

COC 2



# Setup Computer Networks



# What is Computer Network?

- Two or more computers connected together through a communication media form a computer network.
- The computers are connected in a network to exchange information and data. The computers connected in a network can also use resources of other computers.



# Computer Network Components

There are different Components of a Network. The following are the basic components of a Network:

- *Server*
- *Client*
- *Media*
- *Network Adapter*
- *Resources*
- *User*
- *Protocols*

# Server



Powerful computers that provides services to the other computers on the network

The **function** of a computer **server** is to store, retrieve and send or "serve" files and data to other computers on its network. Many businesses of all sizes use a local network or "intranet" in their office facilities.



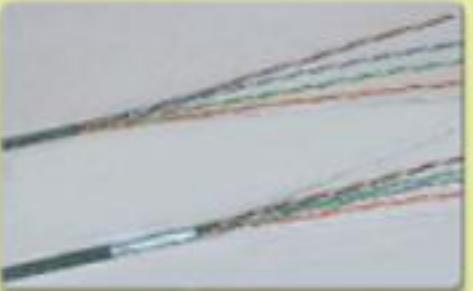
# Client Computer



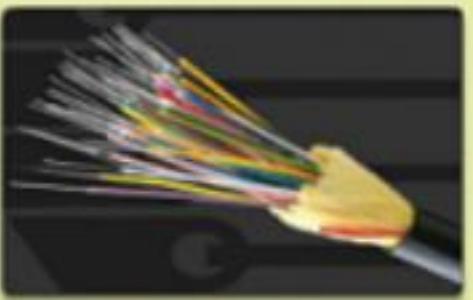
Computer that uses the services that a server provides the client is less powerful than server computer or terminal (called a **CLIENT**) can search simultaneously a number of databases maintained on heterogeneous computers (called servers

# Media

Copper



Fiber Optic



Wireless



- A physical connection between the devices on a network

Communication across a network is carried on a **medium**. The medium provides the channel over which the message travels from source to destination.

Modern networks primarily use the following three types of media to interconnect devices and to provide the pathway over which data can be transmitted:

- Metallic wires within cables
- Glass or plastic fibers (fiber-optic cable)
- Wireless transmission

# Network Adapter



**Network adopter or network interface card (NIC)** is a circuit board with the components necessary for sending and receiving data. It is plugged into one of the available slots on the Pc and transmission cable is attached to the connector on the NIC.

A **network adapter** is the component of a computer's internal hardware that is used for communicating over a **network** with another computer. It enable a computer to connect with another computer, server or any **networking** device over an LAN connection. A **network adapter** can be used over a wired or wireless **network**.

# Resources

- Anything available to a client on the network is considered a resource printers, data, fax devices and other network devices and information are resources.



## Network Devices



Wireless Router



Switch



Desktop



Laptop



Server

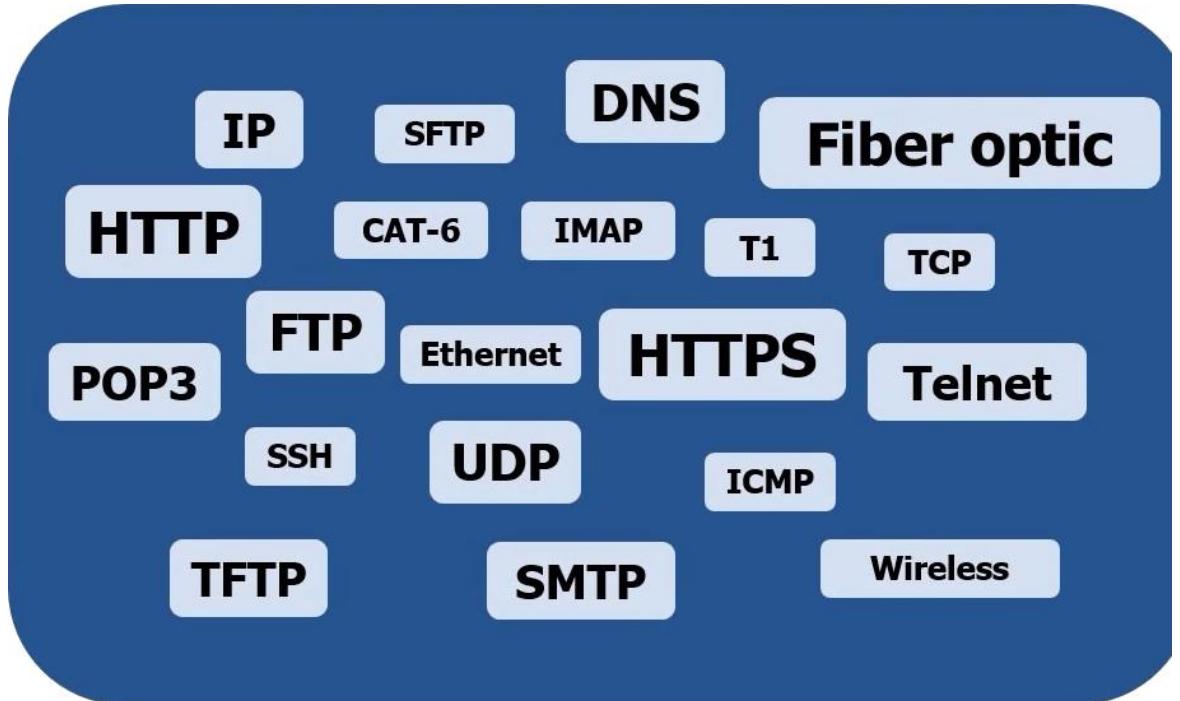


# User



-Any person that uses a client to access resources on the network

# Protocols



These are written rules used for communications. They are the languages that computers use to talk to each other on a network

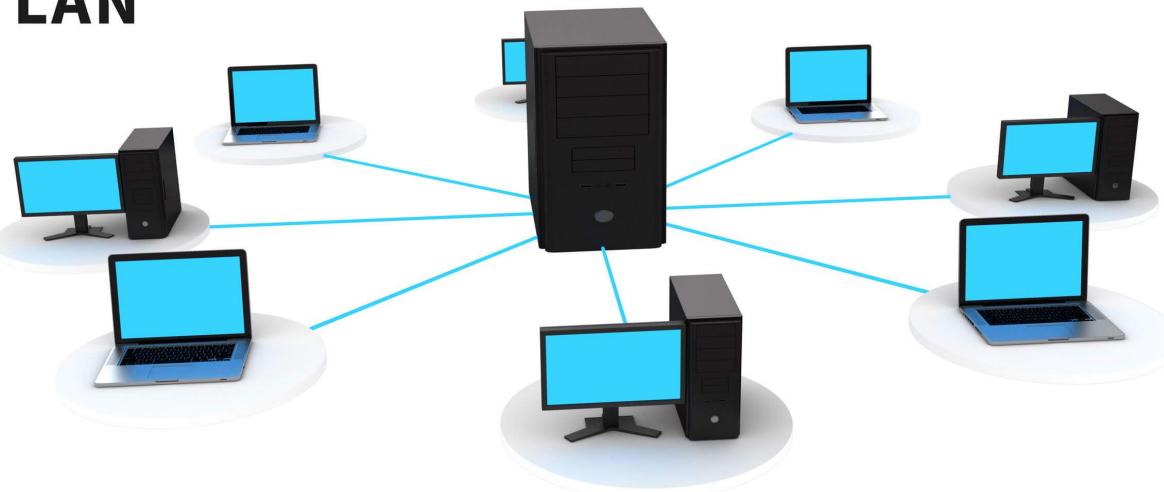
A **network protocol** is an established set of rules that determine how data is transmitted between different devices in the same **network**. Essentially, it allows connected devices to communicate with each other, regardless of any differences in their internal processes, structure or design.

# Different Types of Computer Network

- *Local Area Network (LAN)*
- *Metropolitan Area Network (MAN)*
- *Wide Area Network (WAN)*
- *Storage Area Network (SAN)*
- *Virtual Area Network (VPN)*

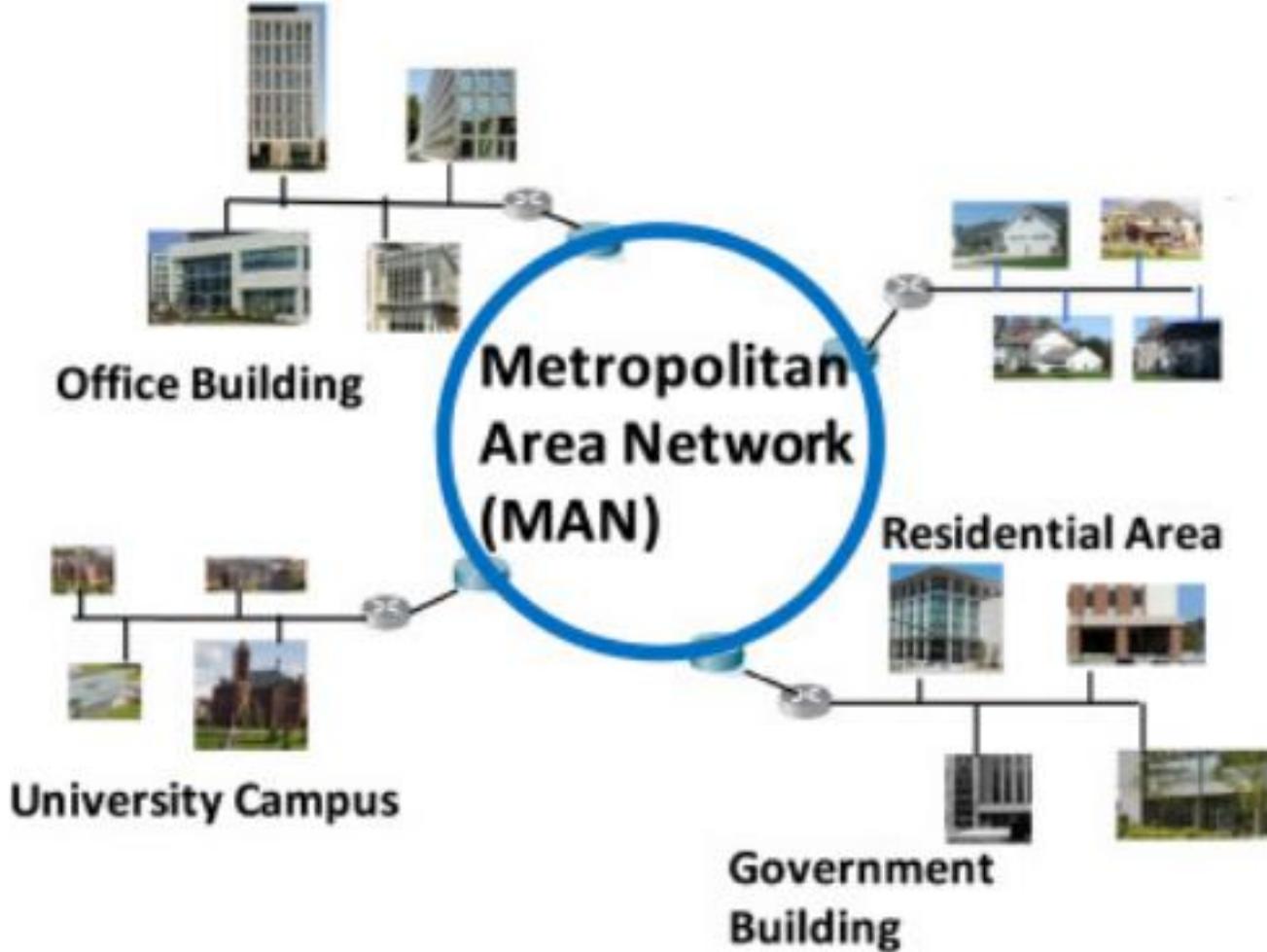
# Local Area Network (LAN)

LAN



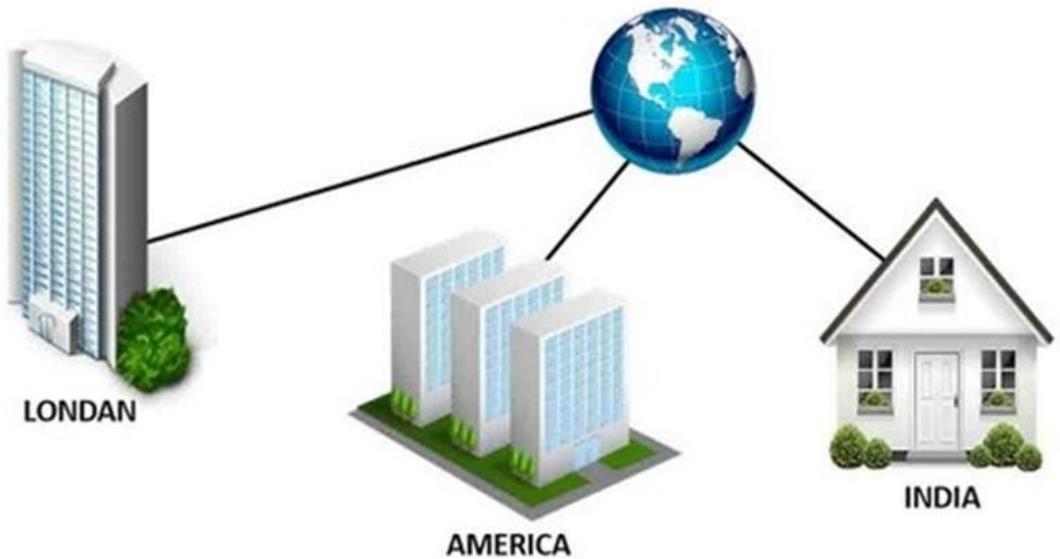
- Supplies networking capability to a group of computers in close proximity to each other such as in an office building, a school, or a home. A LAN is useful for sharing resources like files, printers, games or other applications.
- The **function of Local Area Networks** is to link computers together and provide shared access to printers, files, and other services. **Local area network** architecture is categorized as either peer-to-peer or client-server.

# Metropolitan Area Network (MAN)



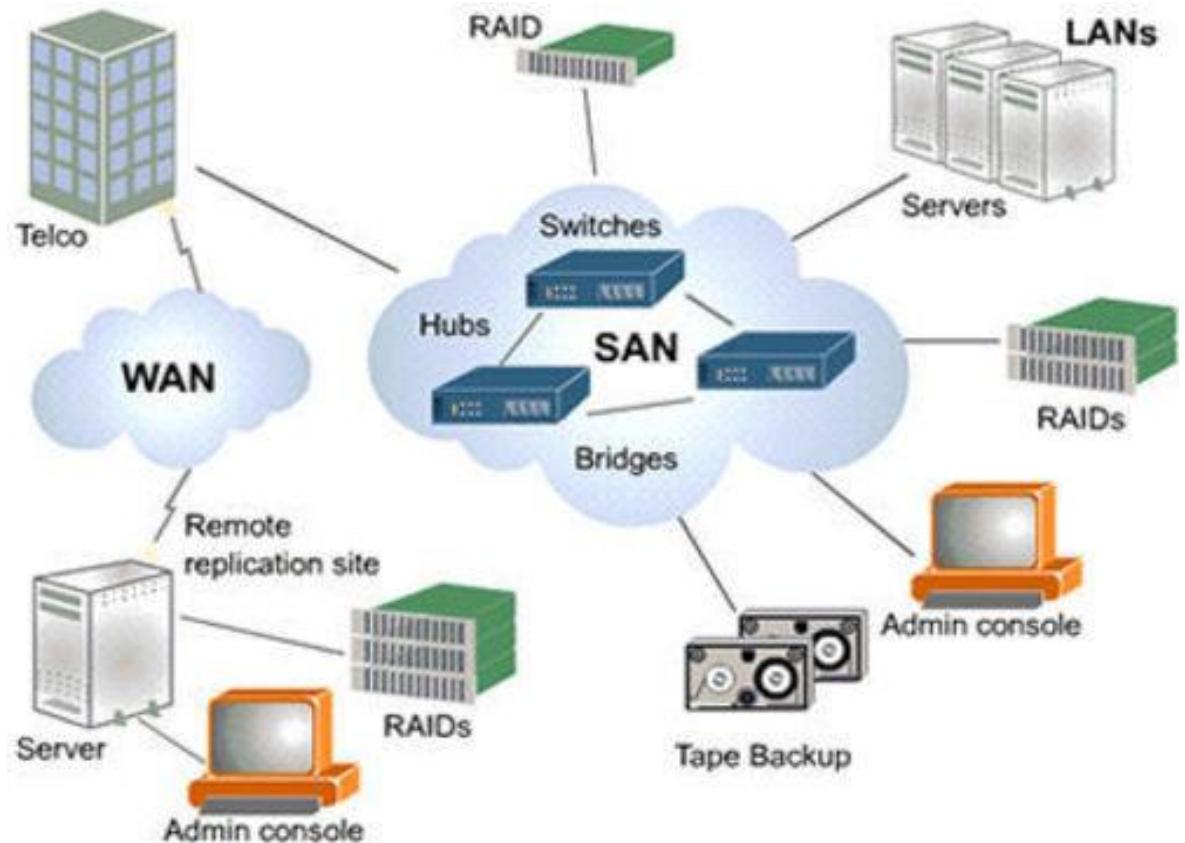
- Is a computer network that usually spans a city or a large campus, A MAN usually interconnects a number of (LANs) using a high-capacity backbone technology, such as fiber-optical links.
- A **metropolitan area network (MAN)** is a **computer network** that usually covers a large **city** or campus. **MAN** usually interconnects a number of **local area** networks (LANs) using high capacity backbone technology, such as fiber-optic links, and provides up-link services for wide **area** networks (or WANs) and the Internet.

# Wide Area Network (WAN)



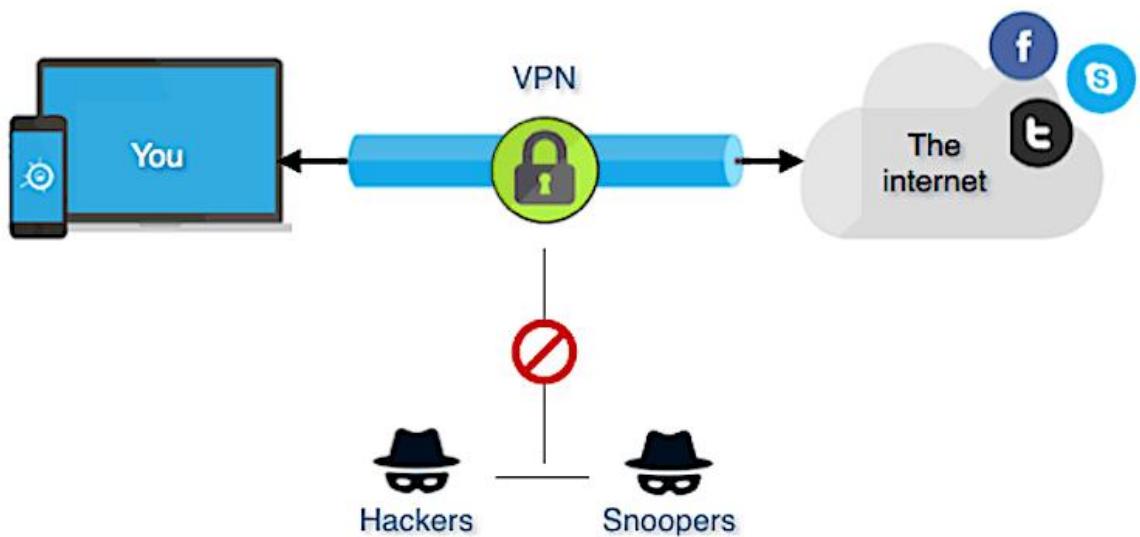
- Is a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, or national boundaries) using private or public network transports. Business and government entities utilize WANs to relay data among employees, clients, buyers, and suppliers from various geographical locations. In essence, this mode of telecommunication allows a business to effectively carry out its daily function regardless of location. The Internet can be considered a WAN as well, and is used by businesses, governments, organizations, and individuals for almost any purpose imaginable.

# Storage Area Network (SAN)



- Is a high-speed sub network of shared storage devices, A storage device is a machine that contains nothing but a disk or disks for storing data.
- A **Storage Area Network** is a **network** whose main **purpose** is to transfer data between **storage** devices and servers and among **storage** devices.

# Virtual Private Network (VPN)



-A virtual private network, or VPN, is an encrypted connection over the Internet from a device to a network. The encrypted connection helps ensure that sensitive data is safely transmitted. It prevents unauthorized people from eavesdropping on the traffic and allows the user to conduct work remotely. VPN technology is widely used in corporate environments.

- A **VPN**, or **Virtual Private Network**, allows you to create a secure connection to another **network** over the **Internet**. **VPNs** can be used to access region-restricted websites, shield your browsing activity from prying eyes on public Wi-Fi, and more.



# Network Topology

## What is Network Topology?

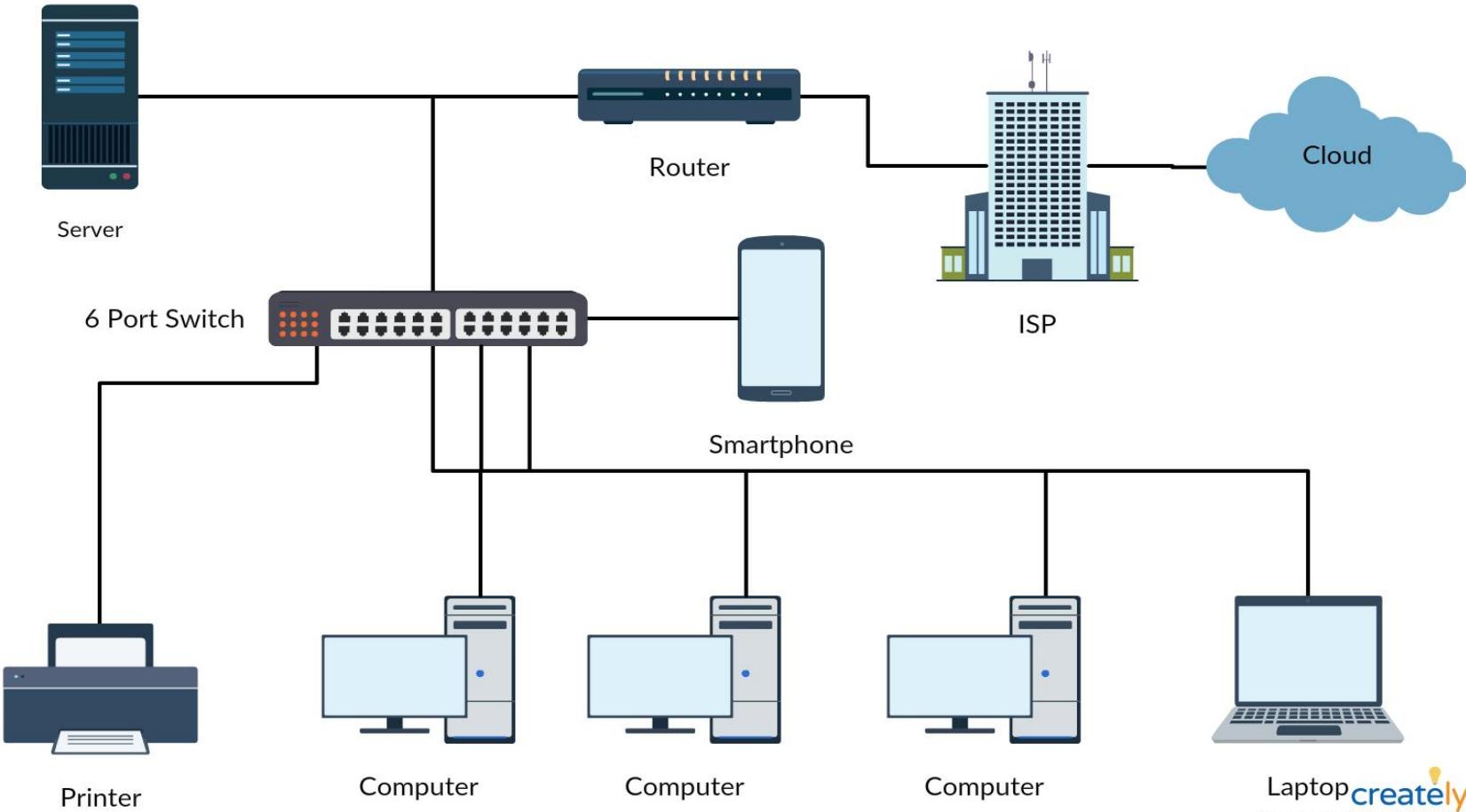
- Physical and logical network layout of computer Network.

**Physical** – actual layout of the computer cables and other network devices.

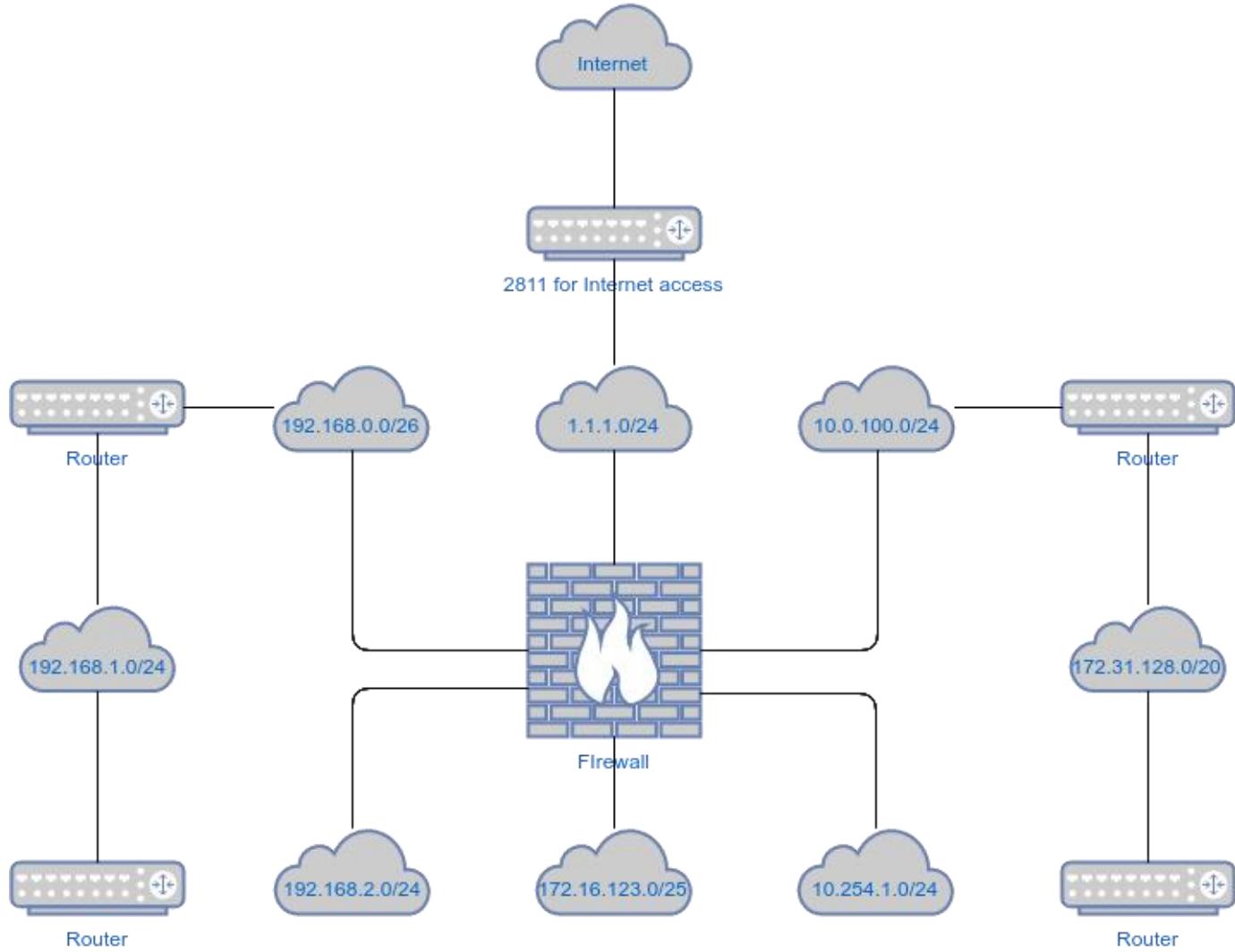
**Logical** – the way in which the network appears to the devices that use it.

# Physical Network

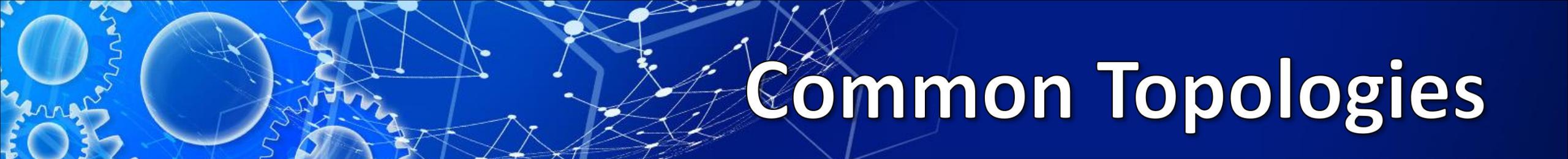
– actual layout of the computer cables and other network devices.



# Logical Network



- the way in which the network appears to the devices that use it.
- The logical Network is the definition of how signals and information travel from point to point within the network. You may see a different logical topology than the physical topology, although they could be the same.



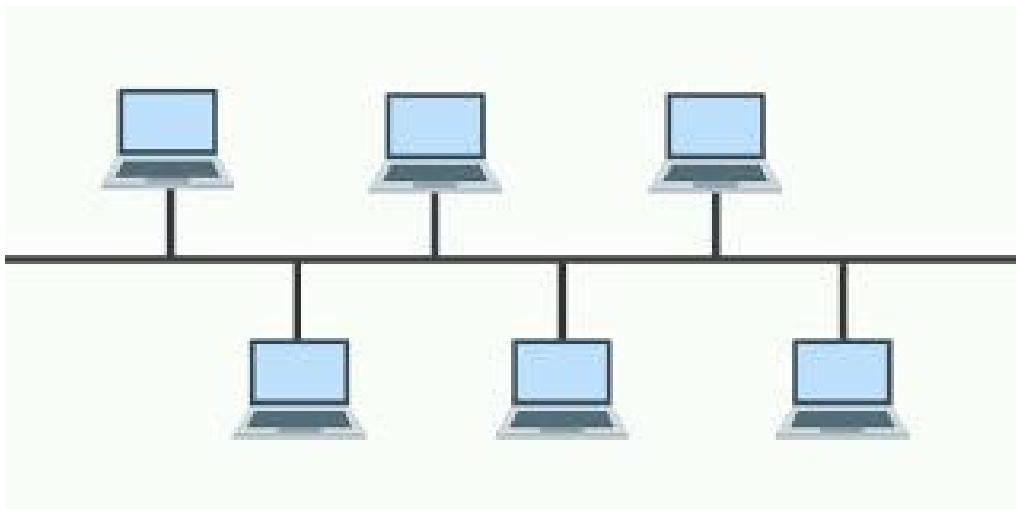
# Common Topologies

- *Bus Topology*
- *Ring Topology*
- *Star Topology*
- *Mesh Topology*
- *Wireless Topology*

ANGEL  
GERWIN  
ARCHIE  
DANIEL  
EMERITO

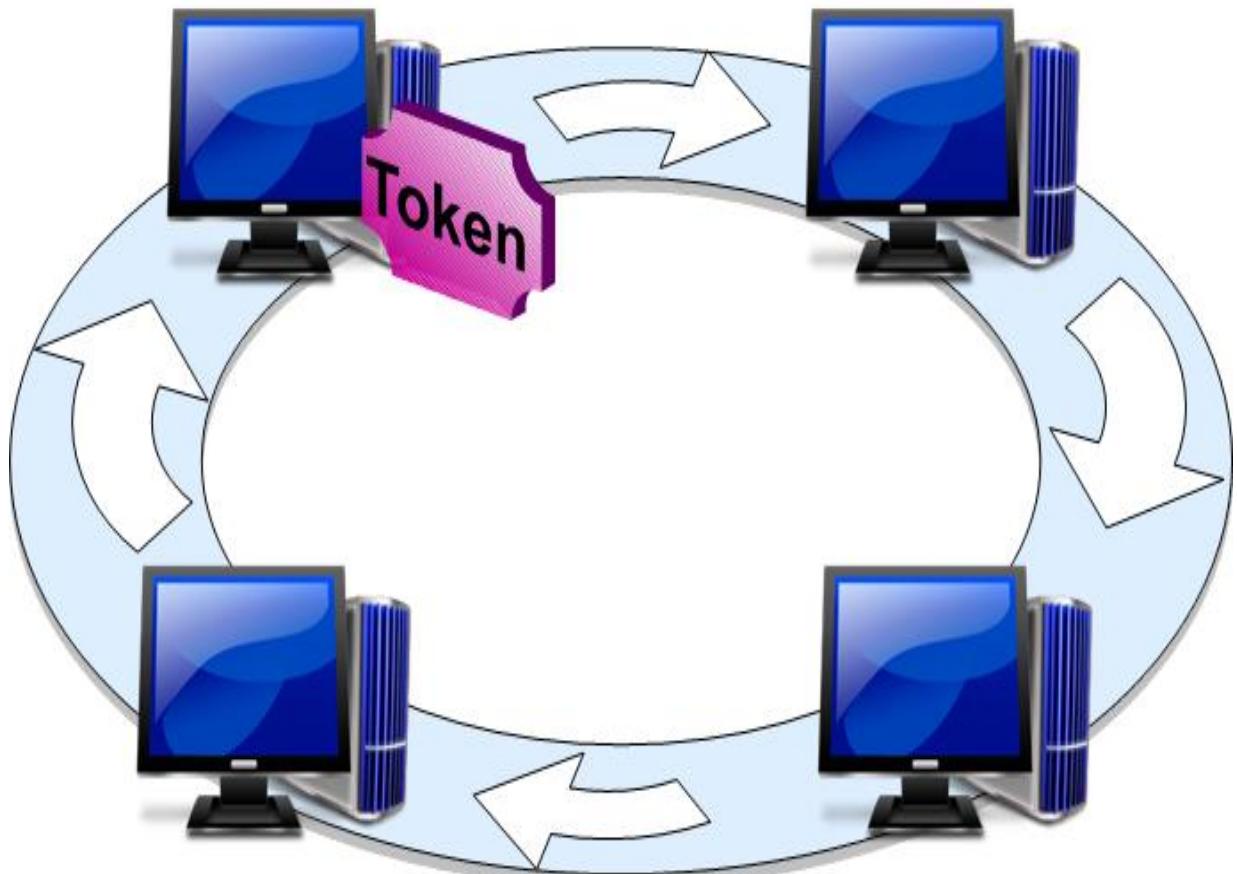
WYCO  
JOSEPH  
WILMER  
NICK  
ARMAN

# Bus Topology



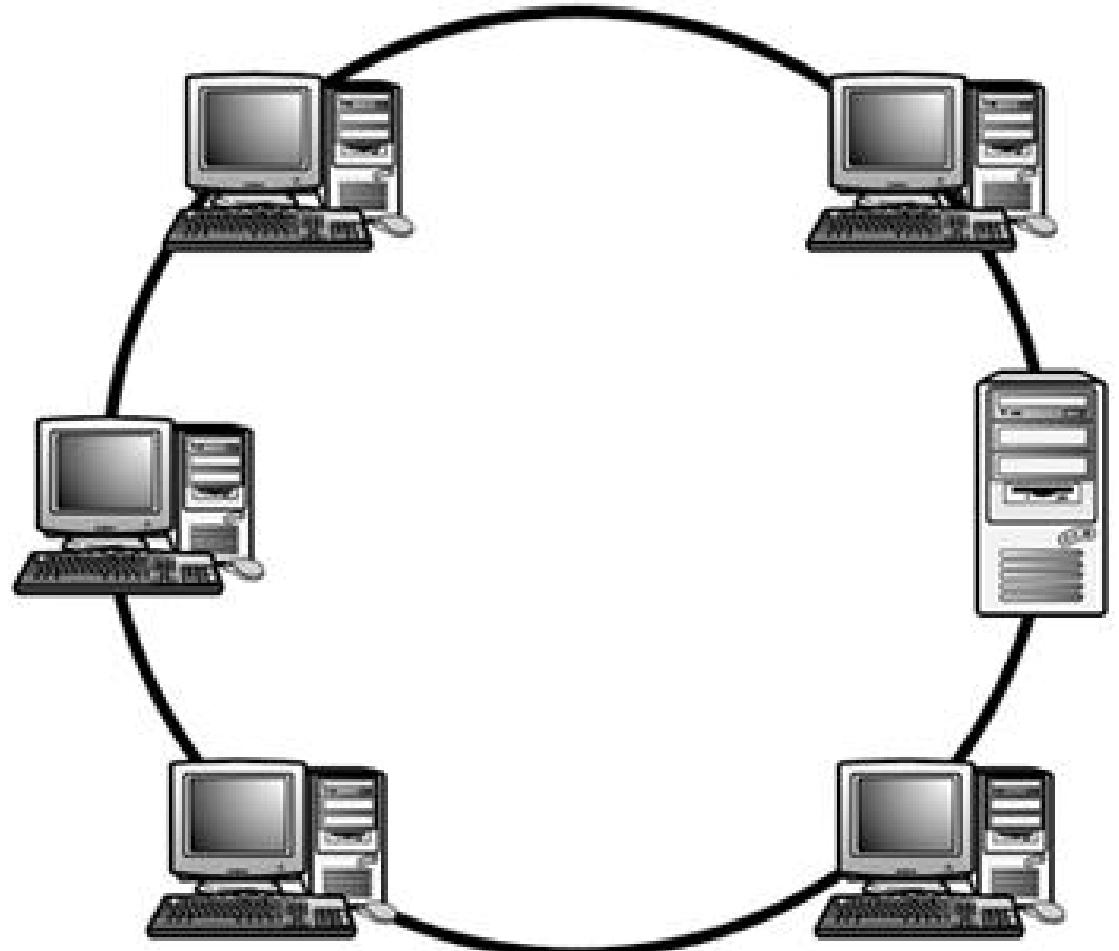
- Uses a trunk or backbone to which all of the computers on the network connect.
- Systems connect to this backbone using T connectors or taps.
- **Bus topology** is a method of connecting two or more computers serially, using the main cable as the center of data traffic. The connectors used in the **bus topology** include BNC and T connector connectors as well as terminators, while for **bus transmission topologies** using Coaxial cable.
- Advantages
  - Cheap and easy to implement
  - Require less cable
  - Does not use any specialized network to troubleshoot.
- Disadvantages
  - Network disruption when computers are added or removed
  - A break in the cable will prevent all systems from accessing the network.
  - Difficult to troubleshoot.

# Ring Topology



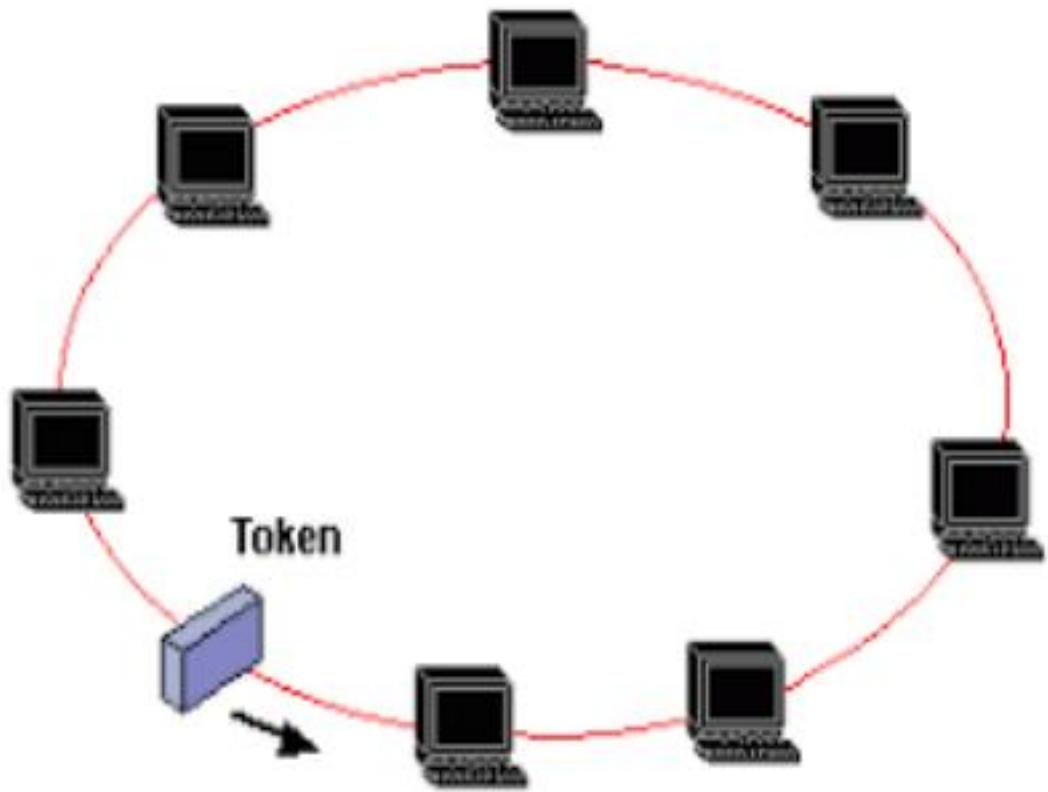
- A **ring topology** is a **topology** for a Local Area Network (LAN) in which every device has exactly two neighbors for communication purposes. Typically, all messages travel through a **ring** in the same direction. A failure in any cable or device breaks the loop and will take down the entire segment.

