Certification Program for AWS Solution Architect Associate

AWS Partner Network

APN Consulting Partners

APN Consulting Partners are professional services firms that help customers design, architect, build, migrate, and manage their workloads and applications on AWS. Consulting Partners include System Integrators, Strategic Consultancies, Agencies, Managed Service Providers, and Value-Added Resellers.

Register as an APN Consulting Partner

Consulting Partner Benefits & Requirements

APN Technology Partners

APN Technology Partners provide software solutions that are either hosted on, or integrated with, the AWS platform. APN Technology Partners include Independent Software Vendors (ISVs), SaaS, PaaS, Developer Tools, Management and Security Vendors.

Register as an APN Technology Partner

Technology Partner Benefits & Requirements

AWS Partner Journey

Partner Training

- Accreditations:

  - AWS Business Professional

  - AWS Technical Professional

  - AWS TCO and Cloud Economics

Available at APN Portal once registered

Partner Training

- ## Base certifications:

  - AWS Certified Solutions Architect - Associate
  - AWS Certified Developer - Associate
  - AWS Certified SysOps Administrator - Associate
  - AWS Certified Solutions Architect – Professional
  - AWS Certified DevOps Engineer - Professional

Partner Requirements

	Required AWS Certifications **Associate** Level	Required AWS Certifications **Professional** Level
APN Consulting Partners **Standard**	2	0
APN Consulting Partners **Advanced**	4	2
APN Consulting Partners **Premier**	20	8

https://aws.amazon.com/partners/consulting

A stop on the Whitepapers

- Overview of Amazon Web Services (Dec'15, 35p)
- AWS Well-Architected Framework (Nov'16, 71p)
- AWS Security Best Practices (Aug'16, 79p)
- AWS Storage Services Overview (Dec'16, 54p)
- Architecting for the Cloud: AWS Best Practices (Feb16, 42p)
- Overview of Security Processes (Aug'16, 75p)
  http://aws.amazon.com/security/

- Risk and Compliance (Jan'17, 87p)
  http://aws.amazon.com/compliance/resources

https://aws.amazon.com/whitepapers/

6 Advantages of Cloud Computing

- Trade capital expense for variable expense
- Benefit from massive economies of scale
- Stop guessing about capacity
- Increase speed and agility
- Stop spending money running and maintaining data centers
- Go global in minutes

AWS Overview

- ## Global Infrastructure: 16 Regions, 42 Availability zones, 56 Edge Locations

- ## Security and Compliance:
  - SOC 1/ISAE 3402, SOC 2, SOC 3
  - FISMA, DIACAP, and FedRAMP
  - PCI DSS Level 1
  - ISO 9001, ISO 27001, ISO 27018

- ## Amazon Web Services Cloud Platform: 90% of the Public Cloud, MS has 5%, +1000 New Services and Features released in 2016.
  -

