

Subnetting

- [IP Address](#): A logical numeric address that is assigned to every single computer, printer, switch, router or any other device that is part of a TCP/IP-based network
- [Subnet](#): A separate and identifiable portion of an organization's network, typically arranged on one floor, building or geographical location
- [Subnet Mask](#): A 32-bit number used to differentiate the network component of an IP address by dividing the IP address into a network address and host address

First Octet value	Class	Example IP address
0 - 126	Class A	34.126.35.125
128 - 191	Class B	134.23.45.123
192 - 223	Class C	212.11.123.3
224 - 239	Class D	225.2.3.40
240 - 255	Class E	245.192.1.123

Class	Address components	Network / Host
Class A	Network.Host.Host.Host	34.126.35.125
Class B	Network. Network.Host.Host	134.23.45.123
Class C	Network. Network Network.Host	212.11.123.3
Class D	Not Defined	Not Defined
Class E	Not Defined	Not Defined

205.112.45.60

1101101.01110000.00101101.00111100

Network
Address

Host
Address

Borrowed b

255.255.255.128

.11111.11111111.11111111.10000000

Node

Address

Borrowed bit

Class A Host/Subnet Table

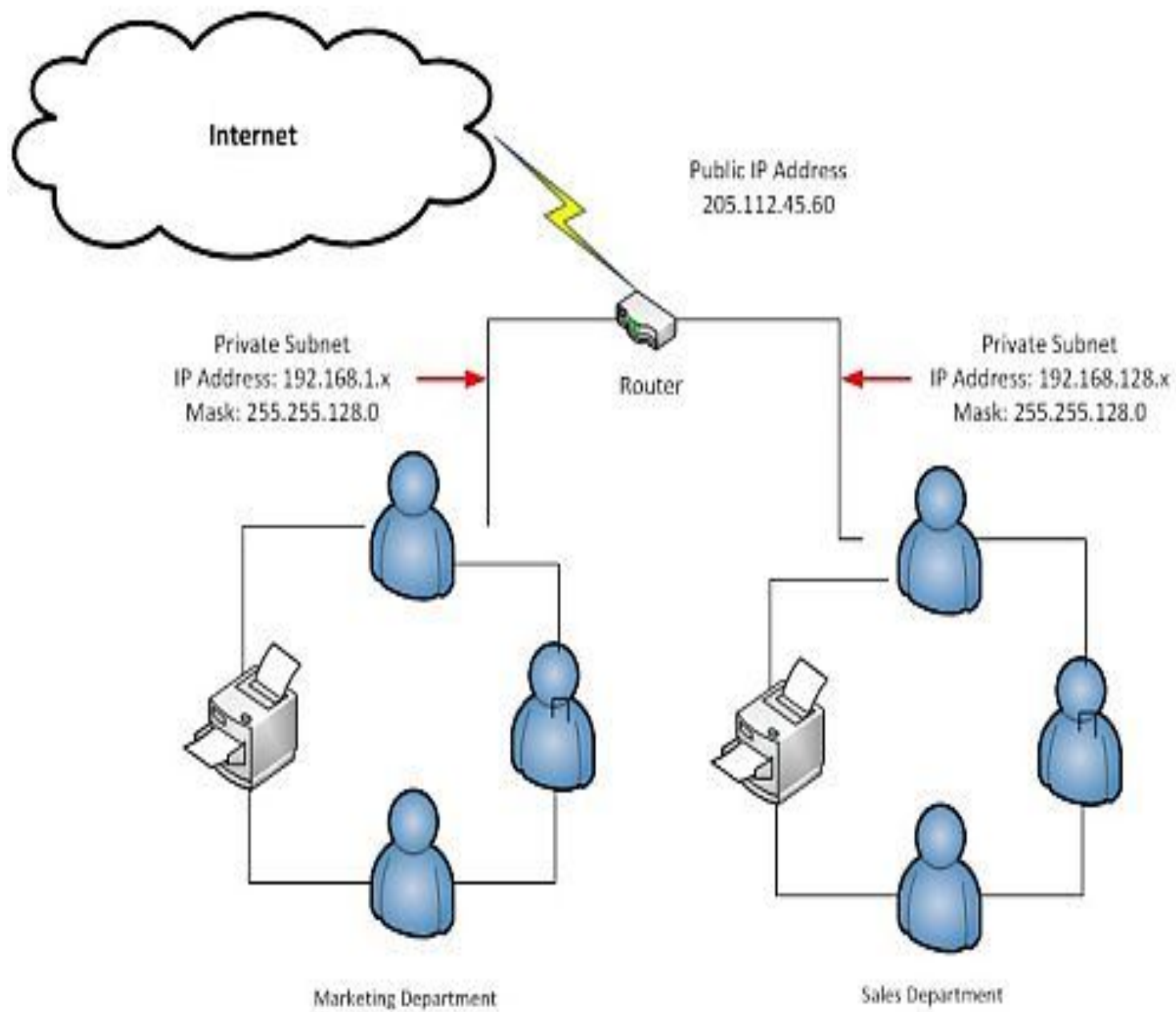
Class A bits	Subnet Mask	Effective Subnets	Effective Hosts	Number of Subnet Mask bits
1	255.128.0.0	2	8388606	/9
2	255.192.0.0	4	4194302	/10
3	255.224.0.0	8	2097150	/11
4	255.240.0.0	16	1048574	/12
5	255.248.0.0	32	524286	/13
6	255.252.0.0	64	262142	/14
7	255.254.0.0	128	131070	/15
8	255.255.0.0	256	65534	/16
9	255.255.128.0	512	32766	/17
10	255.255.192.0	1024	16382	/18
11	255.255.224.0	2048	8190	/19
12	255.255.240.0	4096	4094	/20
13	255.255.248.0	8192	2046	/21
14	255.255.252.0	16384	1022	/22
15	255.255.254.0	32768	510	/23
16	255.255.255.0	65536	254	/24
17	255.255.255.128	131072	126	/25
18	255.255.255.192	262144	62	/26
19	255.255.255.224	524288	30	/27
20	255.255.255.240	1048576	14	/28
21	255.255.255.248	2097152	6	/29
22	255.255.255.252	4194304	2	/30
23	255.255.255.254	8388608	2	/31

