2025

Implementation and Simulation of a Virtualised Environment

A+

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Windows Server Setup for Domain Controller, Database Server, & Web Server

Installing SQL Server Management Studio

Backup and disaster recovery

Dynamic resource allocation

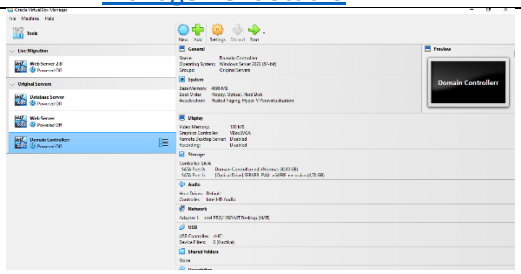
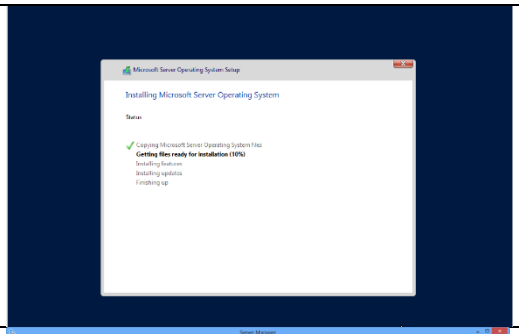
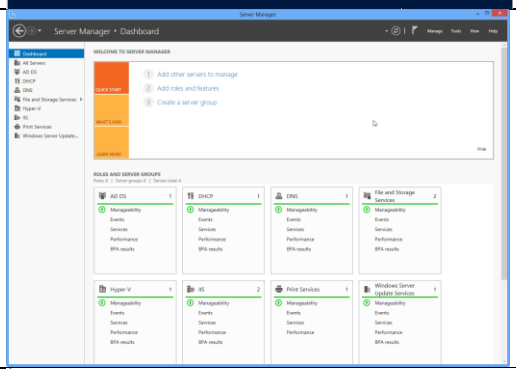
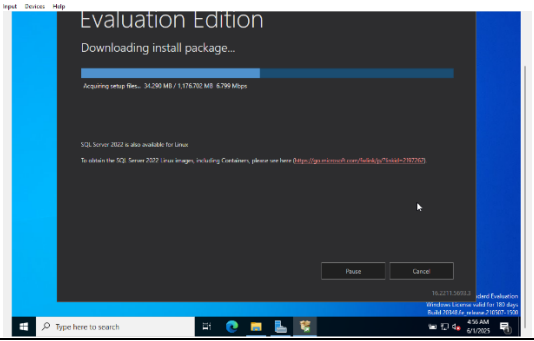
Bitlocker Installation & Encryption

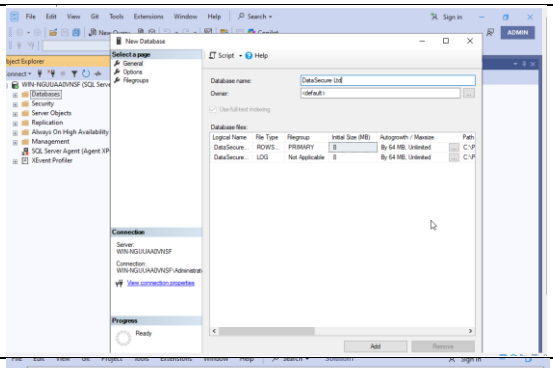
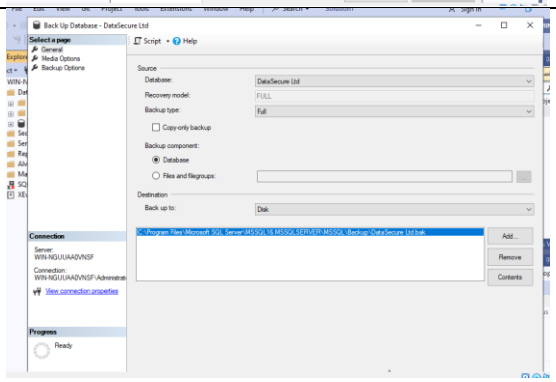
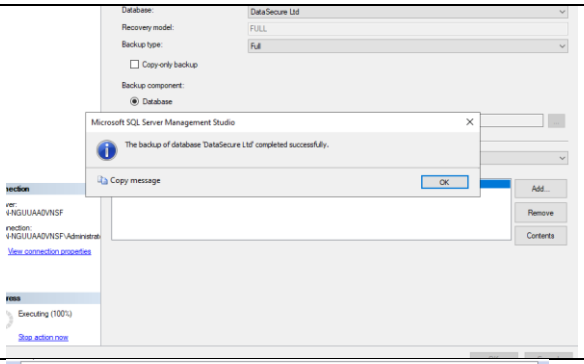
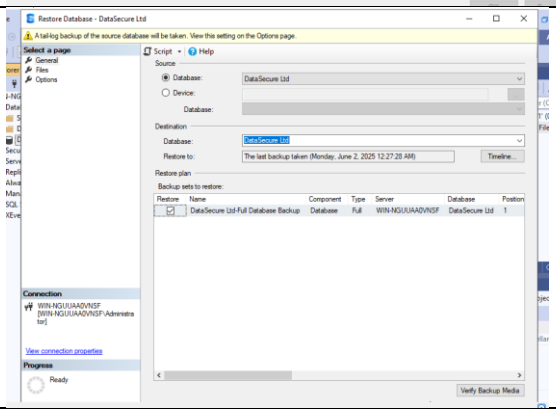
Testing migration

