Basic Network Configuration

TCP/IP Configuration

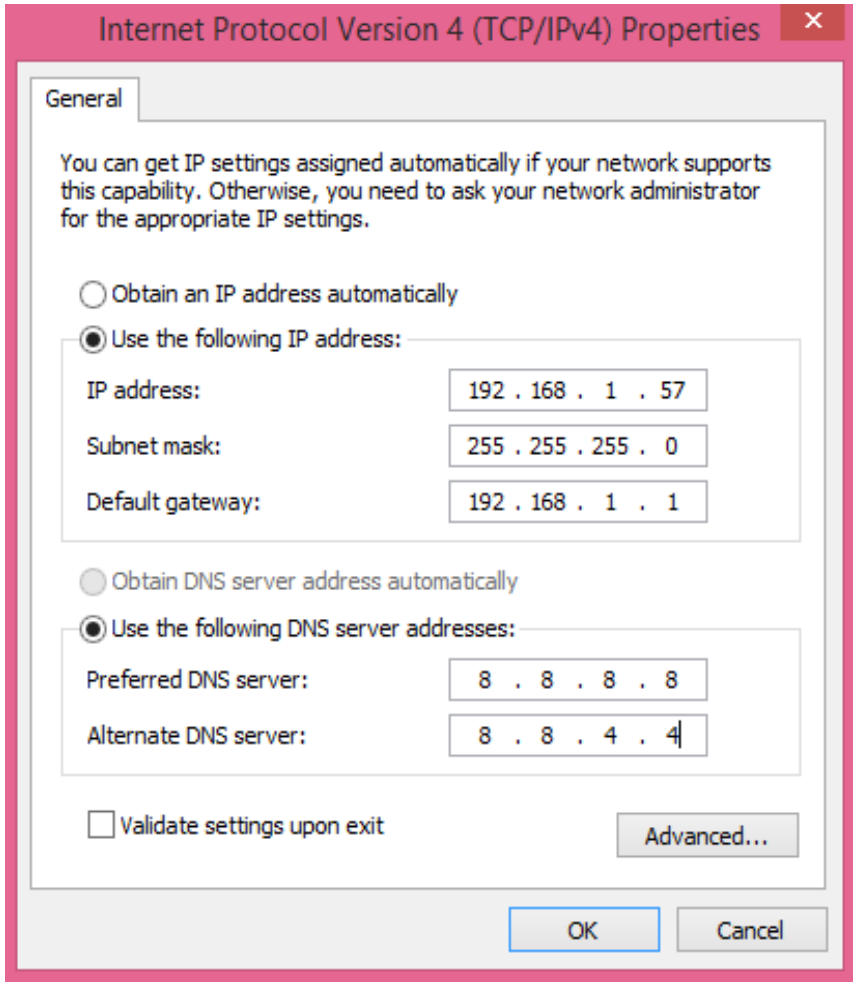
Static	DHCP
	
☐ Assign Manually	☐ Assign Automatically
☐ Not change	☐ Does change
	☐ Need DHCP server

Network Connections

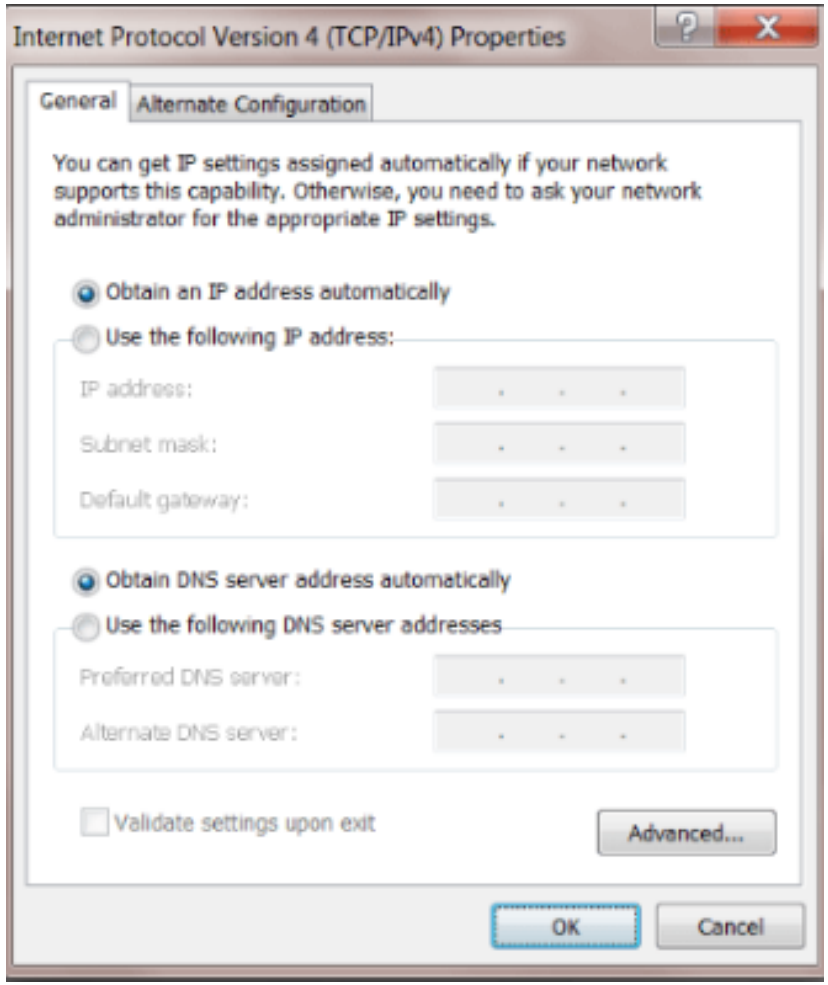
ncpa.cpl

IP Addressing

- Static IP Addressing



- DHCP Addressing



Common Command Utility

- The command is **ipconfig** to see ip addresses of all network connections on device and used with options

Ipconfig options	Description
ipconfig /all	Display additional network configuration information
ipconfig /release	Release the IP address learned from the DHCP server (No longer having an IP address)
ipconfig /renew	Forces DHCP client to renew its dhcp address from the server
ipconfig /flushdns	Clears the DNS resolver cache on the host

- The command is **ping** and the user–defined argument is the *ip–address* of the destination device.

```
ping ip-address
```

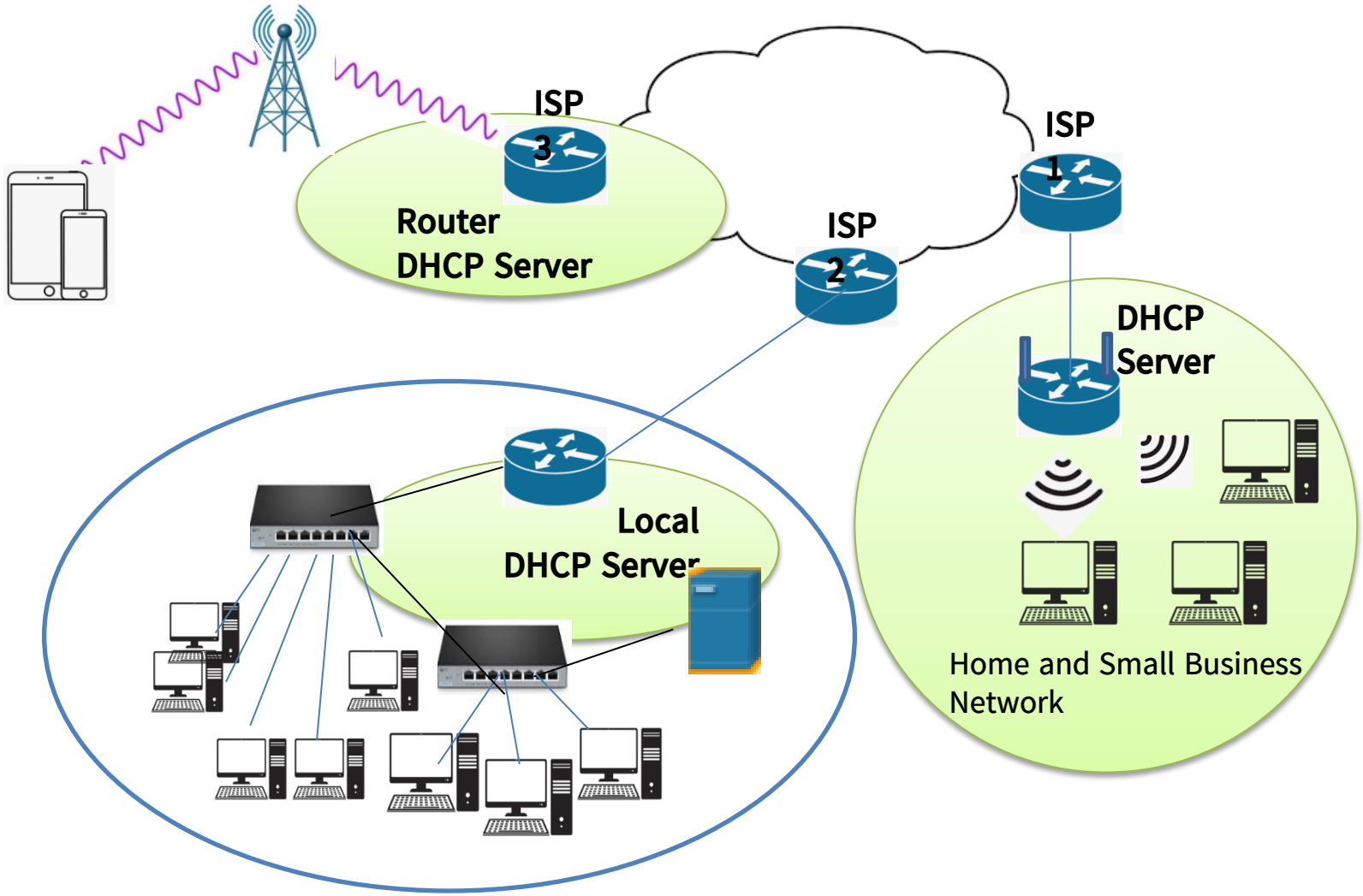
- The command is **tracert/traceroute** and the user–defined argument is the *ip–address* of the destination device.

```
traceroute ip-address
```

