

FreeBSD Porter's Handbook

The FreeBSD Documentation Project

FreeBSD Porter's Handbook

by

Revision: [49021](#)

2016-06-29 12:43:37Z by mat.

Copyright © 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016
The FreeBSD Documentation Project

Copyright

Redistribution and use in source (XML DocBook) and 'compiled' forms (XML, HTML, PDF, PostScript, RTF and so forth) with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code (XML DocBook) must retain the above copyright notice, this list of conditions and the following disclaimer as the first lines of this file unmodified.
2. Redistributions in compiled form (transformed to other DTDs, converted to PDF, PostScript, RTF and other formats) must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.



Important

THIS DOCUMENTATION IS PROVIDED BY THE FREEBSD DOCUMENTATION PROJECT "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE FREEBSD DOCUMENTATION PROJECT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

FreeBSD is a registered trademark of the FreeBSD Foundation.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Sun, Sun Microsystems, Java, Java Virtual Machine, JDK, JRE, JSP, JVM, Netra, OpenJDK, Solaris, StarOffice, SunOS and VirtualBox are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this document, and the FreeBSD Project was aware of the trademark claim, the designations have been followed by the "™" or the "®" symbol.

Table of Contents

| | |
|---|-----|
| 1. Introduction | 1 |
| 2. Making a New Port | 3 |
| 3. Quick Porting | 5 |
| 3.1. Writing the Makefile | 5 |
| 3.2. Writing the Description Files | 6 |
| 3.3. Creating the Checksum File | 7 |
| 3.4. Testing the Port | 8 |
| 3.5. Checking the Port with portlint | 8 |
| 3.6. Submitting the New Port | 8 |
| 4. Slow Porting | 11 |
| 4.1. How Things Work | 11 |
| 4.2. Getting the Original Sources | 12 |
| 4.3. Modifying the Port | 12 |
| 4.4. Patching | 13 |
| 4.5. Configuring | 15 |
| 4.6. Handling User Input | 15 |
| 5. Configuring the Makefile | 17 |
| 5.1. The Original Source | 17 |
| 5.2. Naming | 17 |
| 5.3. Categorization | 22 |
| 5.4. The Distribution Files | 27 |
| 5.5. MAINTAINER | 40 |
| 5.6. COMMENT | 41 |
| 5.7. PORTSCOUT | 42 |
| 5.8. Dependencies | 42 |
| 5.9. MASTERDIR | 48 |
| 5.10. Man Pages | 48 |
| 5.11. Info Files | 49 |
| 5.12. Makefile Options | 49 |
| 5.13. Specifying the Working Directory | 62 |
| 5.14. Conflict Handling | 63 |
| 5.15. Installing Files | 64 |
| 6. Special Considerations | 69 |
| 6.1. Staging | 69 |
| 6.2. Bundled Libraries | 69 |
| 6.3. Shared Libraries | 71 |
| 6.4. Ports with Distribution Restrictions or Legal Concerns | 71 |
| 6.5. Building Mechanisms | 73 |
| 6.6. Using GNU Autotools | 75 |
| 6.7. Using GNU gettext | 76 |
| 6.8. Using Perl | 77 |
| 6.9. Using X11 | 79 |
| 6.10. Using GNOME | 81 |
| 6.11. GNOME Components | 83 |
| 6.12. Using Qt | 86 |
| 6.13. Using KDE | 89 |
| 6.14. Using Java | 90 |
| 6.15. Web Applications, Apache and PHP | 93 |
| 6.16. Using Python | 95 |
| 6.17. Using Tcl/Tk | 97 |
| 6.18. Using Emacs | 97 |
| 6.19. Using Ruby | 97 |
| 6.20. Using SDL | 98 |
| 6.21. Using wxWidgets | 99 |
| 6.22. Using Lua | 104 |
| 6.23. Using iconv | 105 |

| | |
|--|-----|
| 6.24. Using Xfce | 106 |
| 6.25. Using Mozilla | 107 |
| 6.26. Using Databases | 108 |
| 6.27. Starting and Stopping Services (rc Scripts) | 108 |
| 6.28. Adding Users and Groups | 110 |
| 6.29. Ports That Rely on Kernel Sources | 111 |
| 7. Advanced pkg-plist Practices | 113 |
| 7.1. Changing pkg-plist Based on Make Variables | 113 |
| 7.2. Empty Directories | 114 |
| 7.3. Configuration Files | 114 |
| 7.4. Dynamic Versus Static Package List | 115 |
| 7.5. Automated Package List Creation | 115 |
| 7.6. Expanding Package List with Keywords | 115 |
| 8. pkg-* | 123 |
| 8.1. pkg-message | 123 |
| 8.2. pkg-install | 123 |
| 8.3. pkg-deinstall | 123 |
| 8.4. Changing the Names of pkg-* | 123 |
| 8.5. Making Use of SUB_FILES and SUB_LIST | 124 |
| 9. Testing the Port | 125 |
| 9.1. Running make describe | 125 |
| 9.2. Portlint | 125 |
| 9.3. Port Tools | 125 |
| 9.4. PREFIX and DESTDIR | 125 |
| 9.5. Poudriere | 126 |
| 9.6. Tinderbox | 133 |
| 10. Upgrading a Port | 135 |
| 10.1. Using Subversion to Make Patches | 136 |
| 10.2. UPDATING and MOVED | 137 |
| 11. Security | 139 |
| 11.1. Why Security is So Important | 139 |
| 11.2. Fixing Security Vulnerabilities | 139 |
| 11.3. Keeping the Community Informed | 139 |
| 12. Dos and Don'ts | 145 |
| 12.1. Introduction | 145 |
| 12.2. WRKDIR | 145 |
| 12.3. WRKDIRPREFIX | 145 |
| 12.4. Differentiating Operating Systems and OS Versions | 145 |
| 12.5. Writing Something After bsd.port.mk | 145 |
| 12.6. Use the exec Statement in Wrapper Scripts | 146 |
| 12.7. Do Things Rationally | 147 |
| 12.8. Respect Both CC and CXX | 147 |
| 12.9. Respect CFLAGS | 147 |
| 12.10. Feedback | 148 |
| 12.11. README.html | 148 |
| 12.12. Marking a Port as Architecture Neutral | 148 |
| 12.13. Marking a Port Not Installable with BROKEN , FORBIDDEN , or IGNORE | 148 |
| 12.14. Marking a Port for Removal with DEPRECATED or EXPIRATION_DATE | 149 |
| 12.15. Avoid Use of the .error Construct | 150 |
| 12.16. Usage of sysctl | 150 |
| 12.17. Rerolling Distfiles | 150 |
| 12.18. Use POSIX Standards | 151 |
| 12.19. Miscellanea | 151 |
| 13. A Sample Makefile | 153 |
| 14. Keeping Up | 155 |
| 14.1. FreshPorts | 155 |
| 14.2. The Web Interface to the Source Repository | 155 |
| 14.3. The FreeBSD Ports Mailing List | 155 |

| | |
|---|-----|
| 14.4. The FreeBSD Port Building Cluster | 155 |
| 14.5. Portscout: the FreeBSD Ports Distfile Scanner | 155 |
| 14.6. The FreeBSD Ports Monitoring System | 156 |
| 15. Using USES Macros | 157 |
| 15.1. An Introduction to USES | 157 |
| 15.2. 7z | 157 |
| 15.3. ada | 157 |
| 15.4. autoreconf | 158 |
| 15.5. blaslapack | 158 |
| 15.6. bdb | 158 |
| 15.7. bison | 159 |
| 15.8. charsetfix | 159 |
| 15.9. cmake | 159 |
| 15.10. compiler | 159 |
| 15.11. cpe | 159 |
| 15.12. cran | 160 |
| 15.13. desktop-file-utils | 160 |
| 15.14. desthack | 160 |
| 15.15. display | 160 |
| 15.16. dos2unix | 160 |
| 15.17. drupal | 161 |
| 15.18. execinfo | 161 |
| 15.19. fakeroot | 161 |
| 15.20. fam | 161 |
| 15.21. firebird | 161 |
| 15.22. fmake | 161 |
| 15.23. fonts | 161 |
| 15.24. fortran | 162 |
| 15.25. fuse | 162 |
| 15.26. gecko | 162 |
| 15.27. gem | 162 |
| 15.28. gettext | 162 |
| 15.29. gettext-runtime | 162 |
| 15.30. gettext-tools | 162 |
| 15.31. ghostscript | 163 |
| 15.32. gmake | 163 |
| 15.33. gnome | 163 |
| 15.34. go | 166 |
| 15.35. gperf | 166 |
| 15.36. gssapi | 166 |
| 15.37. horde | 167 |
| 15.38. iconv | 167 |
| 15.39. imake | 167 |
| 15.40. kmod | 168 |
| 15.41. lha | 168 |
| 15.42. libarchive | 168 |
| 15.43. libedit | 168 |
| 15.44. libtool | 168 |
| 15.45. localbase | 168 |
| 15.46. lua | 169 |
| 15.47. makeinfo | 169 |
| 15.48. makeself | 169 |
| 15.49. mate | 169 |
| 15.50. metaport | 170 |
| 15.51. mysql | 170 |
| 15.52. mono | 170 |
| 15.53. motif | 170 |
| 15.54. ncurses | 170 |

| | |
|------------------------------------|-----|
| 15.55. ninja | 170 |
| 15.56. objc | 171 |
| 15.57. openal | 171 |
| 15.58. pathfix | 171 |
| 15.59. pear | 171 |
| 15.60. perl5 | 171 |
| 15.61. pgsq1 | 171 |
| 15.62. php | 172 |
| 15.63. pkgconfig | 172 |
| 15.64. pure | 173 |
| 15.65. pyqt | 173 |
| 15.66. python | 174 |
| 15.67. qmail | 174 |
| 15.68. qmake | 174 |
| 15.69. readline | 174 |
| 15.70. scons | 174 |
| 15.71. shared-mime-info | 175 |
| 15.72. shebangfix | 175 |
| 15.73. sqlite | 176 |
| 15.74. ssl | 176 |
| 15.75. tar | 176 |
| 15.76. tcl | 176 |
| 15.77. terminfo | 177 |
| 15.78. tk | 177 |
| 15.79. twisted | 177 |
| 15.80. uidfix | 177 |
| 15.81. uniquefiles | 177 |
| 15.82. webplugin | 178 |
| 15.83. xfce | 178 |
| 15.84. zip | 178 |
| 15.85. zope | 178 |
| 16. __FreeBSD_version Values | 179 |

List of Tables

| | |
|---|-----|
| 5.1. Package Naming Examples | 21 |
| 5.2. Examples of DISTVERSION and the Derived PORTVERSION | 27 |
| 5.3. Shortcuts for MASTER_SITE_* Macros | 29 |
| 5.4. Magic MASTER_SITES Macros | 29 |
| 5.5. USE_GITHUB Description | 30 |
| 5.6. USE_* | 46 |
| 6.1. Variables for Ports That Use configure | 73 |
| 6.2. Variables for Ports That Use cmake | 74 |
| 6.3. Variables the Users Can Define for cmake Builds | 74 |
| 6.4. Variables for Ports That Use scons | 75 |
| 6.5. Read-Only Variables for Ports That Use Perl | 77 |
| 6.6. Variables for Ports That Use X | 79 |
| 6.7. GNOME Components | 83 |
| 6.8. GNOME Macro Components | 84 |
| 6.9. GNOME Legacy Components | 84 |
| 6.10. Deprecated Components: Do Not Use | 86 |
| 6.11. Variables Provided to Ports That Use Qt | 86 |
| 6.12. Available Qt Library Components | 87 |
| 6.13. Available Qt Tool Components | 87 |
| 6.14. Available Qt Plugin Components | 88 |
| 6.15. Variables for Ports That Use qmake | 88 |
| 6.16. Available KDE 4 Components | 89 |
| 6.17. Variables Which May be Set by Ports That Use Java | 90 |
| 6.18. Variables Provided to Ports That Use Java | 91 |
| 6.19. Constants Defined for Ports That Use Java | 92 |
| 6.20. Variables for Ports That Use Apache | 93 |
| 6.21. Useful Variables for Porting Apache Modules | 94 |
| 6.22. Most Useful Variables for Ports That Use Python | 96 |
| 6.23. The Most Useful Read-Only Variables for Ports That Use Tcl/Tk | 97 |
| 6.24. Useful Variables for Ports That Use Ruby | 97 |
| 6.25. Selected Read-Only Variables for Ports That Use Ruby | 98 |
| 6.26. Variables to Select wxWidgets Versions | 100 |
| 6.27. Available wxWidgets Versions | 100 |
| 6.28. wxWidgets Version Specifications | 100 |
| 6.29. Variables to Select Preferred wxWidgets Versions | 100 |
| 6.30. Available wxWidgets Components | 100 |
| 6.31. Available wxWidgets Dependency Types | 101 |
| 6.32. Default wxWidgets Dependency Types | 101 |
| 6.33. Variables to Select Unicode in wxWidgets Versions | 101 |
| 6.34. Variables Defined for Ports That Use wxWidgets | 102 |
| 6.35. Legal Values for WX_CONF_ARGS | 103 |
| 6.36. Variables Defined for Ports That Use Lua | 104 |
| 6.37. Variables for Ports That Use Mozilla | 107 |
| 6.38. Variables for Ports Using Databases | 108 |
| 10.1. Subversion Update File Prefixes | 137 |
| 16.1. __FreeBSD_version Values | 179 |

List of Examples

| | |
|--|-----|
| 5.1. Simple Use of <code>USE_GITHUB</code> | 31 |
| 5.2. More Complete Use of <code>USE_GITHUB</code> | 31 |
| 5.3. Use of <code>USE_GITHUB</code> with <code>DISTVERSIONPREFIX</code> | 31 |
| 5.4. Use of <code>USE_GITHUB</code> with Multiple Distribution Files | 32 |
| 5.5. Use of <code>USE_GITHUB</code> with Multiple Distribution Files Using <code>GH_TUPLE</code> | 33 |
| 5.6. Simplified Use of <code>MASTER_SITES:n</code> with One File Per Site | 35 |
| 5.7. Simplified Use of <code>MASTER_SITES:n</code> with More Than One File Per Site | 36 |
| 5.8. Detailed Use of <code>MASTER_SITES:n</code> in <code>MASTER_SITE_SUBDIR</code> | 37 |
| 5.9. Detailed Use of <code>MASTER_SITES:n</code> with Comma Operator, Multiple Files, Multiple Sites and Multiple Subdirectories | 37 |
| 5.10. Detailed Use of <code>MASTER_SITES:n</code> with SourceForge (SF) | 39 |
| 5.11. Simplified Use of <code>MASTER_SITES:n</code> with <code>PATCH_SITES</code> | 39 |
| 5.12. Use of <code>ALWAYS_KEEP_DISTFILES</code> | 40 |
| 5.13. Wrong Declaration of an Optional Dependency | 47 |
| 5.14. Correct Declaration of an Optional Dependency | 47 |
| 5.15. Simple Use of <code>OPTIONS</code> | 50 |
| 5.16. Check for Unset Port <code>OPTIONS</code> | 51 |
| 5.17. Practical Use of <code>OPTIONS</code> | 51 |
| 5.18. Wrong Handling of an Option | 52 |
| 5.19. Correct Handling of an Option | 52 |
| 5.20. Simple Use of <code>OPT_IMPLIES</code> | 56 |
| 5.21. Simple Use of <code>OPT_PREVENTS</code> | 57 |
| 6.1. <code>USES= cmake</code> Example | 74 |
| 6.2. Perl Dependency Example | 78 |
| 6.3. <code>USE_XORG</code> Example | 79 |
| 6.4. Using X11-Related Variables | 79 |
| 6.5. Selecting Qt 4 Components | 88 |
| 6.6. <code>USES= qmake</code> Example | 89 |
| 6.7. <code>USE_KDE4</code> Example | 90 |
| 6.8. Example Makefile for PEAR Class | 95 |
| 6.9. Example Makefile for Horde Module | 95 |
| 6.10. Makefile for a Simple Python Module | 96 |
| 6.11. Selecting wxWidgets Components | 101 |
| 6.12. Detecting Installed wxWidgets Versions and Components | 102 |
| 6.13. Using wxWidgets Variables in Commands | 103 |
| 6.14. Simple <code>iconv</code> Usage | 105 |
| 6.15. <code>iconv</code> Usage with <code>configure</code> | 105 |
| 6.16. Fixing Hardcoded <code>-liconv</code> | 106 |
| 6.17. Checking for Native <code>iconv</code> Availability | 106 |
| 6.18. <code>USES=xfce</code> Example | 107 |
| 6.19. Using Xfce's Own GTK3 Widgets | 107 |
| 7.1. Example of a <code>@dirrmtryecho</code> Keyword | 120 |
| 7.2. Real Life Example, How <code>@sample</code> is Implemented | 120 |
| 9.1. Using <code>make.conf</code> to Change Default Perl | 133 |
| 12.1. How to Avoid Using <code>.error</code> | 150 |
| 15.1. Using Multiple Values | 157 |
| 15.2. Adding an Argument | 157 |
| 15.3. Adding Multiple Arguments | 157 |
| 15.4. Mixing it All Together | 157 |
| 15.5. Typical Use | 167 |

Chapter 1. Introduction

The FreeBSD Ports Collection is the way almost everyone installs applications ("ports") on FreeBSD. Like everything else about FreeBSD, it is primarily a volunteer effort. It is important to keep this in mind when reading this document.

In FreeBSD, anyone may submit a new port, or volunteer to maintain an existing unmaintained port. No special commit privilege is needed.

Chapter 2. Making a New Port

Interested in making a new port, or upgrading existing ports? Great!

What follows are some guidelines for creating a new port for FreeBSD. To upgrade an existing port, read this, then read [Chapter 10, Upgrading a Port](#).

When this document is not sufficiently detailed, refer to `/usr/ports/Mk/bsd.port.mk`, which is included by all port `Makefiles`. Even those not hacking `Makefiles` daily can gain much knowledge from it. Additionally, specific questions can be sent to the [FreeBSD ports mailing list](#).



Note

Only a fraction of the variables (*VAR*) that can be overridden are mentioned in this document. Most (if not all) are documented at the start of `/usr/ports/Mk/bsd.port.mk`; the others probably ought to be. Note that this file uses a non-standard tab setting: Emacs and Vim will recognize the setting on loading the file. Both `vi(1)` and `ex(1)` can be set to use the correct value by typing `:set tabstop=4` once the file has been loaded.

Looking for something easy to start with? Take a look at the [list of requested ports](#) and see if you can work on one (or more).

Chapter 3. Quick Porting

This section describes how to quickly create a new port. For applications where this quick method is not adequate, the full “Slow Porting” process is described in [Chapter 4, Slow Porting](#).

First, get the original tarball and put it into DISTDIR, which defaults to /usr/ports/distfiles .



Note

These steps assume that the software compiled out-of-the-box. In other words, absolutely no changes were required for the application to work on a FreeBSD system. If anything had to be changed, refer to [Chapter 4, Slow Porting](#).



Note

It is recommended to set the DEVELOPER [make\(1\)](#) variable in /etc/make.conf before getting into porting.

```
# echo DEVELOPER=yes >> /etc/make.conf
```

This setting enables the “developer mode” that displays deprecation warnings and activates some further quality checks on calling make.

3.1. Writing the Makefile

The minimal Makefile would look something like this:

```
# $FreeBSD$

PORTNAME= oneko
PORTVERSION= 1.1b
CATEGORIES= games
MASTER_SITES= ftp://ftp.cs.columbia.edu/archives/X11R5/contrib/

MAINTAINER= youremail@example.com
COMMENT= Cat chasing a mouse all over the screen

.include <bsd.port.mk>
```



Note

In some cases, the Makefile of an existing port may contain additional lines in the header, such as the name of the port and the date it was created. This additional information has been declared obsolete, and is being phased out.

Try to figure it out. Do not worry about the contents of the \$FreeBSD\$ line, it will be filled in automatically by Subversion when the port is imported to our main ports tree. A more detailed example is shown in the [sample Makefile](#) section.

3.2. Writing the Description Files

There are two description files that are required for any port, whether they actually package or not. They are `pkg-descr` and `pkg-plist`. Their `pkg-` prefix distinguishes them from other files.

3.2.1. `pkg-descr`

This is a longer description of the port. One to a few paragraphs concisely explaining what the port does is sufficient.



Note

This is *not* a manual or an in-depth description on how to use or compile the port! *Please be careful when copying from the README or manpage.* Too often they are not a concise description of the port or are in an awkward format. For example, manpages have justified spacing, which looks particularly bad with monospaced fonts.

A well-written `pkg-descr` describes the port completely enough that users would not have to consult the documentation or visit the website to understand what the software does, how it can be useful, or what particularly nice features it has. Mentioning certain requirements like a graphical toolkit, heavy dependencies, runtime environment, or implementation languages help users decide whether this port will work for them.

Include a URL to the official WWW homepage. Prepend *one* of the websites (pick the most common one) with **WWW:** (followed by single space) so that automated tools will work correctly. If the URI is the root of the website or directory, it must be terminated with a slash.



Note

If the listed webpage for a port is not available, try to search the Internet first to see if the official site moved, was renamed, or is hosted elsewhere.

This example shows how `pkg-descr` looks:

```
This is a port of oneko, in which a cat chases a poor mouse all over
the screen.
:
(etc.)

WWW: http://www.oneko.org/
```

3.2.2. `pkg-plist`

This file lists all the files installed by the port. It is also called the “packing list” because the package is generated by packing the files listed here. The pathnames are relative to the installation prefix (usually `/usr/local`).

Here is a small example:

```
bin/oneko
man/man1/oneko.1.gz
lib/X11/app-defaults/Oneko
lib/X11/oneko/cat1.xpm
lib/X11/oneko/cat2.xpm
lib/X11/oneko/mouse.xpm
```

Refer to the [pkg-create\(8\)](#) manual page for details on the packing list.



Note

It is recommended to keep all the filenames in this file sorted alphabetically. It will make verifying changes when upgrading the port much easier.



Tip

Creating a packing list manually can be a very tedious task. If the port installs a large numbers of files, [creating the packing list automatically](#) might save time.

There is only one case when `pkg-plist` can be omitted from a port. If the port installs just a handful of files, list them in `PLIST_FILES`, within the port's `Makefile`. For instance, we could get along without `pkg-plist` in the above `oneko` port by adding these lines to the `Makefile`:

```
PLIST_FILES= bin/oneko \
man/man1/oneko.1.gz \
lib/X11/app-defaults/Oneko \
lib/X11/oneko/cat1.xpm \
lib/X11/oneko/cat2.xpm \
lib/X11/oneko/mouse.xpm
```



Note

Usage of `PLIST_FILES` should not be abused. When looking for the origin of a file, people usually try to grep through the `pkg-plist` files in the ports tree. Listing files in `PLIST_FILES` in the `Makefile` makes that search more difficult.



Tip

If a port needs to create an empty directory, or creates directories outside of `${PREFIX}` during installation, refer to [Section 7.2.1, “Cleaning Up Empty Directories”](#) for more information.

The price for this way of listing a port's files and directories is that the keywords described in [pkg-create\(8\)](#) and [Section 7.6, “Expanding Package List with Keywords”](#) cannot be used. Therefore, it is suitable only for simple ports and makes them even simpler. At the same time, it has the advantage of reducing the number of files in the ports collection. Please consider using this technique before resorting to `pkg-plist`.

Later we will see how `pkg-plist` and `PLIST_FILES` can be used to fulfill [more sophisticated tasks](#).

3.3. Creating the Checksum File

Just type `make makesum`. The ports make rules will automatically generate the file `distinfo`.

3.4. Testing the Port

Make sure that the port rules do exactly what is desired, including packaging up the port. These are the important points to verify:

- `pkg-plist` does not contain anything not installed by the port.
- `pkg-plist` contains everything that is installed by the port.
- The port can be installed using the `install` target. This verifies that the install script works correctly.
- The port can be deinstalled properly using the `deinstall` target. This verifies that the deinstall script works correctly.
- The port only has access to network resources during the `fetch` target phase. This is important for package builders, such as [ports-mgmt/poudriere](#).
- Make sure that `make package` can be run as a normal user (that is, not as `root`). If that fails, `NEED_ROOT=yes` must be added to the port `Makefile`.

Procedure 3.1. Recommended Test Ordering

1. `make stage`
2. `make check-orphans`
3. `make package`
4. `make install`
5. `make deinstall`
6. `pkg add package-filename`
7. `make package` (as user)

Make certain no warnings are shown in any of the stages.

Thorough automated testing can be done with [ports-mgmt/tinderbox](#) or [ports-mgmt/poudriere](#) from the Ports Collection. These applications maintain `jails` where all of the steps shown above can be tested without affecting the state of the host system.

3.5. Checking the Port with `portlint`

Please use `portlint` to see if the port conforms to our guidelines. The [ports-mgmt/portlint](#) program is part of the ports collection. In particular, check that the [Makefile](#) is in the right shape and the [package](#) is named appropriately.



Important

Do not blindly follow the output of `portlint`. It is a static lint tool and sometimes gets things wrong.

3.6. Submitting the New Port

Before submitting the new port, read the [DOs and DON'Ts](#) section.

Once happy with the port, the only thing remaining is to put it in the main FreeBSD ports tree and make everybody else happy about it too.



Important

We do not need the `work` directory or the `pkgname.tgz` package, so delete them now.

Next, build the [shar\(1\)](#) file. Assuming the port is called `oneko`, `cd` to the directory above where the `oneko` directory is located, and then type: `shar `find oneko` > oneko.shar`

A diff created from a Subversion checkout of the ports tree is also acceptable. Add all the files with `svn add`. `cd` to the base of the ports tree so full paths to the changed files are included in the diff, then generate the diff with `svn diff`. For example, `svn diff games/oneko > oneko.diff`.

Submit `oneko.shar` or `oneko.diff` with the [bug submission form](#).. Use product “Ports & Packages”, component “Individual Port(s)”, and follow the guidelines shown there. Add a short description of the program to the Description field of the PR (perhaps a short version of `COMMENT`), and remember to add `oneko.shar` or `oneko.diff` as an attachment.



Note

Giving a good description in the summary of the problem report makes the work of port committers a lot easier. We prefer something like “New port: *category/portname short description of the port*” for new ports. Using this scheme makes it easier and faster to begin the work of committing the new port.

After submitting the port, please be patient. The time needed to include a new port in FreeBSD can vary from a few days to a few months. A simple search form of the Problem Report database can be searched at <https://bugs.freebsd.org/bugzilla/query.cgi>.

To get a listing of *open* port PRs, select *Open* and *Ports & Packages* in the search form, then click .

After looking at the new port, we will reply if necessary, and commit it to the tree. The submitter's name will also be added to the list of [Additional FreeBSD Contributors](#) and other files.

Chapter 4. Slow Porting

Okay, so it was not that simple, and the port required some modifications to get it to work. In this section, we will explain, step by step, how to modify it to get it to work with the ports paradigm.

4.1. How Things Work

First, this is the sequence of events which occurs when the user first types `make` in the port's directory. Having `bsd.port.mk` in another window while reading this really helps to understand it.

But do not worry, not many people understand exactly how `bsd.port.mk` is working... :-)

1. The `fetch` target is run. The `fetch` target is responsible for making sure that the tarball exists locally in `DISTDIR`. If `fetch` cannot find the required files in `DISTDIR` it will look up the URL `MASTER_SITES`, which is set in the Makefile, as well as our FTP mirrors where we put distfiles as backup. It will then attempt to fetch the named distribution file with `FETCH`, assuming that the requesting site has direct access to the Internet. If that succeeds, it will save the file in `DISTDIR` for future use and proceed.
2. The `extract` target is run. It looks for the port's distribution file (typically a gzipped tarball) in `DISTDIR` and unpacks it into a temporary subdirectory specified by `WRKDIR` (defaults to `work`).
3. The `patch` target is run. First, any patches defined in `PATCHFILES` are applied. Second, if any patch files named `patch-*` are found in `PATCHDIR` (defaults to the `files` subdirectory), they are applied at this time in alphabetical order.
4. The `configure` target is run. This can do any one of many different things.
 1. If it exists, `scripts/configure` is run.
 2. If `HAS_CONFIGURE` or `GNU_CONFIGURE` is set, `WRKSRC/configure` is run.
5. The `build` target is run. This is responsible for descending into the port's private working directory (`WRKSRC`) and building it.
6. The `stage` target is run. This puts the final set of built files into a temporary directory (`STAGEDIR`, see [Section 6.1, "Staging"](#)). The hierarchy of this directory mirrors that of the system on which the package will be installed.
7. The `package` target is run. This creates a package using the files from the temporary directory created during the `stage` target and the port's `pkg-plist`.
8. The `install` target is run. This installs the package created during the `package` target into the host system.

The above are the default actions. In addition, define targets `pre-something` or `post-something`, or put scripts with those names, in the `scripts` subdirectory, and they will be run before or after the default actions are done.

For example, if there is a `post-extract` target defined in the Makefile, and a file `pre-build` in the `scripts` subdirectory, the `post-extract` target will be called after the regular extraction actions, and `pre-build` will be executed before the default build rules are done. It is recommended to use Makefile targets if the actions are simple enough, because it will be easier for someone to figure out what kind of non-default action the port requires.

The default actions are done by the `do-something` targets from `bsd.port.mk`. For example, the commands to extract a port are in the target `do-extract`. If the default target does not do the job right, redefine the `do-something` target in the Makefile.



Note

The “main” targets (for example, `extract`, `configure`, etc.) do nothing more than make sure all the stages up to that one are completed and call the real targets or scripts, and they are not intended to be changed. To fix the extraction, fix `do-extract`, but never ever change the way `extract` operates! Additionally, the target `post-deinstall` is invalid and is not run by the ports infrastructure.

Now that what goes on when the user types `make install` is better understood, let us go through the recommended steps to create the perfect port.

4.2. Getting the Original Sources

Get the original sources (normally) as a compressed tarball (`foo.tar.gz` or `foo.tar.bz2`) and copy it into `DISTDIR`. Always use *mainstream* sources when and where possible.

Set the variable `MASTER_SITES` to reflect where the original tarball resides. Shorthand definitions exist for most mainstream sites in `bsd.sites.mk`. Please use these sites—and the associated definitions—if at all possible, to help avoid the problem of having the same information repeated over again many times in the source base. As these sites tend to change over time, this becomes a maintenance nightmare for everyone involved. See [Section 5.4.2, “MASTER_SITES”](#) for details.

If there is no FTP/HTTP site that is well-connected to the net, or can only find sites that have irritatingly non-standard formats, put a copy on a reliable FTP or HTTP server (for example, a home page).

If a convenient and reliable place to put the distfile cannot be found, we can “house” it ourselves on `ftp.FreeBSD.org`; however, this is the least-preferred solution. The distfile must be placed into `~/public_distfiles/` of someone's `freefall` account. Ask the person who commits the port to do this. This person will also set `MASTER_SITES` to `LOCAL/username` where *username* is their FreeBSD cluster login.

If the port's distfile changes all the time without any kind of version update by the author, consider putting the distfile on a home page and listing it as the first `MASTER_SITES`. Try to talk the port author out of doing this; it really does help to establish some kind of source code control. Hosting a specific version will prevent users from getting checksum mismatch errors, and also reduce the workload of maintainers of our FTP site. Also, if there is only one master site for the port, it is recommended to house a backup on a home page and list it as the second `MASTER_SITES`.

If the port requires additional patches that are available on the Internet, fetch them too and put them in `DISTDIR`. Do not worry if they come from a site other than where the main source tarball comes, we have a way to handle these situations (see the description of [PATCHFILES](#) below).

4.3. Modifying the Port

Unpack a copy of the tarball in a private directory and make whatever changes are necessary to get the port to compile properly under the current version of FreeBSD. Keep *careful track* of steps, as they will be needed to automate the process shortly. Everything, including the deletion, addition, or modification of files has to be doable using an automated script or patch file when the port is finished.

If the port requires significant user interaction/customization to compile or install, take a look at one of Larry Wall's classic `Configure` scripts and perhaps do something similar. The goal of the new ports collection is to make each port as “plug-and-play” as possible for the end-user while using a minimum of disk space.



Note

Unless explicitly stated, patch files, scripts, and other files created and contributed to the FreeBSD ports collection are assumed to be covered by the standard BSD copyright conditions.

4.4. Patching

In the preparation of the port, files that have been added or changed can be recorded with `diff(1)` for later feeding to `patch(1)`. Doing this with a typical file involves saving a copy of the original file before making any changes using a `.orig` suffix.

```
% cp file file.orig
```

After all changes have been made, `cd` back to the port directory. Use `make makepatch` to generate updated patch files in the `files` directory.

4.4.1. General Rules for Patching

Patch files are stored in `PATCHDIR`, usually `files/`, from where they will be automatically applied. All patches must be relative to `WRKSRCS`. Typically `WRKSRCS` is a subdirectory of `WRKDIR`, the directory where the distfile is extracted. Use `make -V WRKSRCS` to see the actual path. The patch names are to follow these rules:

- Avoid having more than one patch modify the same file. For example, having both `patch-foobar.c` and `patch-foobar.c2` making changes to `${WRKSRCS}/foobar.c` makes them fragile and difficult to debug.
- When creating names for patch files, replace each underscore (`_`) with two underscores (`__`) and each slash (`/`) with one underscore (`_`). For example, to patch a file named `src/freetype_joystick.c`, name the corresponding patch `patch-src_freetype__joystick.c`. Do not name patches like `patch-aa` or `patch-ab`. Always use the path and file name in patch names. Using `make makepatch` automatically generates the correct names.
- A patch may modify multiple files if the changes are related and the patch is named appropriately. For example, `patch-add-missing-stdlib.h`.
- Only use characters `[-+._a-zA-Z0-9]` for naming patches. In particular, *do not use `::` as a path separator*, use `_` instead.

Minimize the amount of non-functional whitespace changes in patches. It is common in the Open Source world for projects to share large amounts of a code base, but obey different style and indenting rules. When taking a working piece of functionality from one project to fix similar areas in another, please be careful: the resulting patch may be full of non-functional changes. It not only increases the size of the ports repository but makes it hard to find out what exactly caused the problem and what was changed at all.

If a file must be deleted, do it in the `post-extract` target rather than as part of the patch.

4.4.2. Manual Patch Generation



Note

Manual patch creation is usually not necessary. Automatic patch generation as described earlier in this section is the preferred method. However, manual patching may be required occasionally.

Patches are saved into files named `patch-*` where `*` indicates the pathname of the file that is patched, such as `patch-Imakefile` or `patch-src-config.h`.

After the file has been modified, `diff(1)` is used to record the differences between the original and the modified version. `-u` causes `diff(1)` to produce “unified” diffs, the preferred form.

```
% diff -u file.orig file > patch-pathname-file
```

When generating patches for new, added files, `-N` is used to tell `diff(1)` to treat the non-existent original file as if it existed but was empty:

```
% diff -u -N newfile.orig newfile > patch-pathname-newfile
```

Do not add `$FreeBSD$` RCS strings in patches. When patches are added to the Subversion repository with `svn add`, the `fbbsd:nokeywords` property is set to `yes` automatically so keywords in the patch are not modified when committed. The property can be added manually with `svn propset fbbsd:nokeywords yes files...`

Using the `recurse (-r)` option to `diff(1)` to generate patches is fine, but please look at the resulting patches to make sure there is no unnecessary junk in there. In particular, diffs between two backup files, `Makefiles` when the port uses `Imake` or `GNU configure`, etc., are unnecessary and have to be deleted. If it was necessary to edit `configure.in` and run `autoconf` to regenerate `configure`, do not take the diffs of `configure` (it often grows to a few thousand lines!). Instead, define `USE_AUTOTOOLS=autoconf:261` and take the diffs of `configure.in`.

4.4.3. Simple Automatic Replacements

Simple replacements can be performed directly from the port `Makefile` using the in-place mode of `sed(1)`. This is useful when changes use the value of a variable:

```
post-patch:
  @${REINPLACE_CMD} -e 's|for Linux|for FreeBSD|g' ${WRKSRCS}/README
```

Quite often, software being ported uses the `CR/LF` convention in source files. This may cause problems with further patching, compiler warnings, or script execution (like `/bin/sh^M not found`). To quickly convert all files from `CR/LF` to just `LF`, add this entry to the port `Makefile`:

```
USES= dos2unix
```

A list of specific files to convert can be given:

```
USES= dos2unix
DOS2UNIX_FILES= util.c util.h
```

Use `DOS2UNIX_REGEX` to convert a group of files across subdirectories. Its argument is a `find(1)`-compatible regular expression. More on the format is in [re_format\(7\)](#). This option is useful for converting all files of a given extension. For example, convert all source code files, leaving binary files intact:

```
USES= dos2unix
DOS2UNIX_REGEX= .*\.([ch]|cpp)
```

A similar option is `DOS2UNIX_GLOB`, which runs `find` for each element listed in it.


```
USES= dos2unix
DOS2UNIX_GLOB= *.c *.cpp *.h
```

The base directory for the conversion can be set. This is useful when there are multiple distfiles and several contain files which require line-ending conversion.

```
USES= dos2unix
DOS2UNIX_WKRSRC= ${WRKDIR}
```

4.5. Configuring

Include any additional customization commands in the `configure` script and save it in the `scripts` subdirectory. As mentioned above, it is also possible to do this with Makefile targets and/or scripts with the name `pre-configure` or `post-configure`.

4.6. Handling User Input

If the port requires user input to build, configure, or install, set `IS_INTERACTIVE` in the Makefile. This will allow “overnight builds” to skip it. If the user sets the variable `BATCH` in his environment (and if the user sets the variable `INTERACTIVE`, then *only* those ports requiring interaction are built). This will save a lot of wasted time on the set of machines that continually build ports (see below).

It is also recommended that if there are reasonable default answers to the questions, `PACKAGE_BUILDING` be used to turn off the interactive script when it is set. This will allow us to build the packages for CDROMs and FTP.

Chapter 5. Configuring the Makefile

Configuring the Makefile is pretty simple, and again we suggest looking at existing examples before starting. Also, there is a [sample Makefile](#) in this handbook, so take a look and please follow the ordering of variables and sections in that template to make the port easier for others to read.

Consider these problems in sequence during the design of the new Makefile:

5.1. The Original Source

Does it live in DISTDIR as a standard gzipped tarball named something like `foozolix-1.2.tar.gz` ? If so, go on to the next step. If not, the distribution file format might require overriding one or more of `DISTVERSION` , `DISTNAME`, `EXTRACT_CMD`, `EXTRACT_BEFORE_ARGS`, `EXTRACT_AFTER_ARGS`, `EXTRACT_SUFX`, or `DISTFILES`.

In the worst case, create a custom `do-extract` target to override the default. This is rarely, if ever, necessary.

5.2. Naming

The first part of the port's Makefile names the port, describes its version number, and lists it in the correct category.

5.2.1. PORTNAME and PORTVERSION

Set `PORTNAME` to the base name of the port. Set `PORTVERSION` to the version number of the port unless `DISTVERSION` is used (see [Section 5.4.1, “DISTVERSION/DISTNAME”](#)).



Important

The package name must be unique across the entire ports tree. Make sure that the `PORTNAME` is not already in use by an existing port. If the name has already been used, add either `PKG-NAMEPREFIX` or `PKGNAMEPREFIX`.

5.2.2. PORTREVISION and PORTEPOCH

5.2.2.1. PORTREVISION

`PORTREVISION` is a monotonically increasing value which is reset to 0 with every increase of `PORTVERSION` , typically every time there is a new official vendor release. If `PORTREVISION` is non-zero, the value is appended to the package name. Changes to `PORTREVISION` are used by automated tools like [pkg-version\(8\)](#) to determine that a new package is available.

`PORTREVISION` must be increased each time a change is made to the port that changes the generated package in any way. That includes changes that only affect a package built with non-default [options](#).

Examples of when `PORTREVISION` must be bumped:

- Addition of patches to correct security vulnerabilities, bugs, or to add new functionality to the port.
- Changes to the port Makefile to enable or disable compile-time options in the package.
- Changes in the packing list or the install-time behavior of the package. For example, a change to a script which generates initial data for the package, like [ssh\(1\)](#) host keys.

- Version bump of a port's shared library dependency (in this case, someone trying to install the old package after installing a newer version of the dependency will fail since it will look for the old `libfoo.x` instead of `libfoo.(x+1)`).
- Silent changes to the port distfile which have significant functional differences. For example, changes to the distfile requiring a correction to `distinfo` with no corresponding change to `PORTVERSION`, where a `diff -ru` of the old and new versions shows non-trivial changes to the code.

Examples of changes which do not require a `PORTREVISION` bump:

- Style changes to the port skeleton with no functional change to what appears in the resulting package.
- Changes to `MASTER_SITES` or other functional changes to the port which do not affect the resulting package.
- Trivial patches to the distfile such as correction of typos, which are not important enough that users of the package have to go to the trouble of upgrading.
- Build fixes which cause a package to become compilable where it was previously failing. As long as the changes do not introduce any functional change on any other platforms on which the port did previously build. Since `PORTREVISION` reflects the content of the package, if the package was not previously buildable then there is no need to increase `PORTREVISION` to mark a change.

A rule of thumb is to decide whether a change committed to a port is something which *some* people would benefit from having. Either because of an enhancement, fix, or by virtue that the new package will actually work at all. Then weigh that against that fact that it will cause everyone who regularly updates their ports tree to be compelled to update. If yes, `PORTREVISION` must be bumped.



Note

People using binary packages will *never* see the update if `PORTREVISION` is not bumped. Without increasing `PORTREVISION`, the package builders have no way to detect the change and thus, will not rebuild the package.

5.2.2.2. PORTEPOCH

From time to time a software vendor or FreeBSD porter will do something silly and release a version of their software which is actually numerically less than the previous version. An example of this is a port which goes from `foo-20000801` to `foo-1.0` (the former will be incorrectly treated as a newer version since 20000801 is a numerically greater value than 1).



Tip

The results of version number comparisons are not always obvious. `pkg version` (see [pkg-version\(8\)](#)) can be used to test the comparison of two version number strings. For example:

```
% pkg version -t 0.031 0.29
>
```

The `>` output indicates that version 0.031 is considered greater than version 0.29, which may not have been obvious to the porter.

In situations such as this, `PORTEPOCH` must be increased. If `PORTEPOCH` is nonzero it is appended to the package name as described in section 0 above. `PORTEPOCH` must never be decreased or reset to zero, because that would cause comparison to a package from an earlier epoch to fail. For example, the package would not be detected as out

of date. The new version number, 1.0,1 in the above example, is still numerically less than the previous version, 20000801, but the ,1 suffix is treated specially by automated tools and found to be greater than the implied suffix ,0 on the earlier package.

Dropping or resetting PORTEPOCH incorrectly leads to no end of grief. If the discussion above was not clear enough, please consult the [FreeBSD ports mailing list](#).

It is expected that PORTEPOCH will not be used for the majority of ports, and that sensible use of PORTVERSION can often preempt it becoming necessary if a future release of the software changes the version structure. However, care is needed by FreeBSD porters when a vendor release is made without an official version number — such as a code “snapshot” release. The temptation is to label the release with the release date, which will cause problems as in the example above when a new “official” release is made.

For example, if a snapshot release is made on the date 20000917, and the previous version of the software was version 1.2, do not use 20000917 for PORTVERSION. The correct way is a PORTVERSION of 1.2.20000917, or similar, so that the succeeding release, say 1.3, is still a numerically greater value.

5.2.2.3. Example of PORTREVISION and PORTEPOCH Usage

The gtkmumble port, version 0.10, is committed to the ports collection:

```
PORTNAME= gtkmumble
PORTVERSION= 0.10
```

PKGNAME becomes gtkmumble-0.10.

A security hole is discovered which requires a local FreeBSD patch. PORTREVISION is bumped accordingly.

```
PORTNAME= gtkmumble
PORTVERSION= 0.10
PORTREVISION= 1
```

PKGNAME becomes gtkmumble-0.10_1

A new version is released by the vendor, numbered 0.2 (it turns out the author actually intended 0.10 to actually mean 0.1.0, not “what comes after 0.9” - oops, too late now). Since the new minor version 2 is numerically less than the previous version 10, PORTEPOCH must be bumped to manually force the new package to be detected as “newer”. Since it is a new vendor release of the code, PORTREVISION is reset to 0 (or removed from the Makefile).

```
PORTNAME= gtkmumble
PORTVERSION= 0.2
PORTEPOCH= 1
```

PKGNAME becomes gtkmumble-0.2,1

The next release is 0.3. Since PORTEPOCH never decreases, the version variables are now:

```
PORTNAME= gtkmumble
PORTVERSION= 0.3
PORTEPOCH= 1
```

PKGNAME becomes gtkmumble-0.3,1



Note

If PORTEPOCH were reset to 0 with this upgrade, someone who had installed the gtkmumble-0.10_1 package would not detect the gtkmumble-0.3 package as newer, since 3 is still numerically less than 10. Remember, this is the whole point of PORTEPOCH in the first place.

5.2.3. PKGNAMEPREFIX and PKGNAMESUFFIX

Two optional variables, PKGNAMEPREFIX and PKGNAMESUFFIX, are combined with PORTNAME and PORTVERSION to form PKGNAME as `${PKGNAMEPREFIX}${PORTNAME}${PKGNAMESUFFIX}-${PORTVERSION}`. Make sure this conforms to our [guidelines for a good package name](#). In particular, the use of a hyphen (-) in PORTVERSION is *not* allowed. Also, if the package name has the *language-* or the *-compiled.specifcs* part (see below), use PKGNAMEPREFIX and PKGNAMESUFFIX, respectively. Do not make them part of PORTNAME.

5.2.4. Package Naming Conventions

These are the conventions to follow when naming packages. This is to make the package directory easy to scan, as there are already thousands of packages and users are going to turn away if they hurt their eyes!

Package names take the form of *language_region-name-compiled.specifcs-version.numbers*.

The package name is defined as `${PKGNAMEPREFIX}${PORTNAME}${PKGNAMESUFFIX}-${PORTVERSION}`. Make sure to set the variables to conform to that format.

language_region-

FreeBSD strives to support the native language of its users. The *language-* part is a two letter abbreviation of the natural language defined by ISO-639 when the port is specific to a certain language. Examples are *ja* for Japanese, *ru* for Russian, *vi* for Vietnamese, *zh* for Chinese, *ko* for Korean and *de* for German.

If the port is specific to a certain region within the language area, add the two letter country code as well. Examples are *en_US* for US English and *fr_CH* for Swiss French.

The *language-* part is set in PKGNAMEPREFIX.

name

Make sure that the port's name and version are clearly separated and placed into PORTNAME and PORTVERSION. The only reason for PORTNAME to contain a version part is if the upstream distribution is really named that way, as in the [textproc/libxml2](#) or [japanese/kinput2-freewnn](#) ports. Otherwise, PORTNAME cannot contain any version-specific information. It is quite normal for several ports to have the same PORTNAME, as the [www/apache*](#) ports do; in that case, different versions (and different index entries) are distinguished by PKGNAMEPREFIX and PKGNAMESUFFIX values.

There is a tradition of naming Perl 5 modules by prepending *p5-* and converting the double-colon separator to a hyphen. For example, the `Data::Dumper` module becomes *p5-Data-Dumper*.

-compiled.specifcs

If the port can be built with different [hardcoded defaults](#) (usually part of the directory name in a family of ports), the *-compiled.specifcs* part states the compiled-in defaults. The hyphen is optional. Examples are paper size and font units.

The *-compiled.specifcs* part is set in PKGNAMESUFFIX.

-version.numbers

The version string follows a dash (-) and is a period-separated list of integers and single lowercase alphabets. In particular, it is not permissible to have another dash inside the version string. The only exception is the string *p1* (meaning “patchlevel”), which can be used *only* when there are no major and minor version numbers in the software. If the software version has strings like “alpha”, “beta”, “rc”, or “pre”, take the first letter and put it immediately after a period. If the version string continues after those names, the numbers follow the single alphabet without an extra period between them (for example, *1.0b2*).

The idea is to make it easier to sort ports by looking at the version string. In particular, make sure version number components are always delimited by a period, and if the date is part of the string, use the *0.0.yyyy.mm.dd* format, not *dd.mm.yyyy* or the non-Y2K compliant *yy.mm.dd* format. It is important to prefix the version with *0.0.* in case a release with an actual version number is made, which would be numerically less than *yyyy*.



Important

Package name must be unique among all of the ports tree, check that there is not already a port with the same **PORTNAME** and if there is add one of **PKGNAMEPREFIX** or **PKGNAME_SUFFIX**.

Here are some (real) examples on how to convert the name as called by the software authors to a suitable package name:

Table 5.1. Package Naming Examples

| Distribution Name | PKGNAMEPREFIX | PORTNAME | PKGNAME_SUFFIX | PORTVERSION | Reason |
|-------------------|---------------|----------|----------------|-------------|---|
| mule-2.2.2 | (empty) | mule | (empty) | 2.2.2 | No changes required |
| mule-1.0.1 | (empty) | mule | 1 | 1.0.1 | mule already exists |
| EmiClock-1.0.2 | (empty) | emiclock | (empty) | 1.0.2 | No uppercase names for single programs |
| rdist-1.3alpha | (empty) | rdist | (empty) | 1.3.a | No strings like alpha allowed |
| es-0.9-beta1 | (empty) | es | (empty) | 0.9.b1 | No strings like beta allowed |
| mailman-2.0rc3 | (empty) | mailman | (empty) | 2.0.r3 | No strings like rc allowed |
| v3.3beta021.src | (empty) | tiff | (empty) | 3.3 | What the heck was that anyway? |
| tvtnm | (empty) | tvtnm | (empty) | pl11 | Version string always required |
| piewm | (empty) | piewm | (empty) | 1.0 | Version string always required |
| xvgr-2.10pl1 | (empty) | xvgr | (empty) | 2.10.1 | pl allowed only when no major/minor version numbers |
| gawk-2.15.6 | ja- | gawk | (empty) | 2.15.6 | Japanese language version |
| psutils-1.13 | (empty) | psutils | -letter | 1.13 | Paper size hard-coded at package build time |
| pkfonts | (empty) | pkfonts | 300 | 1.0 | Package for 300dpi fonts |

If there is absolutely no trace of version information in the original source and it is unlikely that the original author will ever release another version, just set the version string to 1.0 (like the `piewm` example above). Otherwise, ask the original author or use the date string the source file was released on (0.0.yyyy.mm.dd) as the version.

5.3. Categorization

5.3.1. CATEGORIES

When a package is created, it is put under `/usr/ports/packages/All` and links are made from one or more subdirectories of `/usr/ports/packages`. The names of these subdirectories are specified by the variable `CATEGORIES`. It is intended to make life easier for the user when he is wading through the pile of packages on the FTP site or the CDROM. Please take a look at the [current list of categories](#) and pick the ones that are suitable for the port.

This list also determines where in the ports tree the port is imported. If there is more than one category here, the port files must be put in the subdirectory with the name of the first category. See [below](#) for more discussion about how to pick the right categories.

5.3.2. Current List of Categories

Here is the current list of port categories. Those marked with an asterisk (*) are *virtual* categories—those that do not have a corresponding subdirectory in the ports tree. They are only used as secondary categories, and only for search purposes.



Note

For non-virtual categories, there is a one-line description in `COMMENT` in that subdirectory's Makefile.

| Category | Description | Notes |
|---------------|---|--|
| accessibility | Ports to help disabled users. | |
| afterstep* | Ports to support the AfterStep window manager. | |
| arabic | Arabic language support. | |
| archivers | Archiving tools. | |
| astro | Astronomical ports. | |
| audio | Sound support. | |
| benchmarks | Benchmarking utilities. | |
| biology | Biology-related software. | |
| cad | Computer aided design tools. | |
| chinese | Chinese language support. | |
| comms | Communication software. | Mostly software to talk to the serial port. |
| converters | Character code converters. | |
| databases | Databases. | |
| deskutils | Things that used to be on the desktop before computers were invented. | |
| devel | Development utilities. | Do not put libraries here just because they are libraries. They should <i>not</i> be in this category unless they truly do not belong anywhere else. |
| dns | DNS-related software. | |

| Category | Description | Notes |
|------------|--|--|
| docs* | Meta-ports for FreeBSD documentation. | |
| editors | General editors. | Specialized editors go in the section for those tools. For example, a mathematical-formula editor will go in <code>math</code> , and have <code>editors</code> as a second category. |
| elisp* | Emacs-lisp ports. | |
| emulators | Emulators for other operating systems. | Terminal emulators do <i>not</i> belong here. X-based ones go to <code>x11</code> and text-based ones to either <code>comms</code> or <code>misc</code> , depending on the exact functionality. |
| finance | Monetary, financial and related applications. | |
| french | French language support. | |
| ftp | FTP client and server utilities. | If the port speaks both FTP and HTTP, put it in <code>ftp</code> with a secondary category of <code>www</code> . |
| games | Games. | |
| geography* | Geography-related software. | |
| german | German language support. | |
| gnome* | Ports from the GNOME Project. | |
| gnustep* | Software related to the GNUSTEP desktop environment. | |
| graphics | Graphics utilities. | |
| hamradio* | Software for amateur radio. | |
| haskell* | Software related to the Haskell language. | |
| hebrew | Hebrew language support. | |
| hungarian | Hungarian language support. | |
| ipv6* | IPv6 related software. | |
| irc | Internet Relay Chat utilities. | |
| japanese | Japanese language support. | |
| java | Software related to the Java™ language. | The <code>java</code> category must not be the only one for a port. Save for ports directly related to the Java language, porters are also encouraged not to use <code>java</code> as the main category of a port. |
| kde* | Ports from the KDE Project. | |
| kld* | Kernel loadable modules. | |
| korean | Korean language support. | |
| lang | Programming languages. | |

| Category | Description | Notes |
|------------|---|--|
| linux* | Linux applications and support utilities. | |
| lisp* | Software related to the Lisp language. | |
| mail | Mail software. | |
| math | Numerical computation software and other utilities for mathematics. | |
| mbone* | MBone applications. | |
| misc | Miscellaneous utilities | Things that do not belong anywhere else. If at all possible, try to find a better category for the port than misc, as ports tend to be overlooked in here. |
| multimedia | Multimedia software. | |
| net | Miscellaneous networking software. | |
| net-im | Instant messaging software. | |
| net-mgmt | Networking management software. | |
| net-p2p | Peer to peer network applications. | |
| news | USENET news software. | |
| palm | Software support for the Palm™ series. | |
| parallel* | Applications dealing with parallelism in computing. | |
| pear* | Ports related to the Pear PHP framework. | |
| perl5* | Ports that require Perl version 5 to run. | |
| plan9* | Various programs from Plan9 . | |
| polish | Polish language support. | |
| ports-mgmt | Ports for managing, installing and developing FreeBSD ports and packages. | |
| portuguese | Portuguese language support. | |
| print | Printing software. | Desktop publishing tools (previewers, etc.) belong here too. |
| python* | Software related to the Python language. | |
| ruby* | Software related to the Ruby language. | |
| rubygems* | Ports of RubyGems packages. | |
| russian | Russian language support. | |
| scheme* | Software related to the Scheme language. | |

| Category | Description | Notes |
|--------------|--|--|
| science | Scientific ports that do not fit into other categories such as <code>astro</code> , <code>biology</code> and <code>math</code> . | |
| security | Security utilities. | |
| shells | Command line shells. | |
| spanish* | Spanish language support. | |
| sysutils | System utilities. | |
| tcl* | Ports that use Tcl to run. | |
| textproc | Text processing utilities. | It does not include desktop publishing tools, which go to <code>print</code> . |
| tk* | Ports that use Tk to run. | |
| ukrainian | Ukrainian language support. | |
| vietnamese | Vietnamese language support. | |
| windowmaker* | Ports to support the WindowMaker window manager. | |
| www | Software related to the World Wide Web. | HTML language support belongs here too. |
| x11 | The X Window System and friends. | This category is only for software that directly supports the window system. Do not put regular X applications here. Most of them go into other <code>x11-*</code> categories (see below). |
| x11-clocks | X11 clocks. | |
| x11-drivers | X11 drivers. | |
| x11-fm | X11 file managers. | |
| x11-fonts | X11 fonts and font utilities. | |
| x11-servers | X11 servers. | |
| x11-themes | X11 themes. | |
| x11-toolkits | X11 toolkits. | |
| x11-wm | X11 window managers. | |
| xfce* | Ports related to the Xfce desktop environment. | |
| zope* | Zope support. | |

5.3.3. Choosing the Right Category

As many of the categories overlap, choosing which of the categories will be the primary category of the port can be tedious. There are several rules that govern this issue. Here is the list of priorities, in decreasing order of precedence:

- The first category must be a physical category (see [above](#)). This is necessary to make the packaging work. Virtual categories and physical categories may be intermixed after that.
- Language specific categories always come first. For example, if the port installs Japanese X11 fonts, then the `CATEGORIES` line would read `japanese x11-fonts`.

- Specific categories are listed before less-specific ones. For instance, an HTML editor is listed as `www editors`, not the other way around. Also, do not list `net` when the port belongs to any of `irc`, `mail`, `news`, `security`, or `www`, as `net` is included implicitly.
- `x11` is used as a secondary category only when the primary category is a natural language. In particular, do not put `x11` in the category line for X applications.
- Emacs modes are placed in the same ports category as the application supported by the mode, not in `editors`. For example, an Emacs mode to edit source files of some programming language goes into `lang`.
- Ports installing loadable kernel modules also have the virtual category `kld` in their `CATEGORIES` line. This is one of the things handled automatically by adding `USES=kmod`.
- `misc` does not appear with any other non-virtual category. If there is `misc` with something else in `CATEGORIES`, that means `misc` can safely be deleted and the port placed only in the other subdirectory.
- If the port truly does not belong anywhere else, put it in `misc`.

If the category is not clearly defined, please put a comment to that effect in the [port submission](#) in the bug database so we can discuss it before we import it. As a committer, send a note to the [FreeBSD ports mailing list](#) so we can discuss it first. Too often, new ports are imported to the wrong category only to be moved right away. This causes unnecessary and undesirable bloat in the master source repository.

5.3.4. Proposing a New Category

As the Ports Collection has grown over time, various new categories have been introduced. New categories can either be *virtual* categories—those that do not have a corresponding subdirectory in the ports tree— or *physical* categories—those that do. This section discusses the issues involved in creating a new physical category. Read it thoroughly before proposing a new one.

