SUBNETTING EXAMPLE

GI\ 172.31.103.0/ 24 → initial host bits: 8

1. Determine Net & Host Requirements

subnets: 5

hosts: 27

2. Staisfy Net and Host Reqirements

	=2^s ≥	**5**	**→S=**	**3**	CHECK S+H = initial host bits	MULTIPLIER:	No. Of Created Subnet:	No. Of Usuable Hosts:
subnet bits								
host bits	**=(2^h)-2 ≥**	**27**	**→H=**	**5**	8 8	=2^H= 32	=2^S= 8	=(2^H)-2= 30

3.Subnet Mask

11111111	11111111	11111111	111 00000	[binary format]
nnnnnnnn	nnnnnnnn	nnnnnnnn	sss hhhh	
255.	**255.**	**255**	**224**	[dotted decimal notaion]
	/ 27			[prefix length]

4,5,6. Determine Network, Broadcast and Usable Host IP Addresses

Sub	Net Address	1st Usable Address	Last Usable Address	Broadcast Addres	Description	Each Supports	192	168	20	**nnn**hhhhhh
1	172.31.103.0	172.31.103.1	172.31.103.30	172.31.103.31	Room 114	30 Hosts	192	168	20	**000**000000
2	172.31.103.32	172.31.103.33	172.31.103.62	172.31.103.63	Room 275	30 Hosts	192	168	20	**001**000000
3	**172.31.103.64**	**172.31.103.65**	**172.31.103.94**	**172.31.103.95**	**will be further subnetted to support the next 2 LANS**		192	168	20	**010**000000
4	**172.31.103.96**	**172.31.103.97**	**172.31.103.126**	**172.31.103.127**	**will be further subnetted to support the WAN Link**		192	168	20	**011**000000
5	172.31.103.128	172.31.103.129	172.31.103.158	172.31.103.159	unused/avaiable		192	168	20	**100**000000
6	172.31.103.160	172.31.103.161	172.31.103.190	172.31.103.191	unused/avaiable		192	168	20	**101**000000
7	172.31.103.192	172.31.103.193	172.31.103.222	172.31.103.223	unused/avaiable		192	168	20	**110**00000
8	172.31.103.224	172.31.103.225	172.31.103.254	172.31.103.255	unused/avaiable		192	168	20	**111**000000

Subnetting the subnet :)

GIVEN: **172.31.103.64/ 27** → **initial host bits: 5**

1. Determine Net & Host Requirements

subnets: -

hosts: 14 **I'll stick to this requirement and force S=1**

2. Staisfy Net and Host Reqirements

					CHECK S+H = initial host bits	MULTIPLIER:	No. Of Crea	No. Of Usuable Hosts:
subnet bits	**=2^s ≥**	**-**	**→S=**	**1**	5 5	=2^H= 16	=2^S= 2	=(2^H)-2= 14
host bits	**=(2^h)-2 ≥**	**14**	**→H=**	**4**				

3.Subnet Mask

11111111	11111111	11111111	1111 0000	[binary format]
nnnnnnnn	nnnnnnnn	nnnnnnnn	nnns hhhh	
255.	**255.**	**255**	**240**	[dotted decimal notaion]
/ 28				[prefix length]

4,5,6. Determine Network, Broadcast and Usable Host IP Addresses

Sub	Net Address	1st Usable Address	Last Usable Address	Broadcast Addres	Description	Each Supports
1	172.31.103.64	172.31.103.65	172.31.103.79	172.31.103.80	Room 312	14 Hosts
2	172.31.103.80	172.31.103.81	172.31.103.94	172.31.103.95	Room 407	14 Hosts

172	31	103	64
172	31	103	**nnn**shhhh
192	168	20	**010**00000
192	168	20	**010**100000

Subnetting the subnet :)

GIVEN: 172.31.103.96/ 27 → **initial host bits: 5**

1. Determine Net & Host Requirements

subnets: -

hosts: 2 **I'll stick to this requirement and force S=3**

2. Staisfy Net and Host Reqirements

					CHECK S+H = initial host bits	MULTIPLIER:	No. Of Crea	No. Of Usuable Hosts:
subnet bits	**=2^s ≥**	**-**	**→S=**	**3**	5 5	=2^H= 4	=2^S= 8	=(2^H)-2= 2
host bits	**=(2^h)-2 ≥**	**2**	**→H=**	**2**				

