**Assignment:** Dev environments, naming convention, installation and documentation.

**Required Resources**

* BrightSpace Course Resource Documents:
  + Naming Convention Document (NCD)
  + Company Inc Description
  + Setup VMWare at home with campus network (for personal devices)
* Windows Server 2019 **Standard** ISO ([Azure for Education](https://azureforeducation.microsoft.com/devtools)) and KMS Key
* Windows 10 Education **22H2** – ISO ([Azure for Education](https://azureforeducation.microsoft.com/devtools)) and KMS Key (Pro Education)

**Professional Documentation**

All documentation must be done in a **professional style**. It must include:

* Title page
* **Updateable** Table of Contents
* Document introduction
* Section introductions or description, each section must be clearly identified
* Graphics or screenshots MUST include a title with a short description
* Any direct or copied quotes or graphics MUST be properly credited in a footnote
* ALL sources MUST be properly cited (APA format) and placed at the end of your document in a bibliography.
* **NO** embedded, zipped or compressed files. \*\* All scripts must be converted to text before including them in your documentation. \*\*
* **1 Professional Word Document ONLY.**

**Research and documentation sections** -Please complete all research and question responses in your own words. Research sections not completed in your own words may result in a mark of 0 for the section.

**NOTE:** Please do NOT copy and paste responses from internet, **even with a citation**. I expect each section or response to be in your own words. Be prepared to explain your responses and demonstrate your comprehension.

**No marks** will be given for cited or credited information included in document.

***\*\* I recommend completing any research section before completing any required task listed below as you will have a much better understanding of the material and data.***

**Evaluation:** This assignment is markedas per the attached Rubric (marks will be deducted for deviating from Requirements). \*\*You may be asked to demonstrate some of your assignment to show your comprehension of the material.

**Marking and Assignment Notes:**

* ScreenshotsMUST include user or device identifying information.
* Screenshots MUST be added to your document in the order of creation.
* Documentation must meet Professionalism requirements.
* **Automatic mark of 0 - Assignment not submitted or work not original.**

<http://www.nscc.ca/docs/about-nscc/policies-procedures/policy-studentcodeofconduct.pdf>

<https://www.nscc.ca/docs/about-nscc/policies-procedures/policy-academicintegrity.pdf>

**NOTE: This assignment may require some adaption, research and troubleshooting.**

We will use Company Inc along with your structure, naming conventions etc. to complete a series of Tasks that will allow us to create a Dev Environment to learn and practice some industry standard windows security features and skills.

**Task 1 –Simple Install of Windows Server 2019 Standard - Domain Controller**

*Server Requirements:*

Windows Server 2019 Standard (with desktop experience) - Domain Controller (Simple Install).

* Required:
  + VMware machine (Typical install)
    - Ensure you select **I will install operating system later**.
  + VM Named according to naming convention document (NCD).
  + Drive partition information:
    - NVME (1x 100g / 1x 40g).
      * Remember your second drive cannot be added until your VM is created.
    - Split disk into multiple files.
  + Memory = 4G
  + Processors = 2 processors, 1 core (Total processors cores: 2)
  + 2 x Network Adapters = NAT
  + Make the following changes during install:
    - Time and currency = English Canada
    - Activate your server with the KMS key[[1]](#footnote-1). (unless using Azure Key)
    - Standard with **Desktop Experience**
    - Custom install on Drive 0
  + User/Password information
    - Administrator password = Passw0rd (**does not expire**)
  + Correct time zone
  + Confirm your workstation is activated, if not complete the following steps:
    - Open the command prompt as an administrator (elevated command prompt)
    - Type the following to check activation

slmgr /xpr

* + - If your workstation is not activated run the following commands to set the KMS Key and point your workstation to the KMS Server.

