[version_1.0]

Errors or corrections? Contact us at https://support.aws.amazon.com/#/contacts/aws-training

Exercise: Compute & Networking

*The exercises are designed to be completed in your AWS account, and **will have an associated cost.** For this reason, in addition to the written instructions, this course includes video recordings of the exercises. If you intend to attempt the exercises, familiarize yourself with AWS pricing, specifically Amazon EC2 pricing, Amazon S3 pricing, and Amazon DynamoDB pricing and the AWS Free Tier.*

In this scenario, you will create the underlying network infrastructure in which the employee directory EC2 instance will live. In this exercise, you will set up a new VPC with four subnets (two public and two private) and two route tables (one public and one private). Then, you will launch an EC2 instance inside the new VPC. Finally, at the end of the lab, you will stop the instance to prevent future costs from incurring.

Lab Steps

Stage 1 - Create VPC

1. Search for **VPC** in the search bar at the top. Choose **VPC**.
2. Choose **Your VPCs** in the left panel. Choose **Create VPC**. Under **Name tag** paste in `app-vpc`.
3. For the **IPv4 CIDR block** paste in `10.1.0.0/16`. Choose **Create VPC**.
4. Choose **Internet Gateways** in the left panel. Choose **Create internet gateway**. Under **Name tag** paste in `app-igw`. Choose **Create internet gateway**.
5. Choose **Actions** and **Attach to VPC**. Under **Available VPCs** choose the `app-vpc`. Choose **Attach internet gateway**.

Stage 2 - Create Subnets

6. Choose **Subnets** at the left. Choose **Create subnet**. Under **VPC ID**, select the `app-vpc` from the drop down list.
7. Under **Subnet settings** and **Subnet name**, paste in `Public Subnet 1`. Under **Availability Zone**, choose the 1st AZ.

   Example: If you are in US West (Oregon) you would choose **us-west-2a**.
8. For the **IPv4 CIDR block** paste in `10.1.1.0/24`.
9. Choose **Add new subnet**. Under **Subnet name**, paste in `Public Subnet 2`. Under **Availability Zone**, choose the 2nd AZ.

   Example: If you are in US West (Oregon) you would choose **us-west-2b**.
10. For the **IPv4 CIDR block** paste in `10.1.2.0/24`.

11. Choose **Add new subnet**. Under **Subnet name**, paste in `Private Subnet 1`. Under **Availability Zone,** choose the 1st AZ.

    Example: If you are in US West (Oregon) you would choose **us-west-2a**.

12. For the **IPv4 CIDR block** paste in `10.1.3.0/24`.
13. Choose **Add new subnet**. Under **Subnet name**, paste in `Private Subnet 2`. Under **Availability Zone**, choose the 2nd AZ.

    Example: If you are in US West (Oregon) you would choose **us-west-2b**.

14. For the **IPv4 CIDR block** paste in `10.1.4.0/24`.
15. Finally choose **Create subnet**.
16. Select the checkbox next to **Public Subnet 1** after the subnets have been created. Choose **Actions** and **Modify auto-assign IP settings**. Under **Auto-assign IPv4**, choose **Enable auto-assign public IPv4 address**. Choose **Save**.
17. De-select **Public Subnet 1**. Select the checkbox next to **Public Subnet 2**. Choose **Actions** and **Modify auto-assign IP settings**. Under **Auto-assign IPv4**, choose **Enable auto-assign public IPv4 address**. Choose **Save**.

Stage 3 - Create Route Tables

1. Choose **Route Tables** at the left. Choose **Create route table**. Under **Name tag**, paste in `app-routetable-public`. Under **VPC**, choose the `app-vpc`. Choose **Create**. Choose **Close**.
2. Select the `app-routetable-public` from the list. Choose the **Routes** tab. Choose **Edit routes**.
3. Choose **Add route**. For **Destination**, paste in `0.0.0.0/0`. For **Target** choose **Internet Gateway**. Choose the `app-igw` you set up in the VPC section. Select **Save routes**. Choose **Close**.
4. Choose the **Subnet Associations** tab. Choose **Edit subnet associations**. Select the 2 Public subnets (`Public Subnet 1` & `Public Subnet 2`) you created in the Subnet section. Choose **Save**.
5. Choose **Create route table**. Under **Name tag** paste in `app-routetable-private`. Under **VPC** chose the `app-vpc`. Choose **Create**. Choose **Close**.
6. Deselect the `app-routetable-public`. Select the `app-routetable-private` from the list. Choose the **Subnet Associations** tab. Choose **Edit subnet associations**. Select the 2 Private subnets (`Private Subnet 1` & `Private Subnet 2`) you created in the Subnet section. Choose **Save**.

