

CLOUD COMPUTING
LAB 13



Submitted To:
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Submitted By:
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BSE V-A
2023-BSE-031

Task 1 — Create IAM Group and Output Details

task1_project_directory.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ mkdir -p ~/Lab13
cd ~/Lab13
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13/Lab13 (main) $
```

task1_file_created.png

```
● @KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13/Lab13 (main) $ ls
main.tf
```

task1_main_tf.png

```
Task > main.tf > output "group_details"
provider "aws" {
  shared_config_files = ["~/.aws/config"]
  shared_credentials_files = ["~/.aws/credentials"]
}

resource "aws_iam_group" "developers" {
```

task1_terraform_init.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform init

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

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13/Lab13 (main) $ terraform apply -auto-approve

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

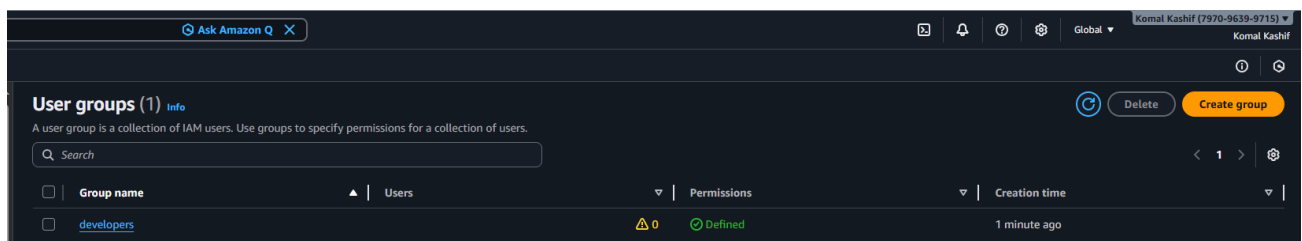
Outputs:

group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
```

task1_terraform_output.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13/Lab13 (main) $ terraform
group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPA5WPGPNRIWSOVQPNE5"
```

task1_aws_console_group.png



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

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13/Lab13 (main) $ terraform apply -auto-approve

"group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
"group_name" = "developers"
"unique_id" = "AGPASWPGPNRIWSOVQPNE5"
}
user_details = {
  "unique_id" = "AIDA5WPGPNRI5E5P3HF3E"
  "user_arn" = "arn:aws:iam::941618064465:user/users/loadbalancer"
  "user_name" = "loadbalancer"
}
```

task2_terraform_output.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform output

group_details = {
  "group_arn" = "arn:aws:iam::941618064465:group/groups/developers"
  "group_name" = "developers"
  "unique_id" = "AGPASWPGPNRIWSOVQPNE5"
}
user_details = {
  "unique_id" = "AIDA5WPGPNRI5E5P3HF3E"
  "user_arn" = "arn:aws:iam::941618064465:user/users/loadbalancer"
  "user_name" = "loadbalancer"
}
```

task2_aws_console_user.png

Users (5) info

An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.

Q Search

<input type="checkbox"/>	User name	Path	Group	Last activity	MFA	Password age	Console last sign-in	Access key ID	Active key age	Access key last used
<input type="checkbox"/>	Admin	/	0	12 days ago	-	24 days	24 days ago	Active - AKIA3TFVF2N...	12 days	1
<input type="checkbox"/>	Assignment-2	/	0	31 days ago	-	31 days	-	Active - AKIA3TFVF2N...	31 days	3
<input type="checkbox"/>	KomalKashif	/	0	15 hours ago	-	-	-	Active - AKIA3TFVF2N...	4 days	1
<input type="checkbox"/>	Lab15	/	0	6 days ago	-	14 days	-	Active - AKIA3TFVF2N...	14 days	6
<input type="checkbox"/>	loadbalancer	/	1	-	-	2 minutes	-	-	-	-

task2_aws_console_user_groups.png

developers info

Summary

User group name: developers

Creation time: January 31, 2026, 17:55 (UTC+05:00)

ARN: arn:aws:iam::797096399715:group/developers

Users (1)

Permissions

Access Advisor

Users in this group (1)

An IAM user is an entity that you create in AWS to represent the person or application that uses it to interact with AWS.

Q Search

<input type="checkbox"/>	User name	Groups	Last activity	Creation time
<input type="checkbox"/>	loadbalancer	None	3 minutes ago	

Task 3 — Attach Policies to IAM Group

task3_main_tf_policies.png

```
Task > main.tf > resource "aws_iam_group_policy_attachment" "change_password"
output "user_details" {
}

