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Hashu Advani Memorial Complex, Collector Colony, Chembur East, Mumbai - 400074.

Department of Information Technology A.Y. 2024-25

Advance DevOps Lab
Experiment 02

Aim: To Build Your Application using AWS CodeBuild and Deploy on S3 / SEBS using AWS CodePipeline, deploy Sample Application on EC2 instance using AWS CodeDeploy.

Roll No.	53
Name	Aryan Deepak Saraf
Class	D15B
Subject	Advance DevOps Lab
LO Mapped	LO1: To understand the fundamentals of Cloud Computing and be fully proficient with Cloud based DevOps solution deployment options to meet your business requirements.
Grade:	

AIM : To Build Your Application using AWS CodeBuild and Deploy on S3 / SEBS using AWS CodePipeline, deploy Sample Application on EC2 instance using AWS CodeDeploy.

THEORY :

Continuous deployment is a key practice in modern DevOps, enabling organizations to streamline their software release process by automating the deployment of application updates. It allows for the seamless delivery of code revisions to production environments without requiring explicit approval from a developer, thereby reducing time-to-market and enhancing the overall efficiency of the development lifecycle.

AWS CodePipeline is a continuous integration and continuous delivery (CI/CD) service that facilitates the building, testing, and deployment of code whenever there is a change in the source code repository. By automating these steps, CodePipeline ensures that new features, bug fixes, and updates are reliably and consistently delivered to users.

One of the critical components of a continuous deployment pipeline is the deployment environment, which is typically made up of virtual servers or containers that host the application.

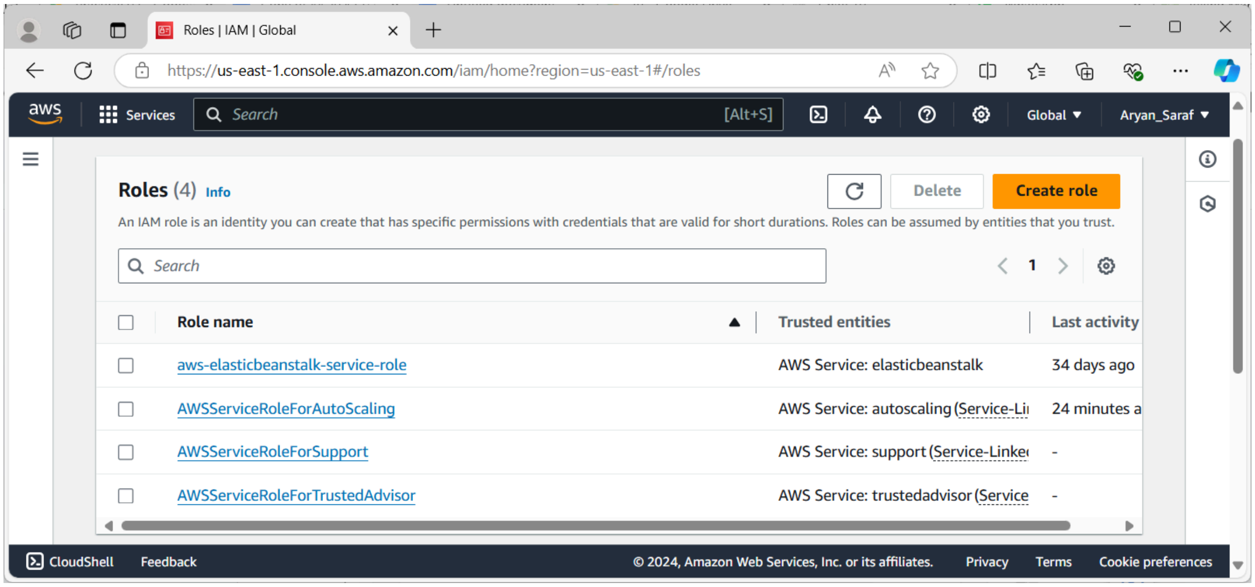
Amazon Elastic Beanstalk (EBS) is a Platform as a Service (PaaS) offering that simplifies the deployment and management of applications in the cloud. It abstracts the underlying infrastructure, such as EC2 instances, load balancers, and scaling configurations, allowing developers to focus on writing code without worrying about provisioning and maintaining the infrastructure.

In a typical AWS CodePipeline workflow, the source code for an application is stored in a version control system like GitHub, an S3 bucket, or AWS CodeCommit. The pipeline monitors this source repository for changes and triggers a series of automated actions whenever a change is detected. These actions might include building the application, running automated tests, and finally deploying the code to a live environment.

The deployment target in this setup could be an Amazon EC2 instance managed by Elastic Beanstalk, which takes care of the deployment details like setting up the necessary resources, deploying the code, and ensuring that the application is running smoothly. This integration with Elastic Beanstalk offers an out-of-the-box deployment solution that is both scalable and resilient.

AWS CodePipeline's integration with Elastic Beanstalk ensures that every code change goes through a consistent deployment process, thereby minimizing human errors and ensuring that the application remains stable and reliable. This automated process not only accelerates the development cycle but also improves the quality of the software by providing immediate feedback on the code's performance in a production-like environment.

Create a role in an IAM.



Roles | IAM | Global
https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles
aws
Services
Search
[Alt+S]
Global
Aryan_Saraf

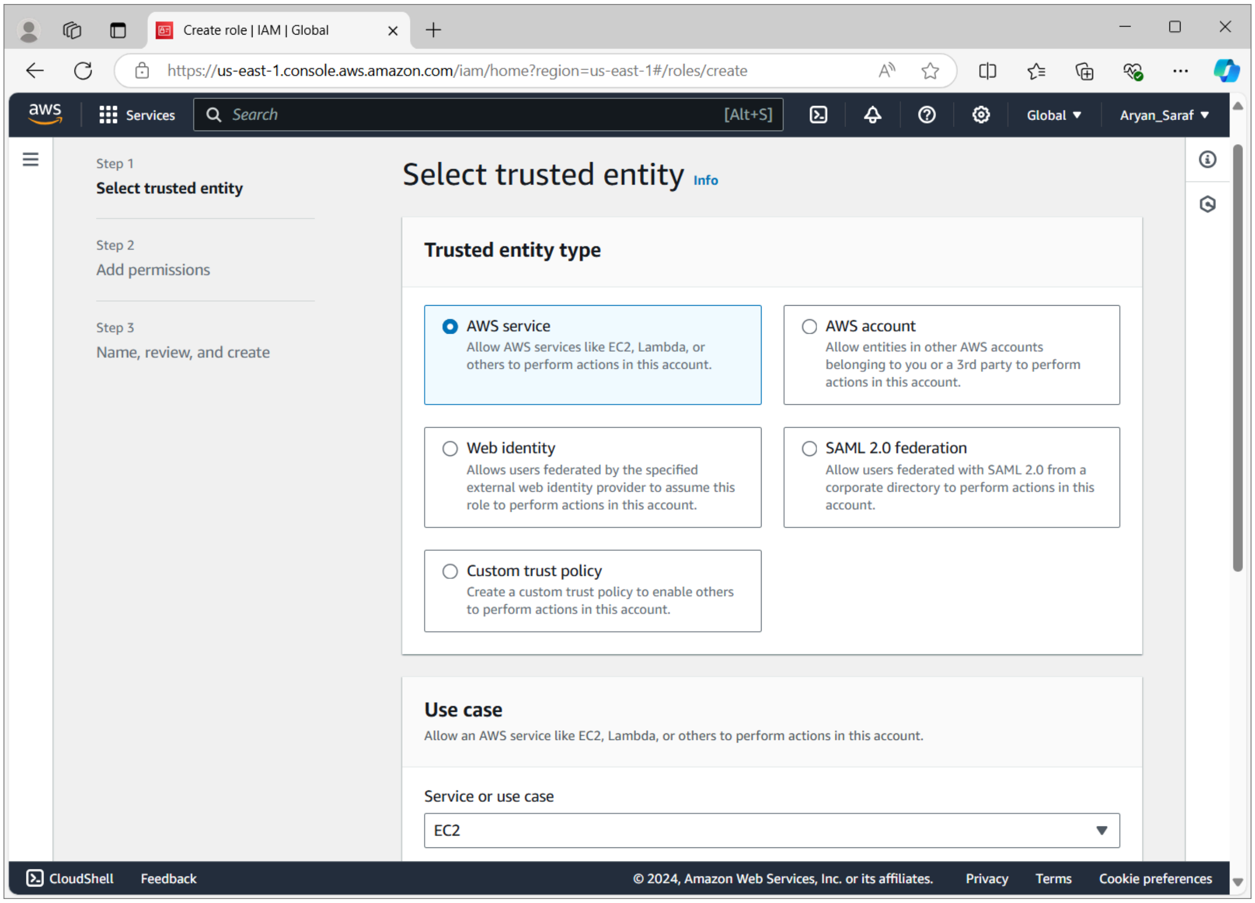
Roles (4) Info

Delete Create role

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.

□	Role name	Trusted entities	Last activity
□	aws-elasticbeanstalk-service-role	AWS Service: elasticbeanstalk	34 days ago
□	AWSServiceRoleForAutoScaling	AWS Service: autoscaling (Service-Li	24 minutes a
□	AWSServiceRoleForSupport	AWS Service: support (Service-Linke	-
□	AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service	-

Add EC2 for a service or use case.



Create role | IAM | Global
https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles/create
aws
Services
Search
[Alt+S]
Global
Aryan_Saraf

Step 1
Select trusted entity

Step 2
Add permissions

Step 3
Name, review, and create

Select trusted entity Info

Trusted entity type

● AWS service
Allow AWS services like EC2, Lambda, or others to perform actions in this account.

○ AWS account
Allow 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
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.

○ Custom trust policy
Create a custom trust policy to enable others to perform actions in this account.

