

SUBNETTING C-CLASS NETWORKS

192.168.1.0/24 Network

Address	192	168	1	0000	0000
Mask	255	255	255	0000	0000
	Network Portion			Host Portion	

With no host bits borrowed, the host portion of both the network address and mask are all 0 bits.

Borrow 1 bit from the host portion of the address.

Original	192.	168.	1.	0	000	0000	1 Network
Mask	255.	255.	255.	0	000	0000	

The borrowed bit value is **0** for the Net 0 address.

Net 0	192.	168.	1.	0	000	0000	2 Subnets
Net 1	192.	168.	1.	1	000	0000	

The new subnets have the **SAME** subnet mask.

Mask	255.	255.	255.	1	000	0000
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Decimal Representation

Original	192.	168.	1.	0	000	0000	Network: 192.168.1.0/24
Mask	255.	255.	255.	0	000	0000	Mask: 255.255.255.0

Borrowing 1 bit creates 2 subnets with the same mask.

Net 0	192.	168.	1.	0	000	0000	Network: 192.168.1.0/25
Mask	255.	255.	255.	1	000	0000	Mask: 255.255.255.128
Net 1	192.	168.	1.	1	000	0000	Network: 192.168.1.128/25
Mask	255.	255.	255.	1	000	0000	Mask: 255.255.255.128

Address Range for 192.168.1.0/25 Network

Network Address

192. 168. 1. 0 000 0000 = 192.168.1.0

First Host Address

192. 168. 1. 0 000 0001 = 192.168.1.1

Last Host Address

192. 168. 1. 0 111 1110 = 192.168.1.126

Broadcast Address

192. 168. 1. 0 111 1111 = 192.168.1.127

Address Range for 192.168.1.128/25 Network

Network Address

192. 168. 1. 1 000 0000 = 192.168.1.128

First Host Address

192. 168. 1. 1 000 0001 = 192.168.1.129

Last Host Address

192. 168. 1. 1 111 1110 = 192.168.1.254

Broadcast Address

192. 168. 1. 1 111 1111 = 192.168.1.255

Subnets = 2^n
(where n = bits borrowed)

192. 168. 1. 0 000 0000

1 bit was borrowed

$2^1 = 2$ subnets

Hosts = 2^n
(where n = host bits remaining)

192. 168. 1. 0 000 0000

7 bits remain in host field

$2^7 = 128$ hosts per subnet
 $2^7 - 2 = 126$ valid hosts per subnet

Borrowing 2 Bits

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Original	192.	168.	1.	00	00	0000
Mask	255.	255.	255.	00	00	0000

Borrowing 2 bits creates 4 subnets:

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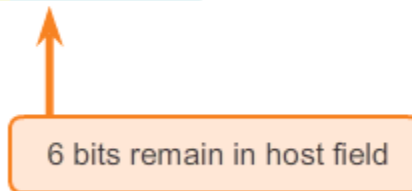
Net 0	192.	168.	1.	00	00	0000	192.168.1.0/26
Net 1	192.	168.	1.	01	00	0000	192.168.1.64/26
Net 2	192.	168.	1.	10	00	0000	192.168.1.128/26
Net 3	192.	168.	1.	11	00	0000	192.168.1.192/26

All 4 subnets use the same mask:

Mask	255.	255.	255.	11	00	0000	Mask:255.255.255.192
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Hosts = 2^n
(where n = host bits remaining)

192.	168.	1.	00	00	0000
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$2^6 = 64$ hosts per subnet
 $2^6 - 2 = 62$ valid hosts per subnet

CLASS – B SUBNETTING

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172.	16.	0000 000	0.	0000 0000
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255.	255.	1111 111	0.	0000 0000
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Borrowing 7 bits creates 128 subnets

172.	16.	0000 000	0.	0000 0000
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 172.16.0.0/23

172.	16.	0000 001	0.	0000 0000
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 172.16.2.0/23

172.	16.	0000 010	0.	0000 0000
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 172.16.4.0/23

.. to ..

