OpenSS7 STREAMS Compatibility Installation and Reference Manual

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Package strcompat-0.9.2.7

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Preface

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Abstract

This manual provides a *Installation and Reference Manual* for *OpenSS7 STREAMS Compatibility*.

Objective

The objective of this manual is to provide a guide for the *STREAMS* programmer when developing *STREAMS* modules, drivers and application programs for *OpenSS7 STREAMS Compatibility*.

This guide provides information to developers on the use of the *STREAMS* mechanism at user and kernel levels.

STREAMS was incorporated in UNIX System V Release 3 to augment the character input/output (I/O) mechanism and to support development of communication services.

STREAMS provides developers with integral functions, a set of utility routines, and facilities that expedite software design and implementation.

Intent

The intent of this manual is to act as an introductory guide to the *STREAMS* programmer. It is intended to be read alone and is not intended to replace or supplement the *OpenSS7 STREAMS Compatibility* manual pages. For a reference for writing code, the manual pages (see `STREAMS(9)`) provide a better reference to the programmer. Although this describes the features of the *OpenSS7 STREAMS Compatibility* package, OpenSS7 Corporation is under no obligation to provide any software, system or feature listed herein.

Audience

This manual is intended for a highly technical audience. The reader should already be familiar with *Linux* kernel programming, the *Linux* file system, character devices, driver input and output, interrupts, software interrupt handling, scheduling, process contexts, multiprocessor locks, etc.

The guide is intended for network and systems programmers, who use the *STREAMS* mechanism at user and kernel levels for *Linux* and *UNIX* system communication services.

Readers of the guide are expected to possess prior knowledge of the *Linux* and *UNIX* system, programming, networking, and data communication.

[1] Formerly X/Open and UNIX International.

Revisions

Take care that you are working with a current version of this manual: you will not be notified of updates. To ensure that you are working with a current version, contact the Author, or check The OpenSS7 Project website for a current version.

A current version of this manual is normally distributed with the *OpenSS7 STREAMS Compatibility* package.

Version Control

```
strcompat.texi,v
Revision 0.9.2.21  2008-09-20 11:04:34  brian
- added package patchlevel

Revision 0.9.2.20  2008-08-03 06:03:35  brian
- protected agains texinfo commands in log entries

Revision 0.9.2.19  2008/07/27 08:49:06  brian
- no invariant sections, more libtool ignores

Revision 0.9.2.18  2008-04-28 16:47:06  brian
- updates for release

Revision 0.9.2.17  2008-04-25 11:50:49  brian
- updates to AGPLv3

Revision 0.9.2.16  2007/08/12 06:44:20  brian
- updated licenses in manuals

Revision 0.9.2.15  2007/02/28 06:30:45  brian
- updates and corrections, #ifdef instead of #if

Revision 0.9.2.14  2007/01/03 14:57:17  brian
- documentation updates for release

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- old rpms hate nested ifs, release updates

Revision 0.9.2.12  2006/10/21 10:01:12  brian
- updated streams release number

Revision 0.9.2.11  2006/09/18 01:06:34  brian
- updated manuals and release texi docs

Revision 0.9.2.10  2006/08/28 10:46:56  brian
- correction

Revision 0.9.2.9  2006/08/28 10:32:53  brian
- updated references

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- finalizing auto release files

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- better release file generation

Revision 0.9.2.6  2006/08/23 11:00:32  brian
- added preface, corrections and updates for release
```

```
Revision 0.9.2.5  2006/08/22 12:57:09  brian
- updated documentation

Revision 0.9.2.4  2006/03/22 10:02:03  brian
- added makefile target index

Revision 0.9.2.3  2006/03/03 11:11:14  brian
- 64-bit compatibility, fixes, updates for release

Revision 0.9.2.2  2005/07/08 13:15:59  brian
- updates to documentation

Revision 0.9.2.1  2005/07/04 19:28:53  brian
- first cut at streams compatibility package

Revision 0.9  2005/07/04 19:28:53  brian
file strcompat.texi was initially added on branch OpenSS7-0_9_2.
```

ISO 9000 Compliance

Only the TEX, texinfo, or roff source for this manual is controlled. An opaque (printed, postscript or portable document format) version of this manual is an **UNCONTROLLED VERSION**.

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Acknowledgements

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- OpenSS7 Corporation

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- Vodare Ltd.
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Contributors

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– John Wenker
– Others

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– Brian Bidulock

See [Index of Authors], page 170, for a complete listing and cross-index of authors to sections of this manual.

Maintainer

The maintainer of the *OpenSS7 OpenSS7 STREAMS Compatibility* package is:

– Brian Bidulock

Please send bug reports to `bugs@openss7.org` using the '`send-pr`' script included in the package, only after reading the '`BUGS`' file in the release, or See Section 8.2 [Problem Reports], page 121.

Web Resources

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Bug Reports

Please send bug reports to `bugs@openss7.org` using the '`send-pr`' script included in the *OpenSS7 STREAMS Compatibility* package, only after reading the '`BUGS`' file in the release, or See Section 8.2 [Problem Reports], page 121. You can access the OpenSS7 GNATS database directly via the web, however, the preferred method for sending new bug reports is via mail with the '`send-pr`' script.

Mailing Lists

The OpenSS7 Project provides a number of general discussion Mailing Lists for discussion concerning the *OpenSS7 OpenSS7 STREAMS Compatibility* package as well as other packages released by The OpenSS7 Project.

These are `mailman` mailing lists and so have convenient web interfaces for subscribers to control their settings. See `http://www.openss7.org/mailinglist.html`.

The mailing lists are as follows:

'`openss7`' The '`openss7`' mailing list is for general enquiries, information exchange and announcements regarding the OpenSS7 Project. This is our original mailing list and takes the highest amount of traffic.

'`openss7-announce`'
The '`openss7-announce`' mailing list is for announcements related to the OpenSS7 Project. This list will accept announcements posted by subscribers. Subscribe to this list if you are interested in announcements from the OpenSS7 Project, subscribers and sponsors, related to the OpenSS7 Project or STREAMS, SS7, SIGTRAN or SCTP in general.

‘openss7-cvs’
: The ‘openss7-cvs’ mailing list is for automatic CVS log reporting. You must get permission of the owner to subscribe to this list. Subscribers are not allowed to post to this list, this is merely for distributing notification of changes to the CVS repository.h

‘openss7-develop’
: The ‘openss7-develop’ mailing list is for email exchange related to the development projects under the OpenSS7 Project. This includes development requests, proposals, requests for comment or proposal. Subscribe to this list if you are interested in ongoing development details regarding the OpenSS7 Project.

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: The ‘openss7-test’ mailing list is for email exchange related to the testing of code under the OpenSS7 Project. This specifically relates to conformance testing, verification testing, interoperability testing and beta testing. Subscribe to this list if you are interested in participating in and receiving ongoing details of test activities under the OpenSS7 Project.

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: The ‘openss7-bugs’ mailing list is specifically tailored to bug tracking. The mailing list takes a feed from the OpenSS7 GNATS bug tracking system and accepts posting of responses to bug reports, tracking and resolution. Subscribe to this list if you are interested in receiving detailed *OpenSS7* release code bug tracking information. This list is not archived; for historical information on problem reports, see our GNATS databases.

‘openss7-updates’
: The ‘openss7-updates’ mailing list provides updates on OpenSS7 Project code releases and ongoing activities. Subscribers are not allowed to post to this list; this list is for official OpenSS7 Project announcements only. Subscribe to this list if you are interested in receiving updates concerning official releases and activities of the OpenSS7 Project.

‘openss7-streams’
: The ‘openss7-streams’ mailing list is for email exchange related to the *STREAMS* development projects under the OpenSS7 Project. This includes development requests, proposals, requests for comment or proposal. Subscribe to this list if you are interested in ongoing development details regarding the OpenSS7 Project *STREAMS* components.

‘linux-streams’
: The ‘linux-streams’ mailing list is for mail exchange related to *Linux Fast-STREAMS* or *Linux STREAMS*. This includes patches, development requests, proposals, requests for comment or proposal. Subscribe to this list if you are interested in ongoing development details regarding the *STREAMS* for Linux components. This is the the new (September 2006) home of the ‘linux-streams’ list formerly of gsyc.escet.urjc.es.

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Quick Start Guide

OpenSS7 STREAMS Compatibility

Package strcompat-0.9.2.7 was released under AGPLv3 2008-10-31.

The *OpenSS7 STREAMS Compatibility* package provides the ability for *Linux Fast-STREAMS* to exhibit source level compatibility with a wide range of *UNIX STREAMS* implementations. Also, it provides *LiS* source, and some 2.18.0 binary, compatibility for *Linux Fast-STREAMS*. The objective of the package is to provide source level compatibility with a wide range of *UNIX STREAMS* implementations permitting drivers and modules to port easily to *Linux Fast-STREAMS* from any other *STREAMS* implementation, making it possible to release drivers and modules from a single *UNIX* code base with minimal localisms for *Linux*.

These compatibility modules provide source level compatibility with *AIX*, *HPUX*, *OSF/1*, *MacOT*, *Mentat*, *SUX*, *Solaris*, *SUPER/UX*, *IRIX*, *LiS*, *UnixWare*, *UXP/V* and *SVR 4.2* STREAMS. The package contains all the necessary manual pages and other documentation in an autoconf tarball.

The package currently includes the following *STREAMS* kernel modules and drivers:[1]

- ‘`streams_os7compat.ko`’ ‘`kernel`’
- ‘`streams_svr3compat.ko`’ ‘`kernel`’
- ‘`streams_svr4compat.ko`’ ‘`kernel`’
- ‘`streams_mpscompat.ko`’ ‘`kernel`’
- ‘`streams_suncompat.ko`’ ‘`kernel`’
- ‘`streams_uw7compat.ko`’ ‘`kernel`’
- ‘`streams_osfcompat.ko`’ ‘`kernel`’
- ‘`streams_aixcompat.ko`’ ‘`kernel`’
- ‘`streams_hpuxcompat.ko`’ ‘`kernel`’
- ‘`streams_irixcompat.ko`’ ‘`kernel`’
- ‘`streams_liscompat.ko`’ ‘`kernel`’
- ‘`streams_lfscompat.ko`’ ‘`kernel`’
- ‘`streams_maccompat.ko`’ ‘`kernel`’

The *OpenSS7 STREAMS Compatibility* package provides compatibility with the following *STREAMS* implementations:

- *OpenSS7 variants*
- *UNIX® System V Release 3.2*
- *UNIX® System V Release 4.2*
- *MPS® Mentat Portable Streams*
- *Solaris® 9/SunOS® 5.9*
- *UnixWare® 7.1.3*
- *Digital® UNIX (OSF/1.2)*
- *AIX® 5L Version 5.1 Portable STREAMS Environment*
- *HP-UX® 11.0i v2 STREAMS/UX*

[1] Note that these are kernel modules and are *not STREAMS* modules.

- *IRIX® 6.5.17*
- *Linux STREAMS 2.18.0*
- *Linux Fast-STREAMS 0.9.2*
- *Mac® OS 9 Open Transport*

These compatibility modules compile as kernel modules and will be demand loaded into the kernel when used by a specific *STREAMS* module or driver. The compatibility modules ease porting of *STREAMS* modules and drivers from other Operating Systems to *Linux*.

This distribution is only currently applicable to *Linux* 2.4 and 2.6 kernels and was targeted at `ix86`, `x86_64`, `ppc` and `ppc64` architectures, but should build and install for other architectures as well.

Release

This is the `strcompat-0.9.2.7` package, released 2008-10-31. This '`0.9.2.7`' release, and the latest version, can be obtained from the download area of The OpenSS7 Project website using a command such as:

```
$> wget http://www.openss7.org/tarballs/strcompat-0.9.2.7.tar.bz2
```

The release is available as an `autoconf(1)` tarball, '`src.rpm`' or '`dsc`', as a set of binary '`rpm`'s or '`deb`'s, or as a `yum(8)` or `apt(8)` repository. See the download page for the `autoconf(1)` tarballs, '`src.rpm`'s, '`dsc`'s, or repository access instructions. See the `strcompat` package page for tarballs, source and binary packages.

Please see the '`NEWS`' file for release notes and history of user visible changes for the current version, and the '`ChangeLog`' file for a more detailed history of implementation changes. The '`TODO`' file lists features not yet implemented and other outstanding items.

Please see the '`INSTALL`', '`INSTALL-strcompat`' and '`README-make`', files (or see Chapter 7 [Installation], page 65) for installation instructions.

When working from `cvs(1)` or `git(1)`, please see the '`README-cvs`', file (or see Section 7.2.8 [Downloading from CVS], page 77). An abbreviated installation procedure that works for most applications appears below.

See '`README-alpha`' (if it exists) for alpha release information.

Prerequisites

The quickest and easiest way to ensure that all prerequisites are met is to download and install this package from within the *OpenSS7 Master Package*, `openss7-0.9.2.G`, instead of separately.

Prerequisites for the OpenSS7 STREAMS Compatibility package are as follows:

1. *Linux* distribution, somewhat *Linux Standards Base* compliant, with a 2.4 or 2.6 kernel and the appropriate tool chain for compiling out-of-tree kernel modules. Most recent *Linux* distributions are usable out of the box, but some development packages must be installed. For more information, see Section 6.2 [Compatibility], page 52.

- A fairly LSB compliant GNU/Linux distribution.[2]
- Linux 2.4 kernel (2.4.10 - 2.4.27), or
- Linux 2.6 kernel (2.6.3 - 2.6.26);
- glibc2 or better.
- GNU groff (for man pages).[3]
- GNU texinfo (for info files).
- GNU bison and flex (for config programs).
- net-snmp (for SNMP agents).[4]

(Note: If you acquired `strcompat` a part of the *OpenSS7 Master Package*, then the dependencies listed below will already have been met by unpacking the master package.)

2. *OpenSS7 Linux Fast-STREAMS*, streams-0.9.2.4.[5]

When configuring and building multiple *OpenSS7 Project* release packages, place all of the source packages (unpacked tarballs) at the same directory level and all build directories at the same directory level (e.g. all source packages under '`/usr/src`').

When installing packages that install as kernel modules, it is necessary to have the correct kernel development package installed. For the following distributions, use the following commands:

```
Ubuntu:  $> apt-get install linux-headers
Debian:  $> apt-get install kernel-headers
Fedora:  $> yum install kernel-devel
```

You also need the same version of `gcc(1)` compiler with which the kernel was built. If it is not the default, add '`CC=kgcc`' on the line after '`./configure`', for example:

```
$> ../strcompat-0.9.2.7/configure CC='gcc-3.4'
```

Installation

The following commands will download, configure, build, check, install, validate, uninstall and remove the package:

```
$> wget http://www.openss7.org/tarballs/strcompat-0.9.2.7.tar.bz2
$> tar -xjvf strcompat-0.9.2.7.tar.bz2
$> mkdir build
$> pushd build
$> ../strcompat-0.9.2.7/configure --enable-autotest
$> make
$> make check
$> sudo make install
$> sudo make installcheck
$> sudo make uninstall
$> popd
$> sudo rm -rf build
```

[2] See Section 6.2.1 [GNU/Linux Distributions], page 52, for more information.

[3] If you are using a Debian release, please make sure to install the groff extension package ('`groff_ext`'), as it contains the `refer` or `grefer` commands necessary for including references in the manual pages.

[4] A wide range of net-snmp releases are supported, from UCD-SNMP 4.2.5 through net-snmp 5.4.

[5] Although, at one time, this package supported *LiS*, *LiS* is now deprecated and unsupported.

```
$> rm -rf strcompat-0.9.2.7
$> rm -f strcompat-0.9.2.7.tar.bz2
```

If you have problems, try building with the logging targets instead. If the make of a logging target fails, an automatic problem report will be generated that can be mailed to The OpenSS7 Project.[6] Installation steps using the logging targets proceed as follows:

```
$> wget http://www.openss7.org/tarballs/strcompat-0.9.2.7.tar.bz2
$> tar -xjvf strcompat-0.9.2.7.tar.bz2
$> mkdir build
$> pushd build
$> ../strcompat-0.9.2.7/configure --enable-autotest
$> make compile.log
$> make check.log
$> sudo make install.log
$> sudo make installcheck.log
$> sudo make uninstall.log
$> popd
$> sudo rm -rf build
$> rm -rf strcompat-0.9.2.7
$> rm -f strcompat-0.9.2.7.tar.bz2
```

See '`README-make`' for additional specialized make targets.

For custom applications, see the '`INSTALL`' and '`INSTALL-strcompat`' files or the see Chapter 7 [Installation], page 65, as listed below. If you encounter troubles, see Chapter 8 [Troubleshooting], page 117, before issuing a bug report.

Brief Installation Instructions

The OpenSS7 STREAMS Compatibility package is available from the downloads area of The OpenSS7 Project website using a command such as:

```
$> wget http://www.openss7.org/tarballs/strcompat-0.9.2.7.tar.bz2
```

Unpack the tarball using a command such as:

```
$> tar -xjvf strcompat-0.9.2.7.tar.bz2
```

The tarball will unpack into the relative subdirectory named after the package name: strcompat-0.9.2.7.

The package builds using the GNU `autoconf` utilities and the '`configure`' script. To build the package, we recommend using a separate '`build`' directory as follows:

```
$> mkdir build
$> cd build
$> ../strcompat-0.9.2.7/configure
```

In general, the package configures and builds without adding any special options to the '`configure`' script. For general options to the '`configure`' script, see the GNU '`INSTALL`' file in the distribution:

```
$> less ../strcompat-0.9.2.7/INSTALL
```

[6] Please see Section 8.2 [Problem Reports], page 121, or the file '`PROBLEMS`' in the release directory for more information on filing a proper *Problem Report*.

For specific options to the 'configure' script, see the 'INSTALL-strcompat' file in the distribution, or simply execute the configure script with the '--help' option like so:

```
$> ../strcompat-0.9.2.7/configure --help
```

After configuring the package, the package can be compiled simply by issuing the 'make' command:

```
$> make
```

Some specialized makefile targets exists, see the 'README-make' file in the distribution or simply invoke the 'help' target like so:

```
$> make help | less
```

After successfully building the package, the package can be checked by invoking the 'check' make target like so:

```
$> make check
```

After successfully checking the package, the package can be installed by invoking the 'install' make target (as root) like so:

```
$> sudo make install
```

The test suites that ship with the package can be invoked after the package has been installed by invoking the 'installcheck' target. This target can either be invoked as root, or as a normal user, like so:

```
$> make installcheck
```

(Note: you must add the '--enable-autotest' flag to 'configure', above for the test suites to be invoked with 'make installcheck'.)

The package can be cleanly removed by invoking the 'uninstall' target (as root):

```
$> sudo make uninstall
```

Then the build directory and tarball can be simply removed:

```
$> cd ..
$> rm -rf build
$> rm -rf strcompat-0.9.2.7
$> rm -f strcompat-0.9.2.7.tar.bz2
```

Detailed Installation Instructions

More detailed installation instructions can be found in the Chapter 7 [Installation], page 65, contained in the distribution in 'text', 'info', 'html' and 'pdf' formats:

```
$> cd ../strcompat-0.9.2.7
$> less doc/manual/strcompat.txt
$> lynx doc/manual/strcompat.html
$> info doc/manual/strcompat.info
$> xpdf doc/manual/strcompat.pdf
```

The 'text' version of the manual is always available in the 'MANUAL' file in the release.

The current manual is also always available online from *The OpenSS7 Project* website at:

```
$> lynx http://www.openss7.org/strcompat_manual.html
```

1 Introduction

This manual documents the design, implementation, installation, operation and future development schedule of the *OpenSS7 STREAMS Compatibility* package.

1.1 Overview

This manual documents the design, implementation, installation, operation and future development of the *OpenSS7 STREAMS Compatibility* package.

1.2 Organization of this Manual

This manual is organized (loosely) into several sections as follows:

1.3 Conventions and Definitions

This manual uses *texinfo* typographic conventions.

2 Objective

The *OpenSS7 STREAMS Compatibility* package is intended to provide maximum compatibility between *Linux STREAMS (LiS)* or *Linux Fast-STREAMS (LfS)* and other *STREAMS* implementations on major UNIX operating systems, for the purpose of porting existing *STREAMS* modules and drivers from those operating system to *Linux*.

Also, the *OpenSS7 STREAMS Compatibility* package aims to provide compatibility between *Linux STREAMS (LiS)* and *Linux Fast-STREAMS* to ease the porting of *STREAMS* modules and drivers from *LiS* to *Linux Fast-STREAMS* with minimal effort.

To meet that objective, *OpenSS7 STREAMS Compatibility* aims to support the *STREAMS* DDI/DKI and registration functions of the following *STREAMS* implementations:

- UNIX System V Release 3.2
- UNIX System V Release 4 MP
- UNIX System V Release 4.0 MP
- UNIX System V Release 4.2 MP
- Mentat Portable Streams (MPS)
- Linux STREAMS LiS 2.16
- Linux STREAMS LiS 2.18
- Linux Fast-STREAMS 0.7a
- Linux Fast-STREAMS 0.9.2
- AIX 5L Version 5.1 Portable STREAMS Environment (PSE)
- HP-UX 11.0i v2 STREAMS/UX
- OSF/1.2 - Digital UNIX STREAMS
- UnixWare 7.1.3 (OpenUnix 8) STREAMS
- Solaris 9/SunOS 5.9 (OpenSolaris) STREAMS
- Mac OS 9 OpenTransport 1.5r2
- IRIX 6.5.17 STREAMS
- SUPER-UX Release 9.2
- UXP/V V10L10 STREAMS V10

Because it is not necessary to have all of these compatibility modules loaded at a given time, and to reduce the footprint of the resulting kernel modules, the *OpenSS7 STREAMS Compatibility* package implements these compatibility modules as separate demand loadable *Linux* kernel modules.

The *OpenSS7 STREAMS Compatibility* package contains compatibility modules that were originally part of the *Linux Fast-STREAMS* package. They have been separated into an package independent from *Linux Fast-STREAMS* for the purpose of provide some of the same capabilities to *Linux STREAMS (LiS)* in advance of production releases of *Linux Fast-STREAMS*.

2.1 Rationale

The *OpenSS7 STREAMS Compatibility* package is designed and implemented to be compatible with as many *SVR 4.2 MP* based implementations of *STREAMS*a s possible. This is done for several reasons:

1. Porting legacy drivers to *Linux*:

   Many legacy *STREAMS* drivers have been written and developed for *SVR 4.2 MP* or *UNIX* systems based on *SVR 4.2 MP*. Remaining compatible with as many implementations as possible permits these legacy drivers to be easily ported from their native *UNIX* variant to the *Linux Fast-STREAMS* environment, thus quickly porting these legacy drivers to *Linux*.

2. Leverage of knowledge base:

   Many developers are familiar with one or another of the mainstream *UNIX* implementations of *SVR 4.2 MP STREAMS*. By remaining as compatible as possible with all these implementations of *STREAMS* permits knowledge and expertise in the *UNIX* variant of *STREAMS* to be transferred and applied to *Linux Fast-STREAMS* on *Linux*.

3. Reverse portability:

   Because it is compatible as possible with other *STREAMS* implementations, *STREAMS* drivers and modules developed on *Linux Fast-STREAMS* can easily be ported to other implementations if a set of compatibility and portability guidelines are followed. This allows *STREAMS* driver and modules developed on the *Linux* operating system to be used on branded *UNIX* systems with minimal porting and modification.

4. Multiple baselines:

   Because the source code developed for *Linux Fast-STREAMS* can remain quite close to that for other mainstream *UNIX* implementations of *SVR 4.2 MP STREAMS*, it is possible to have multiple baselines for different architectures in the same source code files. This eases the maintenance of *STREAMS* drivers and modules across *Linux Fast-STREAMS* and other *UNIX* systems.

5. Standardization:

   By being as compatible as possible with many *STREAMS* implementations as possible, *Linux Fast-STREAMS* implements an ipso facto standard. Unfortunately, the OpenGroup and *POSIX* have been very lacking in the standardization of internal kernel interfaces such as *STREAMS*. Maximum compatibility moves close to providing a standard for such interfaces.

6. Licensing and Technology Binding

   By implementing an ipso facto standard, independent *STREAMS* drivers and modules written to the technical interface avoid being impinged upon by the GNU Affero Public License under which *Linux STREAMS* and *Linux Fast-STREAMS* are distributed.

2.2 Use with Linux STREAMS

The *OpenSS7 STREAMS Compatibility* package was originally part of the *Linux Fast-STREAMS* base package, '`streams`'. The purpose for separating the package was originally to support both *LiS* and *Linux Fast-STREAMS* until such time as *Linux Fast-STREAMS*

was a suitable production replacement for *LiS*. With release **streams-0.9.2.4**, *Linux Fast-STREAMS* is a far superior production replacement for *LiS* and *LiS* is now deprecated. Although, at one time, the *OpenSS7 STREAMS Compatibility* package worked with *LiS*, it is no longer supported on *LiS* and is only tested and validated for *Linux Fast-STREAMS*. Even when it was supported, *LiS* has so many bugs, deficiencies and incompatibilities in the Stream head, that it was not possible to obtain usable compatibility in conjunction with *LiS*. *Linux Fast-STREAMS* does not have these problems.

2.3 Use with Linux Fast-STREAMS

The *OpenSS7 STREAMS Compatibility* package functions much better with the *Linux Fast-STREAMS* implementation with which it was originally intended to function. *Linux Fast-STREAMS* provides a superset of the capabilities of *SVR 4.2 MP* intended to provide compatibility across as many mainstream *UNIX* implementations of *STREAMS* as possible. Also, *Linux Fast-STREAMS* does not have the bugs, races, deficiencies, and other difficulties present in the *LiS* package.[1]

[1] *The OpenSS7 Project* really has no vested interest in promoting *Linux Fast-STREAMS* over *LiS*. The project uses *Linux Fast-STREAMS* instead of *LiS* based on technical merit alone. *The OpenSS7 Project* has released both *LiS* and *Linux Fast-STREAMS* packages and has provided support for both packages up until the production release of *Linux Fast-STREAMS*. Many of the *OpenSS7 Project STREAMS* modules and drivers will still run under *LiS*, albeit with far less performance far poorer conformance to standards, and the all too frequent kernel crashes experienced with *LiS*.

3 Reference

3.1 Files

The following sections provide a manifest of the files that are installed by the *OpenSS7 STREAMS Compatibility* package:

STRCOMPAT creates the following kernel modules files in the kernel modules directory, '`/lib/modules/2.4.20-28.7/`':[1]

'`modules.strcompat`'

STRCOMPAT installs the following kernel module files in the kernel modules directory, '`/lib/modules/2.4.20-28.7/strcompat/`':[2]

'`streams_os7compat.ko`'
: *OpenSS7* compatibility module.

'`streams_svr3compat.ko`'
: *SVR 3* compatibility module.

'`streams_svr4compat.ko`'
: *SVR 4.2 MP* compatibility module.

'`streams_mpscompat.ko`'
: *MPS* compatibility module.

'`streams_suncompat.ko`'
: *Solaris* compatibility module.

'`streams_uw7compat.ko`'
: *UnixWare* compatibility module.

'`streams_osfcompat.ko`'
: *OSF/1* compatibility module.

'`streams_aixcompat.ko`'
: *AIX* compatibility module.

'`streams_hpuxcompat.ko`'
: *HP-UX* compatibility module.

'`streams_irixcompat.ko`'
: *IRIX* compatibility module.

'`streams_liscompat.ko`'
: *LiS* compatibility module.

'`streams_maccompat.ko`'
: *Mac OT* compatibility module.

STRCOMPAT installs the following header files in the system include directory, '`/usr/include/strcompat/`':

---

[1] The kernel version '`2.4.20-28.7`' is just and example. For the running kernel, '`uname -r`' is expected.

[2] The kernel version '`2.4.20-28.7`' is just and example. For the running kernel, '`uname -r`' is expected.

‘`sys/strcompat/config.h`’
: Contains configuration defines for the ‘`strcompat`’ package.

‘`sys/strcompat/version.h`’
: Contains module versions (on 2.4 kernels) for the ‘`strcompat`’ package.

‘`sys/os7/allocb.h`’
: Contains declarations of OpenSS7 buffer allocation helper functions.

‘`sys/os7/bufpool.h`’
: Contains declarations of OpenSS7 buffer pool helper functions.

