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File provider.tf

```
provider "aws" {  
    region = "eu-west-2"  
}
```

File vpc.tf

1. VPC

```
resource "aws_vpc" "latihan-vpc-awan_mendung" {  
    cidr_block = "10.0.0.0/18"  
    tags = {  
        Name = "latihan vpc awan mendung"  
    }  
}
```

2. Access control list (ACL)

```

resource "aws_network_acl" "latihan-acl-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id

  ingress {
    protocol = "tcp"
    rule_no = 100
    action = "allow"
    cidr_block = "0.0.0.0/0"
    from_port = 3306
    to_port = 3306
  }

  ingress {
    protocol = "tcp"
    rule_no = 101
    action = "allow"
    cidr_block = "0.0.0.0/0"
    from_port = 22
    to_port = 22
  }

  egress {
    protocol = -1
    rule_no = 100
    action = "allow"
    cidr_block = "0.0.0.0/0"
    from_port = 0
    to_port = 0
  }

  tags = {
    Name = "latihan acl awan mendung"
  }
}

```

3. Availability Zone a

```

resource "aws_subnet" "latihan-public-subnet-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id
  cidr_block = "10.0.0.0/24"
  map_public_ip_on_launch = "true"
  availability_zone = "eu-west-2a"

  tags = {
    Name = "latihan public subnet awan mendung"
  }
}

resource "aws_subnet" "latihan-private-subnet-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id
  cidr_block = "10.0.1.0/24"
  map_public_ip_on_launch = "false"
  availability_zone = "eu-west-2a"

  tags = {
    Name = "latihan private subnet awan mendung"
  }
}

```

4. Availability Zone b (update)

```

resource "aws_subnet" "latihan-public-subnet2-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id
  cidr_block = "10.0.2.0/24"
  map_public_ip_on_launch = "true"
  availability_zone = "eu-west-2b"

  tags = {
    Name = "latihan public subnet 2 awan mendung"
  }
}

resource "aws_subnet" "latihan-private-subnet2-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id
  cidr_block = "10.0.3.0/24"
  map_public_ip_on_launch = "false"
  availability_zone = "eu-west-2b"

  tags = {
    Name = "latihan private subnet 2 awan mendung"
  }
}

```

5. Asosiasi ACL dengan private subnet

```

resource "aws_network_acl_association" "latihan-acl-assoc-awan_mendung" {
  network_acl_id = aws_network_acl.latihan-acl-awan_mendung.id
  subnet_id = aws_subnet.latihan-private-subnet-awan_mendung.id
}

resource "aws_network_acl_association" "latihan-acl-assoc2-awan_mendung" {
  network_acl_id = aws_network_acl.latihan-acl-awan_mendung.id
  subnet_id = aws_subnet.latihan-private-subnet2-awan_mendung.id
}

```

6. Internet gateway

```

resource "aws_internet_gateway" "latihan-igw-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id

  tags = {
    Name = "latihan igw awan mendung"
  }
}

```

7. Router table public

```

resource "aws_route_table" "latihan-public-rt-awan_mendung" {
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id

  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.latihan-igw-awan_mendung.id
  }

  tags = {
    Name = "latihan public rt awan mendung"
  }
}

```

8. Asosiasi Public Subnet dan Router Public (update)

```

resource "aws_route_table_association" "latihan-public-rta-awan_mendung" {
  subnet_id = aws_subnet.latihan-public-subnet-awan_mendung.id
  route_table_id = aws_route_table.latihan-public-rt-awan_mendung.id
}

resource "aws_route_table_association" "latihan-public-rta2-awan_mendung" {
  subnet_id = aws_subnet.latihan-public-subnet2-awan_mendung.id
  route_table_id = aws_route_table.latihan-public-rt-awan_mendung.id
}

```

File ec2.tf

1. Security Group untuk EC2

```

resource "aws_security_group" "latihan-security-group-awan_mendung" {
  description = "Allow limited inbound external traffic"
  vpc_id = "${aws_vpc.latihan-vpc-awan_mendung.id}"

  name = "latihan-sg-awan-mendung"

  ingress {
    protocol = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
    from_port = 22
    to_port = 22
  }

  ingress {
    protocol = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
    from_port = 3000
    to_port = 3000
  }

  ingress {
    protocol = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
    from_port = 3306
    to_port = 3306
  }

  ingress {
    protocol = "icmp"
    cidr_blocks = ["0.0.0.0/0"]
    from_port = -1
    to_port = -1
  }

  egress {
    protocol = "-1"
    cidr_blocks = ["0.0.0.0/0"]
    from_port = 0
    to_port = 0
  }

  tags = {
    Name = "latihan-sg-awan-mendung"
  }
}

