# H4: Jed Alcantara

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Consider a router that interconnects three subnets: Subnet 1, Subnet 2, and Subnet 3. Suppose all of the interfaces in each of these three subnets are required to have the prefix 223.1.17/24. Also, suppose that Subnet 1 is required to support at least 40 interfaces, Subnet 2 is to support at least 80 interfaces, and Subnet 3 is to support at least 20 interfaces. Provide three network addresses (of the form a.b.c.d/x) that satisfy these constraints.

Subnet 1: 223.1.17.0/26 2^6 = 64
Subnet 2: 223.1.17.64/25 2^7 = 128
Subnet 3: 223.1.17.192/27 2^5 = 32

Consider the topology shown in Figure 4.20 in the textbook. 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.

1. | Subnet a: 214.97.0.0/24 | 2^8 = 256 |
   |---|---|
2. | Subnet b: 214.97.1.0/25 | 2^7 = 128 |
   |---|---|
3. | Subnet c: 214.97.1.128/25 | 2^7 = 128 |
   |---|---|
4. | Subnet d: 214.97.2.0/31 | 2^1 = 2 |
   |---|---|
5. | Subnet e: 214.97.2.2/31 | 2^1 = 2 |
   |---|---|
6. | Subnet f: 214.97.2.4/31 | 2^1 = 4 |
   |---|---|

1. Router 1
   1. 214.97.0.0-> A
   2. 214.97.2.0 -> D
   3. 214.97.2.4-> F
2. Router 2
   1. 214.97.2.0 -> D
   2. 214.97.1.0-> B
   3. 214.97.2.2 -> E
3. Router 3
   1. 214.97.2.4 -> F
   2. 214.97.2.2 -> E
   3. 214.97.1.128 -> C

Consider the SDN OpenFlow network shown in Figure 4.30 in the textbook. Suppose that the desired forwarding behavior for datagrams arriving at s2 is as follows:

a. any datagrams arriving on input port 1 from hosts h5 or h6 that are destined to hosts h1 or h2 should be forwarded over output port 2;
Incoming port = 1; ip source = 10.3.*.*; ip destination = 10.1.*.*;
Action = Forward (2)

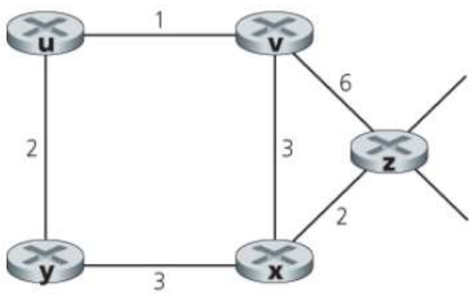
b. any datagrams arriving on input port 2 from hosts h1 or h2 that are destined to hosts h5 or h6 should be forwarded over output port 1;
Incoming port = 2; ip source = 10.1.*.*; ip destination = 10.3.*.*;
Action = Forward (1)

c. any arriving datagrams on input ports 1 or 2 and destined to hosts h3 or h4 should be delivered to the host specified;
Incoming port = 1, 2; ip destination = 10.2.0.4;
Action = Forward (4)
Incoming port = 1, 2; ip destination = 10.2.0.3;

Action = Forward (3)

d. hosts h3 and h4 should be able to send datagrams to each other. Specify the flow table entries in s2 that implement this forwarding behavior.
Incoming port = 4; ip source = 10.2.0.4; ip destination = 10.2.0.3;
Action = Forward (3)
Incoming port = 3; ip source = 10.2.0.3; ip destination = 10.2.0.4;
Action = Forward (4)

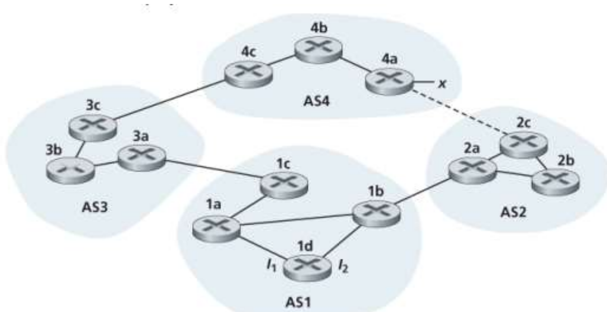
Consider the network shown below. Assume that the distance vector announcements are made in the following order u, v, x, y, and then z. How many iterations after which node z will have the shortest paths calculated to all other nodes? For each iteration, show who sends out the DV and which other nodes update/modify their DV?




| | u | v | x | y | z |
|---|---|---|---|---|---|
| z | inf | 6 | 2 | inf | 0 |
| v | 1 | 0 | 3 | inf | 6 |
| x | inf | 3 | 0 | 3 | 2 |

1. Assume 6 and 2 are the shortest path from z to v and x respectively.
2. Given 3 + 2 = 5 < 6, assign z,x + x,v = 5 as the new shortest path for v
3. Since u is attacked to v, assign shortest path from z to u as 5 + 1 = 6
4. Since y is attched to x, assign shortest path from z to x as 2 + 3 = 5

Consider the network shown below. Suppose AS3 and AS2 are running OSPF for their intra-AS routing protocol. Suppose AS1 and AS4 are running RIP for their intra-AS routing protocol. Suppose eBGP and iBGP are used for the inter-AS routing protocol. Initially suppose there is no physical link between AS2 and AS4.




a. Router 3c learns about prefix x from which routing protocol: OSPF, eBGP, or iBGP?
eBGP
b. Router 3a learns about x from which routing protocol?
iBGP
c. Router 1c learns about x from which routing protocol?
eBGP
d. Router 1d learns about x from which routing protocol
iBGP