

# Configuring the System to Share Internet from Single User to Multi-user with Single Internet Dongle

Kapil Kumar, Prateek Sharma, Ajay Kumar Singh

**Abstract**— Now a days everywhere there is the need of internet. Everyone wants to access internet on mobile phones, system and laptops. Internet can be accessed on a system either wired or wireless. Internet dongle is used to access internet on systems wirelessly. The aim of this paper is to make single user internet dongle to multi-user by sharing the internet connection. This internet connection is shared using Local Area Network connection that is created in between laptop and other systems. Hardware as well as software configuration is required for this purpose.

**Index Terms**— Bandwidth, Internet Sharing, Internet dongle, Local Area Network.

## I. INTRODUCTION

Internet Connection Sharing (ICS) provides networked computers with the ability to share a single connection to the Internet. When there are more than two computers, the Internet connection can be shared among the systems, rather than to get a new connection for every system. A higher bandwidth provides an added advantage in Internet sharing [1], because there is enough bandwidth to share. But there are some problems associated with Internet sharing. The Multiple system operator (MSO) may provide only one IP address with the cable modem service. If you need more than one IP address, you may have to pay more. Also, most cable modems do not have routing capabilities. To use more than one IP address [2] on the local area network (LAN), address translation is needed. In case of a commercial environment a secure Internet server may be essential for efficient Internet sharing.

If you have multiple computers, you can use ICS to allow you and others on your LAN [3] to perform different tasks simultaneously. For example, one person can send and receive e-mail messages, while another person downloads a file, and third person may browse the Internet. You can also gain access to your corporate e-mail accounts from a client computer while others on your LAN cannot. You can use Web-enabled programs such as downloading updates, Microsoft NetMeeting and other video conferencing programs. Connecting one computer to the Internet, and dynamically routing traffic between the Internet and LAN-based computers through this computer accomplish Internet connection sharing/Internet sharing

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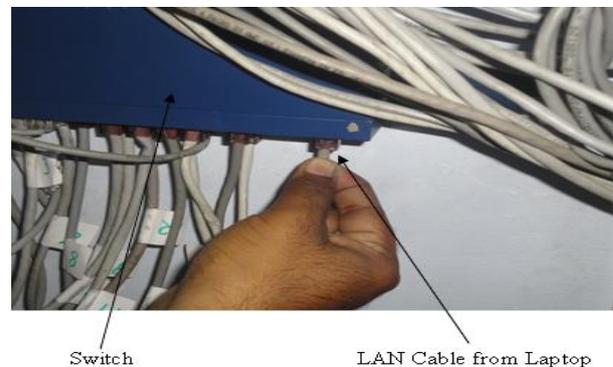
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## II. INTERNET SHARING STEPS

The entire process of Internet sharing is described in the following steps with the help of figures.

### Step 1: Connect LAN Cable from Switch and Laptop

A LAN is created. A Laptop is connected from this network by LAN wire and connects it to the one port of the switch of the LAN connection as shown in figure 1.



**Fig. 1 Switch and LAN Cables**

A switch is used to connect the systems in LAN. A laptop is also connected to switch through LAN cable. One end of that LAN cable is connected to switch and other end is connected to Network Interface Card (NIC) slot of the laptop with RJ45 Connector.

### Step 2: Insert Internet dongle into Laptop

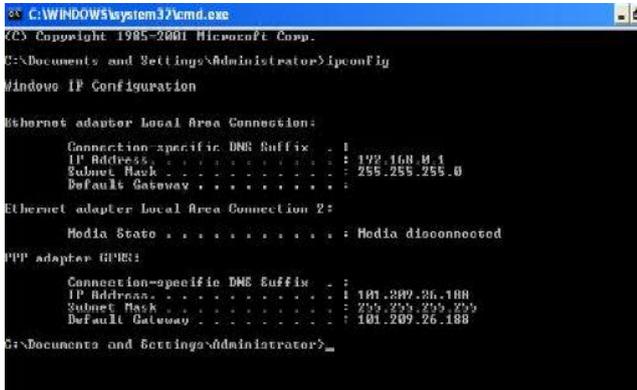
Internet dongle is inserted into the Universal Serial Bus (USB) port of the laptop as shown in figure 2 so that we can access the internet on this laptop through this.

Proposed work is to setup a connection so that all the system in this network can access this internet connection.



**Fig. 2 Laptop with Internet Dongle**

After putting the internet dongle IP Config command is run to check the IP address [4] of the server and its response is shown in figure 3. Ipconfig is a DOS command that can be used from MS-DOS to display the network settings currently assigned and given by a network. This command can be utilized to verify a network connection as well as to verify your network settings.



