5. Creating a Virtual Private Cloud

Task 1: Creating a VPC

1. In the search box to the right of **Services**, search for and choose **VPC** to open the VPC console.
   The VPC console provides a wizard that can automatically create several VPC architectures. However, in this lab, you will create the VPC components manually.

2. In the left navigation pane, choose **Your VPCs**.
   A default VPC is provided so that you can launch resources as soon as you start using AWS. There is also a **Shared VPC** that you will use later in the lab. However, you will now create your own *Lab VPC*.

   The VPC will have a Classless Inter-Domain Routing (CIDR) range of **10.0.0.0/16**, which includes all IP address that start with **10.0.x.x**. It contains over 65,000 addresses. You will later divide the addresses into separate *subnets*.

3. Choose **Create VPC** and configure these settings:
   - **Name tag:** `Lab VPC`
   - **IPv4 CIDR block:** `10.0.0.0/16`
   - Choose **Create VPC**
     A message that you successfully created the VPC appears.

4. In the lower half of the page, choose the **Tags** tab.

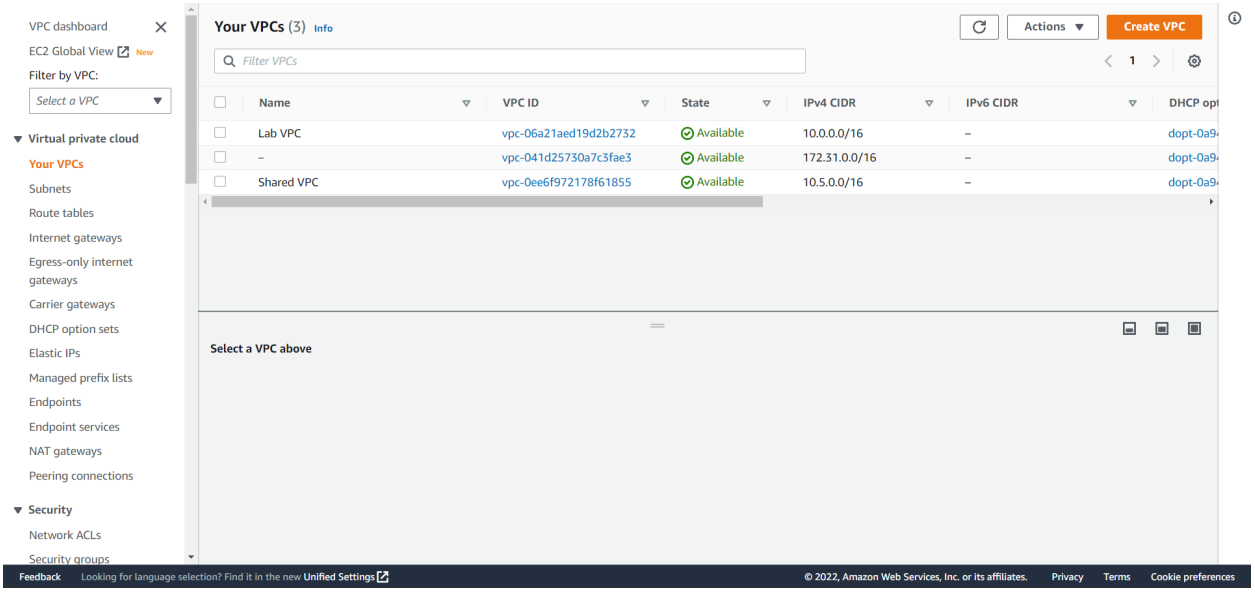
   Tags are useful for identifying resources. For example, you can use a tag to identify cost centers or different environments (such as development, test, or production).

5. Choose **Actions** and select **Edit DNS hostnames**.

   This option assigns a *friendly* Domain Name System (DNS) name to EC2 instances in the VPC, such as: *ec2-52-42-133-255.us-west-2.compute.amazonaws.com*

6. Select **enable** and then choose **Save changes**

   Any EC2 instances that are launched into the VPC will now automatically receive a DNS hostname. You can also add a more meaningful DNS name (such as *app.example.com*) later by using Amazon Route 53.



