

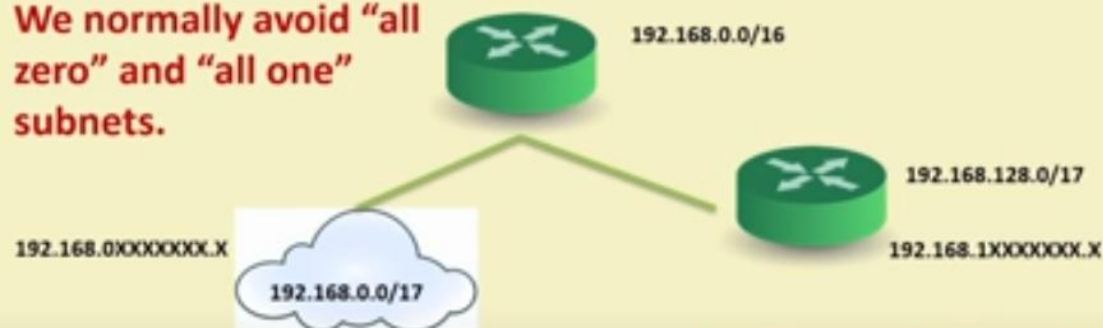
IP Address	10111111	10110100	01010011	11101011
Netmask	11111111	11110000	00000000	00000000
	Subnet Address		Host Address	

## Divide a Network into Subnets

- Let the IP address of a network is 203.110.0.0/16
- We want to divide this network into three subnets
- We need 3 bits for subnets – **why not 2 bits?**
  - Subnet 1 – 100, Subnet 2– 101, Subnet 3 – 110
- Rest 13 bits are used for addressing the hosts of those subnets.
- The subnets are – 203.110.128.0/19, 203.110.160.0/19, 203.110.192.0/19

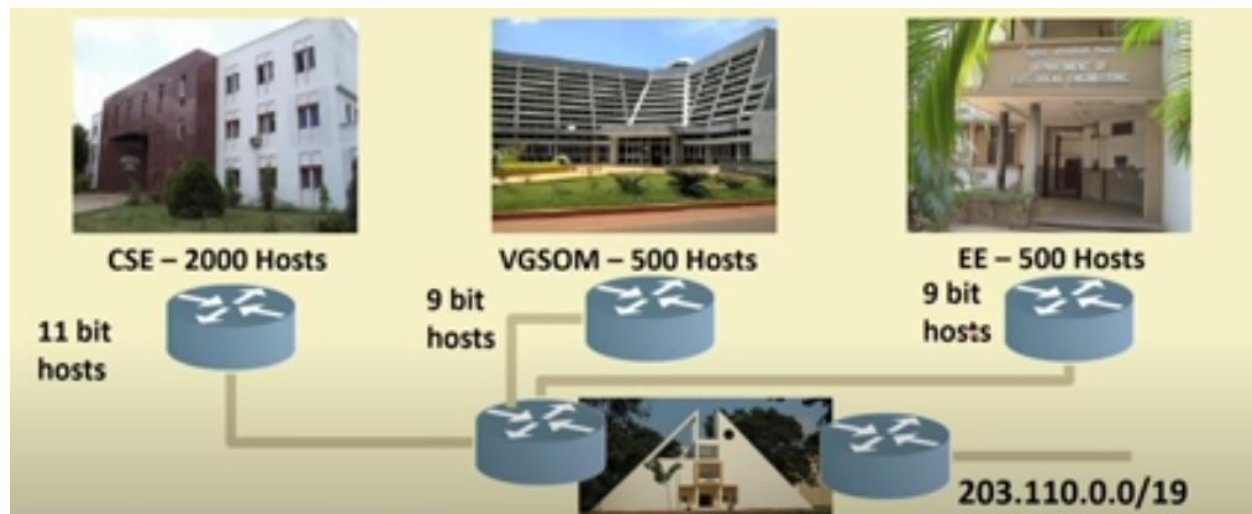
## All Zero and All One Subnets

We normally avoid “all zero” and “all one” subnets.