‘`sys/os7/bufq.h`’
: Contains declarations of OpenSS7 private buffer queue helper functions.

‘`sys/os7/compat.h`’
: Contains declarations of OpenSS7 compatibility defines and includes. This is the only header file that needs to be included for a *STREAMS* module or driver that needs to be compatible with both *LiS* and *Linux Fast-STREAMS*.

‘`sys/os7/debug.h`’
: Contains declarations of OpenSS7 debugging macros.

‘`sys/os7/lock.h`’
: Contains declarations of OpenSS7 queue locking helper functions.

‘`sys/os7/priv.h`’
: Contains declarations of OpenSS7 queue private structure helper functions.

‘`sys/os7/queue.h`’
: Contains declarations of OpenSS7 queue put and service procedure helper functions.

‘`sys/os7/timer.h`’
: Contains declarations of OpenSS7 timer helper functions.

‘`sys/os7/ddi.h`’
: Contains declarations of OpenSS7 additional helper functions.

‘`sys/os7/strconf.h`’
: Contains declarations of OpenSS7 *STREAMS* configuration helper functions.

‘`sys/os7/stream.h`’
: Contains declarations of OpenSS7 *STREAMS* helper functions.

‘`sys/stream.h`’
: Contains a main header file providing *STREAMS* utility function declarations. Depending on defines when including this file, this file may include ‘`stream.h`’ files for specific implementations.

‘`sys/strconf.h`’
: Contains a main header file providing *STREAMS* configuration function declarations. Depending on defines when including this file, this file may include ‘`stream.h`’ files for specific implementations.

‘`sys/ddi.h`’
: Contains a main header file providing *STREAMS* DDI/DKI function declarations. Depending on defines when including this file, this file may include ‘`stream.h`’ files for specific implementations.

‘`sys/aix/stream.h`’
: Contains declarations of *STREAMS* functions unique to *AIX*.

‘`sys/aix/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *AIX*.

‘`sys/aix/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *AIX*.

‘`sys/hpux/stream.h`’
: Contains declarations of *STREAMS* functions unique to *HP-UX*.

‘`sys/hpux/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *HP-UX*.

‘`sys/hpux/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *HP-UX*.

‘`sys/irix/stream.h`’
: Contains declarations of *STREAMS* functions unique to *IRIX*.

‘`sys/irix/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *IRIX*.

‘`sys/irix/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *IRIX*.

‘`sys/lis/stream.h`’
: Contains declarations of *STREAMS* functions unique to *LiS*.

‘`sys/lis/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *LiS*.

‘`sys/lis/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *LiS*.

‘`sys/mac/stream.h`’
: Contains declarations of *STREAMS* functions unique to *Mac OT*.

‘`sys/mac/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *Mac OT*.

‘`sys/mac/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *Mac OT*.

‘`sys/mps/stream.h`’
: Contains declarations of *STREAMS* functions unique to *MPS*.

‘`sys/mps/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *MPS*.

‘`sys/mps/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *MPS*.

‘`sys/osf/stream.h`’
: Contains declarations of *STREAMS* functions unique to *OSF/1*.

‘`sys/osf/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *OSF/1*.

‘`sys/osf/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *OSF/1*.

‘`sys/sun/stream.h`’
: Contains declarations of *STREAMS* functions unique to *Solaris*.

‘`sys/sun/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *Solaris*.

‘`sys/sun/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *Solaris*.

‘`sys/sun/strsun.h`’
: Contains specific declarations for *Solaris* helper functions.

‘`sys/sunddi.h`’
: Main header file used to include *Solaris* DDI/DKI function declarations.

‘`sys/strsun.h`’
: Main header file used to include *Solaris Solaris* function declarations.

‘`sys/svr3/stream.h`’
: Contains declarations of *STREAMS* functions unique to *SVR 3*.

‘`sys/svr3/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *SVR 3*.

‘`sys/svr3/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *SVR 3*.

‘`sys/svr4/stream.h`’
: Contains declarations of *STREAMS* functions unique to *SVR 4.2 MP*.

‘`sys/svr4/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *SVR 4.2 MP*.

‘`sys/svr4/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *SVR 4.2 MP*.

‘`sys/uw7/stream.h`’
: Contains declarations of *STREAMS* functions unique to *UnixWare*.

‘`sys/uw7/strconf.h`’
: Contains declarations of *STREAMS* configuration functions unique to *UnixWare*.

‘`sys/uw7/ddi.h`’
: Contains declarations of *STREAMS* DDI/DKI functions unique to *UnixWare*.

STRCOMPAT installs the following test programs in the system libexec directory, '`/usr/libexec/strcompat/`':[3]

'`send-pr`'
'`send-pr.config`'
: The `send-pr` stand-alone shell script can be used for the automatic generation of problem reports for the *OpenSS7 STREAMS Compatibility* package. The '`send-pr.config`' file provides localized definitions used by the `send-pr` program. For more information on problem reports, See Section 8.2 [Problem Reports], page 121, and, in particular, See Section 8.2.4 [Stand Alone Problem Reports], page 124.

'`testsuite`'
'`atlocal`'
: The `testsuite` stand-alone shell script invokes test cases in the test programs above as compiled into a comprehensive regression, troubleshooting and validation test suite for the *OpenSS7 STREAMS Compatibility* drivers. The '`atlocal`' file provides localized definitions used by the `testsuite` program. For more information on test suites, See Section 8.1 [Test Suites], page 117, and, in particular, See Section 8.1.2.1 [Running Test Suites], page 121.

STRCOMPAT installs the following init scripts in the system init directory, '`/etc/rc.d/init.d/`' (non-Debian) or '`/etc/init.d/`' (Debian):

'`strcompat`'
: This is the name of the system init script on non-Debian based systems.

'`strcompat.sh`'
: This is the name of the system init script on Debian based systems.

STRCOMPAT installs the following system configuration files in the configuration directory, '`/etc/`':

'`strcompat.conf`'
: This file provided configuration information for any system controls affected by the '`strcompat`' package.

'`modutils/strcompat`'
: This file provides module definitions and demand loading aliases for the '`strcompat`' package. This file is really only applicable to older 2.4 kernels.

STRCOMPAT installs the following system configuration file in the system configuration directory, '`/etc/sysconfig/`' (non-Debian) or '`/etc/default/`' (Debian):

'`strcompat`'
: This file provides system configuration information used by init scripts for the '`strcompat`' package. Some options of init script execution can be controlled by this file.

STRCOMPAT installs the following info files in the system info directory, '`/usr/share/info/`':

[3] Note that on some systems, '`/usr/libexec`' does not exist, and '`/usr/lib`' is used instead.

‘`strcompat.info`’
‘`strcompat.info-1`’
‘`strcompat.info-2`’
: These files contain this manual in *GNU info* format.

STRCOMPAT installs the following manual page macros and reference database files in the system man directory, ‘`/usr/share/man/`’:[4]

‘`strcompat.macros`’
: This file contains manual page macro definitions included by the manual pages included in the package.

‘`strcompat.refs`’
: This file contains a reference database referenced by the manual pages included in the package.

STRCOMPAT installs the following manual pages in the system man directory, ‘`/usr/share/man/man5/`’:

‘`strcompat.5`’
: manual page for the `strcompat(5)` package.

STRCOMPAT installs the following manual pages in the system man directory, ‘`/usr/share/man/man8/`’:

‘`strcompat_mknod.8`’
: Documentation for the `strcompat_mknod(8)` utility program.

STRCOMPAT installs the following manual pages in the system man directory, ‘`/usr/share/man/man9/`’:

The *OpenSS7 STREAMS Compatibility* package installs several hundred manual pages that are too many to list here. Following are just the primary manual pages. Begin with any of these manual pages to obtain references to the remaining pages.

‘`man9/os7compat.9`’
: `os7compat(9)`

‘`man9/svr3compat.9`’
: `svr3compat(9)`

‘`man9/svr4compat.9`’
: `svr4compat(9)`

‘`man9/mpscompat.9`’
: `mpscompat(9)`

‘`man9/suncompat.9`’
: `suncompat(9)`

‘`man9/uw7compat.9`’
: `uw7compat(9)`

‘`man9/osfcompat.9`’
: `osfcompat(9)`

[4] Note that macro and reference databse files are not installed if the package is configured for cooked manpages.

‘`man9/aixcompat.9`’
: `aixcompat(9)`

‘`man9/hpuxcompat.9`’
: `hpuxcompat(9)`

‘`man9/irixcompat.9`’
: `irixcompat(9)`

‘`man9/liscompat.9`’
: `liscompat(9)`

‘`man9/maccompat.9`’
: `maccompat(9)`

3.2 Drivers

The *OpenSS7 STREAMS Compatibility* package only includes drivers for the purpose of providing examples of the use of the utility functions included in the package, as well as to provide loadable drivers for the purpose of test suite execution. If you are not interested in test suite execution, these drivers can be removed.

STREAMS drivers included in the package are as follows:

‘`streams_aixdrv.ko`’
: an example driver for testing *AIX 5L Version 5.1 Portable STREAMS Environment (PSE)* compatibility.

‘`streams_hpuxdrv.ko`’
: an example driver for testing *HP-UX 11.0i v2 STREAMS/UX* compatibility.

‘`streams_irixdrv.ko`’
: an example driver for testing *IRIX 6.5.17 STREAMS* compatibility.

‘`streams_lfsdrv.ko`’
: an example driver for testing *Linux Fast-STREAMS 0.9.2.4* compatibility.

‘`streams_lisdrv.ko`’
: an example driver for testing *Linux STREAMS LiS 2.16 and LiS 2.18* compatibility.

‘`streams_macdrv.ko`’
: an example driver for testing *Mac OS 9 OpenTransport 1.5r2* compatibility.

‘`streams_mpsdrv.ko`’
: an example driver for testing *Mentat Portable Streams (MPS)* compatibility.

‘`streams_osfdrv.ko`’
: an example driver for testing *OSF/1.2 - Digital UNIX STREAMS* compatibility.

‘`streams_sundrv.ko`’
: an example driver for testing *Solaris 9/SunOS 5.9 (OpenSolaris) STREAMS* compatibility.

‘`streams_suxdrv.ko`’
: an example driver for testing *SUPER-UX Release 9.2* compatibility.

‘`streams_svr3drv.ko`’
: an example driver for testing *UNIX System V Release 3.2* compatibility.

‘`streams_svr4drv.ko`’
: an example driver for testing *UNIX System V Release 4.2 MP* compatibility.

‘`streams_uw7drv.ko`’
: an example driver for testing *UnixWare 7.1.3 (OpenUnix 8) STREAMS* compatibility.

‘`streams_uxpdrv.ko`’
: an example driver for testing *UXP/V V10L10 STREAMS V10* compatibility.

3.3 Modules

The *OpenSS7 STREAMS Compatibility* package only includes modules for the purpose of providing examples of the use of the utility functions included in the package, as well as to provide loadable modules for the purpose of test suite execution. If you are not interested in test suite execution, these modules can be removed.

STREAMS modules included in the package are as follows:

‘`streams_aixmod.ko`’
: an example module for testing *AIX 5L Version 5.1 Portable STREAMS Environment (PSE)* compatibility.

‘`streams_hpuxmod.ko`’
: an example module for testing *HP-UX 11.0i v2 STREAMS/UX* compatibility.

‘`streams_irixmod.ko`’
: an example module for testing *IRIX 6.5.17 STREAMS* compatibility.

‘`streams_lfsmod.ko`’
: an example module for testing *Linux Fast-STREAMS 0.9.2.4* compatibility.

‘`streams_lismod.ko`’
: an example module for testing *Linux STREAMS LiS 2.16 and LiS 2.18* compatibility.

‘`streams_macmod.ko`’
: an example module for testing *Mac OS 9 OpenTransport 1.5r2* compatibility.

‘`streams_mpsmod.ko`’
: an example module for testing *Mentat Portable Streams (MPS)* compatibility.

‘`streams_osfmod.ko`’
: an example module for testing *OSF/1.2 - Digital UNIX STREAMS* compatibility.

‘`streams_sunmod.ko`’
: an example module for testing *Solaris 9/SunOS 5.9 (OpenSolaris) STREAMS* compatibility.

‘`streams_suxmod.ko`’
: an example module for testing *SUPER-UX Release 9.2* compatibility.

‘`streams_svr3mod.ko`’
: an example module for testing *UNIX System V Release 3.2* compatibility.

‘`streams_svr4mod.ko`’
: an example module for testing *UNIX System V Release 4.2 MP* compatibility.

‘`streams_uw7mod.ko`’
: an example module for testing *UnixWare 7.1.3 (OpenUnix 8) STREAMS* compatibility.

‘`streams_uxpmod.ko`’
: an example module for testing *UXP/V V10L10 STREAMS V10* compatibility.

3.4 Libraries

3.5 Utilities

The *OpenSS7 STREAMS Compatibility* package does not provide any system utilities of its own. For a set of system utilities that are compatible across the same wide range of operating systems, use the *OpenSS7 STREAMS Utilities* package.

What the *OpenSS7 STREAMS Compatibility* package does provide is a set of kernel modules that provide compatibility utilities to the STREAMS module or driver developer. These kernel modules are as follows:

‘`streams_aixcompat.ko`’
: *STREAMS* module writer utilities for *AIX 5L Version 5.1 Portable STREAMS Environment (PSE)* compatibility.

‘`streams_hpuxcompat.ko`’
: *STREAMS* module writer utilities for *HP-UX 11.0i v2 STREAMS/UX* compatibility.

‘`streams_irixcompat.ko`’
: *STREAMS* module writer utilities for *IRIX 6.5.17 STREAMS* compatibility.

‘`streams_lfscompat.ko`’
: *STREAMS* module writer utilities for *Linux Fast-STREAMS 0.9.2.4* compatibility.

‘`streams_liscompat.ko`’
: *STREAMS* module writer utilities for *Linux STREAMS LiS 2.16 and LiS 2.18* compatibility.

‘`streams_maccompat.ko`’
: *STREAMS* module writer utilities for *Mac OS 9 OpenTransport 1.5r2* compatibility.

‘`streams_mpscompat.ko`’
: *STREAMS* module writer utilities for *Mentat Portable Streams (MPS)* compatibility.

‘`streams_osfcompat.ko`’
: *STREAMS* module writer utilities for *OSF/1.2 - Digital UNIX STREAMS* compatibility.

‘`streams_suncompat.ko`’
: *STREAMS* module writer utilities for *Solaris 9/SunOS 5.9 (OpenSolaris) STREAMS* compatibility.

‘`streams_suxcompat.ko`’
: *STREAMS* module writer utilities for *SUPER-UX Release 9.2* compatibility.

‘`streams_svr3compat.ko`’
: *STREAMS* module writer utilities for *UNIX System V Release 3.2* compatibility.

‘`streams_svr4compat.ko`’
: *STREAMS* module writer utilities for *UNIX System V Release 4.2 MP* compatibility.

‘`streams_uw7compat.ko`’
: *STREAMS* module writer utilities for *UnixWare 7.1.3 (OpenUnix 8) STREAMS* compatibility.

‘`streams_uxpcompat.ko`’
: *STREAMS* module writer utilities for *UXP/V V10L10 STREAMS V10* compatibility.

3.5.1 AIX Utilities

3.5.2 HP-UX Utilities

3.5.3 IRIX Utilities

3.5.4 LfS Utilities

3.5.5 LiS Utilities

3.5.6 MacOT Utilities

3.5.7 MPS Utilities

3.5.8 OSF Utilities

3.5.9 Solaris Utilities

3.5.10 SUPER-UX Utilities

3.5.11 SVR3 Utilities

3.5.12 SVR4 Utilities

3.5.13 UnixWare Utilities

3.5.14 UXP/V Utilities

3.6 Development

The *OpenSS7 STREAMS Compatibility* package contains the necessary header files, shared and static libraries, manuals and manual pages, necessary for the development of kernel modules, *STREAMS* modules and drivers, and applications programs based on the *OpenSS7 STREAMS Compatibility* package.

3.6.1 Header Files

Header files are installed, typically, in the '`/usr/include/strcompat/`' subdirectory.[5] To use the header files from the package, '`-I/usr/include/strcompat`' must be included in the `gcc` command line as a preprocessor option. This is true regardless of whether user space or kernel programs are being compiled.

In general, '`-I`' include directives on the `gcc` command line should be ordered in the reverse order of the dependencies between add-on packages. So, for example, if the include files from all add-on packages are required, the order of these directives would be: '`-I/usr/include/strcompat -I/usr/include/streams`'.

Following are the user visible header files provided by the `strcompat-0.9.2.7` package in directory '`/usr/include/strcompat/`':

'`sys/stream.h`'
: A replacement '`stream.h`' file

'`sys/strconf.h`'
: A replacement '`strconf.h`' file

'`sys/ddi.h`'
: A replacement '`ddi.h`' file

'`sys/strsun.h`'
: A replacement '`strsun.h`' file

'`sys/sunddi.h`'
: A replacement '`sunddi.h`' file

3.6.1.1 User Space Programs

Typically include files for interacting with *STREAMS* from user space include the '`stropts.h`' header file. Additional files for interacting with specific drivers or module may also be required. The *OpenSS7 STREAMS Compatibility* package does not provide any user space header files.

3.6.1.2 Kernel Driver and Modules

Typical include files for writing *STREAMS* modules and drivers for kernel include the '`sys/cmn_err.h`', '`sys/kmem.h`', '`sys/dki.h`', '`sys/stream.h`', '`sys/ddi.h`', and '`sys/strconf.h`' header files. Additional header files for interacting with specific drivers or modules may also be required.

[5] One of the major reasons for using this non-standard subdirectory is to avoid conflict with header files already located in the '`/usr/include`' directory.

3.6.2 Libraries

Shared or static versions of the '`libstreams`' library must be linked when using the `strcompat-0.9.2.7` package. This library must either be specified on the `gcc` command line as a shared library (e.g. '`-lstreams`') or as a static library (e.g. '`/usr/lib/libstreams.a`').

If the shared library is linked, include the following options on the `gcc` command line:

If the static library is linked, include the following options on the `gcc` command line:

3.6.3 Kernel Module

Developing *STREAMS* kernel modules is similar to user space programs with regard to header files. '`/usr/include/strcompat`' should be placed as as include directory to search in the `gcc` command line. The rules for compiling *Linux* kernel modules should be followed. In particular, several important intricacies should be considered:

- The `gcc` compiler used to compile the kernel modules must be the same version of compiler that was used to compile the kernel.
- The `gcc` command line must have the same compile flags that were used to compile the kernel.
- The `gcc` command line must define several important kernel defines including '`-DLINUX`', '`-D__KERNEL__`', as well as the base name of the module.
- The `gcc` command line must include several important include files directly on the command line such as '`--include /lib/modules/2.4.20-28.7/build/include/linux/autoconf.h`' and maybe even '`--include /lib/modules/2.4.20-28.7/build/include/linux/modversion.h`'.[6]

3.6.4 Manual Pages

The `strcompat-0.9.2.7` package installs a number of manual pages. The number of manual pages installed totals several hundred manual pages.

[6] The kernel version '`2.4.20-28.7`' if just an example. For the running kernel, use the output of '`uname -r`'.

4 Porting

Although each of the manual pages of supported functions and structures provide compatibility and porting information in the *COMPATIBILITY* and *CONFORMANCE* sections, this document attempts to collect together some of the overarching pertinent information concerning porting from various *UNIX* operation systems support *STREAMS* to *Linux Fast-STREAMS*. For general portability information concerning porting *from Linux Fast-STREAMS* to other *STREAMS* implementations, to avoid technical lock-in, see the *COMPATIBILITY* section in the manual page for the specific function.

The porting information is organized by the operating system from which porting is being attempted. Note that, aside from configuration details, any system not listed here that is based on *SVR 4.2 MP* or on another of the implementations, should start with that implementation's portability information.

Porting information is organized into sections as follows:

4.1 SVR 3.2 Porting

Detailed portability information for porting *STREAMS* modules and drivers from *SVR 3.2* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

This section captures portability information for *SVR 3.2* based systems. If the operating system from which you are porting more closely fits one of the other portability sections, please see that section. For the most part, porting from *SVR 3.2* to *OpenSS7 STREAMS Compatibility* is not much different than porting forward from *SVR 3.2* to *SVR 4.2 MP*. If you wish to be able to access some backward compatible *SVR 3.2* functions, use the *SVR 3.2* Compatibility Module. Therefore, it is recommended that *STREAMS* modules and drivers for *SVR 3.2* be ported forward to *SVR 4.2 MP* before being ported to *OpenSS7 STREAMS Compatibility*.

4.1.1 Differences from SVR 3.2

The most significant difference in *SVR 3.2* and *SVR 4.2 MP* was the declaration of the queue open and close routine entry points. Some *STREAMS* implementations still support both *SVR 3.2* entry point declarations as well as *SVR 4.2 MP* entry point declarations. *OpenSS7 STREAMS Compatibility* only supports the *SVR 4.2 MP* style entry points. *SVR 3.2* was not MP-safe. *OpenSS7 STREAMS Compatibility* is MP-safe.

A significant number of utilities were implemented in *SVR 3.2* as architecture dependent macros. In *SVR 4.2 MP* these became architecture independent function calls. In general, *OpenSS7 STREAMS Compatibility* is different from *SVR 3.2* in any way that *SVR 3.2* is different from *SVR 4.2 MP*.

4.1.2 Commonalities with SVR 3.2

In general, most of the *STREAMS* utility functions that were present in *SVR 3.2* also made it into *SVR 4* (with few exceptions). *SVR 3.2* did not yet have the concept of a DDI/DKI, but the *STREAMS* functions present in *SVR 3.2* appear in the *SVR 4.2 MP* DDI/DKI.

4.1.3 Compatibility functions for SVR 3.2

`alloc_proto(9)`
: Allocate control and data message blocks.

`emajor(9)`
: Get the external (real) major device number from the device number.

`eminor(9)`
: Get the external extended major device number from the device number.

4.1.4 Configuration with SVR 3.2

I have never seen a description of *SVR 3.2 STREAMS* configuration. I can only assume that it involved relinking the kernel in some fashion.

4.2 SVR 4.2 Porting

Detailed portability information for porting *STREAMS* modules and drivers from *SVR 4.2* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

This section captures portability information for *SVR 4.2 MP* based systems. If the operating system from which you are porting more closely fits one of the other portability section, please see that section.

4.2.1 Differences from SVR 4.2

OpenSS7 STREAMS Compatibility have very few difference from *SVR 4.2 MP*. Not all *SVR 4.2 MP* functions are implemented in the base *OpenSS7 STREAMS Compatibility* kernel modules. Some functions are included in the *SVR 4.2 MP* Compatibility Module ('`streams_svr4compat.ko`') from the '`strcompat`' package.

4.2.2 Priority Levels

Linux has a different concept of priority levels *SVR 4.2 MP*. **Linux** has basically 4 priority levels as follows:

1. Preemptive

   At this priority level, software and hardware interrupts are enabled and the kernel is executing with preemption enabled. This means that the currently executing kernel thread could preempt and sleep in favour of another thread of kernel execution.

   This priority level only exist on preemptive (mostly 2.6) kernels.
2. Non-Preemptive

   At this priority level, software and hardware interrupts are enabled and the kernel is executing with preemption disabled. This means that the currently executing kernel thread will only be interrupted by software or hardware interrupts.

   This priority level exists in all kernels.
3. Software Interrupts Disabled

   At this priority level, software interrupts are disabled and the kernel is executing with preemption disabled. This means that the currently executing kernel thread will only be interrupted by hardware interrupts.

This is the case when the executing thread is processing a software interrupt, or when the currently executing thread has disabled software interrupts.

This priority level exists in all kernels.

4. Interrupt Service Routines Disabled

   At this priority level, hardware interrupts are disabled and the kernel is executing with preemption disabled. This means that the currently executing kernel thread will not be interrupted.

   This is the case when the executing thread is processing a hardware interrupt, or when the currently executing thread has disabled hardware interrupts.

   This priority level exists in all kernels.

4.2.3 Commonalities with SVR 4.2

4.2.4 Compatibility functions for SVR 4.2

4.2.5 Configuration with SVR 4.2

4.3 MPS Porting

Detailed portability information for porting *STREAMS* modules and drivers from *MPS* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.3.1 Differences from MPS

4.3.2 Commonalities with MPS

4.3.3 Compatibility functions for MPS

4.3.4 Configuration with MPS

4.4 AIX Porting

Detailed portability information for porting *STREAMS* modules and drivers from *AIX* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.4.1 Differences from AIX

4.4.2 Commonalities with AIX

4.4.3 Compatibility functions for AIX

4.4.4 Configuration with AIX

4.5 HP-UX Porting

Detailed portability information for porting *STREAMS* modules and drivers from *HP-UX* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.5.1 Differences from HP-UX

4.5.2 Commonalities with HP-UX

4.5.3 Compatibility functions for HP-UX

4.5.4 Configuration with HP-UX

4.6 IRIX Porting

Detailed portability information for porting *STREAMS* modules and drivers from *IRIX* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.6.1 Differences from IRIX

4.6.2 Commonalities with IRIX

4.6.3 Compatibility functions for IRIX

4.6.4 Configuration with IRIX

4.7 LfS Porting

Detailed portability information for porting *STREAMS* modules and drivers from *LfS* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.7.1 Differences from LfS

4.7.2 Commonalities with LfS

4.7.3 Compatibility functions for LfS

4.7.4 Configuration with LfS

4.8 LiS Porting

Detailed portability information for porting *STREAMS* modules and drivers from *LiS* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.8.1 Differences from LiS

4.8.2 Commonalities with LiS

4.8.3 Compatibility functions for LiS

4.8.4 Configuration with LiS

4.9 MacOT Porting

Detailed portability information for porting *STREAMS* modules and drivers from *MacOT* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.9.1 Differences from MacOT

4.9.2 Commonalities with MacOT

4.9.3 Compatibility functions for MacOT

4.9.4 Configuration with MacOT

4.10 OSF/1 Porting

Detailed portability information for porting *STREAMS* modules and drivers from *OSF/1* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.10.1 Differences from OSF/1

4.10.2 Commonalities with OSF/1

4.10.3 Compatibility functions for OSF/1

4.10.4 Configuration with OSF/1

4.11 Solaris Porting

Detailed portability information for porting *STREAMS* modules and drivers from *Solaris* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.11.1 Differences from Solaris

4.11.2 Commonalities with Solaris

4.11.3 Compatibility functions for Solaris

4.11.4 Configuration with Solaris

4.12 SUX Porting

Detailed portability information for porting *STREAMS* modules and drivers from *SUX* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.12.1 Differences from SUX

4.12.2 Commonalities with SUX

4.12.3 Compatibility functions for SUX

4.12.4 Configuration with SUX

4.13 UnixWare Porting

Detailed portability information for porting *STREAMS* modules and drivers from *UnixWare* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.13.1 Differences from UnixWare

4.13.2 Commonalities with UnixWare

4.13.3 Compatibility functions for UnixWare

4.13.4 Configuration with UnixWare

4.14 UXP Porting

Detailed portability information for porting *STREAMS* modules and drivers from *UXP* to *OpenSS7 STREAMS Compatibility* is contained in this package under the `svr3compat(9)` manual page. This package also contains specific compatibility functions in the '`streams_svr3compat.ko`' module.

4.14.1 Differences from UXP

4.14.2 Commonalities with UXP

4.14.3 Compatibility functions for UXP

4.14.4 Configuration with UXP

5 Conformance

5.1 STREAMS Compatibility

Linux Fast-STREAMS is designed to be as compatible as possible with as wide a range of *STREAMS* implementations as possible. On top of this base compatibility, the *OpenSS7 STREAMS Compatibility* package provides compatible *STREAMS* utility, DDI/DKI and configuration functions specific to a particular *STREAMS* implementation.[1]

OpenSS7 STREAMS Compatibility provides some degree of compatibility with other *STREAMS* implementation as follows:

— *SVR 4.2 ES/MP*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *SVR 4.2 ES/MP* to ease portability and common comprehension, see Section "SVR 4.2 Compatibility" in *STREAMS Programmer's Guide*.

— *AIX 5L Version 5.1*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *AIX 5L Version 5.1* to ease portability and common comprehension, see Section "AIX Compatibility" in *STREAMS Programmer's Guide*.

