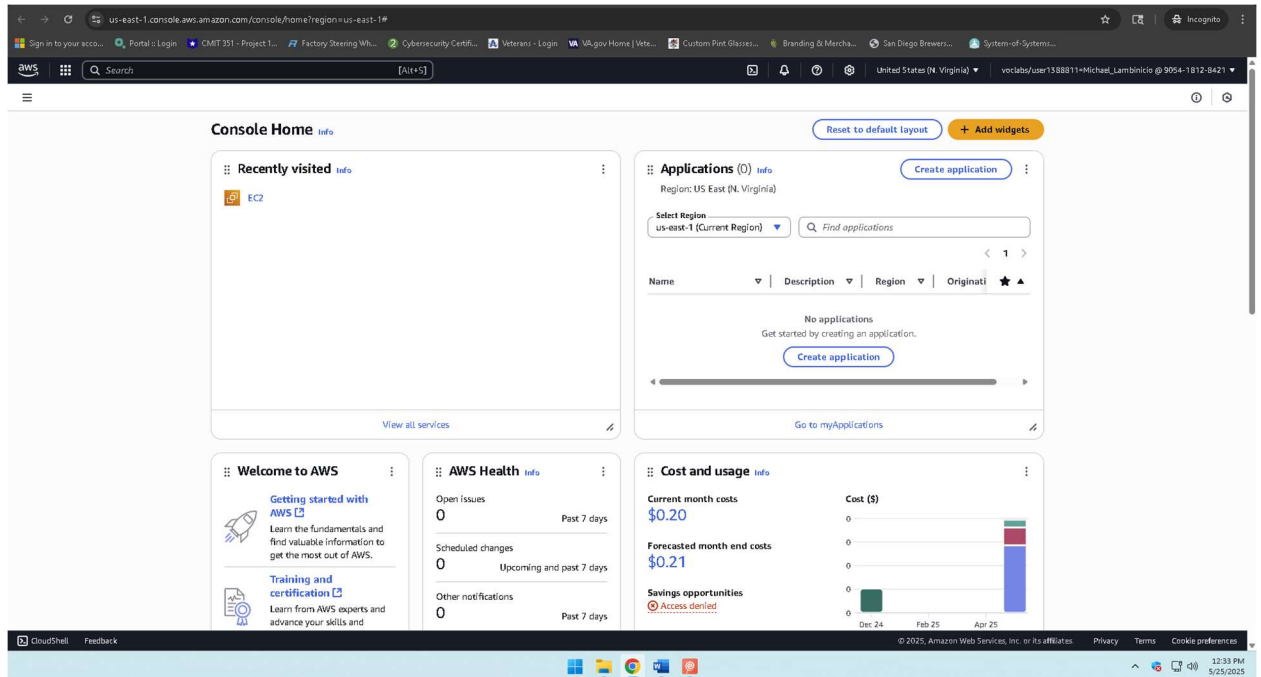


CMIT 495 Current Trends and Projects in Computer Networks and Security

Week 2 – Cloud Computing

1. Log in to your newly created AWS account and take a screenshot of the AWS Management Console (Dashboard) and paste it below question 1. The screenshot should include the username you created during the setup phase.



2. Launch a Windows Virtual Machine (VM). Provide a detailed overview of the steps required to install the Microsoft Windows operating system (OS) on the VM. The steps may be listed in the form of bullet points or a summary with complete sentences. Use as much space as required. Finally, take a screenshot of the desktop and paste it with your response below this question.

To start, you will load up the EC2 console and select Launch Instance button in orange.

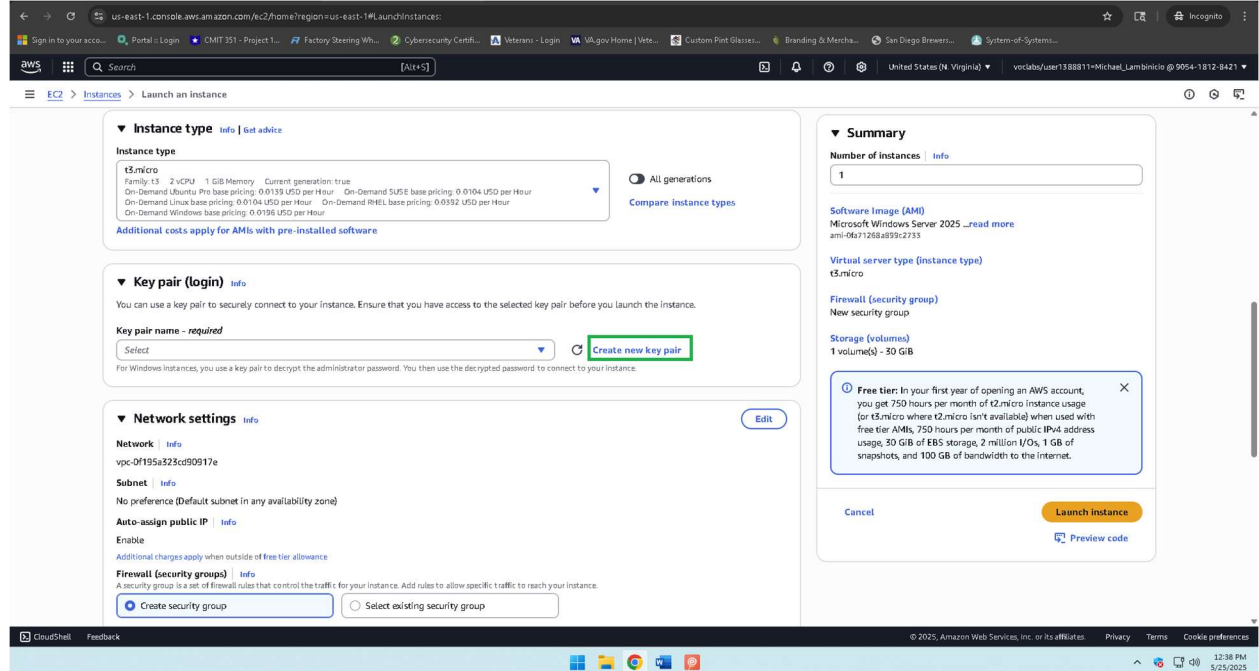
The screenshot shows the AWS Management Console for the EC2 service in the United States (N. Virginia) region. The 'Launch instance' button is highlighted with a green box. The dashboard includes a 'Resources' section with counts for various EC2 resources, a 'Service health' section showing the status of the region, and an 'Account attributes' section with details about the default VPC and settings. A sidebar on the left contains navigation links for EC2, Instances, Images, Elastic Block Store, and Network & Security.

