

# Index

## Symbols

---

%b fields (logs), 45  
%h fields (logs), 45  
%r fields (logs), 45  
%{Referer}i fields (logs), 46  
%>s fields (logs), 45  
%t fields (logs), 45  
%u fields (logs), 45  
%{User-agent}i fields (logs), 46  
%v fields, 57  
| (pipes), redirecting logs, 47  
/ (slashes), trailing slash problems, 78-79  
\* (wildcards), configuring  
  IP-based virtual hosts, 85  
403 Forbidden/Access Denied, 35  
404 Document Not Found  
  responses, redirecting, 64-65  
443, as default SSL port, 124

## A

---

Accept mechanism, tuning  
  Apache, 171  
AcceptFilter directive, 172  
access control. *See also*  
  authorization; security  
  Apache 2.2, 117  
  browser types, restricting  
  access by, 114  
  CGI scripts, restricting  
  execution, 110  
  combining control methods,  
  106  
  custom access denied  
  pages, 106-107

denial-of-service attacks,  
  110  
denying system access, 109  
directory listings, disabling, 111  
D<Directory> section, using,  
  115  
hotlinking, preventing,  
  112-113  
HTTP methods, restricting,  
  113-114  
IP addresses, allowing/deny-  
  ing specific access,  
  104-105  
L<Location> section, using,  
  115  
mod\_ssl and complex  
  access control, 143  
need for, understanding,  
  97-98  
overview, 100  
restricting by default, 121-122  
self-controlled password-  
  protection for users, 108  
Server: headers, changing,  
  111-112  
  user databases, creating,  
  101-102  
access denied errors, 35  
access forbidden problems,  
  40-41  
access logs, description of, 44  
AccessFilename directive, 95  
Action directive, 68  
AddDefaultCharset directive,  
  77  
AddHandler directive, 65, 110  
AddModule directive, 17

## AddModuleList directive

AddModuleList directive, 119

address already in use errors,  
startup errors, 32-33

AJP protocol, 193

alert argument (LogLevel  
directive), 26

Alias directive, 61-62

AliasMatch directive

default name-based virtual  
hosts, configuring, 88

favicon.ico requests,  
redirecting, 16

URL patterns, mapping to  
files, 62

All (per-directory  
configuration files), 95

Allow directive

access control and, 100  
browser type, restricting  
access by, 114

specifying allowed  
addresses, 104

AllowOverride directive, 95

AllowOverride none, 170

alternatives to Apache, 179

Apache

advantages of, 3-4

alternatives to, 179

configuration file. *See*  
configuration files  
(Apache)

downloading, 6

groups run as, changing, 14

installations. *See*  
installations (Apache)

IP addresses, changing, 13-14

modules

adding without  
recompiling, 18-19  
enabling/disabling, 17  
listing compiled-in  
modules, 16

my Web Page icons,

providing, 15-16

official website, 6

ports, changing, 13-14

publishing content, 19-20

server names, specifying, 15

starting/stopping, 11-13

users run as, changing, 14

versions, security  
differences, 98

Apache 1.3. *See also* Apache

caching in, 182

comparing to 2.0, 4

DAV, installing, 149-150.

*See also* DAV

Apache 2.0. *See also* Apache

caching in, 182, 191-192

comparing to 1.3, 4

DAV, installing, 149. *See*  
*also* DAV

Apache 2.2. *See also* Apache

access control, 117

caching in, 182, 191-192

Apache LogView SQL tool, 52

Apache Monitor, 12, 30

Apache-SSL. *See* SSL

apache.exe executable, 12

apachectl configtest  
command, 27

apachectl tool, 11-12

apachetop tool, 51

apxs tool, 18

archiving logs, 53

asymmetric cryptography, 126

Authconfig (per-directory  
configuration files), 95

AuthDBMAuthoritative  
directive, 104

AuthDBMGroupFile directive,  
104

AuthDBMUserFile directive,  
104

**authentication.** *See also* access control

- application level management, 116
- basic authentication, 98–100
- configurations, 101
- differences in Apache versions, 98
- digest authentication, 98–100
- mod\_auth\_anon, 115
- mod\_auth\_ldap, 115
- mod\_security, 116
- mod\_ssl, 115
- third-party modules for, 116

**AuthGroupFile directive,** 103

**AuthName directive,** 101

**authorization.** *See also* authentication

- configurations, 101
- differences in Apache versions, 98
- with Require directive, 103–104
- SSL. *See* SSL

