SVKM'S NMIM'S Nilkamal School of Mathematics, Applied Statistics & Analytics
Master of Science (Data Science)

Practical-2 Platform as a service using AWS.

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Writeup:-

- **PLATFORM AS A SERVICE**

Platform as a Service (PaaS) is a complete cloud environment that includes everything developers need to build, run, and manage applications—from servers and operating systems to all the networking, storage, middleware, tools, and more**.**

How does PaaS work?
Unlike IaaS or SaaS service models, PaaS solutions are specific to application and software development and typically include:
Cloud infrastructure: Data centers, storage, network equipment, and servers
Middleware software: Operating systems, frameworks, development kits (SDK), libraries, and more
User interface: A graphical user interface (GUI), a command line interface (CLI), an API interface, and in some cases, all three

Benefits of PaaS

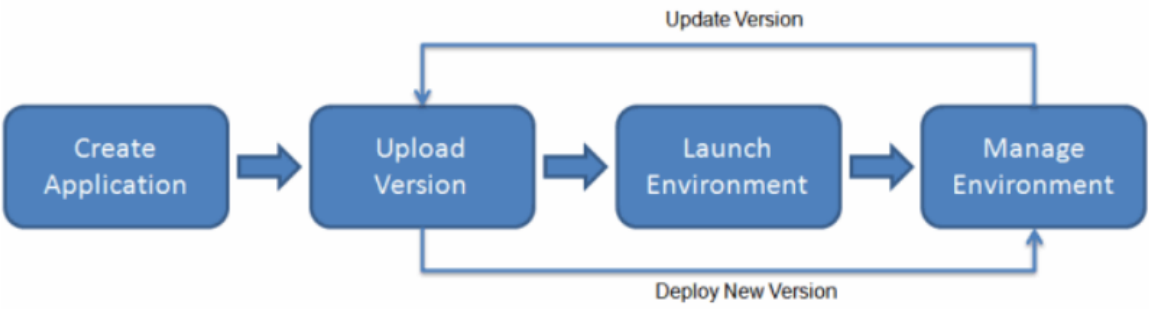
- Faster time to market
- Low maintenance
- Easy scalability
- Flexible access
- Cost-effective pricing

- **ELASTIC BEANSTALK**

Elastic Beanstalk is a service for deploying and scaling web applications and services. Upload your code and Elastic Beanstalk automatically handles the deployment—from capacity provisioning, load balancing, and auto scaling to application health monitoring.
Use cases
Quickly launch web applications
Deploy scalable web applications in minutes without the complexity of provisioning and managing underlying infrastructure.

Create mobile API backends for your applications
Use your favorite programming language to build mobile API backends, and Elastic Beanstalk will manage patches and updates.

Replatform critical business applications
Migrate stateful applications off legacy infrastructure to Elastic Beanstalk and connect securely to your private network.



WORKFLOW OF ELASTIC BEANSTALK

Platforms for Programming Languages Provided By Elastic Beanstalk are

- GO
- Java
- Node.js
- PHP
- Python
- Ruby

Platforms for Application Servers Provided by Elastic Beanstalk are

- Tomcat
- Docker

- **COMPONENTS OF BEANSTALK**

AWS Elastic Beanstalk Components

1. **Application Handling**:
   Elastic Beanstalk adopts the project code directly, naming the application after the project's home directory.
2. **Application Environments**:
   Supports multiple environments (e.g., DEV, UAT, PROD) for running applications at different stages.
3. **Automated Health Checks:**
   AWS conducts automatic health checks on Elastic Beanstalk applications, monitoring EC2 deployments.
4. **Health status indicators**: Red (failure), Yellow (partial failure), Grey (updating), Green (success), Isolated (environments and applications are isolated).
5. **Scalability and Load Balancing:**
   Utilizes Auto-Scaling for dynamic application scalability.
   Elastic Load Balancer (ELB) balances web request loads across application instances.
6. **Language Support:**

Supports Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker applications on familiar servers.

7. **Pricing:**
   No additional charges for Elastic Beanstalk; users pay for services and resources provisioned by the service.
8. **Automatic Provisioning:**
   Relieves users from selecting services and configuring security groups; handles automatic provisioning.
9. **Scalability Assurance:**
   Leverages Auto Scaling, theoretically capable of handling any amount of internet traffic, as claimed by AWS.

- **IAM**

Identity and access management (IAM) is a framework of business processes, policies and technologies that facilitates the management of electronic or digital identities. With an IAM framework in place, information technology (IT) managers can control user access to critical information within their organizations. Systems used for IAM include single sign-on systems, two-factor authentication, multifactor authentication and privileged access management.

IAM systems can be deployed on premises, provided by a third-party vendor through a cloud-based subscription model or deployed in a hybrid model.

On a fundamental level, IAM **encompasses the following components**:

how individuals are identified in a system (understand the difference between identity management and authentication);

how roles are identified in a system and how they are assigned to individuals;

adding, removing and updating individuals and their roles in a system;

assigning levels of access to individuals or groups of individuals; and

protecting the sensitive data within the system and securing the system itself.

IAM Features: Brief Overview

- Shared Access:
  Facilitates easy resource sharing among project teams.
- Cost-Free Access:
  IAM feature is free; charges incurred only when accessing other AWS services using IAM users.
- Centralized Control:
  Provides centralized control over user and group creation, management, and data access within the AWS account.
- Permission Granting:
  Root account, with administrative rights, grants specific permissions to IAM users for accessing services.
- Multifactor Authentication:
  Enhances account security with a third-party six-digit code, required along with the password for account logins.

- **Implement paas using elastic beanstalk for the following.**
    1. Server
    2. Java
    3. Python
    4. Node.js

Beanstalk

IAM(Identity Access Management)- Roles can be assigned with this

Q1:

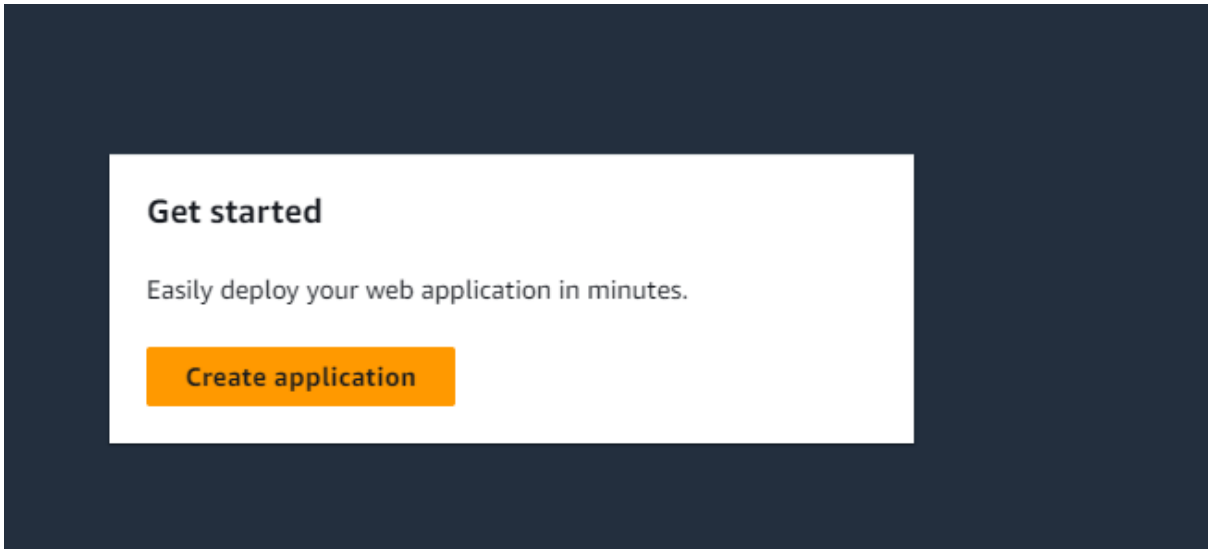
CREATE ENV

In Elastic Beanstalk

- EXECUTING APPLICATIONS
- UPLOADING APPLICATIONS

PAAS

STEPS SCREENSHOTS



Configure environment Info

Environment tier Info

Amazon Elastic Beanstalk has two types of environment tiers to support different types of web applications.

- (•) Web server environment
  Run a website, web application, or web API that serves HTTP requests. Learn more
- ( ) Worker environment
  Run a worker application that processes long-running workloads on demand or performs tasks on a schedule. Learn more

Application information Info

Application name

Mywebserver

Maximum length of 100 characters.

▶ Application tags (optional)

Environment information Info

Choose the name, subdomain and description for your environment. These cannot be changed later.

Environment name

Mywebserver-env

Must be from 4 to 40 characters in length. The name can contain only letters, numbers, and hyphens. It can't start or end with a hyphen. This name must be unique within a region in your account.

Domain

Leave blank for autogenerated value .eu-north-1.elasticbeanstalk.com Check availability

Environment description

This is a application which will execute python web apps

Platform Info

Platform type

Managed platform
Platforms published and maintained by Amazon Elastic Beanstalk. Learn more

Custom platform
Platforms created and owned by you. This option is unavailable if you have no platforms.

Platform

Choose a platform

- .NET Core on Linux
- .NET on Windows Server
- Docker
- Go
- Java
- Node.js
- PHP
- Python
- Ruby
- Tomcat

Existing version
Application versions that you have uploaded.

Upload your code
Upload a source bundle from your computer or copy one from Amazon S3.

Platform Info

Platform type

Managed platform
Platforms published and maintained by Amazon Elastic Beanstalk. Learn more

Custom platform
Platforms created and owned by you. This option is unavailable if you have no platforms.

Platform

Java

Platform branch

Corretto 21 running on 64bit Amazon Linux 2023

Platform version

4.2.0 (Recommended)

Application code Info

- (•) Sample application
- ( ) Existing version
  Application versions that you have uploaded.
- ( ) Upload your code
  Upload a source bundle from your computer or copy one from Amazon S3.

Configure service access Info

Service access

IAM roles, assumed by Elastic Beanstalk as a service role, and EC2 instance profiles allow Elastic Beanstalk to create and manage your environment. Both the IAM role and instance profile must be attached to IAM managed policies that contain the required permissions. Learn more

Service role

- ( ) Create and use new service role
- (•) Use an existing service role

Existing service roles

Choose an existing IAM role for Elastic Beanstalk to assume as a service role. The existing IAM role must have the required IAM managed policies.