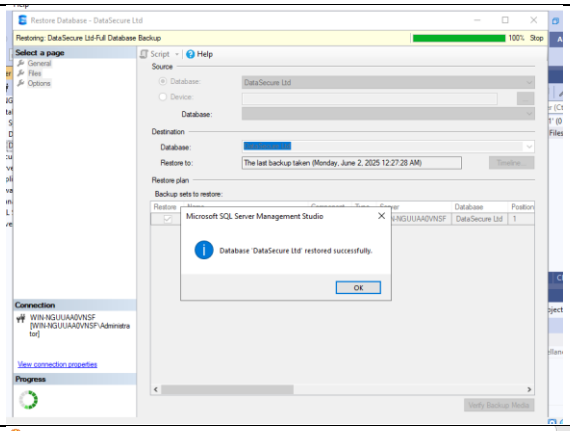
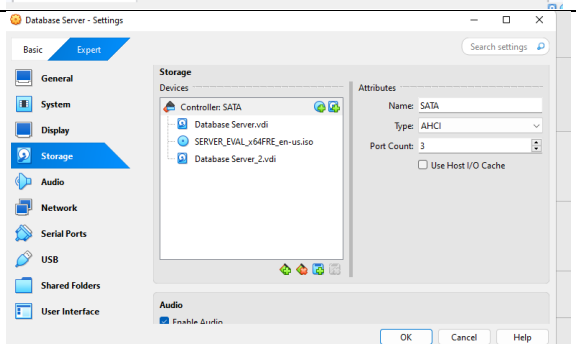
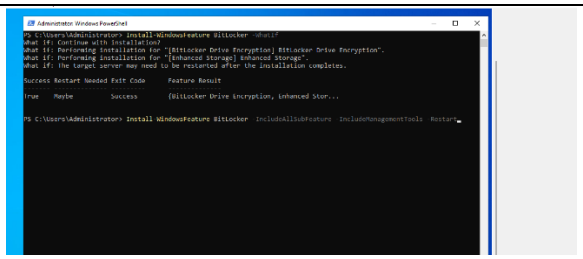
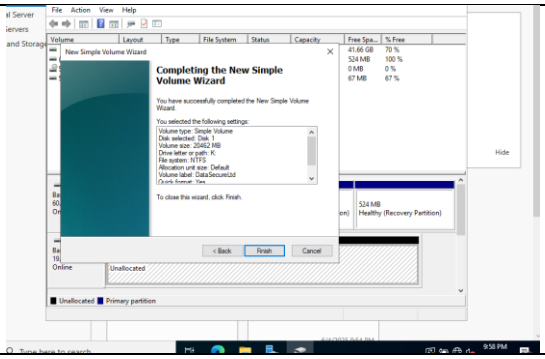
Live migration

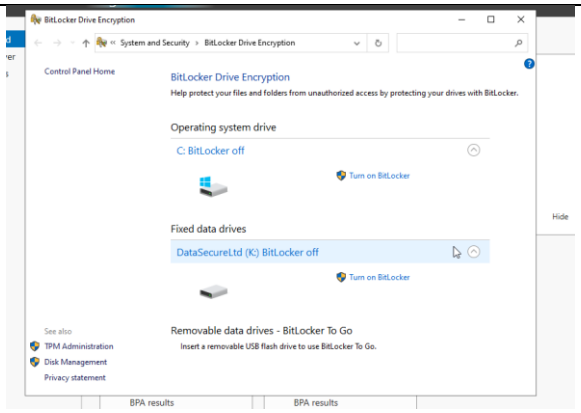
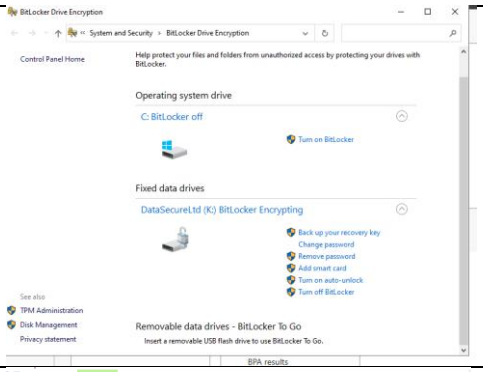
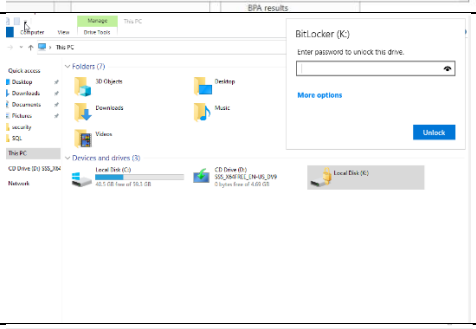
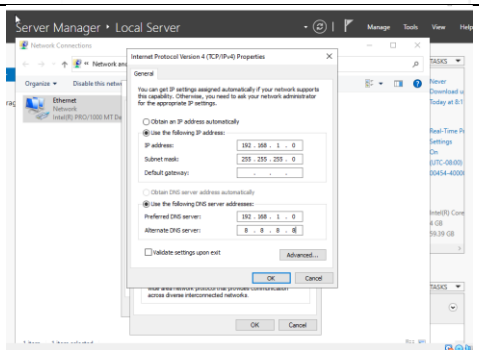
Security testing