Task 2: Creating subnets

Creating a public subnet

The public subnet will be used for internet-facing resources.

7. In the left navigation pane, choose **Subnets**.

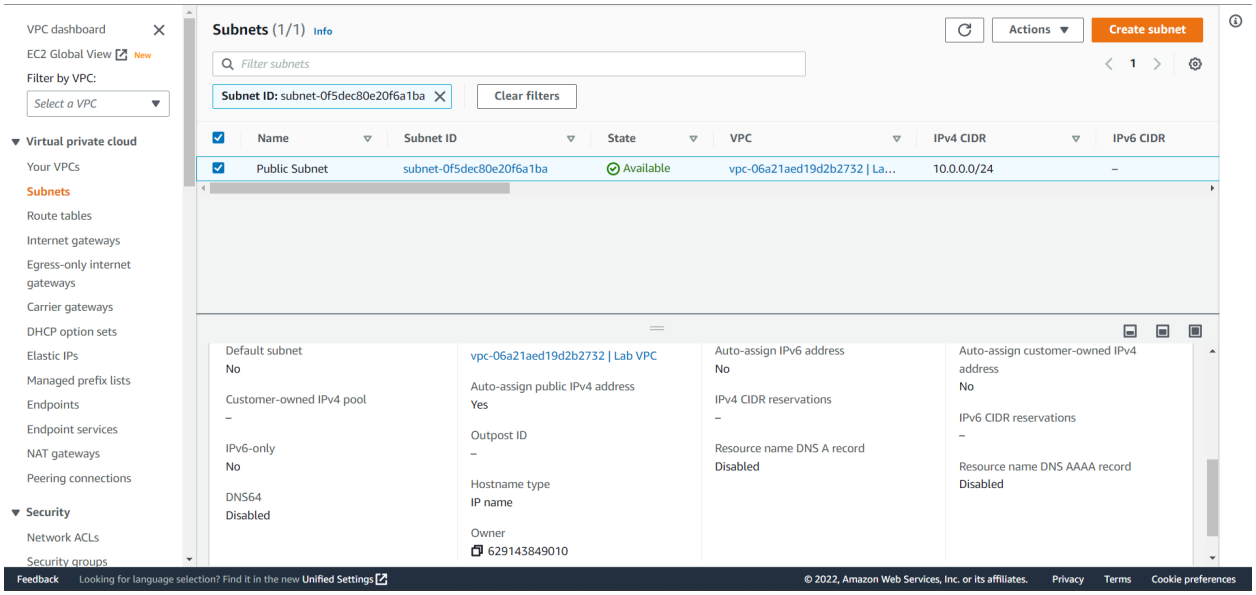
8. Choose **Create subnet** and configure these settings:

    - **VPC ID:** *Lab VPC*
    - **Subnet name:** Public Subnet
    - **Availability Zone:** Select the *first* Availability Zone in the list (do *not* keep the No Preference default)
    - **IPv4 CIDR block:** 10.0.0.0/24
    - Choose **Create subnet**

