

Index

Numerics

- 1GE-66 Gigabit interface, 49
- 3DES (Triple Data Encryption Standard), 334
- 4FE-66 interface card, 48

A

AAA (authentication, authorization, and accounting), 12, 517, 520

- configuring, 542
 - cut-through proxies*, 573
 - Do I Know This Already? quiz*, 537–539
- defined, 517
- Do I Know This Already? quiz*, 513
- PIX Firewalls supported AAA server technologies, 520
- servers
 - identifying*, 542, 545
 - specifying*, 541
- support, 45
- troubleshooting, 577, 581

aaa accounting command, 543

aaa authentication command, 543, 546

aaa authentication console command, 548

aaa authorization command, 543

aaa-server command, 542

aaa-server local command, 543

access, 9

- AAA, 517, 520
- networks
 - security*, 7
 - threats*, 8
 - types of attacks*, 8, 11
 - vulnerabilities*, 8

access attacks, 9–11

access VPNs, 331

- Do I Know This Already? quiz*, 395

access-group command, 631

accessing

- ASDM
 - from browser, requirements*, 459
 - from Windows 2000/XP OS, requirements*, 460
- Cisco Security Appliance, 79
 - with SSH*, 80–82
 - with Telnet*, 79–80
- security contexts, 234

accounting, 518

- configuring, 567–569
- troubleshooting, 579

ACEs (access list entries), 185

- managing, 188–189

ACLs (access control lists), 27

- ACEs, managing, 188–189
- configuring on WebVPNs, 371
- downloadable, configuring, 573–576
- inbound access, configuring on Cisco Security Appliance, 185–187
- line numbers, 188
- logging feature, 192–193
- remarks, removing, 189

ACS (Cisco Secure Access Control Server), 45, 537

activation keys, upgrading, 88–89

active units, 307

active-active failover, 313

- failover groups, 314–316

ActiveX objects, filtering, 501–503

-
- Adaptive Security Algorithm (ASA), 32, 41–43**
 - address command, 91**
 - addresses**
 - IP
 - global*, 629–630
 - mapping*, 627
 - translation, 46, 118, 126
 - bidirectional*, 126
 - commands*, 119–120
 - configuring multiple*, 124, 126
 - NAT*, 120–121
 - PAT*, 122
 - static*, 119, 123
 - troubleshooting*, 126, 130
 - admin contexts, 227–228**
 - converting to security contexts, 229
 - admin-context command, 229**
 - administrative access modes, transparent mode**
 - configuring, 165–167
 - traffic management, 168–169
 - AES (Advanced Encryption Standard), 334**
 - aggressive mode key exchanges, 335–337**
 - AH (Authentication Header), 332**
 - AIP-SSM (ATM Interface Processor-SSM), 49**
 - AIP-SSM (Advanced Inspection and Protection Security Service Module), 610**
 - installing, 611–613
 - setup process, 613–615
 - algorithms, ASA, 32, 41–43**
 - allocate-interface command, 230**
 - applets (Java), filtering, 502**
 - application inspection, 193**
 - of DNS, 194, 605–606
 - of FTP, 194, 601–602
 - of HTTP, 602–605
 - of rsh, 608
 - of RTSP, 591
 - of SMTP, 195, 606–607
 - of SNMP, 608
 - of SQL*NET, 609
 - of VoIP protocols/applications, 592
 - H.323*, 593, 595
 - MGCP*, 596–597
 - QTIQBE*, 593
 - SCCP*, 597–598
 - SIP*, 598
 - ports, reassigning, 600
 - applications**
 - AVVID, 14–15, 19
 - threats, 8
 - applying multiple service policies to traffic, 216–217**
 - Architecture for Voice, Video, and Integrated Data. See AVVID, 14, 19–20**
 - area command, parameters, 285**
 - arp-inspection ethertype command, 169**
 - ASA (Adaptive Security Algorithm), 32, 41–43**
 - ASA Security Appliance**
 - password recovery procedures, 96–97
 - ASBRs (Autonomous System Boundary Routers), 282, 286**
 - ASDM (Adaptive Security Device Manager), 453, 457**
 - accessing from browser, requirements, 459
 - Building Blocks tab, 476

- Device Administration tab, 477
- GUI, 457
- installing, 461–463
- Interfaces tab, 465
- IPS, configuring, 615–616
- IPS tab, 474
- minimum hardware/software requirements, 458–459
- Monitoring tab, 479–481
- NAT tab, 472
- Properties tab, 477–479
- remote access VPNs, creating, 486, 489, 493
- Routing tab, 474
- running with Linux, requirements, 460
- running with SPARC, 460
- Security Policies tab, 467, 471–472
- site-to-site VPNs, creating, 482–486
- VPN tab, 473–474

assigning

- access to WebVPN users, 364–365, 367
- actions to traffic classes, 207–209, 211–213
- connection policies, 213
- interfaces to contexts, 230–232
- match parameters to class maps, 206
- policies to interface, 214–216
- policies to traffic classes, 208–209
 - connection policy*, 213
 - inspect policy*, 211–212
 - IPS policy*, 212–213
 - police policy*, 209–210
 - priority policy*, 210
- shell authorization sets to NDGs, 562
- users to groups, 555
- virtual contexts to failover groups, 316

attacks, 9, 18

- access, 10–11
- DoS, 11
- reconnaissance, 9–10
- Syslog, 251
- threats, 8

authentication, 281, 517

- Cisco VPN Software Client, 420
- configuring, 545–546, 554
 - authentication timeout*, 553
 - console access authentication*, 548
 - designating parameters*, 547
 - services*, 549
- cut-through proxy, 32, 43

- Easy VPN Remote, 422
- IUA, Cisco VPN Client configuration, 434–435
- prompts, 552
- services, 549
- SUA, Cisco VPN Client configuration, 433–434
- timeout, 553
- troubleshooting, 578
- VPDN group, 438
- X.509 certificate support, 45, 67
- XAUTH, configuring, 409–416

authentication telnet console command, 80**authorization, 517**

- command-level, 82–85
- configuring, 554
 - Cisco Secure ACS*, 555, 558–565
- cut-through proxy, 32, 43
- troubleshooting, 579

auth-prompt command, 552–553**AVVID (Architecture for Voice, Video, and Integrated Data), 14–15, 19****B**