slmgr.vbs -ipk KMSKeyHere

slmgr.vbs -skms **10.82.40.52**

* + - Then type the following to force the activation request

slmgr.vbs -ato

* + - Now recheck activation with the first command.
  + Host Name according to established naming convention.
    - Location = Rack 1 Unit 18
  + Confirm/install VMWare Tools (may install automatically)
  + Complete all required updates.
* Complete the following PowerShell commands to test your successful installation. Troubleshoot any failures or incorrect results and rerun your commands if required.
  + Net user Administrator
  + Slmgr /xpr
  + Hostname
  + Get-TimeZone
* **STOP.** Be prepared to demo each command from above with the correct(ed) results.
* Modify the Virtual Machine Description to list:
  + Operating System:
  + Creation Date:
  + Hostname:
  + Administrator Password:
* Since we have made some major modifications to our server, this would be a great time to take a **snapshot** of your server in the off position.
* This is also a great time to add the **lines to our VMX** while our VM is in the off position.

**Task 2 –Domain Controller install and base configuration**

Before installing the Domain Controller Role, we will need to set a static IP for our server.

* Edit your IPv4 settings on your Local Server Dashboard to set the server IP addresses and DNS setting as below.

Ethernet 0

* + - Static IP = 192.168.208.10
    - Netmask = 255.255.255.0
    - Gateway = 192.168.208.2
    - DNS IPs:
      * Primary DNS =192.168.208.10
      * Secondary DNS = 192.168.208.11

Ethernet 1

* + - Static IP = 192.168.208.11
    - Netmask = 255.255.255.0
    - Gateway = Blank
    - DNS IPs:
      * Primary DNS = Blank
      * Secondary DNS = Blank

*NOTE: \*\*You may notice a “warning” on your network icon in your task bar. This does not mean you made a mistake or have an error, this is because we have configured our Gateway to an incomplete network. In other words, our gateway does not route to an existing DNS as we have not yet setup our DNS Server.*

* As we have modified our IP settings, restart your computer to allow it to update all network tables and configurations with your new IP addressing settings.
* **Stop**. Confirm your network IP information is configured correctly by running the following command in an elevated PowerShell console. Correct any issues before continuing.

Get-NetIPAddress -AddressFamily IPv4 | Get-NetIPConfiguration -detailed | Format-List

* Before continuing let’s apply any new critical updates that are required and Restart.

Now that we have set up our IP addressing for our server it is time to start installing our Domain Controller Role. We will use Server Manager to install the AD (Active Directory) DS (Domain Services) role.

* **Domain** **Name** = As per company documentation (Company Inc Description).
* In your Server Manager **Dashboard**, Add the roles and features
* Select “Active Directory Domain Services” and “DNS Server” **accepting all defaults**.
* Ignore any warning that arise but troubleshoot any errors.
* Restart your server (even if you are not asked) when the install of the roles are complete.

After the restart, you will notice you have a notification (yellow icon under flag in menu bar) in your Server Management Dashboard. Because this is your first Doman Controller in your network, you need to “**promote**” your server to act as the Primary Domain Controller.

Open your notification (yellow icon under flag in menu bar) and complete the required options:

* Promote your server to a Domain Controller.
* Select “Add a new forest”
* Place your **FQDN** in the “Root domain name” box (*see PowerPoint in BrightSpace for FQDN, Company Inc for domain*)
* We will be using Windows Server **2016** for our Forest and Domain Functional Levels as these are the highest levels available for us.
* Set your Domain Controller capabilities to:
  + Domain Name System (DNS) Server
  + Global Catalog (GC)
  + Do NOT create a Read Only Domain Controller
  + Type DSRM Password = Passw0rd

\*Be very careful to not type the password incorrectly as it is difficult to reset this password.

