



Network I - Lab 02

Part 01 : PC Hardware

Objective

- Become familiar with the basic peripheral components of a PC computer system.
- Identify PC connections including network attachment.
- Examine the internal PC configuration and identify major components.
- Observe the boot process for the Windows operating system.
- Use the Control Panel to find out information about the PC.

Background

Knowing the components of a PC is valuable when troubleshooting. This knowledge is also important to success in the networking field.

Before beginning, the instructor or lab assistant should have a typical desktop PC available with all peripherals.

Peripherals include the keyboard, monitor, mouse, speakers or head phones, a network interface card (NIC), and a network cable.

The system unit cover should be removed. If the cover is not removed, the tools should be provided to remove it.

Work individually or in teams.

Step 1 Examine the computer and peripheral components

Examine the computer and peripheral components both front and back.

Note: The components and configuration of the PC may vary.

What are the manufacturer and model number of this computer?

Manufacturer:	
Model Number:	

What are the major external components of the PC including the peripherals?

Component Name / Characteristics	Manufacturer / Description	Component Name / Characteristics	Manufacturer / Description
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	



Step 2 Remove the PC system unit cover and examine internal components

List at least 8 major internal components inside the system unit. Use the procedure in step 5 to find the CPU and amount of RAM.

Component Name Manufacturer / Description / Characteristics	Component Name Manufacturer / Description / Characteristics
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Step 3 Assemble the PC components observe the boot process

Assemble the PC components, attach all peripherals, and boot the PC. Observe the boot process.

The computer should boot to the Windows operating system. If the computer does not boot, contact the lab assistant.

Did the Windows operating system boot correctly? _____

Did the screen show how much memory there was as the system was booting?

Step 4 Gather basic information about the computer CPU and RAM

Gather basic information about the computer CPU and memory. The instruction to complete this step may vary slightly depending on the version of Windows.

Consult with the instructor if lab assistance if required.

Click the Start button. Select Settings then Control Panel. Click on the System icon and then the General tab. View the information about the computer using the operating system.

What is the Central Processing Unit? _____

What is the speed in MHz of the CPU? _____

How much RAM is installed? _____

All equipment should be returned to the original state or as directed by the instructor.



Part 02 - PC Network TCP/IP Configuration

Objective

- Identify tools used to discover a computer network configuration with various operating systems.
- Gather information including connection, host name, Layer 2 MAC address and Layer 3 TCP/IP network address information.
- Compare network information to other PCs on the network.

Background

This lab assumes the use of any version of Windows. This is a non-destructive lab and can be done on any machine without concern of changing the system configuration. Ideally, this lab is performed in a classroom or other LAN environment that connects to the Internet.

This lab can be done from a single remote connection via a modem or DSL-type connection. The instructor will furnish IP addresses. In the following instructions the lab runs twice. The two runs reflect the operating system differences between the Windows NT/2000/XP systems and Windows Vista/7 systems. Students should perform the lab on both types of systems if possible.

Step 1 Gather TCP/IP configuration information

Use the Start menu to open the Command Prompt, an MS-DOS-like window.

Press **Start > Programs > Accessories > Command Prompt** or **Start > Programs > Command Prompt**.

The following figure shows the Command screen.

Type **ipconfig** and press the **Enter** key.

The spelling of **ipconfig** is critical while case is not. It is short for IP Configuration.

```
C:\WINDOWS\system32\cmd.exe

Ethernet adapter Local Area Connection 2:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.1.7
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Wireless Network Connection:

    Media State . . . . . : Media disconnected

C:\Documents and Settings\Dr. Ahmed ElShafee>
```

Ipconfig @ windows XP



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Ahmed ElShafee>ipconfig

Windows IP Configuration

Wireless LAN adapter Wireless Network Connection 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :

Ethernet adapter Bluetooth Network Connection 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :

Wireless LAN adapter Wireless Network Connection:

