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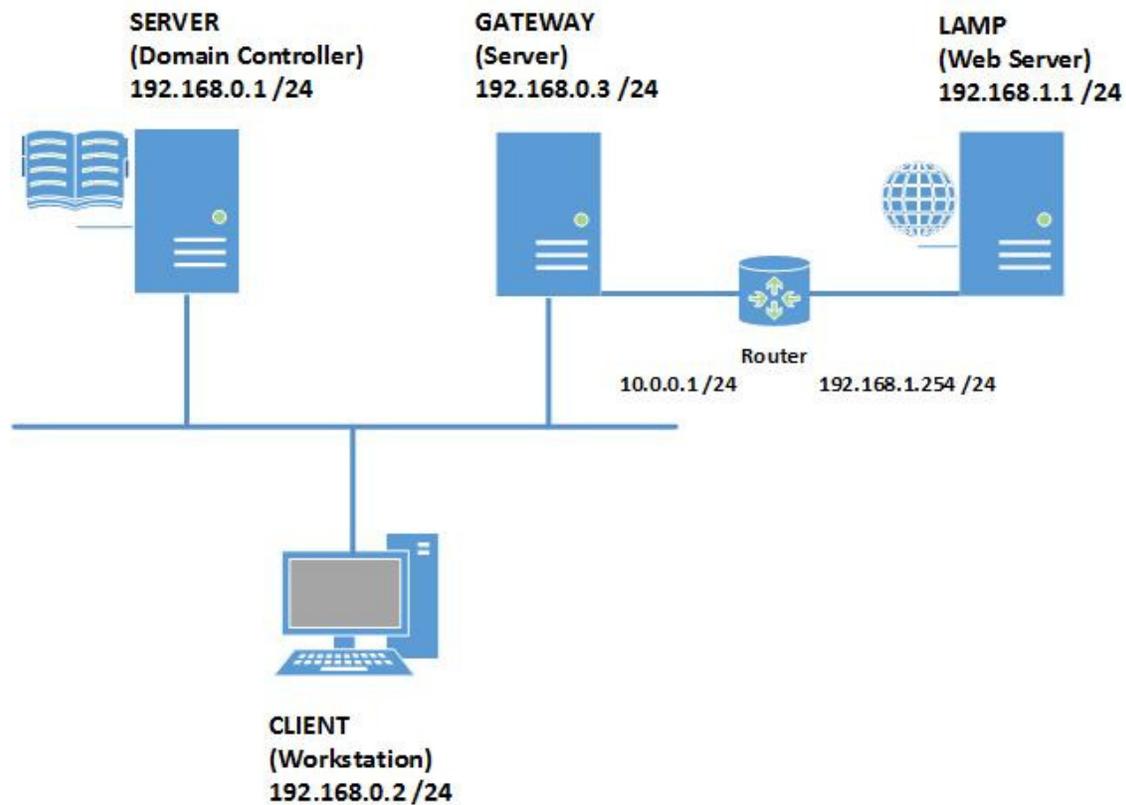
Introduction

The **IP Address Configuration** module provides you with the instruction and computer hardware to develop your hands on skills in the defined topics. This module includes the following exercises:

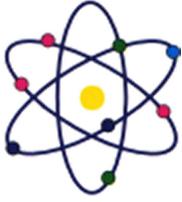
- 1) Examining the IP Configuration
- 2) Performing a Connectivity Test
- 3) Reconfiguring IP in Linux

Lab Diagram

During your session you will have access to the following lab configuration.



Connecting to your lab

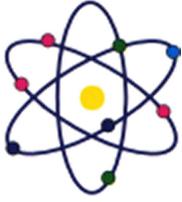


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In this module you will be working on the following equipment to carry out the steps defined in each exercise.

- **SERVER** (Domain Controller)
- **CLIENT** (Workstation)



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- **GATEWAY** (Server)
- **LAMP** (Web Server)
- **ROUTER**

Each exercise will detail which console you are required to work on to carry out the steps.

To start simply click on the named Server or Workstation from the device list (located on the left hand side of the screen) and click the **Power on** from the in tools bar. In some cases the devices may power on automatically.

During the boot up process an activity indicator will be displayed in the name tab:

- Black - Powered Off
- Orange - Working on your request
- Green - Ready to access

If the remote console is not displayed automatically in the main window (or popup) click the **Connect** icon located in the tools bar to start your session.

If the remote console does not appear please try the following option:

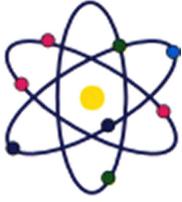
- Switch between the HTML 5 and Java client versions in the tools bar.

In the event this does not resolve your connectivity problems please visit our [Help / Support](#) pages for additional resolution options.

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Exercise 1 - Examining the IP Configuration

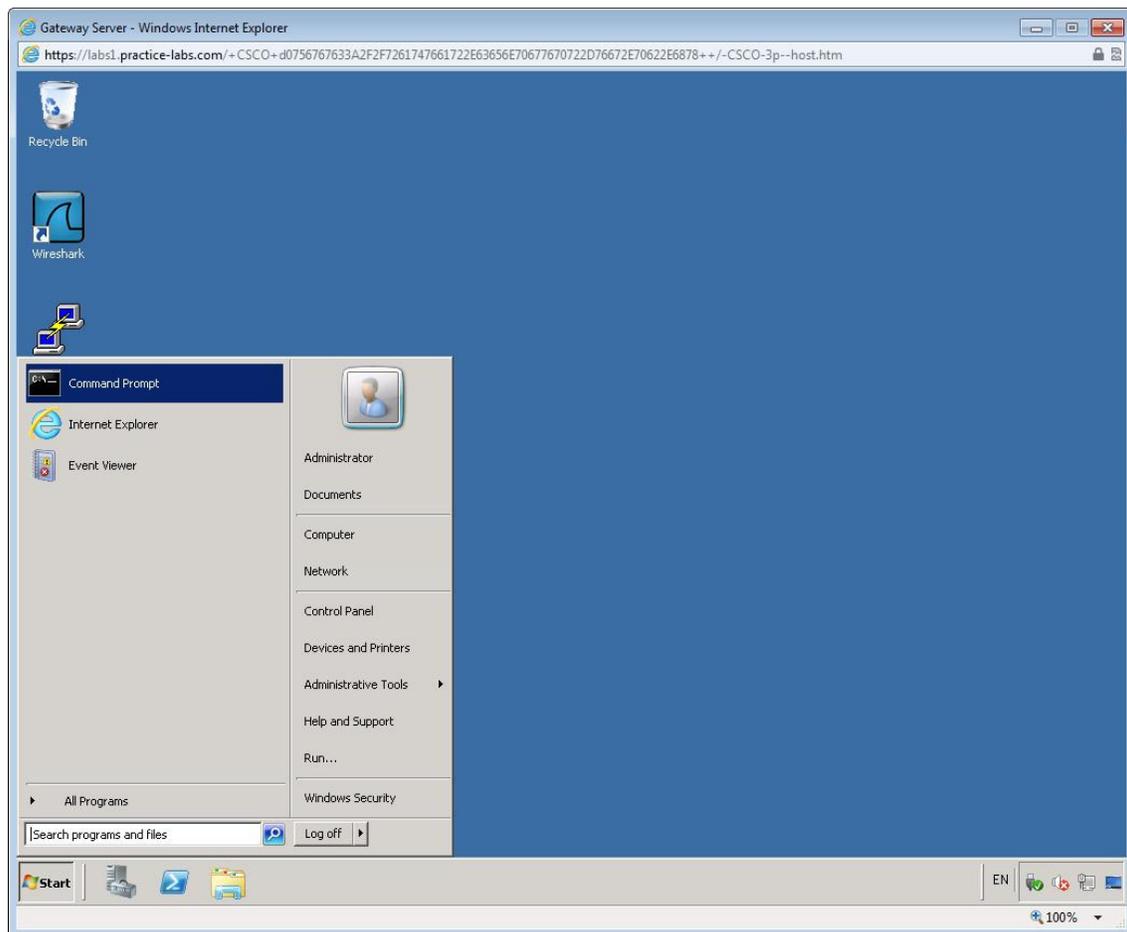
In these exercises, you will configure the IP settings for an adapter in Linux and learn the use of the status and troubleshooting tools **ipconfig / ifconfig** and **ping**. To better understand this technology, refer to your course material or read the information available at the following links
<http://windows.microsoft.com/en-gb/windows7/networking-home-computers-running-different-versions-of-windows> or https://docs.fedoraproject.org/en-US/Fedora/15/html/Deployment_Guide/ch-Network_Interfaces.html

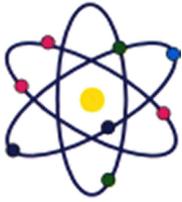
Reviewing IP Details From the Command Line

Step 1

Ensure you have powered on the required devices defined in the introduction **Connect to GATEWAY**.

Open a command prompt





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Type the following command:

```
Ipconfig /all
```

Press Enter. Review the IP address details for each network card installed on the server.

```
Gateway Server - Windows Internet Explorer
https://labs1.practice-labs.com/+CSCO+d0756767633A2F27261747661722E63656E70677670722D76672E70622E6878++/-CSCO-3p--host.htm

Administrator: Command Prompt
WINS Proxy Enabled. . . . . : No

Ethernet adapter Internal:
Connection-specific DNS Suffix . . . : 
Description . . . . . : Intel(R) PRO/1000 MT Network Connection
Physical Address. . . . . : 00-50-56-A3-46-04
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::2913:1b40:8ab1:bfa7%12(Preferred)
IPv4 Address. . . . . : 192.168.0.3(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.250
DHCPv6 Iaid . . . . . : 268456922
DHCPv6 Client DUID. . . . . : 00-01-00-01-17-B2-D4-99-08-00-27-B3-12-1C-00-00-00-00

DNS Servers . . . . . : 192.168.0.1
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Internet:
Connection-specific DNS Suffix . . . : 
Description . . . . . : Intel(R) PRO/1000 MT Network Connection #2
Physical Address. . . . . : 00-50-56-A3-46-05
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::fc28:38a8:58ee:6c5a%13(Preferred)
IPv4 Address. . . . . : 10.0.0.2(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 
DHCPv6 Iaid . . . . . : 318787670
DHCPv6 Client DUID. . . . . : 00-01-00-01-17-B2-D4-99-08-00-27-B3-12-1C-00-00-00-00

DNS Servers . . . . . : fec0:0:0:ffff::1%1
                       fec0:0:0:ffff::2%1
                       fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

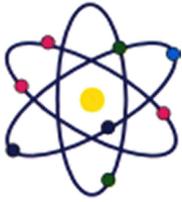
Tunnel adapter isatap.{B8A831CE-01DB-4302-96CA-B76E91122E16}:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . : 
Description . . . . . : Microsoft ISATAP Adapter
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes

Tunnel adapter isatap.{0F7170E4-662B-4D89-B38E-CC54BE6F79E8}:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . : 
Description . . . . . : Microsoft ISATAP Adapter #2
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes

C:\Users\Administrator>
```

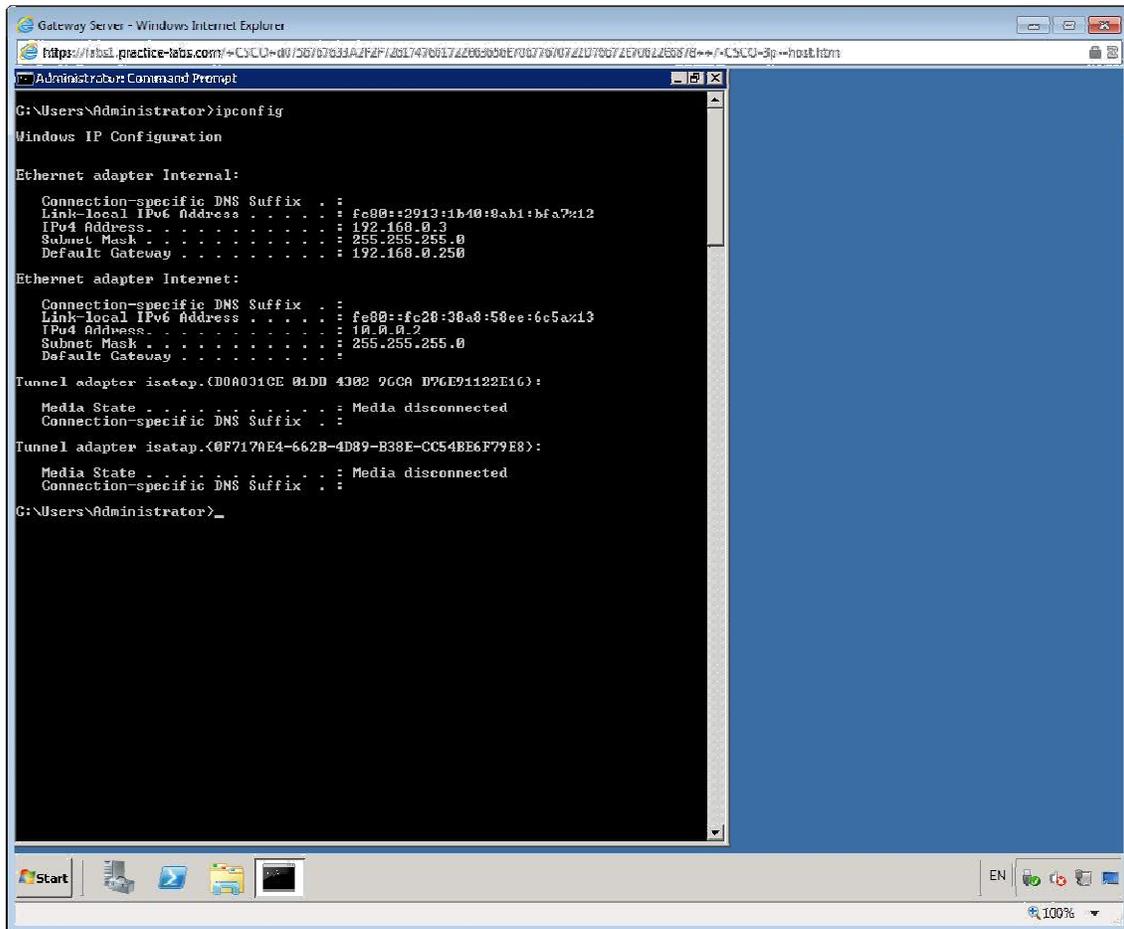
More detailed information about the IP configuration (and the Windows network configuration) is displayed. Note that the MAC address ("physical address") is listed.

You can use the **ipconfig** option for summary detail.



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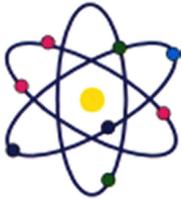
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Step 2

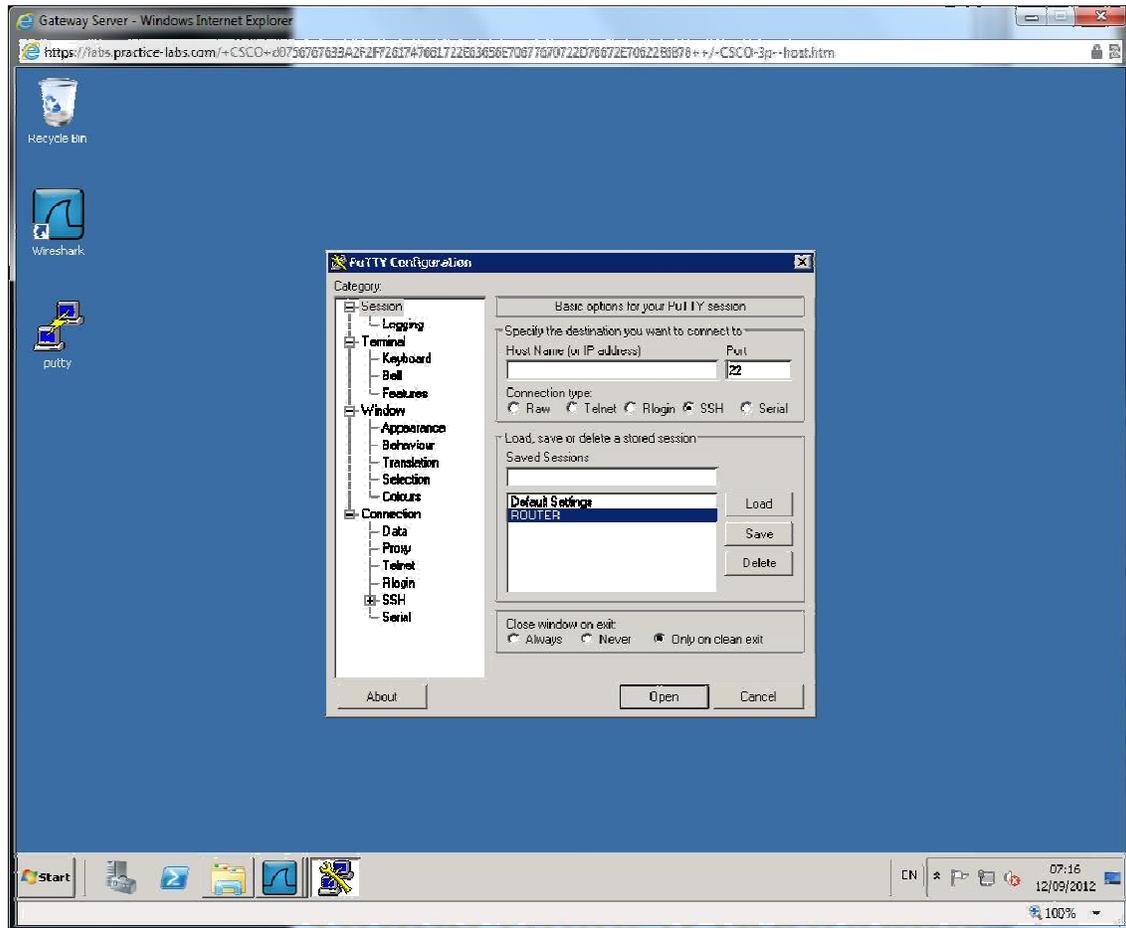
On **GATEWAY** click on the **putty** application located on the desktop.

