

How to build up a network

**between two or more
computers in
Windows 7?**

collected by:

Javad Rasti

rasti@eng.ui.ac.ir, www.jrasti.ir

December 2012

TABLE OF CONTENTS

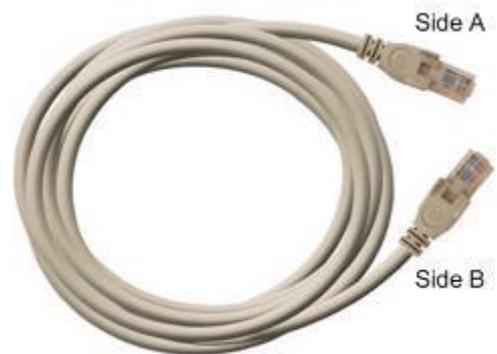
1. HARDWARE	3
1.1. WHAT IS A CROSS-CABLE?	3
1.1.1. <i>Straight Cable</i>	3
1.1.2. <i>Crossover Cable</i>	4
2. SOFTWARE CONFIGURATION	4
2.1. SETTING NAME/WORKGROUP OF THE COMPUTERS	5
2.2. HOW TO CONFIGURE IP ADDRESS ... ?	8
2.3. NETWORK CONFIGURATIONS	11
2.4. HOW TO PING AN IP?	12
3. ENABLE FILE AND PRINTER SHARING	14
4. SETUP A WIRELESS AD HOC NETWORK	16
5. REFERENCES	18

1. Hardware

You only need 1 crossover cable and 2 network cards. This is wired connection approach to connect 2 computers directly without involving other network devices, such as network router or switch. It's effective and simple way if you want to connect the computers temporary. If the network card on computers supports auto MDI/MDIX feature, you could use crossover or straight through network cable to connect both computers. If not, crossover cable is needed!

1.1. What is a cross-Cable?

Common Ethernet network cables are straight and crossover cable. This Ethernet network cable is made of 4 pair high performance cable that consist twisted pair conductors that used for data transmission. Both end of cable is called RJ45 connector.



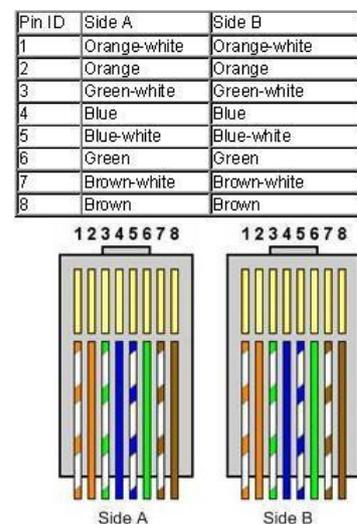
The cable can be categorized as **Cat 5, Cat 5e, Cat 6 UTP cable**. Cat 5 UTP cable can support 10/100 Mbps Ethernet network, whereas Cat 5e and Cat 6 UTP cable can support Ethernet network running at 10/100/1000 Mbps. You might have heard about Cat 3 UTP cable, it's not popular anymore since it can only support 10 Mbps Ethernet network.

Straight and crossover cable can be Cat3, Cat 5, Cat 5e or Cat 6 UTP cable, the only difference is each type will have different wire arrangement in the cable for serving different purposes.

1.1.1. Straight Cable

You usually use straight cable to connect different type of devices. This type of cable will be used most of the time and can be used to:

- 1) Connect a computer to a switch/hub's normal port.
- 2) Connect a computer to a cable/DSL modem's LAN port.
- 3) Connect a router's WAN port to a cable/DSL



modem's LAN port.

4) Connect a router's LAN port to a switch/hub's uplink port. (normally used for expanding network)

5) Connect 2 switches/hubs with one of the switch/hub using an uplink port and the other one using normal port.

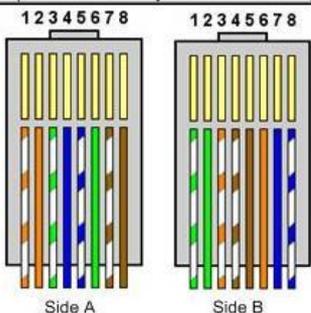
If you need to check how straight cable looks like, it's easy. **Both side (side A and side B) of cable have wire arrangement with same color.**

1.1.2. Crossover Cable

Sometimes you will use crossover cable, it's usually used to connect same type of devices. A crossover cable can be used to:

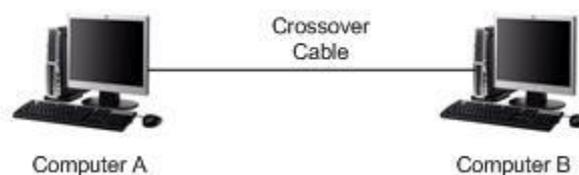
- 1) Connect 2 computers directly.
- 2) Connect a router's LAN port to a switch/hub's normal port. (normally used for expanding network)
- 3) Connect 2 switches/hubs by using normal port in both switches/hubs.

