MAC notation

MAC - Media Access Control

dc-a6-32-52-17-79

manufacturer number

unique ID

Raspberry Pi Trading Ltd

00-15-5D -52-17-80

manufacturer number

unique ID

192.168.255.255

Microsoft Corporation

68-5D-43-52-17-81

manufacturer number

unique ID

Intel Corporate

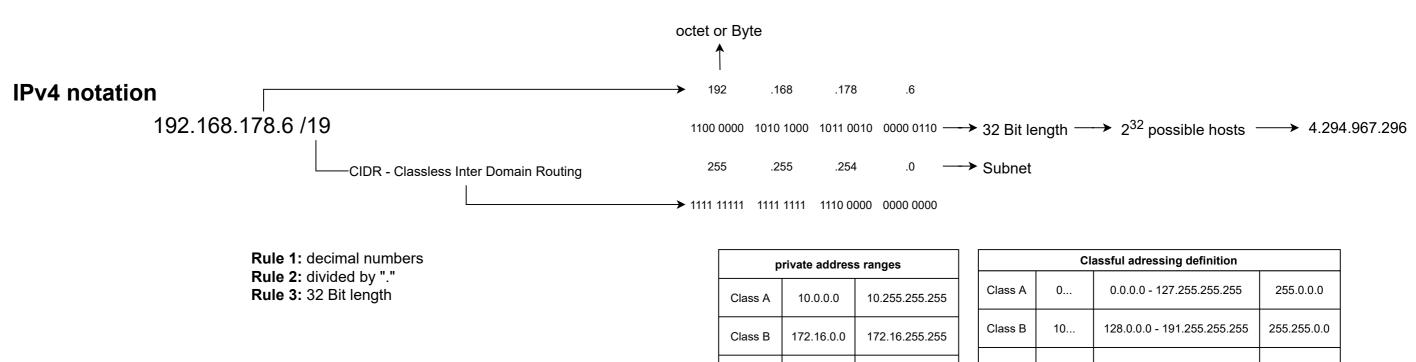
Rule 1: hexadecimal numbers

Rule 2: hexadecimal letters lowercased

Rule 3: divided by "-" or ":"

Rule 4: 48 Bit length

IPv4 loopback



Class C

192.168.0.0

127.0.0.1 - 127.255.255.254 169.254.1.0 - 169.254.254.255 http://127.0.0.1/ APIPA - Automatic Private IP Adressing

IPv4 linklocal

Classful adressing definition									
Class A	0	0.0.0.0 - 127.255.255.255	255.0.0.0						
Class B	10	128.0.0.0 - 191.255.255.255	255.255.0.0						
Class C	110	192.0.0.0 - 223.255.255.255	255.255.255.0						
Class D	1110	224.0.0.0 - 239.255.255.255	reserved for multicast						
Class E	1111	240.0.0.0 - 255.255.255.255	reserved for future						

IPv4 Subnet notation



Subnetting IPv4 FLSM

take a subnet an divide it to equal subnets 192.168.2.0 / 26 is given, you need 4 subnets

FLSM - Fixed Length Subnet Mask

1111 1111	1111 1111	1111 1111		255.255.255.192 /26	1111 1111	1111 1111	1111 1111	1100 0000	255.255.255.192	/26	
1111 1111	1111 1111	1111 1111	11 11 0000	255.255.255.240 /28 4 subnets = 2 ² = 2 Bits	0000 0000	0000 0000	0000 0000	0011 1111	192.168.2.64	/26	192.168.2.0 - 192.168.2.64 2 ⁶ - 2 = 62 IP addresses
1111 1111	1111 1111	1111 1111	1100 0000	255.255.255.240 /28	0000 0000	0000 0000	0000 0000	0000 0000	192.168.2.0	/28	192.168.2.0 - 192.168.2.31 2 ⁴ - 2 = 14 IP addresses
1111 1111	1111 1111	1111 1111	11 01 0000	255.255.255.240 /28	0000 0000	0000 0000	0000 0000	0001 0000	192.168.2.32	/28	192.168.2.32 - 192.168.2.63 2 ⁴ - 2 = 14 IP addresses
1111 1111	1111 1111	1111 1111	11 10 0000	255.255.255.240 /28	0000 0000	0000 0000	0000 0000	0010 0000	192.168.2.64	/28	192.168.2.64 - 192.168.2.95 2 ⁴ - 2 = 14 IP addresses
1111 1111	1111 1111	1111 1111	11 11 0000	255.255.255.240 /28	0000 0000	0000 0000	0000 0000	0011 0000	192.168.2.96	/28	192.168.2.96 - 192.168.2.127 2 ⁴ - 2 = 14 IP addresses
					0000 0000	0000 0000	0000 0000	0 1 00 0000	192.168.2.128		↑
	NetID of next NetID - 1 = Broadcast IP from Subnet Before										- 1 = Broadcast IP from Subnet Before