Then you will give it a name and select Windows as the OS for the virtual machine.

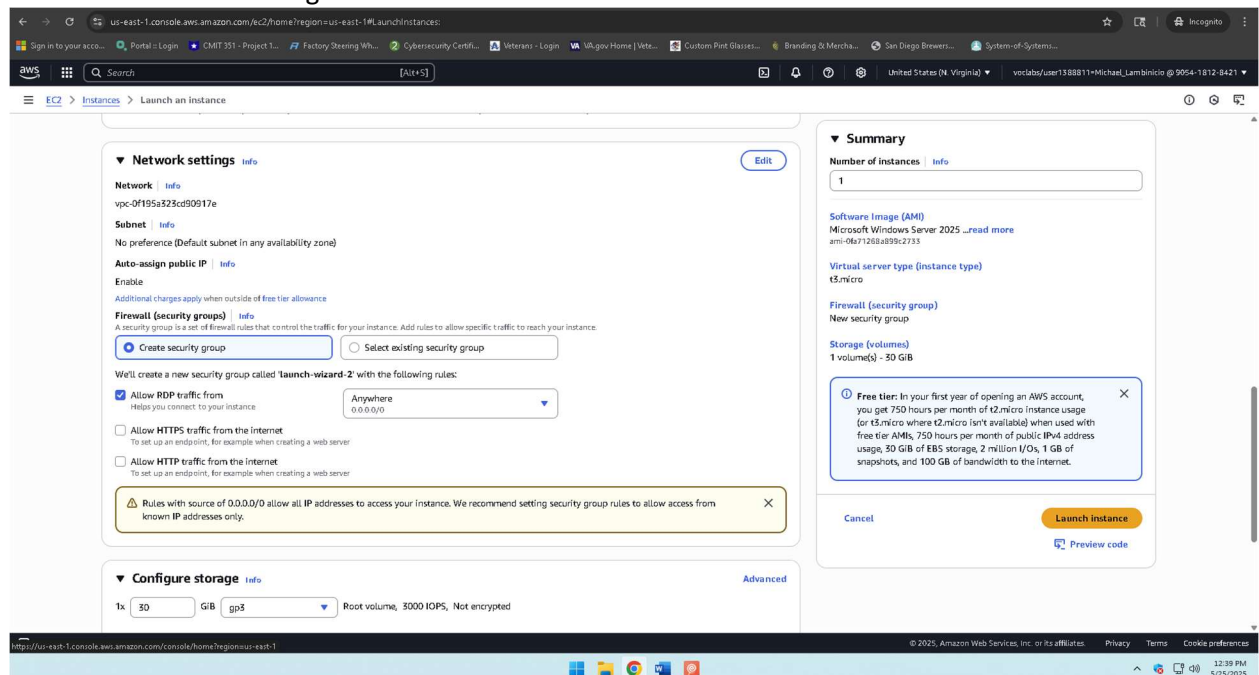
The screenshot shows the 'Launch an instance' page in the AWS Management Console. The 'Name' field is set to 'Windows Instance'. The 'Application and OS Images (Amazon Machine Image)' section shows a list of AMIs, with 'Windows' selected. The 'Summary' section on the right shows the configuration details for the instance, including the number of instances, software image, virtual server type, firewall, and storage. The 'Launch instance' button is highlighted with a green box.

Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

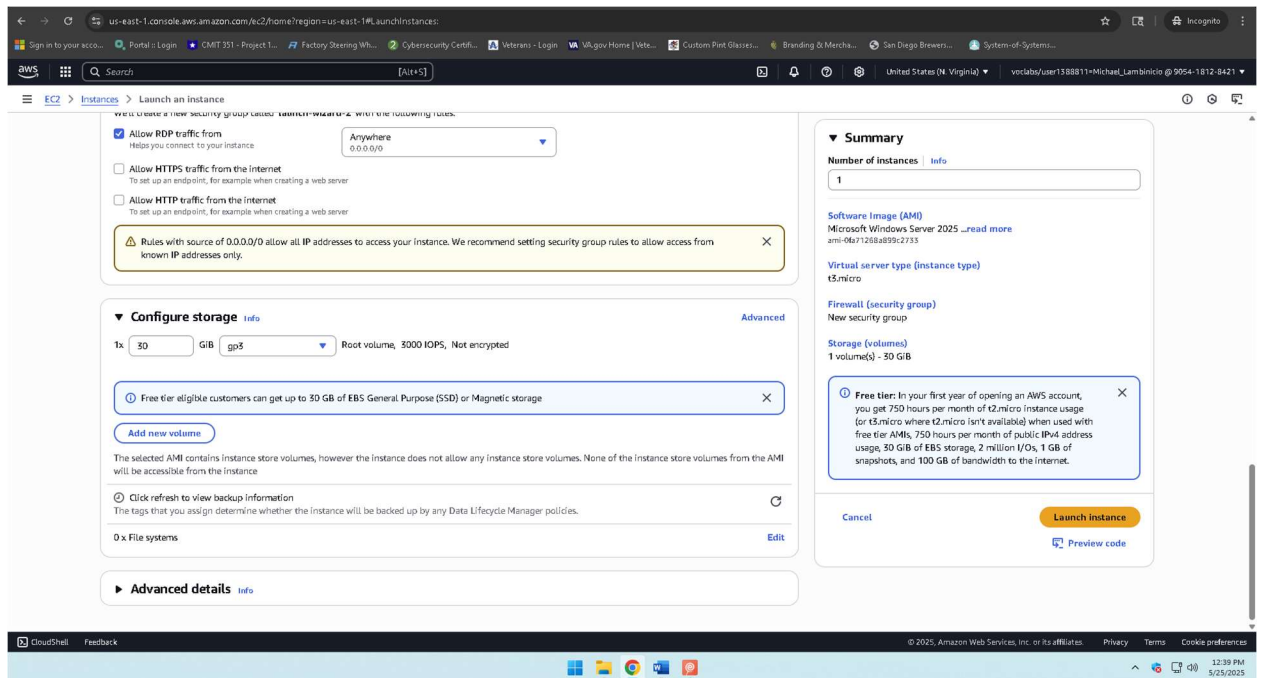
After, you will scroll down and select create key pair to generate a key for the OS, which you will then save it to your computer for future use.



