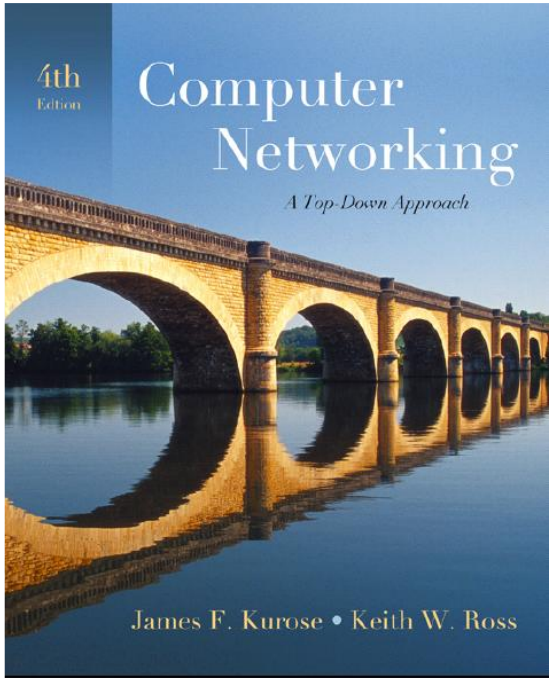
Review



Computer Networking: A Top Down Approach, 4th edition.
Jim Kurose, Keith Ross
Addison-Wesley, July 2007.

Chapter 1: Introduction

1.2 Network edge

- App's using TCP and why?Such as HTTP , FTP , Telnet, SMTP
- App's using UDP and why? streaming media, DNS, Skype
- Physical Media: features

1.4 Performance: delay, loss and throughput in packet-switched networks

- Four sources of packet delay and which one is variable?
- Four sources of packet delay domain the delay in different link type (LAN, Wireless, WAN)
- How to calculate the throughput of a path

1.5 Protocol layers, service models

- Layers and functions of ISO/OSI reference model
- Data encapsulation process of TCP/IP

Chapter 2: Application layer

2.1 Principles of network applications

- Application layer protocol and Underlying transport protocol (such as SMTP, POP3,Telnet, HTTP, FTP)
- Application architectures (C/S, p2p, Hybrid) & network architectures (TCP/IP, ISO/OSI)
- Transport service requirements of common apps –ppt 13

2.2 Web and HTTP

- Process of requesting objects by HTTP
- HTTP mechanism: cache get the update pages-conditional Get-ppt 41
- Web cache example-ppt 39

Chapter 2: Application layer

2.4 Electronic Mail

- SMTP: sending email to the receiver's server
- POP3 and IMAP: receive email from receiver's server

2.5 DNS

- Functions of DNS: hostname to IP address translation
- What they are in the DNS database?
- What are the DNS servers that are queried (in order) to find an specified IP address by the iterative acess process
- load distribution of DNS: replicated Web servers: set of IP addresses for one canonical name

2.6 P2P file sharing

- Characteristics

Chapter 3: Transport Layer

3.1 Transport-layer services

- Differences on providing data transmission services
  - network layer: between end-to-end hosts
  - transport layer: between application processes
- What are the reliable, in-order delivery of TCP
  - Reliable data transfer, congestion control, flow control, connection management

3.2 Multiplexing and demultiplexing

- Meanings of multiplexing and demultiplexing
- UDP socket identified by two-tuple (dest IP address, dest port number)
- TCP socket identified by 4-tuple (source IP address, source port number, dest IP address, dest port number)

Chapter 3: Transport Layer

3.4 Principles of reliable data transfer

- principles of reliable data transfer for GBN
- principles of reliable data transfer for SR
- Comparison of the sending and receiving window size for the alternating bit, SR, and GBN protocol.

3.5 Connection-oriented transport: TCP

- TCP segment format and Services provided by TCP
- All mechanisms of TCP reliable data transfer
- Solved problems of end-to-end communication : reliable transfer, flow control, congestion control, error detection
- Connection management: Three-way handshaking

Chapter 3: Transport Layer

3.6 TCP congestion control

- Goal of congestion control is different from that of the flow control
- TCP Slow Start –see figure 3-53
  - When CongWin is below Threshold, sender in slow-start phase, window grows exponentially.
  - When CongWin is above Threshold, sender is in congestion-avoidance phase, window grows linearly.
  - When a triple duplicate ACK occurs, Threshold set to CongWin/2 and CongWin set to Threshold (version of Reno of TCP protocol).
  - When timeout occurs, Threshold set to CongWin/2 and CongWin is set to 1 MSS.

Chapter 4: Network Layer

4. 1 Services of Network-Layer

- Two key functions: forwarding and routing.

4. 2 Virtual circuit and datagram networks

- provide network layer connection and connection-less service respectively.
- Longest prefix matching

4.4 IP: Internet Protocol

- The number of interfaces and IP addresses of host and router
- Datagram format : all of fields、length of fixed header(20 Bytes), overhead of a IP datagram encapsulate other PDU
- IP Fragmentation : MTU--see example of book

Chapter 4: Network Layer

4.4 IP: Internet Protocol (conti-)

- IPv4 addressing—
  - Subnets and mask, format of CIDR
  - Subnet classification and route aggregation
- ICMP: error reporting and echo request/reply (ping), traceroute

4.5 Routing algorithms

- Global or decentralized information needed in different route algorithm
- Link state--Dijkstra's algorithm
- Two reasons of hierarchical routing for Internet:Scale and administrative autonomy

Chapter 4: Network Layer

4.5 Routing algorithms (Conti)

- neither source host nor the intermediate routers know the complete path to destination host that will be reached by IP datagram.

4.6 Routing in the Internet

- What routing algorithms are intra-As or inter-AS
  - RIP, OSPF , BGP and what routing algorithm they are based on
  - Different from RIP, BGP announce the sequence of ASs (AS path) on the routes to destinations
- What is the main dominant issue for routing among Ases
  - Reachability information and Policy

Chapter 5: The Data Link Layer

5.1 data transmission services

- data link layer : between adjacent nodes over a link
- Link Layer Services: framing, link access,flow control, error detection and correction

5.2 Error detection and correction

- CRC: how to generate frame and how to detect the error with CRC

5.3 Multiple access protocols

- Two types of "links": point-to-point & broadcast
- Collision of broadcast channel when two or more nodes send data at the same time
- Data link layer is divided into two sub-layers: LLC and MAC
- Multiple access protocol-three broad classes
  - Channel Partitioning: TDMA 、FDMA、 ……
  - Random Access: ALOHA、CSMA、 CSMA\CD、……
  - "Taking turns": Tokening Ring

Chapter 5: The Data Link Layer

5.4 Link-Layer Addressing

- MAC address： assigned at manufacturing time
- ARP
  - ARP: IP address -> MAC address
  - encapsulated in a link-layer broadcast frame
  - process of ARP query and ARP addressing routing to another LAN, and how is the router working in the process-ppt31, ppt32

5.5 Ethernet

- Algorithm of exponential backoff in the Ethernet CSMA/CD

5.6 Link-layer switches

- Switch- link-layer device:
  - Feathers of Switch
  - Creation of Switch table :process of self-learning