

# Index

- 3DES, 282, 286
- access token, *see* Dropbox
- Access-Accept, 210
- Access-Reject, 222
- account, 205
- accounting, 216
- Active Directory, 204
- address
  - assign, 54
  - dynamic, 217
  - fake, 81
  - global unicast, 63
  - interface, 98
  - IP, 28
  - IPv4, 56, 72
  - IPv6, 61, 103, 127
  - link-local, 63
  - MAC, 33
  - multicast, 164, 170
  - private, 117
  - translation, *see* NAT
  - unique local, 63
  - virtual, 157, 158
- advertising frequency, 158, 166, 168
- AES, 143, 282
- AES-NI, 139, 285
- AH, *see* IPsec
- alert, 268
- algorithm, 122, 143, 151, 282
- Annex J, 242
- anti spoofing, 72, 80
- antivirus, 182
- API, 217, 311, **325**
- APU, 42, 242
- ARP, 63, 252, 292
- attack, 257
- authentication, 182, **201**, 303
  - VPN, 120, 138, 152
- authorization, 201
- backup, 158, 309
- bandwidth limitation, 111
- base, 166
- Bash, 218, 308
- beep, 49
- benchmark, 298
- best practice, 297
- binat, *see* NAT
- bind, 220
- bitmask, 281
- block, 75
- Blowfish, 143
- bridge, *see* network bridge
- browser, 333
- buffer, 283
- CA, *see* certificate authority

- cache, 182, 198, 292
- captive portal, 223
- CARP, **155**, 189, 228
- category, *see* proxy, 322
- certificate, 56, 139, 152, 193, 204, 213, 311, 334
- certificate authority, 194, 213, 334
- charon, 131
- Chatbot, *see* Telegram
- check, 231
- Cisco, 319
- ClamAV, 199
- cluster, 156, 189
- collector, 176, 177
- command line, 269
- compression, 151
- condition, 268
- configd, 269
- configuration, 51, **307**, 359
- connection setup, 120
- console, 51, 56
- controller, *see* MVC
- core, 289
- CPU core, 289
- cpuset, 281
- cron, 270, 309
- crypto key, 152
- curl, 92, 99, 218, 308
- CVE, 261
- Dashboard, 252
- dead peer detection, 120, 126
- default route, 57
- DHCP, 247
- DHCPv6, 251
- Directory as a Service, 211
- disk, 24
- distinguished name, 125, 212
- DNS, 56, 247
- domain, 56, 204
- DoS, 111
- dpinger, 239
- Drive, *see* Google Drive
- drop, 268
- Dropbox, 307
- DSL, 241
- dual stack, 249, 252
- DynDNS, 255
- e1000, 53, 278
- Easy Editor, 350
- editor, 317, **350**
- EICAR, 199
- election, 166
- Emerging Threats, 267
- encryption, 120
- errata, 359
- ESP, *see* IPsec, 130
- ESXi, *see* VMware
- factory reset, 297
- failover, 159, 167, 236
- failure protection, 228, 232
- filter, 183, 185
  - LDAP, 206
  - operation, 91
  - rule, *see* firewall rule
- firewall, 28, **71**, 235, 252
  - backup, 156
  - rule, **73**, 99, 109, 122, 144
  - transparent, 87
  - troubleshooting, 84
  - uncover, 93
- first match, 72

- flash memory, 47
- floating rule, 85
- flow, *see* NetFlow
- FreeBSD, 19, 53, 85, 105, 167
- gateway, 56, 231
  - group, 232
- GeoIP, 82
- GEOM mirror, 46
- GET, 327
- GitHub, 308, 359
- global unicast, *see* address
- Google, 247
- Google Drive, 311
- group, *see* firewall
- hard disk mirror, 46
- hardware, 41
- header, 117
- health check, 231
- heartbeat, 156
- hostname, 56
- hypervisor, 34
- ICAP, 199
- ICMP, 252
- IDS, 257, 331
  - rule, 268
  - transparent, 263
- ifconfig, 277
- ifinfo, 277
- iftop, 277
- IKE, 120, 130
- in-band, *see* management
- interface, *see* network card
- interface identifier, *see* IPv6
- Internet, 244
- Internet Key Exchange, *see* IKE
- interrupt, 280
- intrusion detection, *see* IDS
- IP
  - address, *see* address
  - monitor, 231
  - virtual, 99, 158
- iperf, 284, 298
- IPS, 262
- IPsec, 117, 139, 202, 222, 286, 290
  - throughput, 282
  - troubleshooting, 129
- IPTV, 243
- IPv4, 56, 248
- IPv6, 61, 103, 169, 179, 238, 249
- ISO file, 32
- ITU-T, 242
- JSON, 218, 327
- JumpCloud, 211
- keepalive, 156
- kernel, 56, 266
- key, 300, 329
  - pre-shared, 138
  - private, 301
  - public, 302
- keyboard, 48
- lab
  - network, 23, 359
  - server, 29
- latency, 234
- LDAP, 202, 213
  - filter, 206
  - troubleshooting, 220
- LibreSSL, 153, 286
- lighttpd, 335
- link-local, *see* address