Network Services (DHCP & DNS)

- To send data on the network, a host needs two important IP address services_ static IP or dhcp and dns
- DHCP is the service used by ISPs, network administrators, and wireless routers to automatically assign IP address
- DNS is the method computers use to translate domain names into IP addresses

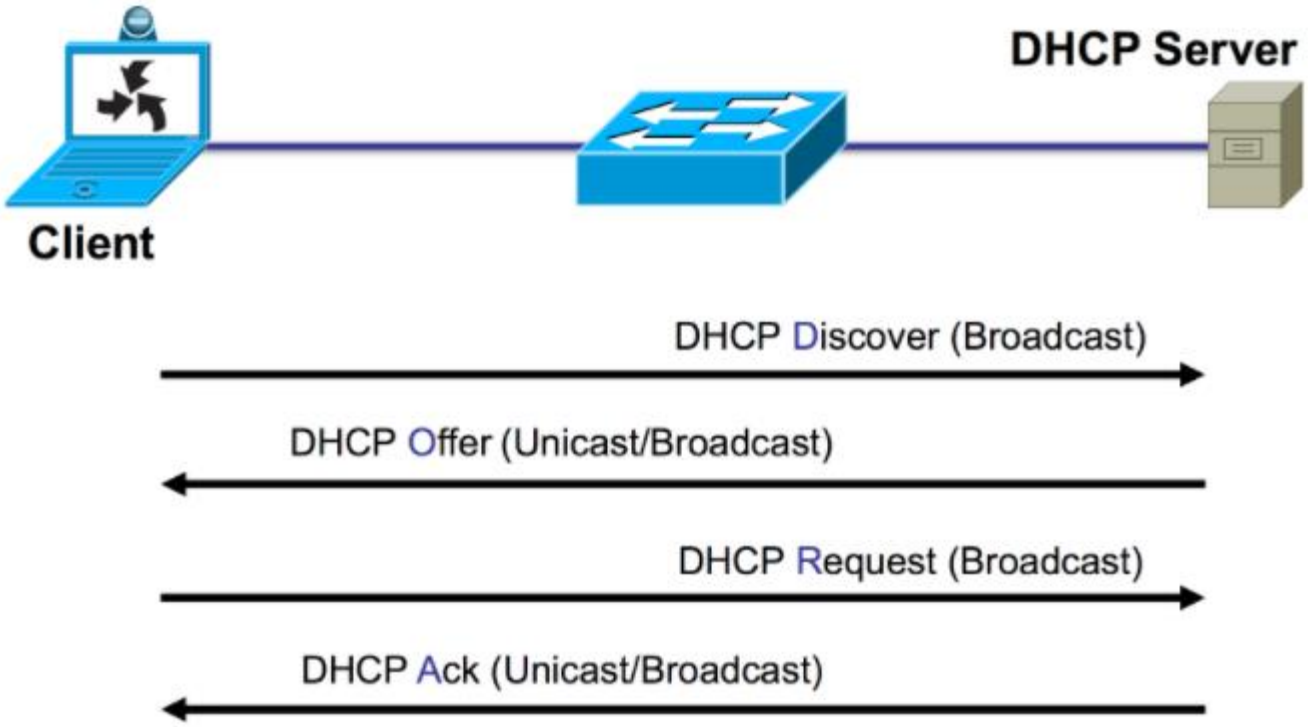
Dynamic Host Configuration Protocol (DHCP)



Basic DHCP Characteristics

- Use four messages between client and server
  - Discover
  - Offer
  - Request
  - ACK
- Use fixed ports for client and server (UDP 67 , 68)
- Use broadcast in Network Layer (255.255.255.255)
- Use IP Pool, Lease time (Day/Hours/Minutes)

DHCP Steps



Source	Destination	Protocol	Stage
0.0.0.0	255.255.255.255	DHCP	Discover
192.168.3.249	255.255.255.255	DHCP	Offer
0.0.0.0	255.255.255.255	DHCP	Request
192.168.3.249	255.255.255.255	DHCP	ACK

Lab-1

Configure DHCP and Assign IP address Automatically

Step 1: Add a wireless router, switch and five PCs

Step 2: Connect PCs to switch (Choose FastEthernet)

Step 3: Connect switch to router (Choose FastEthernet)

Step 4: Connect to Wireless Router

a. Connect Admin to Wireless Router

(i) Assign IP address to one PC with 192.168.0.10/24

In the **Desktop** tab, choose **IP Configuration**, enter **192.168.0.10 with subnet mask 255.255.255.0**

(ii) Choose **Command Prompt,** check IP with the command **ipconfig**

(iii) **On the Command Prompt,** check connection to WR with the command **ping 192.168.0.1**

(iv) Choose **Web Browser, Enter 192.168.0.1 in the URL.**

(v) Use **admin** for both the username and password.

Step 5: Configure DHCP on the Setup

a. Navigate to **Setup > Basic Setup**.
b. Scroll down the page to **Network Setup**.
c. The IP address assigned to **Router IP** is 192.168.0.1. Change it to 192.168.50.1. There are 50 available IP addresses in the DHCP pool.
d. Add **8.8.8.8** as the DNS server with the DHCP settings.
e. Scroll to the bottom of the window and click **Save Settings**.
f. Note that the DHCP range of addresses has been automatically updated to reflect the interface IP address change. The Web Browser will display a **Request Timeout** after a short time.

Step 6: Check DHCP IP on PCs

a. PC2, on **Desktop tab,** Click **Command Prompt,** Type **ipconfig /renew** to force to re-obtain IP
b. Check IP again on PC2, Type **ipconfig**
c. Type **ipconfig /release** to force to release DHCP
d. Type **ipconfig /renew** to force to re-obtain IP and type **ipconfig** to check the IP again
e. Do the same steps on PC3, PC4, PC5

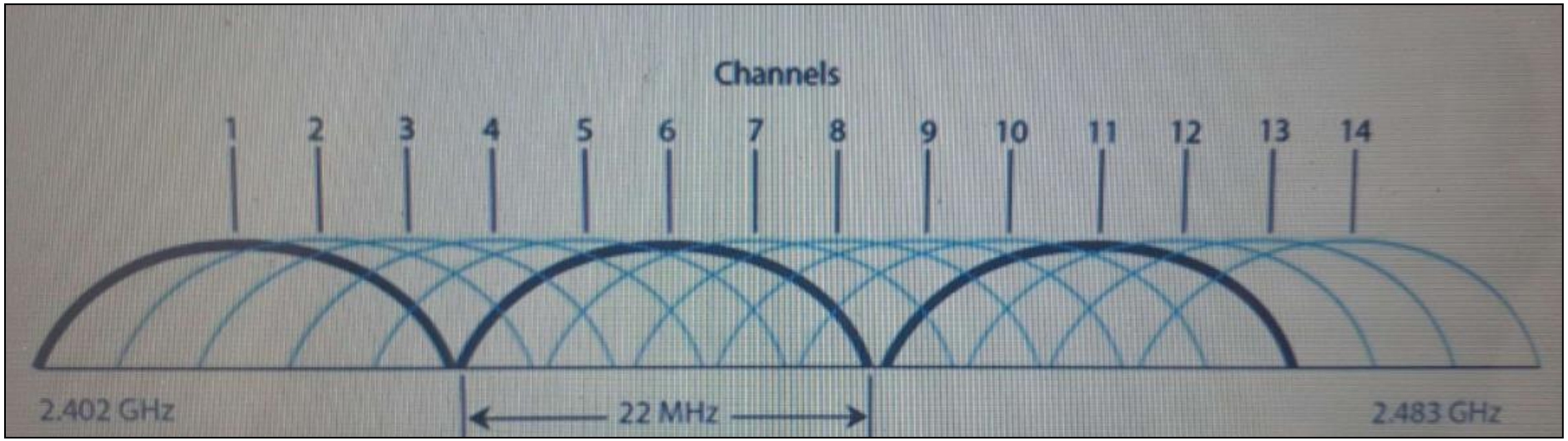
Step 7: Check Ips on all PCs and check the connectivity

