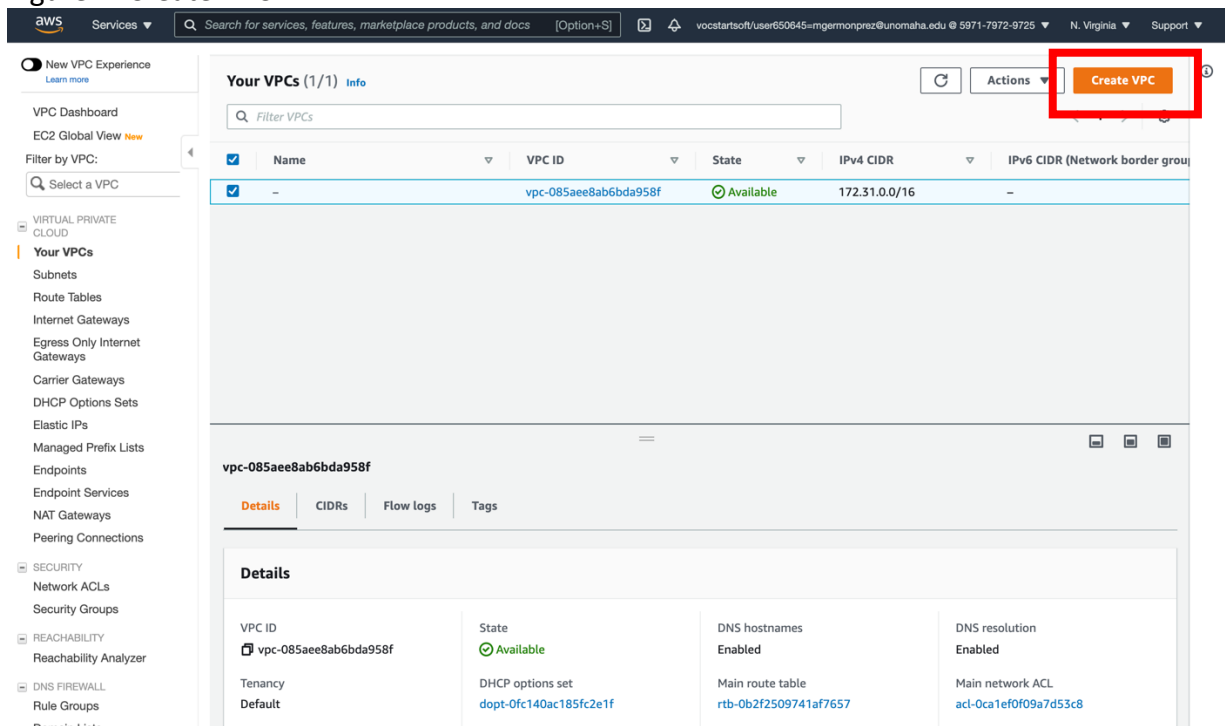


Virtual Private Cloud Lab

This is the VPC lab in our continued investigation of the AWS environment. In this lab, you will be creating a new virtual private cloud (VPC), along with an associated subnet within that VPC, and you will be (like old times) launching an instance into that VPC/Subnet. I would like to point out that there are two questions at the end of this lab that I'd like you to answer, in addition to the usual things of taking screen captures and providing descriptions of your work.

To start, open your VPC service in AWS. You can find it by simply searching for 'VPC'. When you open it, you will have a button in the top right corner needed to create your VPC.

Figure 1. Create VPC



Clicking on that button will take you to this screen. Create a name tag for the VPC and you will have to declare the size of the VPC. This is in the CIDR block location. This will just determine how many IP addresses we are able to deploy in the VPC. You can use a different block than me, that's up to you.

Figure 2. Naming your VPC and declaring the CIDR block

aws Services ▾ [Option+S]

VPC > Your VPCs > Create VPC

Create VPC [Info](#)

A VPC is an isolated portion of the AWS cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.

