

# man pages section 3: Library Interfaces and Headers

Beta



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# Preface

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Both novice users and those familiar with the SunOS operating system can use online man pages to obtain information about the system and its features. A man page is intended to answer concisely the question “What does it do?” The man pages in general comprise a reference manual. They are not intended to be a tutorial.

## Overview

The following contains a brief description of each man page section and the information it references:

- Section 1 describes, in alphabetical order, commands available with the operating system.
- Section 1M describes, in alphabetical order, commands that are used chiefly for system maintenance and administration purposes.
- Section 2 describes all of the system calls. Most of these calls have one or more error returns. An error condition is indicated by an otherwise impossible returned value.
- Section 3 describes functions found in various libraries, other than those functions that directly invoke UNIX system primitives, which are described in Section 2.
- Section 4 outlines the formats of various files. The C structure declarations for the file formats are given where applicable.
- Section 5 contains miscellaneous documentation such as character-set tables.
- Section 7 describes various special files that refer to specific hardware peripherals and device drivers. STREAMS software drivers, modules and the STREAMS-generic set of system calls are also described.
- Section 9E describes the DDI (Device Driver Interface)/DKI (Driver/Kernel Interface), DDI-only, and DKI-only entry-point routines a developer can include in a device driver.
- Section 9F describes the kernel functions available for use by device drivers.
- Section 9S describes the data structures used by drivers to share information between the driver and the kernel.

Below is a generic format for man pages. The man pages of each manual section generally follow this order, but include only needed headings. For example, if there are no bugs to report,

there is no BUGS section. See the `intro` pages for more information and detail about each section, and `man(1)` for more information about man pages in general.

NAME	This section gives the names of the commands or functions documented, followed by a brief description of what they do.
SYNOPSIS	<p>This section shows the syntax of commands or functions. When a command or file does not exist in the standard path, its full path name is shown. Options and arguments are alphabetized, with single letter arguments first, and options with arguments next, unless a different argument order is required.</p> <p>The following special characters are used in this section:</p> <ul style="list-style-type: none"><li>[ ] Brackets. The option or argument enclosed in these brackets is optional. If the brackets are omitted, the argument must be specified.</li><li>. . . Ellipses. Several values can be provided for the previous argument, or the previous argument can be specified multiple times, for example, "filename . . .".</li><li>  Separator. Only one of the arguments separated by this character can be specified at a time.</li><li>{ } Braces. The options and/or arguments enclosed within braces are interdependent, such that everything enclosed must be treated as a unit.</li></ul>
PROTOCOL	This section occurs only in subsection 3R to indicate the protocol description file.
DESCRIPTION	This section defines the functionality and behavior of the service. Thus it describes concisely what the command does. It does not discuss OPTIONS or cite EXAMPLES. Interactive commands, subcommands, requests, macros, and functions are described under USAGE.
IOCTL	This section appears on pages in Section 7 only. Only the device class that supplies appropriate parameters to the <code>ioctl(2)</code> system call is called <code>ioctl</code> and generates its own heading. <code>ioctl</code> calls for a specific device are listed alphabetically (on the man page for that specific device).

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	<p><code>ioctl</code> calls are used for a particular class of devices all of which have an <code>io</code> ending, such as <code>mtio(7I)</code>.</p>
OPTIONS	<p>This section lists the command options with a concise summary of what each option does. The options are listed literally and in the order they appear in the SYNOPSIS section. Possible arguments to options are discussed under the option, and where appropriate, default values are supplied.</p>
OPERANDS	<p>This section lists the command operands and describes how they affect the actions of the command.</p>
OUTPUT	<p>This section describes the output – standard output, standard error, or output files – generated by the command.</p>
RETURN VALUES	<p>If the man page documents functions that return values, this section lists these values and describes the conditions under which they are returned. If a function can return only constant values, such as 0 or -1, these values are listed in tagged paragraphs. Otherwise, a single paragraph describes the return values of each function. Functions declared void do not return values, so they are not discussed in RETURN VALUES.</p>
ERRORS	<p>On failure, most functions place an error code in the global variable <code>errno</code> indicating why they failed. This section lists alphabetically all error codes a function can generate and describes the conditions that cause each error. When more than one condition can cause the same error, each condition is described in a separate paragraph under the error code.</p>
USAGE	<p>This section lists special rules, features, and commands that require in-depth explanations. The subsections listed here are used to explain built-in functionality:</p> <ul style="list-style-type: none"><li>Commands</li><li>Modifiers</li><li>Variables</li><li>Expressions</li><li>Input Grammar</li></ul>
EXAMPLES	<p>This section provides examples of usage or of how to use a command or function. Wherever possible a complete</p>

example including command-line entry and machine response is shown. Whenever an example is given, the prompt is shown as `example%`, or if the user must be superuser, `example#`. Examples are followed by explanations, variable substitution rules, or returned values. Most examples illustrate concepts from the SYNOPSIS, DESCRIPTION, OPTIONS, and USAGE sections.

ENVIRONMENT VARIABLES	This section lists any environment variables that the command or function affects, followed by a brief description of the effect.
EXIT STATUS	This section lists the values the command returns to the calling program or shell and the conditions that cause these values to be returned. Usually, zero is returned for successful completion, and values other than zero for various error conditions.
FILES	This section lists all file names referred to by the man page, files of interest, and files created or required by commands. Each is followed by a descriptive summary or explanation.
ATTRIBUTES	This section lists characteristics of commands, utilities, and device drivers by defining the attribute type and its corresponding value. See <a href="#">attributes(5)</a> for more information.
SEE ALSO	This section lists references to other man pages, in-house documentation, and outside publications.
DIAGNOSTICS	This section lists diagnostic messages with a brief explanation of the condition causing the error.
WARNINGS	This section lists warnings about special conditions which could seriously affect your working conditions. This is not a list of diagnostics.
NOTES	This section lists additional information that does not belong anywhere else on the page. It takes the form of an aside to the user, covering points of special interest. Critical information is never covered here.
BUGS	This section describes known bugs and, wherever possible, suggests workarounds.

R E F E R E N C E

Introduction

**Name** Intro – introduction to functions and libraries

**Description** This section describes functions found in various Solaris libraries, other than those functions described in Section 2 of this manual that directly invoke UNIX system primitives. Function declarations can be obtained from the `#include` files indicated on each page. Pages are grouped by library and are identified by the library name (or an abbreviation of the library name) after the section number. Collections of related libraries are grouped into volumes as described below. The first volume contains pages describing the contents of each shared library and each header used by the functions, macros, and external variables described in the remaining volumes.

Library Interfaces and Headers This volume describes the contents of each shared library and each header used by functions, macros, and external variables described in the remaining volumes.

(3LIB)

The libraries described in this section are implemented as shared objects.

Descriptions of shared objects can include a definition of the global symbols that define the shared objects' public interface, for example `SUNW_1.1`. Other interfaces can exist within the shared object, for example `SUNWprivate.1.1`. The public interface provides a stable, committed set of symbols for application development. The private interfaces are for internal use only, and could change at any time.

(3HEAD)

The headers described in this section are used by functions, macros, and external variables. Headers contain function prototypes, definitions of symbolic constants, common structures, preprocessor macros, and defined types. Each function described in the remaining five volumes specifies the headers that an application must include in order to use that function. In most cases only one header is required. These headers are present on an application development system; they do have to be present on the target execution system.

Basic Library Functions The functions described in this volume are the core C library functions that are basic to application development.

(3C)

These functions, together with those of Section 2, constitute the standard C library, `libc`, which is automatically linked by the C compilation system. The standard C library is implemented as a shared object, `libc.so`. See [libc\(3LIB\)](#) and the “C Compilation System” chapter of the *ANSI C Programmer's Guide* for a discussion. Some functions behave differently in standard-conforming environments. This behavior is noted on the individual manual pages. See [standards\(5\)](#).

The `libpthread` and `libthread` libraries are filter libraries on `libc` that are used for building multithreaded applications: `libpthread` implements the POSIX (see [standards\(5\)](#)) threads interface, whereas `libthread` implements the Solaris threads interface. See MULTITHREADED APPLICATIONS, below.

**(3C\_DB)**

These functions constitute the threads debugging library, `libc_db`. This library is implemented as a shared object, `libc_db.so`, but is not automatically linked by the C compilation system. Specify `-lc_db` on the `cc` command line to link with this library. See [libc\\_db\(3LIB\)](#).

**(3MALLOC)**

These functions constitute the various memory allocation libraries: `libmalloc`, `libbsdmalloc`, `libmapmalloc`, `libmtmalloc`, and `libumem`. Each of these libraries is implemented as a shared object (`libmalloc.so`, `libbsdmalloc.so`, `libmapmalloc.so`, `libmtmalloc.so`, and `libumem.so`). These libraries are not automatically linked by the C compilation system. Specify `-lmalloc`, `-lbsdmalloc`, `-lmapmalloc`, `-lmtmalloc`, and `-lumem` to link with, respectively, `libmalloc`, `libbsdmalloc`, `libmapmalloc`, `libmtmalloc`, and `libumem`. See [libmalloc\(3LIB\)](#), [libbsdmalloc\(3LIB\)](#), [libmapmalloc\(3LIB\)](#), [libmtmalloc\(3LIB\)](#), and [libumem\(3LIB\)](#).

Networking Library Functions The functions described in this volume comprise the various networking libraries.

**(3COMMPUTIL)**

These functions constitute the communication protocol parser utilities library, `libcommputil`. This library is implemented as a shared object, `libcommputil.so`, but it is not automatically linked by the C compilation system. Specify `-lcommputil` on the `cc` command line to link with this library. See [libcommputil\(3LIB\)](#).

**(3DLPI)**

These functions constitute the data link provider interface library, `libdlpi`. This library is implemented as a shared object, `libdlpi.so`, but it is not automatically linked by the C compilation system. Specify `-ldlpi` on the `cc` command line to link with this library. See [libdlpi\(3LIB\)](#).

**(3DNS\_SD)**

These functions constitute the DNS service discovery library, `libdns_sd`. This library is implemented as a shared object, `libdns_sd.so`, but it is not automatically linked by the C compilation system. Specify `-ldns_sd` on the `cc` command line to link with this library. See [libdns\\_sd\(3LIB\)](#).

**(3GSS)**

These functions constitute the generic security services library. This library is implemented as a shared object, `libgss.so`, but it is not automatically linked by the C compilation system. Specify `-lgss` on the `cc` command line to link with this library. See [libgss\(3LIB\)](#).

**(3LDAP)**

These functions constitute the lightweight directory access protocol library, `libldap`. This library is implemented as a shared object, `libldap.so`, but is not automatically linked by the C compilation system. Specify `-lldap` on the `cc` command line to link with this library. See [ldap\(3LDAP\)](#).

**(3NSL)**

These functions constitute the network service library, `libnsl`. This library is implemented as a shared object, `libnsl.so`, but is not automatically linked by the C compilation system. Specify `-lnsl` on the `cc` command line to link with this library. See [libnsl\(3LIB\)](#).

Many base networking functions are also available in the X/Open networking interfaces library, `libxnet`. See section (3XNET) below for more information on the `libxnet` interfaces.

**(3RESOLV)**

These functions constitute the resolver library, `libresolv`. This library is implemented as a shared object, `libresolv.so`, but is not automatically linked by the C compilation system. Specify `-lresolv` on the `cc` command line to link with this library. See [libresolv\(3LIB\)](#).

**(3RPC)**

These functions constitute the remote procedure call libraries, `librpcsvc` and `librpcsoc`. The latter is provided for compatibility only; new applications should not link to it. Both libraries are implemented as shared objects, `librpcsvc.so` and `librpcsoc.so`, respectively. Neither library is automatically linked by the C compilation system. Specify `-lrpcsvc` or `-lrpcsoc` on the `cc` command line to link with these libraries. See [librpcsvc\(3LIB\)](#).

**(3SASL)**

These functions constitute the simple authentication and security layer library, `libsasl`. This library is implemented as a shared object, `libsasl.so`, but it is not automatically linked by the C compilation system. Specify `-lsasl` on the `cc` command line to link with this library. See [libsasl\(3LIB\)](#).

**(3SIP)**

These functions constitute the session initiation protocol library, `libsip`. This library is implemented as a shared object, `libsip.so`, but it is not automatically linked by the C compilation system. Specify `-lsip` on the `cc` command line to link with this library. See [libsip\(3LIB\)](#).

**(3SLP)**

These functions constitute the service location protocol library, `libslp`. This library is implemented as a shared object, `libslp.so`, but it is not automatically linked by the C compilation system. Specify `-lslp` on the `cc` command line to link with this library. See [libslp\(3LIB\)](#).

**(3SOCKET)**

These functions constitute the sockets library, `libsocket`. This library is implemented as a shared object, `libsocket.so`, but is not automatically linked by the C compilation system. Specify `-lsocket` on the `cc` command line to link with this library. See [libsocket\(3LIB\)](#).

**(3XNET)**

These functions constitute X/Open networking interfaces which comply with the X/Open CAE Specification, Networking Services, Issue 4 (September, 1994). This library is



implemented as a shared object, `libxnet.so`, but is not automatically linked by the C compilation system. Specify `-lxnet` on the `cc` command line to link with this library. See [libxnet\(3LIB\)](#) and [standards\(5\)](#) for compilation information.

Under all circumstances, the use of the Sockets API is recommended over the XTI and TLI APIs. If portability to other XPGV4v2 (see [standards\(5\)](#)) systems is a requirement, the application must use the `libxnet` interfaces. If portability is not required, the sockets interfaces in `libsocket` and `libnsl` are recommended over those in `libxnet`. Between the XTI and TLI APIs, the XTI interfaces (available with `libxnet`) are recommended over the TLI interfaces (available with `libnsl`).

Curses Library Functions The functions described in this volume comprise the libraries that provide graphics and character screen updating capabilities.

### (3CURSES)

The functions constitute the following libraries:

#### `libcurses`

These functions constitute the curses library, `libcurses`. This library is implemented as a shared object, `libcurses.so`, but is not automatically linked by the C compilation system. Specify `-lcurses` on the `cc` command line to link with this library. See [libcurses\(3LIB\)](#).

#### `libform`

These functions constitute the forms library, `libform`. This library is implemented as a shared object, `libform.so`, but is not automatically linked by the C compilation system. Specify `-lform` on the `cc` command line to link with this library. See [libform\(3LIB\)](#).

#### `libmenu`

These functions constitute the menus library, `libmenu`. This library is implemented as a shared object, `libmenu.so`, but is not automatically linked by the C compilation system. Specify `-lmenu` on the `cc` command line to link with this library. See [libmenu\(3LIB\)](#).

#### `libpanel`

These functions constitute the panels library, `libpanel`. This library is implemented as a shared object, `libpanel.so`, but is not automatically linked by the C compilation system. Specify `-lpanel` on the `cc` command line to link with this library. See [libpanel\(3LIB\)](#).

### (3PLOT)

These functions constitute the graphics library, `libplot`. This library is implemented as a shared object, `libplot.so`, but is not automatically linked by the C compilation system. Specify `-lplot` on the `cc` command line to link with this library. See [libplot\(3LIB\)](#).

### (3XCURSES)

These functions constitute the X/Open curses library, located in `/usr/xpg4/lib/libcurses.so`. This library provides a set of internationalized functions and macros for creating and modifying input and output to a terminal screen. Included in

this library are functions for creating windows, highlighting text, writing to the screen, reading from user input, and moving the cursor. X/Open Curses is designed to optimize screen update activities. The X/Open Curses library conforms fully with Issue 4 of the X/Open Extended Curses specification. See [libcurses\(3XCURSES\)](#).

Extended Library Functions, Vol. 1    The functions described in this volume comprise the following specialized libraries:

(3BSM)

These functions constitute the Solaris auditing library, `libbsm`. This library is implemented as a shared object, `libbsm.so`, but is not automatically linked by the C compilation system. Specify `-lbsm` on the `cc` command line to link with this library. See [libbsm\(3LIB\)](#).

(3CFGADM)

These functions constitute the configuration administration library, `libcfgadm`. This library is implemented as a shared object, `libcfgadm.so`, but is not automatically linked by the C compilation system. Specify `-lcfgadm` on the `cc` command line to link with this library. See [libcfgadm\(3LIB\)](#).

(3CONTRACT)

These functions constitute the contract management library, `libcontract`. This library is implemented as a shared object, `libcontract.so`, but is not automatically linked by the C compilation system. Specify `-lcontract` on the `cc` command line to link with this library. See [libcontract\(3LIB\)](#).

(3CPC)

These functions constitute the CPU performance counter library, `libcpc`, and the process context library, `libpctx`. These libraries are implemented as shared objects, `libcpc.so` and `libpctx.so`, respectively, but are not automatically linked by the C compilation system. Specify `-lcpc` or `-lpctx` on the `cc` command line to link with these libraries. See [libcpc\(3LIB\)](#) and [libpctx\(3LIB\)](#).

(3DAT)

These functions constitute the direct access transport library, `libdat`. This library is implemented as a shared object, `libdat.so`, but is not automatically linked by the C compilation system. Specify `-ldat` on the `cc` command line to link with this library. See [libdat\(3LIB\)](#).

(3DEVID)

These functions constitute the device ID library, `libdevid`. This library is implemented as a shared object, `libdevid.so`, but is not automatically linked by the C compilation system. Specify `-ldevid` on the `cc` command line to link with this library. See [libdevid\(3LIB\)](#).

(3DEVINFO)

These functions constitute the device information library, `libdevinfo`. This library is implemented as a shared object, `libdevinfo.so`, but is not automatically linked by the C compilation system. Specify `-ldevinfo` on the `cc` command line to link with this library. See [libdevinfo\(3LIB\)](#).

**(3ELF)**

These functions constitute the ELF access library, `libelf`, (Extensible Linking Format). This library provides the interface for the creation and analyses of “elf” files; executables, objects, and shared objects. `libelf` is implemented as a shared object, `libelf.so`, but is not automatically linked by the C compilation system. Specify `-lelf` on the `cc` command line to link with this library. See [libelf\(3LIB\)](#).

**(3EXACCT)**

These functions constitute the extended accounting access library, `libexacct`, and the project database access library, `libproject`. These libraries are implemented as shared objects, `libexacct.so` and `libproject.so`, respectively, but are not automatically linked by the C compilation system. Specify `-lexacct` or `-lproject` on the `cc` command line to link with these libraries. See [libexacct\(3LIB\)](#) and [libproject\(3LIB\)](#).

**(3FCOE)**

These functions constitute the Fibre Channel over Ethernet port management library. This library is implemented as a shared object, `libfcoe.so`, but is not automatically linked by the C compilation system. Specify `-lfcoe` on the `cc` command line to link with this library. See [libfcoe\(3LIB\)](#).

**(3FM)**

These functions constitute the fault management events library. This library is implemented as a shared object, `libfmevent.so`, but is not automatically linked by the C compilation system. Specify `-lfmevent` on the `cc` command line to link with this library. See [libfmevent\(3LIB\)](#).

**(3FSTYP)**

These functions constitute the file system type identification library. This library is implemented as a shared object, `libfstyp.so`, but is not automatically linked by the C compilation system. Specify `-lfstyp` on the `cc` command line to link with this library. See [libfstyp\(3LIB\)](#).

Extended Library  
Functions, Vol. 2

The functions described in this volume comprise the following specialized libraries:

**(3GEN)**

These functions constitute the string pattern-matching and pathname manipulation library, `libgen`. This library is implemented as a shared object, `libgen.so`, but is not automatically linked by the C compilation system. Specify `-lgen` on the `cc` command line to link with this library. See [libgen\(3LIB\)](#).

**(3HBAAPI)**

These functions constitute the common fibre channel HBA information library, `libhbaapi`. This library is implemented as a shared object, `libhbaapi.so`, but is not automatically linked by the C compilation system. Specify `-lhbaapi` on the `cc` command line to link with this library. See [libhbaapi\(3LIB\)](#).

**(3ISCSIT)**

These functions constitute the iSCSI Management library, `libiscsit`. This library is implemented as a shared object, `libiscsit.so`, but is not automatically linked by the C compilation system. Specify `-liscsit` on the `cc` command line to link with this library. See [libiscsit\(3LIB\)](#).

**(3KSTAT)**

These functions constitute the kernel statistics library, which is implemented as a shared object, `libkstat.so`, but is not automatically linked by the C compilation system. Specify `-lkstat` on the `cc` command line to link with this library. See [libkstat\(3LIB\)](#).

**(3KVM)**

These functions allow access to the kernel's virtual memory library, which is implemented as a shared object, `libkvm.so`, but is not automatically linked by the C compilation system. Specify `-lkvm` on the `cc` command line to link with this library. See [libkvm\(3LIB\)](#).

**(3LAYOUT)**

These functions constitute the layout service library, which is implemented as a shared object, `liblayout.so`, but is not automatically linked by the C compilation system. Specify `-llayout` on the `cc` command line to link with this library. See [liblayout\(3LIB\)](#).

**(3LGRP)**

These functions constitute the locality group library, which is implemented as a shared object, `liblgrp.so`, but is not automatically linked by the C compilation system. Specify `-llgrp` on the `cc` command line to link with this library. See [liblgrp\(3LIB\)](#).

**(3M)**

These functions constitute the mathematical library, `libm`. This library is implemented as a shared object, `libm.so`, but is not automatically linked by the C compilation system. Specify `-lm` on the `cc` command line to link with this library. See [libm\(3LIB\)](#).

**(3MAIL)**

These functions constitute the user mailbox management library, `libmail`. This library is implemented as a shared object, `libmail.so`, but is not automatically linked by the C compilation system. Specify `-lmail` on the `cc` command line to link with this library. See [libmail\(3LIB\)](#).

**(3MP)**

These functions constitute the integer mathematical library, `libmp`. This library is implemented as a shared object, `libmp.so`, but is not automatically linked by the C compilation system. Specify `-lmp` on the `cc` command line to link with this library. See [libmp\(3LIB\)](#).

**(3MPAPI)**

These functions constitute the Common Multipath Management library, `libMPAPI`. This library is implemented as a shared object, `libMPAPI.so`, but is not automatically linked by the C compilation system. Specify `-lMPAPI` on the `cc` command line to link with this library. See [libMPAPI\(3LIB\)](#).

**(3MVEC)**

These functions constitute the vector mathematical library, `libmvec`. This library is implemented as a shared object, `libmvec.so`, but is not automatically linked by the C compilation system. Specify `-lmvec` on the `cc` command line to link with this library. See [libmvec\(3LIB\)](#).

Extended Library  
Functions, Vol. 3

The functions described in this volume comprise the following specialized libraries:

**(3NVPAIR)**

These functions constitute the name-value pair library, `libnvpair`. This library is implemented as a shared object, `libnvpair.so`, but is not automatically linked by the C compilation system. Specify `-lnvpair` on the `cc` command line to link with this library. See [libnvpair\(3LIB\)](#).

**(3PAM)**

These functions constitute the pluggable authentication module library, `libpam`. This library is implemented as a shared object, `libpam.so`, but is not automatically linked by the C compilation system. Specify `-lpam` on the `cc` command line to link with this library. See [libpam\(3LIB\)](#).

**(3PAPI)**

These functions constitute the Free Standards Group Open Printing API (PAPI) library, `libpapi`. This library is implemented as a shared object, `libpapi.so`, but is not automatically linked by the C compilation system. Specify `-lpapi` on the `cc` command line to link with this library. See [libpapi\(3LIB\)](#).

**(3PICL)**

These functions constitute the PICL library, `libpicl`. This library is implemented as a shared object, `libpicl.so`, but is not automatically linked by the C compilation system. Specify `-lpicl` on the `cc` command line to link with this library. See [libpicl\(3LIB\)](#) and [libpicl\(3PICL\)](#).

**(3PICLTREE)**

These functions constitute the PICL plug-in library, `libpicltree`. This library is implemented as a shared object, `libpicltree.so`, but is not automatically linked by the C compilation system. Specify `-lpicltree` on the `cc` command line to link with this library. See [libpicltree\(3LIB\)](#) and [libpicltree\(3PICLTREE\)](#).

**(3POOL)**

These functions constitute the pool configuration manipulation library, `libpool`. This library is implemented as a shared object, `libpool.so`, but is not automatically linked by the C compilation system. Specify `-lpool` on the `cc` command line to link with this library. See [libpool\(3LIB\)](#).

**(3PROJECT)**

These functions constitute the project database access library, `libproject`. This library is implemented as a shared object, `libproject.so`, but is not automatically linked by the C compilation system. Specify `-lproject` on the `cc` command line to link with this library. See [libproject\(3LIB\)](#).

**(3REPARSE)**

These functions constitute the reparse point library, `libreparse`. This library is implemented as a shared object, `libreparse.so`, but is not automatically linked by the C compilation system. Specify `-lreparse` on the `cc` command line to link with this library. See [libreparse\(3LIB\)](#).

**(3RSM)**

These functions constitute the remote shared memory library, `librsm`. This library is implemented as a shared object, `librsm.so`, but is not automatically linked by the C compilation system. Specify `-lrsm` on the `cc` command line to link with this library. See [librsm\(3LIB\)](#).

Extended Library  
Functions, Vol. 4

The functions described in this volume comprise the following specialized libraries:

**(3SCF)**

These functions constitute the object-caching memory allocation library, `libscf`. This library is implemented as a shared object, `libscf.so`, but is not automatically linked by the C compilation system. Specify `-lscf` on the `cc` command line to link with this library. See [libscf\(3LIB\)](#).

**(3SEC)**

These functions constitute the file access control library, `libsec`. This library is implemented as a shared object, `libsec.so`, but is not automatically linked by the C compilation system. Specify `-lsec` on the `cc` command line to link with this library. See [libsec\(3LIB\)](#).

**(3SECDB)**

These functions constitute the security attributes database library, `libsecdb`. This library is implemented as a shared object, `libsecdb.so`, but is not automatically linked by the C compilation system. Specify `-lsecdb` on the `cc` command line to link with this library. See [libsecdb\(3LIB\)](#).

**(3SNMP)**

These functions constitute the SNMP libraries, `libssagent` and `libssasmp`. These libraries are implemented as shared objects, `libssagent.so` and `libssasmp.so`, respectively, but are not automatically linked by the C compilation system. Specify `-lssagent` or `-lssasmp` on the `cc` command line to link with these libraries. See [libssagent\(3LIB\)](#) and [libssasmp\(3LIB\)](#).

### (3STMF)

These functions constitute the SCSI Target Mode Framework library, `libstmf`. This library is implemented as a shared object, `libstmf.so`, but is not automatically linked by the C compilation system. Specify `-lstmf` on the `cc` command line to link with this library. See [libstmf\(3LIB\)](#).

### (3SYSEVENT)

These functions constitute the system event library, `libsysevent`. This library is implemented as a shared object, `libsysevent.so`, but is not automatically linked by the C compilation system. Specify `-lsysevent` on the `cc` command line to link with this library. See [libsysevent\(3LIB\)](#).

### (3TECLA)

These functions constitute the interactive command-line input library, `libtecla`. This library is implemented as a shared object, `libtecla.so`, but is not automatically linked by the C compilation system. Specify `-ltecla` on the `cc` command line to link with this library. See [libtecla\(3LIB\)](#).

### (3TNF)

These functions constitute the TNF libraries, `libtnf`, `libtnfctl`, and `libtnfprobe`. These libraries are implemented as shared objects, `libtnf.so`, `libtnfctl.so`, and `libtnfprobe.so`, respectively, but are not automatically linked by the C compilation system. Specify `-ltnf`, `-ltnfctl`, or `-ltnfprobe` on the `cc` command line to link with these libraries. See [libtnfctl\(3TNF\)](#) and [libtnfctl\(3LIB\)](#).

### (3TSOL)

These functions constitute the Trusted Extensions library, `libtsol`, and the Trusted Extensions network library, `libtsnet`. These libraries are implemented as shared objects, `libtsol.so` and `libtsnet.so`, but are not automatically linked by the C compilation system. Specify `-ltsol` or `-ltsnet` on the `cc` command line to link with these libraries. See [libtsol\(3LIB\)](#) and [libtsnet\(3LIB\)](#).

### (3UUID)

These functions constitute the universally unique identifier library, `libuuid`. This library is implemented as a shared object, `libuuid.so`, but is not automatically linked by the C compilation system. Specify `-luuid` on the `cc` command line to link with this library. See [libuuid\(3LIB\)](#).

### (3VOLMGT)

These functions constitute the volume management library, `libvolmgt`. This library is implemented as a shared object, `libvolmgt.so`, but is not automatically linked by the C compilation system. Specify `-lvolmgt` on the `cc` command line to link with this library. See [libvolmgt\(3LIB\)](#).

**(3WSREG)**

These functions constitute the product install registry library, `libwsreg`. This library is implemented as a shared object, `libwsreg.so`, but is not automatically linked by the C compilation system. Specify `-lwsreg` on the `cc` command line to link with this library. See [libwsreg\(3LIB\)](#).

**(3XTSOL)**

These functions constitute the Trusted Extensions to the X windows library, `libXtSol`. This library is implemented as a shared object, `libXtSol.so`, but is not automatically linked by the C compilation system. Specify `-lX11` and then `-lXtSol` on the `cc` command line to link with this library. See [libXtSol\(3LIB\)](#).

**Multimedia Library  
Functions****(3MLIB)**

These functions constitute the mediaLib library, `libmLib`. This library is implemented as a shared object, `libmLib.so`, but is not automatically linked by the C compilation system. Specify `-lmLib` on the `cc` command line to link with this library. See [libmLib\(3LIB\)](#).

**(3MMS)**

These functions constitute the Media Management System library, `libmms`. This library is implemented as a shared object, `libmms.so`, but is not automatically linked by the C compilation system. Specify `-lmms` on the `cc` command line to link with this library. See [libmms\(3LIB\)](#).

**Definitions** A character is any bit pattern able to fit into a byte on the machine. In some international languages, however, a “character” might require more than one byte, and is represented in multi-bytes.

The null character is a character with value 0, conventionally represented in the C language as `\0`. A character array is a sequence of characters. A null-terminated character array (a *string*) is a sequence of characters, the last of which is the null character. The null string is a character array containing only the terminating null character. A null pointer is the value that is obtained by casting `0` into a pointer. C guarantees that this value will not match that of any legitimate pointer, so many functions that return pointers return `NULL` to indicate an error. The macro `NULL` is defined in `<stdio.h>`. Types of the form `size_t` are defined in the appropriate headers.

**Multithreaded  
Applications**

Both POSIX threads and Solaris threads can be used within the same application. Their implementations are completely compatible with each other; however, only POSIX threads guarantee portability to other POSIX-conforming environments.

The [libpthread\(3LIB\)](#) and [libthread\(3LIB\)](#) libraries are implemented as filters on [libc\(3LIB\)](#).

When compiling a multithreaded application, the `-mt` option must be specified on the command line.



There is no need for a multithreaded application to link with `-lthread`. An application must link with `-lpthread` only when POSIX semantics for `fork(2)` are desired. When an application is linked with `-lpthread`, a call to `fork()` assumes the behavior `fork1(2)` rather than the default behavior that forks all threads.

When compiling a POSIX-conforming application, either the `_POSIX_C_SOURCE` or `_POSIX_PTHREAD_SEMANTICS` option must be specified on the command line. For POSIX.1c-conforming applications, define the `_POSIX_C_SOURCE` flag to be `>= 199506L`:

```
cc -mt [ flag... ] file... -D_POSIX_C_SOURCE=199506L -lpthread
```

For POSIX behavior with the Solaris `fork()` and `fork1()` distinction, compile as follows:

```
cc -mt [ flag... ] file... -D_POSIX_PTHREAD_SEMANTICS
```

For Solaris threads behavior, compile as follows:

```
cc -mt [ flag... ] file...
```

Unsafe interfaces should be called only from the main thread to ensure the application's safety.

MT-Safe interfaces are denoted in the ATTRIBUTES section of the functions and libraries manual pages (see `attributes(5)`). If a manual page does not state explicitly that an interface is MT-Safe, the user should assume that the interface is unsafe.

**Realtime Applications** The environment variable `LD_BIND_NOW` must be set to a non-null value to enable early binding. Refer to the “When Relocations are Processed” chapter in *Linker and Libraries Guide* for additional information.

<b>Files</b>	<code>INCDIR</code>	usually <code>/usr/include</code>
	<code>LIBDIR</code>	usually either <code>/lib</code> or <code>/usr/lib</code> (32-bit) or either <code>/lib/64</code> or <code>/usr/lib/64</code> (64-bit)
	<code>LIBDIR/*.so</code>	shared libraries

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This notice shall appear on any product containing this material.

**See Also** `ar(1)`, `ld(1)`, `fork(2)`, `stdio(3C)`, `attributes(5)`, `standards(5)`

*Linker and Libraries Guide*

*Performance Profiling Tools*

*ANSI C Programmer's Guide*

**Diagnostics** For functions that return floating-point values, error handling varies according to compilation mode. Under the `-Xt` (default) option to `cc`, these functions return the conventional values `0`, `±HUGE`, or `NaN` when the function is undefined for the given arguments or when the value is not representable. In the `-Xa` and `-Xc` compilation modes, `±HUGE_VAL` is returned instead of `±HUGE`. (`HUGE_VAL` and `HUGE` are defined in `math.h` to be infinity and the largest-magnitude single-precision number, respectively.)

**Notes** None of the functions, external variables, or macros should be redefined in the user's programs. Any other name can be redefined without affecting the behavior of other library functions, but such redefinition might conflict with a declaration in an included header.

The headers in `INCDIR` provide function prototypes (function declarations including the types of arguments) for most of the functions listed in this manual. Function prototypes allow the compiler to check for correct usage of these functions in the user's program. The `lint` program checker can also be used and will report discrepancies even if the headers are not included with `#include` statements. Definitions for Sections 2 and 3C are checked automatically. Other definitions can be included by using the `-l` option to `lint`. (For example, `-lm` includes definitions for `libm`.) Use of `lint` is highly recommended. See the `lint` chapter in *Performance Profiling Tools*

Users should carefully note the difference between `STREAMS` and *stream*. `STREAMS` is a set of kernel mechanisms that support the development of network services and data communication drivers. It is composed of utility routines, kernel facilities, and a set of data structures. A *stream* is a file with its associated buffering. It is declared to be a pointer to a type `FILE` defined in `<stdio.h>`.

In detailed definitions of components, it is sometimes necessary to refer to symbolic names that are implementation-specific, but which are not necessarily expected to be accessible to an application program. Many of these symbolic names describe boundary conditions and system limits.

In this section, for readability, these implementation-specific values are given symbolic names. These names always appear enclosed in curly brackets to distinguish them from symbolic names of other implementation-specific constants that are accessible to application programs by headers. These names are not necessarily accessible to an application program through a header, although they can be defined in the documentation for a particular system.

In general, a portable application program should not refer to these symbolic names in its code. For example, an application program would not be expected to test the length of an argument list given to a routine to determine if it was greater than {ARG\_MAX}.



## REFERENCE

### Library Interfaces and Headers

**Name** acct.h, acct – per-process accounting file format

**Synopsis** #include <sys/types.h>  
#include <sys/acct.h>

**Description** Files produced as a result of calling [acct\(2\)](#) have records in the form defined by <sys/acct.h>, whose contents are:

```
typedef ushort_t comp_t; /* pseudo "floating point"
                          representation */
                          /* 3 bit base-8 exponent in the high */
                          /* order bits, and a 13-bit fraction */
                          /* in the low order bits. */

struct acct
{
    char ac_flag; /* Accounting flag */
    char ac_stat; /* Exit status */
    uid_t ac_uid; /* Accounting user ID */
    gid_t ac_gid; /* Accounting group ID */
    dev_t ac_tty; /* control tty */
    time_t ac_btime; /* Beginning time */
    comp_t ac_utime; /* accounting user time in clock ticks */
    comp_t ac_stime; /* accounting system time in clock ticks */
    comp_t ac_etime; /* accounting total elapsed time in clock
                      ticks */

    comp_t ac_mem; /* memory usage in clicks (pages) */
    comp_t ac_io; /* chars transferred by read/write */
    comp_t ac_rw; /* number of block reads/writes */
    char ac_comm[8]; /* command name */
};

/*
 * Accounting Flags
 */

#define AFORK 01 /* has executed fork, but no exec */
#define ASU 02 /* used super-user privileges */
#define ACCTF 0300 /* record type */
#define AEXPND 040 /* Expanded Record Type – default */
```

In `ac_flag`, the `AFORK` flag is turned on by each `fork` and turned off by an `exec`. The `ac_comm` field is inherited from the parent process and is reset by any `exec`. Each time the system charges the process with a clock tick, it also adds to `ac_mem` the current process size, computed as follows:

*(data size) + (text size) / (number of in-core processes using text)*

The value of `ac_mem / (ac_stime + ac_utime)` can be viewed as an approximation to the mean process size, as modified by text sharing.

The structure `tacct`, (which resides with the source files of the accounting commands), represents a summary of accounting statistics for the user id `ta_uid`. This structure is used by the accounting commands to report statistics based on user id.

```

/*
 * total accounting (for acct period), also for day
 */
struct tacct {
    uid_t      ta_uid;      /* user id */
    char       ta_name[8]; /* login name */
    float      ta_cpu[2];  /* cum. cpu time in minutes, */
                          /* p/np (prime/non-prime time) */
    float      ta_kcore[2]; /* cum. kcore-minutes, p/np */
    float      ta_con[2];  /* cum. connect time in minutes,
                          p/np */
    float      ta_du;      /* cum. disk usage (blocks)*/
    long       ta_pc;      /* count of processes */
    unsigned short ta_sc;  /* count of login sessions */
    unsigned short ta_dc;  /* count of disk samples */
    unsigned short ta_fee; /* fee for special services */
};

```

The `ta_cpu`, `ta_kcore`, and `ta_con` members contain usage information pertaining to prime time and non-prime time hours. The first element in each array represents the time the resource was used during prime time hours. The second element in each array represents the time the resource was used during non-prime time hours. Prime time and non-prime time hours may be set in the `holidays` file (see [holidays\(4\)](#)).

The `ta_kcore` member is a cumulative measure of the amount of memory used over the accounting period by processes owned by the user with uid `ta_uid`. The amount shown represents kilobyte segments of memory used, per minute.

The `ta_con` member represents the amount of time the user was logged in to the system.

**Files** `/etc/acct/holidays` prime/non-prime time table

**See Also** [acctcom\(1\)](#), [acct\(1M\)](#), [acctcon\(1M\)](#), [acctmerg\(1M\)](#), [acctprc\(1M\)](#), [acctsh\(1M\)](#), [prtacct\(1M\)](#), [runacct\(1M\)](#), [shutacct\(1M\)](#), [acct\(2\)](#), [exec\(2\)](#), [fork\(2\)](#)

**Notes** The `ac_mem` value for a short-lived command gives little information about the actual size of the command, because `ac_mem` may be incremented while a different command (for example, the shell) is being executed by the process.

**Name** aio.h, aio – asynchronous input and output

**Synopsis** #include <aio.h>

**Description** The <aio.h> header defines the aiocb structure which includes the following members:

int	aio_fildes	file descriptor
off_t	aio_offset	file offset
volatile void*	aio_buf	location of buffer
size_t	aio_nbytes	length of transfer
int	aio_reqprio	request priority offset
struct sigevent	aio_sigevent	notification type
int	aio_lio_opcode	lio operation

This header also includes the following constants:

AIO_ALLDONE	A return value indicating that none of the requested operations could be canceled since they are already complete.
AIO_CANCELED	A return value indicating that all requested operations have been canceled.
AIO_NOTCANCELED	A return value indicating that some of the requested operations could not be canceled since they are in progress.
LIO_NOP	A <a href="#">lio_listio(3C)</a> element operation option indicating that no transfer is requested.
LIO_NOWAIT	A <a href="#">lio_listio()</a> synchronization operation indicating that the calling thread is to continue execution while the <a href="#">lio_listio()</a> operation is being performed, and notification is to be given when the operation is complete.
LIO_READ	A <a href="#">lio_listio()</a> element operation option requesting a read.
LIO_WAIT	A <a href="#">lio_listio()</a> synchronization operation indicating that the calling thread is to suspend until the <a href="#">lio_listio()</a> operation is complete.
LIO_WRITE	A <a href="#">lio_listio()</a> element operation option requesting a write.