- bandwidth, restricting on traffic flows, 209**
- banner command, 164–165**
- banner messages, configuring on Cisco Security Appliance, 163–165**
- basic AIP-SSM settings, configuring, 613–615**
- debug command, 645**
- bidirectional network address translation, 126**
- bidirectional service policies, 215**
- block scans, 10**
- blocking applets, 502**
- boothelper disks, creating, 92–93**
- Building Blocks tab (ASDM), 476**

C**caches**

- no url-cache command, 506
- show url-cache command, 508

call-agent command, 596**capabilities of specific PIX Firewall models, 49, 61****CAs (certificate authorities), 338, 421**

case studies

- DUKEM, 623
 - authentication*, 632
 - basic Cisco Security Appliance configuration*, 625–630
 - configuring access rules*, 631
 - failover*, 646, 648
 - growth expectation*, 624
 - VPNs*, 633–645
 - troubleshooting PIX Firewall implementation, 649–658
- causes of failover events, 307**
- certificates, X.509, 45**
- cgi-truncate parameter, 507**
- changeto command, 234**
- changing context mode of operation, 228**
- CIFS (Common Internet File System), 117**
- cipher block chains, 334**
- Cisco ASA 5510 Security Appliance**
 - configuring, 235–240
 - features and capabilities, 62–63
- Cisco ASA 5520 Security Appliance, features and capabilities, 63–64**
- Cisco ASA 5540 Security Appliance, features and capabilities, 64–65**
- Cisco ASA Security Appliance, AIP-SSM module, 610–611**
- Cisco ASA Security Appliance 5510, 44**
- Cisco ASA Security Appliance 5520, 44**
- Cisco ASA Security Appliance 5540, 44**
- Cisco Easy VPN Remote Router clients, 407**
- Cisco FWSM (Firewall Service Module), 44**
- Cisco PIX 501 Firewall, 49–50**
- Cisco PIX 501 VPN Client, 406**
- Cisco PIX 506 VPN Client, 406**
- Cisco PIX 506E Firewall, 51–53**
- Cisco PIX 515E Firewall, 55, 53–56**
- Cisco PIX 525 Firewall, 56–58**
- Cisco PIX 535 Firewall, 58–61**
- Cisco PIX Firewall FastEthernet Interface Card (PIX-1FE), 48**
- Cisco Secure ACS (Access Control Server), 537**
 - configuring, 531
 - downloadable PIX ACLs, 576
 - configuring*, 573–576
 - logging targets and options, 570
 - users, configuring, 555
 - verifying, 581

- version 3.3, new features, 521

- Windows server installation*, 523–533

Cisco Secure Intrusion Detection

- Sensor, 44, 67**

- Cisco Secure PIX 506, 44**

- Cisco Secure PIX 515, 44**

- Cisco Secure PIX 525, 44**

- Cisco Secure PIX 535, 44**

- Cisco Secure Scanner, 13**

Cisco Security Appliance

- AAA, supported server technologies, 520

- accessing, 79

- with SSH*, 80–82

- with Telnet*, 79–80

- Cisco VPN Client, configuring, 432–435

- configuring, 464

- as VPN gateway*, 343–355

- cut-through proxy feature, 43, 519

- DHCP, enabling, 445

- DHCP client, configuring, 159

- DHCP server

- auto configuration*, 445

- configuring*, 156–159, 443–444

- debugging*, 445–446

- DNS message support, 154

- Easy VPN Remote, configuring, 431–432

- failover

- active-active*, 313–316

- configuring*, 316–321

- LAN-based*, 312–313

- monitoring*, 309–310

- stateful*, 311–312

- MAC address table, 169

- MPFs, 46

- multimedia support, 591

- NTP, configuring, 160–162

- OS, upgrading, 89–92

- PPPoE client

- configuring*, 437–438

- enabling*, 439

- monitoring*, 439–441

- running on PPPoE network, 435–436

- security contexts, 47

- shell configuration, 465

- SNMP, configuring, 98

- system clock, configuring, 162–163

- transparent mode

- configuring*, 165–167

- traffic management*, 168–169

- troubleshooting-related commands, 98–103

Cisco VPN 3002 Hardware Client, 405–406**Cisco VPN Client**

- client device mode, configuring, 432
- IUA, configuring, 434–435
- SUA, configuring, 433–434

Cisco VPN Software Client, 405, 418

- authentication and encryption, 420
- digital certificates, 421
- features, 419
- installing, 423–425
- key management techniques, 420
- manual configuration, 422–430
 - modifying VPN Client options,* 426–428
- specifications, 419
- tunneling protocols, 420

CiscoWorks Management Center for Firewalls (PIX MC), 47**class maps**

- creating, 203–205
- match criteria, viewing, 207
- match parameters, assigning, 206
- matches, defining, 206

clear command, 358**clear rip command, 282****clear route command, 280****clear uauth command, 554****clear xlate command, 127****clearing multicast routes, 291****CLI (command-line interface), 46, 68, 80****client device mode, Cisco VPN Client configuration, 432****client mode (Easy VPN Remote), 417****clients, Easy VPN Remote, 405–407****clock timezone command, 163****command-level authorization, 82–85****command-line interface (CLI), 46, 68, 80****commands**

- aaa accounting, 543
- aaa authentication console, 548
- aaa authentication, 543, 546
- aaa authorization, 543
- aaa-server command, 542
- access-group command, 631
- address, 91
- admin-context, 229
- allocate-interface, 230
- area, parameters, 285
- arp-inspection ethertype, 169