EC2 key pair

Select an EC2 key pair to securely log in to your EC2 instances. Learn more

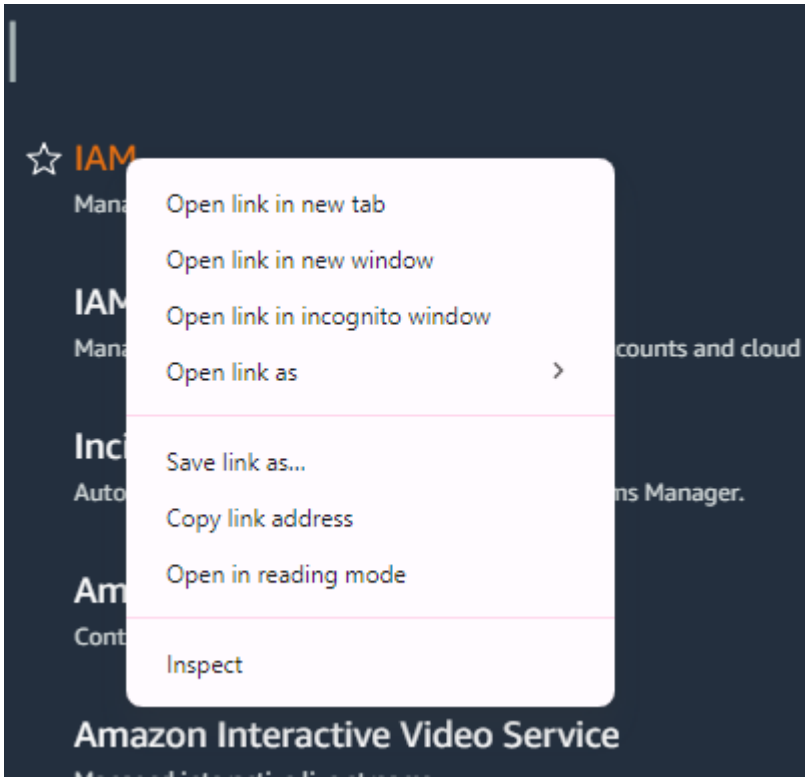
Choose a key pair

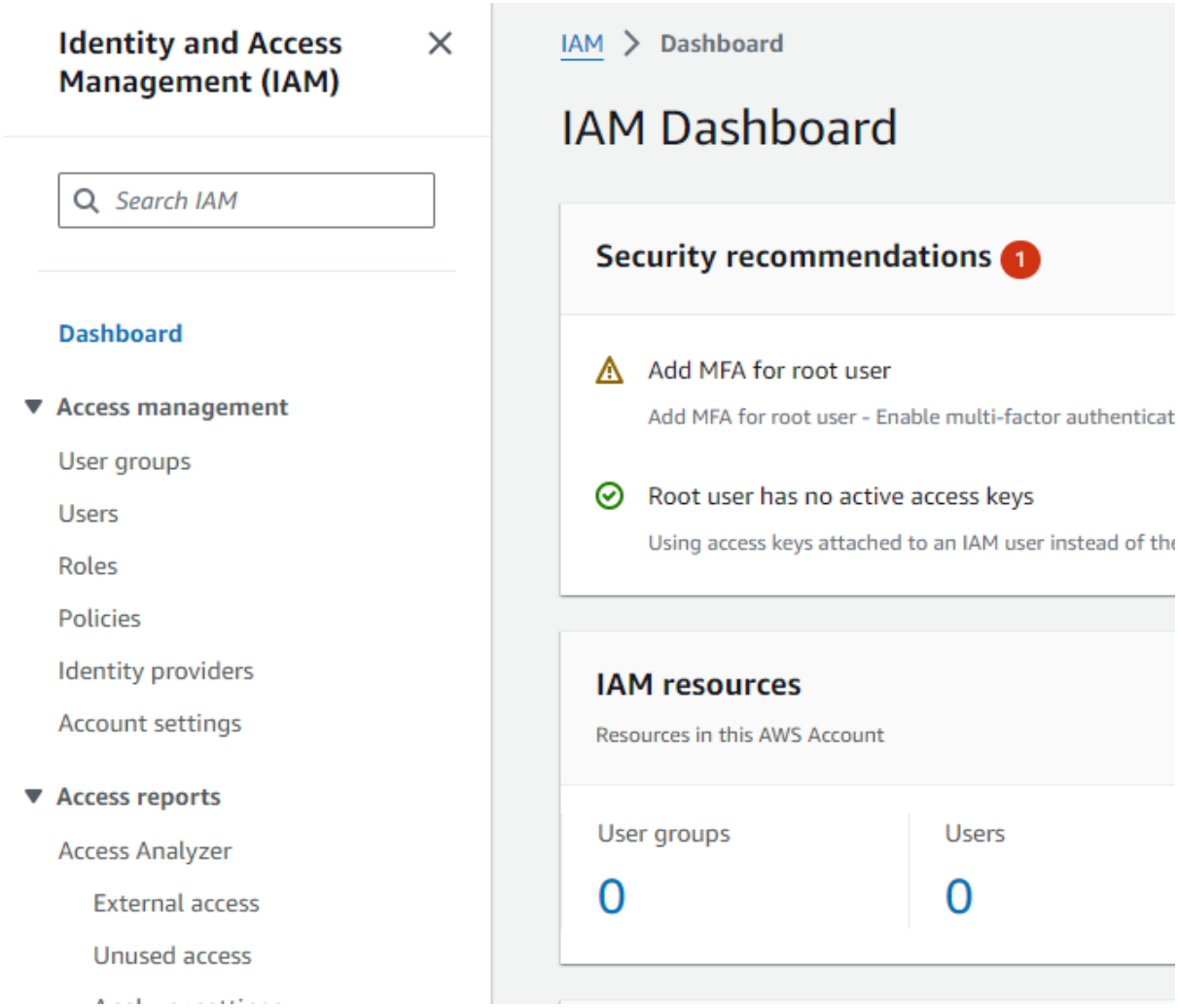
EC2 instance profile

Choose an IAM instance profile with managed policies that allow your EC2 instances to perform required operations.

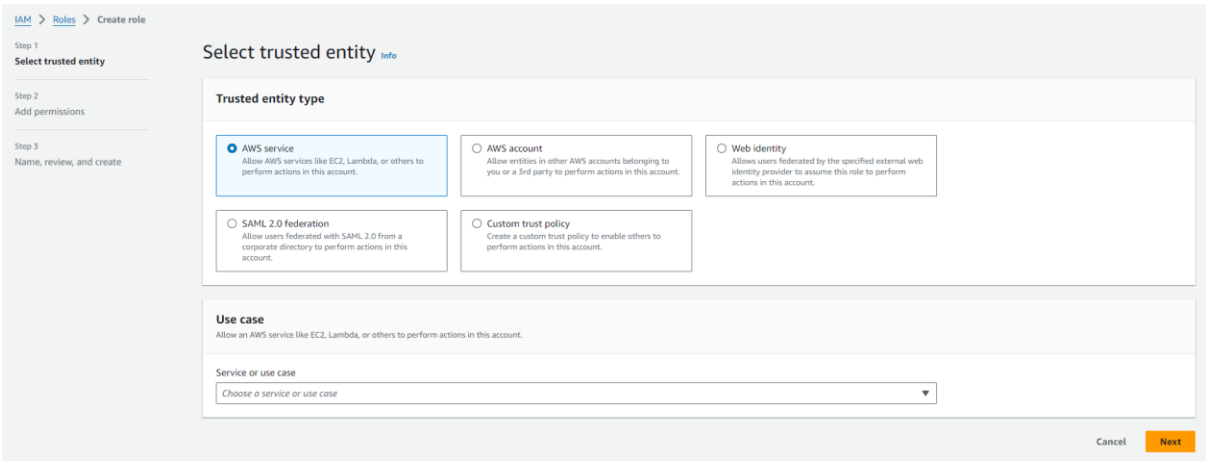
View permission details

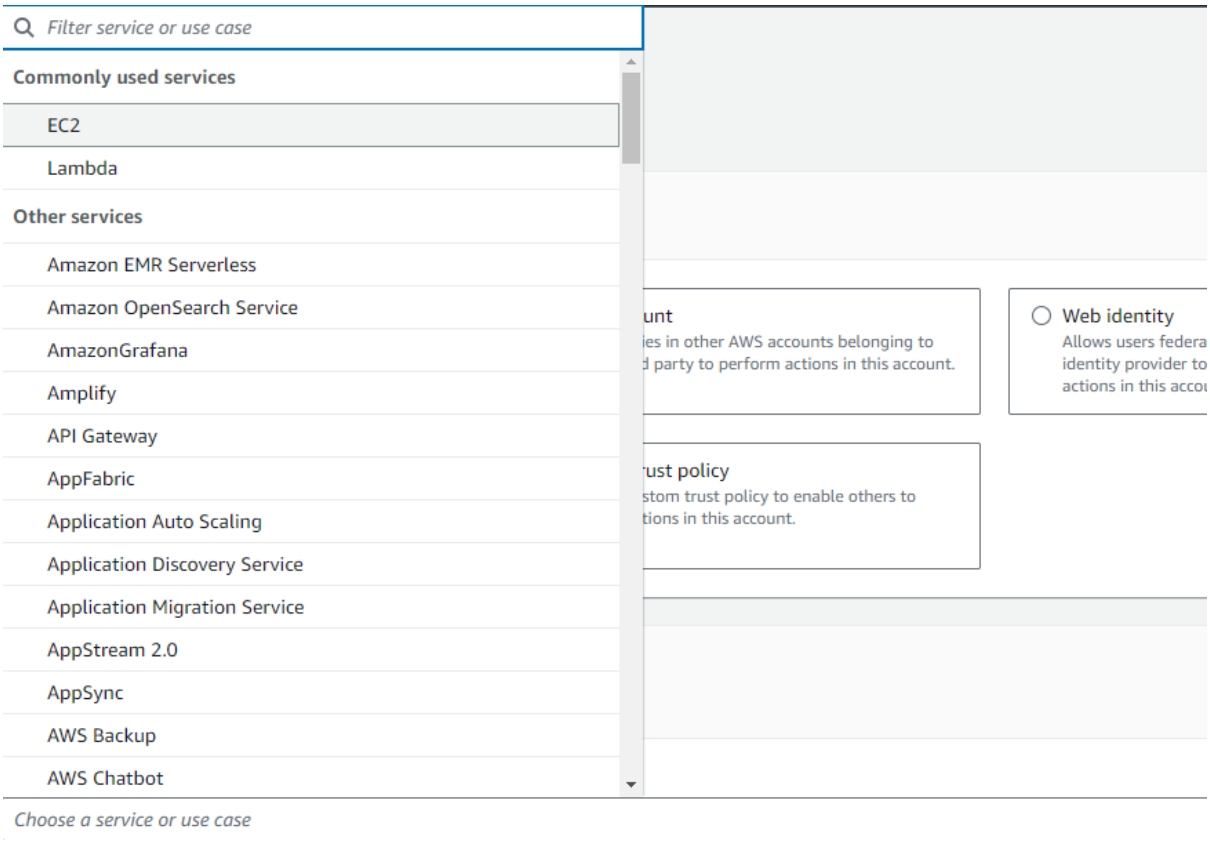
Cancel | Skip to review | Previous | Next