# Logical Ring



Meaning that data travels in circular fashion from one computer to another on the network.

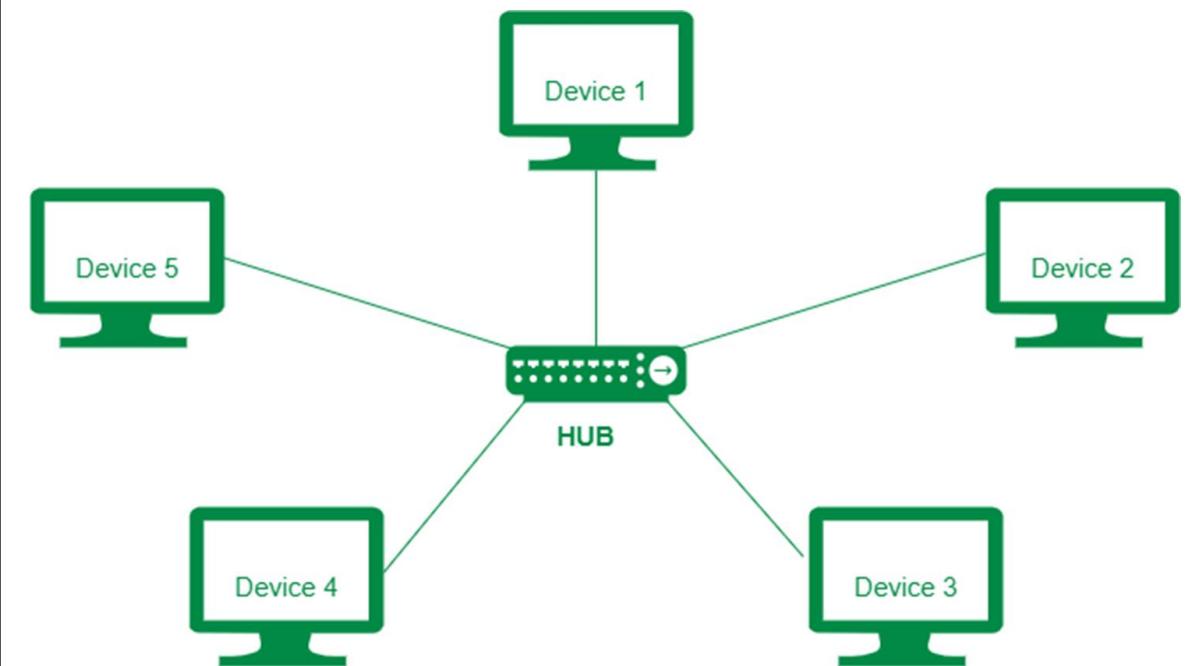
# Token Ring



**Token Ring** uses a ring topology whereby the data is sent from one machine to the next and so on around the ring until it ends up back where it started. It also uses a token passing protocol which means that a machine can only use the network when it has control of the Token, this ensures that there are no collisions because only one machine can use the network at any given time

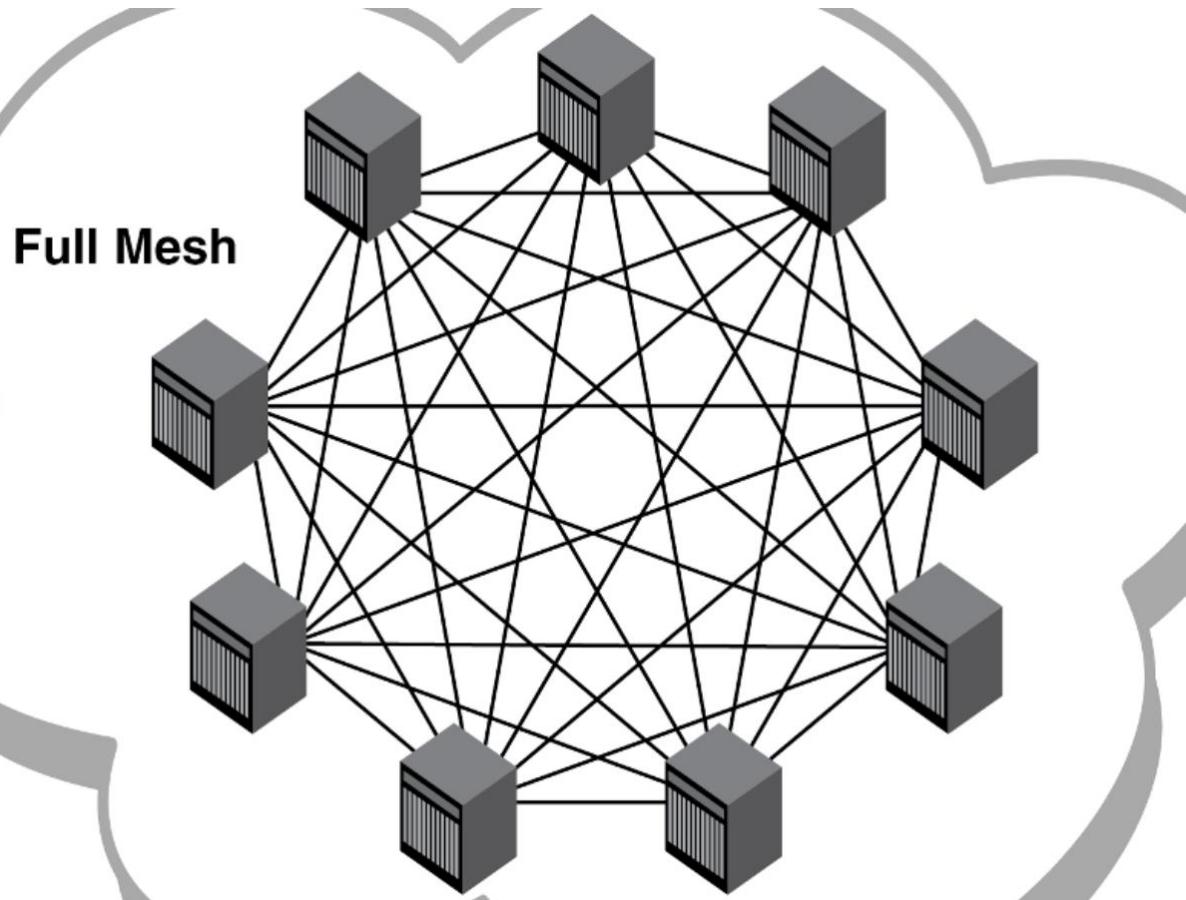
- Ring Topology
- Advantages
  - Cable faults are easily located, making troubleshooting easier.
  - Ring networks are moderately easy to install
- Disadvantages
  - Expansion to the network can cause network disruption
  - A single break in the cable can disrupt the entire network.

# Star Topology



- All computers/devices connect to a central device called hub or switch.
  - Each device requires a single cable point-to-point connection between the device and hub.
  - Most widely implemented
  - Hub is the single point of failure
- 
- Advantages
    - Easily expanded without disruption
    - Cable failure affects only a single user
    - Easy to troubleshoot and isolate the problems
  - Disadvantages
    - Requires more cable to the network
    - A central connecting device allows for a single point of failure
    - More difficult to implement

# Mesh Topology



- Each computer connects to every other.
- High level of redundancy.
- Rarely used.
  - Wiring is very complicated
  - Cabling cost is high
  - Troubleshooting a failed cable is tricky
  - A variation hybrid mesh - create point to point connection between specific network devices, often seen in WAN implementation.
- Advantages
  - Provides redundant paths between devices
  - The network can be expanded without disruption to current uses
- Disadvantages
  - Requires more cable than the other LAN topologies
  - Can be expensive implementation

# Wireless Networking



- Do not require physical cabling
- Particularly useful for remote access for laptop users
- Eliminate cable faults and cable breaks.
- Signal interference and security issue.
  
- Advantages
  - Allows for wireless remote access
  - Network can be expanded without disruption to current users
- Disadvantages
  - Potential security issues associated with wireless transmissions
  - Limited speed in comparison to other network topologies.



# NETWORK OHS & 5S PRINCIPLES

## OHS Policies and Procedures

*Occupational health and safety (OHS)*

- refers to the legislation, policies, procedures and activities that aim to protect the health, safety and welfare of all people at the workplace.

# Personal safety while working with PC's

- Before doing anything, listen to your trainer's instruction to prevent accidents or any unwanted events that may occur on your workplace.
- Be sure not to mix electronic components and water.
- Avoid playing or running while inside the room.

# Personal safety while working with PC's

- Always wear personal protective equipment (PPE) like coverall, shoes with rubber sole, antistatic wrist strap, etc.
- Ask for assistance from your trainer when it comes on dealing with tools & equipment.
- Applying safety measure when handling tools and equipment are necessary to avoid certain damages.
- Be sure to use the tools and equipment properly to avoid accidents.



# 5S Methodology

- Manufacturing companies are all familiar with the 5S methodology to organize the workspace for efficiency and effectiveness.
- 5S is the name of a workplace organization method that uses a list of five Japanese words:
- *seiri, seiton, seiso, seiketsu, and shitsuke.*



# 5S Methodology

- *sort, set, shine, standardize, sustain*
- (Credit goes to Hiroyuki Hirano and his overall approach to production systems)



# 1. Sort

- Sorting helps you to use a red tag method that will get rid of all the different processes or items that you don't need. Throughout the years, your organization may have acquired software and hardware that may be either used partially, or not used at all.



## 2. Set

- Now that you have a better understanding of what you have, and what you need – and let's not forget some free space, you can move on to the next aspect of 5 S method: set everything in order.



## 3. Shine

- Once you have the workplace sorted and set, it's time to put some shine on. What are you doing to make sure your network is neat and clean? The third step, shine, is crucial to the 5S methods.



## 4. Standardize

- One of the most important things you can do for your business is to standardize the equipment and processes within your computer network. New procedures, once vetted, should be properly documented and made standard.



## 5. Sustain

- Your final step, sustain, is the hardest – not falling back into old habits is not easy. It is even more difficult if you don't have a full-time IT staff on board to perform tech support and maintenance.

NHEIL  
JONAS  
MARK  
PAUL



# NETWORK TOOLS, EQUIPMENT, MATERIALS & TESTING DEVICES

- *Network Tools*
  - This are the tools needed for Computer Networking Set-up
- *Network Equipment*
  - network equipment or computer networking devices, are electronic devices which are required for communication and interaction between devices on a computer network.

# Network Tools

- *Crimping tool*

- A crimping tool is a tool designed to crimp or connect a connector to the end of a cable. For example, network cables and phone cables are created using a crimping tool to connect the RJ-45 and RJ-11 connectors to the end of the cable.





# Network Tools

- ***Wire stripper***
  - A tool designed to remove the protective covering off of a cable to expose the inner wires. Because different wires come in different shapes, there are dozens of different wire strippers available.



# Network Tools

- *Electric Hand Drill with Drill bit*
  - Is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for boring holes in various materials or fastening various materials together with the use of fasteners.



# Network Equipment

- *Patch panel*
  - A patch panel, patch bay, patch field or jack field is a device or unit featuring a number of jacks, usually of the same or similar type, for the use of connecting and routing circuits for monitoring, interconnecting, and testing circuits in a convenient, flexible manner.



# Network Equipment

- ***Network Hub***
  - When referring to a network, a hub is the most basic networking device that connects multiple computers or other network devices together.



# Network Equipment

- ***Network Switch***
  - A network switch (also called switching hub, bridging hub, officially MAC Bridge) is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device.



# Network Equipment

- *Managed Switch*
  - Give you more control over your LAN traffic and offer advanced features to control that traffic.



# Network Equipment

- ***Network Controller/Network Interface Card***

- A network interface controller (NIC, also known as a network interface card, network adapter, LAN adapter or physical network interface and by similar terms) is a computer hardware component that connects a computer to a computer network.



# Network Equipment

- ***Wireless Router***

- A wireless router is a device that performs the functions of a router and also includes the functions of a wireless access point. It is used to provide access to the Internet or a private computer network.



# Network Equipment

- ***Wireless Access Point***

- In computer networking, a wireless access point(AP) is a device that allows wireless devices to connect to a wired network using Wi-Fi, or related standards.



# Network Equipment

- *Printer*

- In computing, a printer is a peripheral which makes a persistent human readable representation of graphics or text on paper or similar physical media.



# Network Equipment

- ***Cable Tester/Network Tester***
  - A cable tester is a device that is used to test the strength and connectivity of a particular type of cable or other wired assemblies.



# Network Materials

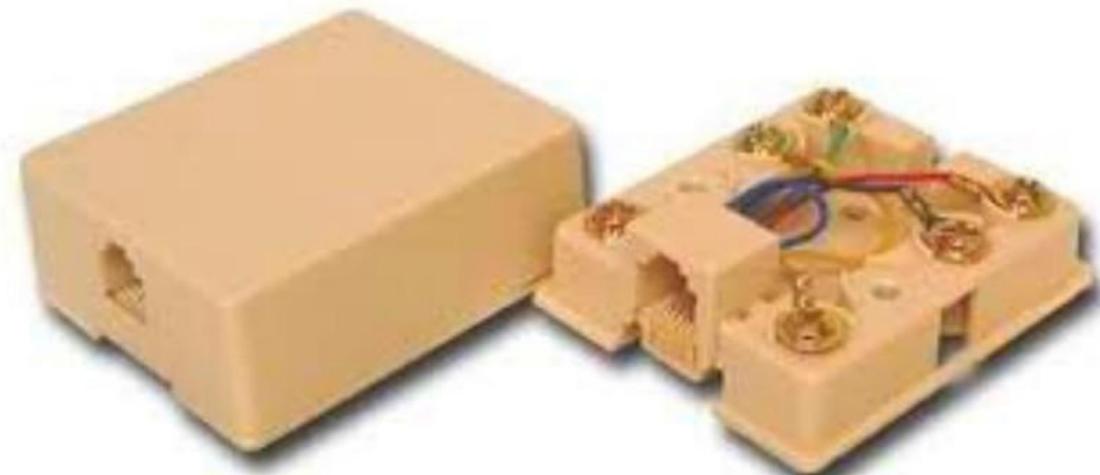
- **RJ 45**
  - Short for Registered Jack-45, an eight-wire connector used commonly to connect computers onto local-area networks (LAN), especially Ethernets.



# Network Materials

- ***Modular Box***

- Use to in a large building, usually place on the wall to connect telephone lines or network cable easily.



# Network Materials

- *Raceway*

- A raceway (sometimes referred to as a raceway system) is an enclosed conduit that forms a physical pathway for electrical wiring. Raceways protect wires and cables from heat, humidity, corrosion, water intrusion and general physical threats.



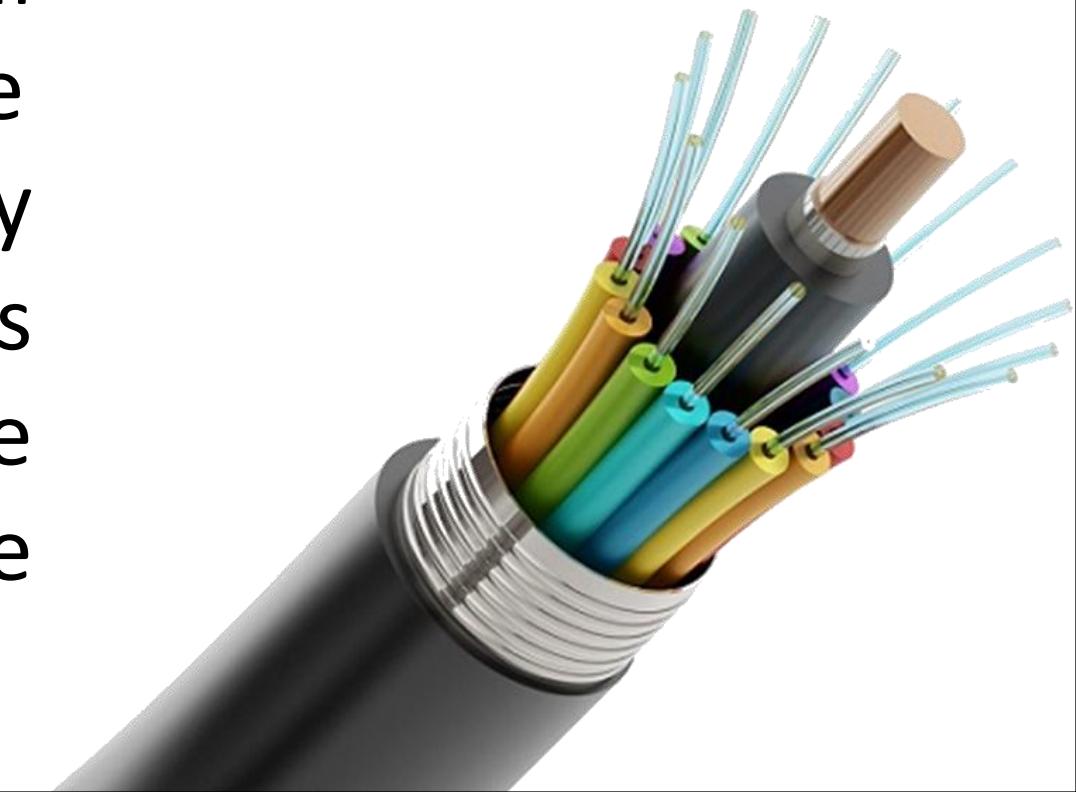
# Network Materials

- ***UTP Cable***
  - Unshielded Twisted Pair cable is most certainly by far the most popular cable around the world. UTP cable is used not only for networking but also for the traditional telephone.



# Network Materials

- *Fiber Optic Cable*
  - An optical fiber cable is a cable containing one or more optical fibers that are used to carry light. The optical fiber elements are typically individually coated with plastic layers and contained in a protective tube suitable for the environment where the cable will be deployed.



# Network Personal Protective Equipment

- *Protective eyewear*

- is protective gear for the eyes, which comes in many types depending upon the threat that is to be reduced. The threats can be particles, light, wind blast, heat, sea spray or some type of ball or puck used in sports.



# Network Personal Protective Equipment

- ***Gloves***

- A glove (Middle English from Old English *glof*) is a garment covering the whole hand. Gloves have separate sheaths or openings for each finger and the thumb; if there is an opening but no covering sheath for each finger they are called "fingerless gloves".



# Network Personal Protective Equipment

- ***Working clothes***

- is clothing worn for work, especially work that involves manual labor. Often those employed within trade industries elect to be outfitted in workwear because it is built to provide durability and safety.

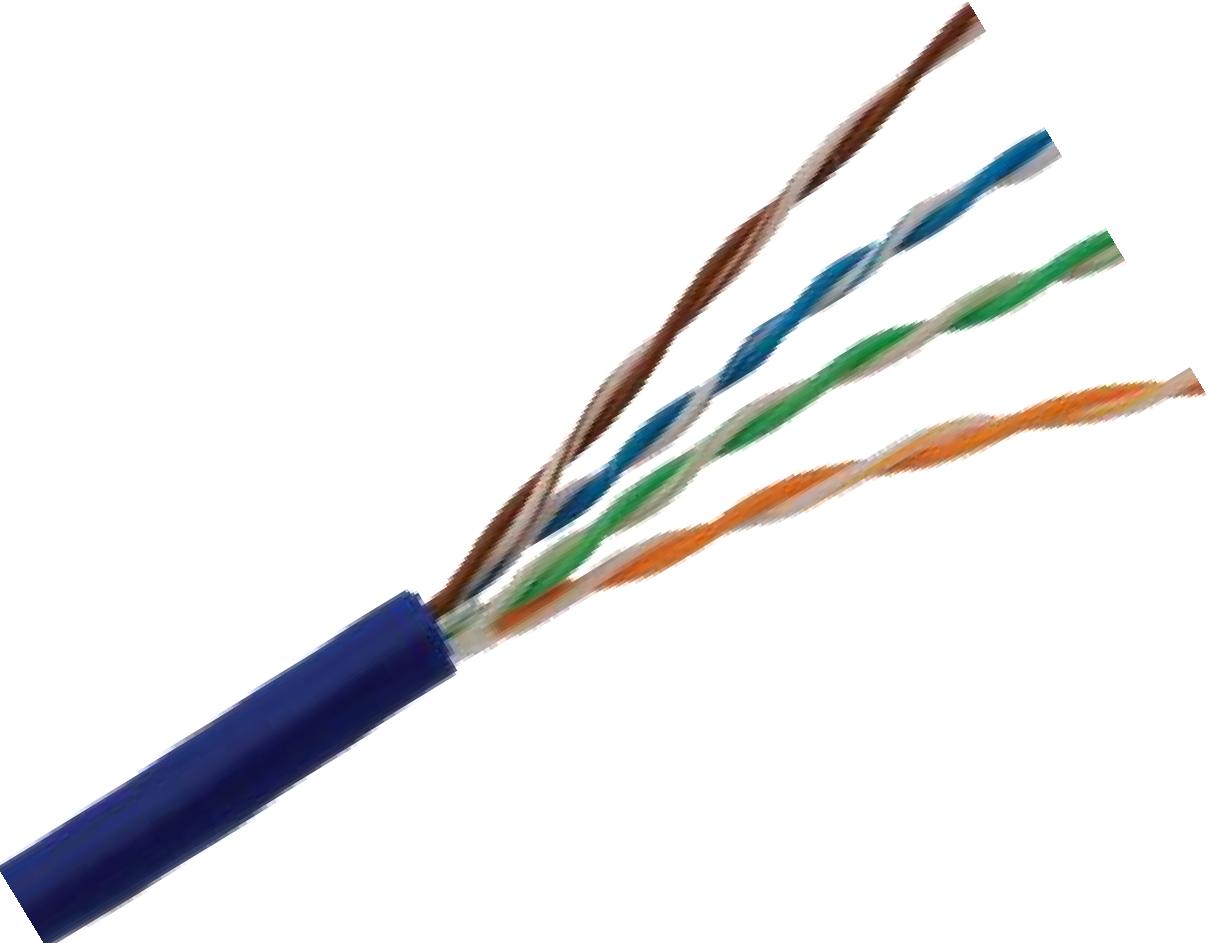


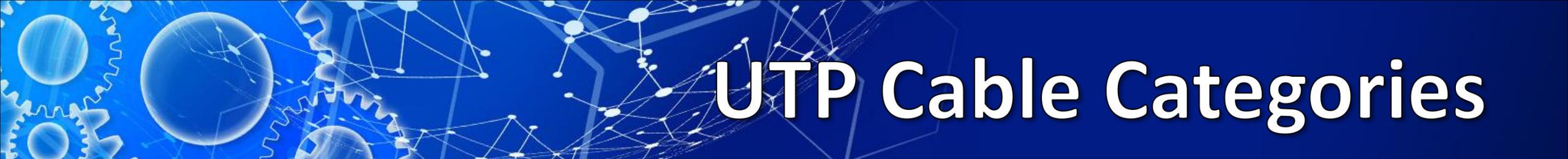
# NETWORK CABLE INSTALLATION AND TESTING

- ***What is Network Cables?***
  - Networking cables are used to connect one network device to other network devices or to connect two or more computers to share printer, scanner etc.

# Network Cables

- *Unshielded Twisted Pair*
  - Unshielded Twisted Pair cable is most certainly by far the most popular cable around the world. UTP cable is used not only for networking but also for the traditional telephone.





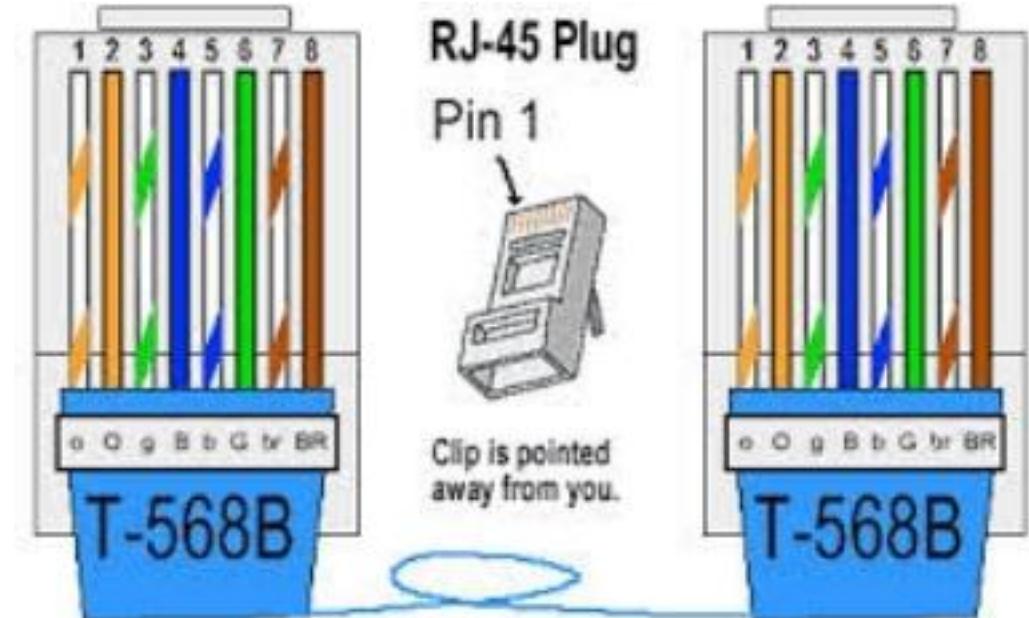
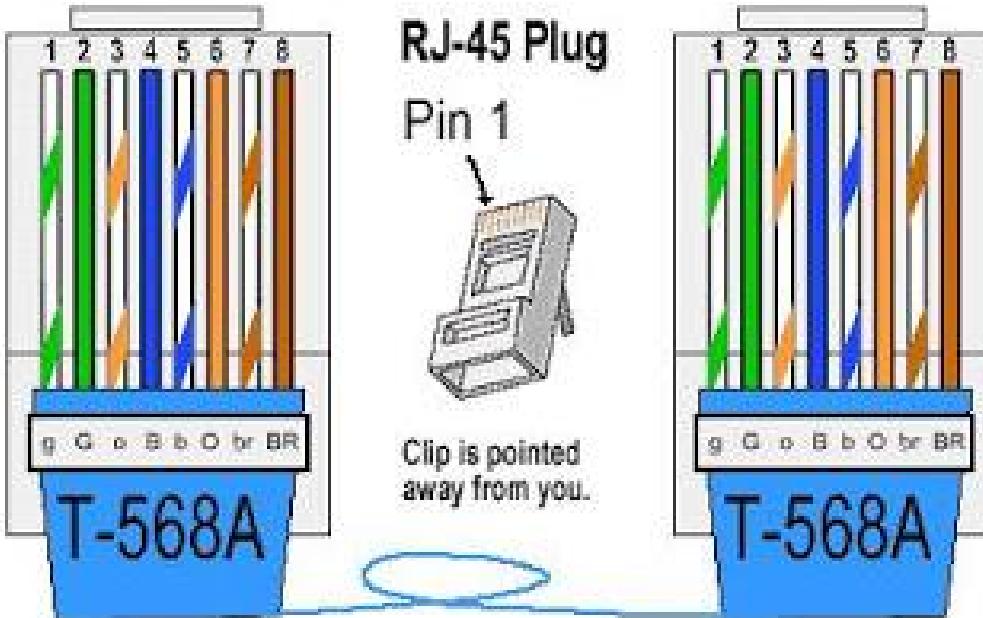
# UTP Cable Categories

- **CAT1** - Data rate up to 1Mbps - Traditional Telephone & ISDN – Modem
- **CAT2** - Data rate up to 4Mbps - Token Ring
- **CAT3** - Data rate up to 10Mbps - Token Ring & 10Base-T
- **CAT4** - Data rate up to 16Mbps - Token Ring
- **CAT5** - Data rate up to 100Mbps - Ethernet (10Mbps) - Fast Ethernet (100Mbps) & Token Ring (16Mbps)
- **CAT5e** - Data rate up to 1000Mbps - Gigabit Ethernet
- **CAT6** - Data rate up to 1000Mbps - Gigabit Ethernet

# Ethernet Cable Standard Color Coding

- **TIA/EIA 568-A** standard which was ratified in 1995, was replaced by the **TIA/EIA 568-B** standard in 2002 and has been updated since. Both standards define the T-568A and T-568B pin-outs for using Unshielded Twisted Pair cable and RJ-45 connectors for Ethernet connectivity.

# Straight-Through Ethernet Cable



# Crossover Cable Wiring

## TIA/EIA 568A Wiring

1	White and Green
2	Green
3	White and Orange
4	Blue
5	White and Blue
6	Orange
7	White and Brown
8	Brown

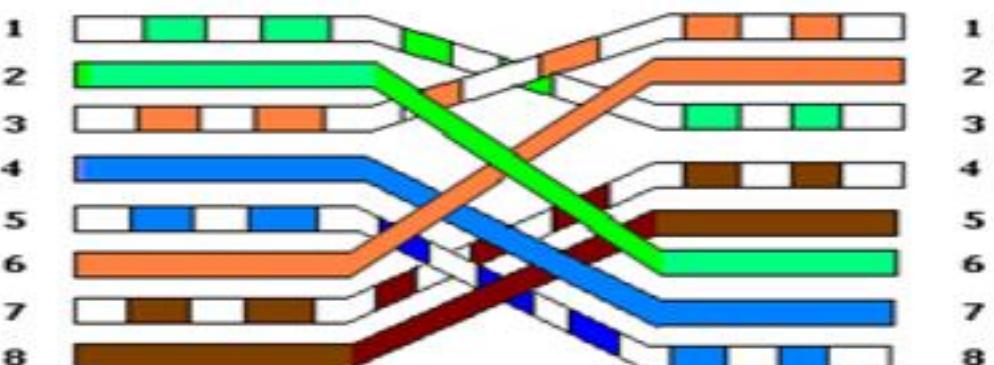
## TIA/EIA 568B Wiring

1	White and Orange
2	Orange
3	White and Green
4	Blue
5	White and Blue
6	Green
7	White and Brown
8	Brown

Figure A

Shows the Pin Out of Straightthrough Cables

## TIA/EIA 568A Crossed Wiring



## TIA/EIA 568B Crossed Wiring

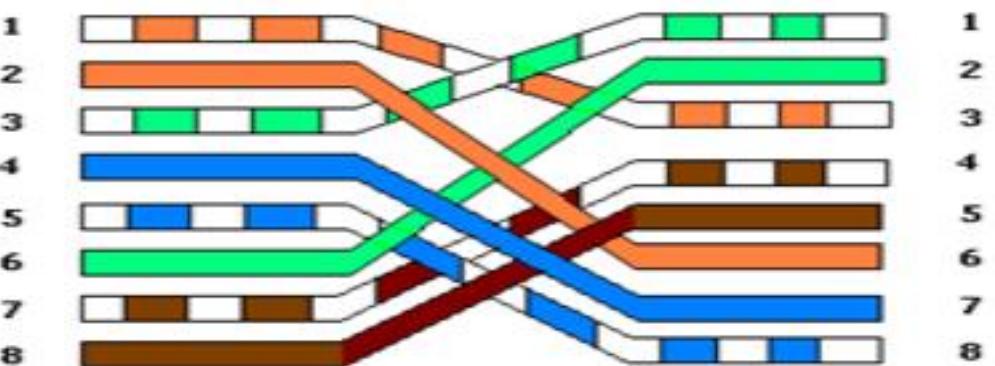
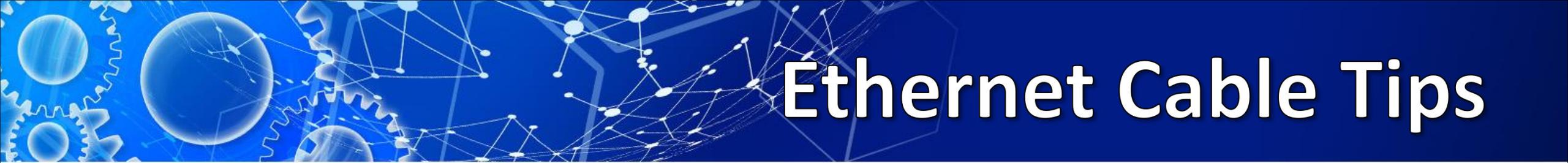


Figure B

Shows the Pin Out of Crossover Cables



# Ethernet Cable Tips

- A straight-thru cable has identical ends.
- A crossover cable has different ends.
- A straight-thru is used as a patch cord in Ethernet connections.
- A crossover is used to connect two Ethernet devices without a hub or for connecting two hubs.
- A crossover has one end with the Orange set of wires switched with the Green set.



# Ethernet Cable Tips

- Odd numbered pins are always striped, even numbered pins are always solid colored.
- Looking at the RJ-45 with the clip facing away from you, Brown is always on the right, and pin 1 is on the left.
- No more than 1/2" of the Ethernet cable should be untwisted otherwise it will be susceptible to crosstalk.
- Do not deform, do not bend, do not stretch, do not staple, do not run p



# How to wire your room with Cat5e or Cat6 Ethernet Cable

- Although wireless is simpler for a lot of people, due to multimedia sharing, bandwidth on a home network, and paranoia about wireless security, you may want to use a hard wired solution for home networking. Having a wired network at home allows you to have a private, high-speed network for internet access, file sharing, media streaming, online gaming, IP security cameras, and much more.

# Step 1: Initial Considerations and Planning

*There are certain design considerations that need to be addressed based on your needs.*

1. Which room(s) do I want wired?
2. How many ports do I want in each location?
3. What is a good location for distribution?
4. What path should the cables take?
5. What network speed do I need?



## Step 2: Required Tools, Equipment and Materials Tools

### *Tools*

1. Crimping Tool
2. Electric Hand Drill
3. Wire Stripper

### *Equipment*

1. Patch panel
2. Network Switch/Hub
3. Wireless Router
4. Wireless Access point
5. Manage Switch



## Step 2: Required Tools, Equipment and Materials Tools

### *Materials*

1. Cat5e or Cat6 UTP
2. Cat5e or Cat6 UTP Cable Crimp (Straight-through & Crossover)
3. Raceways
4. Modular Box
5. Label maker (optional).

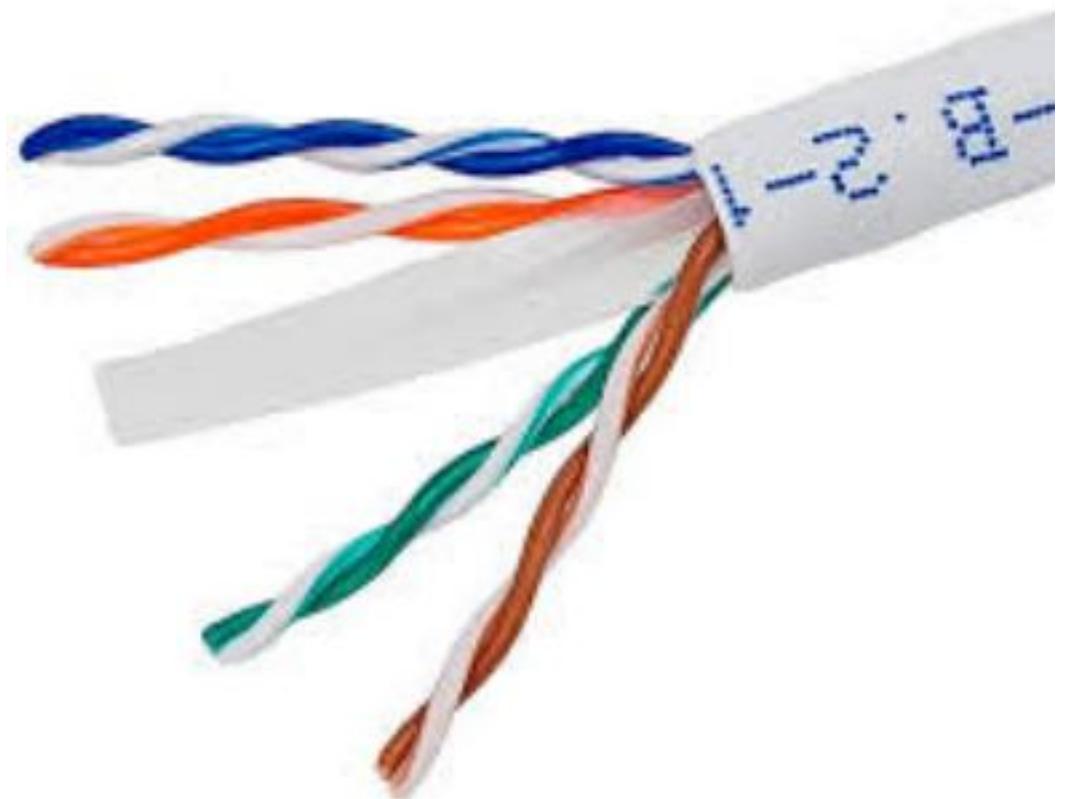


# Step 3: Measure and Run the Cables

- There are a number of ways to do this. You can estimate, measure from floor plans, run one, etc.

# Step 4: Connect the Wires to the Patch Panel

- *Strip the sheath*
  - a. Remove the cable sheath 2.54 cm (1 inch) from the end of the cable.



# Step 4: Connect the Wires to the Patch Panel

- *Position wires in data jack*
  - a. Position wires in the proper channels on the RJ-45 jack maintaining the twists as close to the jack as possible. The diagram that follows shows an example of how to place the wires with one type of jack.

# Step 4: Connect the Wires to the Patch Panel

- b. Most jacks have the channels color-coded to indicate where the wires go. The following photo of the jack shows one model. Jacks are typically stamped to indicate whether they are T568A or T568B.



# Step 4: Connect the Wires to the Patch Panel

- *Punch down the data jack*
  - a. Use the punch tool to push conductors into the channels. Make sure to position the cutting side of the punch tool so that it faces the outside of the jack. If this is not done, it will cut the wire being punched. Try tilting the handle of the punch tool a little to the outside, so it will cut better.



# Step 4: Connect the Wires to the Patch Panel

## *Punch down the data jack*

- b. If any wire remains attached after using the punch tool, simply twist the ends gently to remove them. Then place the clips on the jack, and tighten them. Make sure that no more than 1.27 cm (one half inch) of untwisted wire is between the end of the cable jacket and the channels on the jack. Attach the faceplate.
- c. Snap the jack into the faceplate by pushing it from the back side. Make sure when this is done, that the jack is right-side up so the clip faces down when the wall plate is mounted.

# Step 4: Connect the Wires to the Patch Panel

*Punch down the data jack*

- d. Use the screws to attach the faceplate to either the box or to the bracket. If there is a surface mounted box, keep in mind that it might hold 30-60 cm (1-2 feet) of excess cable. Then it will be necessary to either slide the cable through the tie-wraps, or pull back the raceway that covers it, in order to push the excess cable back into the wall. If there is a flush-mounted jack, all that is needed is to push the excess cable back into the wall.