Our existing practice has been to avoid creating a new physical category unless either a large number of ports would logically belong to it, or the ports that would belong to it are a logically distinct group that is of limited general interest (for instance, categories related to spoken human languages), or preferably both.

The rationale for this is that such a change creates a [fair amount of work](#) for both the committers and also for all users who track changes to the Ports Collection. In addition, proposed category changes just naturally seem to attract controversy. (Perhaps this is because there is no clear consensus on when a category is “too big”, nor whether categories should lend themselves to browsing (and thus what number of categories would be an ideal number), and so forth.)

Here is the procedure:

1. Propose the new category on [FreeBSD ports mailing list](#). Include a detailed rationale for the new category, including why the existing categories are not sufficient, and the list of existing ports proposed to move. (If there are new ports pending in Bugzilla that would fit this category, list them too.) If you are the maintainer and/or submitter, respectively, mention that as it may help the case.
2. Participate in the discussion.
3. If it seems that there is support for the idea, file a PR which includes both the rationale and the list of existing ports that need to be moved. Ideally, this PR would also include these patches:
 - Makefiles for the new ports once they are repocopied
 - Makefile for the new category
 - Makefile for the old ports' categories

- Makefiles for ports that depend on the old ports
 - (for extra credit, include the other files that have to change, as per the procedure in the Committer's Guide.)
4. Since it affects the ports infrastructure and involves moving and patching many ports but also possibly running regression tests on the build cluster, assign the PR to the Ports Management Team <portmgr@FreeBSD.org>.
 5. If that PR is approved, a committer will need to follow the rest of the procedure that is [outlined in the Committer's Guide](#).

Proposing a new virtual category is similar to the above but much less involved, since no ports will actually have to move. In this case, the only patches to include in the PR would be those to add the new category to CATEGORIES of the affected ports.

5.3.5. Proposing Reorganizing All the Categories

Occasionally someone proposes reorganizing the categories with either a 2-level structure, or some other kind of keyword structure. To date, nothing has come of any of these proposals because, while they are very easy to make, the effort involved to retrofit the entire existing ports collection with any kind of reorganization is daunting to say the very least. Please read the history of these proposals in the mailing list archives before posting this idea. Furthermore, be prepared to be challenged to offer a working prototype.

5.4. The Distribution Files

The second part of the Makefile describes the files that must be downloaded to build the port, and where they can be downloaded.

5.4.1. DISTVERSION/DISTNAME

DISTNAME is the name of the port as called by the authors of the software. DISTNAME defaults to `${PORTNAME}-${DISTVERSIONPREFIX}${DISTVERSION}${DISTVERSIONSUFFIX}`, and DISTVERSION defaults to `${PORTVERSION}` so override it only if necessary. DISTNAME is only used in two places. First, the distribution file list (DISTFILES) defaults to `${DISTNAME}${EXTRACT_SUFFIX}`. Second, the distribution file is expected to extract into a subdirectory named WRKSRC, which defaults to `work/${DISTNAME}`.

Some vendor's distribution names which do not fit into the `${PORTNAME}-${PORTVERSION}` -scheme can be handled automatically by setting DISTVERSION. PORTVERSION will be derived from it automatically.



Note

Only one of PORTVERSION and DISTVERSION can be set at a time. If DISTVERSION does not derive a correct PORTVERSION, do not use DISTVERSION, set PORTVERSION to the right value and set DISTNAME with PORTNAME with either some computation of PORTVERSION or the verbatim upstream version.

Table 5.2. Examples of DISTVERSION and the Derived PORTVERSION

| DISTVERSION | PORTVERSION |
|-------------|-------------|
| 0.7.1d | 0.7.1.d |
| 10Alpha3 | 10.a3 |
| 3Beta7-pre2 | 3.b7.p2 |

| DISTVERSION | PORTVERSION |
|-------------|-------------|
| 8:f_17 | 8f.17 |



Note

PKGNAMEPREFIX and PKGNAMESUFFIX do not affect DISTNAME. Also note that if WRKSRC is equal to `${WRKDIR}/${DISTNAME}` while the original source archive is named something other than `${PORTNAME}-${PORTVERSION}${EXTRACT_SUFFIX}`, leave DISTNAME alone—defining only DISTFILES is easier than both DISTNAME and WRKSRC (and possibly EXTRACT_SUFFIX).

5.4.2. MASTER_SITES

Record the directory part of the FTP/HTTP-URL pointing at the original tarball in MASTER_SITES. Do not forget the trailing slash (/)!

The make macros will try to use this specification for grabbing the distribution file with FETCH if they cannot find it already on the system.

It is recommended that multiple sites are included on this list, preferably from different continents. This will safeguard against wide-area network problems. We are even planning to add support for automatically determining the closest master site and fetching from there; having multiple sites will go a long way towards helping this effort.



Important

MASTER_SITES must not be blank. It must point to the actual site hosting the distribution files. It cannot point to web archives, or the FreeBSD distribution files cache sites. The only exception to this rule is ports that do not have any distribution files. For example, meta-ports do not have any distribution files, so MASTER_SITES does not need to be set.

5.4.2.1. Using MASTER_SITE_* Variables

Shortcut abbreviations are available for popular archives like SourceForge (SOURCEFORGE), GNU (GNU), or Perl CPAN (PERL_CPAN). MASTER_SITES can use them directly:

```
MASTER_SITES= GNU/make
```

The older expanded format still works, but all ports have been converted to the compact format. The expanded format looks like this:

```
MASTER_SITES= ${MASTER_SITE_GNU}
MASTER_SITE_SUBDIR= make
```

These values and variables are defined in [Mk/bsd.sites.mk](#). New entries are added often, so make sure to check the latest version of this file before submitting a port.



Tip

For any MASTER_SITE_ FOO variable, the shorthand FOO can be used. For example, use:

```
MASTER_SITES= FOO
```

If MASTER_SITE_SUBDIR is needed, use this:

```
MASTER_SITES= F00/bar
```



Note

Some `MASTER_SITE_*` names are quite long, and for ease of use, shortcuts have been defined:

Table 5.3. Shortcuts for `MASTER_SITE_*` Macros

| Macro | Shortcut |
|-----------------|----------|
| PERL_CPAN | CPAN |
| GITHUB | GH |
| GITHUB_CLOUD | GHC |
| LIBREOFFICE_DEV | LODEV |
| NETLIB | NL |
| RUBYGEMS | RG |
| SOURCEFORGE | SF |
| SOURCEFORGE_JP | SFJP |

5.4.2.2. Magic `MASTER_SITES` Macros

Several “magic” macros exist for popular sites with a predictable directory structure. For these, just use the abbreviation and the system will choose a subdirectory automatically. For a port named `Stardict`, of version 1.2.3, and hosted on SourceForge, adding this line:

```
MASTER_SITES= SF
```

infers a subdirectory named `/project/stardict/stardict/1.2.3`. If the inferred directory is incorrect, it can be overridden:

```
MASTER_SITES= SF/stardict/WyabdcRealPeopleTTS/${PORTVERSION}
```

This can also be written as

```
MASTER_SITES= SF
MASTER_SITE_SUBDIR= stardict/WyabdcRealPeopleTTS/${PORTVERSION}
```

Table 5.4. Magic `MASTER_SITES` Macros

| Macro | Assumed subdirectory |
|-------------------------|---|
| APACHE_COMMONS_BINARIES | <code>\${PORTNAME:S,commons-, ,}</code> |
| APACHE_COMMONS_SOURCE | <code>\${PORTNAME:S,commons-, ,}</code> |
| APACHE_JAKARTA | <code>\${PORTNAME:S,-,/,}/source</code> |
| BERLIOS | <code>\${PORTNAME:tl}.berlios</code> |
| CHEEESHOP | <code>source/\${DISTNAME:C/(.)*.*\1}/</code> <code>\${DISTNAME:C/(.)*-[0-9].*\1}/</code> |
| CPAN | <code>\${PORTNAME:C/-.*//}</code> |
| DEBIAN | <code>pool/main/\${PORTNAME:C/^((lib)?).*\1}/</code> <code>\${PORTNAME}</code> |

| Macro | Assumed subdirectory |
|-----------|---|
| FARSIGHT | \${PORTNAME} |
| FESTIVAL | \${PORTREVISION} |
| GCC | releases/\${DISTNAME} |
| GENTOO | distfiles |
| GIMP | \${PORTNAME}/\${PORTVERSION:R}/ |
| GH | \${GH_ACCOUNT}/\${GH_PROJECT}/tar.gz/ \${GH_TAGNAME}?dummy=/ |
| GHC | \${GH_ACCOUNT}/\${GH_PROJECT}/ |
| GNOME | sources/\${PORTNAME}/\${PORTVERSION:C/^([0-9]+ \. [0-9]+) .*/\1/} |
| GNU | \${PORTNAME} |
| GNUPG | \${PORTNAME} |
| GNU_ALPHA | \${PORTNAME} |
| HORDE | \${PORTNAME} |
| LODEV | \${PORTNAME} |
| MATE | \${PORTVERSION:C/^([0-9]+\.[0-9]+) .*/\1/} |
| MOZDEV | \${PORTNAME:tl} |
| NL | \${PORTNAME} |
| QT | archive/qt/\${PORTVERSION:R} |
| SAMBA | \${PORTNAME} |
| SAVANNAH | \${PORTNAME:tl} |
| SF | \${PORTNAME:tl}/\${PORTNAME:tl}/\${PORTVERSION} |

5.4.3. USE_GITHUB

If the distribution file comes from a specific commit or tag on [GitHub](#) for which there is no officially released file, there is an easy way to set the right `DISTNAME` and `MASTER_SITES` automatically. These variables are available:

Table 5.5. USE_GITHUB Description

| Variable | Description | Default |
|------------|---|--|
| GH_ACCOUNT | Account name of the GitHub user hosting the project | \${PORTNAME} |
| GH_PROJECT | Name of the project on GitHub | \${PORTNAME} |
| GH_TAGNAME | Name of the tag to download (2.0.1, hash, ...) Using the name of a branch here is incorrect. It is also possible to use the hash of a commit id to do a snapshot. | \${DISTVERSIONPRE-FIX}\${DISTVERSION}\${DISTVERSIONSUFFIX-FIX} |
| GH_TUPLE | GH_TUPLE allows putting all the GH_ACCOUNT, GH_PROJECT, and GH_TAGNAME into one variable. The format is <i>account:project:tag-name:group</i> . It is helpful when there is more than one GitHub project from which to fetch. | |



Important

Do not use `GH_TUPLE` for the default distribution file, as it has no default.

Example 5.1. Simple Use of `USE_GITHUB`

While trying to make a port for version 1.2.7 of `pkg` from the FreeBSD user on github, at <https://github.com/freebsd/pkg>, The Makefile would end up looking like this (slightly stripped for the example):

```
PORTNAME= pkg
PORTVERSION= 1.2.7

USE_GITHUB= yes
GH_ACCOUNT= freebsd
```

It will automatically have `MASTER_SITES` set to `GH GHC` and `WRKSRC` to `${WRKDIR}/pkg-1.2.7` .

Example 5.2. More Complete Use of `USE_GITHUB`

While trying to make a port for the bleeding edge version of `pkg` from the FreeBSD user on github, at <https://github.com/freebsd/pkg>, the Makefile ends up looking like this (slightly stripped for the example):

```
PORTNAME= pkg-devel
PORTVERSION= 1.3.0.a.20140411

USE_GITHUB= yes
GH_ACCOUNT= freebsd
GH_PROJECT= pkg
GH_TAGNAME= 6dbb17b
```

It will automatically have `MASTER_SITES` set to `GH GHC` and `WRKSRC` to `${WRKDIR}/pkg-6dbb17b` .

Example 5.3. Use of `USE_GITHUB` with `DISTVERSIONPREFIX`

From time to time, `GH_TAGNAME` is a slight variation from `DISTVERSION` . For example, if the version is 1.0.2, the tag is `v1.0.2` . In those cases, it is possible to use `DISTVERSIONPREFIX` or `DISTVERSIONSUFFIX`:

```
PORTNAME= foo
PORTVERSION= 1.0.2
DISTVERSIONPREFIX= v

USE_GITHUB= yes
```

It will automatically set `GH_TAGNAME` to `v1.0.2` , while `WRKSRC` will be kept to `${WRKDIR}/foo-1.0.2` .

5.4.3.1. Fetching Multiple Files from GitHub

The `USE_GITHUB` framework also supports fetching multiple distribution files from different places in GitHub. It works in a way very similar to [Section 5.4.8, “Multiple Distribution or Patches Files from Multiple Locations”](#).

Multiple values are added to `GH_ACCOUNT`, `GH_PROJECT`, and `GH_TAGNAME`. Each different value is assigned a tag. The main value can either have no tag, or the `:DEFAULT` tag. A value can be omitted if it is the same as the default as listed in [Table 5.5, “USE_GITHUB Description”](#).

`GH_TUPLE` can also be used when there are a lot of distribution files. It helps keep the account, project, tagname, and group information at the same place.

For each tag, a `${WRKSRC_tag}` helper variable is created, containing the directory into which the file has been extracted. The `${WRKSRC_tag}` variables can be used to move directories around during post-extract, or add to `CONFIGURE_ARGS`, or whatever is needed so that the software builds correctly.



Note

As this is only syntactic sugar above `DISTFILES` and `MASTER_SITES`, the tag names must adhere to the restrictions on group names outlined in [Section 5.4.8, “Multiple Distribution or Patches Files from Multiple Locations”](#)

Example 5.4. Use of `USE_GITHUB` with Multiple Distribution Files

From time to time, there is a need to fetch more than one distribution file. For example, when the upstream git repository uses submodules. This can be done easily using tags in the `GH_*` variables:

```
PORTNAME= foo
PORTVERSION= 1.0.2

USE_GITHUB= yes
GH_ACCOUNT= bar:icons,contrib
GH_PROJECT= foo-icons:icons foo-contrib:contrib
GH_TAGNAME= 1.0:icons fa579bc:contrib

CONFIGURE_ARGS= --with-contrib=${WRKSRC_contrib}

post-extract:
    @${MV} ${WRKSRC_icons} ${WRKSRC}/icons
```

This will fetch three distribution files from github. The default one comes from `foo/foo` and is version 1.0.2. The second one, tagged `icons`, comes from `bar/foo-icons` and is in version 1.0. The third one comes from `bar/foo-contrib` and uses the Git commit `fa579bc`. The distribution files are named `foo-foo-1.0.2_GH0.tar.gz`, `bar-foo-icons-1.0_GH0.tar.gz`, and `bar-foo-contrib-fa579bc_GH0.tar.gz`.

All the distribution files are extracted in `${WRKDIR}` in their respective subdirectories. The default file is still extracted in `${WRKSRC}`, in this case, `${WRKDIR}/foo-1.0.2`. Each additional distribution file is extracted in `${WRKSRC_tag}`. Here, for the `icons` tag, it is called `${WRKSRC_icons}` and it contains `${WRKDIR}/foo-icons-1.0`. The file with the `contrib` tag is called `${WRKSRC_contrib}` and contains `${WRKDIR}/foo-contrib-fa579bc`.

Example 5.5. Use of `USE_GITHUB` with Multiple Distribution Files Using `GH_TUPLE`

This is functionally equivalent to [Example 5.4, “Use of `USE_GITHUB` with Multiple Distribution Files”](#), but using `GH_TUPLE`:

```
PORTNAME= foo
PORTVERSION= 1.0.2

USE_GITHUB= yes
GH_TUPLE= bar:foo-icons:1.0:icons \
          bar:foo-contrib:fa579bc:contrib

CONFIGURE_ARGS= --with-contrib=${WRKSRCDIR}/contrib

post-extract:
    @${MV} ${WRKSRCDIR}/icons ${WRKSRCDIR}/icons
```

Grouping was used in the previous example with `bar:icons,contrib`. Some redundant information is present with `GH_TUPLE` because grouping is not possible.

5.4.4. `EXTRACT_SUFFIX`

If there is one distribution file, and it uses an odd suffix to indicate the compression mechanism, set `EXTRACT_SUFFIX`.

For example, if the distribution file was named `foo.tar.gzip` instead of the more normal `foo.tar.gz`, write:

```
DISTNAME= foo
EXTRACT_SUFFIX= .tar.gzip
```

The `USES=tar[: xxx]`, `USES=lha` or `USES=zip` automatically set `EXTRACT_SUFFIX` to the most common archives extensions as necessary, see [Chapter 15, Using `USES` Macros](#) for more details. If neither of these are set then `EXTRACT_SUFFIX` defaults to `.tar.gz`.



Note

As `EXTRACT_SUFFIX` is only used in `DISTFILES`, only set one of them..

5.4.5. `DISTFILES`

Sometimes the names of the files to be downloaded have no resemblance to the name of the port. For example, it might be called `source.tar.gz` or similar. In other cases the application's source code might be in several different archives, all of which must be downloaded.

If this is the case, set `DISTFILES` to be a space separated list of all the files that must be downloaded.

```
DISTFILES= source1.tar.gz source2.tar.gz
```

If not explicitly set, `DISTFILES` defaults to `${DISTNAME}${EXTRACT_SUFFIX}`.

5.4.6. `EXTRACT_ONLY`

If only some of the `DISTFILES` must be extracted—for example, one of them is the source code, while another is an uncompressed document—list the filenames that must be extracted in `EXTRACT_ONLY`.

```
DISTFILES= source.tar.gz manual.html
EXTRACT_ONLY= source.tar.gz
```

When none of the DISTFILES need to be uncompressed, set EXTRACT_ONLY to the empty string.

```
EXTRACT_ONLY=
```

5.4.7. PATCHFILES

If the port requires some additional patches that are available by FTP or HTTP, set PATCHFILES to the names of the files and PATCH_SITES to the URL of the directory that contains them (the format is the same as MASTER_SITES).

If the patch is not relative to the top of the source tree (that is, WRKSRC) because it contains some extra pathnames, set PATCH_DIST_STRIP accordingly. For instance, if all the pathnames in the patch have an extra foozoliX-1.0/ in front of the filenames, then set PATCH_DIST_STRIP=-p1.

Do not worry if the patches are compressed; they will be decompressed automatically if the filenames end with .Z, .gz, .bz2 or .xz.

If the patch is distributed with some other files, such as documentation, in a gzipped tarball, using PATCHFILES is not possible. If that is the case, add the name and the location of the patch tarball to DISTFILES and MASTER_SITES. Then, use EXTRA_PATCHES to point to those files and `bsd.port.mk` will automatically apply them. In particular, do not copy patch files into `${PATCHDIR}`. That directory may not be writable.



Tip

If there are multiple patches and they need mixed values for the strip parameter, it can be added alongside the patch name in PATCHFILES, e.g:

```
PATCHFILES= patch1 patch2:-p1
```

This does not conflict with [the master site grouping feature](#), adding a group also works:

```
PATCHFILES= patch2:-p1:source2
```



Note

The tarball will have been extracted alongside the regular source by then, so there is no need to explicitly extract it if it is a regular gzipped or compressed tarball. Take extra care not to overwrite something that already exists in that directory if extracting it manually. Also, do not forget to add a command to remove the copied patch in the `pre-clean` target.

5.4.8. Multiple Distribution or Patches Files from Multiple Locations

(Consider this to be a somewhat “advanced topic”; those new to this document may wish to skip this section at first).

This section has information on the fetching mechanism known as both `MASTER_SITES:n` and `MASTER_SITES_NN`. We will refer to this mechanism as `MASTER_SITES:n`.

A little background first. OpenBSD has a neat feature inside DISTFILES and PATCHFILES which allows files and patches to be postfixed with `:n` identifiers. Here, `n` can be any word containing `[0-9a-zA-Z_]` and denote a group designation. For example:

```
DISTFILES= alpha:0 beta:1
```

In OpenBSD, distribution file `alpha` will be associated with variable `MASTER_SITES0` instead of our common `MASTER_SITES` and `beta` with `MASTER_SITES1`.

This is a very interesting feature which can decrease that endless search for the correct download site.

Just picture 2 files in `DISTFILES` and 20 sites in `MASTER_SITES`, the sites slow as hell where `beta` is carried by all sites in `MASTER_SITES`, and `alpha` can only be found in the 20th site. It would be such a waste to check all of them if the maintainer knew this beforehand, would it not? Not a good start for that lovely weekend!

Now that you have the idea, just imagine more `DISTFILES` and more `MASTER_SITES`. Surely our “distfiles survey meister” would appreciate the relief to network strain that this would bring.

In the next sections, information will follow on the FreeBSD implementation of this idea. We improved a bit on OpenBSD's concept.



Important

The group names cannot have dashes in them (-), in fact, they cannot have any characters out of the `[a-zA-Z0-9_]` range. This is because, while `make(1)` is ok with variable names containing dashes, `sh(1)` is not.

5.4.8.1. Simplified Information

This section explains how to quickly prepare fine grained fetching of multiple distribution files and patches from different sites and subdirectories. We describe here a case of simplified `MASTER_SITES:n` usage. This will be sufficient for most scenarios. More detailed information are available in [Section 5.4.8.2, “Detailed Information”](#).

Some applications consist of multiple distribution files that must be downloaded from a number of different sites. For example, Ghostscript consists of the core of the program, and then a large number of driver files that are used depending on the user's printer. Some of these driver files are supplied with the core, but many others must be downloaded from a variety of different sites.

To support this, each entry in `DISTFILES` may be followed by a colon and a “tag name”. Each site listed in `MASTER_SITES` is then followed by a colon, and the tag that indicates which distribution files are downloaded from this site.

For example, consider an application with the source split in two parts, `source1.tar.gz` and `source2.tar.gz`, which must be downloaded from two different sites. The port's Makefile would include lines like [Example 5.6, “Simplified Use of MASTER_SITES:n with One File Per Site”](#).

Example 5.6. Simplified Use of `MASTER_SITES:n` with One File Per Site

```
MASTER_SITES= ftp://ftp1.example.com/:source1 \
http://www.example.com/:source2
DISTFILES= source1.tar.gz:source1 \
source2.tar.gz:source2
```

Multiple distribution files can have the same tag. Continuing the previous example, suppose that there was a third distfile, `source3.tar.gz`, that is downloaded from `ftp.example2.com`. The Makefile would then be written like [Example 5.7, “Simplified Use of MASTER_SITES:n with More Than One File Per Site”](#).

Example 5.7. Simplified Use of `MASTER_SITES:n` with More Than One File Per Site

```
MASTER_SITES= ftp://ftp.example.com/:source1 \
http://www.example.com/:source2
DISTFILES= source1.tar.gz:source1 \
source2.tar.gz:source2 \
source3.tar.gz:source2
```

5.4.8.2. Detailed Information

Okay, so the previous example did not reflect the new port's needs? In this section we will explain in detail how the fine grained fetching mechanism `MASTER_SITES:n` works and how it can be used.

1. Elements can be postfixed with `:n` where `n` is `[^:,]+`, that is, `n` could conceptually be any alphanumeric string but we will limit it to `[a-zA-Z_][0-9a-zA-Z_]+` for now.

Moreover, string matching is case sensitive; that is, `n` is different from `N`.

However, these words cannot be used for postfixing purposes since they yield special meaning: `default`, `all` and `ALL` (they are used internally in item [ii](#)). Furthermore, `DEFAULT` is a special purpose word (check item [3](#)).

2. Elements postfixed with `:n` belong to the group `n`, `:m` belong to group `m` and so forth.
3. Elements without a postfix are groupless, they all belong to the special group `DEFAULT`. Any elements postfixed with `DEFAULT`, is just being redundant unless an element belongs to both `DEFAULT` and other groups at the same time (check item [5](#)).

These examples are equivalent but the first one is preferred:

```
MASTER_SITES= alpha
```

```
MASTER_SITES= alpha:DEFAULT
```

4. Groups are not exclusive, an element may belong to several different groups at the same time and a group can either have either several different elements or none at all.
5. When an element belongs to several groups at the same time, use the comma operator `(,)`.

Instead of repeating it several times, each time with a different postfix, we can list several groups at once in a single postfix. For instance, `:m,n,o` marks an element that belongs to group `m`, `n` and `o`.

All these examples are equivalent but the last one is preferred:

```
MASTER_SITES= alpha alpha:SOME_SITE
```

```
MASTER_SITES= alpha:DEFAULT alpha:SOME_SITE
```

```
MASTER_SITES= alpha:SOME_SITE,DEFAULT
```

```
MASTER_SITES= alpha:DEFAULT,SOME_SITE
```

6. All sites within a given group are sorted according to `MASTER_SORT_AWK`. All groups within `MASTER_SITES` and `PATCH_SITES` are sorted as well.
7. Group semantics can be used in any of the variables `MASTER_SITES`, `PATCH_SITES`, `MASTER_SITE_SUBDIR`, `PATCH_SITE_SUBDIR`, `DISTFILES`, and `PATCHFILES` according to this syntax:

- a. All `MASTER_SITES`, `PATCH_SITES`, `MASTER_SITE_SUBDIR` and `PATCH_SITE_SUBDIR` elements must be terminated with the forward slash `/` character. If any elements belong to any groups, the group postfix `:n` must come right after the terminator `/`. The `MASTER_SITES:n` mechanism relies on the existence of the terminator `/` to avoid confusing elements where a `:n` is a valid part of the element with occurrences where `:n` denotes group `n`. For compatibility purposes, since the `/` terminator was not required before in both `MASTER_SITE_SUBDIR` and `PATCH_SITE_SUBDIR` elements, if the postfix immediate preceding character is not a `/` then `:n` will be considered a valid part of the element instead of a group postfix even if an element is postfixed with `:n`. See both [Example 5.8, “Detailed Use of `MASTER_SITES:n` in `MASTER_SITE_SUBDIR`”](#) and [Example 5.9, “Detailed Use of `MASTER_SITES:n` with Comma Operator, Multiple Files, Multiple Sites and Multiple Subdirectories”](#).

Example 5.8. Detailed Use of `MASTER_SITES:n` in `MASTER_SITE_SUBDIR`

```
MASTER_SITE_SUBDIR= old:n new/:NEW
```

- Directories within group `DEFAULT` -> `old:n`
- Directories within group `NEW` -> `new`

Example 5.9. Detailed Use of `MASTER_SITES:n` with Comma Operator, Multiple Files, Multiple Sites and Multiple Subdirectories

```
MASTER_SITES= http://site1/%SUBDIR%/ http://site2/:DEFAULT \
http://site3/:group3 http://site4/:group4 \
http://site5/:group5 http://site6/:group6 \
http://site7/:DEFAULT,group6 \
http://site8/%SUBDIR%/:group6,group7 \
http://site9/:group8
DISTFILES= file1 file2:DEFAULT file3:group3 \
file4:group4,group5,group6 file5:grouping \
file6:group7
MASTER_SITE_SUBDIR= directory-trial:1 directory-n/:groupn \
directory-one/:group6,DEFAULT \
directory
```

The previous example results in this fine grained fetching. Sites are listed in the exact order they will be used.

- `file1` will be fetched from
 - `MASTER_SITE_OVERRIDE`
 - `http://site1/directory-trial:1/`
 - `http://site1/directory-one/`
 - `http://site1/directory/`
 - `http://site2/`
 - `http://site7/`
 - `MASTER_SITE_BACKUP`
- `file2` will be fetched exactly as `file1` since they both belong to the same group

- MASTER_SITE_OVERRIDE
- <http://site1/directory-trial:1/>
- <http://site1/directory-one/>
- <http://site1/directory/>
- <http://site2/>
- <http://site7/>
- MASTER_SITE_BACKUP
- file3 will be fetched from
 - MASTER_SITE_OVERRIDE
 - <http://site3/>
 - MASTER_SITE_BACKUP
- file4 will be fetched from
 - MASTER_SITE_OVERRIDE
 - <http://site4/>
 - <http://site5/>
 - <http://site6/>
 - <http://site7/>
 - <http://site8/directory-one/>
 - MASTER_SITE_BACKUP
- file5 will be fetched from
 - MASTER_SITE_OVERRIDE
 - MASTER_SITE_BACKUP
- file6 will be fetched from
 - MASTER_SITE_OVERRIDE
 - <http://site8/>
 - MASTER_SITE_BACKUP

8. How do I group one of the special macros from `bsd.sites.mk`, for example, SourceForge (SF)?

This has been simplified as much as possible. See [Example 5.10, “Detailed Use of MASTER_SITES:n with SourceForge \(SF\)”](#).

Example 5.10. Detailed Use of `MASTER_SITES:n` with SourceForge (sf)

```
MASTER_SITES= http://site1/ SF/something/1.0:sourceforge,TEST
DISTFILES= something.tar.gz:sourceforge
```

something.tar.gz will be fetched from all sites within SourceForge.

9. How do I use this with `PATCH*`?

All examples were done with `MASTER*` but they work exactly the same for `PATCH*` ones as can be seen in [Example 5.11](#), “Simplified Use of `MASTER_SITES:n` with `PATCH_SITES`”.

Example 5.11. Simplified Use of `MASTER_SITES:n` with `PATCH_SITES`

```
PATCH_SITES= http://site1/ http://site2/:test
PATCHFILES= patch1:test
```

5.4.8.3. What Does Change for Ports? What Does Not?

- i. All current ports remain the same. The `MASTER_SITES:n` feature code is only activated if there are elements postfixed with `:n` like elements according to the aforementioned syntax rules, especially as shown in item 7.
- ii. The port targets remain the same: `checksum`, `makesum`, `patch`, `configure`, `build`, etc. With the obvious exceptions of `do-fetch`, `fetch-list`, `master-sites` and `patch-sites`.

- `do-fetch`: deploys the new grouping postfixed `DISTFILES` and `PATCHFILES` with their matching group elements within both `MASTER_SITES` and `PATCH_SITES` which use matching group elements within both `MASTER_SITE_SUBDIR` and `PATCH_SITE_SUBDIR`. Check [Example 5.9](#), “Detailed Use of `MASTER_SITES:n` with Comma Operator, Multiple Files, Multiple Sites and Multiple Subdirectories”.
- `fetch-list`: works like old `fetch-list` with the exception that it groups just like `do-fetch`.
- `master-sites` and `patch-sites`: (incompatible with older versions) only return the elements of group `DEFAULT`; in fact, they execute targets `master-sites-default` and `patch-sites-default` respectively.

Furthermore, using target either `master-sites-all` or `patch-sites-all` is preferred to directly checking either `MASTER_SITES` or `PATCH_SITES`. Also, directly checking is not guaranteed to work in any future versions. Check item B for more information on these new port targets.

iii. New port targets

- A. There are `master-sites- n` and `patch-sites- n` targets which will list the elements of the respective group `n` within `MASTER_SITES` and `PATCH_SITES` respectively. For instance, both `master-sites-DEFAULT` and `patch-sites-DEFAULT` will return the elements of group `DEFAULT`, `master-sites-test` and `patch-sites-test` of group `test`, and thereon.
- B. There are new targets `master-sites-all` and `patch-sites-all` which do the work of the old `master-sites` and `patch-sites` ones. They return the elements of all groups as if they all belonged to the same group with

the caveat that it lists as many `MASTER_SITE_BACKUP` and `MASTER_SITE_OVERRIDE` as there are groups defined within either `DISTFILES` or `PATCHFILES`; respectively for `master-sites-all` and `patch-sites-all`.

5.4.9. DIST_SUBDIR

Do not let the port clutter `/usr/ports/distfiles`. If the port requires a lot of files to be fetched, or contains a file that has a name that might conflict with other ports (for example, `Makefile`), set `DIST_SUBDIR` to the name of the port (`${PORTNAME}` or `${PKGNAMEPREFIX}${PORTNAME}` are fine). This will change `DISTDIR` from the default `/usr/ports/distfiles` to `/usr/ports/distfiles/${DIST_SUBDIR}`, and in effect puts everything that is required for the port into that subdirectory.

It will also look at the subdirectory with the same name on the backup master site at `ftp.FreeBSD.org`. (Setting `DISTDIR` explicitly in `Makefile` will not accomplish this, so please use `DIST_SUBDIR`.)



Note

This does not affect `MASTER_SITES` defined in the `Makefile`.

5.4.10. ALWAYS_KEEP_DISTFILES

If the port uses binary distfiles and has a license that requires that the source code is provided with packages distributed in binary form, like GPL, `ALWAYS_KEEP_DISTFILES` will instruct the FreeBSD build cluster to keep a copy of the files specified in `DISTFILES`. Users of these ports will generally not need these files, so it is a good idea to only add the source distfiles to `DISTFILES` when `PACKAGE_BUILDING` is defined.

Example 5.12. Use of `ALWAYS_KEEP_DISTFILES`

```
.if defined(PACKAGE_BUILDING)
DISTFILES+=  foo.tar.gz
ALWAYS_KEEP_DISTFILES= yes
.endif
```

When adding extra files to `DISTFILES`, make sure to also add them to `distinfo`. Also, the additional files will normally be extracted into `WRKDIR` as well, which for some ports may lead to undesirable side effects and require special handling.

5.5. MAINTAINER

Set your mail-address here. Please. :-)

Only a single address without the comment part is allowed as a `MAINTAINER` value. The format used is `user@host-name.domain`. Please do not include any descriptive text such as a real name in this entry. That merely confuses the Ports infrastructure and most tools using it.

The maintainer is responsible for keeping the port up to date and making sure that it works correctly. For a detailed description of the responsibilities of a port maintainer, refer to [The challenge for port maintainers](#).



Note

A maintainer volunteers to keep a port in good working order. Maintainers have the primary responsibility for their ports, but not exclusive ownership. Ports exist for the benefit of the community and, in reality, belong to the community. What this means is that people other than the maintainer can make changes to a port. Large changes to the Ports Collection might require changes to many ports. The FreeBSD Ports Management Team or members of other teams might modify ports to fix dependency issues or other problems, like a version bump for a shared library update.

Some types of fixes have “blanket approval” from the Ports Management Team <portmgr@FreeBSD.org>, allowing any committer to fix those categories of problems on any port. These fixes do not need approval from the maintainer. Blanket approval does not apply to ports that are maintained by teams like <autotools@FreeBSD.org>, <x11@FreeBSD.org>, <gnome@FreeBSD.org>, or <kde@FreeBSD.org>. These teams use external repositories and can have work that would conflict with changes that would normally fall under blanket approval.

Blanket approval for most ports applies to these types of fixes:

- Most infrastructure changes to a port (that is, modernizing, but not changing the functionality). For example, converting to staging, `USE_GMAKE` to `USES=gmake`, the new `LIB_DEPENDS` format...
- Trivial and *tested* build and runtime fixes.

Other changes to the port will be sent to the maintainer for review and approval before being committed. If the maintainer does not respond to an update request after two weeks (excluding major public holidays), then that is considered a maintainer timeout, and the update may be made without explicit maintainer approval. If the maintainer does not respond within three months, or if there have been three consecutive timeouts, then that maintainer is considered absent without leave, and can be replaced as the maintainer of the particular port in question. Exceptions to this are anything maintained by the Ports Management Team <portmgr@FreeBSD.org>, or the Security Officer Team <security-officer@FreeBSD.org>. No unauthorized commits may ever be made to ports maintained by those groups.

We reserve the right to modify the maintainer's submission to better match existing policies and style of the Ports Collection without explicit blessing from the submitter or the maintainer. Also, large infrastructural changes can result in a port being modified without the maintainer's consent. These kinds of changes will never affect the port's functionality.

The Ports Management Team <portmgr@FreeBSD.org> reserves the right to revoke or override anyone's maintainership for any reason, and the Security Officer Team <security-officer@FreeBSD.org> reserves the right to revoke or override maintainership for security reasons.

5.6. COMMENT

The comment is a one-line description of a port shown by `pkg info`. Please follow these rules when composing it:

1. The COMMENT string should be 70 characters or less.
2. Do *not* include the package name or version number of software.
3. The comment must begin with a capital and end without a period.

4. Do not start with an indefinite article (that is, A or An).
5. Capitalize names such as Apache, JavaScript, or Perl.
6. Use a serial comma for lists of words: "green, red, and blue."
7. Check for spelling errors.

Here is an example:

```
COMMENT= Cat chasing a mouse all over the screen
```

The COMMENT variable immediately follows the MAINTAINER variable in the Makefile.

5.7. PORTSCOUT

Portscout is an automated distfile check utility for the FreeBSD Ports Collection, described in detail in [Section 14.5](#), “Portscout: the FreeBSD Ports Distfile Scanner”.

PORTSCOUT defines special conditions within which the Portscout distfile scanner is restricted.

Situations where PORTSCOUT is set include:

- When distfiles have to be ignored, whether for specific versions, or specific minor revisions. For example, to exclude version 8.2 from distfile version checks because it is known to be broken, add:

```
PORTSCOUT= ignore:8.2
```

- When specific versions or specific major and minor revisions of a distfile must be checked. For example, if only version 0.6.4 must be monitored because newer versions have compatibility issues with FreeBSD, add:

```
PORTSCOUT= limit:^0\.6\.4
```

- When URLs listing the available versions differ from the download URLs. For example, to limit distfile version checks to the download page for the [databases/pgtune](#) port, add:

```
PORTSCOUT= site:http://pgfoundry.org/frs/?group_id=1000416
```

5.8. Dependencies

Many ports depend on other ports. This is a very convenient feature of most Unix-like operating systems, including FreeBSD. Multiple ports can share a common dependency, rather than bundling that dependency with every port or package that needs it. There are seven variables that can be used to ensure that all the required bits will be on the user's machine. There are also some pre-supported dependency variables for common cases, plus a few more to control the behavior of dependencies.

5.8.1. LIB_DEPENDS

This variable specifies the shared libraries this port depends on. It is a list of *lib:dir* tuples where *lib* is the name of the shared library, *dir* is the directory in which to find it in case it is not available. For example,

```
LIB_DEPENDS= libjpeg.so:graphics/jpeg
```

will check for a shared jpeg library with any version, and descend into the `graphics/jpeg` subdirectory of the ports tree to build and install it if it is not found.

The dependency is checked twice, once from within the `build` target and then from within the `install` target. Also, the name of the dependency is put into the package so that `pkg install` (see [pkg-install\(8\)](#)) will automatically install it if it is not on the user's system.

5.8.2. RUN_DEPENDS

This variable specifies executables or files this port depends on during run-time. It is a list of *path:dir[:target]* tuples where *path* is the name of the executable or file, *dir* is the directory in which to find it in case it is not available, and *target* is the target to call in that directory. If *path* starts with a slash (/), it is treated as a file and its existence is tested with `test -e`; otherwise, it is assumed to be an executable, and `which -s` is used to determine if the program exists in the search path.

For example,

```
RUN_DEPENDS= ${LOCALBASE}/news/bin/innd:news/inn \
xmlcatmgr:textproc/xmlcatmgr
```

will check if the file or directory `/usr/local/news/bin/innd` exists, and build and install it from the `news/inn` subdirectory of the ports tree if it is not found. It will also see if an executable called `xmlcatmgr` is in the search path, and descend into `textproc/xmlcatmgr` to build and install it if it is not found.



Note

In this case, `innd` is actually an executable; if an executable is in a place that is not expected to be in the search path, use the full pathname.



Note

The official search PATH used on the ports build cluster is

```
/sbin:/bin:/usr/sbin:/usr/bin:/usr/local/sbin:/usr/local/bin
```

The dependency is checked from within the `install` target. Also, the name of the dependency is put into the package so that `pkg install` (see [pkg-install\(8\)](#)) will automatically install it if it is not on the user's system. The *target* part can be omitted if it is the same as `DEPENDS_TARGET`.

A quite common situation is when `RUN_DEPENDS` is literally the same as `BUILD_DEPENDS`, especially if ported software is written in a scripted language or if it requires the same build and run-time environment. In this case, it is both tempting and intuitive to directly assign one to the other:

```
RUN_DEPENDS= ${BUILD_DEPENDS}
```

However, such assignment can pollute run-time dependencies with entries not defined in the port's original `BUILD_DEPENDS`. This happens because of [make\(1\)](#)'s lazy evaluation of variable assignment. Consider a Makefile with `USE_*`, which are processed by `ports/Mk/bsd.*.mk` to augment initial build dependencies. For example, `USES= gmake` adds `devel/gmake` to `BUILD_DEPENDS`. To prevent such additional dependencies from polluting `RUN_DEPENDS`, create another variable with the current content of `BUILD_DEPENDS` and assign it to both `BUILD_DEPENDS` and `RUN_DEPENDS`:

```
MY_DEPENDS= some:devel/some \
other:lang/other
BUILD_DEPENDS= ${MY_DEPENDS}
RUN_DEPENDS= ${MY_DEPENDS}
```



Important

Do not use `:=` to assign `BUILD_DEPENDS` to `RUN_DEPENDS` or vice-versa. All variables are expanded immediately, which is exactly the wrong thing to do and almost always a failure.

5.8.3. BUILD_DEPENDS

This variable specifies executables or files this port requires to build. Like `RUN_DEPENDS`, it is a list of *path:dir[:target]* tuples. For example,

```
BUILD_DEPENDS= unzip:archivers/unzip
```

will check for an executable called `unzip`, and descend into the `archivers/unzip` subdirectory of the ports tree to build and install it if it is not found.



Note

“build” here means everything from extraction to compilation. The dependency is checked from within the `extract` target. The *target* part can be omitted if it is the same as `DEPENDS_TARGET`

5.8.4. FETCH_DEPENDS

This variable specifies executables or files this port requires to fetch. Like the previous two, it is a list of *path:dir[:target]* tuples. For example,

```
FETCH_DEPENDS= ncftp2:net/ncftp2
```

will check for an executable called `ncftp2`, and descend into the `net/ncftp2` subdirectory of the ports tree to build and install it if it is not found.

The dependency is checked from within the `fetch` target. The *target* part can be omitted if it is the same as `DEPENDS_TARGET`.

5.8.5. EXTRACT_DEPENDS

This variable specifies executables or files this port requires for extraction. Like the previous, it is a list of *path:dir[:target]* tuples. For example,

```
EXTRACT_DEPENDS= unzip:archivers/unzip
```

will check for an executable called `unzip`, and descend into the `archivers/unzip` subdirectory of the ports tree to build and install it if it is not found.

The dependency is checked from within the `extract` target. The *target* part can be omitted if it is the same as `DEPENDS_TARGET`.



Note

Use this variable only if the extraction does not already work (the default assumes `tar`) and cannot be made to work using `USES=tar`, `USES=lha` or `USES=zip` described in [Chapter 15, Using USES Macros](#).

5.8.6. PATCH_DEPENDS

This variable specifies executables or files this port requires to patch. Like the previous, it is a list of *path:dir[:target]* tuples. For example,

```
PATCH_DEPENDS= ${NONEXISTENT}:java/jfc:extract
```

will descend into the `java/jfc` subdirectory of the ports tree to extract it.

The dependency is checked from within the `patch` target. The *target* part can be omitted if it is the same as `DEPENDS_TARGET`.

5.8.7. USES

Parameters can be added to define different features and dependencies used by the port. They are specified by adding this line to the Makefile:

```
USES= feature[:arguments]
```

For the complete list of values, please see [Chapter 15, Using USES Macros](#).



Warning

`USES` cannot be assigned after inclusion of `bsd.port.pre.mk`.

5.8.8. USE_*

Several variables exist to define common dependencies shared by many ports. Their use is optional, but helps to reduce the verbosity of the port Makefiles. Each of them is styled as `USE_*`. These variables may be used only in the port Makefiles and `ports/Mk/bsd.*.mk`. They are not meant for user-settable options — use `PORT_OPTIONS` for that purpose.



Note

It is *always* incorrect to set any `USE_*` in `/etc/make.conf`. For instance, setting

```
USE_GCC=X.Y
```

(where `X.Y` is version number) would add a dependency on `gccXY` for every port, including `lang/gccXY` itself!

Table 5.6. `USE_*`

| Variable | Means |
|----------------------|---|
| <code>USE_GCC</code> | The port requires GCC (<code>gcc</code> or <code>g++</code>) to build. Some ports need any GCC version, some require modern, recent versions. It is typically set to <code>any</code> (in this case, GCC from base would be used on versions of FreeBSD that still have it, or <code>lang/gcc</code> port would be installed when default C/C++ compiler is Clang); or <code>yes</code> (means always use stable, modern GCC from <code>lang/gcc</code> port). The exact version can also be specified, with a value such as <code>4.7</code> . The minimal required version can be specified as <code>4.6+</code> . The GCC from the base system is used when it satisfies the requested version, otherwise an appropriate compiler is built from the port, and <code>CC</code> and <code>CXX</code> are adjusted accordingly. |

Variables related to `gmake` and `configure` are described in [Section 6.5, “Building Mechanisms”](#), while `autoconf`, `automake` and `libtool` are described in [Section 6.6, “Using GNU Autotools”](#). Perl related variables are described in [Section 6.8, “Using Perl”](#). X11 variables are listed in [Section 6.9, “Using X11”](#). [Section 6.10, “Using GNOME”](#) deals with GNOME and [Section 6.13, “Using KDE”](#) with KDE related variables. [Section 6.14, “Using Java”](#) documents Java variables, while [Section 6.15, “Web Applications, Apache and PHP”](#) contains information on Apache, PHP and PEAR modules. Python is discussed in [Section 6.16, “Using Python”](#), while Ruby in [Section 6.19, “Using Ruby”](#). [Section 6.20, “Using SDL”](#) provides variables used for SDL applications and finally, [Section 6.24, “Using Xfce”](#) contains information on Xfce.

5.8.9. Minimal Version of a Dependency

A minimal version of a dependency can be specified in any `*_DEPENDS` except `LIB_DEPENDS` using this syntax:

```
p5-Spiffy>=0.26:devel/p5-Spiffy
```

The first field contains a dependent package name, which must match the entry in the package database, a comparison sign, and a package version. The dependency is satisfied if `p5-Spiffy-0.26` or newer is installed on the machine.

5.8.10. Notes on Dependencies

As mentioned above, the default target to call when a dependency is required is `DEPENDS_TARGET`. It defaults to `install`. This is a user variable; it is never defined in a port's `Makefile`. If the port needs a special way to handle a dependency, use the `:target` part of `*_DEPENDS` instead of redefining `DEPENDS_TARGET`.

When running `make clean`, the port dependencies are automatically cleaned too. If this is not desirable, define `NOCLEANDEPENDS` in the environment. This may be particularly desirable if the port has something that takes a long time to rebuild in its dependency list, such as KDE, GNOME or Mozilla.

To depend on another port unconditionally, use the variable `${NONEXISTENT}` as the first field of `BUILD_DEPENDS` or `RUN_DEPENDS`. Use this only when the source of the other port is needed. Compilation time can be saved by specifying the target too. For instance

```
BUILD_DEPENDS= ${NONEXISTENT}:graphics/jpeg:extract
```

will always descend to the `jpeg` port and extract it.

5.8.11. Circular Dependencies Are Fatal



Important

Do not introduce any circular dependencies into the ports tree!

The ports building technology does not tolerate circular dependencies. If one is introduced, someone, somewhere in the world, will have their FreeBSD installation broken almost immediately, with many others quickly to follow. These can really be hard to detect. If in doubt, before making that change, make sure to run: `cd /usr/ports; make index`. That process can be quite slow on older machines, but it may be able to save a large number of people, including yourself, a lot of grief in the process.

5.8.12. Problems Caused by Automatic Dependencies

Dependencies must be declared either explicitly or by using the [OPTIONS framework](#). Using other methods like automatic detection complicates indexing, which causes problems for port and package management.

Example 5.13. Wrong Declaration of an Optional Dependency

```
.include <bsd.port.pre.mk>

.if exists(${LOCALBASE}/bin/foo)
LIB_DEPENDS= libbar.so:foo/bar
.endif
```

The problem with trying to automatically add dependencies is that files and settings outside an individual port can change at any time. For example: an index is built, then a batch of ports are installed. But one of the ports installs the tested file. The index is now incorrect, because an installed port unexpectedly has a new dependency. The index may still be wrong even after rebuilding if other ports also determine their need for dependencies based on the existence of other files.

Example 5.14. Correct Declaration of an Optional Dependency

```
OPTIONS_DEFINE= BAR
BAR_DESC= Calling cellphones via bar

BAR_LIB_DEPENDS= libbar.so:foo/bar
```

Testing option variables is the correct method. It will not cause inconsistencies in the index of a batch of ports, provided the options were defined prior to the index build. Simple scripts can then be used to automate the building, installation, and updating of these ports and their packages.

5.8.13. USE_* and WANT_*

USE_* are set by the port maintainer to define software on which this port depends. A port that needs Firefox would set

```
USE_FIREFOX= yes
```

Some `USE_*` can accept version numbers or other parameters. For example, a port that requires Apache 2.2 would set

```
USE_APACHE= 22
```

For more control over dependencies in some cases, `WANT_*` are available to more precisely specify what is needed. For example, consider the [mail/squirrelmail](#) port. This port needs some PHP modules, which are listed in `USE_PHP`:

```
USE_PHP= session mhash gettext mbstring pcre openssl xml
```

Those modules may be available in CLI or web versions, so the web version is selected with `WANT_*`:

```
WANT_PHP_WEB= yes
```

Available `USE_*` and `WANT_*` are defined in the files in `/usr/ports/Mk`.

5.9. MASTERDIR

If the port needs to build slightly different versions of packages by having a variable (for instance, resolution, or paper size) take different values, create one subdirectory per package to make it easier for users to see what to do, but try to share as many files as possible between ports. Typically, by using variables cleverly, only a very short Makefile is needed in all but one of the directories. In the sole Makefile, use `MASTERDIR` to specify the directory where the rest of the files are. Also, use a variable as part of `PKGNAME_SUFFIX` so the packages will have different names.

This will be best demonstrated by an example. This is part of `japanese/xdvi300/Makefile`;

```
PORTNAME= xdvi
PORTVERSION= 17
PKGNAMEPREFIX= ja-
PKGNAME_SUFFIX= ${RESOLUTION}

# default
RESOLUTION?= 300
.if ${RESOLUTION} != 118 && ${RESOLUTION} != 240 && \
    ${RESOLUTION} != 300 && ${RESOLUTION} != 400
pre-everything::
    @${ECHO_MSG} "Error: invalid value for RESOLUTION: \"${RESOLUTION}\""
    @${ECHO_MSG} "Possible values are: 118, 240, 300 (default) and 400."
    @${FALSE}
.endif
```

[japanese/xdvi300](#) also has all the regular patches, package files, etc. Running `make` there, it will take the default value for the resolution (300) and build the port normally.

As for other resolutions, this is the *entire* `xdvi118/Makefile`:

```
RESOLUTION= 118
MASTERDIR= ${CURDIR}/../xdvi300

.include "${MASTERDIR}/Makefile"
```

(`xdvi240/Makefile` and `xdvi400/Makefile` are similar). `MASTERDIR` definition tells `bsd.port.mk` that the regular set of subdirectories like `FILESDIR` and `SCRIPTDIR` are to be found under `xdvi300`. The `RESOLUTION=118` line will override the `RESOLUTION=300` line in `xdvi300/Makefile` and the port will be built with resolution set to 118.

5.10. Man Pages

If the port anchors its man tree somewhere other than `PREFIX`, use `MANDIRS` to specify those directories. Note that the files corresponding to manual pages must be placed in `pkg-plist` along with the rest of the files. The purpose of `MANDIRS` is to enable automatic compression of manual pages, therefore the file names are suffixed with `.gz`.

5.11. Info Files

If the package needs to install GNU info files, list them in `INFO` (without the trailing `.info`), one entry per document. These files are assumed to be installed to `PREFIX/INFO_PATH`. Change `INFO_PATH` if the package uses a different location. However, this is not recommended. These entries contain just the path relative to `PREFIX/INFO_PATH`. For example, [lang/gcc34](#) installs info files to `PREFIX/INFO_PATH/gcc34`, and `INFO` will be something like this:

```
INFO= gcc34/cpp gcc34/cppinternals gcc34/g77 ...
```

Appropriate installation/de-installation code will be automatically added to the temporary `pkg-plist` before package registration.

5.12. Makefile Options

Many applications can be built with optional or differing configurations. Examples include choice of natural (human) language, GUI versus command-line, or type of database to support. Users may need a different configuration than the default, so the ports system provides hooks the port author can use to control which variant will be built. Supporting these options properly will make users happy, and effectively provide two or more ports for the price of one.

5.12.1. OPTIONS

5.12.1.1. Background

`OPTIONS_*` give the user installing the port a dialog showing the available options, and then saves those options to `${PORT_DBDIR}/${OPTIONS_NAME}/options`. The next time the port is built, the options are reused. `PORT_DBDIR` defaults to `/var/db/ports`. `OPTIONS_NAME` is to the port origin with an underscore as the space separator, for example, for [dns/bind99](#) it will be `dns_bind99`.

When the user runs `make config` (or runs `make build` for the first time), the framework checks for `${PORT_DBDIR}/${OPTIONS_NAME}/options`. If that file does not exist, the values of `OPTIONS_*` are used, and a dialog box is displayed where the options can be enabled or disabled. Then `options` is saved and the configured variables are used when building the port.

If a new version of the port adds new `OPTIONS`, the dialog will be presented to the user with the saved values of old `OPTIONS` prefilled.

`make showconfig` shows the saved configuration. Use `make rmconfig` to remove the saved configuration.

5.12.1.2. Syntax

`OPTIONS_DEFINE` contains a list of `OPTIONS` to be used. These are independent of each other and are not grouped:

```
OPTIONS_DEFINE= OPT1 OPT2
```

Once defined, `OPTIONS` are described (optional, but strongly recommended):

```
OPT1_DESC= Describe OPT1
OPT2_DESC= Describe OPT2
OPT3_DESC= Describe OPT3
OPT4_DESC= Describe OPT4
OPT5_DESC= Describe OPT5
OPT6_DESC= Describe OPT6
```

`ports/Mk/bsd.options.desc.mk` has descriptions for many common `OPTIONS`. While often useful, override them if the description is insufficient for the port.



Tip

When describing options, view it from the perspective of the user: “What functionality does it change?” and “Why would I want to enable this?” Do not just repeat the name. For example, describing the NLS option as “include NLS support” does not help the user, who can already see the option name but may not know what it means. Describing it as “Native Language Support via gettext utilities” is much more helpful.



Important

Option names are always in all uppercase. They cannot use mixed case or lowercase.

OPTIONS can be grouped as radio choices, where only one choice from each group is allowed:

```
OPTIONS_SINGLE= SG1
OPTIONS_SINGLE_SG1= OPT3 OPT4
```



Warning

There *must* be one of each `OPTIONS_SINGLE` group selected at all times for the options to be valid. One option of each group *must* be added to `OPTIONS_DEFAULT`.

OPTIONS can be grouped as radio choices, where none or only one choice from each group is allowed:

```
OPTIONS_RADIO= RG1
OPTIONS_RADIO_RG1= OPT7 OPT8
```

OPTIONS can also be grouped as “multiple-choice” lists, where *at least one* option must be enabled:

```
OPTIONS_MULTI= MG1
OPTIONS_MULTI_MG1= OPT5 OPT6
```

OPTIONS can also be grouped as “multiple-choice” lists, where none or any option can be enabled:

```
OPTIONS_GROUP= GG1
OPTIONS_GROUP_GG1= OPT9 OPT10
```

OPTIONS are unset by default, unless they are listed in `OPTIONS_DEFAULT`:

```
OPTIONS_DEFAULT= OPT1 OPT3 OPT6
```

OPTIONS definitions must appear before the inclusion of `bsd.port.options.mk`. `PORT_OPTIONS` values can only be tested after the inclusion of `bsd.port.options.mk`. Inclusion of `bsd.port.pre.mk` can be used instead, too, and is still widely used in ports written before the introduction of `bsd.port.options.mk`. But be aware that some variables will not work as expected after the inclusion of `bsd.port.pre.mk`, typically some `USE_*` flags.

Example 5.15. Simple Use of `OPTIONS`

```
OPTIONS_DEFINE= FOO BAR
```

```

FOO_DESC= Option foo support
BAR_DESC= Feature bar support

OPTIONS_DEFAULT=FOO

# Will add --with-foo / --without-foo
FOO_CONFIGURE_WITH= foo
BAR_RUN_DEPENDS= bar:bar/bar

.include <bsd.port.mk>

```

Example 5.16. Check for Unset Port **OPTIONS**

```

.if ! ${PORT_OPTIONS:MEXAMPLES}
CONFIGURE_ARGS+=--without-examples
.endif

```

The form shown above is discouraged. The preferred method is using a configure knob to really enable and disable the feature to match the option:

```

# Will add --with-examples / --without-examples
EXAMPLES_CONFIGURE_WITH= examples

```

Example 5.17. Practical Use of **OPTIONS**

```

OPTIONS_DEFINE=  EXAMPLES

OPTIONS_SINGLE=  BACKEND
OPTIONS_SINGLE_BACKEND= MYSQL PGSQL BDB

OPTIONS_MULTI=   AUTH
OPTIONS_MULTI_AUTH= LDAP PAM SSL

EXAMPLES_DESC=   Install extra examples
MYSQL_DESC=      Use MySQL as backend
PGSQL_DESC=      Use PostgreSQL as backend
BDB_DESC=        Use Berkeley DB as backend
LDAP_DESC=       Build with LDAP authentication support
PAM_DESC=        Build with PAM support
SSL_DESC=        Build with OpenSSL support

OPTIONS_DEFAULT= PGSQL LDAP SSL

# Will add USE_PGSQL=yes
PGSQL_USE= pgsql=yes
# Will add --enable-postgres / --disable-postgres
PGSQL_CONFIGURE_ENABLE= postgres

ICU_LIB_DEPENDS= libicuuc.so:devel/icu

# Will add --with-examples / --without-examples
EXAMPLES_CONFIGURE_WITH= examples

# Check other OPTIONS

```

```
.include <bsd.port.mk>
```

5.12.1.3. Default Options

These options are always on by default.

- DOCS — build and install documentation.
- NLS — Native Language Support.
- EXAMPLES — build and install examples.
- IPV6 — IPv6 protocol support.



Note

There is no need to add these to `OPTIONS_DEFAULT`. To have them active, and show up in the options selection dialog, however, they must be added to `OPTIONS_DEFINE`.

5.12.2. Feature Auto-Activation

When using a GNU configure script, keep an eye on which optional features are activated by auto-detection. Explicitly disable optional features that are not needed by adding `--without-xxx` or `--disable-xxx` in `CONFIGURE_ARGS`.

