

INDEX

Numerics 3DES, 130–131 limitations of, 132 strengths of, 131 802 11b standard, 278	acceptable use policies, 54–55 confidential information, 57 passwords, specifying criteria 57–58 prohibited activities, 59–62	
802.11b standard, 278 APs, associating, 304 enhancing security, 311–312 hacking tools AirSNORT, 282, 288, 297, 310, 313, 316–317 NetStumbler, 313–315 packet sniffers, 315–316 SSIDs, 303–304 WEP, 302–306 limitations of, 306	access control, 86 accounting, 117–118 ACLs, 89–90, 199 applying to vty ports, 227 deny statements, 94 grocery list analogy, 91–94 implicit deny statements, 196 limitations of, 95 lock and key, 199 permit statement, 205 static, 196	
AAA, 115 accounting, 117–118 authentication, 116 authorization, 116 aaa new-model command, 218	active reconnaissance, 17 ad-hoc WLANs, 283 AES (Advanced Encryption Standard), 128, 232 AH (Authentication Header), 250 AirSNORT, 282, 288, 297, 310, 313, 316–317 all-in-one firewalls, implementing, 171 anomaly detection, 334	



antennas, 290–291	atomic signatures, 210
applets (Java), blocking, 201	attacks
application level firewalls, 105	Cisco IOS IDS signatures, 211
application specific monitoring,	covering tracks, 31–33
200–201	DoS, 358
applications	on WLANs, 297–298
attacks, 28	ping-based, 360–361
for performing exploitation	preventing, 361–362
attacks, 357	smurf, 360
applying	SYN flood, 361
crypto maps to interfaces, 268	downstream liability, 160
passwords to console port, 227	enumerating, Microsoft Windows,
APs (access points)	22–25
antennas, 290–291	escalating privilege, 30–31
associating, 304	firewalking, 366
bandwidth limitations, 285	gaining access, 26
distance limitations, 285	IP spoofing, 170, 356
misconfigured, 300-302	applications used, 357
rogue APs, 298–300	land, 364
SSIDs, 289, 303–304	man-in-the-middle, 362
ARIN (American Registry for	ARP spoofing, 362
Internet Numbers), 100	ping of death, 365
ARP poisoning, 362	ping pong, 365
ARP proxy, disabling, 223	ping-based, 360
ARP spoofing attacks, 362	reconnaissance, 13
ASA (adaptive security	active, 17
algorithm), 170	DNS, 16
assessing vulnerability, tools,	DNS tools, 15–17
374–383	goals of, 13–15
associating, 304	ū v

scanning, 18–20	bandwidth, limitations on WLANs,
get command, 21–22	285–286
vulnerability scanning, 22	banners, configuring, 226–227
session hijacking, 356	benefits of VPNs, 239–240
applications used, 357	bit buckets, 107
SYN flood, 365–366	black hole routes, 224
preventing, 219	blocking Java applets, 201
targeted	brute force attacks, 41
misconfiguration attacks, 28–29	
on applications, 28	
on operating systems, 27	•
script attacks, 29–30	C
teardrop, 365	capturing core dumps, 220
U.S. as source, 34	carrier protocol, 247
Xmas tree, 364	CAs (Certificate Authorities), 261
authentication, 116, 134	case studies
local, TACACS+, 218	DMZs, necessity of, 176-177
on IPSec VPNs, 246	firewalls
per user, 199	deploying with mail server in
RADIUS, 118–119	DMZ, 181–184
authenticity of data, 132	deploying with mail servers,
authorization, 116	178–180
per user, 199	CBAC (Context-Based Access
automated attacks, 27	Control), 197–200
	application specific monitoring,
	200–201
_	communication session states, tracking, 199

