Workshop #1

Intro to AWS, Compute in the Cloud

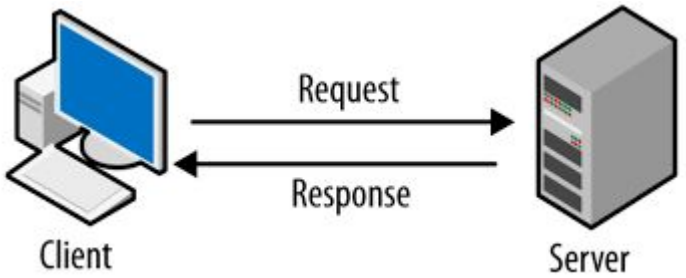
What is AWS?

- AWS offers a massive range of services
- Simple services/solutions include:
  - Compute
  - Storage
- Complex services/solutions include:
  - AL/ML
  - Robot development platforms
  - Orbital Satellite rental
  - And many, many more!

Fundamental Cloud Compute Model/Client-Server Model

- Client = Browser, Application, etc…
- Server = Virtual Server

- Client makes a request and the server evaluates the details and returns the information!



Models for Cloud Computing

- Cloud-Based:
- All Applications are:
  - Migrated to the cloud!
  - Ran on the cloud!
  - Designed and Built on the cloud

- On Premises (aka private cloud):
  - Resources are deployed using *virtualization* and other tools
  - Applications are run and fetch data from on-premises data centers.

- Hybrid:
- Situational, but for simplicity's sake, just remember it is a combination of cloud-based and on-premises!

Benefits of Cloud Computing

- Trade upfront expense for variable expense
- Stop spending money to run and maintain data centers
- Stop guessing capacity
- Increase speed and agility
- Go global in minutes

These are very important to memorize!

Compute in the Cloud!

Amazon Elastic Compute Cloud (EC2)

- Essentially a virtual server.
- Provides secure, resizable compute capacity in the cloud as *instances*.
- Some Customizable configurations:
  - Operating System
  - Application Server
  - Instance type
- Handles your workload!

