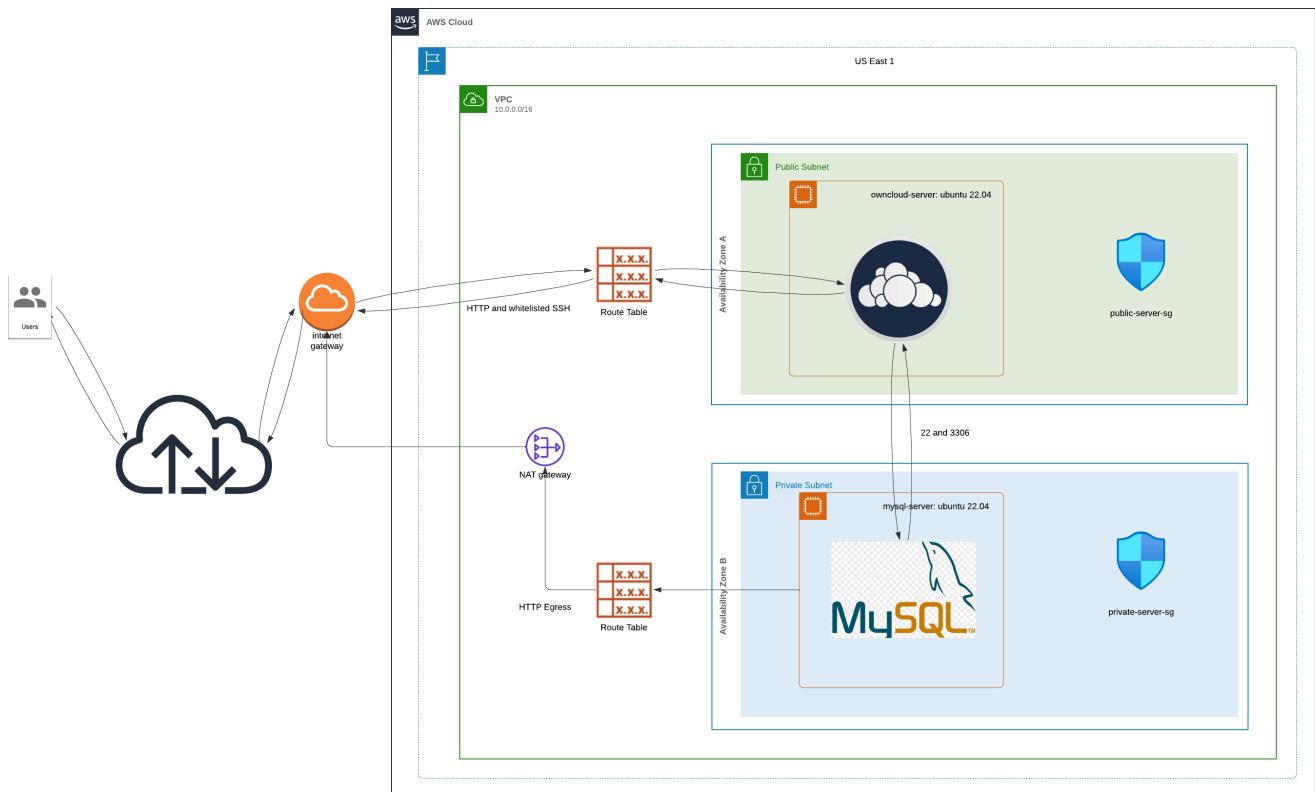


# Owncloud Solution

Implement an Owncloud file server so that our organization can store and share files in a secure manner; giving our organization the ability to enforce our security policy. Implementation will involve creating the following AWS resources.

1. A vpc.
2. A public subnet.
3. A private subnet.
4. A public security group (details below)
5. A private security group (details below)
6. An internet gateway.
7. A NAT gateway.
8. A public ec2 instance.
9. A private ec2 instance.

## Architectural Diagram



## VPC

### Requirements:

Custom VPC called "owncloud-vpc".

VPC > Your VPCs > vpc-0ccf48c84e513566b

### vpc-0ccf48c84e513566b / owncloud-vpc

Actions ▾

| Details                          |                               | Info                                       |                       |
|----------------------------------|-------------------------------|--|-----------------------|
| VPC ID                           | Available                     | Block Public Access                        | Disabled              |
| DNS resolution                   | Enabled                       | DHCP option set                            | rtb-057dda5a89cea9e77 |
| Main network ACL                 | Default                       | IPv4 CIDR                                  | -                     |
| acl-0f95bed4889188dc9            | No                            | 10.0.0.0/16                                | Owner ID              |
| IPv6 CIDR (Network border group) | Network Address Usage metrics | Route 53 Resolver DNS Firewall rule groups | 417355468534          |
| -                                | Disabled                      | -  |                       |

Resource map | CIDRs | Flow logs | Tags | Integrations

Resource map Info

```
graph LR; V[VPC] --- S1[Subnets (2)]; V --- RT1[Route tables (3)]; V --- NC[Network connections (2)]; S1 --- US1a[us-east-1a]; S1 --- US1b[us-east-1b]; RT1 --- PRT[private_route_table]; RT1 --- PCR[public_cr]; RT1 --- RTB[rtb-057dda5a89cea9e77]; US1a --- PRT; US1a --- PCR; US1b --- PRT; US1b --- RTB; PRT --- IGW((igw)); PCR --- IGW; RTB --- IGW; IGW --- NC;
```

```
resource "aws_vpc" "owncloud-vpc" {
  cidr_block      = var.vpc_cidr_block
  instance_tenancy = "default"

  tags = merge(
    local.common_tags,
    {
      Name = var.vpc_name
    }
  )
}
```

## Public Subnet

### Requirements:

One of two subnets (this one public the other private)

VPC > Subnets > subnet-0130915a13851af50

### subnet-0130915a13851af50 / public\_subnet

Actions ▾

| Details   |   |                                   |   |
|---|---|-----------------------------------|---|
| Subnet ID<br>subnet-0130915a13851af50             | Subnet ARN<br>arnaws:ec2:us-east-1:417355468534:subnet/subnet-0130915a13851af50 | State<br>Available                | Block Public Access<br>Off                  |
| IPv4 CIDR<br>10.0.1.0/24                          | Available IPv4 addresses<br>249   | IPv6 CIDR<br>-                    | IPv6 CIDR association ID<br>-               |
| Availability Zone<br>us-east-1a                   | Availability Zone ID<br>use1-az4  | Network border group<br>us-east-1 | VPC<br>vpc-0ccf48c84e513566b   owncloud-vpc |
| Route table<br>rtb-00e7053fee9deb710   public_crt | Network ACL<br>acl-0f95bed4889188dc9  | Default subnet<br>No              | Auto-assign public IPv4 address<br>Yes      |
| Auto-assign IPv6 address<br>No                    | Auto-assign customer-owned IPv4 address<br>No                                   | Customer-owned IPv4 pool<br>-     | Outpost ID<br>-                             |
| IPv4 CIDR reservations<br>-                       | IPv6 CIDR reservations<br>-   | IPv6-only<br>No                   | Hostname type<br>IP name                    |
| Resource name DNS A record<br>Disabled            | DNS64<br>Disabled   | DNS64<br>Disabled                 | Owner<br>417355468534                       |
| Resource name DNS AAAA record<br>Disabled         |   |                                   |   |

Flow logs | **Route table** | Network ACL | CIDR reservations | Sharing | Tags

**Route table:** rtb-00e7053fee9deb710 / public\_crt Edit route table association

| Routes (2)                         |                                       |
|------------------------------------|---------------------------------------|
| <input type="text"/> Filter routes |                                       |
| Destination                        | Target                                |
| 10.0.0.0/16                        | local                                 |
| 0.0.0.0/0                          | <a href="#">igw-052a178f191398664</a> |

```
resource "aws_subnet" "public_subnet" {
  vpc_id           = aws_vpc.owncloud-vpc.id
  cidr_block       = var.public_subnet_cidr_block
  availability_zone = "us-east-1a"
  map_public_ip_on_launch = true

  tags = merge(
    local.common_tags,
    {
      Name = "public_subnet"
    }
  )
}
```

## Public Security Group

### Requirements:

Allows public http access ("0.0.0.0/0") to the ownCloud server over port 80.  
 Allows ssh over port 22 from whitelisted IPs.

