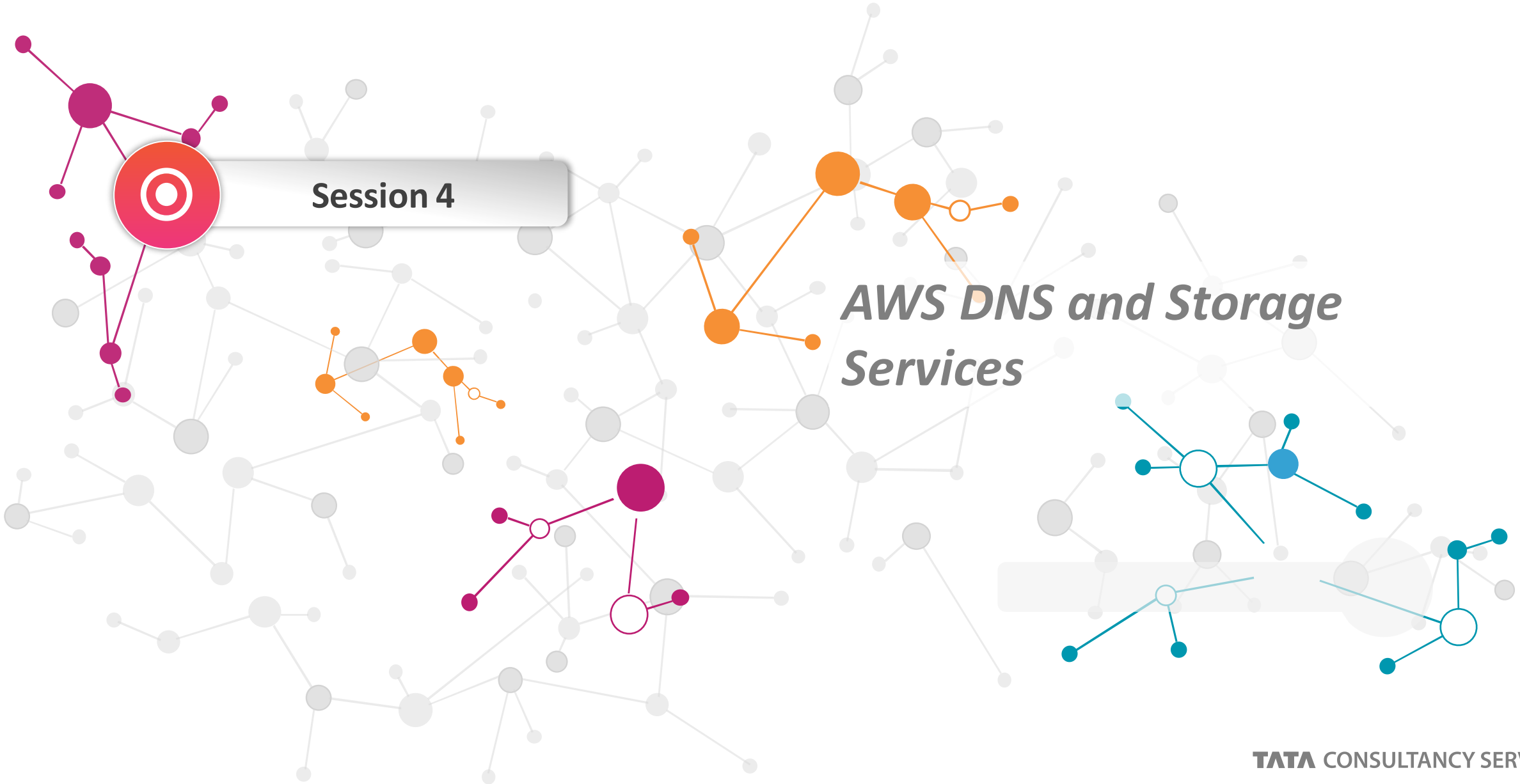
AWS Academy

North America
Talent Development Team

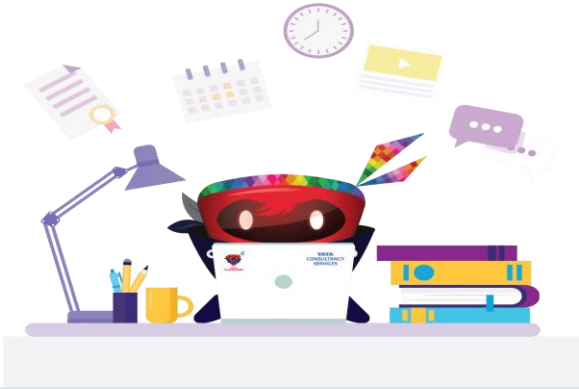
Date



AWS DNS and Storage Services

- Amazon Route53
- Storage in AWS
- Amazon Simple Storage Service (S3)
- Amazon Elastic File System(EFS)
- Amazon Elastic Block Store (EBS)

AWS SAA Boot Camp

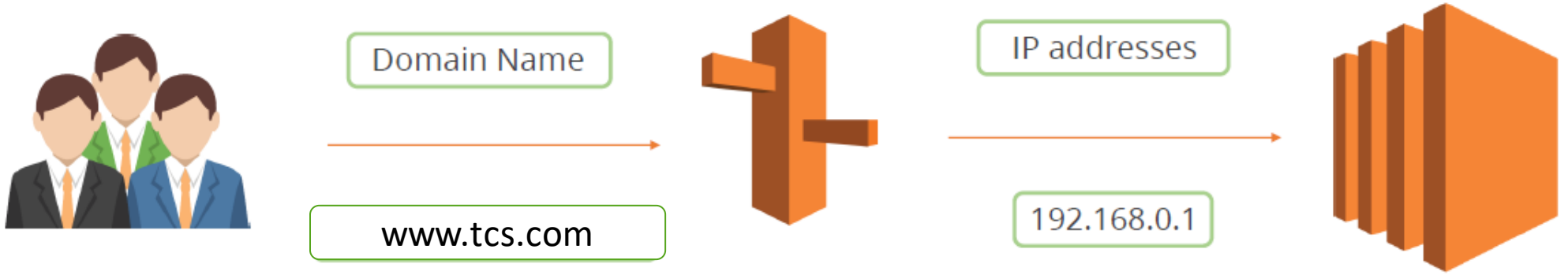


AWS Networking

Route 53

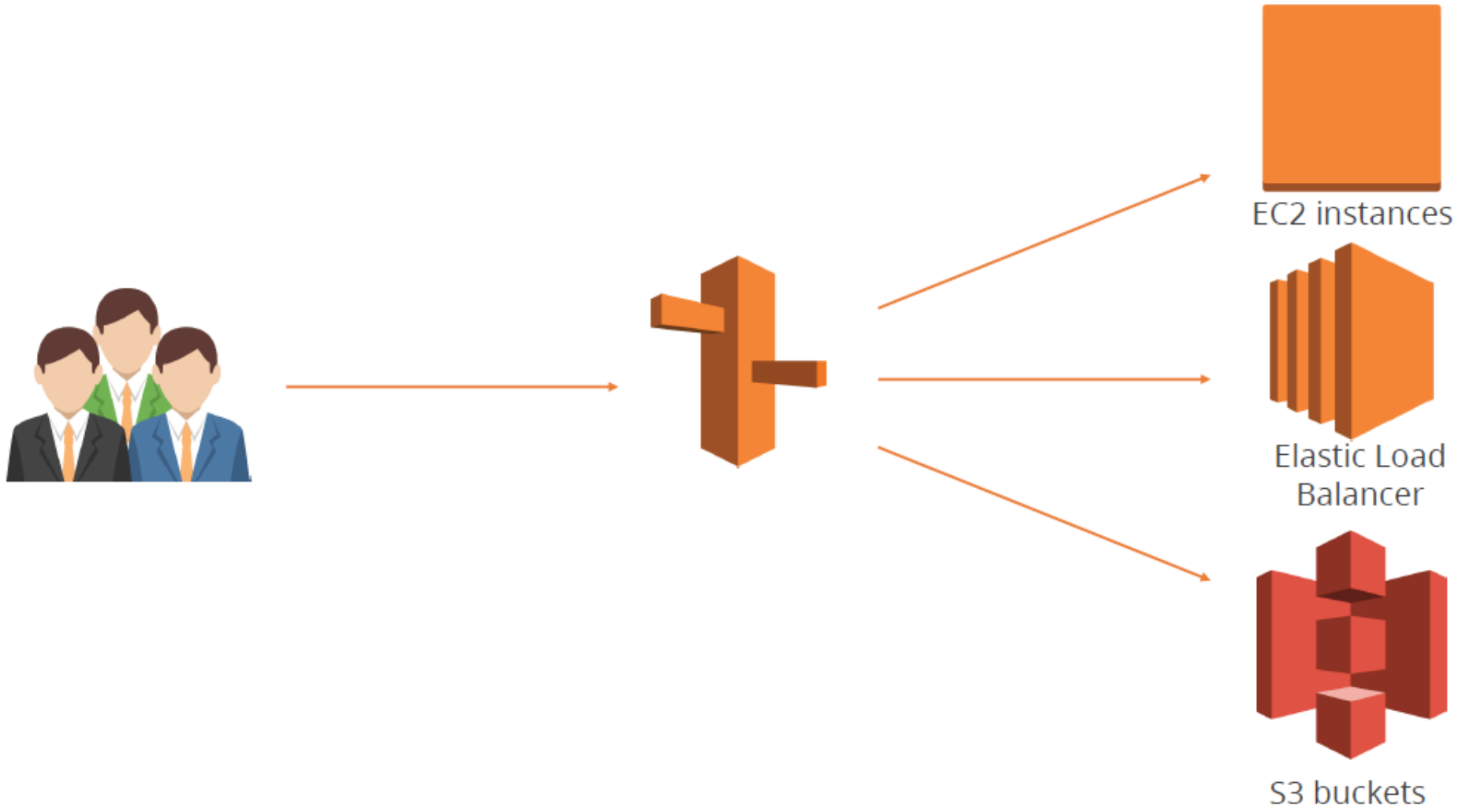
Domain Name Servers(DNS)

DNS provides a directory of domain names and translates them to IP addresses.