**See Also** [lseek\(2\)](#), [read\(2\)](#), [write\(2\)](#), [fsync\(3C\)](#), [libaio\(3LIB\)](#), [lio\\_listio\(3C\)](#)



**Name** archives.h, archives – device header

```

Description /* Magic numbers */
#define CMN_ASC 0x070701 /* Cpio Magic Number for -c header */
#define CMN_BIN 070707 /* Cpio Magic Number for Binary header */
#define CMN_BBS 0143561 /* Cpio Magic Number for Byte-Swap header */
#define CMN_CRC 0x070702 /* Cpio Magic Number for CRC header */
#define CMS_ASC "070701" /* Cpio Magic String for -c header */
#define CMS_CHR "070707" /* Cpio Magic String for odc header */
#define CMS_CRC "070702" /* Cpio Magic String for CRC header */
#define CMS_LEN 6 /* Cpio Magic String length */
/* Various header and field lengths */
#define CHRSZ 76 /* -H odc size minus filename field */
#define ASCSZ 110 /* -c and CRC hdr size minus filename field */
#define TAR SZ 512 /* TAR hdr size */
#define HNAMELEN 256 /* maximum filename length for binary and
odc headers */
#define EXPNLEN 1024 /* maximum filename length for -c and
CRC headers */
#define HTIMLEN 2 /* length of modification time field */
#define HSIZLEN 2 /* length of file size field */
/* cpio binary header definition */
struct hdr_cpio {
    short h_magic, /* magic number field */
          h_dev; /* file system of file */
    ushort_t h_ino, /* inode of file */
             h_mode, /* modes of file */
             h_uid, /* uid of file */
             h_gid; /* gid of file */
    short h_nlink, /* number of links to file */
          h_rdev, /* maj/min numbers for special files */
          h_mtime[HTIMLEN], /* modification time of file */
          h_namesize, /* length of filename */
          h_filesize[HSIZLEN]; /* size of file */
    char h_name[HNAMELEN]; /* filename */
};
/* cpio -H odc header format */
struct c_hdr {
    char c_magic[CMS_LEN],
          c_dev[6],
          c_ino[6],
          c_mode[6],
          c_uid[6],
          c_gid[6],
          c_nlink[6],
          c_rdev[6],
          c_mtime[11],
          c_namesz[6],

```

```
        c_filesz[11],
        c_name[HNAMLEN];
};
/* -c and CRC header format */
struct Exp_cpio_hdr {
    char E_magic[CMS_LEN],
        E_ino[8],
        E_mode[8],
        E_uid[8],
        E_gid[8],
        E_nlink[8],
        E_mtime[8],
        E_filesize[8],
        E_maj[8],
        E_min[8],
        E_rmaj[8],
        E_rmin[8],
        E_namesize[8],
        E_chksum[8],
        E_name[EXPNLEN];
};
/* Tar header structure and format */
#define TBLOCK 512 /* length of tar header and data blocks */
#define TNAMLEN 100 /* maximum length for tar file names */
#define TMODLEN 8 /* length of mode field */
#define TUIDLEN 8 /* length of uid field */
#define TGIDLEN 8 /* length of gid field */
#define TSIZLEN 12 /* length of size field */
#define TTIMLEN 12 /* length of modification time field */
#define TCRLEN 8 /* length of header checksum field */
/* tar header definition */
union tblock {
    char dummy[TBLOCK];
    struct header {
        char t_name[TNAMLEN]; /* name of file */
        char t_mode[TMODLEN]; /* mode of file */
        char t_uid[TUIDLEN]; /* uid of file */
        char t_gid[TGIDLEN]; /* gid of file */
        char t_size[TSIZLEN]; /* size of file in bytes */
        char t_mtime[TTIMLEN]; /* modification time of file */
        char t_chksum[TCRLEN]; /* checksum of header */
        char t_typeflag; /* flag to indicate type of file */
        char t_linkname[TNAMLEN]; /* file this file is linked with */
        char t_magic[6]; /* magic string always "ustar" */
        char t_version[2]; /* version strings always "00" */
        char t_uname[32]; /* owner of file in ASCII */
        char t_gname[32]; /* group of file in ASCII */
    };
};
```

```

        char t_devmajor[8];      /* major number for special files */
        char t_devminor[8];     /* minor number for special files */
        char t_prefix[155];     /* pathname prefix */
    } tbuf;
}
/* volcopy tape label format and structure */
#define VMAGLEN 8
#define VVOLLEN 6
#define VFILLEN 464
struct volcopy_label {
    char v_magic[VMAGLEN],
        v_volume[VVOLLEN],
        v_reels,
        v_reel;
    long v_time,
        v_length,
        v_dens,
        v_reelblks, /* u370 added field */
        v_blksize, /* u370 added field */
        v_nblocks; /* u370 added field */
    char v_fill[VFILLEN];
    long v_offset; /* used with -e and -reel options */
    int v_type; /* does tape have nblocks field? */
};

/*
 * Define archive formats for extended attributes.
 *
 * Extended attributes are stored in two pieces.
 * 1. An attribute header which has information about
 *    what file the attribute is for and what the attribute
 *    is named.
 * 2. The attribute record itself. Stored as a normal file type
 *    of entry.
 * Both the header and attribute record have special modes/typeflags
 * associated with them.
 *
 * The names of the header in the archive look like:
 * /dev/null/attr.hdr
 *
 * The name of the attribute looks like:
 * /dev/null/attr.
 *
 * This is done so that an archiver that doesn't understand these formats
 * can just dispose of the attribute records unless the user chooses to
 * rename them via cpio -r or pax -i
 *

```

```

* The format is composed of a fixed size header followed
* by a variable sized xattr_buf. If the attribute is a hard link
* to another attribute, then another xattr_buf section is included
* for the link.
*
* The xattr_buf is used to define the necessary "pathing" steps
* to get to the extended attribute. This is necessary to support
* a fully recursive attribute model where an attribute may itself
* have an attribute.
*
* The basic layout looks like this.

```

```

* -----
* |               |
* |       xattr_hdr       |
* |               |
* |-----|
* |-----|
* |               |
* |       xattr_buf       |
* |               |
* |-----|
* |-----|
* |               |
* |   (optional link info)   |
* |               |
* |-----|
* |               |
* |   attribute itself       |
* |   stored as normal tar   |
* |   or cpio data with     |
* |   special mode or       |
* |   typeflag               |
* |               |
* |-----|

```

```

*/
#define XATTR_ARCH_VERS "1.0"

```

```

/*
* extended attribute fixed header
*
* h_version          format version.
* h_size             size of header + variable sized data sections.
* h_component_len    Length of entire pathing section.
* h_link_component_len Length of link component section. Again same

```

```
*          definition as h_component_len.
*/
struct xattr_hdr {
    char    h_version[7];
    char    h_size[10];
    char    h_component_len[10]; /* total length of path component */
    char    h_link_component_len[10];
};

/*
 * The name is encoded like this:
 * filepathNULattrpathNUL[attrpathNULL]...
 */
struct xattr_buf {
    char    h_namesz[7]; /* length of h_names */
    char    h_typeflag; /* actual typeflag of file being archived */
    char    h_names[1]; /* filepathNULattrpathNUL... */
};

/*
 * Special values for tar archives
 */

/*
 * typeflag for tar archives.
 */

/*
 * Attribute hdr and attribute files have the following typeflag
 */
#define _XATTR_HDRTYPE        'E'

/*
 * For cpio archives the header and attribute have
 * _XATTR_CPIO_MODE ORED into the mode field in both
 * character and binary versions of the archive format
 */
#define _XATTR_CPIO_MODE        0xB000
```

**Name** ar.h, ar – archive file format

**Synopsis** `#include <ar.h>`

**Description** The archive command `ar` is used to combine several files into one. Archives are used mainly as libraries to be searched by the link editor `ld`.

Each archive begins with the archive magic string.

```
#define ARMAG "!<arch>\n" /* magic string */
#define SARMAG 8 /* length of magic string */
```

Following the archive magic string are the archive file members. Each file member is preceded by a file member header which is of the following format:

```
#define ARFMAG "\n" /* header trailer string */

struct ar_hdr /* file member header */
{
    char ar_name[16]; /* '/' terminated file member name */
    char ar_date[12]; /* file member date */
    char ar_uid[6] /* file member user identification */
    char ar_gid[6] /* file member group identification */
    char ar_mode[8] /* file member mode (octal) */
    char ar_size[10]; /* file member size */
    char ar_fmag[2]; /* header trailer string */
};
```

All information in the file member headers is in printable ASCII. The numeric information contained in the headers is stored as decimal numbers (except for `ar_mode` which is in octal). Thus, if the archive contains printable files, the archive itself is printable.

If the file member name fits, the `ar_name` field contains the name directly, and is terminated by a slash (/) and padded with blanks on the right. If the member's name does not fit, `ar_name` contains a slash (/) followed by a decimal representation of the name's offset in the archive string table described below.

The `ar_date` field is the modification date of the file at the time of its insertion into the archive. Common format archives can be moved from system to system as long as the portable archive command `ar` is used.

Each archive file member begins on an even byte boundary; a newline is inserted between files if necessary. Nevertheless, the size given reflects the actual size of the file exclusive of padding.

Notice there is no provision for empty areas in an archive file.

Each archive that contains object files (see [a.out\(4\)](#)) includes an archive symbol table. This symbol table is used by the link editor `ld` to determine which archive members must be loaded

during the link edit process. The archive symbol table (if it exists) is always the first file in the archive (but is never listed) and is automatically created and/or updated by ar.

The archive symbol table has a zero length name (that is, `ar_name[0]` is `'/'`), `ar_name[1]` is `'`, etc.). All “words” in this symbol table have four bytes, using the machine-independent encoding shown below. All machines use the encoding described here for the symbol table, even if the machine’s “natural” byte order is different.

```

          0      1      2      3
0x01020304  01    02    03    04

```

The contents of this file are as follows:

1. The number of symbols. Length: 4 bytes.
2. The array of offsets into the archive file. Length: 4 bytes \* “the number of symbols”.
3. The name string table. Length:  $ar\_size - 4 \text{ bytes} * (\text{“the number of symbols”} + 1)$ .

As an example, the following symbol table defines 4 symbols. The archive member at file offset 114 defines *name*. The archive member at file offset 122 defines *object*. The archive member at file offset 426 defines *function* and the archive member at file offset 434 defines *name2*.

```

Example Symbol Table  Offset  +0  +1  +2  +3
0                    |-----| 4 offset entries
                    |         4         |
4                    |-----| name
                    |        114       |
8                    |-----| object
                    |        122       |
12                   |-----| function
                    |         426      |
16                   |-----| name2
                    |         434      |
20                   | n | a | m | e |
                    |-----|
24                   | \0 | o | b | j |
                    |-----|
28                   | e | c | t | \0 |
                    |-----|
32                   | f | u | n | c |
                    |-----|
36                   | t | i | o | n |
                    |-----|
40                   | \0 | n | a | m |
                    |-----|
44                   | e | 2 | \0 |
                    |-----|

```

The string table contains exactly as many null terminated strings as there are elements in the offsets array. Each offset from the array is associated with the corresponding name from the string table (in order). The names in the string table are all the defined global symbols found in the common object files in the archive. Each offset is the location of the archive header for the associated symbol.

If some archive member's name is more than 15 bytes long, a special archive member contains a table of file names, each followed by a slash and a new-line. This string table member, if present, will precede all "normal" archive members. The special archive symbol table is not a "normal" member, and must be first if it exists. The `ar_name` entry of the string table's member header holds a zero length name `ar_name[0]=='/'`, followed by one trailing slash (`ar_name[1]=='/'`), followed by blanks (`ar_name[2]==' '`, etc.). Offsets into the string table begin at zero. Example *ar\_name* values for short and long file names appear below.

Offset	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
0	f	i	l	e	_	n	a	m	e	_
10	s	a	m	p	l	e	/	\n	l	o
20	n	g	e	r	f	i	l	e	n	a
30	m	e	x	a	m	p	l	e	/	\n
	Member Name					ar_name				
short-name			short-name/			Not in string table				
file_name_sample			/0			Offset 0 in string table				
longerfilenamexample			/18			Offset 18 in string table				

**See Also** [ar\(1\)](#), [ld\(1\)](#), [strip\(1\)](#), [a.out\(4\)](#)

**Notes** The `strip` utility will remove all archive symbol entries from the header. The archive symbol entries must be restored with the `-ts` options of the `ar` command before the archive can be used with the link editor `ld`.



**Name** assert.h, assert – verify program assertion

**Synopsis** #include <assert.h>

**Description** The <assert.h> header defines the `assert()` macro. It refers to the macro `NDEBUG` which is not defined in the header. If `NDEBUG` is defined as a macro name before the inclusion of this header, the `assert()` macro is defined simply as:

```
#define assert(ignore)((void) 0)
```

Otherwise, the macro behaves as described in [assert\(3C\)](#).

The `assert()` macro is redefined according to the current state of `NDEBUG` each time <assert.h> is included.

The `assert()` macro is implemented as a macro, not as a function. If the macro definition is suppressed in order to access an actual function, the behavior is undefined.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [assert\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** complex.h, complex – complex arithmetic

**Synopsis** #include <complex.h>

**Description** The <complex.h> header defines the following macros:

complex	Expands to <code>_Complex</code> .
<code>_Complex_I</code>	Expands to a constant expression of type <code>const float _Complex</code> , with the value of the imaginary unit (that is, a number $i$ such that $i^2 = -1$ ).
imaginary	Expands to <code>_Imaginary</code> .
<code>_Imaginary_I</code>	Expands to a constant expression of type <code>const float _Imaginary</code> with the value of the imaginary unit.
I	Expands to either <code>_Imaginary_I</code> or <code>_Complex_I</code> . If <code>_Imaginary_I</code> is not defined, I expands to <code>_Complex_I</code> .

An application can undefine and then, if appropriate, redefine the `complex`, `imaginary`, and `I` macros.

**Usage** Values are interpreted as radians, not degrees.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [cabs\(3M\)](#), [cacos\(3M\)](#), [cacosh\(3M\)](#), [carg\(3M\)](#), [casin\(3M\)](#), [casinh\(3M\)](#), [catan\(3M\)](#), [catanh\(3M\)](#), [ccos\(3M\)](#), [ccosh\(3M\)](#), [cexp\(3M\)](#), [cimag\(3M\)](#), [clog\(3M\)](#), [conj\(3M\)](#), [cpow\(3M\)](#), [cproj\(3M\)](#), [creal\(3M\)](#), [csin\(3M\)](#), [csinh\(3M\)](#), [csqrt\(3M\)](#), [ctan\(3M\)](#), [ctanh\(3M\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Notes** The choice of `I` instead of `i` for the imaginary unit concedes to the widespread use of the identifier `i` for other purposes. The application can use a different identifier, say `j`, for the imaginary unit by following the inclusion of the <complex.h> header with:

```
#undef I
#define j _Imaginary_I
```

An `I` suffix to designate imaginary constants is not required, as multiplication by `I` provides a sufficiently convenient and more generally useful notation for imaginary terms. The corresponding real type for the imaginary unit is `float`, so that use of `I` for algorithmic or notational convenience does not result in widening types.

On systems with imaginary types, the application has the ability to control whether use of the macro `I` introduces an imaginary type, by explicitly defining `I` to be `_Imaginary_I` or `_Complex_I`.

Disallowing imaginary types is useful for some applications intended to run on implementations without support for such types.

The macro `_Imaginary_I` provides a test for whether imaginary types are supported. The `cis()` function ( $\cos(x) + I*\sin(x)$ ) was considered but rejected because its implementation is easy and straightforward, even though some implementations could compute sine and cosine more efficiently in tandem.

**Name** cpio.h, cpio – cpio archive values

**Synopsis** `#include <cpio.h>`

**Description** Values needed by the `c_mode` field of the cpio archive format are described as follows:

Name	Description
C_IRUSR	Read by owner
C_IWUSR	Write by owner
C_IXUSR	Execute by owner
C_IRGRP	Read by group
C_IWGRP	Write by group
C_IXGRP	Execute by group
C_IROTH	Read by others
C_IWOTH	Write by others
C_IXOTH	Execute by others
C_ISUID	Set user ID
C_ISGID	Set group ID
C_ISVTX	On directories, restricted deletion flag
C_ISDIR	Directory
C_ISFIFO	FIFO
C_ISREG	Regular file
C_ISBLK	Block special
C_ISCHR	Character special
C_ISCTG	Reserved
C_ISLNK	Symbolic link
C_ISSOCK	Socket

The header defines the symbolic constant:

```
MAGIC          "070707"
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

---

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [pax\(1\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** dirent.h, dirent – format of directory entries

**Synopsis** #include <dirent.h>

**Description** The internal format of directories is unspecified. The <dirent.h> header defines the following type:

**DIR** A type representing a directory stream.

The header also defines the structure `dirent`, which includes the following members:

```
ino_t d_ino      /* file serial number */
char d_name[]   /* name of entry */
```

The type `ino_t` is defined as described in <sys/types.h>. See [types\(3HEAD\)](#).

The character array `d_name` is of unspecified size, but the number of bytes preceding the terminating null byte must not exceed `{NAME_MAX}`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [closedir\(3C\)](#), [opendir\(3C\)](#), [readdir\(3C\)](#), [rewinddir\(3C\)](#), [seekdir\(3C\)](#), [telldir\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** errno.h, errno – system error numbers

**Synopsis** #include <errno.h>

**Description** The <errno.h> header provides a declaration for errno and gives positive values for the symbolic constants listed on the [Intro\(2\)](#) manual page.

**Usage** Values for errno are required to be distinct positive values rather than non-zero values.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [Intro\(2\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** fcntl.h, fcntl – file control options

**Synopsis** #include <fcntl.h>

**Description** The <fcntl.h> header defines the following requests and arguments for use by the functions `fcntl(2)`, `open(2)`, and `openat(2)`.

Values for *cmd* used by `fcntl()` (the following values are unique):

<code>F_DUPFD</code>	Duplicate file descriptor.
<code>F_DUP2FD</code>	Similar to <code>F_DUPFD</code> , but always returns <i>arg</i> .
<code>F_GETFD</code>	Get file descriptor flags.
<code>F_SETFD</code>	Set file descriptor flags.
<code>F_GETFL</code>	Get file status flags.
<code>F_SETFL</code>	Set file status flags.
<code>F_GETOWN</code>	Get process or process group ID to receive SIGURG signals.
<code>F_SETOWN</code>	Set process or process group ID to receive SIGURG signals.
<code>F_FREESP</code>	Free storage space associated with a section of the ordinary file <i>files</i> .
<code>F_ALLOCSP</code>	Allocate space for a section of the ordinary file <i>files</i> .
<code>F_ALLOCS64</code>	Equivalent to <code>F_ALLOCS</code> , but takes a <code>struct flock64</code> argument rather than a <code>struct flock</code> argument.
<code>F_GETLK</code>	Get record locking information.
<code>F_GETLK64</code>	Equivalent to <code>F_GETLK</code> , but takes a <code>struct flock64</code> argument rather than a <code>struct flock</code> argument.
<code>F_SETLK</code>	Set record locking information.
<code>F_SETLK64</code>	Equivalent to <code>F_SETLK</code> , but takes a <code>struct flock64</code> argument rather than a <code>struct flock</code> argument.
<code>F_SETLKW</code>	Set record locking information; wait if blocked.
<code>F_SETLKW64</code>	Equivalent to <code>F_SETLKW</code> , but takes a <code>struct flock64</code> argument rather than a <code>struct flock</code> argument.
<code>F_SHARE</code>	Set share reservation.
<code>F_UNSHARE</code>	Remove share reservation.

File descriptor flags used for `fcntl()`:

`FD_CLOEXEC` Close the file descriptor upon execution of an exec function (see `exec(2)`).



Values for `l_type` used for record locking with `fcntl()` (the following values are unique):

- `F_RDLCK` Shared or read lock.
- `F_UNLCK` Unlock.
- `F_WRLCK` Exclusive or write lock.

Values for `f_access` used for share reservations with `fcntl()` (the following values are unique):

- `F_RDACC` Read-only share reservation.
- `F_WRACC` Write-only share reservation.
- `F_RWACC` Read and write share reservation.

Values for `f_deny` used for share reservations with `fcntl()` (the following values are unique):

- `F_COMPAT` Compatibility mode share reservation.
- `F_RDDNY` Deny other read access share reservations.
- `F_WRDNY` Deny other write access share reservations.
- `F_RWDNY` Deny other read or write access share reservations.
- `F_NODNY` Do not deny other read or write access share reservations.

File creation and assignment flags are used in the `oflag` argument by `open()` and `openat()`. All of these values are bitwise distinct:

- `O_CREAT` Create file if it does not exist.
- `O_EXCL` Exclusive use flag.
- `O_NOCTTY` Do not assign controlling tty.
- `O_TRUNC` Truncate flag.
- `O_XATTR` When opening a file, this flag affects the way in which relative paths are resolved by `open()` and `openat()`. With this flag set, the *path* argument is resolved as an extended attribute reference on either the current working directory (if `open()`) or of the file referenced by the file descriptor argument of `openat()`.

File status flags used for `fcntl()`, `open()`, and `open()`:

- `O_APPEND` Set append mode.
- `O_NDELAY` Non-blocking mode.
- `O_NONBLOCK` Non-blocking mode (POSIX; see [standards\(5\)](#)).

<code>O_DSYNC</code>	Write I/O operations on the file descriptor complete as defined by synchronized I/O data integrity completion.
<code>O_RSYNC</code>	Read I/O operations on the file descriptor complete at the same level of integrity as specified by the <code>O_DSYNC</code> and <code>O_SYNC</code> flags. If both <code>O_DSYNC</code> and <code>O_RSYNC</code> are set in <i>oflag</i> , all I/O operations on the file descriptor complete as defined by synchronized I/O data integrity completion. If both <code>O_SYNC</code> and <code>O_RSYNC</code> are set in <i>oflag</i> , all I/O operations on the file descriptor complete as defined by synchronized I/O file integrity completion.
<code>O_SYNC</code>	When opening a regular file, this flag affects subsequent writes. If set, each <a href="#">write(2)</a> will wait for both the file data and file status to be physically updated. Write I/O operations on the file descriptor complete as defined by synchronized I/O file integrity completion.

Mask for use with file access modes:

`O_ACCMODE` Mask for file access modes.

File access modes used for `fcntl()`, `open()`, and `openat()`:

`O_RDONLY` Open for reading only.

`O_RDWR` Open for reading and writing.

`O_WRONLY` Open for writing only.

The following constants are used by system calls capable of resolving paths relative to a provided open file descriptor:

<code>AT_FDCWD</code>	Special value to pass in place of a file descriptor to inform the called routine that relative path arguments should be resolved from the current working directory.
<code>AT_SYMLINK_NOFOLLOW</code>	Flag passed to <a href="#">fstatat(2)</a> and <a href="#">fchownat(2)</a> to change the behavior of these functions when they are given a file as an argument that is a symbolic link. In this case the functions operate on the symbolic link file rather than the file the link references.
<code>AT_REMOVEDIR</code>	Flag passed to <a href="#">unlinkat(2)</a> to tell it to assume that its path argument refers to a directory and to attempt to remove this directory.

The `flock` structure describes a file lock. It includes the following members:

```
short  l_type; /* Type of lock */
short  l_whence; /* Flag for starting offset */
off_t  l_start; /* Relative offset in bytes */
off_t  l_len; /* Size; if 0 then until EOF */
long   l_sysid; /* Returned with F_GETLK */
```

```
pid_t  l_pid;    /* Returned with F_GETLK */
```

The structure `fshare` describes a file share reservation. It includes the following members:

```
short  f_access; /* Type of reservation */
short  f_deny;   /* Type of reservations to deny */
long   f_id;     /* Process unique identifier */
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [creat\(2\)](#), [exec\(2\)](#), [fcntl\(2\)](#), [open\(2\)](#), [fdatasync\(3C\)](#), [fsync\(3C\)](#), [fsattr\(5\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Notes** Data is successfully transferred for a write operation to a regular file when the system ensures that all data written is readable on any subsequent open of the file (even one that follows a system or power failure) in the absence of a failure of the physical storage medium.

Data is successfully transferred for a read operation when an image of the data on the physical storage medium is available to the requesting process.

Synchronized I/O data integrity completion (see [fdatasync\(3C\)](#)):

- For reads, the operation has been completed or diagnosed if unsuccessful. The read is complete only when an image of the data has been successfully transferred to the requesting process. If there were any pending write requests affecting the data to be read at the time that the synchronized read operation was requested, these write requests will be successfully transferred prior to reading the data.
- For writes, the operation has been completed or diagnosed if unsuccessful. The write is complete only when the data specified in the write request is successfully transferred, and all file system information required to retrieve the data is successfully transferred.

File attributes that are not necessary for data retrieval (access time, modification time, status change time) need not be successfully transferred prior to returning to the calling process.

Synchronized I/O file integrity completion (see [fsync\(3C\)](#)):

- Identical to a synchronized I/O data integrity completion with the addition that all file attributes relative to the I/O operation (including access time, modification time, status change time) will be successfully transferred prior to returning to the calling process.

**Name** fenv.h, fenv – floating-point environment

**Synopsis** #include <fenv.h>

**Description** The <fenv.h> header defines the following data types through typedef:

fenv_t	Represents the entire floating-point environment. The floating-point environment refers collectively to any floating-point status flags and control modes supported by the implementation.
fexcept_t	Represents the floating-point status flags collectively, including any status the implementation associates with the flags. A floating-point status flag is a system variable whose value is set (but never cleared) when a floating-point exception is raised, which occurs as a side effect of exceptional floating-point arithmetic to provide auxiliary information. A floating-point control mode is a system variable whose value can be set by the user to affect the subsequent behavior of floating-point arithmetic.

The <fenv.h> header defines the following constants if and only if the implementation supports the floating-point exception by means of the floating-point functions `feclearexcept()`, `fegetexceptflag()`, `feraiseexcept()`, `fesetexceptflag()`, and `fetestexcept()`. Each expands to an integer constant expression with values such that bitwise-inclusive ORs of all combinations of the constants result in distinct values.

```
FE_DIVBYZERO
FE_INEXACT
FE_INVALID
FE_OVERFLOW
FE_UNDERFLOW
```

The <fenv.h> header defines the following constant, which is simply the bitwise-inclusive OR of all floating-point exception constants defined above:

```
FE_ALL_EXCEPT
```

The <fenv.h> header defines the following constants. Each expands to an integer constant expression whose values are distinct non-negative values.

```
FE_DOWNWARD
FE_TONEAREST
FE_TOWARDZERO
FE_UPWARD
```

The <fenv.h> header defines the following constant, which represents the default floating-point environment (that is, the one installed at program startup) and has type pointer to const-qualified `fenv_t`. It can be used as an argument to the functions within the <fenv.h> header that manage the floating-point environment.

```
FE_DFL_ENV
```

The `FENV_ACCESS` pragma provides a means to inform the implementation when an application might access the floating-point environment to test floating-point status flags or run under non-default floating-point control modes. The pragma occurs either outside external declarations or preceding all explicit declarations and statements inside a compound statement. When outside external declarations, the pragma takes effect from its occurrence until another `FENV_ACCESS` pragma is encountered, or until the end of the translation unit. When inside a compound statement, the pragma takes effect from its occurrence until another `FENV_ACCESS` pragma is encountered (including within a nested compound statement), or until the end of the compound statement; at the end of a compound statement the state for the pragma is restored to its condition just before the compound statement. If this pragma is used in any other context, the behavior is undefined.

If part of an application tests floating-point status flags, sets floating-point control modes, or runs under non-default mode settings, but was translated with the state for the `FENV_ACCESS` pragma off, the behavior is undefined. The default state (on or off) for the pragma is implementation-defined. (When execution passes from a part of the application translated with `FENV_ACCESS` off to a part translated with `FENV_ACCESS` on, the state of the floating-point status flags is unspecified and the floating-point control modes have their default settings.)

**Usage** This header is designed to support the floating-point exception status flags and directed-rounding control modes required by the IEC 60559: 1989 standard, and other similar floating-point state information. Also, it is designed to facilitate code portability among all systems. Certain application programming conventions support the intended model of use for the floating-point environment:

- A function call does not alter its caller's floating-point control modes, clear its caller's floating-point status flags, or depend on the state of its caller's floating-point status flags unless the function is so documented.
- A function call is assumed to require default floating-point control modes, unless its documentation promises otherwise.
- A function call is assumed to have the potential for raising floating-point exceptions, unless its documentation promises otherwise.

With these conventions, an application can safely assume default floating-point control modes (or be unaware of them). The responsibilities associated with accessing the floating-point environment fall on the application that does so explicitly.

Even though the rounding direction macros might expand to constants corresponding to the values of `FLT_ROUNDS`, they are not required to do so. For example:

```
#include <fenv.h>
void f(double x)
{
    #pragma STDC FENV_ACCESS ON
    void g(double);
```

```
void h(double);
/* ... */
g(x + 1);
h(x + 1);
/* ... */
}
```

If the function `g()` might depend on status flags set as a side effect of the first `x+1`, or if the second `x+1` might depend on control modes set as a side effect of the call to function `g()`, then the application must contain an appropriately placed invocation as follows:

```
#pragma STDC FENV_ACCESS ON
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [feclearexcept\(3M\)](#), [fegetenv\(3M\)](#), [fegetexceptflag\(3M\)](#), [fegetround\(3M\)](#), [feholdexcept\(3M\)](#), [feraiseexcept\(3M\)](#), [fesetenv\(3M\)](#), [fesetexceptflag\(3M\)](#), [fesetround\(3M\)](#), [fetestexcept\(3M\)](#), [feupdateenv\(3M\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** float.h, float – floating types

**Synopsis** #include <float.h>

**Description** The characteristics of floating types are defined in terms of a model that describes a representation of floating-point numbers and values that provide information about an implementation's floating-point arithmetic.

The following parameters are used to define the model for each floating-point type:

- $s$  sign ( $\pm 1$ )
- $b$  base or radix of exponent representation (an integer  $> 1$ )
- $e$  exponent (an integer between a minimum  $e_{\min}$  and a maximum  $e_{\max}$ )
- $p$  precision (the number of base- $b$  digits in the significand)
- $f_k$  non-negative integers less than  $b$  (the significand digits)

In addition to normalized floating-point numbers ( $f_1 > 0$  if  $x \neq 0$ ), floating types might be able to contain other kinds of floating-point numbers, such as subnormal floating-point numbers ( $x \neq 0$ ,  $e = e_{\min}$ ,  $f_1 = 0$ ) and unnormalized floating-point numbers ( $x \neq 0$ ,  $e = e_{\min}$ ,  $f_1 = 0$ ), and values that are not floating-point numbers, such as infinities and NaNs. A *NaN* is an encoding signifying Not-a-Number. A *quiet NaN* propagates through almost every arithmetic operation without raising a floating-point exception; a *signaling NaN* generally raises a floating-point exception when occurring as an arithmetic operand.

The accuracy of the library functions in [math.h\(3HEAD\)](#) and [complex.h\(3HEAD\)](#) that return floating-point results is defined on the [libm\(3LIB\)](#) manual page.

All integer values in the `<float.h>` header, except `FLT_ROUNDS`, are constant expressions suitable for use in `#if` preprocessing directives; all floating values are constant expressions. All except `DECIMAL_DIG`, `FLT_EVAL_METHOD`, `FLT_RADIX`, and `FLT_ROUNDS` have separate names for all three floating-point types. The floating-point model representation is provided for all values except `FLT_EVAL_METHOD` and `FLT_ROUNDS`.

The rounding mode for floating-point addition is characterized by the value of `FLT_ROUNDS`:

- 1 Indeterminable.
- 0 Toward zero.
- 1 To nearest.
- 2 Toward positive infinity.
- 3 Toward negative infinity.

The values of operations with floating operands and values subject to the usual arithmetic conversions and of floating constants are evaluated to a format whose range and precision

might be greater than required by the type. The use of evaluation formats is characterized by the architecture-dependent value of `FLT_EVAL_METHOD`:

- 1 Indeterminable.
- 0 Evaluate all operations and constants just to the range and precision of the type.
- 1 Evaluate operations and constants of type float and double to the range and precision of the double type; evaluate long double operations and constants to the range and precision of the long double type.
- 2 Evaluate all operations and constants to the range and precision of the long double type.

The values given in the following list are defined as constants.

- Radix of exponent representation,  $b$ .  
`FLT_RADIX`
- Number of base-`FLT_RADIX` digits in the floating-point significand,  $p$ .  
`FLT_MANT_DIG`  
`DBL_MANT_DIG`  
`LDBL_MANT_DIG`
- Number of decimal digits,  $n$ , such that any floating-point number in the widest supported floating type with  $p_{\max}$  radix  $b$  digits can be rounded to a floating-point number with  $n$  decimal digits and back again without change to the value.  
`DECIMAL_DIG`
- Number of decimal digits,  $q$ , such that any floating-point number with  $q$  decimal digits can be rounded into a floating-point number with  $p$  radix  $b$  digits and back again without change to the  $q$  decimal digits.  
`FLT_DIG`  
`DBL_DIG`  
`LDBL_DIG`
- Minimum negative integer such that `FLT_RADIX` raised to that power minus 1 is a normalized floating-point number,  $e_{\min}$ .  
`FLT_MIN_EXP`  
`DBL_MIN_EXP`  
`LDBL_MIN_EXP`
- Minimum negative integer such that 10 raised to that power is in the range of normalized floating-point numbers.  
`FLT_MIN_10_EXP`  
`DBL_MIN_10_EXP`  
`LDBL_MIN_10_EXP`



- Maximum integer such that FLT\_RADIX raised to that power minus 1 is a representable finite floating-point number,  $e_{\max}$ .

```
FLT_MAX_EXP
DBL_MAX_EXP
LDBL_MAX_EXP
```

- Maximum integer such that 10 raised to that power is in the range of representable finite floating-point numbers.

```
FLT_MAX_10_EXP
DBL_MAX_10_EXP
LDBL_MAX_10_EXP
```

The values given in the following list are defined as constant expressions with values that are greater than or equal to those shown:

- Maximum representable finite floating-point number.

```
FLT_MAX
DBL_MAX
LDBL_MAX
```

The values given in the following list are defined as constant expressions with implementation-defined (positive) values that are less than or equal to those shown:

- The difference between 1 and the least value greater than 1 that is representable in the given floating-point type,  $b^{1-p}$ .

```
FLT_EPSILON
DBL_EPSILON
LDBL_EPSILON
```

- Minimum normalized positive floating-point number,  $b_{\min}^e^{-1}$ .

```
FLT_MIN
DBL_MIN
LDBL_MIN
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [complex.h\(3HEAD\)](#), [math.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** floatingpoint.h, floatingpoint – IEEE floating point definitions

**Synopsis** #include <floatingpoint.h>

**Description** This file defines constants, types, and functions used to implement standard floating point according to ANSI/IEEE Std 754-1985. The functions are implemented in `libc`. The included header file `<sys/ieee_fp.h>` defines certain types of interest to the kernel.

IEEE Rounding Modes	<code>fp_direction_type</code>	The type of the IEEE rounding direction mode. Note: the order of enumeration varies according to hardware.
	<code>fp_precision_type</code>	The type of the IEEE rounding precision mode, which only applies on systems that support extended precision such as machines based on the Intel 80387 FPU or the 80486. SIGFPE handling:
	<code>sigfpe_code_type</code>	The type of a SIGFPE code.
	<code>sigfpe_handler_type</code>	The type of a user-definable SIGFPE exception handler called to handle a particular SIGFPE code.
	<code>SIGFPE_DEFAULT</code>	A macro indicating the default SIGFPE exception handling, namely to perform the exception handling specified by the user, if any, and otherwise to dump core using <a href="#">abort(3C)</a> .
	<code>SIGFPE_IGNORE</code>	A macro indicating an alternate SIGFPE exception handling, namely to ignore and continue execution.
	<code>SIGFPE_ABORT</code>	A macro indicating an alternate SIGFPE exception handling, namely to abort with a core dump.
IEEE Exception Handling	<code>N_IEEE_EXCEPTION</code>	The number of distinct IEEE floating-point exceptions.
	<code>fp_exception_type</code>	The type of the <code>N_IEEE_EXCEPTION</code> exceptions. Each exception is given a bit number.
	<code>fp_exception_field_type</code>	The type intended to hold at least <code>N_IEEE_EXCEPTION</code> bits corresponding to the IEEE exceptions numbered by <code>fp_exception_type</code> . Thus <code>fp_inexact</code> corresponds to the least significant bit and <code>fp_invalid</code> to the fifth least significant bit. Note: some operations may set more than one exception.
IEEE Formats and Classification	<code>single; extended; quadruple</code>	Definitions of IEEE formats.
	<code>fp_class_type</code>	An enumeration of the various classes of IEEE values and symbols.
IEEE Base Conversion	The functions described under <a href="#">floating_to_decimal(3C)</a> and <a href="#">decimal_to_floating(3C)</a> satisfy not only the IEEE Standard, but also the stricter requirements of correct rounding for all arguments.	

DECIMAL_STRING_LENGTH	The length of a <code>decimal_string</code> .
<code>decimal_string</code>	The digit buffer in a <code>decimal_record</code> .
<code>decimal_record</code>	The canonical form for representing an unpacked decimal floating-point number.
<code>decimal_form</code>	The type used to specify fixed or floating binary to decimal conversion.
<code>decimal_mode</code>	A struct that contains specifications for conversion between binary and decimal.
<code>decimal_string_form</code>	An enumeration of possible valid character strings representing floating-point numbers, infinities, or NaNs.

**Files** `/usr/include/sys/ieeefp.h`

**See Also** [abort\(3C\)](#), [decimal\\_to\\_floating\(3C\)](#), [econvert\(3C\)](#), [floating\\_to\\_decimal\(3C\)](#), [sigfpe\(3C\)](#), [string\\_to\\_decimal\(3C\)](#), [strtod\(3C\)](#)

**Name** fmtmsg.h, fmtmsg – message display structures

**Synopsis** #include <fmtmsg.h>

**Description** The <fmtmsg.h> header defines the following macros, which expand to constant integer expressions:

MM_HARD	Source of the condition is hardware.
MM_SOFT	Source of the condition is software.
MM_FIRM	Source of the condition is firmware.
MM_APPL	Condition detected by application.
MM_UTIL	Condition detected by utility.
MM_OPSYS	Condition detected by operating system.
MM_RECOVER	Recoverable error.
MM_NRECOV	Non-recoverable error.
MM_HALT	Error causing application to halt.
MM_ERROR	Application has encountered a non-fatal fault.
MM_WARNING	Application has detected unusual non-error condition.
MM_INFO	Informative message.
MM_NOSEV	No severity level provided for the message.
MM_PRINT	Display message on standard error.
MM_CONSOLE	Display message on system console.

The table below indicates the null values and identifiers for [fmtmsg\(3C\)](#) arguments. The <fmtmsg.h> header defines the macros in the Identifier column, which expand to constant expressions that expand to expressions of the type indicated in the Type column:

Argument	Type	Null-Value	Identifier
<i>label</i>	char*	(char*) NULL	MM_NULLLBL
<i>severity</i>	int	0	MM_NULLSEV
<i>class</i>	long	0L	MM_NULLMC
<i>text</i>	char*	(char*) NULL	MM_NULLTXT
<i>action</i>	char*	(char*) NULL	MM_NULLACT
<i>tag</i>	char*	(char*) NULL	MM_NULLTAG

The `<fmtmsg.h>` header also defines the following macros for use as return values for `fmtmsg()`:

- `MM_OK`           The function succeeded.
- `MM_NOTOK`       The function failed completely.
- `MM_NOMSG`       The function was unable to generate a message on standard error, but otherwise succeeded.
- `MM_NOCON`       The function was unable to generate a console message, but otherwise succeeded.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [fmtmsg\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** fnmatch.h, fnmatch – filename-matching types

**Synopsis** #include <fnmatch.h>

**Description** The <fnmatch.h> header defines the following constants:

FNM\_NOMATCH      The string does not match the specified pattern.  
FNM\_PATHNAME     Slash in string only matches slash in pattern.  
FNM\_PERIOD        Leading period in string must be exactly matched by period in pattern.  
FNM\_NOESCAPE     Disable backslash escaping.  
FNM\_NOSYS        Reserved.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [fnmatch\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** ftw.h, ftw – file tree traversal

**Synopsis** #include <ftw.h>

**Description** The <ftw.h> header defines the FTW structure that includes the following members:

```
int base
int level
```

The <ftw.h> header defines macros for use as values of the third argument to the application-supplied function that is passed as the second argument to `ftw()` and `nftw()` (see [ftw\(3C\)](#)):

```
FTW_F      file
FTW_D      directory
FTW_DNR    directory without read permission
FTW_DP     directory with subdirectories visited
FTW_NS     unknown type; stat() failed
FTW_SL     symbolic link
FTW_SLN    symbolic link that names a nonexistent file
```

The <ftw.h> header defines macros for use as values of the fourth argument to `nftw()`:

```
FTW_PHYS    Physical walk, does not follow symbolic links. Otherwise, nftw() follows links
             but does not walk down any path that crosses itself.
FTW_MOUNT   The walk does not cross a mount point.
FTW_DEPTH   All subdirectories are visited before the directory itself.
FTW_CHDIR   The walk changes to each directory before reading it.
```

The <ftw.h> header defines the `stat` structure and the symbolic names for `st_mode` and the file type test macros as described in <sys/stat.h>.