**AuthType directive,** 101

**AuthUserFile directive,** 101

**AWStats, log analysis,** 51

---

## B

---

backend servers, hiding, 185

bandwidth, limiting, 174–175

bandwidth share module, 174

basic authentication, 98–100.  
*See also* authentication

**BindAddress directive,** 14

binding to ports, 33. *See also* could not bind to port errors

**Boa,** 178

bottlenecks, finding, 164

**BrowserMatch directive,** 73

browsers, controlling access by browser type, 114

**BufferedLogs directive,** 170

buggy clients (DAV), 157–158

builtin value (SSLPassPhraseDialog), 135

bzip2 compressed releases, 7

---

## C

---

–c option, adding users to user databases, 102

**CA (Certificate Authorities).**  
*See* Certificate Authorities (CAs)

ca argument, creating client certificates, 140

CA.pl wrapper script, creating client certificates, 140

**CacheDisable directive,** 191

**CacheEnable directive,** 191

**CacheGcInterval directive,** 191

**CacheMaxExpire directive,** 191

**CacheRoot directive,** 190

**CacheSize directive,** 190

caching, 181

- in Apache, 182, 191–192
- with proxies, 190
- tuning Apache, 177–178

cadaver, accessing DAV, 156–157

cannot determine hostname errors (startup errors), 34

case sensitivity

- BrowserMatch/SetEnvIf directives, 73
- URLs, fixing problems, 80–81

certificate signing requests, 129–131

certificates

- client certificates, creating, 139–141
- definition of, 124

## certificates

- expired certificates, 139
  - mismatched domains, 139
  - SSL. *See* SSL, certificates
- Certificate Authorities (CAs), 128.** *See also* certificates
  - unknown CAs, 139
- CGI scripts**
  - associating with HTTP
    - methods/MIME types, 68-69
  - DAV and, 158-159
  - description of, 67
  - disabling for security, 120
  - performance, improving, 69-70
  - resources, marking as CGI, 67-68
  - restricting execution, 110
  - troubleshooting, 69
- character sets**
  - default charsets, assigning, 77
  - negotiating, 75
- charsets. *See* character sets
- chmod utility, 34-35
- clear text, security dangers, 99
- ClearModuleList directive, 17, 119
- client certificates, creating, 139-141
- Client denied by server configuration statements, 35
- Combined Log Format, creating, 44-46
- command line
  - DAV, accessing, 156-157
  - kill command, 30
  - SSL, testing, 141-142
  - testing Apache from, 27-28
- Common Gateway Interface scripts.** *See* CGI scripts
- Common Log Format, creating, 44-46**
- Common Name fields (certificates), 130**
- compiled-in modules, listing, 16
- compression
  - with filters, 204
  - tuning Apache, 177-178
- conditionally logging requests, 47-48
- configuration files (Apache)**
  - compiled-in modules, listing, 16
  - multiple configuration files, using, 10-11
  - overview, 9-10
  - per-directory configuration files, 94
    - disabling, 96
    - scope of, controlling, 95
- configuration problems, testing, 27**
- configure command, 17**
- configuring**
  - Prefork MPM, 197-198
  - Worker MPM, 199-200
- connections**
  - limiting, 174-175
  - testing with traceroute utility, 39
  - to Tomcat, 193
  - troubleshooting, 39-40
- content handlers, defining, 65**
- content negotiation**
  - configuring, 75-76
  - disadvantages of, 77
  - overview, 74-75
- could not bind to port errors (startup errors), 33**
- could not open configuration file errors (startup errors), 34**
- could not open log errors (startup errors), 34**
- CPUs, tuning Apache, 164

- crashes, automatically restarting after, 55–56
- crit argument (LogLevel directive), 26
- CSRs. *See* certificate signing requests
- CustomLog directive
  - conditionally logging requests, 47
  - creating custom logs, 46
  - external programs, redirecting logs to, 47
  - virtual hosts, logging separately, 57

## D

---

- databases, logging to, 52
- DAV
  - accessing
    - from command line, 156–157
    - from Firefox, 155
    - from Microsoft Office, 152
    - from Windows, 153–154
  - advantages of, 147
  - buggy clients, 157–158
  - configuring, 150
  - DavLockDB directive, 160–161
  - dynamic content and, 158–159
  - HTTP protocol and, 148
  - installing, 149–150
  - mod\_speling and, 158
  - overview, 145, 147
  - per-user pages, enabling, 159–160
  - securing, 150–151
- DAV-enabled directories, password protecting, 110
- DavLockDB directive, 160–161
- dbmmanage, 104
- debug argument (LogLevel directive), 26
- debugging
  - Apache with Apache, 31
  - virtual host setups, 91
- DefaultLanguage directive, 77
- denial pages (access control), customizing, 106–107
- denial-of-service attacks, 110
- Deny directive, 100, 114
- digest algorithms, 99
- digest authentication, 98–100. *See also* authentication
- Direct Memory Access support, 164
- directive containers
  - for conditional evaluation, 21–22
  - default Apache directive containers, 20–21
  - overview, 20
- directives, configuration files and, 10
- Directory container, 104
- <Directory> directive containers, 20
- Directory index forbidden by rule statements, 35
- directory listings, disabling for access control, 111
- <Directory> section, 115
- Directory sections, tilde characters, 21
- DirectoryIndex directive, 111
  - disable-module, 17
- <DirectoryMatch> directive containers, 20
- disk speeds, increasing, 164
- DNs (Subject Distinguished Names), 138
- Document not found errors, 40
- document tree, making read only, 110

