# DATA COMMUNICATIONS

LECTURE 9 / SWITCHED LOCAL AREA NETWORKS

اللهم صل على محمد وعلى آل محمد، كما صليت على إبراهيم وعلى آل إبراهيم إنك حميد مجيد، اللهم بارك على محمد وعلى آل محمد كما باركت على إبراهيم وعلى آل إبراهيم إنك حميد مجيد

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[ANSWERED]

1) <mark>network-layer address for interface</mark>
   a) 32-bit IP address *
   b) MAC address
   (Slide 4)

2) <mark>used "locally" to get frame from one interface to another physically-connected interface (same subnet, in IP-addressing sense)</mark>
   a) 32-bit IP address
   b) MAC address *
   (Slide 4)

3) <mark>e.g.: 128.119.40.136</mark>
   a) 32-bit IP address *
   b) MAC address
   (Slide 4)

4) <mark>e.g.: 1A-2F-BB-76-09-AD</mark>
   a) 32-bit IP address
   b) MAC address *
   (Slide 4)

5) <mark>used for layer 3 (network layer) forwarding</mark>
   a) 32-bit IP address *
   b) MAC address
   (Slide 4)

6) <mark>32-bit</mark>
   a) 32-bit IP address *
   b) MAC address
   (Slide 4)

7) <mark>48-bit</mark>
   a) 32-bit IP address
   b) MAC address *
   (Slide 4)

8) <mark>(for most LANs) burned in NIC ROM, also sometimes software settable</mark>
   a) 32-bit IP address
   b) MAC address *
   (Slide 4)

9) (base 16) notation (each "numeral" represents 4 bits)
   a) 32-bit IP address
   b) MAC address *
   (Slide 4)

10) Unique 48-bit address
   a) IP address
   b) MAC address *
   (Slide 5)

11) Locally unique 32-bit address
   a) IP address *
   b) MAC address
   (Slide 5)

12) …  allocation administered by IEEE
   a) IP address
   b) MAC address *
   (Slide 6)

13) manufacturer buys portion of …. space (to assure uniqueness)
   a) IP address
   b) MAC address *
   (Slide 6)

14) like postal address
   a) IP address *
   b) MAC address
   (Slide 5)

15) like Social Security Number
   a) IP address
   b) MAC address *
   (Slide 6)

16) recall IP address …
   a) portable
   b) not portable *
   (Slide 6)

17) .... depends on IP subnet to which node is attached
    a) IP address *
    b) MAC address
    (Slide 6)

18) can move interface from one LAN to another
    a) IP address
    b) MAC address *
    (Slide 6)

19) each IP node (host, router) on LAN has table
    a) ERD Table
    b) ARP Table *
    c) IP Table
    d) MAC Table
    (Slide 7)

20) mappings for some LAN nodes
    a) IP/MAC address *
    b) TTL
    (Slide 7)

21) time after which address mapping will be forgotten
    a) MAC
    b) TTL *
    c) TCL
    b) DML
    (Slide 7)

22) TTL is typically ... minutes
    a) 5
    b) 10
    c) 20 *
    d) 60
    (Slide 7)

23) example: A wants to send datagram to B but B's MAC address not in A's ARP table, so A uses ARP to find B's MAC address
    a) T *
    b) F
    (Slide 8-10)

24) <mark>from the given example …</mark>
    a) A broadcasts ARP query, containing B's IP addr *
    b) B broadcasts ARP query, containing A's IP addr
    (Slide 8-10)

25) <mark>from the given example …</mark>
    a) source MAC address = FF-FF-FF- FF-FF-FF
    b) destination MAC address = FF-FF-FF- FF-FF-FF *
    c) source MAC address = 00-00-00- 00-00-00
    d) source MAC address = 00-00-00- 00-00-00
    (Slide 8-10)

26) <mark>from the given example …</mark>
    a) all nodes on LAN receive ARP query *
    b) not all nodes on LAN receive ARP query
    (Slide 8-10)

27) <mark>from the given example …</mark>
    a) A replies to B with ARP response, giving its MAC address
    a) B replies to A with ARP response, giving its MAC address *
    (Slide 8-10)

28) <mark>from the given example …</mark>
    a) A receives B's reply, adds B entry into its local ARP table *
    b) B receives A's reply, adds A entry into its local ARP table
    (Slide 8-10)

29) <mark>walkthrough: sending a datagram from A to B via R, R is a router, A and B are two different</mark>
devices from two different networks and the router connects these networks assume that A
knows B's IP address, A knows IP address of first hop router, R, A knows R's MAC address, The
first step is ….
    a) A creates IP datagram with IP source A, destination B *
    b) A creates IP datagram with IP source A, destination R
    (Slide 11-16)

30) <mark>from the given example the second step is …</mark>
    a) A creates link-layer frame containing A-to-B IP datagram, R's MAC address is frame's
destination *
    b) A creates link-layer frame containing A-to-B IP datagram, B's MAC address is frame's
destination
    (Slide 11-16)

31) <mark>from the given example the next step is …</mark>
   a) frame sent from A to B
   b) frame sent from A to R *
   (Slide 11-16)