back doors, 363

applications used, 31–33



Cisco IOS IDS, 209 content-based packet inspection, 202-203 packet auditing process, 211–213 FFS security process, 204–207 signatures, 210 dynamic filtering, 198 Cisco IOS Software IDS, 207-208 ARP proxy, disabling, 223 intended use, 209 configuration files, encrypted, 218 operational overview, 209 core dump facility, 220 packet auditing process, 211–213 error reporting facility, 208 signatures, 208–210 facilities, 208 Java applet blocking, 201 FFS, 190 limitations of, 213–214 benefits of, 198-201 session logging, 199 content-based packet inspection, CDP (Cisco Discovery Protocol), 202-207 disabling, 225 IDS. 207-209 **CEF** (Cisco Express Forwarding), limitations of, 213–214 enabling, 220 process-switched packets, 205 centralized sensor management, 328 FFS (Firewall Feature Set), CBAC, **CHAP** (Challenge Handshake 197-198 **Authentication Protocol), 137** Firewall Feature Set, benefits of, 192 Chappell, Laura, 210 Secure IOS Template, 214 chargen service, disabling, 217 topology, 215-228 checksums, MD5, 135 Cisco PIX Firewalls, configuring choke points, edge routers as, 193 VPNs for client access, 268–272 permissible traffic, 195 Cisco SDM Security device choke routers manager, 215 limitations of, 196 classes of IPv4 addresses, 100 static ACLs, 196 client-based filtering, 110 **CIS (Center for Internet** clock timezone command, 220 Security), 36 combining key IDS functions, 336

commands comparing L2TP and PPTP, 140-141 aaa new-model, 218 clock timezone, 220 SSH and Telnet, 146-149 enable secret, 218 TACACS+ and RADIUS, 121 compound signatures, 211 get, 21–22 conduit permit statement, 165 ip accounting access-violations, 223 ip cef. 220 confidential information, defining for acceptable use policies, 57 ip classless, 219 configuration files, encrypted, 218 ip multicast boundary, 223 configuring ip subnet-zero, 219 banners, 226–227 ip tcp intercept connectiontimeout, 219 Cisco PIX VPNs for client access, 268-272 ip tcp intercept watch-timeout, 219 firewalls ip tftp source-interface, 220 inbound access policy, 172–173 ip verify unicast reverse-path, 222-224 outbound access policy, 173 null0 interface, 221 line vtv, 227 nbstat, 24 routers as VPN peers, 264 net view, 24 IPSec. 264-267 ISAKMP, 260-263 nslookup, 15–17 ntp authenticate, 221 congestion, Nagle algorithm, 216 service nagle, 216 connection aware technologies, 97 service password-encryption, 217 connection establishment phases (VPNs), 255–258 service sequence numbers, 217 console logging, 218 show privilege, 117 console port, applying community strings (SNMP), passwords, 227 securing access, 225



content filtering, 108–109	DDoS attacks, 39, 358
client-based filtering, 110	ping-based, 360-361
limitations of, 111	preventing, 361–362
server-based filtering, 111	smurf, 360
content-based packet inspection,	SYN flood, 361
202–207	DDoS Daemons, 359
control messages, 137	deception systems, 347
controlling access, 86	default manufacturer SSIDs,
core dump facility, 220	303–304
Core Impact, 384–388	deny statements, 94
Corporate Security Team, 54	DES (Data Encryption Standard)
Counterpane Internet Security,	encryption, 127
138–139	RSA DES Challenge web page, 128
creating crypto maps, 266	strengths of, 128-130
crypto maps, applying to	detecting anomalous activity, 334
interfaces, 268	development of Intrusion
CVE (common vulnerabilities and	Detection, 325
exposures) database, 35, 328	devices
	firewalls, 158
	ASA, 170
D	basic functions of, 167–168
D	DMZ, 174–177
data authenticity, 132	downstream liability, 160
data classification policy, protecting	implementing, 170–171
sensitive information, 7	inbound access policy,
data integrity, 132	configuring, 172–173
on IPSec VPNs, 246	inside interfaces, 169
data packets, 137	limitations of, 184–185
	need for, 159–160

outbound access policy,	DoS attacks, 39, 358
configuring, 173	on WLANs, 297–298
outside interfaces, 169	ping-based, 360–361
rules, 161	preventing, 361–362
security policies, 163–165	smurf, 360
SPI, 166, 168	SYN flood, 361
Diffie-Hellman algorithm, 257	downstream liability, 34, 160
digital signatures, 134–135	Dsniff, 357
directed broadcast, 360	dumpster diving, 4
disabling	dynamic ACLs, lock and key, 199
ARP proxy, 223	dynamic filtering, 198
CDP, 225	dynamic NAT, 102
chargen and echo services, 217	dynamic proxy firewalls, 106
ICMP mask reply messages, 223	
ICMP redirect messages, 222	
IP directed broadcasts, 222	_
source routing, 223	E
disaster recovery, 373	EAP (Extensible Authentication
displaying	Protocol), 307
MOTD banners, 226–227	EAP-Cisco Wireless, 309
user privilege level, 117	EAP-MD5, 308-309
distance limitations of WLANs, 284	EAP-TLS, 310
DMZs, 174	EAP-TTLS, 311
case study, 176–177	eavesdropping on WLANs, 295-297
mail server deployment	echo service, disabling, 217
case study, 181–184	edge routers, 190
placement of, 175-176	as network choke point, 192-193
DNS, in passive reconnaissance,	limitations of, 196
15–17	permissible traffic, 195
	static ACLs, 196

