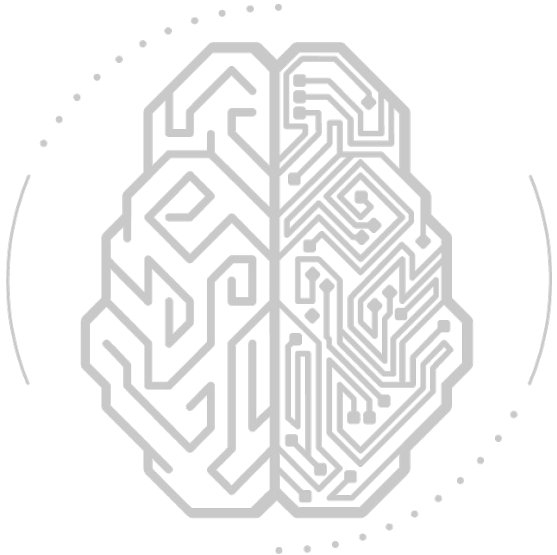
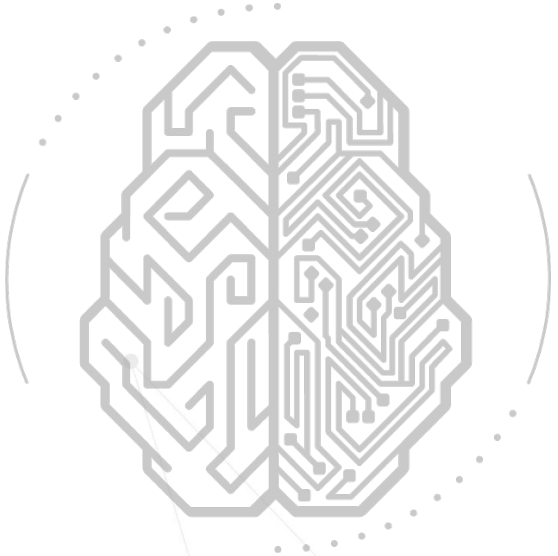
Cloud Practitioner



What's in it for you

AWS Cloud Practitioner	
S.No.	**Agenda**
1	AWS Services S3 - Overview
2	Demo - S3
3	AWS Services Ec2 - Overview
4	Demo - Ec2
5	AWS Services IAM - Overview
6	Demo - IAM
7	AWS Billing & Cost Management - Overview

AWS Services - S3



AWS Services - S3: Introduction

- Amazon Simple Storage Service (Amazon S3) is storage for the Internet. We can use Amazon S3 to store and retrieve any amount of data at any time, from anywhere on the web.
- Amazon S3 is one of the main building blocks of AWS - It's advertised as "infinitely scaling" storage. Many websites use Amazon S3 as a backbone, and even many AWS services use Amazon S3 as an integration as well
- S3 Buckets
  - Buckets must have a globally unique name (across all regions all accounts)
  - Buckets are defined at the region level
  - S3 looks like a global service but buckets are created in a region
  - Naming convention
    - No uppercase
    - No underscore
    - 3-63 characters long
    - Not an IP
    - Must start with lowercase letter or number
- S3 Objects
  - Objects (files) have a Key, and the key is the FULL path: s3://my-bucket/my_folder1/another_folder/my_file.txt
  - Object values are the content of the body: Max Object Size is 5TB (5000GB) and if uploading more than 5GB, must use "multi-part upload"
  - Metadata (list of text key / value pairs – system or user metadata)
  - Tags (Unicode key / value pair – up to 10) – useful for security / lifecycle
  - Version ID (if versioning is enabled)

AWS Services - S3: Introduction

- S3 Durability:
  - High durability (99.999999999%, 11 9’s) of objects across multiple AZ
  - If you store 10,000,000 objects with Amazon S3, you can on average expect to incur a loss of a single object once every 10,000 years
  - Same for all storage classes
- Availability
  - Measures how readily available a service is
  - S3 standard has 99.99% availability, which means it will not be available 53 minutes a year
  - Varies depending on storage class

AWS Services - S3: Features

- Amazon S3 - Static Websites
  - S3 can host static websites and have them accessible on the www
  - The website URL will be:
    - <bucket-name>.s3-website-<AWS-region>.amazonaws.com OR
    - <bucket-name>.s3-website.<AWS-region>.amazonaws.com

- Amazon S3 - Versioning
  - You can version your files in Amazon S3
  - It is enabled at the bucket level
  - It is best practice to version your buckets
    - Protect against unintended deletes (ability to restore a version)
    - Easy roll back to previous version

- S3 Access Logs
  - Very helpful to come down to the root cause of an issue, or audit usage, view suspicious patterns, etc
  - Any request made to S3, from any account, authorized or denied, will be logged into another S3 bucket

- S3 Replication (CRR & SRR)
  - Must enable versioning in source and destination, and Buckets can be in different accounts
  - Replication are of two types - Cross Region Replication (CRR) and Same Region Replication (SRR)
  - Replication is Asynchronous in nature - Copying is asynchronous

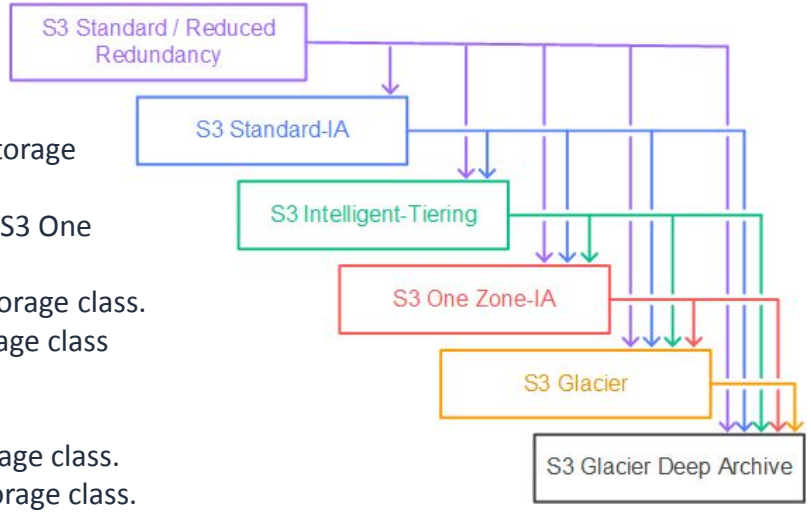
AWS Services - S3: Storage Classes

- Amazon S3 Standard - General Purpose: Used for frequently accessed data, Low latency and high throughput
- Amazon S3 Intelligent Tiering: Same as S3 Standard Cost-optimized by automatically moving objects between two access tiers based on changing access patterns - Frequent access, and Infrequent access
- Amazon S3 Standard-Infrequent Access (IA): Suitable for data that is less frequently accessed, but requires rapid access when needed
- Amazon S3 One Zone-Infrequent Access: Same as IA but data is stored in a single AZ
- Amazon Glacier: Low cost object storage (in GB/month) meant for archiving / backup, and data is retained for the longer term (years)
- Amazon Glacier Deep Archive - same as Glacier but it is more cheap than Glacier

