

Index

A

- Access control
 - database security
 - mechanisms, 145
 - multilevel, 146
 - query modification, 146
 - stored procedures, 146
 - views, 146
 - mobile and wireless security, 174
- Access Control Lists (ACLs), 56, 59, 63
- Address resolution protocol (ARP), 129
- Advanced Encryption Standard (AES), 99, 174
- Adware
 - freeware/shareware, 22
 - infected websites, 22
 - infinite pop-ups, 21
 - man-in-the-middle attacks, 21
 - pop-up ads, 20
 - slow down device's, 21
 - spying, 21
 - users, 22
- Alternate Data Stream (ADS)
 - ADSCheck, 217
 - ADSSpy, 217, 218
 - CAT tool, Nix Utilities, 217
 - feature, 216
 - hiding data, 217
 - StreamArmor, 218
- Anti-Malware detection techniques, 196, 197
- Apple iOS security, 170
- Apple iPhones™ cloud locks, 164
- Apple Mac's FileVault, 109
- Applications section
 - anti-virus software application, 13

- vulnerability scanning, 13–15
- ARP Spoofing attacks, 127–129
- Asset value, 9
- Attacker
 - Malware, 140
 - Network, 140
 - notice, 144
- Attribute-based access control (ABAC), 66
- Authentication, Access control and
 - Accountability (AAA), 64

B

- Backdoors, 31
- BlowFish, 100
- Bootkits, 23
- Boot-sector viruses, 38
- Browser Hijacking, 41

C

- Carriage return line feeds (CRLF) Injection
 - attacks, 42
- Certificate Authorities (CA), 104, 113
- Cipher Block Chaining (CBC), 97
- Cipher FeedBack (CFB), 97
- Code injection, 41–43
- Confidential information, 4
- Counter (CTR), 97
- Crimeware, 35–37
- Cross site request forgery (CSRF), 143, 144
- Cross-site Scripting (XSS), 42
- Crypto ransomware, 24
- Cyber-attacks, 121

D

Data encryption standard (DES), 62
 Data modification attacks, 126, 127
 Database security

- access control (*see* Access control, database security)
- applications, 155
- attack, SQL injection (*see* SQL injection attack)
- management system, 144
- measures, 145
- privacy
 - adding/deleting records, 147
 - data perturbation/anonymization, 148
 - output perturbation, 148
 - query restriction, 148
 - statistical database, 146, 147

 Denial of Service (DoS) attack, 5–6
 Digital Encryption Standard (DES), 96
 Disaster Recovery Plan (DRP), 80, 85, 89
 Discretionary Access Control (DAC), 56
 Disk and computer forensics

- ADS, 216–218
- analysis, 208, 209
- applications
 - Kali Linux, 241
 - Linux Logs, 241
 - Linux Rootkit Checker, 242
 - memory analysis with volatility, 240
 - Windows registry, 241
- data recovery, 207, 208
- digital investigations, 204
- event viewers, 232, 233
- ext systems (*see* Extended file system (Ext))
- factors, 204
- FAT system, 209, 210, 212, 213
- HFS+ systems, 221–222
- HFS+ volume headers, 222
- image acquisition, 205–207
- Internet usage and traces (*see* Internet traces)
- investigations
 - Linux (*see* Linux operating systems)
 - MAC operating systems, 236, 237
 - Windows operating systems, 227–229
- memory (*see* Memory forensics)
- NTFS systems, 214–216
- operating system, 205
- skills
 - Binwalk disk forensic tool, 238
 - file carving, 238–240
 - foremost forensic tool, 237
 - hex-editor program, 238

- raw format image acquisition, 238
- unallocated disk, 214
- web logs, 233
- Windows registry, 229

 Distributed denial of service (DDoS) attack, 30
 Distribution, Crimeware

- affiliate marketing, 37
- attachment, 36
- hacking, 37
- Internet Worm, 36
- Piggybacking, 36
- Web Browser Exploit, 36

 Dynamic link library (DLL) file, 33
E

EICAR test files, 13
 Electronic Code Book (ECB), 97
 Electronic mail (email) virus, 38
 Email (Mail command/SMTP) injection, 42
 Encrypted salt-sector initialization vector (ESSIV), 110
 Encrypting File System (EFS), 108
 Ethernet Network cards (NIC), 251
 Extended file system (Ext)