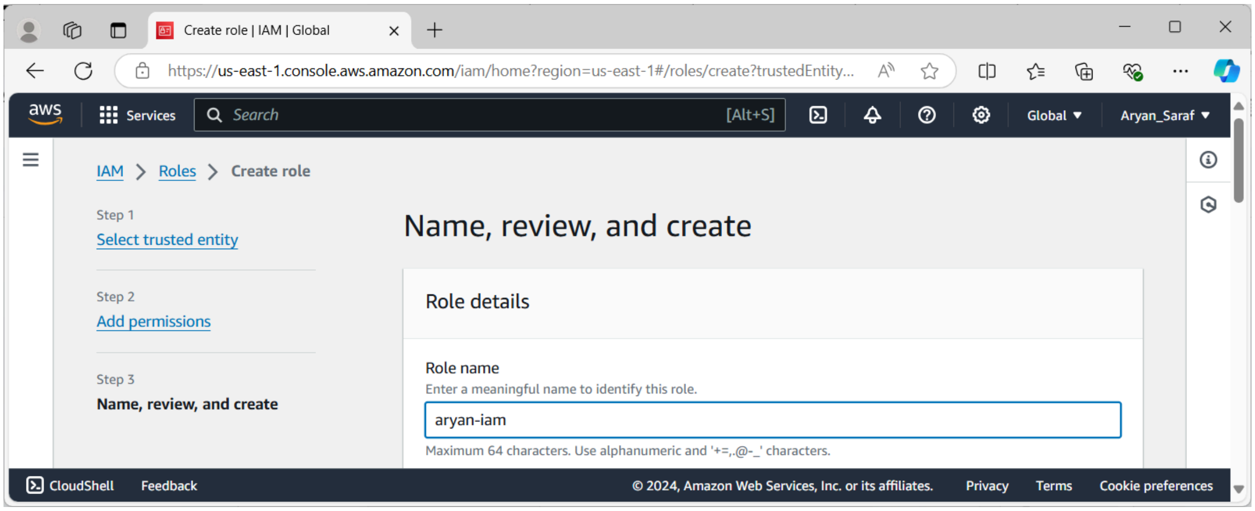
Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

Service or use case

EC2

Give name to the role.


Create role | IAM | Global
https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles/create?trustedEntity...
aws
Services
Search
[Alt+S]
Global
Aryan_Saraf
IAM > Roles > Create role
Step 1
Select trusted entity
Step 2
Add permissions
Step 3
Name, review, and create
CloudShell
Feedback
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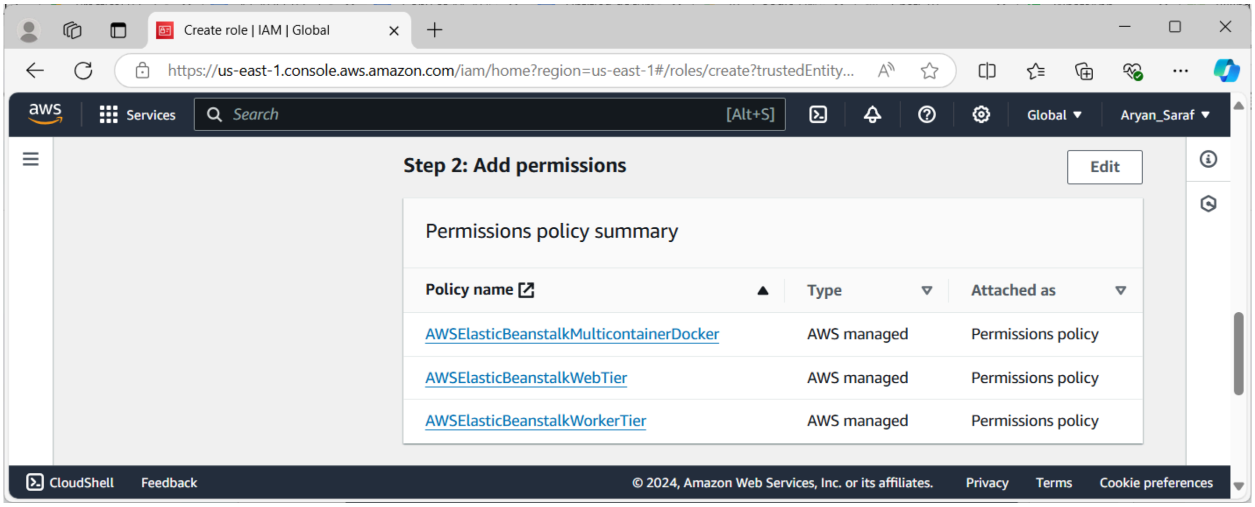
Name, review, and create

Role details

Role name
Enter a meaningful name to identify this role.
aryan-iam
Maximum 64 characters. Use alphanumeric and '+=,.@-_' characters.

Required policies (permissions) to be added while creating IAM user.


Create role | IAM | Global
https://us-east-1.console.aws.amazon.com/iam/home?region=us-east-1#/roles/create?trustedEntity...
aws
Services
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Global
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Edit
CloudShell
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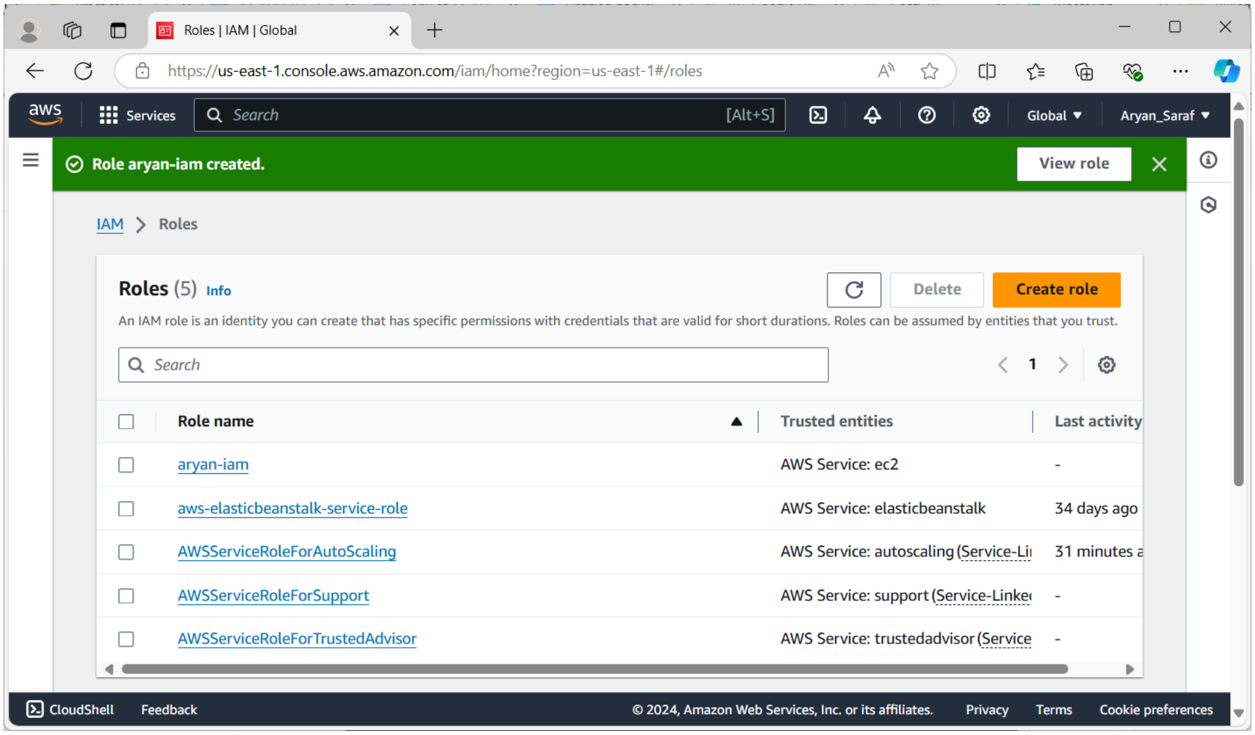
Step 2: Add permissions

Permissions policy summary

Policy name	Type	Attached as
AWSElasticBeanstalkMulticontainerDocker	AWS managed	Permissions policy
AWSElasticBeanstalkWebTier	AWS managed	Permissions policy
AWSElasticBeanstalkWorkerTier	AWS managed	Permissions policy

IAM role is being created



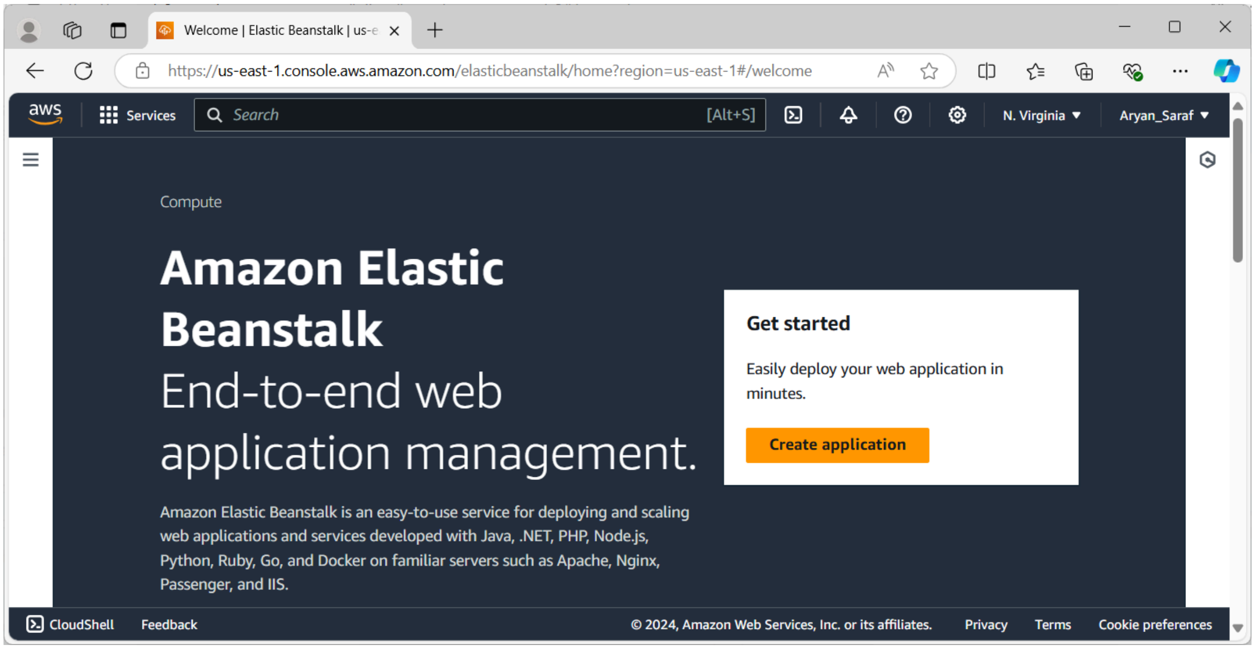
Role aryan-iam created.

