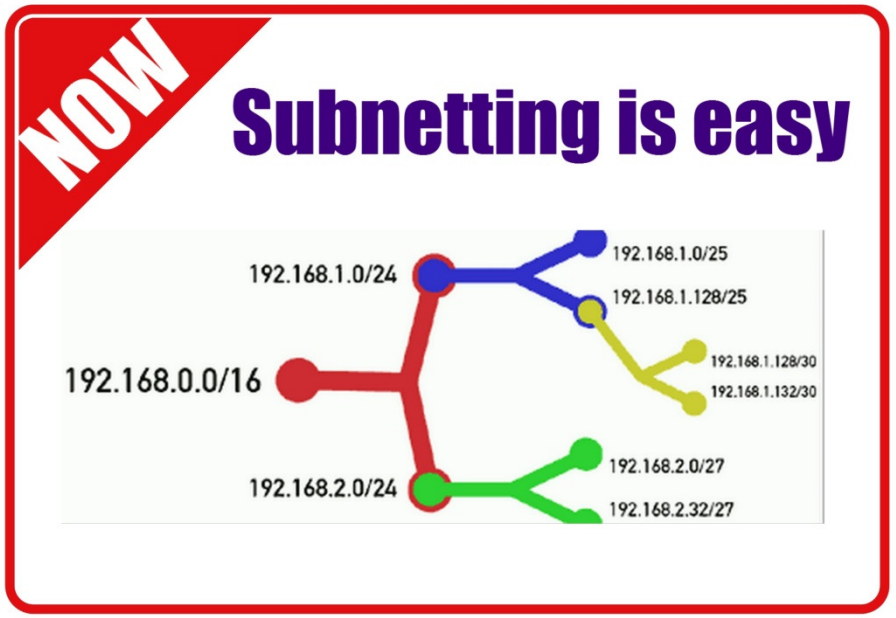
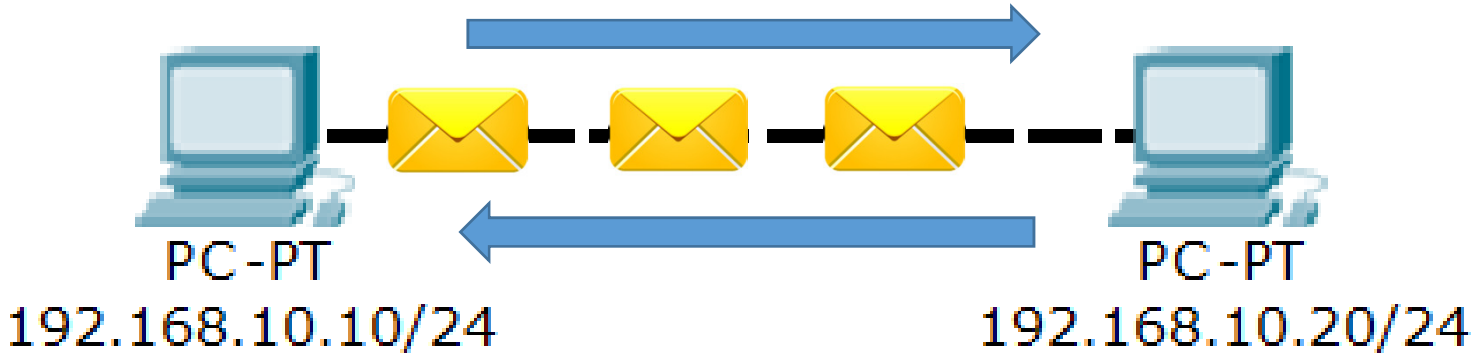
Subnetting

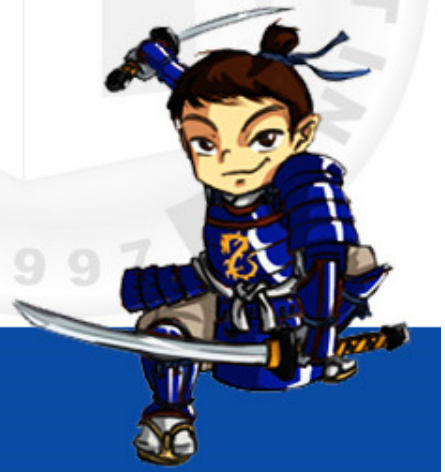

NOW
Subnetting is easy
192.168.1.0/24
192.168.1.0/25
192.168.1.128/25
192.168.1.128/30
192.168.1.132/30
192.168.0.0/16
192.168.2.0/24
192.168.2.0/27
192.168.2.32/27

