

MAC notation

MAC - Media Access Control

dc-a6-32

manufacturer number

Raspberry Pi Trading Ltd

-52-17-79

unique ID

00-15-5D

manufacturer number

Microsoft Corporation

-52-17-80

unique ID

68-5D-43

manufacturer number

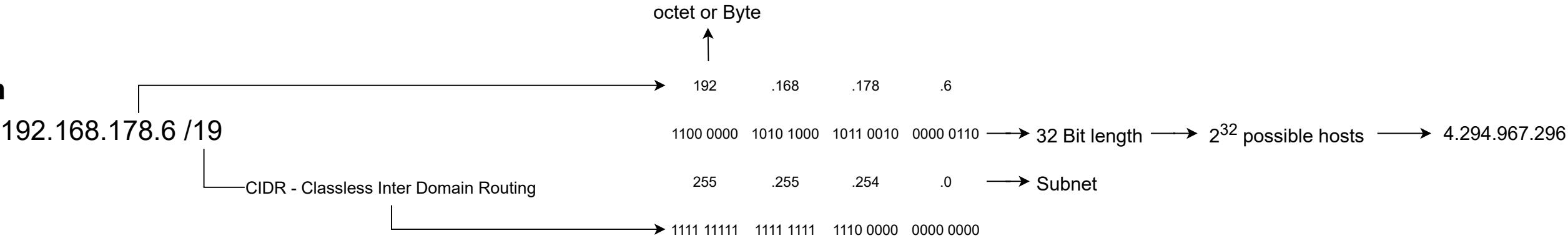
Intel Corporate

-52-17-81

unique ID

- Rule 1: hexadecimal numbers
- Rule 2: hexadecimal letters lowercased
- Rule 3: divided by "-" or ":"
- Rule 4: 48 Bit length

IPv4 notation



- Rule 1: decimal numbers
- Rule 2: divided by "."
- Rule 3: 32 Bit length

private address ranges		
Class A	10.0.0.0	10.255.255.255
Class B	172.16.0.0	172.16.255.255
Class C	192.168.0.0	192.168.255.255