Subnetting IPv4 VLSM

take a subnet an divide it into different subnets 192.168.2.0 / 26 is given, you need

1 subnet for 3 hosts

1 subnet for 30 hosts

VLSM - Variable Length Subnet Mask



Supernetting IPv4

you got 4 subnets and need to combine these



IPv6 notation

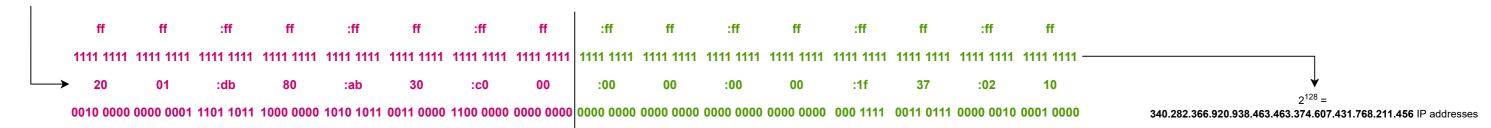
2001:db80:ab30:C000:0000:0000:1f37:0210/56

Rule 1: hexadecimal numbers

Rule 2: hexadecimal letters lowercased

Rule 3: divided by ":"

Rule 4: 128 Bit length



network prefix
never greater than 64 Bit

interface identifier does not have an broadcast

IPv6 vs IPv4

IPv6...

- has much more addresses
- supports unicast and multicast, not broadcast because "We don't want any device to to be able to broadcast across the entire internet"
- has less routes, so it's faster for tasported packages
- has IPsec included

©YlloNieR

2021-10-16 13:38:00 UTC+2

2001:db80:ab30:C000:**0000:0000**:1f37:0210/56

Rule 1: string of zeros can be removed once

2001:db80:ab30:C000::1f37:0210/56

Rule 2: leading zeros or left zeros of sextet can be removed

2001:db80:ab30:C000::1f37:210/56

2001:db80:0000:C000:0000:0000:1f37:0000/56

Rule 3: more than one string of 4 zeros can be replaced by 0

2001:db80:0:C000::1f37:0/56

IPv6 loopback

http://[::1]/

IPv6 linklocal

fe80::/10

IPv6 SLAAC

if you get automatically an IPv6 address then by

SLAAC - Stateless Automatic Address Configuration

SLAAC publishes your MAC address, to prevent this IPv6 Privacy Extension was added e.g. on Windows 10 on default

your MAC is c5:69:61:de:f3:32

your IPv6 network prefix is cd3b:d22b:e3ae:5f18::/64

								с5	:69	:61	:de	:f3	:32			\neg
								c5	:69	:61	:ff	:fe	:de	:f3	:32	1 . ←
cd	3b	:d2	2b	:e3	ae	:5f	18	:00	00	:00	00	:00	00	:00	00	
								с5	:69	:61	:ff	:fe	:de	:f3	:32	2.
cd	3b	:d2	2b	:e3	ae	:5f	18	с5	69	:61	ff	:fe	de	:f3	32	
cd	3b	:d2	2b	:e3	ae	:5f	18	с5	69	:61	ff	:fe	de	:f3	32	\neg
								1100 0101	01 1 0 1001							
								1100 0101	01 0 0 1001							3.
cd	3b	:d2	2b	:e3	ae	:5f	18	с5	49	:61	ff	:fe	de	:f3	32	\longleftarrow

- 1. Step put ff:fe in the middle of MAC, this is the EUI-64 addressformat from IEEE for MACs
- 2. Step combine network prefix with extended MAC and correct the seperator
- 3. Step convert the seventh Bit

Subnetting IPv6

take a prefix an divide it to equal subnets

cd3b:d22b:e3ae:4000::/50 is given, you need 4 subnets

