

PRACTICALS

For linux experiments : do only student login , not guest login

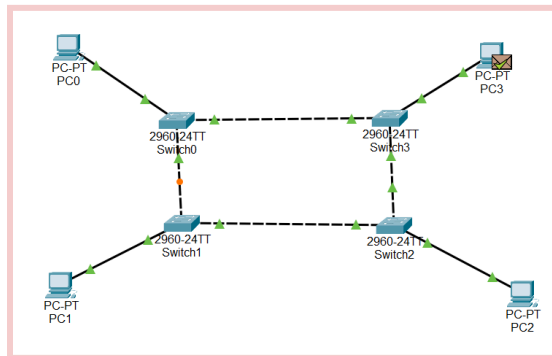
1. Basic linux commands

- **Ifconfig** : ifconfig
- **Ping** : first do ifconfig and then take the ip address from there and perform-ping 192.168.20.13 (dont type these numbers type the ip address written in the screen)
- **Tracepath** : tracepath.google.com
- **Traceroute** : traceroute google.com , traceroute rait.ac.in (any one of the two)
- **Host** : www.google.com
- **Nslookup** : nslookup google.com nslookup rait.ac.in (any one of the two)
- **Netstat** : netstat
- **IP** : ip
- **Dig** : dig google.com, dig rait.ac.in (any one of the two)

2. Network topology: cisco packet

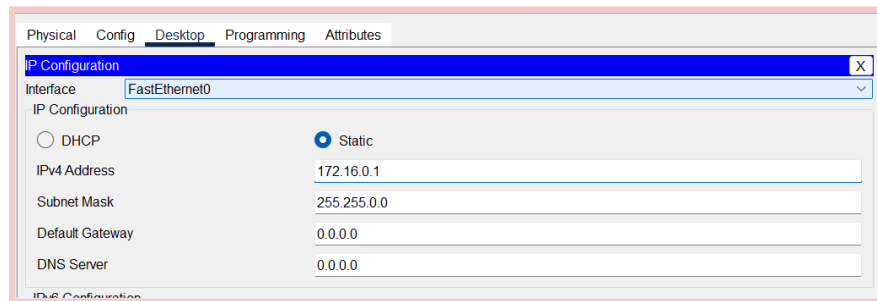
Ring topology:

- 4 PCs , 4 2960 switches
- Connection by automatic wire (it has a thunderbolt icon)

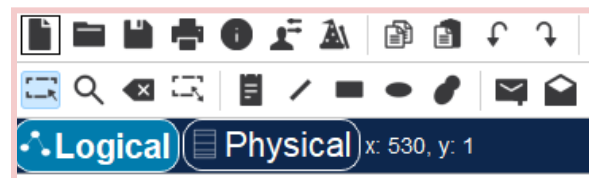


- Connect each PCs to one switch and connect all switches among themselves.
- Wait for arrows to turn green.

- Click on PC, select Desktop, Choose IP configuration, enter a random IP Address(172.16.0.1)in ipv4 Address section and the subnet mask gets automatically entered. Repeat the same for all 4PCs.



- Click on simulation in the right bottom corner. Click on **show All None**. click on edit filters and **choose ICMP**.
- Select the message icon(2nd row,2nd from right) on the left top and click on PC3 and PC0.

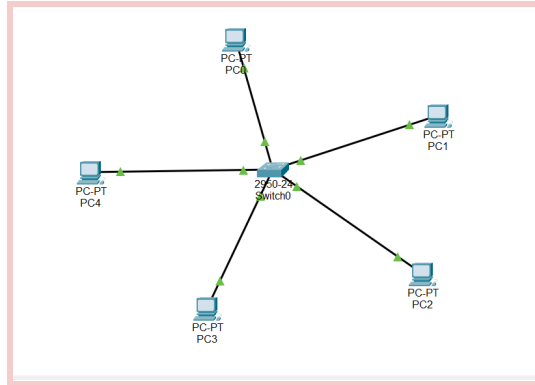


- click on the **play button** on the simulation window. Wait until the message is passed and shows **successful status** at right bottom