authentication telnet, 80

auth-prompt, 552–553

banner, 164–165

call-agent, 596

changeto, 234

clear, 358

clear route, 280

clear uauth, 554

clear xlate, 127

clock timezone, 163

config-url, 232

content-type-verification, 604

copy tftp flash, 90

crypto ipsec transform-set, 412

debug, 645

VPNs, troubleshooting, 358–360

debug aaa accounting, 579

debug aaa authentication, 578

debug aaa authorization, 579

debug igmp, 297

debug radius, 580

debug tacacs, 580

default-inspection-traffic, 206

dhcpd address, 443

duplex, 148

enable password, 80

failover poll, 309

file, 91

filter activex, 503

filter java, 501

filter url, 504

global, 149–150

icmp, 152

igmp access-group, 292

igmp forward, 291

igmp join-group, 291

igmp query-interval, 292

igmp query-max-response-time, 293

igmp version, 292

inspect, 211, 600

inspect dns, 606

inspect ftp, 194

inspect h323, 595

inspect rtsp, 592

inspect smtp, 607

interface, 91, 142–143

ip address, 145

ip local pool, 411

ips, 212

- logging (syslog), 253
 - logging facility facility, 252
 - logging on, 260
 - max-header-length, 604
 - mroute, 290
 - multicast interface, 290
 - nameif, 113, 131, 144, 277
 - nat, 146–147
 - nat 0, 183
 - nat-control, 149
 - no aaa-server, 544
 - no url-cache, 506
 - object-group
 - icmp-type object type parameter*, 191
 - network object type parameter*, 190
 - protocol object type parameter*, 191
 - service object type parameter*, 191
 - OSPF-related, 282, 288
 - network command*, 284
 - prefix-list command*, 285
 - redistribute ospf command*, 286
 - router ospf command*, 283
 - passwd, 80
 - pim, 292
 - pim dr-priority, 293
 - pim rp-address, 293
 - ping, 91, 152
 - police, 209
 - port-misuse, 605
 - priority, 210
 - redistribute ospf, 286
 - rip, 151–152
 - rip command, 281
 - route, 150, 278
 - router ospf, 286
 - server, 91
 - set connection, 214
 - show, 645
 - VPNs, troubleshooting*, 356, 358
 - show aaa-server, 578
 - show accounting, 579
 - show activation-key, 88
 - show command, 578
 - show conn, 128
 - show context, 235
 - show mac-address-table, 169
 - show mode, 228
 - show perfmon, 509
 - show route, 280
 - show run policy-map, 214
 - show running-config service policy, 217
 - show service-policy, 217–218
 - show tech-support, 99
 - show url-cache, 508
 - show url-server stats, 508
 - show version, 86
 - show vpdn, 439, 441
 - show vpdn pppinterface, 440
 - show xlate, 127
 - speed, 148
 - ssh command, 81
 - static, 124, 180
 - sysopt uauth allow-http-cache, 548
 - telnet, 79
 - tftp flash, performing OS upgrades, 89–90
 - timeout uauth, 553
 - translation, 119–120
 - troubleshooting, 100–103
 - troubleshooting-related, 98–99, 101–103
 - url-cache, 505
 - url-server, 503
 - virtual telnet, 549
 - vpnclient server, 432
 - vpnclient vpngroup, 432
 - write memory, 80, 154, 311
 - xlate, 120
- Common Internet File System (CIFS), 117**
- components of AAA, 517, 520, 541**
- configuration administrative access mode, 141**
- configuration files, uploading to contexts, 232**
- configuration replication, 310–311**
- configuring. *See also* example configurations**
- AAA, 542
 - cut-through proxies*, 573
 - Do I Know This Already? quiz*, 537–539
 - accounting, 567–569
 - authentication, 545–546, 554
 - authentication timeout*, 553
 - console access authentication*, 548
 - designating parameters*, 547
 - services*, 549
 - authentication timeout, 554
 - authorization, 554
 - Cisco Secure ACS*, 555, 558–565

- per group command authorization*, 563
 - shell command authorization*, 561
- Cisco Security Appliance, 464
 - as DHCP client*, 159
 - as DHCP server*, 156–159, 443–444
 - as VPN gateway*, 343–355
 - DUKEM case study*, 625–632
 - failover*, 316–321
 - login banners*, 163–165
 - NTP*, 160–162
 - PPPoE client*, 437–438
 - system clock*, 162–163
- Cisco VPN Client
 - client device mode*, 432
 - manual configuration*, 422–430
 - modifying VPN Client options*, 426–428
 - IUA*, 434–435
 - SUA*, 433–434
- CSACS, 531, 555
- cut-through proxy, 573
- DHCP server, 441–442
- DNS support, 130
- downloadable PIX ACLs, 573–576
- Easy VPN Remote, 431–432
 - PIX Firewalls*, 433
- failover
 - DUKEM case study*, 646, 648
 - requirements*, 308–309
- failover groups, 315
- filters, 508
- inbound access on Cisco Security Appliance, 180–187
- interfaces, 628–630
- IPS through ASDM, 615–616
- multiple translation types, 124–126
- NAT, 415
 - on Security Appliance interfaces*, 232
- OSPF, 286–288
- PAT, 147
- per user command authorization*, 564
- redundancy, 33–34
- RIP, 151–152, 281–282
- routing, 628–630
- security contexts, 235, 237–240
- SNMP on Cisco Security Appliance, 98
- static routes, 279–280
- syslog, 47, 68, 255
 - messages at the console*, 258
 - sending messages to a log server*, 259–261
 - SNMP traps and SNMP requests*, 261
 - syslogd servers*, 262–263
- transparent mode, 165–167
 - traffic management*, 168–169
- URL-filtering policy, 504
- virtual HTTP inbound connections, 552
- virtual Telnet, outbound connections, 550
- VPDN group, 438
- VPNs, 645
 - DUKEM case study*, 633–635, 638, 641–645
- WebVPNs
 - content filtering*, 371
 - e-mail proxies*, 369–371
 - gateways*, 361–364
 - port forwarding*, 367–368
 - user access*, 364–365, 367
- XAUTH, 409–416
- config-url command, 232**
- connection policies, assigning, 212–213**
- connection process for Easy VPN Remote, 407–409**
- connectionless protocols, UDP, 114–117**
- connections**
 - Cisco Secure PIX 501, 50
 - Cisco Secure PIX 515E, 55
 - Cisco Secure PIX 535, 60
 - cut-through proxy, 32, 519
 - embryonic (half-open), 116
 - filters, Java applets, 502
 - flags, 129
 - security, 7
 - Telnet, 79
 - threats, 8
 - troubleshooting, 126
 - types of attacks, 8, 11
 - vulnerabilities, 8
- connectivity of Security Appliance, testing, 152–153**
- console access authentication, 548**
- content filtering**
 - "Do I Know This Already?" quiz, 498
 - configuring on WebVPN, 371
- content-type-verification command, 604**
- context administrators, 229**

contexts

- admin context, 227
- administration context, 228
- assigning to failover groups, 316
- configuration files, uploading, 232
- deleting, 234
- interfaces, allocating, 230–232
- modes of operation, changing, 228
- status, displaying, 235
- switching between, 234

controlling HTTP message header size, 604**converting admin contexts to security contexts, 229****copy tftp flash command, 90****crypto maps, arguments and options, 354****creating**