## sg-0f0270731dada77cb - terraform-20241114111310171200000001

Actions ▾

**Details**

|   |   |  |   |
|---|---|--|---|
| Security group name<br>terraform-20241114111310171200000001 | Security group ID<br>sg-0f0270731dada77cb   | Description<br>Opens port for SSH and HTTP | VPC ID<br><a href="#">vpc-0ccf48c84e513566b</a> |
| Owner<br>417355468534                                       | Inbound rules count<br>2 Permission entries | Outbound rules count<br>1 Permission entry |   |

Inbound rules | Outbound rules | Sharing - new | VPC associations - new | Tags

**Inbound rules (2)**

| <input type="checkbox"/> | Name | Security group rule ID | IP version | Type | Protocol | Port range | Source     |
|--------------------------|------|------------------------|------------|------|----------|------------|------------|
| <input type="checkbox"/> | -    | sgr-04c8eeea8dc24269   | IPv4       | HTTP | TCP      | 80         | 0.0.0.0/0  |
| <input type="checkbox"/> | -    | sgr-0b900c8f8bedfef9d  | IPv4       | SSH  | TCP      | 22         | [REDACTED] |

```
resource "aws_security_group" "public_sg" {
  vpc_id = aws_vpc.owncloud-vpc.id

  description = "Opens port for SSH and HTTP"

  ingress {
    from_port   = 80
    to_port     = 80
    protocol    = "tcp"
    cidr_blocks = ["0.0.0.0/0"]
  }

  ingress {
    from_port   = 22
    to_port     = 22
    protocol    = "tcp"
    cidr_blocks = [var.ssh_allowed_ip]
  }

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

  tags = merge(
    local.common_tags,
    {
      Name = "public-server-SG"
    }
  )
}
```

## Private Subnet

## Requirements:

One of two subnets (this one private the other public)

The screenshot shows the AWS VPC Subnet configuration for a private subnet. The subnet ID is subnet-062f296ed8c1ed690, located in the us-east-1b availability zone with a CIDR of 10.0.2.0/24. It has a route table associated with it (rtb-015b81355ca3a49fe). The subnet ARN is arn:aws:ec2:us-east-1:417355468534:subnet/subnet-062f296ed8c1ed690. The state is available, and it is not associated with a VPC. The network border group is us-east-1. The subnet has no customer-owned IPv4 pool and is IPv6-only. It is not auto-assigned and has no DNS records. The owner is 417355468534.

**Route table:** rtb-015b81355ca3a49fe / private\_route\_table

**Routes (2)**

| Destination | Target                |
|-------------|-----------------------|
| 10.0.0.0/16 | local                 |
| 0.0.0.0/0   | nat-04dd7e7de78c0be76 |

```
resource "aws_subnet" "private_subnet" {
  vpc_id          = aws_vpc.owncloud-vpc.id
  cidr_block      = var.private_subnet_cidr_block
  availability_zone = "us-east-1b"

  tags = merge(
    local.common_tags,
    {
      Name = "private_subnet"
    }
  )
}
```

## Private Security Group

### Requirements:

Allows ingress on port 3306 and 22 from the public ec2 instance private IP. The public ec2 is a "Bastion Host". There is no ingress on port 80.

## sg-0732418372fb4f24c - terraform-20241114111333959600000005

Actions ▾

## Details

|   |   |  |   |
|---|---|--|---|
| Security group name<br>terraform-20241114111333959600000005 | Security group ID<br>sg-0732418372fb4f24c   | Description<br>Managed by Terraform        | VPC ID<br><a href="#">vpc-0ccf48c84e513566b</a> |
| Owner<br>417355468534                                       | Inbound rules count<br>2 Permission entries | Outbound rules count<br>1 Permission entry |   |

[Inbound rules](#) | [Outbound rules](#) | [Sharing - new](#) | [VPC associations - new](#) | [Tags](#)

## Inbound rules (2)

| Search |                        | Manage tags |              | Edit inbound rules |            |               |
|--------|------------------------|-------------|--------------|--------------------|------------|---------------|
| Name   | Security group rule ID | IP version  | Type         | Protocol           | Port range | Source        |
| -      | sgr-0d826e974c0a534c2  | IPv4        | SSH          | TCP                | 22         | 10.0.1.127/32 |
| -      | sgr-00d914181b9514398  | IPv4        | MYSQL/Aurora | TCP                | 3306       | 10.0.1.127/32 |

```
resource "aws_security_group" "private_sg" {
  vpc_id = aws_vpc.owncloud-vpc.id

  # mysql
  ingress {
    from_port = 3306
    to_port   = 3306
    protocol  = "tcp"
    cidr_blocks = ["${aws_instance.owncloud-server.private_ip}/32"]
  }

  # bastion setup
  ingress {
    from_port   = 22
    to_port     = 22
    protocol    = "tcp"
    cidr_blocks = ["${aws_instance.owncloud-server.private_ip}/32"]
  }

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

  tags = merge(
    local.common_tags,
    {
      Name = "private-server-SG"
    }
  )
}
```

## Internet Gateway

## Requirements:

VPC > Internet gateways > igw-052a178f191398664

### igw-052a178f191398664 / igw

Actions ▾

| Details   |                   | Info   |                       |     |       |      |     |          |      |           |      |
|---|-------------------|--|-----------------------|-----|-------|------|-----|----------|------|-----------|------|
| Internet gateway ID<br>igw-052a178f191398664  | State<br>Attached | VPC ID<br><a href="#">vpc-0ccf48c84e513566b</a>   owncloud-vpc | Owner<br>417355468534 |     |       |      |     |          |      |           |      |
| Tags  |                   |  |                       |     |       |      |     |          |      |           |      |
| <a href="#">Manage tags</a><br><table border="1"><thead><tr><th>Key</th><th>Value</th></tr></thead><tbody><tr><td>Name</td><td>igw</td></tr><tr><td>Owncloud</td><td>true</td></tr><tr><td>Terraform</td><td>true</td></tr></tbody></table> |                   |  |                       | Key | Value | Name | igw | Owncloud | true | Terraform | true |
| Key   | Value             |  |                       |     |       |      |     |          |      |           |      |
| Name  | igw               |  |                       |     |       |      |     |          |      |           |      |
| Owncloud  | true              |  |                       |     |       |      |     |          |      |           |      |
| Terraform   | true              |  |                       |     |       |      |     |          |      |           |      |

## Requirements:

## NAT Gateway

VPC > NAT gateways > nat-04dd7e7de78c0be76

### nat-04dd7e7de78c0be76 / owncloud-nat-gateway

Actions ▾

| Details  |  |  |   |
|--|--|--|---|
| NAT gateway ID<br>nat-04dd7e7de78c0be76  | Connectivity type<br>Public  | State<br>Available   | State message <a href="#">Info</a><br>-                               |
| NAT gateway ARN<br><a href="#">arn:aws:ec2:us-east-1:417355468534:natgateway/nat-04dd7e7de78c0be76</a> | Primary public IPv4 address<br><a href="#">3.214.231.10</a>        | Primary private IPv4 address<br><a href="#">10.0.1.151</a>             | Primary network interface ID<br><a href="#">eni-005b247906928f854</a> |
| VPC<br><a href="#">vpc-0ccf48c84e513566b</a> / owncloud-vpc  | Subnet<br><a href="#">subnet-0130915a13851af50</a> / public_subnet | Created<br><a href="#">Thursday, November 14, 2024 at 05:13:21 CST</a> | Deleted<br>-  |

Secondary IPv4 addresses | Monitoring | [Tags](#)

Tags

Manage tags

| Key       | Value                |
|-----------|----------------------|
| Terraform | true                 |
| Owncloud  | true                 |
| Name      | owncloud-nat-gateway |

# Public ec2 Instance

## Requirements:

Deploy an ec2 instance in the public subnet for the OwnCloud installation.

