# ACCESS - CONTROL LIST

- ✓ Access List is a basic firewall software integrated in Cisco IOS.
- ✓ Act as a protocol *"firewall"*
- ✓ Provides layer 3 and layer 4 security
- ✓ Control the flow of traffic from one network to another
- ✓ Filters the IP packets
- ✓ There should be at least one permit statement
- ✓ An implicit deny blocks all traffic by default
- ✓ Can have one access list per interface per direction
- ✓ Deny,Permit,Source Address,Destination Address,Inbound,Outbound
- ✓ Operators (eq,neq,lt,gt)

## ACCESS LIST TYPES:

- ✓ STANDARD ACCESS LIST.
- ✓ EXTENDED ACCESS LIST.
- ✓ NAMED ACCESS LIST.

### STANDARD ACCESS LISTS:

Standard access lists for IP checks only the *'source address'*.

RANGE: 1 to 99. Expanded Range: 1000 – 1999

### EXTENDED ACCESS LISTS:

Extended access lists checks both 'source' and 'destination' IP addresses.
They also can check for 'specific protocols', 'port numbers', and other parameters.

RANGE: 100 to 199. Expanded Range: 2000 to 2699.



### NAMED ACCESS LIST

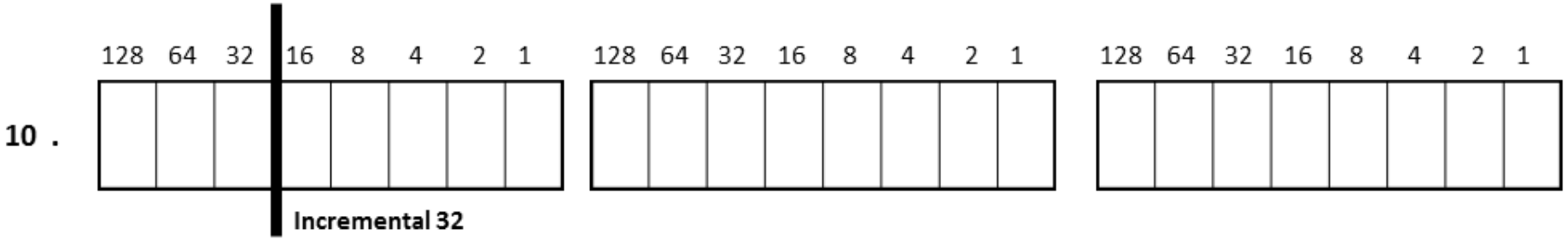
A feature for Cisco IOS Release 11.2 or newer, Named IP access lists can be used to delete individual entries from a specific access list. This enables you to modify your access lists without deleting and then reconfiguring them.

Removing of specific statement in a numbered access-lists is not possible

# Wildcard Mask

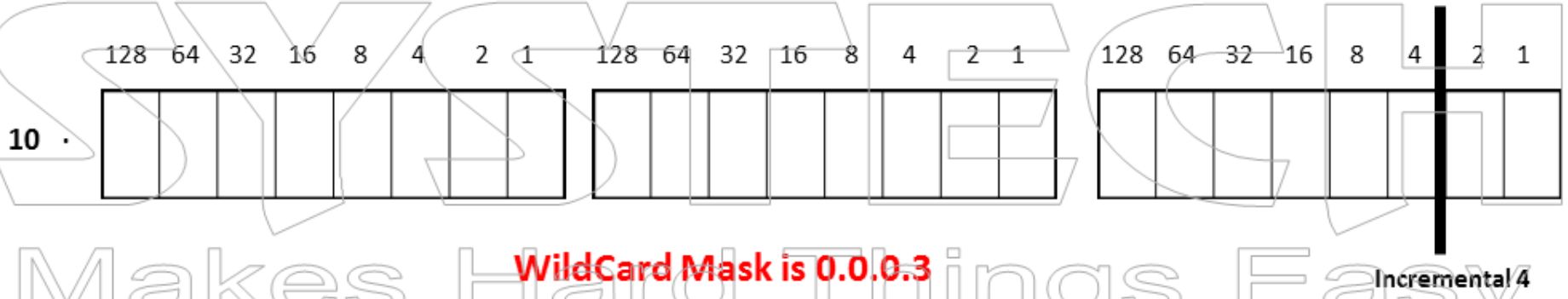
- ✓ It is a value to inform access list to check the IP address.
- ✓ A wildcard mask bit **0** means ***check*** the corresponding bit value.
- ✓ A wildcard mask bit **1** means ***will not check*** that corresponding bit value.
- ✓ The use of wildcard masks is most prevalent when building Access Control Lists (ACLs) on Cisco routers. ACLs are filters and make use of wildcard masks to define the scope of the address filter.
- ✓ Address filtering uses wildcard masking to indicate to the software whether to check or ignore corresponding IP address bits when comparing the address bits in an access list entry to a packet being submitted to the access list.
- ✓ By carefully setting wildcard masks, an administrator can select single or several IP addresses for permit or deny tests.
- ✓ If you do not supply a wildcard mask with a source or destination address in an access list statement, the software assumes a default wildcard mask of 0.0.0.0.