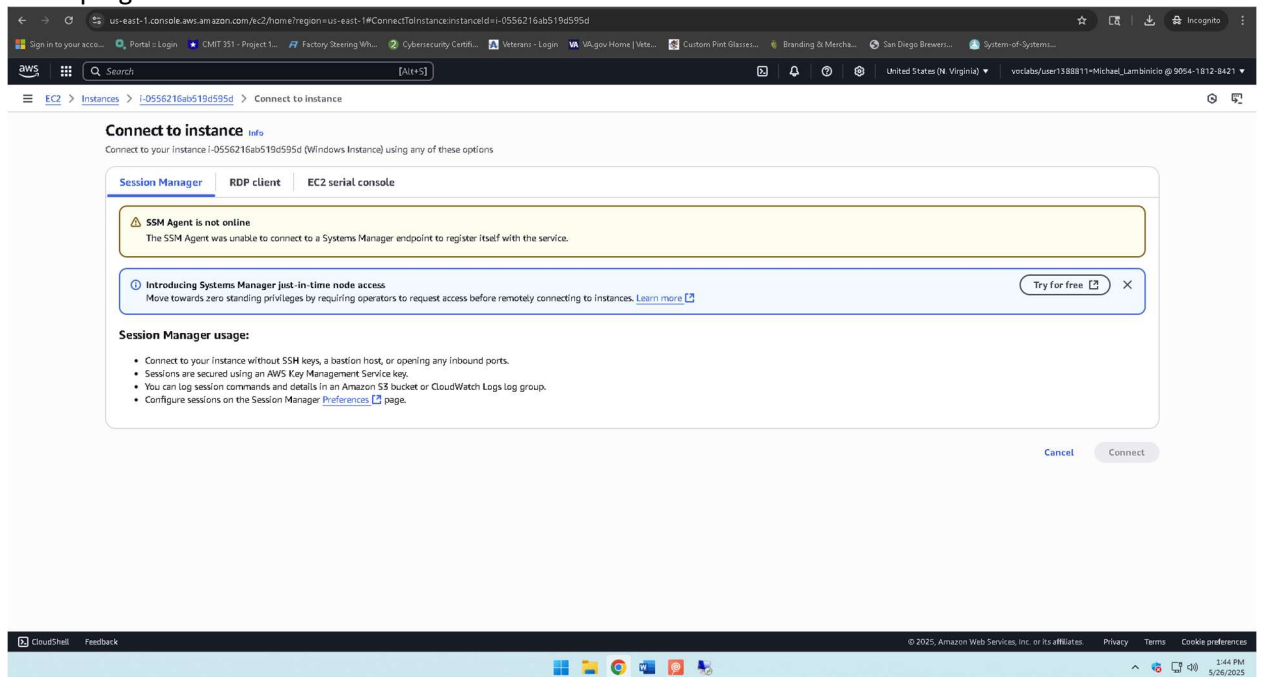
Network settings and storage settings will stay on default settings and then click on Launch Instance button on the right.



Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

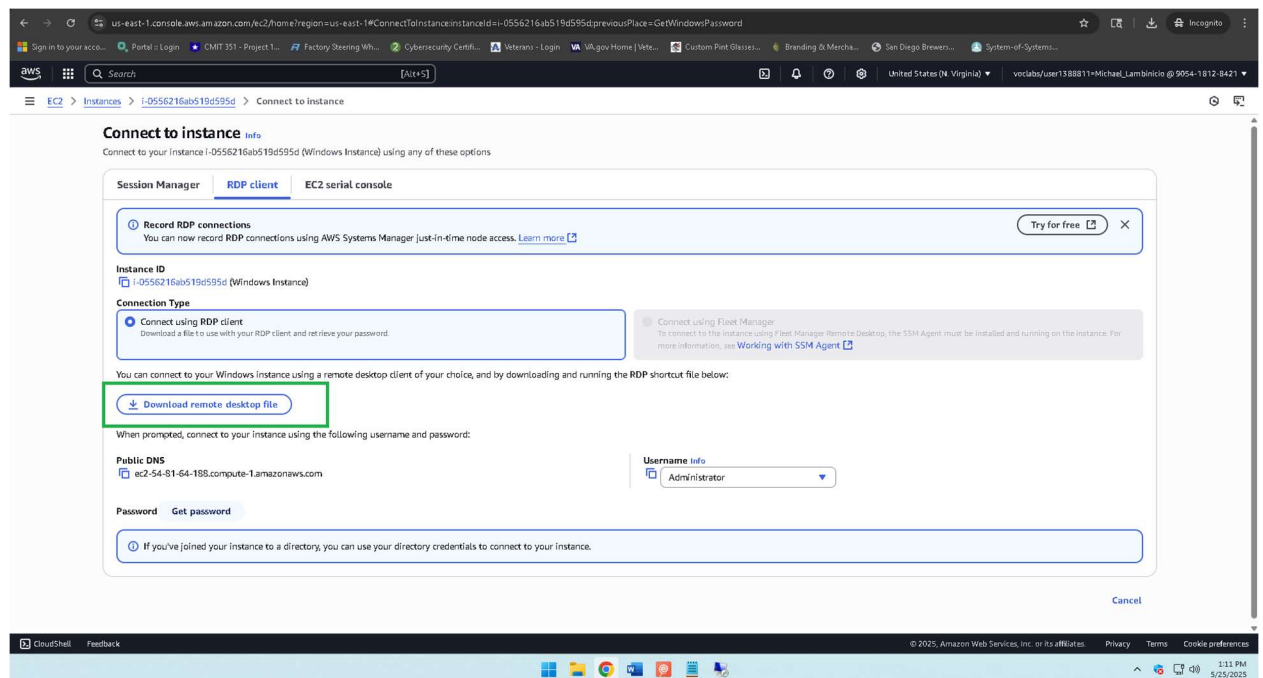


Once the instance is created, you will then select it with the checkbox and choose to connect on the top right corner.



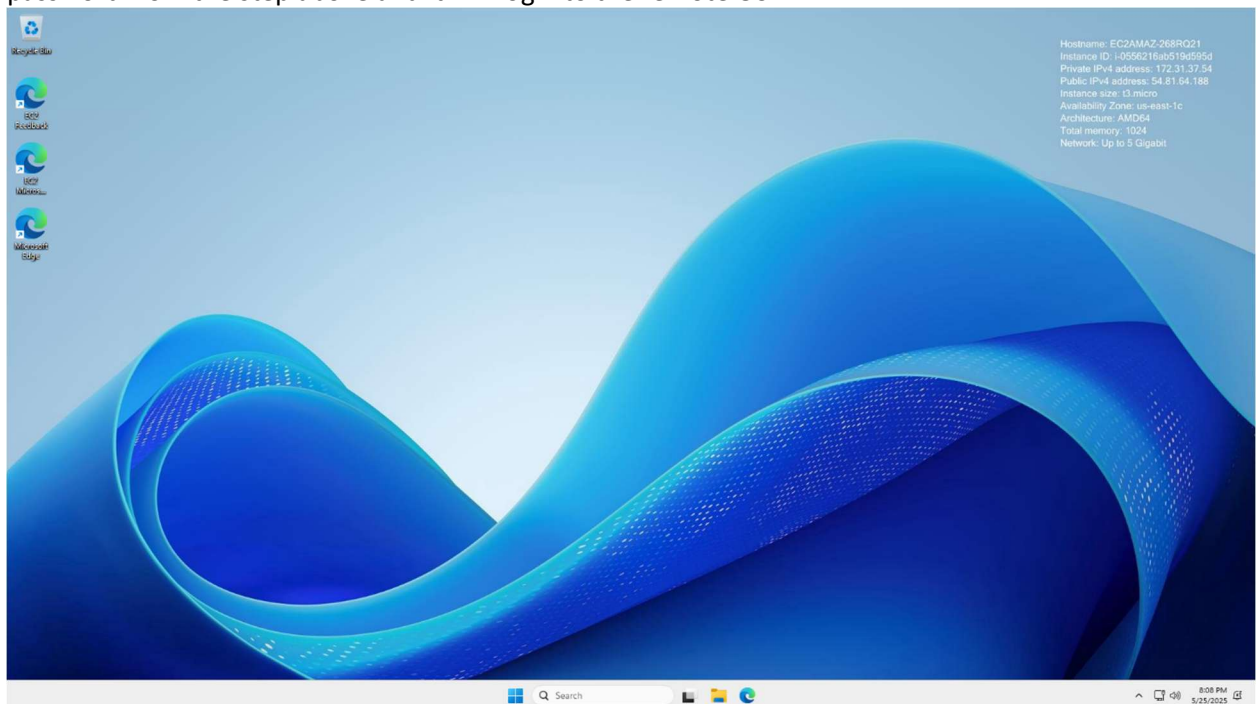
When the window below opens, you will click on “RDP client” tab. Then, you will select download remote desktop file and save it to your computer where you can open it after.

Export/print your completed file as a PDF and upload to your LEO/Assignments folder.