Type command ipconfig
Type command **ping I92.168.50.101**

Wireless Channels

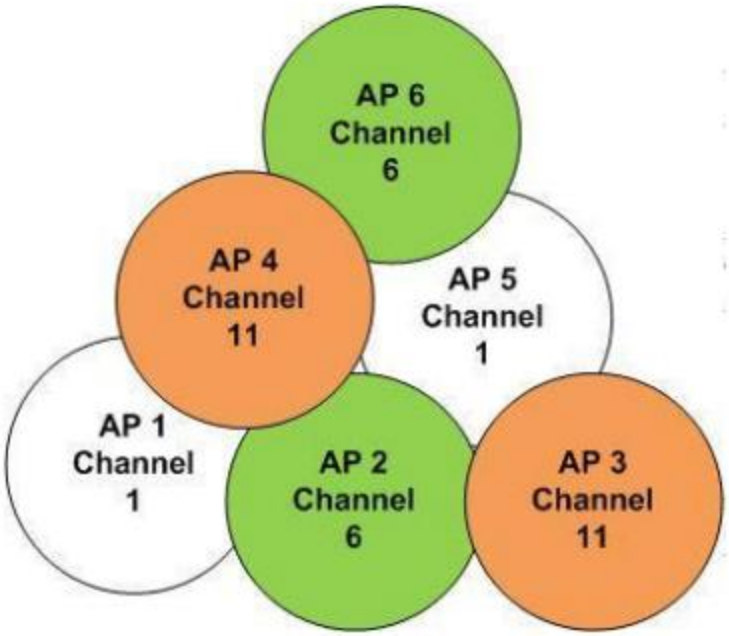
- Two unlicensed frequency band
- 2.4GHz
- 5GHz

- There are fourteen channels between the range of frequency.



Possible two issues

- Channel Overlapping
- Adjacent–Channel



- One channel to another to avoid nonoverlapping, it is needed to set the range of 25MHz.
- The frequency difference is 5MHz between channels
- If we use Channel 1, we need to set Channel 6 (1 + 5) for another AP. So 2.4GHz Frequency Band can have up to 3 non–overlapping channels. Channel 1, 6 and 11

Lab-2

Configure wireless network with DHCP

Step 1: Configure wireless router SSID

a. From PC1, connect to wireless router at **192.168.50.1** in a web browser on **Admin**.
b. Go to **Wireless > Basic Wireless Settings**.
c. Change **Network Name (SSID)** to **IAC_Center** for 2.4 GHz.
d. Choose the **Standard Channel** to **1 - 2.437GHz**.
e. Disable 5GHz frequencies settings
f. Scroll to the bottom of the window and click **Save Settings**.

Step 2: Configure wireless security

a. Go to **Wireless > Wireless Security**.
b. Under the 2.4 GHz heading, select **WPA2 Personal** for the Security Mode.
c. For the Encryption field, keep the default **AES** setting.
d. In the Passphrase field, enter **IAC123456** as the passphrase.
e. Click **Save Settings**.

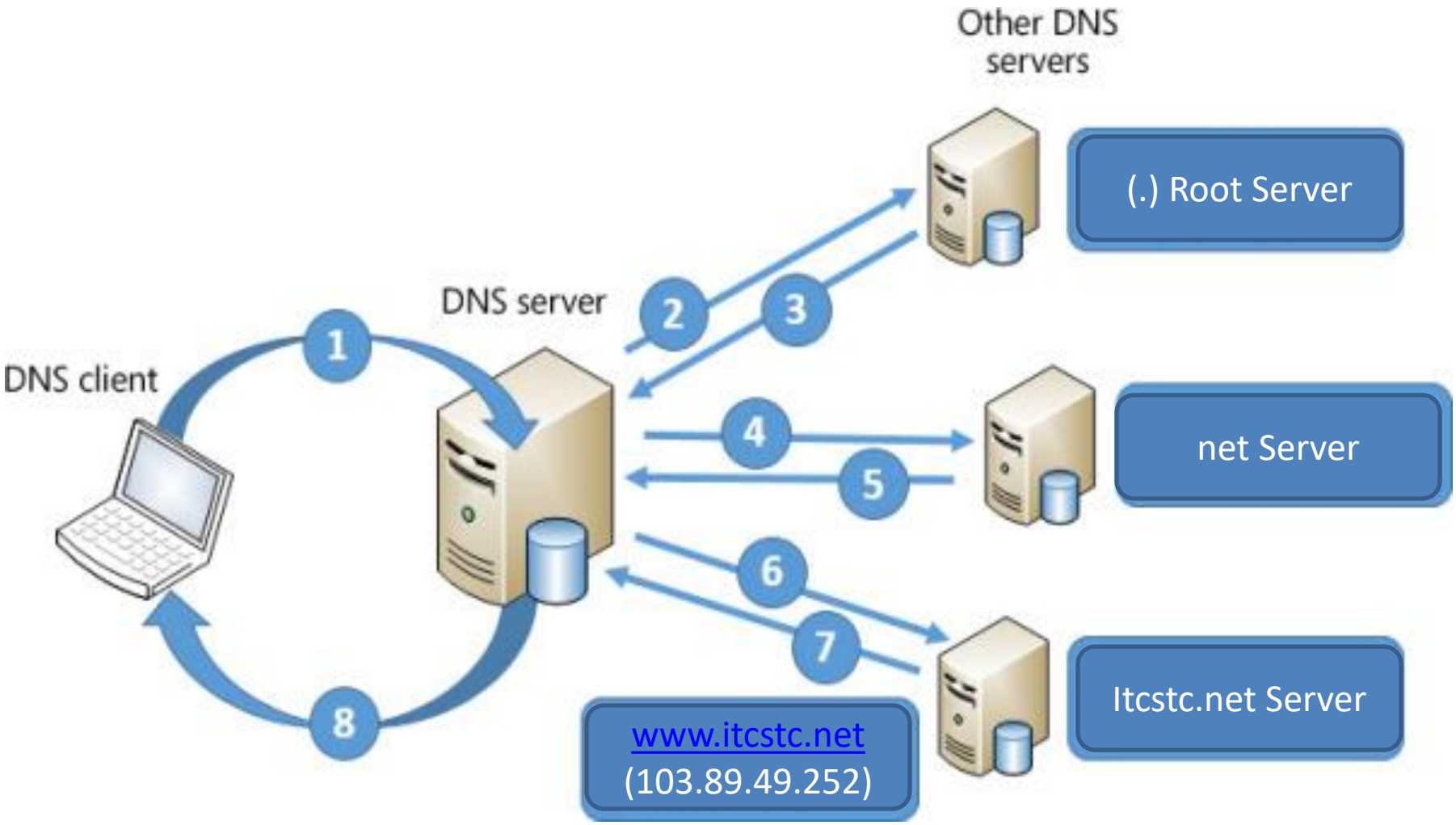
Step 3: Add wireless devices (laptops) and connect to wireless network with SSID

Lab 3

Download packet tracer file lab3 and instruction document.

Follow the instructions.

Domain Name System (DNS)



