

Project 7

Design and Implement Highly Available Web Application

<https://catalog.us-east-1.prod.workshops.aws/workshops/3de93ad5-ebbe-4258-b977-b45cdfe661f1/en-US>

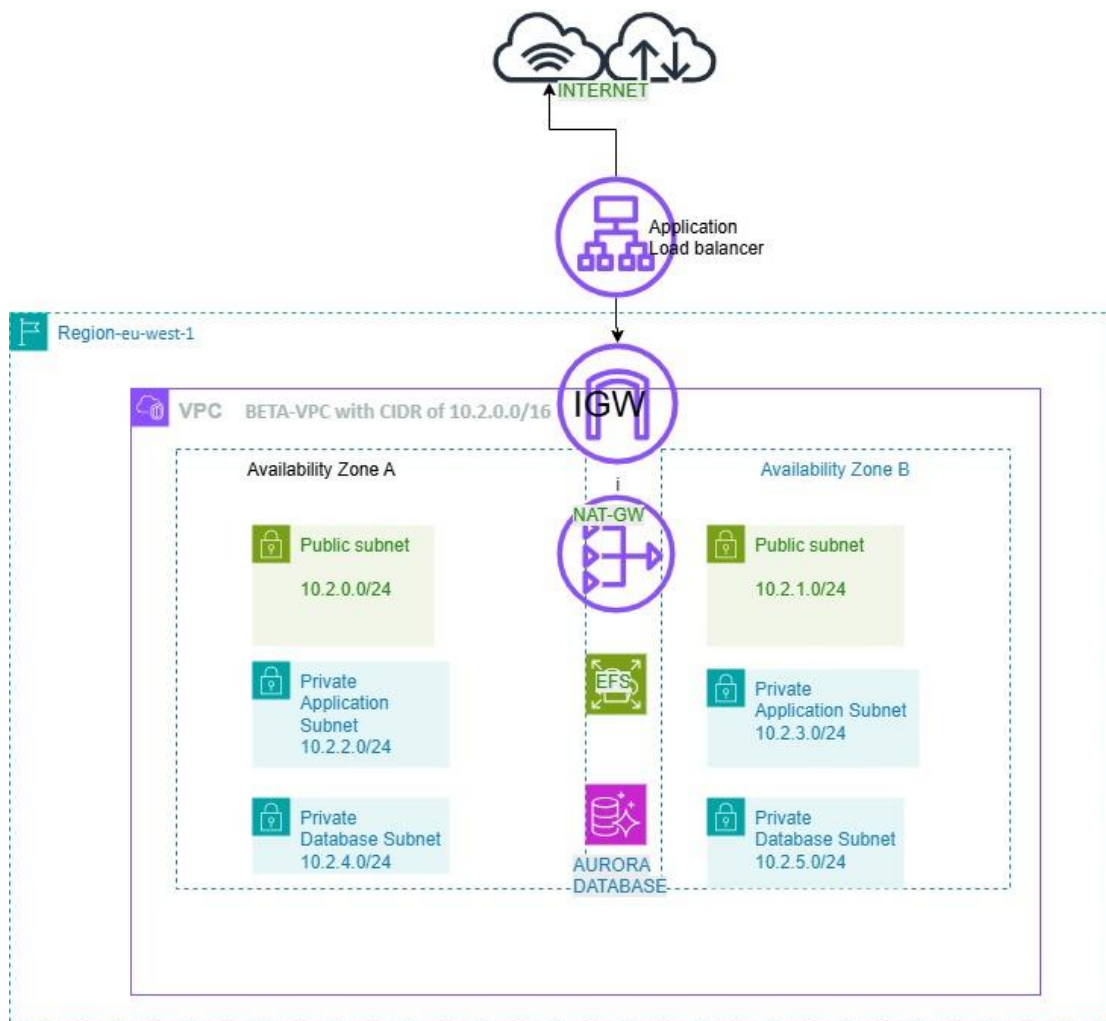
INTRODUCTION

In this workshop, we will explore how to configure Amazon VPC, Amazon RDS, Amazon EC2 and Amazon EFS to build a highly available, auto-scaling multi-tier web application.

We chose eu-west-1 (Ireland) as our region.

1. Amazon VPC was created across multiple availability zones in your region of choice.
2. You will then deploy a highly available relational database across those availability zones using Amazon RDS.
3. Application tier was created across two availability zone.
4. Using Amazon EFS you will create shared file system spanning multiple availability zones.
5. Load-balanced group of web servers that will automatically scale in response to load to complete your application tier.