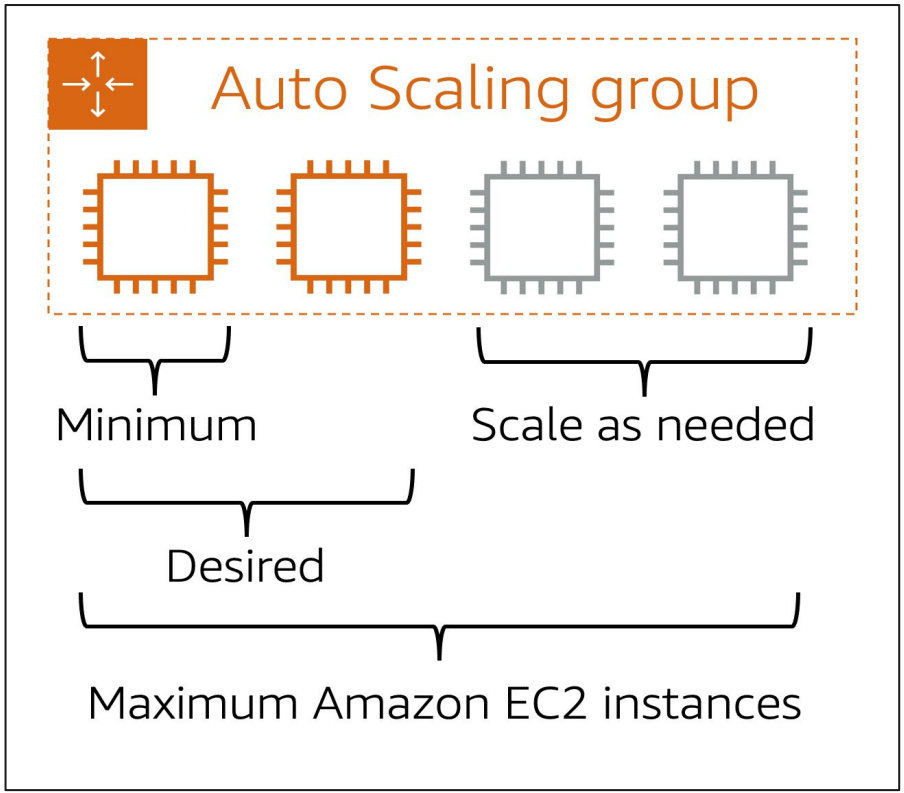
EC2 Instance Types

- **General Purpose:**
  - Balanced workloads
- **Computer Optimized:**
  - High-performance web-servers, compute-intensive applications, dedicated gaming servers
- **Memory Optimized:**
  - Large amount of data/data analytics
- **Accelerated Computing:**
  - Graphics applications/streaming
- **Storage Optimized:**
  - Huge amounts of storage, like sequential read-writes (i.e. log processing(

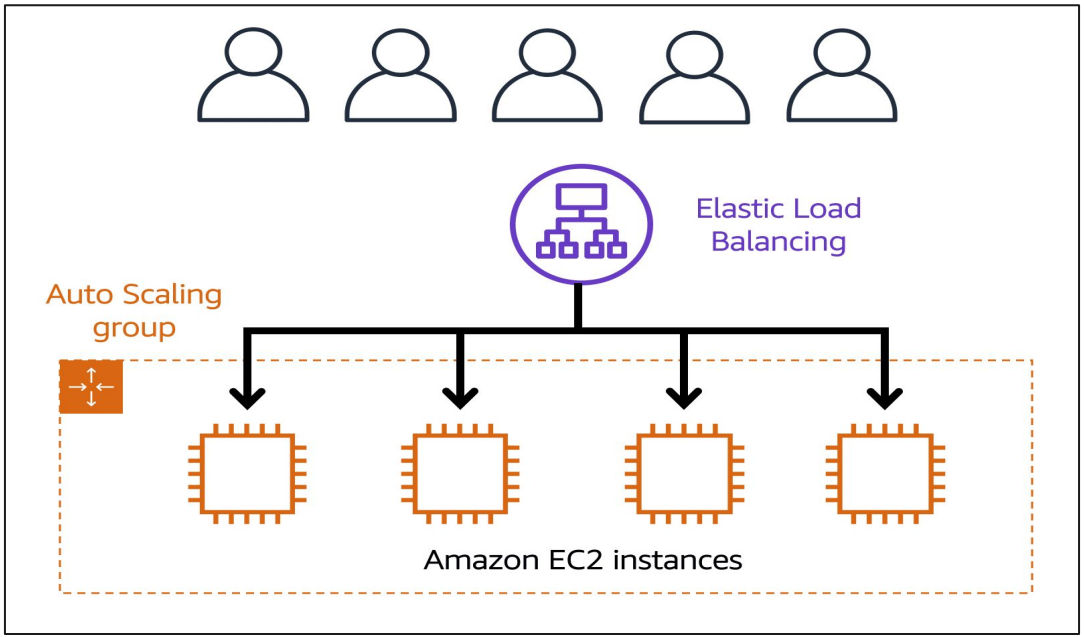
EC2 Pricing

- **On-Demand:** For short-term, irregular workloads. Pay for what you use use.
- **Amazon EC2 Savings Plans:** Reduce costs by committing to 1-year or 3-year usage term.
- **Reserved Instances:** Billing discount applied to On-Demand instances. Purchase them for 1 or 3-year usage terms. On-Demand rates will be charged until you terminate the instance or purchase a new Reserved Instance.
- **Spot Instances:** Workloads with flexible start and end times that can withstand interruptions.
- **Dedicated Hosts:** Literally a physical server with EC2 instance capacity fully dedicated to your use. Most expensive.