Event List										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC3	PC0	ICMP		0.000	N	0	(edit)	(delete)

Star Topology:

- 5 PCs and 1 2950-24 switch



- Connect all PCs to switch using same wire option as above
- Wait for arrows to turn green
- Follow all the remaining steps same as above

3. Hamming code : c code

```
#include<stdio.h>

void main() {
    int data[10];
    int dataatrec[10],c,c1,c2,c3,i;

    printf("Enter 4 bits of data one by one\n");
    scanf("%d",&data[0]);
    scanf("%d",&data[1]);
    scanf("%d",&data[2]);
    scanf("%d",&data[4]);

    //Calculation of even parity
    data[6]=data[0]^data[2]^data[4];
    data[5]=data[0]^data[1]^data[4];
    data[3]=data[0]^data[1]^data[2];

    printf("\nEncoded data is\n");
    for(i=0;i<7;i++)
        printf("%d ",data[i]);

    printf("\n\nEnter received data bits one by one\n");
    for(i=0;i<7;i++)
        scanf("%d",&dataatrec[i]);

    c1=dataatrec[6]^dataatrec[4]^dataatrec[2]^dataatrec[0];
```

```

c2=dataatrec[5]^dataatrec[4]^dataatrec[1]^dataatrec[0];
c3=dataatrec[3]^dataatrec[2]^dataatrec[1]^dataatrec[0];
c=c3*4+c2*2+c1 ;

```

```

    if(c==0) {
printf("\nNo error while transmission of data\n");
    }
else {
printf("\nError on position %d",c);

```

```

printf("\nData sent : ");
    for(i=0;i<7;i++)
        printf("%d",data[i]);

```

```

printf("\nData received : ");
    for(i=0;i<7;i++)
        printf("%d",dataatrec[i]);
printf("\nCorrect message is\n");

```

```

//if erroneous bit is 0 we complement it else vice versa
if(dataatrec[7-c]==0)
dataatrec[7-c]=1;
    else
dataatrec[7-c]=0;
for (i=0;i<7;i++) {
printf("%d",dataatrec[i]);
}
,}
}

```

4. Packet filtering by IP forwarding: linux

- Add Routes

```

sudo route add -net 162.50.1.1 gw 192.168.52.1 netmask 255.255.255.255
password
netstat -rn

```

- Delete Routes

```

sudo route del -net 162.50.1.1 gw 192.168.52.1 netmask 255.255.255.255
netstat -rn

```

- Change default gateway

```

sudo route add default gw 192.168.52.1
netstat -rn

```

- Delete gateway added

sudo route del default gw 192.168.52.1

netstat -rn

```
student@student-HP-280-G2-Microtower:~$ sudo route add -net 162.50.1.1 gw 192.168.52.1 netmask 255.255.255.255
[sudo] password for student:
student@student-HP-280-G2-Microtower:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 192.168.52.1 0.0.0.0 UG 0 0 0 enp4s0
10.0.0.10 192.168.52.1 255.255.255.255 UGH 0 0 0 enp4s0
162.50.1.1 192.168.52.1 255.255.255.255 UGH 0 0 0 enp4s0
169.254.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.52.0 0.0.0.0 255.255.254.0 U 0 0 0 enp4s0
student@student-HP-280-G2-Microtower:~$ sudo route del -net 162.50.1.1 gw 192.168.52.1 netmask 255.255.255.255
student@student-HP-280-G2-Microtower:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 192.168.52.1 0.0.0.0 UG 0 0 0 enp4s0
10.0.0.10 192.168.52.1 255.255.255.255 UGH 0 0 0 enp4s0
169.254.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.52.0 0.0.0.0 255.255.254.0 U 0 0 0 enp4s0
student@student-HP-280-G2-Microtower:~$ sudo route add default gw 192.168.52.1
student@student-HP-280-G2-Microtower:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 192.168.52.1 0.0.0.0 UG 0 0 0 enp4s0
0.0.0.0 192.168.52.1 0.0.0.0 UG 0 0 0 enp4s0
10.0.0.10 192.168.52.1 255.255.255.255 UGH 0 0 0 enp4s0
169.254.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.52.0 0.0.0.0 255.255.254.0 U 0 0 0 enp4s0
student@student-HP-280-G2-Microtower:~$ sudo route del default gw 192.168.52.1
student@student-HP-280-G2-Microtower:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 192.168.52.1 0.0.0.0 UG 0 0 0 enp4s0
10.0.0.10 192.168.52.1 255.255.255.255 UGH 0 0 0 enp4s0
169.254.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.52.0 0.0.0.0 255.255.254.0 U 0 0 0 enp4s0
student@student-HP-280-G2-Microtower:~$
```