## DocumentRoot directive

- DocumentRoot directive, 19, 85
- DoS attacks, 173
- downloading Apache, 6
- DSSL flag, 135
- dynamic content, DAV and, 158-159. *See also* CGI scripts

---

**E**


---

- emerg argument (LogLevel directive), 26
- enable-module, 17
- enable-shared=max option, 7
- enable-ssl option, 133
- enabling
  - forward proxy support, 183-184
  - proxy support, 183
- encoding, negotiating, 75
- encryption keys. *See also* SSL, certificates
  - overview, 126
  - pairs, creating, 127
  - password-protected pairs, creating, 127-128
  - passwords, removing, 128
- End Task button (Windows Task Manager), 31
- environment variables
  - accessing, 72
  - conditionally logging requests, 47-48
  - logging, 72
  - setting, 71-73
  - special environment variables, overview, 74
- error argument (LogLevel directive), 26

- error logs
  - files of, 37
  - LogLevel directive, 25-26
  - overview, 24
- error.log, 24. *See also* error logs
- ErrorDocument directive, 88
- ErrorLog directive, 24
- errors. *See* troubleshooting
- Event MPM, 200
- ExecCGI parameter (Options directive), 69
- experimental MPMs, 200
- explicit configuration settings, denying system access, 109
- ExtendedStatus, 172
- ExtendedStatus On directive, 49
- external processes, controlling, 167

---

**F**


---

- facilities. *See* syslog facilities
- failed requests, redirecting, 64-65
- failures (Apache), automatically restarting Apache after, 55-56
- FastCGI, 70, 178
- favicon.ico Not Found log entries, 58
- favicon.ico requests, redirecting, 15
- File favicon.ico Not Found log entries, 58
- File robots.txt Not Found log entries, 58
- file systems, 168
- FileInfo (per-directory configuration files), 95
- <Files> directive containers, 21
- Files sections, tilde characters, 21

<FilesMatch> directive  
 containers, 21  
 filters, 195, 201–202  
   compression with, 204  
 Firefox, accessing DAV, 155  
 FollowSymLinks parameter,  
 109, 169  
 forking, 196  
 forward proxies, 182–184  
 FTP servers, Apache as, 202–203

## G–H

---

gensa, 127  
 graceful restarts (Apache), 13  
 Group directive, 14  
 groups  
   Apache server running as,  
   changing, 14  
   authorizing. *See* authorization

handlers. *See* content handlers  
 hdparm utility, 164  
 Header directive, 189–190  
 headers  
   malformed header from  
   script errors, 37  
   manipulating in reverse  
   proxies, 189–190  
   passing proxy information,  
   188  
   premature end of script  
   headers errors, 37  
 hiding backend servers, 185  
 hosting. *See* virtual hosts  
 HostNameLookups directive,  
 54–55, 171  
 hostnames  
   IP addresses, replacing with  
   hostnames, 54–55  
   resolving, 34

Host: headers, name-based  
 virtual hosts and, 86–87.  
*See also* name-based virtual  
 hosts  
 hotlinking, access control for,  
 112–113  
 .htaccess files, allowing users  
 self-protection, 108. *See also*  
 per-directory configuration  
 files  
 htdbm, 104  
 htdocs/ directory, publishing  
 content, 19  
 HTML, validating with Tidy, 81  
 htpasswd utility, 101  
 HTTP  
   content negotiation, 74–77  
   DAV and, 148  
   methods, restricting for  
   access control, 113–114  
 httpd -M, 16  
 httpd -S, 91  
 httpd -V, 5  
 httpd process, 29–30  
 httpd.conf. *See* configuration  
 files (Apache)  
 httpd.pid Overwritten log  
 entries, 58  
 HTTPS, 124. *See also* SSL  
 HUP, kill command and, 30

## I

---

IE (Internet Explorer),  
 server-generated error  
 messages and, 107  
 <IfDefine> directive  
 containers, 22  
 IfDefine SSL block, 134  
 <IfModule> directive  
 containers, 22  
 ifModule sections, 17

