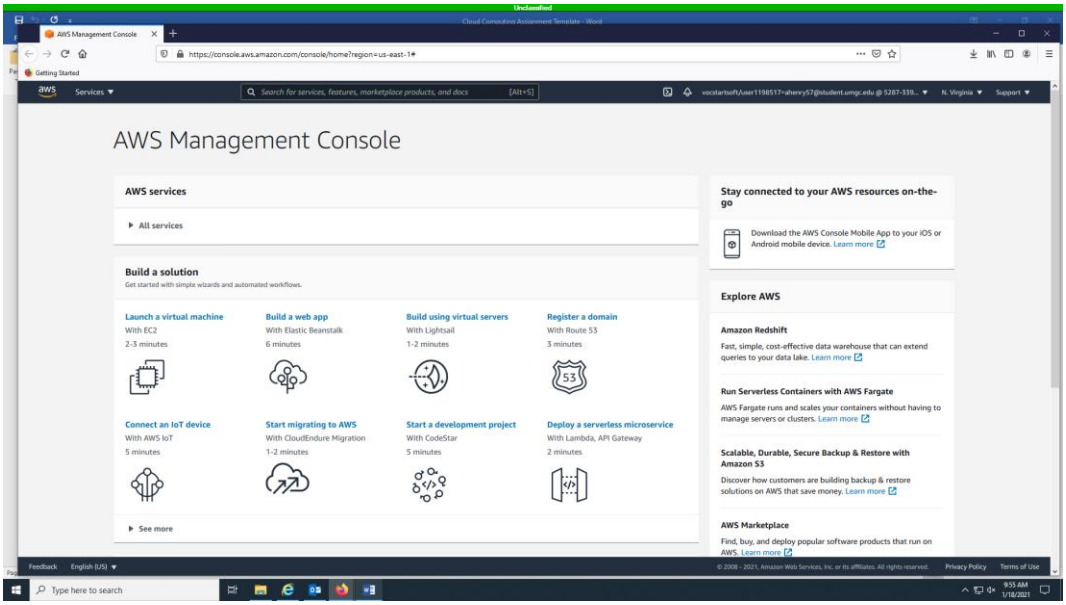
CMIT 495 Current Trends and Projects in Computer Networks and Security

