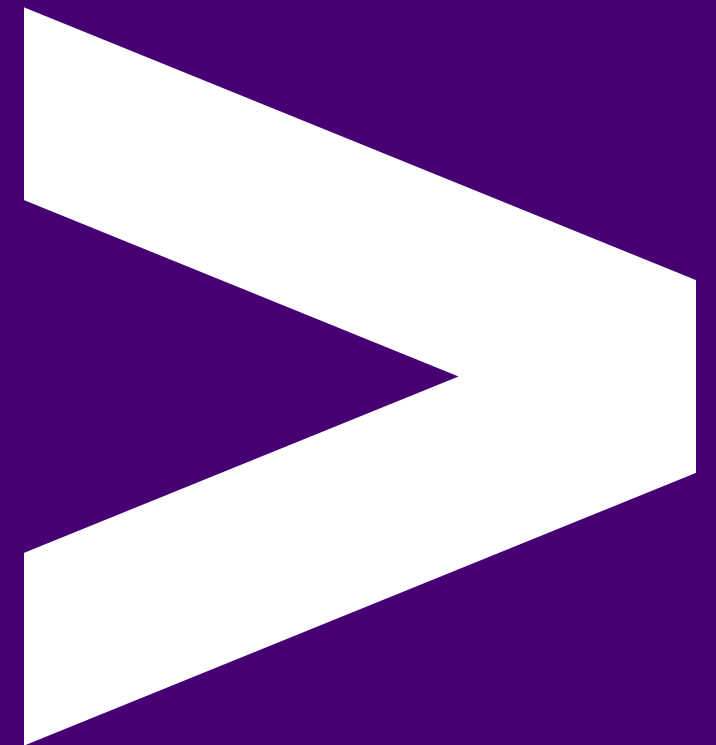


# AWS 01 - Intro to Cloud and AWS



# AWS sessions list

- AWS 01 AWS + Cloud Intro ← 1.5hrs
- AWS 02 AWS CLI Setup 1.5hrs
- AWS 03 S3 Storage (Console) 1.5hrs
- AWS 04 CloudFormation Intro + S3 Storage (IaC) 1.5hrs
- AWS 05 Lambda Intro 1.5hrs
- AWS 06 Lambda (IaC) 1.5hrs
- AWS 07 Redshift (IaC) 1.5hrs
- AWS 08 EC2 (IaC) + Grafana setup 1.5hrs

Note the "you are here" arrow "←" which we will update through the related sessions.

# Overview

- What is AWS?
- AWS Console
- IAM (Identity and Access Management)

# Learning Objectives

- Define the role AWS plays in modern software development
- Identify the different use cases for the AWS console
- Understand how to access the AWS Console for the course
- Understand the need for regions and availability zones
- Understand the user and access management capabilities of IAM

# What is the cloud?

- "The cloud" refers to servers that are accessed over the Internet, and the software and databases that run on those servers
- Cloud servers are located in data centers all over the world
- By using cloud computing, users and companies do not have to manage physical servers themselves or run software applications on their own machines

