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MICROSOFT AZURE

CLOUD

LOUIE S. VENEGAS

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WHAT'S TO COME...

Throughout the course of this project I will demonstrate the implementation of the following components of Microsoft Azure Cloud Services

1. Creating Virtual Machines
2. V-NETS and SubNets
3. Azure VM Security
4. Cloud Storage



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PART 1

VIRTUAL MACHINES

LOUIE VENEGAS

Introduction

In this module I launched a Virtual Machine on Microsoft Azure then accessed it via REMOTE DESKTOP PROTOCOL(RDP) from my home machine. To accomplish this, I had to follow some steps I will go over briefly now. First, I gained access to Microsoft Azure by logging in with my DeVry email. Leveraging my new account, I accessed the platform and confirmed my student subscription. With the goal of deploying a VM I navigated to the resource menu and clicked VM. Then I worked through the steps of deployment and deployed. Then using RDP(remote desktop protocol) I connected to the VM.

Deploying a VM in Azure

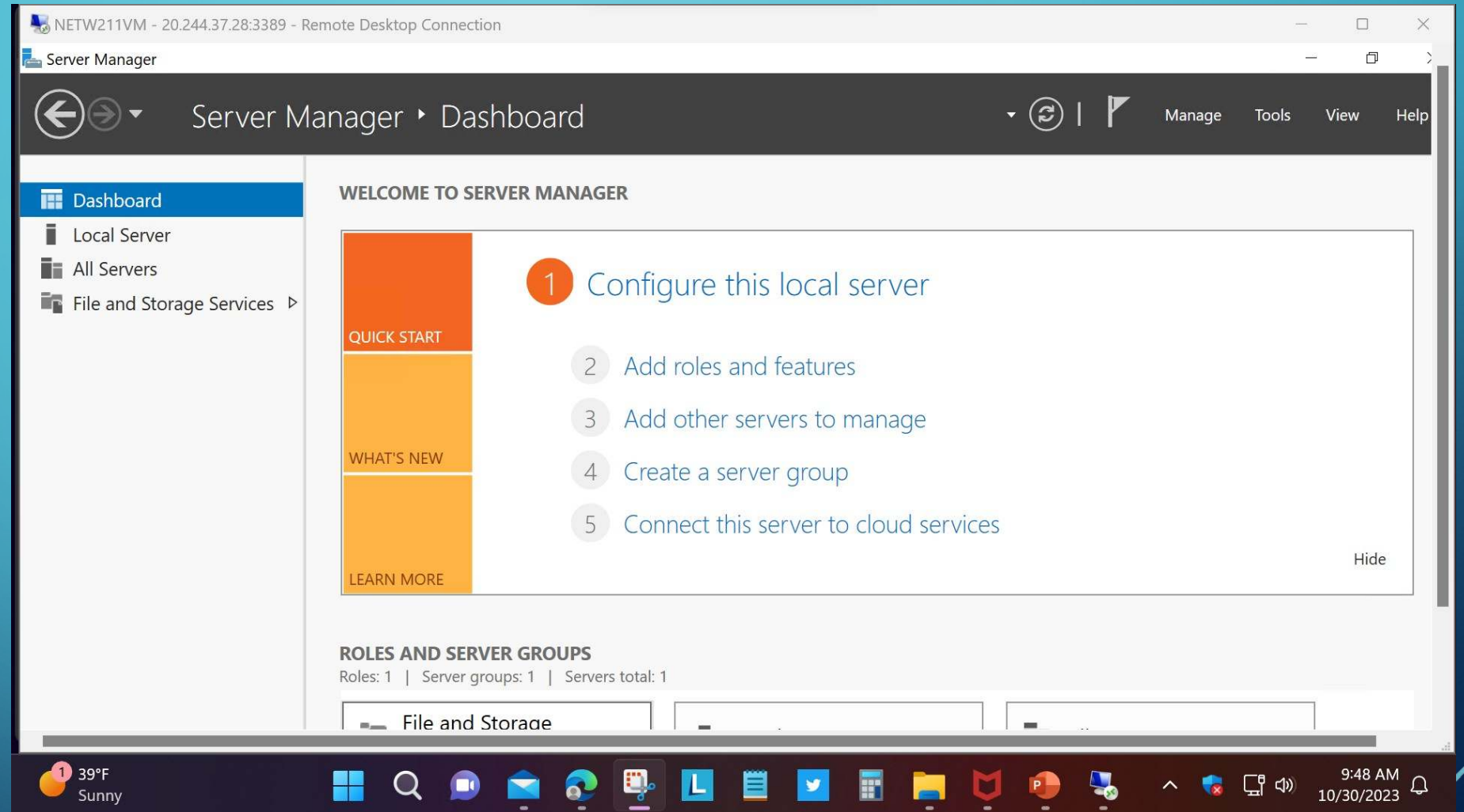
The NETW211VM
overview page:
resource group,
subscription, and
public IP address
of the deployed
virtual machine.

The screenshot shows the Microsoft Azure portal interface. The browser tabs at the top include 'DeVry Stud...', 'Module 2: I...', 'CreateVm-M...', 'NETW211 C...', 'NETW211 C...', 'Sign On to...', and '+'. The address bar shows the URL 'https://portal.azure.com/#view/HubsExtension/DeploymentDetail...'. The page title is 'CreateVm-MicrosoftWindowsServer.WindowsServer-201-20231030092512 | Overview'. The left sidebar shows 'Overview', 'Inputs', 'Outputs', and 'Template'. The main content area displays a green checkmark and the text 'Your deployment is complete'. Below this, the deployment details are shown: 'Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe...', 'Subscription: Azure for Students', 'Resource group: NETW211-LV', 'Start time: 10/30/2023, 9:35:56 AM', and 'Correlation ID: abd98148-58fc-4c4d-9828-83c2222578a1'. The 'Next steps' section includes 'Setup auto-shutdown Recommended', 'Monitor VM health, performance and network dependencies Recommended', and 'Run a script inside the virtual machine Recommended'. At the bottom, there are buttons for 'Go to resource' and 'Create another VM'. A sidebar on the right contains sections for 'Cost Management', 'Microsoft Defender for Cloud', 'Free Microsoft tutorials', and 'Work with an expert'. A notification in the top right corner states 'Deployment succeeded'.

Connecting to the VM

Properties for NETW211VM: computer name, operating system version, and hardware details.

The Events section below records the date and time of each action.



Deleting the VM

The NETW211-LV resource group after teardown, now returning “No resources match your filters.”

The screenshot shows the Microsoft Azure portal interface. The browser window has multiple tabs open, including 'DeVry S...', 'Module...', 'NETW2...', 'NETW2...', 'Resource...', 'Sign On...', and 'window...'. The address bar shows the URL 'https://portal.azure.com/#view/HubsExtension/BrowseResourceGr...'. The page title is 'Microsoft Azure' with a search bar. The main content area is titled 'Resource groups' for 'DeVry University (mydevryedu.onmicrosoft.com)'. It includes a filter bar with 'Subscription equals all' and 'Location equals all'. Below the filter bar, it says 'Showing 1 to 1 of 1 records.' and displays a table with one resource group: 'Louie_Venegas' under the 'Azure for Students' subscription in the 'East US 2' region. The Windows taskbar at the bottom shows the weather as 41°F Sunny, the date and time as 10:04 AM 10/30/2023, and several application icons.

Name	Subscription	Location
Louie_Venegas	Azure for Students	East US 2

Conclusions

In this module I launched a virtual machine on Azure. One technical challenge I faced along the way was that my subscription for my student account had expired, so I was unable to create any resources. I had to navigate the platform and reinstate my account privileges which I did successfully. Launching an instance on azure is a valuable versatile skill that will be utilized in a number IT related jobs.