The Network Index

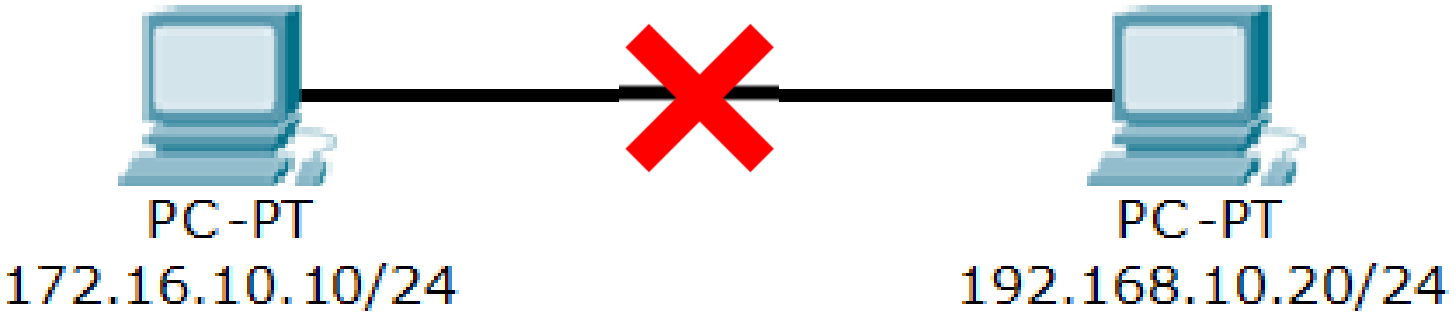


The Network Index defines the network portion of the IP.