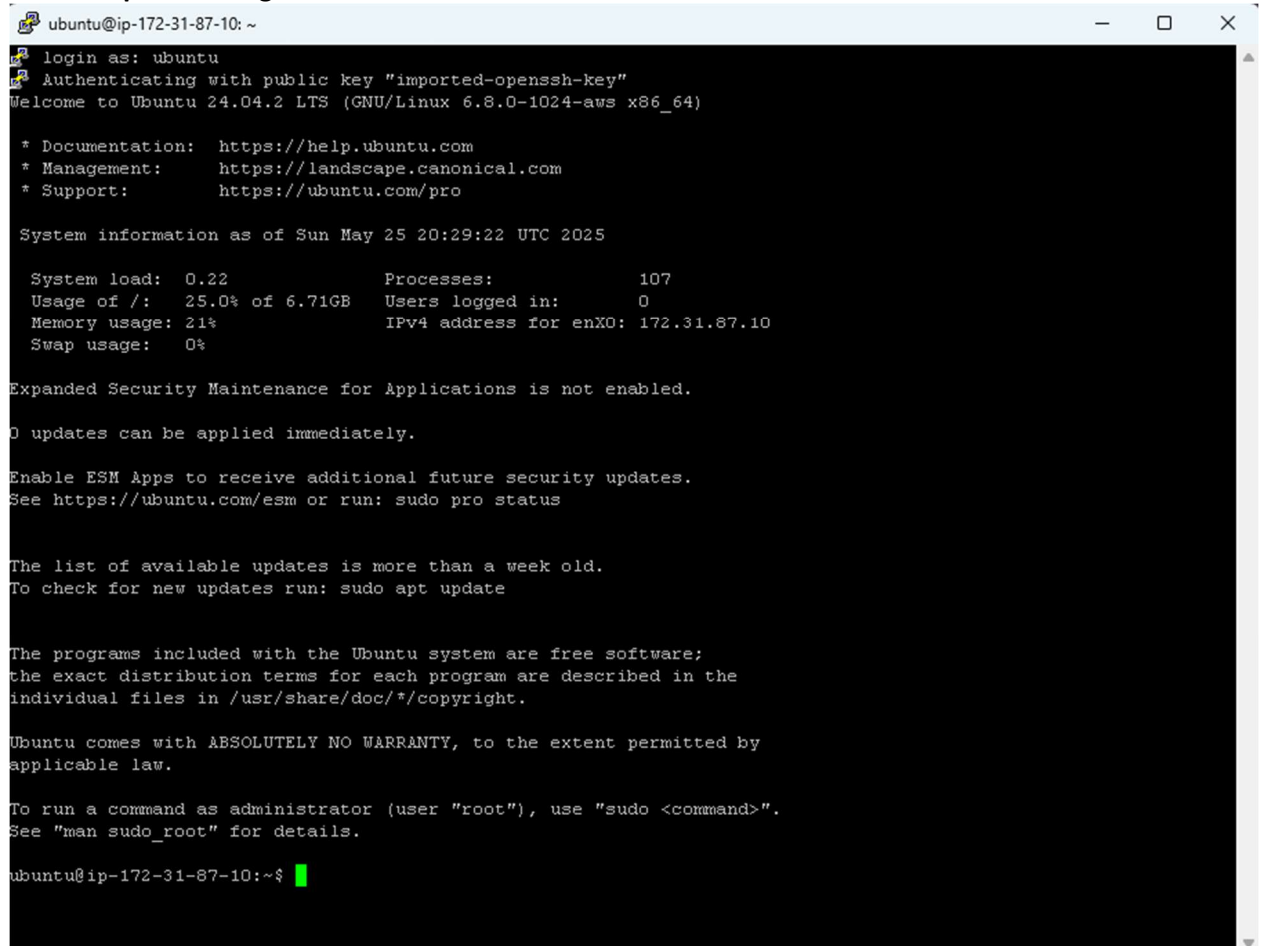
Below that, you will click on get “password link” and ask you to upload the key file you saved earlier (should be in .pem format). It will upload the file, and you can select decrypt password on the bottom right of the screen. When it generates the password, you will copy it and use it at the next step.

Once you double click to open, it will initiate a connection and ask for your password. Paste the password from the step above and it will login to the remote OS.



Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

3. Using what you learned from Project 1, provision and launch a new AWS EC2 Ubuntu Linux Server and connect to it via the SSH protocol. Note any challenges or opportunities associated with this provisioning.

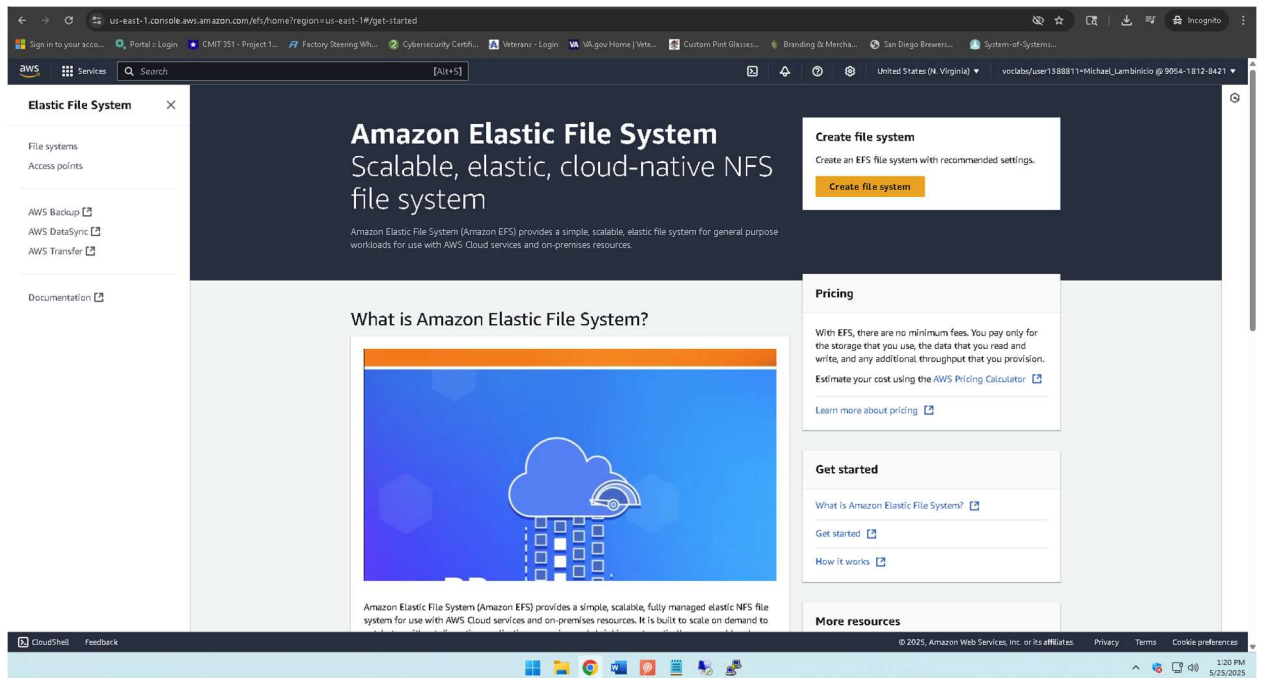


```
ubuntu@ip-172-31-87-10: ~  
login as: ubuntu  
Authenticating with public key "imported-openssh-key"  
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1024-aws x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:        https://ubuntu.com/pro  
  
System information as of Sun May 25 20:29:22 UTC 2025  
  
System load:  0.22          Processes:           107  
Usage of /:   25.0% of 6.71GB Users logged in:       0  
Memory usage: 21%          IPv4 address for enx0: 172.31.87.10  
Swap usage:   0%  
  
Expanded Security Maintenance for Applications is not enabled.  
  
0 updates can be applied immediately.  
  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
ubuntu@ip-172-31-87-10:~$
```