IAM
Open link in new tab
Open link in new window
Open link in incognito window
Open link as
Save link as...
Copy link address
Open in reading mode
Inspect
Amazon Interactive Video Service

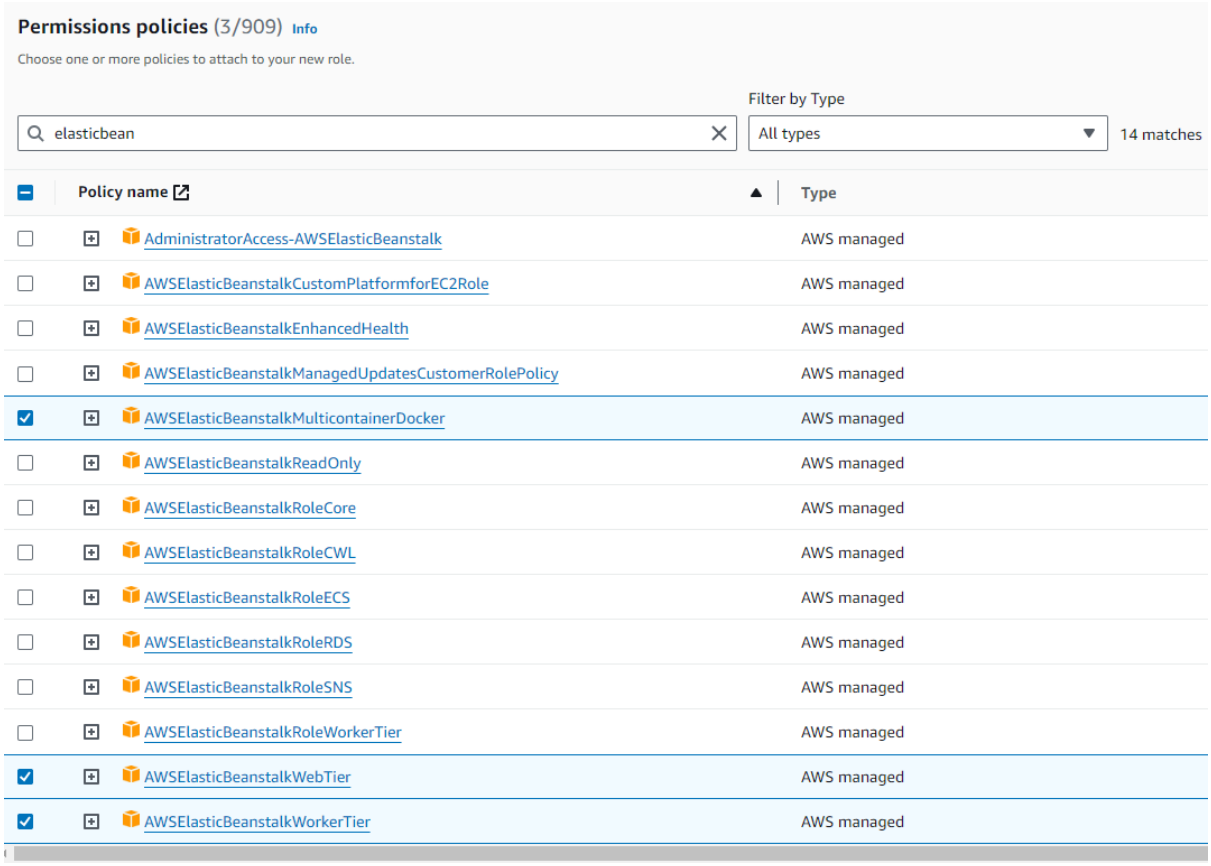

Identity and Access Management (IAM)
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
Identity providers
Account settings
Access reports
Access Analyzer
External access
Unused access
IAM > Dashboard
IAM Dashboard
Security recommendations 1
Add MFA for root user
Add MFA for root user - Enable multi-factor authenticat
Root user has no active access keys
Using access keys attached to an IAM user instead of the
IAM resources
Resources in this AWS Account
User groups
0
Users
0

