Modul 117

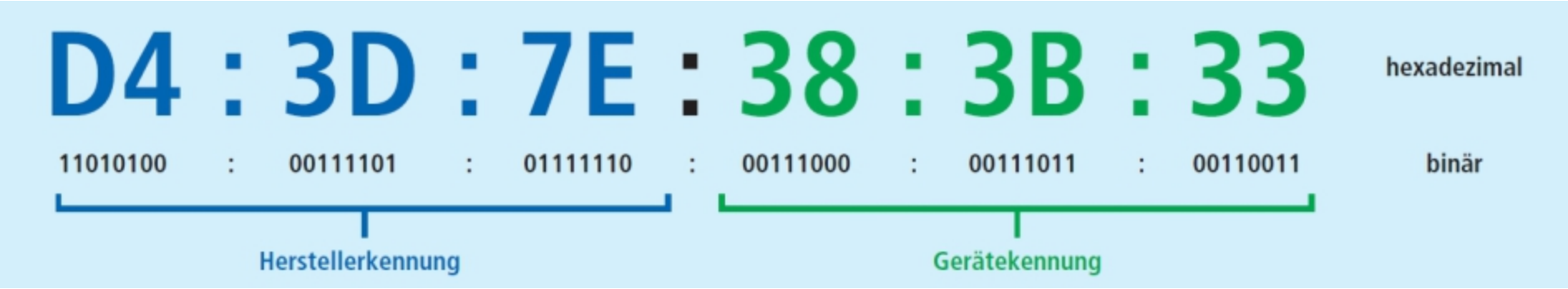
Informatik- und Netzinfrastruktur für ein kleines Unternehmen realisieren