The screenshot shows the AWS EC2 Instances page with a single instance selected. The instance summary card displays the following details:

| Instance summary for i-097d9d0d54bcc1ebb (owncloud-server) <a href="#">Info</a>   |  |   |
|---|--|---|
| Updated less than a minute ago  |  |   |
| Instance ID<br>i-097d9d0d54bcc1ebb  | Public IPv4 address<br>100.26.43.28   <a href="#">open address</a>                   |   |
| IPv6 address<br>-   | Instance state<br>Running  |   |
| Hostname type<br>IP name: ip-10-0-1-127.ec2.internal  | Private IP DNS name (IPv4 only)<br>ip-10-0-1-127.ec2.internal                        |   |
| Answer private resource DNS name<br>-   | Instance type<br>t2.micro  |   |
| Auto-assigned IP address<br>100.26.43.28 [Public IP]  | VPC ID<br>vpc-0ccf48c84e513566b (owncloud-vpc)                                       |   |
| IAM Role<br>-   | Subnet ID<br>subnet-0130915a13851af50 (public_subnet)                                |   |
| IMDSv2<br>Optional<br>EC2 recommends setting IMDSv2 to required   <a href="#">Learn more</a>  | Instance ARN<br>arn:aws:ec2:us-east-1:417355468534:instance/i-097d9d0d54bcc1ebb      |   |
| <a href="#">Details</a>   <a href="#">Status and alarms</a>   <a href="#">Monitoring</a>   <a href="#">Security</a>   <a href="#">Networking</a>   <a href="#">Storage</a>   <a href="#">Tags</a> |  |   |
| <b>▼ Instance details <a href="#">Info</a></b>  |  |   |
| Platform<br>Ubuntu  | AMI ID<br>ami-005fc0f236362e99f  | Monitoring<br>disabled  |
| Platform details<br>Linux/UNIX  | AMI name<br>ubuntu/images/hvm-ssd/ubuntu-jammy-22.04-amd64-server-20240927           | Termination protection<br>Disabled  |
| Stop protection<br>Disabled   | Launch time<br>Thu Nov 14 2024 05:13:22 GMT-0600 (Central Standard Time)<br>(6 days) | AMI location<br>amazon/ubuntu/images/hvm-ssd/ubuntu-jammy-22.04-amd64-server-20240927 |
| Instance auto-recovery<br>Default   | Lifecycle<br>normal  | Stop-hibernate behavior<br>Disabled   |
| AMI Launch index<br>0   | Key pair assigned at launch<br>own-cloud   | State transition reason<br>-  |
| Credit specification<br>standard  | Kernel ID<br>-   | State transition message<br>-   |
| Usage operation<br>RunInstances   | RAM disk ID<br>-   | Owner<br>417355468534   |

```
resource "aws_instance" "owncloud-server" {
  ami                      = var.ubuntu_ami
  instance_type            = "t2.micro"
  subnet_id                = aws_subnet.public_subnet.id
  associate_public_ip_address = true
  key_name                 = var.key_pair

  vpc_security_group_ids = [aws_security_group.public_sg.id]

  tags = merge(
    local.common_tags,
    {
      Name = "owncloud-server"
    }
  )
}
```

```

        }
    }

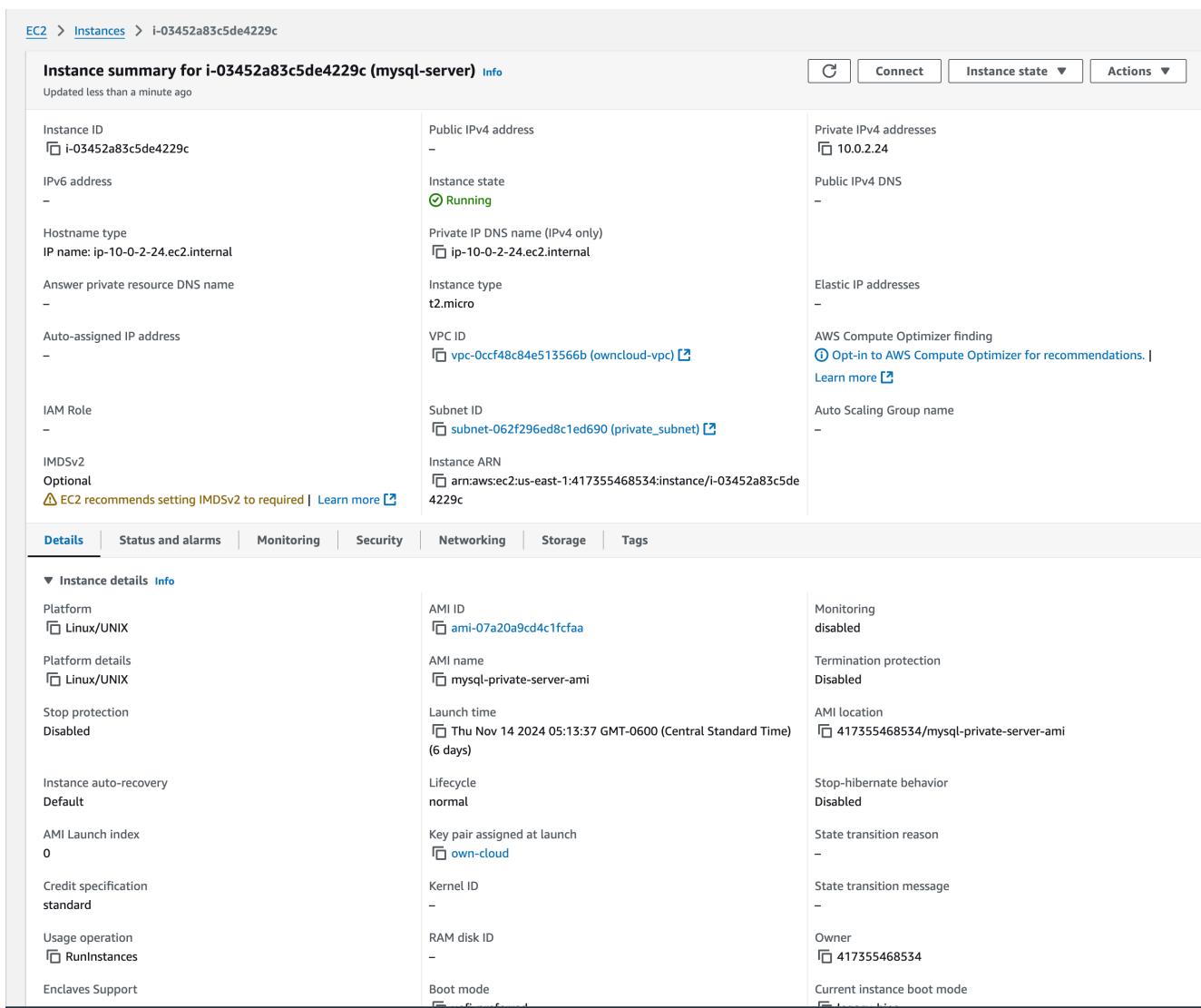
variable "ubuntu_ami" {
  description = "AMIs for Ubuntu 22.04 instances"
  type        = string
  default     = "ami-005fc0f236362e99f"
}

```

# Private ec2 Instance

## Requirements:

Deploy an ec2 instance in the private subnet to host the MySQL database for the OwnCloud server.



The screenshot shows the AWS EC2 Instances page. The instance summary for the MySQL server is displayed, showing it's running and assigned to a private subnet. The instance details section provides a comprehensive breakdown of the instance configuration, including the AMI ID, launch time, and various protection and monitoring settings.