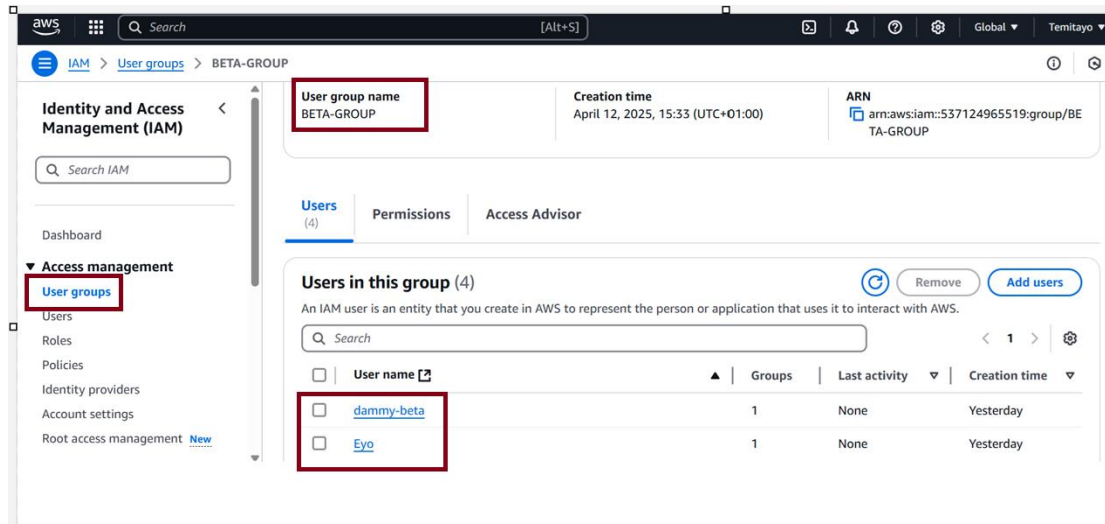
TOPOLOGY



STEP 1

IAM user account was created attached to administrator group with privilege to access AWS services

BETA group was created which we attached all users account created to this group



LAB 1 (CONFIGUARTION OF NETWORK)

LAB 1.1

VIRTUAL PRIVATE CLOUD (VPC) was created with a name BETA-VPC with CIDR of 10.2.0.0/16

Create VPC [Info](#)

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create [Info](#)
Create only the VPC resource or the VPC and other networking resources.

☒ VPC only ☐ VPC and more

Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.

BETA-VPC

IPv4 CIDR block [Info](#)
☒ IPv4 CIDR manual input ☐ IPAM-allocated IPv4 CIDR block

IPv4 CIDR
10.2.0.0/16
CIDR block size must be between /16 and /28.

IPv6 CIDR block [Info](#)
☒ No IPv6 CIDR block ☐ IPAM-allocated IPv6 CIDR block ☐ Amazon-provided IPv6 CIDR block ☐ IPv6 CIDR owned by me

Tenancy [Info](#)

Click on **Actions** and then select **Edit VPC Settings**. Enable **DNS resolution** and **DNS hostnames** under **DNS Settings**

VPC details

VPC ID
vpc-06ee73f02460db061

Name
BETA-VPC

DHCP settings

DHCP option set
dopt-0016dc486f064ffc0

DNS settings

☒ Enable DNS resolution [Info](#)

☒ Enable DNS hostnames [Info](#)

Network Address Usage metrics settings

☐ Enable Network Address Usage metrics [Info](#)

LAB 1.2

CREATE PUBLIC AND PRIVATE SUBNETS

Create public and private subnets. Six subnets will be created with three for each Availability Zone (AZ). Public subnet will have Internet Gateway, load balancers and NAT gateways. Application Subnet will contain application servers and your shared EFS filesystem. Database subnets has relational database. It will be accessible to other resources in the VPC but will have no access to the Internet and cannot be addressed by the Internet or the load balancers.