9. Select **Public Subnet**.

10. Choose **Actions** and select **Edit subnet settings**, then:

    - Select **Enable auto-assign public IPv4 address**
    - Choose **Save**

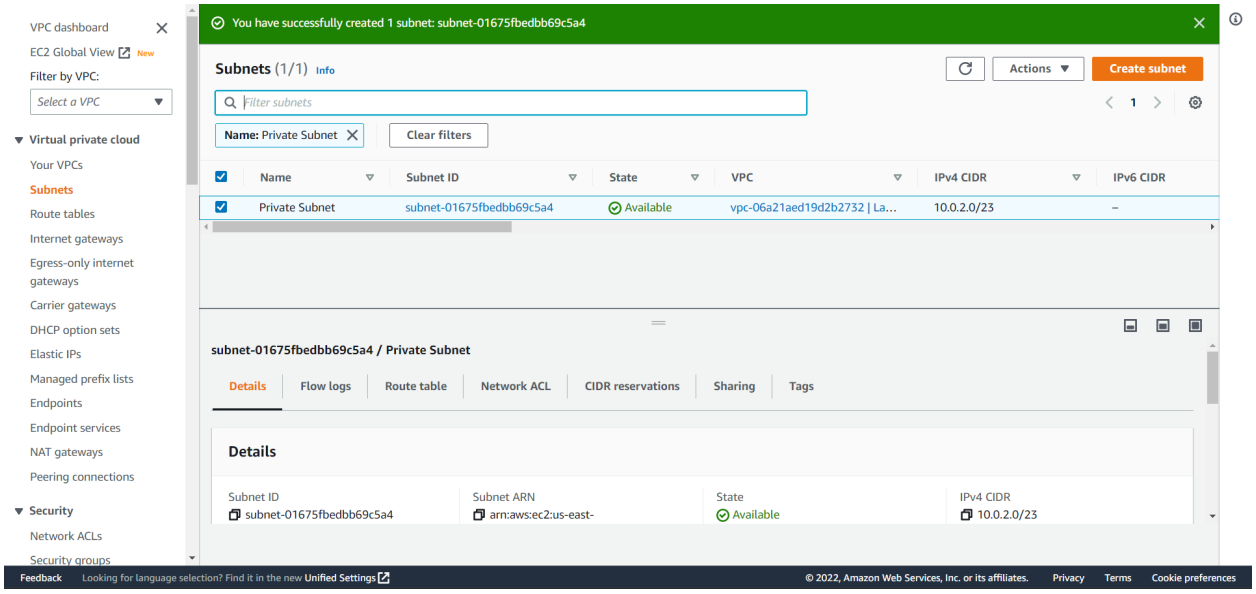


Creating a private subnet

Use what you just learned to create another subnet with these settings:

- **VPC ID:** *Lab VPC*
- **Subnet name:** Private Subnet
- **Availability Zone:** Select the *first* Availability Zone in the list (do *not* keep the No Preference default)

- **IPv4 CIDR block:** 10.0.2.0/23



Task 3: Creating an internet gateway

16. in the left navigation pane, choose **Internet Gateways**.

17. Choose **Create internet gateway** and configure these settings:
    - **Name tag:** Lab IGW
    - Choose **Create internet gateway**

18. You can now attach the internet gateway to your *Lab VPC*.

19. Choose **Actions** then **Attach to VPC**, and configure these settings:

    - **Available VPCs:** Place you cursor in the search box, then select *Lab VPC*
    - Choose **Attach internet gateway**
      This action will attach the internet gateway to your *Lab VPC*. Though you created an internet gateway and attached it to your VPC, you must also configure the public subnet *route table* so it uses the internet gateway.

Task 4: Configuring route tables

20. In this task, you will:

- Create a *public route table* for internet-bound traffic
- Add a *route* to the route table to direct internet-bound traffic to the internet gateway
- Associate the public subnet with the new route table

21. In the left navigation pane, choose **Route Tables**.
Several route tables are displayed, but there is only one route table associated with *Lab VPC*. This route table routes traffic locally, so it is called a *private route table*.

22. Scroll to the right so that you can see the **VPC** column, then expand the width of the column so that you can see which one is used by **Lab VPC**.