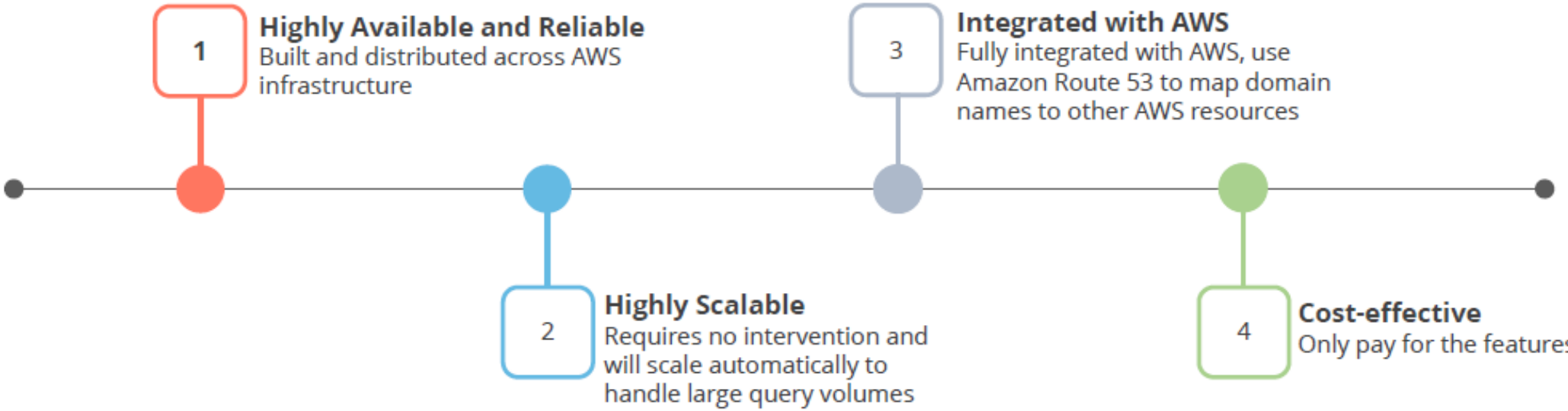
Route 53 Uses

You can use Route 53 to route user traffic to AWS resources like EC2 instances, ELB, or S3 buckets.



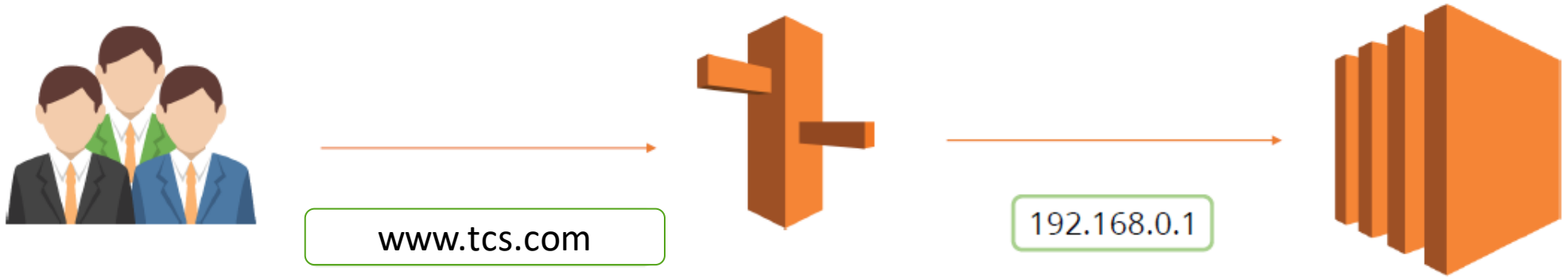
Route 53 Benefits

Following are the Route 53 benefits:



DNS Uses

DNS is used to translate domain names into IP addresses.



DNS - Terminologies

1. Domain Name

Human-friendly name for an Internet resource

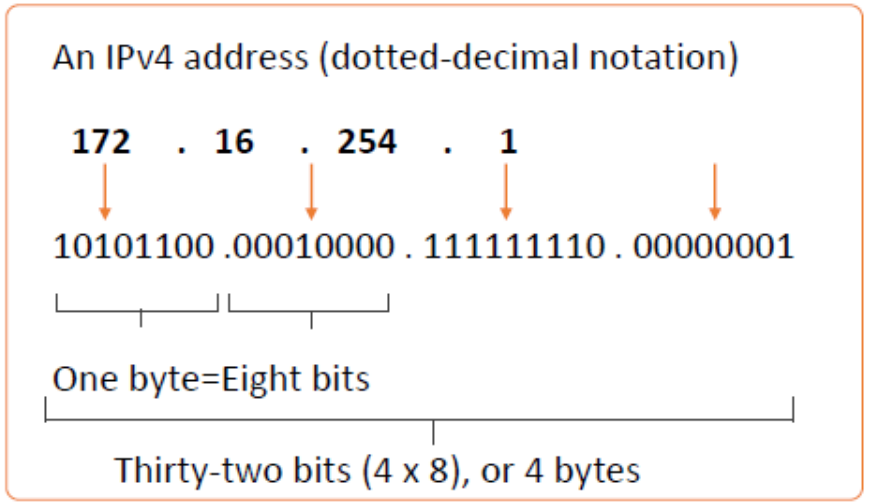
192.168.0.1

www.tcs.com

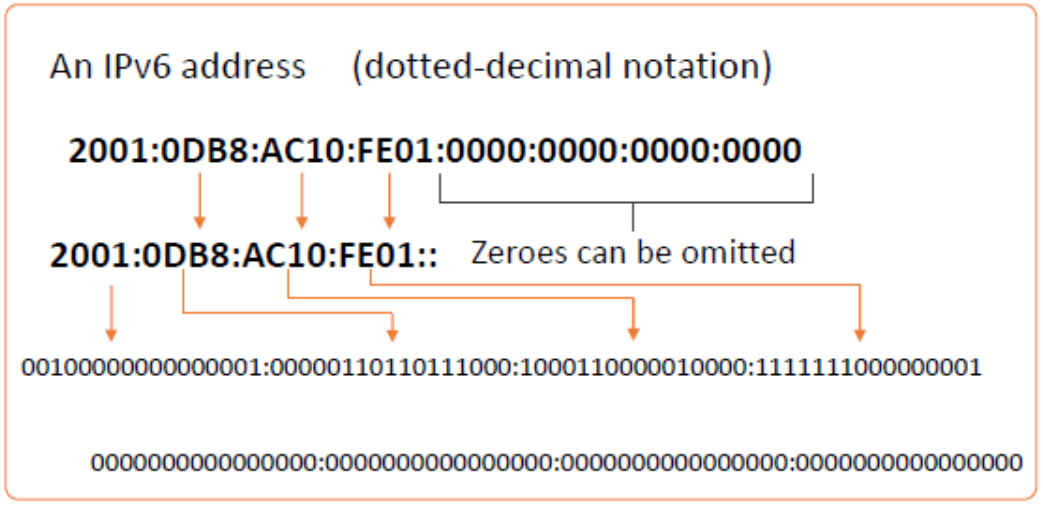
DNS Terminologies

2. IP Address

IP address is a network addressable location.
Each IP address has to be unique within its network. In your AWS VPC, you can have IP addresses like 10.0.1.0, but for websites, the network is the Internet, so a unique IP address is required.



10.0.1.0



DNS Terminologies

3. Top-Level Domain

A Top-Level Domain is the portion of the domain name furthest to the right.

DNS Terminologies

4. Hosts

The domain owner can define individual hosts within a domain that refers to separate services or computers.

DNS Terminologies

5. Subdomains

Subdomains are the parts that are underneath the top-level domain.

DNS Terminologies

6. Fully Qualified Domain Name (FQDN)

A Fully Qualified Domain Name, or FQDN, also called an absolute domain, is the complete domain name for a specific computer on the Internet.

DNS Terminologies

7. Name Server

A Name server is a computer or service that translates domain names to IP Addresses.

DNS Terminologies

8. Zone Files

Zone Files reside in name servers and are text files that contain the mappings between domain names and IP addresses.

```
$ORIGIN example.com
$TTL 86400
@       IN      SOA     dns1.example.com.     hostmaster.example.com. (
                        2001062501 ; serial
                        21600      ; refresh after 6 hours
                        3600       ; retry after 1 hour
                        604800     ; expire after 1 week
                        86400 )    ; minimum TTL of 1 day

        IN      NS      dns1.example.com.
        IN      NS      dns2.example.com.

        IN      MX      10      mail.example.com.
        IN      MX      20      mail2.example.com.

                IN      A       10.0.1.5

server1         IN      A       10.0.1.5
server2         IN      A       10.0.1.7
dns1            IN      A       10.0.1.2
dns2            IN      A       10.0.1.3

ftp             IN      CNAME   server1
mail            IN      CNAME   server1
mail2           IN      CNAME   server2
www             IN      CNAME   server2
```

DNS Terminologies

9. Start of Authority (SOA)

A Start of Authority, or SOA, record is mandatory for every domain.

