

Lab 4 – TCP/IP Configuration and Tools

Upon completion of this lab, you will have performed both Automatic and Manual TCP/IP configurations and used TCP/IP tools to test, configure and troubleshoot your IPv4 installation on Windows Server.

There are several questions in this lab intended to force you to stop, think, and determine if you understand what is happening. You might find it useful to record the answers to these questions for your own learning. However, you do not need to hand in the answers to these questions.

Approximate completion time: 90 minutes.

You will need to work on three different VMs during this lab:

- Server1: Sections 1.0-5.0
- Server2: Sections 1.0, 2.0 & 6.0
- Client1: Sections 7.0

1.0 Change the Network Settings for VMWare Workstation Pro

1. Open Server2 in VMWare Workstation. Do not turn it on.
2. Click 'Edit virtual machine settings'
3. Select 'Network Adapter' and change this setting to 'Bridged'.
4. Do the same for your Server1 and Client1.
5. Power on both Server1 and Server2.

2.0 Allowing 'ping' Through the Firewall (Firewall Configuration)

Default Windows Server configurations has a firewall setting that does not allow your server to respond to Ping requests. In order for this lab to work correctly, open **PowerShell** and type:

Import-Module NetSecurity

netsh advfirewall firewall add rule name="Allow Ping" protocol=icmpv4 dir=in action=allow

*Run both of these commands **As Administrator** on Server1, Server2 and Client1. You may have to right-click on Powershell and select Run As Administrator.

Close the PowerShell window once this operation is completed.

3.0 Check TCP/IP Configuration on Server 1

1. Click Start and click Control Panel.
2. If you are at the Control Panel Home view, click View Network status and tasks (under Network and Internet). If you are in the Classic View, double-click the icon for Network and Sharing Center.

3. Click the link for Change Adapter Settings.
4. Right-click the appropriate connection, such as Ethernet0. Click Properties.
5. Check to see if TCP/IP is enabled. If it is enabled you will see checkmarks next to IPV4 and/or IPV6.
6. Double-click Internet Protocol Version 4 (TCP/IPv4). Note that the default configuration is to "Obtain an IP address automatically". Notice that you cannot see what your current IPv4 information. Close the dialog box by clicking Cancel and close the Ethernet0 Properties dialog box as well.

4.0 Use IPCONFIG and PING (Server1)

Practice more on these commands as these are most useful for network configuration and troubleshooting. Please answer the questions 1 -17 below and save all answers in a document file as Lab4-Answers.docx.

INFORMATION:

ipconfig is a command line utility that allows you to view and reset your TCP/IP configuration information. The syntax of the command and options are as follows: *ipconfig /OPTIONS*

OPTIONS:

/? Displays this help message
/all Displays full configuration information
/release Releases the IP address for the specified adapter
/renew Renews the IP address for the specified adapter
/flushdns Purges the DNS Resolver cache

Ping is a command line utility used to test connectivity between computers.

If you are having connectivity problems, you can use the ping command to check the destination IP address you want to reach and record the results. The ping command displays whether the destination responded and how long it took to receive a reply. If there is an error in the delivery to the destination, the ping command displays an error message.

You can use the ping command to:

- *Ping your computer (by address, not hostname) to determine that TCP/IP is functioning. (Pinging your computer does not verify that your network adapter is functioning.)*
- *Ping another computer on your local network (by address) to determine connectivity.*
- *Ping using a hostname to determine if DNS is resolving names.*
- *Ping the local router to determine whether the router is running.*
- *Ping beyond your local router.*

For more information about the PING command, see the following link, or use Google:
<http://technet.microsoft.com/en-us/library/cc737478%28v=ws.10%29.aspx>

INSTRUCTIONS START HERE

1. To open an Administrative Command Prompt, hover the mouse cursor of the upper or lower right corner of the screen. Select Search. Type Command Prompt. Right click Command Prompt and select Run as Administrator. **(Make sure you are using Command Prompt and NOT PowerShell.)**

Question 1. At the Command Prompt, type `ipconfig` and hit enter. Information about your TCP/IP configuration will display in the window. Notice your IP address, subnet mask and default gateway.

- Where did this TCP/IP configuration come from?
- How do you know?
- What other information is displayed

Question 2. Type `ipconfig /all` and hit enter.

- What is the HOST NAME?
- What is the IP address of the DHCP server?
- What is the IP address of your DNS server?