Inclusion of the <ftw.h> header might also make visible all symbols from <sys/stat.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [ftw\(3C\)](#), [stat.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** glob.h, glob – pathname pattern-matching types

**Synopsis** #include <glob.h>

**Description** The <glob.h> header defines the structures and symbolic constants used by the [glob\(3C\)](#).

The structure type `glob_t` contains the following members:

```
size_t gl_pathc      /* count of paths matched by pattern */
char   **gl_pathv   /* pointer to a list of matched
                    pathnames */
size_t gl_offs      /* lots to reserve at the beginning
                    of gl_pathv */
```

The following constants are provided as values for the `flags` argument:

`GLOB_APPEND` Append generated pathnames to those previously obtained.

`GLOB_DOOFFS` Specify how many null pointers to add to the beginning of `gl_pathv`.

`GLOB_ERR` Cause `glob()` to return on error.

`GLOB_MARK` Each pathname that is a directory that matches pattern has a slash appended.

`GLOB_NOCHECK` If pattern does not match any pathname, then return a list consisting of only pattern.

`GLOB_NOESCAPE` Disable backslash escaping.

`GLOB_NOSORT` Do not sort the pathnames returned.

The following constants are defined as error return values:

`GLOB_ABORTED` The scan was stopped because `GLOB_ERR` was set or `(*errfunc)()` returned non-zero.

`GLOB_NOMATCH` The pattern does not match any existing pathname, and `GLOB_NOCHECK` was not set in flags.

`GLOB_NOSPACE` An attempt to allocate memory failed.

`GLOB_NOSYS` Reserved.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard



**See Also** [glob\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** grp.h, grp – group structure

**Synopsis** #include <grp.h>

**Description** The <grp.h> header declares the structure group, which includes the following members:

```
char *gr_name      /* name of the group */
gid_t gr_gid       /* numerical group ID */
char **gr_mem      /* pointer to a null-terminated array of
                    character pointers to member names */
```

The gid\_t type is defined as described in <sys/types.h> (see [types\(3HEAD\)](#)).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getgrnam\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** iconv.h, iconv – codeset conversion facility

**Synopsis** `#include <iconv.h>`

**Description** The `<iconv.h>` header defines the following type:

`iconv_t` Identifies the conversion from one codeset to another.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [iconv\(3C\)](#), [iconv\\_close\(3C\)](#), [iconv\\_open\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** if.h, if – sockets local interfaces

**Synopsis** #include <net/if.h>

**Description** The <net/if.h> header defines the if\_nameindex structure, which includes the following members:

```
unsigned if_index    /* numeric index of the interface */
char     *if_name    /* null-terminated name of the interface */
```

The <net/if.h> header defines the following macro for the length of a buffer containing an interface name (including the terminating null character):

```
IF_NAMESIZE    interface name length
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [if\\_nametoindex\(3XNET\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** inet.h, inet – definitions for internet operations

**Synopsis** #include <arpa/inet.h>

**Description** The <arpa/inet.h> header defines the type `in_port_t`, the type `in_addr_t`, and the `in_addr` structure, as described in [in.h\(3HEAD\)](#).

Inclusion of the <arpa/inet.h> header may also make visible all symbols from [in.h\(3HEAD\)](#).

The following are declared as functions, and may also be defined as macros:

```
in_addr_t      inet_addr(const char *);
in_addr_t      inet_lnaof(struct in_addr);
struct in_addr inet_makeaddr(in_addr_t, in_addr_t);
in_addr_t      inet_netof(struct in_addr);
in_addr_t      inet_network(const char *);
char           *inet_ntoa(struct in_addr);
```

**Default** For applications that do not require standard-conforming behavior (those that use the socket interfaces described in section 3N of the reference manual; see [Intro\(3\)](#) and [standards\(5\)](#)), the following may be declared as functions, or defined as macros, or both:

```
uint32_t      htonl(uint32_t);
uint16_t      htons(uint16_t);
uint32_t      ntohl(uint32_t);
uint16_t      ntohs(uint16_t);
```

**Standard conforming** For applications that require standard-conforming behavior (those that use the socket interfaces described in section 3XN of the reference manual; see [Intro\(3\)](#) and [standards\(5\)](#)), the following may be declared as functions, or defined as macros, or both:

```
in_addr_t      htonl(in_addr_t);
in_port_t      htons(in_port_t);
in_addr_t      ntohl(in_addr_t);
in_port_t      ntohs(in_port_t);
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [Intro\(3\)](#), [htonl\(3SOCKET\)](#), [htonl\(3XNET\)](#), [inet\\_addr\(3SOCKET\)](#), [inet\\_addr\(3XNET\)](#), [in.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** in.h, in – Internet Protocol family

**Synopsis** #include <netinet/in.h>

**Description** The <netinet/in.h> header defines the following types through typedef:

in\_port\_t     An unsigned integral type of exactly 16 bits.

in\_addr\_t     An unsigned integral type of exactly 32 bits. The <netinet/in.h> header defines the in\_addr structure that includes the following member:

The <netinet/in.h> header defines the in\_addr structure that includes the following member:

in\_addr\_t     s\_addr

The <netinet/in.h> header defines the type sa\_family\_t as described in [socket.h\(3HEAD\)](#).

The <netinet/in.h> header defines the following macros for use as values of the *level* argument of getsockopt() and setsockopt():

IPPROTO\_IP     Dummy for IP

IPPROTO\_ICMP   Control message protocol

IPPROTO\_TCP    TCP

IPPROTO\_UDP    User datagram protocol The <netinet/in.h> header defines the following macros for use as destination addresses for connect(), sendmsg(), and sendto():

INADDR\_ANY     Local host address

INADDR\_BROADCAST   Broadcast address

The <netinet/in.h> header defines the sockaddr\_in structure that is used to store addresses for the Internet protocol family. Values of this type must be cast to struct sockaddr for use with the socket interfaces.

**Default** For applications that do not require standard-conforming behavior (those that use the socket interfaces described in section (3SOCKET) of the reference manual; see [Intro\(3\)](#) and [standards\(5\)](#)), the <netinet/in.h> header defines the sockaddr\_in structure that includes the following members:

sa\_family\_t     sin\_family

in\_port\_t     sin\_port

struct in\_addr   sin\_addr

char            sin\_zero[8]

Standard conforming For applications that require standard-conforming behavior (those that use the socket interfaces described in section (3XNET) of the reference manual; see [Intro\(3\)](#) and [standards\(5\)](#)), the `<netinet/in.h>` header defines the `sockaddr_in` structure that includes the following members:

```
sa_family_t    sin_family
in_port_t     sin_port
struct in_addr sin_addr
unsigned char  sin_zero[8]
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [Intro\(3\)](#), [connect\(3SOCKET\)](#), [connect\(3XNET\)](#), [getsockopt\(3SOCKET\)](#), [getsockopt\(3XNET\)](#), [sendmsg\(3SOCKET\)](#), [sendmsg\(3XNET\)](#), [sendto\(3SOCKET\)](#), [sendto\(3XNET\)](#), [setsockopt\(3SOCKET\)](#), [setsockopt\(3XNET\)](#), [socket.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** inttypes.h, inttypes – fixed size integer types

**Synopsis** #include <inttypes.h>

**Description** The <inttypes.h> header includes the <stdint.h> header.

The <inttypes.h> header includes a definition of the following type:

`imaxdiv_t` structure type that is the type of the value returned by the `imaxdiv()` function.

The following macros are defined. Each expands to a character string literal containing a conversion specifier, possibly modified by a length modifier, suitable for use within the format argument of a formatted input/output function when converting the corresponding integer type. These macros have the general form of `PRI` (character string literals for the `fprintf()` and `fwprintf()` family of functions) or `SCN` (character string literals for the `fscanf()` and `fwscanf()` family of functions), followed by the conversion specifier, followed by a name corresponding to a similar type name in <stdint.h>. In these names, *N* represents the width of the type as described in <stdint.h>. For example, `PRIdFAST32` can be used in a format string to print the value of an integer of type `int_fast32_t`.

The `fprintf()` macros for signed integers are:

```
PRIdN  PRIdLEASTN  PRIdFASTN  PRIdMAX  PRIdPTR
PRIiN  PRIiLEASTN  PRIiFASTN  PRIiMAX  PRIiPTR
```

The `fprintf()` macros for unsigned integers are:

```
PRIoN  PRIoLEASTN  PRIoFASTN  PRIoMAX  PRIoPTR
PRIuN  PRIuLEASTN  PRIuFASTN  PRIuMAX  PRIuPTR
PRIxN  PRIxLEASTN  PRIxFASTN  PRIxMAX  PRIxPTR
PRIXN  PRIXLEASTN  PRIXFASTN  PRIXMAX  PRIXPTR
```

The `fscanf()` macros for signed integers are:

```
SCNdN  SCNdLEASTN  SCNdFASTN  SCNdMAX  SCNdPTR
SCNiN  SCNiLEASTN  SCNiFASTN  SCNiMAX  SCNiPTR
```

The `fscanf()` macros for unsigned integers are:

```
SCNoN  SCNoLEASTN  SCNoFASTN  SCNoMAX  SCNoPTR
SCNuN  SCNuLEASTN  SCNuFASTN  SCNuMAX  SCNuPTR
SCNxN  SCNxLEASTN  SCNxFASTN  SCNxMAX  SCNxPTR
```

For each type that the implementation provides in <stdint.h>, the corresponding `fprintf()` and `fwprintf()` macros must be defined. The corresponding `fscanf()` and `fwscanf()` macros must be defined as well, unless the implementation does not have a suitable modifier for the type.



**Usage** The purpose of `<inttypes.h>` is to provide a set of integer types whose definitions are consistent across machines and independent of operating systems and other implementation idiosyncrasies. It defines, with a `typedef`, integer types of various sizes. Implementations are free to `typedef` them as ISO C standard integer types or extensions that they support. Consistent use of this header greatly increases the portability of applications across platforms.

**Examples** **EXAMPLE 1** Use of Macro

The following code uses one of the macros available through `<inttypes.h>`.

```
#include <inttypes.h>
#include <wchar.h>
int main(void)
{
    uintmax_t i = UINTMAX_MAX; // This type always exists.
    wprintf("The largest integer value is %020"
           PRIxMAX, "\n", i);
    return 0;
}
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [imaxdiv\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** ipc.h, ipc – XSI interprocess communication access structure

**Synopsis** #include <sys/ipc.h>

**Description** The <sys/ipc.h> header is used by three mechanisms for interprocess communication (IPC): messages, semaphores, and shared memory. All use a common structure type, ipc\_perm, to pass information used in determining permission to perform an IPC operation.

The ipc\_perm structure contains the following members:

```
uid_t  uid      /* owner's user ID */
gid_t  gid      /* owner's group ID */
uid_t  cuid     /* creator's user ID */
gid_t  cgid    /* creator's group ID */
mode_t mode    /* read/write permission
```

The uid\_t, gid\_t, mode\_t, and key\_t types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

Definitions are provided for the constants listed below.

Mode bits:

IPC\_CREAT     Create entry if key does not exist.

IPC\_EXCL     Fail if key exists.

IPC\_NOWAIT    Error if request must wait.

Keys:

IPC\_PRIVATE   Private key.

Control commands:

IPC\_RMID     Remove identifier.

IPC\_SET     Set options.

IPC\_STAT     Get options.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [ftok\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** iso646.h, iso646 – alternative spellings

**Synopsis** `#include <iso646.h>`

**Description** The `<iso646.h>` header defines the following macros (on the left) that expand to the corresponding tokens (on the right):

```
and      &&
and_eq   &=
bitand   &
bitor    |
compl    ~
not      !
not_eq   !=
or       ||
or_eq    |=
xor      ^
xor_eq   ^=
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [attributes\(5\)](#), [standards\(5\)](#)

**Name** langinfo.h, langinfo – language information constants

**Synopsis** `#include <langinfo.h>`

**Description** The `<langinfo.h>` header contains the constants used to identify items of `langinfo` data (see [nl\\_langinfo\(3C\)](#)). The type of the constant, `nl_item`, is defined as described in `<nl_types.h>`.

The following constants are defined. The entries under Category indicate in which [setlocale\(3C\)](#) category each item is defined.

Constant	Category	Meaning
CODESET	LC_CTYPE	codeset name
D_T_FMT	LC_TIME	string for formatting date and time
D_FMT	LC_TIME	date format string
T_FMT	LC_TIME	time format string
T_FMT_AMPM	LC_TIME	a.m. or p.m. time format string
AM_STR	LC_TIME	ante-meridiem affix
PM_STR	LC_TIME	post-meridiem affix
DAY_1	LC_TIME	name of the first day of the week (for example, Sunday)
DAY_2	LC_TIME	name of the second day of the week (for example, Monday)
DAY_3	LC_TIME	name of the third day of the week (for example, Tuesday)
DAY_4	LC_TIME	name of the fourth day of the week (for example, Wednesday)
DAY_5	LC_TIME	name of the fifth day of the week (for example, Thursday)
DAY_6	LC_TIME	name of the sixth day of the week (for example, Friday)
DAY_7	LC_TIME	name of the seventh day of the week (for example, Saturday)
ABDAY_1	LC_TIME	abbreviated name of the first day of the week
ABDAY_2	LC_TIME	abbreviated name of the second day of the week
ABDAY_3	LC_TIME	abbreviated name of the third day of the week

Constant	Category	Meaning
ABDAY_4	LC_TIME	abbreviated name of the fourth day of the week
ABDAY_5	LC_TIME	abbreviated name of the fifth day of the week
ABDAY_6	LC_TIME	abbreviated name of the seventh day of the week
ABDAY_7	LC_TIME	abbreviated name of the seventh day of the week
MON_1	LC_TIME	name of the first month of the year
MON_2	LC_TIME	name of the second month
MON_3	LC_TIME	name of the third month
MON_4	LC_TIME	name of the fourth month
MON_5	LC_TIME	name of the fifth month
MON_6	LC_TIME	name of the sixth month
MON_7	LC_TIME	name of the seventh month
MON_8	LC_TIME	name of the eighth month
MON_9	LC_TIME	name of the ninth month
MON_10	LC_TIME	name of the tenth month
MON_11	LC_TIME	name of the eleventh month
MON_12	LC_TIME	name of the twelfth month
ABMON_1	LC_TIME	abbreviated name of the first month
ABMON_2	LC_TIME	abbreviated name of the second month
ABMON_3	LC_TIME	abbreviated name of the third month
ABMON_4	LC_TIME	abbreviated name of the fourth month
ABMON_5	LC_TIME	abbreviated name of the fifth month
ABMON_6	LC_TIME	abbreviated name of the sixth month
ABMON_7	LC_TIME	abbreviated name of the seventh month
ABMON_8	LC_TIME	abbreviated name of the eighth month
ABMON_9	LC_TIME	abbreviated name of the ninth month
ABMON_10	LC_TIME	abbreviated name of the tenth month
ABMON_11	LC_TIME	abbreviated name of the eleventh month
ABMON_12	LC_TIME	abbreviated name of the twelfth month

Constant	Category	Meaning
ERA	LC_TIME	era description segments
ERA_D_FMT	LC_TIME	era date format string
ERA_D_T_FMT	LC_TIME	era date and time format string
ERA_T_FMT	LC_TIME	era time format string
ALT_DIGITS	LC_TIME	alternative symbols for digits
RADIXCHAR	LC_NUMERIC	radix character
THOUSEP	LC_NUMERIC	separator for thousands
YESEXPR	LC_MESSAGES	affirmative response expression
NOEXPR	LC_MESSAGES	negative response expression
YESSTR	LC_MESSAGES	affirmative response for yes/no queries
NOSTR	LC_MESSAGES	negative response ro yes/no queries
CRNCYSTR	LC_MONETARY	local currency symbol, preceded by '-' if the symbol should appear before the value, '+' if the symbol should appear after the value, or '.' if the symbol should replace the radix character

If the locale's values for `p_cs_precedes` and `n_cs_precedes` do not match, the value of `nL_langinfo(CRNCYSTR)` is unspecified.

The `<langinfo.h>` header declares the following as a function:

```
char *nL_langinfo(nL_item);
```

Inclusion of `<langinfo.h>` header may also make visible all symbols from `<nL_types.h>`.

**Usage** Wherever possible, users are advised to use functions compatible with those in the ISO C standard to access items of `langinfo` data. In particular, the `strftime(3C)` function should be used to access date and time information defined in category `LC_TIME`. The `localeconv(3C)` function should be used to access information corresponding to `RADIXCHAR`, `THOUSEP`, and `CRNCYSTR`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [mkmsgs\(1\)](#), [localeconv\(3C\)](#), [nl\\_langinfo\(3C\)](#), [nl\\_types.h\(3HEAD\)](#), [setlocale\(3C\)](#), [strftime\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** libadm – general administrative library

**Synopsis** `cc [ flag... ] file... -ladm [ library... ]`

**Description** Functions in this library provide device management, VTOC handling, regular expressions, and packaging routines.

**Interfaces** The shared object `libadm.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>circf</code>	<code>loc1</code>
<code>loc2</code>	<code>locs</code>
<code>nbra</code>	<code>pkgdir</code>
<code>read_extvtoc</code>	<code>read_vtoc</code>
<code>sed</code>	<code>write_extvtoc</code>
<code>write_vtoc</code>	

**Files** `/lib/libadm.so.1` shared object  
`/lib/64/libadm.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [read\\_vtoc\(3EXT\)](#), [attributes\(5\)](#), [regexp\(5\)](#)



**Name** libaio – asynchronous I/O library

**Synopsis** `cc [ flag... ] file... -laio [ library... ]`

**Description** Historically, functions in this library provided asynchronous I/O operations. This functionality now resides in [libc\(3LIB\)](#)

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on `libc.so.1`. New application development need not specify `-laio`.

**Interfaces** The shared object `libaio.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>aiocancel</code>	<code>aioread</code>
<code>aiowait</code>	<code>aiowrite</code>
<code>assfail</code>	<code>close</code>
<code>fork</code>	<code>sigaction</code>

The following interfaces are unique to the 32-bit version of this library:

<code>aioread64</code>	<code>aiowrite64</code>
------------------------	-------------------------

**Files** `/lib/libaio.so.1` shared object  
`/lib/64/libaio.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [aiocancel\(3C\)](#), [aioread\(3C\)](#), [aiowait\(3C\)](#), [aiowrite\(3C\)](#), [aio.h\(3HEAD\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

**Name** libauto\_ef – auto encoding finder library

**Synopsis** `cc [ flag... ] file... -lauto_ef [ library... ]  
#include <auto_ef.h>`

**Description** Functions in this library provide automatic encoding identification.

**Interface Level** The shared object `libauto_ef.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```
auto_ef_file                auto_ef_free
auto_ef_get_encoding        auto_ef_get_score
auto_ef_str
```

**Files** `/usr/lib/libauto_ef.so.1` shared object  
`/usr/lib/64/libauto_ef.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWautoef (32-bit) SUNWautoefx (64-bit)
Interface Stability	Stable
MT-Level	MT-Safe

**See Also** [auto\\_ef\(1\)](#), [auto\\_ef\(3EXT\)](#), [attributes\(5\)](#)

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**Name** libbsdmalloc – memory allocator interface library

**Synopsis** `cc [ flag... ] file... -lbsdmalloc [ library... ]  
#include <stdlib.h>`

**Description** Functions in this library provide a collection of malloc routines that use BSD semantics.

**Interfaces** The shared object `libbsdmalloc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```

free                                malloc
realloc

```

**Files** `/usr/lib/libbsdmalloc.so.1` shared object  
`/usr/lib/64/libbsdmalloc.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [bsdmalloc\(3MALLOC\)](#), [attributes\(5\)](#)

**Name** libbsm – basic security library

**Synopsis** `cc [ flag... ] file. -lbsm [ library... ]`

**Description** Functions in this library provide basic security, library object reuse, and auditing.

**Interfaces** The shared object `libbsm.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>au_close</code>	<code>au_open</code>
<code>au_preselect</code>	<code>au_to_arg</code>
<code>au_to_arg32</code>	<code>au_to_arg64</code>
<code>au_to_attr</code>	<code>au_to_cmd</code>
<code>au_to_data</code>	<code>au_to_groups</code>
<code>au_to_in_addr</code>	<code>au_to_ipc</code>
<code>au_to_iport</code>	<code>au_to_me</code>
<code>au_to_newgroups</code>	<code>au_to_opaque</code>
<code>au_to_path</code>	<code>au_to_process</code>
<code>au_to_process_ex</code>	<code>au_to_return</code>
<code>au_to_return32</code>	<code>au_to_return64</code>
<code>au_to_socket</code>	<code>au_to_subject</code>
<code>au_to_subject_ex</code>	<code>au_to_text</code>
<code>au_user_mask</code>	<code>au_write</code>
<code>audit</code>	<code>auditon</code>
<code>auditsvc</code>	<code>endac</code>
<code>endauclass</code>	<code>endauevent</code>
<code>endauser</code>	<code>getacdir</code>
<code>getacflg</code>	<code>getacmin</code>
<code>getacna</code>	<code>getauclassent</code>
<code>getauclassent_r</code>	<code>getauclassnam</code>
<code>getauclassnam_r</code>	<code>getaudit</code>
<code>getaudit_addr</code>	<code>getauditflagsbin</code>
<code>getauditflagschar</code>	<code>getauevent</code>

getauevent_r	getauevnam
getauevnam_r	getauevnonam
getauevnum	getauevnum_r
getauuid	getauserent
getauserent_r	getausernam
getausernam_r	getfauditflags
setac	setaclass
setaclassfile	setaudit
setaudit_addr	setauevent
setaueventfile	setauuid
setauuser	setauuserfile
testac	

**Files** /lib/libbsm.so.1      shared object  
 /lib/64/libbsm.so.1    64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	See individual man page for each function.

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libc – C library

**Description** Functions in this library provide various facilities defined by System V, ANSI C, POSIX, and so on. See [standards\(5\)](#). In addition, those facilities previously defined in the internationalization and the wide-character libraries are now defined in this library, as are the facilities previously defined in the multithreading libraries, `libthread` and `libpthreads`.

**Interfaces** The shared object `libc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>___loc1</code>	<code>___errno</code>
<code>__builtin_alloca</code>	<code>__ctype</code>
<code>__fbufsize</code>	<code>__flbf</code>
<code>__flt_rounds</code>	<code>__fpending</code>
<code>__fpurge</code>	<code>__freadable</code>
<code>__freading</code>	<code>__fsetlocking</code>
<code>__fwritable</code>	<code>__fwriting</code>
<code>__huge_val</code>	<code>__iob</code>
<code>__loc1</code>	<code>__major</code>
<code>__makedev</code>	<code>__minor</code>
<code>__nsw_extended_action</code>	<code>__nsw_freeconfig</code>
<code>__nsw_getconfig</code>	<code>__posix_asctime_r</code>
<code>__posix_ctime_r</code>	<code>__posix_getgrgid_r</code>
<code>__posix_getgrnam_r</code>	<code>__posix_getlogin_r</code>
<code>__posix_getpwnam_r</code>	<code>__posix_getpwuid_r</code>
<code>__posix_sigwait</code>	<code>__posix_ttyname_r</code>
<code>__priocntl</code>	<code>__priocntlset</code>
<code>__pthread_cleanup_pop</code>	<code>__pthread_cleanup_push</code>
<code>__sysconf_xpg5</code>	<code>__xpg4</code>
<code>__xpg4_putmsg</code>	<code>__xpg4_putpmsg</code>
<code>_Exit</code>	<code>_altzone</code>
<code>_assert</code>	<code>_cleanup</code>
<code>_ctype</code>	<code>_daylight</code>

---

_environ	_exit
_exithandle	_filbuf
_flsbuf	_flushlbf
_getdate_err	_getdate_err_addr
_iob	_isnan
_isnand	_lwp_cond_broadcast
_lwp_cond_reltimedwait	_lwp_cond_signal
_lwp_cond_timedwait	_lwp_cond_wait
_lwp_continue	_lwp_info
_lwp_kill	_lwp_mutex_lock
_lwp_mutex_trylock	_lwp_mutex_unlock
_lwp_self	_lwp_sema_init
_lwp_sema_post	_lwp_sema_trywait
_lwp_sema_wait	_lwp_suspend
_lwp_suspend2	_modf
_nextafter	_nsc_trydoorcall
_nss_XbyY_buf_alloc	_nss_XbyY_buf_free
_nss_netdb_aliases	_numeric
_scalb	_sibuf
_sobuf	_stack_grow
_sys_buslist	_sys_cldlist
_sys_fpelist	_sys_illlist
_sys_segvlst	_sys_siginfoflistp
_sys_siglist	_sys_siglistn
_sys_siglistp	_sys_traplist
_timezone	_tolower
_toupper	_tzname
_xftw	
a64l	abort

abs	access
acct	acl
addrtosymstr	addsev
addseverity	adjtime
aio_cancel	aio_error
aio_fsync	aio_read
aio_return	aio_suspend
aio_waitn	aio_write
aiocancel	aioread
aiowait	aiowrite
alarm	alphasort
altzone	ascftime
asctime	asctime_r
asprintf	
atexit	atof
atoi	atol
atoll	atomic_add_16
atomic_add_16_nv	atomic_add_32
atomic_add_32_nv	atomic_add_64
atomic_add_64_nv	atomic_add_8
atomic_add_8_nv	atomic_add_char
atomic_add_char_nv	atomic_add_int
atomic_add_int_nv	atomic_add_long
atomic_add_long_nv	atomic_add_ptr
atomic_add_ptr_nv	atomic_add_short
atomic_add_short_nv	atomic_and_16
atomic_and_16_nv	atomic_and_32
atomic_and_32_nv	atomic_and_64
atomic_and_64_nv	atomic_and_8



---

<code>atomic_and_8_nv</code>	<code>atomic_and_uchar</code>
<code>atomic_and_uchar_nv</code>	<code>atomic_and_uint</code>
<code>atomic_and_uint_nv</code>	<code>atomic_and_ulong</code>
<code>atomic_and_ulong_nv</code>	<code>atomic_and_ushort</code>
<code>atomic_and_ushort_nv</code>	<code>atomic_cas_16</code>
<code>atomic_cas_32</code>	<code>atomic_cas_64</code>
<code>atomic_cas_8</code>	<code>atomic_cas_ptr</code>
<code>atomic_cas_uchar</code>	<code>atomic_cas_uint</code>
<code>atomic_cas_ulong</code>	<code>atomic_cas_ushort</code>
<code>atomic_clear_long_excl</code>	<code>atomic_dec_16</code>
<code>atomic_dec_16_nv</code>	<code>atomic_dec_32</code>
<code>atomic_dec_32_nv</code>	<code>atomic_dec_64</code>
<code>atomic_dec_64_nv</code>	<code>atomic_dec_8</code>
<code>atomic_dec_8_nv</code>	<code>atomic_dec_ptr</code>
<code>atomic_dec_ptr_nv</code>	<code>atomic_dec_uchar</code>
<code>atomic_dec_uchar_nv</code>	<code>atomic_dec_uint</code>
<code>atomic_dec_uint_nv</code>	<code>atomic_dec_ulong</code>
<code>atomic_dec_ulong_nv</code>	<code>atomic_dec_ushort</code>
<code>atomic_dec_ushort_nv</code>	<code>atomic_inc_16</code>
<code>atomic_inc_16_nv</code>	<code>atomic_inc_32</code>
<code>atomic_inc_32_nv</code>	<code>atomic_inc_64</code>
<code>atomic_inc_64_nv</code>	<code>atomic_inc_8</code>
<code>atomic_inc_8_nv</code>	<code>atomic_inc_ptr</code>
<code>atomic_inc_ptr_nv</code>	<code>atomic_inc_uchar</code>
<code>atomic_inc_uchar_nv</code>	<code>atomic_inc_uint</code>
<code>atomic_inc_uint_nv</code>	<code>atomic_inc_ulong</code>
<code>atomic_inc_ulong_nv</code>	<code>atomic_inc_ushort</code>
<code>atomic_inc_ushort_nv</code>	<code>atomic_or_16</code>
<code>atomic_or_16_nv</code>	<code>atomic_or_32</code>

atomic_or_32_nv	atomic_or_64
atomic_or_64_nv	atomic_or_8
atomic_or_8_nv	atomic_or_uchar
atomic_or_uchar_nv	atomic_or_uint
atomic_or_uint_nv	atomic_or_ulong
atomic_or_ulong_nv	atomic_or_ushort
atomic_or_ushort_nv	atomic_set_long_excl
atomic_swap_16	atomic_swap_32
atomic_swap_64	atomic_swap_8
atomic_swap_ptr	atomic_swap_uchar
atomic_swap_uint	atomic_swap_ulong
atomic_swap_ushort	attropen
backtrace	backtrace_symbols
backtrace_symbols_fd	basename
bcmp	bcopy
bindtextdomain	bind_textdomain_codeset
brk	bsd_signal
bsearch	btowc
bzero	calloc
catclose	catgets
catopen	cfgetispeed
cfgetospeed	cfsetispeed
cfsetospeed	cftime
chdir	chmod
chown	chroot
clearerr	clock
clock_getres	clock_gettime
clock_nanosleep	clock_settime
close	closedir

---

closefrom	closelog
cond_broadcast	cond_destroy
cond_init	cond_reltimedwait
cond_signal	cond_timedwait
cond_wait	confstr
creat	crypt
crypt_genhash_impl	crypt_gensalt
crypt_gensalt_impl	csetcol
csetlen	ctermid
ctermid_r	ctime
ctime_r	cuserid
daemon	
daylight	dbm_clearerr
dbm_close	dbm_delete
dbm_error	dbm_fetch
dbm_firstkey	dbm_nextkey
dbm_open	dbm_store
dcgettext	dcngettext
decimal_to_double	decimal_to_extended
decimal_to_quadruple	decimal_to_single
dgettext	difftime
directio	dirfd
dirname	div
dladdr	dladdr1
dlclose	dldump
dlerror	dlinfo
dlmopen	dlopen
dlsym	dngettext
door_bind	door_call

door_create	door_cred
door_getparam	door_info
door_return	door_revoke
door_server_create	door_setparam
door_ucred	door_unbind
door_xcreate	double_to_decimal
drand48	dup
dup2	econvert
ecvt	enable_extended_FILE_stdio
encrypt	endgrent
endnetgrent	endpwent
endspent	endusershell
endutent	endutxent
environ	erand48
err	errno
errx	euccol
euclen	eucscol
execl	execle
execlp	execv
execve	execvp
exit	extended_to_decimal
faccessat	
facl	fattach
fchdir	fchmod
fchown	fchownat
fchroot	fclose
fcntl	fconvert
fcvt	fdatasync
fdetach	

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fdopen	fdopendir
fdwalk	feof
ferror	fflush
ffs	fgetattr
fgetc	
fgetgrent	fgetgrent_r
fgetpos	fgetpwent
fgetpwent_r	fgets
fgetspent	fgetspent_r
fgetwc	fgetws
file_to_decimal	fileno
finite	flockfile
fmtmsg	fnmatch
fopen	fork
fork1	forkall
forkallx	forkx
fpathconf	fpclass
fpgetmask	fpgetround
fpgetsticky	fprintf
fpsetmask	fpsetround
fpsetsticky	fputc
fputs	fputwc
fputws	fread
free	freopen
frexp	fscanf
fseek	fseeko
fsetattr	
fsetpos	fstat
fstatat	fstatfs

fstatvfs	fsync
ftell	ftello
ftime	ftok
ftruncate	ftrylockfile
ftw	func_to_decimal
funlockfile	futimens
futimesat	
fwide	fwprintf
fwrite	fwscanf
gconvert	gcvt
getacct	getattrat
getc	
getc_unlocked	getchar
getchar_unlocked	getcontext
getcpuid	getcwd
getdate	getdate_err
getdents	getdtablesize
getegid	getenv
geteuid	getexecname
getextmntent	getgid
getgrent	getgrent_r
getgrgid	getgrgid_r
getgrnam	getgrnam_r
getgroups	gethomegroup
gethostid	gethostname
gethrtime	gethrvtime
getisax	getitimer
getloadavg	getlogin
getlogin_r	getmntany

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getmntent	getmsg
getnetgrent	getnetgrent_r
getopt	getopt_clip
getopt_long	getopt_long_only
getpagesize	getpagesizes
getpass	getpassphrase
getpeercred	getpflags
getpgid	getpgrp
getpid	getpmsg
getppid	getppriv
getpriority	getprojid
getpw	getpwent
getpwent_r	getpwnam
getpwnam_r	getpwuid
getpwuid_r	getrctl
getrlimit	getrusage
gets	getsid
getspent	getspent_r
getspnam	getspnam_r
getsubopt	gettaskid
gettext	gettimeofday
gettxt	getuid
getusershell	getustack
getutent	getutid
getutline	getutmp
getutmpx	getutxent
getutxid	getutxline
getvfsany	getvfSENT
getvfsfile	getvfSSpec

getw	getwc
getwchar	getwd
getwidth	getws
getzoneid	getzoneidbyname
getzonenambyid	glob
globfree	gmtime
gmtime_r	grantpt
gsignal	hasmntopt
hcreate	hdestroy
hsearch	iconv
iconv_close	iconv_open
imaxabs	imaxdiv
index	initgroups
initstate	innetgr
insque	ioctl
is_system_labeled	
isaexec	isalnum
isalpha	isascii
isastream	isatty
isblank	iscntrl
isdigit	isenglish
isgraph	isideogram
islower	isnan
isnand	isnanf
isnumber	isphonogram
isprint	ispunct
issetugid	isspace
isspecial	isupper
iswalnum	iswalph



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iswblank	iswcntrl
iswctype	iswdigit
iswgraph	iswlower
iswprint	iswpunct
iswspace	iswupper
iswxdigit	isxdigit
jrand48	kill
killpg	l64a
labs	ladd
lchown	lckpwn
lcong48	ldexp
ldivide	lexp10
lfind	lfmt
link	lio_listio
llabs	
lldiv	llog10
llseek	lltostr
localeconv	localtime
localtime_r	lockf
logb	lone
longjmp	lrnd48
lsearch	lseek
lshiffl	lstat
lsub	lten
lzero	madvise
makecontext	makeutx
malloc	mblen
mbrlen	mbrtowc
mbsinit	mbsrtowcs

mbstowcs	mbtowc
memalign	membar_consumer
membar_enter	membar_exit
membar_producer	memccpy
memchr	memcmp
memcntl	memcpy
meminfo	memmove
memset	mincore
mkdir	mkfifo
mknod	mkstemp
mktemp	mktime
mlock	mlockall
mmap	mmapobj
modctl	
modf	modff
modutx	monitor
mount	mprotect
mq_close	mq_getattr
mq_notify	mq_open
mq_receive	mq_reltimedreceive_np
mq_reltimedsend_np	mq_send
mq_setattr	mq_timedreceive
mq_timedsend	mq_unlink
rand48	msgctl
msgget	msgids
msgrcv	msgsnap
msgsnd	msync
munlock	munlockall
munmap	mutex_consistent

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mutex_destroy	mutex_init
mutex_lock	mutex_trylock
mutex_unlock	nanosleep
nextafter	
nfs_getfh	nftw
ngettext	nice
nl_langinfo	nrnd48
nss_default_finders	nss_delete
nss_endent	nss_getent
nss_search	nss_setent
ntp_adjtime	ntp_gettime
open	openat
opendir	openlog
optarg	opterr
optind	optopt
p_online	pathconf
pause	pclose
pcsample	perror
pfmt	pipe
plock	poll
popen	port_alert
port_associate	port_create
port_dissociate	port_get
port_getn	port_send
port_sendn	posix_fadvise
posix_fallocate	posix_madvise
posix_memalign	posix_openpt
posix_spawn	posix_spawn_file_actions_addclose
posix_spawn_file_actions_addclosefrom_np	posix_spawn_file_actions_adddup2

posix_spawn_file_actions_addopen	posix_spawn_file_actions_destroy
posix_spawn_file_actions_init	posix_spawnattr_destroy
posix_spawnattr_getflags	posix_spawnattr_getpgroup
posix_spawnattr_getschedparam	posix_spawnattr_getschedpolicy
posix_spawnattr_getsigdefault	posix_spawnattr_getsigignore_np
posix_spawnattr_getsigmask	posix_spawnattr_init
posix_spawnattr_setflags	posix_spawnattr_setpgroup
posix_spawnattr_setschedparam	posix_spawnattr_setschedpolicy
posix_spawnattr_setsigdefault	posix_spawnattr_setsigignore_np
posix_spawnattr_setsigmask	posix_spawnnp
pread	printf
printstack	priocntl
priocntlset	priv_addset
priv_allocset	priv_basicset
priv_copyset	
priv_delset	priv_emptyset
priv_fillset	priv_freeset
priv_getbyname	priv_getbynum
priv_getsetbyname	priv_getsetbynum
priv_gettext	priv_ineffect
priv_intersect	priv_inverse
priv_iseptyset	priv_isequalset
priv_isfullset	priv_ismember
priv_issubset	priv_set
priv_set_to_str	priv_str_to_set
priv_union	processor_bind
processor_info	profil
pselect	pset_assign
pset_bind	pset_create

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pset_destroy	pset_getattr
pset_getloadavg	pset_info
pset_list	pset_setattr
psiginfo	psignal
pthread_atfork	pthread_attr_destroy
pthread_attr_getdetachstate	pthread_attr_getguardsize
pthread_attr_getinheritsched	pthread_attr_getschedparam
pthread_attr_getschedpolicy	pthread_attr_getscope
pthread_attr_getstack	pthread_attr_getstackaddr
pthread_attr_getstacksize	pthread_attr_init
pthread_attr_setdetachstate	pthread_attr_setguardsize
pthread_attr_setinheritsched	pthread_attr_setschedparam
pthread_attr_setschedpolicy	pthread_attr_setscope
pthread_attr_setstack	pthread_attr_setstackaddr
pthread_attr_setstacksize	pthread_barrier_destroy
pthread_barrier_init	pthread_barrier_wait
pthread_barrierattr_destroy	pthread_barrierattr_getpshared
pthread_barrierattr_init	pthread_barrierattr_setpshared
pthread_cancel	pthread_cond_broadcast
pthread_cond_destroy	pthread_cond_init
pthread_cond_reltimedwait_np	pthread_cond_signal
pthread_cond_timedwait	pthread_cond_wait
pthread_condattr_destroy	pthread_condattr_getclock
pthread_condattr_getpshared	pthread_condattr_init
pthread_condattr_setclock	pthread_condattr_setpshared
pthread_create	pthread_detach
pthread_equal	pthread_exit
pthread_getconcurrency	pthread_getschedparam
pthread_getspecific	pthread_join

pthread_key_create	pthread_key_create_once_np
pthread_key_delete	
pthread_kill	pthread_mutex_consistent
pthread_mutex_destroy	pthread_mutex_getprioceiling
pthread_mutex_init	pthread_mutex_lock
pthread_mutex_reltimedlock_np	pthread_mutex_setprioceiling
pthread_mutex_timedlock	pthread_mutex_trylock
pthread_mutex_unlock	pthread_mutexattr_destroy
pthread_mutexattr_getprioceiling	pthread_mutexattr_getprotocol
pthread_mutexattr_getpshared	pthread_mutexattr_getrobust
pthread_mutexattr_gettype	pthread_mutexattr_init
pthread_mutexattr_setprioceiling	pthread_mutexattr_setprotocol
pthread_mutexattr_setpshared	pthread_mutexattr_setrobust
pthread_mutexattr_settype	pthread_once
pthread_rwlock_destroy	pthread_rwlock_init
pthread_rwlock_rdlock	pthread_rwlock_reltimedrdlock_np
pthread_rwlock_reltimedwrlock_np	pthread_rwlock_timedrdlock
pthread_rwlock_timedwrlock	pthread_rwlock_tryrdlock
pthread_rwlock_trywrlock	pthread_rwlock_unlock
pthread_rwlock_wrlock	pthread_rwlockattr_destroy
pthread_rwlockattr_getpshared	pthread_rwlockattr_init
pthread_rwlockattr_setpshared	pthread_self
pthread_setcancelstate	pthread_setcanceltype
pthread_setconcurrency	pthread_setspecific
pthread_sigmask	pthread_setschedparam
pthread_setschedprio	pthread_spin_destroy
pthread_spin_init	pthread_spin_lock
pthread_spin_trylock	pthread_spin_unlock
pthread_testcancel	ptsname

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putacct	putc
putc_unlocked	putchar
putchar_unlocked	putenv
putmsg	putpmsg
putpwent	puts
putspent	pututline
pututxline	putw
putwc	putwchar
putws	pwrite
qeconvert	qecvt
qfconvert	qfcvt
qgconvert	qgcvt
qsort	quadruple_to_decimal
raise	rand
rand_r	random
rctl_walk	rctlblk_get_enforced_value
rctlblk_get_firing_time	rctlblk_get_global_action
rctlblk_get_global_flags	rctlblk_get_local_action
rctlblk_get_local_flags	rctlblk_get_privilege
rctlblk_get_recipient_pid	rctlblk_get_value
rctlblk_set_local_action	rctlblk_set_local_flags
rctlblk_set_privilege	rctlblk_set_recipient_pid
rctlblk_set_value	rctlblk_size
re_comp	re_exec
read	readdir
readdir_r	readlink
readv	realloc
realpath	reboot
regcmp	regcomp

regerror	regex
regexec	regfree
remove	remque
rename	renameat
resetmnttab	resolvepath
rewind	rewinddir
rindex	rmdir
rw_rdlock	rw_read_held
rw_tryrdlock	rw_trywrlock
rw_unlock	rw_write_held
rw_wrlock	rwlock_destroy
rwlock_init	sbrk
scalb	scandir
scanf	sched_get_priority_max
sched_get_priority_min	sched_getparam
sched_getscheduler	sched_rr_get_interval
sched_setparam	sched_setscheduler
sched_yield	schedctl_exit
schedctl_init	schedctl_lookup
schedctl_start	schedctl_stop
seconvert	seed48
seekdir	select
sem_close	sem_destroy
sem_getvalue	sem_init
sem_open	sem_post
sem_reltimedwait_np	sem_timedwait
sem_trywait	sem_unlink
sem_wait	
sema_destroy	sema_held



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sema_init	sema_post
sema_trywait	sema_wait
semctl	semget
semids	semop
semtimedop	setattrat
setbuf	
setbuffer	setcat
setcontext	setegid
setenv	seteuid
setgid	setgrent
setgroups	sethostname
setitimer	setjmp
setkey	setlabel
setlinebuf	setlocale
setlogmask	setnetgrent
setpflags	setpgid
setpgrp	setppriv
setpriority	setpwent
setrctl	setregid
setreuid	setrlimit
setsid	setspent
setstate	settaskid
settimeofday	setuid
setusershell	setustack
setutent	setutxent
setvbuf	sfconvert
sgconvert	shm_open
shm_unlink	shmat
shmctl	shmdt

shmget	shmids
sig2str	sigaction
sigaddset	sigaltstack
sigdelset	sigemptyset
sigfillset	sigfpe
sighold	sigignore
siginterrupt	sigismember
siglongjmp	signal
sigpause	sigpending
sigprocmask	sigqueue
sigrelse	
sigsend	sigsendset
sigset	sigsetjmp
sigstack	sigsuspend
sigtimedwait	sigwait
sigwaitinfo	single_to_decimal
sleep	snprintf
sprintf	srand
srand48	srandom
sscanf	ssignal
stack_getbounds	stack_inbounds
stack_setbounds	stack_violation
stat	statfs
statvfs	stime
str2sig	strcasecmp
strcat	strchr
strcmp	strcoll
strcpy	strcspn
strdup	strerror

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strerror_r	strfmon
strftime	string_to_decimal
strlcat	strncpy
strlen	strncasecmp
strncat	strncmp
strncpy	strpbrk
strptime	strrchr
strsep	
strsignal	strspn
strstr	strtod
strtof	strtoimax
strtok	strtok_r
strtol	strtold
strtoll	strtoul
strtoull	strtoumax
strtows	strxfrm
swab	swapcontext
swapctl	swprintf
swscanf	symlink
sync	sync_instruction_memory
sysconf	sysfs
sysinfo	syslog
system	tcdrain
tcflow	tcflush
tcgetattr	tcgetpgrp
tcgetsid	tcsendbreak
tcsetattr	tcsetpgrp
tdelete	tell
telldir	tempnam

textdomain	tfind
thr_continue	thr_create
thr_exit	thr_getconcurrency
thr_getprio	thr_getspecific
thr_join	thr_keycreate
thr_keycreate_once	
thr_kill	thr_main
thr_min_stack	thr_self
thr_setconcurrency	thr_setprio
thr_setspecific	thr_sigsetmask
thr_stksegment	thr_suspend
thr_yield	time
timer_create	timer_delete
timer_getoverrun	timer_gettime
timer_settime	
times	timezone
tmpfile	tmpnam
tmpnam_r	toascii
tolower	toupper
towctrans	towlower
towupper	truncate
tsearch	ttyname
ttyname_r	ttyslot
twalk	tzname
tzset	u8_strcmp
u8_textprep_str	u8_validate
uadmin	
ualarm	uconv_u16tou32
uconv_u16tou8	uconv_u32tou16

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uconv_u32tou8	uconv_u8tou16
uconv_u8tou32	ucred_free
ucred_get	ucred_getegid
ucred_geteuid	ucred_getgroups
ucred_getpflags	ucred_getpid
ucred_getprivset	ucred_getprojid
ucred_getrgid	ucred_getruid
ucred_getsgid	ucred_getsuid
ucred_getzoneid	ucred_size
ulckpwdf	ulimit
ulltostr	umask
umount	umount2
uname	ungetc
ungetwc	unlink
unlinkat	unlockpt
unordered	unsetenv
updwtmp	updwtmpx
usleep	ustat
utime	utimensat
utimes	utmpname
utmpxname	uucopy
valloc	vasprintf
verr	verrx
vfork	vforkx
vfprintf	vfscanf
vwprintf	vwscanf
vhangup	vlfmt
vpfmt	vprintf
vscanf	vsnprintf

vsprintf	vsscanf
vswprintf	vswscanf
vsyslog	vwarn
vwarnx	vwprintf
vscanf	wait
wait3	wait4
waitid	waitpid
walkcontext	warn
warnx	watoll
wcrtomb	wscat
wcschr	wscmp
wscoll	wscopy
wscspn	wcsftime
wcslen	wcsncat
wcsncmp	wcsncpy
wcspbrk	wcsrchr
wcsrtombs	wcsspn
wcsstr	wcstod
wcstof	wcstoimax
wcstok	wcstol
wcstold	wcstoll
wcstombs	wcstoul
wcstoull	wcstoumax
wcswcs	wcswidth
wcsxfrm	wctob
wctomb	wctrans
wctype	wcwidth
wmemchr	wmemcmp
wmemcpy	wmemmove

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wmemset	wordexp
wordfree	wprintf
wracct	write
writev	wscanf
wscasecmp	wscat
wschr	wscmp
wscol	wscoll
wscopy	wscspn
wsdup	wslen
wsncasecmp	wsncat
wsncmp	wsncpy
wspbrk	wsprintf
wsrchr	wsscang
wssp	wstod
wstok	wstol
wstoll	wstostr
wsxfrm	yield

The following interfaces are unique to the 32-bit version of this library:

__div64	__mul64
__posix_readdir_r	__rem64
__udiv64	__urem64
_bufendtab	_lastbuf
_s_fcntl	_sys_nsig
_xftw64	aio_cancel64
aio_error64	aio_fsync64
aio_read64	aio_return64
aio_suspend64	aio_waitn64
aio_write64	creat64

fgetpos64	fopen64
freopen64	fseeko64
fsetpos64	fstat64
fstatvfs64	ftello64
ftruncate64	ftw64
getdents64	getrlimit64
lio_listio64	lockf64
lseek64	lstat64
mkstemp64	mmap64
nftw64	open64
pread64	ptrace
pwrite64	readdir64
readdir64_r	s_fcntl
s_ioctl	select_large_fdset
setrlimit64	stat64
statvfs64	sys_errlist
sys_nerr	tell64
tmpfile64	truncate64

The following interfaces are unique to the 32-bit SPARC version of this library:

.div	.mul
.rem	.stret1
.stret2	.stret4
.stret8	.udiv
.umul	.urem
_Q_add	_Q_cmp
_Q_cmpe	_Q_div
_Q_dtoq	_Q_feq
_Q_fge	_Q_fgt



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<code>_Q_fle</code>	<code>_Qflt</code>
<code>_Q_fne</code>	<code>_Q_itoq</code>
<code>_Q_lltoq</code>	<code>_Q_mul</code>
<code>_Q_neg</code>	<code>_Q_qtod</code>
<code>_Q_qtoi</code>	<code>_Q_qtoll</code>
<code>_Q_qtos</code>	<code>_Q_qtou</code>
<code>_Q_qtoull</code>	<code>_Q_sqrt</code>
<code>_Q_stoq</code>	<code>_Q_sub</code>
<code>_Q_ulltoq</code>	<code>_Q_utoq</code>
<code>__dtoll</code>	<code>__dtou</code>
<code>__dtoull</code>	<code>__ftoll</code>
<code>__ftou</code>	<code>__ftoull</code>
<code>__umul64</code>	

The following interfaces are unique to the 32-bit x86 version of this library:

<code>__fpstart</code>	<code>_fp_hw</code>
<code>_fpstart</code>	<code>_fxstat</code>
<code>_lxstat</code>	<code>_nuname</code>
<code>_thr_errno_addr</code>	<code>_xmknod</code>
<code>_xstat</code>	<code>nuname</code>

The following interfaces are unique to the 64-bit SPARC version of this library:

<code>_Qp_add</code>	<code>_Qp_cmp</code>
<code>_Qp_cmpe</code>	<code>_Qp_div</code>
<code>_Qp_dtoq</code>	<code>_Qp_feq</code>
<code>_Qp_fge</code>	<code>_Qp_fgt</code>
<code>_Qp_fle</code>	<code>_Qpflt</code>
<code>_Qp_fne</code>	<code>_Qp_itoq</code>

<code>_Qp_mul</code>	<code>_Qp_neg</code>
<code>_Qp_qtod</code>	<code>_Qp_qtoi</code>
<code>_Qp_qtos</code>	<code>_Qp_qtoui</code>
<code>_Qp_qtoux</code>	<code>_Qp_qtox</code>
<code>_Qp_sqrt</code>	<code>_Qp_stoq</code>
<code>_Qp_sub</code>	<code>_Qp_uitoq</code>
<code>_Qp_uxtoq</code>	<code>_Qp_xtoq</code>
<code>__align_cpy_1</code>	<code>__align_cpy_16</code>
<code>__align_cpy_2</code>	<code>__align_cpy_4</code>
<code>__align_cpy_8</code>	<code>__dtoul</code>
<code>__ftoul</code>	<code>__sparc_utrap_install</code>

**Files**

<code>/lib/libc.so.1</code>	shared object
<code>/lib/64/libc.so.1</code>	64-bit shared object
<code>/lib/c_synonyms.so.1</code>	A compatibility library to provide access to obsolete libc synonym symbols
<code>/lib/64/c_synonyms.so.1</code>	A 64-bit compatibility library to provide access to obsolete libc synonym symbols

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [attributes\(5\)](#), [lf64\(5\)](#), [standards\(5\)](#)

**Notes** The synonyms compatibility library, `c_synonyms.so.1`, provides a mechanism to support old applications and libraries that were mistakenly built using now-obsolete synonym symbols from `libc`.

Before the advent of direct binding (`-B direct`) `libc` provided many functions with two names. For example, `getpwent()` and `_getpwent()`. These two names referred to exactly the same function in `libc`. The leading-underscore symbol was intended to be used by system libraries in order to avoid conflicting with an application that might define its own version of

`getpwent()` with completely different semantics. Standard-conforming applications may not define and use function names with leading underscores.

Solaris system libraries are now built with direct binding. This means that a system library that calls `getpwent()` will bind directly to the instance of `getpwent()` in `libc`, even if the application to which it is linked defines a different `getpwent()` for its own use. The application binds to its instance of `getpwent()` and there is no resulting conflict. The direct binding mechanism is equally available to libraries not delivered with Solaris.

As a result of this evolution, most of the leading-underscore synonym symbols have been removed from `libc`. This means that applications that call these now-obsolete function names will cease to work. They will typically draw the error:

