



New Zealand Diploma in System Administration Level 6

IAC601: Infrastructure as Code

Assessment/Aromatawai - Assessment 1

Version 1 Credits 12

Practical Assessment



	Submission	FER1	FER2
Result	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Date	Click or tap to enter a date.	Click or tap to enter a date.	Click or tap to enter a date.
Assessor's Signature			

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Assessor's Feedback

Submission

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Part 1

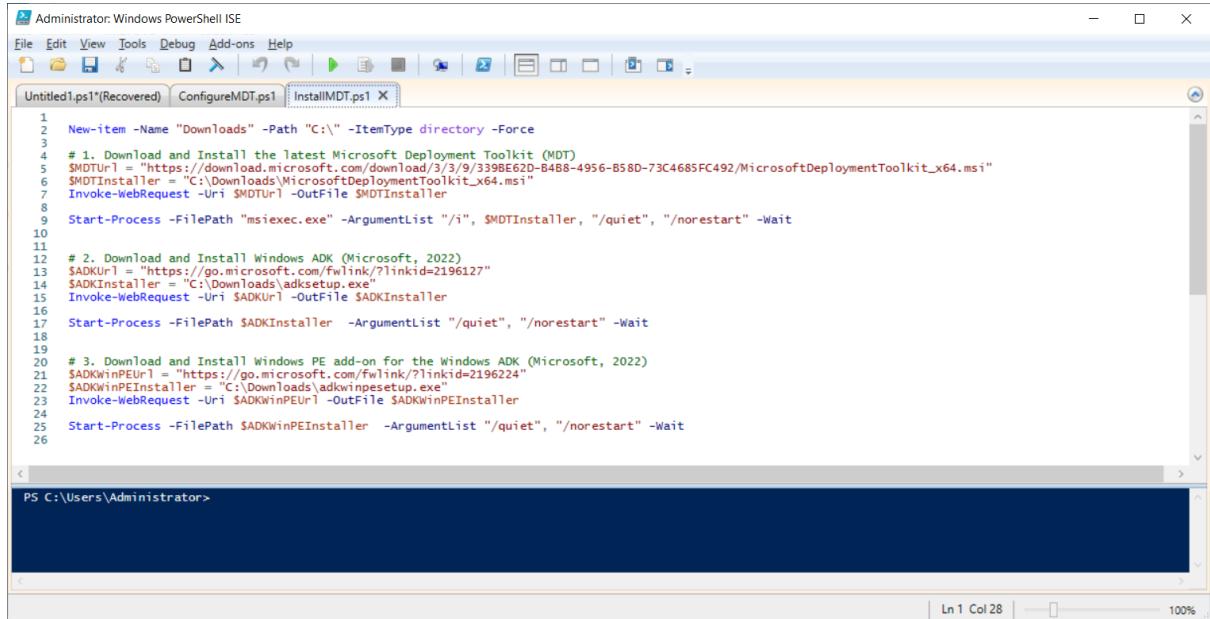
Task 1: Planning for Pre-Deployment Processes

1. Prepare a Windows Server that already has the ADDS, DHCP and DNS roles configured.

The screenshot shows the Windows Server Manager interface. The left sidebar is titled "Local Server" and includes options for Dashboard, All Servers, AD DS, DHCP, DNS, and File and Storage Services. The main area displays the "PROPERTIES" for the server VM-DC, which is part of the spark.com domain. The properties include system information like processor, memory, and disk space, as well as security settings for Microsoft Defender Firewall, Antivirus, and Enhanced Security Configuration. Below the properties is an "EVENTS" section showing a list of recent logs, all of which are warnings related to Microsoft Windows-DNS Client Events and Microsoft Windows-DHCP-Server.

Server Name	ID	Severity	Source	Log	Date and Time
VM-DC	1014	Warning	Microsoft-Windows-DNS Client Events	System	9/1/2024 3:39:48 PM
VM-DC	10020	Warning	Microsoft-Windows-DHCP-Server	System	9/1/2024 12:28:23 PM
VM-DC	1056	Warning	Microsoft-Windows-DHCP-Server	System	9/1/2024 12:28:19 PM
VM-DC	10020	Warning	Microsoft-Windows-DHCP-Server	System	9/1/2024 12:11:46 PM

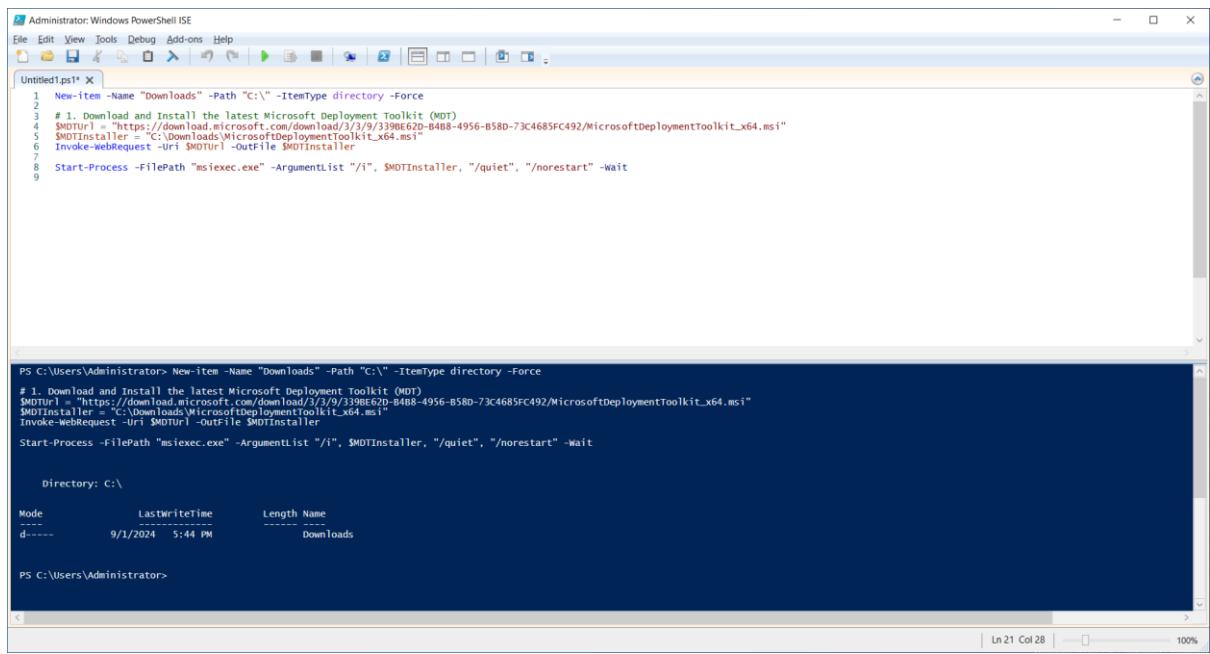
2. PowerShell Script for Installation



The screenshot shows the Windows PowerShell ISE interface. The title bar says "Administrator: Windows PowerShell ISE". The menu bar includes File, Edit, View, Tools, Debug, Add-ons, and Help. The toolbar has standard icons for file operations. The tabs at the top are Untitled1.ps1* (Recovered), ConfigureMDT.ps1, and InstallMDT.ps1 (X). The code editor contains a PowerShell script named "InstallMDT.ps1". The script performs three main tasks:

```
1 New-item -Name "Downloads" -Path "C:\\" -ItemType directory -Force
2 # 1. Download and Install the latest Microsoft Deployment Toolkit (MDT)
3 $MDTUrl = "https://download.microsoft.com/download/3/3/9/339BE62D-B4B8-4956-B58D-73C4685FC492/MicrosoftDeploymentToolkit_x64.msi"
4 $MDTInstaller = "C:\Downloads\MicrosoftDeploymentToolkit_x64.msi"
5 Invoke-WebRequest -Uri $MDTUrl -Outfile $MDTInstaller
6 Start-Process -FilePath "msiexec.exe" -ArgumentList "/i", $MDTInstaller, "/quiet", "/norestart" -Wait
7
8 # 2. Download and Install Windows ADK (Microsoft, 2022)
9 $ADKUrl = "https://go.microsoft.com/fwlink/?linkid=2196127"
10 $ADKInstaller = "C:\Downloads\adksetup.exe"
11 Invoke-WebRequest -Uri $ADKUrl -Outfile $ADKInstaller
12 Start-Process -FilePath $ADKInstaller -ArgumentList "/quiet", "/norestart" -Wait
13
14 # 3. Download and Install Windows PE add-on for the Windows ADK (Microsoft, 2022)
15 $ADKWinPEUrl = "https://go.microsoft.com/fwlink/?linkid=2196224"
16 $ADKWinPEInstaller = "C:\Downloads\adkwinsetup.exe"
17 Invoke-WebRequest -Uri $ADKWinPEUrl -Outfile $ADKWinPEInstaller
18 Start-Process -FilePath $ADKWinPEInstaller -ArgumentList "/quiet", "/norestart" -Wait
19
20 PS C:\Users\Administrator>
```

3. Install MDT with PowerShell Script

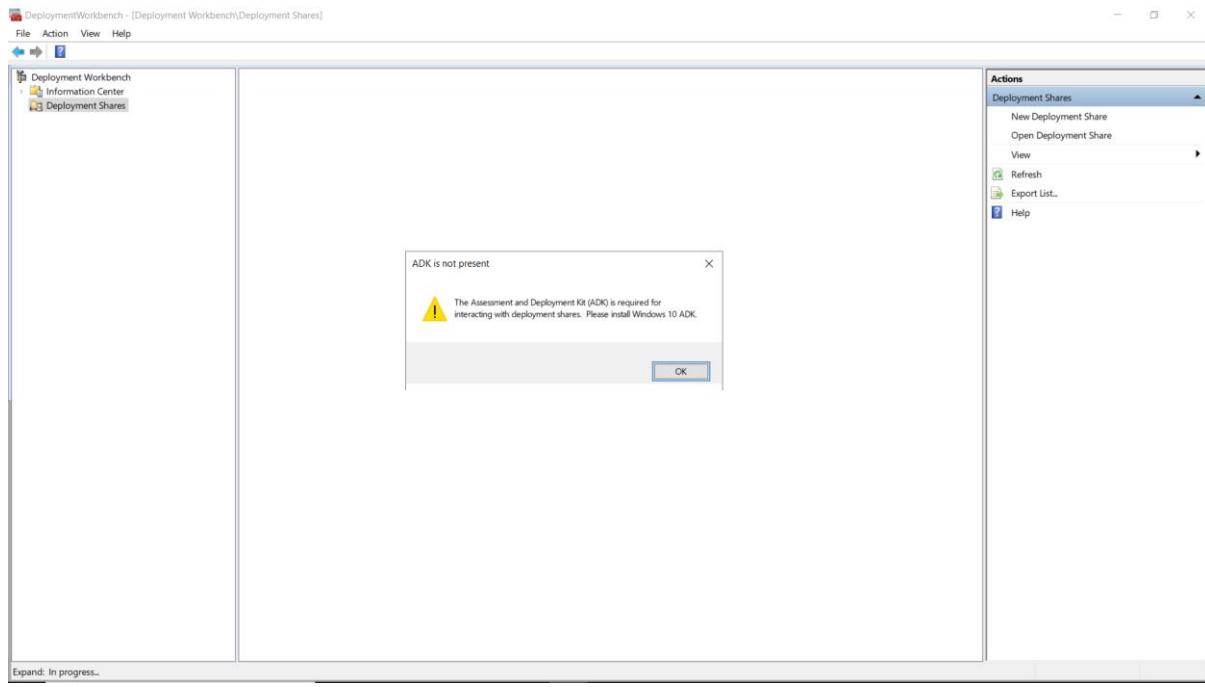


The screenshot shows the Windows PowerShell ISE interface. The title bar says "Administrator: Windows PowerShell ISE". The menu bar includes File, Edit, View, Tools, Debug, Add-ons, and Help. The toolbar has standard icons for file operations. The tabs at the top are Untitled1.ps1* (X) and InstallMDT.ps1 (X). The code editor contains the same PowerShell script as the previous screenshot. The command `New-item -Name "Downloads" -Path "C:\\" -ItemType directory -Force` is run, creating a "Downloads" folder on the C: drive.

```
1 New-item -Name "Downloads" -Path "C:\\" -ItemType directory -Force
2 # 1. Download and Install the latest Microsoft Deployment Toolkit (MDT)
3 $MDTUrl = "https://download.microsoft.com/download/3/3/9/339BE62D-B4B8-4956-B58D-73C4685FC492/MicrosoftDeploymentToolkit_x64.msi"
4 $MDTInstaller = "C:\Downloads\MicrosoftDeploymentToolkit_x64.msi"
5 Invoke-WebRequest -Uri $MDTUrl -Outfile $MDTInstaller
6 Start-Process -FilePath "msiexec.exe" -ArgumentList "/i", $MDTInstaller, "/quiet", "/norestart" -Wait
7
8 # 2. Download and Install Windows ADK (Microsoft, 2022)
9 $ADKUrl = "https://go.microsoft.com/fwlink/?linkid=2196127"
10 $ADKInstaller = "C:\Downloads\adksetup.exe"
11 Invoke-WebRequest -Uri $ADKUrl -Outfile $ADKInstaller
12 Start-Process -FilePath $ADKInstaller -ArgumentList "/quiet", "/norestart" -Wait
13
14 # 3. Download and Install Windows PE add-on for the Windows ADK (Microsoft, 2022)
15 $ADKWinPEUrl = "https://go.microsoft.com/fwlink/?linkid=2196224"
16 $ADKWinPEInstaller = "C:\Downloads\adkwinsetup.exe"
17 Invoke-WebRequest -Uri $ADKWinPEUrl -Outfile $ADKWinPEInstaller
18 Start-Process -FilePath $ADKWinPEInstaller -ArgumentList "/quiet", "/norestart" -Wait
19
20 PS C:\Users\Administrator> New-item -Name "Downloads" -Path "C:\\" -ItemType directory -Force
21
22 Directory: C:\

Mode                LastwriteTime      Length Name
----                -----          ---- 
d----- 9/1/2024 5:44 PM            Downloads

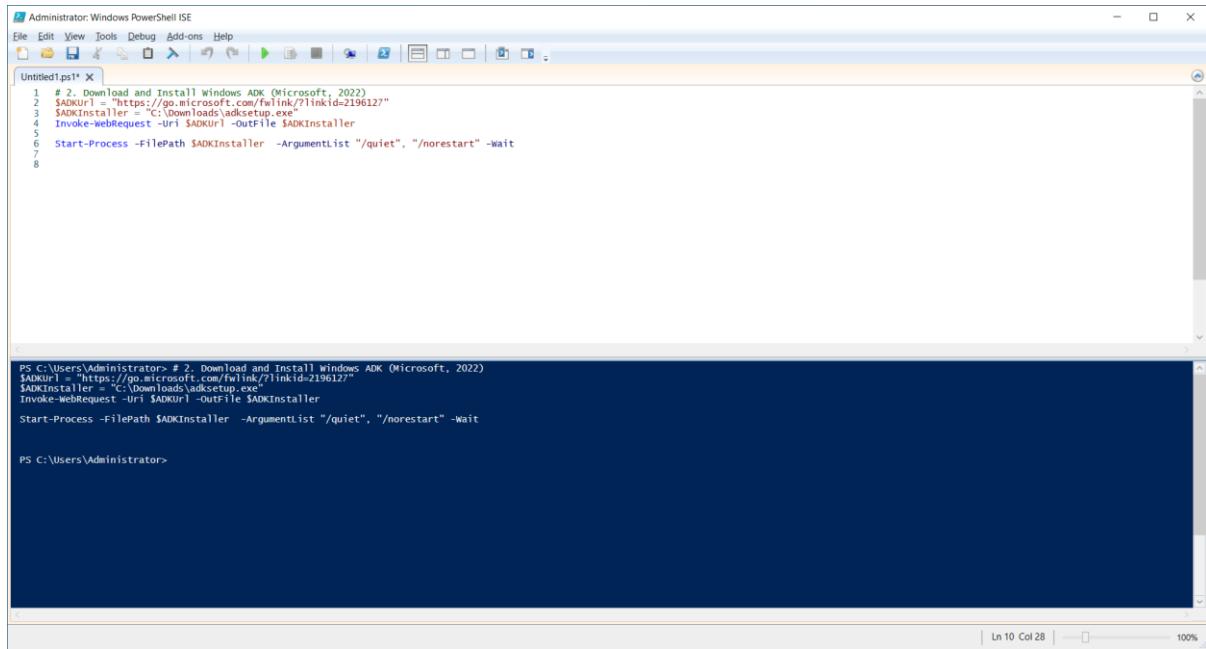
PS C:\Users\Administrator>
```



7

AEU3000774

4. Install Windows ADK

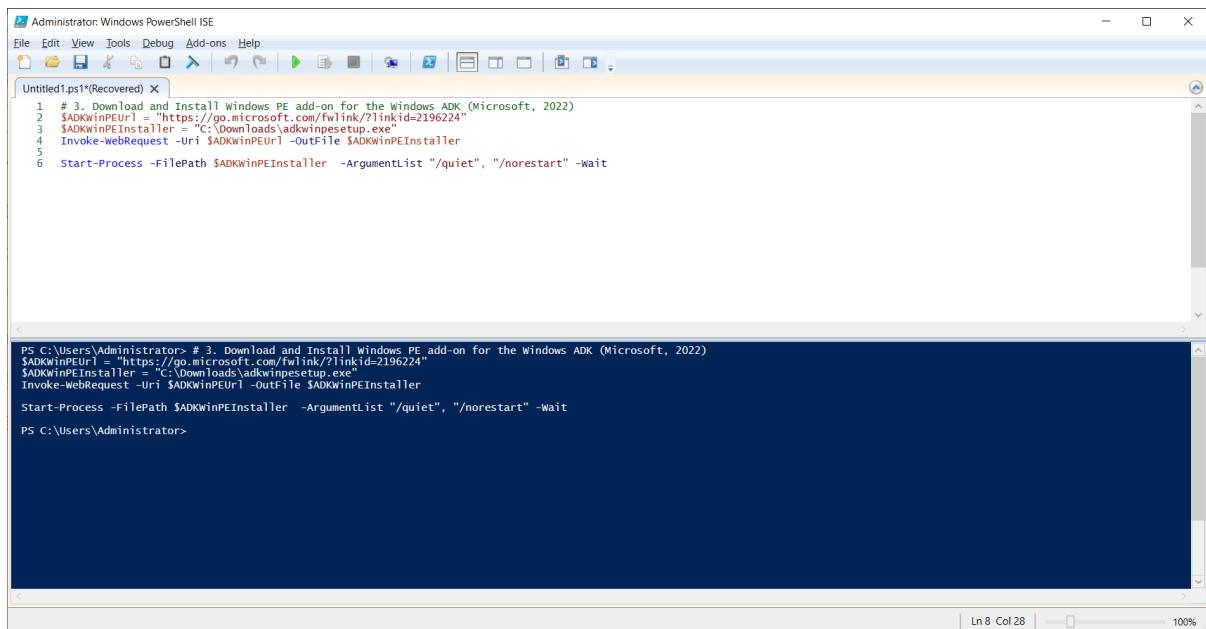


```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
Untitled1.ps1* X
1 # 2. Download and Install Windows ADK (Microsoft, 2022)
2 $ADKUrl = "https://go.microsoft.com/fwlink/?LinkId=2196127"
3 $ADKInstaller = "C:\Downloads\adksetup.exe"
4 Invoke-WebRequest -Uri $ADKUrl -Outfile $ADKInstaller
5
6 Start-Process -FilePath $ADKInstaller -ArgumentList "/quiet", "/norestart" -Wait
7
8

PS C:\Users\Administrator> # 2. Download and Install Windows ADK (Microsoft, 2022)
$ADKUrl = "https://go.microsoft.com/fwlink/?LinkId=2196127"
$ADKInstaller = "C:\Downloads\adksetup.exe"
Invoke-WebRequest -Uri $ADKUrl -Outfile $ADKInstaller
Start-Process -filePath $ADKInstaller -ArgumentList "/quiet", "/norestart" -wait

PS C:\Users\Administrator>
```

5. Install Windows PE add-on for the Windows ADK

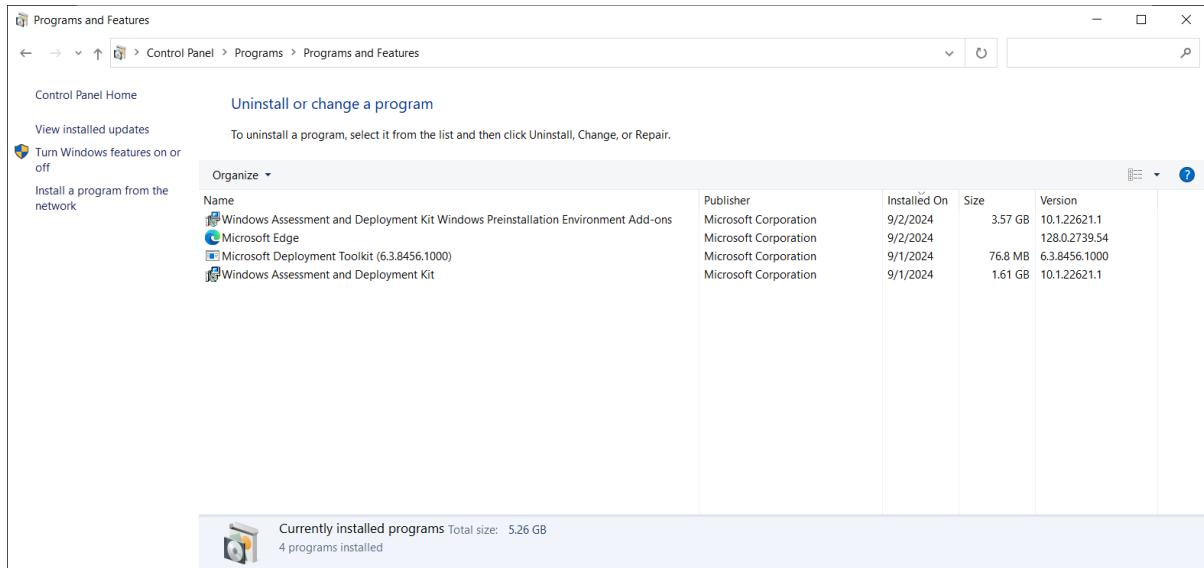


```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
Untitled1.ps1*Recovered X
1 # 3. Download and Install windows PE add-on for the windows ADK (Microsoft, 2022)
2 $ADKWinPEUrl = "https://go.microsoft.com/fwlink/?LinkId=2196224"
3 $ADKWinPEInstaller = "C:\Downloads\adkwinpesetup.exe"
4 Invoke-WebRequest -Uri $ADKWinPEUrl -Outfile $ADKWinPEInstaller
5
6 Start-Process -FilePath $ADKWinPEInstaller -ArgumentList "/quiet", "/norestart" -Wait
7
8

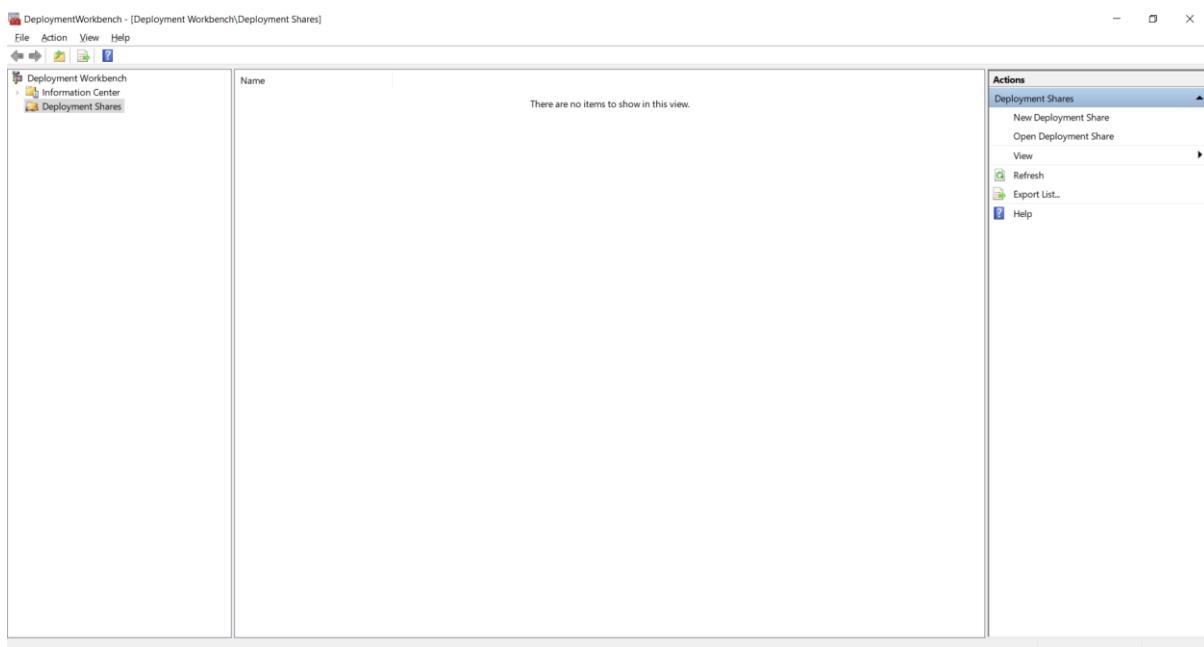
PS C:\Users\Administrator> # 3. Download and Install Windows PE add-on for the Windows ADK (Microsoft, 2022)
$ADKWinPEUrl = "https://go.microsoft.com/fwlink/?LinkId=2196224"
$ADKWinPEInstaller = "C:\Downloads\adkwinpesetup.exe"
Invoke-WebRequest -Uri $ADKWinPEUrl -Outfile $ADKWinPEInstaller
Start-Process -filePath $ADKWinPEInstaller -ArgumentList "/quiet", "/norestart" -wait

PS C:\Users\Administrator>
```

6. Check installation in Control Panel list:



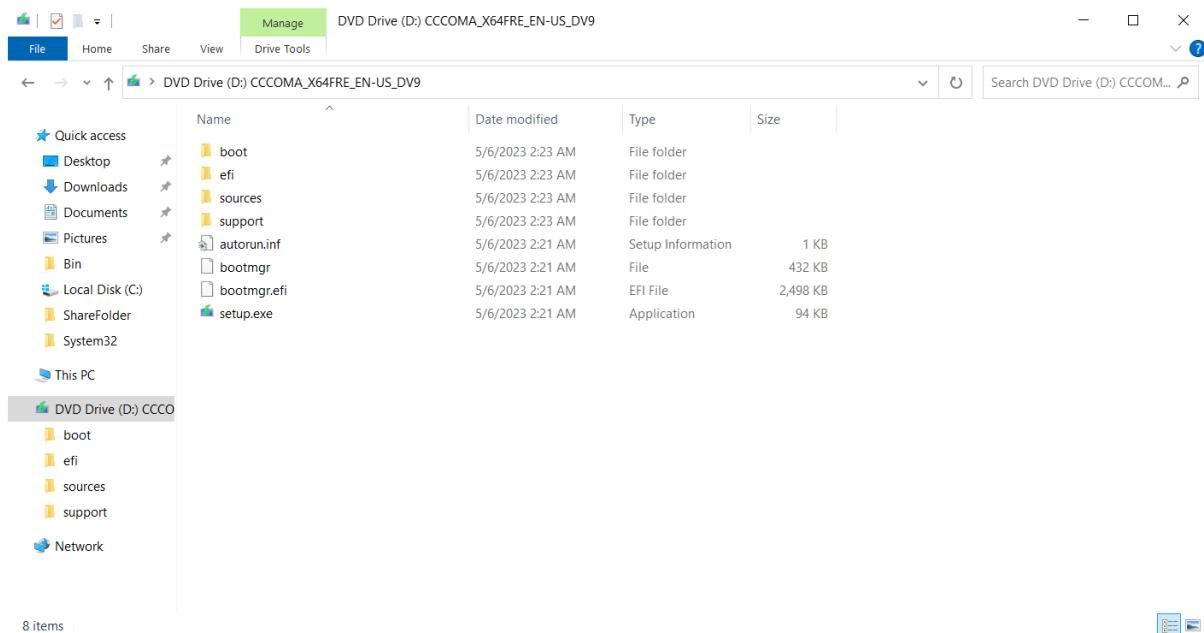
7. Check MDT after Windows ADK and PE add-on installed.



8. Download Windows 11 image and mount it to the Server

- Link of download Windows 11 (Microsoft, n.d.)