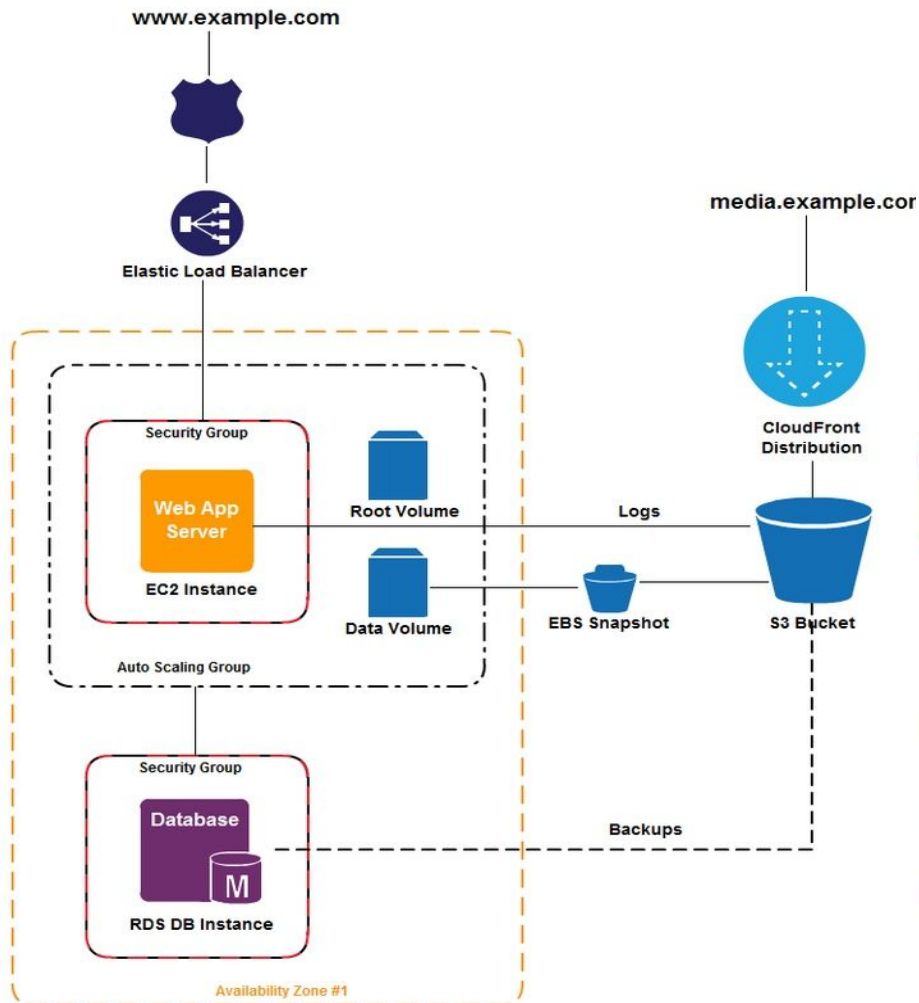# Well Architected Framework?

- Five Pillars

    - Security
    - Reliability
    - Performance Efficiency
    - Cost Optimization
    - Operational Excellence (Dec, 17)
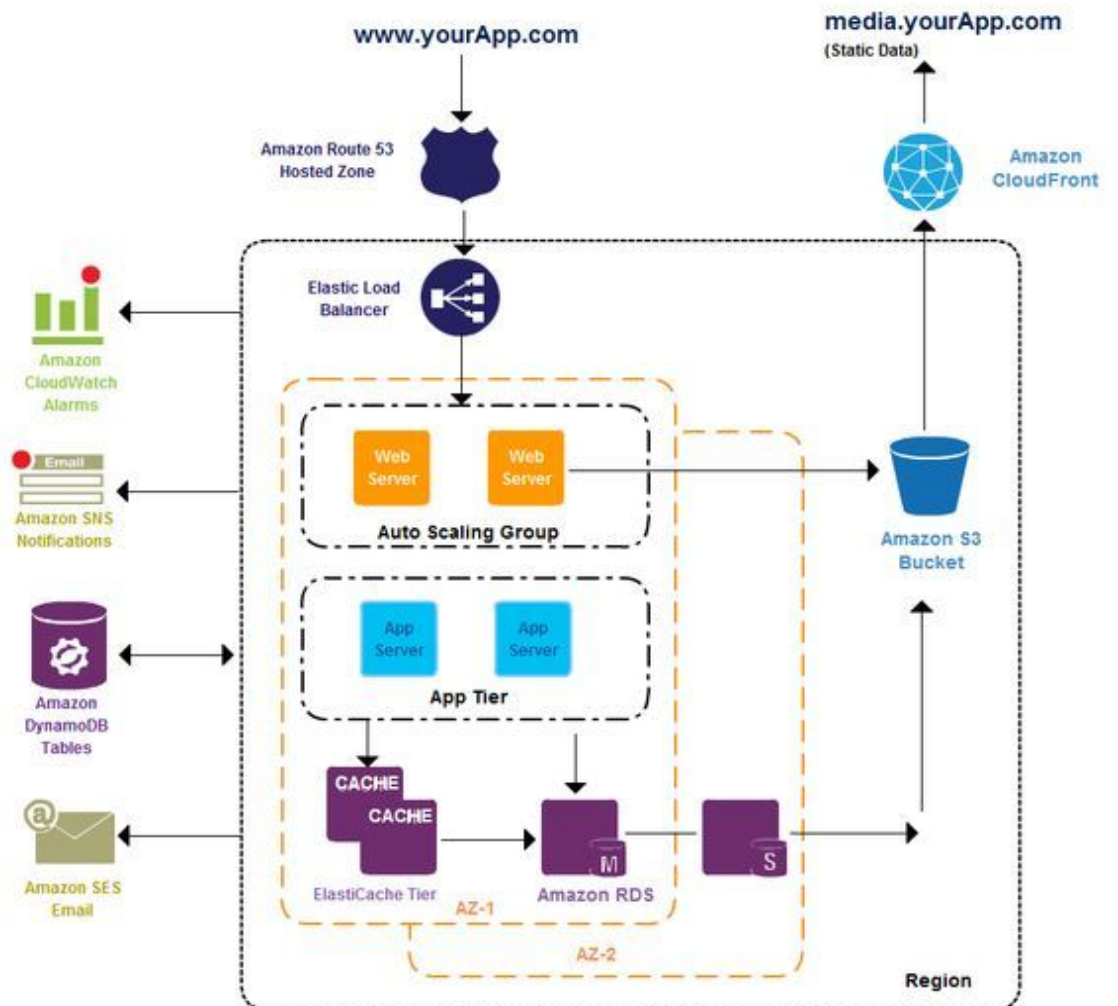
Well Architected Framework