| Instance summary for i-03452a83c5de4229c (mysql-server) <a href="#">Info</a>   |   | Actions  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
|--|---|--|--|--|---|------------------------|--|--|------------------------------------|-----------------------------|---|---|-----------------------------------|---------------------|-------------------------------------|-----------------------|--|------------------------------|----------------------------------|----------------|-------------------------------|---|------------------|---------------------------------------|------------------|----------------|---------------------------------|
| Updated less than a minute ago   |   |  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Instance ID<br><a href="#">i-03452a83c5de4229c</a>   | Public IPv4 address<br>-  | Private IPv4 addresses<br><a href="#">10.0.2.24</a>  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| IPv6 address<br>-  | Instance state<br><span style="color: green;">Running</span>                                      | Public IPv4 DNS<br>-   |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Hostname type<br>IP name: ip-10-0-2-24.ec2.internal  | Private IP DNS name (IPv4 only)<br><a href="#">ip-10-0-2-24.ec2.internal</a>                      | Elastic IP addresses<br>-  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Answer private resource DNS name<br>-  | Instance type<br>t2.micro   | AWS Compute Optimizer finding<br><a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a>   <a href="#">Learn more</a> |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Auto-assigned IP address<br>-  | VPC ID<br><a href="#">vpc-0ccf48c84e513566b (owncloud-vpc)</a>                                    | Auto Scaling Group name<br>-   |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| IAM Role<br>-  | Subnet ID<br><a href="#">subnet-062f296ed8c1ed690 (private_subnet)</a>                            |  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| IMDSv2<br>Optional<br><a href="#">△ EC2 recommends setting IMDSv2 to required</a>   <a href="#">Learn more</a>   | Instance ARN<br><a href="#">arn:aws:ec2:us-east-1:417355468534:instance/i-03452a83c5de4229c</a>   |  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| <a href="#">Details</a>   <a href="#">Status and alarms</a>   <a href="#">Monitoring</a>   <a href="#">Security</a>   <a href="#">Networking</a>   <a href="#">Storage</a>   <a href="#">Tags</a>  |   |  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| <b>Instance details</b> <a href="#">Info</a> <table border="1"> <tbody> <tr> <td>Platform<br/><a href="#">Linux/UNIX</a></td> <td>AMI ID<br/><a href="#">ami-07a20a9cd4c1fcfaa</a></td> <td>Monitoring<br/>disabled</td> </tr> <tr> <td>Platform details<br/><a href="#">Linux/UNIX</a></td> <td>AMI name<br/><a href="#">mysql-private-server-ami</a></td> <td>Termination protection<br/>Disabled</td> </tr> <tr> <td>Stop protection<br/>Disabled</td> <td>Launch time<br/><a href="#">Thu Nov 14 2024 05:13:37 GMT-0600 (Central Standard Time) (6 days)</a></td> <td>AMI location<br/><a href="#">417355468534/mysql-private-server-ami</a></td> </tr> <tr> <td>Instance auto-recovery<br/>Default</td> <td>Lifecycle<br/>normal</td> <td>Stop-hibernate behavior<br/>Disabled</td> </tr> <tr> <td>AMI Launch index<br/>0</td> <td>Key pair assigned at launch<br/><a href="#">own-cloud</a></td> <td>State transition reason<br/>-</td> </tr> <tr> <td>Credit specification<br/>standard</td> <td>Kernel ID<br/>-</td> <td>State transition message<br/>-</td> </tr> <tr> <td>Usage operation<br/><a href="#">RunInstances</a></td> <td>RAM disk ID<br/>-</td> <td>Owner<br/><a href="#">417355468534</a></td> </tr> <tr> <td>Enclaves Support</td> <td>Boot mode<br/>-</td> <td>Current instance boot mode<br/>-</td> </tr> </tbody> </table> |   |  |  | Platform<br><a href="#">Linux/UNIX</a> | AMI ID<br><a href="#">ami-07a20a9cd4c1fcfaa</a> | Monitoring<br>disabled | Platform details<br><a href="#">Linux/UNIX</a> | AMI name<br><a href="#">mysql-private-server-ami</a> | Termination protection<br>Disabled | Stop protection<br>Disabled | Launch time<br><a href="#">Thu Nov 14 2024 05:13:37 GMT-0600 (Central Standard Time) (6 days)</a> | AMI location<br><a href="#">417355468534/mysql-private-server-ami</a> | Instance auto-recovery<br>Default | Lifecycle<br>normal | Stop-hibernate behavior<br>Disabled | AMI Launch index<br>0 | Key pair assigned at launch<br><a href="#">own-cloud</a> | State transition reason<br>- | Credit specification<br>standard | Kernel ID<br>- | State transition message<br>- | Usage operation<br><a href="#">RunInstances</a> | RAM disk ID<br>- | Owner<br><a href="#">417355468534</a> | Enclaves Support | Boot mode<br>- | Current instance boot mode<br>- |
| Platform<br><a href="#">Linux/UNIX</a>   | AMI ID<br><a href="#">ami-07a20a9cd4c1fcfaa</a>   | Monitoring<br>disabled   |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Platform details<br><a href="#">Linux/UNIX</a>   | AMI name<br><a href="#">mysql-private-server-ami</a>  | Termination protection<br>Disabled   |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Stop protection<br>Disabled  | Launch time<br><a href="#">Thu Nov 14 2024 05:13:37 GMT-0600 (Central Standard Time) (6 days)</a> | AMI location<br><a href="#">417355468534/mysql-private-server-ami</a>  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Instance auto-recovery<br>Default  | Lifecycle<br>normal   | Stop-hibernate behavior<br>Disabled  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| AMI Launch index<br>0  | Key pair assigned at launch<br><a href="#">own-cloud</a>  | State transition reason<br>-   |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Credit specification<br>standard   | Kernel ID<br>-  | State transition message<br>-  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Usage operation<br><a href="#">RunInstances</a>  | RAM disk ID<br>-  | Owner<br><a href="#">417355468534</a>  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |
| Enclaves Support   | Boot mode<br>-  | Current instance boot mode<br>-  |  |  |   |                        |  |  |                                    |                             |   |   |                                   |                     |                                     |                       |  |                              |                                  |                |                               |   |                  |                                       |                  |                |                                 |

```

resource "aws_instance" "mysql-server" {
  ami           = var.private_server_ami
  instance_type = "t2.micro"
  subnet_id     = aws_subnet.private_subnet.id
}

```

```

key_name      = var.key_pair

vpc_security_group_ids = [aws_security_group.private_sg.id]

tags = merge(
  local.common_tags,
  {
    Name = "mysql-server"
  }
)
}

variable "private_server_ami" {
  description = "Private server ami with mysql installed on it"
  type        = string
}

```

Installing MySQL was tedious. So I created an ami from the server after I was satisfied.

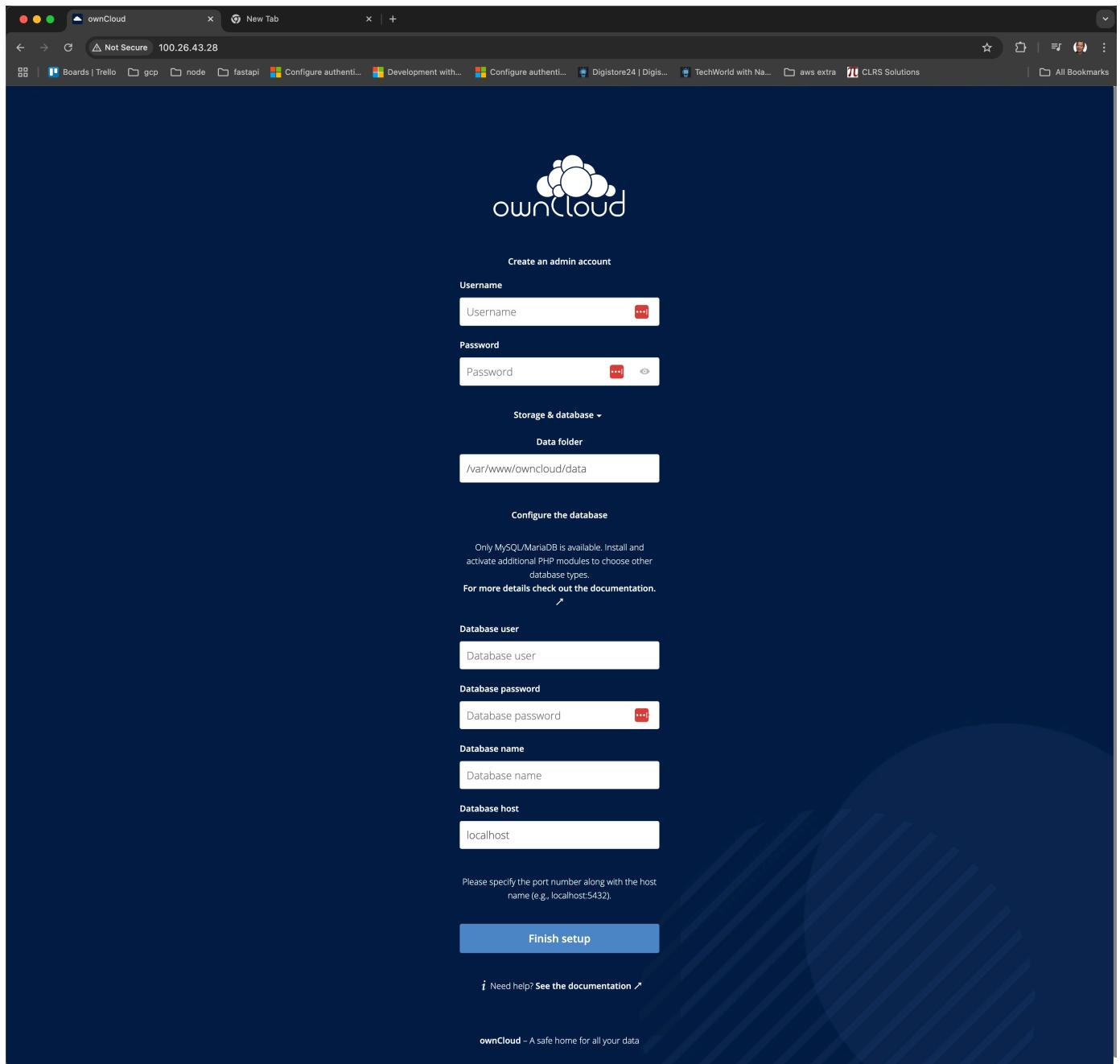
This proved to be useful since I could destroy and apply the ec2 resource daily. The ami id was stored in a terraform.tfvars file: private\_server\_ami = "ami-07a20a9cd4c1fcfaa" .