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PART 2

AZURE V-NET AND
SUBNETS

Introduction

Well here we are again for another fine episode of VNET deployment on the cloud. For those of you who are new, what this means is that over this brief presentation we are going to build ourselves a network with some hosts inside of it. Here is the trick though, we are going to do it virtually on Microsoft's Azure cloud computing platform. And hold on, the rabbit isn't out of the hat yet, we are also going to do some subnetting. We should end up with something that looks like a physical network, two subnets running two instances of Windows Server, still able to communicate with each other. No I'm not a magician this is basic cloud computing.

Creating a V-Net with Two Subnets

With a /24 network prefix, I can create 251 **usable** IPv4 host addresses, one is used for the v-net gateway the other two are used for azure services, of course you also got the broadcast address and the network address. Which is an actual total of 256.

References

1. M. M. (2023, August 24). Configure IP addresses for an Azure network interface. Configure IP Addresses for an Azure Network Interface | Microsoft Learn. <https://learn.microsoft.com/en-us/azure/virtual-network/ip-services/virtual-network-network-interface-addresses>
2. M. M. (2023, August 24). Public IP addresses in Azure - Azure Virtual Network. Public IP Addresses in Azure - Azure Virtual Network | Microsoft Learn. <https://learn.microsoft.com/en-us/azure/virtual-network/ip-services/public-ip-addresses>

Deploying VMs into Subnets (1 of 3)

Properties for Subnet0-VM, showing its networking configuration and VM size.

The screenshot displays the Microsoft Azure portal interface. The browser address bar shows the URL <https://portal.azure.com/#@mydevryedu.onmicrosoft.com/re...>. The page title is "Subnet0-VM - Microsoft Azure". The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Networking, Connect, Windows Admin Center, Disks, Size, and Microsoft Defender for Cloud. The main content area shows the "Subnet0-VM" virtual machine overview. A warning banner at the top states: "Subnet0-VM virtual machine agent status is not ready. Troubleshoot the issue →". Below this, the "Essentials" section lists key properties:

Property	Value
Resource group	NET211-RG
Status	Running
Location	Central India (Zone 1)
Subscription	Azure for Students
Subscription ID	b19e6ffa-4e3a-4c5b-b079-759026cb4d5c
Availability zone	1
Tags	Add tags
Operating system	Windows
Size	Standard B1s (1 vcpu, 1 GiB memory)
Public IP address	20.244.32.158
Virtual network/subnet	NET211-VNet-lv/Subnet0
DNS name	Not configured
Health state	-

At the bottom, there are tabs for "Properties", "Monitoring", "Capabilities (8)", "Recommendations", and "Tutorials". The "Networking" tab is currently selected, showing the "Virtual machine" and "Networking" sections. The Windows taskbar at the bottom indicates a temperature of 47°F, heavy rain, and the time is 6:23 PM on 11/9/2023.

Deploying VMs into Subnets (2 of 3)

Properties for Subnet1-VM, showing its networking configuration and VM size.

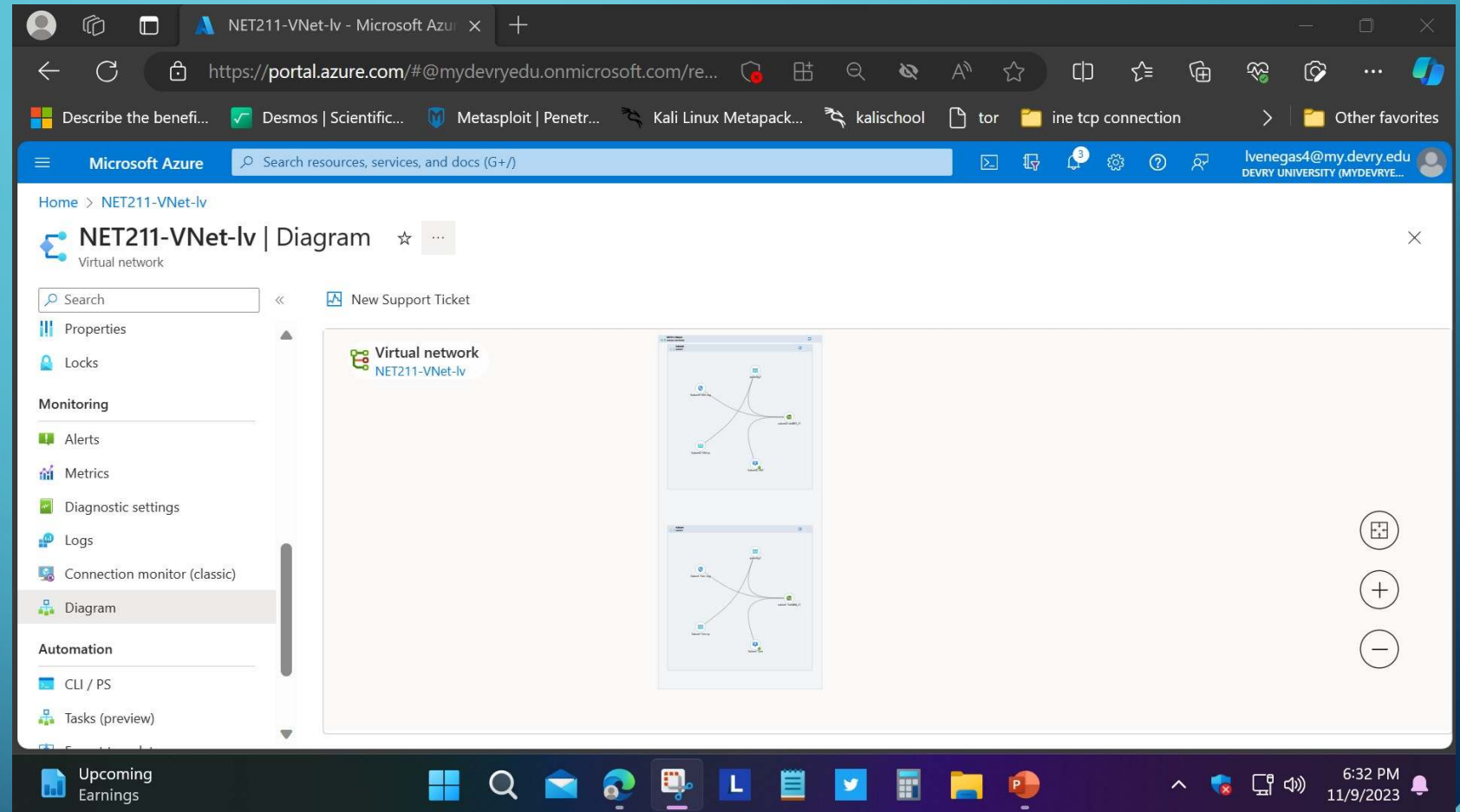
The screenshot displays the Microsoft Azure portal interface. The browser address bar shows the URL <https://portal.azure.com/#@mydevryedu.onmicrosoft.com/re...>. The page title is 'Subnet-1vm - Microsoft Azure'. The left sidebar contains navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Networking, Connect, Windows Admin Center, Disks, Size, and Microsoft Defender for Cloud. The main content area shows the 'Subnet-1vm' virtual machine details. A warning message states: 'Subnet-1vm virtual machine agent status is not ready. Troubleshoot the issue →'. The 'Essentials' section lists the following properties:

Property	Value
Resource group (move)	NET211-RG
Status	Running
Location	Central India (Zone 1)
Subscription (move)	Azure for Students
Subscription ID	b19e6ffa-4e3a-4c5b-b079-759026cb4d5c
Availability zone	1
Tags (edit)	Add tags
Operating system	Windows
Size	Standard B1s (1 vcpu, 1 GiB memory)
Public IP address	20.244.39.25
Virtual network/subnet	NET211-VNet-lv/Subnet1
DNS name	Not configured
Health state	-

Below the Essentials section, there are tabs for Properties, Monitoring, Capabilities (8), Recommendations, and Tutorials. The 'Networking' tab is currently selected, showing the 'Virtual machine' section.