```
$ ./application
ld.so.1: fatal: relocation error: symbol _getpwent:
referenced symbol not found
Killed
```

All of the old leading-underscore symbols have been copied to the synonyms compatibility library. This library simply redirects the calls to the non-underscore instances of the corresponding functions in `libc`. Use it as a pre-loaded object:

```
$ LD_PRELOAD=c_synonyms.so.1 ./application
```

The synonyms compatibility library is intended neither to enable the generation of applications that call the obsolete leading-underscore synonym functions, nor to endorse this particular programming practice.

**Name** libc\_db – threads debugging library

**Synopsis**

```
cc [ flag ... ] file ... -lc_db [ library ... ]
#include <proc_service.h>
#include <thread_db.h>
```

**Description** The libc\_db library provides support for monitoring and manipulating threads-related aspects of a multithreaded program. There are at least two processes involved, the controlling process and one or more target processes. The controlling process is the libc\_db client, which links with libc\_db and uses libc\_db to inspect or modify threads-related aspects of one or more target processes. The target processes must be multithreaded processes that use libc. The controlling process might or might not be multithreaded itself.

The most commonly anticipated use for libc\_db is that the controlling process will be a debugger for a multithreaded program, hence the "db" in libc\_db.

The libc\_db library is dependent on the internal implementation details of libc. It is a "friend" of libc in the C++ sense, which is precisely the "value added" by libc\_db. It encapsulates the knowledge of libc internals that a debugger needs to manipulate the threads-related state of a target process.

To be able to inspect and manipulate target processes, libc\_db makes use of certain process control primitives that must be provided by the process using libc\_db. The imported interfaces are defined in [proc\\_service\(3PROC\)](#). In other words, the controlling process is linked with libc\_db and calls routines in libc\_db. In turn, libc\_db calls certain routines that it expects the controlling process to provide. These process control primitives allow libc\_db to:

- Look up symbols in a target process.
- Stop and continue individual lightweight processes ( LWPs) within a target process.
- Stop and continue an entire target process.
- Read and write memory and registers in a target process.

Initially, a controlling process obtains a handle for a target process. Through that handle it can then obtain handles for the component objects of the target process, its threads, its synchronization objects, and its thread-specific-data keys.

When libc\_db needs to return sets of handles to the controlling process, for example, when returning handles for all the threads in a target process, it uses an iterator function. An iterator function calls back a client-specified function once for each handle to be returned, passing one handle back on each call to the callback function. The calling function also passes another parameter to the iterator function, which the iterator function passes on to the callback function. This makes it easy to build a linked list of thread handles for a particular target process. The additional parameter is the head of the linked list, and the callback function simply inserts the current handle into the linked list.

Callback functions are expected to return an integer. Iteration terminates early if a callback function returns a non-zero value. Otherwise, iteration terminates when there are no more handles to pass back.

**Interfaces** The shared object `libc_db.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>td_init</code>	<code>td_log</code>
<code>td_sync_get_info</code>	<code>td_sync_get_stats</code>
<code>td_sync_setstate</code>	<code>td_sync_waiters</code>
<code>td_ta_clear_event</code>	<code>td_ta_delete</code>
<code>td_ta_enable_stats</code>	<code>td_ta_event_addr</code>
<code>td_ta_event_getmsg</code>	<code>td_ta_get_nthreads</code>
<code>td_ta_get_ph</code>	<code>td_ta_get_stats</code>
<code>td_ta_map_addr2sync</code>	<code>td_ta_map_id2thr</code>
<code>td_ta_map_lwp2thr</code>	<code>td_ta_new</code>
<code>td_ta_reset_stats</code>	<code>td_ta_set_event</code>
<code>td_ta_setconcurrency</code>	<code>td_ta_sync_iter</code>
<code>td_ta_sync_tracking_enable</code>	<code>td_ta_thr_iter</code>
<code>td_ta_tsd_iter</code>	<code>td_thr_clear_event</code>
<code>td_thr_dbresume</code>	<code>td_thr_dbsuspend</code>
<code>td_thr_event_enable</code>	<code>td_thr_event_getmsg</code>
<code>td_thr_get_info</code>	<code>td_thr_getfpregs</code>
<code>td_thr_getgregs</code>	<code>td_thr_getxregs</code>
<code>td_thr_getxregsize</code>	<code>td_thr_lockowner</code>
<code>td_thr_set_event</code>	<code>td_thr_setfpregs</code>
<code>td_thr_setgregs</code>	<code>td_thr_setprio</code>
<code>td_thr_setsigpending</code>	<code>td_thr_setxregs</code>
<code>td_thr_sigsetmask</code>	<code>td_thr_sleepinfo</code>
<code>td_thr_tsd</code>	<code>td_thr_validate</code>

**Files** /lib/libc\_db.so.1 shared object  
/lib/64/libc\_db.so.1 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [Intro\(3\)](#), [td\\_ta\\_new\(3C\\_DB\)](#), [attributes\(5\)](#), [threads\(5\)](#)

**Name** libcfgadm – configuration administration library

**Synopsis** `cc [ flag... ] file... -lcfgadm -ldevinfo -ldl [ library.. ]  
#include <config_admin.h>`

**Description** Functions in this library provide services for configuration administration.

**Interfaces** The shared object `libcfgadm.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>config_ap_id_cmp</code>	<code>config_change_state</code>
<code>config_help</code>	<code>config_list</code>
<code>config_list_ext</code>	<code>config_private_func</code>
<code>config_stat</code>	<code>config_strerror</code>
<code>config_test</code>	<code>config_unload_libs</code>

**Files** `/usr/lib/libcfgadm.so.1` shared object  
`/usr/lib/64/libcfgadm.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Mt-Safe

**See Also** [pvs\(1\)](#), [cfgadm\(1M\)](#), [Intro\(3\)](#), [config\\_admin\(3CFGADM\)](#), [attributes\(5\)](#)

**Name** libcommputil – communication protocol parser utilities library

**Synopsis** `cc [ flag... ] file... -lcommputil [ library... ]  
#include <sdp.h>`

**Description** The communication protocol parser utilities library is a placeholder for public interfaces that facilitate parsing of various communication protocols. Functions in this library parse the SDP (Session Description Protocol) description, check for syntax conformance, and generate SDP descriptions.

SDP (Session Description Protocol), described in RFC 4566, describes multimedia sessions for the purposes of session announcement, session invitation, and other forms of multimedia session initiation. SDP is used to convey session information in Session Initiation Protocol (SIP), Streaming Media (Real Time Streaming Protocol, RTSP), email, and World Wide Web and Multicast Session Announcement.

**Interfaces** The shared object `libcommputil.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>sdp_add_attribute</code>	<code>sdp_add_bandwidth</code>
<code>sdp_add_connection</code>	<code>sdp_add_email</code>
<code>sdp_add_information</code>	<code>sdp_add_key</code>
<code>sdp_add_media</code>	<code>sdp_add_name</code>
<code>sdp_add_origin</code>	<code>sdp_add_phone</code>
<code>sdp_add_repeat</code>	<code>sdp_add_time</code>
<code>sdp_add_uri</code>	<code>sdp_add_zone</code>
<code>sdp_clone_session</code>	<code>sdp_delete_attribute</code>
<code>sdp_delete_field</code>	<code>sdp_delete_media</code>
<code>sdp_delete_media_field</code>	<code>sdp_find_attribute</code>
<code>sdp_find_media</code>	<code>sdp_find_media_rtpmap</code>
<code>sdp_free_session</code>	<code>sdp_new_session</code>
<code>sdp_parse</code>	<code>sdp_session_to_str</code>

**Files** `/lib/libcommputil.so.1` shared object.  
`/lib/64/libcommputil.so.1` 64-bit shared object.



**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libcontract – contract management library

**Synopsis** `cc [ flag... ] 'getconf LFS_CFLAGS' file... -lcontract [ library... ]  
#include <libcontract.h>`

**Description** Functions in this library provide various interfaces to interact with the [contract\(4\)](#) file system. The header provides structure and function declarations for all library interfaces.

**Interfaces** The shared object `libcontract.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>ct_ctl_abandon</code>	<code>ct_ctl_ack</code>
<code>ct_ctl_adopt</code>	<code>ct_ctl_nack</code>
<code>ct_ctl_newct</code>	<code>ct_ctl_qack</code>
<code>ct_dev_status_get_aset</code>	<code>ct_dev_status_get_dev_state</code>
<code>ct_dev_status_get_minor</code>	<code>ct_dev_status_get_noneg</code>
<code>ct_dev_tmpl_clear_noneg</code>	<code>ct_dev_tmpl_get_aset</code>
<code>ct_dev_tmpl_get_minor</code>	<code>ct_dev_tmpl_get_noneg</code>
<code>ct_dev_tmpl_set_aset</code>	<code>ct_dev_tmpl_set_minor</code>
<code>ct_dev_tmpl_set_noneg</code>	<code>ct_event_free</code>
<code>ct_event_get_ctid</code>	<code>ct_event_get_evid</code>
<code>ct_event_get_flags</code>	<code>ct_event_get_nevid</code>
<code>ct_event_get_newct</code>	<code>ct_event_get_type</code>
<code>ct_event_read</code>	<code>ct_event_read_critical</code>
<code>ct_event_reliable</code>	<code>ct_event_reset</code>
<code>ct_pr_event_get_exitstatus</code>	<code>ct_pr_event_get_gcorefile</code>
<code>ct_pr_event_get_pcorefile</code>	<code>ct_pr_event_get_pid</code>
<code>ct_pr_event_get_ppid</code>	<code>ct_pr_event_get_sender</code>
<code>ct_pr_event_get_senderct</code>	<code>ct_pr_event_get_signal</code>
<code>ct_pr_event_get_zcorefile</code>	<code>ct_pr_status_get_contracts</code>
<code>ct_pr_status_get_fatal</code>	<code>ct_pr_status_get_members</code>
<code>ct_pr_status_get_param</code>	<code>ct_pr_status_get_aux</code>
<code>ct_pr_status_get_creator</code>	<code>ct_pr_status_get_ctid</code>

<code>ct_pr_status_get_fmri</code>	<code>ct_pr_tmpl_get_fatal</code>
<code>ct_pr_tmpl_get_param</code>	<code>ct_pr_tmpl_get_transfer</code>
<code>ct_pr_tmpl_set_fatal</code>	<code>ct_pr_tmpl_set_param</code>
<code>ct_pr_tmpl_set_transfer</code>	<code>ct_status_free</code>
<code>ct_status_get_cookie</code>	<code>ct_status_get_critical</code>
<code>ct_status_get_holder</code>	<code>ct_status_get_id</code>
<code>ct_status_get_informative</code>	<code>ct_status_get_nevents</code>
<code>ct_status_get_nevid</code>	<code>ct_status_get_ntime</code>
<code>ct_status_get_qtime</code>	<code>ct_status_get_state</code>
<code>ct_status_get_type</code>	<code>ct_status_get_zoneid</code>
<code>ct_status_read</code>	<code>ct_tmpl_activate</code>
<code>ct_tmpl_clear</code>	<code>ct_tmpl_create</code>
<code>ct_tmpl_get_cookie</code>	<code>ct_tmpl_get_critical</code>
<code>ct_tmpl_get_informative</code>	<code>ct_tmpl_get_svc_aux</code>
<code>ct_tmpl_get_svc_fmri</code>	<code>ct_tmpl_set_cookie</code>
<code>ct_tmpl_set_critical</code>	<code>ct_tmpl_set_informative</code>
<code>ct_tmpl_set_svc_aux</code>	<code>ct_tmpl_set_svc_fmri</code>

**Files** `/usr/lib/libcontract.so.1` shared object  
`/usr/lib/64/libcontract.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
Interface Stability	Committed
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [contract\(4\)](#), [attributes\(5\)](#), [lfcompile\(5\)](#)

**Name** libcpc – CPU performance counter library

**Synopsis** `cc [ flag... ] file... -lcpc [ library... ]`

**Description** Functions in this library provide access to CPU performance counters on platforms that contain the appropriate hardware.

**Interfaces** The shared object `libcpc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>cpc_access</code>	<code>cpc_bind_cpu</code>
<code>cpc_bind_curlwp</code>	<code>cpc_bind_event</code>
<code>cpc_bind_pctx</code>	<code>cpc_buf_add</code>
<code>cpc_buf_copy</code>	<code>cpc_buf_create</code>
<code>cpc_buf_destroy</code>	<code>cpc_buf_get</code>
<code>cpc_buf_hrttime</code>	<code>cpc_buf_set</code>
<code>cpc_buf_sub</code>	<code>cpc_buf_tick</code>
<code>cpc_buf_zero</code>	<code>cpc_caps</code>
<code>cpc_cciname</code>	<code>cpc_close</code>
<code>cpc_cpuref</code>	<code>cpc_count_sys_events</code>
<code>cpc_count_usr_events</code>	<code>cpc_disable</code>
<code>cpc_enable</code>	<code>cpc_event_accum</code>
<code>cpc_event_diff</code>	<code>cpc_eventtostr</code>
<code>cpc_getcciname</code>	<code>cpc_getcpuref</code>
<code>cpc_getcpuver</code>	<code>cpc_getnpic</code>
<code>cpc_getusage</code>	<code>cpc_npics</code>
<code>cpc_open</code>	<code>cpc_pctx_bind_event</code>
<code>cpc_pctx_invalidate</code>	<code>cpc_pctx_rele</code>
<code>cpc_pctx_take_sample</code>	<code>cpc_rele</code>
<code>cpc_request_preset</code>	<code>cpc_set_add_request</code>
<code>cpc_set_create</code>	<code>cpc_set_destroy</code>
<code>cpc_set_restart</code>	<code>cpc_set_sample</code>
<code>cpc_seterrfn</code>	<code>cpc_seterrhdlr</code>

cpc_shared_bind_event	cpc_shared_close
cpc_shared_open	cpc_shared_rele
cpc_shared_take_sample	cpc_strtoevent
cpc_take_sample	cpc_unbind
cpc_version	cpc_walk_attr
cpc_walk_events_all	cpc_walk_events_pic
cpc_walk_generic_events_all	cpc_walk_generic_events_pic
cpc_walk_names	cpc_walk_requests

**Files** /usr/lib/libcpc.so.1      shared object  
 /usr/lib/64/libcpc.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcpcu
MT-Level	Safe

**See Also** [cputrack\(1\)](#), [cpustat\(1M\)](#), [Intro\(3\)](#), [cpc\(3CPC\)](#), [attributes\(5\)](#), [xVM\(5\)](#)

**Notes** There is no support for access to performance counters in the [xVM\(5\)](#) environment. The -h operations for [cputrack\(1\)](#) are not enabled.



**Name** libcurses, libtermcap, libtermLib – screen handling and optimization library

**Synopsis** `cc [ flag... ] file... -lcurses [ library... ]`

**Description** Functions in the `libcurses` library provide a terminal-independent method of updating character screens with reasonable optimization. The `libtermcap` and `libtermLib` libraries are identical to `libcurses` and are maintained for backward compatibility.

See [libcurses\(3XCURSES\)](#) for information about the `curses` library that conforms to X/Open Curses, Issue 4, Version 2.

**Interfaces** The shared objects `libcurses.so.1`, `libtermcap.so.1`, and `libtermLib.so.1` provide the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>_getsyx</code>	<code>_meta</code>
<code>_ring</code>	<code>_setecho</code>
<code>_setnonl</code>	<code>_setqiflush</code>
<code>addch</code>	<code>addchnstr</code>
<code>addchstr</code>	<code>addnstr</code>
<code>addnwstr</code>	<code>addstr</code>
<code>addwch</code>	<code>addwchnstr</code>
<code>addwchstr</code>	<code>addwstr</code>
<code>attroff</code>	<code>attron</code>
<code>attrset</code>	<code>baudrate</code>
<code>beep</code>	<code>bkgd</code>
<code>bkgdset</code>	<code>border</code>
<code>box</code>	<code>can_change_color</code>
<code>cbreak</code>	<code>clear</code>
<code>clearok</code>	<code>clrtoebot</code>
<code>clrtoeol</code>	<code>color_content</code>
<code>copywin</code>	<code>crmode</code>
<code>curs_set</code>	<code>curserr</code>
<code>def_prog_mode</code>	<code>def_shell_mode</code>
<code>del_curterm</code>	<code>delay_output</code>

delch	deleteln
delkeymap	delscreen
delwin	derwin
doupdate	dupwin
echo	echochar
echowchar	endwin
erase	erasechar
filter	flash
flushinp	getbmap
getch	getmouse
getnwstr	getstr
getwch	getwin
getwstr	halfdelay
has_colors	has_ic
has_il	idcok
idlok	immedok
inch	inchnstr
inchstr	init_color
init_pair	initscr
innstr	innwstr
insch	insdelln
insertln	insnstr
insnwstr	insstr
instr	inswch
inswstr	intrflush
inwch	inwchnstr
inwchstr	inwstr
is_linetouched	is_wintouched
isendwin	keyname



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keypad	killchar
leaveok	longname
m_addch	m_addstr
m_clear	m_erase
m_initscr	m_move
m_newterm	m_refresh
map_button	meta
mouse_off	mouse_on
mouse_set	move
mvaddch	mvaddchnstr
mvaddchstr	mvaddnstr
mvaddnwstr	mvaddstr
mvaddwch	mvaddwchnstr
mvaddwchstr	mvaddwstr
mvcur	mvdelch
mvderwin	mvgetch
mvgetnwstr	mvgetstr
mvgetwch	mvgetwstr
mvinch	mvinchnstr
mvinchstr	mvinnstr
mvinnwstr	mvinsch
mvinsnstr	mvinsnwstr
mvinsstr	mvinstr
mvinswch	mvinswstr
mvinwch	mvinwchnstr
mvinwchstr	mvinwstr
mvprintw	mvscanw
mwaddch	mwaddchnstr
mwaddchstr	mwaddnstr

mvwaddnwstr	mvwaddstr
mvwaddwch	mvwaddwchnstr
mvwaddwchstr	mvwaddwstr
mvwdelch	mvwgetch
mvwgetnwstr	mvwgetstr
mvwgetwch	mvwgetwstr
mvwin	mvwinch
mvwinchnstr	mvwinchstr
mvwinnstr	mvwinnwstr
mvwinsch	mvwinsnstr
mvwinsnwstr	mvwinsstr
mvwinstr	mvwinswch
mvwinswstr	mvwinwch
mvwinwchnstr	mvwinwchstr
mvwinwstr	mvwprintw
mvwscanw	napms
newkey	newpad
newscreen	newterm
newwin	nl
nocbreak	nocrmode
nodelay	noecho
nonl	noqiflush
noraw	notimeout
overlay	overwrite
pair_content	pechochar
pechowchar	pnoutrefresh
prefresh	printw
putp	putwin
qiflush	raw

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redrawwin	refresh
request_mouse_pos	reset_prog_mode
reset_shell_mode	resetty
restartterm	ripoffline
savetty	scanw
scr_dump	scr_init
scr_restore	scr_set
scrl	scroll
scrollok	set_term
setcurscreen	setscreg
setsyx	setterm
setupterm	slk_attroff
slk_attron	slk_attrset
slk_clear	slk_init
slk_label	slk_noutrefresh
slk_refresh	slk_restore
slk_set	slk_start
slk_touch	standend
standout	start_color
subpad	subwin
syncok	termattrs
termname	tgetent
tgetflag	tgetnum
tgetstr	tgoto
tigetflag	tigetnum
tigetstr	timeout
touchline	touchwin
tparm	tputs
traceoff	traceon

typeahead	unctrl
ungetch	ungetwch
untouchwin	vidattr
vidputs	vidupdate
vwprintw	vwscanw
waddch	waddchnstr
waddchstr	waddnstr
waddnwstr	waddstr
waddwch	waddwchnstr
waddwchstr	waddwstr
wadjcurspos	wattroff
wattron	wattrset
wbkgd	wbkgdset
wborder	wclear
wclrtoebot	wclrtoeol
wcursyncup	wdelch
wdeleteln	wechochar
wchowchar	werase
wgetch	wgetnstr
wgetnwstr	wgetstr
wgetwch	wgetwstr
whline	winch
winchnstr	winchstr
winnstr	winnwstr
winsch	winsdelln
winsertln	winsnstr
winsnwstr	winsstr
winstr	winswch
winswstr	winwch

winchnstr	winwchstr
winwstr	wmouse_position
wmove	wmovenextch
wmoveprevch	wnoutrefresh
wprintw	wredrawln
wrefresh	wscanw
wscr1	wsetscrreg
wstandend	wstandout
wsyncdown	wsyncup
wtimeout	wtouchln
wline	

**Files**

/lib/libcurses.so.1	shared object
/lib/64/libcurses.so.1	64-bit shared object
/lib/libtermcap.so.1	shared object (symbolic link to /lib/libcurses.so.1)
/lib/64/libtermcap.so.1	64-bit shared object (symbolic link to /lib/64/libcurses.so.1)
/lib/libterm1ib.so.1	shared object (symbolic link to /lib/libcurses.so.1)
/lib/64/libterm1ib.so.1	64-bit shared object (symbolic link to /lib/64/libcurses.so.1)

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [curses\(3CURSES\)](#), [libcurses\(3XCURSES\)](#), [attributes\(5\)](#)

**Name** libdat – direct access transport library

**Synopsis** `cc [ flag... ] file... -ldat [ library... ]  
#include <dat/udat.h>`

**Description** The libdat library provides an application with the User Direct Access Programming Library (uDAPL) 1.2 functions to access the underlying RDMA-able interconnects. Different uDAPL service providers listed in the DAT static registry `dat.conf(4)` can be registered during runtime with the DAT library. After an application opens an interface adapter belonging to a particular service provider, all function calls will be redirected to that service provider's library.

**Interfaces** The shared object `libdat.so.1` provides the public interfaces defined below for applications. See [Intro\(3\)](#) for additional information on shared object interfaces.

uDAPL 1.1	<code>dat_cno_create</code>	<code>dat_cno_free</code>
	<code>dat_cno_modify_agent</code>	<code>dat_cno_query</code>
	<code>dat_cno_wait</code>	<code>dat_cr_accept</code>
	<code>dat_cr_handoff</code>	<code>dat_cr_query</code>
	<code>dat_cr_reject</code>	<code>dat_ep_connect</code>
	<code>dat_ep_create</code>	<code>dat_ep_disconnect</code>
	<code>dat_ep_dup_connect</code>	<code>dat_ep_free</code>
	<code>dat_ep_get_status</code>	<code>dat_ep_modify</code>
	<code>dat_ep_post_rdma_read</code>	<code>dat_ep_post_rdma_write</code>
	<code>dat_ep_post_recv</code>	<code>dat_ep_post_send</code>
	<code>dat_ep_query</code>	<code>dat_ep_reset</code>
	<code>dat_evd_clear_unwaitable</code>	<code>dat_evd_create</code>
	<code>dat_evd_dequeue</code>	<code>dat_evd_disable</code>
	<code>dat_evd_enable</code>	<code>dat_evd_free</code>
	<code>dat_evd_modify_cno</code>	<code>dat_evd_post_se</code>
	<code>dat_evd_query</code>	<code>dat_evd_resize</code>
	<code>dat_evd_set_unwaitable</code>	<code>dat_evd_wait</code>
	<code>dat_get_consumer_context</code>	<code>dat_get_handle_type</code>
	<code>dat_ia_close</code>	<code>dat_ia_open</code>
	<code>dat_ia_query</code>	<code>dat_lmr_create</code>

	<code>dat_lmr_free</code>	<code>dat_lmr_query</code>
	<code>dat_provider_fini</code>	<code>dat_provider_init</code>
	<code>dat_psp_create</code>	<code>dat_psp_create_any</code>
	<code>dat_psp_free</code>	<code>dat_psp_query</code>
	<code>dat_pz_create</code>	<code>dat_pz_free</code>
	<code>dat_pz_query</code>	<code>dat_registry_list_providers</code>
	<code>dat_rmr_bind</code>	<code>dat_rmr_create</code>
	<code>dat_rmr_free</code>	<code>dat_rmr_query</code>
	<code>dat_rsp_create</code>	<code>dat_rsp_free</code>
	<code>dat_rsp_query</code>	<code>dat_set_consumer_context</code>
	<code>dat_strerror</code>	
uDAPL 1.2	<code>dat_ep_create_with_srq</code>	<code>dat_ep_recv_query</code>
	<code>dat_ep_set_watermark</code>	<code>dat_lmr_sync_rdma_read</code>
	<code>dat_lmr_sync_rdma_write</code>	<code>dat_srq_create</code>
	<code>dat_srq_free</code>	<code>dat_srq_post_recv</code>
	<code>dat_srq_query</code>	<code>dat_srq_resize</code>
	<code>dat_srq_set_lw</code>	

The shared object `libdat.so.1` also provides the public interfaces defined below for service providers.

<code>dat_registry_add_provider</code>	<code>dat_registry_remove_provider</code>
--	---

**Files** `/usr/lib/libdat.so.1` shared object  
`/usr/lib/64/libdat.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWudaplu (user) SUNWudaplr (root)

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard: uDAPL, 1.1, 1.2
MT-Level	Unsafe

**See Also** [datadm\(1M\)](#), [Intro\(3\)](#), [dat.conf\(4\)](#), [attributes\(5\)](#)

**Notes** The `libdat` library supports service providers written according to the uDAPL 1.2 specification. A service provider library has to be a dynamic loadable shared object with two public entry points exported:

`dat_provider_init`

`dat_provider_fini`

In terms of installation, the service provider package should include a [service\\_provider.conf\(4\)](#) file. The [datadm\(1M\)](#) administrative configuration program should be used to add and remove service provider's entries in the system-wide [dat.conf\(4\)](#).



**Name** libdevid – device ID library

**Synopsis** `cc [ flag... ] file... -ldevid [ library... ]  
#include <devid.h>`

**Description** Functions in this library provide unique device IDs for identifying a device, independent of the device name or device number.

**Interfaces** The shared object `libdevid.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>devid_compare</code>	<code>devid_deviceid_to_nmlist</code>
<code>devid_free</code>	<code>devid_free_nmlist</code>
<code>devid_get</code>	<code>devid_get_minor_name</code>
<code>devid_sizeof</code>	<code>devid_str_decode</code>
<code>devid_str_encode</code>	<code>devid_str_free</code>
<code>devid_valid</code>	

**Files** `/lib/libdevid.so.1` shared object.

`/lib/64/libdevid.so.1` 64-bit shared object.

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Stable
MT-Level	MT-Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libdevinfo – device information library

**Synopsis**

