

YummyDelight Migration Strategy Plan Document

1.a. Cloud Services Evaluation

There are three available cloud services and deployment models on the market.

1. Infrastructure as a Service (IaaS)

The model provides virtualised computing resources on the internet, including servers, storage, and network components, on a pay-as-you-go basis (Mell & Grance, 2011). AWS EC2, Microsoft Azure virtual machines, and Google Compute Engine are some examples of this deployment model. YummyDelight can migrate their applications without significant redesign and have full control over the infrastructure, similar to their onpremises setups. However, it requires management of operating systems and applications, which needs substantial IT resources.

2. Platform as a Service (PaaS)

Users can use platforms that allow them to develop, run, and manage applications without dealing with underlying infrastructure, such as AWS Elastic Beanstalk, Google App Engine, and Microsoft Azure App Services (Mell & Grance, 2011). YummyDelight developers work is easier as this model simplifies application deployment and scaling and reduces the need for managing servers and storages. However, it may cause less control over the underlying infrastructure and limitations in customisation.

3. Software as a Service (SaaS)

This model involves subscription-based software applications accessible via web browsers. Salesforce, Office 365, and Google Workplace are some examples. These services are secure, cost-effective, scalable, and easy to deploy based on the YummyDelight demands. However, as they are shared services, there might be data security and compliance concerns for YummyDelight.

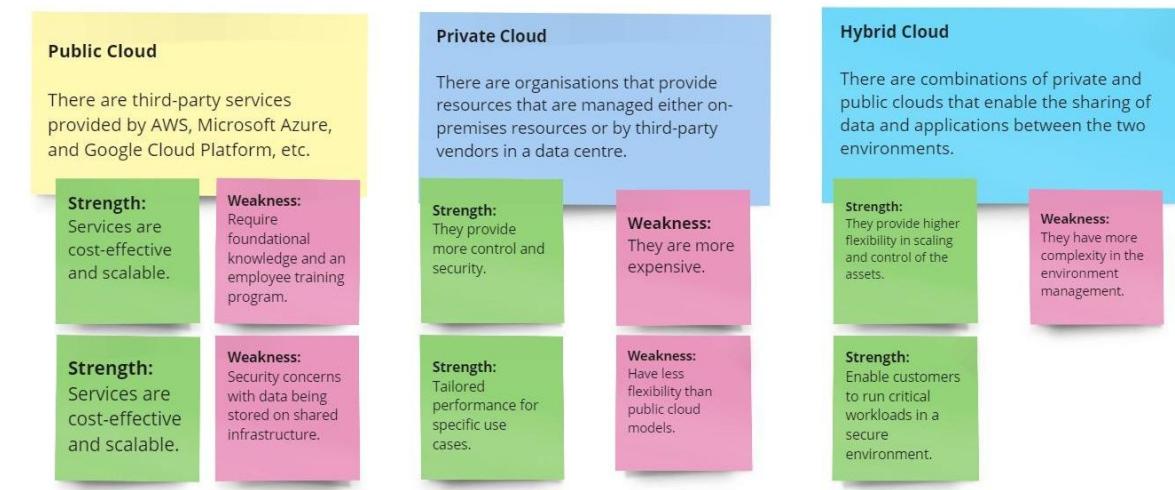


Figure 58: Cloud Deployment models

1.b. Cloud Opportunities

1. Scalability and Flexibility

YummyDelight is currently facing challenges with its on-premises infrastructure, which is too expensive and insufficient to support all business operational demands. YummyDelight's 25 million customers demand can fluctuate, especially in peak seasons. Therefore, there is a need for increasing the capacity of servers located in eight locations.

Opportunity: AWS offers '**Autoscaling**' and '**Elastic Load Balancers**', allowing YummyDelight to automatically adjust resources up or down based on their traffic.

2. Cost Efficiency

Maintaining 32 servers, storage systems, and networking equipment is capital-intensive. Also, there are other expenditures for energy consumption, hardware procurement, cooling systems, staffing for administration and support, and ongoing maintenance.

Opportunity: AWS provides a **pay-as-you-go** service model, and YumDelight can avoid large upfront infrastructure costs by adopting an OpEX model with no need for an annual contract.

3. Disaster Recovery and High Availability

YummyDelight currently employs an off-site disaster recovery system. Managing such backups for multiple locations increases complexity, expenses and also the risks of data loss or business damage during power outages and hardware failures.

Opportunity: AWS offers various disaster recovery solutions such as **Amazon S3** for backup storage and Amazon RDS for automated backups and failover. **Multi-AZ deployments** also can ensure high availability and redundancy across multiple locations.

4. Security and Compliance

YummyDelight is keen to keep sensitive company and customer data secure. Therefore, they need significant investment in firewalls, intrusion detection and prevention systems, and compliance management, which is not ideal for the business.

Opportunity: AWS provides built-in tools such as **AWS Identity and Access Management (IAM)**, **GuardDuty**, and **AWS Shield** for DDoS protection.

5. Business Availability

YummyDelight (with eight offices) has to ensure their business is seamlessly available and operating across the UK. Hardware failure, insufficient disaster recovery capability, and a lack of geography redundancy are some of the current risks that should be addressed.

Opportunity: AWS offers global **Availability Zones** and **Regions**, ensuring high resilience and continuity. In addition, this will enable YummyDelight to expand the business operation globally without adding physical data centres in other regions.

6. Agility and Innovation

YummyDelight's static IT resources can be updated slowly, and it is difficult to quickly innovate or deploy new services. Any changes involve hardware procurement, installation, and configuration, which also leads to long delays.

Opportunity: AWS provides rapid deployment of resources and services, which enables YummyDelight to innovate faster. Services like **Amazon Lamda** and **S3** make it easier to build new features and scale them globally.

2.c. Key Factors to Assess Before Migrating to AWS

There are some key factors YummyDelight should consider when assessing their current on-premises infrastructure before migrating to the cloud:

1. Current assets

- Identify all of servers, workstations, network devices, and software applications in use (Levine, 2013).
- Identify application interactions, including 3rd party integrations (Kavis, 2014).
- Check if software licenses are transferable to AWS (Velte et al., 2010).

2. Performance metrics and resource utilisation:

- Review CPU, memory, storage, and network bandwidth usage to define required AWS resources (Smith & Nair, 2015).
- Plan for scaling based on current peak usage periods.

3. Security and compliance requirements:

- We need to categorise data sensitivity and ensure compliance with GDPR and other regulations (Hashizume et al., 2013; Pearson, 2013).

4. Network architecture:

- Current network setup, including MPLS connections, to plan AWS networking must be assessed (Wittig & Wittig, 2018).
- Consider the impact of network performance on real-time cloud applications (Stevens & Pohl, 2015).

5. Operational Process and Expertise:

- Evaluate the IT team's cloud knowledge and identify AWS training needs.
- Plan for the shift from hardware maintenance to cloud resource management.

6. Application Compatibility:

- Determine if current applications are suitable for AWS migration.
- Identify outdated systems that may pose migration challenges.

7. Security Policies:

- Review authentication and authorisation protocols for replication in AWS (Hashizume et al., 2013).
- Plan encryption strategies for data at rest and in transit.

8. Stakeholder and User Research:

- Ensure migration aligns with business objectives and has executive support (Kotter, 2012).
- Research the impact on employees and customers to plan mitigation strategies.

2.d. Migration Strategy for YummyDelight

As we need high scalability, reliability, and cost-efficiency in migrating to cloud infrastructures, there are key AWS services such as the following to start with for a simple and smooth migration.

1. Planning and Preparation

We should set clear objectives and identify which applications, workloads, or databases will be migrated and how they interact with each other. Making sure to backup existing data and select a migration tool like **AWS Migration Hub** to prepare the best migration strategy plan. Assemble the migration team and invest in AWS training programs if required (Amazon Web Services, 2021).

2. Create an AWS root account and set up IAM:

To create and manage the AWS services, an initial account has been created to manage all other accounts and groups and assign permissions that control access to AWS resources. This root account is only used for tasks that require unique permissions (Abeeb, 2021). For everyday administrative tasks, **we will create IAM users with necessary permissions, which we talk about it in Task 4.h** [View figures 1-4](#)

3. Build a VPC and Launch a Web Server

In order to establish our resources on the cloud and protect our infrastructure, we need to set up a virtual private cloud (VPC). To create a VPC, please see [figures 13–17](#)

4. Amazon Elastic Compute Cloud (EC2)

To provide resizable compute capacity on the cloud and also to replicate on-premises Windows operating servers (4 per location), we need to launch 32 **Amazon EC2** instances. To meet the workload required to compute, memory, and storage, we need three separate EC2 instance types, which you can read more about in the appendix. View [figures 18–20](#)

5. Amazon Elastic Block Storage (EBS)

Attach **EBS volumes** to EC2 instances for persistence storage, like a hard drive for each instance. Gp3 volumes and io2 volumes, respectively, would be suitable for general-purpose storage and high-performance database storage. They are resizable and useful for backup, disaster recovery, and data migration to other regions. All are possible by creating a **snapshot** of a current volume, attaching it to a new instance, and creating a new volume from that snapshot. View [Figures 21-31](#)

6. AWS Simple Storage Service (S3)

Create **S3 buckets** as object storages to host static web-interfaced apps or core applications, but mainly to **replicate a secure and scalable backup and disaster recovery** of large unstructured data (videos, images, tables, etc.). It is also notable that the S3 Glacier is a better option for long-term usage and infrequent backups (e.g., for compliance purposes). Both options are cost-effective and useful for large files and unstructured data. The S3 storage will be necessary later for big data analytics used as a data lake. Here we create two buckets, one for the YummyDelight WebApplication and the other one for their databases. View[Figures 35–41](#)

7. Elastic Load balancer (ELB) and Auto-Scaleing Groups

Set up **Autoscaling Groups** for the web servers and other resources to automatically scale up or down instances based on the traffic or usage demands. And **load balancer** to distribute the incoming traffic into multiple EC2 instances. In this way, we ensure that first we will pay for total usage instead of maximum capacity. Second, we will protect hardware by detecting and replacing unhealthy instances; and lastly, we will improve availability by balanced traffic distribution when workload is less predictable.

8. AWS CloudFront

Amazon CloudFront provides a Content Delivery Network (CDN) service for delivering the contents more efficiently in different locations. This solution is crucial for having a low latency in the user experience and improving load time for users accessing the company's website (Amazon Web Services, 2021).

3.e. Recommended AWS Web Server Services.

AWS RDS for migrating databases like MySQL and Oracle for core applications like CRM, inventory management, transaction processing, etc. is a better long-term choice as it provides automated maintenance, backups, failover support, multi-AZ deployments (high availability), and are cost-efficient. Running databases on EC2 would demand higher operational overhead, provide higher complexities in setup, and have less scalability. View [Figures 42–48](#)

While there are many services provided by AWS that should be used by YummyDelight to have a smooth and efficient migration to the cloud that were mentioned before, there are some other services that in later stages of migration will be necessary or important to use. One of these services is **AWS Backup**. This centralised service simplifies backup processes for data and applications and can be part of the disaster recovery plan (Amazon Web Services, 2021).

Another service that could benefit the business with efficient automation is AWS Lambda. We can set **AWS Lambda** for automating processes, improving scalability, and reducing the infrastructure costs with no need for provisioning or managing servers. For instance, YummyDelight can use Lambda for processing transactions or automating backups without maintaining the running server, or when an event like file uploads or cloudWatch alarms triggers Lambda, the written codes can automatically process new tasks like sending notifications, whether it is one or thousand triggers (scalability).

Moreover, to optimise the AWS resource consumption and reduce costs, we can use **AWS Cost Explorer**. And more security-wise, **AWS Security Shield** and **Guard Duty** can enhance security protection. To proactively support YummyDelight to track the performance of the AWS resources and audit processes, we should set **Amazon CloudWatch** to monitor EC2 instances, RDS, Lambda, and S3 performance, set automated alerts, and configure automatic measures like scaling based on the preset metrics, such as CPU utilisation.

Also, YummyDelight EC2 instances can have a centralised sharing file system (**FSx for Windows**) that enables us to store, have access to, and manage data effectively in our VPC across multiple subnets and on-premises resources through VPN, which are highly scalable, durable, and secure. View [Figures 32–34](#)

3.f. Role of AWS Migration Hub and AWS Server Migration Service

- The **AWS Migration Hub** helps migration process by simplifying and accelerating the discovery, assessment, planning, execution, and tracking of the status of each application migration (Amazon Web Services, 2021).
 - It provides a **single place** to discover servers, plan migrations, and track the status of each application migration (Amazon Web Services, 2021).
 - Migration Hub Journeys **facilitate collaboration**, especially when transitioning between manual and automated efforts (Amazon Web Services, 2023)
 - Migration Hub Journeys can alert AWS experts for assistance when challenges arise (Amazon Web Services, 2023).

- It integrates with native migration tools like AWS Server Migration Service and AWS Database Migration Service, as well as partner tools (TechTarget, n.d.).
 - It automatically processes data from ADS and other resources.
 - Migration Hub Refactor Spaces bridges networking across AWS accounts so that new and legacy services can communicate.
- The **AWS Server Migration Service (SMS)** automates and accelerates the end-to-end migration process of on-premises virtual machines to AWS EC2 instances.
 - SMS automatically replicates live server volumes to AWS, which reduces server downtime during cutover.
 - It can orchestrate large-scale server migrations in a cost-effective way.
 - It supports most widely used operating systems.
 - It provides a user-friendly interface to manage and track the progress of the migration.
 - It combines data collection tools with automated server replication. (Amazon Web Services, n.d.)

By leveraging these two services, YummyDelight can minimise the downtime during migration, reduce the time, resources, and ultimately costs for migration, mitigating the risks of data loss or errors, and finally having a centralised oversight for better coordination between IT teams.

4.g. Security Best Practices for AWS Setup

1. **Identity and Access Management (IAM):** We must implement a least-privilege model for all users.
2. **Encryption:** Using AWS KMS for data encryption at rest (in S3, EBS, and RDS) and in transit with Secure Sockets Layer (SSL)/Transport Layer Security is crucial.
3. **MFA:** We must enable multi-factor authentication across all accounts.
4. **Compliance:** We need to ensure compliance with GDPR through regular audits using AWS Config.
5. **Network security:** Deploy resources within VPC isolated from other networks and configure inbound and outbound traffic rules to instances and subnets.
6. **Amazon CloudWatch:** Monitor and detect anomalies in AWS resources.
7. **AWS CloudTrail:** Enable CloudTrail to log all API calls for auditing and compliance purposes.

4.h. Leveraging AWS IAM for Secure Access

YummyDelight should use IAM to create custom roles for specific access rights to services and resources by adhering to role-based access control (RBAC). We can create custom policies and assigning them to each group to make sure access to resources is controlled. After creating a root account, we need to follow these steps:

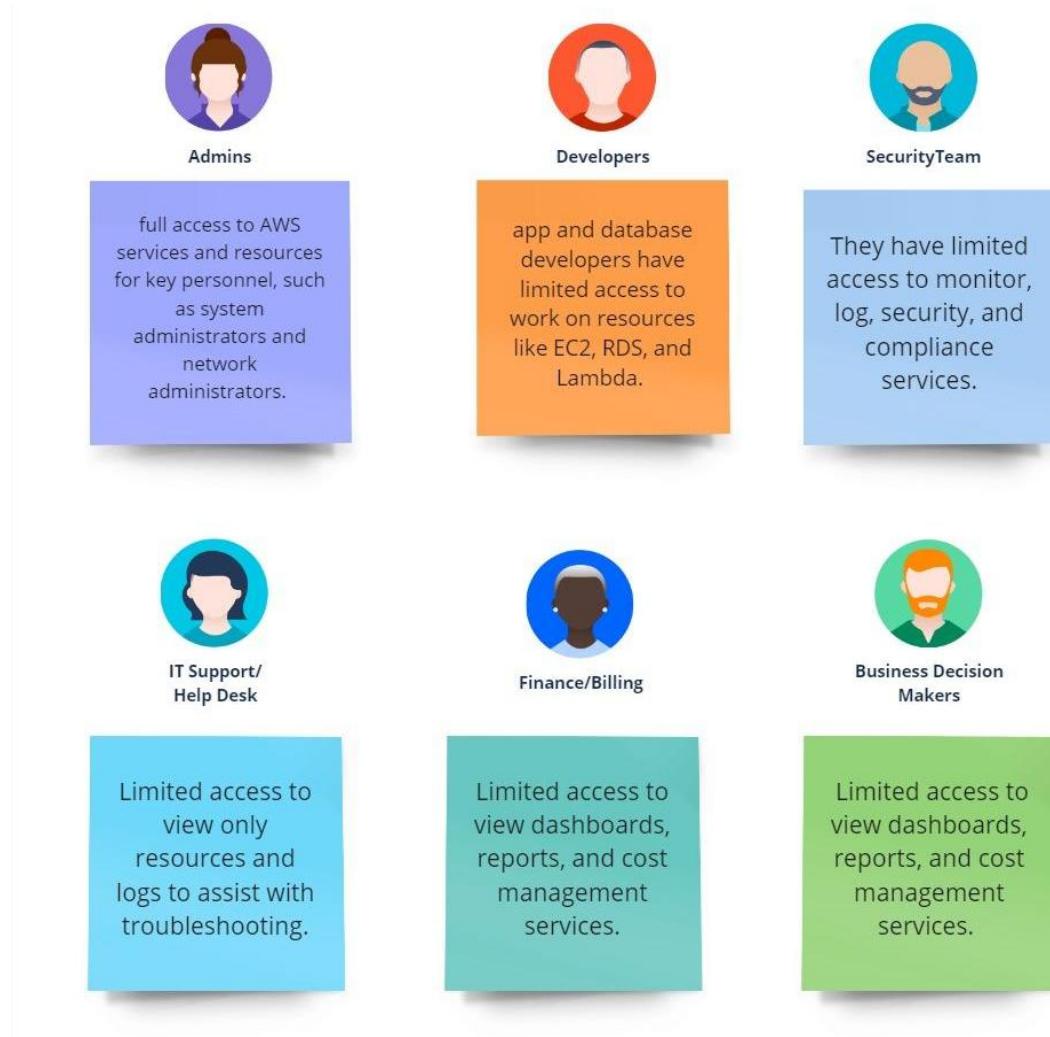


Figure 60: IAM users

4.1. Create IAM Users:

Network Administrators: 2 users (1 at HQ, 1 at the regional office) manage routing, load balancing, and VPN connections.

