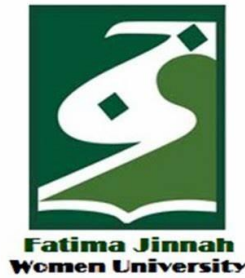


**CLOUD COMPUTING LAB**



**SUBMITTED TO**  
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**SUBMITTED BY**  
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2023-BSE-025

BSE V-A

## Lab 13

### Terraform IAM Management with AWS

#### Task 0 Lab Setup (Codespace & GH CLI)

- task0\_codespace\_create\_and\_list.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ gh codespace list
```

NAME	DISPLAY NAME	REPOSITORY	BRANCH	STATE	CREATED AT
refactored-acorn-...	refactored acorn	HamnaMahmood20/...	main	Available	about 1 minute ago

- task0\_codespace\_ssh\_connected.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ gh codespace ssh -c refactored-acorn-x5gwq9w4qvr6c9p6j
```

Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-1030-azure x86\_64)

\* Documentation: <https://help.ubuntu.com>  
\* Management: <https://landscape.canonical.com>  
\* Support: <https://ubuntu.com/pro>

The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/\*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $
```

#### Task 1 Create IAM Group and Output Details

- task1\_project\_directory.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ mkdir -p ~/Lab13
```

```
@HamnaMahmood20 →~ $ cd ~/Lab13
```

```
@HamnaMahmood20 →~/Lab13 $
```

- task1\_file\_created.png

```
@HamnaMahmood20 →~/Lab13 $ touch main.tf
```

```
@HamnaMahmood20 →~/Lab13 $ ls
```

```
main.tf
```

- task1\_main\_tf.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ touch main.tf
```

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ ls
```

```
main.tf
```

```
lab_13 > Task > main.tf > output "group_details"
1  provider "aws" {
2    shared_config_files    = ["~/.aws/config"]
3    shared_credentials_files = ["~/.aws/credentials"]
4  }
5
6  resource "aws_iam_group" "developers" {
```

- task1\_terraform\_init.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ terraform init
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

- task1\_terraform\_apply.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ terraform apply auto-approve
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:

group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
}
commands will detect it and remind you to do so if necessary.
```

- task1\_terraform\_output.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ terraform output
group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
```

- task1\_aws\_console\_group.png

### User groups (1) [Info](#)

A user group is a collection of IAM users. Use groups to specify permissions for a collection of users.

< 1 >
⚙️

<input type="checkbox"/>	Group name	▲	Users	▼	Permissions	▼	Creation time	▼
<input type="checkbox"/>	<a href="#">developers</a>				⚠️ 0	⚠️ Not defined	5 minutes ago	

## Task 2 – Create IAM User with Group Membership

- task2\_main\_tf\_user.png

```
Task > main.tf > output "user_details"
output "group_details" {
}

resource "aws_iam_user" "lb" {
  name = "loadbalancer"
  path = "/users/"
  force_destroy = true
  tags = {
    DisplayName = "Load Balancer"
  }
}
```

- task2\_terraform\_apply.png

```
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ terraform apply auto-approve
"group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
"group_name" = "developers"
"unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
}
user_details = {
  "unique_id" = "AIDA5WPGPNRI5E5P3HF3E"
  "user_arn" = "arn:aws:iam::941618064465:user/users/loadbalancer"
  "user_name" = "loadbalancer"
}
```

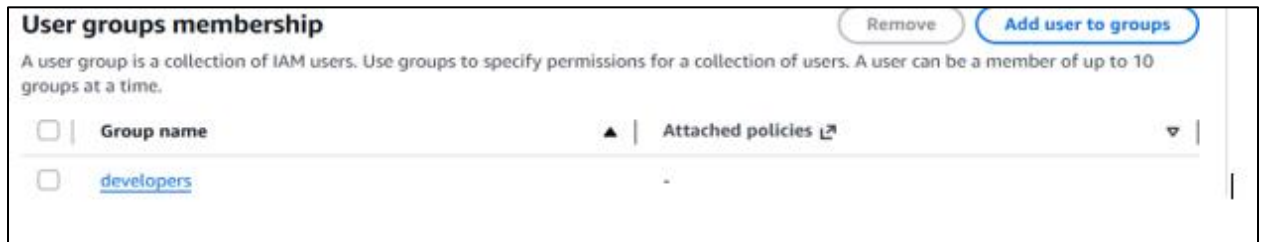
- task2\_terraform\_output.png

```
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ terraform output
group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
}
user_details = {
  "unique_id" = "AIDA5WPGPNRI5E5P3HF3E"
  "user_arn" = "arn:aws:iam::941618064465:user/users/loadbalancer"
  "user_name" = "loadbalancer"
}
```