Week 2 – Cloud Computing

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

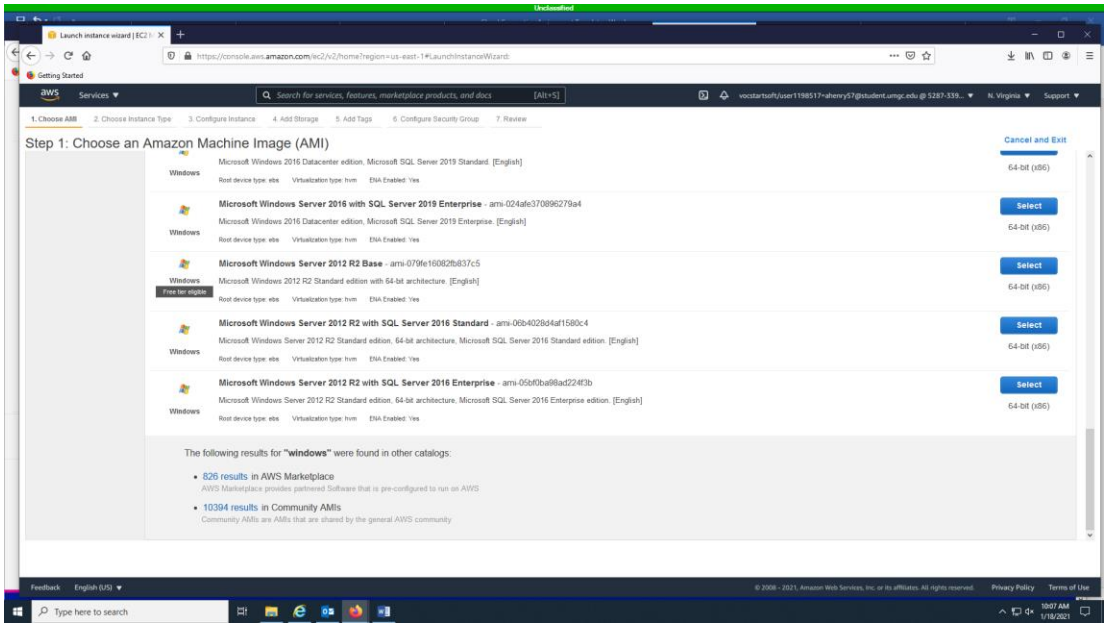


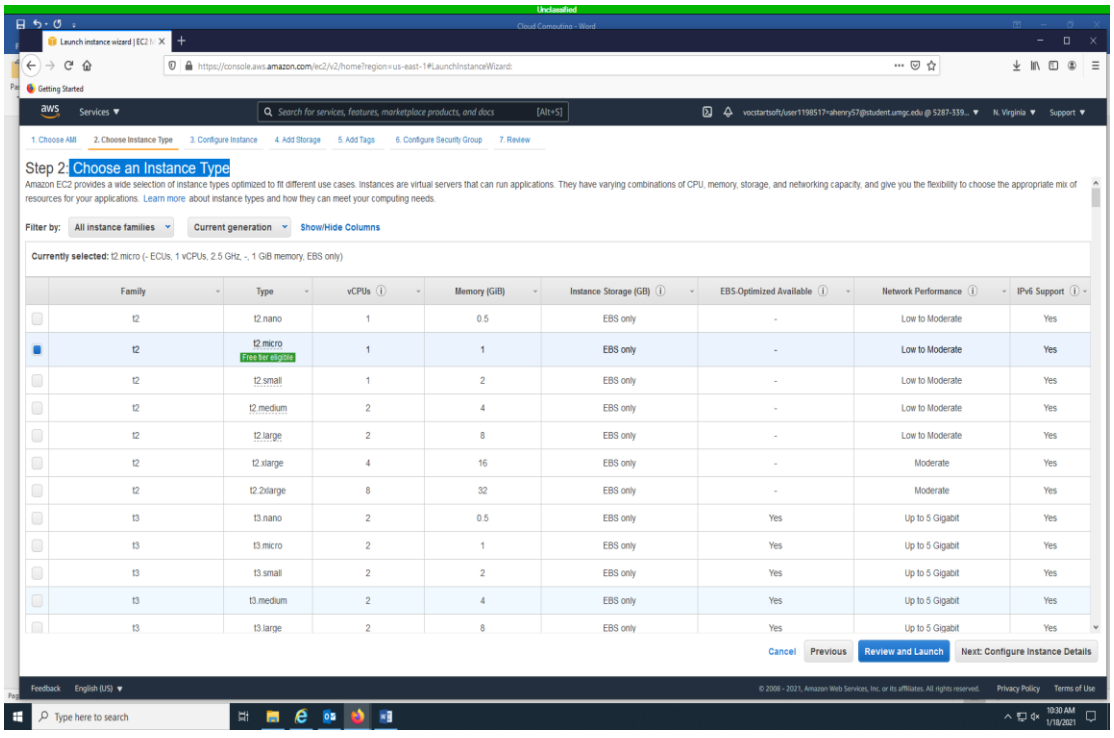
2. **Launch a Windows Virtual Machine (VM). Provide a detailed overview of the steps required to install the Microsoft Windows operating system on the VM. The steps may be listed in bullet points or complete sentences. Use as much space as required. Finally, take a screenshot of the desktop and embed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

- Launch AWS Management Console
- Click EC2
- New Window will populate
- Step 1: Choose an Amazon Machine Image (AMI)
- Select Microsoft Windows Server 2012 R2 Base (Free)
- Choose an Instance Type (select t2)
- Click Review and Launch
- Review Launch Instance (Click Launch)
- Enable Inbound traffic in setting utilizing your Computer IP address
- Select existing or create a new key.
- Download key pair (Launch instance)
- Proceed to RDP table and select download.
- Download RDP

Upon completion of this assignment, export your file as a PDF and upload to the LEO/Assignments folder.

- Obtain password with PEM key created.
- Decrypt password and enter in RDP session.
- After clicking on yes, the system connects and launches the Windows Virtual Machine.





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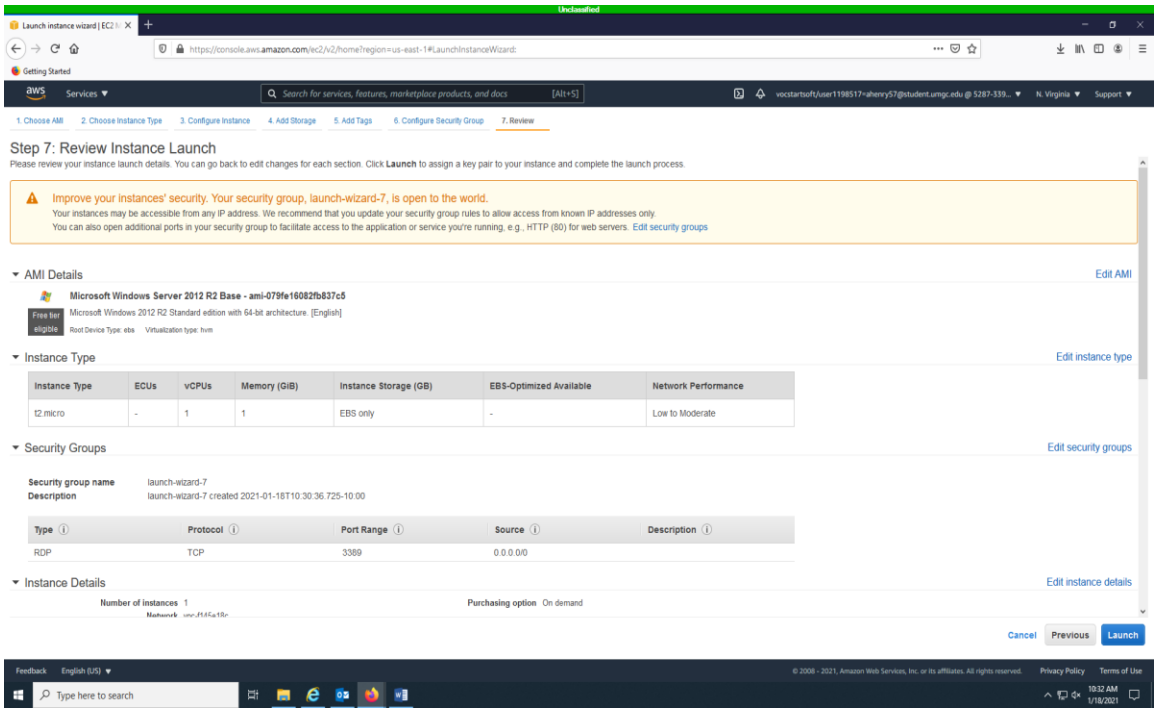