<https://go.microsoft.com/fwlink/?linkid=2171764>



9. Download Applications: Google Chrome, VLC and Adobe Acrobat Reader.

- Link of download Google Chrome:

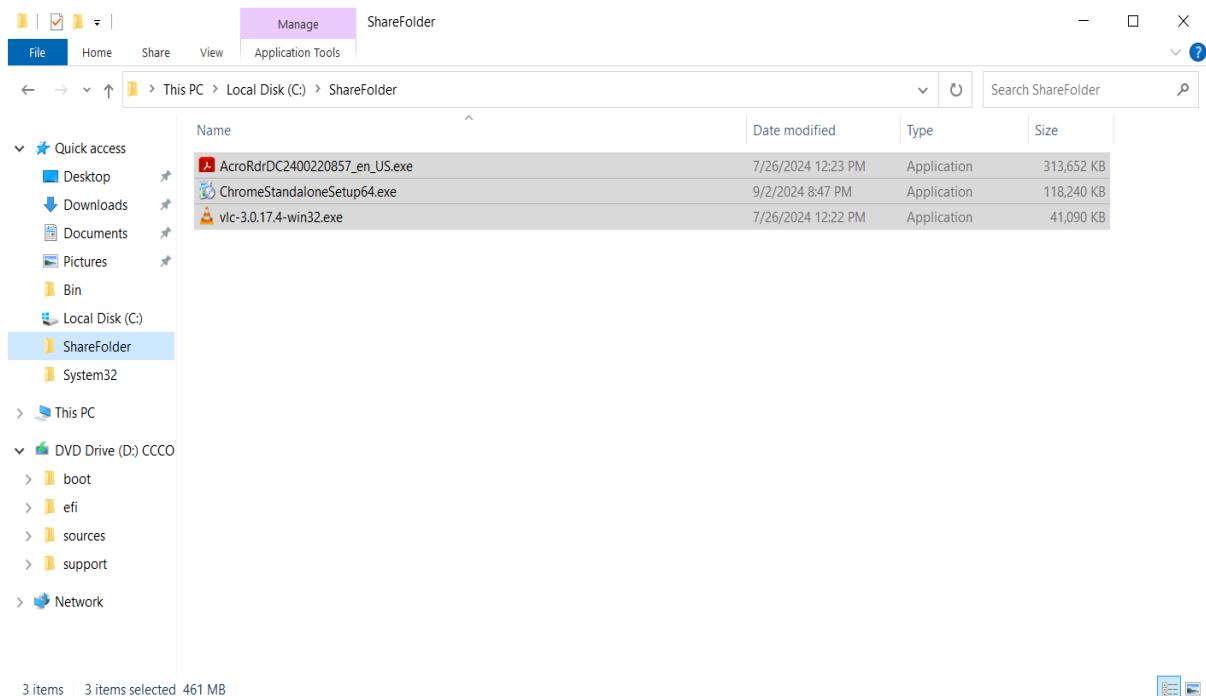
https://dl.google.com/tag/s/appguid%3D%7B8A69D345-D564-463C-AFF1-A69D9E530F96%7D%26iid%3D%7B8760FC7E-F333-738A-2267-71EB73676E42%7D%26lang%3Den%26browser%3D5%26usagestats%3D0%26ap pname%3DGoogle%2520Chrome%26needsadmin%3Dtrue%26ap%3Dx64-stable-statsdef_0%26brand%3DGCEA/dl/chrome/install/googlechromestandaloneenterprise64.msi

- Link of download VLC (VideoLAN, n.d.):

<https://get.videolan.org/vlc/3.0.17.4/win32/vlc-3.0.17.4-win32.exe>

- Link of download Adobe Acrobat Reader (Adobe, n.d.):

<https://get.adobe.com/reader/enterprise/>



10. Check the PowerShell script on the GitHub website

```

# 1. Download and Install the latest Microsoft Deployment Toolkit (MDT)
$MDTInstaller = "https://download.microsoft.com/download/3/3/3/33920-8480-4956-B5BD-73C4685FC492/MicrosoftDeploymentToolkit_x64.msi"
Invoke-WebRequest -Uri $MDTInstaller -Outfile $MDTInstaller
Start-Process -FilePath $MDTInstaller -ArgumentList "/quiet", "/norestart" -Wait

# 2. Download and Install Windows ADK (Microsoft, 2022)
$ADKURL = "https://go.microsoft.com/fwlink/?linkid=2196127"
$ADKInstaller = "C:\Downloads\WindowsDeploymentKit-x64.msi"
Invoke-WebRequest -Uri $ADKURL -Outfile $ADKInstaller
Start-Process -FilePath $ADKInstaller -ArgumentList "/quiet", "/norestart" -Wait

# 3. Download and Install Windows PE add-on for the Windows ADK (Microsoft, 2022)
$ADKWinPEURL = "https://go.microsoft.com/fwlink/?linkid=2196224"
$ADKWinPEInstaller = "C:\Downloads\adkwinpeinstall.exe"
Invoke-WebRequest -Uri $ADKWinPEURL -Outfile $ADKWinPEInstaller
Start-Process -FilePath $ADKWinPEInstaller -ArgumentList "/quiet", "/norestart" -Wait

```

Task 2: Analysis and Evaluation of Legal and Regulatory Requirements

There are several primary legal and regulatory requirements in New Zealand, including Privacy Act 2020(Privacy Act 2020. 2024), Copyright Act 1994(Copyright Act 1994. 2023), Fair Trading Act 1986(Fair Trading Act 1986. 2024), Health Information Privacy Code 2020(Health Information Privacy Code 2020. 2022), and New Zealand Information Security Manual (New Zealand Information Security Manual. 2024), etc.

To use Microsoft Deployment Toolkit (MDT) to deploy Windows 11 and applications automatically involves those legal and regulatory requirements listed above. These requirements ensure that the deployment process is compliance with software licenses, data protection, and security regulations.

1. Software license compliance.

- During the implementation, to ensure all software installed, including Windows 11, Google Chrome, VLC Media Player, and Adobe Acrobat Reader, is properly licensed for use by Media Labs under Copyright Act 1994 and Fair Trading Act 1986.
- For Media Labs, licenses are confirmed before deployment. A record of all software licenses, proof of purchase and download links is maintained and the usage and installation of software on each client machine is documented to demonstrate compliance.

2. Data protection and privacy.

- Under Privacy Act 2020 and Health Information Privacy Code 2020, it includes ensuring that no personal data is unlawfully processed during the deployment, and appropriate measures are in place to secure any personal data that may be involved.
- During deployment, all personal data is minimized, protected, and only used for the necessary purposes, and data is encrypted and is not leaked or improperly accessed. MDT and deployment scripts is configured to anonymize to avoid storing any user-specific data in deployment logs or capturing user data during the deployment process.

3. Security and compliance standards.

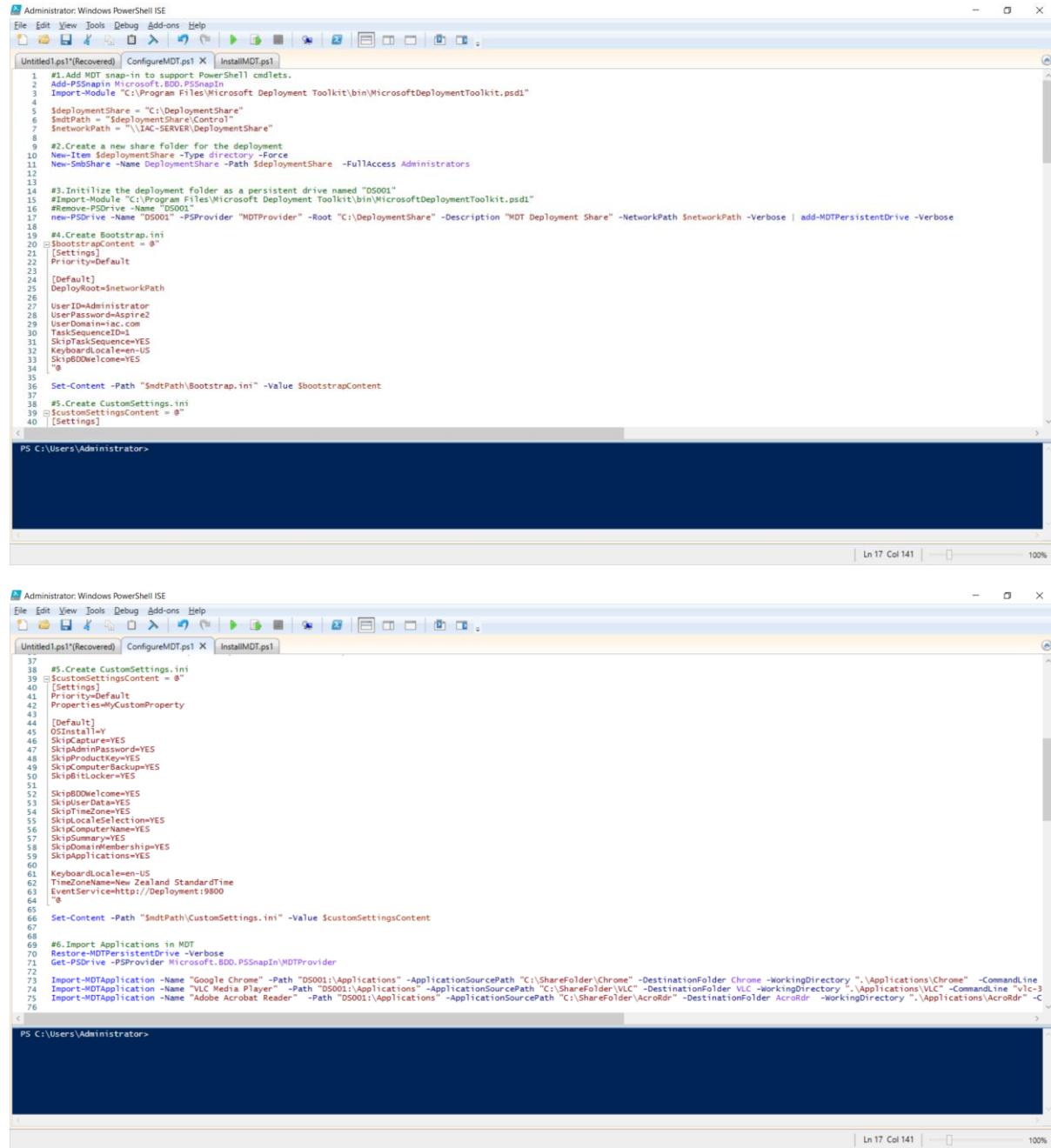
- Under New Zealand Information Security Manual, deployment processes should include measures that align with these standards, like secure transmission of data and maintaining system integrity, protecting against cybersecurity with security patches and updates to prevent vulnerabilities,

managing firewall rules, ensuring security policies are enforced, and managing system settings to prevent unauthorized changes.

- During deployment, PowerShell script is configured to update Windows 11 and all other applications with the latest patches to avoid vulnerabilities.

Task 3: Plan, Design and Create a Deployment Script

1. The PowerShell script for MDT deployment



The screenshot shows two tabs open in the Windows PowerShell ISE:

- ConfigureMDT.ps1**: This tab contains PowerShell code for configuring MDT. It includes commands like `Add-PSSnapin Microsoft.BDD.PSSnapin`, `Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.ps1"`, and `New-SmbShare -Name DeploymentShare -Path $deploymentShare -FullAccess Administrators`. It also handles bootstrap content and custom settings.
- InstallMDT.ps1**: This tab contains PowerShell code for installing applications. It includes commands like `#Import Applications in MDT`, `Import-MDTPersistentDrive -Verbose`, and `Get-PSDrive -PSProvider Microsoft.BDD.PSSnapIn\MDTPersistentDrive`. It imports specific applications like Google Chrome, VLC Media Player, and Adobe Acrobat Reader.

The screenshot shows a Windows PowerShell Integrated Scripting Environment (ISE) window titled "Administrator: Windows PowerShell ISE". The window contains a script named "InstallMDT.ps1" which is part of a larger configuration process. The script includes several sections for importing applications, creating task sequences, generating boot images, and configuring Windows Deployment Services (WDS). The code uses cmdlets like Import-MDTApplication, Import-MDTOperatingSystem, Set-ItemProperty, Update-MDTDeploymentShare, and Wdsutil. The script is run from the command line at PS C:\Users\Administrator>.

```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
Untitled.ps1 (Recovered) ConfigureMDT.ps1 X InstallMDT.ps1
74 Import-MDTApplication -Name "VLC Media Player" -Path "DS001\Applications" -ApplicationSourcePath "C:\ShareFolder\VLC" -DestinationFolder VLC -WorkingDirectory ".\Applications\VLC" -CommandLine "vlc -3"
75 Import-MDTApplication -Name "Adobe Acrobat Reader" -Path "DS001\Applications" -ApplicationSourcePath "C:\ShareFolder\AcroRdr" -DestinationFolder AcroRdr -WorkingDirectory ".\Applications\AcroRdr" -C
76
77 #Check import result
78 #Get-ItemProperty -Path 'DS001\Applications\Google Chrome'
79
80 #Import Operating System
81 Import-MDTOperatingSystem -path "DS001\Operating Systems" -SourcePath "D:\" -DestinationFolder "Windows 11 Home x64" -Verbose
82
83 #Create Tasksequence
84 Import-MDTTaskSequence -path "DS001\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "DS001\Operating Systems\Windows 11 Pro in Wind
85
86
87 #9.Add the Applications:Google Chrome, VLC, and Acrobat Reader to the Tasksequence manually.
88 #-----#
89 #Before to generate the boot image, the applications should be added into tasksequence manually.
90 #
91
92 #10.Generate the boot image
93 #Since Windows 11 will be installed on X64 machines and x86 image will not be generated.
94 Set-ItemProperty -Path "DS001" -Name "SupportX86" -value $false -Force -Verbose
95
96 #Generate the boot image.
97 Update-MDTDeploymentShare -Path "DS001:" -Force -Verbose
98
99
100 #11. Install and Configure Windows Deployment Services (WDS)
101 & Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
102 Install-WindowsFeature -Name WDS -IncludeManagementTools
103 Import-Module WDS
104
105 #12.Initialize WDS
106 wdsutil /Verbose /Progress /Initialize-Server /remInst:DeploymentShare
107
108 #13.Configure WDS settings
109 wdsutil /Set-Server /AnswerClientsAll # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
110 wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt
111 wdsutil /set-Server /UseDhcpPorts:No
112
113 #14.Start Windows Deployment Service
114 wdsutil /Verbose /start-Server
115
116 #15.Add MDT Boot Image to WDS
117 #Remove-WdsBootImage -ImageName LiteTouchPE_x64.wim -Architecture X64
118 Import-WdsBootImage -Path "$deploymentShare\Boot\LiteTouchPE_x64.wim" -NewImageName LiteTouchPE_x64.wim -SkipVerify -Verbose # -ImageType "Microsoft Boot Image"
119
120
```

2. Check the PowerShell script on the GitHub website

The screenshot shows a web browser window with the URL <https://github.com/Spark-Aspire2/iac-assessment/tree/main/part1>. The left sidebar shows a tree view of files under 'part1': 'Bootstrap.ini', 'ConfigureMDT.ps1', 'CustomSettings.ini', 'InstallMDT.ps1', 'IAC601 Assessment 1 - Practical ...', 'IAC601 Assessment 1 - Practical ...', and 'README.md'. The right pane displays a table of recent commits:

Name	Last commit message	Last commit date
Bootstrap.ini	add .ini files	2 minutes ago
ConfigureMDT.ps1	add Part 2 scripts	5 days ago
CustomSettings.ini	add .ini files	2 minutes ago
InstallMDT.ps1	add Part 2 scripts	5 days ago

The screenshot shows a web browser window with the URL <https://github.com/Spark-Aspire2/iac-assessment/blob/main/part1/ConfigureMDT.ps1>. The left sidebar shows the same file structure as the previous screenshot. The right pane displays the content of the 'ConfigureMDT.ps1' file:

```
1 #Add MDT snap-in to support PowerShell cmdlets.
2 Add-PSSnapin Microsoft.800.PSSnapIn
3 Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psdi"
4
5 $deploymentShare = "C:\DeploymentShare"
6 $mdtPath = "$deploymentShare\Control"
7 $networkPath = "\\IAc-SERVER\DeploymentShare"
8
9 #Create a new share folder for the deployment
10 New-Item $deploymentShare -Type directory -Force
11 New-SeShare -Name DeploymentShare -Path $deploymentShare -FullAccess Administrators
12
13
14 #Initialize the deployment folder as a persistent drive named "DS0001"
15 #Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psdi"
16 #Mount-PSDrive -Name DS0001 -PSProvider "MDTProvider" -Root "C:\DeploymentShare" -Description "MDT Deployment Share" -NetworkPath "\\IAc-SERVER\DeploymentShare" -Verbose | Add-MDTPersistentDrive -Verbose
17
18 #Create Bootstrap.ini
19 $bootstrapContent = @'
20 [Settings]
21 Priority=Default
22
23 [Default]
24 DeployRoot=$networkPath
25
26
27 UserID=Administrator
28 UserPassword=Aspire2
29 UserDomain=iac.com
30 TaskSequenceID=1
31 SkipTaskSequence=YES
32 KeyboardLocale=en-US
33 SkipDDKLicense=YES
34
35 '#
```

The screenshot shows a GitHub repository page for 'Spark-Aspire2 / lac-assessment'. The file 'Bootstrap.ini' is selected in the left sidebar under the 'part1' folder. The main content area displays the following configuration file:

```
[Settings]
Priority=Default
[Default]
DeployRoot=\IAC-SERVER\DeploymentShare
UserID=Administrator
UserPassword=aspire2
UserName=iac.com
TextSequenceID=2
SkipTestSequence=YES
KeyboardLocale=en-US
SkipDDKWelcome=YES
```

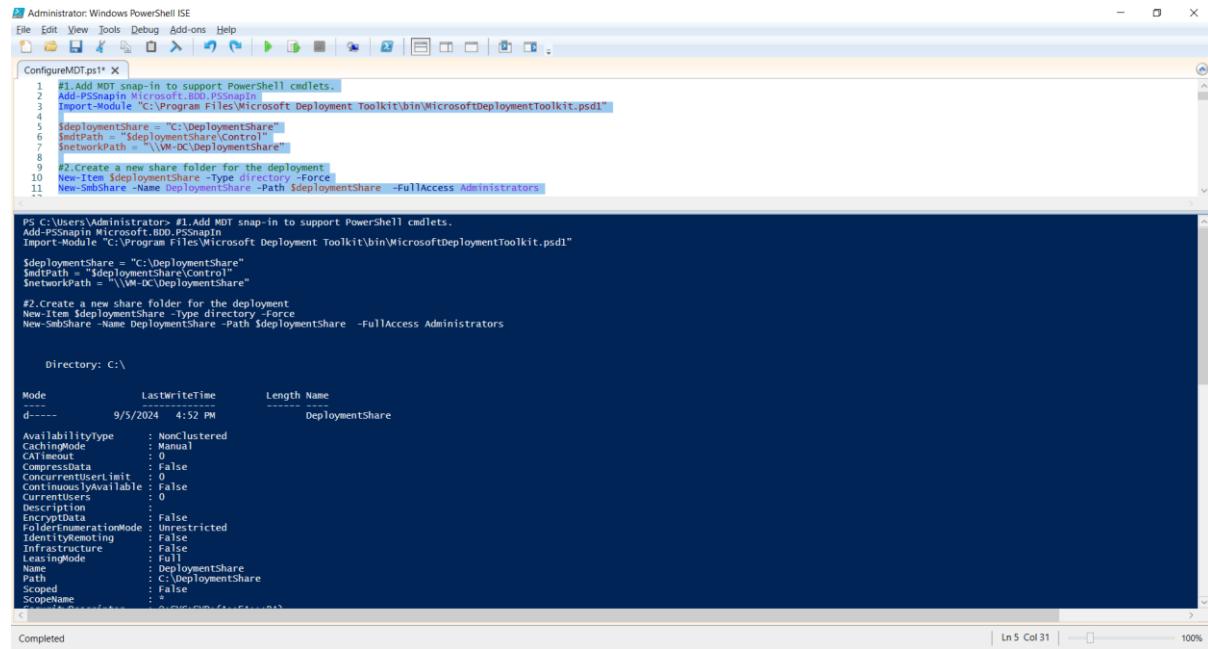
The screenshot shows the same GitHub repository page. The file 'CustomSettings.ini' is selected in the left sidebar under the 'part1' folder. The main content area displays the following configuration file:

```
[Settings]
Properties=MyCustomProperty
[Default]
OSInstall=Y
SkipAdminUser=YES
SkipAdminPassword=YES
SkipProductKey=YES
SkipComputerBackup=YES
SkipBitLocker=YES
SkipDDKWelcome=YES
SkipUserData=YES
SkipTimezone=YES
SkipLocalSelection=YES
SkipLanguage=YES
SkipDefaultPrinter=YES
SkipDefaultPrinterPath=YES
SkipApplications=YES
KeyboardLocale=en-US
TimeZoneName=New Zealand Standard Time
EventService=http://Deployment:9000
```

Task 4: Pre- and Post-Deployment Implementation for a new client machine

1. Execute the deployment PowerShell script step by step:

- Add MDT snap-in to support PowerShell cmdlets and create a new share folder for the deployment



```
#1.Add MDT snap-in to support PowerShell cmdlets.
2.Add-PSSnapin Microsoft.BDD.PSSnapin
3.Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psd1"
4.
5.$deploymentShare = "C:\DeploymentShare"
6.$snfPath = "$deploymentShare\Control"
7.$networkPath = "\\\VM-DC\DeploymentShare"
8.
9.#2.Create a new share folder for the deployment
10.New-Item $deploymentShare -Type directory -Force
11.New-SmbShare -Name DeploymentShare -Path $deploymentShare -FullAccess Administrators

PS C:\Users\Administrators #1.Add MDT snap-in to support PowerShell cmdlets.
Add-PSSnapin Microsoft.BDD.PSSnapin
Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psd1"

$deploymentShare = "C:\DeploymentShare"
$snfPath = "$deploymentShare\Control"
$networkPath = "\\\VM-DC\DeploymentShare"

#2.Create a new share folder for the deployment
New-Item $deploymentShare -Type directory -Force
New-SmbShare -Name DeploymentShare -Path $deploymentShare -FullAccess Administrators

Directory: C:/

Mode LastWriteTime Length Name
---- ----- ---- 
d---- 9/5/2024 4:52 PM DeploymentShare

AvailabilityType : NonClustered
CachingMode : Manual
CV : 0
CompressData : False
ConcurrentUserLimit : 0
ConcurrentlyAvailable : False
CurrentSize : 0
Description :
EncryptData : False
FullAccessRestrictionMode : Unrestricted
IdentityRemoting : False
Infrastructure : False
LeasingMode : Full
Name : DeploymentShare
Path : C:\DeploymentShare
Scoped : False
ScopeName : 
```

- Initialize the deployment folder as a persistent drive named "DS00

```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1
12
13
14 #3. Initialize the deployment folder as a persistent drive named "DS00"
15 #Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psd1"
16 #Remove-PSDrive -Name "DS001"
17 new-PSDrive -Name "DS001" -PSProvider "MDTProvider" -Root "C:\DeploymentShare" -Description "MDT Deployment Share" -Force -Verbose | add-MDTPersistentDrive -Verbose
18
19
20 #.Create Bootstrap.ini
21 $bootstrapContent = @"
22 [Settings]
23 Priority=Default
24
25 [Default]
26 DeployRoot=$networkPath
27
28 UserID=Administrator
29 UserPassword=Aspire2
30 UserDomain=iac.com
31 TaskSequenceID=1
32 SkipTaskSequence=YES
33 KeyboardLocale=en-US
34 SkipBDDWelcome=YES
35 "8
36
37 Set-Content -Path "$mdtPath\Bootstrap.ini" -Value $bootstrapContent
38
39 #$.Create CustomSettings.ini
40 $customSettingsContent = @"
41 [Settings]
42
43 "8
44
45 PS C:\Users\Administrator> #3. Initialize the deployment folder as a persistent drive named "DS001"
#Import-Module "C:\Program Files\Microsoft Deployment Toolkit\bin\MicrosoftDeploymentToolkit.psd1"
#Remove-PSDrive -Name "DS001"
new-PSDrive -Name "DS001" -PSProvider "MDTProvider" -Root "C:\DeploymentShare" -Description "MDT Deployment Share" -Force -Verbose | add-MDTPersistentDrive -Verbose

VERBOSE: Performing the operation "New drive" on target "Name: DS001 Provider: Microsoft.BDD.PSSnapIn\MDTProvider Root: C:\DeploymentShare".
VERBOSE: Performing the operation "Open" on target "deployment share".
VERBOSE: MDT provider Microsoft.BDD.PSSnapIn\MDTProvider added successfully.
VERBOSE: Adding MDT drive DS001 to the persisted drive list.

Name          Used (GB)   Free (GB) Provider      Root
DS001           100.00     0.00 MDTProvider   C:\DeploymentShare
VERBOSE: Successfully added MDT drive DS001 to the persisted drive list.

PS C:\Users\Administrator>

```

- Create Bootstrap.ini

```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1
12
13
14 #3. Create Bootstrap.ini
15 $bootstrapContent = @"
16 [Settings]
17 Priority=Default
18
19 [Default]
20 DeployRoot=$networkPath
21
22 UserID=Administrator
23 UserPassword=Aspire2
24 UserDomain=iac.com
25 TaskSequenceID=1
26 SkipTaskSequence=YES
27 KeyboardLocale=en-US
28 SkipBDDWelcome=YES
29 "8
30
31 Set-Content -Path "$mdtPath\Bootstrap.ini" -Value $bootstrapContent
32
33 PS C:\Users\Administrator> #4.Create Bootstrap.ini
$bootstrapContent = @"
[Settings]
Priority=Default
[Default]
DeployRoot=$networkPath
UserID=Administrator
UserPassword=Aspire2
UserDomain=iac.com
TaskSequenceID=1
SkipTaskSequence=YES
KeyboardLocale=en-US
SkipBDDWelcome=YES
"8
34
35 Set-Content -Path "$mdtPath\Bootstrap.ini" -Value $bootstrapContent
36
37 PS C:\Users\Administrator>

```

• Create CustomSettings.ini

```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X
39 $#_CreateCustomSettingsContent = @"
40 <[Settings]>
41 Priority=Default
42 Properties=@{CustomProperty}
43
44 <[Default]>
45 OSInstall=YES
46 SkipSignature=YES
47 SkipAdminPassword=YES
48 SkipProductKey=YES
49 SkipComputerBackup=YES
50 SkipBitLocker=YES
51
52 SkipIp000Welcome=YES
53 SkipIp000Dns=YES
54 SkipTimezone=YES
55 SkipLocaleSelection=YES
56 SkipComputerName=YES
57 SkipDomainName=YES
58 SkipDomainMembership=YES
59 SkipDomainMembership=YES
60 SkipApplications=YES
61
62 KeyboardLocale=en-US
63 TimeZoneName=New Zealand StandardTime
64 EventService=http://Deployment:9800
65 "
66 Set-Content -Path "$mdtPath\CustomSettings.ini" -Value $customSettingsContent
67
68
PS C:\Users\Administrator>

```

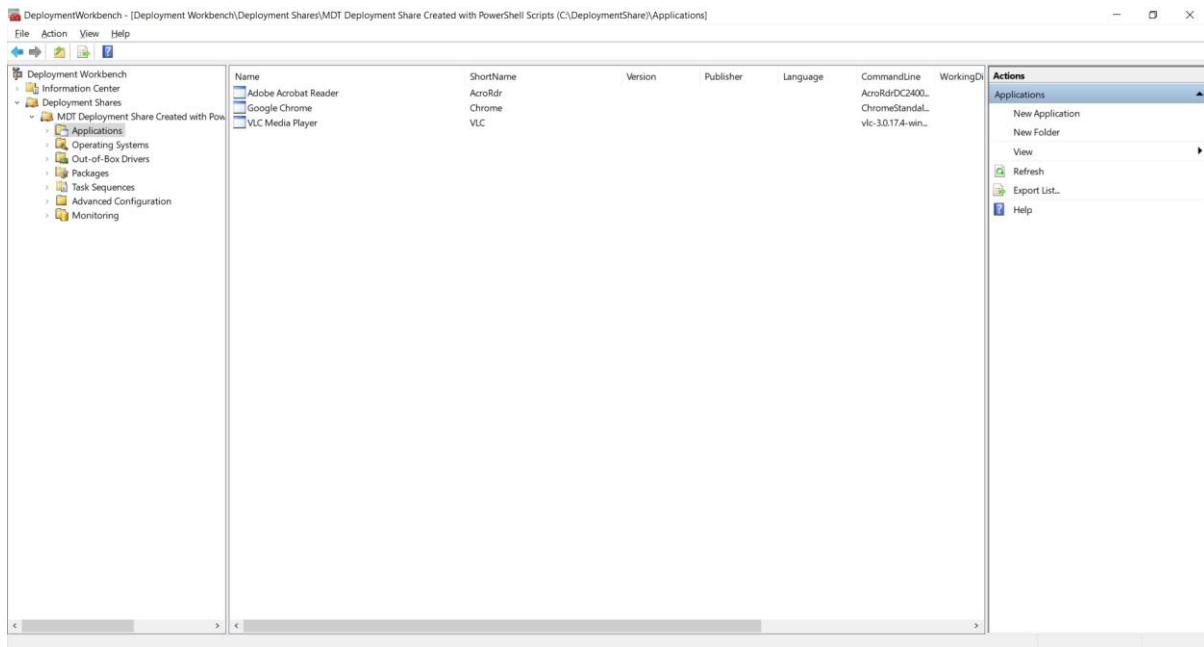
The screenshot shows a Windows PowerShell ISE window with the title 'Administrator: Windows PowerShell ISE'. The code in the editor creates a string variable '\$customSettingsContent' containing an ini file configuration. The ini file includes settings for OS installation, skip steps like signature and password, and various system configurations like locale and time zone. The code then uses the 'Set-Content' cmdlet to write this content to a file named 'CustomSettings.ini' located at '\$mdtPath'. The bottom of the window shows the command 'PS C:\Users\Administrator>'.