- task2\_aws\_console\_user.png

Users (2) <a href="#">Info</a>							
An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.							
<input type="text" value="Search"/>							
<input type="checkbox"/>	User name	Path	Group	Last activity	MFA	Password age	
<input type="checkbox"/>	<a href="#">Admin</a>	/	0	13 minutes ago	-	9 days	
<input type="checkbox"/>	<a href="#">loadbalancer</a>	/users/	1	-	-	-	

- task2\_aws\_console\_user\_groups.png



### Task 3 – Attach Policies to IAM Group

- task3\_main\_tf\_policies.png

```
resource "aws_iam_group_policy_attachment" "developer_ec2_fullaccess" {
  group = aws_iam_group.developers.name
  policy_arn = "arn:aws:iam::aws:policy/AmazonEC2FullAccess"
```

- task3\_terraform\_apply.png

```
@HamnaMahmood20 → /workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve
Apply complete! Resources: 2 added, 0 changed, 0 destroyed.

Outputs:

group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPASWPGPNRTWSOVOPNE5"
```

- task3\_aws\_console\_policies.png

<input type="checkbox"/>	Policy name <a href="#">↗</a>	Type	Attached entities
<input type="checkbox"/>	<a href="#">AmazonEC2FullAccess</a>	AWS managed	<a href="#">1</a>
<input type="checkbox"/>	<a href="#">IAMUserChangePassword</a>	AWS managed	<a href="#">2</a>

### Task 4 – Create Login Profile for IAM User

- task4\_variables\_tf.png

```
Task > variables.tf > variable "iam_password"
variable "iam_password" {
  description = "Temporary password for the IAM user"
  type        = string
  sensitive   = true
  default     = "IdontKnow"
```

- task4\_create\_login\_script.png

```
lab_13 > Task > $ create-login-profile.sh
1  #!/usr/bin/env bash
2  set -euo pipefail
3
4  USERNAME="$1"
5  PASSWORD="$2"
```

- task4\_chmod\_script.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ chmod +x create-login-profile.sh
```

- task4\_terraform\_apply.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve -var="iam_password=MySecurePass123!"
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

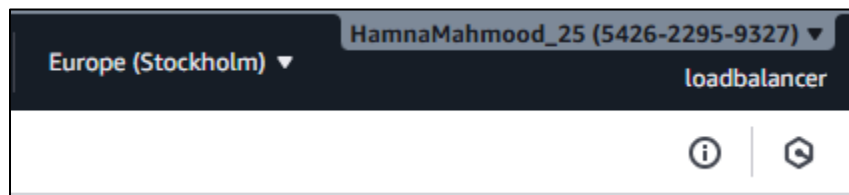
Outputs:

group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
```

- task4\_aws\_cli\_verify.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ aws iam get-login-profile --user-name loadbalancer
{
  "LoginProfile": {
    "UserName": "loadbalancer",
    "CreateDate": "2026-01-28T08:31:30+00:00",
    "PasswordResetRequired": true
```

- task4\_aws\_console\_login.png



- task4\_aws\_console\_password\_reset.png



#### Task 5- Generate Access Keys for IAM Users

- task5\_main\_tf\_access\_keys.png