# AWS

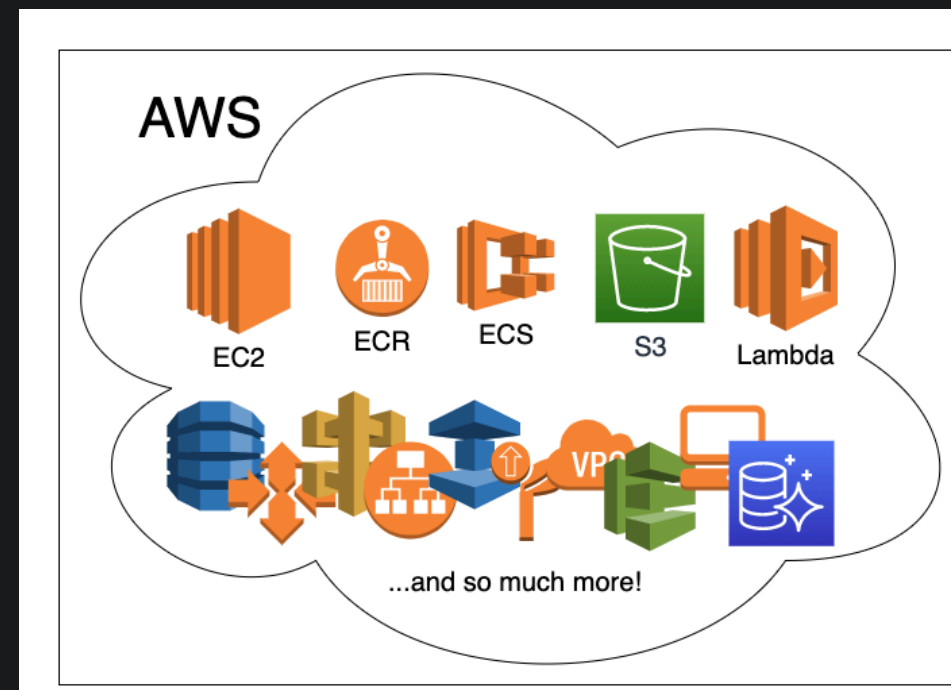


# What is AWS?

- **Amazon Web Services** is a cloud computing platform
- Offerings encompass computing power, database storage, content delivery, logging and monitoring - if you need to do a thing, there's an AWS service for it
- At last count, there were over 200 AWS services to choose from...

# What is AWS?

One way of thinking of any Cloud provider is as a set of services we can use in our projects;



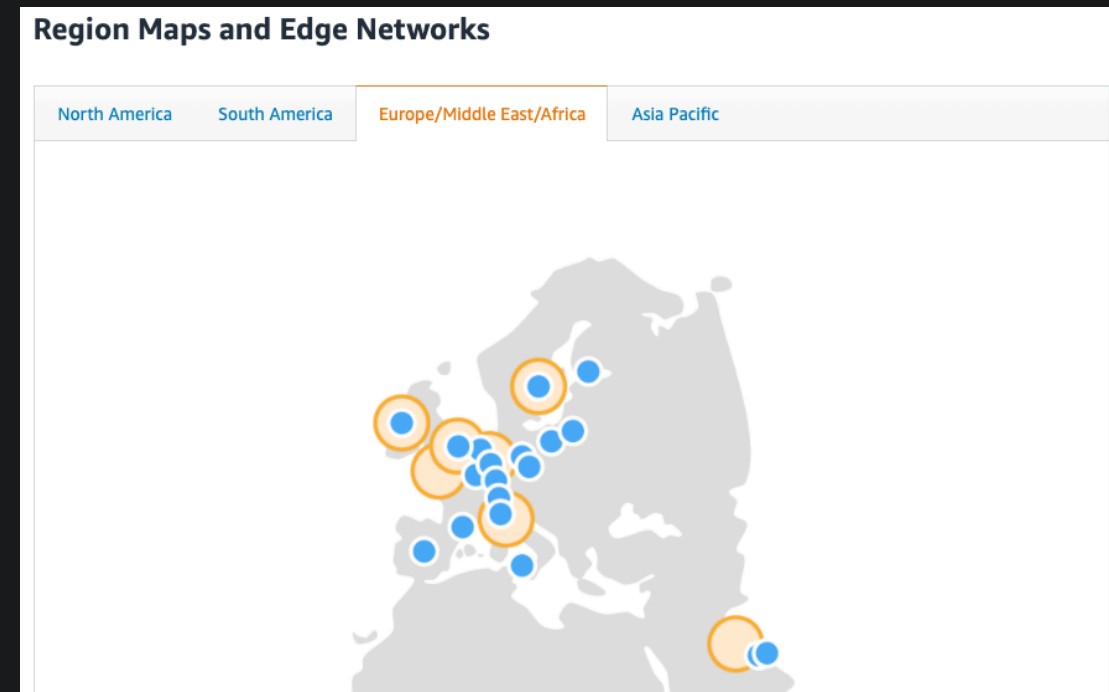


# Regions

- A physical location somewhere in the world where AWS data centers are clustered
- Each group of logical data centres within a Region is called an **Availability Zone**
- Multiple geographic Regions, including North America, South America, Europe, China, Asia Pacific, South Africa, and the Middle East
- Regions have a code name, such as `eu-west-1` which represents the Irish region, or `eu-west-2`, which is London