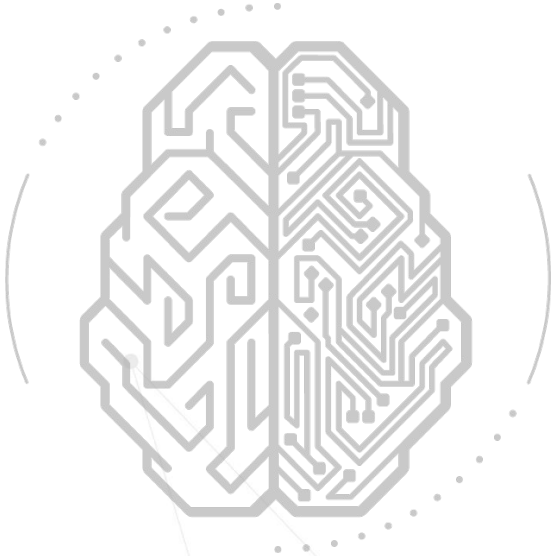
	S3 Standard	S3 Intelligent-Tiering*	S3 Standard-IA	S3 One Zone-IA†	S3 Glacier	S3 Glacier Deep Archive
Designed for durability	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)	99.999999999% (11 9's)
Designed for availability	99.99%	99.9%	99.9%	99.5%	99.99%	99.99%
Availability SLA	99.9%	99%	99%	99%	99.9%	99.9%
Availability Zones	≥3	≥3	≥3	1	≥3	≥3
Minimum capacity charge per object	N/A	N/A	128KB	128KB	40KB	40KB
Minimum storage duration charge	N/A	30 days	30 days	30 days	90 days	180 days

AWS Services - S3: Lifecycle

- In an S3 Lifecycle configuration, you can define rules to transition
- objects from one storage class to another to save on storage costs
- You can transition from the following:
  - The S3 Standard storage class to any other storage class.
  - Any storage class to the S3 Glacier or S3 Glacier Deep Archive storage classes.
  - The S3 Standard-IA storage class to the S3 Intelligent-Tiering or S3 One Zone-IA storage classes.
  - The S3 Intelligent-Tiering storage class to the S3 One Zone-IA storage class.
  - The S3 Glacier storage class to the S3 Glacier Deep Archive storage class
- You can't transition from the following:
  - Any storage class to the S3 Standard/Reduced Redundancy storage class.
  - The S3 Intelligent-Tiering storage class to the S3 Standard-IA storage class.
  - The S3 One Zone-IA storage class to the S3 Standard-IA or S3 Intelligent-Tiering storage classes.



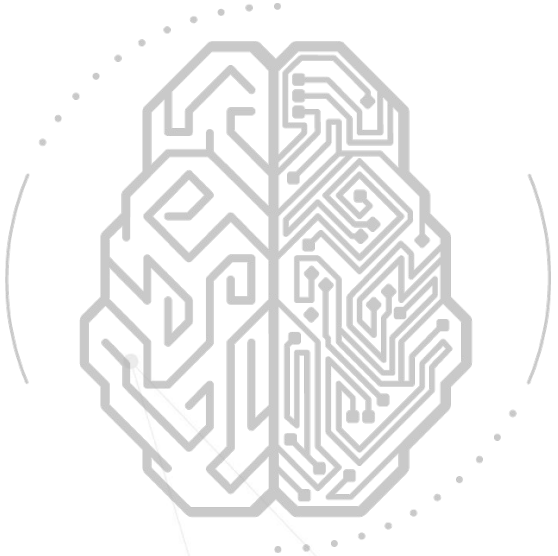
AWS Services - S3: Demo



How to Host and Configure Your Static Website on Amazon S3

- Step 1: Create an Amazon S3 Bucket
- Step 2: Enable Static Website Hosting Configuration for Your Bucket
- Step 3: Download the Static Website Code from Github - link
- Step 4: Upload Your Static Website Code to the Bucket
- Step 5: Accessing Your Static Website Content Over the Internet Through the AWS Region-Specific Web Address

AWS Services - Ec2



AWS Services - Ec2: Introduction

- Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud.
- Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster
- Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use
- It mainly consists in the capability of
  - Renting virtual machines (EC2)
  - Storing data on virtual drives (EBS)
  - Distributing load across machines (ELB)
  - Scaling the services using an auto-scaling group (ASG)
- Benefits
  - Elastic Web-Scale Computing
  - Complete Controlled
  - Flexible Cloud Hosting Service
  - Integrated
  - Reliable & Secure
  - Less Expensive

AWS Services - Ec2: Instance Types

- General-Purpose : This family instances provide a balance of CPU, memory, and network resources making them a good choice for many applications.
- Compute-Optimized : This family instances are geared towards applications that benefit from high compute power.
- Memory-Optimized : This family instances are designed for memory-intensive applications
- Storage-Optimized : This family instances provides you with direct-attached storage options optimized for applications with specific disk I/O and storage capacity requirements
- GPU Instance : This family instances allows you to take advantage of the parallel performance of NVidia Tesla GPUs using the CUDA or OpenCL programming models for GPU computing

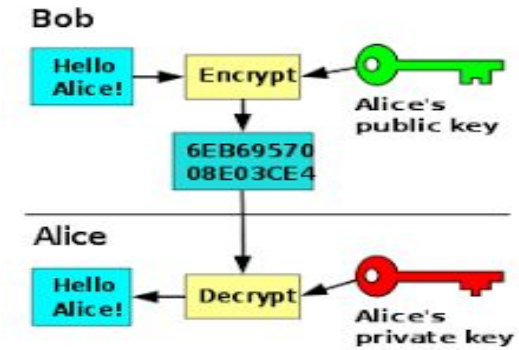
Instance Family	Current Generation Instance Types
General purpose	`t2.nano` | `t2.micro` | `t2.small` | `t2.medium` | `t2.large` | `m4.large` | `m4.xlarge` | `m4.2xlarge` | `m4.4xlarge` | `m4.10xlarge` | `m3.medium` | `m3.large` | `m3.xlarge` | `m3.2xlarge`
Compute optimized	`c4.large` | `c4.xlarge` | `c4.2xlarge` | `c4.4xlarge` | `c4.8xlarge` | `c3.large` | `c3.xlarge` | `c3.2xlarge` | `c3.4xlarge` | `c3.8xlarge`
Memory optimized	`r3.large` | `r3.xlarge` | `r3.2xlarge` | `r3.4xlarge` | `r3.8xlarge`
Storage optimized	`i2.xlarge` | `i2.2xlarge` | `i2.4xlarge` | `i2.8xlarge` | `d2.xlarge` | `d2.2xlarge` | `d2.4xlarge` | `d2.8xlarge`
GPU instances	`g2.2xlarge` | `g2.8xlarge`

AWS Services - Ec2: Instances Purchasing Options

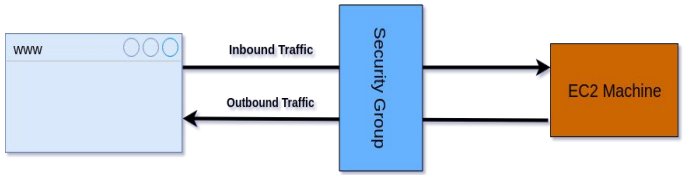
- On Demand Instances - With On-Demand instances, you pay for compute capacity by per hour or per second depending on instances type and no longer-term commitments or upfront payments are needed to be given
- Reserved Instances - Reserved Instances provide you with a significant discount (up to 75%) compared to On-Demand instance pricing.
- Spot Instances - Spot Instances are available at up to a 90% discount compared to On-Demand prices
- Dedicated Host - A Dedicated Host is a physical EC2 server dedicated for a users. Dedicated Hosts can help you address compliance requirements and reduce costs by allowing you to use your existing server-bound software licenses
- Dedicated Instances - A Dedicated Instances running on hardware that's dedicated to you. May share hardware with other instances in same account. No control over instance placement (can move hardware after Stop / Start)
- Which purchasing option is right for me?
    - On demand: book a OLA cab, whenever you want a ride
    - Reserved: outstation ride, reservation for a long time, we may get a good discount.
    - Spot instances: shared cab/pool cab, depends on the availability and route. You can get kicked out at any time
    - Dedicated Hosts: Your own car

AWS Services - Ec2: Security

- EC2 Key Pairs
  - When you launch an instance, you specify the key pair which you require to use.
  - At the boot time, the public key content is placed on the instance in an entry within ~/.ssh/authorized_keys
  - To log in to your instance, you must specify the private key when you connect to the instance

