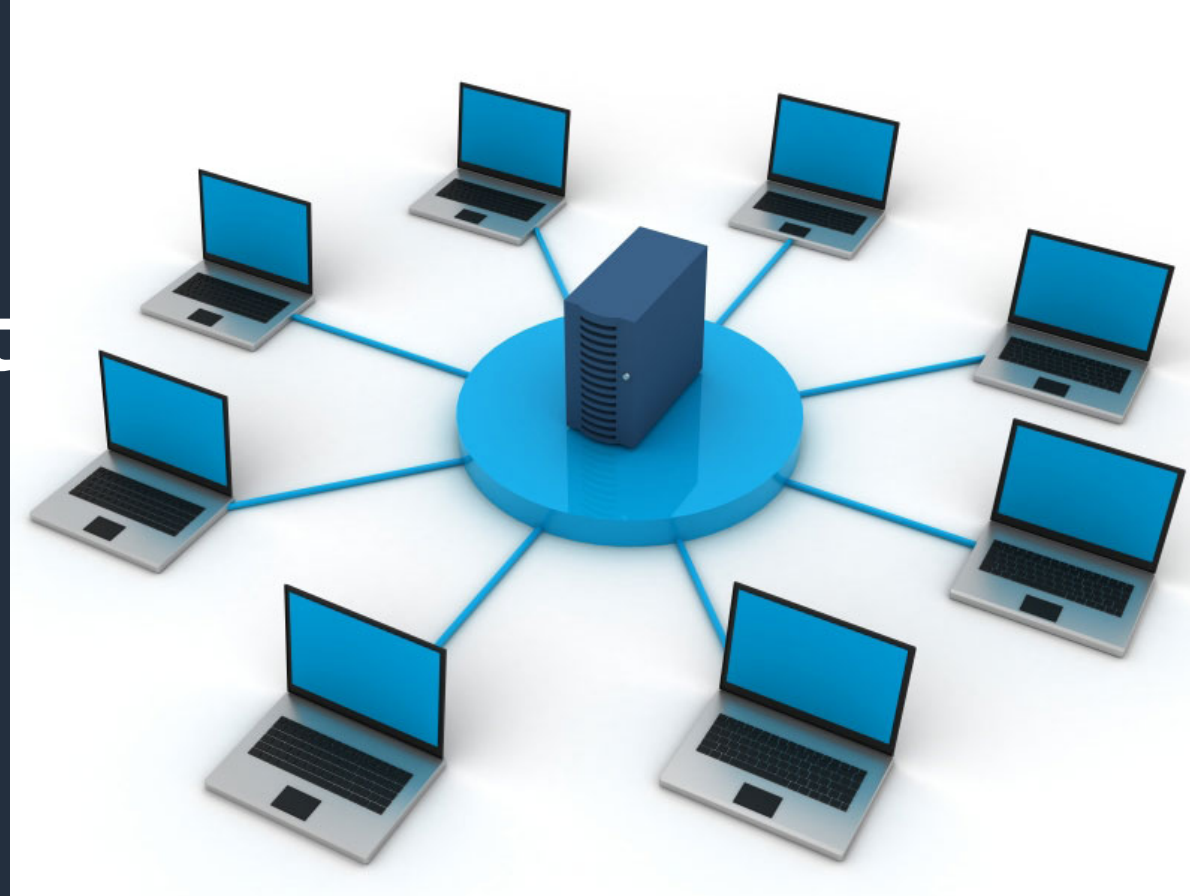aws

Cloud Computing, IAM & EC2
