姚熙源 3190300677 计算机网络作业 5

1. Give two example computer applications for which connection-oriented service is appropriate. Now give two examples for which connectionless service is best.

Answer :

Connection-oriented service : file transfer, remote login, video call

Connectionless service : credit card verification, electronic funds transfer

2. Consider the network of Fig. 5-12(a). Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The cost of the links from C to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the cost.

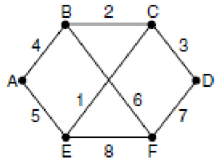

Fig. 5-12(a)

Answer :

Initial routing table

	A	B	C	D	E	F
From B	5	0	8	12	6	2
From D	16	12	6	0	9	10
From E	7	6	3	9	0	4

Cost of link from C to B,D and E are 6,3 and 5.

C->A: Dist(C,A) = Min[Dist(C,B) + Dist(B,A) , Dist(C,E) + Dist(E,A) , Dist(C,D) + Dist(D,A)] = Min(5+6, 5+7, 3+16) = Min(11, 12, 19) = 11, so minimum path from C->A is C->B->A
C->B: Dist(C,B) = 6
C->D: Dist(C,D) = 3
C->E: Dist(C,E) = 5
C->F: Dist(C,F) = Min(6+2, 3+10 , 5+4) = Min(8, 13, 9) = 8

C's new routing table is

	A	B	C	D	E	F
From B	11	6	0	3	5	8
via	B	B	-	D	E	B

3. Please give an example in which the poisoned reverse technique cannot prevent the count-to-infinity problem and explain why.

Answer :

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   C —— D
  /  \
 A -  B
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When connection between C and D stops, C will receive the value of infinity, then A will receive the value of B+1, and at the next moment, B will receive value of A+1,so it is forming an count-to-infinity problem.

4. A router has just received the following new IP addresses: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated? If so, to what? If not, why not?

Answer :

The first 16 bits are the same, so we consider the last 5 bits.

96 in binary : 0110 0000

104 in binary : 0110 1000

112 in binary : 0111 0000

120 in binary : 0111 1000

We can see that the first 5 bit on the above are not same, but the first 3 bits are the same, therefore can be aggregated to 57.6.96.0/19.

5. The set of IP addresses from 29.18.0.0 to 19.18.128.255 has been aggregated to 29.18.0.0/17. However, there is a gap of 1024 unassigned addresses from 29.18.60.0 to 29.18.63.255 that are now suddenly assigned to a host using a different outgoing line. Is it now necessary to split up the aggregate address into its constituent blocks, add the new block to the table, and then see if any reaggregation is possible? If not, what can be done instead?

Answer :

60.0 in binary : 0011 1100 0000 0000

63.255 in binary : 0011 1111 1111 1111

Don’t have to split up, we can add 29.18.60.0/22 to the routing table, when the address matches both 29.18.0.0/17 and 29.18.60.0/22, the longest prefix will be selected which is 29.18.60.0/22.

6. A router has the following (CIDR) entries in its routing table:

Address/mask Next hop

135.46.56.0/22 Interface 0 | 56.0 in binary : 0011 1000 0000 0000

135.46.60.0/22 Interface 1 | 60.0 in binary : 0011 1100 0000 0000

192.53.40.0/23 Router 1 | 40.0 in binary : 0010 1000 0000 0000

default Router 2

For each of the following IP addresses, what does the router do

if a packet with that address arrives?

(a) 135.46.63.10

(b) 135.46.57.14

(c) 135.46.52.2

(d) 192.53.40.7

(e) 192.53.56.7

Answer :

63.10 in binary : 0011 1111 0000 1010

57.14 in binary : 0011 1001 0000 1110

52.2 in binary : 0011 0100 0000 0010

40.7 in binary : 0010 1000 0000 0111

56.7 in binary : 0011 1000 0000 0111

Address/mask	Next hop
135.46.63.10	Interface 1
135.46.57.14	Interface 0
135.46.52.2	Router 2
192.53.40.7	Router 1
192.53.56.7	Router 2

7. When the IPv6 protocol is introduced, does the ARP protocol have to be changed? If so, are the changes conceptual or technical?

Answer : ARP protocol don’t have to be changed. There are no changes conceptually. Technically, the IP address requested are now bigger, so bigger fields are needed as well.

8. Consider the user of differentiated services with expedited forwarding. Is there a guarantee that expedited packets experience a shorter delay than regular packets? Why or why not?

Answer : No guarantee. If too many packets are expedited, their channel may be getting even worse performance than the regular channel.

9. A token bucket scheme is used for traffic shaping. A new token is put into the bucket every 5 µsec. Each token is good for one short packet, which contains 48 bytes of data.What is the maximum sustainable data rate?

Answer : With a token every 5µsec, 200000packet/sec can be sent. Each packet holds 48bytes of data (48*8=384bits). The maximum sustainable data rate is 200000 * 384 = 76.8Mbps.