- boothelper disks, 92–93
- class maps, 203–205
- downloadable ACLs, 576
- object groups, 189
- policy maps, 207–208
- remote access VPNs with ASDM VPN Wizard, 486, 489, 493
- security contexts, 230
- site-to-site VPNs with ASDM VPN Wizard, 482–483, 485–486

crypto ipsec transform-set command, 412**crypto maps**

- arguments and options, 354
- dynamic, 414

CSACS. *See* Cisco Secure ACS (Access Control Server)**cut-through proxy, 32, 43, 519, 573****D****data compression, Easy VPN Remote, 421****DDoS (distributed denial of service)****attacks, 11****debug aaa accounting command, 579****debug aaa authentication command, 578****debug aaa authorization command, 579****debug command, troubleshooting VPNs, 358–360****debug igmp command, 297****debug radius command, 580****debug tacacs command, 580****debugging**

- DHCP server on Cisco Security Appliance, 445–446
- multicast configuration, 296

default routes, 279**default-inspection-traffic command, 206****defense in depth, 14****defining class map matches, 206****deleting contexts, 234****demilitarized zone (DMZ) segment, 125****denial of service (DoS) attacks, 11****DES (Data Encryption Standard), 334****Device Administration tab (ASDM), 477****DHCP (Dynamic Host Configuration Protocol), 442****DHCP client, Cisco Security Appliance configuration, 159****DHCP server**

- auto configuration, 445
- Cisco Security Appliance configuration, 156–159, 443–444
- configuring, 441–442
- debugging commands, 445–446

dhcpcd address command, 443**dhcpcd auto-config command, 437****Diffie-Hellman, 336****digital certificates**

- Cisco VPN Software Client functionality, 421
- X.509, 45

disabling Syslog messages, 264**displaying**

- class map match criteria, 207
- context information, 235
- policy map configurations, 214
- service policy configurations, 217

distributed denial of service (DDoS) attacks, 11**DMZ (demilitarized zone) segment, 125****DN (distinguished name), 408****DNS (Domain Name Service)**

- application inspection, 194, 605–606
- message support on Security Appliance, 154
- queries, 9
- support, configuring, 130

DNS doctoring, 155**DNS inspection, 605**

Do I Know This Already? quizzes

- AAA, 513, 537, 539
- access VPNs, 395
- content filtering, 498
- network security, 4–6
- PIX Firewalls, 25, 38–40
- Syslog, 247
- system maintenance, 75

domains, 207

- connection policy, 213
- inspect policy, 211–212
- IPS policy, 212
- police policy, 209
- priority policy, 210

DoS (denial of service) attacks, 9–11**downloadable PIX ACLs, 576**

- configuring, 573–576

DPD (dead peer detection), 402, 416**duplex command, 148****dynamic address translation, 119****dynamic crypto maps, 414****dynamic routes, 280**

- OSPF
 - commands*, 282–286
 - configuring*, 286–288
- RIP, configuring, 282

E**Easy VPN Remote, 400**

- authentication, 422
- configuring, 431–432
- connection process, 407–409
- modes of operation, 416
 - client mode*, 417
- overview, 404
- PIX Firewall configuration, SUA, 433
- supported clients, 405–406
- supported servers, 404

Easy VPN Server, 400

- IPSec options, 403
- overview, 402

e-mail proxies, configuring on WebVPN, 369–371**EMBLEM format, 261****embryonic connections, 116****enable password command, 80****enabling**

- DHCP on Cisco Security Appliance, 445
- IUA, 435
- PPPoE client on Cisco Security Appliance, 439
- transparent mode, 167

encapsulation of upper-level data, 114**encryption, 334**

- Cisco VPN Software Client, 420
- hash algorithms, 413

enrollment mechanisms, 421**environments, ROBO, 51****Ethernet VLAN tagging, 273**

- logical interfaces, 274–276
- managing VLANs, 276–277

event reporting (syslog), 47, 68**example configurations**

- of routed mode Security Appliance, 170–172
- of transparent mode Security Appliance, 172–173

external threats, 9**extranet VPNs, 331****F****failover**

- active-active, 313
 - failover groups*, 314–316
- causes of, 307
- configuring, 316–317, 319–321
 - DUKEM case study*, 646–648
 - requirements*, 308–309
- LAN-based, 312–313
- monitoring on Cisco Security Appliance, 309–310
- redundancy, 33–34
- stateful, 311–312

failover groups

- assigning virtual contexts to, 316
- configuring, 315

failover poll command, 309**feature domains, 207****file command, 91****filter activex command, 503****filter java command, 501****filter url command, 504**

filtering, 501

- ActiveX objects, 503
- FTP, 506
- FTP sites, 505
- HTTPS, 505–506
- Java applets, 501–502
- URLs, 503, 505
 - configuring URL-filtering policy, 504*
 - identifying servers, 503*
- viewing, 508

firewalls, 27, 31

- managing, 46–47, 68
- packet filtering, 27, 29
- PIX, 31, 33–34
 - ASA, 32, 41–43
 - Cisco 501, 50*
 - Cisco 515E, 55*
 - Cisco 535, 60*
- proxy servers, 29
- stateful packet inspection, 30–31

first-match classification policy, 217**first-match rule, 216****fixup protocols, 333****Flash memory, saving Security Appliance configuration, 154****floating routes, 279****formatting boothelper disk, 93****frames, 114****FTP (File Transfer Protocol)**

- application inspection, 194, 601–602
- filtering, 506

FWSM (Cisco Firewall Service Module), 44**G****gateways, 91**

- VPNs, 48, 69

global addresses, 118**global attributes (WebVPNs), configuring, 361–364****global command, 149–150****global information, recording, 626****global IP addresses, 629–630****global_policy policy maps, 208****grouping objects, 189****groups, assigning users to, 555****H****H.323, application inspection, 593, 595****hardware requirements**

- for ASDM, 458–459
- for CSACS, 522

hash algorithms, 334**HMAC (Keyed-Hash Message Authentication Code), 335****horizontal scans, 9****HTTP**

- application inspection, 602–605
- message header size, controlling, 604
- OS upgrades, performing on client, 92