```
lab_13 > Task > main.tf > ...
66 # Access key for IAM user
67 resource "aws_iam_access_key" "lb_access_key" {
68     user = aws_iam_user.lb.name
```

- task5\_terraform\_apply.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto
-approve -var="iam_password=MySecurePass123!"
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

- task5\_tfstate\_secret. Png

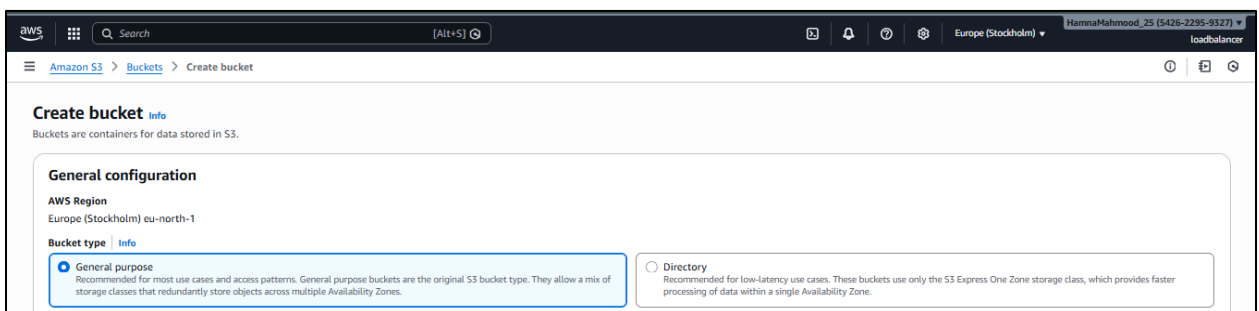
```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ cat terraform.tfstate
| grep -A 10 "access_key_secret"
  "access_key_secret": {
    "value": "09BbFIWKW7J5vRngwSzuIVZTiMkUXFtCMoBc9122",
    "type": "string",
    "sensitive": true
  },
  "group_details": {
    "value": {
      "group_arn": "arn:aws:iam::941618064465:group/groups/developers",
      "group_name": "developers",
      "unique_id": "AGPASWPGPNRIWSOVQPNE5"
```

- task5\_aws\_console\_access\_keys. Png

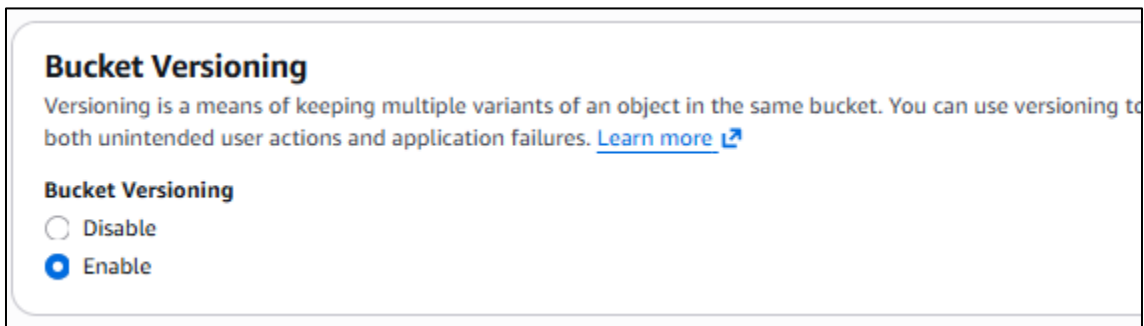
<b>AKIA5WPGPNRIYT2DNYFM</b>	
<b>Description</b>	<b>Status</b>
-	✓ Active
<b>Last used</b>	<b>Created</b>
None	6 minutes ago
<b>Last used region</b>	<b>Last used service</b>
N/A	N/A

## Task 6 – Implement Terraform State with S3

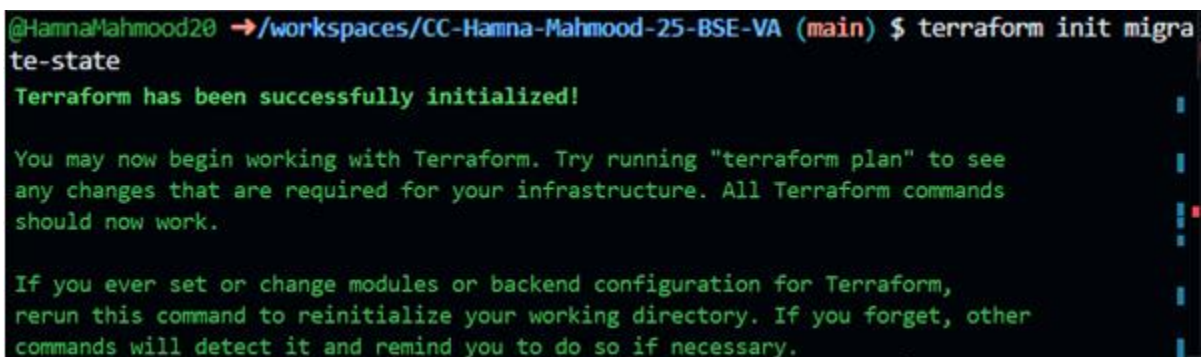
- task6\_s3\_bucket\_create.png



- task6\_s3\_bucket\_versioning.png



- task6\_terraform\_init\_migrate.png

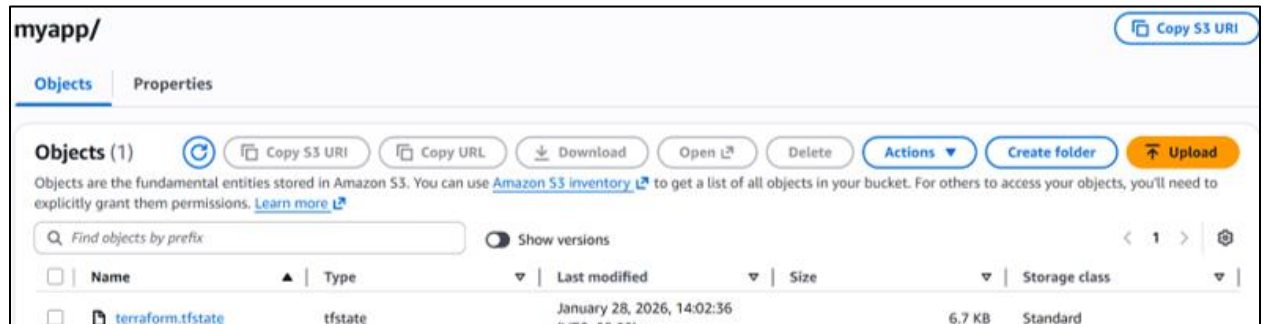


- task6\_terraform\_apply.png



