IPV6

- √ The working standard for the IPv6 protocol was published by the Internet Engineering
 Task Force (IETF) in 1998.
- ✓ In 1997, IBM became the first commercial vendor to support IPv6 through its AIX 4.3 OS.
- ✓ In 2004, Japan and Korea were acknowledged as having the first public deployments of IPv6.
- √ The explosive growth in mobile devices including mobile phones, notebook computers, and wireless handheld devices has created a need for additional blocks of IP addresses.
- ✓ IPv4 currently supports a maximum of approximately 4.3 billion unique IP addresses.
 - IPv6 supports 340,282,366,920,938,463,463,374,607,431,768,211,456

340-Undecillion 282-decillion 366 nonillion 920-octillion 938-septillion 463-sextillion 463-quintillion 374-quadrillion 607-trillion 431 billion 768-million 211-thousand 456

3.6 million IPs for 1 square feet

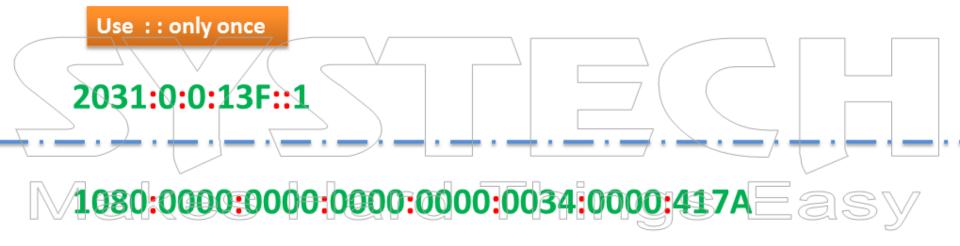
√ Recent advancements in network technology including Network Address Translation (NAT)
have temporarily lessened the urgency for new IP addresses, however, recent estimates
indicate that IPv4 addresses could be exhausted before 2020.



IPV6 ADDRESS

2031:0000:0000:013F:0000:0000:0000:0001

2031::13F:0:0:0:1

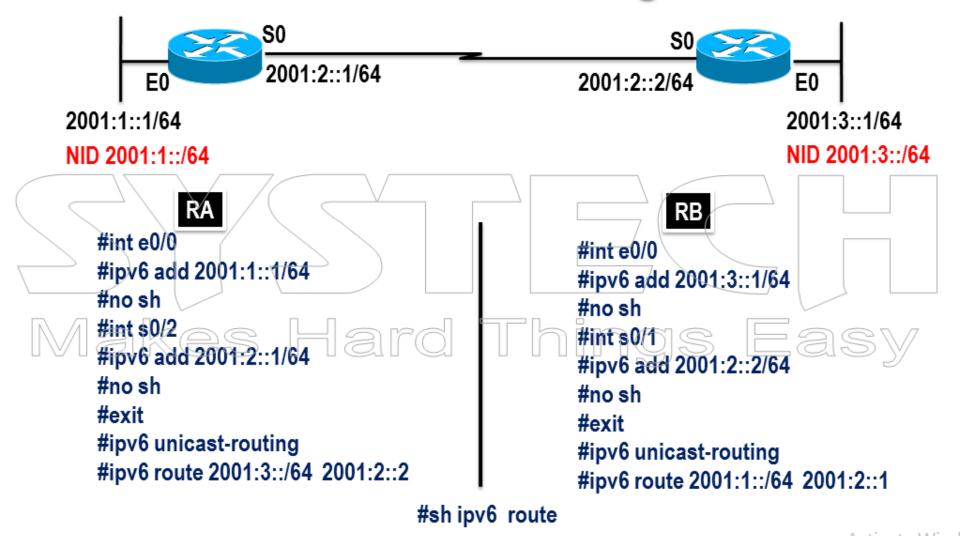


1080:0:0:0:0:34:0:417A

1080::34:0:417A



IPV6 Static routing





IPV6 ADDRESS TYPES

✓ Unique local: It's like ipv4 private address, its range is FD00::/8

✓ Link local: Generated automatically for each interface FE80::/10

✓ Global unicast: It's like public address, its address space is 2000::/3

✓ Unspecified: Shows as ::/128 when host has no usable IPV6 address.