```
cc [ flag... ] file... -ldevinfo [ library... ]
#include <libdevinfo.h>
```

**Description** Functions in this library access device configuration information.

Device configuration data is organized as a tree of device nodes, defined as `di_node_t` in the `libdevinfo` interfaces. Each `di_node_t` represents a physical or logical (pseudo) device. The types of data associated with device nodes are:

- data defined for all device nodes (attributes)
- data defined for all multipath path nodes
- data defined for all minor node data
- properties specific to nodes

All device nodes have a set of common attributes, such as a node name, an instance number, and a driver binding name. Common device node attributes are accessed by calling interfaces listed on the `di_binding_name(3DEVINFO)` manual page. Each device node also has a physical path, which is accessed by calling `di_devfs_path(3DEVINFO)`.

Properties provide device specific information for device configuration and usage. Properties can be defined by software (`di_prop_t`) or by firmware (`di_prom_prop_t`). One way to access each `di_prop_t` is to make successive calls to `di_prop_next(3DEVINFO)` until `DI_PROP_NIL` is returned. For each `di_prop_t`, use interfaces on the `di_prop_bytes(3DEVINFO)` manual page to obtain property names and values. Another way to access these properties is to call `di_prop_lookup_bytes(3DEVINFO)` to find the value of a property with a given name. Accessing a `di_prom_prop_t` is similar to accessing a `di_prop_t`, except that the interface names start with `di_prom_prop` and additional calls to `di_prom_init(3DEVINFO)` and `di_prom_fini(3DEVINFO)` are required.

Minor nodes contain information exported by the device for creating special files for the device. Each device node has 0 or more minor nodes associated with it. A list of minor nodes (`di_minor_t`) can be obtained by making successive calls to `di_minor_next(3DEVINFO)` until `DI_MINOR_NIL` is returned. For each minor node, `di_minor_devt(3DEVINFO)` and related interfaces are called to get minor node data.

In some configurations, multipath device access via a virtual host controller interface (vHCI) abstraction is possible. An example of a driver using this abstraction is `scsi_vhci(7D)`. In such cases, devices are not directly represented as children of their physical host controller interface (pHCI) bus adapter. Instead, devices have an identity-oriented representation as a child of a vHCI. All paths leading to the same identity are represented by a common child endpoint of the vHCI called the “client” device node. The vHCI virtualizes access among the underlying pHCI physical paths. The underlying connection between vHCI-managed client endpoints and the pHCI paths to that endpoint is represented by a class of nodes called “path” nodes (`di_path_t`).

Each path node is associated with two device nodes: its pHCI device node, and its client device node. A list of paths associated with a specific pHCI device node can be obtained using [di\\_path\\_phci\\_next\\_path\(3DEVINFO\)](#), and a list of paths associated with a specific client device node can be obtained using [di\\_path\\_client\\_next\\_path\(3DEVINFO\)](#). These functions return `DI_PATH_NIL` when the end of the list of path nodes is reached.

For each path node, [di\\_path\\_state\(3DEVINFO\)](#) and related interfaces are called to get path node data.

Using `libdevinfo` involves three steps:

- Creating a snapshot of the device tree
- Traversing the device tree to get information of interest
- Destroying the snapshot of the device tree

A snapshot of the device tree is created by calling [di\\_init\(3DEVINFO\)](#) and destroyed by calling [di\\_fini\(3DEVINFO\)](#). An application can specify the data to be included in the snapshot (full or partial tree, include or exclude properties and minor nodes) and get a handle to the root of the device tree. See [di\\_init\(3DEVINFO\)](#) for details. The application then traverses the device tree in the snapshot to obtain device configuration data.

The device tree is normally traversed through parent-child-sibling linkage. Each device node contains references to its parent, its next sibling, and the first of its children. Given the `di_node_t` returned from [di\\_init\(\)](#), one can find all children by first calling [di\\_child\\_node\(3DEVINFO\)](#), followed by successive calls to [di\\_sibling\\_node\(3DEVINFO\)](#) until `DI_NODE_NIL` is returned. By following this procedure recursively, an application can visit all device nodes contained in the snapshot. Two interfaces, [di\\_walk\\_node\(3DEVINFO\)](#) and [di\\_walk\\_minor\(3DEVINFO\)](#) functions are provided to facilitate device tree traversal. The [di\\_walk\\_node\(\)](#) function visits all device nodes and executes a user-supplied callback function for each node visited. The [di\\_walk\\_minor\(\)](#) function does the same for each minor node in the device tree.

An alternative way to traverse the device tree is through the per-driver device node linkage. Device nodes contain a reference to the next device node bound to the same driver. Given the `di_node_t` returned from [di\\_init\(\)](#), an application can find all device nodes bound to a driver by first calling [di\\_drv\\_first\\_node\(3DEVINFO\)](#), followed by successive calls to [di\\_drv\\_next\\_node\(3DEVINFO\)](#) until `DI_NODE_NIL` is returned. Traversing the per-driver device node list works only when the snapshot includes all device nodes.

See [di\\_init\(3DEVINFO\)](#) for examples of `libdevinfo` usage. See *Writing Device Drivers* for information about Solaris device configuration.

**Interfaces** The shared object `libdevinfo.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

di_binding_name	di_bus_addr
di_child_node	di_compatible_names
di_devfs_minor_path	di_devfs_path
di_devfs_path_free	di_devid
di_driver_major	di_driver_name
di_driver_ops	di_drv_first_node
di_drv_next_node	di_fini
di_init	di_instance
di_link_next_by_lnode	di_link_next_by_node
di_link_private_get	di_link_private_set
di_link_spectype	di_link_to_lnode
di_lnode_devinfo	di_lnode_devt
di_lnode_name	di_lnode_next
di_lnode_private_get	di_lnode_private_set
di_minor_devt	di_minor_name
di_minor_next	di_minor_nodetype
di_minor_private_get	di_minor_private_set
di_minor_spectype	di_minor_type
di_node_name	di_node_private_get
di_node_private_set	di_nodeid
di_parent_node	di_path_bus_addr
di_path_client_devfs_path	di_path_client_next_path
di_path_client_node	di_path_devfs_path
di_path_instance	di_path_node_name
di_path_phci_next_path	di_path_phci_node
di_path_prop_bytes	di_path_prop_int64s
di_path_prop_ints	di_path_prop_len
di_path_prop_lookup_bytes	di_path_prop_lookup_int64s
di_path_prop_lookup_ints	di_path_prop_lookup_strings

di_path_prop_name	di_path_prop_strings
di_path_prop_next	di_path_prop_type
di_path_state	di_prom_fini
di_prom_init	di_prom_prop_data
di_prom_prop_lookup_bytes	di_prom_prop_lookup_ints
di_prom_prop_lookup_strings	di_prom_prop_name
di_prom_prop_next	di_prop_bytes
di_prop_devt	di_prop_int64
di_prop_ints	di_prop_lookup_bytes
di_prop_lookup_int64	di_prop_lookup_ints
di_prop_lookup_strings	di_prop_name
di_prop_next	di_prop_strings
di_prop_type	di_sibling_node
di_state	di_walk_link
di_walk_lnode	di_walk_minor
di_walk_node	

### Examples EXAMPLE 1 Information accessible through libdevinfo interfaces

The following example illustrates the kind of information accessible through libdevinfo interfaces for a device node representing a hard disk (sd2):

#### Attributes

```
node name: sd
instance: 2
physical path: /sbus@1f,0/espdma@e,8400000/esp@e,8800000/sd@2,0
```

#### Properties

```
target=2
lun=0
```

#### Minor nodes

```
(disk partition /dev/dsk/c0t2d0s0)
name: a
dev_t: 0x0080010 (32/16)
spectype: IF_BLK (block special)
(disk partition /dev/rdisk/c0t2d0s2)
name: c,raw
dev_t: 0x0080012 (32/18)
```

**EXAMPLE 1** Information accessible through libdevinfo interfaces *(Continued)*

spectype: IF\_CHR (character special)

**Files** /lib/libdevinfo.so.1 shared object  
 /usr/lib/64/libdevinfo.so.1 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl, SUNWstatl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	Safe

**See Also** [pvs\(1\)](#), [devlinks\(1M\)](#), [prtconf\(1M\)](#), [Intro\(3\)](#), [di\\_binding\\_name\(3DEVINFO\)](#), [di\\_child\\_node\(3DEVINFO\)](#), [di\\_devfs\\_path\(3DEVINFO\)](#), [di\\_init\(3DEVINFO\)](#), [di\\_minor\\_devt\(3DEVINFO\)](#), [di\\_minor\\_next\(3DEVINFO\)](#), [di\\_path\\_bus\\_addr\(3DEVINFO\)](#), [di\\_path\\_client\\_next\\_path\(3DEVINFO\)](#), [di\\_path\\_prop\\_bytes\(3DEVINFO\)](#), [di\\_path\\_prop\\_lookup\\_bytes\(3DEVINFO\)](#), [di\\_path\\_prop\\_next\(3DEVINFO\)](#), [di\\_prom\\_init\(3DEVINFO\)](#), [di\\_prop\\_bytes\(3DEVINFO\)](#), [di\\_prop\\_lookup\\_bytes\(3DEVINFO\)](#), [di\\_prop\\_next\(3DEVINFO\)](#), [di\\_walk\\_minor\(3DEVINFO\)](#), [di\\_walk\\_node\(3DEVINFO\)](#), [attributes\(5\)](#)

*Writing Device Drivers*

**Name** libdl – dynamic linking library

**Synopsis** `cc [ flag... ] file... -ldl [ library... ]`

**Description** Historically, functions in `libdl` provided for dynamic linking support. This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on the runtime linker. See [ld.so.1\(1\)](#). New application development need not specify `-ldl`.

**Interfaces** The shared object `libdl.so.1` provides the following public interfaces. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>dldaddr</code>	<code>dldaddr1</code>
<code>dldclose</code>	<code>dlddump</code>
<code>dlderror</code>	<code>dldinfo</code>
<code>dldmopen</code>	<code>dldopen</code>
<code>dldsym</code>	

**Files** `/lib/libdl.so.1` shared object  
`/lib/64/libdl.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [ld.so.1\(1\)](#), [pvs\(1\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

**Name** libdlpi – Data Link Provider Interface (DLPI) library

**Synopsis** `cc [ flag... ] file... -ldlpi [ library... ]  
#include <libdlpi.h>`

**Description** The `libdlpi` library provides functions that support a programming interface for DLPI applications. The functions support only DLPI Version 2 devices in connectionless mode.

**Interfaces** The shared object `libdlpi.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>dlpi_arptype</code>	<code>dlpi_bind</code>
<code>dlpi_close</code>	<code>dlpi_disabmulti</code>
<code>dlpi_disabnotify</code>	<code>dlpi_enabmulti</code>
<code>dlpi_enabnotify</code>	<code>dlpi_fd</code>
<code>dlpi_get_physaddr</code>	<code>dlpi_iftype</code>
<code>dlpi_info</code>	<code>dlpi_linkname</code>
<code>dlpi_mactype</code>	<code>dlpi_open</code>
<code>dlpi_promiscoff</code>	<code>dlpi_promiscon</code>
<code>dlpi_recv</code>	<code>dlpi_send</code>
<code>dlpi_set_physaddr</code>	<code>dlpi_set_timeout</code>
<code>dlpi_strerror</code>	<code>dlpi_unbind</code>
<code>dlpi_walk</code>	

**Files** `/lib/libdlpi.so.1` shared object  
`/lib/64/libdlpi.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)



**Name** libdns\_sd – DNS service discovery library

**Synopsis** `cc [ flag ... ] file ... -ldns_sd [ library ... ]  
#include <dns_sd.h>`

**Description** The libdns\_sd library functions provide facilities for applications to advertise and discover services that use the DNS protocol.

**Interfaces** The shared object libdns\_sd.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

DNSServiceBrowse	DNSServiceConstructFullName
DNSServiceCreateConnection	DNSServiceEnumerateDomains
DNSServiceProcessResult	DNSServiceQueryRecord
DNSServiceReconfirmRecord	DNSServiceRefDeallocate
DNSServiceRefSockFD	DNSServiceRegister
DNSServiceResolve	TXTRRecordCreate

**Files** /lib/libdns\_sd.so.1      shared object  
/lib/64/libdns\_sd.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libdoor – doors library

**Synopsis** `cc [ flag... ] file... [ library... ]  
#include <door.h>`

**Description** Historically, functions in this library provided programmatic access to doors, including the ability to create and call them. This functionality now resides in [libc\(3LIB\)](#).

Doors are a fast light-weight RPC mechanism for secure control transfer between processes on the same machine. Conceptually, a thread in one process can issue a call using a door descriptor that causes code to be executed in another process and then returns using the traditional synchronous RPC model. Doors can also be used to pass data and file descriptors between processes.

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on `libc.so.1`. New application development need not specify `-ldoor`.

**Interfaces** The shared object `libdoor.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>door_bind</code>	<code>door_call</code>
<code>door_create</code>	<code>door_cred</code>
<code>door_info</code>	<code>door_return</code>
<code>door_revoke</code>	<code>door_server_create</code>
<code>door_ucred</code>	<code>door_unbind</code>

**Files** `/lib/libdoor.so.1` shared object  
`/lib/64/libdoor.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
MT-Level	Safe

**See Also** [Intro\(3\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

Stevens, W. Richard. *UNIX Network Programming, Volume 2: Interprocess Communications*, 2/e. Tucson, Ariz.: Prentice Hall, 1999.

**Name** libdtrace – DTrace dynamic tracing software library

**Description** Functions in this library define the interface for interacting with the DTrace dynamic tracing software, including the D language compiler and facilities for enabling probes and consuming trace data.

**Interfaces** The interfaces provided by libdtrace.so.1 are currently private to the implementation of the Solaris system and DTrace subsystem and are subject to change at any time without notice. Applications using these interfaces might fail to run on future releases. Refer to the *Solaris Dynamic Tracing Guide* for a description of the public documented interfaces available for the DTrace facility.

**Files** /usr/lib/libdtrace.so.1      shared object  
 /usr/lib/64/libdtrace.so.1    64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWdtrc
Interface Stability	Private
MT-Level	Unsafe

**See Also** [dtrace\(1M\)](#), [attributes\(5\)](#), [dtrace\(7D\)](#)

*Solaris Dynamic Tracing Guide*

**Name** libefi – EFI partition table library

**Synopsis** `cc [ flag... ] file... -lefi [ library... ]`

**Description** The functions in this library manipulate a disk's EFI partition table.

**Interfaces** The shared object `libefi.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>efi_alloc_and_init</code>	<code>efi_alloc_and_read</code>
<code>efi_free</code>	<code>efi_use_whole_disk</code>
<code>efi_write</code>	

**Files** `/lib/libefi.so.1`      shared object  
`/lib/64/libefi.so.1`    64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [efi\\_alloc\\_and\\_init\(3EXT\)](#), [attributes\(5\)](#)

**Name** libelf – ELF access library

**Synopsis** `cc [ flag... ] file... -lelf [ library... ]  
#include <libelf.h>`

**Description** Functions in this library provide routines to manipulate ELF (Executable and Linking Format) object files, archive files, and archive members. The header provides type and function declarations for all library services.

**Interfaces** The shared object `libelf.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>elf32_checksum</code>	<code>elf32_fsize</code>
<code>elf32_getehdr</code>	<code>elf32_getphdr</code>
<code>elf32_getshdr</code>	<code>elf32_newehdr</code>
<code>elf32_newphdr</code>	<code>elf32_xlatetof</code>
<code>elf32_xlatetom</code>	<code>elf64_checksum</code>
<code>elf64_fsize</code>	<code>elf64_getehdr</code>
<code>elf64_getphdr</code>	<code>elf64_getshdr</code>
<code>elf64_newehdr</code>	<code>elf64_newphdr</code>
<code>elf64_xlatetof</code>	<code>elf64_xlatetom</code>
<code>elf_begin</code>	<code>elf_cntl</code>
<code>elf_end</code>	<code>elf_errmsg</code>
<code>elf_errno</code>	<code>elf_fill</code>
<code>elf_flagdata</code>	<code>elf_flagehdr</code>
<code>elf_flagelf</code>	<code>elf_flagphdr</code>
<code>elf_flagscn</code>	<code>elf_flagshdr</code>
<code>elf_getarhdr</code>	<code>elf_getarsym</code>
<code>elf_getbase</code>	<code>elf_getdata</code>
<code>elf_getident</code>	<code>elf_getphdrnum</code>
<code>elf_getphnum</code>	<code>elf_getscn</code>
<code>elf_getshdrnum</code>	<code>elf_getshdrstrndx</code>
<code>elf_getshnum</code>	<code>elf_getshstrndx</code>
<code>elf_hash</code>	<code>elf_kind</code>

elf_memory	elf_ndxscn
elf_newdata	elf_newscn
elf_next	elf_nextscn
elf_rand	elf_rawdata
elf_rawfile	elf_strptr
elf_update	elf_version
gelf_checksum	gelf_fsize
gelf_getcap	gelf_getclass
gelf_getdyn	gelf_getehdr
gelf_getmove	gelf_getphdr
gelf_getrel	gelf_getrela
gelf_getshdr	gelf_getsym
gelf_getsyminfo	gelf_getsymshndx
gelf_newehdr	gelf_newphdr
gelf_update_cap	gelf_update_dyn
gelf_update_ehdr	gelf_update_move
gelf_update_phdr	gelf_update_rel
gelf_update_rela	gelf_update_shdr
gelf_update_sym	gelf_update_symshndx
gelf_update_syminfo	gelf_xlatetof
gelf_xlatetom	nlist

**Files** /lib/libelf.so.1      shared object  
 /lib/64/libelf.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [elf\(3ELF\)](#), [gelf\(3ELF\)](#), [attributes\(5\)](#)

**Name** libexacct – extended accounting file access library

**Synopsis** `cc [ flag... ] file... -lexacct [ library... ]  
#include <exacct.h>`

**Description** Functions in this library define the interface for reading and writing extended accounting (exacct) files. The <exacct.h> header provides type and function declarations for all library services, as well as for the characteristics of accounting files generated by the Solaris kernel.

**Interfaces** The shared object `libexacct.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>ea_alloc</code>	<code>ea_attach_to_group</code>
<code>ea_attach_to_object</code>	<code>ea_close</code>
<code>ea_copy_object</code>	<code>ea_copy_object_tree</code>
<code>ea_error</code>	<code>ea_free</code>
<code>ea_free_item</code>	<code>ea_free_object</code>
<code>ea_get_creator</code>	<code>ea_get_hostname</code>
<code>ea_get_object</code>	<code>ea_get_object_tree</code>
<code>ea_match_object_catalog</code>	<code>ea_next_object</code>
<code>ea_open</code>	<code>ea_pack_object</code>
<code>ea_previous_object</code>	<code>ea_set_group</code>
<code>ea_set_item</code>	<code>ea_strdup</code>
<code>ea_strfree</code>	<code>ea_unpack_object</code>
<code>ea_write_object</code>	

**Files** `/usr/lib/libexacct.so.1` shared object  
`/usr/lib/64/libexacct.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Evolving
MT-Level	MT-Safe



**See Also** [acctadm\(1M\)](#), [Intro\(3\)](#), [ea\\_error\(3EXACCT\)](#), [ea\\_open\(3EXACCT\)](#), [ea\\_pack\\_object\(3EXACCT\)](#), [ea\\_set\\_item\(3EXACCT\)](#), [attributes\(5\)](#)

**Notes** The SUNWosdem package provides source code for the `exdump` utility that uses the `libxacct` APIs to dump the contents of extended accounting files. The source code can be compiled in the directory `/usr/demo/libxacct`.

**Name** libfcoe – FCoE Port Mangament library

**Synopsis** `cc [ flag... ] file... lfcoe [ library... ]  
#include <libfcoe.h>`

**Description** Functions in this library provide management of the FCoE (Fibre Channel over Ethernet) ports in the system, allowing clients to create, delete and list information of FCoE ports.

**Interfaces** The shared object `libfcoe.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```
FCOE_CreatePort          FCOE_DeletePort
FCOE_GetPortList
```

**Files** `/lib/libfcoe.so.1` shared object  
`/lib/64/libfcoe.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWfcoeu
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [FCOE\\_CreatePort\(3FCOE\)](#), [FCOE\\_DeletePort\(3FCOE\)](#), [FCOE\\_GetPortList\(3FCOE\)](#), [attributes\(5\)](#)

**Name** libfmevent – fault management events library

**Synopsis** `cc [ flag... ] file... -L/usr/lib/fm -lfmevent -lnvpair [ library... ]  
#include <fm/libfmevent.h>  
#include <libnvpair.h>`

**Description** This library allows a process to subscribe to a subset of fault management protocol events published by the fault management daemon.

**Interfaces** The shared object `libfmevent.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>fmev_attr_list</code>	<code>fmev_class</code>
<code>fmev_dup</code>	<code>fmev_errno</code>
<code>fmev_hold</code>	<code>fmev_localtime</code>
<code>fmev_rele</code>	<code>fmev_shdl_alloc</code>
<code>fmev_shdl_fini</code>	<code>fmev_shdl_free</code>
<code>fmev_shdl_init</code>	<code>fmev_shdl_subscribe</code>
<code>fmev_shdl_unsubscribe</code>	<code>fmev_shdl_zalloc</code>
<code>fmev_shdlctl_serialize</code>	<code>fmev_shdlctl_sigmask</code>
<code>fmev_shdlctl_thrattr</code>	<code>fmev_shdlctl_thrcreate</code>
<code>fmev_shdlctl_thrsetup</code>	<code>fmev_strerror</code>
<code>fmev_time_nsec</code>	<code>fmev_time_sec</code>
<code>fmev_timespec</code>	

**Files** `usr/lib/fm/libfmevent.so.1` shared object  
`usr/lib/fm/64/libfmevent.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Architecture	all
Availability	SUNWfmd
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [fmev\\_shdl\\_init\(3FM\)](#), [libnypair\(3LIB\)](#), [attributes\(5\)](#)

**Name** libform – forms library

**Synopsis** `cc [ flag... ] file... -lform [ library... ]`

**Description** Functions in this library provide forms using [libcurses\(3LIB\)](#) routines.

**Interfaces** The shared object `libform.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>current_field</code>	<code>data_ahead</code>
<code>data_behind</code>	<code>dup_field</code>
<code>dynamic_field_info</code>	<code>field_arg</code>
<code>field_back</code>	<code>field_buffer</code>
<code>field_count</code>	<code>field_fore</code>
<code>field_index</code>	<code>field_info</code>
<code>field_init</code>	<code>field_just</code>
<code>field_opts</code>	<code>field_opts_off</code>
<code>field_opts_on</code>	<code>field_pad</code>
<code>field_status</code>	<code>field_term</code>
<code>field_type</code>	<code>field_userptr</code>
<code>form_driver</code>	<code>form_fields</code>
<code>form_init</code>	<code>form_opts</code>
<code>form_opts_off</code>	<code>form_opts_on</code>
<code>form_page</code>	<code>form_sub</code>
<code>form_term</code>	<code>form_userptr</code>
<code>form_win</code>	<code>free_field</code>
<code>free_fieldtype</code>	<code>free_form</code>
<code>link_field</code>	<code>link_fieldtype</code>
<code>move_field</code>	<code>new_field</code>
<code>new_fieldtype</code>	<code>new_form</code>
<code>new_page</code>	<code>pos_form_cursor</code>
<code>post_form</code>	<code>scale_form</code>
<code>set_current_field</code>	<code>set_field_back</code>

set_field_buffer	set_field_fore
set_field_init	set_field_just
set_field_opts	set_field_pad
set_field_status	set_field_term
set_field_type	set_field_userptr
set_fieldtype_arg	set_fieldtype_choice
set_form_fields	set_form_init
set_form_opts	set_form_page
set_form_sub	set_form_term
set_form_userptr	set_form_win
set_max_field	set_new_page
unpost_form	

**Files** /usr/lib/libform.so.1      shared object  
/usr/lib/64/libform.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libcurses\(3LIB\)](#), [attributes\(5\)](#)

**Name** libfstyp – file system type identification library

**Synopsis** `cc [ flag|PO ] file|PO -lfstyp -lnvpair [ library|PO ]`  
`#include <libnvpair.h>`  
`#include <libfstyp.h>`

**Description** The libfstyp library exports a set of functions to identify the file system type of an unmounted file system using heuristic modules.

Internally, the library is comprised of interfaces exported by file system-specific modules. See [fstyp\\_mod\\_init\(3FSTYP\)](#).

**Interfaces** The shared object libfstyp.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>fstyp_fini</code>	<code>fstyp_get_attr</code>
<code>fstyp_ident</code>	<code>fstyp_init</code>
<code>fstyp_mod_dump</code>	<code>fstyp_mod_fini</code>
<code>fstyp_mod_get_attr</code>	<code>fstyp_mod_ident</code>
<code>fstyp_mod_init</code>	<code>fstyp_strerror</code>

**Files** /lib/libfstyp.so.1 shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit)
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [fstyp\\_mod\\_init\(3FSTYP\)](#), [libnvpair\(3LIB\)](#), [attributes\(5\)](#)

**Name** libgen – string pattern-matching library

**Synopsis** `cc [ flag... ] file... -lgen [ library... ]`

**Description** Functions in this library provide routines for string pattern-matching and pathname manipulation.

**Interfaces** The shared object `libgen.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>___braelist</code>	<code>___braslist</code>	<code>___loc1</code>
<code>___loc2</code>	<code>___locs</code>	<code>___nbra</code>
<code>___regerrno</code>	<code>___reglength</code>	<code>advance</code>
<code>bgets</code>	<code>braelist</code>	<code>braslist</code>
<code>bufsplit</code>	<code>compile</code>	<code>copylist</code>
<code>eaccess</code>	<code>gmatch</code>	<code>isencrypt</code>
<code>loc1</code>	<code>loc2</code>	<code>locs</code>
<code>mkdirp</code>	<code>nbra</code>	<code>p2close</code>
<code>p2open</code>	<code>pathfind</code>	<code>regerrno</code>
<code>reglength</code>	<code>rmdirp</code>	<code>step</code>
<code>strcadd</code>	<code>strccpy</code>	<code>streadd</code>
<code>strecpy</code>	<code>strfind</code>	<code>strrspn</code>
<code>strtrns</code>		

The following interface is unique to the 32-bit version of this library:

`copylist64`

**Files** `/lib/libgen.so.1` shared object  
`/lib/64/libgen.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)



ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libgen.h, libgen – definitions for pattern matching functions

**Synopsis** `#include <libgen.h>`

**Description** The `<libgen.h>` header lists definitions used for string pattern-matching and pathname manipulation. See [libgen\(3LIB\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [basename\(3C\)](#), [dirname\(3C\)](#), [libgen\(3LIB\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** libgss – Generic Security Services library

**Synopsis** `cc [ flag... ] file... -lgss [ library... ]  
#include <gssapi/gssapi.h>`

**Description** The functions in this library are the routines that comprise the Generic Security Services library.

When libgss fails to load or initialize a mechanism listed in /etc/gss/mech, a message is sent to [syslog\(3C\)](#).

**Interfaces** The shared object libgss.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

GSS_C_NT_ANONYMOUS	GSS_C_NT_EXPORT_NAME
GSS_C_NT_HOSTBASED_SERVICE	GSS_C_NT_MACHINE_UID_NAME
GSS_C_NT_STRING_UID_NAME	GSS_C_NT_USER_NAME
gss_accept_sec_context	gss_acquire_cred
gss_add_cred	gss_add_oid_set_member
gss_canonicalize_name	gss_compare_name
gss_context_time	gss_create_empty_oid_set
gss_delete_sec_context	gss_display_name
gss_display_status	gss_duplicate_name
gss_export_name	gss_export_sec_context
gss_get_mic	gss_import_name
gss_import_sec_context	gss_indicate_mechs
gss_init_sec_context	gss_inquire_context
gss_inquire_cred	gss_inquire_cred_by_mech
gss_inquire_mechs_for_name	gss_inquire_names_for_mech
gss_process_context_token	gss_release_buffer
gss_release_cred	gss_release_name
gss_release_oid	gss_release_oid_set
gss_seal	gss_sign
gss_store_cred	gss_test_oid_set_member
gss_unseal	gss_unwrap

<code>gss_verify</code>	<code>gss_verify_mic</code>
<code>gss_wrap</code>	<code>gss_wrap_size_limit</code>

There are also the following extensions to the official GSS-API, defined in `<gssapi/gssapi_ext.h>`.

<code>gss_add_buffer_set_member</code>	<code>gss_create_empty_buffer_set</code>
<code>gss_inquire_sec_context_by_oid</code>	<code>gss_release_buffer_set</code>

**Files** `/usr/lib/libgss.so.1` shared object  
`/usr/lib/64/libgss.so.1` 64-bit shared object file

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWgss (32-bit) SUNWgssx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [syslog\(3C\)](#), [attributes\(5\)](#)

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**Name** libhbaapi – Common Fibre Channel HBA information library

**Synopsis** `cc [ flag|PO ] file|PO -lHBAAPI [ library|PO ]  
#include <hbaapi.h>`

**Description** The functions in this library access Fibre Channel HBA data.

Fibre Channel HBA information is provided through a standard interface in a vendor independent manner. This common interface provides access to the following information:

- Local HBA attributes
- Local HBA port attributes and statistics
- Mapping between FCP-2 discovered devices and operating system SCSI information
- Discovered devices port attributes
- SCSI commands for discovered FCP-2 devices (Report LUNS, Read Capacity, and Inquiry)
- Common Transport commands to discover Fabric details

**Interfaces** The shared object `libhbaapi.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>HBA_CloseAdapter</code>	<code>HBA_FreeLibrary</code>
<code>HBA_GetAdapterAttributes</code>	<code>HBA_GetAdapterName</code>
<code>HBA_GetAdapterPortAttributes</code>	<code>HBA_GetBindingCapability</code>
<code>HBA_GetBindingSupport</code>	<code>HBA_GetDiscoveredPortAttributes</code>
<code>HBA_GetEventBuffer</code>	<code>HBA_GetFC4Statistics</code>
<code>HBA_GetFCPStatistics</code>	<code>HBA_GetFcpPersistentBinding</code>
<code>HBA_GetFcpTargetMapping</code>	<code>HBA_GetFcpTargetMappingV2</code>
<code>HBA_GetNumberOfAdapters</code>	<code>HBA_GetPersistentBindingV2</code>
<code>HBA_GetPortAttributesByWWN</code>	<code>HBA_GetPortStatistics</code>
<code>HBA_GetRNIDMgmtInfo</code>	<code>HBA_GetVendorLibraryAttributes</code>
<code>HBA_GetVersion</code>	<code>HBA_GetWrapperLibraryAttributes</code>
<code>HBA_LoadLibrary</code>	<code>HBA_OpenAdapter</code>
<code>HBA_OpenAdapterByWWN</code>	<code>HBA_RefreshAdapterConfiguration</code>
<code>HBA_RefreshInformation</code>	<code>HBA_RegisterForAdapterAddEvents</code>
<code>HBA_RegisterForAdapterEvents</code>	<code>HBA_RegisterForAdapterPortEvents</code>
<code>HBA_RegisterForAdapterPortStatEvents</code>	<code>HBA_RegisterForLinkEvents</code>

HBA_RegisterForTargetEvents	HBA_RemoveAllPersistentBindings
HBA_RemoveCallback	HBA_RemovePersistentBinding
HBA_ResetStatistics	HBA_ScsiInquiryV2
HBA_ScsiReadCapacityV2	HBA_ScsiReportLUNsV2
HBA_SendCTPassThru	HBA_SendCTPassThruV2
HBA_SendLIRR	HBA_SendRLS
HBA_SendRNID	HBA_SendRNIDV2
HBA_SendRPL	HBA_SendRPS
HBA_SendReadCapacity	HBA_SendReportLUNs
HBA_SendSRL	HBA_SendScsiInquiry
HBA_SetBindingSupport	HBA_SetPersistentBindingV2
HBA_SetRNIDMgmtInfo	

**Usage** Client applications link with the Common Library (using `-lHBAAPI`) to access the interfaces. The Common Library dynamically loads individual Vendor-Specific Libraries (VSL) listed in `/etc/hba.conf` described on the [hba.conf\(4\)](#).

Using the `libhbaapi` involves the following steps:

1. Optionally determining the version of the library by calling `HBA_GetVersion(3HBAAPI)`.
2. Initializing the Common Library by calling `HBA_LoadLibrary(3HBAAPI)`.
3. Determine the number of HBAs known to the common library by calling `HBA_GetNumberOfAdapters(3HBAAPI)`.
4. Determine each HBA name in turn by calling `HBA_GetAdapterName(3HBAAPI)`.
5. Open each HBA in turn by calling `HBA_OpenAdapter(3HBAAPI)`.
6. Operate on a given HBA by calling the following:
  - `HBA_GetAdapterAttributes(3HBAAPI)`
  - `HBA_GetAdapterPortAttributes(3HBAAPI)`
  - `HBA_GetDiscoveredPortAttributes(3HBAAPI)`
  - `HBA_GetPortAttributesByWWN(3HBAAPI)`
  - `HBA_SendCTPassThru(3HBAAPI)`
  - `HBA_SendCTPassThruV2(3HBAAPI)`
  - `HBA_GetEventBuffer(3HBAAPI)`
  - `HBA_SetRNIDMgmtInfo(3HBAAPI)`
  - `HBA_GetRNIDMgmtInfo(3HBAAPI)`
  - `HBA_SendRNID(3HBAAPI)`
  - `HBA_SendRNIDV2(3HBAAPI)`
  - `HBA_RefreshInformation(3HBAAPI)`

- [HBA\\_RefreshAdapterConfiguration\(3HBAAPI\)](#)
  - [HBA\\_GetVendorLibraryAttributes\(3HBAAPI\)](#)
  - [HBA\\_GetWrapperLibraryAttributes\(3HBAAPI\)](#)
  - [HBA\\_ResetStatistics\(3HBAAPI\)](#)
  - [HBA\\_GetFcpTargetMapping\(3HBAAPI\)](#)
  - [HBA\\_GetFcpTargetMappingV2\(3HBAAPI\)](#)
  - [HBA\\_GetFcpPersistentBinding\(3HBAAPI\)](#)
  - [HBA\\_SendScsiInquiry\(3HBAAPI\)](#)
  - [HBA\\_SendReportLUNs\(3HBAAPI\)](#)
  - [HBA\\_ScsiReportLUNsV2\(3HBAAPI\)](#)
  - [HBA\\_SendReadCapacity\(3HBAAPI\)](#)
  - [HBA\\_SendRLS\(3HBAAPI\)](#)
7. Close open HBAs by calling [HBA\\_CloseAdapter\(3HBAAPI\)](#).
  8. Unload the library by calling [HBA\\_FreeLibrary\(3HBAAPI\)](#).

**Errors** Errors are generally returned from the underlying VSL and can include any of the following values:

<a href="#">HBA_STATUS_OK</a>	Request completed successfully. (No Error)
<a href="#">HBA_STATUS_ERROR</a>	Non-specific error encountered.
<a href="#">HBA_STATUS_ERROR_NOT_SUPPORTED</a>	The VSL does not support this interface.
<a href="#">HBA_STATUS_ERROR_INVALID_HANDLE</a>	The <i>handle</i> argument does not refer to an open HBA handle.
<a href="#">HBA_STATUS_ERROR_ARG</a>	An argument in the request was invalid.
<a href="#">HBA_STATUS_ERROR_ILLEGAL_WWN</a>	A WWN in the request was not recognized.
<a href="#">HBA_STATUS_ERROR_ILLEGAL_INDEX</a>	An index in the request was not recognized.
<a href="#">HBA_STATUS_ERROR_MORE_DATA</a>	A larger buffer is required to complete the requested operation.
<a href="#">HBA_STATUS_ERROR_STALE_DATA</a>	The state of the HBA has changed, possibly due to Dynamic Reconfiguration or devices being added or removed. The caller should call <a href="#">HBA_RefreshInformation(3HBAAPI)</a> and reissue any discovery logic to reset all indexes related to this HBA.
<a href="#">HBA_STATUS_SCSI_CHECK_CONDITION</a>	A SCSI check-condition was encountered during the I/O operation. Not all VSLs report this error value. Some might return <a href="#">HBA_STATUS_ERROR</a> when a check-condition is encountered, or <a href="#">HBA_STATUS_OK</a> .

HBA_STATUS_ERROR_BUSY	The requested device is busy. A retry might be effective.
HBA_STATUS_ERROR_TRY_AGAIN	The requested I/O timed out. A retry might be effective.
HBA_STATUS_ERROR_UNAVAILABLE	The requested HBA has been removed or deactivated.

All other error values are reserved.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcfcl (32-bit) SUNWcfclx (64-bit)
Interface Stability	Standard: FC-MI 1.92 (API version 1) Standard: FC-HBA Version 4 (API version 2)
MT-Level	Safe

**See Also** [HBA\\_GetAdapterAttributes\(3HBAAPI\)](#), [HBA\\_GetAdapterName\(3HBAAPI\)](#), [HBA\\_GetAdapterPortAttributes\(3HBAAPI\)](#), [HBA\\_GetBindingCapability\(3HBAAPI\)](#), [HBA\\_GetDiscoveredPortAttributes\(3HBAAPI\)](#), [HBA\\_GetEventBuffer\(3HBAAPI\)](#), [HBA\\_GetFcpPersistentBinding\(3HBAAPI\)](#), [HBA\\_GetFcpTargetMapping\(3HBAAPI\)](#), [HBA\\_GetNumberOfAdapters\(3HBAAPI\)](#), [HBA\\_GetPortAttributesByWWN\(3HBAAPI\)](#), [HBA\\_GetPortStatistics\(3HBAAPI\)](#), [HBA\\_GetVersion\(3HBAAPI\)](#), [HBA\\_GetWrapperLibraryAttributes\(3HBAAPI\)](#), [HBA\\_LoadLibrary\(3HBAAPI\)](#), [HBA\\_OpenAdapter\(3HBAAPI\)](#), [HBA\\_RefreshInformation\(3HBAAPI\)](#), [HBA\\_RegisterForAdapterEvents\(3HBAAPI\)](#), [HBA\\_SendCTPassThru\(3HBAAPI\)](#), [HBA\\_SendRLS\(3HBAAPI\)](#), [HBA\\_SendScsiInquiry\(3HBAAPI\)](#), [HBA\\_SetRNIDMgmtInfo\(3HBAAPI\)](#), [hba.conf\(4\)](#), [attributes\(5\)](#)

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**Name** libidnkit – IDN conversion library

**Synopsis** `cc [ flag... ] file... -lidnkit [ library... ]  
#include <idn/api.h>`

**Description** Functions in this library provide conversions between ACE string and multibyte character string of the current locale or a specified codeset. They support various manipulations of internationalized domain names, including encoding conversion and name preparation. They are designed according to IDNA framework where each application must do necessary preparations for the internationalized domain names before passing them to the resolver. The library provides easy-to-use, high-level interfaces to help applications with the preparation.

The libidnkit library internally uses [iconv\(3C\)](#) to provide encoding conversion from UTF-8 to the local encoding (such as ISO8859-1, usually determined by the current locale), and from the local encoding to UTF-8.