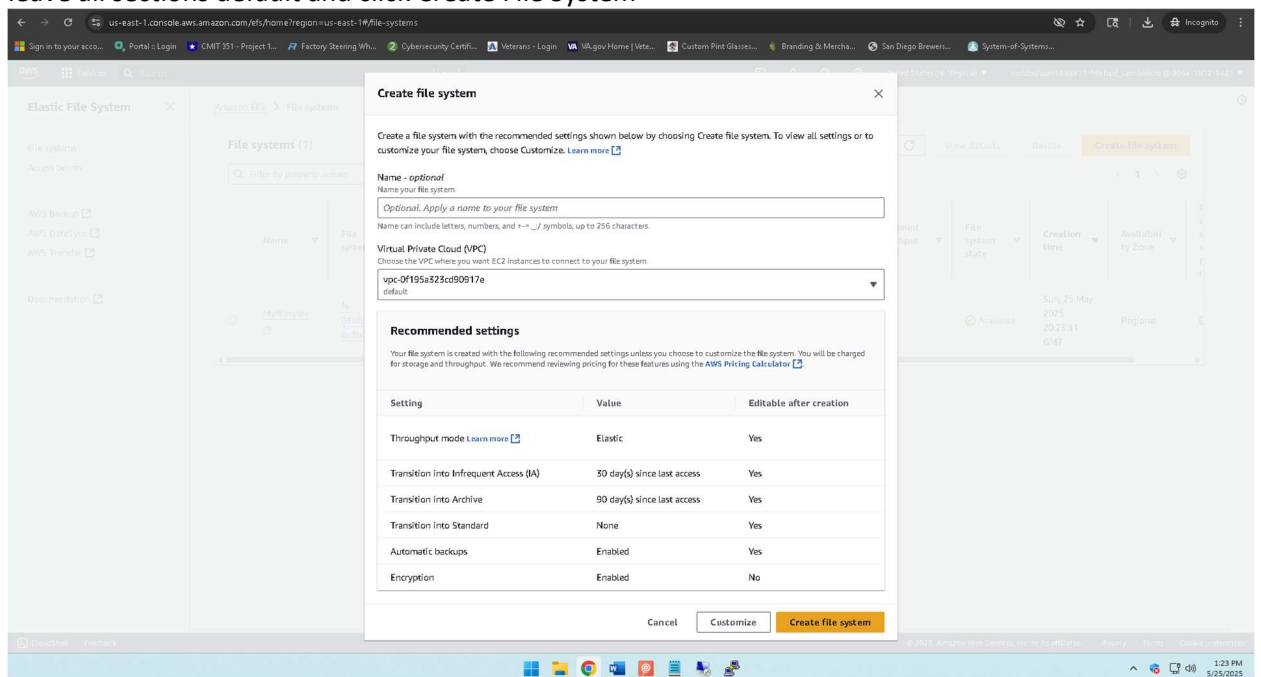
4. Using AWS, create a network file system with Amazon Elastic File Systems (EFS) and attach it to the running Ubuntu Server instance. You may use the [AWS web page](#) for step-by-step instructions and understand how the EFS works. Take a screenshot of the result and embed it below. Specifically, take a screenshot to verify that your file system has been successfully mounted, along with the results from creating a test file in your new file system. This will be done by running a simple dd command to generate a 1GiB file in your new directory. Finally, describe the value of a network file system.

When clicking on the “services” menu in the top left corner of the AWS console, type EFS to bring you to the home page.

Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

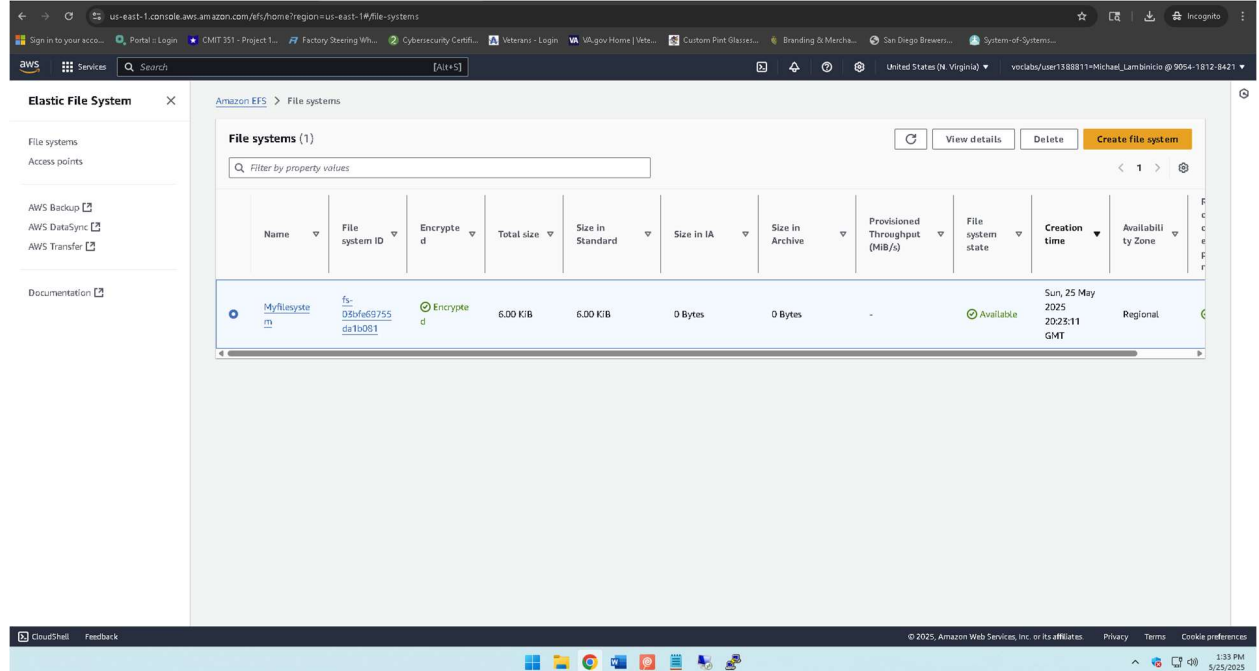


Then, you will select “Create File system” highlighted in orange. Create a name for the EFS and leave all sections default and click Create File System

