[简答题]

P14. Consider a subnet with prefix 128.119.40.128/26. Give an example of one IP address (of form xxx.xxx.xxx.xxx) that can be assigned to this network. Suppose an ISP owns the block of addresses of the form 128.119.40.64/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets?

[参考答案]

128.119.40.128—128.119.40.191 之间的任意地址都可以。

分好的 IP 地址数目相同的四个子网为：

128.119.40.64/28,

128.119.40.80/28,

128.119.40.96/28,

128.119.40.112/28

[简答题]

P15. Consider the topology shown in Figure 4.20 . Denote the three subnets with hosts (starting clockwise at 12:00) as Networks A, B, and C. Denote the subnets without hosts as Networks D, E, and F.

a. Assign network addresses to each of these six subnets, with the following constraints: All addresses must be allocated from 214.97.254/23; Subnet A should have enough addresses to support 250 interfaces; Subnet B should have enough addresses to support 120 interfaces; and Subnet C should have enough addresses to support 120 interfaces. Of course, subnets D, E and F should each be able to support two interfaces. For each subnet, the assignment should take the form a.b.c.d/x or a.b.c.d/x – e.f.g.h/y.

b. Using your answer to part (a), provide the forwarding tables (using longest prefix matching) for each of the three routers.

[参考答案]

a. 子网 A：214.97.255/24（256 个地址）

子网 B：214.97.254.0/29-214.97.254.0/25（128-8 = 120 个地址）

子网 C：214.97.254.128/25（128 个地址）

子网 D：214.97.254.0/31（2 个地址）

子网 E：214.97.254.2/31（2 个地址）

子网 F：214.97.254.4/30（4 个地址）

b. 根据题意，可以认为 D、E、F 分别对应 4.20 拓扑图里的右上，下方，左上三个子网。因此 A 路由器可以到达子网 A、D、F；B 路由器可以到达子网 D、B、E； C 路由器可以到达子网 F、E、C；使用最长匹配原则，有：

路由器 R1：

11010110 01100001 11111111 ******** 子网 A

11010110 01100001 11111110 0000000* 子网 D

11010110 01100001 11111110 000001** 子网 F

路由器 R2：

11010110 01100001 11111111 0000000* 子网 D

11010110 01100001 11111110 0******* 子网 B

11010110 01100001 11111110 0000001* 子网 E

路由器 R3：

11010110 01100001 11111111 000001** 子网 F

11010110 01100001 11111110 0000001* 子网 E

11010110 01100001 11111110 1******* 子网 C

[简答题]

P18. Consider the network setup in Figure 4.25 . Suppose that the ISP instead assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24.

a. Assign addresses to all interfaces in the home network.

b. Suppose each host has two ongoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six corresponding entries in the NAT translation table.

[参考答案]

a.图 4.25 中家庭网络中有三台主机，可以将 IP 地址设为 192.168.1.2, 192.168.1.3, 192.168.1.4。对应的路由器接口为 192.168.1.1。

b. 因为每台主机有两个 TCP 连接，因此每台主机在 NAT 转换表中对应两个表项。三台主机在 WAN 端地址相同，端口不同。对应的 NAT 转换表为：

WAN 端	LAN 端
24.34.112.235, 4000	192.168.1.2, 3445
24.34.112.235, 4001	192.168.1.2, 3446
24.34.112.235, 4002	192.168.1.3, 3545
24.34.112.235, 4003	192.168.1.3, 3546
24.34.112.235, 4004	192.168.1.4, 3545
24.34.112.235, 4005	192.168.1.4, 3546