```

2. Key Pair

```

resource "tls_private_key" "rsa" {
  algorithm = "RSA"
  rsa_bits  = 4096
}

resource "local_file" "LatihanPrivateKeyPairAwanMendung" {
  filename = "latihanKeyPairAwanMendung"
  content  = tls_private_key.rsa.private_key_pem
}

resource "aws_key_pair" "latihanKeyPairAwanMendung" {
  key_name   = "latihanKeyPairAwanMendung"
  public_key = tls_private_key.rsa.public_key_openssh
}

```

3. Data template file

```

data "template_file" "user_data" {
  template = "${file("scriptku.sh")}"
  vars = {
    rds_address = "${aws_db_instance.latihan_db_rds_awan_mendung.address}"
    rds_username = "${aws_db_instance.latihan_db_rds_awan_mendung.username}"
    rds_password = "${aws_db_instance.latihan_db_rds_awan_mendung.password}"
    rds_db_name = "${aws_db_instance.latihan_db_rds_awan_mendung.db_name}"
  }
}

```

4. scriptku.sh

```

#!/bin/bash
sudo apt-get update
sudo apt install default-mysql-client -y
#sudo mysql -u "${rds_username}" --password="${rds_password}" --host "${rds_address}" -e "CREATE DATABASE ${rds_db_name} /
*!40100 DEFAULT CHARACTER SET utf8 */"
sudo apt install nodejs npm -y
cd /home/admin
sudo mkdir myapp
cd myapp
git clone https://github.com/jokoprsty/latihan_rds.git
cd latihan_rds
echo "DB_USER=${rds_username}" >> .env
echo "DB_PASS=${rds_password}" >> .env
echo "DB_NAME=${rds_db_name}" >> .env
echo "DB_HOST=${rds_address}" >> .env
sudo npm install
sudo npm install pm2 -g
sudo pm2 start /home/admin/myapp/latihan_rds/app.js -u admin --watch
sudo pm2 save
pm2 startup

```

5. EC2 instance (update)

```

locals {
  loc_ami = "ami-0efc5833b9d584374"
  loc_instance_type = "t2.micro"
}

resource "aws_instance" "latihan-ec2-awan_mendung" {
  depends_on = [ aws_db_instance.latihan_db_rds_awan_mendung ]
  ami = local.loc_ami
  instance_type = local.loc_instance_type
  key_name = aws_key_pair.latihanKeyPairAwanMendung.key_name
  vpc_security_group_ids = [ "${aws_security_group.latihan-security-group-awan_mendung.id}" ]
  subnet_id = "${aws_subnet.latihan-public-subnet-awan_mendung.id}"
  user_data = data.template_file.user_data.rendered
  tags = {
    Name = "latihan-ec2-awan_mendung"
  }
}

resource "aws_instance" "latihan-ec2-2-awan_mendung" {
  depends_on = [ aws_db_instance.latihan_db_rds_awan_mendung ]
  ami = local.loc_ami
  instance_type = local.loc_instance_type
  key_name = aws_key_pair.latihanKeyPairAwanMendung.key_name
  vpc_security_group_ids = [ "${aws_security_group.latihan-security-group-awan_mendung.id}" ]
  subnet_id = "${aws_subnet.latihan-private-subnet2-awan_mendung.id}"
  user_data = data.template_file.user_data.rendered
  tags = {
    Name = "latihan-ec2-2-awan_mendung"
  }
}

```

File rds.tf

1. Subnet group RDS

```

resource "aws_db_subnet_group" "latihan_subnet_db_awan_mendung" {
  name = "latihan_subnet_db"
  subnet_ids = [aws_subnet.latihan-private-subnet-awan_mendung.id,aws_subnet.latihan-private-subnet2-awan_mendung.id]

  tags = {
    Name = "latihan_subnet_db_awan_mendung"
  }
}

```

2. Security group untuk RDS

```

resource "aws_security_group" "latihan-rds-sg-awan_mendung" {
  name = "latihan_rds_sg_awan_mendung"
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id

  ingress {
    from_port = 3306
    to_port = 3306
    protocol = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
  }

  egress {
    from_port = 3306
    to_port = 3306
    protocol = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
  }

  tags = {
    Name = "latihan_rds_sg_awan_mendung"
  }
}

```

3. RDS (update)

```

resource "aws_db_instance" "latihan_db_rds_awan_mendung" {
  identifier = "latihan-db-rds-awanmendung"
  instance_class = "db.t3.micro"
  allocated_storage = 20
  engine = "mariadb"
  engine_version = "10.6.14"
  username = "latihan"
  password = 12345678
  db_name = "my_project"
  db_subnet_group_name = aws_db_subnet_group.latihan_subnet_db_awan_mendung.name
  vpc_security_group_ids = [aws_security_group.latihan-rds-sg-awan_mendung.id]
  publicly_accessible = false
  skip_final_snapshot = true
  multi_az = true
}