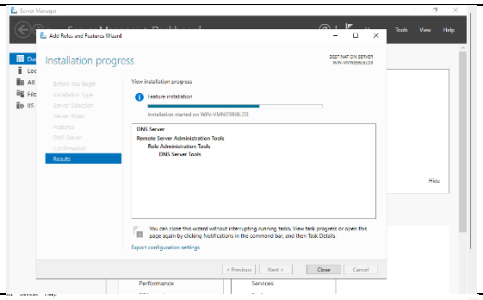
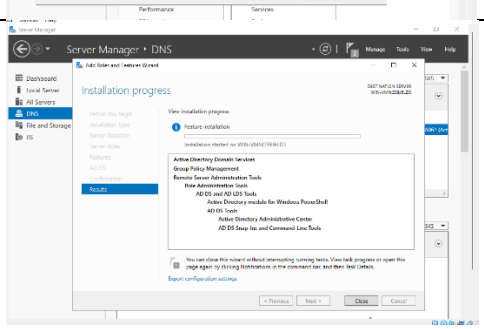
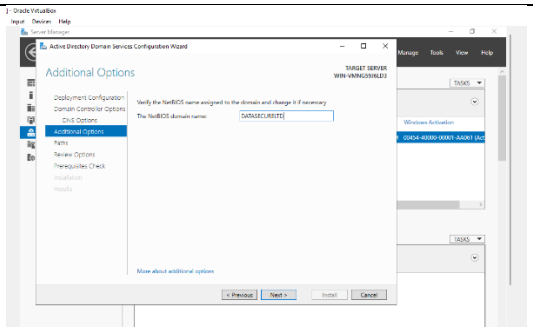
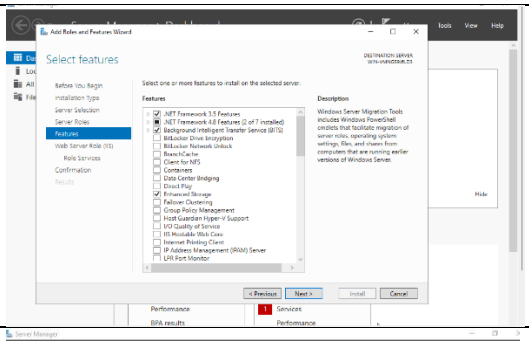
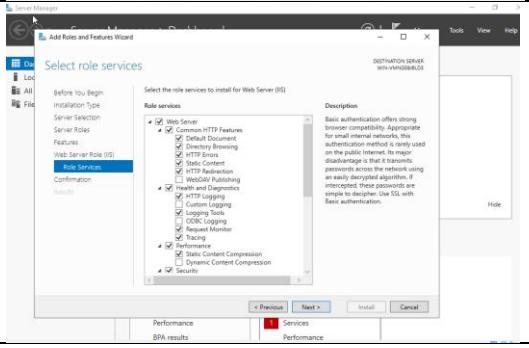
START