Example 5.18. Wrong Handling of an Option

```
.if ${PORT_OPTIONS:MFOO}
LIB_DEPENDS+= libfoo.so:devel/foo
CONFIGURE_ARGS+= --enable-foo
.endif
```

In the example above, imagine a library `libfoo` is installed on the system. The user does not want this application to use `libfoo`, so he toggled the option off in the `make config` dialog. But the application's configure script detects the library present in the system and includes its support in the resulting executable. Now when the user decides to remove `libfoo` from the system, the ports system does not protest (no dependency on `libfoo` was recorded) but the application breaks.

Example 5.19. Correct Handling of an Option

```
FOO_LIB_DEPENDS= libfoo.so:devel/foo
# Will add --enable-foo / --disable-foo
FOO_CONFIGURE_ENABLE= foo
```



Note

Under some circumstances, the shorthand conditional syntax can cause problems with complex constructs. The errors are usually `Malformed conditional`, an alternative syntax can be used.

```
.if !empty(VARIABLE:MVALUE)
```

as an alternative to

```
.if ${VARIABLE:MVALUE}
```

5.12.3. Options Helpers

There are some macros to help simplify conditional values which differ based on the options set.

5.12.3.1. OPTIONS_SUB

If `OPTIONS_SUB` is set to `yes` then each of the options added to `OPTIONS_DEFINE` will be added to `PLIST_SUB` and `SUB_LIST`, for example:

```
OPTIONS_DEFINE= OPT1
OPTIONS_SUB= yes
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:M OPT1}
PLIST_SUB+= OPT1="" NO_OPT1="@comment "
SUB_LIST+= OPT1="" NO_OPT1="@comment "
.else
PLIST_SUB+= OPT1="@comment " NO_OPT1=""
SUB_LIST+= OPT1="@comment " NO_OPT1=""
.endif
```



Note

The value of `OPTIONS_SUB` is ignored. Setting it to any value will add `PLIST_SUB` and `SUB_LIST` entries for *all* options.

5.12.3.2. OPT_USE and OPT_USE_OFF

When option `OPT` is selected, for each `key=value` pair in `OPT_USE`, `value` is appended to the corresponding `USE_KEY`. If `value` has spaces in it, replace them with commas and they will be changed back to spaces during processing. `OPT_USE_OFF` works the same way, but when `OPT` is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_USE= mysql=yes xorg=x11,xextproto,xext,xrandr
OPT1_USE_OFF= openssl=yes
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1
```

```
.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
USE_MYSQL= yes
USE_XORG= x11 xextproto xext xrandr
.else
USE_OPENSSL= yes
.endif
```

5.12.3.3. *OPT_CONFIGURE_ENABLE*

When option *OPT* is selected, for each *entry* in *OPT_CONFIGURE_ENABLE* then *--enable-entry* is appended to *CONFIGURE_ARGS*. When option *OPT* is *not* selected, *--disable-entry* is appended to *CONFIGURE_ARGS*. An optional argument can be specified with an = symbol. This argument is only appended to the *--enable-entry* configure option. For example:

```
OPTIONS_DEFINE= OPT1 OPT2
OPT1_CONFIGURE_ENABLE= test1 test2
OPT2_CONFIGURE_ENABLE= test2=exhaustive
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
CONFIGURE_ARGS+= --enable-test1 --enable-test2
.else
CONFIGURE_ARGS+= --disable-test1 --disable-test2
.endif

.if ${PORT_OPTIONS:MOPT2}
CONFIGURE_ARGS+= --enable-test2=exhaustive
.else
CONFIGURE_ARGS+= --disable-test2
.endif
```

5.12.3.4. *OPT_CONFIGURE_WITH*

When option *OPT* is selected, for each *entry* in *OPT_CONFIGURE_WITH* then *--with-entry* is appended to *CONFIGURE_ARGS*. When option *OPT* is *not* selected, *--without-entry* is appended to *CONFIGURE_ARGS*. An optional argument can be specified with an = symbol. This argument is only appended to the *--with-entry* configure option. For example:

```
OPTIONS_DEFINE= OPT1 OPT2
OPT1_CONFIGURE_WITH= test1
OPT2_CONFIGURE_WITH= test2=exhaustive
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1 OPT2

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
CONFIGURE_ARGS+= --with-test1
.else
CONFIGURE_ARGS+= --without-test1
.endif

.if ${PORT_OPTIONS:MOPT2}
CONFIGURE_ARGS+= --with-test2=exhaustive
.else
CONFIGURE_ARGS+= --without-test2
.endif
```


5.12.3.5. *OPT_CONFIGURE_ON* and *OPT_CONFIGURE_OFF*

When option *OPT* is selected, the value of *OPT_CONFIGURE_ON*, if defined, is appended to *CONFIGURE_ARGS*. *OPT_CONFIGURE_OFF* works the same way, but when *OPT* is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_CONFIGURE_ON= --add-test
OPT1_CONFIGURE_OFF= --no-test
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOP1}
CONFIGURE_ARGS+= --add-test
.else
CONFIGURE_ARGS+= --no-test
.endif
```

5.12.3.6. *OPT_CMAKE_ON* and *OPT_CMAKE_OFF*

When option *OPT* is selected, the value of *OPT_CMAKE_ON*, if defined, is appended to *CMAKE_ARGS*. *OPT_CMAKE_OFF* works the same way, but when *OPT* is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_CMAKE_ON= -DTEST:BOOL=true -DDEBUG:BOOL=true
OPT1_CMAKE_OFF= -DOPTIMIZE:BOOL=true
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOP1}
CMAKE_ARGS+= -DTEST:BOOL=true -DDEBUG:BOOL=true
.else
CMAKE_ARGS+= -DOPTIMIZE:BOOL=true
.endif
```

See [Section 5.12.3.7, “*OPT_CMAKE_BOOL* and *OPT_CMAKE_BOOL_OFF*”](#) for a shorter helper when the value is boolean.

5.12.3.7. *OPT_CMAKE_BOOL* and *OPT_CMAKE_BOOL_OFF*

When option *OPT* is selected, for each *entry* in *OPT_CMAKE_BOOL* then *-Dentry:BOOL=true* is appended to *CMAKE_ARGS*. When option *OPT* is *not* selected, *-Dentry:BOOL=false* is appended to *CONFIGURE_ARGS*. *OPT_CMAKE_BOOL_OFF* is the oposite, *-Dentry:BOOL=false* is appended to *CMAKE_ARGS* when the option is selected, and *-Dentry:BOOL=true* when the option is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_CMAKE_BOOL= TEST DEBUG
OPT1_CMAKE_BOOL_OFF= OPTIMIZE
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOP1}
CMAKE_ARGS+= -DTEST:BOOL=true -DDEBUG:BOOL=true \
-DOPTIMIZE:BOOL=false
.else
CMAKE_ARGS+= -DTEST:BOOL=false -DDEBUG:BOOL=false \
```

```
-DOPTIMIZE:BOOL=true
#endif
```

5.12.3.8. *OPT_QMAKE_ON* and *OPT_QMAKE_OFF*

When option *OPT* is selected, the value of *OPT_QMAKE_ON*, if defined, is appended to *QMAKE_ARGS*. *OPT_QMAKE_OFF* works the same way, but when *OPT* is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_QMAKE_ON= -DTEST:BOOL=true
OPT1_QMAKE_OFF= -DPRODUCTION:BOOL=true
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

#include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
QMAKE_ARGS+= -DTEST:BOOL=true
.else
QMAKE_ARGS+= -DPRODUCTION:BOOL=true
#endif
```

5.12.3.9. *OPT_IMPLIES*

Provides a way to add dependencies between options.

When *OPT* is selected, all the options listed in this variable will be selected too. Using the [OPT_CONFIGURE_ENABLE](#) described earlier to illustrate:

```
OPTIONS_DEFINE= OPT1 OPT2
OPT1_IMPLIES= OPT2

OPT1_CONFIGURE_ENABLE= opt1
OPT2_CONFIGURE_ENABLE= opt2
```

Is equivalent to:

```
OPTIONS_DEFINE= OPT1 OPT2

#include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
CONFIGURE_ARGS+= --enable-opt1
.else
CONFIGURE_ARGS+= --disable-opt1
#endif

.if ${PORT_OPTIONS:MOPT2} || ${PORT_OPTIONS:MOPT1}
CONFIGURE_ARGS+= --enable-opt2
.else
CONFIGURE_ARGS+= --disable-opt2
#endif
```

Example 5.20. Simple Use of *OPT_IMPLIES*

This port has a X11 option, and a GNOME option that needs the X11 option to be selected to build.

```
OPTIONS_DEFINE= X11 GNOME
OPTIONS_DEFAULT= X11

X11_USE= xorg=xi,xextproto
GNOME_USE= gnome=gtk30
```

```
GNOME_IMPLIES= X11
```

5.12.3.10. *OPT_PREVENTS* and *OPT_PREVENTS_MSG*

Provides a way to add conflicts between options.

When *OPT* is selected, all the options listed in this variable must be un-selected. If *OPT_PREVENTS_MSG* is also selected, its content will be shown, explaining why they conflict. For example:

```
OPTIONS_DEFINE= OPT1 OPT2
OPT1_PREVENTS= OPT2
OPT1_PREVENTS_MSG= OPT1 and OPT2 enable conflicting options
```

Is roughly equivalent to:

```
OPTIONS_DEFINE= OPT1 OPT2

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT2} || ${PORT_OPTIONS:MOPT1}
BROKEN= Option OPT1 conflicts with OPT2 (select only one)
.endif
```

The only difference is that the first one will write an error after running `make config`, suggesting changing the selected options.

Example 5.21. Simple Use of *OPT_PREVENTS*

This port has X509 and SCTP options. Both options add patches, but the patches conflict with each other, so they cannot be selected at the same time.

```
OPTIONS_DEFINE= X509 SCTP

SCTP_PATCHFILES= ${PORTNAME}-6.8p1-sctp-2573.patch.gz:-p1
SCTP_CONFIGURE_WITH= sctp

X509_PATCH_SITES= http://www.roumenpetrov.info/openssh/x509/:x509
X509_PATCHFILES= ${PORTNAME}-7.0p1+x509-8.5.diff.gz:-p1:x509
X509_PREVENTS= SCTP
X509_PREVENTS_MSG= X509 and SCTP patches conflict
```

5.12.3.11. *OPT_VARS* and *OPT_VARS_OFF*

Provides a generic way to set and append to variables.



Warning

Before using *OPT_VARS* and *OPT_VARS_OFF*, see if there is already a more specific helper available in [Section 5.12.3.13](#), “Generic Variables Replacement, *OPT_VARIABLE* and *OPT_VARIABLE_OFF*”.

When option *OPT* is selected, and *OPT_VARS* defined, *key=value* and *key+=value* pairs are evaluated from *OPT_VARS*. An `=` cause the existing value of *KEY* to be overwritten, an `+=` appends to the value. *OPT_VARS_OFF* works the same way, but when *OPT* is *not* selected.

```

OPTIONS_DEFINE= OPT1 OPT2 OPT3
OPT1_VARS= also_build+=bin1
OPT2_VARS= also_build+=bin2
OPT3_VARS= bin3_build=yes
OPT3_VARS_OFF= bin3_build=no

MAKE_ARGS= ALSO_BUILD="${ALSO_BUILD}" BIN3_BUILD="${BIN3_BUILD}"

```

is equivalent to:

```

OPTIONS_DEFINE= OPT1 OPT2

MAKE_ARGS= ALSO_BUILD="${ALSO_BUILD}" BIN3_BUILD="${BIN3_BUILD}"

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOP1}
ALSO_BUILD+= bin1
.endif

.if ${PORT_OPTIONS:MOP2}
ALSO_BUILD+= bin2
.endif

.if ${PORT_OPTIONS:MOP2}
BIN3_BUILD= yes
.else
BIN3_BUILD= no
.endif

```



Tip

Values containing whitespace must be enclosed in quotes:

```
OPT_VARS= foo="bar baz"
```

This is due to the way [make\(1\)](#) variable expansion deals with whitespace. When `OPT_VARS=foo=bar baz` is expanded, the variable ends up containing two strings, `foo=bar` and `baz`. But the submitter probably intended there to be only one string, `foo=bar baz`. Quoting the value prevents whitespace from being used as a delimiter.

5.12.3.12. Dependencies, `OPT_DEPTYPE` and `OPT_DEPTYPE_OFF`

For any of these dependency types:

- `PKG_DEPENDS`
- `EXTRACT_DEPENDS`
- `PATCH_DEPENDS`
- `FETCH_DEPENDS`
- `BUILD_DEPENDS`
- `LIB_DEPENDS`
- `RUN_DEPENDS`

When option `OPT` is selected, the value of `OPT_DEPTYPE`, if defined, is appended to `DEPTYPE`. `OPT_DEPTYPE_OFF` works the same, but when `OPT` is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_LIB_DEPENDS= liba.so:devel/a
OPT1_LIB_DEPENDS_OFF= libb.so:devel/b
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOPT1}
LIB_DEPENDS+= liba.so:devel/a
.else
LIB_DEPENDS+= libb.so:devel/b
.endif
```

5.12.3.13. Generic Variables Replacement, *OPT_VARIABLE* and *OPT_VARIABLE_OFF*

For any of these variables:

- ALL_TARGET
- BROKEN
- CATEGORIES
- CFLAGS
- CONFIGURE_ENV
- CONFLICTS
- CONFLICTS_BUILD
- CONFLICTS_INSTALL
- CPPFLAGS
- CXXFLAGS
- DESKTOP_ENTRIES
- DISTFILES
- EXTRA_PATCHES
- EXTRACT_ONLY
- GH_ACCOUNT
- GH_PROJECT
- GH_TAGNAME
- GH_TUPLE
- IGNORE
- INFO
- INSTALL_TARGET
- LDFLAGS
- LIBS

- MAKE_ARGS
- MAKE_ENV
- MASTER_SITES
- PATCHFILES
- PATCH_SITES
- PLIST_DIRS
- PLIST_DIRSTRY
- PLIST_FILES
- PLIST_SUB
- PORTDOCS
- PORTEXAMPLES
- SUB_FILES
- SUB_LIST
- TEST_TARGET
- USES

When option *OPT* is selected, the value of *OPT_ABOVEVARIABLE*, if defined, is appended to *ABOVEVARIABLE*. *OPT_ABOVEVARIABLE_OFF* works the same way, but when *OPT* is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1
OPT1_USES= gmake
OPT1_CFLAGS_OFF= -DTEST
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MOP1}
USES+= gmake
.else
CFLAGS+= -DTEST
.endif
```



Note

Some variables are not in this list, in particular `PKGNAMEPREFIX` and `PKGNAME_SUFFIX`. This is intentional. A port *must not* change its name when its option set changes.



Warning

Some of these variables, at least `ALL_TARGET` and `INSTALL_TARGET`, have their default values set *after* the options are processed.

With these lines in the Makefile:

```
ALL_TARGET= all
DOCS_ALL_TARGET= doc
```

If the DOCS option is enabled, ALL_TARGET will have a final value of `all doc`; if the option is disabled, it would have a value of `all`.

With only the options helper line in the Makefile:

```
DOCS_ALL_TARGET= doc
```

If the DOCS option is enabled, ALL_TARGET will have a final value of `doc`; if the option is disabled, it would have a value of `all`.

5.12.3.14. Additional Build Targets, *TARGET-OPT-on* and *TARGET-OPT-off*

These Makefile targets can accept optional extra build targets:

- `pre-fetch`
- `do-fetch`
- `post-fetch`
- `pre-extract`
- `do-extract`
- `post-extract`
- `pre-patch`
- `do-patch`
- `post-patch`
- `pre-configure`
- `do-configure`
- `post-configure`
- `pre-build`
- `do-build`
- `post-build`
- `pre-install`
- `do-install`
- `post-install`
- `post-stage`
- `pre-package`
- `do-package`

- `post-package`

When option *OPT* is selected, the target *TARGET-OPT* -on, if defined, is executed after *TARGET*. *TARGET-OPT* -off works the same way, but when *OPT* is *not* selected. For example:

```
OPTIONS_DEFINE= OPT1

post-patch-OPT1-on:
  @${REINPLACE_CMD} -e '/opt1/d' ${WRKSRC}/Makefile
post-patch-OPT1-off:
  @${REINPLACE_CMD} -e '/opt1/s|usr/bin|${LOCALBASE}/bin|' ${WRKSRC}/Makefile
```

is equivalent to:

```
OPTIONS_DEFINE= OPT1

.include <bsd.port.options.mk>

post-patch:
  .if ${PORT_OPTIONS:MLOPT1}
    @${REINPLACE_CMD} -e '/opt1/d' ${WRKSRC}/Makefile
  .else
    @${REINPLACE_CMD} -e '/opt1/s|usr/bin|${LOCALBASE}/bin|' ${WRKSRC}/Makefile
  .endif
```

5.13. Specifying the Working Directory

Each port is extracted into a working directory, which must be writable. The ports system defaults to having `DISTFILES` unpack in to a directory called `${DISTNAME}`. In other words, if the `Makefile` has:

```
PORTNAME= foo
PORTVERSION= 1.0
```

then the port's distribution files contain a top-level directory, `foo-1.0`, and the rest of the files are located under that directory.

A number of variables can be overridden if that is not the case.

5.13.1. `WRKSRC`

The variable lists the name of the directory that is created when the application's distfiles are extracted. If our previous example extracted into a directory called `foo` (and not `foo-1.0`) write:

```
WRKSRC= ${WRKDIR}/foo
```

or possibly

```
WRKSRC= ${WRKDIR}/${PORTNAME}
```

5.13.2. `WRKSRC_SUBDIR`

If the source files needed for the port are in a subdirectory of the extracted distribution file, set `WRKSRC_SUBDIR` to that directory.

```
WRKSRC_SUBDIR= src
```

5.13.3. `NO_WRKSUBDIR`

If the port does not extract in to a subdirectory at all, then set `NO_WRKSUBDIR` to indicate that.

```
NO_WRKSUBDIR= yes
```




Note

Because `WRKDIR` is the only directory that is supposed to be writable during the build, and is used to store many files recording the status of the build, the port's extraction will be forced into a subdirectory.

5.14. Conflict Handling

There are three different variables to register a conflict between packages and ports: `CONFLICTS`, `CONFLICTS_INSTALL` and `CONFLICTS_BUILD`.



Note

The conflict variables automatically set the variable `IGNORE`, which is more fully documented in [Section 12.13](#), “Marking a Port Not Installable with `BROKEN`, `FORBIDDEN`, or `IGNORE`”.

When removing one of several conflicting ports, it is advisable to retain `CONFLICTS` in those other ports for a few months to cater for users who only update once in a while.

5.14.1. `CONFLICTS_INSTALL`

If the package cannot coexist with other packages (because of file conflicts, runtime incompatibilities, etc.), list the other package names in `CONFLICTS_INSTALL`. Use shell globs like `*` and `?` here. Enumerate package names in there, not port names or origins. Please make sure that `CONFLICTS_INSTALL` does not match this port's package itself. Otherwise enforcing its installation with `FORCE_PKG_REGISTER` will no longer work. `CONFLICTS_INSTALL` check is done after the build stage and prior to the install stage.

5.14.2. `CONFLICTS_BUILD`

If the port cannot be built when other specific ports are already installed, list the other port names in `CONFLICTS_BUILD`. Use shell globs like `*` and `?` here. Use package names, not port names or origins. `CONFLICTS_BUILD` check is done prior to the build stage. Build conflicts are not recorded in the resulting package.

5.14.3. `CONFLICTS`

If the port cannot be built if a certain port is already installed and the resulting package cannot coexist with the other package, list the other package name in `CONFLICTS`. use shell globs like `*` and `?` here. Enumerate package names in there, not port names or origins. Please make sure that `CONFLICTS` does not match this port's package itself. Otherwise enforcing its installation with `FORCE_PKG_REGISTER` will no longer work. `CONFLICTS` check is done prior to the build stage and prior to the install stage.

5.15. Installing Files



Important

The `install` phase is very important to the end user because it adds files to their system. All the additional commands run in the port Makefile's `*-install` targets should be echoed to the screen. *Do not* silence these commands with `@` or `.SILENT`.

5.15.1. `INSTALL_*` Macros

Use the macros provided in `bsd.port.mk` to ensure correct modes of files in the port's `*-install` targets. Set ownership directly in `pkg-plist` with the corresponding entries, such as `@(owner,group,)`, `@owner owner`, and `@group group`. These operators work until overridden, or until the end of `pkg-plist`, so remember to reset them after they are no longer needed. The default ownership is `root:wheel`. See [Section 7.6.13, “Base Keywords”](#) for more information.

- `INSTALL_PROGRAM` is a command to install binary executables.
- `INSTALL_SCRIPT` is a command to install executable scripts.
- `INSTALL_LIB` is a command to install shared libraries (but not static libraries).
- `INSTALL_KLD` is a command to install kernel loadable modules. Some architectures do not like having the modules stripped, so use this command instead of `INSTALL_PROGRAM`.
- `INSTALL_DATA` is a command to install sharable data, including static libraries.
- `INSTALL_MAN` is a command to install manpages and other documentation (it does not compress anything).

These variables are set to the [install\(1\)](#) command with the appropriate flags for each situation.



Important

Do not use `INSTALL_LIB` to install static libraries, because stripping them renders them useless. Use `INSTALL_DATA` instead.

5.15.2. Stripping Binaries and Shared Libraries

Installed binaries should be stripped. Do not strip binaries manually unless absolutely required. The `INSTALL_PROGRAM` macro installs and strips a binary at the same time. The `INSTALL_LIB` macro does the same thing to shared libraries.

When a file must be stripped, but neither `INSTALL_PROGRAM` nor `INSTALL_LIB` macros are desirable, `${STRIP_CMD}` strips the program or shared library. This is typically done within the `post-install` target. For example:

```
post-install:
  ${STRIP_CMD} ${STAGEDIR}${PREFIX}/bin/xd1
```

When multiple files need to be stripped:

```
post-install:
  .for l in geometry media body track world
    ${STRIP_CMD} ${STAGEDIR}${PREFIX}/lib/lib${PORTNAME}-${l}.so.0
  .endfor
```

Use `file(1)` on a file to determine if it has been stripped. Binaries are reported by `file(1)` as `stripped`, or not `stripped`. Additionally, `strip(1)` will detect programs that have already been stripped and exit cleanly.

5.15.3. Installing a Whole Tree of Files

Sometimes, a large number of files must be installed while preserving their hierarchical organization. For example, copying over a whole directory tree from `WRKSRC` to a target directory under `PREFIX`. Note that `PREFIX`, `EXAMPLESDIR`, `DATADIR`, and other path variables must always be prepended with `STAGEDIR` to respect staging (see [Section 6.1, “Staging”](#)).

Two macros exist for this situation. The advantage of using these macros instead of `cp` is that they guarantee proper file ownership and permissions on target files. The first macro, `COPYTREE_BIN`, will set all the installed files to be executable, thus being suitable for installing into `PREFIX/bin`. The second macro, `COPYTREE_SHARE`, does not set executable permissions on files, and is therefore suitable for installing files under `PREFIX/share` target.

```
post-install:
  ${MKDIR} ${STAGEDIR}${EXAMPLESDIR}
  (cd ${WRKSRC}/examples && ${COPYTREE_SHARE} . ${STAGEDIR}${EXAMPLESDIR})
```

This example will install the contents of the `examples` directory in the vendor distfile to the proper `examples` location of the port.

```
post-install:
  ${MKDIR} ${STAGEDIR}${DATADIR}/summer
  (cd ${WRKSRC}/temperatures && ${COPYTREE_SHARE} "June July August" &
  ${STAGEDIR}${DATADIR}/summer)
```

And this example will install the data of summer months to the `summer` subdirectory of a `DATADIR`.

Additional `find` arguments can be passed via the third argument to `COPYTREE_*` macros. For example, to install all files from the first example except Makefiles, one can use these commands.

```
post-install:
  ${MKDIR} ${STAGEDIR}${EXAMPLESDIR}
  (cd ${WRKSRC}/examples && \
  ${COPYTREE_SHARE} . ${STAGEDIR}${EXAMPLESDIR} "! -name Makefile")
```

These macros do not add the installed files to `pkg-plist`. They must be added manually. For optional documentation (`PORTDOCS`, see [Section 5.15.4, “Install Additional Documentation”](#)) and examples (`PORTEXAMPLES`), the `%%PORTDOCS%%` or `%%PORTEXAMPLES%%` prefixes must be prepended in `pkg-plist`.

5.15.4. Install Additional Documentation

If the software has some documentation other than the standard `man` and `info` pages that is useful for the user, install it under `DOCSDIR`. This can be done, like the previous item, in the `post-install` target.

Create a new directory for the port. The directory name is `DOCSDIR`. This usually equals `PORTNAME`. However, if the user might want different versions of the port to be installed at the same time, the whole `PKGNAME` can be used.

Since only the files listed in `pkg-plist` are installed, it is safe to always install documentation to `STAGEDIR` (see [Section 6.1, “Staging”](#)). Hence `.if` blocks are only needed when the installed files are large enough to cause significant I/O overhead.

```
post-install:
  ${MKDIR} ${STAGEDIR}${DOCSDIR}
  ${INSTALL_MAN} ${WRKSRC}/docs/xvdocs.ps ${STAGEDIR}${DOCSDIR}
```

On the other hand, if there is a `DOCS` option in the port, install the documentation in a `post-install-DOCS-on` target. These targets are described in [Section 5.12.3.14, “Additional Build Targets, `TARGET-OPT-on` and `TARGET-OPT-off`”](#).

Here are some handy variables and how they are expanded by default when used in the Makefile:

- DATADIR gets expanded to PREFIX/share/PORTNAME .
- DATADIR_REL gets expanded to share/PORTNAME .
- DOCSDIR gets expanded to PREFIX/share/doc/PORTNAME .
- DOCSDIR_REL gets expanded to share/doc/PORTNAME .
- EXAMPLESDIR gets expanded to PREFIX/share/examples/PORTNAME .
- EXAMPLESDIR_REL gets expanded to share/examples/PORTNAME .



Note

The DOCS option only controls additional documentation installed in DOCSDIR. It does not apply to standard man pages and info pages. Things installed in DATADIR and EXAMPLESDIR are controlled by DATA and EXAMPLES options, respectively.

These variables are exported to PLIST_SUB. Their values will appear there as pathnames relative to PREFIX if possible. That is, share/doc/PORTNAME will be substituted for %%DOCSDIR%% in the packing list by default, and so on. (See more on pkg-plist substitution [here](#).)

All conditionally installed documentation files and directories are included in pkg-plist with the %%PORTDOCS%% prefix, for example:

```
%%PORTDOCS%%DOCSDIR%/AUTHORS
%%PORTDOCS%%DOCSDIR%/CONTACT
```

As an alternative to enumerating the documentation files in pkg-plist, a port can set the variable PORTDOCS to a list of file names and shell glob patterns to add to the final packing list. The names will be relative to DOCSDIR. Therefore, a port that utilizes PORTDOCS, and uses a non-default location for its documentation, must set DOCSDIR accordingly. If a directory is listed in PORTDOCS or matched by a glob pattern from this variable, the entire subtree of contained files and directories will be registered in the final packing list. If the DOCS option has been unset then files and directories listed in PORTDOCS would not be installed or added to port packing list. Installing the documentation at PORTDOCS as shown above remains up to the port itself. A typical example of utilizing PORTDOCS looks as follows:

```
PORTDOCS= README.* ChangeLog docs/*
```



Note

The equivalents of PORTDOCS for files installed under DATADIR and EXAMPLESDIR are PORTDATA and PORTEXAMPLES, respectively.

The contents of pkg-message are displayed upon installation. See [the section on using pkg-message](#) for details. pkg-message does not need to be added to pkg-plist.

5.15.5. Subdirectories Under PREFIX

Try to let the port put things in the right subdirectories of PREFIX. Some ports lump everything and put it in the subdirectory with the port's name, which is incorrect. Also, many ports put everything except binaries, header files and manual pages in a subdirectory of lib, which does not work well with the BSD paradigm. Many of the files

must be moved to one of these directories: `etc` (setup/configuration files), `libexec` (executables started internally), `sbin` (executables for superusers/managers), `info` (documentation for info browser) or `share` (architecture independent files). See [hier\(7\)](#) for details; the rules governing `/usr` pretty much apply to `/usr/local` too. The exception are ports dealing with USENET “news”. They may use `PREFIX/news` as a destination for their files.

Chapter 6. Special Considerations

This section explains the most common things to consider when creating a port.

6.1. Staging

`bsd.port.mk` expects ports to work with a “stage directory”. This means that a port must not install files directly to the regular destination directories (that is, under `PREFIX`, for example) but instead into a separate directory from which the package is then built. In many cases, this does not require root privileges, making it possible to build packages as an unprivileged user. With staging, the port is built and installed into the stage directory, `STAGEDIR`. A package is created from the stage directory and then installed on the system. Automake tools refer to this concept as `DESTDIR`, but in FreeBSD, `DESTDIR` has a different meaning (see [Section 9.4, “PREFIX and DESTDIR”](#)).



Note

No port *really* needs to be root. It can mostly be avoided by using `USES=uidfix`. If the port still runs commands like `chown(8)`, `chgrp(1)`, or forces owner or group with `install(1)` then use `USES=fakeroot` to fake those calls. Some patching of the port's `Makefiles` will be needed.

Meta ports, or ports that do not install files themselves but only depend on other ports, must avoid needlessly extracting the `mtree(8)` to the stage directory. This is the basic directory layout of the package, and these empty directories will be seen as orphans. To prevent `mtree(8)` extraction, add this line:

```
NO_MTREE= yes
```



Tip

Metaports should use `USES=metaport`. It sets up defaults for ports that do not fetch, build, or install anything.

Staging is enabled by prepending `STAGEDIR` to paths used in the `pre-install`, `do-install`, and `post-install` targets (see the examples through the book). Typically, this includes `PREFIX`, `ETCDIR`, `DATADIR`, `EXAMPLESDIR`, `MANPREFIX`, `DOCSDIR`, and so on. Directories should be created as part of the `post-install` target. Avoid using absolute paths whenever possible.

When creating a symlink, `STAGEDIR` is prepended to the target path only. For example:

```
${LN} -sf libfoo.so.42 ${STAGEDIR}${PREFIX}/lib/libfoo.so
```

The source path `${PREFIX}/lib/libfoo.so.42` looks fine but could, in fact, be incorrect. Absolute paths can point to a wrong location, like when a remote file system has been mounted with NFS under a non-root mount point. Relative paths are less fragile, and often much shorter.

Ports that install kernel modules must prepend `STAGEDIR` to their destination, by default `/boot/modules`.

6.2. Bundled Libraries

This section explains why bundled dependencies are considered bad and what to do about them.

6.2.1. Why Bundled Libraries Are Bad

Some software requires the porter to locate third-party libraries and add the required dependencies to the port. Other software bundles all necessary libraries into the distribution file. The second approach seems easier at first, but there are some serious drawbacks:

This list is loosely based on the [Fedora](#) and [Gentoo](#) wikis, both licensed under the [CC-BY-SA 3.0](#) license.

Security

If vulnerabilities are found in the upstream library and fixed there, they might not be fixed in the library bundled with the port. One reason could be that the author is not aware of the problem. This means that the porter must fix them, or upgrade to a non-vulnerable version, and send a patch to the author. This all takes time, which results in software being vulnerable longer than necessary. This in turn makes it harder to coordinate a fix without unnecessarily leaking information about the vulnerability.

Bugs

This problem is similar to the problem with security in the last paragraph, but generally less severe.

Forking

It is easier for the author to fork the upstream library once it is bundled. While convenient on first sight, it means that the code diverges from upstream making it harder to address security or other problems with the software. A reason for this is that patching becomes harder.

Another problem of forking is that because code diverges from upstream, bugs get solved over and over again instead of just once at a central location. This defeats the idea of open source software in the first place.

Symbol collision

When a library is installed on the system, it might collide with the bundled version. This can cause immediate errors at compile or link time. It can also cause errors when running the program which might be harder to track down. The latter problem could be caused because the versions of the two libraries are incompatible.

Licensing

When bundling projects from different sources, license issues can arise more easily, especially when licenses are incompatible.

Waste of resources

Bundled libraries waste resources on several levels. It takes longer to build the actual application, especially if these libraries are already present on the system. At run-time, they can take up unnecessary memory when the system-wide library is already loaded by one program and the bundled library is loaded by another program.

Waste of effort

When a library needs patches for FreeBSD, these patches have to be duplicated again in the bundled library. This wastes developer time because the patches might not apply cleanly. It can also be hard to notice that these patches are required in the first place.

6.2.2. What to do About Bundled Libraries

Whenever possible, use the unbundled version of the library by adding a `LIB_DEPENDS` to the port. If such a port does not exist yet, consider creating it.

Only use bundled libraries if the upstream has a good track record on security and using unbundled versions leads to overly complex patches.



Note

In some very special cases, for example emulators, like Wine, a port has to bundle libraries, because they are in a different architecture, or they have been modified to fit the software's use. In that case, those libraries should not be exposed to other ports for linking. Add `BUNDLE_LIBS=yes` to the port's `Makefile`. This will tell [pkg\(8\)](#) to not compute provided libraries.

Always ask the Ports Management Team <portmgr@FreeBSD.org> before adding this to a port.

6.3. Shared Libraries

If the port installs one or more shared libraries, define a `USE_LDCONFIG` make variable, which will instruct a `bsd.port.mk` to run `${LDCONFIG} -m` on the directory where the new library is installed (usually `PREFIX/lib`) during `post-install` target to register it into the shared library cache. This variable, when defined, will also facilitate addition of an appropriate `@exec /sbin/ldconfig -m` and `@unexec /sbin/ldconfig -R` pair into `pkg-plist`, so that a user who installed the package can start using the shared library immediately and de-installation will not cause the system to still believe the library is there.

```
USE_LDCONFIG= yes
```

The default directory can be overridden by setting `USE_LDCONFIG` to a list of directories into which shared libraries are to be installed. For example, if the port installs shared libraries into `PREFIX/lib/foo` and `PREFIX/lib/bar` use this in `Makefile`:

```
USE_LDCONFIG= ${PREFIX}/lib/foo ${PREFIX}/lib/bar
```

Please double-check, often this is not necessary at all or can be avoided through `-rpath` or setting `LD_RUN_PATH` during linking (see [lang/moscow_ml](#) for an example), or through a shell-wrapper which sets `LD_LIBRARY_PATH` before invoking the binary, like [www/seamoney](#) does.

When installing 32-bit libraries on 64-bit system, use `USE_LDCONFIG32` instead.

If the software uses [autotools](#), and specifically `libtool`, add `USES=libtool`.

When the major library version number increments in the update to the new port version, all other ports that link to the affected library must have their `PORTREVISION` incremented, to force recompilation with the new library version.

6.4. Ports with Distribution Restrictions or Legal Concerns

Licenses vary, and some of them place restrictions on how the application can be packaged, whether it can be sold for profit, and so on.



Important

It is the responsibility of a porter to read the licensing terms of the software and make sure that the FreeBSD project will not be held accountable for violating them by redistributing the source or compiled binaries either via FTP/HTTP or CD-ROM. If in doubt, please contact the [FreeBSD ports mailing list](#).

In situations like this, the variables described in the next sections can be set.

6.4.1. NO_PACKAGE

This variable indicates that we may not generate a binary package of the application. For instance, the license may disallow binary redistribution, or it may prohibit distribution of packages created from patched sources.

However, the port's `DISTFILES` may be freely mirrored on FTP/HTTP. They may also be distributed on a CD-ROM (or similar media) unless `NO_CDRM` is set as well.

If the binary package is not generally useful, and the application must always be compiled from the source code, use `NO_PACKAGE`. For example, if the application has configuration information that is site specific hard coded into it at compile time, set `NO_PACKAGE`.

Set `NO_PACKAGE` to a string describing the reason why the package cannot be generated.

6.4.2. NO_CDROM

This variable alone indicates that, although we are allowed to generate binary packages, we may put neither those packages nor the port's `DISTFILES` onto a CD-ROM (or similar media) for resale. However, the binary packages and the port's `DISTFILES` will still be available via FTP/HTTP.

If this variable is set along with `NO_PACKAGE`, then only the port's `DISTFILES` will be available, and only via FTP/HTTP.

Set `NO_CDROM` to a string describing the reason why the port cannot be redistributed on CD-ROM. For instance, use this if the port's license is for "non-commercial" use only.

6.4.3. NOFETCHFILES

Files defined in `NOFETCHFILES` are not fetchable from any of `MASTER_SITES`. An example of such a file is when the file is supplied on CD-ROM by the vendor.

Tools which check for the availability of these files on `MASTER_SITES` have to ignore these files and not report about them.

6.4.4. RESTRICTED

Set this variable alone if the application's license permits neither mirroring the application's `DISTFILES` nor distributing the binary package in any way.

Do not set `NO_CDROM` or `NO_PACKAGE` along with `RESTRICTED`, since the latter variable implies the former ones.

Set `RESTRICTED` to a string describing the reason why the port cannot be redistributed. Typically, this indicates that the port contains proprietary software and that the user will need to manually download the `DISTFILES`, possibly after registering for the software or agreeing to accept the terms of an EULA.

6.4.5. RESTRICTED_FILES

When `RESTRICTED` or `NO_CDROM` is set, this variable defaults to `${DISTFILES} ${PATCHFILES}`, otherwise it is empty. If only some of the distribution files are restricted, then set this variable to list them.

6.4.6. LEGAL_TEXT

If the port has legal concerns not addressed by the above variables, set `LEGAL_TEXT` to a string explaining the concern. For example, if special permission was obtained for FreeBSD to redistribute the binary, this variable must indicate so.

6.4.7. /usr/ports/LEGAL and LEGAL

A port which sets any of the above variables must also be added to `/usr/ports/LEGAL`. The first column is a glob which matches the restricted distfiles. The second column is the port's origin. The third column is the output of `make -VLEGAL`.

6.4.8. Examples

The preferred way to state "the distfiles for this port must be fetched manually" is as follows:

```
.if !exists(${DISTDIR}/${DISTNAME}${EXTRACT_SUFFIX})
IGNORE= may not be redistributed because of licensing reasons. Please visit some-website to accept their license and download ${DISTFILES} into ${DISTDIR}
```

```
.endif
```

This both informs the user, and sets the proper metadata on the user's machine for use by automated programs.

Note that this stanza must be preceded by an inclusion of `bsd.port.pre.mk`.

6.5. Building Mechanisms

6.5.1. Building Ports in Parallel

The FreeBSD ports framework supports parallel building using multiple `make` sub-processes, which allows SMP systems to utilize all of their available CPU power, allowing port builds to be faster and more effective.

This is achieved by passing `-jX` flag to [make\(1\)](#) running on vendor code. This is the default build behavior of ports. Unfortunately, not all ports handle parallel building well and it may be required to explicitly disable this feature by adding the `MAKE_JOBS_UNSAFE=yes` variable. It is used when a port is known to be broken with `-jX`.

6.5.2. `make`, `gmake`, `fmake`, and `imake`

Several differing `make` implementations exist. Ported software often requires a particular implementation, like GNU `make`, known in FreeBSD as `gmake`, or `fmake`, the legacy FreeBSD `make`.

If the port uses GNU `make`, add `gmake` to `USES`. If the legacy FreeBSD `make` is needed, add `fmake` there.

`MAKE_CMD` can be used to reference the specific command configured by the `USES` setting in the port's Makefile. In rare cases when more than one `make` implementation is listed in `USES`, the variables `GMAKE` (for the GNU version) or `FMAKE` (for the legacy FreeBSD version) are available. Only use `MAKE_CMD` within the application Makefiles in `WRKSRC` to call the `make` implementation expected by the ported software.

If the port is an X application that uses `imake` to create Makefiles from Imakefiles, set `USES= imake ..` See the [USES=imake](#) section of [Chapter 15, Using USES Macros](#) for more details.

If the port's source Makefile has something other than `all` as the main build target, set `ALL_TARGET` accordingly. The same goes for `install` and `INSTALL_TARGET`.

6.5.3. `configure` Script

If the port uses the `configure` script to generate Makefile from `Makefile.in`, set `GNU_CONFIGURE=yes`. To give extra arguments to the `configure` script (the default argument is `--prefix=${PREFIX} --infodir=${PREFIX}/${INFO_PATH} --mandir=${MANPREFIX}/man --build=${CONFIGURE_TARGET}`), set those extra arguments in `CONFIGURE_ARGS`. Extra environment variables can be passed using `CONFIGURE_ENV`.

Table 6.1. Variables for Ports That Use `configure`

| Variable | Means |
|-------------------------------|---|
| <code>GNU_CONFIGURE</code> | The port uses <code>configure</code> script to prepare build. |
| <code>HAS_CONFIGURE</code> | Same as <code>GNU_CONFIGURE</code> , except default <code>configure</code> target is not added to <code>CONFIGURE_ARGS</code> . |
| <code>CONFIGURE_ARGS</code> | Additional arguments passed to <code>configure</code> script. |
| <code>CONFIGURE_ENV</code> | Additional environment variables to be set for <code>configure</code> script run. |
| <code>CONFIGURE_TARGET</code> | Override default <code>configure</code> target. Default value is <code>\${MACHINE_ARCH}-portbld-freebsd\${OSREL}</code> . |

6.5.4. Using cmake

For ports that use CMake, define `USES= cmake`, or `USES= cmake:outsource` to build in a separate directory (see below).

Table 6.2. Variables for Ports That Use cmake

| Variable | Means |
|--------------------------------|---|
| <code>CMAKE_ARGS</code> | Port specific CMake flags to be passed to the <code>cmake</code> binary. |
| <code>CMAKE_BUILD_TYPE</code> | Type of build (CMake predefined build profiles). Default is <code>Release</code> , or <code>Debug</code> if <code>WITH_DEBUG</code> is set. |
| <code>CMAKE_ENV</code> | Environment variables to be set for the <code>cmake</code> binary. Default is <code>\${CONFIGURE_ENV}</code> . |
| <code>CMAKE_SOURCE_PATH</code> | Path to the source directory. Default is <code>\${WRKSRC}</code> . |

Table 6.3. Variables the Users Can Define for cmake Builds

| Variable | Means |
|----------------------------|---|
| <code>CMAKE_VERBOSE</code> | Enable verbose build output. Default not set, unless <code>BATCH</code> or <code>PACKAGE_BUILDING</code> are set. |
| <code>CMAKE_NOCOLOR</code> | Disables color build output. Default not set, unless <code>BATCH</code> or <code>PACKAGE_BUILDING</code> are set. |

CMake supports these build profiles: `Debug`, `Release`, `RelWithDebInfo` and `MinSizeRel`. `Debug` and `Release` profiles respect system `*FLAGS`, `RelWithDebInfo` and `MinSizeRel` will set `CFLAGS` to `-O2 -g` and `-Os -DNDEBUG` correspondingly. The lower-cased value of `CMAKE_BUILD_TYPE` is exported to `PLIST_SUB` and must be used if the port installs `*.cmake` depending on the build type (see [deskutils/strigi](#) for an example). Please note that some projects may define their own build profiles and/or force particular build type by setting `CMAKE_BUILD_TYPE` in `CMakeLists.txt`. To make a port for such a project respect `CFLAGS` and `WITH_DEBUG`, the `CMAKE_BUILD_TYPE` definitions must be removed from those files.

Most CMake-based projects support an out-of-source method of building. The out-of-source build for a port can be requested by using the `:outsource` suffix. When enabled, `CONFIGURE_WRKSRC`, `BUILD_WRKSRC` and `INSTALL_WRKSRC` will be set to `${WRKDIR}/.build` and this directory will be used to keep all files generated during configuration and build stages, leaving the source directory intact.

Example 6.1. USES= cmake Example

This snippet demonstrates the use of CMake for a port. `CMAKE_SOURCE_PATH` is not usually required, but can be set when the sources are not located in the top directory, or if only a subset of the project is intended to be built by the port.

```
USES=      cmake:outsource
CMAKE_SOURCE_PATH= ${WRKSRC}/subproject
```

6.5.5. Using scon

If the port uses SCons, define `USE_SCONS=yes`.

Table 6.4. Variables for Ports That Use SCONS

| Variable | Means |
|----------------|--|
| SCONS_ARGS | Port specific SCons flags passed to the SCons environment. |
| SCONS_BUILDENV | Variables to be set in system environment. |
| SCONS_ENV | Variables to be set in SCons environment. |
| SCONS_TARGET | Last argument passed to SCons, similar to MAKE_TARGET. |

To make third party SConstruct respect everything that is passed to SCons in SCONS_ENV (that is, most importantly, CC/CXX/CFLAGS/CXXFLAGS), patch SConstruct so build Environment is constructed like this:

```
env = Environment(**ARGUMENTS)
```

It may be then modified with `env.Append` and `env.Replace`.

6.6. Using GNU Autotools

6.6.1. Introduction

The various GNU autotools provide an abstraction mechanism for building a piece of software over a wide variety of operating systems and machine architectures. Within the Ports Collection, an individual port can make use of these tools via a simple construct:

```
USE_AUTOTOOLS= tool[:env] ...
```

At the time of writing, `tool` can be one of `autoconf`, `autoheader`, `automake`, `aclocal`, `libtoolize`. It can also be one the older legacy of `autoconf213`, `autoheader213`, `automake14`, `aclocal14`.

`env` is used to specify that the environmental variables are needed. It also adds a build dependency on the tool. The relevant tool is *not* ran as part of the `run-autotools` target.

Multiple tools can be specified at once, either by including them all on a single line, or using the `+=` Makefile construct.

6.6.2. libtool and libtoolize

Ports shipping with their own copy of `libtool` (search for a file named `ltmain.sh`) need to have `USES=libtool`. If a port has `USE_AUTOTOOLS=libtoolize` it probably also needs `USES=libtool`. See the [USES=libtool](#) section in [Chapter 15, Using USES Macros](#) for more details.

6.6.3. libltdl.so

Some ports make use of the `libltdl.so` library package, which is part of the `libtool` suite. Use of this library does not automatically necessitate the use of `libtool` itself. If the port needs `libltdl.so`, add a dependency on it:

```
LIB_DEPENDS= libltdl.so:devel/libltdl
```

6.6.4. autoconf and autoheader

Some ports do not contain a `configure` script, but do contain an `autoconf` template in `configure.ac`. Use these assignments to let `autoconf` create the `configure` script, and also have `autoheader` create template headers for use by the `configure` script.

```
USE_AUTOTOOLS= autoconf[:env]
```

and

```
USE_AUTOTOOLS= autoheader
```

which also implies the use of `autoconf`.

The additional optional variables `AUTOCONF_ARGS` and `AUTOHEADER_ARGS` can be overridden by the port `Makefile` if specifically requested. Most ports are unlikely to need this. See `bsd.autotools.mk` for further details.

6.6.5. automake and aclocal

Some packages only contain `Makefile.am`. These have to be converted into `Makefile.in` using `automake`, and the further processed by `configure` to generate an actual `Makefile`.

Similarly, packages occasionally do not ship with an included `aclocal.m4`, again required to build the software. This can be achieved with `aclocal`, which scans `configure.ac` or `configure.in`.

`aclocal` has a similar relationship to `automake` as `autoheader` does to `autoconf`, described in the previous section. `aclocal` implies the use of `automake`, thus we have:

```
USE_AUTOTOOLS= automake[:env]
```

and

```
USE_AUTOTOOLS= aclocal
```

As with `autoconf` and `autoheader`, both `automake` and `aclocal` have optional argument variables, `AUTOMAKE_ARGS` and `ACLOCAL_ARGS` respectively, which may be overridden by the port `Makefile` if required.

6.7. Using GNU `gettext`

6.7.1. Basic Usage

If the port requires `gettext`, set `USES= gettext`, and the port will inherit a dependency on `libintl.so` from [devel/gettext](#). Other values for `gettext` usage are listed in [USES=gettext](#).

A rather common case is a port using `gettext` and `configure`. Generally, GNU `configure` should be able to locate `gettext` automatically.

```
USES= gettext
GNU_CONFIGURE= yes
```

If it ever fails to, hints at the location of `gettext` can be passed in `CPPFLAGS` and `LDFLAGS` as follows:

```
USES= gettext
CPPFLAGS+= -I${LOCALBASE}/include
LDLAGS+= -L${LOCALBASE}/lib

GNU_CONFIGURE= yes
```

6.7.2. Optional Usage

Some software products allow for disabling NLS. For example, through passing `--disable-nls` to `configure`. In that case, the port must use `gettext` conditionally, depending on the status of the NLS option. For ports of low to medium complexity, use this idiom:

```
GNU_CONFIGURE= yes

OPTIONS_DEFINE= NLS
OPTIONS_SUB= yes

NLS_USES= gettext
NLS_CONFIGURE_ENABLE= nls

.include <bsd.port.mk>
```

Or using the older way of using options:

```
GNU_CONFIGURE= yes

OPTIONS_DEFINE= NLS

.include <bsd.port.options.mk>

.if ${PORT_OPTIONS:MNLS}
USES+= gettext
PLIST_SUB+= NLS=""
.else
CONFIGURE_ARGS+= --disable-nls
PLIST_SUB+= NLS="@comment "
.endif

.include <bsd.port.mk>
```

The next item on the to-do list is to arrange so that the message catalog files are included in the packing list conditionally. The Makefile part of this task is already provided by the idiom. It is explained in the section on [advanced pkg-plist practices](#). In a nutshell, each occurrence of `%%NLS%%` in `pkg-plist` will be replaced by `"@comment "` if NLS is disabled, or by a null string if NLS is enabled. Consequently, the lines prefixed by `%%NLS%%` will become mere comments in the final packing list if NLS is off; otherwise the prefix will be just left out. Then insert `%%NLS%%` before each path to a message catalog file in `pkg-plist`. For example:

```
%%NLS%%share/locale/fr/LC_MESSAGES/foobar.mo
%%NLS%%share/locale/no/LC_MESSAGES/foobar.mo
```

In high complexity cases, more advanced techniques may be needed, such as [dynamic packing list generation](#).

6.7.3. Handling Message Catalog Directories

There is a point to note about installing message catalog files. The target directories for them, which reside under `LOCALBASE/share/locale`, must not be created and removed by a port. The most popular languages have their respective directories listed in `PORTSDIR/Templates/BSD.local.dist`. The directories for many other languages are governed by the [devel/gettext](#) port. Consult its `pkg-plist` and see whether the port is going to install a message catalog file for a unique language.

6.8. Using Perl

If `MASTER_SITES` is set to `CPAN`, the correct subdirectory is usually selected automatically. If the default subdirectory is wrong, `CPAN/Module` can be used to change it. `MASTER_SITES` can also be set to the old `MASTER_SITE_PERL_CPAN`, then the preferred value of `MASTER_SITE_SUBDIR` is the top-level hierarchy name. For example, the recommended value for `p5-Module-Name` is `Module`. The top-level hierarchy can be examined at cpan.org. This keeps the port working when the author of the module changes.

The exception to this rule is when the relevant directory does not exist or the distfile does not exist in that directory. In such case, using author's id as `MASTER_SITE_SUBDIR` is allowed. The `CPAN:AUTHOR` macro can be used, which will be translated to the hashed author directory. For example, `CPAN:AUTHOR` will be converted to `authors/id/A/AU/AUTHOR`.

When a port needs Perl support, it must set `USES=perl5` with the optional `USE_PERL5` described in [the perl5 USES description](#).

Table 6.5. Read-Only Variables for Ports That Use Perl

| Read only variables | Means |
|---------------------|---|
| PERL | The full path of the Perl 5 interpreter, either in the system or installed from a port, but without the version |

| Read only variables | Means |
|---------------------|--|
| | number. Use this when the software needs the path to the Perl interpreter. To replace “#!” lines in scripts, use USES=shebangfix . |
| PERL_VERSION | The full version of Perl installed (for example, 5.8.9). |
| PERL_LEVEL | The installed Perl version as an integer of the form MNNPP (for example, 500809). |
| PERL_ARCH | Where Perl stores architecture dependent libraries. Defaults to \${ARCH} - freebsd . |
| PERL_PORT | Name of the Perl port that is installed (for example, perl5). |
| SITE_PERL | Directory name where site specific Perl packages go. This value is added to PLIST_SUB . |



Note

Ports of Perl modules which do not have an official website must link to cpan.org in the WWW line of pkg-descr . The preferred URL form is <http://search.cpan.org/dist/Module-Name/> (including the trailing slash).



Note

Do not use \${SITE_PERL} in dependency declarations. Doing so assumes that perl5.mk has been included, which is not always true. Ports depending on this port will have incorrect dependencies if this port's files move later in an upgrade. The right way to declare Perl module dependencies is shown in the example below.

Example 6.2. Perl Dependency Example

```
p5-I0-Tee>=0.64:devel/p5-I0-Tee
```

For Perl ports that install manual pages, the macro PERL5_MAN3 can be used inside pkg-plist . For example,

```
lib/perl5/5.14/man/man3/AnyEvent::I3.3.gz
```

can be replaced with

```
%%PERL5_MAN3%%/AnyEvent::I3.3.gz
```



Note

There are no PERL5_MANx macros for the other sections (x in 1, 2 and 4 to 9) because those get installed in the regular directories.

6.9. Using X11

6.9.1. X.Org Components

The X11 implementation available in The Ports Collection is X.Org. If the application depends on X components, set `USE_XORG` to the list of required components. Available components, at the time of writing, are:

bigreqsproto compositeproto damageproto dmx dmxproto dri2proto dri3proto evieproto fixesproto fontcacheproto fontenc fontsproto fontutil glproto ice inputproto kbproto libfs oldx pciaccess pixman presentproto printproto randrproto recordproto renderproto resourceproto scrnsaverproto sm trapproto videoproto x11 xau xaw xaw6 xaw7 xbitmaps xcb xcmiscproto xcomposite xcursor xdamage xdmcp xevie xext xextproto xf86bigfontproto xf86dgaproto xf86driproto xf86miscproto xf86rushproto xf86vidmodeproto xfixes xfont xfontcache xft xi xinerama xineramaproto xkbfile xkbui xmu xmuu xorg-macros xorg-server xp xpm xprintapputil xprintutil xproto xproxymngproto xrandr xrender xres xscrnsaver xshmfence xt xtrans xtrap xtst xv xvmc xxf86dga xxf86misc xxf86vm .

Always up-to-date list can be found in `/usr/ports/Mk/bsd.xorg.mk` .

The Mesa Project is an effort to provide free OpenGL implementation. To specify a dependency on various components of this project, use `USE_GL`. Valid options are: `egl`, `gl`, `glesv2`, `glew`, `glu`, `glut`, `glw` and `linux`. For backwards compatibility, the value of `yes` maps to `glu`.

Example 6.3. `USE_XORG` Example

```
USE_XORG= xrender xft xkbfile xt xaw
USE_GL= glu
```

Table 6.6. Variables for Ports That Use X

| | |
|--------------------------|---|
| <code>USES= imake</code> | The port uses <code>imake</code> . |
| <code>XMKMF</code> | Set to the path of <code>xmkmf</code> if not in the <code>PATH</code> . Defaults to <code>xmkmf -a</code> . |

Example 6.4. Using X11-Related Variables

```
# Use some X11 libraries
USE_XORG= x11 xpm
```

6.9.2. Ports That Require Motif

If the port requires a Motif library, define `USES= motif` in the `Makefile`. Default Motif implementation is [x11-toolkits/open-motif](#). Users can choose [x11-toolkits/lesstif](#) instead by setting `WANT_LESSTIF` in their `make.conf` .

`MOTIFLIB` will be set by `motif.mk` to reference the appropriate Motif library. Please patch the source of the port to use `${MOTIFLIB}` wherever the Motif library is referenced in the original `Makefile` or `Imakefile`.

There are two common cases:

- If the port refers to the Motif library as `-lXm` in its `Makefile` or `Imakefile`, substitute `${MOTIFLIB}` for it.

- If the port uses `XmClientLibs` in its `Imakefile`, change it to `${MOTIFLIB} ${XTOOLLIB} ${XLIB}` .

Note that `MOTIFLIB` (usually) expands to `-L/usr/local/lib -lXm -lXp` or `/usr/local/lib/libXm.a` , so there is no need to add `-L` or `-l` in front.

6.9.3. X11 Fonts

If the port installs fonts for the X Window System, put them in `LOCALBASE/lib/X11/fonts/local` .

6.9.4. Getting a Fake `DISPLAY` with `Xvfb`

Some applications require a working X11 display for compilation to succeed. This poses a problem for machines that operate headless. When this variable is used, the build infrastructure will start the virtual framebuffer X server. The working `DISPLAY` is then passed to the build. See [USES=display](#) for the possible arguments.

```
USES= display
```

6.9.5. Desktop Entries

Desktop entries ([a freedesktop standard](#)) provide a way to automatically adjust desktop features when a new program is installed, without requiring user intervention. For example, newly-installed programs automatically appear in the application menus of compatible desktop environments. Desktop entries originated in the GNOME desktop environment, but are now a standard and also work with KDE and Xfce. This bit of automation provides a real benefit to the user, and desktop entries are encouraged for applications which can be used in a desktop environment.

6.9.5.1. Using Predefined `.desktop` Files

Ports that include predefined `*.desktop` must include those files in `pkg-plist` and install them in the `$LOCALBASE/share/applications` directory. The [INSTALL_DATA macro](#) is useful for installing these files.

6.9.5.2. Updating Desktop Database

If a port has a `MimeType` entry in its `portname.desktop`, the desktop database must be updated after install and deinstall. To do this, define `USES= desktop-file-utils`.

6.9.5.3. Creating Desktop Entries with `DESKTOP_ENTRIES`

Desktop entries can be easily created for applications by using `DESKTOP_ENTRIES`. A file named *name* `.desktop` will be created, installed, and added to `pkg-plist` automatically. Syntax is:

```
DESKTOP_ENTRIES= "NAME" "COMMENT" "ICON" "COMMAND" "CATEGORY" StartupNotify
```

The list of possible categories is available on the [Freedesktop website](#). `StartupNotify` indicates whether the application is compatible with *startup notifications*. These are typically a graphic indicator like a clock that appears at the mouse pointer, menu, or panel to give the user an indication when a program is starting. A program that is compatible with startup notifications clears the indicator after it has started. Programs that are not compatible with startup notifications would never clear the indicator (potentially confusing and infuriating the user), and must have `StartupNotify` set to `false` so the indicator is not shown at all.

Example:

```
DESKTOP_ENTRIES= "ToME" "Roguelike game based on JRR Tolkien's work" \
  "${DATADIR}/extra/graf/tome-128.png" \
  "tome -v -g" "Application;Game;RolePlaying;" \
  false
```

6.10. Using GNOME

6.10.1. Introduction

This chapter explains the GNOME framework as used by ports. The framework can be loosely divided into the base components, GNOME desktop components, and a few special macros that simplify the work of port maintainers.

While developing a port or changing one, please set

```
DEVELOPER=yes
```

in the environment or in `/etc/make.conf`. This causes the ports framework to enable additional checks.

6.10.2. Using `USE_GNOME`

Adding this variable to the port allows the use of the macros and components defined in `bsd.gnome.mk`. The code in `bsd.gnome.mk` adds the needed build-time, run-time or library dependencies or the handling of special files. GNOME applications under FreeBSD use the `USE_GNOME` infrastructure. Include all the needed components as a space-separated list. The `USE_GNOME` components are divided into these virtual lists: basic components, GNOME 3 components and legacy components. If the port needs only GTK3 libraries, this is the shortest way to define it:

```
USE_GNOME= gtk30
```

`USE_GNOME` components automatically add the dependencies they need. Please see [Section 6.11, “GNOME Components”](#) for an exhaustive list of all `USE_GNOME` components and which other components they imply and their dependencies.

Here is an example Makefile for a GNOME port that uses many of the techniques outlined in this document. Please use it as a guide for creating new ports.