Aufbau von Netzwerken

Adressierung

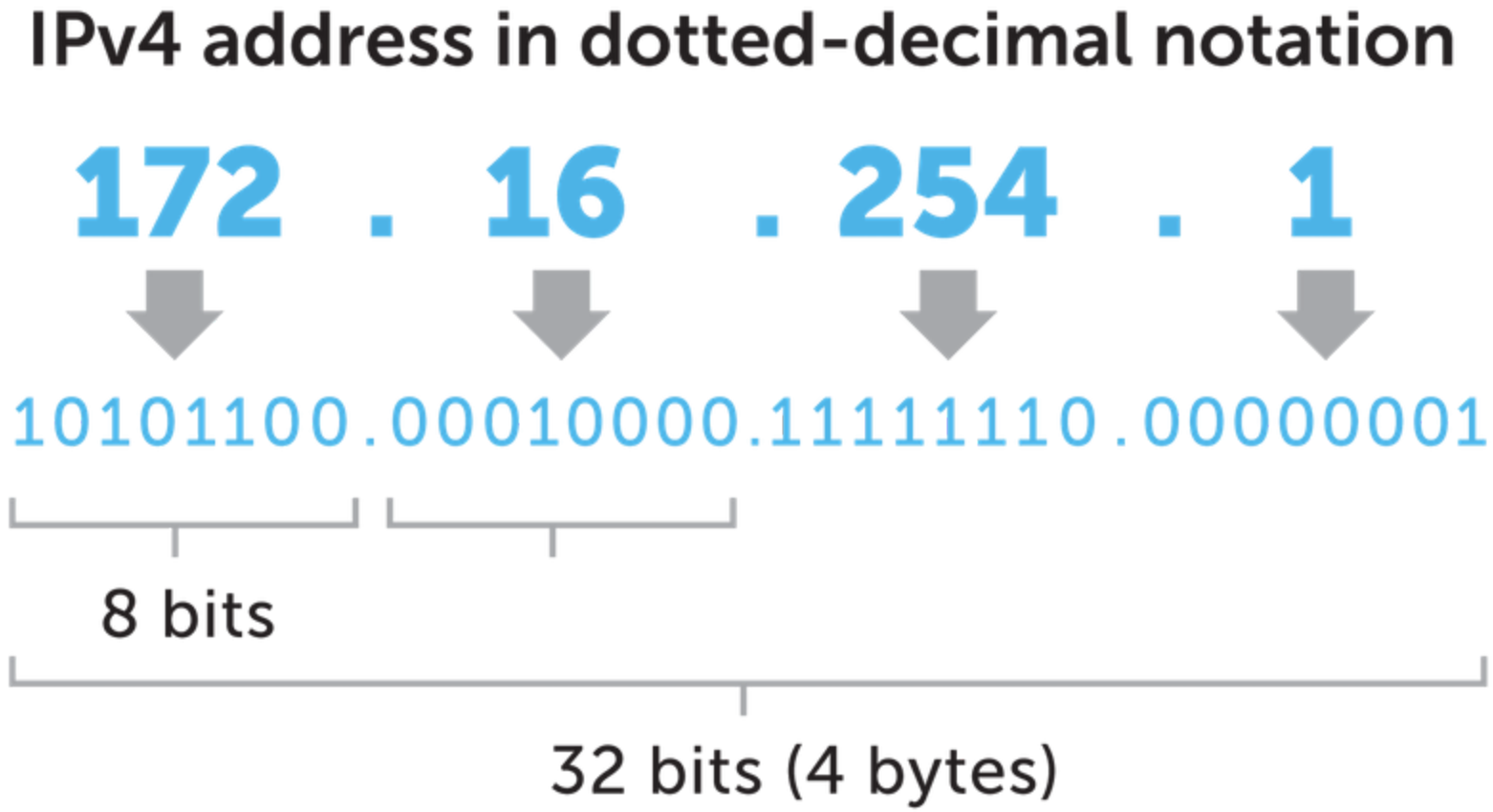
Modul 117