— *HP-UX 11.0i v2*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *HP-UX 11.0i v2* to ease portability and common comprehension, see Section "HP-UX Compatibility" in *STREAMS Programmer's Guide*.

— *OSF/1 1.2/Digital UNIX/True 64*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *OSF/1 1.2/Digital UNIX* to ease portability and common comprehension, see Section "OSF/1 Compatibility" in *STREAMS Programmer's Guide*.

— *UnixWare 7.1.3 (OpenUnix 8)*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *UnixWare 7.1.3 (OpenUnix 8)* to ease portability and common comprehension, see Section "UnixWare Compatibility" in *STREAMS Programmer's Guide*.

— *Solaris 9/SunOS 5.9*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *Solaris 9/SunOS 5.9* to ease portability and common comprehension, see Section "Solaris Compatibility" in *STREAMS Programmer's Guide*.

— *SUPER-UX*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *SUPER-UX* to ease portability and common comprehension, see Section "SUX Compatibility" in *STREAMS Programmer's Guide*.

[1] Although the *OpenSS7 STREAMS Compatibility* package has, in the past, built and installed over *LiS*, because *LiS* lacked the base compatibility offered by *Linux Fast-STREAMS*, the compatibility offered by this package in conjunction with *LiS* was simple functional declaration compatibility only.

— *UXP/V*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *UXP/V* to ease portability and common comprehension, see Section "UXP Compatibility" in *STREAMS Programmer's Guide*.

— *LiS-2.16.18*
: *OpenSS7 STREAMS Compatibility* provides some degree of operational compatibility with *LiS 2.16* to ease portability and common comprehension, see Section "LiS Compatibility" in *STREAMS Programmer's Guide*.

For additional details, see Section "About This Manual" in *STREAMS Programmer's Guide*.

5.1.1 SVR 3.2 Compatibility

Almost all of the *SVR 3.2* functions have been continued into *SVR 4*, with the exception of some backward compatibility functions. These functions are implemented in the *UNIX System V Release 3.2 Compatibility Module*, '`streams_svr3compat.ko`'. There are implemented in a separate module, because it is very unlikely that they will be used. This module can be suppressed at configuration time.

5.1.1.1 UNIX System V Release 3.2 Functions

Following are the *UNIX System V Release 3.2 STREAMS* functions and their documented support in the various implementation with which this package is compatible. The *Linux Fast-STREAMS* package implements many of these function in the core '`streams.ko`' kernel module.

`cmpdev(9)` –
`emajor(9)` – get the external major number from a device number
`eminor(9)` – get the external minor number from a device number
`etoimajor(9)` – convert an external major number to an internal one
`expdev(9)` –
`itoemajor(9)` – convert an internal major number to an external one
`major(9)` – get the major number from a device number
`makedev(9)` – make a device number from a major and minor number
`minor(9)` – get the minor number from a device number

Notes:

- Only *Solaris* and *UXP/V* implement the `cmpdev(9)` and `expdev(9)` functions.
- The *OpenSS7 STREAMS Compatibility* package does not support `cmpdev(9)`, `expdev(9)`, `major(9)`, `minor(9)` or `makedev(9)` functions. The `emajor(9)`, `eminor(9)`, `etoimajor(9)` and `itoemajor(9)` functions are implemented as part of the *UNIX System V Release 3.2 Compatibiltiy Module*, '`streams_svr3compat.ko`'.
- For specific compatibility notes, see the individual manual pages for these functions.

5.1.2 SVR 4.2 Compatibility

5.1.2.1 UNIX System V Release 4 STREAMS Functions::

Following are the *UNIX System V Release 4.0 STREAMS* functions and their documented support in the various implementations with which this package is compatible. The *Linux*

Fast-STREAMS package implements all of these functions in the core '`streams.ko`' kernel module.

`adjmsg(9)` – trim a STREAMS message block.
`allocb(9)` – allocate a STREAMS message block.
`backq(9)` – find the previous STREAMS queue.
`bcanput(9)` – test a STREAMS queue for band flow control.
`bufcall(9)` – create a buffer callback.
`canenable(9)` – check if a queue can be enabled by `putq(9)`.
`canput(9)` – test a STREAMS queue for flow control.
`copyb(9)` – copy a STREAMS message block.
`copymsg(9)` – copy a STREAMS message block chain.
`datamsg(9)` – test if a STREAMS message block is a data message.
`dupb(9)` – duplicate a STREAMS message block.
`dupmsg(9)` – duplicate a STREAMS message block chain.
`enableok(9)` – permit STREAMS queue enabling with `putq(9)`.
`esballoc(9)` – allocate a STREAMS message block with external buffer.
`esbbcall(9)` – create an external buffer callback.
`flushband(9)` – flush a STREAMS queue band.
`flushq(9)` – flush a STREAMS queue.
`freeb(9)` – free a STREAMS message block.
`freemsg(9)` – free a STREAMS message block chain.
`getadmin(9)` – get a STREAMS module administrative function pointer.
`getmid(9)` – get a STREAMS module id.
`getq(9)` – get a message from a STREAMS queue.
`insq(9)` – insert a message into a STREAMS queue.
`linkb(9)` – chain a STREAMS message block onto another.
`msgdsize(9)` – calculate data size of a STREAMS message chain.
`noenable(9)` – prohibit STREAMS queue enabling on `putq(9)`.
`OTHERQ(9)` – find the other STREAMS queue in a queue pair.
`pullupmsg(9)` – pull up a STREAMS message chain into a single message block.
`putbq(9)` – put a STREAMS message back on a queue.
`putctl1(9)` – put a 1 byte control message to a STREAMS queue.
`putctl(9)` – put a control message to a STREAMS queue.
`putnext(9)` – pass a message to the next STREAMS queue.
`putq(9)` – put a message on a STREAMS queue.
`qenable(9)` – enable a STREAMS queue.
`qreply(9)` – reply with a message to a STREAMS queue.
`qsize(9)` – count the messages on a STREAMS queue.
`RD(9)` – find the read queue of a STREAMS queue pair.
`rmvb(9)` – remove a message block from a STREAMS message chain.
`rmvq(9)` – remove a message from a STREAMS queue.
`SAMESTR(9)` – test if STREAMS queues belong to the same stream.
`splstr(9)` – set software priority level for STREAMS.
`strlog(9)` – log to the STREAMS logger.
`strqget(9)` – get attributes of the STREAMS stream head.
`strqset(9)` – set attributes of the STREAMS stream head.

testb(9) – test if a STREAMS message block can be allocated.
unbufcall(9) – cancel a STREAMS buffer callback.
unlinkb(9) – remove a message block from a STREAMS message chain.
WR(9) – find the write queue of a STREAMS queue pair.

Notes:

- canenable(9) is really an *SVR 3.2* compatibility function that should not be used with *SVR 4 STREAMS* programs.
- For the most part, the *UNIX System V Release 4.0 STREAMS* functions are universally implemented. Exceptions to this include backq(9), which appears to be an oversight on the part of *SUPER-UX* documentation; esbbcall(9), that can be emulated by calling bufcall(9) with a size of zero; getadmin(9), getmid(9) and strlog(9), which seems to be more of a *Solaris* and *LiS* problem; SAMESTR(9), which is only useful on systems with *STREAMS* support for pipes and FIFOs.
- Because all of these functions are supported by the core *Linux Fast-STREAMS* package, and all but getadmin(9), getmid(9) and strlog(9) are supported by the core *Linux STREAMS (LiS)* package, these functions are not provided in the *SVR 4.2 Compatibility Module*, 'streams_svr4compat.ko'. The three functions missing from *LiS* are implemented in the *Linux Fast-STREAMS Compatibility Module*, 'streams_lfscompat.ko', that is only built and installed against *LiS*.
- *LiS* always misses what *Solaris* misses. That is probably not a coincidence.
- For specific compatibility notes, see the individual manual pages for these functions.

5.1.2.2 UNIX System V Release 4 MP STREAMS Functions

UNIX System V Release 4.0 Multiprocessor (MP) STREAMS functions and their documented support in the various implementations with which this package is compatible. *Linux Fast-STREAMS* implements most of these functions in the core 'streams.ko' kernel module. The MPSTR_QLOCK(9), MPSTR_QRELE(9), MPSTR_STPLOCK(9) and MPSTR_STPRELE(9) locking functions are part of the *SVR 4.2 MP* compatibility module, 'streams_svr4compat.ko' because they only have documented support in *UnixWare*.

bcanputnext(9) – test band flow control from the next STREAMS queue.
canputnext(9) – test flow control from the next STREAMS queue.
freezestr(9) – acquire exclusive access to a STREAMS queue.
msgpullup(9) – pull up bytes in a message into a new message block.
pcmsg(9) – test a message type for priority.
put(9) – put a message on a STREAMS queue (invoking its put procedure).
putnextctl1(9) – put a 1 byte control message to the next STREAMS queue.
putnextctl(9) – put a control message to the next STREAMS queue.
qprocsoff(9) – disable STREAMS queue procedures.
qprocson(9) – enable STREAMS queue procedures.
unfreezestr(9) – release exclusive access from a STREAMS queue.
MPSTR_QLOCK(9) – lock a STREAMS queue for exclusive access.
MPSTR_QRELE(9) – unlock a STREAMS queue from exclusive access.
MPSTR_STPLOCK(9) – lock a STREAMS stream head for exclusive access.
MPSTR_STPRELE(9) – unlock a STREAMS stream head from exclusive access.

Notes:

- Although they are *STREAMS* functions, no implementation documentation other than *UnixWare* mentions the `MPSTR_QLOCK(9)`, `MPSTR_QRELE(9)`, `MPSTR_STPLOCK(9)` and `MPSTR_STPRELE(9)` functions, so they are placed in the *SVR 4.2 MP* compatibility module, '`streams_svr4compat`'.
- The `pcmsg(9)` function seems to have been missed by a number of implementations.
- *AIX*, *OSF/1* and *UXP/V* do not document any of these functions, which is bad: these are the MP functions for *STREAMS*.
- *LiS* did not have anything resembling a `qprocson(9)` or `qprocsoff(9)` implementation until recently (2.18.0). *LiS* also did not have any `freezestr(9)` or `unfreezestr(9)` implementation until recently (2.18.0). Neither implementations are fully functional or in accordance with *STREAMS* documentation, making them almost unusable.
- *LiS* always misses what *Solaris* misses. That is probably not a coincidence.

5.1.2.3 UNIX System V Release 4.0 DDI/DKI Functions

`ASSERT(9)` –
`bcopy(9)` –
`biodone(9)` –
`biowait(9)` –
`bp_mapin(9)` –
`bp_mapout(9)` –
`brelse(9)` –
`btop(9)` –
`btopr(9)` –
`bzero(9)` –
`clrbuf(9)` –
`cmn_err(9)` –
`copyin(9)` –
`copyout(9)` –
`delay(9)` –
`dma_disable(9)` –
`dma_enable(9)` –
`dma_free_buf(9)` –
`dma_free_cb(9)` –
`dma_get_best_mode(9)` –
`dma_get_buf(9)` –
`dma_get_cb(9)` –
`dma_pageio(9)` –
`dma_prog(9)` –
`dma_stop(9)` –
`dma_swsetup(9)` –
`dma_swstart(9)` –
`drv_getparm(9)` –
`drv_hztousec(9)` –
`drv_priv(9)` –
`drv_setparm(9)` –

drv_usectohz(9) –
drv_usecwait(9) –
freerbuf(9) –
geteblk(9) –
getemajor(9) –
geteminor(9) –
geterror(9) –
getmajor(9) –
getminor(9) –
getrbuf(9) –
hat_getkpfnum(9) –
hat_getppfnum(9) –
inb(9) –
inl(9) –
inw(9) –
kmem_alloc(9) –
kmem_fast_alloc(9) –
kmem_free(9) –
kmem_zalloc(9) –
makedevice(9) –
max(9) –
min(9) –
ngeteblk(9) –
outb(9) –
outl(9) –
outw(9) –
page_numtopp(9) –
page_pptonum(9) –
physiock(9) –
physmap(9) –
physmap_free(9) –
pollwakeup(9) –
pptophys(9) –
psignal(9) –
ptob(9) –
rdam_filter(9) –
repinsb(9) –
repinsd(9) –
repinsw(9) –
repoutsb(9) –
repoutsd(9) –
repoutsw(9) –
rmalloc(9) –
rmfree(9) –
rmsetwant(9) –
sleep(9) –
spl0(9) –

spl1(9) –
spl2(9) –
spl3(9) –
spl4(9) –
spl5(9) –
spl6(9) –
spl7(9) –
spl(9) –
splbase(9) –
spldisk(9) –
splhi(9) –
spltimeout(9) –
spltty(9) –
splx(9) –
timeout(9) –
uiomove(9) –
untimeout(9) –
ureadc(9) –
useracc(9) –
uwritec(9) –
vtop(9) –
wakeup(9) –

Notes:

– For specific compatibility notes, see the individual manual pages for these functions.

5.1.2.4 UNIX System V Release 4.0 MP DDI/DKI Functions

dtimeout(9) –
itimeout(9) –
rmallocmap(9) –
rmalloc_wait(9) –
rmfreemap(9) –
bioerror(9) –
getnextpg(9) –
kvtoppid(9) –
phalloc(9) –
phfree(9) –
phystoppid(9) –
proc_ref(9) –
proc_signal(9) –
proc_unref(9) –

Notes:

– For specific compatibility notes, see the individual manual pages for these functions.

5.1.2.5 UNIX System V Release 4.2 DDI/DKI Functions

drv_gethardware(9)	–
mod_drvattach(9)	–
mod_drvdetach(9)	–

Notes:

– For specific compatibility notes, see the individual manual pages for these functions.

5.1.2.6 UNIX System V Release 4.2 MP DDI/DKI Functions

bcb_alloc(9)	–
bcb_free(9)	–
bcmp(9)	–
buf_breakup(9)	–
cm_addval(9)	–
cm_AT_putconf(9)	–
cm_delval(9)	–
cm_devconfig_size(9)	–
cm_getbrdkey(9)	–
cm_getnbrd(9)	–
cm_getval(9)	–
cm_getversion(9)	–
cm_intr_attach(9)	–
cm_intr_detach(9)	–
cm_read_devconfig(9)	–
cm_write_devconfig(9)	–
dma_cascade(9)	–
dma_physreq(9)	–
drv_mmap(9)	–
drv_munmap(9)	–
getpl(9)	–
iobitmapctl(9)	–
kmem_alloc_physcontig(9)	–
kmem_free_physcontig(9)	–
KS_HOLDLOCKS(9)	–
LOCK(9)	–
LOCK_ALLOC(9)	–
LOCK_DEALLOC(9)	–
LOCK_OWNED(9)	–
met_ds_alloc_stats(9)	–
met_ds_dealloc_stats(9)	–
met_ds_dequeued(9)	–
met_ds_hist_stats(9)	–
met_ds_iodone(9)	–

met_ds_queued(9)	–
ovbcopy(9)	–
physreq_alloc(9)	–
physreq_free(9)	–
physreq_prep(9)	–
proc_valid(9)	–
RW_ALLOC(9)	–
RW_DEALLOC(9)	–
RW_RDLOCK(9)	–
RW_TRYRDLOCK(9)	–
RW_TRYWRLOCK(9)	–
RW_UNLOCK(9)	–
RW_WRLOCK(9)	–
SLEEP_ALLOC(9)	–
SLEEP_DEALLOC(9)	–
SLEEP_LOCK(9)	–
SLEEP_LOCKAVAIL(9)	–
SLEEP_LOCKOWNED(9)	–
SLEEP_LOCK_SIG(9)	–
SLEEP_TRYLOCK(9)	–
SLEEP_UNLOCK(9)	–
strcat(9)	–
strcmp(9)	–
strcpy(9)	–
strlen(9)	–
strncat(9)	–
strncmp(9)	–
strncpy(9)	–
SV_ALLOC(9)	–
SV_BROADCAST(9)	–
SV_DEALLOC(9)	–
SV_SIGNAL(9)	–
SV_WAIT(9)	–
SV_WAIT_SIG(9)	–
TRYLOCK(9)	–
UNLOCK(9)	–

Notes:

– For specific compatibility notes, see the individual manual pages for these functions.

5.1.3 MPS Compatibility

5.1.3.1 Mentat Portable Streams (MPS) Utility Functions

The *Mentat Portable Streams (MPS)* utility functions are important because they exist on many *UNIX* systems. *AIX*, *HP-UX*, *OSF/1.2* and *Mac OpenTransport* are based on *MPS*. Almost all variants use the *Mentat* TCP/IP implementations, and therefore have implementations of many of these functions internally if not exposed. *AIX*, *OSF/1.2* and

especially *Mac OpenTransport* expose and document most (if not all) of these functions. The *OpenSS7 STREAMS Compatibility* package supports all of these functions.[2]

`mi_alloc(9)` – allocate and free kernel memory without later regard to size.
`mi_allocq(9)` – `allocq(9)` replacement.
`mi_alloc_sleep(9)` – `kmem_alloc(9)` replacement.
`mi_attach(9)` – associate instance data with a *STREAMS* queue.
`mi_bcmp(9)` – compare two binary memory extents.
`mi_bufcall(9)` – reliable alternative to `bufcall(9)`.
`mi_close_comm(9)` – *STREAMS* common minor device close utility.
`mi_close_detached(9)` – release instance data from the *STREAMS* queue and perform close cleanup.
`mi_close_free(9)` – free a *STREAMS* driver or module instance from a Stream.
`mi_close_unlink(9)` – unlink a *STREAMS* driver or module instance from a Stream.
`mi_copy_done(9)` – `ioctl(2s)` complete.
`mi_copyin(9)` – copy data from a user buffer.
`mi_copyin_n(9)` – copy data from a user buffer.
`mi_copyout(9)` – copy data from a user buffer.
`mi_copyout_alloc(9)` – allocate a buffer to be copied out using `mi_copyout(9)`.
`mi_copy_set_rval(9)` – set return value for input-output control.
`mi_copy_state(9)` – current state of the input-output control process.
`mi_detach(9)` – disassociate instance data from the *STREAMS* queue.
`mi_first_dev_ptr(9)` – obtain first device instance pointer.
`mi_first_ptr(9)` – obtain first instance pointer.
`mi_free(9)` – `kmem_free(9)` replacement.
`mi_freeq(9)` – `freeq(9)` replacement.
`mi_mpprintf(9)` – print a formatted string to a message buffer.
`mi_mpprintf_nr(9)` – continue to print a formatted string to a message buffer.
`mi_next_dev_ptr(9)` – obtain next device instance pointer.
`mi_next_ptr(9)` – *STREAMS* minor device list traversal.
`mi_offset_param(9)` – obtain parameter location within *STREAMS* message block.
`mi_offset_paramc(9)` – obtain parameter location within *STREAMS* message block chain.
`mi_open_alloc(9)` – allocate a *STREAMS* driver or module instance.
`mi_open_alloc_sleep(9)` – allocate a *STREAMS* driver or module instance (may sleep).
`mi_open_comm(9)` – *STREAMS* common minor device open utility.
`mi_open_detached(9)` – *STREAMS* create detached instance data.
`mi_open_link(9)` – link a *STREAMS* driver or module instance on open.
`mi_prev_ptr(9)` – *STREAMS* minor device list traversal.
`mi_reallocb(9)` – reallocate a *STREAMS* message block.
`mi_reuse_proto(9)` – reuse a *STREAMS* protocol message block.
`mi_set_sth_copyopt(9)` – set the *STREAMS* Stream head copy options.

[2] Lately the *OpenSS7 Project* has moved away from using OpenSS7 defined helper functions and move toward using the MPS functions instead. Many of the OpenSS7 utilities predate the compatibility modules and were developed in ignorance of the existing helper functions defined by Mentat and Sun. As such, most OpenSS7 communications protocol stacks require this module to be present on the system.

`mi_set_sth_hiwat(9)` – set the *STREAMS* Stream head high water mark.
`mi_set_sth_lowat(9)` – set the *STREAMS* Stream head low water mark.
`mi_set_sth_maxblk(9)` – set the *STREAMS* Stream head maximum block size.
`mi_set_sth_wroff(9)` – set the *STREAMS* Stream head write offset.
`mi_sprintf(9)` – `sprintf(3)` replacement.
`mi_sprintf_putc(9)` – put a character in a sprintf buffer.
`mi_strcmp(9)` – `strcmp(3)` replacement.
`mi_strlen(9)` – `strlen(3)` replacement.
`mi_strlog(9)` – `strlog(9)` replacement.
`mi_strol(9)` – `strtol(3)` replacement.
`mi_timer(9)` – process a *STREAMS* timer.
`mi_timer_alloc(9)` – allocate a *STREAMS* timer.
`mi_timer_cancel(9)` – cancel a *STREAMS* timer.
`mi_timer_free(9)` – free a *STREAMS* timer.
`mi_timer_move(9)` – move a *STREAMS* timer.
`mi_timer_q_switch(9)` – switch queues for a *STREAMS* timer.
`mi_timer_stop(9)` – stop a *STREAMS* timer.
`mi_timer_valid(9)` – check a *STREAMS* timer.
`mi_zalloc(9)` – `kmem_zalloc(9)` replacement.
`mi_zalloc_sleep(9)` – `kmem_zalloc(9)` replacement.
`mps_become_writer(9)` – *STREAMS* mutex upgrade.
`mps_intr_disable(9)` – disable interrupts.
`mps_intr_enable(9)` – enable interrupts.

Notes:

- *Mac OpenTransport* documents almost all of these functions. The internal implementations of some *UNIX* variants differ from the *Mac OpenTransport* documentation in name and prototype.
- For the functions that are exposed by various implementations and their exact names and prototypes, see the individual variant sections.
- For specific compatibility notes, see the individual manual pages for these functions.

5.1.4 AIX Compatibility

5.1.4.1 AIX 5L Version 5.1 Portable STREAMS Environment (PSE) STREAMS Functions

`mi_bufcall(9)` – reliable alternative to `bufcall(9)`.
`mi_close_comm(9)` – *STREAMS* common minor device close utility.
`mi_next_ptr(9)` – *STREAMS* minor device list traversal.
`mi_open_comm(9)` – *STREAMS* common minor device open utility.
`putctl2(9)` –
`splstr(9)` – set software priority level for STREAMS.
`splx(9)` –
`str_install(9)` –
`unweldq(9)` –
`wantio(9)` –

wantmsg(9)	–
weldq(9)	–

Notes:

– For specific compatibility notes, see the individual manual pages for these functions.

5.1.5 HP-UX Compatibility

5.1.6 IRIX Compatibility

5.1.7 LfS Compatibility

5.1.8 LiS Compatibility

5.1.9 MacOT Compatibility

5.1.10 OSF/1 Compatibility

5.1.11 Solaris Compatibility

5.1.12 SUX Compatibility

5.1.13 UnixWare Compatibility

5.1.14 UXP Compatibility

6 Releases

This is the OpenSS7 Release of the OpenSS7 STREAMS Compatibility tools, drivers and modules used with the *Linux Fast-STREAMS* or *Linux STREAMS*[1] SVR 4.2 STREAMS releases.

The purpose of providing a separate release of this package was to separate the OpenSS7 STREAMS Compatibility tools, headers, drivers and modules from the *Linux STREAMS*[2] package for use with both *Linux STREAMS*[3] and *Linux Fast-STREAMS* in preparation for replacement of the former by the later.

The following sections provide information on OpenSS7 STREAMS Compatibility releases as well as compatibility information of OpenSS7 release to mainstream UNIX releases of the core, modules and drivers, as well as Linux kernel compatibility.

6.1 Prerequisites

The quickest and easiest way to ensure that all prerequisites are met is to download and install this package from within the *OpenSS7 Master Package*, `openss7-0.9.2.G`, instead of separately.

Prerequisites for the OpenSS7 STREAMS Compatibility package are as follows:

1. *Linux* distribution, somewhat *Linux Standards Base* compliant, with a 2.4 or 2.6 kernel and the appropriate tool chain for compiling out-of-tree kernel modules. Most recent *Linux* distributions are usable out of the box, but some development packages must be installed. For more information, see Section 6.2 [Compatibility], page 52.
   - A fairly LSB compliant GNU/Linux distribution.[4]
   - Linux 2.4 kernel (2.4.10 - 2.4.27), or
   - Linux 2.6 kernel (2.6.3 - 2.6.26);
   - glibc2 or better.
   - GNU groff (for man pages).[5]
   - GNU texinfo (for info files).
   - GNU bison and flex (for config programs).
   - net-snmp (for SNMP agents).[6]

(Note: If you acquired `strcompat` a part of the *OpenSS7 Master Package*, then the dependencies listed below will already have been met by unpacking the master package.)

2. *OpenSS7 Linux Fast-STREAMS*, streams-0.9.2.4.[7]

If you need to rebuild the package from sources with modifications, you will need a larger GNU tool chain as described in See Section 7.2.8 [Downloading from CVS], page 77.

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[1] *Linux STREAMS* is buggy, unsupported and deprecated. Do not use it.

[2] *Linux STREAMS* is buggy, unsupported and deprecated. Do not use it.

[3] *Linux STREAMS* is buggy, unsupported and deprecated. Do not use it.

[4] See Section 6.2.1 [GNU/Linux Distributions], page 52, for more information.

[5] If you are using a Debian release, please make sure to install the groff extension package (‘`groff_ext`’), as it contains the `refer` or `grefer` commands necessary for including references in the manual pages.

[6] A wide range of net-snmp releases are supported, from UCD-SNMP 4.2.5 through net-snmp 5.4.

[7] Although, at one time, this package supported *LiS*, *LiS* is now deprecated and unsupported.

6.2 Compatibility

This section discusses compatibility with major prerequisites.

6.2.1 GNU/Linux Distributions

OpenSS7 STREAMS Compatibility is compatible with the following *Linux* distributions:[8]

- CentOS Enterprise Linux 3.4 (centos34) TBD
- CentOS Enterprise Linux 4.0 (centos4) TBD
- CentOS Enterprise Linux 4.92 (centos49) TBD
- CentOS Enterprise Linux 5.0 (centos5)
- CentOS Enterprise Linux 5.1 (centos51)
- CentOS Enterprise Linux 5.2 (centos52)
- Debian 3.0r2 Woody (deb3.0) TBD
- Debian 3.1r0a Sarge (deb3.1) TBD
- Debian 4.0r1 Etch (deb4.0)
- Debian 4.0r2 Etch (deb4.0)
- Debian 4.0r3 Etch (deb4.0)
- Fedora Core 1 (FC1) TBD
- Fedora Core 2 (FC2) TBD
- Fedora Core 3 (FC3) TBD
- Fedora Core 4 (FC4) TBD
- Fedora Core 5 (FC5) TBD
- Fedora Core 6 (FC6) TBD
- Fedora 7 (FC7)
- Fedora 8 (FC8)
- Fedora 9 (FC9)
- Gentoo 2006.1 (untested) TBD
- Gentoo 2007.1 (untested) TBD
- Lineox 4.026 (LEL4) TBD
- Lineox 4.053 (LEL4) TBD
- Mandrakelinux 9.2 (MDK92) TBD
- Mandrakelinux 10.0 (MDK100) TBD
- Mandrakelinux 10.1 (MDK101) TBD
- Mandriva Linux LE2005 (MDK102) TBD
- Mandriva Linux LE2006 (MDK103) TBD
- Mandriva One (untested)
- RedHat Linux 7.2 (RH7)
- RedHat Linux 7.3 (RH7)

[8] Items marked as '`TBD`' are scheduled to have support deprecated. That is, in a future release, the distributions marked '`TBD`' will not longer be validated before release.