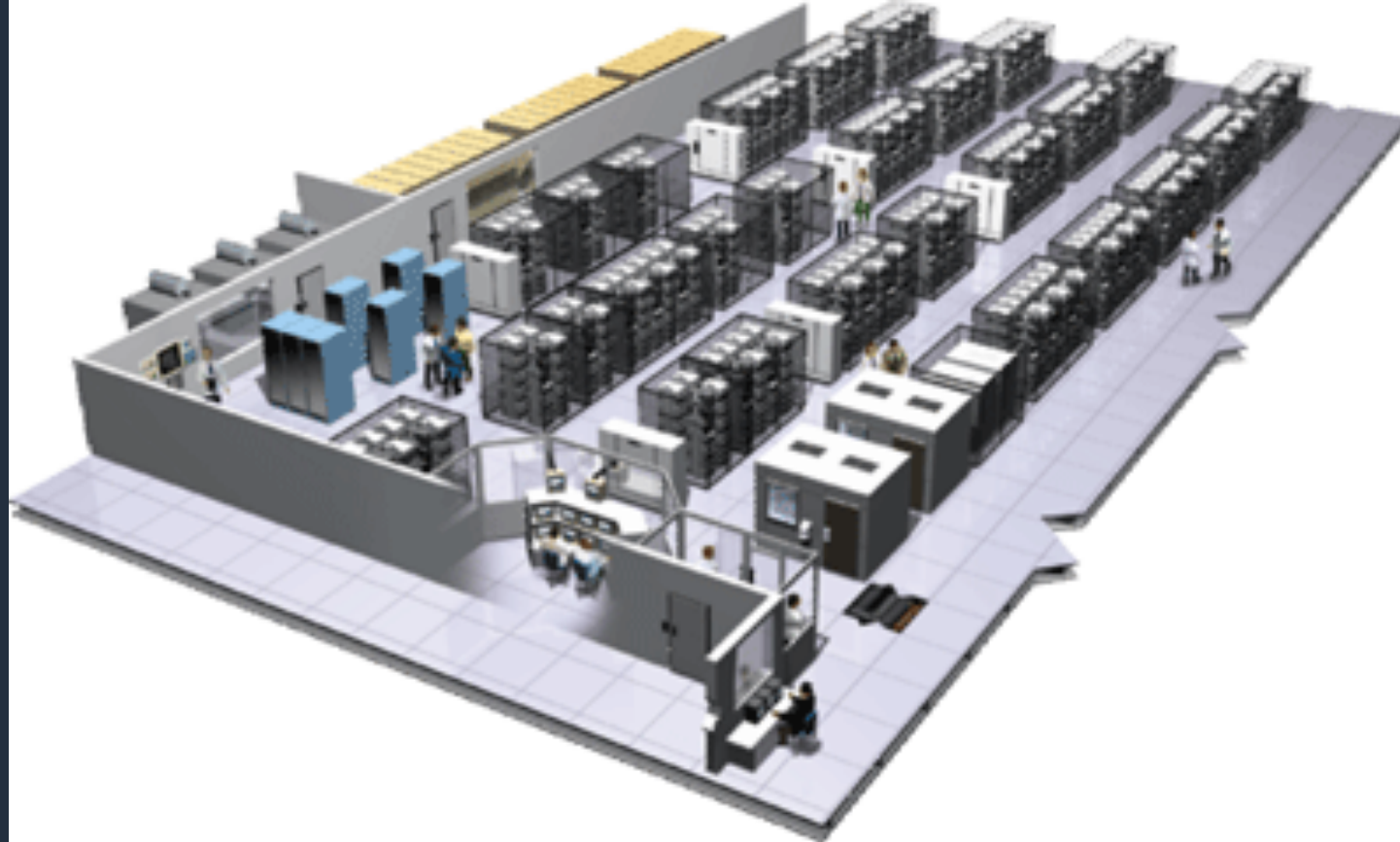
Aditya Pendyala