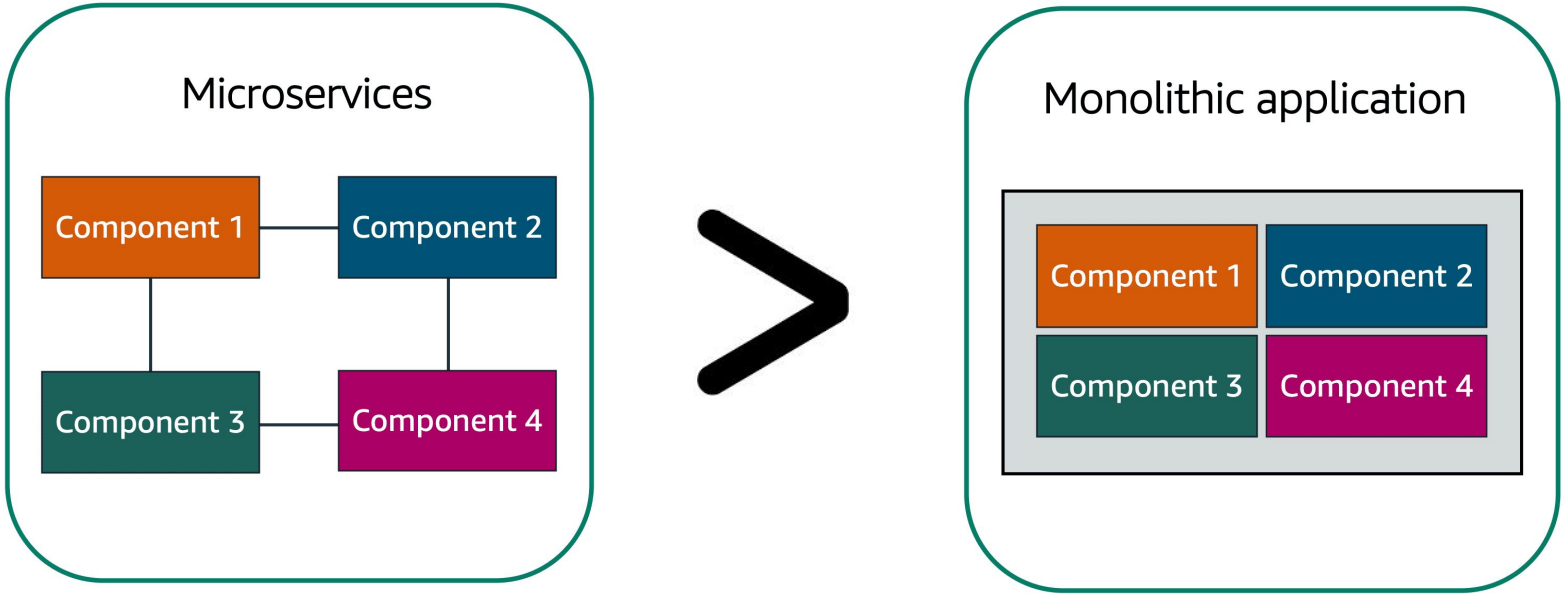
EC2 Scaling


Auto Scaling group
Minimum
Scale as needed
Desired
Maximum Amazon EC2 instances

Amazon Elastic Load Balancer/Balancing (ELB)



Loose-Coupling



Amazon Simple Notification Service (SNS)

- AWS pub/sub service
- A publisher can publish messages to subscribers
- Subscribers can be:
  - Web servers
  - Email addresses
  - AWS Lambda functions

Amazon Simple Queue Service (SQS)

- AWS message queueing service
- Send, store, and receive messages between software components
- Decoupled approach lets separate components work efficiently and independently.

Additional AWS Compute Services

AWS Lambda

AWS Elastic Container Service (ECS)

AWS Elastic Kubernetes Service (EKS)

AWS Fargate

Questions?

Hands-On Activity

Thank You!