- ## Pillar 1: Security
  - ### Design Principles:
    - Apply security at all levels, Enable traceability, Implement least privilege principle...
  - ### Definition:
    - Identity and Access Management, Detective Control...
  - ### Questions:
    - How are you protecting access to and use of the AWS root account credentials?
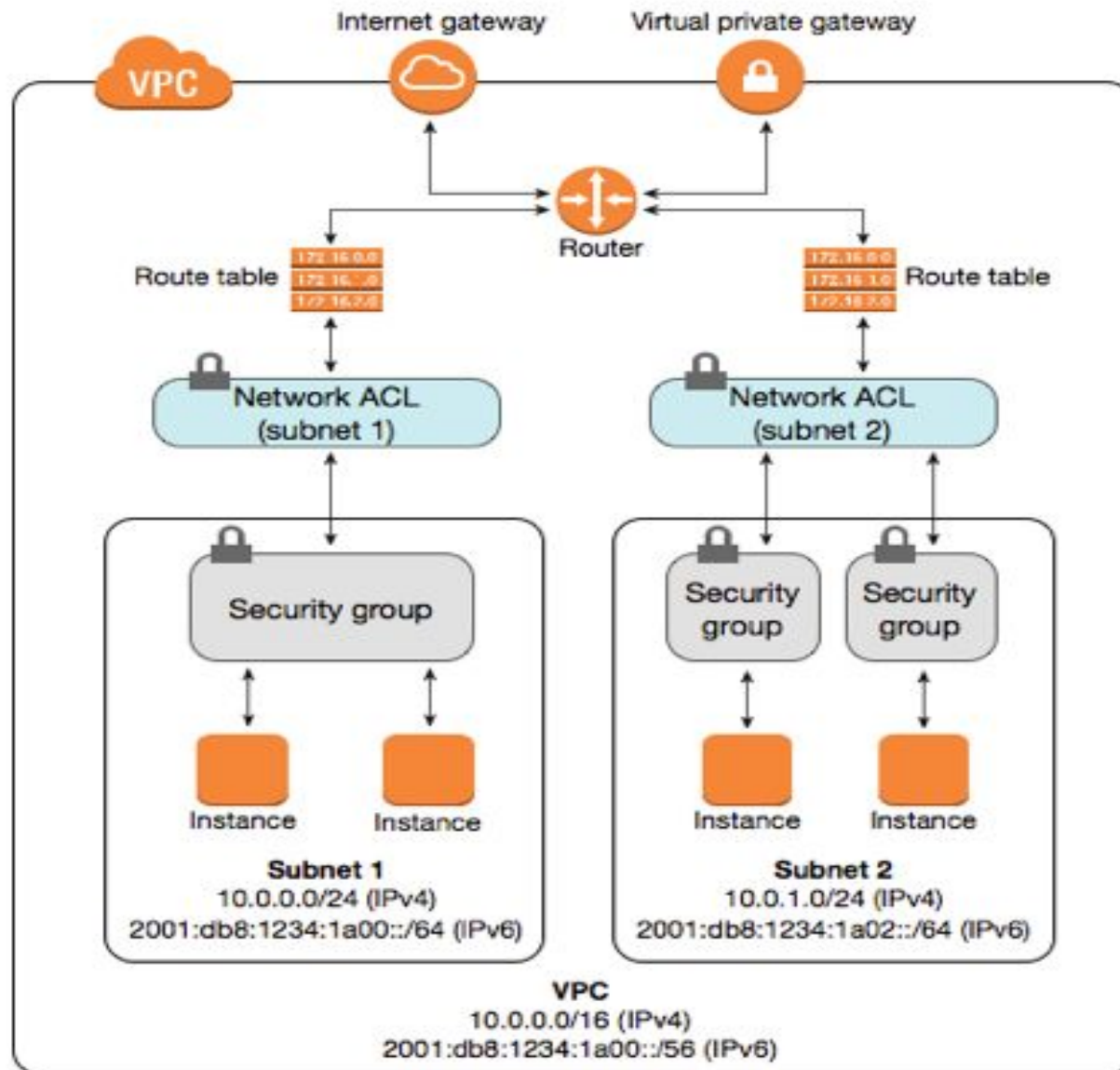
Well Architected Framework