```
# $FreeBSD$

PORTNAME=  regexxer
PORTVERSION=  0.10
CATEGORIES=  devel textproc gnome
MASTER_SITES=  GNOME

MAINTAINER=  kwm@FreeBSD.org
COMMENT=  Interactive tool for performing search and replace operations

USES=  gettext gmake pathfix pkgconfig tar:xz
GNU_CONFIGURE=  yes
USE_GNOME=  gnomeprefix intlhack gtksourceviewmm3
CPPFLAGS+=  -I${LOCALBASE}/include
LDFLAGS+=  -L${LOCALBASE}/lib
INSTALLS_ICONS=  yes

GLIB_SCHEMAS=  org.regexxer.gschema.xml

.include <bsd.port.mk>
```



Note

The `USE_GNOME` macro without any arguments does not add any dependencies to the port. `USE_GNOME` cannot be set after `bsd.port.pre.mk`.

6.10.3. Variables

This section explains which macros are available and how they are used. Like they are used in the above example. The [Section 6.11, “GNOME Components”](#) has a more in-depth explanation. `USE_GNOME` has to be set for these macros to be of use.

INSTALLS_ICONS

GTK+ ports which install Freedesktop-style icons to `${LOCALBASE}/share/icons` should use this macro to ensure that the icons are cached and will display correctly. The cache file is named `icon-theme.cache`. Do not include that file in `pkg-plist`. This macro handles that automatically. This macro is not needed for Qt, which use a internal method.

GLIB_SCHEMAS

List of all the glib schema files the port installs. The macro will add the files to the port plist and handle the registration of these files on install and deinstall.

The glib schema files are written in XML and end with the `gschema.xml` extension. They are installed in the `share/glib-2.0/schemas/` directory. These schema files contain all application config values with there default settings. The actual database used by the applications is built by `glib-compile-schema`, which is run by the `GLIB_SCHEMAS` macro.

```
GLIB_SCHEMAS=foo.gschema.xml
```



Note

Do not add glib schemas to the `pkg-plist`. If they are listed in `pkg-plist`, they will not be registered and the applications might not work properly.

GCONF_SCHEMAS

List all the gconf schema files. The macro will add the schema files to the port plist and will handle their registration on install and deinstall.

GConf is the XML-based database that virtually all GNOME applications use for storing their settings. These files are installed into the `etc/gconf/schemas` directory. This database is defined by installed schema files that are used to generate `%gconf.xml` key files. For each schema file installed by the port, there be an entry in the `Makefile`:

```
GCONF_SCHEMAS=my_app.schemas my_app2.schemas my_app3.schemas
```



Note

Gconf schemas are listed in the `GCONF_SCHEMAS` macro rather than `pkg-plist`. If they are listed in `pkg-plist`, they will not be registered and the applications might not work properly.

INSTALLS_OMF

Open Source Metadata Framework (OMF) files are commonly used by GNOME 2 applications. These files contain the application help file information, and require special processing by `ScrollKeeper/rarian`. To properly register OMF files when installing GNOME applications from packages, make sure that `omf` files are listed in `pkg-plist` and that the port `Makefile` has `INSTALLS_OMF` defined:

```
INSTALLS_OMF=yes
```

When set, `bsd.gnome.mk` automatically scans `pkg-plist` and adds appropriate `@exec` and `@unexec` directives for each `.omf` to track in the OMF registration database.

6.11. GNOME Components

For further help with a GNOME port, look at some of the [existing ports](#) for examples. The [FreeBSD GNOME page](#) has contact information if more help is needed. The components are divided into GNOME components that are currently in use and legacy components. If the component supports argument, they are listed between parenthesis in the description. The first is the default. "Both" is shown if the component defaults to adding to both build and run dependencies.

Table 6.7. GNOME Components

| Component | Associated program | Description |
|------------------------------------|--|---|
| <code>atk</code> | <code>accessibility/atk</code> | Accessibility toolkit (ATK) |
| <code>atkmm</code> | <code>accessibility/atkmm</code> | c++ bindings for atk |
| <code>cairo</code> | <code>graphics/cairo</code> | Vector graphics library with cross-device output support |
| <code>caiomm</code> | <code>graphics/caiomm</code> | c++ bindings for cairo |
| <code>dconf</code> | <code>devel/dconf</code> | Configuration database system (both, build, run) |
| <code>evolutiondataserver3</code> | <code>databases/evolution-data-server</code> | Data backends for the Evolution integrated mail/PIM suite |
| <code>gdkpixbuf2</code> | <code>graphics/gdk-pixbuf2</code> | Graphics library for GTK+ |
| <code>glib20</code> | <code>devel/glib20</code> | GNOME core library <code>glib20</code> |
| <code>glibmm</code> | <code>devel/glibmm</code> | c++ bindings for glib20 |
| <code>gnomecontrolcenter3</code> | <code>sysutils/gnome-control-center</code> | GNOME 3 Control Center |
| <code>gnomedesktop3</code> | <code>x11/gnome-desktop</code> | GNOME 3 desktop UI library |
| <code>gsound</code> | <code>audio/gsound</code> | GObject library for playing system sounds (both, build, run) |
| <code>gtk-update-icon-cache</code> | <code>graphics/gtk-update-icon-cache</code> | Gtk-update-icon-cache utility from the Gtk+ toolkit |
| <code>gtk20</code> | <code>x11-toolkits/gtk20</code> | Gtk+ 2 toolkit |
| <code>gtk30</code> | <code>x11-toolkits/gtk30</code> | Gtk+ 3 toolkit |
| <code>gtkmm20</code> | <code>x11-toolkits/gtkmm20</code> | c++ bindings 2.0 for the gtk20 toolkit |
| <code>gtkmm24</code> | <code>x11-toolkits/gtkmm24</code> | c++ bindings 2.4 for the gtk20 toolkit |
| <code>gtkmm30</code> | <code>x11-toolkits/gtkmm30</code> | c++ bindings 3.0 for the gtk30 toolkit |
| <code>gtksourceview2</code> | <code>x11-toolkits/gtksourceview2</code> | Widget that adds syntax highlighting to GtkTextView |
| <code>gtksourceview3</code> | <code>x11-toolkits/gtksourceview3</code> | Text widget that adds syntax highlighting to the GtkTextView widget |
| <code>gtksourceviewmm3</code> | <code>x11-toolkits/gtksourceviewmm3</code> | c++ bindings for the gtksourceview3 library |
| <code>gvfs</code> | <code>devel/gvfs</code> | GNOME virtual file system |
| <code>intltool</code> | <code>textproc/intltool</code> | Tool for internationalization (also see intlhack) |

| Component | Associated program | Description |
|---------------|-----------------------------|--|
| introspection | devel/gobject-introspection | Basic introspection bindings and tools to generate introspection bindings. Most of the time :build is enough, :both/:run is only need for applications that use introspection bindings. (both, build, run) |
| libgda5 | databases/libgda5 | Provides uniform access to different kinds of data sources |
| libgda5-ui | databases/libgda5-ui | UI library from the libgda5 library |
| libgdamm5 | databases/libgdamm5 | c++ bindings for the libgda5 library |
| libgsf | devel/libgsf | Extensible I/O abstraction for dealing with structured file formats |
| librsvg2 | graphics/librsvg2 | Library for parsing and rendering SVG vector-graphic files |
| libsigc++20 | devel/libsigc++20 | Callback Framework for C++ |
| libxml++26 | textproc/libxml++26 | c++ bindings for the libxml2 library |
| libxml2 | textproc/libxml2 | XML parser library (both, build, run) |
| libxslt | textproc/libxslt | XSLT C library (both, build, run) |
| metacity | x11-wm/metacity | Window manager from GNOME |
| nautilus3 | x11-fm/nautilus | GNOME file manager |
| pango | x11-toolkits/pango | Open-source framework for the layout and rendering of i18n text |
| pangomm | x11-toolkits/pangomm | c++ bindings for the pango library |
| py3gobject3 | devel/py3-gobject3 | Python 3, GObject 3.0 bindings |
| pygobject3 | devel/py-gobject3 | Python 2, GObject 3.0 bindings |
| vte3 | x11-toolkits/vte3 | Terminal widget with improved accessibility and I18N support |

Table 6.8. GNOME Macro Components

| Component | Description |
|---------------|--|
| gnomeprefix | Supply configure with some default locations. |
| intlhack | Same as intltool, but patches to make sure share/locale/ is used. Please only use when intltool alone is not enough. |
| referencehack | This macro is there to help splitting of the API or reference documentation into its own port. |

Table 6.9. GNOME Legacy Components

| Component | Associated program | Description |
|-----------|----------------------|---|
| atspi | accessibility/at-spi | Assistive Technology Service Provider Interface |
| esound | audio/esound | Enlightenment sound package |
| gal2 | x11-toolkits/gal2 | Collection of widgets taken from GNOME 2 gnumeric |

| Component | Associated program | Description |
|--------------------|---------------------------------|--|
| gconf2 | devel/gconf2 | Configuration database system for GNOME 2 |
| gconfmm26 | devel/gconfmm26 | c++ bindings for gconf2 |
| gdkpixbuf | graphics/gdk-pixbuf | Graphics library for GTK+ |
| glib12 | devel/glib12 | glib 1.2 core library |
| gnomedocutils | textproc/gnome-doc-utils | GNOME doc utils |
| gnomemimedata | misc/gnome-mime-data | MIME and Application database for GNOME 2 |
| gnomesharp20 | x11-toolkits/gnome-sharp20 | GNOME 2 interfaces for the .NET runtime |
| gnomespeech | accessibility/gnome-speech | GNOME 2 text-to-speech API |
| gnomevfs2 | devel/gnome-vfs | GNOME 2 Virtual File System |
| gtk12 | x11-toolkits/gtk12 | Gtk+ 1.2 toolkit |
| gtkhtml3 | www/gtkhtml3 | Lightweight HTML rendering/printing/editing engine |
| gtkhtml4 | www/gtkhtml4 | Lightweight HTML rendering/printing/editing engine |
| gtksharp20 | x11-toolkits/gtk-sharp20 | GTK+ and GNOME 2 interfaces for the .NET runtime |
| gtksourceview | x11-toolkits/gtksourceview | Widget that adds syntax highlighting to GtkTextView |
| libartgpl2 | graphics/libart_lgpl | Library for high-performance 2D graphics |
| libbonobo | devel/libbonobo | Component and compound document system for GNOME 2 |
| libbonoboui | x11-toolkits/libbonoboui | GUI frontend to the libbonobo component of GNOME 2 |
| libgda4 | databases/libgda4 | Provides uniform access to different kinds of data sources |
| libglade2 | devel/libglade2 | GNOME 2 glade library |
| libgnome | x11/libgnome | Libraries for GNOME 2, a GNU desktop environment |
| libgnomecanvas | graphics/libgnomecanvas | Graphics library for GNOME 2 |
| libgnomekbd | x11/libgnomekbd | GNOME 2 keyboard shared library |
| libgnomeprint | print/libgnomeprint | Gnome 2 print support library |
| libgnomeprintui | x11-toolkits/libgnomeprintui | Gnome 2 print support library |
| libgnomeui | x11-toolkits/libgnomeui | Libraries for the GNOME 2 GUI, a GNU desktop environment |
| libgtkhtml | www/libgtkhtml | Lightweight HTML rendering/printing/editing engine |
| libgtksourceviewmm | x11-toolkits/libgtksourceviewmm | c++ binding of GtkSourceView |
| libidl | devel/libIDL | Library for creating trees of CORBA IDL file |

| Component | Associated program | Description |
|-----------------|-------------------------------|--|
| libsigc++12 | devel/libsigc++12 | Callback Framework for C++ |
| libwnck | x11-toolkits/libwnck | Library used for writing pagers and tasklists |
| libwnck3 | x11-toolkits/libwnck3 | Library used for writing pagers and tasklists |
| orbit2 | devel/ORBit2 | High-performance CORBA ORB with support for the C language |
| pygnome2 | x11-toolkits/py-gnome2 | Python bindings for GNOME 2 |
| pygobject | devel/py-gobject | Python 2, GObject 2.0 bindings |
| pygtk2 | x11-toolkits/py-gtk2 | Set of Python bindings for GTK+ |
| pygtksourceview | x11-toolkits/py-gtksourceview | Python bindings for GtkSourceView 2 |
| vte | x11-toolkits/vte | Terminal widget with improved accessibility and I18N support |

Table 6.10. Deprecated Components: Do Not Use

| Component | Description |
|---------------|--|
| HAVE_GNOME | Deprecated, do not use. Was used to check if a component was installed. This was used for ports that did not have <code>--enable/--disable</code> switches for their configure script. But the building of parts of a port without a implicit request is discouraged. |
| WANT_GNOME | Deprecated, do not use. Was used by ports that needed <code>USE_GNOME</code> for optional dependencies, which were defined after <code>bsd.port.pre.mk</code> . Since <code>USE_GNOME</code> can be used after the inclusion of <code>bsd.port.options.mk</code> , there is little need for this macro any more. |
| pangox-compat | pangox-compat has been deprecated and split off from the pango package. |

6.12. Using Qt

6.12.1. Ports That Require Qt

The Ports Collection provides support for Qt 4 and Qt 5 frameworks with `USE_QTx`, where `x` is 4 or 5. Set `USE_QTx` to the list of required Qt components (libraries, tools, plugins). The Qt 4 and Qt 5 frameworks are quite similar. The main difference is the set of supported components.

The Qt framework exports a number of variables which can be used by ports, some of them listed below:

Table 6.11. Variables Provided to Ports That Use Qt

| | |
|-----------|--|
| QT_PREFIX | Set to the path where Qt was installed (<code>\${LOCALBASE}</code>). |
| QMAKE | Full path to <code>qmake</code> binary. |
| LRELEASE | Full path to <code>lrelease</code> utility. |
| MOC | Full path to <code>moc</code> . |
| RCC | Full path to <code>rcc</code> . |

| | |
|--------------|-----------------------|
| UIC | Full path to uic. |
| QT_INCDIR | Qt include directory. |
| QT_LIBDIR | Qt libraries path. |
| QT_PLUGINDIR | Qt plugins path. |

When using the Qt framework, these settings are deployed:

```
CONFIGURE_ARGS+= --with-qt-includes=${QT_INCDIR} \
--with-qt-libraries=${QT_LIBDIR} \
--with-extra-libs=${LOCALBASE}/lib \
--with-extra-includes=${LOCALBASE}/include

CONFIGURE_ENV+= QDIR="${QT_PREFIX}" QMAKE="${QMAKE}" \
MOC="${MOC}" RCC="${RCC}" UIC="${UIC}" \
QMAKESPEC="${QMAKESPEC}"

PLIST_SUB+= QT_INCDIR=${QT_INCDIR_REL} \
QT_LIBDIR=${QT_LIBDIR_REL} \
QT_PLUGINDIR=${QT_PLUGINDIR_REL}
```

Some configure scripts do not support the arguments above. To suppress modification of `CONFIGURE_ENV` and `CONFIGURE_ARGS`, set `QT_NONSTANDARD`.

6.12.2. Component Selection

Individual Qt tool and library dependencies must be specified in `USE_QT x`. Every component can be suffixed with `_build` or `_run`, the suffix indicating whether the dependency on the component is at buildtime or runtime. If unsuffixed, the component will be depended on at both build- and runtime. Usually, library components are specified unsuffixed, tool components are mostly specified with the `_build` suffix and plugin components are specified with the `_run` suffix. The most commonly used components are listed below (all available components are listed in `_USE_QT_ALL`, `_USE_QT4_ONLY`, and `_USE_QT5_ONLY` in `/usr/ports/Mk/bsd.qt.mk`):

Table 6.12. Available Qt Library Components

| Name | Description |
|---------|----------------------------------|
| core | core library (Qt 5 only) |
| corelib | core library (Qt 4 only) |
| dbus | Qt DBus library |
| gui | graphical user interface library |
| network | network library |
| opengl | Qt OpenGL library |
| script | script library |
| sql | SQL library |
| testlib | unit testing library |
| webkit | Qt WebKit library |
| xml | Qt XML library |

To determine the libraries an application depends on, run `ldd` on the main executable after a successful compilation.

Table 6.13. Available Qt Tool Components

| Name | Description |
|-------|----------------------------------|
| qmake | Makefile generator/build utility |

| Name | Description |
|---------------|---|
| buildtools | build tools (moc, rcc), needed for almost every Qt application (Qt 5 only) |
| linguisttools | localization tools: <code>lrelease</code> , <code>lupdate</code> (Qt 5 only) |
| linguist | localization tools: <code>lrelease</code> , <code>lupdate</code> (Qt 4 only) |
| moc | meta object compiler, needed for almost every Qt application at buildtime (Qt 4 only) |
| rcc | resource compiler, needed if the application comes with <code>*.rc</code> or <code>*.qrc</code> files (Qt 4 only) |
| uic | user interface compiler, needed if the application comes with <code>*.ui</code> files, in practice, every Qt application with a GUI (Qt 4 only) |

Table 6.14. Available Qt Plugin Components

| Name | Description |
|--------------|---|
| iconengines | SVG icon engine plugin, needed if the application ships SVG icons (Qt 4 only) |
| imageformats | plugins for TGA, TIFF, and MNG image formats |

Example 6.5. Selecting Qt 4 Components

In this example, the ported application uses the Qt 4 graphical user interface library, the Qt 4 core library, all of the Qt 4 code generation tools and Qt 4's Makefile generator. Since the `gui` library implies a dependency on the core library, `corelib` does not need to be specified. The Qt 4 code generation tools `moc`, `uic` and `rcc`, as well as the Makefile generator `qmake` are only needed at buildtime, thus they are specified with the `_build` suffix:

```
USE_QT4= gui moc_build qmake_build rcc_build uic_build
```

6.12.3. Using qmake

If the application provides a qmake project file (`*.pro`), define `USES= qmake` along with `USE_QT x`. Note that `USES= qmake` already implies a build dependency on `qmake`, therefore the `qmake` component can be omitted from `USE_QT x`. Similar to [CMake](#), `qmake` supports out-of-source builds, which can be enabled by specifying the `outsources` argument (see [USES= qmake example](#)).

Table 6.15. Variables for Ports That Use qmake

| Variable | Means |
|-------------------|---|
| QMAKE_ARGS | Port specific qmake flags to be passed to the qmake binary. |
| QMAKE_ENV | Environment variables to be set for the qmake binary. The default is <code>\${CONFIGURE_ENV}</code> . |
| QMAKE_SOURCE_PATH | Path to qmake project files (<code>.pro</code>). The default is <code>\${WRKSR}</code> if an out-of-source build is requested, empty otherwise. |

Example 6.6. USES= qmake Example

This snippet demonstrates the use of qmake for a Qt 4 port:

```
USES= qmake:outsource
USE_QT4= moc_build
```

For a Qt 5 port:

```
USES= qmake:outsource
USE_QT5= buildtools_build
```

Qt applications are often written to be cross-platform and often X11/Unix is not the platform they are developed on, which in turn leads to certain loose ends, like:

- *Missing additional include paths.* Many applications come with system tray icon support, but neglect to look for includes and/or libraries in the X11 directories. To add directories to qmake's include and library search paths via the command line, use:

```
QMAKE_ARGS+= INCLUDEPATH+=${LOCALBASE}/include \
LIBS+=-L${LOCALBASE}/lib
```

- *Bogus installation paths.* Sometimes data such as icons or .desktop files are by default installed into directories which are not scanned by XDG-compatible applications. [editors/texmaker](#) is an example for this - look at `patch-texmaker.pro` in the `files` directory of that port for a template on how to remedy this directly in the qmake project file.

6.13. Using KDE

6.13.1. KDE 4 Variable Definitions

If the application depends on KDE 4, set `USE_KDE4` to the list of required components. `_build` and `_run` suffixes can be used to force components dependency type (for example, `baseapps_run`). If no suffix is set, a default dependency type will be used. To force both types, add the component twice with both suffixes (for example, `automoc4_build automoc4_run`). The most commonly used components are listed below (up-to-date components are documented at the top of `/usr/ports/Mk/bsd.kde4.mk`):

Table 6.16. Available KDE 4 Components

| Name | Description |
|-----------------|--|
| kdehier | Hierarchy of common KDE directories |
| kdelibs | KDE core libraries |
| kdeprefix | If set, port will be installed into <code>\${KDE4_PREFIX}</code> |
| automoc4 | Build tool to automatically generate moc files |
| akonadi | Storage server for KDE PIM data |
| soprano | Library for Resource Description Framework (RDF) |
| strigi | Strigi desktop search library |
| libkcddb | KDE CDDb (compact disc database) library |
| libkcompactdisc | KDE library for interfacing with audio CDs |

| Name | Description |
|-----------|--|
| libkdeedu | Libraries used by educational applications |
| libkdcraw | KDE LibRaw library |
| libkexiv2 | KDE Exiv2 library |
| libkipi | KDE Image Plugin Interface |
| libkonq | Konqueror core library |
| libksane | KDE SANE ("Scanner Access Now Easy") library |
| pimlibs | Personal information management libraries |
| kate | Advanced text editor framework |
| marble | Virtual globe and world atlas |
| okular | Universal document viewer |
| korundum | KDE Ruby bindings |
| perlkde | KDE Perl bindings |
| pykde4 | KDE Python bindings |
| pykdeuic4 | PyKDE user interface compiler |
| smokekde | KDE SMOKE libraries |

KDE 4 ports are installed into `KDE4_PREFIX`. This is achieved by specifying the `kdeprefix` component, which overrides the default `PREFIX`. The ports, however, respect any `PREFIX` set via the `MAKEFLAGS` environment variable and/or `make` arguments. Currently `KDE4_PREFIX` is identical to the default `PREFIX`, `${LOCALBASE}`.

Example 6.7. `USE_KDE4` Example

This is a simple example for a KDE 4 port. `USES= cmake:outsource` instructs the port to utilize CMake, a configuration tool widely used by KDE 4 projects (see [Section 6.5.4, “Using cmake”](#) for detailed usage). `USE_KDE4` brings dependency on KDE libraries and makes port using `automoc4` at build stage. Required KDE components and other dependencies can be determined through configure log. `USE_KDE4` does not imply `USE_QT4`. If a port requires some Qt 4 components, specify them in `USE_QT4`.

```
USES= cmake:outsource
USE_KDE4= kdelibs kdeprefix automoc4
USE_QT4= moc_build qmake_build rcc_build uic_build
```

6.14. Using Java

6.14.1. Variable Definitions

If the port needs a Java™ Development Kit (JDK™) to either build, run or even extract the distfile, then define `USE_JAVA`.

There are several JDKs in the ports collection, from various vendors, and in several versions. If the port must use one of these versions, define which one. The most current version, and FreeBSD default is [java/openjdk6](#).

Table 6.17. Variables Which May be Set by Ports That Use Java

| Variable | Means |
|-----------------------|--|
| <code>USE_JAVA</code> | Define for the remaining variables to have any effect. |

| Variable | Means |
|--------------|---|
| JAVA_VERSION | List of space-separated suitable Java versions for the port. An optional "+" allows specifying a range of versions (allowed values: 1.5[+] 1.6[+] 1.7[+]). |
| JAVA_OS | List of space-separated suitable JDK port operating systems for the port (allowed values: native linux). |
| JAVA_VENDOR | List of space-separated suitable JDK port vendors for the port (allowed values: freebsd bsdjva sun openjdk). |
| JAVA_BUILD | When set, add the selected JDK port to the build dependencies. |
| JAVA_RUN | When set, add the selected JDK port to the run dependencies. |
| JAVA_EXTRACT | When set, add the selected JDK port to the extract dependencies. |

Below is the list of all settings a port will receive after setting USE_JAVA:

Table 6.18. Variables Provided to Ports That Use Java

| Variable | Value |
|------------------------------|--|
| JAVA_PORT | The name of the JDK port (for example, java/openjdk6). |
| JAVA_PORT_VERSION | The full version of the JDK port (for example, 1.6.0). Only the first two digits of this version number are needed, use <code>\${JAVA_PORT_VERSION:C/^([0-9])\.([0-9]) (.*)\$/\1.\2/}</code> . |
| JAVA_PORT_OS | The operating system used by the JDK port (for example, 'native'). |
| JAVA_PORT_VENDOR | The vendor of the JDK port (for example, 'openjdk'). |
| JAVA_PORT_OS_DESCRIPTION | Description of the operating system used by the JDK port (for example, 'Native'). |
| JAVA_PORT_VENDOR_DESCRIPTION | Description of the vendor of the JDK port (for example, 'OpenJDK BSD Porting Team'). |
| JAVA_HOME | Path to the installation directory of the JDK (for example, '/usr/local/openjdk6'). |
| JAVAC | Path to the Java compiler to use (for example, '/usr/local/openjdk6/bin/javac'). |
| JAR | Path to the jar tool to use (for example, '/usr/local/openjdk6/bin/jar' or '/usr/local/bin/fast-jar'). |
| APPLETVIEWER | Path to the appletviewer utility (for example, '/usr/local/openjdk6/bin/appletviewer'). |
| JAVA | Path to the java executable. Use this for executing Java programs (for example, '/usr/local/openjdk6/bin/java'). |
| JAVADOC | Path to the javadoc utility program. |
| JAVAH | Path to the javah program. |
| JAVAP | Path to the javap program. |
| JAVA_KEYTOOL | Path to the keytool utility program. |

| Variable | Value |
|-----------------|--|
| JAVA_N2A | Path to the <code>native2ascii</code> tool. |
| JAVA_POLICYTOOL | Path to the <code>policytool</code> program. |
| JAVA_SERIALVER | Path to the <code>serialver</code> utility program. |
| RMIC | Path to the RMI stub/skeleton generator, <code>rmic</code> . |
| RMIREGISTRY | Path to the RMI registry program, <code>rmiregistry</code> . |
| RMID | Path to the RMI daemon program <code>rmid</code> . |
| JAVA_CLASSES | Path to the archive that contains the JDK class files, <code>\${JAVA_HOME}/jre/lib/rt.jar</code> . |

Use the `java-debug` make target to get information for debugging the port. It will display the value of many of the previously listed variables.

Additionally, these constants are defined so all Java ports may be installed in a consistent way:

Table 6.19. Constants Defined for Ports That Use Java

| Constant | Value |
|--------------|--|
| JAVASHAREDIR | The base directory for everything related to Java. Default: <code>\${PREFIX}/share/java</code> . |
| JAVAJARDIR | The directory where JAR files is installed. Default: <code>\${JAVASHAREDIR}/classes</code> . |
| JAVALLIBDIR | The directory where JAR files installed by other ports are located. Default: <code>\${LOCALBASE}/share/java/classes</code> . |

The related entries are defined in both `PLIST_SUB` (documented in [Section 7.1, “Changing pkg-plist Based on Make Variables”](#)) and `SUB_LIST`.

6.14.2. Building with Ant

When the port is to be built using Apache Ant, it has to define `USE_ANT`. Ant is thus considered to be the sub-make command. When no `do-build` target is defined by the port, a default one will be set that runs Ant according to `MAKE_ENV`, `MAKE_ARGS` and `ALL_TARGET`. This is similar to the `USES= gmake` mechanism, which is documented in [Section 6.5, “Building Mechanisms”](#).

6.14.3. Best Practices

When porting a Java library, the port has to install the JAR file(s) in `${JAVAJARDIR}`, and everything else under `${JAVASHAREDIR}/${PORTNAME}` (except for the documentation, see below). To reduce the packing file size, reference the JAR file(s) directly in the Makefile. Use this statement (where `myport.jar` is the name of the JAR file installed as part of the port):

```
PLIST_FILES+= ${JAVAJARDIR}/myport.jar
```

When porting a Java application, the port usually installs everything under a single directory (including its JAR dependencies). The use of `${JAVASHAREDIR}/${PORTNAME}` is strongly encouraged in this regard. It is up to the porter to decide whether the port installs the additional JAR dependencies under this directory or uses the already installed ones (from `${JAVAJARDIR}`).

When porting a Java™ application that requires an application server such as [www/tomcat7](#) to run the service, it is quite common for a vendor to distribute a `.war`. A `.war` is a Web application ARchive and is extracted when called by the application. Avoid adding a `.war` to `pkg-plist`. It is not considered best practice. An application server will expand war archive, but not clean it up properly if the port is removed. A more desirable way of working with this file is to extract the archive, then install the files, and lastly add these files to `pkg-plist`.

```
TOMCATDIR= ${LOCALBASE}/apache-tomcat-7.0
WEBAPPDIR= myapplication

post-extract:
  @${MKDIR} ${WRKDIR}/${PORTDIRNAME}
  @${TAR} xf ${WRKDIR}/myapplication.war -C ${WRKDIR}/${PORTDIRNAME}

do-install:
  cd ${WRKDIR} && \
  ${INSTALL} -d -o ${WWWOWN} -g ${WWWGRP} ${TOMCATDIR}/webapps/${PORTDIRNAME}
  cd ${WRKDIR}/${PORTDIRNAME} && ${COPYTREE_SHARE} \* ${WEBAPPDIR}/${PORTDIRNAME}
```

Regardless of the type of port (library or application), the additional documentation is installed in the [same location](#) as for any other port. The Javadoc tool is known to produce a different set of files depending on the version of the JDK that is used. For ports that do not enforce the use of a particular JDK, it is therefore a complex task to specify the packing list (`pkg-plist`). This is one reason why porters are strongly encouraged to use `PORTDOCS`. Moreover, even if the set of files that will be generated by `javadoc` can be predicted, the size of the resulting `pkg-plist` advocates for the use of `PORTDOCS`.

The default value for `DATADIR` is `${PREFIX}/share/${PORTNAME}`. It is a good idea to override `DATADIR` to `${JAVASHAREDIR}/${PORTNAME}` for Java ports. Indeed, `DATADIR` is automatically added to `PLIST_SUB` (documented in [Section 7.1, “Changing pkg-plist Based on Make Variables”](#)) so use `%%DATADIR%%` directly in `pkg-plist`.

As for the choice of building Java ports from source or directly installing them from a binary distribution, there is no defined policy at the time of writing. However, people from the [FreeBSD Java Project](#) encourage porters to have their ports built from source whenever it is a trivial task.

All the features that have been presented in this section are implemented in `bsd.java.mk`. If the port needs more sophisticated Java support, please first have a look at the [bsd.java.mk Subversion log](#) as it usually takes some time to document the latest features. Then, if the needed support that is lacking would be beneficial to many other Java ports, feel free to discuss it on the [FreeBSD Java Language mailing list](#).

Although there is a `java` category for PRs, it refers to the JDK porting effort from the FreeBSD Java project. Therefore, submit the Java port in the `ports` category as for any other port, unless the issue is related to either a JDK implementation or `bsd.java.mk`.

Similarly, there is a defined policy regarding the `CATEGORIES` of a Java port, which is detailed in [Section 5.3, “Categorization”](#).

6.15. Web Applications, Apache and PHP

6.15.1. Apache

Table 6.20. Variables for Ports That Use Apache

| | |
|----------------|---|
| USE_APACHE | The port requires Apache. Possible values: <code>yes</code> (gets any version), <code>22</code> , <code>24</code> , <code>22-24</code> , <code>22+</code> , etc. The default <code>APACHE</code> version is <code>22</code> . More details are available in <code>ports/Mk/bsd.apache.mk</code> and at wiki.freebsd.org/Apache/ . |
| APXS | Full path to the <code>apxs</code> binary. Can be overridden in the port. |
| HTTPD | Full path to the <code>httpd</code> binary. Can be overridden in the port. |
| APACHE_VERSION | The version of present Apache installation (read-only variable). This variable is only available after inclusion of <code>bsd.port.pre.mk</code> . Possible values: <code>22</code> , <code>24</code> . |

| | |
|------------------|---|
| APACHEMODDIR | Directory for Apache modules. This variable is automatically expanded in <code>pkg-plist</code> . |
| APACHEINCLUDEDIR | Directory for Apache headers. This variable is automatically expanded in <code>pkg-plist</code> . |
| APACHEETCDIR | Directory for Apache configuration files. This variable is automatically expanded in <code>pkg-plist</code> . |

Table 6.21. Useful Variables for Porting Apache Modules

| | |
|---------------|---|
| MODULENAME | Name of the module. Default value is <code>PORTNAME</code> . Example: <code>mod_hello</code> |
| SHORTMODNAME | Short name of the module. Automatically derived from <code>MODULENAME</code> , but can be overridden. Example: <code>hello</code> |
| AP_FAST_BUILD | Use <code>apxs</code> to compile and install the module. |
| AP_GENPLIST | Also automatically creates a <code>pkg-plist</code> . |
| AP_INC | Adds a directory to a header search path during compilation. |
| AP_LIB | Adds a directory to a library search path during compilation. |
| AP_EXTRAS | Additional flags to pass to <code>apxs</code> . |

6.15.2. Web Applications

Web applications must be installed into `PREFIX/www/appname`. This path is available both in `Makefile` and in `pkg-plist` as `WWWDIR`, and the path relative to `PREFIX` is available in `Makefile` as `WWWDIR_REL`.

The user and group of web server process are available as `WWWOWN` and `WWWGRP`, in case the ownership of some files needs to be changed. The default values of both are `www`. Use `WWWOWN?= myuser` and `WWWGRP?= mygroup` if the port needs different values. This allows the user to override them easily.



Important

Use `WWWOWN` and `WWWGRP` sparingly. Remember that every file the web server can write to is a security risk waiting to happen.

Do not depend on Apache unless the web app explicitly needs Apache. Respect that users may wish to run a web application on a web server other than Apache.

6.15.3. PHP

PHP web applications declare their dependency on it with `USES=php`. See [Section 15.62, “php”](#) for more information.

6.15.4. PEAR Modules

Porting PEAR modules is a very simple process.

Add `USES=pear` to the port's `Makefile`. The framework will install the relevant files in the right places and automatically generate the `plist` at install time.

Example 6.8. Example Makefile for PEAR Class

```
PORTNAME=      Date
PORTVERSION= 1.4.3
CATEGORIES= devel www pear

MAINTAINER= example@domain.com
COMMENT= PEAR Date and Time Zone Classes

USES= pear

.include <bsd.port.mk>
```

6.15.4.1. Horde Modules

In the same way, porting Horde modules is a simple process.

Add `USES=horde` to the port's Makefile. The framework will install the relevant files in the right places and automatically generate the plist at install time.

The `USE_HORDE_BUILD` and `USE_HORDE_RUN` variables can be used to add buildtime and runtime dependencies on other Horde modules. See `Mk/Uses/horde.mk` for a complete list of available modules.

Example 6.9. Example Makefile for Horde Module

```
PORTNAME= Horde_Core
PORTVERSION= 2.14.0
CATEGORIES= devel www pear

MAINTAINER= horde@FreeBSD.org
COMMENT= Horde Core Framework libraries

OPTIONS_DEFINE= KOLAB SOCKETS
KOLAB_DESC= Enable Kolab server support
SOCKETS_DESC= Depend on sockets PHP extension

USES= horde
USE_PHP= session

USE_HORDE_BUILD= Horde_Role
USE_HORDE_RUN= Horde_Role Horde_History Horde_Pack \
  Horde_Text_Filter Horde_View

KOLAB_USE= HORDE_RUN=Horde_Kolab_Server,Horde_Kolab_Session
SOCKETS_USE= PHP=sockets

.include <bsd.port.mk>
```

6.16. Using Python

The Ports Collection supports parallel installation of multiple Python versions. Ports must use a correct `python` interpreter, according to the user-settable `PYTHON_VERSION`. Most prominently, this means replacing the path to `python` executable in scripts with the value of `PYTHON_CMD`.

Ports that install files under `PYTHON_SITELIBDIR` must use the `pyXY-` package name prefix, so their package name embeds the version of Python they are installed into.

```
PKGNAMEPREFIX= ${PYTHON_PKGNAMEPREFIX}
```

Table 6.22. Most Useful Variables for Ports That Use Python

| | |
|--------------------------------------|---|
| <code>USES=python</code> | The port needs Python. The minimal required version can be specified with values such as <code>2.7+</code> . Version ranges can also be specified by separating two version numbers with a dash: <code>USES=python:3.2-3.3</code> |
| <code>USE_PYTHON=distutils</code> | Use Python <code>distutils</code> for configuring, compiling, and installing. This is required when the port comes with <code>setup.py</code> . This overrides the <code>do-build</code> and <code>do-install</code> targets and may also override <code>do-configure</code> if <code>GNU_CONFIGURE</code> is not defined. |
| <code>USE_PYTHON=autoplist</code> | Create the packaging list automatically. This also requires <code>USE_PYTHON=distutils</code> to be set. |
| <code>USE_PYTHON=concurrent</code> | The port will use an unique prefix, typically <code>PYTHON_PKGNAMEPREFIX</code> for certain directories, such as <code>EXAMPLESDIR</code> and <code>DOCSDIR</code> and also will append a suffix, the python version from <code>PYTHON_VER</code> , to binaries and scripts to be installed. This allows ports to be installed for different Python versions at the same time, which otherwise would install conflicting files. |
| <code>PYTHON_PKGNAMEPREFIX</code> | Used as a <code>PKGNAMEPREFIX</code> to distinguish packages for different Python versions. Example: <code>py27-</code> |
| <code>PYTHON_SITELIBDIR</code> | Location of the site-packages tree, that contains installation path of Python (usually <code>LOCALBASE</code>). <code>PYTHON_SITELIBDIR</code> can be very useful when installing Python modules. |
| <code>PYTHONPREFIX_SITELIBDIR</code> | The <code>PREFIX</code> -clean variant of <code>PYTHON_SITELIBDIR</code> . Always use <code>%%PYTHON_SITELIBDIR%%</code> in <code>pkg-plist</code> when possible. The default value of <code>%%PYTHON_SITELIBDIR%%</code> is <code>lib/python%%PYTHON_VERSION%%/site-packages</code> |
| <code>PYTHON_CMD</code> | Python interpreter command line, including version number. |
| <code>PYNUMERIC</code> | Dependency line for numeric extension. |
| <code>PYNUMPY</code> | Dependency line for the new numeric extension, <code>numpy</code> . (<code>PYNUMERIC</code> is deprecated by upstream vendor). |
| <code>PYXML</code> | Dependency line for XML extension (not needed for Python 2.0 and higher as it is also in base distribution). |

A complete list of available variables can be found in `/usr/ports/Mk/Uses/python.mk`.

Example 6.10. Makefile for a Simple Python Module

```
PORTNAME= sample
PORTVERSION= 1.2.3
CATEGORIES= devel

MAINTAINER= john@doe.tld
```

```
COMMENT= Python sample module

USES= python
USE_PYTHON= autoplist distutils

.include <bsd.port.mk>
```

Some Python applications claim to have DESTDIR support (which would be required for staging) but it is broken (Mailman up to 2.1.16, for instance). This can be worked around by recompiling the scripts. This can be done, for example, in the post-build target. Assuming the Python scripts are supposed to reside in PYTHONPREFIX_SITELIBDIR after installation, this solution can be applied:

```
(cd ${STAGEDIR}${PREFIX} \
  && ${PYTHON_CMD} ${PYTHON_LIBDIR}/compileall.py \
  -d ${PREFIX} -f ${PYTHONPREFIX_SITELIBDIR:S;${PREFIX}/;;})
```

This recompiles the sources with a path relative to the stage directory, and prepends the value of PREFIX to the file name recorded in the byte-compiled output file by -d. -f is required to force recompilation, and the :S;\${PREFIX}/;; strips prefixes from the value of PYTHONPREFIX_SITELIBDIR to make it relative to PREFIX.

6.17. Using Tcl/Tk

The Ports Collection supports parallel installation of multiple Tcl/Tk versions. Ports should try to support at least the default Tcl/Tk version and higher with USES=tcl. It is possible to specify the desired version of tcl by appending :xx, for example, USES=tcl:85.

Table 6.23. The Most Useful Read-Only Variables for Ports That Use Tcl/Tk

| | |
|----------------|-----------------------------------|
| TCL_VER | chosen major.minor version of Tcl |
| TCLSH | full path of the Tcl interpreter |
| TCL_LIBDIR | path of the Tcl libraries |
| TCL_INCLUDEDIR | path of the Tcl C header files |
| TK_VER | chosen major.minor version of Tk |
| WISH | full path of the Tk interpreter |
| TK_LIBDIR | path of the Tk libraries |
| TK_INCLUDEDIR | path of the Tk C header files |

See the [USES=tcl](#) and [USES=tk](#) of [Chapter 15, Using USES Macros](#) for a full description of those variables. A complete list of those variables is available in `/usr/ports/Mk/Uses/tcl.mk`.

6.18. Using Emacs

This section is yet to be written.

6.19. Using Ruby

Table 6.24. Useful Variables for Ports That Use Ruby

| Variable | Description |
|------------------|---|
| USE_RUBY | The port requires Ruby. |
| USE_RUBY_EXTCONF | The port uses <code>extconf.rb</code> to configure. |

| Variable | Description |
|----------------|--|
| USE_RUBY_SETUP | The port uses <code>setup.rb</code> to configure. |
| RUBY_SETUP | Set to the alternative name of <code>setup.rb</code> . Common value is <code>install.rb</code> . |

This table shows the selected variables available to port authors via the ports infrastructure. These variables are used to install files into their proper locations. Use them in `pkg-plist` as much as possible. Do not redefine these variables in the port.

Table 6.25. Selected Read-Only Variables for Ports That Use Ruby

| Variable | Description | Example value |
|---------------------|---|--|
| RUBY_PKGNAMEPREFIX | Used as a <code>PKGNAMEPREFIX</code> to distinguish packages for different Ruby versions. | ruby19- |
| RUBY_VERSION | Full version of Ruby in the form of <code>x.y.z[.p]</code> . | 1.9.3.484 |
| RUBY_SITELIBDIR | Architecture independent libraries installation path. | <code>/usr/local/lib/ruby/site_ruby/1.9</code> |
| RUBY_SITEARCHLIBDIR | Architecture dependent libraries installation path. | <code>/usr/local/lib/ruby/site_ruby/1.9/amd64-freebsd10</code> |
| RUBY_MOODOCDIR | Module documentation installation path. | <code>/usr/local/share/doc/ruby19/patsy</code> |
| RUBY_MODEXAMPLESDIR | Module examples installation path. | <code>/usr/local/share/examples/ruby19/patsy</code> |

A complete list of available variables can be found in `/usr/ports/Mk/bsd.ruby.mk`.

6.20. Using SDL

`USE_SDL` is used to autoconfigure the dependencies for ports which use an SDL based library like [devel/sdl12](#) and [graphics/sdl_image](#).

These SDL libraries for version 1.2 are recognized:

- sdl: [devel/sdl12](#)
- console: [devel/sdl_console](#)
- gfx: [graphics/sdl_gfx](#)
- image: [graphics/sdl_image](#)
- mixer: [audio/sdl_mixer](#)
- mm: [devel/sdlmm](#)
- net: [net/sdl_net](#)
- pango: [x11-toolkits/sdl_pango](#)
- sound: [audio/sdl_sound](#)

- ttf: [graphics/sdl_ttf](#)

These SDL libraries for version 2.0 are recognized:

- sdl: [devel/sdl20](#)
- gfx: [graphics/sdl2_gfx](#)
- image: [graphics/sdl2_image](#)
- mixer: [audio/sdl2_mixer](#)
- net: [net/sdl2_net](#)
- ttf: [graphics/sdl2_ttf](#)

Therefore, if a port has a dependency on [net/sdl2_net](#) and [audio/sdl2_mixer](#), the syntax will be:

```
USE_SDL= net mixer
```

The dependency [devel/sdl12](#), which is required by [net/sdl2_net](#) and [audio/sdl2_mixer](#), is automatically added as well.

Using `USE_SDL` with entries for SDL 1.2, it will automatically:

- Add a dependency on `sdl12-config` to `BUILD_DEPENDS`
- Add the variable `SDL_CONFIG` to `CONFIGURE_ENV`
- Add the dependencies of the selected libraries to `LIB_DEPENDS`

Using `USE_SDL` with entries for SDL 2.0, it will automatically:

- Add a dependency on `sdl2-config` to `BUILD_DEPENDS`
- Add the variable `SDL2_CONFIG` to `CONFIGURE_ENV`
- Add the dependencies of the selected libraries to `LIB_DEPENDS`

6.21. Using wxWidgets

This section describes the status of the wxWidgets libraries in the ports tree and its integration with the ports system.

6.21.1. Introduction

There are many versions of the wxWidgets libraries which conflict between them (install files under the same name). In the ports tree this problem has been solved by installing each version under a different name using version number suffixes.

The obvious disadvantage of this is that each application has to be modified to find the expected version. Fortunately, most of the applications call the `wx-config` script to determine the necessary compiler and linker flags. The script is named differently for every available version. Majority of applications respect an environment variable, or accept a `configure` argument, to specify which `wx-config` script to call. Otherwise they have to be patched.

6.21.2. Version Selection

To make the port use a specific version of wxWidgets there are two variables available for defining (if only one is defined the other will be set to a default value):

Table 6.26. Variables to Select wxWidgets Versions

| Variable | Description | Default value |
|------------|--------------------------------------|------------------------|
| USE_WX | List of versions the port can use | All available versions |
| USE_WX_NOT | List of versions the port cannot use | None |

The available wxWidgets versions and the corresponding ports in the tree are:

Table 6.27. Available wxWidgets Versions

| Version | Port |
|---------|--------------------------------------|
| 2.4 | x11-toolkits/wxgtk24 |
| 2.6 | x11-toolkits/wxgtk26 |
| 2.8 | x11-toolkits/wxgtk28 |



Note

The versions starting from 2.5 also come in Unicode version and are installed by a slave port named like the normal one plus a -unicode suffix, but this can be handled with variables (see [Section 6.21.4, “Unicode”](#)).

The variables in [Table 6.26, “Variables to Select wxWidgets Versions”](#) can be set to one or more of these combinations separated by spaces:

Table 6.28. wxWidgets Version Specifications

| Description | Example |
|--------------------------------|---------|
| Single version | 2.4 |
| Ascending range | 2.4+ |
| Descending range | 2.6- |
| Full range (must be ascending) | 2.4-2.6 |

There are also some variables to select the preferred versions from the available ones. They can be set to a list of versions, the first ones will have higher priority.

Table 6.29. Variables to Select Preferred wxWidgets Versions

| Name | Designed for |
|-------------|--------------|
| WANT_WX_VER | the port |
| WITH_WX_VER | the user |

6.21.3. Component Selection

There are other applications that, while not being wxWidgets libraries, are related to them. These applications can be specified in `WX_COMPS`. These components are available:

Table 6.30. Available wxWidgets Components

| Name | Description | Version restriction |
|---------|----------------------------|---------------------|
| wx | main library | none |
| contrib | contributed libraries | none |
| python | wxPython (Python bindings) | 2.4-2.6 |

| Name | Description | Version restriction |
|---------|-------------|---------------------|
| mozilla | wxMozilla | 2.4 |
| svg | wxSVG | 2.6 |

The dependency type can be selected for each component by adding a suffix separated by a semicolon. If not present then a default type will be used (see [Table 6.32, “Default wxWidgets Dependency Types”](#)). These types are available:

Table 6.31. Available wxWidgets Dependency Types

| Name | Description |
|-------|---|
| build | Component is required for building, equivalent to BUILD_DEPENDS |
| run | Component is required for running, equivalent to RUN_DEPENDS |
| lib | Component is required for building and running, equivalent to LIB_DEPENDS |

The default values for the components are detailed in this table:

Table 6.32. Default wxWidgets Dependency Types

| Component | Dependency type |
|-----------|-----------------|
| wx | lib |
| contrib | lib |
| python | run |
| mozilla | lib |
| svg | lib |

Example 6.11. Selecting wxWidgets Components

This fragment corresponds to a port which uses wxWidgets version 2.4 and its contributed libraries.

```
USE_WX= 2.4
WX_COMPS= wx contrib
```

6.21.4. Unicode

The wxWidgets library supports Unicode since version 2.5. In the ports tree both versions are available and can be selected with these variables:

Table 6.33. Variables to Select Unicode in wxWidgets Versions

| Variable | Description | Designed for |
|--------------|---|--------------|
| WX_UNICODE | The port works <i>only</i> with the Unicode version | the port |
| WANT_UNICODE | The port works with both versions but prefers the Unicode one | the port |
| WITH_UNICODE | The port will use the Unicode version | the user |

| Variable | Description | Designed for |
|-----------------|---|--------------|
| WITHOUT_UNICODE | The port will use the normal version if supported (when <code>WX_UNICODE</code> is not defined) | the user |



Warning

Do not use `WX_UNICODE` for ports that can use both Unicode and normal versions. If the port needs to use Unicode by default, define `WANT_UNICODE` instead.

6.21.5. Detecting Installed Versions

To detect an installed version, define `WANT_WX`. If it is not set to a specific version then the components will have a version suffix. `HAVE_WX` will be filled after detection.

Example 6.12. Detecting Installed wxWidgets Versions and Components

This fragment can be used in a port that uses wxWidgets if it is installed, or an option is selected.

```
WANT_WX= yes

.include <bsd.port.pre.mk>

.if defined(WITH_WX) || !empty(PORT_OPTIONS:MWX) || !empty(HAVE_WX:Mwx-2.4)
USE_WX= 2.4
CONFIGURE_ARGS+= --enable-wx
.endif
```

This fragment can be used in a port that enables wxPython support if it is installed or if an option is selected, in addition to wxWidgets, both version 2.6.

```
USE_WX= 2.6
WX_COMPS= wx
WANT_WX= 2.6

.include <bsd.port.pre.mk>

.if defined(WITH_WXPYTHON) || !empty(PORT_OPTIONS:MWXPYTHON) || !empty(
(HAVE_WX:Mpython)
WX_COMPS+= python
CONFIGURE_ARGS+= --enable-wxpython
.endif
```

6.21.6. Defined Variables

These variables are available in the port (after defining one from [Table 6.26, “Variables to Select wxWidgets Versions”](#)).

Table 6.34. Variables Defined for Ports That Use wxWidgets

| Name | Description |
|------------------------|---|
| <code>WX_CONFIG</code> | The path to the wxWidgets <code>wx-config</code> script (with different name) |

| Name | Description |
|------------|--|
| WXRC_CMD | The path to the wxWidgets wxrc program (with different name) |
| WX_VERSION | The wxWidgets version that is going to be used (for example, 2.6) |
| WX_UNICODE | If not defined but Unicode is going to be used then it will be defined |

6.21.7. Processing in `bsd.port.pre.mk`

Define `WX_PREMK` to be able to use the variables right after including `bsd.port.pre.mk`.



Important

When defining `WX_PREMK`, then the version, dependencies, components and defined variables will not change if modifying the wxWidgets port variables *after* including `bsd.port.pre.mk`.

Example 6.13. Using wxWidgets Variables in Commands

This fragment illustrates the use of `WX_PREMK` by running the `wx-config` script to obtain the full version string, assign it to a variable and pass it to the program.

```
USE_WX= 2.4
WX_PREMK= yes

.include <bsd.port.pre.mk>

.if exists(${WX_CONFIG})
VER_STR!= ${WX_CONFIG} --release
PLIST_SUB+= VERSION="${VER_STR}"
.endif
```



Note

The wxWidgets variables can be safely used in commands when they are inside targets without the need of `WX_PREMK`.

6.21.8. Additional `configure` Arguments

Some GNU `configure` scripts cannot find wxWidgets with just the `WX_CONFIG` environment variable set, requiring additional arguments. `WX_CONF_ARGS` can be used for provide them.

Table 6.35. Legal Values for `WX_CONF_ARGS`

| Possible value | Resulting argument |
|-----------------------|---|
| <code>absolute</code> | <code>--with-wx-config=\${WX_CONFIG}</code> |

| Possible value | Resulting argument |
|----------------|---|
| relative | --with-wx=\${LOCALBASE} --with-wx-config=\${WX_CONFIG:T} |

6.22. Using Lua

This section describes the status of the Lua libraries in the ports tree and its integration with the ports system.

6.22.1. Introduction

There are many versions of the Lua libraries and corresponding interpreters, which conflict between them (install files under the same name). In the ports tree this problem has been solved by installing each version under a different name using version number suffixes.

The obvious disadvantage of this is that each application has to be modified to find the expected version. But it can be solved by adding some additional flags to the compiler and linker.

6.22.2. Version Selection

A port using Lua only needs to have this line:

```
USES= lua
```

If a specific version of Lua is needed, instructions on how to select it are given in the `USES=lua` part of [Chapter 15, Using USES Macros](#).

6.22.3. Defined Variables

These variables are available in the port.

Table 6.36. Variables Defined for Ports That Use Lua

| Name | Description |
|-------------------|--|
| LUA_VER | The Lua version that is going to be used (for example, 5.1) |
| LUA_VER_STR | The Lua version without the dots (for example, 51) |
| LUA_PREFIX | The prefix where Lua (and components) is installed |
| LUA_SUBDIR | The directory under \${PREFIX}/bin, \${PREFIX}/share and \${PREFIX}/lib where Lua is installed |
| LUA_INCDIR | The directory where Lua and tolua header files are installed |
| LUA_LIBDIR | The directory where Lua and tolua libraries are installed |
| LUA_MODLIBDIR | The directory where Lua module libraries (.so) are installed |
| LUA_MODSHAREDIR | The directory where Lua modules (.lua) are installed |
| LUA_PKGNAMEPREFIX | The package name prefix used by Lua modules |
| LUA_CMD | The path to the Lua interpreter |
| LUAC_CMD | The path to the Lua compiler |

6.23. Using iconv

After 2013-10-08 (254273), FreeBSD 10-CURRENT and newer versions have a native iconv in the operating system. On earlier versions, converters/libiconv was used as a dependency.

For software that needs iconv, define USES=iconv. FreeBSD versions before 10-CURRENT on 2013-08-13 (254273) do not have a native iconv. On these earlier versions, a dependency on converters/libiconv will be added automatically.

When a port defines USES=iconv, these variables will be available:

| Variable name | Purpose | Value before FreeBSD 10-CURRENT (2013-08-13) | Value after FreeBSD 10-CURRENT (2013-08-13) |
|----------------------|---|--|---|
| ICONV_CMD | Directory where the iconv binary resides | \${LOCALBASE}/bin/iconv | /usr/bin/iconv |
| ICONV_LIB | ld argument to link to libiconv (if needed) | -liconv | (empty) |
| ICONV_PREFIX | Directory where the iconv implementation resides (useful for configure scripts) | \${LOCALBASE} | /usr |
| ICONV_CONFIGURE_ARG | Preconstructed configure argument for configure scripts | --with-libiconv-prefix=\${LOCALBASE} | (empty) |
| ICONV_CONFIGURE_BASE | Preconstructed configure argument for configure scripts | --with-libiconv=\${LOCALBASE} | (empty) |

These two examples automatically populate the variables with the correct value for systems using converters/libiconv or the native iconv respectively:

Example 6.14. Simple iconv Usage

```
USES= iconv
LDFLAGS+= -L${LOCALBASE}/lib ${ICONV_LIB}
```

Example 6.15. iconv Usage with configure

```
USES= iconv
CONFIGURE_ARGS+= ${ICONV_CONFIGURE_ARG}
```

As shown above, ICONV_LIB is empty when a native iconv is present. This can be used to detect the native iconv and respond appropriately.

Sometimes a program has an ld argument or search path hardcoded in a Makefile or configure script. This approach can be used to solve that problem:

Example 6.16. Fixing Hardcoded `-liconv`

```
USES=  iconv

post-patch:
  @${REINPLACE_CMD} -e 's/-liconv/${ICONV_LIB}/' ${WRKSRCS}/Makefile
```

In some cases it is necessary to set alternate values or perform operations depending on whether there is a native `iconv`. `bsd.port.pre.mk` must be included before testing the value of `ICONV_LIB`:

Example 6.17. Checking for Native `iconv` Availability

```
USES=  iconv

.include <bsd.port.pre.mk>

post-patch:
  .if empty(ICONV_LIB)
    # native iconv detected
    @${REINPLACE_CMD} -e 's|iconv||' ${WRKSRCS}/Config.sh
  .endif

.include <bsd.port.post.mk>
```

6.24. Using Xfce

Ports that need Xfce libraries or applications set `USES=xfce`.

Specific Xfce library and application dependencies are set with values assigned to `USE_XFCE`. They are defined in `/usr/ports/Mk/Uses/xfce.mk`. The possible values are:

garcon

[sysutils/garcon](#)

libexo

[x11/libexo](#)

libgui

[x11-toolkits/libxfce4gui](#)

libmenu

[x11/libxfce4menu](#)

libutil

[x11/libxfce4util](#)

panel

[x11-wm/xfce4-panel](#)

thunar

[x11-fm/thunar](#)

xfconf
[x11/xfce4-conf](#)

Example 6.18. **USES=xfce** Example

```
USES=  xfce
USE_XFCE= libmenu
```

Example 6.19. Using Xfce's Own GTK3 Widgets

In this example, the ported application uses the GTK3-specific widgets [x11/libxfce4menu](#) and [x11/xfce4-conf](#).