HTTPS filtering, 506**I****IANA (Internet Assigned Numbers Authority), reserved private address space, 118****icmp command, 152****icmp-type object type parameter (object-group command), 191****identifying servers, 503, 542, 545****IGMP (Internet Group Management), 289****igmp access-group command, 292****igmp forward command, 291****igmp join-group command, 291****igmp query-interval command, 292****igmp query-max-response-time command, 293****igmp version command, 292****IKE (internet Key Exchange), 335**

- phase 1 negotiation, 337

inactivity timer, 554**inbound access, configuring on Cisco Security Appliance, 180–187****inbound connections, cut-through proxy, 32****inbound multicast traffic, 294–295****Individual User Authentication (IUA), 434****information security, 7****Initial Contact, 403****inline mode (AIP-SSM), 610****Inline mode (IPS), 212****input service policies, 215****inspect command, 211, 600****inspect dns command, 606****inspect ftp command, 194**

- inspect h323 command, 595**
- inspect policy, 211–212**
- inspect rtsp command, 592**
- inspect smtp command, 607**
- installing**
 - AIP-SSM module, 611–613
 - ASDM, 461–463
 - Cisco VPN Software Client, 423–425
 - CSACS 3.3 on Windows server, 523–533
 - operating systems, 85–87
- integrity, X.509 certificate support, 45, 67**
- interception, 10**
- interface command, 91, 142–143**
- interfaces**
 - assigning to contexts, 230–232
 - CLI, 46, 68, 80
 - configuring, 628–630
 - NAT translation, configuring, 232
 - security levels, 41, 143
- Interfaces tab (ASDM), 465**
- interface-specific service policies, 216**
 - first-match classification policy, 217
 - matching logic, 216
 - multimatch classification policy, 216
- intranet VPNs, 331**
- intrusion detection, 44, 67**
 - optimizing, 13
- IP addresses**
 - address pools, 411
 - global, 629–630
 - mapping, 627
- ip address command, 145**
- ip local pool command, 411**
- IP routing, 277**
 - dynamic routes, 280
 - RIP, configuring*, 282
 - OSPF*, 282, 284–286, 288
 - multicast, 289
 - commands*, 290–293
 - debugging*, 296
 - inbound traffic*, 294–295
 - outbound traffic*, 295–296
 - static routes, 277
 - configuring*, 279–280
- IP subnets, performing address translation, 181**
- IPS, configuring through ASDM, 615–616**
- IPS policy, 212**
- IPS tab (ASDM), 474**

- IPSec**
 - AH, 332
 - CA server enrollment process, 338
 - Easy VPN Server, 403
 - IKE, 335
 - options and attributes, 403
 - PFS, 338
 - phase 1 negotiation, 337
 - phase 2 negotiation, 337
- isakmp keepalive command, 416**
- isakmp policy command, 410**
- IUA (Individual User Authentication), 434**
 - Cisco VPN Client configuration, 434–435

J-K

- Java applets, filtering, 501–502**
- joining multicast groups, 291**

L

- LAN-based failover, 312–313**
- levels of syslog security, 252**
- licenses, Security Plus Software, 64**
- Linux, requirements for running ASDM, 460**
- listening ports, 8**
- local addresses, 118**
- logging ACLs, 192–193**
- logging commands (syslog), 253**
- logging facilities, 2520**
- logical interfaces, 274–276**
- login banners, configuring, 163–165**
- logs, viewing, 256**
- longurl-truncate parameter, 507**
- lost passwords, recovering on ASA Security Appliance, 96–97**
- LSAs (link-state advertisements), 282**

M

- MAC address table, 169**
- mac-learn command, 170**
- mail inspection, 606–607**
- main mode key exchanges, 335**
- managing**
 - ACEs, 188–189
 - firewalls, 46–47, 68
 - VLANs, 276–277

manual configuration, Cisco VPN Software Client, 422, 426–430

mapping static IP addresses, 627

MARs (Machine Access Restrictions) on Cisco Secure ACS 3.3, 521

matching logic of service policies, 216

max-header-length command, 604

MD5 (Message Digest 5), 335

MDIX (Medium Dependent Interface Crossover), 406

memory

- Flash memory, saving Security Appliance configuration, 154
- requirements, 85

message digest, 335

messages, syslog

- changing levels, 253
- disabling, 264
- organizing, 254
- reading, 254
- sending to a Telnet session, 259

MGCP (Message Group Configuration Protocol), application inspection, 596–597

MIBs (Message Information Bases), 97

Microsoft NetMeeting, 549

minimum hardware/OS requirements for Cisco Secure ACS, 522

modes of context operation, verifying, 228

modification

- access attacks, 10
- activation keys, 89

monitor mode, performing OS upgrades, 90–91

monitoring

- Cisco Security Appliance failover, 309–310
- networks, 13
- PPPoE client, 439
 - on Cisco Security Appliance*, 439–441

Monitoring tab (ASDM), 479, 481

MPFs (Modular Policy Frameworks), 46

- policies, assigning to interface, 214–216
- policy maps
 - creating*, 207–208
 - viewing*, 214
- traffic classes
 - assigning actions to*, 207–213
 - assigning policies to*, 208–213
- traffic flow matching
 - class map criteria, viewing*, 207

- class map matches, defining*, 206
- class maps, creating*, 203–205

mroute command, 290

MTU (maximum transmission unit), 423

multicast groups, joining, 291

multicast interface command, 290

multicast routing, 289

- commands
 - igmp access-group command*, 292
 - igmp forward command*, 291
 - igmp join-group command*, 291
 - igmp query-interval command*, 292
 - igmp query-max-response-time command*, 293
 - igmp version command*, 292
 - mroute command*, 290
 - multicast interface command*, 290
- debugging, 296
- inbound traffic, 294–295
- outbound traffic, 295–296

multimatch classification policy, 216

multimedia application protocols, support for on Cisco Security Appliance, 591

multiple-context mode, creating security contexts, 230

N

NAC (Network Admission Control) feature, Cisco Secure ACS 3.3, 521

NAFs (Network Access Filters), 521

nameif command, 113, 131, 144, 277

NAS (Network Access Server), 518, 541

- identifying, 542, 545

NAT (Network Address Translation), 118–121

- bidirectional, 126
- configuring, 415
- inbound access, configuring on Cisco Security Appliance, 180–181, 184–185
- policy NAT, 184
- static NAT, 180
- translated addresses, viewing, 150