2-Tier Auto-scalable Web Application Architecture in 1 AZ

www.example.com

Elastic Load Balancer

Security Group

Web App Server

EC2 Instance

Root Volume

Data Volume

Logs

EBS Snapshot

S3 Bucket

media.example.com

CloudFront Distribution

Backups

Auto Scaling Group

Security Group

Database

RDS DB Instance

Availability Zone #1

3-Tier Auto-scalable Web Application Architecture

www.yourApp.com

media.yourApp.com
(Static Data)

Amazon Route 53 Hosted Zone

Elastic Load Balancer

Amazon CloudFront

Amazon CloudWatch Alarms

Email
Amazon SNS Notifications

Amazon DynamoDB Tables

Amazon SES Email

Web Server   Web Server
Auto Scaling Group

App Server   App Server
App Tier

CACHE
CACHE
ElastiCache Tier   AZ-1

Amazon RDS

Amazon S3 Bucket

AZ-2

Region

Well Architected Framework

Solution Architect Associate

- ## Blueprint:

The table below lists the domains measured by this examination and the extent to which they are represented.

Domain	% of Examination
1.0 Designing highly available, cost efficient, fault tolerant, scalable systems	60%
2.0 Implementation/Deployment	10%
3.0 Data Security	20%
4.0 Troubleshooting	10%
TOTAL	**100%**

AWS Products - Overview

- Main classes:
  - Storage
  - Compute
  - Databases
  - Networking
  - Application
  - Deployment and Management
    -

AWS Cloud Platform

Services ⌄ | **Edit** ⌄

Amazon Web Services

Compute & Networking

Direct Connect
Dedicated Network Connection to AWS

EC2
Virtual Servers in the Cloud

Elastic MapReduce
Managed Hadoop Framework

Route 53
Scalable Domain Name System

VPC
Isolated Cloud Resources

Storage & Content Delivery

CloudFront
Global Content Delivery Network

Glacier
Archive Storage in the Cloud

S3
Scalable Storage in the Cloud

Storage Gateway
Integrates On-Premises IT Environments with Cloud Storage

Database

DynamoDB
Predictable and Scalable NoSQL Data Store

ElastiCache
In-Memory Cache

RDS
Managed Relational Database Service

Redshift NEW
Managed Petabyte-Scale Data Warehouse Service

Deployment & Management

CloudFormation
Templated AWS Resource Creation

CloudWatch
Resource and Application Monitoring

Data Pipeline
Orchestration for Data-Driven Workflows

Elastic Beanstalk
AWS Application Container

IAM
Secure AWS Access Control

OpsWorks NEW
DevOps Application Management Service

App Services

CloudSearch
Managed Search Service

Elastic Transcoder NEW
Easy-to-use Scalable Media Transcoding

SES
Email Sending Service

SNS
Push Notification Service

SQS
Message Queue Service

SWF
Workflow Service for Coordinating Application Components

AWS Cloud Platform

Explore Our Products

Compute	Storage	Database	Migration	Networking & Content Delivery
Developer Tools	Management Tools	Security, Identity & Compliance	Analytics	Artificial Intelligence
Mobile Services	Application Services	Messaging	Business Productivity	Desktop & App Streaming
Internet of Things	Game Development			