Click on create role





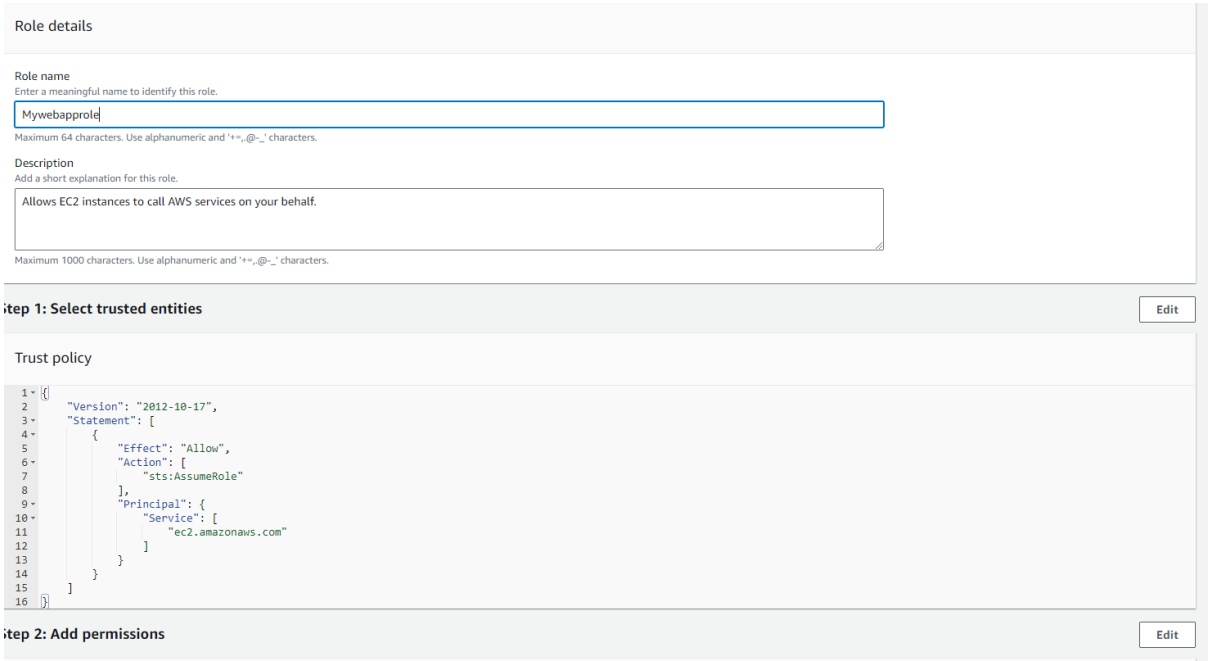
Click next



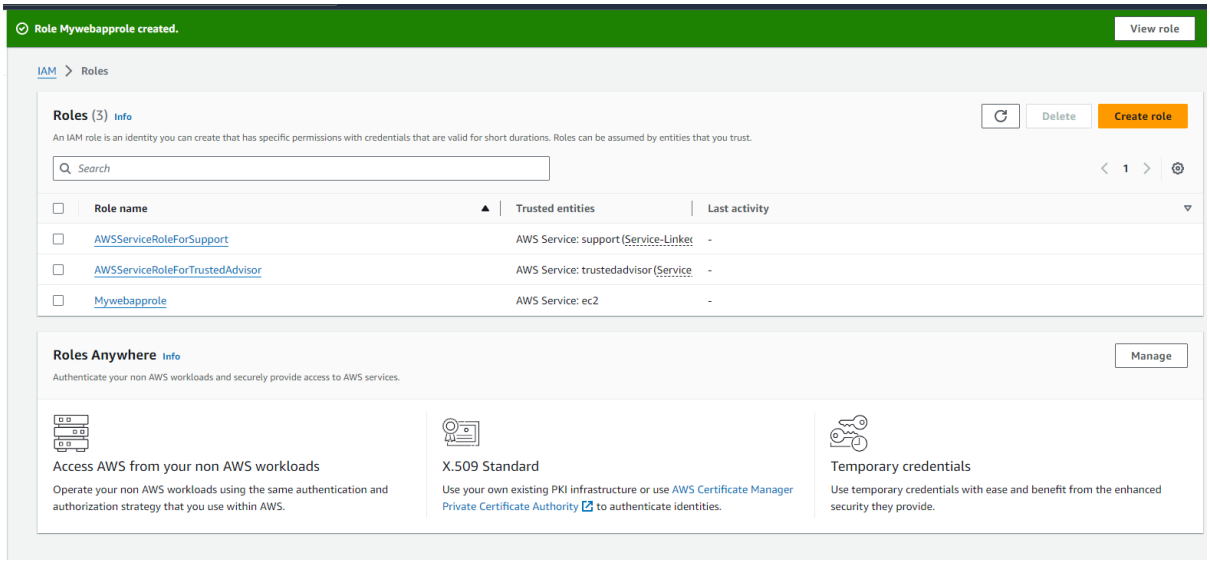
Worker tier-applications that you run

Multicontainer -webserver

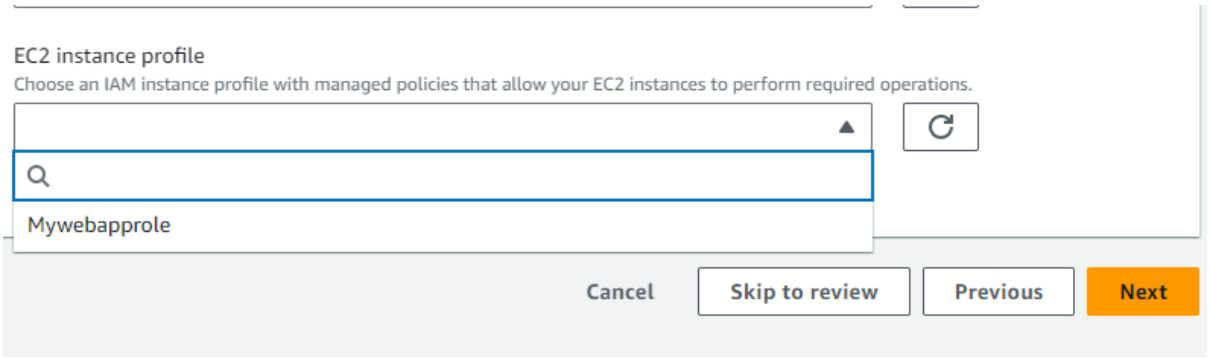
Click next

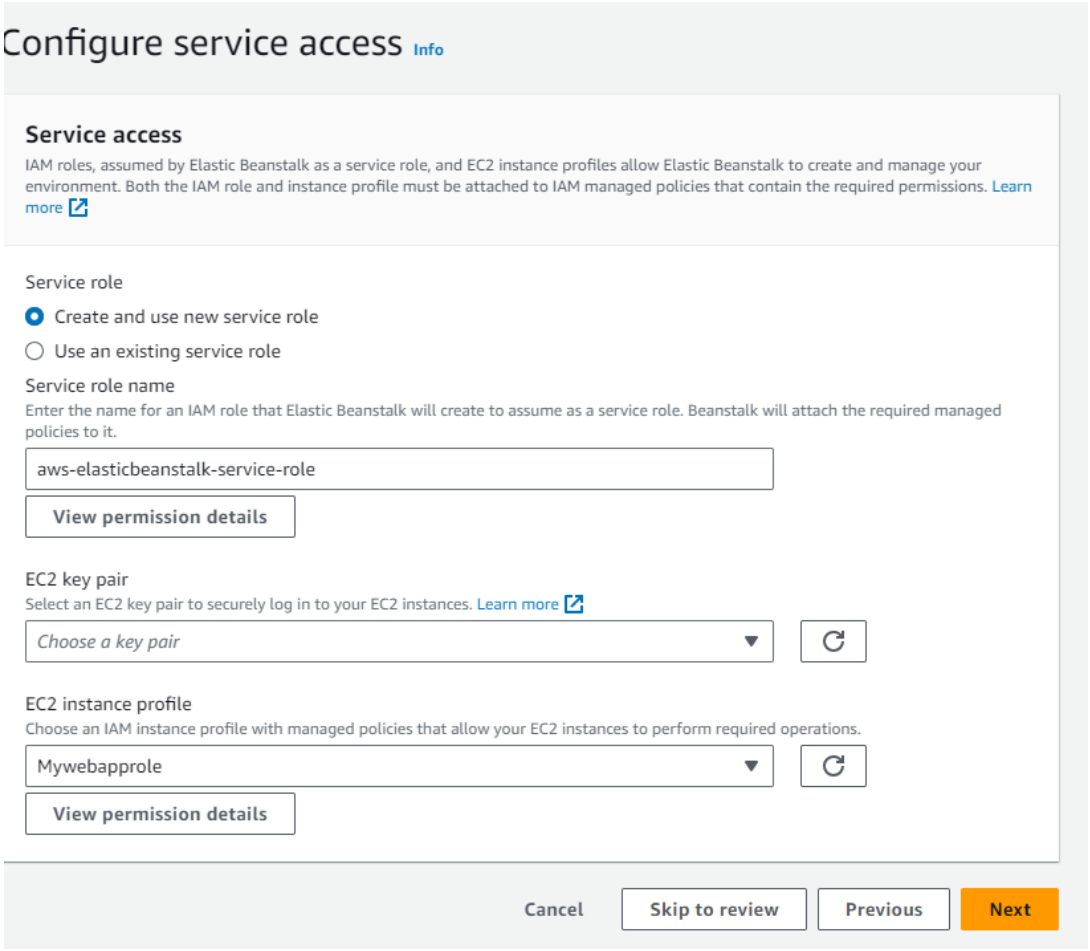


Click on create role

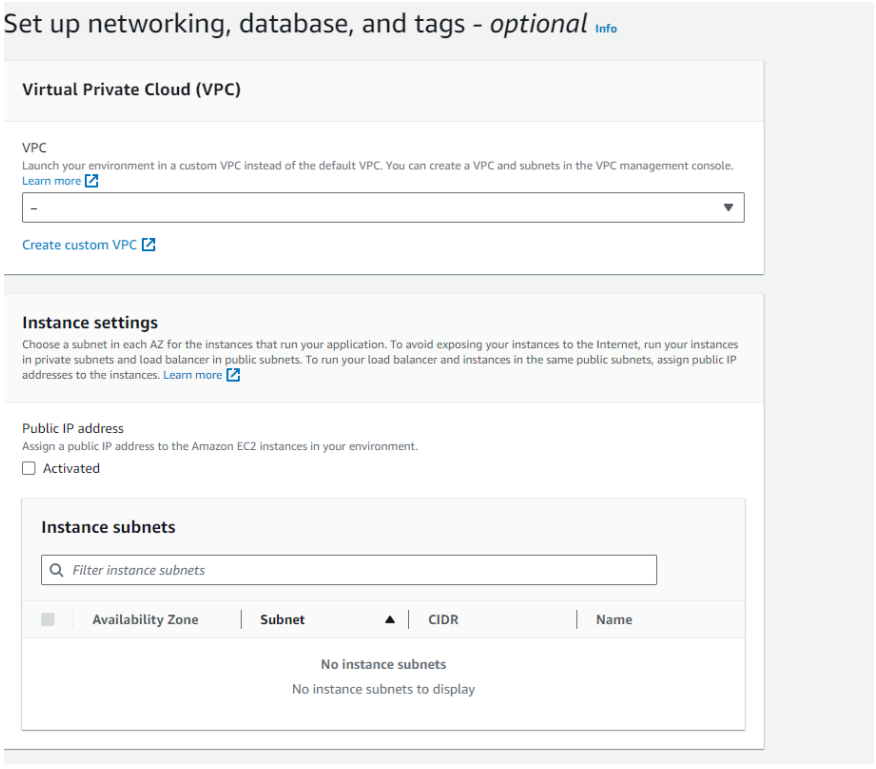


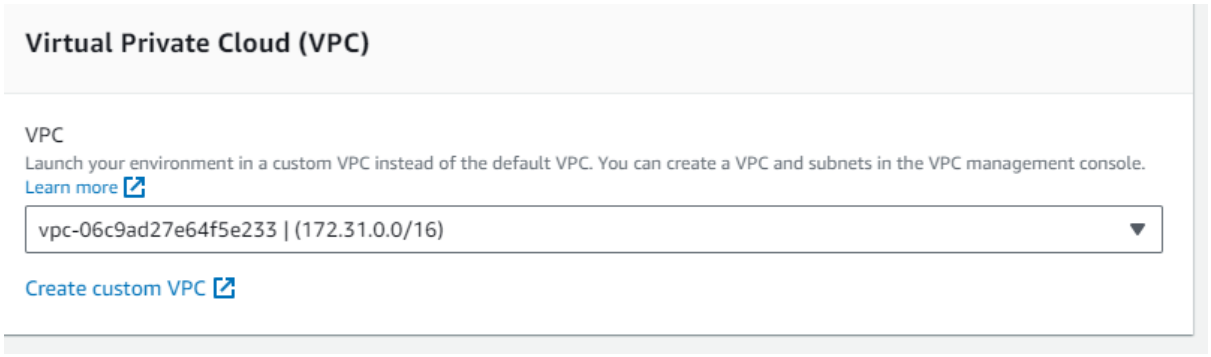
Refresh the instance profile cyclic button

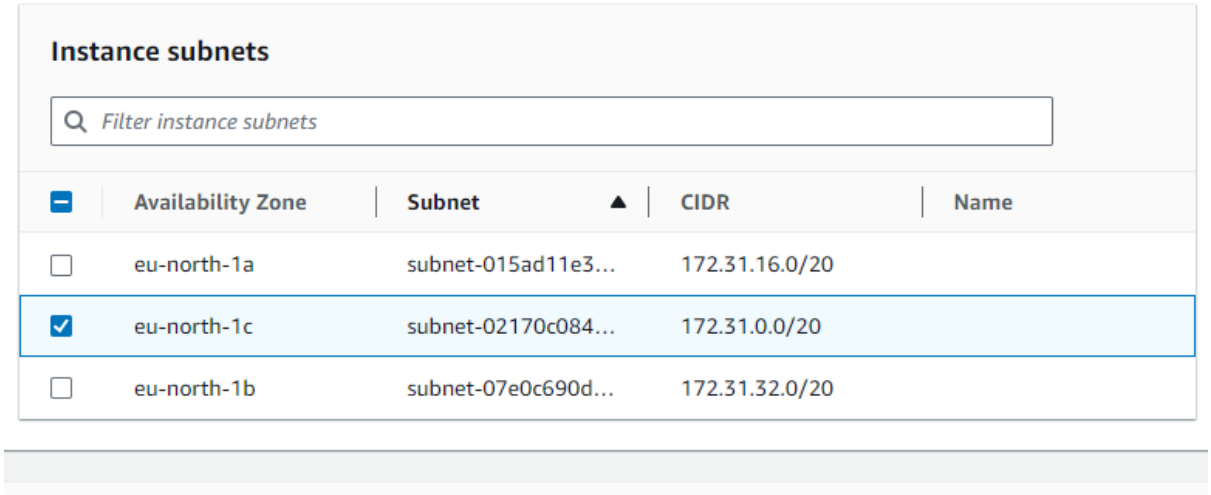



Configure service access Info
Service access
IAM roles, assumed by Elastic Beanstalk as a service role, and EC2 instance profiles allow Elastic Beanstalk to create and manage your environment. Both the IAM role and instance profile must be attached to IAM managed policies that contain the required permissions. Learn more
Service role
Create and use new service role
Use an existing service role
Service role name
Enter the name for an IAM role that Elastic Beanstalk will create to assume as a service role. Beanstalk will attach the required managed policies to it.
aws-elasticbeanstalk-service-role
View permission details
EC2 key pair
Select an EC2 key pair to securely log in to your EC2 instances. Learn more
Choose a key pair
EC2 instance profile
Choose an IAM instance profile with managed policies that allow your EC2 instances to perform required operations.
Mywebapprole
View permission details
Cancel
Skip to review
Previous
Next

