

- Part I Computer network applications and standardization
- Chapter 1 Computer networks and standardization p. 3
  - 1.1 Network goals p. 3
  - 1.2 Network evolution p. 4
  - 1.3 Components of computer networks p. 8
  - 1.4 Network structure p. 12
  - 1.5 Data communication networks (DCNs) p. 14
  - 1.6 Network architectures and layered protocols p. 19
  - 1.7 Data communication in OSI-RM p. 28
  - 1.8 Standards organizations p. 32
  - 1.9 Local area network (LAN) evolution p. 39
  - 1.10 Current trends in communication networks p. 41
- Part II Fundamentals of digital communication and signaling
  - Chapter 2 Basic concepts of digital communication and signaling p. 49
    - 2.1 Introduction p. 49
    - 2.2 Basic transmission signaling concepts p. 49
    - 2.3 Electrical and voice signals: Basic definitions p. 51
    - 2.4 Filters p. 63
    - 2.5 Errors in data communication p. 64
    - 2.6 Repeaters and amplifiers p. 70
  - Chapter 3 Signal transmission basics p. 73
    - 3.1 Modulation and demodulation: Basic concepts p. 73
    - 3.2 Analog modulation (AM) p. 75
    - 3.3 Digital modulation (DM) p. 85
    - 3.4 Modems (MOdulator/DEModulator) and modem standards p. 92
    - 3.5 Multiplexers p. 114
    - 3.6 Switching techniques p. 127
    - 3.7 Communication control interfaces p. 132
  - Chapter 4 Modes of communication channel p. 141
    - 4.1 Introduction p. 141
    - 4.2 Communication channel p. 141
    - 4.3 Information coding p. 156
    - 4.4 Character error detection and correction coding p. 158
    - 4.5 Error-control techniques and standard protocols p. 159
    - 4.6 Terminals p. 170
  - Chapter 5 Transmission media p. 175
    - 5.1 Introduction p. 175
    - 5.2 Communication channels p. 176
    - 5.3 Open-wire lines p. 177
    - 5.4 Twisted-pair wires/cables p. 178
    - 5.5 Coaxial cable p. 181
    - 5.6 Optical fiber communication p. 186
    - 5.7 Wireless communication p. 191
    - 5.8 Typical broadband LAN configuration p. 200
  - Chapter 6 Telephone systems p. 209
    - 6.1 Introduction p. 209

- 6.2 Evolution of telephone system p. 209
- 6.3 Hierarchical model of telephone systems p. 210
- 6.4 Telephone network systems p. 213
- 6.5 Private automatic branch exchange (PABX) p. 224
- 6.6 Digital carrier systems (DCS) p. 227
- Part III Local area networking and internetworking
- Chapter 7 Introduction to local area networks (LANs) p. 243
- 7.1 Local area networks evolution p. 243
- 7.2 LAN definitions and standards p. 245
- 7.3 LAN characterization p. 262
- Chapter 8 IEEE LANs p. 301
- 8.1 IEEE 802 recommendations (OSI-RM) p. 301
- 8.2 IEEE standard LANs p. 313
- Chapter 9 Nonstandard LANs and internetworking p. 367
- 9.1 Non-OSI-RM LANs p. 367
- 9.2 LAN-to-LAN interconnection p. 383
- 9.3 Internetworking devices for LANs p. 389
- 9.4 Wireless LANs p. 401
- Part IV The OSI-RM architecture and protocols
- Chapter 10 Physical layer p. 413
- 10.1 Introduction p. 413
- 10.2 Layered protocol and interfacing p. 414
- 10.3 Physical layer functions and services p. 415
- 10.4 Physical layer interface standards p. 416
- 10.5 Terminals p. 434
- 10.6 Physical layer protocol primitives and parameters p. 438
- Chapter 11 Data link layer p. 441
- 11.1 Introduction p. 441
- 11.2 Layered protocols and interfacing p. 442
- 11.3 ISO data link layer services and functions p. 443
- 11.4 Data link control functions and protocols p. 445
- 11.5 Data link control configurations p. 457
- 11.6 Data link protocols p. 463
- 11.7 Error-control protocols p. 469
- 11.8 Examples of data link protocols p. 475
- 11.9 Data link service protocol primitives and parameters p. 497
- Chapter 12 Network layer p. 503
- 12.1 Introduction p. 503
- 12.2 Layered protocols and interfacing p. 504
- 12.3 ISO network layer services and functions p. 505
- 12.4 Network routing service concepts p. 507
- 12.5 Sub-network (subnet) interface p. 509
- 12.6 Packet-switched data network (PSDN) (CCITT X.25) p. 511
- 12.7 Internetworking and packet-switched data network (PSDN) protocols p. 539
- 12.8 Network routing switching techniques: Basic concepts p. 569
- 12.9 Network congestion control p. 577