tunnel mode, 248

	"	44
Y		3

as packet inspector, 197-198	enhancing wireless security, 311-312
versus firewalls, 191	enterprise firewalls,
eliminating false positives, 328	implementing, 171
enable secret command, 218	enumerating Microsoft Windows,
enable secret passwords, 218	22–25
enabling	error reporting facility on Cisco
CEF, 220	IOS Software, 208
logging, 217	escalating privilege, 30–31
RADIUS, 119	ESP (Encapsulated Security
SSH, 228	Protocol), 250
encrypted configuration files, 218	ESP (Encapsulating Security Payload), 140
encryption, 126	establishing IPSec SAs, 251
3DES, 130–131	Ethereal, 296
limitations of, 132	ettercap, 146, 357
strength of, 131	event correlation, 327
DES, 127	examples of security policies, 81–82
RSA DES Challenge web page,	explicit permit access model, 203
128	exploits, 356
strength of, 128–130	•
passwords, 217	applications attacks, 28
SSH, 145–146	code, 31 DoS, 359
authentication ciphers, 150	
limitatations of, 152–153	misconfiguration attacks, 28–29
operation, 149–151	operating system attacks, 27
port forwarding, 151	script attacks, 29–30
SecureCRT client, 151	tools for accomplishing, 357
versus Telnet, 146–148	extended ACLs, 199
encryption modes (VPNs)	extended IP ACLs, 90
transport mode, 249	extended TACACS, 119–120

external network security	packet auditing process, 211–213
assessments, performing, 369–370	signatures, 208–210
extranet connection policies, 74–77	limitations of, 213–214
extranet VPNs, 233, 238	process-switched packets, 205
	security process, 203-205
	firewalking, 366
_	firewalls, 158, 191. See also FFS
F	(Firewall Feature Set)
facilities, 208	all-in-one, implementing, 171
core dump, 220	application level, 105
false positives, eliminating, 328	ASA, 170
FFS (Firewall Feature Set), 197	basic functions of, 167-168
benefits of, 198-200	DMZs, 174
application specific monitoring,	case study, 176–177
201	placement of, 175–176
Java applet blocking, 201	downstream liability, 160
VPNs, 201	dynamic proxy firewalls, 106
CBAC, 197–198	enterprise, implementing, 171
application specific	implementing, 170
monitoring, 200	inbound access policy,
communication states,	configuring, 172–173
tracking, 199	inside interfaces, 169
dynamic filtering, 198	limitations of, 184–185
session logging, 199	need for, 159–160
content-based packet inspection,	outbound access policy,
202–207	configuring, 173
IDS, 207–208	outside interfaces, 169
intended use, 209	personal, implementing, 170
operational overview, 209	proxy firewalls, limitations of, 107–108



routerwalls, 197 rules, 161 security policies, 163–164 and firewall configuration, 165 conduit permit statements, 165 SPI, 166-168 standard proxy firewalls, 105 versus edge routers, 191 footprinting, 13–15

Gartner Dataquest, 232 get command, 21-22 goals of reconnaissance, 13–15 of VPNs, 239-240

GRE (Generic Routing Encapsulation), 136

hackers

escalating privilege, 30–31 intelligence preparation operations, 13 script kiddies, 9

hacking tools

AirSNORT, 282, 288, 297, 310, 313, 316-317 NetStumbler, 313-315 wireless packet sniffers, 315–316 half-open attacks, 365–366 half-open sessions, 207 half-open sockets, 219 Hammersley, Ben, 286 hash checks, 135 hash values, 133