Pin ID	side A	side B
1	Orange-white	green-white
2	Orange	green
3	green-white	orange-white
4	blue	brown-white
5	blue-white	Brown
6	green	orange
7	brown-white	Blue
8	brown	blue-white



In you need to check how crossover cable looks like, **both side (side A and side B) of cable have wire arrangement with following different color.**

Let see how to do it here: Plug in network card each to computer and then connect the network cable to both computers' network card. You have finished the physical setup!



2. Software Configuration

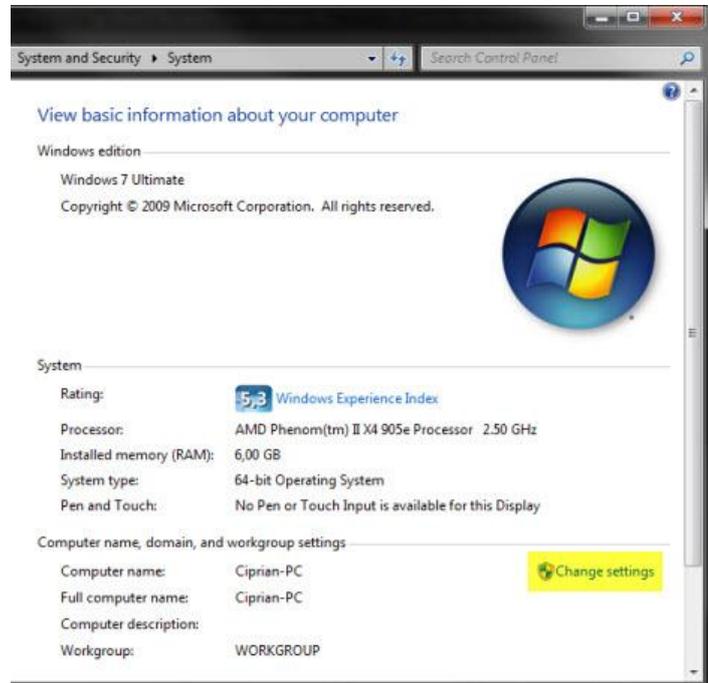
Now let's proceed to install network card driver on each computer if you have not done yet and also make sure the driver is installed properly.

2.1. Setting Name/WorkGroup of the computers

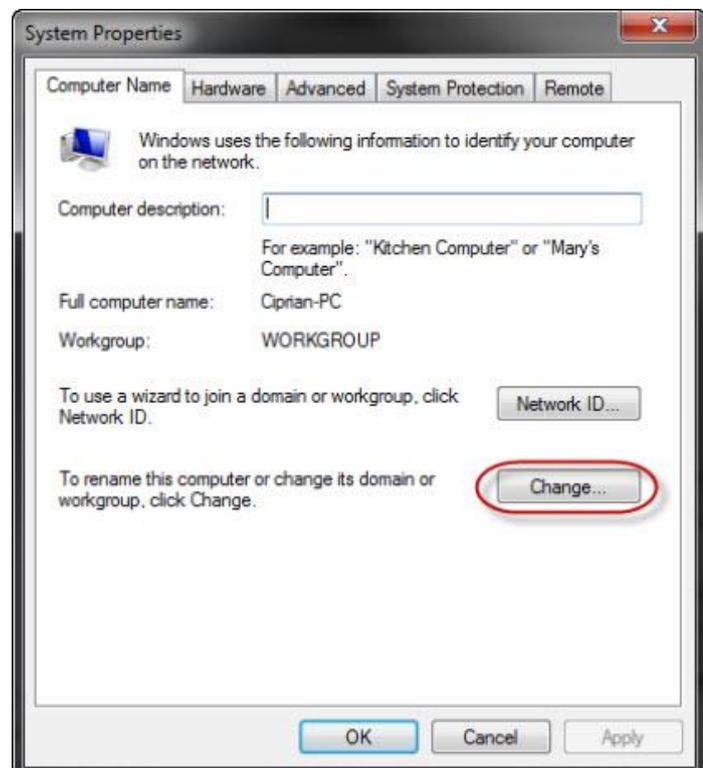
Both of the computers must be the member of the same WorkGroup, but owning different names. To change the name/workgroup of a computer:

Go to *Control Panel* -> *System and Security* -> *System* or search for the word *system* in the Start Menu search box and click on the result with the same name.

