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## L2 switches

### Lab setup

*For this lab boot into windows XP. Choose other option in grub and then choose earlier version of Windows.*

**Although there are no lab queries in the handout, viva based on this lab can be taken later on. Hence all students should do this lab properly.**

This lab will be demoed with both Physical switch and Cisco Packet Tracer in class. Steps are mentioned with respect to hardware switches and not with respect to Cisco Packet Tracer. Adjust the steps while using simulator appropriately.

It is necessary for all students to practice same setup using physical switches in lab, so that all students are comfortable with actual switches and not just simulator.

### Information about switch and cables

#### About L2 switches

- We can configure access ports and trunk ports
- We can configure VLAN 1 IP so that we can telnet to switch or access it over http
- We can configure storm control
- We can configure standard and extended access lists with some limitations
- We can configure switch to be vtp server, vtp client or to be in vtp transparent mode
- We can enable / disable specific ports administratively.

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- Light at top of port on switch can be used to see if port is enabled or err-disabled

### **About L3 switches**

- We can configure IPs in multiple VLANs and do inter-VLAN routing
- We can configure static routing
- We can configure basic routing protocols like RIP, RIPv2, EIGRP

### **About network cables**

- Straight cables and color coding (W/O, O, W/G, Bl, W/Bl, G, W/Br, Br; etc.)
- About com cable
- About using USB to serial converter for connecting to switches using laptop.

### **Connecting to L2 switch**

1. Start switch by connecting power cable and powering it on. Connect console cable from serial port of PC to console port of switch.
2. Use 'Start → All programs → Accessories → Communications → Hyperterminal'.
3. If asked for location, tone dialing / pulse dialing etc. fill any random values. This is one time menu and values dont matter at all.
4. When prompted for 'Connection Description' enter some name like 'cisco\_switch'.
5. In 'Connect To' choose 'Connect using' com1.
6. In 'Com1 Properties' click on default settings so that values become 9600, 8, N, 1, N.
7. Then click 'ok' to connect to switch.
8. If prompted for password enter 'iiit123' as password. This should bring you to prompt like:

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```
switch_name>
```

9. Now use command 'enable' to go to enable mode. When prompted for password use 'iiit123'. This should bring you to prompt like:

```
switch_name#
```

## Terminology

- The password prompted for while connecting through console before giving any password is called 'console password'.
- The prompt that comes after entering console password is called 'user mode' or 'user exec mode'. This prompt has switch name followed by a greater than ('>') sign.
- The password prompted for after entering 'enable' command on user exec mode is called 'enable password'.
- The prompt that comes after entering enable password is called 'enable mode' or 'privileged mode' or 'privileged exec mode'. This prompt has switch name followed by a hash('#') sign.
- The prompt that comes after entering 'configure terminal' command in enable mode is called 'global configuration mode'. This prompt has switch name followed by '(config)#'.
- The prompt that comes after entering 'interface fastethernet 0/1' command in global configuration mode is called 'interface configuration mode'. This prompt has switch name followed by '(config-if)#'.
- The prompt that comes after entering 'line vty 0 15' command in global configuration mode is called 'line configuration mode'. This prompt has switch name followed by '(config-line)#'.

Also learn about command 'line console 0' to go into line configuration mode and about vty passwords required when connecting to switch over telnet.

## Basic switch operations and commands

1. See switch version information. Specifically IOS version and switch model number.

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```
show version
```

2. Erase current switch configuration

```
erase startup-config  
write erase (on newer IOS)
```

3. Reload switch

```
reload
```

Note that there is no shutdown option for switch. Whenever we are finished working with switch we can physically power it off by removing power cable or by switching off power from AC wall socket.

4. Configure switch hostname

```
hostname <switch_name>
```

5. Save running configuration as startup-configuration.

```
copy running-config startup-config  
write (on newer IOS)
```

6. See current configuration

```
show running-config
```

7. See which interface are up and which are down

```
show interface status  
show ip interface brief (on new switches)
```

8. See details of particular interface

```
show interfaces fastethernet 0/1
```

9. See details of all interfaces

```
show interfaces
```

10. Configure IP address of switch:

```
interface vlan 1  
ip address 10.10.10.1 255.255.255.0  
no shutdown
```

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11. Configure Default gateway for switch:

```
ip default-gateway 10.10.10.2
```

12. Configure DNS server

```
ip name-server 192.168.36.222
```

13. Configure console password:

```
line console 0
password iit123
login
```

14. Configure vty password: (Note vty password must be set if you want to use telnet to connect to switch)

```
line vty 0 15
password iit123
login
```

15. Configure enable password (more or less useless if enable secret is also set)

```
enable password dummy
```

16. Configure enable secret

```
enable secret iit123
```

17. Use password encryption feature

```
service password-encryption
```

18. Enable synchronous logging for vty and console

```
logging synchronous
```

19. See command history: (Note wont persist between multiple connections to switch)

```
show history
```

20. Modify history commands length:

```
terminal history size <lines>
```

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21. See current time

```
show clock
```

22. Set time

```
clock set 14:37:00 24 Jan 2011
```

23. Configure access port:

```
switchport mode access
switchport access vlan <vlan_number>
```

Note by default all ports are in access vlan 1.

24. Configure trunk port:

```
switchport mode trunk
switchport trunk allowed vlan 1,100
```

25. Learn to use auto-complete features of switch prompt. Also learn to use help using '?' key or help command.

26. Learn to configure banners motd, login and exec and where they get displayed

```
banner login Thisisloginbanner
banner motd # This is MOTD banner #
banner exec ^This is exec banner ^
```

Only motd banner can be configured in simulator

27. Learn to configure exec-timeout for additional security for both console and vty lines

```
exec-timeout 15 0
```

28. Shutdown interface administratively or disable administrative shutdown of interface.

```
shutdown
no shutdown
```

Note that we do not have reverse commands in switch. To negate command we need to precede complement command with 'no')

29. Configure port speed

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speed 100

30. Configure duplex settings

duplex full