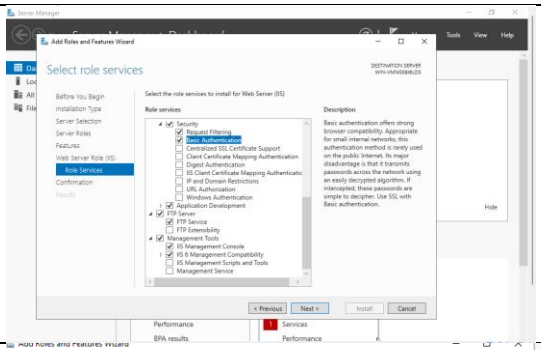
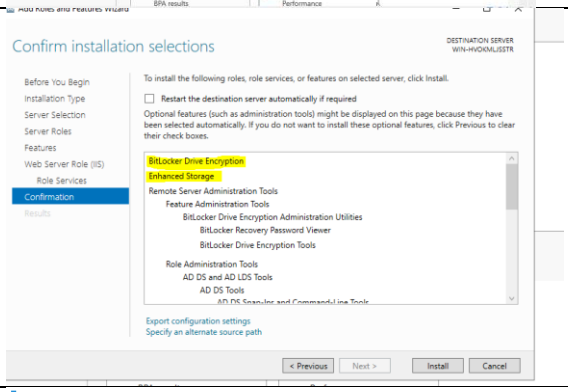
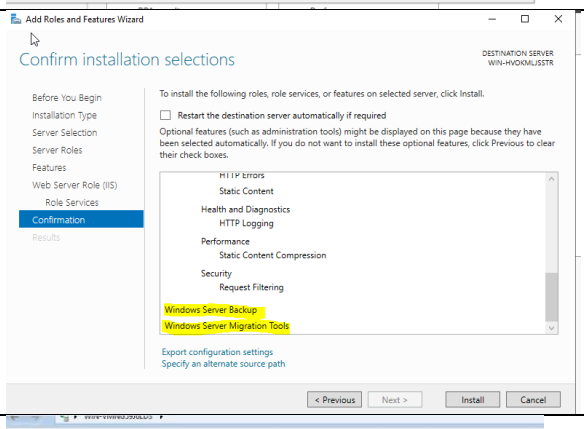
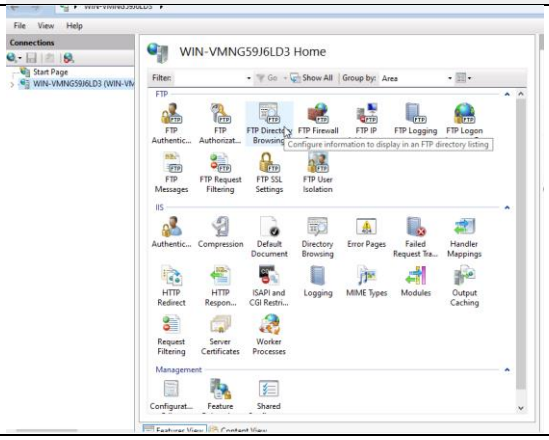
	• Oracle VirtualBox • Installing SQL Server 2022 and SQL Server Management Studio
Windows Server Setup for Domain Controller, Database Server & Web Server: Once you've completed the installation of Oracle virtual box, Windows server the next thing step is configuring our virtual machines with the recommended CPU, RAM and Memory for the server	
Now it is time to switch on our VMs, for our server firstly you will select the correct language for your Administrator, you will then proceed to select the Windows Server 2022 Standard Evaluation (Desktop Experience), and finally you will allocate that 60Gb space to the server.	
Once the installation is done you will then be prompted to give your server a password, after assigning it a password and logging in the server will then open up the Server Manager Application, this action will happen every time you switch on the server	
Now that your Windows Server is up and running it is time to install the software to allow it to work as a Database Server so we will follow the steps from the link above.	

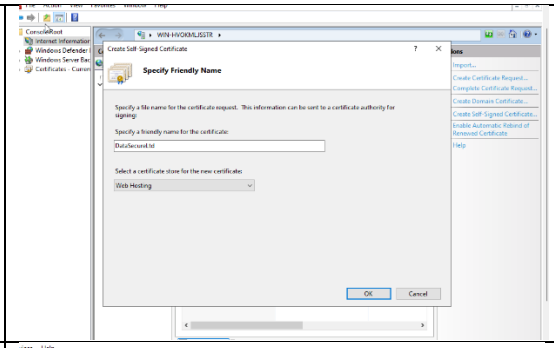
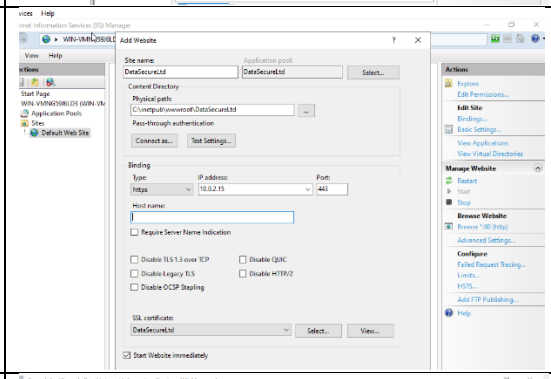
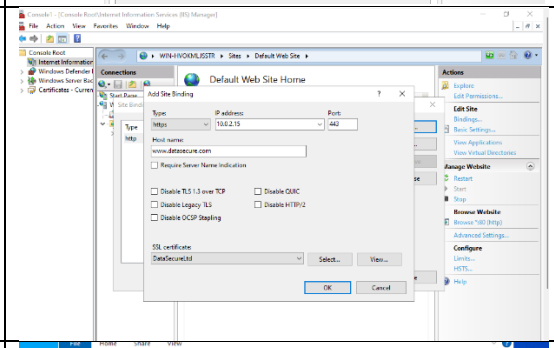
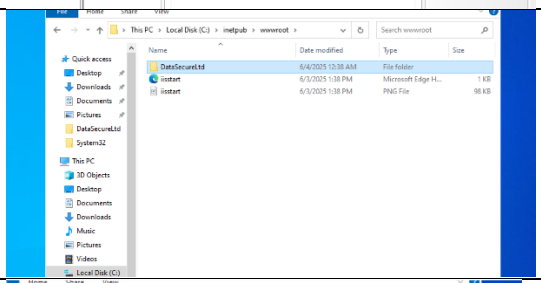
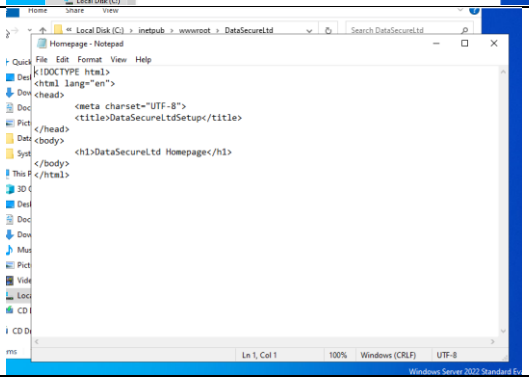
Backup and disaster recovery: Now that we have our SQL Server Management Studio installed, we need to create a database, first thing that we need to do is connect to our SQL Server through Windows Authentication once we have done that our Database will be created	
In order to create a backup of your database you will need to locate the database you want to backup once you've located the database right-click it then on the drop-down menu look for tasks then after that look for backup the backup database will open with the database you want to backup you can then select whether you want to initiate a full/differential/transaction log backup ***(Note do not save the backup in the same destination you want to change the destination to another location to ensure that if anything happens to the original database the backup is not affected)**	
Database Backup Complete	
To restore a database, we will need to right-click on the main database then on the drop-down menu select restore database this will open the restore database window either select database/device and browse for where you saved the database backup once you've located it finish the steps and restore the database	