```
USES=  xfce:gtk3
USE_XFCE= libmenu xfconf
```



Tip

Xfce components included this way will automatically include any dependencies they need. It is no longer necessary to specify the entire list. If the port only needs [x11-wm/xfce4-panel](#), use:

```
USES=  xfce
USE_XFCE= panel
```

There is no need to list the components [x11-wm/xfce4-panel](#) needs itself like this:

```
USES=  xfce
USE_XFCE= libexo libmenu libutil panel
```

However, Xfce components and non-Xfce dependencies of the port must be included explicitly. Do not count on an Xfce component to provide a sub-dependency other than itself for the main port.

6.25. Using Mozilla

Table 6.37. Variables for Ports That Use Mozilla

| | |
|-------------------|--|
| USE_GECKO | Gecko backend the port can handle. Possible values: libxul (libxul.so), seamonkey (libgtkembedmoz.so, deprecated, must not be used any more). |
| USE_FIREFOX | The port requires Firefox as a runtime dependency. Possible values: yes (get default version), 40, 36, 35. Default dependency is on version 40. |
| USE_FIREFOX_BUILD | The port requires Firefox as a buildtime dependency. Possible values: see USE_FIREFOX. This automatically sets USE_FIREFOX and assigns the same value. |

| | |
|-----------------------|---|
| USE_SEAMONKEY | The port requires SeaMonkey as a runtime dependency. Possible values: <code>yes</code> (get default version), <code>20</code> , <code>11</code> (deprecated, must not be used any more). Default dependency is on version <code>20</code> . |
| USE_SEAMONKEY_BUILD | The port requires SeaMonkey as a buildtime dependency. Possible values: see <code>USE_SEAMONKEY</code> . This automatically sets <code>USE_SEAMONKEY</code> and assigns the same value. |
| USE_THUNDERBIRD | The port requires Thunderbird as a runtime dependency. Possible values: <code>yes</code> (get default version), <code>31</code> , <code>30</code> (deprecated, must not be used any more). Default dependency is on version <code>31</code> . |
| USE_THUNDERBIRD_BUILD | The port requires Thunderbird as a buildtime dependency. Possible values: see <code>USE_THUNDERBIRD</code> . This automatically sets <code>USE_THUNDERBIRD</code> and assigns the same value. |

A complete list of available variables can be found in `/usr/ports/Mk/bsd.gecko.mk`.

6.26. Using Databases

Table 6.38. Variables for Ports Using Databases

| Variable | Means |
|------------|--|
| USE_BDB | Obsolete. Replaced by <code>USES=bdb</code> |
| USE_MYSQL | Obsolete. Replaced by <code>USES=mysql</code> |
| USE_PGSQL | Obsolete. Replaced by <code>USES=pgsql</code> |
| USE_SQLITE | Obsolete. Replaced by <code>USES=sqlite</code> |

6.27. Starting and Stopping Services (rc Scripts)

`rc.d` scripts are used to start services on system startup, and to give administrators a standard way of stopping, starting and restarting the service. Ports integrate into the system `rc.d` framework. Details on its usage can be found in [the rc.d Handbook chapter](#). Detailed explanation of the available commands is provided in [rc\(8\)](#) and [rc.subr\(8\)](#). Finally, there is [an article](#) on practical aspects of `rc.d` scripting.

With a mythical port called *doorman*, which needs to start a *doormand* daemon. Add the following to the Makefile:

```
USE_RC_SUBR= doormand
```

Multiple scripts may be listed and will be installed. Scripts must be placed in the `files` subdirectory and a `.in` suffix must be added to their filename. Standard `SUB_LIST` expansions will be ran against this file. Use of the `%%PREFIX%` and `%%LOCALBASE%` expansions is strongly encouraged as well. More on `SUB_LIST` in [the relevant section](#).

As of FreeBSD 6.1-RELEASE, local `rc.d` scripts (including those installed by ports) are included in the overall [rcorder\(8\)](#) of the base system.

An example simple `rc.d` script to start the *doormand* daemon:

```
#!/bin/sh

# $FreeBSD$
#
# PROVIDE: doormand
# REQUIRE: LOGIN
```

```
# KEYWORD: shutdown
#
# Add these lines to /etc/rc.conf.local or /etc/rc.conf
# to enable this service:
#
# doormand_enable (bool): Set to NO by default.
#   Set it to YES to enable doormand.
# doormand_config (path): Set to %%PREFIX%%/etc/doormand/doormand.cf
#   by default.

. /etc/rc.subr

name=doormand
rcvar=doormand_enable

load_rc_config $name

: ${doormand_enable:=NO}
: ${doormand_config=%%PREFIX%%/etc/doormand/doormand.cf }

command=%%PREFIX%%/sbin/${name}
pidfile=/var/run/${name}.pid

command_args="-p $pidfile -f $doormand_config "

run_rc_command "$1"
```

Unless there is a very good reason to start the service earlier, or it runs as a particular user (other than root), all ports scripts must use:

```
REQUIRE: LOGIN
```

If the startup script launches a daemon that must be shutdown, the following will trigger a stop of the service on system shutdown:

```
KEYWORD: shutdown
```

If the script is not starting a persistent service this is not necessary.

For optional configuration elements the "=" style of default variable assignment is preferable to the ":=" style here, since the former sets a default value only if the variable is unset, and the latter sets one if the variable is unset *or* null. A user might very well include something like:

```
doormand_flags=""
```

in their `rc.conf.local`, and a variable substitution using ":=" would inappropriately override the user's intention. The `_enable` variable is not optional, and must use the ":" for the default.

6.27.1. Pre-Commit Checklist

Before contributing a port with an `rc.d` script, and more importantly, before committing one, please consult this checklist to be sure that it is ready.

The [devel/rclint](#) port can check for most of these, but it is not a substitute for proper review.

1. If this is a new file, does it have a `.sh` extension? If so, that must be changed to just `file.in` since `rc.d` files may not end with that extension.
2. Does the file have a `$FreeBSD$` tag?
3. Do the name of the file (minus `.in`), the `PROVIDE` line, and `$name` all match? The file name matching `PROVIDE` makes debugging easier, especially for [rcorder\(8\)](#) issues. Matching the file name and `$name` makes it easier to figure out which variables are relevant in `rc.conf.local`. It is also a policy for all new scripts, including those in the base system.

4. Is the `REQUIRE` line set to `LOGIN`? This is mandatory for scripts that run as a non-root user. If it runs as root, is there a good reason for it to run prior to `LOGIN`? If not, it must run after so that local scrips can be loosely grouped to a point in [rcorder\(8\)](#) after most everything in the base is already running.
5. Does the script start a persistent service? If so, it must have `KEYWORD: shutdown`.
6. Make sure there is no `KEYWORD: FreeBSD` present. This has not been necessary nor desirable for years. It is also an indication that the new script was copy/pasted from an old script, so extra caution must be given to the review.
7. If the script uses an interpreted language like `perl`, `python`, or `ruby`, make certain that `command_interpreter` is set appropriately, for example, for `Perl`, by adding `PERL=${PERL}` to `SUB_LIST` and using `%%PERL%%`. Otherwise,

```
# service name stop
```

will probably not work properly. See [service\(8\)](#) for more information.

8. Have all occurrences of `/usr/local` been replaced with `%%PREFIX%%`?
9. Do the default variable assignments come after `load_rc_config`?
10. Are there default assignments to empty strings? They should be removed, but double-check that the option is documented in the comments at the top of the file.
11. Are things that are set in variables actually used in the script?
12. Are options listed in the default `name_flags` things that are actually mandatory? If so, they must be in `command_args`. The `-d` option is a red flag (pardon the pun) here, since it is usually the option to “daemonize” the process, and therefore is actually mandatory.
13. `name_flags` must never be included in `command_args` (and vice versa, although that error is less common).
14. Does the script execute any code unconditionally? This is frowned on. Usually these things must be dealt with through a `start_precmd`.
15. All boolean tests must use the `checkyesno` function. No hand-rolled tests for `[Yy][Ee][Ss]`, etc.
16. If there is a loop (for example, waiting for something to start) does it have a counter to terminate the loop? We do not want the boot to be stuck forever if there is an error.
17. Does the script create files or directories that need specific permissions, for example, a `pid` that needs to be owned by the user that runs the process? Rather than the traditional [touch\(1\)](#)/[chown\(8\)](#)/[chmod\(1\)](#) routine, consider using [install\(1\)](#) with the proper command line arguments to do the whole procedure with one step.

6.28. Adding Users and Groups

Some ports require a particular user account to be present, usually for daemons that run as that user. For these ports, choose a *unique* UID from 50 to 999 and register it in `ports/UIDs` (for users) and `ports/GIDs` (for groups). The unique identification should be the same for users and groups.

Please include a patch against these two files when requiring a new user or group to be created for the port.

Then use `USERS` and `GROUPS` in `Makefile`, and the user will be automatically created when installing the port.

```
USERS= pulse
GROUPS= pulse pulse-access pulse-rt
```

The current list of reserved UIDs and GIDs can be found in `ports/UIDs` and `ports/GIDs`.

6.29. Ports That Rely on Kernel Sources

Some ports (such as kernel loadable modules) need the kernel source files so that the port can compile. Here is the correct way to determine if the user has them installed:

```
USES= kmod
```

Apart from this check, the `kmod` feature takes care of most items that these ports need to take into account.

Chapter 7. Advanced pkg-plist Practices

7.1. Changing pkg-plist Based on Make Variables

Some ports, particularly the p5- ports, need to change their pkg-plist depending on what options they are configured with (or version of perl, in the case of p5- ports). To make this easy, any instances in pkg-plist of `%OSREL%`, `%PERL_VER%`, and `%PERL_VERSION%` will be substituted appropriately. The value of `%OSREL%` is the numeric revision of the operating system (for example, 4.9). `%PERL_VERSION%` and `%PERL_VER%` is the full version number of perl (for example, 5.8.9). Several other `%VAR%` related to port's documentation files are described in [the relevant section](#).

To make other substitutions, set `PLIST_SUB` with a list of `VAR=VALUE` pairs and instances of `%VAR%` will be substituted with `VALUE` in pkg-plist.

For instance, if a port installs many files in a version-specific subdirectory, use a placeholder for the version so that pkg-plist does not have to be regenerated every time the port is updated. For example:

```
OCTAVE_VERSION= ${PORTREVISION}
PLIST_SUB= OCTAVE_VERSION=${OCTAVE_VERSION}
```

in the Makefile and use `%OCTAVE_VERSION%` wherever the version shows up in pkg-plist. When the port is upgraded, it will not be necessary to edit dozens (or in some cases, hundreds) of lines in pkg-plist.

If files are installed conditionally on the options set in the port, the usual way of handling it is prefixing pkg-plist lines with a `%OPT%` for lines needed when the option is enabled, or `%NO_OPT%` when the option is disabled, and adding `OPTIONS_SUB=yes` to the Makefile. See [Section 5.12.3.1, "OPTIONS_SUB"](#) for more information.

For instance, if there are files that are only installed when the X11 option is enabled, and Makefile has:

```
OPTIONS_DEFINE= X11
OPTIONS_SUB= yes
```

In pkg-plist, put `%X11%` in front of the lines only being installed when the option is enabled, like this:

```
%X11%bin/foo-gui
```

This substitution will be done between the `pre-install` and `do-install` targets, by reading from `PLIST` and writing to `TMPPLIST` (default: `WRKDIR/.PLIST.mktmp`). So if the port builds `PLIST` on the fly, do so in or before `pre-install`. Also, if the port needs to edit the resulting file, do so in `post-install` to a file named `TMPPLIST`.

Another way of modifying a port's packing list is based on setting the variables `PLIST_FILES` and `PLIST_DIRS`. The value of each variable is regarded as a list of pathnames to write to `TMPPLIST` along with `PLIST` contents. While names listed in `PLIST_FILES` and `PLIST_DIRS` are subject to `%VAR%` substitution as described above, it is better to use the `${VAR}` directly. Except for that, names from `PLIST_FILES` will appear in the final packing list unchanged, while `@dir` will be prepended to names from `PLIST_DIRS`. To take effect, `PLIST_FILES` and `PLIST_DIRS` must be set before `TMPPLIST` is written, that is, in `pre-install` or earlier.

From time to time, using `OPTIONS_SUB` is not enough. In those cases, adding a specific `TAG` to `PLIST_SUB` inside the Makefile with a special value of `@comment`, makes package tools to ignore the line. For instance, if some files are only installed when the X11 option is on and the architecture is `i386`:

```
.include <bsd.port.pre.mk>

.if ${PORT_OPTIONS:MX11} && ${ARCH} == "i386"
PLIST_SUB+= X11i386=""
.else
```

```
PLIST_SUB+= X11I386="@comment "  
.endif
```

7.2. Empty Directories

7.2.1. Cleaning Up Empty Directories

When being de-installed, a port has to remove empty directories it created. Most of these directories are removed automatically by [pkg\(8\)](#), but for directories created outside of `${PREFIX}`, or empty directories, some more work needs to be done. This is usually accomplished by adding `@dir` lines for those directories. Subdirectories must be deleted before deleting parent directories.

```
[...-]  
@dir /var/games/oneko/saved-games  
@dir /var/games/oneko
```

7.2.2. Creating Empty Directories

Empty directories created during port installation need special attention. They must be present when the package is created. If they are not created by the port code, create them in the `Makefile`:

```
post-stage:  
${MKDIR} ${STAGEDIR}${PREFIX}/some/directory
```

Add the directory to `pkg-plist` like any other. For example:

```
@dir some/directory
```

7.3. Configuration Files

If the port installs configuration files to `PREFIX/etc` (or elsewhere) do *not* list them in `pkg-plist`. That will cause `pkg delete` to remove files that have been carefully edited by the user, and a re-installation will wipe them out.

Instead, install sample files with a `filename.sample` extension. The `@sample` macro automates this, see [Section 7.6.9, “@sample file \[file\]”](#) for what it does exactly. For each sample file, add a line to `pkg-plist`:

```
@sample etc/orbit.conf.sample
```

If there is a very good reason not to install a working configuration file by default, only list the sample filename in `pkg-plist`, without the `@sample` followed by a space part, and add a [message](#) pointing out that the user must copy and edit the file before the software will work.



Tip

When a port installs its configuration in a subdirectory of `${PREFIX}/etc`, use `ETCDIR`, which defaults to `${PREFIX}/etc/${PORTNAME}`, it can be overridden in the ports `Makefile` if there is a convention for the port to use some other directory. The `%%ETCDIR%%` macro will be used in its stead in `pkg-plist`.



Note

The sample configuration files should always have the `.sample` suffix. If for some historical reason using the standard suffix is not possible, or if the sample files come from some other directory, use this construct:

```
@sample etc/orbit.conf-dist etc/orbit.conf
```

or

```
@sample %%EXAMPLESDIR%/orbit.conf etc/orbit.conf
```

The format is `@sample sample-file actual-config-file`.

7.4. Dynamic Versus Static Package List

A *static package list* is a package list which is available in the Ports Collection either as `pkg-plist` (with or without variable substitution), or embedded into the Makefile via `PLIST_FILES` and `PLIST_DIRS`. Even if the contents are auto-generated by a tool or a target in the Makefile *before* the inclusion into the Ports Collection by a committer (for example, using `make makeplist`), this is still considered a static list, since it is possible to examine it without having to download or compile the distfile.

A *dynamic package list* is a package list which is generated at the time the port is compiled based upon the files and directories which are installed. It is not possible to examine it before the source code of the ported application is downloaded and compiled, or after running a `make clean`.

While the use of dynamic package lists is not forbidden, maintainers should use static package lists wherever possible, as it enables users to [grep\(1\)](#) through available ports to discover, for example, which port installs a certain file. Dynamic lists should be primarily used for complex ports where the package list changes drastically based upon optional features of the port (and thus maintaining a static package list is infeasible), or ports which change the package list based upon the version of dependent software used. For example, ports which generate docs with Javadoc.

7.5. Automated Package List Creation

First, make sure the port is almost complete, with only `pkg-plist` missing. Running `make makeplist` will show an example for `pkg-plist`. The output of `makeplist` must be double checked for correctness as it tries to automatically guess a few things, and can get it wrong.

User configuration files should be installed as `filename.sample`, as it is described in [Section 7.3, “Configuration Files”](#). `info/dir` must not be listed and appropriate `install-info` lines must be added as noted in the [info files](#) section. Any libraries installed by the port must be listed as specified in the [shared libraries](#) section.

7.6. Expanding Package List with Keywords

All keywords can also take optional arguments in parentheses. The arguments are owner, group, and mode. This argument is used on the file or directory referenced. To change the owner, group, and mode of a configuration file, use:

```
@sample(games,games,640) etc/config.sample
```

The arguments are optional. If only the group and mode need to be changed, use:

```
@sample(,games,660) etc/config.sample
```

7.6.1. @desktop-file-utils

Will run `update-desktop-database -q` after installation and deinstallation.

7.6.2. @fc directory

Add a `@dir` entry for the directory passed as an argument, and run `fc-cache -fs` on that directory after installation and deinstallation.

7.6.3. @fcfontsdir directory

Add a `@dir` entry for the directory passed as an argument, and run `fc-cache -fs`, `mkfontscale` and `mkfontdir` on that directory after installation and deinstallation. Additionally, on deinstallation, it removes the `fonts.scale` and `fonts.dir` cache files if they are empty. This keyword is equivalent to adding both [@fc directory](#) and [@fontsdir directory](#).

7.6.4. @fontsdir directory

Add a `@dir` entry for the directory passed as an argument, and run `mkfontscale` and `mkfontdir` on that directory after installation and deinstallation. Additionally, on deinstallation, it removes the `fonts.scale` and `fonts.dir` cache files if they are empty.

7.6.5. @glib-schemas

Runs `glib-compile-schemas` on installation and deinstallation.

7.6.6. @info file

Add the file passed as argument to the plist, and updates the info document index on installation and deinstallation. Additionally, it removes the index if empty on deinstallation. This should never be used manually, but always through INFO. See [Section 5.11, “Info Files”](#) for more information.

7.6.7. @kld directory

Runs `kldxref` on the directory on installation and deinstallation. Additionally, on deinstallation, it will remove the directory if empty.

7.6.8. @rmtry file

Will remove the file on deinstallation, and not give an error if the file is not there.

7.6.9. @sample file [file]

This is used to handle installation of configuration files, through example files bundled with the package. The “actual”, non-sample, file is either the second filename, if present, or the first filename without the `.sample` extension.

This does three things. First, add the first file passed as argument, the sample file, to the plist. Then, on installation, if the actual file is not found, copy the sample file to the actual file. And finally, on deinstallation, remove the actual file if it has not been modified. See [Section 7.3, “Configuration Files”](#) for more information.

7.6.10. @shared-mime-info directory

Runs `update-mime-database` on the directory on installation and deinstallation.

7.6.11. @shell file

Add the file passed as argument to the plist.

On installation, add the full path to `file` to `/etc/shells`, while making sure it is not added twice. On deinstallation, remove it from `/etc/shells`.

7.6.12. @terminfo

Do not use by itself. If the port installs `*.terminfo` files, add `USES=terminfo` to its Makefile.

On installation and deinstallation, if **tic** is present, refresh `${PREFIX}/share/misc/terminfo.db` from the `*.terminfo` files in `${PREFIX}/share/misc`.

7.6.13. Base Keywords

There are a few keywords that are hardcoded, and documented in [pkg-create\(8\)](#). For the sake of completeness, they are also documented here.

7.6.13.1. @ [file]

The empty keyword is a placeholder to use when the file's owner, group, or mode need to be changed. For example, to set the group of the file to `games` and add the `setgid` bit, add:

```
@(,games,2755) sbin/daemon
```

7.6.13.2. @preexec command, @postexec command, @preunexec command, @postunexec command

Execute *command* as part of the package installation or deinstallation process.

@preexec command

Execute *command* as part of the pre-install scripts.

@postexec command

Execute *command* as part of the post-install scripts.

@preunexec command

Execute *command* as part of the pre-deinstall scripts.

@postunexec command

Execute *command* as part of the post-deinstall scripts.

If *command* contains any of these sequences somewhere in it, they are expanded inline. For these examples, assume that `@cwd` is set to `/usr/local` and the last extracted file was `bin/emacs`.

%F

Expand to the last filename extracted (as specified). In the example case `bin/emacs`.

%D

Expand to the current directory prefix, as set with `@cwd`. In the example case `/usr/local`.

%B

Expand to the basename of the fully qualified filename, that is, the current directory prefix plus the last file-spec, minus the trailing filename. In the example case, that would be `/usr/local/bin`.

%f

Expand to the filename part of the fully qualified name, or the converse of **%B**. In the example case, `emacs`.

7.6.13.3. @mode mode

Set default permission for all subsequently extracted files to *mode*. Format is the same as that used by [chmod\(1\)](#). Use without an arg to set back to default permissions (mode of the file while being packed).



Important

This must be a numeric mode, like `644`, `4755`, or `600`. It cannot be a relative mode like `u+s`.

7.6.13.4. @owner user

Set default ownership for all subsequent files to *user*. Use without an argument to set back to default ownership (root).

7.6.13.5. @group group

Set default group ownership for all subsequent files to *group*. Use without an arg to set back to default group ownership (wheel).

7.6.13.6. @comment string

This line is ignored when packing.

7.6.13.7. @dir directory

Declare directory name. By default, directories created under PREFIX by a package installation are automatically removed. Use this when an empty directory under PREFIX needs to be created, or when the directory needs to have non default owner, group, or mode. Directories outside of PREFIX need to be registered. For example, /var/db/\${PORTNAME} needs to have a @dir entry whereas \${PREFIX}/share/\${PORTNAME} does not if it contains files or uses the default owner, group, and mode.

7.6.13.8. @exec command, @unexec command (Deprecated)

Execute *command* as part of the installation or deinstallation process. Please use [Section 7.6.13.2](#), “@preexec command, @postexec command, @preunexec command, @postunexec command” instead.

7.6.13.9. @dirrm directory (Deprecated)

Declare directory name to be deleted at deinstall time. By default, directories created under PREFIX by a package installation are deleted when the package is deinstalled.

7.6.13.10. @dirrmtry directory (Deprecated)

Declare directory name to be removed, as for @dirrm, but does not issue a warning if the directory cannot be removed.

7.6.14. Creating New Keywords

Package list files can be extended by keywords that are defined in the \${PORTSDIR}/Keywords directory. The settings for each keyword are stored in a UCL file named *keyword.ucl*. The file must contain at least one of these sections:

- attributes
- action
- pre-install
- post-install
- pre-deinstall
- post-deinstall
- pre-upgrade
- post-upgrade

7.6.14.1. attributes

Changes the owner, group, or mode used by the keyword. Contains an associative array where the possible keys are owner, group, and mode. The values are, respectively, a user name, a group name, and a file mode. For example:


```
attributes: { owner: "games", group: "games", mode: 0555 }
```

7.6.14.2. **action**

Defines what happens to the keyword's parameter. Contains an array where the possible values are:

setprefix

Set the prefix for the next plist entries.

dir

Register a directory to be created on install and removed on deinstall.

dirm

Register a directory to be deleted on deinstall. Deprecated.

dirmtry

Register a directory to try and deleted on deinstall. Deprecated.

file

Register a file.

setmode

Set the mode for the next plist entries.

setowner

Set the owner for the next plist entries.

setgroup

Set the group for the next plist entries.

comment

Does not do anything, equivalent to not entering an action section.

ignore_next

Ignore the next entry in the plist.

7.6.14.3. **arguments**

If set to true, adds argument handling, splitting the whole line, `%@`, into numbered arguments, `%1`, `%2`, and so on. For example, for this line:

```
@foo some.content other.content
```

`%1` and `%2` will contain:

```
some.content
other.content
```

It also affects how the [action](#) entry works. When there is more than one argument, the argument number must be specified. For example:

```
actions: [file(1)]
```

7.6.14.4. **pre-install, post-install, pre-deinstall, post-deinstall, pre-upgrade, post-upgrade**

These keywords contains a [sh\(1\)](#) script to be executed before or after installation, deinstallation, or upgrade of the package. In addition to the usual `@exec %foo` placeholders described in [Section 7.6.13.2](#), “[preexec command](#)”, “[postexec command](#)”, “[preunexec command](#)”, “[postunexec command](#)”, there is a new one, `%@`, which represents the argument of the keyword.

7.6.14.5. Custom Keyword Examples

Example 7.1. Example of a `@dirrmtryecho` Keyword

This keyword does two things, it adds a `@dirrmtry` *directory* line to the packing list, and echoes the fact that the directory is removed when deinstalling the package.

```
actions: [dirrmtry]
post-deinstall: <<EOD
    echo "Directory %D/%@ removed."
EOD
```

Example 7.2. Real Life Example, How `@sample` is Implemented

This keyword does three things. It adds the first *filename* passed as an argument to `@sample` to the packing list, it adds to the `post-install` script instructions to copy the sample to the actual configuration file if it does not already exist, and it adds to the `post-deinstall` instructions to remove the configuration file if it has not been modified.

```
actions: [file(1)]
arguments: true
post-install: <<EOD
    case "%1" in
        /*) sample_file="%1" -;;
        *) sample_file="%D/%1" -;;
    esac
    target_file="${sample_file%.sample}"
    set -- %@
    if [ $# -eq 2 -]; then
        target_file=${2}
    fi
    case "${target_file}" in
        /*) target_file="${target_file}" -;;
        *) target_file="%D/${target_file}" -;;
    esac
    if ! [ -f "${target_file}" -]; then
        /bin/cp -p "${sample_file}" "${target_file}" && \
        /bin/chmod u+w "${target_file}"
    fi
EOD
pre-deinstall: <<EOD
    case "%1" in
        /*) sample_file="%1" -;;
        *) sample_file="%D/%1" -;;
    esac
    target_file="${sample_file%.sample}"
    set -- %@
    if [ $# -eq 2 -]; then
        set -- %@
        target_file=${2}
    fi
    case "${target_file}" in
        /*) target_file="${target_file}" -;;
        *) target_file="%D/${target_file}" -;;
    esac
    if cmp -s "${target_file}" "${sample_file}"; then
        rm -f "${target_file}"
    else
```

```
    echo "You may need to manually remove ${target_file} if it is no longer &
needed."
fi
EOD
```


Chapter 8. pkg-*

There are some tricks we have not mentioned yet about the pkg-* files that come in handy sometimes.

8.1. pkg-message

To display a message when the package is installed, place the message in pkg-message. This capability is often useful to display additional installation steps to be taken after a pkg install or to display licensing information.

When some lines about the build-time knobs or warnings have to be displayed, use ECHO_MSG. pkg-message is only for post-installation steps. Likewise, the distinction between ECHO_MSG is for printing informational text to the screen and ECHO_CMD is for command pipelining:

```
update-etc-shells:
  @${ECHO_MSG} "updating /etc/shells"
  @${CP} /etc/shells /etc/shells.bak
  @( ${GREP} -v ${PREFIX}/bin/bash /etc/shells.bak; \
    ${ECHO_CMD} ${PREFIX}/bin/bash) >/etc/shells
  @${RM} /etc/shells.bak
```



Note

Do not add an entry for pkg-message in pkg-plist.

8.2. pkg-install

If the port needs to execute commands when the binary package is installed with pkg add or pkg install, use pkg-install. This script will automatically be added to the package. It will be run twice by pkg, the first time as \${SH} pkg-install \${PKGNAME} PRE-INSTALL before the package is installed, and the second time as \${SH} pkg-install \${PKGNAME} POST-INSTALL after it has been installed. \$2 can be tested to determine which mode the script is being run in. The PKG_PREFIX environmental variable will be set to the package installation directory.

8.3. pkg-deinstall

This script executes when a package is removed.

This script will be run twice by pkg delete. The first time as \${SH} pkg-deinstall \${PKGNAME} DEINSTALL before the port is de-installed and the second time as \${SH} pkg-deinstall \${PKGNAME} POST-DEINSTALL after the port has been de-installed. \$2 can be tested to determine which mode the script is being run in. The PKG_PREFIX environmental variable will be set to the package installation directory.

8.4. Changing the Names of pkg-*

All the names of pkg-* are defined using variables that can be changed in the Makefile if needed. This is especially useful when sharing the same pkg-* files among several ports or when it is necessary to write to one of these files. See [writing to places other than WRKDIR](#) for why it is a bad idea to write directly into the directory containing the pkg-* files.

Here is a list of variable names and their default values. (PKGDIR defaults to \${MASTERDIR}.)

| Variable | Default value |
|--------------|--------------------------|
| DESCR | \${PKGDIR}/pkg-descr |
| PLIST | \${PKGDIR}/pkg-plist |
| PKGINSTALL | \${PKGDIR}/pkg-install |
| PKGDEINSTALL | \${PKGDIR}/pkg-deinstall |
| PKGMESSAGE | \${PKGDIR}/pkg-message |

8.5. Making Use of SUB_FILES and SUB_LIST

SUB_FILES and SUB_LIST are useful for dynamic values in port files, such as the installation PREFIX in pkg-message.

SUB_FILES specifies a list of files to be automatically modified. Each *file* in the SUB_FILES list must have a corresponding *file.in* present in FILESDIR. A modified version will be created as \${WRKDIR}/*file*. Files defined as a value of USE_RC_SUBR (or the deprecated USE_RCORDER) are automatically added to SUB_FILES. For the files pkg-message, pkg-install, and pkg-deinstall, the corresponding Makefile variable is automatically set to point to the processed version.

SUB_LIST is a list of VAR=VALUE pairs. For each pair, %%VAR%% will be replaced with VALUE in each file listed in SUB_FILES. Several common pairs are automatically defined: PREFIX, LOCALBASE, DATADIR, DOCSDIR, EXAMPLESDIR, WWWDIR, and ETCDIR. Any line beginning with @comment followed by a space, will be deleted from resulting files after a variable substitution.

This example replaces %%ARCH%% with the system architecture in a pkg-message:

```
SUB_FILES= pkg-message
SUB_LIST= ARCH=${ARCH}
```

Note that for this example, pkg-message.in must exist in FILESDIR.

Example of a good pkg-message.in:

```
Now it is time to configure this package.
Copy %%PREFIX%%/share/examples/putsy/%%ARCH%%.conf into your home directory
as .putsy.conf and edit it.
```

Chapter 9. Testing the Port

9.1. Running `make describe`

Several of the FreeBSD port maintenance tools, such as [portupgrade\(1\)](#), rely on a database called `/usr/ports/INDEX` which keeps track of such items as port dependencies. `INDEX` is created by the top-level `ports/Makefile` via `make index`, which descends into each port subdirectory and executes `make describe` there. Thus, if `make describe` fails in any port, no one can generate `INDEX`, and many people will quickly become unhappy.



Note

It is important to be able to generate this file no matter what options are present in `make.conf`, so please avoid doing things such as using `.error` statements when (for instance) a dependency is not satisfied. (See [Section 12.15, “Avoid Use of the `.error` Construct”](#).)

If `make describe` produces a string rather than an error message, everything is probably safe. See `bsd.port.mk` for the meaning of the string produced.

Also note that running a recent version of `portlint` (as specified in the next section) will cause `make describe` to be run automatically.

9.2. Portlint

Do check the port with [portlint](#) before submitting or committing it. `portlint` warns about many common errors, both functional and stylistic. For a new (or repocopied) port, `portlint -A` is the most thorough; for an existing port, `portlint -C` is sufficient.

Since `portlint` uses heuristics to try to figure out errors, it can produce false positive warnings. In addition, occasionally something that is flagged as a problem really cannot be done in any other way due to limitations in the ports framework. When in doubt, the best thing to do is ask on [FreeBSD ports mailing list](#).

9.3. Port Tools

The [ports-mgmt/porttools](#) program is part of the Ports Collection.

`port` is the front-end script, which can help simplify the testing job. Whenever a new port or an update to an existing one needs testing, use `port test` to test the port, including the [portlint](#) checking. This command also detects and lists any files that are not listed in `pkg-plist`. For example:

```
# port test /usr/ports/net/csup
```

9.4. PREFIX and DESTDIR

`PREFIX` determines where the port will be installed. It defaults to `/usr/local`, but can be set by the user to a custom path like `/opt`. The port must respect the value of this variable.

`DESTDIR`, if set by the user, determines the complete alternative environment, usually a jail or an installed system mounted somewhere other than `/`. A port will actually install into `DESTDIR/PREFIX`, and register with the package

database in `DESTDIR/var/db/pkg` . As `DESTDIR` is handled automatically by the ports infrastructure with [chroot\(8\)](#). There is no need for modifications or any extra care to write `DESTDIR`-compliant ports.

The value of `PREFIX` will be set to `LOCALBASE` (defaulting to `/usr/local`). If `USE_LINUX_PREFIX` is set, `PREFIX` will be `LINUXBASE` (defaulting to `/compat/linux`).

Avoiding hard-coded `/usr/local` paths in the source makes the port much more flexible and able to cater to the needs of other sites. Often, this can be accomplished by replacing occurrences of `/usr/local` in the port's various Makefiles with `${PREFIX}`. This variable is automatically passed down to every stage of the build and install processes.

Make sure the application is not installing things in `/usr/local` instead of `PREFIX`. A quick test for such hard-coded paths is:

```
% make clean; make package PREFIX=/var/tmp/`make -V PORTNAME`
```

If anything is installed outside of `PREFIX`, the package creation process will complain that it cannot find the files.

In addition, it is worth checking the same with the stage directory support (see [Section 6.1, “Staging”](#)):

```
% make stage && make check-plist && make stage-qa && make package
```

- `check-plist` checks for files missing from the `plist`, and files in the `plist` that are not installed by the port.
- `stage-qa` checks for common problems like bad shebang, symlinks pointing outside the stage directory, setuid files, and non-stripped libraries...

These tests will not find hard-coded paths inside the port's files, nor will it verify that `LOCALBASE` is being used to correctly refer to files from other ports. The temporarily-installed port in `/var/tmp/`make -V PORTNAME`` must be tested for proper operation to make sure there are no problems with paths.

`PREFIX` must not be set explicitly in a port's Makefile. Users installing the port may have set `PREFIX` to a custom location, and the port must respect that setting.

Refer to programs and files from other ports with the variables mentioned above, not explicit pathnames. For instance, if the port requires a macro `PAGER` to have the full pathname of `less`, do not use a literal path of `/usr/local/bin/less` . Instead, use `${LOCALBASE}`:

```
-DPAGER="\`${LOCALBASE}/bin/less`"
```

The path with `LOCALBASE` is more likely to still work if the system administrator has moved the whole `/usr/local` tree somewhere else.



Tip

All these tests are done automatically when running `poudriere testport` or `poudriere bulk -t`. It is highly recommended that every ports contributor install it, and tests all his ports with it. See [Section 9.5, “Poudriere”](#) for more information.

9.5. Poudriere

For a ports contributor, Poudriere is one of the most important and helpful testing and build tools. Its main features include:

- Bulk building of the entire ports tree, specific subsets of the ports tree, or a single port including its dependencies
- Automatic packaging of build results

- Generation of build log files per port
- Providing a signed [pkg\(8\)](#) repository
- Testing of port builds before submitting a patch to the FreeBSD bug tracker or committing to the ports tree
- Testing for successful ports builds using different options

Because Poudriere performs its building in a clean [jail\(8\)](#) environment and uses [zfs\(8\)](#) features, it has several advantages over traditional testing on the host system:

- No pollution of the host environment: No leftover files, no accidental removals, no changes of existing configuration files.
- Verify `pkg-plist` for missing or superfluous entries
- Ports committers sometimes ask for a Poudriere log alongside a patch submission to assess whether the patch is ready for integration into the ports tree

It is also quite straightforward to set up and use, has no dependencies, and will run on any supported FreeBSD release. This section shows how to install, configure, and run Poudriere as part of the normal workflow of a ports contributor.

The examples in this section show a default file layout, as standard in FreeBSD. Substitute any local changes accordingly. The ports tree, represented by `${PORTSDIR}`, is located in `/usr/ports`. Both `${LOCALBASE}` and `${PREFIX}` are `/usr/local` by default.

9.5.1. Installing Poudriere

Poudriere is available in the ports tree in [ports-mgmt/poudriere](#). It can be installed using [pkg\(8\)](#) or from ports:

```
# pkg install poudriere
```

or

```
# make -C /usr/ports/ports-mgmt/poudriere install clean
```

There is also a work-in-progress version of Poudriere which will eventually become the next release. It is available in [ports-mgmt/poudriere-devel](#). This development version is used for the official FreeBSD package builds, so it is well tested. It often has newer interesting features. A ports committer will want to use the development version because it is what is used in production, and has all the new features that will make sure everything is exactly right. A contributor will not necessarily need those as the most important fixes are backported to released version. The main reason for the use of the development version to build the official package is because it is faster, in a way that will shorten a full build from 18 hours to 17 hours when using a high end 32 CPU server with 128GB of RAM. Those optimizations will not matter a lot when building ports on a desktop machine.

9.5.2. Setting Up Poudriere

The port installs a default configuration file, `/usr/local/etc/poudriere.conf`. Each parameter is documented in the configuration file and in [poudriere\(8\)](#). Here is a minimal example config file:

```
ZPOOL=tank
ZROOTFS=/poudriere
BASEFS=/poudriere
DISTFILES_CACHE=/usr/ports/distfiles
RESOLV_CONF=/etc/resolv.conf
FREEBSD_HOST=ftp://ftp.freebsd.org
SVN_HOST=svn.FreeBSD.org
```

ZPOOL

The name of the ZFS storage pool which Poudriere shall use. Must be listed in the output of `zpool status`.

ZROOTFS

The root of Poudriere-managed file systems. This entry will cause Poudriere to create [zfs\(8\)](#) file systems under `tank/poudriere`.

BASEFS

The root mount point for Poudriere file systems. This entry will cause Poudriere to mount `tank/poudriere` to `/poudriere`.

DISTFILES_CACHE

Defines where distfiles are stored. In this example, Poudriere and the host share the distfiles storage directory. This avoids downloading tarballs which are already present on the system.

RESOLV_CONF

Use the host `/etc/resolv.conf` inside jails for DNS. This is needed so jails can resolve the URLs of distfiles when downloading. It is not needed when using a proxy. Refer to the default configuration file for proxy configuration.

FREEBSD_HOST

The FTP/HTTP server to use when the jails are installed from FreeBSD releases and updated with [freebsd-update\(8\)](#). Choose a server location which is close, for example if the machine is located in Australia, use `ftp.au.freebsd.org`.

SVN_HOST

The server from where jails are installed and updated when using Subversion. Also used for ports tree when not using [portsnap\(8\)](#). Again, choose a nearby location. A list of official Subversion mirrors can be found in the [FreeBSD Handbook Subversion section](#).

9.5.3. Creating Poudriere Jails

Create the base jails which Poudriere will use for building:

```
# poudriere jail -c -j 93Ramd64 -v 9.3-RELEASE -a amd64
```

Fetch a 9.3-RELEASE for amd64 from the FTP server given by `FREEBSD_HOST` in `poudriere.conf`, create the `zfs` file system `tank/poudriere/jails/93Ramd64`, mount it on `/poudriere/jails/93Ramd64` and extract the 9.3-RELEASE tarballs into this file system.

```
# poudriere jail -c -j 10i386 -v stable/10 -a i386 -m svn+https
```

Create `tank/poudriere/jails/10i386`, mount it on `/poudriere/jails/10i386`, then check out the tip of the Subversion branch of `FreeBSD-10-STABLE` from `SVN_HOST` in `poudriere.conf` into `/poudriere/jails/10i386/usr/src`, then complete a `buildworld` and install it into `/poudriere/jails/10i386`.



Tip

If a specific Subversion revision is needed, append it to the version string. For example:

```
# poudriere jail -c -j 10i386 -v stable/10@123456 -a i386 -m svn+https
```



Note

While it is possible to build a newer version of FreeBSD on an older version, most of the time it will not run. For example, if a `stable/10` jail is needed, the host will have to run `stable/10` too. Running `10.0-RELEASE` is not enough.



Caution

The default svn protocol works but is not very secure. Using `svn+https` along with verifying the remote server's SSL fingerprint is advised. It will ensure that the files used for building the jail are from a trusted source.

A list of jails currently known to Poudriere can be shown with `poudriere jail -l`:

```
# poudriere jail -l
JAILNAME      VERSION      ARCH  METHOD
93Ramd64      9.3-RELEASE  amd64  ftp
10i386        10.0-STABLE  i386   svn+https
```

9.5.4. Keeping Poudriere Jails Updated

Managing updates is very straightforward. The command:

```
# poudriere jail -u -j JAILNAME
```

updates the specified jail to the latest version available. For FreeBSD releases, update to the latest patchlevel with [frebsd-update\(8\)](#). For FreeBSD versions built from source, update to the latest Subversion revision in the branch.



Tip

For jails employing a `svn+*` method, it is helpful to add `-J NumberOfParallelBuildJobs` to speed up the build by increasing the number of parallel compile jobs used. For example, if the building machine has 6 CPUs, use:

```
# poudriere jail -u -J 6 -j JAILNAME
```

9.5.5. Setting Up Ports Trees for Use with Poudriere

There are multiple ways to use ports trees in Poudriere. The most straightforward way is to have Poudriere create a default ports tree for itself:

```
# poudriere ports -c
```

This command creates `tank/poudriere/ports/default`, mount it on `/poudriere/ports/default`, and populate it using [portsnap\(8\)](#). Afterward it is included in the list of known ports trees:

```
# poudriere ports -l
PORTSTREE  METHOD  PATH
default    portsnap /poudriere/ports/default
```



Note

Note that the “default” ports tree is special. Each of the build commands explained later will implicitly use this ports tree unless specifically specified otherwise. To use another tree, add `-p treename` to the commands.

While useful for regular bulk builds, having this default ports tree with the [portsnap\(8\)](#) method may not be the best way to deal with local modifications for a ports contributor. As with the creation of jails, it is possible to use

a different method for creating the ports tree. To add an additional ports tree for testing local modifications and ports development, checking out the tree via Subversion is possible:

```
# poudriere ports -c -m svn+https -p subversive
```

Creates `tank/poudriere/ports/subversive` and mounts it on `/poudriere/ports/subversive`. It is then populated using Subversion. Finally, it is added to the list of known ports trees:

```
# poudriere ports -l
PORTSTREE    METHOD    PATH
default      portsnap /poudriere/ports/default
subversive    svn+https /poudriere/ports/subversive
```



Tip

The `svn` method allows extra qualifiers to tell Subversion exactly how to fetch data. This is explained in [poudriere\(8\)](#). For instance, `poudriere ports -c -m svn+ssh -p subversive` uses SSH for the checkout.

9.5.6. Using Manually Managed Ports Trees with Poudriere

Depending on the workflow, it can be extremely helpful to use ports trees which are maintained manually. For instance, if there is a local copy of the ports tree in `/work/ports`, point Poudriere to the location:

```
# poudriere ports -c -F -f none -M /work/ports -p development
```

This will be listed in the table of known trees:

```
# poudriere ports -l
PORTSTREE    METHOD    PATH
development  -        /work/ports
```



Note

The dash in the `METHOD` column means that Poudriere will not update or change this ports tree, ever. It is completely up to the user to maintain this tree, including all local modifications that may be used for testing new ports and submitting patches.

9.5.7. Keeping Poudriere Ports Trees Updated

As straightforward as with jails described earlier:

```
# poudriere ports -u -p PORTSTREE
```

Will update the given `PORTSTREE`, one tree given by the output of `poudriere -l`, to the latest revision available on the official servers.



Note

Ports trees without a method, see [Section 9.5.6, “Using Manually Managed Ports Trees with Poudriere”](#), cannot be updated like this. They must be updated manually by the porter.

9.5.8. Testing Ports

After jails and ports trees have been set up, the result of a contributor's modifications to the ports tree can be tested.

For example, local modifications to the [www/firefox](#) port located in `/work/ports/www/firefox` can be tested in the previously created 9.3-RELEASE jail:

```
# poudriere testport -j 93Ramd64 -p development -o www/firefox
```

This will build all dependencies of Firefox. If a dependency has been built previously and is still up-to-date, the pre-built package is installed. If a dependency has no up-to-date package, one will be built with default options in a jail. Then Firefox itself is built.

The complete build of every port is logged to `/poudriere/data/logs/bulk/93Ri386-development/build-time/logs`.

The directory name `93Ri386-development` is derived from the arguments to `-j` and `-p`, respectively. For convenience, a symbolic link `/poudriere/data/logs/bulk/93Ri386-development/latest` is also maintained. The link points to the latest *build-time* directory. Also in this directory is an `index.html` for observing the build process with a web browser.

By default, Poudriere cleans up the jails and leaves log files in the directories mentioned above. To ease investigation, jails can be kept running after the build by adding `-i` to `testport`:

```
# poudriere testport -j 93Ramd64 -p development -i -o www/firefox
```

After the build completes, and regardless of whether it was successful, a shell is provided within the jail. The shell is used to investigate further. Poudriere can be told to leave the jail running after the build finishes with `-I`. Poudriere will show the command to run when the jail is no longer needed. It is then possible to [jexec\(8\)](#) into it:

```
# poudriere testport -j 93Ramd64 -p development -I -o www/firefox
[...-]
====> Installing local Pkg repository to /usr/local/etc/pkg/repos
====> Leaving jail 93Ramd64-development-n running, mounted at /poudriere/data/.u
m/93Ramd64-development/ref for interactive run testing
====> To enter jail: jexec 93Ramd64-development-n env -i TERM=$TERM /usr/bin/login -fp  
root
====> To stop jail: poudriere jail -k -j 93Ramd64 -p development
# jexec 93Ramd64-development-n env -i TERM=$TERM /usr/bin/login -fp root
# [do some stuff in the jail]
# exit
# poudriere jail -k -j 93Ramd64 -p development
====> Umounting file systems
```

An integral part of the FreeBSD ports build infrastructure is the ability to tweak ports to personal preferences with options. These can be tested with Poudriere as well. Adding the `-c`:

```
# poudriere testport -c -o www/firefox
```

Presents the port configuration dialog before the port is built. The ports given after `-o` in the format *category/portname* will use the specified options, all dependencies will use the default options. Testing dependent ports with non-default options can be accomplished using sets, see [Section 9.5.9, "Using Sets"](#).



Tip

When testing ports where `pkg-plist` is altered during build depending on the selected options, it is recommended to perform a test run with all options selected *and* one with all options deselected.

9.5.9. Using Sets

For all actions involving builds, a so-called *set* can be specified using `-z setname`. A set refers to a fully independent build. This allows, for instance, usage of `testport` with non-standard options for the dependent ports.

To use sets, Poudriere expects an existing directory structure similar to `PORT_DBDIR`, defaults to `/var/db/ports` in its configuration directory. This directory is then nullfs-mounted into the jails where the ports and their dependencies are built. Usually a suitable starting point can be obtained by recursively copying the existing `PORT_DBDIR` to `/usr/local/etc/poudriere.d/ jailname-portname-setname-options`. This is described in detail in [poudriere\(8\)](#). For instance, testing [www/firefox](#) in a specific set named `devset`, add the `-z devset` parameter to the `testport` command:

```
# poudriere testport -j 93Ramd64 -p development -z devset -o www/firefox
```

This will look for the existence of these directories in this order:

- `/usr/local/etc/poudriere.d/93Ramd64-development-devset-options`
- `/usr/local/etc/poudriere.d/93Ramd64-devset-options`
- `/usr/local/etc/poudriere.d/93Ramd64-development-options`
- `/usr/local/etc/poudriere.d/devset-options`
- `/usr/local/etc/poudriere.d/development-options`
- `/usr/local/etc/poudriere.d/93Ramd64-options`
- `/usr/local/etc/poudriere.d/options`

From this list, Poudriere nullfs-mounts the *first existing* directory tree into the `/var/db/ports` directory of the build jails. Hence, all custom options are used for all the ports during this run of `testport`.

After the directory structure for a set is provided, the options for a particular port can be altered. For example:

```
# poudriere options -c www/firefox -z devset
```

The configuration dialog for [www/firefox](#) is shown, and options can be edited. The selected options are saved to the `devset` set.



Note

Poudriere is very flexible in the option configuration. They can be set for particular jails, ports trees, and for multiple ports by one command. Refer to [poudriere\(8\)](#) for details.

9.5.10. Providing a Custom `make.conf` File

Similar to using sets, Poudriere will also use a custom `make.conf` if it is provided. No special command line argument is necessary. Instead, Poudriere looks for existing files matching a name scheme derived from the command line. For instance:

```
# poudriere testport -j 93Ramd64 -p development -z devset -o www/firefox
```

causes Poudriere to check for the existence of these files in this order:

- `/usr/local/etc/poudriere.d/make.conf`
- `/usr/local/etc/poudriere.d/devset-make.conf`

- `/usr/local/etc/poudriere.d/development-make.conf`
- `/usr/local/etc/poudriere.d/93Ramd64-make.conf`
- `/usr/local/etc/poudriere.d/93Ramd64-development-make.conf`
- `/usr/local/etc/poudriere.d/93Ramd64-devset-make.conf`
- `/usr/local/etc/poudriere.d/93Ramd64-development-devset-make.conf`

Unlike with sets, all of the found files will be appended, *in that order*, into one `make.conf` inside the build jails. It is hence possible to have general make variables, intended to affect all builds in `/usr/local/etc/poudriere.d/make.conf`. Special variables, intended to affect only certain jails or sets can be set in specialised `make.conf` files, such as `/usr/local/etc/poudriere.d/93Ramd64-development-devset-make.conf`.

Example 9.1. Using **make.conf** to Change Default Perl

To build a set with a non default Perl version, for example, 5.20, using a set named `perl5-20`, create a `perl5-20-make.conf` with this line:

```
DEFAULT_VERSIONS+= perl=5.20
```



Note

Note the use of `+=` so that if the variable is already set in the default `make.conf` its content will not be overwritten.

9.5.11. Pruning no Longer Needed Distfiles

Poudriere comes with a built-in mechanism to remove outdated distfiles that are no longer used by any port of a given tree. The command

```
# poudriere distclean -p portstree
```

will scan the distfiles folder, `DISTFILES_CACHE` in `poudriere.conf`, versus the ports tree given by the `-p portstree` argument and prompt for removal of those distfiles. To skip the prompt and remove all unused files unconditionally, the `-y` argument can be added:

```
# poudriere distclean -p portstree -y
```

9.6. Tinderbox

As an avid ports contributor, take a look at Tinderbox. It is a powerful system for building and testing ports. Install Tinderbox using [ports-mgmt/tinderbox](#) port. Be sure to read supplied documentation since the configuration is not trivial.

Visit the [Tinderbox website](#) for more details.

Chapter 10. Upgrading a Port

When a port is not the most recent version available from the authors, update the local working copy of `/usr/ports`. The port might have already been updated to the new version.

When working with more than a few ports, it will probably be easier to use Subversion to keep the whole ports collection up-to-date, as described in the [Handbook](#). This will have the added benefit of tracking all the port's dependencies.

The next step is to see if there is an update already pending. To do this, there are two options. There is a searchable interface to the [FreeBSD Problem Report \(PR\) or bug database](#). Select `Ports Tree` in the Product dropdown, and enter the name of the port in the Summary field.

However, sometimes people forget to put the name of the port into the Summary field in an unambiguous fashion. In that case, try searching in the Comment field in the Detailed Bug Information section, or try the [FreeBSD Ports Monitoring System](#) (also known as `portsmon`). This system attempts to classify port PRs by portname. To search for PRs about a particular port, use the [Overview of One Port](#).

If there is no pending PR, the next step is to send an email to the port's maintainer, as shown by `make maintainer`. That person may already be working on an upgrade, or have a reason to not upgrade the port right now (because of, for example, stability problems of the new version), and there is no need to duplicate their work. Note that unmaintained ports are listed with a maintainer of `ports@FreeBSD.org`, which is just the general ports mailing list, so sending mail there probably will not help in this case.

If the maintainer asks you to do the upgrade or there is no maintainer, then help out FreeBSD by preparing the update! Please do this by using the `diff(1)` command in the base system.

To create a suitable `diff` for a single patch, copy the file that needs patching to *something.orig*, save the changes to *something* and then create the patch:

```
% diff -u something.orig something > something.diff
```

Otherwise, either use the `svn diff` method ([Section 10.1, “Using Subversion to Make Patches”](#)) or copy the contents of the port to an entire different directory and use the result of the recursive `diff(1)` output of the new and old ports directories (for example, if the modified port directory is called `superedit` and the original is in our tree as `superedit.bak`, then save the result of `diff -rUN superedit.bak superedit`). Either unified or context diff is fine, but port committers generally prefer unified diffs. Note the use of the `-N` option—this is the accepted way to force diff to properly deal with the case of new files being added or old files being deleted. Before sending us the diff, please examine the output to make sure all the changes make sense. (In particular, make sure to first clean out the work directories with `make clean`).



Note

If some files have been added, copied, moved, or removed, add this information to the problem report so that the committer picking up the patch will know what `svn(1)` commands to run.

To simplify common operations with patch files, use `make makepatch` as described in [Section 4.4, “Patching”](#). Other tools exist, like `/usr/ports/Tools/scripts/patchtool.py`. Before using it, please read `/usr/ports/Tools/scripts/README.patchtool`.

If the port is unmaintained, and you are actively using it, please consider volunteering to become its maintainer. FreeBSD has over 4000 ports without maintainers, and this is an area where more volunteers are always needed. (For a detailed description of the responsibilities of maintainers, refer to the section in the [Developer's Handbook](#).)

To submit the diff, use the [bug submit form](#) (product Ports & Packages, component Individual Port(s)). If the submitter is also maintaining the port, be sure to put [MAINTAINER] at the beginning of the Summary line. Always include the category with the port name, followed by colon, and brief description of the issue. For example: *category/portname: add FOO option*, or if maintaining the port, [MAINTAINER] *category/portname: Update to X.Y.* Please mention any added or deleted files in the message, as they have to be explicitly specified to [svn\(1\)](#) when doing a commit. Do not compress or encode the diff.

Before submitting the bug, review the [Writing the problem report](#) section in the Problem Reports article. It contains far more information about how to write useful problem reports.



Important

If the upgrade is motivated by security concerns or a serious fault in the currently committed port, please notify the Ports Management Team <portmgr@FreeBSD.org> to request immediate rebuilding and redistribution of the port's package. Unsuspecting users of pkg will otherwise continue to install the old version via `pkg install` for several weeks.



Note

Please use [diff\(1\)](#) or `svn diff` to create updates to existing ports. Other formats include the whole file and make it impossible to see just what has changed. When diffs are not included, the entire update might be ignored.

Now that all of that is done, read about how to keep up-to-date in [Chapter 14, Keeping Up](#).

10.1. Using Subversion to Make Patches

When possible, please submit a [svn\(1\)](#) diff. They are easier to handle than diffs between “new and old” directories. It is easier to see what has changed, and to update the diff if something was modified in the Ports Collection since the work on it began, or if the committer asks for something to be fixed. Also, a patch generated with `svn diff` can be easily applied with `svn patch` and will save some time to the committer.

```
% cd ~/my_wrkdir ❶
% svn co https://svn.FreeBSD.org /ports/head/dns/pdnsd ❷
% cd ~/my_wrkdir/pdnsd
```

- ❶ This can be anywhere, of course. Building ports is not limited to within `/usr/ports/`.
- ❷ svn.FreeBSD.org is the FreeBSD public Subversion server. See [Subversion mirror sites](#) for more information.

While in the port directory, make any changes that are needed. If adding, copying, moving, or removing a file, use `svn` to track these changes:

```
% svn add new_file
% svn copy some_file file_copy
% svn move old_name new_name
% svn remove deleted_file
```

Make sure to check the port using the checklist in [Section 3.4, “Testing the Port”](#) and [Section 3.5, “Checking the Port with portlint”](#).