5. Socket programming (exp 8) : linux

- Make 2 different file : one for **server side** and one for **client side**

Server side

sudo nano MyServer.java **(IN LINUX)**

```
import java.io.*; import java.net.*;
public class MyServer
public static void main(String[] args){
try { ServerSocket ss=new ServerSocket(6666); Socket s=ss.accept();//establishes connection
DataInputStream dis=new DataInputStream(s.getInputStream()); String
str=(String)dis.readUTF(); System.out.println("message= "+str); ss.close();
}
catch(Exception e){System.out.println(e);
}
```

```
}  
}
```

After copy paste, press ctrl+x , y , enter (this will save your file)

Client side server

sudo nano MyClient.java **(IN LINUX)**

```
import java.io.*; import java.net.*;  
public class MyClient {  
    public static void main(String[] args) {  
        try { Socket s=new Socket("localhost",6666); DataOutputStream dout=new  
            DataOutputStream(s.getOutputStream()); dout.writeUTF("Hello Server"); dout.flush();  
            dout.close(); s.close(); }  
        catch(Exception e){System.out.println(e);  
        }  
    }  
}
```

After copy paste, press ctrl+x , y , enter (this will save your file)

To run the file in Linux:

If **javac not found** do this:

sudo apt install default-jdk

javac MyServer.java

java MyServer

OPEN NEW TERMINAL KEEP OLD ONE OPEN

javac MyClient.java

java MyClient

After this you should find the message on MyServer terminal

6. Perform file transfer - linux

- sudo apt-get install vsftpd
- sudo nano /etc/vsftpd.conf
- sudo service vsftpd start
- service vsftpd status
- service vsftpd stop
- service vsftpd status

- sudo service vsftpd start
- Ifconfig
- ftp <your IP-address>
- <username ubuntu ka>
- <password>
- ls
- Lcd
- get <your local directory that lcd gives>
- put <your local directory that lcd gives>
- pwd
- put /home/student/Desktop/FTP logged in.png
- sudo get /home/student/Desktop/FTP logged in.png
- quit