2. Type `ipconfig /?` to display the help file for `ipconfig`. Notice all of the options and examples that are displayed (more than are in the introduction, above).

Question 3. Type `ipconfig /release` and hit enter. What have you just done?

Question 4. Type `ipconfig /renew` and hit enter. What have you just done?

Question 5. Type `ipconfig /all` again.

- Is your configuration information the same as it was before or is it different?
- Why would you “release and renew” your IP configuration?

3. Type `ping localhost` and hit enter.

4. Type `ping loopback` and hit enter.

Question 6. Type `ping 127.0.0.1` and hit enter. Is there any difference in the output of the 3 commands (8, 9, 10) you used?

5. Use two VMs to do the next few steps.

Question 7. Type `ping [your server2's IP address]`

- What is the result?

Question 8. Type `ping google.com`

- What is the result?
- Why does not your computer recognize google.com?

Question 9. Type the command `ping -l 1500 [IP address of your Client1 or Server2]`

- Notice the bytes entry in the results and compare it to your previous pings.
- What is the difference?

Question 10. Type `ping -n 10 [ip address of client1 or server2]`

- Notice the results of the command.
- What did this ping command do differently from previous pings?

5.0 Using ARP to See Your Local ARP Cache

ARP (Address Resolution Protocol) is used to acquire the physical addresses associated with a computer's network interface card (NIC). Every NIC has a physical address, or media access control (MAC) address. The MAC address is programmed on the NIC when it is manufactured and no two NICs have the same MAC address. For computers to communicate with each other, they must know the MAC addresses of each other's NIC. Proper communications using TCP/IP rely on both IP addresses and MAC addresses.

In this exercise, you will view your ARP cache to view the MAC addresses of systems that you have communicated with. You will then ping the IP address of a system that does not appear in your ARP cache and verify that it was added to the cache.

1. Open an Administrative Command Prompt, if one is not already open.

Question 11. At the command prompt, type **arp -a** and press ENTER. Make a note of any entries that are in your ARP cache.

2. Ping the IP address of a host on your network that was not in your ARP cache by typing **ping <IP address>**.

Question 12. Type **arp -a** again to view your ARP Cache. Is the new address found in the above step #2 added to the ARP Cache. Record the new entry:

Question 13. Type **arp /?** to find other switches that can be used with the arp command.

- What does the -d switch do?
- What does the -s switch do?

3. Exit the Command Prompt window on Server1.

6.0 Manual/Static IP Configuration on Server2.

In this activity, you will change Server2 to have a manual TCP/IP configuration and you will use tools to test the configuration and connectivity.

6.1 Manually Configure TCP/IP

1. In you Internet Protocol Version 4 Properties dialog box, change the IPV4 settings to:

IP Address 10.0.xxx.20 (xxx is the number you collected in your PreLab)

Subnet Mask 255.255.0.0

Leave the Default Gateway and DNS settings blank.

(You may have done this in Lab 2 – if so, please check if these are correct and go to the next step)

6.2 Use IPCONFIG and PING

Question 14. Open an Administrative Command Prompt and use `ipconfig /all` to verify your configuration. What is different this time?

Question 15. Use ping to test your local configuration and connectivity between Server 2 with Server 1.

- What happens?
- Should you be able to access the Internet with your current configuration?
- Should you be able to ping your Server1?

7.0 Configuring your Windows Client to connect to the Server

1. Open your Client1 VM and login using the username you created in Lab 1. This user account will have Administrative privileges on this computer.
2. Open Control Panel (in Windows, you can always press the Windows Key on the keyboard and type the option you are looking for). From Network and Internet, select View network status and tasks.
3. On the left side of the window, select Change adapter settings. Right-click your Ethernet adapter and select Properties from the menu.

Question 16. Open the properties for Internet Protocol Version 4 (TCP/IPv4).

- What is the default setting for TCP/IP on your Windows Client?
- How do you find out your current TCP/IP configuration?
- Will you be able to connect to both Server1 and Server2 with your current configuration? Explain.
- Can you access the Internet with this configuration?

Question 17. Test your connection with each server using the **ping** command. Which server can you connect to and why? If you cannot connect, why?