```
% svn status
% svn update ❶
```

- ❶ This will attempt to merge the differences between the patch and current repository version. Watch the output carefully. The letter in front of each file name indicates what was done with it. See [Table 10.1, “Subversion Update File Prefixes”](#) for a complete list.

Table 10.1. Subversion Update File Prefixes

| | |
|---|--|
| U | The file was updated without problems. |
| G | The file was updated without problems (only when working against a remote repository). |
| M | The file had been modified, and was merged without conflicts. |
| C | The file had been modified, and was merged with conflicts. |

If C is displayed as a result of `svn update`, it means something changed in the Subversion repository and `svn(1)` was not able to merge the local changes with those from the repository. It is always a good idea to inspect the changes anyway, since `svn(1)` does not know anything about the structure of a port, so it might (and probably will) merge things that do not make sense.

The last step is to make a unified `diff(1)` of the changes:

```
% svn diff > ../`make -VPKGNAME`.diff
```



Note

If files have been added, copied, moved, or removed, include the `svn(1)` `add`, `copy`, `move`, and `remove` commands that were used. `svn move` or `svn copy` must be run before the patch can be applied. `svn add` or `svn remove` must be run after the patch is applied.

Send the patch following the [problem report submission guidelines](#).



Tip

The patch can be automatically generated and the PR pre-filled with the contact information by using `port submit`. See [Section 9.3, “Port Tools”](#) for more details.

10.2. UPDATING and MOVED

10.2.1. /usr/ports/UPDATING

If upgrading the port requires special steps like changing configuration files or running a specific program, it must be documented in this file. The format of an entry in this file is:

```
YYYYMMDD:
AFFECTS: users of portcategory/portname
AUTHOR: Your name <Your email address>

Special instructions
```



Tip

When including exact portmaster, portupgrade, and/or pkg instructions, please make sure to get the shell escaping right. For example, do *not* use:

```
# pkg delete -g -f docbook-xml* docbook-sk* docbook[2345]??-* docbook-4*
```

As shown, the command will only work with bourne shells. Instead, use the form shown below, which will work with both bourne shell and c-shell:

```
# pkg delete -g -f docbook-xml\* docbook-sk\* docbook\[2345\]\?\?-\* docbook-4\*
```



Note

It is recommended that the AFFECTS line contains a glob matching all the ports affected by the entry so that automated tools can parse it as easily as possible. If an update concerns all the existing BIND 9 versions the AFFECTS content must be `users of dns/bind9*`, it must *not* be `users of BIND 9`

10.2.2. /usr/ports/MOVED

This file is used to list moved or removed ports. Each line in the file is made up of the name of the port, where the port was moved, when, and why. If the port was removed, the section detailing where it was moved can be left blank. Each section must be separated by the | (pipe) character, like so:

```
old name|new name (blank for deleted)|date of move|reason
```

The date must be entered in the form YYYY-MM-DD . New entries are added to the end of the list to keep it in chronological order, with the oldest entry at the top of the list.

If a port was removed but has since been restored, delete the line in this file that states that it was removed.

If a port was renamed and then renamed back to its original name, add a new one with the intermediate name to the old name, and remove the old entry as to not create a loop.



Note

Any changes must be validated with `Tools/scripts/MOVEDlint.awk` .

If using a ports directory other than `/usr/ports` , use:

```
% cd /home/user/ports
% env PORTSDIR=$PWD Tools/scripts/MOVEDlint.awk
```

Chapter 11. Security

11.1. Why Security is So Important

Bugs are occasionally introduced to the software. Arguably, the most dangerous of them are those opening security vulnerabilities. From the technical viewpoint, such vulnerabilities are to be closed by exterminating the bugs that caused them. However, the policies for handling mere bugs and security vulnerabilities are very different.

A typical small bug affects only those users who have enabled some combination of options triggering the bug. The developer will eventually release a patch followed by a new version of the software, free of the bug, but the majority of users will not take the trouble of upgrading immediately because the bug has never vexed them. A critical bug that may cause data loss represents a graver issue. Nevertheless, prudent users know that a lot of possible accidents, besides software bugs, are likely to lead to data loss, and so they make backups of important data; in addition, a critical bug will be discovered really soon.

A security vulnerability is all different. First, it may remain unnoticed for years because often it does not cause software malfunction. Second, a malicious party can use it to gain unauthorized access to a vulnerable system, to destroy or alter sensitive data; and in the worst case the user will not even notice the harm caused. Third, exposing a vulnerable system often assists attackers to break into other systems that could not be compromised otherwise. Therefore closing a vulnerability alone is not enough: notify the audience of it in the most clear and comprehensive manner, which will allow them to evaluate the danger and take appropriate action.

11.2. Fixing Security Vulnerabilities

While on the subject of ports and packages, a security vulnerability may initially appear in the original distribution or in the port files. In the former case, the original software developer is likely to release a patch or a new version instantly. Update the port promptly with respect to the author's fix. If the fix is delayed for some reason, either [mark the port as FORBIDDEN](#) or introduce a patch file to the port. In the case of a vulnerable port, just fix the port as soon as possible. In either case, follow [the standard procedure for submitting changes](#) unless having rights to commit it directly to the ports tree.



Important

Being a ports committer is not enough to commit to an arbitrary port. Remember that ports usually have maintainers, must be respected.

Please make sure that the port's revision is bumped as soon as the vulnerability has been closed. That is how the users who upgrade installed packages on a regular basis will see they need to run an update. Besides, a new package will be built and distributed over FTP and WWW mirrors, replacing the vulnerable one. Bump `PORTREVISION` unless `PORTVERSION` has changed in the course of correcting the vulnerability. That is, bump `PORTREVISION` if adding a patch file to the port, but do not bump it if updating the port to the latest software version and thus already touched `PORTVERSION`. Please refer to the [corresponding section](#) for more information.

11.3. Keeping the Community Informed

11.3.1. The VuXML Database

A very important and urgent step to take as early after a security vulnerability is discovered as possible is to notify the community of port users about the jeopardy. Such notification serves two purposes. First, if the danger is

really severe it will be wise to apply an instant workaround. For example, stop the affected network service or even deinstall the port completely until the vulnerability is closed. Second, a lot of users tend to upgrade installed packages only occasionally. They will know from the notification that they *must* update the package without delay as soon as a corrected version is available.

Given the huge number of ports in the tree, a security advisory cannot be issued on each incident without creating a flood and losing the attention of the audience when it comes to really serious matters. Therefore security vulnerabilities found in ports are recorded in [the FreeBSD VuXML database](#). The Security Officer Team members also monitor it for issues requiring their intervention.

Committers can update the VuXML database themselves, assisting the Security Officer Team and delivering crucial information to the community more quickly. Those who are not committers or have discovered an exceptionally severe vulnerability should not hesitate to contact the Security Officer Team directly, as described on the [FreeBSD Security Information](#) page.

The VuXML database is an XML document. Its source file `vuIn.xml` is kept right inside the port [security/vuxml](#). Therefore the file's full pathname will be `PORTSDIR/security/vuxml/vuIn.xml`. Each time a security vulnerability is discovered in a port, please add an entry for it to that file. Until familiar with VuXML, the best thing to do is to find an existing entry fitting the case at hand, then copy it and use it as a template.

11.3.2. A Short Introduction to VuXML

The full-blown XML format is complex, and far beyond the scope of this book. However, to gain basic insight on the structure of a VuXML entry only the notion of tags is needed. XML tag names are enclosed in angle brackets. Each opening `<tag>` must have a matching closing `</tag>`. Tags may be nested. If nesting, the inner tags must be closed before the outer ones. There is a hierarchy of tags, that is, more complex rules of nesting them. This is similar to HTML. The major difference is that XML is eXtensible, that is, based on defining custom tags. Due to its intrinsic structure XML puts otherwise amorphous data into shape. VuXML is particularly tailored to mark up descriptions of security vulnerabilities.

Now consider a realistic VuXML entry:

```
<vuIn vid="f4bc80f4-da62-11d8-90ea-0004ac98a7b9"> ❶
  <topic>Several vulnerabilities found in Foo</topic> ❷
  <affects>
    <package>
      <name>foo</name> ❸
      <name>foo-devel</name>
      <name>ja-foo</name>
      <range><ge>1.6</ge><lt>1.9</lt></range> ❹
      <range><ge>2.*</ge><lt>2.4_1</lt></range>
      <range><eq>3.0b1</eq></range>
    </package>
    <package>
      <name>openfoo</name> ❺
      <range><lt>1.10_7</lt></range> ❻
      <range><ge>1.2,1</ge><lt>1.3_1,1</lt></range>
    </package>
  </affects>
  <description>
    <body xmlns="http://www.w3.org/1999/xhtml">
      <p>J. Random Hacker reports:</p> ❼
      <blockquote
        cite="http://j.r.hacker.com/advisories/1">
          <p>Several issues in the Foo software may be exploited
            via carefully crafted QUUX requests. These requests will
            permit the injection of Bar code, mumble theft, and the
            readability of the Foo administrator account.</p>
        </blockquote>
      </body>
    </description>
```

```

<references> ❸
  <freebsdlsa>SA-10:75.foo</freebsdlsa> ❹
  <freebsdpr>ports/987654</freebsdpr> ❺
  <cvename>CAN-2010-0201</cvename> ❻
  <cvename>CAN-2010-0466</cvename>
  <bid>96298</bid> ❼
  <certsa>CA-2010-99</certsa> ❽
  <certvu>740169</certvu> ❾
  <uscrtsa>SA10-99A</uscrtsa> ❿
  <uscrtta>SA10-99A</uscrtta> ⓫
  <mlist msgid="201075606@hacker.com">http://marc.theaimsgroup.com/?
l=bugtraq&m=203886607825605</mlist> ⓬
  <url>http://j.r.hacker.com/advisories/1</url> ⓭
</references>
<dates>
  <discovery>2010-05-25</discovery> ⓯
  <entry>2010-07-13</entry> ⓰
  <modified>2010-09-17</modified> ⓱
</dates>
</vuln>

```

The tag names are supposed to be self-explanatory so we shall take a closer look only at fields which needs to be filled in:

- ❶ This is the top-level tag of a VuXML entry. It has a mandatory attribute, `vid`, specifying a universally unique identifier (UUID) for this entry (in quotes). Generate a UUID for each new VuXML entry (and do not forget to substitute it for the template UUID unless writing the entry from scratch). use [uuidgen\(1\)](#) to generate a VuXML UUID.
- ❷ This is a one-line description of the issue found.
- ❸ The names of packages affected are listed there. Multiple names can be given since several packages may be based on a single master port or software product. This may include stable and development branches, localized versions, and slave ports featuring different choices of important build-time configuration options.



Important

It is the submitter's responsibility to find all such related packages when writing a VuXML entry. Keep in mind that `make search name=foo` is helpful. The primary points to look for are:

- the `foo-devel` variant for a `foo` port;
- other variants with a suffix like `-a4` (for print-related packages), `-without-gui` (for packages with X support disabled), or similar;
- `jp-`, `ru-`, `zh-`, and other possible localized variants in the corresponding national categories of the ports collection.

- ❹ Affected versions of the package(s) are specified there as one or more ranges using a combination of `<lt>`, `<le>`, `<eq>`, `<ge>`, and `<gt>` elements. Check that the version ranges given do not overlap.

In a range specification, `*` (asterisk) denotes the smallest version number. In particular, `2.*` is less than `2.a`. Therefore an asterisk may be used for a range to match all possible `alpha`, `beta`, and `RC` versions. For instance, `<ge>2.*</ge><lt>3.*</lt>` will selectively match every `2.x` version while `<ge>2.0</ge><lt>3.0</lt>` will not since the latter misses `2.r3` and matches `3.b`.

The above example specifies that affected are versions from `1.6` to `1.9` inclusive, versions `2.x` before `2.4_1`, and version `3.0b1`.

- ⑤ Several related package groups (essentially, ports) can be listed in the `<affected>` section. This can be used if several software products (say FooBar, FreeBar and OpenBar) grow from the same code base and still share its bugs and vulnerabilities. Note the difference from listing multiple names within a single `<package>` section.
- ⑥ The version ranges have to allow for `PORTEPOCH` and `PORTREVISION` if applicable. Please remember that according to the collation rules, a version with a non-zero `PORTEPOCH` is greater than any version without `PORTEPOCH`, for example, `3.0.1` is greater than `3.1` or even than `8.9`.
- ⑦ This is a summary of the issue. XHTML is used in this field. At least enclosing `<p>` and `</p>` has to appear. More complex mark-up may be used, but only for the sake of accuracy and clarity: No eye candy please.
- ⑧ This section contains references to relevant documents. As many references as apply are encouraged.
- ⑨ This is a [FreeBSD security advisory](#).
- ⑩ This is a [FreeBSD problem report](#).
- ⑪ This is a [MITRE CVE](#) identifier.
- ⑫ This is a [SecurityFocus Bug ID](#).
- ⑬ This is a [US-CERT](#) security advisory.
- ⑭ This is a [US-CERT](#) vulnerability note.
- ⑮ This is a [US-CERT](#) Cyber Security Alert.
- ⑯ This is a [US-CERT](#) Technical Cyber Security Alert.
- ⑰ This is a URL to an archived posting in a mailing list. The attribute `msgid` is optional and may specify the message ID of the posting.
- ⑱ This is a generic URL. Only if none of the other reference categories apply.
- ⑲ This is the date when the issue was disclosed (`YYYY-MM-DD`).
- ⑳ This is the date when the entry was added (`YYYY-MM-DD`).
- ㉑ This is the date when any information in the entry was last modified (`YYYY-MM-DD`). New entries must not include this field. Add it when editing an existing entry.

11.3.3. Testing Changes to the VuXML Database

This example describes a new entry for a vulnerability in the package `dropbear` that has been fixed in version `dropbear-2013.59`.

As a prerequisite, install a fresh version of [security/vuxml](#) port.

First, check whether there already is an entry for this vulnerability. If there were such an entry, it would match the previous version of the package, `2013.58`:

```
% pkg audit dropbear-2013.58
```

If there is none found, add a new entry for this vulnerability.

```
% cd ${PORTSDIR}/security/vuxml
% make newentry
```

Verify its syntax and formatting:

```
% make validate
```



Note

At least one of these packages needs to be installed: [textproc/libxml2](#), [textproc/jade](#).

Verify that the `<affected>` section of the entry will match the correct packages:

```
% pkg audit -f ${PORTSDIR}/security/vuxml/vuln.xml dropbear-2013.58
```

Make sure that the entry produces no spurious matches in the output.

Now check whether the right package versions are matched by the entry:

```
% pkg audit -f ${PORTSDIR}/security/vuxml/vuln.xml dropbear-2013.58 dropbear-2013.59
dropbear-2012.58 is vulnerable:
dropbear -- exposure of sensitive information, DoS
CVE: CVE-2013-4434
CVE: CVE-2013-4421
WWW: http://portaudit.FreeBSD.org/8c9b48d1-3715-11e3-a624-00262d8b701d.html

1 problem(s) in the installed packages found.
```

The former version matches while the latter one does not.

Chapter 12. Dos and Don'ts

12.1. Introduction

Here is a list of common dos and don'ts that are encountered during the porting process. Check the port against this list, but also check ports in the [PR database](#) that others have submitted. Submit any comments on ports as described in [Bug Reports and General Commentary](#). Checking ports in the PR database will both make it faster for us to commit them, and prove that you know what you are doing.

12.2. WRKDIR

Do not write anything to files outside WRKDIR. WRKDIR is the only place that is guaranteed to be writable during the port build (see [installing ports from a CDRom](#) for an example of building ports from a read-only tree). The pkg-* files can be modified by [redefining a variable](#) rather than overwriting the file.

12.3. WRKDIRPREFIX

Make sure the port honors WRKDIRPREFIX. Most ports do not have to worry about this. In particular, when referring to a WRKDIR of another port, note that the correct location is WRKDIRPREFIXPORTSDIR/*subdir/name/work* not PORTSDIR/*subdir/name/work* or .CURDIR/../../*subdir/name/work* or some such.

Also, if defining WRKDIR, make sure to prepend \${WRKDIRPREFIX}\${.CURDIR} in the front.

12.4. Differentiating Operating Systems and OS Versions

Some code needs modifications or conditional compilation based upon what version of FreeBSD Unix it is running under. The preferred way to tell FreeBSD versions apart are the __FreeBSD_version and __FreeBSD__ macros defined in [sys/param.h](#). If this file is not included add the code,

```
#include <sys/param.h>
```

to the proper place in the .c file.

__FreeBSD__ is defined in all versions of FreeBSD as their major version number. For example, in FreeBSD 9.x, __FreeBSD__ is defined to be 9.

```
#if __FreeBSD__ >= 9
#   if __FreeBSD_version >= 901000
/* 9.1+ release specific code here */
#   endif
#endif
```

A complete list of __FreeBSD_version values is available in [Chapter 16, __FreeBSD_version Values](#).

12.5. Writing Something After bsd.port.mk

Do not write anything after the .include <bsd.port.mk> line. It usually can be avoided by including bsd.port.pre.mk somewhere in the middle of the Makefile and bsd.port.post.mk at the end.



Important

Include either the `bsd.port.pre.mk/bsd.port.post.mk` pair or `bsd.port.mk` only; do not mix these two usages.

`bsd.port.pre.mk` only defines a few variables, which can be used in tests in the Makefile, `bsd.port.post.mk` defines the rest.

Here are some important variables defined in `bsd.port.pre.mk` (this is not the complete list, please read `bsd.port.mk` for the complete list).

| Variable | Description |
|-----------|--|
| ARCH | The architecture as returned by <code>uname -m</code> (for example, <code>i386</code>) |
| OPSYS | The operating system type, as returned by <code>uname -s</code> (for example, <code>FreeBSD</code>) |
| OSREL | The release version of the operating system (for example, <code>2.1.5</code> or <code>2.2.7</code>) |
| OSVERSION | The numeric version of the operating system; the same as <code>__FreeBSD_version</code> . |
| LOCALBASE | The base of the “local” tree (for example, <code>/usr/local</code>) |
| PREFIX | Where the port installs itself (see more on PREFIX). |



Note

When `MASTERDIR` is needed, always define it before including `bsd.port.pre.mk`.

Here are some examples of things that can be added after `bsd.port.pre.mk`:

```
# no need to compile lang/perl5 if perl5 is already in system
.if ${OSVERSION} > 300003
BROKEN= perl is in system
.endif
```

Always use tab instead of spaces after `BROKEN=`.

12.6. Use the `exec` Statement in Wrapper Scripts

If the port installs a shell script whose purpose is to launch another program, and if launching that program is the last action performed by the script, make sure to launch the program using the `exec` statement, for instance:

```
#!/bin/sh
exec %%LOCALBASE%/bin/java -jar %%DATADIR%/foo.jar "$@"
```

The `exec` statement replaces the shell process with the specified program. If `exec` is omitted, the shell process remains in memory while the program is executing, and needlessly consumes system resources.

12.7. Do Things Rationally

The Makefile should do things in a simple and reasonable manner. Making it a couple of lines shorter or more readable is always better. Examples include using a `make .if` construct instead of a shell `if` construct, not redefining `do-extract` if redefining `EXTRACT*` is enough, and using `GNU_CONFIGURE` instead of `CONFIGURE_ARGS += --prefix=${PREFIX}`.

If a lot of new code is needed to do something, there may already be an implementation of it in `bsd.port.mk`. While hard to read, there are a great many seemingly-hard problems for which `bsd.port.mk` already provides a shorthand solution.

12.8. Respect Both `cc` and `cxx`

The port must respect both `CC` and `CXX`. What we mean by this is that the port must not set the values of these variables absolutely, overriding existing values; instead, it may append whatever values it needs to the existing values. This is so that build options that affect all ports can be set globally.

If the port does not respect these variables, please add `NO_PACKAGE=ignores` either `cc` or `cxx` to the Makefile.

Here is an example of a Makefile respecting both `CC` and `CXX`. Note the `+=`:

```
CC?= gcc
```

```
CXX?= g++
```

Here is an example which respects neither `CC` nor `CXX`:

```
CC= gcc
```

```
CXX= g++
```

Both `CC` and `CXX` can be defined on FreeBSD systems in `/etc/make.conf`. The first example defines a value if it was not previously set in `/etc/make.conf`, preserving any system-wide definitions. The second example clobbers anything previously defined.

12.9. Respect `CFLAGS`

The port must respect `CFLAGS`. What we mean by this is that the port must not set the value of this variable absolutely, overriding the existing value. Instead, it may append whatever values it needs to the existing value. This is so that build options that affect all ports can be set globally.

If it does not, please add `NO_PACKAGE=ignores` `cflags` to the Makefile.

Here is an example of a Makefile respecting `CFLAGS`. Note the `+=`:

```
CFLAGS+= -Wall -Werror
```

Here is an example which does not respect `CFLAGS`:

```
CFLAGS= -Wall -Werror
```

`CFLAGS` is defined on FreeBSD systems in `/etc/make.conf`. The first example appends additional flags to `CFLAGS`, preserving any system-wide definitions. The second example clobbers anything previously defined.

Remove optimization flags from the third party Makefiles. The system `CFLAGS` contains system-wide optimization flags. An example from an unmodified Makefile:

```
CFLAGS= -O3 -funroll-loops -DHAVE_SOUND
```

Using system optimization flags, the Makefile would look similar to this example:

```
CFLAGS+= -DHAVE_SOUND
```

12.10. Feedback

Do send applicable changes and patches to the upstream maintainer for inclusion in the next release of the code. This makes updating to the next release that much easier.

12.11. README.html

README.html is not part of the port, but generated by `make readme`. Do not include this file in patches or commits.



Note

If `make readme` fails, make sure that the default value of `ECHO_MSG` has not been modified by the port.

12.12. Marking a Port as Architecture Neutral

Ports that do not have any architecture-dependent files or requirements are identified by setting `NO_ARCH=yes`.

12.13. Marking a Port Not Installable with **BROKEN**, **FORBIDDEN**, or **IGNORE**

In certain cases, users must be prevented from installing a port. There are several variables that can be used in a port's `Makefile` to tell the user that the port cannot be installed. The value of these make variables will be the reason that is shown to users for why the port refuses to install itself. Please use the correct make variable. Each variable conveys radically different meanings, both to users and to automated systems that depend on `Makefiles`, such as [the ports build cluster](#), [FreshPorts](#), and [portsmon](#).

12.13.1. Variables

- **BROKEN** is reserved for ports that currently do not compile, install, deinstall, or run correctly. Use it for ports where the problem is believed to be temporary.

If instructed, the build cluster will still attempt to try to build them to see if the underlying problem has been resolved. (However, in general, the cluster is run without this.)

For instance, use **BROKEN** when a port:

- does not compile
- fails its configuration or installation process
- installs files outside of `${PREFIX}`
- does not remove all its files cleanly upon deinstall (however, it may be acceptable, and desirable, for the port to leave user-modified files behind)
- has runtime issues on systems where it is supposed to run fine.
- **FORBIDDEN** is used for ports that contain a security vulnerability or induce grave concern regarding the security of a FreeBSD system with a given port installed (for example, a reputedly insecure program or a program that

provides easily exploitable services). Mark ports as **FORBIDDEN** as soon as a particular piece of software has a vulnerability and there is no released upgrade. Ideally upgrade ports as soon as possible when a security vulnerability is discovered so as to reduce the number of vulnerable FreeBSD hosts (we like being known for being secure), however sometimes there is a noticeable time gap between disclosure of a vulnerability and an updated release of the vulnerable software. Do not mark a port **FORBIDDEN** for any reason other than security.

- **IGNORE** is reserved for ports that must not be built for some other reason. Use it for ports where the problem is believed to be structural. The build cluster will not, under any circumstances, build ports marked as **IGNORE**. For instance, use **IGNORE** when a port:
 - does not work on the installed version of FreeBSD
 - has a distfile which may not be automatically fetched due to licensing restrictions
 - does not work with some other currently installed port (for instance, the port depends on [www/apache20](http://www.apache20) but [www/apache22](http://www.apache22) is installed)



Note

If a port would conflict with a currently installed port (for example, if they install a file in the same place that performs a different function), use **CONFLICTS** instead. **CONFLICTS** will set **IGNORE** by itself.

- To mark a port as **IGNOREd** only on certain architectures, there are two other convenience variables that will automatically set **IGNORE: ONLY_FOR_ARCHS** and **NOT_FOR_ARCHS**. Examples:

```
ONLY_FOR_ARCHS= i386 amd64
```

```
NOT_FOR_ARCHS= ia64 sparc64
```

A custom **IGNORE** message can be set using **ONLY_FOR_ARCHS_REASON** and **NOT_FOR_ARCHS_REASON**. Per architecture entries are possible with **ONLY_FOR_ARCHS_REASON_ARCH** and **NOT_FOR_ARCHS_REASON_ARCH**.

- If a port fetches i386 binaries and installs them, set **IA32_BINARY_PORT**. If this variable is set, `/usr/lib32` must be present for IA32 versions of libraries and the kernel must support IA32 compatibility. If one of these two dependencies is not satisfied, **IGNORE** will be set automatically.

12.13.2. Implementation Notes

Do not quote the values of **BROKEN**, **IGNORE**, and related variables. Due to the way the information is shown to the user, the wording of messages for each variable differ:

```
BROKEN= fails to link with base -lcrypto
```

```
IGNORE= unsupported on recent versions
```

resulting in this output from `make describe`:

```
====>  foobar-0.1 is marked as broken: fails to link with base -lcrypto.
```

```
====>  foobar-0.1 is unsupported on recent versions.
```

12.14. Marking a Port for Removal with **DEPRECATED** or **EXPIRATION_DATE**

Do remember that **BROKEN** and **FORBIDDEN** are to be used as a temporary resort if a port is not working. Permanently broken ports will be removed from the tree entirely.

When it makes sense to do so, users can be warned about a pending port removal with `DEPRECATED` and `EXPIRATION_DATE`. The former is a string stating why the port is scheduled for removal; the latter is a string in ISO 8601 format (YYYY-MM-DD). Both will be shown to the user.

It is possible to set `DEPRECATED` without an `EXPIRATION_DATE` (for instance, recommending a newer version of the port), but the converse does not make any sense.

There is no set policy on how much notice to give. Current practice seems to be one month for security-related issues and two months for build issues. This also gives any interested committers a little time to fix the problems.

12.15. Avoid Use of the `.error` Construct

The correct way for a Makefile to signal that the port cannot be installed due to some external factor (for instance, the user has specified an illegal combination of build options) is to set a non-blank value to `IGNORE`. This value will be formatted and shown to the user by `make install`.

It is a common mistake to use `.error` for this purpose. The problem with this is that many automated tools that work with the ports tree will fail in this situation. The most common occurrence of this is seen when trying to build `/usr/ports/INDEX` (see [Section 9.1, “Running make describe”](#)). However, even more trivial commands such as `make maintainer` also fail in this scenario. This is not acceptable.

Example 12.1. How to Avoid Using `.error`

The first of the next two Makefile snippets will cause `make index` to fail, while the second one will not:

```
.error "option is not supported"
```

```
IGNORE=option is not supported
```

12.16. Usage of `sysctl`

The usage of `sysctl` is discouraged except in targets. This is because the evaluation of any `makevars`, such as used during `make index`, then has to run the command, further slowing down that process.

Only use `sysctl(8)` through `SYSCTL`, as it contains the fully qualified path and can be overridden, if one has such a special need.

12.17. Rerolling Distfiles

Sometimes the authors of software change the content of released distfiles without changing the file's name. Verify that the changes are official and have been performed by the author. It has happened in the past that the distfile was silently altered on the download servers with the intent to cause harm or compromise end user security.

Put the old distfile aside, download the new one, unpack them and compare the content with `diff(1)`. If there is nothing suspicious, update `distinfo`. Be sure to summarize the differences in the PR or commit log, so that other people know that nothing bad has happened.

Contact the authors of the software and confirm the changes with them.

12.18. Use POSIX Standards

FreeBSD ports generally expect POSIX compliance. Some software and build systems make assumptions based on a particular operating system or environment that can cause problems when used in a port.

Do not use `/proc` if there are any other ways of getting the information. For example, `setprogname(argv[0])` in `main()` and then `getprogname(3)` to know the executable name.

Do not rely on behavior that is undocumented by POSIX.

Do not record timestamps in the critical path of the application if it also works without. Getting timestamps may be slow, depending on the accuracy of timestamps in the OS. If timestamps are really needed, determine how precise they have to be and use an API which is documented to just deliver the needed precision.

A number of simple syscalls (for example `gettimeofday(2)`, `getpid(2)`) are much faster on Linux® than on any other operating system due to caching and the vsyscall performance optimizations. Do not rely on them being cheap in performance-critical applications. In general, try hard to avoid syscalls if possible.

Do not rely on Linux®-specific socket behavior. In particular, default socket buffer sizes are different (call `setsockopt(2)` with `SO_SNDBUF` and `SO_RCVBUF`, and while Linux®'s `send(2)` blocks when the socket buffer is full, FreeBSD's will fail and set `ENOBUFS` in `errno`).

If relying on non-standard behavior is required, encapsulate it properly into a generic API, do a check for the behavior in the configure stage, and stop if it is missing.

Check the [man pages](#) to see if the function used is a POSIX interface (in the “STANDARDS” section of the man page).

Do not assume that `/bin/sh` is `bash`. Ensure that a command line passed to `system(3)` will work with a POSIX compliant shell.

A list of common bashisms is available [here](#).

Check that headers are included in the POSIX or man page recommended way. For example, `sys/types.h` is often forgotten, which is not as much of a problem for Linux® as it is for FreeBSD.

12.19. Miscellanea

Always double-check `pkg-descr` and `pkg-plist`. If reviewing a port and a better wording can be achieved, do so.

Do not copy more copies of the GNU General Public License into our system, please.

Please be careful to note any legal issues! Do not let us illegally distribute software!

Chapter 13. A Sample Makefile

Here is a sample Makefile that can be used to create a new port. Make sure to remove all the extra comments (ones between brackets).

The format shown is the recommended one for ordering variables, empty lines between sections, and so on. This format is designed so that the most important information is easy to locate. We recommend using [portlint](#) to check the Makefile.

```
[the header...just to make it easier for us to identify the ports.-]
# Created by: Satoshi Asami <asami@FreeBSD.org>
[The optional Created by: line names the person who originally
created the port. Note that the ":" is followed by a space
and not a tab character.
If this line is present, future maintainers must
not change or remove it except at the original author's request.-]

# $FreeBSD$
[ ^^^^^^^ This will be automatically replaced with RCS ID string by SVN
when it is committed to our repository. If upgrading a port, do not alter
this line back to "$FreeBSD$". SVN deals with it automatically.-]

[section to describe the port itself and the master site - PORTNAME
and PORTVERSION are always first, followed by CATEGORIES,
and then MASTER_SITES, which can be followed by MASTER_SITE_SUBDIR.
PKGNAMEPREFIX and PKGNAME_SUFFIX, if needed, will be after that.
Then comes DISTNAME, EXTRACT_SUFX and/or DISTFILES, and then
EXTRACT_ONLY, as necessary.-]
PORTNAME= xdvi
PORTVERSION= 18.2
CATEGORIES= print
[do not forget the trailing slash ("/")!
if not using MASTER_SITE * macros]
MASTER_SITES= ${MASTER_SITE_XCONTRIB}
MASTER_SITE_SUBDIR= applications
PKGNAMEPREFIX= ja-
DISTNAME= xdvi-pl18
[set this if the source is not in the standard ".tar.gz" form]
EXTRACT_SUFX= .tar.Z

[section for distributed patches -- can be empty]
PATCH_SITES= ftp://ftp.sra.co.jp/pub/X11/japanese/
PATCHFILES= xdvi-18.patch1.gz xdvi-18.patch2.gz

[maintainer; *mandatory*! This is the person who is volunteering to
handle port updates, build breakages, and to whom a users can direct
questions and bug reports. To keep the quality of the Ports Collection
as high as possible, we no longer accept new ports that are assigned to
"ports@FreeBSD.org".-]
MAINTAINER= asami@FreeBSD.org
COMMENT= DVI Previewer for the X Window System

[dependencies -- can be empty]
RUN_DEPENDS= gs:print/ghostscript

[this section is for other standard bsd.port.mk variables that do not
belong to any of the above]
[If it asks questions during configure, build, install...-]
IS_INTERACTIVE= yes
[If it extracts to a directory other than ${DISTNAME}...-]
WRKSRCS= ${WRKDIR}/xdvi-new
[If the distributed patches were not made relative to ${WRKSRCS},
this may need to be tweaked]
PATCH_DIST_STRIP= -pl
```

```
[If it requires a "configure" script generated by GNU autoconf to be run]
GNU_CONFIGURE= yes
[If it requires GNU make, not /usr/bin/make, to build...-]
USES= gmake
[If it is an X application and requires "xmkmf -a" to be run...-]
USES= imake
[et cetera.-]

[non-standard variables to be used in the rules below]
MY_FAVORITE_RESPONSE= "yeah, right"

[then the special rules, in the order they are called]
pre-fetch:
    i go fetch something, yeah

post-patch:
    i need to do something after patch, great

pre-install:
    and then some more stuff before installing, wow

[and then the epilogue]

.include <bsd.port.mk>
```

Chapter 14. Keeping Up

The FreeBSD Ports Collection is constantly changing. Here is some information on how to keep up.

14.1. FreshPorts

One of the easiest ways to learn about updates that have already been committed is by subscribing to [FreshPorts](#). Multiple ports can be monitored. Maintainers are strongly encouraged to subscribe, because they will receive notification of not only their own changes, but also any changes that any other FreeBSD committer has made. (These are often necessary to keep up with changes in the underlying ports framework—although it would be most polite to receive an advance heads-up from those committing such changes, sometimes this is overlooked or impractical. Also, in some cases, the changes are very minor in nature. We expect everyone to use their best judgement in these cases.)

To use FreshPorts, an account is required. Those with registered email addresses at [@FreeBSD.org](#) will see the opt-in link on the right-hand side of the web pages. Those who already have a FreshPorts account but are not using a [@FreeBSD.org](#) email address can change the email to [@FreeBSD.org](#), subscribe, then change it back again.

FreshPorts also has a sanity test feature which automatically tests each commit to the FreeBSD ports tree. If subscribed to this service, a committer will receive notifications of any errors which FreshPorts detects during sanity testing of their commits.

14.2. The Web Interface to the Source Repository

It is possible to browse the files in the source repository by using a web interface. Changes that affect the entire port system are now documented in the [CHANGES](#) file. Changes that affect individual ports are now documented in the [UPDATING](#) file. However, the definitive answer to any question is undoubtedly to read the source code of [bsd.port.mk](#), and associated files.

14.3. The FreeBSD Ports Mailing List

As a ports maintainer, consider subscribing to [FreeBSD ports mailing list](#). Important changes to the way ports work will be announced there, and then committed to [CHANGES](#).

If the volume of messages on this mailing list is too high, consider following [FreeBSD ports announce mailing list](#) which contains only announcements.

14.4. The FreeBSD Port Building Cluster

One of the least-publicized strengths of FreeBSD is that an entire cluster of machines is dedicated to continually building the Ports Collection, for each of the major OS releases and for each Tier-1 architecture.

Individual ports are built unless they are specifically marked with `IGNORE`. Ports that are marked with `BROKEN` will still be attempted, to see if the underlying problem has been resolved. (This is done by passing `TRYBROKEN` to the port's `Makefile`.)

14.5. Portscout: the FreeBSD Ports Distfile Scanner

The build cluster is dedicated to building the latest release of each port with distfiles that have already been fetched. However, as the Internet continually changes, distfiles can quickly go missing. [Portscout](#), the FreeBSD Ports distfile

scanner, attempts to query every download site for every port to find out if each distfile is still available. Portscout can generate HTML reports and send emails about newly available ports to those who request them. Unless not otherwise subscribed, maintainers are asked to check periodically for changes, either by hand or using the RSS feed.

Portscout's first page gives the email address of the port maintainer, the number of ports the maintainer is responsible for, the number of those ports with new distfiles, and the percentage of those ports that are out-of-date. The search function allows for searching by email address for a specific maintainer, and for selecting whether only out-of-date ports are shown.

Upon clicking on a maintainer's email address, a list of all of their ports is displayed, along with port category, current version number, whether or not there is a new version, when the port was last updated, and finally when it was last checked. A search function on this page allows the user to search for a specific port.

Clicking on a port name in the list displays the [FreshPorts](#) port information.

14.6. The FreeBSD Ports Monitoring System

Another handy resource is the [FreeBSD Ports Monitoring System](#) (also known as `portsmon`). This system comprises a database that processes information from several sources and allows it to be browsed via a web interface. Currently, the ports Problem Reports (PRs), the error logs from the build cluster, and individual files from the ports collection are used. In the future, this will be expanded to include the distfile survey, as well as other sources.

To get started, use the [Overview of One Port](#) search page to find all the information about a port.

This is the only resource available that maps PR entries to portnames. PR submitters do not always include the portname in their Synopsis, although we would prefer that they did. So, `portsmon` is a good place to find out whether an existing port has any PRs filed against it, any build errors, or if a new port the porter is considering creating has already been submitted.

Chapter 15. Using USES Macros

15.1. An Introduction to USES

USES macros make it easy to declare requirements and settings for a port. They can add dependencies, change building behavior, add metadata to packages, and so on, all by selecting simple, preset values..

Each section in this chapter describes a possible value for USES, along with its possible arguments. Arguments are appended to the value after a colon (:). Multiple arguments are separated by commas (,).

Example 15.1. Using Multiple Values

```
USES= bison perl
```

Example 15.2. Adding an Argument

```
USES= gmake:lite
```

Example 15.3. Adding Multiple Arguments

```
USES= drupal:7,theme
```

Example 15.4. Mixing it All Together

```
USES= pgsq1:9.3+ cpe python:2.7,build
```

15.2. 7z

Possible arguments: (none), p7zip, partial

Extract using [7z\(1\)](#) instead of [bsdtar\(1\)](#) and sets `EXTRACT_SUFX=.7z`. The p7zip option forces a dependency on the 7z from [archivers/p7zip](#) if the one from the base system is not able to extract the files. `EXTRACT_SUFX` is not changed if the partial option is used, this can be used if the main distribution file does not have a `.7z` extension.

15.3. ada

Possible arguments: (none), 5, 6

Depends on an Ada-capable compiler, and sets CC accordingly. Defaults to use gcc 5 from ports. Use the `:X` version option to force building with a different version.

15.4. autoreconf

Possible arguments: (none), build

Runs autoreconf. It encapsulates the `aclocal`, `autoconf`, `autoheader`, `automake`, `autopoint`, and `libtoolize` commands. Each command applies to `${AUTORECONF_WKSRCSRC}/configure.ac` or its old name, `${AUTORECONF_WKSRCSRC}/configure.in`. If `configure.ac` defines subdirectories with their own `configure.ac` using `AC_CONFIG_SUBDIRS`, autoreconf will recursively update those as well. The `:build` argument only adds build time dependencies on those tools but does not run autoreconf. A port can set `AUTORECONF_WKSRCSRC` if `WKSRCSRC` does not contain the path to `configure.ac`.

15.5. blaslapack

Possible arguments: (none), atlas, netlib (default), gotoblas, openblas

Adds dependencies on Blas / Lapack libraries.

15.6. bdb

Possible arguments: (none), 48, 5 (default), 6

Add dependency on the Berkeley DB library. Default to [databases/db5](#). It can also depend on [databases/db48](#) when using the `:48` argument or [databases/db6](#) with `:6`. It is possible to declare a range of acceptable values, `:48+` finds the highest installed version, and falls back to 4.8 if nothing else is installed. `INVALID_BDB_VER` can be used to specify versions which do not work with this port. The framework exposes the following variables to the port:

BDB_LIB_NAME

The name of the Berkeley DB library. For example, when using [databases/db5](#), it contains `db-5.3`.

BDB_LIB_CXX_NAME

The name of the Berkeley DB C++ library. For example, when using [databases/db5](#), it contains `db_cxx-5.3`.

BDB_INCLUDE_DIR

The location of the Berkeley DB include directory. For example, when using [databases/db5](#), it will contain `${LOCALBASE}/include/db5`.

BDB_LIB_DIR

The location of the Berkeley DB library directory. For example, when using [databases/db5](#), it contains `${LOCALBASE}/lib`.

BDB_VER

The detected Berkeley DB version. For example, if using `USES=bdb:48+` and Berkeley DB 5 is installed, it contains 5.



Important

[databases/db48](#) is deprecated and unsupported. It must not be used by any port.

15.7. bison

Possible arguments: (none), build, run, both

Uses [devel/bison](#) By default, with no arguments or with the `build` argument, it implies `bison` is a build-time dependency, `run` implies a run-time dependency, and `both` implies both run-time and build-time dependencies.

15.8. charsetfix

Possible arguments: (none)

Prevents the port from installing `charset.alias`. This must be installed only by [converters/libiconv](#). `CHARSET-FIX_MAKEFILEIN` can be set to a path relative to `WRKSRC` if `charset.alias` is not installed by `${WRKSRC}/Makefile.in`.

15.9. cmake

Possible arguments: (none), outsource, run

Uses CMake for configuring and building. With the `outsource` argument, an out-of-source build will be performed. With the `run` argument, a run-time dependency is registered. For more information see [Section 6.5.4, “Using cmake”](#).

15.10. compiler

Possible arguments: (none), `c++14-lang`, `c++11-lang`, `gcc-c++11-lib`, `c++11-lib`, `c++0x`, `c11`, `openmp`, `nested-fct`, `features`

Determines which compiler to use based on any given wishes. Use `c++14-lang` if the port needs a C++14-capable compiler, `gcc-c++11-lib` if the port needs the `g++` compiler with a C++11 library, or `c++11-lib` if the port needs a C++11-ready standard library. If the port needs a compiler understanding C++11, C++0X, C11, OpenMP, or nested functions, the corresponding parameters can be used. Use `features` to request a list of features supported by the default compiler. After including `bsd.port.pre.mk` the port can inspect the results using these variables:

- `COMPILER_TYPE`: the default compiler on the system, either `gcc` or `clang`
- `ALT_COMPILER_TYPE`: the alternative compiler on the system, either `gcc` or `clang`. Only set if two compilers are present in the base system.
- `COMPILER_VERSION`: the first two digits of the version of the default compiler.
- `ALT_COMPILER_VERSION`: the first two digits of the version of the alternative compiler, if present.
- `CHOSEN_COMPILER_TYPE`: the chosen compiler, either `gcc` or `clang`
- `COMPILER_FEATURES`: the features supported by the default compiler. It currently lists the C++ library.

15.11. cpe

Possible arguments: (none)

Include Common Platform Enumeration (CPE) information in package manifest as a CPE 2.3 formatted string. See the [CPE specification](#) for details. To add CPE information to a port, follow these steps:

1. Search for the official CPE para for the software product either by using the NVD's [CPE search engine](#) or in the [official CPE dictionary](#) (warning, very large XML file). *Do not ever make up CPE data.*

2. Add `cpe` to `USES` and compare the result of `make -V CPE_STR` to the CPE dictionary para. Continue one step at a time until `make -V CPE_STR` is correct.
3. If the product name (second field, defaults to `PORTNAME`) is incorrect, define `CPE_PRODUCT`.
4. If the vendor name (first field, defaults to `CPE_PRODUCT`) is incorrect, define `CPE_VENDOR`.
5. If the version field (third field, defaults to `PORTVERSION`) is incorrect, define `CPE_VERSION`.
6. If the update field (fourth field, defaults to empty) is incorrect, define `CPE_UPDATE`.
7. If it is still not correct, check `Mk/Uses/cpe.mk` for additional details, or contact the Ports Security Team <port-ssecteam@FreeBSD.org>.
8. Derive as much as possible of the CPE name from existing variables such as `PORTNAME` and `PORTVERSION`. Use variable modifiers to extract the relevant portions from these variables rather than hardcoding the name.
9. Always run `make -V CPE_STR` and check the output before committing anything that changes `PORTNAME` or `PORTVERSION` or any other variable which is used to derive `CPE_STR`.

15.12. `cran`

Possible arguments: (none), `auto-plist`

Uses the Comprehensive R Archive Network. Specify `auto-plist` to automatically generate `pkg-plist`.

15.13. `desktop-file-utils`

Possible arguments: (none)

Uses `update-desktop-database` from [devel/desktop-file-utils](#). An extra post-install step will be run without interfering with any post-install steps already in the port Makefile. A line with `@desktop-file-utils` will be added to the `plist`.

15.14. `desthack`

Possible arguments: (none)

Changes the behavior of GNU `configure` to properly support `DESTDIR` in case the original software does not.

15.15. `display`

Possible arguments: (none), `ARGS`

Set up a virtual display environment. If the environment variable `DISPLAY` is not set, then `Xvfb` is added as a build dependency, and `CONFIGURE_ENV` is extended with the port number of the currently running instance of `Xvfb`. The `ARGS` parameter defaults to `install` and controls the phase around which to start and stop the virtual display.

15.16. `dos2unix`

Possible arguments: (none)

The port has files with line endings in DOS format which need to be converted. Several variables can be set to control which files will be converted. The default is to convert *all* files, including binaries. See [Section 4.4.3, “Simple Automatic Replacements”](#) for examples.

- `DOS2UNIX_REGEX` : match file names based on a regular expression.
- `DOS2UNIX_FILES` : match literal file names.
- `DOS2UNIX_GLOB` : match file names based on a glob pattern.
- `DOS2UNIX_WKSR` : the directory from which to start the conversions. Defaults to `$(WKSR)` .

15.17. drupal

Possible arguments: 6, 7, module, theme

Automate installation of a port that is a Drupal theme or module. Use with the version of Drupal that the port is expecting. For example, `USES=drupal:6,module` says that this port creates a Drupal 6 module. A Drupal 7 theme can be specified with `USES=drupal:7,theme`.

15.18. execinfo

Possible arguments: (none)

Add a library dependency on [devel/libexecinfo](#) if `libexecinfo.so` is not present in the base system.

15.19. fakeroot

Possible arguments: (none)

Changes some default behavior of build systems to allow installing as a user. See <http://fakeroot.alioth.debian.org/> for more information on `fakeroot`.

15.20. fam

Possible arguments: (none), fam, gamin

Uses a File Alteration Monitor as a library dependency, either [devel/fam](#) or [devel/gamin](#). End users can set `WITH_FAM_SYSTEM` to specify their preference.

15.21. firebird

Possible arguments: (none), 25

Add a dependency to the client library of the Firebird database.

15.22. fmake

Possible arguments: (none)

Uses [devel/fmake](#) as a build-time dependency.

15.23. fonts

Possible arguments: (none), fc, fcfontsdir (default), fontsdir, none

Adds a runtime dependency on tools needed to register fonts. Depending on the argument, add a [@fc](#) `${FONTSDIR}` line, [@fcfontsdir](#) `${FONTSDIR}` line, [@fontsdir](#) `${FONTSDIR}` line, or no line if the argument is none, to the plist. `FONTS` defaults to `${PREFIX}/share/fonts/${FONTNAME}` and `FONTNAME` to `${PORTNAME}`. Add `FONTS` to `PLIST_SUB` and `SUB_LIST`

15.24. fortran

Possible arguments: gcc (default)

Uses the GNU Fortran compiler.

15.25. fuse

Possible arguments: (none)

The port will depend on the FUSE library and handle the dependency on the kernel module depending on the version of FreeBSD.

15.26. gecko

Possible arguments: libxul (default), firefox, seamonkey, thunderbird, build, *XY*, *XY+*

Add a dependency on different gecko based applications. If `libxul` is used, it is the only argument allowed. When the argument is not `libxul`, the `firefox`, `seamonkey`, or `thunderbird` arguments can be used, along with optional `build` and *XY*/*XY+* version arguments.

15.27. gem

Possible arguments: (none), noautoplist

Handle building with RubyGems. If `noautoplist` is used, the packing list is not generated automatically.

15.28. gettext

Possible arguments: (none)

Deprecated. Will include both [gettext-runtime](#) and [gettext-tools](#).

15.29. gettext-runtime

Possible arguments: (none), lib (default), build, run

Uses [devel/gettext-runtime](#). By default, with no arguments or with the `lib` argument, implies a library dependency on `libintl.so`. `build` and `run` implies, respectively a build-time and a run-time dependency on `gettext`.

15.30. gettext-tools

Possible arguments: (none), build (default), run

Uses [devel/gettext-tools](#). By default, with no argument, or with the `build` argument, a build time dependency on `msgfmt` is registered. With the `run` argument, a run-time dependency is registered.

15.31. ghostscript

Possible arguments: *X*, build, run, nox11

A specific version *X* can be used. Possible versions are 7, 8, 9, and agpl (default). nox11 indicates that the -nox11 version of the port is required. build and run add build- and run-time dependencies on Ghostscript. The default is both build- and run-time dependencies.

15.32. gmake

Possible arguments: (none), lite

Uses [devel/gmake](#), or [devel/gmake-lite](#) if the lite argument is used, as a build-time dependency and sets up the environment to use gmake as the default make for the build.

15.33. gnome

Possible arguments: (none)

Provides an easy way to depend on GNOME components. The components should be listed in USE_GNOME. The available components are:

- atk
- atkmm
- atspi
- cairo
- cairomm
- dconf
- esound
- evolutiondataserver3
- gal2
- gconf2
- gconfmm26
- gdkpixbuf
- gdkpixbuf2
- glib12
- glib20
- glibmm
- gnomecontrolcenter3
- gnomedesktop3
- gnomedocutils

- gnomemenu3
- gnomemimedata
- gnomeprefix
- gnomesharp20
- gnomespeech
- gnomevfs2
- gsound
- gtk-update-icon-cache
- gtk12
- gtk20
- gtk30
- gtkhtml3
- gtkhtml4
- gtkmm20
- gtkmm24
- gtkmm30
- gtksharp10
- gtksharp20
- gtksourceview
- gtksourceview2
- gtksourceview3
- gtksourceviewmm3
- gvfs
- intlhack
- intltool
- introspection
- libartlgpl2
- libbonobo
- libbonoboui
- libgda4
- libgda5
- libgda5-ui

- libgdamm
- libgdamm5
- libglade2
- libgnome
- libgnomecanvas
- libgnomekbd
- libgnomeprint
- libgnomeprintui
- libgnomeui
- libgsf
- libgtkhtml
- libgtksourceviewmm
- libidl
- librsvg2
- libsigc++12
- libsigc++20
- libwnck
- libwnck3
- libxml++26
- libxml2
- libxslt
- metacity
- nautilus3
- orbit2
- pango
- pangomm
- pangox-compat
- py3gobject3
- pygnome2
- pygobject
- pygobject3
- pygtk2
- pygtksourceview

- referencehack
- vte
- vte3

The default dependency is build- and run-time, it can be changed with `:build` or `:run`. For example:

```
USES=  gnome
USE_GNOME= gnomemenu3:build intlhack
```

See [Section 6.10, “Using GNOME”](#) for more information.

15.34. go

Possible arguments: (none)

Sets default values and targets used to build Go software. A build-time dependency on [lang/go](#) is added. The build process is controlled by several variables:

GO_PKGNAME

The name of the Go package. This is the directory that will be created in `GOPATH/src`. The default value is `${PORTNAME}`.

GO_TARGET

The name of the packages to build. The default value is `${GO_PKGNAME}`.

CGO_CFLAGS

Additional CFLAGS values to be passed to the C compiler by go.

CGO_LDFLAGS

Additional LDFLAGS values to be passed to the C compiler by go.

15.35. gperf

Possible arguments: (none)

Add a buildtime dependency on [devel/gperf](#) if `gperf` is not present in the base system.

15.36. gssapi

Possible arguments: (none), `base` (default), `heimdal`, `mit`, `flags`, `bootstrap`

Handle dependencies needed by consumers of the GSS-API. Only libraries that provide the Kerberos mechanism are available. By default, or set to `base`, the GSS-API library from the base system is used. Can also be set to `heimdal` to use [security/heimdal](#), or `mit` to use [security/krb5](#).

When the local Kerberos installation is not in `LOCALBASE`, set `HEIMDAL_HOME` (for `heimdal`) or `KRB5_HOME` (for `krb5`) to the location of the Kerberos installation.

These variables are exported for the ports to use:

- GSSAPIBASEDIR
- GSSAPICPPFLAGS
- GSSAPIINCDIR

- GSSAPILDFLAGS
- GSSAPILIBDIR
- GSSAPILIBS
- GSSAPI_CONFIGURE_ARGS

The `flags` option can be given alongside `base`, `heimdal`, or `mit` to automatically add `GSSAPICPPFLAGS`, `GSSAPILDFLAGS`, and `GSSAPILIBS` to `CFLAGS`, `LD_FLAGS`, and `LDADD`, respectively. For example, use `base,flags`.

The `bootstrap` option is a special prefix only for use by [security/krb5](#) and [security/heimdal](#). For example, use `bootstrap,mit`.

Example 15.5. Typical Use

```
OPTIONS_SINGLE= GSSAPI
OPTIONS_SINGLE_GSSAPI= GSSAPI_BASE GSSAPI_HEIMDAL GSSAPI_MIT GSSAPI_NONE

GSSAPI_BASE_USES= gssapi
GSSAPI_BASE_CONFIGURE_ON= --with-gssapi=${GSSAPIBASEDIR} ${GSSAPI_CONFIGURE_ARGS}
GSSAPI_HEIMDAL_USES= gssapi:heimdal
GSSAPI_HEIMDAL_CONFIGURE_ON= --with-gssapi=${GSSAPIBASEDIR} ⌘
${GSSAPI_CONFIGURE_ARGS}
GSSAPI_MIT_USES= gssapi:mit
GSSAPI_MIT_CONFIGURE_ON= --with-gssapi=${GSSAPIBASEDIR} ${GSSAPI_CONFIGURE_ARGS}
GSSAPI_NONE_CONFIGURE_ON= --without-gssapi
```

15.37. horde

Possible arguments: (none)

Add buildtime and runtime dependencies on [devel/pear-channel-horde](#). Other Horde dependencies can be added with `USE_HORDE_BUILD` and `USE_HORDE_RUN`. See [Section 6.15.4.1, “Horde Modules”](#) for more information.

15.38. iconv

Possible arguments: (none), `lib`, `build`, `patch`, `translit`, `wchar_t`

Uses `iconv` functions, either from the port [converters/libiconv](#) as a build-time and run-time dependency, or from the base system on 10-CURRENT after a native `iconv` was committed in [254273](#). By default, with no arguments or with the `lib` argument, implies `iconv` with build-time and run-time dependencies. `build` implies a build-time dependency, and `patch` implies a patch-time dependency. If the port uses the `WCHAR_T` or `//TRANSLIT` `iconv` extensions, add the relevant arguments so that the correct `iconv` is used. For more information see [Section 6.23, “Using iconv”](#).

15.39. imake

Possible arguments: (none), `env`, `notall`, `noman`

Add [devel/imake](#) as a build-time dependency and run `xmkmf -a` during the configure stage. If the `env` argument is given, the configure target is not set. If the `-a` flag is a problem for the port, add the `notall` argument. If `xmkmf` does not generate a `install.man` target, add the `noman` argument.

15.40. kmod

Possible arguments: (none)

Fills in the boilerplate for kernel module ports, currently:

- Add `kld` to `CATEGORIES`.
- Set `SSP_UNSAFE` .
- Set `IGNORE` if the kernel sources are not found in `SRC_BASE`.
- Define `KMODDIR` to `/boot/modules` by default, add it to `PLIST_SUB` and `MAKE_ENV` , and create it upon installation. If `KMODDIR` is set to `/boot/kernel` , it will be rewritten to `/boot/modules` . This prevents breaking packages when upgrading the kernel due to `/boot/kernel` being renamed to `/boot/kernel.old` in the process.
- Handle cross-referencing kernel modules upon installation and deinstallation, using [@kld](#).

15.41. lha

Possible arguments: (none)

Set `EXTRACT_SUFX` to `.lzh`

15.42. libarchive

Possible arguments: (none)

Registers a dependency on [archivers/libarchive](#). Any ports depending on `libarchive` must include `USES=libarchive` .

15.43. libedit

Possible arguments: (none)

Registers a dependency on [devel/libedit](#). Any ports depending on `libedit` must include `USES=libedit`.

15.44. libtool

Possible arguments: (none), `keepla`, `build`

Patches `libtool` scripts. This must be added to all ports that use `libtool` . The `keepla` argument can be used to keep `.la` files. Some ports do not ship with their own copy of `libtool` and need a build time dependency on [devel/libtool](#), use the `:build` argument to add such dependency.

15.45. localbase

Possible arguments: (none)

Ensures that libraries from dependencies in `LOCALBASE` are used instead of the ones from the base system. Ports that depend on libraries that are also present in the base system should use this. It is also used internally by a few other `USES`.

15.46. lua

Possible arguments: (none), *XY*+, *XY*, build, run

Adds a dependency on Lua. By default this is a library dependency, unless overridden by the build or run option. The default version is 5.2, unless set by the *XY* parameter (for example, 51 or 52+).

15.47. makeinfo

Possible arguments: (none)

Add a build-time dependency on makeinfo if it is not present in the base system.

15.48. makeself

Possible arguments: (none)

Indicates that the distribution files are makeself archives and sets the appropriate dependencies.

15.49. mate

Possible arguments: (none)

Provides an easy way to depend on MATE components. The components should be listed in `USE_MATE`. The available components are:

- autogen
- caja
- common
- controlcenter
- desktop
- dialogs
- docutils
- icontheme
- intlhack
- intltool
- libmatekbd
- libmateweather
- marco
- menus
- notificationdaemon
- panel

- `pluma`
- `polkit`
- `settingsdaemon`

The default dependency is build- and run-time, it can be changed with `:build` or `:run`. For example:

```
USES= mate
USE_MATE= menus:build intlhack
```

15.50. `metaport`

Possible arguments: (none)

Sets the following variables to make it easier to create a metaport: `MASTER_SITES`, `DISTFILES`, `EXTRACT_ONLY`, `NO_BUILD`, `NO_INSTALL`, `NO_MTREE`, `NO_ARCH`.

15.51. `mysql`

Possible arguments: (none), *version*, *client* (default), *server*, *embedded*

Provide support for MySQL. If no version is given, try to find the current installed version. Fall back to the default version, MySQL-5.6. The possible versions are 55, 55m, 55p, 56, 56p, 57, 100m, and 101m. The m and p suffixes are for the MariaDB and Percona variants of MySQL. *server* and *embedded* add a build- and run-time dependency on the MySQL server. When using *server* or *embedded*, add *client* to also add a dependency on `libmysqlclient.so`. A port can set `IGNORE_WITH_MYSQL` if some versions are not supported.

The framework sets `MYSQL_VER` to the detected MySQL version.

15.52. `mono`

Possible arguments: (none)

Adds a dependency on the Mono (currently only C#) framework by setting the appropriate dependencies.

15.53. `motif`

Possible arguments: (none)

Uses [x11-toolkits/open-motif](#) as a library dependency. End users can set `WANT_LESSTIF` for the dependency to be on [x11-toolkits/lesstif](#) instead of [x11-toolkits/open-motif](#).

15.54. `ncurses`

Possible arguments: (none), *base*, *port*

Uses ncurses, and causes some useful variables to be set.

15.55. `ninja`

Possible arguments: (none)

Uses `ninja` to build the port. End users can set `NINJA_VERBOSE` for verbose output.

15.56. `objc`

Possible arguments: (none)

Add objective C dependencies (compiler, runtime library) if the base system does not support it.

15.57. `openal`

Possible arguments: `al`, `soft` (default), `si`, `alut`

Uses OpenAL. The backend can be specified, with the software implementation as the default. The user can specify a preferred backend with `WANT_OPENAL`. Valid values for this knob are `soft` (default) and `si`.

15.58. `pathfix`

Possible arguments: (none)

Look for `Makefile.in` and configure in `PATHFIX_WKSRRC` (defaults to `WKSRRC`) and fix common paths to make sure they respect the FreeBSD hierarchy. If the port uses `automake`, set `PATHFIX_MAKEFILEIN` to `Makefile.am` if needed.

If the port `USES=cmake` it will look for `CMakeLists.txt` in `PATHFIX_WKSRRC`. If needed, that default filename can be changed with `PATHFIX_CMAKELISTSTXT`.

15.59. `pear`

Possible arguments: (none)

Adds a dependency on `devel/pear`. It will setup default behavior for software using the PHP Extension and Application Repository. See [Section 6.15.4, “PEAR Modules”](#) for more information.

15.60. `perl5`

Possible arguments: (none)

Depends on Perl. These variables can be set:

- `PERL_VERSION`: Full version of Perl to use, or the default if not set
- `PERL_ARCH`: Directory name of architecture dependent libraries, defaults to `mach`
- `PERL_PORT`: Name of the Perl port to be installed, the default is derived from `PERL_VERSION`
- `SITE_PERL` : Directory name for site specific Perl packages
- `USE_PERL5`: Phases in which to use Perl, can be `extract`, `patch`, `build`, `install`, or `run`. It can also be `configure`, `modbuild`, or `modbuildtiny` when `Makefile.PL`, `Build.PL`, or the `Module::Build::Tiny` flavor of `Build.PL` is required. It defaults to `build run`.

15.61. `pgsql`

Possible arguments: (none), `X`, `Y`, `X.Y`, `Y+`, `X.Y-`

Provide support for PostgreSQL. Maintainer can set version required. Minimum and maximum versions can be specified; for example, 9.0-, 8.4+.

Add PostgreSQL component dependency, using `WANT_PGSQL=component[:target]`. for example, `WANT_PGSQL=server:configure pltcl plperl` For the full list use `make -V _USE_PGSQL_DEP`.

15.62. php

Possible arguments: (none), `phpize`, `ext`, `zend`, `build`, `cli`, `cgi`, `mod`, `web`, `embed`

Provide support for PHP. Add a runtime dependency on the default PHP version, [lang/php56](#).

`phpize`

Use to build a PHP extension.

`ext`

Use to build, install and register a PHP extension.

`zend`

Use to build, install and register a Zend extension.

`build`

Set PHP also as a build-time dependency.

`cli`

Needs the CLI version of PHP.

`cgi`

Needs the CGI version of PHP.

`mod`

Needs the Apache module for PHP.

`web`

Needs the Apache module or the CGI version of PHP.

`embed`

Needs the embedded library version of PHP.

Variables are used to specify which PHP modules are required, as well as which version of PHP are supported.

`USE_PHP`

The list of required PHP extensions at run-time. Add `:build` to the extension name to add a build-time dependency. Example: `pcre xml:build gettext`

`DEFAULT_PHP_VER`

Selects which major version of PHP will be installed as a dependency when no PHP is installed yet. Default is 56. Possible values: 55, 56, and 7.

`IGNORE_WITH_PHP`

The port does not work with PHP of the given version. Possible values: 55, 56, and 7.

15.63. pkgconfig

Possible arguments: (none), `build` (default), `run`, `both`

Uses [devel/pkgconf](#). With no arguments or with the `build` argument, it implies `pkg-config` as a build-time dependency. `run` implies a run-time dependency and `both` implies both run-time and build-time dependencies.

15.64. `pure`

Possible arguments: `(none)`, `ffi`

Uses [lang/pure](#). Largely used for building related pure ports. With the `ffi` argument, it implies [devel/pure-ffi](#) as a run-time dependency.

15.65. `pyqt`

Possible arguments: `(none)`, `4`, `5`

Uses PyQt. If the port is part of PyQt itself, set `PYQT_DIST`. Use `USE_PYQT` to select the components the port needs. The available components are:

- `core`
- `dbus`
- `dbussupport`
- `demo`
- `designer`
- `designerplugin`
- `doc`
- `gui`
- `multimedia`
- `network`
- `opengl`
- `qscintilla2`
- `sip`
- `sql`
- `svg`
- `test`
- `webkit`
- `xml`
- `xmlpatterns`

These components are only available with PyQt4:

- `assistant`
- `declarative`
- `help`
- `phonon`
- `script`

- scripttools

These components are only available with PyQt5:

- multimediacomponents
- printsupport
- qml
- serialport
- webkitwidgets
- widgets

The default dependency for each component is build- and run-time, to select only build or run, add `_build` or `_run` to the component name. For example:

```
USES= pyqt
USE_PYQT= core doc_build designer_run
```

15.66. python

Possible arguments: (none), *X.Y*, *X.Y+*, *-X.Y*, *X.Y-Z.A*, build, run, test

Uses Python. A supported version or version range can be specified. If Python is only needed at build time, run time or for the tests, it can be set as a build, run or test dependency with build, run, or test. See [Section 6.16, “Using Python”](#) for more information.

15.67. qmail

Possible arguments: (none), build, run, both, vars

Uses [mail/qmail](#). With the build argument, it implies qmail as a build-time dependency. run implies a run-time dependency. Using no argument or the both argument implies both run-time and build-time dependencies. vars will only set QMAIL variables for the port to use.

15.68. qmake

Possible arguments: (none), norecursive, outsource

Uses QMake for configuring. For more information see [Section 6.12.3, “Using qmake”](#).

15.69. readline

Possible arguments: (none), port

Uses readline as a library dependency, and sets CPPFLAGS and LDFLAGS as necessary. If the port argument is used or if readline is not present in the base system, add a dependency on [devel/readline](#)

15.70. scons

Possible arguments: (none)

Provide support for the use of [devel/scons](#)

15.71. shared-mime-info

Possible arguments: (none)

Uses update-mime-database from [misc/shared-mime-info](#). This uses will automatically add a post-install step in such a way that the port itself still can specify there own post-install step if needed. It also add an [@shared-mime-info](#) para to the plist.

15.72. shebangfix

Possible arguments: (none)

A lot of software uses incorrect locations for script interpreters, most notably `/usr/bin/perl` and `/bin/bash`. The shebangfix macro fixes shebang lines in scripts listed in `SHEBANG_FILES`. The shebangfix macro is run from `${WRKSRC}`, so it can contain paths that are relative to `${WRKSRC}`. It can also deal with absolute paths if files outside of `${WRKSRC}` require patching. For example:

```
USES= shebangfix
SHEBANG_FILES= scripts/foobar.pl scripts/*.sh
```

Currently Bash, Java, Ksh, Lua, Perl, PHP, Python, Ruby, Tcl, and Tk are supported by default.

There are three configuration variables:

SHEBANG_LANG

The list of supported interpreters.

interp_CMD

The path to the command interpreter on FreeBSD. The default value is `${LOCALBASE}/bin/interp`.

interp_OLD_CMD

The list of wrong invocations of interpreters. These are typically obsolete paths, or paths used on other operating systems that are incorrect on FreeBSD. They will be replaced by the correct path in `interp_CMD`. This list will always be part of `interp_OLD_CMD`: `"/usr/bin/env interp" /bin/interp /usr/bin/interp`.

To add another interpreter, set `SHEBANG_LANG`. For example:

```
SHEBANG_LANG= lua
```

`interp_OLD_CMD` will contain multiple values. Any entry with spaces must be quoted. For example, if it was not already defined, the Ksh entry could be defined as:

```
SHEBANG_LANG= ksh
ksh_OLD_CMD= "/usr/bin/env ksh" /bin/ksh /usr/bin/ksh
ksh_CMD= ${LOCALBASE}/bin/ksh
```

Some software uses strange locations for an interpreter. For example, an application might expect Python to be located in `/opt/bin/python2.7`. The strange path to be replaced can be declared in the port Makefile:

```
python_OLD_CMD= /opt/bin/python2.7
```



Note

The fixing of shebangs is done during the `patch` phase. If scripts are created with incorrect shebangs during the `build` phase, the build process (for examples, the `configure` script, or

the Makefiles) must be patched to generate the right shebangs. Correct paths for supported interpreters are available in *interp_CMD*.

15.73. sqlite

Possible arguments: (none), 2, 3

Add a dependency on SQLite. The default version used is 3, but version 2 is also possible using the `:2` modifier.

15.74. ssl

Possible arguments: (none)

Provide support for OpenSSL. These variables are available for the port's use, they are also added to `MAKE_ENV`:

`OPENSSLBASE`

Path to the OpenSSL installation base.

`OPENSSLDIR`

Path to OpenSSL's configuration files.

`OPENSSLLIB`

Path to the OpenSSL libraries.

`OPENSSLINC`

Path to the OpenSSL includes.

`OPENSSLRPATH`

If defined, the path the linker needs to use to find the OpenSSL libraries.

15.75. tar

Possible arguments: (none), Z, bz2, bzip2, lzma, tbz, tbz2, tgz, txz, xz

Set `EXTRACT_SUFX` to `.tar`, `.tar.Z`, `.tar.bz2`, `.tar.bzip2`, `.tar.lzma`, `.tbz`, `.tbz2`, `.tgz`, `.txz` or `.tar.xz` respectively.

15.76. tcl

Possible arguments: *version*, *wrapper*, *build*, *run*, *tea*

Add a dependency on Tcl. A specific version can be requested using *version*. The version can be empty, one or more exact version numbers (currently 84, 85, or 86), or a minimal version number (currently 84+, 85+ or 86+). To only request a non version specific wrapper, use *wrapper*. A build- or run-time only dependency can be specified using *build* or *run*. To build the port using the Tcl Extension Architecture, use *tea*. After including `bsd.port.pre.mk` the port can inspect the results using these variables:

- `TCL_VER`: chosen major.minor version of Tcl
- `TCLSH`: full path of the Tcl interpreter
- `TCL_LIBDIR`: path of the Tcl libraries
- `TCL_INCLUDEDIR`: path of the Tcl C header files

- `TK_VER`: chosen major.minor version of Tk
- `WISH`: full path of the Tk interpreter
- `TK_LIBDIR`: path of the Tk libraries
- `TK_INCLUDEDIR`: path of the Tk C header files

15.77. `terminfo`

Possible arguments: (none)

Adds `@terminfo` to the `plist`. Use when the port installs `*.terminfo` files in `${PREFIX}/share/misc`.

15.78. `tk`

Same as arguments for `tcl`

Small wrapper when using both Tcl and Tk. The same variables are returned as when using Tcl.

15.79. `twisted`

Possible arguments: (none), `ARGS`

Add a dependency on `twistedCore`. The list of required components can be specified as a value of this variable. `ARGS` can be one of:

- `build`: add `twistedCore` or any specified component as build dependency.
- `run`: add `twistedCore` or any specified component as run dependency.

Besides `build` and `run`, one or more other supported twisted components can be specified. Supported values are listed in `Uses/twisted.mk`.

15.80. `uidfix`

Possible arguments: (none)

Changes some default behavior (mostly variables) of the build system to allow installing this port as a normal user. Try this in the port before using `USES=fakeroot` or patching.

15.81. `uniquefiles`

Possible arguments: (none), `dirs`

Make files or directories 'unique', by adding a prefix or suffix. If the `dirs` argument is used, the port needs a prefix (and only a prefix) based on `UNIQUE_PREFIX` for standard directories `DOCSDIR`, `EXAMPLESDIR`, `DATADIR`, `WWWDIR`, `ETCDIR`. These variables are available for ports:

- `UNIQUE_PREFIX`: The prefix to be used for directories and files. Default: `${PKGNAMEPREFIX}`.
- `UNIQUE_PREFIX_FILES`: A list of files that need to be prefixed. Default: empty.
- `UNIQUE_SUFFIX`: The suffix to be used for files. Default: `${PKGNAME_SUFFIX}`.

- `UNIQUE_SUFFIX_FILES`: A list of files that need to be suffixed. Default: empty.

15.82. webplugin

Possible arguments: (none), `ARGS`

Automatically create and remove symbolic links for each application that supports the webplugin framework. `ARGS` can be one of:

- `gecko`: support plug-ins based on Gecko
- `native`: support plug-ins for Gecko, Opera, and WebKit-GTK
- `linux`: support Linux plug-ins
- `all` (default, implicit): support all plug-in types
- (individual entries): support only the browsers listed

These variables can be adjusted:

- `WEBPLUGIN_FILES`: No default, must be set manually. The plug-in files to install.
- `WEBPLUGIN_DIR`: The directory to install the plug-in files to, default `PREFIX/lib/browser_plugins/WEBPLUGIN_NAME`. Set this if the port installs plug-in files outside of the default directory to prevent broken symbolic links.
- `WEBPLUGIN_NAME`: The final directory to install the plug-in files into, default `PKGBASE`.

15.83. xfce

Possible arguments: (none), `gtk3`

Provide support for Xfce related ports. See [Section 6.24, “Using Xfce”](#) for details.

The `gtk3` argument specifies that the port requires GTK3 support. It adds additional features provided by some core components, for example, [x11/libxfce4menu](#) and [x11-wm/xfce4-panel](#).

15.84. zip

Possible arguments: (none), `infozip`

Indicates that the distribution files use the ZIP compression algorithm. For files using the InfoZip algorithm the `infozip` argument must be passed to set the appropriate dependencies.

15.85. zope

Possible arguments: (none)

Uses [www/zope](#). Mostly used for building zope related ports. `ZOPE_VERSION` can be used by a port to indicate that a specific version of zope shall be used.

Chapter 16. `__FreeBSD_version` Values

Here is a convenient list of `__FreeBSD_version` values as defined in [sys/param.h](#):

Table 16.1. `__FreeBSD_version` Values

| Value | Date | Release |
|----------------|--------------------|--|
| 119411 | | 2.0-RELEASE |
| 199501, 199503 | March 19, 1995 | 2.1-CURRENT |
| 199504 | April 9, 1995 | 2.0.5-RELEASE |
| 199508 | August 26, 1995 | 2.2-CURRENT before 2.1 |
| 199511 | November 10, 1995 | 2.1.0-RELEASE |
| 199512 | November 10, 1995 | 2.2-CURRENT before 2.1.5 |
| 199607 | July 10, 1996 | 2.1.5-RELEASE |
| 199608 | July 12, 1996 | 2.2-CURRENT before 2.1.6 |
| 199612 | November 15, 1996 | 2.1.6-RELEASE |
| 199612 | | 2.1.7-RELEASE |
| 220000 | February 19, 1997 | 2.2-RELEASE |
| (not changed) | | 2.2.1-RELEASE |
| (not changed) | | 2.2-STABLE after 2.2.1-RELEASE |
| 221001 | April 15, 1997 | 2.2-STABLE after texinfo-3.9 |
| 221002 | April 30, 1997 | 2.2-STABLE after top |
| 222000 | May 16, 1997 | 2.2.2-RELEASE |
| 222001 | May 19, 1997 | 2.2-STABLE after 2.2.2-RELEASE |
| 225000 | October 2, 1997 | 2.2.5-RELEASE |
| 225001 | November 20, 1997 | 2.2-STABLE after 2.2.5-RELEASE |
| 225002 | December 27, 1997 | 2.2-STABLE after <code>ldconfig -R merge</code> |
| 226000 | March 24, 1998 | 2.2.6-RELEASE |
| 227000 | July 21, 1998 | 2.2.7-RELEASE |
| 227001 | July 21, 1998 | 2.2-STABLE after 2.2.7-RELEASE |
| 227002 | September 19, 1998 | 2.2-STABLE after <code>semctl(2)</code> change |
| 228000 | November 29, 1998 | 2.2.8-RELEASE |
| 228001 | November 29, 1998 | 2.2-STABLE after 2.2.8-RELEASE |
| 300000 | February 19, 1996 | 3.0-CURRENT before <code>mount(2)</code> change |
| 300001 | September 24, 1997 | 3.0-CURRENT after <code>mount(2)</code> change |
| 300002 | June 2, 1998 | 3.0-CURRENT after <code>semctl(2)</code> change |
| 300003 | June 7, 1998 | 3.0-CURRENT after <code>ioctl</code> arg changes |
| 300004 | September 3, 1998 | 3.0-CURRENT after ELF conversion |
| 300005 | October 16, 1998 | 3.0-RELEASE |
| 300006 | October 16, 1998 | 3.0-CURRENT after 3.0-RELEASE |
| 300007 | January 22, 1999 | 3.0-STABLE after 3/4 branch |
| 310000 | February 9, 1999 | 3.1-RELEASE |

| Value | Date | Release |
|--------|--------------------|---|
| 310001 | March 27, 1999 | 3.1-STABLE after 3.1-RELEASE |
| 310002 | April 14, 1999 | 3.1-STABLE after C++ constructor/destructor order change |
| 320000 | | 3.2-RELEASE |
| 320001 | May 8, 1999 | 3.2-STABLE |
| 320002 | August 29, 1999 | 3.2-STABLE after binary-incompatible IPFW and socket changes |
| 330000 | September 2, 1999 | 3.3-RELEASE |
| 330001 | September 16, 1999 | 3.3-STABLE |
| 330002 | November 24, 1999 | 3.3-STABLE after adding mkstemp(3) to libc |
| 340000 | December 5, 1999 | 3.4-RELEASE |
| 340001 | December 17, 1999 | 3.4-STABLE |
| 350000 | June 20, 2000 | 3.5-RELEASE |
| 350001 | July 12, 2000 | 3.5-STABLE |
| 400000 | January 22, 1999 | 4.0-CURRENT after 3.4 branch |
| 400001 | February 20, 1999 | 4.0-CURRENT after change in dynamic linker handling |
| 400002 | March 13, 1999 | 4.0-CURRENT after C++ constructor/destructor order change |
| 400003 | March 27, 1999 | 4.0-CURRENT after functioning dladdr(3) |
| 400004 | April 5, 1999 | 4.0-CURRENT after <code>__deregister_frame_info</code> dynamic linker bug fix (also 4.0-CURRENT after EGCS 1.1.2 integration) |
| 400005 | April 27, 1999 | 4.0-CURRENT after suser(9) API change (also 4.0-CURRENT after newbus) |
| 400006 | May 31, 1999 | 4.0-CURRENT after cdevsw registration change |
| 400007 | June 17, 1999 | 4.0-CURRENT after the addition of <code>so_cred</code> for socket level credentials |
| 400008 | June 20, 1999 | 4.0-CURRENT after the addition of a poll syscall wrapper to <code>libc_r</code> |
| 400009 | July 20, 1999 | 4.0-CURRENT after the change of the kernel's <code>dev_t</code> type to <code>struct specinfo</code> pointer |
| 400010 | September 25, 1999 | 4.0-CURRENT after fixing a hole in jail(2) |
| 400011 | September 29, 1999 | 4.0-CURRENT after the <code>sigset_t</code> datatype change |
| 400012 | November 15, 1999 | 4.0-CURRENT after the cutover to the GCC 2.95.2 compiler |
| 400013 | December 4, 1999 | 4.0-CURRENT after adding pluggable linux-mode ioctl handlers |

| Value | Date | Release |
|--------|--------------------|---|
| 400014 | January 18, 2000 | 4.0-CURRENT after importing OpenSSL |
| 400015 | January 27, 2000 | 4.0-CURRENT after the C++ ABI change in GCC 2.95.2 from -fvtable-thunks to -fno-vtable-thunks by default |
| 400016 | February 27, 2000 | 4.0-CURRENT after importing OpenSSH |
| 400017 | March 13, 2000 | 4.0-RELEASE |
| 400018 | March 17, 2000 | 4.0-STABLE after 4.0-RELEASE |
| 400019 | May 5, 2000 | 4.0-STABLE after the introduction of delayed checksums. |
| 400020 | June 4, 2000 | 4.0-STABLE after merging libxpg4 code into libc. |
| 400021 | July 8, 2000 | 4.0-STABLE after upgrading Binutils to 2.10.0, ELF branding changes, and tcsh in the base system. |
| 410000 | July 14, 2000 | 4.1-RELEASE |
| 410001 | July 29, 2000 | 4.1-STABLE after 4.1-RELEASE |
| 410002 | September 16, 2000 | 4.1-STABLE after setproctitle(3) moved from libutil to libc. |
| 411000 | September 25, 2000 | 4.1.1-RELEASE |
| 411001 | | 4.1.1-STABLE after 4.1.1-RELEASE |
| 420000 | October 31, 2000 | 4.2-RELEASE |
| 420001 | January 10, 2001 | 4.2-STABLE after combining libgcc.a and libgcc_r.a, and associated GCC linkage changes. |
| 430000 | March 6, 2001 | 4.3-RELEASE |
| 430001 | May 18, 2001 | 4.3-STABLE after wint_t introduction. |
| 430002 | July 22, 2001 | 4.3-STABLE after PCI powerstate API merge. |
| 440000 | August 1, 2001 | 4.4-RELEASE |
| 440001 | October 23, 2001 | 4.4-STABLE after d_thread_t introduction. |
| 440002 | November 4, 2001 | 4.4-STABLE after mount structure changes (affects filesystem klds). |
| 440003 | December 18, 2001 | 4.4-STABLE after the userland components of smbfs were imported. |
| 450000 | December 20, 2001 | 4.5-RELEASE |
| 450001 | February 24, 2002 | 4.5-STABLE after the usb structure element rename. |
| 450004 | April 16, 2002 | 4.5-STABLE after the sendmail_enable rc.conf(5) variable was made to take the value NONE. |

| Value | Date | Release |
|--------|-------------------|---|
| 450005 | April 27, 2002 | 4.5-STABLE after moving to XFree86 4 by default for package builds. |
| 450006 | May 1, 2002 | 4.5-STABLE after accept filtering was fixed so that is no longer susceptible to an easy DoS. |
| 460000 | June 21, 2002 | 4.6-RELEASE |
| 460001 | June 21, 2002 | 4.6-STABLE sendfile(2) fixed to comply with documentation, not to count any headers sent against the amount of data to be sent from the file. |
| 460002 | July 19, 2002 | 4.6.2-RELEASE |
| 460100 | June 26, 2002 | 4.6-STABLE |
| 460101 | June 26, 2002 | 4.6-STABLE after MFC of `sed -i'. |
| 460102 | September 1, 2002 | 4.6-STABLE after MFC of many new pkg_install features from the HEAD. |
| 470000 | October 8, 2002 | 4.7-RELEASE |
| 470100 | October 9, 2002 | 4.7-STABLE |
| 470101 | November 10, 2002 | Start generated <code>__std{in,out,err}p</code> references rather than <code>__sF</code> . This changes <code>std{in,out,err}</code> from a compile time expression to a runtime one. |
| 470102 | January 23, 2003 | 4.7-STABLE after MFC of mbuf changes to replace <code>m_aux</code> mbufs by <code>m_tag</code> 's |
| 470103 | February 14, 2003 | 4.7-STABLE gets OpenSSL 0.9.7 |
| 480000 | March 30, 2003 | 4.8-RELEASE |
| 480100 | April 5, 2003 | 4.8-STABLE |
| 480101 | May 22, 2003 | 4.8-STABLE after realpath(3) has been made thread-safe |
| 480102 | August 10, 2003 | 4.8-STABLE 3ware API changes to twe. |
| 490000 | October 27, 2003 | 4.9-RELEASE |
| 490100 | October 27, 2003 | 4.9-STABLE |
| 490101 | January 8, 2004 | 4.9-STABLE after <code>e_sid</code> was added to struct <code>kinfo_eproc</code> . |
| 490102 | February 4, 2004 | 4.9-STABLE after MFC of libmap functionality for <code>rtld</code> . |
| 491000 | May 25, 2004 | 4.10-RELEASE |
| 491100 | June 1, 2004 | 4.10-STABLE |
| 491101 | August 11, 2004 | 4.10-STABLE after MFC of revision 20040629 of the package tools |
| 491102 | November 16, 2004 | 4.10-STABLE after VM fix dealing with unwiring of fictitious pages |
| 492000 | December 17, 2004 | 4.11-RELEASE |

| Value | Date | Release |
|--------|--------------------|--|
| 492100 | December 17, 2004 | 4.11-STABLE |
| 492101 | April 18, 2006 | 4.11-STABLE after adding libdata/ld-config directories tomtree files. |
| 500000 | March 13, 2000 | 5.0-CURRENT |
| 500001 | April 18, 2000 | 5.0-CURRENT after adding addition ELF header fields, and changing our ELF binary branding method. |
| 500002 | May 2, 2000 | 5.0-CURRENT after kld metadata changes. |
| 500003 | May 18, 2000 | 5.0-CURRENT after buf/bio changes. |
| 500004 | May 26, 2000 | 5.0-CURRENT after binutils upgrade. |
| 500005 | June 3, 2000 | 5.0-CURRENT after merging libxpg4 code into libc and after TASKQ interface introduction. |
| 500006 | June 10, 2000 | 5.0-CURRENT after the addition of AGP interfaces. |
| 500007 | June 29, 2000 | 5.0-CURRENT after Perl upgrade to 5.6.0 |
| 500008 | July 7, 2000 | 5.0-CURRENT after the update of KAME code to 2000/07 sources. |
| 500009 | July 14, 2000 | 5.0-CURRENT after ether_ifattach() and ether_ifdetach() changes. |
| 500010 | July 16, 2000 | 5.0-CURRENT after changingmtree defaults back to original variant, adding -L to follow symlinks. |
| 500011 | July 18, 2000 | 5.0-CURRENT after kqueue API changed. |
| 500012 | September 2, 2000 | 5.0-CURRENT after setproctitle(3) moved from libutil to libc. |
| 500013 | September 10, 2000 | 5.0-CURRENT after the first SMPng commit. |
| 500014 | January 4, 2001 | 5.0-CURRENT after <sys/select.h> moved to <sys/selinfo.h>. |
| 500015 | January 10, 2001 | 5.0-CURRENT after combining libgcc.a and libgcc_r.a, and associated GCC linkage changes. |
| 500016 | January 24, 2001 | 5.0-CURRENT after change allowing libc and libc_r to be linked together, deprecating -pthread option. |
| 500017 | February 18, 2001 | 5.0-CURRENT after switch from struct ucred to struct xucred to stabilize kernel-exported API for mountd et al. |
| 500018 | February 24, 2001 | 5.0-CURRENT after addition of CPUTYPE make variable for controlling CPU-specific optimizations. |
| 500019 | June 9, 2001 | 5.0-CURRENT after moving machine/iocctl_fd.h to sys/fdcio.h |

| Value | Date | Release |
|---------------|--------------------|---|
| 500020 | June 15, 2001 | 5.0-CURRENT after locale names re-naming. |
| 500021 | June 22, 2001 | 5.0-CURRENT after Bzip2 import. Also signifies removal of S/Key. |
| 500022 | July 12, 2001 | 5.0-CURRENT after SSE support. |
| 500023 | September 14, 2001 | 5.0-CURRENT after KSE Milestone 2. |
| 500024 | October 1, 2001 | 5.0-CURRENT after <code>d_thread_t</code> , and moving UUCP to ports. |
| 500025 | October 4, 2001 | 5.0-CURRENT after ABI change for descriptor and creds passing on 64 bit platforms. |
| 500026 | October 9, 2001 | 5.0-CURRENT after moving to XFree86 4 by default for package builds, and after the new libc <code>strnstr()</code> function was added. |
| 500027 | October 10, 2001 | 5.0-CURRENT after the new libc <code>strcasestr()</code> function was added. |
| 500028 | December 14, 2001 | 5.0-CURRENT after the userland components of smbfs were imported. |
| (not changed) | | 5.0-CURRENT after the new C99 specific-width integer types were added. |
| 500029 | January 29, 2002 | 5.0-CURRENT after a change was made in the return value of sendfile(2) . |
| 500030 | February 15, 2002 | 5.0-CURRENT after the introduction of the type <code>fflags_t</code> , which is the appropriate size for file flags. |
| 500031 | February 24, 2002 | 5.0-CURRENT after the usb structure element rename. |
| 500032 | March 16, 2002 | 5.0-CURRENT after the introduction of Perl 5.6.1. |
| 500033 | April 3, 2002 | 5.0-CURRENT after the <code>sendmail_enable rc.conf(5)</code> variable was made to take the value NONE. |
| 500034 | April 30, 2002 | 5.0-CURRENT after <code>mtx_init()</code> grew a third argument. |
| 500035 | May 13, 2002 | 5.0-CURRENT with Gcc 3.1. |
| 500036 | May 17, 2002 | 5.0-CURRENT without Perl in <code>/usr/src</code> |
| 500037 | May 29, 2002 | 5.0-CURRENT after the addition of dlfunc(3) |
| 500038 | July 24, 2002 | 5.0-CURRENT after the types of some struct <code>sockbuf</code> members were changed and the structure was re-ordered. |
| 500039 | September 1, 2002 | 5.0-CURRENT after GCC 3.2.1 import. Also after headers stopped using <code>_BSD_FOO_T_</code> and started using <code>_FOO_T_DECLARED</code> . This value can |

| Value | Date | Release |
|--------|--------------------|--|
| | | also be used as a conservative estimate of the start of bzip2(1) package support. |
| 500040 | September 20, 2002 | 5.0-CURRENT after various changes to disk functions were made in the name of removing dependency on disklabel structure internals. |
| 500041 | October 1, 2002 | 5.0-CURRENT after the addition of getopt_long(3) to libc. |
| 500042 | October 15, 2002 | 5.0-CURRENT after Binutils 2.13 upgrade, which included new FreeBSD emulation, vec, and output format. |
| 500043 | November 1, 2002 | 5.0-CURRENT after adding weak pthread_XXX stubs to libc, obsoleting libXThrStub.so. 5.0-RELEASE. |
| 500100 | January 17, 2003 | 5.0-CURRENT after branching for RELENG_5_0 |
| 500101 | February 19, 2003 | <sys/dkstat.h> is empty. Do not include it. |
| 500102 | February 25, 2003 | 5.0-CURRENT after the d_mmap_t interface change. |
| 500103 | February 26, 2003 | 5.0-CURRENT after taskqueue_swi changed to run without Giant, and taskqueue_swi_giant added to run with Giant. |
| 500104 | February 27, 2003 | cdevsw_add() and cdevsw_remove() no longer exists. Appearance of MAJOR_AUTO allocation facility. |
| 500105 | March 4, 2003 | 5.0-CURRENT after new cdevsw initialization method. |
| 500106 | March 8, 2003 | devstat_add_entry() has been replaced by devstat_new_entry() |
| 500107 | March 15, 2003 | Devstat interface change; see sys/sys/param.h 1.149 |
| 500108 | March 15, 2003 | Token-Ring interface changes. |
| 500109 | March 25, 2003 | Addition of vm_paddr_t. |
| 500110 | March 28, 2003 | 5.0-CURRENT after realpath(3) has been made thread-safe |
| 500111 | April 9, 2003 | 5.0-CURRENT after usbhid(3) has been synced with NetBSD |
| 500112 | April 17, 2003 | 5.0-CURRENT after new NSS implementation and addition of POSIX.1 getpw*_r, getgr*_r functions |
| 500113 | May 2, 2003 | 5.0-CURRENT after removal of the old rc system. |
| 501000 | June 4, 2003 | 5.1-RELEASE. |
| 501100 | June 2, 2003 | 5.1-CURRENT after branching for RELENG_5_1. |

| Value | Date | Release |
|--------|--------------------|---|
| 501101 | June 29, 2003 | 5.1-CURRENT after correcting the semantics of sigtimedwait(2) and sigwaitinfo(2). |
| 501102 | July 3, 2003 | 5.1-CURRENT after adding the lockfunc and lockfuncarg fields to bus_dma_tag_create(9) . |
| 501103 | July 31, 2003 | 5.1-CURRENT after GCC 3.3.1-pre 20030711 snapshot integration. |
| 501104 | August 5, 2003 | 5.1-CURRENT 3ware API changes to tve. |
| 501105 | August 17, 2003 | 5.1-CURRENT dynamically-linked /bin and /sbin support and movement of libraries to /lib. |
| 501106 | September 8, 2003 | 5.1-CURRENT after adding kernel support for Coda 6.x. |
| 501107 | September 17, 2003 | 5.1-CURRENT after 16550 UART constants moved from <dev/sio/sioreg.h> to <dev/ic/ns16550.h>. Also when libmap functionality was unconditionally supported by rtld. |
| 501108 | September 23, 2003 | 5.1-CURRENT after PFIL_HOOKS API update |
| 501109 | September 27, 2003 | 5.1-CURRENT after adding kiconv(3) |
| 501110 | September 28, 2003 | 5.1-CURRENT after changing default operations for open and close in cdevsw |
| 501111 | October 16, 2003 | 5.1-CURRENT after changed layout of cdevsw |
| 501112 | October 16, 2003 | 5.1-CURRENT after adding kobj multiple inheritance |
| 501113 | October 31, 2003 | 5.1-CURRENT after the if_xname change in struct ifnet |
| 501114 | November 16, 2003 | 5.1-CURRENT after changing /bin and /sbin to be dynamically linked |
| 502000 | December 7, 2003 | 5.2-RELEASE |
| 502010 | February 23, 2004 | 5.2.1-RELEASE |
| 502100 | December 7, 2003 | 5.2-CURRENT after branching for RELENG_5_2 |
| 502101 | December 19, 2003 | 5.2-CURRENT after __cxa_atexit/_cxa_finalize functions were added to libc. |
| 502102 | January 30, 2004 | 5.2-CURRENT after change of default thread library from libc_r to libpthread. |
| 502103 | February 21, 2004 | 5.2-CURRENT after device driver API megapatch. |

| Value | Date | Release |
|--------|-------------------|---|
| 502104 | February 25, 2004 | 5.2-CURRENT after getopt_long_only() addition. |
| 502105 | March 5, 2004 | 5.2-CURRENT after NULL is made into ((void *)0) for C, creating more warnings. |
| 502106 | March 8, 2004 | 5.2-CURRENT after pf is linked to the build and install. |
| 502107 | March 10, 2004 | 5.2-CURRENT after time_t is changed to a 64-bit value on sparc64. |
| 502108 | March 12, 2004 | 5.2-CURRENT after Intel C/C++ compiler support in some headers and execve(2) changes to be more strictly conforming to POSIX. |
| 502109 | March 22, 2004 | 5.2-CURRENT after the introduction of the bus_alloc_resource_any API |
| 502110 | March 27, 2004 | 5.2-CURRENT after the addition of UTF-8 locales |
| 502111 | April 11, 2004 | 5.2-CURRENT after the removal of the getvfsent(3) API |
| 502112 | April 13, 2004 | 5.2-CURRENT after the addition of the .warning directive for make. |
| 502113 | June 4, 2004 | 5.2-CURRENT after ttyioctl() was made mandatory for serial drivers. |
| 502114 | June 13, 2004 | 5.2-CURRENT after import of the AL-TQ framework. |
| 502115 | June 14, 2004 | 5.2-CURRENT after changing sema_timedwait(9) to return 0 on success and a non-zero error code on failure. |
| 502116 | June 16, 2004 | 5.2-CURRENT after changing kernel dev_t to be pointer to struct cdev*. |
| 502117 | June 17, 2004 | 5.2-CURRENT after changing kernel udev_t to dev_t. |
| 502118 | June 17, 2004 | 5.2-CURRENT after adding support for CLOCK_VIRTUAL and CLOCK_PROF to clock_gettime(2) and clock_getres(2). |
| 502119 | June 22, 2004 | 5.2-CURRENT after changing network interface cloning overhaul. |
| 502120 | July 2, 2004 | 5.2-CURRENT after the update of the package tools to revision 20040629. |
| 502121 | July 9, 2004 | 5.2-CURRENT after marking Bluetooth code as non-i386 specific. |
| 502122 | July 11, 2004 | 5.2-CURRENT after the introduction of the KDB debugger framework, the conversion of DDB into a backend and the introduction of the GDB backend. |

| Value | Date | Release |
|--------|--------------------|---|
| 502123 | July 12, 2004 | 5.2-CURRENT after change to make VFS_ROOT take a struct thread argument as does vflush. Struct kinfo_proc now has a user data pointer. The switch of the default X implementation to xorg was also made at this time. |
| 502124 | July 24, 2004 | 5.2-CURRENT after the change to separate the way ports rc.d and legacy scripts are started. |
| 502125 | July 28, 2004 | 5.2-CURRENT after the backout of the previous change. |
| 502126 | July 31, 2004 | 5.2-CURRENT after the removal of kmem_alloc_pageable() and the import of gcc 3.4.2. |
| 502127 | August 2, 2004 | 5.2-CURRENT after changing the UMA kernel API to allow ctors/inits to fail. |
| 502128 | August 8, 2004 | 5.2-CURRENT after the change of the vfs_mount signature as well as global replacement of PRISON_ROOT with SUSER_ALLOWJAIL for the suser(9) API. |
| 503000 | August 23, 2004 | 5.3-BETA/RC before the pfil API change |
| 503001 | September 22, 2004 | 5.3-RELEASE |
| 503100 | October 16, 2004 | 5.3-STABLE after branching for RELENG_5_3 |
| 503101 | December 3, 2004 | 5.3-STABLE after addition of glibc style strftime(3) padding options. |
| 503102 | February 13, 2005 | 5.3-STABLE after OpenBSD's nc(1) import MFC. |
| 503103 | February 27, 2005 | 5.4-PRERELEASE after the MFC of the fixes in <src/include/stdbool.h> and <src/sys/i386/include/_types.h> for using the GCC-compatibility of the Intel C/C++ compiler. |
| 503104 | February 28, 2005 | 5.4-PRERELEASE after the MFC of the change of ifi_epoch from wall clock time to uptime. |
| 503105 | March 2, 2005 | 5.4-PRERELEASE after the MFC of the fix of EOVERFLOW check in vsprintf(3). |
| 504000 | April 3, 2005 | 5.4-RELEASE. |
| 504100 | April 3, 2005 | 5.4-STABLE after branching for RELENG_5_4 |
| 504101 | May 11, 2005 | 5.4-STABLE after increasing the default thread stack sizes |

| Value | Date | Release |
|--------|--------------------|---|
| 504102 | June 24, 2005 | 5.4-STABLE after the addition of sha256 |
| 504103 | October 3, 2005 | 5.4-STABLE after the MFC of if_bridge |
| 504104 | November 13, 2005 | 5.4-STABLE after the MFC of bsdiff and portsnap |
| 504105 | January 17, 2006 | 5.4-STABLE after MFC of ldconfig_local_dirs change. |
| 505000 | May 12, 2006 | 5.5-RELEASE. |
| 505100 | May 12, 2006 | 5.5-STABLE after branching for RELENG_5_5 |
| 600000 | August 18, 2004 | 6.0-CURRENT |
| 600001 | August 27, 2004 | 6.0-CURRENT after permanently enabling PFIL_HOOKS in the kernel. |
| 600002 | August 30, 2004 | 6.0-CURRENT after initial addition of ifi_epoch to struct if_data. Backed out after a few days. Do not use this value. |
| 600003 | September 8, 2004 | 6.0-CURRENT after the re-addition of the ifi_epoch member of struct if_data. |
| 600004 | September 29, 2004 | 6.0-CURRENT after addition of the struct inpcb argument to the pfil API. |
| 600005 | October 5, 2004 | 6.0-CURRENT after addition of the "-d DESTDIR" argument to newsyslog. |
| 600006 | November 4, 2004 | 6.0-CURRENT after addition of glibc style strftime(3) padding options. |
| 600007 | December 12, 2004 | 6.0-CURRENT after addition of 802.11 framework updates. |
| 600008 | January 25, 2005 | 6.0-CURRENT after changes to VOP_*VOBJECT() functions and introduction of MNTK_MPSAFE flag for Giantfree filesystems. |
| 600009 | February 4, 2005 | 6.0-CURRENT after addition of the cpufreq framework and drivers. |
| 600010 | February 6, 2005 | 6.0-CURRENT after importing OpenBSD's nc(1). |
| 600011 | February 12, 2005 | 6.0-CURRENT after removing semblance of SVID2 matherr() support. |
| 600012 | February 15, 2005 | 6.0-CURRENT after increase of default thread stacks' size. |
| 600013 | February 19, 2005 | 6.0-CURRENT after fixes in <src/include/stdbool.h> and <src/sys/i386/include/_types.h> for using the GCC-compatibility of the Intel C/C++ compiler. |
| 600014 | February 21, 2005 | 6.0-CURRENT after EOVERFLOW checks in vsprintf(3) fixed. |

| Value | Date | Release |
|--------|-------------------|--|
| 600015 | February 25, 2005 | 6.0-CURRENT after changing the struct if_data member, ifi_epoch, from wall clock time to uptime. |
| 600016 | February 26, 2005 | 6.0-CURRENT after LC_CTYPE disk format changed. |
| 600017 | February 27, 2005 | 6.0-CURRENT after NLS catalogs disk format changed. |
| 600018 | February 27, 2005 | 6.0-CURRENT after LC_COLLATE disk format changed. |
| 600019 | February 28, 2005 | Installation of acpica includes into /usr/include. |
| 600020 | March 9, 2005 | Addition of MSG_NOSIGNAL flag to send(2) API. |
| 600021 | March 17, 2005 | Addition of fields to cdevsw |
| 600022 | March 21, 2005 | Removed gtar from base system. |
| 600023 | April 13, 2005 | LOCAL_CREDS, LOCAL_CONNWAIT socket options added to unix(4). |
| 600024 | April 19, 2005 | hwpmc(4) and related tools added to 6.0-CURRENT. |
| 600025 | April 26, 2005 | struct icmphdr added to 6.0-CURRENT. |
| 600026 | May 3, 2005 | pf updated to 3.7. |
| 600027 | May 6, 2005 | Kernel libalias and ng_nat introduced. |
| 600028 | May 13, 2005 | POSIX ttyname_r(3) made available through unistd.h and libc. |
| 600029 | May 29, 2005 | 6.0-CURRENT after libpcap updated to v0.9.1 alpha 096. |
| 600030 | June 5, 2005 | 6.0-CURRENT after importing NetBSD's if_bridge(4). |
| 600031 | June 10, 2005 | 6.0-CURRENT after struct ifnet was broken out of the driver softcs. |
| 600032 | July 11, 2005 | 6.0-CURRENT after the import of libpcap v0.9.1. |
| 600033 | July 25, 2005 | 6.0-STABLE after bump of all shared library versions that had not been changed since RELENG_5. |
| 600034 | August 13, 2005 | 6.0-STABLE after credential argument is added to dev_clone event handler. 6.0-RELEASE. |
| 600100 | November 1, 2005 | 6.0-STABLE after 6.0-RELEASE |
| 600101 | December 21, 2005 | 6.0-STABLE after incorporating scripts from the local_startup directories into the base rcorder(8) . |
| 600102 | December 30, 2005 | 6.0-STABLE after updating the ELF types and constants. |

| Value | Date | Release |
|--------|--------------------|---|
| 600103 | January 15, 2006 | 6.0-STABLE after MFC of pidfile(3) API. |
| 600104 | January 17, 2006 | 6.0-STABLE after MFC of ldconfig_local_dirs change. |
| 600105 | February 26, 2006 | 6.0-STABLE after NLS catalog support of csh(1). |
| 601000 | May 6, 2006 | 6.1-RELEASE |
| 601100 | May 6, 2006 | 6.1-STABLE after 6.1-RELEASE. |
| 601101 | June 22, 2006 | 6.1-STABLE after the import of csup. |
| 601102 | July 11, 2006 | 6.1-STABLE after the iwi(4) update. |
| 601103 | July 17, 2006 | 6.1-STABLE after the resolver update to BIND9, and exposure of reentrant version of netdb functions. |
| 601104 | August 8, 2006 | 6.1-STABLE after DSO (dynamic shared objects) support has been enabled in OpenSSL. |
| 601105 | September 2, 2006 | 6.1-STABLE after 802.11 fix-ups changed the api for the IEEE80211_IOC_STA_INFO ioctl. |
| 602000 | November 15, 2006 | 6.2-RELEASE |
| 602100 | September 15, 2006 | 6.2-STABLE after 6.2-RELEASE. |
| 602101 | December 12, 2006 | 6.2-STABLE after the addition of Wi-Spy quirk. |
| 602102 | December 28, 2006 | 6.2-STABLE after pci_find_extcap() addition. |
| 602103 | January 16, 2007 | 6.2-STABLE after MFC of dlsym change to look for a requested symbol both in specified dso and its implicit dependencies. |
| 602104 | January 28, 2007 | 6.2-STABLE after MFC of ng_deflate(4) and ng_pred1(4) netgraph nodes and new compression and encryption modes for ng_ppp(4) node. |
| 602105 | February 20, 2007 | 6.2-STABLE after MFC of BSD licensed version of gzip(1) ported from NetBSD. |
| 602106 | March 31, 2007 | 6.2-STABLE after MFC of PCI MSI and MSI-X support. |
| 602107 | April 6, 2007 | 6.2-STABLE after MFC of ncurses 5.6 and wide character support. |
| 602108 | April 11, 2007 | 6.2-STABLE after MFC of CAM 'SG' peripheral device, which implements a subset of Linux SCSI SG passthrough device API. |
| 602109 | April 17, 2007 | 6.2-STABLE after MFC of readline 5.2 patchset 002. |
| 602110 | May 2, 2007 | 6.2-STABLE after MFC of pmap_invalidate_cache(), pmap_change_at- |

| Value | Date | Release |
|--------|--------------------|---|
| | | tr(), pmap_mapbios(), pmap_mapdev_attr(), and pmap_unmapbios() for amd64 and i386. |
| 602111 | June 11, 2007 | 6.2-STABLE after MFC of BOP_BD-FLUSH and caused breakage of the filesystem modules KBI. |
| 602112 | September 21, 2007 | 6.2-STABLE after libutil(3) MFC's. |
| 602113 | October 25, 2007 | 6.2-STABLE after MFC of wide and single byte ctype separation. Newly compiled binary that references to ctype.h may require a new symbol, __mb_sb_limit, which is not available on older systems. |
| 602114 | October 30, 2007 | 6.2-STABLE after ctype ABI forward compatibility restored. |
| 602115 | November 21, 2007 | 6.2-STABLE after back out of wide and single byte ctype separation. |
| 603000 | November 25, 2007 | 6.3-RELEASE |
| 603100 | November 25, 2007 | 6.3-STABLE after 6.3-RELEASE. |
| 603101 | December 7, 2007 | 6.3-STABLE after fixing multibyte type support in bit macro. |
| 603102 | April 24, 2008 | 6.3-STABLE after adding l_sysid to struct flock. |
| 603103 | May 27, 2008 | 6.3-STABLE after MFC of the memrchr function. |
| 603104 | June 15, 2008 | 6.3-STABLE after MFC of support for :u variable modifier in make(1). |
| 604000 | October 4, 2008 | 6.4-RELEASE |
| 604100 | October 4, 2008 | 6.4-STABLE after 6.4-RELEASE. |
| 700000 | July 11, 2005 | 7.0-CURRENT. |
| 700001 | July 23, 2005 | 7.0-CURRENT after bump of all shared library versions that had not been changed since RELENG_5. |
| 700002 | August 13, 2005 | 7.0-CURRENT after credential argument is added to dev_clone event handler. |
| 700003 | August 25, 2005 | 7.0-CURRENT after memmem(3) is added to libc. |
| 700004 | October 30, 2005 | 7.0-CURRENT after solisten(9) kernel arguments are modified to accept a backlog parameter. |
| 700005 | November 11, 2005 | 7.0-CURRENT after IFP2ENADDR() was changed to return a pointer to IF_LLADDR(). |
| 700006 | November 11, 2005 | 7.0-CURRENT after addition of if_addr member to struct ifnet and IFP2ENADDR() removal. |

| Value | Date | Release |
|--------|--------------------|--|
| 700007 | December 2, 2005 | 7.0-CURRENT after incorporating scripts from the local_startup directories into the base rcorder(8) . |
| 700008 | December 5, 2005 | 7.0-CURRENT after removal of MNT_NODEV mount option. |
| 700009 | December 19, 2005 | 7.0-CURRENT after ELF-64 type changes and symbol versioning. |
| 700010 | December 20, 2005 | 7.0-CURRENT after addition of hostb and vgapci drivers, addition of pci_find_extcap(), and changing the AGP drivers to no longer map the aperture. |
| 700011 | December 31, 2005 | 7.0-CURRENT after tv_sec was made time_t on all platforms but Alpha. |
| 700012 | January 8, 2006 | 7.0-CURRENT after ldconfig_local_dirs change. |
| 700013 | January 12, 2006 | 7.0-CURRENT after changes to /etc/rc.d/abi to support /compat/linux/etc/ld.so.cache being a symlink in a readonly filesystem. |
| 700014 | January 26, 2006 | 7.0-CURRENT after pts import. |
| 700015 | March 26, 2006 | 7.0-CURRENT after the introduction of version 2 of hwpmc(4) 's ABI. |
| 700016 | April 22, 2006 | 7.0-CURRENT after addition of fcloseall(3) to libc. |
| 700017 | May 13, 2006 | 7.0-CURRENT after removal of ip6fw. |
| 700018 | July 15, 2006 | 7.0-CURRENT after import of snd_emu10kx. |
| 700019 | July 29, 2006 | 7.0-CURRENT after import of OpenSSL 0.9.8b. |
| 700020 | September 3, 2006 | 7.0-CURRENT after addition of bus_dma_get_tag function |
| 700021 | September 4, 2006 | 7.0-CURRENT after libpcap 0.9.4 and tcpdump 3.9.4 import. |
| 700022 | September 9, 2006 | 7.0-CURRENT after dlsym change to look for a requested symbol both in specified dso and its implicit dependencies. |
| 700023 | September 23, 2006 | 7.0-CURRENT after adding new sound IOCTLS for the OSSv4 mixer API. |
| 700024 | September 28, 2006 | 7.0-CURRENT after import of OpenSSL 0.9.8d. |
| 700025 | November 11, 2006 | 7.0-CURRENT after the addition of libelf. |
| 700026 | November 26, 2006 | 7.0-CURRENT after major changes on sound sysctls. |

| Value | Date | Release |
|--------|-------------------|--|
| 700027 | November 30, 2006 | 7.0-CURRENT after the addition of Wi-Spy quirk. |
| 700028 | December 15, 2006 | 7.0-CURRENT after the addition of sctp calls to libc |
| 700029 | January 26, 2007 | 7.0-CURRENT after the GNU gzip(1) implementation was replaced with a BSD licensed version ported from NetBSD. |
| 700030 | February 7, 2007 | 7.0-CURRENT after the removal of IPIP tunnel encapsulation (VIF-F_TUNNEL) from the IPv4 multicast forwarding code. |
| 700031 | February 23, 2007 | 7.0-CURRENT after the modification of bus_setup_intr() (newbus). |
| 700032 | March 2, 2007 | 7.0-CURRENT after the inclusion of ipw(4) and iwi(4) firmware. |
| 700033 | March 9, 2007 | 7.0-CURRENT after the inclusion of ncurses wide character support. |
| 700034 | March 19, 2007 | 7.0-CURRENT after changes to how insmntque(), getnewvnode(), and vfs_hash_insert() work. |
| 700035 | March 26, 2007 | 7.0-CURRENT after addition of a notify mechanism for CPU frequency changes. |
| 700036 | April 6, 2007 | 7.0-CURRENT after import of the ZFS filesystem. |
| 700037 | April 8, 2007 | 7.0-CURRENT after addition of CAM 'SG' peripheral device, which implements a subset of Linux SCSI SG passthrough device API. |
| 700038 | April 30, 2007 | 7.0-CURRENT after changing getenv(3) , putenv(3) , setenv(3) and unsetenv(3) to be POSIX conformant. |
| 700039 | May 1, 2007 | 7.0-CURRENT after the changes in 700038 were backed out. |
| 700040 | May 10, 2007 | 7.0-CURRENT after the addition of flopen(3) to libutil. |
| 700041 | May 13, 2007 | 7.0-CURRENT after enabling symbol versioning, and changing the default thread library to libthr. |
| 700042 | May 19, 2007 | 7.0-CURRENT after the import of gcc 4.2.0. |
| 700043 | May 21, 2007 | 7.0-CURRENT after bump of all shared library versions that had not been changed since RELENG_6. |
| 700044 | June 7, 2007 | 7.0-CURRENT after changing the argument for vn_open()/VOP_OPEN() from file descriptor index to the struct file *. |

| Value | Date | Release |
|---------------|--------------------|--|
| 700045 | June 10, 2007 | 7.0-CURRENT after changing pam_nologin(8) to provide an account management function instead of an authentication function to the PAM framework. |
| 700046 | June 11, 2007 | 7.0-CURRENT after updated 802.11 wireless support. |
| 700047 | June 11, 2007 | 7.0-CURRENT after adding TCP LRO interface capabilities. |
| 700048 | June 12, 2007 | 7.0-CURRENT after RFC 3678 API support added to the IPv4 stack. Legacy RFC 1724 behavior of the IP_MULTICAST_IF ioctl has now been removed; 0.0.0.0/8 may no longer be used to specify an interface index. Use struct ipmreqn instead. |
| 700049 | July 3, 2007 | 7.0-CURRENT after importing pf from OpenBSD 4.1 |
| (not changed) | | 7.0-CURRENT after adding IPv6 support for FAST_IPSEC, deleting KAME IPSEC, and renaming FAST_IPSEC to IPSEC. |
| 700050 | July 4, 2007 | 7.0-CURRENT after converting setenv/putenv/etc. calls from traditional BSD to POSIX. |
| 700051 | July 4, 2007 | 7.0-CURRENT after adding new mmap/lseek/etc syscalls. |
| 700052 | July 6, 2007 | 7.0-CURRENT after moving I4B headers to include/i4b. |
| 700053 | September 30, 2007 | 7.0-CURRENT after the addition of support for PCI domains |
| 700054 | October 25, 2007 | 7.0-CURRENT after MFC of wide and single byte ctype separation. |
| 700055 | October 28, 2007 | 7.0-RELEASE, and 7.0-CURRENT after ABI backwards compatibility to the FreeBSD 4/5/6 versions of the PCIOCGETCONF, PCIOCREAD and PCIOCWRITE IOCTLS was MFCed, which required the ABI of the PCIOCGETCONF IOCTL to be broken again |
| 700100 | December 22, 2007 | 7.0-STABLE after 7.0-RELEASE |
| 700101 | February 8, 2008 | 7.0-STABLE after the MFC of m_collapse(). |
| 700102 | March 30, 2008 | 7.0-STABLE after the MFC of kdb_enter_why(). |
| 700103 | April 10, 2008 | 7.0-STABLE after adding l_sysid to struct flock. |
| 700104 | April 11, 2008 | 7.0-STABLE after the MFC of procstat(1). |

| Value | Date | Release |
|--------|-------------------|--|
| 700105 | April 11, 2008 | 7.0-STABLE after the MFC of umtx features. |
| 700106 | April 15, 2008 | 7.0-STABLE after the MFC of write(2) support to psm(4) . |
| 700107 | April 20, 2008 | 7.0-STABLE after the MFC of F_DUP2FD command to fcntl(2) . |
| 700108 | May 5, 2008 | 7.0-STABLE after some lockmgr(9) changes, which makes it necessary to include sys/lock.h to use lockmgr(9) . |
| 700109 | May 27, 2008 | 7.0-STABLE after MFC of the memrchr function. |
| 700110 | August 5, 2008 | 7.0-STABLE after MFC of kernel NFS lockd client. |
| 700111 | August 20, 2008 | 7.0-STABLE after addition of physically contiguous jumbo frame support. |
| 700112 | August 27, 2008 | 7.0-STABLE after MFC of kernel DTrace support. |
| 701000 | November 25, 2008 | 7.1-RELEASE |
| 701100 | November 25, 2008 | 7.1-STABLE after 7.1-RELEASE. |
| 701101 | January 10, 2009 | 7.1-STABLE after strndup merge. |
| 701102 | January 17, 2009 | 7.1-STABLE after cpuctl(4) support added. |
| 701103 | February 7, 2009 | 7.1-STABLE after the merge of multi-/no-IPv4/v6 jails. |
| 701104 | February 14, 2009 | 7.1-STABLE after the store of the suspension owner in the struct mount, and introduction of vfs_susp_clean method into the struct vfsops . |
| 701105 | March 12, 2009 | 7.1-STABLE after the incompatible change to the kern.ipc.shmsecs sysctl to allow allocating larger SysV shared memory segments on 64bit architectures. |
| 701106 | March 14, 2009 | 7.1-STABLE after the merge of a fix for POSIX semaphore wait operations. |
| 702000 | April 15, 2009 | 7.2-RELEASE |
| 702100 | April 15, 2009 | 7.2-STABLE after 7.2-RELEASE. |
| 702101 | May 15, 2009 | 7.2-STABLE after ichsmb(4) was changed to use left-adjusted slave addressing to match other SMBus controller drivers. |
| 702102 | May 28, 2009 | 7.2-STABLE after MFC of the fdopendir function. |
| 702103 | June 06, 2009 | 7.2-STABLE after MFC of PmcTools. |

| Value | Date | Release |
|--------|--------------------|---|
| 702104 | July 14, 2009 | 7.2-STABLE after MFC of the close-from system call. |
| 702105 | July 31, 2009 | 7.2-STABLE after MFC of the SYSVIPC ABI change. |
| 702106 | September 14, 2009 | 7.2-STABLE after MFC of the x86 PAT enhancements and addition of d_mmap_single() and the scatter/gather list VM object type. |
| 703000 | February 9, 2010 | 7.3-RELEASE |
| 703100 | February 9, 2010 | 7.3-STABLE after 7.3-RELEASE. |
| 704000 | December 22, 2010 | 7.4-RELEASE |
| 704100 | December 22, 2010 | 7.4-STABLE after 7.4-RELEASE. |
| 800000 | October 11, 2007 | 8.0-CURRENT. Separating wide and single byte ctype. |
| 800001 | October 16, 2007 | 8.0-CURRENT after libpcap 0.9.8 and tcpdump 3.9.8 import. |
| 800002 | October 21, 2007 | 8.0-CURRENT after renaming kthread_create() and friends to kproc_create() etc. |
| 800003 | October 24, 2007 | 8.0-CURRENT after ABI backwards compatibility to the FreeBSD 4/5/6 versions of the PCIOCGGETCONF, PCIOCREAD and PCIOCWRITE IOCTLs was added, which required the ABI of the PCIOCGGETCONF IOCTL to be broken again |
| 800004 | November 12, 2007 | 8.0-CURRENT after agp(4) driver moved from src/sys/pci to src/sys/dev/agp |
| 800005 | December 4, 2007 | 8.0-CURRENT after changes to the jumbo frame allocator (rev 174247). |
| 800006 | December 7, 2007 | 8.0-CURRENT after the addition of callgraph capture functionality to hwpmc(4). |
| 800007 | December 25, 2007 | 8.0-CURRENT after kdb_enter() gains a "why" argument. |
| 800008 | December 28, 2007 | 8.0-CURRENT after LK_EXCLUPGRADE option removal. |
| 800009 | January 9, 2008 | 8.0-CURRENT after introduction of lockmgr_disown(9) |
| 800010 | January 10, 2008 | 8.0-CURRENT after the vn_lock(9) prototype change. |
| 800011 | January 13, 2008 | 8.0-CURRENT after the VOP_LOCK(9) and VOP_UNLOCK(9) prototype changes. |
| 800012 | January 19, 2008 | 8.0-CURRENT after introduction of lockmgr_recursed(9), BUF_RECURSED(9) and BUF_ISLOCKED(9) and the removal of BUF_REFCNT(). |

| Value | Date | Release |
|--------|-------------------|---|
| 800013 | January 23, 2008 | 8.0-CURRENT after introduction of the “ASCII” encoding. |
| 800014 | January 24, 2008 | 8.0-CURRENT after changing the prototype of lockmgr(9) and removal of lockcount() and LOCKMGR_ASSERT(). |
| 800015 | January 26, 2008 | 8.0-CURRENT after extending the types of the fts(3) structures. |
| 800016 | February 1, 2008 | 8.0-CURRENT after adding an argument to MEXTADD(9) |
| 800017 | February 6, 2008 | 8.0-CURRENT after the introduction of LK_NODUP and LK_NOWITNESS options in the lockmgr(9) space. |
| 800018 | February 8, 2008 | 8.0-CURRENT after the addition of m_collapse. |
| 800019 | February 9, 2008 | 8.0-CURRENT after the addition of current working directory, root directory, and jail directory support to the kern.proc.filedesc sysctl. |
| 800020 | February 13, 2008 | 8.0-CURRENT after introduction of lockmgr_assert(9) and BUF_ASSERT functions. |
| 800021 | February 15, 2008 | 8.0-CURRENT after introduction of lockmgr_args(9) and LK_INTERNAL flag removal. |
| 800022 | (backed out) | 8.0-CURRENT after changing the default system ar to BSD ar(1) . |
| 800023 | February 25, 2008 | 8.0-CURRENT after changing the prototypes of lockstatus(9) and VOP_ISLOCKED(9) , more specifically retiring the struct thread argument. |
| 800024 | March 1, 2008 | 8.0-CURRENT after axing out the lockwaiters and BUF_LOCKWAITERS functions, changing the return value of brelvp from void to int and introducing new flags for lockinit(9) . |
| 800025 | March 8, 2008 | 8.0-CURRENT after adding F_DUP2FD command to fcntl(2) . |
| 800026 | March 12, 2008 | 8.0-CURRENT after changing the priority parameter to cv_broadcastpri such that 0 means no priority. |
| 800027 | March 24, 2008 | 8.0-CURRENT after changing the bpf monitoring ABI when zerocopy bpf buffers were added. |
| 800028 | March 26, 2008 | 8.0-CURRENT after adding l_sysid to struct flock. |
| 800029 | March 28, 2008 | 8.0-CURRENT after reintegration of the BUF_LOCKWAITERS function and the addition of lockmgr_waiters(9) . |

| Value | Date | Release |
|--------|-----------------|--|
| 800030 | April 1, 2008 | 8.0-CURRENT after the introduction of the rw_try_rlock(9) and rw_try_wlock(9) functions. |
| 800031 | April 6, 2008 | 8.0-CURRENT after the introduction of the lockmgr_rw and lockmgr_args_rw functions. |
| 800032 | April 8, 2008 | 8.0-CURRENT after the implementation of the openat and related syscalls, introduction of the O_EXEC flag for the open(2) , and providing the corresponding linux compatibility syscalls. |
| 800033 | April 8, 2008 | 8.0-CURRENT after added write(2) support for psm(4) in native operation level. Now arbitrary commands can be written to <code>/dev/psm%d</code> and status can be read back from it. |
| 800034 | April 10, 2008 | 8.0-CURRENT after introduction of the memrchr function. |
| 800035 | April 16, 2008 | 8.0-CURRENT after introduction of the fdopendir function. |
| 800036 | April 20, 2008 | 8.0-CURRENT after switchover of 802.11 wireless to multi-bss support (aka vaps). |
| 800037 | May 9, 2008 | 8.0-CURRENT after addition of multi routing table support (aka setfib(1) , setfib(2)). |
| 800038 | May 26, 2008 | 8.0-CURRENT after removal of netatm and ISDN4BSD . Also, the addition of the Compact C Type (CTF) tools. |
| 800039 | June 14, 2008 | 8.0-CURRENT after removal of sgtty . |
| 800040 | June 26, 2008 | 8.0-CURRENT with kernel NFS lockd client. |
| 800041 | July 22, 2008 | 8.0-CURRENT after addition of arc4random_buf(3) and arc4random_uniform(3) . |
| 800042 | August 8, 2008 | 8.0-CURRENT after addition of cpuctl(4) . |
| 800043 | August 13, 2008 | 8.0-CURRENT after changing bpf(4) to use a single device node, instead of device cloning. |
| 800044 | August 17, 2008 | 8.0-CURRENT after the commit of the first step of the vimage project renaming global variables to be virtualized with a <code>V_</code> prefix with macros to map them back to their global names. |
| 800045 | August 20, 2008 | 8.0-CURRENT after the integration of the MPSAFE TTY layer, including |

| Value | Date | Release |
|--------|--------------------|--|
| | | changes to various drivers and utilities that interact with it. |
| 800046 | September 8, 2008 | 8.0-CURRENT after the separation of the GDT per CPU on amd64 architecture. |
| 800047 | September 10, 2008 | 8.0-CURRENT after removal of VSVTX, VSGID and VSUID. |
| 800048 | September 16, 2008 | 8.0-CURRENT after converting the kernel NFS mount code to accept individual mount options in the <code>nmount()</code> <code>iovec</code> , not just one big struct <code>nfs_args</code> . |
| 800049 | September 17, 2008 | 8.0-CURRENT after the removal of suser(9) and suser_cred(9) . |
| 800050 | October 20, 2008 | 8.0-CURRENT after buffer cache API change. |
| 800051 | October 23, 2008 | 8.0-CURRENT after the removal of the MALLOC(9) and FREE(9) macros. |
| 800052 | October 28, 2008 | 8.0-CURRENT after the introduction of <code>accmode_t</code> and renaming of <code>VOP_ACCESS</code> 'a_mode' argument to 'a_accmode'. |
| 800053 | November 2, 2008 | 8.0-CURRENT after the prototype change of vfs_busy(9) and the introduction of its <code>MBF_NOWAIT</code> and <code>MBF_MNTLSTLOCK</code> flags. |
| 800054 | November 22, 2008 | 8.0-CURRENT after the addition of <code>buf_ring</code> , memory barriers and <code>ifnet</code> functions to facilitate multiple hardware transmit queues for cards that support them, and a lockless ring-buffer implementation to enable drivers to more efficiently manage queuing of packets. |
| 800055 | November 27, 2008 | 8.0-CURRENT after the addition of Intel™ Core, Core2, and Atom support to hwpmc(4) . |
| 800056 | November 29, 2008 | 8.0-CURRENT after the introduction of multi-/no-IPv4/v6 jails. |
| 800057 | December 1, 2008 | 8.0-CURRENT after the switch to the <code>ath</code> <code>hal</code> source code. |
| 800058 | December 12, 2008 | 8.0-CURRENT after the introduction of the <code>VOP_VPTOCNP</code> operation. |
| 800059 | December 15, 2008 | 8.0-CURRENT incorporates the new <code>arp-v2</code> rewrite. |
| 800060 | December 19, 2008 | 8.0-CURRENT after the addition of <code>makefs</code> . |
| 800061 | January 15, 2009 | 8.0-CURRENT after TCP Appropriate Byte Counting. |

| Value | Date | Release |
|--------|-------------------|---|
| 800062 | January 28, 2009 | 8.0-CURRENT after removal of minor(), minor2unit(), unit2minor(), etc. |
| 800063 | February 18, 2009 | 8.0-CURRENT after GENERIC config change to use the USB2 stack, but also the addition of fdevname(3). |
| 800064 | February 23, 2009 | 8.0-CURRENT after the USB2 stack is moved to and replaces dev/usb. |
| 800065 | February 26, 2009 | 8.0-CURRENT after the renaming of all functions in libmp(3). |
| 800066 | February 27, 2009 | 8.0-CURRENT after changing USB devfs handling and layout. |
| 800067 | February 28, 2009 | 8.0-CURRENT after adding getdelim(), getline(), stpncpy(), strlen(), wcsnlen(), wcscasecmp(), and wcsncasecmp(). |
| 800068 | March 2, 2009 | 8.0-CURRENT after renaming the ushub devclass to uhub. |
| 800069 | March 9, 2009 | 8.0-CURRENT after libusb20.so.1 was renamed to libusb.so.1. |
| 800070 | March 9, 2009 | 8.0-CURRENT after merging IGMPv3 and Source-Specific Multicast (SSM) to the IPv4 stack. |
| 800071 | March 14, 2009 | 8.0-CURRENT after gcc was patched to use C99 inline semantics in c99 and gnu99 mode. |
| 800072 | March 15, 2009 | 8.0-CURRENT after the IF_NEEDSGIANT flag has been removed; non-MPSAFE network device drivers are no longer supported. |
| 800073 | March 18, 2009 | 8.0-CURRENT after the dynamic string token substitution has been implemented for rpath and needed paths. |
| 800074 | March 24, 2009 | 8.0-CURRENT after tcpdump 4.0.0 and libpcap 1.0.0 import. |
| 800075 | April 6, 2009 | 8.0-CURRENT after layout of structs vnet_net, vnet_inet and vnet_ipfw has been changed. |
| 800076 | April 9, 2009 | 8.0-CURRENT after adding delay profiles in dummynet. |
| 800077 | April 14, 2009 | 8.0-CURRENT after removing VOP_LEASE() and vop_vector.vop_lease. |
| 800078 | April 15, 2009 | 8.0-CURRENT after struct rt_weight fields have been added to struct rt_metrics and struct rt_metrics_lite, changing the layout of struct rt_metrics_lite. A bump to RTM_VERSION was made, but backed out. |

| Value | Date | Release |
|--------|----------------|--|
| 800079 | April 15, 2009 | 8.0-CURRENT after struct llentry pointers are added to struct route and struct route_in6. |
| 800080 | April 15, 2009 | 8.0-CURRENT after layout of struct inpcb has been changed. |
| 800081 | April 19, 2009 | 8.0-CURRENT after the layout of struct malloc_type has been changed. |
| 800082 | April 21, 2009 | 8.0-CURRENT after the layout of struct ifnet has changed, and with if_ref() and if_rele() ifnet refcounting. |
| 800083 | April 22, 2009 | 8.0-CURRENT after the implementation of a low-level Bluetooth HCI API. |
| 800084 | April 29, 2009 | 8.0-CURRENT after IPv6 SSM and MLDv2 changes. |
| 800085 | April 30, 2009 | 8.0-CURRENT after enabling support for VIMAGE kernel builds with one active image. |
| 800086 | May 8, 2009 | 8.0-CURRENT after adding support for input lines of arbitrarily length in patch(1). |
| 800087 | May 11, 2009 | 8.0-CURRENT after some VFS KPI changes. The thread argument has been removed from the FSD parts of the VFS. VFS_* functions do not need the context any more because it always refers to curthread. In some special cases, the old behavior is retained. |
| 800088 | May 20, 2009 | 8.0-CURRENT after net80211 monitor mode changes. |
| 800089 | May 23, 2009 | 8.0-CURRENT after adding UDP control block support. |
| 800090 | May 23, 2009 | 8.0-CURRENT after virtualizing interface cloning. |
| 800091 | May 27, 2009 | 8.0-CURRENT after adding hierarchical jails and removing global securelevel. |
| 800092 | May 29, 2009 | 8.0-CURRENT after changing sx_init_flags() KPI. The SX_ADAPTIVESPIN is retired and a new SX_NOADAPTIVE flag is introduced to handle the reversed logic. |
| 800093 | May 29, 2009 | 8.0-CURRENT after adding mnt_xflag to struct mount. |
| 800094 | May 30, 2009 | 8.0-CURRENT after adding VOP_ACCESSX(9) . |
| 800095 | May 30, 2009 | 8.0-CURRENT after changing the polling KPI. The polling handlers |

| Value | Date | Release |
|--------|-------------------|--|
| | | now return the number of packets processed. A new IFCAP_POLLING_NOCOUNT is also introduced to specify that the return value is not significant and the counting should be skipped. |
| 800096 | June 1, 2009 | 8.0-CURRENT after updating to the new netisr implementation and after changing the way we store and access FIBs. |
| 800097 | June 8, 2009 | 8.0-CURRENT after the introduction of vnet destructor hooks and infrastructure. |
| 800097 | June 11, 2009 | 8.0-CURRENT after the introduction of netgraph outbound to inbound path call detection and queuing, which also changed the layout of struct thread. |
| 800098 | June 14, 2009 | 8.0-CURRENT after OpenSSL 0.9.8k import. |
| 800099 | June 22, 2009 | 8.0-CURRENT after NGROUPS update and moving route virtualization into its own VImage module. |
| 800100 | June 24, 2009 | 8.0-CURRENT after SYSVIPC ABI change. |
| 800101 | June 29, 2009 | 8.0-CURRENT after the removal of the /dev/net/* per-interface character devices. |
| 800102 | July 12, 2009 | 8.0-CURRENT after padding was added to struct sackhint, struct tcpcb, and struct tcpstat. |
| 800103 | July 13, 2009 | 8.0-CURRENT after replacing struct tcptopt with struct toeopt in the TOE driver interface to the TCP syncache. |
| 800104 | July 14, 2009 | 8.0-CURRENT after the addition of the linker-set based per-vnet allocator. |
| 800105 | July 19, 2009 | 8.0-CURRENT after version bump for all shared libraries that do not have symbol versioning turned on. |
| 800106 | July 24, 2009 | 8.0-CURRENT after introduction of OBJT_SG VM object type. |
| 800107 | August 2, 2009 | 8.0-CURRENT after making the newbus subsystem Giant free by adding the newbus sxlock and 8.0-RELEASE. |
| 800108 | November 21, 2009 | 8.0-STABLE after implementing EVFILT_USER kevent filter. |
| 800500 | January 7, 2010 | 8.0-STABLE after __FreeBSD_version bump to make pkg_add -r use packages-8-stable. |

| Value | Date | Release |
|--------|-------------------|---|
| 800501 | January 24, 2010 | 8.0-STABLE after change of the <code>scan_dir(3)</code> and <code>alphasort(3)</code> prototypes to conform to SUSv4. |
| 800502 | January 31, 2010 | 8.0-STABLE after addition of <code>sig-pause(3)</code> . |
| 800503 | February 25, 2010 | 8.0-STABLE after addition of <code>SIOCGIFDESCR</code> and <code>SIOCSIFDESCR</code> ioctls to network interfaces. These ioctl can be used to manipulate interface description, as inspired by OpenBSD. |
| 800504 | March 1, 2010 | 8.0-STABLE after MFC of importing <code>x86emu</code> , a software emulator for real mode x86 CPU from OpenBSD. |
| 800505 | May 18, 2010 | 8.0-STABLE after MFC of adding <code>liblzma</code> , <code>xz</code> , <code>xzdec</code> , and <code>lzmainfo</code> . |
| 801000 | June 14, 2010 | 8.1-RELEASE |
| 801500 | June 14, 2010 | 8.1-STABLE after 8.1-RELEASE. |
| 801501 | November 3, 2010 | 8.1-STABLE after KBI change in struct <code>sysentvec</code> , and implementation of <code>PL_FLAG_SCE/SCX/EXEC/SI</code> and <code>pl_siginfo</code> for <code>ptrace(PT_LWPINFO)</code> . |
| 802000 | December 22, 2010 | 8.2-RELEASE |
| 802500 | December 22, 2010 | 8.2-STABLE after 8.2-RELEASE. |
| 802501 | February 28, 2011 | 8.2-STABLE after merging DTrace changes, including support for user-land tracing. |
| 802502 | March 6, 2011 | 8.2-STABLE after merging <code>log2</code> and <code>log2f</code> into <code>libm</code> . |
| 802503 | May 1, 2011 | 8.2-STABLE after upgrade of the gcc to the last GPLv2 version from the FSF <code>gcc-4_2-branch</code> . |
| 802504 | May 28, 2011 | 8.2-STABLE after introduction of the KPI and supporting infrastructure for modular congestion control. |
| 802505 | May 28, 2011 | 8.2-STABLE after introduction of <code>Hhook</code> and <code>Khelp</code> KPIs. |
| 802506 | May 28, 2011 | 8.2-STABLE after addition of OSD to struct <code>tcpcb</code> . |
| 802507 | June 6, 2011 | 8.2-STABLE after ZFS v28 import. |
| 802508 | June 8, 2011 | 8.2-STABLE after removal of the <code>schedtail</code> event handler and addition of the <code>sv_schedtail</code> method to struct <code>sysvec</code> . |
| 802509 | July 14, 2011 | 8.2-STABLE after merging the SSE3 support into <code>binutils</code> . |
| 802510 | July 19, 2011 | 8.2-STABLE after addition of <code>RFTSIGZMB</code> flag for <code>rfork(2)</code> . |

| Value | Date | Release |
|--------|--------------------|--|
| 802511 | September 9, 2011 | 8.2-STABLE after addition of automatic detection of USB mass storage devices which do not support the no synchronize cache SCSI command. |
| 802512 | September 10, 2011 | 8.2-STABLE after merging of re-factoring of auto-quirk. |
| 802513 | October 25, 2011 | 8.2-STABLE after merging of the MAP_PREFAULT_READ flag to mmap(2) . |
| 802514 | November 16, 2011 | 8.2-STABLE after merging of addition of posix_fallocate(2) syscall. |
| 802515 | January 6, 2012 | 8.2-STABLE after merging of addition of the posix_fadvise(2) system call. |
| 802516 | January 16, 2012 | 8.2-STABLE after merging gperf 3.0.3 |
| 802517 | February 15, 2012 | 8.2-STABLE after introduction of the new extensible sysctl(3) interface NET_RT_IPLISTL to query address lists (rev 231769). |
| 803000 | March 3, 2012 | 8.3-RELEASE. |
| 803500 | March 3, 2012 | 8.3-STABLE after branching releng/8.3 (RELENG_8_3). |
| 804000 | March 28, 2013 | 8.4-RELEASE. |
| 804500 | March 28, 2013 | 8.4-STABLE after 8.4-RELEASE. |
| 804504 | September 9, 2014 | 8.4-STABLE after FreeBSD-SA-14:18 (rev 271305). |
| 804505 | September 16, 2014 | 8.4-STABLE after FreeBSD-SA-14:19 (rev 271668). |
| 804506 | October 21, 2014 | 8.4-STABLE after FreeBSD-SA-14:21 (rev 273413). |
| 804507 | November 4, 2014 | 8.4-STABLE after FreeBSD-SA-14:23, FreeBSD-SA-14:24, and FreeBSD-SA-14:25 (rev 274162). |
| 804508 | February 25, 2015 | 8-STABLE after FreeBSD-EN-15:01.vt, FreeBSD-EN-15:02.openssl, FreeBSD-EN-15:03.freebsd-update, FreeBSD-SA-15:04.igmp, and FreeBSD-SA-15:05.bind (rev 279287). |
| 900000 | August 22, 2009 | 9.0-CURRENT. |
| 900001 | September 8, 2009 | 9.0-CURRENT after importing x86emu, a software emulator for real mode x86 CPU from OpenBSD. |
| 900002 | September 23, 2009 | 9.0-CURRENT after implementing the EVFILT_USER kevent filter functionality. |
| 900003 | December 2, 2009 | 9.0-CURRENT after addition of sigpause(3) and PIE support in csu. |

| Value | Date | Release |
|--------|-------------------|--|
| 900004 | December 6, 2009 | 9.0-CURRENT after addition of libu-log and its libutempter compatibility interface. |
| 900005 | December 12, 2009 | 9.0-CURRENT after addition of <code>sleepq_sleepcnt()</code> , which can be used to query the number of waiters on a specific waiting queue. |
| 900006 | January 4, 2010 | 9.0-CURRENT after change of the <code>scandir(3)</code> and <code>alphasort(3)</code> prototypes to conform to SUSv4. |
| 900007 | January 13, 2010 | 9.0-CURRENT after the removal of <code>utmp(5)</code> and the addition of <code>utmpx</code> (see <code>getutxent(3)</code>) for improved logging of user logins and system events. |
| 900008 | January 20, 2010 | 9.0-CURRENT after the import of BSD <code>bc/dc</code> and the deprecation of GNU <code>bc/dc</code> . |
| 900009 | January 26, 2010 | 9.0-CURRENT after the addition of <code>SIOCGIFDESCR</code> and <code>SIOCSIFDESCR</code> ioctls to network interfaces. These ioctl can be used to manipulate interface description, as inspired by OpenBSD. |
| 900010 | March 22, 2010 | 9.0-CURRENT after the import of <code>zlib 1.2.4</code> . |
| 900011 | April 24, 2010 | 9.0-CURRENT after adding soft-updates journalling. |
| 900012 | May 10, 2010 | 9.0-CURRENT after adding <code>liblzma</code> , <code>xz</code> , <code>xzdec</code> , and <code>lzmainfo</code> . |
| 900013 | May 24, 2010 | 9.0-CURRENT after bringing in USB fixes for <code>linux(4)</code> . |
| 900014 | June 10, 2010 | 9.0-CURRENT after adding Clang. |
| 900015 | July 22, 2010 | 9.0-CURRENT after the import of BSD <code>grep</code> . |
| 900016 | July 28, 2010 | 9.0-CURRENT after adding <code>mti_zone</code> to struct <code>malloc_type_internal</code> . |
| 900017 | August 23, 2010 | 9.0-CURRENT after changing back default <code>grep</code> to GNU <code>grep</code> and adding <code>WITH_BSD_GREP</code> knob. |
| 900018 | August 24, 2010 | 9.0-CURRENT after the <code>pthread_kill(3)</code> -generated signal is identified as <code>SI_LWP</code> in <code>si_code</code> . Previously, <code>si_code</code> was <code>SI_USER</code> . |
| 900019 | August 28, 2010 | 9.0-CURRENT after addition of the <code>MAP_PREFAULT_READ</code> flag to <code>mmap(2)</code> . |
| 900020 | September 9, 2010 | 9.0-CURRENT after adding drain functionality to <code>sbufs</code> , which also changed the layout of struct <code>sbuf</code> . |

| Value | Date | Release |
|--------|--------------------|---|
| 900021 | September 13, 2010 | 9.0-CURRENT after DTrace has grown support for userland tracing. |
| 900022 | October 2, 2010 | 9.0-CURRENT after addition of the BSD man utilities and retirement of GNU/GPL man utilities. |
| 900023 | October 11, 2010 | 9.0-CURRENT after updating xz to git 20101010 snapshot. |
| 900024 | November 11, 2010 | 9.0-CURRENT after libgcc.a was replaced by libcompiler_rt.a. |
| 900025 | November 12, 2010 | 9.0-CURRENT after the introduction of the modularised congestion control. |
| 900026 | November 30, 2010 | 9.0-CURRENT after the introduction of Serial Management Protocol (SMP) passthrough and the XPT_SMP_IO and XPT_GDEV_ADVINFO CAM CCBs. |
| 900027 | December 5, 2010 | 9.0-CURRENT after the addition of log2 to libm. |
| 900028 | December 21, 2010 | 9.0-CURRENT after the addition of the Hhook (Helper Hook), Khelp (Kernel Helpers) and Object Specific Data (OSD) KPIs. |
| 900029 | December 28, 2010 | 9.0-CURRENT after the modification of the TCP stack to allow Khelp modules to interact with it via helper hook points and store per-connection data in the TCP control block. |
| 900030 | January 12, 2011 | 9.0-CURRENT after the update of libdialog to version 20100428. |
| 900031 | February 7, 2011 | 9.0-CURRENT after the addition of pthread_getthreadid_np(3). |
| 900032 | February 8, 2011 | 9.0-CURRENT after the removal of the uio_yield prototype and symbol. |
| 900033 | February 18, 2011 | 9.0-CURRENT after the update of binutils to version 2.17.50. |
| 900034 | March 8, 2011 | 9.0-CURRENT after the struct sysvec (sv_schedtail) changes. |
| 900035 | March 29, 2011 | 9.0-CURRENT after the update of base gcc and libstdc++ to the last GPLv2 licensed revision. |
| 900036 | April 18, 2011 | 9.0-CURRENT after the removal of libobjc and Objective-C support from the base system. |
| 900037 | May 13, 2011 | 9.0-CURRENT after importing the libprocstat(3) library and fuser(1) utility to the base system. |
| 900038 | May 22, 2011 | 9.0-CURRENT after adding a lock flag argument to VFS_FHTOVP(9). |

| Value | Date | Release |
|--------|--------------------|---|
| 900039 | June 28, 2011 | 9.0-CURRENT after importing pf from OpenBSD 4.5. |
| 900040 | July 19, 2011 | Increase default MAXCPU for FreeBSD to 64 on amd64 and ia64 and to 128 for XLP (mips). |
| 900041 | August 13, 2011 | 9.0-CURRENT after the implementation of Capsicum capabilities; fget(9) gains a rights argument. |
| 900042 | August 28, 2011 | Bump shared libraries' version numbers for libraries whose ABI has changed in preparation for 9.0. |
| 900043 | September 2, 2011 | Add automatic detection of USB mass storage devices which do not support the no synchronize cache SCSI command. |
| 900044 | September 10, 2011 | Re-factor auto-quirk. 9.0-RELEASE. |
| 900045 | January 2, 2012 | 9-CURRENT after MFC of true/false from 1000002. |
| 900500 | January 2, 2012 | 9.0-STABLE. |
| 900501 | January 6, 2012 | 9.0-STABLE after merging of addition of the posix_fadvise(2) system call. |
| 900502 | January 16, 2012 | 9.0-STABLE after merging gperf 3.0.3 |
| 900503 | February 15, 2012 | 9.0-STABLE after introduction of the new extensible sysctl(3) interface NET_RT_IFLISTL to query address lists (rev 231768). |
| 900504 | March 3, 2012 | 9.0-STABLE after changes related to mounting of filesystem inside a jail (rev 232728). |
| 900505 | March 13, 2012 | 9.0-STABLE after introduction of new tcp(4) socket options: TCP_KEEPINIT, TCP_KEEPIDLE, TCP_KEEPINTVL, and TCP_KEEPCNT (rev 232945). |
| 900506 | May 22, 2012 | 9.0-STABLE after introduction of the quick_exit function and related changes required for C++11 (rev 235786). |
| 901000 | August 5, 2012 | 9.1-RELEASE. |
| 901500 | August 6, 2012 | 9.1-STABLE after branching releng/9.1 (RELENG_9_1). |
| 901501 | November 11, 2012 | 9.1-STABLE after LIST_PREV() added to queue.h (rev 242893) and KBI change in USB serial devices (rev 240659). |
| 901502 | November 28, 2012 | 9.1-STABLE after USB serial jitter buffer requires rebuild of USB serial device modules. |
| 901503 | February 21, 2013 | 9.1-STABLE after USB moved to the driver structure requiring a rebuild |

| Value | Date | Release |
|--------|--------------------|---|
| | | of all USB modules. Also indicates the presence of nmtree. |
| 901504 | March 15, 2013 | 9.1-STABLE after install gained -l, -M, -N and related flags and cat gained the -l option. |
| 901505 | June 13, 2013 | 9.1-STABLE after fixes in ctfmerge bootstrapping (rev 249243). |
| 902001 | August 3, 2013 | releng/9.2 branched from stable/9 (rev 253912). |
| 902501 | August 2, 2013 | 9.2-STABLE after creation of releng/9.2 branch (rev 253913). |
| 902502 | August 26, 2013 | 9.2-STABLE after inclusion of the PIM_RESCAN CAM path inquiry flag (rev 254938). |
| 902503 | August 27, 2013 | 9.2-STABLE after inclusion of the SI_UNMAPPED cdev flag (rev 254979). |
| 902504 | October 22, 2013 | 9.2-STABLE after inclusion of support for “first boot” rc(8) scripts (rev 256917). |
| 902505 | December 12, 2013 | 9.2-STABLE after Heimdal encoding fix (rev 259448). |
| 902506 | December 31, 2013 | 9-STABLE after MAP_STACK fixes (rev 260082). |
| 902507 | March 5, 2014 | 9-STABLE after upgrade of libc++ to 3.4 release (rev 262801). |
| 902508 | March 14, 2014 | 9-STABLE after merge of the Radeon KMS driver (rev 263170). |
| 902509 | March 21, 2014 | 9-STABLE after upgrade of llvm/clang to 3.4 release (rev 263509). |
| 902510 | March 27, 2014 | 9-STABLE after merge of the vt(4) driver (rev 263818). |
| 902511 | March 27, 2014 | 9-STABLE after FreeBSD-SA-14:06.openssl (rev 264289). |
| 902512 | April 30, 2014 | 9-STABLE after FreeBSD-SA-14:08.tcp (rev 265123). |
| 903000 | June 20, 2014 | 9-RC1 releng/9.3 branch (rev 267656). |
| 903500 | June 20, 2014 | 9.3-STABLE releng/9.3 branch (rev 267657). |
| 903501 | July 8, 2014 | 9-STABLE after FreeBSD-SA-14:17.kmem (rev 268433). |
| 903502 | August 19, 2014 | 9-STABLE after SOCK_DGRAM bug fix (rev 269789). |
| 903503 | September 9, 2014 | 9-STABLE after FreeBSD-SA-14:18 (rev 269687). |
| 903504 | September 16, 2014 | 9-STABLE after FreeBSD-SA-14:19 (rev 271668). |

| Value | Date | Release |
|---------|--------------------|--|
| 903505 | October 21, 2014 | 9-STABLE after FreeBSD-SA-14:20, FreeBSD-SA-14:21, and FreeBSD-SA-14:22 (rev 273412). |
| 903506 | November 4, 2014 | 9-STABLE after FreeBSD-SA-14:23, FreeBSD-SA-14:24, and FreeBSD-SA-14:25 (rev 274162). |
| 903507 | December 13, 2014 | 9-STABLE after merging an important fix to the LLVM vectorizer, which could lead to buffer overruns in some cases (rev 275742). |
| 903508 | February 25, 2015 | 9-STABLE after FreeBSD-EN-15:01.vt, FreeBSD-EN-15:02.openssl, FreeBSD-EN-15:03.freebsd-update, FreeBSD-SA-15:04.igmp, and FreeBSD-SA-15:05.bind (rev 279287). |
| 903509 | February 29, 2016 | 9-STABLE after bumping the default value of <code>compat.linux.osrelease</code> to 2.6.18 to support the <code>linux-c6-*</code> ports out of the box (rev 296219). |
| 1000000 | September 26, 2011 | 10.0-CURRENT. |
| 1000001 | November 4, 2011 | 10-CURRENT after addition of the <code>posix_fadvise(2)</code> system call. |
| 1000002 | December 12, 2011 | 10-CURRENT after defining boolean <code>true/false</code> in <code>sys/types.h</code> , <code>sizeof(bool)</code> may have changed (rev 228444). 10-CURRENT after <code>xlocale.h</code> was introduced (rev 227753). |
| 1000003 | December 16, 2011 | 10-CURRENT after major changes to <code>carp(4)</code> , changing size of <code>struct in_aliasreq</code> , <code>struct in6_aliasreq</code> (rev 228571) and straitening arguments check of <code>SIOCAIFADDR</code> (rev 228574). |
| 1000004 | January 1, 2012 | 10-CURRENT after the removal of <code>skpc(9)</code> and the addition of <code>memchr(9)</code> (rev 229200). |
| 1000005 | January 16, 2012 | 10-CURRENT after the removal of support for <code>SIOCSIFADDR</code> , <code>SIOCSIFNETMASK</code> , <code>SIOCSIFBRDADDR</code> , <code>SIOCSIFDSTADDR</code> <code>ioctl</code> s (rev 230207). |
| 1000006 | January 26, 2012 | 10-CURRENT after introduction of read capacity data asynchronous notification in the <code>cam(4)</code> layer (rev 230590). |
| 1000007 | February 5, 2012 | 10-CURRENT after introduction of new <code>tcp(4)</code> socket options: <code>TCP_KEEPI</code> <code>NIT</code> , <code>TCP_KEEPI</code> <code>DLE</code> , <code>TCP_KEEPI</code> <code>NTVL</code> , and <code>TCP_KEEPI</code> <code>CNT</code> (rev 231025). |

| Value | Date | Release |
|---------------|-------------------|--|
| 1000008 | February 11, 2012 | 10-CURRENT after introduction of the new extensible sysctl(3) interface NET_RT_IPLIST to query address lists (rev 231505). |
| 1000009 | February 25, 2012 | 10-CURRENT after import of libarchive 3.0.3 (rev 232153). |
| 1000010 | March 31, 2012 | 10-CURRENT after xlocale cleanup (rev 233757). |
| 1000011 | April 16, 2012 | 10-CURRENT import of LLVM/Clang 3.1 trunk r154661 (rev 234353). |
| 1000012 | May 2, 2012 | 10-CURRENT jemalloc import (rev 234924). |
| 1000013 | May 22, 2012 | 10-CURRENT after byacc import (rev 235788). |
| 1000014 | June 27, 2012 | 10-CURRENT after BSD sort becoming the default sort (rev 237629). |
| 1000015 | July 12, 2012 | 10-CURRENT after import of OpenSSL 1.0.1c (rev 238405). |
| (not changed) | July 13, 2012 | 10-CURRENT after the fix for LLVM/Clang 3.1 regression (rev 238429). |
| 1000016 | August 8, 2012 | 10-CURRENT after KBI change in ucom(4) (rev 239179). |
| 1000017 | August 8, 2012 | 10-CURRENT after adding streams feature to the USB stack (rev 239214). |
| 1000018 | September 8, 2012 | 10-CURRENT after major rewrite of pf(4) (rev 240233). |
| 1000019 | October 6, 2012 | 10-CURRENT after pf(9) KBI/KPI changed to supply packets in net byte order to AF_INET filter hooks (rev 241245). |
| 1000020 | October 16, 2012 | 10-CURRENT after the network interface cloning KPI changed and struct if_clone becoming opaque (rev 241610). |
| 1000021 | October 22, 2012 | 10-CURRENT after removal of support for non-MPSAFE filesystems and addition of support for FUSEFS (rev 241519 , 241897). |
| 1000022 | October 22, 2012 | 10-CURRENT after the entire IPv4 stack switched to network byte order for IP packet header storage (rev 241913). |
| 1000023 | November 5, 2012 | 10-CURRENT after jitter buffer in the common USB serial driver code, to temporarily store characters if the TTY buffer is full. Add flow stop and start signals when this happens (rev 242619). |

| Value | Date | Release |
|---------|-------------------|---|
| 1000024 | November 5, 2012 | 10-CURRENT after clang was made the default compiler on i386 and amd64 (rev 242624). |
| 1000025 | November 17, 2012 | 10-CURRENT after the sin6_scope_id member variable in struct sockadr_in6 was changed to being filled by the kernel before passing the structure to the userland via sysctl or routing socket. This means the KAME-specific embedded scope id in sin6_addr.s6_addr[2] is always cleared in userland application (rev 243443). |
| 1000026 | January 11, 2013 | 10-CURRENT after install gained the -N flag (rev 245313). May also be used to indicate the presence of nmtree. |
| 1000027 | January 29, 2013 | 10-CURRENT after cat gained the -l flag (rev 246083). |
| 1000028 | February 13, 2013 | 10-CURRENT after USB moved to the driver structure requiring a rebuild of all USB modules (rev 246759). |
| 1000029 | March 4, 2013 | 10-CURRENT after the introduction of tickless callout facility which also changed the layout of struct callout (rev 247777). |
| 1000030 | March 12, 2013 | 10-CURRENT after KPI breakage introduced in the VM subsystem to support read/write locking (rev 248084). |
| 1000031 | April 26, 2013 | 10-CURRENT after the dst parameter of the ifnet if_output method was changed to take const qualifier (rev 249925). |
| 1000032 | May 1, 2013 | 10-CURRENT after the introduction of the accept4 (rev 250154) and pipe2 (rev 250159) system calls. |
| 1000033 | May 21, 2013 | 10-CURRENT after flex 2.5.37 import (rev 250881). |
| 1000034 | June 3, 2013 | 10-CURRENT after the addition of these functions to libm: cacos, cacosf, cacosh, cacoshf, casin, casinf, casinh, casinhf, catan, catanf, catanh, catanhf, logl, log2l, log10l, log1pl, expm1l (rev 251294). |
| 1000035 | June 8, 2013 | 10-CURRENT after the introduction of the aio_mlock system call (rev 251526). |
| 1000036 | July 9, 2013 | 10-CURRENT after the addition of a new function to the kernel GSSAPI module's function call interface (rev 253049). |

| Value | Date | Release |
|---------|-----------------|--|
| 1000037 | July 9, 2013 | 10-CURRENT after the migration of statistics structures to PCPU counters. Changed structures include: ahstat, arpstat, espstat, icmp6_ifstat, icmp6stat, in6_ifstat, ip6stat, ipcompstat, ipipstat, ipsecstat, mrt6stat, mrtstat, pfkeystat, pim6stat, pimstat, rip6stat, udpstat (rev 253081). |
| 1000038 | July 16, 2013 | 10-CURRENT after making ARM EABI the default ABI on arm, armeb, armv6, and armv6eb architectures (rev 253396). |
| 1000039 | July 22, 2013 | 10-CURRENT after CAM and mps(4) driver scanning changes (rev 253549). |
| 1000040 | July 24, 2013 | 10-CURRENT after addition of libusb pkgconf files (rev 253638). |
| 1000041 | August 5, 2013 | 10-CURRENT after change from time_second to time_uptime in PF_INET6 (rev 253970). |
| 1000042 | August 9, 2013 | 10-CURRENT after VM subsystem change to unify soft and hard busy mechanisms (rev 254138). |
| 1000043 | August 13, 2013 | 10-CURRENT after WITH_ICONV is enabled by default. A new src.conf(5) option, WITH_LIBICONV_COMPAT (disabled by default) adds libiconv_open to provide compatibility with the libiconv port (rev 254273). |
| 1000044 | August 15, 2013 | 10-CURRENT after libc.so conversion to an ld(1) script (rev 251668 , 254358). |
| 1000045 | August 15, 2013 | 10-CURRENT after devfs programming interface change by replacing the cdevsw flag D_UNMAPPED_IO with the struct cdev flag SI_UNMAPPED (rev 254389). |
| 1000046 | August 19, 2013 | 10-CURRENT after addition of M_PROTO[9-12] and removal of M_FRAG M_FIRSTFRAG M_LASTFRAG mbuf flags (rev 254524 , 254526). |
| 1000047 | August 21, 2013 | 10-CURRENT after stat(2) update to allow storing some Windows/DOS and CIFS file attributes as stat(2) flags (rev 254627). |
| 1000048 | August 22, 2013 | 10-CURRENT after modification of structure xsctp_inpcb (rev 254672). |
| 1000049 | August 24, 2013 | 10-CURRENT after physio(9) support for devices that do not function properly with split I/O, such as sa(4) (rev 254760). |

| Value | Date | Release |
|---------|-------------------|---|
| 1000050 | August 24, 2013 | 10-CURRENT after modifications of structure mbuf (rev 254780 , 254799 , 254804 , 254807 254842). |
| 1000051 | August 25, 2013 | 10-CURRENT after Radeon KMS driver import (rev 254885 , 254887). |
| 1000052 | September 3, 2013 | 10-CURRENT after import of NetBSD libexecinfo is connected to the build (rev 255180). |
| 1000053 | September 6, 2013 | 10-CURRENT after API and ABI changes to the Capsicum framework (rev 255305). |
| 1000054 | September 6, 2013 | 10-CURRENT after gcc and libstdc++ are no longer built by default (rev 255321). |
| 1000055 | September 6, 2013 | 10-CURRENT after addition of MMAP_32BIT mmap(2) flag (rev 255426). |
| 1000100 | December 7, 2013 | releeng/10.0 branched from stable/10 (rev 259065). |
| 1000500 | October 10, 2013 | 10-STABLE after branch from head/ (rev 256283). |
| 1000501 | October 22, 2013 | 10-STABLE after addition of first-boot rc(8) support (rev 256916). |
| 1000502 | November 20, 2013 | 10-STABLE after removal of iconv symbols from libc.so.7 (rev 258398). |
| 1000510 | December 7, 2013 | releeng/10.0 __FreeBSD_version update to prevent the value from going backwards (rev 259067). |
| 1000700 | December 7, 2013 | 10-STABLE after releeng/10.0 branch (rev 259069). |
| 1000701 | December 15, 2013 | 10.0-STABLE after Heimdal encoding fix (rev 259447). |
| 1000702 | December 31, 2013 | 10-STABLE after MAP_STACK fixes (rev 260135). |
| 1000703 | March 5, 2014 | 10-STABLE after upgrade of libc++ to 3.4 release (rev 262801). |
| 1000704 | March 7, 2014 | 10-STABLE after MFC of the vt(4) driver (rev 262861). |
| 1000705 | March 21, 2014 | 10-STABLE after upgrade of llvm/clang to 3.4 release (rev 263508). |
| 1000706 | April 6, 2014 | 10-STABLE after GCC support for __block definition (rev 264214). |
| 1000707 | April 8, 2014 | 10-STABLE after FreeBSD-SA-14:06.openssl (rev 264289). |
| 1000708 | April 30, 2014 | 10-STABLE after FreeBSD-SA-14:07.devfs, FreeBSD-SA-14:08.tcp, and FreeBSD-SA-14:09.openssl (rev 265122). |

| Value | Date | Release |
|---------|--------------------|--|
| 1000709 | May 13, 2014 | 10-STABLE after support for UDP-Lite protocol (RFC 3828) (rev 265946). |
| 1000710 | June 13, 2014 | 10-STABLE after changes to strcasecmp(3) , moving <code>strcasecmp_l()</code> and <code>strncasecmp_l()</code> from <code><string.h></code> to <code><strings.h></code> for POSIX 2008 compliance (rev 267465). |
| 1000711 | July 8, 2014 | 10-STABLE after FreeBSD-SA-14:17.kmem (rev 268432). |
| 1000712 | August 1, 2014 | 10-STABLE after nfsd(8) 4.1 merge (rev 269398). |
| 1000713 | August 3, 2014 | 10-STABLE after regex(3) library update to add “>” and “<” delimiters (rev 269484). |
| 1000714 | August 3, 2014 | 10-STABLE after SOCK_DGRAM bug fix (rev 269490). |
| 1000715 | September 9, 2014 | 10-STABLE after FreeBSD-SA-14:18 (rev 269686). |
| 1000716 | September 16, 2014 | 10-STABLE after FreeBSD-SA-14:19 (rev 271667). |
| 1000717 | September 18, 2014 | 10-STABLE after i915 HW context support (rev 271816). |
| 1001000 | October 2, 2014 | 10.1-RC1 after releng/10.1 branch (rev 272463). |
| 1001500 | October 2, 2014 | 10-STABLE after releng/10.1 branch (rev 272464). |
| 1001501 | October 21, 2014 | 10-STABLE after FreeBSD-SA-14:20, FreeBSD-SA-14:22, and FreeBSD-SA-14:23 (rev 273411). |
| 1001502 | November 4, 2014 | 10-STABLE after FreeBSD-SA-14:23, FreeBSD-SA-14:24, and FreeBSD-SA-14:25 (rev 274162). |
| 1001503 | November 25, 2014 | 10-STABLE after merging new libraries/utilities (dpv and figpar) for data throughput visualization (rev 275040). |
| 1001504 | December 13, 2014 | 10-STABLE after merging an important fix to the LLVM vectorizer, which could lead to buffer overruns in some cases (rev 275742). |
| 1001505 | January 3, 2015 | 10-STABLE after merging some arm constants in r276312 (rev 276633). |
| 1001506 | January 12, 2015 | 10-STABLE after merging max table size update for yacc (rev 277087). |
| 1001507 | January 27, 2015 | 10-STABLE after changes to the UDP tunneling callback to provide a context pointer and the source sockaddr (rev 277790). |

| Value | Date | Release |
|---------|-------------------|--|
| 1001508 | February 18, 2015 | 10-STABLE after addition of the CDAI_TYPE_EXT_INQ request type (rev 278974). |
| 1001509 | February 25, 2015 | 10-STABLE after Free-BSD-EN-15:01.vt, Free-BSD-EN-15:02.openssl, Free-BSD-EN-15:03.freebsd-update, Free-BSD-SA-15:04.igmp, and Free-BSD-SA-15:05.bind (rev 279287). |
| 1001511 | 19 March, 2015 | 10-STABLE after sys/capability.h is renamed to sys/capsicum.h (rev 280224 /). |
| 1001512 | 24 March, 2015 | 10-STABLE after addition of new mtio(4), sa(4) ioctls (rev 281954). |
| 1001513 | 24 April, 2015 | 10-STABLE after starting the process of removing the use of the deprecated "M_FLOWID" flag from the network code (rev 281955). |
| 1002000 | 24 July, 2015 | releeng/10.2 branched from 10-STABLE (rev 285830). |
| 1002500 | 24 July, 2015 | 10-STABLE after releeng/10.2 branched from 10-STABLE (rev 285831). |
| 1002501 | 8 October, 2015 | 10-STABLE after merge of ZFS changes that affected the internal interface of zfeature_info structure (rev 288572). |
| 1002502 | 24 November, 2015 | 10-STABLE after merge of dump device changes that affected the arguments of g_dev_setdumpdev() (rev 291215). |
| 1002503 | 14 December, 2015 | 10-STABLE after merge of changes to the internal interface between the nfsd.ko and nfscommon.ko modules, requiring them to be upgraded together (rev 292223). |
| 1002504 | 22 December, 2015 | 10-STABLE after merge of xz 5.2.2 merge (multithread support) (rev 292588). |
| 1002505 | 30 December, 2015 | 10-STABLE after merge of changes to pci(4) (rev 292907). |
| 1002506 | 9 January, 2016 | 10-STABLE after merge of utimensat(5) (rev 293473). |
| 1002507 | 9 January, 2016 | 10-STABLE after merge of changes to linux(4) (rev 293477 through 293609). |
| 1002508 | 9 January, 2016 | 10-STABLE after merge of changes to figbar(3) types/macros (rev 290275). |
| 1002509 | 1 February, 2016 | 10-STABLE after merge of API change to dpv(3) (rev 295107). |

| Value | Date | Release |
|---------|-------------------|--|
| 1003000 | 4 March, 2016 | releng/10.3 branched from 10-STABLE (rev 296373). |
| 1003500 | 4 March, 2016 | 10-STABLE after releng/10.3 branched from 10-STABLE (rev 296374). |
| 1100000 | October 10, 2013 | 11.0-CURRENT (rev 256284). |
| 1100001 | October 19, 2013 | 11.0-CURRENT after addition of support for "first boot" rc.d scripts, so ports can make use of this (rev 256776). |
| 1100002 | November 5, 2013 | 11.0-CURRENT after dropping support for historic iocls (rev 257696). |
| 1100003 | November 17, 2013 | 11.0-CURRENT after iconv changes (rev 258284). |
| 1100004 | December 15, 2013 | 11.0-CURRENT after the behavior change of gss_pseudo_random introduced in r259286 (rev 259424). |
| 1100005 | December 28, 2013 | 11.0-CURRENT after r259951 - Do not coalesce entries in vm_map_stack() (rev 260010). |
| 1100006 | January 28, 2014 | 11.0-CURRENT after upgrades of libelf and libdwarf (rev 261246). |
| 1100007 | January 30, 2014 | 11.0-CURRENT after upgrade of libc++ to 3.4 release (rev 261283). |
| 1100008 | February 14, 2014 | 11.0-CURRENT after libc++ 3.4 ABI compatibility fix (rev 261801). |
| 1100009 | February 16, 2014 | 11.0-CURRENT after upgrade of llvm/clang to 3.4 release (rev 261991). |
| 1100010 | February 28, 2014 | 11.0-CURRENT after upgrade of ncurses to 5.9 release (rev 262629). |
| 1100011 | March 13, 2014 | 11.0-CURRENT after ABI change in struct if_data (rev 263102). |
| 1100012 | March 14, 2014 | 11.0-CURRENT after removal of Novell IPX protocol support (rev 263140). |
| 1100013 | March 14, 2014 | 11.0-CURRENT after removal of AppleTalk protocol support (rev 263152). |
| 1100014 | March 16, 2014 | 11.0-CURRENT after renaming <sys/capability.h> to <sys/capicum.h> to avoid a clash with similarly named headers in other operating systems. A compatibility header is left in place to limit build breakage, but will be deprecated in due course (rev 263235). |
| 1100015 | March 22, 2014 | 11.0-CURRENT after cnt rename to vm_cnt (rev 263620). |

| Value | Date | Release |
|---------|--------------------|---|
| 1100016 | March 23, 2014 | 11.0-CURRENT after addition of armv6hf TARGET_ARCH (rev 263660). |
| 1100017 | April 4, 2014 | 11.0-CURRENT after GCC support for __block definition (rev 264121). |
| 1100018 | April 6, 2014 | 11.0-CURRENT after support for UDP-Lite protocol (RFC 3828) (rev 264212). |
| 1100019 | April 8, 2014 | 11.0-CURRENT after FreeBSD-SA-14:06.openssl (rev 264265). |
| 1100020 | May 1, 2014 | 11.0-CURRENT after removing lindev in favor of having /dev/full by default (rev 265212). |
| 1100021 | May 6, 2014 | 11.0-CURRENT after src.opts.mk changes, decoupling make.conf(5) from buildworld (rev 265419). |
| 1100022 | May 30, 2014 | 11.0-CURRENT after changes to strcasecmp(3) , moving strcasecmp_l() and strncasecmp_l() from <string.h> to <strings.h> for POSIX 2008 compliance (rev 266865). |
| 1100023 | June 13, 2014 | 11.0-CURRENT after the CUSE library and kernel module have been attached to the build by default (rev 267440). |
| 1100024 | June 27, 2014 | 11.0-CURRENT after sysctl(3) API change (rev 267992). |
| 1100025 | June 30, 2014 | 11.0-CURRENT after regex(3) library update to add ">" and "<" delimiters (rev 268066). |
| 1100026 | July 1, 2014 | 11.0-CURRENT after the internal interface between the NFS modules, including the krpc, was changed by (rev 268115). |
| 1100027 | July 8, 2014 | 11.0-CURRENT after FreeBSD-SA-14:17.kmem (rev 268431). |
| 1100028 | July 21, 2014 | 11.0-CURRENT after hdestroy() compliance fix changed ABI (rev 268945). |
| 1100029 | August 3, 2014 | 11.0-CURRENT after SOCK_DGRAM bug fix (rev 269489). |
| 1100030 | September 1, 2014 | 11.0-CURRENT after SOCK_RAW sockets were changed to not modify packets at all (rev 270929). |
| 1100031 | September 9, 2014 | 11.0-CURRENT after FreeBSD-SA-14:18.openssl (rev 269686). |
| 1100032 | September 11, 2014 | 11.0-CURRENT after API changes to ifa_ifwithbroadaddr, ifa_ifwithdstaddr, ifa_ifwithnet, and ifa_ifwithroute (rev 271438). |

| Value | Date | Release |
|---------|--------------------|--|
| 1100033 | September 9, 2014 | 11.0-CURRENT after changing access, eaccess, and faccessat to validate the mode argument (rev 271657). |
| 1100034 | September 16, 2014 | 11.0-CURRENT after FreeBSD-SA-14:19.tcp (rev 271666). |
| 1100035 | September 17, 2014 | 11.0-CURRENT after i915 HW context support (rev 271705). |
| 1100036 | September 17, 2014 | Version bump to have ABI note distinguish binaries ready for strict mmap(2) flags checking (rev 271724). |
| 1100037 | October 6, 2014 | 11.0-CURRENT after addition of explicit_bzero(3) (rev 272673). |
| 1100038 | October 11, 2014 | 11.0-CURRENT after cleanup of TCP wrapper headers (rev 272951). |
| 1100039 | October 18, 2014 | 11.0-CURRENT after removal of MAP_RENAME and MAP_NORESERVE (rev 273250). |
| 1100040 | October 21, 2014 | 11.0-CURRENT after FreeBSD-SA-14:23 (rev 273146). |
| 1100041 | October 30, 2014 | 11.0-CURRENT after API changes to syscall_register, syscall32_register, syscall_register_helper and syscall32_register_helper (rev 273707). |
| 1100042 | November 3, 2014 | 11.0-CURRENT after a change to struct tcpcb (rev 274046). |
| 1100043 | November 4, 2014 | 11.0-CURRENT after enabling vt(4) by default (rev 274085). |
| 1100044 | November 4, 2014 | 11.0-CURRENT after adding new libraries/utilities (dpv and figpar) for data throughput visualization (rev 274116). |
| 1100045 | November 4, 2014 | 11.0-CURRENT after FreeBSD-SA-14:23, FreeBSD-SA-14:24, and FreeBSD-SA-14:25 (rev 274162). |
| 1100046 | November 13, 2014 | 11.0-CURRENT after kern_poll signature change (rev 274462). |
| 1100047 | November 13, 2014 | 11.0-CURRENT after removal of no-at version of VFS syscalls helpers, like kern_open (rev 274476). |
| 1100048 | December 1, 2014 | 11.0-CURRENT after starting the process of removing the use of the deprecated "M_FLOWID" flag from the network code (rev 275358). |
| 1100049 | December 9, 2014 | 11.0-CURRENT after importing an important fix to the LLVM vectorizer, which could lead to buffer overruns in some cases (rev 275633). |

| Value | Date | Release |
|---------|-------------------|--|
| 1100050 | December 12, 2014 | 11.0-CURRENT after adding AES-ICM and AES-GCM to OpenCrypto (rev 275732). |
| 1100051 | December 23, 2014 | 11.0-CURRENT after removing old NFS client and server code from the kernel (rev 276096). |
| 1100052 | December 31, 2014 | 11.0-CURRENT after upgrade of clang, llvm and lldb to 3.5.0 release (rev 276479). |
| 1100053 | January 7, 2015 | 11.0-CURRENT after MCLGET() gained a return value (rev 276750). |
| 1100054 | January 15, 2015 | 11.0-CURRENT after rewrite of call-out subsystem (rev 277213). |
| 1100055 | January 22, 2015 | 11.0-CURRENT after reverting call-out changes in r277213 (rev 277528). |
| 1100056 | January 23, 2015 | 11.0-CURRENT after addition of futimens and utimensat system calls (rev 277610). |
| 1100057 | January 29, 2015 | 11.0-CURRENT after removal of d_thread_t (rev 277897). |
| 1100058 | February 5, 2015 | 11.0-CURRENT after addition of support for probing the SCSI VPD Extended Inquiry page (0x86) (rev 278228). |
| 1100059 | February 9, 2015 | 11.0-CURRENT after import of xz 5.2.0, which added multi-threaded compression and lzma gained libthr dependency (rev 278433). |
| 1100060 | February 16, 2015 | 11.0-CURRENT after forwarding FBIO_BLANK to framebuffer clients (rev 278846). |
| 1100061 | February 18, 2015 | 11.0-CURRENT after CDAI_FLAG_NONE addition (rev 278964). |
| 1100062 | February 23, 2015 | 11.0-CURRENT after mtio(4) and sa(4) API and ioctl(2) additions (rev 279221). |
| 1100063 | March 7, 2015 | 11.0-CURRENT after adding mutex support to the pps.ioctl() API in the kernel (rev 279728). |
| 1100064 | March 7, 2015 | 11.0-CURRENT after adding PPS support to USB serial drivers (rev 279729). |
| 1100065 | March 15, 2015 | 11.0-CURRENT after upgrading clang, llvm and lldb to 3.6.0 (rev 280031). |
| 1100066 | March 20, 2015 | 11.0-CURRENT after removal of SSLv2 support from OpenSSL (rev 280306). |

| Value | Date | Release |
|---------|-------------------|--|
| 1100067 | March 25, 2015 | 11.0-CURRENT after removal of SSLv2 support from fetch(1) and fetch(3) (rev 280630). |
| 1100068 | April 6, 2015 | 11.0-CURRENT after change to net.inet6.ip6.mif6table sysctl (rev 281172). |
| 1100069 | April 15, 2015 | 11.0-CURRENT after removal of const qualifier from iconv(3) (rev 281550). |
| 1100071 | April 29, 2015 | 11.0-CURRENT after API/ABI change to smb(4) (rev 281985). |
| 1100072 | May 1, 2015 | 11.0-CURRENT after adding reallocarray(3) in libc (rev 282314). |
| 1100073 | May 8, 2015 | 11.0-CURRENT after extending the maximum number of allowed PCM channels in a PCM stream to 127 and decreasing the maximum number of sub-channels to 1 (rev 282650). |
| 1100074 | May 25, 2015 | 11.0-CURRENT after adding preliminary support for x86-64 Linux binaries (rev 283424), and upgrading clang and llvm to 3.6.1 (rev 283526). |
| 1100075 | May 27, 2015 | 11.0-CURRENT after dounmount() requiring a reference on the passed struct mount (rev 283602). |
| 1100076 | June 4, 2015 | 11.0-CURRENT after disabled generation of legacy formatted password databases entries by default. (rev 283983). |
| 1100077 | June 10, 2015 | 11.0-CURRENT after API changes to lim_cur , lim_max , and lim_rlimit (rev 284215). |
| 1100079 | August 18, 2015 | 11.0-CURRENT after import of jemalloc 4.0.0 (rev 286866). |
| 1100080 | October 5, 2015 | 11.0-CURRENT after upgrading clang, llvm, lldb, compiler-rt and libc ++ to 3.7.0 (rev 288943). |
| 1100081 | October 16, 2015 | 11.0-CURRENT after undating ZFS to support resumable send/receive (rev r289362). |
| 1100085 | October 30, 2015 | 11.0-CURRENT after import of OpenSSL 1.0.2d (rev 290207). |
| 1100088 | November 7, 2015 | 11.0-CURRENT after string collation and locales rework (rev 290495). |
| 1100089 | November 7, 2015 | 11.0-CURRENT after API change to sysctl_add_oid(9) (rev 290475 and r290505). |
| 1100090 | November 10, 2015 | 11.0-CURRENT after API change to callout_stop macro; (rev 290664). |

| Value | Date | Release |
|---------|-------------------|--|
| 1100092 | December 19, 2015 | 11.0-CURRENT after removal of <code>vm_pageout_grow_cache</code> (rev 292469). |
| 1100093 | December 30, 2015 | 11.0-CURRENT after removal of <code>sys/crypto/sha2.h</code> (rev 292782). |
| 1100094 | January 15, 2016 | 11.0-CURRENT after LinuxKPI PCI changes (rev 294086). |
| 1100095 | January 19, 2016 | 11.0-CURRENT after LRO optimizations (rev 294327). |
| 1100096 | January 21, 2016 | 11.0-CURRENT after LinuxKPI <code>idr_*</code> additions (rev 294505). |
| 1100097 | January 26, 2016 | 11.0-CURRENT after API change to <code>dpv(3)</code> (rev 294860). |
| 1100098 | February 16, 2016 | 11.0-CURRENT after API change to <code>rman</code> (rev 294883). |
| 1100100 | February 26, 2016 | 11.0-CURRENT after <code>bus_alloc_resource_anywhere()</code> API addition (rev 296136). |
| 1100116 | May 31, 2016 | 11.0-CURRENT after SHA-512t256 (rev 300903) and Skein (rev 300966) were added to <code>libmd</code> , <code>libcrypt</code> , the kernel, and ZFS (rev 301010). |



Note

Note that 2.2-STABLE sometimes identifies itself as “2.2.5-STABLE” after the 2.2.5-RELEASE. The pattern used to be year followed by the month, but we decided to change it to a more straightforward major/minor system starting from 2.2. This is because the parallel development on several branches made it infeasible to classify the releases merely by their real release dates. Do not worry about old -CURRENTs; they are listed here just for reference.