• Import Applications (Chrome, VLC and Acrobat Reader) into MDT

```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X
40 <#Import Applications in MDT>
41 Restore-MDTPersistentDrive -verbose
42 Get-PSDrive -PSProvider Microsoft.BDD.PSSnapIn\MDTPProvider
43
44 Import-MDTApplication -Name "Google Chrome" -Path "DS001\Applications" -ApplicationSourcePath "C:\ShareFolder\Chrome" -DestinationFolder Chrome -Commandline "ChromeStandaloneSetup64.exe /silent /insta
45 Import-MDTApplication -Name "VLC Media Player" -Path "DS001\Applications" -ApplicationSourcePath "C:\ShareFolder\VLC" -DestinationFolder VLC -Commandline "vlc-3.0.17.4-win32.exe /L=1033 /S" -ShortNa
46 Import-MDTApplication -Name "Adobe Acrobat Reader" -Path "DS001\Applications" -ApplicationSourcePath "C:\ShareFolder\AcroRdr" -DestinationFolder AcroRdr -Commandline "AcroRdrDC2400220857_en_US.exe /s
47 #Check import result
48 #Get-ItemProperty -Path "DS001\Applications\Google Chrome"
49
50 #Import Operating System
51 import-mdtoperatingsystem -path "DS001\Operating Systems" -SourcePath "D:\\" -DestinationFolder "Windows 11 Home x64" -verbose
52
53 #Create Tasksequence
54 import-mdttasksequence -path "DS001\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "DS001\Operating Systems\Windows 11 Pro in Wind
55
56
57
58
59
59 #VERBOSE: Restoring drive 'DS001' with path 'C:\DeploymentShare'
60 WARNING: Unable to restore drive DS001.
61
62 Name Used (GB) Free (GB) Provider Root CurrentLocation
63 DS001 MDTProvider C:\DeploymentShare
64
65 Name : Google Chrome
66
67 Name : VLC Media Player
68
69 Name : Adobe Acrobat Reader
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```

- Check imported applications on the MDT management console:



- Import Operating System

Administrator: Windows PowerShell ISE

```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
Administrator: Windows PowerShell ISE
ConfigureMDT.ps1 | X
[...]
63 TimeZoneName=New Zealand StandardTime
64 EventService=http://Deployment:9800
65 "
66 Set-Content -Path "$mdtPath\CustomSettings.ini" -Value $customSettingsContent
67
68 #6.Import Applications in MDT
69 Restore-MDTAssistantDrive -verbose
70 Get-PSDrive -PSProvider Microsoft.BDD.PSSnapIn\MDTProvider
71
72 Import-MDTApplication -Name "Google Chrome" -Path "D$001\Applications" -ApplicationSourcePath "C:\ShareFolder\Chrome" -DestinationFolder Chrome -CommandLine "ChromeStandaloneSetup64.exe /silent /install /quiet /norestart"
73 Import-MDTApplication -Name "VLC Media Player" -Path "D$001\Applications" -ApplicationSourcePath "C:\ShareFolder\VLC" -DestinationFolder VLC -CommandLine "vlc-3.0.17.4-win32.exe /L=1033 /S" -ShortName VLC
74 Import-MDTApplication -Name "Adobe Acrobat Reader" -Path "D$001\Applications" -ApplicationSourcePath "C:\ShareFolder\AcroRdr" -DestinationFolder AcroRdr -CommandLine "AcroRdrDC2400220857_en_US.exe /s"
75
76 #Check import result
77 #Get-ItemProperty -Path 'D$001\Applications\Google Chrome'
78
79 #Import Operating System
80 #Import-mdtoperatingsystem -path "D$001\Operating Systems" -sourcePath "D:\\" -DestinationFolder "Windows 11 Home x64" -verbose
81 Import-mdtoperatingsystem -path "D$001\Operating Systems" -sourcePath "D:\\" -DestinationFolder "Windows 11 Home x64" -verbose
82
83 #Create Tasksequence
84 import-mdttasksequence -path "D$001\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "D$001\Operating Systems\Windows 11 Pro in Wind...
85
86 #9.Add the Applications:Google Chrome, VLC, and Acrobat Reader to the Tasksequence manually.
87 #-----#
88 #Before to generate the boot image, the applications should be added into tasksequence manually.
89
90
91
92
Import operating system.
Copying "D:\sources\bootsvc.dll" to "C:\DeploymentShare\Operating Systems\Windows 11 Home x64\sources\bootsvc.dll" (9%).
Name : VLC Media Player
Name : Adobe Acrobat Reader

PS C:\Users\Administrator> #7.Import Operating System
import-mdtoperatingsystem -path "D$001\Operating Systems" -sourcePath "D:\\" -DestinationFolder "Windows 11 Home x64" -Verbose
VERBOSE: Performing the operation "import" on target "Operating system".

```

Running script / selection. Press Ctrl+C to stop. Press Ctrl+B to break into debugger.

Administrator: Windows PowerShell ISE

```

File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1 X
78 #Check import result
79 $Get-ItemProperty -Path "DS001:\Applications\Google Chrome"
80
81 #[Import Operating System]
82 import-mdtoperatingsystem -path "DS001:\Operating Systems" -SourcePath "D:\" -DestinationFolder "Windows 11 Home x64" -Verbose
83
84 #Create Tasksequence
85 import-mdttasksequence -path "DS001:\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "DS001:\Operating Systems\Windows 11 Pro in Wind
86
87 #Add the Applications:Google Chrome, VLC, and Acrobat Reader to the Tasksequence manually.
88 #-----
89 #Before to generate the boot image, the applications should be added into tasksequence manually.
90 #-----
91 #-----
```

PS C:\Users\Administrator> #7. Import Operating System
import-mdtoperatingsystem -path "DS001:\Operating Systems" -SourcePath "D:\" -DestinationFolder "Windows 11 Home x64" -Verbose
VERBOSE: Performing the operation "Import" on target "Operating system".
VERBOSE: Creating new item named windows 11 Home in windows 11 Home x64 install.wim at DS001:\Operating Systems.
Name
--
windows 11 Home in windows 11 Home x64 install.wim
VERBOSE: Creating new item named windows 11 Home N in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Home N in windows 11 Home x64 install..
VERBOSE: Creating new item named windows 11 Home Single Language in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Home Single Language in windows 11 H...
VERBOSE: Creating new item named windows 11 Education in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Education in windows 11 Home x64 INS...
VERBOSE: Creating new item named windows 11 Education N in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Education N in windows 11 Home x64 i...
VERBOSE: Creating new item named windows 11 Pro in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro in windows 11 Home x64 Inst...
VERBOSE: Creating new item named windows 11 Pro N in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro N in windows 11 Home x64 Inst...
VERBOSE: Creating new item named windows 11 Pro Education in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro Education in windows 11 Home x...
VERBOSE: Creating new item named windows 11 Pro Education N in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro Education N in windows 11 Home ...
VERBOSE: Creating new item named windows 11 Pro for Workstations in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro for Workstations in windows 11 H...
VERBOSE: Creating new item named windows 11 Pro N for Workstations in windows 11 Home x64 install.wim at DS001:\Operating Systems.
windows 11 Pro N for Workstations in windows 11 ...
VERBOSE: Import processing finished.

PS C:\Users\Administrator>

Completed | Ln 83 Col 1 | 100%

- Check imported Windows 11 on the MDT management Console.

DeploymentWorkbench - [Deployment Workbench]\Deployment Shares\MDT Deployment Share Created with PowerShell Scripts (C:\DeploymentShare)\Operating Systems

File Action View Help

Name	Description	Platform	Build	OStype	Flags	enable	Actions
Windows 11 Education in Windows 11 Home x64 in...	Windows 11 Education	x64	10.022621.1702	Windows IBS	Education	True	
Windows 11 Education N in Windows 11 Home x64...	Windows 11 Education N	x64	10.022621.1702	Windows IBS	EducationN	True	
Windows 11 Home in Windows 11 Home x64 install...	Windows 11 Home	x64	10.022621.1702	Windows IBS	Core	True	
Windows 11 Home N in Windows 11 Home x64 inst...	Windows 11 Home N	x64	10.022621.1702	Windows IBS	CoreN	True	
Windows 11 Home Single Language in Windows 11 ..	Windows 11 Home Single Language	x64	10.022621.1702	Windows IBS	CoreSingleLan...	True	
Windows 11 Pro Education in Windows 11 Home x6...	Windows 11 Pro Education	x64	10.022621.1702	Windows IBS	ProfessionalEd...	True	
Windows 11 Pro Education N in Windows 11 Home ...	Windows 11 Pro Education N	x64	10.022621.1702	Windows IBS	ProfessionalEd...	True	
Windows 11 Pro for Workstations in Windows 11 H...	Windows 11 Pro for Workstations	x64	10.022621.1702	Windows IBS	ProfessionalW...	True	
Windows 11 Pro in Windows 11 Home x64 install.w...	Windows 11 Pro	x64	10.022621.1702	Windows IBS	Professional	True	
Windows 11 Pro N for Workstations in Windows 11 ..	Windows 11 Pro N for Workstations	x64	10.022621.1702	Windows IBS	ProfessionalW...	True	
Windows 11 Pro N in Windows 11 Home x64 install...	Windows 11 Pro N	x64	10.022621.1702	Windows IBS	ProfessionalN	True	

- Create Tasksequence

```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X

78 #> #Check Import result
79 #> $Get-ItemProperty -Path 'DS001:\Applications\Google Chrome'
80
81 #> #Import Operating System
82 #> import-mdtoperatingsystem -path "DS001:\Operating Systems" -SourcePath "D:\\" -DestinationFolder "Windows 11 Home x64" -Verbose
83
84 #> #Create TaskSequence
85 import-mdttasksequence -path "DS001:\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "DS001:\Operating Systems\Windows 11 Pro in Wind...
86
87
88 #> #Add the Applications:Google Chrome, VLC, and Acrobat Reader to the Tasksequence manually.
89 #> -----
90 #> Before to generate the boot image, the applications should be added into tasksequence manually.
91 #> -----
92

VERBOSE: Creating new item named Windows 11 Education in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
VERBOSE: Creating new item named Windows 11 Education N in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Education N in Windows 11 Home x64 i...
VERBOSE: Creating new item named Windows 11 Pro in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro in Windows 11 Home x64 i...
VERBOSE: Creating new item named Windows 11 Pro N in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro N in Windows 11 Home x64 i...
VERBOSE: Creating new item named Windows 11 Pro Education in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro Education in Windows 11 Home x64 i...
VERBOSE: Creating new item named Windows 11 Pro Education N in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro Education N in Windows 11 Home x...
VERBOSE: Creating new item named Windows 11 Pro for Workstations in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro for Workstations in Windows 11 H...
VERBOSE: Creating new item named Windows 11 Pro N for Workstations in Windows 11 Home x64 install.wim at DS001:\Operating Systems.
Windows 11 Pro N for Workstations in Windows 11...
VERBOSE: Import processing finished.

PS C:\Users\Administrator> #> .\Create_TaskSequence
import-mdttasksequence -path "DS001:\Task Sequences" -Name "OS and Apps" -Template "Client.xml" -Comments "" -ID "1" -Version "1.0" -OperatingSystemPath "DS001:\Operating Systems\Windows 11 Pro in Windows 11...

VERBOSE: Performing the operation "Import" on target "Task sequence".
VERBOSE: Beginning task sequence import
VERBOSE: Creating new item named OS and Apps at DS001:\Task Sequences.

Name
-----
OS and Apps
VERBOSE: Import processing finished.

PS C:\Users\Administrator> |
```

- Add the Applications: Google Chrome, VLC, and Acrobat Reader to the Tasksequence manually.

- Generate the boot image

```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help

ConfigureMDT.ps1* X
91 #
92 #
93 #10.Generate the boot image
94 #$since windows 11 will be installed on x64 machines and x86 image will not be generated.
95 Set-ItemProperty -Path "DS001:" -Name "SupportX86" -Value $false -Force -Verbose
96 
97 #Generate the boot image.
98 update-MD5DeploymentShare -Path "DS001:" -Force -Verbose
99 
100 sleep -Seconds 10
101 
102 #11. Install and Configure windows Deployment Services (WDS)
103 # Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
104 Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
105 Import-Module WDS
106 
107 #12.Initialize WDS
108 wdsutil /Verbosity/Progress/Initialize-Server /remInst:"C:\RemoteInstall"
109 
110 #13.Configure WDS settings
111 wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
112 wdsutil /Set-Server /PxePromptPolicy /KnownNoPrompt /NewNoPrompt
113 
114

VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsCore.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsCore.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsEnv.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsEnv.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsManager.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsManager.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsMount\Deploy\Tools\x64\TsMounttrap.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsMounttrap.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsMessaging.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsMessaging.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsBootstrap.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsBootstrap.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsProgress.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsProgress.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsProgressResult.exe to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsProgressResult.exe
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\TsProgressResult.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\TsProgressResult.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\Community.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\Community.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\ccmgenert.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\ccmgenert.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\cmagent.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\cmagent.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\msvcr120.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\msvcr120.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\00000409.tres.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\00000409.tres.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\Microsoft.BDD.Utility.dll to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Deploy\Tools\x64\Microsoft.BDD.Utility.dll
VERBOSE: Copy: C:\Windows\Microsoft Deployment Toolkit\Samples\Background.bmp to C:\Users\AdminI-1\AppData\Local\Temp\MDTUpdate.7136\Mount\Windows\system32\winpe.bmp
VERBOSE: Copying win to the deployment share.
VERBOSE: Creating an ISO.
VERBOSE: Copying ISO to the deployment share.
VERBOSE: 
== Completed processing platform x64 ==
VERBOSE: 
== Processing complete ==

PS C:\Users\Administrator>
```

- **Install and Configure Windows Deployment Services (WDS)**

```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X
01 #................................................................
02 #10. Generate the boot image
03 #Since Windows 11 will be installed on x64 machines and x86 image will not be generated.
04 Set-ItemProperty -Path "DS001:" -Name "SupportX86" -Value $false -Force -Verbose
05
06 #Generate the boot image.
07 Update-MDTDeploymentShare -Path "DS001:" -Force -Verbose
08
09 Sleep -Seconds 10
10
11 #11. Install and Configure Windows Deployment Services (WDS)
12 # Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
13 Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
14 Import-Module WDS
15
16 #12. Initialize WDS
17 wdsutil /Verbose /Progress /Initialize-Server /remInst:"c:\RemoteInstall"
18
19 #13. Configure WDS settings
20 wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
21 wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt
22
23
24
Start Installation...
29%

```

VERBOSE: Copy: C:\DeploymentShare\Tools\x64\msvcrt20.dll to C:\Users\Administrator\Temp\MDTUpdate_7136\Mount\Deploy\Tools\x64\msvcrt20.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\msvcrt20.dll to C:\Users\Administrator\Temp\MDTUpdate_7136\Mount\Deploy\Tools\x64\msvcrt20.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\00000409.tsres.dll to C:\Users\Administrator\Temp\MDTUpdate_7136\Mount\Deploy\Tools\x64\00000409.tsres.dll
VERBOSE: Copy: C:\DeploymentShare\Tools\x64\Microsoft.BOO.Utility.dll to C:\Users\Administrator\Temp\MDTUpdate_7136\Mount\Deploy\Tools\x64\Microsoft.BOO.Utility.dll
VERBOSE: Creating WIM for the deployment share.
VERBOSE: Creating ISO to the deployment share.
VERBOSE: --- Completed processing platform x64 ---
VERBOSE: --- Processing complete ---

PS C:\Users\Administrator> #11. Install and Configure Windows Deployment Services (WDS)
Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
Import-Module WDS

```

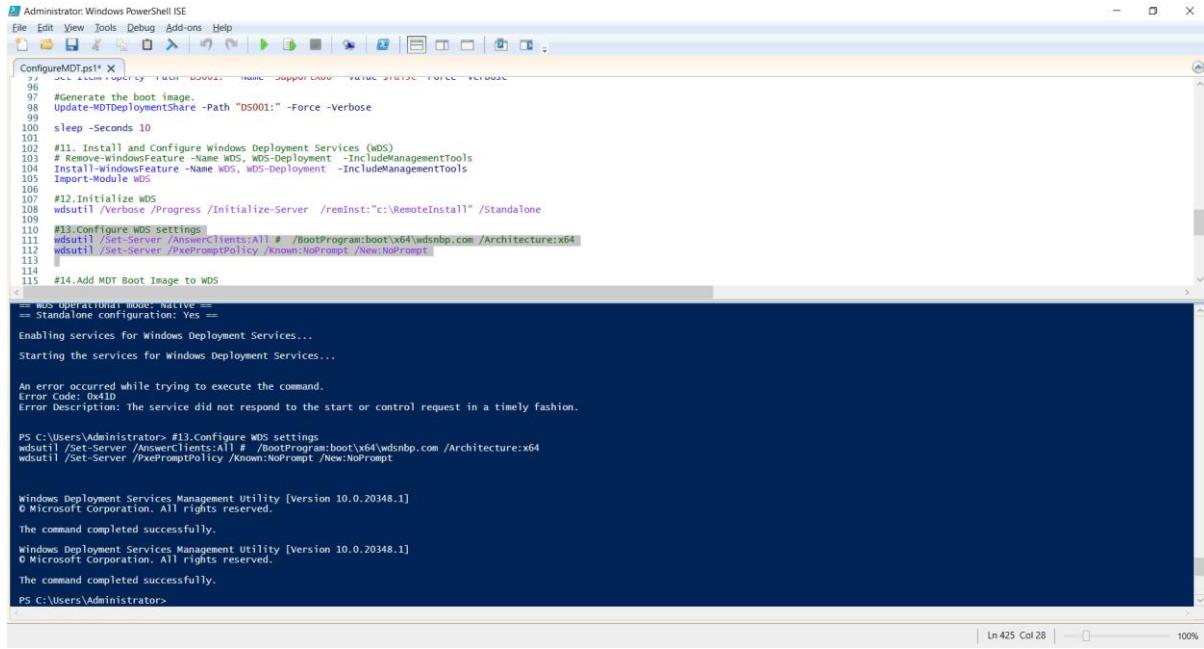
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X
01 #................................................................
02 #10. Generate the boot image.
03 #Update-MDTDeploymentShare -Path "DS001:" -Force -Verbose
04
05 Sleep -Seconds 10
06
07 #11. Install and Configure Windows Deployment Services (WDS)
08 # Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
09 Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
10 Import-Module WDS
11
12 #12. Initialize WDS
13 wdsutil /Verbose /Progress /Initialize-Server /remInst:"c:\RemoteInstall" /Standalone
14
15 #13. Configure WDS settings
16 wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
17 wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt
18
19
20 #14. Add MDT Boot Image to WDS
21
--> Installing system files
.
--> Installing boot files for x86
.....
--> Installing boot files for x64
.....
-> Updating the registry
-> Configuring the TFTP provider
-> Configuring service control point settings
== WDS operational mode: Native ==
== Standalone configuration: Yes ==
Enabling services for Windows Deployment Services...
Starting the services for Windows Deployment Services...

An error occurred while trying to execute the command.
Error Code: 0x41D
Error Description: The service did not respond to the start or control request in a timely fashion.

PS C:\Users\Administrator>

```

- Configure WDS settings



```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1 X
72  $([System]::Sleep(1000))
73  #Generate the boot image.
74  Update-MDTDeploymentShare -Path "D$001:" -Force -Verbose
75
76  sleep -Seconds 10
77
78  #11. Install and Configure Windows Deployment Services (WDS)
79  # Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
80  Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
81  Import-Module WDS
82
83  #12. Initialize WDS
84  wdsutil /Verbose /Progress /Initialize-Server /remInst:"c:\RemoteInstall" /Standalone
85
86  #13. Configure WDS settings
87  wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
88  wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt
89
90  #14. Add MDT Boot Image to WDS
91
92  ## WDS OPERATIONAL MODE: Native ==
93  ## Standalone configuration: Yes ==
94
95  Enabling services for Windows Deployment Services...
96  Starting the services for Windows Deployment Services...
97
98  An error occurred while trying to execute the command.
99  Error Code: 0x41D
100 Error Description: The service did not respond to the start or control request in a timely fashion.

PS C:\Users\Administrator> #13.Configure WDS settings
wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt

Windows Deployment Services Management Utility [Version 10.0.20348.1]
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The command completed successfully.

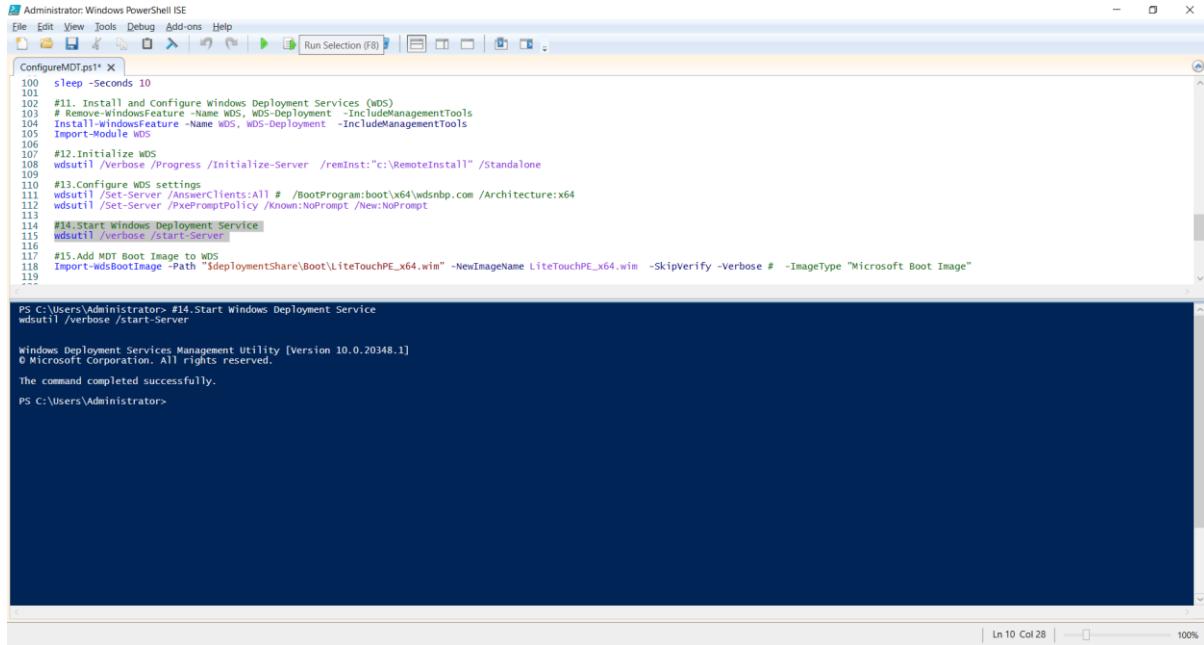
Windows Deployment Services Management Utility [Version 10.0.20348.1]
© Microsoft Corporation. All rights reserved.

The command completed successfully.

PS C:\Users\Administrator>

```

- Start Windows Deployment Service



```

Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1 X
100 sleep -Seconds 10
101
102 #11. Install and Configure Windows Deployment Services (WDS)
103 # Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
104 Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
105 Import-Module WDS
106
107 #12. Initialize WDS
108 wdsutil /Verbose /Progress /Initialize-Server /remInst:"c:\RemoteInstall" /Standalone
109
110 #13. Configure WDS settings
111 wdsutil /Set-Server /AnswerClients:All # /BootProgram:boot\x64\wdsnbp.com /Architecture:x64
112 wdsutil /Set-Server /PxePromptPolicy /Known:NoPrompt /New:NoPrompt
113
114 #14. Start Windows Deployment Service
115 wdsutil /verbose /start-Server
116
117 #15. Add MDT Boot Image to WDS
118 Import-wdsBootImage -Path "$deploymentShare\Boot\LiteTouchPE_x64.wim" -NewImageName LiteTouchPE_x64.wim -SkipVerify -Verbose # -ImageType "Microsoft Boot Image"
119

PS C:\Users\Administrator> #14.Start Windows Deployment Service
wdsutil /verbose /start-Server

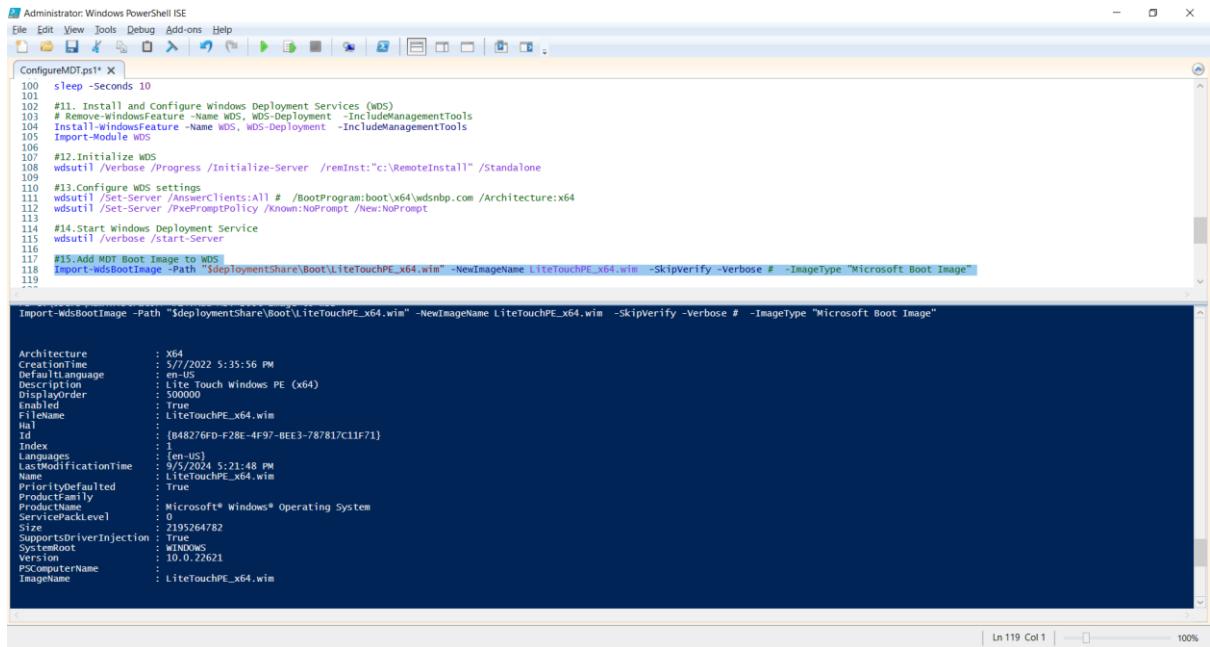
Windows Deployment Services Management Utility [Version 10.0.20348.1]
© Microsoft Corporation. All rights reserved.

The command completed successfully.