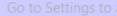
Same as 127.0.0.1 in IPV4, in IPV6 ::1/128

✓ Multicast: Reserved space for this is FF::/8

✓ Tunneling: 2002::/16 range reserved for tunneling



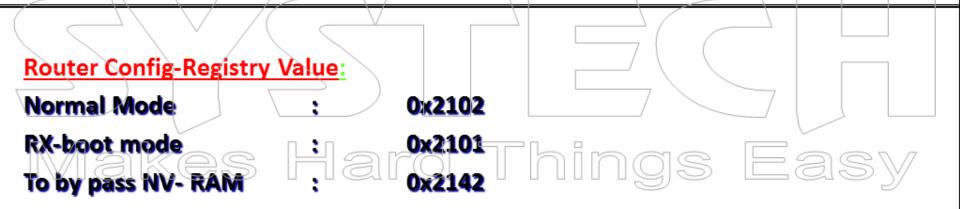






I O S (Internetwork operating systems)

- IOS is stored in flash
- Running configuration is stored in RAM
- Startup configuration is stored in NV RAM. (Non-volatile)



TO BACKUP : (Normal mode & RX-boot Mode)

TO RESTORE : (Only RX-boot Mode)

Install TFTP (Trivial File Transfer Protocol)





ROUTER HARDWARE COMPONENTS

There are 7 major internal components of a router:

- CPU
- RAM
- NVRAM
- Flash
- ROM
- Console
- Interfaces

CPU

The CPU performs functions just as it does in a normal PC. It executes commands given by the IOS using other hardware components. High-end routers may contain multiple processors or extra slots to add more CPUs later.

RAM

Random Access Memory; this component is dynamic. Meaning, its content changes constantly. The main role of the RAM is to: Store routing tables, hold fast-switching cache, performs packet buffering, and hold queues. It also provides temporary memory for the configuration file of the router while the router is powered on. However, the RAM loses content when router is restarted or powered off. This component is upgradeable!





NVRAM

Nonvolatile RAM is used to store the startup configuration files. This type of RAM does not lose its content when the router is restarted or powered off.

Flash

Flash memory is very important because it holds the Cisco IOS image file, as well as backups. This flash memory is classified as an EEPROM (Electronically Erasable Programmable Read Only Memory). The flash ROM is upgradeable in most Cisco routers.

ROM

The ROM performs the same operations as a BIOS. It holds information about the systems hardware components and runs POST when the router first starts up.

This component can be upgraded by "unplugging" the chip and installing a new one.

A ROM upgrade ensures newer versions of the IOS.

Console

The console consists of the physical plugs and jacks on the router. The purpose of the console is to provide access for configurations.

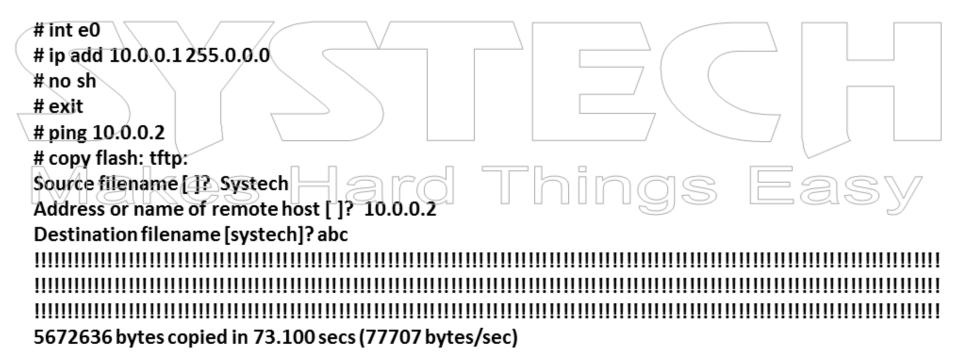
Interfaces

The interfaces provide connectivity to LAN, WAN, and Console/Aux. They can be RJ-45 jacks soldered onto the motherboard, transceiver modules, or card modules. Cisco routers, especially the higher-end models, can be configured in many different ways. They can use a combination of transceivers, card modules and onboard interfaces.



IOS BACKUP

sh version
sh flash
File Length Name/status
1 5672636 systech
[5672700 bytes used, 11104516 available, 16777216 total]
16384K bytes of processor board System flash (Read ONLY)



Now abc file is stored in C:\Program Files\Cisco Systems\Cisco TFTP Server\abc

Activate Wind Go to Settings to

I O S CONFIGURATION BACKUP

Configure any protocol e.g.: RIP.

sh startup-config (configuration is not viewed)

%% Non-volatile configuration memory is not present

#copy running-config startup-config

Destination filename [startup-config]? enter

sh startup-config (configuration is viewed)

#copy startup-config tftp:

Address or name of remote host []? 10.0.0.2

!!