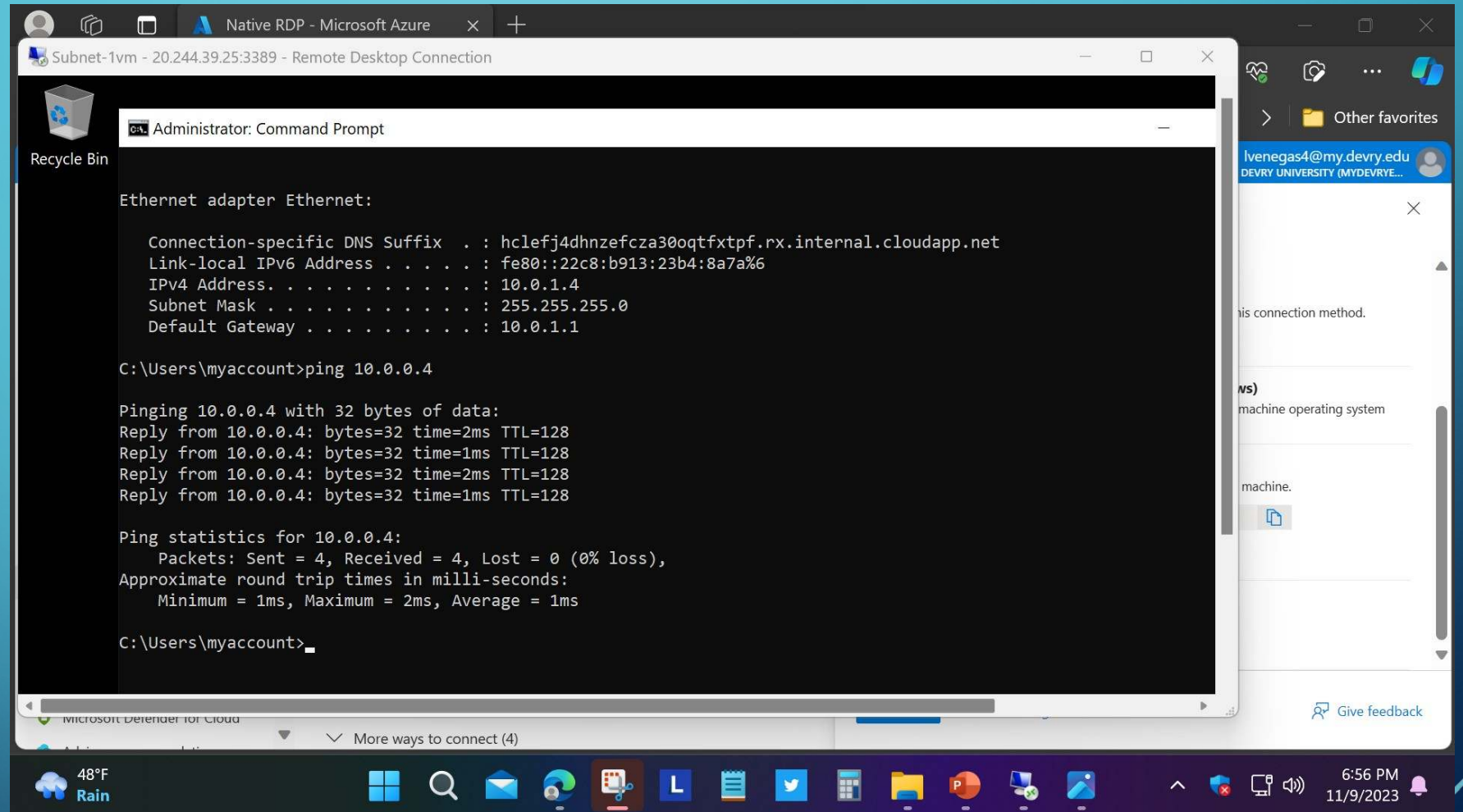
Deploying VMs into Subnets (3 of 3)

Topology of NETW211-VNet-LV: two subnets, Subnet0 and Subnet1, each running one virtual machine.



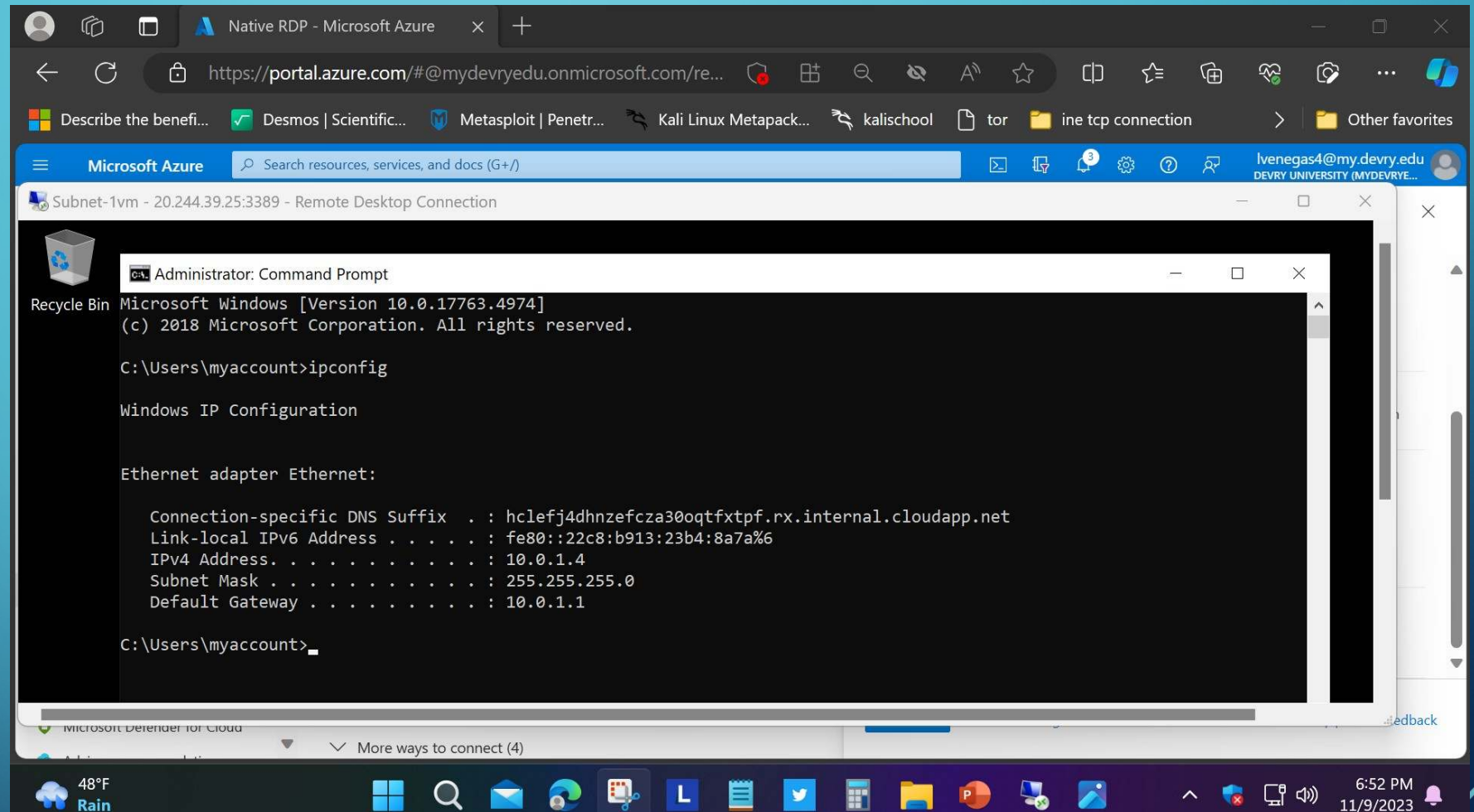
Verifying Connectivity between VMs (1 of 2)

ipconfig and ping results from the command prompt on Subnet0-VM, confirming it reaches the VM in Subnet1.