**Interfaces** The shared object `libidnkit.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```
idn_decodename                idn_decodename2
idn_enable                    idn_encodename
idn_nameinit
```

**Files** `/usr/lib/libidnkit.so.1` shared object  
`/usr/lib/64/libidnkit.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWidnl
Interface Stability	Evolving
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [iconv\(3C\)](#), [idn\\_decodename\(3EXT\)](#), [setlocale\(3C\)](#), [hosts\(4\)](#), [attributes\(5\)](#), [environ\(5\)](#)

RFC 3490 Internationalizing Domain Names in Applications (IDNA)  
RFC 3491 Nameprep: A Stringprep Profile for Internationalized Domain Names (IDN)  
RFC 3492 Punycode: A Bootstring encoding of Unicode for Internationalized Domain Names in Applications (IDNA)

RFC 3454	Preparation of Internationalized Strings ("stringprep")
RFC 952	DoD Internet Host Table Specification
RFC 921	Domain Name System Implementation Schedule - Revised
STD 3, RFC 1122	Requirements for Internet Hosts -- Communication Layers
STD 3, RFC 1123	Requirements for Internet Hosts -- Applications and Support

Unicode Standard Annex #15: Unicode Normalization Forms, Version 3.2.0.  
<http://www.unicode.org>

International Language Environments Guide (for this version of Solaris)

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**Name** libilb – integrated load balancing library

**Synopsis** `cc [ flag... ] file... -lilb [ library... ]  
#include <libilb.h>`

**Description** Functions in this library provide the following capabilities:

- create and destroy ILB rules
- enable and disable rules
- add and remove back-end server for a given rule
- enable and disable servers
- retrieve the list of rules currently known to the kernel
- provide a walker function that can call a function supplied to the library by means of a pointer for every rule, server group, and health check.

**Interfaces** The shared object `libilb.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>ilb_add_server_to_group</code>	<code>ilb_address_to_srvID</code>
<code>ilb_close</code>	<code>ilb_create_hc</code>
<code>ilb_create_rule</code>	<code>ilb_create_servergroup</code>
<code>ilb_destroy_hc</code>	<code>ilb_destroy_rule</code>
<code>ilb_destroy_servergroup</code>	<code>ilb_disable_rule</code>
<code>ilb_disable_server</code>	<code>ilb_enable_rule</code>
<code>ilb_enable_server</code>	<code>ilb_errstr</code>
<code>ilb_get_hc_info</code>	<code>ilb_open</code>
<code>ilb_rem_server_from_group</code>	<code>ilb_reset_config</code>
<code>ilb_show_nat</code>	<code>ilb_show_persist</code>
<code>ilb_srvID_to_address</code>	<code>ilb_walk_hc</code>
<code>ilb_walk_hc_srvs</code>	<code>ilb_walk_rules</code>
<code>ilb_walk_servergroups</code>	<code>ilb_walk_servers</code>

<b>Files</b> <code>/lib/libilb.so.1</code>	shared object
<code>/lib/sparcv9/libilb.so.1</code>	SPARC shared object
<code>/lib/amd64/libilb.so.1</code>	x86 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWlib
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libintl – internationalization library

**Synopsis**

```
cc [ flag... ] file... -lintl [ library... ]
#include <libintl.h>
#include <locale.h> /* needed for dcgettext() only */
```

**Description** Historically, functions in this library provided wide character translations. This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on `libc.so.1`. New application development need not specify `-lintl`.

**Interfaces** The shared object `libintl.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>bindtextdomain</code>	<code>dcgettext</code>
<code>dgettext</code>	<code>gettext</code>
<code>textdomain</code>	

**Files** `/lib/libintl.so.1` a filter on `/lib/libc.so.1`  
`/lib/64/libintl.so.1` a filter on `/lib/64/libc.so.1`

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe with exceptions

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [gettext\(3C\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

**Name** libintl.h, libintl – international messaging

**Synopsis** `#include <libintl.h>`

**Description** The `<libintl.h>` header provides the following macro:

`GNU_GETTEXT_SUPPORTED_REVISION(major)`

This macro returns the maximum minor revision number supported for the specified major revision of the GNU MO file format.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Uncommitted

**See Also** [gettext\(3C\)](#), [attributes\(5\)](#)

**Name** libiscsit – iSCSI Management library

**Synopsis** `cc [ flag... ] file... -liscsit [ library... ]  
#include <libiscsit.h>`

**Description** Functions in this library provide management services for COMSTAR iSCSI target ports.

**Interfaces** The shared object `libiscsit.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>it_config_commit</code>	<code>it_config_free</code>
<code>it_config_load</code>	<code>it_config_setprop</code>
<code>it_ini_create</code>	<code>it_ini_delete</code>
<code>it_ini_free</code>	<code>it_ini_setprop</code>
<code>it_portal_create</code>	<code>it_portal_delete</code>
<code>it_tgt_create</code>	<code>it_tgt_delete</code>
<code>it_tgt_free</code>	<code>it_tgt_setprop</code>
<code>it_tpg_create</code>	<code>it_tpg_delete</code>
<code>it_tpg_free</code>	<code>it_tpgt_create</code>
<code>it_tpgt_delete</code>	<code>it_tpgt_free</code>

**Files** `/lib/libiscsit.so.1` shared object  
`/lib/64/libiscsit.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWiscsitu
Interface Stability	Committed
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [it\\_config\\_load\(3ISCSIT\)](#), [it\\_ini\\_create\(3ISCSIT\)](#), [it\\_portal\\_create\(3ISCSIT\)](#), [it\\_tgt\\_create\(3ISCSIT\)](#), [it\\_tpg\\_create\(3ISCSIT\)](#), [attributes\(5\)](#)



**Name** libkmf – Key Management Framework library

**Synopsis** `cc [ flag... ] file... -lkmf [ library... ]  
#include <kmfapi.h>`

**Description** These functions comprise the Key Management Framework library. They are intended to be used by applications that need to perform operations involving the creation and management of public key objects such as public/private key pairs, certificates, certificate signing requests, certificate validation, certificate revocation lists, and OCSP response processing.

**Interfaces** The shared object `libkmf.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>kmf_add_cert_eku</code>	<code>kmf_add_csr_eku</code>
<code>kmf_add_policy_to_db</code>	<code>kmf_build_pk12</code>
<code>kmf_check_cert_date</code>	<code>kmf_check_crl_date</code>
<code>kmf_compare_rdns</code>	<code>kmf_configure_keystore</code>
<code>kmf_create_cert_file</code>	<code>kmf_create_csr_file</code>
<code>kmf_create_keypair</code>	<code>kmf_create_ocsp_request</code>
<code>kmf_create_sym_key</code>	<code>kmf_decode_csr</code>
<code>kmf_decrypt</code>	<code>kmf_delete_cert_from_keystore</code>
<code>kmf_delete_crl</code>	<code>kmf_delete_key_from_keystore</code>
<code>kmf_delete_policy_from_db</code>	<code>kmf_der_to_pem</code>
<code>kmf_dn_parser</code>	<code>kmf_download_cert</code>
<code>kmf_download_crl</code>	<code>kmf_ekuname_to_oid</code>
<code>kmf_encode_cert_record</code>	<code>kmf_encrypt</code>
<code>kmf_export_pk12</code>	<code>kmf_finalize</code>
<code>kmf_find_attr</code>	<code>kmf_find_cert</code>
<code>kmf_find_cert_in_crl</code>	<code>kmf_find_crl</code>
<code>kmf_find_key</code>	<code>kmf_find_prikey_by_cert</code>
<code>kmf_free_algoid</code>	<code>kmf_free_bigint</code>
<code>kmf_free_crl_dist_pts</code>	<code>kmf_free_data</code>
<code>kmf_free_dn</code>	<code>kmf_free_eku</code>
<code>kmf_free_eku_policy</code>	<code>kmf_free_extn</code>

kmf_free_kmf_cert	kmf_free_kmf_key
kmf_free_policy_record	kmf_free_raw_key
kmf_free_raw_sym_key	kmf_free_signed_cert
kmf_free_signed_csr	kmf_free_spki
kmf_free_str	kmf_free_tbs_cert
kmf_free_tbs_csr	kmf_get_attr
kmf_get_attr_ptr	kmf_get_cert_auth_info_access
kmf_get_cert_basic_constraint	kmf_get_cert_crl_dist_pts
kmf_get_cert_eku	kmf_get_cert_email_str
kmf_get_cert_end_date_str	kmf_get_cert_extn
kmf_get_cert_extn_str	kmf_get_cert_id_data
kmf_get_cert_id_str	kmf_get_cert_issuer_str
kmf_get_cert_ku	kmf_get_cert_policies
kmf_get_cert_pubkey_alg_str	kmf_get_cert_pubkey_str
kmf_get_cert_serial_str	kmf_get_cert_sig_alg_str
kmf_get_cert_start_date_str	kmf_get_cert_subject_str
kmf_get_cert_validity	kmf_get_cert_version_str
kmf_get_data_format	kmf_get_encoded_ocsp_response
kmf_get_file_format	kmf_get_kmf_error_str
kmf_get_ocsp_for_cert	kmf_get_ocsp_status_for_cert
kmf_get_pk11_handle	kmf_get_plugin_error_str
kmf_get_policy	kmf_get_string_attr
kmf_get_sym_key_value	kmf_hexstr_to_bytes
kmf_import_crl	kmf_import_cert
kmf_import_objects	kmf_initialize
kmf_is_cert_data	kmf_is_cert_file
kmf_is_crl_file	kmf_ku_to_string
kmf_list_crl	kmf_oid_to_ekuname
kmf_oid_to_string	kmf_pem_to_der

kmf_pk11_token_lookup	kmf_read_input_file
kmf_select_token	kmf_set_attr
kmf_set_attr_at_index	kmf_set_cert_basic_constraint
kmf_set_cert_extn	kmf_set_cert_issuer
kmf_set_cert_issuer_altname	kmf_set_cert_ku
kmf_set_cert_pubkey	kmf_set_cert_serial
kmf_set_cert_sig_alg	kmf_set_cert_subject
kmf_set_cert_subject_altname	kmf_set_cert_validity
kmf_set_cert_version	kmf_set_csr_extn
kmf_set_csr_ku	kmf_set_csr_pubkey
kmf_set_csr_sig_alg	kmf_set_csr_subject
kmf_set_csr_subject_altname	kmf_set_csr_version
kmf_set_policy	kmf_set_token_pin
kmf_sign_cert	kmf_sign_csr
kmf_sign_data	kmf_store_cert
kmf_store_key	kmf_string_to_ku
kmf_string_to_oid	kmf_validate_cert
kmf_verify_cert	kmf_verify_crl_file
kmf_verify_csr	kmf_verify_data
kmf_verify_policy	

**Files** /lib/libkmf.so.1 shared object  
 /lib/64/libkmf.so.1 64-bit shared object  
 /usr/include/kmfapi.h KMF function definitions  
 /usr/include/kmftypes.h KMF structures and types.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsr (32-bit) SUNWcsrx (64-bit)

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Safe

**See Also** [kmfcfg\(1\)](#), [pktool\(1\)](#), [attributes\(5\)](#)

*Solaris Security for Developers Guide*

**Name** libkrb5 – MIT Kerberos 5 library

**Synopsis** `cc -I/usr/include/kerberosv5 [ flag... ] file... -lkrb5 [ library... ]`  
`#include <krb5.h>`  
`#include <com_err.h>`

**Description** The functions in this library are the routines that comprise the MIT Kerberos 5 library.

**Interfaces** The shared object `libkrb5.so` provides the public interface defined below.

The `krb5` library is provided as a convenience to allow native `krb5` applications to be built and to run. Compatibility between Solaris releases of the `krb5` interface is not guaranteed. For new applications that require these features, [libgss\(3LIB\)](#) is recommended.

For detailed documentation on the `krb5` interface, see the MIT Kerberos 5 web site at <http://web.mit.edu/kerberos>.

The `krb5_cc_gen_new` routine, listed in `krb5.h` section, is flawed and should be avoided. Until a new routine is available from MIT, the following can be done:

```
char ccname[40];
int tmpfd;

snprintf(ccname, sizeof(ccname), "FILE:/tmp/krb5cc_%d_XXXXXX",
         geteuid());

if ((tmpfd = mkstemp(ccname+strlen("FILE:"))) == -1) {
    log("mkstemp(): %.100s", strerror(errno));
    problem = errno;
    goto fail;
}
if (fchmod(tmpfd, S_IRUSR | S_IWUSR) == -1) {
    log("fchmod(): %.100s", strerror(errno));
    close(tmpfd);
    problem = errno;
    goto fail;
}
close(tmpfd);
problem = krb5_cc_resolve(authctxt->krb5_ctx, ccname, &ccache);
...
fail:
```

The `krb5_string_to_key` and `krb5_string_to_key` routines, listed in `krb5.h` section, are part of the old cryptosystem and should not be used in new apps.

```
com_err.h  com_err
           com_err_va
           error_message
```

krb5.h krb5\_address\_compare  
krb5\_address\_order  
krb5\_address\_search  
krb5\_aname\_to\_localname  
krb5\_appdefault\_boolean  
krb5\_appdefault\_string  
krb5\_auth\_con\_free  
krb5\_auth\_con\_genaddrs  
krb5\_auth\_con\_get\_checksum\_func  
krb5\_auth\_con\_getaddrs  
krb5\_auth\_con\_getauthenticator  
krb5\_auth\_con\_getflags  
krb5\_auth\_con\_getkey  
krb5\_auth\_con\_getlocalseqnumber  
krb5\_auth\_con\_getrcache  
krb5\_auth\_con\_getrecvsubkey  
krb5\_auth\_con\_getremoteseqnumber  
krb5\_auth\_con\_getsendsubkey  
krb5\_auth\_con\_init  
krb5\_auth\_con\_set\_checksum\_func  
krb5\_auth\_con\_setaddrs  
krb5\_auth\_con\_setflags  
krb5\_auth\_con\_setports  
krb5\_auth\_con\_setrcache  
krb5\_auth\_con\_setrecvsubkey  
krb5\_auth\_con\_setsendsubkey  
krb5\_auth\_con\_setuseruserkey  
krb5\_build\_principal  
krb5\_build\_principal\_ext  
krb5\_c\_block\_size  
krb5\_c\_checksum\_length  
krb5\_c\_decrypt  
krb5\_c\_encrypt  
krb5\_c\_encrypt\_length  
krb5\_c\_etype\_compare  
krb5\_c\_free\_state  
krb5\_c\_init\_state  
krb5\_c\_is\_coll\_proof\_cksum  
krb5\_c\_is\_keyed\_cksum  
krb5\_c\_keyed\_checksum\_types  
krb5\_c\_make\_checksum  
krb5\_c\_make\_random\_key  
krb5\_c\_random\_make\_octets  
krb5\_c\_string\_to\_key

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krb5\_c\_string\_to\_key\_with\_params  
krb5\_c\_valid\_cksumtype  
krb5\_c\_valid\_enctype  
krb5\_c\_verify\_checksum  
krb5\_cc\_close  
krb5\_cc\_copy\_creds  
krb5\_cc\_default  
krb5\_cc\_default\_name  
krb5\_cc\_destroy  
krb5\_cc\_end\_seq\_get  
krb5\_cc\_gen\_new  
krb5\_cc\_get\_name  
krb5\_cc\_get\_principal  
krb5\_cc\_get\_type  
krb5\_cc\_initialize  
krb5\_cc\_next\_cred  
krb5\_cc\_remove\_cred  
krb5\_cc\_resolve  
krb5\_cc\_retrieve\_cred  
krb5\_cc\_set\_default\_name  
krb5\_cc\_set\_flags  
krb5\_cc\_start\_seq\_get  
krb5\_cc\_store\_cred  
krb5\_change\_password  
krb5\_cksumtype\_to\_string  
krb5\_copy\_addresses  
krb5\_copy\_authdata  
krb5\_copy\_authenticator  
krb5\_copy\_checksum  
krb5\_copy\_creds  
krb5\_copy\_data  
krb5\_copy\_keyblock  
krb5\_copy\_keyblock\_contents  
krb5\_copy\_principal  
krb5\_copy\_ticket  
krb5\_decode\_authdata\_container  
krb5\_decode\_ticket  
krb5\_deltat\_to\_string  
krb5\_encode\_authdata\_container  
krb5\_enctype\_to\_string  
krb5\_free\_addresses  
krb5\_free\_ap\_rep\_enc\_part  
krb5\_free\_authdata  
krb5\_free\_authenticator

krb5\_free\_checksum  
krb5\_free\_checksum\_contents  
krb5\_free\_cksumtypes  
krb5\_free\_context  
krb5\_free\_cred\_contents  
krb5\_free\_creds  
krb5\_free\_data  
krb5\_free\_data\_contents  
krb5\_free\_default\_realm  
krb5\_free\_error  
krb5\_free\_host\_realm  
krb5\_free\_keyblock  
krb5\_free\_keyblock\_contents  
krb5\_free\_keytab\_entry\_contents  
krb5\_free\_principal  
krb5\_free\_realm\_string  
krb5\_free\_tgt\_creds  
krb5\_free\_ticket  
krb5\_free\_unparsed\_name  
krb5\_fwd\_tgt\_creds  
krb5\_get\_credentials  
krb5\_get\_credentials\_renew  
krb5\_get\_credentials\_validate  
krb5\_get\_default\_realm  
krb5\_get\_host\_realm  
krb5\_get\_init\_creds\_keytab  
krb5\_get\_init\_creds\_opt\_init  
krb5\_get\_init\_creds\_opt\_set\_address\_list  
krb5\_get\_init\_creds\_opt\_set\_etype\_list  
krb5\_get\_init\_creds\_opt\_set\_forwardable  
krb5\_get\_init\_creds\_opt\_set\_preauth\_list  
krb5\_get\_init\_creds\_opt\_set\_proxiable  
krb5\_get\_init\_creds\_opt\_set\_renew\_life  
krb5\_get\_init\_creds\_opt\_set\_salt  
krb5\_get\_init\_creds\_opt\_set\_tkt\_life  
krb5\_get\_key\_data  
krb5\_get\_key\_etype  
krb5\_get\_key\_length  
krb5\_get\_init\_creds\_password  
krb5\_get\_permitted\_etypes  
krb5\_get\_profile  
krb5\_get\_prompt\_types  
krb5\_get\_renewed\_creds  
krb5\_get\_server\_rcache



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krb5\_get\_validated\_creds  
krb5\_init\_allocated\_keyblock  
krb5\_init\_context  
krb5\_init\_keyblock  
krb5\_init\_secure\_context  
krb5\_is\_thread\_safe  
krb5\_kt\_add\_entry  
krb5\_kt\_close  
krb5\_kt\_default  
krb5\_kt\_default\_name  
krb5\_kt\_end\_seq\_get  
krb5\_kt\_get\_entry  
krb5\_kt\_get\_name  
krb5\_kt\_get\_type  
krb5\_kt\_next\_entry  
krb5\_kt\_read\_service\_key  
krb5\_kt\_remove\_entry  
krb5\_kt\_resolve  
krb5\_kt\_start\_seq\_get  
krb5\_kuserok  
krb5\_mk\_error  
krb5\_mk\_ncred  
krb5\_mk\_priv  
krb5\_mk\_rep  
krb5\_mk\_req  
krb5\_mk\_req\_extended  
krb5\_mk\_safe  
krb5\_mk\_1cred  
krb5\_os\_localaddr  
krb5\_pac\_add\_buffer  
krb5\_pac\_free  
krb5\_pac\_get\_types  
krb5\_pac\_get\_buffer  
krb5\_pac\_init  
krb5\_pac\_parse  
krb5\_pac\_verify  
krb5\_parse\_name  
krb5\_principal\_compare  
krb5\_principal2salt  
krb5\_prompter\_posix  
krb5\_rd\_cred  
krb5\_rd\_error  
krb5\_rd\_priv  
krb5\_rd\_rep

krb5\_rd\_req  
krb5\_rd\_safe  
krb5\_read\_password  
krb5\_realm\_compare  
krb5\_realm\_iterator  
krb5\_realm\_iterator\_create  
krb5\_realm\_iterator\_free  
krb5\_recvauth  
krb5\_recvauth\_version  
krb5\_saltype\_to\_string  
krb5\_sendauth  
krb5\_set\_default\_realm  
krb5\_set\_default\_tgs\_enctypes  
krb5\_set\_key\_data  
krb5\_set\_key enctype  
krb5\_set\_key\_length  
krb5\_set\_password  
krb5\_set\_password\_using\_ccache  
krb5\_set\_principal\_realm  
krb5\_set\_real\_time  
krb5\_sname\_to\_principal  
krb5\_string\_to\_cksumtype  
krb5\_string\_to\_deltat  
krb5\_string\_to enctype  
krb5\_string\_to\_key  
krb5\_string\_to\_saltype  
krb5\_string\_to\_timestamp  
krb5\_timeofday  
krb5\_timestamp\_to\_sfstring  
krb5\_timestamp\_to\_string  
krb5\_unparse\_name  
krb5\_unparse\_name\_ext  
krb5\_us\_timeofday  
krb5\_use enctype  
krb5\_verify\_init\_creds  
krb5\_verify\_init\_creds\_opt\_init  
krb5\_verify\_init\_creds\_opt\_set\_ap\_req\_nofail  
krb5\_xfree  
krb5\_xfree\_wrap

**Files** /usr/lib/libkrb5.so.1      shared object  
         /usr/lib/64/libkrb5.so.1    64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWkrbu (32-bit and 64-bit)
Interface Stability	Volatile
MT-Level	Safe

**See Also** [krb5-config\(1\)](#), [libgss\(3LIB\)](#), [attributes\(5\)](#)

**Name** libkstat – kernel statistics library

**Synopsis** `cc [ flag... ] file... -lkstat [ library... ]  
#include <kstat.h>`

**Description** Functions in this library provide a general-purpose mechanism for providing kernel statistics to users.

**Interfaces** The shared object `libkstat.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>kstat_chain_update</code>	<code>kstat_close</code>
<code>kstat_data_lookup</code>	<code>kstat_lookup</code>
<code>kstat_open</code>	<code>kstat_read</code>
<code>kstat_write</code>	

**Files** `/lib/libkstat.so.1` shared object  
`/lib/64/libkstat.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Stable
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [kstat\(3KSTAT\)](#), [attributes\(5\)](#)

**Name** libkvm – Kernel Virtual Memory access library

**Synopsis** `cc [ flag... ] file... -lkvm [ library ... ]  
#include <kvm.h>`

**Description** Functions in this library provide application access to kernel symbols, addresses and values. The individual functions are documented in Section 3KVM of the reference manual.

**Interfaces** The shared object `libkvm.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>kvm_close</code>	<code>kvm_getcmd</code>
<code>kvm_getproc</code>	<code>kvm_getu</code>
<code>kvm_kread</code>	<code>kvm_kwrite</code>
<code>kvm_nextproc</code>	<code>kvm_nlist</code>
<code>kvm_open</code>	<code>kvm_read</code>
<code>kvm_setproc</code>	<code>kvm_uread</code>
<code>kvm_uwrite</code>	<code>kvm_write</code>

**Files** `/usr/lib/libkvm.so.1` shared object  
`/usr/lib/64/libkvm.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	<code>kvm_read()</code> and <code>kvm_write()</code> are Obsolete; the remaining functions are Stable.
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libl – lex library

**Synopsis** `cc [ flag... ] file... [ library... ]`

**Description** Functions in this library provide user interfaces to the [lex\(1\)](#) library.

**Interfaces** The shared object `libl.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>allprint</code>	<code>allprint_w</code>
<code>main</code>	<code>sprint</code>
<code>sprint_w</code>	<code>yyles</code>
<code>yyles_e</code>	<code>yyles_w</code>
<code>yyracc</code>	<code>yyreject</code>
<code>yyreject_e</code>	<code>yyreject_w</code>
<code>yywrap</code>	

**Files** `/usr/lib/libl.so.1` shared object  
`/usr/lib/64/libl.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [lex\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** liblayout – layout service library

**Synopsis** `cc [ flag... ] file... -llayout [ library... ]`  
`#include <sys/layout.h>`

**Description** Functions in this library provide various layout service routines.

**Interfaces** The shared object `liblayout.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>m_create_layout</code>	<code>m_destroy_layout</code>
<code>m_getvalues_layout</code>	<code>m_setvalues_layout</code>
<code>m_transform_layout</code>	<code>m_wtransform_layout</code>

**Files** `/usr/lib/liblayout.so.1` shared object  
`/usr/lib/64/liblayout.so.1` 64-bit shared object.

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWctpls
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** liblgrp – locality group library

**Synopsis** `cc [ flag... ] file... -llgrp [ library... ]  
#include <sys/lgrp_user.h>`

**Description** The functions in this library traverse the lgroup (locality group) hierarchy, discover its contents, and set a thread's affinity for an lgroup. A locality group represents the set of CPU-like and memory-like hardware devices that are at most some locality apart from each other.

**Interfaces** The shared object `liblgrp.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>lgrp_affinity_get</code>	<code>lgrp_affinity_set</code>
<code>lgrp_children</code>	<code>lgrp_cookie_stale</code>
<code>lgrp_cpus</code>	<code>lgrp_fini</code>
<code>lgrp_home</code>	<code>lgrp_init</code>
<code>lgrp_latency</code>	<code>lgrp_latency_cookie</code>
<code>lgrp_mem_size</code>	<code>lgrp_nlgrps</code>
<code>lgrp_parents</code>	<code>lgrp_resourcess</code>
<code>lgrp_root</code>	<code>lgrp_version</code>
<code>lgrp_view</code>	

**Files** `/usr/lib/liblgrp.so.1` shared object  
`/usr/lib/64/liblgrp.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [lgrp\\_affinity\\_get\(3LGRP\)](#), [lgrp\\_children\(3LGRP\)](#), [lgrp\\_cookie\\_stale\(3LGRP\)](#), [lgrp\\_cpus\(3LGRP\)](#), [lgrp\\_fini\(3LGRP\)](#), [lgrp\\_home\(3LGRP\)](#), [lgrp\\_init\(3LGRP\)](#), [lgrp\\_latency\(3LGRP\)](#), [lgrp\\_mem\\_size\(3LGRP\)](#), [lgrp\\_nlgrps\(3LGRP\)](#), [lgrp\\_parents\(3LGRP\)](#), [lgrp\\_root\(3LGRP\)](#), [lgrp\\_version\(3LGRP\)](#), [lgrp\\_view\(3LGRP\)](#), [attributes\(5\)](#)



**Name** libm – C math library

**Synopsis** `c99 [ flag... ] file... -lm [ library... ]`

**Description** Functions in this library provide common elementary mathematical functions and floating point environment routines defined by System V, ANSI C, POSIX, and so on. See [standards\(5\)](#). Additional functions in this library provide extended support for handling floating point exceptions.

**Interfaces** The shared object `libm.so.2` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>acos</code>	<code>acosf</code>
<code>acosh</code>	<code>acoshf</code>
<code>acoshl</code>	<code>acosl</code>
<code>asin</code>	<code>asinf</code>
<code>asinh</code>	<code>asinhf</code>
<code>asinh1</code>	<code>asinl</code>
<code>atan</code>	<code>atan2</code>
<code>atan2f</code>	<code>atan2l</code>
<code>atanf</code>	<code>atanh</code>
<code>atanhf</code>	<code>atanhl</code>
<code>atanl</code>	<code>cabs</code>
<code>cabsf</code>	<code>cabsl</code>
<code>cacos</code>	<code>cacosf</code>
<code>cacosh</code>	<code>cacoshf</code>
<code>cacoshl</code>	<code>cacosl</code>
<code>carg</code>	<code>cargf</code>
<code>cargl</code>	<code>casin</code>
<code>casinf</code>	<code>casinh</code>
<code>casinhf</code>	<code>casinhl</code>
<code>casinl</code>	<code>catan</code>
<code>catanf</code>	<code>catanh</code>
<code>catanhf</code>	<code>catanhl</code>

catanl	cbrt
cbrtf	cbrtl
ccos	ccosf
ccosh	ccoshf
ccoshl	ccosl
ceil	ceilf
ceill	cexp
cexpf	cexpl
cimag	cimagf
cimagl	clog
clogf	clogl
conj	conjf
conjl	copysign
copysignf	copysignl
cos	cosf
cosh	coshf
coshl	cosl
cpow	cpowf
cpowl	cproj
cprojf	cprojl
creal	crealf
creall	csin
csinf	csinh
csinhf	csinhl
csinl	csqrt
csqrtf	csqrtl
ctan	ctanf
ctanh	ctanhf
ctanhl	ctanl

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erf	erfc
erfcf	erfcf
erff	erfl
exp	exp2
exp2f	exp2l
expf	expl
expm1	expm1f
expm1l	fabs
fabsf	fabsl
fdim	fdimf
fdiml	feclearexcept
fegetenv	fegetexceptflag
fegetround	feholdexcept
feraiseexcept	fesetenv
fesetexceptflag	fesetround
fetestexcept	feupdateenv
fex_get_handling	fex_get_log
fex_get_log_depth	fex_getexcepthandler
fex_log_entry	fex_merge_flags
fex_set_handling	fex_set_log
fex_set_log_depth	fex_setexcepthandler
floor	floorf
floorl	fma
fmaf	fmaf
fmax	fmaxf
fmaxl	fmin
fminf	fminl
fmod	fmodf
fmodl	frexp

frexpf	frexpl
gamma	gamma_r
gammaf	gammaf_r
gammal	gammal_r
hypot	hypotf
hypotl	ilogb
ilogbf	ilogbl
isnan	j0
j0f	j0l
j1	j1f
j1l	jnl
jnf	jnl
ldexp	ldexpf
ldexpl	lgamma
lgamma_r	lgammaf
lgammaf_r	lgammal
lgammal_r	llrint
llrintf	llrintl
llround	llroundf
llroundl	log
log10	log10f
log10l	log1p
log1pf	log1pl
log2	log2f
log2l	logb
logbf	logbl
logf	logl
lrint	lrintf
lrintl	lround

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lroundf	lroundl
matherr	modf
modff	modfl
nan	nanf
nanl	nearbyint
nearbyintf	nearbyintl
nextafter	nextafterf
nextafterl	nexttoward
nexttowardf	nexttowardl
pow	powf
powl	remainder
remainderf	remainderl
remquo	remquof
remquol	rint
rintf	rintl
round	roundf
roundl	scalb
scalbf	scalbl
scalbln	scalblnf
scalblnl	scalbn
scalbnf	scalbnl
signgam	signgamf
signgaml	significand
significandf	significandl
sin	sincos
sincosf	sincosl
sinf	sinh
sinhf	sinhl
sinl	sqrt

<code>sqrtf</code>	<code>sqrtl</code>
<code>tan</code>	<code>tanf</code>
<code>tanh</code>	<code>tanhf</code>
<code>tanhL</code>	<code>tanl</code>
<code>tgamma</code>	<code>tgammaf</code>
<code>tgammaL</code>	<code>trunc</code>
<code>truncf</code>	<code>truncl</code>
<code>y0</code>	<code>y0f</code>
<code>y0L</code>	<code>y1</code>
<code>y1f</code>	<code>y1L</code>
<code>yn</code>	<code>ynf</code>
<code>ynL</code>	

The following interfaces are unique to the x86 and x64 versions of this library:

<code>fegetprec</code>	<code>fesetprec</code>
------------------------	------------------------

**Accuracy** ISO/IEC 9899:1999, also known as C99, specifies the functions listed in the following tables and states that the accuracy of these functions is “implementation-defined”. The information below characterizes the accuracy of these functions as implemented in `libm.so.2`. For each function, the tables provide an upper bound on the largest error possible for any argument and the largest error actually observed among a large sample of arguments. Errors are expressed in “units in the last place”, or ulps, relative to the exact function value for each argument (regarding the argument as exact). Ulps depend on the precision of the floating point format: if  $y$  is the exact function value,  $x$  and  $x'$  are adjacent floating point numbers such that  $x < y < x'$ , and  $x''$  is the computed function value, then provided  $x$ ,  $x'$ , and  $x''$  all lie in the same binade, the error in  $x''$  is  $|y - x''| / |x - x'|$  ulps. In particular, when the error is less than one ulp, the computed value is one of the two floating point numbers adjacent to the exact value.

The bounds and observed errors listed below apply only in the default floating point modes. Specifically, on SPARC, these bounds assume the rounding direction is round-to-nearest and non-standard mode is disabled. On x86, the bounds assume the rounding direction is round-to-nearest and the rounding precision is round-to-64-bits. Moreover, on x86, floating point function values are returned in a floating point register in extended double precision format, but the bounds below assume that the result value is then stored to memory in the format corresponding to the function's type. On x64, the bounds assume the rounding

direction in both the x87 floating point control word and the MXCSR is round-to-nearest, the rounding precision in the x87 control word is round-to-64-bits, and the FTZ and DAZ modes are disabled.

The error bounds listed below are believed to be correct, but smaller bounds might be proved later. The observed errors are the largest ones currently known, but larger errors might be discovered later. Numbers in the notes column refer to the notes following the tables.

## Real Functions

### Single precision real functions (SPARC, x86, and x64)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
acosf	1.0	< 1	
acoshf	1.0	< 1	
asinf	1.0	< 1	
asinhf	1.0	< 1	
atanf	1.0	< 1	
atan2f	1.0	< 1	
atanhf	1.0	< 1	
cbrtf	1.0	< 1	
cosf	1.0	< 1	
coshf	1.0	< 1	
erff	1.0	< 1	
erfcf	1.0	< 1	
expf	1.0	< 1	
exp2f	1.0	< 1	
expm1f	1.0	< 1	
hypotf	1.0	< 1	
lgammaf	1.0	< 1	
logf	1.0	< 1	
log10f	1.0	< 1	
log1pf	1.0	< 1	

---

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
log2f	1.0	< 1	
powf	1.0	< 1	
sinf	1.0	< 1	
sinhf	1.0	< 1	
sqrtf	0.5	0.500	[1]
tanf	1.0	< 1	
tanhf	1.0	< 1	
tgammaf	1.0	< 1	

---

### Double precision real functions (SPARC and x64)

---

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
acos	1.0	< 1	
acosh	4.0	1.878	
asin	1.0	< 1	
asinh	7.0	1.653	
atan	1.0	<1	
atan2	2.5	1.475	
atanh	4.0	1.960	
cbrt	1.0	< 1	
cos	1.0	< 1	
cosh	3.0	1.168	
erf	4.0	0.959	
erfc	6.0	2.816	
exp	1.0	< 1	
exp2	2.0	1.050	
expm1	1.0	< 1	

---



function	error bound	largest error	notes
	(ulps)	observed (ulps)	
hypot	1.0	< 1	
lgamma	61.5	5.629	[2]
log	1.0	< 1	
log10	3.5	1.592	
log1p	1.0	< 1	
log2	1.0	< 1	
pow	1.0	< 1	
sin	1.0	< 1	
sinh	4.0	2.078	
sqrt	0.5	0.500	[1]
tan	1.0	< 1	
tanh	3.5	2.136	
tgamma	1.0	< 1	

### Double precision real functions (x86)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
acos	1.0	< 1	
acosh	4.0	1.694	
asin	1.0	< 1	
asinh	7.0	1.493	
atan	1.0	< 1	
atan2	1.0	< 1	
atanh	4.0	1.445	
cbrt	1.0	< 1	
cos	1.0	< 1	
cosh	3.0	1.001	

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
erf	4.0	0.932	
erfc	6.0	2.728	
exp	1.0	< 1	
exp2	1.0	< 1	
expm1	1.0	< 1	
hypot	1.0	< 1	
lgamma	61.5	2.654	[2]
log	1.0	< 1	
log10	1.0	< 1	
log1p	1.0	< 1	
log2	1.0	< 1	
pow	1.0	< 1	
sin	1.0	< 1	
sinh	4.0	1.458	
sqrt	0.5003	0.500	[1]
tan	1.0	< 1	
tanh	3.5	1.592	
tgamma	1.0	< 1	

### Quadruple precision real functions (SPARC)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
acosl	3.5	1.771	
acoshl	8.0	1.275	
asinl	4.0	2.007	
asinh1	9.0	1.823	
atanl	1.0	< 1	

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
atan2l	2.5	1.102	
atanhl	4.0	1.970	
cbrtl	1.0	< 1	
cosl	1.0	< 1	
coshl	3.5	0.985	
erfl	2.0	0.779	
erfcl	68.5	13.923	
expl	1.0	< 1	
exp2l	2.0	0.714	
expml	2.0	1.020	
hypotl	1.0	< 1	
lgammal	18.5	2.916	[2]
logl	1.0	< 1	
log10l	3.5	1.156	
log1pl	2.0	1.216	
log2l	3.5	1.675	
powl	1.0	< 1	
sinl	1.0	< 1	
sinhl	4.5	1.589	
sqrtl	0.5	0.500	[1]
tanl	4.5	2.380	
tanhL	4.5	1.692	
tgammal	1.0	< 1	

### Extended precision real functions (x86 and x64)

---

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
acosl	3.0	1.868	
acoshl	8.0	2.352	
asinl	3.0	1.716	
asinh1	9.0	2.346	
atanl	1.0	< 1	
atan2l	1.0	< 1	
atanhl	4.0	2.438	
cbrtl	1.0	< 1	
cosl	1.0	< 1	
coshl	3.5	1.288	
erfl	1.0	< 1	
erfcl	78.5	13.407	
expl	3.5	1.291	
exp2l	1.5	0.807	
expml	4.0	1.936	
hypotl	3.5	2.087	
lgammal	22.5	4.197	[2]
logl	2.0	0.881	
log10l	2.0	1.284	
log1pl	5.0	2.370	
log2l	1.0	< 1	
powl	32770.0	4478.132	
sinl	1.0	< 1	
sinhl	4.5	2.356	
sqrtrl	0.5	0.500	[1]
tanl	4.5	2.366	
tanh1	4.5	2.417	

---

	error bound	largest error	
function	(ulps)	observed (ulps)	notes
tgamma1	1.0	< 1	

**Notes:**

- [1] On SPARC and x64, `sqrtf`, `sqrt`, and `sqrtl` are correctly rounded in accordance with IEEE 754. On x86, `sqrtl` is correctly rounded, `sqrtf` is correctly rounded provided the result is narrowed to single precision as discussed above, but `sqrt` might not be correctly rounded due to “double rounding”: when the intermediate value computed to extended precision lies exactly halfway between two representable numbers in double precision, the result of rounding the intermediate value to double precision is determined by the round-ties-to-even rule. If this rule causes the second rounding to round in the same direction as the first, the net rounding error can exceed 0.5 ulps. (The error is bounded instead by  $0.5 \cdot (1 + 2^{-11})$  ulps.)
- [2] Error bounds for `lgamma` and `lgamma1` apply only for positive arguments.

Complex functions The real-valued complex functions `cabsf`, `cabs`, `cabsl`, `cargf`, `carg`, and `cargl` are equivalent to the real functions `hypotf`, `hypot`, `hypotl`, `atan2f`, `atan2`, and `atan2l`, respectively. The error bounds and observed errors given above for the latter functions also apply to the former.

The complex functions listed below are complex-valued. For each function, the error bound shown applies separately to both the real and imaginary parts of the result. (For example, both the real and imaginary parts of `cacosf(z)` are accurate to within 1 ulp regardless of their magnitudes.) Similarly, the largest observed error shown is the largest error found in either the real or the imaginary part of the result.

**Single precision complex functions (SPARC and x64)**

	error bound	largest error	
function	(ulps)	observed (ulps)	notes
<code>cacosf</code> , <code>cacoshf</code>	1	< 1	[1]
<code>casinf</code> , <code>casinhf</code>	1	< 1	
<code>catanf</code> , <code>catanhf</code>	6	< 1	
<code>ccosf</code> , <code>ccoshf</code>	10	2.012	
<code>cexpf</code>	3	2.239	
<code>clogf</code>	3	< 1	
<code>cpowf</code>	—	< 1	[2]

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
csinf, csinhf	10	2.009	
csqrtf	4	< 1	
ctanf, ctanhf	13	6.987	

### Single precision complex functions (x86)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cacosf, cacoshf	1	< 1	[1]
casinf, casinhf	1	< 1	
catanf, catanhf	6	< 1	
ccosf, ccoshf	10	1.984	
cexpf	3	1.984	
clogf	3	< 1	
cpowf	—	< 1	[2]
csinf, csinhf	10	1.973	
csqrtf	4	< 1	
ctanf, ctanhf	13	4.657	

### Double precision complex functions (SPARC and x64)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cacos, cacosh	9	3.831	[1]
casin, casinh	9	3.732	
catan, catanh	6	4.179	
ccos, ccosh	10	3.832	
cexp	3	2.255	
clog	3	2.870	

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cpow	-	-	[2]
csin, csinh	10	3.722	
csqrt	4	3.204	
ctan, ctanh	13	7.143	

### Double precision complex functions (x86)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cacos, cacosh	9	3.624	[1]
casin, casinh	9	3.624	
catan, catanh	6	2.500	
ccos, ccosh	10	2.929	
cexp	3	2.147	
clog	3	1.927	
cpow	-	-	[2]
csin, csinh	10	2.918	
csqrt	4	1.914	
ctan, ctanh	13	4.630	

### Quadruple precision complex functions (SPARC)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cacosl, cacoshl	9	3	[1]
casinl, casinhl	9	3	
catanl, catanhl	6	3	
ccosl, ccoshl	10	3	
cexpl	3	2	

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
clogl	3	2	
cpowl	-	-	[2]
csinl, csinhl	10	3	
csqrtl	4	3	
ctanl, ctanhl	13	5	

### Extended precision complex functions (x86 and x64)

function	error bound	largest error	notes
	(ulps)	observed (ulps)	
cacosl, cacoshl	9	2	[1]
casinl, casinhl	9	2	
catanl, catanhl	6	2	
ccosl, ccoshl	10	3	
cexpl	3	2.699	
clogl	3	1	
cpowl	-	-	[2]
csinl, csinhl	10	3	
csqrtl	4	1.452	
ctanl, ctanhl	13	5	

#### Notes:

- [1] The complex hyperbolic trigonometric functions are equivalent by symmetries to their circular trigonometric counterparts. Because the implementations of these functions exploit these symmetries, corresponding functions have the same error bounds and observed errors.
- [2] For large arguments, the results computed by `cpowf`, `cpow`, and `cpowl` can have unbounded relative error. It might be possible to give error bounds for specific domains, but no such bounds are currently available. The observed errors shown are for the domain  $\{(z, w) : \max(|\operatorname{Re} z|, |\operatorname{Im} z|, |\operatorname{Re} w|, |\operatorname{Im} w|) \leq 1\}$ .



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**Files** /lib/libm.so.2 shared object  
/lib/64/libm.so.2 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWlibmsr
MT-Level	Safe with exceptions

As described on the [lgamma\(3M\)](#) manual page, `gamma()` and `lgamma()` and their `float` and `long double` counterparts are Unsafe. All other functions in `libm.so.2` are MT-Safe.

**See Also** [Intro\(3\)](#), [lgamma\(3M\)](#), [math.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** libmail – user mailbox lockfile management library

**Synopsis** cc [ *flag...* ] *file...* -lmail [ *library...* ]  
#include <maillock.h>

**Description** Interfaces in this library provide functions for managing user mailbox lockfiles.

**Interfaces** The shared object libmail.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

maillock  
touchlock

mailunlock

**Files** /usr/lib/libmail.so.1      shared object  
/usr/lib/64/libmail.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [maillock\(3MAIL\)](#), [attributes\(5\)](#)

**Name** libmalloc – memory allocation library

**Synopsis** `cc [ flag... ] file... -lmalloc [ library... ]`

**Description** Functions in this library provide routines for memory allocation. These routines are space-efficient but have lower performance. Their usage can result in serious performance degradation.

**Interfaces** The shared object `libmalloc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>calloc</code>	<code>cfree</code>
<code>free</code>	<code>mallinfo</code>
<code>malloc</code>	<code>mallopt</code>
<code>memalign</code>	<code>realloc</code>
<code>valloc</code>	

**Files** `/usr/lib/libmalloc.so.1` shared object  
`/usr/lib/64/libmalloc.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [Intro\(3\)](#), [malloc\(3MALLOC\)](#), [attributes\(5\)](#)

**Name** libmapmalloc – alternative memory allocator library

**Synopsis** `cc [ flag... ] file... -lmapmalloc [ library... ]`  
`#include <stdlib.h>`

**Description** Functions in this library provide malloc routines that use [mmap\(2\)](#) instead of [sbrk\(2\)](#) for acquiring heap space.

**Interfaces** The shared object `libmapmalloc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>calloc</code>	<code>cfree</code>
<code>free</code>	<code>mallinfo</code>
<code>malloc</code>	<code>mallopt</code>
<code>memalign</code>	<code>realloc</code>
<code>valloc</code>	

**Files** `/usr/lib/libmapmalloc.so.1` shared object  
`/usr/lib/64/libmapmalloc.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [mmap\(2\)](#), [sbrk\(2\)](#), [Intro\(3\)](#), [malloc\(3C\)](#), [malloc\(3MALLOC\)](#), [mapmalloc\(3MALLOC\)](#), [attributes\(5\)](#)

**Name** libmd – Message Digest library

**Synopsis**