- file recovery, 220, 221
- high level layout, 218
- inode, 219
- journal process, 219
- Linux, 218
- Minix, 219

 eXtensible Access Control Markup Language (XACML), 70

F

File allocation table (FAT) system

- corrupted data, 213
- data area, 210
- deleted data, 212
- DOS and Windows operating systems, 209
- extensions, 213
- FAT12 disk sizes, 209, 210
- FAT16, FAT32 and NTFS, 210
- floppy, 209
- fsstat tool, 211
- hidden data, 212
- mmls tool, 211
- primary and backup FAT structures, 210
- reserved area, 210
- unallocated/formatted data, 213

 File infectors, 38
 File-sharing/peer-to-peer (P2P) worm, 28

Firmware, 24
Flash worm, 28
Foremost tool, 259, 260

G

Global Navigation Satellite Systems (GNSS), 301
GNU Privacy Guard (GnuPG), 105

H

Hardware, 24
Hardware/network security issues in mobile/
smart devices, 173
Hardware-based keyloggers
acoustic keyloggers, 34
electromagnetic emissions, 34
firmware-based, 34
keyboard hardware, 34
keyboard overlays, 34
optical surveillance, 34
physical evidence, 34
smartphone sensors, 34
wireless sniffers, 34
Hierarchical file systems (HFS), 221, 222
Host header injection, 42
HTML-Proxies, 29

I

Information hiding and protection
asymmetric encryption
algorithms, 100–104
commitment schemes, 114
cryptography applications
Apple OS/X, 109–111
browsers, 105–107
e-commerce, 104, 105
email communication, 105
Internet/online communications and
e-commerce, 104
operating systems and disks, 107–109
telecommunication/networks, 107
digital time-stamping, 115
encryption, 92
experience/ability section, 119, 120
hashing/steganography, 92
information authentication, 113
information concealment, 91, 92
information concealment/authenticity
techniques, 115–117
information integrity, 91

information integrity and authentication
techniques, 111–113
information system/website, 92, 93
knowledge sections
cipherng/encryption algorithms, 95
cryptography/encryption, 93–95
key-based encryption techniques, 95
methods, 95
message authentication, 113
password storage
and verification, 114, 115
skills section
encryption algorithms, 117
encryption applications, 118
information concealment
applications, 119
information integrity algorithms, 118
information integrity applications, 118
symmetric encryption algorithms
block ciphers, 95–100
BlowFish, 100
stream ciphers, 100
Information location
description, 3
hard and flash drives, 4
in motion, 4
Information security, 10–12
Information security cases, 12, 13
Information sensitivity
categories, 4
confidential information, 4
private information, 5
public information, 5
Information state
creation, 2
description, 2
processing, 3
storage, 3
transition, 3
Information taxonomy, 2
Internet Bot, 31
Internet DOS, 29
Internet of Things (IoT), 11
Internet Protocol Security (IPSec), 107
Internet Relay Chat (IRC) worm, 28
Internet traces
applications, 229
Google Chrome, 230, 232
Mozilla Firefox, 231
MS Internet explorer, 230
OSI layers' perspective, 230
Intrusion Detection/Protection Systems (IDS/
IPS), 267–269