```

File lb.tf

1. Jenis load balancer

```
resource "aws_lb" "latihan-lb-awan-mendung" {
  name = "latihan-lb-awan-mendung"
  internal = false
  load_balancer_type = "application"
  security_groups = [aws_security_group.latihan-security-group-awan_mendung.id]
  subnets = [ aws_subnet.latihan-public-subnet-awan_mendung.id,aws_subnet.latihan-public-subnet2-awan_mendung.id ]
}
```

2. Load balancer target group

```
resource "aws_lb_target_group" "latihan-lb-target-group-awan-mendung" {
  name = "latihan-lb-target-group-awan"
  port = 3000
  protocol = "HTTP"
  vpc_id = aws_vpc.latihan-vpc-awan_mendung.id
}
```

3. Mengasosiasi target group dengan instance

```
resource "aws_lb_target_group_attachment" "latihan-lb-tga1-awan-mendung" {
  target_group_arn = aws_lb_target_group.latihan-lb-target-group-awan-mendung.arn
  target_id = aws_instance.latihan-ec2-awan_mendung.id
  port = 3000
}

resource "aws_lb_target_group_attachment" "latihan-lb-tga2-awan-mendung" {
  target_group_arn = aws_lb_target_group.latihan-lb-target-group-awan-mendung.arn
  target_id = aws_instance.latihan-ec2-2-awan_mendung.id
  port = 3000
}
```

4. Load balancer listener

```
resource "aws_lb_listener" "latihan_lb_listener_awan_mendung" {
  load_balancer_arn = aws_lb.latihan-lb-awan-mendung.arn
  port = "3000"
  protocol = "HTTP"

  default_action {
    type = "forward"
    target_group_arn = aws_lb_target_group.latihan-lb-target-group-awan-mendung.arn
  }
}
```

File autoscaling.tf

1. Launch template

2. Autoscaling group

3. Autoscaling policy

Terraform init

```
PS C:\Users\acer\Documents\Tugas Ongoing\Pertemuan 13 Awan\AwanMendung> terraform init
Initializing the backend...
Initializing provider plugins...
- Reusing previous version of hashicorp/local from the dependency lock file
- Reusing previous version of hashicorp/template from the dependency lock file
- Reusing previous version of hashicorp/aws from the dependency lock file
- Reusing previous version of hashicorp/tls from the dependency lock file
- Using previously-installed hashicorp/aws v5.94.1
- Using previously-installed hashicorp/tls v4.0.6
- Using previously-installed hashicorp/local v2.5.2
```

Terraform plan

```
PS C:\Users\acer\Documents\Tugas Ongoing\Pertemuan 13 Awan\AwanMendung> terraform plan

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create
<= read (data resources)

Terraform will perform the following actions:

# data.template_file.user data will be read during apply
```

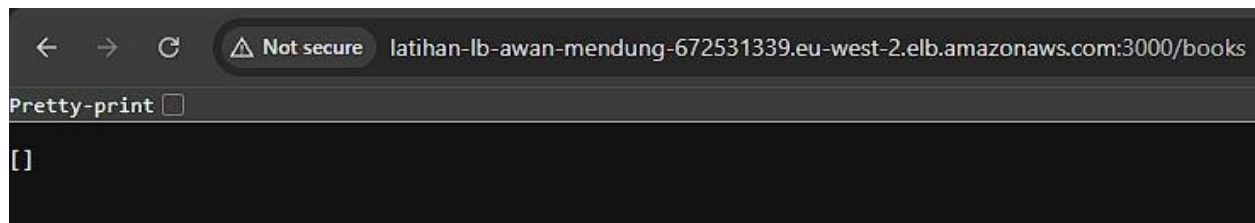
Terraform apply

```
aws_autoscaling_group.latihan-autoscaling-group-awan_mendung: Still creating... [10s elapsed]
aws_autoscaling_group.latihan-autoscaling-group-awan_mendung: Still creating... [20s elapsed]
aws_autoscaling_group.latihan-autoscaling-group-awan_mendung: Still creating... [30s elapsed]
aws_autoscaling_group.latihan-autoscaling-group-awan_mendung: Still creating... [40s elapsed]
aws_autoscaling_group.latihan-autoscaling-group-awan_mendung: Creation complete after 49s [id=latihan-autoscaling-group-awan_mendung]
aws_autoscaling_policy.latihan-auto-policy-awan_mendung: Creating...
aws_autoscaling_policy.latihan-auto-policy-awan_mendung: Creation complete after 3s [id=latihan-auto-policy-awan_mendung]

Apply complete! Resources: 2 added, 0 changed, 1 destroyed.
```

