计算机网络原理 第五次作业

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书面作业

2. Datagram networks route each packet as a separate unit, independent of all others. Virtual-circuit networks do not have to do this, since each data packet follows a predetermined route. Does this observation mean that virtual-circuit networks do not need the capability to route isolated packets from an arbitrary source to an arbitrary destination? Explain your answer. This is incorrect. Virtual-circuit networks still require the capability to route isolated packets from an arbitrary source to an arbitrary destination. These packets are connection setup packets from an arbitrary source to destination.

3. Give three examples of protocol parameters that might be negotiated when a connection is set up. Examples of protocol parameters include window size, maximum packet size, and data rate.

9. For hierarchical routing for 4800 routers, what region and cluster sizes should be chosen to minimize the size of the routing table for a three layer hierarchy? A good starting place is the hypothesis that a solution with k clusters of k regions of k routers is close to optimal, which means that k is about the cube root of 4800 (around 16). Use trial and error to check out combinations where all three parameters are in the general vicinity of 16. In order to minimize the size of the routing table for a three layer hierarchy, we should use 15 clusters, each with 16 regions, where each region has 15 routers. The table size is 15 + 16 + 20 = 51.

10. In the text it was stated that when a mobile host is not home, packets sent to its home LAN are intercepted by its home agent on the LAN. For an IP network on 802.3 LAN, how does the home agent accomplish this interception? In order to accomplish this interception, the home agent makes the router think it is the mobile host through ARP request response. The router gets IP packets and broadcasts ARP query, asking fofor the 802.3 MAC address of the machine with that IP address.

22. 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? No, there is no guarantee. In fact, if there are too many packets. The user of differentiated services may in fact have worse performance than using a regular one.

28. A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle? A subnet mask of 255.255.240.0 means that it is 20 bits long (the first 20 bits are all ones). That means the network part is 20 bits. The remaining 12 bits are for the host. So therefore the host has 2^12 hosts address

34. Many companies have a policy of having two (or more) routers connecting the company to the Internet to provide some redundancy in case one of them goes down. Is this still possible with NAT? Explain your answer. It is possible. The basis of NAT is that all the packets pertaining to a single connection pass in and out of the same router. If each router has its own IP address, and all traffic belonging to a single connection can be sent to the same router, then the mapping can be done correctly.

40. IPv6 uses a 16 byte address. If a block of 1 million addresses is allocated every picosecond, how long will the address last? A 16 byte address (128 bits) means that there are 2^128 or 3.4 x 10^38 addresses. If we allocate a block of 1 million addresses a picosecond, 10^18 per second, they will last for 10^13 years.

42. When the IPv6 protocol is allocated, does the ARP protocol have to be changed? If so, are the changes conceptual or technical. Conceptually, there are no changes to the ARP protocol that have to be changed. On the other hand, the IP addresses requested are now bigger, so bigger fields are needed.