Class B Host/Subnet Table

Class B bits	Subnet Mask	Effective Subnets	Effective Hosts	Number of Subnet Mask bits
1	255.255.128.0	2	32766	/17
2	255.255.192.0	4	16382	/18
3	255.255.224.0	8	8190	/19
4	255.255.240.0	16	4094	/20
5	255.255.248.0	32	2046	/21
6	255.255.252.0	64	1022	/22
7	255.255.254.0	128	510	/23
8	255.255.255.0	256	254	/24
9	255.255.255.128	512	126	/25
10	255.255.255.192	1024	62	/26
11	255.255.255.224	2048	30	/27
12	255.255.255.240	4096	14	/28
13	255.255.255.248	8192	6	/29
14	255.255.255.252	16384	2	/30
15	255.255.255.254	32768	2	/31

Class C Host/Subnet Table

Class C bits	Subnet Mask	Effective Subnets	Effective Hosts	Number of Subnet Mask bits
1	255.255.255.128	2	126	/25
2	255.255.255.192	4	62	/26
3	255.255.255.224	8	30	/27
4	255.255.255.240	16	14	/28
5	255.255.255.248	32	6	/29
6	255.255.255.252	64	2	/30
7	255.255.255.254	128	2	/31

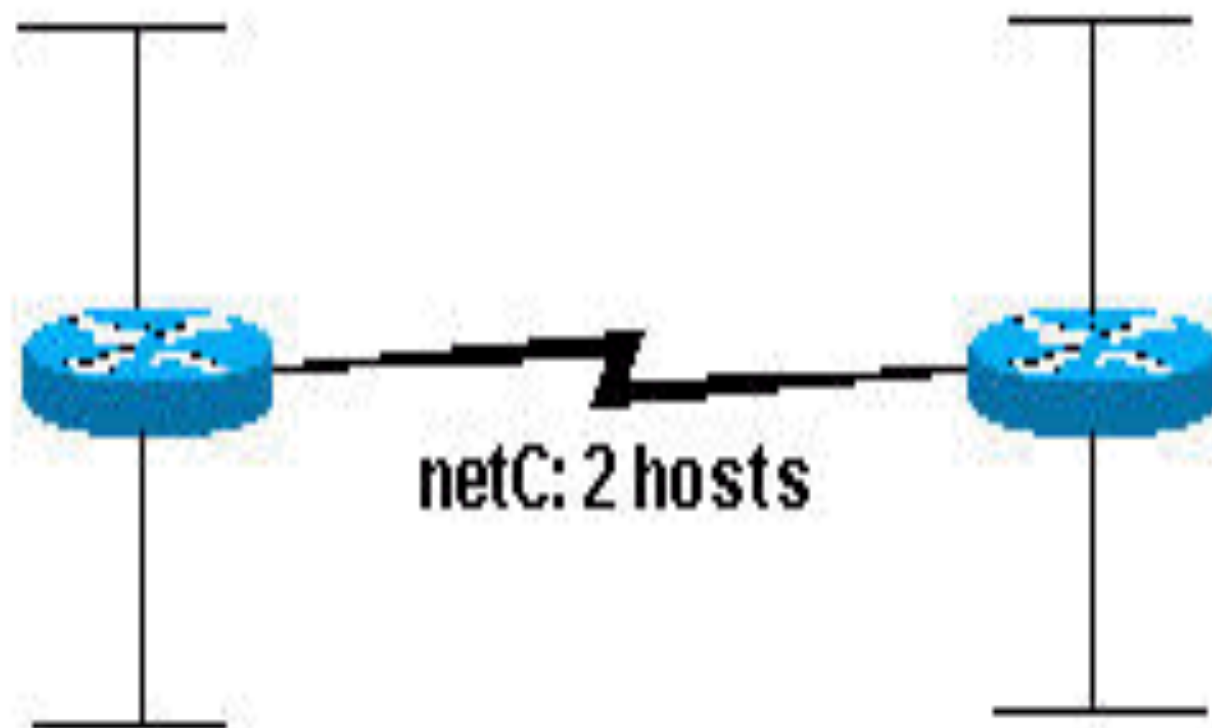


CIDR Address Blocks

CIDR Prefix	Dotted Decimal Notation	# Node Addresses	# of Traditional Class Networks
/13	255.248.0.0	512K	8 B or 2048 C class
/14	255.252.0.0	256K	4 B or 1024 C class