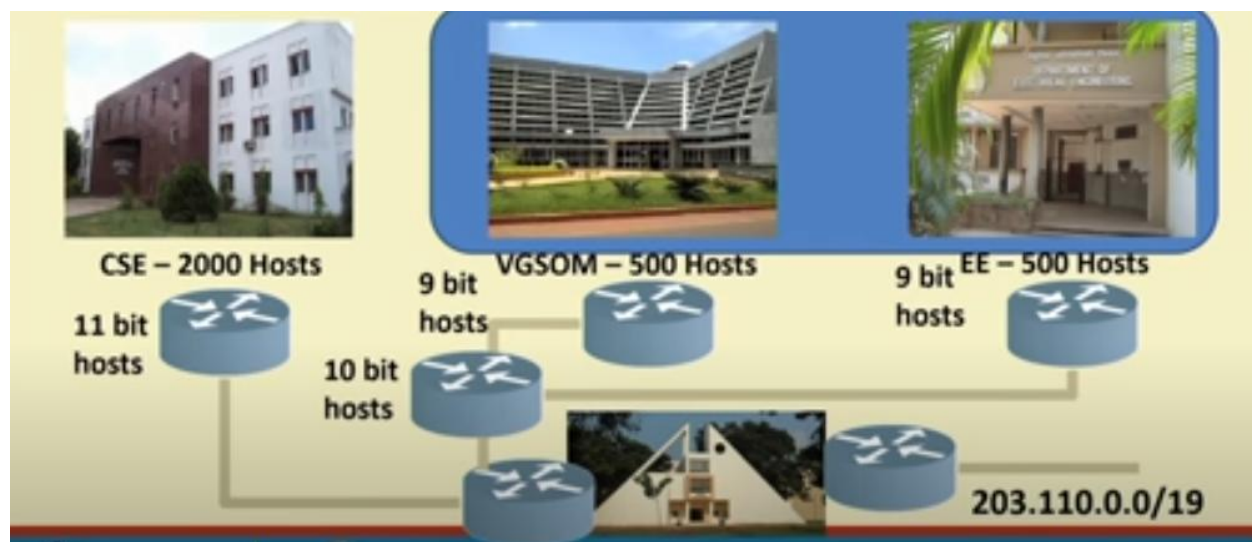


The network address for the subnet and the original network is identical – **Subnet Zero**

Broadcast address for this subnet is 192.168.255.255, broadcast address for the original network is also 192.168.255.255 – **All-One Subnet**