https://aws.amazon.com/products/?hp=tile&so-exp=below

AWS Products - Storage

- ## Object Storage
    - S3 (Simple Storage Service)
        - S3 – Standard
        - IF – Infrequent access
        - RR – Reduce Redundancy

    - Glaciar
        - Data archiving, 3 – 5 hrs to retrieve

AWS Products - Storage
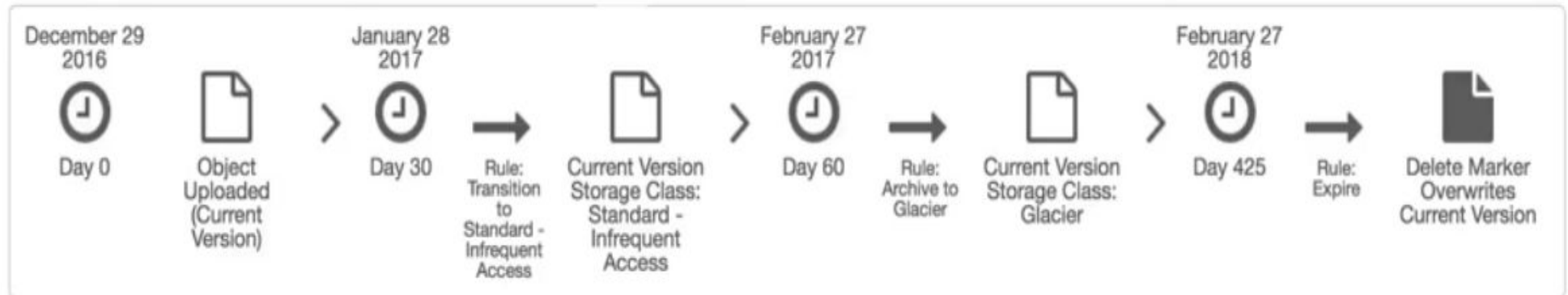
- ## Life Cycle Management
  -

EXAMPLE:

December 29 2016 — Day 0 — Object Uploaded (Current Version) > January 28 2017 — Day 30 — Rule: Transition to Standard - Infrequent Access → Current Version Storage Class: Standard - Infrequent Access

AWS Products - Storage

- Life Cycle Management

EXAMPLE:

December 29 2016		January 28 2017				February 27 2017				February 27 2018		
Day 0	Object Uploaded (Current Version)	Day 30	Rule: Transition to Standard - Infrequent Access	Current Version Storage Class: Standard - Infrequent Access		Day 60	Rule: Archive to Glacier	Current Version Storage Class: Glacier		Day 425	Rule: Expire	Delete Marker Overwrites Current Version

AWS Products - Storage

- ## S3 Features:
    - Version control
    - Logging
    - Cross Region Replication
    - Life Cycle Management

AWS Products - Storage

- ## S3 Features:
  - Security and Encryption
    - In transist: SSL/TLS,
    - At rest:
      - SSE-S3
      - SSE -KMS,
      - SSE – C or CSE
  - Read after Write consistency in Puts of new objects
  - Eventual consistency for Overwrites and Deletes
  - Multipart upload.

AWS Products - Storage

- ## EBS – Elastic block storage
  - ### Instance Storage
    - Direct attached, ephemeral
    - Hadoop, NoSQL
    - EC provided with 4GB – 6,4TB at no cost.

