Create VPC

1. Make sure you are in the**US East (N. Virginia) us-east-1** region.
2. Navigate to **VPC** under the services menu. Click on **Your VPCs**.
3. Click on **Create VPC**.
   * Name Tag        : ***MyVPC***
   * IPv4 CIDR block    : **10.0.0.0/16**
   * IPv6 CIDR block    : Select **No IPv6 CIDR Block**
   * Tenancy        : **Default**
   * Click on **Create VPC**.
4. The VPC is now created.

Create Public and Private Subnets

1. Navigate to **Subnets** in the left panel of the VPC page.
2. Let's create Public subnet. Click on **Create subnet**.
   * VPC ID           : select ***MyVPC***
   * Subnet Name        : ***MyPublicSubnet***
   * Availability Zone    : **No Preference**
   * IPv4 CIDR block    : **10.0.0.0/24**
   * Click on **Create subnet**.
3. **Let's enable Auto Assign public IP to Instances created within this subnet,**
   * Select *MyPublicSubnet*, Click on **Actions**.
   * Click on **Modify auto-assign IP settings**
   * Enable auto-assign public IPv4 address   : **Check**
   * Click on **Save**.
4. Let’s create a private subnet. Click on **Create subnet.**
   * VPC ID           : select ***MyVPC***
   * Subnet Name        : ***MyPrivateSubnet***
   * Availability Zone    : **No Preference**
   * IPv4 CIDR block    : **10.0.1.0/24**
   * Click on **Create subnet**.
5. two subnets are created.

Create Internet Gateway

1. Navigate **Internet Gateways**in the left panel of the VPC page.
2. Click on **Create internet gateway**.
   * Name tag    : ***MyIGW***
   * Click on **Create internet gateway**.

Internet Gateway will be created.

To attach Internet Gateway to a VPC,

* + Select the Internet Gateway *MyIGW*.
  + Click on **Actions**. Select **Attach to VPC**.
  + VPC    : ***MyVPC***
  + Click on **Attach internet gateway**, So *MyIGW* is attached to *MyVPC*.

Create Public Route Table and Configure

We will create a route table and attach a public subnet to it. Instances launched within this subnet will have access to the Internet.

1. Navigate to Route Table in the left panel of the **VPC** page.
2. Click on **Create route table**.
   * Name tag    : ***PublicRouteTable***
   * VPC        : ***MyVPC***
   * Click on **Create route table**.
3. A route table by name *PublicRouteTable* will be created.
4. To attach an Internet Gateway, select *PublicRouteTable*.
5. In the **Routes** tab below:
   * Click on https://play.whizlabs.com/frontend/web/media/2019/10/15/image48.png.
   * On the next page, click on https://play.whizlabs.com/frontend/web/media/2019/10/15/image11_59_32.png
   * Destination        : Enter **0.0.0.0/0**
   * Target            : Select **Internet Gateway**, and once the internet gateways have been created, select ***MyIGW***
   * Click on **Save changes**.
6. To associate the Public Subnet to the route table, Select *PublicRouteTable*.
   * Click on the **Subnet Associations** tab.
   * Click on https://play.whizlabs.com/frontend/web/media/2019/10/15/image52.png.
   * On the next page, select *MyPublicSubnet* from the list displayed.
   * Click on **Save associations**.

As you can see, there is another existing route table already available for *MyVPC*. It is a main route table created at the time the VPC was created. We will use it while creating the **NAT Gateway**.

Launching an EC2 Instance in Public Subnet

1. Make sure you are in the **N.Virginia** region go to instances and click on **Launch instances.**
2. Choose an Amazon Machine Image (AMI): Search for **Amazon Linux 2 AMI** in the search box and click on the **select** button.
3. Choose an Instance Type: select  and click on the https://play.whizlabs.com/frontend/web/media/2019/10/15/image34.png
4. Configure Instance Details:
   * Network        : ***MyVPC***
   * Subnet            : ***MyPublicSubnet***
   * Auto-assign Public IP    : *Use Subnet Setting(Enable)* - default
   * Leave all other settings as default.
5. Create new Security Group with SSH and source should be anywhere.