Jalankan aplikasi web

- Buka browser, kemudian copy alamat dns pada menu load balancer di halaman ec2 ke browser, buka dengan port 3000(jika tidak muncul, tunggu beberapa saat, cek ec2 sampai selesai initializing):
 - dns_load_balancer:3000/books



- Insert data ke dalam mysql melalui ec2(gunakan ssh), insert data dengan menggunakan alamat mysql yang ada di /home/admin/myapp/latihan_rds/.env, kemudian buka di browser
 - dns_load_balancer:3000/books/1

```
admin@ip-10-0-0-227: ~/myapp/latihan_rds
login as: admin
Authenticating with public key "imported-openssh-key"
Linux ip-10-0-0-227 6.1.0-23-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.99-1
(2024-07-15) x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri May 30 16:11:31 2025 from 104.28.247.132
admin@ip-10-0-0-227:~$ cd /home/admin/myapp/latihan_rds
admin@ip-10-0-0-227:~/myapp/latihan_rds$ sudo mysql -h latihan-db-rds-awanmendun
g.ct04s2k4aash.eu-west-2.rds.amazonaws.com -u latihan -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 105
Server version: 10.6.14-MariaDB managed by https://aws.amazon.com/rds/

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> use database my_project
ERROR 1049 (42000): Unknown database 'database'
MariaDB [(none)]> use my_project
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [my_project]> insert into Books (title, author, createAt, updateAt) valu
es ("Pelangi Surga", "Agiel", NOW(), NOW());
ERROR 1054 (42S22): Unknown column 'createAt' in 'field list'
MariaDB [my_project]> insert into Books (title, author, createdAt, updateAt) val
ues ("Pelangi Surga", "Agiel", NOW(), NOW());
ERROR 1054 (42S22): Unknown column 'updateAt' in 'field list'
MariaDB [my_project]> insert into Books (title, author, createdAt, updatedAt) va
lues ("Pelangi Surga", "Agiel", NOW(), NOW());
Query OK, 1 row affected (0.003 sec)

MariaDB [my_project]>
```

```
← → ↻ ⚠ Not secure latihan-lb-awan-mendung-672531339.eu-west-2.elb.amazonaws.com:3000/books/1
Pretty-print ☐
{"id":1,"title":"Pelangi Surga","author":"Agiel","createdAt":"2025-05-30T16:28:43.000Z","updatedAt":"2025-05-30T16:28:43.000Z"}
```

- stop ec2 pada availability zone a, tunggu sebentar sampai status stopped, kemudian cek lagi di browser ke-2 langkah di atas

✔ Successfully initiated rebooting of i-0c3857ca1e0ada3c6 ✕

Instances (1/6) Info Last updated less than a minute ago Connect Instance state ▾ Actions ▾ Launch instances

All states ▾ < 1 > ⚙

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status
<input checked="" type="checkbox"/>	latihan-ec2-awan_mendung	i-0c3857ca1e0ada3c6	Running	t2.micro	✔ 2/2 checks passed	View alarm

← → ↻ ⚠ Not secure latihan-lb-awan-mendung-672531339.eu-west-2.elb.amazonaws.com:3000/books/1

Pretty-print ☐

{"id":1,"title":"Pelangi Surga","author":"Agiel","createdAt":"2025-05-30T16:28:43.000Z","updatedAt":"2025-05-30T16:28:43.000Z"}

Cek failover pada RDS

Aurora and RDS latihan-db-rds-awanmendung

Summary

DB identifier latihan-db-rds-awanmendung	Status Available	Role Instance	Engine MariaDB	Recommendations
CPU 2.48%	Class db.t3.micro	Current activity 0 Connections	Region & AZ eu-west-2a	

Connectivity & security

Endpoint & port Endpoint latihan-db-rds-awanmendung.ct04szk4aash.eu-west-2-rds.amazonaws.com Port 3306	Networking Availability Zone eu-west-2a VPC latihan-vpc-awan-mendung (vpc-0f43a191a7eed8e25) Subnet group latihan_subnet_db Subnets subnet-0ac06ee6ae2f56b subnet-0fb4f45c718eab4651 Network type IPv4	Security VPC security groups latihan_rds_sg_awan_mendung (sg-0545dbc3efa2aa9b6) Active Publicly accessible No Certificate authority Info rds-ca-rsa2048-g1 Certificate authority date May 22, 2021, 06:46 (UTC+07:00) DB instance certificate expiration date May 30, 2026, 22:36 (UTC+07:00)
---	--	--

Install stress test

- Login ke salah satu ec2

```
login as: admin
Authenticating with public key "imported-openssh-key"
Linux ip-10-0-0-227 6.1.0-23-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.99-1
(2024-07-15) x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri May 30 16:15:10 2025 from 36.78.96.73
```