## FIND WILDCARD MASK FOR 10.0.0.0 / 11 ?




**WildCard Mask is 0.31.255.255**

## FIND WILDCARD MASK FOR 10.0.0.0 / 30 ?

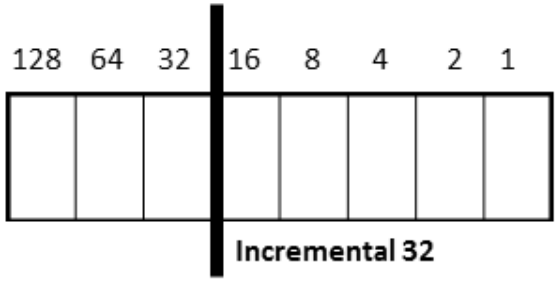



**WildCard Mask is 0.0.0.3**



## FIND WILDCARD MASK FOR 200.200.100.0 / 27 ?

200 . 200 . 100




**WildCard Mask is 0.0.0.31**

# Transmission Control Protocol (TCP)

The Transmission Control Protocol (TCP) is a virtual circuit protocol that is one of the core protocols of the Internet protocol suite. Using TCP, applications on networked hosts can create *connections* to one another, over which they can exchange data in packets. The protocol guarantees reliable and in-order delivery of data from sender to receiver



# User Datagram Protocol (UDP)

The User Datagram Protocol (UDP) is one of the core protocols of the Internet protocol suite. Using UDP, programs on networked computers can send short messages sometimes known as datagram to one another.
UDP does not provide the reliability and ordering guarantees that TCP does. Compared to TCP, UDP is required for broadcast (send to all on local network) and multicast (send to all subscribers).

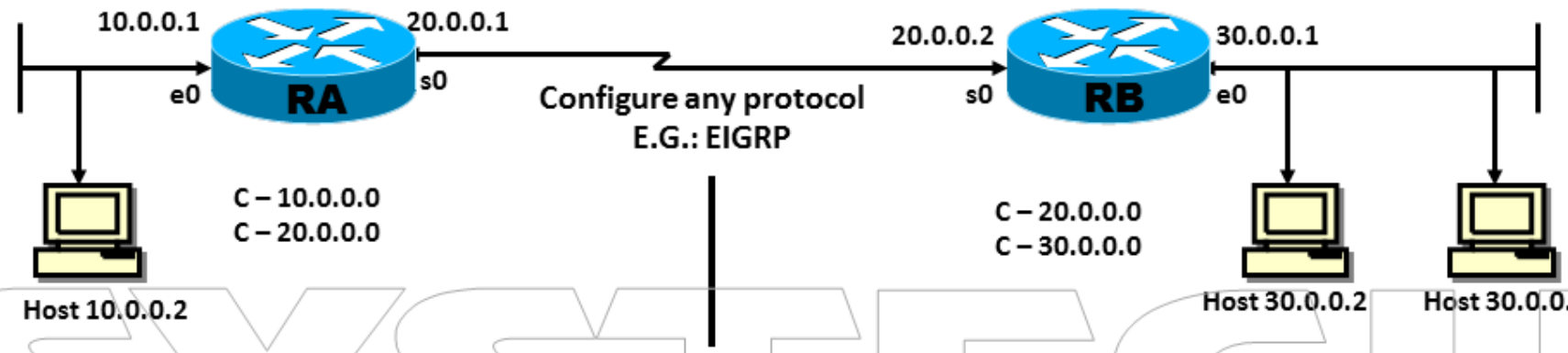
# Reserved TCP and UDP Port Numbers

| DECIMAL | KEYWORD | DESCRIPTION |
|---|---|---|
| 0 | | Reserved |
| 1 – 4 | | Unassigned |
| 5 | RJE | Remote Job Entry |
| 7 | ECHO | Echo |
| 9 | DISCARD | Discard |
| 11 | USERS | Active Users |
| 13 | DAYTIME | Daytime |
| 15 | NETSTAT | Who is Up or NETSTAT |
| 17 | QUOTE | Quote of the Day |
| 19 | CHARGEN | Character Generator |
| 20 | FTP-DATA | File TransferProtocol (data) |
| 21 | FTP | File Transfer Protocol |
| 23 | TELNET | Terminal Connection |
| 25 | SMTP | Simple Mail Transfer Protocol |
| 37 | TIME | Time of Day |
| 39 | RLP | Resource Location Protocol |
| 42 | NAMESERVER | Host Name Server |
| 43 | NICNAME | Who Is |