Verifying Connectivity between VMs (2 of 2)

ipconfig and ping results from the command prompt on Subnet1-VM, confirming the reply from Subnet0.



Conclusions

Well that wasn't so hard, as I stated in the introduction, I used Azure services to launch a virtual network, made it into a network, and ran two instances of Windows Server, one in each subnet. They communicated with each other using the ping command. It was a smooth familiar process, and I didn't have any hiccups.



Introduction



During this project I practiced a couple of skills that would serve me in the tech field. First I created a virtual machine on the Microsoft Azure cloud platform. Then I proceeded to log into the Virtual Machine Via SSH through a command prompt on my local machine. Then I modified the security groups rules of the Virtual machine to allow icmp traffic so I could ping it from my local terminal.

08/08/2026

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PART 3

AZURE VM SECURITY

This is a screenshot of my Azure portal. It is showing the details of a Virtual Machine I created for the purpose of this project.

The screenshot displays the Microsoft Azure portal interface. The browser's address bar shows the URL <https://portal.azure.com/#@mydevryedu.onmicrosoft.com/resource...>. The page title is "net211-VM-LV Virtual machine". The left sidebar contains navigation options: Access control (IAM), Tags, Diagnose and solve problems, Settings (Networking, Connect, Disks, Size, Microsoft Defender for Cloud, Advisor recommendations, Extensions + applications, Availability + scaling, Configuration, Identity), and a search bar. The main content area shows the VM's details under the "Essentials" tab. The "Properties" tab is also visible, showing the VM's configuration. The "Networking" tab shows the public IP address 4.224.32.200. The "Tags" section shows the tag "Add tags". The "Health state" is "OK". The "Operating system" is "Linux (ubuntu 20.04)". The "Size" is "Standard B1s (1 vcpu, 1 GiB memory)". The "Public IP address" is "4.224.32.200". The "Virtual network/subnet" is "net211-VM-LV-vnet/default". The "DNS name" is "Not configured". The "Health state" is "OK". The "Resource group" is "net211-RG-LV". The "Location" is "Central India". The "Subscription" is "Azure for Students". The "Subscription ID" is "b19e6ffa-4e3a-4c5b-b079-759026cb4d5c". The "Computer name" is "net211-VM-LV". The "Operating system" is "Linux (ubuntu 20.04)". The "Image publisher" is "canonical". The "Image offer" is "0001-com-ubuntu-server-focal". The "Public IP address" is "4.224.32.200 (Network interface net211-vm-lv728)". The "Public IP address (IPv6)" is "-". The "Private IP address" is "10.0.0.4". The "Private IP address (IPv6)" is "-". The bottom of the screen shows a Windows taskbar with the date and time "7:29 AM 11/17/2023".

Microsoft Azure

Search resources, services, and docs (G+)

Home >

net211-VM-LV Virtual machine

Search

Connect Start Restart Stop Hibernate (preview) Capture Delete Refresh Open in mobile Feedback CLI / PS

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Networking

Connect

Disks

Size

Microsoft Defender for Cloud

Advisor recommendations

Extensions + applications

Availability + scaling

Configuration

Identity

Essentials

Resource group (move): [net211-RG-LV](#)

Status: Running

Location: Central India

Subscription (move): [Azure for Students](#)

Subscription ID: b19e6ffa-4e3a-4c5b-b079-759026cb4d5c

Tags (edit): [Add tags](#)

Operating system: Linux (ubuntu 20.04)

Size: Standard B1s (1 vcpu, 1 GiB memory)

Public IP address: [4.224.32.200](#)

Virtual network/subnet: [net211-VM-LV-vnet/default](#)

DNS name: [Not configured](#)

Health state: OK

JSON View

Properties Monitoring Capabilities (7) Recommendations Tutorials

Virtual machine

Computer name: net211-VM-LV

Operating system: Linux (ubuntu 20.04)

Image publisher: canonical

Image offer: 0001-com-ubuntu-server-focal

Networking

Public IP address: [4.224.32.200](#) (Network interface [net211-vm-lv728](#))

Public IP address (IPv6): -

Private IP address: 10.0.0.4

Private IP address (IPv6): -

38°F Fog

7:29 AM 11/17/2023

Connecting to the VM via SSH

Here is screenshot of me logged into the Virtual machine through my terminal.

All the details match the ones on the previous page with the azure instance details.

```
azureuser@net211-VM-LV: ~  
azureuser@net211-VM-LV:~$ uname -r  
5.15.0-1050-azure  
azureuser@net211-VM-LV:~$ cat/etc/os-release  
-bash: cat/etc/os-release: No such file or directory  
azureuser@net211-VM-LV:~$ uname -r  
5.15.0-1050-azure  
azureuser@net211-VM-LV:~$ cat /etc/os-release  
NAME="Ubuntu"  
VERSION="20.04.6 LTS (Focal Fossa)"  
ID=ubuntu  
ID_LIKE=debian  
PRETTY_NAME="Ubuntu 20.04.6 LTS"  
VERSION_ID="20.04"  
HOME_URL="https://www.ubuntu.com/"  
SUPPORT_URL="https://help.ubuntu.com/"  
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"  
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"  
VERSION_CODENAME=focal  
UBUNTU_CODENAME=focal  
azureuser@net211-VM-LV:~$ ping -c 4 www.facebook.com ip addr  
ping: addr: Temporary failure in name resolution  
azureuser@net211-VM-LV:~$ ping -c 4 www.facebook.com  
PING star-mini.c10r.facebook.com (163.70.141.35) 56(84) bytes of data.  
64 bytes from edge-star-mini-shv-01-xsp2.facebook.com (163.70.141.35): icmp_seq=1 ttl=50 time=59.4 ms  
64 bytes from edge-star-mini-shv-01-xsp2.facebook.com (163.70.141.35): icmp_seq=2 ttl=50 time=59.4 ms  
64 bytes from edge-star-mini-shv-01-xsp2.facebook.com (163.70.141.35): icmp_seq=3 ttl=50 time=59.9 ms  
64 bytes from edge-star-mini-shv-01-xsp2.facebook.com (163.70.141.35): icmp_seq=4 ttl=50 time=59.7 ms  
  
--- star-mini.c10r.facebook.com ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 3004ms  
rtt min/avg/max/mdev = 59.402/59.611/59.935/0.215 ms  
azureuser@net211-VM-LV:~$
```

Configuring an NSG 1 of 2

Here I am displaying the NSG page for netw211-VM-LV in Microsoft Azure.

Most of the time it is a good idea not to allow ping but for testing purposes it is useful. So I added the allow ICMP ping rule to the

Microsoft Azure

Search resources, services, and docs (G+ /)

Home > net211-VM-LV

net211-VM-LV | Networking

Virtual machine

Search

Feedback Attach network interface Detach network interface

Network security group net211-VM-LV-nsg (attached to network interface: net211-vm-lv728)

Impacts 0 subnets, 1 network interfaces

Priority	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
310	Allow_Ping	Any	ICMP	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBo...	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Need help?