3.Subnet Mask

11111111	11111111	11111111	#### 00	[binary format]
nnnnnnnn	nnnnnnnn	nnnnnnnn	ınnsss hh	

255.	255.	255	252	[dotted decimal notaion]
/ 30				[prefix length]

4,5,6. Determine Network, Broadcast and Usable Host IP Addresses

Sub	Net Address	1st Usable Address	Last Usable Address	Broadcast Addres	Description	Each Supports
0	172.31.103.96	172.31.103.97	172.31.103.98	172.31.103.99	WAN LINK	2 hosts
1	172.31.103.100	172.31.103.101	172.31.103.102	172.31.103.103	unused/avaiable	
2	172.31.103.104	172.31.103.105	172.31.103.106	172.31.103.107	unused/avaiable	
3	172.31.103.108	172.31.103.109	172.31.103.110	172.31.103.111	unused/avaiable	
4	172.31.103.112	172.31.103.113	172.31.103.114	172.31.103.115	unused/avaiable	
5	172.31.103.116	172.31.103.117	172.31.103.118	172.31.103.119	unused/avaiable	
6	172.31.103.120	172.31.103.121	172.31.103.122	172.31.103.123	unused/avaiable	
7	172.31.103.124	172.31.103.125	172.31.103.126	172.31.103.127	unused/avaiable	

172	31	103	**nnnsss**hh	
172	31	103	**011000**00	
172	31	103	**011001**00	
172	31	103	**011010**00	
172	31	103	**011011**00	
172	31	103	**011100**00	
172	31	103	**011101**00	
172	31	103	**011110**00	
172	31	103	**011111**00	

MORE QUESTIONS:

How many subnets are needed in the network topology?	**5**

Which subnet mask will accommodate the number of IP addresses required for Room-114? **(27 hosts)**	**\27**
How many usable host addresses will this subnet support?	**30**
Which subnet mask will accommodate the number of IP addresses required for Room-279? **(25' hosts)**	**\27**
How many usable host addresses will this subnet support?	**30**
Which subnet mask will accommodate the number of IP addresses required for Room-312? **(14 hosts)**	**\31**
How many usable host addresses will this subnet support?	**14**
Which subnet mask will accommodate the number of IP addresses required for Room-407? **(8 hosts)**	**\31**
How many usable host addresses will this subnet support?	**14**
Which subnet mask will accommodate the number of IP addresses required for the connection between Branch1 and	**\33**

Subnet Description	Number of Hosts Needed	Network Address/CIDR	First Usable Host Address	Last Usable Host Address	Broadcast Address	Subnet Mask
PC A LAN	**27**	**172.31.103.0/27**	**172.31.103.1**	**172.31.103.30**	**172.31.103.31**	**255.255.255.224**
PC B LAN	**25**	**172.31.103.32/27**	**172.31.103.33**	**172.31.103.61**	**172.31.103.62**	**255.255.255.224**
PC C LAN	**14**	**172.31.103.64/28**	**172.31.103.65**	**172.31.103.79**	**172.31.103.80**	**255.255.255.240**
PC D LAN	**8**	**172.31.103.80/28**	**172.31.103.81**	**172.31.103.94**	**172.31.103.95**	**255.255.255.240**
WAN LINK	**2**	**172.31.103.96/30**	**172.31.103.97**	**172.31.103.98**	**172.31.103.99**	**255.255.255.252**

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
Branch1	G0/0	172.31.103.1	255.255.225.224	N/A
	G0/1	172.31.103.33	255.255.255.224	N/A
	S0/0/0	172.31.103.97	255.255.255.252	N/A
Branch2	G0/0	172.31.103.65	255.255.255.240	N/A
	G0/1	172.31.103.81	255.255.255.240	N/A
	S0/0/0	172.31.103.98	255.255.255.252	N/A
Room-114	VLAN 1	172.31.103.2	255.255.225.224	172.31.103.1
Room-279	VLAN 1	172.31.103.34	255.255.255.224	172.31.103.33
Room-312	VLAN 1	172.31.103.66	255.255.255.240	172.31.103.65
Room-407	VLAN 1	172.31.103.82	255.255.255.240	172.31.103.81
PC-A	NIC	172.31.103.30	255.255.225.224	172.31.103.1
PC-B	NIC	172.31.103.61	255.255.255.224	172.31.103.33
PC-C	NIC	172.31.103.79	255.255.255.240	172.31.103.65
PC-D	NIC	172.31.103.94	255.255.255.240	172.31.103.81