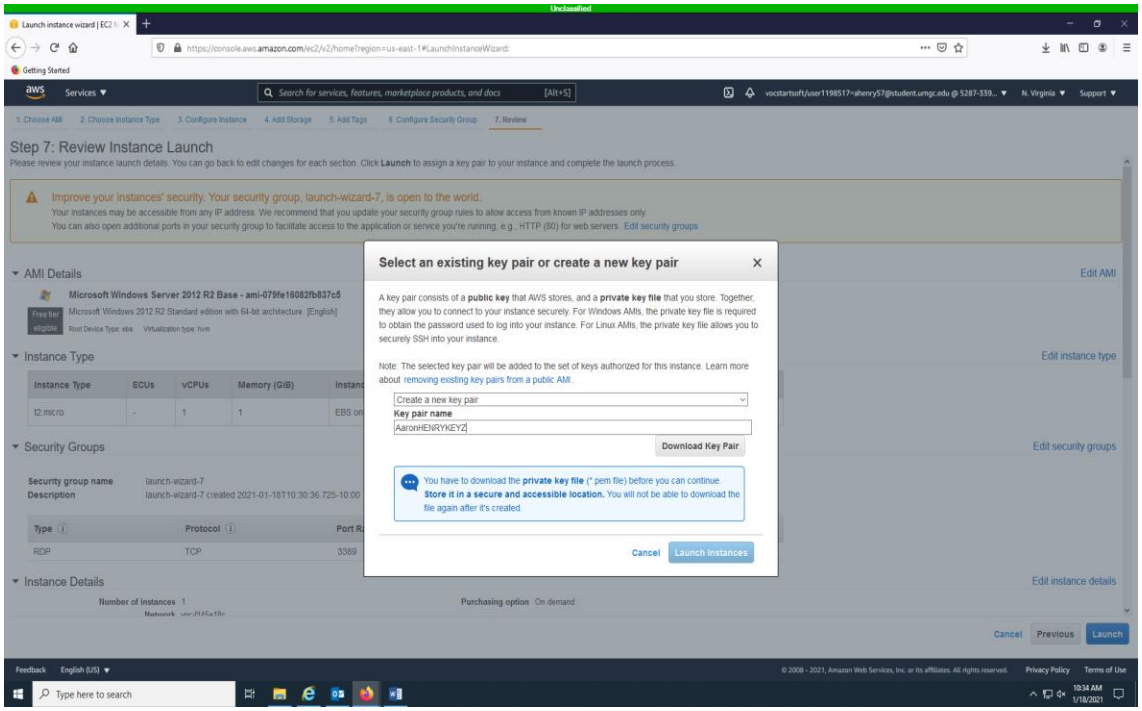

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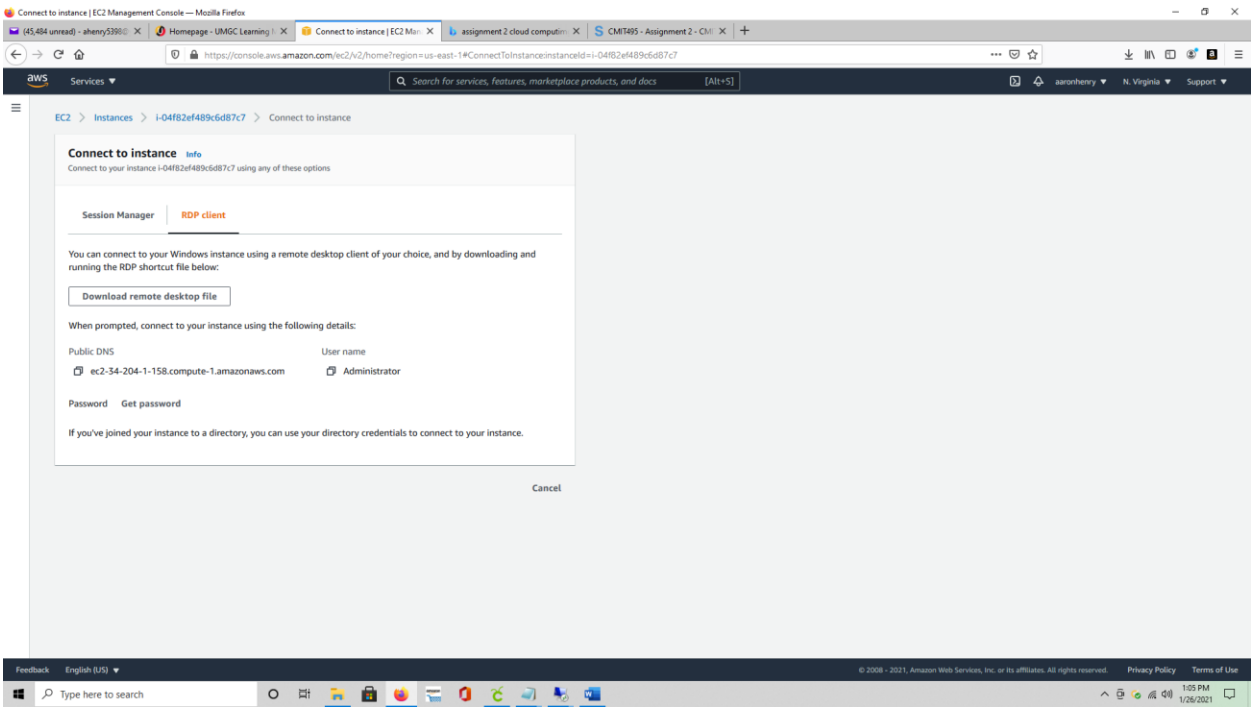

