

TNE10005/TNE60002

Network Administration

Lab 1

An Introduction to Network Administration Labs

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Aim:

- To have an overview of the units' lab infrastructure and resources
- To learn how to use Hyper-V at an introductory level in ATC626 lab connecting to the Network Administration Azure lab

Preparation:

- View [“Lecture 01 Presentation – Topic 2: Network Devices”](#)
- Review [“Lab Report 1 requirements”](#)

Resources:

- Network Administration Lab - Network Topology
https://swinburne.instructure.com/courses/57016/files/28232483?module_item_id=3845607
- Microsoft Unit: Using Virtual Machines – Recommended Best Practices (Video)
https://swinburne.instructure.com/courses/57016/files/28232320?module_item_id=3845610
- How to Connect to Network Administration's Azure Labs
https://swinburne.instructure.com/courses/57016/files/30187456?module_item_id=4131816
- Accessing and Downloading Software from Microsoft Azure for Education
<https://azureforeducation.microsoft.com/devtools>
- “Get Started with Windows Server 2022”
<https://docs.microsoft.com/en-us/windows-server/get-started/server-basics>
- Windows Server 2022, Versions: Standard or Datacenter, 64-bit (English) iso image at
<https://azureforeducation.microsoft.com/devtools>

Introduction to Network Administration - Practice Environment

Network Administration students, to practice weekly, can use a computer in ATC626 computer lab and/or the virtual machine allocated to them in this unit's Azure lab. An allocated virtual machine in the unit Azure lab is called the **Host Machine** since it will host other virtual machines used for practice.

In order to understand network concept and technologies learnt in the units, there is a set of machines with different operating systems installed, and with different roles as in *Fig.1 Network Administration Lab – Network Topology*.

- **sWin22RTR** is a machine that is installed with Windows Server 2022 and functions as a Router.
- **sWin22DC1** is a machine that is installed with Windows Server 2022 and functions as a DHCP server, a DNS server and a Domain Controller.
- **sWin10PC201** is a machine that is installed with Windows 10 in a Workgroup.
- **sWin10CL101** is a machine that is installed with Windows 10 in the domain sWin.Local.
- etc.