## ImageMagick tools

- ImageMagick tools, 178
- Include directive, 10, 134
- Indexes (per-directory configuration files), 95
- info argument (LogLevel directive), 26
- installations (Apache)
  - checking for, 5
  - Linux/Unix OSs, installing on, 6-7
  - multiple version installations, 8-9
  - Windows PCs, installing on, 8
- internal server errors
  - malformed header from script errors, 37
  - premature end of script headers errors, 36-37
  - questions to ask, 41
  - segmentation faults, 36
- IP address resolution, controlling, 54
- IP addresses
  - access control, 104-105
  - Apache servers, changing IP addresses, 13-14
  - hostnames, replacing IP addresses with hostnames, 54-55
  - logged addresses, processing, 54-55
- IP-based virtual hosts. *See also* virtual hosts
  - configuring, 84-85
  - default hosts, configuring, 89-90
  - definition of, 84
  - mixing with name-based virtual hosts, 90-91

---

**J-K**


---

- keepalive support, disabling, 74
- KeepAlives, tuning Apache, 172-173
- KeepAliveTimeout directive, 172
- keys (encryption). *See* encryption keys
- kill command, 30
- killall command, 30

---

**L**


---

- LanguagePriority directive, 77
- languages
  - defaults, assigning, 77
  - negotiating, 75
- lighttpd, 178
- <Limit> directive, 113
- Limit (per-directory configuration files), 95
- <LimitExcept> directive, 113, 151
- LimitRequestBody directive, 174
- LimitRequestFields directive, 174
- LimitRequestFieldSize directive, 174
- LimitRequestLine directive, 174
- LimitXMLRequestBody directive, 174
- links, monitoring linkers, 48
- Linux
  - file descriptors, increasing, 166
  - file systems, mounting with noatime, 168
  - installations (Apache), 5-7
  - limits, increasing, 165
  - process limits, increasing, 165-166



- Listen directive
  - ports/IP addresses, changing, 13-14
  - SSL, configuring Apache for, 134
  - V<VirtualHost> sections, 84
- load balancing
  - with proxies, 192
  - tuning Apache, 176-177
- LoadModule directives, 16, 19
- local0 – local10 facilities. *See* syslog facilities
- <Location> directive
  - containers, 21
- <Location> section, 115
- Location sections, tilde characters, 21
- <LocationMatch> directive
  - containers, 21
- LogFormat directive, 44–46
- logging, disabling/minimizing, 170
- LogLevel directive, 25–26
- logresolve tool, processing logged IP addresses, 55
- logs. *See also* access logs; error logs
  - %b fields, 45
  - %h fields, 45
  - %r fields, 45
  - %o{Referer}i fields, 46
  - %o>s fields, 45
  - %ot fields, 45
  - %o{User-agent}i fields, 46
  - %ou fields, 45
  - archiving, 53
  - common entries, 58
  - conditionally logging requests, 47-48
  - custom log files, creating, 46
  - databases, logging to, 52
  - default log files, 43-44
  - external programs, redirecting logs to, 47
  - IP address resolution, controlling, 54
  - IP addresses, processing, 54-55
  - linkers, monitoring, 48
  - LogFormat directive, 44-46
  - merging and splitting, 56-57
  - open-source tools, analyzing with, 51
  - real time monitoring, 51-52
  - rotating, 53
  - system log daemon, as error log, 25
  - unusual requests, 59
  - virtual hosts, separate logs for, 57
- logs/ directory, 24. *See also* error logs
- Logscan, 52
- logtool project, 56
- lsuf tool, 29
- lynx command-line browser, testing Apache from, 28. *See also* command line

---

## M

---

- Mac OSX
  - file descriptors, increasing, 166
  - installations (Apache), checking for, 5
  - limits, increasing, 165
  - process limits, increasing, 165-166
- malformed header from script errors, 37
- mapping URLs. *See* URL mapping