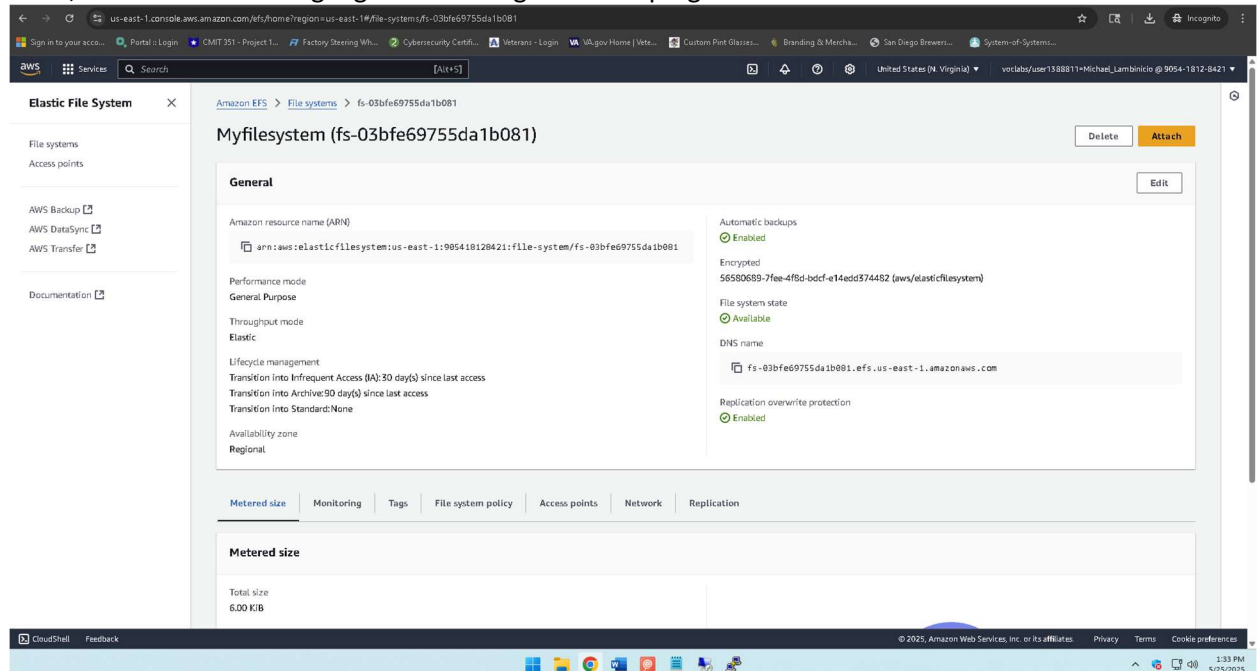


Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

Once the File System is created, click the check box and choose “view details” on the top right corner.



Then, click on “Attach” highlighted in orange in the top right corner.



You will then view the command to type into your terminal application. Click the double box next to it to copy it. Then you will open your terminal application such as PuTTY to login to your instance. Once logged in, you will have to install NFS first to run the command correctly. To do this, you would type `sudo apt-get install nfs-common -y`. After, you would create an EFS directory and then paste the copied command earlier to attach the EFS to your instance.

Export/print your completed file as a PDF and upload to your LEO/Assignments folder.


```

ubuntu@ip-172-31-87-10: ~
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nfs-common is already the newest version (1:2.6.4-3ubuntu5.1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
ubuntu@ip-172-31-87-10:~$ sudo mkdir efs
mkdir: cannot create directory 'efs': File exists
ubuntu@ip-172-31-87-10:~$ ls
efs
ubuntu@ip-172-31-87-10:~$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=
1048576,hard,timeo=600,retrans=2,noresvport fs-087c77c6d8dc0c6a4.efs.us-east-1.a
mazonaws.com:/ efs
ubuntu@ip-172-31-87-10:~$ df -h

```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/root	6.8G	2.4G	4.4G	36%	/
tmpfs	479M	0	479M	0%	/dev/s
tmpfs	192M	888K	191M	1%	/run
tmpfs	5.0M	0	5.0M	0%	/run/l
/dev/xvda16	881M	137M	683M	17%	/boot
/dev/xvda15	105M	6.2M	99M	6%	/boot/
tmpfs	96M	12K	96M	1%	/run/u
fs-087c77c6d8dc0c6a4.efs.us-east-1.amazonaws.com:/	8.0E	0	8.0E	0%	/home/