- RedHat Linux 8.0 (RH8) TBD
- RedHat Linux 9 (RH9) TBD
- RedHat Enterprise Linux 3.0 (EL3) TBD
- RedHat Enterprise Linux 4 (EL4)
- RedHat Enterprise Linux 5 (EL5)
- SuSE 8.0 Professional (SuSE8.0) TBD
- SuSE 9.1 Personal (SuSE9.1) TBD
- SuSE 9.2 Professional (SuSE9.2) TBD
- SuSE OpenSuSE (SuSEOSS) TBD
- SuSE 10.0 (SuSE10.0) TBD
- SuSE 10.1 (SuSE10.1) TBD
- SuSE 10.2 (SuSE10.2) TBD
- SuSE 10.3 (SuSE10.3) TBD
- SuSE 11.0 (SuSE11.0)
- SLES 9 (SLES9) TBD
- SLES 9 SP2 (SLES9) TBD
- SLES 9 SP3 (SLES9) TBD
- SLES 10 (SLES10)
- Ubuntu 5.10 (ubu5.10) TBD
- Ubuntu 6.03 LTS (ubu6.03) TBD
- Ubuntu 6.10 (ubu6.10) TBD
- Ubuntu 7.04 (ubu7.04) TBD
- Ubuntu 7.10 (ubu7.10)
- Ubuntu 8.04 (ubu8.04)
- WhiteBox Enterprise Linux 3.0 (WBEL3) TBD
- WhiteBox Enterprise Linux 4 (WBEL4) TBD

When installing from the tarball (see Section 7.5.3 [Installing the Tar Ball], page 103), this distribution is probably compatible with a much broader array of distributions than those listed above. These are the distributions against which the current maintainer creates and tests builds.

6.2.2 Kernel

The *OpenSS7 STREAMS Compatibility* package compiles as a *Linux* kernel module. It is not necessary to patch the *Linux* kernel to build or use the package.[9] Nor do you have to recompile your kernel to build or use the package. OpenSS7 packages use `autoconf` scripts to adapt the package source to your existing kernel. The package builds and runs nicely against production kernels from the distributions listed above. Rather than relying on kernel versions, the `autoconf` scripts interrogate the kernel for specific features and

[9] At a later date, it is possible to move this package into the kernel, however, with continued resistance to STREAMS from within the *Linux* developer community, this is currently unlikely.

variants to better adapt to distribution production kernels that have had patches applied over the official kernel.org sources.

The *OpenSS7 STREAMS Compatibility* package is compatible with 2.4 kernel series after 2.4.10 and has been tested up to and including 2.4.27. It has been tested from 2.6.3 up to and including 2.6.26 (with Fedora 9, openSUSE 11.0 and Ubuntu 8.04 patchsets). Please note that your mileage may vary if you use a kernel more recent than 2.6.26.4: it is difficult to anticipate changes that kernel developers will make in the future. Many kernels in the 2.6 series now vary widely by release version and if you encounter problems, try a kernel within the supported series.

UP validation testing for kernels is performed on all supported architectures. SMP validation testing was initially performed on UP machines, as well as on an Intel 3.0GHz Pentium IV 630 with HyperThreading enabled (2x). Because HyperThreading is not as independent as multiple CPUs, SMP validation testing was limited. Current releases have been tested on dual 1.8GHz Xeon HP servers (2x) as well as dual quad-core SunFire (8x) servers.

It should be noted that, while the packages will configure, build and install against XEN kernels, that problems running validation test suites against XEN kernels has been reported. *XEN kernels are explicitly not supported.* This may change at some point in the future if someone really requires running OpenSS7 under a XEN kernel.

6.2.3 Architectures

The *OpenSS7 STREAMS Compatibility* package compiles and installs on a wide range of architectures. Although it is believed that the package will work on all architectures supported by the Linux kernel being used, validation testing has only been performed with the following architectures:

- ix86
- x86_64
- ppc (MPC 860)
- ppc64

32-bit compatibility validation testing is performed on all 64-bit architectures supporting 32-bit compatibility. If you would like to validate an OpenSS7 package on a specific machine architecture, you are welcome to sponsor the project with a test machine.

6.2.4 Linux STREAMS

The *OpenSS7 STREAMS Compatibility* package is currently compatible with *Linux STREAMS*,[10] however, to use the *OpenSS7 STREAMS Compatibility* package with *LiS* requires use of the OpenSS7 release packages of *LiS*. The *OpenSS7 STREAMS Compatibility* package is compatible with the OpenSS7 **LiS-2.18.7** release that is available from the The OpenSS7 Project Downloads Page. But, do not use *LiS*: it is buggy, unsupported and deprecated. Use *Linux Fast-STREAMS* instead.

6.2.5 Linux Fast-STREAMS

The *OpenSS7 STREAMS Compatibility* package is currently compatible with *Linux Fast-STREAMS (LfS)*. The *OpenSS7 STREAMS Compatibility* package is compatible with the

[10] *Linux STREAMS* is buggy, unsupported and deprecated. Do not use it.

OpenSS7 **streams-0.9.2.4** release that is available from the The OpenSS7 Project Downloads Page.

6.3 Release Notes

The sections that follow provide information on OpenSS7 releases of the *OpenSS7 STREAMS Compatibility* package.

Major changes for release strcompat-0.9.2.7

This is the seventh separate *OpenSS7 Project* release of the *OpenSS7 STREAMS Compatibility* package. The package was originally present in the *Linux Fast-STREAMS* '`streams-0.7a.2`' release package, but has been separated for five releases.

This release is a stable, production grade release for *Linux Fast-STREAMS* and is part of the OpenSS7 Master Package ('`openss7-0.9.2.G`'). The release includes maintenance support for recent distributions and tool chain, but also includes some performance and feature upgrades and inspection bug fixes. It deprecates previous releases. Please upgrade before reporting bugs on previous releases.

This release is primarily a maintenance release.

Major features since the last public release are as follows:

- Minor documentation corrections.
- Kernel module license made explicit "GPL v2". And then changed back to "GPL".
- License upgrade to *AGPL Version 3*.
- Modifications to build under *Fedora* '`2.6.22.5-49`' kernel. These changes also support '`2.6.22.9-91.fc7`' kernel.
- Ability to strap out major documentation build and installation primarily for embedded targets.
- Improvements to common build process for embedded and cross-compile targets.
- Build corrections for recent *RHAS4* kernels that define `irq_handler_t` with a 3 argument function template.
- Build corrections for *XEN* kernels that define `paddr_t`.
- Fixes for older 2.4 kernels.
- Modifications to build under *Fedora* '`2.6.25-45.fc9`' and '`2.6.26.5-45.fc9`' kernels.
- Updated tool chain to '`m4-1.4.12`', '`autoconf-2.63`' and '`texinfo-4.13`'.
- Conversion of RPM spec files to common approach for major subpackages.
- Updated references database for manual pages and roff documents.
- Build system now builds `yum(8)` repositories for RPMs and `apt-get(8)` repositories for DEBs. Installation documentation has been updated to include details of repository install sourcesref.
- Added `MODULE_VERSION` to all modules and drivers.
- Significant rework of the internal implementation of the `mpscompat(9)` Mentat Portable STREAMS compatability functions that also affects the behaviour of the corresponding `osfcompat(9)`, `aixcompat(9)`, `maccompat(9)` and `hpuxcompat(9)` functions that

depend on them. Added documentation for `mi_acquire(9)`, `mi_acquire_sleep(9)` and `mi_release(9)`; also `mi_open_grab(9)` and `mi_close_put(9)`.

A number of difficulties were discovered by the *OpenSS7 Project* in the MPS compatability functions. See '`BUGS`' in the release for more information. These the `mpscompat(9)` functions are now used extensively by modules and drivers under the *OpenSS7 Project* in favor of the previously used `os7compat(9)` functions.

- Added a test driver and module for the purpose of testing the MPS compatability functions.

This is a public stable production grade release of the package: it deprecates previous releases. Please upgrade to the current release before reporting bugs.

As with other OpenSS7 releases, this release configures, compiles, installs and builds RPMs and DEBs for a wide range of Linux 2.4 and 2.6 RPM- and DPKG-based distributions, and can be used on production kernels without patching or recompiling the kernel.

This package is publicly released under the *GNU Affero General Public License Version 3*. The release is available as an `autoconf` tarball, SRPM, DSC, and set of binary RPMs and DEBs. See the downloads page for the `autoconf` tarballs, SRPMs and DSCs. For tarballs, SRPMs, DSCs and binary RPMs and DEBs, see the strcompat package page.

See `http://www.openss7.org/codefiles/strcompat-0.9.2.7/ChangeLog` and `http://www.openss7.org/codefiles/strcompat-0.9.2.7/NEWS` in the release for more information. Also, see the '`strcompat.pdf`' manual in the release (also in html `http://www.openss7.org/strcompat_manual.html`).

For the news release, see `http://www.openss7.org/rel20081029_J.html`.

Major changes for release strcompat-0.9.2.6

This is the sixth separate *OpenSS7 Project* release of the *OpenSS7 STREAMS Compatibility* package. The package was originally present in the *Linux Fast-STREAMS* '`streams-0.7a.2`' release package, but has been separated for five releases.

This release is a stable, production grade release for *Linux Fast-STREAMS* and is part of the OpenSS7 Master Package ('`openss7-0.9.2.F`'). It deprecates previous releases. Please upgrade before reporting bugs on previous releases.

This release is primarily a maintenance release.

Major features since the last public release are as follows:

- Support build on openSUSE 10.2.
- Support build on Fedora 7 and 2.6.21 kernel.
- Rework of `mi_timer(9)` based timers with the addition of several new helper functions. Enhancements and minor corrections to some OpenSS7 specific compatibility functions.
- Support build on CentOS 5.0 (RHEL5).
- Support build on Ubuntu 7.04.
- Updated to gettext 0.16.1.
- Changes to support build on 2.6.20-1.2307.fc5 and 2.6.20-1.2933.fc6 kernel.
- Supports build on Fedora Core 6.
- Support for recent distributions and tool chains.

Major changes for release strcompat-0.9.2.5

This is the fifth separate *OpenSS7 Project* release of the *OpenSS7 STREAMS Compatibility* package. The package was originally present in the *Linux Fast-STREAMS* '`streams-0.7a.2`' release package, but has been separated for five releases.

This release is a stable, production grade release for *Linux Fast-STREAMS* and is part of the OpenSS7 Master Package ('`openss7-0.9.2.E`'). It deprecates previous releases. Please upgrade before reporting bugs on previous releases.

This release is primarily a maintenance release. Some functionality of the package has been tested by its use in other packages and some defects corrected. Support for *LiS* was deprecated as of the previous release.

Major features since the last public release are as follows:

- Added versions to all exported symbols. Made OpenSS7 unique functions GPL export.
- Improvements to the common build environment with better support for standalone package builds on 2.4 kernels.
- Fixed bug found from inspection in `mi_copyout(9)` function.
- Support for autoconf 2.61, automake 1.10 and gettext 0.16.
- Support for Ubuntu 6.10 distribution and bug fixes for i386 kenels.
- The package now looks for other subpackages with a version number as unpacked by separate tarball.

Major changes for release strcompat-0.9.2.4

This is the fourth separate *OpenSS7 Project* release of the *OpenSS7 STREAMS Compatibility* package. The package was originally present in the *Linux Fast-STREAMS* '`streams-0.7a.2`' release package, but has been separated for four releases.

This release is a stable, production grade release for *Linux Fast-STREAMS* and is part of the OpenSS7 Master Package ('`openss7-0.9.2.G`'). It deprecates previous releases. Please upgrade before reporting bugs on previous releases.

This release is primarily a maintenance release. Some functionality of the package has been tested by its use in other packages and some defects corrected. Support for *LiS* is deprecated as of this release.

The release provides the following enhancements and fixes:

- Support for most recent 2.6.18 kernels (including Fedora Core 5 with inode diet patch set).
- Now builds 32-bit compatibility libraries and tests them against 64-bit kernel modules and drivers. The '`make installcheck`' target will now automatically test both 64-bit native and 32-bit compatibility versions, one after the other, on 64-bit platforms.
- Added versions to all library symbols.
- Many documentation updates for all OpenSS7 packages. Automated release file generation making for vastly improved and timely text documentation present in the release directory.
- Dropped support for *LiS*.
- Package will now support extended ranges of minor devices on 2.6 kernels under *Linux Fast-STREAMS* only.

- Better support for Ubuntu and recent gcc compilers, including debian script corrections.
- Better detection of SUSE distributions, release numbers and SLES distributions: support for additional *SuSE* distributions on `ix86` as well as `x86_64`. Added distribution support includes *SLES 9*, *SLES 9 SP2*, *SLES 9 SP3*, *SLES 10*, *SuSE 10.1*.
- Improved compiler flag generation and optimizations for recent `gcc` compilers and some idiosyncratic behaviour for some distributions (primarily SUSE).
- Optimized compilation is now available also for user level programs in addition to kernel programs. Added new '`--with-optimize`' option to `configure` to accomplish this.
- Added `--disable-devel configure` option to suppress building and installing development environment. This feature is for embedded or pure runtime targets that do not need the development environment (static libraries, manual pages, documentation).
- Added `send-pr` script for automatic problem report generation.

Major changes for release strcompat-0.9.2.3

This release is primarily to support additional compilers (gcc 4.0.2), architectures (x86_64, SMP, 32-bit compatibility), recent Linux distributions (EL4, SuSE 10, LE2006, OpenSuSE) and kernels (2.6.15).

- Corrections for and testing of 64-bit clean compile and test runs on x86_64 architecture. Some bug corrections resulting from gcc 4.0.2 compiler warnings.
- Changes to satisfy gcc 4.0.2 compiler.
- Corrected build flags for Gentoo and 2.6.15 kernels as reported on mailing list.
- Corrections for and testing of 64-bit clean compile and test runs on x86_64 architecture. Some bug corrections resulting from gcc 4.0.2 compiler warnings.
- Initial corrections for and testing of SMP operation on Intel 630 Hyper-Threaded SMP on x86_64. This package should now run well on N-way Xeons even with Hyper-Threading enabled.
- Corrections and validation of 32-bit compatibility over 64-bit on x86_64. Should apply well to other 64-bit architectures as well.

This is a public beta test release of the package.

Major changes for release strcompat-0.9.2.2

This is primarily a bug fixes release and corrections resulting from testing. This is a major bug fix release. The previous release was largely untested. This release has been verified (conformance test suite passes) for operation with *Linux Fast-STREAMS* ('`streams-0.7a.4`').

Initial release strcompat-0.9.2.1

Initial autoconf/RPM packaging of the `strcompat` release.

This is the initial release of the *OpenSS7 STREAMS Compatibility* package for *Linux Fast-STREAMS* (and LiS). These compatibility modules were formerly part of the *Linux Fast-STREAMS* package ('`streams-0.7a.3`'), however, as they were also applicable to *LiS*, they have been removed into a separate package. Once *Linux Fast-STREAMS* is production grade, these compatibility modules will be rolled back into the streams package as *LiS* becomes deprecated.

6.4 Maturity

The *OpenSS7 Project* adheres to the following release philosophy:

- pre-alpha release
- alpha release
- beta release
- gamma release
- production release
- unstable release

6.4.1 Pre-Alpha Releases

Pre-alpha releases are releases that have received no testing whatsoever. Code in the release is not even known to configure or compile. The purpose of a pre-alpha release is to make code and documentation available for inspection only, and to solicit comments on the design approach or other characteristics of the software package.

Pre-alpha release packages ship containing warnings recommending that the user not even execute the contained code.

6.4.2 Alpha Releases

Alpha releases are releases that have received little to no testing, or that have been tested and contains known bugs or defects that make the package unsuitable even for testing. The purpose for an *alpha* release are the same as for the pre-alpha release, with the additional purpose that it is an early release of partially functional code that has problems that an external developer might be willing to fix themselves and contribute back to the project.

Alpha release packages ship containing warnings that executing the code can crash machines and might possibly do damage to systems upon which it is executed.

6.4.3 Beta Releases

Beta releases are releases that have received some testing, but the testing to date is not exhaustive. *Beta* release packages do not ship with known defects. All known defects are resolved before distribution; however, as exhaustive testing has not been performed, unknown defects may exist. The purpose for a *beta* release is to provide a baseline for other organizations to participate in the rigorous testing of the package.

Beta release packages ship containing warnings that the package has not been exhaustively tested and that the package may cause systems to crash. Suitability of software in this category for production use is not advised by the project; however, as always, is at the discretion of the user of the software.

6.4.4 Gamma Releases

Gamma releases are releases that have received exhaustive testing within the project, but external testing has been minimal. *Gamma* release packages do not ship with known defects. As exhaustive internal testing has been performed, unknown defects should be few. Please remember that there is NO WARRANTY on public release packages.

Gamma release packages typically resolve problems in previous *beta* releases, and might not have had full regression testing performed. Suitability of software in this category

for production use is at the discretion of the user of the software. *The OpenSS7 Project* recommends that the complete validation test suites provided with the package be performed and pass on target systems before considering production use.

6.4.5 Production Releases

Production releases are releases that have received exhaustive testing within the project and validated on specific distributions and architectures. *Production* release packages do not ship with known defects. Please remember that there is NO WARRANTY on public release packages.

Production packages ship containing a list of validated distributions and architectures. Full regression testing of any maintenance changes is performed. Suitability of software in this category for production use on the specified target distributions and architectures is at the discretion of the user. It should not be necessary to preform validation tests on the set of supported target systems before considering production use.

6.4.6 Unstable Releases

Unstable releases are releases that have received extensive testing within the project and validated on a a wide range of distributions and architectures; however, is has tested unstable and found to be suffering from critical problems and issues that cannot be resolved. Maintenance of the package has proved impossible. *Unstable* release packages ship with known defects (and loud warnings). Suitability of software in this category for production use is at the discretion of the user of the software. *The OpenSS7 Project* recommends that the problems and issues be closely examined before this software is used even in a non-production environment. Each failing test scenario should be completely avoided by the application. *OpenSS7* beta software is more stable that software in this category.

6.5 Bugs

6.5.1 Defect Notices

OpenSS7 STREAMS Compatibility could possibly contain unknown defects. This is a *production* release. Nevertheless, some remaining unknown defects could possibly be harmful. Validation testing has been performed by the *OpenSS7 Project* and external entities on this software for the set of systems listed in the release notes. Nevertheless, the software might still fail to configure or compile on other systems. The *OpenSS7 Project* recommends that you **validate this software for your target system before using this software**. Use at your own risk. Remember that there is **NO WARRANTY**.[11]

This software is *production* software. As such, it is stable on validated systems but might still crash your kernel in unique circumstances. Installation of the software on a non-validated distribution might mangle your header files or Linux distribution in such a way as to make it unusable. Crashes could possibly lock your system and rebooting the system might not repair the problem. You can possibly lose all the data on your system. Because this software stands a chance of crashing your kernel, the resulting unstable system could possibly destroy computer hardware or peripherals making them unusable. You might void the warranty on any system on which you run this software. YOU HAVE BEEN WARNED.

[11] See sections **Disclaimer of Warranty** and **Limitation of Liability** under [GNU Affero General Public License], page 128.

6.5.2 Known Defects

With the exception of packages not originally created by the *OpenSS7 Project*, the *OpenSS7 Project* software does not ship with known bugs in any release stage except *pre-alpha*. *OpenSS7 STREAMS Compatibility* had no known bugs at the time of release.

6.5.3 Defect History

This section contains historical bugs that were encountered during development and their resolutions. This list serves two purposes:

1. It captures bugs encountered between releases during development that could possibly reoccur (and the Moon is made of blue cheese). It therefore provides a place for users to look if they encounter a problem.
2. It provides a low overhead bug list between releases for developers to use as a '`TODO`' list.

Bugs

`008. 2008-10-19T19:57:41+0000`
: mi_open_link() was not walking device lists correctly.

  fixed in `strcompat-0.9.2.7`.

`007. 2008-10-19T10:39:26+0000`
: mi_open_link() was not returning the assigned device number in devp when sflag was CLONEOPEN.

  fixed in `strcompat-0.9.2.7`.

`006. 2008-07-11T13:52:04+0000`
: lis_alloc_sem() was not setting the supplied count against the created semaphore, but was alway setting the semaphore to 1 (unlocked).

  fixed in `strcompat-0.9.2.7`.

`005. 2008-05-26T14:06:22+0000`
: lis_register_strdev() was failing whenever nminor was greater than zero or not an even multiple of 256. This was due to an error in the logic checking for multiple majors. (Thanks to Omer Tunali for reporting this bug.)

  fixed in `strcompat-0.9.2.7`.

`004. 2007-07-21T17:26:01-0600`
: It was reported that, even with the fix below, validation test suites for XEN kernels are failing. XEN kernels are, therefore, not supported. (Thanks to Bryan Shupe at Flying J for reporting this bug.)

  noted in `strcompat-0.9a.7.rc1`.

`003. 2007-07-21T17:22:10-0600`
: It was reported that paddr_t is already defined in recent XEN kernels, causing compile to fail for these kernels. (Thanks to Bryan Shupe at Flying J for reporting this bug.)

  fixed in `strcompat-0.9a.7.rc1`.

  A check was added to the configure script to check for the existence of paddr_t.

`002. 2007-07-21T17:15:02-0600`

It was discovered that recent kernel on RHAS4 are defining irq_handler_t but have the old 3 argument function template for irq handlers. The detection logic assumed that if irq_hander_t existed, that the newer 2 argument function template for irq handlers were in effect. This caused builds to fail on these RHAS4 kernels.

fixed in `strcompat-0.9a.7.rc1`.

A check was added to the configure script to test whether the irq_handler_t has the newer 2 argument template.

`001. 2007-01-12T11:40:15-0600`

A bug in the `mi_copyout(9)` function was discovered by inspection. The function should complete the last stage of a non-TRANSPARENT input-output control operation by returning an `M_IOCACK(9)` message, but did not. This was fixed for release '`0.9.2.5`'.

6.6 Schedule

Current Plan

There are not many things left to be done on the production OpenSS7 STREAMS Compatibility Modules package. The current plan for the package is largely a maintenance plan including support for current distributions and kernels.

There are currently a large array of Solaris DDI compatibility functions that are not implemented; however, there have not been many requests for this capability. Perhaps the advent of OpenSolaris has forstalled porting of many drivers to Linux, but, regardless of the cause, there is just not a demand. If there are any functions that you need the OpenSS7 Project to support that are not currently supported in one of the compatibility modules, please request support for them on the openss7-develop mailing list.

Things to Do

- Implement the AIX strtune() command.

  todo

- I would really really like a set of rmallocmap(), rmalloc(), rmalloc_wait(), rmfree(), rmfreemap() functions so that drivers could stop using the kmem_cache functions but could acheive similar effect.

  todo

- Work in MUTEX_ALLOC(), MUTEX_DESTROY(), MUTEX_LOCK(), MUTEX_MINE(), MUTEX_OWNED(), MUTEX_TRYLOCK(), MUTEX_UNLOCK() from IRIX into irixcompat.c.

  todo

- Work in streams_interrupt() and STREAMS_TIMEOUT() from IRIX into irixcompat.c.

  todo

- Hey, here's an idea for testing Solaris compatibility: take an OpenSolaris source file for a STREAMS driver and compile and test it under Linux with no (or minimal) source code modifications!

  todo

- Write test programs and test suites. There are really not any test programs or test suites available for the OpenSS7 STREAMS Compatibility Modules package as of strcompat-0.9.2.2.

  todo

- Not all compatibility functionality is implemented. There are a large number of Sun DDI functions applicable to STREAMS that have not been fully implemented. Also, the Sun configuration management mechanism is not yet fully implemented and neither is that for AIX. Also, there is a large group of SVR 4.2 compatible functions that are not directly STREAMS related but are part of the DDI/DKI and should be implemented to provide abstraction from Linux internals as well as the ability to link binary modules.

  moved (Note that the ability to link binary modules has been moved to is own '`strbcm`' package.)

- Linking of binary modules is not yet supported. This is the place (strcompat) where binary modules should be permitted to be loaded against either Linux STREAMS or Linux Fast-STREAMS, because the binary compatibility interface modules are defined here. There is the beginnings of an strconf script output to generate a C-language wrapper file that will link with a binary object file to generate a loadable module that could load under Linux STREAMS or Linux Fast-STREAMS. Note that there are a bunch of binary compatibility issues with Linux STREAMS in the first place (it cannot even be binary compatible with user programs written for 32bit architectures running on 64bit architectures). For fairly restricted use modules and drivers, a single binary object could run on both LiS and LfS.

  moved (Note that the ability to link binary modules has been moved to is own '`strbcm`' package.)

- Documentation. The documentation is trailing a bit. I have thousands of manual pages written, however, some are sparse or incomplete. Also, the manual and the STREAMS Porting Guide needs a bunch of work.

  todo Did a bunch of work on the manual, however, there is still a lot of work on a STREAMS Porting Guide to be done.

6.7 History

For the latest developments with regard to history of changes, please see the '`ChangeLog`' file in the release package.

7 Installation

7.1 Repositories

The OpenSS7 STREAMS Compatibility package release can be accessed from the repositories of The OpenSS7 Project. For `rpm(1)` based systems, the package is available in a `yum(8)` repository based on '`repomd`' XML and may also be accessed using `zypper(8)` or `yast(8)`. For `dpkg(1)` based systems, the package is available in a `apt(8)` repository.

By far the easiest (most repeatable and manageable) form for installing and using *OpenSS7* packages is to install packages from the `yum(8)` or `apt(8)` repositories. If your distribution does not support `yum(8)`, `zypper(8)`, `yast(8)` or `apt(8)`, then it is still possible to install the RPMs or DEBs from the repositories using `rpm(1)`, `dpkg(1)`; or by using `wget(1)` and then installing them from RPM or DEB using `rpm(1)` or `dpkg(1)` locally.

If binaries are not available for your distribution or specific kernel, but your distribution supports `rpm(1)` or `dpkg(1)`, the next best method for installing and using *OpenSS7* packages is to download and rebuild the source RPMs or DSCs from the repository. This can also be performed with `yum(8)`, `zypper(8)`, `yast(8)`, `apt(8)`; or directly using `wget(1)`, `rpm(1)` or `dpkg(1)`.

If your architecture does not support `rpm(1)` or `dpkg(1)` at all, or you have special needs (such as cross-compiling for embedded targets), the final resort method is to download, configure, build and install from tarball. In this later case, the easiest way to build and install *OpenSS7* packages from tarball is to use the tarball for the *OpenSS7 Master Package*, `openss7-0.9.2.G`.

7.1.1 Repositories for YUM

To install or upgrade from the *OpenSS7* '`repomd`' repositories, you will need a file in your '`/etc/yum.repo.d/`' directory. This file can be obtained directly from the *OpenSS7* repository, like so:

```
$> REPOS="http://www.openss7.org/repos/rpms"
$> wget $REPOS/centos/5.2/x86_64/repodata/openss7.repo
$> sudo cp -f openss7.repo /etc/yum.repo.d/
$> sudo yum makecache
```

This example assumes the the distribution is '`centos`' and the distribution release is '`5.2`' and the architecture requires is '`x86_64`'. Another example would be '`$REPOS/i686/suse/11.0/i686/repodata/openss7.repo`', for using `yum(8)` with SUSE.

Once the repository is set up, *OpenSS7* includes a number of virtual package definitions that eas the installation and removal of kernel modules, libraries and utilities. Downloading, configuring, building and installation for a single-kernel distribution is as easy as:

```
$> sudo yum install strcompat
```

Removing the package is as easy as:

```
$> sudo yum remove strcompat
```

If you have difficulty downloading the '`openss7.repo`' file, edit the following information into the file and place it into the '`/etc/yum.repo.d/openss7.repo`' file:

```
-| [openss7]
-| enabled = 1
-| name = OpenSS7 Repository
-| baseurl = http://www.openss7.org/repos/rpms/centos/5.2/x86_64
-| gpgcheck = 1
-| gpgkey = http://www.openss7.org/pubkey.asc
```

Note that it is also possible to point to these repositories as an additional installation source when installing CentOS, RedHat, Fedora, or others. You will have an additional *STREAMS* category from which to choose installation packages.

Some additional installation real or virtual package names and the installations they accomplish are as follows:

‘`strcompat`’
: This package can be used to install or remove the entire OpenSS7 STREAMS Compatibility package. When installing, kernel modules will be installed automatically for the highest version kernel on your system. When removing, all corresponding kernel modules will also be removed.

‘`strcompat-devel`’
: This package can be used to install or remove the development components of the OpenSS7 STREAMS Compatibility package. When installing, ‘`strcompat`’ and appropriate kernel module and kernel module development and debug packages will also be installed. When removing, the development package and all kernel module development and debug packages will also be removed.

‘`strcompat-2.4.20-28.7`’
: This package can be used to install or remove the package for a specific kernel version. When installing, the ‘`strcompat`’ package will also be installed if necessary. When removing the last kernel module package, the ‘`strcompat`’ package will also be removed.

  Note that the version ‘`2.4.20-28.7`’ is just an example. Use the version returned by ‘`$(uname -r)`’ for the kernel for which you wish to install or remove the packages.