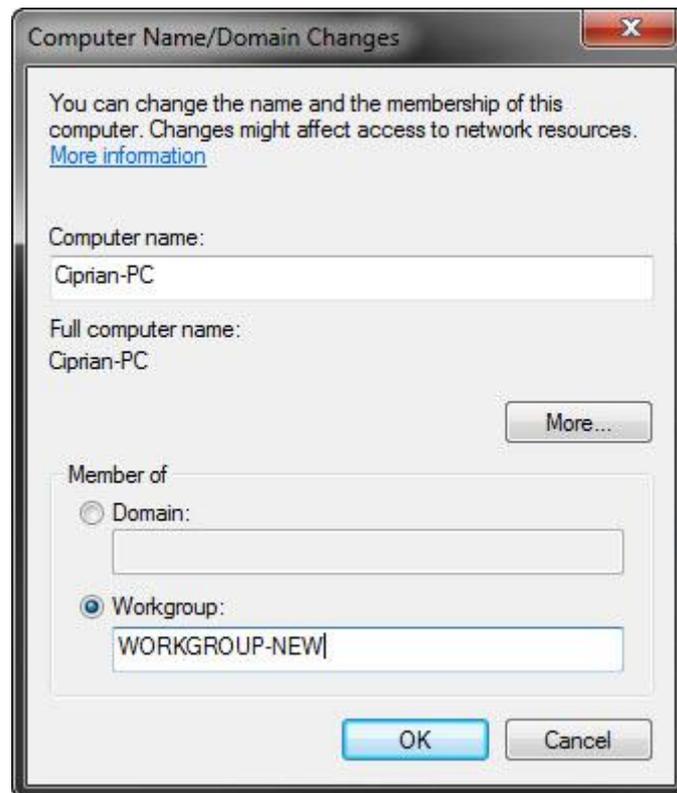
In the *System* window, there is a section called '*Computer name, domain, and workgroup settings*'. There you will see the current workgroup. To change it, click on '*Change settings*'.



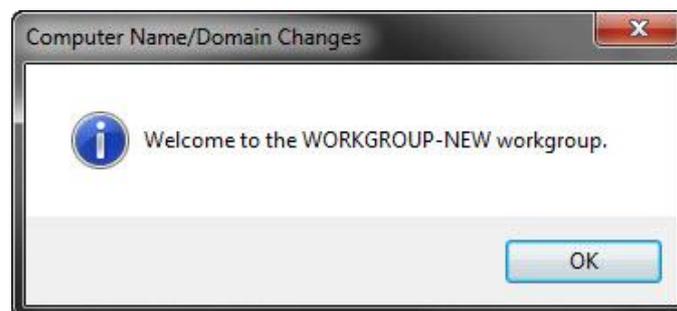
The *System Properties* window will now open. In the *Computer Name* tab, click on the *Change* button.



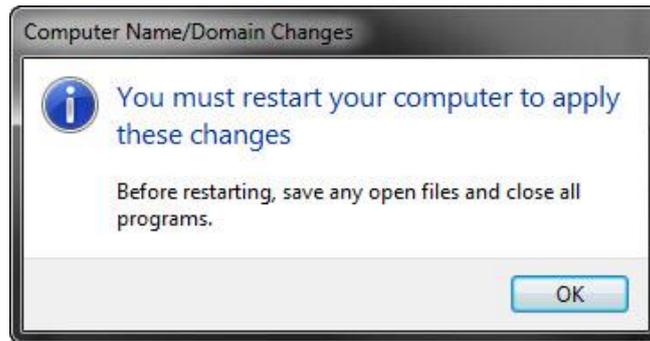
A new window called '*Computer Name/Domain Changes*' will open. In the *Workgroup* field, type the name of the workgroup you want to join and click on *OK*.



When done, you will receive a welcome note.



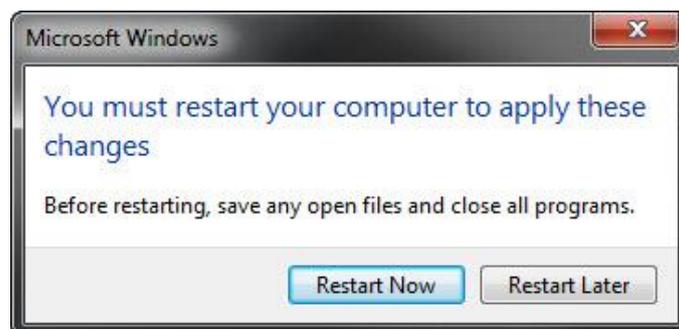
Once you close the welcome note, you will be notified that you must restart your computer in order for the changes to be applied. Click on *OK*.