[Understand Azure load balancing](#)

[Quickstart: Create a public load balancer to load balance Virtual Machines](#)

[Quickstart: Direct web traffic with Azure Application Gateway](#)

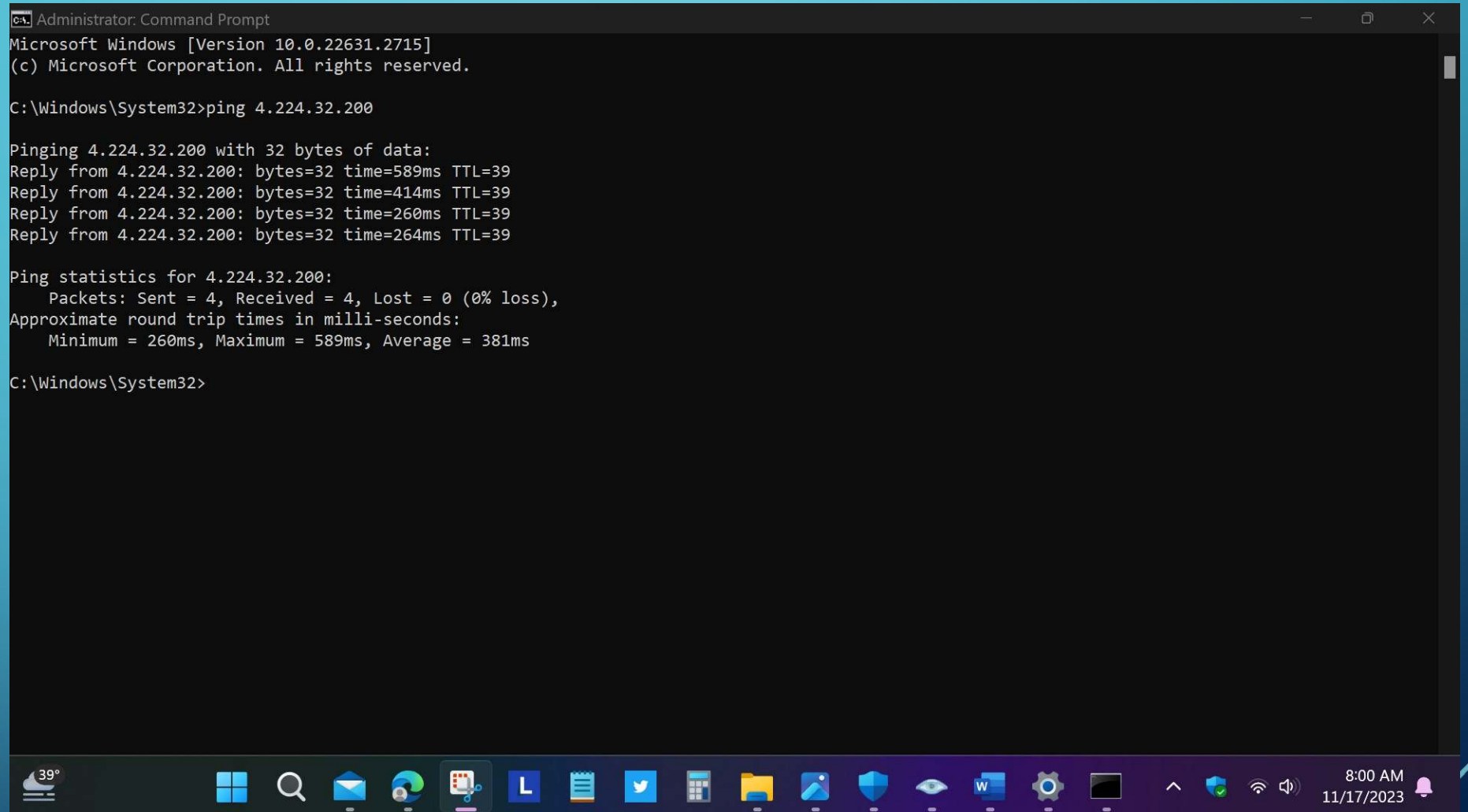
39°

Windows taskbar icons

7:59 AM 11/17/2023

Configuring an NSG 2 of 2

This slide displays
a successful ping
to netw211-VM-LV
At Ip address
4.224.32.200



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.22631.2715]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>ping 4.224.32.200

Pinging 4.224.32.200 with 32 bytes of data:
Reply from 4.224.32.200: bytes=32 time=589ms TTL=39
Reply from 4.224.32.200: bytes=32 time=414ms TTL=39
Reply from 4.224.32.200: bytes=32 time=260ms TTL=39
Reply from 4.224.32.200: bytes=32 time=264ms TTL=39

Ping statistics for 4.224.32.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 260ms, Maximum = 589ms, Average = 381ms