Name	IPv4 CIDR
Public Subnet A	10.2.0.0/24
Public Subnet B	10.2.1.0/24
Application Subnet A	10.2.2.0/24
Application Subnet B	10.2.3.0/24
Data Subnet A	10.2.4.0/24
Data Subnet B	10.2.5.0/24

VPC dashboard

EC2 Global View

Filter by VPC

Virtual private cloud

- Your VPCs
- Subnets**
- Route tables
- Internet gateways
- Egress-only internet gateways
- DHCP option sets
- Elastic IPs
- Managed prefix lists
- NAT gateways
- Peering connections
- Route servers [New](#)

Subnets (6) [Info](#)

Find resources by attribute or tag

VPC: vpc-06ee73f02460db061 [Clear filters](#)

Last updated: 3 minutes ago [Actions](#) [Create subnet](#)

<input type="checkbox"/>	Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
<input type="checkbox"/>	Public Subnet A	subnet-0ca49c14dd4a2226d	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.0.0/24
<input type="checkbox"/>	Public Subnet B	subnet-0e5b5629b347660ac	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.1.0/24
<input type="checkbox"/>	Application Subnet A	subnet-0635d6706977d0c73	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.2.0/24
<input type="checkbox"/>	Application Subnet B	subnet-01ef4265c5bec3361	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.3.0/24
<input type="checkbox"/>	Data Subnet A	subnet-08f22a050967823b4	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.4.0/24
<input type="checkbox"/>	Data Subnet B	subnet-0c4853bd5af8b215f	Available	vpc-06ee73f02460db061 BETA-VPC	Off	10.2.5.0/24

LAB 1.3.

CREATE INTERNET GATEWAY

Create Internet gateway name BETA-IGW and attach it to BETA-VPC

igw-00aa61db199baa59a / BETA-IGW

Actions

Details

Info

Internet gateway ID

igw-00aa61db199baa59a

State

Attached

VPC ID

vpc-06ee73f02460db061 | BETA-VPC

Owner

537124965519

Tags

Manage tags

Search tags

Key

Value

Name

BETA-IGW

LAB 1.4.

CREATE ROUTE TABLE FOR PUBLIC SUBNET.

The default route in public subnet is pointed to internet gateway while the two public subnets created are associated with the public route

rtb-05eaace0dceb48a1 / BETA-PUBLIC-ROUTE

Actions

Details

Info

Route table ID

rtb-05eaace0dceb48a1

Main

No

Explicit subnet associations

2 subnets

Edge associations

-

VPC

vpc-06ee73f02460db061 | BETA-VPC

Owner ID

537124965519

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (2)

Both

Edit routes

Filter routes

Destination

Target

Status

Propagated

0.0.0.0/0

igw-00aa61db199baa59a

Active

No

10.2.0.0/16

local

Active

No

Explicit subnet associations (2)

Edit subnet associations

Find subnet association

1

Settings

Name

Subnet ID

IPv4 CIDR

IPv6 CIDR

Public Subnet A

subnet-0ca49c14dd4a22264

10.2.0.0/24

-

Public Subnet B

subnet-0e5b5629b347660ac

10.2.1.0/24

-

LAB 1.5.

CREATE A NAT GATEWAY IN EACH PUBLIC SUBNET

NAT gateways (2)

Info

Actions

Create NAT gateway

Find resources by attribute or tag

1

Settings

Name

NAT ...

Con...

State

Stat...

Prim...

Prim...

Prim...

VPC

Subnet

BETA-NATGW-A

nat-0fs...

Public

Available

-

176.34...

10.2.0.217

eni-0d1...

vpc-06ee73f02460db061 | BET...

subnet-0ca49c14dd4a222

BETA-NATGW-B

nat-0d0...

Public

Available

-

54.72.1...

10.2.1.108

eni-00d...

vpc-06ee73f02460db061 | BET...

subnet-0e5b5629b347660

LAB 1.6.

APPLICATION ROUTE

Create application route and use NAT gateway as default gateway.

rtb-0b886f74da48d058c / **BETA-APP-NAT-ROUTE-A** Actions

Details Info

Route table ID
rtb-0b886f74da48d058c

VPC
vpc-06ee73f02460db061 | BETA-VPC

Main
No

Owner ID
537124965519

Explicit subnet associations
subnet-0633d6706977d0c73 / Application Subnet A

Edge associations
-

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (2)

Filter routes

Both

Edit routes

< 1 >

Destination	Target	Status	Propagated
0.0.0.0/0	nat-0f5e3a43f445e3cc4	Active	No
10.2.0.0/16	local	Active	No

rtb-0a8c6e87f598f5a3a / **BETA-APP-NAT-ROUTE-B** Actions

Details Info

Route table ID
rtb-0a8c6e87f598f5a3a

VPC
vpc-06ee73f02460db061 | BETA-VPC

Main
No

Owner ID
537124965519

Explicit subnet associations
subnet-01ef4265c5bee3361 / Application Subnet B

Edge associations
-

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (2)

Filter routes

Both

Edit routes

< 1 >

Destination	Target	Status	Propagated
0.0.0.0/0	nat-0d06cf19c135418e1	Active	No
10.2.0.0/16	local	Active	No

LAB 1.7.

