

Student Name : Tang Zhengtian

Group : TS4

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Location (On/Off campus) when you did the experiment: On Campus

LAB 1: UNDERSTANDING NETWORKING WITH INTERNET TECHNOLOGIES
EXERCISE 1A: COMMUNICATION ARCHITECTURES

Classify the following installed communication modules into their appropriate layers in the TCP/IP architecture (ie protocol stack in figure 1.1):

Internet Protocol (IP) : Network layer
Network controller card
(Realtek PCIe GBE Family Controller) : Physical layer

EXERCISE 1B: ADDRESSING

Classify the use of the following addresses into their appropriate layers in the TCP/IP architecture (protocol stack in figure figure 1.1):

Port number : Transport
IP address : Network
MAC address : Data link

EXERCISE 1C: PHYSICAL/MAC/ETHERNET ADDRESSES

Determine the MAC address of your PC:

MAC Address : A4-BB-6D-43-44-CB
Manufacturer : Intel(R)

EXERCISE 1D: IP ADDRESSES

NTU IP address range (NOT your PC IP address) : 155.69.0.0 - 155.69.255.255

Determine the special uses of the following IP addresses:

{ 127, <any> } : Internet host loopback address
{ 172.21, <any> } : Private-use network

EXERCISE 1E: DYNAMIC HOST CONFIGURATION PROTOCOL (DHCP)

Determine the following for your laboratory PC:

DHCP Enabled : Yes
DHCP Server : 155.69.3.8
IP Address : 172.21.145.128
Network/Subnet Mask : 255.255.248.0

What is your IP address (from Ipconfig) : 172.21.145.128

What is the reported IP address from website (try <https://www.apnic.net/>) : 155.69.176.9

Who is the owner of the IP address reported by the website? NTU Network Manager

EXERCISE 1F: PORT NUMBERS

Determine the well-known ports for the following services:

TELNET : 23
 Simple Mail Transfer Protocol (SMTP) : 25
 Quote of the Day Protocol : 17
 Domain Name Service (DNS) : 53
 Hyper-Text Transfer Protocol (HTTP) : 80

1G.) - Register a domain name by visiting any registrars accredited by SGNIC:
 1. Check proposed name's availability on SGNIC's website using WHOSI.
 2. Apply for proposed domain name by submitting an application to SGNIC's list of accredited registrars.
 3. Pay related fees to registrars for registering the domain name.

EXERCISE 1G: DOMAIN NAMES

How do you register/buy a domain name under .sg, e.g. myweb.per.sg?

**EXERCISE 1H: DOMAIN NAMES/IP ADDRESSES TRANSLATION
- DOMAIN NAME SYSTEM (DNS)**

Determine the followings:

Local DNS servers for your laboratory PC : 155.69.3.8 / 155.69.3.9
 Authoritative DNS servers for ntu.edu.sg : 155.69.254.5 / 155.69.254.230
 IP address of domain name www.ntu.edu.sg : 155.69.7.173

What is the command to show the entries in the DNS cache? `ipconfig/displaydns`

What is the command to clear the entries in the DNS cache? `ipconfig/flushdns`

EXERCISE 1J: PROPRIETARY MICROSOFT WINS

Determine the followings for your laboratory PC:

NetBIOS/Host name : spl-r2-v032
 Primary WINS server : 155.69.5.154
 Secondary WINS server : 155.69.5.54

EXERCISE 1K: DEFAULT GATEWAY

IP address of default gateway : 172.21.151.254

**EXERCISE 1L: IP ADDRESS/PHYSICAL ADDRESS TRANSLATION
- ADDRESS RESOLUTION PROTOCOL (ARP)**

Physical MAC address of default gateway : 00-08-e3-ff-fc-a0

EXERCISE 1M: NETWORK REACHABILITY - PING COMMAND

ping your neighbour's PC and run **arp** command again. Do you see your neighbour's PC listed? Why? Yes, ping requires ip of neighbour pc to be converted to physical address hence it will be stored in arp cache

Physical address of neighbour's PC : a4-bb-6d-43-45-a0

EXERCISE 1N: TRACE ROUTE - TRACERT COMMAND

How many routers are separating your laboratory PC and the local DNS servers?

3 routers in between Lab PC and local DNS server.

Run **arp** command again. Can you find the MAC address of the DNS servers? Why?

No, the arp is used to communicate with people/devices on the same network. It will not broadcast beyond its own network. Hence NTU's DNS server are not within the same network, the address of the DNS server will not be stored in the arp cache.