DNS Terminologies

10.Time-To-Live (TTL)

Time-to-Live, or TTL is the length of time (in seconds) that a DNS record is cached on a DNS server or on your PC before it rechecks the details.

DNS Terminologies

11.Records

A record maps a resource to a name.

www.tcs.com → 192.182.239.21
www.google.com → 212.21.32.4

DNS Terminologies | Record Types

- A Record
- CNAME
- NS Record
- Alias Record

DNS Terminologies | Record Types

- A Record
- CNAME
- NS Record
- Alias Record

An “A Record” matches a domain (or subdomain) to an IP address.

```
example.com     A       12.34.56.78
```

DNS Terminologies | Record Types

- A Record
- CNAME
- NS Record
- Alias Record

Canonical Name (CNAME) record matches a domain or subdomain to a different domain.

```
alias.com       CNAME   example.com.
```

DNS Terminologies | Record Types

- A Record
- CNAME
- NS Record
- Alias Record

A NameServer Record (NS Record) stores information about the name servers for a domain.

```
example.com     NS      ns1.linode.com.
example.com     NS      ns2.linode.com.
```

DNS Terminologies | Record Types

- A Record
- CNAME
- NS Record
- Alias Record

An Alias Record is an AWS-created record and used only within AWS. It is similar to a CNAME, however, it's used to map DNS names to ELB, S3 buckets, and CloudFront distributions within your hosted zone.

Amazon Route 53| Routing policies

A routing policy determines how Amazon Route 53 responds to queries.
There are five available methods:

- Simple
- Weighted
- Latency
- Failover
- Geolocation

Amazon Route 53| Routing policies

Simple | Weighted | Latency | Failover | Geolocation

"Simple" is the default routing policy for a single resource.

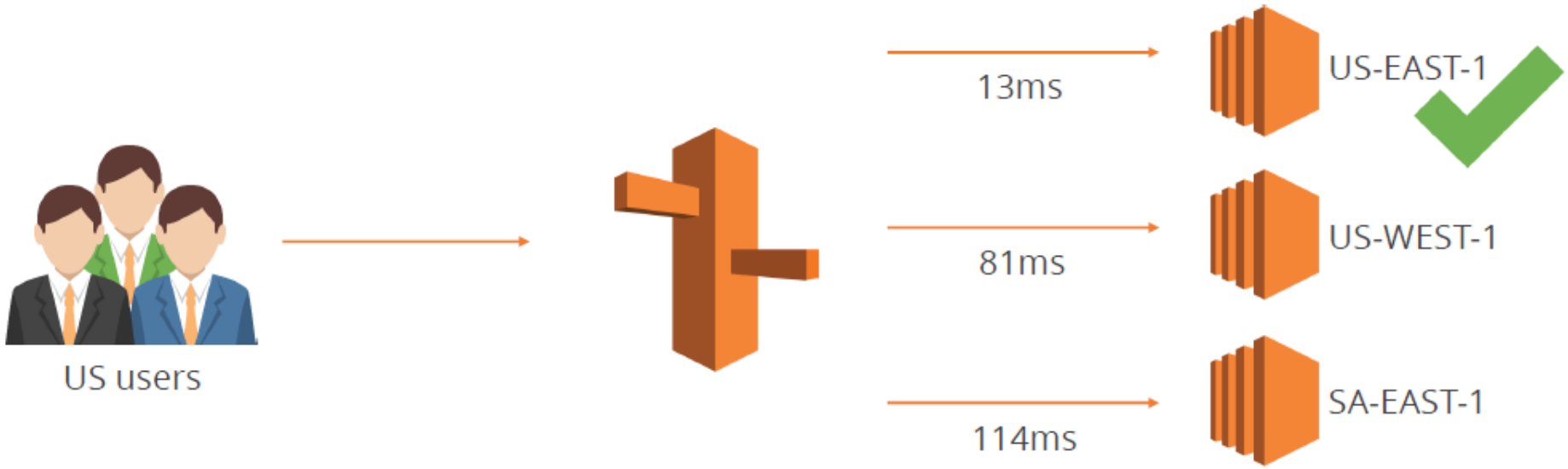
Simple | **Weighted** | Latency | Failover | Geolocation

"Weighted" routing policy can split traffic based on different weights assigned.

Amazon Route 53| Routing policies

Simple | Weighted | Latency | Failover | Geolocation

"Latency" routing policy allows you to route traffic based on the lowest network latency for your end user.



Amazon Route 53| Routing policies

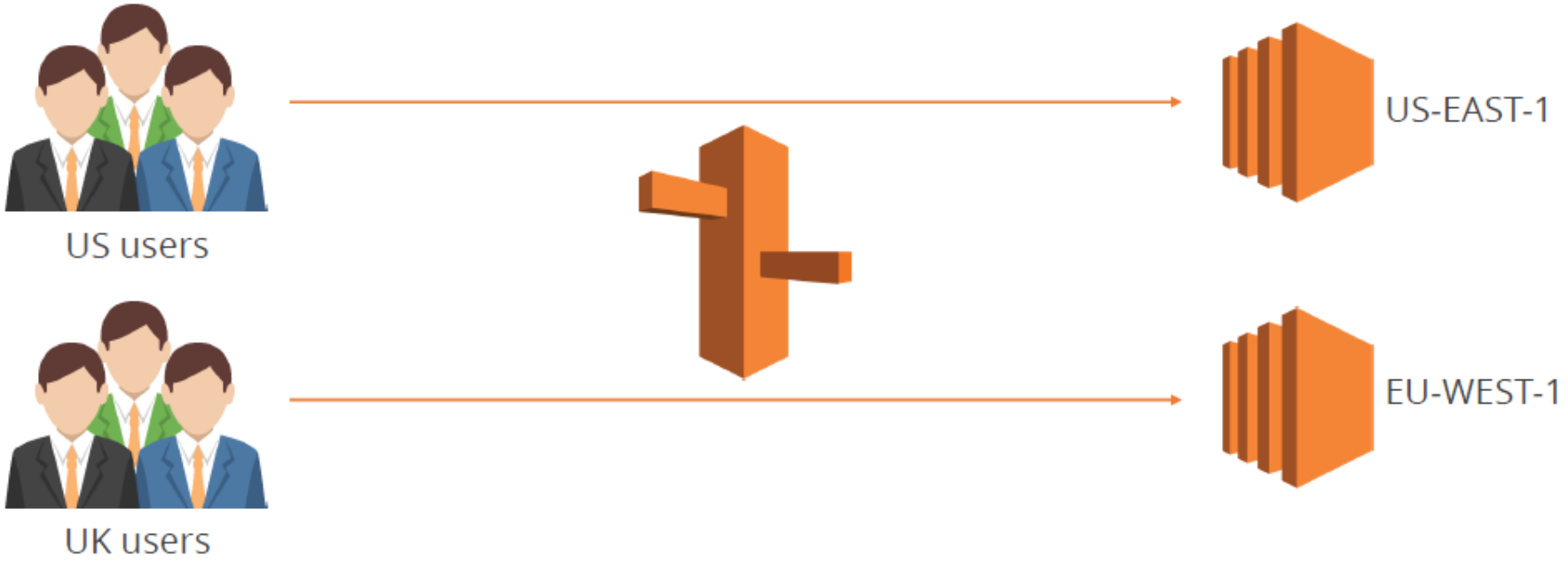
Simple | Weighted | Latency | Failover | Geolocation

"Failover" routing policy allows you to have an active/passive setup.