MAC (Media Access Control) - Hardware Adresse

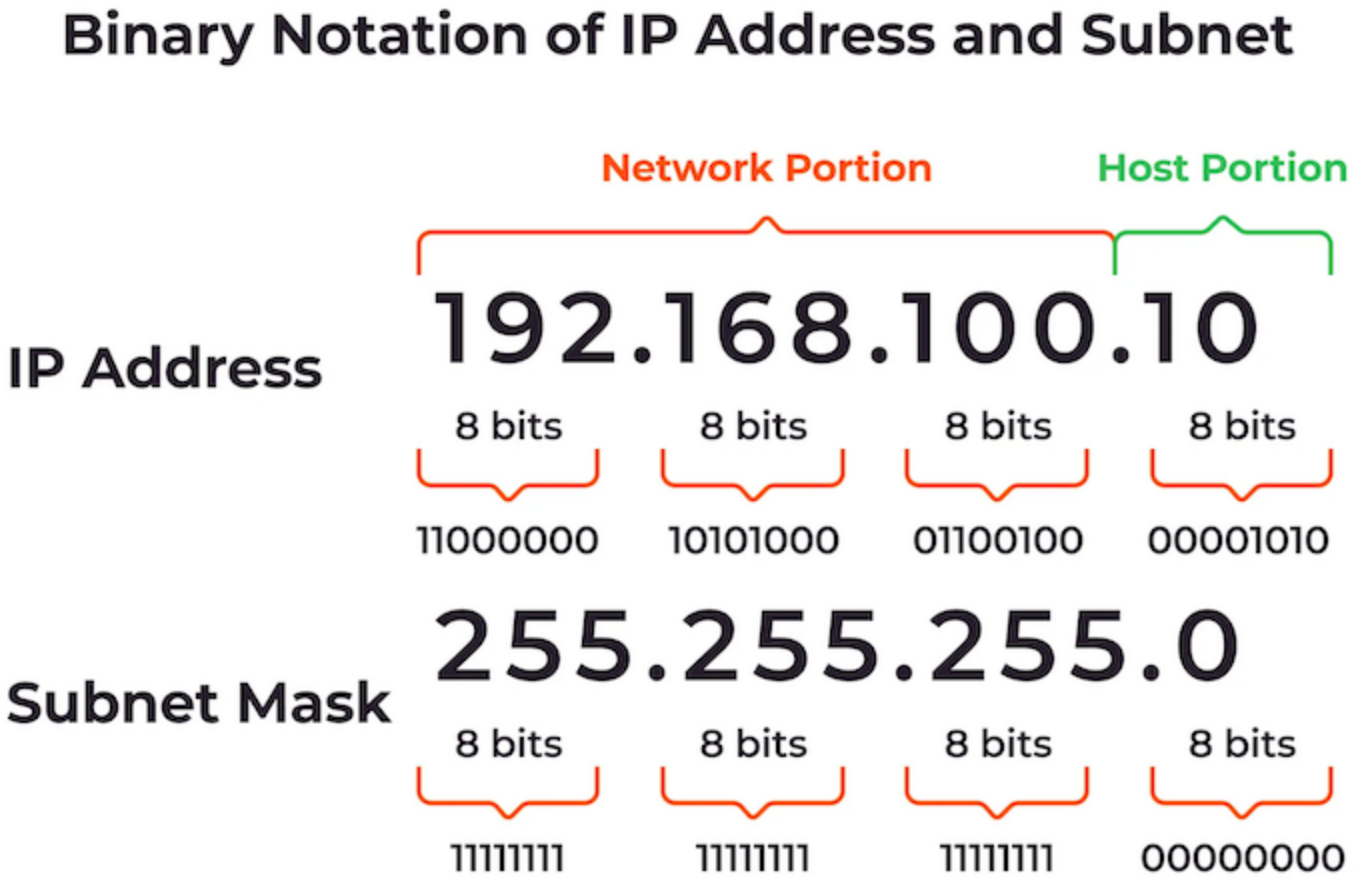


