Subnetting charts

Class A Subnetting chart

CIDR	Subnet mask	Network bits	Host bits	Networks	Block Size or Total Hosts	Valid Hosts
/8	255.0.0.0	0	24	1	16777216	16777214
/9	255.128.0.0	1	23	2	8388608	8388606
/10	255.192.0.0	2	22	4	4194304	4194302
/11	255.224.0.0	3	21	8	2097152	2097150
/12	255.240.0.0	4	20	16	1048576	1048574
/13	255.248.0.0	5	19	32	524288	524286
/14	255.252.0.0	6	18	64	262144	262142
/15	255.254.0.0	7	17	128	131072	131070
/16	255.255.0.0	8	16	256	65536	65534
/17	255.255.128.0	9	15	512	32768	32766
/18	255.255.192.0	10	14	1024	16384	16382
/19	255.255.224.0	11	13	2048	8192	8190
/20	255.255.240.0	12	12	4096	4096	4094
/21	255.255.248.0	13	11	8192	2048	2046
/22	255.255.252.0	14	10	16384	1024	1022
/23	255.255.254.0	15	9	32768	512	510
/24	255.255.255.0	16	8	65536	256	254
/25	255.255.255.128	17	7	131072	128	126
/26	255.255.255.192	18	6	262144	64	62
/27	255.255.255.224	19	5	524288	32	30
/28	255.255.255.240	20	4	1048576	16	14
/29	255.255.255.248	21	3	2097152	8	6
/30	255.255.255.252	22	2	4194304	4	2