```
cc [ flag... ] file... -lmd [ library... ]
#include <md4.h>
#include <md5.h>
#include <sha1.h>
#include <sha2.h>
```

**Description** Functions in this library provide hashing routines for MD4 (RFC1320), MD5 (RFC1321), SHA1 (RFC3174), SHA256 (FIPS 180-2), SHA384 (FIPS 180-2), SHA512 (FIPS 180-2).

**Interfaces** The shared object `libmd.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

MD4Final	MD4Init
MD4Update	md5_calc
MD5Final	MD5Init
MD5Update	SHA1Final
SHA1Init	SHA1Update
SHA2Final	SHA2Init
SHA2Update	

**Security** The MD4 and MD5 algorithms are currently considered weak for cryptographic use. The algorithms should be used only for compatibility with legacy systems or protocols.

The SHA1 algorithm is also believed to have some weaknesses. Migration to one of the SHA2 algorithms—including SHA256, SHA384 or SHA512—is highly recommended when compatibility with data formats and on wire protocols is permitted.

**Files** `/lib/libmd.so.1` shared object  
`/lib/64/libmd.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	MT-Safe

**Name** libmd5 – MD5 hashing library

**Synopsis** `cc [ flag... ] file... -lmd5 [ library... ]  
#include <md5.h>`

**Description** Functions in this library provide MD5 hashing routines.

**Interfaces** The shared object `libmd5.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>MD5Final</code>	<code>MD5Init</code>
<code>MD5Update</code>	<code>md5_calc</code>

**Files** `/lib/libmd5.so.1` shared object  
`/lib/64/libmd5.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libmenu – menus library

**Synopsis** `cc [ flag... ] file... -lmenu [ library... ]`

**Description** Functions in this library provide menus using [libcurses\(3LIB\)](#) routines.

**Interfaces** The shared object `libmenu.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>current_item</code>	<code>free_item</code>
<code>free_menu</code>	<code>item_count</code>
<code>item_description</code>	<code>item_index</code>
<code>item_init</code>	<code>item_name</code>
<code>item_opts</code>	<code>item_opts_off</code>
<code>item_opts_on</code>	<code>item_term</code>
<code>item_userptr</code>	<code>item_value</code>
<code>item_visible</code>	<code>menu_back</code>
<code>menu_driver</code>	<code>menu_fore</code>
<code>menu_format</code>	<code>menu_grey</code>
<code>menu_init</code>	<code>menu_items</code>
<code>menu_mark</code>	<code>menu_opts</code>
<code>menu_opts_off</code>	<code>menu_opts_on</code>
<code>menu_pad</code>	<code>menu_pattern</code>
<code>menu_sub</code>	<code>menu_term</code>
<code>menu_userptr</code>	<code>menu_win</code>
<code>new_item</code>	<code>new_menu</code>
<code>pos_menu_cursor</code>	<code>post_menu</code>
<code>scale_menu</code>	<code>set_current_item</code>
<code>set_item_init</code>	<code>set_item_opts</code>
<code>set_item_term</code>	<code>set_item_userptr</code>
<code>set_item_value</code>	<code>set_menu_back</code>
<code>set_menu_fore</code>	<code>set_menu_format</code>
<code>set_menu_grey</code>	<code>set_menu_init</code>

set_menu_items	set_menu_mark
set_menu_opts	set_menu_pad
set_menu_pattern	set_menu_sub
set_menu_term	set_menu_userptr
set_menu_win	set_top_row
top_row	unpost_menu

**Files** /usr/lib/libmenu.so.1      shared object  
/usr/lib/64/libmenu.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libcurses\(3LIB\)](#), [attributes\(5\)](#)



**Name** libmLib – mediaLib library

**Synopsis** `cc [ flag... ] file... -lmLib [ library... ]  
#include <mLib.h>`

**Description** Interfaces in this library provide functions for multimedia processing. When executed on an UltraSPARC platform, these functions take advantage of the VIS Instruction Set. When executed on an AMD64 platform, these functions take advantage of the MMX/SSE/SSE2 instructions.

**Interfaces** The shared object `libmLib.so.2` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

- System Functions
- `mLib_free`
  - `mLib_malloc`
  - `mLib_memcpy`
  - `mLib_memmove`
  - `mLib_memset`
  - `mLib_realloc`
  - `mLib_version`
- Algebra Functions
- `mLib_MatrixAdd_S16C_Mod`
  - `mLib_MatrixAdd_S16C_S16C_Mod`
  - `mLib_MatrixAdd_S16C_S16C_Sat`
  - `mLib_MatrixAdd_S16C_S8C_Mod`
  - `mLib_MatrixAdd_S16C_S8C_Sat`
  - `mLib_MatrixAdd_S16C_Sat`
  - `mLib_MatrixAdd_S16C_U8C_Mod`
  - `mLib_MatrixAdd_S16C_U8C_Sat`
  - `mLib_MatrixAdd_S16_Mod`
  - `mLib_MatrixAdd_S16_S16_Mod`
  - `mLib_MatrixAdd_S16_S16_Sat`
  - `mLib_MatrixAdd_S16_S8_Mod`
  - `mLib_MatrixAdd_S16_S8_Sat`
  - `mLib_MatrixAdd_S16_Sat`
  - `mLib_MatrixAdd_S16_U8_Mod`
  - `mLib_MatrixAdd_S16_U8_Sat`
  - `mLib_MatrixAdd_S32C_Mod`
  - `mLib_MatrixAdd_S32C_S16C_Mod`
  - `mLib_MatrixAdd_S32C_S16C_Sat`
  - `mLib_MatrixAdd_S32C_S32C_Mod`
  - `mLib_MatrixAdd_S32C_S32C_Sat`
  - `mLib_MatrixAdd_S32C_Sat`
  - `mLib_MatrixAdd_S32_Mod`
  - `mLib_MatrixAdd_S32_S16_Mod`
  - `mLib_MatrixAdd_S32_S16_Sat`
  - `mLib_MatrixAdd_S32_S32_Mod`

- mlib\_MatrixAdd\_S32\_S32\_Sat
- mlib\_MatrixAdd\_S32\_Sat
- mlib\_MatrixAdd\_S8C\_Mod
- mlib\_MatrixAdd\_S8C\_S8C\_Mod
- mlib\_MatrixAdd\_S8C\_S8C\_Sat
- mlib\_MatrixAdd\_S8C\_Sat
- mlib\_MatrixAdd\_S8\_Mod
- mlib\_MatrixAdd\_S8\_S8\_Mod
- mlib\_MatrixAdd\_S8\_S8\_Sat
- mlib\_MatrixAdd\_S8\_Sat
- mlib\_MatrixAddS\_S16C\_Mod
- mlib\_MatrixAddS\_S16C\_S16C\_Mod
- mlib\_MatrixAddS\_S16C\_S16C\_Sat
- mlib\_MatrixAddS\_S16C\_S8C\_Mod
- mlib\_MatrixAddS\_S16C\_S8C\_Sat
- mlib\_MatrixAddS\_S16C\_Sat
- mlib\_MatrixAddS\_S16C\_U8C\_Mod
- mlib\_MatrixAddS\_S16C\_U8C\_Sat
- mlib\_MatrixAddS\_S16\_Mod
- mlib\_MatrixAddS\_S16\_S16\_Mod
- mlib\_MatrixAddS\_S16\_S16\_Sat
- mlib\_MatrixAddS\_S16\_S8\_Mod
- mlib\_MatrixAddS\_S16\_S8\_Sat
- mlib\_MatrixAddS\_S16\_Sat
- mlib\_MatrixAddS\_S16\_U8\_Mod
- mlib\_MatrixAddS\_S16\_U8\_Sat
- mlib\_MatrixAddS\_S32C\_Mod
- mlib\_MatrixAddS\_S32C\_S16C\_Mod
- mlib\_MatrixAddS\_S32C\_S16C\_Sat
- mlib\_MatrixAddS\_S32C\_S32C\_Mod
- mlib\_MatrixAddS\_S32C\_S32C\_Sat
- mlib\_MatrixAddS\_S32C\_Sat
- mlib\_MatrixAddS\_S32\_Mod
- mlib\_MatrixAddS\_S32\_S16\_Mod
- mlib\_MatrixAddS\_S32\_S16\_Sat
- mlib\_MatrixAddS\_S32\_S32\_Mod
- mlib\_MatrixAddS\_S32\_S32\_Sat
- mlib\_MatrixAddS\_S32\_Sat
- mlib\_MatrixAddS\_S8C\_Mod
- mlib\_MatrixAddS\_S8C\_S8C\_Mod
- mlib\_MatrixAddS\_S8C\_S8C\_Sat
- mlib\_MatrixAddS\_S8C\_Sat
- mlib\_MatrixAddS\_S8\_Mod
- mlib\_MatrixAddS\_S8\_S8\_Mod

- mlib\_MatrixAddS\_S8\_S8\_Sat
- mlib\_MatrixAddS\_S8\_Sat
- mlib\_MatrixAddS\_U8C\_Mod
- mlib\_MatrixAddS\_U8C\_Sat
- mlib\_MatrixAddS\_U8C\_U8C\_Mod
- mlib\_MatrixAddS\_U8C\_U8C\_Sat
- mlib\_MatrixAddS\_U8\_Mod
- mlib\_MatrixAddS\_U8\_Sat
- mlib\_MatrixAddS\_U8\_U8\_Mod
- mlib\_MatrixAddS\_U8\_U8\_Sat
- mlib\_MatrixAdd\_U8C\_Mod
- mlib\_MatrixAdd\_U8C\_Sat
- mlib\_MatrixAdd\_U8C\_U8C\_Mod
- mlib\_MatrixAdd\_U8C\_U8C\_Sat
- mlib\_MatrixAdd\_U8\_Mod
- mlib\_MatrixAdd\_U8\_Sat
- mlib\_MatrixAdd\_U8\_U8\_Mod
- mlib\_MatrixAdd\_U8\_U8\_Sat
- mlib\_MatrixAve\_S16
- mlib\_MatrixAve\_S16C
- mlib\_MatrixAve\_S16C\_S16C
- mlib\_MatrixAve\_S16C\_S8C
- mlib\_MatrixAve\_S16C\_U8C
- mlib\_MatrixAve\_S16\_S16
- mlib\_MatrixAve\_S16\_S8
- mlib\_MatrixAve\_S16\_U8
- mlib\_MatrixAve\_S32
- mlib\_MatrixAve\_S32C
- mlib\_MatrixAve\_S32C\_S16C
- mlib\_MatrixAve\_S32C\_S32C
- mlib\_MatrixAve\_S32\_S16
- mlib\_MatrixAve\_S32\_S32
- mlib\_MatrixAve\_S8
- mlib\_MatrixAve\_S8C
- mlib\_MatrixAve\_S8C\_S8C
- mlib\_MatrixAve\_S8\_S8
- mlib\_MatrixAve\_U8
- mlib\_MatrixAve\_U8C
- mlib\_MatrixAve\_U8C\_U8C
- mlib\_MatrixAve\_U8\_U8
- mlib\_MatrixMaximum\_D64
- mlib\_MatrixMaximum\_F32
- mlib\_MatrixMaximumMag\_D64C
- mlib\_MatrixMaximumMag\_F32C

- mlib\_MatrixMaximumMag\_S16C
- mlib\_MatrixMaximumMag\_S32C
- mlib\_MatrixMaximumMag\_S8C
- mlib\_MatrixMaximumMag\_U8C
- mlib\_MatrixMaximum\_S16
- mlib\_MatrixMaximum\_S32
- mlib\_MatrixMaximum\_S8
- mlib\_MatrixMaximum\_U8
- mlib\_MatrixMinimum\_D64
- mlib\_MatrixMinimum\_F32
- mlib\_MatrixMinimumMag\_D64C
- mlib\_MatrixMinimumMag\_F32C
- mlib\_MatrixMinimumMag\_S16C
- mlib\_MatrixMinimumMag\_S32C
- mlib\_MatrixMinimumMag\_S8C
- mlib\_MatrixMinimumMag\_U8C
- mlib\_MatrixMinimum\_S16
- mlib\_MatrixMinimum\_S32
- mlib\_MatrixMinimum\_S8
- mlib\_MatrixMinimum\_U8
- mlib\_MatrixMul\_S16C\_S16C\_Mod
- mlib\_MatrixMul\_S16C\_S16C\_Sat
- mlib\_MatrixMul\_S16C\_S8C\_Mod
- mlib\_MatrixMul\_S16C\_S8C\_Sat
- mlib\_MatrixMul\_S16C\_U8C\_Mod
- mlib\_MatrixMul\_S16C\_U8C\_Sat
- mlib\_MatrixMul\_S16\_S16\_Mod
- mlib\_MatrixMul\_S16\_S16\_Sat
- mlib\_MatrixMul\_S16\_S8\_Mod
- mlib\_MatrixMul\_S16\_S8\_Sat
- mlib\_MatrixMul\_S16\_U8\_Mod
- mlib\_MatrixMul\_S16\_U8\_Sat
- mlib\_MatrixMul\_S32C\_S16C\_Mod
- mlib\_MatrixMul\_S32C\_S16C\_Sat
- mlib\_MatrixMul\_S32C\_S32C\_Mod
- mlib\_MatrixMul\_S32C\_S32C\_Sat
- mlib\_MatrixMul\_S32\_S16\_Mod
- mlib\_MatrixMul\_S32\_S16\_Sat
- mlib\_MatrixMul\_S32\_S32\_Mod
- mlib\_MatrixMul\_S32\_S32\_Sat
- mlib\_MatrixMul\_S8C\_S8C\_Mod
- mlib\_MatrixMul\_S8C\_S8C\_Sat
- mlib\_MatrixMul\_S8\_S8\_Mod
- mlib\_MatrixMul\_S8\_S8\_Sat

- `mllib_MatrixMulShift_S16C_S16C_Mod`
- `mllib_MatrixMulShift_S16C_S16C_Sat`
- `mllib_MatrixMulShift_S16_S16_Mod`
- `mllib_MatrixMulShift_S16_S16_Sat`
- `mllib_MatrixMulS_S16C_Mod`
- `mllib_MatrixMulS_S16C_S16C_Mod`
- `mllib_MatrixMulS_S16C_S16C_Sat`
- `mllib_MatrixMulS_S16C_S8C_Mod`
- `mllib_MatrixMulS_S16C_S8C_Sat`
- `mllib_MatrixMulS_S16C_Sat`
- `mllib_MatrixMulS_S16C_U8C_Mod`
- `mllib_MatrixMulS_S16C_U8C_Sat`
- `mllib_MatrixMulS_S16_Mod`
- `mllib_MatrixMulS_S16_S16_Mod`
- `mllib_MatrixMulS_S16_S16_Sat`
- `mllib_MatrixMulS_S16_S8_Mod`
- `mllib_MatrixMulS_S16_S8_Sat`
- `mllib_MatrixMulS_S16_Sat`
- `mllib_MatrixMulS_S16_U8_Mod`
- `mllib_MatrixMulS_S16_U8_Sat`
- `mllib_MatrixMulS_S32C_Mod`
- `mllib_MatrixMulS_S32C_S16C_Mod`
- `mllib_MatrixMulS_S32C_S16C_Sat`
- `mllib_MatrixMulS_S32C_S32C_Mod`
- `mllib_MatrixMulS_S32C_S32C_Sat`
- `mllib_MatrixMulS_S32C_Sat`
- `mllib_MatrixMulS_S32_Mod`
- `mllib_MatrixMulS_S32_S16_Mod`
- `mllib_MatrixMulS_S32_S16_Sat`
- `mllib_MatrixMulS_S32_S32_Mod`
- `mllib_MatrixMulS_S32_S32_Sat`
- `mllib_MatrixMulS_S32_Sat`
- `mllib_MatrixMulS_S8C_Mod`
- `mllib_MatrixMulS_S8C_S8C_Mod`
- `mllib_MatrixMulS_S8C_S8C_Sat`
- `mllib_MatrixMulS_S8C_Sat`
- `mllib_MatrixMulS_S8_Mod`
- `mllib_MatrixMulS_S8_S8_Mod`
- `mllib_MatrixMulS_S8_S8_Sat`
- `mllib_MatrixMulS_S8_Sat`
- `mllib_MatrixMulSShift_S16C_Mod`
- `mllib_MatrixMulSShift_S16C_S16C_Mod`
- `mllib_MatrixMulSShift_S16C_S16C_Sat`
- `mllib_MatrixMulSShift_S16C_Sat`

- mlib\_MatrixMulSShift\_S16\_Mod
- mlib\_MatrixMulSShift\_S16\_S16\_Mod
- mlib\_MatrixMulSShift\_S16\_S16\_Sat
- mlib\_MatrixMulSShift\_S16\_Sat
- mlib\_MatrixMulSShift\_S32C\_Mod
- mlib\_MatrixMulSShift\_S32C\_S32C\_Mod
- mlib\_MatrixMulSShift\_S32C\_S32C\_Sat
- mlib\_MatrixMulSShift\_S32C\_Sat
- mlib\_MatrixMulSShift\_S32\_Mod
- mlib\_MatrixMulSShift\_S32\_S32\_Mod
- mlib\_MatrixMulSShift\_S32\_S32\_Sat
- mlib\_MatrixMulSShift\_S32\_Sat
- mlib\_MatrixMulSShift\_S8C\_Mod
- mlib\_MatrixMulSShift\_S8C\_S8C\_Mod
- mlib\_MatrixMulSShift\_S8C\_S8C\_Sat
- mlib\_MatrixMulSShift\_S8C\_Sat
- mlib\_MatrixMulSShift\_S8\_Mod
- mlib\_MatrixMulSShift\_S8\_S8\_Mod
- mlib\_MatrixMulSShift\_S8\_S8\_Sat
- mlib\_MatrixMulSShift\_S8\_Sat
- mlib\_MatrixMulSShift\_U8C\_Mod
- mlib\_MatrixMulSShift\_U8C\_Sat
- mlib\_MatrixMulSShift\_U8C\_U8C\_Mod
- mlib\_MatrixMulSShift\_U8C\_U8C\_Sat
- mlib\_MatrixMulSShift\_U8\_Mod
- mlib\_MatrixMulSShift\_U8\_Sat
- mlib\_MatrixMulSShift\_U8\_U8\_Mod
- mlib\_MatrixMulSShift\_U8\_U8\_Sat
- mlib\_MatrixMuls\_U8C\_Mod
- mlib\_MatrixMuls\_U8C\_Sat
- mlib\_MatrixMuls\_U8C\_U8C\_Mod
- mlib\_MatrixMuls\_U8C\_U8C\_Sat
- mlib\_MatrixMuls\_U8\_Mod
- mlib\_MatrixMuls\_U8\_Sat
- mlib\_MatrixMuls\_U8\_U8\_Mod
- mlib\_MatrixMuls\_U8\_U8\_Sat
- mlib\_MatrixMul\_U8C\_U8C\_Mod
- mlib\_MatrixMul\_U8C\_U8C\_Sat
- mlib\_MatrixMul\_U8\_U8\_Mod
- mlib\_MatrixMul\_U8\_U8\_Sat
- mlib\_MatrixScale\_S16C\_Mod
- mlib\_MatrixScale\_S16C\_S16C\_Mod
- mlib\_MatrixScale\_S16C\_S16C\_Sat
- mlib\_MatrixScale\_S16C\_S8C\_Mod

- mlib\_MatrixScale\_S16C\_S8C\_Sat
- mlib\_MatrixScale\_S16C\_Sat
- mlib\_MatrixScale\_S16C\_U8C\_Mod
- mlib\_MatrixScale\_S16C\_U8C\_Sat
- mlib\_MatrixScale\_S16\_Mod
- mlib\_MatrixScale\_S16\_S16\_Mod
- mlib\_MatrixScale\_S16\_S16\_Sat
- mlib\_MatrixScale\_S16\_S8\_Mod
- mlib\_MatrixScale\_S16\_S8\_Sat
- mlib\_MatrixScale\_S16\_Sat
- mlib\_MatrixScale\_S16\_U8\_Mod
- mlib\_MatrixScale\_S16\_U8\_Sat
- mlib\_MatrixScale\_S32C\_Mod
- mlib\_MatrixScale\_S32C\_S16C\_Mod
- mlib\_MatrixScale\_S32C\_S16C\_Sat
- mlib\_MatrixScale\_S32C\_S32C\_Mod
- mlib\_MatrixScale\_S32C\_S32C\_Sat
- mlib\_MatrixScale\_S32C\_Sat
- mlib\_MatrixScale\_S32\_Mod
- mlib\_MatrixScale\_S32\_S16\_Mod
- mlib\_MatrixScale\_S32\_S16\_Sat
- mlib\_MatrixScale\_S32\_S32\_Mod
- mlib\_MatrixScale\_S32\_S32\_Sat
- mlib\_MatrixScale\_S32\_Sat
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- mlib\_VectorCopy\_U8C
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- mlib\_VectorMaximum\_F32

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- `mllib_VectorMaximumMag_F32C`
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- `mllib_VectorMaximumMag_U8C`
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- `mllib_VectorMerge_S8C_S8`
- `mllib_VectorMerge_U8C_U8`
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- `mllib_VectorMinimumMag_D64C`
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- `mllib_VectorMinimum_S8`
- `mllib_VectorMinimum_U8`
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- `mllib_VectorMulM_S32_S16_Sat`

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- `mllib_VectorMulSAdd_U8C_Sat`

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- `mllib_VectorMulShift_S32_Sat`
- `mllib_VectorMulShift_S8C_Mod`
- `mllib_VectorMulShift_S8C_S8C_Mod`
- `mllib_VectorMulShift_S8C_S8C_Sat`
- `mllib_VectorMulShift_S8C_Sat`
- `mllib_VectorMulShift_S8_Mod`
- `mllib_VectorMulShift_S8_S8_Mod`
- `mllib_VectorMulShift_S8_S8_Sat`
- `mllib_VectorMulShift_S8_Sat`
- `mllib_VectorMulShift_U8C_Mod`
- `mllib_VectorMulShift_U8C_Sat`
- `mllib_VectorMulShift_U8C_U8C_Mod`
- `mllib_VectorMulShift_U8C_U8C_Sat`
- `mllib_VectorMulShift_U8_Mod`
- `mllib_VectorMulShift_U8_Sat`
- `mllib_VectorMulShift_U8_U8_Mod`
- `mllib_VectorMulShift_U8_U8_Sat`
- `mllib_VectorMulS_S16C_Mod`
- `mllib_VectorMulS_S16C_S16C_Mod`
- `mllib_VectorMulS_S16C_S16C_Sat`
- `mllib_VectorMulS_S16C_S8C_Mod`
- `mllib_VectorMulS_S16C_S8C_Sat`
- `mllib_VectorMulS_S16C_Sat`

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- `mllib_VectorMulS_S16C_U8C_Sat`
- `mllib_VectorMulS_S16_Mod`
- `mllib_VectorMulS_S16_S16_Mod`
- `mllib_VectorMulS_S16_S16_Sat`
- `mllib_VectorMulS_S16_S8_Mod`
- `mllib_VectorMulS_S16_S8_Sat`
- `mllib_VectorMulS_S16_Sat`
- `mllib_VectorMulS_S16_U8_Mod`
- `mllib_VectorMulS_S16_U8_Sat`
- `mllib_VectorMulS_S32C_Mod`
- `mllib_VectorMulS_S32C_S16C_Mod`
- `mllib_VectorMulS_S32C_S16C_Sat`
- `mllib_VectorMulS_S32C_S32C_Mod`
- `mllib_VectorMulS_S32C_S32C_Sat`
- `mllib_VectorMulS_S32C_Sat`
- `mllib_VectorMulS_S32_Mod`
- `mllib_VectorMulS_S32_S16_Mod`
- `mllib_VectorMulS_S32_S16_Sat`
- `mllib_VectorMulS_S32_S32_Mod`
- `mllib_VectorMulS_S32_S32_Sat`
- `mllib_VectorMulS_S32_Sat`
- `mllib_VectorMulS_S8C_Mod`
- `mllib_VectorMulS_S8C_S8C_Mod`
- `mllib_VectorMulS_S8C_S8C_Sat`
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- `mllib_VectorMulS_S8_S8_Sat`
- `mllib_VectorMulS_S8_Sat`
- `mllib_VectorMulSShift_S16C_Mod`
- `mllib_VectorMulSShift_S16C_S16C_Mod`
- `mllib_VectorMulSShift_S16C_S16C_Sat`
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- `mllib_VectorMulSShift_S16_Mod`
- `mllib_VectorMulSShift_S16_S16_Mod`
- `mllib_VectorMulSShift_S16_S16_Sat`
- `mllib_VectorMulSShift_S16_Sat`
- `mllib_VectorMulSShift_S32C_Mod`
- `mllib_VectorMulSShift_S32C_S32C_Mod`
- `mllib_VectorMulSShift_S32C_S32C_Sat`
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- `mllib_VectorMulSShift_S32_Mod`
- `mllib_VectorMulSShift_S32_S32_Mod`

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- mlib\_VectorMulSShift\_S8C\_Sat
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- mlib\_VectorMul\_U8\_U8\_Sat
- mlib\_VectorNorm\_S16\_Sat
- mlib\_VectorNorm\_S32\_Sat
- mlib\_VectorNorm\_S8\_Sat
- mlib\_VectorNorm\_U8\_Sat
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- mlib\_VectorReverseByteOrder\_D64
- mlib\_VectorReverseByteOrder\_D64\_D64
- mlib\_VectorReverseByteOrder\_F32
- mlib\_VectorReverseByteOrder\_F32\_F32
- mlib\_VectorReverseByteOrder\_Inp

- `mllib_VectorReverseByteOrder_S16`
- `mllib_VectorReverseByteOrder_S16_S16`
- `mllib_VectorReverseByteOrder_S32`
- `mllib_VectorReverseByteOrder_S32_S32`
- `mllib_VectorReverseByteOrder_S64`
- `mllib_VectorReverseByteOrder_S64_S64`
- `mllib_VectorReverseByteOrder_U16`
- `mllib_VectorReverseByteOrder_U16_U16`
- `mllib_VectorReverseByteOrder_U32`
- `mllib_VectorReverseByteOrder_U32_U32`
- `mllib_VectorReverseByteOrder_U64`
- `mllib_VectorReverseByteOrder_U64_U64`
- `mllib_VectorScale_S16C_Mod`
- `mllib_VectorScale_S16C_S16C_Mod`
- `mllib_VectorScale_S16C_S16C_Sat`
- `mllib_VectorScale_S16C_S8C_Mod`
- `mllib_VectorScale_S16C_S8C_Sat`
- `mllib_VectorScale_S16C_Sat`
- `mllib_VectorScale_S16C_U8C_Mod`
- `mllib_VectorScale_S16C_U8C_Sat`
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- `mllib_VectorScale_S16_S8_Sat`
- `mllib_VectorScale_S16_Sat`
- `mllib_VectorScale_S16_U8_Mod`
- `mllib_VectorScale_S16_U8_Sat`
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- `mllib_VectorScale_S32C_S16C_Mod`
- `mllib_VectorScale_S32C_S16C_Sat`
- `mllib_VectorScale_S32C_S32C_Mod`
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- `mllib_VectorScale_S32_S32_Mod`
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- `mllib_VectorScale_S32_Sat`
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- `mllib_VectorScale_S8C_S8C_Mod`
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- `mllib_VectorScale_S8C_Sat`

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- mlib\_VectorScale\_U8C\_U8C\_Sat
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- mlib\_VectorScale\_U8\_Sat
- mlib\_VectorScale\_U8\_U8\_Mod
- mlib\_VectorScale\_U8\_U8\_Sat
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- mlib\_VectorSet\_S16C
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- mlib\_VectorSet\_S8
- mlib\_VectorSet\_S8C
- mlib\_VectorSet\_U8
- mlib\_VectorSet\_U8C
- mlib\_VectorSplit\_S16\_S16C
- mlib\_VectorSplit\_S32\_S32C
- mlib\_VectorSplit\_S8\_S8C
- mlib\_VectorSplit\_U8\_U8C
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- mlib\_VectorSub\_S16C\_S16C\_Mod
- mlib\_VectorSub\_S16C\_S16C\_Sat
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  - mlib\_VectorSumAbs\_U8\_Sat
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  - mlib\_VectorZero\_U8C
- Graphics Functions
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  - mlib\_GraphicsDrawArc\_8



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#### Imaging Functions

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- mlib\_ImageAbs\_Fp\_Inp
- mlib\_ImageAbs\_Inp
- mlib\_ImageAdd
- mlib\_ImageAdd\_Fp
- mlib\_ImageAdd\_Fp\_Inp
- mlib\_ImageAdd\_Inp
- mlib\_ImageAffine
- mlib\_ImageAffine\_Fp
- mlib\_ImageAffineIndex
- mlib\_ImageAffineTable
- mlib\_ImageAffineTable\_Fp
- mlib\_ImageAffineTransform
- mlib\_ImageAffineTransform\_Fp
- mlib\_ImageAffineTransformIndex

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- mlib\_ImageAndNot
- mlib\_ImageAndNot1\_Inp
- mlib\_ImageAndNot2\_Inp
- mlib\_ImageAutoCorrel
- mlib\_ImageAutoCorrel\_Fp
- mlib\_ImageAve
- mlib\_ImageAve\_Fp
- mlib\_ImageAve\_Fp\_Inp
- mlib\_ImageAve\_Inp
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- mlib\_ImageBlend2\_Fp\_Inp
- mlib\_ImageBlend2\_Inp
- mlib\_ImageBlendColor
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- mlib\_ImageBlend\_SA\_ZERO

- mlib\_ImageBlend\_SA\_ZERO\_Inp
- mlib\_ImageBlend\_SC\_DA
- mlib\_ImageBlend\_SC\_DA\_Inp
- mlib\_ImageBlend\_SC\_DC
- mlib\_ImageBlend\_SC\_DC\_Inp
- mlib\_ImageBlend\_SC\_OMDA
- mlib\_ImageBlend\_SC\_OMDA\_Inp
- mlib\_ImageBlend\_SC\_OMDC
- mlib\_ImageBlend\_SC\_OMDC\_Inp
- mlib\_ImageBlend\_SC\_OMSA
- mlib\_ImageBlend\_SC\_OMSA\_Inp
- mlib\_ImageBlend\_SC\_ONE
- mlib\_ImageBlend\_SC\_ONE\_Inp
- mlib\_ImageBlend\_SC\_SA
- mlib\_ImageBlend\_SC\_SA\_Inp
- mlib\_ImageBlend\_SC\_SAS
- mlib\_ImageBlend\_SC\_SAS\_Inp
- mlib\_ImageBlend\_SC\_ZERO
- mlib\_ImageBlend\_SC\_ZERO\_Inp
- mlib\_ImageBlend\_ZERO\_DA
- mlib\_ImageBlend\_ZERO\_DA\_Inp
- mlib\_ImageBlend\_ZERO\_DC
- mlib\_ImageBlend\_ZERO\_DC\_Inp
- mlib\_ImageBlend\_ZERO\_OMDA
- mlib\_ImageBlend\_ZERO\_OMDA\_Inp
- mlib\_ImageBlend\_ZERO\_OMDC
- mlib\_ImageBlend\_ZERO\_OMDC\_Inp
- mlib\_ImageBlend\_ZERO\_OMSA
- mlib\_ImageBlend\_ZERO\_OMSA\_Inp
- mlib\_ImageBlend\_ZERO\_ONE
- mlib\_ImageBlend\_ZERO\_ONE\_Inp
- mlib\_ImageBlend\_ZERO\_SA
- mlib\_ImageBlend\_ZERO\_SA\_Inp
- mlib\_ImageBlend\_ZERO\_SAS
- mlib\_ImageBlend\_ZERO\_SAS\_Inp
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- mlib\_ImageBlend\_ZERO\_ZERO\_Inp
- mlib\_ImageChannelCopy
- mlib\_ImageChannelExtract
- mlib\_ImageChannelInsert
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- mlib\_ImageChannelSplit
- mlib\_ImageClear
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- `mllib_ImageClear_Fp`
- `mllib_ImageColorConvert1`
- `mllib_ImageColorConvert1_Fp`
- `mllib_ImageColorConvert2`
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- `mllib_ImageColorDitherFree`
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- `mllib_ImageColorErrorDiffusion3x3`
- `mllib_ImageColorErrorDiffusionMxN`
- `mllib_ImageColorHSL2RGB`
- `mllib_ImageColorHSL2RGB_Fp`
- `mllib_ImageColorHSV2RGB`
- `mllib_ImageColorHSV2RGB_Fp`
- `mllib_ImageColorOrderedDither8x8`
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- `mllib_ImageColorRGB2CIEMono`
- `mllib_ImageColorRGB2CIEMono_Fp`
- `mllib_ImageColorRGB2HSL`
- `mllib_ImageColorRGB2HSL_Fp`
- `mllib_ImageColorRGB2HSV`
- `mllib_ImageColorRGB2HSV_Fp`
- `mllib_ImageColorRGB2Mono`
- `mllib_ImageColorRGB2Mono_Fp`
- `mllib_ImageColorRGB2XYZ`
- `mllib_ImageColorRGB2XYZ_Fp`
- `mllib_ImageColorRGB2YCC`
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- `mllib_ImageColorTrue2Index`
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- `mllib_ImageColorXYZ2RGB`
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- `mllib_ImageComposite`
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- `mllib_ImageConstAdd_Inp`
- `mllib_ImageConstAnd`
- `mllib_ImageConstAnd_Inp`
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- mlib\_ImageConstDiv
- mlib\_ImageConstDiv\_Fp
- mlib\_ImageConstDiv\_Fp\_Inp
- mlib\_ImageConstDiv\_Inp
- mlib\_ImageConstDivShift
- mlib\_ImageConstDivShift\_Inp
- mlib\_ImageConstMul
- mlib\_ImageConstMul\_Fp
- mlib\_ImageConstMul\_Fp\_Inp
- mlib\_ImageConstMul\_Inp
- mlib\_ImageConstMulShift
- mlib\_ImageConstMulShift\_Inp
- mlib\_ImageConstNotAnd
- mlib\_ImageConstNotAnd\_Inp
- mlib\_ImageConstNotOr
- mlib\_ImageConstNotOr\_Inp
- mlib\_ImageConstNotXor
- mlib\_ImageConstNotXor\_Inp
- mlib\_ImageConstOr
- mlib\_ImageConstOr\_Inp
- mlib\_ImageConstOrNot
- mlib\_ImageConstOrNot\_Inp
- mlib\_ImageConstSub
- mlib\_ImageConstSub\_Fp
- mlib\_ImageConstSub\_Fp\_Inp
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- mlib\_ImageConstXor
- mlib\_ImageConstXor\_Inp
- mlib\_ImageConv2x2
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- mlib\_ImageConv2x2Index
- mlib\_ImageConv3x3
- mlib\_ImageConv3x3\_Fp
- mlib\_ImageConv3x3Index
- mlib\_ImageConv4x4
- mlib\_ImageConv4x4\_Fp
- mlib\_ImageConv4x4Index
- mlib\_ImageConv5x5
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- `mllib_ImageConvKernelConvert`
- `mllib_ImageConvMxN`
- `mllib_ImageConvMxN_Fp`
- `mllib_ImageConvMxNIndex`
- `mllib_ImageConvolveMxN`
- `mllib_ImageConvolveMxN_Fp`
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- `mllib_ImageCopyArea`
- `mllib_ImageCopyMask`
- `mllib_ImageCopyMask_Fp`
- `mllib_ImageCopySubimage`
- `mllib_ImageCreate`
- `mllib_ImageCreateStruct`
- `mllib_ImageCreateSubimage`
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- `mllib_ImageDataTypeConvert`
- `mllib_ImageDelete`
- `mllib_ImageDilate4`
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- `mllib_ImageDilate8`
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- `mllib_ImageDiv2_Fp_Inp`
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- `mllib_ImageDivAlpha_Fp`
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- `mllib_ImageDivAlpha_Inp`
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- `mllib_ImageDivConstShift_Inp`
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- `mllib_ImageDivShift1_Inp`
- `mllib_ImageDivShift2_Inp`
- `mllib_ImageErode4`
- `mllib_ImageErode4_Fp`
- `mllib_ImageErode8`
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- `mllib_ImageExp`
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- `mllib_ImageFlipAntiDiag`
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- `mllib_ImageFlipX`
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- `mllib_ImageFlipY`
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- `mllib_ImageGetType`
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- `mllib_ImageGradient3x3`
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- `mllib_ImageIsNotAligned2`
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- `mllib_ImageIsNotHeight2X`

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- `mllib_ImageIsNotOneDvector`
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- `mllib_ImageMax_Fp`
- `mllib_ImageMax_Fp_Inp`
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- `mllib_ImageMean`
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- `mllib_ImageMedianFilter3x3`
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- `mllib_ImageMedianFilter7x7`
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- `mllib_ImageMedianFilter7x7_US`
- `mllib_ImageMedianFilterMxN`
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- `mllib_ImageMedianFilterMxN_US`
- `mllib_ImageMin`
- `mllib_ImageMinFilter3x3`

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- mlib\_ImageMoment2
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- mlib\_ImageMulAlpha
- mlib\_ImageMulAlpha\_Fp
- mlib\_ImageMulAlpha\_Fp\_Inp
- mlib\_ImageMulAlpha\_Inp
- mlib\_ImageMul\_Fp
- mlib\_ImageMul\_Fp\_Inp
- mlib\_ImageMulShift
- mlib\_ImageMulShift\_Inp
- mlib\_ImageNormCrossCorrel
- mlib\_ImageNormCrossCorrel\_Fp
- mlib\_ImageNot
- mlib\_ImageNotAnd
- mlib\_ImageNotAnd\_Inp
- mlib\_ImageNot\_Inp
- mlib\_ImageNotOr
- mlib\_ImageNotOr\_Inp
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- mlib\_ImageNotXor\_Inp
- mlib\_ImageOr
- mlib\_ImageOr\_Inp
- mlib\_ImageOrNot
- mlib\_ImageOrNot1\_Inp
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- mlib\_ImagePolynomialWarp
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- mlib\_ImageRankFilter3x3
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- `mllib_ImageRankFilterMxN_US`
- `mllib_ImageReformat`
- `mllib_ImageReplaceColor`
- `mllib_ImageReplaceColor_Fp`
