


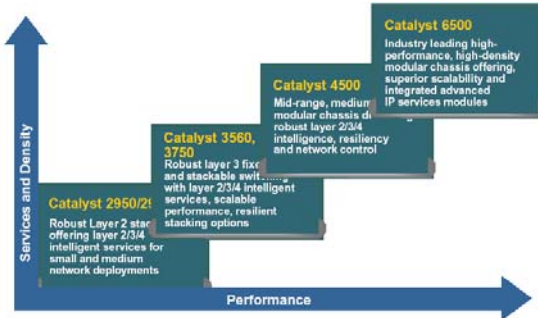
Cisco Devices

CONFIGURING CISCO SWITCH AND ROUTER



Cisco Devices

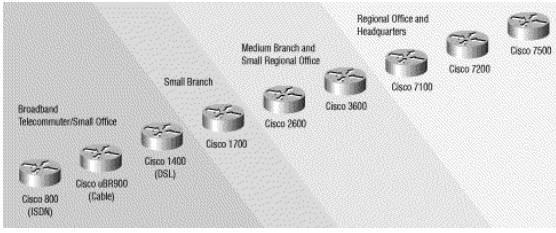
Cisco's LAN Switches



| Model | Key Features |
|---------------------|---|
| Catalyst 2950/21 | Robust Layer 2 star offering layer 2/3/4 intelligent services for small and medium network deployments |
| Catalyst 3560, 3750 | Robust layer 3 fixed and stackable switch with layer 2/3/4 intelligent services, scalable performance, resilient stacking options |
| Catalyst 4500 | Mid-range, medium modular chassis design, robust layer 2/3/4 intelligence, resiliency and network control |
| Catalyst 6500 | Industry leading high-performance, high-density modular chassis offering superior scalability and integrated advanced IP services modules |

Cisco Devices

Cisco's Routers



| Office Type | Router Models |
|---|--|
| Broadband Telecommuter/Small Office | Cisco 800 (ISDN), Cisco uBR900 (Cable), Cisco 1400 (DSL) |
| Small Branch | Cisco 1700 |
| Medium Branch and Small Regional Office | Cisco 2600, Cisco 3600 |
| Regional Office and Headquarters | Cisco 7100, Cisco 7200, Cisco 7500 |

Cisco Devices

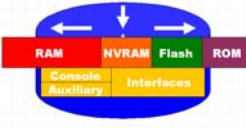
Hardware Components

- **Depending on the model/series (at least)**
 - Mother Board/Back Plane
 - CPU (RISC - MIPS or Motorola)
 - Memory
 - Bus
 - I/O interfaces/Modules

Cisco Devices

Memory Components

- **Flash Memory** – Holds the IOS; is not erased when the router is reloaded; is an EEPROM [Electrically Erasable Programmable Read-Only Memory] created by Intel, that can be erased and reprogrammed repeatedly through an application of higher than normal electric voltage
- **NVRAM** – Non-Volatile RAM - holds router configuration; is not erased when router is reloaded
- **RAM** – Holds packet buffers, ARP cache, routing table, software and data structure that allows the router to function; running-config is stored in RAM, as well as the decompressed IOS in later router models
- **ROM** – Starts and maintains the router



The diagram shows a central blue oval with a downward arrow pointing to a horizontal bar. The bar is divided into segments: RAM (red), NVRAM (orange), Flash (green), and ROM (purple). Below this bar are two yellow boxes labeled 'Console/Auxiliary' and 'Interfaces'.

Cisco Devices

What is IOS?

Internetwork Operating System

- Operating System of all Cisco Devices
- A derivative of BSD UNIX
- Custom built by Cisco for each platform
- Pre-packaged and static. Complete IOS is upgraded.
- Features available in different versions (for a price!)
- GUI's available, but 90%+ of users still prefer command-line configuration.
- IOS is designed to be hardware independent.