System Administrators: 8 users (manage AWS EC2 instances, cloud storage, and backups).

Cybersecurity Analysts: 8 users (monitor, audit, and respond to threats).

Helpdesk/IT Support: 8 users (assist with cloud apps, virtual desktops, and remote access).

Application Developers & DBAs: Handle app development and database optimization.

Finance, HR, Payroll, CRM: Support operational work.

Business Decision Makers: Focus on high-level strategic planning.

[View figures 5–8](#)

* **Note:** By migrating to AWS, YummyDelight can significantly reduce their IT staff. The roles of network and system administrators, cybersecurity analysts, and IT support will shift from operational and managing on-premises hardware to managing centralised cloud infrastructure.

4.2. Create IAM Users, Groups and Assign users to the groups:

By creating groups, we can assign permissions to sets of users based on their job functions. This allows us to easily adjust permissions for a large group of users rather than individually

Groups	Locations and Users							
	HQ	Regional Office	Office3	Office4	Office5	Office6	Office7	Office8
Admins	NetAdmin1 SysAdmin1	NetAdmin2 SysAdmin2	SysAdmin3	SysAdmin4	SysAdmin5	SysAdmin6	SysAdmin7	SysAdmin8
Developers	DevAdmin1	DevAdmin2	DevAdmin3	DevAdmin4	AppDev1	AppDev2	AppDev3	AppDev4
SecurityTeam	CybAdmin1	CybAdmin2	CybAdmin3	CybAdmin4	CybAdmin5	CybAdmin6	CybAdmin7	CybAdmin8
HelpDesk	ITSupp1	ITSupp2	ITSupp3	ITSupp4	ITSupp5	ITSupp6	ITSupp7	ITSupp8
Finance/HR	FinAdmin	HRAdmin	PayAdmin					
DBTeam	DBAdmin1	DBAdmin2						
Business Decision Makers(BDM)	BCDAdmin1	BCDAdmin2						

manage accesses to the resources. View [figures 9–10](#)

4.3. Define Roles and Permissions:

To temporarily grant access to certain AWS services and to the admins, it is required to create roles:

- ‘**EC2Instance**’: This will allow EC2 instances to interact with other AWS services like S3 and DynamoDB without embedding credentials.
- ‘**SecurityMonitoring**’: This role is needed when security analysts need read-only access to services like CloudWatch and VPC Flow Logs for audit checks.
- ‘**Cross-AccountAccess**’: This role is used by an AWS accounts like Finance that need access to resources in another account like BDM for some monitoring purposes or anything else.
- ‘**S3BucketAccess**’: This role is used for services (like EC2 or Lambda) that require access to specific S3 buckets for read and write purposes.[View figures 11–12](#)

4.i. Training Plan for IT Staff

1. **Assessment of Current Skills:** It is the best to identify the current knowledge gaps and create tailored learning plans for individuals.

2. **Foundational Training:** AWS Training and Certification for foundational knowledge could be a great initial training.
 3. **Security Training:** It is a must to encourage utilising AWS Shield, WAF, and Security Hub services for practical training staff with security measures to ensure everyone have sufficient security knowledge.
 4. **AWS Hands-On Labs:** We should give access to AWS Hands-on Labs for practical experience.
 5. **DevOps Integration:** Educating staff on tools such as AWS CodePipeline for continued deployment also matters.
 6. **Mentorship:** Encouraging employees to share their learnings in peers and support less experienced colleagues can be helpful.
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Project Summary

The primary goal of this project was to address the issues that YummyDelight faced with the scalability and dependence on physical servers across eight distinct locations in terms of reliability and cost. While we had to assess the compatibility of application with AWS, it is clear that the majority could be migrated without much complication but for legacy application there might be needed for refactoring and ensure the migration will not disrupt the business.

Key factors such as resource usage, security and how existing applications would conform with cloud implementation. Some of the systems that YummyDelight had included 32 servers, many work stations, different types of storage equipments which required large amounts of money for repair as well as purchase. In response, I recommended that we transition to AWS and make use of Amazon EC2 instances because it provides variable operating capabilities. According to the workloads, I suggested three types of EC2 instances and Amazon RDS to perform the MySQL and Oracle database migration, which is critical for implementing and dealing with CRM and inventory.

In case of storage, Amazon S3 was selected as the solution to store systems- and application-specific static files, backups, and archives for long-term use at minimum cost. On the other hand, Amazon EBS offered a low latency block storage to meet performance required by EC2 instance in providing constant data access for specific applications such as database.

The security of YummyDelight's sensitive customer data was a major concern throughout the process. To address this, I implemented AWS IAM for secure access control and AWS Shield for protection against DDoS attacks. Therefore, Multi-AZ implementations were applied, including through Amazon RDS, with regard to autobackups and failover. This reduced the time of loss of operation in instances of hardware malfunction and ensured business operation persistence. In addition, Amazon S3 tightly connected with AWS Backup ensured that any vital data saved within the organization were protected and recoverable in cases of disaster.

I also faced some challenges along the way. AWS's free tier restricted the size of EBS volumes and EC2 instances, limiting me to smaller sizes like t5.small, whereas YummyDelight required larger options like t5.large. Another hurdle was connecting RDS to MySQL Workbench, where I

encountered credential issues that were eventually resolved by creating and saving new credentials for each connection.

Regarding the migration of web servers of the company and to increase the performance and to reduce the cost, I proposed to use Amazon CloudFront for CDA and for reduced latency for web facing apps. I had to use AWS Elastic Load Balancer and Auto Scaling Groups in order to be prepared for traffic rush and scale up or down the service accordingly, respectively.

Furthermore, I integrated use of AWS Lambda to enable core activities like processing of transactions, generation of notifications among others.

During the migration, the resources such as AWS Migration Hub and AWS Server Migration Service could be helpful and potentially cause the reduction in downtimes and simplify the complicated migration. Cost optimisation is another factor that had to be effectively dealt with accordingly, I started using AWS Cost Explorer and enabled billing alerts for better control.

In the end, this migration plan successfully aligned YummyDelight's operational needs with AWS's scalable, secure, and cost-effective solutions, ensuring a smooth transition to the cloud.

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Appendix

Sign up for AWS

Create your password

It's you! Your email address has been successfully verified.

Your password provides you with sign in access to AWS, so it's important we get it right.

Root user password

Confirm root user password

Continue (step 1 of 5)

OR

Figure 1: Create an AWS Root Account.

Sign up for AWS

Contact Information

How do you plan to use AWS?

- Business - for your work, school, or organization
- Personal - for your own projects

Who should we contact about this account?

Full Name

Phone Number

 +1 ▾ 222-333-4444

Country or Region

United States ▾

Address

Figure 2: Create an AWS Root Account.

Select a support plan

Choose a support plan for your business or personal account. [Compare plans and pricing examples](#). You can change your plan anytime in the AWS Management Console.

<input checked="" type="radio"/> Basic support - Free <ul style="list-style-type: none">Recommended for new users just getting started with AWS24x7 self-service access to AWS resourcesFor account and billing issues onlyAccess to Personal Health Dashboard & Trusted Advisor 	<input type="radio"/> Developer support - From \$29/month <ul style="list-style-type: none">Recommended for developers experimenting with AWSEmail access to AWS Support during business hours12 (business)-hour response times 	<input type="radio"/> Business support - From \$100/month <ul style="list-style-type: none">Recommended for running production workloads on AWS24x7 tech support via email, phone, and chat1-hour response timesFull set of Trusted Advisor best-practice recommendations 
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Figure 3: Selection of the technical support type based on the project requirements.

Sign up for AWS

Secure verification

We will not charge you for usage below AWS Free Tier limits. We may temporarily hold up to \$1 USD (or an equivalent amount in local currency) as a pending transaction for 3-5 days to verify your identity.



Billing Information

Credit or Debit card number

VISA MASTERCARD AMEX

AWS accepts all major credit and debit cards. To learn more about payment options, review our [FAQ](#).

Expiration date

Cardholder's name

CVV

Billing address

Use my contact address

Figure 4: Selecting a bank account for paid services

Step 1
Specify user details

User name
NetAdminHQ

The user name can have up to 64 characters. Valid characters: A-Z, a-z, 0-9, and + = . @ _ - (hyphen)

Provide user access to the AWS Management Console - optional
If you're providing console access to a person, it's a best practice [to manage their access in IAM Identity Center](#).

Are you providing console access to a person?

User type

Specify a user in Identity Center - Recommended
We recommend that you use Identity Center to provide console access to a person. With Identity Center, you can centrally manage user access to their AWS accounts and cloud applications.

I want to create an IAM user
We recommend that you create IAM users only if you need to enable programmatic access through access keys, service-specific credentials for AWS CodeCommit or Amazon Keypairs, or a backup credential for emergency account access.

Console password

Autogenerated password
You can view the password after you create the user.

Custom password
Enter a custom password for the user.

Must be at least 8 characters long
Must include at least three of the following mix of character types: uppercase letters (A-Z), lowercase letters (a-z), numbers (0-9), and symbols ! @ # \$ % ^ & * () _ + - (hyphen) = [] { }

Show password

Users must create a new password at next sign-in - Recommended

Figure 5: Creating users accounts.

Step 1
Specify user details

Step 2
Set permissions

Step 3
Review and create

Step 4
Retrieve password

Set permissions

Add user to an existing group or create a new one. Using groups is a best-practice way to manage user's permissions by job functions. [Learn more](#)

Permissions options

Add user to group
Add user to an existing group, or create a new group. We recommend using groups to manage user permissions by job function.

Copy permissions
Copy all group memberships, attached managed policies, and inline policies from an existing user.

Attach policies directly
Attach a managed policy directly to a user. As a best practice, we recommend attaching policies to a group instead. Then, add the user to the appropriate group.

Permissions policies (1/1229)

Choose one or more policies to attach to your new user.

Filter by Type
Q NetworkAdministrator All types 1 match

Policy name	Type	Attached entities
NetworkAdministrator	AWS managed - job function	0

Set permissions boundary - optional

Figure 6: Setting permissions to the users accounts

Screenshot of the AWS IAM 'Create user' review step:

Review and create

Review your choices. After you create the user, you can view and download the autogenerated password, if enabled.

User details		
User name NetAdminHQ	Console password type Autogenerated	Require password reset Yes

Permissions summary

Name	Type	Used as
IAMUserChangePassword	AWS managed	Permissions policy
NetworkAdministrator	AWS managed - job function	Permissions policy

Tags - optional

Tags are key-value pairs you can add to AWS resources to help identify, organize, or search for resources. Choose any tags you want to associate with this user.

No tags associated with the resource.

Add new tag

You can add up to 50 more tags.

Cancel Previous Create user

Figure 7: Review the users account

Screenshot of the AWS IAM 'Create user' success step:

User created successfully

You can view and download the user's password and email instructions for signing in to the AWS Management Console.

View user

Retrieve password

You can view and download the user's password below or email users instructions for signing in to the AWS Management Console. This is the only time you can view and download this password.

Console sign-in details	
Console sign-in URL	Email sign-in instructions
NetAdminHQ	
***** Show	

Cancel Download .csv file Return to users list

Figure 8: Retrieve password data for users accounts

The screenshot shows the AWS IAM User groups page. The left sidebar includes sections for Dashboard, Access management (User groups, Users, Roles, Policies, Identity providers, Account settings), Access reports (Access Analyzer, External access, Unused access, Analyzer settings, Credential report, Organization activity, Service control policies), and Related consoles (IAM Identity Center, AWS Organizations). The main content area displays the 'User groups (0) Info' section, which states: 'A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.' It features a search bar, a table header with columns for Group name, Users, Permissions, and Creation time, and a message 'No resources to display'. A prominent orange 'Create group' button is located at the top right.

Figure 9: IAM - Creating user groups

The screenshot shows the 'Create user group' page. The left sidebar is identical to Figure 9. The main content area has a 'Name the group' section with a 'User group name' input field containing 'BusinessDecisionMakers'. Below it is an 'Add users to the group - Optional (1/8)' section, which lists IAM users: BCDAdmin1 (selected), CyberAdmin, DBAdmin1, DevAdminHQ, FinAdmin, ITSupp1, NetAdminHQ, and SysAdminHQ. At the bottom is an optional 'Attach permissions policies' section.

User name	Groups	Last activity	Creation time
BCDAdmin1	0	None	24 minutes ago
CyberAdmin	1	None	26 minutes ago
DBAdmin1	1	None	24 minutes ago
DevAdminHQ	1	None	27 minutes ago
FinAdmin	1	None	25 minutes ago
ITSupp1	1	None	25 minutes ago
NetAdminHQ	1	None	1 hour ago
SysAdminHQ	1	None	29 minutes ago

Figure 10: IAM - Add users to groups

The screenshot shows the AWS IAM Roles page. On the left, there's a sidebar with navigation links for Identity and Access Management (IAM), Access management, Access reports, and Related consoles. The main content area displays a table of roles:

Role name	Trusted entities	Last activity
AWSServiceRoleForSupport	AWS Service: support (Service-Linker)	-
AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service)	-

Below the table, there are three sections: "Access AWS from your non AWS workloads" (with a brief description and a small icon), "X.509 Standard" (with a brief description and a small icon), and "Temporary credentials" (with a brief description and a small icon). A "Manage" button is located in the top right corner of the main content area.

Figure 11: IAM - Create roles for securing the accesses

The screenshot shows the "Select trusted entity" step in the IAM Role creation wizard. The left sidebar shows Step 1: Select trusted entity, Step 2: Add permissions, and Step 3: Name, review, and create. The main content area has a title "Select trusted entity" and a sub-section "Trusted entity type". It lists five options:

- AWS service: Allows AWS services like EC2, Lambda, or others to perform actions in this account.
- AWS account: Allows entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
- Web identity: Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
- SAML 2.0 federation: Allows users federated with SAML 2.0 from a corporate directory to perform actions in this account.
- Custom trust policy: Creates a custom trust policy to enable others to perform actions in this account.