04/15/2021

How are applicat

Traditional Data Center

Problems with Traditional Data Centers

- Pay for data center rent / acquisition
- Pay for power supply, cooling & maintenance
- Replace aging hardware
- Respond to demand curves
- Hire a team to monitor infrastructure
- Physical Security of the data center
- Disaster recovery
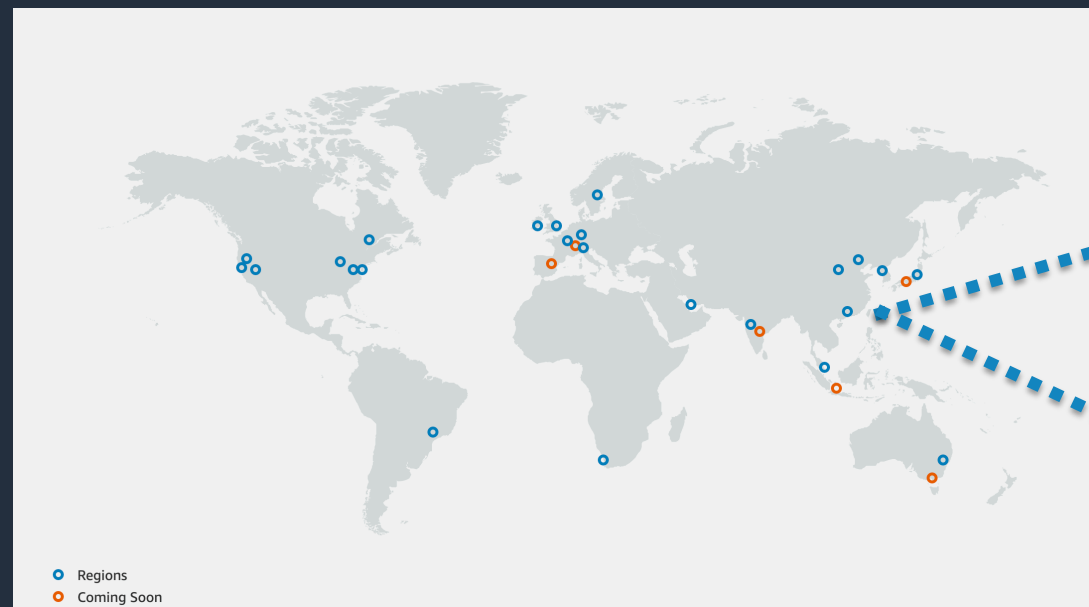
aws

What is Cloud Computing ?
What is **Amazon Web Services (AWS)?**

A broad and deep platform that helps customers build sophisticated, scalable, secure applications

AWS's Global foorprint

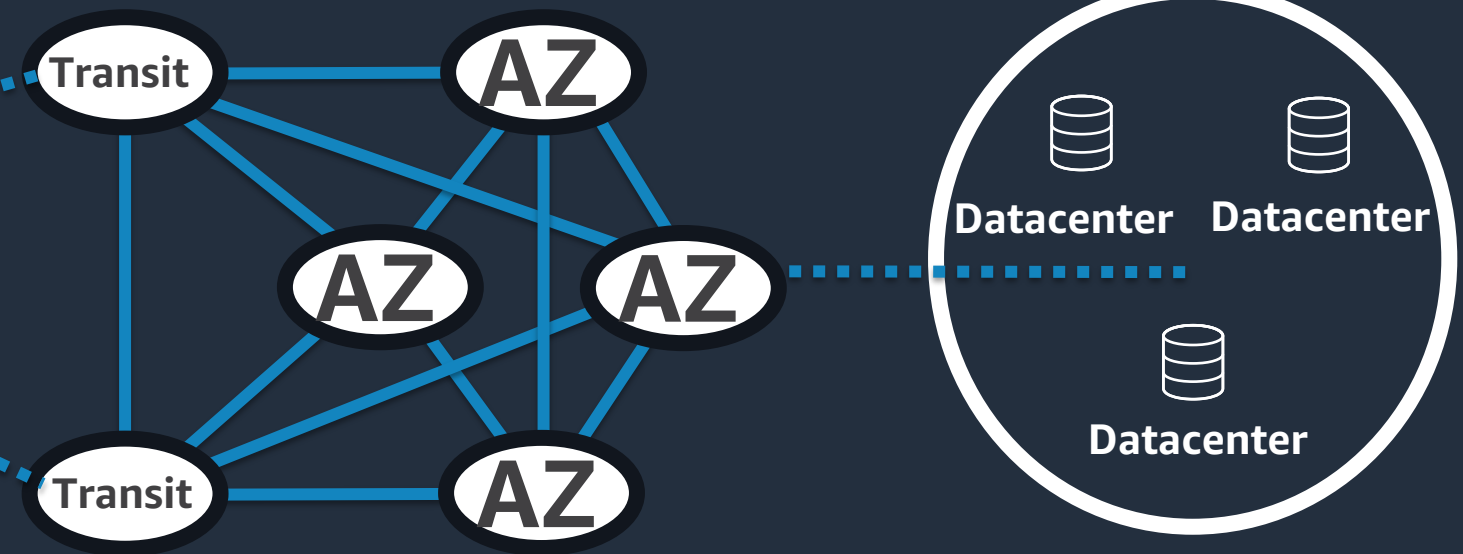The largest global foot print consistently built with a multi-AZ and multi-datacenter design

AWS Region

AWS Availability Zone (AZ)

**Region & Number of Availability Zones**

Announced Regions
Australia, India, Indonesia, Japan, Spain, and Switzerland

25 Regions
80 Availability Zones
230+ Points of Presence

A Region is a physical location in the world where we have multiple **Availability Zones.**

Availability Zones consist of one or more discrete data centers, each with redundant power, networking, and connectivity, housed in separate facilities.

