



Advanced Program On Technology Enhanced Learning

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Subnetting

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Subnetting

- A subnet is a logical subdivision of an IP network
- The process of dividing a network into two or more networks is called subnetting.
- The main purpose of subnetting is to help relieve network congestion ,and improve network performance .
- Security is another benefit of subnetting.
- Know some knowledge a bout subnetmask,network ID,host ID,broadcast ID

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task

For example for Network ID :

Create **three** separate networks or subnets

Your task is to list:

- Network ID

- Subnetmask

- Host ID range

- Number of usable host IDs

- Broadcast ID

Powerful table

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Task

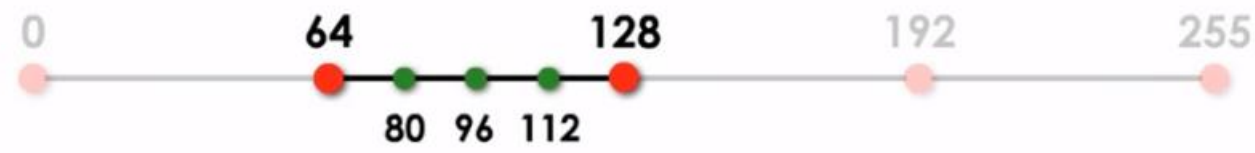
Original networkID:
192.168.4.0/24

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Network ID	Subnet Mask	Host ID Range	# of Usable Host	Broadcast ID
192.168.4.0	/26	192.168.4.1-192.168.4.62	62	192.168.4.63
192.168.4.64	/26	192.168.4.65-192.168.4.126	62	192.168.4.127
192.168.4.128	/26	192.168.4.129-192.168.4.190	62	192.168.4.191
192.168.4.192	/26	192.168.4.193-192.168.4.254	62	192.168.4.255

Subnetting a subnet

FLSM stands for fixed length subnet mask



125.23.200.64/26
Network ID

Three separate subnets for three different departments

Subnet	1	2	4	16	32	64	128	256	
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Subnetting a subnet

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Given network ID 125.23.200.64/26

#	Network ID	Subnet Mask	Host ID Range	# of Usable Host	Broadcast ID
1	125.23.200.64	/28	125.23.200.65-125.23.200.78	14	125.23.200.79
2	125.23.200.80	/28	125.23.200.81-125.23.200.94	14	125.23.200.95
3	125.23.200.96	/28	125.23.200.97-125.23.200.110	14	125.23.200.111
4	125.23.200.112	/28	125.23.200.113-125.23.200.126	14	125.23.200.127



Notes

- If you see a subnet with CIDR from /24 to /30 you can use C Table .
- If you are given a subnet with CIDR value from /8 to /23 you can use B Table .



CIDR

Classes inter domain routing .

CIDR means subnetting.

The class license loses meaning ,that is why the letter C in CIDR means “Classes”.

The main purpose of subnetting is to break the class license so that we can have more smaller-subnets .

The initial goal of CIDR was to slow the increase of [routing tables](#) on routers across the internet and decrease the rapid exhaustion of IPv4 addresses. As a result, the number of available internet addresses has greatly increased.

Class B subnetting table

Subnet	1	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
Host	65536	32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
SM	/16	/17	/18	/19	/20	/21	/22	/23	/24	/25	/26	/27	/28	/29	/30	/31	/32

Task

Suppose I have a class B ID: 172.16.0.0/16,
and I want to create 4 new subnets.
Here are three questions I am going to answer:

- 1) What is the new subnet mask?
- 2) How many usable host IDs for each new subnet?
- 3) List each network ID, the useable host ID range, and each broadcast ID.

Class B ID

Subnet	1	2	4	8	16	32	64	128	256	512	1024	2048	4096	8192	16384	32768	65536
Host	65536	32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
SM	/16	/17	/18	/19	/20	/21	/22	/23	/24	/25	/26	/27	/28	/29	/30	/31	/32



Task

- The new subnetmask is /18
- Each subnet has 16382 usable host IDs

Network ID	Host Range (16,382)	Broadcast ID
172.16.0.0	172.16.0.1 - 172.16.63.254	172.16.63.255
172.16.64.0	172.16.64.1 - 172.16.127.254	172.16.127.255
172.16.128.0	172.16.128.1 - 172.16.191.254	172.16.191.255
172.16.192.0	172.16.192.1 - 172.16.255.254	172.16.255.255

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VLSM subnetting

- The example that we explained before ,we used **Fixed Length Subnet Mask subnetting** or FLSM subnetting .
- In FLSM subnetting all subnets are of equal size with the same subnet mask .
- The FLSM subnetting is easier , this type of subnetting leads to inefficiencies and waste in terms of IP allocation and use .
- **VLSM stands for variable length subnet mask** .
- In VLSM subnetting we can get **different subnet masks** for different networks



Simulation Question

CompTIA Network+ Simulation Question

Corporate headquarters provided your office a portion of their class B subnet to use at a new office location. Allocate the minimum number of addresses (Using CIDR notation) needed to accommodate each department.

Range given: 172.30.232.0/24

● HR	57 devices
● Sales	100 devices
● IT	12 devices

After accommodating each department, identify the unused portion of the subnet by responding to the question on the graphic. All drop downs must be filled.

Task

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Range given: 172.30.232.0/24

- HR 57 devices
- Sales 100 devices
- IT 12 devices
- Finance 25 devices

Range given: 172.30.232.0/24

- Sales 100 devices
- HR 57 devices
- Finance 25 devices
- IT 12 devices

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

Range given: 172.30.232.0/24

- Sales 100 devices
- HR 57 devices
- Finance 25 devices
- IT 12 devices

Which is the largest possible contiguous block of the remaining address?

Subnet	1	2	4	8	16	32	64	128	256
Host	256	128	64	32	16	8	4	2	1
Subnet Mask	/24	/25	/26	/27	/28	/29	/30	/31	/32

The # of IDs used: $128 + 64 + 32 + 16 = 240$



The total # of IDs in /24 is 256



The remaining IDs unused: $256 - 240 = 16$



The answer is /28



In summary

- VLSM subnetting is a more efficient way of subnetting compared with FLSM subnetting.
- With VLSM subnetting we can get the minimum number of host IDs to meet networks with different sizes.
- NEXT webinar VLSM subnetting –subnetting a subnet .

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Q&A

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