Below this, there's a "Use case" section with a dropdown menu set to "EC2". Under "Service or use case", "EC2" is selected. The "Choose a use case for the specified service" section shows the following options:

- EC2: Allows EC2 instances to call AWS services on your behalf.
- EC2 Role for AWS Systems Manager: Allows EC2 instances to call AWS services like CloudWatch and Systems Manager on your behalf.
- EC2 Spot Fleet Role: Allows EC2 Spot Fleet to request and terminate Spot Instances on your behalf.
- EC2 - Spot Fleet Auto Scaling: Allows Auto Scaling to access and update EC2 spot fleets on your behalf.
- EC2 - Spot Fleet Tagging

Figure 12: IAM - Create roles for EC2 service

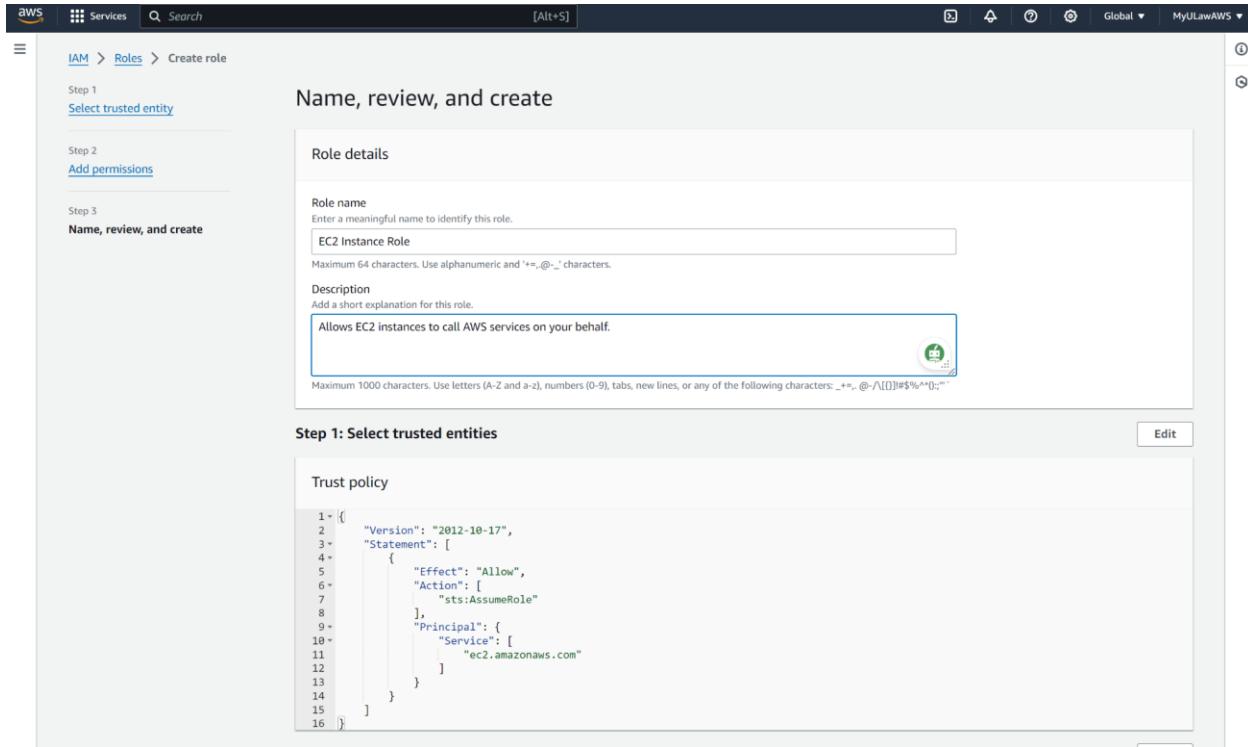


Figure 12: IAM - Add or edit permissions for roles for EC2 service

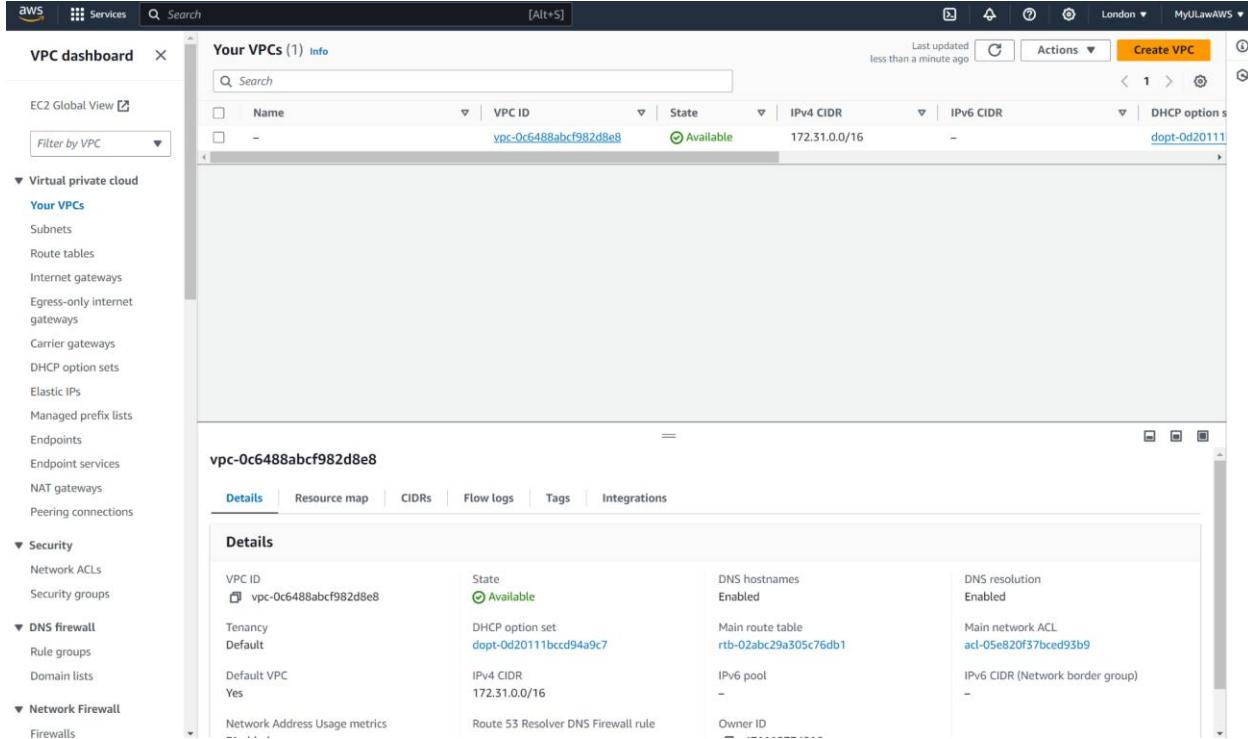


Figure 13: VPC Dashboard

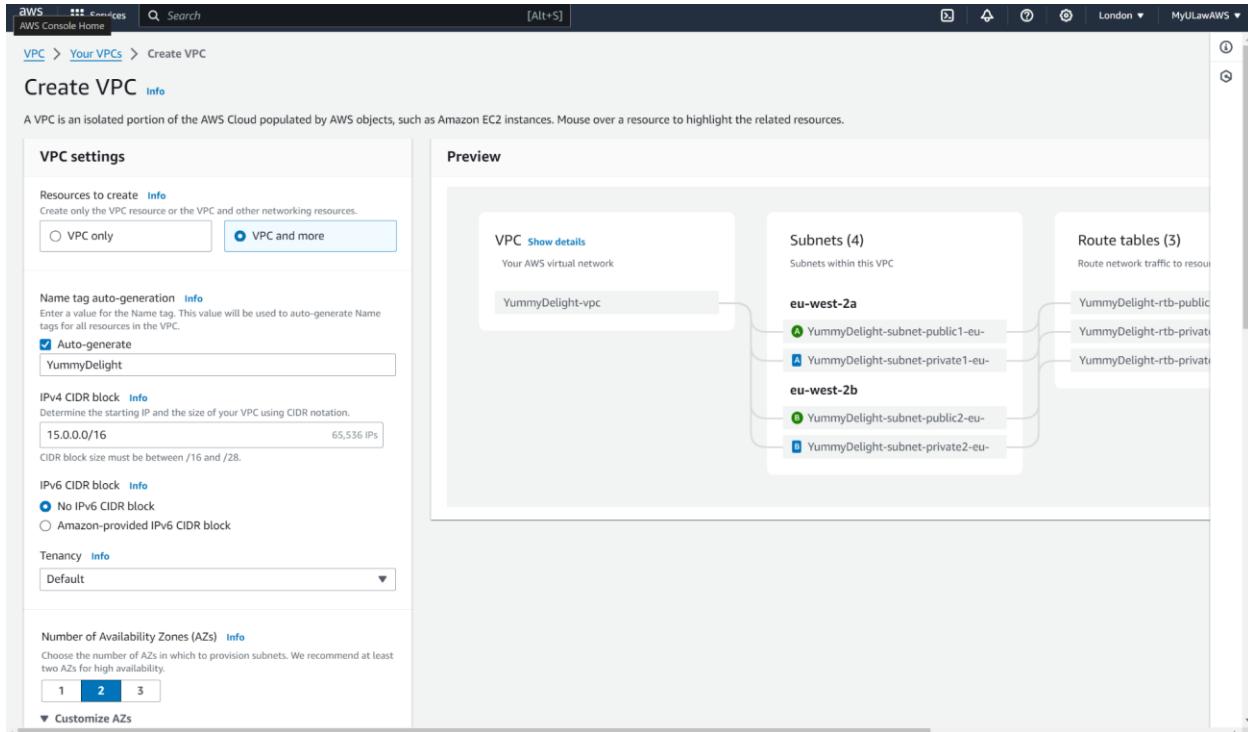


Figure 14: Creating VPC

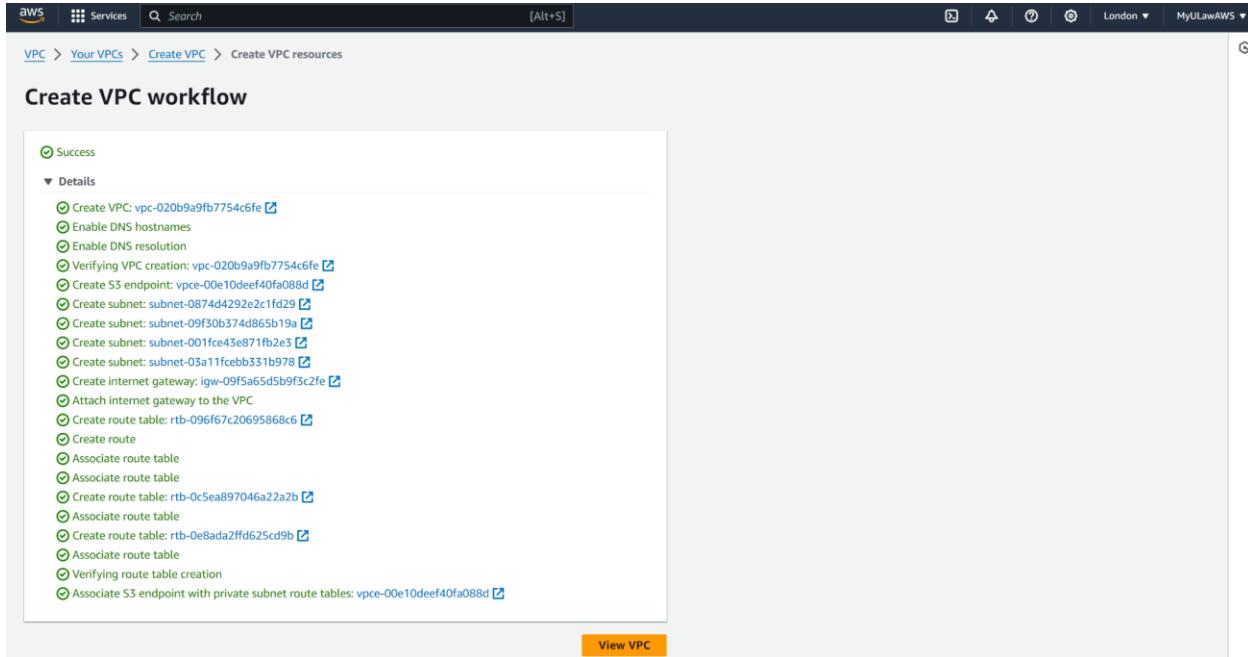


Figure 15: Creating VPC

Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR
YummyDelight-subnet-public1-eu-west-1a	subnet-03bdd86acc7c6ebfb	Available	vpc-08b758202c1ce7e39 YummyDelight	15.0.0.0/20	-
YummyDelight-subnet-private2-eu-west-1a	subnet-02d3bc7798f278a3b	Available	vpc-08b758202c1ce7e39 YummyDelight	15.0.144.0/20	-
YummyDelight-subnet-public2-eu-west-1a	subnet-012e520ffa0fe6ca	Available	vpc-08b758202c1ce7e39 YummyDelight	15.0.16.0/20	-
YummyDelight-subnet-private1-eu-west-1a	subnet-04b3c046df0ac03e9	Available	vpc-08b758202c1ce7e39 YummyDelight	15.0.128.0/20	-

Figure 16: VPC Dashboard

Name	Route table ID	Explicit subnet associations	Main	VPC
YummyDelight-rtb-public	rtb-005e40278eddfc3c5	2 subnets	No	vpc-08b758202c1ce7e39 YummyDelight
-	rtb-0795027a3a5e1c14	-	Yes	vpc-08b758202c1ce7e39 YummyDelight
YummyDelight-rtb-private2-eu-west-2b	rtb-0e915084a464896ac	subnet-02d3bc7798f278...	No	vpc-08b758202c1ce7e39 YummyDelight
YummyDelight-rtb-private1-eu-west-2a	rtb-004b5fb06b44389a7	subnet-04b3c046df0ac0...	No	vpc-08b758202c1ce7e39 YummyDelight

Figure 17: Created VPCs

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
No instances You do not have any instances in this region							

Figure 18: Instances

EC2 Instance for Core Applications and Databases ('YummyDelightDBS'): These Windows instances will host MySQL and Oracle databases, and based on the business requirements like inventory, CRM, and financial systems.

EC2 Instance for Web Servers and Public-Facing Applications ('YummyDelightWeb'): We need these instances for YummyDelight's website, web applications, and POS system integration. They will mainly handle external traffic and requests from the public web.

EC2 Instance for Internal Business Applications ('YummyDelightIBA'): This is needed to secure the internal applications (HR, Finance, and Payroll systems) performance and make it independent from the other compute and network resources.

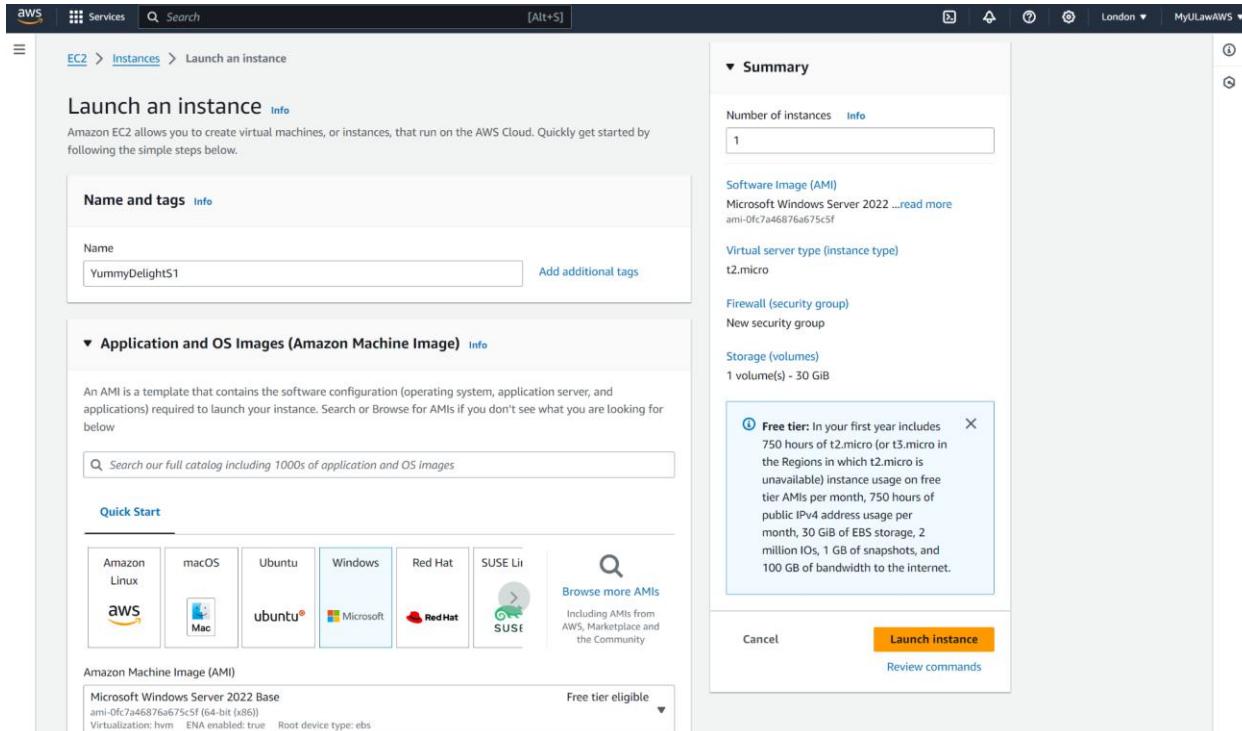


Figure 19: Create instances for YummyDelight

The screenshot shows the AWS EC2 Instances page. The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Instances (with sub-links for Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity, and Reservations), Images (AMIs, AMI Catalog), Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces), and Load Balancing.

The main content area displays the 'Instances (1/2) info' table. It lists two instances:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
<input checked="" type="checkbox"/> YummyDelightWeb	i-0b76c0d31c36b6660	Running	t2.micro	Initializing	View alarms +	eu-west-2c
<input type="checkbox"/> YummyDelightDBS	i-0cb4069cd9e73665	Running	t2.micro	2/2 checks passed	View alarms +	eu-west-2c

A modal window is open for the instance **i-0b76c0d31c36b6660 (YummyDelightWeb)**. The 'Details' tab is selected, showing the following information:

- Instance summary**: Instance ID: i-0b76c0d31c36b6660 (YummyDelightWeb); Public IPv4 address: 18.175.230.82; Private IP DNS name (IPv4 only): ip-172-31-6-254.eu-west-2.compute.internal; Instance state: Running; Hostname type: IP name: ip-172-31-6-254.eu-west-2.compute.internal; Answer private resource DNS name: IPv4 (A); Instance type: t2.micro; Auto-assigned IP address: VPC ID: -.
- Private IP addresses**: 172.31.6.254.
- Public IPv4 DNS**: ec2-18-175-230-82.eu-west-2.compute.amazonaws.com; open address.
- Elastic IP addresses**: -.
- AWS Compute Optimizer finding**: -.