- Install stress package:

- o sudo apt update
- o sudo apt upgrade
- o sudo apt install stress

```
admin@ip-10-0-0-227:~$ sudo apt update
Get:1 file:/etc/apt/mirrors/debian.list Mirrorlist [38 B]
Get:5 file:/etc/apt/mirrors/debian-security.list Mirrorlist [47 B]
Hit:2 https://cdn-aws.deb.debian.org/debian bookworm InRelease
Hit:3 https://cdn-aws.deb.debian.org/debian bookworm-updates InRelease
Hit:4 https://cdn-aws.deb.debian.org/debian bookworm-backports InRelease
Hit:6 https://cdn-aws.deb.debian.org/debian-security bookworm-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
78 packages can be upgraded. Run 'apt list --upgradable' to see them.
admin@ip-10-0-0-227:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following NEW packages will be installed:
  firmware-linux-free linux-image-6.1.0-37-cloud-amd64
The following packages will be upgraded:
  base-files bash bind9-host bind9-libs bsdxattrutils bsdxutils cloud-init
  cloud-initramfs-growroot curl debian-archive-keyring distro-info-data eject
  fdisk initramfs-tools initramfs-tools-core iputils-ping libblkid1 libcap2
  libcap2-bin libcurl3-gnutls libcurl4 libexpat1 libfdisk1 libfreetype6
  libglib2.0-0 libgnutls30 libgssapi-krb5-2 libk5crypto3 libkrb5-3
  libkrb5support0 liblzma5 libmount1 libnghttp2-14 libnss-myhostname
  libpam-systemd libpython3.11-minimal libpython3.11-stdlib libsmartcols1
  libsqlite3-0 libsystemd-shared libsystemd0 libtasn1-6 libudev1 libuuid1
  linux-image-cloud-amd64 login mount openssh-client openssh-server
  openssh-sftp-server passwd python3-cryptography python3-jinja2
  python3-pkg-resources python3-urllib3 python3.11 python3.11-minimal
  qemu-utils shim-helpers-amd64-signed shim-signed shim-signed-common
admin@ip-10-0-0-227:~$ sudo apt install stress
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  stress
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 21.9 kB of archives.
After this operation, 57.3 kB of additional disk space will be used.
Get:1 file:/etc/apt/mirrors/debian.list Mirrorlist [38 B]
Get:2 https://cdn-aws.deb.debian.org/debian bookworm/main amd64 stress amd64 1.0.7-1 [21.9 kB]
Fetched 21.9 kB in 0s (318 kB/s)
Selecting previously unselected package stress.
(Reading database ... 72700 files and directories currently installed.)
Preparing to unpack .../stress_1.0.7-1_amd64.deb ...
Unpacking stress (1.0.7-1) ...
Setting up stress (1.0.7-1) ...
Processing triggers for man-db (2.11.2-2) ...
```

- Jalankan stress test:

- o sudo stress --cpu 2 --timeout 600

```
Processing triggers for man-db (2.11.2-2) ...
admin@ip-10-0-0-227:~$ sudo stress --cpu -- timeout 600
stress: FAIL: [12929] (167) missing argument to option '--cpu'
admin@ip-10-0-0-227:~$ sudo stress --cpu 2 --timeout 600
stress: info: [12932] dispatching hogs: 2 cpu, 0 io, 0 vm, 0 hdd
^C
admin@ip-10-0-0-227:~$ sudo stress --cpu 2 --timeout 600
stress: info: [12937] dispatching hogs: 2 cpu, 0 io, 0 vm, 0 hdd
```