Click next

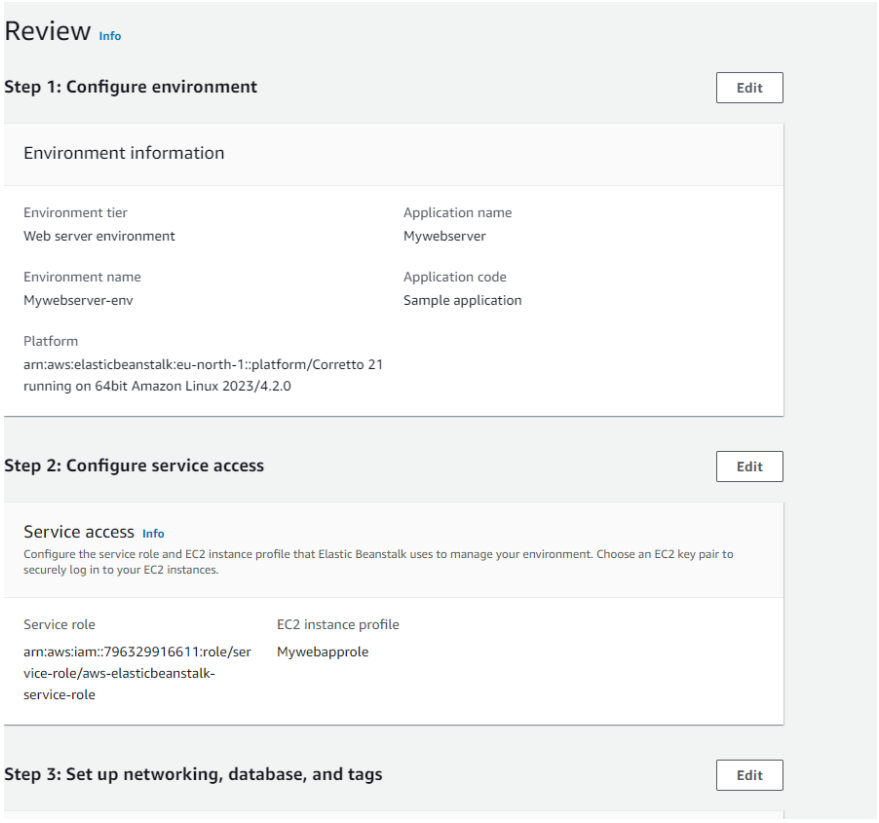

Set up networking, database, and tags - optional Info
Virtual Private Cloud (VPC)
VPC
Launch your environment in a custom VPC instead of the default VPC. You can create a VPC and subnets in the VPC management console.
Learn more
-
Create custom VPC
Instance settings
Choose a subnet in each AZ for the instances that run your application. To avoid exposing your instances to the Internet, run your instances in private subnets and load balancer in public subnets. To run your load balancer and instances in the same public subnets, assign public IP addresses to the instances. Learn more
Public IP address
Assign a public IP address to the Amazon EC2 instances in your environment.
Activated
Instance subnets
Filter instance subnets
Availability Zone
Subnet
CIDR
Name
No instance subnets
No instance subnets to display





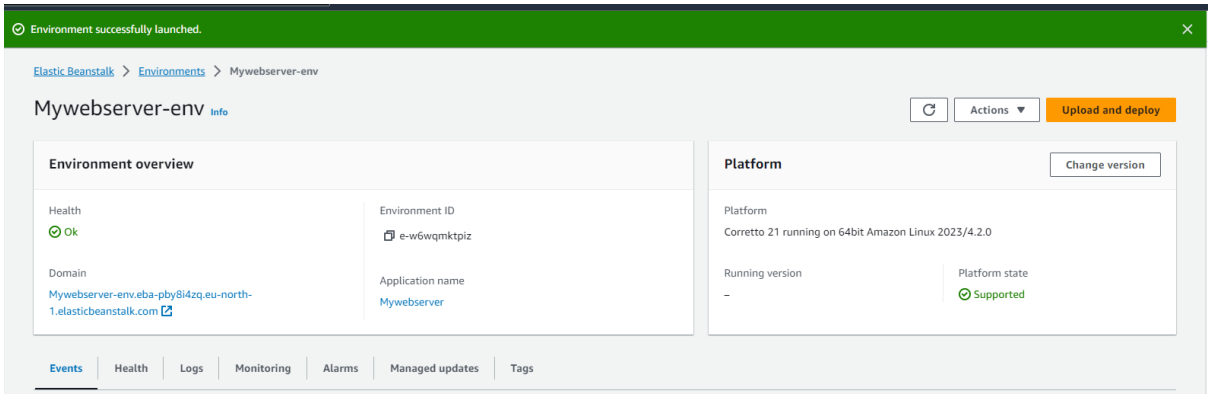
Click next next next

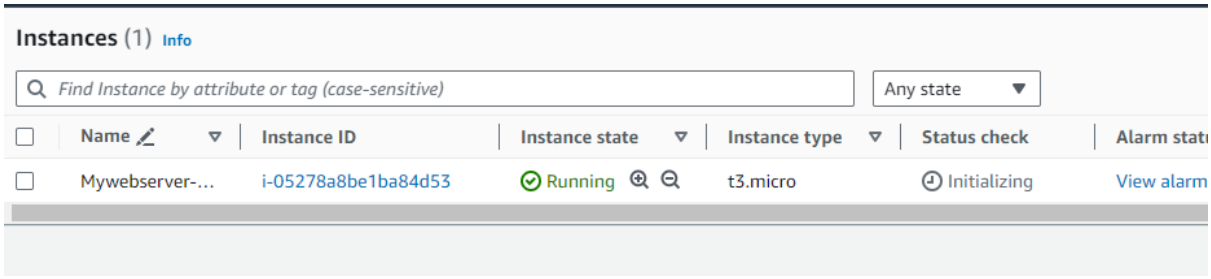
At last will get this window



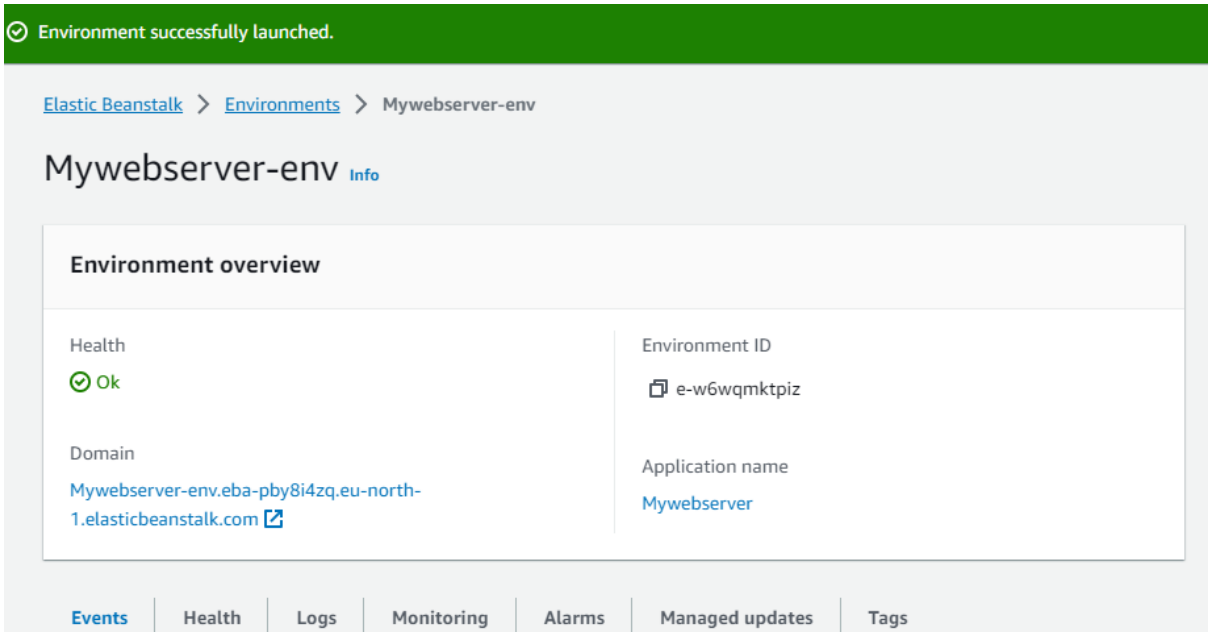
Click submit

Go to EC2 and check if running

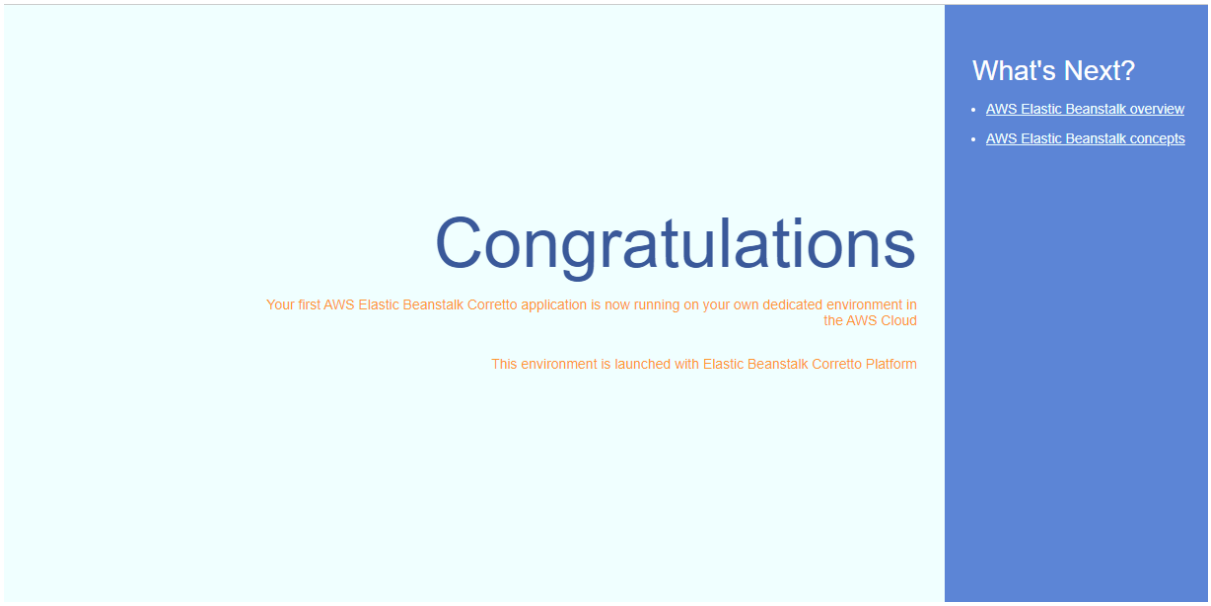




Click on domain url in environment overview



Should get this message



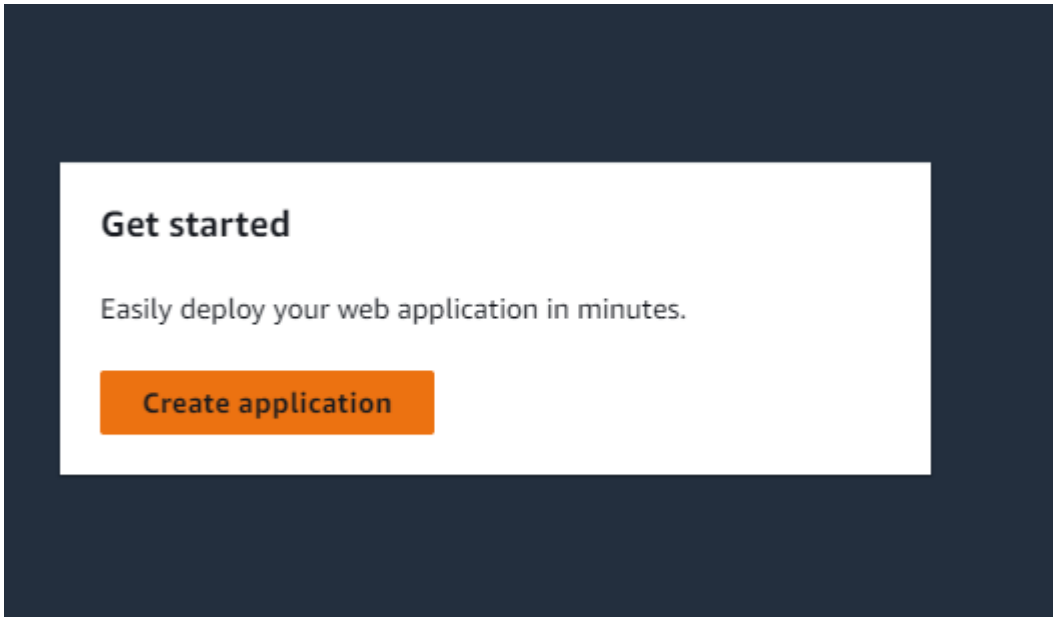
Q NO2

Configure an elastic beanstalk in AWS

GO TO ELASTIC BEANSTALK HOME PAGE

GET started page

Create application



Configure environment Info

Environment tier Info

Amazon Elastic Beanstalk has two types of environment tiers to support different types of web applications.