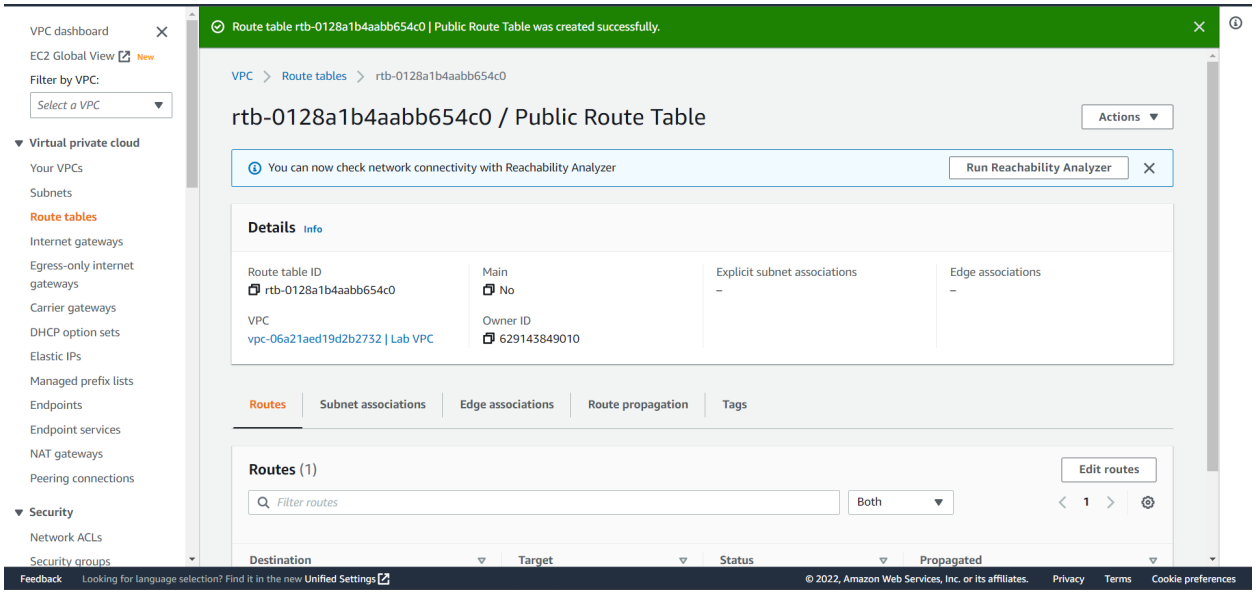
23. Scroll back to the left and select the route table that shows **Lab VPC**.

24. In the **Name** column, choose then enter the name `Private Route Table` and choose .

25. In the lower half of the page, choose the **Routes** tab.

26. Choose **Create route table** and configure these settings:

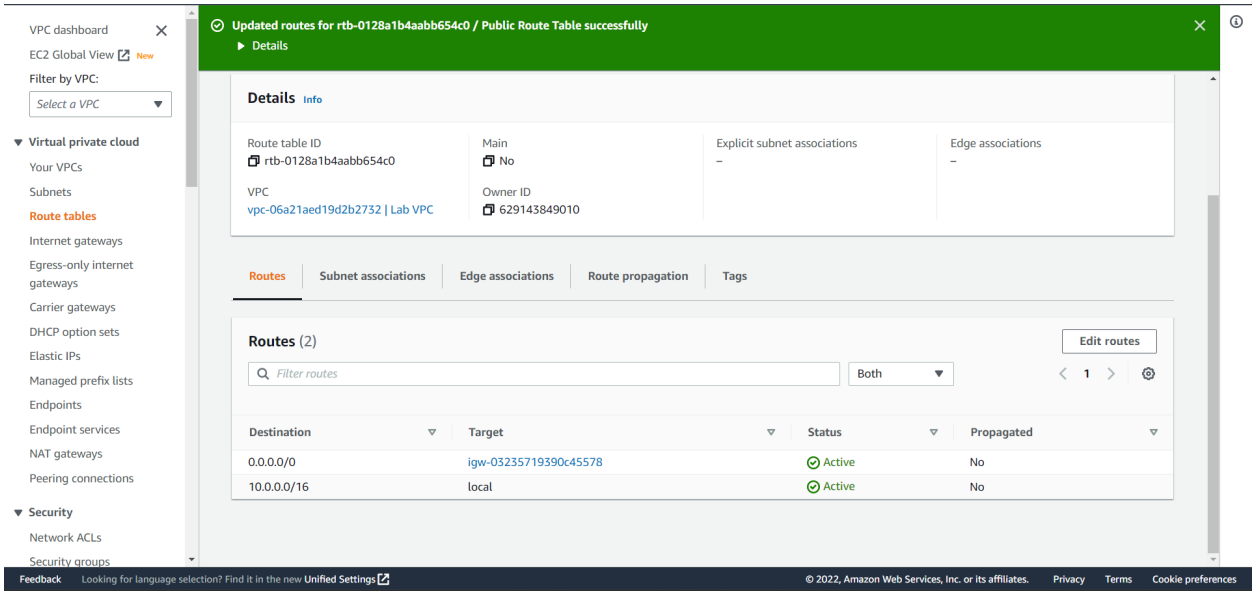
    - **Name:** `Public Route Table`
    - **VPC:** *Lab VPC*
    - Choose **Create route table**