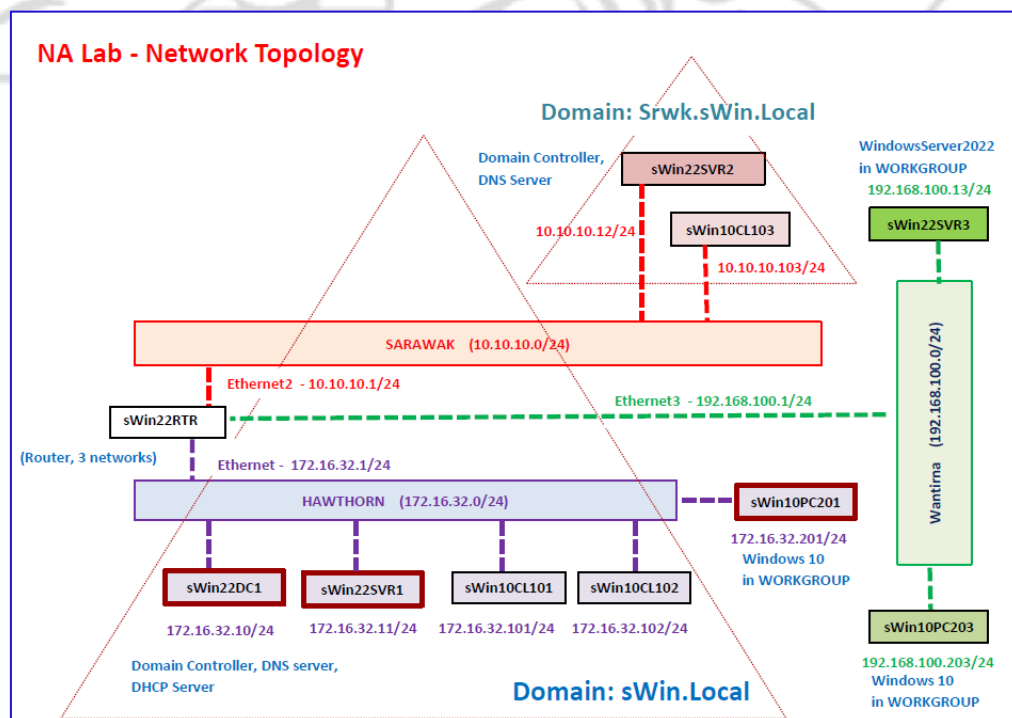


Figure 1: Network Administration Lab – Network Topology

Please be reassured that you will learn such concepts and technologies as DHCP, DNS, Domain, and so on, in the coming weeks, i.e. you will be exploring all components presented in the Network Topology in the following week lab. It is very common that at this stage you might find the Network Topology is complex or you do not know what DHCP server, or DNS server, or Domain Controller is.

Now, by observing the machine names sWin22DC1, sWin22RTR, sWin10PC201, sWinCL101 and the operating system installed in these machines, what operating system do you think is installed in the first machine that is installed Window server 2022 in the domain Swin.local

- sWin22SVR1 _____
- sWin22SVR2 _____
- sWin22SVR3 _____
- sWin10CL102 _____
- sWin10PC203 _____

In Fig.1 Network Administration Lab – Network Topology, there are 3 switches named **Hawthorn**, **Sarawak** and **Wantirna**.

- What are the functions of these switches?

- Which virtual machines are connected to the Hawthorn Switch?

- Which virtual machines are connected to the Sarawak Switch?

- Which virtual machines are connected to the Wantirna Switch?

The **sWin22RTR** is a machine that is installed with Windows Server 2022 and functions as a Router.

- What are the functions of routers in general?

- What are the functions of the sWin22RTR router?

In the following week lab, we will be exploring further the roles/functions of these machines, switches, and router.

Introduction to Hyper-V.

There are 10 computers/machines required in the **NA lab – Network Topology** for each student using in their practice. It is definitely NOT cost, time, space neither technical efficient for deploying and maintaining 10 physical computers for each student to practise. Hence, we have used Hyper-V virtualisation platform in deploying Microsoft unit labs.

Hyper-V is Microsoft's software is installed and enabled within a computer/machine called **host machine**, for running multiple and independent computers/machines so that they can share the same host machine hardware. The part of the host's operating system that allows the virtual machines to share the hardware is called the *hypervisor*, and this is where Hyper-V gets its name. Computers/Machines that run within the Hyper-V software are called virtual computers, virtual machines, or guests. Hence, using Hyper-V, within a single host computer in the ATC626 lab or within a single virtual host machine in the unit Azure lab, the 10 **Guest Virtual Machines** (sWin22DC1, sWin22RTR, sWin10CL101, etc.) are hosted.

Most current computers (i.e. those built since 2012) have processors that support virtualisation with hypervisors. Microsoft Windows Server 2008 or above with Windows 8 Professional or above can all function as a guest operating system for Hyper-V. Unfortunately, the home editions of Windows 8 & Windows 10 do not support Hyper-V.

It is optional for this unit, but if you would like to learn how to install Hyper-V:

- on Windows 10 Professional, click [here](#), or
- on Windows Server, click [here](#)

Click [here](#) to learn how to set up Hyper-V and create a virtual machine in Hyper-V.

However, keep in mind that you need lots of RAM, and lots of free disk space.

If you do not have a host operating system that supports Hyper-V then you may be able to use VMware, but remember that the tutors in this unit may not have the experience to help you with these products.

Introduction to Using Hyper-V.

Exercise 1. Using Hyper-V in Network Administration Azure Lab

We will start with using Hyper-V in the *Network Administration Azure lab*.

Please read the document [How to Connect to Network Administration's Azure Labs](#) in the Module **Laboratory Exercises** on Canvas.


Note: You must have received an invitation email from Microsoft with your link to your Host Virtual Machine. If this email is not in your student email, please first check your junk mail folder and if it is not in your email, post a request in an appropriate thread in Ed Discussions.

1. Loading the Hyper-V Manager

The Hyper-V Manager icon should appear on your desktop or toolbar.