nat 0 access-list address translation rule, 180

nat 0 command, 183

- configuring inbound access on Cisco Security Appliance, 183

nat command, 146–147

NAT tab (ASDM), 472

- NAT Traversal, 334
- nat/global command, 113
- nat-control command, 149
- NDG (Network Device Group), assigning shell
 - authorization sets, 562
- nesting object groups, 192
- NetBIOS Domain Name System, 117
- NetMeeting, 549
- network command, 284
- Network Device Group (NDG), assigning shell
 - authorization sets, 562
- network extension mode (Easy VPN Remote), 418
- network object type parameter (object-group command), 190
- network of networks, 14
- network security
 - as a “legal issue,” 13
 - defense in depth, 14
 - Do I Know This Already? quiz, 4–6
- network security policies, MPF
 - policies, assigning to interface, 214, 216
 - policy maps
 - creating, 207–208
 - viewing, 214
 - traffic classes
 - assigning actions to, 207–209, 211–213
 - assigning policies to, 208–213
 - traffic flow matching, 203–207
- no aaa-server command, 544
- no url-cache command, 506
- nodes, communication, 115
- NTP (Network Time Protocol), configuring on Cisco Security Appliance, 160–162

O

- object groups
 - creating, 189
 - nesting within other object groups, 192

- object-group command
 - icmp-type object type parameter, 191
 - network object type parameter, 190
 - protocol object type parameter, 191
 - service object type parameter, 191
- Open System Interconnection (OSI), 27
- optimizing security, 13
- organizing ACEs, 188–189
- OSs (operating systems)
 - activation key, upgrading, 88–89
 - CSACS minimum requirements, 522
 - installing, 85–87
 - upgrading
 - with HTTP client, 92
 - with monitor mode, 90–91
 - with tftp flash command, 89–90
- OSI (Open System Interconnection) reference model, 27–29
- OSPF (Open Shortest Path First)
 - ASBRs, 286
 - commands, 282
 - network command, 284
 - prefix-list command, 285
 - redistribute ospf command, 286
 - show ospf command, 288
 - configuring, 286–288
 - overview, 282
- OU (Organizational Unit), 408
- outbound multicast traffic, 295–296
- output service policies, 215

P

- packets, 113
- parameters
 - for AAA authentication, 547
 - for access-list command, 185
 - for allocate-interface command, 230
 - for area command, 285
 - for arp-inspection ethertype, 169
 - for banner command, 164–165
 - for cgi-truncate command, 507

- for class map match criteria, assigning, 206
- for duplex command, 148
- for filter command, 502
- for global command, 149–150
- for interface command, 142
- for ip address command, 145
- for nameif command, 144
- for nat command, 146–147
- for police command, 209
- for rip command, 151–152
- for route command, 150
- for service-policy command, 215
- for set connection command, 214
- for show service-policy command, 218
- for speed command, 148
- for syslog command, 255
- for username command, 84
- passwd command, 80**
- password recovery procedures**
 - on ASA Security Appliance, 96–97
 - on diskless PIX Firewall, 95
 - on PIX Firewall 520, 94–95
- PAT (Port Address Translation), 46, 118–119, 122**
 - configuring, 147
 - inbound access, configuring on Cisco Security Appliance, 182
 - translated addresses, viewing, 150
- patches, 8**
- PDM Log panel, 256**
- per group command authorization, configuring, 563**
- per user command authorization, configuring, 564**
- perimeter security, firewalls, 27, 31**
 - packet filtering, 27, 29
 - PIX, 31, 33–34
 - proxy servers, 29
 - stateful inspection, 30–31
- PFS (Perfect Forward Secrecy), 338**
- PFSS (PIX Firewall Syslog Server), 251**
- phase 1 negotiation (IPSec), 332, 337**
- phase 2 negotiations (IPSec), 332, 337**
- physical security**
 - AAA, 517, 520
 - security policies, 11
- PIDs (process IDs), 286**
- pim command, 292**
- pim dr-priority command, 293**
- pim rp-address command, 293**
- ping command, 91, 152**
- ping sweeps, 9**
- pipes, 252**
- PIX Firewalls, 33**
 - ASA, 41–43
 - characteristics, 31
 - Easy VPN Remote configuration, SUA, 433
 - IP routing, 277
 - dynamic routes*, 280–288
 - static routes*, 277–280
 - logical interfaces, 274–276
 - lost passwords, recovering, 94–95
 - optional components, 48–49
 - PPPoE
 - enabling PPPoE client*, 439
 - monitoring PPPoE client*, 439
 - secure real-time embedded system, 32
 - specific model capabilities, 49–61
 - syslog
 - configuring*, 255, 258
 - logging facilities*, 252
 - organizing messages*, 254
 - PFSS*, 263
 - reading messages*, 254
 - sending messages to a log server*, 259–261
 - sending messages to a Telnet session*, 259
 - severity levels*, 253
 - SNMP traps and SNMP requests*, 261
 - troubleshooting, 649–658
 - virtual interfaces, 54
- PIX Firewall Syslog Server (PFSS), 251**
- PIX MC (CiscoWorks Management Center for Firewalls), 47**
- PIX-1FE (Cisco PIX Firewall FastEthernet Interface Card), 48**
- police command, 209**
- policies, 18**
 - assigning to interface, 214–216
 - security, 11
- policy maps**
 - configurations, displaying, 214
 - creating, 207–208
 - global_policy, 208