IPv4 CIDR block [Info](#)

IPv6 CIDR block [Info](#)

☒ No IPv6 CIDR block

☐ Amazon-provided IPv6 CIDR block

☐ IPv6 CIDR owned by me

Tenancy [Info](#)

Default ▾

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional	
<input type="text" value="Name"/>	<input type="text" value="Fall2021"/>	<input type="button" value="Remove"/>

You can add 49 more tags.

Great! You have created a virtual private cloud in AWS in the click of about two buttons. Pretty easy. Remember what a VPC is. It is a network that we created to which you could deploy resources (i.e., the Apache web server). We're not quite done in having that happen, but we are moving in the right direction.

Figure 3. Success!

You successfully created vpc-077e5cc4f64868cbe / Fall2021

VPC > Your VPCs > vpc-077e5cc4f64868cbe

vpc-077e5cc4f64868cbe / Fall2021

Actions

Details Info

VPC ID vpc-077e5cc4f64868cbe	State Available	DNS hostnames Disabled	DNS resolution Enabled
Tenancy Default	DHCP options set dopt-0fc140ac185fc2e1f	Main route table rtb-05a506858365e59af	Main network ACL acl-0f541cd1c8c733aec
Default VPC No	IPv4 CIDR 10.0.0.0/24	IPv6 pool -	IPv6 CIDR (Network border group) -
Route 53 Resolver DNS Firewall rule groups Failed to load rule groups	Owner ID 597179729725		

CIDRs Flow logs Tags

IPv4 CIDRs Info

CIDR	Status
10.0.0.0/24	Associated

IPv6 CIDRs Info

CIDR	Pool	Status
------	------	--------

After you have created your VPC, we now need to create a subnet within that VPC. This also isn't very difficult. Over on the left side, you can simply click on the Subnets option.

Figure 4. Create Subnet

aws Services

Search for services, features, marketplace products, and docs [Option+S]

vocstartsoft/User650645-mjgermonprez@unomaha.edu 5971-7972-9725 N. Virginia Support

New VPC Experience Learn more

VPC Dashboard
EC2 Global View

Filter by VPC:
Select a VPC

Subnets (6) Info

Filter subnets

	Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR
<input type="checkbox"/>	-	subnet-0fba7cdce621112e	Available	vpc-085aee8ab6bda958f	172.31.0.0/20	-
<input type="checkbox"/>	-	subnet-0f48ba80b878f3cd1	Available	vpc-085aee8ab6bda958f	172.31.80.0/20	-
<input type="checkbox"/>	-	subnet-07bf396eb6d36c0bb	Available	vpc-085aee8ab6bda958f	172.31.48.0/20	-
<input type="checkbox"/>	-	subnet-034a39e92adbb1298	Available	vpc-085aee8ab6bda958f	172.31.32.0/20	-
<input type="checkbox"/>	-	subnet-04cc1b06a40f9ad9b	Available	vpc-085aee8ab6bda958f	172.31.64.0/20	-
<input type="checkbox"/>	-	subnet-0253bfc9e4f614a06	Available	vpc-085aee8ab6bda958f	172.31.16.0/20	-

Select a subnet

Create subnet

The only thing here is to note that you need to assign the subnet to your newly created VPC. You should only have two choices – default and the new one.

Figure 5. Associate subnet with VPC

The screenshot shows the AWS Management Console 'Create subnet' page. The breadcrumb navigation at the top reads 'VPC > Subnets > Create subnet'. The main heading is 'Create subnet' with an 'Info' link. The 'VPC' section contains the label 'VPC ID' and the instruction 'Create subnets in this VPC.' Below this is a dropdown menu with the placeholder text 'Select a VPC'. The dropdown is open, showing a search bar with a magnifying glass icon and two options: 'vpc-085aee8ab6bda958f' with the CIDR '172.31.0.0/16' and '(default)' label, and 'vpc-077e5cc4f64868cbe (Fall2021)' with the CIDR '10.0.0.0/24'. A red rectangle highlights the dropdown menu. Below the dropdown, the text 'Select a VPC first to create new subnets.' is displayed. At the bottom of the form is a button labeled 'Add new subnet'. At the bottom right of the console are two buttons: 'Cancel' and 'Create subnet'.