- live image, 32
- load balancing, 167
- load distribution, **227**, 229
- load sharing, 232
- log, 56, 76, 182, 210
- management, **107**, 253
- masquerading, 97
- Master, *see* CARP
- MaxMind, 82
- memory, 24
- mesh, 133
- Microsoft, 201
- mirror port, 258, 318
- mode, *see* OpenVPN
- Model View Controller, 327
- modem, 242
- monitoring, 56, 237
- monowall, 19
- more, 349
- MPD5, 253
- MSS, 289
- mssfix, 291
- MTU, 55, 244, 284, **289**
- Multi-WAN, 227
- multicast, 244, 254
- MVC, 327
- NAT, **95**, 124, 160, 235, 248
  - reflection, 105
  - rule, 85, 89
  - traversal, 124
- NDP, 63
- NetFlow, 173
- netstat, 145, 276
- network
  - bridge, 88, 91, 247, 265, 318
  - card, **55**
  - policy, 209
- network adapter
  - assign, 53
  - name, 53
  - virtual, 277
- nfdump, 176
- normalization, *see* rule
- NPS, 207
- NPTv6, 103, 238
- offload, 280
- open source, 17
- OpenBSD, 167
- OpenSSL, 137, 153, 286
- openssl, 311
- OpenVAS, 259
- OpenVPN, **137**, 202, 286
  - GUI, 149
  - troubleshooting, 150
- operating system, 45
- Oracle, 37
- organizational unit, 205
- out-of-band, *see* management
- packet filter, **71**, 87
- packet loss, 233
- password, 54, 201, 303
- PAT, 97
- pattern, *see* regular expression
- PC-Engines, 42, 242
- PCnet, 53
- PCRE, *see* regular expression
- peer identifier, 129
- peer-to-peer, 135
- performance, 276
  - encryption, 139

- pf, 82, 106, 239
- pfctl, 277
- pfInfo, 78
- pfSense, 19, 335
- pfsync, 162, 171
- pftop, 277
- PHP, 335
- phpVirtualBox, 38
- physdiskwrite, 43
- ping, 58, 92, 290
- pipe, *see* bandwidth limitation
- PKI, 152
- plug-in, 48, 134, 199
- policy, 187, 209
- port forward, 97, 102, 198
- port group, 35
- POST, 327
- PPPoE, 243
- pre-shared key, 130, 138
- prefix, **62**, 104, 238
  - delegation, 249
- programming, 325
- promiscuous mode, 265
- protocol, 201
- proxy, 140, **181**
  - ARP, 101
  - cluster, 189
  - explicit, 183
  - HTTPS, 192
  - transparent, 196
  - troubleshooting, 188
  - web, 202
- PuTTY, 301
- puttygen, 301
- Python, 330
- quick, 85
- RADIUS, 202, 207, 215
  - troubleshooting, 221
- radvd, 254
- RAID, 46
- rdr, 106
- regular expression, 185, **353**
- reject, 75
- REST, 325
- RFC2544, 284
- RFC5737, 28
- RFC6296, 238
- route, 58, 65
- router
  - advertisement, 254
  - default, 57
  - DSL, 241
- routing
  - asymmetric, 165
  - prefix, 62
  - static, 56
  - table, 56
  - throughput, 280
- rule
  - filter, *see* firewall rule
  - floating, 85
  - normalization, 291
  - order, 84
  - time-based, 78
- ruleset, 72, 77, 91, 261
- sAMAccountName, 206
- secure shell, 56
- SecureCopy, 315
- SFTP, 318
- shaper, 111
- signature, 260
- skew, 166

- SLAAC, 250
- SOCKS, 182
- source NAT, *see* NAT
- SPAN, 318
- span port, 318
- spoofing, *see* anti spoofing
- Squid, 184, 198
- SSH, 92, 202, **300**
- SSL, *see* TLS
- SSL inspection, 192
- state table, 162
- strongSwan, 131, 286
- Suricata, 266
- switch, 27
- synchronization, 162, 166
- syslog, 320
- systat, 277
- system
  - embedded, 42
  - sound, 49, 56
- tap, 147
- Telegram, 319
- throughput, 275, 298
- tier, 233
- time, 56
- timestamp, 189, 216
- TLS, 134, 152, 192, 204, 213
- mssfix, 276
- traceroute, 66, 127, 145, 159
- traffic analysis, 255
- traffic shaper, 111, 255
- transparent, 87
- tun, 147
- tuning, 275
- tunnel, 117
  - client-server, 146
  - IPsec, 117
  - OpenVPN, 137
  - site-to-site, 121, 141
- unique local, *see* address
- UNIX, 275
- update, 56
- URL filter, *see* filter
- user space, 139
- vboxmanage, 38
- VDSL, 241
- vectoring, 242
- versioning, 310
- view, *see* Model View Controller
- Vim, 350
- virtio-net, 53, 277
- virtual
  - IP, *see* IP
  - network adapter, 277
  - switch, 35
- VirtualBox, 37
- virtualization, 26
- virus, 182, 199
- VLAN, 27, 41, 243
- vlance, 279
- VMware
  - ESXi, 34, 278
  - Player, 33
  - tools, 48
  - Workstation, 32
- VMXNET, 278
- voucher, 223
- VPN
  - compression, 151
  - dial-in, 133, 146
  - error pattern, 129

- IPsec, 117
- OpenVPN, 137
- performance, 143
- throughput, 128
- Tinc, *see* Tinc VPN
- VRRP, 156
- vulnerability scanner, 260
  
- WAN, 227
- web cache, *see* cache
- web GUI, 56
- web proxy, *see* proxy
- Windows, 66, 149, 204, 318
- WinSCP, 318
  
- XMLRPC Sync, 164, 190
  
- ZeroTier, 135