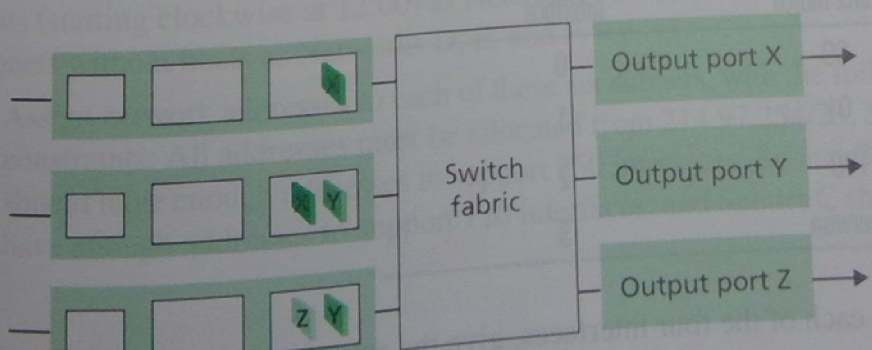
電腦網路導論 HW3

1. Read IPv6 and discuss IPv6's addressing policy
2. 4-4

P4. Consider the switch shown below. Suppose that all datagrams have the same fixed length, that the switch operates in a slotted, synchronous manner, and that in one time slot a datagram can be transferred from an input port to an output port. The switch fabric is a crossbar so that at most one datagram can be transferred to a given output port in a time slot, but different output ports can receive datagrams from different input ports in a single time slot. What is the minimal number of time slots needed to transfer the packets shown from input ports to their output ports, assuming any input queue scheduling order you want (i.e., it need not have HOL blocking)? What is the largest number of slots needed, assuming the worst-case scheduling order you can devise, assuming that a non-empty input queue is never idle?



3. 4-8

P8. 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 up to 62 interfaces, Subnet 2 is to support up to 106 interfaces, and Subnet 3 is to support up to 15 interfaces. Provide three network addresses (of the form a.b.c.d/x) that satisfy these constraints.

4. 4-19

P19. Consider the SDN OpenFlow network shown in Figure 4.30. Suppose that the desired forwarding behavior for datagrams arriving at s2 is as follows:

- 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;
- 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;
- any arriving datagrams on input ports 1 or 2 and destined to hosts h3 or h4 should be delivered to the host specified;
- 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.

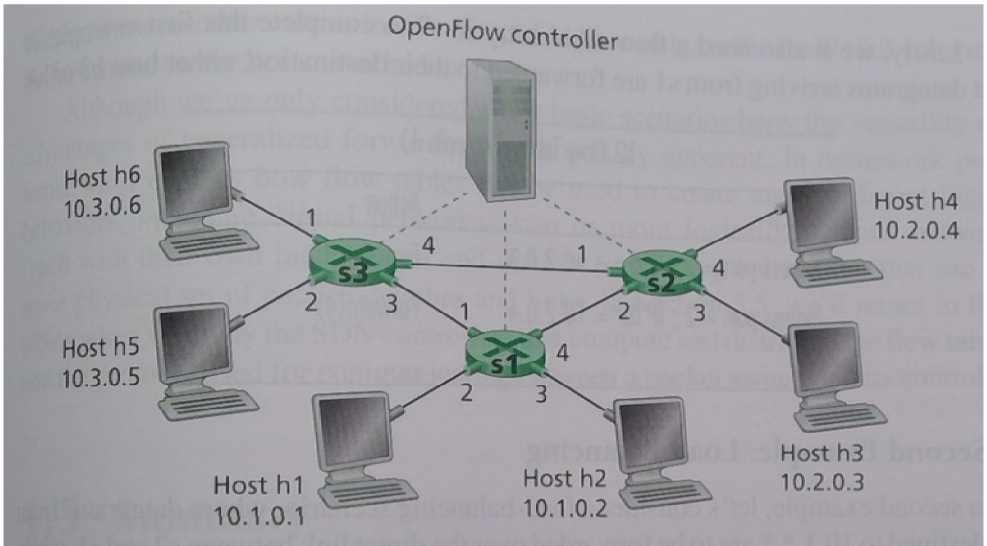
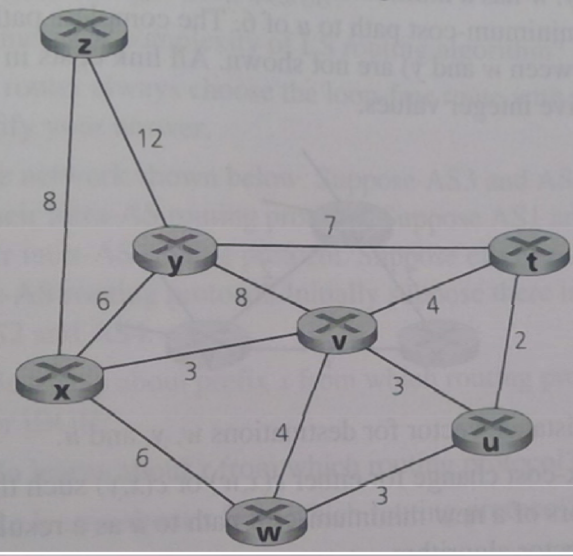


Figure 4.30 ♦ OpenFlow match-plus-action network with three packet switches, 6 hosts, and an OpenFlow controller

5. 5-3

P3. Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing a table similar to Table 5.1.



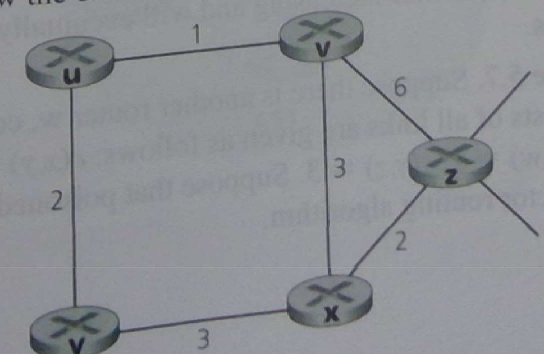
step	N'	D(v), p(v)	D(w), p(w)	D(x), p(x)	D(y), p(y)	D(z), p(z)
0	u	2, u	5, u	1,u	∞	∞
1	ux	2, u	4, x		2, x	∞
2	uxy	2, u	3, y			4, y
3	uxyv		3, y			4, y
4	uxyvw					4, y
5	uxyvwz					

Table 5.1 ♦ Running the link-state algorithm on the network in Figure 5.3

6. 5-5

f. Compute the shortest path from ...

P5. Consider the network shown below, and assume that each node initially knows the costs to each of its neighbors. Consider the distance-vector algorithm and show the distance table entries at node z.



7. 5-14

P14. 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, RIP, eBGP, or iBGP?

b. Router 3a learns about *x* from which routing protocol?

c. Router 1c learns about *x* from which routing protocol?

d. Router 1d learns about *x* from which routing protocol?