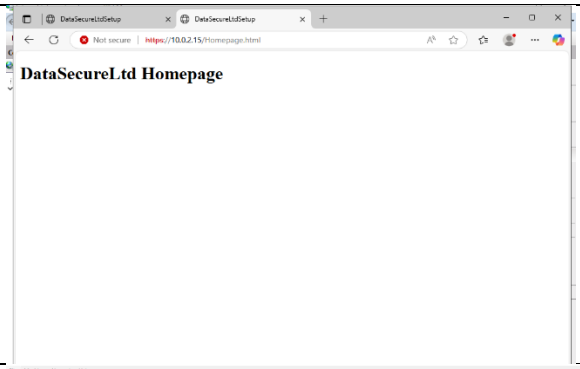
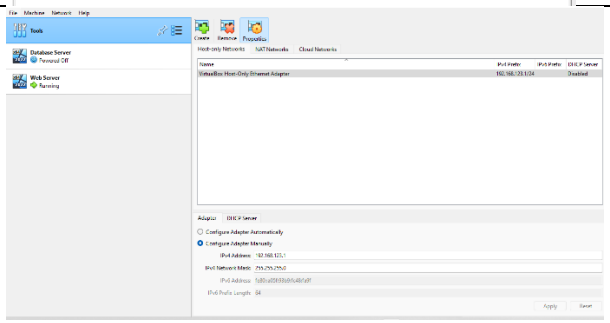
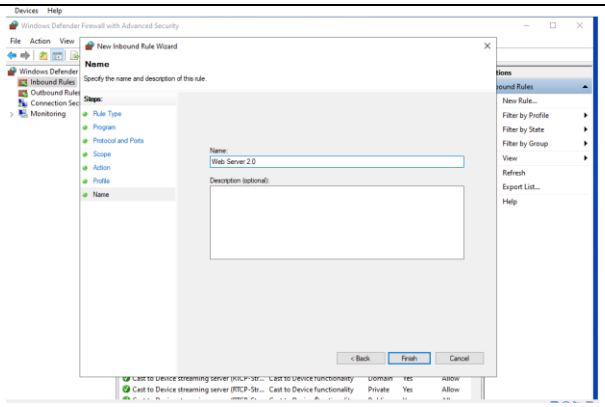
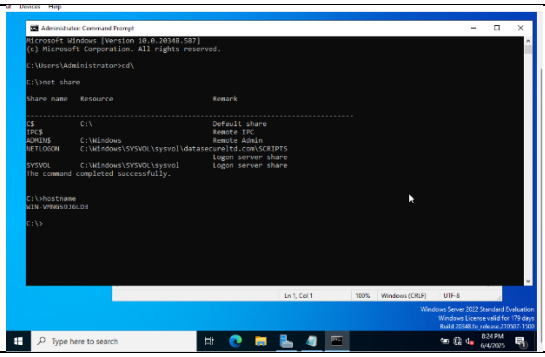
Database Restored	
Dynamic resource allocation We will be assigning our Database Server additional storage in order to do this we will need to go back to our Oracle VirtualBox interface select our Database Server and search for storage option on the dashboard then double click it once you've located it we then click on the green icon it will open up 2 options "Optical Drive" & "Hard Drive" you will select Hard Drive a new window will open up you now select create to create a new drive that the Database can use once you've selected the space you want to give the hard drive select okay	
Bitlocker Installation & Encryption Now since that Bitlocker is not installed on windows server we need to install it through our cmd (command prompts to install Bitlocker: Install WindowsFeature BitLocker Includeallsubfeature IncludemanagementTools Restart)	
The next step is to initialize our new storage so that it can be usable on our Database Server, to do this we will go down to our taskbar and search the following "create and format partition" this will direct us to our disk management there we will see our disk storage right click on it and select initialize go through the steps and give your new drive an appropriate name	