# Step 4: Connect the Wires to the Patch Panel

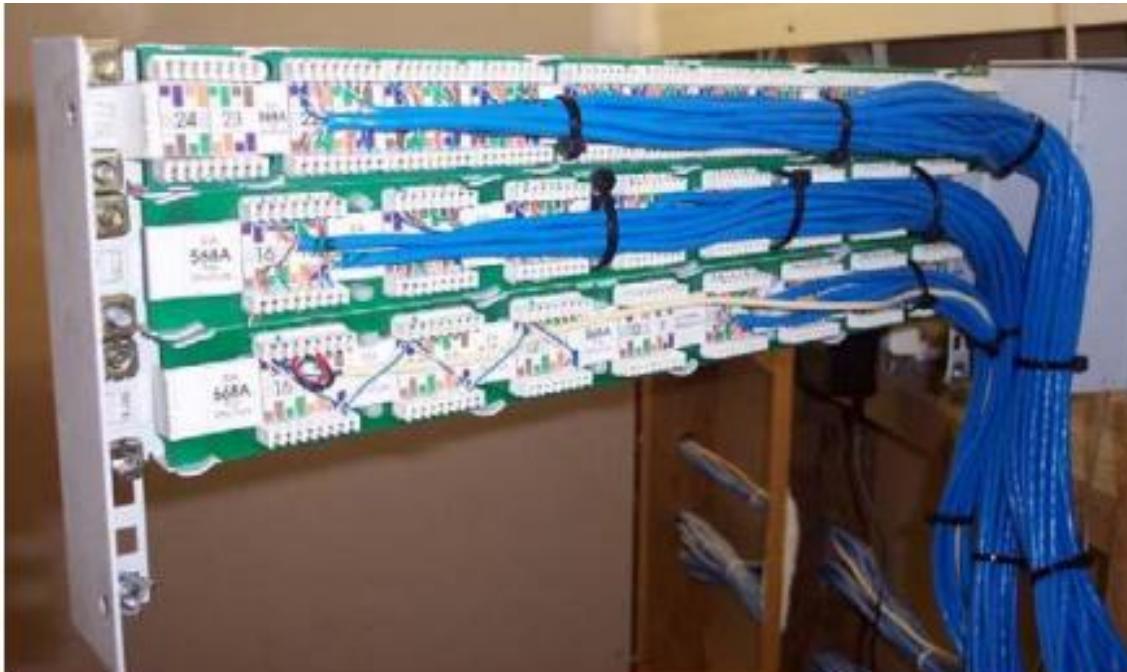
- *Punch down the patch panel*
  - a. On the opposite end of the cabling, remove the jacket 2.54 cm (1 inch) from the cable.
  - b. Lay the wires down in the patch panel so that the colors of the wires correspond exactly to the colors indicated on the pin locations in the same manner as the data jack was punched down.
  - c. Keep the sheath within .64 cm ( $\frac{1}{4}$  inch) of where the wires begin branching out to their pin locations.

# Step 4: Connect the Wires to the Patch Panel

- *Punch down the patch panel*
  - d. Do not untwist the wires more than necessary to lay them down at the pin locations. A good way to keep from untwisting too much is to hold down the wires next to the patch panel with one finger while using the other hand to pull apart each end as you lay it across the connector.

# Step 4: Connect the Wires to the Patch Panel

- *Punch down the patch panel*
- e. The following figure shows a large punch down patch panel with carefully routed cabling.





## Step 5: Test the data jack and patch panel terminations

- a. Obtain two straight-through Ethernet patch cables and verify they both function properly using a simple cable tester.
- b. Connect one end of one of the straight-through Ethernet patch cables to the data jack outlet and one end of the other straight-through cable to the jack at the patch panel.

# Step 5: Test the data jack and patch panel terminations



- c. Insert the opposite ends of the two cables into a simple cable tester and check for continuity from end to end through both patch cables, the data jack, and the patch panel. Did the cable run test good from end to end?

# Step 6: Connect the wires to the modular box

- a. Make sure the stripper is adjusted properly on a scrap piece of cable. The Stripper should be adjusted to only score the jacket to make removing it easier and not nick the twisted pairs.



## Step 6: Connect the wires to the modular box

- b. Straighten the pairs out completely and lay them over the top of the keystone jack noting the color pattern for the 568b wiring. Note: Each keystone jack is slightly different in how they are labeled and how the colors are arranged. The 568B standard is most commonly used and ends of the cable must have the same standards to communicate. We have the 3 most common keystone jack styles pictured here.

# Step 6: Connect the wires to the modular box

The first jack pictured has the 2 standard pairs on the right, and the 2 variable pairs on the left. The A standard is the center column and the B standard is on the left. Both A and B standard applies to the right side of the jack. The solid color box with the lower right corner missing represents the solid color wire with the white stripe. The white box with the colored tip represents the white wire with the colored stripe.

## Step 6: Connect the wires to the modular box

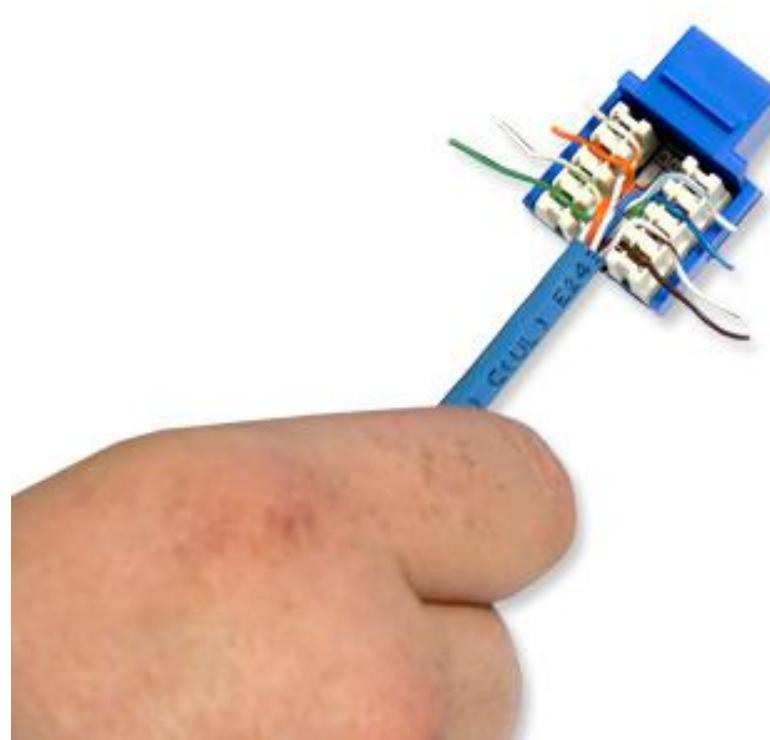
The second jack pictured here has both A and B 22 standards on both sides of the jack, with the color code running down the center. The solid color rectangle represents the solid color wire with the white stripe, while the half white half color rectangle represents the white wire with the colored stripe.

## Step 6: Connect the wires to the modular box

The third jack pictured here has the A and B standard codes labeled on the outside of the jack. With the A standard on top and the B standard on the bottom. The solid box represents the solid wire with the white stripe while the box with the white diagonal stripe going through the middle, represents the white wire with the colored stripe.

# Step 6: Connect the wires to the modular box

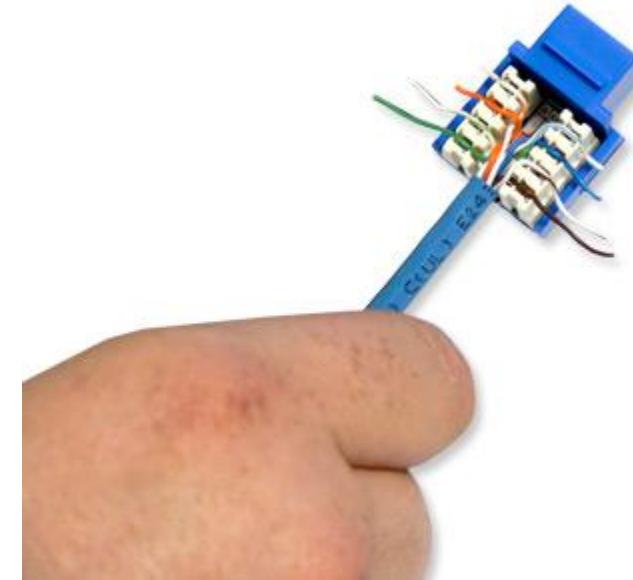
- c. Keeping the pairs as twisted as possible press the wire into the correct groove with your thumbs. If you completely straighten the wires to run them through the jack you will risk cross talk between the pairs.



## Step 6: Connect the wires to the modular box

d. Using a punch down tool punch the wires down into the blades built into the keystone jack. The blades in the jack are designed to work with solid cable, and may not work with stranded cable. Make sure the blade (as noted in the picture) is facing the outside of the keystone jack. If you reverse it you will cut the wires inside the keystone jack rendering them useless.

# Step 6: Connect the wires to the modular box





# Step 7: Connect to the Internet

- a. Connect Network Switch/Hub to the patch panel using cross-over cable base on the network topology.
  
- b. Connect the Wireless Router to the Network hub & to the Modem using cross-over cable base on the network topology.

# Step 7: Connect to the Internet

- c. Connect your pc on the modular box using straight-through cable.





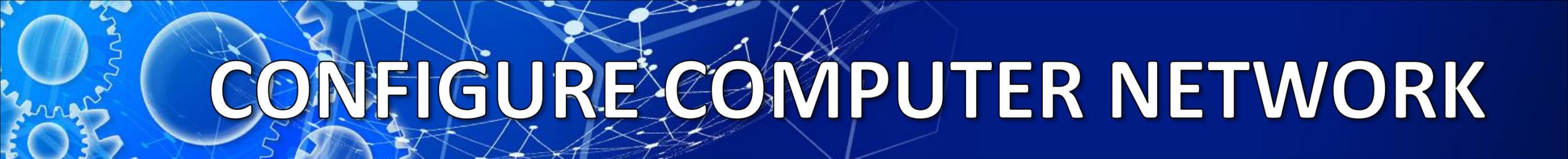
# CONFIGURE COMPUTER NETWORK

- *What is IP Address?*

An Internet Protocol address (IP address) in layman's terms is basically the address given to your computer when it's connected to a network. Technically speaking, an IP address is a 32-bit number that signifies the address of both the sender and receiver of packets on a network.

# CONFIGURE COMPUTER NETWORK

Class	Address Range	Supports
Class A	1.0.0.1 to 126.255.255.254	Large networks with many devices
Class B	128.1.0.1 to 191.255.255.254	Medium-sized networks.
Class C	192.0.1.1 to 223.255.254.254	small networks (fewer than 256 devices)
Class D	224.0.0.0 to 239.255.255.255	Reserved for multicast groups.
Class E	240.0.0.0 to 254.255.255.254	Reserved for future use, or Research and Development Purposes.



# CONFIGURE COMPUTER NETWORK

- *Static IP Address*
  - As the name speaks, the static IP addresses are those types of IP address that never change once they are assigned to a device on a network. No doubt this type of addressing is cost effective but could have a high security risk.



# CONFIGURE COMPUTER NETWORK

- *Dynamic IP Address*
  - On the other hand, a Dynamic IP address changes each time the device logs in to a network. This kind of IP address is very tough to trace and are thus used by companies and business firms.

# CONFIGURE COMPUTER NETWORK

*Which is better, Static or Dynamic?*

- You are probably wondering which type of IP addressing is better, Static or Dynamic? Static IP addresses, as I already mentioned above, are used in places where security is not a big concern like web servers, FTP and dedicate VOIP services. Dynamic IP addressing, on the other hand are used when you browse through the Internet, receive mails, download files, etc.



# CONFIGURE COMPUTER NETWORK

## *How to Configure a Static IP Address in Windows 7*

- Sometimes in order to gain connectivity in certain networks where a DHCP server is not running, the configuration of a static IP address is required.

# CONFIGURE COMPUTER NETWORK

*Let's go through the steps now and configure a static IPv4 address in Windows 7.*

① Use the following IP address:

IP address:

192 . 168 . 1 . 2

Subnet mask:

255 . 255 . 255 . 0

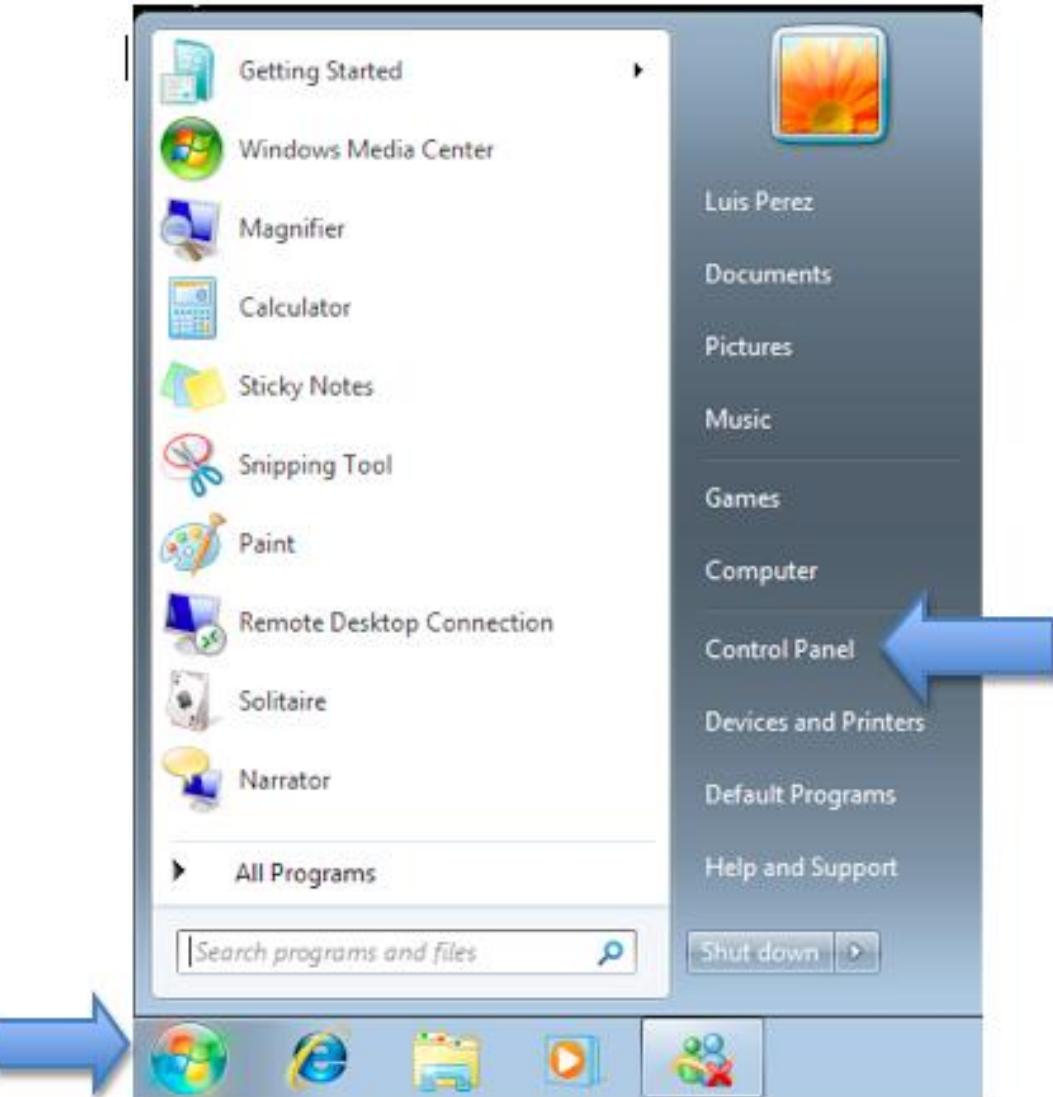
Default gateway:

192 . 168 . 1 . 1

# CONFIGURE COMPUTER NETWORK

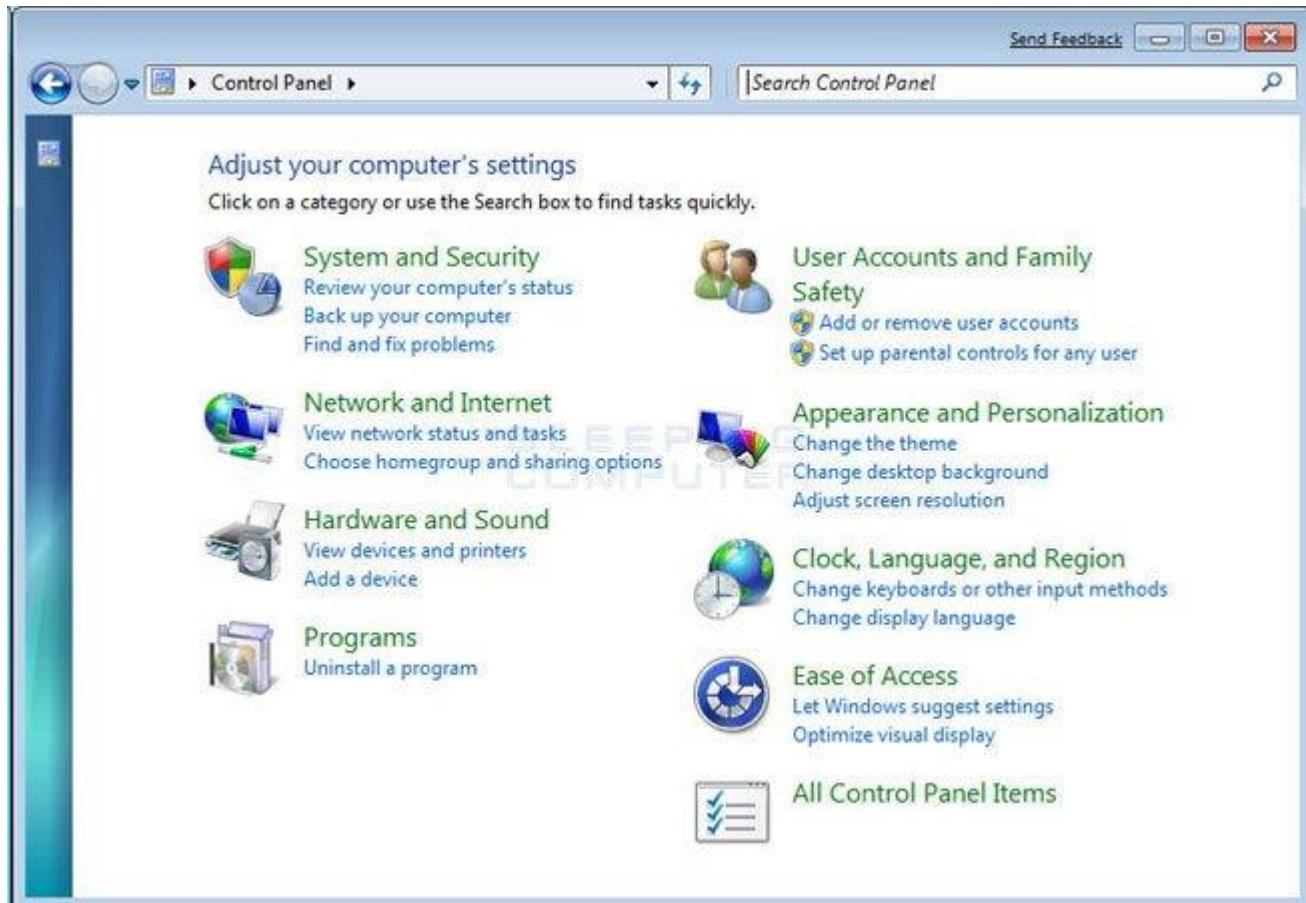
## *Static IPv4 Configuration in Windows 7*

The first thing that must be done is to gain access to the Network and Sharing Center in Windows 7. This can be done in one of two ways; the first way to access it is via the control panel.



# CONFIGURE COMPUTER NETWORK

There are several views which are available for the control panel; by default the category view is used. When using the category view the option that you need to select is called View network status and Tasks, as highlighted below.



# CONFIGURE COMPUTER NETWORK

The second way to gain access to the Network and Sharing Center is to utilize the network icon which is displayed in the system tray when a network interface has been enabled.

# CONFIGURE COMPUTER NETWORK

When this icon is right-clicked the option to open the Network and Sharing Center is given as shown below:



# CONFIGURE COMPUTER NETWORK



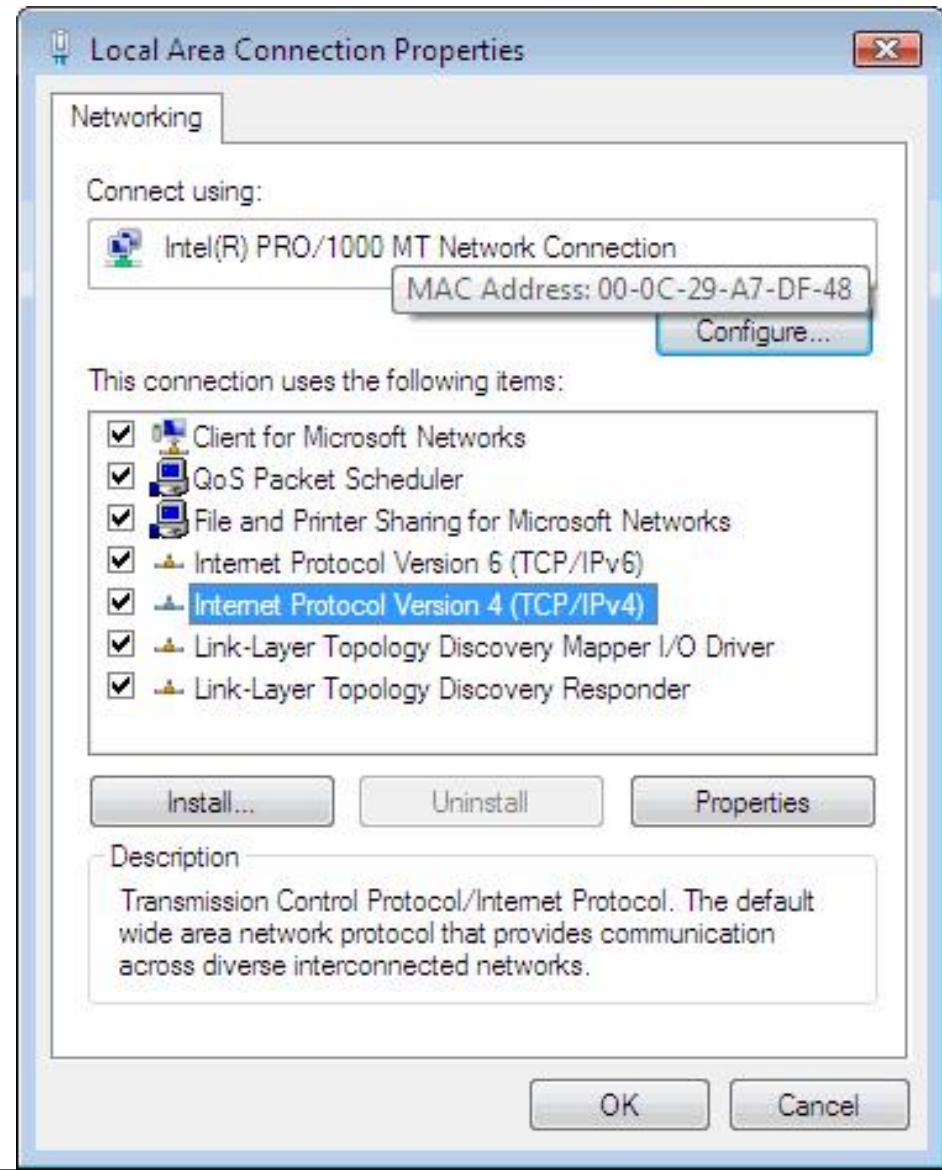
# CONFIGURE COMPUTER NETWORK

For the purposes of this article the wired interface will be used as the interface being given a static IP Address.



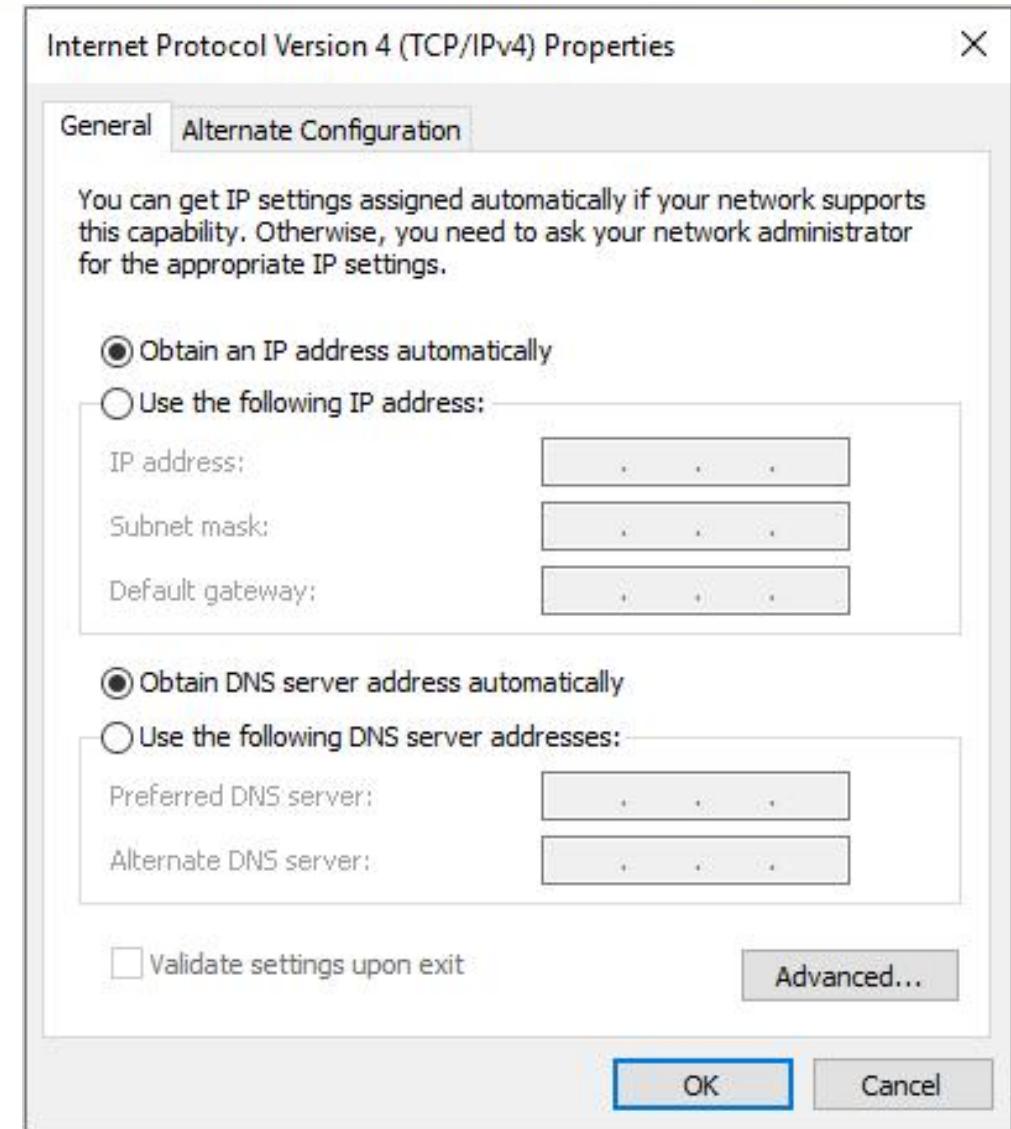
# CONFIGURE COMPUTER NETWORK

Since we want to change the interface IPv4 IP address this option must be selected from the window. Once this option is selected the properties button will be enabled; press the properties button.



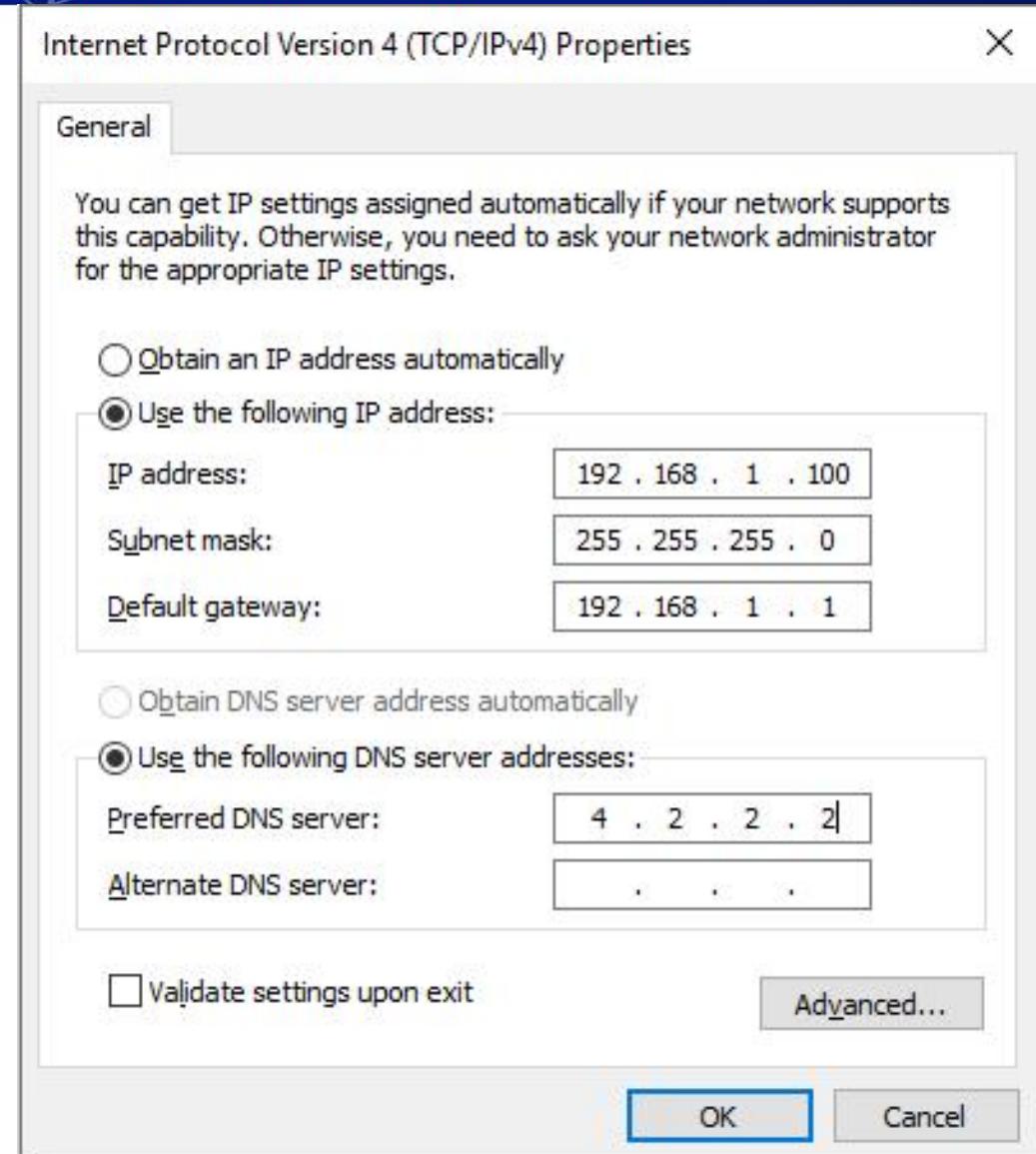
# CONFIGURE COMPUTER NETWORK

In order to change to a static IP address the option to Use the following IP address must be selected; once this is done the option to enter the IP address parameters is enabled and the Use the following DNS server addresses option is selected.



# CONFIGURE COMPUTER NETWORK

These options are shown in their correct locations in the following figure:



# HOMEGROUP Configuration in Windows 7

A new option which was introduced with Windows 7 is Home Group. Home Group allows Windows 7 machines to be linked in an easier way which makes the sharing of resources between machines much simpler to setup. Each machine must become a member of a Home Group in order to utilize this functionality.

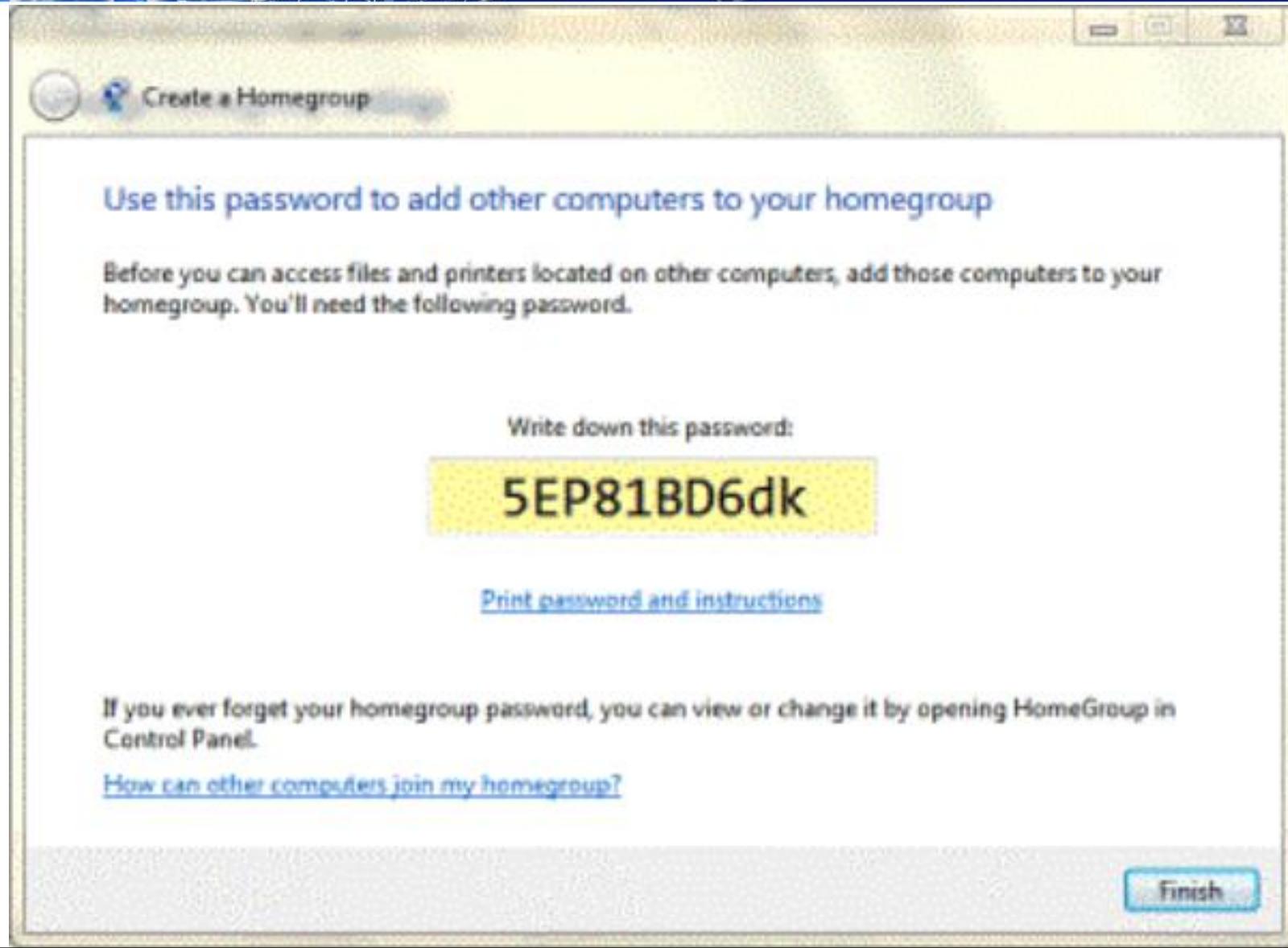
# HOMEGROUP Configuration in Windows 7



# HOMEGROUP Configuration in Windows 7



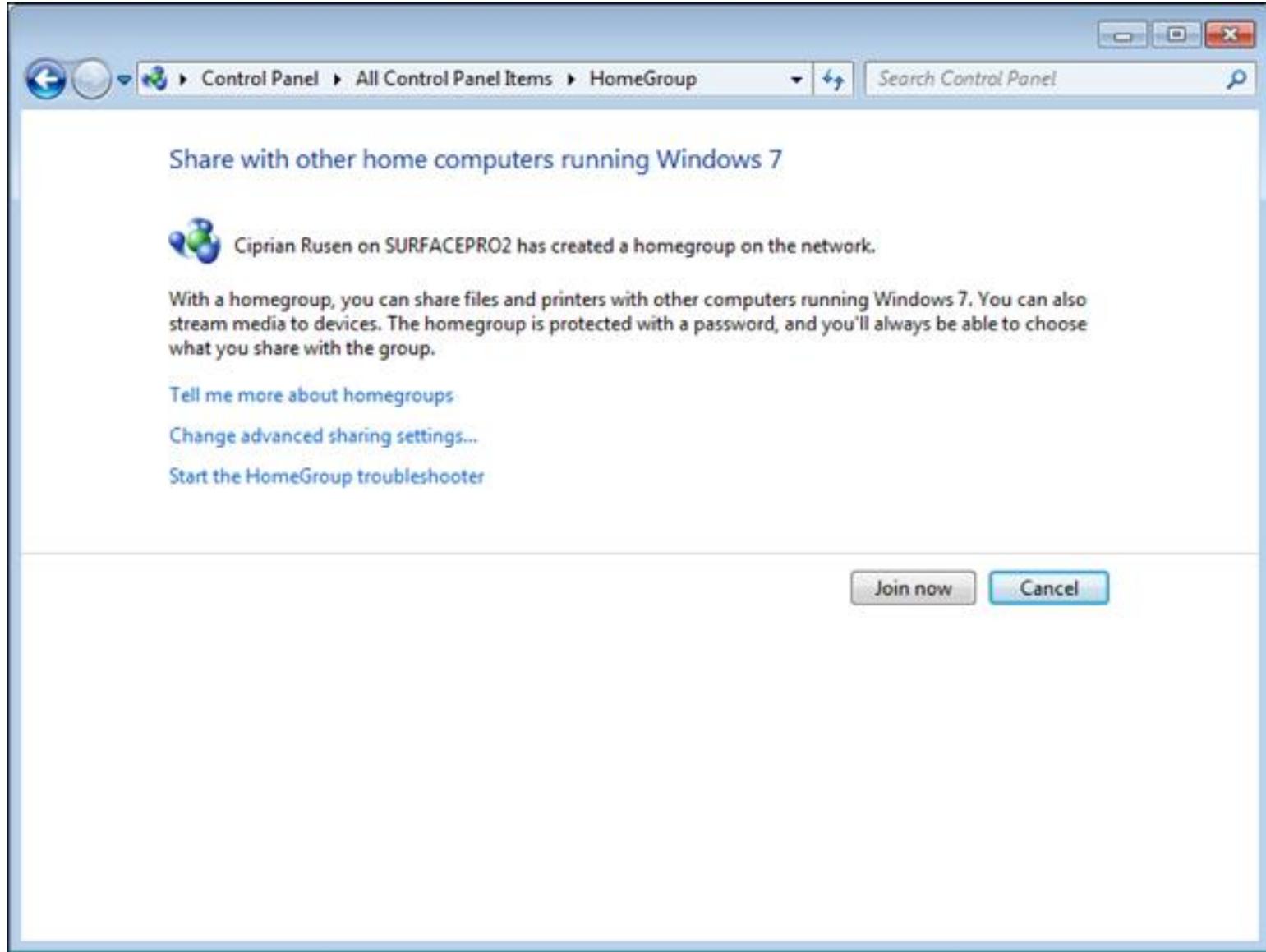
# HOMEGROUP Configuration in Windows 7



# HOMEGROUP Configuration in Windows 7



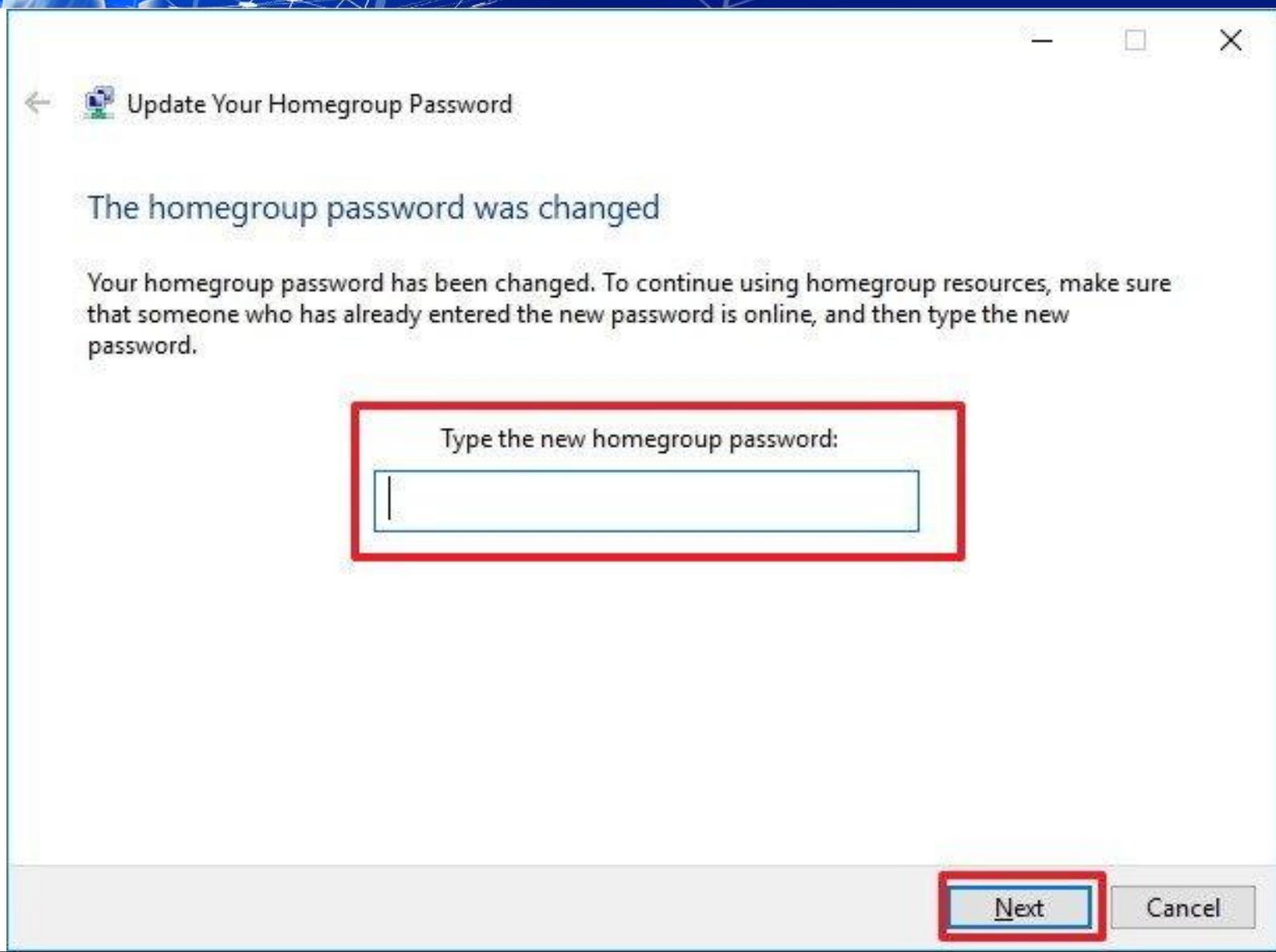
# HOMEGROUP Configuration in Windows 7



# HOMEGROUP Configuration in Windows 7

The following figure shows how the Home Group window will display when there is an existing Home Group on the network. Once this is shown, simply press the Join now button and select the local shared options and enter the Home Group password.