Once you've done that, you will need to declare a CIDR block size to the subnet. Generally, this is some smaller block of numbers than the entire VPC itself. In this image, I went with the /28 size as a subset of the /24 for the overall VPC.

Figure 6. Create subnet CIDR block size.

Associated VPC CIDRs
IPv4 CIDRs
10.0.0.0/24

Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.

The name can be up to 256 characters long.
Availability Zone [Info](#)
Choose the zone in which your subnet will reside, or let Amazon choose one for you.

IPv4 CIDR block [Info](#)

Tags - optional

Key	Value - optional	
<input type="text" value="Name"/>	<input type="text" value="Fall2021"/>	<input type="button" value="Remove"/>

You can add 49 more tags.

Great! Now you have a VPC and a subnet within that VPC. At this point, I want you to launch a new instance into that VPC/Subnet that you just created. The only real difference from things we've been doing in the past is that you will need to declare the VPC and subnet in the details step.

Figure 7. Launch instance into new VPC/Subnet

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower price

Number of instances ⓘ [Launch into Auto Scaling Group ⓘ](#)

Purchasing option ⓘ ☐ Request Spot instances

Network ⓘ [Create new VPC](#)

Subnet ⓘ [Create new subnet](#)
11 IP Addresses available

Auto-assign Public IP ⓘ

Placement group ⓘ ☐ Add instance to placement group

Capacity Reservation ⓘ

Domain join directory ⓘ [Create new directory](#)

IAM role ⓘ [Create new IAM role](#)

Shutdown behavior ⓘ

Stop - Hibernate behavior ⓘ ☐ Enable hibernation as an additional stop behavior

Enable termination protection ⓘ ☐ Protect against accidental termination

Monitoring ⓘ ☐ Enable CloudWatch detailed monitoring
[Additional charges apply.](#)

At this point, your instance is launched into the new VPC/Subnet. However, I'd like you to notice that there is no public IPv4 address like we've had in the past.

Figure 8. Launched instance with no IPv4 public address

The screenshot displays the AWS Management Console interface. At the top, there's a navigation bar with 'Instances (1/2)' and various action buttons like 'Connect', 'Instance state', 'Actions', and 'Launch instances'. Below this is a table listing instances. The instance 'i-08077c5ac5c8dc6cf' (Fall2021) is highlighted, showing it is in a 'Running' state with type 't2.micro' and availability zone 'us-east-1c'.

The details panel for instance 'i-08077c5ac5c8dc6cf (Fall2021)' is shown below. It has tabs for 'Details', 'Security', 'Networking', 'Storage', 'Status checks', 'Monitoring', and 'Tags'. The 'Networking' tab is selected and highlighted with a red box. It shows the following details:

- Instance summary:**
 - Instance ID: i-08077c5ac5c8dc6cf (Fall2021)
 - IPv6 address: -
 - Private IPv4 DNS: ip-10-0-0-14.ec2.internal
 - VPC ID: vpc-077e5cc4f64868cbe (Fall2021)
 - Subnet ID: subnet-00845630c2c5c2bd5 (Fall2021)
- Networking details:**
 - Public IPv4 address: -
 - Instance state: Running
 - Instance type: t2.micro
 - Private IPv4 addresses: 10.0.0.14
 - Public IPv4 DNS: -
 - Elastic IP addresses: -
- Security details:**
 - AWS Compute Optimizer finding: ⚠ User: arn:aws:sts::597179729725:assumed-role/vocstartsoft/user650645=mggermonprez@unomaha.edu is not authorized to perform: compute-optimizer:GetEnrollmentStatus on resource: * with an explicit deny [Retry](#)
 - IAM Role: -

With respect to AWS, you are done but here are the questions I want you to also answer with respect to this lab:

- Question: Could you deploy an instance into a VPC without a subnet? Please explain your answer.
- Question: Why is there no public IP address for you instance in this lab? What do you think is missing from our work that would enable a public IP for our instance?