PS C:\Users\Administrator>

```

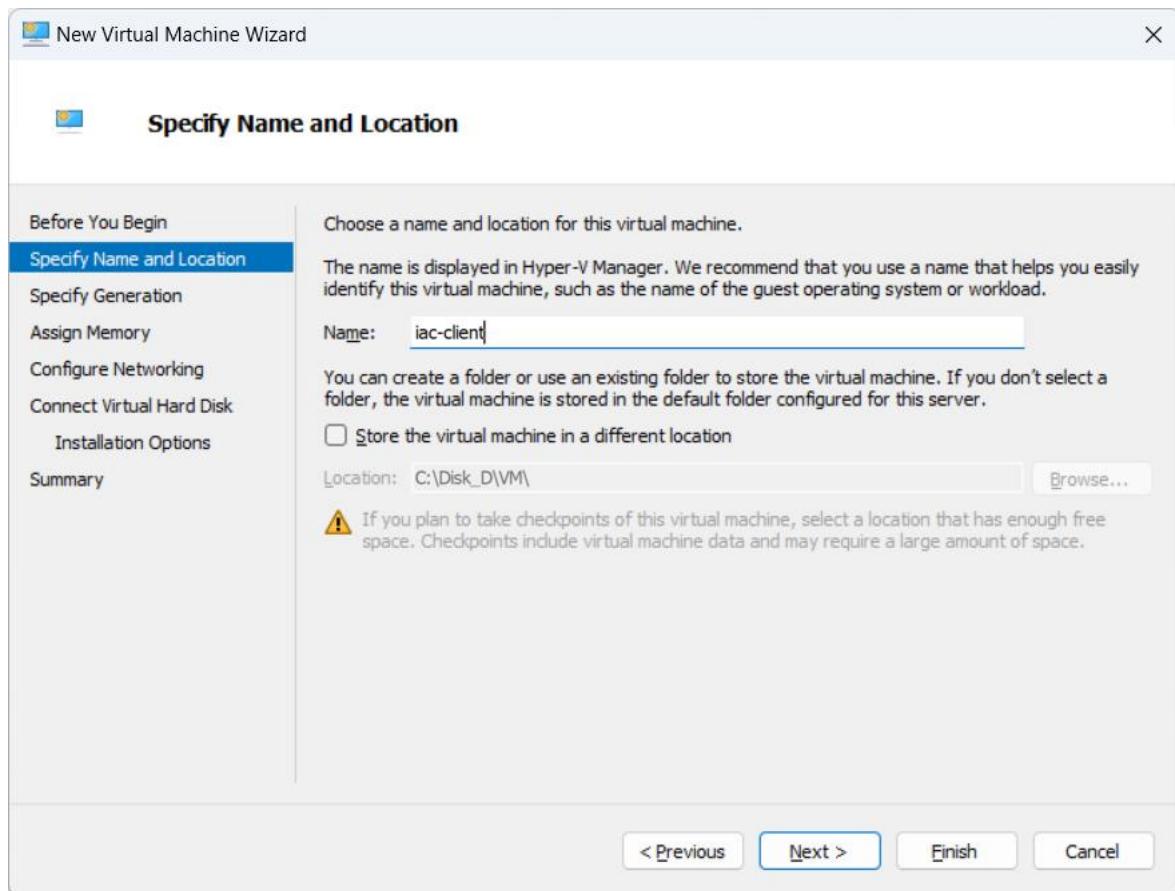
- Add MDT Boot Image to WDS

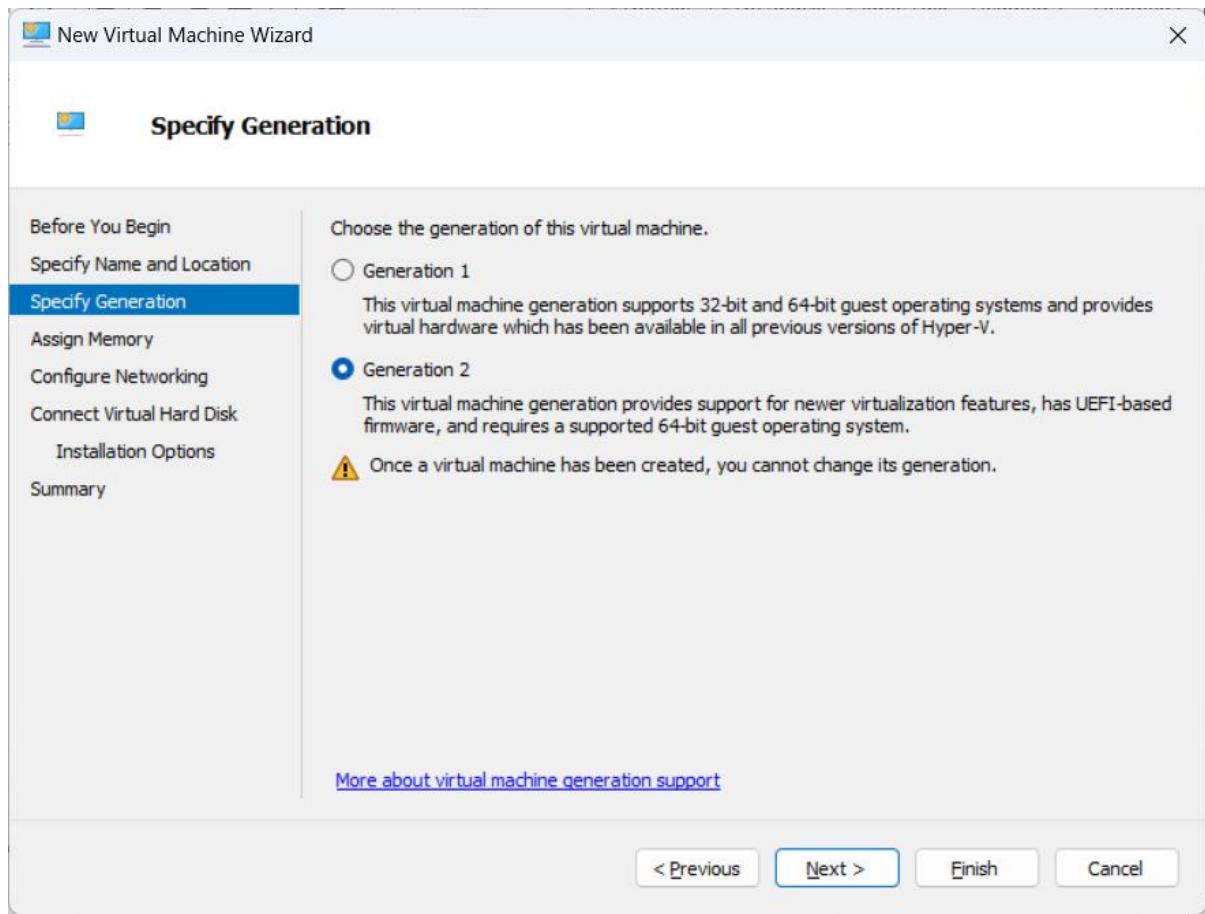


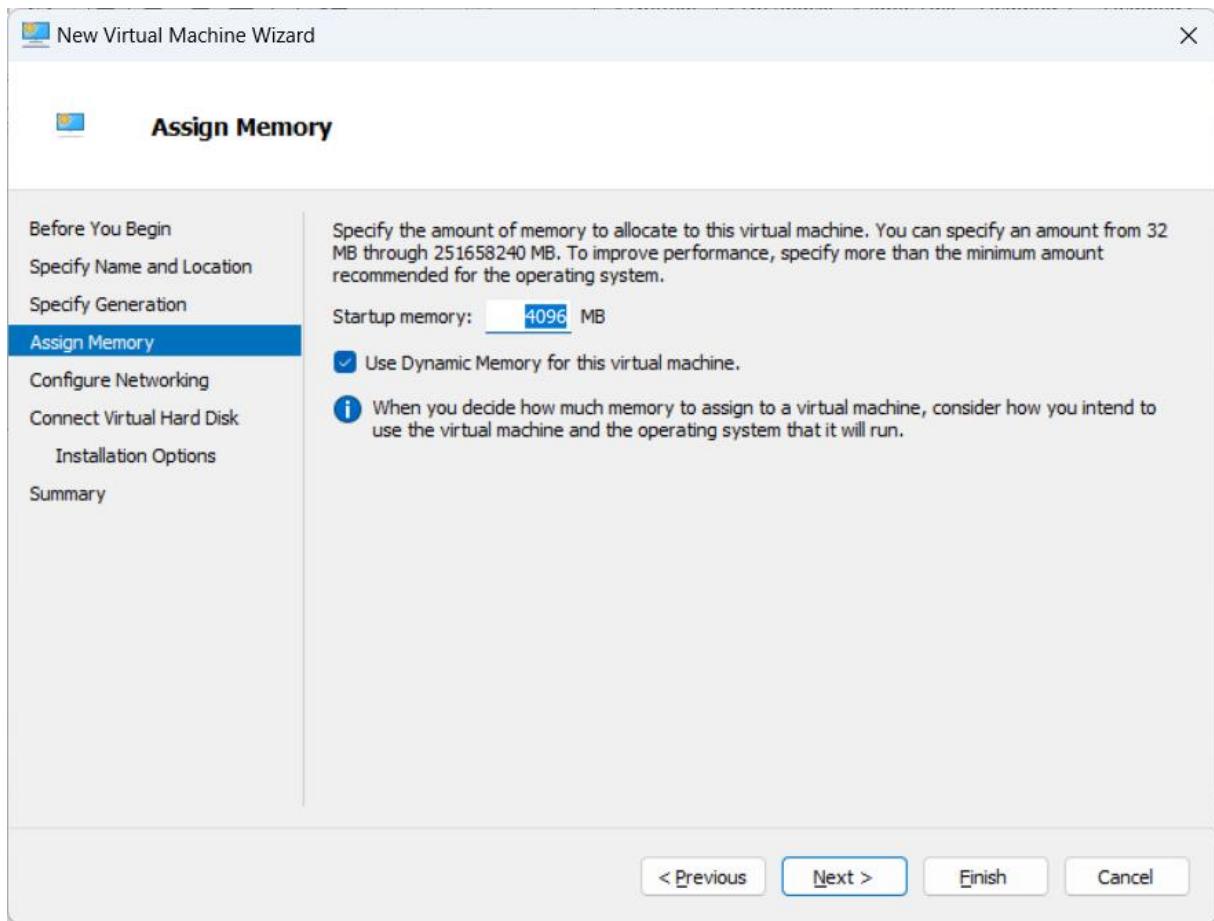
```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
ConfigureMDT.ps1* X
100 Sleep -Seconds 10
101 #1. Install and Configure Windows Deployment Services (WDS)
102 & Remove-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
103 Install-WindowsFeature -Name WDS, WDS-Deployment -IncludeManagementTools
104 Import-Module WDS
105
106 #12. Initialize WDS
107 wdsutil /Verbosity /Progress /Initialize-Server /remInst:"c:\RemoteInstall" /Standalone
108
109 #13. Configure WDS settings
110 wdsutil /Set-Service /AllowClientsAll # /Boot\Program\boot\x64\wdsnbp.com /Architecture:x64
111 wdsutil /Set-Server /PxPrompt /Known:NoPrompt /New:NoPrompt
112
113 #14. Start Windows Deployment Service
114 wdsutil /verbose /start-Server
115
116 #15. Add MDT Boot Image to WDS
117 Import-WdsBootImage -Path "$DeploymentShare\Boot\LiteTouchPE_x64.wim" -NewImageName LiteTouchPE_x64.wim -SkipVerify -Verbose # -ImageType "Microsoft Boot Image"
118
119
Import-WdsBootImage -Path "$DeploymentShare\Boot\LiteTouchPE_x64.wim" -NewImageName LiteTouchPE_x64.wim -SkipVerify -Verbose # -ImageType "Microsoft Boot Image"