* Ignore the warning “A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found…” do **not** create a DNS delegation.
* Accept the NetBIOS domain name (**record** for use later in your Professional Documentation).
* Accept the AD DS database, log files and SYSVOL locations (**record** for use later in your Professional Documentation).
* **Stop**. **View** your script of your settings and place a **copy** in your Professional Documentation.
* Confirm that “All prerequisite checks passed successfully”
* Click install to begin the promotion installation.
* When your install is complete, reboot your server (it may reboot on its own)

***NOTE****: After you have setup your AD DS you may note that you have received a Warning on your network configuration in your status bar as the installation may have reset your DNS settings.*

* Reset your IP DNS settings for your server for NIC 1
* Complete the missing information for NIC 2

\***Make sure both NICs now have 2 DNS IPs**

\*\*You may receive a warning about multiple gateways in a network but you can ignore this warning and complete your configuration as required.

* Since we made a change to our NIC this is a good time to restart our computer.
* **ATTENTION**. We may still have a warning at this time as we have not yet configured our DNS.

**Task 3 – Setup DNS and finalize our server install and configuration.**

Now that we have successfully setup our Domain Controller and promoted it to be our Primary DC it’s time to setup our DNS server and Forwarder.

Configure your DNS Server Properties.

\*\* **Remember your addressing MUST match your server IPs identified earlier, do NOT skip the previous steps.**

* Server Manager Dashboard/Tools/DNS
* Select your DNS server by clicking on it in the left hand window
* Right click, select Properties
* Make the following modifications
* Interfaces – Listen on: Only the your IPv4 IP…: Uncheck the ipv6 addresses

Text

Description automatically generated

* Forwarders – Delete all entries and set to router (gateway)

Graphical user interface, text, application

Description automatically generated

***NOTE*** *– your IP Address will* ***not*** *“resolve” as this is a closed network. Our Gateway does not route to an external router or ISP.*

* Close your DNS Manager as we are finished configuring our DNS settings
* Since we made a change to our NIC this is a good time to restart our computer.
* Once you have restarted the computer, confirm your warning icon is gone from your network in your status bar.
* **Stop**. Confirm our network IP information is configured correctly by running the following command, correct any issues and run the command again until your IP settings are correct.

Get-NetIPAddress -AddressFamily IPv4 | Get-NetIPConfiguration -detailed | Format-List

* **Stop.** Be prepared to demo your IP settings via PowerShell.

Now we will confirm our DNS configuration is correct.

* Open your elevated PowerShell console and test DNS configuration with the following command:

dcdiag /test:dns /v /s:”DNSServerHostnameHere” /f:c:/dcdiagReport.txt

This will create a report in the root of your C drive with the results of your DNS test.

* Review your test to confirm end results show a successful test. See image below.

Expected successful results from end of test:

A screenshot of a computer error

Description automatically generated

* Troubleshoot any failures and rerun the test until each area identifies a PASS.
* **STOP**. Be prepared to demo your DNS Test results from your DNS test report that demonstrates the successful functioning of DNS.

Before continuing we will need to make a few more modifications and configurations.

* We will also take this opportunity to create an **NTFS drive** with thedrive letter **H:** and the label **Data** with our current 40G second drive we added during our virtual machine creation.
* Dashboard/ Tools / Computer Management / Disk Management.
* Initialize your disk using GPT - You should not see your Disk 1 set to unallocated.
* Right Click on Disk 1 and create:
  + Simple Volume
  + Use all disk space
  + Drive Letter H:
  + Volume Label = Data
  + Perform a quick format

Now that we have setup a working Domain Controller we will look at adding some users and groups to our new Dev Environment.

* Let’s use Active Directory to create some new users and groups.
* Dashboard / Tools / Users and Computers
  + New OU
    - OU Name = Techs
  + New Group
    - OU = Techs
    - Group Name = SysOps\_gp (there is an underscore)
    - Add SysOps\_gp group **to** Domain Admins Group
  + New User
    - OU = Techs
    - User name = your FirstName, Initial, LastName
    - User Login Name = SysOp.initials
    - User Password = SOPassw0rd
    - Password = Set to not expire
    - Group Membership =
      * Domain Users group
      * SysOps\_gp
* **Stop**. Be prepared to demo your group and user with the correct configurations.