Amazon Route 53| Routing policies

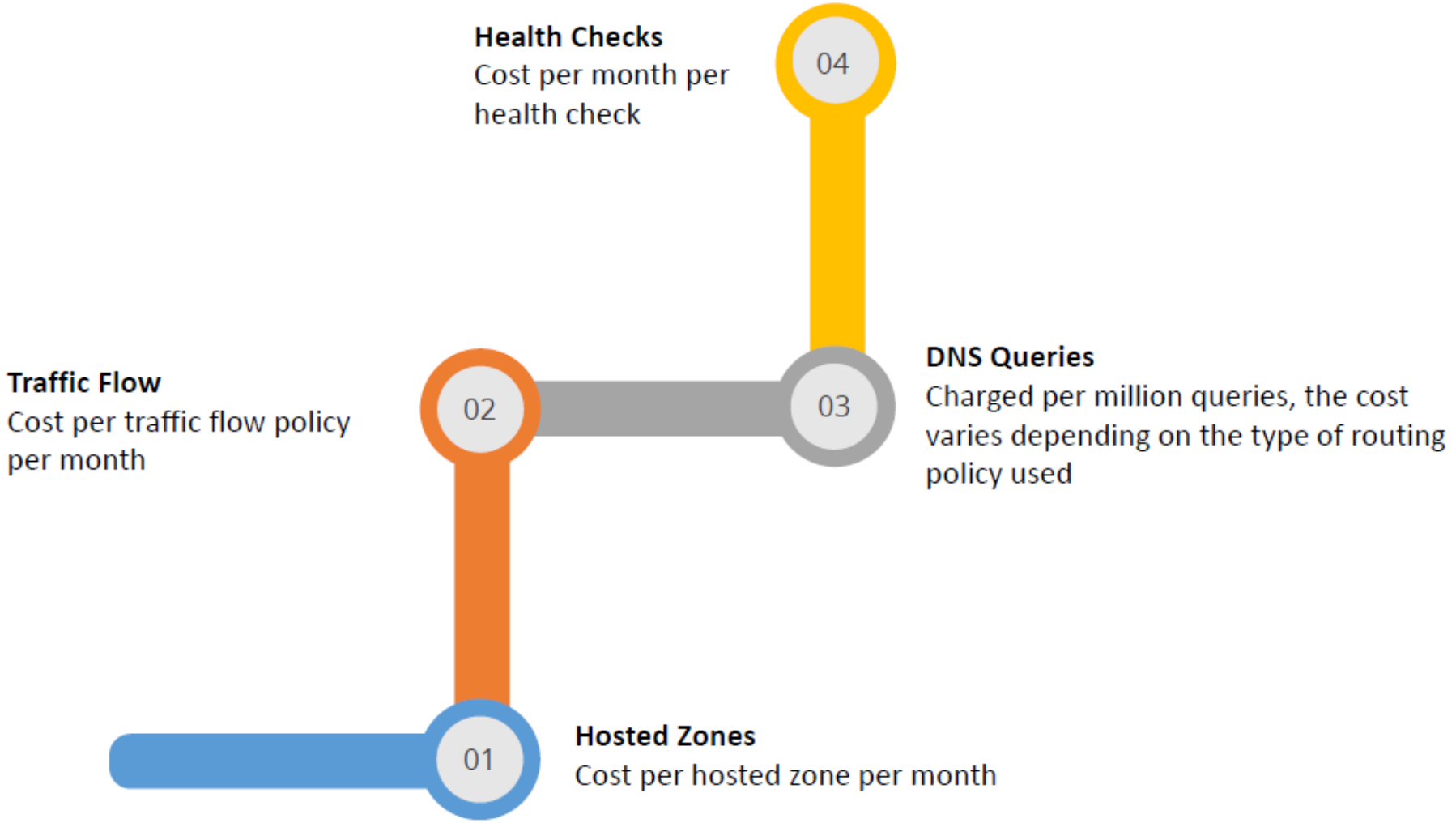
Simple | Weighted | Latency | Failover | Geolocation

"Geolocation" routing policy routes traffic based on the geographic location of your users.

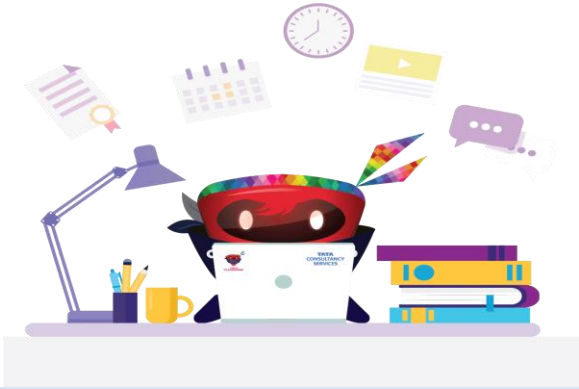


Amazon Route 53 | Cost Overview

The diagram presents an overview of the costs associated with Route 53:



AWS SAA Boot Camp



Storage with AWS

Amazon Storage Services

Storage Services with AWS

- Storage is a mechanism that enables a computer to retain data, either temporarily or permanently.
- Amazon Elastic Block Store (Amazon EBS) provides block level storage volumes for use with EC2 instances (san).
- Amazon Instance store provides temporary block-level storage for your instance(das).
- Amazon Elastic File system (EFS) provides scalable file storage for use with Amazon EC2(nas).
- Amazon object Store Simple Storage Service (S3) provides access to reliable, fast, and inexpensive data storage infrastructure.

