

(1)

Date: 5/12/25

Day: \_\_\_\_\_

## CL-3001 - CNET LAB :-

### Final VLSM Tree & Calculations:-

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#### (I) VLSM Calculations:-

- Base Network: 89.180.0.0 /14
- Total Available IPs :  $2^{(32-14)} = 2^8 = 262,144$  IPs
- Range: 89.180.0.0 to 89.183.255.255

##### 1) Network A :-

- Hosts Required: 43,741
- Need N where  $2^N - 2 \geq 43,741$
- $2^6 = 65,536$
- CIDR =  $32 - 6 = /16$
- Allocation: 89.180.0.0 /16
- Next Available IP: 89.181.0.0

##### 2) Network E :-

- Hosts Required: 16,084
- $2^{15} = 32,768$
- CIDR =  $32 - 15 = /17$
- Allocation: 89.181.0.0 /17
- Next Available IP : 89.181.128.0

##### 3) Network B:-

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- Hosts Required : 11,904
- Need  $2^{14} = 16,384$
- CIDR =  $32 - 14 = /18$
- Allocation :  $89 \cdot 181 \cdot 128 \cdot 0 /18$
- Next Available IP :  $89 \cdot 181 \cdot 192 \cdot 0$

#### 4) Network L :-

- Hosts Required : 11,724
- Need  $2^{14} = 16,384$
- CIDR =  $32 - 14 = /18$
- Allocation :  $89 \cdot 181 \cdot 192 \cdot 0 /18$
- This completes the  $89 \cdot 181 \cdot x \cdot x$  block
- Next Available IP :  $89 \cdot 182 \cdot 0 \cdot 0$

#### 5) Network M :-

- Hosts Required : 8,603
- $2^{14} = 16,384$
- CIDR =  $32 - 14 = /18$
- Allocation :  $89 \cdot 182 \cdot 0 \cdot 0 /18$
- Next Available IP :  $89 \cdot 182 \cdot 64 \cdot 0$

#### 6) Network C :-

- Hosts Required : 6,921
- Need  $2^{13} = 8,192$
- CIDR =  $32 - 13 = /19$
- Allocation :  $89 \cdot 182 \cdot 64 \cdot 0 /19$
- Next Available IP :  $89 \cdot 182 \cdot 96 \cdot 0$

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7) Network D:-

- Hosts Required : 3,797
- Need  $2^{12} = 4,096$
- CIDR =  $32 - 12 = /20$
- Allocation :  $89 \cdot 182 \cdot 96 \cdot 0 / 20$
- Next Available IP :  $89 \cdot 182 \cdot 112 \cdot 0$

8) Network N:-

- Hosts Required : 1,603
- Need  $2^{11} = 2,048$
- CIDR =  $32 - 11 = /21$
- Allocation :  $89 \cdot 182 \cdot 112 \cdot 0 / 21$
- Next Available IP :  $89 \cdot 182 \cdot 120 \cdot 0$

9) Network H:-

- Hosts Required : 1,071
- Need  $2^{11} = 2,048$
- CIDR =  $32 - 11 = /21$
- Allocation :  $89 \cdot 182 \cdot 120 \cdot 0 / 21$
- Next Available IP :  $89 \cdot 182 \cdot 128 \cdot 0$

10) Network J:-

- Hosts Required : 575
- Need  $2^{10} = 1,024$
- CIDR =  $32 - 10 = /22$
- Allocation :  $89 \cdot 182 \cdot 128 \cdot 0 / 22$
- Next Available IP :  $89 \cdot 182 \cdot 132 \cdot 0$

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11) Network I :-

- Hosts Required: 501
- Need  $2^9 = 512$  (510 usable)
- CIDR =  $32 - 9 = /23$
- Allocation:  $89 \cdot 182 \cdot 132 \cdot 0 / 23$
- Next Available IP:  $89 \cdot 182 \cdot 134 \cdot 0$

12) Network F :-

- Hosts Required: 343
- Need  $2^9 = 512$
- CIDR =  $32 - 9 = /23$
- Allocation:  $89 \cdot 182 \cdot 134 \cdot 0 / 23$
- Next Available IP:  $89 \cdot 182 \cdot 136 \cdot 0$

13) Vacant / Server Subnets:-

- Space Allocated:  $89 \cdot 182 \cdot 136 \cdot 0$  to  $89 \cdot 182 \cdot 255 \cdot 255$
- Standard Size: I used /24 ( $2^8 = 256$  IPs) for servers and router LANs for simplicity.
- Assignments:  $89 \cdot 182 \cdot 136 \cdot 0 / 24$  (Web Server)  
 $89 \cdot 182 \cdot 137 \cdot 0 / 24$  (Server 4)  
 ..... (and so on) ...