## MaxKeepAliveRequest directive

- MaxKeepAliveRequest
  - directive, 173
  - merging log files, 56–57
  - methods, associating with CGI scripts, 68–69. *See also* HTTP, methods
- Metux MPM, 201
- Microsoft Knowledge Base, server-generated error messages, 107
- Microsoft Office, accessing DAV, 152
- MIME types
  - CGI scripts, associating with, 68–69
  - configuring, 66
  - description of, 66
- mod\_jk module, 193
- mod\_proxy, enabling support, 183. *See also* proxies
- mod\_proxy\_ajp module, 193
- mod\_proxy\_html module, 186
- module not compatible errors (startup errors), 33–34
- modules
  - adding without recompiling, 18–19
  - compiled-in modules, listing, 16
  - disabling for security, 118–119
  - enabling/disabling, 17
  - filters. *See* filters
  - MPMs. *See* MPMs
  - Protocol. *See* Protocol modules
- mod\_access. *See* access control
- mod\_actions, 68
- mod\_apache\_snmp, 50. *See also* SNMP
- mod\_auth, 151. *See also* access control
  - mod\_auth\_anon, 115
  - mod\_auth\_basic, 117
  - mod\_auth\_dbm, 104
  - mod\_auth\_digest, 117
  - mod\_auth\_ldap, 115
  - mod\_authn\_alias, 117
  - mod\_authn\_dbm, 117
  - mod\_authn\_file, 117
  - mod\_autoindex, 111
  - mod\_backhand, 177
  - mod\_bandwidth, 174
  - mod\_cache module, 177, 191
  - mod\_cgi, 37. *See also* CGI scripts
  - mod\_choke, 175
  - mod\_dav module. *See* DAV
  - mod\_deflate module, 178
  - mod\_disk\_cache module, 191
  - mod\_file\_cache module, 191
  - mod\_include, 71, 110
  - mod\_logio tool, 31
  - mod\_log\_spread, 170
  - mod\_log\_sql, 52
  - mod\_loopback tool, 31
  - mod\_mem\_cache module, 191
  - mod\_nocase, 80
  - mod\_perl, 70, 178
  - mod\_require\_host, 175
  - mod\_rewrite
    - error log files, 37
    - hotlinking, preventing, 112
    - per-user pages, enabling, 160
    - URL mapping, 78
  - mod\_security, 116
  - mod\_setenvif, 73
  - mod\_snmp, 50. *See also* SNMP
  - mod\_speling, 79–80
    - DAV and, 158
    - disabling, 109
  - mod\_ssl
    - alternatives to, 141
    - authentication, 115

compiling, 132-133  
 complex access control, 143  
 configuring Apache,  
   133-134  
 default IP-based virtual  
   hosts, configuring, 89  
   purpose of, 125  
**mod\_status**, 49, 172  
**mod\_tee** tool, 31  
**mod\_throttle**, 175  
**mod\_tidy**. See *Tidy*  
**mod\_trace\_output** tool, 31  
**mod\_tsunami**, 175  
**mod\_userdir**, 159  
**mod\_validator**, 81  
**mod\_vhost\_alias**, 93, 160  
**mod\_vhost\_dbi**, 93  
**mod\_vhost\_ldap**, 93  
**mod\_virtualhost\_alias**, 92  
 monitoring Apache  
   with **mod\_status**, 49  
   in real times, 51-52  
   with SNMP, 50  
**MPMs (Multi Processing  
 Modules)**, 195  
   Event MPM, 200  
   experimental MPMs, 200  
   Metux MPM, 201  
   Perchild MPM, 200  
   Prefork MPM, configuring,  
     197-198  
   process-based MPMs, 196  
   selecting, 196  
   threaded MPMs, 198  
   Worker MPM, configuring,  
     199-200  
**Multipurpose Internet Mail  
 Extensions**. See *MIME types*  
 multiviews, enabling, 76  
 my Web Page icons, providing,  
   15-16

---

## N

---

**name resolutions**, 34  
**name-based virtual hosts**. See  
*also* **virtual hosts**  
   configuring, 86-87  
   default hosts, configuring,  
     88-89  
   mixing with IP-based virtual  
     hosts, 90-91  
   overview, 86  
   SSL, 137-138  
**NameVirtualHost** directives,  
   87, 90  
**negotiation (content)**. See  
   **content negotiation**  
**netstat** tool, 29  
**network connectivity**, testing  
   with *traceroute* utility, 39  
**networks**, tuning Apache  
   Accept mechanism, 171  
   AcceptFilter directive, 172  
   HostnameLookups, 171  
   KeepAlives, 172-173  
   **mod\_status**, 172  
**noatime** option, 168  
**NoCase** directive, 80  
**nokeepalive** variables, 74  
**None** (per-directory configura-  
   tion files), 95  
**notice** argument (**LogLevel**  
   directive), 26

---

## O

---

**open-source tools**, analyzing  
   logs, 51  
**OpenSSL**. See *also* **SSL**  
   certificate signing requests,  
     129-130  
   compiling, 125-126  
**openssl** command, 127. See  
   *also* **SSL**

openwebfolder extension

- openwebfolder extension (Firefox), accessing DAV, 155
- optimization. *See also* tuning Apache
  - CGI scripts, 69–70
  - file systems, 168
  - reverse proxies, 187–188
  - SSL, 136–137
- Options (per-directory configuration files), 95
- Options +ExecCGI directive, 68
- Options +Multiviews directive, 76
- Options -IncludesNoExec directive, 110
- Options directive
  - directory listings, disabling, 111
  - ExecCGI parameter, 69
  - FollowSymLinks parameter, 109, 169
  - SymLinksIfOwnerMatch parameter, 109, 169
- Options ExecCGI is off in this directory statements, 35
- Order Allow,Deny directive, 100
- Order directive, 100, 115
- out switch, OpenSSL and, 127