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

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (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"
```

task3_aws_console_policies.png

The screenshot shows the AWS IAM console for the 'developers' group. The 'Permissions' tab is active, displaying a list of attached policies. The table below summarizes the policies shown:

Policy name	Type	Attached entities
AmazonEC2FullAccess	AWS managed	1
IAMUserChangePassword	AWS managed	5

Task 4 — Create Login Profile for IAM User

task4_variables_tf.png

```
variable "iam_password" {
  description = "Temporary password for the IAM user"
  type        = string
  sensitive    = true
  default      = "IdontKnow"
```

task4_create_login_script.png

```
Task > $ create-login-profile.sh
#!/usr/bin/env bash
set -euo pipefail

USERNAME="$1"
PASSWORD="$2"
```

task4_chmod_script.png

task4_main_tf_login_profile.png

```
resource "null_resource" "create_login_profile" {
  triggers = {
    password_hash = sha256(var.iam_password)
    user          = aws_iam_user.lb.name
  }
}
```

task4_terraform_apply.png

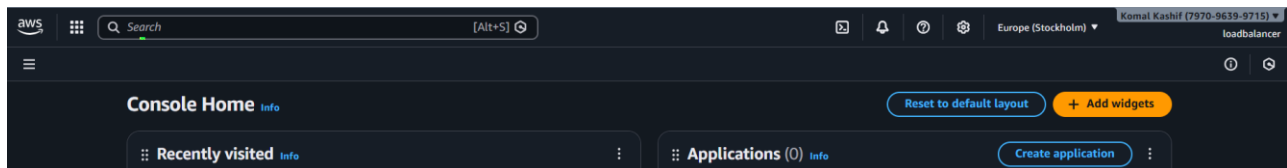
```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform apply -auto-approve
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

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

task4_aws_cli_verify.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (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



Task 5 — Generate Access Keys for IAM User

task5_main_tf_access_keys.png

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

task5_terraform_apply.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform apply -auto-approve -var="iam_password=MySecurePass123!"
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
```

task5_terraform_output.png

```
@KomalKashif →/workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform output
access_key_id = "AKIA5WPGPNRIYT2DNYFM"
access_key_secret = <sensitive>
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"
```

task5_tfstate_secret.png

```
@KomalKashif →/workspaces/CC_KomalKashif_031-Lab-13 (main) $ cat terraform.tfstate | grep -A 10 "access_
key_secret"
  "access_key_secret": {
    "value": "O9BbFIWKW7J5vRngwSzuIVZTiMkUXFtCMoBc9122",
    "type": "string",
    "sensitive": true
  },
  "group_details": {
    "value": {
      "group_arn": "arn:aws:iam::941618064465:group/groups/developers",
      "group_name": "developers",
      "unique_id": "AGPA5WPGPNRIWSOVQPNE5"
```

Task 6 — Implement Terraform Remote State with S3

task6_main_tf_backend.png

```
terraform {
  backend "s3" {
    bucket = "myapp-s3-bucket-laab13"
    key    = "myapp/terraform.tfstate"
    region = "me-central-1"
    encrypt = true
    use_lockfile = true
  }
}
```

task6_terraform_init_migrate.png

```
@KomalKashif →/workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform init -migrate-state
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.
```

task6_terraform_apply.png

```
@KomalKashif →/workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform apply -auto-approve -var="iam_pas
sword=MySecurePass123!"

Apply complete! Resources: 0 added, 0 changed, 0 destroyed.
```

task6_local_state_backup.png

```
@KomalKashif →/workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform ls -la terraform.tfstate*
-rw-rw-rw- 1 vscode vscode    0 Jan 28 09:02 terraform.tfstate
-rw-rw-rw- 1 vscode vscode 6882 Jan 28 09:02 terraform.tfstate.backup_
```

task6_terraform_destroy.png

```
@Komalkashif → /workspaces/CC_Komalkashif_031-Lab-13 (main) $ terraform destroy -auto-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.
```

Task 7 — Create Multiple Users from CSV File

task7_locals_tf.png

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

task7_users_csv.png

```
Task > users.csv
user_name
Michael
Dwight
Jim
Pam
Ryan
```

task7_main_tf_multiple_users.png

```
Task > main.tf > resource "aws_iam_access_key" "users_access_keys" > user
# 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/"
  force_destroy = true
}
```

task7_terraform_init.png

```
@Komalkashif → /workspaces/CC_Komalkashif_031-Lab-13 (main) $ terraform init

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.
```

task7_terraform_apply.png

```
@Komalkashif → /workspaces/CC_Komalkashif_031-Lab-13 (main) $ terraform apply -auto-approve -var="iam_password=MySecurePass123!"