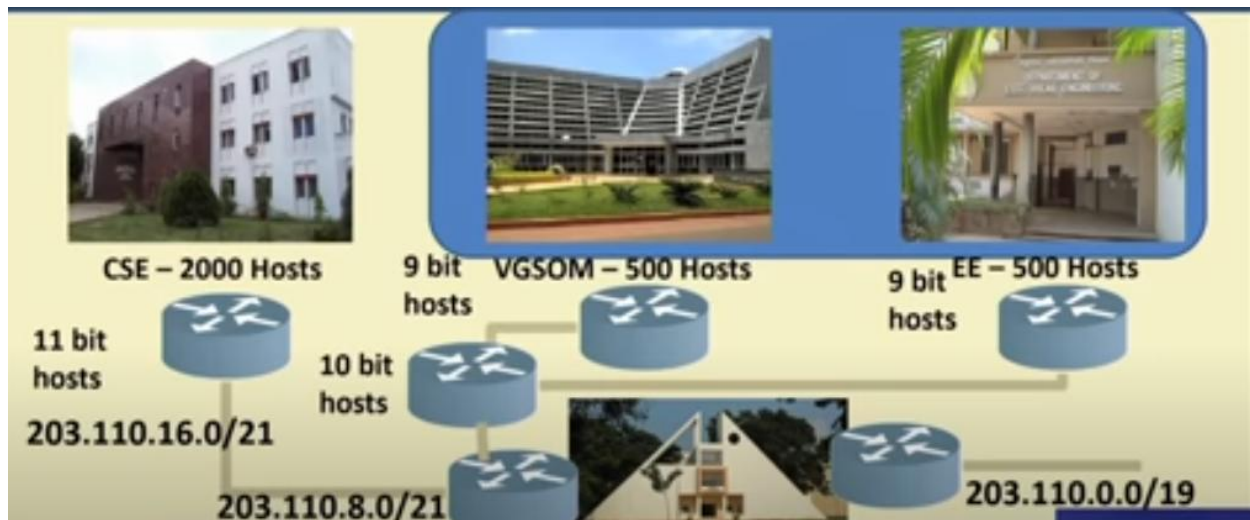


- Address space – 203.110.0.0/19
  - 13 bits are available to serve all the hosts of IITKGP network
  - We need to divide these address space among 3 subnets
- CSE – 11 bits, VGSOM – 9 bits, EE – 9 bits for host address
- We have 2 bits left for identifying three subnets – **Is this possible?**
  - Avoid “all zero” and “all one” subnets
- Let us apply CIDR – Combine VGSOM and EE Networks together



CSE – 11 bits, VGSOM+EE – 10 bits

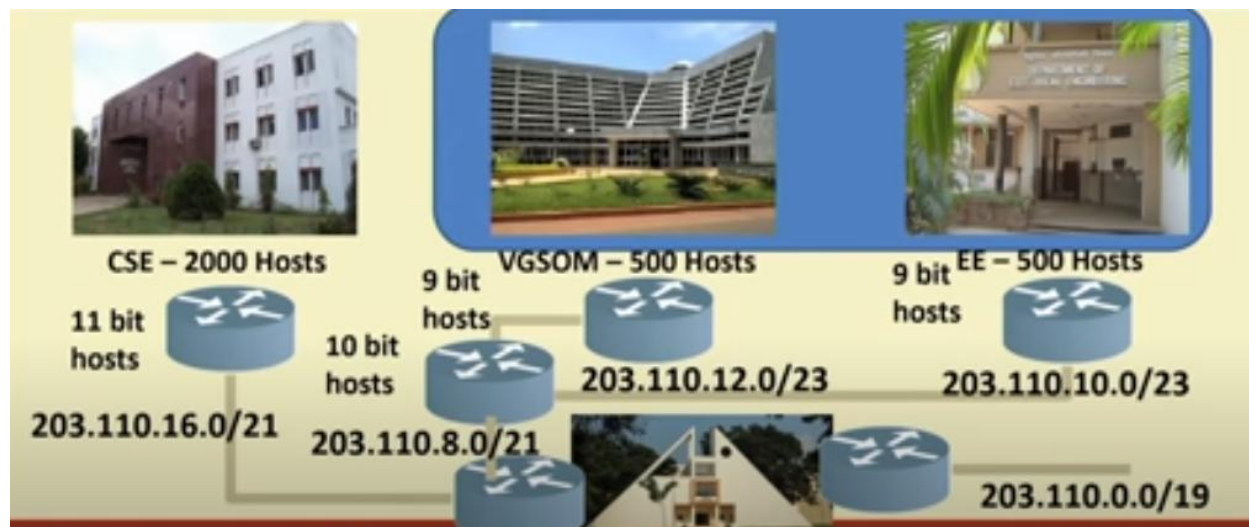
- Network address – 203.110.0.0/19, 203.110.000**XX**XXX.XXXXXXXX
- CSE network address 203.110.00010XXX.XXXXXXXX (203.110.16.0/21)
- VGSOM+EE network address 203.110.00001XXX.XXXXXXXX (203.110.8.0/21)



VGSOM – 9 bits, EE – 9 bits

- Network address – 203.110.8.0/21, 203.110.000**01XX**X.XXXXXXXX
- VGSOM network address 203.110.00001**10**X.XXXXXXXX (203.110.12.0/23)
- EE network address 203.110.00001**01**X.XXXXXXXX (203.110.10.0/23)





## Subnet Example #1

IP Address : 144.97.16.132

Subnet Mask : 255.255.255.192

11111111 11111111 11111111 11000000  
10000010 01100001 00010000 10000100

Network

10000010 01100001 00010000 10000000

144.97.16.128

Host

00000000 00000000 00000000 00000100

4

**IP Address : 144.97.17.132**

**Subnet Mask : 255.255.254.0**

11111111 11111111 11111110 00000000

10000010 01100001 00010001 10000100     \*

**Network**

10000010 01100001 00010000 00000000

**144.97.16.**

**Host**

00000000 00000000 00000001 10000100

**1.132**