Cisco Devices

Configuring Cisco Devices

- Provides Command Line Interface (CLI) and HTTP interface
- HTTP Interface may be an extension of CLI
- CLI can be accessed using Consol Port (through Hyper Terminal) or by Telnetting the device

Cisco Devices

Configuring Cisco Devices

Two modes of Operation :

- Consol Mode : Only Status can be monitored
- Enable Mode : Configuration can be changed and seen
- Router> enable (disable)
Router#

Cisco Devices

CLI Commands

- Exhaustive Command List
- Type help or ? to see list of commands
- Type command ? to see the possible command options
- Commands can be auto-completed using TAB
- Up-Arrow, Down-Arrow can be used to see command history
- Abbreviations of Commands can be used

Cisco Devices

Show Configuration

- sh run : To see running configuration
- sh conf : To see saved configuration

Cisco Devices

Save Configuration

- wr mem

Cisco Devices

Configuration Mode

- conf t

Cisco Devices

Disable or Delete the Configuration

- Use "no" before the configuration line

Cisco Devices

General Commands

- hostname
- ip default-gateway
- ip name-server
- ip routing
- ip route
- ip multicast-routing
- banner

Cisco Devices

Interface Configuration Commands

- Interfaces are named by type and position; e.g.:
 - ethernet0, ethernet1/0,... Fastethernet0,fastethernet1/0,... gigabitethernet0.gigabitethernet1/0
 - serial0, serial1 ... serial3/1
- Can be abbreviated:
 - ethernet0 or eth0 or e0
 - serial0 or ser0 or s0
- IP address and netmask configuration, status configuration etc. are done using interface commands:
 - router#config terminal
 - router(config)#interface e0
 - router(config-if)#ip address 195.176.118.254 255.255.255.0
 - router(config-if)#exit
 - router#

Cisco Devices

Interface Commands

- ip address < ip address > < netmask >
- ip address < ip address > < netmask > **secondary**
- duplex full/half/auto
- speed 10/100/1000/auto
- bandwidth < bandwidth in kbps >
- description < interface description >
- shutdown

- encapsulaion hdhc/ppp

Cisco Devices

Static Routing Commands

- ip route <network address> <netmask> <gateway router address>
 - ip route 172.16.20.0 255.255.255.0 172.16.10.2
- ip default-gateway < default gateway router address>
 - ip default-gateway 172.16.10.1
 - ip route 0.0.0.0 0.0.0.0 172.16.10.1

Cisco Devices

Backup & Restore Configuration

- Copy (from cisco device to tftp server and vice-versa)
- copy startup-config tftp (it will ask the tftp server ip address and destination filename)
- copy tftp startup-config (it will ask the tftp server ip address and destination filename)

Cisco Devices

Static NAT Commands

- ip nat inside (on the port where you have private IP)
- ip nat outside (on the port where you have public IP)
- ip nat inside source static <private ip> <public ip> (global command)

Cisco Devices

NAT Pool Commands

- ip nat inside (on the port where you have private IP)
- ip nat outside (on the port where you have public IP)
- ip nat pool <name of the nat pool> <starting ip address> <last ip address> <netmask of the public ip addresses> (global command)
- ip nat inside source list 1 pool <name of the nat pool> overload (global command)
- access-list 1 permit <private ip> (global command)

Cisco Devices

Diagnostic Commands

- ping
- tracert

Cisco Devices

General Monitoring and Administration Commands

- reload
- sh ver
- sh int

Cisco Devices

Upgrading Cisco IOS

- Download and install TFTP server (<http://www.download.com>)
- Download Cisco IOS Software Image to be upgraded
- Copy this image in the outbound directory of TFTP server
- Establish a Console or Telnet session with the router
- Use sh flash command to check that you have enough space in flash to install the new image
- Backup the existing IOS image on the TFTP server using the command copy flash tftp (it will ask the tftp server ip address and source and destination filename)
- Copy the new IOS image from TFTP server to the flash using the command copy tftp flash (it will ask for the tftp server ip address and source and destination filename)
- Reboot the Router