J

Jail-breaking, mobile devices, 172

K

Keyloggers, 32–35

Knowledge sections, 1–12, 17–44

L

Lightweight Directory Access Protocol (LDAP) injection attacks, 42

Linux operating systems

directories, 234

disk forensics, 233

forensic investigation, 234

forensic investigator, 235

forensic tools, 234

Linux logon log files, 235

tools, 235

versions/flavors, 233

web browsers, 235

Linux Rootkit Checker, 242

Linux Unified Key Setup (LUKS), 110

Locker ransomware, 24

Logic bombs, 41

M

MAC flooding attack, 131, 132

MAC operating systems, 236, 237

Macro viruses, 38

Malware analysis, Software code security

anti-malware detection techniques, 195

manual, 197

NSRL server, 198

software applications, 194

Malware attacker, 140

Malware threats

access or intrusion method, 164

Android platform, 166

Brain Test, 167

Dendroid, 166

Hiddad, 167

hiding methods, 165

payload, 164

Pegasus spyware, 165

Pretender Applications, 166

propagation, 164

RuMMS, 167

Triada, 167

ViperRAT, 166

XcodeGhost, 167

Malwares

applications section

dangerous website, 46–47

Keylogger, 45, 46

Microsoft safety scanner, 44, 45

outlook account, 47, 48

TDSSKiller, 48–50

knowledge sections

Adware, 20–22

backdoors, 31

browser Hijacking, 41

classes, 18

code injection, 41–43

Crimeware, 35–37

hardware-based keyloggers, 34, 35

Internet Bot, 31, 32

Keylogger, 32, 33

logic bomb, 41

pharming, 43

phishing, 40

Ransomware, 24–26

Rogue security software, 31

Rootkits, 22–24

Scareware, 37

software Bugs, 39

software-based keyloggers, 33

spamming, 40

spyware, 18–20

taxonomy of, 17

Trojan horses, 29–31

Viruses, 37–39

Worms, 26, 28, 29

skills section, 44

Memory forensics

analysis with volatility, 240

BIOS, 223

computing systems, 223

data analysis, 223

information, 223, 224

ROM, 223

size, 223

tools

analysis, 225

Dumpit, 225

FTK Imager memory capture, 226

Linux, 227

Redline, 226

simple/generic, 225

Volatilitux, 226

volatility, 225, 226

virtual, 223

Mobile and wireless security

access control models, 174

AES crypto-engine, 174

age of using mobile phones, 161

- anti-malware apps, 168
 - application code signing, 162
 - applications, 178
 - booting process, 173
 - bring your own device (BYOD), 162, 163
 - consumer reports, 161
 - hardware/network, 173
 - installation, unknown/un-trusted stores, 167
 - jail-breaking, 172
 - location-based services and privacy control, 176
 - malware threats (*see* Malware threats)
 - operating systems, 170
 - OSNs, 169
 - physical thefts, 172
 - remote wipe feature, 176
 - Sandboxing, 171
 - skills
 - Smart devices operating systems, 177
 - Software security issues, 177
 - theft and loss/unauthorized access, 163, 164
 - TLS/SSL, 175
 - transmissions, 175
 - unsecured network connection, 175
 - updates, operating systems, 172
 - usage, 161
 - users/software, 162
 - Mobile anti-malware systems, 168
 - Mobile forensics
 - company to seize, 307
 - device folders, 305
 - device information, installed apps, call history, contacts, and messaging, 307
 - device seize, 301
 - device states, 300, 305
 - GPS, 301, 306
 - hardware and software, 299
 - mobile device features, 298
 - operating systems, 299, 300, 304
 - SIM card, 300, 306
 - tools, 301, 302
 - Monte Carlo analysis, 79
 - Multi-variant virus, 38
- N**
- NAC, *see* Network access control (NAC)
 - National Institute of Standards and Technology (NIST), 99
 - Near Field Communication (NFC), 299
 - Network access control (NAC), 125
 - Network attacker, 140
 - Network attacks
 - address resolution protocol, 129
 - countermeasures, 129
 - data modification, 126, 127
 - denial, service attack, 130
 - eavesdropping, 125, 126
 - MAC flooding, 131, 132
 - Packet sniffers, 134
 - SMURF, 133
 - Spoofing
 - ARP, 127–129
 - identification, 126
 - TCP SYN flooding, 132
 - Network forensics
 - ARP spoofing, 273
 - DHCP servers, 250
 - Ethernet cards promiscuous mode, 251
 - firewalls, 267
 - Foremost, 259, 262, 273
 - IDS/IPS, 267–269, 274, 275, 277, 279, 281
 - NIC Promisc Mode, 273
 - packet filtering, 254–257, 261
 - port mirroring, 264
 - real time, analysis, 249
 - routers, 265, 266
 - SDN switches, 273
 - static, analysis, 249
 - switches, 261–264, 274
 - traffic analysis, 247–249, 272
 - wire tapping, 250
 - wireless communication, 269, 270
 - wireless tapping, 250, 251
 - Wireshark, 252–255
 - Network layer, 124
 - Network security
 - application layer, 122
 - applications, 137
 - attacks (*see* Network attacks)
 - cyber-attacks, 121
 - network traffic analysis, 134–137
 - OSI Model, 121–123
 - transport Layer (*see* Transport layer)
 - Non-resident viruses, 38
 - NTFS systems, disk forensics, 214–216
- O**
- Object-based access control (OBAC), 66, 67
 - Online Social Networks (OSNs), 169
 - Open Systems Interconnection model (OSI Model)
 - layers, 121, 122
 - protocols, 123

Operating systems security issues, mobile/
smart devices, 170
Organization's risk tolerance, 73
Output FeedBack (OFB), 97