```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto
-approve -var="iam_password=MySecurePass123!"
Apply complete! Resources: 0 added, 0 changed, 0 destroyed.
```

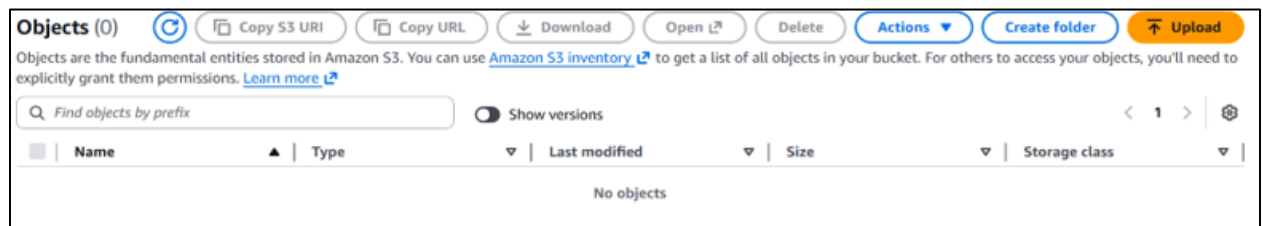
- task6\_s3\_tfstate\_file.png



- task6\_terraform\_destroy.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform destroy -auto
to-approve
aws_iam_group_policy_attachment.developer_ec2_fullaccess: Destruction complete after 1s
aws_iam_user_group_membership.lb_membership: Destruction complete after 1s
aws_iam_group.developers: Destroying... [id=developers]
aws_iam_access_key.lb_access_key: Destruction complete after 1s
aws_iam_user.lb: Destroying... [id=loadbalancer]
aws_iam_group.developers: Destruction complete after 1s
aws_iam_user.lb: Destruction complete after 3s
Destroy complete! Resources: 7 destroyed.
```