# HOMEGROUP Configuration in Windows 7



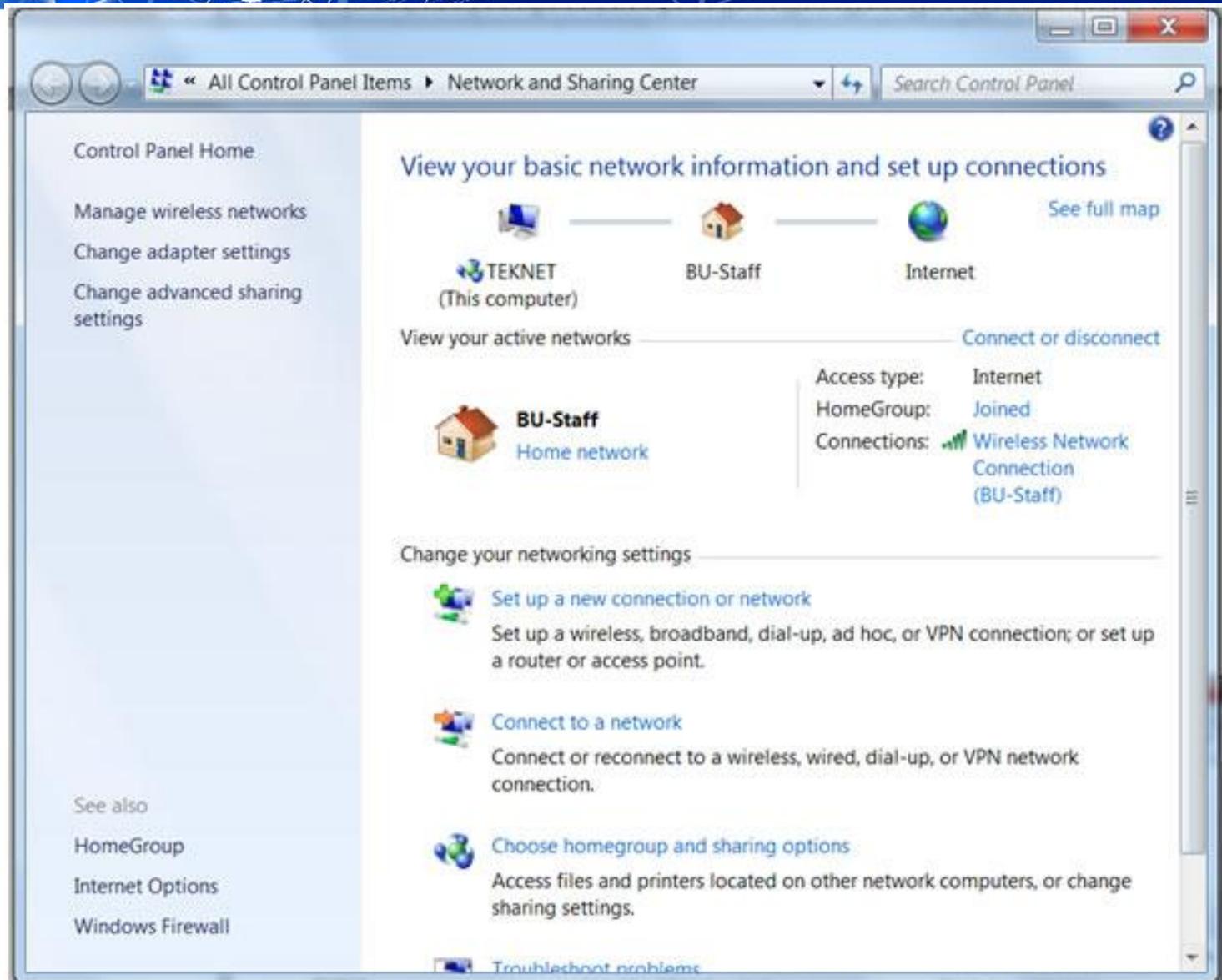
# Windows 7 Network Locations aka Profiles

Another feature which can be used with Windows 7 is network location. Every time a new network connection is established, a prompt will be given to select what type of location the new network connection is. The three options are Home, Work and Public.

# Windows 7 Network Locations aka Profiles

The current location which is selected is shown in the Network and Sharing Center under View your active networks and can be changed by selecting the current setting.

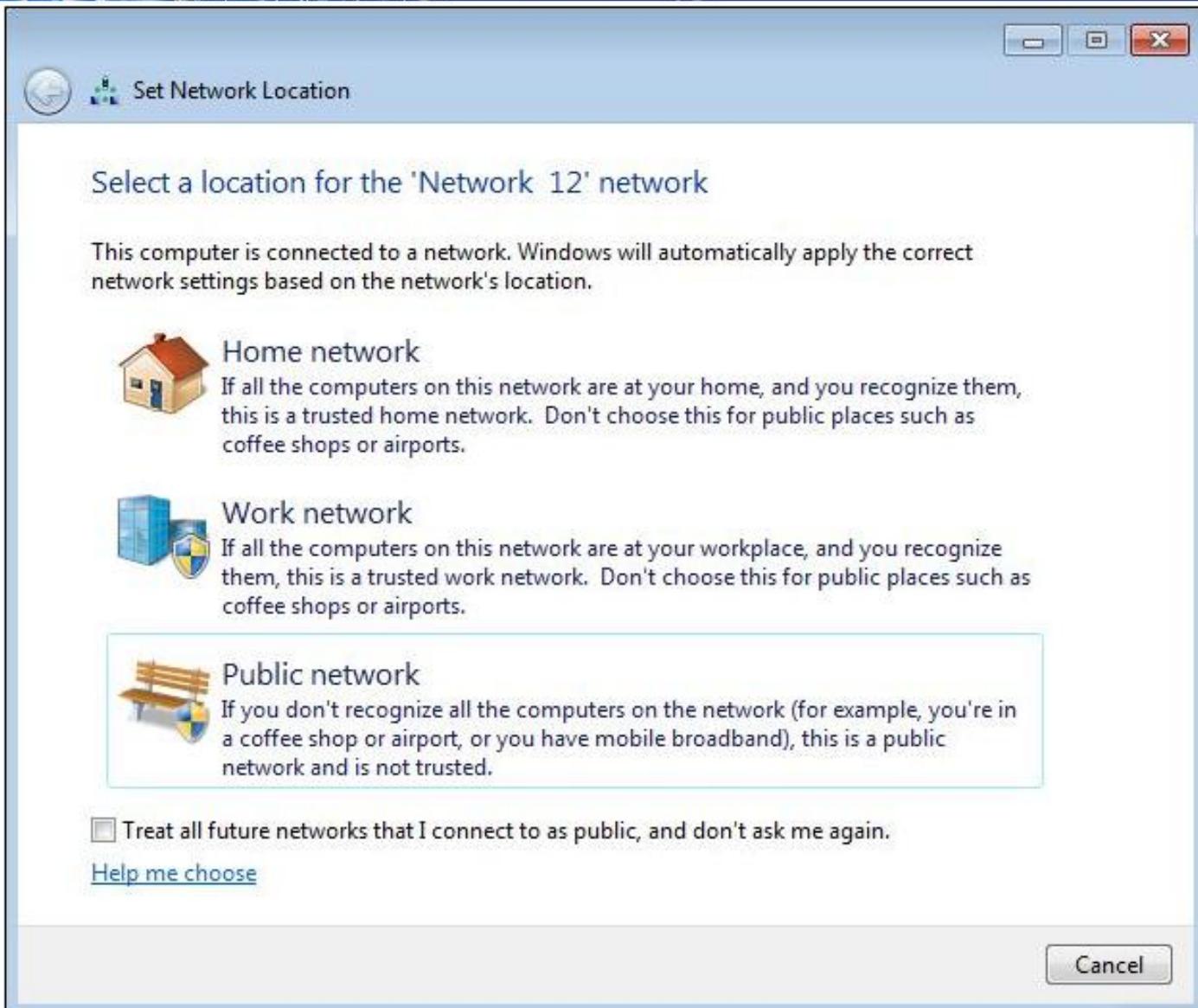
# Windows 7 Network Locations aka Profiles



# Windows 7 Network Locations aka Profiles

Once the setting is selected the Set Network Location window is opened which enables the configuration of a different network location. This window is also the same window which will be used to prompt initial network location selection.

# Windows 7 Network Locations aka Profiles



# Windows 7 Network Locations aka Profiles

- *Conclusion*

There are a number of different advanced options which can be utilized with Windows 7; this article shows how to configure some of the most used options. Windows 7, as with newer operating systems, continues to make better help systems. Take the time to utilize these systems and learn even more about Windows 7 functionality.



# How to Change the Name & Workgroup of Your Windows Computer?

*Changing this in XP was extremely simple, but in Windows 7, Windows 8, or Vista it's buried behind a few more menus. Here are three routes you can take to open up System Properties:*

- Type **sysdm.cpl** into the start menu search box (quickest)
- Right-click on the Computer option on the start menu or in My Computer.
- Open Control Panel, and go to System and Maintenance, and then System.

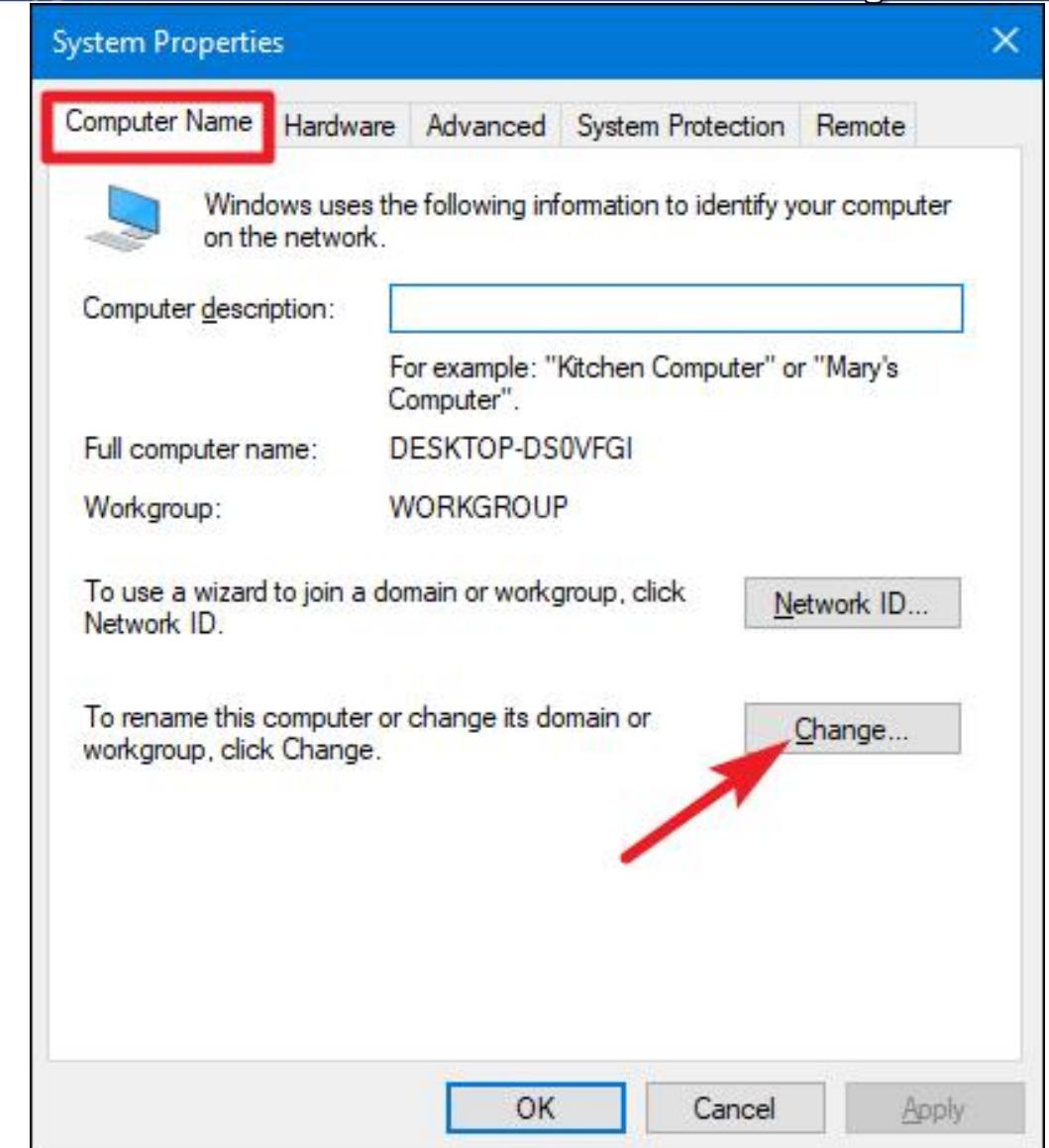
# How to Change the Name & Workgroup of Your Windows Computer?

*If you chose one of the last two options, then you'll need to click on Advanced System Settings on the left menu:*



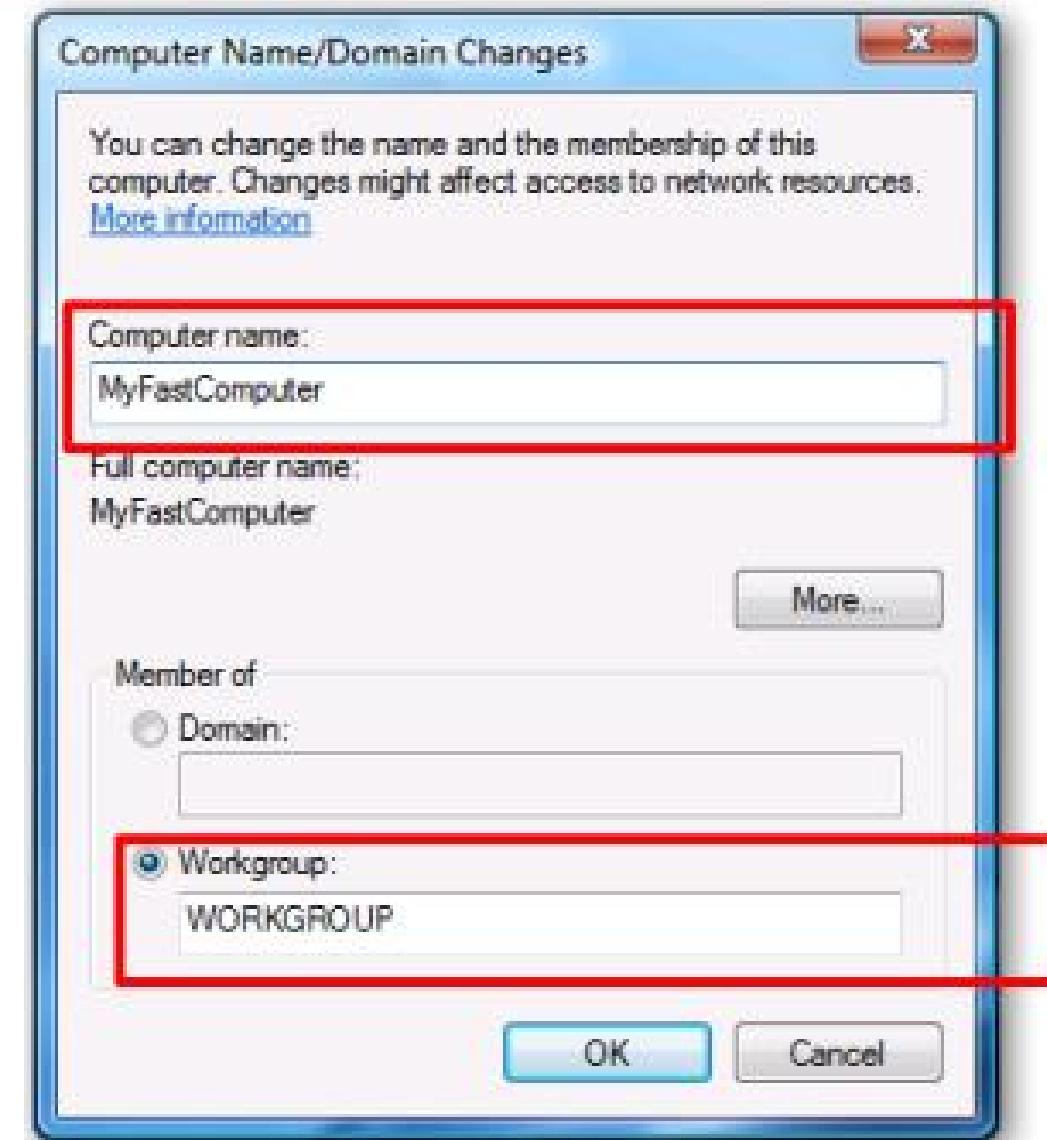
# How to Change the Name & Workgroup of Your Windows Computer?

*Now you'll finally be on the right screen, which should say System Properties.*



# How to Change the Name & Workgroup of Your Windows Computer?

Now you can finally change the name of the computer. You could also change the name of the workgroup to something more descriptive as well. You'll have to reboot after you make this change.



# Share files and folders over the network

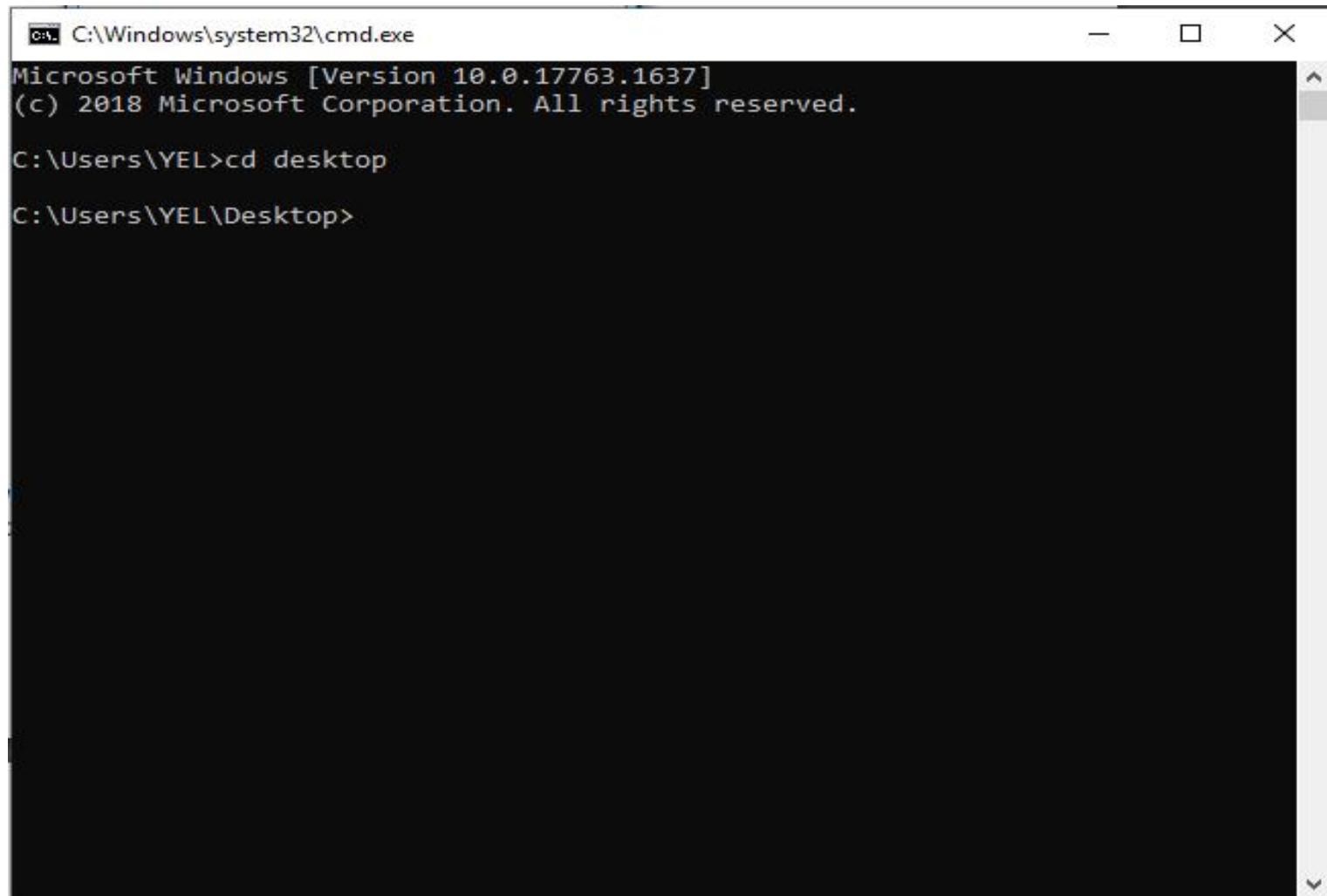
## *Sharing files with public folders*

- To share items in your Public folder and its subfolders with other users of your computer, you don't need to do a thing. By default, all users with an account on your computer can log on and create, view, modify, and delete files in the Public folders.

# Share files and folders over the network

*Step 1: Navigate to the Desktop*

Open command prompt and then use the command to change into the desktop directory.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17763.1637]
(c) 2018 Microsoft Corporation. All rights reserved.

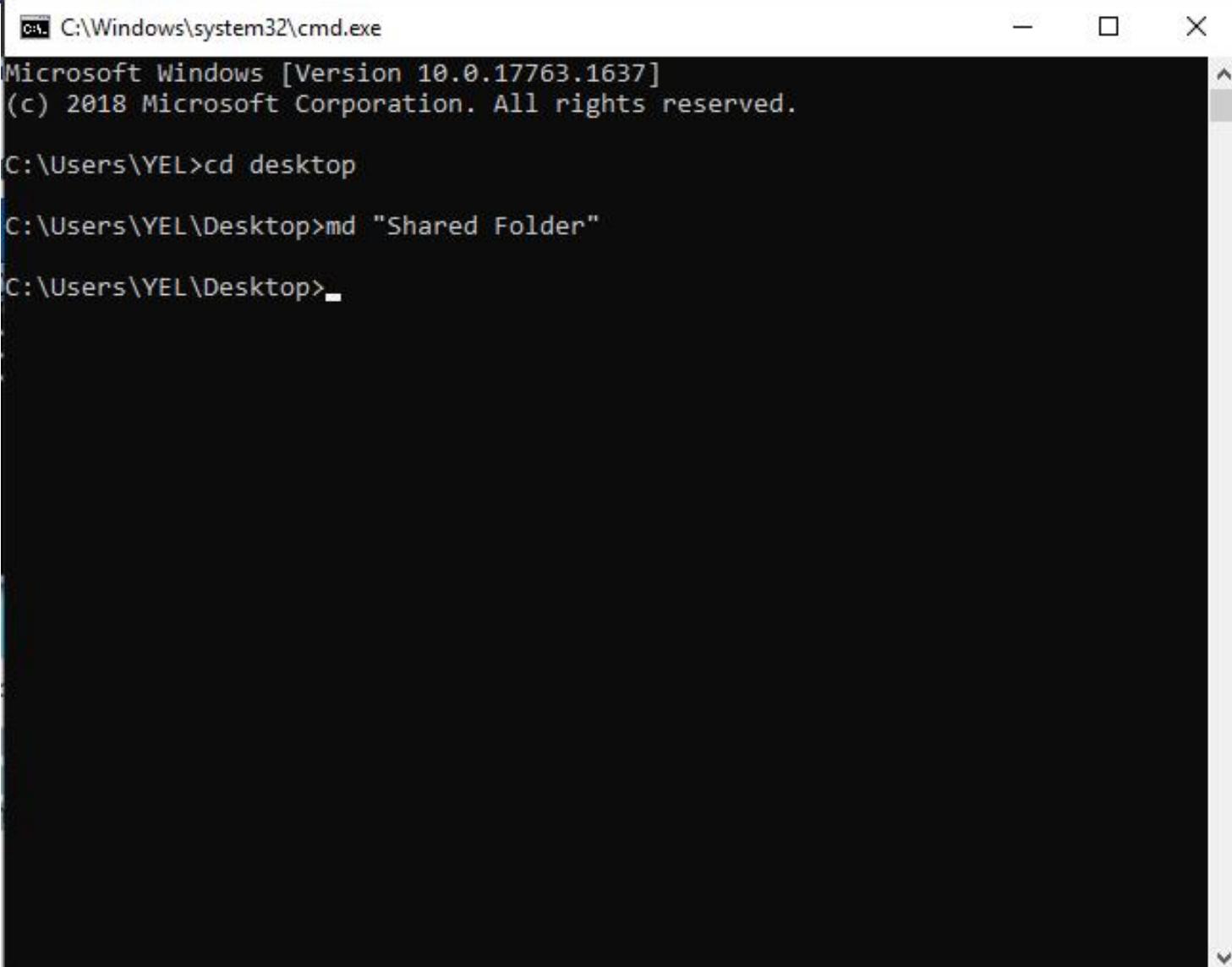
C:\Users\YEL>cd desktop

C:\Users\YEL\Desktop>
```

# Share files and folders over the network

## *Step 2: Create Your Folder*

Use the command .  
Make sure that it is  
visible on your desktop.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17763.1637]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\YEL>cd desktop

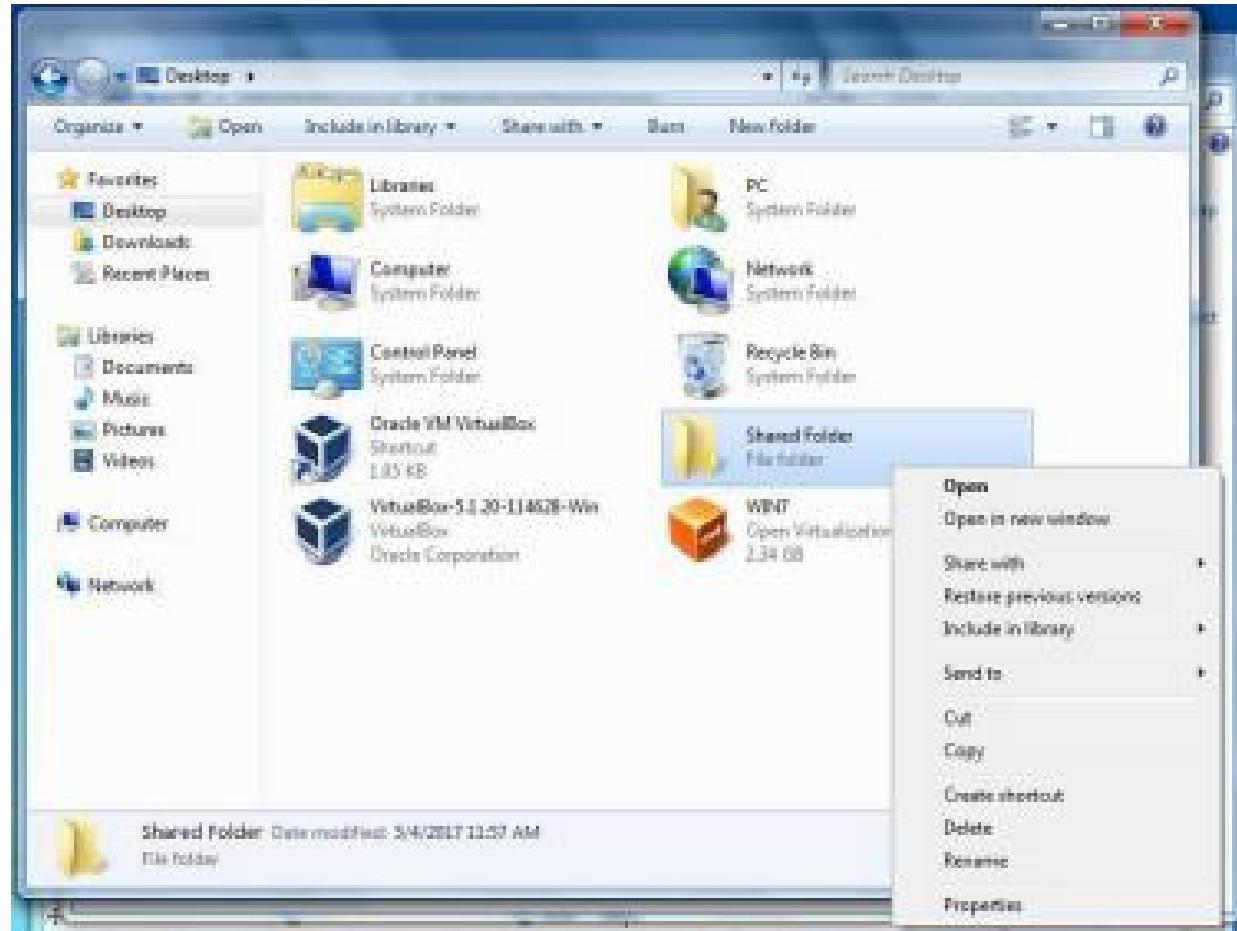
C:\Users\YEL\Desktop>md "Shared Folder"

C:\Users\YEL\Desktop>-
```

# Share files and folders over the network

*Step 3: Navigate to the Folder and Open the Properties*

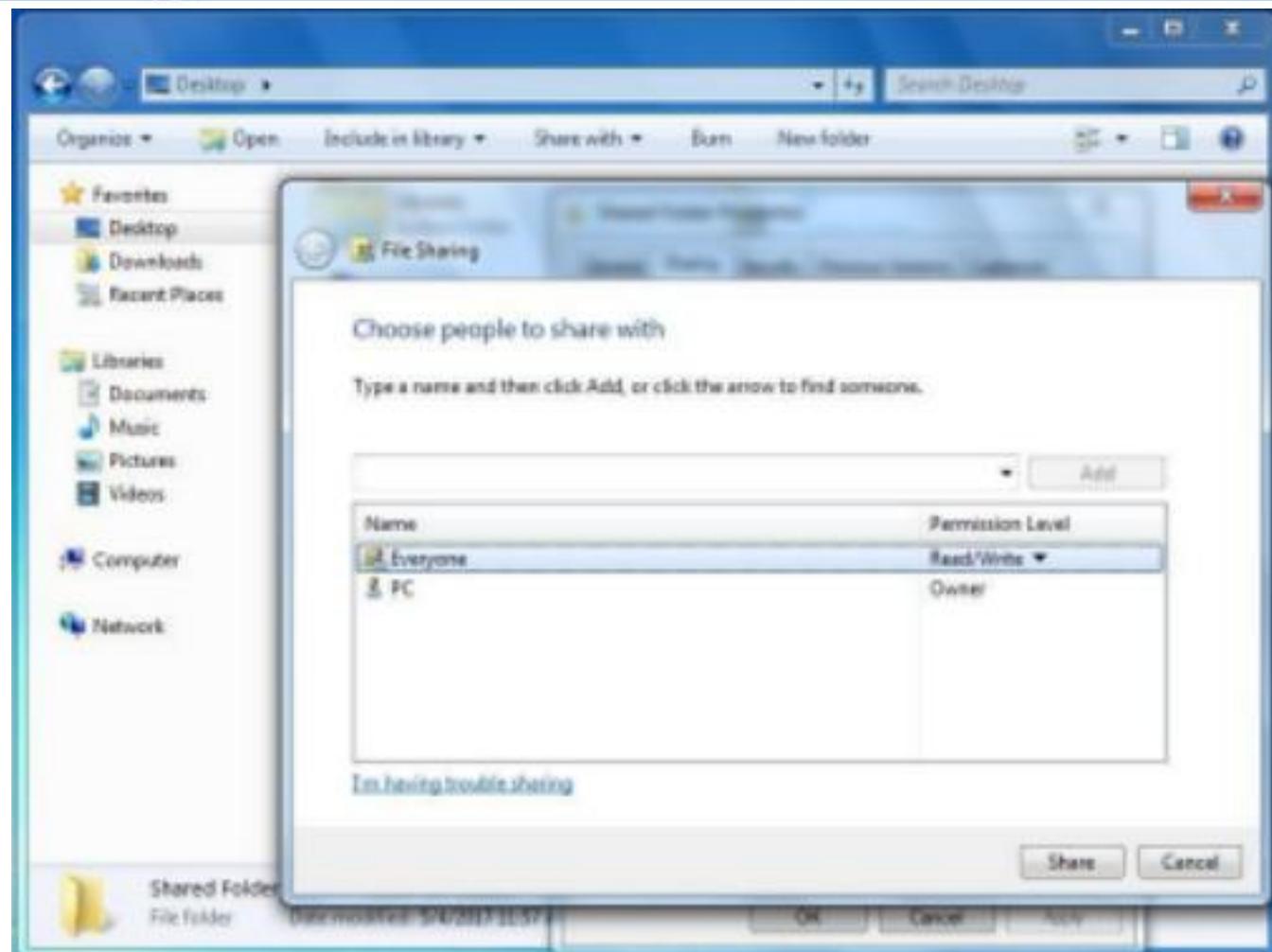
Open the file explorer and go under the Desktop section. Left-click then right-click on the folder. The left-click highlights the folder, and the right-click opens a menu of options.



# Share files and folders over the network

*Step 4: Choose Who You Want to Share With.*

Type and click add. Once you're done with that click share and then go to the advanced sharing.



# Share files and folders over the network

## *Step 5: Sharing the Folder*

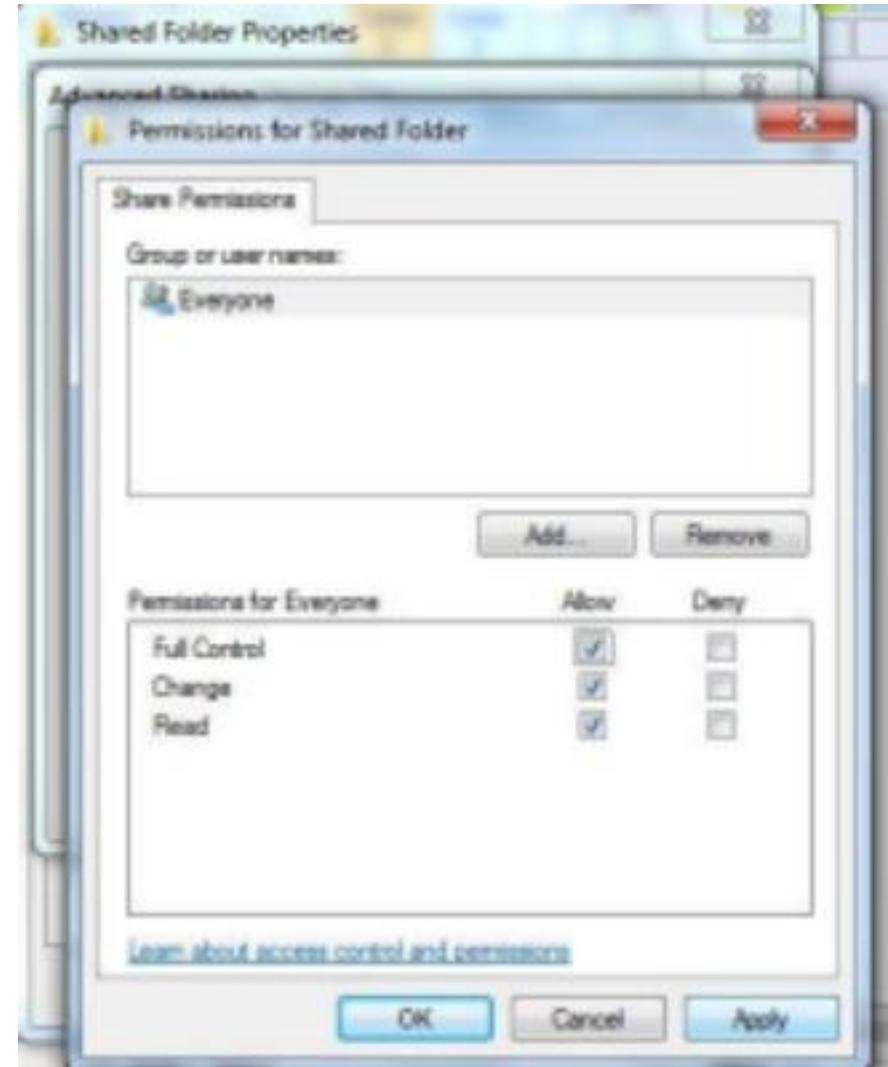
Press the box that lets you share the folder and then go into the permissions section.