Now close the *System Properties* window.



Windows 7 will ask if you want to restart your PC now or later. Make the choice you desire and you are done.



Once the computer is restarted, it will have joined the newly assigned workgroup and you will be able to work with computers from that workgroup.

2.2. How to Configure IP Address and Other Network Information?

Let me show you how to configure IP address and other network information in Windows 7 here. As you know, IP address must be configured on computer in order to communicate with other computers, because this IP address is the standard address understood by computers and other networking devices in networking world.

You can configure IP address, subnet mask, gateway and DNS servers manually on computer, but you can also configure computer to obtain IP address and other network information from DHCP server (most of the time is configured on router).

Without wasting any more time, let me show you quick way to do it:

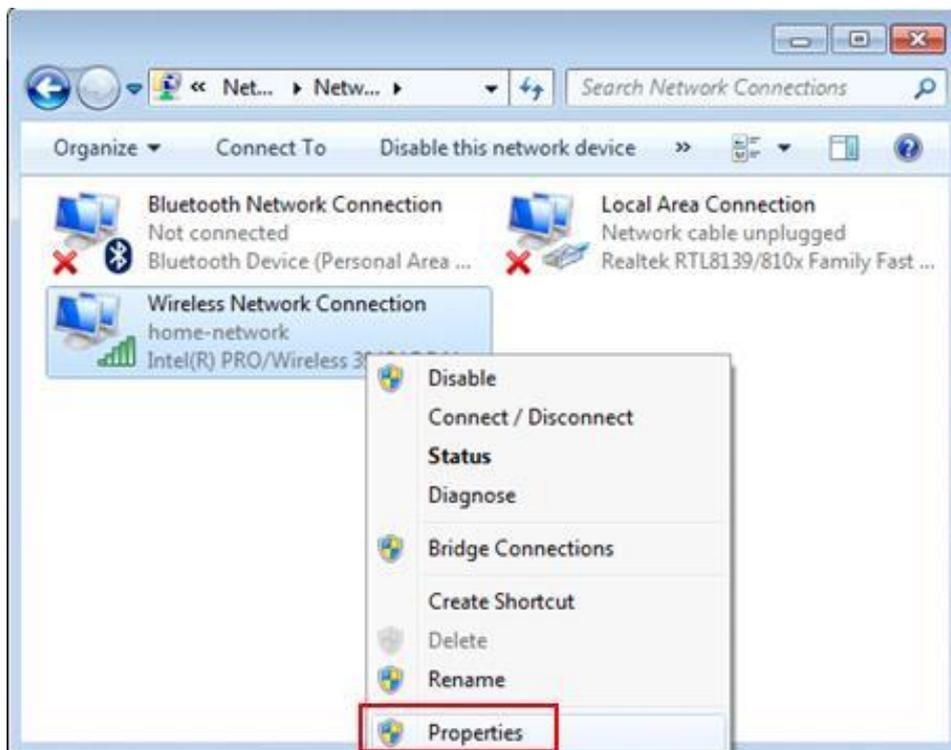
- 1) Go to **Start** and click on **Control Panel**.
- 2) Proceed to click **View network status and tasks** in Control Panel window.



- 3) Network and Sharing Center window will appear, then click **change adapter settings**.



4) Network Connections window will appear. Here you can right click on the **network adapter** (can be wireless adapter or wired Ethernet adapter) that you wish to configure and click **Properties**.