policy NAT, configuring inbound access on Cisco Security Appliance, 184–185

Port Fast, 309

port forwarding, 342

configuring on WebVPN, 367–368

portal interface (WebVPNs), 340

port-misuse command, 605

ports. *See also* PAT

listening, 8

reassigning for application inspection, 600

redirection, 124

PPP (Point-to-Point Protocol), 436

PPPoE (Point-to-Point Protocol over

Ethernet), 435–436

enabling PPPoE client, 439

monitoring PPPoE client, 439

PPPoE client

configuring on Cisco Security Appliance, 437–438

enabling on Cisco Security Appliance, 439

monitoring on Cisco Security Appliance, 439–441

prefix-listcommand, 285

principle of least privilege, 600

priority policy, 210

privileged administrative access mode, 141

processes, security, 12

promiscuous mode (IPS), 212

prompts, authentication, 552

Properties tab (ASDM), 477, 479

protocol object type parameter (object-group command), 191

proxy firewalls, 29

public address translation, 46

Q-R

QTIQBE, application inspection, 593

queries, DNS, 9

RADIUS (Remote Authentication Dial-In User Service), 520

reassigning monitored ports (application inspection), 600

reconnaissance attacks, 9–10

recording global information, 626

recovering lost passwords, 93–94

on ASA Security Appliance, 96–97

on diskless PIX Firewalls, 95

on PIX Firewall 520, 94–95

redirection, 124

redistribute ospf command, 286

redundancy, 33–34

remarks, removing from ACLs, 189

remote access VPNs, 331

creating with ASDM VPN Wizard, 486,

489, 493

remote office/branch office (ROBO), 51

remote-procedure call (RPC), 117

removing

contexts from running configuration, 234

NTP configuration from Cisco Security

Appliance, 162

remarks from ACLs, 189

replication, 310–311

reports, viewing, 570

requests, SNMP, 261

requirements

for failover configuration, 308–309

memory, 85

reserved private address space, 118

resources, unauthorized access to, 10

Restricted Bundle, 61

restricting bandwidth on traffic flows, 209

RIP (Routing Information Protocol),

configuring, 151–152, 281–282

rip command, 151–152, 281

ROBO (remote office/branch office), 51

route command, 150, 278

routed mode (Security Appliance), example

configuration, 170–172

router ospf command, 283, 286

routing, 269, 281

authentication, 281

configuring, 626–630

IP routing, 277

dynamic routes, 280–288

static routes, 277–280

multicast routing, 289, 292

commands, 290–293

debugging, 296

inbound traffic, 294–295

outbound traffic, 295–296

principles, 273

Routing tab (ASDM), 474

RPC (remote-procedure call), 117
 rsh, application inspection, 608
 RTSP (Real-Time Streaming Protocol),
 application inspection, 591
 running configuration, removing security
 contexts from, 234

S

saving Security Appliance configuration to
 Flash memory, 154

scalability of AVVID, 15

scanning

Cisco Secure Scanner, 13
 horizontal, 9
 vertical, 9

SCCP (Skinny Client Control Protocol),
 application inspection, 597–598

SCEP (Simple Certificate Enrollment
 Protocol), 45, 68

Secure Intrusion Detection Sensor, 44, 67
 security

ASA, 32, 41–43
 firewalls, 27, 31
 packet filtering, 27–29
 PIX, 31–34
 proxy servers, 29
 stateful inspection, 30–31
 network security, 7
 as “legal issue,” 13
 optimizing, 13
 policies, 11, 18
 testing, 13
 threats, 8, 17
 traffic, transport protocols, 113, 118
 types of attacks, 8, 11
 vulnerabilities, 8

Security Appliance. *See* Cisco Security
 Appliance

security contexts, 47, 226

accessing, 234
 configuring, 235–240
 creating, 230
 deleting, 234
 interfaces, allocating, 230–232
 status, displaying, 235
 switching between, 234
 unsupported features, 227

security levels of interfaces, 143

Security Plus Software License, 64

Security Policies tab (ASDM), 467, 471–472
 segments, 113

DMZ, 125

server command, 91

servers

AAA

configuring, 542, 573
identifying, 542, 545
specifying, 541

CSACS, 45, 521, 537

installing, 533
users, 555

verifying, 581

filters, identifying, 503

NAS, 518, 541

identifying, 542, 545

NetMeeting, 550

PFSS, 251

Syslog, 251, 262–263

service object type parameter (object-group
 command), 191

service policies, 46

configurations, viewing, 217
 first-match classification policy, 217
 interface-specific, 216
 matching logic, 216
 multimatch classification policy, 216
 statistics, viewing, 217

services, authentication, 549

sessions, 440

set connection command, 214

setting up AIP-SSM module, 613–615

severity levels (syslog), 253

SHA-1 (Secure Hash Algorithm 1), 335

shell authorization sets, assigning to

NDGs, 562

shell command authorization, configuring,
 561, 565

shell configuration, 465

show aaa-server command, 578

show accounting command, 579

show activation-key command, 88

show command, 578, 645

VPNs, troubleshooting, 356–358

show conn command, 128

show context command, 235

show mac-address-table command, 169

- show mode command, 228
- show object-group command, 190
- show ospf command, 288
- show perfmon command, 509
- show route command, 280
- show run policy-map command, 214
- show running-config service policy command, 217
- show service-policy command, 217–218
- show tech-support command, 99
- show url-cache command, 508
- show url-server stats command, 508
- show version command, 86
- show vpdn command, 439, 441
- show vpdn pppinterface command, 440
- show xlate command, 127
- single context mode, 227
 - changing to multiple-mode, 228
- SIP (Session Initiation Protocol), application inspection, 598
- site-to-site VPNs, 331
 - creating with ASDM VPN Wizard, 482–486
- SMTP, application inspection, 195, 606–607
- SNMP (Simple Network Management Protocol), 47, 68
 - application inspection, 608
 - configuring on Cisco Security Appliance, 98
 - MIBs, 97
 - requests, 261
 - system maintenance, 97
 - traps, 261
- software requirements for ASDM, 458–459
- SPARC, requirements for running ASDM, 460
- specifying AAA servers, 541
- speed command, 148
- SPIs (Security Parameter Indexes), 334
- spoofing, 28
- SQL*NET, application inspection, 609
- SSH, accessing Cisco Security Appliance, 80–82
- SSM (Service Security Module), 49
- standby unit, 307
 - configuration replication, 310–311
- Startup Wizard (Cisco Security Appliance Adaptive Security Device Manager), 464
- state tables, 30, 42
- stateful failover, 311–312
 - redundancy, 33–34
- static command, 123–124, 180
- static crypto maps, 414
- static IP address mapping, 627
- static NAT, 180
- static PAT, configuring inbound access on Cisco Security Appliance, 182
- static routes, 277
 - configuring, 279–280
- static translation, 119, 123
- statistics, viewing filters, 508
- structured threats, 8
- SUA (Secure Unit Authentication), 433–434
- switch ports, Port Fast, 309
- switching between contexts, 234
- syslog, 251
 - changing message levels, 253
 - configuring, 255
 - messages at the console, 258
 - sending messages to a log server, 259–261
 - SNMP traps and SNMP requests, 261
 - syslogd servers, 262–263
 - "Do I Know This Already?" quiz, 247
 - event reporting, 47
 - logging facilities, 252
 - messages
 - disabling, 264
 - EMBLEM format, 261
 - organizing, 254
 - reading, 254
 - sending to a Telnet session, 259
 - severity levels, 252–253
 - support, 47, 68
 - viewing logging with PDM, 256
- syslogd servers, 262–263
- sysopt uauth allow-http-cache command, 548
- system clock, configuring on Cisco Security Appliance, 162–163
- system maintenance
 - activation keys, upgrading, 88–89
 - "Do I Know This Already?" quiz, 75
 - command-level authorization, 82–85
 - creating boothelper disks, 92–93
 - OS, installing, 85–87