Double click the entry for **ROUTER**.



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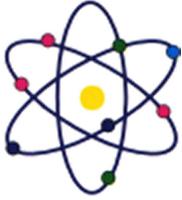
This will launch a **SSH** session to the remote device in order for you to configure settings.

When the console appears enter the following credentials:

```
login as: administrator
```

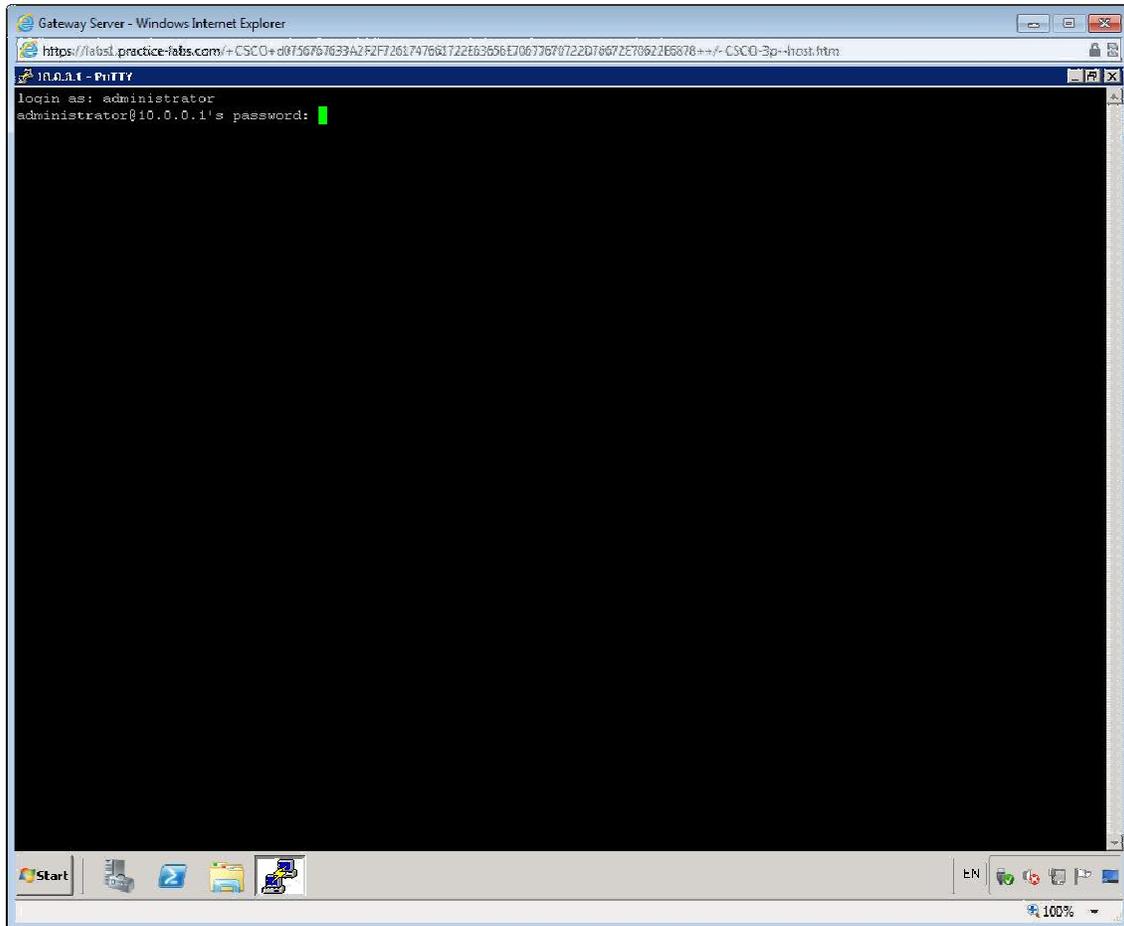
```
password: Pa$$w0rd
```

Note: Unlike Windows the username is case-sensitive on Linux systems. Also the password field does not show any characters, so input the password above and press enter.

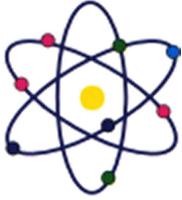


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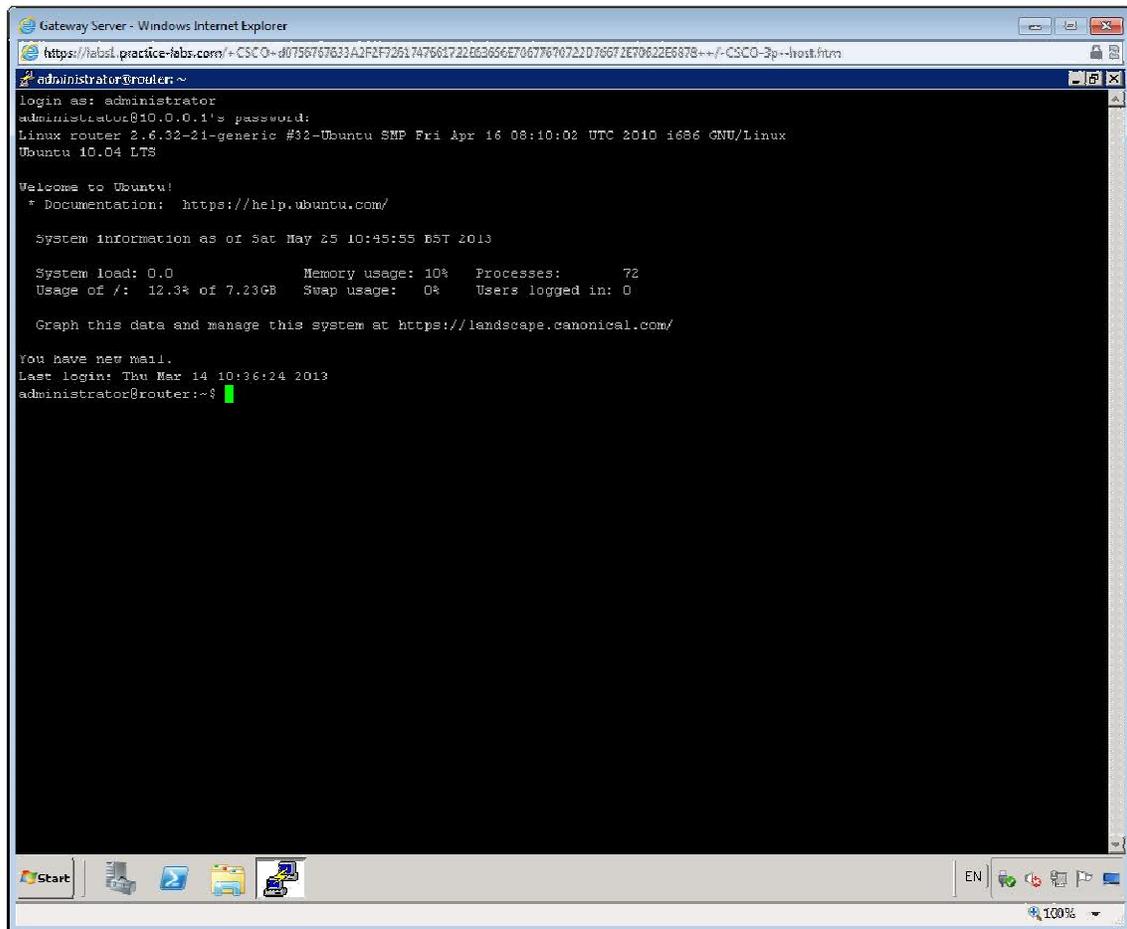


Once you have been successfully authenticated you will be presented with a console where you will be able to enter commands.



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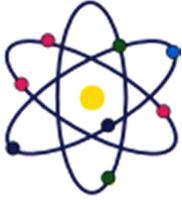


Step 3

From the command line type

```
ifconfig
```

Press Enter.



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```
Gateway Server - Windows Internet Explorer
https://tabsl.practize-febs.com/+CSCO+dl07587676833A2F2F7261747861722E6E3636E70677878722D786712E70622E6878+/-CSCO-3p--host.htm
administrator@router:~
Welcome to Ubuntu!
 * Documentation: https://help.ubuntu.com/

System information as of Sat May 25 10:45:55 EST 2013

System load: 0.0      Memory usage: 10%   Processes:      72
Usage of /:  12.3% of 7.23GB   Swap usage:   0%    Users logged in: 0

Graph this data and manage this system at https://landscape.canonical.com/

You have new mail.
Last login: Thu Mar 14 10:36:24 2013
administrator@router:~$ ifconfig
eth0    Link encap:Ethernet  HWaddr 00:50:56:a3:46:07
        inet addr:192.168.1.254  Bcast:192.168.1.255  Mask:255.255.255.0
        inet6 addr: fe80::250:56ff:fea3:4607/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:21 errors:0 dropped:0 overruns:0 frame:0
        TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:1400 (1.4 KB)  TX bytes:1172 (1.1 KB)
        Interrupt:18 Base address:0x2024

eth1    Link encap:Ethernet  HWaddr 00:50:56:a3:46:08
        inet addr:10.0.0.1   Bcast:10.0.0.255  Mask:255.255.255.0
        inet6 addr: fe80::250:56ff:fea3:4608/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:56 errors:0 dropped:0 overruns:0 frame:0
        TX packets:56 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:6850 (6.8 KB)  TX bytes:9642 (9.6 KB)
        Interrupt:19 Base address:0x20a4

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:16384  Metric:1
        RX packets:86 errors:0 dropped:0 overruns:0 frame:0
        TX packets:86 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:5636 (5.6 KB)  TX bytes:5636 (5.6 KB)

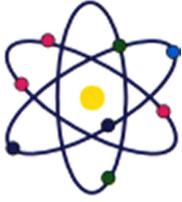
administrator@router:~$
```

Do you notice any difference compared to the Windows ipconfig command?

The output doesn't include the default gateway but there is information about the MTU and packet stats.

Note: No default gateway (router) address is configured. Without this the machine is restricted to the local subnet (though there isn't a router available for it to use yet anyway). The address config is from APIPA as the DHCP server is not available.

Leave the devices you have powered on in their current state and proceed to the next exercise.



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Exercise 2 - Performing a Connectivity Test

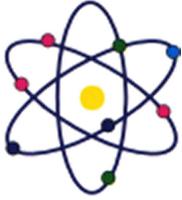
In this exercise, you will use ping to test TCP/IP functionality and links. To better understand this technology, please refer to your course material or use your preferred search engine to gain an understanding of these tasks.

Reviewing Network Configuration

On **GATEWAY** using the console you opened in the last exercise which is connected to **ROUTER**, enter the command:

```
ping 127.0.0.1
```

```
Gateway Server - Windows Internet Explorer
https://labs1.practice-labs.com/+CSCO+d07567633A2F2F7261747661722E63656E70677670722D76672E70622E6878+/-CSCO-3p--host.htm
administrator@router:~
administrator@router:~$ ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.025 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.027 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.030 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.033 ms
64 bytes from 127.0.0.1: icmp_seq=5 ttl=64 time=0.053 ms
```



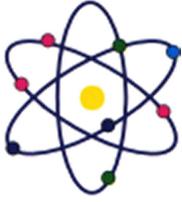
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What does this tell you?

That TCP/IP is installed with a functional configuration.

Press **Ctrl+C** to stop pinging.



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Enter ping **192.168.1.1**

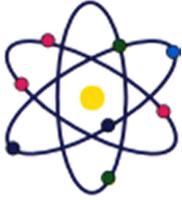
```
Gateway Server - Windows Internet Explorer
https://labs1.practice-labs.com/+CSCO+d0756767633A2F2F7261747661722E63656E70677670722D76672E70622E6878+/-CSCO-3p--host.htm
administrator@router: ~
administrator@router:~$ ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=2.74 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=0.257 ms
64 bytes from 192.168.1.1: icmp_seq=3 ttl=64 time=0.270 ms
64 bytes from 192.168.1.1: icmp_seq=4 ttl=64 time=0.241 ms
```

What does this tell you?

That a host with that ip address is available.

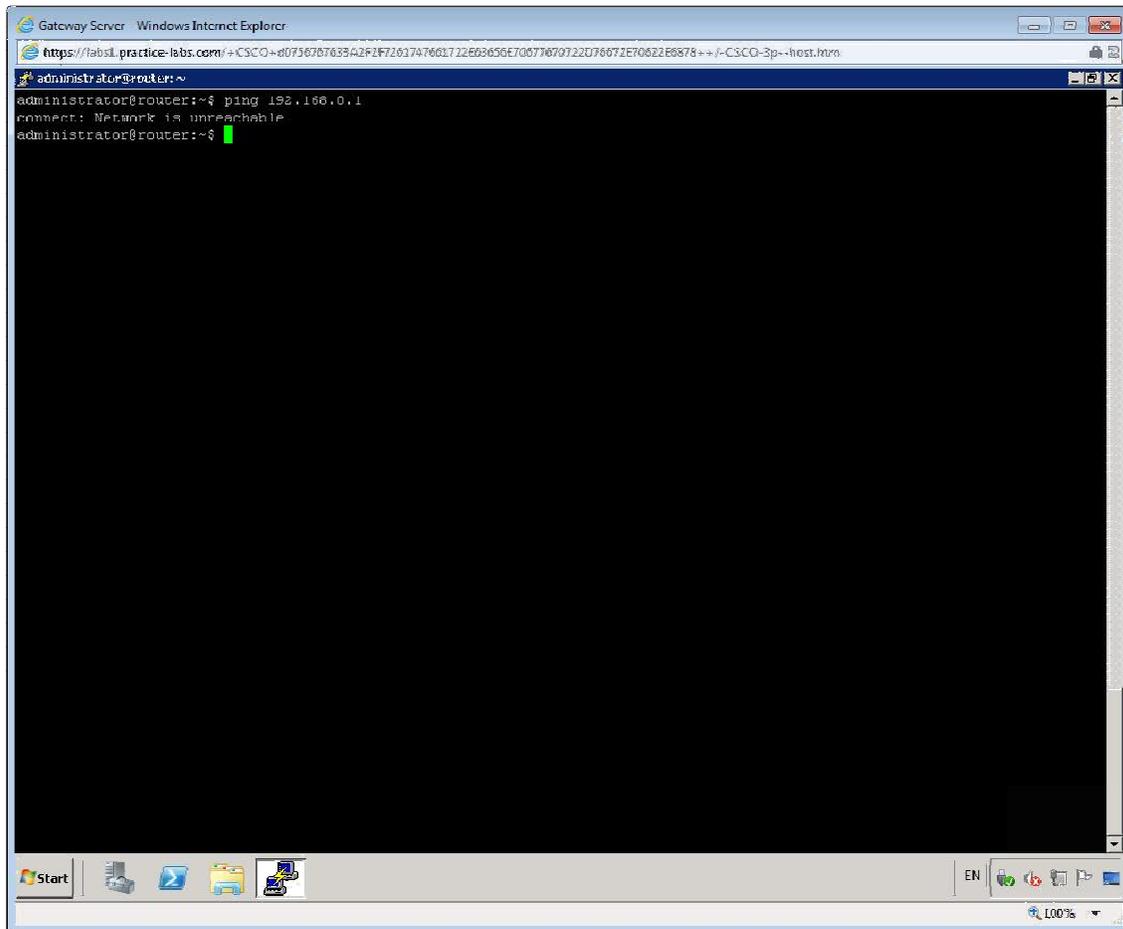
Press **Ctrl+C** to stop pinging.

Enter ping **192.168.0.1**



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What does this tell you?

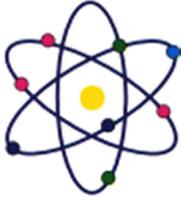
SERVER is on a different network as well as being a different subnet and **ROUTER** is not configured either with a "physical" path to that network nor with the address of a router that could reach that subnet.

Minimise all open windows.

Configure DHCP Server

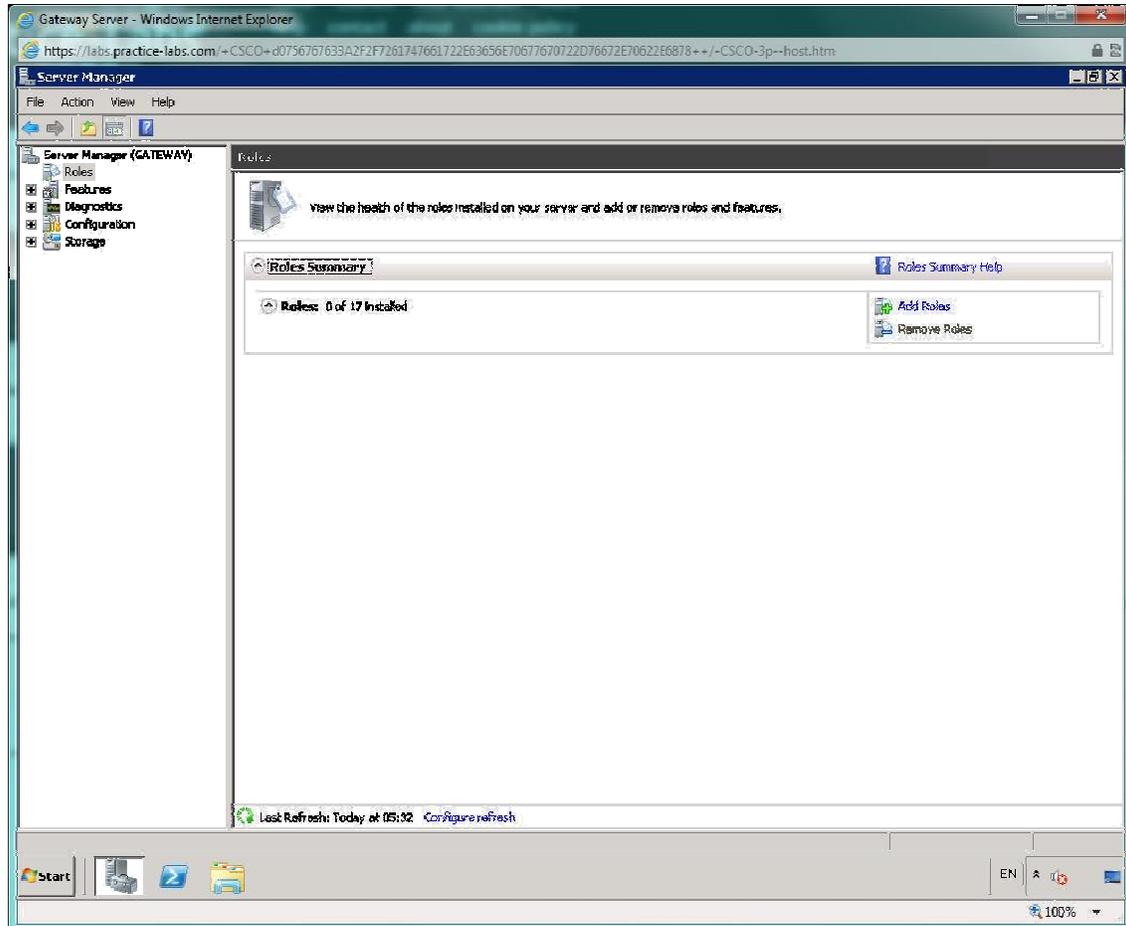
Step 1

On **GATEWAY** server, open up **Server Manager** and select roles.

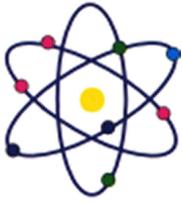


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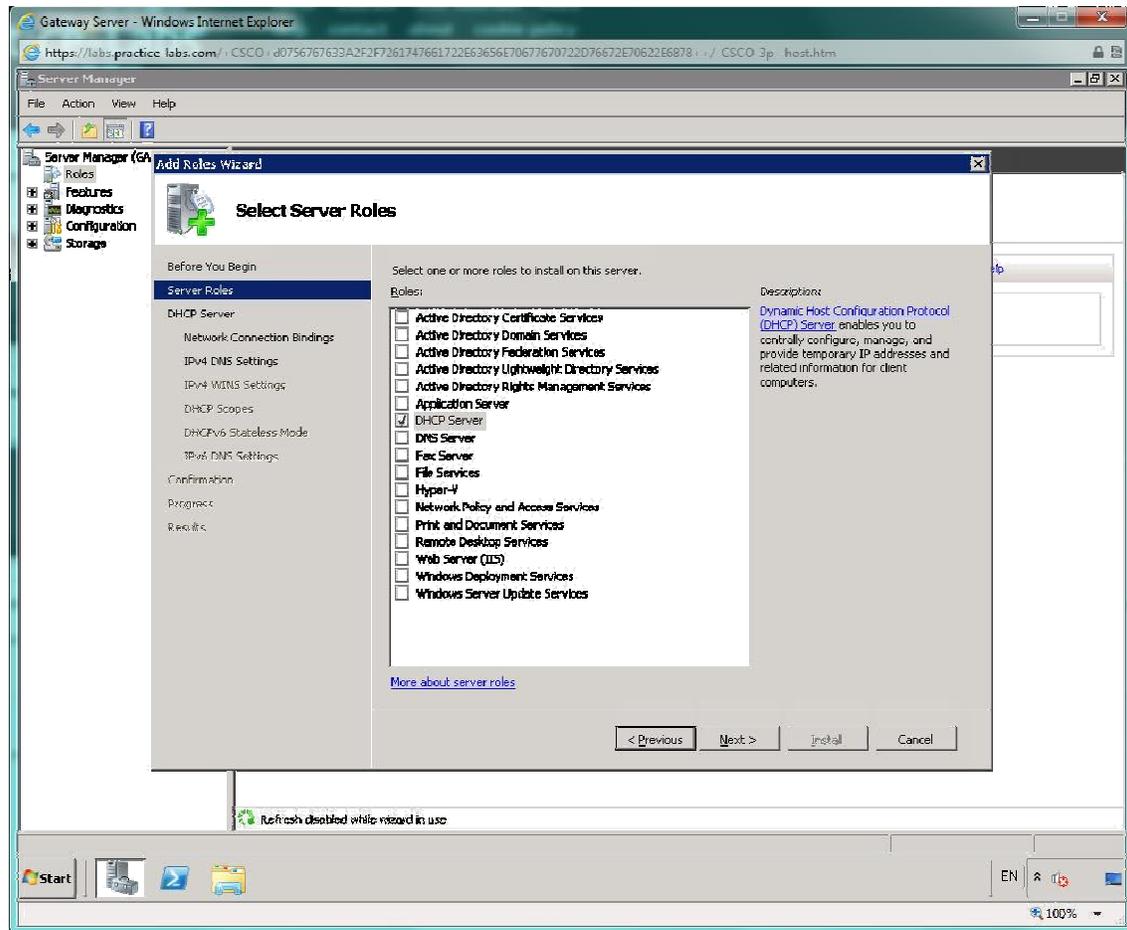


Click **add roles** and then **next**, when prompted select **DHCP server**.

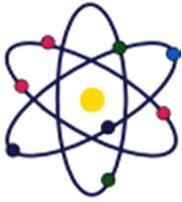


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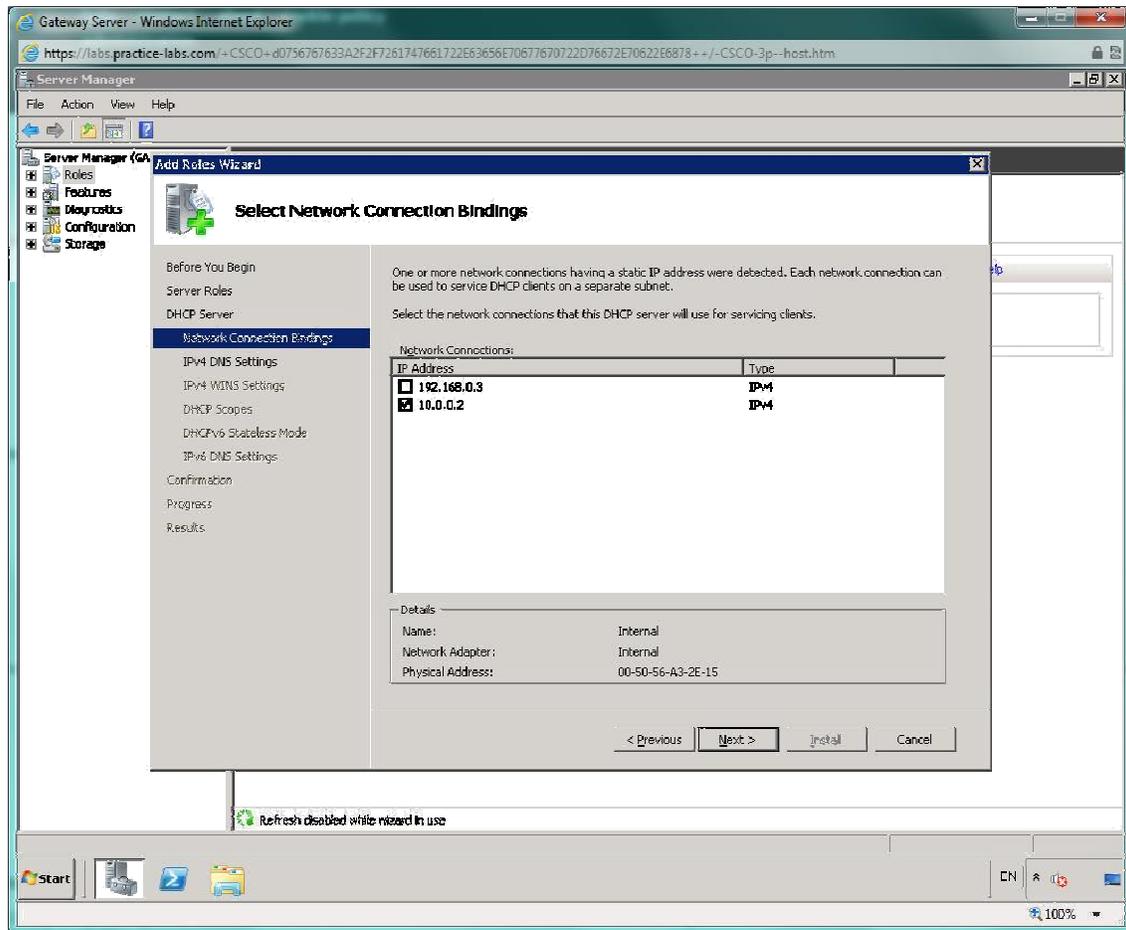


Click **next**, and then check the box next to **10.0.0.2**

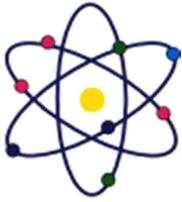


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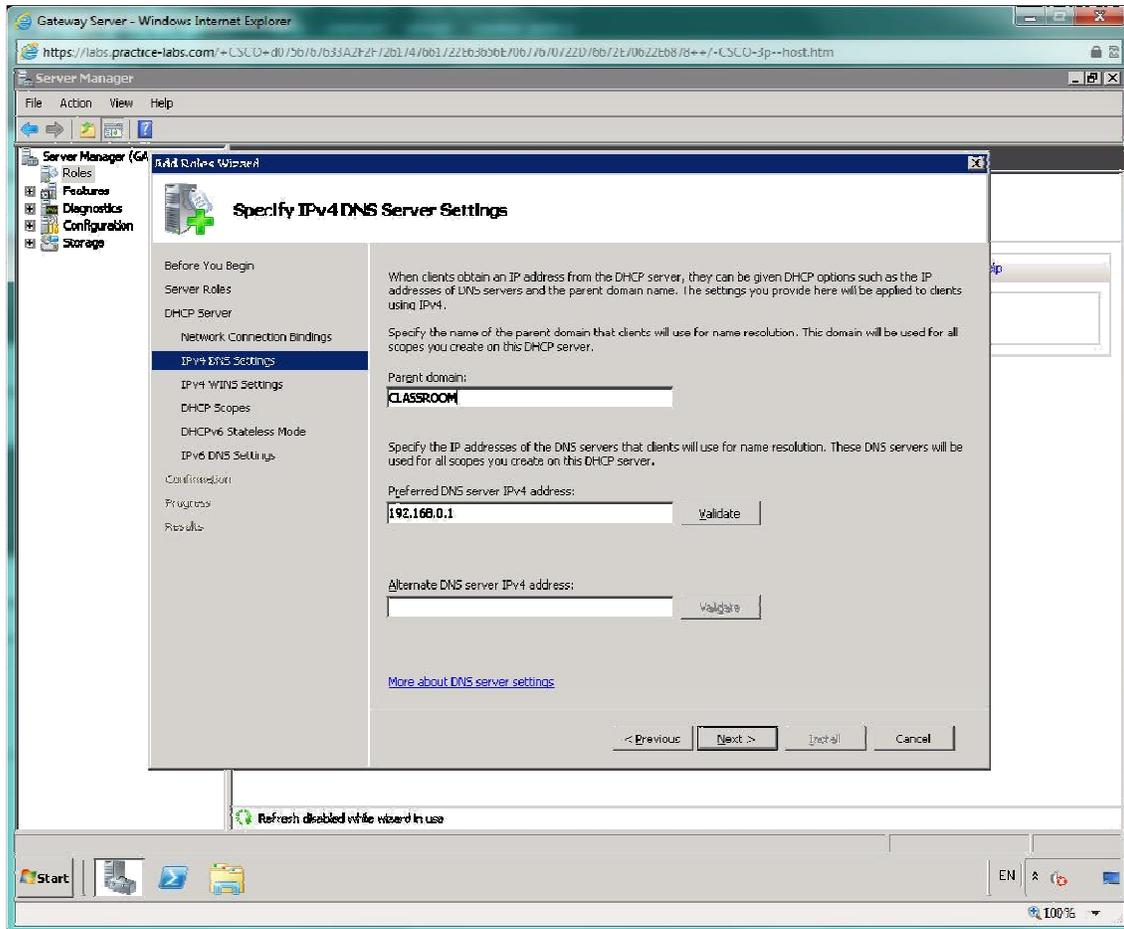


Click next and enter **CLASSROOM** it to the parent domain.



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Click **next** again until you are asked to add a **scope**.

Click **add**.

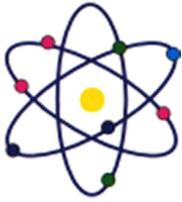
Enter in the following details.

Scope Name: Router Server Scope

Starting IP address: 10.0.0.1

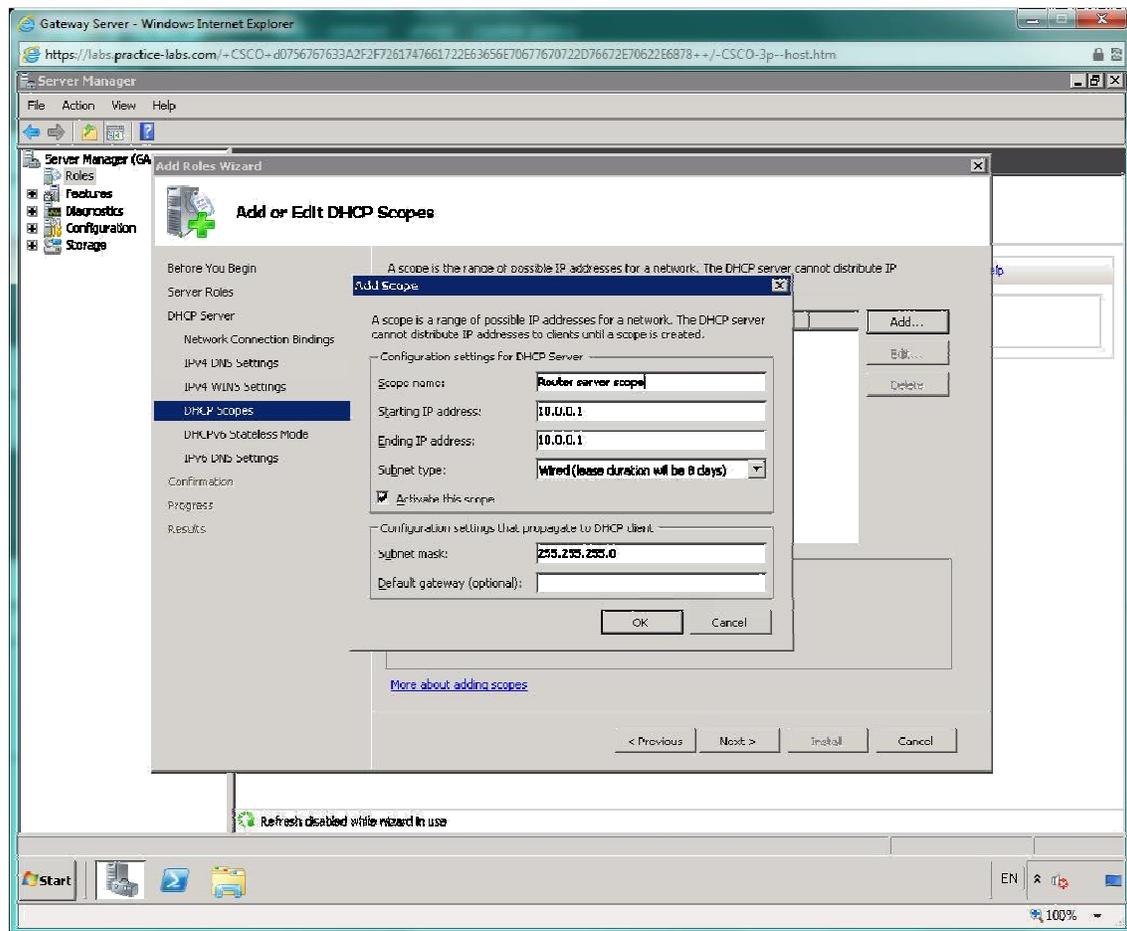
Ending IP address: 10.0.0.1

Subnet Mask: 255.255.255.0

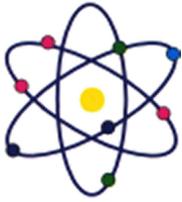


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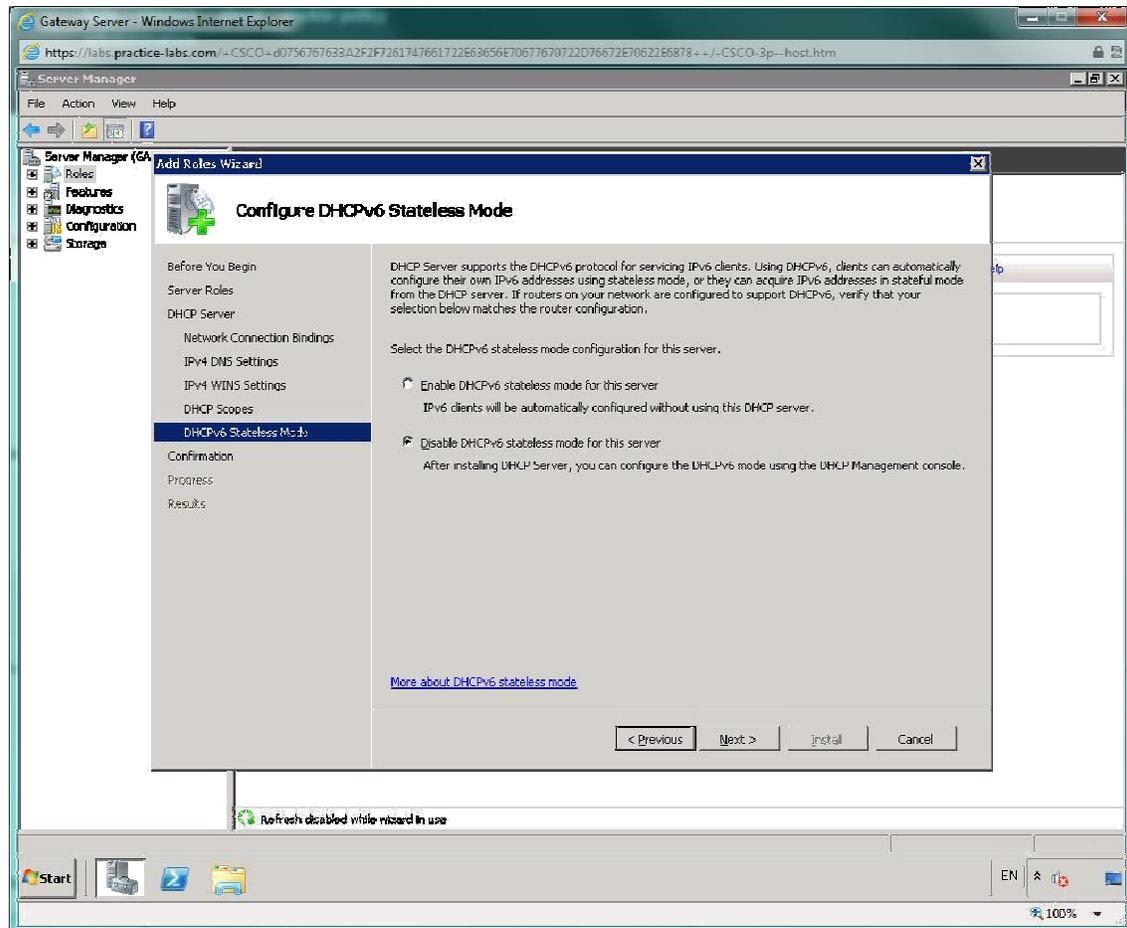


Click next, and disable **DHCPv6 Stateless mode**.

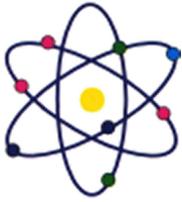


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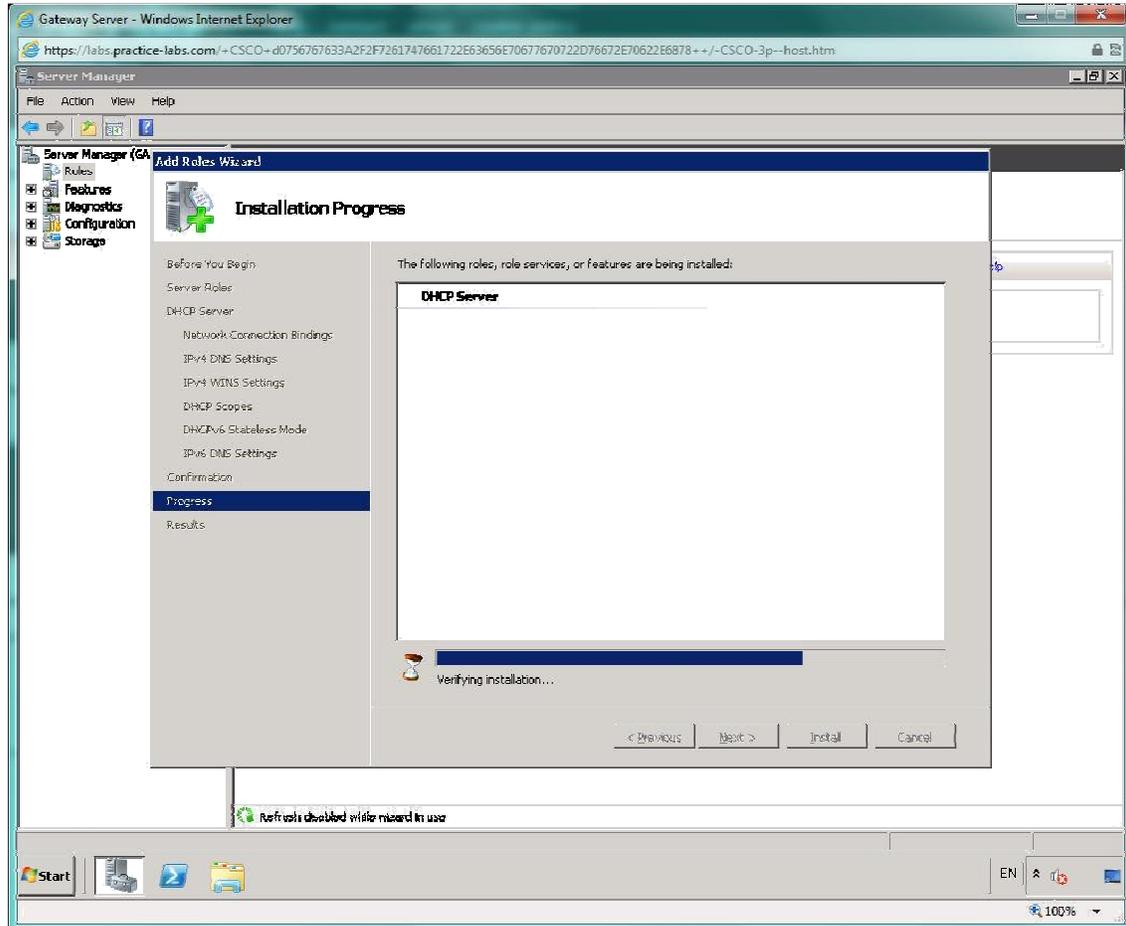


Then click **next** and **install**.



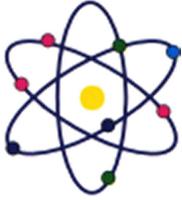
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The server is now configured to distribute IP addresses, close all the open windows and proceed to the following exercise.

Leave the devices you have powered on in their current state and proceed to the next exercise.



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Exercise 3 - Reconfiguring IP in Linux

To configure an adapter in Linux, you must enter the configuration into a text file.

Configure DHCP on Linux

Step 1

Still on **GATEWAY** server open the **SSH** console to **ROUTER**.

From command line type the following:

```
sudo nano /etc/network/interfaces
```

Note: The **sudo** command starts the text editor (nano) with the privileges required to edit this configuration file. Type **Pa\$\$w0rd** and press Enter to confirm the use of root privileges.

```
Gateway Server - Windows Internet Explorer
https://labs.practice-labs.com/+CSCO+d0756767633A2F2F7261747661722E63656E70677670722D76672E70622E66878+/-CSCO-3p--host.htm
administrator@router:~
GNU nano 2.2.2 File: /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).
# The loopback network interface
auto lo
iface lo inet loopback
# The primary network interface
auto eth0
#iface eth0 inet dhcp
iface eth0 inet static
address 192.168.1.254
netmask 255.255.255.0
# The secondary network interface
auto eth1
#iface eth1 inet dhcp
iface eth1 inet static
address 10.0.0.1
netmask 255.255.255.0
[ Read 21 lines ]
^G Get Help      ^O WriteOut     ^F Read File    ^V Prev Page    ^K Cut Text     ^C Cur Pos
^X Exit          ^J Justify      ^W Where Is     ^N Next Page    ^U UnCut Text   ^T To Spell
Start | [Taskbar icons] | EN | 07:29 12/09/2012 | 100%
```

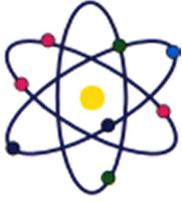


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The current configuration defines a **static IP address** and subnet mask for the adapter "eth0".

Use the **Arrow** keys to move the cursor around the file and edit the ip address of interface "**eth0**" to be the following details:



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Address 192.168.1.205

Leave the netmask details as they are defined.

```
Gateway Server - Windows Internet Explorer
https://labs1.practice-labs.com/+CSCO+d0756767633A2F2F7261747661722E63656E70677670722D76672E70622E6878++/-CSCO-3p--host.htm
administrator@router: ~
GNU nano 2.2.2 File: /etc/network/interfaces Modified
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
#iface eth0 inet dhcp
iface eth0 inet static
address 192.168.1.205
netmask 255.255.255.0

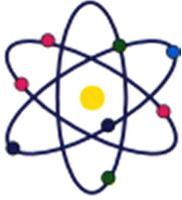
# The secondary network interface
auto eth1
#iface eth1 inet dhcp
iface eth1 inet static
address 10.0.0.1
netmask 255.255.255.0

^G Get Help      ^C WriteOut     ^R Read File   ^V Prev Page   ^K Cut Text    ^G Cur Pos
^X Exit         ^J Justify     ^U Where Is   ^N Next Page  ^U UnCut Text  ^M To Spell
Start [Taskbar icons] EN [System tray] 100%
```

Press **Ctrl+O** then **Enter** to save the file then press **Ctrl+X** to close the text editor.

To apply the new ip address configuration, enter the following command:

```
sudo /etc/init.d/networking restart
```



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```
Gateway Server - Windows Internet Explorer
https://labs.practice-labs.com/~CSCO+d0756767633A2F2F7261747661727E63656E70677670722076672E7062266878++/-CSCO-3p--host.htm
administrator@router~
login as: administrator
administrator@10.0.0.1's password:
Linux router 2.6.32-21-generic #32-Ubuntu SMP Fri Apr 16 08:10:02 UTC 2010 i686
GNU/Linux
Ubuntu 10.04 LTS

Welcome to Ubuntu!
* Documentation:  https://help.ubuntu.com/

System information as of Fri Sep 14 09:37:26 BST 2012

System load: 0.24      Memory usage: 10%    Processes:      89
Usage of /:  13.1% of 7.33GB  Swap usage:  0%    Users logged in: 0

Graph this data and manage this system at https://landscape.canonical.com/

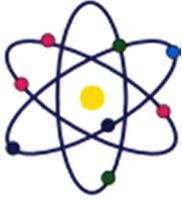
You have new mail.
Last login: Mon Sep 10 17:17:50 2012
administrator@router:~$ sudo nano /etc/network/interfaces
[sudo] password for administrator:
administrator@router:~$ sudo nano /etc/network/interfaces
administrator@router:~$ sudo /etc/init.d/networking restart
 * Reconfiguring network interfaces...
ssh stop/waiting
ssh start/running, process 2285
ssh stop/waiting
ssh start/running, process 2321

administrator@router:~$ [ OK ]
```

Step 2

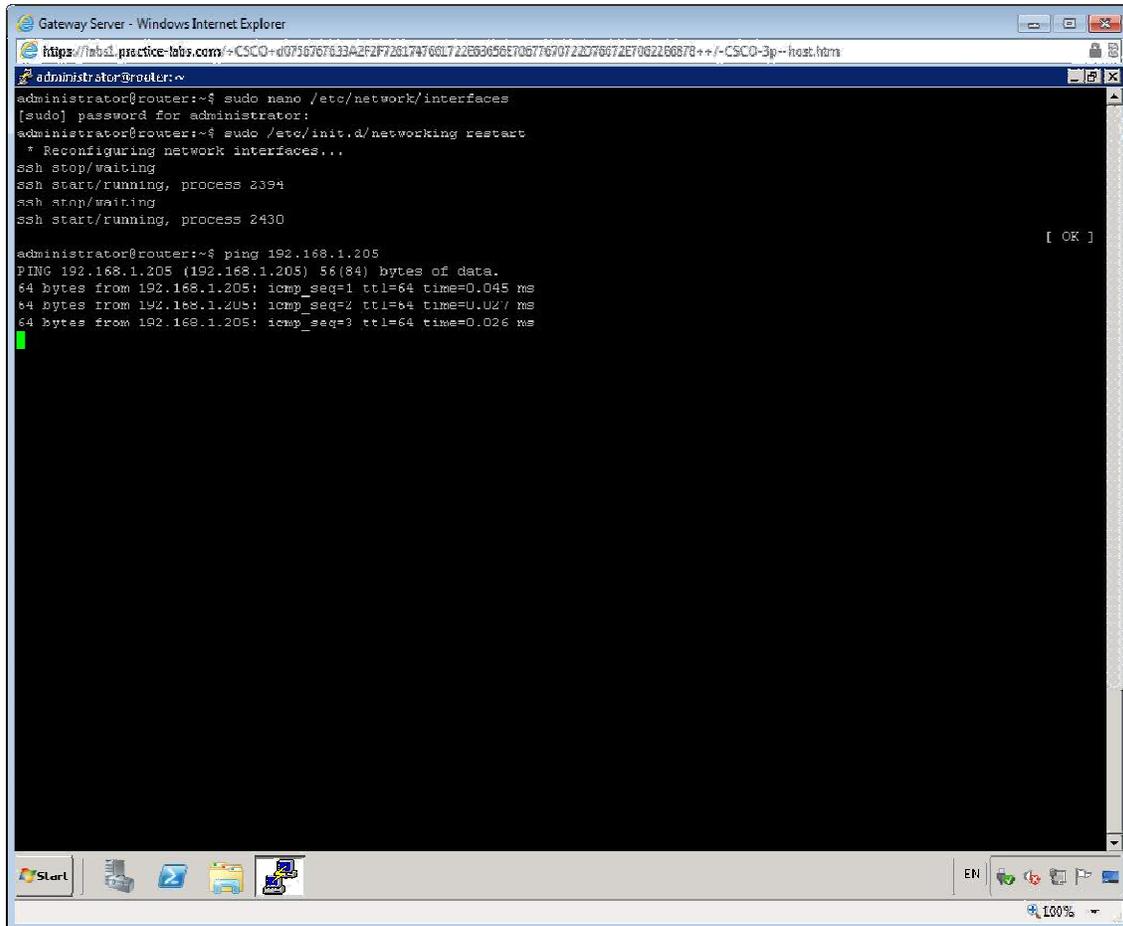
On the **ROUTER** try to ping the new address to ensure the settings are correct.

Ping 192.168.1.205



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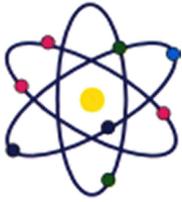
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Open the interfaces configuration file again.

```
sudo nano /etc/network/interfaces
```

Delete the hash (#) symbol from the "dhcp" line in the "eth1" details and add hash symbols to comment out the lines below it.