Route verification using Resource map

Resource map Info

VPC Show details

Your AWS virtual network

BETA-VPC

Subnets (6)
Subnets within this VPC

eu-west-1a

Public Subnet A

Data Subnet A

Application Subnet A

eu-west-1b

Public Subnet B

Data Subnet B

Application Subnet B

Route tables (4)
Route network traffic to resources

BETA-APP-NAT-ROUTE-A
rtb-020a709a40726906b

BETA-PUBLIC-ROUTE

BETA-APP-NAT-ROUTE-B

Network connections
Connections to other network resources

BETA-IGW

BETA-NATGW-A

BETA-NATGW-B

LAB 2 SETTING UP RELATION DATABASE USING AURORA

LAB 2.1

Create two security groups for RDS. One for the clients named BETA DATABASE CLIENTS while the second one is called BETA DATABASE for the database itself.

SECURITY GROUP FOR RDS CLIENTS

sg-0cbb33f9282acc28c - BETA DATABASE CLIENTS

Actions

Details

Security group name

BETA DATABASE CLIENTS

Security group ID

sg-0cbb33f9282acc28c

Description

BETA DATABASE CLIENTS

VPC ID

vpce-06ee73f02460db061

Owner

537124965519

Inbound rules count

0 Permission entries

Outbound rules count

1 Permission entry

Inbound rules

Outbound rules

Sharing - new

VPC associations - new

Tags

Inbound rules

Manage tags

Edit inbound rules

Search

<

1

>

Name

Security group rule ID

IP version

Type

Protocol

Port range

No security group rules found

SECURITY GROUP FOR RDS ALLOWING PORT 3306

sg-0c4178a9a98a53586 - BETA-DATABASE-1

Actions

Details

Security group name

BETA-DATABASE-1

Security group ID

sg-0c4178a9a98a53586

Description

BETA-DATABASE-1

VPC ID

vpce-06ee73f02460db061

Owner

537124965519

Inbound rules count

1 Permission entry

Outbound rules count

1 Permission entry

Inbound rules

Outbound rules

Sharing - new

VPC associations - new

Tags

Inbound rules (1)

Manage tags

Edit inbound rules

Search

<

1

>

Security group rule ID

IP version

Type

Protocol

Port ra...

Source

sg-0ffbbe1ce6bc67dfe7

-

MYSQL/Aurora

TCP

3306

sg-0cbb33f9282acc28c / BETA DATABASE CLIENTS

LAB 2.2

CREATE RDS SUBNET GROUP

Click Amazon RDS console and create RDS subnet group

The screenshot shows the Amazon RDS console interface. The breadcrumb navigation at the top reads: Aurora and RDS > Subnet groups > aurora-beta-db-group. On the left sidebar, under 'Aurora and RDS', the 'Subnet groups' link is highlighted. The main content area displays the details for the 'aurora-beta-db-group' subnet group.

Subnet group details

- VPC ID:** vpc-06ee73f02460db061
- ARN:** arn:aws:rds:eu-west-1:537124965519:subgrp:aurora-beta-db-group
- Supported network types:** IPv4
- Description:** AURORA-BETA-DB-GROUP

Subnets (2)

Availability zone	Subnet name	Subnet ID	CIDR block
eu-west-1a	Data Subnet A	subnet-08f22a050967823b4	10.2.4.0/24
eu-west-1b	Data Subnet B	subnet-0c4853bd5af8b215f	10.2.5.0/24

LAB 2.3

CREATE AURORA DATABASE INSTANCE

The screenshot shows the 'Create database' wizard in the Amazon RDS console. The 'Choose a database creation method' section has 'Standard create' selected. The 'Engine options' section has 'Aurora (MySQL Compatible)' selected.

