

# Chapter 6 - TCP/IP Basic

Every computer has a unique IP address (DHCP server)

IPv4 (version 4)

- 32 1s and 0s

Dots are not required in an IP address for the computer but are only there for humans.

Eights are called "octets" IPv4 there four octets

0 - 255 numbers

128 64 32 16 8 4 2 1 (each time is divided by 2 starting at 128)

All 0s is zero (00000000)

All 1s is 255 (11111111)

## Converting Binary to Decimal Example

128 64 32 16 8 4 2 1

$$0 \ 1 \ 1 \ 1 \ 0 \ 1 \ 0 \ 1 = 64 + 32 + 16 + 4 + 1 = \underline{117}$$

## Converting Decimal to Binary Example

128 64 32 16 8 4 2 1

Decimal **54** converts to

128 cannot go into 54 so the number is 0

64 cannot go into 54 so the number is 0

32 can go into 54 so the number is 1 (54 - 32 = **22**)

16 can go into 22 so the number is 1 (22 - 16 = **6**)

8 cannot go into 6 so the number is 0

4 can go into 6 so the number is 1 (6 - 4 = **2**)

2 can go into 2 so the number is 1 (2 - 2 = **0**)

1 cannot go into 0 so the number is 0

The final binary number is **00110110**.

## Let's Check our Math

128 64 32 16 8 4 2 1

$$0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 1 \ 0 = 32 + 16 + 4 + 2 = 54$$

**SUCCESS!!!!** Make sure you understand this .... Make up some samples of your own.

## ARP (Address Resolution Protocol)

ARP resolves MAC addresses from IP addresses pages 172-173

ARP is just a broadcast

arp -a

## IANA Internet Assigned Numbers Authority

- Passes to Regional Internet Registry (RIR)
  - 5 different ones (no need to know them)

**RIR** give out to ISPs (Internet Service Provider)

**ISP** would provide us IP

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- Class License (A, B, C)
- The first octet in the 4 octets defines the class
  - Class A 1-126 (First digit)
  - Class B 128-191 (First digit)
  - Class C 192-223 (First digit)

Subnet (**CIDR**) **C**lassless **I**nter-**D**omain **R**outing

Subnet Mask will have the following (the 255 indicates which digits are the Network ID)

- **CLASS C Network** 255.255.255.0 ( /24 ) ← Remember the slash is spoken with the word “wack”
  - 192.168. 1. 15 and 192.168.1.24 their Network ID is 192.168.1 but 192.168.2.14 is not part of the same network. Why?  
11111111 11111111 11111111 00000000
- **CLASS B NETWORK** 255.255.0.0 ( /16 )
  - 10.15.22.102 and 10.15.55.203 their Network ID is 10.15 but 10.17.22.100 is not part of the same network.  
11111111 11111111 00000000 00000000
- **CLASS A NETWORK** 255.0.0.0 ( /8 )
  - 204.16.2.40 and 204.33.5.43 their Network ID is 204 ← This is uncommon but the concept follows like above.

CIDR (WATCH the video)

This is extensive and the video(s) will help the most. I will pull questions from these videos

CIDR: Subnetting in the Real World ← Not really done a lot but remember my discussion on this.

## Dynamic versus Static IP Addressing

DHCP versus set in IP Properties

Watch ROGUE VIDEO!!!!!!!!!!