Figure 20: Running instances for YummyDelight

The screenshot shows the 'Create volume' page under the EC2 > Volumes section. The page title is 'Create volume' with an 'Info' link. A note below says 'Create an Amazon EBS volume to attach to any EC2 instance in the same Availability Zone.' The form is titled 'Volume settings' and includes the following fields:

- Volume type**: General Purpose SSD (gp3). A note says 'General Purpose SSD gp3 is now the default selection. gp3 provides up to 20% lower cost per GB than gp2.' with a 'Learn More' link.
- Size (GiB)**: 100. A note says 'Min: 1 GiB, Max: 16384 GiB. The value must be an integer.'
- IOPS**: 3000. A note says 'Min: 3000 IOPS, Max: 16000 IOPS. The value must be an integer.'
- Throughput (MiB/s)**: 125. A note says 'Min: 125 MiB, Max: 1000 MiB. Baseline: 125 MiB/s.'
- Availability Zone**: eu-west-2a.
- Snapshot ID - optional**: Don't create volume from a snapshot.
- Encryption**: Info.

Figure 21: Create EBS for instances

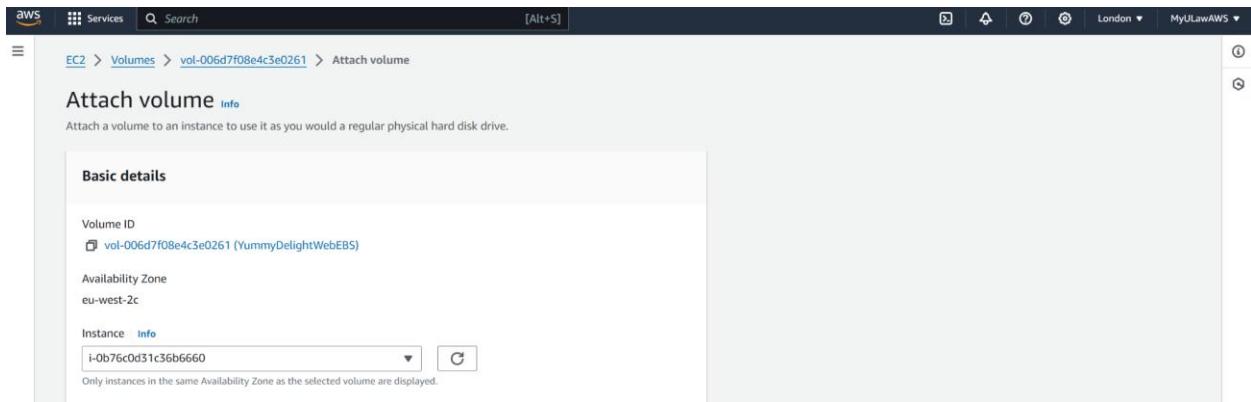


Figure 22: Select the instance to attach a volume

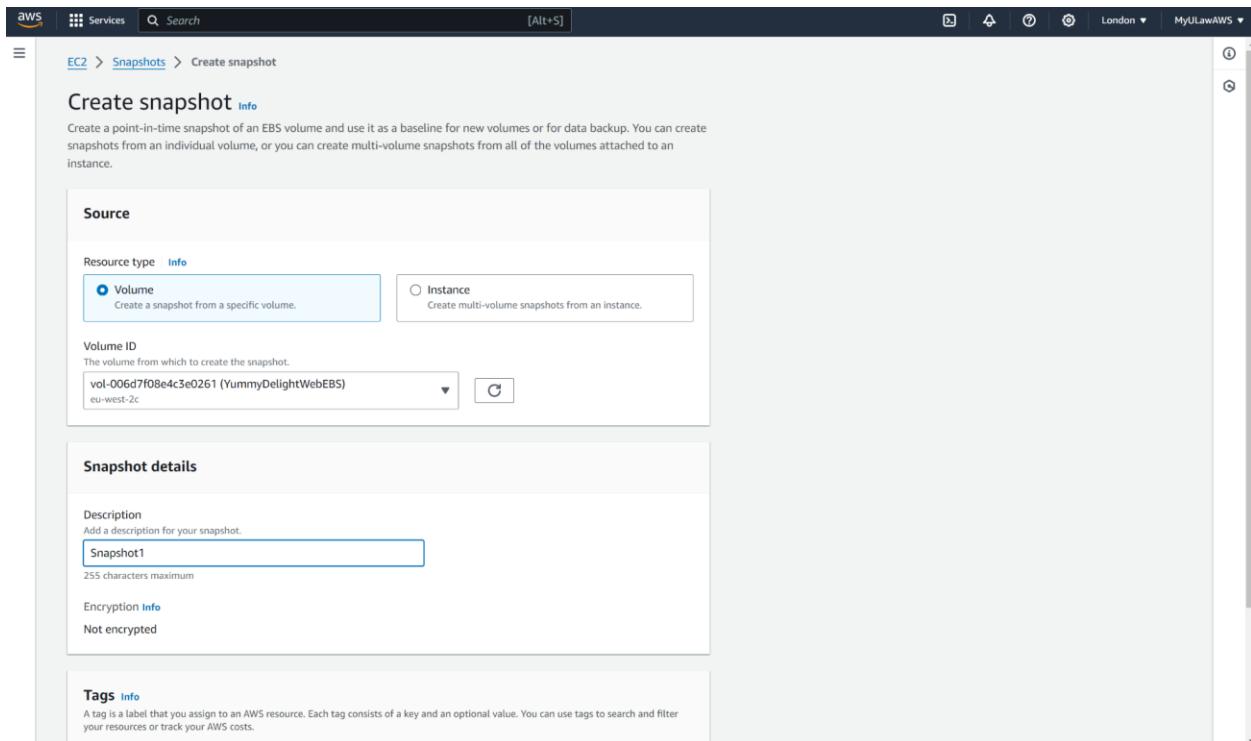


Figure 23: Create a snapshot

The screenshot shows the AWS EC2 Dashboard with the 'Schemas' section selected. The 'Snapshots' tab is active, displaying a table with one row. The table columns include Name, Snapshot ID, Volume size, Description, Storage tier, Snapshot status, and Started. The single entry is 'snap-OaaOac1761d7397ae', 30 GiB, with no description, Standard storage tier, Pending status, and started on 2024/09/13 15:22 GMT+1.

Figure 24: Create a new volume from a snapshot

The screenshot shows the AWS EC2 Dashboard with the 'Schemas' section selected. The 'Snapshots' tab is active, displaying a table with one row. The table columns include Name, Snapshot ID, Volume size, Description, Storage tier, and Snapshot status. The single entry is 'snap-020fad66a5d1e2c43', 100 GiB, with a description 'Snapshot1', Standard storage tier, and a green 'Completed' status. The Actions menu is open, showing options: Create volume from snapshot, Create image from snapshot, Copy snapshot, Delete snapshot, Manage tags, Snapshot settings, and Archiving.

Figure 25: Create a volume from this snapshot on a different region (data migration scenario).

The screenshot shows the 'Create volume' page in the AWS EC2 service. The top navigation bar includes 'Services', 'Search', and 'London'. The main path is 'EC2 > Snapshots > snap-020fad66a5d1e2c43 > Create volume'. The title 'Create volume' has an 'Info' link. Below it, a note says 'Create an Amazon EBS volume to attach to any EC2 instance in the same Availability Zone.' The 'Volume settings' section contains the following fields:

- Snapshot ID:** snap-020fad66a5d1e2c43
- Volume type:** General Purpose SSD (gp3) (selected)
- Size (GiB):** 100 (Min: 1 GiB, Max: 16384 GiB)
- IOPS:** 3000 (Min: 3000 IOPS, Max: 16000 IOPS)
- Throughput (MiB/s):** 125 (Min: 125 MiB, Max: 1000 MiB, Baseline: 125 MiB/s)
- Availability Zone:** eu-west-2b
- Fast snapshot restore:** Enabled

A note at the bottom of the volume type dropdown states: 'General Purpose SSD gp3 is now the default selection. gp3 provides up to 20% lower cost per GB than gp2.' with a 'Learn More' link.

Figure 26: Create a volume from this snapshot on a different region (data migration scenario).

The screenshot shows the 'Attach volume' page in the AWS EC2 service. The top navigation bar includes 'Services', 'Search', and 'London'. The main path is 'EC2 > Volumes > vol-01b7c0cfab70f9f24 > Attach volume'. The title 'Attach volume' has an 'Info' link. Below it, a note says 'Attach a volume to an instance to use it as you would a regular physical hard disk drive.' The 'Basic details' section contains the following fields:

- Volume ID:** vol-01b7c0cfab70f9f24 (SnapshotFromeu-west-2a)
- Availability Zone:** eu-west-2b
- Instance:** A dropdown menu with placeholder 'Search instance ID or name tag' and a search icon. A note below says 'Only instances in the same Availability Zone as the selected volume are displayed.'
- Device name:** A dropdown menu with placeholder 'Select a device name'

At the bottom right are 'Cancel' and 'Attach volume' buttons.

Figure 27: Attach the created volume from a snapshot to another instance:

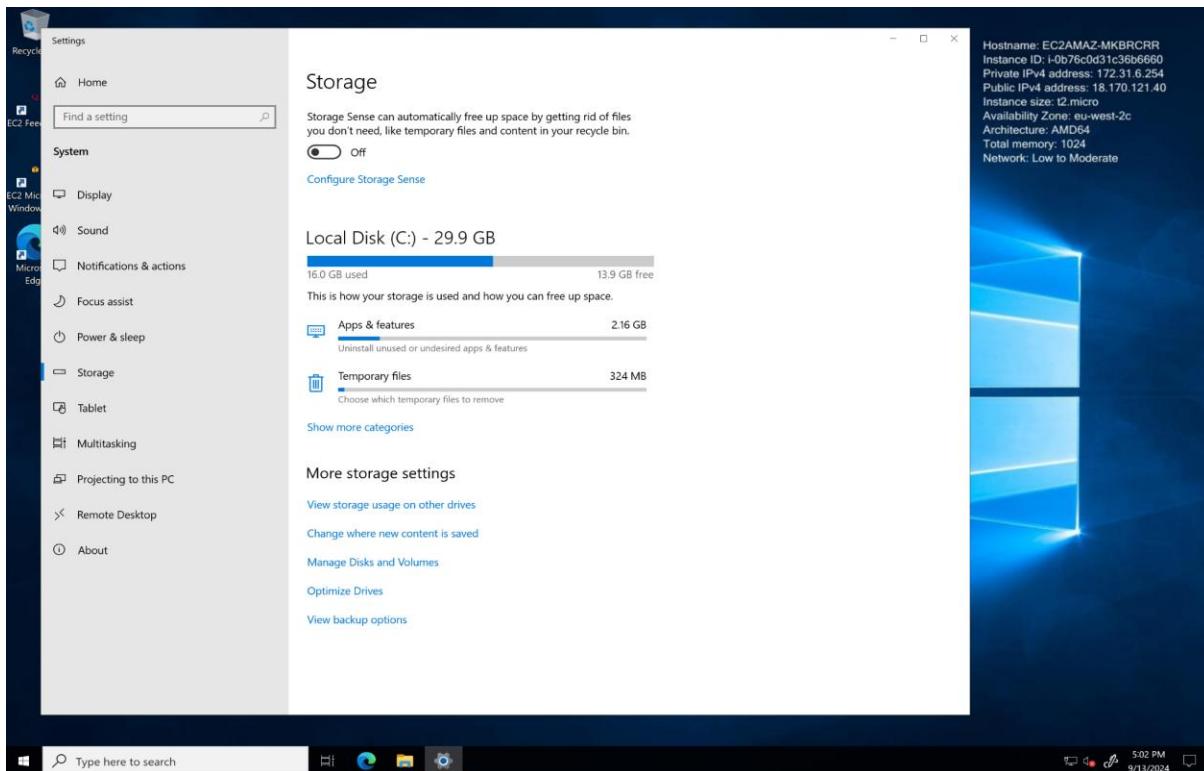


Figure 28: Create and mount an extra EBS Volume for the Windows EC2 Instance.

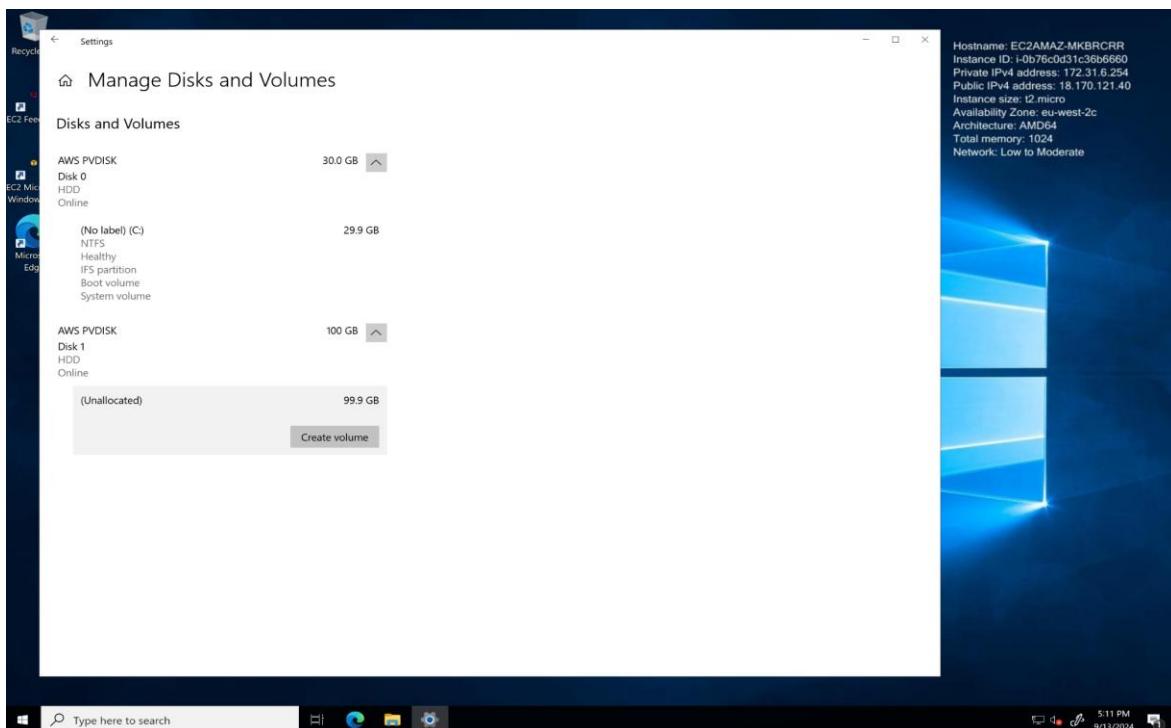


Figure 29: Select an unallocated volume to format and create a volume as a shared File System.

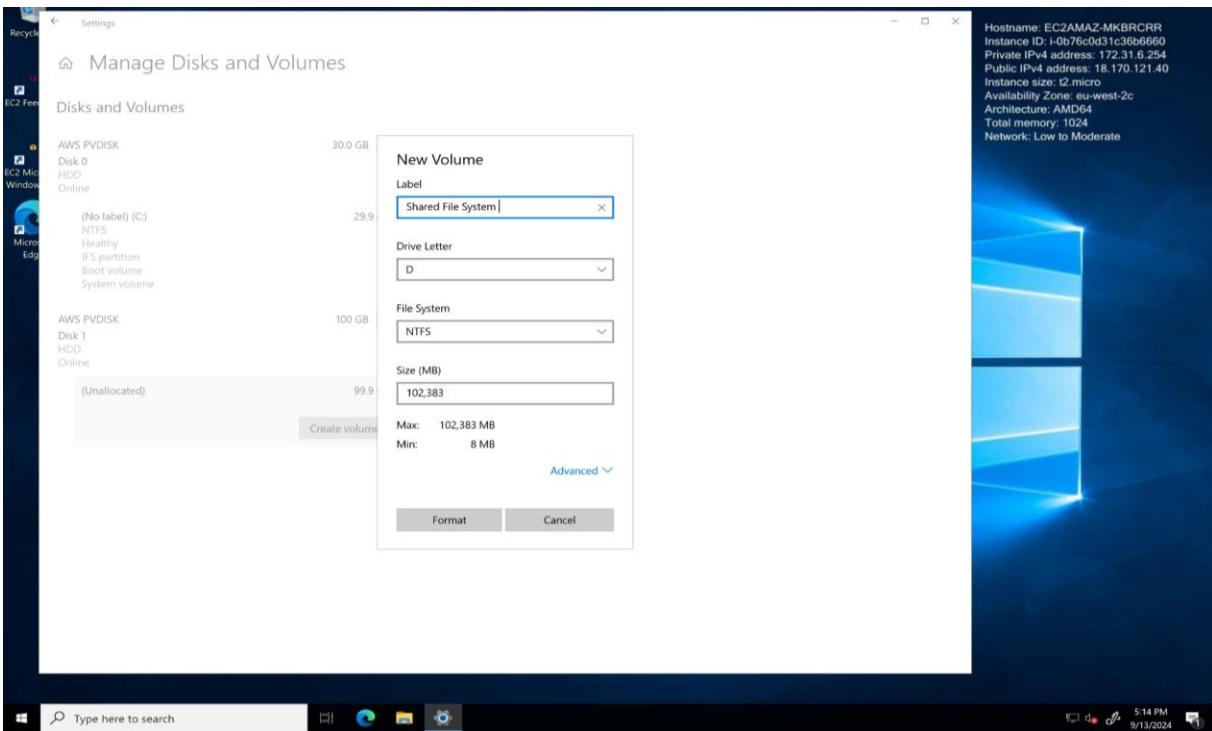


Figure 30: Select an unallocated volume to format and create a volume as a shared File System.