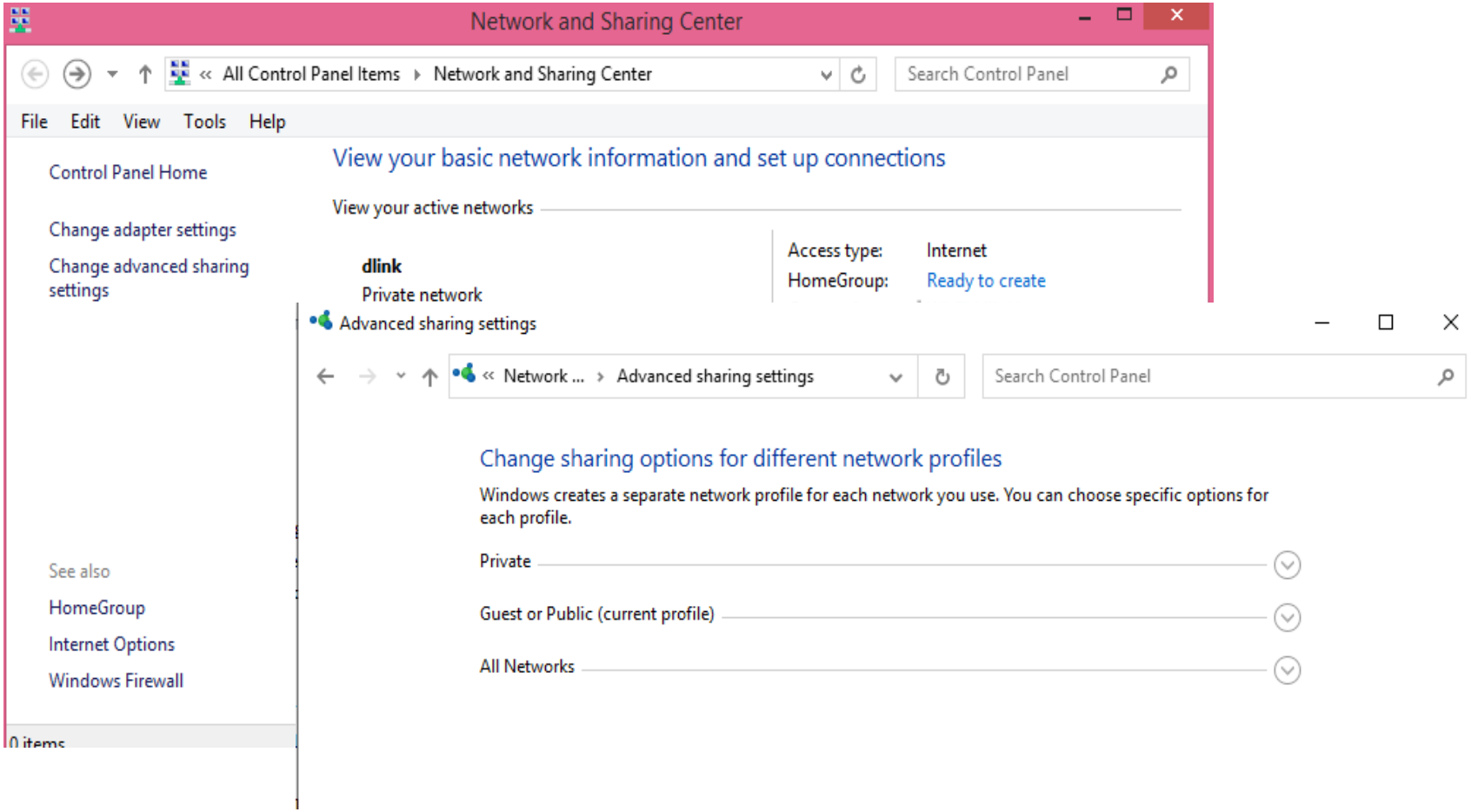
File Sharing

File Sharing in Windows

- Microsoft Windows and other network operating systems contain built–in features for file sharing across either a local area network (LAN)
- Microsoft proprietary SMB (Server Message Block) protocol, network file sharing protocol that can access files or other resources at a remote server
- Security access restrictions can be set up to control that can be obtained the shared files