# Regions

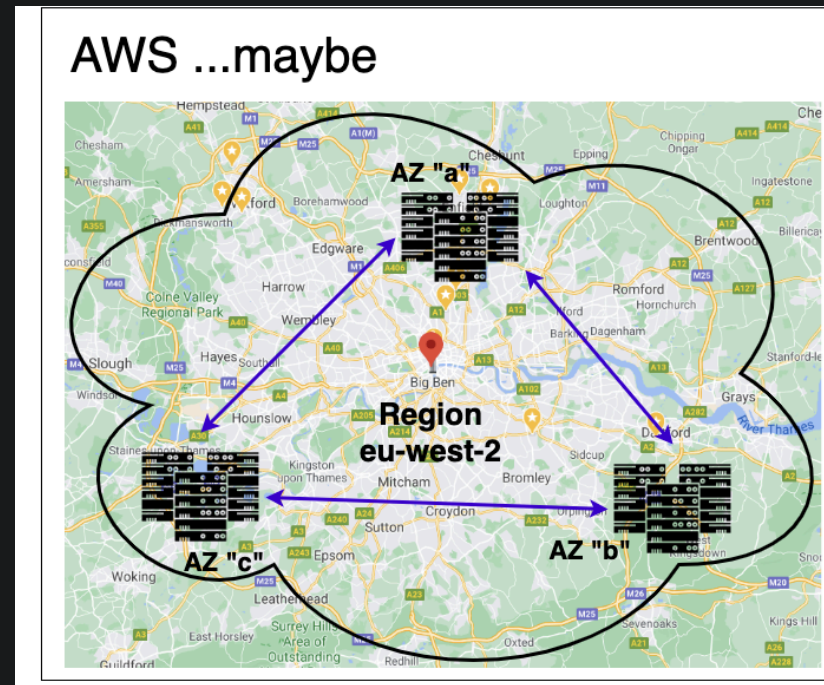
Are located all over the world:



# Availability Zones

- Are comprised of one (or more) discrete data center(s) in an AWS *region*
- AZs in a *region* are physically separate, but within 100km of each other - giving us *high-bandwidth, low-latency* networking
- Give customers the ability to operate production applications and databases that are more highly available, fault tolerant, and scalable than would be possible from a single data center
- If an application is partitioned across AZ's, companies are better isolated and protected from issues such as power outages, lightning strikes, tornadoes, earthquakes, and more