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 loopback

127.0.0.1 - 127.255.255.254

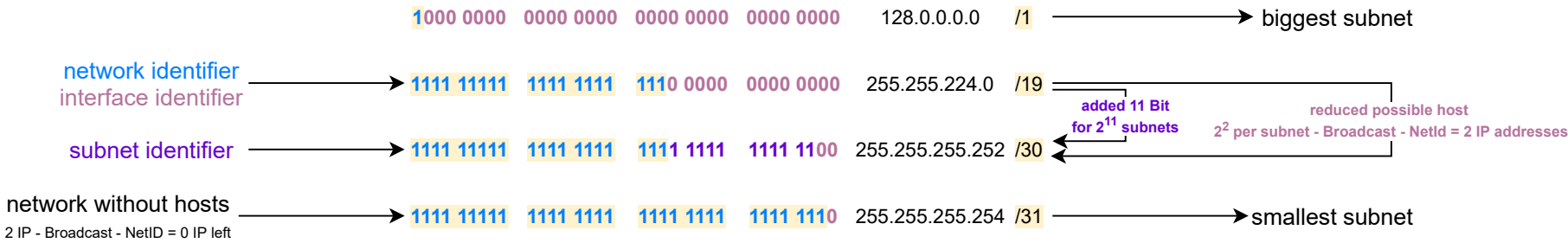
http://127.0.0.1/

IPv4 linklocal

169.254.1.0 - 169.254.254.255

APIPA - Automatic Private IP Adressing

IPv4 Subnet notation

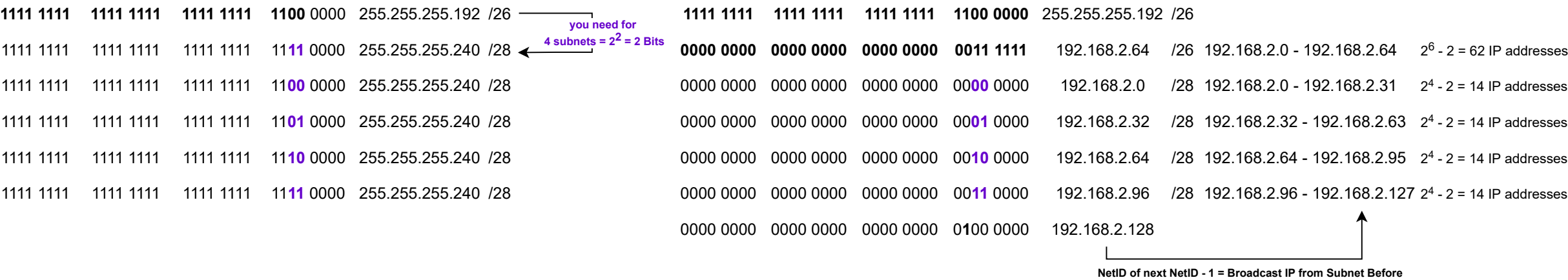


Subnetting IPv4 FLSM

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



Subnetting IPv4 VLSM

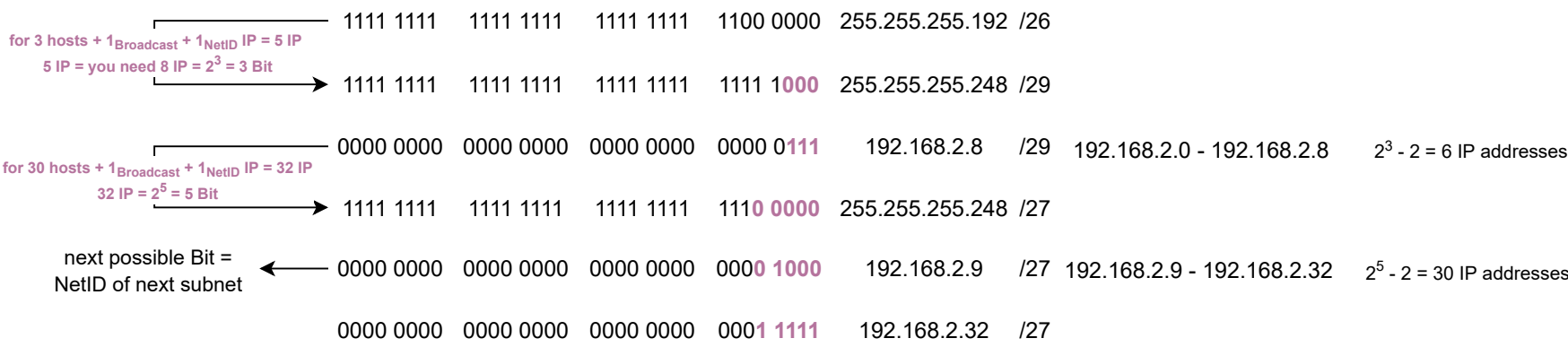
take a subnet an divide it into different subnets

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

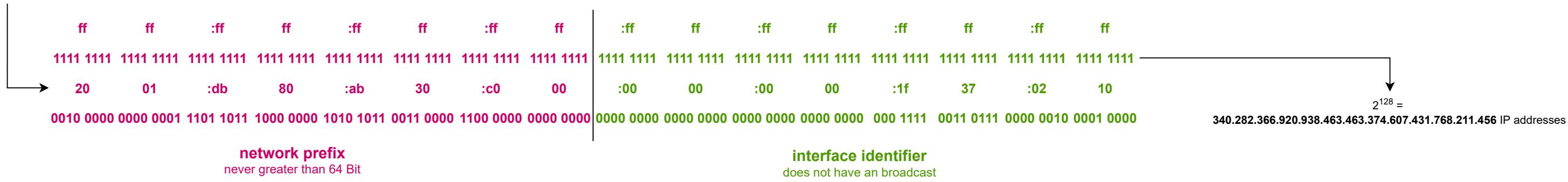
you got 4 subnets and need to combine these



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



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 transported packages
- has IPsec included

IPv6 contraction

Rule 1: string of zeros can be removed once

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

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

::1 - ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff

http://[::1]/

IPv6 linklocal

fe80::/10

IPv6 SLAAC

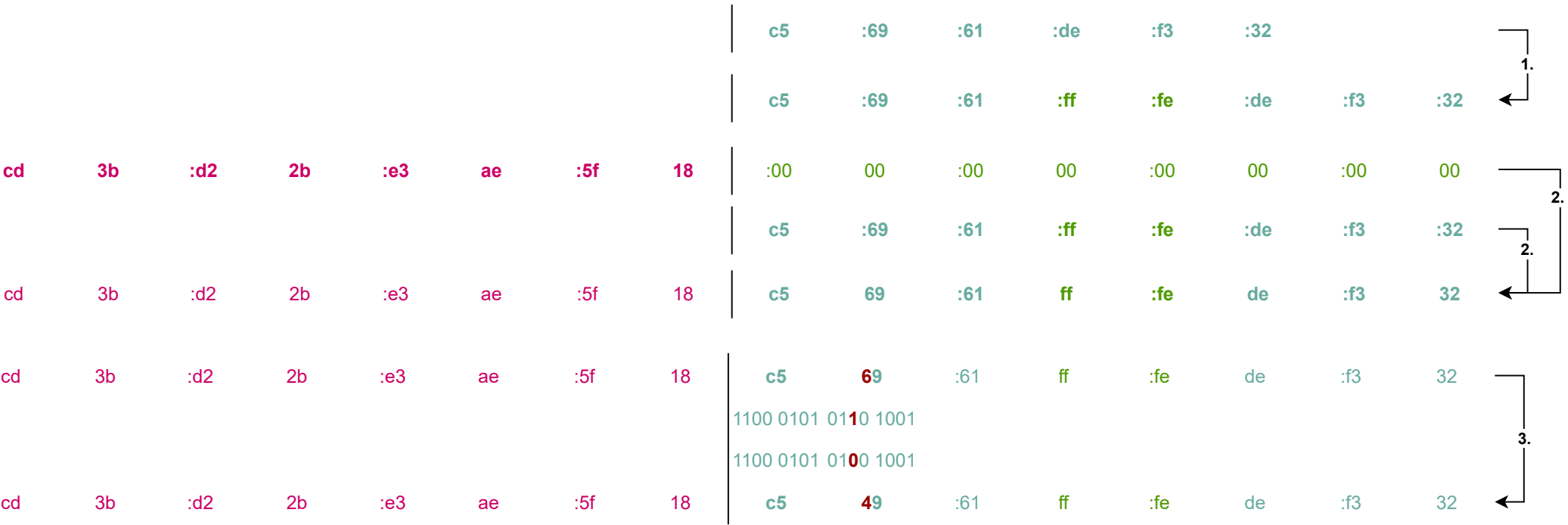
if you get automatically an IPv6 address then by

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



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