# Share files and folders over the network

## *Step 6: Permissions*

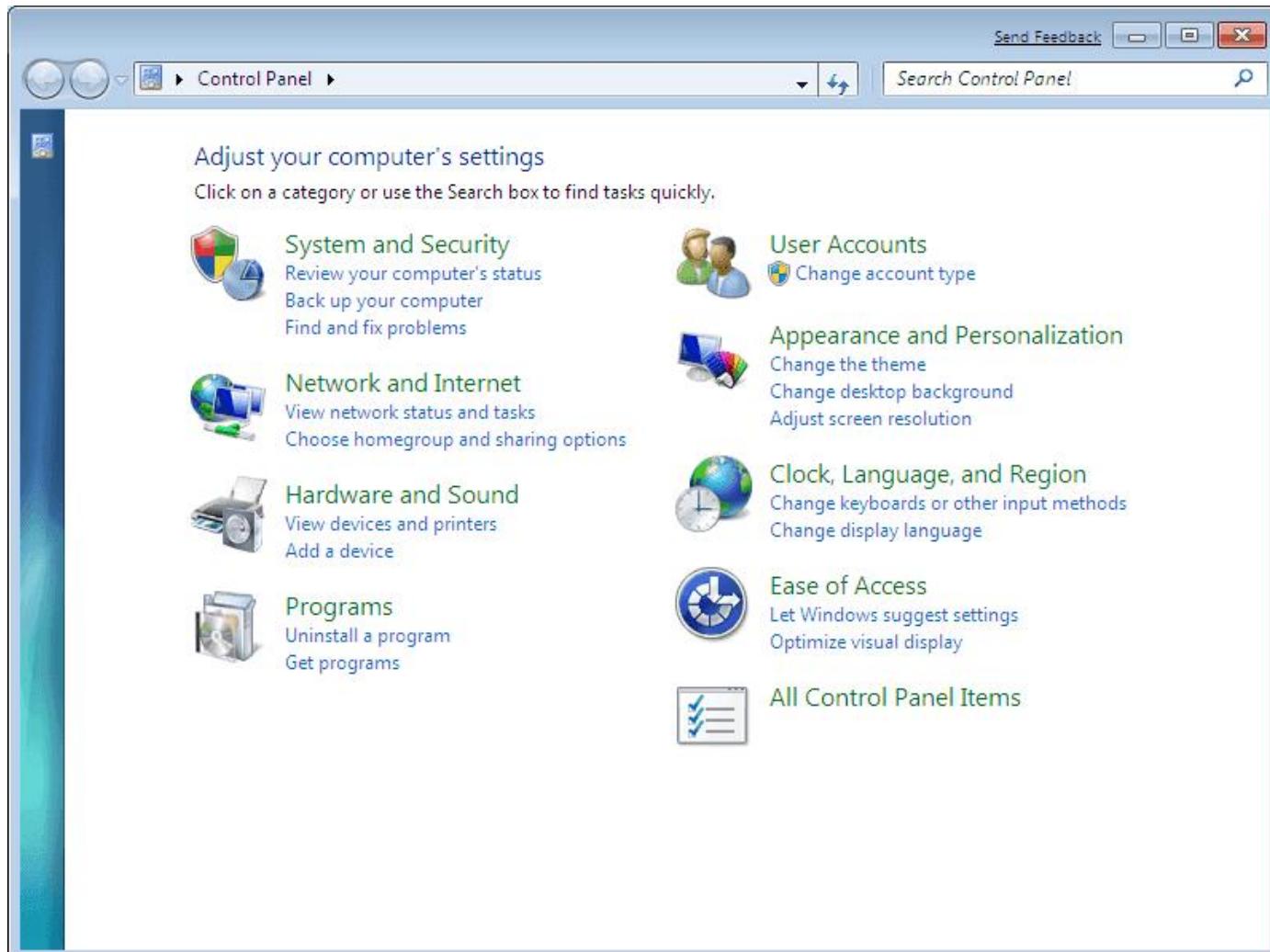
Make sure to give full control to the people that have access to the shared folder. Click Apply then click OK. Once you press OK you'll be back at the advanced sharing page. Press Apply and OK on that page too.



# Share files and folders over the network

## Step 7: Open Control Panel

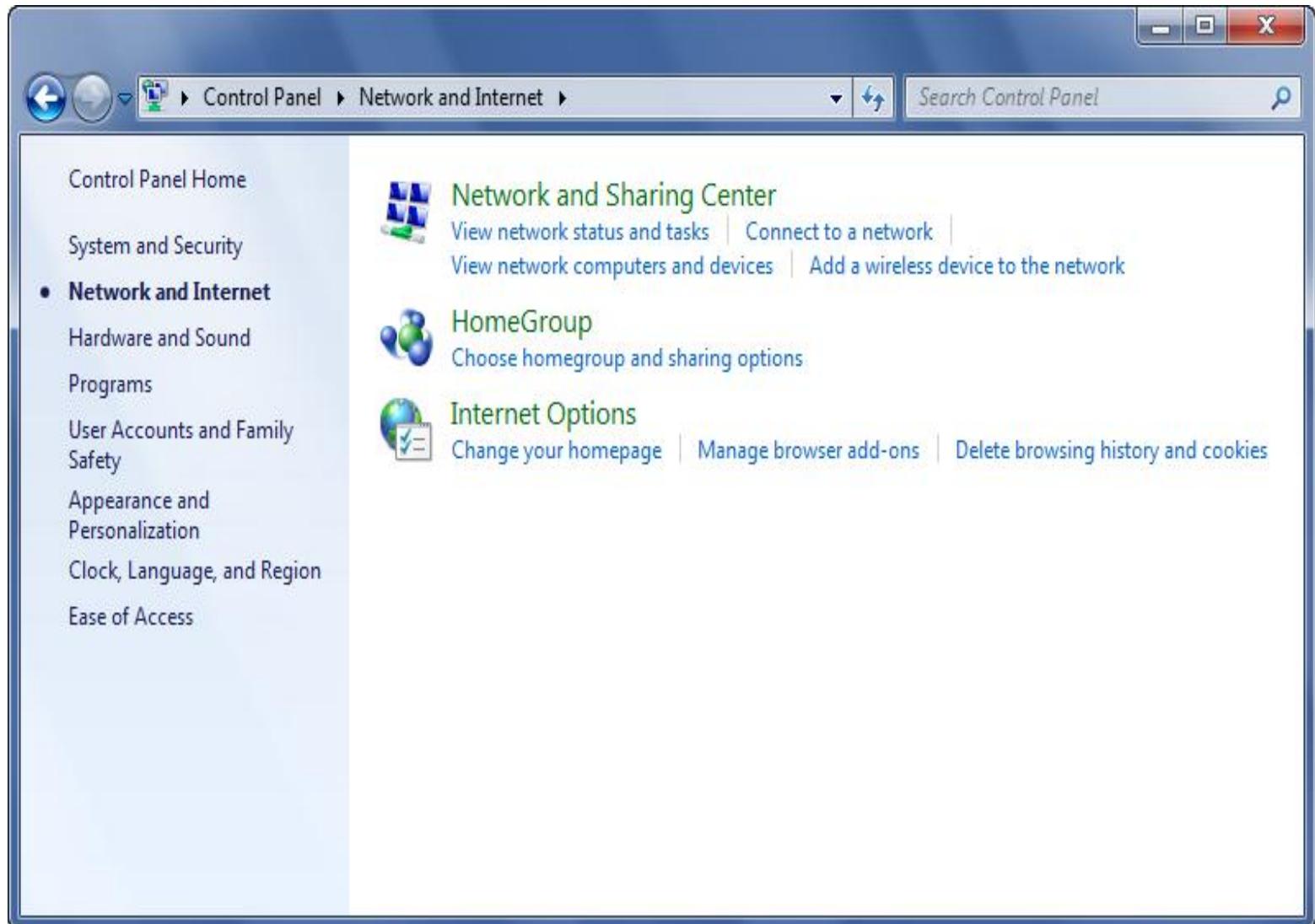
Navigate into the control panel and click on the Network and Internet section.



# Share files and folders over the network

## Step 8: Network and Sharing

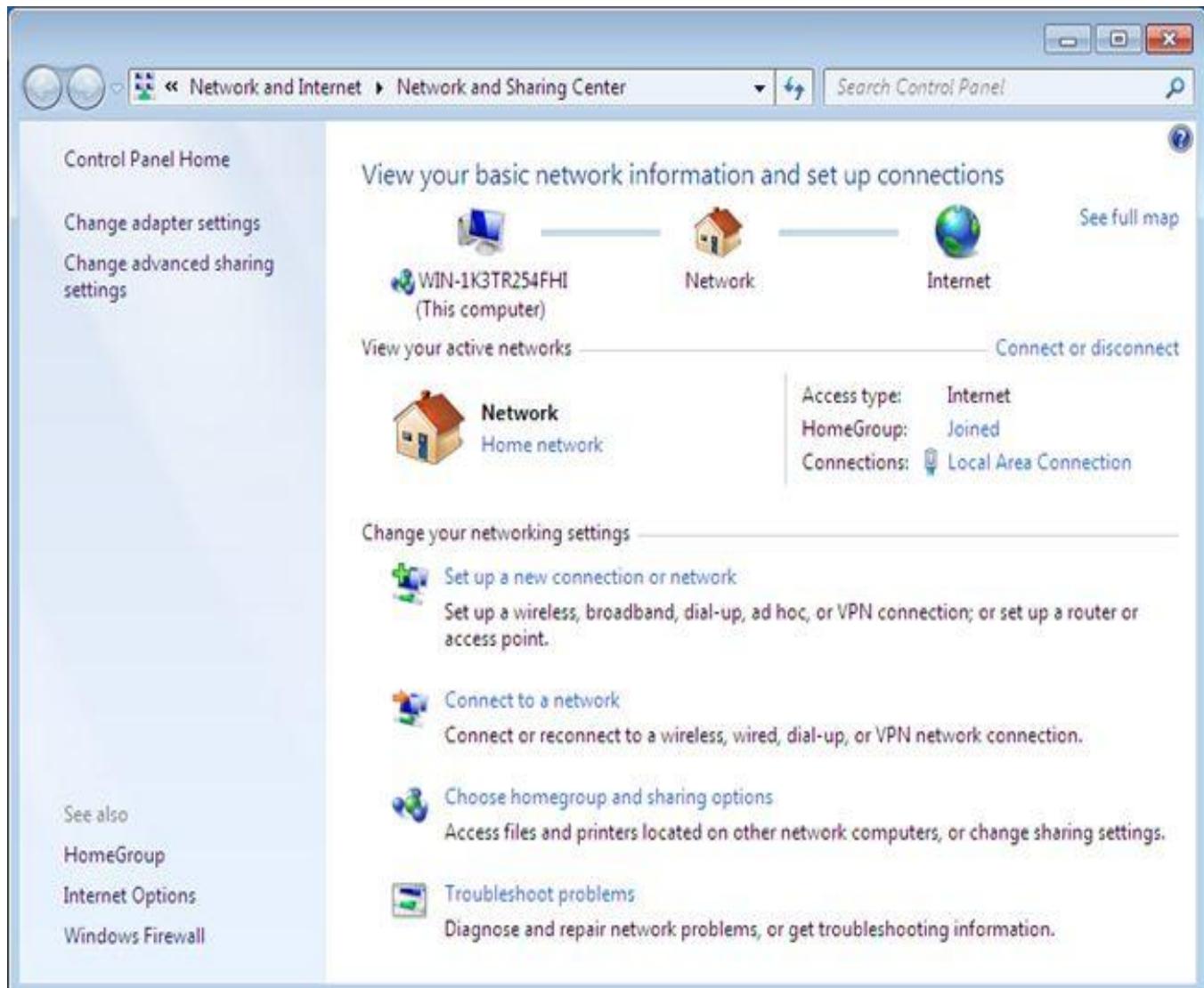
Navigate into the Network and Sharing section.



# Share files and folders over the network

## *Step 9: Advanced Sharing*

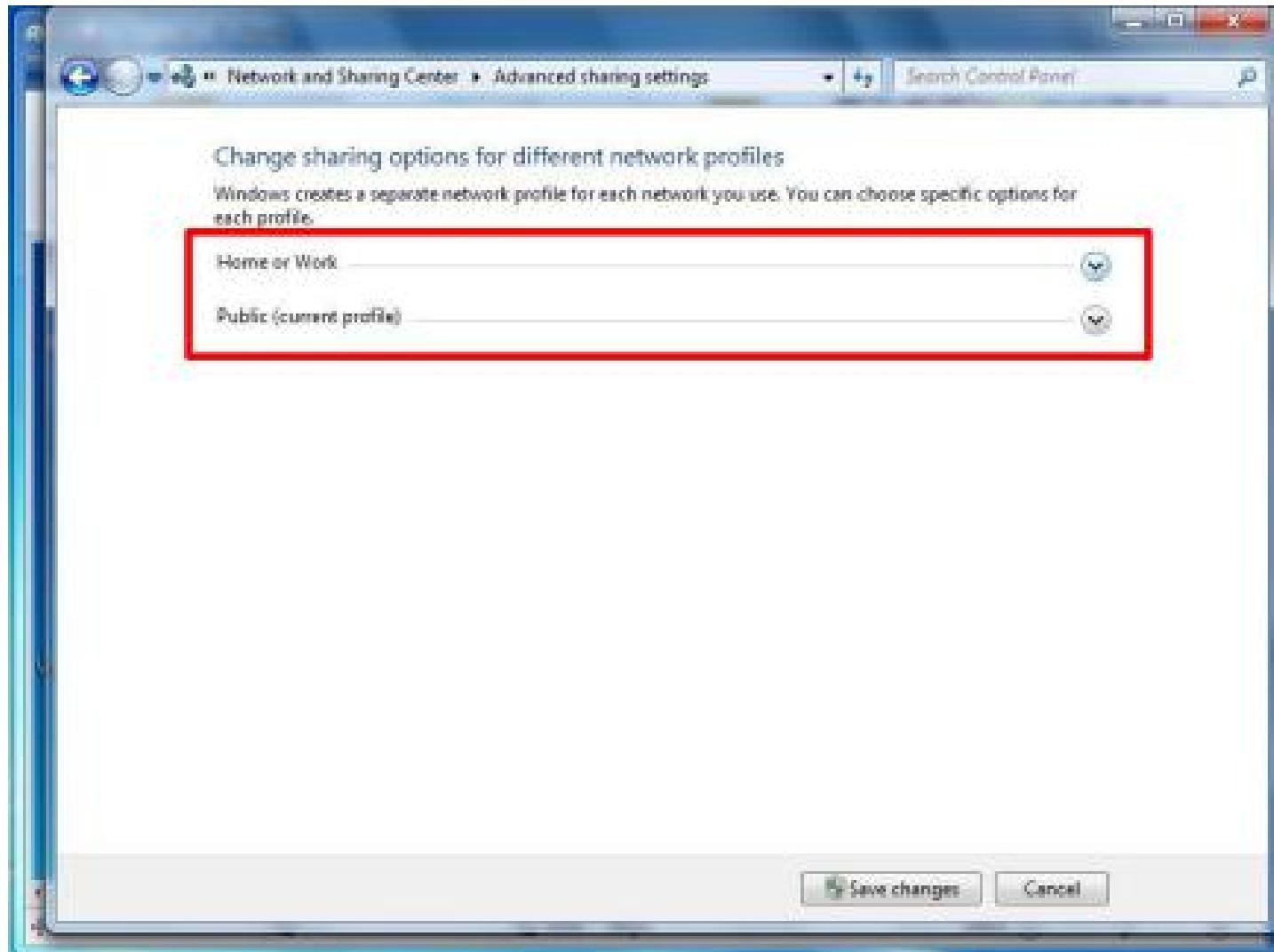
Navigate to the advanced sharing settings.



# Share files and folders over the network

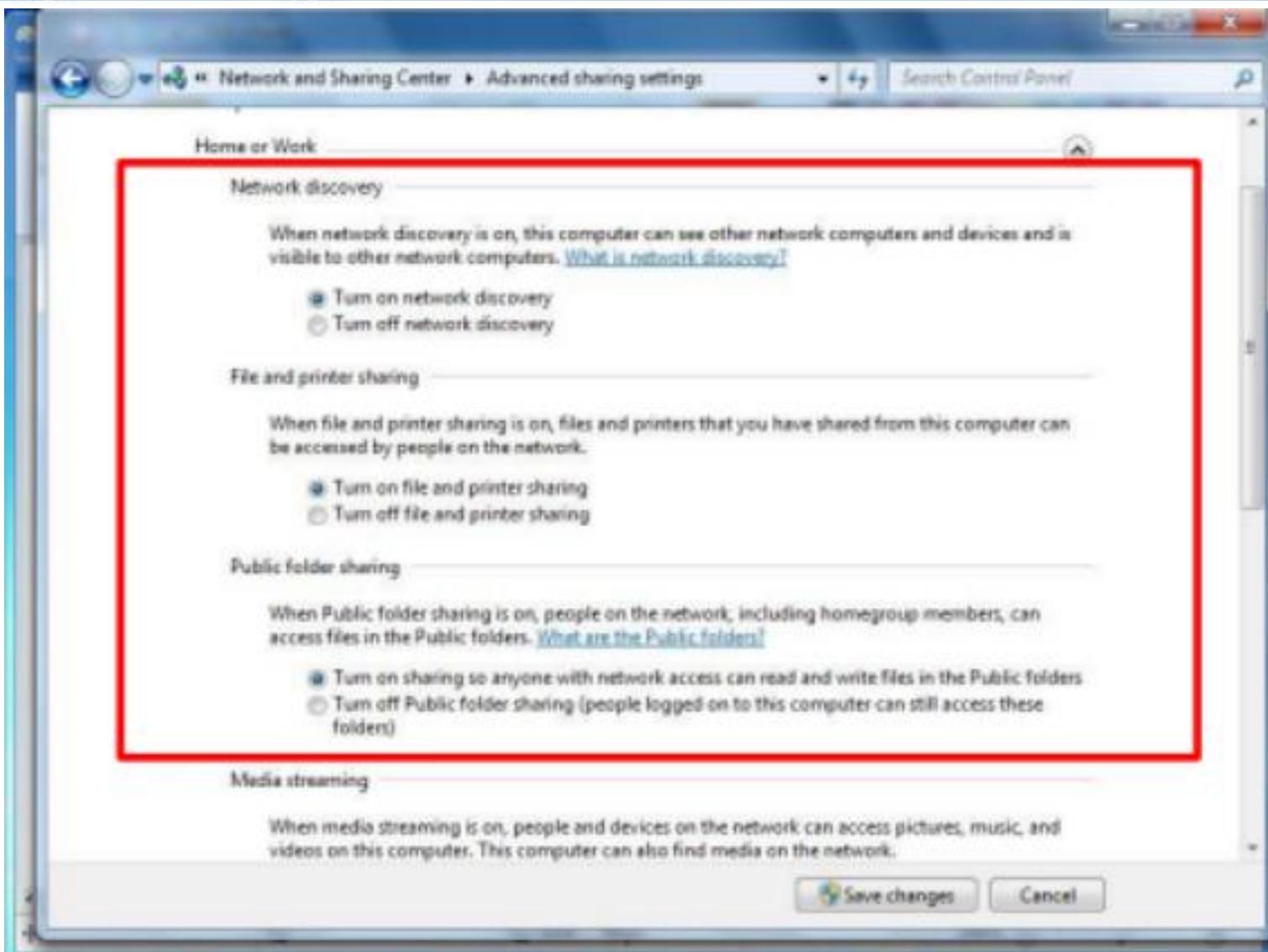
*Step 10: Choose Home and Work / Public*

There are many settings that need to be changed in both of the options.



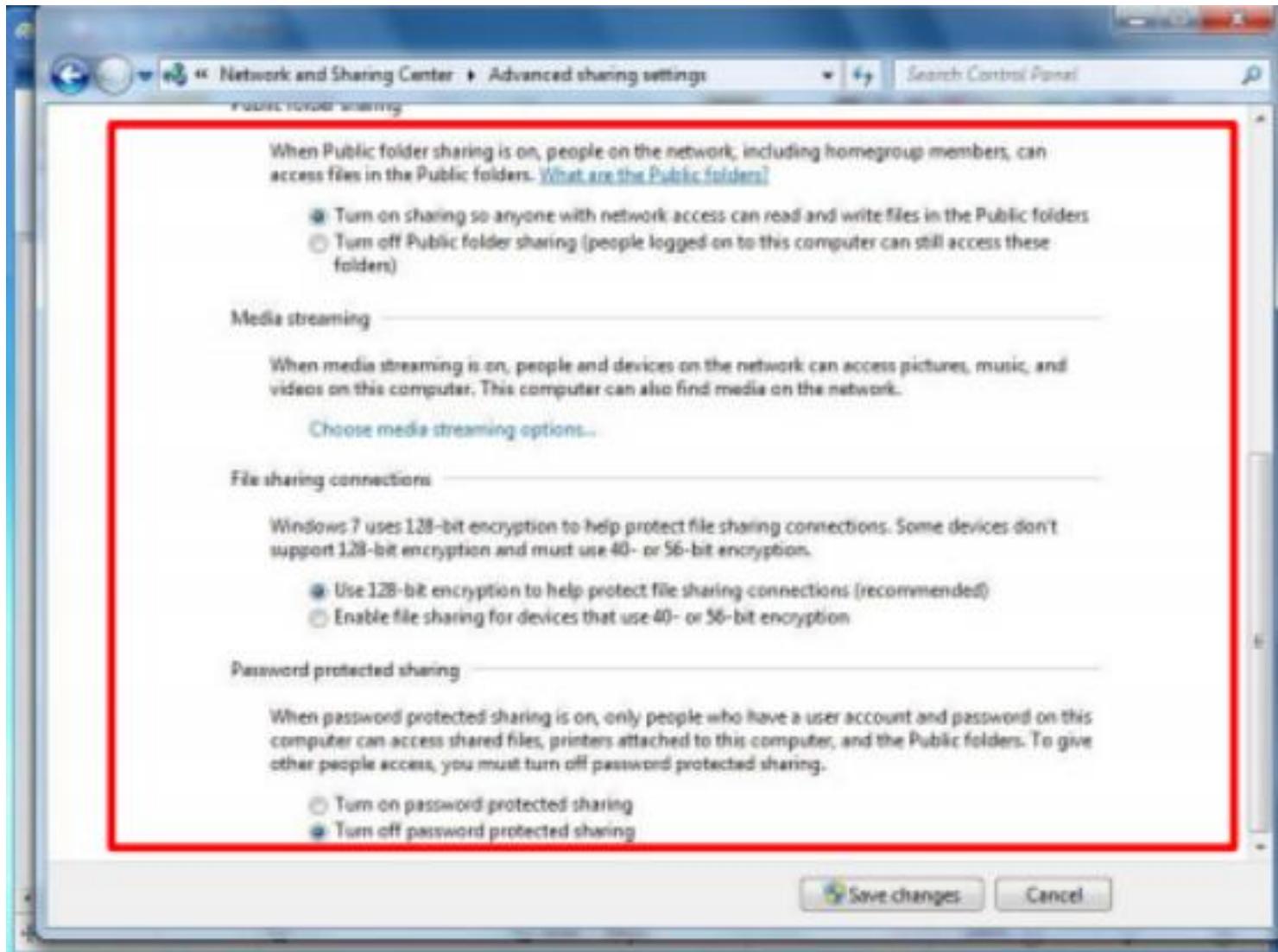
# Share files and folders over the network

*Step 11: Select All Options*



# Share files and folders over the network

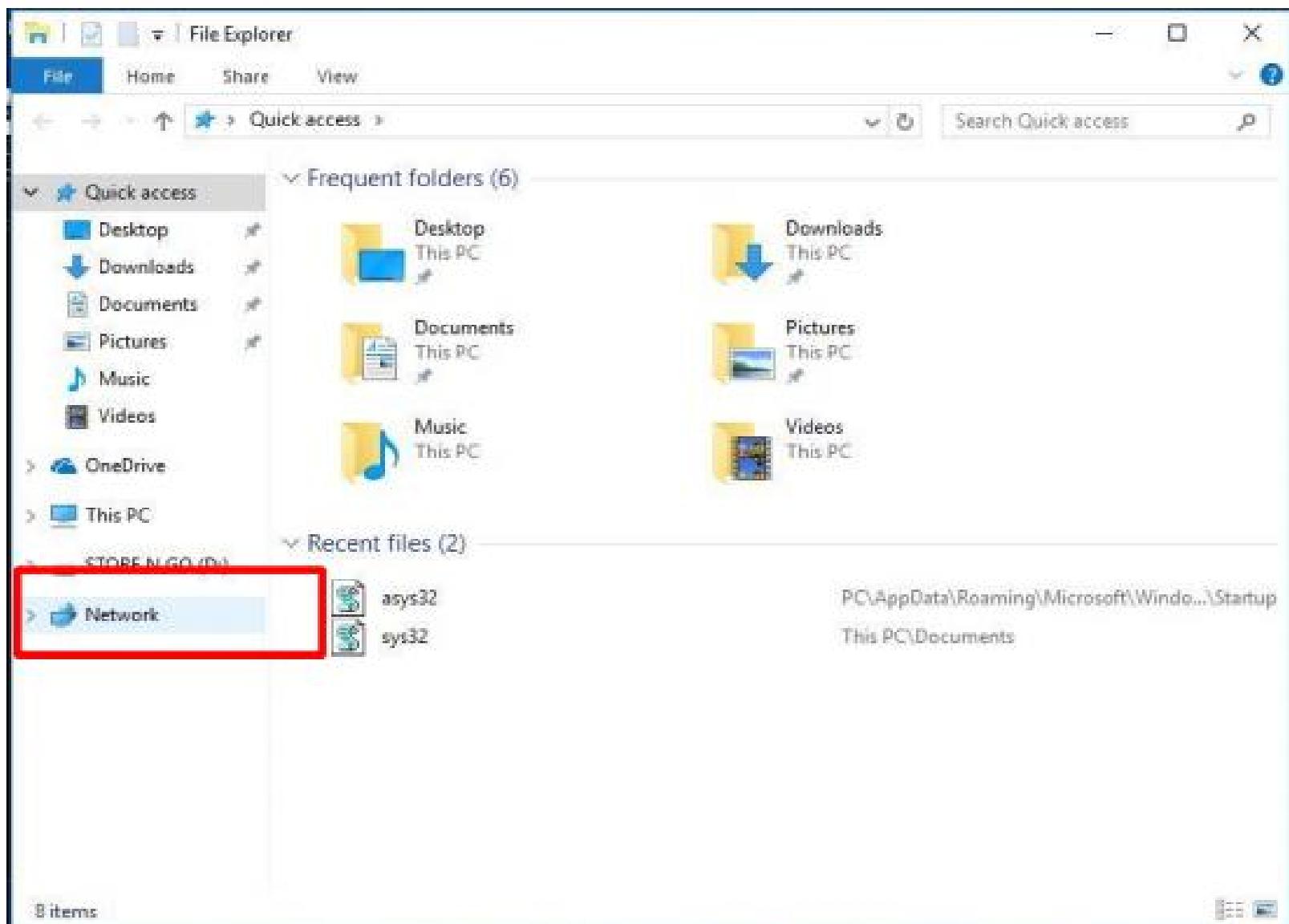
There are going to be many options, the ones you need for the sharing to work are pretty common sense like making sure that your device is allowed to be discovered. And turn off password protected sharing.



# Share files and folders over the network

*Step 12: Go Into Network*

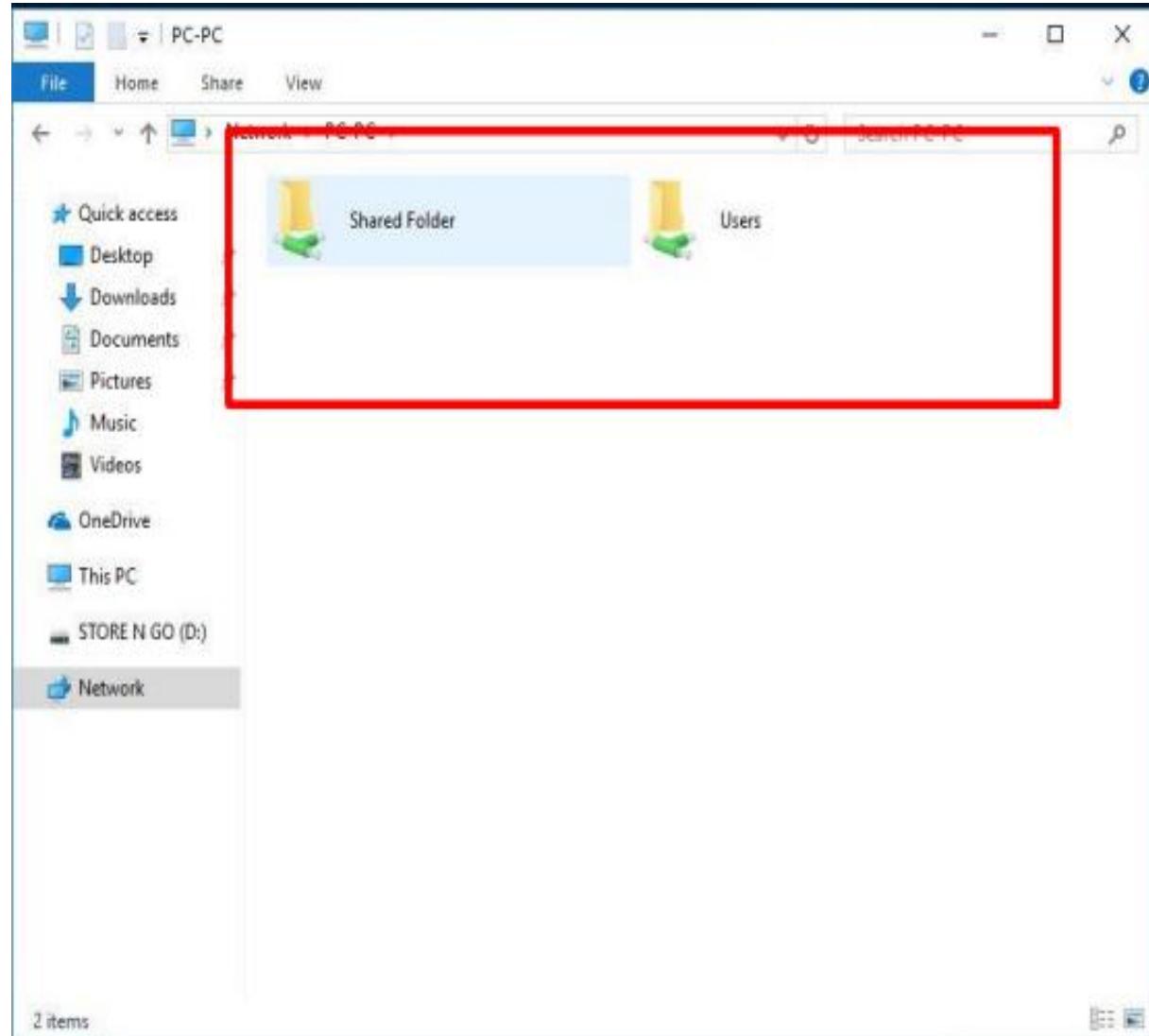
Find the original device that the file was shared from.



# Share files and folders over the network

## *Step 13: Find the Folder That Was Shared*

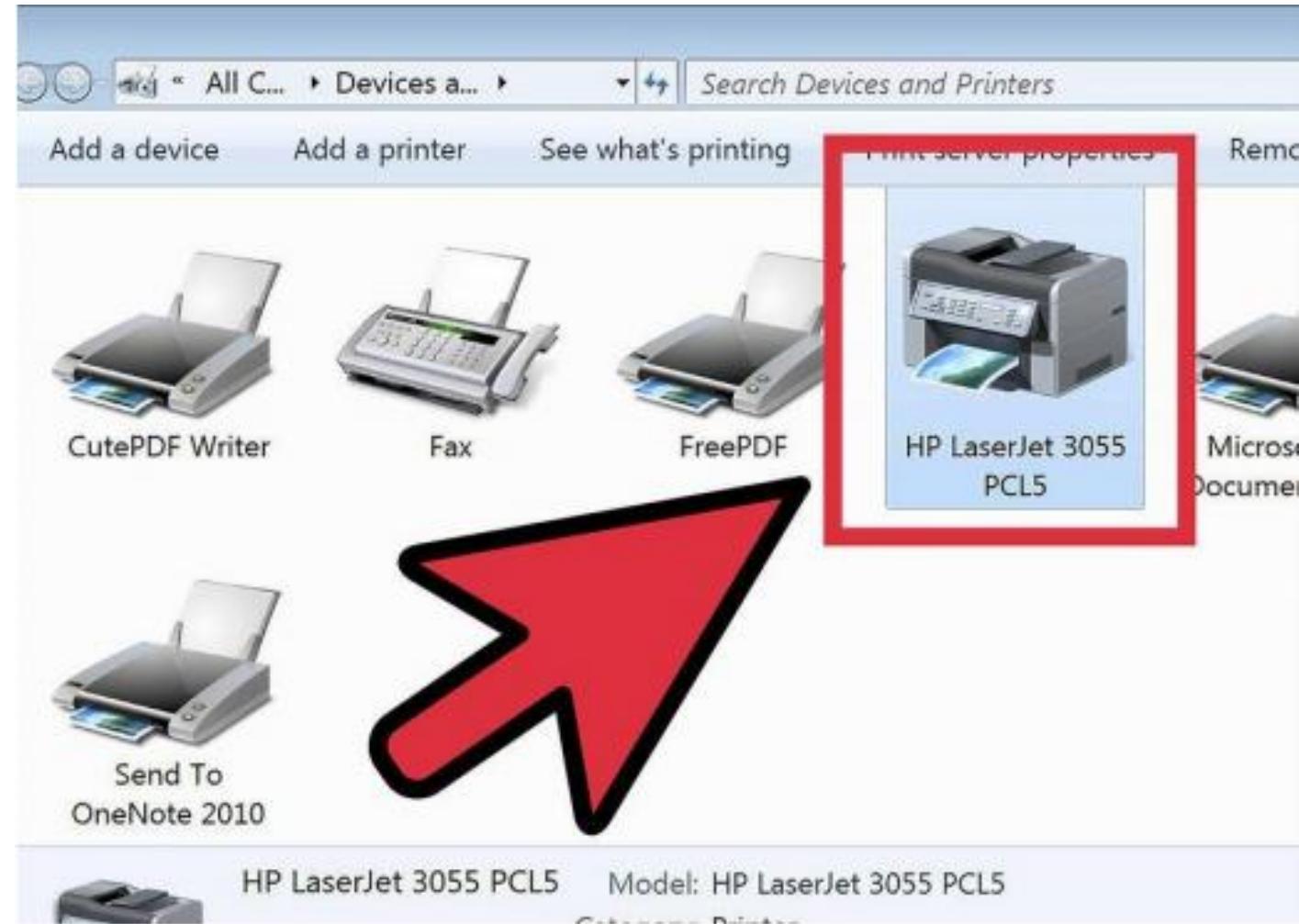
Once you click on the device you will find all the files that were shared from it. You can tell that the folder is shared over the network because it has the green crossroads looking thing under its name.





# Printer Sharing

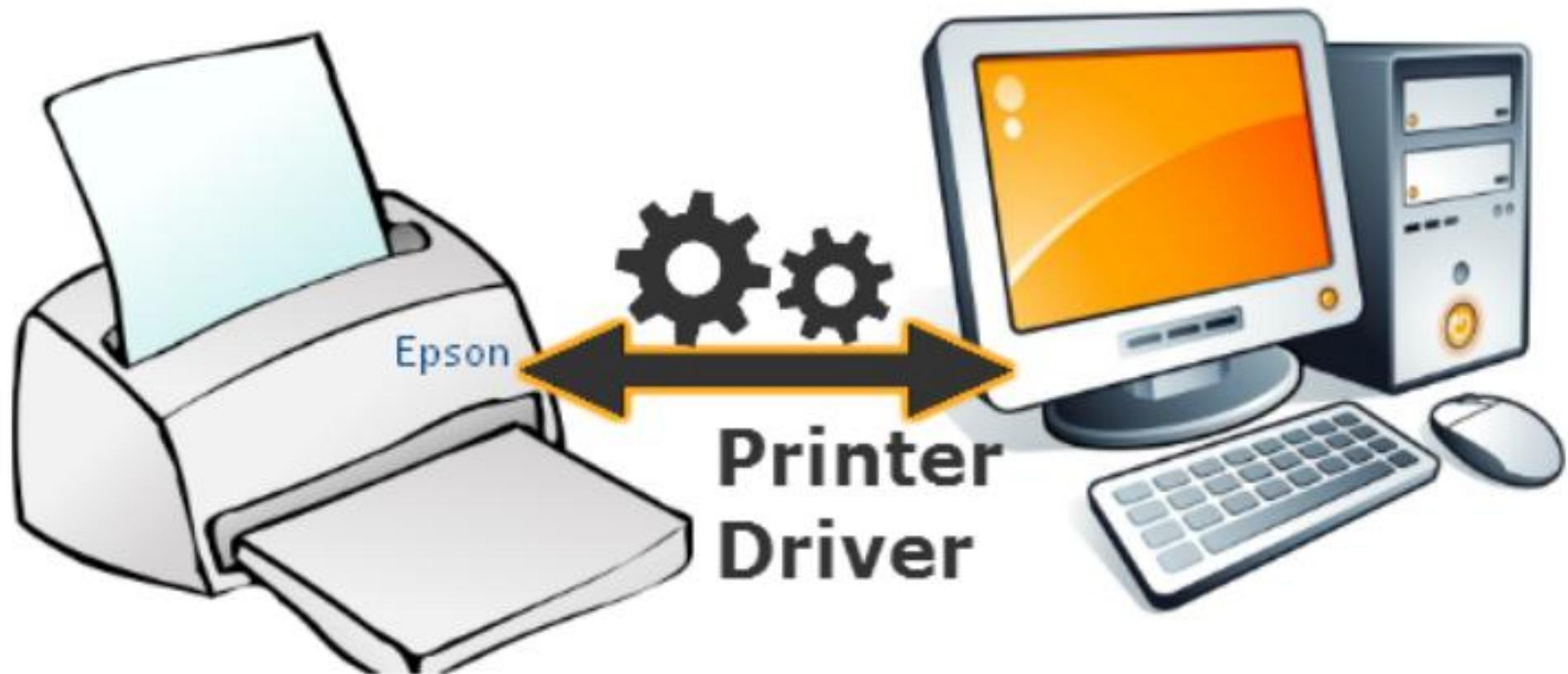
Sharing printers on a network used to be a nightmare, especially if the computers were all running different operating systems.





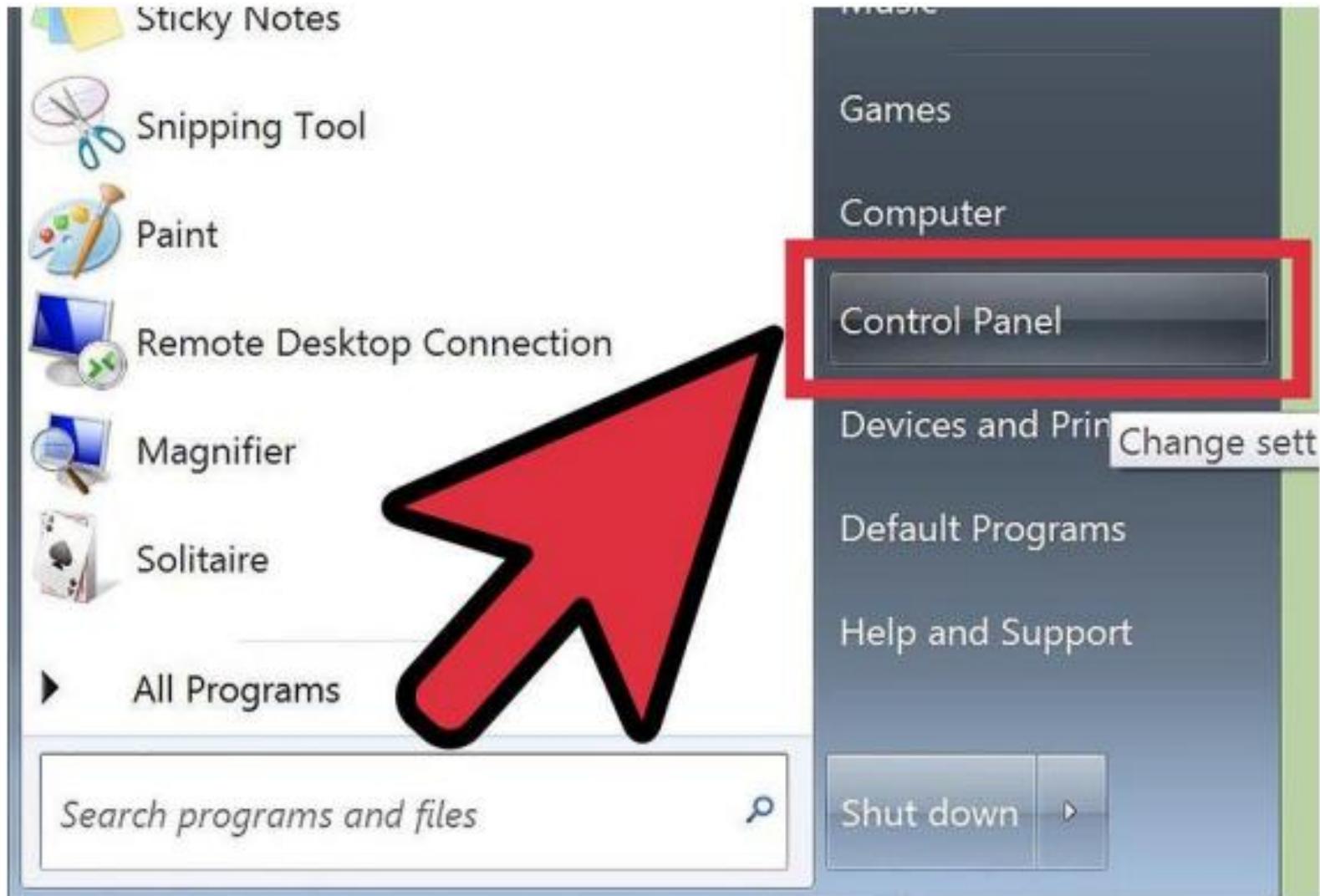
# Printer Sharing

*Step1: Install the printer driver.*



# Printer Sharing

Step 2: Open the Control Panel. You can access the Control Panel in Windows 7 by clicking the Start menu and selecting Control Panel.