Storage is a platform: AWS Storage Maturity

- Amazon EFS
- FSx for Windows & Lustre

File

- Amazon EBS
- Amazon EC2 Instance Store

Block

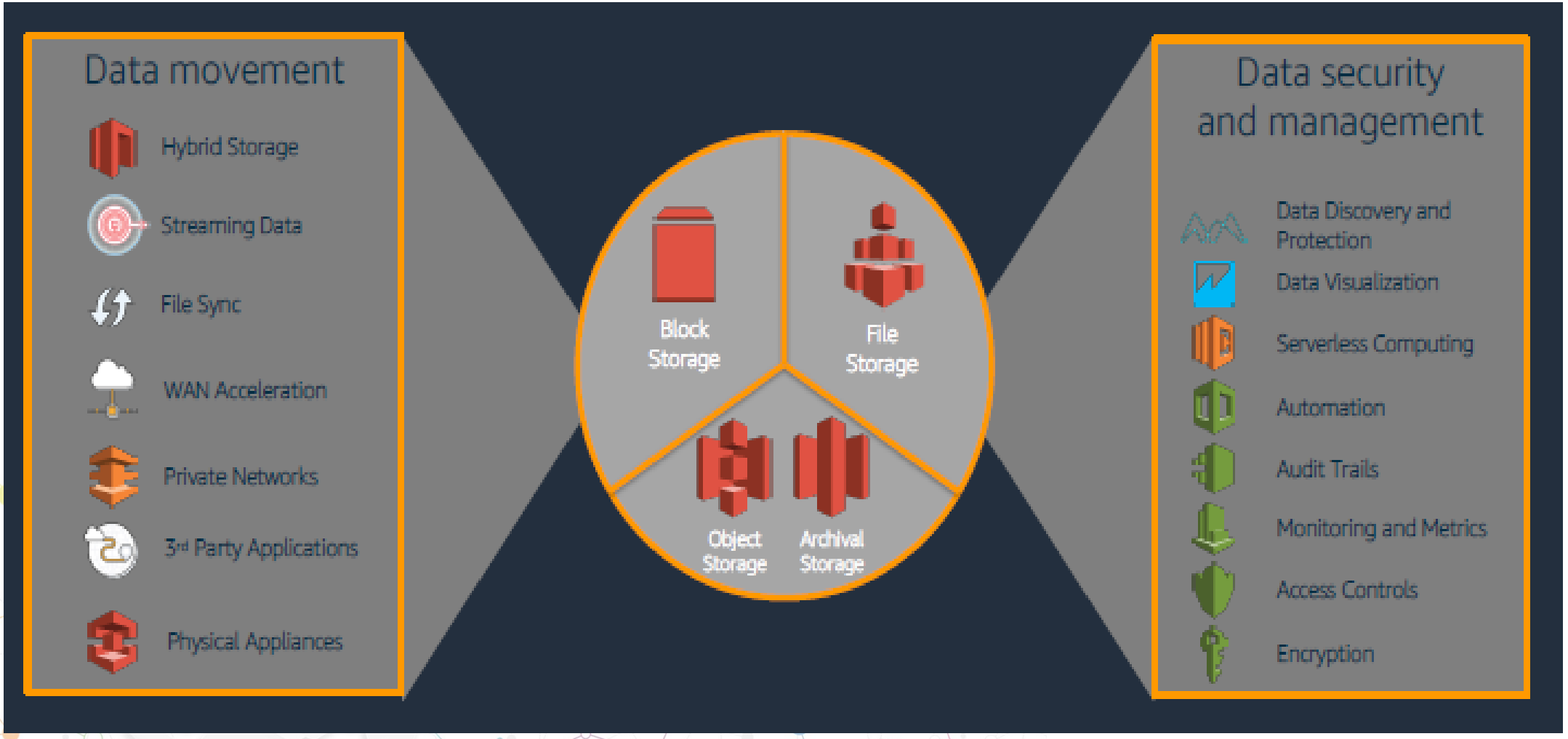
- Amazon S3/S3 IA
- Amazon S3 Glacier

Object

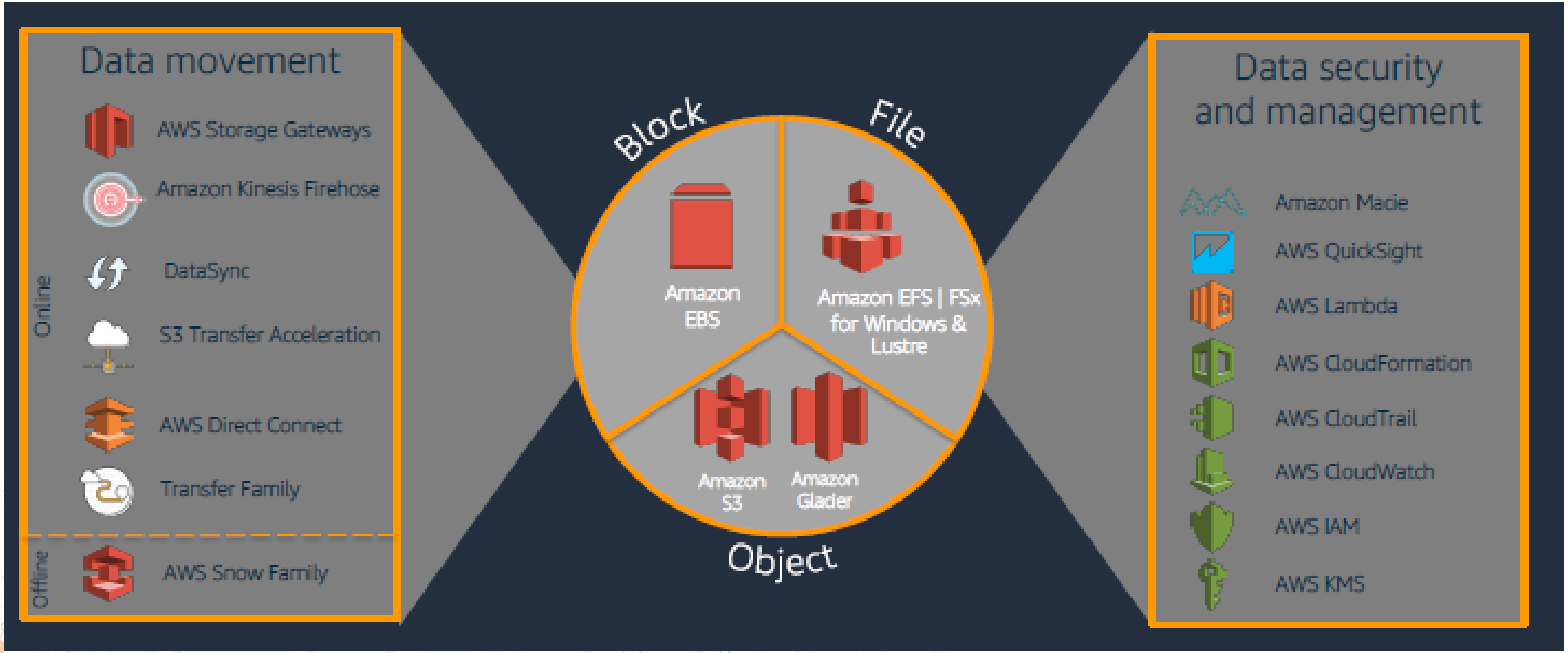
- Amazon S3 Transfer Acceleration
- Amazon Kinesis Data Firehouse
- AWS Transfer for SFTP
- AWS DataSync
- AWS Snowball
- AWS Snowball Edge
- AWS Storage Gateway

Data Transfer

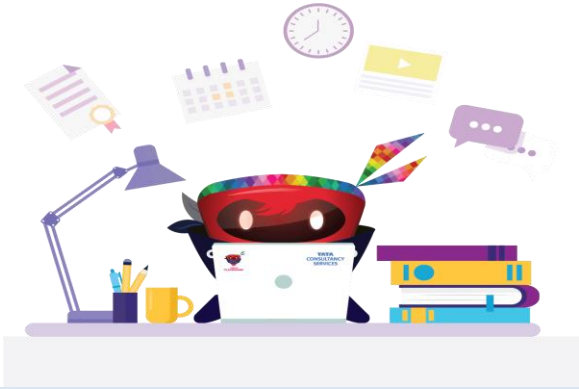
Complete set of building blocks



The broadest range of storage services



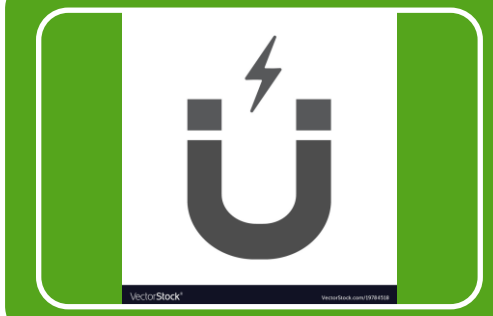
AWS SAA Boot Camp



Storage with AWS

Amazon Simple Storage Services (S3)

Amazon Simple Storage Service (S3)



Collect

- The most ways to move data in/out
- Security that helps the CISO
- Automated cost reduction tools

Store

- Designed for 99.999999999% durability
- Unmatched security and compliance capabilities
- Replication options across regions

Analyze

- On-demand analytics
- Built-in support for SQL expressions with S3 Select
- Detailed data on usage patterns and access

Amazon S3 One Zone-IA

- An S3 storage class built for easily re-creatable data Designed on a single Availability Zone Still 99.9999999% durable but less available and resilient - for 20% less cost

- Use it for:
  - Mobile or Enterprise backup data
  - Off-site compliance data
  - Disaster recovery data
  - Derived analysis data

Amazon S3 Intelligent Tier

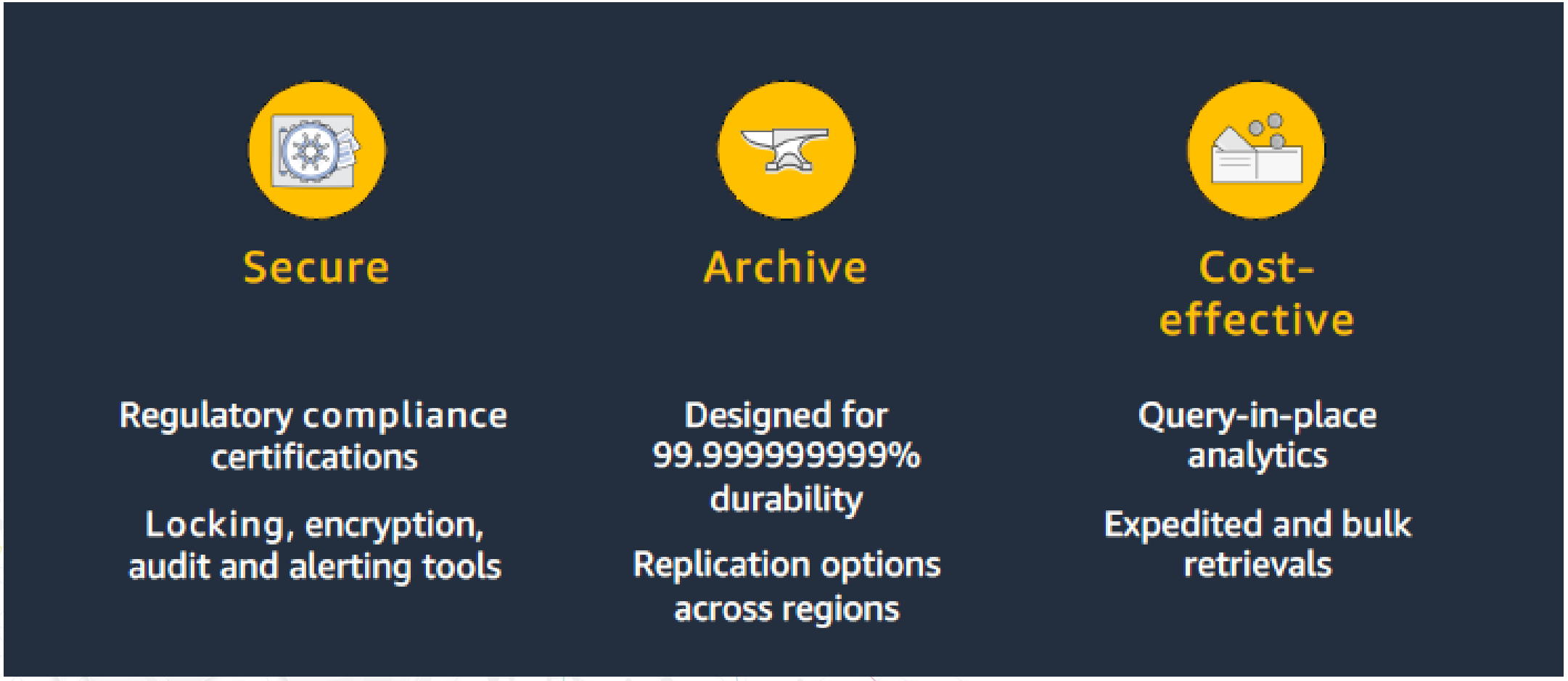
- The S3 Intelligent-Tiering is designed to optimize costs by automatically moving data to the most cost-effective access tier, without performance impact or operational overhead.
- Amazon S3 monitors access patterns of the objects in S3 Intelligent-Tiering, and moves the ones that have not been accessed for 30 consecutive days to the infrequent access tier.