- task6\_s3\_tfstate\_destroyed.png



## Task 7 – Create Multiple Users From CSV File

- task7\_locals\_tf.png

```
locals {
  users = csvdecode(file("users.csv"))
}
```

- task7\_users\_csv.png

```

1  user_name
2  Michael
3  Dwight
4  Jim
5  Pam
6  Ryan

```

- task7\_main\_tf\_multiple\_users.png

```

# Create multiple IAM users from CSV
resource "aws_iam_user" "users" {
  for_each = { for user in local.users : user.user_name => user }

  name      = each.value.user_name
  path      = "/users/"
}

```

- task7\_terraform\_apply.png

```

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform apply -auto-approve
-var="iam_password=MySecurePass123!"
Apply complete! Resources: 107 added, 0 changed, 0 destroyed.

```

- task7\_terraform\_output.png

```

@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ terraform output
"Robert" = {
  "access_key_id" = "AKIASWPGPMRI7Q0WF80"
  "user_arn" = "arn:aws:iam::941618064465:user/users/Robert"
  "user_unique_id" = "AIDASWPGPMRI6AD7NIDH8"
}
"Ryan" = {
  "access_key_id" = "AKIASWPGPMRIVS4IRU7"
  "user_arn" = "arn:aws:iam::941618064465:user/users/Ryan"
  "user_unique_id" = "AIDASWPGPMRI2C7VAJ3CC"
}
"Stanley" = {
  "access_key_id" = "AKIASWPGPMRIYC2X0YHQ"
  "user_arn" = "arn:aws:iam::941618064465:user/users/Stanley"
  "user_unique_id" = "AIDASWPGPMRI6WUCS4SU"
}
"Toby" = {
  "access_key_id" = "AKIASWPGPMRI4V6ZFA72"
  "user_arn" = "arn:aws:iam::941618064465:user/users/Toby"
  "user_unique_id" = "AIDASWPGPMRIQZSFJFVTT"
}
group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPASWPGPMRI2DQWZXS"
}

```

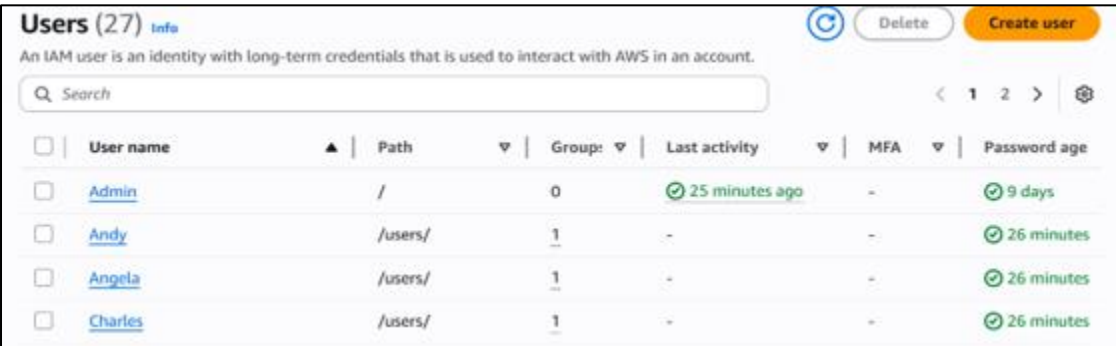
- task7\_tfstate\_secrets.png

```

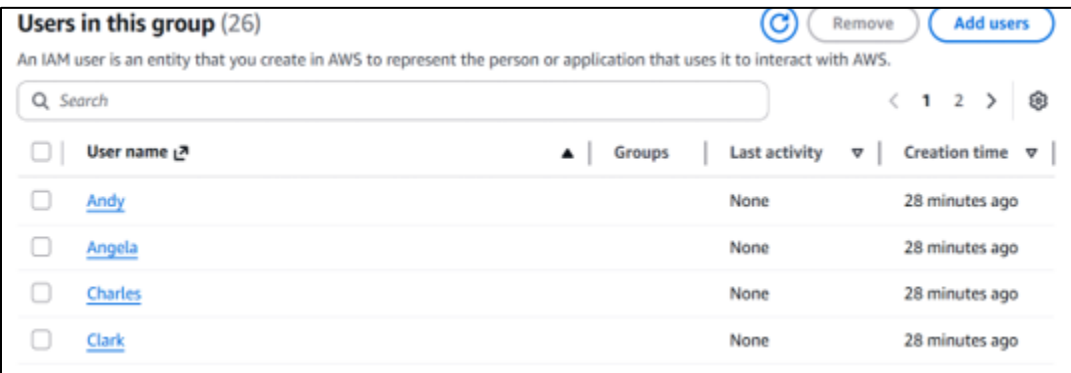
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $ cat terraform.tfstate
| grep -A 5 "all_access_key_secrets"
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA (main) $