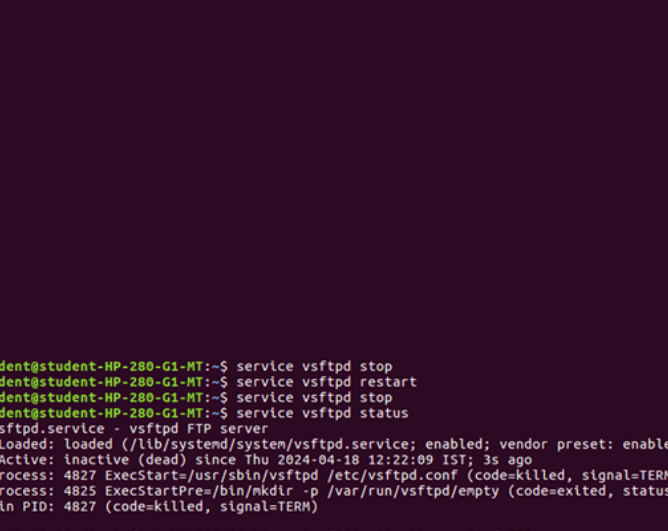
```
student@student-HP-280-G1-MT:~$ sudo apt-get install vsftpd
Reading package lists... Done
Building dependency tree
Reading state information... Done
vsftpd is already the newest version (3.0.3-3ubuntu2).
0 upgraded, 0 newly installed, 0 to remove and 81 not upgraded.
student@student-HP-280-G1-MT:~$ ls
Desktop  Downloads  faizan.txt  os1        Public  suno        Videos
Documents  examples.desktop  Music      Pictures  siya    Templates
student@student-HP-280-G1-MT:~$ cd Desktop/
student@student-HP-280-G1-MT:~/Desktop$ sudo gedit /etc/vsftpd.conf

** (gedit:4956): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-position not supported
student@student-HP-280-G1-MT:~/Desktop$ sudo gedit /etc/vsftpd.conf

** (gedit:5079): WARNING **: Set document metadata failed: Setting attribute metadata::gedit-position not supported
student@student-HP-280-G1-MT:~/Desktop$ service vsftpd start
student@student-HP-280-G1-MT:~/Desktop$ service vsftpd status
● vsftpd.service - vsftpd FTP server
   Loaded: loaded (/lib/systemd/system/vsftpd.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2024-04-18 12:05:42 IST; 13min ago
     Process: 828 ExecStartPre=/bin/mkdir -p /var/run/vsftpd/empty (code=exited, status=0/SUCCESS)
    Main PID: 831 (vsftpd)
      CGroup: /system.slice/vsftpd.service
              └─831 /usr/sbin/vsftpd /etc/vsftpd.conf

Apr 18 12:05:42 student-HP-280-G1-MT systemd[1]: Starting vsftpd FTP server...
Apr 18 12:05:42 student-HP-280-G1-MT systemd[1]: Started vsftpd FTP server.
Apr 18 12:18:18 student-HP-280-G1-MT systemd[1]: Started vsftpd FTP server.
student@student-HP-280-G1-MT:~/Desktop$
```

```
student@student-HP-280-G1-MT:~/Desktop$ ^C
student@student-HP-280-G1-MT:~/Desktop$ service vsftpd restart
student@student-HP-280-G1-MT:~/Desktop$ ftp 192.168.52.54
Connected to 192.168.52.54.
220 (vsFTPd 3.0.3)
Name (192.168.52.54:student): student
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```



The terminal window displays the following commands and output:

```

student@student-HP-280-G1-MT:~$ service vsftpd stop
student@student-HP-280-G1-MT:~$ service vsftpd restart
student@student-HP-280-G1-MT:~$ service vsftpd stop
student@student-HP-280-G1-MT:~$ service vsftpd status
● vsftpd.service - vsftpd FTP server
   Loaded: loaded (/lib/systemd/system/vsftpd.service; enabled; vendor preset: enabled)
   Active: inactive (dead) since Thu 2024-04-18 12:22:09 IST; 3s ago
     Process: 4827 ExecStartPre=/usr/sbin/vsftpd /etc/vsftpd.conf (code=killed, signal=TERM)
     Process: 4825 ExecStartPre=/bin/mkdir -p /var/run/vsftpd/empty (code=exited, status=0/SUCCESS)
    Main PID: 4827 (code=killed, signal=TERM)

Apr 18 12:21:42 student-HP-280-G1-MT systemd[1]: Starting vsftpd FTP server...
Apr 18 12:21:42 student-HP-280-G1-MT systemd[1]: Started vsftpd FTP server.
Apr 18 12:22:09 student-HP-280-G1-MT systemd[1]: Stopping vsftpd FTP server...
Apr 18 12:22:09 student-HP-280-G1-MT systemd[1]: Stopped vsftpd FTP server.
student@student-HP-280-G1-MT:~$

```