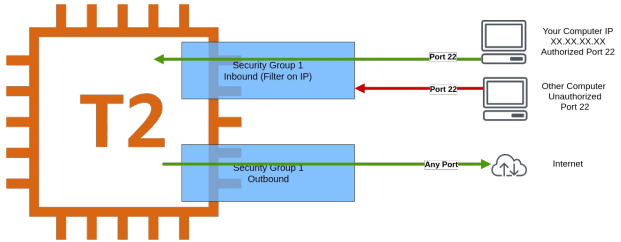


- Security groups
  - Security groups are virtual firewall that controls the traffic for an instance/RDS.
  - When you launch an instance, you can specify one or more security groups
  - You can add rules to each security group that allow traffic to or from its associated instances (Inbound & Outbound Rules)



AWS Services - Ec2: Security

- Security groups - Classic Ports to know
  - 22 = SSH (Secure Shell) - log into a Linux instance
  - 21 = FTP (File Transfer Protocol) – upload files into a file share
  - 22 = SFTP (Secure File Transfer Protocol) – upload files using SSH
  - 80 = HTTP – access unsecured websites
  - 443 = HTTPS – access secured websites
  - 3389 = RDP (Remote Desktop Protocol) – log into a Windows instance



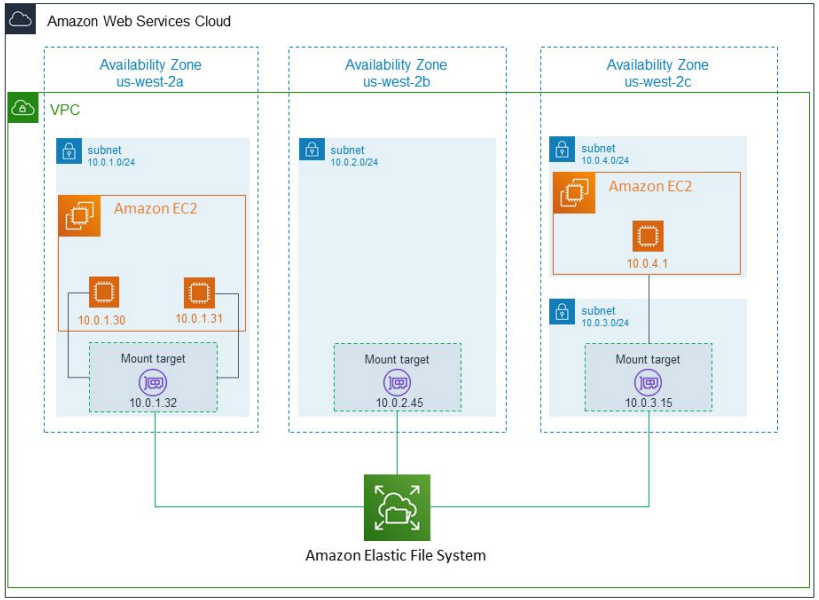
- Rules for AWS Security Groups
  - Security Groups should avoid having large port ranges. This increases the attack surface and increases vulnerability of your EC2 instances.
  - Limit outbound access from ports to specific ports or other destinations.
  - It is good to maintain one security group for SSH Access to your instances since SSH is a critical access.
  - While working with database instances such as RDS, don’t allow unrestricted access to the RDS. Doing so increases the risk of brute-force login attacks.
  - Delete unused security groups as soon as possible. It is a good practice to have regular clean-up exercise on your AWS project environment to ensure there are no unused security groups.
  - Restrict access to security group modification or creation using appropriate IAM policies.

AWS Services - Ec2: EBS

- An EBS (Elastic Block Store) Volume is a network drive you can attach to your instances while they run
- It allows your instances to persist data, even after their termination
- They can only be mounted to one instance at a time, and are bound to a specific availability zone
- It's a network drive (i.e. not a physical drive)
  - It uses the network to communicate the instance, which means there might be a bit of latency
  - It can be detached from an EC2 instance and attached to another one quickly
- It's locked to an Availability Zone (AZ)
  - An EBS Volume in us-east-1a cannot be attached to us-east-1b
  - To move a volume across, you first need to snapshot it
- Have a provisioned capacity (size in GBs, and IOPS)
  - You get billed for all the provisioned capacity
  - You can increase the capacity of the drive over time
- Controls the EBS behaviour when an EC2 instance terminates
  - By default, the root EBS volume is deleted (Delete on Termination attribute is enabled)
  - By default, any other attached EBS volume is not deleted (Delete on Termination attribute is disabled)

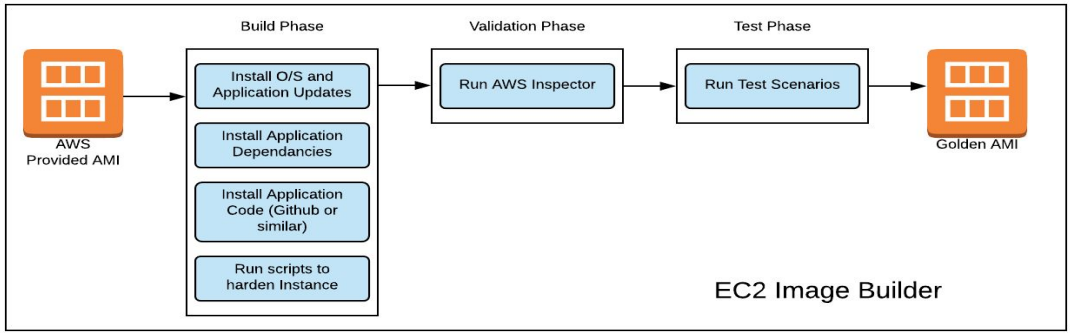
AWS Services - Ec2: EFS

- Amazon EFS provides scalable file storage for use with Amazon EC2. We can use an EFS file system as a common data source for workloads and applications running on multiple instances.
- EFS works with Linux EC2 instances in multi-AZ
- Highly available, scalable, expensive (3x gp2), pay per use, no capacity planning



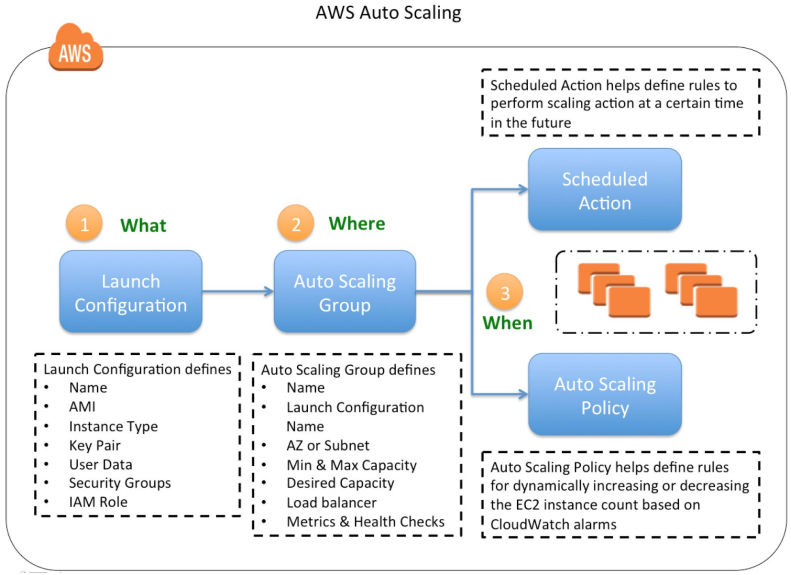
AWS Services - Ec2: AMI Overview

- An Amazon Machine Image (AMI) is a template that contains a software configuration (for example, an operating system, an application server, and applications)
- From an AMI, you launch an instance, which is a copy of the AMI running as a virtual server in the cloud
- AMI are built for a specific region (and can be copied across regions)
- You can launch EC2 instances from:
  - A Public AMI: AWS provided
  - Your own AMI (Private): you make and maintain them yourself
  - An AWS Marketplace AMI: an AMI someone else made (and potentially sells)
- Launch instances from other AMIs (EC2 Image Builder)
  - Automate the creation, maintain, validate and test EC2 AMIs
  - Can be run on a schedule
  - Free service