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```
Gateway Server - Windows Internet Explorer
https://labs1.practice-labs.com/~CSCO+00736767633A2F2F7261747661722E636656E70677670722D70672E7062286378++/-C%00-3g--host.htm
admin@ubuntu:~$ nano /etc/network/interfaces
GNU nano 2.2.2 File: /etc/network/interfaces Modified
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

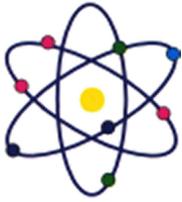
# The primary network interface
auto eth0
#iface eth0 inet dhcp
iface eth0 inet static
address 192.168.1.205
netmask 255.255.255.0

# The secondary network interface
auto eth1
iface eth1 inet dhcp
#iface eth1 inet static
#address 10.0.0.1
#netmask 255.255.255.0
```

Press **Ctrl+O** then **Enter** to save the file then press **Ctrl+X** to close the text editor.

To apply the new ip address configuration, enter the following command:

```
sudo /etc/init.d/networking restart
```

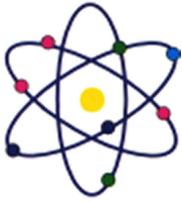


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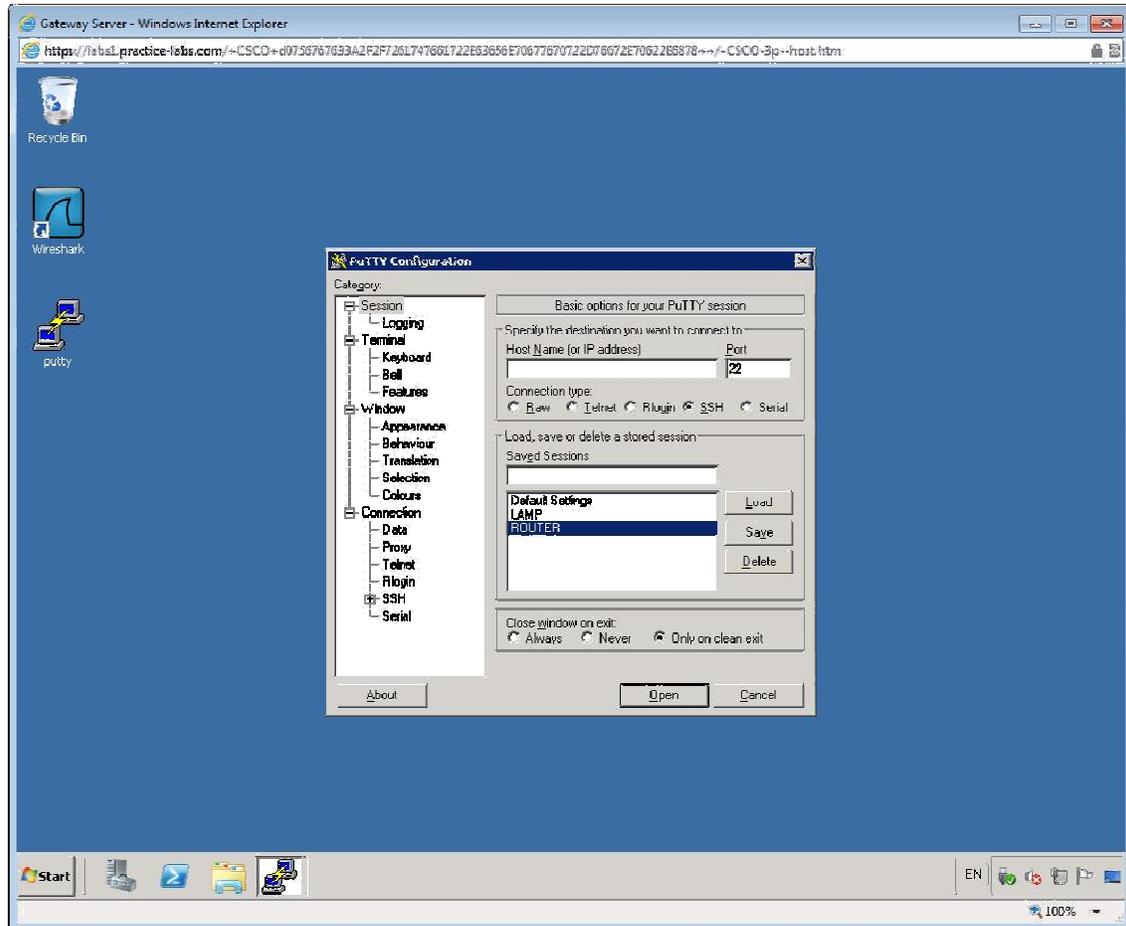
```
administrator@router:~$ sudo nano /etc/network/interfaces
administrator@router:~$ sudo /etc/init.d/networking restart
 * Reconfiguring network interfaces...
Internet Systems Consortium DHCP Client V3.1.3
Copyright 2004-2009 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
```

Note: You will notice the console window looks like it has stopped working. This is because the **SSH** session has been disconnected from **ROUTER**. You can re-launch access by double-clicking the **ROUTER** entry in putty. This happens because the interface has been restarted to apply the new configuration.



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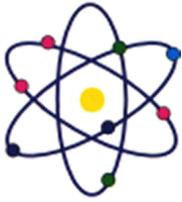


This will launch a **SSH** session to the remote device in order for you to configure settings.

When the console appears enter the following credentials:

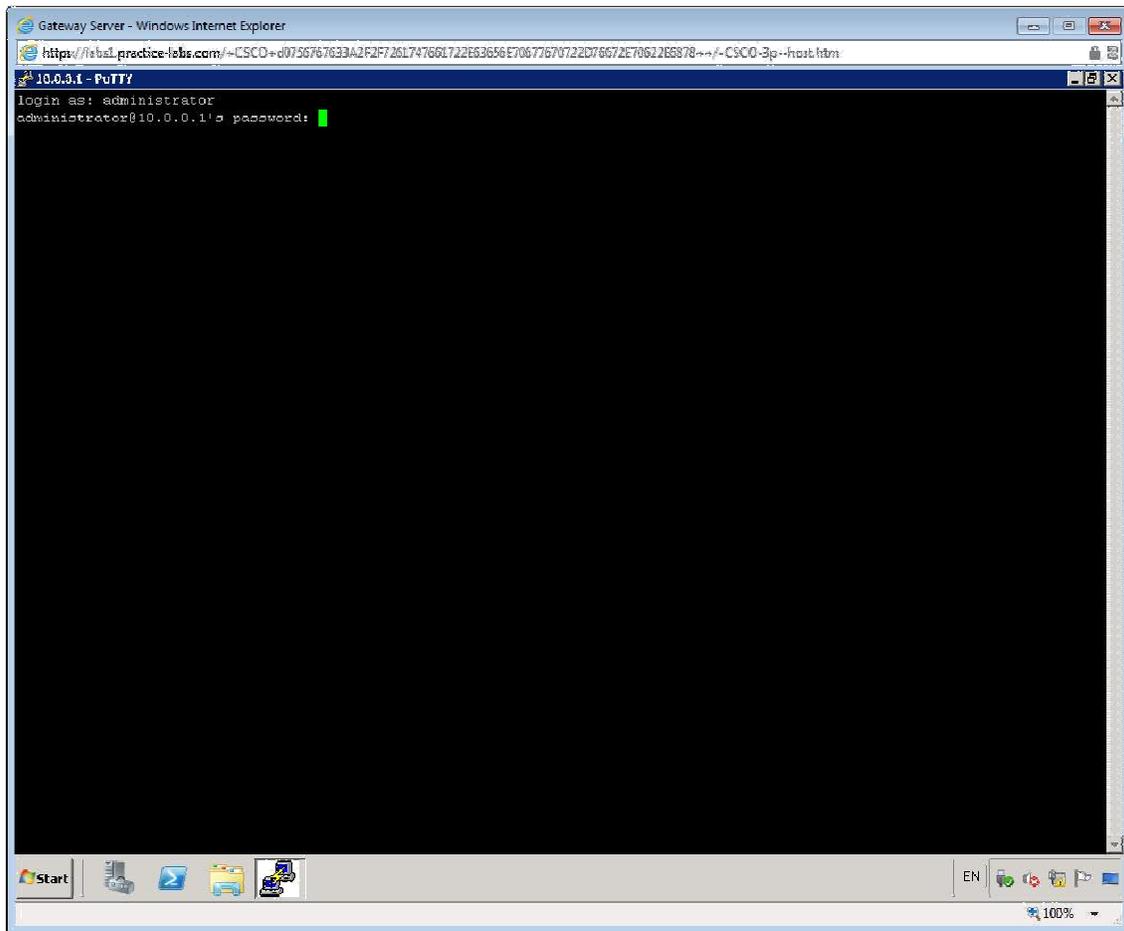
login as: administrator

password: Pa\$\$w0rd

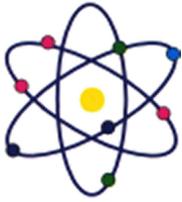


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Once you login use the **ifconfig** command to see the IP address details.



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```
Gateway Server - Windows Internet Explorer
https://labs.practice-fabs.com/+CSCO+d9756767633A2F2F7261747661722E63656E70677676722D76672E78622E66878+++/-CSCO-3p-host.htm

administrator@router~
Welcome to Ubuntu!
 * Documentation: https://help.ubuntu.com/

System information as of Sat May 25 11:29:28 BST 2013

System load: 0.0          Memory usage: 9%        Processes:   90
Usage of /: 12.3% of 7.23GB Swap usage:   0%        Users logged in: 0

Graph this data and manage this system at https://landscape.canonical.com/

You have new mail.
Last login: Sat May 25 10:45:55 2013 from 10.0.0.2
administrator@router:~$ ifconfig

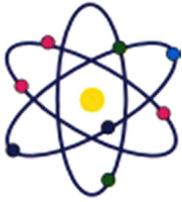
eth0    Link encap:Ethernet  HWaddr 00:50:56:a3:46:07
        inet addr:192.168.1.205  Bcast:192.168.1.255  Mask:255.255.255.0
        inet6 addr: fe80::200:56ff:fea3:4607/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:2 errors:0 dropped:0 overruns:0 frame:0
        TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:120 (120.0 B)  TX bytes:468 (468.0 B)
        Interrupt:18 Base address:0x2024

eth1    Link encap:Ethernet  HWaddr 00:50:56:a3:46:08
        inet addr:10.0.0.1  Bcast:10.0.0.255  Mask:255.255.255.0
        inet6 addr: fe80::200:56ff:fea3:4608/64 Scope:Link
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:41 errors:0 dropped:0 overruns:0 frame:0
        TX packets:39 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:5318 (5.3 KB)  TX bytes:6705 (6.7 KB)
        Interrupt:19 Base address:0x20a4

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:16436  Metric:1
        RX packets:6 errors:0 dropped:0 overruns:0 frame:0
        TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:300 (300.0 B)  TX bytes:300 (300.0 B)

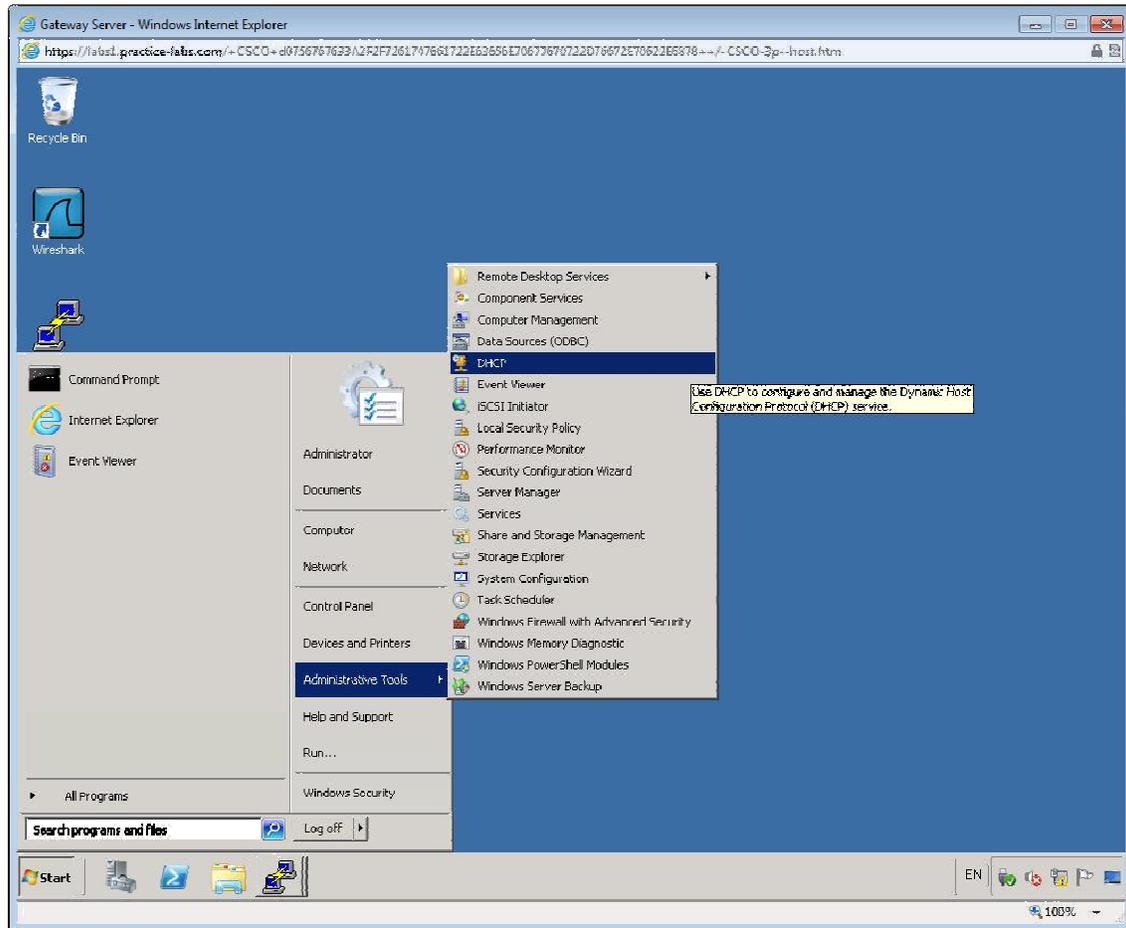
administrator@router:~$
```

Minimise the **SSH** console and open **DHCP Manager** from **Administrative Tool** on **GATEWAY** server.

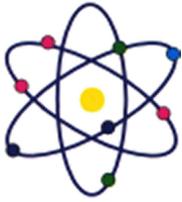


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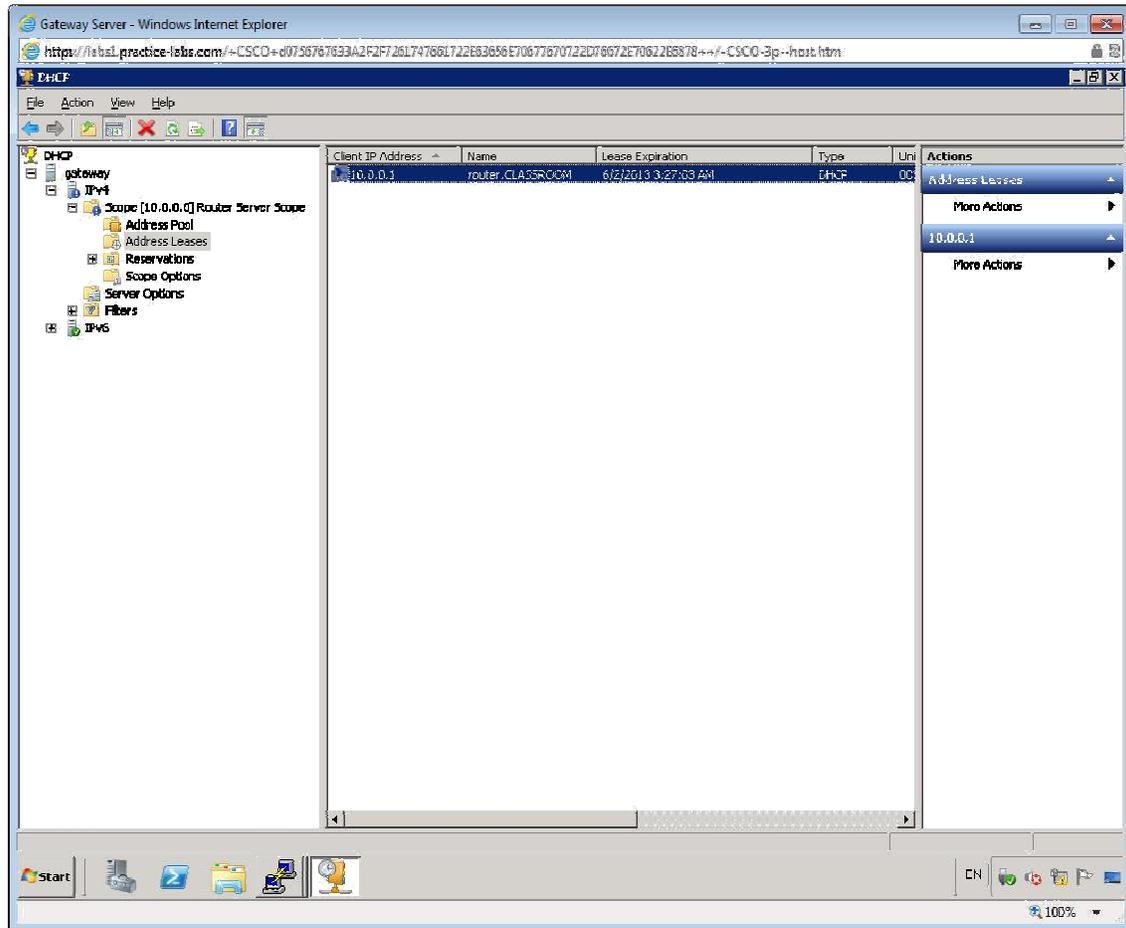


Expand the menu until you see **IPV4 Address Leases**.