```
student@student-HP-280-G1-MT:~  
TX packets:365 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:31662 (31.6 KB) TX bytes:31662 (31.6 KB)  
  
student@student-HP-280-G1-MT:~$ ftp 192.168.52.183  
Connected to 192.168.52.183.  
220 (vsFTPd 3.0.3)  
Name (192.168.52.183:student): student  
331 Please specify the password.  
Password:  
230 Login successful.  
Remote system type is UNIX.  
Using binary mode to transfer files.  
ftp> ls  
200 PORT command successful. Consider using PASV.  
150 Here comes the directory listing.  
drwxr-xr-x 2 1000 1000 4096 Apr 10 10:48 Desktop  
drwxr-xr-x 2 1000 1000 4096 Jan 19 15:41 Documents  
drwxr-xr-x 2 1000 1000 4096 Apr 10 09:31 Downloads  
drwxr-xr-x 2 1000 1000 4096 Jan 19 15:41 Music  
drwxr-xr-x 2 1000 1000 4096 Apr 18 12:22 Pictures  
drwxr-xr-x 2 1000 1000 4096 Jan 19 15:41 Public  
drwxr-xr-x 2 1000 1000 4096 Jan 19 15:41 Templates  
drwxr-xr-x 2 1000 1000 4096 Jan 19 15:41 Videos  
-rw-r--r-- 1 1000 1000 8980 Jan 17 12:21 examples.desktop  
drwxrwxr-x 2 1000 1000 4096 Jan 25 13:34 exp2  
-rw-rw-r-- 1 1000 1000 13 Apr 10 10:33 falsal.txt  
-rw-rw-r-- 1 1000 1000 29 Apr 10 10:32 faizan.txt  
-rw-rw-r-- 1 1000 1000 0 Apr 10 10:44 nipun.txt  
drwxrwxr-x 2 1000 1000 4096 Jan 25 14:54 os  
drwxrwxr-x 2 1000 1000 4096 Jan 25 13:39 os1  
226 Directory send OK.  
ftp> get  
(remote-file)  
usage: get remote-file [ local-file ]  
ftp> lcd  
Local directory now /home/student  
ftp> get /home/student  
local: ./home/student remote: /home/student  
local: ./home/student: No such file or directory  
ftp> put /home/student  
local: /home/student remote: /home/student  
/home/student: not a plain file.  
  
local: FTP remote: logged  
local: FTP: No such file or directory  
ftp> pws  
?Invalid command  
ftp> pwd  
257 "/home/student/Desktop" is the current directory  
ftp> put /home/student/Desktop/FTP logged in.png  
local: /home/student/Desktop/FTP remote: logged  
local: /home/student/Desktop/FTP: No such file or directory  
ftp> get /home/student/Desktop/FTP logged in.png  
local: logged remote: /home/student/Desktop/FTP  
200 PORT command successful. Consider using PASV.  
550 Failed to open file.  
ftp> sudo get /home/student/Desktop/FTP logged in.png  
?Invalid command  
ftp> quit  
221 Goodbye.
```

7. Perform remote login - linux

- sudo apt-get install telnet
- <password>
- sudo /etc/
- Ifconfig
- telnet <your ip address>
- sudo apt-get install telnetd
- mkdir <directory name>
- ls
- rmdir <directory name>
- ls
- mv <any .txt file> <any .txt file>
- ls