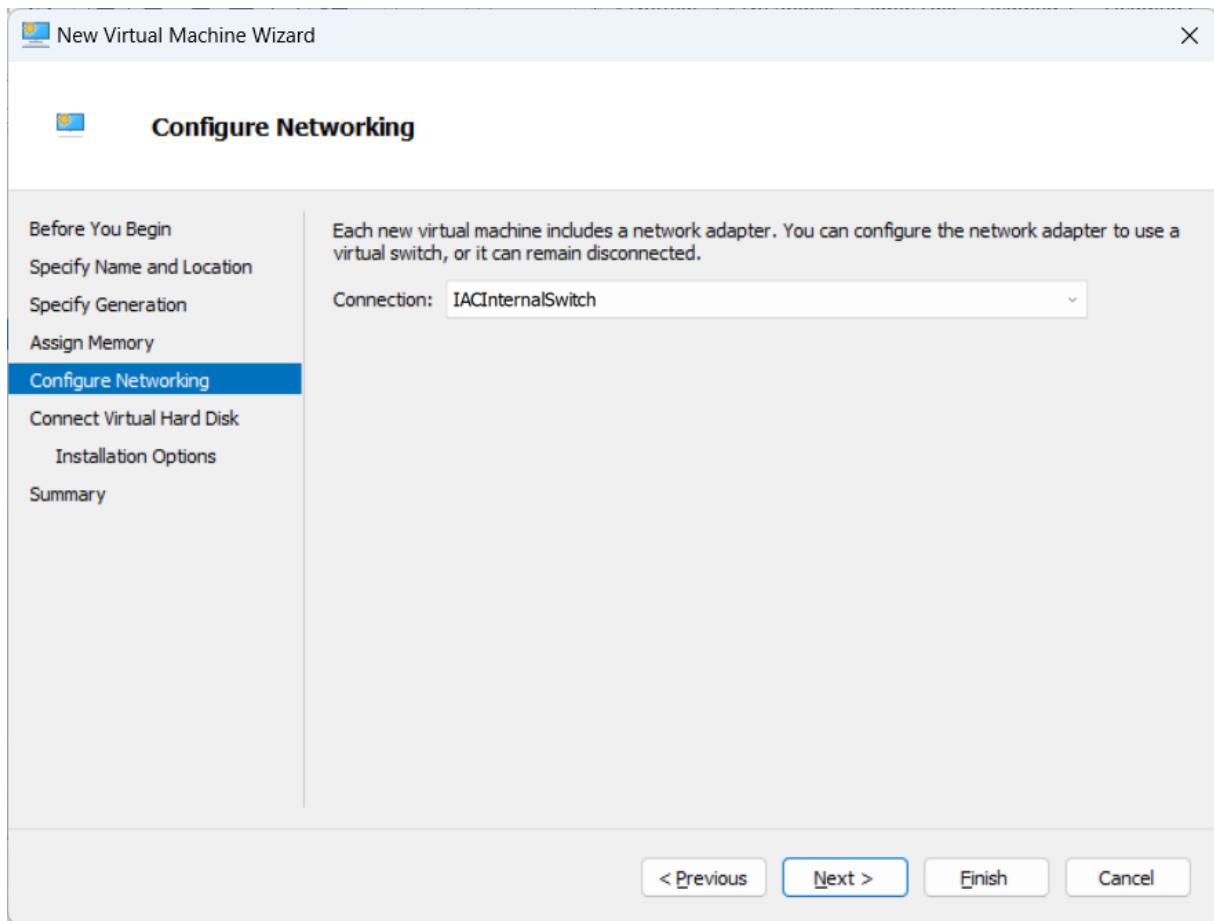
Architecture          : X64
CreationTime         : 5/7/2022 5:35:56 PM
DefaultLanguage      : en-US
Description          : Lite Touch Windows PE (x64)
DiskOrder            : 500000
Enabled              : True
Filename             : LiteTouchPE_x64.wim
Id                  : {B48276FD-F28E-4F97-BEE3-787817C11F71}
Index               : 1
Languages            : {en-US}
LastModificationTime: 5/7/2024 5:21:48 PM
Name                : LiteTouchPE_x64.wim
PriorityDefaulted   : True
ProductFamily       : Microsoft® Windows® Operating System
Provider             : Microsoft
ServicePackLevel    : 0
Size                : 2195264782
SupportsDriverInjection: False
SystemRoot           : WINDOWS
Version              : 10.0.22621
PSCoputerName       : LiteTouchPE_x64.wim
ImageName            : LiteTouchPE_x64.wim
```

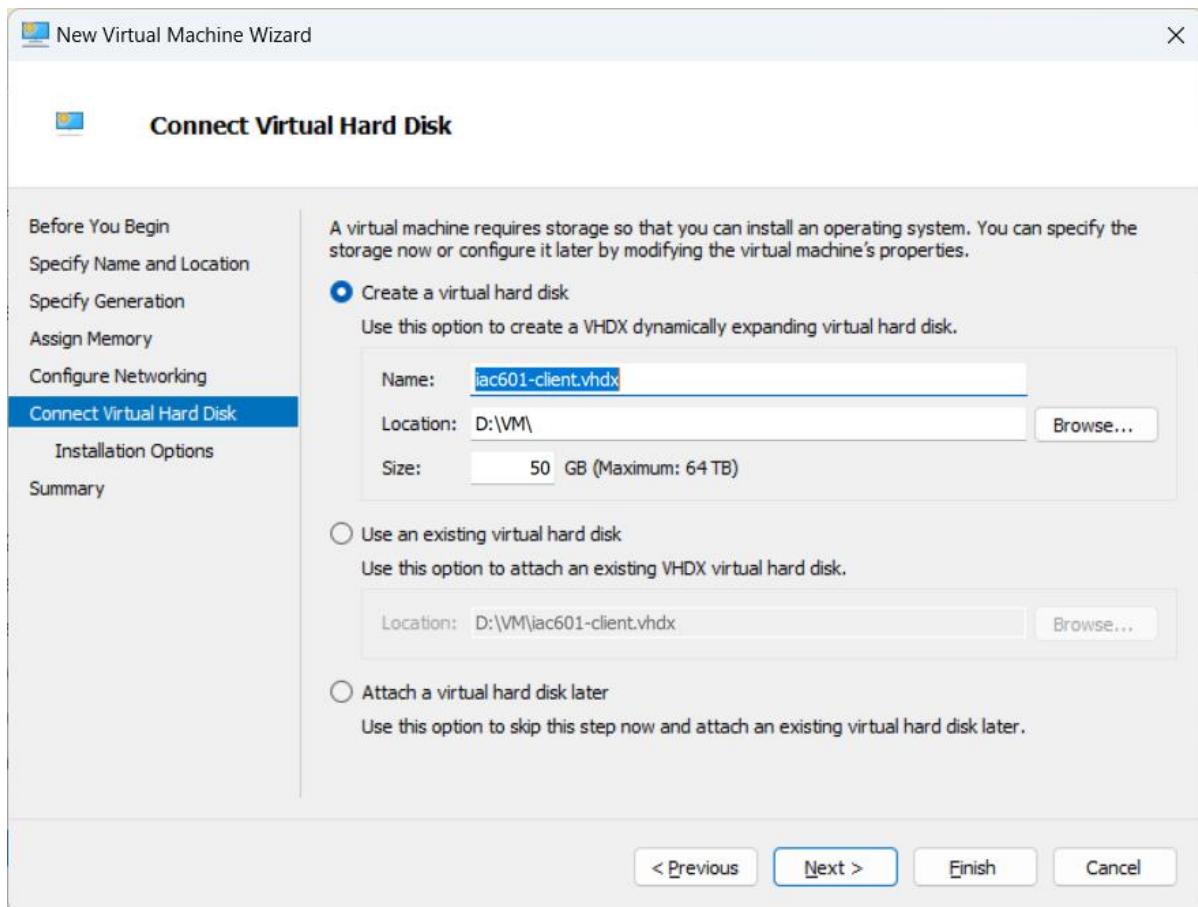
2 . Set parameters for the client virtual machine

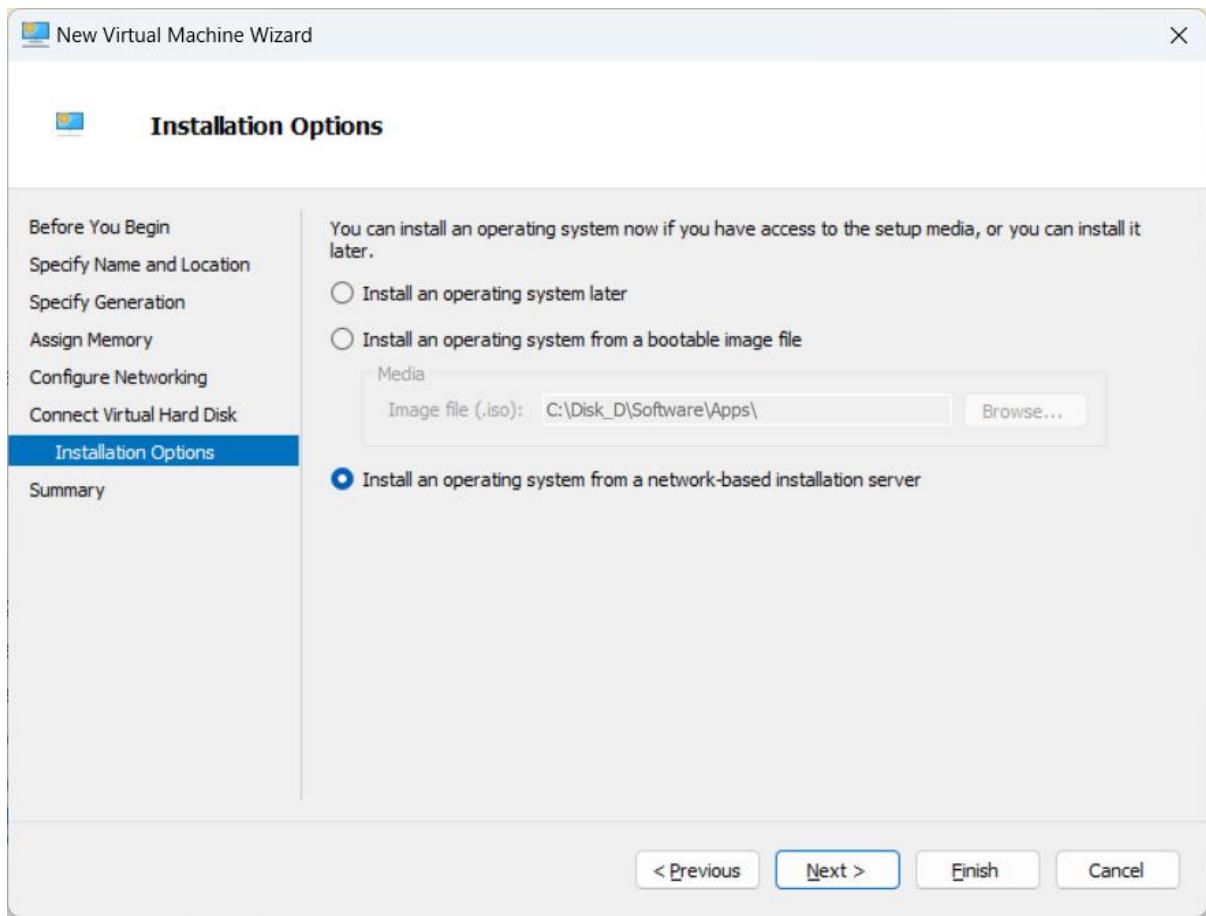


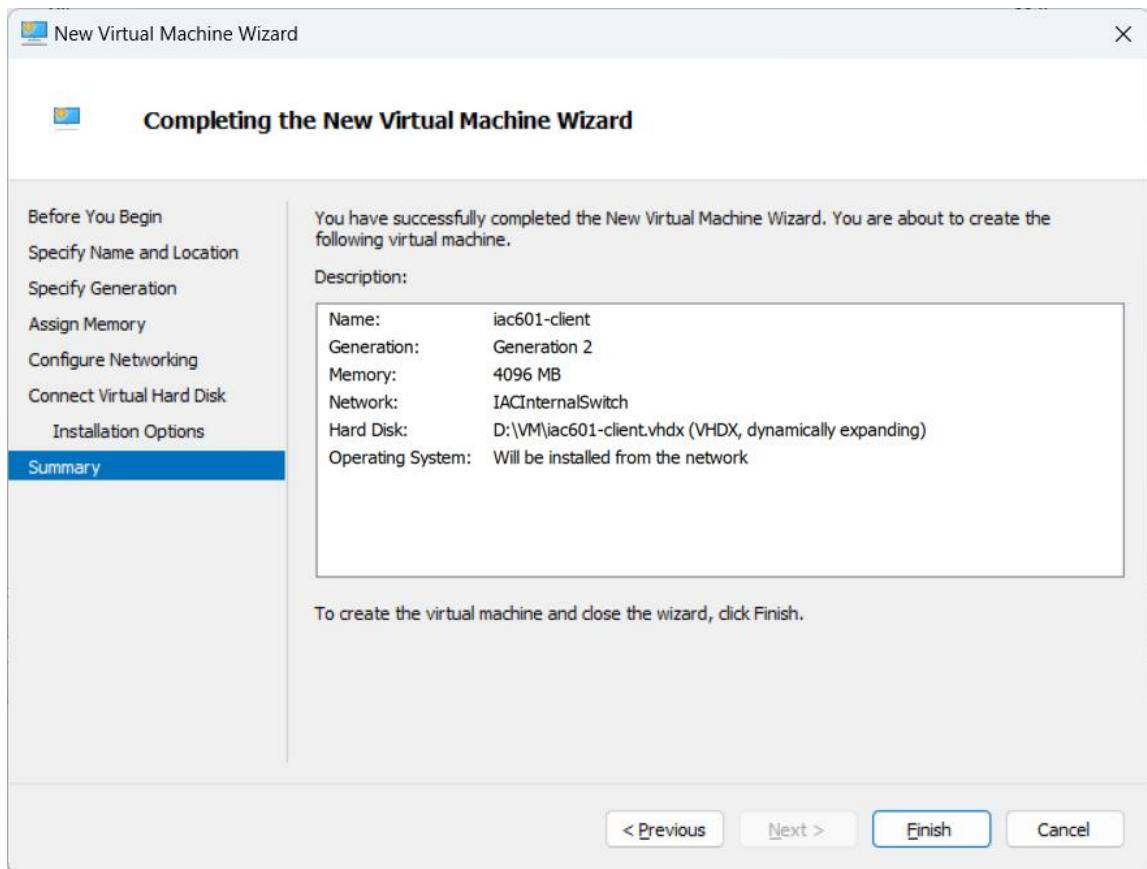


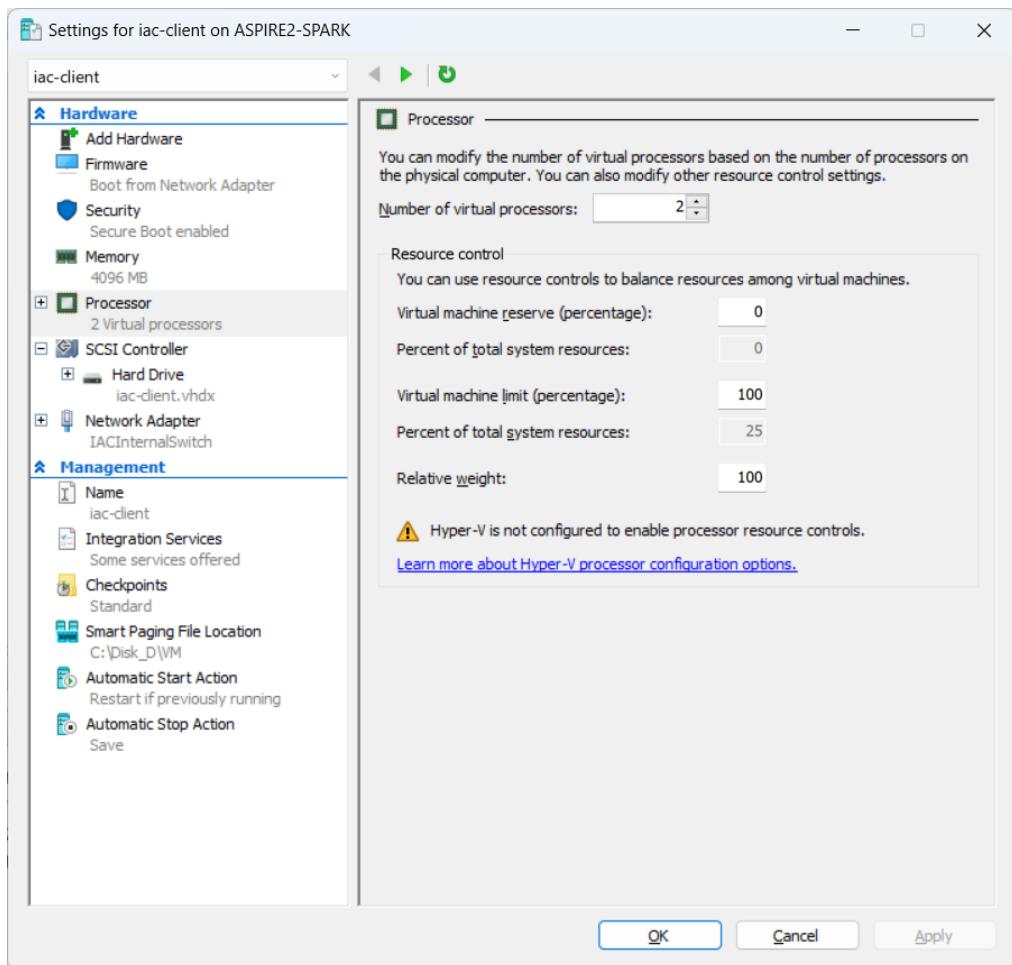




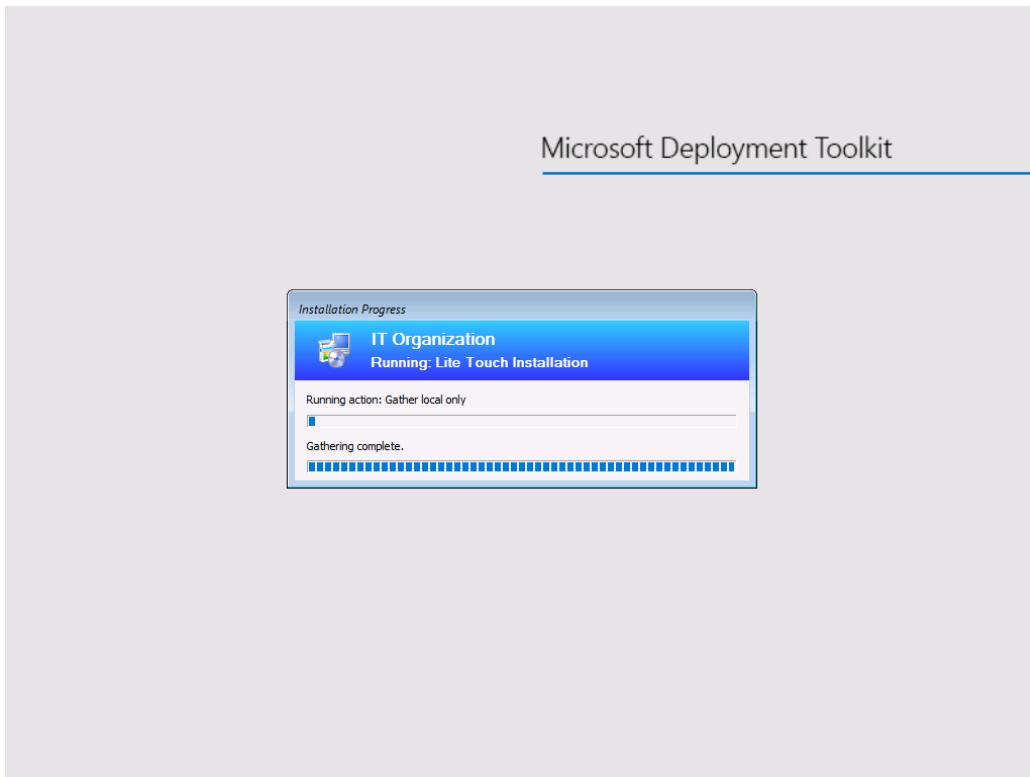




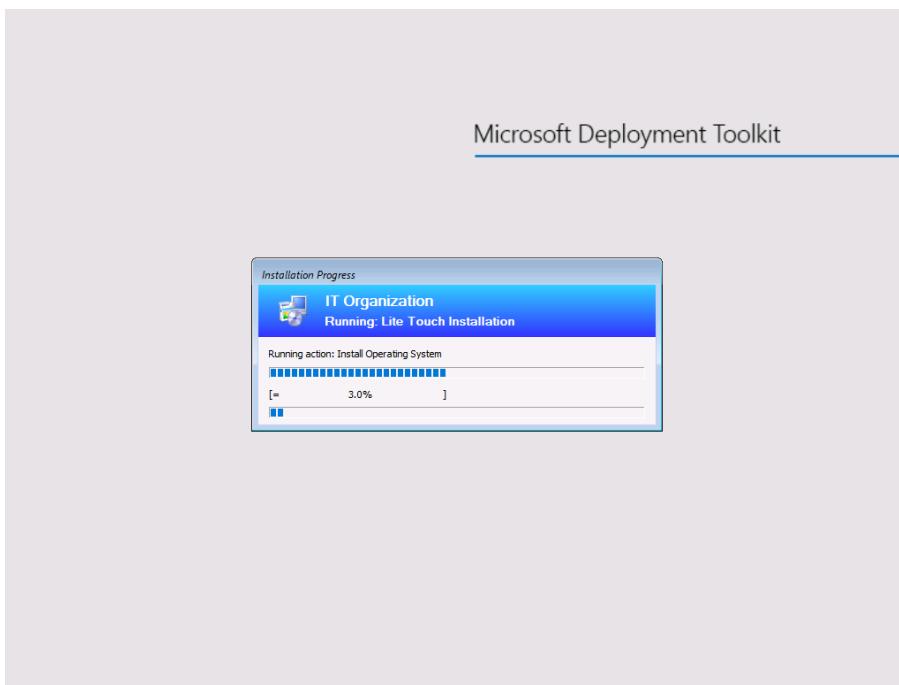




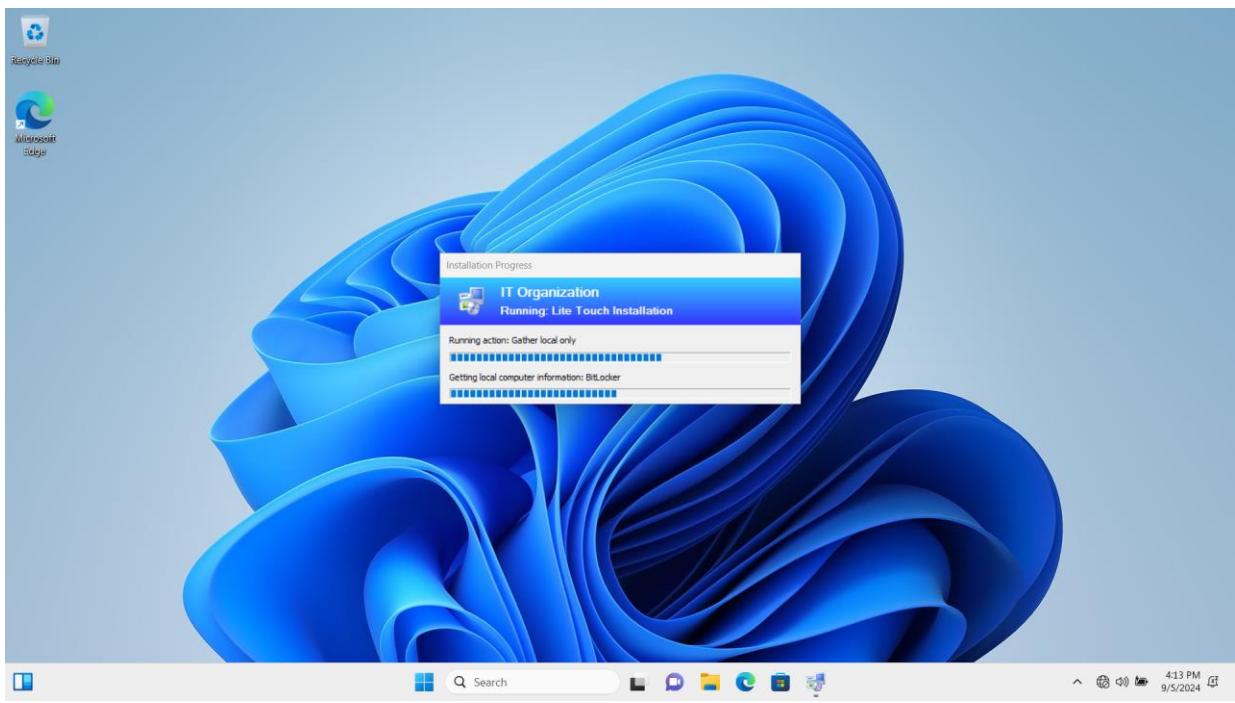
3. Turn on the client machine and Windows Deployment is starting automatically.



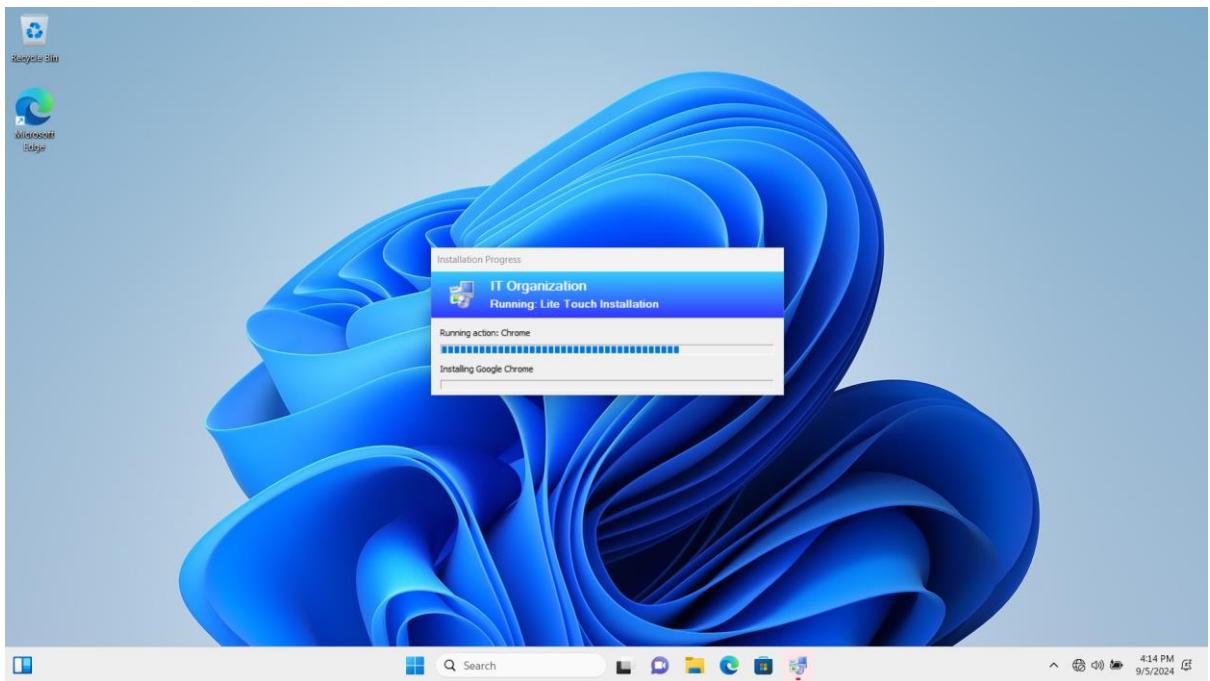
- **Windows 11 Pro is installing**



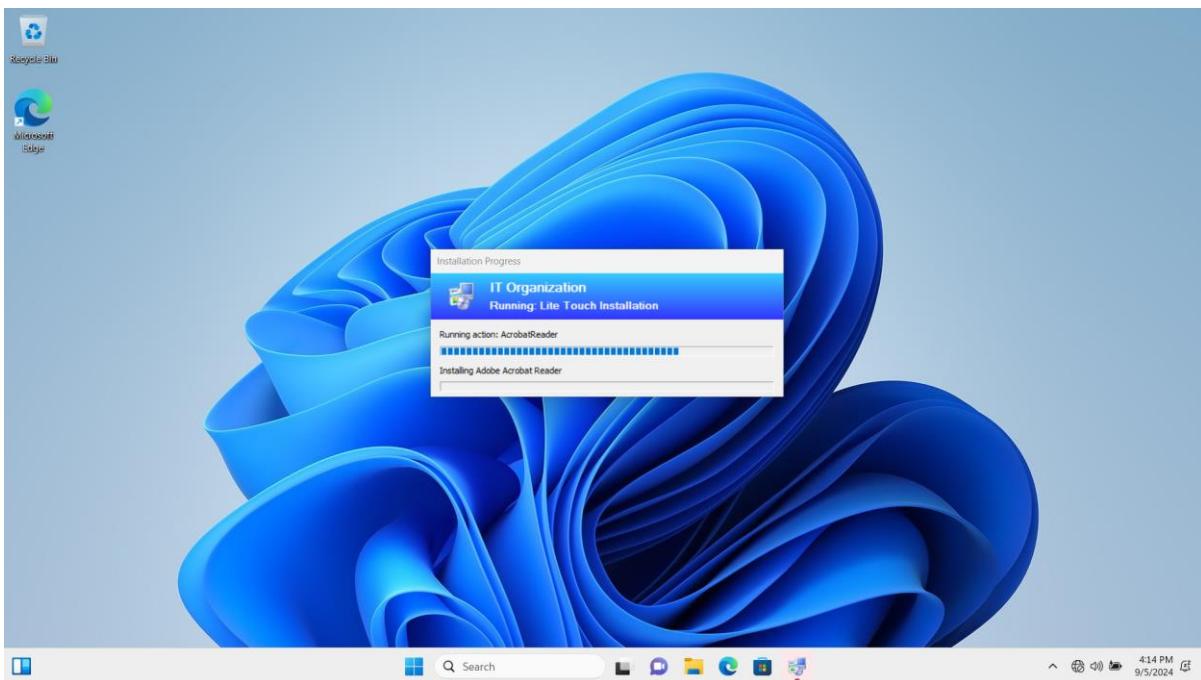
- Windows 11 Pro is installed automatically.



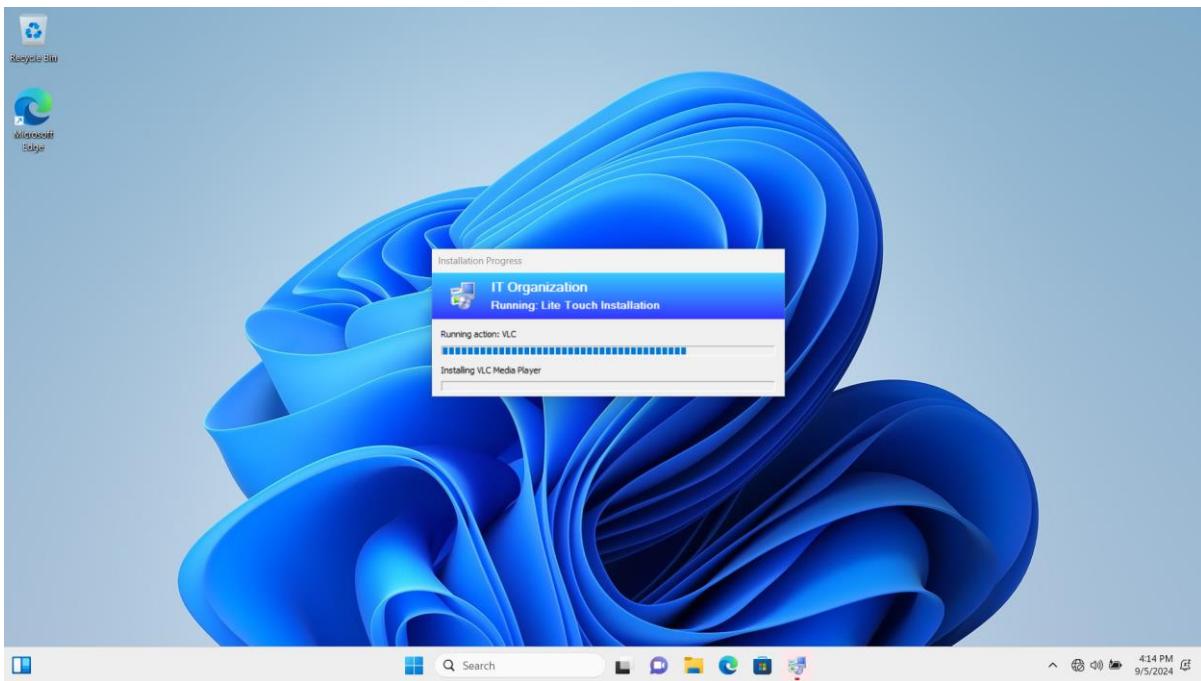
- Google Chrome is installing.



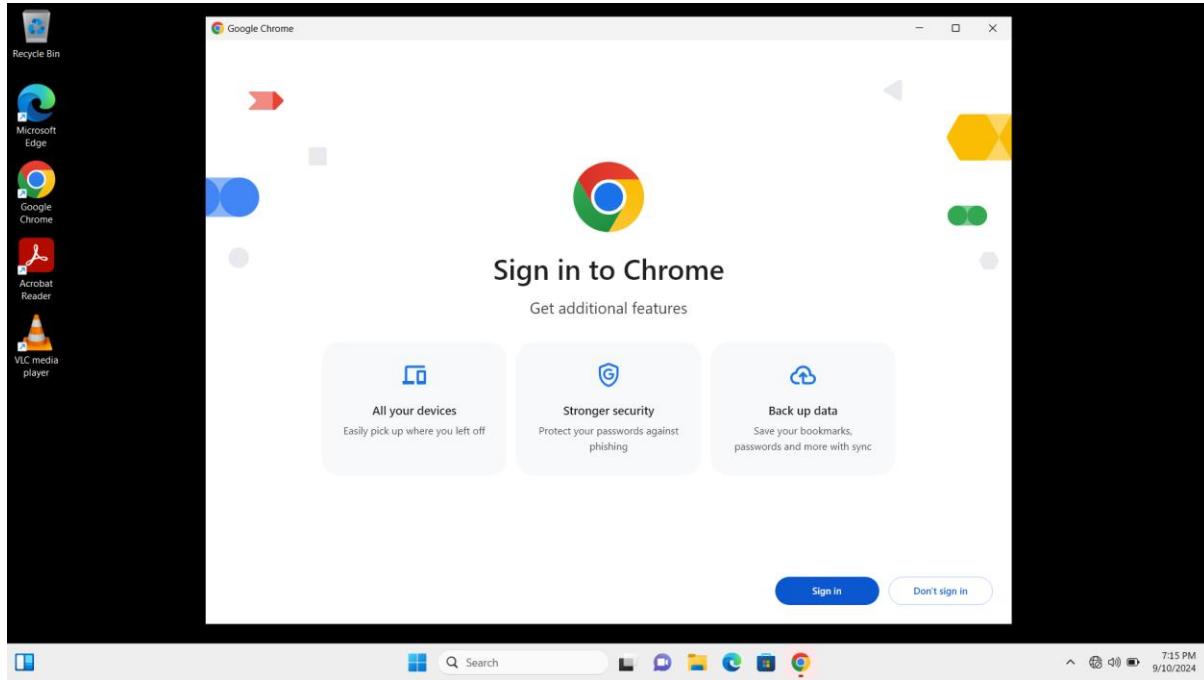
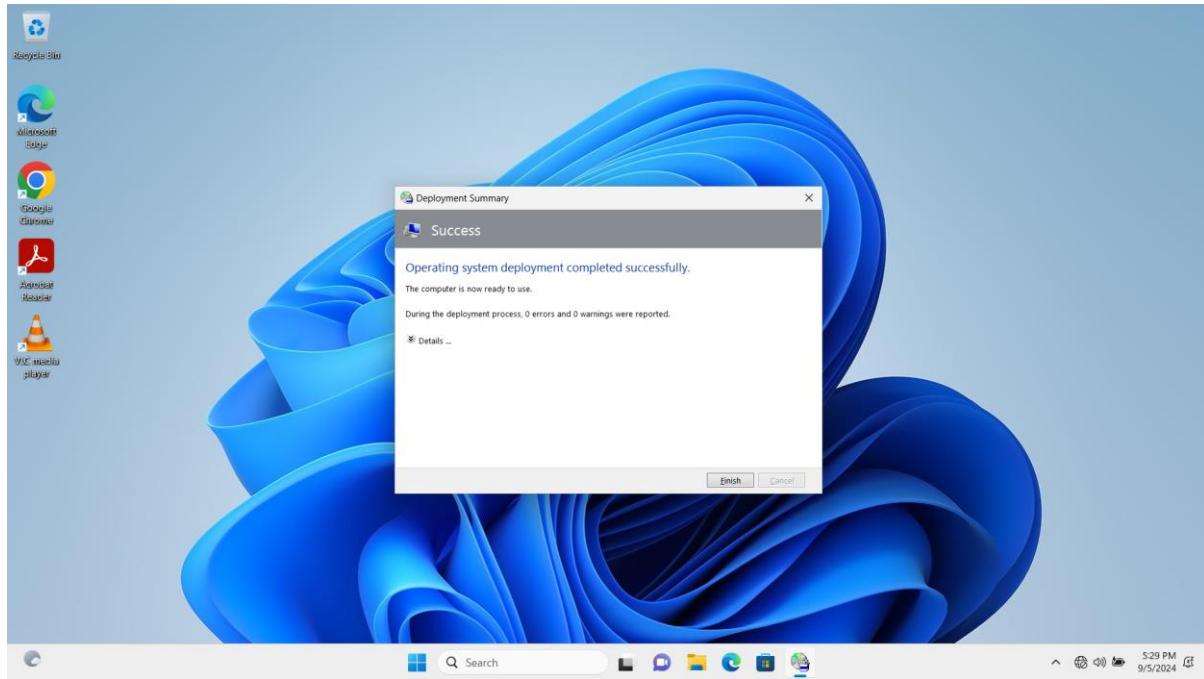
- **Acrobat Reader is installing.**

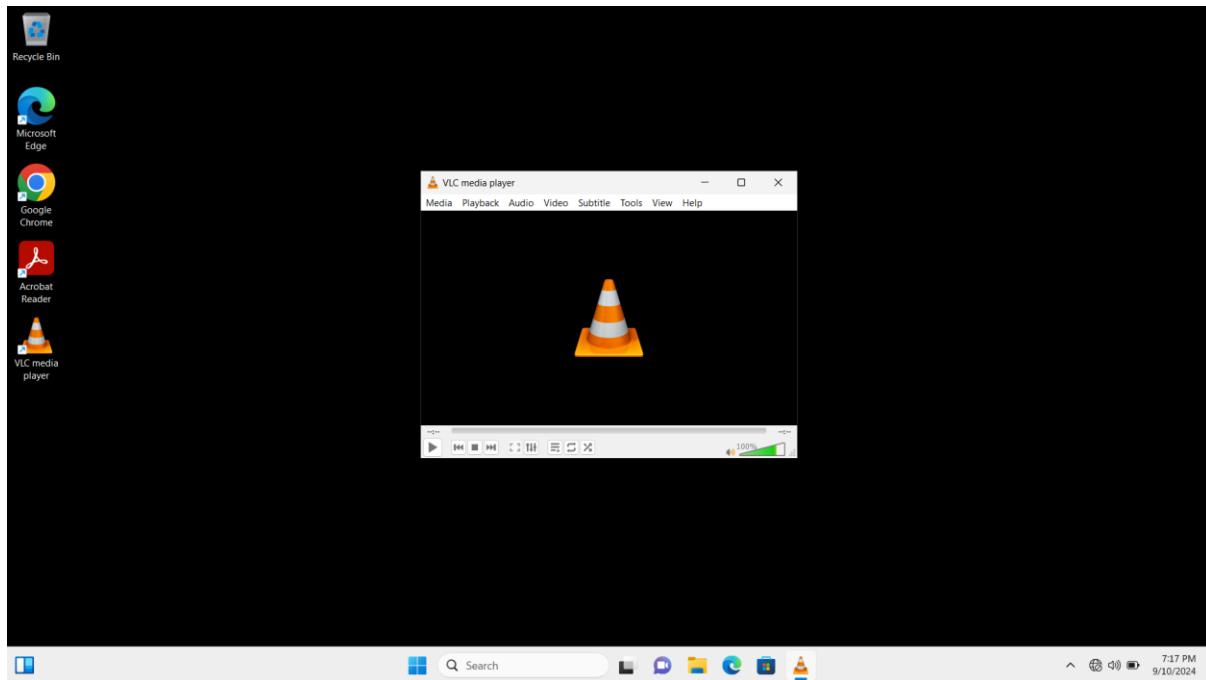
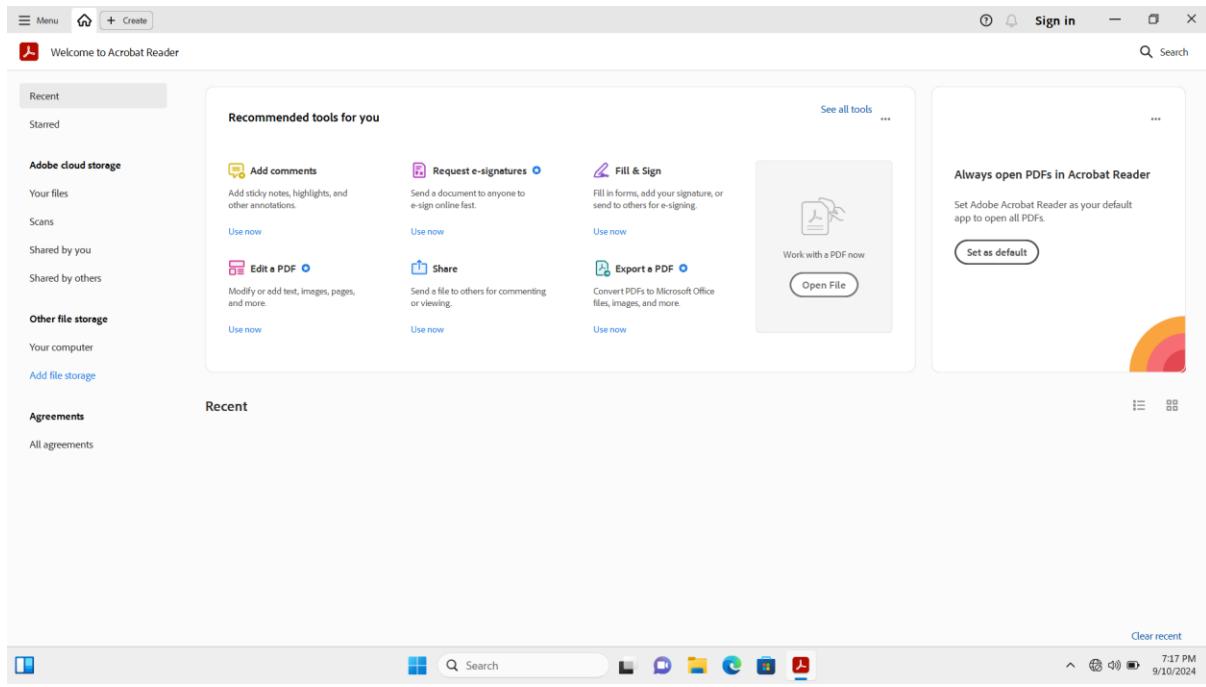


- **VLC is installing.**



- Google Chrome, Acrobat Reader, and VLC are installed automatically, and we can find the icons of them on Desktop.





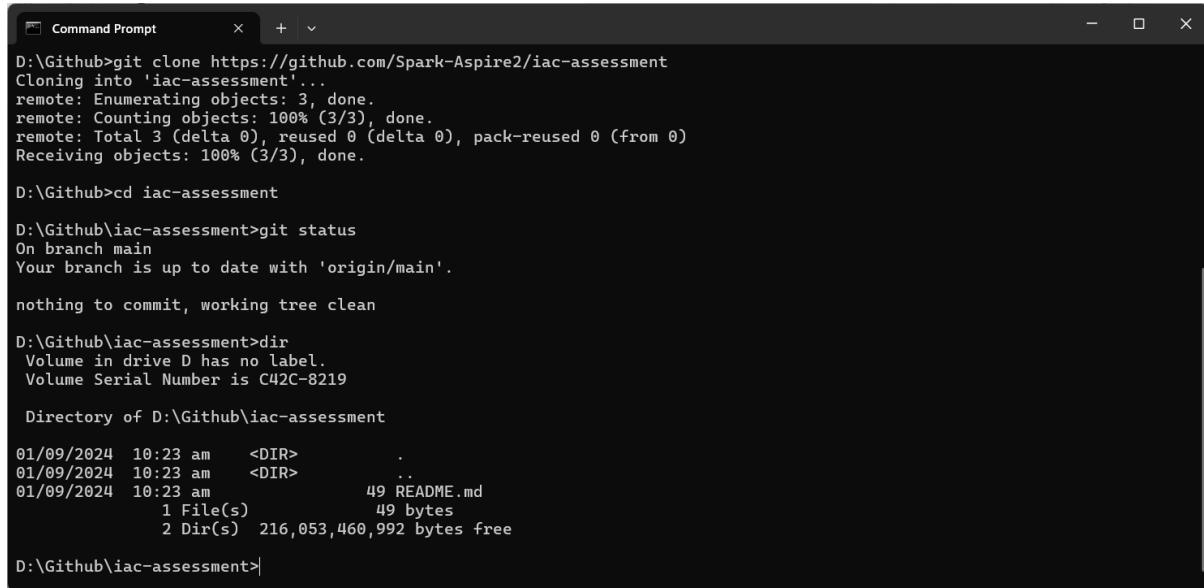
Task 5: Version Control with GitHub Repository

1. Create a new repository:

The screenshot shows the 'Create a new repository' page on GitHub. The URL in the address bar is <https://github.com/new>. The form fields are as follows:

- Owner ***: Spark-Aspire2
- Repository name ***: iac-assessment
- Description (optional)**: For iac601 course assessment.
- Visibility**: Private (selected)
- Initialize this repository with:**
 - Add a README file
- Add .gitignore**: -gitignore template: None
- Choose a license**: License: None
- Note**: This will set `main` as the default branch. Change the default name in your [settings](#).
- Information**: You are creating a private repository in your personal account.
- Create repository** button

2. Clone the Github repository to the local machine:



```
D:\Github>git clone https://github.com/Spark-Aspire2/iac-assessment
Cloning into 'iac-assessment'...
remote: Enumerating objects: 3, done.
remote: Counting objects: 100% (3/3), done.
remote: Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (3/3), done.

D:\Github>cd iac-assessment

D:\Github\iac-assessment>git status
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean

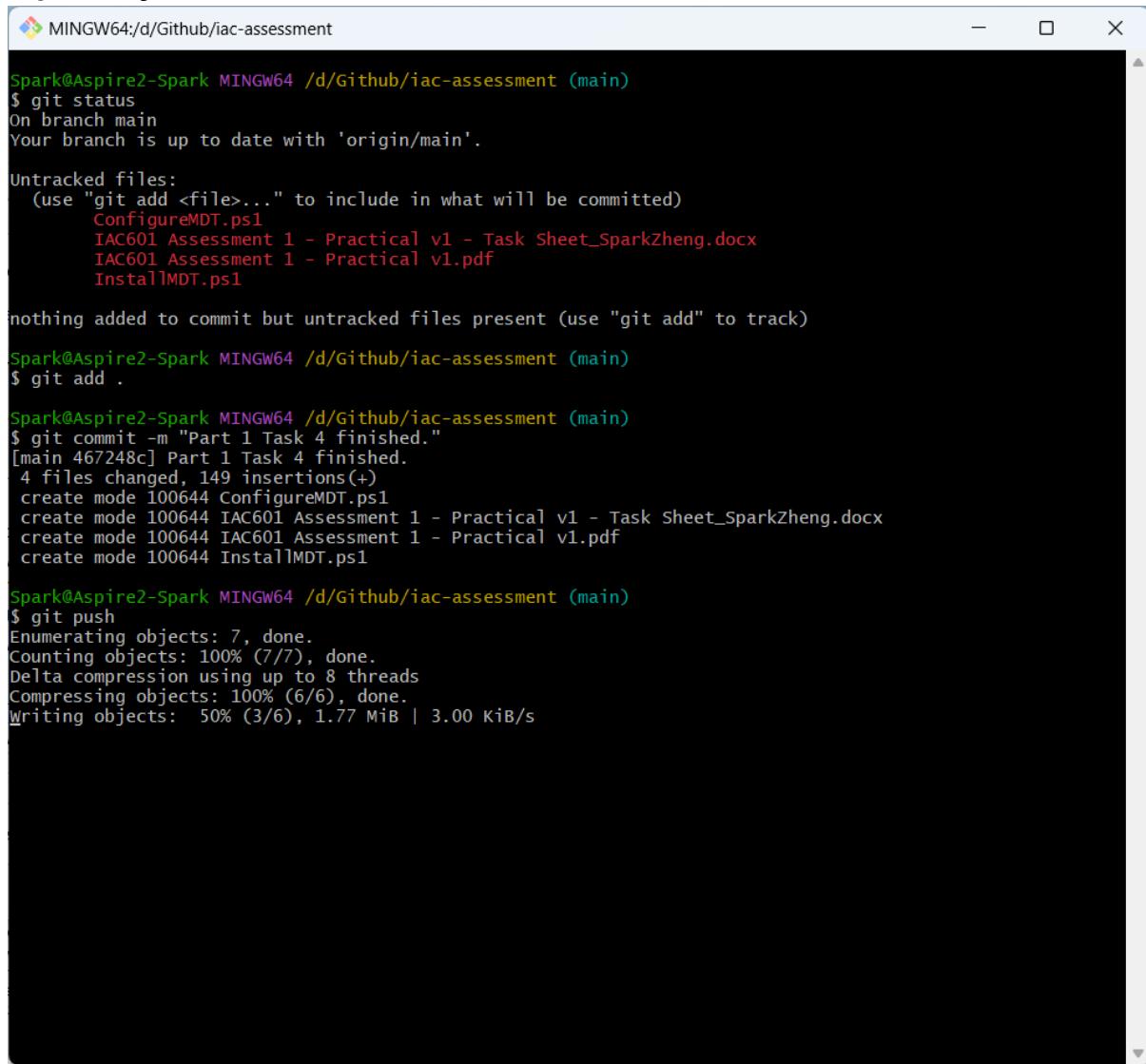
D:\Github\iac-assessment>dir
Volume in drive D has no label.
Volume Serial Number is C42C-8219

Directory of D:\Github\iac-assessment

01/09/2024  10:23 am    <DIR>          .
01/09/2024  10:23 am    <DIR>          ..
01/09/2024  10:23 am           49 README.md
               1 File(s)      49 bytes
               2 Dir(s)  216,053,460,992 bytes free

D:\Github\iac-assessment>
```

3. Upload the latest documentation and PowerShell scripts to Github repository:



```
MINGW64:/d/Github/iac-assessment
$ git status
On branch main
Your branch is up to date with 'origin/main'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    ConfigureMDT.ps1
    IAC601 Assessment 1 - Practical v1 - Task Sheet_SparkZheng.docx
    IAC601 Assessment 1 - Practical v1.pdf
    InstallMDT.ps1

nothing added to commit but untracked files present (use "git add" to track)

Spark@Aspire2-Spark MINGW64 /d/Github/iac-assessment (main)
$ git add .

