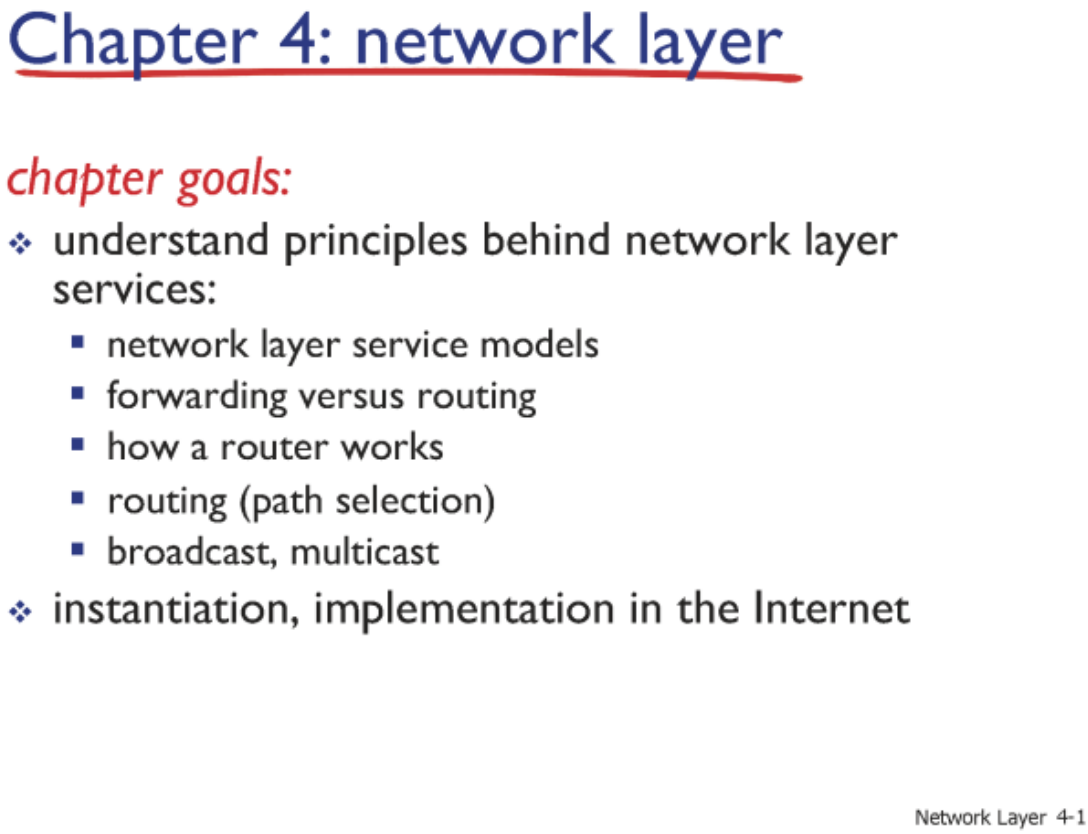
네트워크계층1

강의날짜	@2022/10/17
작성일시	@2022년 10월 17일 오후 10:28
편집일시	@2022년 10월 17일 오후 11:49
분야	네트워크
공부유형	스터디 그룹
복습	☐
태그	



Chapter 4: outline

4.1 introduction

4.2 virtual circuit and datagram networks

4.3 what's inside a router

4.4 IP: Internet Protocol
- datagram format
- IPv4 addressing
- ICMP
- IPv6

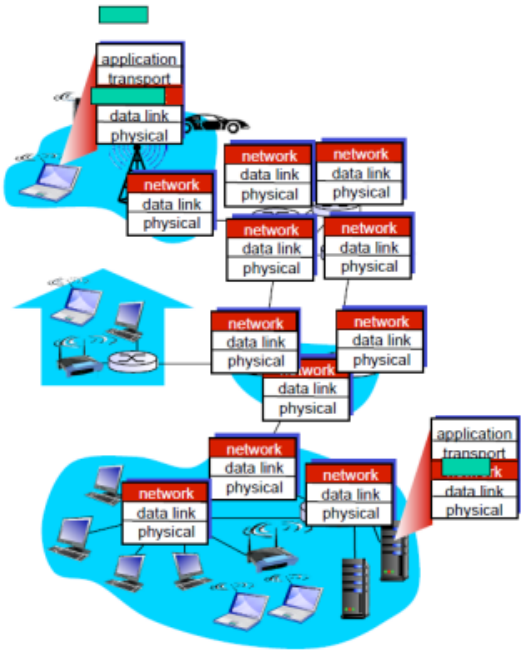
4.5 routing algorithms
- link state
- distance vector
- hierarchical routing

