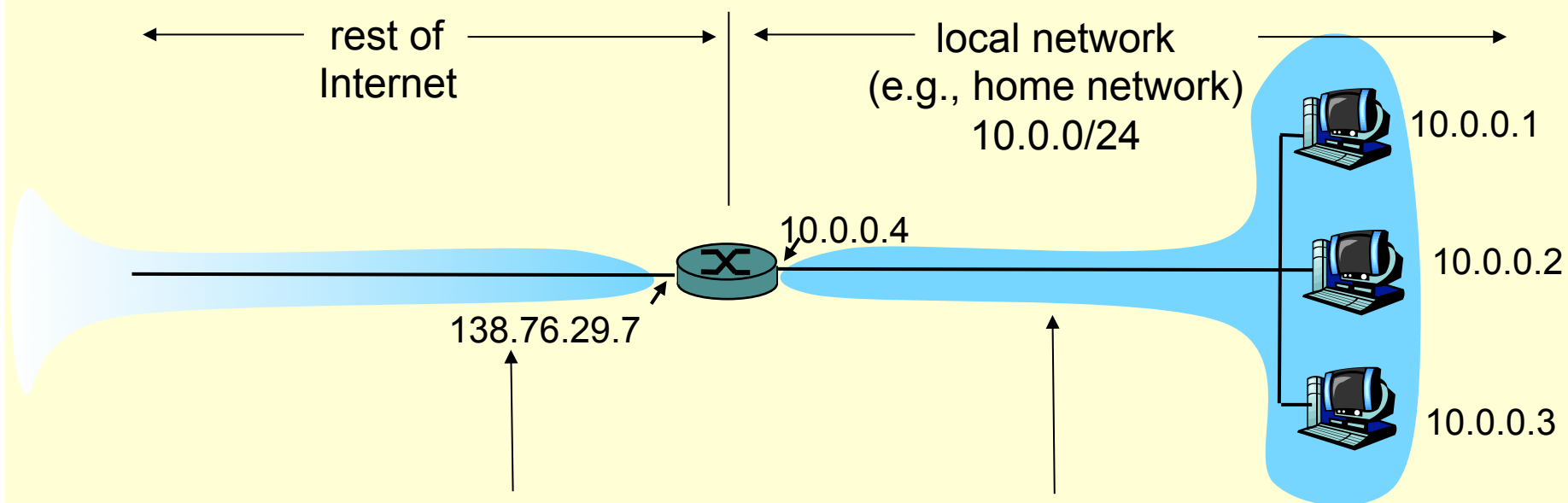


Chapter 23.15-23.19

Network Address Translation

NAT: Network Address Translation



All datagrams *leaving* local network have **same** single source NAT IP address: 138.76.29.7, different source port numbers

Datagrams with source or destination in this network have 10.0.0/24 address for source, destination (as usual)

NAT: Network Address Translation

- ◆ **Motivation: local network uses just one IP address as far as outside world is concerned:**
 - range of addresses not needed from ISP: just one IP address for all devices**
 - can change addresses of devices in local network without notifying outside world**
 - can change ISP without changing addresses of devices in local network**
 - devices inside local net not explicitly addressable, visible by outside world (a security plus).**

NAT: Network Address Translation

- ◆ Implementation: NAT router must:

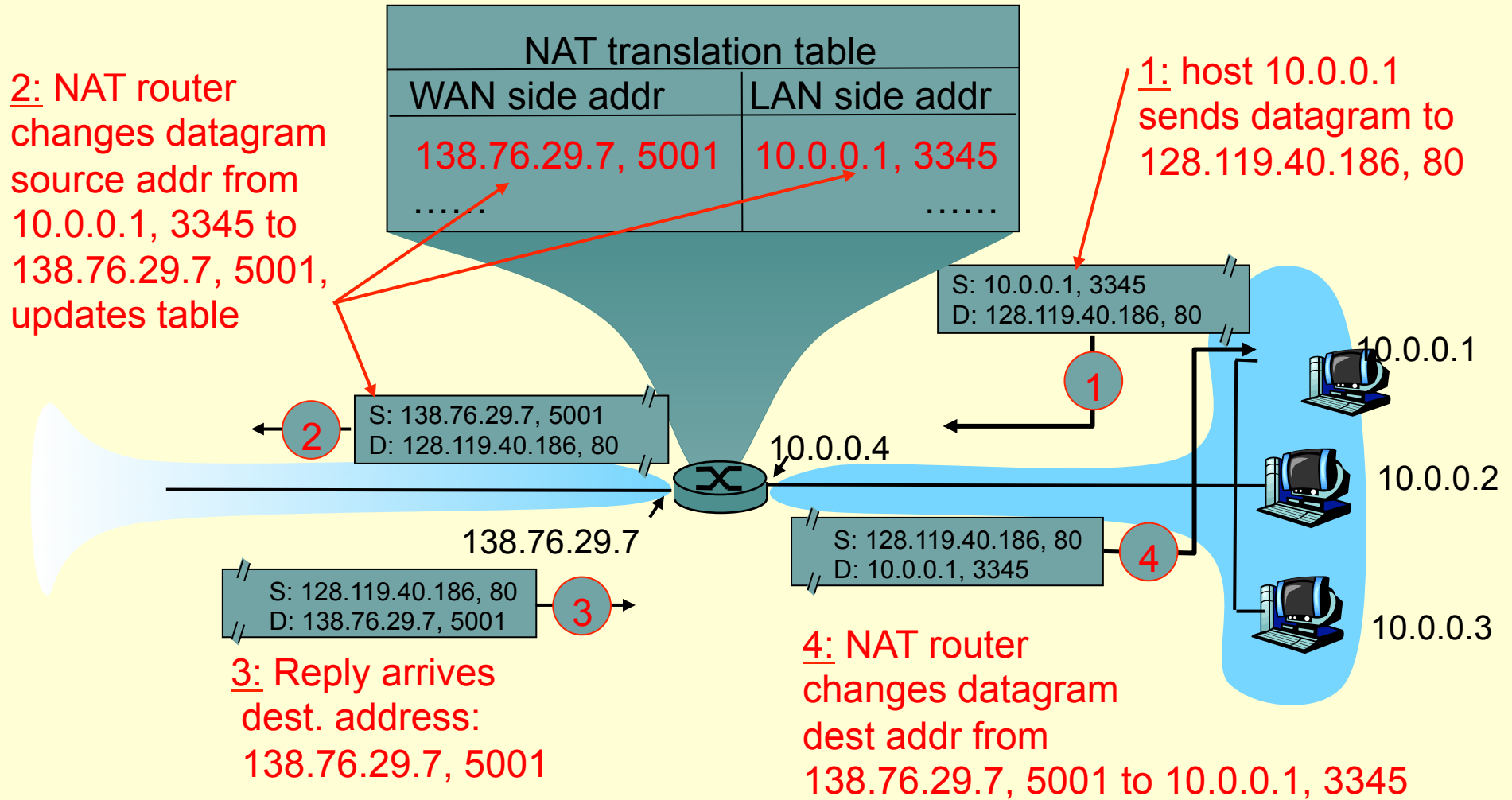
outgoing datagrams: replace (source IP address, port #) of every outgoing datagram to (NAT IP address, new port #)

- ◆ . . . remote clients/servers will respond using (NAT IP address, new port #) as destination addr.

remember (in NAT translation table) every (source IP address, port #) to (NAT IP address, new port #) translation pair

incoming datagrams: replace (NAT IP address, new port #) in dest fields of every incoming datagram with corresponding (source IP address, port #) stored in NAT table

NAT: Network Address Translation



NAT: Network Address Translation

- ◆ **16-bit port-number field:**
 - 60K simultaneous connections with a single LAN-side address!**
- ◆ **NAT is controversial:**
 - routers should only process up to layer 3**
 - violates end-to-end argument**
 - ◆ NAT possibility must be taken into account by app designers, eg, P2P applications
 - address shortage should instead be solved by IPv6**