Roles (5) Info

An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.

	Role name	Trusted entities	Last activity
□	aryan-iam	AWS Service: ec2	-
□	aws-elasticbeanstalk-service-role	AWS Service: elasticbeanstalk	34 days ago
□	AWSServiceRoleForAutoScaling	AWS Service: autoscaling (Service-Li	31 minutes a
□	AWSServiceRoleForSupport	AWS Service: support (Service-Linke	-
□	AWSServiceRoleForTrustedAdvisor	AWS Service: trustedadvisor (Service	-

Go to the Elastic beanstalk and create an application.


Welcome | Elastic Beanstalk | us-e
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/welcome
aws
Services
Search
[Alt+S]
N. Virginia ▼
Aryan_Saraf ▼
Get started
Create application
CloudShell
Feedback
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Compute

Amazon Elastic Beanstalk

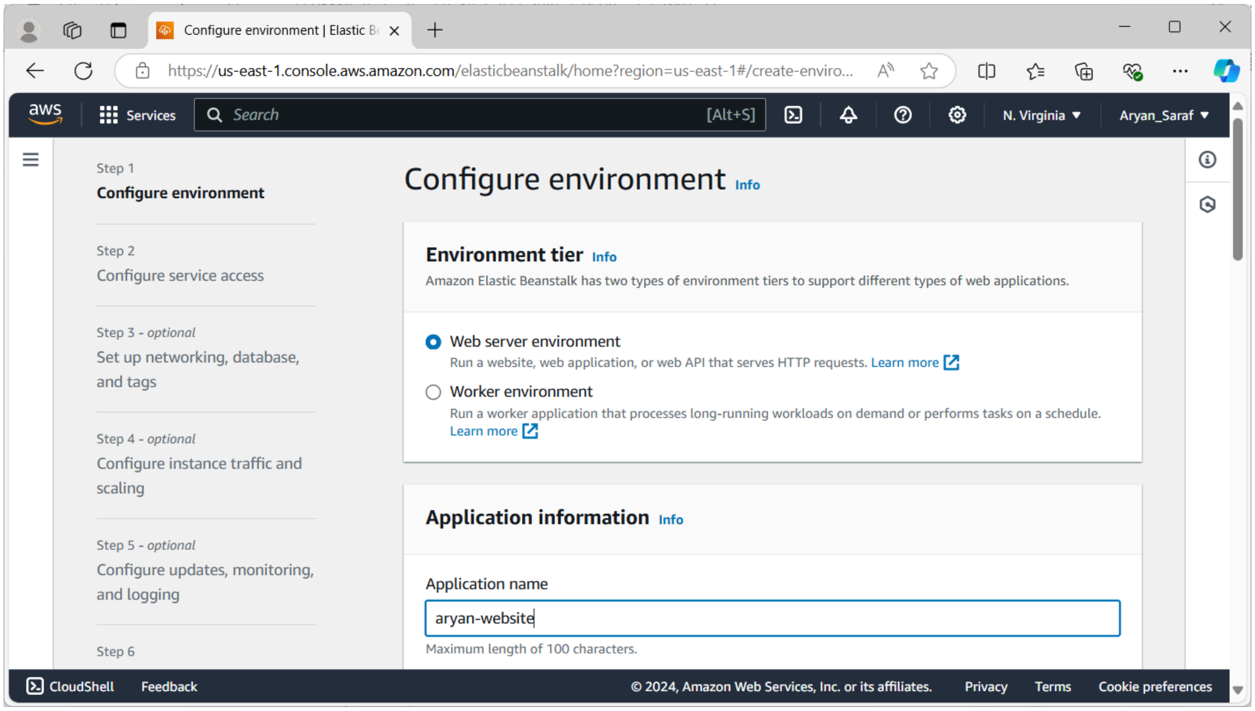
End-to-end web application management.

Amazon Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.

Get started

Easily deploy your web application in minutes.

Give the appropriate name for the application.


Configure environment | Elastic Be
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/create-enviro...
aws
Services
Search
[Alt+S]
N. Virginia ▼
Aryan_Saraf ▼
Step 1
Configure environment
Step 2
Configure service access
Step 3 - optional
Set up networking, database, and tags
Step 4 - optional
Configure instance traffic and scaling
Step 5 - optional
Configure updates, monitoring, and logging
Step 6
CloudShell
Feedback
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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

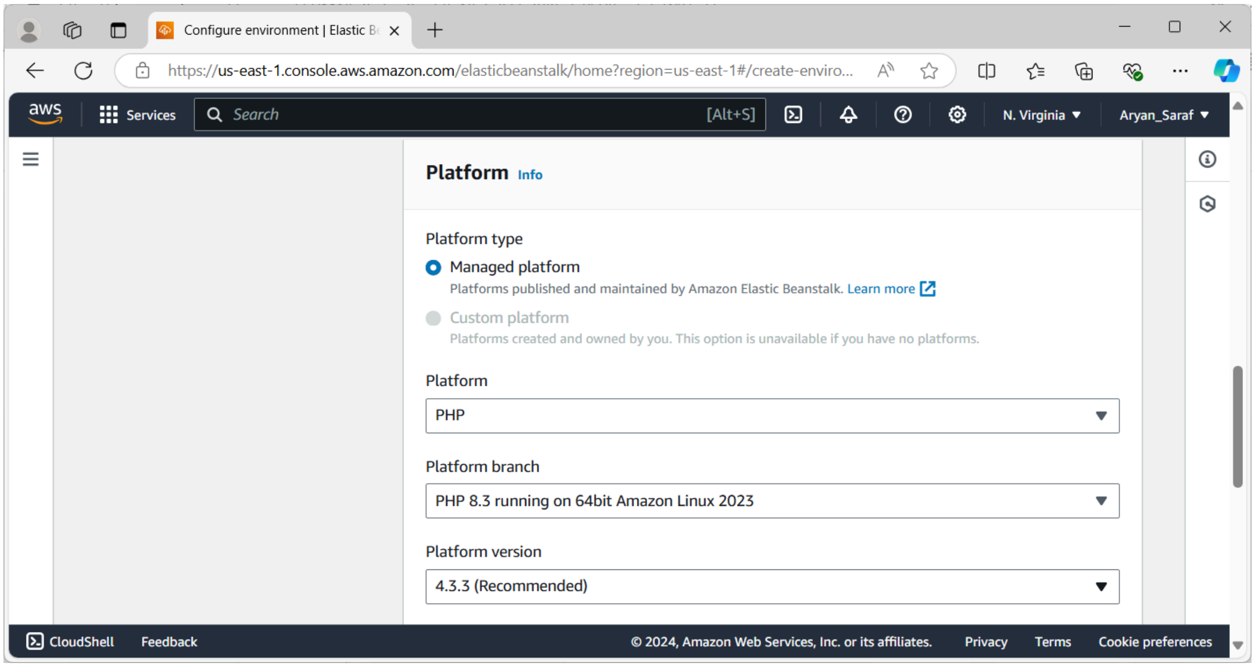
○ Worker environment
Run a worker application that processes long-running workloads on demand or performs tasks on a schedule. Learn more

Application information Info

Application name: aryan-website

Maximum length of 100 characters.

Select the platform as PHP.



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.