4.6 routing in the Internet
- RIP
- OSPF
- BGP

4.7 broadcast and multicast routing

Network layer

- transport segment from sending to receiving host
- on sending side encapsulates segments into datagrams
- on receiving side, delivers segments to transport layer
- network layer protocols in *every* host, router
- router examines header fields in all IP datagrams passing through it



- 라우터에서 패킷을 목적지를 보고 어디로 가야되는지 생각하고 계속 반복된다

Two key network-layer functions

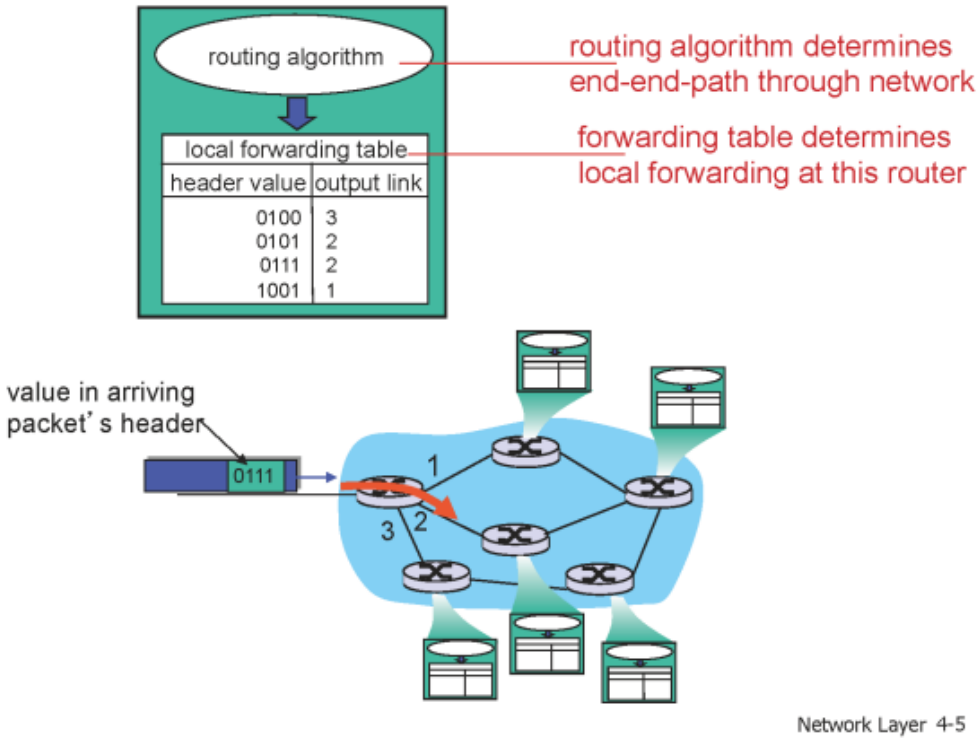
- *forwarding:* move packets from router's input to appropriate router output
- *routing:* determine route taken by packets from source to dest.
  - *routing algorithms*

analogy:

- *routing:* process of planning trip from source to dest
- *forwarding:* process of getting through single interchange

Network Layer 4-4

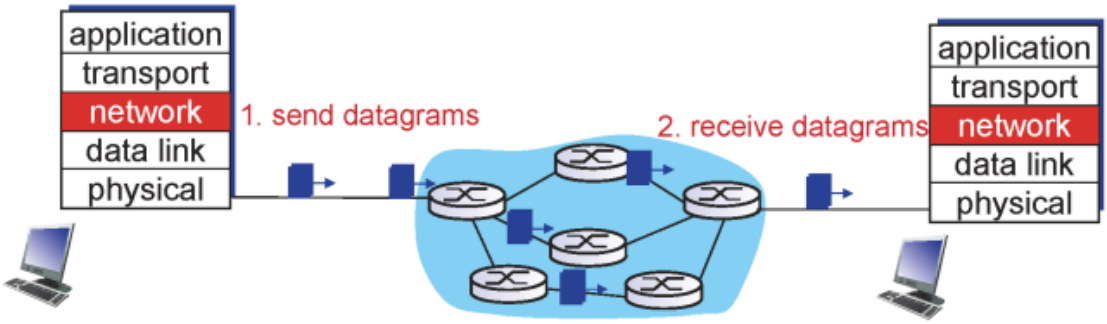
Interplay between routing and forwarding