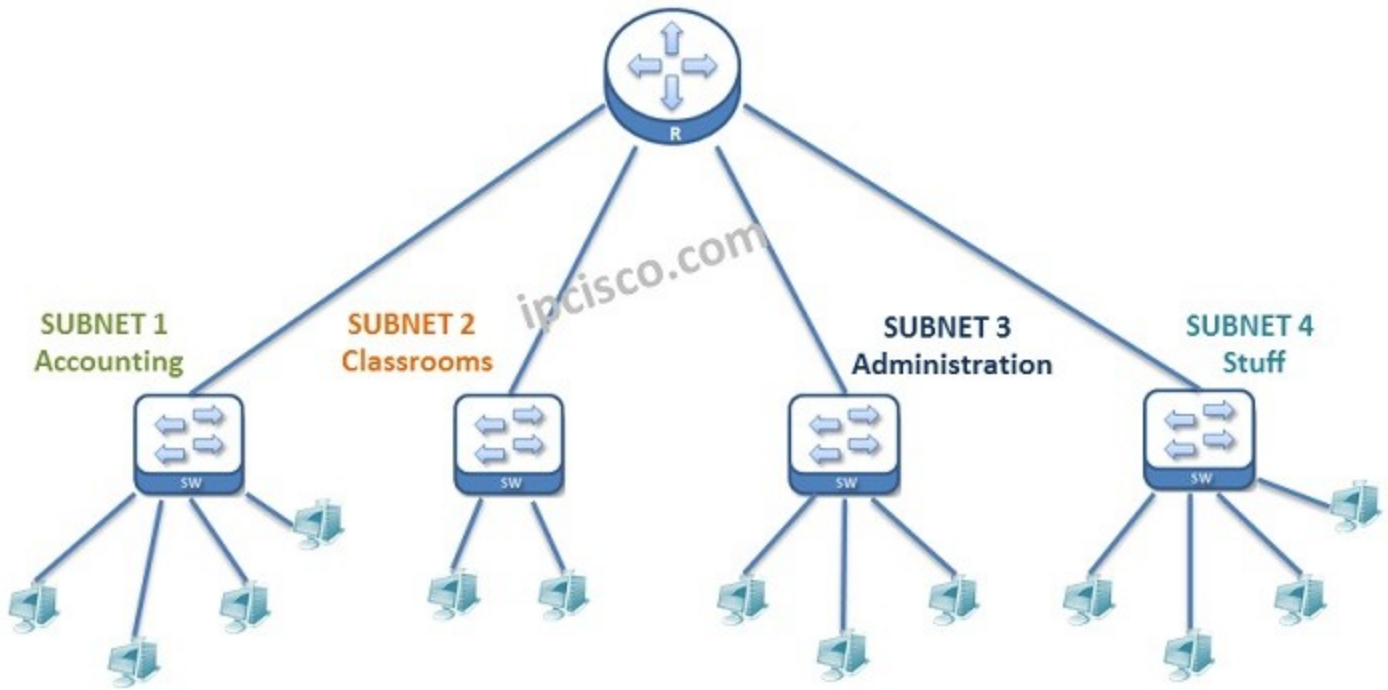
- 48-Bit lange unterteilt in 6 Oktette (jeweils 8 Bit)