Haystack Project, 325 helix antennas, 290-291 HIDS (host-based intrusion detection sensors), 327, 332 **Honeypots**, 345–347 design strategies, 348–349

host-based IDSs, 327

IANA (Internet Assigned Numbers Authority), 100 **IBSS (Independent Basic Service** Set), 283 ICAT metabase, 38

ICMP (Internet Control Message **IEEE 802.11b standard, 278** Protocol) IEEE 802.11g standard, 279, 282 connection tracking on CBAC, 199 IKE, 251-253 flooding, 42 phases of VPN creation, 255-258 mask reply message, disabling, 223 implementing messages, 42 firewalls, 170 ping-based attacks, 360–361 all-in-one firewalls, 171 redirect messages, disabling, 222 enterprise firewalls, 171 smurf attacks, 360 personal firewalls, 170 IDSs, 321–323 with mail server in DMZ, case anomaly detection, 334 study, 181–184 communication stream with mail servers, case study, reassembly, 333 178-180 VPNs, 240-242 development of, 326 HIDS, 332 implicit deny statements, 196 host-based, 327 inbound access policy, firewall configuration, 172-173 in-line intrusion detection, 207 information handling security key functions, 327–329, 336 assessments, 373 log analysis, 336 infrastructure WLANs, 283 network-based, 327 in-line intrusion detection, 207, 210 NIDS, 330-331 inline wiretaps, 330 on FFS, 207–208 **INRGI** website, 214 intended use, 209 inside interfaces, 169 operational overview, 209 inspecting packets. See SPI packet auditing process, 211–213 intelligence preparation signatures, 208–210 operations, 13 protocol analysis, 333 intended use of FFS IDS, 209 signature/pattern matching, 334–335 internal network security standards-based implementation, 328 assessments, performing, 367–369 tweaking, 323



Internet, extranet connection policies, 74–77 **Internet Storm Center, 37** intrusion detection, development of, 325 intrusion prevention, 329 ip accounting access-violations command, 223 ip cef command, 220 ip classless command, 219 IP directed broadcasts, disabling, 222 ip multicast boundary command, 223 IP spoofing, 40, 356 applications used, 357 IP Spoofing attacks, 170 ip subnet-zero command, 219 ip tcp intercept connectiontimeout command, 219 ip tcp intercept watch-timeout command, 219 ip tftp source-interface command, 220 ip verify unicast reverse-path command, 222-224 **IPSs (Intrusion Prevention Systems)**

limitations of, 342–45

Snort, 339, 342

responses and actions, 337–338

IPSec, 139 ESP, 140 router configuration, 264–267 SAs, 251 VPNs, 243-245 AH, 250 authentication, 246 connection establishment phases, 255-258 data integrity, 246 ESP, 250 IKE, 252–253 ISAKMP, 250, 254 SAs. 250–251 transport mode, 249 tunnel mode, 248 IPv6, 100 **ISAKMP** (Internet Security

Association Key Management Protocol), 250, 254 router configuration, 260–263 island analogy of VPNs, 233-235 ISO17799 standard, 79

J-K limitations of ACLs, 95 Java applet blocking, 201 of choke routers, 196 Jones, Matt, 28 of content filtering, 111 of FFS, 213-214 keepalives (TCP), enabling, 216 of firewalls, 184–185 key IDS functions, 327-329 of IPS, 342–343, 345 of NAT, 103–104 of PKI, 114-115 of proxy firewalls, 107–108 of PPTP, 138-139 L2F (Laver 2 Forwarding), 140 of SSH, 152–153 L2TP (Laver 2 Tunneling of WEP, 306 Protocol), 139 line vty command, 227 benefits of, 141 local authentication, TACACS+, 218 LAC, 142 lock and key dynamic ACLs, 199 network architecture, 142 log analysis, 336 operation, 142–143 log messages, time stamping, 216 versus PPTP, 140-141 logging L2TP Network Server (L2TP console logging, 218 Network Server), 140 enabling, 217 LAC (L2TP Access NetFlow, 225 Concentrator), 140–142 Syslog, 225 land Attack, 40 login sessions, SSH, 145 land attacks, 364 authentication ciphers, 150 layered security, 86 limitations of, 152–153 **LEAP, 309** operation, 149–151 legality of WarDriving, 292 port forwarding, 151 liability, downstream, 34 versus Telnet, 146-149



loopback interfaces, configuring as log message source, 221 loose source routing, 41 Lucifer algorithm, 127

monitoring, 87 MOTD banners, configuring, 226-227 multicast filtering, applying to interfaces, 223 multi-deception systems, 348