Spark@Aspire2-Spark MINGW64 /d/Github/iac-assessment (main)
$ git commit -m "Part 1 Task 4 finished."
[main 467248c] Part 1 Task 4 finished.
 4 files changed, 149 insertions(+)
 create mode 100644 ConfigureMDT.ps1
 create mode 100644 IAC601 Assessment 1 - Practical v1 - Task Sheet_SparkZheng.docx
 create mode 100644 IAC601 Assessment 1 - Practical v1.pdf
 create mode 100644 InstallMDT.ps1

Spark@Aspire2-Spark MINGW64 /d/github/iac-assessment (main)
$ git push
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 8 threads
Compressing objects: 100% (6/6), done.
Writing objects: 50% (3/6), 1.77 MiB | 3.00 KiB/s
```

4. Check results on the website of GitHub:

The screenshot shows a GitHub repository page for 'iac-assessment'. The repository is private and contains 5 commits. The commits are:

- ConfigureMDT.ps1: Part 1 Task 4 finished. (2 hours ago)
- IAC601 Assessment 1 - Practical v1 - Task Shee...: Part 1 Task 4 finished. (2 hours ago)
- IAC601 Assessment 1 - Practical v1.pdf: Part 1 Task 4 finished. (2 hours ago)
- InstallMDT.ps1: Part 1 Task 4 finished. (2 hours ago)
- README.md: Initial commit (5 days ago)

The README file is present and contains the text: "For iac601 course assessment."

On the right side of the page, there is an 'About' section with the following details:

- For iac601 course assessment.
- Readme
- Activity
- 0 stars
- 1 watching
- 0 forks

Below the 'About' section are sections for 'Releases', 'Packages', and 'Languages'.

At the bottom of the page, there is a footer with links to GitHub's Terms, Privacy, Security, Status, Docs, Contact, Manage cookies, and Do not share my personal information.

Part 2

Task 1: Planning and Design of Cloud Infrastructure

1. Resource needed by Media Labs to make a pilot test:

- Azure Virtual Machine (VM):

A Windows Server 2022 VM configured with a public IP for RDP access and associated with a network interface, network security group, and virtual network.

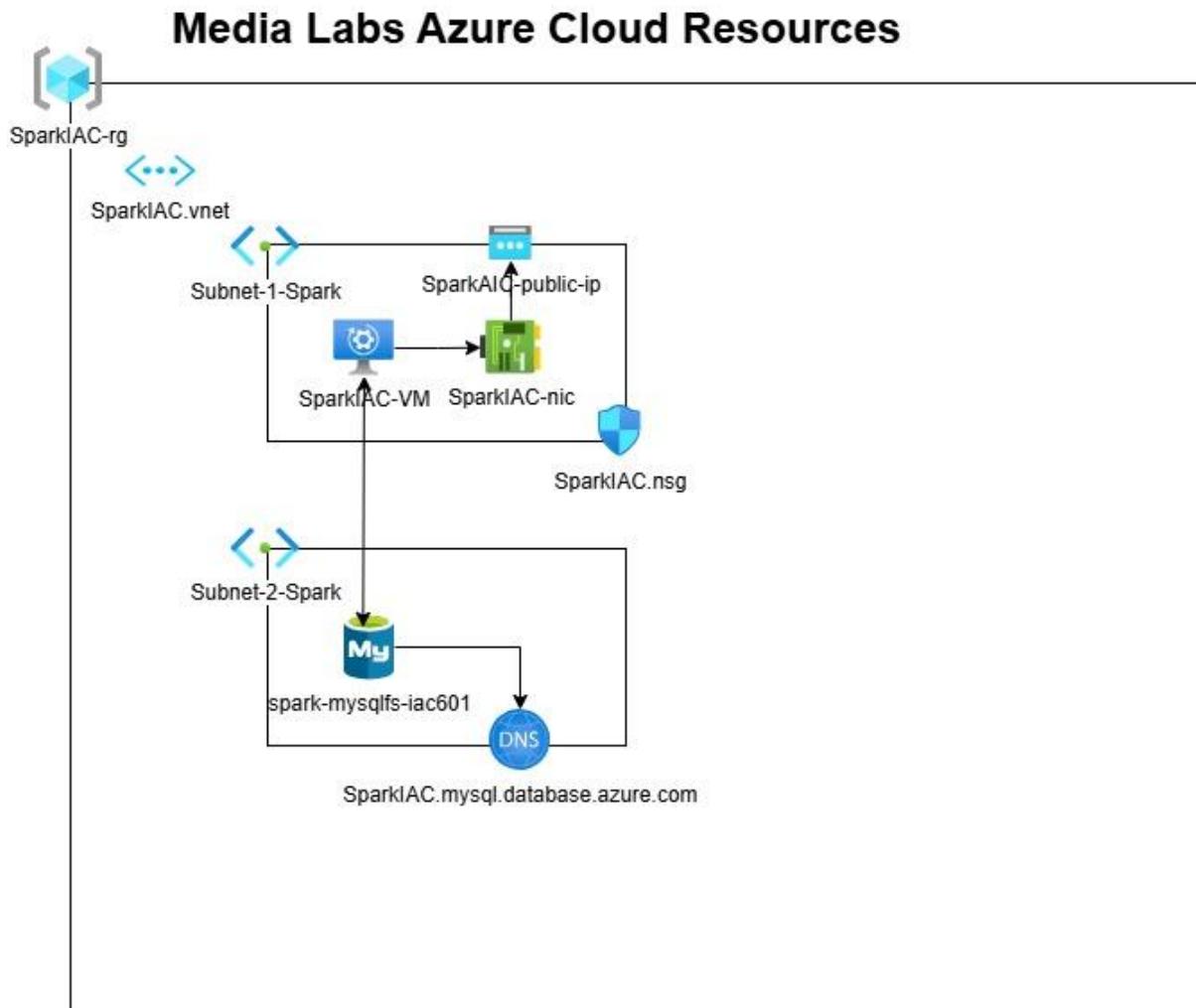
- Azure MySQL Database:

Deployed within the same resource group, using a DNS zone and subnet within the virtual network. Backup retention is configured for 7 days.

Resource list includes:

- 1 resource group
- 1 virtual network
- 2 subnets, one for hosting Windows Server 2022, the other for hosting MySQL Server
- 1 public IP address
- 1 network interface card
- 1 dns zone
- 1 network security group to limit RDP access
- 1 virtual machine, for Windows Server 2022
- 1 mysql flexible server

2. Cloud infrastructure diagram:



Task 2: Analysis and Evaluation of Legal and Regulatory Requirements

There are several primary legal and regulatory requirements in New Zealand, including Privacy Act 2020(Privacy Act 2020. 2024), Copyright Act 1994(Copyright Act 1994. 2023), Fair Trading Act 1986(Fair Trading Act 1986. 2024), Health Information Privacy Code 2020(Health Information Privacy Code 2020. 2022), and New Zealand Information Security Manual (New Zealand Information Security Manual. 2024), etc.

To use terraform scripts to deploy Azure Windows Server 2022 and MySQL flexible server automatically involves those legal and regulatory requirements listed above. These requirements ensure that the deployment process is compliance with software licenses, data protection, and security regulations.

1. Software license compliance.

- During the implementation, to ensure all software installed, including Windows Server 2022, MySQL Server, and MySQL workbench, is properly licensed for use by Media Labs under Copyright Act 1994 and Fair Trading Act 1986.
- For Media Labs, licenses are confirmed before deployment. A record of all software licenses, proof of purchase and download links is maintained and the usage and installation of software on Azure Cloud virtual machines is documented to demonstrate compliance.

2. Data protection and privacy.

- Under Privacy Act 2020 and Health Information Privacy Code 2020, it includes ensuring that no personal data is unlawfully processed during the deployment, and appropriate measures are in place to secure any personal data that may be involved.
- During deployment, all personal data is minimized, protected, and only used for the necessary purposes, and data is encrypted and is not leaked or improperly accessed. Terraform scripts are configured to anonymize to avoid storing any user-specific data in deployment logs or capturing user data during the deployment process.

3. Security and compliance standards.

- Under New Zealand Information Security Manual, deployment processes should include measures that align with these standards, like secure transmission of data and maintaining system integrity, protecting against cybersecurity with security patches and updates to prevent vulnerabilities,

managing firewall rules, ensuring security policies are enforced, and managing system settings to prevent unauthorized changes.

- During deployment, terraform scripts are configured to use security group/rules to limit the source IP addresses and ports which can access the virtual machine on Azure Cloud. Only RDP protocol and the IP address of my laptop are granted to access the virtual machine of Windows Server 2022 and then to access MySQL Server through it.

Task 3: Scripts Design and Development

1. Set Provider

```
##### Provider #####
provider "azurerm" {
    skip_provider_registration = true # This is only required when the User, Service Principal, or Identity running Terraform lacks the permissions to register Azure Resource Providers.

    features {}

}
```

2. Create resource group

```
##### Resource Group #####
resource "azurerm_resource_group" "rg_block" {
    name     = var.rg_name
    location = var.location
}
```

3. Create Vnet

```
##### Virtual Network #####
resource "azurerm_virtual_network" "vnet_1_block" {
    name          = var.vnet_1_name
    location      = azurerm_resource_group.rg_block.location
    resource_group_name = azurerm_resource_group.rg_block.name
    address_space   = var.vnet_1_cidr

    tags = {
        environment = "test"
    }
}
```

```
}
```

4. Create 2 subnets

```
##### Virtual Network 1 - Subnet 1 #####
resource "azurerm_subnet" "subnet_1_block" {
    name          = "${var.vnet_1_name}-${var.subnet_1_name}"
    resource_group_name = azurerm_resource_group.rg_block.name
    virtual_network_name = azurerm_virtual_network.vnet_1_block.name
    address_prefixes   = var.subnet_1_cidr

}

resource "azurerm_subnet" "subnet_2_block" {
    name          = "${var.vnet_1_name}-${var.subnet_2_name}"
    resource_group_name = azurerm_resource_group.rg_block.name
    virtual_network_name = azurerm_virtual_network.vnet_1_block.name
    address_prefixes   = var.subnet_2_cidr
    service_endpoints = ["Microsoft.Storage"]

delegation {
    name = "mysql_fs"
    service_delegation {
        name = "Microsoft.DBforMySQL/flexibleServers"
        actions = [
            "Microsoft.Network/virtualNetworks/subnets/join/action",
        ]
    }
}
```

```
}
```

5. Create public IP address

```
### Public IP Address #####
resource "azurerm_public_ip" "public_ip_1" {
    name          = var.public_ip_1_name
    resource_group_name = azurerm_resource_group.rg_block.name
    location      = azurerm_resource_group.rg_block.location
    allocation_method = "Dynamic"
}
```

6. Create network adapter

```
##### Network Interface #####
resource "azurerm_network_interface" "main_nic_1" {
    name          = var.network_interface_1_name
    location      = azurerm_resource_group.rg_block.location
    resource_group_name = azurerm_resource_group.rg_block.name

    ip_configuration {
        name          = "nic-ip-configuration"
        subnet_id     = azurerm_subnet.subnet_1_block.id
        private_ip_address_allocation = "Dynamic"
        public_ip_address_id      = azurerm_public_ip.public_ip_1.id
    }
}
```

7. Create security rules

```
##### Network Security Group #####
resource "azurerm_network_security_group" "nsg_1_block" {
    name          = var.security_group_name
    location      = azurerm_resource_group.rg_block.location
    resource_group_name = azurerm_resource_group.rg_block.name

    # Only IP addresses of "118.92.0.0/16" are permit to access the VM.
    security_rule {
        name          = "RDP"
        priority      = 1000
        direction     = "Inbound"
        access         = "Allow"
        protocol       = "Tcp"
        source_port_range = "*"
        destination_port_range = "3389"
        source_address_prefix   = "118.92.0.0/16"
        destination_address_prefix = "*"
    }

    tags = {
        environment = "test"
    }
}

resource "azurerm_network_interface_security_group_association" "nic_nsg_association" {
```

```
network_interface_id      = azurerm_network_interface.main_nic_1.id
network_security_group_id = azurerm_network_security_group.nsg_1_block.id
}
```

8. Create DNS for MySQL database

```
### Private DNS Zone #####
resource "azurerm_private_dns_zone" "mysql_dns" {
  name          = var.mysql_dns_name
  resource_group_name = azurerm_resource_group.rg_block.name
}
```

```
### Private DNS Zone Linked with VNET #####
resource "azurerm_private_dns_zone_virtual_network_link" "dns_network_link" {
  name          = var.dns_network_link_name
  private_dns_zone_name = azurerm_private_dns_zone.mysql_dns.name
  virtual_network_id   = azurerm_virtual_network.vnet_1_block.id
  resource_group_name  = azurerm_resource_group.rg_block.name
}
```

9. Create MySQL flexible server

```
### Azure MySQL Database #####
resource "azurerm_mysql_flexible_server" "media_labs_mysql" {
  name          = var.mysql_server_name
  location      = azurerm_resource_group.rg_block.location
```

```

resource_group_name  = azurerm_resource_group.rg_block.name
administrator_login  = var.mysql_root
administrator_password = var.mysql_password
backup_retention_days  = 7
delegated_subnet_id  = azurerm_subnet.subnet_2_block.id
private_dns_zone_id  = azurerm_private_dns_zone.mysql_dns.id

sku_name  = "GP_Standard_D2ds_v4"
depends_on = [azurerm_private_dns_zone_virtual_network_link.dns_network_link]
}

```

10. Create a virtual machine of Windows Server 2022

```

##### Virtual Machine Windows Server 2019 #####
resource "azurerm_windows_virtual_machine" "vm_1_block" {
    name          = var.virtual_machine_1_name
    location      = azurerm_resource_group.rg_block.location
    resource_group_name  = azurerm_resource_group.rg_block.name
    network_interface_ids = [azurerm_network_interface.main_nic_1.id]
    size          = "Standard_B1s"

    admin_username = var.admin_username
    admin_password = var.admin_password
    computer_name  = var.virtual_machine_1_name
    timezone       = var.time_zone

    os_disk {
        caching      = "ReadWrite"
    }
}
```

```

storage_account_type = "Standard_LRS"
}

source_image_reference {
    publisher = "MicrosoftWindowsServer"
    offer    = "WindowsServer"
    sku     = "2022-datacenter-azure-edition"
    version  = "latest"
}

}

```

11. Declaration of variables

```
### Variables Declaration #####
```

```
variable "rg_name" {
    description = "resource group name"
    default    = "SparkIAC-rg"
}
```

```
variable "location" {
    description = "location of resource group"
    default    = "Australia East"
}
```

```
variable "vnet_1_name" {
    description = "name of network"
    default    = "SparkIAC.vnet"
}
```

```

variable "vnet_1_cidr" {
  description = "Network range"
  default    = ["10.10.0.0/16"]
}

variable "subnet_1_name" {
  description = "name of sub-network"
  default    = "Subnet-1-Spark"
}

variable "subnet_1_cidr" {
  description = "subnet range"
  default    = ["10.10.0.0/24"]
}

variable "subnet_2_name" {
  description = "name of sub-network"
  default    = "Subnet-2-Spark"
}

variable "subnet_2_cidr" {
  description = "subnet range"
  default    = ["10.10.1.0/24"]
}

variable "admin_username" {
  default = "spark"
}

variable "admin_password" {

```

```
}

variable "public_ip_1_name" {
  default = "SparkIAC-public-ip"
}

variable "network_interface_1_name" {
  default = "SparkIAC-nic"
}

variable "security_group_name" {
  default = "SparkIAC-nsg"
}

variable "virtual_machine_1_name" {
  default = "SparkIAC-vm"
}

variable "time_zone" {
  default = "New Zealand Standard Time"
}

variable "mysql_root" {
  default = "spark"
}

variable "mysql_password" {
```

```

}

variable "mysql_dns_name" {
  default = "SparkIAC.mysql.database.azure.com"
}

variable "dns_network_link_name" {
  default = "dns-network-link"
}

variable "mysql_server_name" {
  default = "Spark-mysqlfs-iac601"
}

```

12. Assign values to variables

```

### Default values assigned to variables #####
rg_name          = "SparkIAC-rg"
location         = "Australia East"
vnet_1_name      = "SparkIAC.vnet"
subnet_1_name    = "Subnet-1-Spark"
subnet_2_name    = "Subnet-2-Spark"
public_ip_1_name = "SparkIAC-public-ip"
network_interface_1_name = "SparkIAC-nic"
virtual_machine_1_name = "SparkIAC-vm"
admin_username   = "spark"
admin_password   = "TestP@ssword01"
time_zone        = "New Zealand Standard Time"
mysql_server_name = "spark-mysqlfs-iac601"

```

```

mysql_root          = "spark"
mysql_password      = "TestP@ssword01"
mysql_dns_name      = "SparkIAC.mysql.database.azure.com"

```

```

variables.tf
virtualmachine.tf
network.tf
nic.tf
dns.tf
database.tf
securitygroup.tf
terraform.tfvars

iac601-part2 > terraform.tfvars > mysql_dns.name
  1  ### Default values assigned to variables #####
  2  rg_name          = "SparkIAC-rg"
  3  location         = "Australia East"
  4  vnet_1_name       = "SparkIAC.vnet"
  5  subnet_1_name    = "Subnet-1-Spark"
  6  subnet_2_name    = "Subnet-2-Spark"
  7  public_ip_1_name = "SparkIAC-public-ip"
  8  network_interface_1_name = "SparkIAC-nic"
  9  virtual_machine_1_name = "SparkIAC-vm"
 10  admin_username   = "spark"
 11  admin_password   = "TestP@ssword01"
 12  time_zone        = "New Zealand Standard Time"
 13  mysql_server_name = "spark-mysqfs-iac601"
 14  mysql_root        = "spark"
 15  mysql_password    = "TestP@ssword01"
 16  mysql_dns_name   = "SparkIAC.mysql.database.azure.com"

```

13. Check Terraform script on the GitHub website

Name	Last commit message	Last commit date
..	Part 2 finished.	4 days ago
InstallMySQLWorkBench.ps1	Part 2 finished.	4 days ago
MediaLabsNetwork.drawio	Part 2 finished.	4 days ago
MediaLabsNetwork.jpg	Part 2 finished.	4 days ago
database.tf	add Part 2 scripts	5 days ago
dns.tf	add Part 2 scripts	5 days ago
nic.tf	add Part 2 scripts	5 days ago
outputs.tf	add Part 2 scripts	5 days ago
plan.out	add Part 2 scripts	5 days ago
providers.tf	add Part 2 scripts	5 days ago
publicip.tf	add Part 2 scripts	5 days ago
securitygroup.tf	add Part 2 scripts	5 days ago
terraform.tfvars	add Part 2 scripts	5 days ago
variables.tf	add Part 2 scripts	5 days ago
virtualmachine.tf	add Part 2 scripts	5 days ago

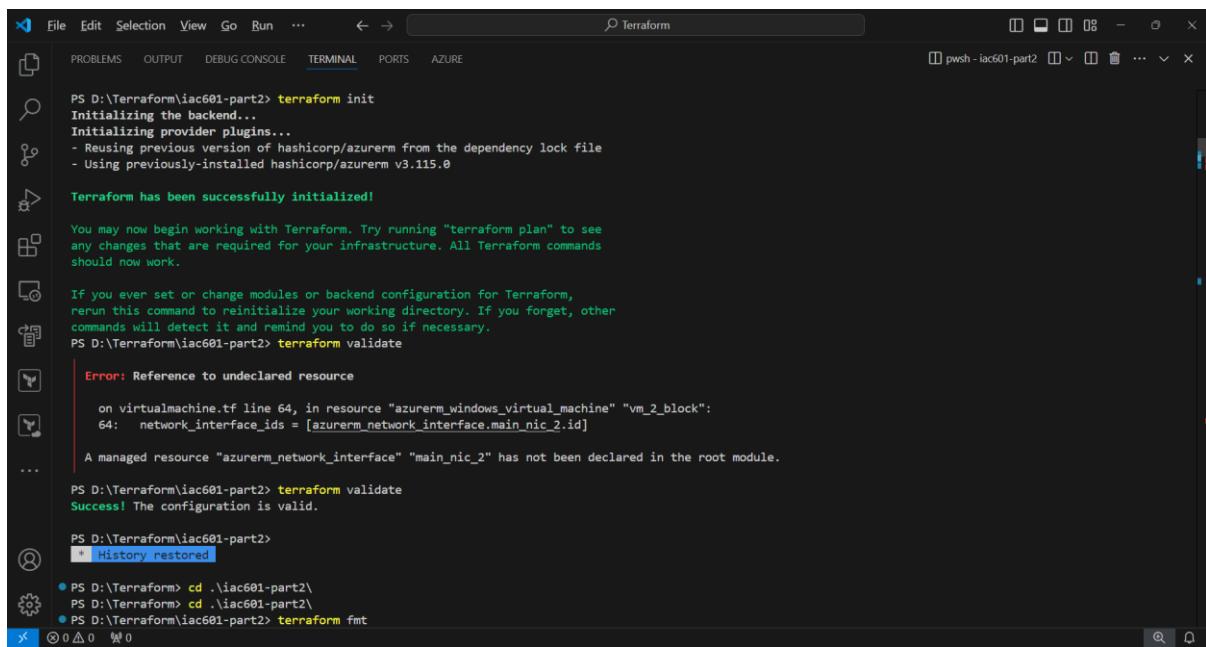
Task 4: Deployment Services to the Azure Platform and Testing

1. Az login

```
signed to variables #####  
rg_name = "SparkIAC-rg"  
location = "Australia East"  
vnet_1_name = "SparkIAC.vnet"  
subnet_1_name = "Subnet-1-Spark"  
name = "SparkIAC-public-ip"  
nic_name = "SparkIAC-nic"  
vm_name = "SparkIAC-vm"  
spark = "spark"  
spark_password = "TestP@ssword01"  
spark_time_zone = "New Zealand Standard Time"  
spark_mysql_name = "spark-mysqls-iac601"  
spark_mysql_password = "spark"  
spark_mysql_time_zone = "TestP@ssword01"  
spark_mysql_host = "SparkIAC.mysql.database.azure.com"  
  
azurerm_resource_group.rg_block: Still destroying... [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/]  
azurerm_resource_group.rg_block: Destruction complete after 55s  
  
Destroy complete! Resources: 12 destroyed.  
PS D:\Terraform\iac601-part2>  
PS D:\Terraform\iac601-part2> az login  
Select the account you want to log in with. For more information on login with Azure CLI, see https://go.microsoft.com/fwlink/?linkid=2271136  
PS D:\Terraform\iac601-part2>
```

```
variables.tf virtualmachine.tf network.tf nic.tf dns.tf database.tf securitygroup.tf terraform.tfvars  
  
iac601-part2 > terraform.tfvars > mysql_dns_name  
1   ### Default values assigned to variables #####  
2   rg_name                         = "SparkIAC-rg"  
3   location                         = "Australia East"  
4   vnet_1_name                     = "SparkIAC.vnet"  
5   subnet_1_name                  = "Subnet-1-Spark"  
  
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   AZURE   pwsh - iac601-part2  
  
Select the account you want to log in with. For more information on login with Azure CLI, see https://go.microsoft.com/fwlink/?linkid=2271136  
Retrieving tenants and subscriptions for the selection...  
[Tenant and subscription selection]  
No   Subscription name   Subscription ID   Tenant  
-----  
[1] *   Azure for Students   424e164f-0e09-4184-b586-048f0c425d9b   Aspire2 Group Limited  
  
The default is marked with an *; the default tenant is 'Aspire2 Group Limited' and subscription is 'Azure for Students' (424e164f-0e09-4184-b586-048f0c425d9b).  
Select a subscription and tenant (Type a number or Enter for no changes): 1  
Tenant: Aspire2 Group Limited  
Subscription: Azure for Students (424e164f-0e09-4184-b586-048f0c425d9b)  
  
[Announcements]  
With the new Azure CLI login experience, you can select the subscription you want to use more easily. Learn more about it and its configuration at https://go.microsoft.com/fwlink/?linkid=2271236  
  
If you encounter any problem, please open an issue at https://aka.ms/azclibug  
[Warning] The login output has been updated. Please be aware that it no longer displays the full list of available subscriptions by default.  
  