| Image summary for ami-07a20a9cd4c1fcfaa   |  |  |  |
|---|--|--|--|
|   |  | Actions ▾  |  |
| AMI ID  | Image type   | Platform details                                       | Root device type                       |
| <a href="#"> ami-07a20a9cd4c1fcfaa</a>  | machine  | Linux/UNIX   | EBS                                    |
| AMI name  | Owner account ID   | Architecture   | Usage operation                        |
| <a href="#"> mysql-private-server-ami</a>   | <a href="#"> 417355468534</a>  | x86_64   | RunInstances                           |
| Root device name  | Status   | Source   | Virtualization type                    |
| <a href="#"> /dev/sda1</a>  | <a href="#"> Available</a>   | <a href="#"> 417355468534/mysql-private-server-ami</a> | hvm                                    |
| Boot mode   | State reason   | Creation date  | Kernel ID                              |
| uefi-preferred  | -  | <a href="#"> 2024-11-14T02:29:54.000Z</a>              | -                                      |
| Description   | Product codes  | RAM disk ID  | Deprecation time                       |
| <a href="#"> MI for pre-configured MySQL private server with database setup for OwnCloud.</a> | -  | -  | -                                      |
| Last launched time  | Block devices  | Deregistration protection                              | Source AMI ID                          |
| Thu Nov 14 2024 05:13:37 GMT-0600 (Central Standard Time)                                     | <a href="#"> /dev/sda1=snap-06376f3b83d48bd6f8:true:p2</a><br><a href="#"> /dev/sdb=ephemeral0</a><br><a href="#"> /dev/sdc=ephemeral1</a> | <a href="#"> Disabled</a>                              | <a href="#"> ami-005fc0f236362e99f</a> |
| Source AMI Region   |  |  |  |
| us-east-1   |  |  |  |

## Notes

### OwnCloud deployment

We were successful in standing up the OwnCloud app. And we were able to configure it minimally.



ubuntu@owncloud: /var/www/owncloud/config

GNU nano 6.2 config.php

```
<?php
$CONFIG = array (
    'instanceid' => 'ocqgz7agltf3',
    'passwordsalt' => 'RwXvt9Gfb9dMVfqSktKwqh0qnEWHDo',
    'secret' => 'gW/t/6q3tpIXyyhMt/SHiS2hJRZE4wRt2WlzXe9zXXPAwGq',
    'trusted_domains' =>
        array (
            0 => '100.26.43.28',
        ),
    'datadirectory' => '/var/www/owncloud/data',
    'overwrite.cli.url' => 'http://100.26.43.28',
    'dbtype' => 'mysql',
    'version' => '10.15.0.2',
    'dbname' => 'owncloud',
    'dbconnectionstring' => '',
    'dbhost' => '10.0.2.24',
    'dbtableprefix' => 'oc_',
    'mysql.utf8mb4' => true,
    'dbuser' => 'owncloud',
    'dbpassword' => 'password',
    'allow_user_to_change_mail_address' => '',
    'logtimezone' => 'UTC',
    'apps_paths' =>
        array (
            0 =>
                array (
                    'path' => '/var/www/owncloud/apps',
                    'url' => '/apps',
                    'writable' => false,
                ),
            1 =>
                array (
                    'path' => '/var/www/owncloud/apps-external',
                    'url' => '/apps-external',
                    'writable' => true,
                ),
        ),
    'installed' => true,
);
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location  
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

*However without https service, the browser and local gateway blocks posting with an anti-phishing policy.*



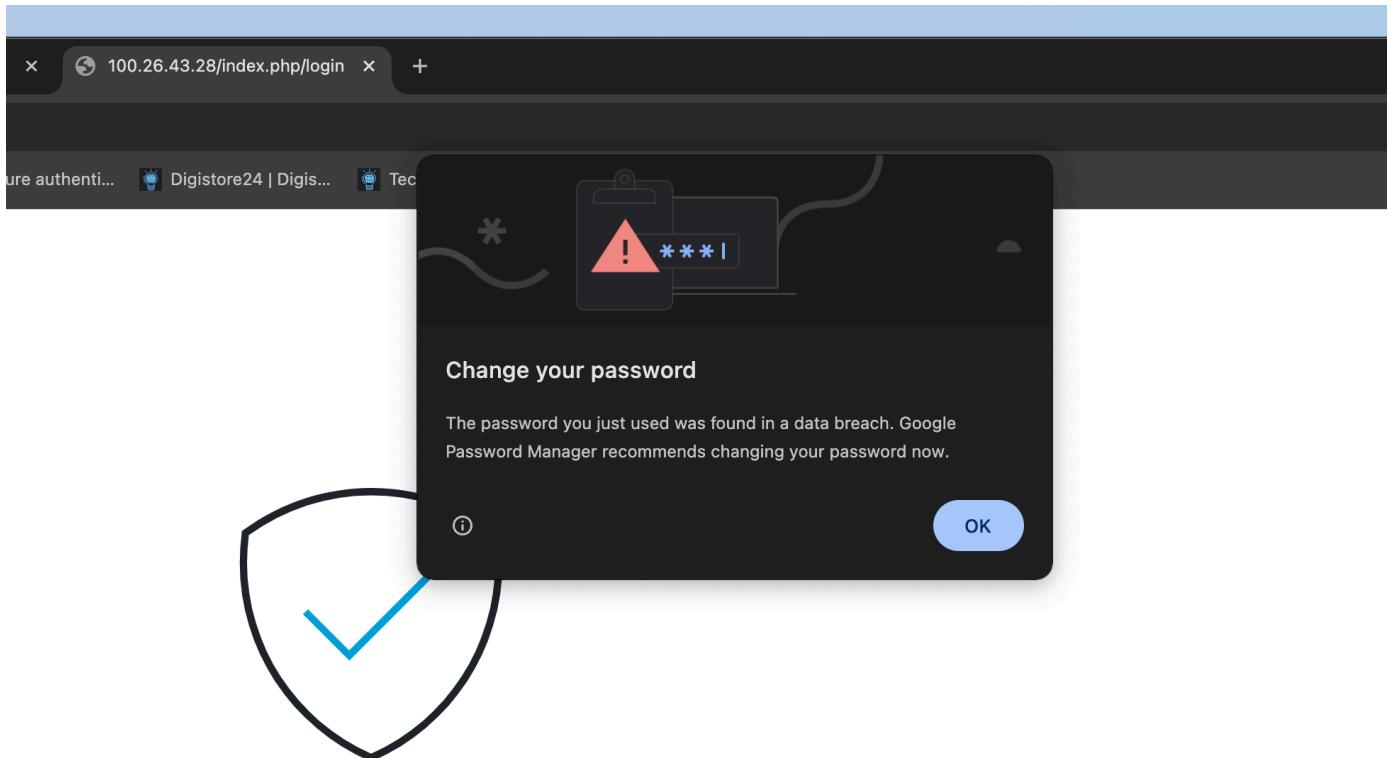
**Username or email**

A white input field with a placeholder text "Username or email". To the right of the input field is a small red square button with three white dots (...).

**Password**

A white input field with a placeholder text "Password". To the right of the input field is a small red square button with three white dots (...).

**Login**



## AT&T Internet Security

# Phishing page blocked for your protection

Phishing pages attempt to obtain sensitive information such as login credentials or credit card details by disguising as trustworthy entities. The stolen data can be then used for financial gain.

[Got It](#)

If you know this page is not dangerous, you can add it to the exceptions list using [AT&T Smart Home Manager](#). Be aware, by adding this site to an exception list you will not be warned about any threats existing on this page in the future.

## Tear Down

```
▶ terraform show -json | jq -r '.values.root_module.resources[] | [.type, .name] | @tsv' | column -t
```

|                      |                 |
|----------------------|-----------------|
| aws_eip              | nat_eip         |
| aws_instance         | mysql-server    |
| aws_instance         | owncloud-server |
| aws_internet_gateway | igw             |

|                             |                                 |
|-----------------------------|---------------------------------|
| aws_nat_gateway             | nat_gateway                     |
| aws_route_table             | private_route_table             |
| aws_route_table             | public_route_table              |
| aws_route_table_association | private_route_table_association |
| aws_route_table_association | public_rt_association           |
| aws_security_group          | private_sg                      |
| aws_security_group          | public_sg                       |
| aws_subnet                  | private_subnet                  |
| aws_subnet                  | public_subnet                   |
| aws_vpc                     | owncloud-vpc                    |

