



Prof. N. Nassiri

Subnets 03





The subnets



• A network can be split into several entities for internal use, while the whole continues to behave as a single network vis-à-vis the outside.

• These entities are called subnets. •

The computer identification field is divided into 2 parts: Subnet number and Machine no.

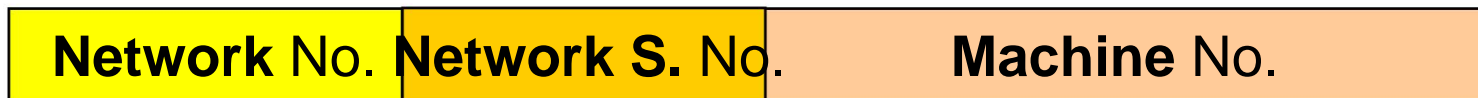
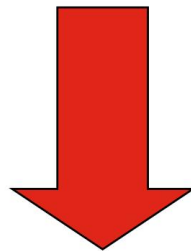
AIM :

• facilitate network administration.

• separate sensitive machines.



• The machine number part is cut in two. One for the sub number network and one for the machine number part.





The choice



The choice is made according to the needs and limitations:

• A range is allocated by the service provider.

• A number of machines that can grow.

• Prospects for site development.



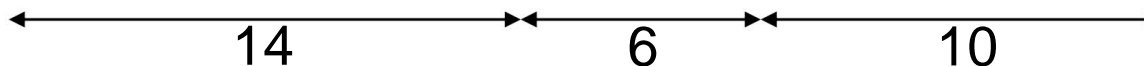
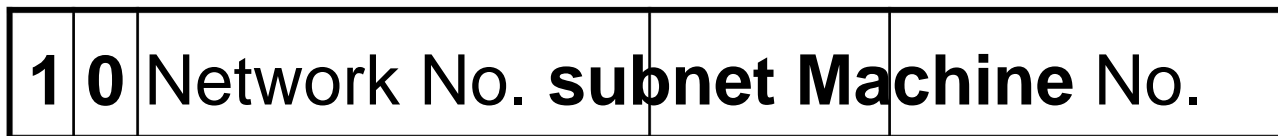
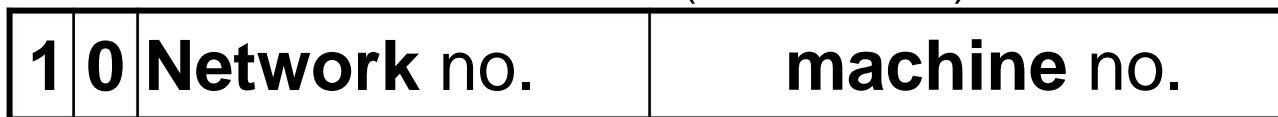
Example of
subnets



A class B network:

- o 16 bits for machine number
- o 6 bits to identify the subnet
- o 10 bits for the machine

• allows to define 64 local networks (sub-network)





subnet masks



• To carry out a division of the network, we have sub masks networks (subnet mask).

• Without splitting, the bits corresponding to the network number are all set to 1, the others to 0.



The default masks



Class A:

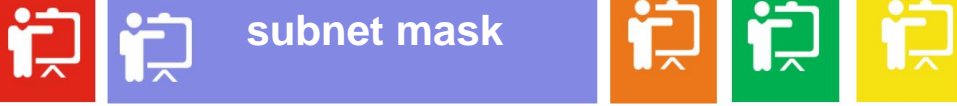
11111111.00000000.00000000.00000000 ý 255.0.0.0

Class B:

11111111.11111111.00000000.00000000 ý 255. 255.0.0.0

Class C:

11111111.11111111.11111111.00000000 ý 255.255.255.0



• The bits corresponding to **id_res** and to the part designating the sub network of **id_ord** are all set to 1, the others to 0.

• To find the address of the subnet to which a computer, we make a logical AND between the subnet mask network and the computer's IP address.