- mengecek penggunaan cpu, buka terminal baru
 - o top


```

admin@ip-10-0-0-227: ~
top - 16:46:42 up 15 min, 1 user, load average: 0.00, 0.15, 0.11
Tasks: 74 total, 1 running, 73 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.0 sy, 0.0 ni, 92.6 id, 0.0 wa, 0.0 hi, 0.0 si, 7.4 st
MiB Mem : 970.0 total, 262.0 free, 258.3 used, 604.5 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used, 711.8 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM    TIME+  COMMAND
    1 root        20   0   167868   12416   9160 S   0.0   1.2   0:02.74 systemd
    2 root        20   0         0         0      0 S   0.0   0.0   0:00.00 kthreadd
    3 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 rcu_gp
    4 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 rcu_par_gp
    5 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 slub_flushwq
    6 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 netns
    8 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
   10 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 mm_percpu_wq
   11 root        20   0         0         0      0 I   0.0   0.0   0:00.00 rcu_tasks_kthread
   12 root        20   0         0         0      0 I   0.0   0.0   0:00.00 rcu_tasks_rude_kthread
   13 root        20   0         0         0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
   14 root        20   0         0         0      0 S   0.0   0.0   0:00.28 ksoftirqd/0
   15 root        20   0         0         0      0 I   0.0   0.0   0:00.12 rcu_preempt
   16 root        rt    0         0         0      0 S   0.0   0.0   0:00.00 migration/0
   18 root        20   0         0         0      0 S   0.0   0.0   0:00.00 cpuhp/0
   20 root        20   0         0         0      0 S   0.0   0.0   0:00.00 kdevtmpfs
   21 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 inet_frag_wq
   22 root        20   0         0         0      0 S   0.0   0.0   0:00.03 kauditd
   23 root        20   0         0         0      0 S   0.0   0.0   0:00.00 khungtaskd
   24 root        20   0         0         0      0 I   0.0   0.0   0:00.10 kworker/u30:1-flush-202:0
   25 root        20   0         0         0      0 S   0.0   0.0   0:00.00 oom_reaper
   26 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 writeback
   28 root        20   0         0         0      0 S   0.0   0.0   0:00.03 kcompactd0
   29 root        25   5         0         0      0 S   0.0   0.0   0:00.00 ksmd
   30 root        39  19         0         0      0 S   0.0   0.0   0:00.00 khugepaged
   31 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 kintegrityd
   32 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 kblockd
   33 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 blkcg_punt_bio
   34 root        20   0         0         0      0 S   0.0   0.0   0:00.00 xen-balloon
   35 root         0 -20         0         0      0 I   0.0   0.0   0:00.00 tpm_dev_wq
   36 root         0 -20         0         0      0 I   0.0   0.0   0:00.14 kworker/0:1H-kblockd
   37 root        20   0         0         0      0 S   0.0   0.0   0:00.02 ksgand0

```

- Cek apakah jumlah instance ec2 bertambah di halaman aws, jika bertambah, artinya auto scaling berhasil, karena salah satu ec2 menjalankan resource yang tinggi karena stress test

Resources

[EC2 Global View](#)



You are using the following Amazon EC2 resources in the Europe (London) Region:

Instances (running)	4	Auto Scaling Groups	1
Capacity Reservations	0	Dedicated Hosts	0
Elastic IPs	0	Instances	6
Key pairs	3	Load balancers	1
Placement groups	0	Security groups	5
Snapshots	0	Volumes	4

Cek Error

Masuk ssh ke ec2 menggunakan putty, setelah masuk, lihat log dengan mengetikkan menggunakan command:

cat /var/log/cloud-init-output.log

```
admin@ip-10-0-0-227: ~
[PM2] [-] Executing: systemctl enable pm2-undefined...
Created symlink /etc/systemd/system/multi-user.target.wants/pm2-undefined.service -> /etc/systemd/system/pm2-undefined.service
[PM2] [v] Command successfully executed.
+-----+
[PM2] Freeze a process list on reboot via:
$ pm2 save

[PM2] Remove init script via:
$ pm2 unstartup systemd
Cloud-init v. 22.4.2 finished at Fri, 30 May 2025 15:47:37 +0000. Datasource DataSourceEc2Local. Up 136.55 seconds
Cloud-init v. 22.4.2 running 'init-local' at Fri, 30 May 2025 16:31:27 +0000. Up 3.49 seconds.
Cloud-init v. 22.4.2 running 'init' at Fri, 30 May 2025 16:31:29 +0000. Up 5.52 seconds.
ci-info: +-----+Net device info+-----+
ci-info: +-----+
ci-info: | Device | Up | Address | Mask | Scope | Hw-Address |
ci-info: +-----+
ci-info: | enX0 | True | 10.0.0.227 | 255.255.255.0 | global | 06:c8:ff:14:20:c3 |
ci-info: | enX0 | True | fe80::4c8:ffff:fe14:20c3/64 | . | link | 06:c8:ff:14:20:c3 |
ci-info: | lo | True | 127.0.0.1 | 255.0.0.0 | host | . |
ci-info: | lo | True | ::1/128 | . | host | . |
ci-info: +-----+
ci-info: +-----+Route IPv4 info+-----+
ci-info: +-----+
ci-info: | Route | Destination | Gateway | Genmask | Interface | Flags |
ci-info: +-----+
ci-info: | 0 | 0.0.0.0 | 10.0.0.1 | 0.0.0.0 | enX0 | UG |
ci-info: | 1 | 10.0.0.0 | 0.0.0.0 | 255.255.255.0 | enX0 | U |
ci-info: | 2 | 10.0.0.1 | 0.0.0.0 | 255.255.255.255 | enX0 | UH |
ci-info: | 3 | 10.0.0.2 | 0.0.0.0 | 255.255.255.255 | enX0 | UH |
ci-info: +-----+
ci-info: +-----+Route IPv6 info+-----+
ci-info: +-----+
ci-info: | Route | Destination | Gateway | Interface | Flags |
ci-info: +-----+
ci-info: | 0 | fe80::/64 | :: | enX0 | U |
ci-info: | 2 | local | :: | enX0 | U |
ci-info: | 3 | multicast | :: | enX0 | U |
ci-info: +-----+
Cloud-init v. 22.4.2 running 'modules:config' at Fri, 30 May 2025 16:31:30 +0000. Up 6.32 seconds.
Cloud-init v. 22.4.2 running 'modules:final' at Fri, 30 May 2025 16:31:30 +0000. Up 6.72 seconds.
Cloud-init v. 22.4.2 finished at Fri, 30 May 2025 16:31:30 +0000. Datasource DataSourceEc2Local. Up 6.81 seconds
admin@ip-10-0-0-227:~$ ^C
admin@ip-10-0-0-227:~$ cat /var/log/cloud-init-output.log
```