Create database

Choose a database creation method

- ☒ **Standard create**
You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- ☐ **Easy create**
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type

- ☒ **Aurora (MySQL Compatible)**
- ☐ Aurora (PostgreSQL Compatible)
- ☐ MySQL
- ☐ PostgreSQL

LAB 3 SETTING UP RELATION DATABASE USING AURORA

LAB 3.1 Create Elastic file system attached to BETA -VPC

Create file system

Create a file system with the recommended settings shown below by choosing Create file system. To view all settings or to customize your file system, choose Customize. [Learn more](#)

Name - optional

Name your file system.

BETA-EFS

Name can include letters, numbers, and +-=._/ symbols, up to 256 characters.

Virtual Private Cloud (VPC)

Choose the VPC where you want EC2 instances to connect to your file system.

vpc-06ee73f02460db061

BETA-VPC

Recommended settings

Your file system is created with the following recommended settings unless you choose to customize the file system. You will be charged for storage and throughput. We recommend reviewing pricing for these features using the [AWS Pricing Calculator](#).

Setting	Value	Editable after creation
Throughput mode Learn more	Elastic	Yes
Transition into Infrequent Access (IA)	30 day(s) since last access	Yes

Cancel

Customize

Create file system

LAB 3.2 Click on customize

File system settings

General

Name - optional

Name your file system.

BETA-EFS

File system type

Choose to either store data across multiple Availability Zones or within a single Availability Zone. [Learn more](#)

☒ Regional

Offers the highest levels of availability and durability by storing file system data across multiple Availability Zones within an AWS Region.


☐ One Zone

Provides continuous availability to data within a single Availability Zone within an AWS Region.

Automatic backups

Automatically backup your file system data with AWS Backup using recommended settings. Additional pricing applies. [Learn more](#)

☐ Enable automatic backups

 We recommend that you create a backup policy for your file system

Lifecycle management

Automatically save money as access patterns change by moving files into the Infrequent Access (IA) or Archive storage class. [Learn more](#)

Transition into Infrequent Access (IA)

Transition files to IA based on the time since they were last accessed in Standard storage.

30 day(s) since last access ▼

Transition into Archive

Transition files to Archive based on the time since they were last accessed in Standard storage.

90 day(s) since last access ▼

Transition into Standard

Transition files back to Standard storage based on when they are first accessed in IA or Archive storage.

None ▼

Encryption

Choose to enable encryption of your file system's data at rest. Uses the AWS KMS service key (aws/elasticfilesystem) by default. [Learn more](#)

☒ Enable encryption of data at rest

► Customize encryption settings

Performance settings

Throughput mode

Choose a method for your file system's throughput limits. [Learn more](#)

☒ Enhanced

Provides more flexibility and higher throughput levels for workloads with a range of performance requirements.

☐ Bursting

Provides throughput that scales with the amount of storage for workloads with basic performance requirements.

☒ Elastic (Recommended)

Use this mode for workloads with unpredictable I/O. With Elastic Throughput, performance automatically scales with your workload activity and you only pay for the throughput you use (data transferred for your file systems per month). [Learn more](#)

On the Network access page, under Mount targets, choose the two subnets created for the Data tier (Data subnet A and B). On the right side, under Security groups, associate the WP EFS security group created above to each mount target and remove the association with the Default security group.

Network access

Network

Virtual Private Cloud (VPC) [Learn more](#)

Choose the VPC where you want EC2 instances to connect to your file system.

vpc-06ee73f02460db061

BETA-VPC

Mount targets

A mount target provides an NFSv4 endpoint at which you can mount an Amazon EFS file system. We recommend creating one mount target per Availability Zone. [Learn more](#)

Availability zone

eu-west-1a ▼

Subnet ID

subnet-08f22a0509... ▼

IP address

Automatic

Security groups

Choose security groups ▼

Remove

sg-02b7e9151f3dd3d8e
WP EFS

eu-west-1b ▼

subnet-0c4853bd5af... ▼

Automatic

Choose security groups ▼

Remove

sg-02b7e9151f3dd3d8e
WP EFS

Add mount target

Lab 4: Create Application load balancer

Create two security groups. One for the load balancer and the other for the webserver. Allow port 80 on the inbound rule of both security groups.