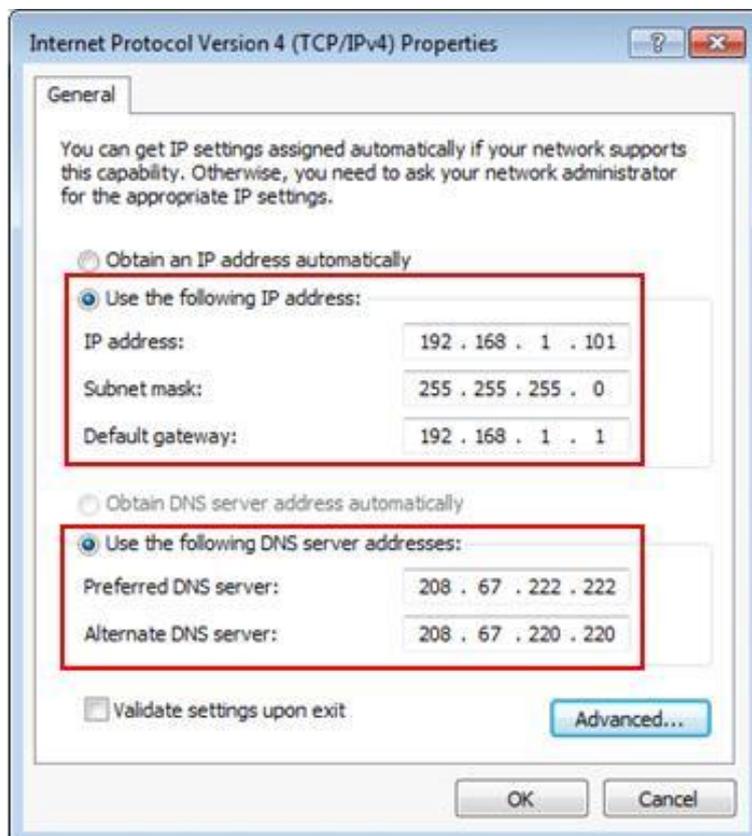
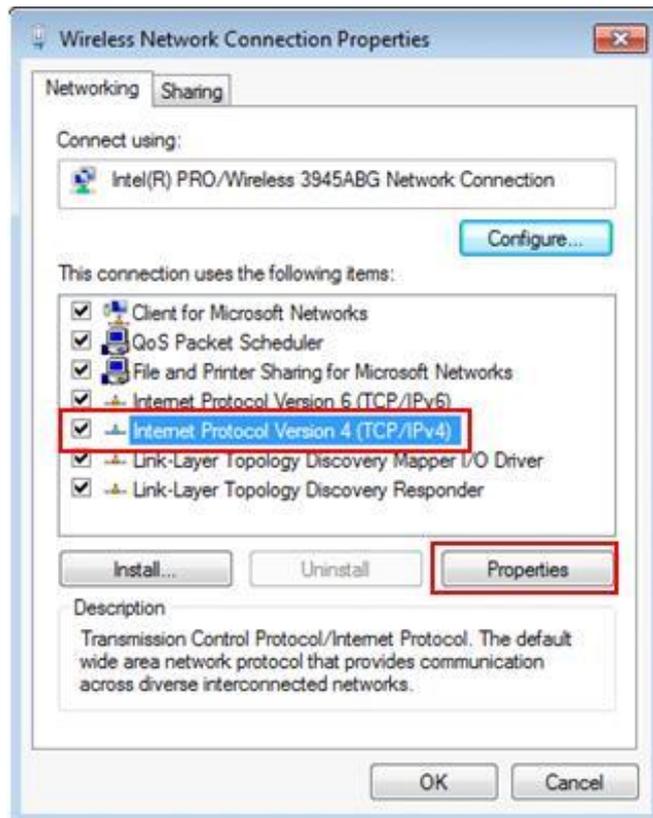
5) In the Network Connection Properties window, tick on **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.

Note: If your computer sits in IPv6 network, you can select **Internet Protocol Version 6 (TCP/IPv6)** to configure IPv6 address, but it's not covered here.

Manual IP Assigning: If you want to do manual configuration, you can now key in the **IP address, Subnet mask, Default gateway and DNS servers.**

Note: IP address of your computer must be unique. None of the 2 computers in the same network can share same IP address, because it will cause IP address conflict.

Note: Default gateway is a router that can route the traffic to the other network or Internet. DNS server is an application server that can translate URL to IP address. Check with your ISP on what DNS servers you should use. An example on my computer comes below.

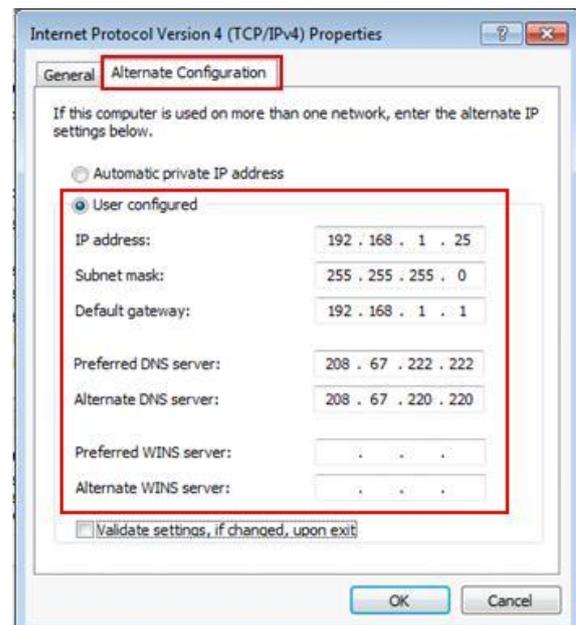


IP Assigned by DHCP server

If you have DHCP server setup on your router or you have dedicated DHCP server, your computer can be assigned IP address and other network information automatically by selecting **Obtain an IP address automatically** and **Obtain DNS server address automatically**.