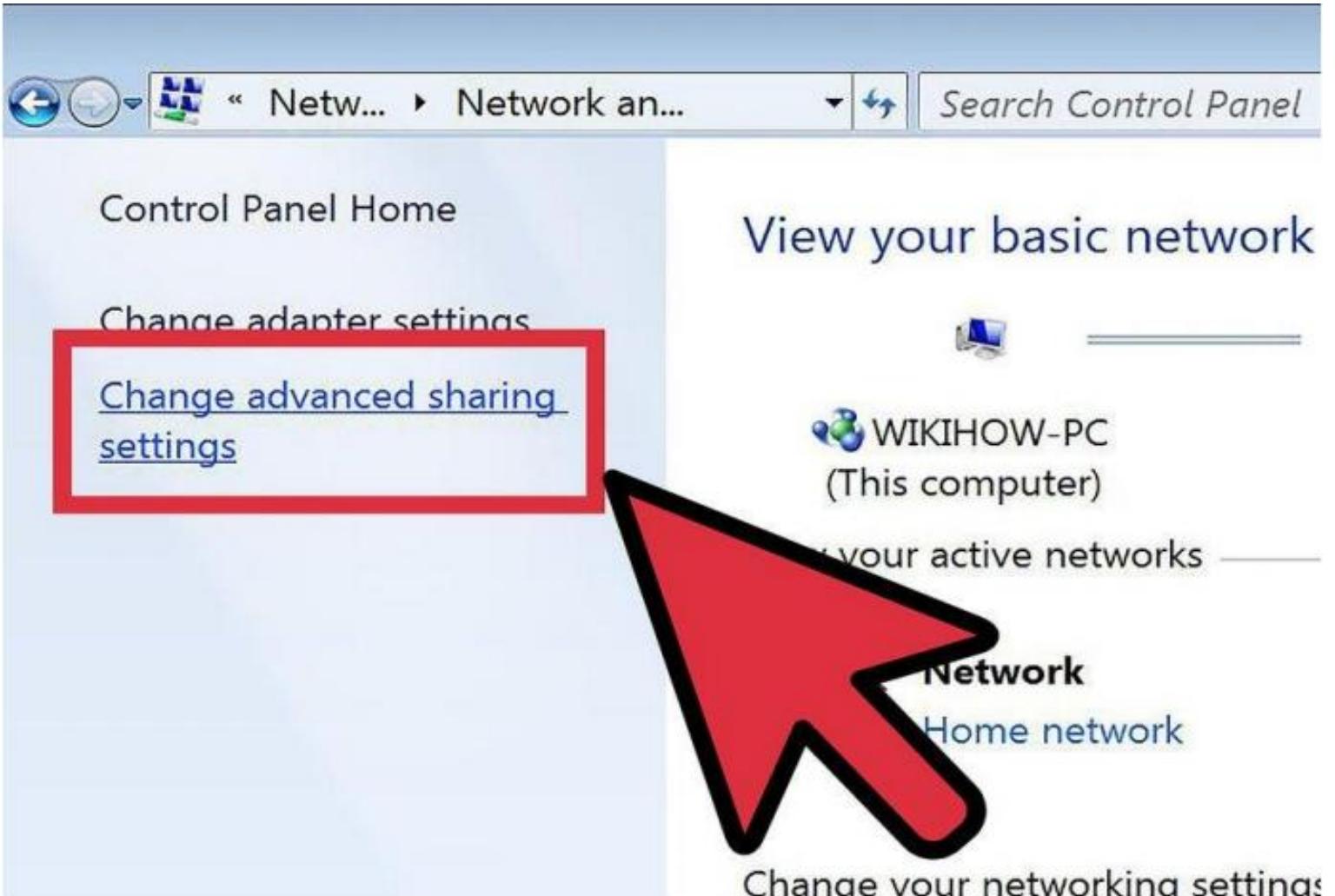
# Printer Sharing

Step 3: Open the Network and Sharing Center. If your Control Panel is in Category view, click "Network and Internet", and then select "Network and Sharing Center". Click on "Network and Internet".



# Printer Sharing

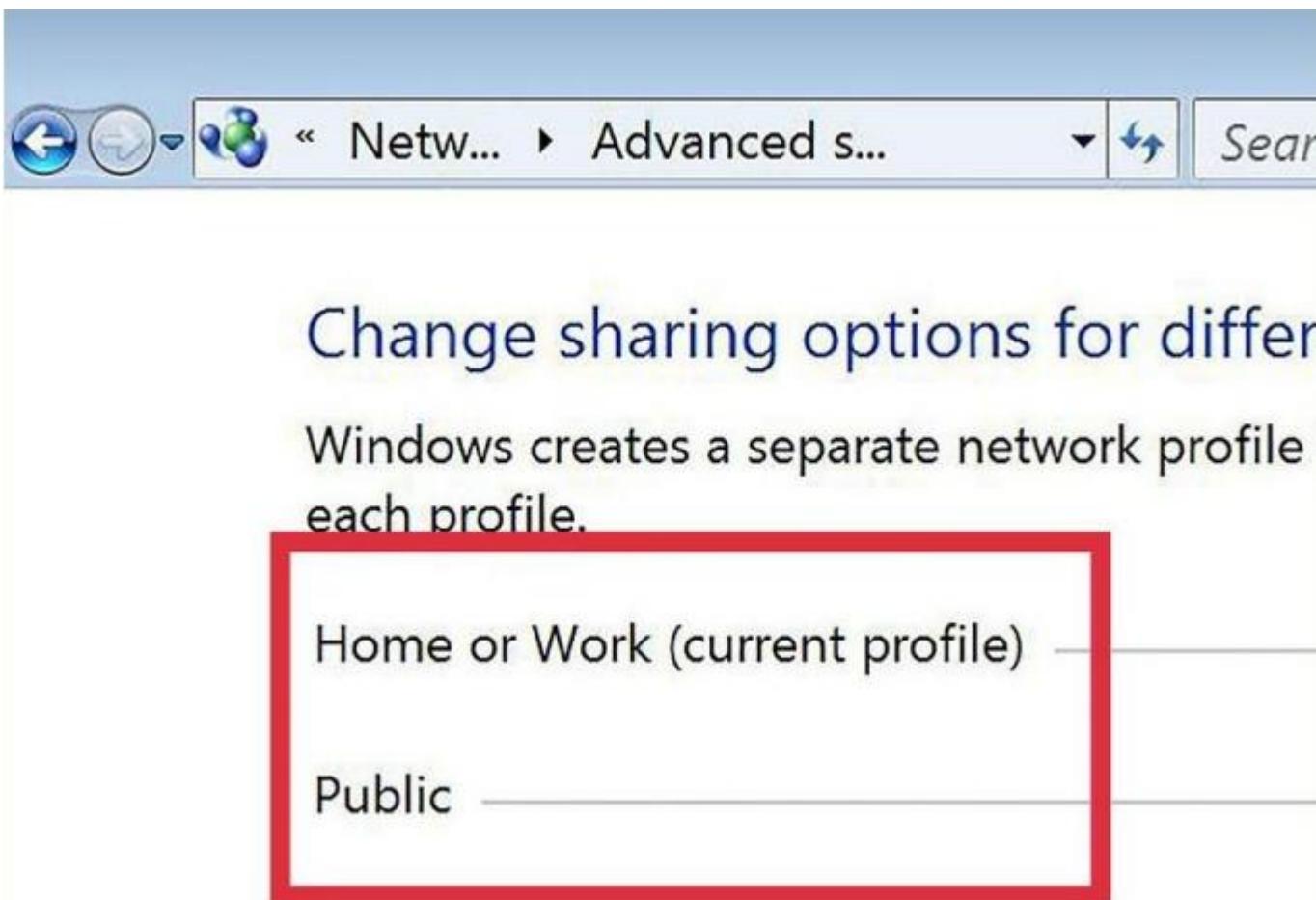
Step 4: Click the "Change advanced sharing settings" link. This is located in the left navigation pane of the Network and Sharing Center.





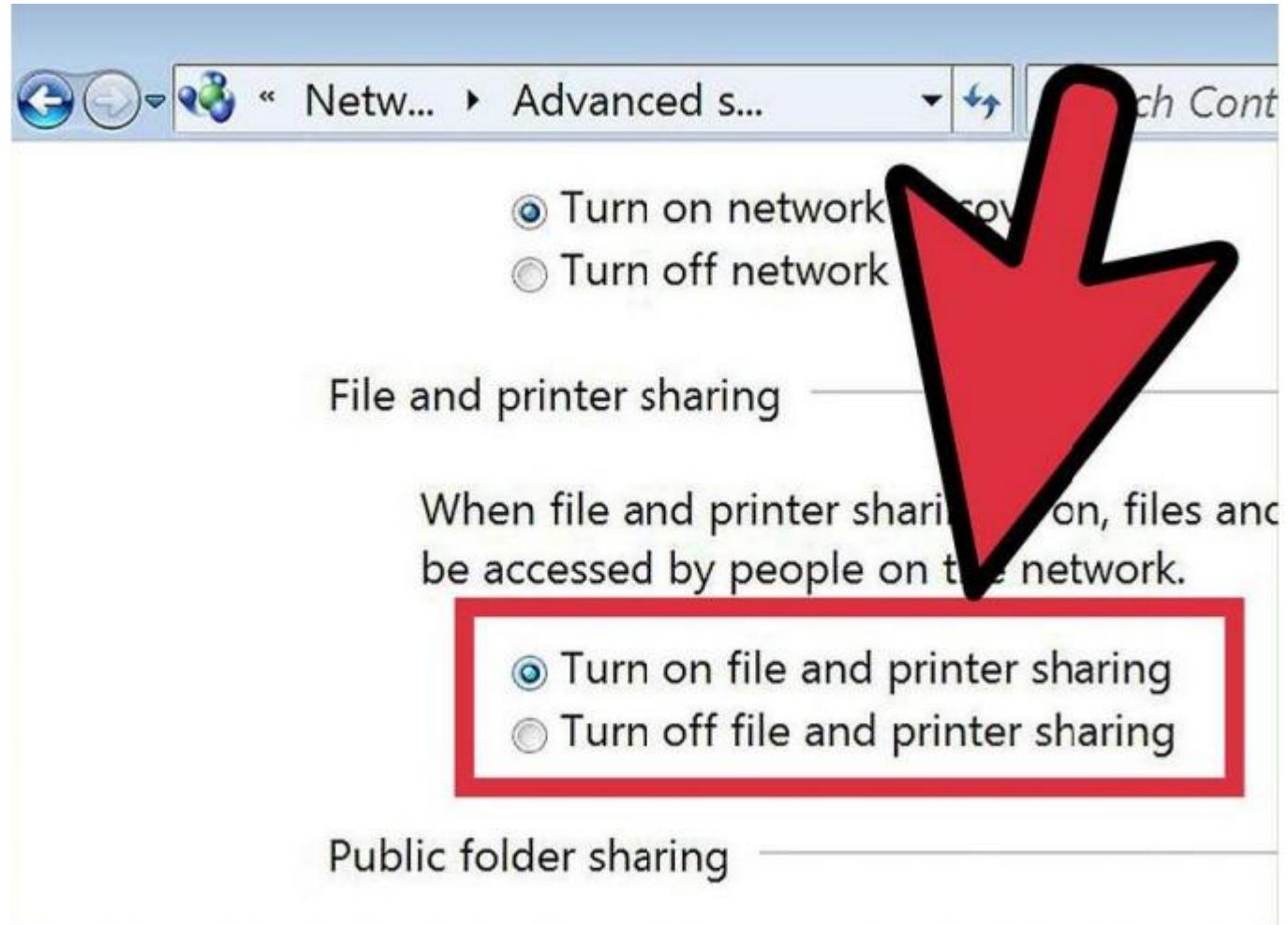
# Printer Sharing

*Step 5: Expand the profile you need to change. You will see three different options when you open the "Advanced share settings": Private, Guest or Public, and All Networks. If you are on a Home network, expand the Private section.*



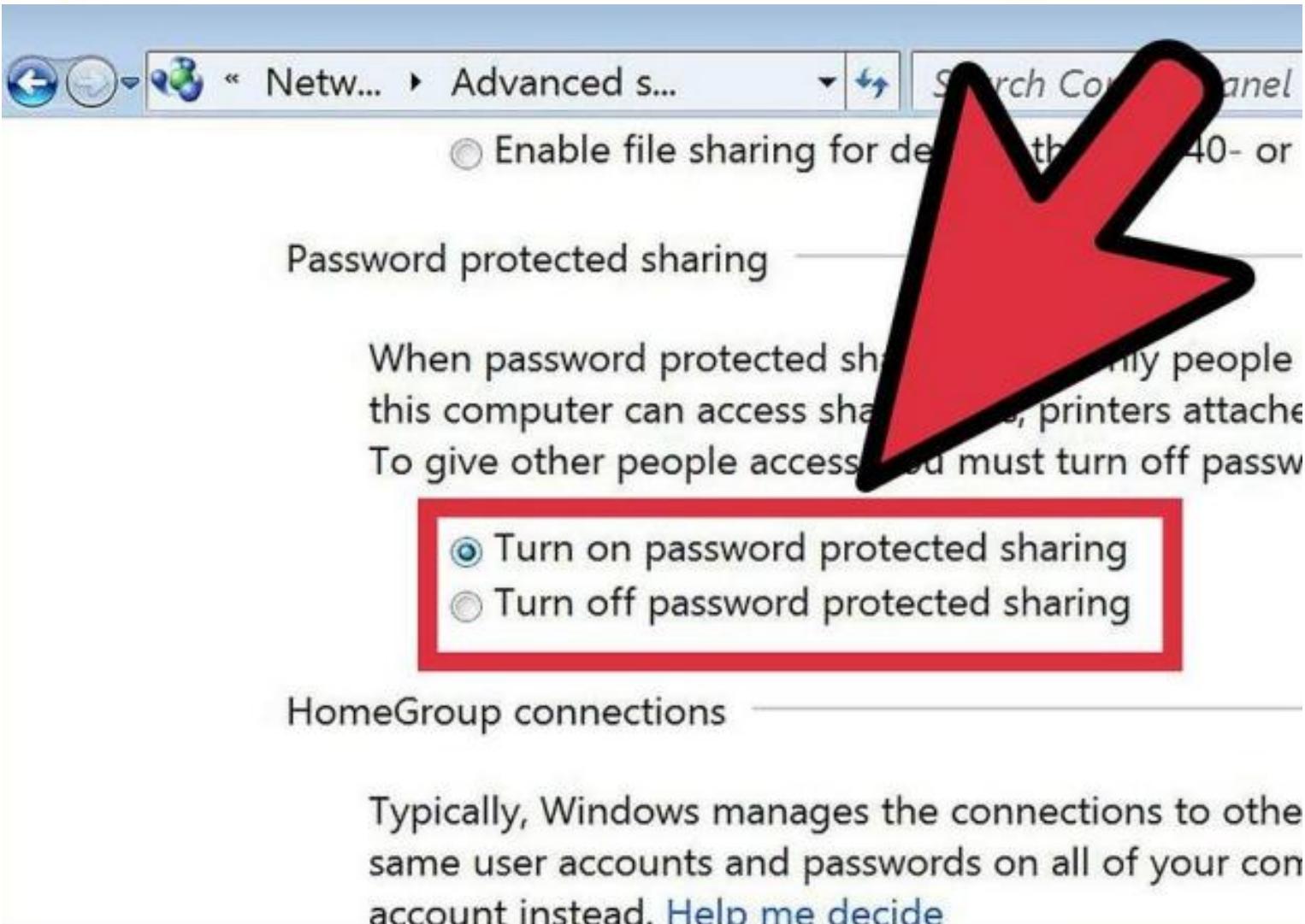
# Printer Sharing

*Step 6: Enable or Turn on "File and printer sharing".*



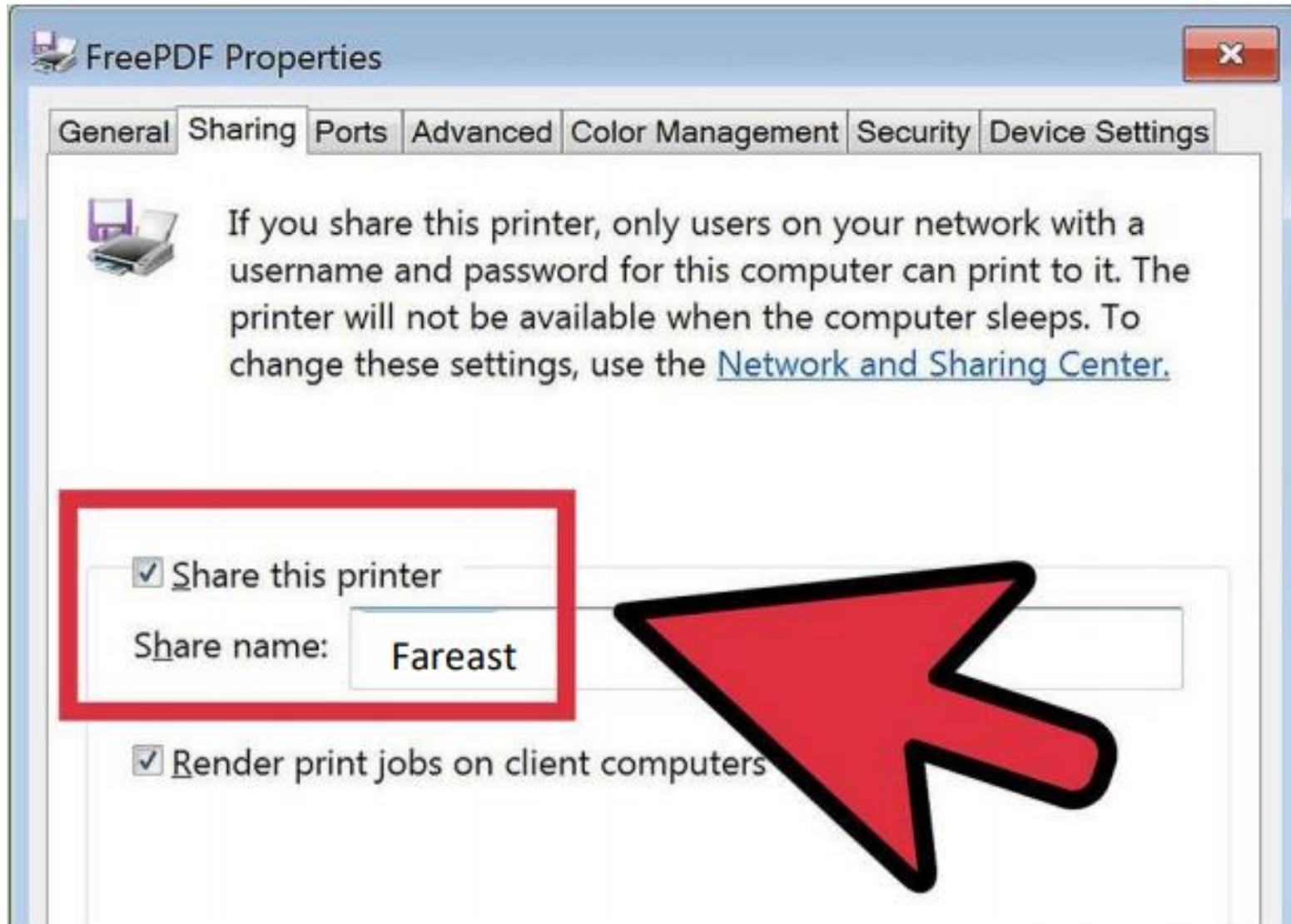
# Printer Sharing

Step 7: Toggle the password protection.



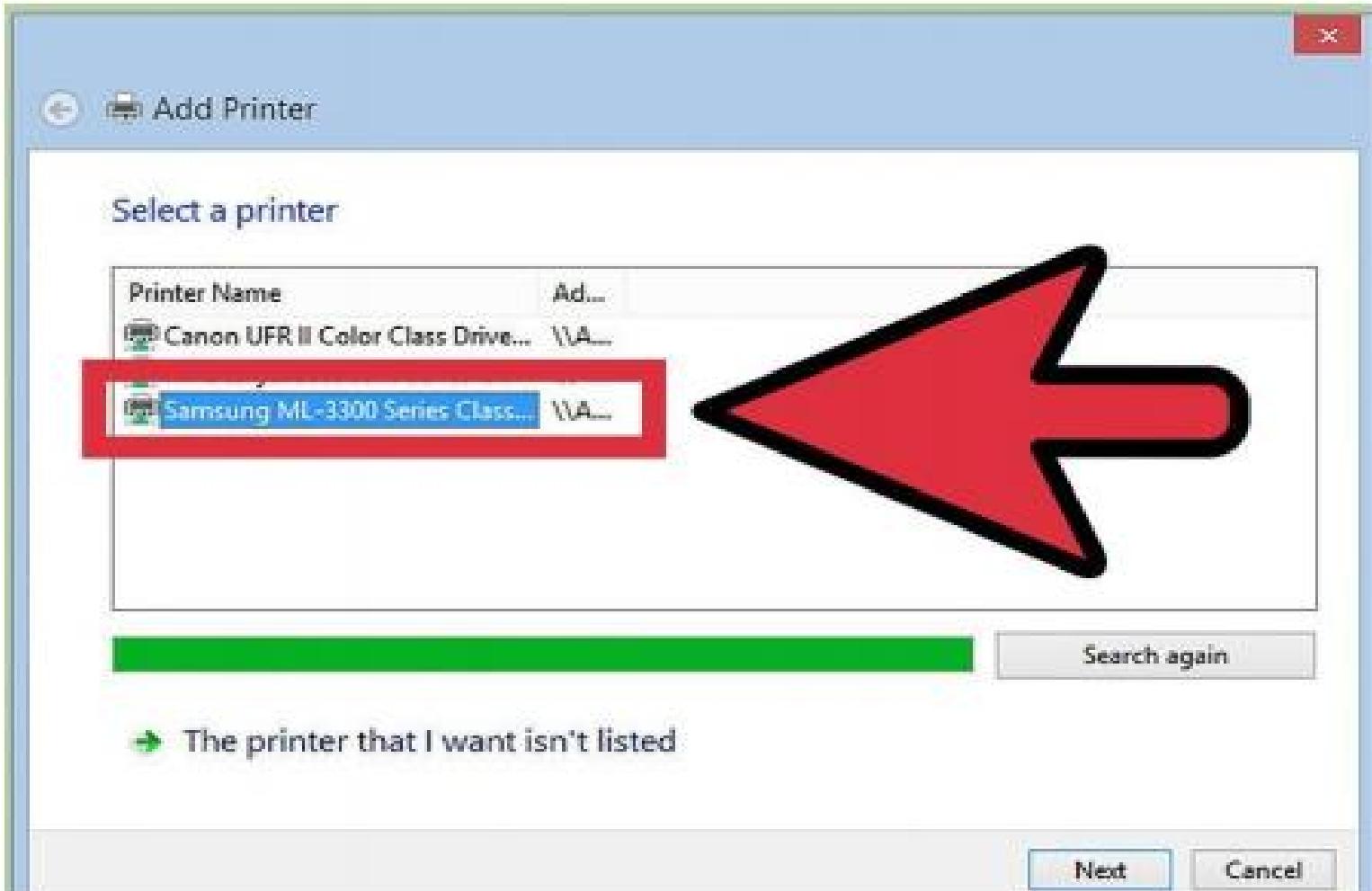
# Printer Sharing

*Step 8: Share the printer. Now that file and printer sharing has been turned on, you will need to share the printer itself.*



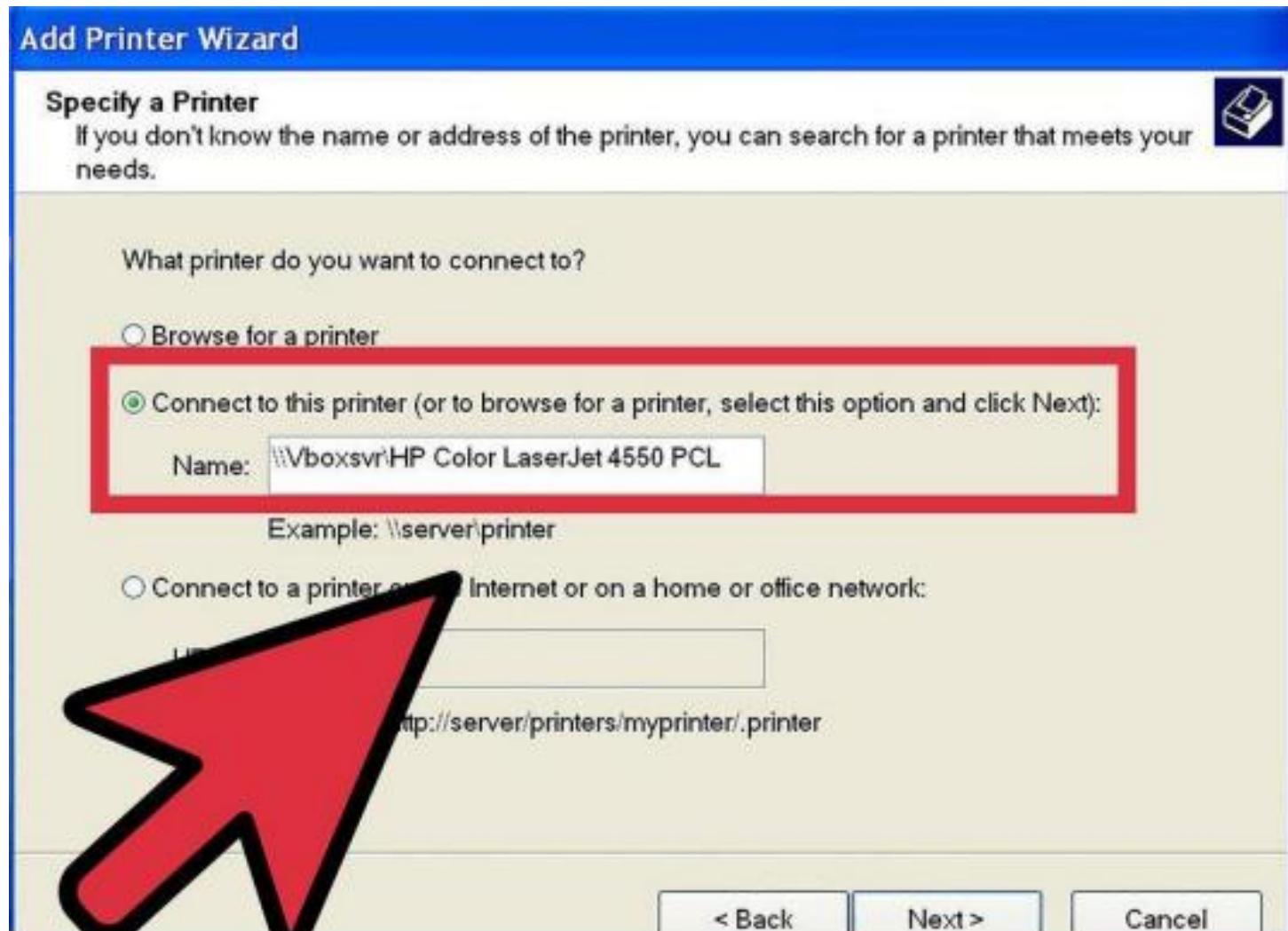
# Connecting to a Shared Printer

*Step 1:* Add a network printer in Windows Vista, 7, and 8. Open the Control Panel and select "Devices and Printers". Click the "Add a printer" button at the top of the window.



# Connecting to a Shared Printer

Step 2: Add a network printer in Windows XP. Open the Control Panel and select Printers and Faxes. Look for the "Printer Tasks" section and click the "Add a printer" option.



# Client wireless device configuration

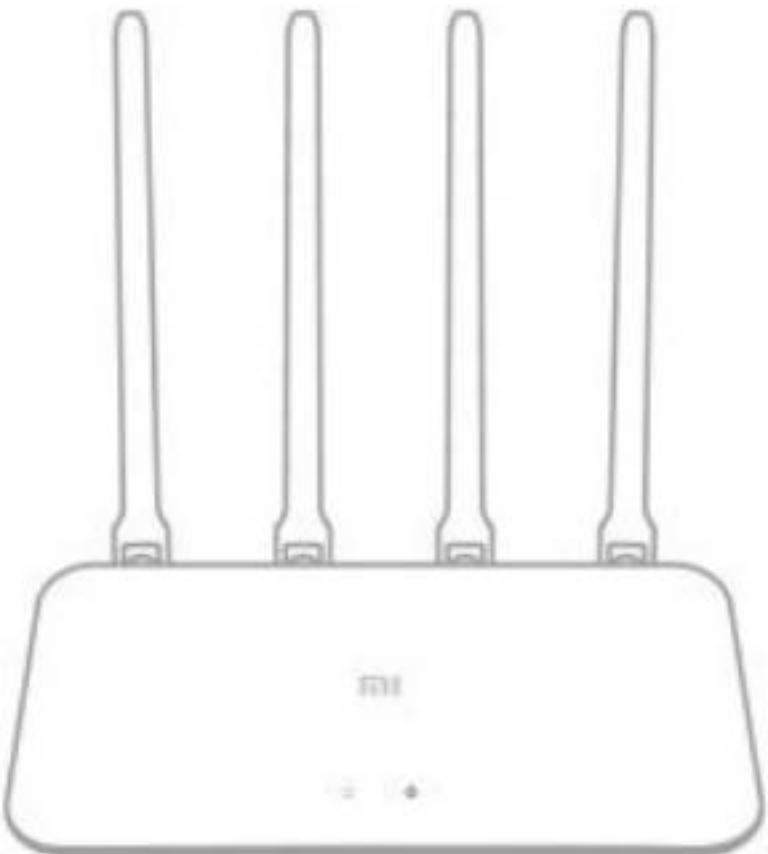
## *What is Wireless Network?*

Wireless networks are computer networks that are not connected by cables of any kind. The use of a wireless network enables enterprises to avoid the costly process of introducing cables into buildings or as a connection between different equipment locations.

# Client wireless device configuration

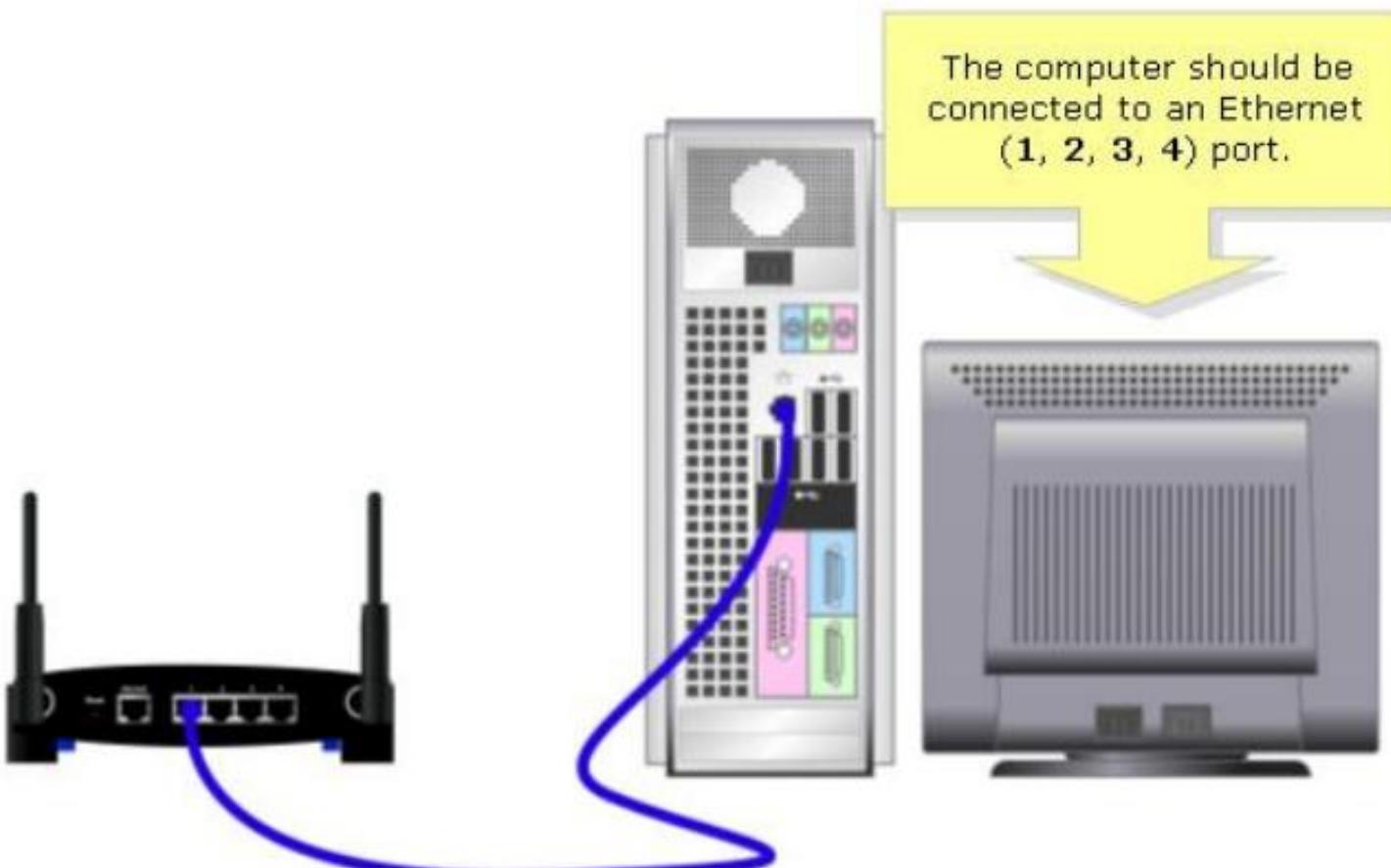
## *Wireless Router*

A wireless router is a device that performs the functions of a router and also includes the functions of a wireless access point. It is used to provide access to the Internet or a private computer network.



# Wireless Router

## Basic Configuration of Wireless Device SSID and Security.





## Basic Configuration of Wireless Device SSID and Security.

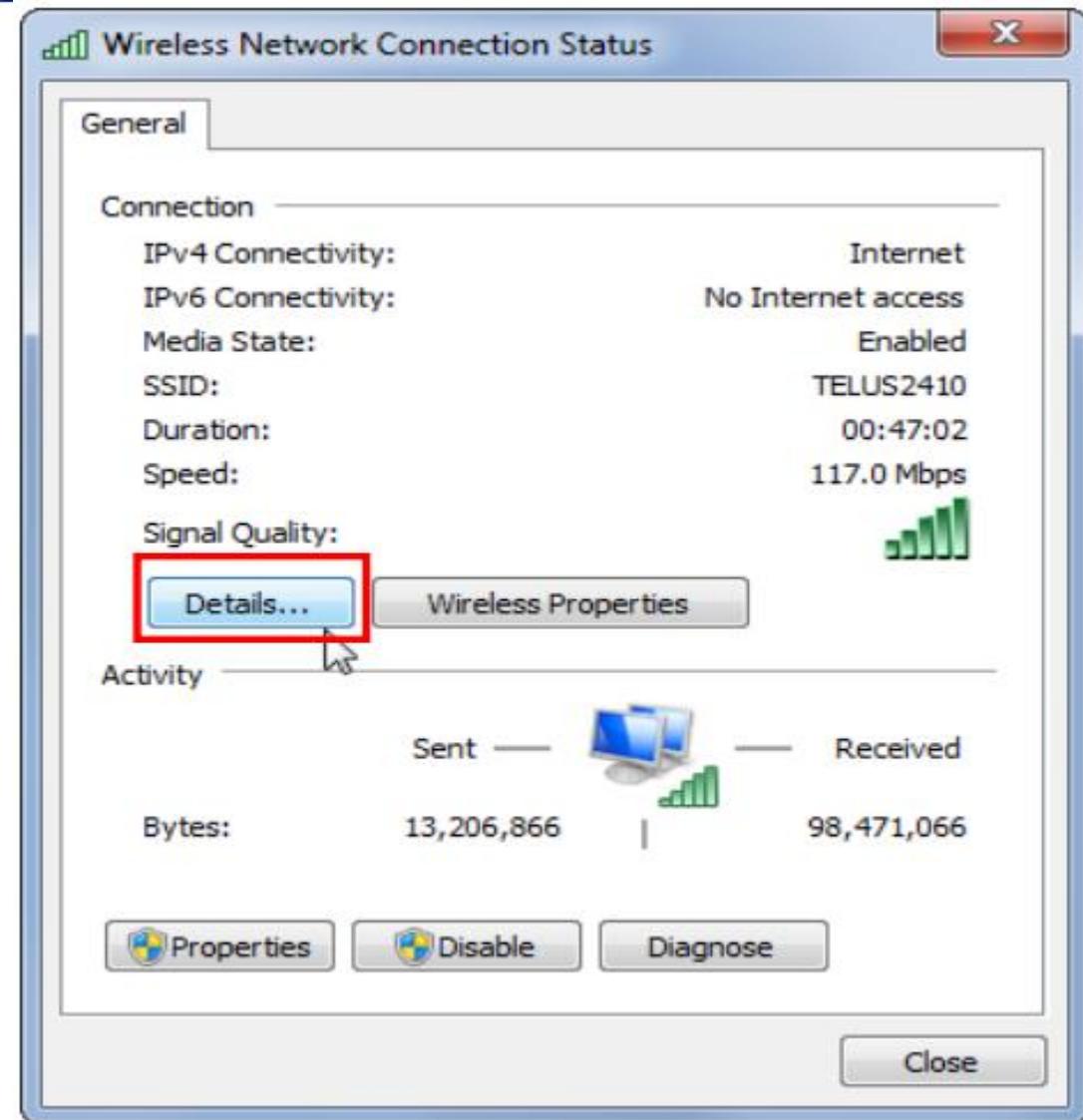
- Check the connection
  - On the desktop of your Computer
    - Network tray – next – open Network Sharing
  - On the Start Menu – Control Panel – Network & Internet
    - Network and Sharing Center

# Basic Configuration of Wireless Device SSID and Security.



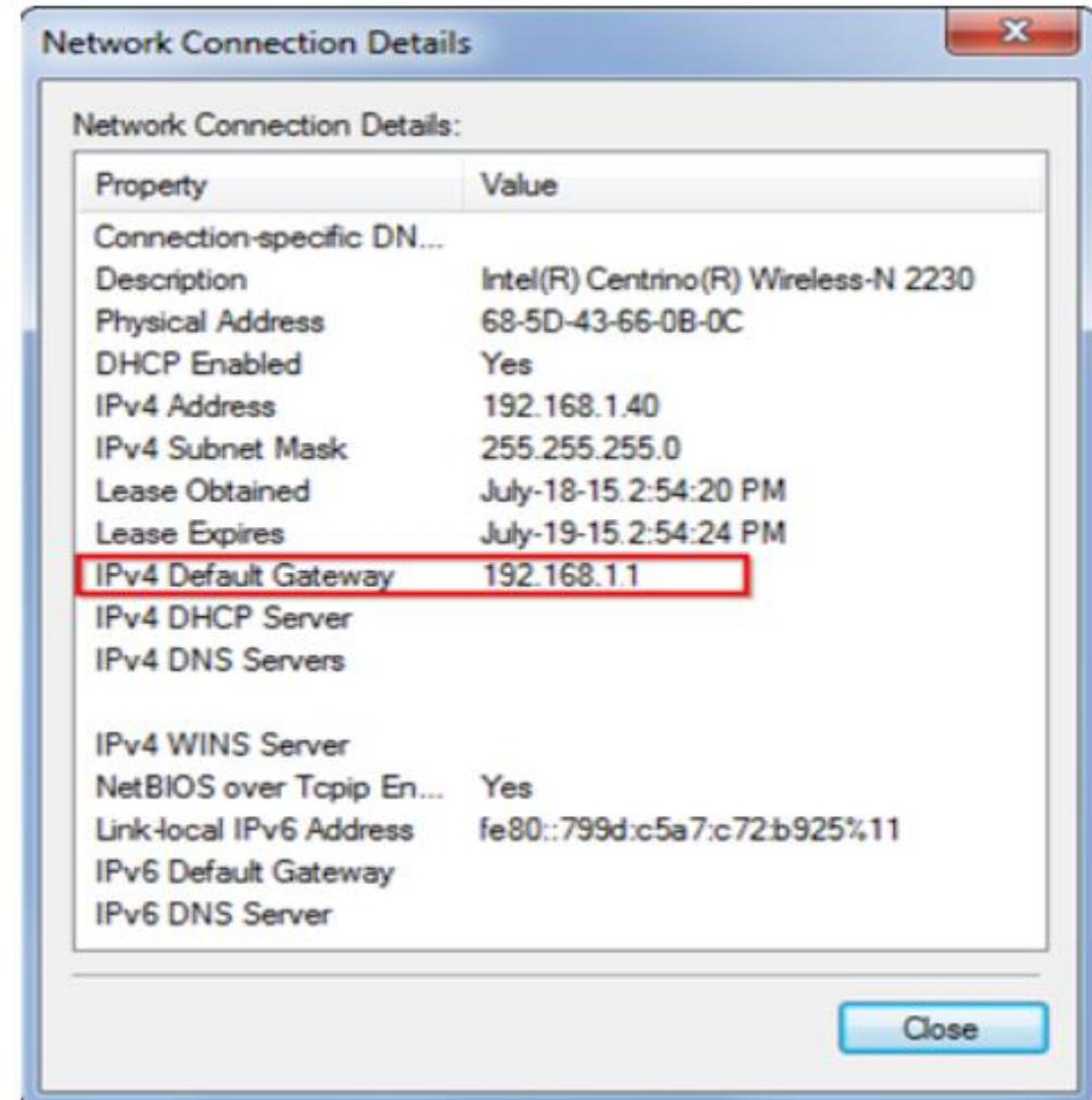
# Basic Configuration of Wireless Device SSID and Security.