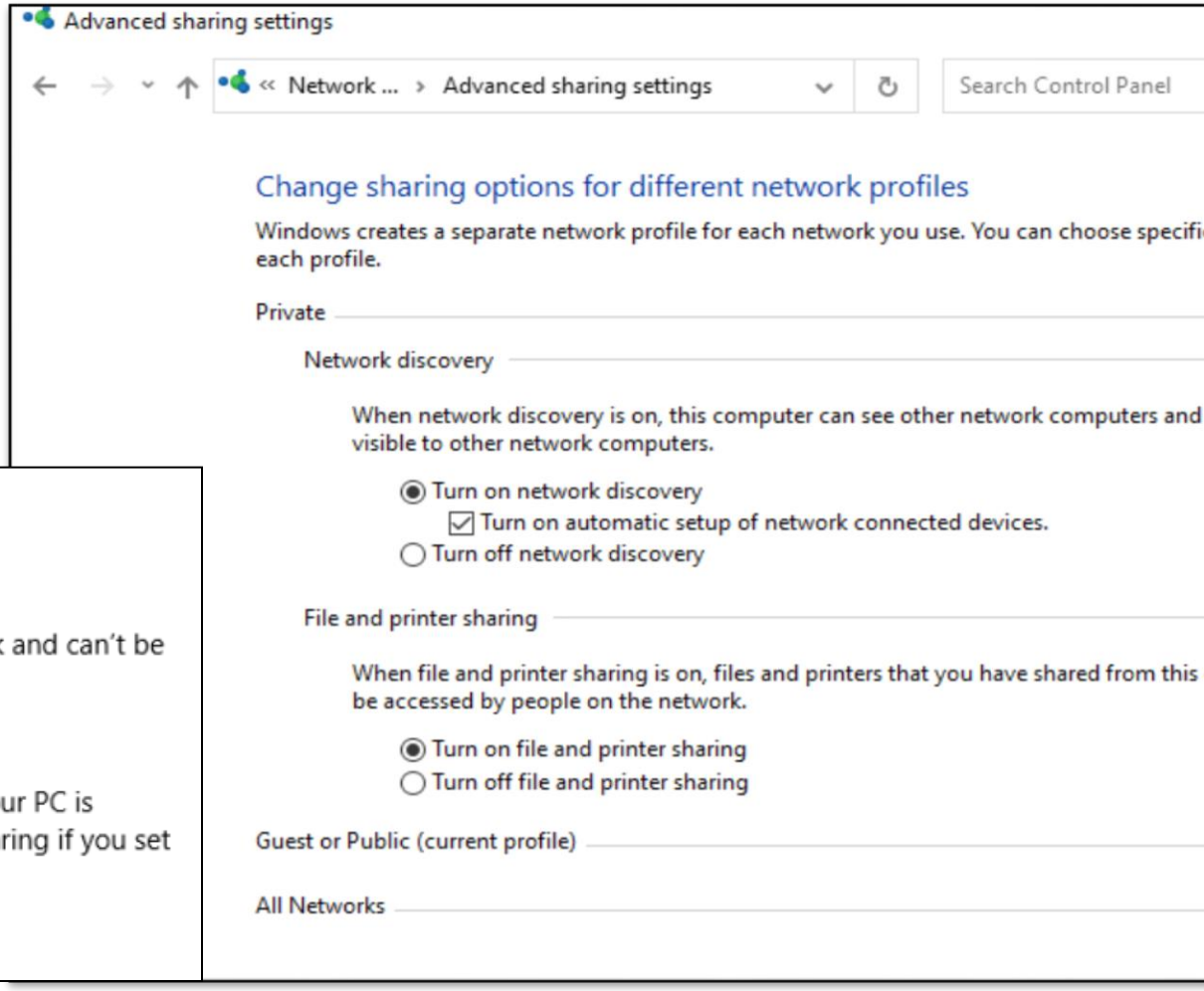
File Sharing in Windows

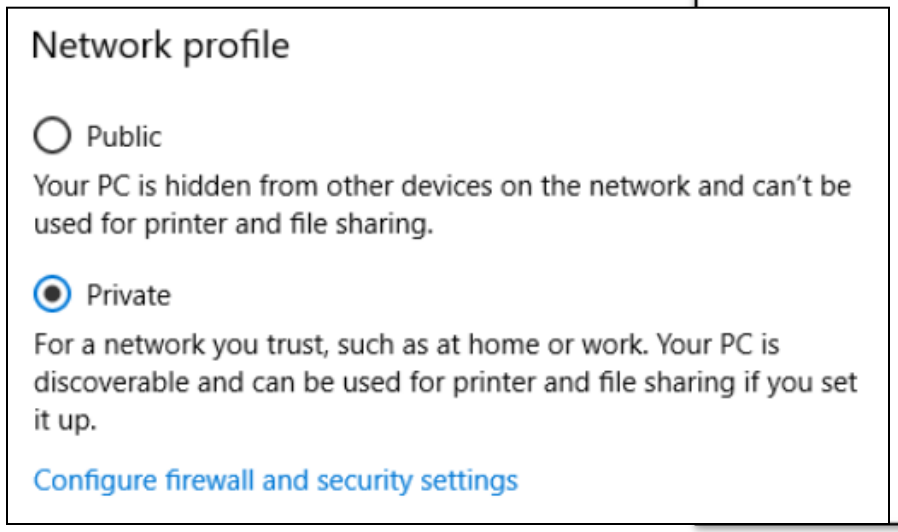
Step 1



File Sharing in Windows

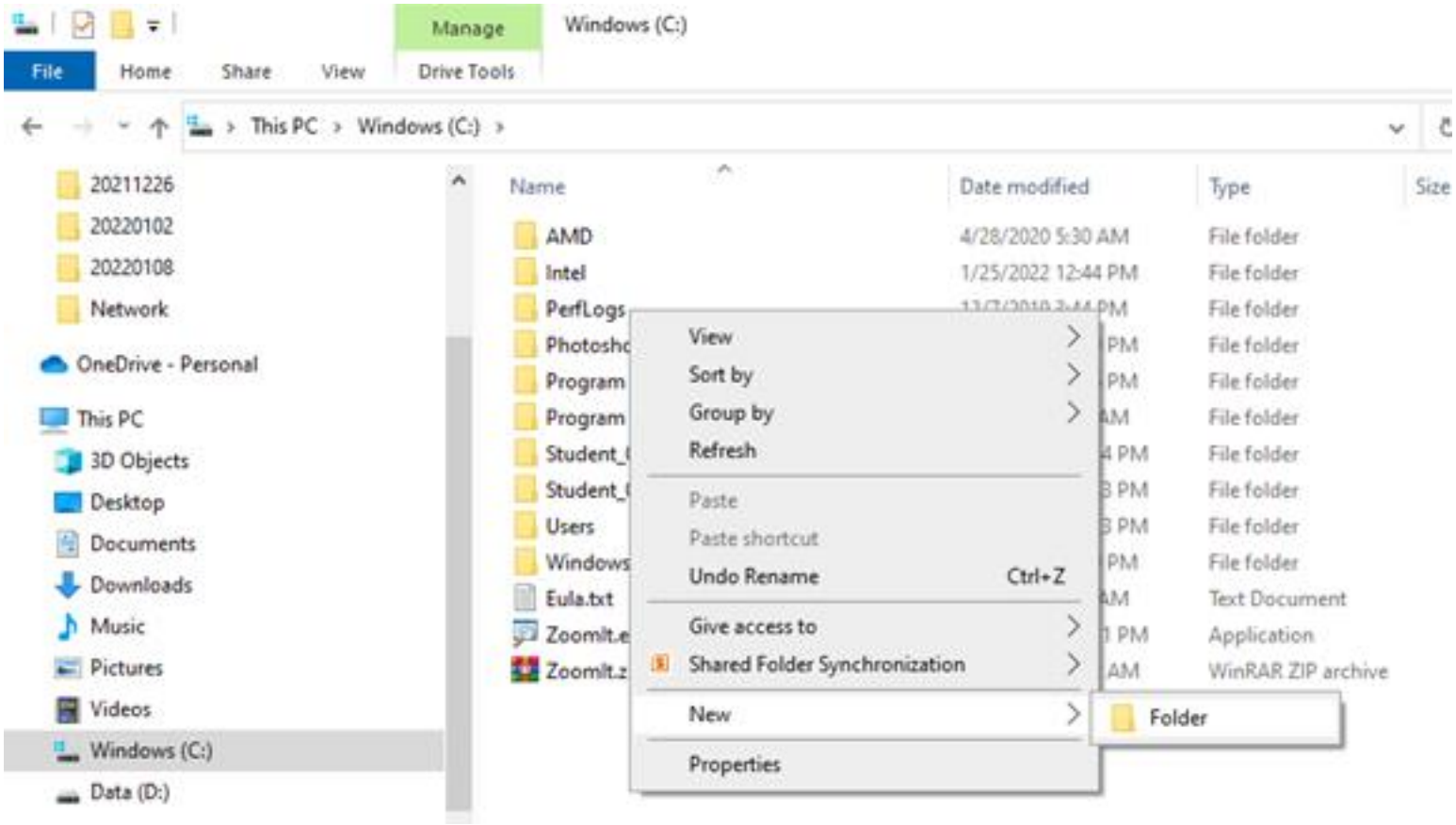
Step 2





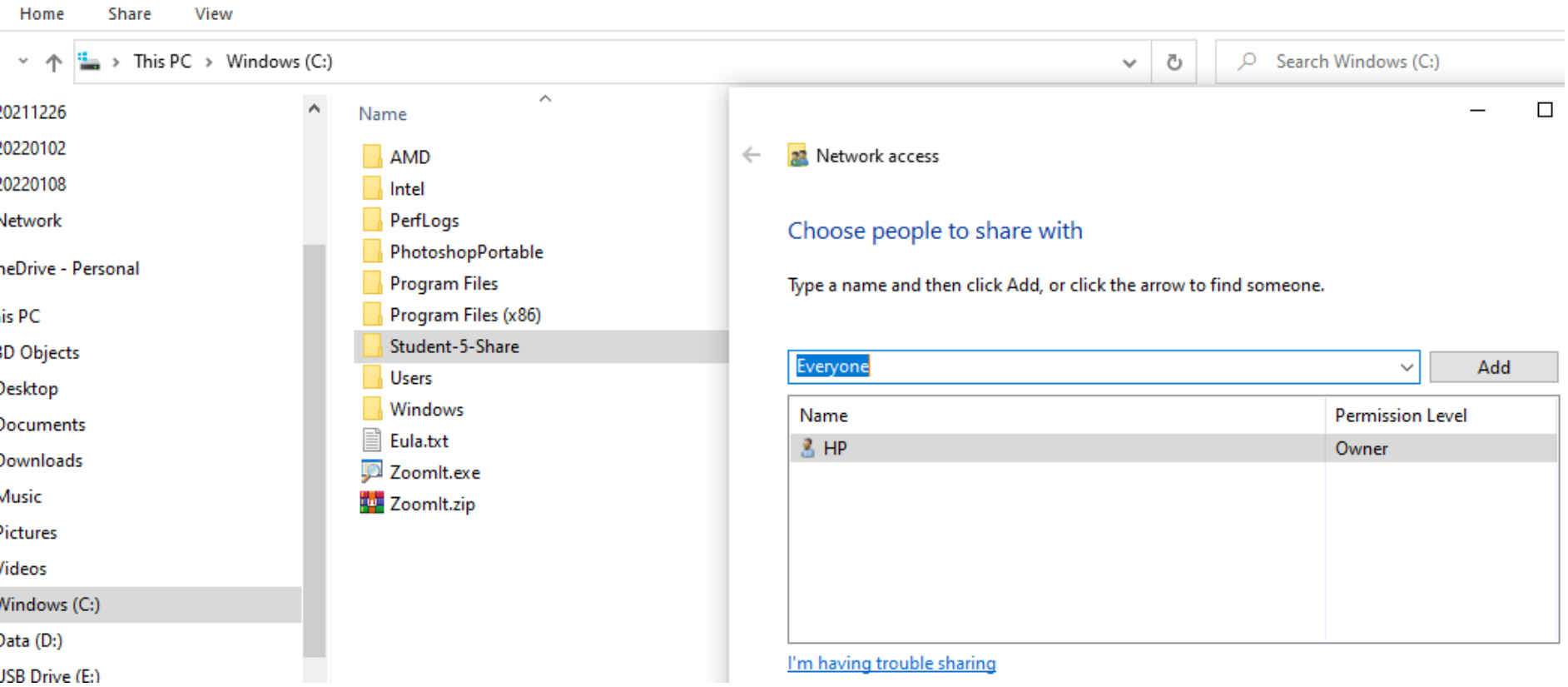
File Sharing in Windows

Step 3



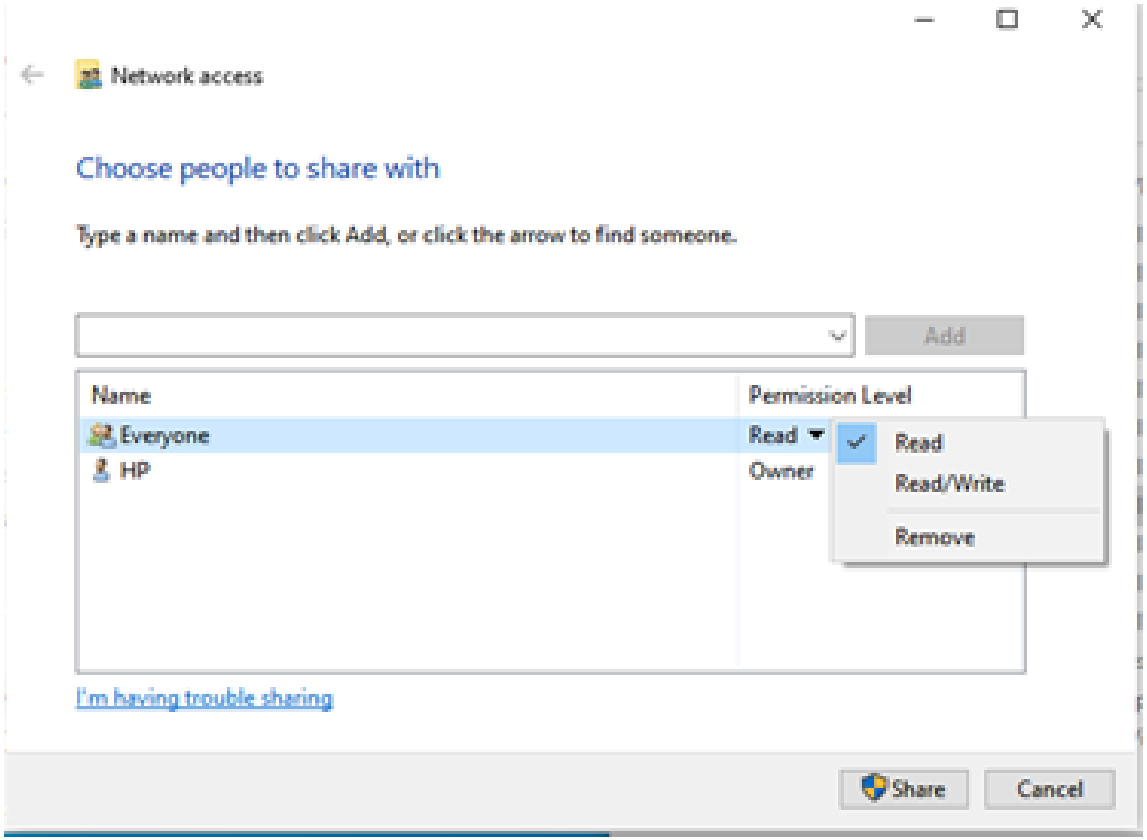
File Sharing in Windows

Step 4



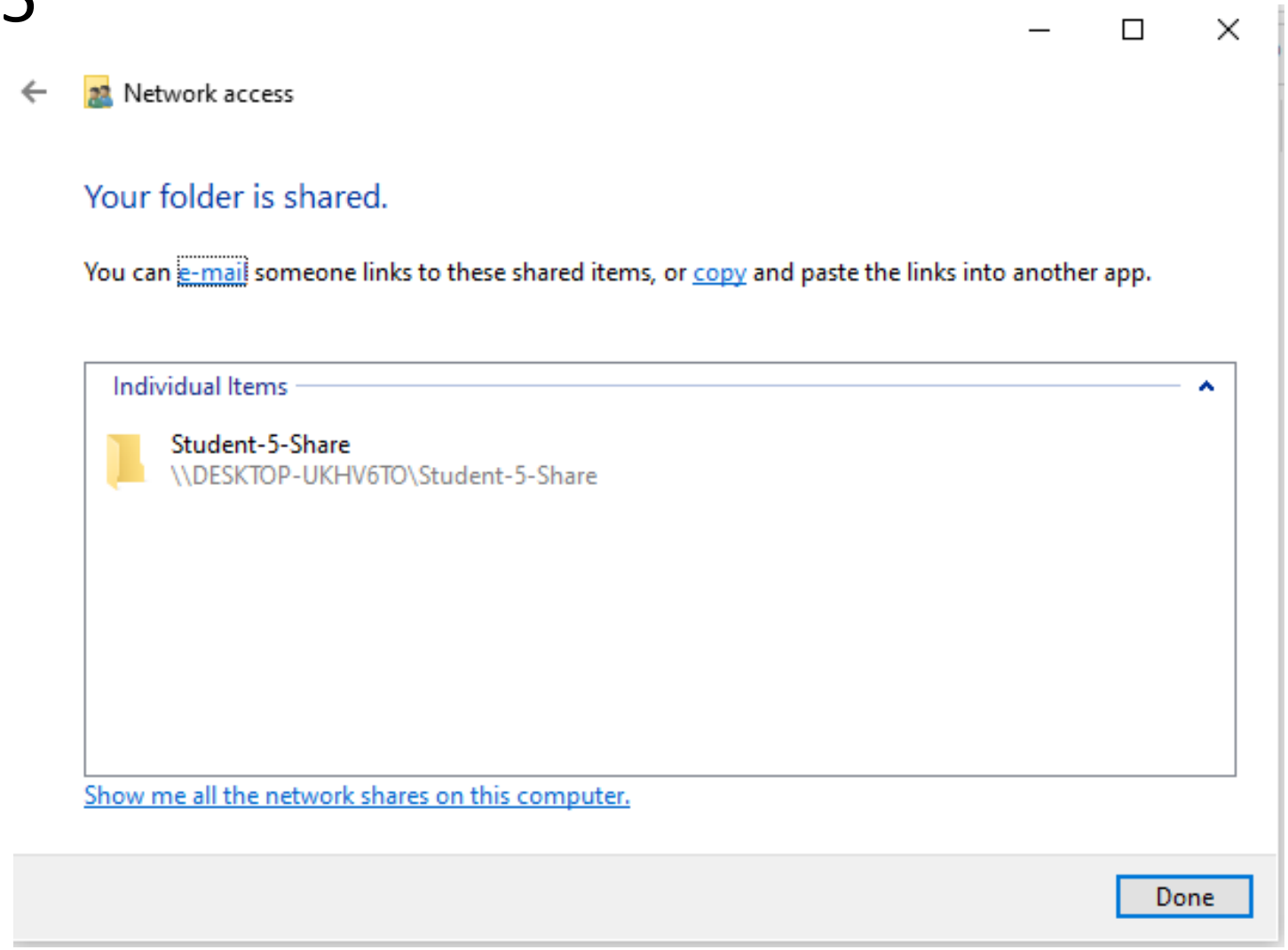
File Sharing in Windows

Step 5



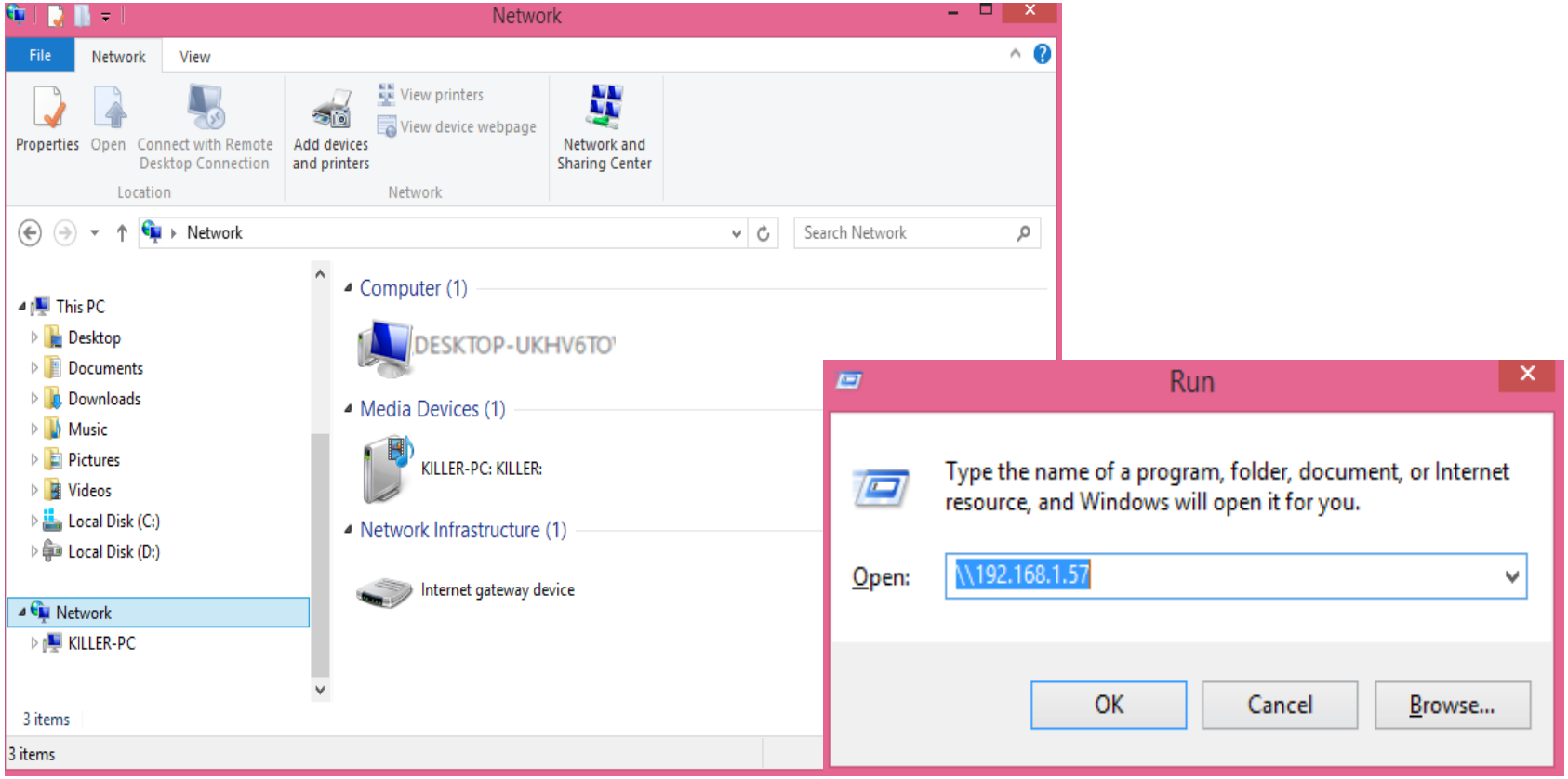