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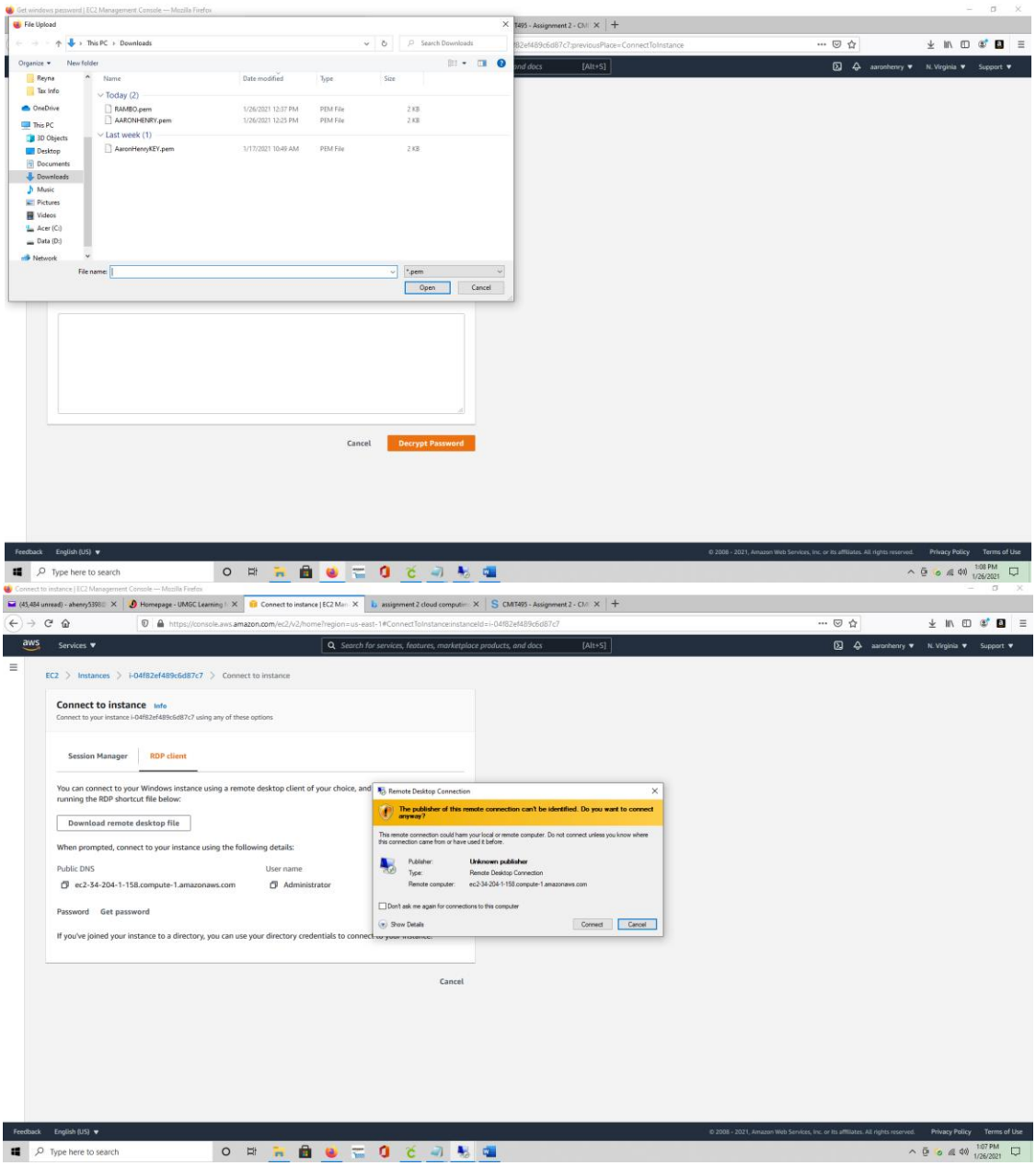