# Reserved TCP and UDP Port Numbers

| DECIMAL | KEYWORD | DESCRIPTION |
|---|---|---|
| 53 | DOMAIN | Domain Name Server |
| 67 | BOOTPS | Bootstrap Protocol Server |
| 68 | BOOTPC | Bootstrap Protocol Client |
| 69 | TFTP | Trivial File Transfer Protocol |
| 75 | | Any Private Dial-out Service |
| 77 | | Any Private RJE Service |
| 79 | FINGER | Finger |
| 80 | HTTP | Hypertext Transfer Protocol |
| 95 | SUPDUP | SUPDUP Protocol |
| 101 | HOSTNAME | NIC Host Name Server |
| 102 | ISO-TSAP | ISO-TSAP |
| 113 | AUTH | Authentication Service |
| 117 | UUCP-PATH | UUCP Path Service |
| 119 | NNTP | N/W News Transfer Protocol |
| 123 | NTP | Network Time Protocol |
| 133-159 | | Unassigned 1 |
| 60-223 | | Reserved |
| 224-241 | | Unassigned |
| 242-255 | | Unassigned |

# STANDARD ACCESS - LIST




- Set Password for TELNET in RA.
- Now the Host 30.0.0.2 and 30.0.0.3 can access Router A through TELNET.

To deny 30 Network (30.0.0.2 and 30.0.0.3 must not access RA)

RA # access-list 1 deny 30.0.0.0 0.255.255.255

Range — Wild card mask

30.0.0.3 must alone access RA.

RA # access-list 1 permit 30.0.0.3 0.0.0.0

(or)

RA # access-list 1 permit host 30.0.0.3 (without wildcard mask)

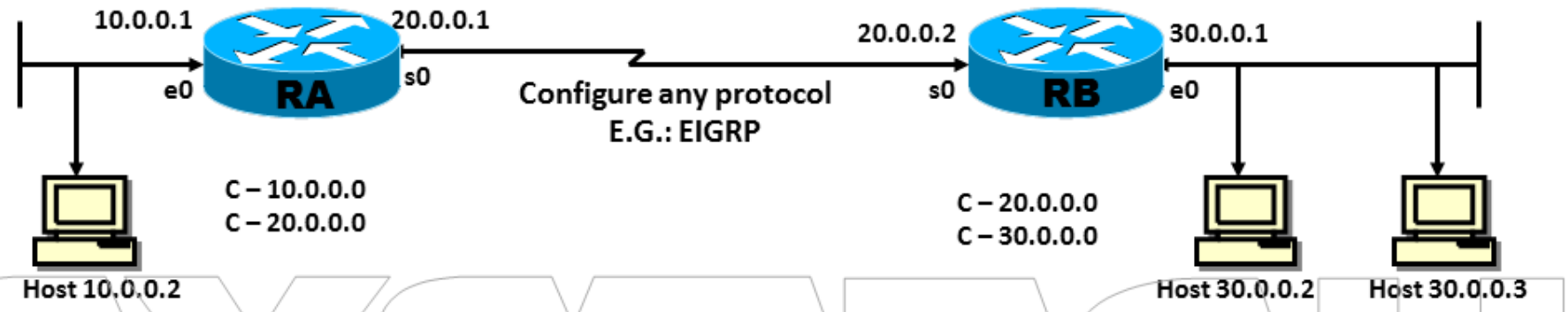
RA # line VTY 0 4

RA # access-class 1 in

Range

RA # sh ip access-list.