- 특정 목적지로 보내기 위해서 목적지 어디로 보내라
- forwarding : 테이블을 보고 전달하면 됨
- 들어온 패킷과 매칭 시켜서 어디로 보낸다.
- 라우터는 죽을 때까지 포워딩만 함
- 라우팅 알고리즘 : 포워딩 테이블을 만드는 것
-

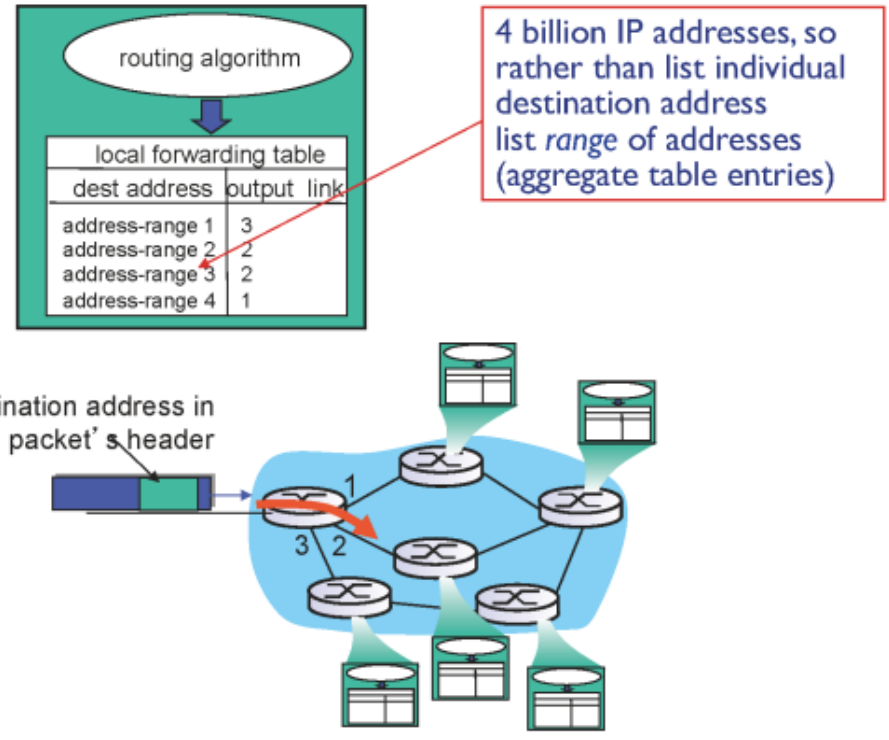
Datagram networks

- no call setup at network layer
- routers: no state about end-to-end connections
  - no network-level concept of "connection"
- packets forwarded using destination host address



Network Layer 4-6

Datagram forwarding table



Network Layer 4-7

Datagram forwarding table

Destination Address Range	Link Interface
11001000 00010111 00010000 00000000 through 11001000 00010111 00010111 11111111	0
11001000 00010111 00011000 00000000 through 11001000 00010111 00011000 11111111	1
11001000 00010111 00011001 00000000 through 11001000 00010111 00011111 11111111	2
otherwise	3

Q: but what happens if ranges don't divide up so nicely?

Network Layer 4-8

- 매칭이 되는 엔트리를 찾아 보낸다

Longest prefix matching

longest prefix matching

when looking for forwarding table entry for given destination address, use *longest* address prefix that matches destination address.

Destination Address Range	Link interface
11001000 00010111 00010*** *********	0
11001000 00010111 00011000 *********	1
11001000 00010111 00011*** *********	2
otherwise	3

examples:

DA: 11001000 00010111 00010110 10100001 which interface?

DA: 11001000 00010111 00011000 10101010 which interface?

Network Layer 4-9

- 매칭을 시키긴 시키되 그 중 가장 길게 매칭되는 엔트리와 포워딩한다.