• It is recommended to have contiguous 1 bits in its masks.



Example mask



• network address: 130.50.0.0

• subnet 1: 130.50.4.0

subnet 2: 130.50.8.0

...

• mask: 111...111111100000000000

255.255.252.0



To which subnet does the machine with IP address 130.50.15.6 belong?

10000010 00110010 00001111 00000110

AND_logical

11111111 11111111 11111100 00000000

10000010 00110010 00001100 00000000

ÿ It belongs to the 130.50.12.0 network



Example of cutting



• If we want to split a class C network into two sub-networks,
which mask do we use?

• The mask 255.255.255.128 • [m bits at 1 and the rest at 0].

• After splitting, we obtain how many usable addresses per network
at ?

• 126 addresses • $[(2^n) - 2]$.

• Find the terminals of each subnet are ?

o See correction on the table



Number of s. networks	Binary value	Decimal value	Number of machines
2	1000 0000	128	252
4	1100 0000	192	248
8	1110 0000	224	240
16	1111 0000	240	224
32	1111 1000	248	192
64	1111 1100	252	128



The 255.255.0.0 subnet mask can be used for addresses of:

To. class B and class C

b. class C only

vs. class A and class B

d. class B only

e. class A only



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To. class B and class C

b. class C only

vs. class A and class B

d. class B only

e. class A only



Let IP address = 192.168.100.120

Subnet mask = 255.255.255.240

This machine belongs to which subnet?

Let IP address = 129.130.10.120

Subnet mask = 255.255.240.0

This machine belongs to which subnet?

See the correction on the table.



Example of division into 4 SR (A, B)



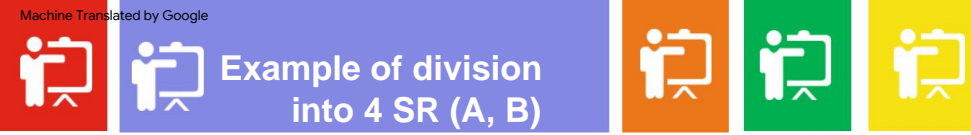
Class	SR mask	Subnet	Address area
AT 10.0.0.0	255.192.0.0	Sr1	10.0.0.1 to 10.63.255.254
		Sr2	10.64.0.1 to 10.127.255.254
		Sr3	10.128.0.1 to 10.191.255.254
		Sr4	10.192.0.1 to 10.255.255.254
B 172.16.0.0	255.255.192.0	Sr1	172.16.0.1 to 172.16.63.254
		Sr2	172.16.64.1 to 172.16.127.254
		Sr3	172.16.128.1 to 172.16.191.254
		Sr4	172.16.192.1 to 172.16.255.254



Example of division
into 4 SR (C)



Class	SR mask	Subnet	Address area
vs 192.168.1.0	255.255.255.192	Sr1	192.168.1.1 to 192.168.1.62
		Sr2	192.168.1.65 to 192.168.1.126
		Sr3	192.168.1.129 to 192.168.1.190
		Sr4	192.168.1.193 to 192.168.1.254



Example of division
into 4 SR (A, B)

Class	Subnet	Network address	Broadcast address
AT 10.0.0.1	Sr1	10.0.0.0	10.63.255.255
	Sr2	10.64.0.0	10.127.255.255
	Sr3	10.128.0.0	10.191.255.255
	Sr4	10.192.0.0	10.255.255.255
B 172.16.0.0	Sr1	172.16.0.0	172.16.63.255
	Sr2	172.16.64.0	172.16.127.255
	Sr3	172.16.128.0	172.16.191.255
	Sr4	172.16.192.0	172.16.255.255



Example of division
into 4 SR (C)



Class	Subnet	Network address	Broadcast address
vs 192.168.1.0	Sr1	192.168.1.0	192.168.1.63
	Sr2	192.168.1.64	192.168.1.127
	Sr3	192.168.1.128	192.168.1.191
	Sr4	192.168.1.192	192.168.1.255