# EXTENDED ACCESS - LIST




## INSTALL IIS & FTP in Host 10.0.0.2

FTP (file transfer protocol) is a commonly used protocol for exchanging files over any network that supports the TCP/IP protocol (such as the Internet or an intranet).
PORT NO: 21



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HTTP (Hypertext Transfer Protocol) is a method used to transfer or convey information on the World Wide Web. Its original purpose was to provide a way to publish and retrieve HTML pages
PORT NO: 80

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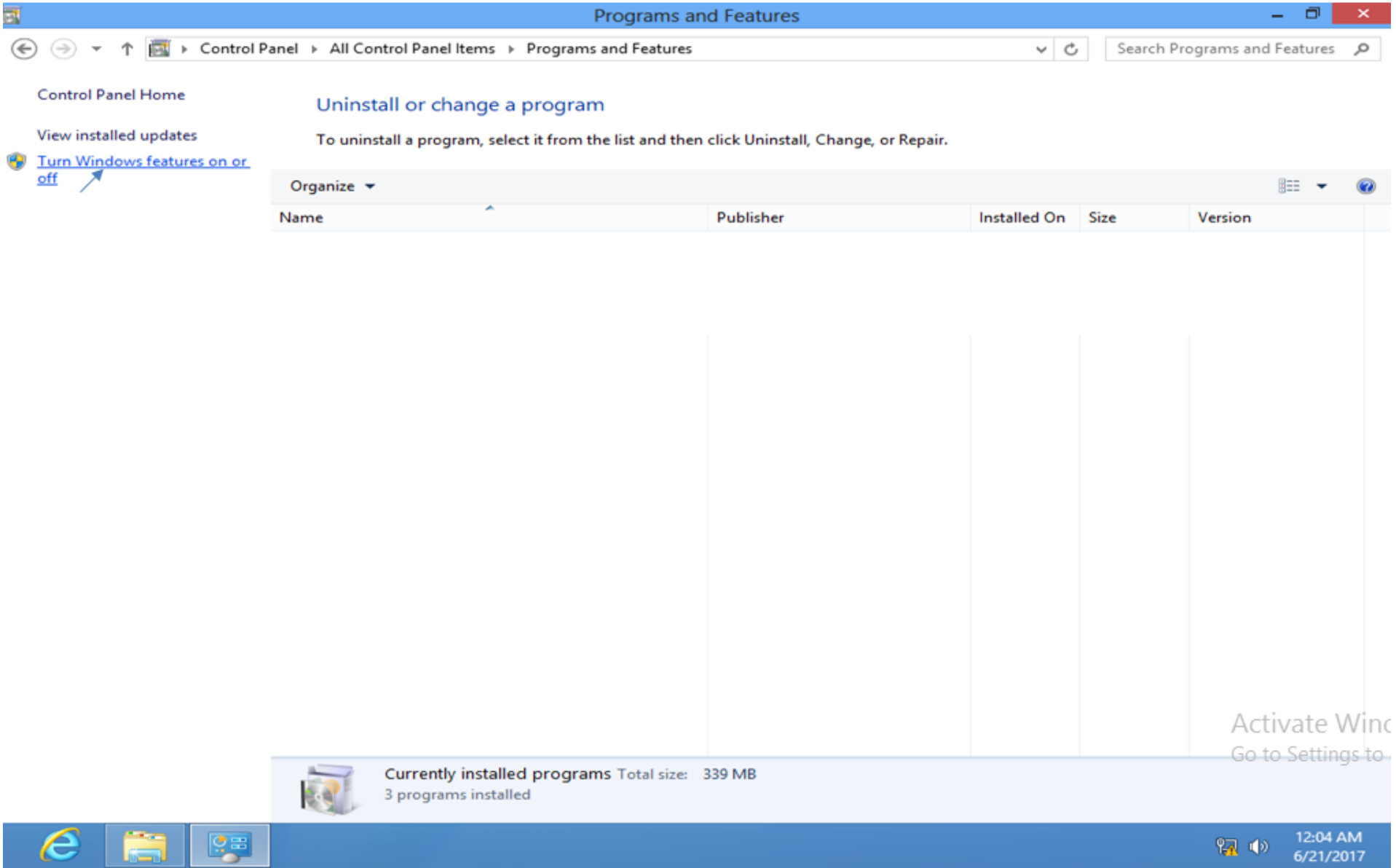
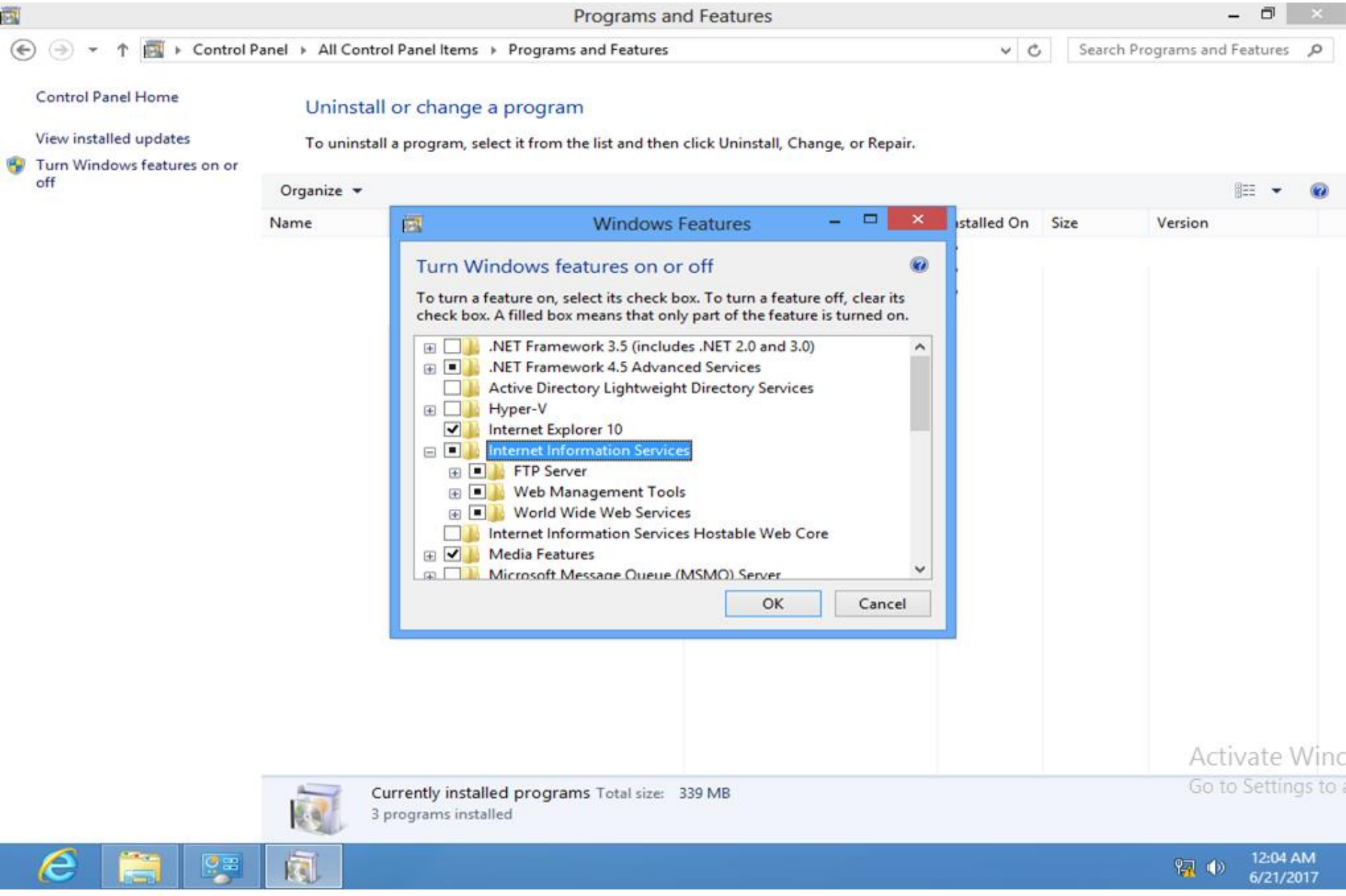
ICMP (Internet Control Message Protocol) is one of the core protocols of the Internet protocol suite. It is chiefly used by networked computers' operating systems to send error messages—indicating, for instance, that a requested service is not available or that a host or router could not be reached.