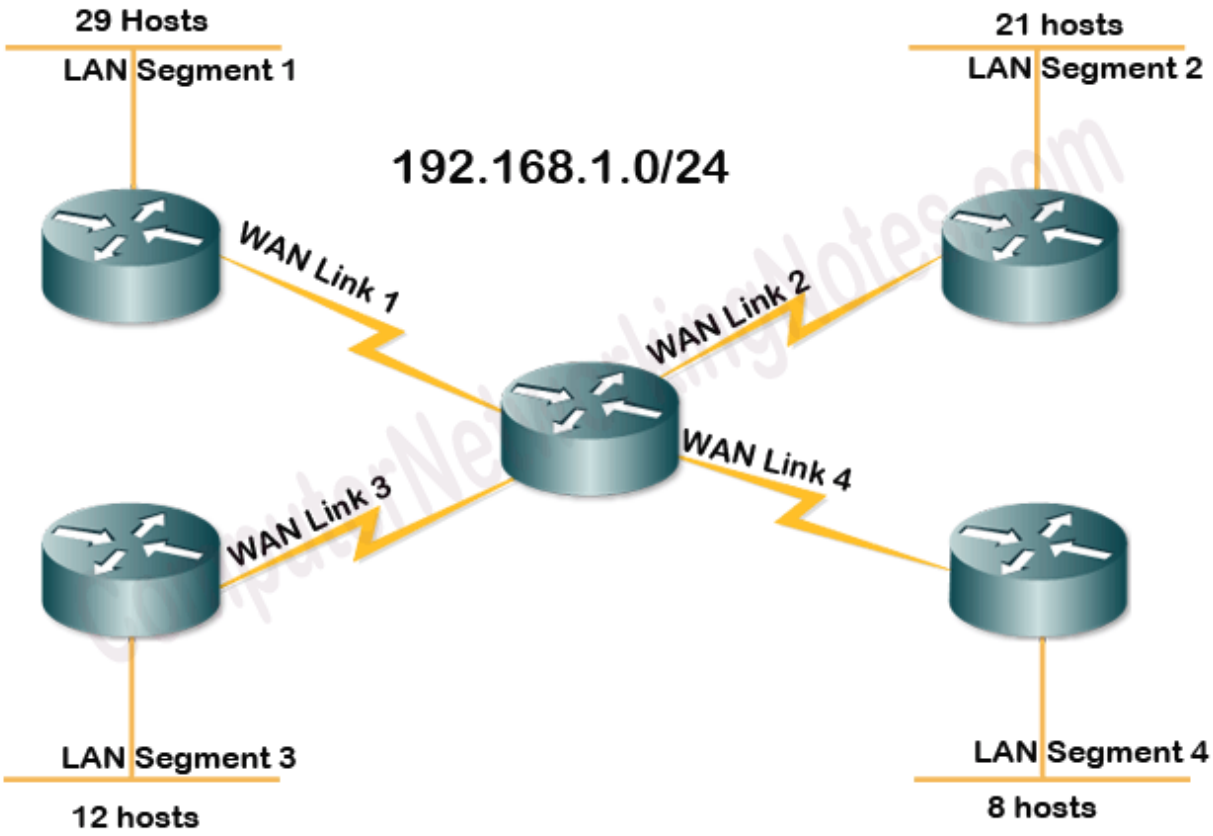
Class B Subnetting chart

CIDR	Subnet mask	Network bits	Host bits	Networks	Block Size /Total Hosts	Valid Hosts
/16	255.255.0.0	0	16	1	65536	65534
/17	255.255.128.0	1	15	2	32768	32766
/18	255.255.192.0	2	14	4	16384	16382
/19	255.255.224.0	3	13	8	8192	8190
/20	255.255.240.0	4	12	16	4096	4094
/21	255.255.248.0	5	11	32	2048	2046
/22	255.255.252.0	6	10	64	1024	1022
/23	255.255.254.0	7	9	128	512	510
/24	255.255.255.0	8	8	256	256	254
/25	255.255.255.128	9	7	512	128	126
/26	255.255.255.192	10	6	1024	64	62
/27	255.255.255.224	11	5	2048	32	30
/28	255.255.255.240	12	4	4096	16	14
/29	255.255.255.248	13	3	8192	8	6
/30	255.255.255.252	14	2	16384	4	2

Class C Subnetting chart

CIDR	Subnet mask	Network bits	Host bits	Networks	Block Size /Total Hosts	Valid Hosts
/24	255.255.255.0	0	8	1	256	254
/25	255.255.255.128	1	7	2	128	126
/26	255.255.255.192	2	6	4	64	62
/27	255.255.255.224	3	5	8	32	30
/28	255.255.255.240	4	4	16	16	14
/29	255.255.255.248	5	3	32	8	6
/30	255.255.255.252	6	2	64	4	2

Examples of VLSM Subnetting



Step by step VLSM calculation

Based on hosts' requirement, arrange all segments in descending order and select appropriate block size for each segment.

VLSM Example

No.	Segment	Host requirement	Nearest block size	Valid hosts in block
1	LAN Segment1	29	32	30 (32 -2)
2	LAN Segment 2	21	32	30 (32 -2)
3	LAN Segment 3	12	16	14 (16-2)
4	LAN Segment 4	8	16	14 (16-2)
5	WAN Link 1	2	4	2 (4-2)
6	WAN Link 2	2	4	2 (4-2)
7	WAN Link 3	2	4	2 (4-2)
8	WAN Link 4	2	4	2 (4-2)

VLSM Example

The first largest segment (LAN Segment1) requires the block size 32. For 32 block size, we use the Subnetting of /27.

In class C, Subnetting of /27 provides us 8 networks (subnets) of block size 32.

0-31, 32-63, 64-95, 96-127, 128-159, 160-191, 192-223, 224-255

Let's use the first subnet **0-31** for it.

Since second segment (LAN Segment2) also has the similar requirement, use the second subnet **32-63** for it.

Third segment (LAN Segment3) requires the block size 16 which is different from the second segment, so instead of using the subnet which provides block size 32, we will do the Subnetting again and use the subnet which provides block size 16.

In class C, Subnetting of /28 provides 16 networks of block size 16.

0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111, 112-127, 128-143, 144-159, 160-175, 176-191, 192-207, 208-223, 224-239, 240-255

If we exclude the occupied subnets, we will get the available subnets for this segment and next segments.

The subnets which provide the addresses which are already assigned are known as occupied subnets. In this Subnetting the occupied subnets are 0-15, 16-31, 32-47 and 48-63. These subnets provide the addresses (0 to 63) which are already assigned in previous segments.

Let's use the first available subnet **64-79** from this Subnetting for the third segment (LAN Segment3).

Forth segment (LAN Segment4) also has the similar requirement. Let's assign next available subnet **80-95** to it.

Next segments are WAN links. WAN links require only 2 addresses. For 2 valid addresses we need the block size of 4.