IPv4 - Logische Adresse

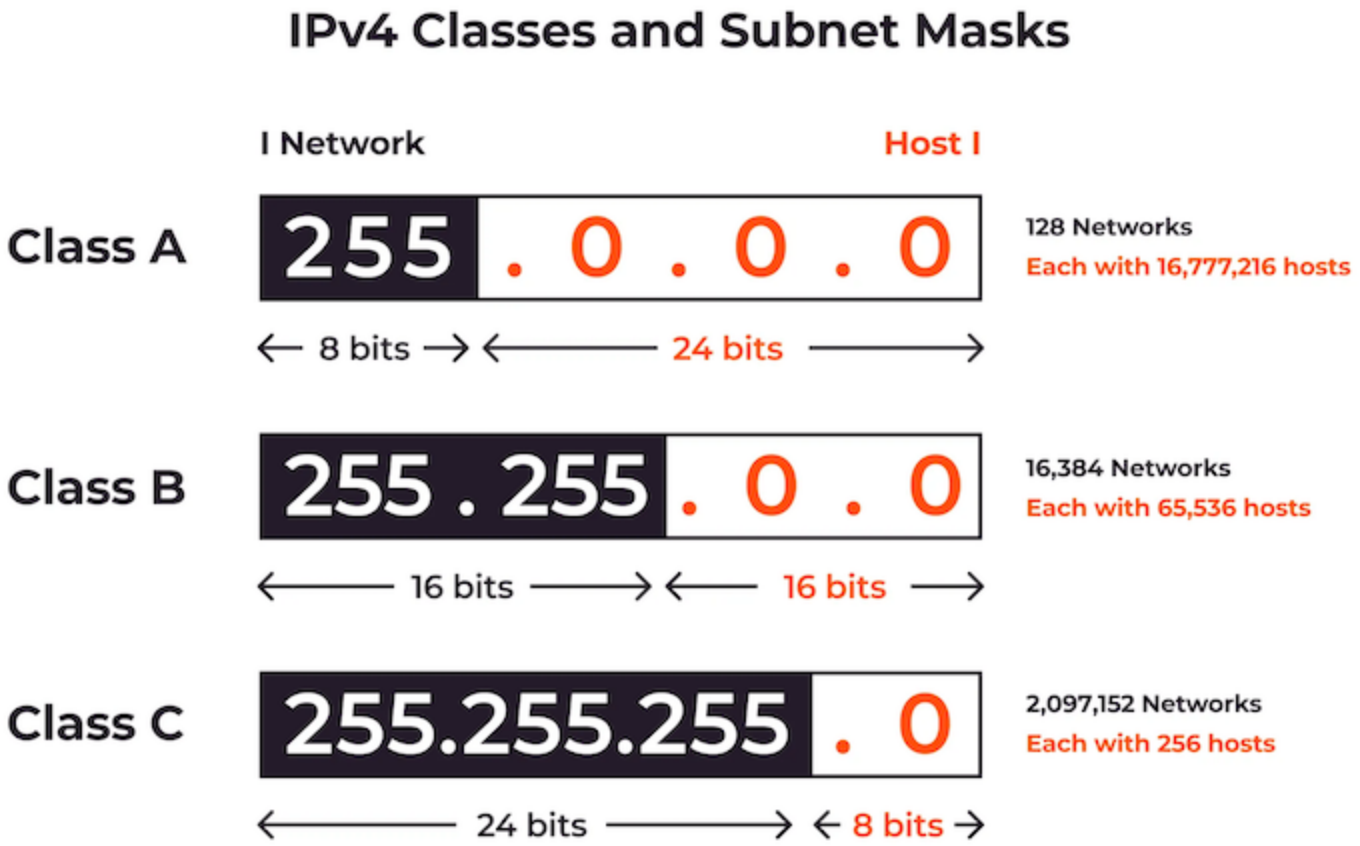


IPv4 - Subnetting




R
SUBNET 1
Accounting
SUBNET 2
Classrooms
SUBNET 3
Administration
SUBNET 4
Stuff
SW
SW
SW
SW
ipcisco.com