  - Designed for durability of 99.999999999% of objects across multiple Availability Zones
  - S3 Lifecycle management for automatic migration of objects to other S3 Storage Classes

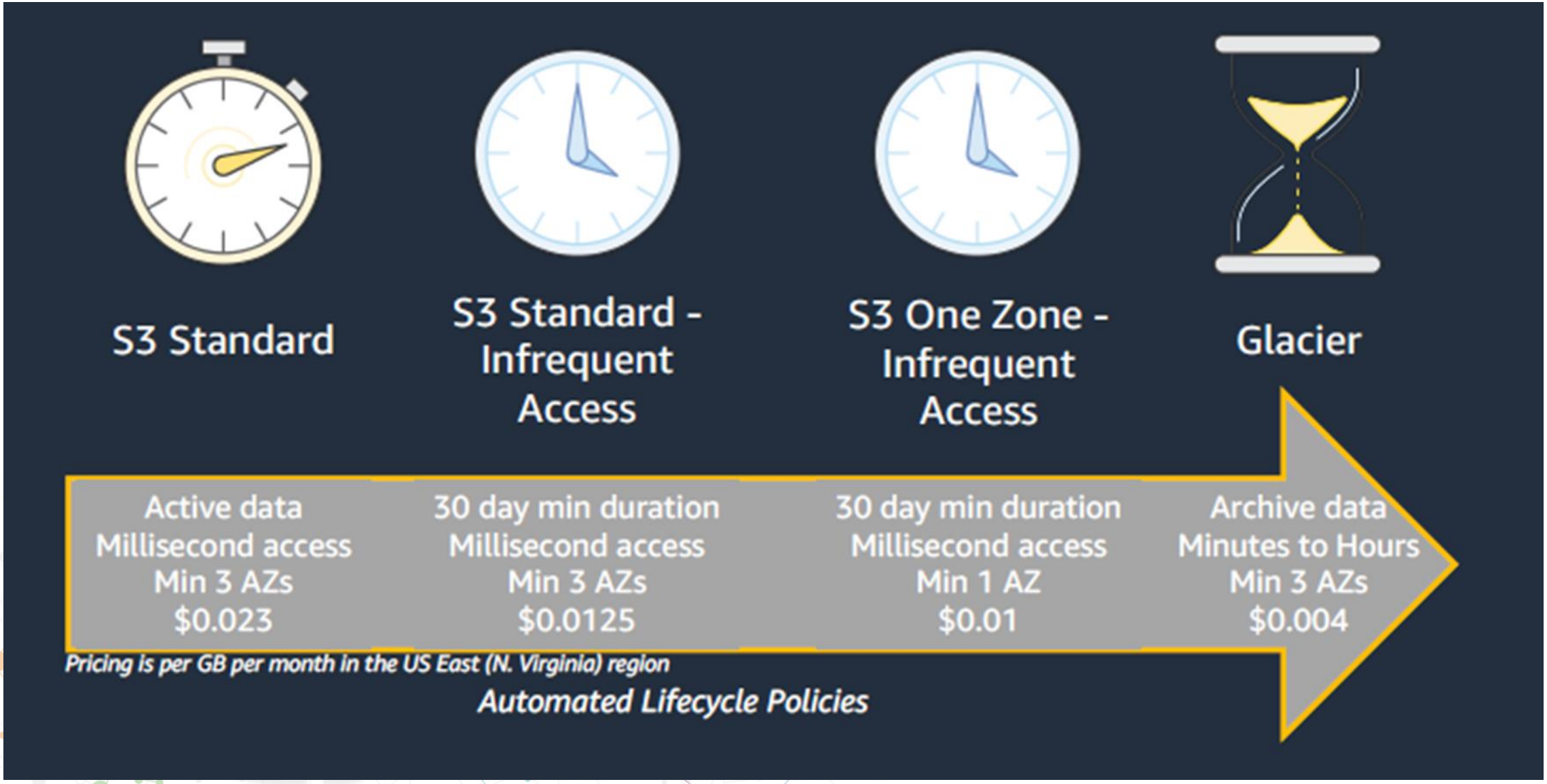
Use it for:

- Mobile or Enterprise backup data
- Off-site compliance data
- Disaster recovery data
- Derived analysis data

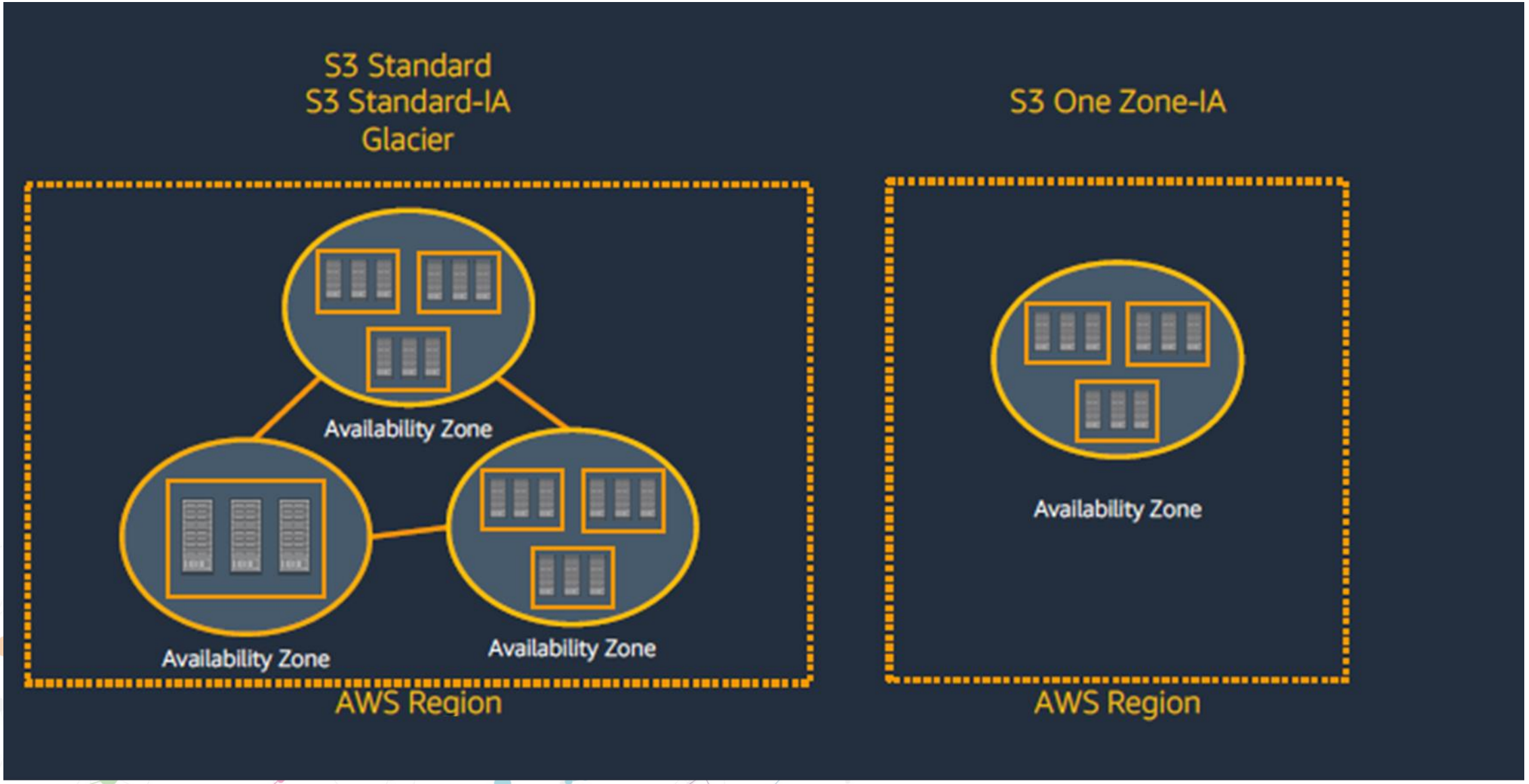
Amazon Glacier



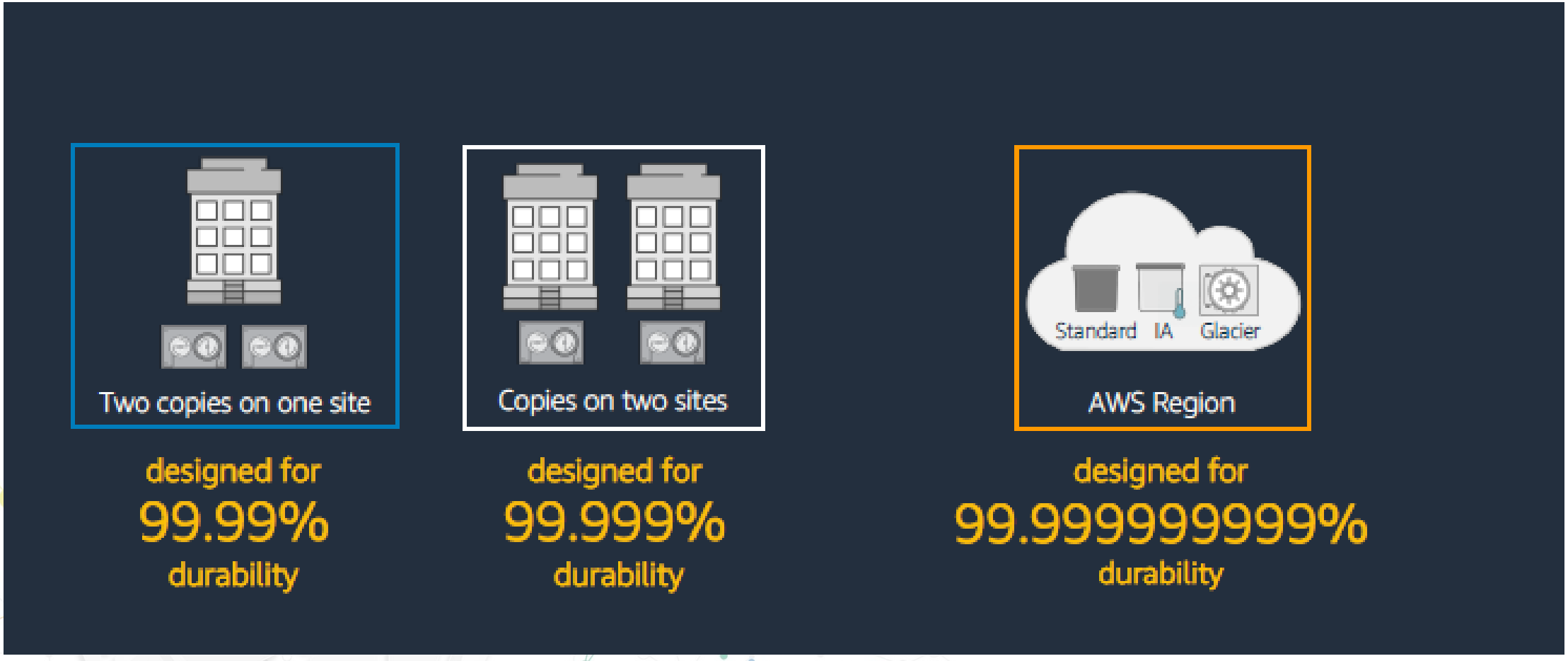
Object storage classes



How do AWS object storage classes differ in design?