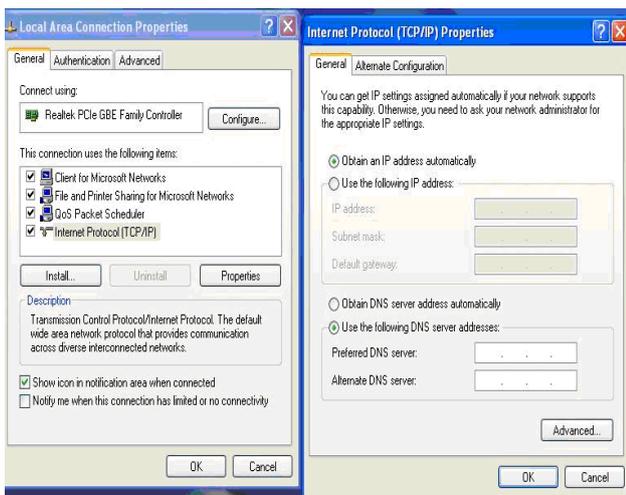
**Fig. 3 IP CONFIG on Server Side**

### Step 3: IP Address Setting

Select that particular connection in the network connection *i.e.* Local Area Connection as shown in the figure 4. Then in the properties select the Internet Protocol (TCP/IP) [5] and go to the advanced setting. In the TCP/IP properties set the IP address of the clients. There are two ways to set IP address either it is set manually or automatically.

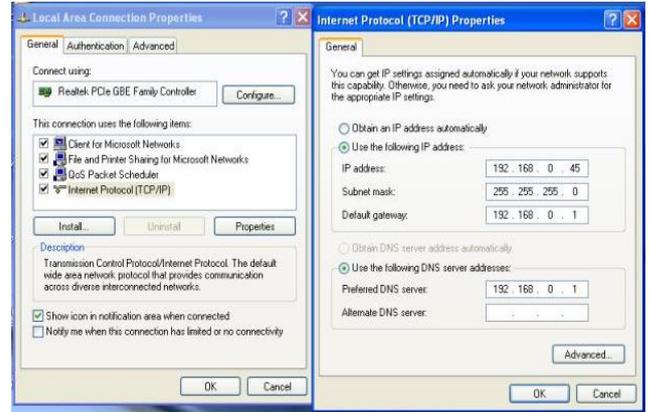
In the figure 4 the IP address is set automatically. Client acquires IPv4 address from server and connects to server. Clients acquire IP Address of class 2 to connect to server.

Second way to connect from server is by setting the IP address manually. Select Local Area Connection in the network connections and right click on it and go to the properties. Select Internet protocol (TCP/IP) and in general click on button use the following IP address and Domain Name Server (DNS) [6] address. IP address and DNS server address are set manually as shown in figure 5.



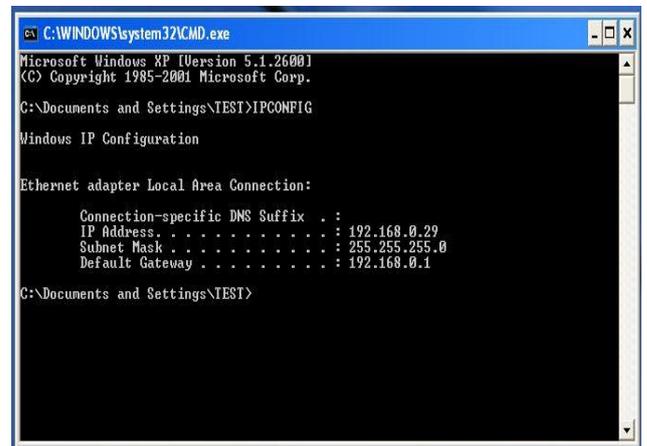
**Fig. 4 IP Address Setting (Automatically)**

The IP address of these clients can not be matched from each others. The IP address of these clients can be *i.e.* first 24 bits are net ID and next 8 bits are Host ID of IPv4. When IP address of the clients are set manually then in the DNS part of the client is the IP address of server (Laptop *i.e.* 192.168.0.1).



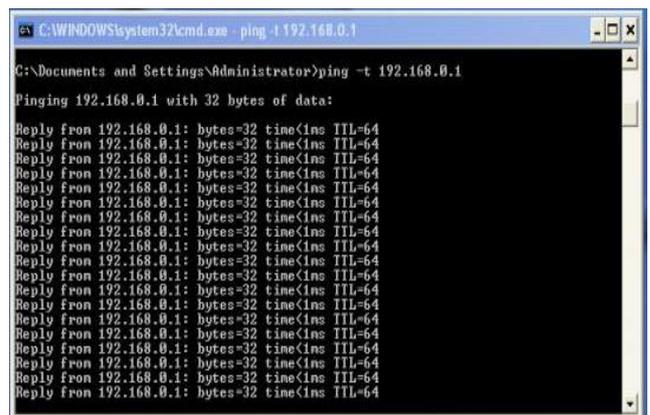
**Fig. 5 IP Address Setting (Manually)**

IP address is set as 192.168.0.45, subnet mask is 255.255.255.0 that is default for this IP address, gateway [7] is 192.168.0.1 and address of DNS is 192.168.0.1. This setting is shown in figure 5. Net ID is same for all the clients and Host ID is different from each other so that IP address may not clash.