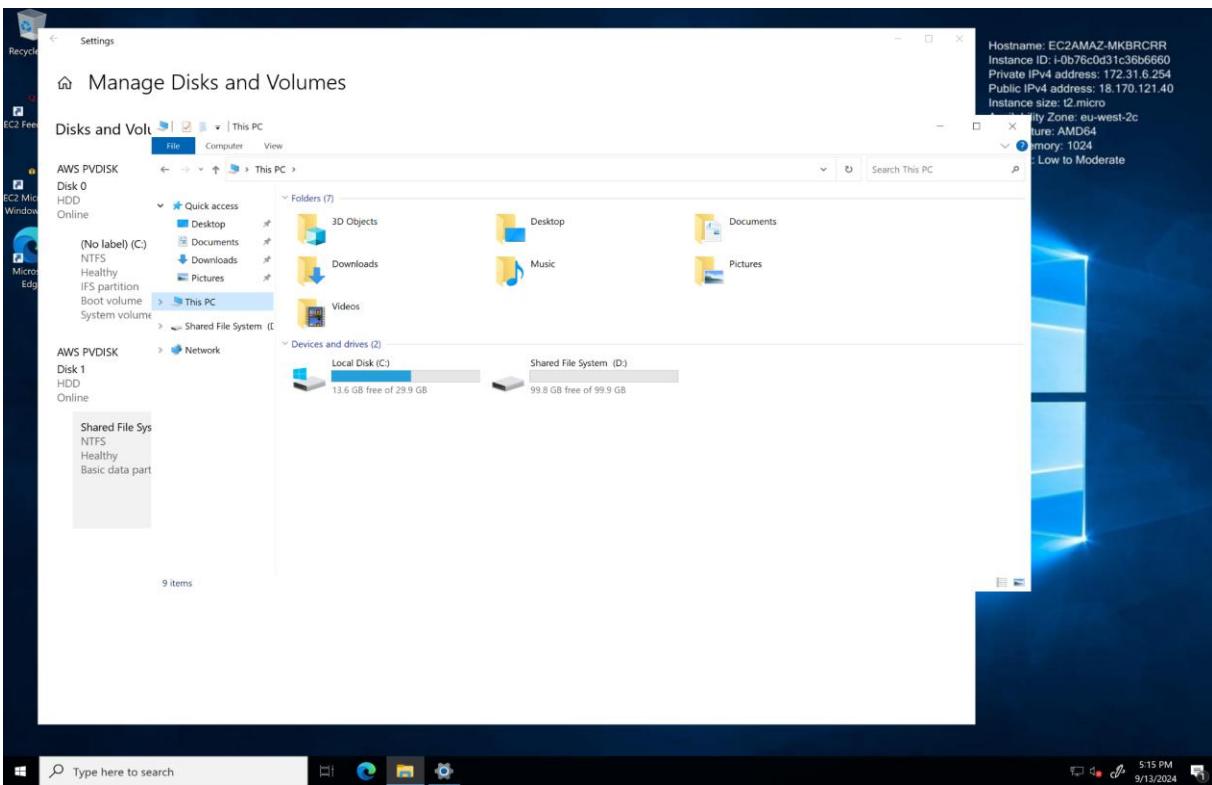


Figure 31: Created volume as a shared File System.

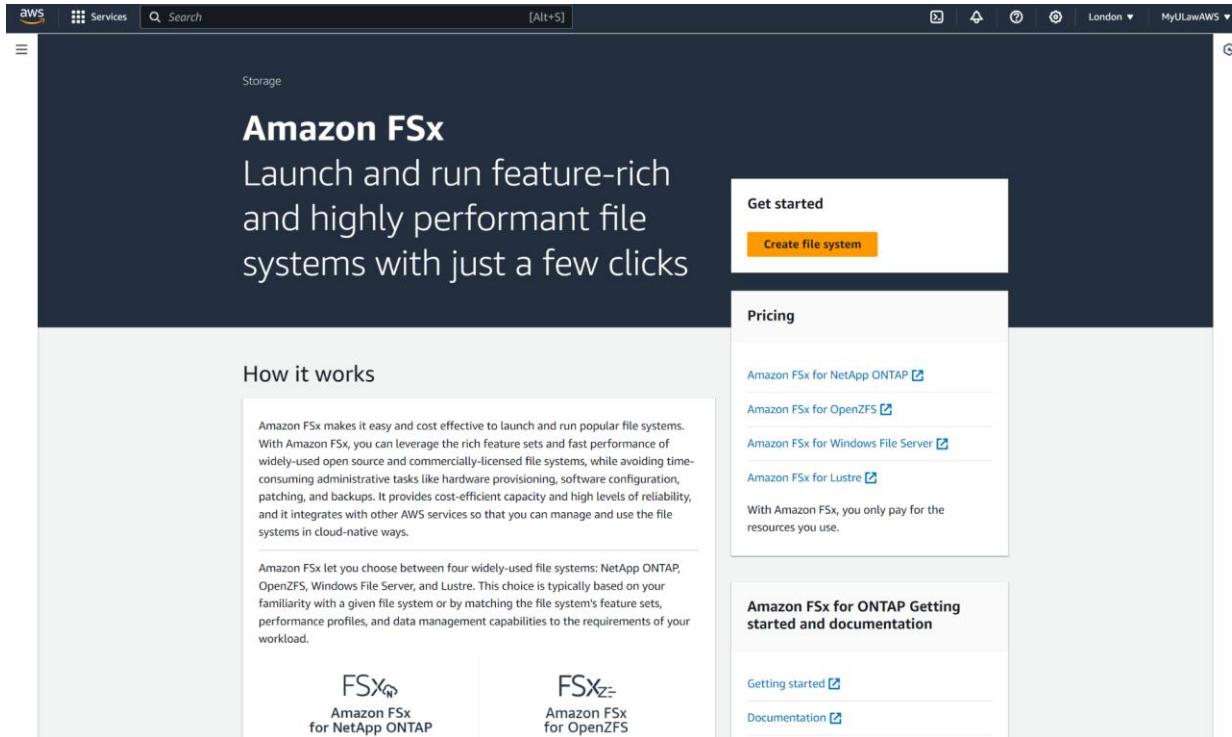


Figure 32: Create File Systems on Windows Instances.

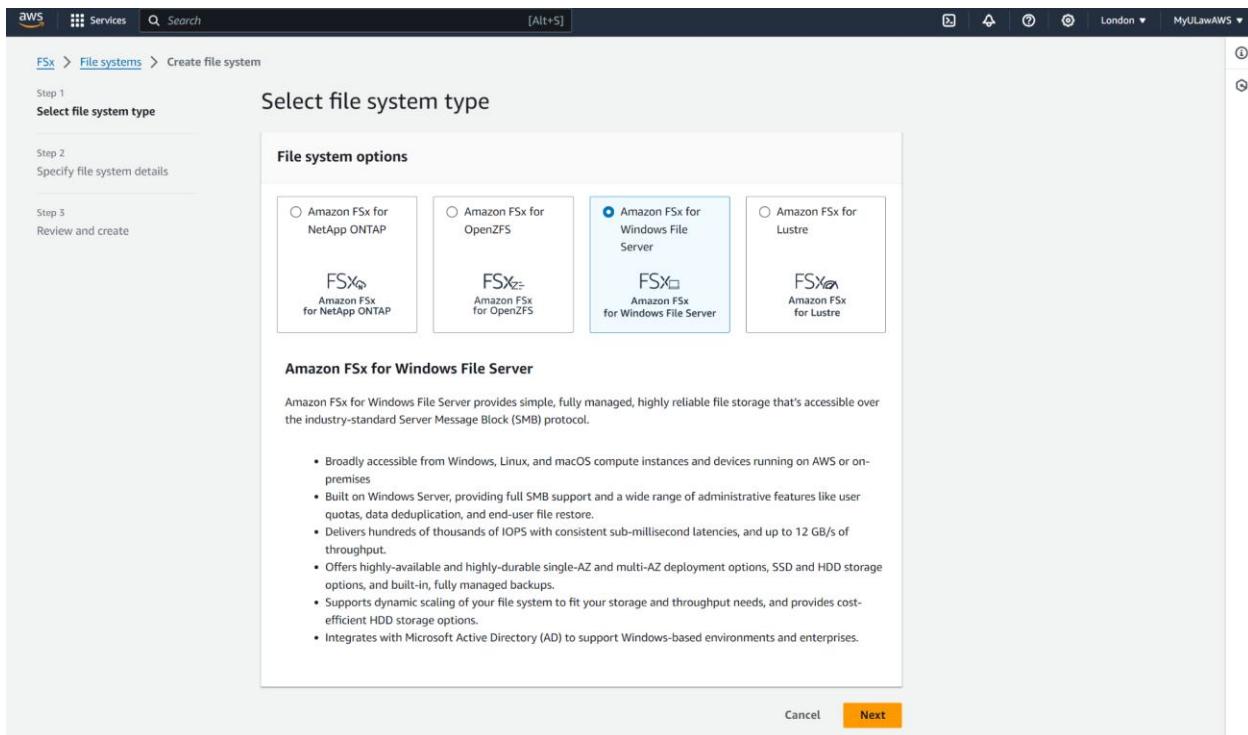


Figure 33: Create File Systems on Windows Instances.

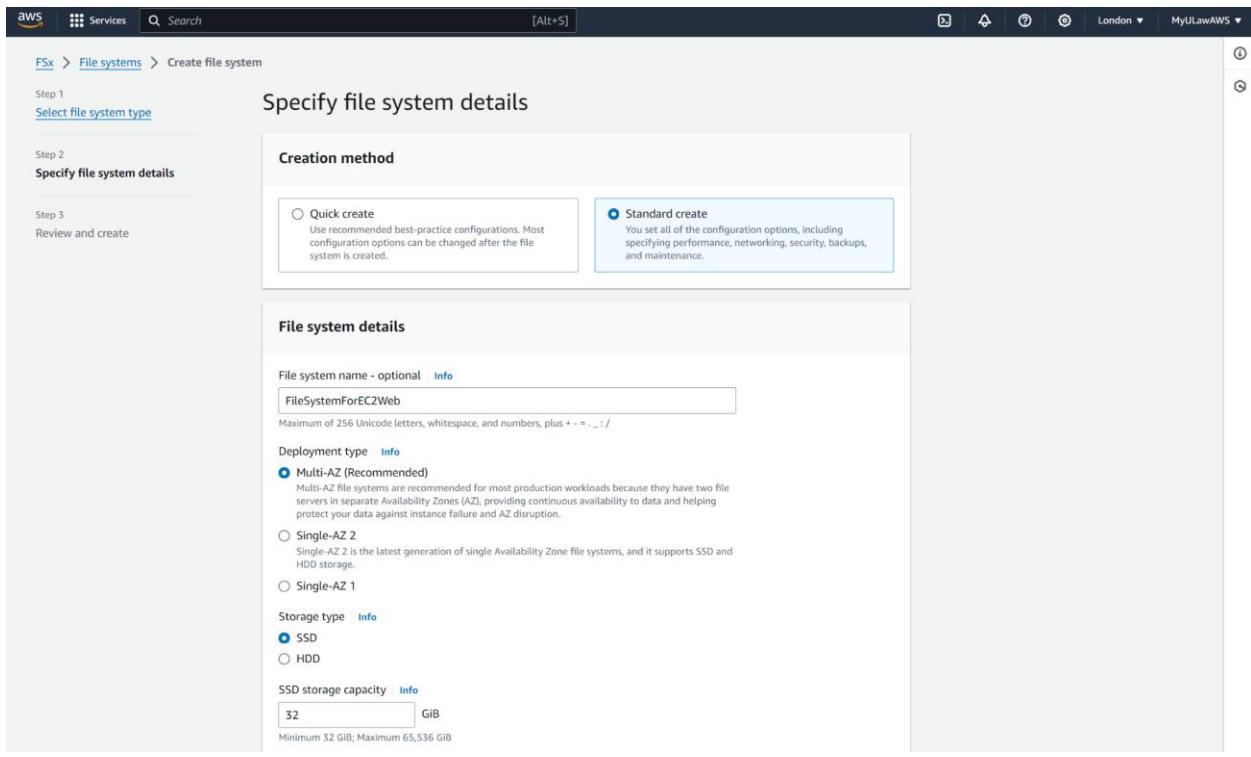


Figure 34: Create File Systems on Windows Instances.

Amazon S3

Buckets

- Access Grants
- Access Points
- Object Lambda Access Points
- Multi-Region Access Points
- Batch Operations
- IAM Access Analyzer for S3

Block Public Access settings for this account

▼ Storage Lens

- Dashboards
- Storage Lens groups
- AWS Organizations settings

Feature spotlight 7

► AWS Marketplace for S3

Amazon S3 > Buckets

Account snapshot - updated every 24 hours [All AWS Regions](#)

Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

[View Storage Lens dashboard](#)

General purpose buckets (1) [Info](#) [All AWS Regions](#)

Buckets are containers for data stored in S3.

Name	AWS Region	IAM Access Analyzer	Creation date
elasticbeanstalk-us-east-1-471112774916	US East (N. Virginia) us-east-1	View analyzer for us-east-1	July 22, 2024, 12:58:49 (UTC+01:00)

Figure 35: Amazon S3 Bucket Dashboard

The screenshot shows the 'Create bucket' wizard in the AWS S3 service. The 'General configuration' step is active. Key details include:

- AWS Region:** Europe (London) eu-west-2
- Bucket name:** YummyDelightStaticWebsite
- Copy settings from existing bucket - optional:** A link to 'See rules for bucket naming'.
- Choose bucket:** A button to select an existing bucket.
- Object Ownership:** Set to 'ACLs disabled (recommended)'.
- Block Public Access settings for this bucket:** A note about public access being granted through access control lists (ACLs), bucket policies, or access point policies.

Figure 36: Create S3 bucket

The screenshot shows the 'Buckets' page in the AWS S3 service. The newly created bucket 'yummydelightwebsite' is listed under 'General purpose buckets'. Key details include:

Name	AWS Region	IAM Access Analyzer	Creation date
elasticbeanstalk-us-east-1-471112774916	US East (N. Virginia) us-east-1	View analyzer for us-east-1	July 22, 2024, 12:58:49 (UTC+01:00)
yummydelightwebsite	Europe (London) eu-west-2	View analyzer for eu-west-2	September 13, 2024, 19:42:02 (UTC+01:00)