PS D:\Terraform\iac601-part2>
```

2. Terraform init.



PS D:\Terraform\iac601-part2> **terraform init**
Initializing the backend...
Initializing provider plugins...
- Reusing previous version of hashicorp/azurerm from the dependency lock file
- Using previously-installed hashicorp/azurerm v3.115.0

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
PS D:\Terraform\iac601-part2> **terraform validate**

Error: Reference to undeclared resource

on virtualmachine.tf line 64, in resource "azurerm_windows_virtual_machine" "vm_2_block":
64: network_interface_ids = [azurerm_network_interface.main_nic_2.id]

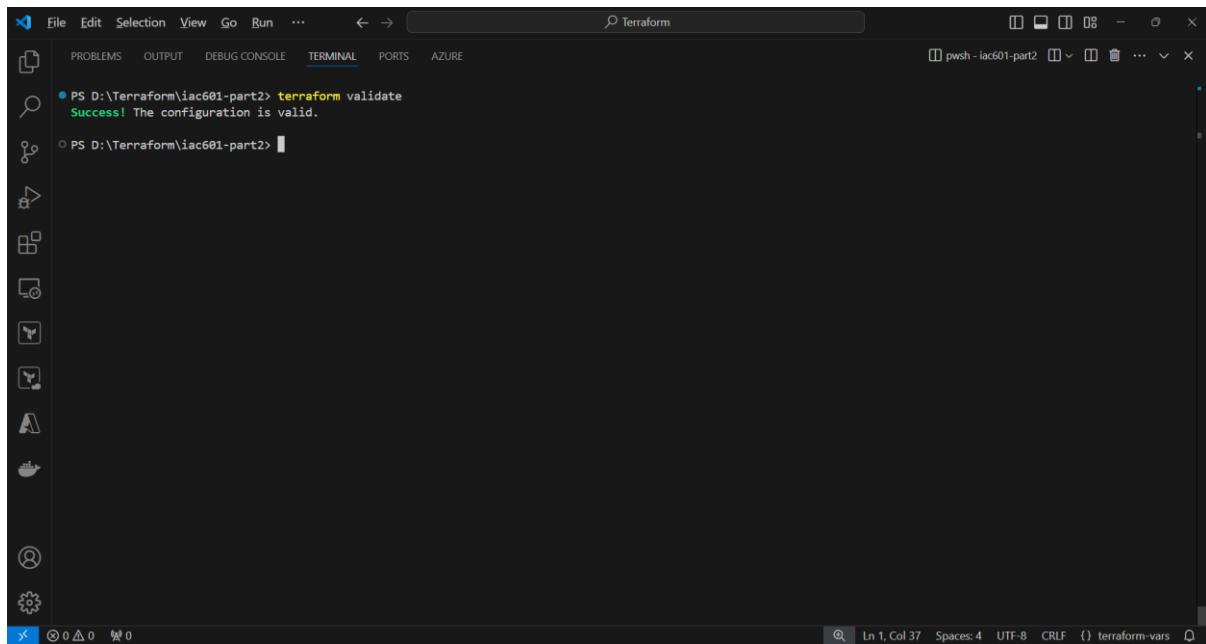
A managed resource "azurerm_network_interface" "main_nic_2" has not been declared in the root module.

PS D:\Terraform\iac601-part2> **terraform validate**
Success! The configuration is valid.

PS D:\Terraform\iac601-part2>
+ History restored

● PS D:\Terraform> cd .\iac601-part2
PS D:\Terraform> cd .\iac601-part2
● PS D:\Terraform\iac601-part2> **terraform fmt**

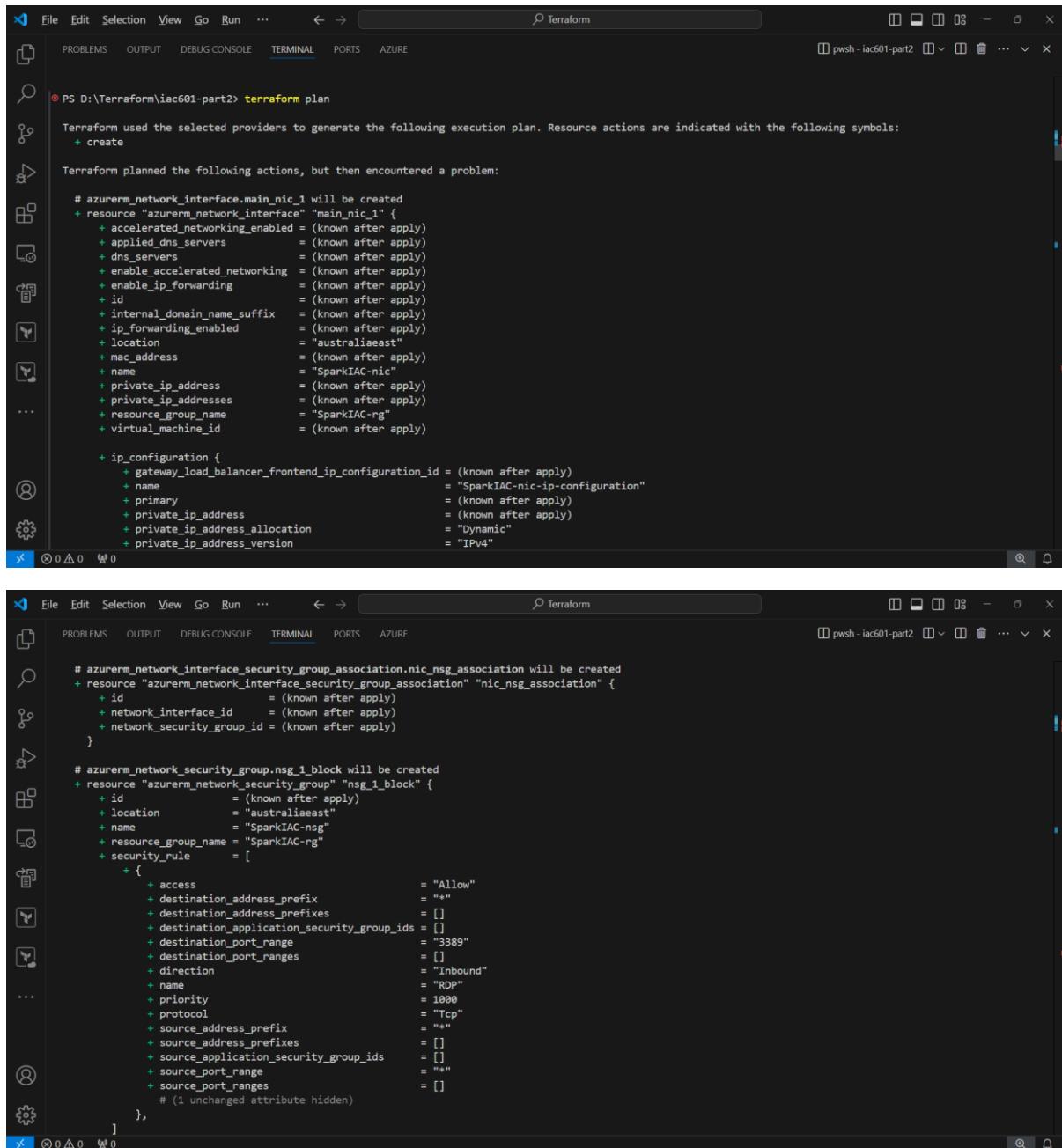
3. Terraform validation



● PS D:\Terraform\iac601-part2> **terraform validate**
Success! The configuration is valid.

○ PS D:\Terraform\iac601-part2>

4. Terraform plan



The image shows two side-by-side terminal windows in Visual Studio Code, both titled "Terraform".

The left terminal window displays the following Terraform plan output:

```
PS D:\Terraform\iac601-part2> terraform plan
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create

Terraform planned the following actions, but then encountered a problem:

# azurerm_network_interface.main_nic_1 will be created
+ resource "azurerm_network_interface" "main_nic_1" {
  + accelerated_networking_enabled = (known after apply)
  + applied_dns_servers          = (known after apply)
  + dns_servers                   = (known after apply)
  + enable_accelerated_networking = (known after apply)
  + enable_ip_forwarding          = (known after apply)
  + id                            = (known after apply)
  + internal_domain_name_suffix  = (known after apply)
  + ip_forwarding_enabled         = (known after apply)
  + location                      = "australiaeast"
  + mac_address                   = (known after apply)
  + name                          = "SparkIAC-nic"
  + private_ip_address            = (known after apply)
  + private_ip_addresses          = (known after apply)
  + resource_group_name           = "SparkIAC-rg"
  + virtual_machine_id            = (known after apply)

  + ip_configuration {
    + gateway_load_balancer_frontend_ip_configuration_id = (known after apply)
    + name          = "SparkIAC-nic-ip-configuration"
    + primary       = (known after apply)
    + private_ip_address
    + private_ip_address_allocation
    + private_ip_address_version
  }
}
```

The right terminal window displays the following Terraform plan output:

```
# azurerm_network_interface_security_group_association.nic_nsg_association will be created
+ resource "azurerm_network_interface_security_group_association" "nic_nsg_association" {
  + id          = (known after apply)
  + network_interface_id = (known after apply)
  + network_security_group_id = (known after apply)
}

# azurerm_network_security_group.nsg_1_block will be created
+ resource "azurerm_network_security_group" "nsg_1_block" {
  + id          = (known after apply)
  + location    = "australiaeast"
  + name        = "SparkIAC-nsg"
  + resource_group_name = "SparkIAC-rg"
  + security_rule = [
    + {
      + access          = "Allow"
      + destination_address_prefix = "*"
      + destination_address_prefixes = []
      + destination_application_security_group_ids = []
      + destination_port_range     = "3389"
      + destination_port_ranges   = []
      + direction             = "Inbound"
      + name                  = "RDP"
      + priority              = 1000
      + protocol              = "Tcp"
      + source_address_prefix  = "*"
      + source_address_prefixes = []
      + source_application_security_group_ids = []
      + source_port_range      = "*"
      + source_port_ranges    = []
    }
  ],
}
```

A screenshot of the Visual Studio Code interface, showing the Terraform extension. The terminal tab is active, displaying the following Terraform code:

```
+ resource "azurerm_private_dns_zone" "mysql_dns" {
+   id                               = (known after apply)
+   max_number_of_record_sets        = (known after apply)
+   max_number_of_virtual_network_links
+   max_number_of_virtual_network_links_with_registration = (known after apply)
+   name                            = "SparkIAC.mysql.database.zure.com"
+   number_of_record_sets           = (known after apply)
+   resource_group_name             = "SparkIAC-rg"
+
+   soa_record (known after apply)
}

# azurerm_private_dns_zone_virtual_network_link.dns_network_link will be created
+ resource "azurerm_private_dns_zone_virtual_network_link" "dns_network_link" {
+   id                               = (known after apply)
+   name                            = "dns-network-link"
+   private_dns_zone_name           = "SparkIAC.mysql.database.zure.com"
+   registration_enabled            = false
+   resource_group_name              = "SparkIAC-rg"
+   virtual_network_id               = (known after apply)
}

# azurerm_public_ip.public_ip_1 will be created
+ resource "azurerm_public_ip" "public_ip_1" {
+   allocation_method                = "Dynamic"
+   ddos_protection_mode             = "VirtualNetworkInherited"
+   fqdn                            = (known after apply)
+   id                               = (known after apply)
+   idle_timeout_in_minutes          = 4
+   ip_address                      = (known after apply)
+   ip_version                      = "IPv4"
+   location                         = "australiaeast"
+   name                            = "SparkIAC-public-ip"
}
```

A screenshot of the Visual Studio Code interface, showing the Terraform extension. The terminal tab is active, displaying the following Terraform code:

```
# azurerm_resource_group.rg_block will be created
+ resource "azurerm_resource_group" "rg_block" {
+   id                               = (known after apply)
+   location                         = "australiaeast"
+   name                            = "SparkIAC-rg"
}

# azurerm_subnet.subnet_1_block will be created
+ resource "azurerm_subnet" "subnet_1_block" {
+   address_prefixes                 = [
+     + "10.10.1.0/24",
+   ]
+   default_outbound_access_enabled    = true
+   enforce_private_link_endpoint_network_policies = (known after apply)
+   enforce_private_link_service_network_policies = (known after apply)
+   id                               = (known after apply)
+   name                            = "SparkIAC.vnet-Subnet-Spark"
+   private_endpoint_network_policies = (known after apply)
+   private_endpoint_network_policies_enabled = (known after apply)
+   private_link_service_network_policies_enabled = (known after apply)
+   resource_group_name              = "SparkIAC-rg"
+   virtual_network_name             = "SparkIAC.vnet"
+
+   delegation {
+     + name = "mysql_fs"
+
+     + service_delegation {
+       + actions = [
+         + "Microsoft.Network/virtualNetworks/subnets/join/action",
+       ]
+       + name    = "Microsoft.DBforMySQL/flexibleServers"
+     }
+   }
}
```

The screenshot shows the VS Code interface with the Terraform extension active. The Problems panel on the left displays several error messages from a Terraform plan:

```

Error: "name" must only contain numbers, lowercase characters and '-', got Spark-mysqlfs-iac601
with azurerm_mysql_flexible_server.media_labs_mysql,
on database.tf line 4, in resource "azurerm_mysql_flexible_server" "media_labs_mysql":
  4:   name          = var.mysql_server_name

Error: "administrator_login" cannot be `azure_superuser`, `admin`, `administrator`, `root`, `guest` or `public`
with azurerm_mysql_flexible_server.media_labs_mysql,
on database.tf line 7, in resource "azurerm_mysql_flexible_server" "media_labs_mysql":
  7:   administrator_login = var.mysql_root

Error: "admin_username" specified is not allowed, got "administrator", cannot match: "administrator, admin, user, user1, test, user2, test1, user3, admin1, 1, 12
3, a, actuser, adm, admin2, aspnet, backup, console, david, guest, john, owner, root, server, sql, support, support_388945a0, sys, test2, test3, user4, user5"
with azurerm_windows_virtual_machine.vm_1_block,
on virtualmachine.tf line 10, in resource "azurerm_windows_virtual_machine" "vm_1_block":
10:   admin_username = var.admin_username

Error: "computer_name" may only contain alphanumeric characters and dashes
with azurerm_windows_virtual_machine.vm_1_block,
on virtualmachine.tf line 12, in resource "azurerm_windows_virtual_machine" "vm_1_block":
12:   computer_name = var.virtual_machine_1_name

```

There are several errors during terraform plan.

- Virtual machine name cannot be set to “SparkIAC.vm”, so it is modified to “SparkIAC-vm”.
- For MySQL server name, only lowercase char could be used, so it is assigned with “spark-mysqlfs-iac601”

After modification, the script passed the terraform plan finally.

The screenshot shows the VS Code interface with the Terraform extension active. The TERMINAL tab displays the output of a Terraform plan command:

```

resource_group_name = "SparkIAC-rg"
size                = "Standard_B1s"
timezone            = "New Zealand Standard Time"
virtual_machine_id = (known after apply)
vm_agent_platform_updates_enabled = false

os_disk {
  caching           = "ReadWrite"
  disk_size_gb     = (known after apply)
  name              = (known after apply)
  storage_account_type = "Standard_LRS"
  write_accelerator_enabled = false
}

source_image_reference {
  offer      = "WindowsServer"
  publisher  = "MicrosoftWindowsServer"
  sku        = "2022-datacenter-azure-edition"
  version    = "latest"
}

termination_notification (known after apply)
...

```

Plan: 11 to add, 0 to change, 0 to destroy.

Changes to Outputs:

```

+ vm_1_ipv4_address = (known after apply)

```

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if you run "terraform apply" now.

5. Terraform apply

The screenshot shows the VS Code interface with the Terraform extension active. The terminal tab is selected, displaying the command `terraform apply`. The output shows the execution plan for creating two resources: an Azure MySQL flexible server and an Azure network interface. The plan details the configuration for each resource, including administrator login, password, backup retention days, and other properties.

```
PS D:\Terraform\iac601-part2> terraform apply
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

# azurerm_mysql_flexible_server.media_labs_mysql will be created
+ resource "azurerm_mysql_flexible_server" "media_labs_mysql" {
    + administrator_login          = "spark"
    + administrator_password        = (sensitive value)
    + backup_retention_days         = 7
    + delegated_subnet_id           = (known after apply)
    + fqdn                          = (known after apply)
    + geo_redundant_backup_enabled = false
    + id                            = (known after apply)
    + location                      = "australiaeast"
    + name                          = "spark-mysqfs-iac601"
    + private_dns_zone_id          = (known after apply)
    + public_network_access_enabled = (known after apply)
    + replica_capacity              = (known after apply)
    + replication_role              = (known after apply)
    + resource_group_name           = "SparkIAC-rg"
    + sku_name                      = "GP_Standard_D2ds_v4"
    + version                        = (known after apply)

    + storage (known after apply)
}

# azurerm_network_interface.main_nic_1 will be created
+ resource "azurerm_network_interface" "main_nic_1" {
    + accelerated_networking_enabled = (known after apply)
    + applied_dns_servers           = (known after apply)
```

This screenshot shows the continuation of the Terraform apply process. The terminal output displays the execution plan, which includes adding 12 resources and changing 0 resources. It also lists changes to outputs, specifically the IP address of a VM. A prompt asks if the user wants to perform the actions, with a note that only 'yes' will be accepted. The user has typed 'yes' at the prompt.

```
+ size                                = "Standard_B1s"
+ timezone                             = "New Zealand Standard Time"
+ virtual_machine_id                   = (known after apply)
+ vm_agent_platform_updates_enabled     = false

+ os_disk {
    + caching                = "ReadWrite"
    + disk_size_gb            = (known after apply)
    + name                    = (known after apply)
    + storage_account_type    = "Standard_LRS"
    + write_accelerator_enabled = false
}

+ source_image_reference {
    + offer                  = "WindowsServer"
    + publisher               = "MicrosoftWindowsServer"
    + sku                     = "2022-datacenter-azure-edition"
    + version                 = "latest"
}

+ termination_notification (known after apply)

Plan: 12 to add, 0 to change, 0 to destroy.

Changes to Outputs:
+ vm_1_ipv4_address = (known after apply)

Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.

Enter a value: yes
```

```

File Edit Selection View Go Run ...
TERMINAL psh - iac601-part2
PROBLEMS OUTPUT DEBUG CONSOLE PORTS AZURE
Plan: 12 to add, 0 to change, 0 to destroy.

Changes to Outputs:
+ vm_1_ipv4_address = (known after apply)

Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.

Enter a value: yes

azurerm_resource_group.rg_block: Creating...
azurerm_resource_group.rg_block: Creation complete after 9s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg]
azurerm_private_dns_zone.mysql_dns: Creating...
azurerm_virtual_network.vnet_1_block: Creating...
azurerm_network_security_group.ngs_1_block: Creating...
azurerm_public_ip.public_ip_1: Creating...
azurerm_network_security_group.ngs_1_block: Creation complete after 3s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.Network/networkSecurityGroups/SparkIAC-ngs]
azurerm_public_ip.public_ip_1: Creation complete after 4s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.Network/publicIPAddresses/SparkIAC-public-ip]
azurerm_virtual_network.vnet_1_block: Creation complete after 6s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.Network/virtualNetworks/SparkIAC.vnet]
azurerm_subnet.subnet_2_block: Creating...
azurerm_subnet.subnet_1_block: Creating...
azurerm_private_dns_zone.mysql_dns: Still creating... [10s elapsed]
azurerm_subnet.subnet_1_block: Creation complete after 5s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.Network/virtualNetworks/SparkIAC.vnet/subnets/SparkIAC.vnet-Subnet-1-Spark]
azurerm_network_interface.main_nic_1: Creating...
azurerm_subnet.subnet_2_block: Still creating... [10s elapsed]
azurerm_subnet.subnet_2_block: Creation complete after 10s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.Network/virtualNetworks/SparkIAC.vnet/subnets/SparkIAC.vnet-Subnet-2-Spark]
azurerm_private_dns_zone.mysql_dns: Still creating... [20s elapsed]
Ln 12, Col 43 Spaces: 2 UTF-8 CRLF {} Terraform

```

```

File Edit Selection View Go Run ...
TERMINAL psh - iac601-part2
PROBLEMS OUTPUT DEBUG CONSOLE PORTS AZURE
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [10s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [20s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [30s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [40s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [50s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m0s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m10s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m20s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m30s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m40s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [1m50s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m0s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m10s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m20s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m30s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m40s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [2m50s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m0s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m10s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m20s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m30s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m40s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Still creating... [3m50s elapsed]
azurerm_mysql_flexible_server.media_labs_mysql: Creation complete after 44m1s [id=/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/providers/Microsoft.DBforMySQL/flexibleServers/spark-mysqfs-iac601]

Apply complete! Resources: 12 added, 0 changed, 0 destroyed.

