**AWS Framework**

**Five Pillars of Well-Architected Framework**

**O.S.R.P.C.**

**Security**

Ability to protect data, systems, and assets. Take advantage of cloud technologies to improve security.

**Reliability**

Ability of a workload to perform its intended function correctly and consistently when its expected to. Including the ability to operate and test the workload through its total lifecycle.

**Performance Efficiency**

Ability to use computing power efficiently to meet system requirements and to maintain that efficiency as demand changes and technology evolves.

**Cost Optimization**

Ability to run systems to deliver business value at the lowest price point.

**Good Design Principles**

**Stop guessing your capacity needs**

**Test systems at production scale**

**-**in the cloud you can create production scale environments on demand, test, and then decommission the resources. This costs only a fraction of simulating live environments on premise.

**Automate to make architectural experimentation easier**

**-**automation allows you to create and replicate your workloads at low cost and avoid the expense of manual effort. You can track changes to your automation, audit the impact, and revert to previous parameters when necessary.

**Allow for evolutionary architectures**

**Drive architectures using data**

-You can collect data on how your architectural choices affect the behavior of your workload. This lets you make fact based decisions.

**Improve through game days**

-Test how your architecture performs by by regularly scheduling game days to simulate events in production.

**EC2 (Elastic Compute Cloud)**

**Technical**:

-Resizable compute capacity in the cloud

-99.99% availability

-Each region has at least 3 availability zones

-275 typs of instances

-Can hibernate EC2 instance (uses EBS and billed at EBS rates). Persists RAM. Applications that take awhile to bootstrap or persist state into memory benefit from this.

-Customers requiring massive floating point power will benefit from GPU instances

-Customers requiring high graphics capabilities will benefit from GPU Graphic instances

-Scalable computing capacity in the cloud.

-No need to invest in hardware upfront so develop and deploy applications faster.

-Scale up or down reducing need to forecast traffic

-AMI (Amazon Machine Image) preconfigured templates that package up what you need for a server including OS and additional software.

-Instance Types configurations of CPU, memory, storage, and networking capacity

-Secure login via Key Pairs AWS stores the public, you keep the private

-Instance Store Volumes temporary data that's deleted when you stop, hibernate, or terminate an instance

-Elastic Block Store (EBS) volumes for persisting data

-Regions and availability zones for both instances and EBS volumes

-Security Groups firewalls that allows you to control protocols, ports, and IP ranges that can reach your instance

-Static IPV4 addresses for dynamic cloud computing known as Elastic IP addresses

-Manage with AWS Console in web or via CLI

-Can use AWS Cloud Formation, use templates to launch resources

-Supports Query API GET and POST

-Uses ECC memory

Questions:

Billed by hour or second?

**Payment:**

-On-Demand

Pay by the hour, no long term commitments or up front costs

-Savings Plan

Reduced cost by committing to a consistent usage amount, paid per hour in 1 or 3 years terms

-Reserved Instances

Reduced cost by committing to a specific instance configuration, including Type and Region for 1 or 3 year terms

-Spot Instances

Request unused EC2 instances

For bill go to Billing and Cost Management Dashboard in AWS Billing and Cost Management console

**Security**:

-Lockdown security model prevents administrative access

-AWS Nitro offloads EC2 hardware functions to dedicated areas reducing attack surface

-Supports 89 security standards including CI-DSS, HIPAA/HITECH, FedRAMP, GDPR, FIPS

140-2, and NIST 800-171

**Billing:**

-On-Demand:

-Pay for compute capacity by the hour or second.

-Applications with short term or spikey or unpredictable workloads that can’t be interupted

-Spot Instances:

-Request spare capacity at up to 90% off

-Applications that have flexible start and stop times

-Apps that are only feasible at very low compute prices

-Users with urgent needs for large amounts of additional capacity

Savings Plans:

-Lower pricing model in exchange for a committment of consistent amount of usage

Reserved Instances:

-Discount on price by paying up front, reserves a specific availability zone instance

Dedicated Hosts:

-A Physical server dedicated for your use. Can help reduce costs by allowing you to use your existing server-bound software licenses, including Windows Server, SQL Server, SUSE Linux Enterprise server