Understanding Durability



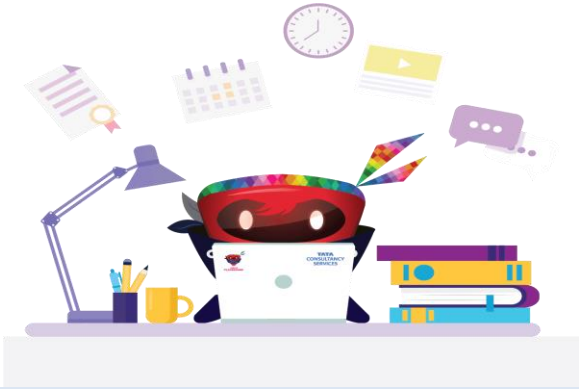
Amazon S3 Data Consistency Model

- Amazon S3 provides read-after-write consistency for PUTS of new objects in your S3 bucket in all regions with one condition :

  - HEAD or GET request to the key name (to find if the object exists) before creating the object, Amazon S3 provides eventual consistency for read-after-write.
  - Eventual consistency for overwrite PUTS and DELETES

Refer Consistency example:
https://docs.aws.amazon.com/AmazonS3/latest/dev/Introduction.html#ConsistencyModel

AWS SAA Boot Camp



Storage with AWS

Amazon Elastic Block Store (EBS)

Amazon Elastic Block Store

Transparent

Adjustable performance and price on the fly

Supports applications without re-architecting

Reliable

Highly available

Fault-tolerant

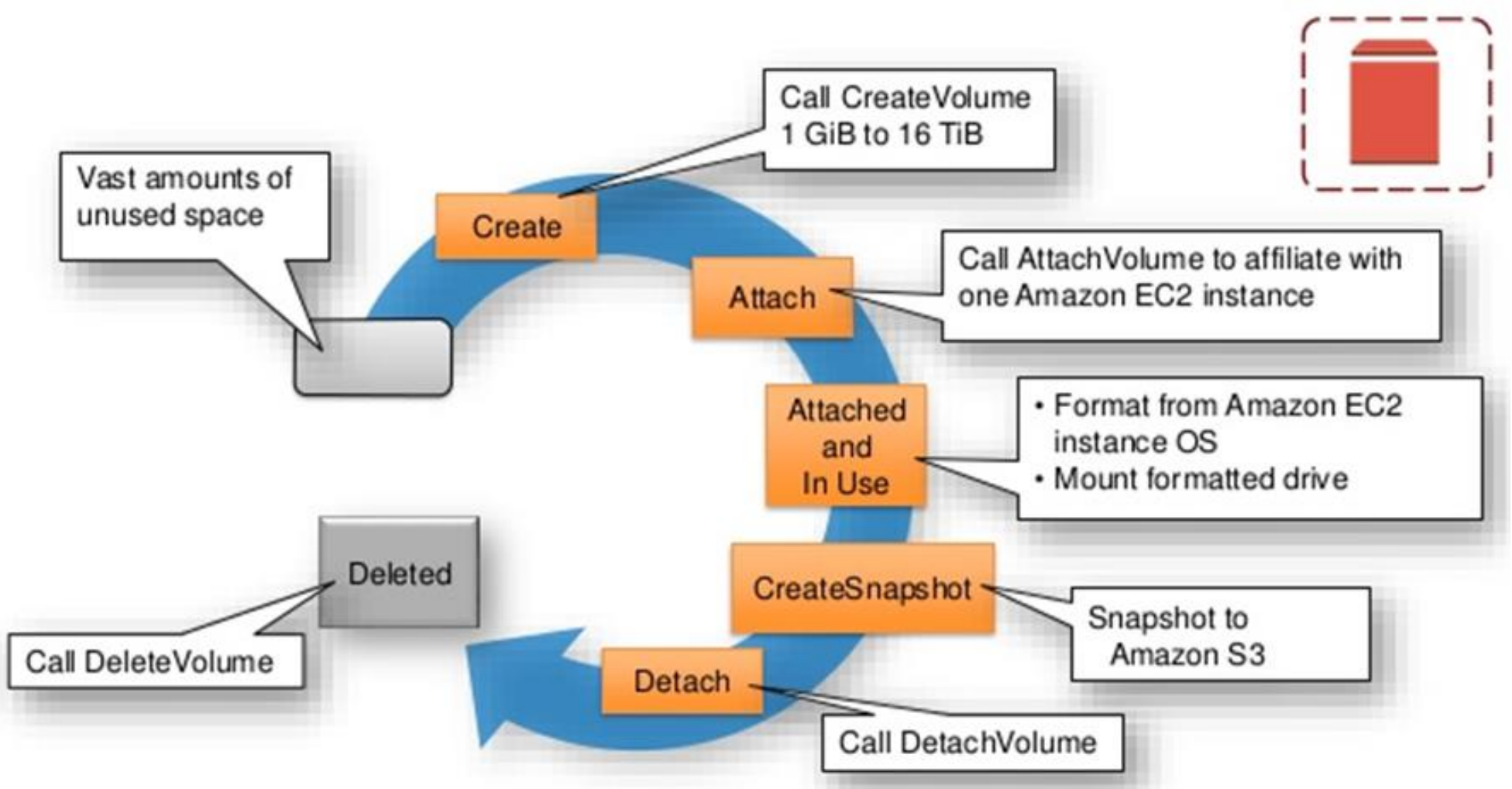
Foundational for enterprise applications

Performant

Consistently high IOPS and throughput

Optimized for low-latency workloads

Amazon EBS | EBS Volume LifeCycle

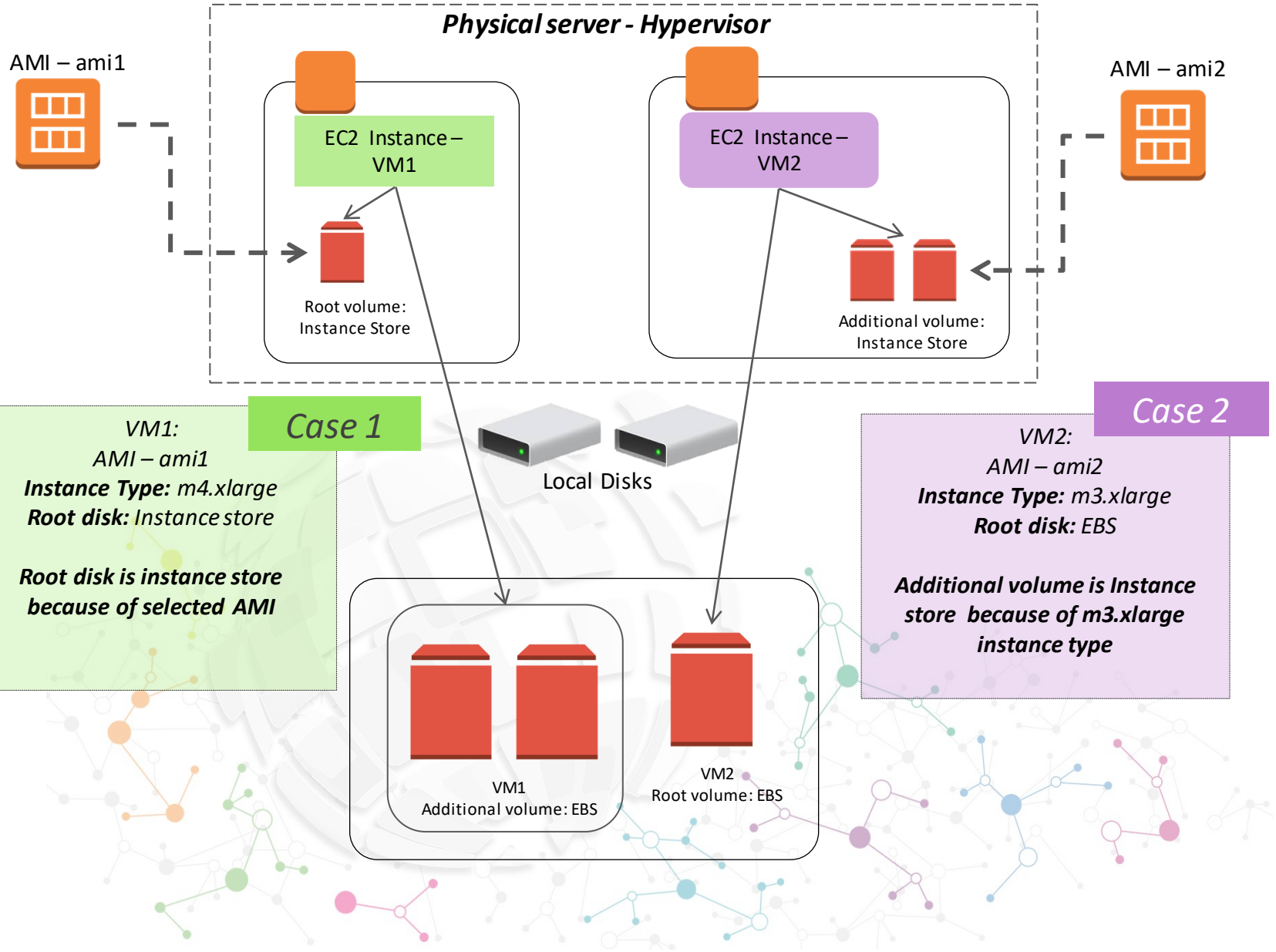


Amazon Instance Store

- An instance store provides temporary block-level storage for your instance.
- Disks that are physically attached to the host computer.
- The virtual devices for instance store volumes are ephemeral.
- If an instance reboots (intentionally or unintentionally), data in the instance store persists.