```

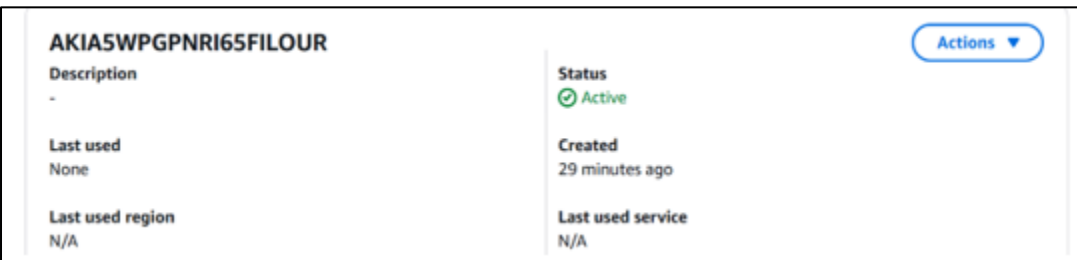
- task7\_aws\_console\_all\_users. Png



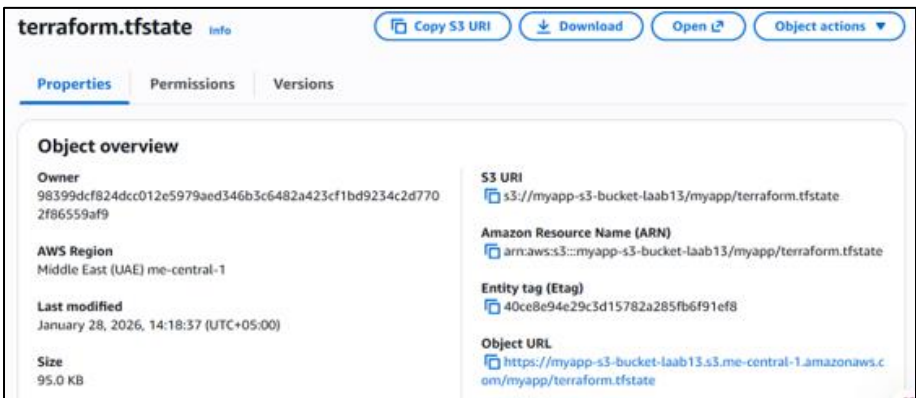
- task7\_aws\_console\_group\_members. Png