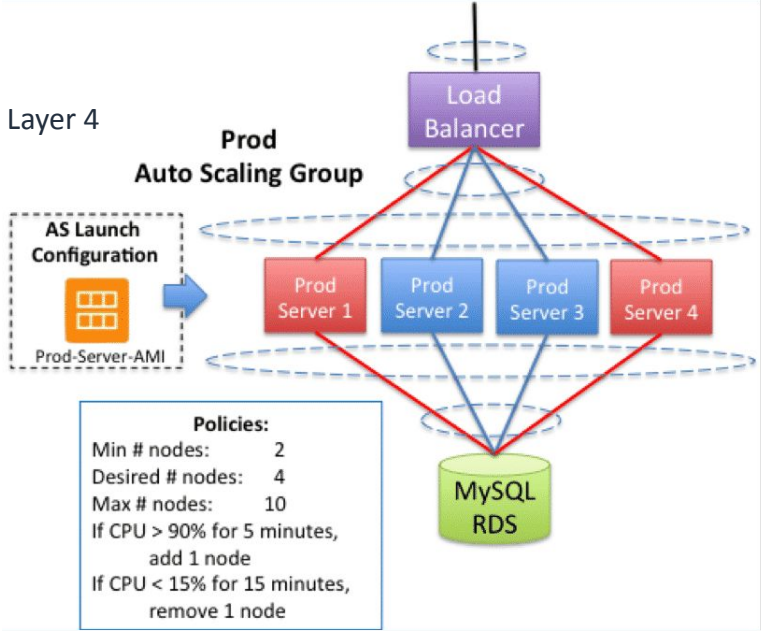
AWS Services - Ec2: Auto Scaling Group

- In real-life, the load on your websites and application can change
- In the cloud, you can create and get rid of servers very quickly
- The goal of an Auto Scaling Group (ASG) is to:
  - Scale out (add EC2 instances) to match an increased load
  - Scale in (remove EC2 instances) to match a decreased load
  - Ensure we have a min and a max number of machines running
  - Automatically register new instances to a load balancer
  - Replace unhealthy instances
- Cost Savings: only run at an optimal capacity (principle of the cloud)
- Scaling Strategies
  - Manual Scaling: Update the size of an ASG manually
  - Dynamic Scaling: Respond to changing demand
    - Simple / Step Scaling
      - When a CloudWatch alarm is triggered (example CPU > 70%), then add 2 units
      - When a CloudWatch alarm is triggered (example CPU < 30%), then remove 1
    - Target Tracking Scaling - Example: I want the average ASG CPU to stay at around 40%
    - Scheduled Scaling - Example: increase the min. capacity to 10 at 5 pm on Fridays

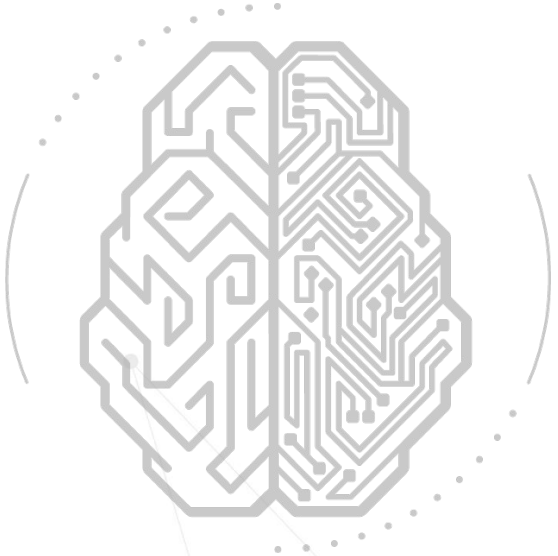


AWS Services - Ec2: Elastic Load Balancing

- Load balancers are servers that forward internet traffic to multiple servers (EC2 Instances) downstream
- An ELB (Elastic Load Balancer) is a managed load balancer
  - AWS guarantees that it will be working
  - AWS takes care of upgrades, maintenance, high availability
  - AWS provides only a few configuration knobs
- It costs less to setup your own load balancer but it will be a lot more effort on your end (maintenance, integrations)
- 3 kinds of load balancers offered by AWS:
  - Application Load Balancer (HTTP / HTTPS only) – Layer 7
  - Network Load Balancer (ultra-high performance, allows for TCP) – Layer 4
  - Classic Load Balancer (slowly retiring) – Layer 4 & 7
- Auto Scaling Group in AWS With Load Balancer



AWS Services - Ec2: Demo



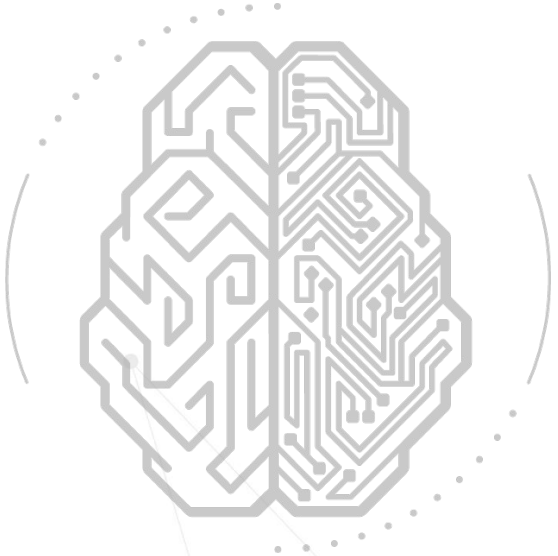
How to Host and Configure Your Website on Amazon Ec2

- Step 1: Sign in to the AWS console and search for “EC2”. Navigate to the EC2 dashboard and click “Launch Instance”
  - Choose AMI & Instance Type
  - Configure Instance
  - Add Storage & Tags
  - Configure Security Group
  - Review

- Selecting the instance (click the button next to the instance) displays information about the instance below. In this area, you will see the IPv4 Public IP address of your instance. Copy it to your clipboard
  - Provide permissions on your key-pair file: `chmod 400 <path_to_key_pair_file>`
  - SSH into your new EC2 instance: `ssh -i <key_pair_file> ec2-user@<public_ip>`
  - Update all of the packages on the instance: `sudo yum update -y`
  - Install an apache webserver: `sudo yum install httpd -y`
  - Start the webserver: `service httpd start`

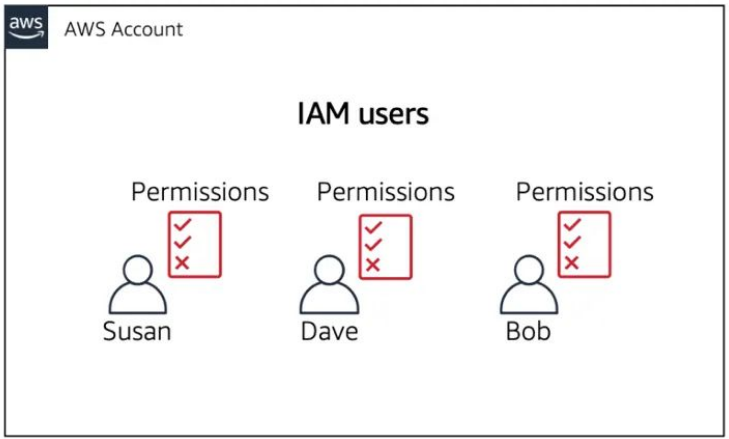
- In this section you will create an index.html file to be served.
  - Navigate to the directory: `cd /var/www/html`
  - Manually create an index.html file in this directory: `vi index.html`
  - Exit and save. Make sure that the file has content: `cat index.html`
  - Start the webserver: `service httpd start`