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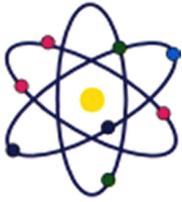
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You will see that the DHCP server has assigned the 10.0.0.1 ip address to the **ROUTER**.

Close all the open windows.

Leave the devices you have powered on in their current state and proceed to the next exercise.



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Exercise 4 - IP Addressing Settings

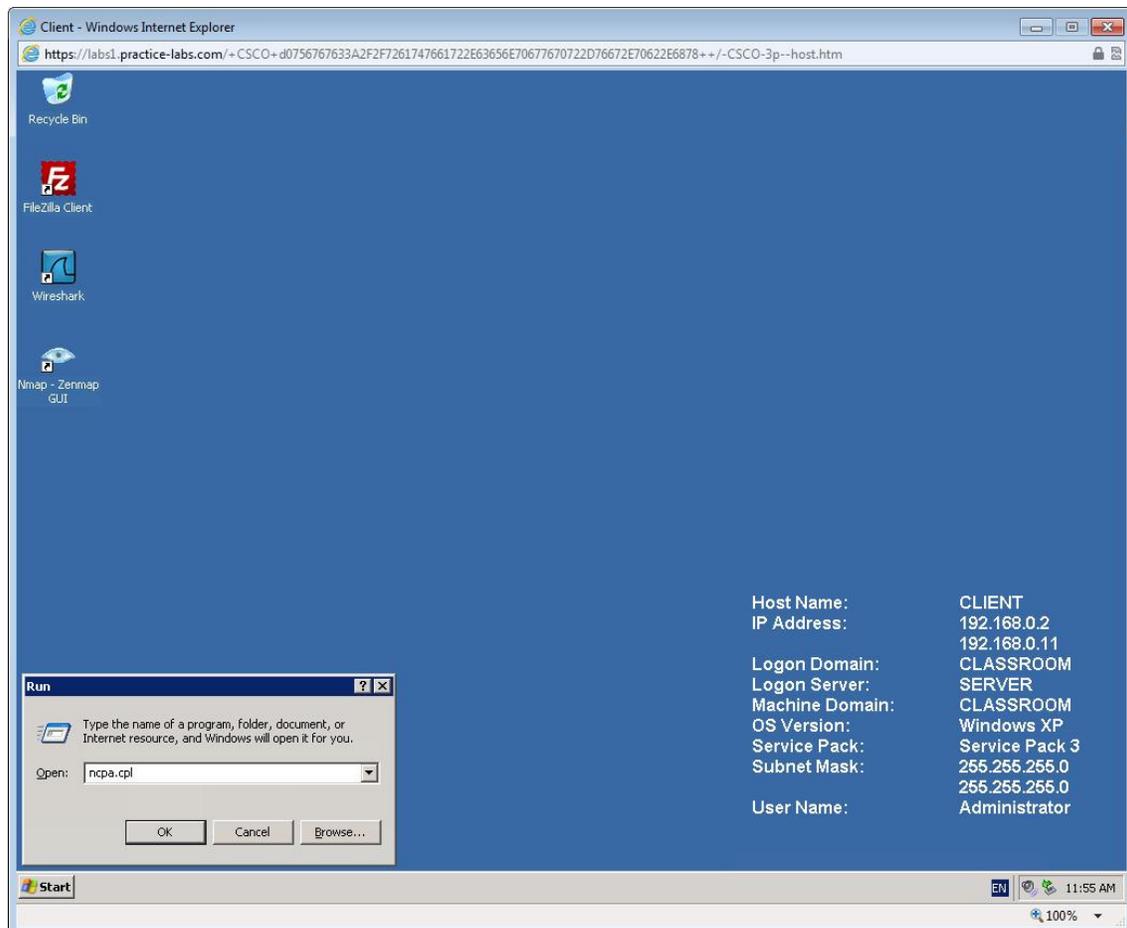
In these exercises, you will discover the effect on connectivity when you adjust the subnet mask applied to an IP configuration.

Subnet Masks

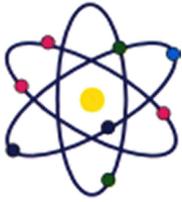
Step 1

Ensure you have powered on the required devices defined in the introduction **Connect to CLIENT**.

Once logged in open the **Run** box then type **ncpa.cpl**, and press Enter.

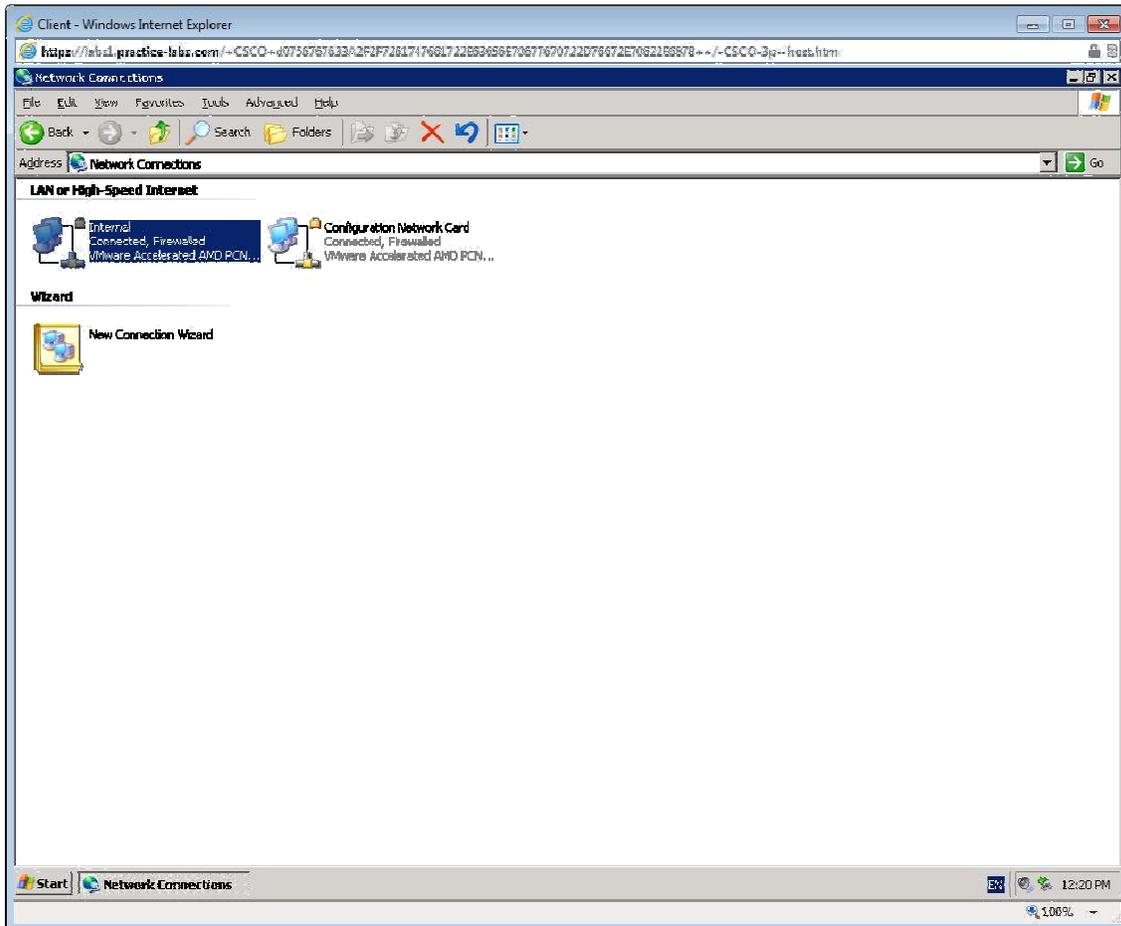


Right-click Local Area Connection called **Internal** and select **Properties**.

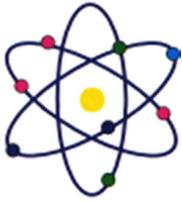


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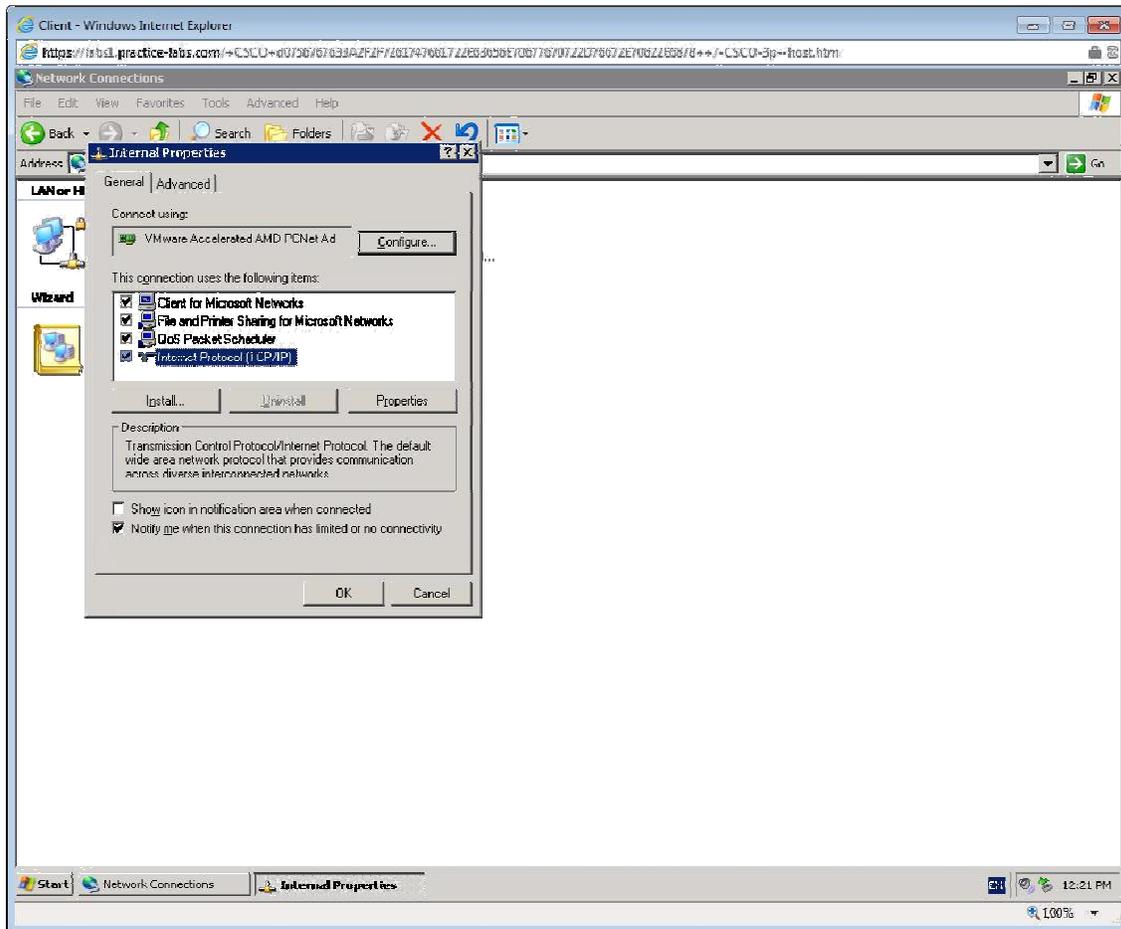


Double-click **Internet Protocol (TCP/IP)**.



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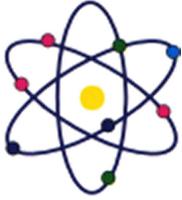
Review the IP address details, these should be the following:

IP address: 192.168.0.2

Subnet mask: 255.255.255.0

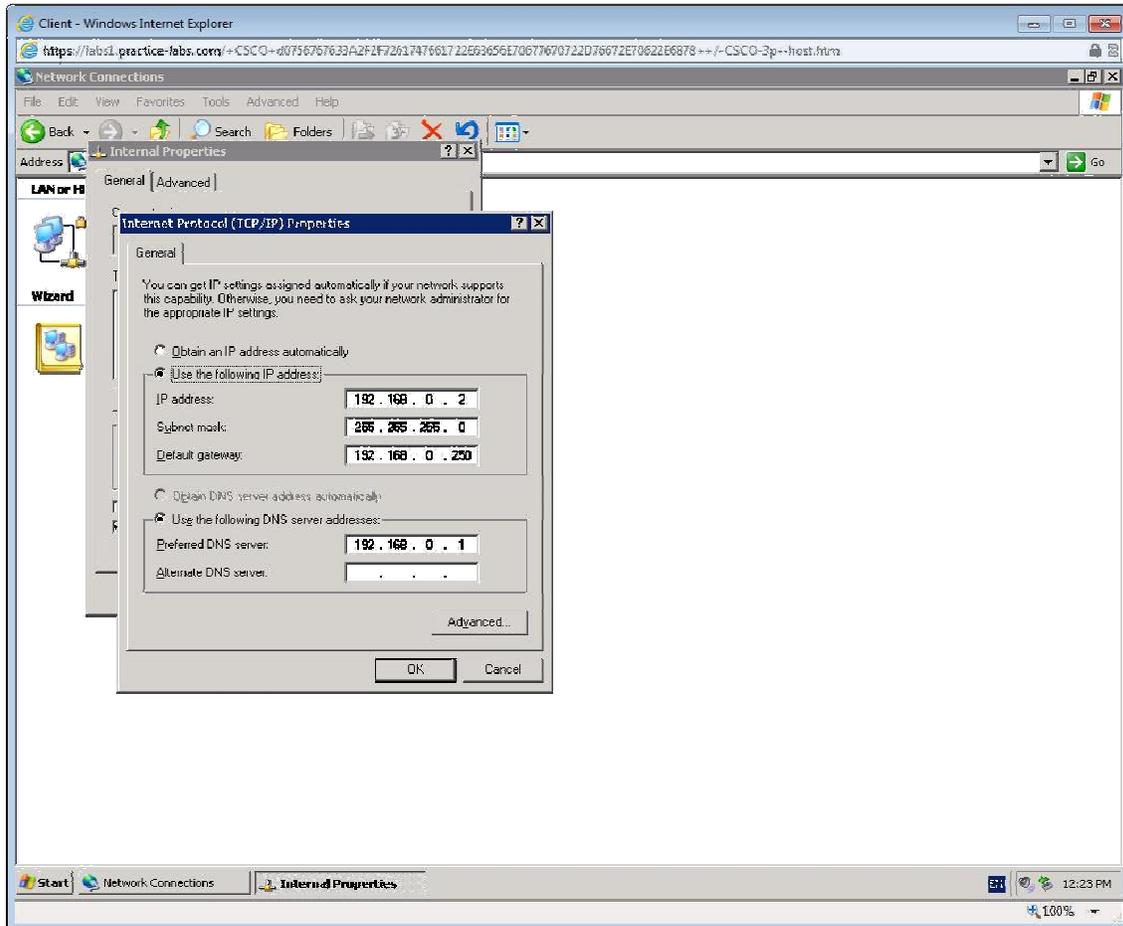
Default gateway: 192.168.0.250

Preferred DNS server: 192.168.0.1



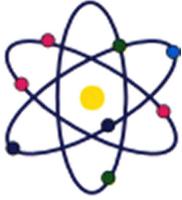
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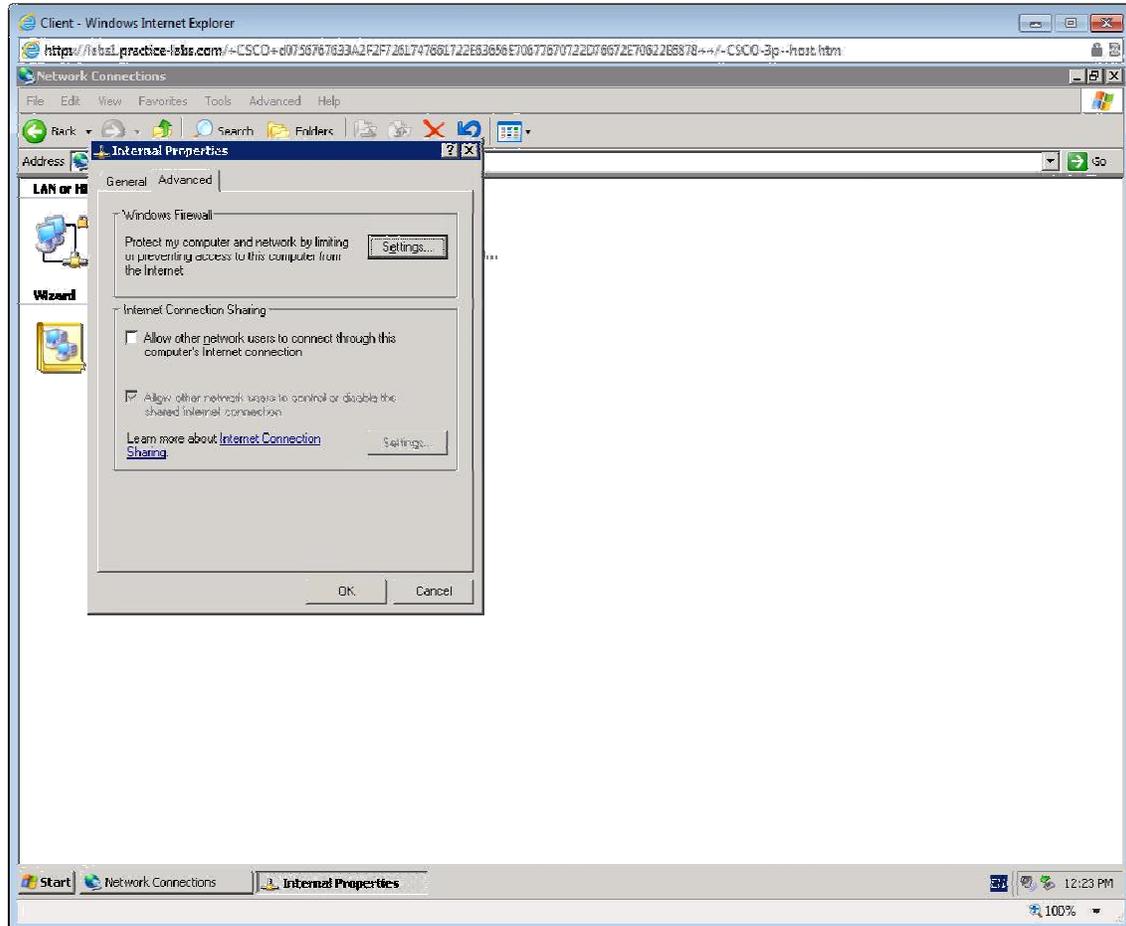
Click **OK** to close.

Click on the **Advanced** tab and **Settings** option.

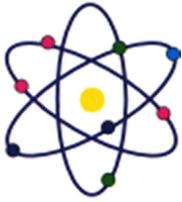


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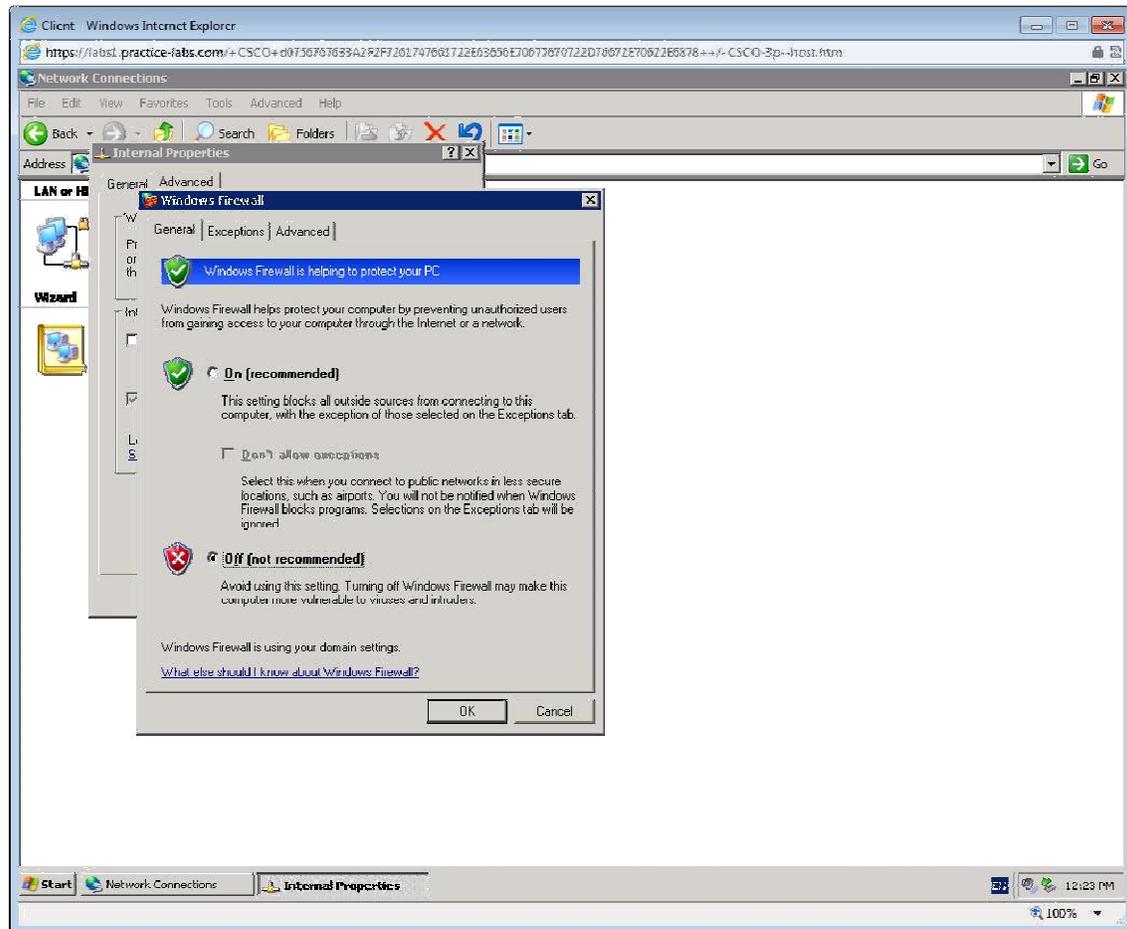


Turn the **Firewall** off for this test. Click OK to close all open dialog boxes.



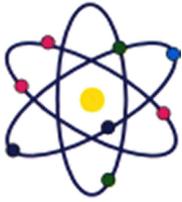
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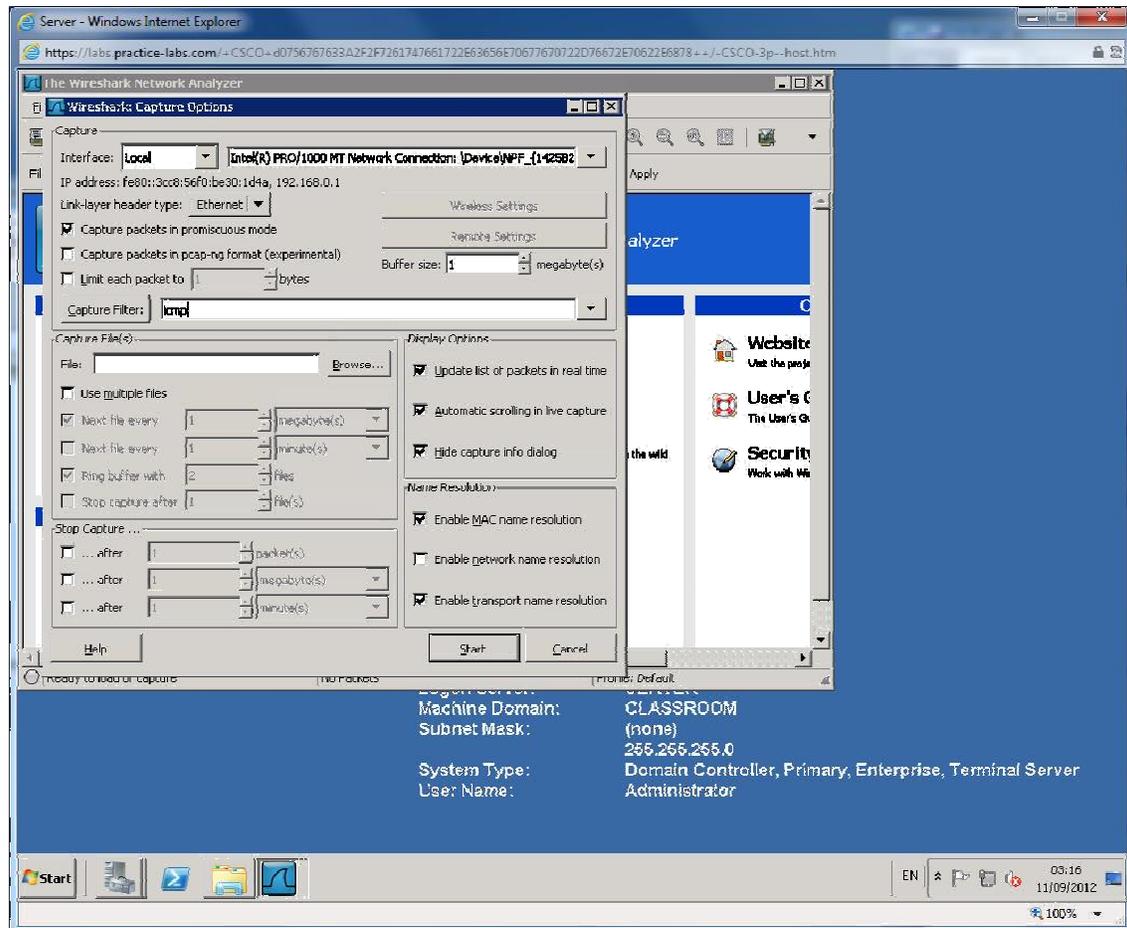
Step 2

Connect to SERVER and start Wireshark (desktop shortcut) and display the Capture Options dialog. Enter **icmp** in the **Capture Filter** box and click **Start**.

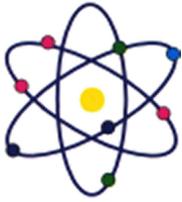


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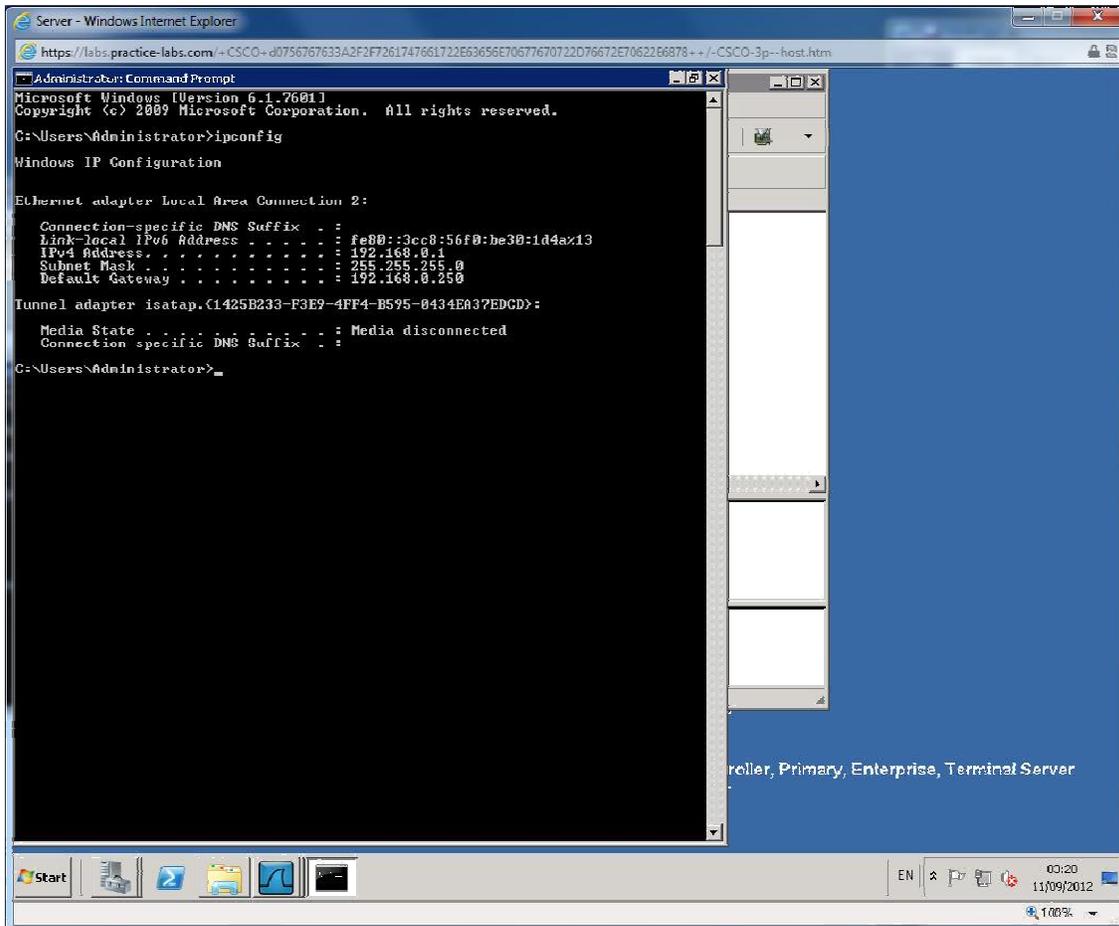


Recall that **SERVER** is configured with an IP address of **192.168.0.1** and a subnet mask of **255.255.255.0** you can confirm this by using the ipconfig command.

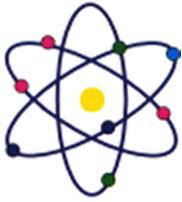


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From the open a command prompt enter ping 192.168.0.2 to verify the link.

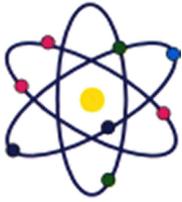


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The screenshot displays a Windows Server desktop with two windows open. The left window is a Command Prompt titled "Administrator: Command Prompt" showing the execution of a ping command to 192.168.0.2. The output indicates that all four packets were received successfully with a 0% loss rate. The right window is a Wireshark packet capture titled "Server - Windows Internet Explorer" showing a list of captured packets. The selected packet is an ICMP Echo Reply (ping response) from 192.168.0.2 to 192.168.0.1. The packet details show the IP header and the ICMP Echo Reply data, including the sequence number 21 and the TTL value of 128.

Observe the Wireshark packet capture you will see that the communication is successful between source address of 192.168.0.1 (SERVER) and 192.168.0.2 (CLIENT).



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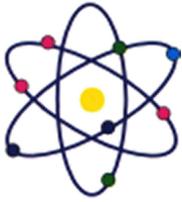
No.	Time	Source	Destination	Protocol	Info
1	0.000000	192.168.0.250	192.168.0.1	ICMP	destination unreachable (Host unreachable)
2	3.750997	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=21/5376, ttl=128)
3	3.976640	192.168.0.250	192.168.0.1	ICMP	destination unreachable (Host unreachable)
4	8.032589	192.168.0.250	192.168.0.1	ICMP	destination unreachable (Host unreachable)
5	8.577781	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=22/5632, ttl=128)
6	13.569804	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=23/5888, ttl=128)
7	13.570095	192.168.0.2	192.168.0.1	ICMP	Echo (ping) reply (id=0x0001, seq(byte)=23/5888, ttl=128)
8	19.966887	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=24/6144, ttl=128)
9	19.907106	192.168.0.2	192.168.0.1	ICMP	Echo (ping) reply (id=0x0001, seq(byte)=24/6144, ttl=128)
10	20.979851	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=25/6400, ttl=128)
11	20.980137	192.168.0.2	192.168.0.1	ICMP	Echo (ping) reply (id=0x0001, seq(byte)=25/6400, ttl=128)
12	21.993717	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=26/6656, ttl=128)
13	21.992927	192.168.0.2	192.168.0.1	ICMP	Echo (ping) reply (id=0x0001, seq(byte)=26/6656, ttl=128)
14	23.007747	192.168.0.1	192.168.0.2	ICMP	Echo (ping) request (id=0x0001, seq(byte)=27/6912, ttl=128)
15	23.007949	192.168.0.2	192.168.0.1	ICMP	Echo (ping) reply (id=0x0001, seq(byte)=27/6912, ttl=128)
16	30.730937	192.168.0.250	192.168.0.1	ICMP	destination unreachable (Host unreachable)

The screenshot also shows the packet details pane for the selected packet (No. 16), displaying the Ethernet II, Internet Protocol, and Internet Control Message Protocol layers. At the bottom, the hex and ASCII dump of the packet data is visible.