608 bytes copied in 0.216 secs

Now xyz file is stored in C:\Program Files\Cisco Systems\Cisco TFTP Server\xyz



I O S CONFIGURATION RESTORE

erase startup-config Change mode to RX-boot mode configure terminal # # config-register 0x2101 # ctlr z reload Router(boot)> enable Router(boot)# configure terminal Router(boot)(config)# int e0 Router(boot)(config-if)# p add 10.0.0.1 255.0.0.0 Router(boot)(config-if)# no sh Router(boot)(config-if)# ctrl z Router(boot)# ping 10.0.0.2 Router(boot)# copy tftp startup-config Host or network configuration file [host]? Enter -Easy Address of remote host [255.255.255.255]? 10.0.0.2 Name of configuration file []? Configure using xyz from 10.0.0.2? [confirm] enter Loading xyz from 10.0.0.2 (via Ethernet0): ! OK - 608/32723 bytes] [OK] Router(boot)# configure terminal Router(boot)(config)# config-register 0x2102 Router(boot)(config)# exit Router(boot)# reload Activate Wind



IOS RESTORE

Change mode to RX- boot mode configure terminal config-register 0x2101 ctlr z reload Router(boot)> enable Router(boot)# configure terminal Router(boot)(config)# int e0 Router(boot)(config-if)# ip add 10.0.0.1 255.0.0.0 Router(boot)(config-if)# no sh Router(boot)(config-if)# ctrl z Router(boot)# ping 10.0.0.2 Router(boot)# copy tftp flash Address or name of remote host [255.255.255.255]? 10.0.0.2 Source file name? abc Destination file name [abc]? Systechccna Erase flash device before writing? [confirm] Flash contains files. Are you sure you want to erase? [confirm] enter Copy 'abc' from server as 'systechcona' into Flash WITH erase? [yes/no] y OK - 5672636/16777216 bytes] Verifying checksum... OK (0xE2CB) Flash copy took 0:03:11 [hh:mm:ss] Router(boot)# configure terminal Router(boot)(config)# config-register 0x2102 Router(boot)(config)# exit Router(boot)# reload Activate Winc



Go to Settings to a

PASSWORD RECOVERY

Set password to console mode.

Switch OFF and ON the router

Press ctrl – break (to enter rom monitor mode)

- > o/r 0x2142
- > i (it will reboot)
- # enable
- # sh startup-config (now note the password) in gs Easy
- # configure terminal
- # config-register 0x2102
- # ctrl z
- # reload







(Cross Over Cable)



TFTP Server

IP Address: 10.0.0.2 SubnetMask:255.0.0.0

TFTP Server

Download and store CISCO IOS in server. View > Options (for deselect the two check

Boxes logging and file transfer progress.)

ROUTER A

remmon 16 > IP_ADDRESS=10.1.1.1

(10.1.1.1 is the temporary IP address assigned to the router)

rommon 17 > IP_SUBNET_MASK=255.255.255.0

(Same as on the TFTP server)

rommon 18 > DEFAULT_GATEWAY=10.1.1.2

(Use the IP address of the TFTP server)

rommon 19 > TFTP_SERVER=10.1.1.2

(TFTP server's IP address)

rommon 20 > TFTP_FILE=c2600-is-mz.120-7.T.bin

(Exact name is case sensitive)



Easy



rommon 21 > TFTP_CHECKSUM=0 (This prevents checksum errors with earlier 2600 boot ROMs) rommon 22 > tftpdnld This command must be lower case. IP_ADDRESS: 10.1.1.1 IP_SUBNET_MASK: 255.255.255.0 **DEFAULT GATEWAY: 10.1.1.2 TFTP_SERVER: 10.1.1.2** TFTP FILE: c2600-is-mz.120-7.T.bin

Invoke this command for disaster recovery only.

WARNING: all existing data in all partitions on

flash will be lost!

Do you wish to continue? y/n: [n]: y

Receiving c2600-is-mz.120-7.T.bin from 10.1.1.2

11111,11111111111111111111111111

File reception completed.

Copying file c2600-is-mz.120-7.T to flash.

Erasing flash at 0x607c0000

program flash location 0x60440000

rommon 22 >reset

