

# Classful and Special IPv4 Addressing

	32 bits				
	1 <sup>st</sup> Octet	2 <sup>nd</sup> Octet	3 <sup>rd</sup> Octet	4 <sup>th</sup> Octet	
Class	7 bits		24bits		Dotted Decimal Range
A	0	Network ID	Host ID		1.0.0.0 to 127.255.255.255
B	10	14 bits Network ID		16bits Host ID	128.0.0.0 to 191.255.255.255
C	110	21bits Network ID		8 bits Host ID	192.0.0.0 to 223.255.255.255
D	1110	28 bits Multicast Address			224.0.0.0 to 239.255.255.255
E	1111	28 bits Reserved			240.0.0.0 to 255.255.255.255

# Router Protocols RIP, OSPF, BGP and ICMP

1. RIP, OSPF, and BGP are application layer protocols
2. ICMP is a transport layer protocol

1. Routing protocols are integral to layer 3, the network layer. Why then are routing protocols a layer 5, application layer, protocol?
2. ICMP is integral to layer 3, the network layer. Why then is ICMP a layer 4, transport layer, protocol?

## IP Addresses Reserved for Private Networks

Prefix	Mask	Lowest Address	Highest Address
10.0.0.0/8	255.0.0.0	10.0.0.0	10.255.255.255
172.16.0.0/12	255.240.0.0	172.16.0.0	172.31.255.255
192.168.0.0/16	255.255.0.0	192.168.0.0	192.168.255.255
169.254.0.0/16	255.255.0.0	169.254.0.0	169.254.255.255

The prefixes reserved for use with private networks not connected to the global Internet. If a datagram sent to one of these addresses accidentally reaches the Internet, an error will result.

# Summary of Special IP Address Conventions

All 0's		Startup source address
All 1's		Limited broadcast (local net)
Net id	All 1's	Directed broadcast for net-id
Net id	All 0's	Directed broadcast for net-id
127	Anything often 0.0.1	Loopback (LocalHost)

## IP Addresses Reserved for Private Networks

Prefix	Mask	Lowest Address	Highest Address
10.0.0.0/8	255.0.0.0	10.0.0.0	10.255.255.255
172.16.0.0/12	255.240.0.0	172.16.0.0	172.31.255.255
192.168.0.0/16	255.255.0.0	192.168.0.0	192.168.255.255
169.254.0.0/16	255.255.0.0	169.254.0.0	169.254.255.255

The prefixes reserved for use with private networks not connected to the global Internet. If a datagram sent to one of these addresses accidentally reaches the Internet, an error will result.

## How Subnet Masks Work (same subnet)

	<u>Dotted Decimal</u>
Source Host IP	192.168.101.217
Subnet /Notation	192.168.101/24
Subnet Mask Notation	255.255.255.0
Destination Host IP	192.168.101.210

	<u>Binary</u>
Source Host IP	11000000.10101000.01100101.11011001
Subnet Mask	11111111.11111111.11111111.00000000
Destination Host IP	11000000.10101000.01100101.11010010
Source & Mask	11000000.10101000.01100101.00000000
Dest. & Mask	11000000.10101000.01100101.00000000

## How Subnet Masks Work (different subnet)

### Dotted Decimal

Source Host IP	192.168.101.217
Subnet /Notation	192.168.101/24
Subnet Mask Notation	255.255.255.0
Destination Host IP	192.168.110.217

### Binary

Source Host IP	11000000.10101000.01100101.11011001
Subnet Mask	11111111.11111111.11111111.00000000
Destination Host IP	11000000.10101000.01101110.11010010
Source & Mask	11000000.10101000.01100101.00000000
Dest. & Mask	11000000.10101000.01101110.00000000