File Sharing in Windows

Step 5



Accessing Shared Files

From Remote Clients

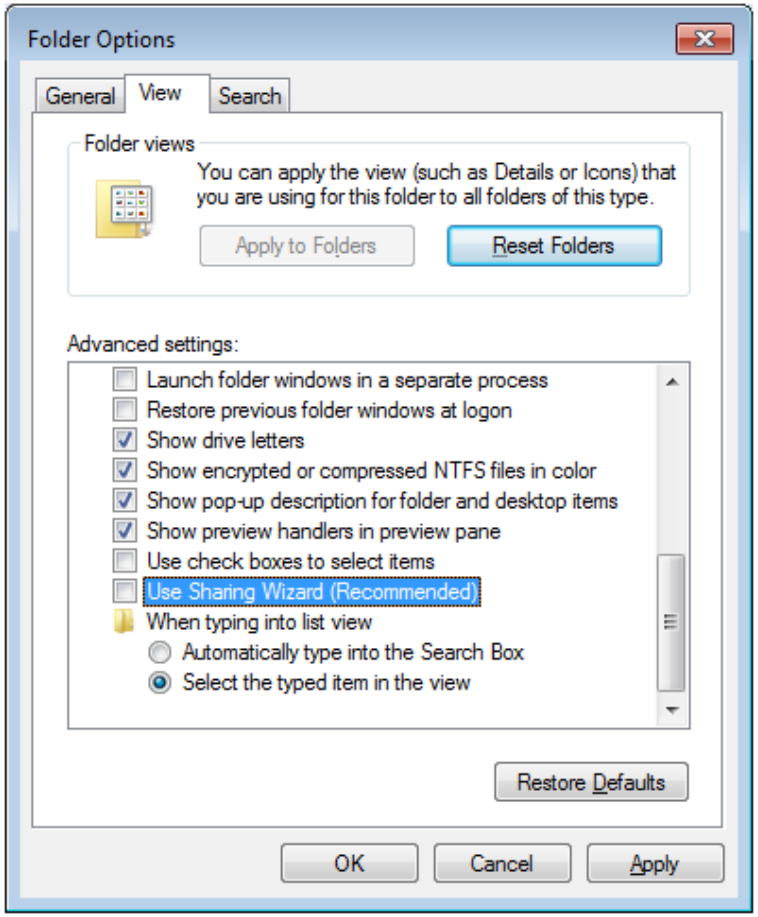


Printer Sharing

Step 1: Sharing a printer on a networked computer (Windows 7)

Control Panel > Folder Options > View

Unclick (deselect) > Use Sharing Wizard (Recommended)



Printer Sharing

Control Panel > Network and Sharing Center

(OR)

Network icon on menu bar > Open Network and internet setting > Network and Sharing Center

