3-leg perimeter DMZ configuration, 17, 176
568A, 53
568B, 53
802.3, 21–22
8P8C, 6

A
Address Resolution Protocol, 37
Ad-hoc mode, 62
Anycast address, 87
Application layer
   definition, 32
   gateways, 44, 173
   protocols, 43–44, 45
Application-level gateway (ALG), 173
ARP table, 37
Asynchronous transfer mode (ATM), 158, 159
Attenuation, 55
Authentication header (AH), 138
Automatic Private IP Addressing (APIPA)
   definition of, 74
   disabling, 133

B
Back-to-back DMZ configuration, 16, 175
Baseband, 35
Basic rate ISDN, 158
Binary to decimal conversion, 71–72
BitTorrent, 25–26
BOGB, 52
Border Gateway Protocol (BGP), 148
Bridge mode, 61
Broadband, 35
Broadband cable, 159, 160
Broadcast, 3, 10
Broadcast address, 70

C
Cables, networking
   BOGB, 52
   crossover, 53
   fiber optic, 57–59
   plenum rated, 57
   shielded twisted-pair, 56
   straight through, 53
   tools, 54–55
   twisted-pair, 51–57
Caching proxy, 175
CAM table, 36
Carrier sense multiple access with collision avoidance
   (CSMA/CA), 22
Carrier sense multiple access with collision detection
   (CSMA/CD), 21
Category 5e, 56
Category 6, 56
Centralized computing, 23
Channel bonding, 62
CIR (committed information rate), 156
Circuit-level gateway, 173
Classful network architecture, 69
Classless inter-domain routing (CIDR), 85–86
Client-server model, 23–24
Command prompt, 99–101
Communications subnetwork
   data link layer (DLL), 35–36
   definition of, 33
   network layer, 36–38
   OSI model, 33–38
   physical layer, 34–35
Computer telephony integration (CTI), 24
Connectionless communications, 39
Connection-oriented communications, 39
Continuity tester, 55
Crossover cable, 53
Crosstalk, 57
CSU/DSU, 151
CTI-based server, 24

D
Database server, 24
Data emanation, 56
Data link layer (DLL)
   communications subnetwork, 35–36
   definition of, 32
   devices, 45
   layer 2 switching, 36
   protocols, 45
Data transfer rate, 10, 34
Decimal to binary conversion, 71
Default gateway
   configuring, 76–77
   definition of, 75–76
Demilitarized zone (DMZ)
   back-to-back configuration, 16, 175
   definition of, 16, 175
   perimeter networks, 16–17
   SOHO router, setting up on, 176
   3-leg perimeter configuration, 17, 176
Devices, wireless, 59–61
Digital subscriber line (DSL), 159, 160
Distributed networks
   client-server model, 23–24
Distributed networks (contd.)
  definition of, 23
  peer-to-peer (P2P) model, 24–26
Distributive computing, 23
DNS server address
  configuration, 76–77
  definition of, 76
Domain Name System (DNS)
  definition of, 138, 142
  installing, 139–140
DORA process, 129–130
DSL. See Digital subscriber line (DSL)
Dual IP stack, 93
Dynamic Host Configuration Protocol (DHCP)
  APIPA, 133
  configuring, 130–132
  definition of, 129, 141
  DORA process, 129–130
Dynamic IP address, 74
Dynamic routing, 147

E
Electromagnetic interference (EMI), 56
Emanation. See Data emanation
Encapsulated, 38
Encapsulating security payload (ESP), 138
Encoded, 43
Ethernet
  definition of, 10, 21
  frame, 38
  standards, 22–23
  switching, 10, 22
  types, 10
Extranet, 166–167

F
Faraday cage, 56
Far end crosstalk (FEXT), 57
Fast Ethernet, 23
Fiber Distributed Data Interface (FDDI), 20, 21, 159, 160
Fiber optic cable
  definition of, 57
  EMI, 59
  examining, 57–58
  modes, 58
  types, 58–59
File server, 23–24
File transfer protocol (FTP), 112
Firewall
  definition of, 172
  examples of, 173
  methodologies, 172–173
  SOHO, four-port, configuring, 173–174
Frame aggregation, 62
Frame Relay
  characteristics, 155–156
  components, 157
  definition of, 154, 159
  format, 156
Frames, 21
FTP command, 112–113, 120
Full duplex, 8, 54

G
Gateways
  application layer, 44, 173
  circuit-level, 173
  default, 75–77
  Gigabit Ethernet, 23
  Global routing prefix, 87