Figure 37: Created an S3 bucket

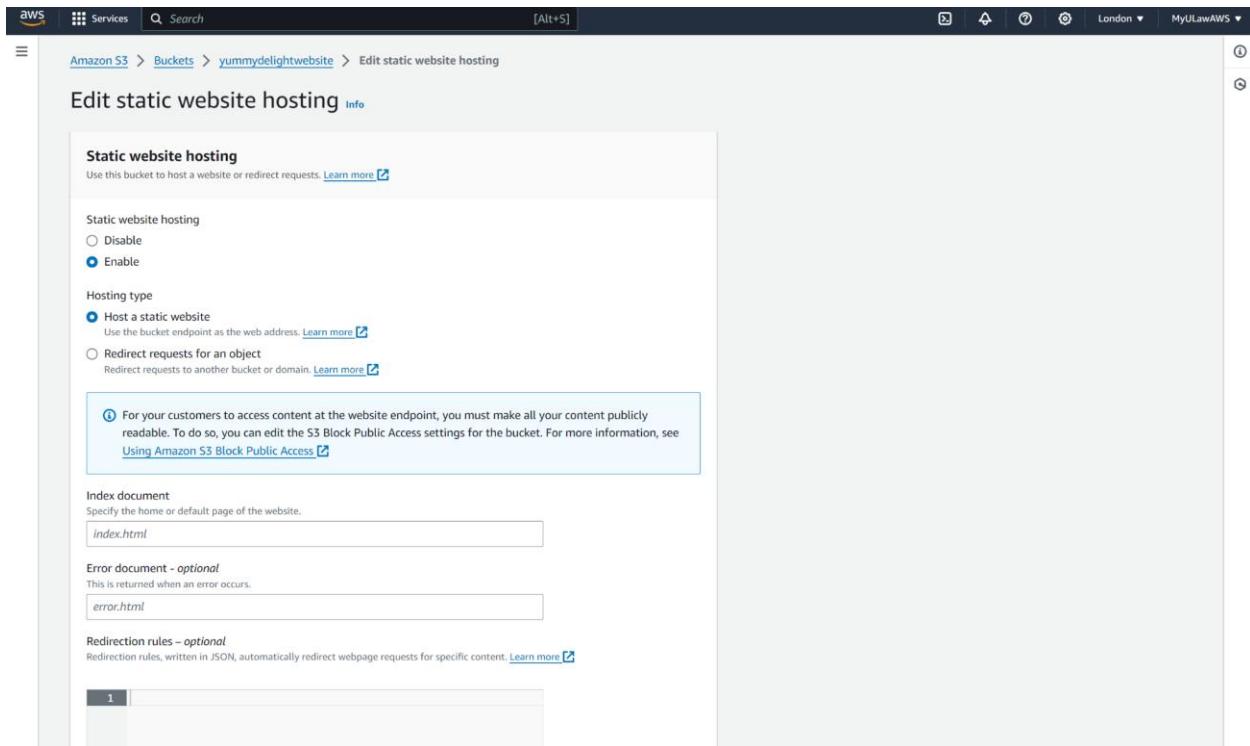


Figure 38: Enable the website hosting

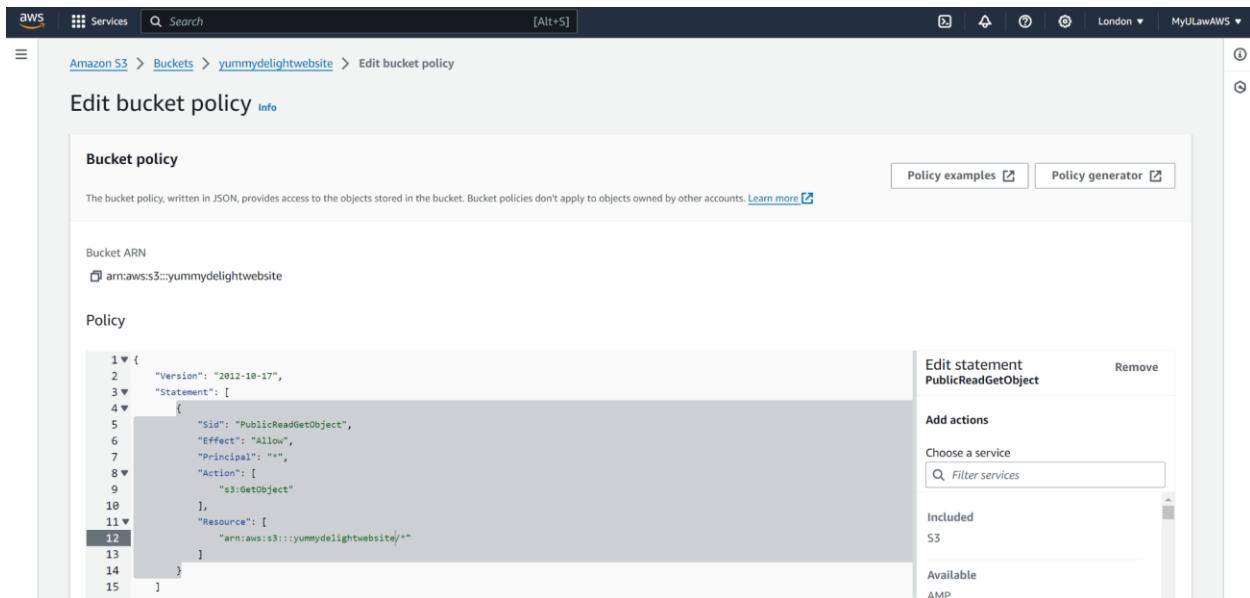


Figure 39: Enable the website hosting and edit the policy

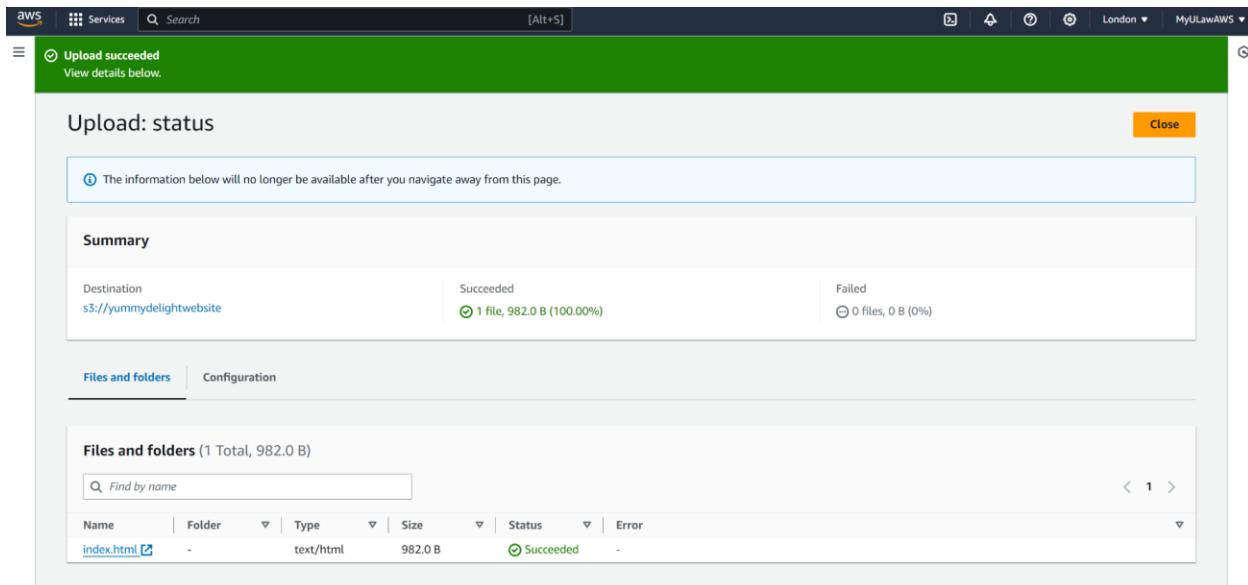


Figure 40: Upload html file

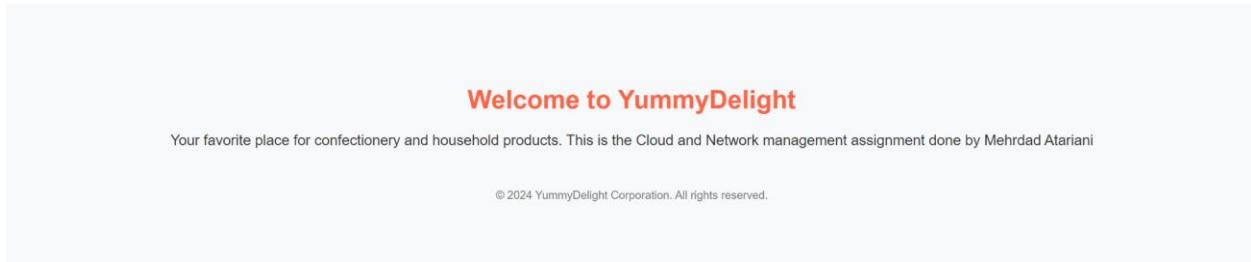


Figure 41: Preview the static website

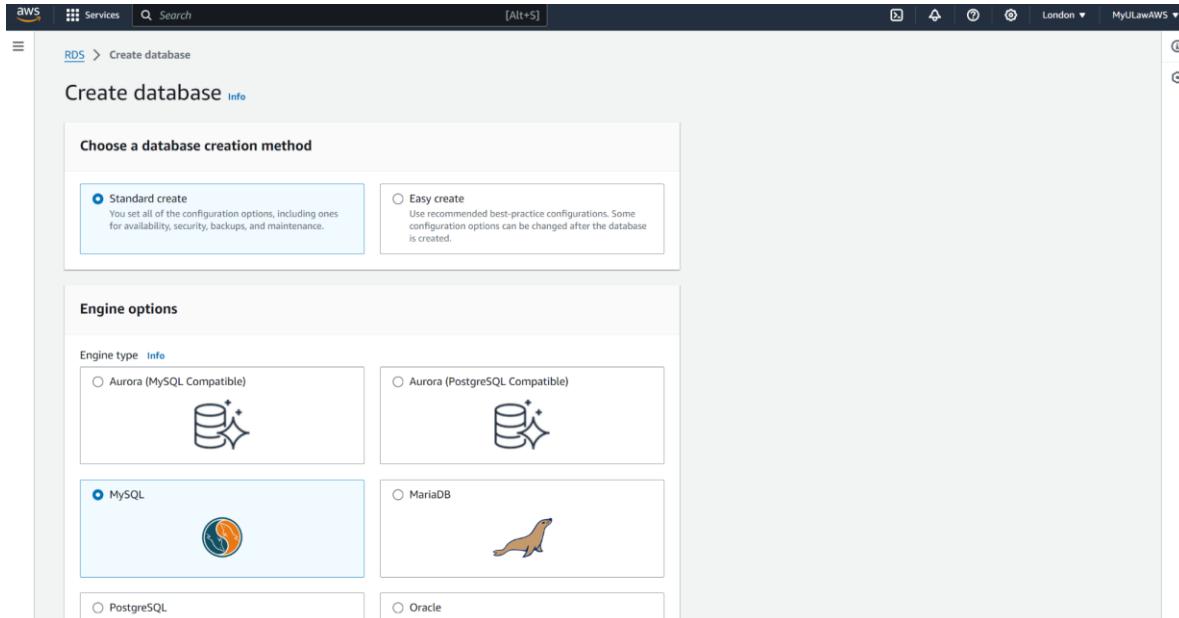


Figure 42: Create an AWS RDS instance and connect from MySQL

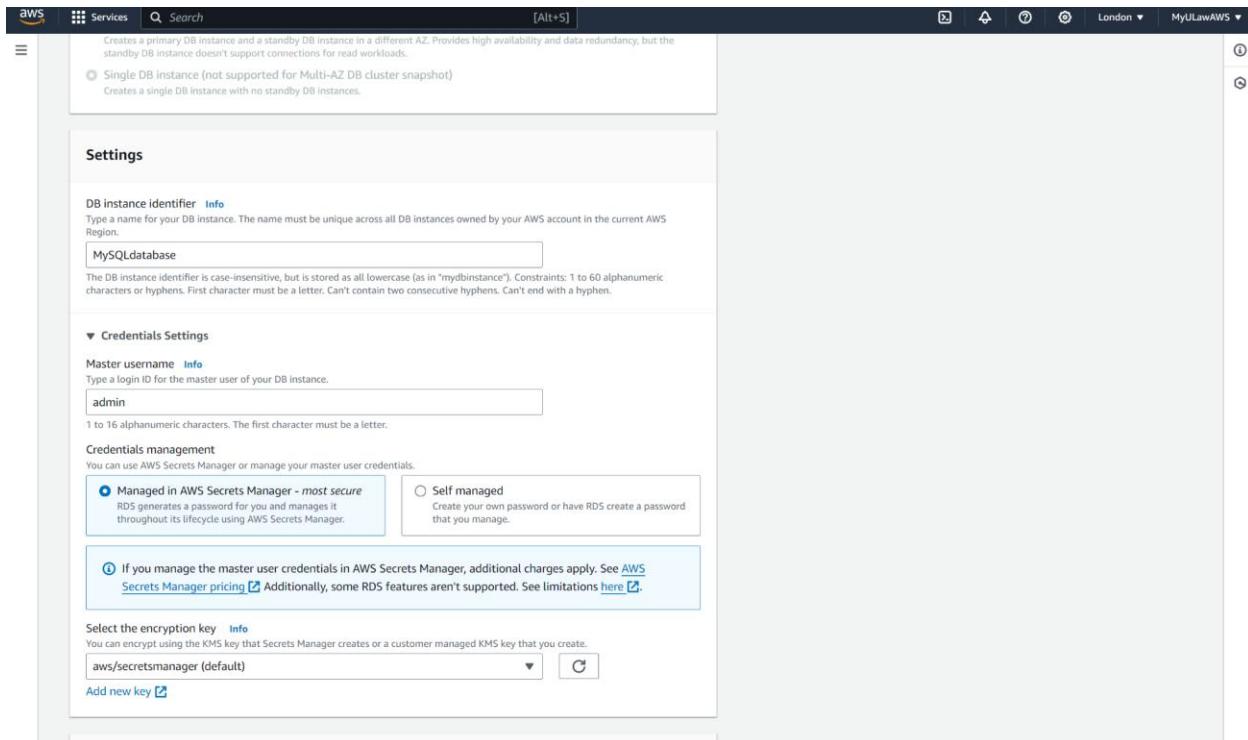


Figure 43: Create an AWS RDS instance and connect from MySQL

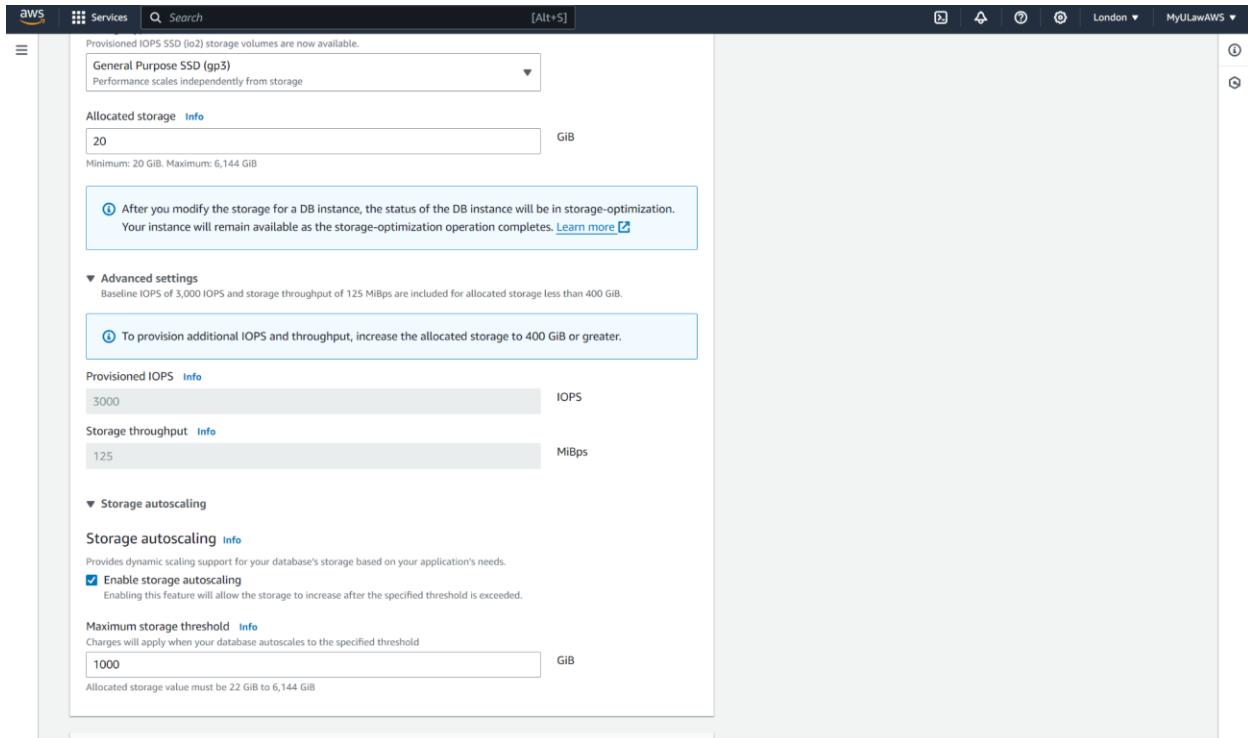


Figure 44: Create an AWS RDS instance and connect from MySQL

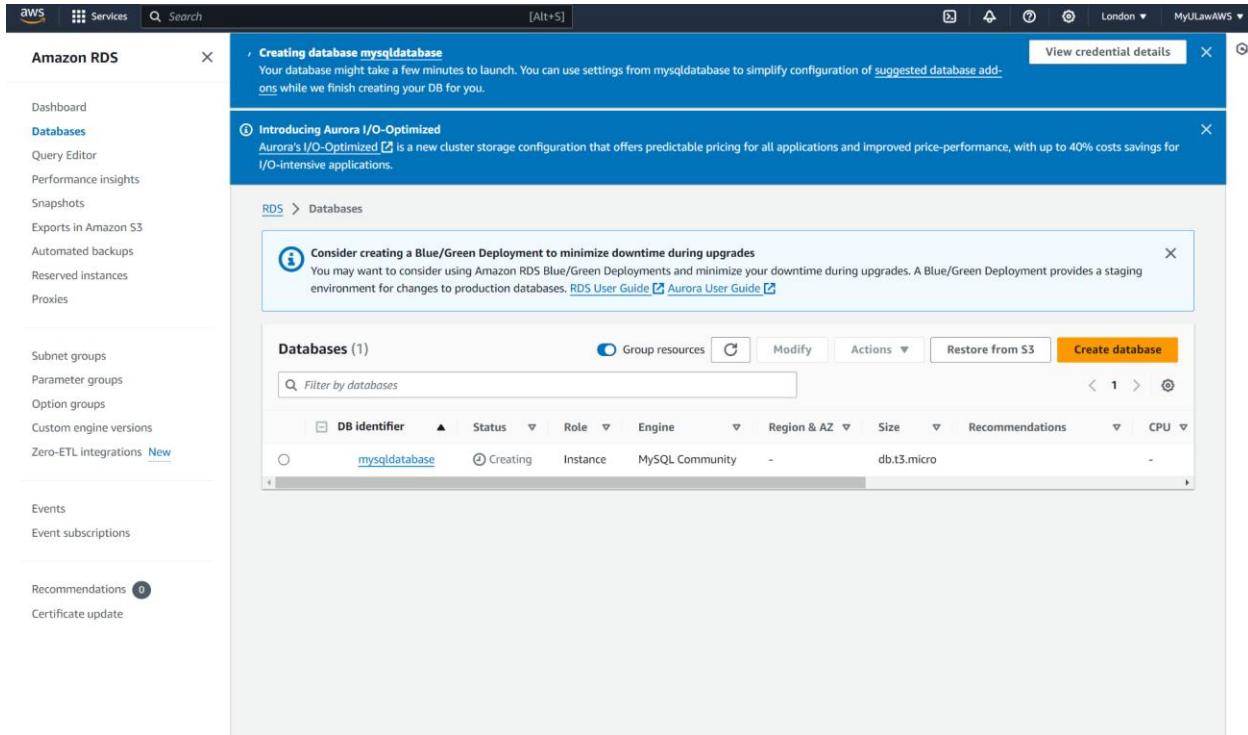


Figure 45: Created an AWS RDS instance

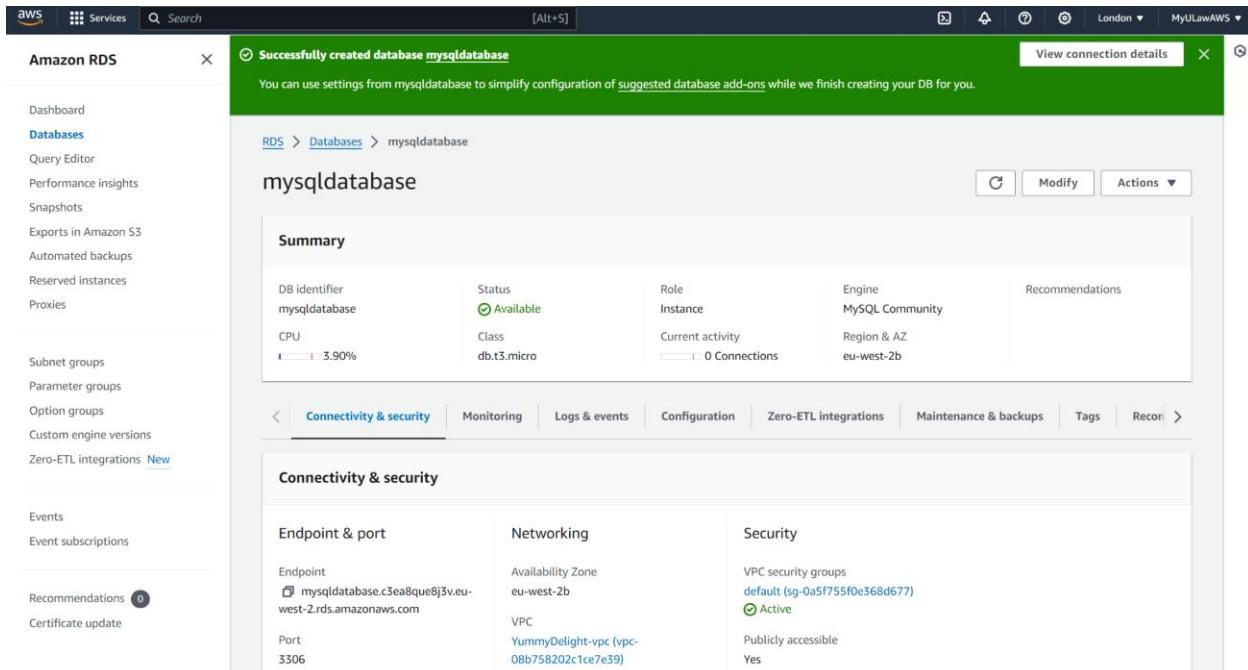


Figure 45: Created an AWS RDS instance

The screenshot shows the AWS EC2 Dashboard with the 'Security Groups' section selected. A single security group, 'sg-0a1dd07c28960920f' (name: 'launch-wizard-1'), is listed. The details pane below shows the inbound rules tab, which contains one rule: 'sgr-0e10fb11f2f9189b1' (Type: MySQL/Aurora, Protocol: TCP, Port range: 3306, Source: Custom, Destination: 0.0.0.0/0).