C:\Windows\System32>
```

The screenshot shows a Windows 10 desktop with a taskbar at the bottom. The taskbar includes icons for weather (39°), Start menu, Search, Mail, Edge, Task View, and several application icons (L, Notepad, Twitter, Calculator, File Explorer, Photos, Security, Camera, Word, Settings, and a network icon). The system tray on the right shows the time as 8:00 AM on 11/17/2023. The Command Prompt window is open, displaying the results of a ping command to 4.224.32.200, which was successful with 0% loss.

Conclusion

Conclusions

During this project I have successfully learned how to connect a host via SSH.

I also learned how to modify a security group to allow various types of traffic.

One technical challenge was that my windows 10 home edition computer did not come with the SSH client installed. So, when I tried to log in to my virtual machine via SSH my command prompt did not recognize the SSH command. The fix for this was simple. I had to find the optional features tab in the windows settings and install the SSH client. Once the client was installed, I was able to successfully SSH into a live virtual machine on Microsoft Azure that I launched.



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PART 4

CLOUD STORAGE

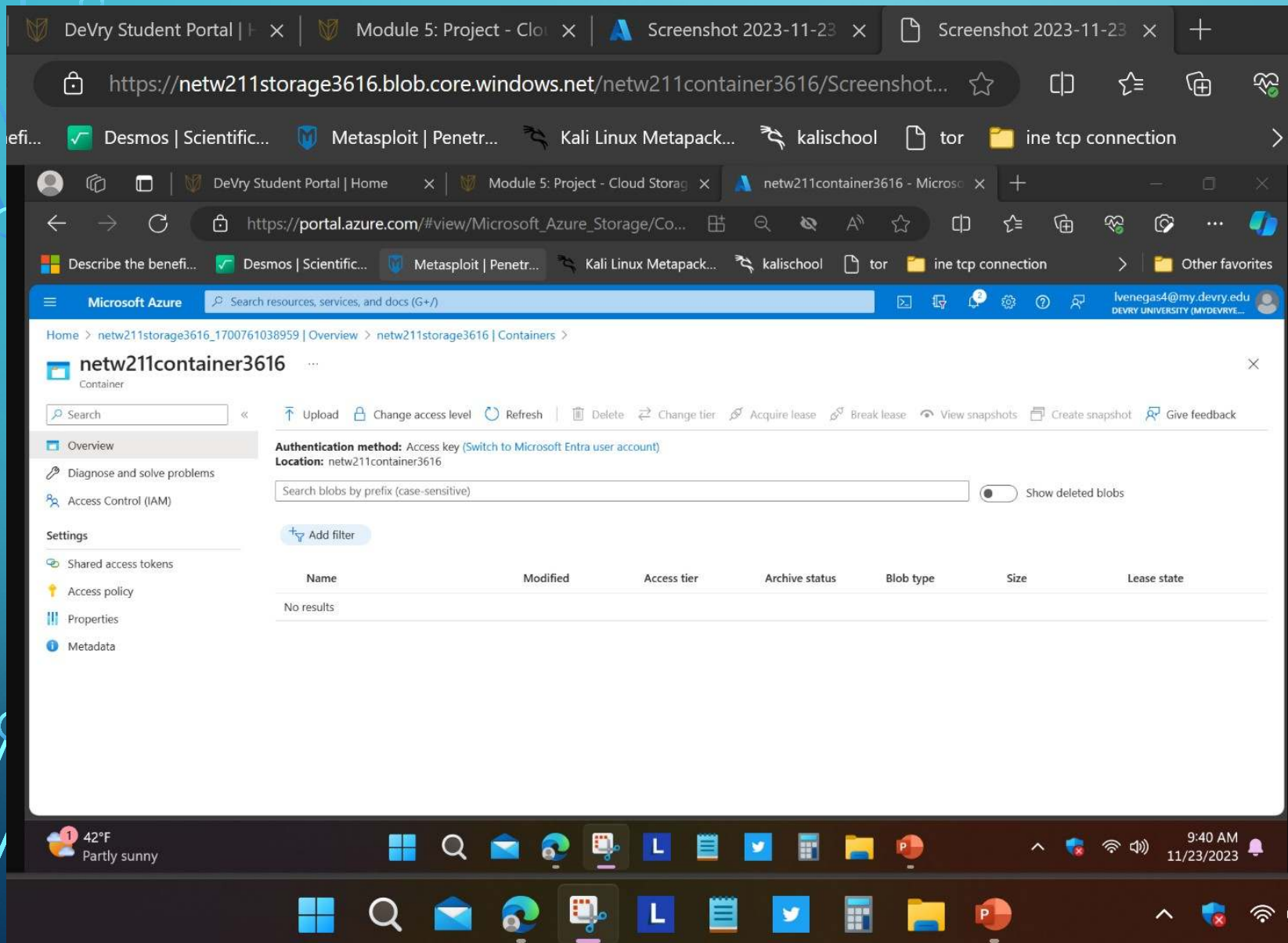


CLOUD STORAGE INTRODUCTION

In this presentation I will explore Microsoft's Azure Blob Storage. This is an object storage service for storing and protecting data for various uses.

I will

1. Create a storage account and container
2. Upload and access a file
3. Create a blob snapshot



UPLOADING AND ACCESSING A FILE

◦ Here is a screenshot of my browser window with an image I uploaded from my local computer with the URL on top of the window.

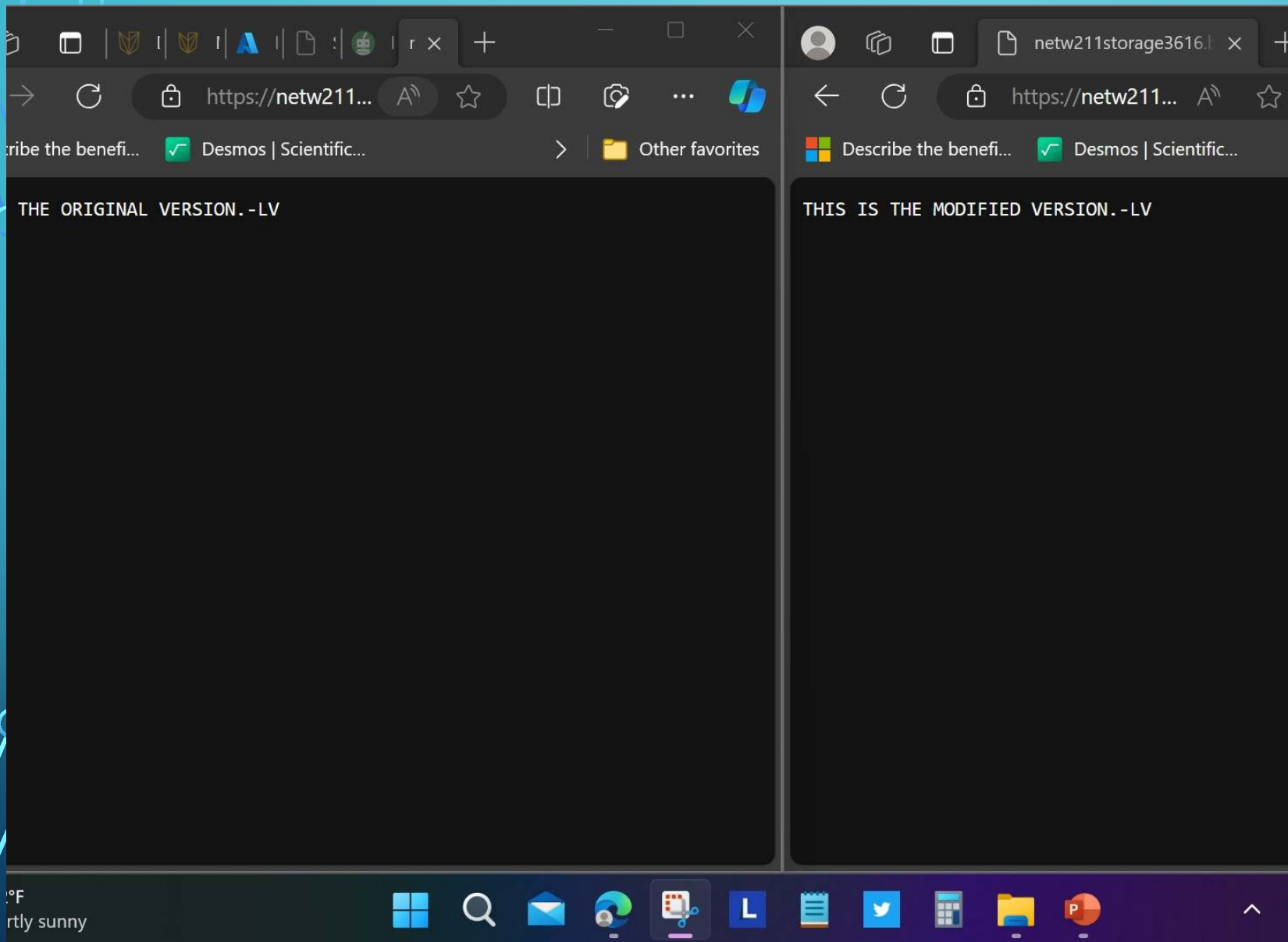
◦ You can also see the metadata showing the last modified date.

CREATING A BLOB SNAPSHOT 1 OF 2



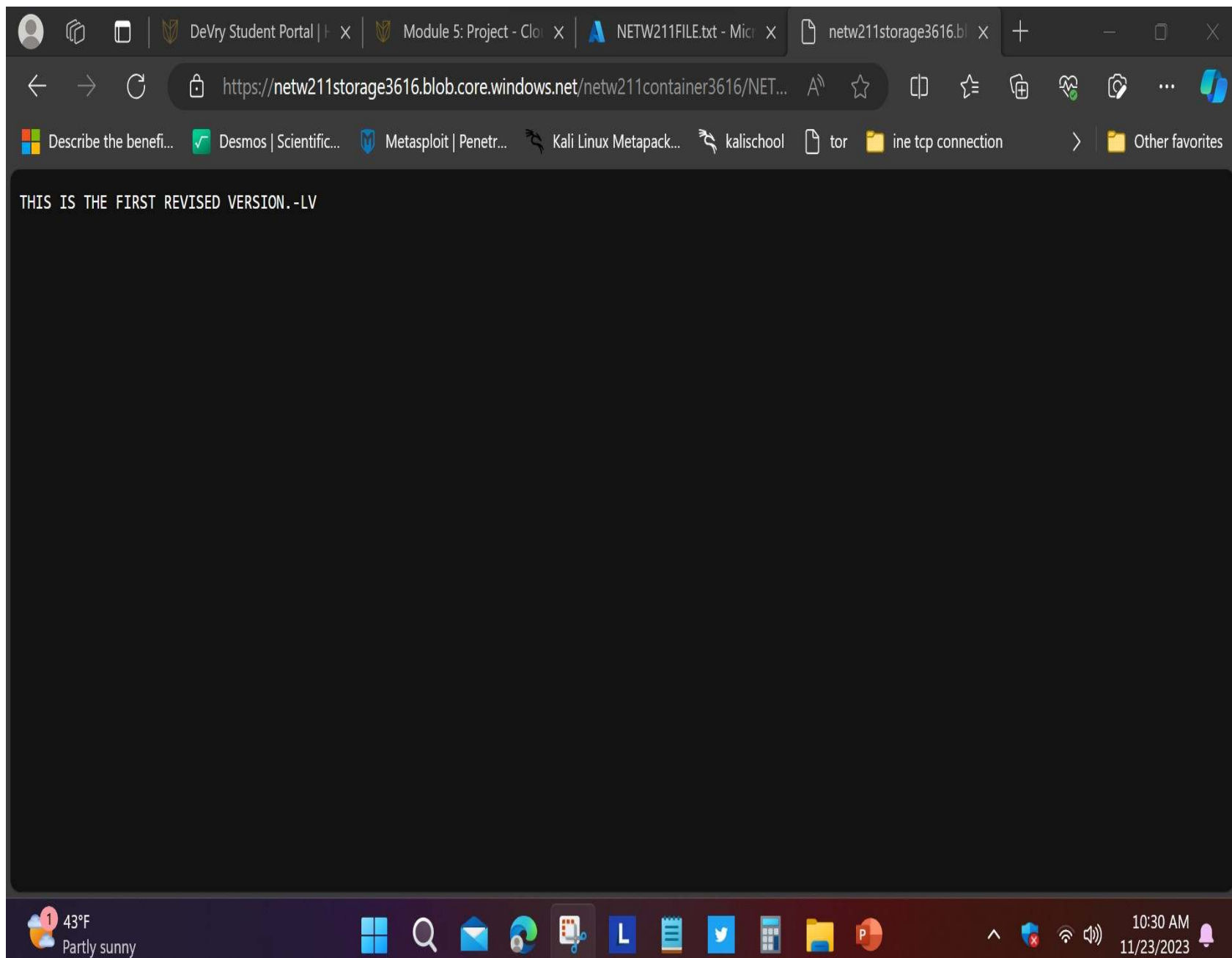
your data..





CREATING BLOB SNAPSHOT 2 OF 2

- This screenshot shows my browser window with “this is the original version-lv” message and the URL on top of the window.



This screenshot shows my browser window with “this is the First Revised version-lv” message and the URL on top of the window.

CONCLUSIONS

- During the course of this project, I was surprised to see the way I could access the files via browser in HTML format. This exercise informed me of ways things can be stored and accessed from the internet independent of local computers. I am somewhat familiar with azure so navigating it usually is no problem and this project was the same it ran smoothly with no hiccups. As far as skills I can translate to work... This knowledge I am sure is part of a bigger picture I can't quite see yet. But I am sure that within the next few sessions I will get some clarification.