```
> terraform destroy
aws_vpc.owncloud-vpc: Refreshing state... [id=vpc-0ccf48c84e513566b]
aws_eip.nat_eip: Refreshing state... [id=eipalloc-07c6444a1902e5483]
aws_internet_gateway.igw: Refreshing state... [id=igw-052a178f191398664]
aws_subnet.private_subnet: Refreshing state... [id=subnet-062f296ed8c1ed690]
aws_subnet.public_subnet: Refreshing state... [id=subnet-0130915a13851af50]
aws_security_group.public_sg: Refreshing state... [id=sg-0f0270731dada77cb]
aws_route_table.public_route_table: Refreshing state... [id=rtb-00e7053fee9deb710]
aws_nat_gateway.nat_gateway: Refreshing state... [id=nat-04dd7e7de78c0be76]
aws_route_table_association.public_rt_association: Refreshing state... [id=rtbassoc-02aa6617f3a642633]
aws_instance.owncloud-server: Refreshing state... [id=i-097d9d0d54bcc1ebbb]
aws_route_table.private_route_table: Refreshing state... [id=rtb-015b81355ca3a49fe]
aws_route_table_association.private_route_table_association: Refreshing state... [id=rtbassoc-00982c2]
aws_security_group.private_sg: Refreshing state... [id=sg-0732418372fb4f24c]
aws_instance.mysql-server: Refreshing state... [id=i-03452a83c5de4229c]
```

Plan: 0 to add, 0 to change, 14 to destroy.

#### Changes to Outputs:

|                                  |   |
|----------------------------------|---|
| - internet_gateway_id            | = "igw-052a178f191398664" -> null                                   |
| - mysql_server_ssh_string        | = "ssh -i own-cloud.pem ubuntu@10.0.2.24" -> null                   |
| - nat_gateway_id                 | = "nat-04dd7e7de78c0be76" -> null                                   |
| - owncloud_ssh_string            | = "ssh -i own-cloud.pem ubuntu@100.26.43.28" -> null                |
| - private_route_table_id         | = "rtb-015b81355ca3a49fe" -> null                                   |
| - private_server_ec2             | = "i-03452a83c5de4229c" -> null                                     |
| - private_server_sg_id           | = "sg-0732418372fb4f24c" -> null                                    |
| - private_subnet_cidr_block      | = "10.0.2.0/24" -> null   |
| - private_subnet_id              | = "subnet-062f296ed8c1ed690" -> null                                |
| - public_route_table_id          | = "rtb-00e7053fee9deb710" -> null                                   |
| - public_server_ec2              | = "i-097d9d0d54bcc1ebbb" -> null                                    |
| - public_server_sg_id            | = "sg-0f0270731dada77cb" -> null                                    |
| - public_subnet_cidr_block       | = "10.0.1.0/24" -> null   |
| - public_subnet_id               | = "subnet-0130915a13851af50" -> null                                |
| - scp_command_to_owncloud_server | = "scp -i own-cloud.pem ./own-cloud.pem ubuntu@100.26.43.28:/home/i |
| - vpc_id                         | = "vpc-0ccf48c84e513566b" -> null                                   |

Do you really want to destroy all resources?

Terraform will destroy all your managed infrastructure, as shown above.

There is no undo. Only 'yes' will be accepted to confirm.

Enter a value: yes

```
aws_route_table_association.public_rt_association: Destroying... [id=rtbassoc-02aa6617f3a642633]
aws_route_table_association.private_route_table_association: Destroying... [id=rtbassoc-00982c2221759]
aws_instance.mysql-server: Destroying... [id=i-03452a83c5de4229c]
aws_route_table_association.private_route_table_association: Still destroying... [id=rtbassoc-00982c2]
aws_route_table_association.public_rt_association: Still destroying... [id=rtbassoc-02aa6617f3a642633]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 10s elapsed]
aws_route_table_association.public_rt_association: Destruction complete after 13s
aws_route_table_association.private_route_table_association: Destruction complete after 13s
```