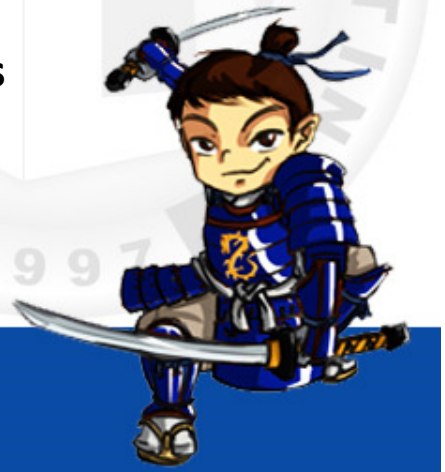
Cross-cable connection is required



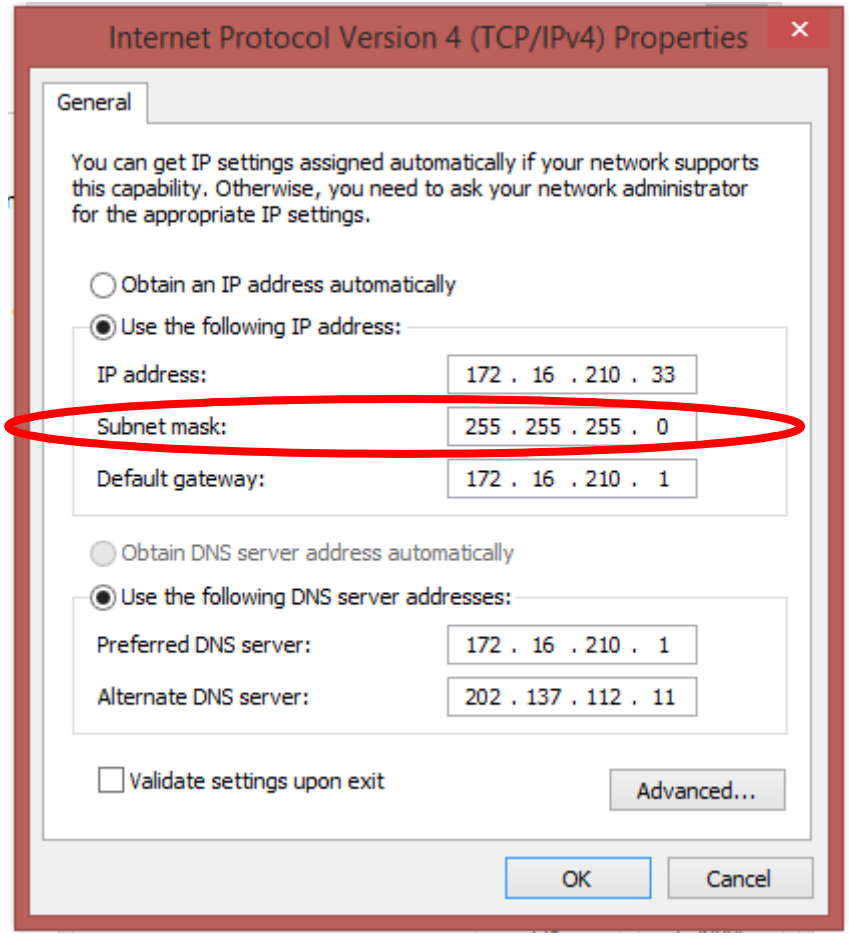
IP Address and Network Index



In a LAN, hosts must have the same network portion of the IP address and the same network index.



IP Addressing and Subnetting



IP Addressing and Subnetting

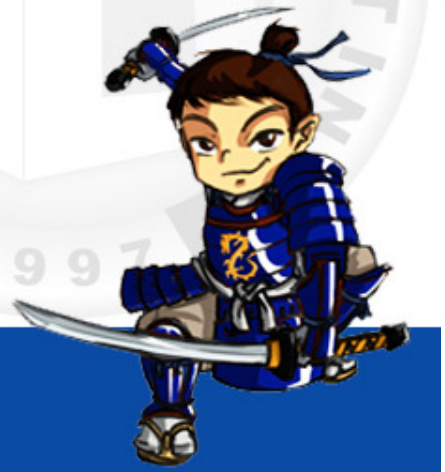
THE ANATOMY OF THE SUBNET MASK

XXXXXXXX . XXXXXXXX . XXXXXXXX . XXXXXXXX

X – represents binary digit (0 or 1)

- **Divided into 4 octets (1st octet on the left)**
- **32-bit long**

The subnet mask defines the network portion of the IP.

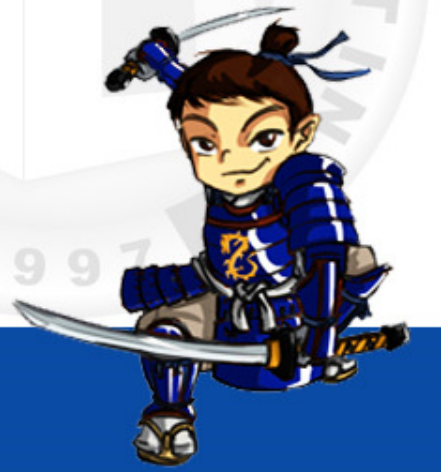


IP Addressing and Subnetting

Examples:

11111111 . 11111111 . 11111111 . 00000000
11111111 . 11111111 . 00000000 . 00000000
11111111 . 11111111 . 11100000 . 00000000

Recall: BINARY NOTATION and CONVERSION



IP Addressing and Subnetting

Default Subnet Masks of Classes A, B and C IP Addresses

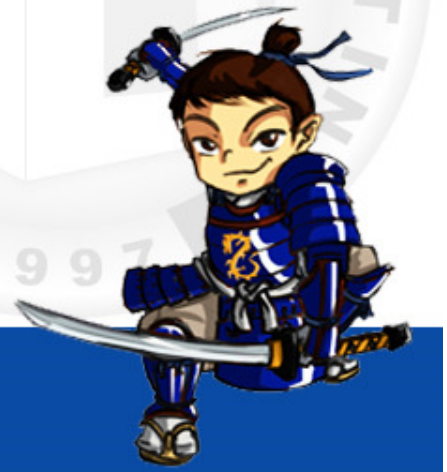
- Class A
  255 . 0 . 0 . 0 (1st octet)

- Class B
  255 . 255 . 0 . 0 (1st & 2nd octets)