## P

---

- pages (HTML). *See* HTML
- pairs of encryption keys, creating, 127
- PassEnv directive, 72
- password files. *See* user databases
- password-protected pairs of encryption keys, creating, 127–128
- passwords, allowing user control, 108
- Pthalizer, 51
- PATH\_INFO variable, 69
- PATH\_TRANSLATED variable, 69
- patterns (URLs), mapping with AliasMatch directive, 62
- PCs. *See* Windows PCs
- PEM format, creating client certificates, 140
- per-directory configuration files, 94
  - disabling, 96, 169–170
  - scope of, controlling, 95
- per-user pages (DAV), enabling, 159–160
- Perchild MPM, 200
- performance, definition of, 164. *See also* optimization; tuning Apache
- performance enhancement. *See* optimization
- permission denied errors (startup errors), 34
- permissions
  - access denied errors, 35
  - checking, 121
- pglogd, logging to databases, 52
- PHP, DAV and, 158–159
- piping logs, 47
- POP3 servers, Apache as, 203
- Port directive, comparing to Listen directive, 14
- ports
  - Apache servers, changing ports, 13–14
  - binding to, 33. *See also* could not bind to port errors
- Pound proxy, 193
- prefix option, 7
- Prefork MPM, configuring, 197–198

preforking, 197  
 premature end of script  
   headers errors, 36–37  
 preventing reverse proxies,  
   186  
 private keys. *See* encryption keys  
 process-based MPMs, 196  
   Prefork MPM, configuring,  
     197–198  
   Worker MPM, configuring,  
     199–200  
 Protocol modules, 196,  
   202–203  
 proxies, 181. *See also* reverse  
   proxies  
   caching proxies, 190  
   connecting to Tomcat, 193  
   enabling support, 183  
   forward proxies, 182–184  
   load balancing, 192  
   Pound, 193  
   Squid, 193  
   transparent proxies, 194  
 proxy functionality,  
   limiting/disabling, 121  
 ProxyErrorOverride directive,  
   186  
 ProxyIOBufferSize directive,  
   187–188  
 ProxyPass directive, 184–186  
 ProxyPassReverse directive, 185  
 ProxyPassReverseCookieDomain  
   directive, 186  
 ProxyPassReverseCookiePath  
   directive, 186  
 ProxyPreserveHost directive,  
   188  
 ps tool, 29  
 public key cryptography, 126  
 public keys. *See* certificates;  
   encryption keys  
 publishing content (Apache),  
   19–20

---

## Q–R

---

RAM, increasing, 164  
 rand switch, OpenSSL and,  
   127  
 read only, document tree as, 110  
 real time log monitoring,  
   51–52  
 Redirect directive, 63  
   404 Document Not Found  
     responses, redirecting,  
       64–65  
   default name-based virtual  
     hosts, configuring, 89  
   SSL, forcing universal  
     service under, 137  
 redirect-carefully environment  
   (DAV), 158  
 RedirectCarefully directive,  
   153  
 redirecting URLs  
   failed/unauthorized  
     requests, redirecting,  
       64–65  
   Redirect directive, 63  
   RedirectMatch directive,  
     63–64  
   trailing slash problems,  
     78–79  
 redirections, troubleshooting, 38  
 RedirectMatch directive,  
   63–64  
 Referer, logging headers, 48  
 regular expressions, definition  
   of, 62  
 relative paths, configuration  
   files and, 10  
 RemoveHandler directive, 65  
 RequestHeader directive, 190  
 requests. *See also* logs  
   abuse, preventing, 173  
   Accept mechanism, 171  
 Require directive, 101–104

restarting Apache

- restarting Apache, 11–12
  - automatically after failure, 55–56
  - graceful restarts, 13
- reverse proxies, 182
  - header manipulation, 189–190
  - hiding backend servers, 185
  - passing information in headers, 188
  - performance enhancement, 187–188
  - preventing, 186
  - SSL processing, 188
  - tuning Apache, 176–177
  - URL unification, 184–185
- RFC 2817 specification, 138
- RLimitCPU directive, 167
- RLimitMem directive, 167
- RLimitNProc directive, 167
- Robotcop module, 175–176
- robots, dealing with, 175–176
- robots.txt, 176
- robots.txt Not Found log entries, 58
- root, running servers as, 14
- rotatelog tool, 53
- rotating logs, 53