Lab 4.1 LOAD BALANCER SECURITY GROUP

EC2 > Security Groups > sg-08e563ce24985450b - WP LOAD BALANCER > Edit inbound rules

Edit inbound rules [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
sg-r-08aff799c1c72b864	HTTP	TCP	80	My IP	
<div>197.253.0.253/32</div>					<div>Delete</div>

Add rule

Cancel

Preview changes

Save rules

Lab 4.2 WP WEB SERVER SECURITY GROUP

EC2 > Security Groups > sg-099a2a95190e77371 - WP WEB SERVERS > Edit inbound rules

Edit inbound rules [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
sg-r-06e33a2700f340a1e	HTTP	TCP	80	Custom	
<div>sg-08e563ce24985450b</div>					<div>Delete</div>

Add rule

Cancel

Preview changes

Save rules

Lab 4.3 CREATE APPLICATION LOAD BALANCER

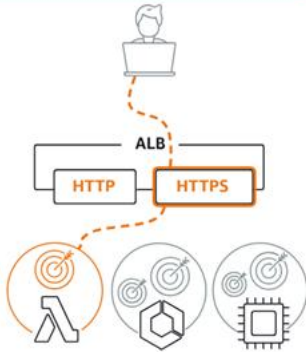
Create application load balancer named BETA-ALB

Compare and select load balancer type

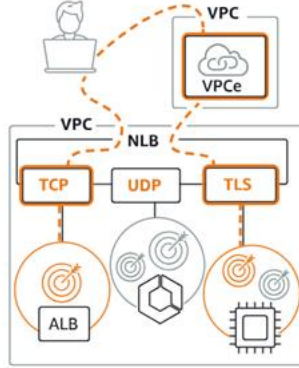
A complete feature-by-feature comparison along with detailed highlights is also available. [Learn more](#)

Load balancer types

Application Load Balancer [Info](#)



Network Load Balancer [Info](#)



Gateway Load Balancer [Info](#)



Basic configuration

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

BETA-ALB

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme [Info](#)

Scheme can't be changed after the load balancer is created.

☒ Internet-facing

- Serves internet-facing traffic.
- Has public IP addresses.
- DNS name is publicly resolvable.
- Requires a public subnet.

☐ Internal

- Serves internal traffic.
- Has private IP addresses.
- DNS name is publicly resolvable.
- Compatible with the IPv4 and Dualstack IP address types.

Load balancer IP address type [Info](#)

Select the front-end IP address type to assign to the load balancer. The VPC and subnets mapped to this load balancer must include the selected IP address types. Public IPv4 addresses ha

☒ IPv4

Includes only IPv4 addresses.

☐ Dualstack

Includes IPv4 and IPv6 addresses.

☐ Dualstack without public IPv4

Includes a public IPv6 address, and private IPv4 and IPv6 addresses. Compatible with **internet-facing** load balancers only.

Network mapping [Info](#)

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

VPC [Info](#)

The load balancer will exist and scale within the selected VPC. The selected VPC is also where the load balancer targets must be hosted unless routing to Lambda or on-premises targets, or if using VPC peering. To confirm the VPC for you For a new VPC, [create a VPC](#).

BETA-VPC

vpc-06ee73f02460db061
IPv4 VPC CIDR: 10.2.0.0/16

IP pools - new [Info](#)

You can optionally choose to configure an IPAM pool as the preferred source for your load balancers IP addresses. Create or view Pools in [Amazon VPC IP Address Manager console](#).

☐ Use IPAM pool for public IPv4 addresses

The IPAM pool you choose will be the preferred source of public IPv4 addresses. If the pool is depleted IPv4 addresses will be assigned by AWS.

Availability Zones and subnets [Info](#)

Select at least two Availability Zones and a subnet for each zone. A load balancer node will be placed in each selected zone and will automatically scale in response to traffic. The load balancer routes traffic to targets in the selected Availi

☐ eu-west-1a (euw1-az2)

☐ eu-west-1b (euw1-az3)

Load balancers (1/1)

Actions

Create load balancer

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Q

Filter load balancers

<

1

>

<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input checked="" type="checkbox"/>	BETA-ALB	BETA-ALB-1247648413.eu-...	Active	vpc-06ee73f02460db061	2 Availability Zones	application	April 12, 2025, 12:37 (...)

Lab 5: Create a launch Template

Create a launch template named WP-Webserver-LT and attach security group for web server clients, database clients and EFS clients

EC2 > Launch templates > Create launch template

Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

Launch template name and description

Launch template name - *required*

WP-Webserver-LT-2

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '*', '@'.