Destroy Instance

Perintah jika hanya ingin mendestroy salah satu instance ec2

terraform destroy -target aws_instance.<NAME>

```
admin@ip-10-0-0-227:~$ terraform destroy -target aws_instance.latihan-ec2-2-awan_mendung
```

TUGAS

- Screenshot pada AWS:

- VPC

- Subnet

Subnets (7) Info						
Q Find subnets by attribute or tag						
Last updated less than a minute ago Actions Create subnet						
< 1 > ⚙						
<input type="checkbox"/>	Name	Subnet ID	State	VPC	Block Public	
<input type="checkbox"/>	latihan public subnet awan mendung	subnet-0f77b3d1d4cf7615f	Available	vpc-0f43a191a7eed8e25 latih...	Off	
<input type="checkbox"/>	-	subnet-0fc945b1ae6c31741	Available	vpc-0455a7982ac55c9a5	Off	
<input type="checkbox"/>	latihan private subnet 2 awan mendung	subnet-0fb4fdc718eab4651	Available	vpc-0f43a191a7eed8e25 latih...	Off	
<input type="checkbox"/>	-	subnet-02cf83642a40508ef	Available	vpc-0455a7982ac55c9a5	Off	
<input type="checkbox"/>	-	subnet-00d51212e5691c3d4	Available	vpc-0455a7982ac55c9a5	Off	
<input type="checkbox"/>	latihan public subnet 2 awan mendung	subnet-05a752a1155177e60	Available	vpc-0f43a191a7eed8e25 latih...	Off	
<input type="checkbox"/>	latihan private subnet awan mendung	subnet-0ac04ee6aee2ff56b	Available	vpc-0f43a191a7eed8e25 latih...	Off	

- Route

Route tables (3) [Info](#) Last updated 1 minute ago [Actions](#) [Create route table](#)

Find route tables by attribute or tag

<input type="checkbox"/>	Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VF
<input type="checkbox"/>	-	rtb-0495c0812b23171c9	-	-	Yes	vp
<input type="checkbox"/>	-	rtb-0be3e69ee433e6e53	-	-	Yes	vp

Router Association

Route tables (1/3) [Info](#) Last updated 2 minutes ago [Actions](#) [Create route table](#)

Find route tables by attribute or tag

<input type="checkbox"/>	Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VF
<input checked="" type="checkbox"/>	-	rtb-0495c0812b23171c9	-	-	Yes	vp
<input type="checkbox"/>	-	rtb-0be3e69ee433e6e53	-	-	Yes	vp

rtb-0495c0812b23171c9

[Details](#) [Routes](#) [Subnet associations](#) [Edge associations](#) [Route propagation](#) [Tags](#)

Explicit subnet associations (0) [Edit subnet associations](#)

Find subnet association

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
No subnet associations You do not have any subnet associations.			

[Activate Windows](#)

Load balancers

Load balancers (1) [Actions](#) [Create load balancer](#)

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

Filter load balancers

<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type
<input type="checkbox"/>	latihan-lb-awan-mendung	latihan-lb-awan-mendung-...	Active	vpc-0f43a191a7eed8e25	2 Availability Zones	applica

Auto scaling group

Auto Scaling groups (1) [Info](#) Last updated less than a minute ago [Launch configurations](#) [Launch templates](#) [Actions](#) [Create Auto Scaling group](#)

Search your Auto Scaling groups

<input type="checkbox"/>	Name	Launch template/configuration	Instances	Status	Desired capacity
<input type="checkbox"/>	latihan-autoscaling-group-awan-mendung	latihan-launch-template-awan_mendung	2	-	2

EC2

Instance

Instances (4) [Info](#) Last updated less than a minute ago [Connect](#) [Instance state](#) [Actions](#) [Launch instances](#)

Find Instance by attribute or tag (case-sensitive) [All states](#)