# To installing IIS and FTP features

Open **control panel** → Click **Programs and Features**



# Select **IIS and FTP services** and click **ok**



# HTTP

Save systech.html files in c:\inetpub\wwwroot

- **Now the Host 30.0.0.2 and 30.0.0.3 can access http.**
  **(Type in Internet Explorer - http:\\10.0.0.2\systech.html in 30.0.0.2 & 30.0.0.3)**

**Deny 30.0.0.2 accessing HTTP:**

**RA # access-list 150 deny tcp host 30.0.0.2 host 10.0.0.2 eq 80**

**RA # access-list 150 permit ip any any**

**(or)**

**RA # access-list 150 permit tcp 30.0.0.0 0.255.255.255 10.0.0.0 0.255.255.255.**

**RA # int s0**

**RA # ip access-group 150 in**

**Now HTTP will not work in 30.0.0.2 but Host 30.0.0.3 can access HTTP.**

# Named & Time based Access List

RA # time-range WEBSERVER

RA #periodic daily 10:00 to 18:00

RA # ip access-list extended WEBSERVER

RA # permit tcp any host 10.0.0.2 eq 80 time-range WEBSERVER

RA # int s0

RA # ip access-group WEBSERVER in

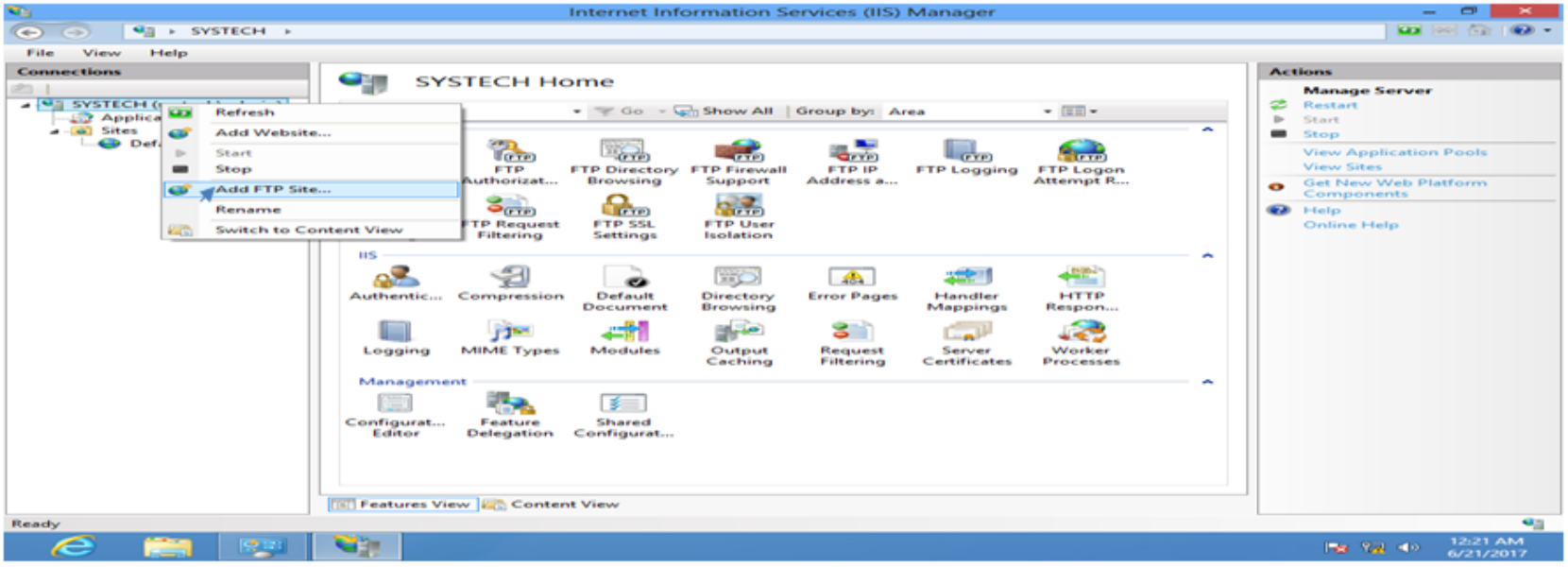
Now WEBSERVER will not work in 30.0.0.2 and Host 30.0.0.3 can access HTTP.