## S

---

- S option (httpd), 91
- sample scripts, removing for security, 120
- Satisfy directive, 106
- scalability, definition of, 164
- ScanErrLog, 52
- Script directive, 69
- ScriptAlias directive, 67
- ScriptLog directive, 69
- ScriptLogBuffer directive, 69
- ScriptLogLength directive, 69
- scrop, per-directory c-  
onfiguration files, 95
- sections, definition of, 10
- Secure HTTP. *See* SSL
- Secure Sockets Layer/Transport Layer Security. *See* SSL
- security. *See also* access control; authentication; authorization
  - CGI scripts, disabling  
unneeded scripts, 120
  - DAV, 150–151
  - differences in Apache versions, 98
  - modules, disabling  
unneeded modules, 118–119
  - permissions, checking, 121
  - proxy functionality, limiting/disabling, 121
  - restricting access by default, 121–122
  - sample scripts, removing, 120
  - updating Apache, 117
- segmentation faults, 36
- selecting MPMs, 196
- self-signed certificates, 131–132
- server names, specifying, 15
- server side includes. *See* SSI
- server-generated error messages, IE and, 107
- server-parsed content handler, configuring SSI, 71
- ServerAlias directive, 87
- ServerName directive
  - IP-based virtual hosts, configuring, 84
  - name-based virtual hosts, 87
  - server names, specifying, 15
- ServerRoot directive, 11, 19
- servers, 202–203

- ServerTokens directive, 112
- Server: headers, changing for access control, 111-112
- SetEnv directive, 72
- SetEnvIf directive, 73, 114
- SetFilter directive, 81
- SetHandler directive, 65, 68
- SIGHUP, kill command and, 30
- Simple Network Management Protocol. *See* SNMP
- sitecopy, accessing DAV, 157
- Skype, port conflicts with, 33
- slashes (/), trailing slash problems, 78-79
- SNMP, monitoring Apache with, 50
- source tarballs, downloading, 6
- special environment variables, 74. *See also* environment variables
- spelling, fixing URL spelling mistakes, 79-80
- splitting log files, 56-57
- Squid proxy, 193
- SSI
  - configuring, 71
  - overview, 70-71
- SSL
  - alternatives to mod\_ssl, 141
  - authorization modules and, 138
  - buggy implementations, handling, 142
  - certificates
    - certificate signing requests, 129-131
    - client certificates, creating, 139-141
    - expired certificates, 139
    - mismatched domains, 139
    - overview, 128-129
    - self-signed certificates, 131-132
    - unknown CAs, 139
  - compiling, 132-133
  - complex access control, 143
  - configuring Apache, 133-134
  - encryption keys. *See also* SSL, certificates overview, 126
    - pairs, creating, 127
    - password-protected pairs, creating, 127-128
    - passwords, removing, 128
  - forcing universal service under, 137
  - name-based virtual hosts and, 137-138
  - OpenSSL, compiling, 125-126
  - overview, 123-124
  - performance, improving, 136-137
  - SSLPassPhraseDialog directive, 135-136
  - starting Apache, 134-135
  - testing
    - from the command line, 141-142
    - installations of, 135
    - virtual hosts and, 92
    - warning messages when accessing, 139
    - workings of, 125
- SSL processing with reverse proxies, 188
- SSL/TLS. *See* SSL
- SSLCACertificateFile directive, 141
- SSLCertificateFile directive, 134
- SSLCertificateKeyFile directives, 134

## SSLEngine On directives

- SSLEngine On directives, 134
- SSLOptions directive, 138
- SSLPassPhraseDialog directive, 135–136
- SSLRequire directive, 143
- SSLVerifyClient directive, 141
- SSL\_BASE=/usr/local/ssl/, removing, 132
- starting Apache, 11–12
  - automatic restarts on failure, 55–56
  - graceful restarts, 13
  - with SSL support, 134–135
  - troubleshooting, 38
- startssl option, 135
- startup errors
  - address already in use errors, 32–33
  - cannot determine hostname errors, 34
  - could not bind to port errors, 33
  - module not compatible errors, 33–34
  - permission denied errors, 34
  - syntax errors, 32
- status settings, tuning Apache
  - Accept mechanism, 171
  - AcceptFilter directive, 172
  - HostnameLookups, 171
  - KeepAlives, 172–173
  - mod\_status, 172
- stopping Apache, 11–12, 30–31
- strings, regular expressions, 62. *See also* regular expressions
- stunnel, SSL and, 141
- Subject Distinguished Names (DNs), 138
- symbolic links, handling, 168, 170
- symlinks. *See* symbolic links