32) <mark>from the given example the next step is ..</mark>
   a) frame received at B, datagram removed, passed up to IP
   b) frame received at R, datagram removed, passed up to IP *
   (Slide 11-16)

33) <mark>from the given example the next step is …</mark>
   a) R determines outgoing interface,passes datagram with IP source A,destination B to link layer *
   b) R determines outgoing interface,passes datagram with IP source A,destination R to link layer
   (Slide 11-16)

34) <mark>from the given example the next step is ..</mark>
   a) R creates link-layer frame containing A-to-B IP datagram. Frame destination address: B's MAC address *
   b) R creates link-layer frame containing A-to-B IP datagram. Frame destination address: R's MAC address
   (Slide 11-16)

35) <mark>from the given example the next step is transmitting link-layer frame</mark>
   a) T *
   b) F
   (Slide 11-16)

36) <mark>from the given example the next step is …</mark>
   a) B receives frame, extracts IP datagram destination B *
   b) B receives frame, extracts IP datagram destination R
   (Slide 11-16)

37) <mark>from the given example the final step is …</mark>
   a) B passes datagram up protocol stack to IP *
   b) R passes datagram up protocol stack to IP
   (Slide 11-16)

38) <mark>Ethernet dominant …</mark>
   a) wired LAN technology *
   b) wireless LAN technology
   (Slide 18-23)

39) Ehternet
   a) simpler
   b) cheap
   c) first widely used LAN technology
   d) kept up with speed race: 10 Mbps - 400 Gbps
   e) All of the above *
   (Slide 18-23)

40) popular through mid 90s
   a) bus *
   b) switched
   (Slide 18-23)

41) prevails today
   a) bus
   b) switched *
   (Slide 18-23)

42) active link-layer 2 switch in center
   a) bus
   b) switched *
   (Slide 18-23)

43) all nodes in same collision domain (can collide with each other)
   a) bus *
   b) switched
   (Slide 18-23)

44) each "spoke" runs a (separate) Ethernet protocol (nodes do not collide with each other)
   a) bus
   b) switched *
   (Slide 18-23)

45) sending interface encapsulates IP datagram (or other network layer protocol packet) in Ethernet frame
   a) T *
   b) F
   (Slide 18-23)

46) <mark>used to synchronize receiver, sender clock rates</mark>
    a) preamble *
    b) addresses
    c) type
    d) CRC
    (Slide 18-23)

47) <mark>cyclic redundancy check at receiver</mark>
    a) preamble
    b) addresses
    c) type
    d) CRC *
    (Slide 18-23)

48) <mark>if error detected the frame is dropped</mark>
    a) T *
    b) F
    (Slide 18-23)

49) <mark>indicates higher layer protocol</mark>
    a) preamble
    b) addresses
    c) type *
    d) CRC
    (Slide 18-23)

50) <mark>6-byte source, destination MAC addresses</mark>
    a) preamble
    b) addresses *
    c) type
    d) CRC
    (Slide 18-23)

51) <mark>used to demultiplex up at receiver</mark>
    a) preamble
    b) addresses
    c) type *
    d) CRC
    (Slide 18-23)

52) if adapter receives frame with matching destination address, or with broadcast address (e.g., ARP packet), it passes data in frame to network layer protocol otherwise, adapter discards frame
   a) T *
   b) F
   (Slide 18-23)

53) mostly IP but others possible, e.g., Novell IPX, AppleTalk
   a) preamble
   b) addresses
   c) type *
   d) CRC
   (Slide 18-23)

54) 7 bytes of 10101010 followed by one byte of 10101011
   a) preamble *
   b) addresses
   c) type
   d) CRC
   (Slide 18-23)

55) Ethernet is connectionless: no handshaking between sending and receiving NICS
   a) T *
   b) F
   (Slide 18-23)

56) Ethernet is unreliable: receiving NIC doesn't send ACKS or NAKS to sending NIC
   a) T *
   b) F
   (Slide 18-23)

57) Ethernet's MAC protocol: ....with binary backoff
   a) ALOHA
   b) slotted CSMA/CD
   c) unslotted CSMA/CD *
   (Slide 18-23)

58) data in dropped frames recovered only if initial sender uses higher layer rdt (e.g., TCP), otherwise dropped data lost
   a) T *
   b) F
   (Slide 18-23)

59) Ethernet comes with different speeds: 2 Mbps, 10 Mbps, 100 Mbps, 1Gbps, 10 Gbps, 40 Gbps
   a) T *
   b) F
   (Slide 18-23)

60) Ethernet comes with different physical layer media: fiber, cable
   a) T *
   b) F
   (Slide 18-23)

61) Ethernet comes with common MAC protocol and frame format
   a) T *
   b) F
   (Slide 18-23)

62) There are
   a) one Ethernet standard
   b) many different Ethernet standards *
   (Slide 18-23)

لا تنسونا من صالح دعائكم

اللهم صل على محمد وعلى آل محمد، كما صليت على إبراهيم وعلى آل إبراهيم إنك حميد مجيد، اللهم بارك على محمد وعلى آل محمد كما باركت على إبراهيم وعلى آل إبراهيم إنك حميد مجيد

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