RA # sh clock

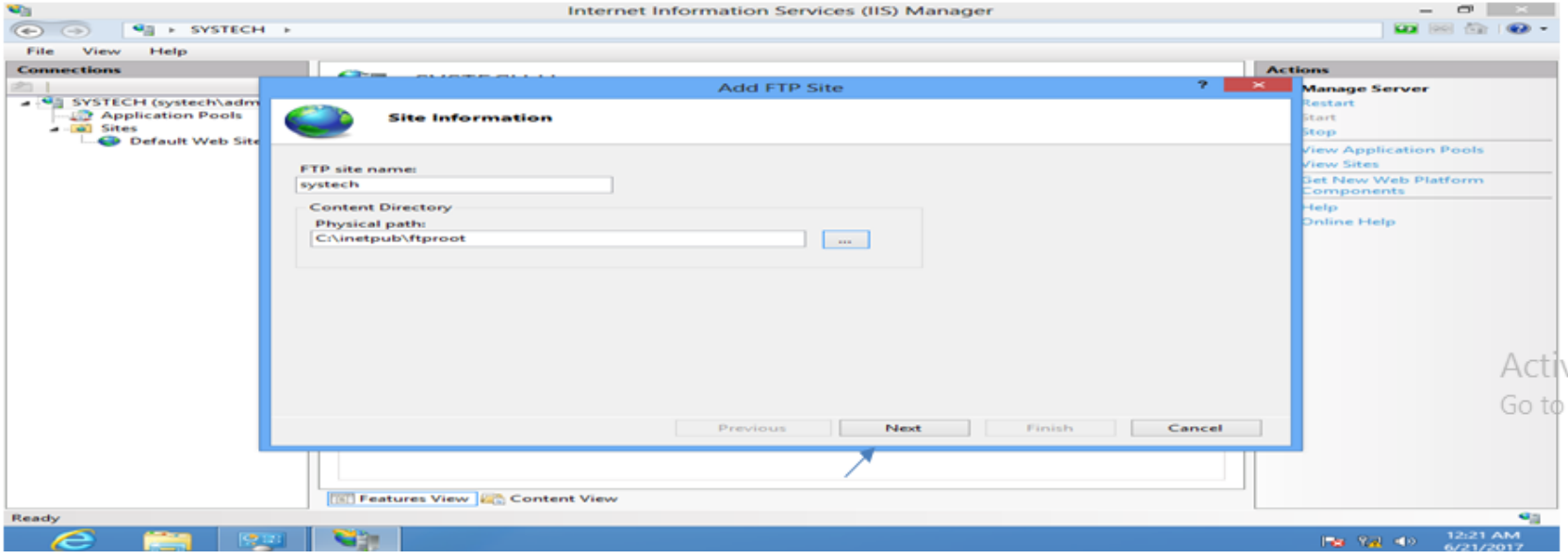
RA # clock set 15:03:00 20 december 2012.

# Configuring FTP

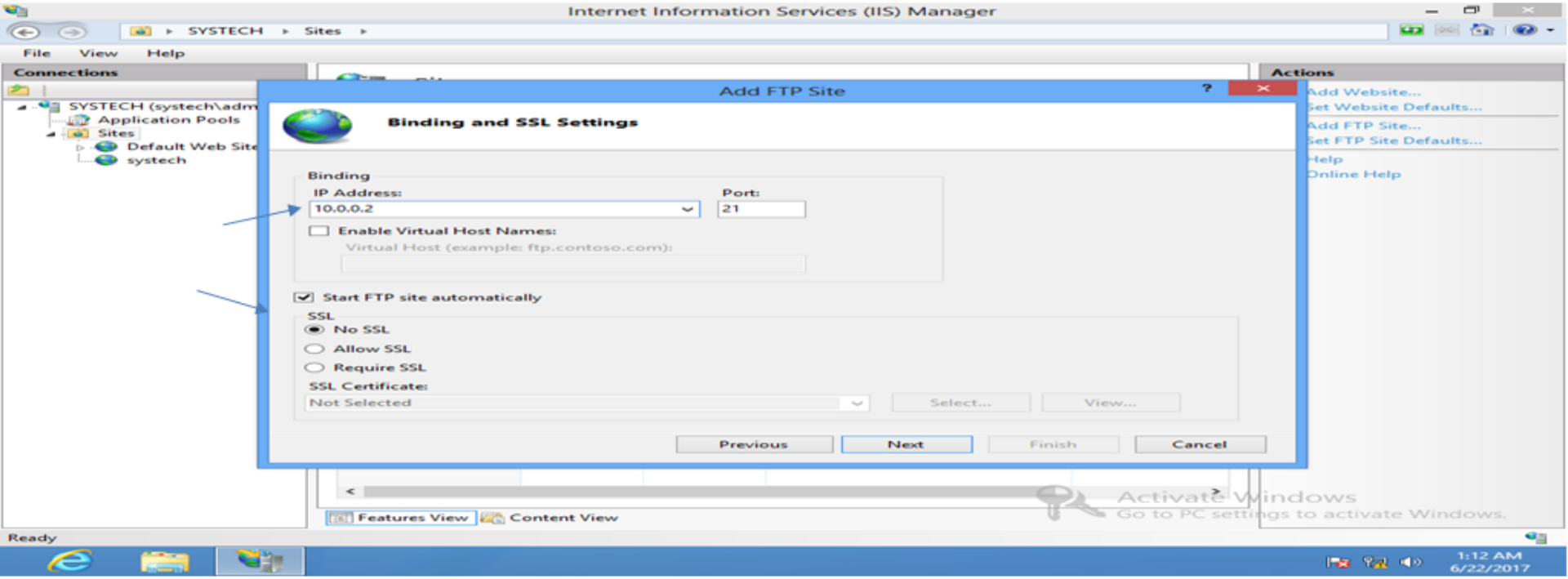
Step 1: Open **IIS Manager** right click **Site** click **Add FTP Site**