‘`strcompat-2.4.20-28.7-devel`’
: This package can be used to install or remove the development and debug packages for a specific kernel version. When installing, the ‘`strcompat`’ and ‘`strcompat-devel`’ packages will also be installed if necessary. When removing the development and debug for kernel modules for the last kernel, the ‘`strcompat-devel`’ package will also be removed.

  Note that the version ‘`2.4.20-28.7`’ is just an example. Use the version returned by ‘`$(uname -r)`’ for the kernel for which you wish to install or remove the packages.

For assistance with specific RPMs, see Section 7.2.3 [Downloading the Binary RPM], page 69.

7.1.2 Repositories for APT

For assistance with specific DEBs, see Section 7.2.4 [Downloading the Debian DEB], page 72.

7.2 Downloading

The OpenSS7 STREAMS Compatibility package releases can be downloaded from the downloads page of The OpenSS7 Project. The package is available as a binary RPM (for popular architectures) a source RPM, Debian binary DEB and source DSC, or as a tar ball. If you are using a browsable viewer, you can obtain the OpenSS7 release of `strcompat` from the links in the sections that follow.

By far the easiest (most repeatable and manageable) form for installing and using *OpenSS7* packages is to download and install individual packages from binary RPM or DEB. If binary RPMs or DEBs are not available for your distribution, but your distribution supports `rpm(1)` or `dpkg(1)`, the next best method for installing and using *OpenSS7* packages is to download and rebuild the source RPMs or DSCs.

If your architecture does not support `rpm(1)` or `dpkg(1)` at all, or you have special needs (such as cross-compiling for embedded targets), the final resort method is to download, configure, build and install from tarball. In this later case, the easiest way to build and install *OpenSS7* packages from tarball is to use the tarball for the *OpenSS7 Master Package*, `openss7-0.9.2.G`.

7.2.1 Downloading with YUM

OpenSS7 repositories support `yum(8)` and `zypper(8)` in repomd XML format as well as YaST and YaST2 formats.

OpenSS7 includes virtual packages that ease the installation and removal of kernel modules, libraries and utilities. Downloading, configuration, building and installation for a signle-kernel distribution installation is as easy as:

```
% sudo yum install strcompat
```

This and additional packages for installation are detailed as follows:

‘`strcompat`’
: Install this package if you need the runtime ‘`strcompat`’ package.

  ```
  % sudo yum install strcompat
  ```

  This will install the ‘`strcompat`’, ‘`strcompat-lib`’ and ‘`strcompat-KVERSION`’ RPMs, where ‘`KVERSION`’ is the highest version number kernel on your system.

  Remove this package if you need to remove all vestages of the ‘`strcompat`’ package.

  ```
  % sudo yum remove strcompat
  ```

  This will remove the ‘`strcompat`’, ‘`strcompat-lib`’, ‘`strcompat-devel`’, ‘`strcompat-KVERSION`’ and ‘`strcompat-devel-KVERSION`’ RPMs for all kernels on your system.

‘`strcompat-devel`’
: Install this package if you need the development ‘`strcompat`’ package.

  ```
  % sudo yum install strcompat-devel
  ```

  This will install the ‘`strcompat`’, ‘`strcompat-lib`’, ‘`strcompat-devel`’, ‘`strcompat-KVERSION`’ and ‘`strcompat-devel-KVERSION`’ RPMs, where ‘`KVERSION`’ is the highest version number kernel on your system.

Remove this package if you do not need development capabilities for the '`strcompat`' package for any kernel.

```
% sudo yum remove strcompat-devel
```

This will remove the '`strcompat-devel`' and '`strcompat-devel-KVERSION`' RPMs for all kernels on your system.

'`strcompat-2.4.20-28.7`'

Install this package if you need the runtime '`strcompat`' for kernel version '`2.4.20-28.7`'. The value '`2.4.20-28.7`' is just an example. For the running kernel, you can install the runtime '`strcompat`' components with:

```
% sudo yum install strcompat-$(uname -r)
```

This will install the '`strcompat`', '`strcompat-lib`' and '`strcompat-2.4.20-28.7`' RPMs, where '`2.4.20-28.7`' is the kernel version specified.

Remove this package if you no longer need the runtime '`strcompat`' for kernel version '`2.4.20-28.7`'. The value '`2.4.20-28.7`' is just an example. For the running kernel, you can remove the runtime '`strcompat`' components with:

```
% sudo yum remove strcompat-$(uname -r)
```

This will remove the '`strcompat-2.4.20-28.7`' and '`strcompat-devel-2.4.20-28.7`' RPMs, where '`2.4.20-28.7`' is the kernel version specified. Also, if this is the last kernel for which '`strcompat`' was installed, the '`strcompat`' '`strcompat-lib`' and '`strcompat-devel`' RPMs will also be removed.

Note that this is a virtual package name: the actual RPMs installed or removed from the system is a kernel module package whose precise name will depend upon the system being used.

'`strcompat-devel-2.4.20-28.7`'

Install this package if you need the development '`strcompat`' package for kernel version '`2.4.20-28.7`'. The value '`2.4.20-28.7`' is just an example. For the running kernel, you can install the kernel development '`strcompat`' components with:

```
% sudo yum install strcompat-devel-$(uname -r)
```

This will install the '`strcompat`', '`strcompat-lib`', '`strcompat-devel`', '`strcompat-2.4.20-28.7`' and '`strcompat-devel-2.4.20-28.7`' RPMs, where '`2.4.20-28.7`' is the kernel version specified.

Remove this package if you no longer need the development capabilities for the '`strcompat`' package for kernel version '`2.4.20-28.7`'. The value '`2.4.20-28.7`' is just an example. For the running kernel, you can remove the kernel development '`strcompat`' components with:

```
% sudo yum remove strcompat-devel-$(uname -r)
```

This will remove the '`strcompat-devel-2.4.20-28.7`' RPMs, where '`2.4.20-28.7`' is the kernel version specified. Also, if this is the last kernel for which '`strcompat`' was installed, the '`strcompat-devel`' RPMs will also be removed.

Note that this is a virtual package name: the actual RPMs installed or removed from the system is a kernel module package whose precise name will depend upon the system being used.

‘strcompat-lib’
: This package is an auxillary package that should be removed and inserted automatically by yum(8). In rare instances you might need to remove or install this package explicitly.

7.2.2 Downloading with APT

OpenSS7 repositries support apt(8) repositorie digests and signatures.

7.2.3 Downloading the Binary RPM

To install from binary RPM, you will need several of the RPM for a complete installation. Binary RPM fall into several categories. To download and install a complete package requires the appropriate RPM from each of the several categories below, as applicable. Some release packages do not provide RPMs in each of the several categories.

To install from Binary RPM, you will need all of the following kernel independent packages for your architecture, and one of the kernel-dependent packages from the next section.

Independent RPM

Independent RPM are dependent on neither the Linux kernel version, nor the *STREAMS* package. For example, the source package ‘strcompat-source-0.9.2.7-1.7.2.noarch.rpm’, is not dependent on kernel nor *STREAMS* package.

All of the following kernel and *STREAMS* independent RPM are required for your architecture. Binary RPMs listed here are for example only: additional binary RPMs are available from the downloads site. If your architecture is not available, you can build binary RPM from the source RPM (see see Section 7.4.1 [Building from the Source RPM], page 100).

Architecture Independent

strcompat-dev-0.9.2.7-1.7.2.noarch.rpm
: The ‘strcompat-dev’ package contains the device definitions necessary to run applications programs developed for OpenSS7 STREAMS Compatibility.[1]

strcompat-doc-0.9.2.7-1.7.2.noarch.rpm
: The ‘strcompat-doc’ package contains this manual in plain text, postscript, ‘pdf’ and ‘html’ forms, along with the meta-information from the ‘strcompat’ package. It also contains all of the manual pages necessary for developing OpenSS7 STREAMS Compatibility applications and OpenSS7 STREAMS Compatibility *STREAMS* modules or drivers.

strcompat-init-0.9.2.7-1.7.2.noarch.rpm
: The ‘strcompat-init’ package contains the init scripts and provides the ‘postinst’ scripts necessary to create kernel module preloads and modules definitions for all kernel module ‘core’ subpackages.

[1] Not all distributions support the ‘%dev’ RPM macro: a case in point is the SuSE 8.0 distribution which uses an older version of rpm(1). Distributions that do not support the ‘%dev’ macro will build devices as a ‘%post’ operation. Note also that not all release packages contain devices. Only packages that provide *STREAMS* character device drivers need devices, and then only when the ‘specfs’ or ‘devfsd’ is not being used.

strcompat-source-0.9.2.7-1.7.2.noarch.rpm
: The '`strcompat-source`' package contains the source code necessary for building the OpenSS7 STREAMS Compatibility release. It includes the `autoconf(1)` configuration utilities necessary to create and distribute tarballs, '`rpm`' and '`deb`'/'`dsc`'.[2]

Architecture Dependent

strcompat-devel-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-devel`' package contains library archives for static compilation, header files to develop OpenSS7 STREAMS Compatibility modules and drivers. This also includes the header files and static libraries required to compile OpenSS7 STREAMS Compatibility applications programs.

strcompat-lib-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-lib`' package contains the run-time shared libraries necessary to run application programs and utilities developed for the '`strcompat`' package.[3]

STREAMS-Dependent RPM

STREAMS-Dependent RPM are dependent upon the specific *STREAMS* package being used, either *Linux STREAMS* or *Linux Fast-STREAMS*. Packages dependent upon *Linux STREAMS* will have '`LiS`' in the package name. Packages dependent upon *Linux Fast-STREAMS* will have '`streams`' in the package name. Note that some *STREAMS*-Dependent RPM are also Kernel-Dependent RPM as described below.

One of the following *STREAMS*-Dependent packages is required for your architecture. If your architecture is not on the list, you can build binary RPM from the source RPM (see see Section 7.4.1 [Building from the Source RPM], page 100).

strcompat-LiS-util-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-LiS-util`' package provides administrative and configuration test utilities and commands associated with the OpenSS7 STREAMS Compatibility package. Because this package must link a *STREAMS*-specific library, it is a *STREAMS*-Dependent package. Use the '`strcompat-LiS-util`' package if you have *LiS* installed.

strcompat-streams-util-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-streams-util`' package provides administrative and configuration test utilities and commands associated with the OpenSS7 STREAMS Compatibility package. Because this package must link a *STREAMS*-specific library, it is a *STREAMS*-Dependent package. Use the '`strcompat-streams-util`' package if you have streams installed.

---

[2] Note that not all releases have source RPM packages. Release packages that do not contain kernel modules do not generate a source RPM package.

[3] Note that not all release packages contain shared libraries, and, therefore, not all release packages contain this package.

Kernel-Dependent RPM

Kernel-Dependent RPM are dependent on specific Linux Kernel Binary RPM releases. Packages are provided for popular released *RedHat* kernels. Packages dependent upon *RedHat* or other kernel RPM will have the '`_kversion`' kernel package version in the package name.

One of the following Kernel-Dependent packages is required for your architecture and kernel version. If your architecture or kernel version is not on the list, you can build binary RPM from the source RPM (see see Section 7.4.1 [Building from the Source RPM], page 100).[4]

strcompat-core-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-core`' package contains the loadable kernel modules that depend only on the kernel. This package is heavily tied to the kernel for which it was compiled. This particular package applies to kernel version '`2.4.20-28.7`'.[5]

strcompat-info-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-info`' package[6] contains the module symbol version information for the '`core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loading the actual kernel modules (from the '`core`' subpackage above). This package is heavily tied to the kernel for which it was compiled. This particular package applies to kernel version '`2.4.20-28.7`'.[7]

strcompat-LiS-core-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-LiS-core`' package contains the kernel modules that provide the OpenSS7 STREAMS Compatibility *STREAMS* modules and drivers. This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`LiS`' (*Linux STREAMS*) on kernel version '`2.4.20-28.7`'.[8]

strcompat-streams-core-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-streams-core`' package contains the kernel modules that provide the OpenSS7 STREAMS Compatibility *STREAMS* modules and drivers. This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`streams`' (*Linux Fast-STREAMS*) on kernel version '`2.4.20-28.7`'.[9]

---

[4] Note that on *Mandrakelinux*, unlike other RPM kernel distributions, kernel packages for the ix86 architectures are always placed in i586 architecture packages regardless of the true processor architecture of the kernel package. '`configure`' detects this and builds the appropriate packages.

[5] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example. Note also that only release packages that contain kernel modules will contain a '`core`' subpackage.

[6] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`info`' subpackage. Also, this subpackage is only applicable to 2.4 series kernels and is not necessary and not built for 2.6 series kernels.

[7] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[8] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[9] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

strcompat-LiS-info-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-LiS-info`' package[10] contains the module symbol version information for the '`LiS-core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loaded the actual kernel modules (from the '`LiS-core`' subpackage above). This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`LiS`' (*Linux STREAMS*) on kernel version '`2.4.20-28.7`'.[11]

strcompat-streams-info-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm
: The '`strcompat-streams-info`' package[12] contains the module symbol version information for the '`streams-core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loaded the actual kernel modules (from the '`streams-core`' subpackage above). This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`streams`' (*Linux Fast-STREAMS*) on kernel version '`2.4.20-28.7`'.[13]

Configuration and Installation

To configure, build and install the binary RPM, See Section 7.3.1 [Configuring the Binary RPM], page 80.

7.2.4 Downloading the Debian DEB

To install from binary DEB, you will need several of the DEB for a complete installation. Binary DEB fall into several categories. To download and install a complete package requires the appropriate DEB from each of the several categories below, as applicable. Some release packages do not provide DEBs in each of the several categories.

To install from Binary DEB, you will need all of the following kernel independent packages for your architecture, and one of the kernel-dependent packages from the next section.

Independent DEB

Independent DEB are dependent on neither the Linux kernel version, nor the *STREAMS* package. For example, the source package '`strcompat-source_0.9.2.7-0_i386.deb`', is not dependent on kernel nor *STREAMS* package.

All of the following kernel and *STREAMS* independent DEB are required for your architecture. Binary DEBs listed here are for example only: additional binary DEBs are available from the downloads site. If your architecture is not available, you can build binary DEB from the Debian DSC (see see Section 7.4.2 [Building from the Debian DSC], page 101).

---

[10] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`LiS-info`' subpackage.

[11] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[12] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`streams-info`' subpackage.

[13] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

Architecture Independent

strcompat-dev_0.9.2.7-0_all.deb
: The '`strcompat-dev`' package contains the device definitions necessary to run applications programs developed for OpenSS7 STREAMS Compatibility.[14]

strcompat-doc_0.9.2.7-0_all.deb
: The '`strcompat-doc`' package contains this manual in plain text, postscript, '`pdf`' and '`html`' forms, along with the meta-information from the '`strcompat`' package. It also contains all of the manual pages necessary for developing OpenSS7 STREAMS Compatibility applications and OpenSS7 STREAMS Compatibility *STREAMS* modules or drivers.

strcompat-init_0.9.2.7-0_all.deb
: The '`strcompat-init`' package contains the `init` scripts and provides the postinst scripts necessary to create kernel module preloads and modules definitions for all kernel module '`core`' subpackages.

strcompat-source_0.9.2.7-0_all.deb
: The '`strcompat-source`' package contains the source code necessary for building the OpenSS7 STREAMS Compatibility release. It includes the `autoconf(1)` configuration utilities necessary to create and distribute tarballs, rpms and deb/dscs.[15]

Architecture Dependent

strcompat-devel_0.9.2.7-0_i386.deb
: The '`strcompat-devel`' package contains library archives for static compilation, header files to develop OpenSS7 STREAMS Compatibility modules and drivers. This also includes the header files and static libraries required to compile OpenSS7 STREAMS Compatibility applications programs.

strcompat-lib_0.9.2.7-0_i386.deb
: The '`strcompat-lib`' package contains the run-time shared libraries necessary to run application programs and utilities developed for the '`strcompat`' package.[16]

STREAMS-Dependent DEB

STREAMS-Dependent DEB are dependent upon the specific *STREAMS* package being used, either *Linux STREAMS* or *Linux Fast-STREAMS*. Packages dependent upon *Linux STREAMS* will have '`LiS`' in the package name. Packages dependent upon *Linux Fast-STREAMS* will have '`streams`' in the package name. Note that some *STREAMS*-Dependent DEB are also Kernel-Dependent DEB as described below.

---

[14] Note that not all release packages contain devices. Only packages that provide *STREAMS* character device drivers need devices, and then only when the '`specfs`' or '`devfsd`' is not being used.

[15] Note that not all releases have source DEB packages. Release packages that do not contain kernel modules do not generate a source DEB package.

[16] Note that not all release packages contain shared libraries, and, therefore, not all release packages contain this package.

One of the following *STREAMS*-Dependent packages is required for your architecture. If your architecture is not on the list, you can build binary DEB from the Debian DSC (see see Section 7.4.2 [Building from the Debian DSC], page 101).

strcompat-LiS-util_0.9.2.7-0_i386.deb
: The '`strcompat-LiS-util`' package provides administrative and configuration test utilities and commands associated with the OpenSS7 STREAMS Compatibility package. Because this package must link a *STREAMS*-specific library, it is a *STREAMS*-Dependent package. Use the '`strcompat-LiS-util`' package if you have *LiS* installed.

strcompat-streams-util_0.9.2.7-0_i386.deb
: The '`strcompat-streams-util`' package provides administrative and configuration test utilities and commands associated with the OpenSS7 STREAMS Compatibility package. Because this package must link a *STREAMS*-specific library, it is a *STREAMS*-Dependent package. Use the '`strcompat-streams-util`' package if you have streams installed.

Kernel-Dependent DEB

Kernel-Dependent DEB are dependent on specific Linux Kernel Binary DEB releases. Packages are provided for popular released *Debian* kernels. Packages dependent upon *Debian* or other kernel DEB will have the '`_kversion`' kernel package version in the package name.

One of the following Kernel-Dependent packages is required for your architecture and kernel version. If your architecture or kernel version is not on the list, you can build binary DEB from the source DEB (see see Section 7.4.2 [Building from the Debian DSC], page 101).[17]

strcompat-core-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-core`' package contains the loadable kernel modules that depend only on the kernel. This package is heavily tied to the kernel for which it was compiled. This particular package applies to kernel version '`2.4.20-28.7`'.[18]

strcompat-info-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-info`' package[19] contains the module symbol version information for the '`core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loading the actual kernel modules (from the '`core`' subpackage above). This package is heavily tied to the kernel for which it was compiled. This particular package applies to kernel version '`2.4.20-28.7`'.[20]

[17] Note that on *Mandrakelinux*, unlike other DEB kernel distributions, kernel packages for the ix86 architectures are always placed in i586 architecture packages regardless of the true processor architecture of the kernel package. '`configure`' detects this and builds the appropriate packages.

[18] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example. Note also that only release packages that contain kernel modules will contain a '`core`' subpackage.

[19] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`info`' subpackage. Also, this subpackage is only applicable to 2.4 series kernels and is not necessary and not built for 2.6 series kernels.

[20] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

strcompat-LiS-core-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-LiS-core`' package contains the kernel modules that provide the OpenSS7 STREAMS Compatibility *STREAMS* modules and drivers. This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`LiS`' (*Linux STREAMS*) on kernel version '`2.4.20-28.7`'.[21]

strcompat-streams-core-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-streams-core`' package contains the kernel modules that provide the OpenSS7 STREAMS Compatibility *STREAMS* modules and drivers. This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`streams`' (*Linux Fast-STREAMS*) on kernel version '`2.4.20-28.7`'.[22]

strcompat-LiS-info-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-LiS-info`' package[23] contains the module symbol version information for the '`LiS-core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loaded the actual kernel modules (from the '`LiS-core`' subpackage above). This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`LiS`' (*Linux STREAMS*) on kernel version '`2.4.20-28.7`'.[24]

strcompat-streams-info-2.4.20-28.7_0.9.2.7-0_i386.deb
: The '`strcompat-streams-info`' package[25] contains the module symbol version information for the '`streams-core`' subpackage, above. It is possible to load this subpackage and compile modules that use the exported symbols without loaded the actual kernel modules (from the '`streams-core`' subpackage above). This package is heavily tied to the *STREAMS* package and kernel for which it was compiled. This particular package applies to '`streams`' (*Linux Fast-STREAMS*) on kernel version '`2.4.20-28.7`'.[26]

Configuration and Installation

To configure, build and install the Debian DEB, See Section 7.3.2 [Configuring the Debian DEB], page 81.

7.2.5 Downloading the Source RPM

If you cannot obtain a binary RPM for your architecture, or would like to roll you own binary RPM, download the following source RPM.

---

[21] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[22] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[23] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`LiS-info`' subpackage.

[24] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[25] Note that only release packages that contain kernel modules and that export versioned symbols will contain a '`streams-info`' subpackage.

[26] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

strcompat-0.9.2.7-1.src.rpm
: This is the source RPM for the package. From this source RPM it is possible to build binary RPM for any supported architecture and for any 2.4 or 2.6 kernel, for either *Linux STREAMS* or *Linux Fast-STREAMS*.

Configuration

To configure the source RPM, See Section 7.3.3 [Configuring the Source RPM], page 81.

7.2.6 Downloading the Debian DSC

If you cannot obtain a binary DEB for your architecture, or would like to roll your own DEB, download the following Debian DSC.

strcompat_0.9.2.7-0.dsc
strcompat_0.9.2.7-0.tar.gz
: This is the Debian DSC for the package. From this Debian DSC it is possible to build binary DEB for any supported architecture and for any 2.4 or 2.6 kernel, for either *Linux STREAMS* or *Linux Fast-STREAMS*.

Configuration

To configure the source RPM, See Section 7.3.4 [Configuring the Debian DSC], page 88.

7.2.7 Downloading the Tar Ball

For non-`rpm(1)` and non-`dpkg(1)` architectures, download the tarball as follows:

strcompat-0.9.2.7.tar.gz
strcompat-0.9.2.7.tar.bz2
: These are the `tar(1)` balls for the release. These `tar(1)` balls contain the `autoconf(1)` distribution which includes all the source necessary for building and installing the package. These tarballs will even build Source RPM and Binary RPM on `rpm(1)` architectures and Debian DSC and DEB on `dpkg(1)` architectures.

The tar ball may be downloaded easily with `wget(1)` as follows:

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
```

or

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.gz
```

Note that you will need an *OpenSS7 Project* user name and password to download release candidates (which are only available to subscribers and sponsors of the *OpenSS7 Project*).

Unpacking the Archive

After downloading one of the tar balls, unpack the archive using one of the following commands:

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.gz
% tar -xzvf strcompat-0.9.2.7.tar.gz
```

or

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
```

Either will create a subdirectory name '`strcompat-0.9.2.7`' containing all of the files and subdirectories for the `strcompat` package.

Configuration

To configure and install the tar ball, See Section 7.3.5 [Configuring the Tar Ball], page 88.

7.2.8 Downloading from CVS

If you are a subscriber or sponsor of The OpenSS7 Project with CVS archive access privileges then you can download release, mid-release or release candidate versions of the '`strcompat`' package from the project CVS archive.

The OpenSS7 STREAMS Compatibility package is located in the '`strcompat`' module of '`/var/cvs`'. For release tag information, see Chapter 6 [Releases], page 51.

To access the archive from the project CVS pserver, use the following commands to check out a version from the archive:

```
% export CVSROOT='-d:pserver:username@cvs.openss7.com:2401/var/cvs'
% cvs login
Password: *********
% cvs co -r strcompat_0.9.2.7 strcompat
% cvs logout
```

It is, of course, possible to check out by date or by other criteria. For more information, see `cvs(1)`.

Preparing the CVS Working Directory

Although public releases of the '`strcompat`' package do not require reconfiguration, creating a configurable directory from the CVS archive requires tools not normally distributed with the other releases.

The build host requires the following GNU tools:

- `m4 1.4.12`
- `autoconf 2.63`
- `automake 1.10.1`
- `libtool 2.2.4`
- `gettext 0.17`
- `flex 2.5.33`
- `bison 2.3`

Most desktop development GNU/Linux distributions wil have these tools; however, some non-development or server-style installations might not and they must be installed separately.[27]

Also, these tools can be acquired from the FSF website in the free software directory, and also at the following locations:

- m4-1.4.12
- autoconf-2.63
- automake-1.10.1
- libtool-2.2.4
- gettext-0.17
- flex-2.5.33
- bison-2.3

It should be stressed that, in particular, the `autoconf(1)`, and `automake(1)`, must be at version releases `2.63` and `1.10.1`. *The versions normally distributed in some mainstream GNU/Linux distributions are, in fact, much older than these versions.*[28] GNU version of these packages configured and installed to default directories will install in '`/usr/local/`' allowing them to coexist with distribution installed versions.

For building documentation, the build host also requires the following documentation tools:

- `gs 6.51` or `ghostscript 6.51`, or newer.
- `tetex 3.0` or `texlive 2007`, or newer.
- `texinfo 4.13a` or newer.
- `transfig 3.2.3d` or newer.
- `imagemagick 5.3.8` or `ImageMagick 5.3.8`, or newer.
- `groff 1.17.2` or newer.
- `gnuplot 3.7` or newer.
- `latex2html 1.62` or newer.

Most desktop GNU/Linux distributions will have these tools; however, some server-style installations (e.g. *Ubuntu*-server, *SLES 9* or *Fedora 6 or 7*) will not and they must be installed separately.[29]

Note that `texinfo 4.12` must not be used as it breaks the build process.

For uncooked manual pages, the entire `groff(1)` package is required on older *Debian* and *Ubuntu* systems (the base package did not include `grefer(1)` which is used extensively by uncooked manual pages). The following will get what you need on older systems:

---

[27] Older version of bison (2.0) and the older version of flex (2.5.4a) are also suitable. Where possible, use the more recent bison 2.3 and flex 2.5.33.

[28] A notable exception is Debian and Fedora 7. Note that on Fedora 7 the `gettext-devel` package must be installed.

[29] In particular, for *CentOS*, *Fedora 6 or 7*, the `tetex-latex` and `gnuplot` packages must be loaded as well. Note also that the `latex2html` used to be part of the `textex` package (or subpackages) but is now often packaged on its own. Recent distributions such as SUSE 11.0 and Fedora 9 use the `texlive` package instead of the `tetex` package.

```
Debian: % apt-get install groff_ext
Ubuntu: % apt-get install groff
```

On newer systems, simply:

```
% apt-get install groff
```

In addition, the build host requires a complete tool chain for compiling for the target host, including kernel tools such as `genksyms(8)` and others.

If you wish to package '`rpms`' on an `rpm(1)` system, or '`debs`' on a `dpkg(1)` system, you will need the appropriate tool chain. Systems based on `rpm(1)` typically have the necessary tool chain available, however, `dpkg(1)` systems do not. The following on a *Debian* or *Ubuntu* system will get what you need:

```
% apt-get install debhelper
% apt-get install fakeroot
```

To generate a configuration script and the necessary scriptlets required by the GNU `autoconf(1)` system, execute the following commands on the working directory:

```
% autoreconf -fiv strcompat
```

where, '`strcompat`' is the name of the directory to where the working copy was checked out under the previous step. This command generates the '`configure`' script and other missing pieces that are normally distributed with the release Tar Balls, SRPMs and DSCs.

Make sure that '`autoreconf --version`' returns '`2.63`'. Otherwise, you may need to perform something like the following:

```
% PATH="/usr/local/bin:$PATH"
% autoreconf -fiv strcompat
```

After reconfiguring the directory, the package can then be configured and built using the same instructions as are used for the Tar Ball, see Section 7.3.5 [Configuring the Tar Ball], page 88, and Section 7.4.3 [Building from the Tar Ball], page 102.

Do note, however, that `make(1)` will rebuild the documentation that is normally released with the package. Additional tools may be necessary for building the documentation. To avoid building and installing the documentation, use the '`--disable-devel`' or '`--disable-docs`' option to configure described in Section 7.3.5 [Configuring the Tar Ball], page 88.

When configuring the package in a working directory and while working a change-compile-test cycle that involves configuration macros or documentation, I find it of great advantage to invoke the GNU '`configure`' options '`--enable-maintainer-mode`', '`--enable-dependency-tracking`' and '`--disable-devel`'. The first of these three options will add maintainer-specific targets to any generated '`Makefile`', the second option will invoke automatic dependency tracking within the '`Makefile`' so rebuilds after changes

to macro, source or documentation files will be automatically rebuilt; and the last option will suppress rebuilding and reinstalling documentation manual pages and header files. Header files will still be available under the '`/usr/src`' directory.