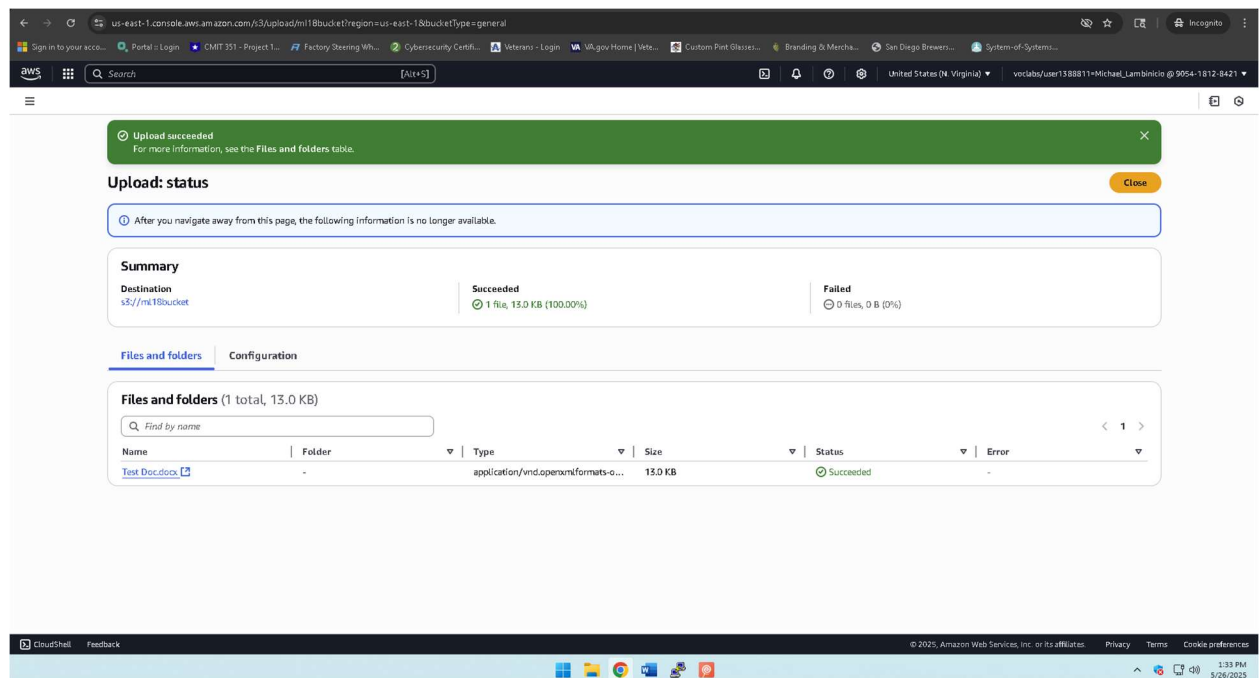
```

ubuntu@ip-172-31-87-10:~$

```

The value a network file system can bring is having the ability to manage data in a centralized environment allowing you to simplify the ability to backup, monitor security, and handle all data effectively. Once setup and attached to a virtual server, it extends your ability to access that file system from your networked devices.

5. Using the AWS platform, create an S3 bucket and upload any file to the S3 bucket. Take a screenshot showing the file was uploaded to the S3 bucket and paste it below. If necessary, use the AWS webpage above for step-by-step instructions.



6. The CTO will be reviewing this document. You have shown how easy it is to provision a Microsoft OS using the AWS platform. The CTO chose AWS because it offered a free account. She will now expect a recommendation from you on what cloud service to use for the organization's PaaS (e.g., the infrastructure, OS, runtime, etc.) needs. There is no need for a private cloud, so the public option will work just fine. Describe the difference between the Google Cloud platform, Amazon AWS platform, and Microsoft Azure platform. Provide a recommendation for the CTO as to which service provider you would recommend and why. Be explicit and detailed in your recommendation.

AWS is a great platform that has extended services available that serve at the enterprise level and because of its dominance in the market today, it would be an easy option because it could also integrate with the accounts already established. Google is phenomenal because of its advancements in data analytics using Artificial Intelligence (AI) and how it has now been adopted by almost every network infrastructure and devices today. Microsoft Azure is great since using Windows OS, it is an alternative option for cloud solutions as it integrates well with all other Microsoft products such as 365. My recommendation would be using AWS as it would give a lot more familiarity with CTO as they have taken advantage of the free account and make everything seamless without any down time using their PaaS model.

7. The CTO approved your comparative analysis between the cloud service providers (i.e. Amazon, Google, and Microsoft). She has decided to proceed with an [Amazon Virtual Private Cloud \(Amazon VPC\)](#). The Amazon VPC enables one to launch AWS resources into a virtual network, which is similar to a traditional network that can be operated in an on-premises data center. Keep in mind that networking, storage, and security associated with a VPC are as important as the overall scalable infrastructure of AWS.

Export/print your completed file as a PDF and upload to your LEO/Assignments folder.

- a. To begin, the CEO would like you to provide the network settings needed to provision two (2) subnets for the VPC as shown in the table below:

Subnet	End-User	CIDR	Network	Broadcast	Mask
A	Developers	146.38.70.105/20	146.38.64.0/20	146.38.79.255	255.255.240.0
B	Marketing	172.31.0.0 /16	172.31.0.0/16	172.31.255.255	255.255.0.0

- b. Based on your understanding, list the network address, broadcast address, and subnet mask for subnet A and subnet B in the table above. Perform the necessary calculations and explain how you arrived at your answer.

To better help you understand IP addressing, IP subnetting, and IP address summarization, review the following AWS documentation prior to answering the questions in this section:

- [VPCs and subnets](#)
- [CIDR and Peering for VPC and AWS Control Tower](#)
- [Subnet CIDR reservations](#)

Note:

The key benefit of an Amazon VPC (or a virtual private network) is that the internal network devices are not openly accessible via the Internet and can only be accessed from within a secure network. Thus, it keeps the proprietary applications and data protected.

Classless Internet Domain Routing (CIDR) notation: CIDR was introduced as a means to primarily improve address space utilization as a result of the rapid growth of the Internet and growth of the IP routing tables held in the Internet routers. Represented by an IP prefix, CIDR moves away from the traditional IP classes (e.g., Class A, Class B, Class C, etc.). Subnetting a network address space using CCIDR leads to an effective IP address space only for the number of hosts needed without wasting IP addresses.

8. Please note the following carefully. Confirm that you have stopped and terminated your Microsoft Windows virtual machine, deleted your file system from the Amazon EFS console, deleted the contents of your Amazon S3 bucket, and deleted your Amazon S3 bucket. To confirm, simply type your name below.

MICHAEL LAMBINICIO