Click the Details button to view more information about the connection.



# Basic Configuration of Wireless Device SSID and Security.

Look for the IPv4 Default Gateway IP address in the details window. Plug this IP address into your web browser's address bar.

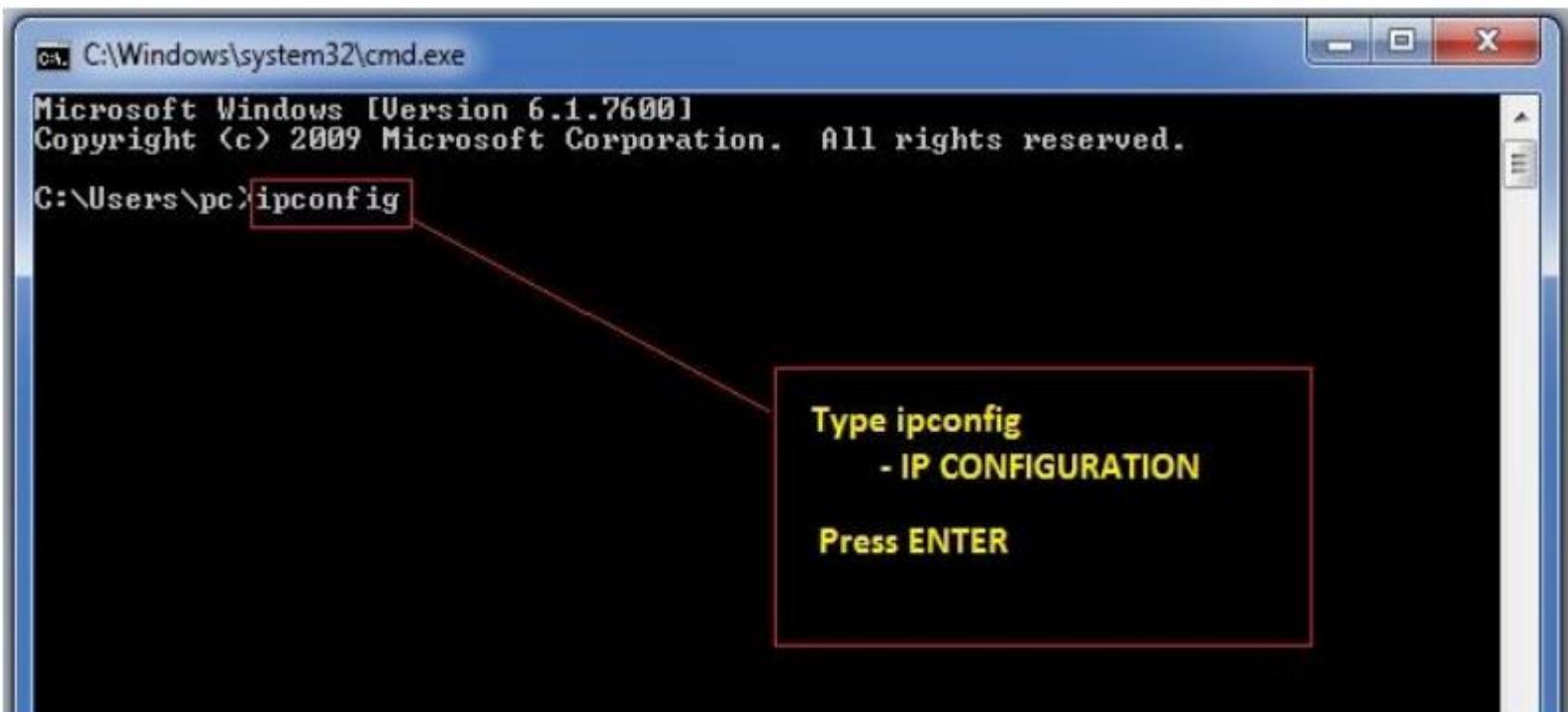


# Basic Configuration of Wireless Device SSID and Security.

## *Other way*

- Go to Start – search bar – type RUN (to enter DOS or Command Prompt) – inside the DOS

- Type
  - ✓ IPCONFIG
  - ✓ ipconfig



# Basic Configuration of Wireless Device SSID and Security.

```
C:\Windows\system32\cmd.exe
Connection-specific DNS Suffix . :
Wireless LAN adapter Wireless Network Connection:
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::cd07:49a6:ac6b:23de%11
IPv4 Address . . . . . : 192.168.1.40
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
Tunnel adapter isatap.<DD9912D7-D9C7-4161-BFE9-81AC83542968>:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . :
Tunnel adapter Teredo Tunneling Pseudo-Interface:
Media State . . . . . . . . . : Media disconnected
Connection-specific DNS Suffix . . :
C:\Users\pc>
```

IP ADDRESS given by  
the ROUTER

ROUTER Default IP  
ADDRESS



# Router Configuration

## *STEP 1: Log into the router from your computer*

You will need to have a working network card or port with a computer attached in order to connect to the ADSL router. These instructions assume the default router setup.

# Router Configuration

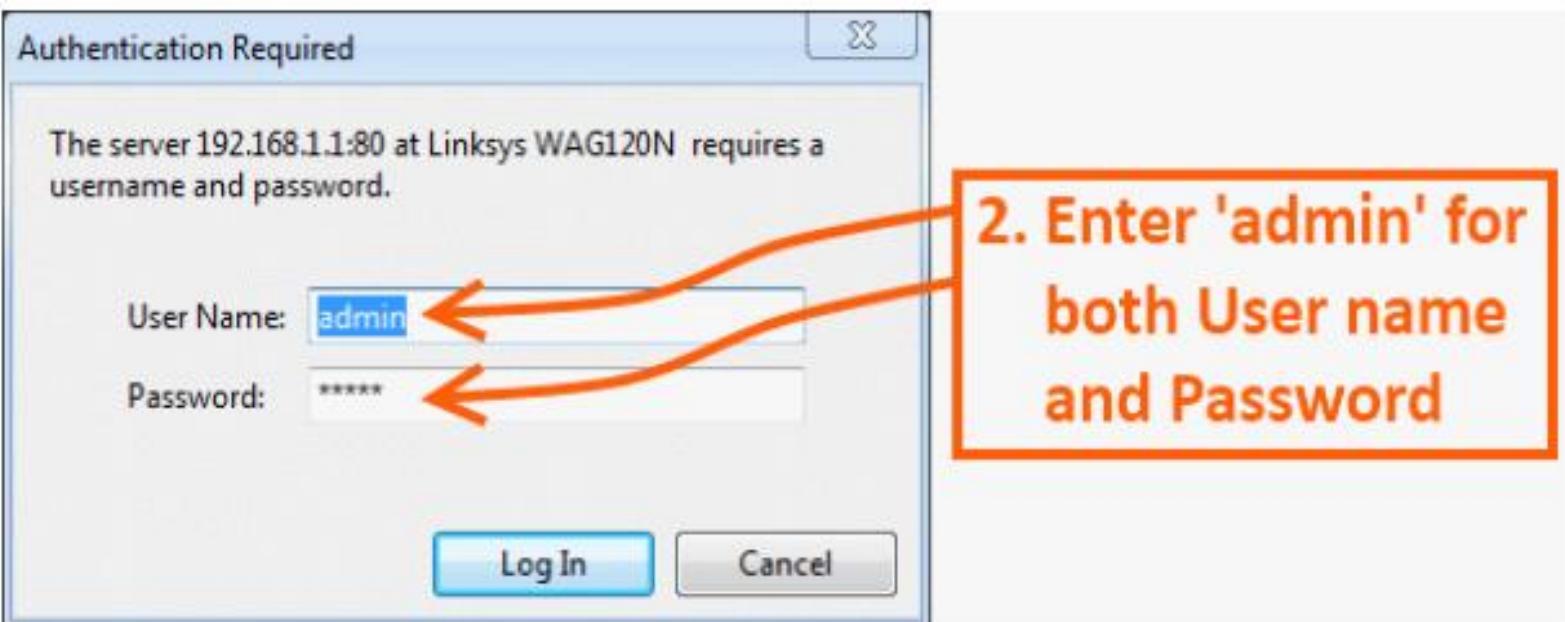
Open a browser (Internet Explorer, Mozilla Firefox, Google Chrome etc.) and type the brand of the router e.g. <http://tplinkmodem> or type <http://192.168.1.1> in the address bar. "Refer to manufacturer's manual"



1. Enter '192.168.1.1' in the address bar of your browser and press enter or click on Go.

# Router Configuration

The browser should ask you for username and password, use username: admin and password: admin (these are the default for Linksys routers, refer to your manual if they don't work).





# Router Configuration

## *STEP 2: Configure Local Wireless Settings*

- The wireless access point is deactivated by default. To activate it securely follow the steps outlined below.
- Click on Interface Setup.
- Click on Wireless.
- Select **Activated**.



# Router Configuration

## *STEP 2: Configure Local Wireless Settings*

- From the Channel dropdown select **United States**.
- **Choose a name** for your wireless access point and enter it next to SSID.
- From the Authentication Type dropdown select **WPA-PSK**.
- **Choose a password** that is not easily guessable of at least 8 characters and enter it next to PreShared Key.
- Click **SAVE** to **SAVE** the new wireless settings.

# Router Configuration

TP-LINK®

Interface Quick Start Interface Setup Advanced Setup Access Management

Internet LAN Wireless

Access Point Settings

1. Click 'Interface Setup'

2. Click on 'Wireless'

3. Select 'Activated'

4. Select 'United States'

5. Choose a name that you will recognise

6. Choose 'WPA-PSK'

7. Choose a password

8. Click 'SAVE'

Multiple SSIDs Settings

WPA-PSK

Wireless MAC Address Filter

Interface Setup

Advanced Setup

Access Management

Internet

LAN

Wireless

Access Point:  Activated  Deactivated

Channel: SOUTH\_AFRICA  Auto Current Channel: 1

Transmit Power: High

Beacon Interval(ms): 100 (range: 20~1000)

RTS/CTS Threshold: 2347 (range: 1500~2347)

Fragmentation Threshold(bytes): 2346 (range: 256~2346, even numbers only)

DTIM(ms): 1 (range: 1~255)

802.11 b/g: 802.11b+g

SSID Index: 1

Broadcast SSID:  Yes  No

SSID: Your wireless network

Authentication Type: WPA-PSK

Encryption: TKIP

Pre-Shared Key: something people can't guess (8-63 ASCII characters or 64 hexadecimal characters)

Active:  Activated  Deactivated

Action: Allow Association  the follow Wireless LAN station(s) association.

Mac Address #1: 00:00:00:00:00:00

Mac Address #2: 00:00:00:00:00:00

Mac Address #3: 00:00:00:00:00:00

Mac Address #4: 00:00:00:00:00:00

Mac Address #5: 00:00:00:00:00:00

Mac Address #6: 00:00:00:00:00:00

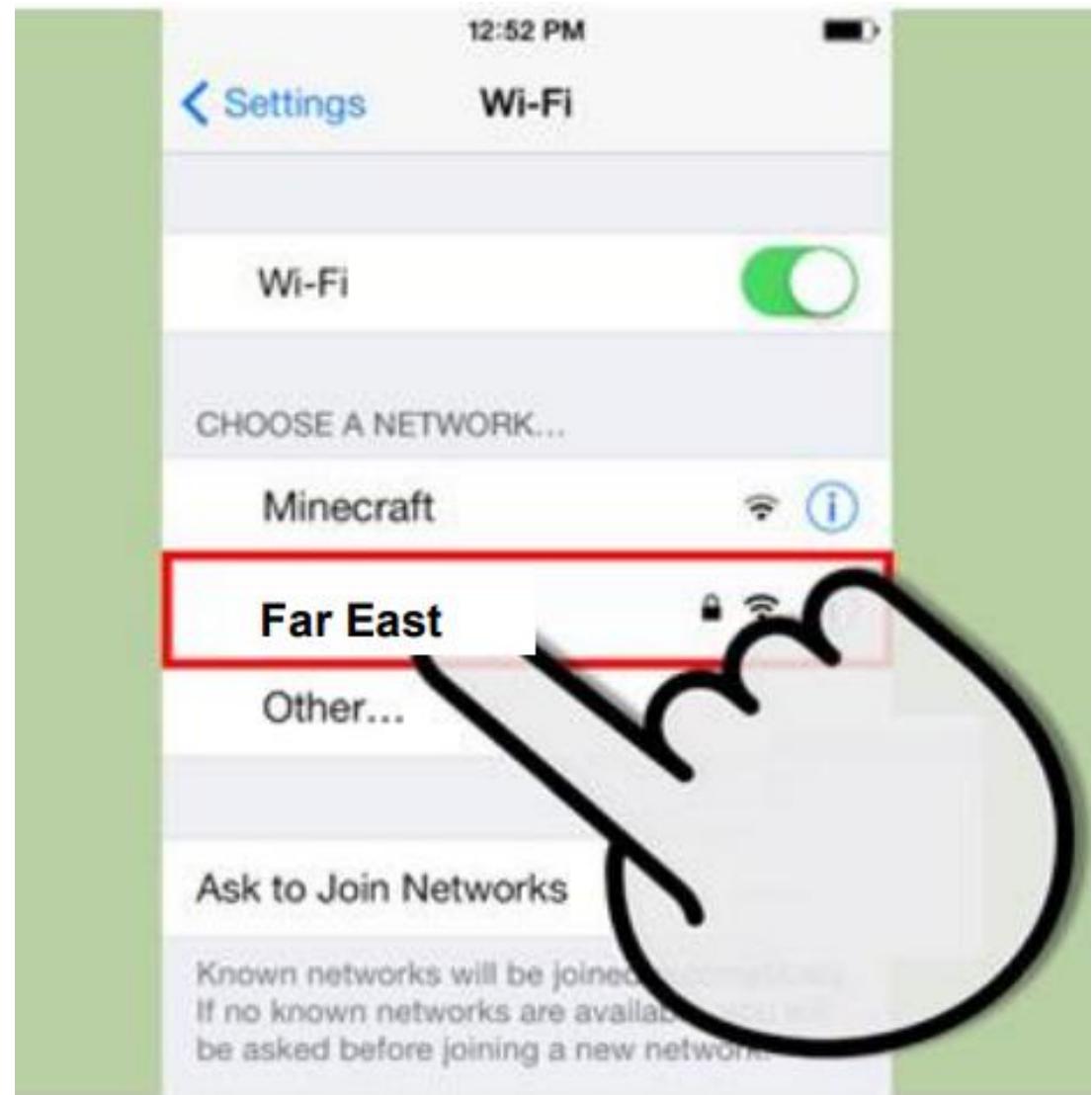
Mac Address #7: 00:00:00:00:00:00

Mac Address #8: 00:00:00:00:00:00

SAVE CANCEL

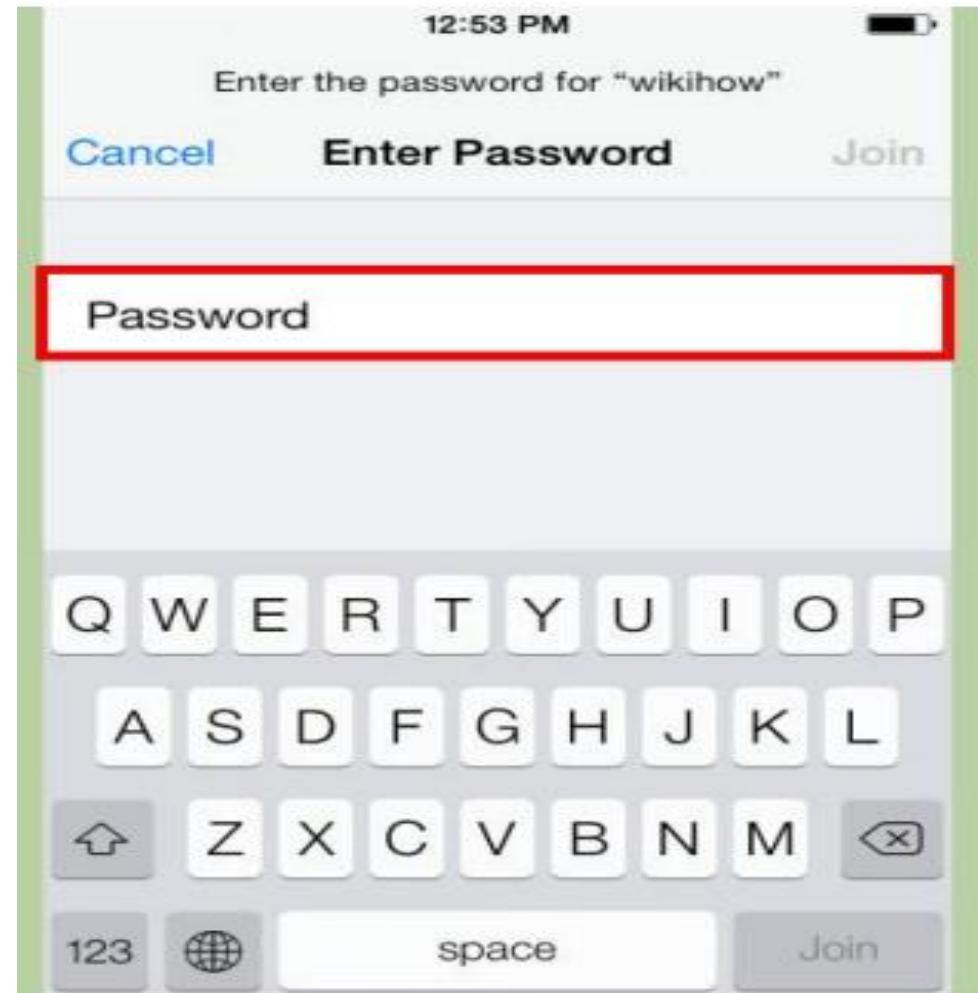
# Connecting Your Wireless Devices

Connect a computer,  
tablet, or Smartphone to  
the wireless network.



# Connecting Your Wireless Devices

Enter your wireless *passphrase*. Once you enter the passphrase, your device will be automatically connected to the wireless network.





# DEVICE LAN & WAN NETWORK CONFIGURATIONS

## *Difference between LAN & WAN in Wireless Routers*

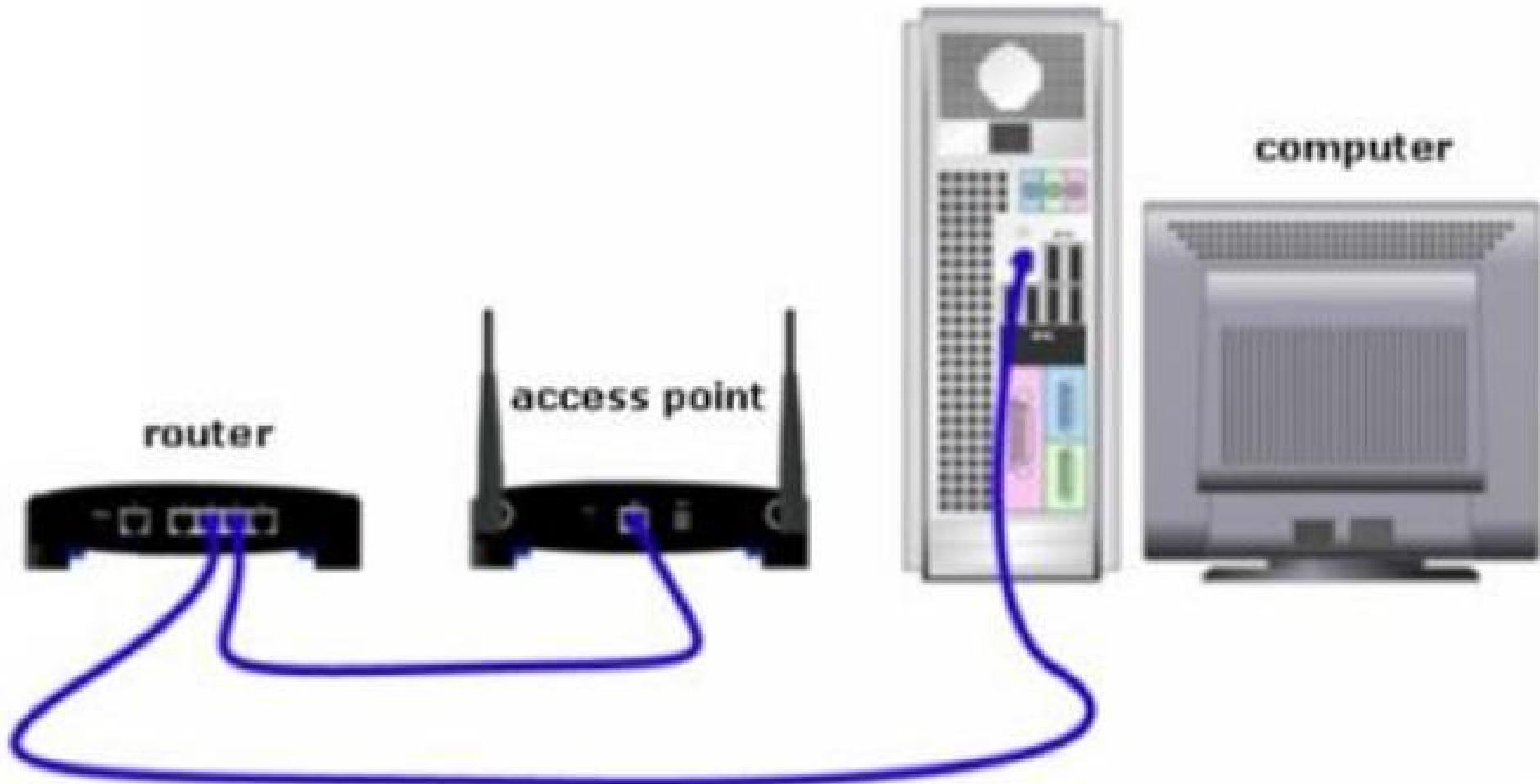
- **LAN** A local area network is one where all the computers are in the same general location. This can mean all in the same office or building, or in a group of nearby buildings.
- **WAN** A wide area network is one that covers a much bigger region than a local area network, which could be across a town, a region, a country or the entire world.



# DEVICE LAN & WAN NETWORK CONFIGURATIONS

- **Wireless Routers** In the context of a wireless router, the WAN in question is almost always the Internet itself. A router may have one or more LAN ports into which the users plug computers and other devices that need an Internet connection.
- **WLAN** The term WAN could be confused with WLAN, or wireless local area network. A WLAN is a type of LAN that uses wireless technology (nearly always Wi-Fi) to connect some or all computers and devices to the router, and in turn to one another and the Internet.

# WIRELESS DEVICE LAN CONFIGURATION



# WIRELESS DEVICE LAN CONFIGURATION

## *STEP 1: Log into the router from your computer*

- You will need to have a working network card or port with a computer attached in order to connect to the ADSL router. These instructions assume the default router setup. This guide assumes that you have set up all the physical connections as per the welcome note, found inside the router's box or at the back of device.

# WIRELESS DEVICE LAN CONFIGURATION

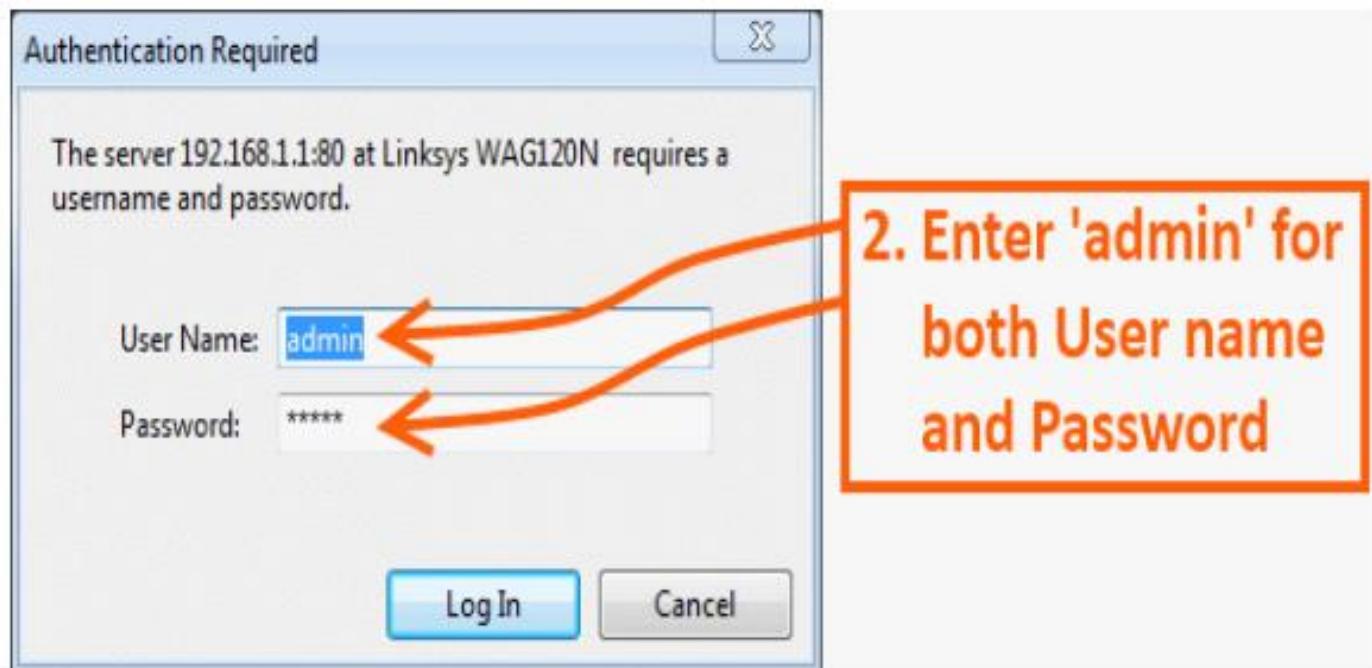
- Open a browser (Internet Explorer, Mozilla Firefox , Google Chrome etc. ) and type the brand of the router e.g. `http://tplinkmodem` or type `http://192.168.1.1` in the address bar



1. Enter '**192.168.1.1**' in the address bar  
of your browser and press enter or  
click on Go.

# WIRELESS DEVICE LAN CONFIGURATION

- The browser should ask you for username and password, use username: admin and password: admin (these are the default for Linksys routers, refer to your manual if they don't work)



# WIRELESS DEVICE LAN CONFIGURATION

## *STEP 2: Configure Local Area Network(LAN) Settings*

- Click on Interface Setup.
- Click on LAN. 55
- Choose and change for your LAN IP ADDRESS and enter it next to IP ADDRESS.
- NOTE: (3rd) digit of your IP should the same as DHCP Server. (192.168.\_\_.1)

# WIRELESS DEVICE LAN CONFIGURATION

## *STEP 2: Configure Local Area Network(LAN) Settings*

- Configure Starting IP Address and IP Pool count.  
(how many users can connect to the device)
- Configure LAN/Ethernet port can be use.
- Click SAVE to save the new LAN settings.

**Interface**

Quick Start

Interface Setup

Advanced Setup

Access Management

Maintenance

Status

Help

Internet

LAN

Wireless

**Router Local IP**

IP Address :  Select 'IP ADDRESS'  
 IP Subnet Mask :   
 Dynamic Route :  Direction :   
 Multicast :   
 IGMP Snoop :  Disabled  Enabled

NOTE: must be UNIQUE

- change the third digit of  
your IP ADDRESS.**DHCP****DHCP Server**

DHCP :  Disabled  Enabled  Relay  
 Starting IP Address :   
 IP Pool Count :   
 Lease Time :  seconds (0 sets to default value of 259200)  
 Physical Ports :  1  2  3  4

NOTE: (3rd) digit of  
your IP should be  
the same as DHCP Server.**DHCP Table**

Hostname	IP Address	MAC Address	Status	Expire Time
	<input type="text" value="192.168.1.100"/>	<input type="text" value="Manual Config"/>	<input type="text" value="Static"/>	
infomaniac	<input type="text" value="192.168.1.102"/>	<input type="text" value="98:FE:94:4C:B1:7C"/>	<input type="text" value="Auto"/>	<input type="text" value="89days, 23:20:11"/>
infomaniac	<input type="text" value="192.168.1.103"/>	<input type="text" value="48:D7:05:CB:54:D5"/>	<input type="text" value="Auto"/>	<input type="text" value="89days, 22:46:0"/>

**DNS**

DNS Relay :   
 Primary DNS Server :   
 Secondary DNS Server :

SAVE | CANCEL

# WIRELESS DEVICE LAN CONFIGURATION

*STEP 3: Reconnect on LAN Network for new Address.*

- Click on START MENU.
- TYPE cmd to enter the DOS.
- Type ipconfig /release
- Then wait
- On the Graphical Interface

# WIRELESS DEVICE LAN CONFIGURATION

*STEP 3: Reconnect on LAN Network for new Address.*

- Click on NETWORK - Network and Sharing Center
- Change adapter setting - Right Click - Local Area Connection (LAC)
- Click on Disable then Enable.
- Type ipconfig /renew
- Then wait again for the new IP ADDRESS.

## Command Prompt

Microsoft Windows XP [Version 5.1.2600]  
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Owner>ipconfig /release

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

Connection-specific DNS Suffix . :  
IP Address . . . . . : : : : 0.0.0.0  
Subnet Mask . . . . . : : : : 0.0.0.0  
Default Gateway . . . . . : : : :

C:\Documents and Settings\Owner>ipconfig /renew

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

Connection-specific DNS Suffix . :  
IP Address . . . . . : : : : 172.16.31.33  
Subnet Mask . . . . . : : : : 255.255.255.0  
Default Gateway . . . . . : : : : 172.16.31.254

C:\Documents and Settings\Owner>

The first command  
clears any "leftover" IP.

The second command  
finds the local wireless  
network and  
reconnects.

# WIRELESS DEVICE LAN CONFIGURATION

*STEP 4: Configure IP Reservation using MAC Address.*

- On the DHCP Table
- Highlight then COPY and PASTE the MAC ADDRESS
- Click SAVE to save the new LAN settings.
- NOTE: For the Documentation write down all the IP ADDRESS you change and especially the new IP ADDRESS.

# WIRELESS DEVICE LAN CONFIGURATION

DHCP Table

Hostname	IP Address	MAC Address	Status	Expire Time
	192.168.1.8	00:19:66:86:C5:84	Static	
tplink31047	192.168.1.10	00:19:66:86:C5:84	Static	N/A
	192.168.1.2	00:19:66:86:C5:84	Static	N/A
android_b40ecffff71691e1c	192.168.1.3	9C:CA:D9:A5:EF:4B	Auto	2days, 22:58:25
	192.168.1.4	00:12:FE:E0:64:98	Auto	89days, 23:52:43
Android_866150001747985	192.168.1.5	FC:25:3F:25:59:A5	Auto	2days, 22:2:43
android_878d5b71fee93db5	192.168.1.6	D8:B3:77:97:80:DB	Auto	2days, 22:59:18
android-1cdc101015b1f77a	192.168.1.7	00:12:FE:E0:64:98	Auto	2days, 23:12:44
	192.168.1.101	FC:25:3F:25:59:A5	Auto	89days, 21:50:33

Copy the MAC  
ADDRESS then PASTE

DNS

DNS Relay : Use Auto Discovered DNS Server Only

Primary DNS Server : N/A

Secondary DNS Server : N/A

SAVE CANCEL

# WIRELESS DEVICE LAN CONFIGURATION

## *STEP 5: Configure AccessPoint*

- Open a browser (Internet Explorer, Mozilla Firefox , Google Chrome etc. ) and type the brand of the router e.g. `http://tplinkap` or type `http://192.168.0.254` in the address bar or refer to manufacturers' manual

tplinkrepeater.net

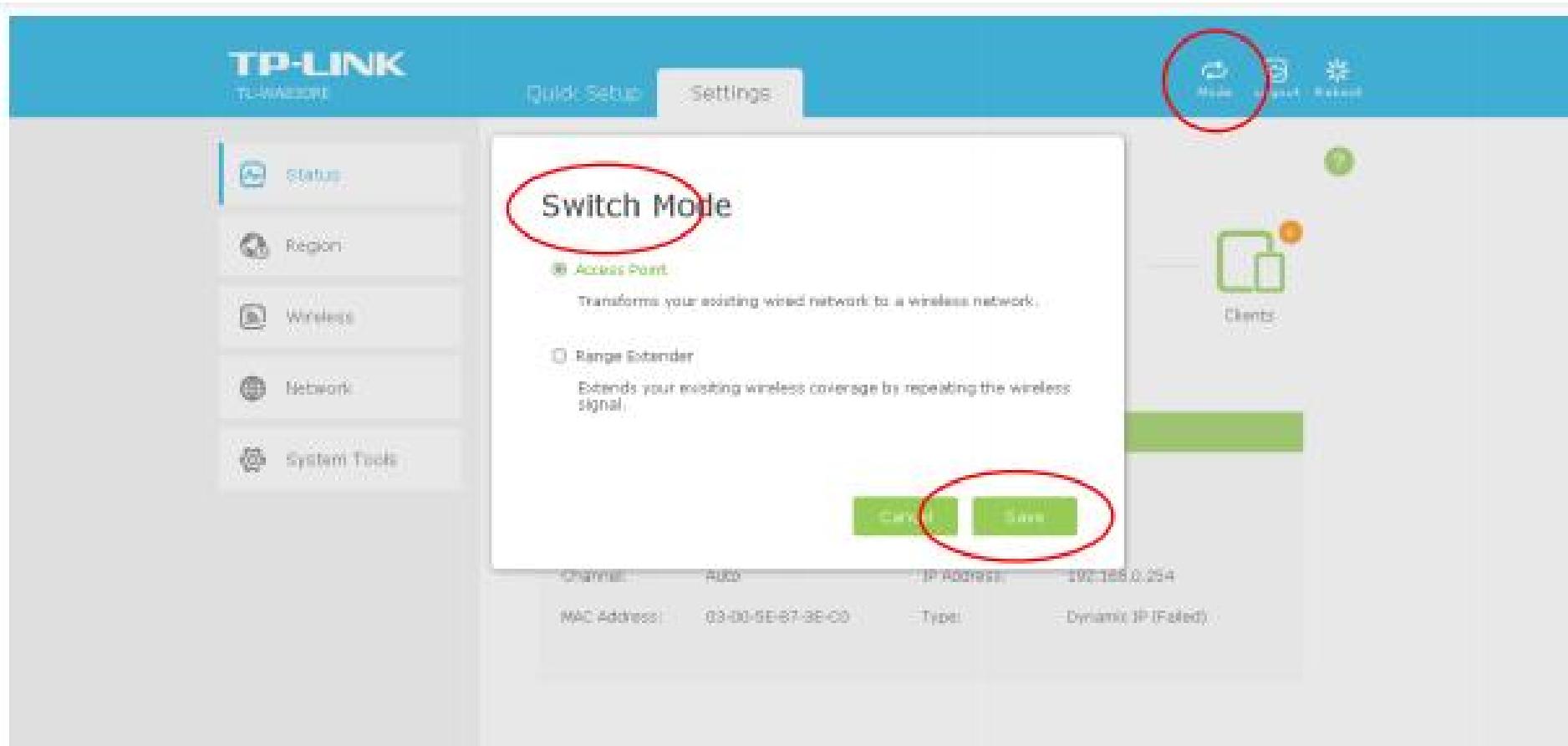
192.168.0.254

**TP-LINK**  
TL-WA830REType the Brand or the default IP  
ADDRESS of the ACCESS POINT.Type the default  
Username and Password  
"admin"

	<input type="text" value="admin"/>
	<input type="password" value="....."/>

Login

# WIRELESS DEVICE LAN CONFIGURATION



**First**  
Select 'MODE' button

**Second**  
Click on 'Access Point'

**Third**  
Click 'SAVE' to  
continue and reboot  
then wait.

# WIRELESS DEVICE LAN CONFIGURATION

TP-LINK  
TL-WA820RE

Quick Setup Settings

Status Region Wireless Network System Tools

Rebooting... 16%

Extended 2.4GHz

SSID:	TP-LINK_08EC	Wired	DHCP Server:	On
Channel:	Auto		IP Address:	192.168.0.254
MAC Address:	00-0E-87-3E-C0	Type:	Dynamic IP (Failed)	

Clients

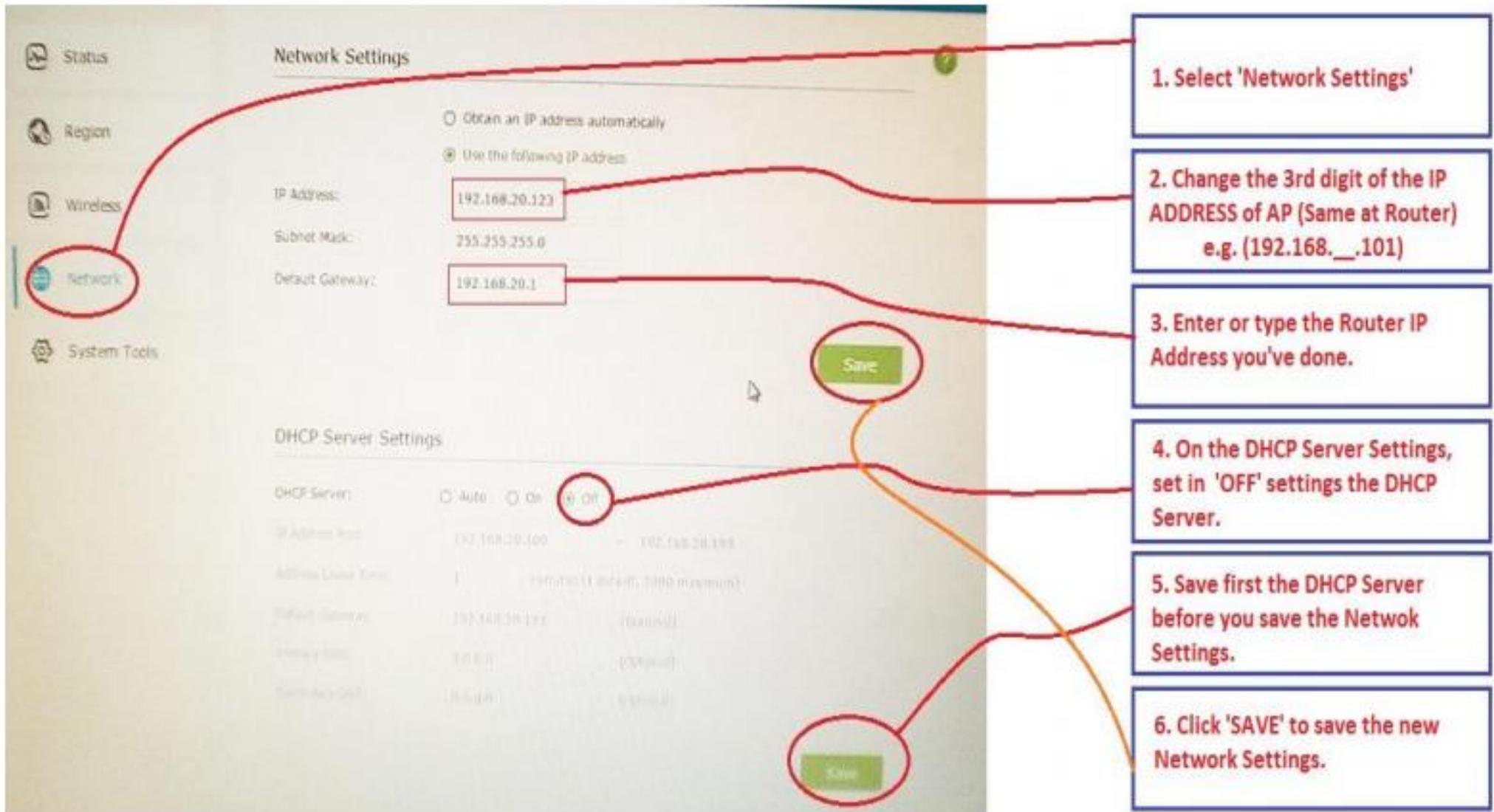
# WIRELESS DEVICE LAN CONFIGURATION

The screenshot shows the TP-LINK TL-WA820RE web-based configuration interface. The left sidebar lists various settings like Status, Region, Wireless, and System Tools, with 'Wireless Settings' highlighted by a red oval. The main 'Wireless' configuration page has several fields: 'Network Name (SSID)' set to 'PRACTICE\_AP', 'Security' set to 'WPA/WPA2 - Personal (Recommended)', 'Version' set to 'Auto', 'Encryption' set to 'Auto', 'Password' set to '12345678', 'Mode' set to '802.11(bgn) mixed', 'Channel Width' set to 'Auto', 'Channel' set to '6', and 'Transmit Power' set to 'High'. A red line connects the 'Wireless Settings' link in the sidebar to the 'Wireless' page. Another red line connects the 'Settings' button in the top navigation bar to the 'Wireless' page. Red boxes on the right side provide numbered instructions:

1. Click on 'Settings'
2. Click on 'Wireless Settings'
3. Choose a name that you will recognise then add '\_AP' at the end.
4. Choose 'WPA/WPA2'
5. Choose a Password
6. Click 'SAVE' to save the new Wireless Settings.