Now that we have created a new environment with a domain we should take the time to elevate our security by modifying our Password Policy. We will do that for everyone by creating a new Password and Lockout Policy with our Group Policy. We will use the following site to support us.

<https://www.windows-active-directory.com/active-directory-password-policies.html>

* Dashboard / Tools / Group Policy Management
* Use the supplied site to create a Password Policy and Lockout policy as identified below:
  + Enforce password history limitations to **5**
  + Set the security setting that determines the period of time (in days) that a password can be used before the system requires the user to change it to **60 days**
  + Set the security setting that determines the period of time (in days) that a password must be used before the user can change it to **2 days**
  + Set the minimum password length to **7** characters
  + Set the account lockout threshold to **3** attempts
  + Set the account lockout duration to 1 minutes
  + Make sure the system resets its lockout counter after **1** minutes
* **Stop**. Be prepared to demo your Password and Lockout Policy settings with Group Policy Manager.
* **Stop**. Since we have made some major modifications to our server, this would be a great time to take a snapshot of your server in the off position.
* **Stop**. Since we have completed most of our configuration for now we will also create a Gold Copy of our server.
* **Stop.** Capture the **properties** of your Gold copy including **location, creation date, modification date and size** and add it to your documentation.

**Task 4 –Windows 10 version 22H2 Client (Pro Education)**

* As this is a workstation/client installation and not a server we will follow our Company Inc. and Naming Convention documents for a Client install and configuration.

*Virtual Machine (VM) Requirements:*

* VM Named according to naming convention document (NCD).
* Machine will have 8g of memory (if you are not able to support 8G then 4G will be acceptable)
* Processors/cores = default
* 2 drives (1x 100g / 1x 40g)
* 1 x NIC = NAT
  + Update your Virtual Machine Description with the recommended details.

*Workstation Requirements:*

* Set up with the following selections:
  + Time and currency = Canadian English
  + Setup for organization
  + Domain Join (do **NOT** use a Microsoft account)
  + Default User Name = InstallTech.
  + Password = ITPassw0rd (password does not expire)
  + First 3 security questions – Answer = nscc for each one
  + Do NOT turn on any additional options or Cortana and only send minimum content
* Set time zone
* System /Host (Device) Name = According to naming convention document (NCD)
* Critical updates applied.
* Activate your client using the KMS Key[[2]](#footnote-2).
* VMWare tools (if required)
* Install Notepad++, 7zip
* Folder options set to:
  + Display hidden files
  + Display file extensions
* Complete the following PowerShell commands to test your successful installation. Troubleshoot any failures or incorrect results and rerun your commands if required.
  + Net user “Default User”
  + Slmgr /xpr
  + Hostname
  + Get-TimeZone

Now that we have created a new Client we will complete our Dev Environment by adding our client to our domain.

* Set your client IP addressing:
  + IP = DCHP
  + DNS:
    - Primary DNS = DNS Server IP
    - Secondary DNS = Blank

A screenshot of a computer

Description automatically generated

IP Configuration Example

* Add your client to your domain using the following site as a guide.
  + When prompted use your **Domain Administrator** account to authenticate to the domain.

<https://activedirectorypro.com/join-computer-to-domain-using-powershell/>

* **Remember**, once we have added our client to the domain, we will **not** use the local default account.
* Test your client is now a member of the domain by logging in with your Systems Operator account.
* **ATTENTION**: Now that we have added our Client to our Domain we will always need to ensure our Domain Controller is running before we start or stop our client or the connection will be broken!
* **Stop**. Be prepared to demo your client is an active member of your domain.
* **Create** a snapshot of the workstation in the “off” state after workstation install and configuration is complete. Follow our naming convention for snapshots.
* Create “Gold” Copy of your completed workstation install.