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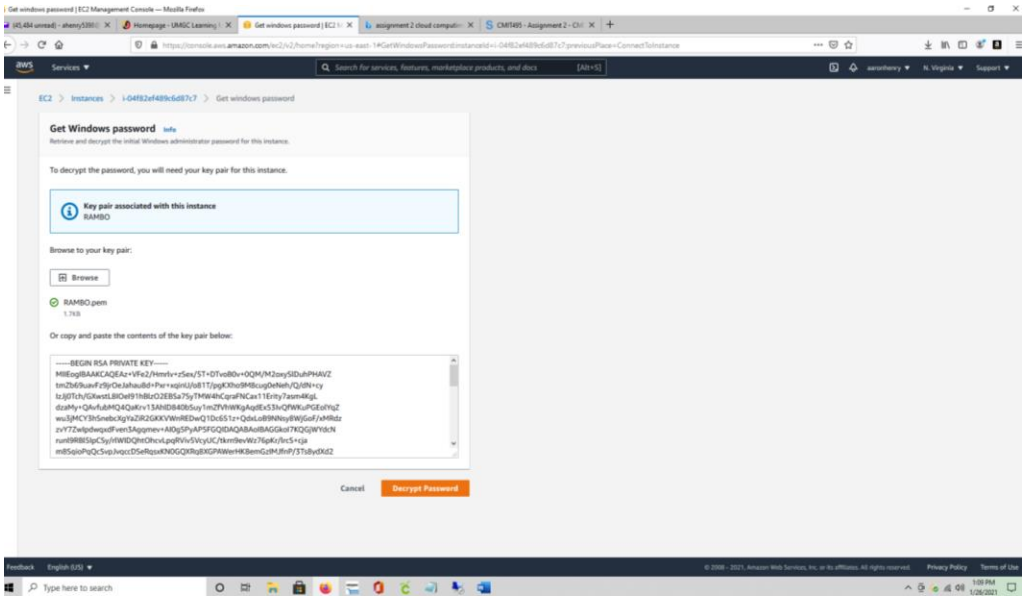

