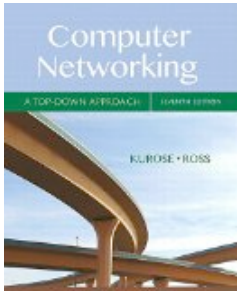
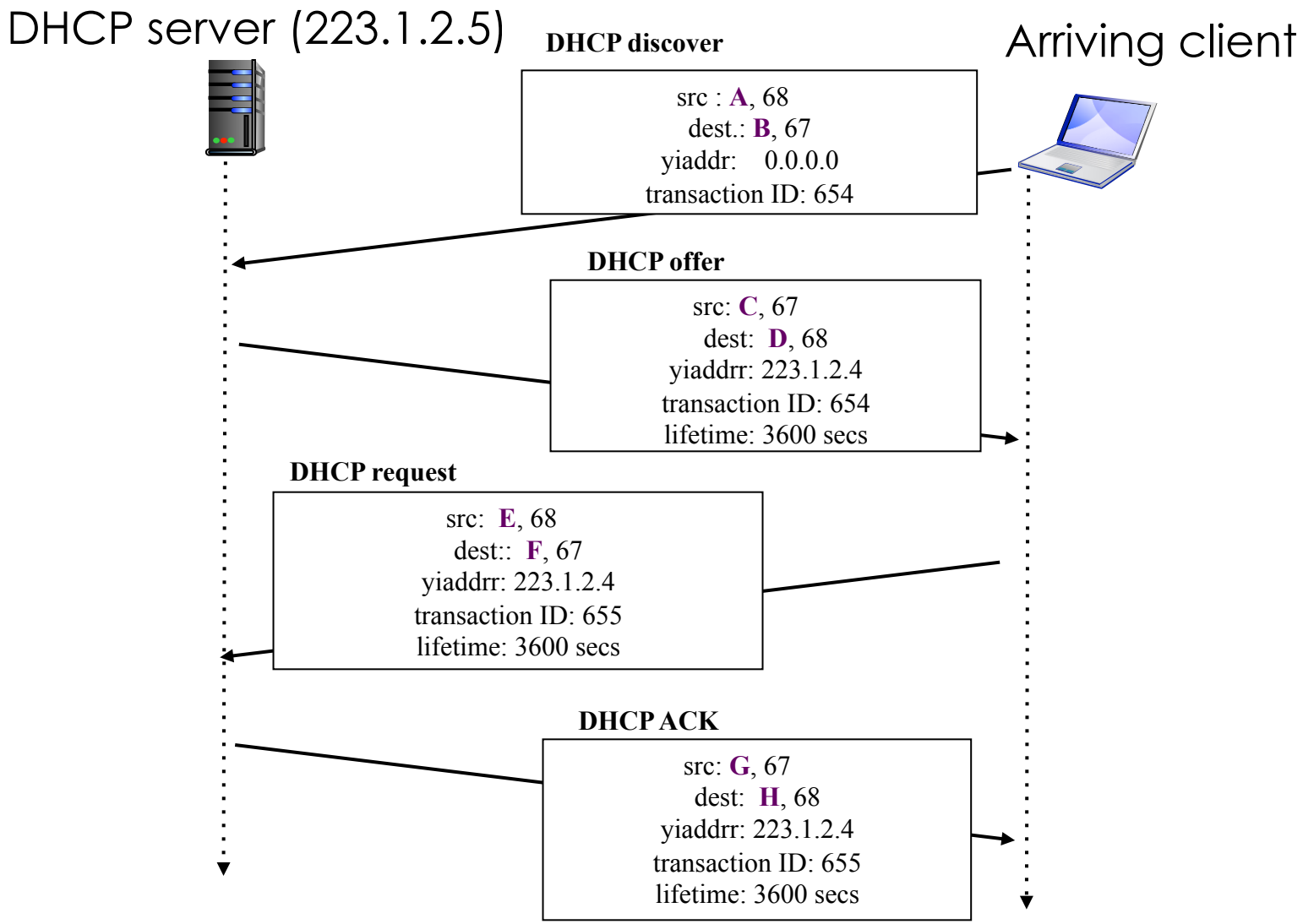
COMP 375: Lecture 28



- **News & Notes:**
  - Midterm #2 in class Friday
  - Project #4 due Monday
- **Reading (Mon, Apr. 16)**
  - Sections 5.2.{1-2} (Link State and Distance Vector Routing)

DHCP

DHCP uses up to four steps to assign an IP address to a new client.



yiaddr: "your internet address"

DHCP can return more than just the assigned IP address.