P

Packet Sniffing attacks, 134
Personal Information Manager (PIM), 299
Pharming, 43
Phishing, 40
Physical security, 126
Physical thefts, mobile phones, 172
Physical-world DOS, 29
Physical-world Reconnaissance, 29
Policy Administration Point (PAP), 67
Policy Decision Point (PDP), 66
Policy Enforcement Point (PEP), 66
Private information, 5
Public information, 5
Public Key Encryption (PKE), 104

R

Radio frequency identification (RFID) virus, 38
Ransomware, 24, 26
Remote wipe feature, 176
Resident viruses, 38
Risk

- definition, 73
- impact of, 73
- metrics, 74
- monitoring, 74
- response, 74
- security, 73
- tracking, 74

Risk management and planning

- applications' section
 - assessment/model, 89
 - cyber security plan, 89–90
- knowledge sections
 - approaches, 76, 82, 83
 - assessment and model, 79
 - cyber security awareness, 81, 86
 - disaster recovery, 80, 81, 85
 - DRP sections, 85–86
 - forensics resources, 81, 82
 - incident response planning, 79, 80, 83, 84
 - policies, 77, 78
 - security, 75, 76
 - self-assessment survey, 84, 85
 - tolerance, 76, 77, 83
- skill's section

- development process, 88
- disaster recovery plan, 89
- disaster recovery planning, 87–88
- incident response plan, 88
- metrics, 87
- security incident responses, 87
- tracking, 87

Rivest-Shamir-Adleman (RSA), 101, 102

Rogue security software, 31

Role-based access control (RBAC)

- and OBAC, 66, 67

- in MAC, 64

- permissions, 64

- policies/roles, 65

- policy-based security systems, 64

Rootkits, 22–24, 48–50

RuMMS, 167

S

Sandboxing, 171

Scareware, 37

Script virus, 38

Secunia PSI software, 14

Secure phone booting process, 173

Secure shell (SSH), 107

Secure Socket Tunneling Protocol (SSTP), 107

Secure Sockets Layer (SSL), 104

Security

- mobile and wireless (*see* Mobile and wireless security)

- web (*see* Web security)

Security access controls

- applications sections

- OBAC systems, 70

- RBAC systems, 70

- websites and web-applications, 69

- authentication, 55

- components, 55

- database management systems, 53

- different database management, 54

- different operating systems, 54

- different websites and web-applications, 54

- knowledge sections

- database management systems, 59, 60

- digital certificates, 62–63

- distributed and operating systems, 63, 64

- identity management, 61

- Kerberos, 62

- OBAC and RBAC, 56

- operating and file systems, 56–59

- permissions, 56

- session time-out, 62

- SSO methods, 61
 - websites and web-applications, 60–61
 - OBAC, 53, 54
 - operating systems, 53
 - RBAC, 53, 54 (*see* Role-based access control (RBAC))
 - skills sections
 - in Linux, 68, 69
 - Windows SAM database, 67, 68
 - websites and web-applications, 53
 - Security awareness, 10
 - Security countermeasurement
 - description, 10
 - human, 10
 - legal, 10
 - organizational, 10
 - technical, 10
 - Security education, 10
 - Security goals
 - accountability, 6
 - authentication, 6
 - authorization, 6
 - availability, 5
 - confidentiality, 5
 - description, 5
 - identification, 6
 - integrity, 5
 - non-repudiation, 7
 - privacy, 6
 - Security risks, 7, 8
 - Security threat, 8
 - Security training, 10
 - Single-Sign-On (SSO), 61
 - Skills section, CIA triad - confidentiality, integrity and availability, 12, 13
 - Smart devices operating systems and security issues, 177
 - SMURF attacks, 133
 - Software Bugs, 39
 - Software code security
 - evaluation, software programs, 198
 - management and control of information, 183
 - perspectives, 199
 - skills
 - Malwares, 198
 - reviews, 198
 - testing tools, 197
 - and vulnerability issues (*see* Vulnerability, Software code security)
 - Software Defined Networking (SDN)
 - Controllers, 64
 - Software security issues, smart devices, 177
 - Software-based keyloggers, 33
 - API-based, 33
 - grabbing based, 33
 - hypervisor-based, 33
 - Javascript-based, 33
 - kernel-based, 33
 - memory injection based, 33
 - Spamming, 40
 - Spyware
 - ActiveX control, 19
 - anti-spyware, 19
 - browser add-ons, 19
 - computer programs, 18
 - devices, 19
 - disable active-X, 20
 - drive-by download, 19
 - installation, 20
 - piggybacked software installation, 19
 - pop-up blocker, 20
 - type of, 18
 - "X" icon, 20
 - SQL GRANT/REVOKE commands, 60
 - SQL injection (SQLi), 42
 - SQL injection attack
 - automated, 149
 - deleting, updating and inserting data, 154
 - initiation, 150
 - input validation vulnerability, 150, 151
 - mitigation, 152
 - skills, 152, 153
 - statements, 149
 - steal data, 150, 152
 - Web application, 154
 - Yahoo Voices, 149
 - Statistical database, 147
 - Steal data, 150, 152
 - Subscriber Identity Module (SIM) card, 300
 - Swarm worm, 28
- T**
- TCP SYN flooding, 132
 - TDSSKiller, 48, 49
 - Theft and loss/unauthorized access, mobile devices, 163, 164
 - Time Stamping Authority (TSA), 115
 - Transmission Control Protocol (TCP), 122
 - Transport layer
 - Network layer, 124
 - routing and translation, addresses, 125
 - types of addresses, Internet, 124, 125
 - UDP, 123
 - TCP, 122
 - Transport Layer Security (TLS), 105