IPv4 - Classen



Private IP

historische Namen	CIDR-Notation	Netzadressbereich	Anzahl Adressen
Klasse A	10.0.0.0/8	10.0.0.0 bis 10.255.255.255	16'777'216
Klasse B	172.16.0.0/12	172.16.0.0 bis 172.31.255.255	1'048'576
Klasse C	192.168.0.0/16	192.168.0.0 bis 192.168.255.255	65'536

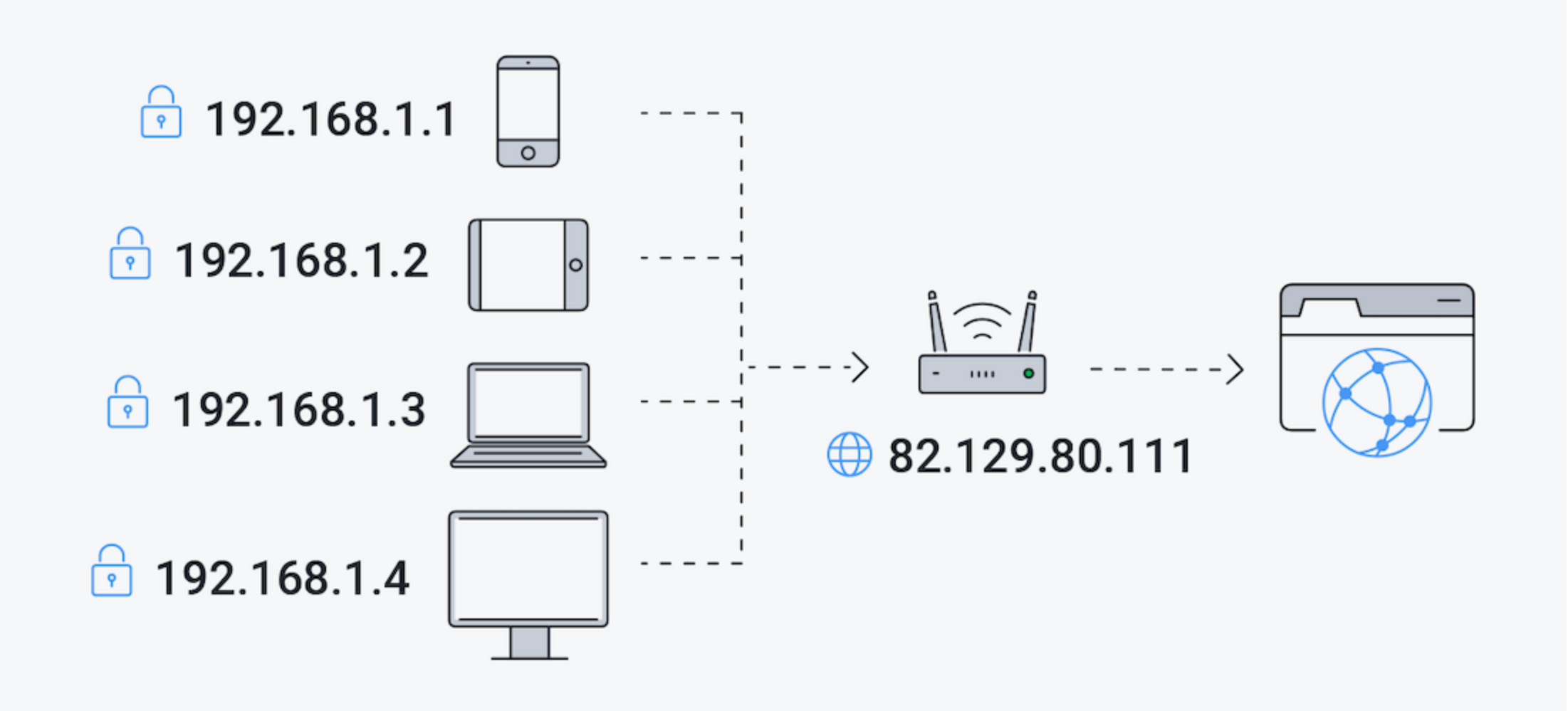
Subnetzmasken

Subnetzmaske	verfügbare Host-Adressen	Binäre 32-Bit-Werte	Suffix
255.0.0.0	**16.777.214**	**1111 1111 0000 0000 0000 0000 0000 0000**	**/8**
255.128.0.0	8.388.606	1111 1111 1000 0000 0000 0000 0000 0000	/9
255.192.0.0	4.194.302	1111 1111 1100 0000 0000 0000 0000 0000	/10
255.224.0.0	2.097.150	1111 1111 1110 0000 0000 0000 0000 0000	/11
255.240.0.0	1.048.574	1111 1111 1111 0000 0000 0000 0000 0000	/12
255.248.0.0	524.286	1111 1111 1111 1000 0000 0000 0000 0000	/13
255.252.0.0	262.142	1111 1111 1111 1100 0000 0000 0000 0000	/14
255.254.0.0	131.070	1111 1111 1111 1110 0000 0000 0000 0000	/15
255.255.0.0	**65.534**	**1111 1111 1111 1111 0000 0000 0000 0000**	**/16**
255.255.128.0	32.766	1111 1111 1111 1111 1000 0000 0000 0000	/17
255.255.192.0	16.382	1111 1111 1111 1111 1100 0000 0000 0000	/18
255.255.224.0	8.190	1111 1111 1111 1111 1110 0000 0000 0000	/19
255.255.240.0	4.094	1111 1111 1111 1111 1111 0000 0000 0000	/20
255.255.248.0	2.046	1111 1111 1111 1111 1111 1000 0000 0000	/21
255.255.252.0	1.022	1111 1111 1111 1111 1111 1100 0000 0000	/22
255.255.254.0	510	1111 1111 1111 1111 1111 1110 0000 0000	/23
255.255.255.0	**254**	**1111 1111 1111 1111 1111 1111 0000 0000**	**/24**
255.255.255.128	126	1111 1111 1111 1111 1111 1111 1000 0000	/25
255.255.255.192	62	1111 1111 1111 1111 1111 1111 1100 0000	/26
255.255.255.224	30	1111 1111 1111 1111 1111 1111 1110 0000	/27
255.255.255.240	14	1111 1111 1111 1111 1111 1111 1111 0000	/28
255.255.255.248	6	1111 1111 1111 1111 1111 1111 1111 1000	/29
255.255.255.252	2	1111 1111 1111 1111 1111 1111 1111 1100	/30