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status
<input type="checkbox"/>	latihan-ec2-awan_mendung	i-0c3857ca1e0ada3c6	Running	t2.micro	2/2 checks passed	View alarm
<input type="checkbox"/>		i-05a6826050b9163c0	Running	t2.micro	2/2 checks passed	View alarm
<input type="checkbox"/>	latihan-ec2-2-awan_mendung	i-0a94033c71bba87d7	Running	t2.micro	2/2 checks passed	View alarm
<input type="checkbox"/>		i-0a5b17cdf305b2799	Running	t2.micro	2/2 checks passed	View alarm

- Security group

Security Groups (5) [Info](#) [Actions](#) [Export security groups to CSV](#) [Create security group](#)

Find security groups by attribute or tag

<input type="checkbox"/>	Name	Security group ID	Security group name	VPC ID
<input type="checkbox"/>	latihan-sg-awan-me...	sg-0c376fe4926dba1e2	latihan-sg-awan-mendung	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-037755c244179535b	default	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-03f41f91410dfe25d	default	vpc-0455a7982ac55c9a5
<input type="checkbox"/>	latihan_rds_sg_awan...	sg-0545dbc3efa2aa9b6	latihan_rds_sg_awan_mendung	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-0be3f5cdcaf3bc8d8	launch-wizard-1	vpc-0455a7982ac55c9a5

- RDS

- Database

Databases (1) [Group resources](#) [Modify](#) [Actions](#) [Create database](#)

Filter by databases

<input type="checkbox"/>	DB identifier	Status	Role	Engine	Region ...	Size
<input type="radio"/>	latihan-db-rds-awanmendung	Available	Instance	MariaDB	eu-west-2a	db.t3.micro

- Subnet group

Subnet groups (1) [Edit](#) [Delete](#) [Create DB subnet group](#)

Filter by subnet group

<input type="checkbox"/>	Name	Description	Status	VPC
<input type="checkbox"/>	latihan_subnet_db	Managed by Terraform	Complete	vpc-0f43a191a7eed8e25

- Security group

Connectivity & security

Endpoint & port

Endpoint
[latihan-db-rds-awanmendung](#)
g.ct04s2k4aash.eu-west-2.rds.amazonaws.com

Port
3306

Networking

Availability Zone
eu-west-2a

VPC
[latihan vpc awan mendung \(vpc-0f43a191a7eed8e25\)](#)

Subnet group
latihan_subnet_db

Subnets
[subnet-0ac04ee6aee2ff56b](#)
[subnet-0fb4fdc718eab4651](#)

Network type
IPv4

Security

VPC security groups
[latihan_rds_sg_awan_mendung \(sg-0545dbc3efa2aa9b6\)](#)
Active

Publicly accessible
No

Certificate authority [Info](#)
rds-ca-rsa2048-g1

Certificate authority date
May 22, 2061, 06:46 (UTC+07:00)

DB instance certificate expiration date
May 30, 2026, 22:36 (UTC+07:00)

Security Groups (5) [Actions](#) [Export security groups to CSV](#) [Create security group](#)

Find security groups by attribute or tag

<input type="checkbox"/>	Name	Security group ID	Security group name	VPC ID
<input type="checkbox"/>	latihan-sg-awan-me...	sg-0c376fe4926dba1e2	latihan-sg-awan-mendung	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-037755c244179535b	default	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-03f41f91410dfe25d	default	vpc-0455a7982ac55c9a5
<input type="checkbox"/>	latihan_rds_sg_awan...	sg-0545dbc3efa2aa9b6	latihan_rds_sg_awan_mendung	vpc-0f43a191a7eed8e25
<input type="checkbox"/>	-	sg-0be3f5cdcaf3bc8d8	launch-wizard-1	vpc-0455a7982ac55c9a5

- Setelah semua praktikum selesai, lakukan:
 - terraform destroy

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

PORTS

```
aws_subnet.latihan-private-subnet2-awan_mendung: Destroying... [id=subnet-0fb4fdc718eab4651]
aws_subnet.latihan-private-subnet-awan_mendung: Destroying... [id=subnet-0ac04ee6aee2ff56b]
aws_subnet.latihan-private-subnet2-awan_mendung: Destruction complete after 3s
aws_subnet.latihan-private-subnet-awan_mendung: Destruction complete after 4s
aws_security_group.latihan-rds-sg-awan_mendung: Destruction complete after 5s
aws_vpc.latihan-vpc-awan_mendung: Destroying... [id=vpc-0f43a191a7eed8e25]
aws_vpc.latihan-vpc-awan_mendung: Destruction complete after 2s
```

Destroy complete! Resources: 29 destroyed.

❖ PS C:\Users\acer\Documents\Tugas Ongoing\Pertemuan 13 Awan\AwanMendung>