Apply complete! Resources: 107 added, 0 changed, 0 destroyed.
```


Cleanup:

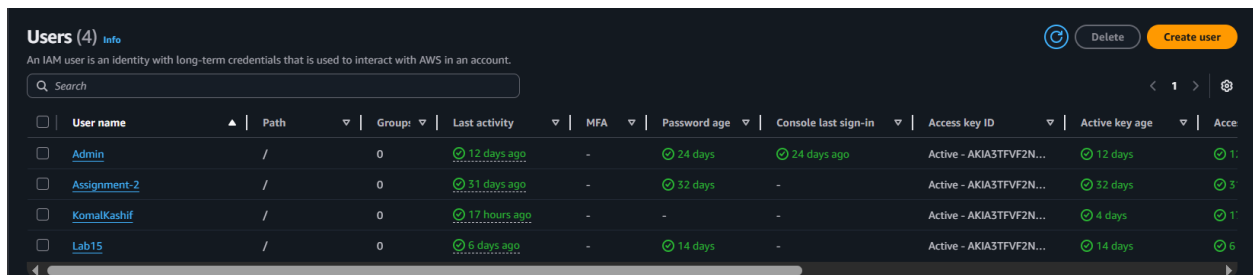
cleanup_destroy_complete.png

```
@KomalKashif → /workspaces/CC_KomalKashif_031-Lab-13 (main) $ terraform destroy -auto-approve
aws_iam_user.users["Dwight"]: Destruction complete after 3s
aws_iam_user.users["Phyllis"]: Destruction complete after 3s
aws_iam_user.users["Robert"]: Destruction complete after 3s
aws_iam_user.users["Jim"]: Destruction complete after 5s
aws_iam_user.users["David"]: Destruction complete after 3s
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

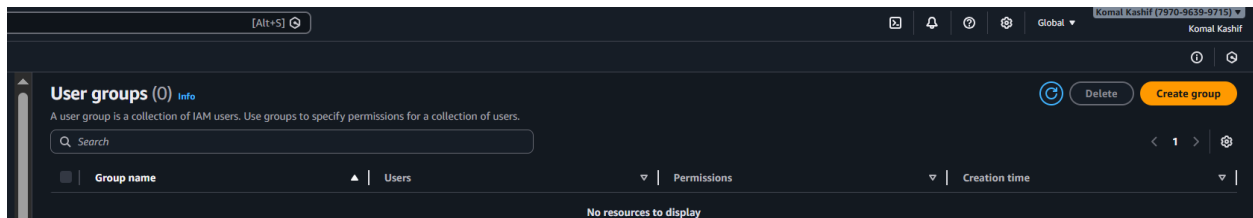
These are just the previous users which are left.



The screenshot shows the AWS IAM console 'Users' page. It lists four users: Admin, Assignment-2, KomalKashif, and Lab15. Each user entry includes details like Path, Group, Last activity, MFA, Password age, Console last sign-in, Access key ID, Active key age, and Access key status.

<input type="checkbox"/>	User name	Path	Group	Last activity	MFA	Password age	Console last sign-in	Access key ID	Active key age	Access key status
<input type="checkbox"/>	Admin	/	0	12 days ago	-	24 days	24 days ago	Active - AKIA3TFVF2N...	12 days	1
<input type="checkbox"/>	Assignment-2	/	0	31 days ago	-	32 days	-	Active - AKIA3TFVF2N...	32 days	3
<input type="checkbox"/>	KomalKashif	/	0	17 hours ago	-	-	-	Active - AKIA3TFVF2N...	4 days	1
<input type="checkbox"/>	Lab15	/	0	6 days ago	-	14 days	-	Active - AKIA3TFVF2N...	14 days	6

cleanup_aws_console_group_deleted.png



The screenshot shows the AWS IAM console 'User groups' page. It displays a message 'No resources to display' under the 'Group name' column, indicating that all user groups have been successfully deleted.

<input type="checkbox"/>	Group name	Users	Permissions	Creation time
No resources to display				

cleanup_final_files.png

```
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
-rw-rw-rw- 1 vscode vscode 0 Jan 28 09:02 terraform.tfstate
-rw-rw-rw- 1 vscode vscode 6882 Jan 28 09:02 terraform.tfstate.backup
-rw-rw-rw- 1 vscode vscode 166 Jan 28 09:13 users.csv
-rw-rw-rw- 1 vscode vscode 149 Jan 28 08:25 variables.tf
```