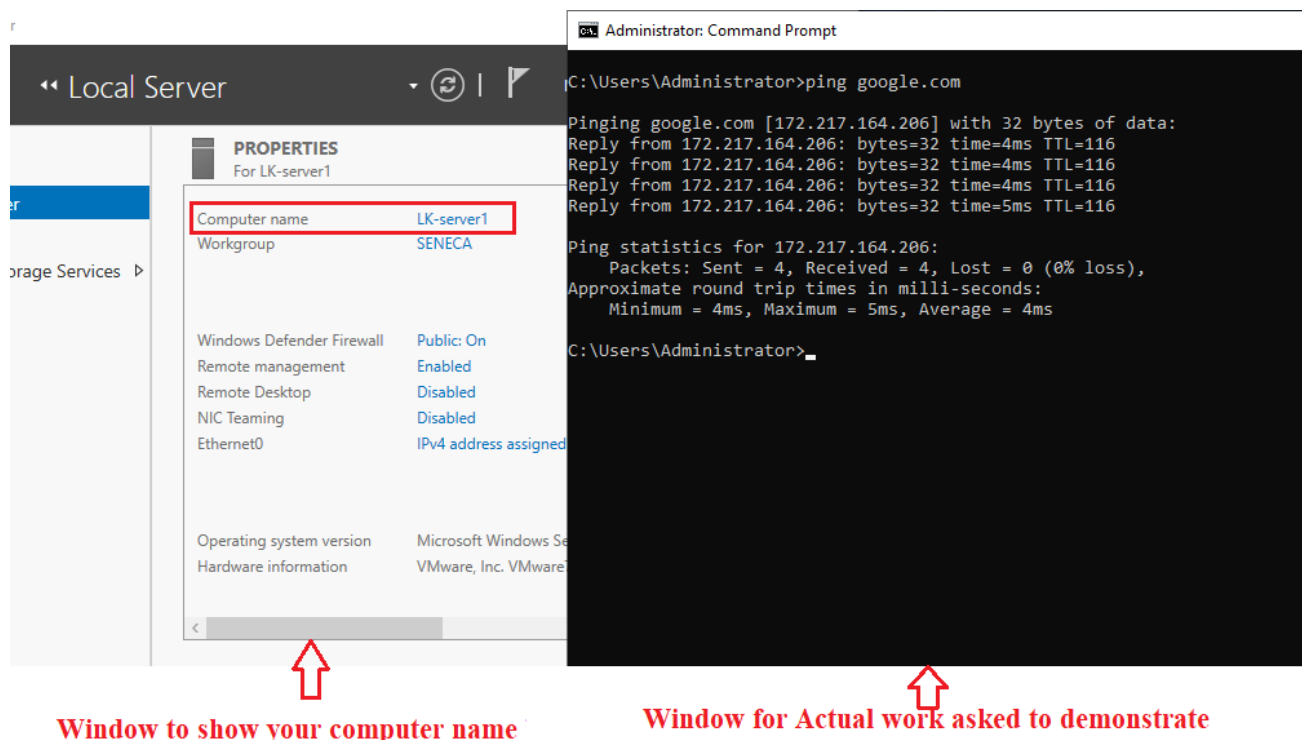
4. View your IP configuration using `ipconfig /all`.
5. **Manually configure TCP/IP with the TCP/IP settings on the Prelab Chart. (you may have done this in LAB2. If so, please check the configuration is done correct)**
6. View your IP configuration using `ipconfig /all`.

- Will you be able to connect to both Server1 and Server 2 with your current configuration? Explain.
- Can you access the Internet with this configuration?

To prove you have completed the lab, you must submit the following into blackboard

- On Server1: demonstrate that IPv4 is Automatically configured, and display the IP address the server has obtained from the DHCP server. Take a screenshot and save it as Lab4-Server1.jpg
- On Server2, demonstrate that IPv4 is Manually configured, and show the configuration. Take a screenshot and save it as Lab4-Server2.jpg
- On Client1, demonstrate that IPv4 is Manually configured, and show the configuration. Take a screenshot and save it as Lab4-Client1.jpg
- Save answers of Question 1 – 17 in a document file, save the file as Lab4-Answers.docx

Whenever you take a screenshot of your actual work that you are asked to demonstrate, please make sure you take a screenshot of your computer name along with the actual work together (side by side). For reference, please see the screenshot below:



Upload Lab4-Server1.jpg, Lab4-Server2.jpg, Lab4-Client1.jpg and Lab4-Answers.docx to the blackboard.