- Data in the instance store is lost under any of the following circumstances:
  - The underlying disk drive fails
  - The instance stops
  - The instance terminates

AWS EC2 : Instance Store volumes



Whether Root disk is on Instance Store or on EBS –depends on AMI selected

- *Root disk on instance store -> Instance cannot be stopped (only rebooted or terminated)* ***(i.e, Case 1)***
- *Root disk on EBS -> Instance can be stopped, rebooted or terminated* ***(i.e, Case 2)***

Whether additional volumes are on Instance Store or EBS –depends on Instance type selected

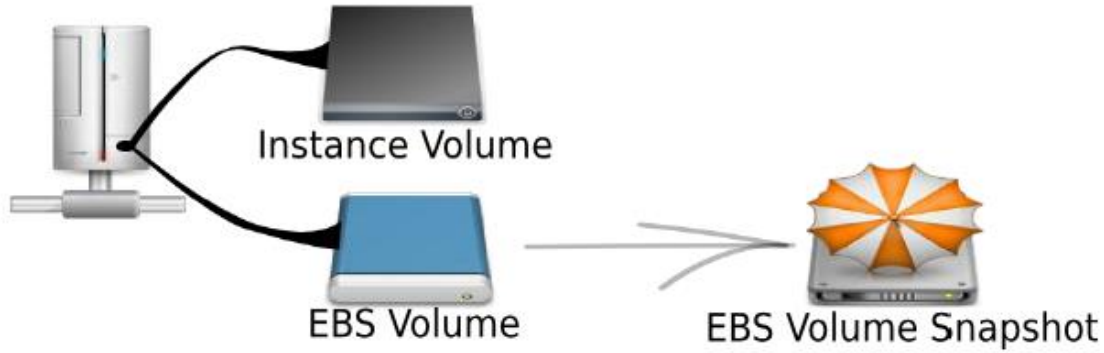
- *Volumes on Instance store -> Data lost when instance is stopped* ***(i.e, Case 2)***
- *Volumes on EBS -> Data persists even when instance is stopped* ***(i.e, Case 1)***

EBS | Snapshots

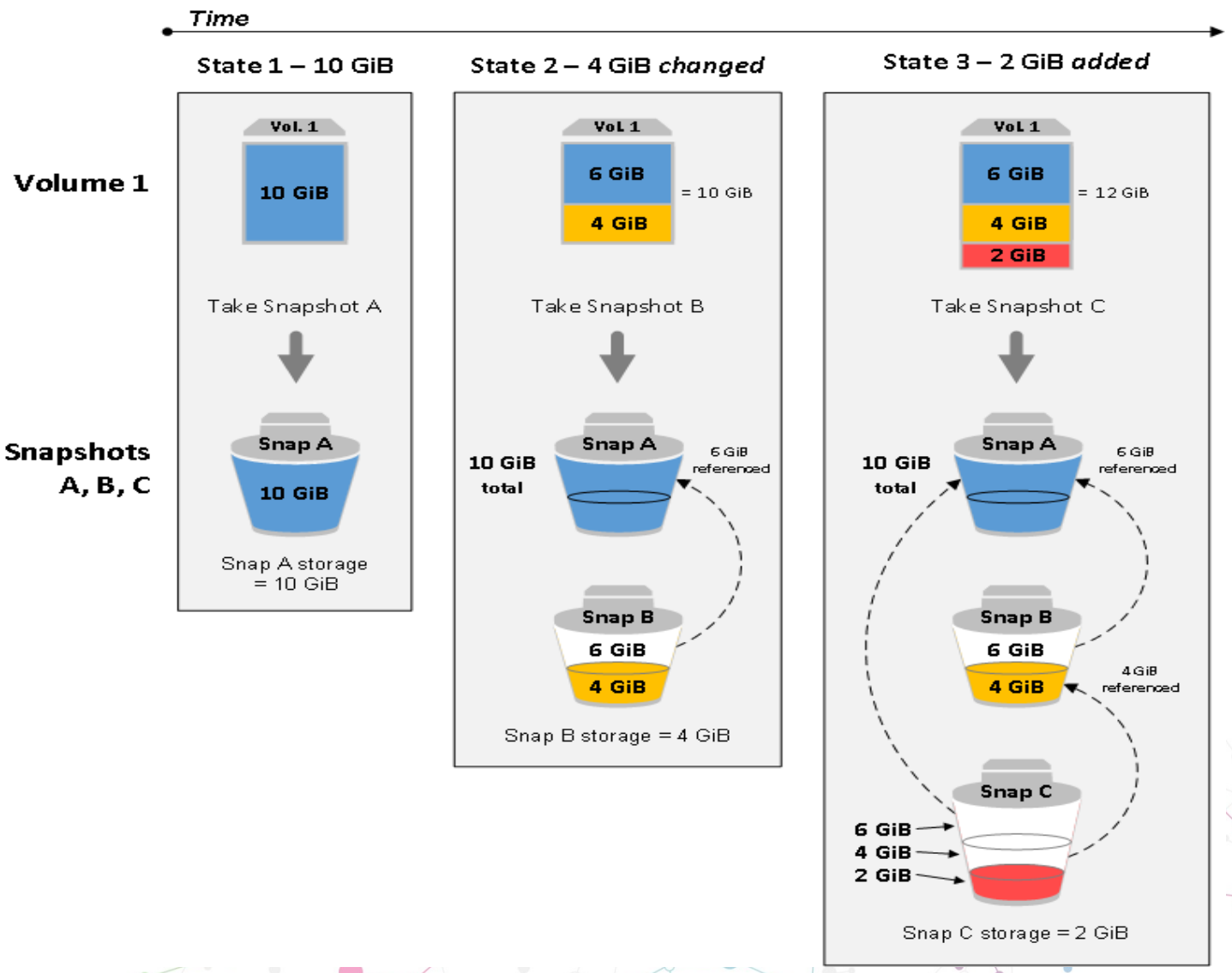
- You can back up the data on your EBS volumes to Amazon S3 by taking Point-In-Time Snapshots
- Snapshot can be copied to other Availability zone and other region as well.
- Snapshots are incremental backups, which means that only the blocks on the device that have changed after your most recent snapshot are saved.

Multi-Volume Snapshots

- Snapshots can be used to create a backup of critical workloads, such as a large database or a file system that spans across multiple EBS volumes. Multi-volume snapshots allow you to take exact point-in-time, data coordinated, and crash-consistent snapshots across multiple EBS volumes attached to an EC2 instance.



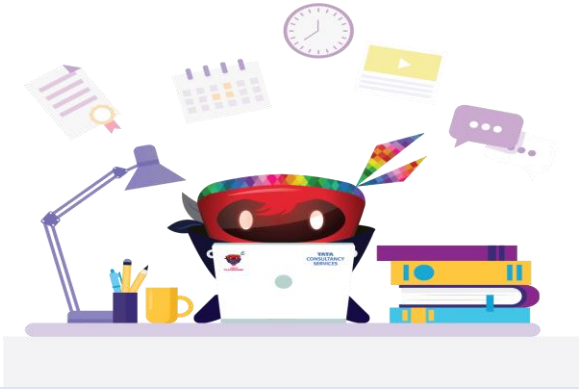
EBS| How Incremental Snapshots Work?



In this diagram, Volume 1 is shown at three points in time. A snapshot is taken of each of these three volume states.

- In State 1, the volume has 10 GiB of data. Because Snap A is the first snapshot taken of the volume, the entire 10 GiB of data must be copied.
- In State 2, the volume still contains 10 GiB of data, but 4 GiB have changed. Snap B needs to copy and store only the 4 GiB that changed after Snap A was taken. The other 6 GiB of unchanged data, which are already copied and stored in Snap A, are *referenced* by Snap B rather than (again) copied. This is indicated by the dashed arrow.
- In State 3, 2 GiB of data have been added to the volume, for a total of 12 GiB. Snap C needs to copy the 2 GiB that were added after Snap B was taken. As shown by the dashed arrows, Snap C also references 4 GiB of data stored in Snap B, and 6 GiB of data stored in Snap A.
- The total storage required for the three snapshots is 16 GiB.

AWS SAA Boot Camp



Storage with AWS

Amazon Elastic File System (EFS)

Amazon Elastic File System

Simple

Fully managed

Highly reliable regional design

Secure

No re-architecting required

Elastic

Automatically grows and shrinks

Lower TCO than DIY or on-prem

Scalable

Consistent IOPS

Consistent throughput

Flexible client connectivity

Thank You!

Enabling Certainty

TATA CONSULTANCY SERVICES