Figure 2: Hyper-V Manager Icon

Double clicking the Hyper-V Manager icon will launch it. If the icon is missing on your computer press the **Win** key () and then select **Hyper-V Manager**.

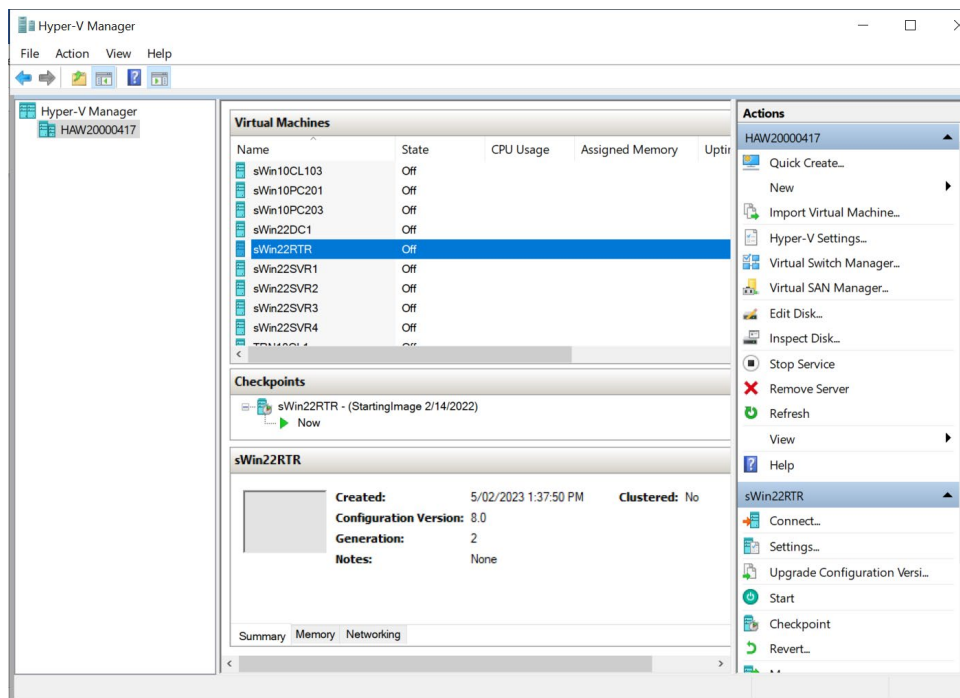
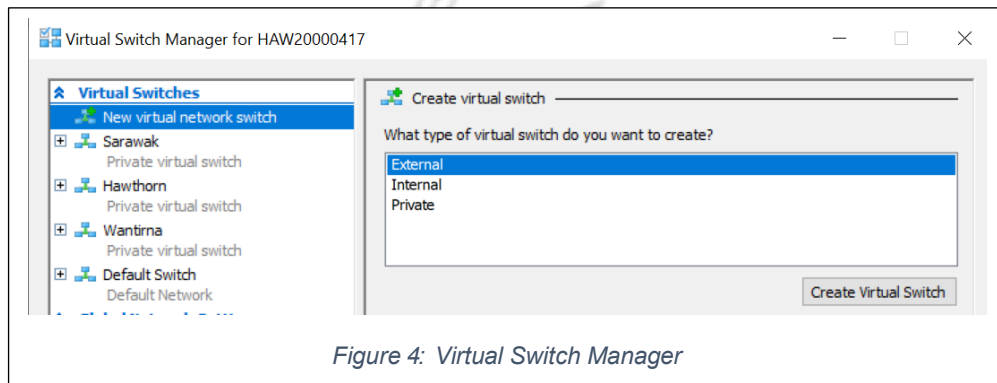


Figure 3: Hyper-V Manager Interface

In the Hyper-V manager interface, notice the panes Virtual Machines and Actions. We will be mainly using these panes in this lab.

2. Viewing and Creating Virtual Switches

- a. From the Actions pane of **Hyper-V Manager** select **Virtual Switch Manager...**



Notice that at the top left, under Virtual Switches, you can see the existing virtual switches, i.e. Sarawak, Hawthorn and Wantirna switches created as parts of the unit's Network topology.