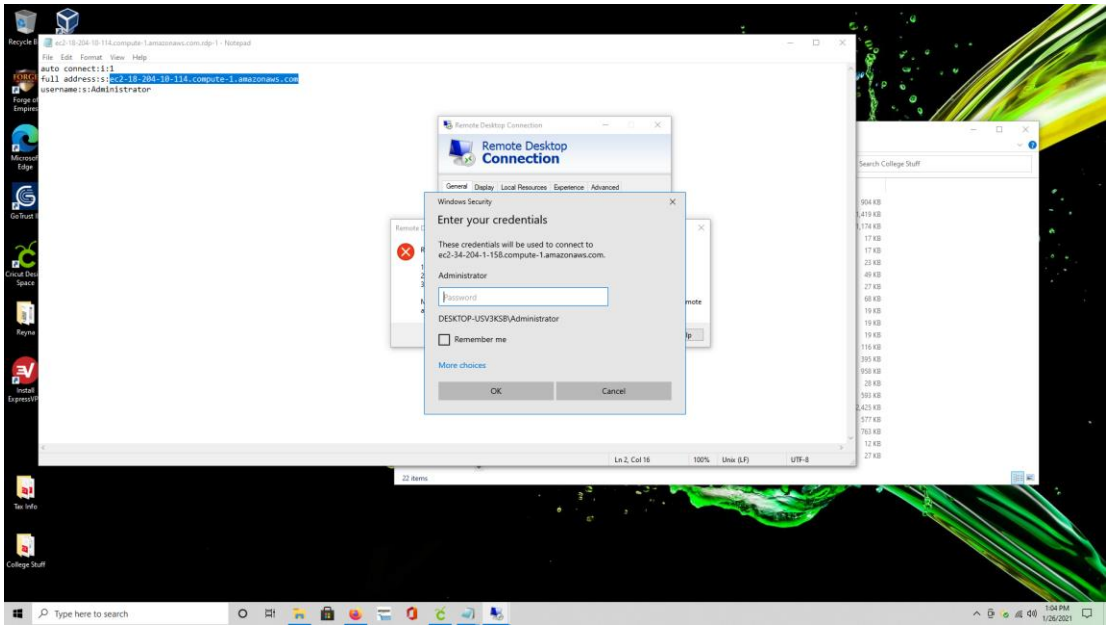

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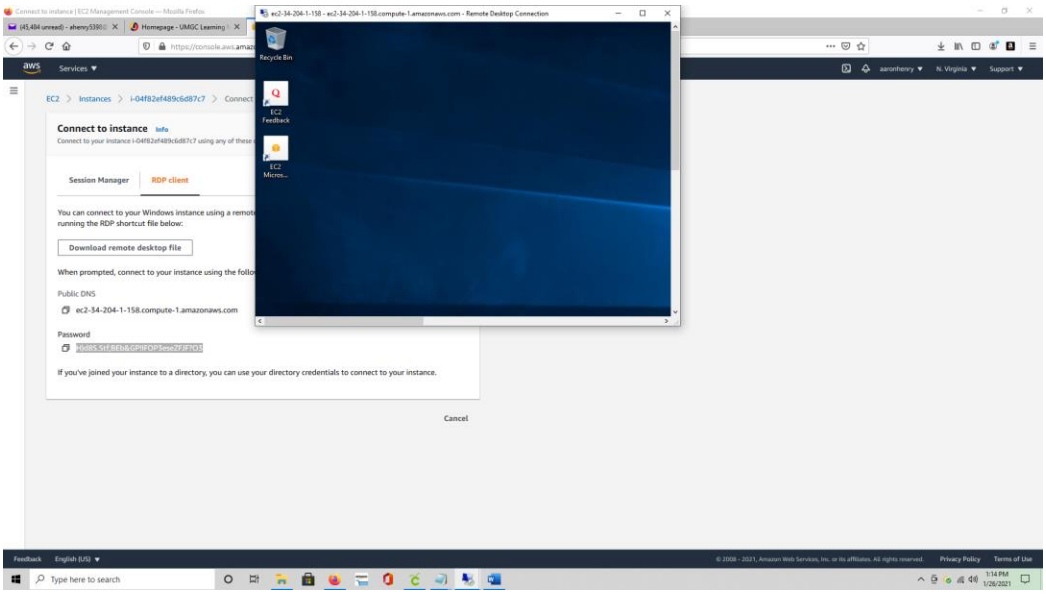

3. **Using AWS, *create a network file system* with Amazon Elastic File Systems (EFS). Use the *AWS Use Cases web page* for step-by-step instructions. Take a screenshot of the result and embed it below. Specifically, take a screenshot of *verifying your file system has been successfully mounted*, and the results of *creating a test file in your new file system by running a simple dd command to generate a 1GiB file in your new directory*. Finally, describe the value of a network file system.**

```
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
12 package(s) needed for security, out of 19 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-43-246 ~]$ sudo mkdir efs
[ec2-user@ip-172-31-43-246 ~]$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,w
size=1048576,hard,timeo=600,retrans=2,noresvport fs-9c1b6ee5.efs.us-east-2.amazo
naws.com:/ efs
[ec2-user@ip-172-31-43-246 ~]$ df -h
Filesystem                                Size  Used Avail Use% Mounted on
devtmpfs                                  483M   64K  483M   1% /dev
tmpfs                                     493M     0  493M   0% /dev/shm
/dev/xvda1                                7.8G  1.1G  6.6G  14% /
fs-9c1b6ee5.efs.us-east-2.amazonaws.com:/  8.0E     0  8.0E   0% /home/ec2-user/
efs
[ec2-user@ip-172-31-43-246 ~]$ sudo dd if=/dev/zero of=~/efs/1GiB bs=1M count=10
24 status=progress
1006632960 bytes (1.0 GB) copied, 7.044525 s, 143 MB/s
1024+0 records in
1024+0 records out
1073741824 bytes (1.1 GB) copied, 9.31939 s, 115 MB/s
[ec2-user@ip-172-31-43-246 ~]$
```