H
Half duplex, 8, 54
Hops, 153
Host, 11
Hub, 3

I
IEEE 802.1Q, 36
IEEE 802.1X, 62
IEEE 802.3, 21
IEEE 802.11 WLAN standards, 61
Inbound ports, 40. See also Ports
Infrastructure mode, 62
Institute of Electrical and Electronics Engineers (IEEE), 21
Integrated Services Digital Network (ISDN), 158, 159
Interface ID, 88
Interference, 56–57
Interior Gateway Routing Protocol (IGRP), 148
Internet, 165–166
Internet Assigned Numbers Authority (IANA), 39–40
Internet content filter, 175
Internet Control Message Protocol (ICMP), 37
Internet Engineering Task Force (IETF), 45, 165
Internet Protocol (IP) address
  binary conversion, 71–72
  class A, 72–73
  class B, 73–74
  class C, 75
  definition, 10
  IPv4, 69–84, 93
  IPv6, 86–93
  parts of, 11
  public versus private, 74
  settings, configuring, 10–14
  static versus dynamic, 74
Internet Protocol Security (IPsec)
  definition of, 138, 141
  protocols, 138
Intranet, 166–167
ipconfig command
  definition of, 13
  network layer, 37
  TCP/IP, 101–105
IP conflict, 73
IP forwarding, 138
IP proxy, 175
IPv4 address
Index | 185

- classes, 69–75
- configuring, 75
- default gateways, 75–76
- DNS server, 76–77
- network address translation (NAT), 78–79
- subnetting, 79–84
- IPv4-mapped addresses, 93
- IPv6 address
  - configuring, 88–93
  - definition of, 86
  - dual IP stack, 93
  - versus IPv4, 86–87
  - parts, 87–88
  - types, 87
- IPv6 subnet, 88
- IPv6 tunneling, 93
- ISDN. See Integrated Services Digital Network

L
- Layer 2 switching, 36
- Layer 3 switching, 38
- Leased lines, 156
- Local area network (LAN)
  - data transfer on, 10
  - definition of, 2
  - documentation, examining, 3–5
  - IP, configuring, 10–14
  - structure, documenting, 2–5
  - types of, 14–16
  - virtual, 15–16
  - wired, 14–15
  - wireless, 15–16
- Logical IP address, 70
- Logical topology, 20
- Loopback IP address, 70

M
- MAC flood, 36
- Masked, 79
- MDI port, 54
- MDI-X ports, 54
- Media Access Control (MAC) address, 35
- Medium dependent interface (MDI) port, 19, 54
- Mesh topology, 19–20
- Messaging server, 24
- Microsoft Visio, 3
- Multicast address, 87
- Multicasting, 71
- Multi-mode fiber optic (MM), 58
- Multiple-Input Multiple-Output (MIMO), 61
- Multistation Access Unit (MAU), 20

N
- Name resolution
  - DNS, 138–140
  - WINS, 140–141
- NAT. See Network address translation (NAT)
- NAT filtering, 173
- Nbtstat command, 109–110
- Near end crosstalk (NEXT), 57
- Net command, 119
- Netsh command, 113–115
- Netstat command, 107–109
- Network
  - adapters, 5–9, 60
  - cables, fiber optic, 57–59
  - cables, twisted-pair 51–57
  - controller, 24
  - distributed, 23–26
  - documentation, 2–3
  - interference, 56
  - operating systems, 24
  - perimeter, 16–17
  - reasons for using, 2
  - speed, 10. See also data transfer rate
  - subnet, 81–82
  - standards, 21–23
  - topology, 18–20
  - wired, 51–59 (see also Wired network)
  - wireless, 59–64 (see also Wireless network)
- Network address translation (NAT), 78–79
- Networking services
  - DHCP, 129–133, 141
  - DNS, 138–140, 142
  - Remote Access Service, 136
  - Remote Desktop Services, 134–136
  - Routing and Remote Access Service (RRAS), 136–138, 141
  - Terminal Services, 134–136, 141
  - WINS, 140–141, 142
- Network interface card (NIC), 5. See also Network adapter
- Network intrusion detection system (NIDS), 175
- Network intrusion prevention system (NIPS), 175
- Network layer
  - communications subnetwork, 36–38
  - definition of, 32
  - devices, 45
  - layer 3 switching, 38
  - protocols, 45
- Nmap, 174
- Node, 70
- nslookup, 112

O
- Open shortest path first, 119, 148
- Open Systems Interconnection (OSI) model
  - communication subnetwork, 33–38
  - definition of, 31
  - layers, 31–33, 39–45
- Outbound ports, 40. See also Ports
- Overhead, 38