- b. Now, let's create a new virtual switch for computers in Croydon location to connect to, from the **Create virtual switch** windows, click the button **Create Virtual Switch**.

In the **Name:** field, enter the name **Croydon**. In the **Notes:** field, enter a note that lets others know that you created the switch for this lab. Configure the **Connection type** to be a **Private network**. Click **OK**.

3. Examining the Properties of a Virtual Machine (VM)

- a. In the most left pane, click on <ComputerName> (i.e. **23s1NetAd-Host**) beneath the Hyper-V Manager.
- b. In the Virtual Machines pane, right-click any VM, i.e. **sWin22SVR3**. You will see the options Connect, Settings, Start, Checkpoint and Revert.

c. To view the properties of the VM, click on **Settings**.

- How much RAM has been allocated to this VM: 1024 MB
- Which controller has the VM's hard disk attached? SCSI Controller
- What network is the VM attached to: Wantirna

Notice that at the top left of the settings window you can change the VM focus, i.e. you can choose other VMs to change the settings of.

d. Click on **Cancel**.

4. Virtual Machine – Checkpoints and Reverting

Each guest VM in a computer in ACT626 lab or in a host VM allocated to each student in the unit Azure lab has been deployed with a Checkpoint, named **StartingImage**, in which the VM has been configured with correct settings and roles as designed and detailed in the Lab Network topology.

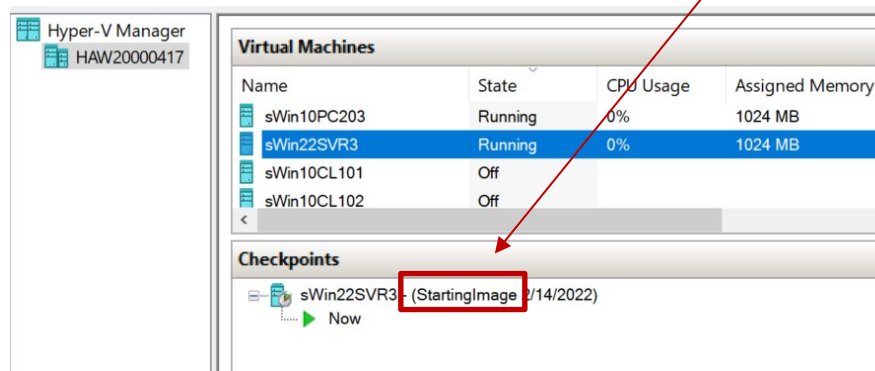


Figure 5: The **StartingImage** Checkpoint

Please note that we will not be creating any additional checkpoints in ATC626 lab neither in Azure labs, but it is very useful if you have the VM set deployed in your own computer. A checkpoint will save the state of a virtual machine at a particular point of time, hence it enables to revert the VM back to that point of time configuration.

During the semester, students will likely practise on different learnt concepts and technologies by configuring different settings and roles. These practice require VMs without unwanted errors or pre-configured (i.e. by previous lab class students). Hence, to prevent unwanted and unknown errors, students are instructed to successfully **revert** (i.e. reverting returns without errors) a VM prior to launching it for using.

Reverting deletes the changes and reverts the VM back to the state when **the last Checkpoint** was made. Since there is only one checkpoint (the *StartingImage* checkpoint) was created for each VM when the lab was deployed, the **revert** action in the unit lab instructions means reverting a VM back to its StartingImage.

Now, let's try this Revert feature!

We will first launch/start a VM (i.e. **sWin22SVR3**) that has been reverted to its StartingImage, observe the original settings; make some changes; then revert the VM back to its original state (its StartingImage).

- a. Right click **sWin22SVR3**, and select **Settings**.

Which virtual switch that this VM is connected to? Wantirna

(Hints: Look under **Hardware – Network Adapter**)

- b. Now change the Network Adapter to connect to a different virtual switch, i.e. Hawthorn.

In Settings for sWin22SVR3, under Hardware, click to select **Network Adapter**.

In the **Network Adapter** window, pull down the **Virtual switch:** and select **Hawthorn**, then click **OK**.