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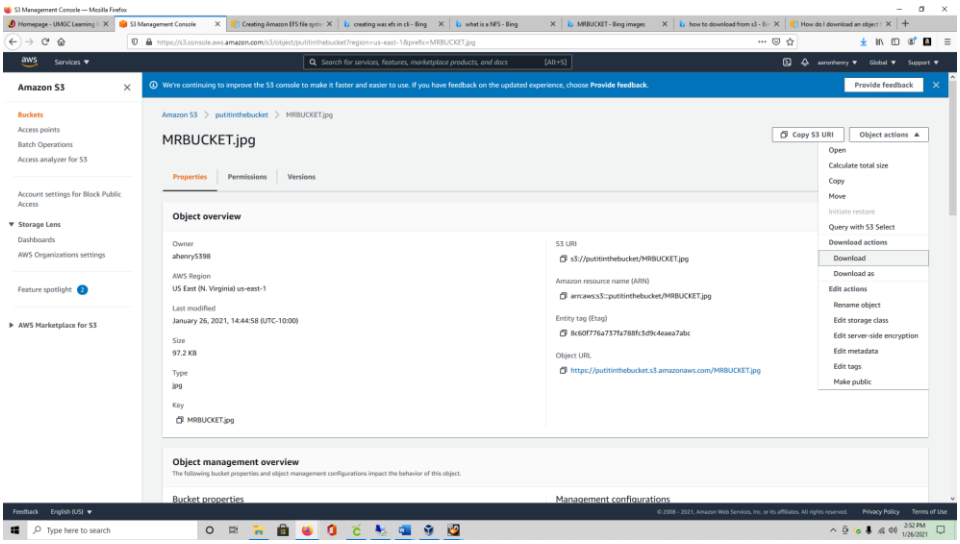
```
The authenticity of host '3.19.29.140 (3.19.29.140)' can't be established.
ECDSA key fingerprint is SHA256:YcGVdNDyHxEin7INLPJdhV5k/D5LJGTaZ10kbznVdqw.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '3.19.29.140' (ECDSA) to the list of known hosts.

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
12 package(s) needed for security, out of 19 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-43-246 ~]$ sudo mkdir efs
[ec2-user@ip-172-31-43-246 ~]$ sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,w
size=1048576,hard,timeo=600,retrans=2,noresvport fs-9c1b6ee5.efs.us-east-2.amazo
naws.com:/ efs
[ec2-user@ip-172-31-43-246 ~]$ df -h
Filesystem                                 Size  Used Avail Use% Mounted on
devtmpfs                                   483M   64K  483M   1% /dev
tmpfs                                      493M     0  493M   0% /dev/shm
/dev/xvda1                                 7.8G  1.1G  6.6G  14% /
fs-9c1b6ee5.efs.us-east-2.amazonaws.com:/  8.0E     0  8.0E   0% /home/ec2-user/
efs
[ec2-user@ip-172-31-43-246 ~]$
```

- NFS is a low-cost solution for network file sharing that is easy to setup as it uses the existing IP infrastructure. NFS is that allows for central management, decreasing the need for added software and disk space on individual user systems. Enables local users to access remote data and files in the same ability it can be locally. NFS utilizes TCP and UDP for data access and delivery, which is dependent on the version in use.

4. **Using AWS, *store and retrieve a file*. Use the AWS Use Cases web page for step-by-step instructions. Take a screenshot of the result and embed it below. Specifically, take a screenshot *retrieving the object from the S3 bucket.***



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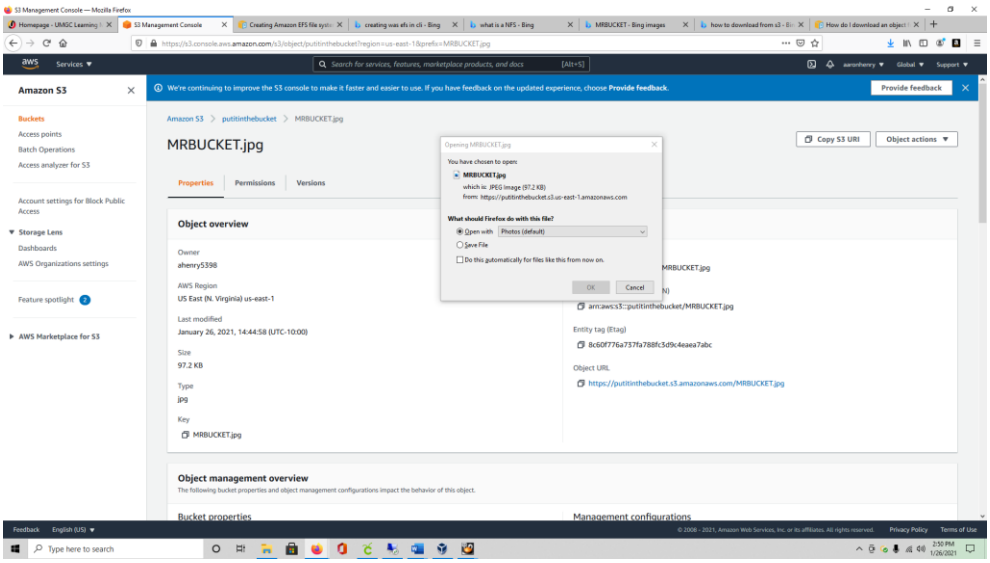