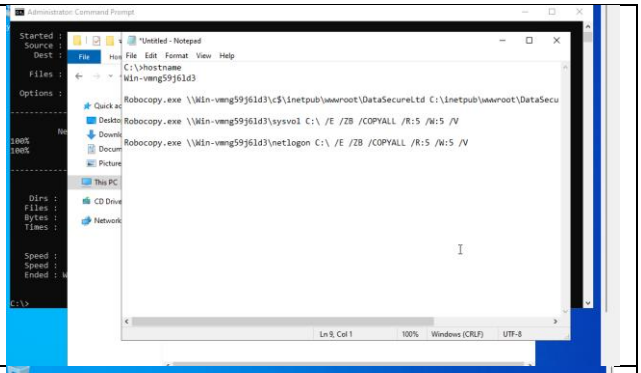
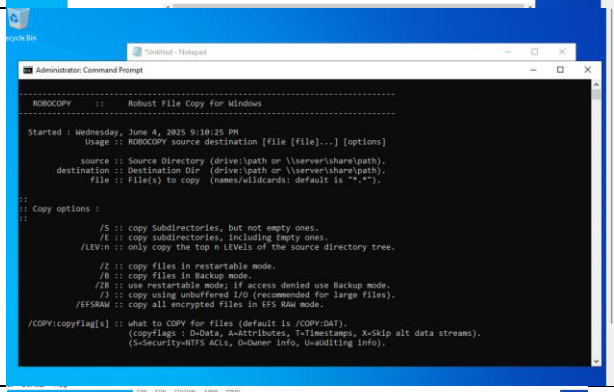
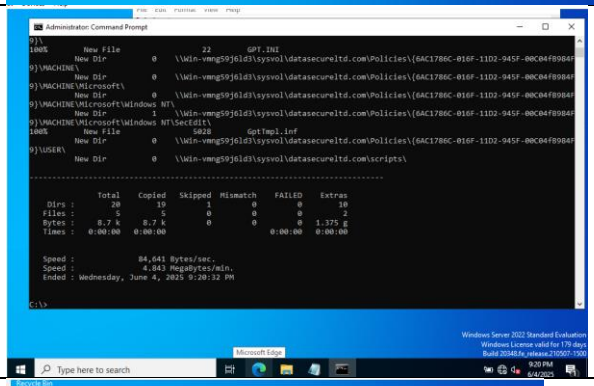
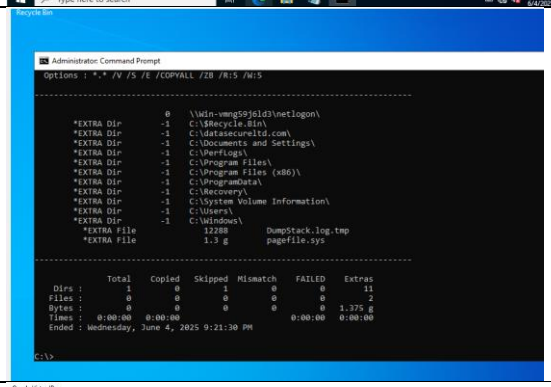
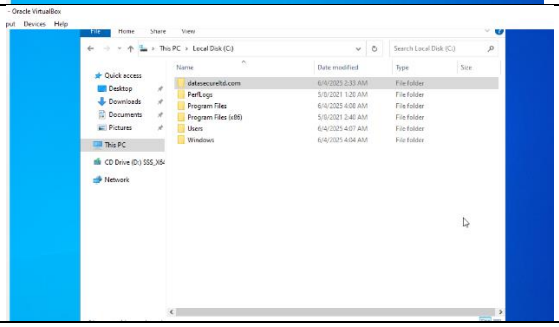
Next step is to encrypt our drive to protect any and all sensitive information stored by DataSecure Ltd, to activate this feature on the drive we will need to search on our taskbar the following “manage bitlocker” this will direct us to the bitlocker drive encryption locate the drive you want to encrypt then follow the steps to complete encryption ***(note you will need to save the recovery key on an external drive for security purposes)**	
Disk Encryption Complete	
Disk in File Explorer asking for password to open	
Domain Controller Configuration Now that we have completed the configurations for our Database Server, we need to setup the configurations for our Domain Controller firstly we need to give our DC a static address we will this by changing the IPv4 of the server to do this we will select the ethernet option on the local server tab, this tab will redirect us to the network connections window you will then click on the ethernet adapter option, then click on properties, then click on IPv4 change the settings from DHCP to Static by selecting the box then give your server a new IP address	