- 12.10 Value-added networks (VANs) p. 578
- Chapter 13 Transport layer p. 587
- 13.1 Introduction p. 587
- 13.2 Layered protocols and interfacing p. 588
- 13.3 ISO 8072 transport layer services and functions p. 589
- 13.4 Transport layer service control protocol p. 593
- 13.5 ISO 8073 transport layer protocol primitives and parameters p. 600
- 13.6 Transmission control protocol (TCP) p. 613
- 13.7 Internet protocol (IP) p. 624
- Chapter 14 Session layer p. 629
- 14.1 Introduction p. 629
- 14.2 Layered protocols and interfacing p. 629
- 14.3 ISO 8326 session layer services and functions p. 630
- 14.4 ISO 8326 session layer service operation p. 633
- 14.5 ISO 8326 session layer service primitives p. 637
- 14.6 ISO 8327 session layer protocol primitives and parameters p. 642
- 14.7 ISO 8327 session layer protocol data unit (SPDU) p. 650
- Chapter 15 Presentation layer p. 659
- 15.1 Introduction p. 659
- 15.2 Layered protocols and interfacing p. 660
- 15.3 ISO 8822 presentation layer services and functions p. 661
- 15.4 ISO 8822 presentation layer service primitives p. 663
- 15.5 ISO 8823 presentation layer protocol p. 670
- 15.6 Presentation context, representation, and notation standards p. 676
- 15.7 Security p. 686
- 15.8 Secure socket layer protocol p. 700
- Chapter 16 Application layer p. 705
- 16.1 Introduction p. 705
- 16.2 Layered protocols and interfacing p. 707
- 16.3 ISO application layer services and functions p. 708
- 16.4 Application layer architecture (structure) p. 709
- 16.5 Application layer standards and protocols p. 711
- 16.6 Application layer protocols of proprietary LANs p. 744
- Chapter 17 Internet: Services and connections p. 749
- 17.1 Introduction p. 749
- 17.2 The Internet p. 752
- 17.3 Internet addressing p. 772
- 17.4 Detailed descriptions of Internet services p. 779
- Part V High-speed networking and internetworking
- Chapter 18 Integrated digital network (IDN) technology p. 815
- 18.1 Introduction p. 815
- 18.2 Evolution of digital transmission p. 817
- 18.3 Digital transmission services p. 818
- 18.4 Switching techniques p. 821
- 18.5 Public networks p. 830
- 18.6 Integrated services digital network (ISDN) p. 832

- 18.7 Layered model of ISDN p. 844
- 18.8 ISDN protocols p. 858
- 18.9 Broadband ISDN: Why? p. 863
- Chapter 19 High-speed networks p. 867
- 19.1 Introduction p. 869
- 19.2 Applications of integrated networks p. 869
- 19.3 Evolution of high-speed and high-bandwidth networks p. 870
- 19.4 Evolution of switching techniques p. 878
- 19.5 Fiber-distributed data interface (FDDI) p. 882
- 19.6 Switched multimegabit data service (SMDS) p. 896
- 19.7 Frame relay p. 903
- 19.8 Broadband integrated services digital network (B-ISDN) p. 909
- 19.9 Asynchronous transfer mode (ATM) operation p. 938
- Part VI Client-server LAN implementation
- Chapter 20 Client-server computing architecture p. 981
- 20.1 Introduction p. 981
- 20.2 Distributed computing architecture (DCA) p. 982
- 20.3 Components of DCA p. 984
- 20.4 Client-server computing architecture p. 985
- 20.5 Client-server models p. 996
- 20.6 Client-server operating systems p. 1001
- 20.7 Graphical user interface (GUI) tools p. 1005
- 20.8 Client-server LAN implementation p. 1014
- 20.9 Case studies p. 1019
- Acronyms p. 1023
- Glossary p. 1031
- Index p. 1111