Change advanced sharing settings > Password protected sharing

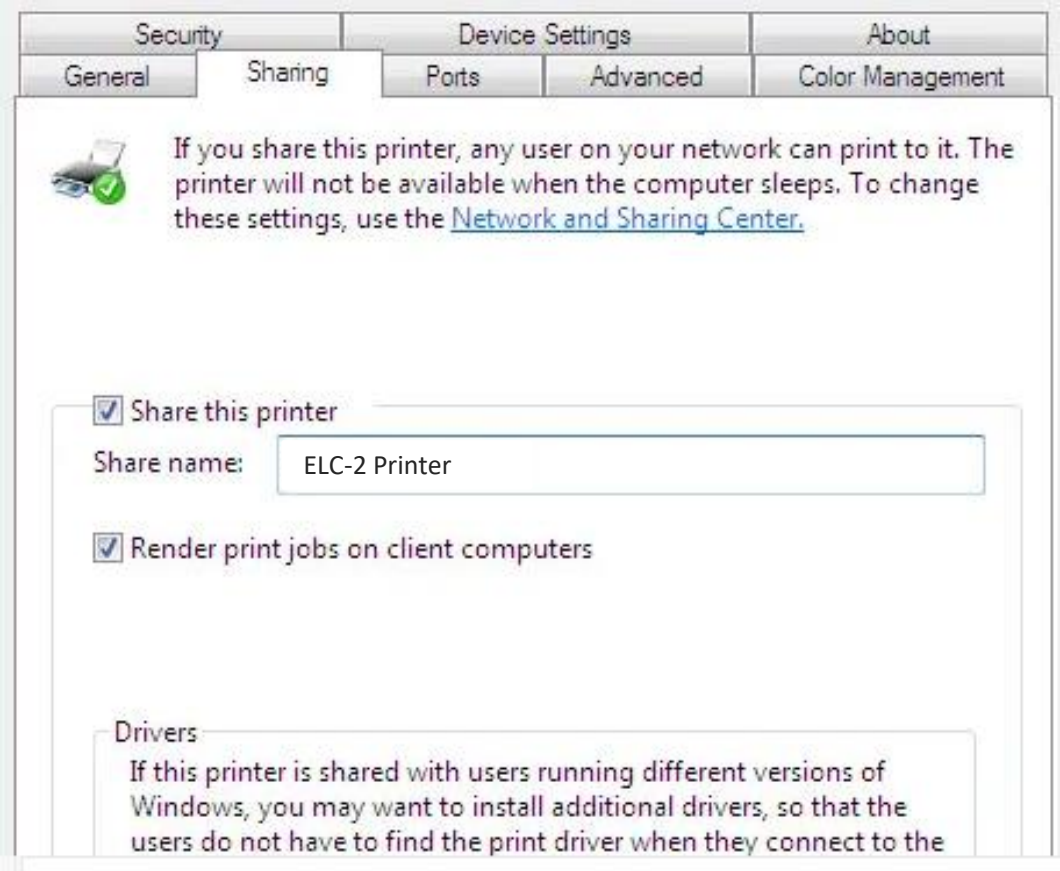
Turn off password protected sharing

Printer Sharing

Control Panel > Devices and Printers > Right–click the printer > Printer properties

Sharing tab > Share this printer

(Give the share name)



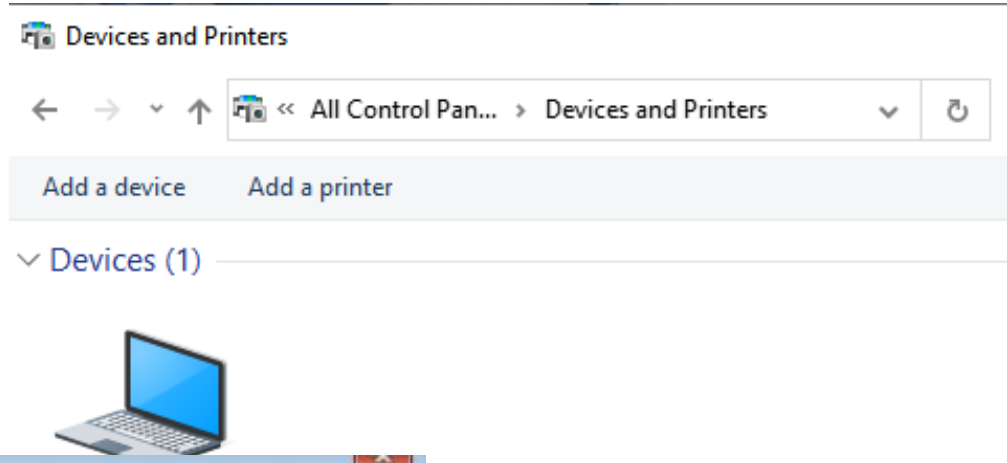
Printer Sharing

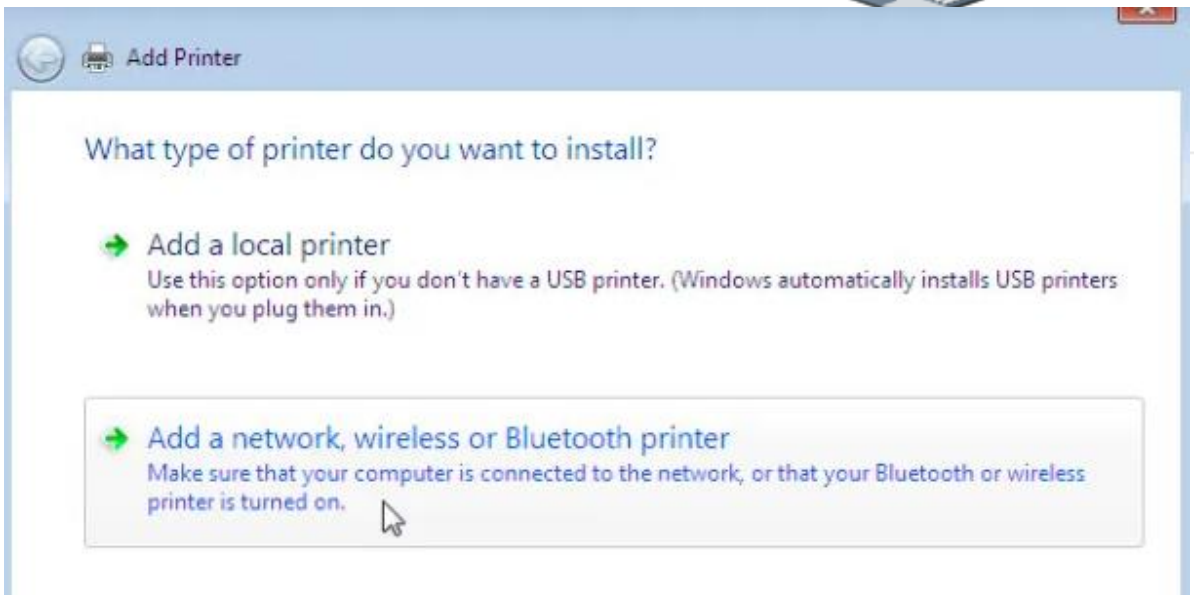
Step 2: Adding the shared printer and printing on remote computers