7.3 Configuration

7.3.1 Configuring the Binary RPM

In general the binary RPM do not require any configuration, however, during installation it is possible to relocate some of the installation directories. This allows some degree of customization. Relocations that are available on the binary RPM are as follows:

'`strcompat-LiS-core-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm`'
'`strcompat-streams-core-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm`'

'`/lib/modules/2.4.20-28.7`'
: This relocatable directory contains the kernel modules that provide the strcompat *STREAMS* core, drivers and modules.[30]

'`strcompat-LiS-info-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm`'
'`strcompat-streams-info-2.4.20-28.7-0.9.2.7-1.7.2.i686.rpm`'

'`/usr/include/strcompat/2.4.20-28.7`'
: This relocatable directory contains the kernel module exported symbol information that allows other kernel modules to be compiled against the correct version of the strcompat package.[31]

'`strcompat-dev-0.9.2.7-1.7.2.i686.rpm`'
: (not relocatable)

'`strcompat-devel-0.9.2.7-1.7.2.i686.rpm`'

'`/usr/lib`'
: This relocatable directory contains strcompat libraries.

'`/usr/include/strcompat`'
: This relocatable directory contains strcompat header files.

'`strcompat-doc-0.9.2.7-1.7.2.i686.rpm`'

'`/usr/share/doc`'
: This relocatable directory contains all package specific documentation (including this manual). The subdirectory in this directory is the '`strcompat-0.9.2.7`' directory.

'`/usr/share/info`'
: This relocatable directory contains info files (including the info version of this manual).

'`/usr/share/man`'
: This relocatable directory contains manual pages.

[30] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[31] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example. Also, note that the '`info`' subpackage is only applicable to the 2.4 kernel series.

‘strcompat-LiS-lib-0.9.2.7-1.7.2.i686.rpm’
‘strcompat-streams-lib-0.9.2.7-1.7.2.i686.rpm’

‘/usr/lib’
: This relocatable directory contains the run-time shared libraries necessary to run applications programs and utilities developed for OpenSS7 STREAMS Compatibility.

‘/usr/share/locale’
: This relocatable directory contains the locale information for shared library files.

‘strcompat-source-0.9.2.7-1.7.2.i686.rpm’

‘/usr/src’
: This relocatable directory contains the source code.

‘strcompat-LiS-util-0.9.2.7-1.7.2.i686.rpm’
‘strcompat-streams-util-0.9.2.7-1.7.2.i686.rpm’

‘/usr/bin’
: This relocatable directory contains binary programs and utilities.

‘/usr/sbin’
: This relocatable directory contains system binary programs and utilities.

‘/usr/libexec’
: This relocatable directory contains test programs.

‘/etc’
: This relocatable directory contains `init` scripts and configuration information.

Installation

To install the binary RPM, See Section 7.5.1 [Installing the Binary RPM], page 102.

7.3.2 Configuring the Debian DEB

In general the binary DEB do not require any configuration.

Installation

To install the Debian DEB, See Section 7.5.2 [Installing the Debian DEB], page 103.

7.3.3 Configuring the Source RPM

When building from the source RPM (see Section 7.4.1 [Building from the Source RPM], page 100), the rebuild process uses a number of macros from the user’s ‘`.rpmmacros`’ file as described in `rpm(8)`.

Following is an example of the ‘`~/.rpmmacros`’ file that I use for rebuilding RPMS:

```
#
# RPM macros for building rpms
#

%vendor OpenSS7 Corporation
%distribution OpenSS7
%disturl http://www.openss7.org/
%packager Brian Bidulock <bidulock@openss7.org>
%url http://www.openss7.org/

%_signature gpg
%_gpg_path /home/brian/.gnupg
%_gpg_name openss7@openss7.org
%_gpgbin /usr/bin/gpg

%_source_payload w9.bzdio
%_binary_payload w9.bzdio

%_unpackaged_files_terminate_build 1
%_missing_doc_files_terminate_build 1
%_use_internal_dependency_generator 0
%_repackage_all_erasures 0
%_rollback_transaction_on_failure 0

%configure2_5x %configure
%make make
```

When building from the source RPM (see Section 7.4.1 [Building from the Source RPM], page 100), it is possible to pass a number of additional configuration options to the `rpmbuild(1)` process.

The additional configuration options are described below.

Note that distributions that use older versions of rpm do not have the '`--with`' or '`--without`' options defined. To achieve the same effect as:

```
--with someparm=somearg
```

do:

```
--define "_with_someparm --with-someparm=somearg"
```

This is a generic description of common `rpmbuild(1)` options. Not all `rpmbuild(1)` options are applicable to all SRPMs. Options that are kernel module specific are only applicable to SRPMs that build kernel modules. *STREAMS* options are only applicable to SRPMs that provide or require *STREAMS*.

`--define "_kversion $PACKAGE_KVERSION"`
: Specifies the kernel version other than the running kernel for which to build. If `_kversion` is not defined when rebuilding, the environment variable *PACKAGE_KVERSION* is used. If the environment variable *PACKAGE_KVERSION* is not defined, then the version of the running kernel (i.e. discovered with '`uname -r`') is used as the target version for kernel-dependent packages. This option can also be defined in an '`.rpmspec`' file using the macro name '`_kversion`'.

`--with checks`
`--without checks`
: Enable or disable preinstall checks. Each packages supports a number of preinstall checks that can be performed by invoking the '`check`' target with `automake(1)`. These currently consist of checking each kernel module for unresolved kernel symbols, checking for documentation for exported kernel module symbols, checking for documentation for exported library symbols, checking for standard options for build and installable programs, checking for documentation for built and installable programs. Normally these checks are only run in maintainer mode, but can be enabled and disabled with this option.

`--with k-optimize=HOW`
`--without k-optimize`
: Specify '`HOW`' optimization, *normal*, *size*, *speed* or *quick*. *size* compiles kernel modules `-Os`, *speed* compiles kernel modules `-O3`, and *quick* compiles kernel modules `-O0`. The default is *normal*. Use with care.

`--with cooked-manpages`
`--without cooked-manpages`
: Some systems do not like `grefer(1)` references in manual pages.[32] This option will cook `soelim(1)`, `refer(1)`, `tbl(1)` and `pic(1)` commands from the manual pages and also strip `groff(1)` comments. The default is to leave manual pages uncooked: they are actually smaller that way.

`--with public`
`--without public`
: Release public packages or private packages. This option has no effect on the '`strcompat`' package. The default is to release public packages.

`--with k-debug`
`--without k-debug`
: Specifies whether kernel debugging is to be performed on the build kernel modules. Mutually exclusive with `test` and `safe` below. This has the effect of removing static and inline attributes from functions and invoking all debugging macros in the code. The default is to not perform kernel debugging.

`--with k-test`
`--without k-test`
: Specifies whether kernel testing is to be performed. Mutually exclusive with `debug` above and `safe` below. This has the effect of removing static and inline attributes from functions and invoking most debugging macros in the code. The default is to not perform kernel testing.

[32] In particular, some *Debian* systems do not load the `groff(1)` extensions package and do not have `grefer(1)` installed. Although this is an oversight on the configuration of the particular *Debian* system, we accomodate such misconfiguration with this feature.

`--with k-safe`
`--without k-safe`
: Specifies whether kernel saftey is to be performed. Mutually exclusive with `debug` and `test` above. This has the effect of invoking some more pedantic assertion macros in the code. The default is not to apply kernel safety.

`--with k-inline`
`--without k-inline`
: Specifies whether kernel `inline` functions are to be placed inline. This has the effect of adding the '`-finline-functions`' flag to *CFLAGS* for compiling kernel modules. Linux 2.4 kernels are normally compiled '`-O2`' which does not respect the `inline` directive. This compiles kernel modules with '`-finline-functions`' to get closer to '`-O3`' optimization. For better optimization controls, See Section 7.3.5 [Configuring the Tar Ball], page 88.

`--with k-modversions`
`--without k-modversions`
: Specifies whether kernel symbol versions are to be applied to symbols exported by package kernel modules. The default is to version exported module symbols. This package does not export symbols so this option has no effect.

`--with devfs`
`--without devfs`
: Specifies whether the build is for a device file system daemon enabled system with autoloading, or not. The default is to build for `devfsd(1)` autoloading when *CONFIG_DEVFS_FS* is defined in the target kernel. The '`rebuild`' target uses this option to signal to the RPM spec file that the '`dev`' subpackage need not be built. This option does not appear when the package has no devices.

`--with devel`
`--without devel`
: Specifies whether to build development environment packages such as those that include header files, static libraries, manual pages and `texinfo(1)` documentation. The default is to build development environment packages. This option can be useful when building for an embedded target where only the runtime components are desired.

`--with docs`
`--without docs`
: Specifies whether to build and install major documentation such manual pages and `texinfo(1)` documentation. The default is to build and install documentation. This option can be useful when building for an embedded target where only the runtime and static compile components are desired, but not major documentation. This option does not override the setting of `--without devel`.

`--with tools`
`--without tools`
: Specifies whether user space packages are to be built. The default is to build user space packages. This option can be useful when rebuilding for multiple architectures and target kernels. The '`rebuild`' `automake(1)` target uses this

feature when rebuilding for all available architectures and kernels, to rebuild user packages once per architecture instead of once per kernel.

`--with modules`
`--without modules`
: Specifies whether kernel modules packages are to be built. The default is to build kernel module packages. This option can be useful when rebuilding for multiple architectures and target kernels. The '`rebuild`' `automake(1)` target uses this feature to rebuild for all available architectures and kernels.

`--with lis`
`--without lis`
: Specifies that the package is to be rebuilt against *Linux STREAMS*. The default is to automatically identify whether '`LiS`' or '`streams`' is loaded on the build system and build accordingly.

`--with lfs`
`--without lfs`
: Specifies that the package is to be rebuilt against *Linux Fast-STREAMS*. The default is to automatically identify whether '`LiS`' or '`streams`' is loaded on the build system and build accordingly.

In addition, the following `rpm` options, specific to the OpenSS7 STREAMS Compatibility package are available:

`--without compat-os7`
: Disable *OpenSS7* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *OpenSS7* documentation so that STREAMS drivers and modules written to *OpenSS7* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *OpenSS7* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-svr3`
: Disable *UNIX SVR 3.2* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UNIX SVR 3.2* documentation so that STREAMS drivers and modules written to *UNIX SVR 3.2* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UNIX SVR 3.2* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-svr4`
: Disable *UNIX SVR 4.2 MP* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UNIX SVR 4.2 MP* documentation so that STREAMS drivers and modules written to *UNIX SVR 4.2 MP* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UNIX SVR 4.2 MP* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-mps`
: Disable *Mentat Portable STREAMS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Mentat Portable STREAMS* documentation so that STREAMS drivers and modules written to *Mentat Portable STREAMS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Mentat Portable STREAMS* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-sol8`
: Disable *Solaris 8* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Solaris 8* documentation so that STREAMS drivers and modules written to *Solaris 8* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Solaris 8* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-uw7`
: Disable *UnixWare 7* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UnixWare 7* documentation so that STREAMS drivers and modules written to *UnixWare 7* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UnixWare 7* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-osf`
: Disable *OSF/1.2* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *OSF/1.2* documentation so that STREAMS drivers and modules written to *OSF/1.2* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *OSF/1.2* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-aix`
: Disable *AIX 5L Version 5.1* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *AIX 5L Version 5.1* documentation so that STREAMS drivers and modules written to *AIX 5L Version 5.1* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *AIX 5L Version 5.1* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-hpux`
: Disable *HPUX STREAMS/UX* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *HPUX STREAMS/UX*

documentation so that STREAMS drivers and modules written to *HPUX STREAMS/UX* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *HPUX STREAMS/UX* will require porting in more respects. This option defaults to '`enabled`'.

`--without compat-irix`
: Disable *IRIX* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *IRIX* documentation so that STREAMS drivers and modules written to *IRIX* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *IRIX* will require porting in more respects. This option defaults to '`enabled`'.

`--with compat-lis`
`--without compat-lis`
: Disable *LiS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *LiS* documentation so that STREAMS drivers and modules written to *LiS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *LiS* will require porting in more respects. This option defaults to '`enabled`' when compiled with *Linux Fast STREAMS*, '`disabled`' when compiled with *Linux STREAMS*.

`--with compat-lfs`
`--without compat-lfs`
: Disable *Linux Fast STREAMS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Linux Fast STREAMS* documentation so that STREAMS drivers and modules written to *Linux Fast STREAMS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Linux Fast STREAMS* will require porting in more respects. This option defaults to '`enabled`' when compiled with *Linux STREAMS*, '`disabled`' when compiled with *Linux Fast STREAMS*.

`--without compat-mac`
: Disable *MacOT* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *MacOT* documentation so that STREAMS drivers and modules written to *MacOT* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *MacOT* will require porting in more respects. This option defaults to '`enabled`'.

In general, the default values of these options are sufficient for most purposes and no options need be provided when rebuilding the Source RPMs.

Build

To build from the source RPM, See Section 7.4.1 [Building from the Source RPM], page 100.

7.3.4 Configuring the Debian DSC

The Debian DSC can be configured by passing options in the environment variable *BUILD_DEBOPTIONS*. The options placed in this variable take the same form as those passed to the '`configure`' script, See Section 7.3.5 [Configuring the Tar Ball], page 88. For an example, See Section 7.4.2 [Building from the Debian DSC], page 101.

Build

To build from the Debian DSC, See Section 7.4.2 [Building from the Debian DSC], page 101.

7.3.5 Configuring the Tar Ball

All of the normal GNU `autoconf(1)` configuration options and environment variables apply. Additional options and environment variables are provided to tailor or customize the build and are described below.

7.3.5.1 Configure Options

This is a generic description of common '`configure`' options that are in addition to those provided by `autoconf(1)`, `automake(1)`, `libtool(1)` and `gettext(1)`.

Not all '`configure`' options are applicable to all release packages. Options that are kernel module specific are only applicable to release packages that build kernel modules. *STREAMS* options are only applicable to release packages that provide or require *STREAMS*.

Following are the additional '`configure`' options, their meaning and use:

`--enable-checks`
`--disable-checks`
: Enable or disable preinstall checks. Each release package supports a number of preinstall checks that can be performed by invoking the '`check`' target with `make(1)`. These currently consist of checking each kernel module for unresolved kernel symbols, checking for documentation for exported kernel module symbols, checking for documentation for exported library symbols, checking for standard options for build and installable programs, checking for documentation for built and installable programs. Normally these checks are only run in maintainer mode, but can be enabled and disabled with this option.

`--enable-autotest`
`--disable-autotest`
: Enable or disable pre- and post-installation testing. Each release package supports a number of `autotest` test suites that can be performed by invoking the '`installcheck`' target with `make(1)`. These currently consist of running installed modules, commands and binaries against a number of specific test cases. Normally these checks are only run in maintainer mode, but can be enabled and disabled with this option.

`--disable-compress-manpages`
: Compress manual pages with '`gzip -9`' or '`bzip2 -9`' or leave them uncompressed. The default is to compress manual pages with '`gzip -9`' or '`bzip2 -9`' if a single compressed manual page exists in the target installation directory ('`--mandir`'). This disables automatic compression.

`--disable-public`
: Disable public release. This option is not usable on public releases and only has a usable effect on OpenSS7 STREAMS Compatibility when the package is acquired from CVS. In particular, the *STREAMS SS7/VoIP/ISDN/SIGTRAN Stacks* (`strss7-0.9a.8`) release package has a large number of non-public components. Specifying this option will cause the package to build and install all private release components in addition to the public release components. This option affects all release packages. Most release packages do not have private release components.

`--disable-initscripts`
: Disables the installation of `init` scripts. The default is to configure and install `init` scripts and their associated configuration files.

  Although the default is to install `init` scripts, installation attempts to detect a System V `init` script configuration, and if one is not found, the `init` scripts are installed into the appropriate directories, but the symbolic links to the run level script directories are not generated and the script is not invoked. Therefore, it is safe to leave this option unchanged, even on distributions that do not support System V `init` script layout.

`--disable-32bit-libs`
: Disables the build and install of 32-bit compatibility libraries and test binaries on 64-bit systems that support 32-bit compatibility. The default is to build and install 32-bit compatibility libraries and test binaries. This option can be usefule when configuring for an embedded target where only native shared libraries and binaries are desired.

`--disable-devel`
: Disables the installation of development environment components such as header files, static libraries, manual pages and `texinfo(1)` documentation. The default is to install development environment components. This option can be useful when configuring for an embedded target where only the runtime components are desired, or when performing a edit-compile-test cycle.

`--disable-docs`
: Disables the build and installation of major documentation such manual pages and `texinfo(1)` documentation. The default is to build and install documentation. This option can be useful when building for an embedded target where only the runtime and static compile components are desired, but not major documentation. This option does not override the setting of '`--disable-devel`'.

`--enable-tools`
: Specifies whether user space programs and libraries are to be built and installed. The default is to build and install user space programs and libraries. This option can be useful when rebuilding for multiple architectures and target kernels, particularly under `rpm(1)` or `dpkg(1)`. The '`rebuild`' `automake(1)` target uses this feature when rebuilding RPMs for all available architectures and kernels, to rebuild user packages once per architecture instead of once per kernel.

`--enable-modules`
: Specifies whether kernel modules are to be built and installed. The default is to build and install kernel modules. This option can be useful when rebuilding for multiple architectures and target kernels, particularly under `rpm(1)` or `dpkg(1)`. The '`rebuild`' `automake(1)` target uses this feature to rebuild for all available architectures and kernels. This option has no effect for release packages that do not provide kernel modules.

`--enable-arch`
: Specifies whether architectural dependent package components are to be built and installed. This option can be useful when rebuilding for multiple architectures and target kernels, particularly under `dpkg(1)`. The default is to configure, build and install architecture dependent package components. This option has no effect for release packages that do not provide architecture dependent components.

`--enable-indep`
: Specifies whether architecture independent package components are to be built and installed. This option can be useful when rebuilding for multiple architectures and target kernels, particularly under `dpkg(1)`. The default is to configure, build and install architecture independent package components. This options has no effect for release packages that do not provide architecture independent components.

`--enable-k-inline`
: Enable kernel inline functions. Most Linux kernels build without '`-finline-functions`'. This option adds the '`-finline-functions`' and '`-Winline`' flags to the compilation of kernel modules. Use with care. This option has no effect for release packages that do not provide kernel modules.

`--enable-k-safe`
: Enable kernel module run-time safety checks. Specifies whether kernel safety is to be performed. This option is mutually exclusive with '`--enable-k-test`' and '`--enable-k-debug`' below. This has the effect of invoking some more pedantic assertion macros in the code. The default is not to apply kernel safety. This option has no effect for release packages that have are no kernel modules.

`--enable-k-test`
: Enable kernel module run-time testing. Specifies whether kernel testing is to be performed. This option is mutually exclusive with '`--enable-k-safe`' above and '`--enable-k-debug`' below. This has the effect of remove `static` and `inline` attributes from functions and invoking most non-performance affecting debugging macros in the code. The default is not to perform kernel testing. This option has no effect for release packages that do not provide kernel modules.

`--enable-k-debug`
: Enable kernel module run-time debugging. Specifies whether kernel debugging is to be performed. This option is mutually exclusive with '`--enable-k-safe`' and '`--enable-k-test`' above. This has the effect of removing `static` and `inline` attributes from functions and invoking all debugging macros in the

code (including performance-affecting debug macros). The default is to not perform kernel debugging. This option has no effect for release packages that do not provide kernel modules.

`--disable-k-modversions`
: Disable module versions on `strcompat` symbols. Specifies whether kernel symbol versions are to be used on symbols exported from built `strcompat` modules. The default is to provide kernel symbol versions on all exported symbols. This option has no effect for release packages that do not provide kernel modules.

`--enable-devfs`
`--disable-devfs`
: Specifies whether the build is for a device file system daemon enabled system with autoloading, or not. The default is to build for `devfsd(8)` autoloading when *CONFIG_DEVFS_FS* is defined in the target kernel. The '`reuild`' `automake(1)` target uses this option to signal to the RPM spec file that the '`dev`' subpackage need not be built. This option has no effect for release packages that do not provide devices.

`--with-gpg-user=GNUPGUSER`
: Specify the `gpg(1)` '`GNUPGUSER`' for signing RPMs and tarballs. The default is the content of the environment variable *GNUPGUSER*. If unspecified, the `gpg(1)` program will normally use the user name of the account invoking the `gpg(1)` program. For building source RPMs, the RPM macro '`_gpg_name`' will override this setting.

`--with-gpg-home=GNUPGHOME`
: Specify the '`GNUPGHOME`' directory for signing RPMs and tarballs. The default is the user's '`~/.gpg`' directory. For building source RPMs, the RPM macro '`_gpg_path`' will override this setting.

`--with-pkg-epoch=EPOCH`
: Specifies the epoch for the package. This is neither used for `rpm(1)` nor `dpkg(1)` packages, it applies to the tarball release as a whole. The default is the contents of the '`.pkgepoch`' file in the release package source directory or, if that file does not exist, zero (0).

`--with-pkg-release=RELEASE`
: Specifies the release for the package. This is neither used for `rpm(1)` nor `dpkg(1)` packages, it applies to the tarball release as a whole. The default is the contents of the '`.pkgrelease`' file in the release package source directory or, if that file does not exist, one (1). This is the number after the last point in the package version number.

`--with-pkg-distdir=DIR`
: Specifies the distribution directory for the package. This is used by the maintainer for building distributions of tarballs. This is the directory into which archives are copied for distribution. The default is the top build directory.

`--with-cooked-manpages`
: Convert manual pages to remove macro dependencies and `grefer(1)` references. Some systems do not like `grefer(1)` references in manual pages.[33] This option will cook `soelim(1)`, `refer(1)`, `tbl(1)` and `pic(1)` commands from the manual pages and also strip `groff(1)` comments. The default is to leave manual pages uncooked (they are actually smaller that way).

`--with-rpm-epoch=PACKAGE_EPOCH`
: Specify the '`PACKAGE_EPOCH`' for the RPM spec file. The default is to use the RPM epoch contained in the release package file '`.rpmepoch`'.

`--with-rpm-release=PACKAGE_RPMRELEASE`
: Specify the '`PACKAGE_RPMRELEASE`' for the RPM '`spec`' file. The default is to use the RPM release contained in the release package file '`.rpmrelease`'.

`--with-rpm-extra=PACKAGE_RPMEXTRA`
: Specify the '`PACKAGE_RPMEXTRA`' extra release information for the RPM spec file. The default is to use the RPM extra release information contained in the release package file '`.rpmextra`'. Otherwise, this value will be determined from automatic detection of the RPM distribution.

`--with-rpm-topdir=PACKAGE_RPMTOPDIR`
: Specify the '`PACKAGE_RPMTOPDIR`' top directory for RPMs. If specified with a null '`PACKAGE_RPMTOPDIR`', the default directory for the RPM distribution will be used. If this option is not provided on the command line, the top build directory will be used as the RPM top directory as well.

`--with-deb-epoch=EPOCH`
: Specify the '`PACKAGE_DEBEPOCH`' for the DEB control file. The default is to use the DEB epoch contained in the release package file '`.debepoch`'.

`--with-deb-release=RELEASE`
: Specify the '`PACKAGE_DEBRELEASE`' for the DEB control file. The default is to use the DEB release contained in the release package file '`.debrelease`'.

`--with-deb-topdir=DIR`
: Specify the '`PACKAGE_DEBTOPDIR`' top directory for DEBs. If specified with a null '`PACKAGE_DEBTOPDIR`', the default directory for the DEB distribution will be used. If this option is not provided on the command line, the top build directory will be used as the DEB top directory as well.

`--with-k-release=PACKAGE_KRELEASE`
: Specify the '`PACKAGE_KRELEASE`' release of the Linux kernel for which the build is targeted. When not cross compiling, if this option is not set, the build will be targeted at the kernel running in the build environment (e.g., '`uname -r`'). When cross-compiling this option must be specified or the configure script will generate an error and terminate.

[33] In particular, some *Debian* or *Ubuntu* systems do not load the `groff(1)` extensions package and do not have `grefer(1)` installed. Although this is an oversight on the configuration of the particular *Debian* or *Ubuntu* system, we accomodate such misconfiguration with this feature.

`--with-k-linkage=PACKAGE_KLINKAGE`
: Specify the '`PACKAGE_KLINKAGE`' for kernel module linkage. This can be one of the following:

  - '`loadable`' – loadable kernel modules
  - '`linkable`' – linkable kernel objects

  The default is to build loadable kernel modules.

`--with-k-modules=K-MODULES-DIR`
: Specify the '`K-MODULES-DIR`' directory to which kernel modules will be installed. The default is based on the option '`--with-k-release`', '`--with-k-prefix`' and '`--with-k-rootdir`'. The default is '`DESTDIR`'/'`K-MODULES-DIR`' which is typically '*`DESTDIR`*`/lib/modules/`*`PACKAGE_KRELEASE`*`/`'. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-build=K-BUILD-DIR`
: Specify the '`K-BUILD-DIR`' base kernel build directory in which configured kernel source resides. The default is '*`DESTDIR`*`/`*`K-MODULES-DIR`*`/build`'. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-source=K-SOURCE-DIR`
: Specify the '`K-SOURCE-DIR`' base kernel build directory in which configured kernel source resides. The default is '*`DESTDIR`*`/`*`K-MODULES-DIR`*`/source`'. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-modver=K-MODVER-FILE`
: Specify the '`K-MODVER-FILE`' kernel module versions file. The default is '*`K-BUILD-DIR`*`/Module.symvers`'. This file is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-sysmap=K-SYSMAP-FILE`
: Specify the '`K-SYSMAP-FILE`' kernel system map file. The default is '*`K-BUILD-DIR`*`/System.map`'. This file is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-archdir=K-ARCHDIR`
: Specify the '`K-ARCHDIR`' kernel source architecture specific directory. The default is '*`DESTDIR`*`/`*`K-SOURCE-DIR`*`/arch`'. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-machdir=K-MACHDIR`
: Specify the '`K-MACHDIR`' kernel source machine specific directory. The default is '*`DESTDIR`*`/`*`K-SOURCE-DIR`*`/target_cpu`'. This directory is normally located

by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-config=K-CONFIG`
: Specify the '`K-CONFIG`' kernel configuration file. The default is '*`BOOT`*`/config-`*`K-RELEASE`*'. This configuration file is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message.

`--with-k-optimize=HOW`
`--without-k-optimize`
: Specify '`HOW`' optimization, *normal*, *size*, *speed* or *quick*. *size* compiles kernel modules `-Os`, *speed* compiles kernel modules `-O3`, and *quick* compiles kernel modules `-O0`. The default is *normal*. Use with care. The most common use of this option is to specify '`--with-k-optimize=speed --disable-k-safe`' to compile for maximum performance. Nevertheless, even these setting are *ricing* and the resulting kernel modules will only be about 5% faster.

`--with-lis[=LIS-DIR]`
`--without-lis`
: Specify the '`LIS-DIR`' directory in which to find *LiS* headers. Also specifies that the build is to be made against Linux STREAMS. The default is '`/usr/include/LiS`' if it exists, '`no`' otherwise. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message. This option has no effect on release packages that do not use the *STREAMS* subsystem.

`--with-lfs[=LFS-DIR]`
`--without-lfs`
: Specify the '`LFS-DIR`' directory in which to find *LfS* headers. Also specifies that the build is to be made against Linux Fast-STREAMS. The default is '`/usr/include/streams`' if it exists, '`no`' otherwise. This directory is normally located by the '`configure`' script and need only be provided for special cross-build environments or when requested by a '`configure`' script error message. This option has no effect on release packages that do not use the *STREAMS* subsystem.

`--with-strconf-master=STRCONF_CONFIG`
: Specify the '`STRCONF_CONFIG`' file name to which the configuration master file is written. The default is '`Config.master`'. This option has no effect on release packages that do not use the *STREAMS* subsystem and the strconf scripts. This option should not be specified when configuring the master package as the setting for all add-on packages will conflict.