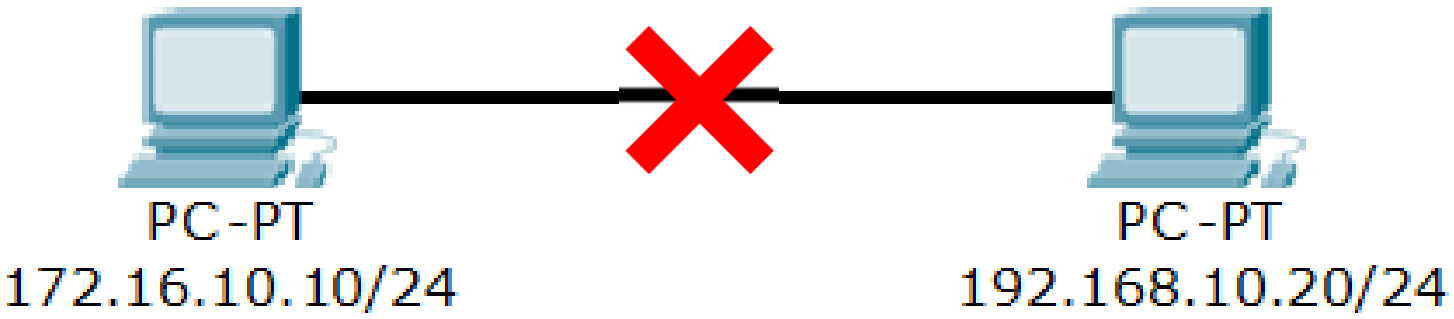
- Class C
  255. 255. 255 . 0 (1st, 2nd & 3rd octets)

Other Commonly Used Subnet Masks

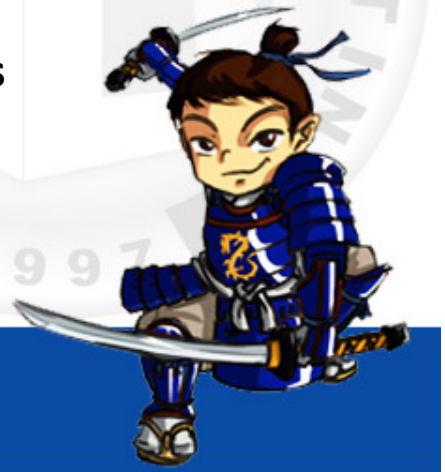
255 . 255 . 255 . 192
255 . 255 . 255 . 224



The Need for a Router



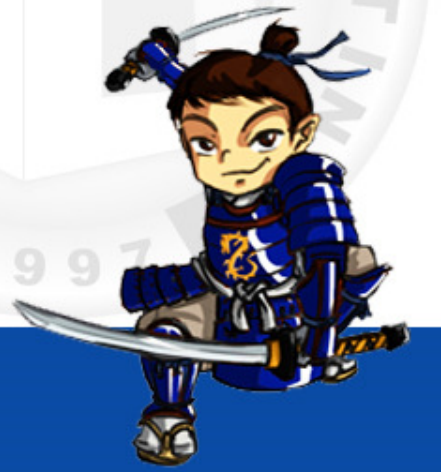
In a LAN, hosts must have the same network portion of the IP address and the same network index.



The Need for Subnetting

Subnetting is the process of dividing a single network into multiple smaller networks.

Subnetting helps in minimizing the wastage of IP address, both private and public.

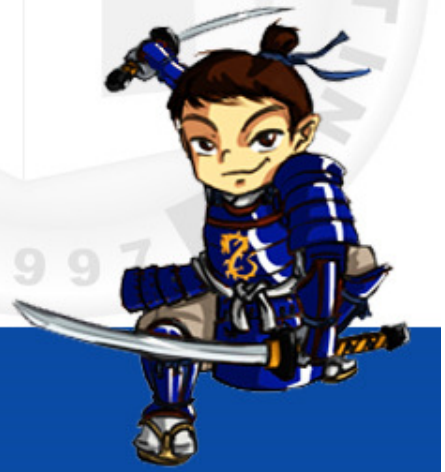


IP Addressing and Subnetting

Example Problem:

Suppose you are a network engineer and is tasked to design a network with 50 hosts each in 3 different rooms inside a floor of a building. Using a single router, design the network with the 192.168.123.0 Class C network address. Choose a valid subnet mask as defined by IANA:

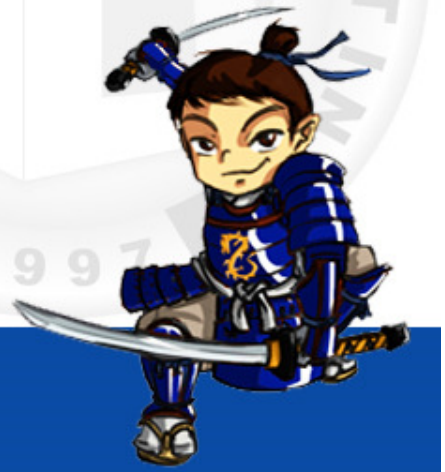
255 . 255 . 255 . 0
255 . 255 . 255 . 192
255 . 255 . 255 . 224



IP Addressing and Subnetting

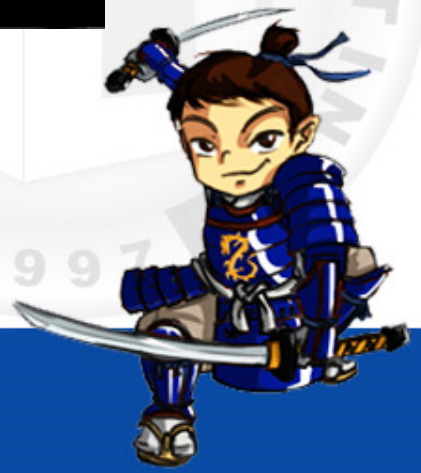
Things to consider:

192 . 168 . 123 . 0 is the network address
192 . 168 . 123 . 255 is the broadcast address
192 . 168 . 123 . 1 – 192 . 168 . 123 . 254 is the range of host