Template version description

WP-Webserver-LT

Max 255 chars

Auto Scaling guidance

Select this if you intend to use this template with EC2 Auto Scaling

☐ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

Template tags

Source template

Lab 5.2: Use Amazon Linux 2023

Recents

Quick Start

Don't include in launch template

Amazon Linux

aws

macOS

Mac

Ubuntu

ubuntu

Windows

Microsoft

Red Hat

Red Hat

SUSE Linux

SUSE

Debian

debian

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Amazon Linux 2023 AMI

ami-01ff9fc7721895c6b (64-bit (x86), uefi-preferred) / ami-034df56910f62214e (64-bit (Arm), uefi)

Virtualization: hvm ENA enabled: true Root device type: ebs

Free tier eligible

Description

Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.

Amazon Linux 2023 AMI 2023.7.20250331.0 x86_64 HVM kernel-6.1

Architecture

64-bit (x86)

Boot mode

uefi-preferred

AMI ID

ami-01ff9fc7721895c6b

Publish Date

2025-03-29

Username

ec2-user

Verified provider

Lab 5.3 : Use Amazon Linux 2023

Attach clients SG for web,database and EFS .

▼ **Network settings** [Info](#)

Subnet [Info](#)

Don't include in launch template ▼ [Create new subnet](#)

When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☒ Select existing security group ☐ Create security group

Security groups [Info](#)

Select security groups ▼

WP WEB SERVERS sg-099a2a95190e77371 ✕
VPC: vpc-06ee73f02460db061

WP EFS CLIENTS sg-02d9aa36dc2019c85 ✕
VPC: vpc-06ee73f02460db061

BETA DATABASE CLIENTS sg-0cbb33f9282acc28c ✕
VPC: vpc-06ee73f02460db061

[Compare security group rules](#)

☐ Hide all selected

Advanced network configuration

Lab 5.4

Expand Advanced details and use the script below to populate the User Data field as text

User data - optional [Info](#)

Upload a file with your user data or enter it in the field.

[Choose file](#)

☐ User data has already been base64 encoded

Paste the script inside LAB5.3 or upload the script

```

#!/bin/bash

DB_NAME="database-1-beta"
DB_USERNAME="admin"
DB_PASSWORD="Beta12345"
DB_HOST="database-1-beta-instance-1.czs0uqeyypcc.eu-west-1.rds.amazonaws.com"
EFS_FS_ID="fs-067e64d854c3565b1"

dnf update -y

#install wget, apache server, php and efs utils
dnf install -y httpd wget php-fpm php-mysql php-json php amazon-efs-utils

#create wp-content mountpoint
mkdir -p /var/www/html/wp-content
mount -t efs $EFS_FS_ID:/ /var/www/html/wp-content

#install wordpress
cd /var/www
wget https://wordpress.org/latest.tar.gz
tar -xzf latest.tar.gz
cp wordpress/wp-config-sample.php wordpress/wp-config.php
rm -f latest.tar.gz

#change wp-config with DB details
cp -rn wordpress/* /var/www/html/
sed -i "s/database_name_here/$DB_NAME/g" /var/www/html/wp-config.php
sed -i "s/username_here/$DB_USERNAME/g" /var/www/html/wp-config.php
sed -i "s/password_here/$DB_PASSWORD/g" /var/www/html/wp-config.php
sed -i "s/localhost/$DB_HOST/g" /var/www/html/wp-config.php

#change httpd.conf file to allowoverride
# enable .htaccess files in Apache config using sed command
sed -i 's/<Directory "\/var\/www\/html">\/,\/<\/Directory>\/ s/AllowOverride None/AllowOverride All/'
/etc/httpd/conf/httpd.conf

# create phpinfo file
echo "<?php phpinfo(); ?>" > /var/www/html/phpinfo.php

# Recursively change OWNER of directory /var/www and all its contents
chown -R apache:apache /var/www

systemctl restart httpd
systemctl enable httpd

```

Lab 6: Create the app server

Create autoscalling group called BETA-ASG

Step 1

Choose launch template

Step 2

Choose instance launch options

Step 3 - optional

Integrate with other services

Step 4 - optional

Configure group size and scaling

Step 5 - optional

Add notifications

Step 6 - optional

Add tags

Step 7

Review

Choose launch template Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.

Name
Auto Scaling group name
Enter a name to identify the group.

Must be unique to this account in the current Region and no more than 255 characters.