  - ### Persistent Storage (block level)
    - General purpose SSD up to 10000 IOPS
    - Provisioned IOPS SSD up to 20000 IOPS
    - Throughput Optimized HDD 500 MiB/s
    - Cold HDD 250 MiB/s

AWS Products - Storage

- EBS
  - Snapshots of VHDs
    - Automatic or manual
    - Exist on S3
    - Are incremental
  - RAID
    - Increase IOPS
    - Needs application consistent snapshot
    - - Freeze the FS, Unmount the Array or Shutdown the EC2
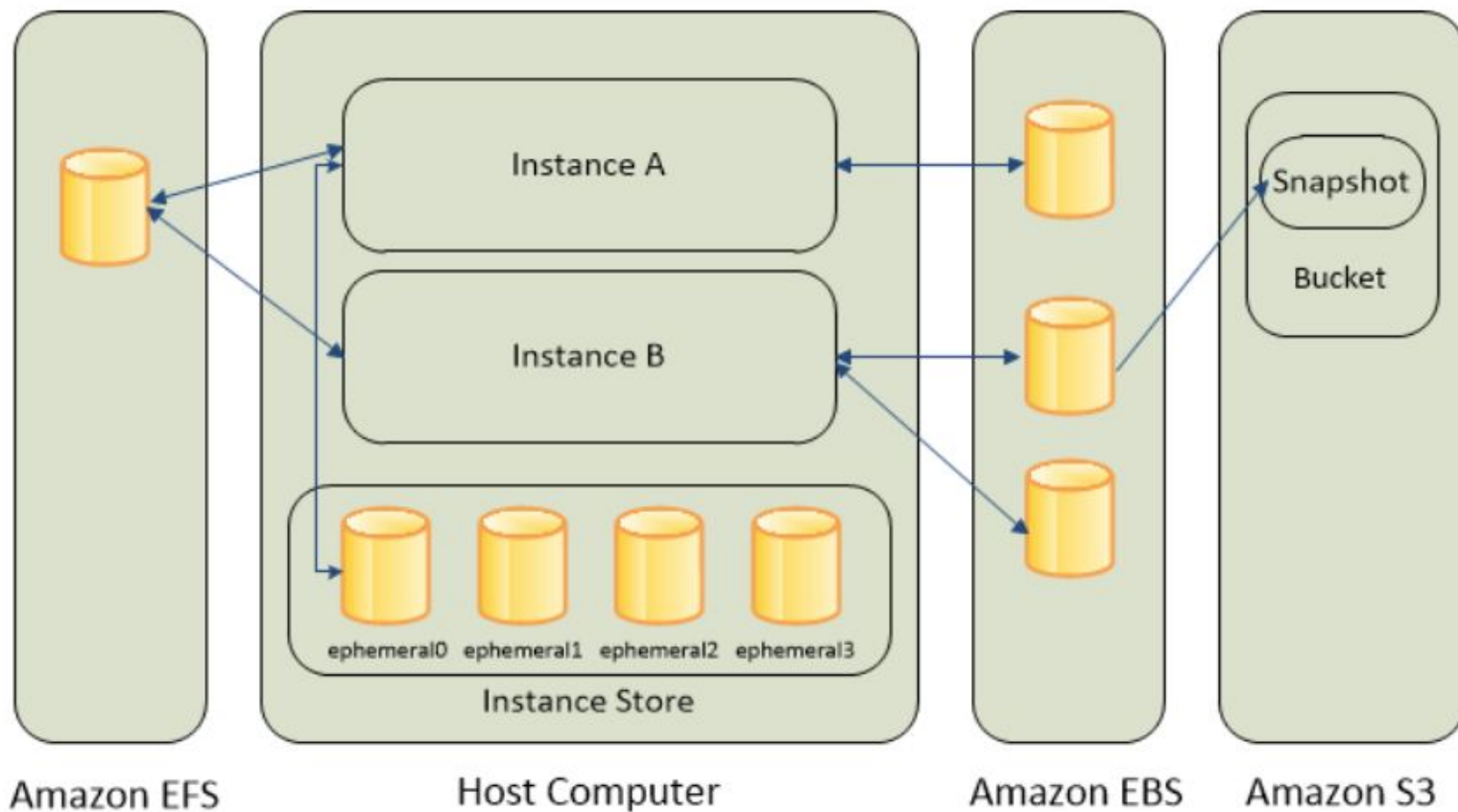   - RAID 0, RAID 10