Figure 46: Configure the security groups of the EC2 instance to allow MySQL access.

The screenshot shows the 'Edit inbound rules' dialog for the security group 'sg-0a1dd07c28960920f'. It displays a single inbound rule: 'sgr-0e10fb11f2f9189b1' (Type: MySQL/Aurora, Protocol: TCP, Port range: 3306, Source: Custom, Destination: 0.0.0.0/0). A warning message at the bottom states: '⚠️ Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' There are 'Save rules' and 'Cancel' buttons at the bottom right.

Figure 47: Configure the security groups of the EC2 instance to allow MySQL access.

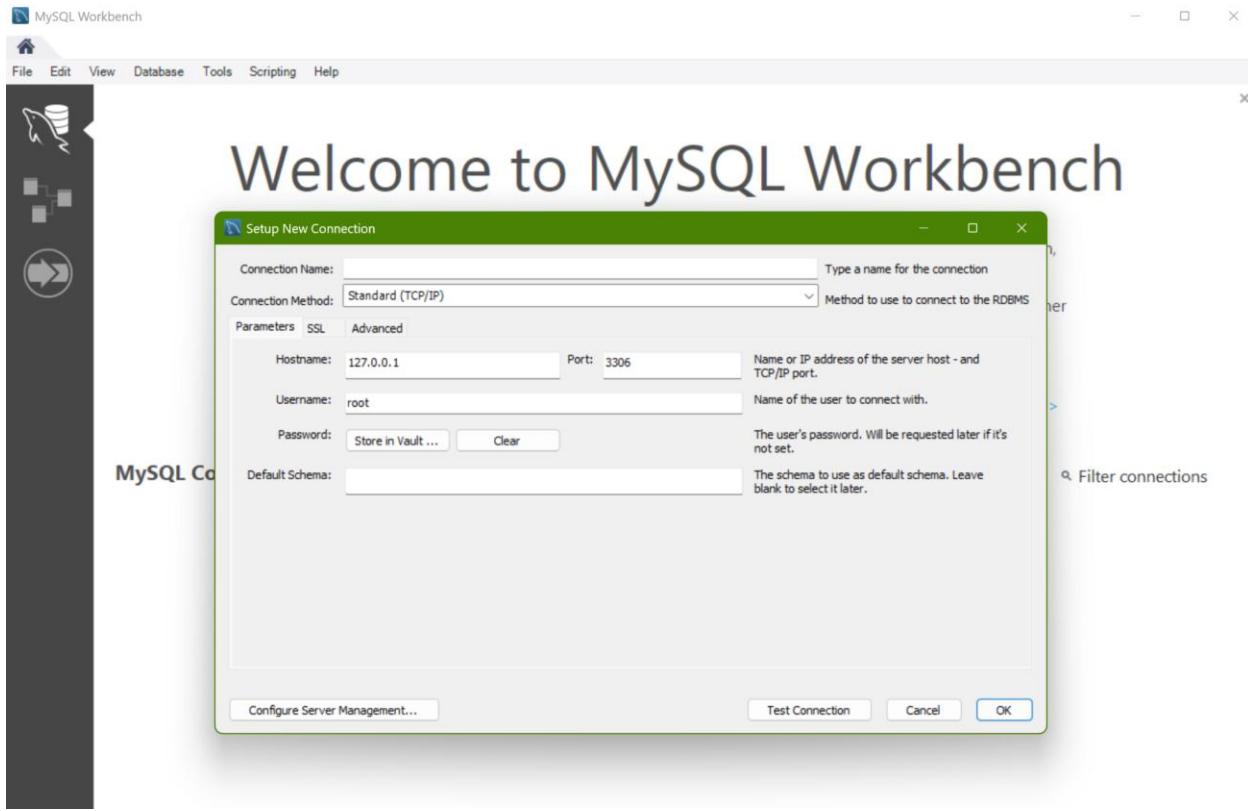


Figure 48: Connect to the RDS MySQL Instance using the MySQL Workbench.

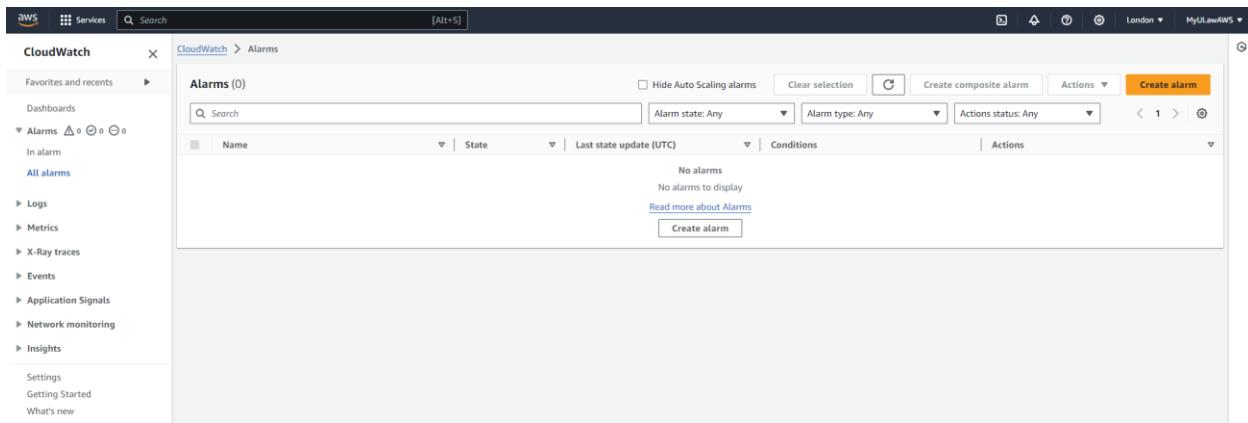


Figure 49: Create a CloudWatch alarm

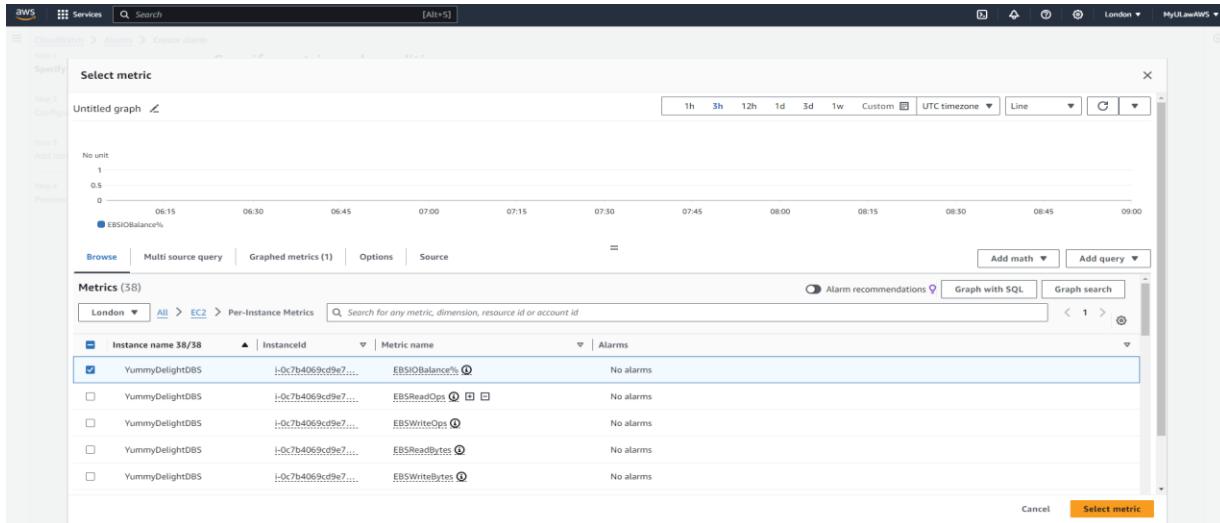


Figure 50: Select the instance to create a CloudWatch alarm

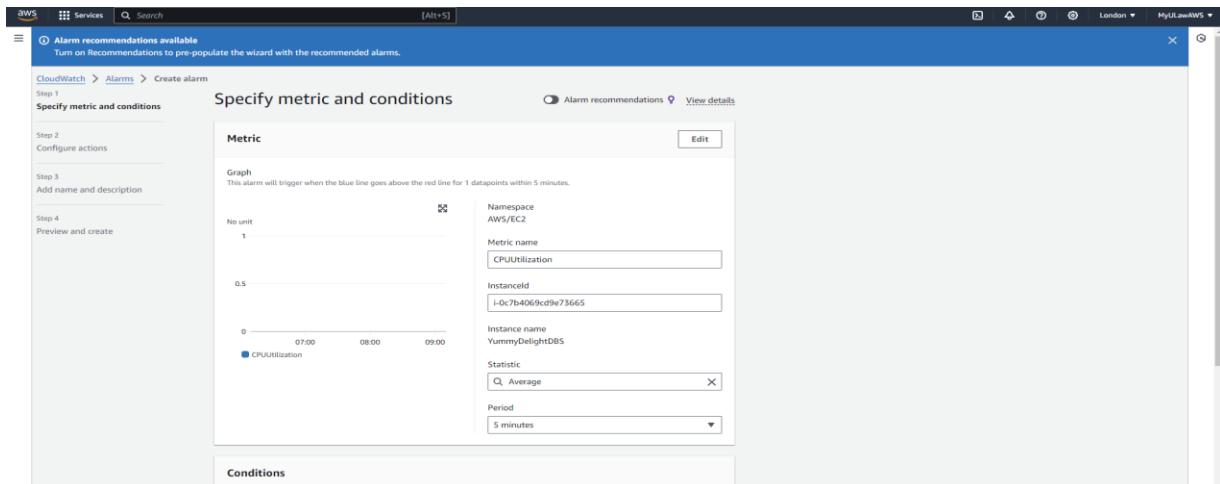


Figure 51: Select the instance to edit the metric to create a CloudWatch alarm

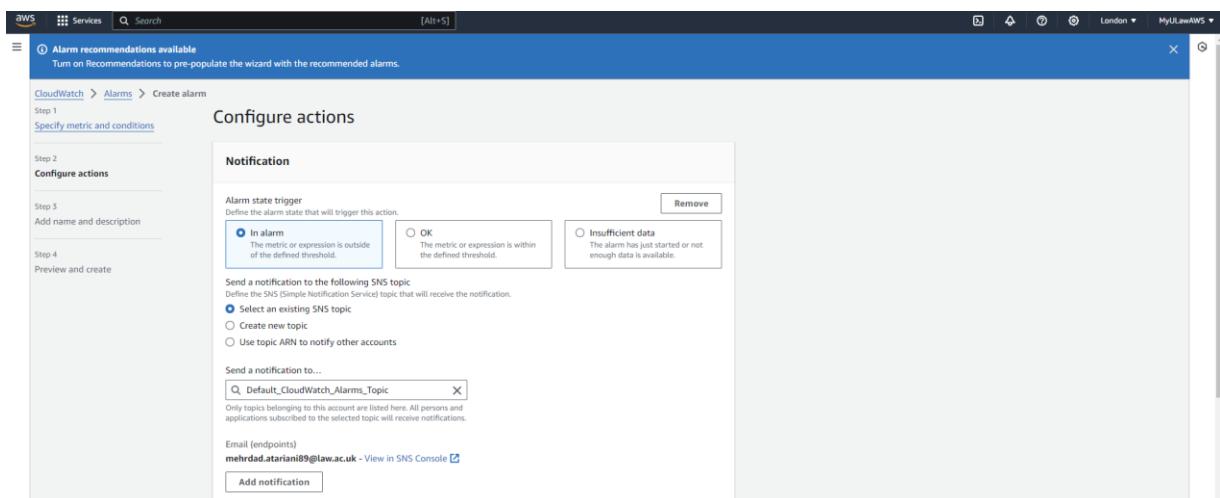


Figure 52: Select and configure the instance metrics to create a CloudWatch alarm