/15	255.254.0.0	128K	2 B or 512 C class
/16	255.255.0.0	64K	1 B or 256 C class
/17	255.255.128.0	32K	128 C class
/18	255.255.192.0	16K	64 C class
/19	255.255.224.0	8K	32 C class
/20	255.255.240.0	4K	16 C class
/21	255.255.248.0	2K	8 C class
/22	255.255.252.0	1K	4 C class
/23	255.255.254.0	512	2 C class
/24	255.255.255.0	256	1 C class
/25	255.255.255.128	128	1/2 C class
/26	255.255.255.192	64	1/4 C class
/27	255.255.255.224	32	1/8 C class

netA: 14 hosts

netD: 7 hosts



netC: 2 hosts

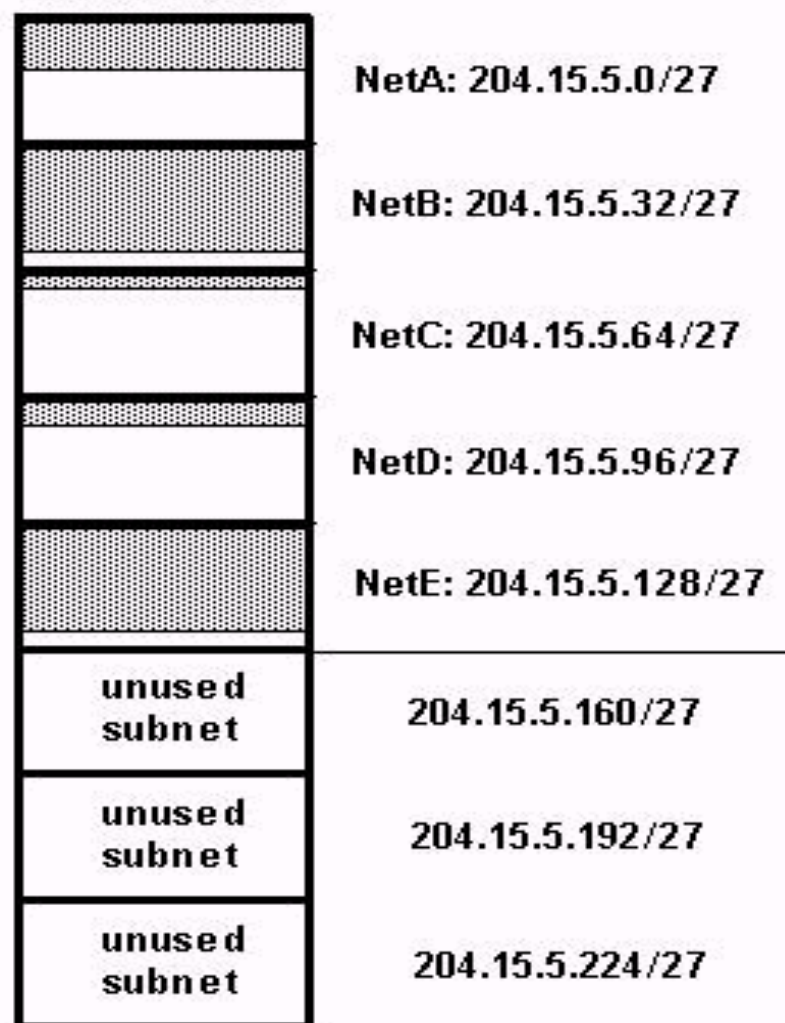
netB: 28 hosts

netE: 28 hosts

- The largest subnet must support 28 host addresses
- Is this possible with a Class C network?
- In order to create the five needed subnets you would need to use three bits from the Class C host bits
- $2^5 = 32$ (30 usable

- netA: 204.15.5.0/27 host address range 1 to 30
- netB: 204.15.5.32/27 host address range 33 to 62
- netC: 204.15.5.64/27 host address range 65 to 94
- netD: 204.15.5.96/27 host address range 97 to 126
- netE: 204.15.5.128/27 host address range 129 to 158

Network
204.15.5.0/24



 **host addresses allocated**

 **host addresses unused**