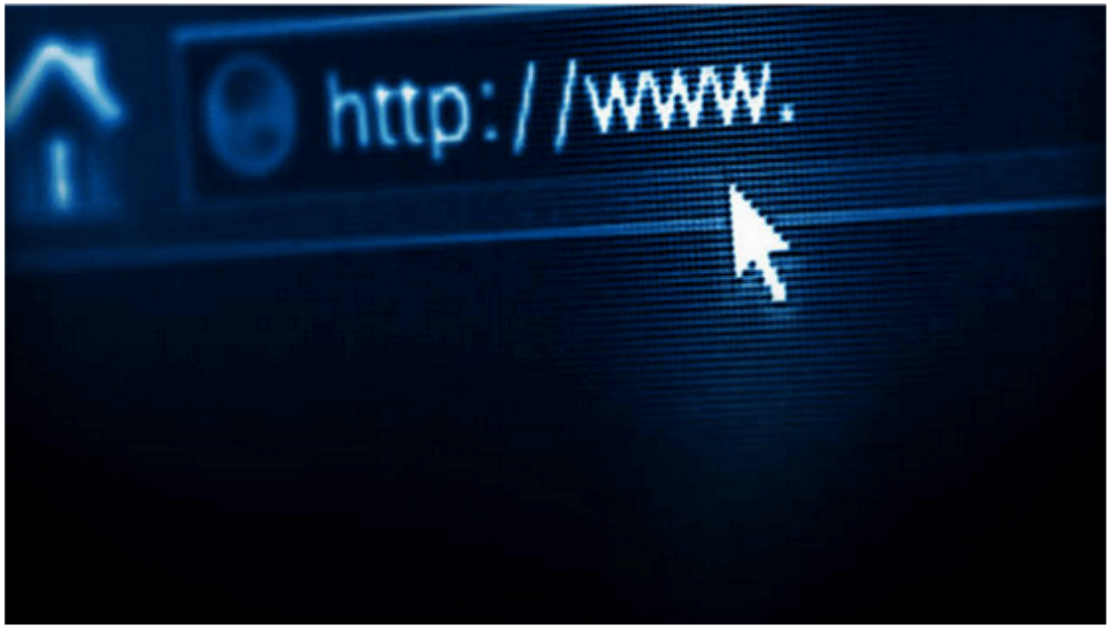
1. Address of first-hop router for client
2. Name and IP address of local DNS server(s)
3. Subnet mask

Section 4.3.4

NETWORK ADDRESS TRANSLATION

By AMANDA SCHUPAK / CBS NEWS / July 3, 2015, 6:00 AM

The Internet has run out of IP addresses (sort of)



ISTOCKPHOTO.COM

Behind every laptop or tablet that goes online, behind every web address, behind every stack of servers, there's an IP address. These strings of numbers and dots act as unique identifiers for the devices and domains on the Internet and allow them to communicate with each other and send information back and forth.

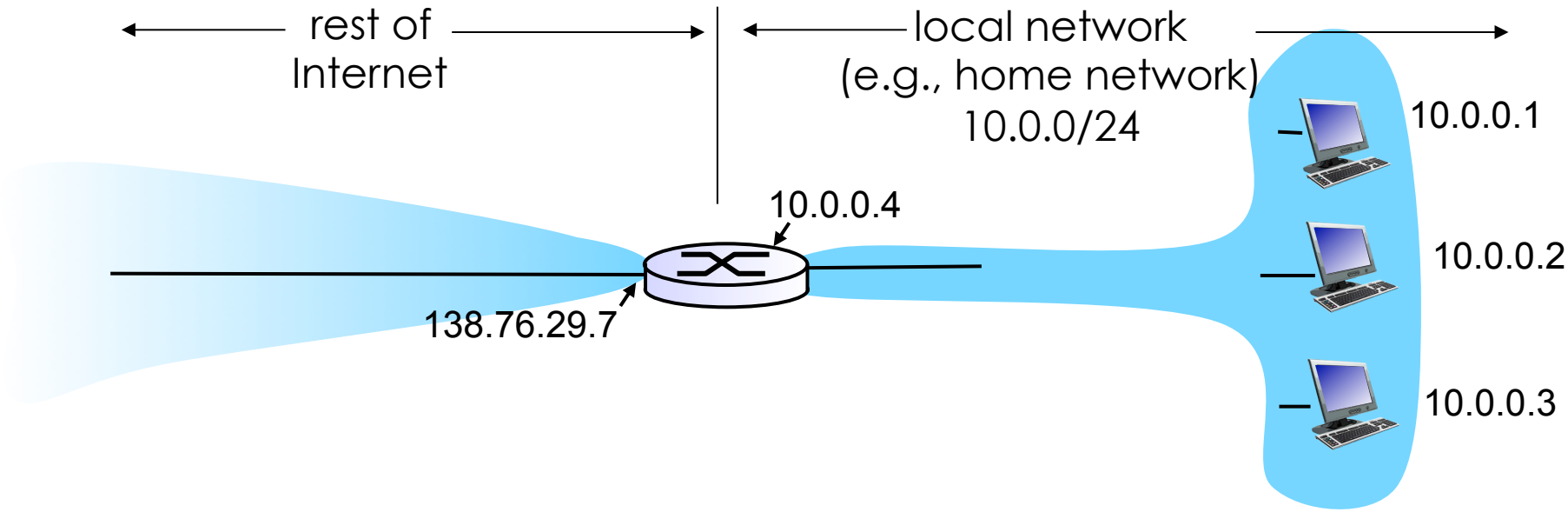
And we're running out of them.