    Connection-specific DNS Suffix . . . . . :
    Link-local IPv6 Address . . . . . : fe80::5d5d:1de3:52cc:6c29%15
    IPv4 Address. . . . . : 192.168.1.4
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . : ACU.DOM

Tunnel adapter Local Area Connection* 19:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :

Tunnel adapter Teredo Tunneling Pseudo-Interface:

    Connection-specific DNS Suffix . . . . . :
    IPv6 Address. . . . . : 2001:0:5ef5:79fb:c90:2b3a:3f57:fefb
    Link-local IPv6 Address . . . . . : fe80::c90:2b3a:3f57:fefb%12
    Default Gateway . . . . . : ::

Tunnel adapter isatap.{C345BCCC-D98A-4208-90D1-848F05194E64}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :

C:\Users\Ahmed ElShafee>_
```

Ipconfig @ windows 7

This first screen shows the IP address, subnet mask, and default gateway. The IP address and the default gateway should be in the same network or subnet, otherwise this host would not be able to communicate outside the network. In the figure the subnet mask tells us that the first three octets must be the same to be in the same network.



Step 8 Record the following TCP/IP information for this computer

IP address:

Subnet Mask:

Default Gateway:

Step 9 Compare the TCP/IP configuration of this computer to others on the LAN

If this computer is on a LAN, compare the information of several machines.

Are there any similarities?

What is similar about the IP addresses?

What is similar about the default gateways?

The IP addresses should share the same network portion. All machines in the LAN should share the same default gateway.

Record a couple of the IP Addresses:

Step 10 Check additional TCP/IP configuration information

To see detailed information, type **ipconfig /all** and press **Enter**.

The figure shows the detailed IP configuration screen.

```
Mark C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\Dr. Ahmed ElShafee>ipconfig/all

Windows IP Configuration

    Host Name . . . . . : dr-vuao151zfkpq
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Unknown
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection 2:

    Connection-specific DNS Suffix . :
    Description . . . . . : Marvell Yukon 88E8040 PCI-E Fast Eth
ernet Controller
    Physical Address. . . . . : 00-24-54-83-35-F3
    Dhcp Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IP Address. . . . . : 192.168.1.7
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1
    DHCP Server . . . . . : 192.168.1.1
    DNS Servers . . . . . : 192.168.1.1
    Lease Obtained. . . . . : Sunday, October 02, 2011 11:12:08 PM
    Lease Expires . . . . . : Monday, October 03, 2011 11:12:08 PM

Ethernet adapter Wireless Network Connection:

    Media State . . . . . : Media disconnected
    Description . . . . . : Atheros AR9285 Wireless Network Adap
ter
    Physical Address. . . . . : F0-7B-CB-5F-15-4C

C:\Documents and Settings\Dr. Ahmed ElShafee>
```



Ipconfig/all @ windows XP

```

C:\Windows\system32\cmd.exe
C:\Users\Ahmed ElShafee>ipconfig/all

Windows IP Configuration

    Host Name . . . . . : ACU-Laptop
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Wireless LAN adapter Wireless Network Connection 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : Microsoft Virtual WiFi Miniport Adapter
    Physical Address. . . . . : E8-39-DF-95-C6-F0
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter Bluetooth Network Connection 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : Bluetooth Device (Personal Area Network)
#3
    Physical Address. . . . . : E8-39-DF-38-48-E6
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . . : Yes

Wireless LAN adapter Wireless Network Connection:

    Connection-specific DNS Suffix . . . . . :
    Description . . . . . : Broadcom 802.11n Network Adapter
    Physical Address. . . . . : E8-39-DF-95-C6-F0
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::5d5d:1de3:52cc:6c29%15(Preferred)
    IPv4 Address. . . . . : 192.168.1.4(Preferred)
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : 02 ??????, 2011 07:39:38 PM
    Lease Expires . . . . . : 03 ??????, 2011 07:39:43 PM
    Default Gateway . . . . . : 192.168.1.1
    DHCP Server . . . . . : 192.168.1.1
    DHCPv6 IAID . . . . . : 384317919
    DHCPv6 Client DUID. . . . . : 00-01-00-01-14-AE-79-BF-00-26-6C-7E-A3-50