14) Silent Networks (P2P Links) :-

- Requirement: Base will be  $2^2 = 4$  IPs
- Need 2 usable IPs + Network + Broadcast = 4 IPs
- CIDR =  $32 - 2 = /30$
- Block Reserved:  $89 \cdot 183 \cdot 255 \cdot 0 / 24$

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Allocations :-

- Link 1 : 89.183.255.0 /30

- Link 2 : 89.183.255.4 /30

. . . . (sequential allocation) . . .

(II) Table 1 - Main Network Allocation :- (89.180.0.0 /14)

Network	Hosts	CIDR	Subnet Mask	Network Address	Gateway IP	Broadcast Address
A	43,741	/16	255.255.0.0	89.180.0.0	89.180.0.1	89.180.255.255
E	16,084	/17	255.255.128.0	89.181.0.0	89.181.0.1	89.181.127.255
B	11,904	/18	255.255.192.0	89.181.128.0	89.181.128.1	89.181.191.255
L	11,724	/18	255.255.192.0	89.181.192.0	89.181.192.1	89.181.255.255
M	8,603	/18	255.255.192.0	89.182.0.0	89.182.0.1	89.181.63.255
C	6,921	/19	255.255.224.0	89.182.64.0	89.182.64.1	89.182.95.255
D	3,797	/20	255.255.240.0	89.182.96.0	89.182.96.1	89.182.111.255
N	1,603	/21	255.255.248.0	89.182.112.0	89.182.112.1	89.182.119.255
H	1,071	/21	255.255.248.0	89.182.120.0	89.182.120.1	89.182.127.255
J	575	/22	255.255.252.0	89.182.128.0	89.182.128.1	89.182.131.255
I	501	/23	255.255.254.0	89.182.132.0	89.182.132.1	89.182.133.255
F	343	/23	255.255.254.0	89.182.134.0	89.182.134.1	89.182.135.255

(III) Table 2 - Private Network (NAT) :- (192.168.0.0 /19)

Network	Hosts	CIDR	Subnet Mask	Network Address	Gateway IP	Broadcast Address
G	4,412	/19	255.255.224.0	192.168.0.0	192.168.0.1	192.168.31.255

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(IV) Table 3 - Vacant Subnets :- (89.182.136.0)

Device	Router	Network Address	Subnet Mask	Gateway IP
Web Server	R5	89.182.140.0	255.255.255.0	89.182.140.1
Server 4	R13	89.182.141.0	255.255.255.0	89.182.141.1
DHCP-2	R14	89.182.142.0	255.255.255.0	89.182.142.1
Data Server	R18	89.182.143.0	255.255.255.0	89.182.143.1
TFTP Server	R11	89.182.144.0	255.255.255.0	89.182.144.1
DHCP-1	R25	89.182.145.0	255.255.255.0	89.182.145.1
Server 0	R0	89.182.146.0	255.255.255.0	89.182.146.1
Server 1	R3	89.182.147.0	255.255.255.0	89.182.147.1
Laptop 13	R20	89.182.150.0	255.255.255.0	89.182.150.1
Laptop 11	R22	89.182.151.0	255.255.255.0	89.182.151.1
Switch 8	R22	89.182.152.0	255.255.255.0	89.182.152.1
Laptop 4	R8	89.182.153.0	255.255.255.0	89.182.153.1
Laptop 6	R12	89.182.154.0	255.255.255.0	89.182.154.1
Laptop 14	R24	89.182.155.0	255.255.255.0	89.182.155.1
Switch 9	R26	89.182.156.0	255.255.255.0	89.182.156.1
Switch 12	R26	89.182.157.0	255.255.255.0	89.182.157.1

(V) Table 4 - Silent Networks :-

Link Name	Connection	Network Address	1 <sup>st</sup> IP	2 <sup>nd</sup> IP
Link 1	R0 - R2	89.183.255.0	.1	.2
Link 2	R0 - R1	89.183.255.4	.5	.6
Link 3	R2 - R3	89.183.255.8	.9	.10
Link 4	R2 - R4	89.183.255.12	.13	.14
Link 5	R2 - R5	89.183.255.16	.17	.18
Link 6	R3 - R5	89.183.255.20	.21	.22
...	...	.....	....	....
Link 30	R26 - R27	89.183.255.116	.117	.118

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## (VI) Final VLSM Tree:-

89.180.0.0/14 (Public IP Base)