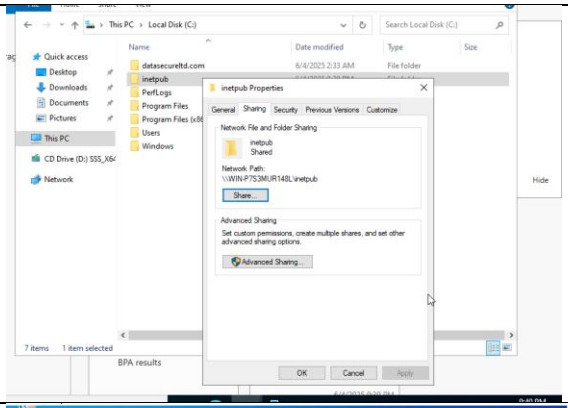
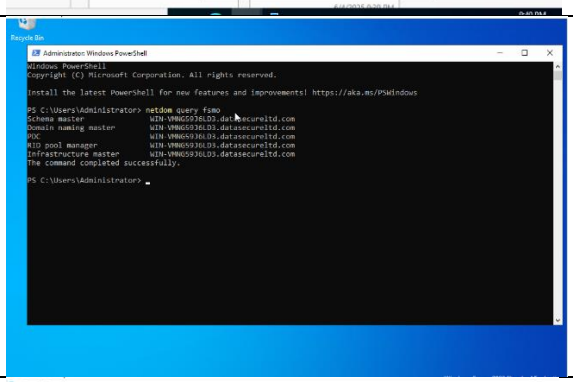
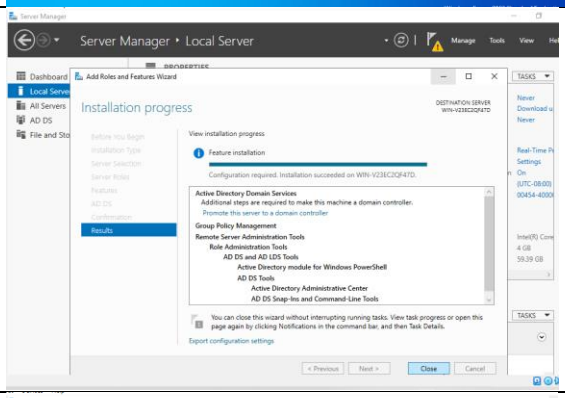
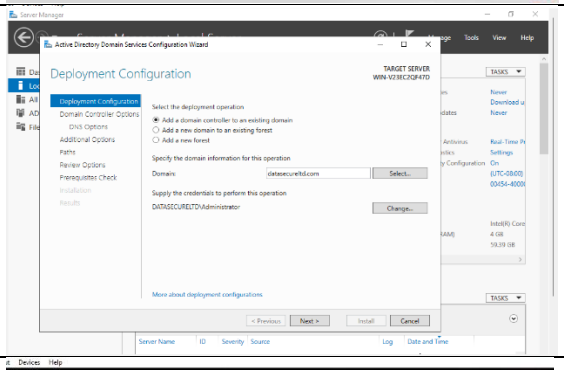
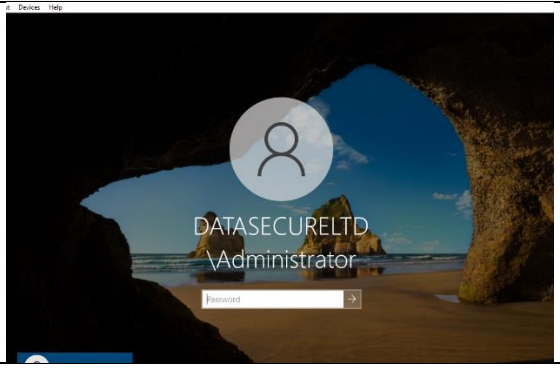
navigate to the add roles and features link on the server manger dashboard. Go through all the pre-installation tabs and on the “server role” tab select the “DNS” check box then install the features and wait for it to complete	
navigate to the add roles and features link on the server manger dashboard. Go through all the pre-installation tabs and on the “server role” tab select the “Active Directory Domain Services” check box then install the features and wait for it to complete	
The server now needs you to install an Active Directory Domain Services (AD DS) which will utilize the DNS to translates human-readable domain names (like "google.com") into numerical IP addresses that computers use to communicate ***(Note this action will require for you to restart the server for it to take full effect)**	
Web Server Configuration: navigate to the add roles and features link on the server manger dashboard. Go through all the pre-installation tabs and on the “server role” tab select the “IIS Web Server” check box then install the features and wait for it to complete	
Adding additional features	