172.	16.	1111 111	0.	0000 0000
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 172.16.254.0/23

Hosts = 2^n
(where n = host bits remaining)

172.	16.	1.	00 00 00	00.	0000 0000
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↑

9 bits remain in host field

$2^9 = 512$ hosts per subnet
 $2^9 - 2 = 510$ valid hosts per subnet

Network Address

172. 16. 1. 00 00 00 00. 0000 0000 = 172.16.0.0/23

First Host Address

172. 16. 1. 00 00 00 00. 0000 0001 = 172.16.0.1/23

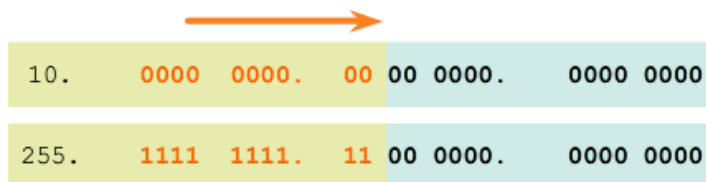
Last Host Address

172. 16. 1. 00 00 00 01. 1111 1110 = 172.16.0.254/23

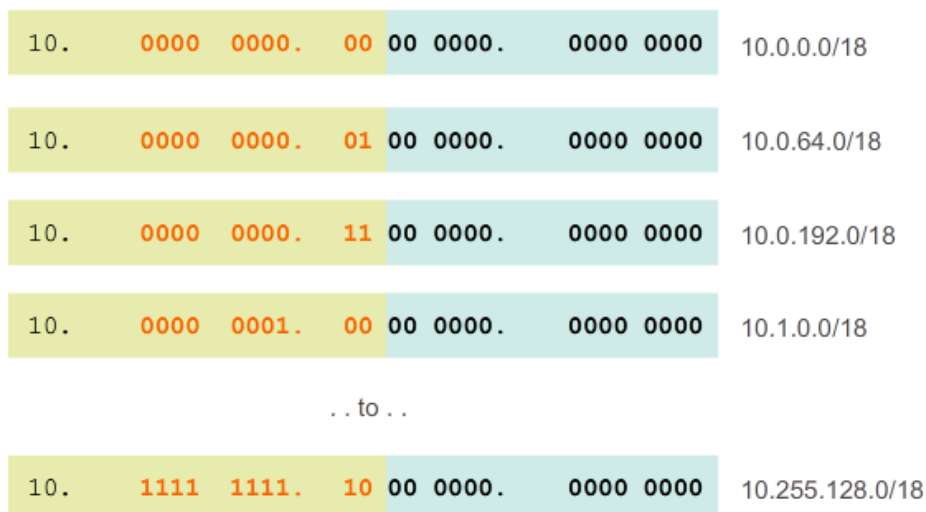
Broadcast Address

172. 16. 1. 00 00 00 01. 1111 1111 = 172.16.1.255

CLASS – A SUBNETTING

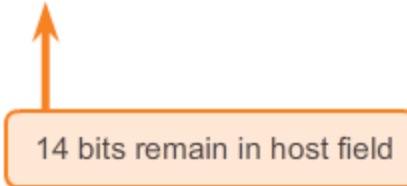


Borrowing 10 bits creates 1024 subnets



Hosts = 2^n
(where n = host bits remaining)

10. 00 00 00 00. 0000 0000. 0000 0000



$2^{14} = 16384$ hosts per subnet
 $2^{14} - 2 = 16382$ valid hosts per subnet

Network Address

10. 00 00 00 00. 0000 0000. 0000 0000 = 10.0.0.0/18

First Host Address

10. 00 00 00 00. 0000 0000. 0000 0001 = 10.0.0.1/18

Last Host Address

10. 00 00 00 00. 0011 1111. 1111 1110 = 10.0.63.254/18

Broadcast Address

10. 00 00 00 00. 0011 1111. 1111 1111 = 10.0.63.255/18