```
aws_route_table.public_route_table: Destroying... [id=rtb-00e7053fee9deb710]
aws_route_table.private_route_table: Destroying... [id=rtb-015b81355ca3a49fe]
aws_route_table.private_route_table: Destruction complete after 1s
aws_nat_gateway.nat_gateway: Destroying... [id=nat-04dd7e7de78c0be76]
aws_route_table.public_route_table: Destruction complete after 1s
aws_internet_gateway.igw: Destroying... [id=igw-052a178f191398664]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 20s elapsed]
aws_nat_gateway.nat_gateway: Still destroying... [id=nat-04dd7e7de78c0be76, 10s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 10s elapsed]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 30s elapsed]
aws_nat_gateway.nat_gateway: Still destroying... [id=nat-04dd7e7de78c0be76, 20s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 20s elapsed]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 40s elapsed]
aws_nat_gateway.nat_gateway: Still destroying... [id=nat-04dd7e7de78c0be76, 30s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 30s elapsed]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 50s elapsed]
aws_nat_gateway.nat_gateway: Still destroying... [id=nat-04dd7e7de78c0be76, 40s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 40s elapsed]
aws_nat_gateway.nat_gateway: Destruction complete after 41s
aws_eip.nat_eip: Destroying... [id=eipalloc-07c6444a1902e5483]
aws_eip.nat_eip: Destruction complete after 1s
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 1m0s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 50s elapsed]
aws_instance.mysql-server: Still destroying... [id=i-03452a83c5de4229c, 1m10s elapsed]
aws_instance.mysql-server: Destruction complete after 1m11s
aws_subnet.private_subnet: Destroying... [id=subnet-062f296ed8c1ed690]
aws_security_group.private_sg: Destroying... [id=sg-0732418372fb4f24c]
aws_subnet.private_subnet: Destruction complete after 0s
aws_security_group.private_sg: Destruction complete after 0s
aws_instance.owncloud-server: Destroying... [id=i-097d9d0d54bcc1ebb]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m0s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 10s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m10s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 20s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m20s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 30s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m30s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 40s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m40s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 50s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 1m50s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 1m0s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 2m0s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 1m10s elapsed]
aws_internet_gateway.igw: Still destroying... [id=igw-052a178f191398664, 2m10s elapsed]
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 1m20s elapsed]
aws_internet_gateway.igw: Destruction complete after 2m19s
aws_instance.owncloud-server: Still destroying... [id=i-097d9d0d54bcc1ebb, 1m30s elapsed]
aws_instance.owncloud-server: Destruction complete after 1m32s
aws_subnet.public_subnet: Destroying... [id=subnet-0130915a13851af50]
aws_security_group.public_sg: Destroying... [id=sg-0f0270731dada77cb]
aws_subnet.public_subnet: Destruction complete after 0s
aws_security_group.public_sg: Destruction complete after 1s
aws_vpc.owncloud-vpc: Destroying... [id=vpc-0ccf48c84e513566b]
aws_vpc.owncloud-vpc: Destruction complete after 0s
```

Destroy complete! Resources: 14 destroyed.

## VPC

### Before

| Your VPCs (2) <a href="#">Info</a> |              |                                       |                        |                  |               |
|------------------------------------|--------------|---------------------------------------|------------------------|------------------|---------------|
| <input type="checkbox"/>           | Name         | VPC ID                                | State                  | Block Public...  | IPv4 CIDR     |
| <input type="checkbox"/>           | owncloud-vpc | <a href="#">vpc-0ccf48c84e513566b</a> | <span>Available</span> | <span>Off</span> | 10.0.0.0/16   |
| <input type="checkbox"/>           | -            | <a href="#">vpc-0cada06644d5167a9</a> | <span>Available</span> | <span>Off</span> | 172.31.0.0/16 |

### After

| Your VPCs (1) <a href="#">Info</a> |      |                                       |                        |                  |               |
|------------------------------------|------|---------------------------------------|------------------------|------------------|---------------|
| <input type="checkbox"/>           | Name | VPC ID                                | State                  | Block Public...  | IPv4 CIDR     |
| <input type="checkbox"/>           | -    | <a href="#">vpc-0cada06644d5167a9</a> | <span>Available</span> | <span>Off</span> | 172.31.0.0/16 |

## Subnets

### Before

| Subnets (4) <a href="#">Info</a>                            |                |  |                        |  |  |
|---|----------------|--|------------------------|--|--|
| <input type="checkbox"/> Find resources by attribute or tag |                |  |                        |  |  |
| <input type="checkbox"/>                                    | Name           | Subnet ID                                | State                  | VPC  |  |
| <input type="checkbox"/>                                    | -              | <a href="#">subnet-0ead258cad2368834</a> | <span>Available</span> | <a href="#">vpc-0cada06644d5167a9</a>                |  |
| <input type="checkbox"/>                                    | public_subnet  | <a href="#">subnet-0130915a13851af50</a> | <span>Available</span> | <a href="#">vpc-0ccf48c84e513566b   owncloud-vpc</a> |  |
| <input type="checkbox"/>                                    | private_subnet | <a href="#">subnet-062f296ed8c1ed690</a> | <span>Available</span> | <a href="#">vpc-0ccf48c84e513566b   owncloud-vpc</a> |  |
| <input type="checkbox"/>                                    | -              | <a href="#">subnet-0b0cd67e9e6c638d7</a> | <span>Available</span> | <a href="#">vpc-0cada06644d5167a9</a>                |  |

### After

| Subnets (2) <a href="#">Info</a>                            |      |  |                        |                                       |                  |
|---|------|--|------------------------|---------------------------------------|------------------|
| <input type="checkbox"/> Find resources by attribute or tag |      |  |                        |                                       |                  |
| <input type="checkbox"/>                                    | Name | Subnet ID                                | State                  | VPC                                   |                  |
| <input type="checkbox"/>                                    | -    | <a href="#">subnet-0ead258cad2368834</a> | <span>Available</span> | <a href="#">vpc-0cada06644d5167a9</a> | <span>Off</span> |
| <input type="checkbox"/>                                    | -    | <a href="#">subnet-0b0cd67e9e6c638d7</a> | <span>Available</span> | <a href="#">vpc-0cada06644d5167a9</a> | <span>Off</span> |

## Security Groups

### Before

## Security Groups (7) [Info](#)

Find resources by attribute or tag

| <input type="checkbox"/> | Name                | ▼ | Security group ID                    | ▼ | Security group name                  | ▼ | VPC ID                                | ▼ | Description                               | ▼ |
|--------------------------|---------------------|---|--------------------------------------|---|--------------------------------------|---|---------------------------------------|---|---|---|
| <input type="checkbox"/> | -                   |   | <a href="#">sg-0720584bfcf98f9d</a>  |   | default                              |   | <a href="#">vpc-0ccf48c84e513566b</a> |   | default VPC security group                |   |
| <input type="checkbox"/> | -                   |   | <a href="#">sg-039b491cc5130a447</a> |   | launch-wizard-2                      |   | <a href="#">vpc-0cada06644d5167a9</a> |   | launch-wizard-2 created 2024-11-13T...    |   |
| <input type="checkbox"/> | -                   |   | <a href="#">sg-05192dc3106e3959c</a> |   | default                              |   | <a href="#">vpc-0cada06644d5167a9</a> |   | default VPC security group                |   |
| <input type="checkbox"/> | Boxing-api-dev2-env |   | <a href="#">sg-056a38516037c1ca2</a> |   | awseb-e-4v2yzsp4ca-stack-AWSEBSec... |   | <a href="#">vpc-0cada06644d5167a9</a> |   | SecurityGroup for ElasticBeanstalk env... |   |
| <input type="checkbox"/> | -                   |   | <a href="#">sg-05b5935c89f7092b2</a> |   | launch-wizard-1                      |   | <a href="#">vpc-0cada06644d5167a9</a> |   | launch-wizard-1 created 2024-11-10T...    |   |
| <input type="checkbox"/> | public-server-SG    |   | <a href="#">sg-f0f270731dada77cb</a> |   | terraform-202411141113101712000...   |   | <a href="#">vpc-0ccf48c84e513566b</a> |   | Opens port for SSH and HTTP               |   |
| <input type="checkbox"/> | private-server-SG   |   | <a href="#">sg-0732418372fb4f24c</a> |   | terraform-202411141113339596000...   |   | <a href="#">vpc-0ccf48c84e513566b</a> |   | Managed by Terraform                      |   |

## After

## Security Groups (4) [Info](#)

Find resources by attribute or tag

| <input type="checkbox"/> | Name                | ▼ | Security group ID                    | ▼ | Security group name                  | ▼ | VPC ID                                | ▼ | Description                               | ▼ |
|--------------------------|---------------------|---|--------------------------------------|---|--------------------------------------|---|---------------------------------------|---|---|---|
| <input type="checkbox"/> | -                   |   | <a href="#">sg-039b491cc5130a447</a> |   | launch-wizard-2                      |   | <a href="#">vpc-0cada06644d5167a9</a> |   | launch-wizard-2 created 2024-11-13T...    |   |
| <input type="checkbox"/> | -                   |   | <a href="#">sg-05192dc3106e3959c</a> |   | default                              |   | <a href="#">vpc-0cada06644d5167a9</a> |   | default VPC security group                |   |
| <input type="checkbox"/> | Boxing-api-dev2-env |   | <a href="#">sg-056a38516037c1ca2</a> |   | awseb-e-4v2yzsp4ca-stack-AWSEBSec... |   | <a href="#">vpc-0cada06644d5167a9</a> |   | SecurityGroup for ElasticBeanstalk env... |   |
| <input type="checkbox"/> | -                   |   | <a href="#">sg-05b5935c89f7092b2</a> |   | launch-wizard-1                      |   | <a href="#">vpc-0cada06644d5167a9</a> |   | launch-wizard-1 created 2024-11-10T...    |   |

## IGW

### Before

#### Internet gateways (2) [Info](#)

Search

| <input type="checkbox"/> | Name | ▼ | Internet gateway ID                   | ▼ | State                 | ▼ | VPC ID   | ▼ | Owner        | ▼ |
|--------------------------|------|---|---------------------------------------|---|-----------------------|---|--|---|--------------|---|
| <input type="checkbox"/> | igw  |   | <a href="#">igw-052a178f191398664</a> |   | <span>Attached</span> |   | <a href="#">vpc-0ccf48c84e513566b   owncloud-vpc</a> |   | 417355468534 |   |
| <input type="checkbox"/> | -    |   | <a href="#">igw-0ee833c0afa37ce63</a> |   | <span>Attached</span> |   | <a href="#">vpc-0cada06644d5167a9</a>                |   | 417355468534 |   |

### After

#### Internet gateways (1) [Info](#)

Search

| <input type="checkbox"/> | Name | ▼ | Internet gateway ID                   | ▼ | State                 | ▼ | VPC ID                                | ▼ | Owner        | ▼ |
|--------------------------|------|---|---------------------------------------|---|-----------------------|---|---------------------------------------|---|--------------|---|
| <input type="checkbox"/> | -    |   | <a href="#">igw-0ee833c0afa37ce63</a> |   | <span>Attached</span> |   | <a href="#">vpc-0cada06644d5167a9</a> |   | 417355468534 |   |

## EIP

### Before

| Elastic IP addresses (2)  |                              |           |                            |                    |                        |                    |                            |                                  |                |  |
|---|------------------------------|-----------|----------------------------|--------------------|------------------------|--------------------|----------------------------|----------------------------------|----------------|--|
| <input type="button" value="Actions"/> <input type="button" value="Allocate Elastic IP address"/> |                              |           |                            |                    |                        |                    |                            |                                  |                |  |
| <input type="text"/> Find resources by attribute or tag   |                              |           |                            |                    |                        |                    |                            |                                  |                |  |
| Name  | Allocated IPv4 addr...       | Type      | Allocation ID              | Reverse DNS record | Associated instance ID | Private IP address | Association ID             | Network interface owner accou... | Network bon... |  |
| -   | <a href="#">18.211.154.1</a> | Public IP | eipalloc-016b30ff2bb1371fa | -                  | -                      | -                  | -                          | -                                | us-east-1      |  |
| -   | <a href="#">3.214.231.10</a> | Public IP | eipalloc-07cd444a1902e5483 | -                  | -                      | 10.0.1.151         | eipassoc-01e5c9486a782cdf5 | 417355468534                     | us-east-1      |  |

After

| Elastic IP addresses (1)  |                              |           |                            |                    |                        |                    |                |                                  |                |  |
|---|------------------------------|-----------|----------------------------|--------------------|------------------------|--------------------|----------------|----------------------------------|----------------|--|
