

浙江大学《计算机网络》课程课后作业五

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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 :
 - 文件传输
 - 在线语音/视频通信
- Connectionless Service :
 - 表单处理
 - 简单的数据请求

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.

Answer:

初始时的路由表

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

C->A : $\text{Dist}(C, A) = \min(D(C, B) + D(B, A), D(C, D) + D(D, A), D(C, E) + D(E, A)) = \min(11, 19, 12) = 10$, 故 C->A 的最短路径是 C->B->A

C->B : $\text{Dist}(C, B) = \min(6+0, 3+12, 5+6) = 6$ via B

C->D : $\text{Dist}(C, D) = \min(6+12, 3+0, 5+9) = 3$ via D

C->E : $\text{Dist}(C, E) = \min(6+6, 3+9, 5+0) = 5$ via E

C->F : $\text{Dist}(C, F) = \min(6+2, 3+10, 5+4) = 8$ via B

因此 C 更新后的路由表为：

A	10	B
B	6	B
C	0	-
D	3	D
E	5	E
F	8	B

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

Answer:

链路如下图所示

C - D

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A - B

当 D 停机时, C 会收到 ∞ 的值, 下一时刻, A 会收到(B+1)的值, 再下一时刻, B 收到(A+1)的值, 如此往复, 形成无穷计算问题。

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:

由于前 16 位都相同, 因此考虑后面的 5 位:

96: 01100 000

104: 01101 000

112: 01110 000

120: 01111 000

可以看到虽然前 5 位不相同, 但是前 3 位是相同的, 因此可以汇聚成 57.6.96.0/19

5. The set of IP addresses from 29.18.0.0 to 29.18.128.255 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=> 001111 00.00000000

63.255=> 001111 11.11111111

不需要再分割, 可以将 29.18.60.0/22 加入到路由表中, 当一个数据包的地址同时符合 29.18.0.0/17 和 29.18.60.0/22 时, 会选择最长匹配的前缀即 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 001110 00.00000000

135.46.60.0/22 Interface 1 001111 00.00000000

192.53.40.0/23 Router 1 0010100 0.00000000

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 00111111.00001010

(b) 135.46.57.14 00111001.00001110

(c) 135.46.52.2 00110100.00000010

(d) 192.53.40.7 00101000.00000111

(e) 192.53.56.7 00111000.00000111

Answer:

(a). Interface 1

(b). Interface 0

(c). Router 2

(d). Router 1

(e). 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:

不需要改变 ARP 协议，这种改变应该是技术性的。

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:

不能保证，如果有很多数据包都是加速型的，那么信道会更加拥堵。

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

Answer:

$v = 48\text{Bytes} / (5\mu\text{s}) = 9.6 \times 10^6 \text{Bytes/s} = 9.6\text{MB/s}$