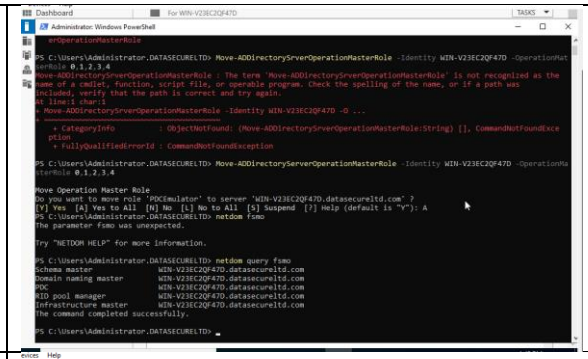
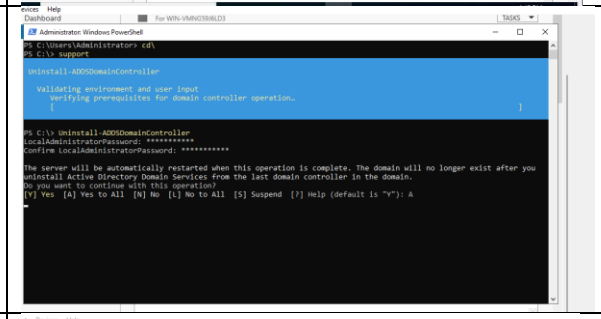
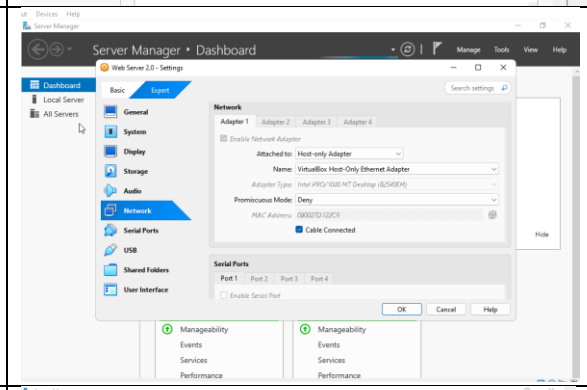
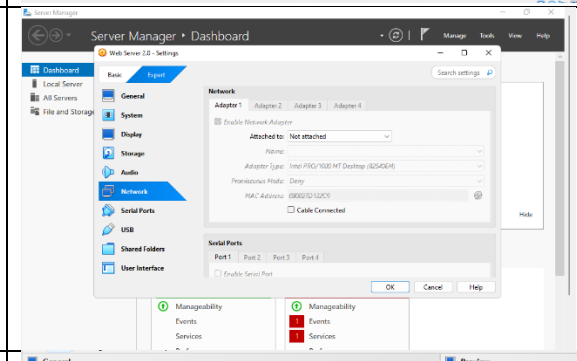
Adding additional features	
Adding security features	
Adding security features	
Once we've installed our Web Server, we need to navigate to the Tools tab in our Server Manger on the drop-menu we will select the Internet Information Service Manager this will allow us to configure our web server	

Creating certificate	
Creating a website	
Creating a binding	
Locating the path of the website on local machine	
Code for our website	

Homepage for our website	
we need to create a network that both are computers are connected to, so it will help our computers to see each other. To complete this task, we need to go back on our Oracle VirtualBox dashboard we then need to double click on the Tools tab a three-line bar will on the right of the Tools tab double click it and then select “Network” on the Host-only Network create a new network this will create an internal network that works from the machines we now need to connect all the machines to the network by changing the network adapters to the Host-only Network we created.	
Now our machines are connected to one network are configured with the right IPv4 Address it is to set a new firewall rule which is our ICMP this will allow for our computers to ping each not only that we can set the ranges of IP address that ping each other so since we have ranges of IP addresses, we are going use those when configuring our ICMP. To find ICMP you will need search for windows firewall defender and select it then you will select “advanced settings” then click on “Inbound Rules” after that on actions select new rule	
Testing Migration Locate path for the files we are moving and the hostname	

Write down the path and execute move with robocopy.exe command in windows terminal	
Robocopy Tools	
Test Migration through file sharing	
Second Test	
Locating sent file & verifying succuss	

Verifying file is part of shared network path	
Live migration The command netdom query fsmo is used to identify which domain controllers hold the Flexible Single Master Operations (FSMO) roles in Active Directory. These roles are crucial for maintaining the integrity and consistency of the Active Directory domain.	
Adding ADDS Roles to Server	
Adding DC to existing forest	
Logging in to added DC	

Live Migration in powershell	
Demoting old DC	
Machine Isolation In order to initiate isolation on your VM(s) we need to disconnect the machine from the adapter it is connected to on the network this will allow for you to test new software on the VM without potentially infecting the other machines or if you are suspect that the machine has been compromised this a quick and easy way of isolation	
VM disconnected from adapter	
VM disconnected from adapter view from the dashboard