AWS Products - Storage

- **EFS – Elastic File System**
  - NFSv4
  - Attached to multiples instances
  - Pay for what you use, scale up to petabytes
  - Stored across multiple AZ's in a region
  - Read after write consistency

AWS Products - Storage

- EBS

AWS Products - Storage

- ## Storage Gateway
  - File Gateway – Flat files stored in S3
  - Volume Gateway
    - Stored Volume: Dataset on Site and asynchronously backed up to S3
    - Cached Volumes. Dataset on S3 with cache on site.
  - Gateway Virtual Tape Library (VTL)
    - Used for popular backup tools: NetBackup, Backup Exec, Veam, etc.

AWS Products - Storage

- ## Petabyte Scale Data Transport
    - Snowball 80 ~ 100 TB
    - Snowball Edge – On-board Computing

AWS Products - Storage

- Petabyte Scale Data Transport
  - Snowball 80 ~ 100 TB
  - Snowball Edge – On-board Computing
  - Snowmobile ~ 100 PB

-

AWS Products - Storage

- Petabyte Scale Data Transport
  - Snowball 80 ~ 100 TB
  - Snowball Edge – On-board Computing
  - Snowmobile ~ 100 PB

- Transfer Acceleration
  - Speeds up transfers to S3 for user in far away location.

AWS Products - Storage

- CloudFront
  - Used for CDN
  - Origin
    - S3 bucket, EC2, ELB, Route53
  - Distribution
    - Collection of Edge locations
    - Web Distribution
    - RTMP – Media streaming
  - Edge locations are Read and Write
  - Object are cached according to TTL

AWS Products - Storage

- CloudFront main features:

  - Use Signed url o cookies to restrict access
  - Device detection
  - Geo Targeting
  - Cross Origin Resource Shearing (CORS)
  - Configurable TTL for the cached content
  - Supported protocols: HTTP/S and RTMP

AWS Products - Storage

- **Elastic Transcoder**
  - Transcode media files into formats for different devices
  - Easy to use, scalable, managed & cost effective
  - Seamless Delivery
    - Adaptive bitrate streaming or progressing download
  - Secure and AWS Integrated
  - Uses AWS SDKs
    - Java, .NET, Node.js, PHP, Python and Ruby

AWS Products - Compute

- EC2 Instances types

-
  - General Purpose: T2, M3, M4
  - Compute Optimized: C4, C3
  - Memory Optimized: X1, R4, R3
  - Accelerated Computing: P2, G2, F1
  - Storage Optimized: I2, D2

AWS Products - Compute

- ## EC2 features:
  - ### Burstable Performance
    - T2: Base Credits + CPU credits per hour stores for 24 hrs, it consumes credits when it burst (CPU>20%)
  - ### Multiple Storage options
    - Instance, GP SSD, Provisioned IOPS SSD, Magnetic
  - ### EBS- Optimized
    - Dedicated throughput to EC2, 0,5 – 4 Gbps
  - ### Cluster Networking
    - Optimized instances launched in Placement Group

AWS Products - Compute

- EC2 launch

-

  - On-Demand Instances
  - Reserved Instances
  - Spot Instances
  - Dedicates Instances

AWS Products - Compute

- ## EC2 Initialization
  - Security Groups
  - Storage type
  - Encryption
  - Roles
  - Custom VPC
  - Bootstraps

AWS Products - Compute

- EC2 Instances features
  - Load Balancer and heath checks
  - Autoscaling
  - Raid Configuration
  - CloudWatch
  - CloudTrail

AWS Products - Compute

- EC2 Instances deployment:
  - Create, harden and clean up*
  - Snapshot and create AMI
  - Use Cloud Formation to deploy architecture

*https://aws.amazon.com/articles/9001172542712674

AWS Products - Compute

- EC2 Placement Groups:
    - Low latency 10 Gb network
    - Only one AZ
    - Only for optimized instance types
    - Same family recommended