MAC address filtering, 307 mail servers

deploying in DMZ, case study, 181-184 deploying with firewalls, case study, 178-180

manageability of VPNs, 241 man-in-the middle attacks, 362 mask reply messages (ICMP), disabling, 223

MD5 (Message Digest 5), 132–135

digital signatures, 134

hash values, 133

message logging

enabling, 217 loopback interfaces, configuring as message source, 221

Microsoft Windows, enumerating, 23-25

misconfiguration attacks, 28–29 misconfigured APs as threat to WLAN security, 300–302

N

Nagle congestion control algorithm, 216

NAT (Network Address Translation), 99, 101–102, 172

dynamic NAT, 102 limitations of, 103–104 overloading, 102 static NAT, 102

NBAR (Network Based Application Recognition), 196 nbtstat command, 24

necessity of DMZs, 176–177 necessity of firewalls, 159–160 Nessus, 376–379

net view command, 24

NetFlow, 225

NetStumbler, 313–315

NIDS (Network-Based Intrusion Detection Systems), 327–331

outbound access policy, firewall
configuration, 173
outside interfaces, 169
overloading, 102
P
Г
packet auditing process on Cisco
IDS, 211–213
packet filtering
ACLs, 89–90
deny statements, 94
grocery list analogy, 91–94
limitations of, 95
dynamic, 198
packet inspection
application specific monitoring, 200
CBAC, 197–200
application specific monitoring,
201
Java applet blocking, 201
limitations of, 213–214
VPNs, 201
content-based, 202-203
FFS security process, 204–207
on edge routers, 197
SPI, 166–168
packet sniffers, 296, 358



communication stream reassembly on IDSs, 333 source routing, 223 SPI, 97-98

PAP (Password Authentication Protocol), 137

passenger protocol, 247 passive reconnaissance, DNS, 16 password policies, 63-65

password construction guidelines, 66 - 68password protection standards,

68-69

passwords

applying to console port, 227 enable secret, 218 encrypting, 217 specifying criteria for acceptable use policies, 57–58 SSIDs, 302-304

PAT (Port Address Translation), 172 patching, 87 pattern matching, 334–335 patterns of trust, 357

penetration testing, 366-370

tools, 383-390

per user authentication, 199

performing

security assessments, 366 external vulnerability and penetration assessment, 369–370 internal vulnerability and penetration assessment, 367–369 physical security, 371 procedural risk assessments, 373 service providers, 374 vulnerability assessments, tools, 374-383

permissible traffic on choke routers, 195

permit statements, 205 personal firewalls, implementing, 170

physical security, assessing, 371 Ping of Death, 39 ping of death attacks, 365 ping pong attacks, 365 ping scans, 40 ping-based attacks, 360

PKI (Public Key Infrastructure), 112-115

placement

of NIDS, 331 of DMZs, 175–176

policies, 163–164 operation, 142–143 versus PPTP, 140-141 acceptable use, 54–55 confidential information, 57 **PPTP** (Point-to-Point Tunneling **Protocol)**, 135–137 passwords, 57–58 GRE, 136 prohibited activities, 59-62 limitations of, 138–139 comparing with firewall configuration, 165 versus L2TP, 140–141 examples of, 81–82 preventing extranet connection policies, 74–77 DoS attacks, 361–362 ISO17799 standard, 79 exploitation attacks, 358 levels of trust, 51–53 SYN-flood attacks, 219 on firewalls, conduit permit Private IP Addresses, 100 statement, 165 privilege levels, 116 password policies, 63–65 escalating, 30–31 password construction procedural risk assessments, 373 guidelines, 66-68 process-switched packets, 205 password protection standards, production Honeypots, 347 68-69 protocol analysis, 333 review team, 54 proxies, 105 types of, 48–50 proxy firewalls VPN security policies, 70–74 dynamic proxy firewalls, 106 port forwarding, SSH, 151 limitations of, 107–108 port mirroring, 330 standard proxy firewalls, 105 port monitors, 347 Public IP Addresses, 100–101 port scan attacks, 39 public-key algorithms, 258 PPP (Point-to-Point Protocol), L2TP, 139 benefits of, 141 LAC, 142 network architecture, 142