- task7\_aws\_console\_user\_access\_key.png



- task7\_s3\_tfstate\_multiple\_users.png



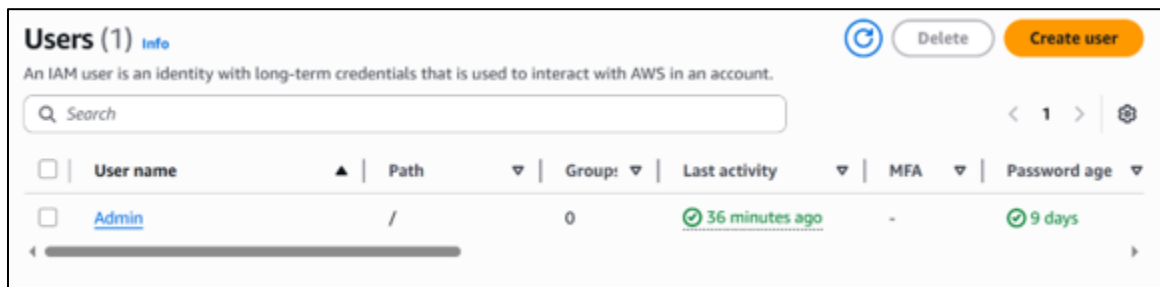
## Cleanup

- cleanup\_destroy\_complete.png

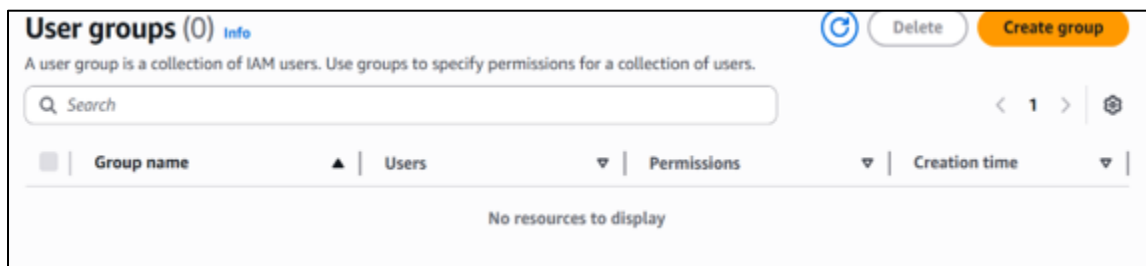
```
aws_iam_user.users["Peter"]: Destruction complete after 3s
aws_iam_user.users["Michael"]: Destruction complete after 3s
aws_iam_user.users["Meredith"]: Destruction complete after 5s
aws_iam_user.users["Kevin"]: Destruction complete after 8s

Destroy complete! Resources: 107 destroyed.
```

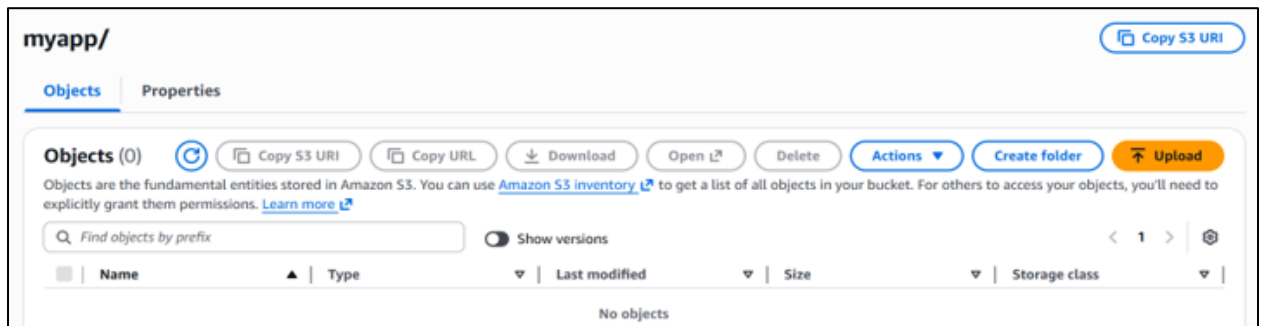
- cleanup\_aws\_console\_users\_deleted.png



- cleanup\_aws\_console\_group\_deleted.png



- cleanup\_s3\_empty\_state.png



- cleanup\_final\_files.png

```
@HamnaMahmood20 →/workspaces/CC-Hamna-Mahmood-25-BSE-VA/lab_13/Task (main) $ ls -la
total 44
drwxrwxrwx+ 3 vscode vscode 4096 Jan 28 09:12 .
drwxrwxrwx+ 3 vscode vscode 4096 Jan 28 07:46 ..
-rwxrwxrwx  1 vscode vscode  422 Jan 28 08:26 create-login-profile.sh
-rw-rw-rw-  1 vscode vscode   49 Jan 28 09:11 locals.tf
-rw-rw-rw-  1 vscode vscode 2535 Jan 28 09:16 main.tf
-rw-rw-rw-  1 vscode vscode    0 Jan 28 07:46 README.md
drwxr-xr-x+ 3 vscode vscode 4096 Jan 28 09:02 .terraform
-rw-r--r--  1 vscode vscode 2422 Jan 28 08:31 .terraform.lock.hcl
```