- password recovery, 93–94
 - on diskless PIX Firewalls*, 95
 - on PIX Firewall 520*, 94–95
- SNMP, 97
- system requirements, CSACS, 522**

T

TACACS+ (Terminal Access Controller Access Control System Plus), 520

- reports, viewing, 571–572
- shell command authorization, configuring, 561

tagging. *See* Ethernet VLAN tagging, 273

TCP

- three-way handshake, 115
- virtual circuits, 114

TCP intercept, configuring inbound access on Cisco Security Appliance, 182

Telnet

- Cisco Security Appliance, accessing, 79–80
- Virtual Telnet, 549

telnet command, 79

testing

- security, 13
- Security Appliance connectivity, 152–153

tftp flash command, performing OS upgrades, 89–90

threats, 8, 17

three-way handshake (TCP), 115

throughput, 49, 61

time settings, configuring NTP on Cisco Security Appliance, 160–162

timeout uauth command, 553

timeouts, authentication, 553

tokens, X.509 certificate support, 45, 67

traffic, 31

- cut-through proxy, 519
- routing, 269
 - principles*, 273
- stateful inspection, 30

traffic classes

- assigning matches to, 207–213
- assigning policies to, 208–209
 - connection policy*, 213
 - inspect policy*, 211–212
 - IPS policy*, 212–213

- police policy*, 209–210

- priority policy*, 210

traffic flow matching, class maps

- creating, 203–205

- matches

- criteria, viewing*, 207

- defining*, 206

traffic management in transparent mode, 168–169

transform sets, 350

- creating, 412

translation. *See also* address translation

- bidirectional, 126

- flags, 128

- multiple, configuring, 124–126

translation slots, 116

transparent firewalls, 48

transparent mode

- configuring, 165–167

- example configuration, 172–173

- traffic management, 168–169

transparent tunneling, 425

transport protocols, 113, 118

- TCP, 114–118

- UDP, 114–117

traps (SNMP), 97, 261

Trojan horses, 10

troubleshooting. *See also* debugging; system maintenance

- AAA, 577, 581

- accounting, 579

- address translation, 126, 130

- authentication, 578

- authorization, 579

- boothelper disk, 93

- commands, 100–103

- password recovery, 93–95

- PIX Firewall implementation, 649–658

- security, 13

- Syslog, 251

- VPNs, 356, 644

- clear command*, 358

- debug command*, 358–360

- show command*, 356, 358

troubleshooting-related commands, 98–99, 101–103

trunk ports, 274

tunneling protocols

- Cisco VPN Software Client, 420
- transparent, 425

types of attacks, 8

- access, 10–11
- DoS, 11
- reconnaissance, 9–10

U**UDP (User Datagram Protocol), 114–117****unauthorized access, 10****unprivileged administrative access mode, 141****unstructured threats, 8****unsupported security context features, 227****upgrading**

- activation keys, 88–89
- operating system
 - with copy tftp flash command, 89*
 - with HTTP client, 92*
 - with monitor mode, 90–91*
 - with tftp flash command, 89–90*

uploading configuration files to contexts, 232**upper-level data encapsulation, 114****url-cache command, 505****URL filtering, 503–505**

- configuring URL-filtering policy, 504
- identifying servers, 503

url-server command, 503**User Datagram Protocol (UDP), 114****V****VAC (VPM Accelerator Card), 48****VAC+ (VPN Accelerator Card Plus), 48****verifying**

- AIP-SSM initialization, 613
- context mode of operation, 228
- CSACS, 581
- Security Appliance connectivity, 152–153
- X.509, 45

vertical scans, 9**viewing**

- class map match criteria, 207
- filters, 508
- logging, 256
- policy map configurations, 214
- reports, 570–572

service policy configurations, 217

service policy statistics, 217

status of security contexts, 235

virtual circuits, 114**virtual HTTP, configuring inbound connections, 552****virtual interfaces, 54****virtual services, authentication, 549****virtual Telnet, configuring outbound connections, 550****virtual telnet command, 549****viruses, 10****Virtual Telnet, 549****VLANs**

- managing, 276–277
- trunk ports, 274

VoIP, application inspection, 592

H.323, 593–595

MGCP, 596–597

QTIQBE, 593

SCCP, 597–598

SIP, 598

VPDN (Virtual Private Dial-Up Networking) group, 438**VPN Accelerator Card Plus (VAC+), 48****VPN tab (ASDM), 473–474****vpnclient server command, 432****vpnclient vpngroup command, 432****VPNs (virtual private networks)**

- access VPNs, 395
- certificates, 45
- configuring, DUKEM case study, 635, 638, 641–644
- gateways, 48, 69
 - Cisco Security Appliance configuration, 343–355*
- IPsec, 332–338
- remote access, DUKEM case study, 645
- troubleshooting, 356, 358, 360, 645
- WebVPNs, 339
 - port forwarding, 342*
 - portal interface, 340*

vulnerabilities, 8

W

WebVPN gateways, 339

- ACLs, configuring, 371
- configuring, 361–364
- content filtering, 371
- e-mail proxies, configuring, 369–371
- port forwarding, configuring, 342, 367–368
- portal interface, 340
- user access, assigning, 364–365, 367

Windows 2000/XP OS

- accessing from browser, requirements, 460
- CSACS, 533
- CSACS 3.3, installing, 523–533

Windows NT

- CSACS, 533
- CSACS 3.3, installing, 523–533

worms, 10

write memory command, 80, 154, 311

X-Y-Z

X.509 certificates, 45

XAUTH (extended authentication)

- configuring*, 409–412, 414–416
- defining group policy for mode
 - configuration push, 412
- transform sets, 413

xlate command, 120