**Fig. 6 IP CONFIG on Client Side**

IP Configuration is checked from IP Config on client. Response of this command is shown in the figure 6.



**Fig. 7 PING Command on Client Side**

Ping [8] command is run towards client in DOS to check the connectivity with server and the following response is generated as shown in figure 7. The ping command is an external command, which is used to determine TCP/IP Networks IP address as well as determine issues with the network.

This command also assists in resolving them. This shows that our server is connected with corresponding client. Reply from 192.168.0.1 that is the IP address of the laptop which acts as server. Byte is 32 and time is 1 ms and Time to Live (TTL) [9] is 64.

**Step 4: Window Firewall Setting**

Window Firewall is set in the advanced setting as shown in figure 8. Window Firewall [10] is turned off so that it bypasses the security features and easily connects to the server.



**Fig. 8 Window Firewall Setting**

**Step 5: Internet Sharing Setting on Server**

Share the internet connection [11] from laptop by selecting the internet connection and in the advanced setting following setting can be done as shown in figure 9 below.

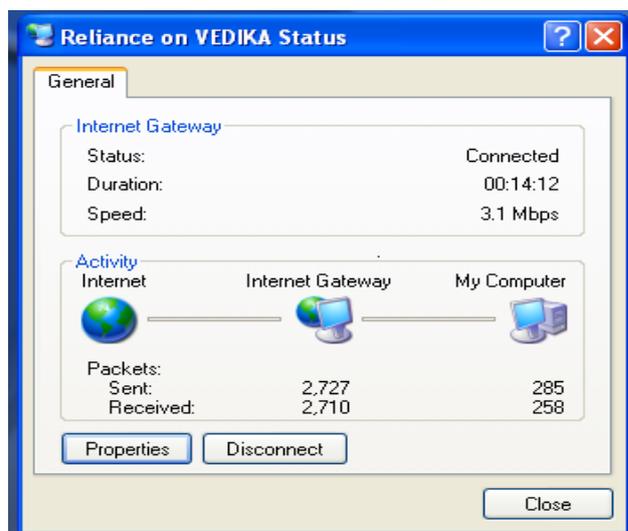
Click on button allow other network user to connect through this computer's internet connection and in home networking connection selects LAN. LAN is selected because we share the internet through this connection.



**Fig. 9 Internet Sharing**

**Step 6: Status of Sharing on Clients**

A network connection on the client side is as depicted in figure 10. The figure shows the status of packet sent and received by internet gateway and the client from server. Now we can access the internet on all systems through the LAN by one dongle only.



**Fig. 10 Status of Connection**

Bandwidth [12] of the internet is divided that are accessed through single internet dongle. The basic advantage is that we can use internet in many system by paying for one connection.

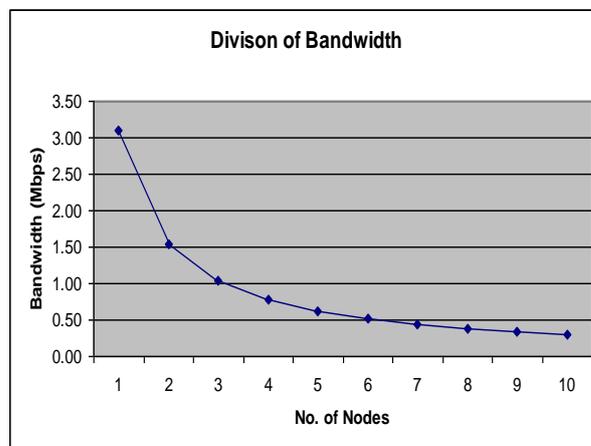
The speed of the internet at the laptop is better in comparison to all other system in the LAN.

By this setup the single user internet dongle works as multi-user. All clients can access internet free of cost, so in this network the laptop act as access point.

This type of connection setup is useful when internet sharing is necessary but speed of internet is not a main issue.

**III. DIVISON OF BANDWIDTH**

The After sharing internet with the help of laptop bandwidth (3.1 Mbps theoretically) is equally divided by number of nodes in that network as shown in figure 13 unless & until some setting is done on server side.



**Fig. 13 Graph of Number of Nodes Vs Bandwidth**



The above graph shows that when there is only one node in the network it uses entire bandwidth i.e. 3.1 Mbps. As and when the number of nodes increases bandwidth is equally divided among them.

#### IV. CONCLUSION

There are several methods for internet connection sharing. In our method laptop acts as access point for providing internet among many users. Only one system (*i.e.* Laptop) is connected to internet directly by dongle and other systems can access internet through sharing. Internet connection is shared by laptop through local area connection. So the resource such as internet bandwidth is utilized efficiently. Other systems can access internet free of cost by making single user internet dongle to multi-user. Our paper can further be enhanced by putting security aspect while sharing the internet with single internet dongle.

#### ACKNOWLEDGMENT

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