27. In the **Routes** tab, choose **Edit routes**

28. Choose Add route then configure these settings:

- Destination: 0.0.0.0/0
- Target: Select *Internet Gateway* and then, from the list, select *Lab IGW*
- Choose Save changes

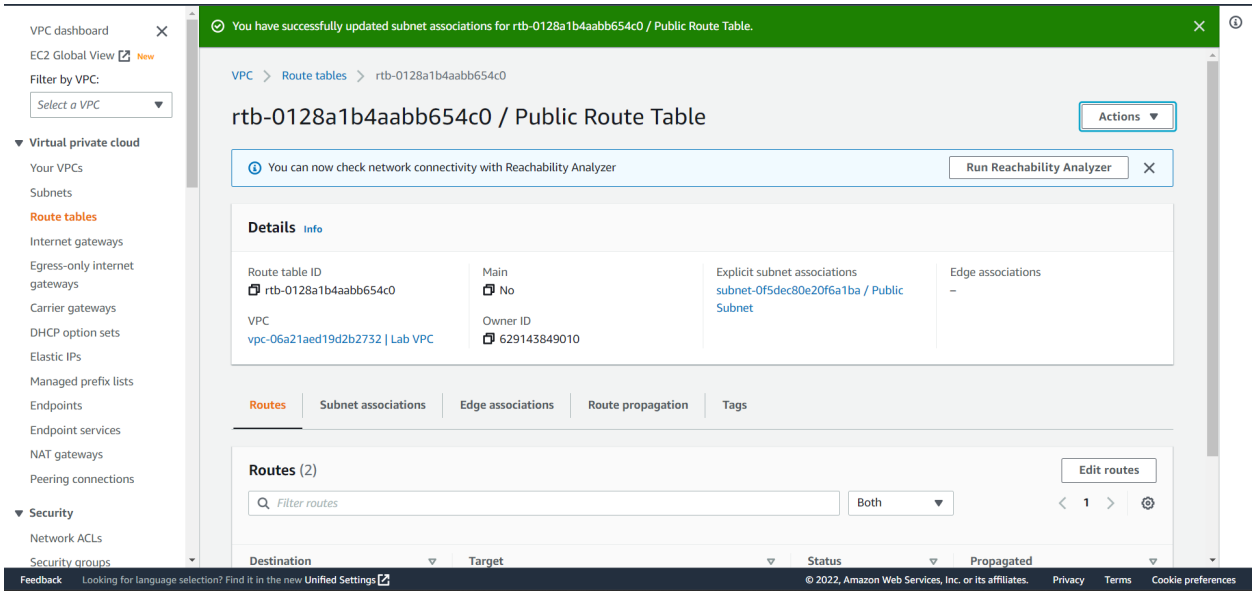


29. Choose the Subnet associations tab.

30. Choose Edit subnet associations

31. Select the row with Public Subnet.

32. Choose **Save associations**



Task 5: Creating a security group for the application server

33. In the left navigation pane, choose **Security Groups**.

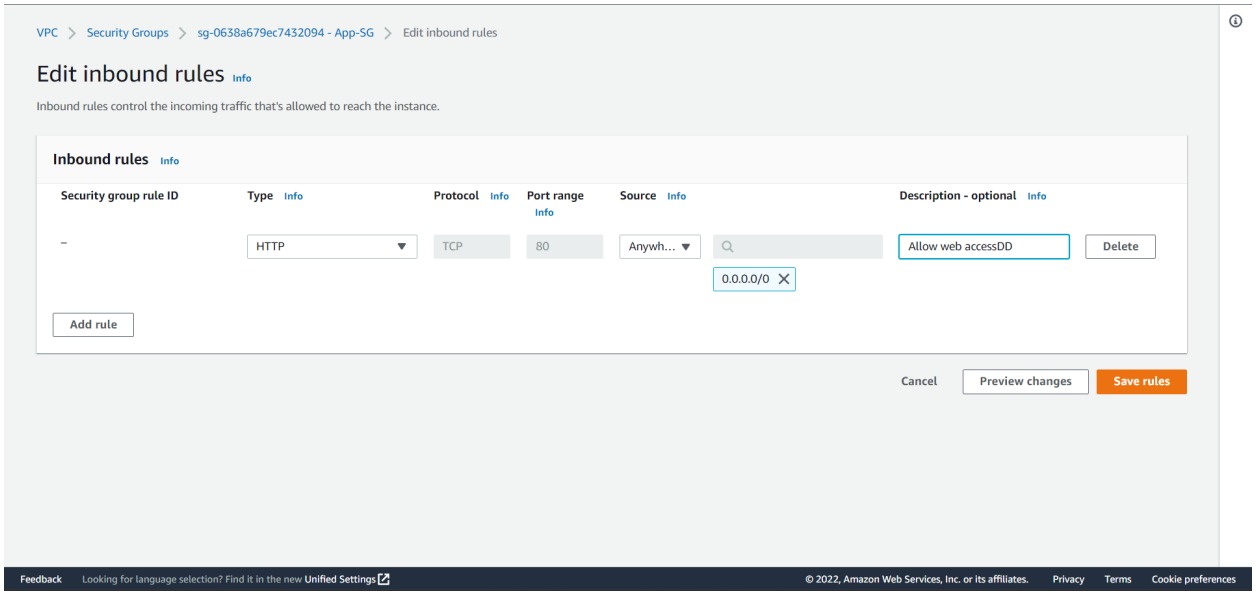
34. Choose **Create security group** and configure these settings:

    - **Security group name:** App-SG
    - **Description:** Allow HTTP traffic
    - **VPC:** select the X to clear the default selection, then choose *Lab VPC*
    - Scroll to the bottom and choose **Create security group**

35. Verify the **Inbound rules** tab is selected below.

36. Choose **Add rule** and then configure these settings:

- **Type:** *HTTP*
- **Source type:** *Anywhere-IPv4*
- **Description:** Allow web access
- Choose **Save rules**



Task 6: Launching an application server in the public subnet

37. In the search box to the right of **Services**, search for and choose **EC2** to open the EC2 console.

38. From the **Launch instance** menu, choose **Launch Instance**. Configure these options:

- **Name**: App Server

- In the list of available *Quick Start* AMIs, keep the default **Amazon Linux** selected. Also keep the specific default **Amazon Linux 2 AMI (HVM)** selected.

- In the *Instance type* panel, keep the default **t2.micro** selected.

- From the **Key pair name** menu, select **vockey**.
- Next to Network settings, choose **Edit**, then configure:
    - **Network:** *Lab VPC*
    - **Subnet:** *Public Subnet*