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PART 5

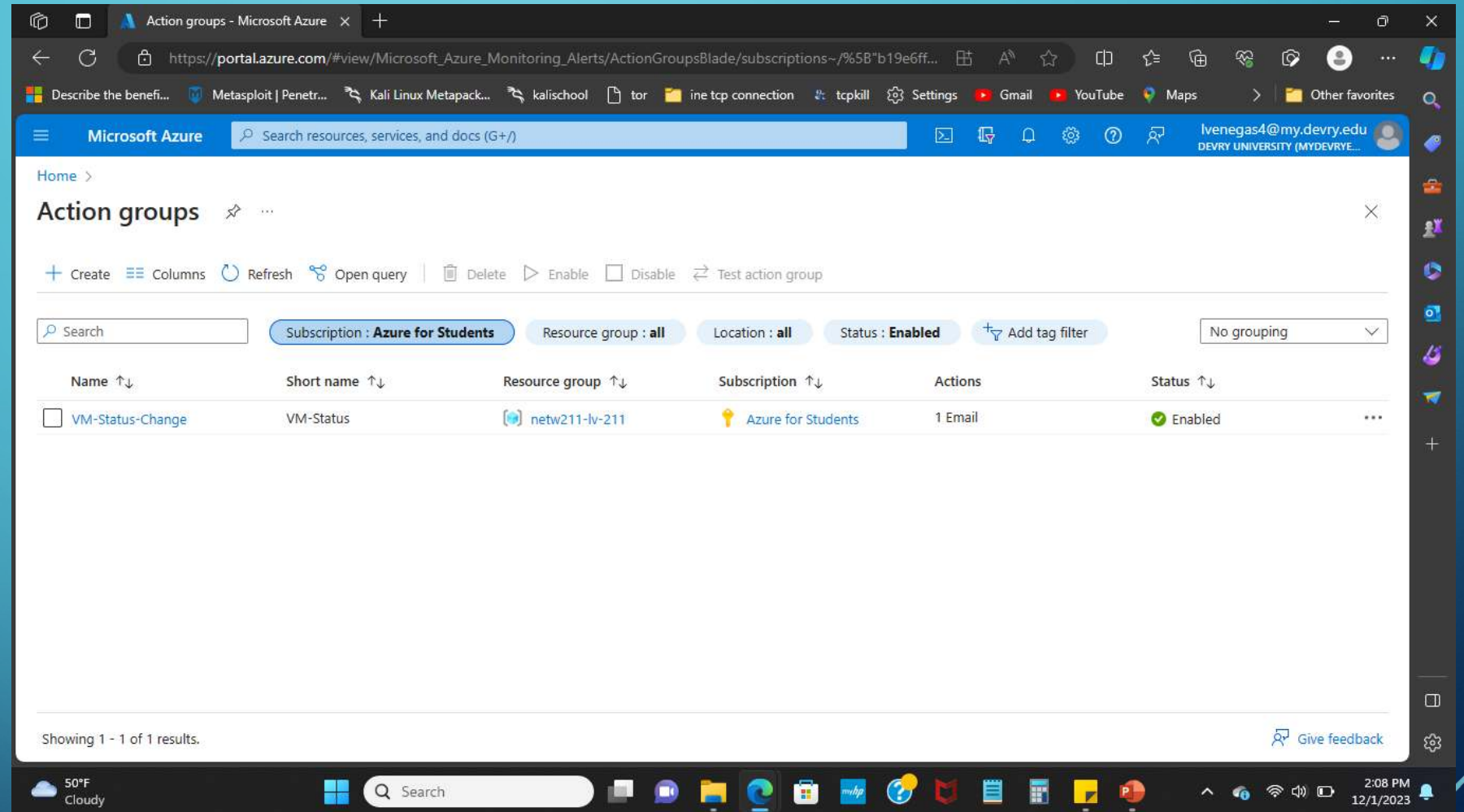
CLOUD MONITORING

Introduction

I will in this module explore Azure Monitor, a service used to monitor Azure resources. These are the objectives to be completed. First I will Set up an Action group and Notifications within my subscription. I will set up an Alert Rule to notify me via email upon VM restart and deallocation. I will be Testing that alert by receiving a notification via email when the rule has been triggered.

Setting up an Action Group and Notifications

The VM-Status-Change action group on the Manage actions page.



The screenshot shows the Microsoft Azure portal interface for managing action groups. The browser address bar displays the URL: https://portal.azure.com/#view/Microsoft_Azure_Monitoring_Alerts/ActionGroupsBlade/subscriptions~/%5B%22b19e6ff.... The page title is "Action groups". Below the title, there are several action buttons: "+ Create", "Columns", "Refresh", "Open query", "Delete", "Enable", "Disable", and "Test action group". A search bar is present, and filters are applied for "Subscription: Azure for Students", "Resource group: all", "Location: all", and "Status: Enabled". The table below lists the action groups:

Name	Short name	Resource group	Subscription	Actions	Status
VM-Status-Change	VM-Status	netw211-lv-211	Azure for Students	1 Email	Enabled

At the bottom of the table, it says "Showing 1 - 1 of 1 results." and there is a "Give feedback" link.

Setting up Alert Rules

The Alert rules window, listing the VM-Deallocate and VM-Restart rules.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft Azure logo and a search bar. The main content area displays the 'Alert rules' window for the subscription 'Azure for Students' and target scope 'NETW211-VM-LV'. The window lists two alert rules: 'VM-Deallocate' and 'VM-Restart', both with a severity of '4 - Verbose' and status 'Enabled'.

Name	Condition	Severity	Target scope	Target resource type	Signal type	Status
VM-Deallocate	Category=Administrative, ...	4 - Verbose	NETW211-VM-LV	Virtual machine	Activity log	Enabled
VM-Restart	Category=Administrative, ...	4 - Verbose	NETW211-VM-LV	Virtual machine	Activity log	Enabled

Testing Alerts

1 of 2

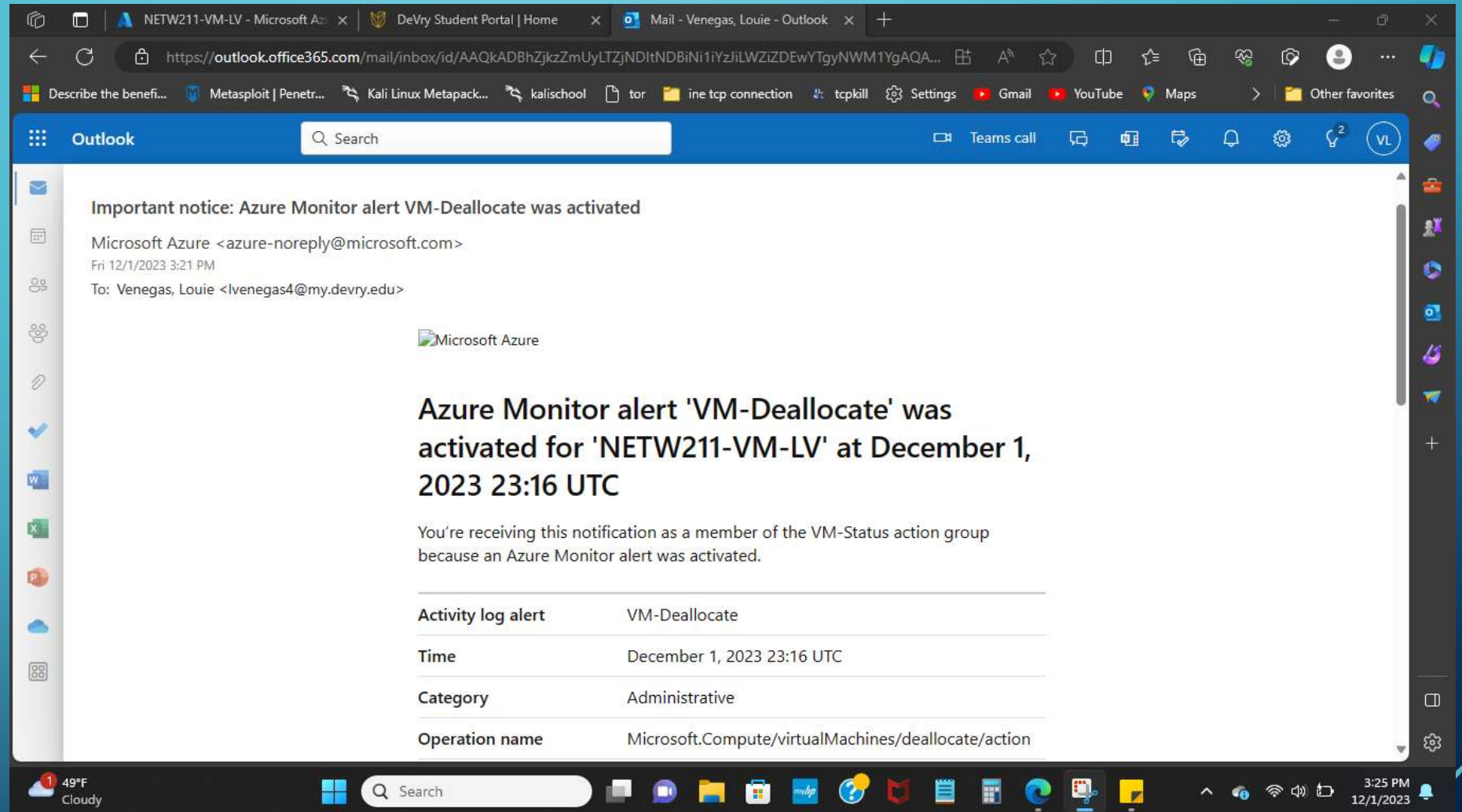