# Availability Zones



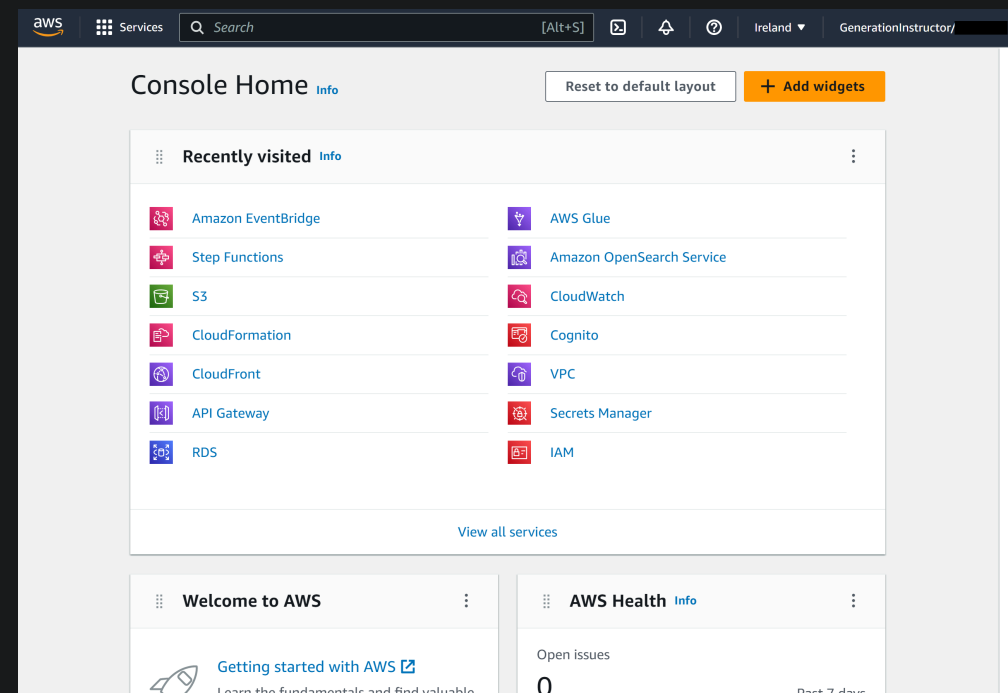
This is a useful page to visualise AZs: <https://aws.amazon.com/about-aws/global-infrastructure>.

## Emoji Check:

Do you feel you understand Regions and Availability Zones? Say so if not!

1. 🥲 Haven't a clue, please help!
2. 😞 I'm starting to get it but need to go over some of it please
3. 😐 Ok. With a bit of help and practice, yes
4. 😊 Yes, with team collaboration could try it
5. 😄 Yes, enough to start working on it collaboratively

# The AWS Management Console



# The AWS Management Console

- The standard web-based graphical interface to AWS
- AWS make changes to it regularly, so don't be surprised if things move around in the UI every few months!
- The home page has a list of your commonly used services, account summary info, and announcements
- Always check which *region* you are looking at!

# The AWS Management Console

- The full list of services can be accessed from the tab at the top
- There are many(!) services, and each of them have been built by different teams (or even companies) around the world
- As such, many of the services have a different look and feel when using them



# AWS Account Access

- Browse to the AWS console login page
  - The instructors will give you the URL
- This should log you with role `student-access-role`

Once you are logged in:

- It helps to make a bookmark for the full login URL. You will have to make a bookmark manually as of course the long URL we enter is immediately forwarded to the root console url!

## Emoji Check:

Are we all logged in, and can you do it again tomorrow? Say so if not!

1. 🥲 Haven't a clue, please help!
2. 😞 I'm starting to get it but need to go over some of it please
3. 😐 Ok. With a bit of help and practice, yes
4. 😊 Yes, with team collaboration could try it
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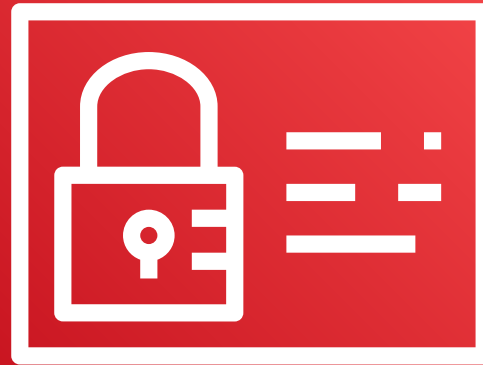
# AWS Services

Services tend to be grouped under one of several categories, including:

- File storage (e.g. [S3](#))
- Compute (e.g. [EC2](#), [Lambda](#))
- Security & identity (e.g. [IAM](#))
- Databases (e.g. [RDS](#), the [Relational Database Service](#))
- Data Warehousing (e.g. [Redshift](#))

For now we'll focus on learning about IAM, but will cover the others in more detail later in the course.

# IAM



# IAM

- **Identity and Access Management**
- Manage *users* and their level of access to the CLI or console
- Assign *roles* to *users* and *services*
- Manage *permissions* for each *role*
- Manage authentication for users or applications accessing AWS
- Free to use - you can create as many roles as you wish

# IAM Features

- Granular permission - user or app can access service X but not service Y
- Identity Federation (login with Facebook, Google, Microsoft Active Directory, etc.)
- Controlling and enforcing MFA
- Password rotation policy
- Integrates with many different AWS services

# IAM Key Terms

- Users
- Groups
- Roles
- Policies

We will dive into what each means.