Transport Layer Security (TLS) or Secure Socket Layer (SSL), 175
 Triada, 167
 Trojan horses, 29–31
 TrueCrypt, 110
 Trusted Third Party (TTP), 104

U

Ubuntu shadow content, 114
 Unsecured wireless network connection, 175
 User Datagram Protocol (UDP), 123
 User-mode/kernel-mode hybrid Rootkit, 23
 Users/software security,
 mobile/smart devices, 162

V

VeraCrypt, 110
 Vetting, 162
 Virtual Private Networks (VPNs), 105
 Virus detection pop-up window, 14
 Virus life cycle
 dormant phase, 39
 execution phase, 39
 propagation phase, 39
 triggering phase, 39
 Viruses, 37–39
 Vulnerability, 9
 Vulnerability threats, 74
 Vulnerability, Software code security
 anti-malware detection
 techniques, 195–197
 buffer and stack overflows, 184
 design flaws
 changes, 193
 control modules and APIs, 193
 encryption, 193
 sensitive data, 193
 validate user inputs, 192, 193
 design principles
 and practices, 190–192
 exception handling, 194
 feedback exceptions, 194
 malware analysis, 195
 manual malware analysis, 197
 memory leak and violation
 issues, 185
 race conditions, 187, 188
 SQL injection and XSS, 185–187
 static and dynamic security analysis,
 188–190
 techniques and tools, 188

W

Warhol worm, 28
 Web application code, 140
 Web browser, 140
 Web forensics
 artifacts for investigation, 294
 criminal and civil cases, 295
 criminal cases with web, 291
 email
 and browsers information, 292
 clients, 285
 file reports, 291
 files, 289, 290
 forensics tools, 286, 287
 headers, 287–289
 headers review, 293
 mail servers, 285
 protocols, 285
 scan for archived files, 293
 software, 295
 steps, 284
 web browsers, 291, 292
 web browsing history, 294, 295
 Web logs, 233
 Web security
 and database (*see* Database security)
 applications, 139, 155
 Cloud, 139
 online transactions, 139
 threat models, 140–144
 Web threat models
 cross site scripting
 Cookie encryption, 143
 Cookies associated with a web page,
 142
 impacts, 143
 sever response, 142
 techniques, 141
 textbox and text area, 141, 142
 URL, 141
 CSRF, 143, 144
 malware attacker, 140
 network attacker, 140
 web attacker, 140
 Wide Area Networks (WAN), 265
 Windows operating systems
 event viewers, 232, 233
 forensic investigations
 artifacts, 229
 backdoors/Rootkits, 228
 disk, 228
 keyword searches, 227
 malicious processes, 228

- review, 227
 - unauthorized user accounts/groups, 228
 - versions of, 228
 - Windows registry, 229, 241
 - Wire tapping, 250
 - Wireless security, *see* Mobile and wireless security
 - Wireless tapping, 250, 251
 - Worms
 - activation, 27
 - malicious code, 26
 - payloads, 28
 - propagation techniques, 28
 - scanning, 27
 - types of, 27, 28
- X**
- XcodeGhost, 167
 - XML injection, 42
 - XPath injection, 42