The “VM-Restart” email alert, with the date and time it fired.

The screenshot shows a Windows 11 desktop with a dark theme. The taskbar at the bottom displays the Start button, a search bar, and several pinned application icons including File Explorer, Microsoft Edge, and various utility apps. The system tray shows the date and time as 3:11 PM on 12/1/2023, along with icons for network, volume, and battery. The main window is an Outlook email client displaying an email from Microsoft Azure. The email subject is "Azure Monitor alert 'VM-Restart' was activated for 'NETW211-VM-LV' at December 1, 2023 23:02 UTC". The email body contains a table with details about the alert.

Activity log alert	VM-Restart
Time	December 1, 2023 23:02 UTC
Category	Administrative
Operation name	Microsoft.Compute/virtualMachines/restart/action
Correlation ID	c5b1db79-ac8f-4606-868d-793f74872463
Level	Informational
Resource ID	/subscriptions/b19e6ffa-4e3a-4c5b-b079-759026cb4d5c/resourceGroups/NETW-RG-LV3616/providers/Microsoft.Compute/virtualMachines/NETW211-VM-LV
Caller	IVENEGAS4@MY.DEVRY.EDU
Properties	[{"eventCategory": "Administrative", "entity": "/subscriptions/b19e6ffa-4e3a-4c5b-b079-759026cb4d5c/resourceGroups/NETW-RG-LV3616/providers/Microsoft.Compute/virtualMachines/NETW211-VM-LV", "message": "Microsoft.Compute/virtualMachines/restart/action", "hierarchy": ...}]

Testing Alerts 2 of 2

The “VM-Deallocate” was activated” email alert, with the date and time it fired.



Conclusions

During this project I essentially created a security group rule and notification about the status of a virtual machine on my cloud network. I configured the cloud to send me an email every time a particular virtual machine was being turned on or off. These are cloud features that one must be able to navigate in the field.

CONCLUSION

- Throughout this project I was given exposure and experience in cloud networking, Microsoft Azure to be exact. I created multiple virtual machines and confirmed credentials via various log on methods such as rdp and ssh. I also created a v-net with multiple subnets, then altered firewall rules and network security groups to verify connectivity of the workstations. Cloud storage was also on the menu, and I briefly sampled blob storage, snapshots and accessing via the internet in my browser... Oh, and did you get a load of the notification emails I got from Azure when my virtual machines were deallocated? These are all versatile skills that can be utilized across many IT jobs.

References

West, J. (2020, October 28). *CompTIA Cloud+ Guide to Cloud Computing*.