`--with-base-major=STRCONF_MAJBASE`
: Start numbering for major devices at '`STRCONF_MAJBASE`'. The default is '`230`'. This option has no effect on release packages that do not use the *STREAMS* subsystem and the strconf scripts. This option should not be specified when configuring the master package as the setting for all add-on packages will conflict.

In addition, the following `configure` options, specific to the OpenSS7 STREAMS Compatibility package are available:

`--disable-compat-os7`
: Disable *OpenSS7* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *OpenSS7* documentation so that STREAMS drivers and modules written to *OpenSS7* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *OpenSS7* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-svr3`
: Disable *UNIX SVR 3.2* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UNIX SVR 3.2* documentation so that STREAMS drivers and modules written to *UNIX SVR 3.2* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UNIX SVR 3.2* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-svr4`
: Disable *UNIX SVR 4.2 MP* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UNIX SVR 4.2 MP* documentation so that STREAMS drivers and modules written to *UNIX SVR 4.2 MP* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UNIX SVR 4.2 MP* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-mps`
: Disable *Mentat Portable STREAMS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Mentat Portable STREAMS* documentation so that STREAMS drivers and modules written to *Mentat Portable STREAMS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Mentat Portable STREAMS* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-sol8`
: Disable *Solaris 8* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Solaris 8* documentation so that STREAMS drivers and modules written to *Solaris 8* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Solaris 8* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-uw7`
: Disable *UnixWare 7* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *UnixWare 7* documentation so that STREAMS drivers and modules written to *UnixWare 7* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *UnixWare 7* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-osf`
: Disable *OSF/1.2* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *OSF/1.2* documentation so that STREAMS drivers and modules written to *OSF/1.2* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *OSF/1.2* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-aix`
: Disable *AIX 5L Version 5.1* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *AIX 5L Version 5.1* documentation so that STREAMS drivers and modules written to *AIX 5L Version 5.1* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *AIX 5L Version 5.1* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-hpux`
: Disable *HPUX STREAMS/UX* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *HPUX STREAMS/UX* documentation so that STREAMS drivers and modules written to *HPUX STREAMS/UX* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *HPUX STREAMS/UX* will require porting in more respects. This option defaults to '`enabled`'.

`--disable-compat-irix`
: Disable *IRIX* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *IRIX* documentation so that STREAMS drivers and modules written to *IRIX* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *IRIX* will require porting in more respects. This option defaults to '`enabled`'.

`--enable-compat-lis`
`--disable-compat-lis`
: Disable *LiS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any

bugs) with the *LiS* documentation so that STREAMS drivers and modules written to *LiS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *LiS* will require porting in more respects. This option defaults to '`enabled`' when compiled with *Linux Fast STREAMS*, '`disabled`' when compiled with *Linux STREAMS*.

`--enable-compat-lfs`
`--disable-compat-lfs`
Disable *Linux Fast STREAMS* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *Linux Fast STREAMS* documentation so that STREAMS drivers and modules written to *Linux Fast STREAMS* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *Linux Fast STREAMS* will require porting in more respects. This option defaults to '`enabled`' when compiled with *Linux STREAMS*, '`disabled`' when compiled with *Linux Fast STREAMS*.

`--disable-compat-mac`
Disable *MacOT* compatibility module. When enabled, OpenSS7 STREAMS Compatibility will attempt to be as compatible as possible (without replicating any bugs) with the *MacOT* documentation so that STREAMS drivers and modules written to *MacOT* specifications will compile with OpenSS7 STREAMS Compatibility. When disabled, STREAMS drivers and modules written for *MacOT* will require porting in more respects. This option defaults to '`enabled`'.

7.3.5.2 Environment Variables

Following are additional environment variables to '`configure`', their meaning and use:

GPG GPG signature command. This is used for signing distributions by the maintainer. By default, '`configure`' will search for this tool.

GNUPGUSER
GPG user name. This is used for signing distributions by the maintainer.

GNUPGHOME
GPG home directory. This is used for signing distributions by the maintainer.

GPGPASSWD
GPG password for signing. This is used for signing distributions by the maintainer. This environment variable is not maintained by the '`configure`' script and should only be used on an isolated system.

SOELIM Roff source elimination command, `soelim(1)`. This is only necessary when the option '`--with-cooked-manpages`' has been specified and '`configure`' cannot find the proper `soelim(1)` command. By default, '`configure`' will search for this tool.

REFER Roff references command, `refer(1)`. This is only necessary when the option '`--with-cooked-manpages`' has been specified and '`configure`' cannot find the proper `refer(1)` command. By default, '`configure`' will search for this tool.

TBL Roff table command, `tbl(1)`. This is only necessary when the option '`--with-cooked-manpages`' has been specified and '`configure`' cannot find the proper `tbl(1)` command. By default, '`configure`' will search for this tool.

PIC Roff picture command, `pic(1)`. This is only necessary when the option '`--with-cooked-manpages`' has been specified and '`configure`' cannot find the proper `pic(1)` command. By default, '`configure`' will search for this tool.

GZIP Default compression options provided to `GZIP_CMD`.

GZIP_CMD
Manpages (and kernel modules) compression commands, `gzip(1)`. This is only necessary when the option '`--without-compressed-manpages`' has *not* been specified and '`configure`' cannot find the proper `gzip(1)` command. By default, '`configure`' will search for this tool.

BZIP2 Default compression options provided to `BZIP2_CMD`

BZIP2_CMD
Manpages compression commands, `bzip2(1)`. This is only necessary when the option '`--without-compressed-manpages`' has *not* been specified and '`configure`' cannot find the proper `bzip2(1)` command. By default, '`configure`' will search for this tool.

MAKEWHATIS
Manpages apropros database rebuild command, `makewhatis(8)`. By default, '`configure`' will search for this tool. By default, '`configure`' will search for this tool.

CHKCONFIG
Chkconfig command, `chkconfig(8)`. This was used for installation of `init` scripts. All packages now come with `init_install(8)` and `init_remove(8)` scripts used to install and remove `init` scripts on both RPM and Debian systems.

RPM Rpm command, `rpm(1)`. This is only necessary for RPM builds. By default, '`configure`' will search for this tool.

RPMBUILD
Build RPM command, `rpmbuild(1)`. This is only necessary for RPM builds. By default, '`configure`' will search for this tool. `rpm(1)` will be used instead of `rpmbuild(1)` only if `rpmbuild(1)` cannot be found.

DPKG Dpkg comand, `dpkg(1)`. This command is used for building Debian packages. By default, '`configure`' will search for this tool.

DPKG_SOURCE
Dpkg-source command, `dpkg-source(1)`. This command is used for building Debian dsc packages. By default, '`configure`' will search for this tool.

DPKG_BUILDPACKAGE
Dpkg-buildpackage command, `dpkg-buildpackage(1)`. This command is used for building Debian deb packages. By default, '`configure`' will search for this tool.

DEB_BUILD_ARCH
: Debian build architecture. This variable is used for building Debian packages. The default is the autoconf build architecture.

DEB_BUILD_GNU_CPU
: Debian build cpu. This variable is used for building Debian packages. The default is the autoconf build cpu.

DEB_BUILD_GNU_SYSTEM
: Debian build os. This variable is used for building Debian packages. The default is the autoconf build os.

DEB_BUILD_GNU_TYPE
: Debian build alias. This variable is used for building Debian packages. The default is the autoconf build alias.

DEB_HOST_ARCH
: Debian host architecture. This variable is used for building Debian packages. The default is the autoconf host architecture.

DEB_HOST_GNU_CPU
: Debian host cpu. This variable is used for building Debian packages. The default is the autoconf host cpu.

DEB_HOST_GNU_SYSTEM
: Debian host os. This variable is used for building Debian packages. The default is the autoconf host os.

DEB_HOST_GNU_TYPE
: Debian host alias. This variable is used for building Debian packages. The default is the autoconf host alias.

LDCONFIG
: Configure loader command, `ldconfig(8)`. Command used to configure the loader when libraries are installed. By default, '`configure`' will search for this tool.

DESTDIR
: Cross build root directory. Specifies the root directory for build and installation.

DEPMOD
: Build kernel module dependencies command, `depmod(8)`. This is used during installation of kernel modules to a running kernel to rebuild the modules dependency database. By default, '`configure`' will search for this tool.

MODPROBE
: Probe kernel module dependencies command, `modprobe(8)`. This is used during installation of kernel modules to a running kernel to remove old modules. By default, '`configure`' will search for this tool.

LSMOD
: List kernel modules command, `lsmod(8)`. This is used during installation of kernel modules to a running kernel to detect old modules for removal. By default, '`configure`' will search for this tool.

LSOF List open files command, `lsof(1)`. This is used during installation of kernel modules to a running kernel to detect old modules for removal. Processes owning the old kernel modules will be killed and the module removed. If the process restarts, the new module will be demand loaded. By default, '`configure`' will search for this tool.

GENKSYMS
Generate kernel symbols command, `genksyms(8)`. This is used for generating module symbol versions during build. By default, '`configure`' will search for this tool.

KGENKSYMS
Linux 2.6 generate kernel symbols command, `genksyms(8)`. This is used for generating module symbol version during build. By default, '`configure`' will search for this tool.

OBJDUMP
Object dumping command, `objdump(1)`. This is used for listing information about object files. By default, '`configure`' will search for this tool.

NM Object symbol listing command, `nm(1)`. This is used for listing information about object files. By default, '`configure`' will search for this tool.

MODPOST_CACHE
Cache file for `modpost(1)`. The version of the `modpost.sh` script that ships with each package can cache information to a cache file to speed multiple builds. This environment variable is used to specify a cache file.

AUTOM4TE
Autom4te command, `autom4te(1)`. This is the executable used by `autotest` for pre- and post-installation checks. By default, '`configure`' will search for this tool.

AUTOTEST
Autotest macro build command, `autom4te(1)`. This is the executable used by `autotest` for pre- and post-installation checks. By default, '`configure`' will search for this tool.

7.3.5.3 Build

To build from the tar ball, See Section 7.4.3 [Building from the Tar Ball], page 102.

7.4 Building

7.4.1 Building from the Source RPM

If you have downloaded the necessary source RPM (see Section 7.2.5 [Downloading the Source RPM], page 75), then the following instructions will rebuild the binary RPMs on your system. Once the binary RPMs are rebuilt, you may install them as described above (see Section 7.5.1 [Installing the Binary RPM], page 102).

The source RPM is rebuilt to binary RPMs as follows:

```
% wget http://www.openss7.org/rpms/SRPMS/strcompat-0.9.2.7-1.src.rpm
% rpmbuild --rebuild -vv strcompat-0.9.2.7-1.src.rpm
```

The rebuild process can also recognize a number of options that can be used to tweak the resulting binaries, See Section 7.3.3 [Configuring the Source RPM], page 81. These options are provided on the `rpm(1)` command line. For example:

```
% rpmbuild --rebuild -vv --target athlon-redhat-linux \
  --define "_kversion 2.4.20-28.7" \
  --with lfs -- strcompat-0.9.2.7-1.src.rpm
```

will rebuild binary RPM for the '`2.4.20-28.7`' kernel for the '`athlon`' architecture against the *Linux Fast-STREAMS STREAMS* package.[34]

Installation

To install the resulting binary RPM, See Section 7.5.1 [Installing the Binary RPM], page 102.

7.4.2 Building from the Debian DSC

If you have downloaded the necessary Debian DSC (see Section 7.2.6 [Downloading the Debian DSC], page 76), then the following instructions will rebuild the binary DEBs on your system. Once the binary DEBs are rebuilt, you may install them as described above (see Section 7.5.2 [Installing the Debian DEB], page 103).

The Debian DSC is rebuilt to binary DEBs as follows:

```
% wget http://www.openss7.org/debian/strcompat_0.9.2.7-0.dsc
% wget http://www.openss7.org/debian/strcompat_0.9.2.7-0.tar.gz
% dpkg-buildpackage -v strcompat_0.9.2.7-0.dsc
```

The rebuild process can also recognize a number of options that can be used to tweak the resulting binaries, See Section 7.3.4 [Configuring the Debian DSC], page 88. These options are provided in the environment variable *BUILD_DPKGOPTIONS* and have the same form as the options to '`configure`', See Section 7.3.5 [Configuring the Tar Ball], page 88. For example:

```
% BUILD_DEBOPTIONS='
        --with-lfs
        --with-k-release=2.4.20-28.7
        --host=athlon-debian-linux-gnu'
  dpkg-buildpackage -v \
  strcompat_0.9.2.7-0.dsc
```

will rebuild binary DEB for the '`2.4.20-28.7`' kernel for the '`athlon`' architecture against the *Linux Fast-STREAMS STREAMS* package.[35]

[34] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

[35] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

Installation

To install the resulting binary DEB, See Section 7.5.2 [Installing the Debian DEB], page 103.

7.4.3 Building from the Tar Ball

If you have downloaded the tar ball (see Section 7.2.7 [Downloading the Tar Ball], page 76), then the following instructions will rebuild the package on your system. (Note that the build process does not required `root` privilege.)

7.4.3.1 Native Build

Following is an example of a native build against the running kernel:

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure
% make
% popd
```

7.4.3.2 Cross-Build

Following is an example for a cross-build. The kernel release version must always be specified for a cross-build.[36] If you are cross-building, specify the root for the build with environment variable *DESTDIR*. The cross-compile host must also be specified if different from the build host. Either the compiler and other tools must be in the usual places where GNU `autoconf(1)` can find them, or they must be specified with declarations such as '`CC=/usr/lib/ppc-linux/gcc`' on the '`configure`' command line.

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure DESTDIR="/some/other/root" \
--with-k-release=2.4.18 --host sparc-linux
% make
% popd
```

7.5 Installing

7.5.1 Installing the Binary RPM

If you have downloaded the necessary binary RPMs (see Section 7.2.3 [Downloading the Binary RPM], page 69), or have rebuilt binary RPMs using the source RPM (see Section 7.4.1 [Building from the Source RPM], page 100), then the following instructions will install the RPMs on your system. For additional information on `rpm(1)`, see `rpm(8)`.

[36] Because it *is* a cross-build, the kernel version on the build machine is unlikely to be the kernel version of the target machine, except by coincidence.

```
% pushd RPMS/i686
% rpm -ihv strcompat-*-0.9.2.7-1.7.2.i686.rpm
```

You must have the correct binary RPMs downloaded or built for this to be successful.

Some of the packages are relocatable and can have final installation directories altered with the '`--relocate`' option to `rpm(1)`, see `rpm(8)`. For example, the following will relocate the documentation and info directories:

```
% pushd RPMS/i686
% rpm -ihv \
        --relocate '/usr/share/doc=/usr/local/share/doc' \
        --relocate '/usr/share/info=/usr/local/share/info' \
        -- strcompat-doc-0.9.2.7-1.7.2.i686.rpm
```

The previous example will install the '`strcompat-doc`' package by will relocate the documentation an info directory contents to the '`/usr/local`' version.

7.5.2 Installing the Debian DEB

If you have downloaded the necessary Debian DEBs (see Section 7.2.4 [Downloading the Debian DEB], page 72), or have rebuild binary DEBs using the Debian DSC (see Section 7.4.2 [Building from the Debian DSC], page 101), then the following instructions will install the DEBs on your system. For additional information see `dpkg(8)`.

```
% pushd debian
% dpkg -iv strcompat-*_0.9.2.7-0_*.deb
```

You must have the correct '`.deb`' files downloaded or build for this to be successful.

7.5.3 Installing the Tar Ball

After the build process (see Section 7.4.3 [Building from the Tar Ball], page 102), installation only requires execution of one of two `automake(1)` targets:

'`make install`'
: The '`install`' `automake(1)` target will install all the components of the package. Root privilege is required to successfully invoke this target.

'`make install-strip`'
: The '`install-strip`' `automake(1)` target will install all the components of the package, but will strip unnecessary information out of the objects and compress manual pages. Root privilege is required to successfully invoke this target.

7.6 Removing

7.6.1 Removing the Binary RPM

To remove an installed version of the binary RPMs (whether obtained from the OpenSS7 binary RPM releases, or whether created by the source RPM), execute the following command:

```
% rpm -evv `rpm -qa | grep '^strcompat-'`
```

For more information see rpm(1).

7.6.2 Removing the Debian DEB

To remove and installed version of the Debian DEB (whether obtained from the OpenSS7 binary DEB releases, or whether created by the Debian DSC), execute the following command:

```
% dpkg -ev `dpkg -l | grep '^strcompat-'`
```

For more information see dpkg(8).

7.6.3 Removing the Source RPM

To remove all the installed binary RPM build from the source RPM, see Section 7.6.1 [Removing the Binary RPM], page 103. Then simply remove the binary RPM package files and source RPM file. A command such as:

```
% find / -name 'strcompat-*.rpm' -type f -print0 | xargs --null rm -f
```

should remove all '`strcompat`' RPMs from your system.

7.6.4 Removing the Debian DSC

To remove all the installed binary DEB build from the Debian DSC, see Section 7.6.2 [Removing the Debian DEB], page 104. Then simply remove the binary DEB package files and Debian DSC file. A command such as:

```
% find / \( -name 'strcompat-*.deb' \
         -o -name 'strcompat-*.dsc' \
         -o -name 'strcompat-*.tar.* \
         \) -type f -print0 | xargs --null rm -f
```

should remove all '`strcompat`' DEBs, DSCs and TARs from your system.

7.6.5 Removing the Tar Ball

To remove a version installed from tar ball, change to the build directory where the package was built and use the '`uninstall`' automake(1) target as follows:

```
% cd /usr/src/strcompat
% make uninstall
% cd ..
% rm -fr strcompat-0.9.2.7
% rm -f strcompat-0.9.2.7.tar.gz
% rm -f strcompat-0.9.2.7.tar.bz2
```

If you have inadvertently removed the build directory and, therefore, no longer have a configured directory from which to execute '`make uninstall`', then perform all of the steps for configuration and installation (see Section 7.5.3 [Installing the Tar Ball], page 103) except the final installation and then perform the steps above.

7.7 Loading

7.7.1 Normal Module Loading

When OpenSS7 STREAMS Compatibility installs, modules and drivers belonging to release packages are normally configured for demand loading. The '`install`' and '`install-strip`' `automake(1)` targets will make the necessary changes to the '`/etc/modules.conf`' file and place the modules in an appropriate place in '`/lib/modules/2.4.20-28.7/strcompat`'. The '`make install`' process should have copied the kernel module files '`streams-*.o`' to the directory '`/lib/modules/2.4.20-28.7/strcompat`'. This means that to load any of these modules, you can simply execute, for example, '`modprobe stream-`*`somedriver`*'.[37]

7.7.1.1 Linux Fast-STREAMS Module Loading

The '`strcompat`' demand load system supports both the old `kerneld` and the new `kmod` mechanisms for demand loading kernel modules.

The convention for '`strcompat`' kernel loadable object files is:

- Their name start with "streams-".
- They are placed in '`/lib/modules/2.4.20-28.7/streams/`', where '`2.4.20-28.7`' is an example kernel version.

If your kernel has been built using the '`kerneld`' daemon, then '`strcompat`' kernel modules will automatically load as soon as the *STREAMS* module is pushed or the driver is opened. The '`make install`' process makes the necessary changes to the '`/etc/modules.conf`' file. After the install, you will see lines like the following added to your '`/etc/modules.conf`' file:

```
prune modules.strcompat
if -f /lib/modules/‘uname -r‘/modules.strcompat
include /lib/modules/‘uname -r‘/modules.strcompat
endif
```

which will provide for demand loading of the modules if they have been built and installed for the running kernel. The '`/lib/modules/‘uname -r‘/modules.strcompat`' file looks like this:

```
alias char-major-245  streams-some_driver
alias char-major-246  streams-other_driver
```

Note that *STREAMS* modules are not listed in this file, but will be loaded by name using '`kerneld`' if available.

[37] Note that the '`_kversion`' of '`2.4.20-28.7`' is only an example.

Linux Fast-STREAMS has a wider range of kernel module loading mechanisms than is provided by the deprecated *LiS*. For mechanisms used for kernel module loading under *Linux Fast-STREAMS*, See Section "Top" in *Linux Fast-STREAMS Reference Manual*.

7.7.1.2 Linux STREAMS Module Loading

LiS is deprecated and this section has been deleted.

7.8 Maintenance

7.8.1 Makefile Targets

`automake(1)` has many targets, not all of which are obvious to the casual user. In addition, *OpenSS7* `automake(1)` files have additional rules added to make maintaining and releasing a package somewhat easier. This list of targets provides some help with what targets can be invoked, what they do, and what they hope to achieve. The available targets are as follows:

7.8.1.1 User Targets

The following are normal targets intended to be invoked by installers of the package. They are concerned with compiling, checking the compile, installing, checking the installation, and removing the package.

'`[all]`' This is also the default target. It compiles the package and all release packages selected by '`configure`'. This is performed after configuring the source with '`configure`'. A '`Makefile`' stub is provided so that if the package has not had `autoreconf(1)` run (such as when checked out from CVS, the package will attempt to run '`autoreconf -fiv`'.

All *OpenSS7 Project* packages are configured without maintainer mode and without dependency tracking by default. This speeds compilation of the package for one-time builds. This also means that if you are developing using the source package (edit-compile-test cycle), changes made to source files will not cause the automatic rebuilding due to dependencies. There are two ways to enable dependency tracking: specify '`--enable-maintainer-mode`' to '`configure`'; or, specify '`--enable-dependency-tracking`' to '`configure`'. I use the former during my edit-compile-test cycle.

This is a standard *GNU* `automake(1)` makefile target. This target does not require root privilege.

'`check`' All *OpenSS7 Project* release packages provide check scripts for the check target. This step is performed after compiling the package and will run all of the '`check`' programs against the compiled binaries. Which checks are performed depends on whether '`--enable-maintainer-mode`' was specified to '`configure`'. If in maintainer mode, checks that assist with the release of the package will be run (such as checking that all manual pages load properly and that they have required sections.) We recommend running the check stage before installing, because it catches problems that might keep the installed package from functioning properly.

Another way to enable the greater set of checks, without invoking maintainer mode, is to specify '`--enable-checks`' to '`configure`'. For more information, see Section 8.1.1 [Pre-installation Checks], page 117.

This is a standard *GNU* `automake(1)` makefile target, although the functions performed are customized for the *OpenSS7 Project*. This target does not require root privilege.

'`install`'

'`install-strip`'

The '`install`' target installs the package by installing each release package. This target also performs some actions similar to the pre- and post-install scripts used by packaging tools such as `rpm(1)` or `dpkg(1)`. The '`install-strip`' target strips unnecessary symbols from executables and kernel modules before installing.

This is a standard *GNU* `automake(1)` makefile target. This target requires root privilege.

'`installcheck`'

All *OpenSS7 Project* packages provide test scripts for the '`installcheck`' target. Test scripts are created and run using `autotest` (part of the `autoconf(1)` package). Which test suites are run and how extensive they are depends on whether '`--enable-maintainer-mode`' was specified to '`configure`'. When in maintainer mode, all test suites will be run. When not in maintainer mode, only a few post-install checks will be performed, but the test suites themselves will be installed in '`/usr/libexec/strcompat`'[38] for later use.

This is a standard *GNU* `automake(1)` makefile target. This target might require root privilege. Tests requiring root privilege will be skipped when run as a regular user. Tests requiring regular account privileges will be skipped when run as root.

'`retest`'

To complement the '`installcheck`' target above, all *OpenSS7 Project* packages provide the '`retest`' target as a means to rerun failed conformance test suite test cases. The '`retest`' target is provided because some test cases in the test suites have delicate timing considerations that allow them to fail sporadically. Invoking this target will retest the failed cases until no cases that are not expected failures remain.

This is an *OpenSS7 Project* specific makefile target. As with '`installcheck`', this target might require root privilege. Tests requiring root privilege will be skipped when run as a regular user. Tests requiring regular account privileges will be skipped when run as root.

'`uninstall`'

This target will reverse the steps taken to install the package. This target also performs pre- and post- erase scripts used by packaging tools such as *rpm* or *dpkg*. You need to have a configured build directory from which to execute this

[38] '`/usr/libexec/strcompat`' is just an example, the actual location is '`${libexecdir}/${PACKAGE}`', which varies from distribution to distribution (as some distributions such as Mandriva do not have a libexec directory).

target, however, you do not need to have compiled any of the files in that build directory.[39]

The '`uninstall`' target unfortunately removes add-on packages in the same order in which they were installed. This is not good for the *OpenSS7 Master Package*, where the '`remove`' target should be used instead.

This is a standard *GNU* `automake(1)` makefile target. This target requires root privilege.

'`remove`' This target is like '`uninstall`' with the exception that it removes add-on packages in the reverse order that installation was performed.[40]

This is an *OpenSS7 Project* specific makefile target. This target requires root privilege.

7.8.1.2 Maintainer Targets

The following targets are targets intended for use by maintainers of the package, or those responsible for release and packaging of a derivative work of the package. Some of these targets are only effective when maintainer mode has been invoked ('`--enable-maintainer-mode`' specified to '`configure`'.)

'`dist`' Creates a distribution package (tarball) in the top level build directory. *OpenSS7 Project* packages distribute two archives: a '`gzip tar`' archive and a '`bzip tar`' archive. These archives will have the name '`strcompat-0.9.2.7.tar.gz`' and '`strcompat-0.9.2.7.tar.bz2`'.

This is a standard *GNU* `automake(1)` makefile target. This target does not require root privilege.

'`distcheck`'

This target is intended for use when releasing the package. It creates the `tar(1)` archives above and then unpacks the tarball in a source directory, configures in a separate build directory, compiles the package, installs the package in a separate install directory, tests the install package to ensure that some components work, and, finally, uses the unpacked source tree to build another tarball. If you have added or removed files from the package, this is a good way to ensure that everything is still stable for release.

This is a standard *GNU* `automake(1)` makefile target. This target does not require root privilege.

7.8.1.3 Clean Targets

'`mostlyclean`'

Cleans out most of the files from the compile stage. This target is helpful if you have not enabled dependency tracking and need to recompile with changes.

This is a standard *GNU* `automake(1)` makefile target. This target does not require root privilege.

---

[39] Therefore, it is possible to download the package, configure it, and then uninstall it. This is handy if you do not have the sources used to build and install the package immediately available.

[40] This is useful from the *OpenSS7 Master Package*.

'`clean`' Cleans all the files from the build directory generated during the '`make [all]`' phase. It does not, however, remove files from the directory left there from the '`configure`' run. Use the '`distclean`' target to remove those too.

This is a standard *GNU* `automake(1)` makefile target. This target might require root privilege if the '`installcheck`' target or the `testsuite` was invoked with root privilege (leaving files belonging to root).

'`distclean`'
This target cleans out the directories left behind by '`distcheck`' and removes all the '`configure`' and generated files from the build directory. This will effectively remove all the files in the build directory, with the except of files that belong to you or some other process.

This is a standard *GNU* `automake(1)` makefile target. This target might require root privilege if the '`installcheck`' target or the `testsuite` was invoked with root privilege (leaving files belonging to root).

'`maintainer-clean`'
This target not only removes files from the build directory, it removes generated files from the source directory as well. Care should be taken when invoking this target, because it removes files generated by the maintainer and distributed with the archive that might require special tools to regenerate. These special tools might only be available to the maintainer.[41] It also means that you probably need a full blown Linux system to rebuild the package. For more information, see Section 7.2.8 [Downloading from CVS], page 77.

This is a standard *GNU* `automake(1)` makefile target. This target might require root privilege if the '`installcheck`' target or the `testsuite` was invoked with root privilege (leaving files belonging to root).

'`check-clean`'
This target removes log files left behind by the '`check`' target. By default, the check scripts append to log files in the top level build directory. This target can be used to clean out those log files before the next run.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

7.8.1.4 Manual Page Targets

The following targets are used to build, install and uninstall just the manual pages from the distribution. These targets are good for creating a distribution of just the manual pages. When building atop multiple packages, these targets recurse down through each package.

'`mans`' Build all of the manual pages. This involves performing parameter substitution on manual pages and optionally cooking the manual pages if '`--with-cooked-manpages`' was requested during configuration.

'`install-mans`'
Installs the manual pages under *DESTDIR*. Specify *DESTDIR* to place the manual pages wherever you see fit. If *DESTDIR* is not specified on the com-

[41] Theoretically this is true, however, the *OpenSS7 Project* does not use any maintainer programs that are not generally available (i.e. open source).

mand line, the manual pages will be installed in the normal installation directory.