```

student@student-HP-280-G1-MT:~/Desktop$ sudo apt-get install telnet
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
telnet is already the newest version (0.17-40).
0 upgraded, 0 newly installed, 0 to remove and 81 not upgraded.
student@student-HP-280-G1-MT:~/Desktop$ sudo /etc/
Display all 130 possibilities? (y or n)
acpi/ cron.hourly/ groff/ lightdm/ rc0.d/ sudoers.d/
alternatives/ cron.monthly/ grub.d/ logcheck/ rc1.d/ sysctl.d/
apm/ cron.weekly/ gss/ logrotate.d/ rc2.d/ systemd/
apparmor/ cups/ gtk-2.0/ modprobe.d/ rc3.d/ termInfo/
apparmor.d/ cupshelpers/ gtk-3.0/ modules-load.d/ rc4.d/ thermal.d/
appport/ dbus-1/ guest-session/ network/ rc5.d/ thunderbird/
apt/ dconf/ hp/ NetworkManager/ rc6.d/ tmpfiles.d/
aptdaemon/ default/ ifplugd/ newt/ rc.local udev/
at-spi2/ depmod.d/ ImageMagick-6/ opt/ rcS.d/ udisks2/
avahi/ dhcp/ init/ pam.d/ resolvconf/ ufw/
bash_completion.d/ dictionaries-common/ init.d/ pcmcia/ rmt update-manager/
binfmt.d/ dnsmasq.d/ initscripts/ perl/ rsyslog.d/ update-motd.d/
bluetooth/ doc-base/ lnsserv/ pkl/ sane.d/ update-notifier/
brltty/ dpkg/ lnsserv.conf.d/ pm/ security/ UPower/
ca-certificates/ emacs/ lproute2/ polkit-1/ selinux/ usb_modeswitch.d/
calendar/ firefox/ kbd/ ppp/ sensors.d/ vlm/
chatscripts/ fonts/ kernel/ profile.d/ sgml/ wpa_supplicant/

student@student-HP-280-G1-MT:~/Desktop$ telnet 192.168.52.54
Trying 192.168.52.54...
Connected to 192.168.52.54.
Escape character is '^J'.
Ubuntu 16.04.6 LTS
student-HP-280-G1-MT login: mkdir
Password: Connection closed by foreign host.
student@student-HP-280-G1-MT:~/Desktop$ telnet 192.168.52.54
Trying 192.168.52.54...
Connected to 192.168.52.54.
Escape character is '^J'.
Ubuntu 16.04.6 LTS
student-HP-280-G1-MT login: student
Password:
Last login: Wed Apr 10 10:53:26 IST 2024 from 192.168.52.220 on pts/2
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.15.0-142-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

89 packages can be updated.
2 updates are security updates.

student@student-HP-280-G1-MT:~$ sudo apt-get install telnetd
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
telnetd is already the newest version (0.17-40).
0 upgraded, 0 newly installed, 0 to remove and 81 not upgraded.
student@student-HP-280-G1-MT:~$ mkdir sanjyot
student@student-HP-280-G1-MT:~$ ls
Desktop Documents Downloads examples.desktop faizan.txt Music os1 Pictures Public sanjyot siya suno Templates Videos
student@student-HP-280-G1-MT:~$ rmdir sanjyot/
student@student-HP-280-G1-MT:~$ ls
Desktop Documents Downloads examples.desktop faizan.txt Music os1 Pictures Public siya suno Templates Videos
student@student-HP-280-G1-MT:~$ mv faizan.txt sanjyot.txt
student@student-HP-280-G1-MT:~$ ls
Desktop Documents Downloads examples.desktop Music os1 Pictures Public sanjyot.txt siya suno Templates Videos
student@student-HP-280-G1-MT:~$

```

If you get error that states **telnet not found** do this:

- `sudo nano /etc/xinetd.d/telnet`
 - Enter the following code in the file:

```

service telnet {
    disable = no
    flags = REUSE
    socket_type = stream
    wait = no
    user = root
    server = /usr/sbin/in.telnetd
    log_on_failure += USERID
}
```
- `sudo /etc/init.d/xinetd restart`
- `telnet localhost`

8. Setup network - cisco packet

This is too tough to do and nobody knows how to complete it in 1hr (takes 3hrs)

God forbid that you should not get this experiment

If you get , leave lab and run for your life
Get minimum marks or get your experiment changed
Good luck, love for you <3<3