AWS Academy
Getting Set Up

• You’ll receive an email invite soon
• From instrustructure.com
• Click on Get Started
AWS Academy
Getting Set Up

• You’ll likely have to Create My Account
• Select a Password and Time Zone
• Uncheck the AWS Spam
• Agree to Use Policy
• Register
AWS Academy

Getting Set Up

- https://www.awsacademy.com/LMS_Login

AWS Academy Learner Lab provides a long-running sandbox environment for exploration of AWS services. Within this class, students will have access to an AWS Production account with access to the AWS resources set up in this environment for the duration of the class. We limit your budget ($100 USD), so you should exercise caution to prevent the AWS resources set up in this environment from running out of credit. If you exceed your budget, you may be unable to complete your environment and lose all of your work.

Each session lasts for 4 hours by default, although you can extend a session by pressing the start button to reset the session timer. At the end of the session, the resources you created will persist. However, we automatically shut down sessions after 4 hours to ensure that you have a chance to complete your work.
AWS Academy
Getting Set Up

• Go into Modules
• Select Learner Lab
  • Note: Safari security policy prevents the Vocareum frame from loading
  • Use Chrome for this
AWS Academy
Getting Set Up

Lab Account Status
AWS Terminal
Start Lab Button
Enter Full Screen
AWS Academy
Getting Set Up

• Click Start Lab Button
• This takes a good 3-5 minutes the very first time to start
EC2 Security
Download SSH Keys

- Click on AWS Details
- Download the PEM file
  - May need the PPK file if you are using Putty on Windows
- You’ll need this for SSH Terminal access and File Transfer
AWS Academy

Getting Set Up

- AWS Account Status Button goes green
- Click the AWS Account Status button to load the AWS Console
- Current Active Lab Session Time Displayed. 4 hours per session
- Total Lab $ Allowance used across all lab sessions. Don’t go over this!
AWS Academy
AWS Console Overview

• AWS Console
• Search for Services
• Pin Favorite Services
• Select Region
AWS Academy
AWS Console Overview

• Can only use regions:
  • N. Virginia (us-east-1)
  • Oregon (us-west-2)

• Doesn’t really matter which

• Be consistent

• I’ll be using Oregon
AWS Overview
Infrastructure as a Service

Platform as a Service

Software as a Service
IaaS
PaaS
SaaS
IaaS
Less Maintenance
More Control
Less $$
More Time

PaaS

SaaS

More $$
Less Time
AWS Services
### Three Main Categories

<table>
<thead>
<tr>
<th>Compute</th>
<th>Storage</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC2</td>
<td>S3</td>
<td>S3</td>
</tr>
<tr>
<td>RDS</td>
<td>RDS</td>
<td>VPC</td>
</tr>
<tr>
<td>Lambda</td>
<td>EBS</td>
<td>VPN</td>
</tr>
</tbody>
</table>
## Compare On-Prem to Cloud

<table>
<thead>
<tr>
<th>On-Prem</th>
<th>AWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMWare</td>
<td>EC2</td>
</tr>
<tr>
<td>Isilon / Synology / NAS</td>
<td>EFS</td>
</tr>
<tr>
<td>F5 bigIP</td>
<td>ELB / ALB</td>
</tr>
<tr>
<td>Firewalls</td>
<td>Security Groups</td>
</tr>
</tbody>
</table>
EC2

- Elastic Cloud Compute
- Virtual Machines (VMs)
- Linux or Windows
- Basic Server Building Block
- Provision, log in, configure as you like
EBS

- Elastic Block Storage
- Standard block storage attached to EC2 instances
- Multiple volumes can be attached to an instance
- Snapshots
EFS

• Elastic File System

• Amazon's Managed NFS Service

• Unix-centric shared file system
  • Mount a single file system across many application hosts
  • Store application files that need to be shared
S3

• Simple Storage System
• Basic Object Storage
  • Key/Value Pairs
  • NOT Block Storage! Cannot directly attach to EC2 Instances
• Good for storing lots of data independent of a single server
• Access through APIs and HTTP
• Much cheaper than EBS
RDS

• Relational Database Service
• PaaS for Databases
  • Oracle, MSSQL, MySQL, PostgresSQL, Aurora
  • AWS manages the servers, minor patching
  • Less management on your part, also less configurability
ELB / ALB

- Elastic Load Balancer / Application Load Balancer
- Simpler, dumber versions of an F5
- Accepts incoming traffic on some port, balances to \( n \) backend servers
- Usually public-facing, in public subnets
- SSL/TLS Termination
Regions

• Geographic location of AWS data centers
• Oregon, Virginia, London, etc.
• Each Region contains multiple physical data centers, each with independent power and networking
• Resources must be specified in a particular Region
  • We use Oregon (us-west-2) for almost everything
Availability Zone

- Within a region, there are multiple Availability Zones
- Each AZ has separate power and networking
- Designed for physical redundancy
- High Availability is achieved by deploying resources into multiple AZs
- Many services (RDS, ELBs, etc) are Multi-AZ capable
VPC

• Virtual Private Cloud
• AWS's Network Construct
• Subnets, Route Table, ACLs, VPNs, etc.
• Almost all compute resources must be assigned to a subnet in a VPC
  • (EC2, RDS, ELBs, EFS, etc)
AWS Shared Responsibility Model
https://aws.amazon.com/compliance/shared-responsibility-model/
Permissions Model