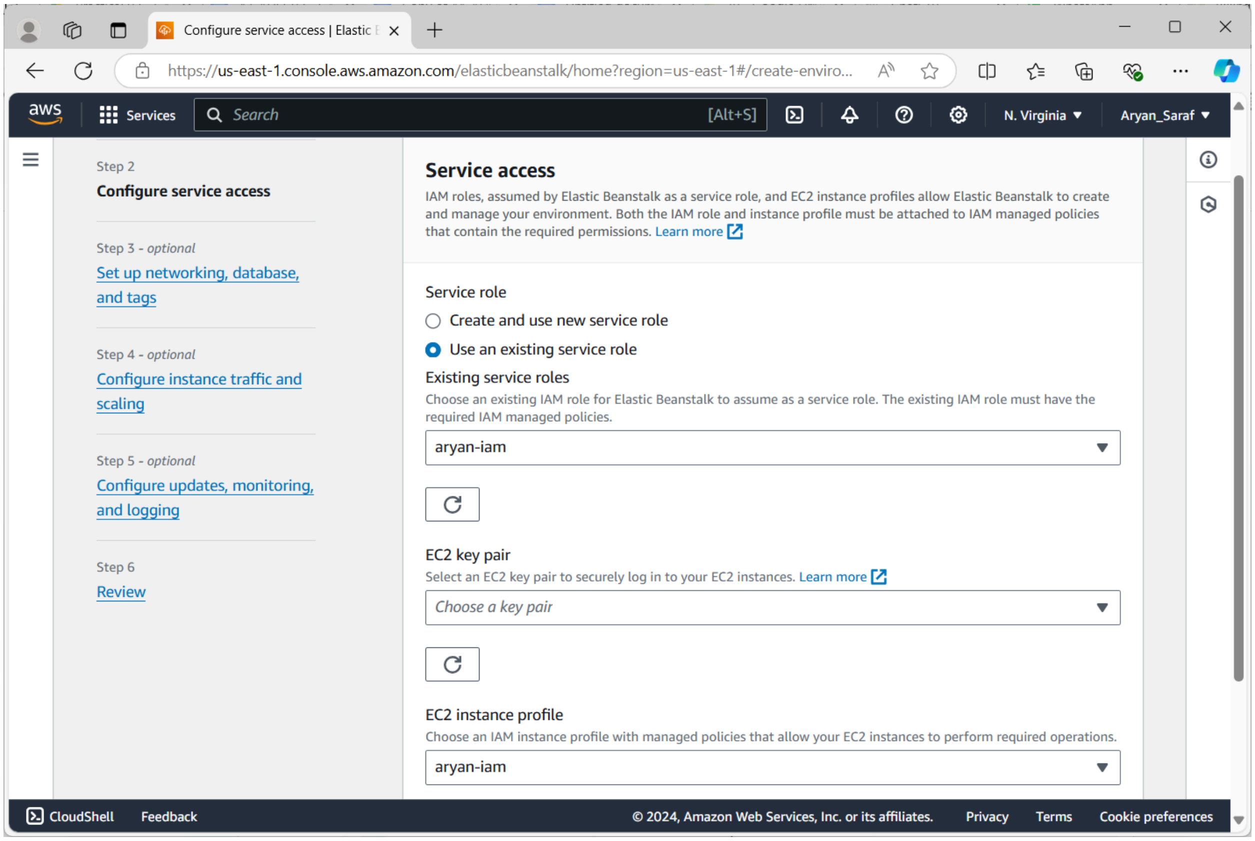
Platform: PHP

Platform branch: PHP 8.3 running on 64bit Amazon Linux 2023

Platform version: 4.3.3 (Recommended)

Configure environment | Elastic Be
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/create-enviro...
Services
Search [Alt+S]
N. Virginia
Aryan_Saraf
CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

In an ec2 instance profile, select the created IAM role.



Step 2
Configure service access

Step 3 - optional
Set up networking, database, and tags

Step 4 - optional
Configure instance traffic and scaling

Step 5 - optional
Configure updates, monitoring, and logging

Step 6
Review

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.

aryan-iam

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

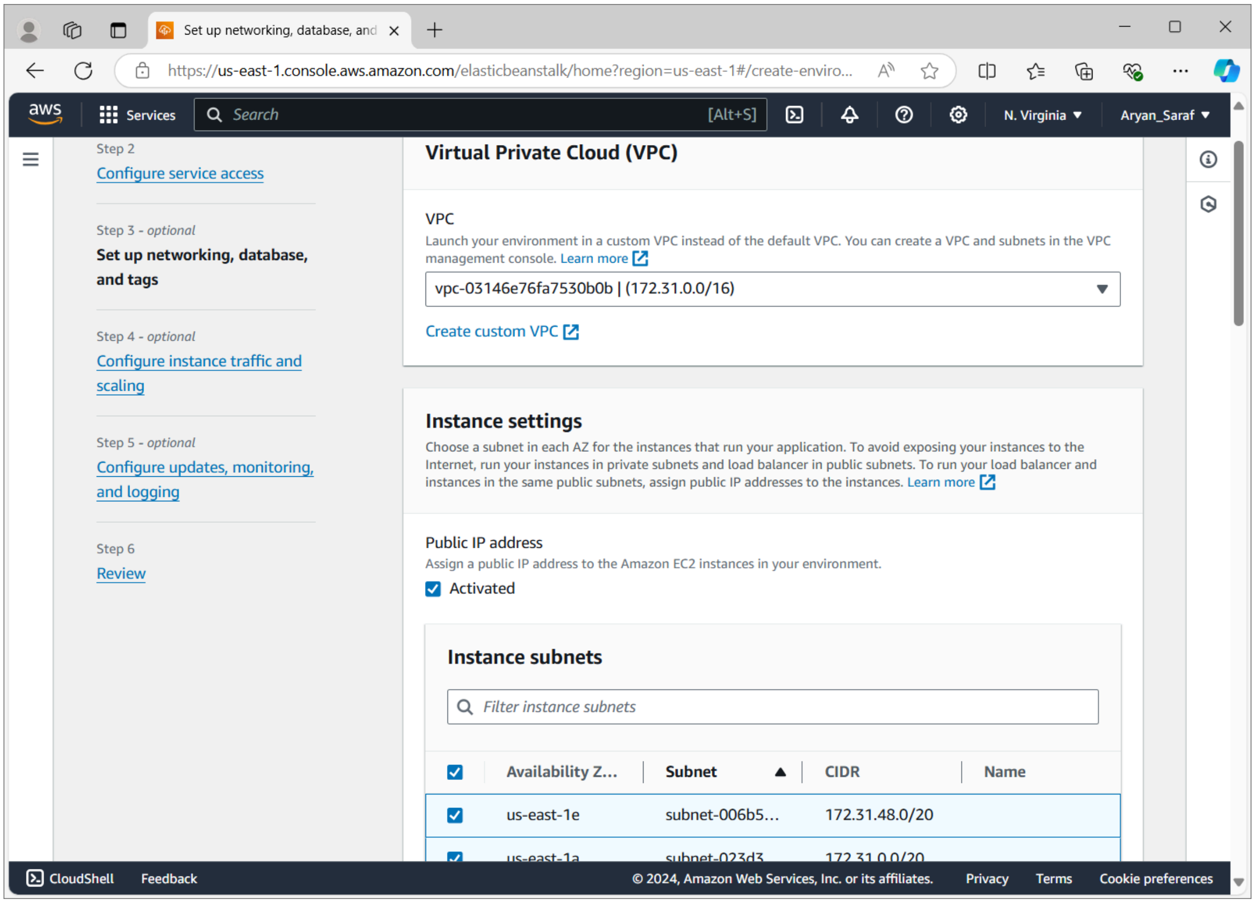
Choose a key pair

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

aryan-iam

Configure service access | Elastic E
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/create-enviro...
Services
Search [Alt+S]
N. Virginia
Aryan_Saraf
CloudShell Feedback © 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Vpc is to be selected. Public IP address and availability is to be checked.



Set up networking, database, and
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/create-enviro...
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Step 2
Configure service access
Step 3 - optional
Set up networking, database, and tags
Step 4 - optional
Configure instance traffic and scaling
Step 5 - optional
Configure updates, monitoring, and logging
Step 6
Review
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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

vpc-03146e76fa7530b0b | (172.31.0.0/16)

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.

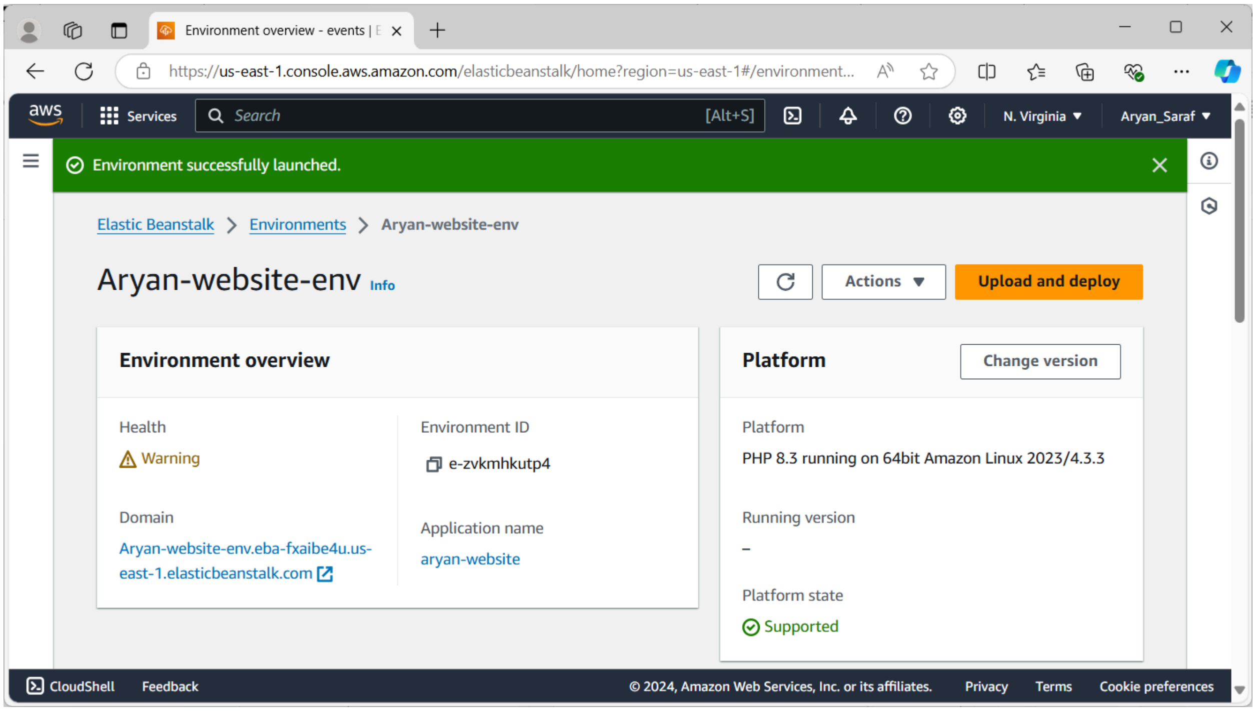
☑ Activated

Instance subnets

Filter instance subnets

☑	Availability Z...	Subnet ▲	CIDR	Name
☑	us-east-1e	subnet-006b5...	172.31.48.0/20	
☑	us-east-1a	subnet-023d3	172.31.0.0/20	

Environment is launched successfully.



Environment successfully launched.