- (•) Web server environment
  Run a website, web application, or web API that serves HTTP requests. Learn more
- ( ) Worker environment
  Run a worker application that processes long-running workloads on demand or performs tasks on a schedule. Learn more

Application information Info

Application name

Tomcat

Maximum length of 100 characters.

▶ Application tags (optional)

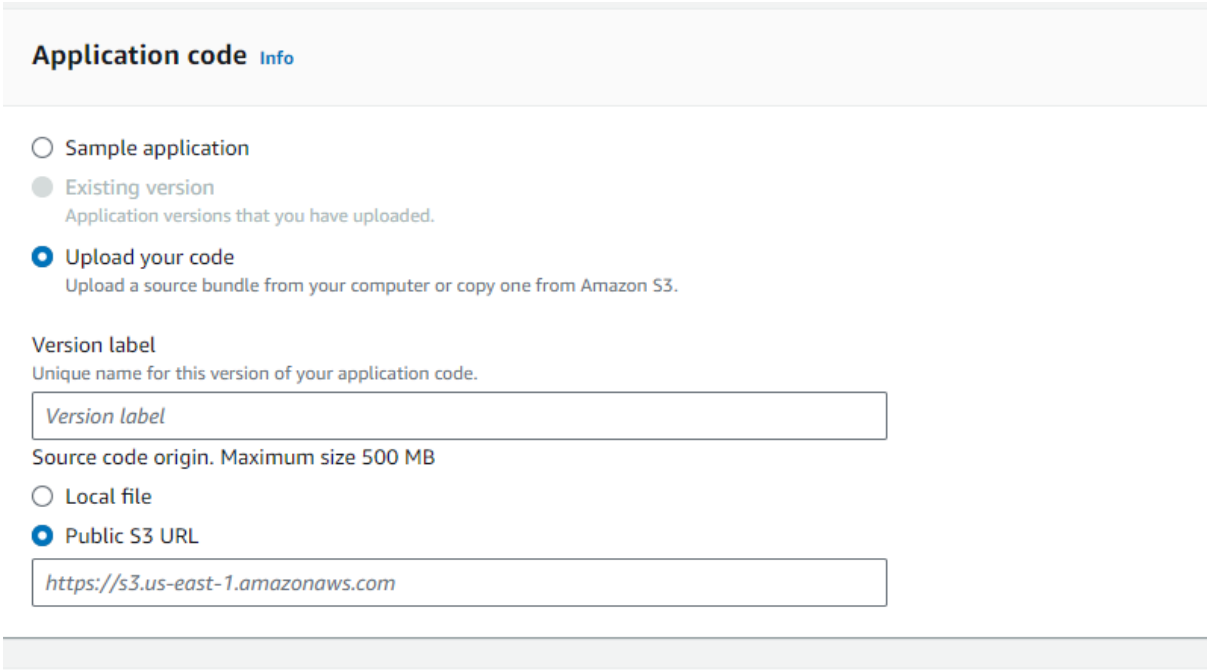
Environment information Info

Choose the name, subdomain and description for your environment. These cannot be changed later.

Environment name

Tomcat-env

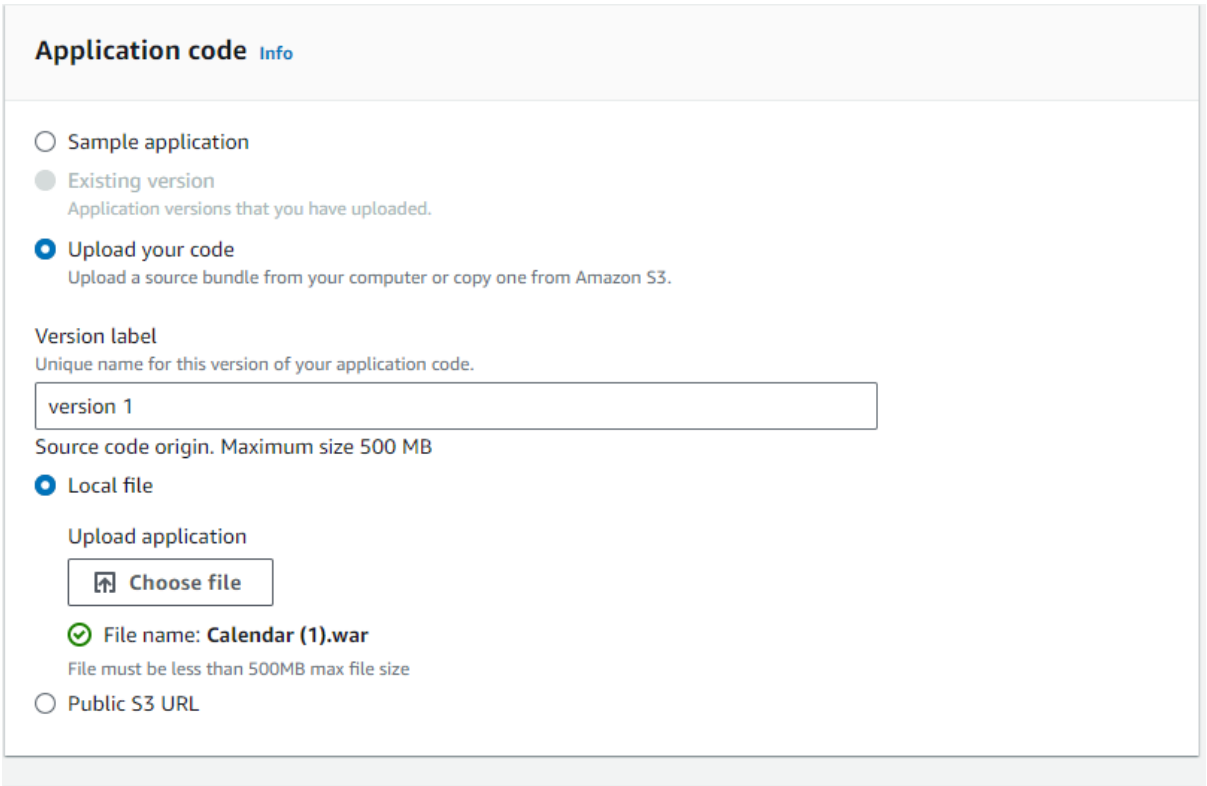
Must be from 4 to 40 characters in length. The name can contain only letters, numbers, and hyphens. It can't start or end with a hyphen.



From the web download calendar.war file from github

https://github.com/manulachathurika/Apache_Stratos_Tomcat_Applications/blob/master/Calendar.war

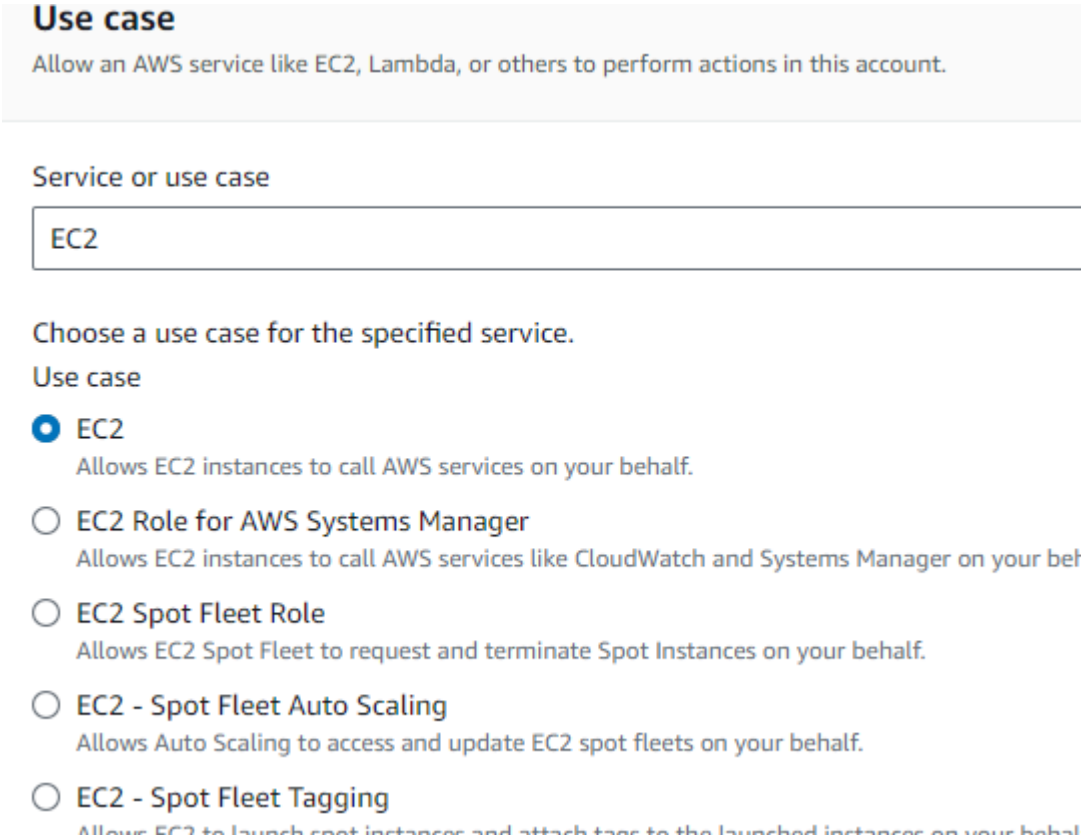
Select local file from option and choose file from your device