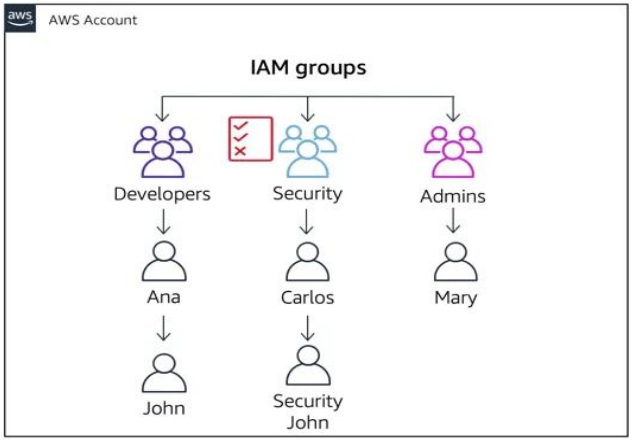
AWS Services - IAM



AWS Services - IAM: Users & Groups

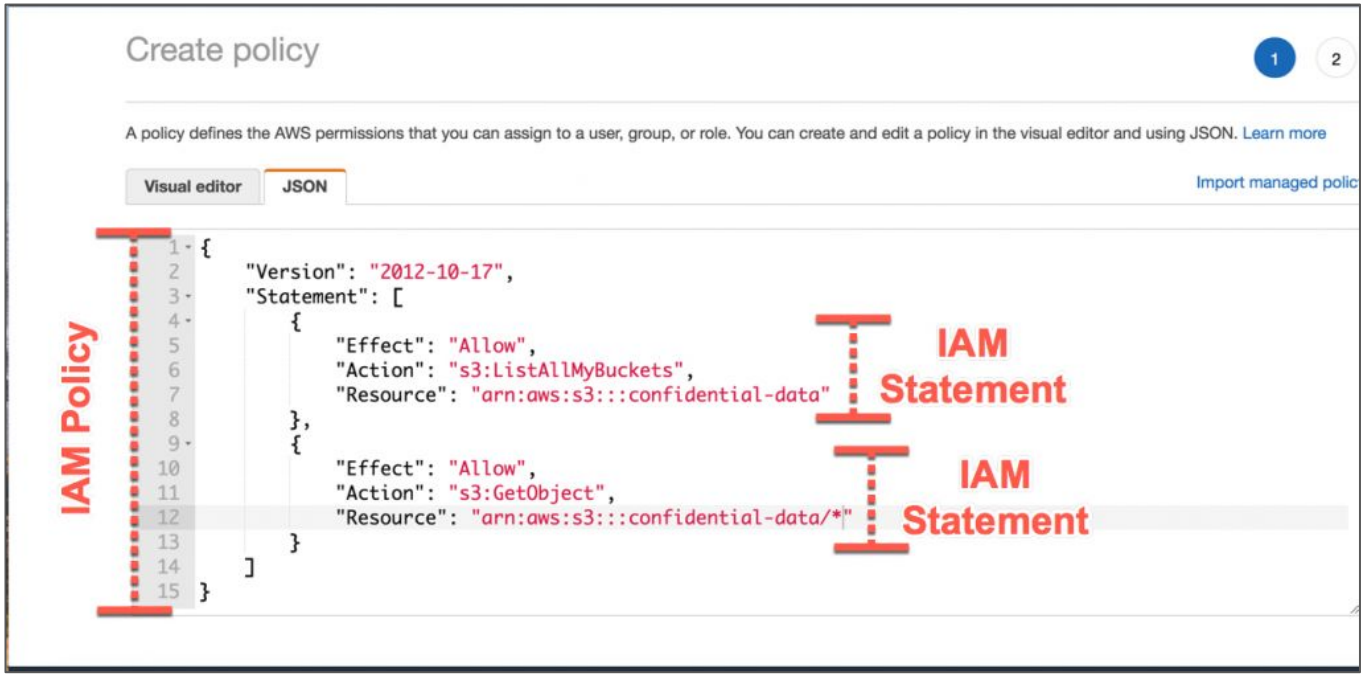
- AWS Identity and Access Management (IAM) - enables you to manage access to AWS services and resources securely. Using IAM, you can create and manage AWS users and groups, and use permissions to allow and deny their access to AWS resources. It is a Global service
- Root account created by default, and should be kept very confidential
- Users are people within your organization, and can be grouped
- Groups only contain users, not other groups
- Users don’t have to belong to a group, and user can belong to multiple groups





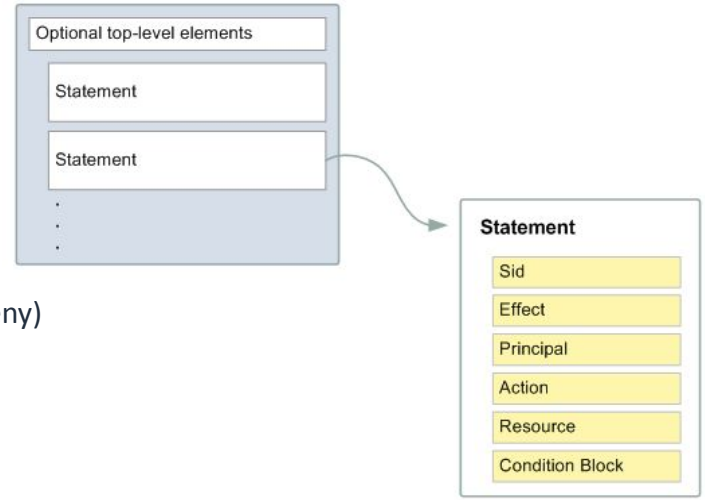
AWS Services - IAM: Permissions

- Users or Groups both can be assigned JSON documents called policies. These policies define the permissions of the users
- In general we should follow the least privilege principle: don't give more permissions than a user needs



AWS Services - IAM: Policies Structure

- Consists of
  - Version: policy language version,always include“2012-10- 17”
  - Id: an identifier for the policy(optional)
  - Statement:one or more individual statements(required)
- Statements consists of
  - Sid:an identifier for the statement(optional)
  - Effect: whether the statement allows or denies access (Allow, Deny)
  - Principal: account/user/role to which this policy applied to
  - Action: list of actions this policy allows or denies
  - Resource:list of resources to which the actions applied to
  - Condition:conditions for when this policy is in effect (optional)

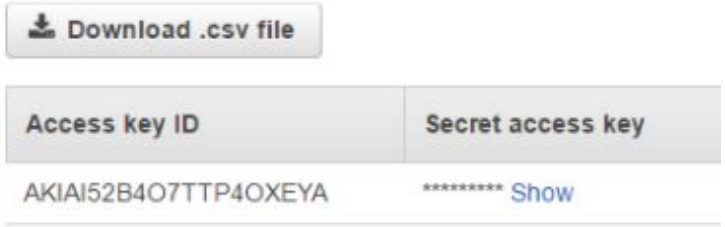


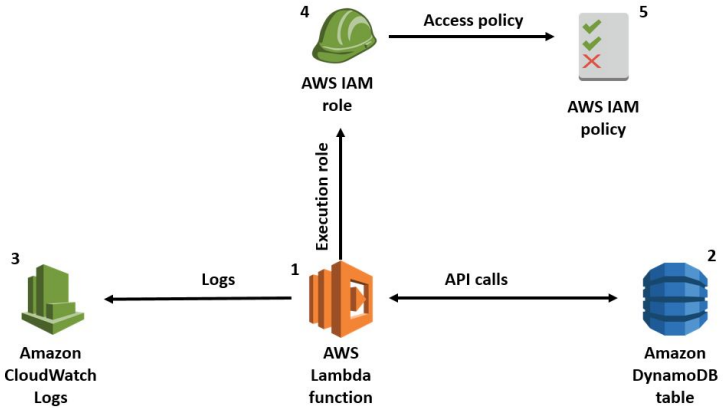
AWS Services - IAM: Password Policy

- Default password policy enforces the following conditions:
  - Minimum password length of 8 characters and a maximum length of 128 characters
  - Minimum of three of the following mix of character types: uppercase, lowercase, numbers, and ! @ # $ % ^ & * ( ) _ + - = [ ] { } | ' symbols
  - Not be identical to your AWS account name or email address
- Custom password policy options
  - Password strength –
    - Require at least one uppercase & lowercase letter from Latin alphabet (A–Z)
    - Require at least one number & on-alphanumeric character ! @ # $ % ^ & * ( ) _ + - = [ ] { } | '
  - Enable password expiration – You can select and specify a minimum of 1 and a maximum of 1,095 days that IAM user passwords are valid after they are set.
  - Password expiration requires administrator reset – Select this option to prevent IAM users from updating their own passwords after the password expires.
  - Allow users to change their own password – You can permit all IAM users in your account to use the IAM console to change their own passwords, as described in Permitting IAM users to change their own passwords.
  - Prevent password reuse – You can prevent IAM users from reusing a specified number of previous passwords. You can specify a minimum number of 1 and a maximum number of 24 previous passwords that can't be repeated.