Aryan-website-env

Environment overview

Health: Warning

Environment ID: e-zvkmhkutp4

Domain: Aryan-website-env.eba-fxaibe4u.us-east-1.elasticbeanstalk.com

Application name: aryan-website

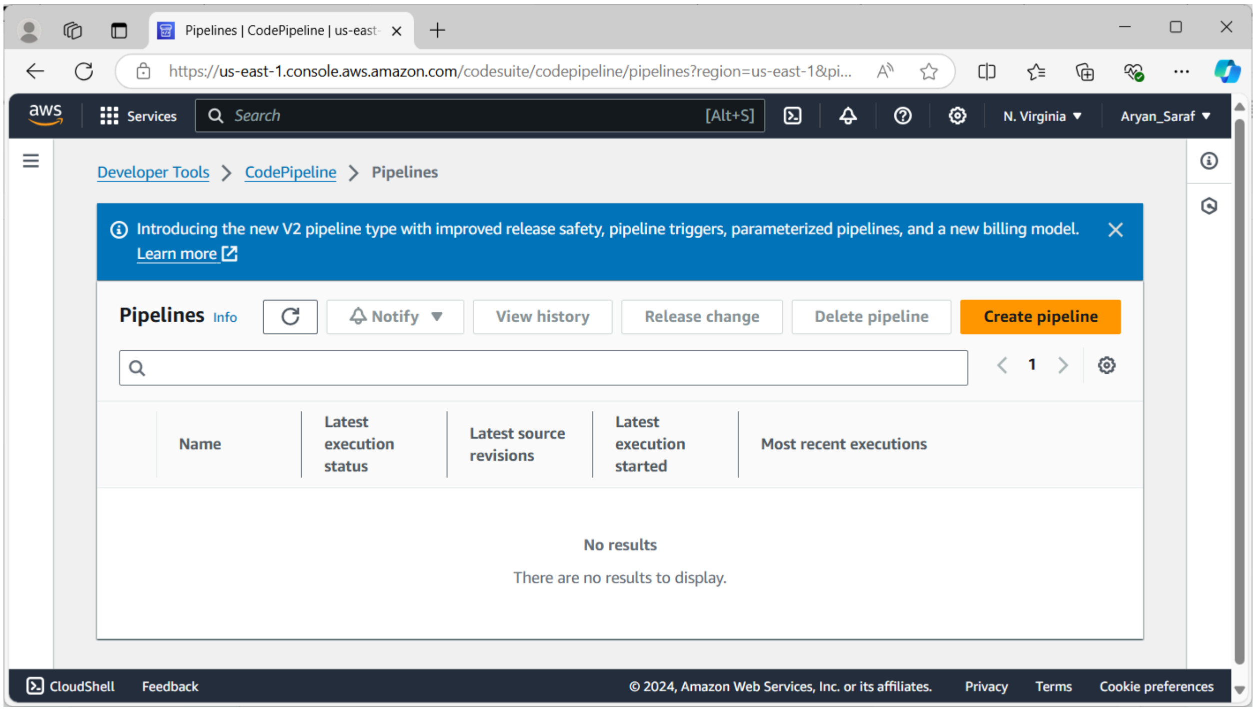
Platform

Platform: PHP 8.3 running on 64bit Amazon Linux 2023/4.3.3

Running version: –

Platform state: Supported

Go to the CodePipeline.



Developer Tools > CodePipeline > Pipelines

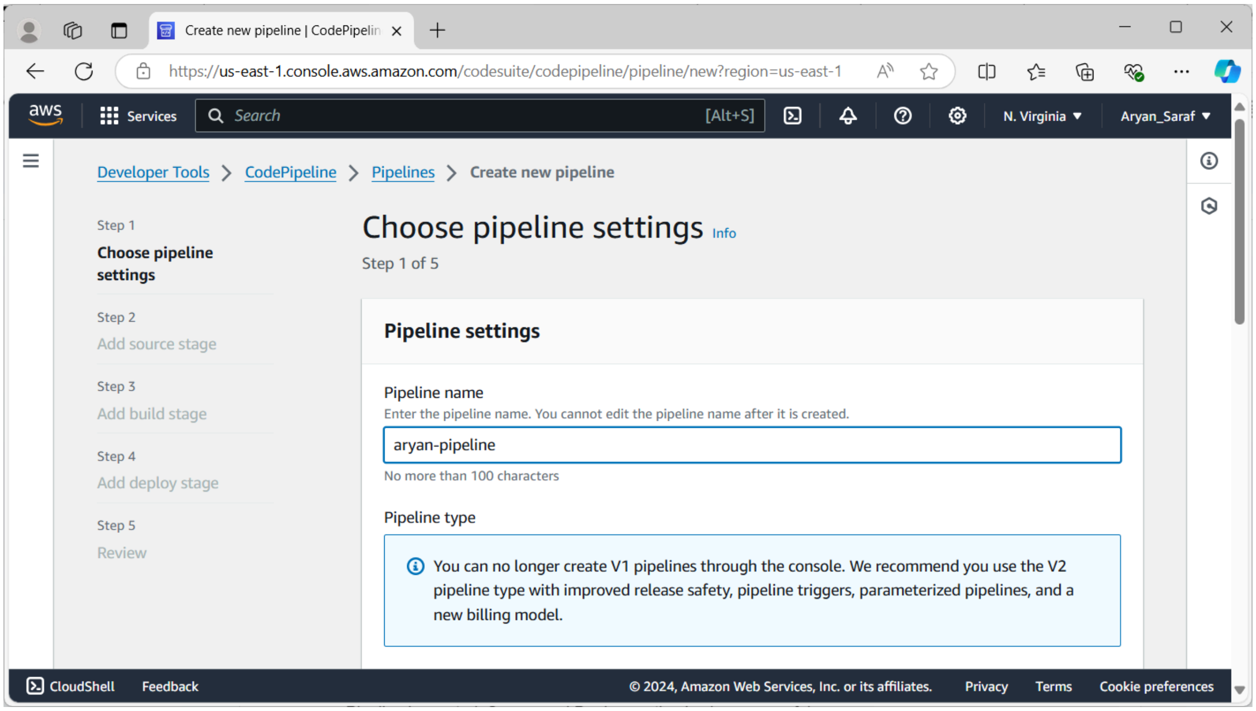
Introducing the new V2 pipeline type with improved release safety, pipeline triggers, parameterized pipelines, and a new billing model. Learn more

Name	Latest execution status	Latest source revisions	Latest execution started	Most recent executions

No results

There are no results to display.

Give name to the pipeline.



Developer Tools > CodePipeline > Pipelines > Create new pipeline

Choose pipeline settings Info

Step 1 of 5

Pipeline settings

Pipeline name

Enter the pipeline name. You cannot edit the pipeline name after it is created.

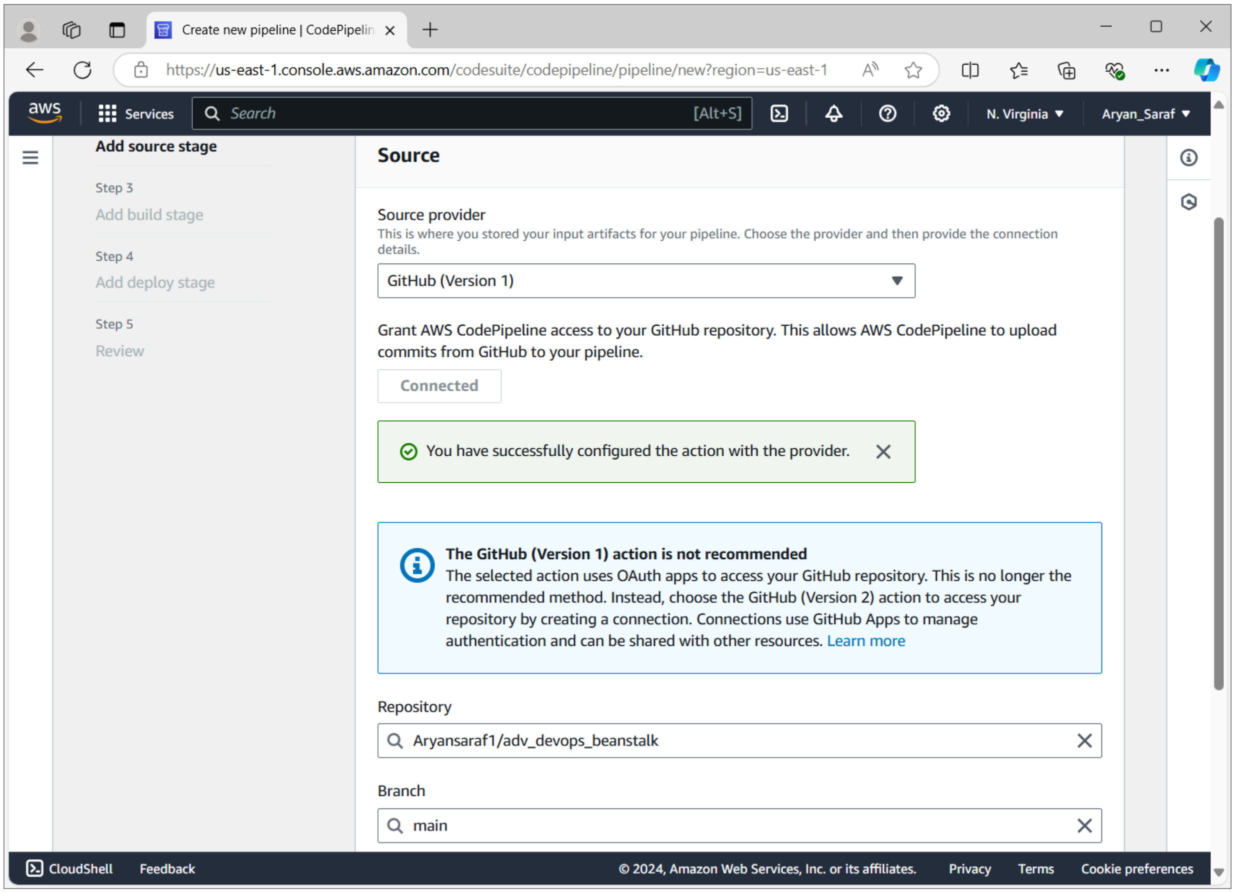
aryan-pipeline

No more than 100 characters

Pipeline type

You can no longer create V1 pipelines through the console. We recommend you use the V2 pipeline type with improved release safety, pipeline triggers, parameterized pipelines, and a new billing model.

