National University of Singapore
School of Computing

CS2105 **Tutorial 9** Semester 2 06/07

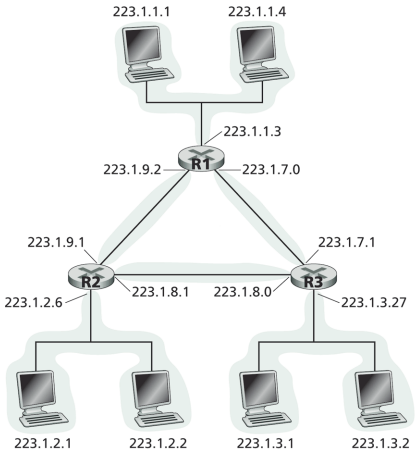

Figure 4.17 ♦ Three routers interconnecting six subnets

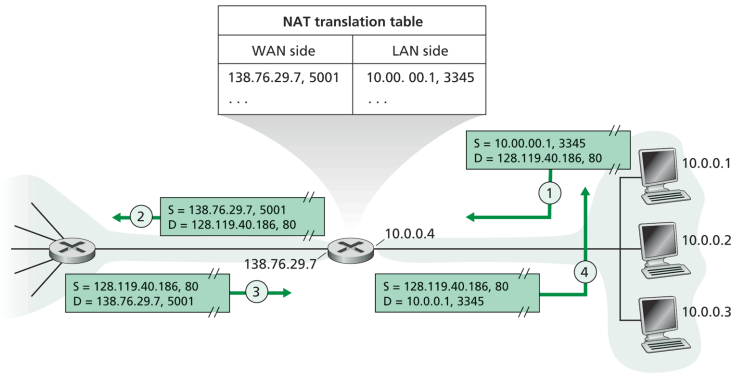

Figure 4.20 ♦ Network address translation

1. **(KR, Chapter 4, Problem 14)** Consider the topology shown in Figure 4.17. 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.

2. **(KR, Chapter 4, Problem 15)** Consider sending a 3,000-byte datagram into a link that has an MTU of 500 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are their charactersitics?

3. **(KR, Chapter 4, Problem 17)**

   Consider the network setup in Figure 4.20. Suppose that the ISP instead assigns the router the address 126.13.89.67 and that the network address of the home network is 192.168/16.

   (a) Assign addresses to all interfaces in the home network.

   (b) Suppose each host has two ongoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six (possible) corresponding entries in the NAT translation table.