Outputs:
vm_1_ipv4_address = "52.237.254.42"
PS D:\Terraform\iac601-part2>
Ln 12, Col 43 Spaces: 2 UTF-8 CRLF {} Terraform

```

6. Check results on the Azure portal site

The screenshot shows two windows of the Microsoft Azure portal.

The top window displays the "Resource groups" page. It lists two resource groups: "NetworkWatcherRG" and "SparkIAC-rg". Both are associated with "Azure for Students" and are located in "Australia Central".

Name	Subscription	Location
NetworkWatcherRG	Azure for Students	Australia Central
SparkIAC-rg	Azure for Students	Australia East

The bottom window shows the "SparkIAC-rg" resource group details. The left sidebar lists group settings like Activity log, Access control (IAM), Tags, Resource visualizer, Events, Settings, Cost Management, Monitoring, Automation, and Help. The main area shows the "Resources" tab with a list of 8 resources:

Name	Type	Location	Actions
spark-mysqls-lac801	Azure Database for MySQL flexi...	Australia East	...
SparkIAC-nic	Network Interface	Australia East	...
SparkIAC-nsg	Network security group	Australia East	...
SparkIAC-public-ip	Public IP address	Australia East	...
SparkIAC-vm	Virtual machine	Australia East	...
SparkIAC-vm_OsDisk_1_131dc0ce55234e5ca9c8b0aab65babfa	Disk	Australia East	...
sparkiac.mysql.database.azure.com	Private DNS zone	Global	...
SparkIAC-vnet	Virtual network	Australia East	...

SparkIAC.vnet - Microsoft Azure

https://portal.azure.com/?feature.msals=true#@aspire2.ac.nz/resource/subscriptions/424e164f-0e09-4184-b586-048f0c425d9b/resourceGroups/SparkIAC-rg/...

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

aeu3000774@aspire2st...
ASPIRE2 GROUP LIMITED (ASPIR...)

Home > SparkIAC.vnet Virtual network

Overview Activity log Access control (IAM) Tags Diagnose and solve problems

> Settings > Monitoring > Automation > Help

Move Delete Refresh Give feedback

Essentials

Resource group (move) : SparkIAC-rg Address space : 10.10.0.0/16
 Location (move) : Australia East DNS servers : Azure provided DNS service
 Subscription (move) : Azure for Students Flow timeout : Configure
 Subscription ID : 424e164f-0e09-4184-b586-048f0c425d9b BGP community string : Configure
 Tags (edit) : environment : test Virtual network ID : d5525349-7b91-4202-b5c5-f04125f58427

Topology Properties Capabilities (5) Recommendations Tutorials

Virtual network SparkIAC.vnet

SparkIAC Subnet 1-Spark

SparkIAC public IP

SparkIAC mg

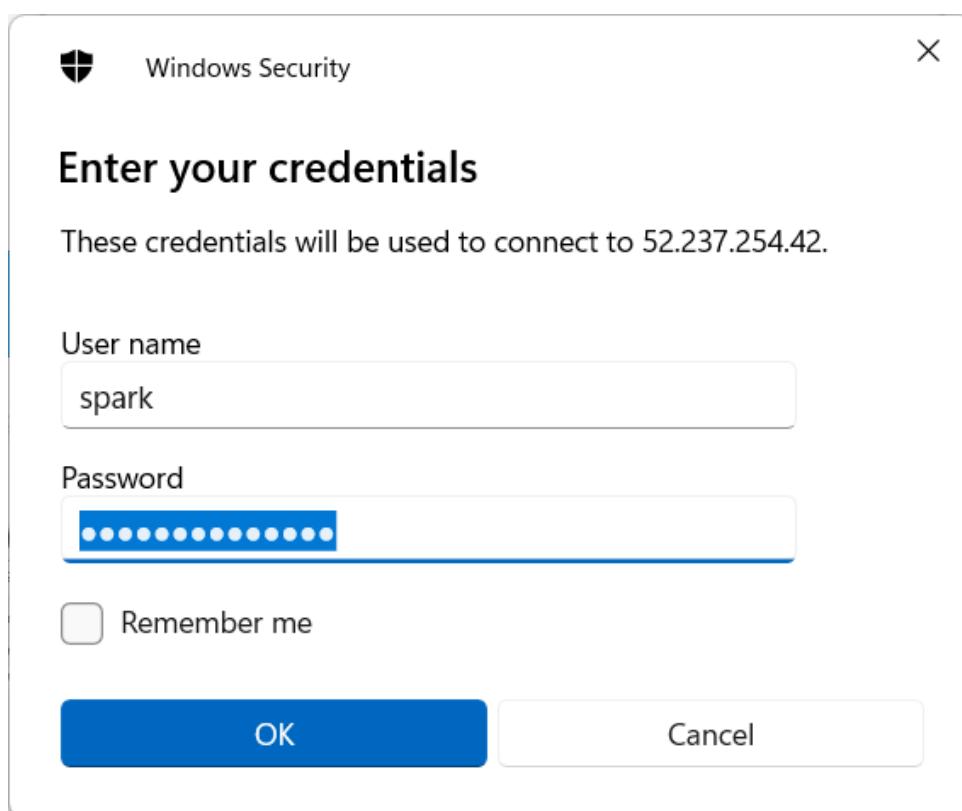
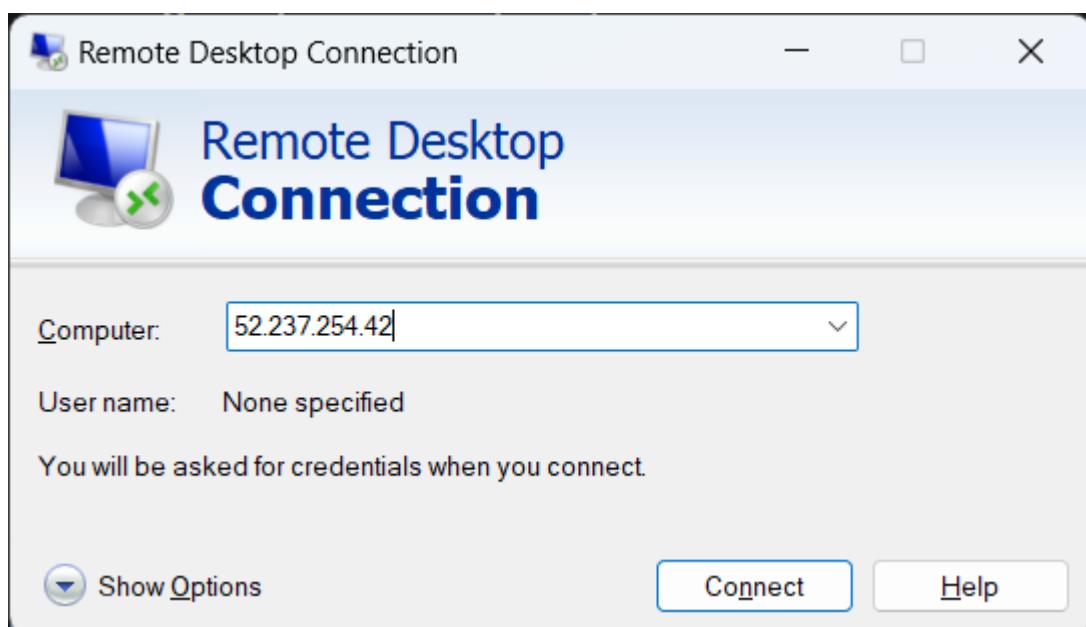
on-ip configuration

View detailed tc

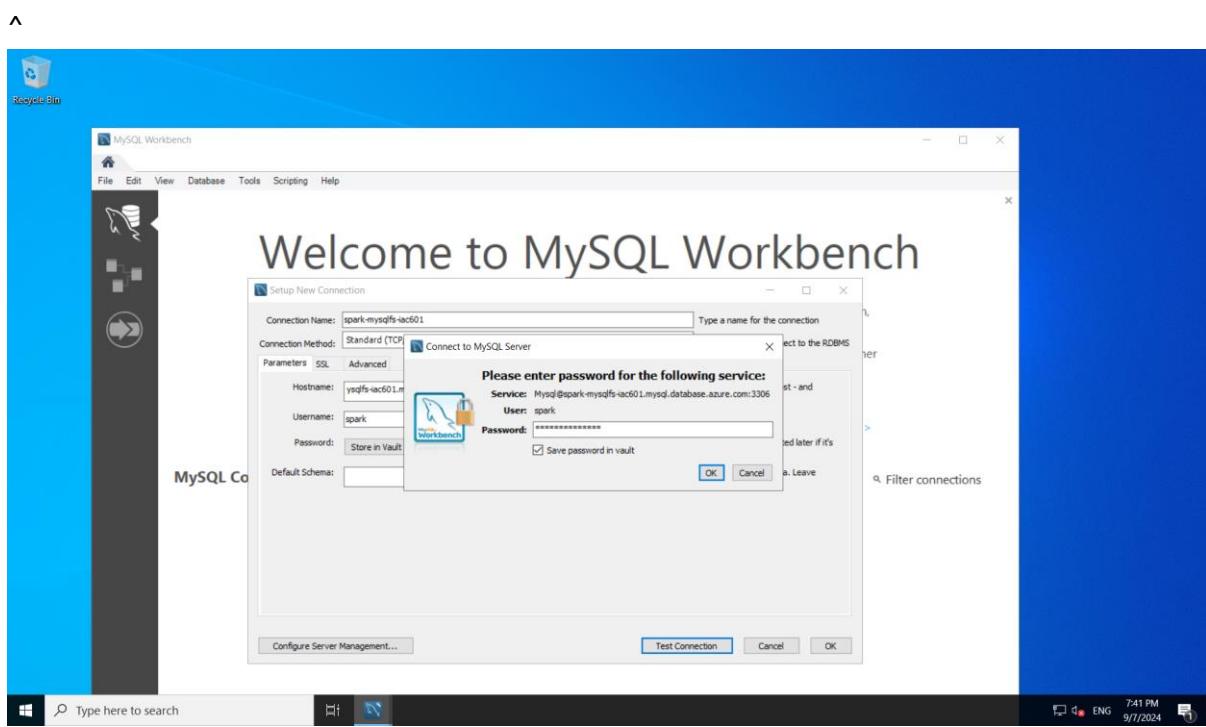
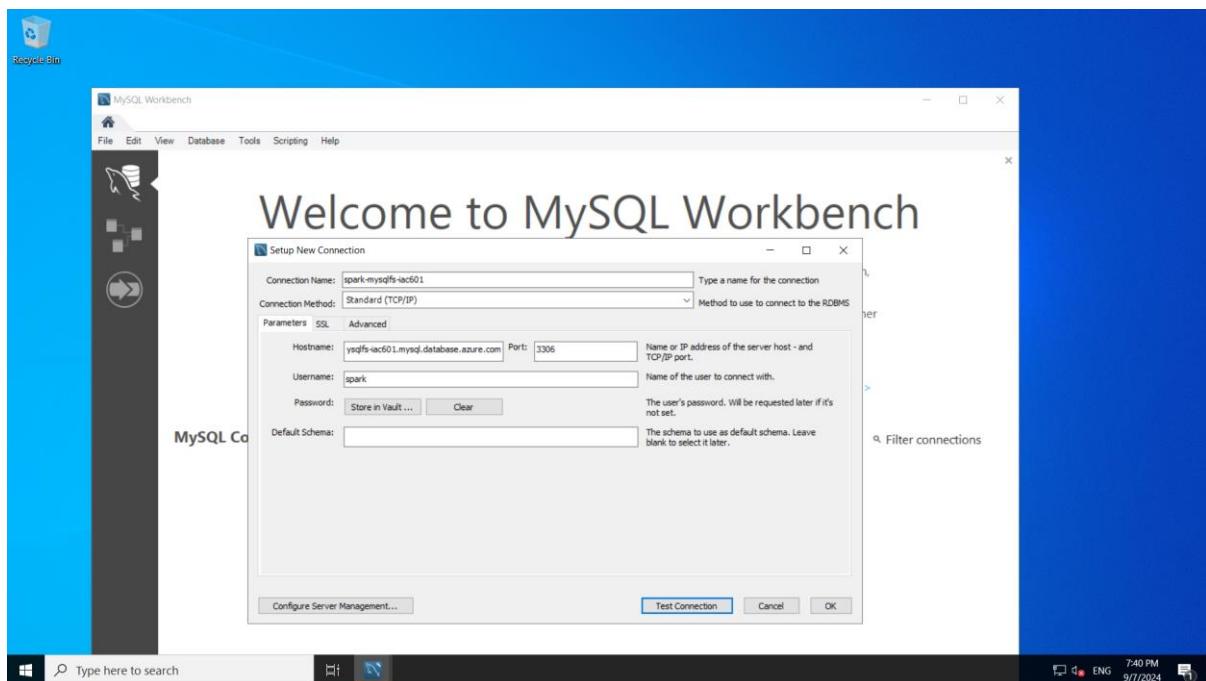
(+)

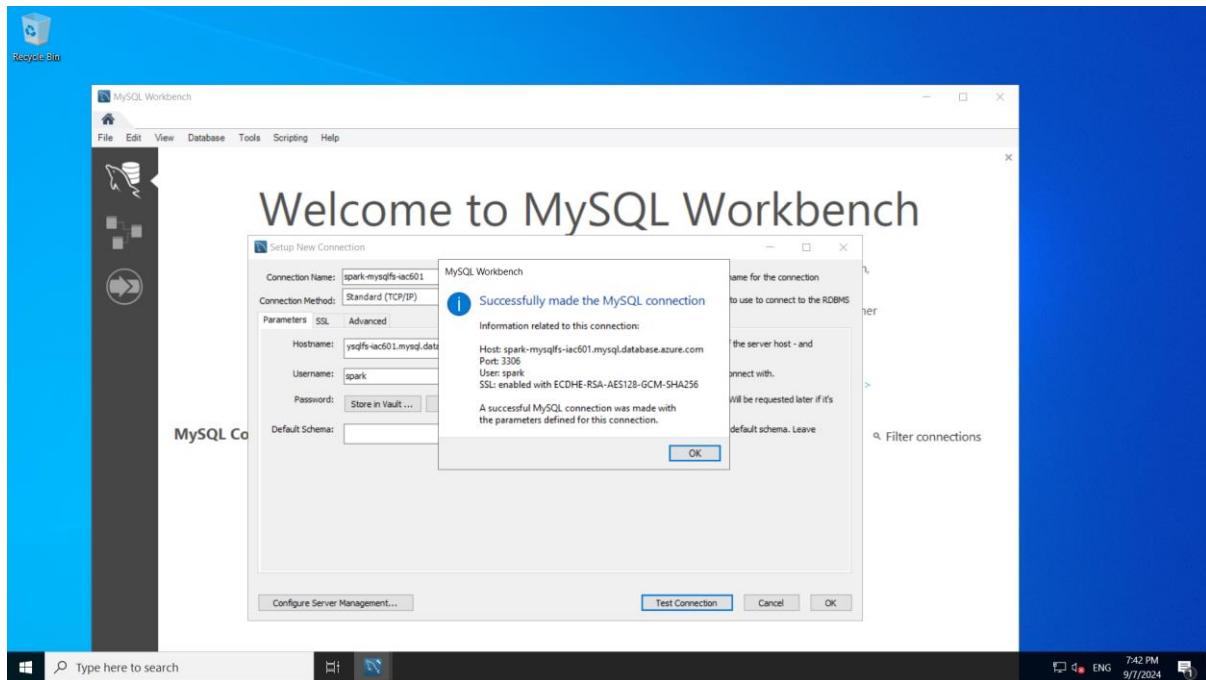
⚙️

7. Connect to the virtual machine of Windows Server 2022

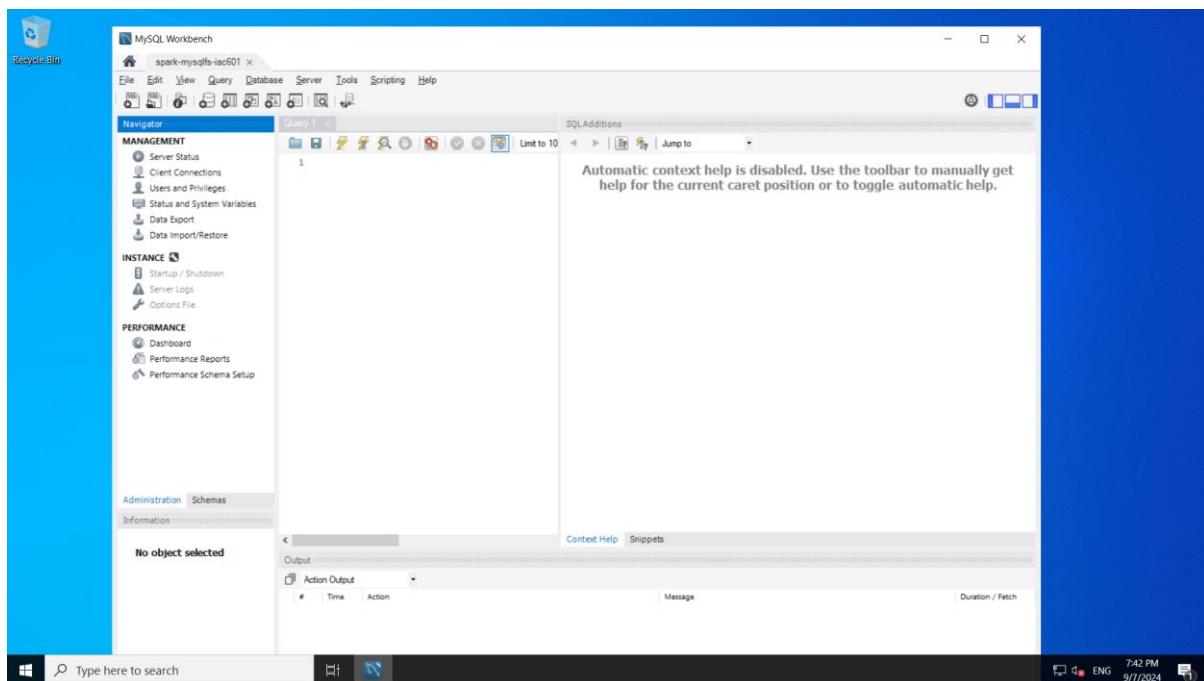


8. Launch MySQL Workbench

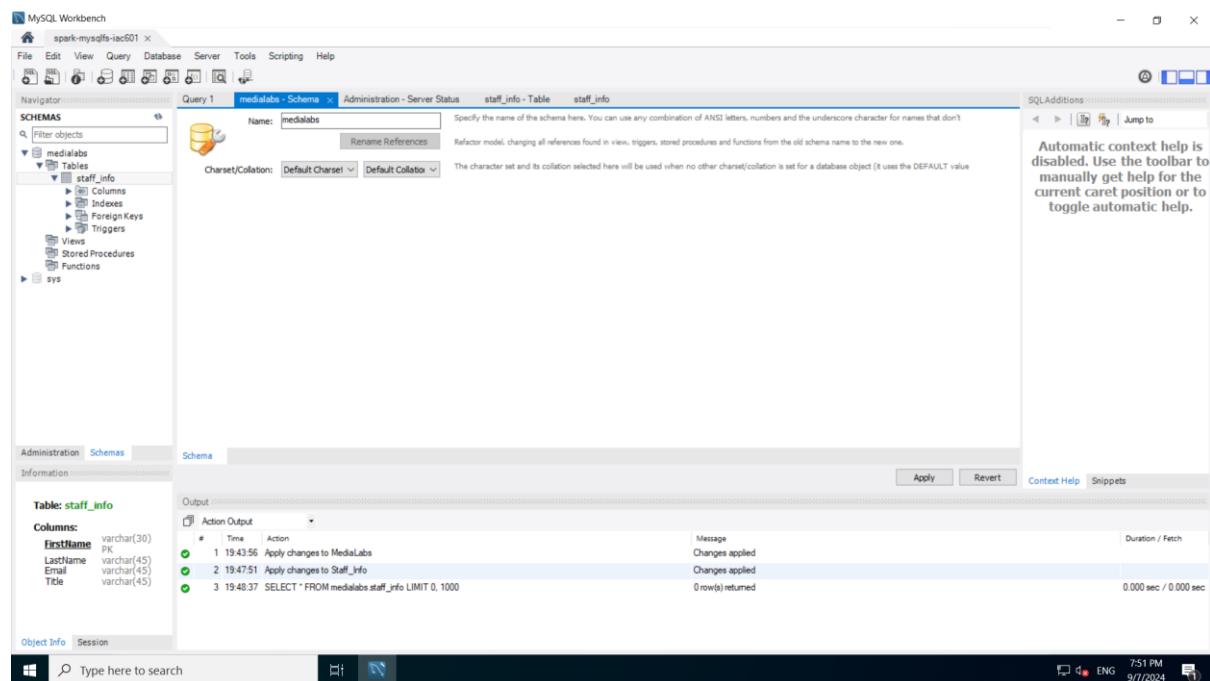




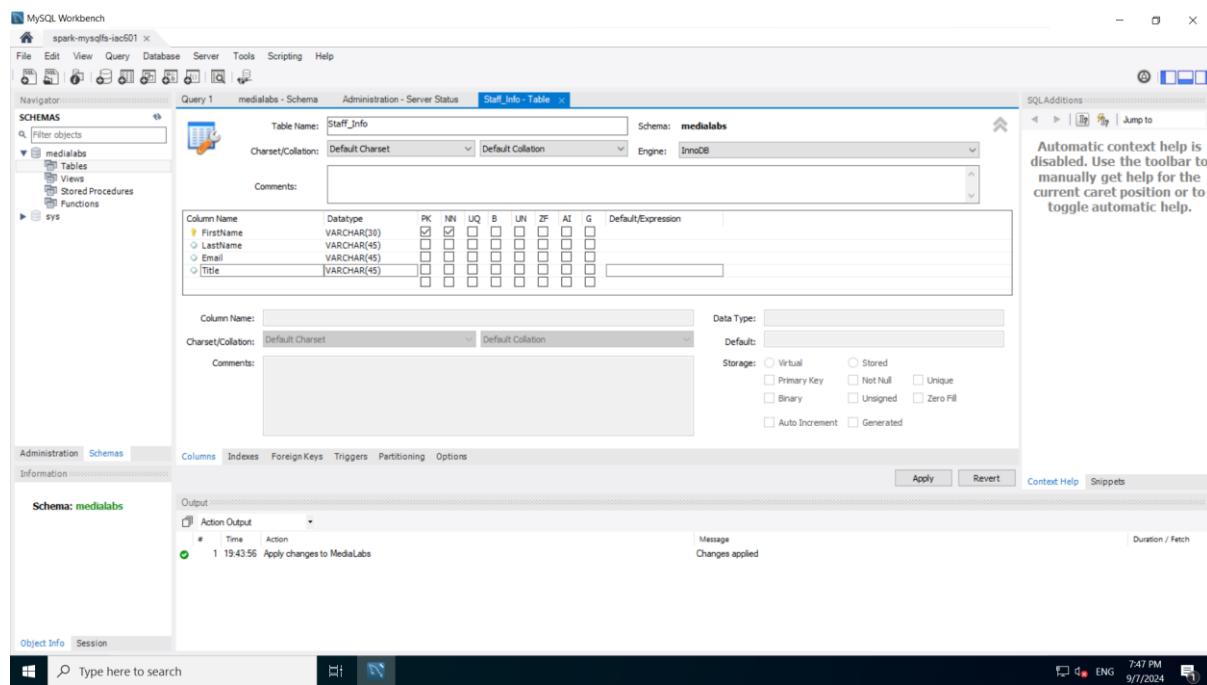
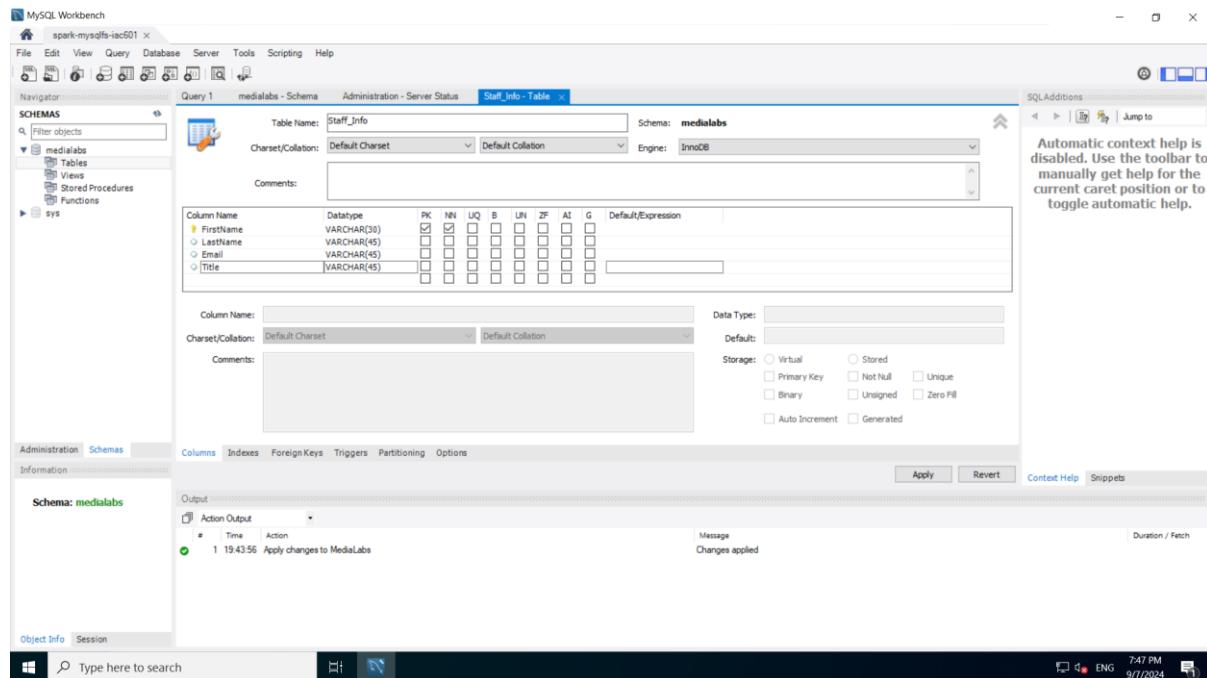
9. Connect to MySQL Server

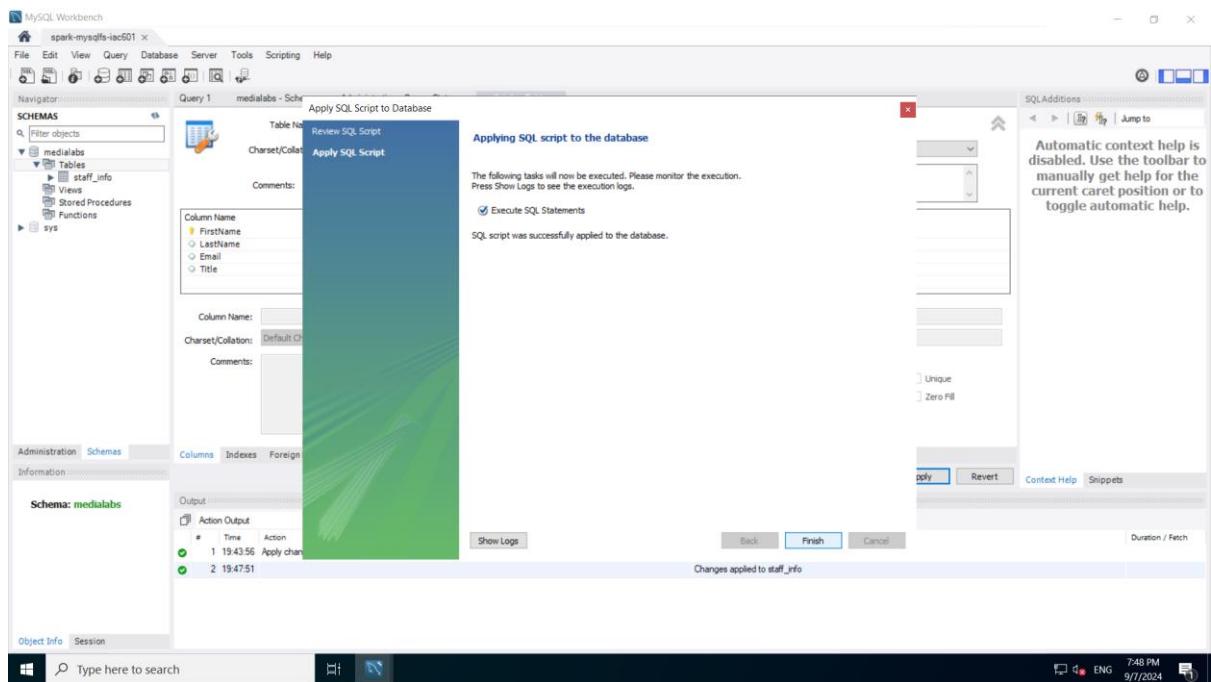


10. Create a database name MediaLabs.



11. Create a table named Staff_Info





12. Add records into the table.

The screenshot shows the MySQL Workbench interface. In the top navigation bar, the database is set to 'spark-myselfs-iac601'. The 'staff_info' table is selected in the central workspace. A query window displays the following SQL command:

```
1 • SELECT * FROM medialabs.staff_info;
```

Below the query window, a result grid shows the data being inserted:

Firstname	Lastname	Email	Title
spark	zheng	aeu3000774@aspre2student.ac.nz	student
		NULL	NULL

On the left, the Navigator pane shows the schema structure, including the 'staff_info' table with columns: Firstname, Lastname, Email, and Title. The 'Information' pane at the bottom provides details about the table, such as its columns and primary key. The status bar at the bottom right indicates the time as 7:50 PM and the date as 9/7/2024.

Task 5: GitHub Repository

1. add script files to local repository

```
Windows PowerShell

PS D:\Github\iac-assessment> git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add/rm <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    deleted:   ConfigureMDT.ps1
    deleted:   InstallMDT.ps1

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    part1/
    part2/

no changes added to commit (use "git add" and/or "git commit -a")
PS D:\Github\iac-assessment> git rm ConfigureMDT.ps1
rm 'ConfigureMDT.ps1'
PS D:\Github\iac-assessment> git rm InstallMDT.ps1
rm 'InstallMDT.ps1'
PS D:\Github\iac-assessment> git add .
PS D:\Github\iac-assessment> git status
On branch main
Your branch is up to date with 'origin/main'.

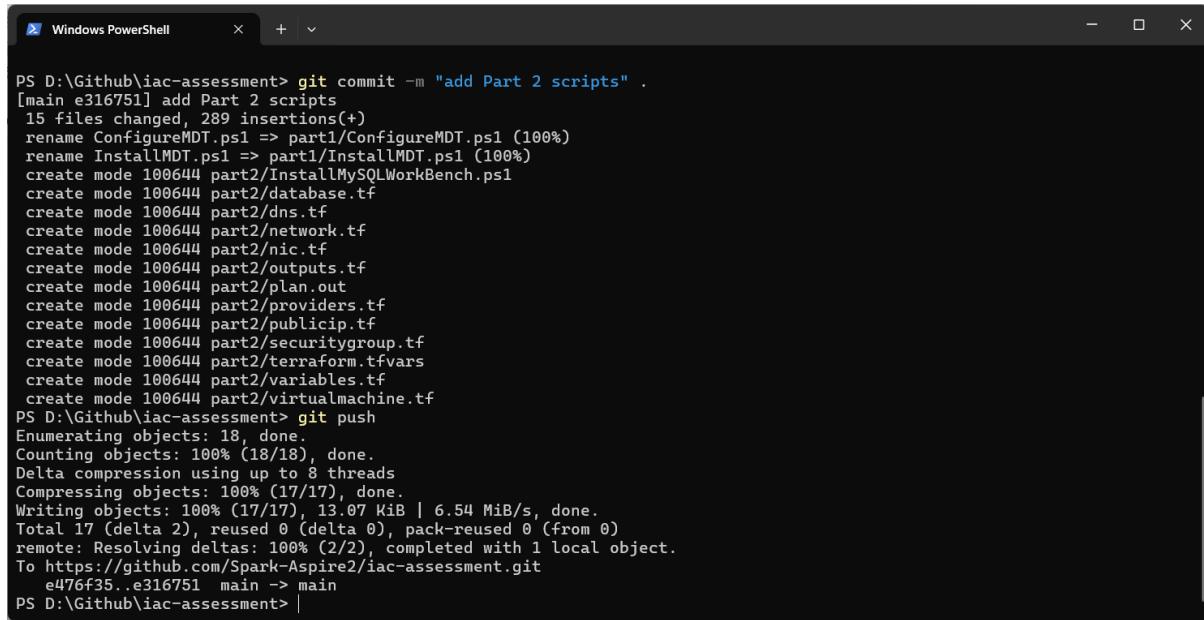
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    renamed:   ConfigureMDT.ps1 -> part1/ConfigureMDT.ps1
    renamed:   InstallMDT.ps1 -> part1/InstallMDT.ps1
    new file:  part2/InstallMySQLWorkBench.ps1
```

2. commit files added to local repository

```
Windows PowerShell

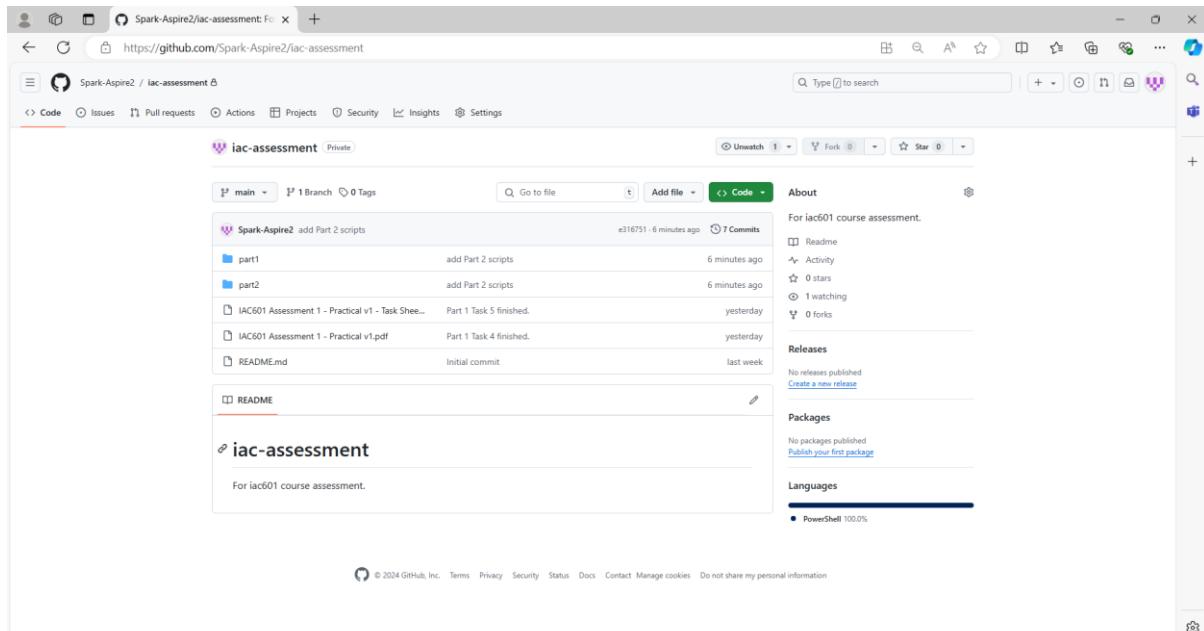
PS D:\Github\iac-assessment> git commit -m "add Part 2 scripts"
[main e316751] add Part 2 scripts
15 files changed, 289 insertions(+)
rename ConfigureMDT.ps1 => part1/ConfigureMDT.ps1 (100%)
rename InstallMDT.ps1 => part1/InstallMDT.ps1 (100%)
create mode 100644 part2/InstallMySQLWorkBench.ps1
create mode 100644 part2/database.tf
create mode 100644 part2/dns.tf
create mode 100644 part2/network.tf
create mode 100644 part2/nic.tf
create mode 100644 part2/outputs.tf
create mode 100644 part2/plan.out
create mode 100644 part2/providers.tf
create mode 100644 part2/publicip.tf
create mode 100644 part2/securitygroup.tf
create mode 100644 part2/terraform.tfvars
create mode 100644 part2/variables.tf
create mode 100644 part2/virtualmachine.tf
PS D:\Github\iac-assessment> git push
Enumerating objects: 18, done.
Counting objects: 100% (18/18), done.
Delta compression using up to 8 threads
Compressing objects: 100% (17/17), done.
Writing objects: 100% (17/17), 13.07 KiB | 6.54 MiB/s, done.
Total 17 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
To https://github.com/Spark-Aspire2/iac-assessment.git
  e476f35..e316751  main -> main
PS D:\Github\iac-assessment> |
```

3. Push local repository to Github



```
PS D:\Github\iac-assessment> git commit -m "add Part 2 scripts" .
[main e316751] add Part 2 scripts
 15 files changed, 289 insertions(+)
 rename ConfigureMDT.ps1 => part1/ConfigureMDT.ps1 (100%)
 rename InstallMDT.ps1 => part1/InstallMDT.ps1 (100%)
 create mode 100644 part2/InstallMySQLWorkBench.ps1
 create mode 100644 part2/database.tf
 create mode 100644 part2/dns.tf
 create mode 100644 part2/network.tf
 create mode 100644 part2/nic.tf
 create mode 100644 part2/outputs.tf
 create mode 100644 part2/plan.out
 create mode 100644 part2/providers.tf
 create mode 100644 part2/publicip.tf
 create mode 100644 part2/securitygroup.tf
 create mode 100644 part2/terraform.tfvars
 create mode 100644 part2/variables.tf
 create mode 100644 part2/virtualmachine.tf
PS D:\Github\iac-assessment> git push
Enumerating objects: 18, done.
Counting objects: 100% (18/18), done.
Delta compression using up to 8 threads
Compressing objects: 100% (17/17), done.
Writing objects: 100% (17/17), 13.07 KiB | 6.54 MiB/s, done.
Total 17 (delta 2), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
To https://github.com/Spark-Aspire2/iac-assessment.git
 e476f35..e316751  main -> main
PS D:\Github\iac-assessment> |
```

4. Check result on Github website



The screenshot shows a GitHub repository named 'Spark-Aspire2 / iac-assessment'. The 'part2' folder is selected in the sidebar, displaying its contents. The commit history for 'part2' is shown, all of which occurred 6 minutes ago. The commits are:

Name	Last commit message	Last commit date
..		6 minutes ago
InstallMySQLWorkBench.ps1	add Part 2 scripts	6 minutes ago
database.tf	add Part 2 scripts	6 minutes ago
dns.tf	add Part 2 scripts	6 minutes ago
network.tf	add Part 2 scripts	6 minutes ago
nic.tf	add Part 2 scripts	6 minutes ago
outputs.tf	add Part 2 scripts	6 minutes ago
plan.out	add Part 2 scripts	6 minutes ago
providers.tf	add Part 2 scripts	6 minutes ago
publicip.tf	add Part 2 scripts	6 minutes ago
securitygroup.tf	add Part 2 scripts	6 minutes ago
terraform.tfvars	add Part 2 scripts	6 minutes ago
variables.tf	add Part 2 scripts	6 minutes ago
virtualmachine.tf	add Part 2 scripts	6 minutes ago
IAC601 Assessment 1 - Practical ...		
IAC601 Assessment 1 - Practical ...		
README.md		

The screenshot shows the main GitHub page for the repository 'iac-assessment'. It lists the branches (main, 1 Branch), tags (0 Tags), and the last 9 commits. The commits are:

Commit	Message	Date
c27fe54	Part 2 finished.	6 minutes ago
part1	add Part 2 scripts	2 hours ago
part2	Part 2 finished.	6 minutes ago
IAC601 Assessment 1 - Practical v1 - Task She...	Part 2 finished.	6 minutes ago
IAC601 Assessment 1 - Practical v1.pdf	Part 1 Task 4 finished.	yesterday
README.md	Initial commit	last week

The page also includes sections for About (described as 'For iac601 course assessment.'), Releases (no releases published), Packages (no packages published), and Languages (HCL 53.8% and PowerShell 46.2%).

References

1. Privacy Act 2020. (2024, July 1).
<https://www.legislation.govt.nz/act/public/2020/0031/latest/LMS23223.html>
2. Copyright Act 1994. (2023, May 31).
<https://www.legislation.govt.nz/act/public/1994/0143/latest/DLM345634.html>
3. Fair Trading Act 1986. (2024, July 10).
<https://www.legislation.govt.nz/act/public/1986/0121/latest/DLM96439.html>
4. Health Information Privacy Code 2020. (2022, July 1).
<https://privacy.org.nz/privacy-act-2020/codes-of-practice/hipc2020/>
5. New Zealand Information Security Manual. (2024, September).
<https://nzism.gcsb.govt.nz/ism-document>