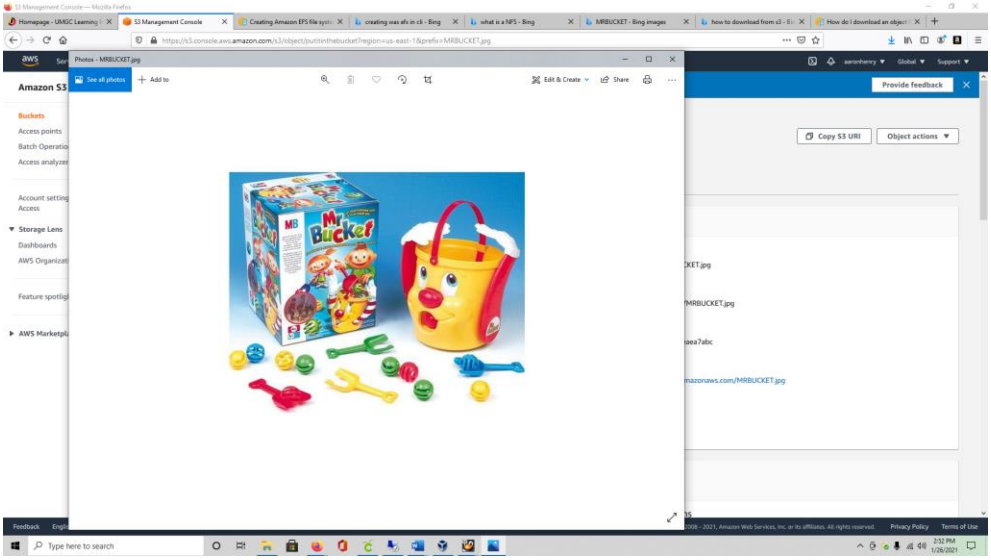

5. **The CTO will be reviewing this document. You have shown how easy it is to provision a Microsoft operating system using AWS. The CTO chose AWS because it offered a free account. She will now expect a recommendation from you on what cloud service to use for the organization PaaS (e.g. operating system)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

AWS is growing platform that is continues to demonstrate Amazon's capability. While they can and do offer free cost structure their pay to play structure can be a little

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confusing at times and hard to understand. AWS tends to focus on public cloud rather a t hybrid or private cloud. This causes interoperating of data over different clouds more difficult to migrate. As AWS is not just out the box like other programs one must be sure they know exactly what is required before utilizing its services, but if the priority is to go with public cloud option then AWS will offer its customers exactly what it needs.

Azure also offers an infrastructure that is just as responsive and exceptional as AWS. Azure is highly attractive to enterprise customers. Unlike AWS, Azure has an option that gives public cloud options, but their focus is both Public and Private. Azure platform works hard to interoperate with data centers.

Google Cloud Platform is relatively newer than the other two. Their enterprise focus is not centrally strong and therefore they have yet to attract the fanbase that AWS and AZURE process. One bright spot in the Google Cloud Platform is unmatched technical expertise. Currently the market leader in learning and AI, machine learning and data analytics.

As the current search is for a Platform as a Service (PaaS) the focus will be in the public cloud option. Our strongest recommendation is that your company go with Amazon AWS. While the free to cost base can be confusing, we have no doubt your company will figure out the requirements needed to be meet.

6. **The CTO appreciated the analysis performed between the cloud service providers (Amazon, Google, and Microsoft). She has decided to proceed with an Amazon Virtual Private Cloud. Amazon Virtual Private Cloud (Amazon VPC) enables you to launch AWS resources into a virtual network that you've defined. This virtual network closely resembles a traditional network that you'd operate in your own data center, with the benefits of using the scalable infrastructure of AWS. To begin, the CEO would like you to provision two subnets. One subnet will be for the developers (Subnet A), which will be provisioned with 146.38.70.105/20. The second subnet will for the marketing department (Subnet B), which will be provisioned with 215.16.52.119/19.**

   What is the network address, broadcast address, and subnet mask for Subnet A and B? Perform the necessary calculations and explain your answer.

   To get the subnet mask of the IP addresses given turn into binary but turning on or utilizing the bits. For **146.38.70.105/20** is broken down into 4 segments, each consisting of 8 bits each. From left to right I used 1's to make a total of 20 bits. I used the following formula to get the Subnet mask.
   128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 11111111 = 255
   128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 11111111 = 255
   128 + 64 + 32 + 0 + 0+ 0 + 0 + 0 = 11111111 = 224

NO BITS USED= 00000000 = 0
Subnet Mask: **255.255.224.0**

Same formula used to get the subnet mask of **215.16.52.119/19.**

SUBNET A: 146.38.70.105/20

Address: 146.38.70.105 10010010. 00100110. 01000110. 01101001
subnet mask: 255.255.240.0 = 20 11111111.11111111.1111 0000.00000000
Broadcast: 146.38.79.255
Network Address: 146.38.64.0 = 10010010. 00100110. 01000000. 00000000

-To get the network address use the first 20 bits from the given IP address 10010010. 00100110. 01000000. 00000000 and the remaining bits turned them to zero with a result of **146.38.64.0.**

-To get the broadcast address turn last bits into 1's to get 10010010. 00100110. 01001111. 11111111 = **146.38.79.255**

SUBNET B: 215.16.52.119/19

Address: 215.16.52.119 11010111. 00010000. 00110100. 01110111

Subnet mask: 255.255.224.0 = 19 11111111. 11111111. 1110 0000. 00000000
Broadcast: 215.16.63.255
Network Address: 215.16.32.0

- To get the network address use the first 19 bits from the given IP address. 11010111. 00010000. 00100000. 00000000 and the remaining bits turned them to zero with a result of 215.16.32.0

- To get the broadcast address turn last bits into 1's to get 11010111. 00010000. 00111111. 1111111 = 215.16.63.255

7. **Confirm that you have stopped and terminated your Microsoft virtual machine, Linux instance, deleted your file system from the Amazon EFS console and deleted your Amazon S3 bucket. To confirm, simply type your name below.**

Aaron Henry

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