"What happened this week is for the first time, organizations qualified for block sizes (of addresses) we don't have," Richard Jimmerson, chief information officer of the American Registry for Internet Numbers (ARIN), which registers and doles out IP addresses, told CBS News. "We are weeks away from having zero left."

RFC 1918 defines a set of **private IPv4 addresses** that should not be routed.

- 10.0.0.0/8 *(16,777,216 hosts)*
- 172.16.0.0/12 *(1,048,576 hosts)*
- 192.168.0.0/16 *(65536 hosts)*

NAT is used in conjunction with private addresses to reduce address pressure.



NAT uses a **translation table** that utilizes port numbers to track sources.

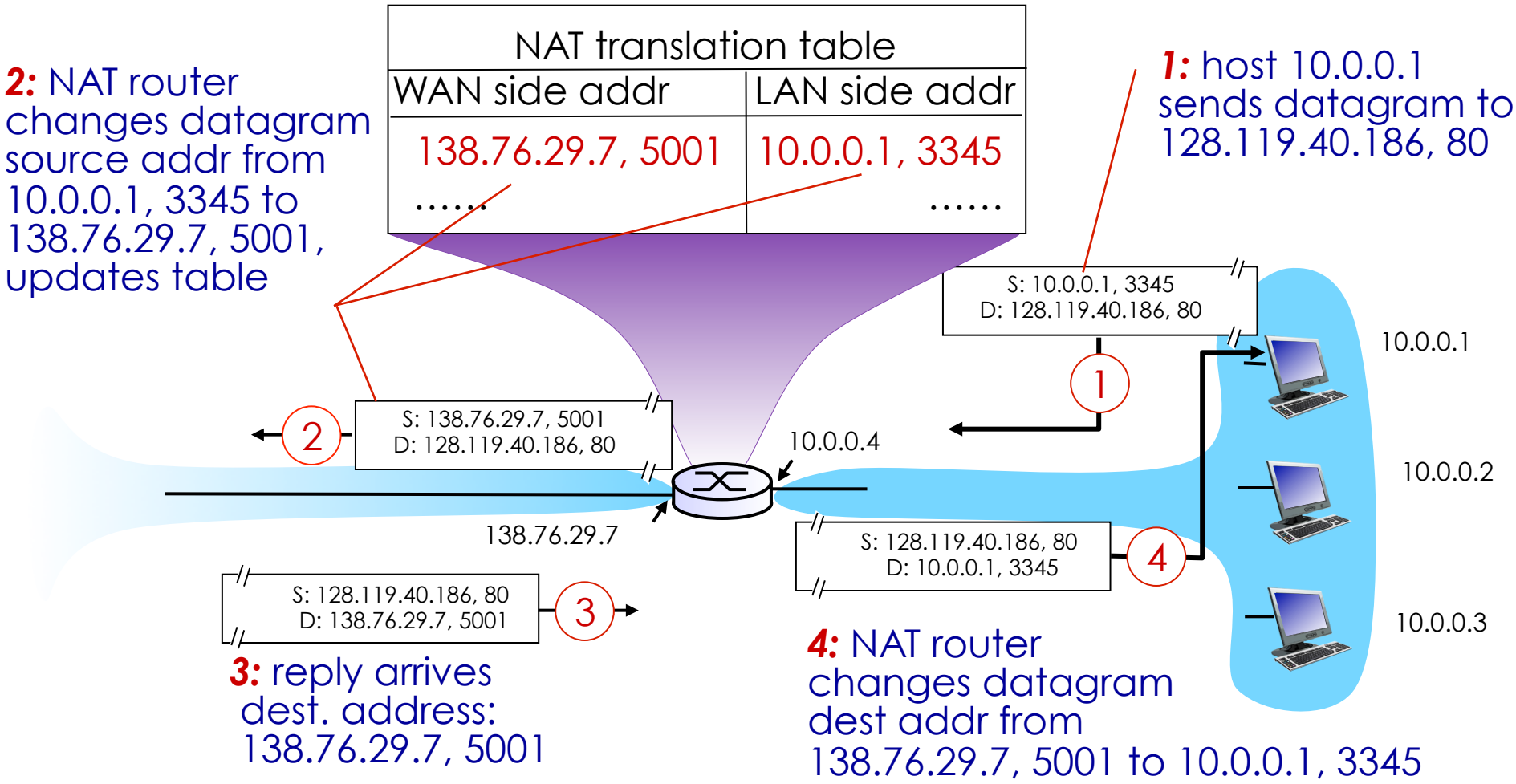
- **Outgoing datagrams**:

  (source IP address, port #) → (NAT IP address, new port #)

- **Incoming datagrams:**

  (NAT IP address, new port #) → (source IP address, port #)

Here is an example of a NAT-enabled router in action.



NAT has several important benefits

Discuss: *What benefits does NAT provide to an organization?*

How do we feel about NAT?

A.	NAT is **great**! It conserves IP addresses and makes it harder to reach non-public machines.
B.	NAT is **mostly good**, but has a few negative features. No big deal.
C.	NAT is **mostly bad**, but in some cases, it's a necessary evil.
D.	NAT is an **abomination** that violates the separation of network layers, and we should not use it!