Note: If you have a notebook, and you use static IP at home and the IP assigned by DHCP server at the office, you can make use of **alternate configuration** to set IP and network information for these 2 different networks.

Set **Obtain an IP address and DNS automatically** on General tab as according to what I specified above, so that the notebook will be assigned IP addresses automatically at the office. After that, click **Alternate Configuration** tab, select User configured option and key in your home network's static IP and other network information. By setting this, when there is no IP information assigned due to no DHCP server at home, this alternate configuration will be applied automatically, so that you don't have to spend time on configuring IP manually every time at home.



2.3. Network Configurations

After installing network card driver, here comes the network configuration, let's create a simple network by assigning following IP address and subnet mask settings to each computer's network card, so that both computers know how to talk to each other:

Computer A:

IP Address: 192.168.1.10
Subnet mask: 255.255.255.0
Gateway: [leave-it-blank]
DNS Servers: [leave-it-blank]

Computer B:

IP Address: 192.168.1.11
Subnet mask: 255.255.255.0
Gateway: [leave-it-blank]
DNS Servers: [leave-it-blank]

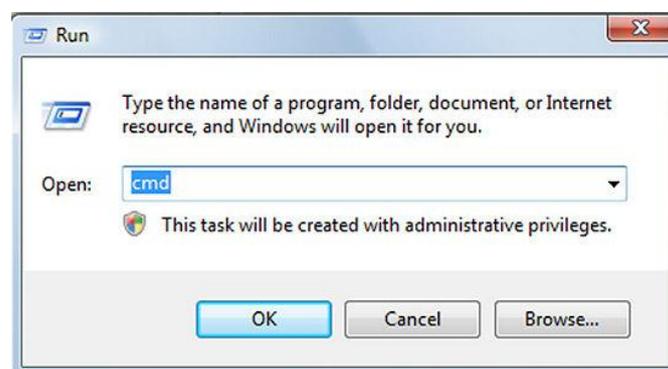
Since these 2 computers are directly connected, no gateway and DNS servers are required to be configured. The IP addresses are arbitrary, but must be of the same class and not repeated (to prevent conflict).

After assigning IP addresses, try to **ping** the other computer from command prompt, you should be able to ping each other and then sharing printers or files as you wish.

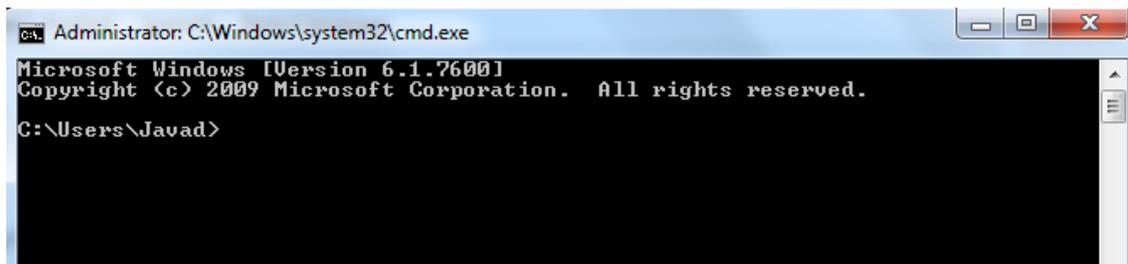
2.4. How to ping an IP?

PING tests the connection between two network nodes by sending packets to a host and then reporting the time it takes to get a response. The nodes can be in a Local Area Network, Wide Area Network or anywhere on the internet. To ping an IP address, follow these instructions.

Go to Start > Run and type cmd.



Press OK to launch Windows Command.