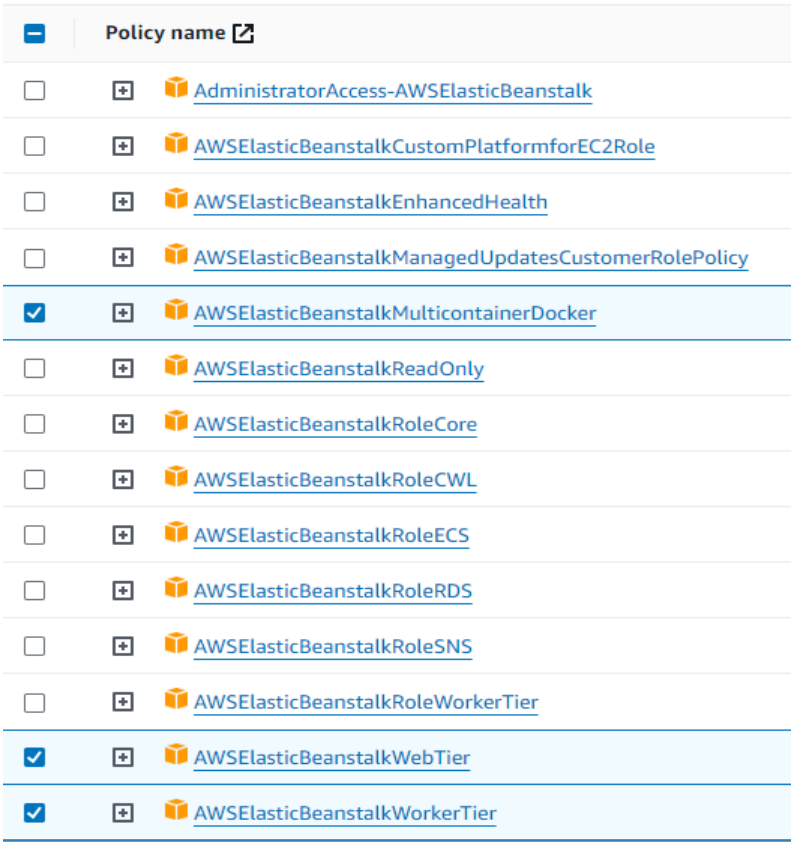
Click next

Go to IAM – Roles- Create new role

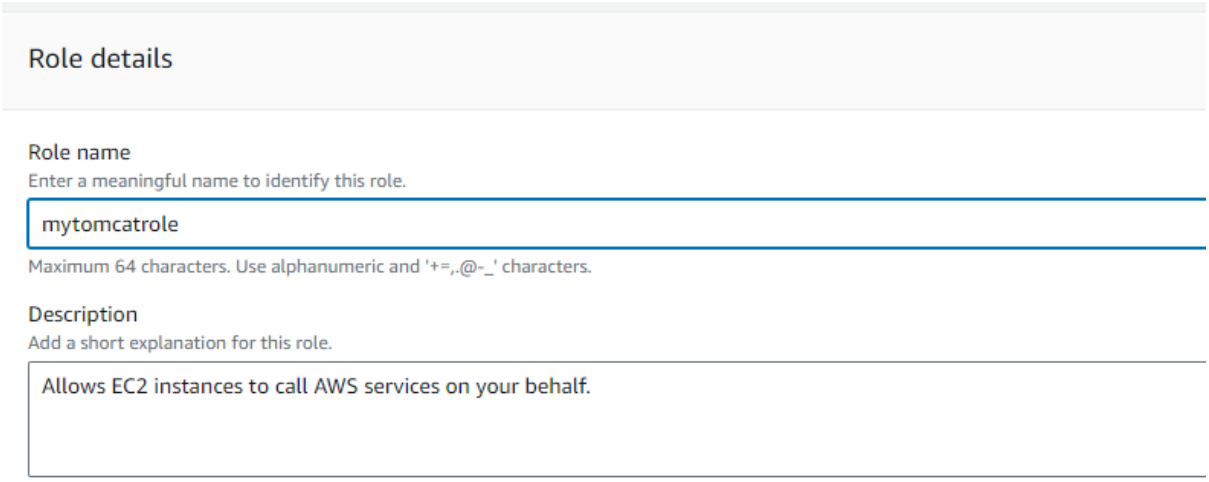
Use case EC2



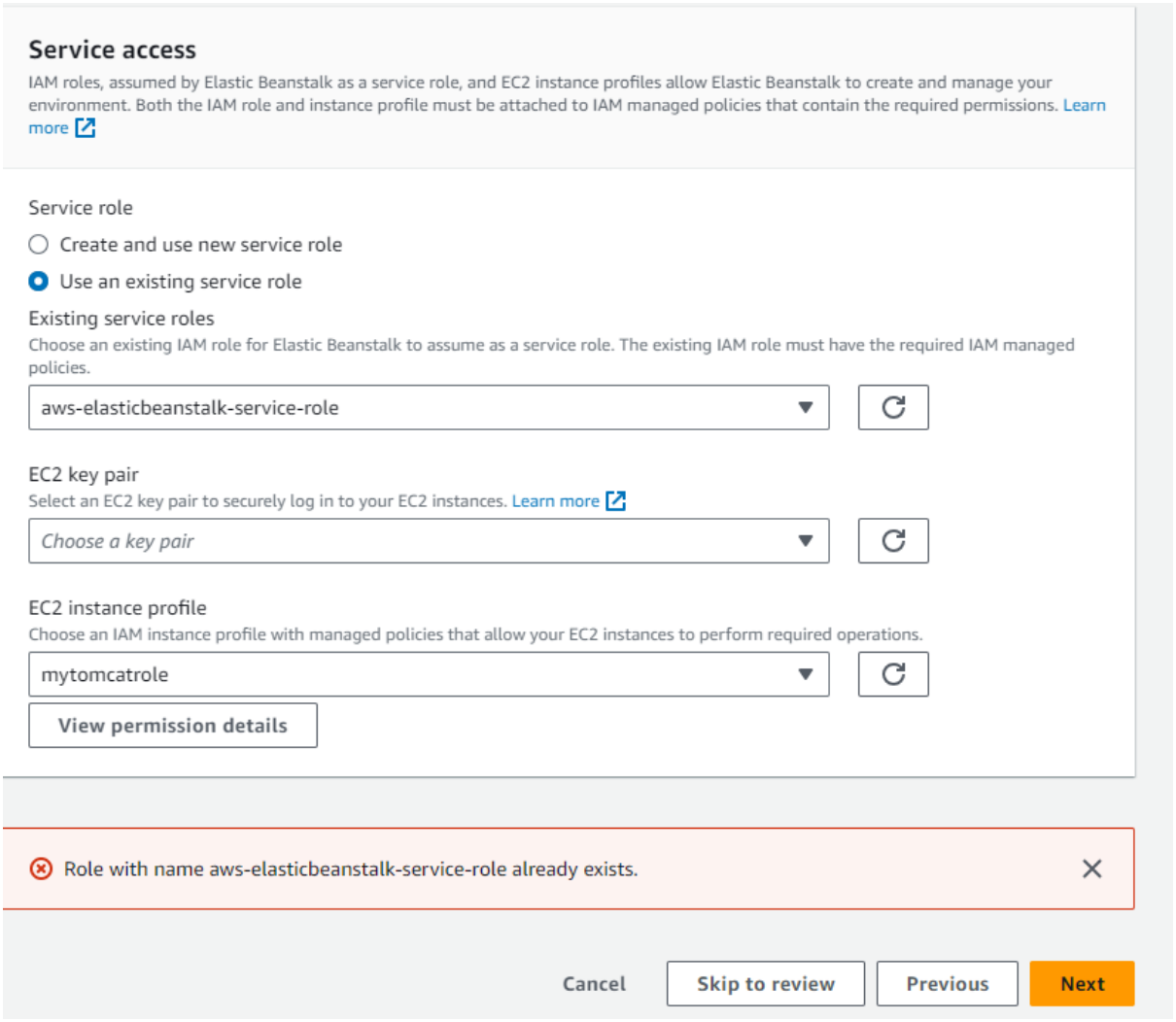
In permissions select same 3 things



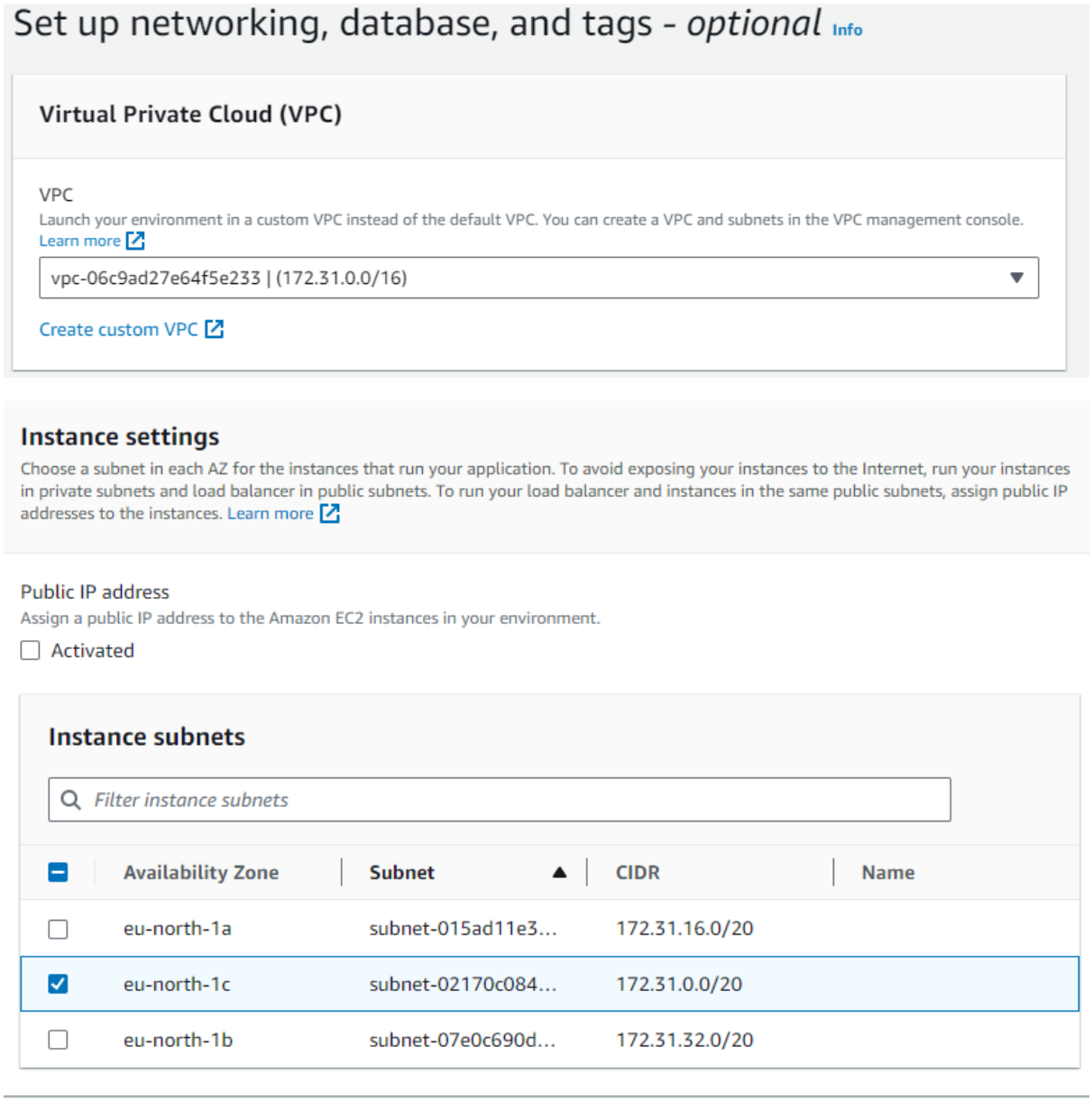
Give role name



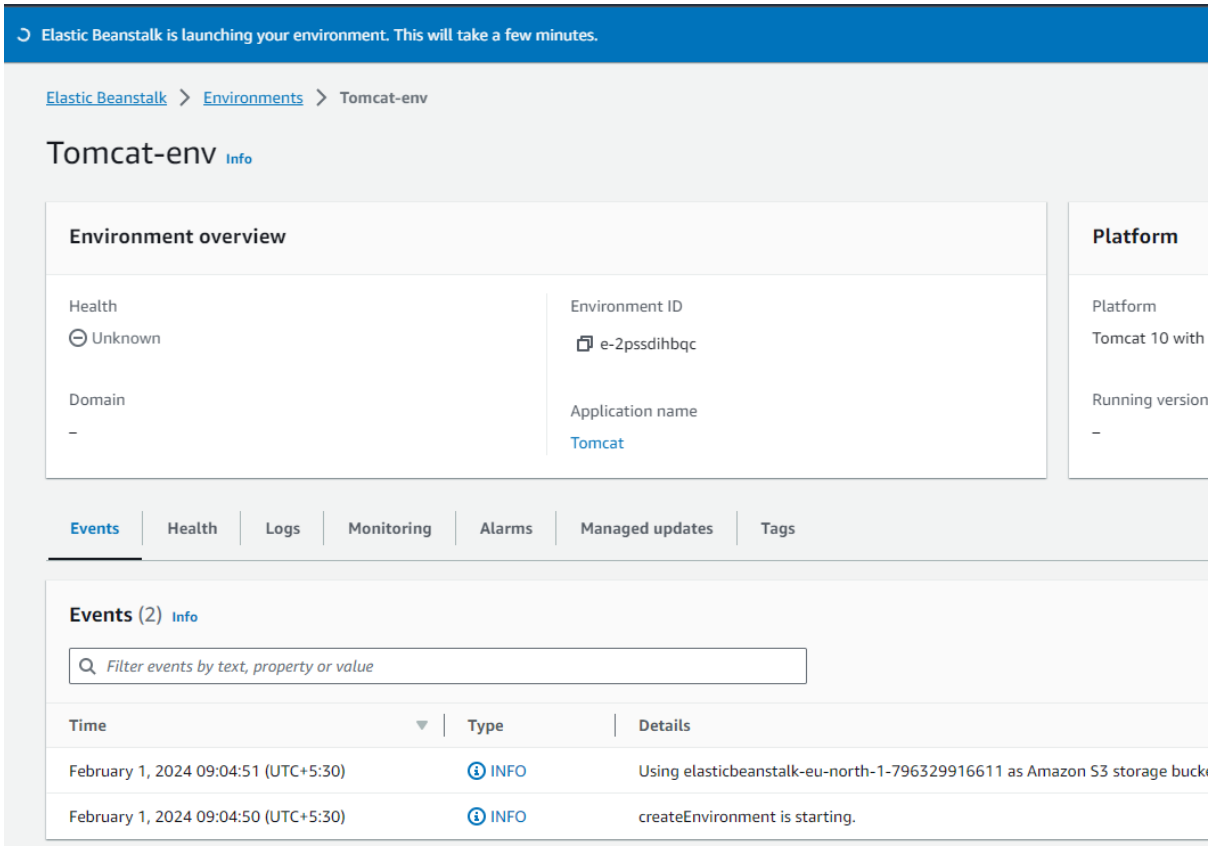
In configure services refresh instance profile button