Choose Type: **SSH**

Source: **Anywhere**

1. Create a new key pair (***MyKey.pem***) to avoid any unwanted issues and login with the public IP as usual.

Launching an EC2 Instance in Private Subnet

1. Click on **Launch instances**.
2. Choose an Amazon Machine Image (AMI)
3. Configure Instance Details:
   * Network        : ***MyVPC***
   * Subnet            : ***MyPrivateSubnet***
   * Auto-assign Public IP    : *Use Subnet Setting(Disable)* - default
   * Leave all other settings as default.
4. Create separate Security Group:
   * + Choose Type: **SSH**
     + Source: **custom : 0.0.0.0/0**
5. Key Pair : Select the existing key created earlier ***MyKey.pem***.
6. Note the Private IP Address of *MyPrivateEC2Server*  like**10.0.1.45**

So currently Two servers are now launched and running and we are login into public subnet ec2-instance.

SSH into Public and Private EC2 Instance and Test Internet Connectivity

* + Login into public subnet one Ec2-instance (first one)
  + Sudo su
  + **yum -y update**

**Since the Internet Gateway *MyIGW*is connected to *MyPublicSubnet*, updates will be completed successfully.**

Now try SSH into ***MyPrivateEC2Server***from ***MyPublicEC2Server***.

In order to SSH into ***MyPrivateEC2Server,*** first we need to create the PEM file in the public EC2.

To create the MyKey.pem in ***MyPublicEC2Server***

**vi MyKey.pem**

**(Simply we have to open that .pem file which we have downloaded during creation of ec2-instances and paste here and save this file)**

Check that the file was created correctly.

* + **ls**

https://play.whizlabs.com/frontend/web/media/2019/10/15/image20.png

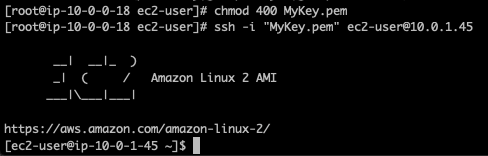
Update Permissions for the MyKey.pem

**chmod 400 MyKey.pem**

Use the Private IP address **10.0.1.45**to SSH.

**ssh -i MyKey.pem ec2-user@10.0.1.45**

**You will see “Are you sure you want to continue connecting (yes/no)?”** : Enter**yes**



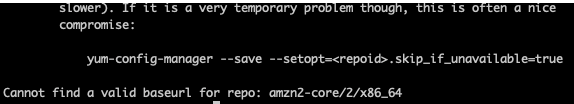
Switch to root user

* + **Sudo su**

Run the updates using the following command:

* + **yum -y update**

**As no internet access is provided for EC2 instances in a private subnet, you will not be able to get updates. After some time, it will fail with the following message**.



Creating NAT Gateway

NAT Gateway is used to provide internet access to the Instances inside a private subnet.

1. Go to VPC Page & In the Left Panel, click on **NAT Gateways**.
2. Click on **Create NAT gateway**.
   * Name                 : **MyNATGateway**
   * Subnet                : Choose ***MyPublicSubnet*** in *MyVPC*
   * Elastic IP Allocation ID    : Click on **Allocate Elastic IP**.
   * Once the new Elastic IP is allocated, click on **Create NAT gateway**.

**Note that NAT Gateway is always created in a public subnet.**

Update Route table and configure NAT Gateway

1. Go to **Route Tables**in the left panel.
2. You can see two Route Tables available for ***MyVPC***
3. To attach Nat Gateway, select the Main Route Table (which is different from the one created by you).
4. In the **Routes** tab below,
   1. Click on https://play.whizlabs.com/frontend/web/media/2019/10/15/image48.png.
   2. In the next page, Click on https://play.whizlabs.com/frontend/web/media/2019/10/15/image11_59_32.png
   3. Destination        :  **0.0.0.0/0**
   4. Target            : Select **NAT Gateway**, and once the internet gateways have loaded, select the NAT Gateway you created.
   5. Click on **Save changes**.

**Now the Instances launched within *MyPrivateSubnet* can access the Internet through the NAT Gateway.**

Test Internet connection from Instance inside Private Subnet

1. SSH back into ***MyPublicEC2Server***.
2. Switch to root user
   * **sudo su**
3. SSH into *MyPrivateEC2Server*
   * **ssh -i "MyKey.pem" ec2-user@10.0.1.45**
4. Switch to root user
   * sudo su
5. Run the updates using the following command:
   * **yum -y update**
6. You can see that the updates have been completed successfully in the terminal.



1. This shows that ***MyPrivateEC2Server***has internet access.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Cheers \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*