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Broad and Deep **Functionality**

TECHNICAL & BUSINESS SUPPORT

| Support | Professional Services | Optimization Guidance | Partner Ecosystem | Training & Certification | Solutions Management | Account Management | Security & Billing Reports | Personalized Dashboard |

MARKETPLACE

| Business Apps | Business Intelligence | DevOps Tools | Security | Networking | Databases | Storage |

ANALYTICS

Data Warehousing	Elasticsearch
Business Intelligence	Data Pipelines
Hadoop/Spark	Interactive SQL Queries
Streaming Data Analysis	ETL
Streaming Data Collection	

APP SERVICES

Queuing & Notifications	Email
Workflow	Transcoding
Search	

DEV OPS

- One-click App Deployment
- Resource Templates
- Build & Test
- Application Lifecycle Management
- DevOps Resource Management
- Triggers
- Containers
- Analyze & Debug
- Patching

MOBILE SERVICES

- API Gateway
- Single Integrated Console
- Identity
- Sync
- Mobile Analytics
- Mobile App Testing
- Targeted Push Notifications

IoT

- Rules Engine
- Device Shadows
- Device SDKs
- Device Gateway
- Registry
- Local Compute

MACHINE LEARNING

- Custom Model Training & Hosting
- Image & Scene Recognition
- Facial Recognition & Analysis
- Facial Search
- Text to Speech
- Conversational Chatbots
- Deep Learning (Apache MXNet, TensorFlow, & others)

ENTERPRISE APPS

- Virtual Desktops
- Sharing & Collaboration
- Corporate Email
- App Streaming
- Communications
- Contact Center

HYBRID ARCHITECTURE

- Data Integration
- Integrated Networking
- Integrated Identity & Access
- Integrated Resource & Deployment Management
- Integrated Devices & Edge Systems

MIGRATION

- Schema Conversion
- Exabyte-Scale Data Migration
- Application Migration
- Database Migration
- Server Migration

INFRASTRUCTURE

- Regions
- Availability Zones
- Points of Presence

CORE SERVICES

Compute
VMs, Auto-scaling, Load Balancing, Containers, Virtual Private Servers, Batch Computing, Cloud Functions, Elastic GPUs, Edge Computing

Storage
Object, Blocks, File, Archivals, Import/Export, Exabyte-scale data transfer

Databases
Relational, NoSQL, Caching, Migration, PostgreSQL compatible

Networking
VPC, DX, DNS

CDN

SECURITY & COMPLIANCE

| Identity Management | Access Control | Monitoring & Logs | Assessment & Reporting | Web Application Firewall |
| Configuration Compliance | Key Management & Storage | Account Grouping | Resource & Usage Auditing | DDOS Protection |

MANAGEMENT TOOLS

| Manage Resources | Service Catalogue | Configuration Tracking |
| Monitoring | Server Management | Resource Templates |

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Shared security responsibility with AWS