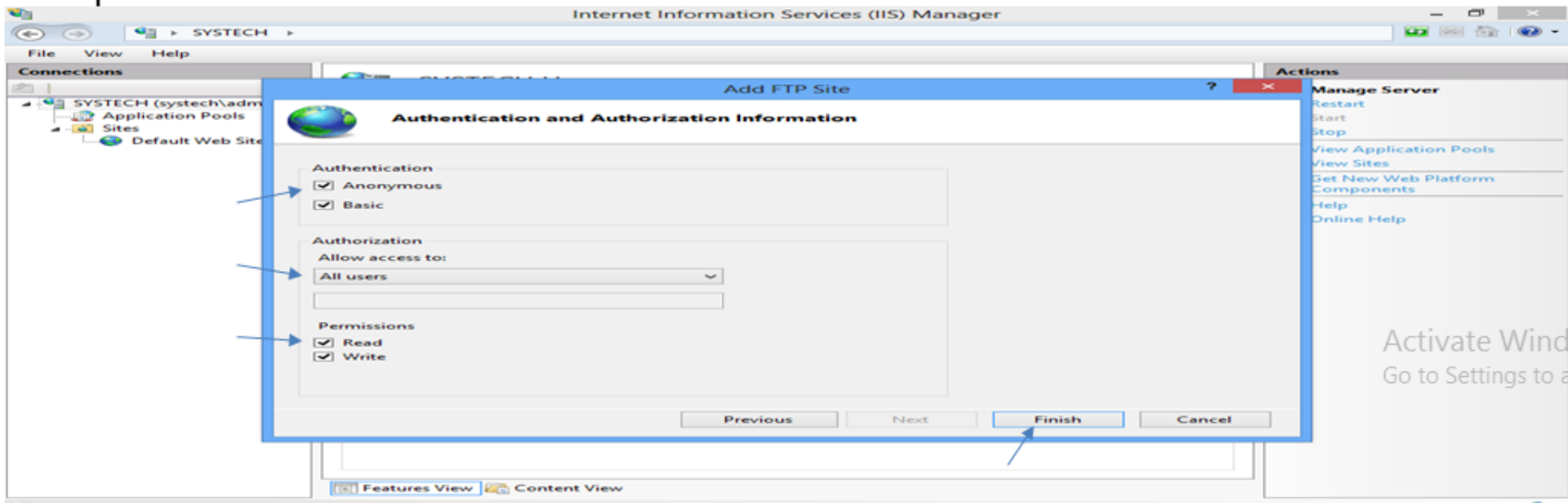

Step 2: Enter **FTP file name** and choose the **FTP Folder location**



Step 3: Enter the **IP Address** and click **Next.**




Step 4:



# FTP

Save setup files in c:\inetpub\ftproot

- **Now the Host 30.0.0.2 and 30.0.0.3 can access FTP.**
  **(Type in Internet Explorer ftp:\\10.0.0.2 in 30.0.0.2 & 30.0.0.3)**

**Deny 30.0.0.2 accessing FTP:**

**RA # access-list 100 deny tcp host 30.0.0.2 host 10.0.0.2 eq 21 (or) ftp**

**RA # access-list 100 permit ip any any**

**(or)**

**RA # access-list 100 permit tcp 30.0.0.0 0.255.255.255 10.0.0.0 0.255.255.255.**

**RA # int s0**

**RA # ip access-group 100 in**

**Now FTP will not work in 30.0.0.2 but Host 30.0.0.3 can access FTP.**

# ICMP

- Now our Network 10 can ping Host 30.0.0.2 and 30.0.0.3.
  (in host 10.0.0.2 ping 30.0.0.1 & 30.0.0.2, it will ping )

**Deny 10.0.0.2 accessing 30.0.0.0 N/W:**

RA # access-list 170 deny icmp host 10.0.0.2 30.0.0.0 0.255.255.255 echo.
Range

RA # access-list 170 permit ip any any

RA # int e0

RA # ip access-group 170 in

Now host 10.0.0.2 will not ping with 30.0.0.2 and 30.0.0.3