- SymLinksIfOwnerMatch parameter, 109, 169
- symmetric cryptography, 126
- syntax errors (startup errors), 32
- syslog facilities, 25
- system log daemon, as error log, 25. *See also* error logs

---

## T

- tail utility, 52
- .tar.bz2 releases, 7
- telnet clients, 28
- testing. *See* troubleshooting
- threaded MPMs, 198–200
- thttpd, 178
- Tidy, validating pages, 81
- tilde (per-user pages), 159
- tilde characters in sections, 21
- TimeOut directive, 174
- timeouts, preventing abuse, 173
- Tomcat, connecting to, 193
- traceroute utility, 39
- trailing slash problems, 78–79
- Transferlog directive, 46–47
- transparent proxies, 194
- troubleshooting. *See also* debugging
  - access denied errors, 35
  - access forbidden problems, 40–41
  - alternate tips for, 41–42
  - CGI scripts, 69
  - from command line, testing Apache, 27–28
  - configuration problems, testing, 27
  - connecting to Apache, 39–40
  - DAV, 157–158
  - DavLockDB directive, 160–161



Document not found errors, 40  
 error logs, 24-26  
 internal server errors, 36-37, 41  
 redirections, 38  
 running Apache.exe process, testing for, 29-30  
 starting Apache, 38  
 startup errors, 32-34  
 stopping Apache, 30-31  
 system log daemon, 25  
 virtual hosts, 88

**tuning Apache.** *See also optimization*

- abuse, preventing, 173-174
- caching, 177-178
- compression, 177-178
- connections/bandwidth, limiting, 174-175
- content negotiation, configuring, 170. *See also content negotiation*
- external processes, controlling, 167
- file system performance, improving, 168
- hardware tweaks, 164-165
- load balancers, 176-177
- module-specific optimizations, 178
- network/status settings, 171-173
- OS limits, increasing, 165
- process limits, increasing, 165-166
- reverse proxies, 176-177
- robots, dealing with, 175-176
- symbolic links, handling, 168, 170

**type maps, enabling multiviews, 76**

---

## U

**ulimit command, 165**

**unauthorized request, redirecting, 64-65**

**Unix**

- file descriptors, increasing, 166
- installations (Apache), 5-7
- limits, increasing, 165
- process limits, increasing, 165-166

**UnsetEnv directive, 72**

**updates, security and, 117**

**URL mapping**

- to files, 61-62
- with mod\_rewrite, 78
- redirecting, 63-65

**URL unification with reverse proxies, 184-185**

**URLs**

- case sensitivity, fixing problems, 80-81
- preventing reverse proxies, 186
- spelling mistakes, fixing, 79-80

**user authentication.** *See authentication*

**user databases, creating, 101-102**

**User directive, 14**

**UserDir enabled/disabled directives, 159**

**users**

- Apache server running as, changing, 14
- root, running servers as, 14

## V

- /var/log/httpd, 24
- variables (environment). *See* environment variables
- versions (Apache). *See* Apache
- virtual hosts
  - alternate host options, 92-94
  - debugging setups, 91
  - IP-based virtual hosts
    - configuring, 84-85
    - default hosts, configuring, 89-90
    - definition of, 84
  - logging separately, 57
  - mixing IP and name-based hosting, 90-91
  - name-based virtual hosts
    - configuring, 86-87
    - default hosts, configuring, 88-89
    - overview, 86
    - SSL, 137-138
  - non-matching requests, troubleshooting, 88
  - overview, 83
  - SSL and, 92
- <VirtualHost> directive
  - containers, 20, 137. *See also* virtual hosts
- <VirtualHost> sections, 84
- VirtualDocumentRootIP, 93
- VirtualScriptAlias directive, 92
- VirtualScriptAliasIP, 93
- Visitors, log analysis, 51
- vlogger tool, 57
- vmstat, 164

## W-Z

- warn argument (LogLevel directive), 26
- warning messages, accessing SSL websites, 139
- watchdog scripts, 55
- web crawlers, dealing with, 175-176
- web spiders, dealing with, 175-176
- Webalizer, 51
- WebDAV, 145, 147. *See also* DAV
- websites, Apache official site, 6
- wildcards (\*), configuring IP-based virtual hosts, 85
- Windows
  - DAV, accessing, 153-154
  - file descriptors, increasing, 166
  - limits, increasing, 165
  - process limits, increasing, 165-166
- Windows PCs, installations (Apache)
  - checking for, 5
  - installing Apache, 8
- Windows task manager, 30-31
- with-apache option, 132
- with-apxs switch, 18
- with-apxs2 switch, 18
- with-ssl=/usr/local/ssl/openssl, 133
- Worker MPM, configuring, 199-200