| <input type="button" value="Actions"/> <input type="button" value="Allocate Elastic IP address"/> |                              |           |                            |                    |                        |                    |                |                                  |                |  |
| <input type="text"/> Find resources by attribute or tag   |                              |           |                            |                    |                        |                    |                |                                  |                |  |
| Name  | Allocated IPv4 addr...       | Type      | Allocation ID              | Reverse DNS record | Associated instance ID | Private IP address | Association ID | Network interface owner accou... | Network bon... |  |
| -   | <a href="#">18.211.154.1</a> | Public IP | eipalloc-016b30ff2bb1371fa | -                  | -                      | -                  | -              | -                                | -              |  |

## Nat Gateway

Before

| NAT gateways (1) <a href="#">Info</a>  |                                       |                 |  |               |                              |                      |                                       |                                      |  |  |
|--|---------------------------------------|-----------------|--|---------------|------------------------------|----------------------|---------------------------------------|--------------------------------------|--|--|
| <input type="button" value="Actions"/> <input type="button" value="Create NAT gateway"/> |                                       |                 |  |               |                              |                      |                                       |                                      |  |  |
| <input type="text"/> Find resources by attribute or tag                                  |                                       |                 |  |               |                              |                      |                                       |                                      |  |  |
| Name   | NAT gateway ID                        | Connectivity... | State  | State message | Primary public IPv4 address  | Primary private I... | Primary network interf...             | VPC                                  | Subnet                                   |  |
| owncloud-nat-gateway   | <a href="#">nat-04dd7e7de78c0be76</a> | Public          | <span style="color: green;">Available</span> | -             | <a href="#">3.214.231.10</a> | 10.0.1.151           | <a href="#">eni-005b247906928f854</a> | vpc-0ccf48c84e513566b / owncloud-vpc | subnet-0130915a13851af50 / public_subnet |  |

After

| NAT gateways (1) <a href="#">Info</a>  |                                       |                 |   |               |                              |                      |                                       |                       |                          |  |
|--|---------------------------------------|-----------------|---|---------------|------------------------------|----------------------|---------------------------------------|-----------------------|--------------------------|--|
| <input type="button" value="Actions"/> <input type="button" value="Create NAT gateway"/> |                                       |                 |   |               |                              |                      |                                       |                       |                          |  |
| <input type="text"/> Find resources by attribute or tag                                  |                                       |                 |   |               |                              |                      |                                       |                       |                          |  |
| Name   | NAT gateway ID                        | Connectivity... | State                                     | State message | Primary public IPv4 address  | Primary private I... | Primary network interf...             | VPC                   | Subnet                   |  |
| owncloud-nat-gateway   | <a href="#">nat-04dd7e7de78c0be76</a> | Public          | <span style="color: gray;">Deleted</span> | -             | <a href="#">3.214.231.10</a> | 10.0.1.151           | <a href="#">eni-005b247906928f854</a> | vpc-0ccf48c84e513566b | subnet-0130915a13851af50 |  |

Notice the state is now "deleted."

## Route Tables

Before

| Route tables (4) <a href="#">Info</a>  |  |   |                   |      |                                      |  |  |  |  |  |
|--|--|---|-------------------|------|--------------------------------------|--|--|--|--|--|
| <input type="button" value="Actions"/> <input type="button" value="Create route table"/> |  |   |                   |      |                                      |  |  |  |  |  |
| <input type="text"/> Find resources by attribute or tag                                  |  |   |                   |      |                                      |  |  |  |  |  |
| Name   | Route table ID                         | Explicit subnet associations              | Edge associations | Main | VPC                                  |  |  |  |  |  |
| private_route_table  | <a href="#">rtb-015b81355ca3a49fe</a>  | subnet-062f296ed8c1ed690 / private_subnet | -                 | No   | vpc-0ccf48c84e513566b   owncloud-vpc |  |  |  |  |  |
| public_crt   | <a href="#">rtb-00e7053fee9deb710</a>  | subnet-0130915a13851af50 / public_subnet  | -                 | No   | vpc-0ccf48c84e513566b   owncloud-vpc |  |  |  |  |  |
| -  | <a href="#">rtb-0479b8004ec7d75fd</a>  | -   | -                 | Yes  | vpc-0cada06644d5167a9                |  |  |  |  |  |
| -  | <a href="#">rtb-057ddaa5a89cea9e77</a> | -   | -                 | Yes  | vpc-0ccf48c84e513566b   owncloud-vpc |  |  |  |  |  |

After

| Route tables (1) <a href="#">Info</a>  |                                       |                              |                   |      |                       |              |  |  |  |  |
|--|---------------------------------------|------------------------------|-------------------|------|-----------------------|--------------|--|--|--|--|
| <input type="button" value="Actions"/> <input type="button" value="Create route table"/> |                                       |                              |                   |      |                       |              |  |  |  |  |
| <input type="text"/> Find resources by attribute or tag                                  |                                       |                              |                   |      |                       |              |  |  |  |  |
| Name   | Route table ID                        | Explicit subnet associations | Edge associations | Main | VPC                   | Owner ID     |  |  |  |  |
| -  | <a href="#">rtb-0479b8004ec7d75fd</a> | -                            | -                 | Yes  | vpc-0cada06644d5167a9 | 417355468534 |  |  |  |  |

## EC2 Instances

# Before

| Instances (2) Info |                      |                |               |                   |                               |                   |                 |                 |            |          |            | Last updated           | Connect | Instance state | Actions | Launch instances |
|--------------------|----------------------|----------------|---------------|-------------------|-------------------------------|-------------------|-----------------|-----------------|------------|----------|------------|------------------------|---------|----------------|---------|------------------|
|                    |                      |                |               |                   |                               |                   |                 |                 |            |          |            | less than a minute ago |         |                |         |                  |
| All states         |                      |                |               |                   |                               |                   |                 |                 |            |          |            |                        |         |                |         |                  |
| Name               | Instance ID          | Instance state | Instance type | Status check      | Alarm status                  | Availability Zone | Public IPv4 DNS | Public IPv4 ... | Elastic IP | IPv6 IPs | Monitoring | Security group         |         |                |         |                  |
| owncloud-server    | i-097d9d05d54bcc1ebb | Running        | t2.micro      | 2/2 checks passed | <a href="#">View alarms</a> + | us-east-1a        | -               | 100.26.43.28    | -          | -        | disabled   | terraform-2024         |         |                |         |                  |
| mysql-server       | i-03452a83c5de4229c  | Running        | t2.micro      | 2/2 checks passed | <a href="#">View alarms</a> + | us-east-1b        | -               | -               | -          | -        | disabled   | terraform-2024         |         |                |         |                  |

# After

| Instances (2) Info |                      |                |               |              |                               |                   |                 |                 |            |          |            | Last updated           | Connect | Instance state | Actions | Launch instances |
|--------------------|----------------------|----------------|---------------|--------------|-------------------------------|-------------------|-----------------|-----------------|------------|----------|------------|------------------------|---------|----------------|---------|------------------|
|                    |                      |                |               |              |                               |                   |                 |                 |            |          |            | less than a minute ago |         |                |         |                  |
| All states         |                      |                |               |              |                               |                   |                 |                 |            |          |            |                        |         |                |         |                  |
| Name               | Instance ID          | Instance state | Instance type | Status check | Alarm status                  | Availability Zone | Public IPv4 DNS | Public IPv4 ... | Elastic IP | IPv6 IPs | Monitoring | Security group         |         |                |         |                  |
| owncloud-server    | i-097d9d05d54bcc1ebb | Terminated     | t2.micro      | -            | <a href="#">View alarms</a> + | us-east-1a        | -               | -               | -          | -        | disabled   | -                      |         |                |         |                  |
| mysql-server       | i-03452a83c5de4229c  | Terminated     | t2.micro      | -            | <a href="#">View alarms</a> + | us-east-1b        | -               | -               | -          | -        | disabled   | -                      |         |                |         |                  |

## Lessons And Observations

As a developer with eight years' experience, I knew my way around the AWS console, as well as Azure and GCP. However, that was mostly with Beanstalk, Azure App, and GCP App Engine and the DBs and some light CI/CD work. So, navigating the through the site and provisioning the resources was not really a challenge. Strike that, it was a challenge in the sense that I found it to be completely inefficient and tedious, and it was too easy to forget what had been provisioned and what hadn't been terminated.

I moved to creating resources through the CLI and script writing. But that was also cumbersome and clumsy. Script writing is inherently procedural and there is little margin for error and bad timing – too many race conditions.

Terraform was by far the easiest method to use. I'm a developer consultant that has learned and used professionally multiple languages, so Terraform was just another language. It provides instant feedback. It's declarative, so race conditions are non-existent. The documentation is outstanding and JetBrains plugin is super helpful. I will be using Terraform for the remainder of the course. Furthermore, infrastructure as code provides version control and iterative workflow. And I could do my work in an IDE (WebStorm) where I am most comfortable.

I would say the assignment was a lot like my job, in that I had to deal with loose requirements and a product owner that was hard to reach. The Php installation instructions for OwnCloud server were incomplete, they produced an error, and I recall having to add two more packages. This is far from the worse the thing in the world, and it is not even unexpected. My conclusion would be that those instructions should not even have been there. It would have been enough to say "install Owncloud on the public server and point it to a MySQL installation on the private server. Here are two installation references. The definition of done is that you navigate to the public IP of the public server via http and you see the config screen." For me the assignment was like any ticket that I would have pulled at work. In fact, I think it would work better if the assignments were created according to "agile" concepts, if they were written like a product backlog item (pbi). For people who are already in the industry it would be easier, and for people going into the industry it would be more preparatory.

The mentor for the project prep session was great. That poor man had so much to do and not enough time to do it. He is right that there is varied experience in the class, even among the "technical" learners. He came across as a very seasoned senior dev/technician.

As far as the material, it was a great introduction to networking and not too challenging. I am looking forward to more advanced topics. I was really impressed with the “Bastion Host” concept. It was satisfying to see that you could not ssh into the private instance unless you were already ssh-ed into the public bastion host.