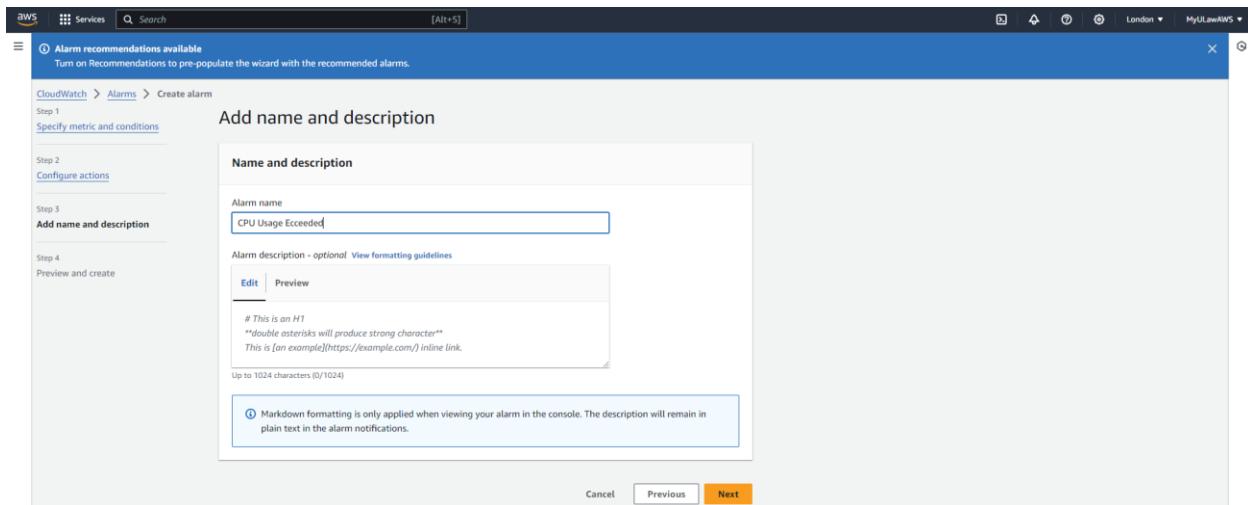


Figure 53: Configure the alarm

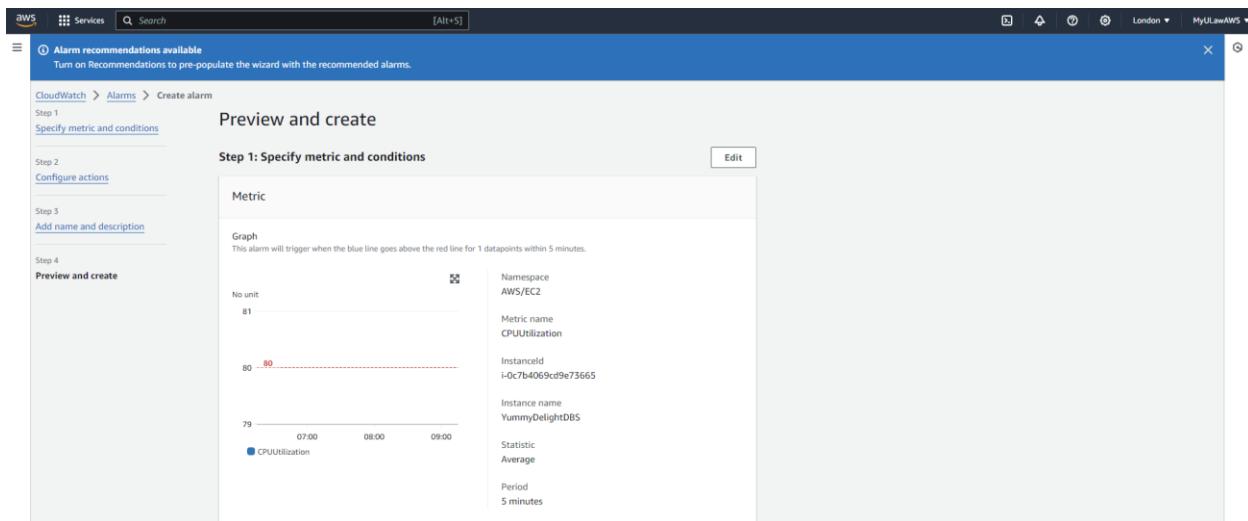


Figure 54: Configure the alarm

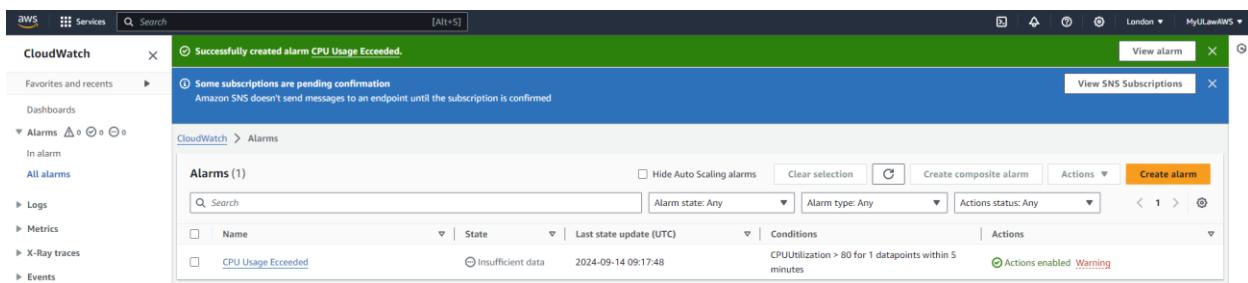


Figure 55: Configure the alarm for CPU usage

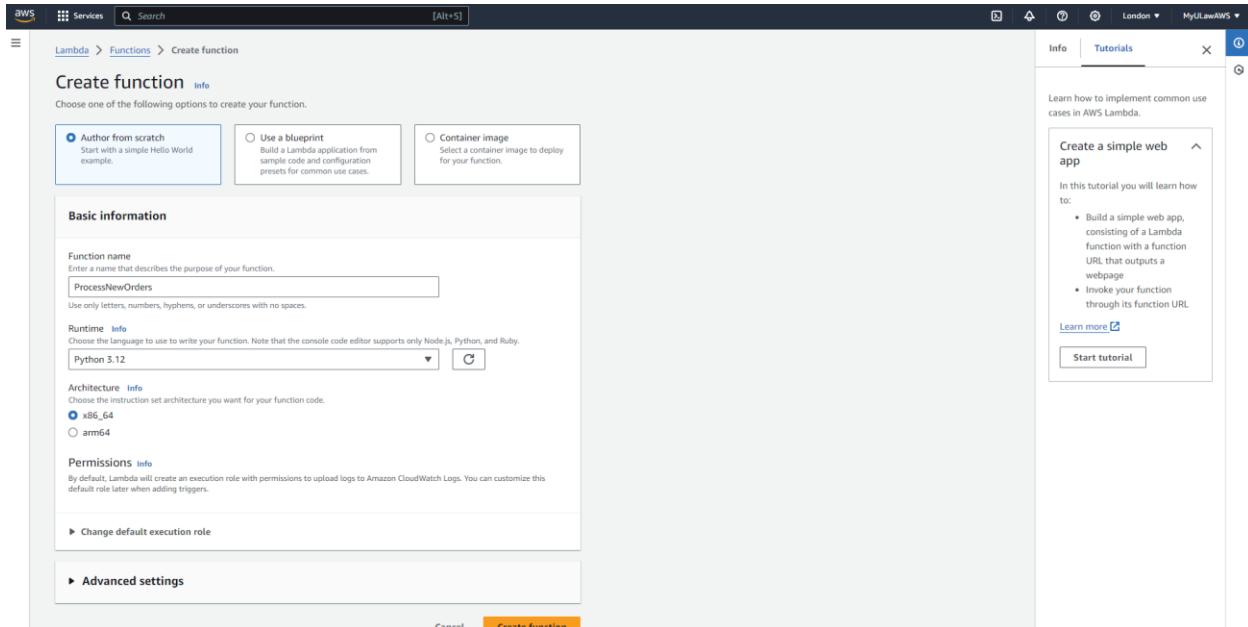


Figure 56: Create a lambda function for automating inventory confirmation emails.

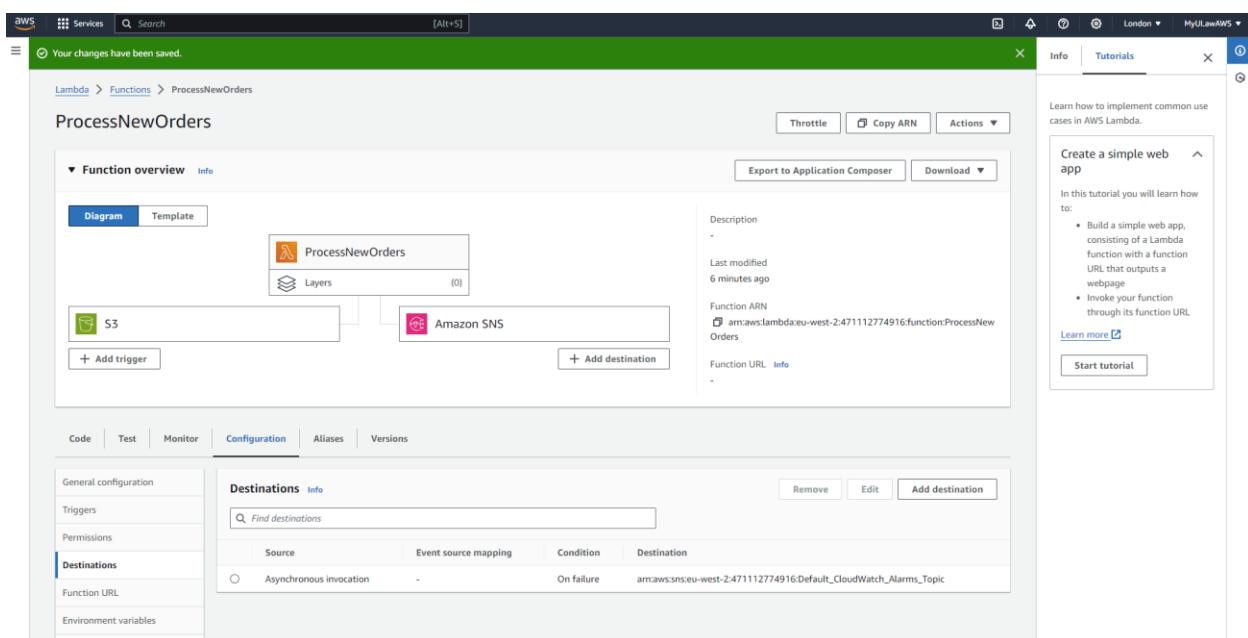


Figure 57: Create a lambda function for automating inventory confirmation emails.

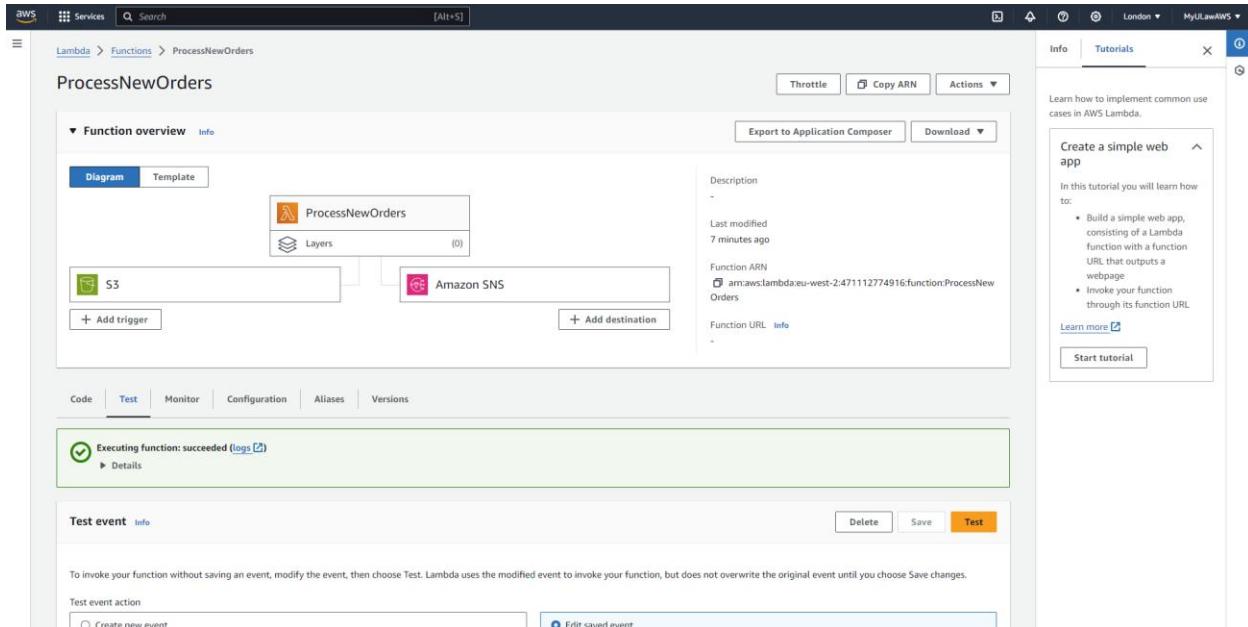


Figure 58: Create a lambda function for automating inventory confirmation emails.

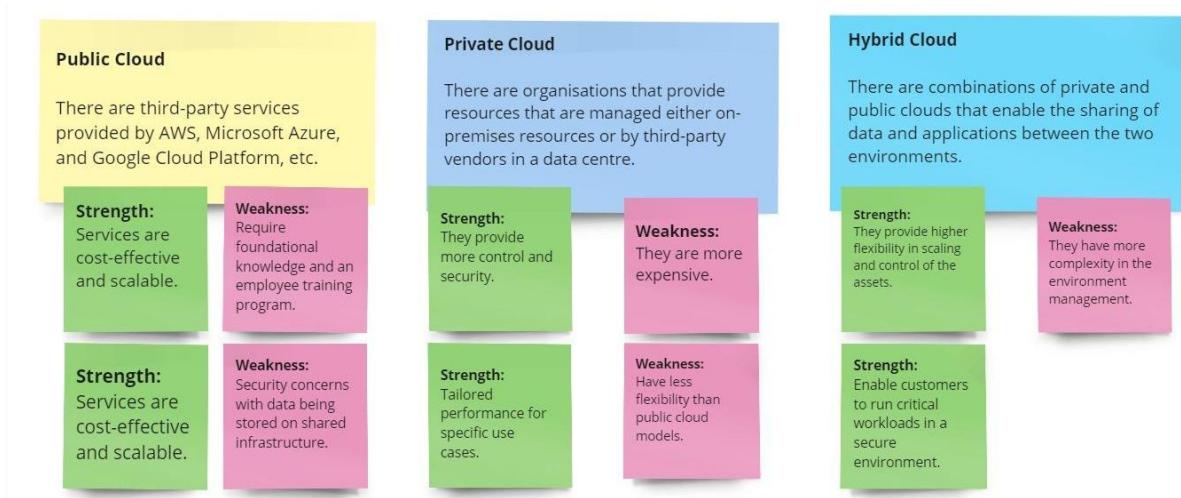


Figure 59: Cloud Deployment models

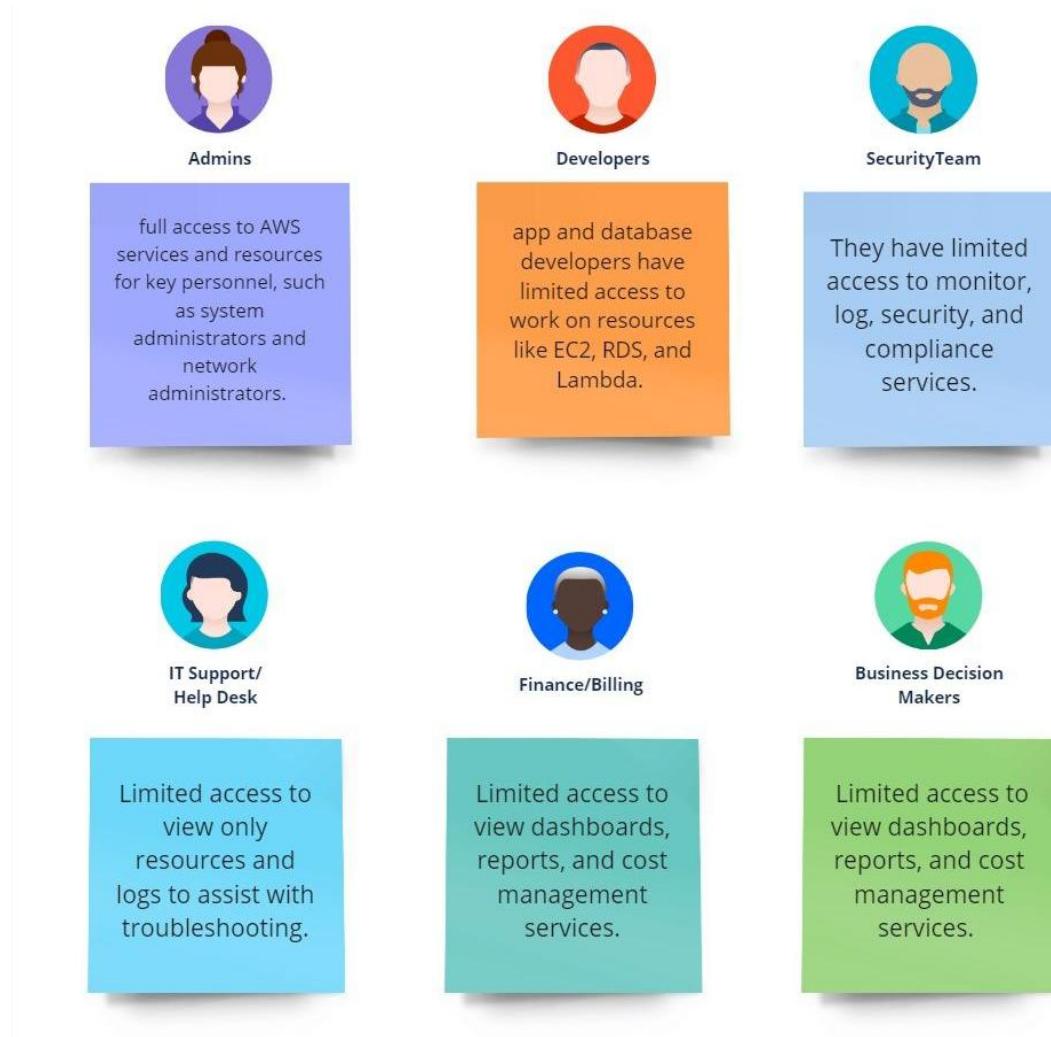


Figure 60: IAM User groups.