R
RADIUS (Remote Authentication
Dial-In User Service), 118
enabling, 119
versus TACACAS+, 121
rate limiting traffic, 222
read/write mode (SNMP), 225
reassembling packets via IDSs, 333
reconnaissance, 13
active, 17
DNS, 16
DNS tools, 15–17
goals of, 13–15
recorded routes, 41
redirect message (ICMP),
disabling, 222
reliability of VPNs, 242
remote access VPNs, 233, 237
split tunneling, 242
remote login sessions, SSH, 145
authentication ciphers, 150
limitations of, 152–153
operation, 149–151
port forwarding, 151
versus Telnet, 146–149
research Honeypots, 347
response teams, 88

Retina, 379–383

```
risk assessment
  external, performing, 369–370
  internal, performing, 367–369
  physical security, performing, 371
  procedural risk assessments,
  performing, 373
  service providers, 374
  tools
    Nessus, 376-379
    Retina, 379-383
    vulnerability scanners, 374-376
role specific security, 87
routers
  configuring as VPN peers, 264
    IPSec, 264-267
    ISAKMP, 260-263
  edge routers, 190
    as network choke point, 192-196
    as packet inspector, 197–198
    versus firewalls, 191
routerwalls, 197
```

routing protocols, 125 RPF (Reverse Path Forwarding), 224 RSA DES Challenge web page, 128

S	service sequence-numbers	
SANS (SysAdmin, Audit, Network, Security) Institute, 36 SAs (security associations), 250–251 IPSec, establishing, 251 ISAKMP, 254 scalability of VPNs, 236, 242 scanning, 18–20 get command, 21–22	service sequence-numbers command, 217 session hijacking, 356 applications used, 357 session logging, 199 sh run command, 147 Shipley, Peter, 291 show privilege command, 117 shunning, 337	
NMAP, accuracy of, 19 vulnerability scanning, 22 Schneier, Bruce, 138	cisco IDS packet auditing process, 211–213	
SCORE, 37 script attacks, 29–30 script kiddies, 9, 196 Secure IOS Template, 214	pattern matching, 334–335 IDS responses to, 208 site-to-site VPNs, 233, 237, 248 router configuration, 264 IPSec, 264–267	
topology, 215—228 SecureCRT, 151 security policies, 47–48, 163–165	ISAKMP, 260–263 smurf attack, 41, 360 sniffers, 43, 358	
on firewalls, conduit permit statement, 165 types of, 48–50 security protocols, 125	WLAN-capable, 295–297, 315–316 sniping, 337 SNMP (Simple Network	
security through obscurity, 8 sequence number tracking, 199 server-based filtering, 111 service nagle command, 216 service password-encryption	Management Protocol), 225 Snort, 339, 342 social engineering, 5–7 source routing, 41, 223 spam, WarSpamming, 292–293	
command, 217		



SPI (Stateful Packet Inspection), 95-96, 166-168 application specific monitoring, 201 limitations of, 99 packet flow, 97-98 Spitzner, Lance, 346 split tunneling, 242 spoofing attacks, 40, 170 SSH (Secure Shell), 145 authentication ciphers, 150 enabling, 228 limitations of, 152–153 operation, 149–151 port forwarding, 151 SecureCRT client, 151 versus Telnet, 146–149 SSIDs (Service Set Identifiers), 289, 303-304 SSL (Secure Socket Layer), 112 standard ACLs, 199 standard IP ACLs, 90 standard proxy firewalls, 105 standards-based IDS implementation, 328 static ACLs, 196 static NAT, 102 Stevens, Richard, 361 strength of 3DES encryption, 131

sof DES encryption, 128-130

strict source routing, 41
STS (Station-to-Station) protocol, 251
symmetric key algorithms, 258
SYN flood attacks, 39, 361, 365–366
preventing, 219
syslog (System Message Logging),
208, 225

T

TACACS+, 119-121

for local authentication, 218

targeted attacks, 27

applications attacks, 28 misconfiguration attacks, 28–29 operating system attacks, 27 script attacks, 29–30 targeted business sectors, 34

targets of choice, 10

assessing vulnerability, 10–12

$targets \ of \ opportunity, 7$

assessing vulnerability, 9–10 Security Through Obscurity, 8 versus targets of choice, 10