Can I push this button?
Permissions in 3 parts

Someone Does something To something

ec2:RunInstance
Permissions in 3 parts

Principal

Action

Resource

ec2:RunInstance
IAM

- Identity & Access Management
- Controls who can do which actions to what resources
IAM User

- A user entity
- Could be configured with web console access (or not)
- Could be configured with API access keys (or not)
- Can have Roles assigned to it, and belong to groups
IAM Role

• A collection of 0 or more Policies

• Roles can be attached to users and services
IAM Policy

- A set of instructions allowing or denying an action to be performed on some resource
- Policies are assigned to Users or Roles
- JSON Document
IAM Policy

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "logs:DescribeLogGroups"
      ],
      "Resource": "*",
      "Effect": "Allow"
    },
    {
      "Action": [
        "logs:Describe*",
        "logs:FilterLogEvents",
        "logs:GetLogEvents"
      ],
      "Resource": "arn:aws:logs::*:123412341234:log-group:kf*",
      "Effect": "Allow"
    }
  ]
}
```
There Are Lots of Actions

e2: AcceptReservedInstancesExchangeQuote
e2: AcceptVpcPeeringConnection
e2: AllocateAddress
e2: AllocateHosts
e2: AssignPrivateIpAddress
e2: AssociateAddress
e2: AssociateDhcpOptions
e2: AssociateFgImage

e2: AssociateElasticNetworkProfile
e2: AssociateRouteTable
e2: AttachClassicLinkVpc
e2: AttachInternetGateway
e2: AttachNetworkInterface
e2: AttachVolume

e2: AttachVpnGateway
e2: AuthorizeSecurityGroupEgress
e2: AuthorizeSecurityGroupIngress
e2: BundleInstance
e2: CancelBundleTask
e2: CancelConversionTask
e2: CancelExportTask
e2: CancelConversionTask
e2: CancelBundleTask

e2: CancelImportTask

e2: CancelReservedInstancesListing
e2: CancelSpotFleetListing
e2: CancelSpotFleetRequests

e2: CancelSpotInstanceRequests

e2: ConfirmProductInstance

e2: CopyImage
e2: CopySnapshot
e2: CreateCustomerGateway
e2: CreateDhcpOptions
e2: CreateFlowLogs
e2: CreateImage

e2: CreateInstanceExportTask
e2: CreateInternetGateway

e2: CreateKeyPair
e2: CreateNetworkGateway
e2: CreateNetworkAcl
e2: CreateNetworkAclEntry

e2: CreatePlacementGroup

e2: CreateReservedInstancesListing

e2: CreateRoute

e2: Create(route)

e2: CreateSecurityGroup

e2: CreateSnapshot
e2: CreateSpotDatafeedSubscription

e2: CreateSubnet

e2: CreateTags

e2: CreateVpc

e2: CreateVpcEndpoint
e2: CreateVpcPeeringConnection

e2: CreateVpcPeeringConnectionRoute

e2: CreateVpnConnection

e2: CreateVpnConnectionRoute

e2: CreateVpnGateway
e2: DeleteCustomerGateway
e2: DeleteDhcpOptions
e2: DeleteFlowLogs
e2: DeleteInternetGateway

e2: DeleteKeyPair
e2: DeleteNatGateway
e2: DeleteNetworkAcl
e2: DeleteNetworkAclEntry

e2: DeleteNetworkInterface
e2: DeletePlacementGroup

e2: DeleteRouteTable

e2: DeleteSecurityGroup

e2: DeleteSnapshot
e2: DeleteSpotDatafeedSubscription

e2: DeleteSubnet

e2: DeleteTags

e2: DeleteVolume
e2: DeleteVpcEndpoints

e2: DeleteVpcPeeringConnection

e2: DeleteVpcPeeringConnectionRoute

e2: DeleteVpnGateway

e2: DeregisterImage

e2: DescribeAccountAttributes

e2: DescribeAddresses

e2: DescribeAvailabilityZones

e2: DescribeBundleTasks

e2: DescribeClassicLinkInstances

e2: DescribeConversionTasks

e2: DescribeCustomerGateways

e2: DescribeDhcpOptions

e2: DescribeExportTasks

e2: DescribeFlowLogs

e2: DescribeHosts

e2: DescribeHostReservationOffering

e2: DescribeIamInstanceProfileAssociation

e2: DescribeIdentityIDFormat

e2: DescribeImageAttribute

e2: DescribeImages

e2: DescribeImportImageTasks

e2: DescribeImportSnapshotTasks

e2: DescribeInstanceAttribute

e2: DescribeInstanceTasks

e2: DescribeInstanceStatus

e2: DescribeInstances

e2: DescribeInternetGateways

e2: DescribeKeyPairs

e2: DescribeMovingAddresses

e2: DescribeNatGateways

e2: DescribeNetworkAcls

e2: DescribeNetworkInterfaceAttribute

e2: DescribeNetworkInterfaces

e2: DescribePlacementGroups

e2: DescribePrefixLists

e2: DescribeRegions

e2: DescribeReservedInstances

e2: DescribeReservedInstancesListings

e2: DescribeReservedInstancesModifications

e2: DescribeReservedInstancesOfferings

e2: DescribeRouteTables

e2: DescribeSecurityGroups

e2: DescribeSnapshotAttribute

e2: DescribeSnapshots

e2: DescribeSpotDatafeedSubscription

e2: DescribeSpotFleetInstances

e2: DescribeSpotFleetRequestId

e2: DescribeSpotFleetRequests
Demo