Select the source as GitHub (version 1)


Create new pipeline | CodePipelin
https://us-east-1.console.aws.amazon.com/codesuite/codepipeline/pipeline/new?region=us-east-1
aws
Services
Search
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N. Virginia
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Add source stage
Step 3
Add build stage
Step 4
Add deploy stage
Step 5
Review
CloudShell
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Source

Source provider
This is where you stored your input artifacts for your pipeline. Choose the provider and then provide the connection details.
GitHub (Version 1)

Grant AWS CodePipeline access to your GitHub repository. This allows AWS CodePipeline to upload commits from GitHub to your pipeline.
Connected

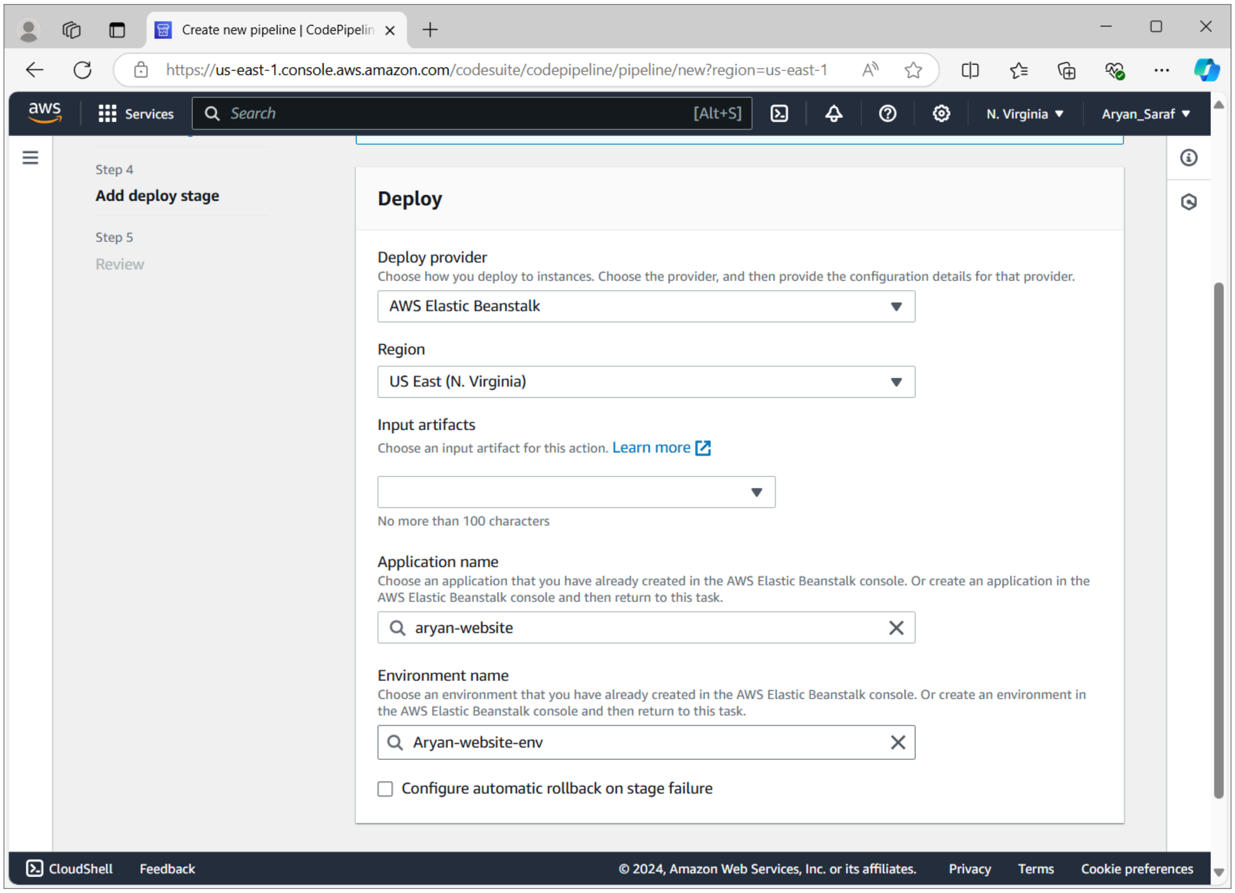
You have successfully configured the action with the provider.

The GitHub (Version 1) action is not recommended
The selected action uses OAuth apps to access your GitHub repository. This is no longer the recommended method. Instead, choose the GitHub (Version 2) action to access your repository by creating a connection. Connections use GitHub Apps to manage authentication and can be shared with other resources. Learn more

Repository: Aryansaraf1/adv_devops_beanstalk

Branch: main

After skipping the build stage, AWS Elastic beanstalk is to be selected in the Deploy Provider. Select your recently created application name and environment name.


Create new pipeline | CodePipelin
https://us-east-1.console.aws.amazon.com/codesuite/codepipeline/pipeline/new?region=us-east-1
aws
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Step 4
Add deploy stage
Step 5
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Deploy

Deploy provider
Choose how you deploy to instances. Choose the provider, and then provide the configuration details for that provider.
AWS Elastic Beanstalk

Region
US East (N. Virginia)

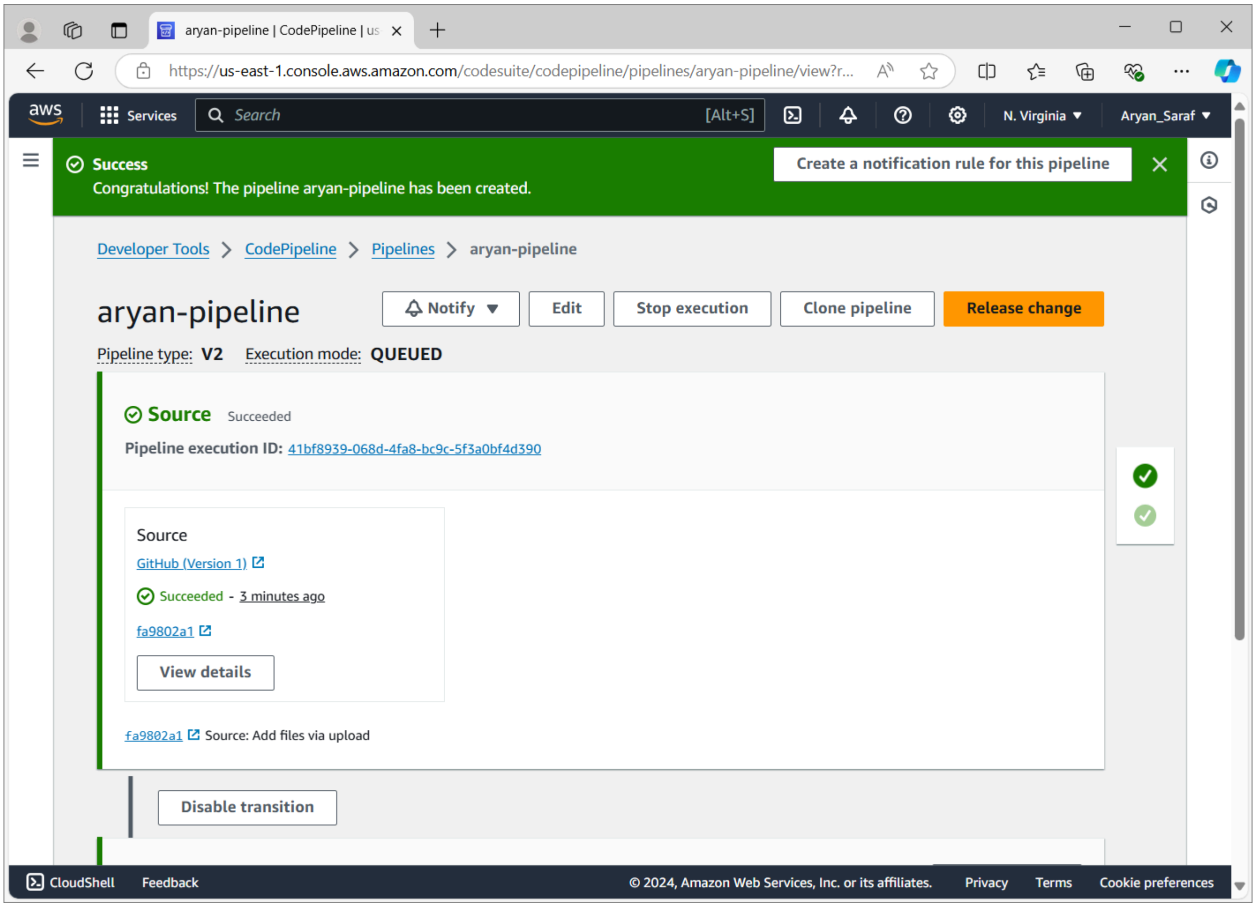
Input artifacts
Choose an input artifact for this action. Learn more
No more than 100 characters

Application name
Choose an application that you have already created in the AWS Elastic Beanstalk console. Or create an application in the AWS Elastic Beanstalk console and then return to this task.
aryan-website

Environment name
Choose an environment that you have already created in the AWS Elastic Beanstalk console. Or create an environment in the AWS Elastic Beanstalk console and then return to this task.
Aryan-website-env