‘`uninstall-mans`’
Uninstalls the manual pages from *DESTDIR*. Specify *DESTDIR* to indicate where to remove the manual pages from. If *DESTDIR* is not specified on the command line, the manual pages will be removed from the normal installation directory.

7.8.1.5 Release Targets

The following are targets used to generate complete releases into the package distribution directory. These are good for unattended and NFS builds, which is what I use them for. Also, when building from atop multiple packages, these targets also recurse down through each package.

‘`release`’ Build all of the things necessary to generate a release. On an `rpm(1)` system this is the distribution archives, the source rpm, and the architecture dependent and architecture independent binary rpms. All items are placed in the package distribution directory that can be specified with the ‘`--with-pkg-distdir=DIR`’ option to ‘`configure`’.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`forced-release`’
The ‘`release`’ target will not regenerate any files that already exist in the package distribution directory. This forced target will.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`release-sign`’
You will be prompted for a password, unless to specify it to make with the *GNUPGPASS* variable. For unattended or non-interactive builds with signing, you can do that as: ‘`make GNUPGPASS=mypasswd release-sign`’

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`forced-release-sign`’
The ‘`release-sign`’ target will not regenerate any files that already exist in the package distribution directory. This forced target will.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`release-clean`’
This target will remove all distribution files for the current package from the package distribution directory.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

7.8.1.6 Logging Targets

For convenience, to log the output of a number of targets to a file, log targets are defined. The log file itself is used as the target to make, but make invokes the target minus a '`.log`' suffix. So, for example, to log the results of target '`foo`', invoke the target '`foo.log`'. The only target that this does not apply to is '`compile.log`'. When you invoke the target '`compile.log`' a simple `automake(1)` is invoked and logged to the file '`compile.log`'. The '`foo.log`' rule applies to all other targets. This does not work for all targets, just a selected few.[42] Following are the logging targets:

Common Logging Targets

Common logging targets correspond to normal user `automake(1)` makefile targets as follows:

'`compile.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`[all]`'.

'`check.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`check`'.

'`install.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`install`'.

'`installcheck.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`installcheck`'.

'`uninstall.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`uninstall`'.

'`remove.log`'
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* '`remove`' target.

Maintainer Logging Targets

Maintainer logging targets correspond to maintainer mode `automake(1)` makefile targets as follows:

'`dist.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`dist`'.

'`distcheck.log`'
: This is an *OpenSS7 Project* specific makefile target, but it invokes the standard *GNU* `automake(1)` makefile target '`distcheck`'.

[42] Note that because logging targets invoke a pipe, `automake(1)` does not return the correct return status (always returns success if the `tee(1)` operation is successful). Therefore, these targets should not be invoked by scripts that need to use the return value from `automake(1)`.

‘`srpm.log`’
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* ‘`srpm`’ target.

‘`rebuild.log`’
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* ‘`rebuild`’ target.

‘`resign.log`’
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* ‘`resign`’ target.

‘`release.log`’
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* ‘`release`’ target.

‘`release-sign.log`’
: This is an *OpenSS7 Project* specific makefile target, that invokes the *OpenSS7 Project* ‘`release-sign`’ target.

If you want to add one, simply add it to *LOGGING_TARGETS* in ‘`Makefile.am`’.

7.8.1.7 Problem Report Targets

To ease problem report generation, all logging targets will automatically generate a problem report suitable for mailing in the file ‘*`target`*`.pr`’ for target ‘*`target`*`.log`’. This problem report file is in the form of an email and can be sent using the included `send-pr` script or by invoking the ‘`send-pr`’ makefile target.

There are two additional problem report targets:

‘`pr`’
: The ‘`pr`’ target is for independently generating a problem report outside of the build or installation process. The target will automatically generate a problem report skeleton suitable for editing and mailing in the file ‘`problem.pr`’. This problem report file is in the form of an email and can be edited and sent directly, or sent using the included `send-pr` script or by invoking the ‘`send-pr`’ target.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`send-pr`’
: The ‘`send-pr`’ target is for finalizing and mailing a problem report generated either inside or outside the build and installation process. The target will automatically finalize and mail the ‘`problem.pr`’ problem report if it has changed since the last time that ‘`send-pr`’ was invoked.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege (unless the problem report file was generated as root).

7.8.1.8 Release Archive Targets

The following targets are used to generate and clean distribution archive and signature files. Whereas the ‘`dist`’ target affects archives in the top build directory, the ‘`release-archive`’ targets affects archives in the package distribution directory (either the top build directory or that specified with ‘`--with-pkg-distdir=DIR`’ to ‘`configure`’).

You can change the directory to which packages are distributed by using the '`--with-pkg-distdir=DIR`' option to '`configure`'. The default directory is the top build directory.

'`release-archives`'
: This target creates the distribution archive files if they have not already been created. This not only runs the '`dist`' target, but also copies the files to the distribution directory, which, by default is the top build directory.

  The files generated are named:

  '`strcompat-0.9.2.7.tar.gz`' and '`strcompat-0.9.2.7.tar.bz2`'

  You can change this distribution directory with the '`--with-pkg-distdir`' option to '`configure`'. See '`./configure --help`' for more details on options.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

'`release-sign-archives`'
: This target is like '`release-archives`', except that it also signs the archives using a *GPG* detached signature. You will be prompted for a password unless you pass the *GNUPGPASS* variable to make. For automated or unattended builds, pass the *GNUPGPASS* variable like so:

  '`make GNUPGPASS=mypasswd release-sign-archives`'

  Signature files will be named:

  '`strcompat-0.9.2.7.tar.gz.asc`' and '`strcompat-0.9.2.7.tar.bz2.asc`'

  These files will be moved to the package distribution directory with the plain text archives.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

'`release-clean-archives`'
: This target will clean the release archives and signature files from the package distribution directory.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

7.8.1.9 RPM Build Targets

On `rpm(1)` systems, or systems sporting rpm packaging tools, the following targets are used to generate `rpm(1)` release packages. The epoch and release number can be controlled by the contents of the '`.rpmepoch`' and '`.rpmrelease`' files, or with the '`--with-rpm-epoch=EPOCH`' and '`--with-rpm-release=RELEASE`' options to '`configure`'. See '`configure --help`' for more information on options. We always use release number '`1`'. You can use release numbers above '`1`'.

'`srpm`'
: This target generates the source rpm for the package (without signing the source rpm). The source rpm will be named: '`strcompat-0.9.2.7-1.srpm`'.

  This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`rpms`’ This target is responsible for generating all of the package binary rpms for the architecture. The binary rpms will be named:

‘`strcompat-*-0.9.2.7-1.*.rpm`’

where the stars indicate the subpackage and the architecture. Both the architecture specific subpackages (binary objects) and the architecture independent (‘`.noarch`’) subpackages will be built unless the the former was disabled with the option ‘`--disable-arch`’, or the later with the option ‘`--disable-indep`’, passed to ‘`configure`’.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`sign`’
‘`srpm-sign`’
These two targets are the same. When invoked, they will add a signature to the source rpm file, provided that the file does not already have a signature. You will be prompted for a password if a signature is required. Automated or unattended builds can be achieved by using the `emake` expect script, included in ‘`${srcdir}/scripts/emake`’.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`rebuild`’ This target accepts searches out a list of kernel names from the ‘`${DESTDIR}/lib/modules`’ directory and builds rpms for those kernels and for each of a set of architectures given in the *AM_RPMTARGETS* variable to make. This is convenience target for building a group of rpms on a given build machine.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

‘`resign`’ This target will search out and sign, with a *GPG* signature, the source rpm, and all of the binary rpms for this package that can be found in the package distribution directory. This target will prompt for a *GPG* password. Automated or unattended builds can be achieved with the `emake` expect script located here: ‘`${srcdir}/scripts/emake`’.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

7.8.1.10 Debian Build Targets

On Debian systems, or systems sporting Debian packaging tools, the following targets are used to generate Debian release packages. The release number can be controlled by the contents of the ‘`.debrelease`’ file, or with the ‘`--with-debrelease=RELEASENUMBER`’ option to ‘`configure`’. See ‘`configure --help`’ for more information on options.

‘`dsc`’ This target will build the Debian source change package (‘`.dsc`’ file). We use release number ‘`0`’ so that the entire tarball is included in the ‘`dsc`’ file. You can use release number ‘`1`’ for the same purposes. Release numbers above ‘`1`’ will not include the entire tarball. The ‘`.dsc`’ file will be named: ‘`strcompat_0.9.2.7-0.dsc`’.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

'`sigs`' This target signs the '`.deb`' files. You will be prompted for a password, unless to specify it to make with the *GNUPGPASS* variable.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

'`debs`' This target will build the Debian binary package ('`.deb`' file) from the '`.dsc`' created above. (This target will also create the '`.dsc`' if it has not been created already.) The subpackage '`.deb`' files will be named: '`strcompat-*_0.9.2.7-0_*.deb`', where the stars indicate the subpackage and the architecture.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

'`csig`' This target signs the '`.dsc`' file. You will be prompted for a password, unless to specify it to make with the *GNUPGPASS* variable.

This is an *OpenSS7 Project* specific makefile target. This target does not require root privilege.

7.8.1.11 Documentation Targets

On systems that have `doxygen(1)` documentation tool, the following targets are used to generate doxygen html documentation:

'`doxy`' This target generates `doxygen(1)` documetnation from suitably marked sources. File containing the necessary documentation marks are discovered automatically by `configure`. Doxygen documentation can be generated bus is not distributed. Documentation is cerated in the subdirectory '`doc/html`'.

8 Troubleshooting

8.1 Test Suites

8.1.1 Pre-installation Checks

Most *OpenSS7* packages, including the *OpenSS7 STREAMS Compatibility* package, ship with pre-installation checks integral to the build system. Pre-installation checks include check scripts that are shipped in the '`scripts`' subdirectory as well as specialized `make` targets that perform the checks.

When building and installing the package from *RPM* or *DEB* source packages (see Section 7.4.1 [Building from the Source RPM], page 100; and Section 7.4.2 [Building from the Debian DSC], page 101), a fundamental set of post-compile, pre-installation checks are performed prior to building binary packages. This is performed automatically and does not require any special actions on the part of the user creating binary packages from source packages.

When building and installing the package from *tarball* (see Section 7.4.3 [Building from the Tar Ball], page 102; and Section 7.5.3 [Installing the Tar Ball], page 103), however, pre-installation checks are only performed if specifically invoked by the builder of the package. Pre-installation checks are invoked after building the package and before installing the package. Pre-installation checks are performed by invoking the '`check`' or '`check.log`' target to `make` when building the package, as shown in Example 8.1.

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure
% make
% make check  # <------- invoke pre-installation checks
% popd
```

Example 8.1: *Invoking Pre-Installation Checks*

Pre-installation checks fall into two categories: *System Checks* and *Maintenance Checks*.

8.1.1.1 Pre-Installation System Checks

System Checks are post-compilation checks that can be performed before installing the package that check to ensure that the compiled objects function and will be successfully installed. When the '`--enable-maintainer-mode`' option has not been passed to `configure`, only *System Checks* will be performed.

For example, the steps shown in Example 8.2 will perform *System* checks.

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure
% make
% make check  # <------ invokes System pre-installation checks
% popd
```

Example 8.2: *Invoking System Checks*

8.1.1.2 Pre-Installation Maintenance Checks

Maintenance Checks include all *System Checks*, but also checks to ensure that the kernel modules, applications programs, header files, development tools, test programs, documentation, and manual pages conform to *OpenSS7* standards. When the '`--enable-maintainer-mode`' option has been passed to `configure`, *Maintenance Checks* will be performed.

For example, the steps shown in Example 8.3 will perform *Maintenance* checks.

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure --enable-maintainer-mode
% make
% make check  # <------ invokes Maintenance pre-installation checks
% popd
```

Example 8.3: *Invoking Maintenance Checks*

8.1.1.3 Specific Pre-Installation Checks

A number of check scripts are provided in the '`scripts`' subdirectory of the distribution that perform both *System* and *Maintenance* checks. These are as follows:

`check_commands`

This check performs both *System* and *Maintenance* checks.

When performing *System* tests, the following tests are performed:

Unless cross-compiling, or unless a program is included in `AM_INSTALLCHECK_STD_OPTIONS_EXEMPT` every program in `bin_PROGRAMS`, `sbin_PROGRAMS`, and `libexec_PROGRAMS` is tested to ensure that the '`--help`', '`--version`', and '`--copying`' options are accepted. When cross-compiling is is not possible to execute cross-compiled binaries, and these checks are skipped in that case.

Script executables, on the other hand, can be executed on the build host, so, unless listed in `AM_INSTALLCHECK_STD_OPTIONS_EXEMPT`, every program in `dist_bit_SCRIPTS`, `dist_sbin_SCRIPTS`, and `pkglibexec_SCRIPTS` are tested to ensure that the '`--help`', '`--version`', and '`--copying`' options are accepted.

When performing *Maintenance* tests, `check_commands` also checks to ensure that a manual page exists in section 1 for every executable binary or script

that will be installed from `bin_PROGRAMS` and `dist_bin_SCRIPTS`. It also checks to ensure that a manual page exists in section 8 for every executable binary or script that will be installed from `sbin_PROGRAMS`, `dist_sbin_SCRIPTS`, `libexec_PROGRAMS`, and `pkglibexec_SCRIPTS`.

`check_decls`

This check only performs *Maintenance* checks.

It collects the results from the `check_libs`, `check_modules` and `check_headers` check scripts and tests to ensure every declaration of a function prototype or external variable contained in installed header files has a corresponding exported symbol from either a to be installed shared object library or a to be installed kernel module. Declarations are exempted from this requirement if their identifiers have been explicitly added to the `EXPOSED_SYMBOL` variable. If `WARN_EXCESS` is set to '`yes`', then the check script will only warn when excess declarations exist (without a corresponding exported symbol); otherwise, the check script will generate an error and the check will fail.

`check_headers`

This check only performs *Maintenance* checks.

When performing *Maintenance* tests, it identifies all of the declarations included in to be installed header files. It then checks to ensure that a manual page exists in sections 2, 3, 7 or 9, as appropriate, for the type of declaration. It also checks to see if a manual page source file exists in the source directory for a declaration that has not been included in the distribution. Function or prototype declarations that do not have a manual page in sections 2, 3, or 9 will cause the check to fail. Other declarations ('`variable`', '`externvar`', '`macro`', '`enumerate`', '`enum`', '`struct`', '`union`', '`typedef`', '`member`', etc.) will only warn if a manual page does not exist, but will not fail the check.

`check_libs`

This check only performs *Maintenance* checks.

When performing *Maintenance* tests, it checks that each exported symbol in each to be installed shared object library has a manual page in section 3. It also checks that each exported symbol has a '`function`', '`prototype`' or '`externvar`' declaration in the to be installed header files. A missing declaration or manual page will cause this check to fail.

`check_mans`

This check only performs *Maintenance* checks.

When performing *Maintenance* tests, it checks that to be install manual pages can be formatted for display without any errors or warnings from the build host `man` program. It also checks that required headings exist for manual pages according to the section in which the manual page will be installed. It warns if recommended headings are not included in the manual pages. Because some *RPM* distributions have manual pages that might conflict with the package manual pages, this check script also checks for conflicts with installed manual pages on the build host. This check script also checks to ensure that all to be

installed manual pages are used in some fashion, that is, they have a declaration, or exported symbol, or are the name of a kernel module or STREAMS module or driver, possibly capitalized.

Note that checking for conflicts with the build host should probably be included in the *System* checks (because *System* checks are performed before the source *RPM* `%install` scriptlet).

`check_modules`

This check performs both *System* and *Maintenance* checks.

When performing *System* tests, it checks each to be installed kernel module to ensure that all undefined symbols can be resolved to either the kernel or another module. It also checks whether an exported or externally declared symbol conflicts with an exported or externally declared symbol present in the kernel or another module.[1]

When performing *Maintenance* tests, this check script tests that each to be installed kernel module has a manual page in section 9 and that each exported symbol that does not begin with an underscore, and that belongs to an exported function or exported variable, has a manual page in section 9. It also checks to ensure that each exported symbol that does not begin with an underscore, and that belongs to an exported function or exported variable, has a '`function`', '`prototype`' or '`externvar`' declaration in the to be installed header files.

`check_streams`

This check performs only *Maintenance* checks.

When performing *Maintenance* tests, it checks that for each configured *STREAMS* module or driver, or device node, that a manual page exists in section 4 or section 7 as appropriate.

The output of the pre-installation tests are fairly self explanatory. Each check script saves some output to '*`name`*`.log`', where *name* is the name of the check script as listed above. A summary of the results of the test are display to standard output and can also be captured to the '`check.log`' file if the '`check.log`' target is used instead of the '`check`' target to `make`.

Because the check scripts proliferate '*`name`*`.log`' files throughout the build directory, a '`make check-clean`' `make` target has be provided to clean them out. '`make check-clean`' should be run before each successive run of '`make check`'.

8.1.2 Post-installation Checks

Most OpenSS7 packages ship with a compatibility and conformance test suite built using the '`autotest`' capabilities of '`autoconf`'. These test suites act as a wrapper for the compatibility and conformance test programs that are shipped with the package.

Unlike the pre-installation checks, the post-installation checks are always run complete. The only check that post-installation test scripts perform is to test whether they have been invoked with root privileges or not. When invoked as root, or as a plain user, some tests might be skipped that require root privileges, or that require plain user privileges, to complete successfully.

[1] This particular check has caught some name space pollution that has occurred in the 2.6.11 kernel.

8.1.2.1 Running Test Suites

There are several ways of invoking the conformance test suites:

1. The test suites can be run after installation of the package by invoking the '`make installcheck`' or '`make installcheck.log`' target. Some packages require that root privileges be acquired before invoking the package.
2. The test suites can be run from the distribution subdirectory after installation of the package by invoking the `testsuite` shell script directly.
3. The test suites can be run standalone from the '`libexec`' ('`/usr/libexec`') installation directory by invoking the `testsuite` shell script directly.

Typical steps for invoking the test suites directly from `make` are shown in Example 8.4.

```
% wget http://www.openss7.org/strcompat-0.9.2.7.tar.bz2
% tar -xjvf strcompat-0.9.2.7.tar.bz2
% pushd strcompat-0.9.2.7
% ./configure
% make
% make check  # <------ invokes System pre-installation checks
% make install
% sudo make installcheck # <------- invokes post-installation tests
% popd
```

Example 8.4: *Invoking System Checks*

When performing post-installation checks for the purposes of generating a problem report, the checks should always be performed from the build directory, either with '`make installcheck`' or by invoking `testsuite` directly from the '`tests`' subdirectory of the build directory. This ensures that all of the information known to `configure` and pertinent to the configuration of the system for which a test case failed, will be collected in the resulting '`testsuite.log`' file deposited upon test suite failure in the '`tests`' directory. This '`testsuite.log`' file can then be attached as part of the problem report and provides rich details to maintainers of the package. See also See Section 8.2 [Problem Reports], page 121, below.

Typical steps for invoking and installed `testsuite` standalone are shown in Example 8.5.

```
% [sudo] /usr/libexec/strcompat/testsuite
```

Example 8.5: *Invoking* `testsuite` *Directly*

When invoked directly, `testsuite` will generate a '`testsuite.log`' file in the current directory, and a '`testsuite.dir`' directory of failed tests cases and debugging scripts. For generating a problem report for failed test cases, see Section 8.2.4 [Stand Alone Problem Reports], page 124.

8.2 Problem Reports

8.2.1 Problem Report Guidelines

Problem reports in the following categories should include a log file as indicated in the table below:

‘`./configure`’
: A problem with the configuration process occurs that causes the ‘`./configure`’ command to fail. The problem report must include the ‘`config.log`’ file that was generated by `configure`.

‘`make compile.log`’
: A problem with the build process occurs that causes the ‘`make`’ command to fail. Perform ‘`make clean`’ and then ‘`make compile.log`’ and attach the ‘`config.log`’ and ‘`compile.log`’ files to the problem report.

‘`make check.log`’
: A problem occurs with the ‘`make check`’ target that causes it to fail. Perform ‘`make check-clean check.log`’ and attach the ‘`config.log`’, ‘`compile.log`’ and ‘`check.log`’ files to the problem report.

‘`sudo make install.log`’
: A problem occurs with ‘`sudo make install`’ that causes it to fail. Perform ‘`sudo make uninstall`’ and ‘`sudo make install.log`’ and attach the ‘`config.log`’, ‘`compile.log`’, ‘`check.log`’, and ‘`install.log`’ files to the problem report.

‘`[sudo] make installcheck.log`’
: A problem occurs with the ‘`make installcheck`’ target that causes the test suite to fail. Attach the resulting ‘`tests/testsuite.log`’ and ‘`installcheck.log`’ file to the problem report. There is no need to attach the other files as they are included in ‘`tests/testsuite.log`’.

‘`[sudo] make uninstall.log`’
: A problem occurs with the ‘`make uninstall`’ target that causes the test suite to fail. Perform ‘`sudo make uninstall.log`’ and attach the ‘`config.log`’, ‘`compile.log`’, ‘`check.log`’, ‘`install.log`’, ‘`installcheck.log`’, ‘`tests/testsuite.log`’ and ‘`uninstall.log`’ file to the problem report.

‘`[sudo] make remove.log`’
: A problem occurs with the ‘`make remove`’ target that causes the test suite to fail. Perform ‘`sudo make remove.log`’ and attach the ‘`config.log`’, ‘`compile.log`’, ‘`check.log`’, ‘`install.log`’, ‘`installcheck.log`’, ‘`tests/testsuite.log`’ and ‘`remove.log`’ file to the problem report.

For other problems that occur during the use of the *OpenSS7 STREAMS Compatibility* package, please write a test case for the test suite that recreates the problem if one does not yet exist and provide a test program patch with the problem report. Also include whatever log files are generated by the kernel (`cmn_err(9)`) or by the `strerr(8)` or `strace(1)` facilities (`strlog(9)`).

8.2.2 Generating Problem Reports

The OpenSS7 Project uses the *GNU GNATS* system for problem reporting. Although the ‘`send-pr`’ tool from the *GNU GNATS* package can be used for bug reporting to the project’s

GNATS database using electronic mail, it is not always convenient to download and install the *GNATS* system to gain access to the '`send-pr`' tool.

Therefore, the *OpenSS7 STREAMS Compatibility* package provides the '`send-pr`' shell script that can be used for problem reporting. The '`send-pr`' shell script can invoked directly and is a work-alike for the *GNU* '`send-pr`' tool.

The '`send-pr`' tool takes the same flags and can be used in the same fashion, however, whereas '`send-pr`' is an interactive tool[2], '`send-pr`' is also able to perform batch processing. Whereas '`send-pr`' takes its field information from local databases or from using the '`query-pr`' C-language program to query a remote database, the '`send-pr`' tool has the field database internal to the tool.

Problem reports can be generate using `make`, See Section 7.8.1.7 [Problem Report Targets], page 112. An example of how simple it is to generate a problem report is illustrated in Example 8.6.

```
% make pr
SEND-PR:
SEND-PR: send-pr:  send-pr was invoked to generate an external report.  An
SEND-PR: automated problem report has been created in the file named
SEND-PR: 'problem.pr' in the current directory.  This problem report can
SEND-PR: be sent to bugs@openss7.org by calling this script as
SEND-PR: '/home/brian/os7/scripts/send-pr --file="problem.pr"'.
SEND-PR:
SEND-PR: It is possible to edit some of the fields before sending on the
SEND-PR: problem report.  Please remember that there is NO WARRANTY.  See
SEND-PR: the file 'COPYING' in the top level directory.
SEND-PR:
SEND-PR: Please do not send confidential information to the bug report
SEND-PR: address.  Inspect the file 'problem.pr' for confidential
SEND-PR: information before mailing.
SEND-PR:
% vim problem.pr  # <--- follow instructions at head of file
% make send-pr
```

Example 8.6: *Invoking Problem Report Generation*

Using the '`make pr`' target to generate a problem report has the advantages that it will assemble any available '`*.log`' files in the build directory and attach them to the problem report.

8.2.3 Automatic Problem Reports

The *OpenSS7 STREAMS Compatibility* package also provides a feature for automatic problem report generation that meets the problem report submission guidelines detailed in the preceding sections.

Whenever a logging makefile target (see Section 7.8.1.6 [Logging Targets], page 111) is invoked, if the primary target fails, the `send-pr` shell script is invoked to automatically

[2] '`send-pr`' launches the user's *EDITOR* to edit the problem report before submitting it.

generate a problem report file suitable for the corresponding target (as described above under see Section 8.2.1 [Problem Report Guidelines], page 122). An example is shown in Example 8.7.

```
% make compile.log
...
...
make[5]: *** [libXNSdrvs_a-ip.o] Error 1
make[5]: Leaving directory `/u6/buildel4/strxns'
make[4]: *** [all-recursive] Error 1
make[4]: Leaving directory `/u6/buildel4/strxns'
make[3]: *** [all] Error 2
make[3]: Leaving directory `/u6/buildel4/strxns'
make[2]: *** [all-recursive] Error 1
make[2]: Leaving directory `/u6/buildel4'
make[1]: *** [all] Error 2
make[1]: Leaving directory `/u6/buildel4'
SEND-PR:
SEND-PR: send-pr:  Make target compile.log failed in the compile stage.  An
SEND-PR: automated problem report has been created in the file named
SEND-PR: 'problem.pr' in the current directory.  This problem report can
SEND-PR: be sent to bugs@openss7.org by calling 'make send-pr'.
SEND-PR:
SEND-PR: It is possible to edit some of the fields before sending on the
SEND-PR: problem report.  Please remember that there is NO WARRANTY.  See
SEND-PR: the file 'COPYING' in the top level directory.
SEND-PR:
SEND-PR: Please do not send confidential information to the bug report
SEND-PR: address.  Inspect the file 'problem.pr' for confidential
SEND-PR: information before mailing.
SEND-PR:
% vim problem.pr  # <--- follow instructions at head of file
% make send-pr
```

Example 8.7: *Problem Report from Failed Logging Target*

8.2.4 Stand Alone Problem Reports

The *OpenSS7 STREAMS Compatibility* package installs the `send-pr` script and its configuration file '`send-pr.config`' in '`${libexecdir}/strcompat`' along with the validation `testsuite`, see See Section 8.1 [Test Suites], page 117. As with the `testsuite`, this allows the `send-pr` script to be used for problem report generation on an installed system that does not have a build directory.

An example of invoking the package `testsuite` and then generating a problem report for failed cases is shown in Example 8.8.

```
% [sudo] /usr/libexec/strcompat/testsuite
% # test cases failed...
% /usr/libexec/strcompat/send-pr
SEND-PR:
SEND-PR: send-pr:  send-pr was invoked to generate an external report.  An
SEND-PR: automated problem report has been created in the file named
SEND-PR: 'problem.pr' in the current directory.  This problem report can
SEND-PR: be sent to bugs@openss7.org by calling this script as
SEND-PR: '/usr/libexec/strcompat/send-pr --file problem.pr'.
SEND-PR:
SEND-PR: It is possible to edit some of the fields before sending on the
SEND-PR: problem report.  Please remember that there is NO WARRANTY.  See
SEND-PR: the file 'COPYING' in the top level directory.
SEND-PR:
SEND-PR: Please do not send confidential information to the bug report
SEND-PR: address.  Inspect the file 'problem.pr' for confidential
SEND-PR: information before mailing.
SEND-PR:
% vim problem.pr  # <--- follow instructions at head of file
% /usr/libexec/strcompat/send-pr --file problem.pr
```

Example 8.8: *Invoking* `send-pr` *Directly*

The advantage of the approach shown in the example is that the `send-pr` script is capable of collecting the '`testsuite.log`' file and the failed test cases and debugging scripts from the '`testsuite.dir`' directory and including them in the problem report, as well as all package pertinent information from the installed '`send-pr.config`'.

8.3 Known Problems

The OpenSS7 Project does not ship software with known bugs. All bugs are unknown.

Verified behaviour is that behaviour that has been verified by conformance test suites that are shipped with the *OpenSS7 STREAMS Compatibility* package.

Unverified behaviour may contain unknown bugs.

Please remember that there is **NO WARRANTY**.

See also Section 6.5 [Bugs], page 60, or file '`BUGS`' in the release directory.

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Version 3, 19 November 2007

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