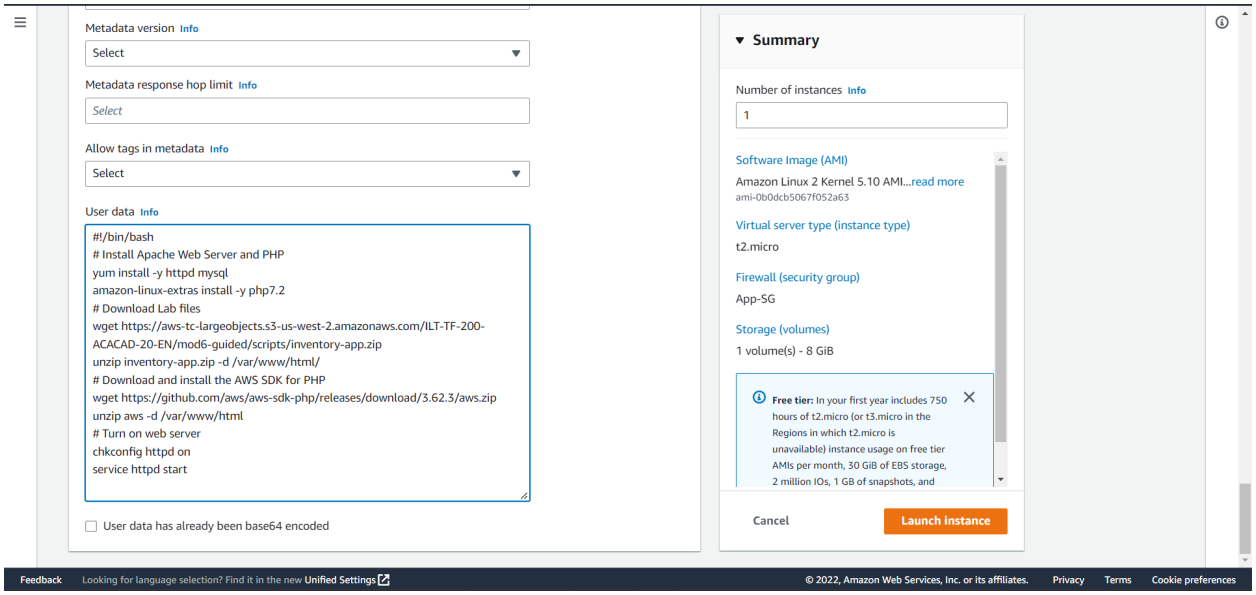
- Under Firewall (security groups), choose **Select an existing security group**.
    - For **Common security groups**, select **App-SG**.

- In the *Configure storage* section, keep the default settings.

- Expand the **Advanced details** panel.

- **IAM instance profile:** *Inventory-App-Role*

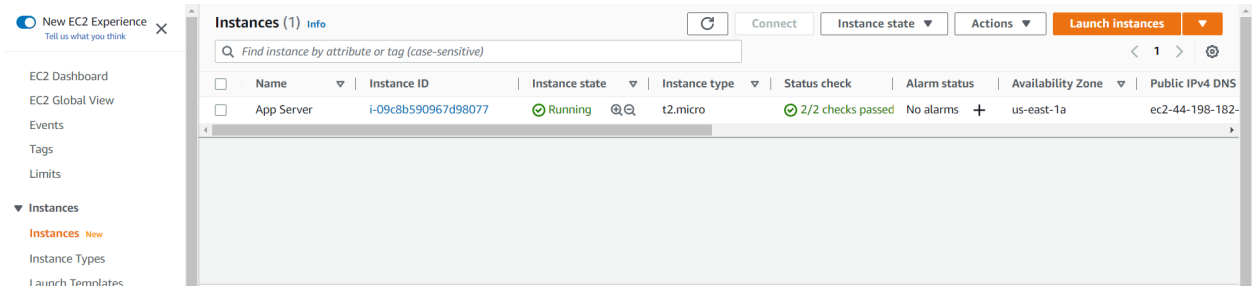
- Scroll to the bottom of the page and then copy and paste the code shown below into the **User data** box:



39. At the bottom of the **Summary** panel on the right side of the screen choose **Launch instance**
You will see a Success message.

40. Choose **View all instances**

41. Wait until the App Server instance shows *2/2 checks passed* in the Status check column.



42. Select **App Server**.

43. Copy the **Public IPv4 DNS** value shown in the **Details** tab at the bottom of the page.

44. Open a new web browser tab with that IP address.

If you configured the VPC correctly, the Inventory application and this message should appear: Please configure Settings to connect to database. You have not configured any database settings yet, but the appearance of the Inventory application demonstrates that the public subnet was correctly configured.
If the Inventory application does no