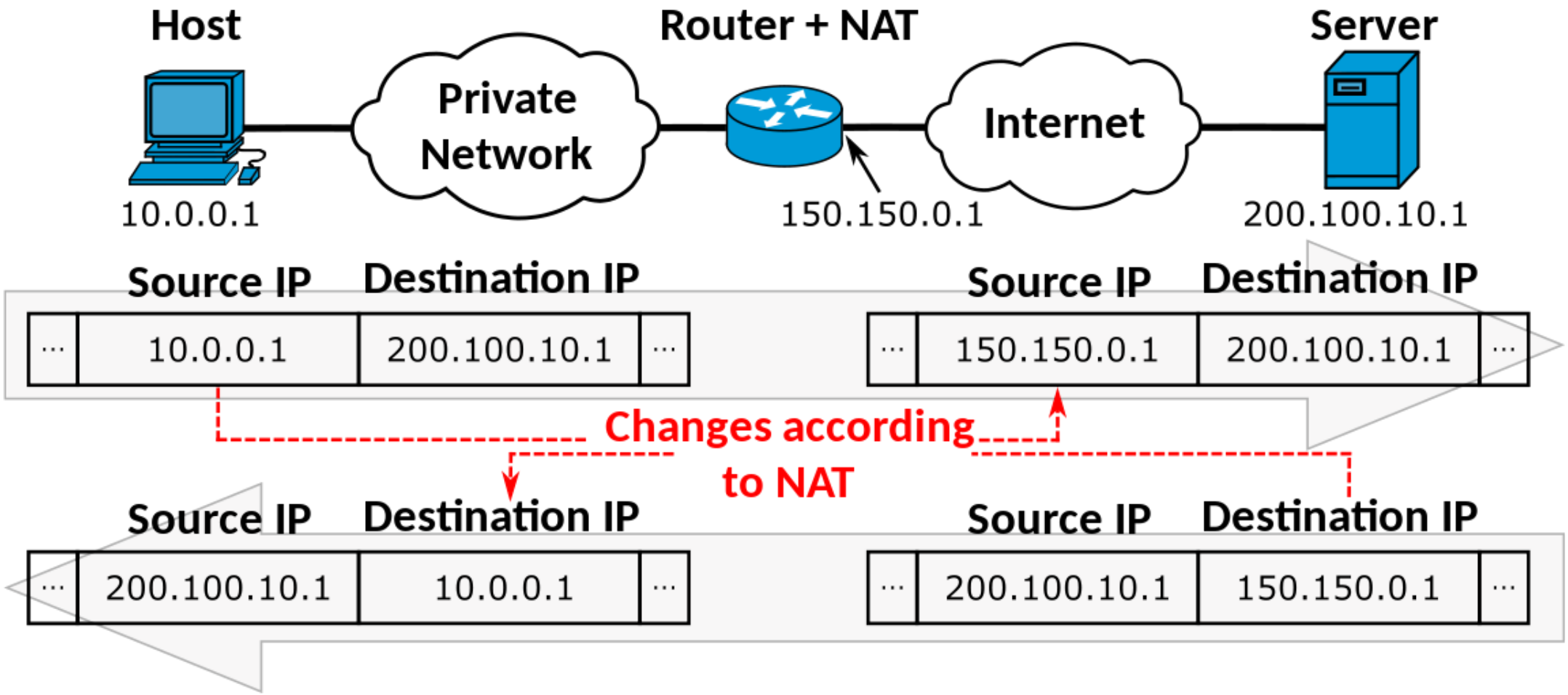
Number of hosts = 2^(number of host bits)-2


There's no place like
127.0.0.1

Public IP



NAT


Host
Router + NAT
Server
Private Network
Internet
10.0.0.1
150.150.0.1
200.100.10.1
Source IP
Destination IP
10.0.0.1
200.100.10.1
Source IP
Destination IP
150.150.0.1
200.100.10.1
Changes according to NAT
Source IP
Destination IP
200.100.10.1
10.0.0.1
Source IP
Destination IP
200.100.10.1
150.150.0.1

Static vs. Dynamic

Static IP	Dynamic IP
Manually assigned by user or network administrator	Automatically assigned by DHCP server
You need to know your stuffs: like what's the usable IP address range, the gateway IP, DNS IP etc.	DHCP server provides the host IP; while doing so, it also informs about the router IP and DNS IP
When there is any network changes, you need to manually change the IP address	DHCP automatically renew the IP lease/assign new IP when network changes
Not scalable - need to key in IP multiple times in multiple hosts when network is large	Scalable - DHCP server automatically assigns IP from the address pool
Easier to identify the real machine in the network based on IP (we can keep a mapping of static IP to machine names/ID)	More difficult to identify real machines based on IP since these addresses are used interchangeably by hosts (refer to DHCP MAC-IP bindings)

IPv6 - Logische Adresse

IPv6-Adressformat

Der vordere Teil der IPv6-Adresse (Präfix) entscheidet, ob der Router ein Paket zum Provider, an einen anderen Router im eigenen Netz oder gar nicht weiterleitet. Teilt der Provider beispielsweise ein /56-Präfix zu, kann man 256 Subnetze bilden.