# IAM - Users

- End users such as people, employees etc.
- Accounts with a username and password
- Can define level of access to AWS services
- Manage the permissions of what the user can perform
- Manage their security credentials (MFA etc.)
- You are either the account owner (root) or an IAM user.



# IAM - Groups

- A collection of users, where you can define permissions for all of them in an easier way
- A group can contain many users, and a user can belong to multiple groups
- Groups can't be nested; they can contain only users, not other groups
- There's no default group that automatically includes all users in the AWS account

## IAM - Roles

- Similar to an IAM user, except a role is intended to be assumed by anyone or any service that needs it
- Provides temporary security credentials for the length of the session, as opposed to a username and password
- Specific permissions on AWS services and resources
- Policies are attached to roles to grant them access/privilege

# IAM - Policies

- You manage access in AWS by creating policies and attaching them to IAM identities (users, groups, roles) or AWS resources
- A policy is an object that, when associated with an identity/resource, defines their permissions
- These permissions determine if a request is allowed or denied
- Most policies are stored as JSON

```
1 {  
2     "Version": "2012-10-17",  
3     "Statement": [  
4         {  
5             "Effect": "Allow",  
6             "Action": "*",  
7             "Resource": "*"  
8         }  
9     ]  
10 }
```

# IAM - Best Practices

- Create **individual** users
- Manage permissions with groups (assign users into groups)
  - e.g. "Admin", "Customers"
- Create one IAM role for each different action users need to perform
  - e.g. "run-stock-report-role", "update-basket-items-role"
- Grant **least privilege** with permissions
- Configure a **strong** password policy
- Enable (enforce) MFA for all users

# IAM - Best Practices

- Setup audits with AWS CloudTrail
- CloudTrail logs for exactly who did what, when, and from where
- Use IAM roles to allow users and services to share access to other services
- Rotate security credentials **regularly**
- Restrict privileged access further with conditions (for instance, only allowing a range of IPs that a request must come from)
- Reduce use of root (mostly used for billing and locking down account securely)

## Emoji Check:

Do you feel you understand the basics of IAM? Say so if not!

1. 😓 Haven't a clue, please help!
2. 😞 I'm starting to get it but need to go over some of it please
3. 😐 Ok. With a bit of help and practice, yes
4. 😊 Yes, with team collaboration could try it
5. 😄 Yes, enough to start working on it collaboratively

Quiz Time! 🧐

## What is an AWS Region?

1. An AWS Infrastructure offering that's optimised for mobile edge computing applications.
2. A physical location somewhere in the world where AWS data centers are clustered.
3. A type of AWS infrastructure deployment that places AWS compute, storage, database, and other select services close to large population, industry, and IT centers.
4. One (or more) discrete data center(s) in an AWS region.

Answer: 2



## **What are the four main areas of AWS IAM?**

1. Groups, Permissions, Roles, Users
2. Groups, Policies. Roles, People
3. Pools, Policies, Roles, Users
4. Groups, Policies, Roles, Users
5. Groups, Policies, Requirements, Users

Answer: 4

## What are policies used for in AWS IAM?

1. An object that, when associated with an identity/resource, defines their permissions.
2. An object that provides temporary security credentials for the length of the session, as opposed to a username and password.
3. A document that is intended to be assumed by anyone or any service that needs it.
4. A document that defines a user permissions for one specific AWS service.

Answer: 1

# Overview - recap

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## Emoji Check:

On a high level, do you think you understand the main concepts of this session? Say so if not!

1. 🥲 Haven't a clue, please help!
2. 😞 I'm starting to get it but need to go over some of it please
3. 😐 Ok. With a bit of help and practice, yes
4. 😊 Yes, with team collaboration could try it
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