Step 3

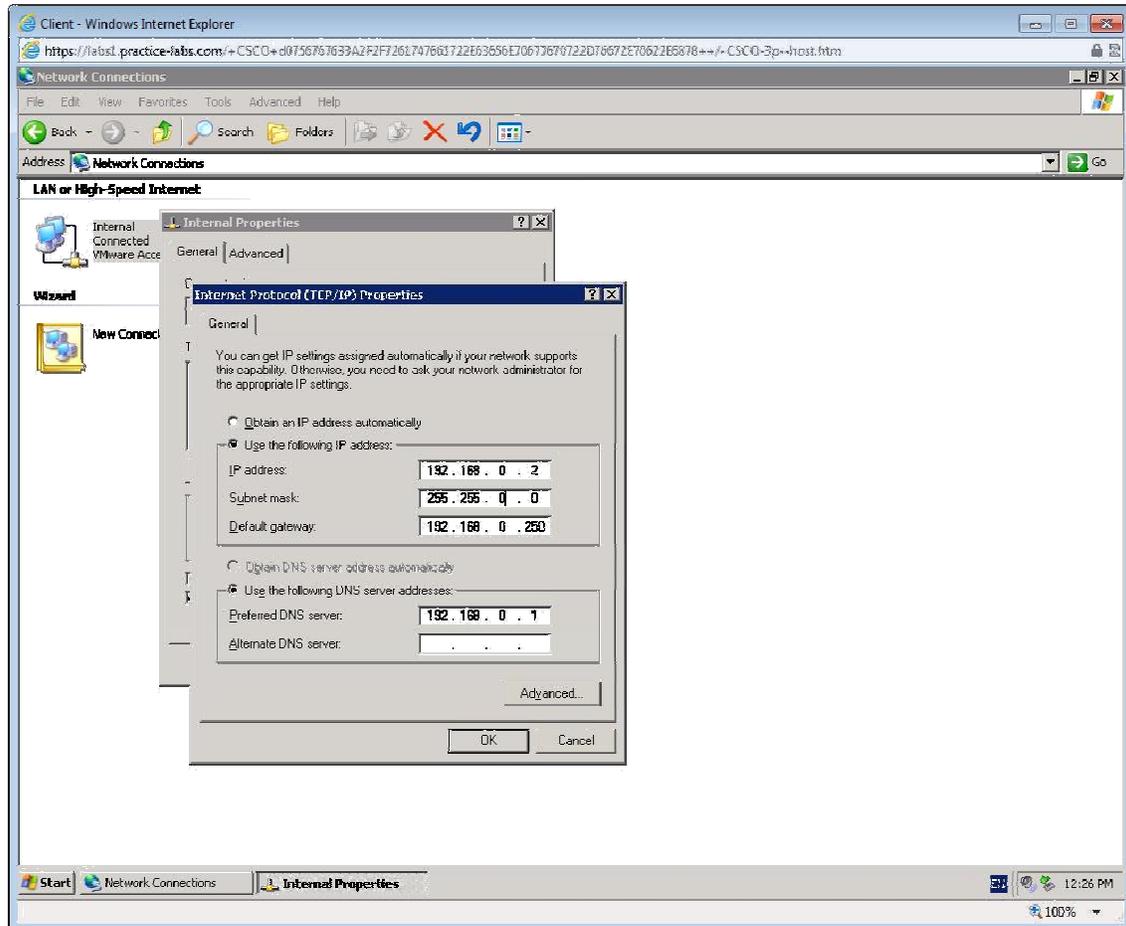
On **CLIENT** open the **IP Properties** dialog for the **Internal Lan** connection.

Set the subnet mask to **255.255.0.0**



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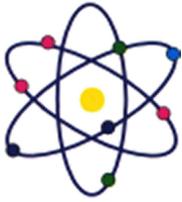


Click **OK** and **OK** again.

Note: You will be disconnected from the **CLIENT** device because of the change you have made.

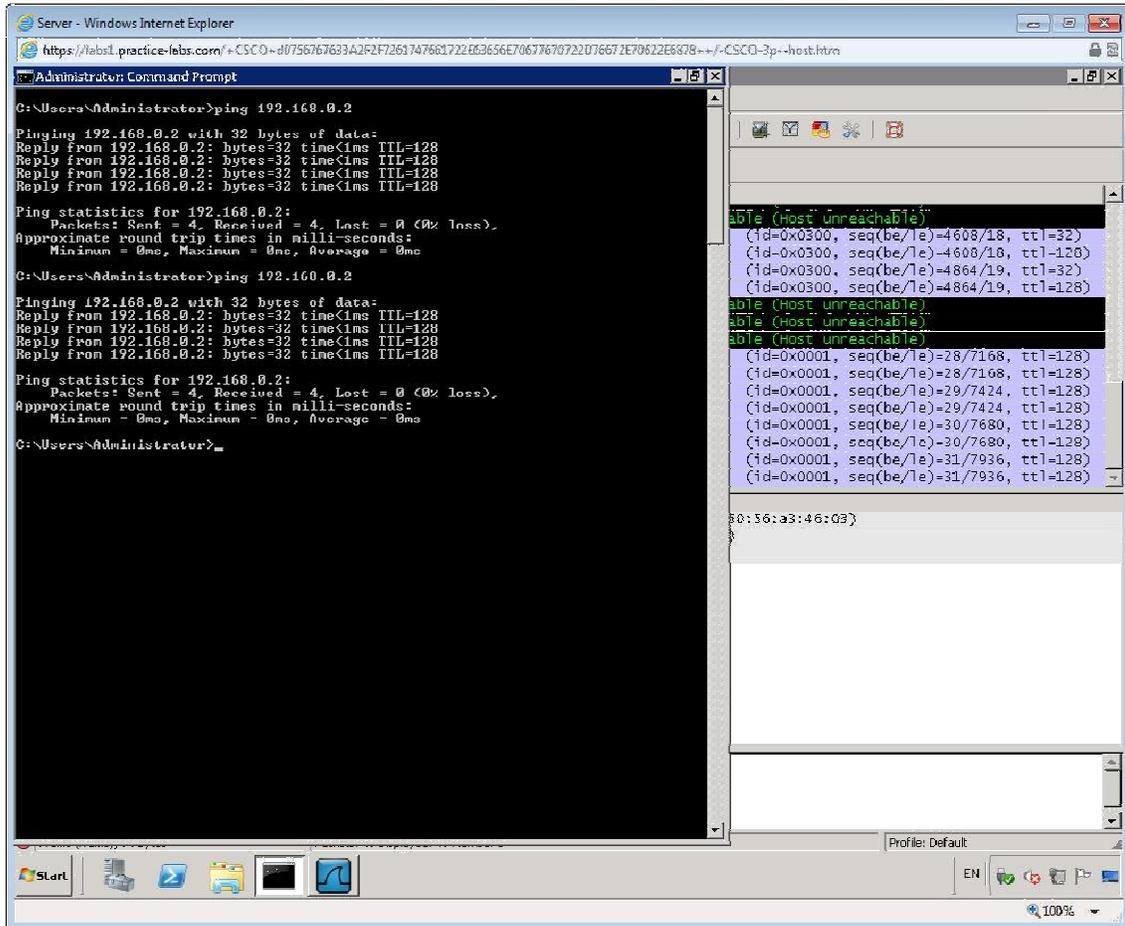
Step 4

On **Server** open a command prompt enter ping **192.168.0.2** to verify the link.



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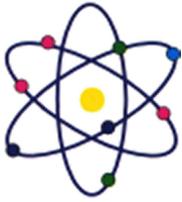


CLIENT can route to SERVER and SERVER can route back to CLIENT as the network ID is the same regardless of the mask. The frames show that each request receives a reply.

However your web session failed because the remote device (CLIENT) is no longer on the same network that you can connect to remotely.

Step 5

On **SERVER** use the **Remote Desktop Connection** client to **Connect** to **CLIENT**.



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The screenshot displays a Windows XP desktop environment. A Remote Desktop Connection dialog box is open, showing the computer name 'REMOTE' and the user name field set to 'None specified'. The dialog box has 'Connect' and 'Help' buttons. In the background, the Wireshark network protocol analyzer is running, capturing traffic on the Intel(R) PRO/1000 MT Network Connection. The packet list pane shows a series of ICMP Echo (ping) requests from 192.168.0.1 to 192.168.0.2. The packet details pane for the selected packet (No. 46) shows the following structure:

- Frame 46: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
- Ethernet II, Src: VMware_a3:46:03 (00:50:56:a3:46:03), Dst: vmware_a3:46:09 (00:50:56:a3:46:09)
- Internet Protocol Version 4, Src: 192.168.0.1 (192.168.0.1), Dst: 192.168.0.2 (192.168.0.2)
- Internet Control Message Protocol

The packet bytes pane shows the following hex and ASCII representation of the ICMP Echo request:

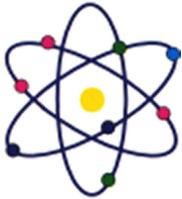
```
0000 00 50 56 a3 46 09 00 50 56 a3 46 03 08 00 45 00  .PV.F..P V.F...E.
0010 00 3c 1a 29 00 00 80 01 00 00 c0 a8 00 01 c0 a8  .<.)... ..
0020 00 02 08 00 4d 3d 00 01 00 1e 61 62 63 64 65 66  ...M... ..abcdef
0030 67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76  ghijklm nopqrstuv
0040 77 61 62 63 64 65 66 67 68 69                    wabcdefgh i
```

Login with the following details:

User name: administrator

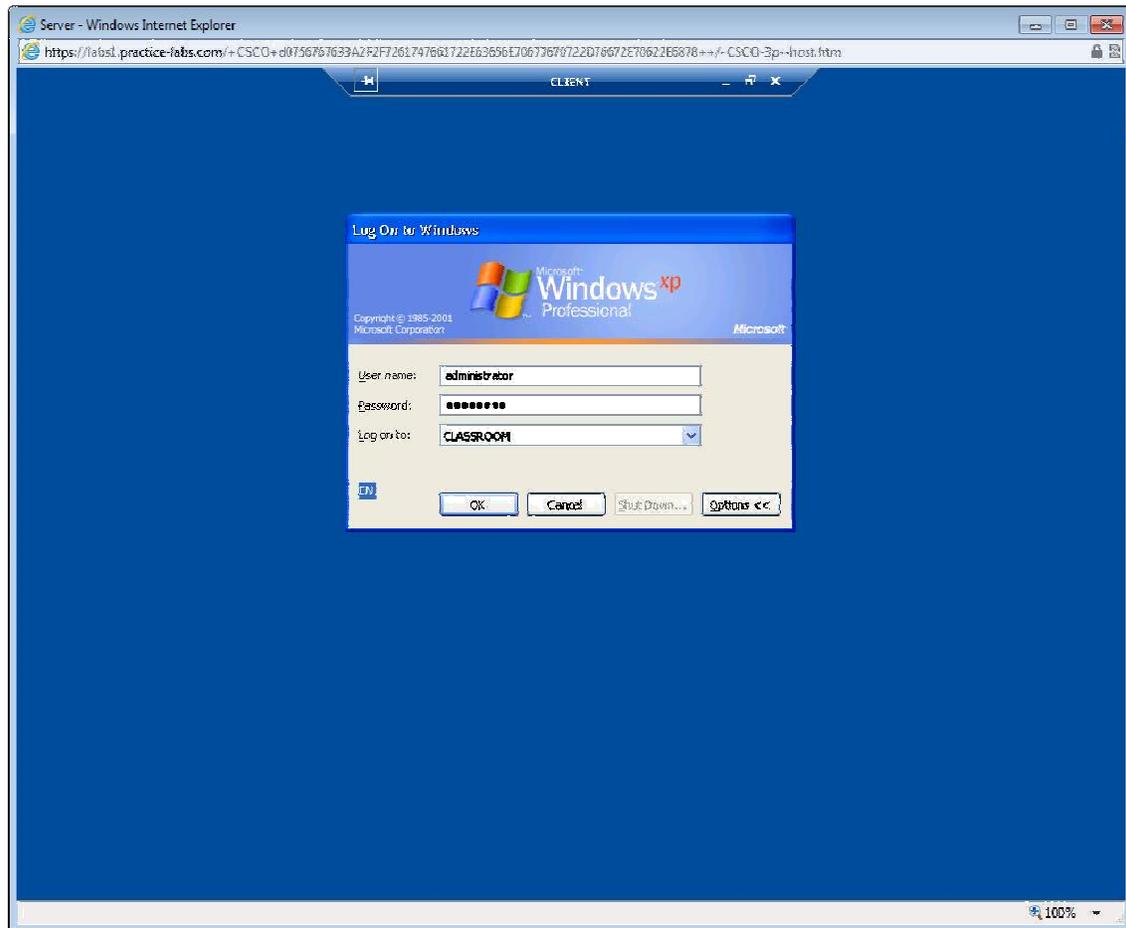
Password: Pa\$\$w0rd

Domain: Classroom

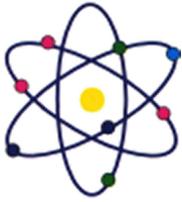


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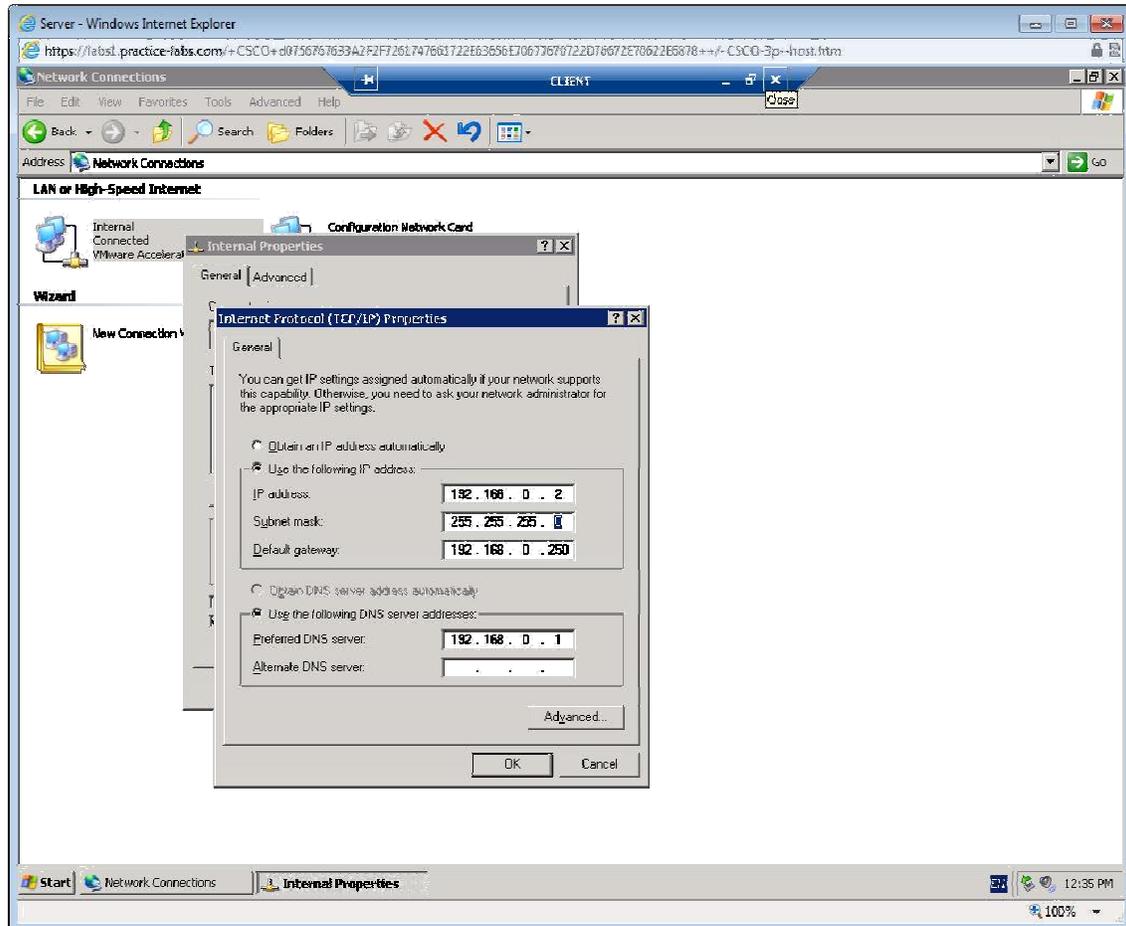


Change the Subnet mask back to 255.255.255.0.



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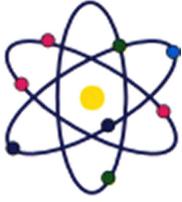
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Click OK to apply the changes.

Now use the **Connect** function located in the **Tool bar** of **CLIENT**. You should now be able to establish a new web session to the workstation.

Shutdown all virtual machines used in this lab, by using the power functions located in the Tools bar before proceeding to the next module. Alternatively you can log out of the lab platform.



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Summary

In this module you completed the following tasks:

- Identify IP address configuration on a Windows and Linux device.
- Install and configure DHCP.
- Configure IP address configuration on a Windows and Linux device.
- The impact of changing subnet masks.