☐ Configure automatic rollback on stage failure

Pipeline is created. Source and Deploy section is also successful.


aryan-pipeline | CodePipeline | us
https://us-east-1.console.aws.amazon.com/codesuite/codepipeline/pipelines/aryan-pipeline/view?r...
aws
Services
Search
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N. Virginia
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Create a notification rule for this pipeline
Developer Tools > CodePipeline > Pipelines > aryan-pipeline
Notify
Edit
Stop execution
Clone pipeline
Release change
View details
Disable transition
CloudShell
Feedback
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Success
Congratulations! The pipeline aryan-pipeline has been created.

aryan-pipeline

Pipeline type: V2 Execution mode: QUEUED

Source Succeeded

Pipeline execution ID: 41bf8939-068d-4fa8-bc9c-5f3a0bf4d390

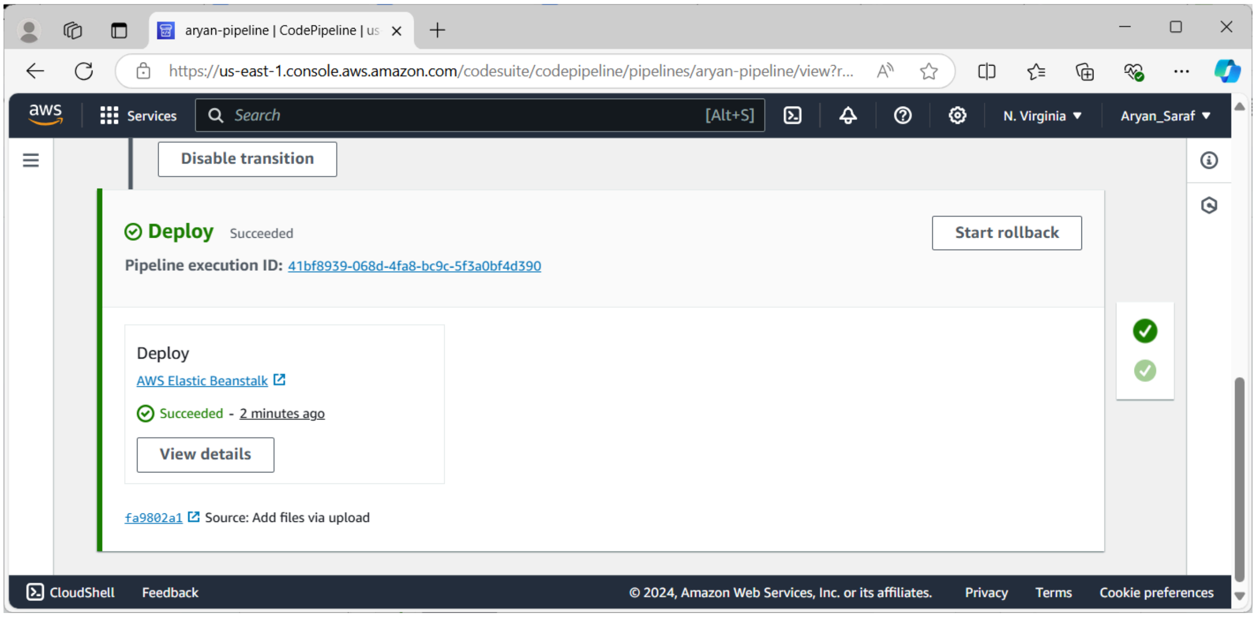
Source

GitHub (Version 1)

Succeeded - 3 minutes ago

fa9802a1

fa9802a1 Source: Add files via upload


aryan-pipeline | CodePipeline | us
https://us-east-1.console.aws.amazon.com/codesuite/codepipeline/pipelines/aryan-pipeline/view?r...
aws
Services
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N. Virginia
Aryan_Saraf
Disable transition
Start rollback
View details
CloudShell
Feedback
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Deploy Succeeded

Pipeline execution ID: 41bf8939-068d-4fa8-bc9c-5f3a0bf4d390

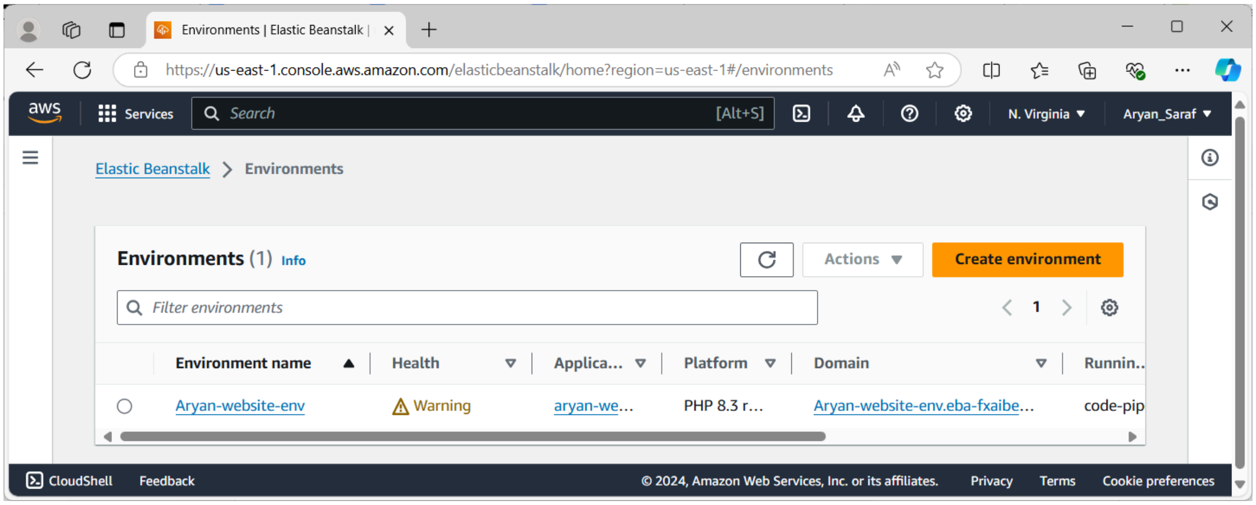
Deploy

AWS Elastic Beanstalk

Succeeded - 2 minutes ago

fa9802a1 Source: Add files via upload

Go to the elastic beanstalk environment and click on domain.


Environments | Elastic Beanstalk
https://us-east-1.console.aws.amazon.com/elasticbeanstalk/home?region=us-east-1#/environments
aws
Services
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N. Virginia
Aryan_Saraf
Elastic Beanstalk > Environments
Actions
Create environment
Filter environments
CloudShell
Feedback
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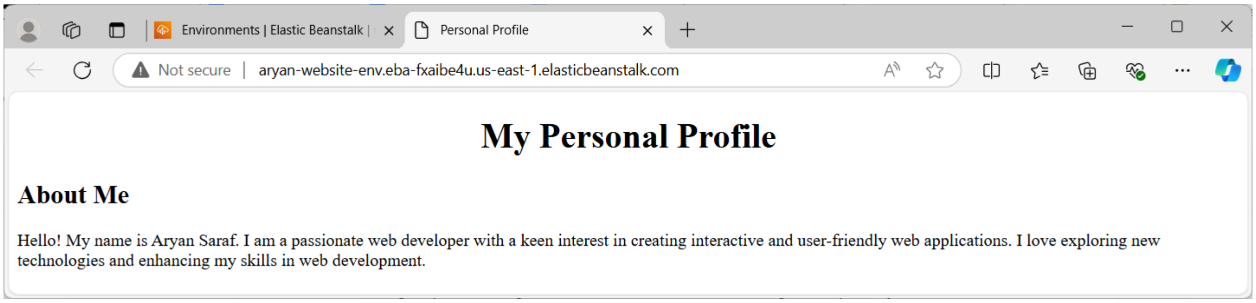
Environments (1) Info

	Environment name	Health	Applica...	Platform	Domain	Runnin..
○	Aryan-website-env	⚠ Warning	aryan-we...	PHP 8.3 r...	Aryan-website-env.eba-fxaibe...	code-pip

Following output is to be generated of the code which is in the github repository.

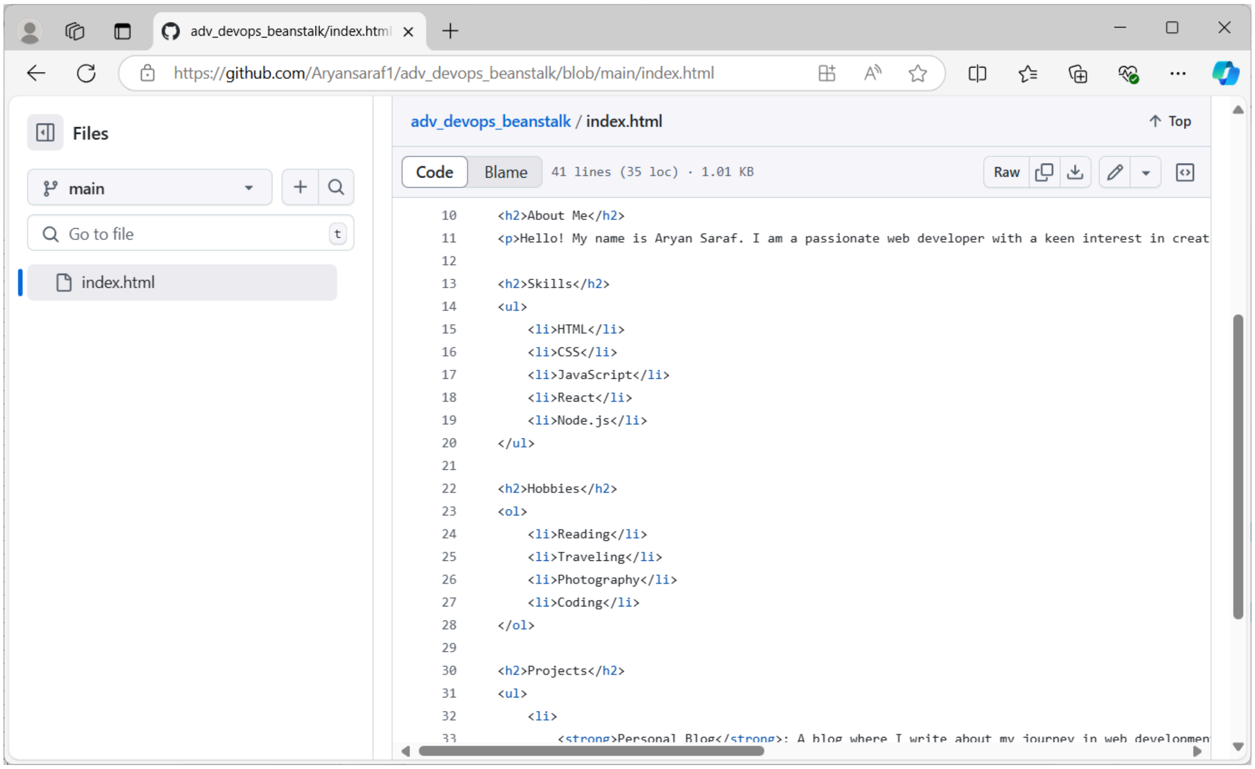

Environments | Elastic Beanstalk
Personal Profile
Not secure
aryan-website-env.eba-fxaibe4u.us-east-1.elasticbeanstalk.com