    DNS Servers . . . . . : 8.8.8.8
    NetBIOS over Tcpi. . . . . : Enabled

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . : ACU.DOM
    Description . . . . . : Atheros AR8152 PCI-E Fast Ethernet Controlle
    Physical Address. . . . . : 00-26-6C-7F-81-AD
  
```

Ipconfig/all @ windows 7 (1)



```
C:\Windows\system32\cmd.exe
C:\Users\Ahmed ElShafee>ipconfig/all

Windows IP Configuration

Host Name . . . . . : ACU-Laptop
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Wireless LAN adapter Wireless Network Connection 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . :
Description . . . . . : Microsoft Virtual WiFi Miniport Adapter
Physical Address. . . . . : E8-39-DF-95-C6-F0
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes

Ethernet adapter Bluetooth Network Connection 3:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . :
Description . . . . . : Bluetooth Device (Personal Area Network)
#3
Physical Address. . . . . : E8-39-DF-38-48-E6
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes

Wireless LAN adapter Wireless Network Connection:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Broadcom 802.11n Network Adapter
Physical Address. . . . . : E8-39-DF-95-C6-F0
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::5d5d:1de3:52cc:6c29%15(Preferred)
IPv4 Address. . . . . : 192.168.1.4(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 02 ??????, 2011 07:39:38 PM
Lease Expires . . . . . : 03 ??????, 2011 07:39:43 PM
Default Gateway . . . . . : 192.168.1.1
DHCP Server . . . . . : 192.168.1.1
DHCPv6 IAID . . . . . : 384317919
DHCPv6 Client DUID. . . . . : 00-01-00-01-14-AE-79-BF-00-26-6C-7E-A3-50

DNS Servers . . . . . : 8.8.8.8
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Local Area Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . : ACU.DOM
Description . . . . . : Atheros AR8152 PCI-E Fast Ethernet Contro
ller
Physical Address. . . . . : 00-26-6C-7F-81-AD
```

ipconfig/all @ windows 7 (2)



The host name, including the computer name and NetBIOS name should be displayed. Also, the DHCP server address, if used, and the date the IP lease starts and ends should be displayed.

Look over the information. Entries for the DNS, used in name resolution servers, may also be present.

The previous figure reveals that the router is performing DHCP services for this network. This would likely be a small office or home office (SOHO) or small branch office implementation.

Notice the Physical Address (MAC) and the NIC model (Description).

In the LAN, what similarities about the Physical (MAC) Addresses are seen?

While not a requirement, most LAN administrators try to standardize components like NICs.

Therefore, it would not be surprising to find all machines share the first three Hex pairs in the adapter address.

These three pairs identify the manufacturer of the adapter.

Write down the IP addresses of any servers listed:

Write down the computer Host Name:

Write down the Host Names of a couple other computers:

Do all of the servers and workstations share the same network portion of the IP address as the student workstation? _____

It would not be unusual for some or all of the servers and workstations to be in another network.

It means that the computer default gateway is going to forward requests to the other network.

Step 11 Close the screen

Close the screen when finished examining network settings.

Repeat the previous steps as necessary. Make sure that it is possible to return to and interpret this screen.

Reflection

Based on observations, what can be deduced about the following results taken from three computers connected to one switch?

Computer 1

IP Address: 192.168.12.113

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.12.1



Computer 2

IP Address: 192.168.12.205

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.12.1

Computer 3

IP Address: 192.168.112.97

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.12.1

Should they be able to talk to each other? Are they all on the same network? Why or why not? If something is wrong, what is most likely the problem?