On Remote Computers

Control Panel > Devices and Printers > Add a printer

Add a network, wireless or Bluetooth printer

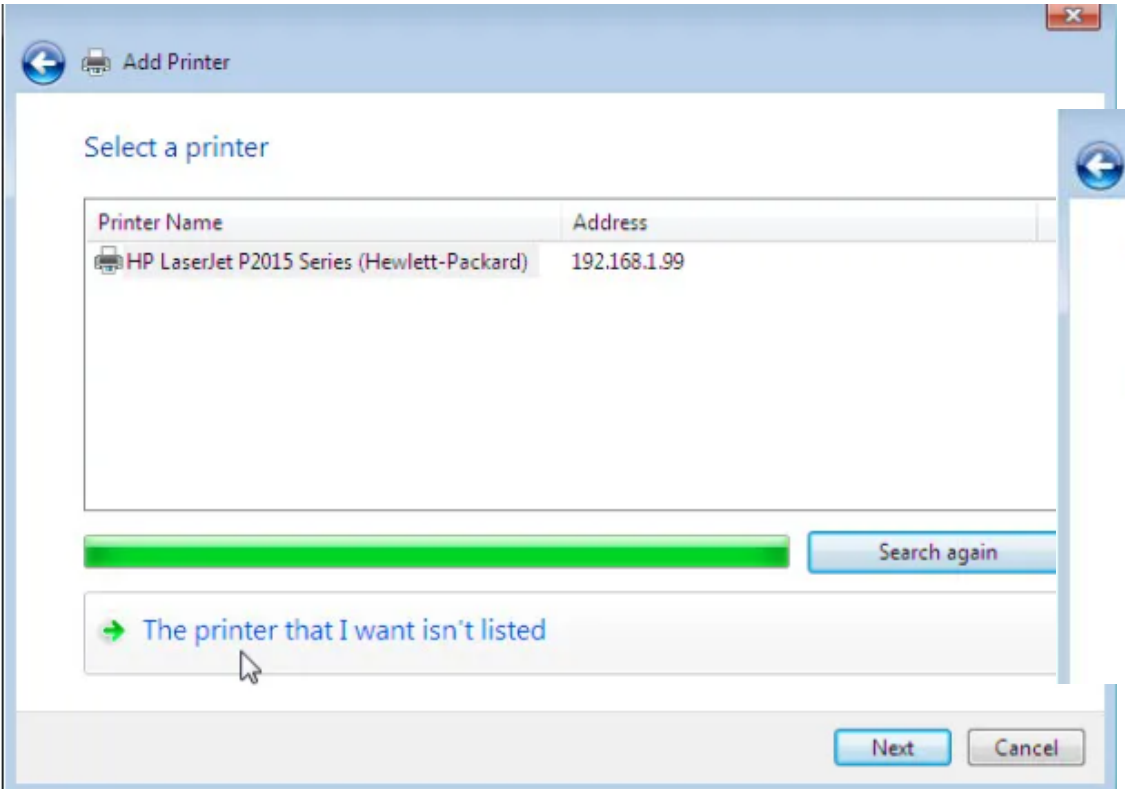


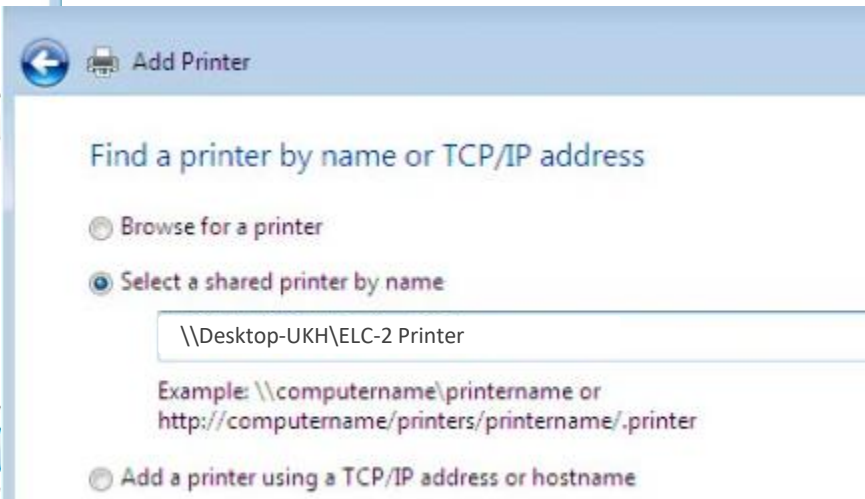


Printer Sharing

When printers are discovered, select a right printer.

We can also find the printer by name or TCP/IP address by selecting “The printer that I want isn’t listed”

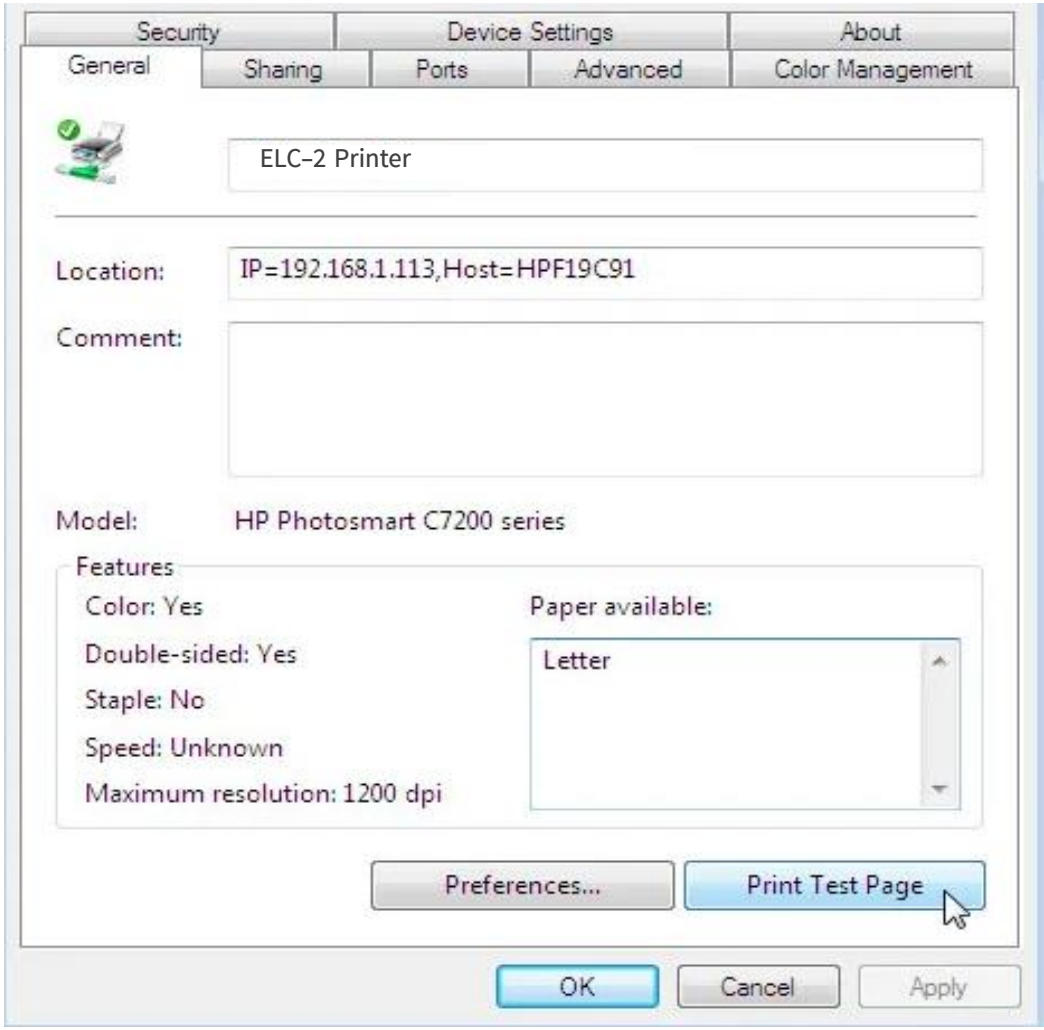




Printer Sharing

Step 3: Print a test page

Control Panel > Devices and Printers > Right Click on shared printer > Printer properties > General > Print Test Page



Network Troubleshooting

- Identify the problem
- Find causes of network problems
- Test the theory to determine the cause
- Document the findings, actions and outcomes

Common Problems for Networking

Identify the Problem	Possible Cause
Network Card light isn't on	Network cable is unplugged or damaged
Windows computer has an IPv4 address (169.254.x.x)	The network cable is unplugged
	The network card is damaged
	The gateway device is power-off
	The gateway device is improperly connected to the network
Device doesn't obtain or renew IP address on network OR detect the wireless network	The NIC in the device is disable
Remote device does not respond to a ping request	Windows firewall disables ping by default
	The link is broken between two networks
The device can access the local network but cannot access the internet	The gateway address is incorrect or not configured
	Uplink connection is down
	DNS service is failed or incorrect setting.

Troubleshooting

Other Cable Issues

- Choosing the wrong cable category type
- Damaged wiring/cables
- Running the cable too close to electro magnetic environment (eg. Near electrical motor)
- RJ–45 cable connectors issue
- Bending the fiber cable too small