AWS Services - IAM: Ways to interact with the services

- To access AWS, you have three options:
  - AWS Management Console (protected by password + MFA)
  - AWS Command Line Interface (CLI): protected by access keys
  - AWS Software Developer Kit (SDK) - for code: protected by access keys
- Access Keys are generated through the AWS Console
  - Users handles their own access keys
  - Access Keys are secret, just like a password. Avoid sharing it
  - Access Key ID ~= username
  - Secret Access Key ~= password
- IAM Roles for Services
  - AWS services will need to perform actions on your behalf
  - To do so, we will assign permissions to AWS services with IAM Roles

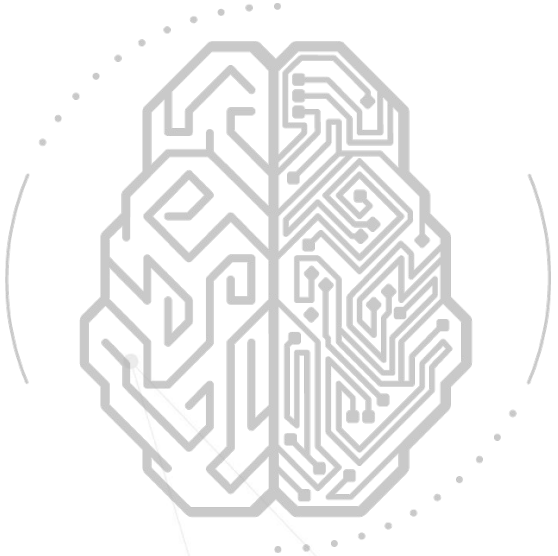




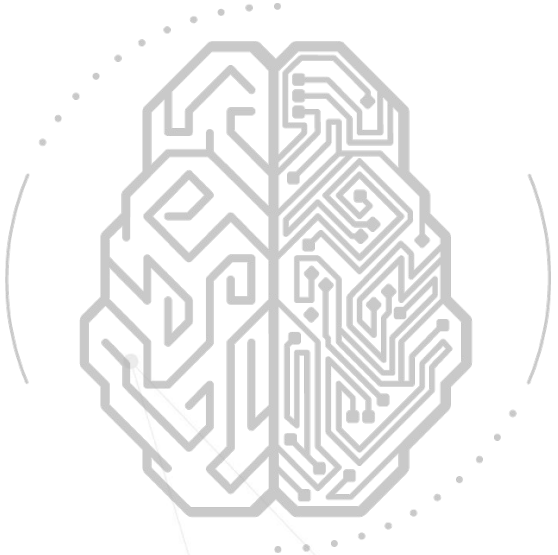
AWS Services - IAM: Guidelines & Best Practices

- Lock away your AWS account root user access keys
- Create individual IAM users
- Assign users to groups and assign permissions to groups
- Grant least privilege
- Configure a strong password policy for your users
- Use and enforce the use of Multi Factor Authentication (MFA)
- Create and use Roles for giving permissions to AWS services
- Never share IAM users & Access Keys
- Rotate credentials regularly
- Remove unnecessary credentials
- Use policy conditions for extra security
- Audit permissions of your account with the IAM Credentials Report

AWS Services - IAM: Demo

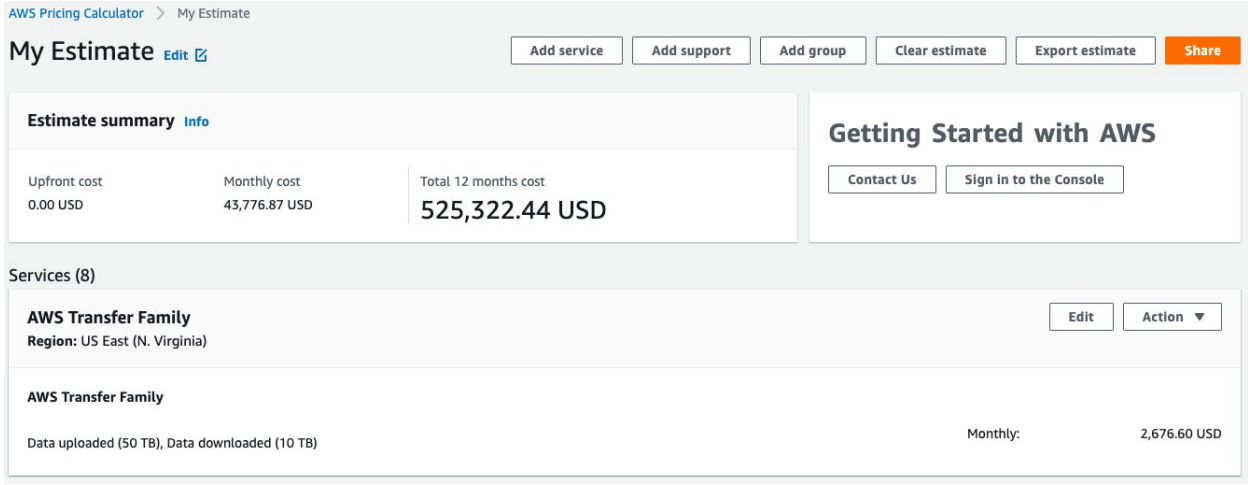


AWS Services - Billing & Cost Management



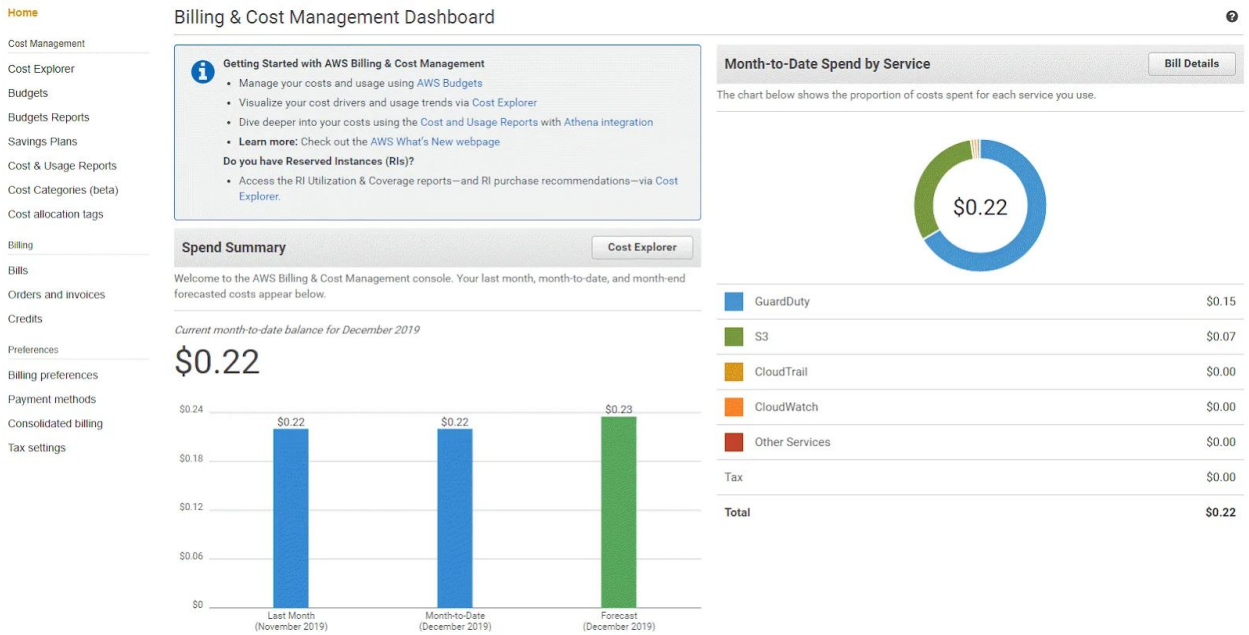
AWS Services - Cost Estimation: AWS Pricing Calculator