Customer is responsible for
security **in** the cloud
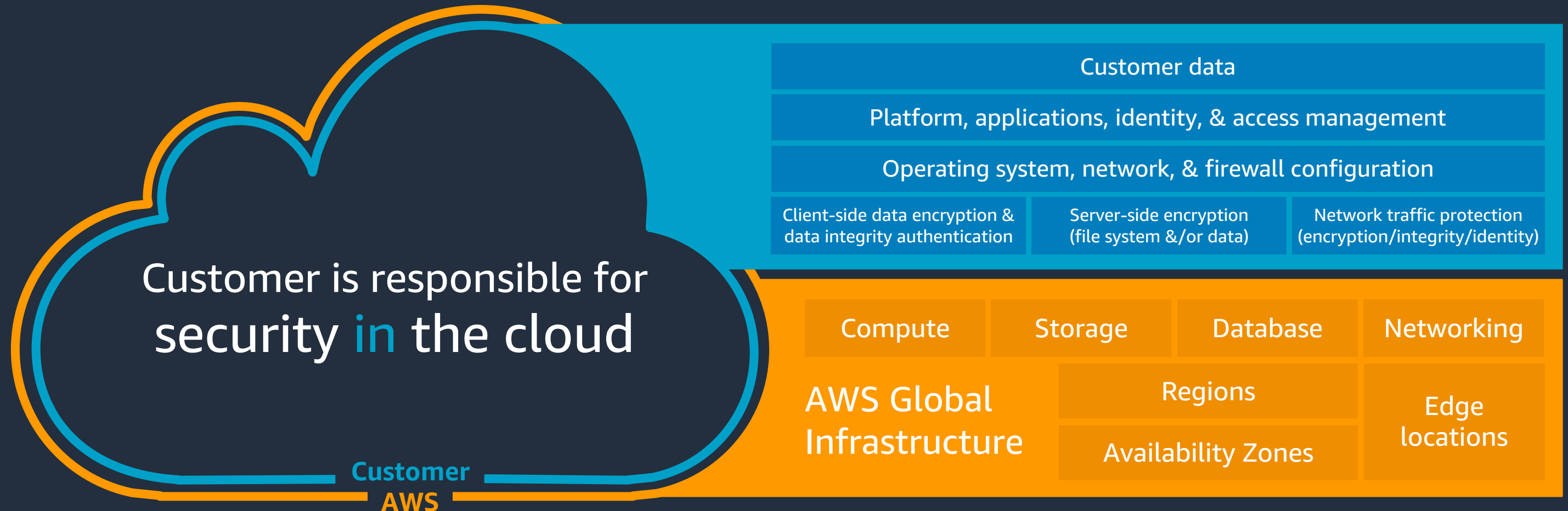
AWS is responsible for
security **of** the cloud

Customer
AWS

Customer data		
Platform, applications, identity, & access management		
Operating system, network, & firewall configuration		
Client-side data encryption & data integrity authentication	Server-side encryption (file system &/or data)	Network traffic protection (encryption/integrity/identity)

Compute	Storage	Database	Networking

AWS Global Infrastructure	Regions	Edge locations
	Availability Zones	

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Identity Access Management (IAM)

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Identity Access Management (IAM)

➤ Users
  ➤ People within Organization
➤ Groups
  ➤ Groups of users
  ➤ Users can belong to multiple groups
➤ Policies
  ➤ JSON Documents
  ➤ Defines permissions
➤ Roles
  ➤ Assign permissions to AWS services to access other AWS services

```json
{
    "Version": "2012-10-17",
    "Statement": {
        "Effect": "Allow",
        "Action": [
            "ec2:startInstances",
            "ec2:stopInstances"
        ],
        "Resource": "*",
        "Condition": {"StringEquals":
            {"ec2:ResourceTag/CostCenter": "${aws:PrincipalTag/CostCenter}"}}
    }
}
```

aws

EC2

EC2

- Elastic Compute Cloud

- Sizing & Configurations Options

  - OS choice

    - Linux

    - Windows

    - MacOS

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EC2 – Purchase Options

aws

EC2 – Purchase Options

➢ On Demand Instances

    ➢ Spin the instance when you need

    ➢ Per Second Billing

    ➢ No Long term commitment

➢ Reserved Instances

    ➢ Reservation period of 1 year or 3 years

    ➢ Upto 72% cost savings over On-Demand instances

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EC2 – Purchase Options

➢ Dedicated Hosts
  ➢ A fully dedicated physical server
  ➢ Useful for Bring Your Own License Model

➢ Dedicated Instances
  ➢ Instances running on hardware dedicated to you
  ➢ Hardware may be shared with other instances in same account

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EC2 Purchase Options

➢ Spot Instances
  ➢ Upto 90% discount off On-Demand instances
  ➢ Same instances as On-Demand
  ➢ Makes use of un-used EC2 capacity on AWS Cloud
  ➢ But…
    ➢ You might lose the instance with 2 minutes of notice time
  ➢ Set Max Price you are willing to pay
    ➢ EC2 Spot Price varies by demand
    ➢ If your price < current spot price, instance is claimed
    ➢ You can hibernate your instance if you need to preserve your state

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Auto Scaling Group

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Auto Scaling Group

- Load changes based on many factors on applications
- "Scale-out" when there is high demand automatically
- "Scale-in" when demand normalizes automatically
- Registers & deregisters EC2 instances with Load Balancer

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