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| **Networking Infrastructure**  Diploma in CSF / IT  Apr 2020 Semester 3 | Week 5 |
| Session 1 |
| **Troubleshooting TCP/IP Networks** | |

**Objectives**

At the end of this lesson, students should be able to identify and use appropriate tools such as **ipconfig, ping, tracert, arp, netstat and nslookup** in troubleshooting a TCP/IP network.

**Activity 1: ipconfig**

1. Type ipconfig/all at the command prompt from your computer.
2. What information is displayed using this command? Paste your screenshot in the box below.

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1. Are the IP addresses of your default gateway, DNS server and DHCP server the same? Explain the reason.

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| My default gateway and DHCP is the same as it is config my the ISP but the DNS is different because I change it. |

**Activity 2: ping**

1. Try to “ping” your default gateway and paste your screenshot in the box below. Discover the various opitons for ping using “ping /?”.

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1. Ping your default gateway (x.x.x.x) with the following options:
2. Ping x.x.x.x –t

Observe and explain, what is the function of “-t” in this command.

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| The there is unlimited amount of ping, -t make the ping loop |

1. Ping x.x.x.x –l

Figure out yourself the command to ping your default gateway with 20 bytes of data. Paste your screenshot in the box below.

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| The bytes from 32 change to 20 bytes |

1. Figure out yourself the command to ping your default gateway with 10000 bytes of data. Paste your screenshot in the box below.

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1. What are your observations by comparing the above 2 results?

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| Bigger the bytes, the longer the time |

1. What is the default TTL for Ping? What option would you use to specify a different TTL value?

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| Default: 64  To specify, use ping -i |

**Activity 3: Tracert**

1. There are many online tools to perform ping and tracert. Visit the following web site <http://centralops.net/co/> to test the “tracert” command.
2. Tracert to [www.google.com](http://www.google.com) and paste your screenshot below. How many hops are there in your tracert?

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**Activity 4: nslookup**

1. Type “nslookup facebook.com in your command prompt and paste your screenshot below.

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1. Do a simple research and find out the meaning of “Non-authoritative answer”.

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| Non-authoritative answer simply means the answer is not fetched from the authoritative DNS server for the queried domain name |

**Activity 5: netstat**

1. Do a search and find out the purpose of “netstat”.

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| Is to print network connections, routing tables, interface statistics, masquerade connections, and multicast memberships  . |

1. Try to type netstat from your command prompt and paste your screenshot below. (If there is no active TCP/IP connections, use the Internet Explorer to access a website. Run netstat again and record your results).

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1. Note that netstat is useful to troubleshoot TCP connections and can be used to check for unauthorized TCP connections.
2. To see the various options available, key in “netstat ?”
3. Key in the command netstat –s and observe the statistics display for the protocol.
4. Try other options such as netstat –r and note the result.

**Activity 6: arp**

This is used to view the ARP cache on the local computer. You can do a simple research to understand more on it. You may also use ARP to return the NIC address of a known IP address.

1. Type arp –a in your machine. What information is display when you key in this command? Paste your screenshot in the box below.

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| This display all resolved MAC address of all port in the ARP cache |

**(Optional)**

**Activity 7: SSH**

**You must know the address of the remote host computer before you can initiate a session with SSH.**

SSH lets you sit at a keyboard connected to one computer and log on to a remote computer across the network. The connection can be to a machine in the same room, on the same campus, or a computer on the World Wide Web somewhere else in the world.

You can invoke the SSH from PuTTY program on your own computer.

**Activity 8: nslookup**

You can try the below nslookup command when you are in campus.

1. Type nslookup in the command prompt. Write down the result.
2. Continue to type set q=all
3. Continue to type facebook.com
4. Write down the result and your observation. It show all DNS record it can get
5. Type set q=mx
6. Type facebook.com and write down the result. Write down your observation

It display all email preference and mail exchanger