AWS Products - Compute

- Lambda:
    - Code and create a function
    - Managed Infrastructure:
        - OS, patching, scaling, fail over, etc
    - Event driven response
        - Changes in S3 buckets or DB table
    - Compute service response
        - Http requests using API Gateway
        - API calls using AWS SDK

AWS Products - Compute

- ## Lambda:
  - ### Available languages:
    - Python, NodeJS, Java and C#
    -
  - ### Low cost:
    - Request # : 0.20 usd per 1M request
    - Duration: 0,00001667 per Gbs,
      - Memory allocated to the function
      - Execution time rounded to 100ms

AWS Products - Network

- Route 53 – Elastic Load Balancer
  - ELB don't have IPv4 addresses but a DNS
  - Use Alias records instead CNAME to refer to AWS resources

- Route 53 – Policies
  - Simple
  - Weighted
  - Lantency
  - Failover
  - Geolocation

AWS Products - Network

- ## VPC – Virtual Private Cloud
  - Logical data center in one region
  - Consists of:
    - IGW and Virtual Private GW for VPN
    - Route Tables, Network ACL, Security Groups and Subnets
    - 1 subnet belong to one AZ
    - Security Groups Vs NACLs
    - VPC Peering with other AWS accounts, No transitive peering

AWS Products - Network

- ## NAT Instance
  - Disable Source/Destination Check
  - Assign routes to IGW and private instances
  - Can create high availability using:
    - Autoscaling groups
    - Multiple AZ's
    - Script to automate failover

- ## Use bastion host to ssh to private instances
- ## Use Flowlogs see traffic inside VPC
  -

AWS Products - Network

- ## NAT Gateway
  - Autoscaling up to 10Gbps
  - No patching
  - Not associated to a Security Group
  - Automatically assigned public IP address
  - Update route tables

AWS Products - Network

- ## Network ACL's
  - Default allows all
  - Custom denies all
  - Each subnet must be associated to one ACL
  - Not associated to a Security Group
  - Evaluates rules in order until it finds one it applies
  - Separates inbound/outbound rules: Stateless

AWS Products - Databases

- **RDS – OLTP**
  - MySQL, Postgres, Oracle, MSSQL, MariaDB
  - Multi-AZ
  - Aurora
    - Multi AZ MySQL and Postgres Compatible
    - 2 DB copies per AZ (3 AZ min), physical.
    - Self healing
  - Read Replicas, up to 5 replicas of production DB

AWS Products - Databases

- ## DynamoDB – NoSQL
  - SSD Stored
  - 3 Geo different data centers
  - Eventual Consistency Read (default)
  - Strong Consistency Read (Available in less than 1s)
  - Pushbutton scaling – No downtime

AWS Products - Databases

- ## RedShift - OLAP
  - Data warehousing
  - Single Node (160Gb)
  - Multi Node
    - Leader Node: Connections and Queries
    - Compute Nodes: Up to 128 Nodes

- ## Elasticache – In memory cache
  - Memcache
  - Redis

AWS Products - Applications

- **SQS**
  - Stores message and wait for a computer to process them.
  - Decoupling the environment
  - Does not offer FIFO, pulls asynchronously
  - 12 hours visibility and up to 14 days retention
  - Message Oriented - "At least once delivery"
  - 64kb "chunks" and up to 256kb messages

AWS Products - Applications

- SWF
  - Coordinate work across distributed application components
  - Involves humans
  - Task oriented, they are only delivered once
  - Up to one year from beginning to end
  - Tracks all tasks and events in an application
  - Actors:
    - Starters, an application
    - Deciders
    - Activity workers

AWS Products - Applications

- ## SNS
  - Subscribers in a topic
    - HTTP
    - HTTPS
    - Email, Email -Jason
    - SQS
    - Application
    - Lambda
  -

AWS Products - Applications

- ## Elastic Transcoder
  - Transcode media files into formats for different devices
  - Easy to use, scalable, managed & cost effective
  - Seamless Delivery
    - Adaptive bitrate streamming or progressing download
  - Secure and AWS Integrated
  - Uses AWS SDKs
    - Java, .NET, Node.js, PHP, Python and Ruby

AWS Products - Overview

FIN