Stage 4 - Launch EC2 instances using role

Now that you've created a network, it's time to launch your EC2 instance using the VPC you created!

1. Search for **EC2** in the search bar at the top. Choose **EC2**.
2. Under **Launch instance** choose the **Launch instance** button.
3. Choose **Select** next to the first AMI which should be **Amazon Linux 2 AMI (HVM), SSD Volume Type**.
4. Choose the **t2.micro** (Free tier eligible) as the **Type**. Choose **Next: Configure Instance Details**.

5. Next to **Network** choose the `app-vpc` from the list. Next to **Subnet** choose `Public Subnet 1` from the list.
6. Next to **Auto-assign Public IP** choose **Enable**.
7. Next to **IAM role** choose the **S3DynamoDBFullAccessRole**.
8. Scroll down to **Advanced Details**. Paste in the following into the **User data** box:

```
#!/bin/bash -ex
wget https://aws-tc-largeobjects.s3-us-west-2.amazonaws.com/DEV-AWS-MO-GCNv2/FlaskApp.zip
unzip FlaskApp.zip
cd FlaskApp/
yum -y install python3 mysql
pip3 install -r requirements.txt
amazon-linux-extras install epel
yum -y install stress
export PHOTOS_BUCKET=${SUB_PHOTOS_BUCKET}
export AWS_DEFAULT_REGION=<INSERT REGION HERE>
export DYNAMO_MODE=on
FLASK_APP=application.py /usr/local/bin/flask run --host=0.0.0.0 --port=80
```

Change the following line to match your region:

Note: You can find this at the top right next to your user name.

```
export AWS_DEFAULT_REGION=<INSERT REGION HERE>
```

Example:

Note: US West (Oregon)

```
export AWS_DEFAULT_REGION=us-west-2
```

Note: You still do not have to change the PHOTOS_BUCKET variable in the User Data script, you will do this in a later lab.

9. Choose **Next: Add Storage**. Choose **Next: Add Tags**.
10. Choose **Add Tag**. Under **Key** paste in `Name`. Under **Value** paste in `employee-directory-app`.
11. Choose **Next: Configure Security Group**. For **Security group name:** paste in `web-security-group`.
12. For the **Description** paste in `Enable HTTP access`.
13. Choose **Add Rule**. For **Type**, choose **HTTP**. For **Source**, change to **Anywhere**. Choose **Add Rule**. For **Type**, choose **HTTPS**. For **Source**, change to **Anywhere**. Then, next to the **SSH** rule, choose the **X** at the right to remove it as you will not need SSH access to the instance.
14. Choose **Review and Launch**. Choose **Launch**. Leave **Choose an existing key pair** selected. Under **Select a key pair** `app-key-pair` should be selected. Select the checkbox next to the acknowledgement. Choose **Launch Instances**.
15. Choose **View Instances**. The instance should now show up under **Instances**. Wait for the **Instance state** to change to **Running** and the **Status check** to change to **2/2 checks passed**.

Note: Often, the status checks update and the UI does not. Feel free to refresh the page after a few minutes to minimize waiting.

16. Next to **Name**, choose the checkbox to select the running `employee-directory-app` instance. Under the **Details** tab, copy down the **Public IPv4 address**.

    Note: do not click the link to open the IPv4 address. Simply just copy the address and paste it into a new tab.

17. Paste it into a new browser tab/window. You should see a **Employee Directory** placeholder. Right now, you will not be able to interact with it as it's not currently connected to a database.

Stage 5 - Stop instance

Congrats! You've launched an EC2 instance hosting your employee directory application into a customized VPC. To prevent future costs, you will now stop the instance. (Note: do not terminate it, as the next lab will use this instance.)

1. Choose **Instance state** and **Stop instance**. Choose **Stop**. The **Instance state** will eventually go into the **Stopped** state.

Lab Complete

Congratulations! You have completed the lab.

For feedback, suggestions, or corrections, please contact us at:https://support.aws.amazon.com/#/contacts/aws-training