TCP (Transmission Control Protocol)

keepalives, enabling, 216 Nagle algorithm, 216 sequence number tracking, 199

TCP Intercept, black hole	tunnel mode (IPSec), 248
routes, 224	tunneling
TCP/IP model, 96	IPSec, 139
tear drop attacks, 40	L2TP, 139
teardrop attacks, 365	benefits of, 141
Telnet	LAC, 142
ettercap, 148	network architecture, 142
Nagle congestion control	operation, 142–143
algorithm, 216	PPTP, 136–137
versus SSH, 146–149	GRE, 136
TFTP , 220	limitations of, 138–139
third party agreements, 76	versus L2TP, 140–141
time stamping log messages, 216	VPNs, 247
time synchronization, NTP, 221	tweaking IDSs, 323
time zones, standardizing on routers, 220	
tools	
for hacking	U
AirSNORT, 282, 288, 297, 310, 313, 316–317	UDP (User Datagram Protocol) connection tracking on CBAC, 199 flooding, 39 unauthorized access, preventing
NetStumbler, 313–315	
wireless packet sniffers, 315–316	
NMAP, 19	
topology of Secure IOS Template, 215–228	on WLANs, 301
traffic, rate limiting, 222	
transport mode, 249	
trust, 51–54	
TTL (Time-To-Live) field, role in	
firewalking attacks, 366	



V	security policies, 70–71, 73–74
VPNs, 201, 231, 236	site-to-site, 237
AES, 232	encapsulating protocol, 248
configuring Cisco PIX Firewall for client access, 268–272	router configuration, 260–267 site-to-site VPNs, 233
connection establishment phases, 255–258	split tunneling, 242 tunneling, 247
encryption modes, 248	vty ports, applying ACLs, 227
extranet, 238	vulnerabilities
goals of, 239–240	external, assessing, 369–370
growth in marketplace, 232	internal, assessing, 367–369
implementation strategies, 240–242	of WANs
IPSec, 243–245	abuses by authorized users, 302
АН, 250	DoS attacks, 297–298
authentication, 246	misconfigured APs, 300–302
data integrity, 246	rogue APs, 298–300
ESP, 250	sniffing, 295, 297
IKE, 252–253	WarChalkers, 287
ISAKMP, 250	WarDriving, 288–292
transport mode, 249	WarFlying, 292
tunnel mode, 248	WarSpamming, 292–293
ISAKMP, 254	WarSpying, 294
island analogy, 233–235	physical security, assessing, 371
manageability, 241	procedural risk assessments,
reliability, 242	performing, 373
remote access, 233, 237	risk assessments, service providers, 374
SAs, 250–251	vulnerability scanners, 22, 374–376
scalability, 236, 242	

W	EAP, 307
WapChalking, 288 WAPs (wireless access points), 281 WarChalking, 286–287 WarDialing, 286 WarDriving, 288–292 WarFlying, 292 WarSpamming, 292–293 WarSpying, 294 wave guide antennas, 290–291 websites	EAP-Cisco Wireless, 309
	EAP-MD5, 308–309
	EAP-TLS, 310
	EAP-TTLS, 311
	enhancing security, 311–312
	hacking tools
	AirSNORT, 282, 288, 297, 310,
	313, 316–317
	NetStumbler, 313–315
	packet sniffers, 315–316
	IEEE 802.11b standard, 278
INRGI, 214	IEEE 802.11g standard, 279
sample security policies, 81–82	infrastructure, 283
WEP (Wireless Encryption	MAC address filtering, 307
Protocol), 302–306	SSIDs, 289, 303–304
WEPcrack, 317	vulnerabilities of
WhatRoute, 17 Wi-Fi, 279 WinNuke, 40	abuses by authorized users, 302
	DoS attacks, 297–298
	misconfigured APs, 300–302
wireless networking, 282	rogue APs, 298–300
wireless packet sniffers, 315–316 WLANs, 277	sniffing, 295, 297
	WarChalkers, 287
ad-hoc, 283	WarDriving, 288–292
antennas, 290–291	WarFlying, 292
APs, associating, 304	WarSpamming, 292–293
bandwidth limitations, 285–286	WarSpying, 294
benefits of, 280–281 distance limitations, 284	WAPs, 281
	WEP, 302–306
	Wi-Fi, 279



X-Y-Z

Xmas tree attacks, 364

zombie computers, 359