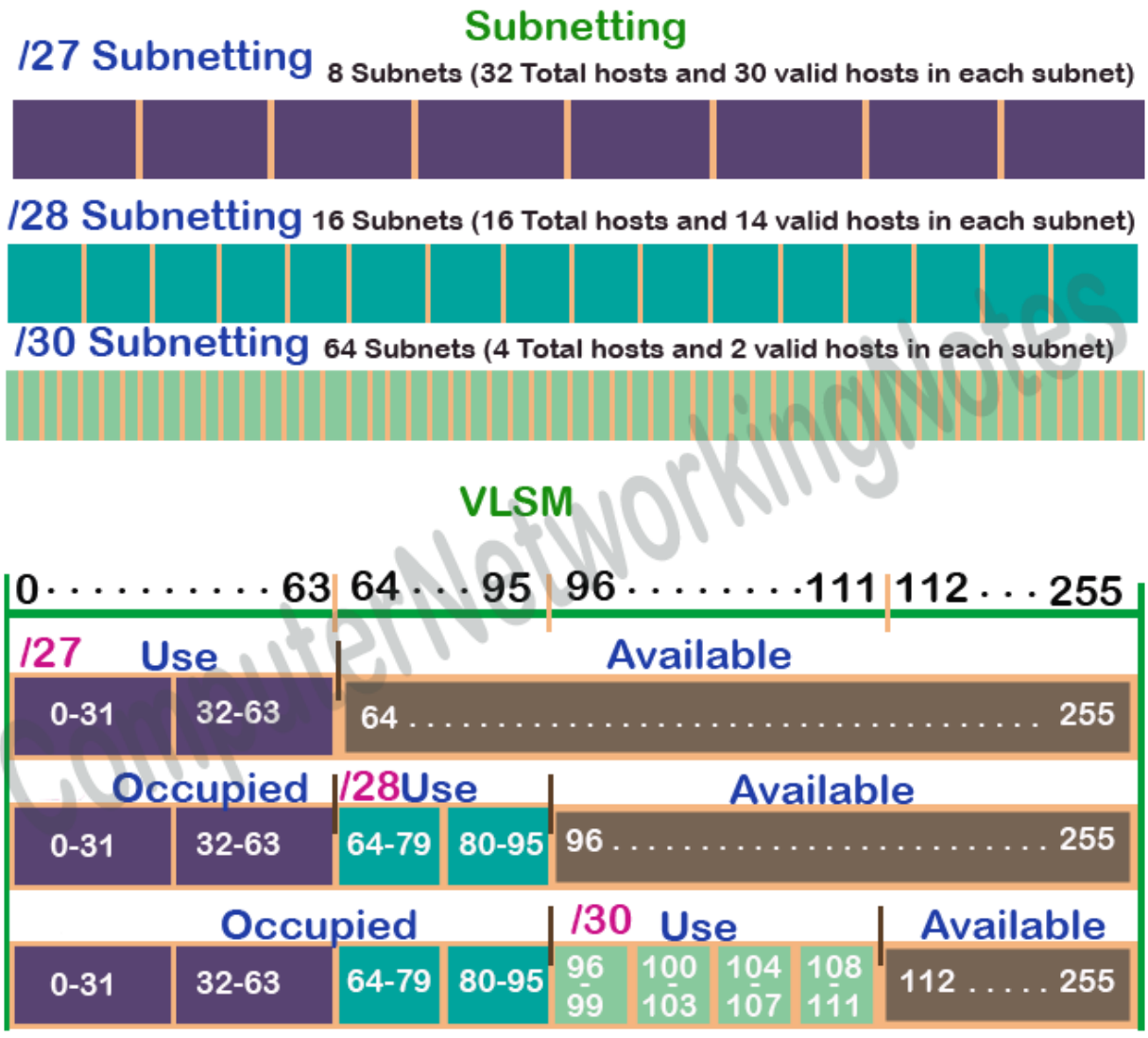
In class C, Subnetting of /30 provides us 64 networks of block size 4.

0-3, 4-7, 8-11, 12-15, 16-19, 20-23, 24-27, 28-31, 32-35, 36-39, 40-43, 44-47, 48-51, 52-55, 56-59, 60-63, 64-67, 68-71, 72-75, 76-79, 80-83, 84-87, 88-91, 92-95, 96-99, 100-103, 104-107, 108-111, 112-115, 116-119, 120-123, 124-127, 128-131, 132-135, 136-139, 140-143, 144-147, 148-151, 152-155, 156-159, 160-163, 164-167, 168-171, 172-175, 176-179, 180-183, 184-187,

188-191, 192-195, 196-199, 200-203, 204-207, 208-211, 212-215, 216-219, 220-223, 224-227, 228-231, 232-235, 236-239, 240-243, 244-247, 248-251, 252-255

Exclude the occupied subnets and use first four available subnets 96-99, 100-103, 104-107 and 108-111 for WAN links.

Following figure explains above steps and Subnetting.



Subnetting table for first example of VLSM

Segment	CIDR	Subnet Mask	Network Address	Broad cast Address	Valid host addresses
LAN Segment1	/27	255.255.255.224	192.168.1.0	192.168.1.31	192.168.1.1 to 192.168.1.30
LAN Segment 2	/27	255.255.255.224	192.168.1.32	192.168.1.63	192.168.1.33 to 192.168.1.62
LAN Segment 3	/28	255.255.255.240	192.168.1.64	192.168.1.79	192.168.1.65 to 192.168.1.78
LAN Segment 4	/28	255.255.255.240	192.168.1.80	192.168.1.95	192.168.1.81 to 192.168.1.94
WAN Link 1	/30	255.255.255.252	192.168.1.96	192.168.1.99	192.168.1.97 to 192.168.1.98
WAN Link 2	/30	255.255.255.252	192.168.1.100	192.168.1.103	192.168.1.101 to 192.168.1.102
WAN Link 3	/30	255.255.255.252	192.168.1.104	192.168.1.107	192.168.1.105 to 192.168.1.106
WAN Link 4	/30	255.255.255.252	192.168.1.108	192.168.1.111	192.168.1.107 to 192.168.1.108