# WIRELESS DEVICE LAN CONFIGURATION

## Network Settings



# WIRELESS DEVICE LAN CONFIGURATION

*Repeat Step 3*

The screenshot shows a Microsoft Windows XP Command Prompt window with a blue title bar. The title bar displays "Command Prompt" and the Windows logo. The main area of the window shows the following text:

```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Owner>ipconfig /release
Windows IP Configuration

Ethernet adapter Wireless Network Connection:

  Connection-specific DNS Suffix . . . . . : .
  IP Address . . . . . : 0.0.0.0
  Subnet Mask . . . . . : 0.0.0.0
  Default Gateway . . . . . : 0.0.0.0

C:\Documents and Settings\Owner>ipconfig /renew
Windows IP Configuration

Ethernet adapter Wireless Network Connection:

  Connection-specific DNS Suffix . . . . . : .
  IP Address . . . . . : 172.16.31.33
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 172.16.31.254

C:\Documents and Settings\Owner>
```

Two arrows point from callout boxes to specific lines of text in the command output:

- An arrow points to the first "ipconfig /release" command, with the callout text: "The first command clears any "leftover" IP."
- An arrow points to the second "ipconfig /renew" command, with the callout text: "The second command finds the local wireless network and reconnects."

# WIRELESS DEVICE LAN CONFIGURATION

## *STEP 6: LAN Settings*

- See all Firewall:
- Set all firewall into “OFF MODE”
- See all Sharing Option: – Network – Network and Sharing Center – Advance Sharing Settings – Network Discovery
- Network Discovery - Turn ON
- File Sharing - Turn ON
- For the Password - Turn OFF

# WIRELESS DEVICE LAN CONFIGURATION



## Customize settings for each type of network

You can modify the firewall settings for each type of network location that you use.

What are network locations?

Home or work (private) network location settings



Turn on Windows Firewall

Block all incoming connections, including those in the list of allowed programs

Notify me when Windows Firewall blocks a new program



Turn off Windows Firewall (not recommended)

Public network location settings



Turn on Windows Firewall

Block all incoming connections, including those in the list of allowed programs

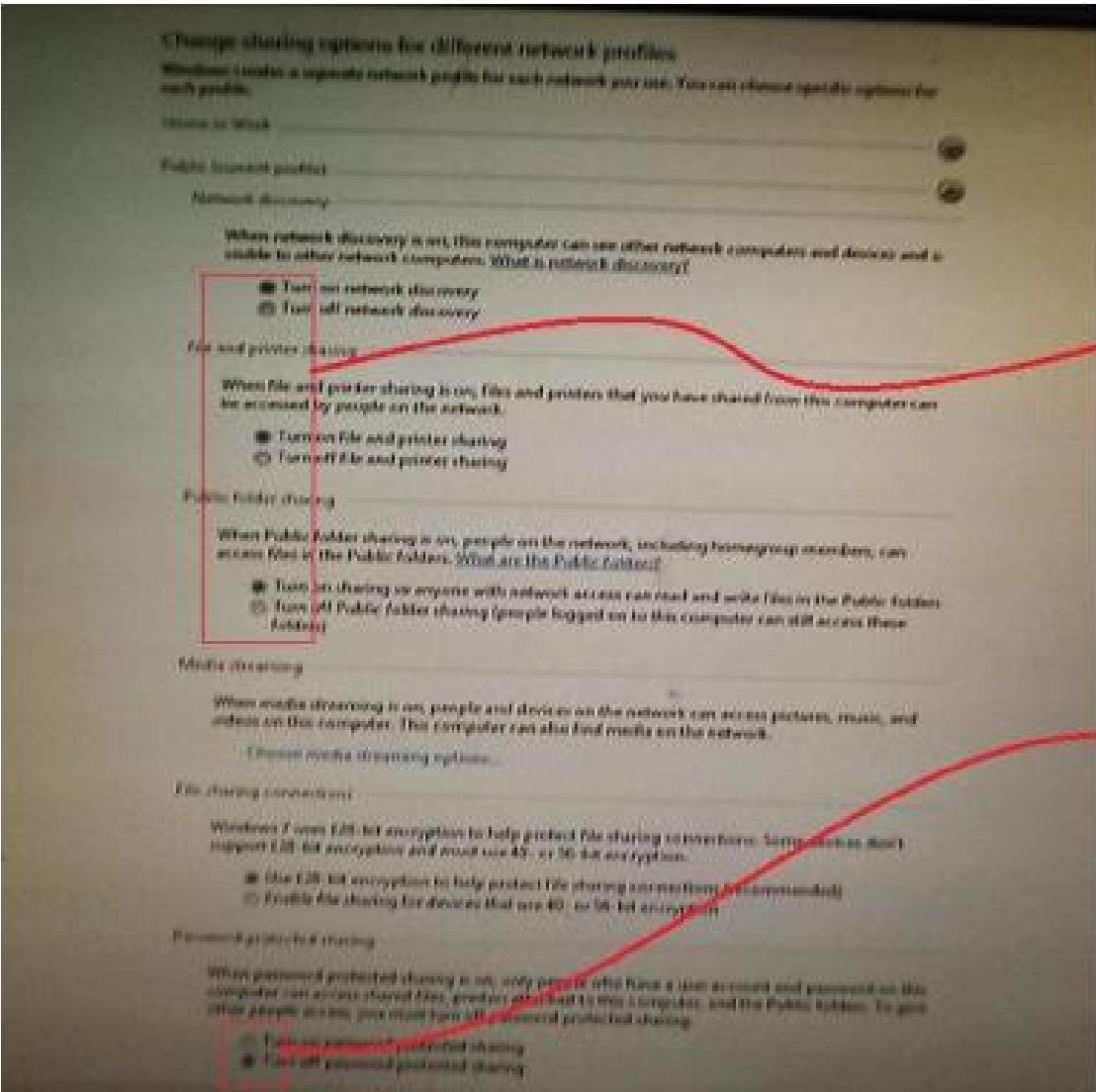
Notify me when Windows Firewall blocks a new program



Turn off Windows Firewall (not recommended)

**TURN OFF**

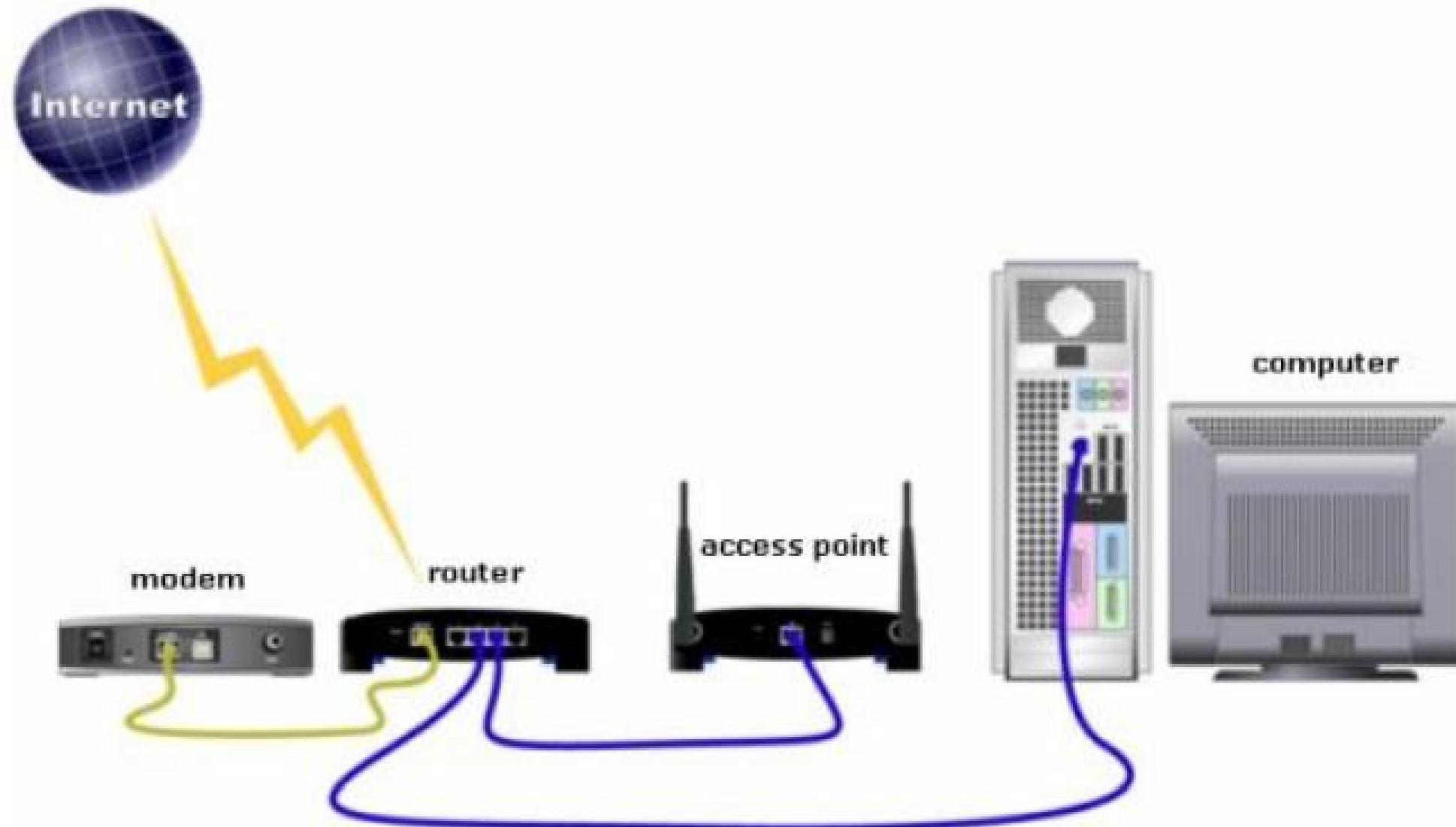
# WIRELESS DEVICE LAN CONFIGURATION



1. TURN ON

2. TURN OFF

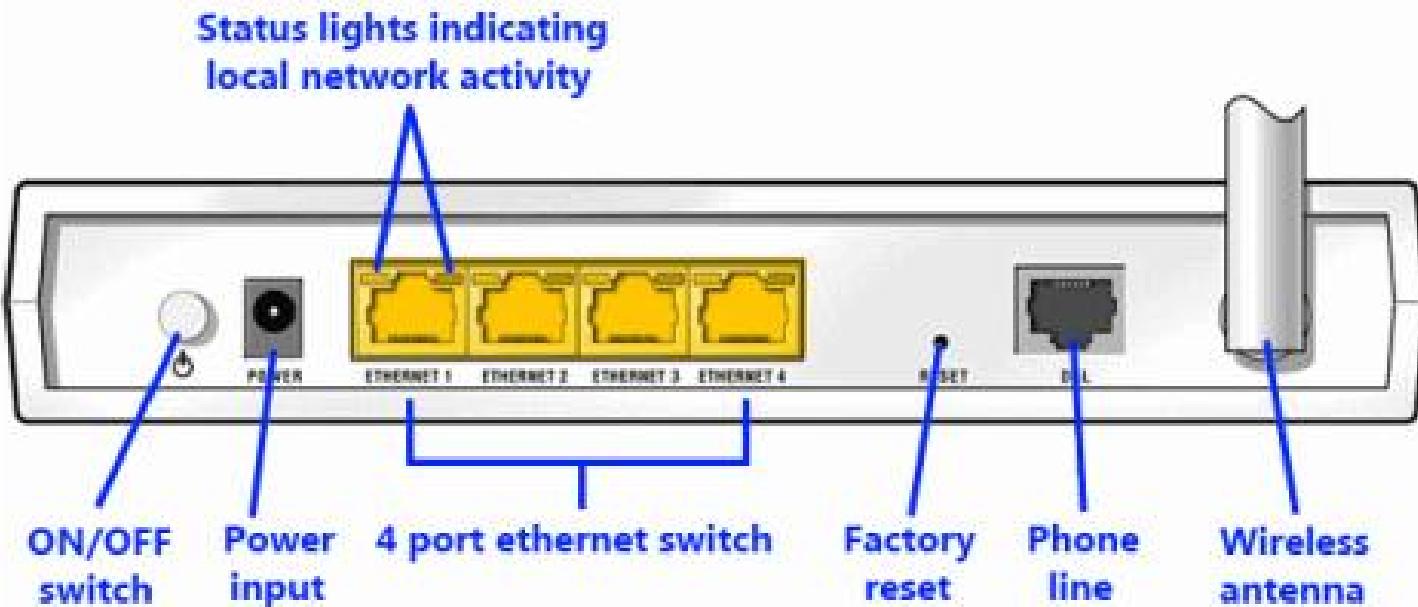
# WIRELESS DEVICE WAN CONFIGURATION



# WIRELESS DEVICE WAN CONFIGURATION

*Before you begin*

Please ensure that your modem/router is connected to your telephone line by a telephone cable and your computer is connected to your modem/router with a LAN cable.



# WIRELESS DEVICE WAN CONFIGURATION

## *STEP 1: Log into the router from your computer*

- You will need to have a working network card or port with a computer attached in order to connect to the ADSL router. These instructions assume the default router setup, if they do not work, contact us. This guide assumes that you have set up all the physical connections as per the welcome note, found inside the router's box.

# WIRELESS DEVICE WAN CONFIGURATION

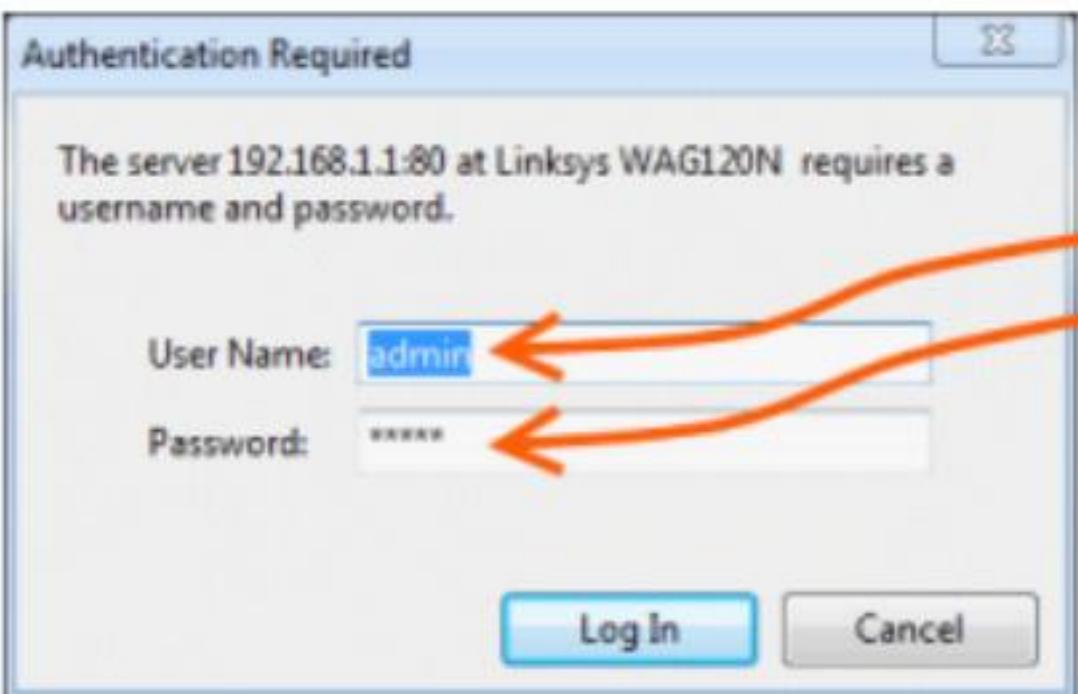
- Open a browser (Internet Explorer, Mozilla Firefox etc.) and type `http://192.168.1.1` in the address bar



**1. Enter '192.168.1.1' in the address bar of your browser and press enter or click on Go.**

# WIRELESS DEVICE WAN CONFIGURATION

- The browser should ask you for username and password, use username: admin and password: admin (these are the default for Linksys routers, refer to your manual if they don't work)



**2. Enter 'admin' for both User name and Password**

# WIRELESS DEVICE WAN CONFIGURATION

## *STEP 2: Configuring Internet Settings from Scratch*

- If you are setting up the modem for the first time or after resetting then follow the steps below. Otherwise if you are merely wanting to change the settings, proceed to step 4.
  1. Click on Quick Setup.
  2. Change the VPI to 8 and the VCI to 35 .

# WIRELESS DEVICE WAN CONFIGURATION

3. Next to the WAN Link Type select PPPoE and next to Encapsulation section select LLC/SNAP-BRIDGING.
4. Enter the username (ie ending with brownie, chocolatechip or vanilla and the password as found of the welcome note we sent you.
5. Click Next.

Device Info  
Quick Setup   
Advanced Setup  
Wireless  
Diagnostics  
Management

## Quick Setup - WAN Configurations

You can configure an ATM PVC identifier (VPI and VCI), select your WAN Link Type.

VPI: [0-255]	<input type="text" value="8"/> 
VCI: [32-65535]	<input type="text" value="35"/> 
WAN Link Type:	<input checked="" type="checkbox"/> PPPoE 
Encapsulation Mode:	<input type="text" value="LLC/SNAP-BRIDGING"/>  (optional)
PPP Username:	<input type="text" value="user@brownie.co.za"/> 
PPP Password:	<input type="text" value="....."/> 
PPPoE Service Name:	<input type="text" value="vanilla"/> 
<input type="checkbox"/> MTU Size	
<input type="checkbox"/> Dial on demand (with idle timeout timer)	
<input type="checkbox"/> Use Static IPv4 Address (optional)	
DNS Settings:	<input checked="" type="radio"/> Obtain Automatically <input type="radio"/> Set DNS Manually
Primary DNS:	<input type="text"/>
Secondary DNS:	<input type="text"/> (optional)

Next 

1. Click 'Quick Setup'

2. Type '8' for VPI  
and '35' for VCI

3. Select 'PPPoE' and  
'LLC/SNAP-BRIDGING'

4. Enter the username  
and password as found  
on your welcome note

5. Click 'Next'

# WIRELESS DEVICE WAN CONFIGURATION

6. Click on Save.

The screenshot shows the configuration interface for a TP-LINK 300M Wireless N ADSL2+ Modem Router (Model No. TD-W8960N). The left sidebar menu includes options: Device Info, Quick Setup (which is selected and highlighted in blue), Advanced Setup, Wireless, Diagnostics, and Management. The main content area is titled "Quick Setup - Wireless Configurations". It contains a note stating: "Note: The all existed ATM & WAN Service will be clean after you click the "Save" button on this Quick Setup page." Below this, it says: "You can configure SSID and your WLAN Authentication type. In order to protect your network from hackers and unauthorized users, it is highly recommended you choose one of the following wireless network security settings." At the bottom, there are two buttons: "Back" and "Save". An orange arrow points to the "Save" button, which is highlighted with a red border. To the right of the arrow, the text "6. Click 'Save'" is displayed in red, indicating the next step in the configuration process.

# WIRELESS DEVICE WAN CONFIGURATION

7. Click on Finish.

The screenshot shows the configuration interface for a TP-LINK 300M Wireless N ADSL2+ Modem Router (Model No. TD-W8960N). The top bar displays the TP-LINK logo and the product information. On the left, a vertical menu bar lists several options: Device Info, Quick Setup (which is highlighted in blue), Advanced Setup, Wireless, Diagnostics, and Management. The main content area is titled "Quick Setup - Finish". It contains a message: "Congratulations! The Router is now connecting you to the Internet. For detail settings, please click other menus if necessary." Below this, a note states: "The change of wireless config will not take effect until the Router reboot." A red callout box with the instruction "7. Click 'Finish'" points to the "Finish" button at the bottom left of the screen. Another button labeled "Reboot" is positioned to the right of the "Finish" button.

TP-LINK

300M Wireless N ADSL2+ Modem Router  
Model No. TD-W8960N

Device Info

Quick Setup

Advanced Setup

Wireless

Diagnostics

Management

Quick Setup - Finish

Congratulations! The Router is now connecting you to the Internet. For detail settings, please click other menus if necessary.

The change of wireless config will not take effect until the Router reboot.  
Click the button below to reboot the router.

Finish

Reboot

7. Click 'Finish'

# WIRELESS DEVICE WAN CONFIGURATION

## *STEP 3: Configure Local Wireless Settings*

- The wireless access point is **on** and **unsecured** by default.  
To secure it follow the steps outlined below.
  1. Click on Wireless.
  2. Choose a Wireless network name by entering a **SSID** so you can identify your router.
  3. Select **South Africa** for the country.
  4. From the Channel dropdown select **South Africa**.

Device Info  
Quick Setup  
Advanced Setup  
**Wireless** ←  
• Basic  
• Security  
• MAC Filter  
• Wireless Bridge  
• Advanced  
• Station Info  
Diagnostics  
Management

## Wireless -- Basic

This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.  
Click "Apply/Save" to configure the basic wireless options.

Enable Wireless

Hide Access Point

Clients Isolation

SSID:

Indoor AP

BSSID:

54:E6:FC:BF:5A:E4

Country:

SOUTH AFRICA

1. Click 'Wireless'

2. Choose wireless network name

3. Select 'South Africa'

4. Click 'Apply/Save'

Device Info  
Quick Setup  
Advanced Setup  
Wireless  
• Basic  
• Security   
• MAC Filter  
• Wireless Bridge  
• Advanced  
• Station Info  
Diagnostics  
Management

## Wireless -- Security

This page allows you to configure security features of the wireless LAN Interface.  
You may setup configuration manually or through Wi-Fi Protected Setup(WPS)

### QSS(WPS)

Enable QSS(WPS):

Add Client (This feature is available only when WPA-PSK, WPA2-PSK or OPEN mode is configured)

Push-Button  PIN

Help

Device PIN:

[Help](#)

**5. Click 'Security'**

### Manual Setup AP

In order to protect your network from hackers and unauthorized users, it is highly recommended you choose one of the following wireless network security settings.

You can set the network authentication method, selecting data encryption, specify whether a network key is required to authenticate to this wireless network and specify the encryption strength.

**Warning:** we suggest you not to set WEP encryption to "Enabled" when the device runs in 11n mode. The device's wireless highest speed is 54Mbps in that encryption type.

Tips: 11n only mode are not supported when WEP encryption is "Enabled" or WPA Encryption type is "TKIP".

Tips: "WPA Encryption" are not allowed to set to "TKIP" when the device runs in 11n mode.

Click "Apply/Save" when done.

Network Authentication:

**6. Select 'WPA2-PSK'**

WPA Pre-Shared Key:

[Click here to display](#)

(You can enter ASCII characters between 8 and 63 characters or 8 to 64 Hexadecimal characters.)

WPA Group Rekey Interval:

(optional)

WPA Encryption:

WEP Encryption:

**7. Choose a wireless password that you will remember**

**8. Click 'Apply/Save'**

# WIRELESS DEVICE WAN CONFIGURATION

## *STEP 4: Changing ADSL Network Username and Password*

- If you wish to change to a different network or update connection settings you need to change the username and password.

# WIRELESS DEVICE WAN CONFIGURATION

- NOTE: If you see more than one item which you can edit or if you wish to change the Encapsulation Mode, please follow the procedure in STEP 1.
  1. Click on Advanced Setup.
  2. Click on WAN Service.
  3. Click on Edit. If there is more than one go to STEP 1

- Device Info
- Quick Setup
- Advanced Setup
  - Layer2 Interface
  - WAN Service
  - LAN
  - MAC Clone
  - Security
  - Parental Control
  - Quality of Service
  - Routing
  - DSL
  - UPnP
  - Interface Grouping
  - LAN Ports
  - IPSec
- Wireless
- Diagnostics
- Management

## PPP Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:

PPP Password:

PPPoE Service Name:

Authentication Method:

- MTU Size
- Enable Fullcone NAT
- Dial on demand (with idle timeout timer)
- PPP IP extension (do not choose unless necessary)
- Use Static IPv4 Address
- Enable PPP Debug Mode
- Bridge PPPoE Frames Between WAN and Local Ports

### Multicast Proxy

- Enable IGMP Multicast Proxy
- Enable MLD Multicast Proxy

Back

Next

5. Change your username to the new one and enter the corresponding password

6. Click 'Next'



# NETWORK CONNECTIVITY TESTING

*Effective testing has a number of prerequisites:*

- Testers must know what the network is required to do.
- Testers must develop a plan for determining whether the network does what it is required to do.
- Testers must be able to mimic end-user activities, and sometimes must be able to mimic some of the network elements (if they are not available during testing).



# NETWORK CONNECTIVITY TESTING

- Testers must be able to determine what the system has done in response to their activities.
- Testers must be able to measure the effectiveness of the testing done so far (and in toto).

In addition, testers need models, tools, and processes to help them do the testing efficiently.



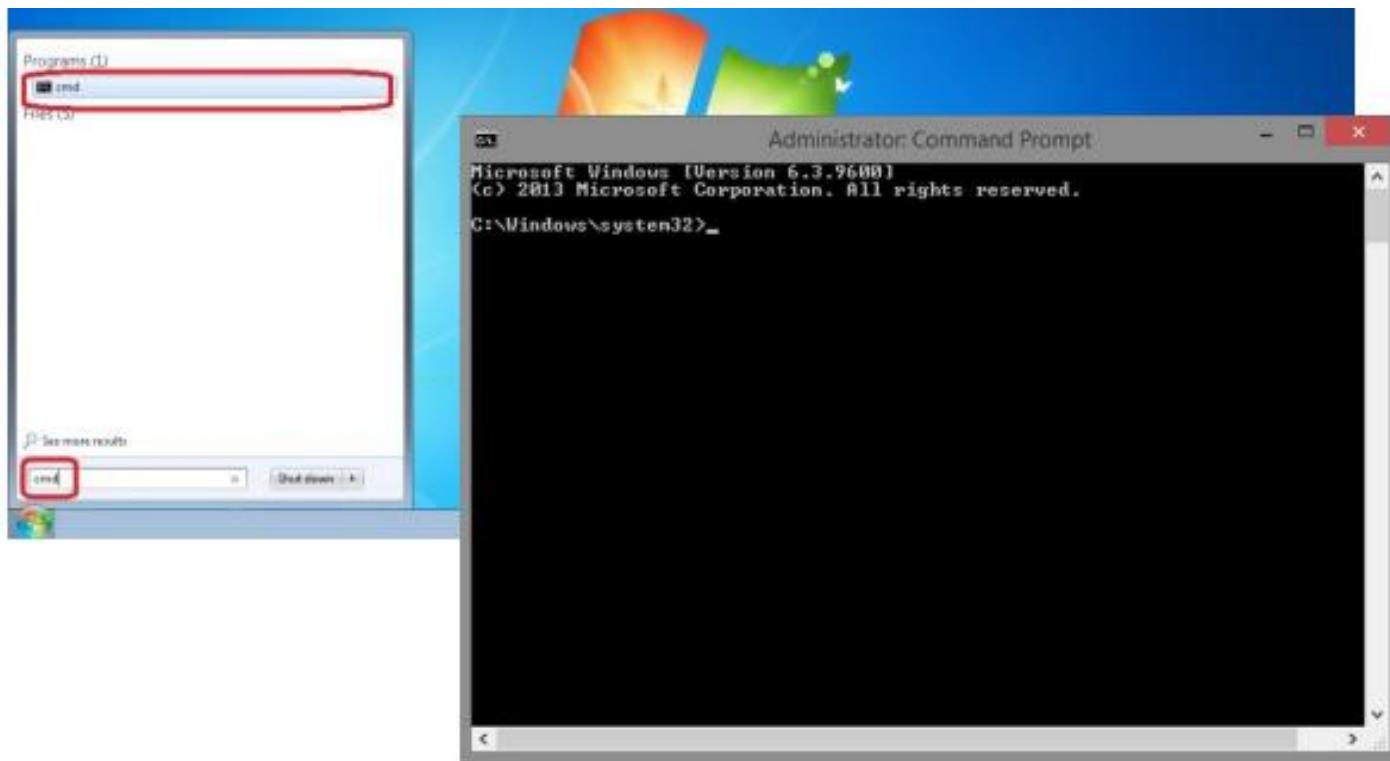
# NETWORK CONNECTIVITY TESTING

*Testing network connectivity using command prompt.*

1. Open the Command Prompt or Terminal. Every operating system has a command line interface that will allow you to run the Ping command. The Ping command operates virtually identically on all systems.

# NETWORK CONNECTIVITY TESTING

- If using Windows, open the Command Prompt. Click the Start button and enter cmd into the Search field. Windows 7 users can type “cmd” while on the search menu. Press Enter to launch the Command Prompt.



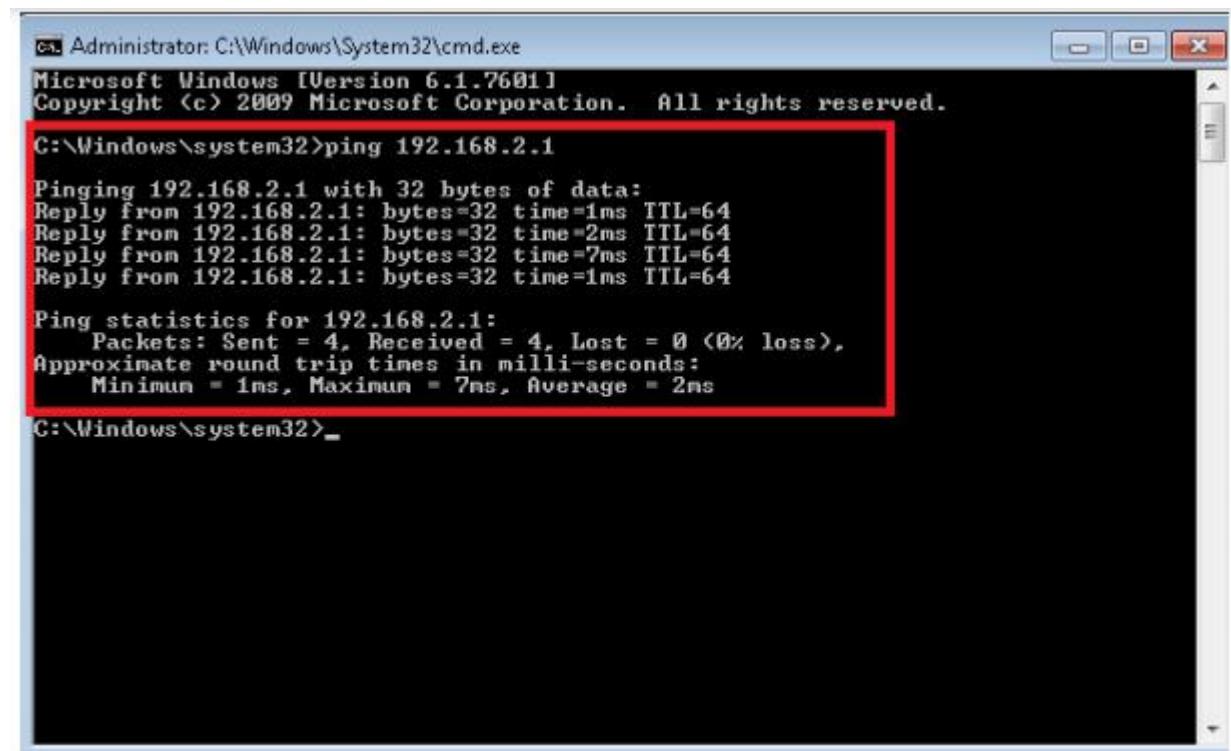
# NETWORK CONNECTIVITY TESTING

2. Enter the Ping command. Type ping hostname/computer name or ping IP address.

A hostname is typically a website address. Replace hostname with the website that or server that you want to ping. For example, to ping computer 1 with the computer name Desktop01. Type ping Desktop01 the press Enter.

# NETWORK CONNECTIVITY TESTING

An IP address is a computer's location on a network, either locally or on the internet. If you know the IP address that you want to ping, replace IP address with it. For example, to ping the IP address 192.168.2.1, type ping 192.168.2.1.



```
C:\Administrator: C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright <c> 2009 Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping 192.168.2.1

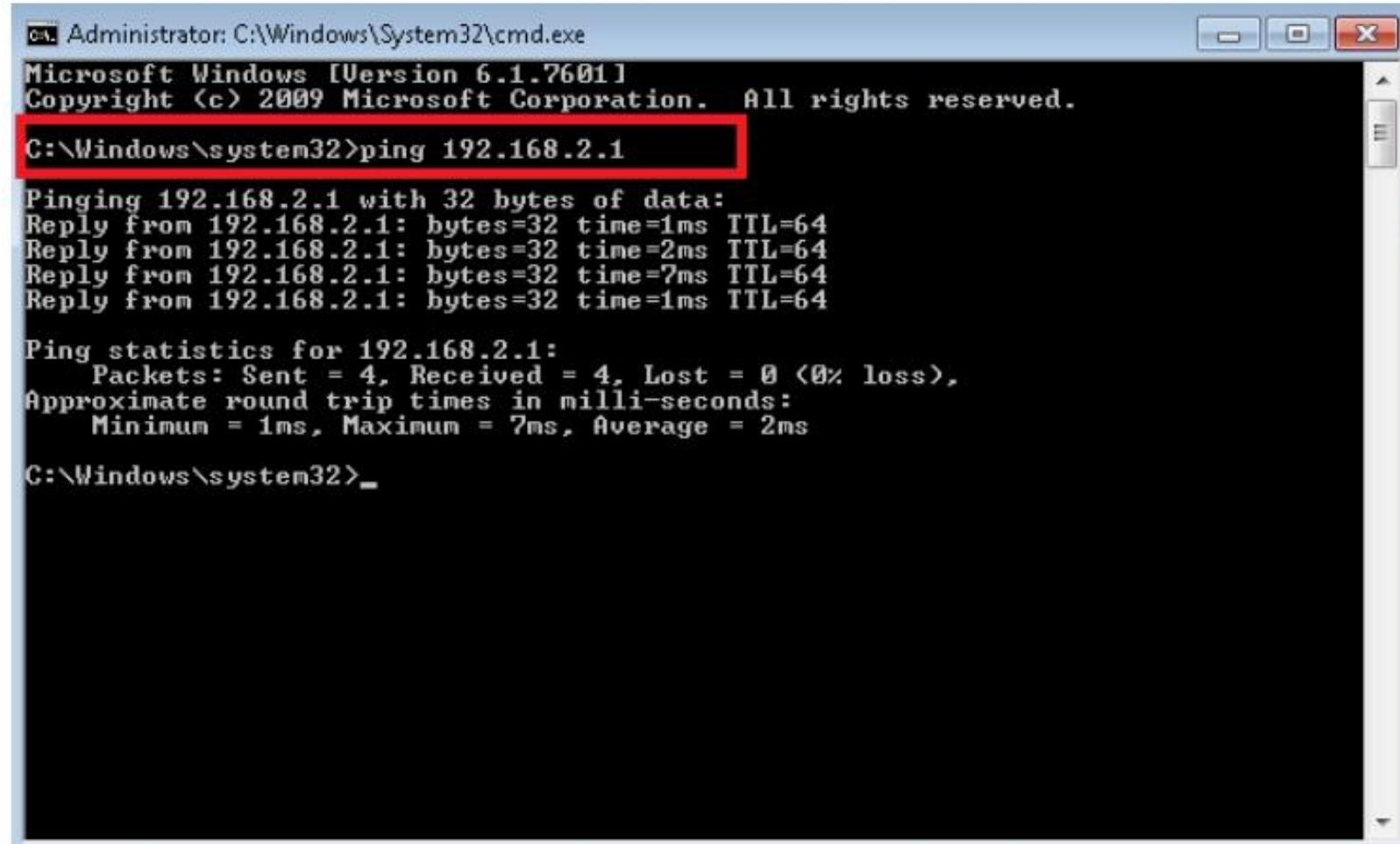
Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64
Reply from 192.168.2.1: bytes=32 time=2ms TTL=64
Reply from 192.168.2.1: bytes=32 time=7ms TTL=64
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 7ms, Average = 2ms

C:\Windows\system32>
```

# NETWORK CONNECTIVITY TESTING

Pinging  
192.168.2.1 with  
32 bytes of data:



```
Administrator: C:\Windows\System32\cmd.exe
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C:\Windows\system32>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64
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Reply from 192.168.2.1: bytes=32 time=7ms TTL=64
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64

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C:\Windows\system32>
```

# NETWORK CONNECTIVITY TESTING

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Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64
Reply from 192.168.2.1: bytes=32 time=2ms TTL=64
Reply from 192.168.2.1: bytes=32 time=7ms TTL=64
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 7ms, Average = 2ms

C:\Windows\system32>
```

Reply from 173.203.142.5: bytes=32 time=1ms TTL=64

Reply from 173.203.142.5: bytes=32 time=2ms TTL=64

Reply from 173.203.142.5: bytes=32 time=7ms TTL=64

You may need to press Ctrl + C to stop pinging.

# NETWORK CONNECTIVITY TESTING



```
c:\ Administrator: C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright <c> 2009 Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64
Reply from 192.168.2.1: bytes=32 time=2ms TTL=64
Reply from 192.168.2.1: bytes=32 time=7ms TTL=64
Reply from 192.168.2.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 7ms, Average = 2ms

C:\Windows\system32>
```

Read the summary. After the operation is completed a summary of the results will be displayed.

# NETWORK CONNECTIVITY TESTING

Ping statistics for 192.168.2.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 7ms, Average = 2ms