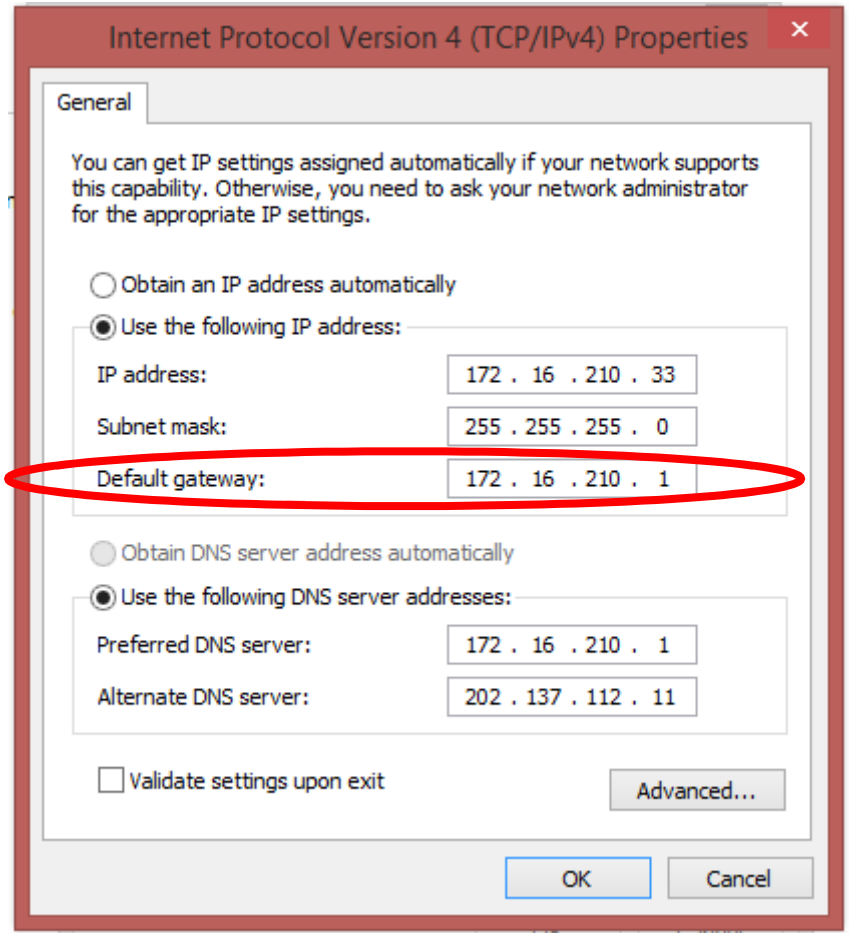


IP Addressing and Subnetting

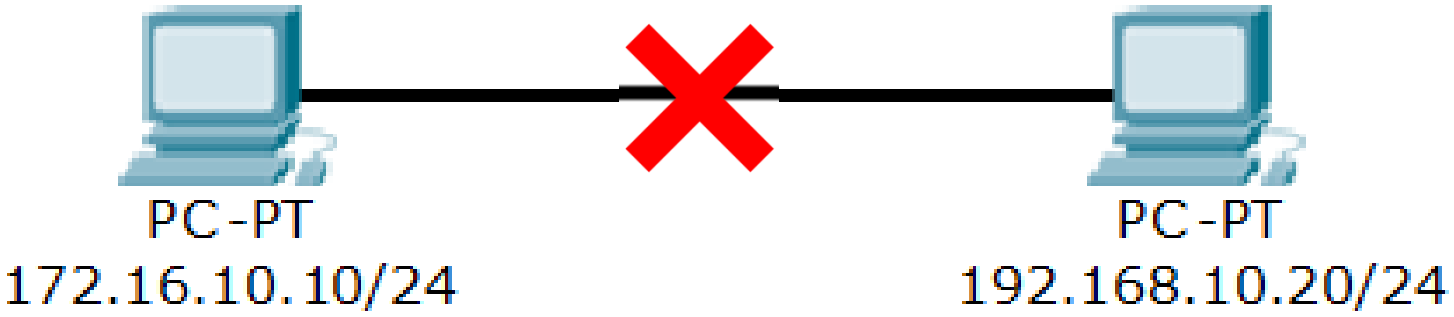
Video Playback



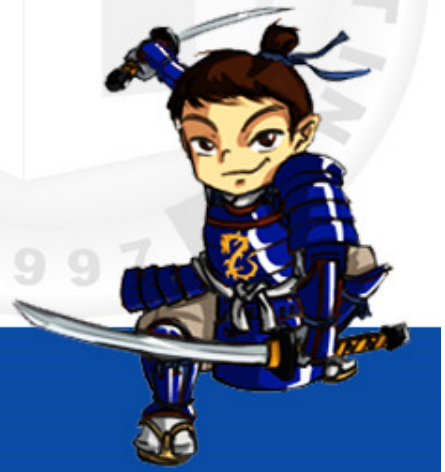
IP Addressing and Subnetting



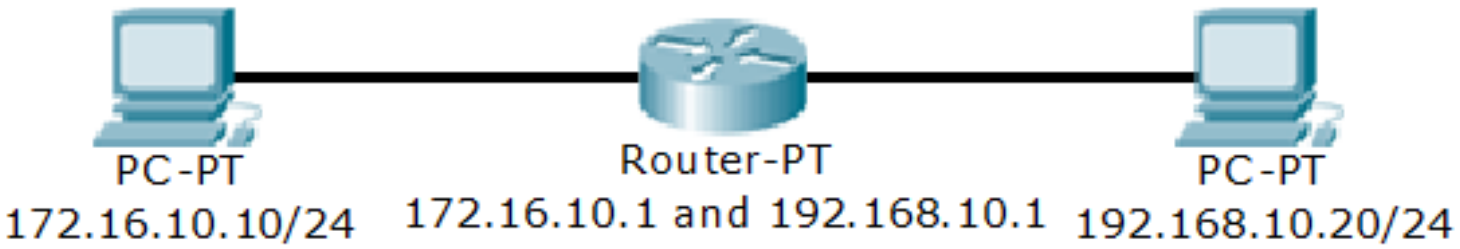
The Need for a Router



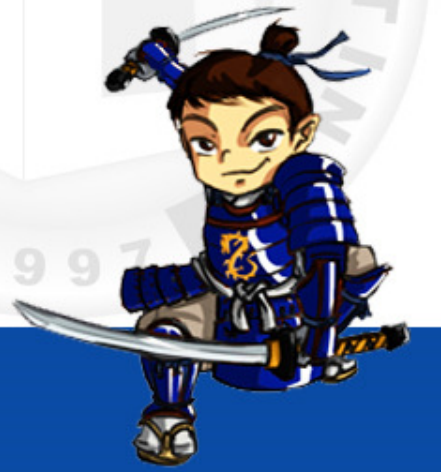
In order for 2 different networks/subnetworks to communicate, the presence of a router is required.



The Need for a Router



A router interconnects 2 or more networks/subnetworks through configuration of the default gateway of each host.



HAVE FUN LEARNING STUDS !!! ^_^x