**Comprehensive and Documentation Submission Marking**

|  |  |
| --- | --- |
| **Value** | **Task** |
|  | **Comprehensive Marking** |
|  | **Server Marking** |
| 4 | Meets Hardware and VMWare requirements including description. |
| 10 | Demo PowerShell commands and print results to report, have your report open for review:  Net user Administrator >> C:\A1Report.txt  Hostname >> C:\A1Report.txt  Get-TimeZone >> C:\A1Report.txt  **OneLineOfCodeBelow**  Get-CimInstance -ClassName SoftwareLicensingProduct | Where-Object PartialProductKey | Select-Object Name, LicenseStatus | Out-File C:\A1report.txt -append  **OneLineOfCodeBelow**  Get-NetIPAddress -AddressFamily IPv4 | Get-NetIPConfiguration -detailed | Format-List | Out-File C:\A1report.txt -append  **OneLineOfCodeBelow**  Get-ADDomain | Select DistinguishedName | Out-File C:\A1report.txt -append |
| 2 | DNS Interfaces Listen on and Forwarders set correctly. |
| 2 | DCdiagReport.txt with correct and successful configuration demonstrated. |
| 1 | H:\ Data Drive |
| 4 | Active Directory Users and Computers include:   * + New OU     - OU Name = Techs   + New Group     - OU = Techs     - Group Name = SysOps\_gp (there is an underscore)     - Add SysOps\_gp group **to** Domain Admins Group   + New User     - OU = Techs     - User name = As per naming convention for Systems Operator     - User Login Name = SysOp.initials     - Password = Set to not expire     - Group Membership =       * Domain Users group       * SysOps\_gp   + Computer     - Client listed in Computers OU |
| 7 | Group Policy - Password and lockout policy   * + Enforce password history limitations to **5**   + Set the security setting that determines the period of time (in days) that a password can be used before the system requires the user to change it to **60 days**   + Set the security setting that determines the period of time (in days) that a password must be used before the user can change it to **2 days**   + Set the minimum password length to **7** characters   + Set the account lockout threshold to **3** attempts   + Set the account lockout duration to **1** minutes   + Make sure the system resets its lockout counter after **1** minutes |
|  | **Client Marking** |
| 5 | Demo PowerShell commands and print results to report, have your report open for review:  Net user Administrator >> C:\A1Report.txt  Hostname >> C:\A1Report.txt  Get-TimeZone >> C:\A1Report.txt  **OneLineOfCodeBelow**  Get-CimInstance -ClassName SoftwareLicensingProduct | Where-Object PartialProductKey | Select-Object Name, LicenseStatus | Out-File C:\A1report.txt -append  **OneLineOfCodeBelow**  Get-NetIPAddress -AddressFamily IPv4 | Get-NetIPConfiguration -detailed | Format-List | Out-File C:\A1report.txt -append |
| 2 | Demo login with Tech Operator account. |
| 4 | All settings and configurations completed and correct:   * Software installed (7zip, Notepad++) * Folder options set |
| **41** | **Total Marks for comprehensive marking** |
|  | **Submitted Documentation** |
| 1 | NetBIOS name for server |
| 3 | AD DS database, log files and SYSVOL locations |
| 2 | DC Promo install script file |
| 2 | Snapshot of **server** with correct naming convention |
| 2 | Gold copy **properties** of **server** with required details. |
| 1 | Snapshot of **client** with correct naming convention |
| 1 | Gold copy **properties** of **client** with required details. |
| 2 | Document follows all Professional documentation requirements as per page 1 of assignment |
| **14** | **Total Marks for document submission** |
|  |  |
| **55** | **Total Assignment Marks.** |

1. *If using a personal computer, you will need to launch your server on nscc machine to activate the KMS key.* [↑](#footnote-ref-1)
2. *If using a personal computer, you will need to launch your server on nscc machine to activate the KMS key.* [↑](#footnote-ref-2)