The physical machine on which your EC2 instance resides could fail
  - The data center within which the physical machine is located could fail

In AWS-speak, the "data center" is called an **Availability Zone (AZ)**. About 5 - 15 miles away from one AZ is at least one more AZ.









A whole cluster of AZ's is known as a **Region**.



### MultiAZ for High Availability

- You should assume that any of your EC2 instances will fail at any time in any of the ways outlined above. When a single EC2 instance or an entire AZ goes offline, your architecture should detect this and simply stop routing traffic to the affected instances.
- This is the idea behind a Multi-AZ setup, and we'll cover it in more detail later.
- Some AWS services such as AWS RDS (where AWS manages a relational database instance of you) have built-in support for Multi-AZ and enabling it requires simply checking a box in the configuration.
- You can go beyond Multi-AZ and use a Multi-Region architecture, where your app can survive an entire region going offline, but a multi-Region setup introduces new complexities and additional cost and is typically only implemented by larger organizations.

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