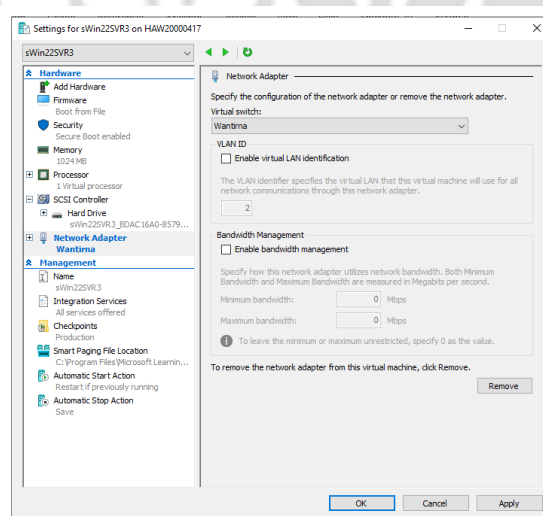


Figure 6: Change Network Adapter settings


- c. Right click on **sWin22SVR3**, and select **Start**.

Notice that no window opens, but in the **sWin22SVR3** pane notice there is a thumbnail image of the virtual machine and this shows it is running.

It is important to remember that virtual machines can run in the background. But if we want to interface with it then we need to connect to it.

- d. Right click on **sWin22SVR3**, and select **Connect**. A window will now open.
- e. Type in the password (**Pa55w.rd**) and either press **Enter** or click on the **Submit** icon (i.e. "→").

*The password **Pa55w.rd** will be the standard password for all user accounts in all labs and exams this semester – so remember it!*

- f. When the log in is complete, right- click the **Win** key  on the tool bar at the bottom left of the window, the **Start Menu** will pop up.

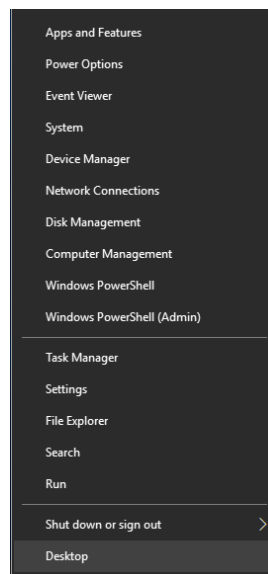


Figure 7: Windows Start Menu

- g. Select **Run**. In the **Open** box, type **cmd** and click **OK**.

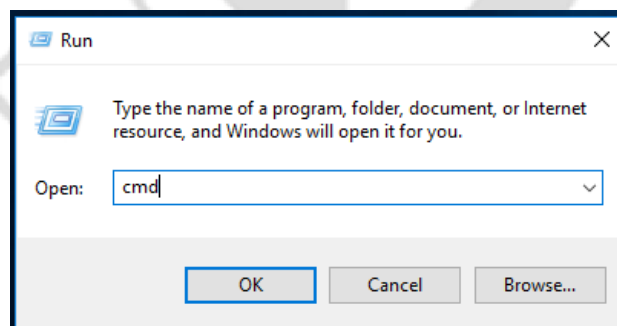



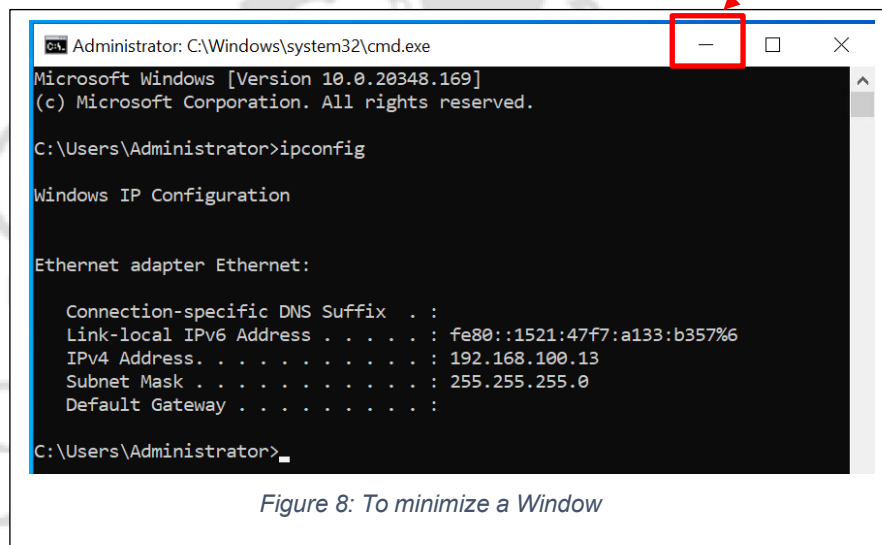
Figure 8: To Launch Command Prompt

- h. In the **Command Prompt**, type **ipconfig** and press **Enter**.
- i. Record the output for the **Ethernet Adapter** here:

IPv4 Address: 192.168.100.13

Subnet Mask: 255.255.255.0

Do not close the **Command Prompt** window since we will use it in the later steps to verify IP settings changes. Hence, just minimise it, click on the  icon on the top right corner of the Window.



We are now going to configure sWin22SRV3's IP settings with IP address of 172.16.32.13 and subnet mask 255.255.0.0

- j. On **sWin22SRV3**, in **Server Manager** Window, click **Local Server** in the most left pane. Below the **properties** section, click the link next to **Ethernet**. In the **Network Connections**, right click **Ethernet** and select **Properties**

Without removing the tick, click on **Internet Protocol Version 4 (TCP/IPv4)**, and select the **Properties** button.

Select **Use the following IP address:** and enter the following details:

- IP address: 172.16.32.13
- Subnet mask: 255.255.0.0

Click **OK** twice.

(Notes: If your **sWin22SRV3** has a default gateway configured (i.e. 192.168.100.13, remove it, i.e. make the default gateway field empty)

- k. To verify that the IP settings have been changed, click **Command Prompt**



icon on the tool bar, then in the **Command Prompt**, type **ipconfig** and press **Enter**.

Confirm that the IP settings are as what you configured in step (j).

You have made 2 changes to sWin22SVR3:

- Change the Network Adapter connection: from Wantirna to Hawthorn
- IP settings: from IP=192.168.100.13 , SM=255.255.255.0
to IP=172.16.32.13, SM=255.255.0.0

Assuming that we have completed all practice and would like to delete all changes made to sWin22SVR3, let's perform **revert** action on this VM.

- l. Right- click the **Win** key on the tool bar at the bottom left of the window, click **Shutdown or Sign out**, then select **Shutdown**. Click **continue** to accept the default reason to shut down, and proceed to shut down the VM.
- m. Back to **Hyper-V manager**, right click **sWin22SVR3**, and select **Revert....** In the **Revert Virtual Machine** pop up box, click **Revert** button to confirm that you want to revert the VM to its previous (the latest) checkpoint.

After reverting completes, verify that **sWin22SVR3** has its *original* settings, i.e.

- Network Adapter connection: Wantirna
- IP settings: IP=192.168.100.13 , SM=255.255.255.0

- n. In **Hyper-V manager**, right-click **sWin22SVR3**, and select **Settings**. Is the Network Adapter connected to Wantirna?

Check with your lab supervisor if the result is different!

- o. In **Hyper-V manager**, right-click **sWin22SVR3**, and select **Start**.

Again, right-click on **sWin22SVR3**, this time select **Connect**. Click **Connect** (or **Reconnect**).

Type in the password (**Pa55w.rd**) and press **Enter**.

Once the log in is complete, use Command Prompt to verify the IP settings.

(Hints: Refer to steps **f-h** in the previous pages)

Are the IP settings the same as what are recorded in step i?

Check with your lab supervisor if the result is different!

Exercise 2. Documenting your Lab Report 1

1. Review [“Lab Report 1 requirements”](#) if you have not done so, in order to best prepare for your learning and assessment.
2. Record the concepts, design strategies, techniques, configurations and commands that you learn in each week learning, both in lecture and laboratory class.

Do not leave the lab until the pack up stage is complete

Pack Up

1. Shut down all guest VMs.
2. **Sign out** from the Host virtual machine and make sure that it is **Stopped** otherwise it will run in the background and use up your quota.
3. If on campus, **log off from the ATC626 lab PC**, and push your chair in as you leave.

~~~~~ End of Lab ~~~~~