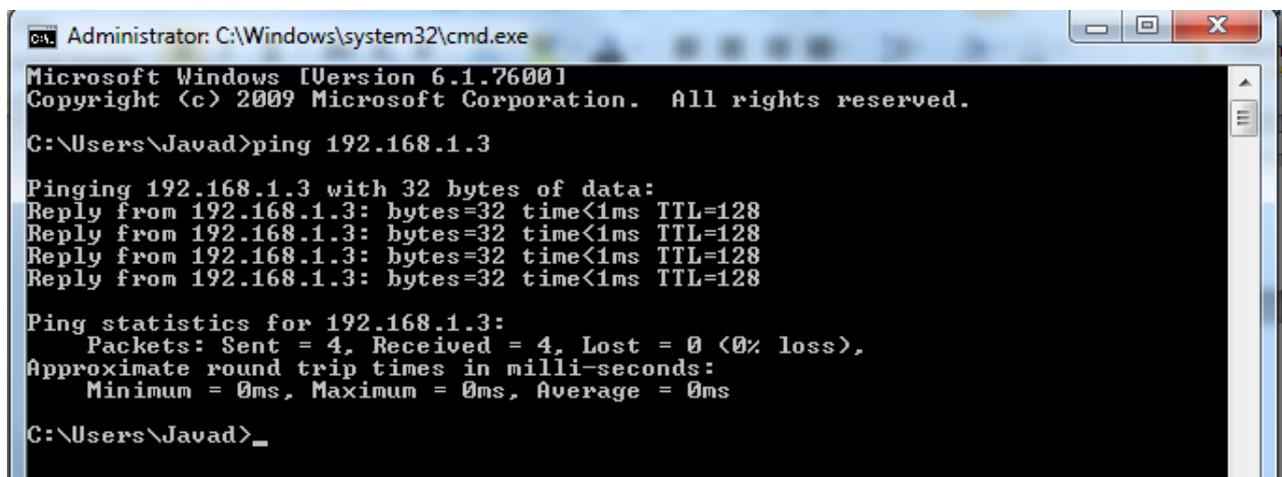
```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Javad>
```

Type *ping* hostname or ping IP address.

For example, to ping a computer with IP:192.168.1.3, type

ping 192.168.1.3.



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

C:\Users\Javad>ping 192.168.1.3

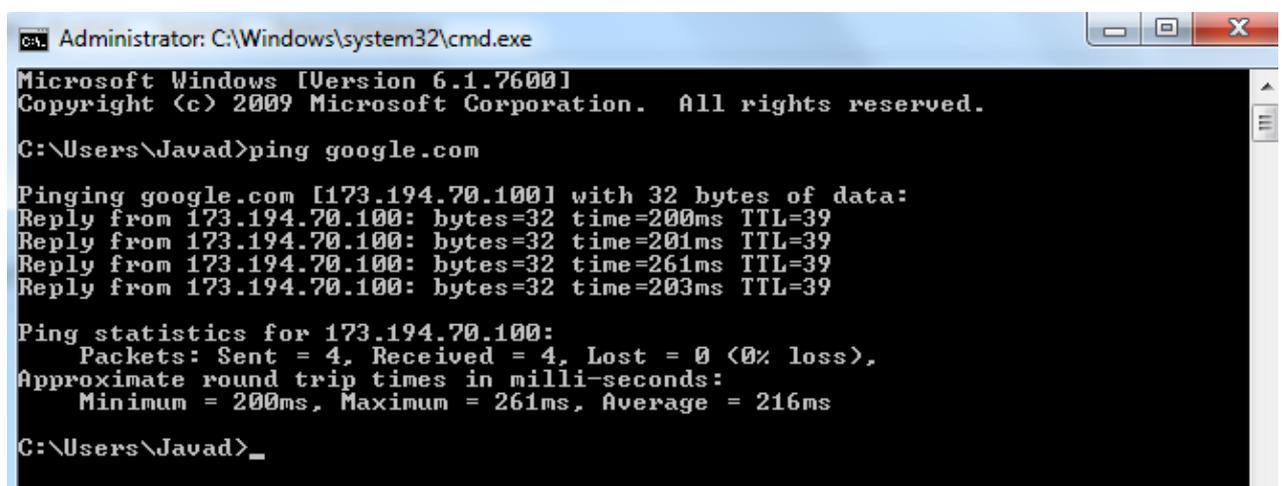
Pinging 192.168.1.3 with 32 bytes of data:
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Javad>_
```

The Reply messages show that the connection between two computers is established.

You can also ping websites, such as google.com:



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

C:\Users\Javad>ping google.com

Pinging google.com [173.194.70.100] with 32 bytes of data:
Reply from 173.194.70.100: bytes=32 time=200ms TTL=39
Reply from 173.194.70.100: bytes=32 time=201ms TTL=39
Reply from 173.194.70.100: bytes=32 time=261ms TTL=39
Reply from 173.194.70.100: bytes=32 time=203ms TTL=39

Ping statistics for 173.194.70.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 200ms, Maximum = 261ms, Average = 216ms

C:\Users\Javad>_
```

3.Enable file and printer sharing

Make sure network discovery and printer sharing are on by following these steps:

1. Open Network and Sharing Center by clicking the **Start** button , clicking **Control Panel**, clicking **Network and Internet**, and then clicking **Network and Sharing Center**.
2. If network discovery is off, click the arrow button  to expand the section, click **Turn on network discovery**, and then click **Apply**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
3. If file sharing is off, click the arrow button  to expand the section, click **Turn on file sharing**, and then click **Apply**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
4. If Public folder sharing is off and you want to share files by placing them in the Public folder on your computer, click the arrow button  to expand the section, click **Turn on sharing so anyone with network access can open files** or **Turn on sharing so anyone with network access can open, change, and create files**, and then click **Apply**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
5. If printer sharing is off, and you have a printer you want to share, click the arrow button  to expand the section, click **Turn on printer sharing**, and then click **Apply**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
6. Finally, share the file or printer by doing one of the following:
 - Right-click the file or folder you want to share, click **Share**, click the arrow, select the people you want to share with, and then click **Share**.
 - Copy the files or folders you want to share to the Public folder on your computer. To find the Public folder, click the **Start** button , and then click **Documents**. In the Navigation pane, under **Favorite Links**, click **Public**.
 - On the other (guest) computer, type "\\IP address or the name of the host computer"
 - To share a printer:

To share a printer attached to your computer

1. Open Network and Sharing Center by clicking the **Start** button , clicking **Control Panel**, clicking **Network and Internet**, and then clicking **Network and Sharing Center**.
2. Click the arrow button  next to **Printer sharing** to expand the section, click **Turn on printer sharing**, and then click **Apply**. Your printer is now shared on the network.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
3. If you are using a computer connected to a workgroup, click the arrow button  next to **Password protected sharing** to expand this section, and then check to see if password-protected sharing is turned on or off. If it is turned on, only people with a user account and password for this computer will be able to access your printer. Turn this off if you want anyone on the network to be able to access the printer you are sharing. To change this setting, select the option you prefer, and then click **Apply**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

Anyone using this computer can already use any printer attached to the computer. Printer sharing allows you to share your printer with people using other computers on the network.

To print using a shared printer

Follow these steps to connect to a shared printer over the network. You must know the name of the computer that has the printer attached to it. If you don't know this name, ask someone who uses that computer, or go to the other computer yourself and look it up. Click the **Start** button , and then, in the Search box, type `\\` followed by the name of the computer with the shared printer you want to use (for example, `\\mylaptop`).

1. Press ENTER.
2. If Windows can find the computer on the network, a folder will open for the computer. Double-click **Printers**. If any shared printers are connected to this computer, they will appear here. If you don't see the shared printer you want to use, ask a person who uses that computer if the printer is connected, turned on, and shared with other users on the network.

3. Double-click the printer. Windows will automatically add the printer to your computer and install the printer driver. When the process is complete, click **Next**.
4. The printer should appear in your Printers folder. You can select this printer when you want to print a document or other type of file.

If Windows can't automatically find and install the printer driver that allows this shared printer to work with your computer, you need to install the driver before you will be able to print.

If you're still having trouble sharing files or a printer on a network, make sure Windows Firewall is not blocking File and Printer Sharing. Here's how:

1. Open Windows Firewall by clicking the **Start** button , clicking **Control Panel**, clicking **Security**, and then clicking **Windows Firewall**.
2. Click **Allow a program through Windows Firewall**.  If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
3. In the **Program or port** list, make sure the **File and Printer Sharing** check box is selected, and then click **OK**.

You can setup a network between more than 2 computers, by connecting them via a hob. The software issues are the same as above.

4. Setup a wireless ad hoc network

An ad hoc network is a temporary connection between computers and devices used for a specific purpose, such as sharing documents during a meeting or playing multiple-player computer games. You can also temporarily share an Internet connection with other people on your ad hoc network, so those people don't have to set up their own Internet connections. Ad hoc networks can only be wireless, so you must have a wireless network adapter installed in your computer to set up or join an ad hoc network. Here are the steps to create an ad hoc network in Windows 7.

1. Click on Start (Windows icon) and type **wireless**. Click on **Manage wireless networks**.



2. Click on **Add** to add a network.



3. Click on **Create an ad hoc network**.



4. Click on **Next**.



5. Enter a name for your network and configure the security options. Click on **Next** when you are done.



All the computers must have IPs of the same class and also must be members of the same workgroup.

5. References

1. <http://windows.microsoft.com/en-US/windows-vista/Enable-file-and-printer-sharing>
2. <http://www.7tutorials.com/how-change-workgroup-windows-7>
3. <http://www.wikihow.com/Ping-an-IP-Address>
4. <http://www.home-network-help.com/crossover.html>
5. <http://www.kombitz.com/2009/02/09/windows-7-how-to-create-an-ad-hoc-network/>