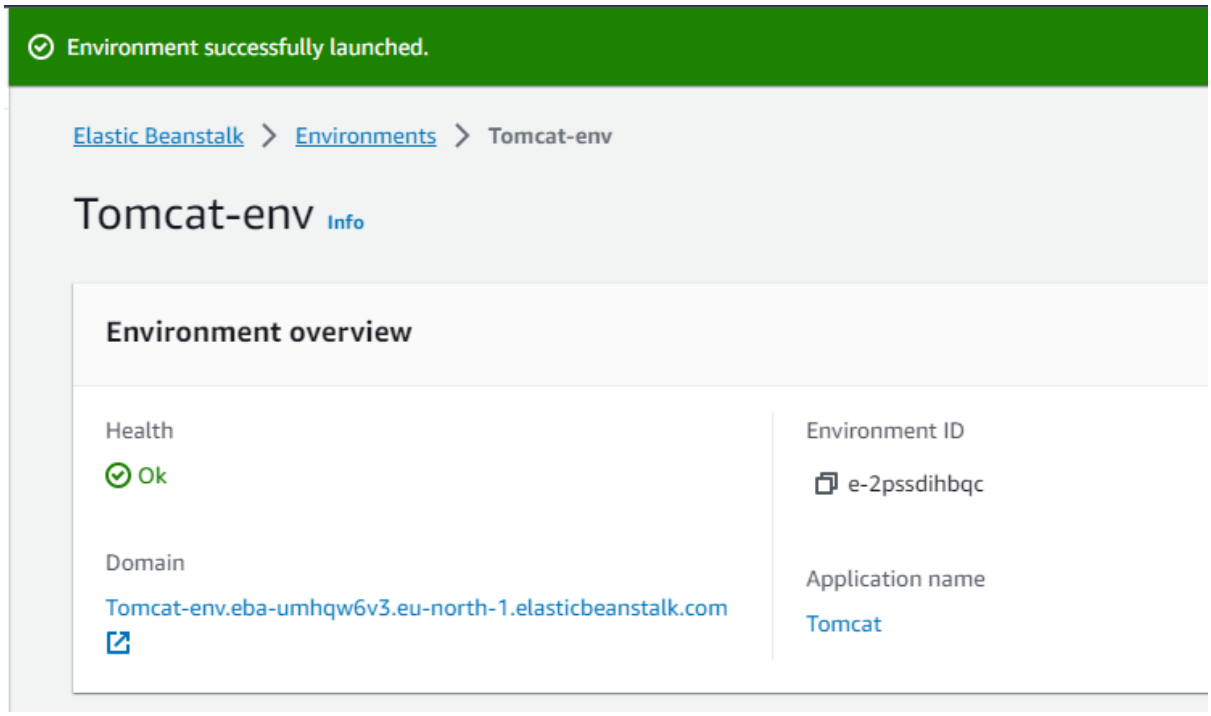
In virtual private cloud select



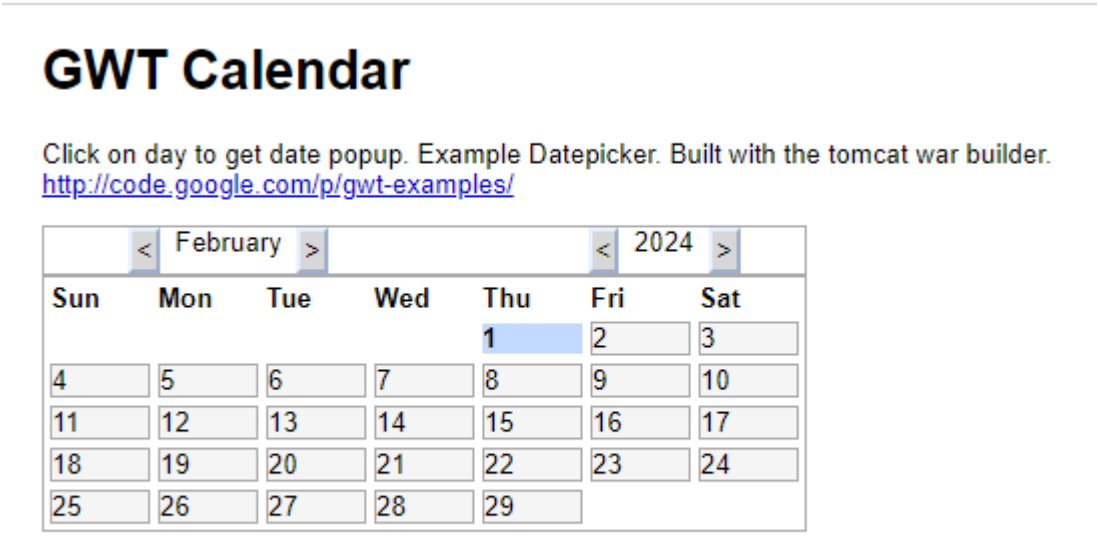
Now 3 times next-> the submit



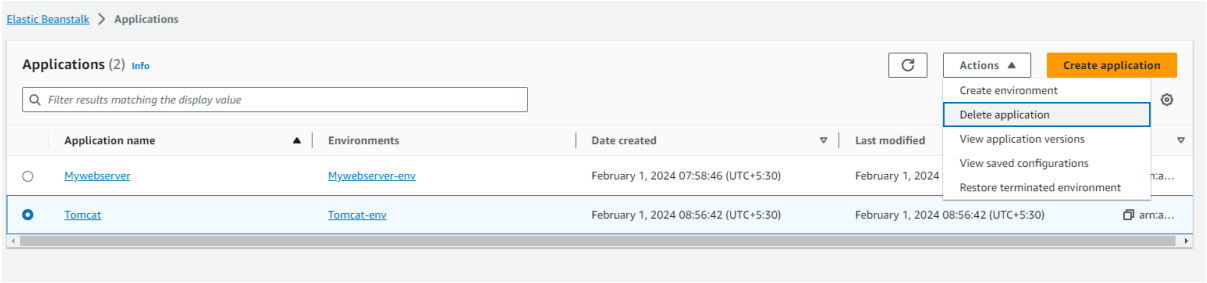
After launched, click on the domain name



Must get this



After this delete the app



In home page select console from services, view all services, S3 from storage down, then delete the bucket