P
- Packet filtering, 173
- Packets, structure, 88
- Packet switching exchange (PSE), 153
Packet switching services
  Frame Relay, 154–157
  X.25, 150–154
Patch cable. See Twisted-pair patch cable
Pathping, 111–112
Peer-to-peer (P2P) model, 24–26
Perimeter network, 16–17
Permanent virtual circuits (PVCs), 155–156
Physical data rate (PHY), 62
Physical layer
  communications subnetwork, 34–35
  data transfer rate, 34
  definition of, 32
  devices, 45
  protocols, 45
Ping command
  definition of, 13–14
  network layer, 37
  TCP/IP, 101, 105–107
Port address translation, 78
Port-based network access control, 62
Ports
  categories, 40
  inbound versus outbound, 40
  MDI, 19, 54
  protocols, 40–41
  RJ-45, 6
  transport layer, 39–41
  POTS/PSTN, 159, 160
Presentation layer
  definition of, 32, 42–43
  protocols, 45
Primary rate ISDN, 158
Print server, 24
Private IP address, 74
Protocols. See also individual OSI layers
  IPSec, 138
  ports, 40–41
  routing, 147–148
  TCP/IP, 118–119
  tunneling, 167–168
Protocol stack, 31
Proxy server, 175
Public IP address, 74
Punch down tool, 55

Radio frequency interference (RFI), 56
Remote Access Service, 136
Remote Desktop Protocol, 134
Remote Desktop Services, 134–136
Ring topology, 20
RJ-45 port, 6
Route command, 115–119, 120
Routers, network layer, 38
Routing
  dynamic versus static, 147
  protocols, 147–148
Routing and Remote Access Service (RRAS)
  configuring, 148–149
  definition of, 136, 141
  enabling, 137–138
Routing information protocol (RIP)
  adding, 148–149
  definition of, 118, 147–148
  installing, 149–150

Security association (SA), 138
Session layer, 32, 42, 45
Serial data transfer, 10
Service set identifier (SSID), 62
Shielded twisted-pair (STP) cables, 56
ShieldsUP, 174–175
Signal emanation. See Data emanation
Single-mode fiber optic (SMF), 58
SOHO (small office–home office)
  firewalls, 173–174
  router, 4
  router, DMZ set up, 176
SONET, 158–159, 160
Star topology, 18–19
Stateful packet inspection (SPI), 173
Static IP address, 74
Static routing, 147
Straight through cable, 53, 54
Subnet mask, 11, 79
Subnetting, 79–84
Switch, 5
Switching, Ethernet, 10
Synchronous, 153

T1, 157
T3, 157
T-carrier, 157–158, 159
TCP/IP
  command prompt, 99–101
  commands, 99–120
  definition of, 69
  FTP, 112–113
  ipconfig, 101–105
  model, 45–46
  nbtstat, 107, 109–110
  net command, 119
  netsh, 113–115
  netstat, 107–109
  nslookup, 112
  pathping, 110, 111–112
  ping, 101, 105–107
  protocols, 118–119
  route, 115–119
  tracert, 110–111
Telecommunications Industry Association/Electronics Industries
  Alliance (TIA/EIA), 53
Telnet, 113
Terminal Services, 134–136, 141
Token ring, 20, 21
Torrents, 25–26
tracert, 110–111
Transceive, 8
Transmission Control Protocol (TCP), 39, 45–46
Transport layer
  definition of, 32, 39
  netstat, 41–42
  ports, 39–41
  protocols, 45
Truncated, 88
Twisted-pair patch cable
  categories, 56
  definition, 51
  examining, 51–53
  interference on, 56–57
  standards, 53
  tools for, 55
  types, 53

U
Unicast, 10
Unicast address, 87
Unmasked, 79
User Datagram Protocol (UDP), 39

V
Variable-length subnet masking, 85
Virtual circuit, 153
Virtual LAN (VLAN)
  definition of, 15–16
  layer 2 switching, 36
Virtual private networks (VPNs)
  creating, 168–171
  definition of, 167
  functionality on routers, 171–172
  tunneling protocols, 167–168

W
Web 2.0, 166
Web server, 24
Wide Area Networks (WAN)
  ATM, 158, 159
  broadband cable, 159, 160
  DSL, 159, 160
  FDDI, 159, 160
  Frame relay, 154–157, 159
  ISDN, 158–159
  packet switching, 150–157
  POTS/PSTN, 159, 160
  routing, 147–150
  SONET, 158, 160
  T-carriers, 157–158, 159
  X.25, 150–154, 159
Wi-Fi, 61
Windows Internet Name Service (WINS)
  definition of, 140, 142
  installing, 140–141
Wired LAN, 14–15
Wired network. See also Network
cable, fiber optic, 57–59
cable, twisted-pair, 51–57
Wireless access point (WAP), 15, 59–60
Wireless bridge, 61
Wireless encryption protocols (WEP), 62
Wireless local area network (WLAN), 15, 61
Wireless network. See also Network
adapters, 60
  connection modes, 62–63
  devices, 59–61
  encryption, 62
  settings, 63–64
  standards, 61–62
Wireless repeater, 60
Wireshark, 37–38, 43
World Wide Web, 166

X
X.25
  advantages of, 154
  characteristics, 152
  components, 152
  definition of, 150, 159
  switching process, 151