- AWS Pricing Calculator is a web based service that we can use to create cost estimates to suit your AWS use cases.
- AWS Pricing Calculator is useful both for people who have never used AWS and for those who want to reorganize or expand their usage
- AWS Pricing Calculator is free for use. It provides an estimate of your AWS fees and charges. The estimate doesn't include any taxes that might apply to the fees and charges.
- AWS Pricing Calculator provides a console interface at https://calculator.aws/#/



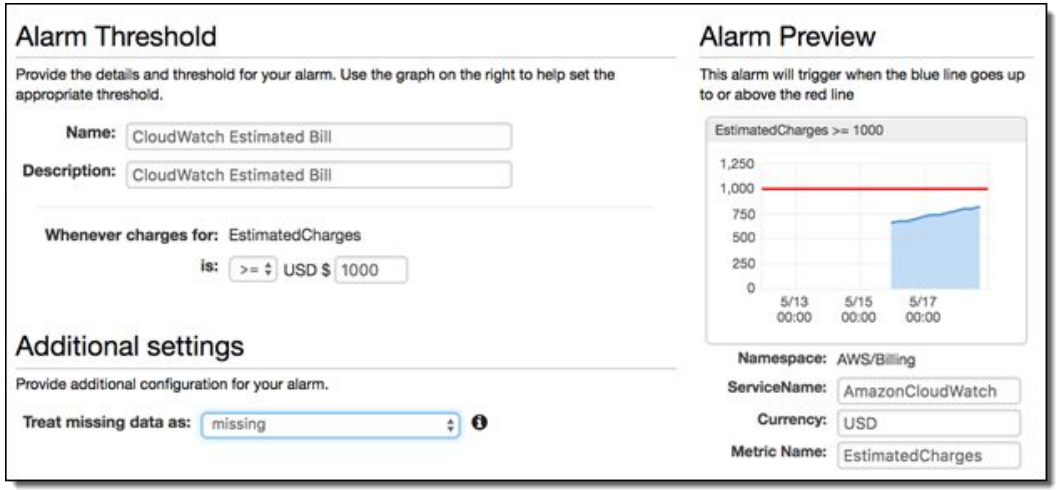
AWS Services - Cost Tracking: Billing Dashboard

- Billing & Cost Management Dashboard can we accessed from the AWS Console, and from there, we can access AWS Budgets, AWS Cost Explorer, and the AWS Cost & Usage Report.



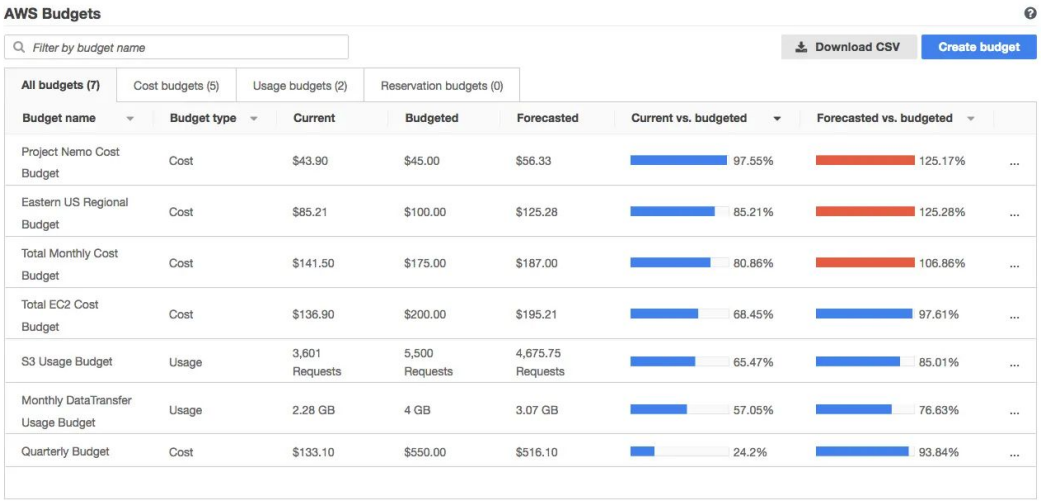
AWS Services - Cost Tracking: Billing Alarm

- We can monitor the estimated AWS charges by using Amazon CloudWatch. When you enable the monitoring of estimated charges for your AWS account, the estimated charges are calculated and sent several times daily to CloudWatch as metric data.
- Billing metric data is stored in the **US East (N. Virginia) Region** and represents worldwide charges. This data includes the estimated charges for every service in AWS that you use, in addition to the estimated overall total of your AWS charges.
- The alarm triggers when your account billing exceeds the threshold you specify. It triggers only when actual billing exceeds the threshold. It doesn't use projections based on your usage so far in the month



AWS Services - Cost Tracking: Budgets

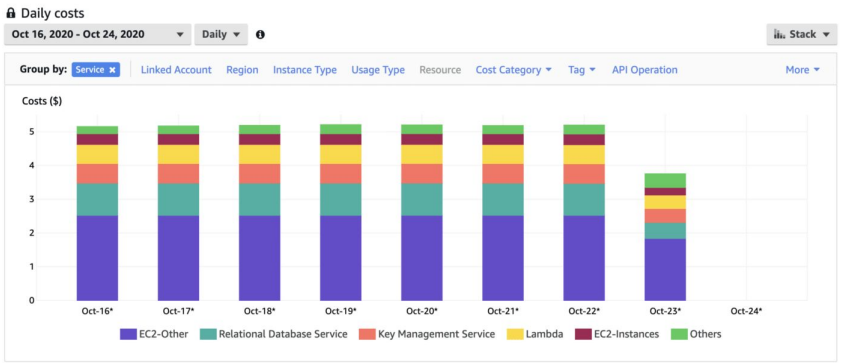
- The AWS Budgets Dashboard is your hub for creating, tracking, and inspecting your budgets with more granularity and visibility. It enables you to create several types of budgets.
  - Cost budgets to monitor costs against a specified dollar amount.
  - Usage budgets to monitor usage of one or more specified usage types.
  - Reservation budgets to track Reserved Instance utilization and coverage.
  - Savings Plans budgets to track Savings Plans utilization and coverage.
- Like the CloudWatch alarm method, you can set budgets to send alerts when you exceed (or are forecasted to exceed) your budgeted cost or usage amount.