My Personal Profile

About Me

Hello! My name is Aryan Saraf. I am a passionate web developer with a keen interest in creating interactive and user-friendly web applications. I love exploring new technologies and enhancing my skills in web development.

Changes are done in the code of the Github repository and it is being directly deployed without any configurations.

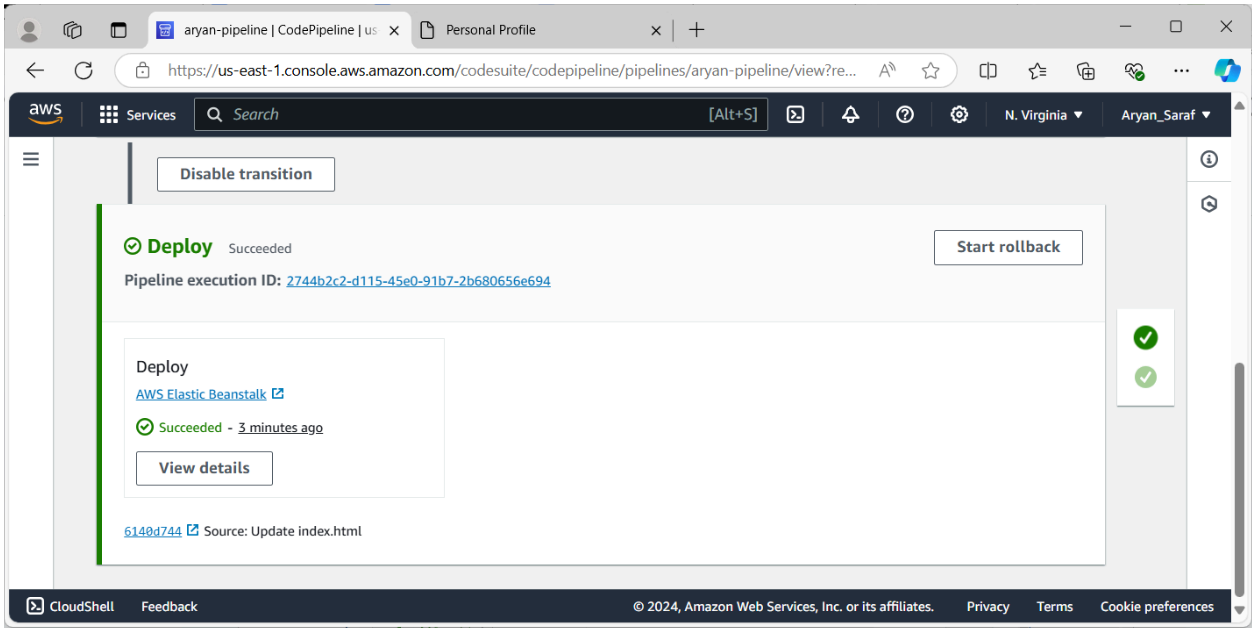

adv_devops_beanstalk/index.html
https://github.com/Aryansaraf1/adv_devops_beanstalk/blob/main/index.html
Files
main
Go to file
t
index.html
adv_devops_beanstalk / index.html
Top
Code
Blame
41 lines (35 loc) · 1.01 KB
Raw

```
<h2>About Me</h2>
<p>Hello! My name is Aryan Saraf. I am a passionate web developer with a keen interest in creat

<h2>Skills</h2>
<ul>
    <li>HTML</li>
    <li>CSS</li>
    <li>JavaScript</li>
    <li>React</li>
    <li>Node.js</li>
</ul>

<h2>Hobbies</h2>
<ol>
    <li>Reading</li>
    <li>Traveling</li>
    <li>Photography</li>
    <li>Coding</li>
</ol>

<h2>Projects</h2>
<ul>
    <li>
        <strong>Personal Blog</strong>: A blog where I write about my journey in web developmen
```


aryan-pipeline | CodePipeline | us
Personal Profile
https://us-east-1.console.aws.amazon.com/codesuite/codepipeline/pipelines/aryan-pipeline/view?re...
aws
Services
Search
[Alt+S]
N. Virginia
Aryan_Saraf
Disable transition
Start rollback
View details
CloudShell
Feedback
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Deploy Succeeded

Pipeline execution ID: 2744b2c2-d115-45e0-91b7-2b680656e694

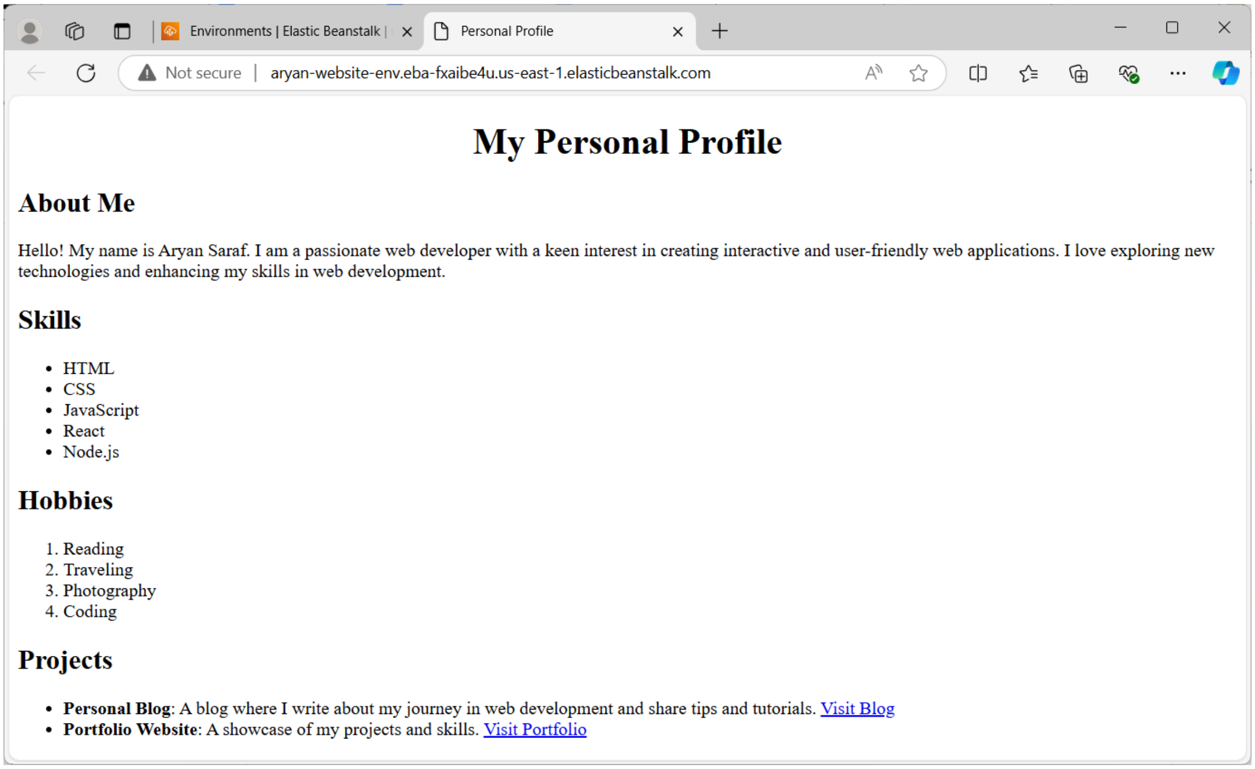
Deploy

AWS Elastic Beanstalk

Succeeded - 3 minutes ago

6140d744 Source: Update index.html

Changes are to be reflected.


Environments | Elastic Beanstalk |
Personal Profile
Not secure
aryan-website-env.eba-fxaibe4u.us-east-1.elasticbeanstalk.com

My Personal Profile

About Me

Hello! My name is Aryan Saraf. I am a passionate web developer with a keen interest in creating interactive and user-friendly web applications. I love exploring new technologies and enhancing my skills in web development.

Skills

- HTML
- CSS
- JavaScript
- React
- Node.js

Hobbies

1. Reading
2. Traveling
3. Photography
4. Coding

Projects

- **Personal Blog**: A blog where I write about my journey in web development and share tips and tutorials. Visit Blog
- **Portfolio Website**: A showcase of my projects and skills. Visit Portfolio

CONCLUSION :

Continuous deployment using AWS CodePipeline and Elastic Beanstalk represents a powerful approach to modern software development, where automation plays a crucial role in delivering high-quality software quickly and efficiently. This method supports the agile methodology by enabling rapid iterations and continuous improvements, leading to more responsive and innovative applications.