Launch template Info

For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

Launch template
Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

Create a launch template [↗](#)

Version

Default (2)

[Create a launch template version](#) [↗](#)

Description
-

AMI ID
ami-01ff9fc7721895c6b

Key pair name
-

Launch template
[WP-Webservers-LT](#) [↗](#)
lt-0c82a8726fc0c8c10

Security groups
-
Security group IDs
[sg-0cbb33f9282acc28c](#) [↗](#)
[sg-099a2a95190e77371](#) [↗](#)
[sg-02d9aa36dc2019c85](#) [↗](#)
[sg-0c4178a9a98a53586](#) [↗](#)

Instance type
t3.micro

Request Spot Instances
No

Additional details

Storage (volumes)
-

Date created
Sat Apr 12 2025 14:26:05 GMT+0100 (West Africa Standard Time)

Cancel

Next

Lab 6.1 From **Network plane** ,attach application subnet A and subnet B

Network
For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

Availability Zones and subnets
Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

eu-west-1a | subnet-0633d6706977d0c73 (Application Subnet A)

10.2.2.0/24

eu-west-1b | subnet-01ef4265c5bee3361 (Application Subnet B)

10.2.3.0/24

[Create a subnet](#) [↗](#)

Availability Zone distribution - new
Auto Scaling automatically balances instances across Availability Zones. If launch failures occur in a zone, select a strategy.

☒ **Balanced best effort**
If launches fail in one Availability Zone, Auto Scaling will attempt to launch in another healthy Availability Zone.

☐ **Balanced only**
If launches fail in one Availability Zone, Auto Scaling will continue to attempt to launch in the unhealthy Availability Zone to preserve balanced distribution.

Cancel

Update

Lab 6.2

For Grouping size and scaling Policy .

Desired capacity is 2

Minimum Capacity is 2

Maximum desired capacity 2

Group size

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum scaling limits.

Desired capacity type

Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.

Units (number of instances) ▼

Desired capacity

Specify your group size.

Scaling limits

Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity

Equal or less than desired capacity

Max desired capacity

Equal or greater than desired capacity

[Cancel](#) [Update](#)

Lab 6.3

Registered targets are healthy in your target group

Registered targets are healthy. 1-year target group

2

Total targets

2

Healthy

0 Anomalous

0

Unhealthy

0

Unused

0

Initial

0

Draining

► Distribution of targets by Availability Zone (AZ)

Select values in this table to see corresponding filters applied to the Registered targets table below.

Targets

Monitoring

Health checks

Attributes

Tags

Registered targets (2) Info

Anomaly mitigation: Not applicable

Deregister

Register targets

Target groups route requests to individual registered targets using the protocol and port number specified. Health checks are performed on all registered targets according to the target group's health check settings. Anomaly detection is automatically applied to HTTP/HTTPS target groups with at least 3 healthy targets.

Filter targets

<input type="checkbox"/>	Instance ID	Name	Port	Zone	Health status	Health status details	Admin...	Overri...
<input type="checkbox"/>	i-0cfe43be259716a06	APP-SERVER-A	80	eu-west-1a (eu...	Healthy	-	No override.	No overri...
<input type="checkbox"/>	i-04bbbdadb3476b22f	APP-SERVER-B	80	eu-west-1b (eu...	Healthy	-	No override.	No overri...

Lab 6.3

Open the DNS name (<http://beta-alb-1247648413.eu-west-1.elb.amazonaws.com/>) for your Application Load Balancer in your web browser to view your newly created Wordpress installation.

504 Gateway Time-out

```
C:\Users\Temitope>ping beta-alb-1247648413.eu-west-1.elb.amazonaws.com

Pinging beta-alb-1247648413.eu-west-1.elb.amazonaws.com [54.77.83.0] with 32 bytes of data:
Reply from 54.77.83.0: bytes=32 time=173ms TTL=245
Reply from 54.77.83.0: bytes=32 time=125ms TTL=245
Reply from 54.77.83.0: bytes=32 time=125ms TTL=245
Reply from 54.77.83.0: bytes=32 time=126ms TTL=245

Ping statistics for 54.77.83.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 125ms, Maximum = 173ms, Average = 137ms
```

CHALLENGES

The challenges we encountered include :

1. We mistakenly attached a wrong VPC to one of the security Groups created. Which was later corrected .

❌ **Auto Scaling group could not be created**
One or more security groups in the launch template are not linked to the VPCs configured in the Auto Scaling group

🔍 Diagnose with Amazon Q

2. The second issue is inability to access the web application due to server error as shown below:

504 Gateway Time-out

3. We do not know how to explore AWS Database