AWS Services - Cost Tracking: Cost Explorer

- AWS Cost Explorer enables you to view and analyze your AWS costs and usage. It provides several default reports to get started, including
  - Monthly or daily costs by service
  - Monthly EC2 running hours costs and usage
  - Reserved Instance utilization and coverage
  - Savings Plans reports

- You can choose from different types of graphs to display data visually, apply filters for granular detail, and save your custom reports.
  - With AWS Cost Explorer, you can:
  - View data for up to the last 13 months.
  - Forecast how much you're likely to spend for the next 3 months.
  - Get recommendations for Amazon EC2 rightsizing and reservation purchases.
  - Identify areas that need follow up.
  - See trends that you can use to understand your costs



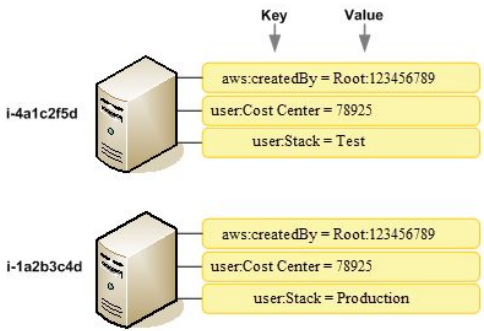
To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Service	Oct-19*	Oct-20*	Oct-21*	Oct-22*	Oct-23*
Key Management Se... ($)	0.58	0.58	0.58	0.58	0.41
Lambda ($)	0.57	0.57	0.57	0.57	0.40
EC2-Instances ($)	0.32	0.32	0.32	0.32	0.22
Security Hub ($)	0.16	0.15	0.14	0.16	0.16
CloudWatch ($)	0.08	0.08	0.08	0.08	0.06
Config ($)	0.02	0.03	0.02	0.02	0.19
S3 ($)	0.01	0.01	0.01	0.01	0.00

AWS Services - Cost Tracking: Cost Allocation Tags

- A tag is a label that you or AWS assigns to an AWS resource. Each tag consists of a key and a value. For each resource, each tag key must be unique, and each tag key can have only one value
- AWS provides two types of cost allocation tags, an AWS generated tags and user-defined tags
- We can activated the AWS generated tags, createdBy before creating these resources. The **createdBy** tag tracks who created a resource. The **user-defined** tags use the user prefix, and the AWS generated tag uses the **aws: prefix**.
- After the tags are applied to AWS resources (such as Amazon EC2 instances or Amazon S3 buckets) and we can also activate the tags in the Billing and Cost Management console, AWS generates a cost allocation report as a CSV file with usage and costs grouped based on the active tags
- At the end of the billing cycle, the total charges (tagged and untagged) on the billing report with cost allocation tags reconciles with the total charges on your Bills page total and other billing reports for the same period



Total Cost	user:Owner	user:Stack	user:Cost Center	user:Application
0.95	DbAdmin	Test	80432	Widget2
0.01	DbAdmin	Test	80432	Widget2
3.84	DbAdmin	Prod	80432	Widget2
6.00	DbAdmin	Test	78925	Widget1
234.63	SysEng	Prod	78925	Widget1
0.73	DbAdmin	Test	78925	Widget1
0.00	DbAdmin	Prod	80432	Portal
2.47	DbAdmin	Prod	78925	Portal

AWS Services - Cost Tracking: Cost and Usage Reports

- The AWS Cost and Usage Reports (AWS CUR) contains the most comprehensive set of cost and usage data available. You can use Cost and Usage Reports to publish your AWS billing reports to an Amazon Simple Storage Service (Amazon S3) bucket that you own
- AWS updates the report in your bucket once a day in comma-separated value (CSV) format
- AWS Cost and Usage Reports tracks your AWS usage and provides estimated charges associated with your account. Each report contains line items for each unique combination of AWS products, usage type, and operation that you use in your AWS account
- AWS Cost and Usage Reports can do the following:
  - Deliver report files to your Amazon S3 bucket
  - Update the report up to three times a day
  - Create, retrieve, and delete your reports using the AWS CUR API Reference

lineItem/ProductCode	lineItem/UsageType	lineItem/Operation	lineItem/AvailabilityZone	lineItem/UsageAmount	lineItem/CurrencyCode	lineItem/LineItemDescription
AmazonEC2	CW:AlarmMonitorUsage	Unknown		0.00134409	USD	$0.00 per alarm-month - first 10 alarms
AmazonS3	Requests-Tier1	ListAllMyBuckets		2	USD	$0.00 per request - PUT, COPY, POST, or LIST requests under the monthly global free tier
AmazonEC2	CW:AlarmMonitorUsage	Unknown		0.00134409	USD	$0.00 per alarm-month - first 10 alarms
AmazonEC2	APS2-EBS:VolumeUsage.gp2	CreateVolume-Gp2		0.01344086	USD	$0.00 per GB-month of General Purpose (SSD) provisioned storage under monthly free tier
AmazonEC2	APS2-EBS:VolumeUsage.gp2	CreateVolume-Gp2		0.01344086	USD	$0.00 per GB-month of General Purpose (SSD) provisioned storage under monthly free tier
AmazonEC2	USW2-BoxUsage:t2.micro	RunInstances:0002	us-west-2a	1	USD	$0.00 per Windows t2.micro instance-hour (or partial hour) under monthly free tier
AmazonEC2	USW2-USE1-AWS-Out-Bytes	PublicIP-Out		0.00000174	USD	$0.000 per GB - data transfer out under the monthly global free tier
AmazonEC2	USW2-USE1-AWS-In-Bytes	PublicIP-In		0.00000138	USD	$0.00 per GB - US West (Oregon) data transfer from US East (Northern Virginia)
AmazonEC2	USW2-USW1-AWS-In-Bytes	PublicIP-In		0.00000149	USD	$0.00 per GB - US West (Oregon) data transfer from US West (Northern California)
AmazonS3	Requests-Tier1	ListAllMyBuckets		2	USD	$0.00 per request - PUT, COPY, POST, or LIST requests under the monthly global free tier
AmazonEC2	USW2-DataTransfer-Out-Bytes	RunInstances		0.00038144	USD	$0.000 per GB - data transfer out under the monthly global free tier
AmazonEC2	USW2-USW1-AWS-Out-Bytes	PublicIP-Out		0.00000174	USD	$0.000 per GB - data transfer out under the monthly global free tier

AWS Services - AWS Support Plans

- Support plans are designed to give you the right mix of tools and access to expertise so that we can be successful with AWS while optimizing performance, managing risk, and keeping costs under control
- AWS Support Plans Pricing

Basic Support Plan is included

Developer	Business	Enterprise
Greater of $29.00	Greater of $100.00	Greater of $15,000.00
- or -	- or -	- or -
3% of monthly AWS charges	10% of monthly AWS charges for the first $0--$10K	10% of monthly AWS charges for the first $0--$150K
	7% of monthly AWS charges from $10K--$80K	7% of monthly AWS charges from $150K--$500K
	5% of monthly AWS charges from $80K--$250K	5% of monthly AWS charges from $500K--$1M
	3% of monthly AWS charges over $250K	3% of monthly AWS charges over $1M

- Basic Support is included for all AWS customers and includes:
  - Customer Service and Communities - 24x7 access to customer service, documentation, whitepapers, and support forums.
  - AWS Trusted Advisor - Access to the 7 core Trusted Advisor checks and guidance to provision your resources following best practices to increase performance and improve security.
  - AWS Personal Health Dashboard - A personalized view of the health of AWS services, and alerts when your resources are impacted

AWS Services - AWS Support Plans

- Developer Support includes all Basic Support Plan +
  - Business hours email access to Cloud Support Associates
  - Unlimited cases / 1 primary contact
  - Case severity / response times - General guidance: < 24 business hours and System impaired: < 12 business hours

- Business Support includes
  - Intended to be used if you have production workloads
  - Trusted Advisor – Full set of checks + API access
  - 24x7 phone, email, and chat access to Cloud Support Engineers
  - Unlimited cases / unlimited contacts
  - Access to Infrastructure Event Management for additional fee.
  - Case severity / response times - General guidance: < 24 business hours, System impaired: < 12 business hours, Production system impaired: < 4 hours, and Production system down: < 1 hour

- Enterprise Support includes all Business Support Plan +
  - Access to a Technical Account Manager (TAM)
  - Concierge Support Team (for billing and account best practices)
  - Infrastructure Event Management,Well-Architected & Operations Reviews
  - Case severity / response times: - Production system impaired: < 4 hours, Production system down: < 1 hour, and Business-critical system down: < 15 minutes

THANK YOU