- `mllib_ImageReplaceColor_Fp_Inp`
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- `mllib_ImageRotate90`
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- `mllib_ImageRotate_Fp`
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- `mllib_ImageScalarBlend`
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- `mllib_ImageScale`
- `mllib_ImageScale2`
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- mlib\_ImageSqr\_Fp
- mlib\_ImageSqr\_Fp\_Inp
- mlib\_ImageSqrShift
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- mlib\_ImageSubsampleBinaryToGray
- mlib\_ImageTestFlags
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- mlib\_ImageThresh1\_Fp
- mlib\_ImageThresh1\_Fp\_Inp
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- mlib\_ImageThresh2\_Fp
- mlib\_ImageThresh2\_Fp\_Inp
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- mlib\_ImageThresh5
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- mlib\_ImageThresh5\_Inp
- mlib\_ImageXor
- mlib\_ImageXor\_Inp
- mlib\_ImageXProj
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  - mlib\_ImageZoomTranslateTable\_Fp
  - mlib\_ImageZoomTranslateToGray
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  - mlib\_SignalADPCM3Bits2Linear
  - mlib\_SignalADPCM4Bits2Linear
  - mlib\_SignalADPCM5Bits2Linear
  - mlib\_SignalADPCMFree
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  - mlib\_SignalALaw2Linear
  - mlib\_SignalALaw2uLaw
  - mlib\_SignalAutoCorrel\_F32
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  - mlib\_SignalAutoCorrel\_S16
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  - mlib\_SignalCepstral\_F32
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  - mlib\_SignalCepstralFree\_S16
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  - mlib\_SignalCepstral\_S16\_Adp
  - mlib\_SignalConvertShift\_F32\_S16
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  - mlib\_SignalConvertShift\_F32\_S8
  - mlib\_SignalConvertShift\_F32S\_S16S
  - mlib\_SignalConvertShift\_F32S\_S32S
  - mlib\_SignalConvertShift\_F32S\_S8S
  - mlib\_SignalConvertShift\_F32S\_U8S
  - mlib\_SignalConvertShift\_F32\_U8

- mlib\_SignalConvertShift\_S16\_F32\_Sat
- mlib\_SignalConvertShift\_S16\_S32\_Sat
- mlib\_SignalConvertShift\_S16\_S8\_Sat
- mlib\_SignalConvertShift\_S16S\_F32S\_Sat
- mlib\_SignalConvertShift\_S16S\_S32S\_Sat
- mlib\_SignalConvertShift\_S16S\_S8S\_Sat
- mlib\_SignalConvertShift\_S16S\_U8S\_Sat
- mlib\_SignalConvertShift\_S16\_U8\_Sat
- mlib\_SignalConvertShift\_S32\_F32\_Sat
- mlib\_SignalConvertShift\_S32\_S16\_Sat
- mlib\_SignalConvertShift\_S32\_S8\_Sat
- mlib\_SignalConvertShift\_S32S\_F32S\_Sat
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- mlib\_SignalConvertShift\_S32\_U8\_Sat
- mlib\_SignalConvertShift\_S8\_F32\_Sat
- mlib\_SignalConvertShift\_S8\_S16\_Sat
- mlib\_SignalConvertShift\_S8\_S32\_Sat
- mlib\_SignalConvertShift\_S8S\_F32S\_Sat
- mlib\_SignalConvertShift\_S8S\_S16S\_Sat
- mlib\_SignalConvertShift\_S8S\_S32S\_Sat
- mlib\_SignalConvertShift\_S8S\_U8S\_Sat
- mlib\_SignalConvertShift\_S8\_U8\_Sat
- mlib\_SignalConvertShift\_U8\_F32\_Sat
- mlib\_SignalConvertShift\_U8\_S16\_Sat
- mlib\_SignalConvertShift\_U8\_S32\_Sat
- mlib\_SignalConvertShift\_U8\_S8\_Sat
- mlib\_SignalConvertShift\_U8S\_F32S\_Sat
- mlib\_SignalConvertShift\_U8S\_S16S\_Sat
- mlib\_SignalConvertShift\_U8S\_S32S\_Sat
- mlib\_SignalConvertShift\_U8S\_S8S\_Sat
- mlib\_SignalConv\_F32\_F32
- mlib\_SignalConv\_F32S\_F32S
- mlib\_SignalConv\_S16\_S16\_Sat
- mlib\_SignalConv\_S16S\_S16S\_Sat
- mlib\_SignalCrossCorrel\_F32
- mlib\_SignalCrossCorrel\_F32S
- mlib\_SignalCrossCorrel\_S16
- mlib\_SignalCrossCorrel\_S16S
- mlib\_SignalDownSample\_F32\_F32
- mlib\_SignalDownSample\_F32S\_F32S
- mlib\_SignalDownSample\_S16\_S16
- mlib\_SignalDownSample\_S16S\_S16S

- mlib\_SignalDTWKScalar\_F32
- mlib\_SignalDTWKScalarFree\_F32
- mlib\_SignalDTWKScalarFree\_S16
- mlib\_SignalDTWKScalarInit\_F32
- mlib\_SignalDTWKScalarInit\_S16
- mlib\_SignalDTWKScalarPath\_F32
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- mlib\_SignalDTWKVector\_F32
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- mlib\_SignalDTWKVectorInit\_S16
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- mlib\_SignalDTWScalar\_F32
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- mlib\_SignalDTWScalarFree\_S16
- mlib\_SignalDTWScalarInit\_F32
- mlib\_SignalDTWScalarInit\_S16
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- mlib\_SignalDTWScalarPath\_S16
- mlib\_SignalDTWScalar\_S16
- mlib\_SignalDTWVector\_F32
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- mlib\_SignalDTWVectorFree\_S16
- mlib\_SignalDTWVectorInit\_F32
- mlib\_SignalDTWVectorInit\_S16
- mlib\_SignalDTWVectorPath\_F32
- mlib\_SignalDTWVectorPath\_S16
- mlib\_SignalDTWVector\_S16
- mlib\_SignalEmphasize\_F32\_F32
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- mlib\_SignalEmphasizeFree\_F32S\_F32S
- mlib\_SignalEmphasizeFree\_S16\_S16
- mlib\_SignalEmphasizeFree\_S16S\_S16S
- mlib\_SignalEmphasizeInit\_F32\_F32
- mlib\_SignalEmphasizeInit\_F32S\_F32S
- mlib\_SignalEmphasizeInit\_S16\_S16
- mlib\_SignalEmphasizeInit\_S16S\_S16S
- mlib\_SignalEmphasize\_S16\_S16\_Sat
- mlib\_SignalEmphasize\_S16S\_S16S\_Sat

- mlib\_SignalFFT\_1\_D64
- mlib\_SignalFFT\_1\_D64C
- mlib\_SignalFFT\_1\_D64C\_D64
- mlib\_SignalFFT\_1\_D64C\_D64C
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- mlib\_SignalFFT\_1\_F32
- mlib\_SignalFFT\_1\_F32C
- mlib\_SignalFFT\_1\_F32C\_F32
- mlib\_SignalFFT\_1\_F32C\_F32C
- mlib\_SignalFFT\_1\_F32\_F32
- mlib\_SignalFFT\_1\_S16C\_Mod
- mlib\_SignalFFT\_1\_S16C\_S16C\_Mod
- mlib\_SignalFFT\_1\_S16C\_S16\_Mod
- mlib\_SignalFFT\_1\_S16\_Mod
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- mlib\_SignalFFT\_2\_D64
- mlib\_SignalFFT\_2\_D64C
- mlib\_SignalFFT\_2\_D64C\_D64
- mlib\_SignalFFT\_2\_D64C\_D64C
- mlib\_SignalFFT\_2\_D64\_D64
- mlib\_SignalFFT\_2\_F32
- mlib\_SignalFFT\_2\_F32C
- mlib\_SignalFFT\_2\_F32C\_F32
- mlib\_SignalFFT\_2\_F32C\_F32C
- mlib\_SignalFFT\_2\_F32\_F32
- mlib\_SignalFFT\_2\_S16
- mlib\_SignalFFT\_2\_S16C
- mlib\_SignalFFT\_2\_S16C\_S16
- mlib\_SignalFFT\_2\_S16C\_S16C
- mlib\_SignalFFT\_2\_S16\_S16
- mlib\_SignalFFT\_3\_D64
- mlib\_SignalFFT\_3\_D64C
- mlib\_SignalFFT\_3\_D64C\_D64
- mlib\_SignalFFT\_3\_D64C\_D64C
- mlib\_SignalFFT\_3\_D64\_D64
- mlib\_SignalFFT\_3\_F32
- mlib\_SignalFFT\_3\_F32C
- mlib\_SignalFFT\_3\_F32C\_F32
- mlib\_SignalFFT\_3\_F32C\_F32C
- mlib\_SignalFFT\_3\_F32\_F32
- mlib\_SignalFFT\_3\_S16C\_Mod
- mlib\_SignalFFT\_3\_S16C\_S16C\_Mod
- mlib\_SignalFFT\_3\_S16C\_S16\_Mod
- mlib\_SignalFFT\_3\_S16\_Mod

- mlib\_SignalFFT\_3\_S16\_S16\_Mod
- mlib\_SignalFFT\_4\_S16
- mlib\_SignalFFT\_4\_S16C
- mlib\_SignalFFT\_4\_S16C\_S16
- mlib\_SignalFFT\_4\_S16C\_S16C
- mlib\_SignalFFT\_4\_S16\_S16
- mlib\_SignalFFTW\_1\_F32
- mlib\_SignalFFTW\_1\_F32C
- mlib\_SignalFFTW\_1\_F32C\_F32
- mlib\_SignalFFTW\_1\_F32C\_F32C
- mlib\_SignalFFTW\_1\_F32\_F32
- mlib\_SignalFFTW\_1\_S16C\_Mod
- mlib\_SignalFFTW\_1\_S16C\_S16C\_Mod
- mlib\_SignalFFTW\_1\_S16C\_S16\_Mod
- mlib\_SignalFFTW\_1\_S16\_Mod
- mlib\_SignalFFTW\_1\_S16\_S16\_Mod
- mlib\_SignalFFTW\_2\_F32
- mlib\_SignalFFTW\_2\_F32C
- mlib\_SignalFFTW\_2\_F32C\_F32
- mlib\_SignalFFTW\_2\_F32C\_F32C
- mlib\_SignalFFTW\_2\_F32\_F32
- mlib\_SignalFFTW\_2\_S16
- mlib\_SignalFFTW\_2\_S16C
- mlib\_SignalFFTW\_2\_S16C\_S16
- mlib\_SignalFFTW\_2\_S16C\_S16C
- mlib\_SignalFFTW\_2\_S16\_S16
- mlib\_SignalFFTW\_3\_F32
- mlib\_SignalFFTW\_3\_F32C
- mlib\_SignalFFTW\_3\_F32C\_F32
- mlib\_SignalFFTW\_3\_F32C\_F32C
- mlib\_SignalFFTW\_3\_F32\_F32
- mlib\_SignalFFTW\_3\_S16C\_Mod
- mlib\_SignalFFTW\_3\_S16C\_S16C\_Mod
- mlib\_SignalFFTW\_3\_S16C\_S16\_Mod
- mlib\_SignalFFTW\_3\_S16\_Mod
- mlib\_SignalFFTW\_3\_S16\_S16\_Mod
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- mlib\_SignalFFTW\_4\_S16C
- mlib\_SignalFFTW\_4\_S16C\_S16
- mlib\_SignalFFTW\_4\_S16C\_S16C
- mlib\_SignalFFTW\_4\_S16\_S16
- mlib\_SignalFIR\_F32\_F32
- mlib\_SignalFIR\_F32S\_F32S
- mlib\_SignalFIRFree\_F32\_F32

- mlib\_SignalFIRFree\_F32S\_F32S
- mlib\_SignalFIRFree\_S16\_S16
- mlib\_SignalFIRFree\_S16S\_S16S
- mlib\_SignalFIRInit\_F32\_F32
- mlib\_SignalFIRInit\_F32S\_F32S
- mlib\_SignalFIRInit\_S16\_S16
- mlib\_SignalFIRInit\_S16S\_S16S
- mlib\_SignalFIR\_S16\_S16\_Sat
- mlib\_SignalFIR\_S16S\_S16S\_Sat
- mlib\_SignalGaussNoise\_F32
- mlib\_SignalGaussNoiseFree\_F32
- mlib\_SignalGaussNoiseFree\_S16
- mlib\_SignalGaussNoiseInit\_F32
- mlib\_SignalGaussNoiseInit\_S16
- mlib\_SignalGaussNoise\_S16
- mlib\_SignalGenBartlett\_F32
- mlib\_SignalGenBartlett\_S16
- mlib\_SignalGenBlackman\_F32
- mlib\_SignalGenBlackman\_S16
- mlib\_SignalGenHamming\_F32
- mlib\_SignalGenHamming\_S16
- mlib\_SignalGenHanning\_F32
- mlib\_SignalGenHanning\_S16
- mlib\_SignalGenKaiser\_F32
- mlib\_SignalGenKaiser\_S16
- mlib\_SignalIFFT\_1\_D64
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- mlib\_SignalIFFT\_1\_D64C\_D64C
- mlib\_SignalIFFT\_1\_D64\_D64
- mlib\_SignalIFFT\_1\_D64\_D64C
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- mlib\_SignalIFFT\_1\_F32C
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- mlib\_SignalIFFT\_1\_F32\_F32C
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- mlib\_SignalIFFT\_1\_S16C
- mlib\_SignalIFFT\_1\_S16C\_S16C
- mlib\_SignalIFFT\_1\_S16\_S16
- mlib\_SignalIFFT\_1\_S16\_S16C
- mlib\_SignalIFFT\_2\_D64
- mlib\_SignalIFFT\_2\_D64C
- mlib\_SignalIFFT\_2\_D64C\_D64C
- mlib\_SignalIFFT\_2\_D64\_D64



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- mlib\_SignalIFFT\_2\_S16\_S16C\_Mod
- mlib\_SignalIFFT\_2\_S16\_S16\_Mod
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- mlib\_SignalIFFT\_3\_D64\_D64C
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- mlib\_SignalIFFT\_3\_F32C
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- mlib\_SignalIFFT\_3\_F32\_F32C
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- mlib\_SignalIFFT\_3\_S16\_S16C\_Mod
- mlib\_SignalIFFT\_3\_S16\_S16\_Mod
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- mlib\_SignalIFFT\_4\_S16C\_S16C
- mlib\_SignalIFFT\_4\_S16\_S16
- mlib\_SignalIFFT\_4\_S16\_S16C
- mlib\_SignalIFFFTW\_1\_F32
- mlib\_SignalIFFFTW\_1\_F32C
- mlib\_SignalIFFFTW\_1\_F32C\_F32C
- mlib\_SignalIFFFTW\_1\_F32\_F32
- mlib\_SignalIFFFTW\_1\_F32\_F32C
- mlib\_SignalIFFFTW\_1\_S16
- mlib\_SignalIFFFTW\_1\_S16C
- mlib\_SignalIFFFTW\_1\_S16C\_S16C
- mlib\_SignalIFFFTW\_1\_S16\_S16
- mlib\_SignalIFFFTW\_1\_S16\_S16C
- mlib\_SignalIFFFTW\_2\_F32
- mlib\_SignalIFFFTW\_2\_F32C
- mlib\_SignalIFFFTW\_2\_F32C\_F32C

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- mlib\_SignalIFFTW\_2\_F32\_F32C
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- mlib\_SignalIFFTW\_2\_S16C\_S16C\_Mod
- mlib\_SignalIFFTW\_2\_S16\_Mod
- mlib\_SignalIFFTW\_2\_S16\_S16C\_Mod
- mlib\_SignalIFFTW\_2\_S16\_S16\_Mod
- mlib\_SignalIFFTW\_3\_F32
- mlib\_SignalIFFTW\_3\_F32C
- mlib\_SignalIFFTW\_3\_F32C\_F32C
- mlib\_SignalIFFTW\_3\_F32\_F32
- mlib\_SignalIFFTW\_3\_F32\_F32C
- mlib\_SignalIFFTW\_3\_S16C\_Mod
- mlib\_SignalIFFTW\_3\_S16C\_S16C\_Mod
- mlib\_SignalIFFTW\_3\_S16\_Mod
- mlib\_SignalIFFTW\_3\_S16\_S16C\_Mod
- mlib\_SignalIFFTW\_3\_S16\_S16\_Mod
- mlib\_SignalIFFTW\_4\_S16
- mlib\_SignalIFFTW\_4\_S16C
- mlib\_SignalIFFTW\_4\_S16C\_S16C
- mlib\_SignalIFFTW\_4\_S16\_S16
- mlib\_SignalIFFTW\_4\_S16\_S16C
- mlib\_SignalIIR\_Biquad\_F32\_F32
- mlib\_SignalIIR\_Biquad\_F32S\_F32S
- mlib\_SignalIIR\_Biquad\_S16\_S16\_Sat
- mlib\_SignalIIR\_Biquad\_S16S\_S16S\_Sat
- mlib\_SignalIIRFree\_Biquad\_F32\_F32
- mlib\_SignalIIRFree\_Biquad\_F32S\_F32S
- mlib\_SignalIIRFree\_Biquad\_S16\_S16
- mlib\_SignalIIRFree\_Biquad\_S16S\_S16S
- mlib\_SignalIIRFree\_P4\_F32\_F32
- mlib\_SignalIIRFree\_P4\_F32S\_F32S
- mlib\_SignalIIRFree\_P4\_S16\_S16
- mlib\_SignalIIRFree\_P4\_S16S\_S16S
- mlib\_SignalIIRInit\_Biquad\_F32\_F32
- mlib\_SignalIIRInit\_Biquad\_F32S\_F32S
- mlib\_SignalIIRInit\_Biquad\_S16\_S16
- mlib\_SignalIIRInit\_Biquad\_S16S\_S16S
- mlib\_SignalIIRInit\_P4\_F32\_F32
- mlib\_SignalIIRInit\_P4\_F32S\_F32S
- mlib\_SignalIIRInit\_P4\_S16\_S16
- mlib\_SignalIIRInit\_P4\_S16S\_S16S
- mlib\_SignalIIR\_P4\_F32\_F32
- mlib\_SignalIIR\_P4\_F32S\_F32S

- mlib\_SignalIIR\_P4\_S16\_S16\_Sat
- mlib\_SignalIIR\_P4\_S16S\_S16S\_Sat
- mlib\_SignalIMDCT\_D64
- mlib\_SignalIMDCT\_F32
- mlib\_SignalIMDCTSplit\_D64
- mlib\_SignalIMDCTSplit\_F32
- mlib\_SignalLimit\_F32
- mlib\_SignalLimit\_F32\_F32
- mlib\_SignalLimit\_F32S
- mlib\_SignalLimit\_F32S\_F32S
- mlib\_SignalLimit\_S16
- mlib\_SignalLimit\_S16S
- mlib\_SignalLimit\_S16\_S16
- mlib\_SignalLimit\_S16S\_S16S
- mlib\_SignalLinear2ADPCM2Bits
- mlib\_SignalLinear2ADPCM3Bits
- mlib\_SignalLinear2ADPCM4Bits
- mlib\_SignalLinear2ADPCM5Bits
- mlib\_SignalLinear2ALaw
- mlib\_SignalLinear2uLaw
- mlib\_SignalLMSFilter\_F32\_F32
- mlib\_SignalLMSFilter\_F32S\_F32S
- mlib\_SignalLMSFilterFree\_F32\_F32
- mlib\_SignalLMSFilterFree\_F32S\_F32S
- mlib\_SignalLMSFilterFree\_S16\_S16
- mlib\_SignalLMSFilterFree\_S16S\_S16S
- mlib\_SignalLMSFilterInit\_F32\_F32
- mlib\_SignalLMSFilterInit\_F32S\_F32S
- mlib\_SignalLMSFilterInit\_S16\_S16
- mlib\_SignalLMSFilterInit\_S16S\_S16S
- mlib\_SignalLMSFilterNonAdapt\_F32\_F32
- mlib\_SignalLMSFilterNonAdapt\_F32S\_F32S
- mlib\_SignalLMSFilterNonAdapt\_S16\_S16\_Sat
- mlib\_SignalLMSFilterNonAdapt\_S16S\_S16S\_Sat
- mlib\_SignalLMSFilter\_S16\_S16\_Sat
- mlib\_SignalLMSFilter\_S16S\_S16S\_Sat
- mlib\_SignalLPC2Cepstral\_F32
- mlib\_SignalLPC2Cepstral\_S16
- mlib\_SignalLPC2Cepstral\_S16\_Adp
- mlib\_SignalLPC2LSP\_F32
- mlib\_SignalLPC2LSP\_S16
- mlib\_SignalLPCAutoCorrel\_F32
- mlib\_SignalLPCAutoCorrelFree\_F32
- mlib\_SignalLPCAutoCorrelFree\_S16

- mlib\_SignalLPCAutoCorrelGetEnergy\_F32
- mlib\_SignalLPCAutoCorrelGetEnergy\_S16
- mlib\_SignalLPCAutoCorrelGetEnergy\_S16\_Adp
- mlib\_SignalLPCAutoCorrelGetPARCOR\_F32
- mlib\_SignalLPCAutoCorrelGetPARCOR\_S16
- mlib\_SignalLPCAutoCorrelGetPARCOR\_S16\_Adp
- mlib\_SignalLPCAutoCorrelInit\_F32
- mlib\_SignalLPCAutoCorrelInit\_S16
- mlib\_SignalLPCAutoCorrel\_S16
- mlib\_SignalLPCAutoCorrel\_S16\_Adp
- mlib\_SignalLPCCovariance\_F32
- mlib\_SignalLPCCovarianceFree\_F32
- mlib\_SignalLPCCovarianceFree\_S16
- mlib\_SignalLPCCovarianceInit\_F32
- mlib\_SignalLPCCovarianceInit\_S16
- mlib\_SignalLPCCovariance\_S16
- mlib\_SignalLPCCovariance\_S16\_Adp
- mlib\_SignalLPCPerceptWeight\_F32
- mlib\_SignalLPCPerceptWeightFree\_F32
- mlib\_SignalLPCPerceptWeightFree\_S16
- mlib\_SignalLPCPerceptWeightInit\_F32
- mlib\_SignalLPCPerceptWeightInit\_S16
- mlib\_SignalLPCPerceptWeight\_S16
- mlib\_SignalLPCPitchAnalyze\_F32
- mlib\_SignalLPCPitchAnalyze\_S16
- mlib\_SignalLSP2LPC\_F32
- mlib\_SignalLSP2LPC\_S16
- mlib\_SignalLSP2LPC\_S16\_Adp
- mlib\_SignalMelCepstral\_F32
- mlib\_SignalMelCepstralFree\_F32
- mlib\_SignalMelCepstralFree\_S16
- mlib\_SignalMelCepstralInit\_F32
- mlib\_SignalMelCepstralInit\_S16
- mlib\_SignalMelCepstral\_S16
- mlib\_SignalMelCepstral\_S16\_Adp
- mlib\_SignalMerge\_F32S\_F32
- mlib\_SignalMerge\_S16S\_S16
- mlib\_SignalMulBartlett\_F32
- mlib\_SignalMulBartlett\_F32\_F32
- mlib\_SignalMulBartlett\_F32S
- mlib\_SignalMulBartlett\_F32S\_F32S
- mlib\_SignalMulBartlett\_S16
- mlib\_SignalMulBartlett\_S16S
- mlib\_SignalMulBartlett\_S16\_S16

- mlib\_SignalMulBartlett\_S16S\_S16S
- mlib\_SignalMulBlackman\_F32
- mlib\_SignalMulBlackman\_F32\_F32
- mlib\_SignalMulBlackman\_F32S
- mlib\_SignalMulBlackman\_F32S\_F32S
- mlib\_SignalMulBlackman\_S16
- mlib\_SignalMulBlackman\_S16S
- mlib\_SignalMulBlackman\_S16\_S16
- mlib\_SignalMulBlackman\_S16S\_S16S
- mlib\_SignalMul\_F32
- mlib\_SignalMul\_F32\_F32
- mlib\_SignalMul\_F32S
- mlib\_SignalMul\_F32S\_F32S
- mlib\_SignalMulHamming\_F32
- mlib\_SignalMulHamming\_F32\_F32
- mlib\_SignalMulHamming\_F32S
- mlib\_SignalMulHamming\_F32S\_F32S
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- mlib\_SignalMulHamming\_S16S
- mlib\_SignalMulHamming\_S16\_S16
- mlib\_SignalMulHamming\_S16S\_S16S
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- mlib\_SignalMulHanning\_F32\_F32
- mlib\_SignalMulHanning\_F32S
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- mlib\_SignalMulHanning\_S16
- mlib\_SignalMulHanning\_S16S
- mlib\_SignalMulHanning\_S16\_S16
- mlib\_SignalMulHanning\_S16S\_S16S
- mlib\_SignalMulKaiser\_F32
- mlib\_SignalMulKaiser\_F32\_F32
- mlib\_SignalMulKaiser\_F32S
- mlib\_SignalMulKaiser\_F32S\_F32S
- mlib\_SignalMulKaiser\_S16
- mlib\_SignalMulKaiser\_S16S
- mlib\_SignalMulKaiser\_S16\_S16
- mlib\_SignalMulKaiser\_S16S\_S16S
- mlib\_SignalMulRectangular\_F32
- mlib\_SignalMulRectangular\_F32\_F32
- mlib\_SignalMulRectangular\_F32S
- mlib\_SignalMulRectangular\_F32S\_F32S
- mlib\_SignalMulRectangular\_S16
- mlib\_SignalMulRectangular\_S16S
- mlib\_SignalMulRectangular\_S16\_S16

- `mllib_SignalMulRectangular_S16S_S16S`
- `mllib_SignalMul_S16_S16_Sat`
- `mllib_SignalMul_S16_Sat`
- `mllib_SignalMul_S16S_S16S_Sat`
- `mllib_SignalMul_S16S_Sat`
- `mllib_SignalMulSAdd_F32`
- `mllib_SignalMulSAdd_F32_F32`
- `mllib_SignalMulSAdd_F32S`
- `mllib_SignalMulSAdd_F32S_F32S`
- `mllib_SignalMulSAdd_S16_S16_Sat`
- `mllib_SignalMulSAdd_S16_Sat`
- `mllib_SignalMulSAdd_S16S_S16S_Sat`
- `mllib_SignalMulSAdd_S16S_Sat`
- `mllib_SignalMulS_F32`
- `mllib_SignalMulS_F32_F32`
- `mllib_SignalMulS_F32S`
- `mllib_SignalMulS_F32S_F32S`
- `mllib_SignalMulShift_S16_S16_Sat`
- `mllib_SignalMulShift_S16_Sat`
- `mllib_SignalMulShift_S16S_S16S_Sat`
- `mllib_SignalMulShift_S16S_Sat`
- `mllib_SignalMulS_S16_S16_Sat`
- `mllib_SignalMulS_S16_Sat`
- `mllib_SignalMulS_S16S_S16S_Sat`
- `mllib_SignalMulS_S16S_Sat`
- `mllib_SignalMulSShiftAdd_S16_S16_Sat`
- `mllib_SignalMulSShiftAdd_S16_Sat`
- `mllib_SignalMulSShiftAdd_S16S_S16S_Sat`
- `mllib_SignalMulSShiftAdd_S16S_Sat`
- `mllib_SignalMulSShift_S16_S16_Sat`
- `mllib_SignalMulSShift_S16_Sat`
- `mllib_SignalMulSShift_S16S_S16S_Sat`
- `mllib_SignalMulSShift_S16S_Sat`
- `mllib_SignalMulWindow_F32`
- `mllib_SignalMulWindow_F32_F32`
- `mllib_SignalMulWindow_F32S`
- `mllib_SignalMulWindow_F32S_F32S`
- `mllib_SignalMulWindow_S16`
- `mllib_SignalMulWindow_S16S`
- `mllib_SignalMulWindow_S16_S16`
- `mllib_SignalMulWindow_S16S_S16S`
- `mllib_SignalNLMSFilter_F32_F32`
- `mllib_SignalNLMSFilter_F32S_F32S`
- `mllib_SignalNLMSFilterFree_F32_F32`

- mlib\_SignalNLMSFilterFree\_F32S\_F32S
- mlib\_SignalNLMSFilterFree\_S16\_S16
- mlib\_SignalNLMSFilterFree\_S16S\_S16S
- mlib\_SignalNLMSFilterInit\_F32\_F32
- mlib\_SignalNLMSFilterInit\_F32S\_F32S
- mlib\_SignalNLMSFilterInit\_S16\_S16
- mlib\_SignalNLMSFilterInit\_S16S\_S16S
- mlib\_SignalNLMSFilterNonAdapt\_F32\_F32
- mlib\_SignalNLMSFilterNonAdapt\_F32S\_F32S
- mlib\_SignalNLMSFilterNonAdapt\_S16\_S16\_Sat
- mlib\_SignalNLMSFilterNonAdapt\_S16S\_S16S\_Sat
- mlib\_SignalNLMSFilter\_S16\_S16\_Sat
- mlib\_SignalNLMSFilter\_S16S\_S16S\_Sat
- mlib\_SignalQuant2\_S16\_F32
- mlib\_SignalQuant2\_S16S\_F32S
- mlib\_SignalQuant\_S16\_F32
- mlib\_SignalQuant\_S16S\_F32S
- mlib\_SignalQuant\_U8\_F32
- mlib\_SignalQuant\_U8\_S16
- mlib\_SignalQuant\_U8S\_F32S
- mlib\_SignalQuant\_U8S\_S16S
- mlib\_SignalReSampleFIR\_F32\_F32
- mlib\_SignalReSampleFIR\_F32S\_F32S
- mlib\_SignalReSampleFIRFree\_F32\_F32
- mlib\_SignalReSampleFIRFree\_F32S\_F32S
- mlib\_SignalReSampleFIRFree\_S16\_S16
- mlib\_SignalReSampleFIRFree\_S16S\_S16S
- mlib\_SignalReSampleFIRInit\_F32\_F32
- mlib\_SignalReSampleFIRInit\_F32S\_F32S
- mlib\_SignalReSampleFIRInit\_S16\_S16
- mlib\_SignalReSampleFIRInit\_S16S\_S16S
- mlib\_SignalReSampleFIR\_S16\_S16\_Sat
- mlib\_SignalReSampleFIR\_S16S\_S16S\_Sat
- mlib\_SignalSineWave\_F32
- mlib\_SignalSineWaveFree\_F32
- mlib\_SignalSineWaveFree\_S16
- mlib\_SignalSineWaveInit\_F32
- mlib\_SignalSineWaveInit\_S16
- mlib\_SignalSineWave\_S16
- mlib\_SignalSplit\_F32\_F32S
- mlib\_SignalSplit\_S16\_S16S
- mlib\_SignaluLaw2ALaw
- mlib\_SignaluLaw2Linear
- mlib\_SignalUpSample\_F32\_F32

- mlib\_SignalUpSample\_F32S\_F32S
  - mlib\_SignalUpSampleFIR\_F32\_F32
  - mlib\_SignalUpSampleFIR\_F32S\_F32S
  - mlib\_SignalUpSampleFIRFree\_F32\_F32
  - mlib\_SignalUpSampleFIRFree\_F32S\_F32S
  - mlib\_SignalUpSampleFIRFree\_S16\_S16
  - mlib\_SignalUpSampleFIRFree\_S16S\_S16S
  - mlib\_SignalUpSampleFIRInit\_F32\_F32
  - mlib\_SignalUpSampleFIRInit\_F32S\_F32S
  - mlib\_SignalUpSampleFIRInit\_S16\_S16
  - mlib\_SignalUpSampleFIRInit\_S16S\_S16S
  - mlib\_SignalUpSampleFIR\_S16\_S16\_Sat
  - mlib\_SignalUpSampleFIR\_S16S\_S16S\_Sat
  - mlib\_SignalUpSample\_S16\_S16
  - mlib\_SignalUpSample\_S16S\_S16S
  - mlib\_SignalWhiteNoise\_F32
  - mlib\_SignalWhiteNoiseFree\_F32
  - mlib\_SignalWhiteNoiseFree\_S16
  - mlib\_SignalWhiteNoiseInit\_F32
  - mlib\_SignalWhiteNoiseInit\_S16
  - mlib\_SignalWhiteNoise\_S16
- Video Processing Functions
- mlib\_VideoAddBlock\_U8\_S16
  - mlib\_VideoColorABGR2JFIFYCC420
  - mlib\_VideoColorABGR2JFIFYCC422
  - mlib\_VideoColorABGR2JFIFYCC444
  - mlib\_VideoColorABGR2RGB
  - mlib\_VideoColorABGRint\_to\_ARGBint
  - mlib\_VideoColorARGB2JFIFYCC420
  - mlib\_VideoColorARGB2JFIFYCC422
  - mlib\_VideoColorARGB2JFIFYCC444
  - mlib\_VideoColorARGB2RGB
  - mlib\_VideoColorBGR2JFIFYCC420
  - mlib\_VideoColorBGR2JFIFYCC422
  - mlib\_VideoColorBGR2JFIFYCC444
  - mlib\_VideoColorBGR2JFIFYCC444\_S16
  - mlib\_VideoColorBGRaint\_to\_ABGRint
  - mlib\_VideoColorBGRint\_to\_ABGRint
  - mlib\_VideoColorBlendABGR
  - mlib\_VideoColorBlendABGR\_Inp
  - mlib\_VideoColorBlendABGR\_ResetAlpha
  - mlib\_VideoColorBlendABGR\_ResetAlpha\_Inp
  - mlib\_VideoColorCMYK2JFIFYCCK444
  - mlib\_VideoColorJFIFYCC2ABGR444
  - mlib\_VideoColorJFIFYCC2ARGB444



- `mllib_VideoColorJFIFYCC2RGB420`
- `mllib_VideoColorJFIFYCC2RGB420_Nearest`
- `mllib_VideoColorJFIFYCC2RGB422`
- `mllib_VideoColorJFIFYCC2RGB422_Nearest`
- `mllib_VideoColorJFIFYCC2RGB444`
- `mllib_VideoColorJFIFYCC2RGB444_S16`
- `mllib_VideoColorJFIFYCCK2CMYK444`
- `mllib_VideoColorMerge2`
- `mllib_VideoColorMerge2_S16`
- `mllib_VideoColorMerge3`
- `mllib_VideoColorMerge3_S16`
- `mllib_VideoColorMerge4`
- `mllib_VideoColorMerge4_S16`
- `mllib_VideoColorResizeABGR`
- `mllib_VideoColorRGB2ABGR`
- `mllib_VideoColorRGB2ARGB`
- `mllib_VideoColorRGB2JFIFYCC420`
- `mllib_VideoColorRGB2JFIFYCC422`
- `mllib_VideoColorRGB2JFIFYCC444`
- `mllib_VideoColorRGB2JFIFYCC444_S16`
- `mllib_VideoColorRGBAint_to_ABGRint`
- `mllib_VideoColorRGBint_to_ABGRint`
- `mllib_VideoColorRGBint_to_BGRAint`
- `mllib_VideoColorRGBseq_to_ABGRint`
- `mllib_VideoColorRGBXint_to_ABGRint`
- `mllib_VideoColorRGBXint_to_ARGBint`
- `mllib_VideoColorSplit2`
- `mllib_VideoColorSplit2_S16`
- `mllib_VideoColorSplit3`
- `mllib_VideoColorSplit3_S16`
- `mllib_VideoColorSplit4`
- `mllib_VideoColorSplit4_S16`
- `mllib_VideoColorUYV444int_to_ABGRint`
- `mllib_VideoColorUYV444int_to_ARGBint`
- `mllib_VideoColorUYV444int_to_UYVY422int`
- `mllib_VideoColorUYV444int_to_YUYV422int`
- `mllib_VideoColorUYVY422int_to_ABGRint`
- `mllib_VideoColorUYVY422int_to_ARGBint`
- `mllib_VideoColorXRGBint_to_ABGRint`
- `mllib_VideoColorXRGBint_to_ARGBint`
- `mllib_VideoColorYUV2ABGR411`
- `mllib_VideoColorYUV2ABGR420`
- `mllib_VideoColorYUV2ABGR420_W`
- `mllib_VideoColorYUV2ABGR420_WX2`

- mlib\_VideoColorYUV2ABGR420\_WX3
- mlib\_VideoColorYUV2ABGR420\_X2
- mlib\_VideoColorYUV2ABGR420\_X3
- mlib\_VideoColorYUV2ABGR422
- mlib\_VideoColorYUV2ABGR444
- mlib\_VideoColorYUV2ARGB411
- mlib\_VideoColorYUV2ARGB420
- mlib\_VideoColorYUV2ARGB422
- mlib\_VideoColorYUV2ARGB444
- mlib\_VideoColorYUV2RGB411
- mlib\_VideoColorYUV2RGB420
- mlib\_VideoColorYUV2RGB422
- mlib\_VideoColorYUV2RGB444
- mlib\_VideoColorYUV411seq\_to\_ABGRint
- mlib\_VideoColorYUV411seq\_to\_ARGBint
- mlib\_VideoColorYUV411seq\_to\_UYVY422int
- mlib\_VideoColorYUV411seq\_to\_YUYV422int
- mlib\_VideoColorYUV420seq\_to\_ABGRint
- mlib\_VideoColorYUV420seq\_to\_ARGBint
- mlib\_VideoColorYUV420seq\_to\_UYVY422int
- mlib\_VideoColorYUV420seq\_to\_YUYV422int
- mlib\_VideoColorYUV422seq\_to\_ABGRint
- mlib\_VideoColorYUV422seq\_to\_ARGBint
- mlib\_VideoColorYUV422seq\_to\_UYVY422int
- mlib\_VideoColorYUV422seq\_to\_YUYV422int
- mlib\_VideoColorYUV444int\_to\_ABGRint
- mlib\_VideoColorYUV444int\_to\_ARGBint
- mlib\_VideoColorYUV444int\_to\_UYVY422int
- mlib\_VideoColorYUV444int\_to\_YUYV422int
- mlib\_VideoColorYUV444seq\_to\_ABGRint
- mlib\_VideoColorYUV444seq\_to\_ARGBint
- mlib\_VideoColorYUV444seq\_to\_UYVY422int
- mlib\_VideoColorYUV444seq\_to\_YUYV422int
- mlib\_VideoColorYUYV422int\_to\_ABGRint
- mlib\_VideoColorYUYV422int\_to\_ARGBint
- mlib\_VideoCopyRefAve\_U8\_U8
- mlib\_VideoCopyRefAve\_U8\_U8\_16x16
- mlib\_VideoCopyRefAve\_U8\_U8\_16x8
- mlib\_VideoCopyRefAve\_U8\_U8\_8x16
- mlib\_VideoCopyRefAve\_U8\_U8\_8x4
- mlib\_VideoCopyRefAve\_U8\_U8\_8x8
- mlib\_VideoCopyRef\_S16\_U8
- mlib\_VideoCopyRef\_S16\_U8\_16x16
- mlib\_VideoCopyRef\_S16\_U8\_16x8

- mlib\_VideoCopyRef\_S16\_U8\_8x16
- mlib\_VideoCopyRef\_S16\_U8\_8x4
- mlib\_VideoCopyRef\_S16\_U8\_8x8
- mlib\_VideoCopyRef\_U8\_U8
- mlib\_VideoCopyRef\_U8\_U8\_16x16
- mlib\_VideoCopyRef\_U8\_U8\_16x8
- mlib\_VideoCopyRef\_U8\_U8\_8x16
- mlib\_VideoCopyRef\_U8\_U8\_8x4
- mlib\_VideoCopyRef\_U8\_U8\_8x8
- mlib\_VideoDCT16x16\_S16\_S16
- mlib\_VideoDCT16x16\_S16\_S16\_B10
- mlib\_VideoDCT2x2\_S16\_S16
- mlib\_VideoDCT4x4\_S16\_S16
- mlib\_VideoDCT8x8Quantize\_S16\_S16\_B12
- mlib\_VideoDCT8x8Quantize\_S16\_S16\_B12\_NA
- mlib\_VideoDCT8x8Quantize\_S16\_U8
- mlib\_VideoDCT8x8Quantize\_S16\_U8\_NA
- mlib\_VideoDCT8x8\_S16\_S16
- mlib\_VideoDCT8x8\_S16\_S16\_B10
- mlib\_VideoDCT8x8\_S16\_S16\_B10\_NA
- mlib\_VideoDCT8x8\_S16\_S16\_B12
- mlib\_VideoDCT8x8\_S16\_S16\_NA
- mlib\_VideoDCT8x8\_S16\_U8
- mlib\_VideoDCT8x8\_S16\_U8\_NA
- mlib\_VideoDeQuantizeIDCT8x8\_S16\_S16\_B12
- mlib\_VideoDeQuantizeIDCT8x8\_S16\_S16\_B12\_NA
- mlib\_VideoDeQuantizeIDCT8x8\_U8\_S16
- mlib\_VideoDeQuantizeIDCT8x8\_U8\_S16\_NA
- mlib\_VideoDeQuantizeInit\_S16
- mlib\_VideoDeQuantize\_S16
- mlib\_VideoDownSample420
- mlib\_VideoDownSample420\_S16
- mlib\_VideoDownSample422
- mlib\_VideoDownSample422\_S16
- mlib\_VideoH263OverlappedMC\_S16\_U8
- mlib\_VideoH263OverlappedMC\_U8\_U8
- mlib\_VideoIDCT8x8\_S16\_S16
- mlib\_VideoIDCT8x8\_S16\_S16\_B12
- mlib\_VideoIDCT8x8\_S16\_S16\_B12\_NA
- mlib\_VideoIDCT8x8\_S16\_S16\_DC
- mlib\_VideoIDCT8x8\_S16\_S16\_NA
- mlib\_VideoIDCT8x8\_S16\_S16\_Q1
- mlib\_VideoIDCT8x8\_S16\_S16\_Q1\_Mismatch
- mlib\_VideoIDCT8x8\_U8\_S16

- mlib\_VideoIDCT8x8\_U8\_S16\_DC
- mlib\_VideoIDCT8x8\_U8\_S16\_NA
- mlib\_VideoIDCT8x8\_U8\_S16\_Q1
- mlib\_VideoIDCT\_IEEE\_S16\_S16
- mlib\_VideoInterpAveX\_U8\_U8
- mlib\_VideoInterpAveX\_U8\_U8\_16x16
- mlib\_VideoInterpAveX\_U8\_U8\_16x8
- mlib\_VideoInterpAveX\_U8\_U8\_8x16
- mlib\_VideoInterpAveX\_U8\_U8\_8x4
- mlib\_VideoInterpAveX\_U8\_U8\_8x8
- mlib\_VideoInterpAveXY\_U8\_U8
- mlib\_VideoInterpAveXY\_U8\_U8\_16x16
- mlib\_VideoInterpAveXY\_U8\_U8\_16x8
- mlib\_VideoInterpAveXY\_U8\_U8\_8x16
- mlib\_VideoInterpAveXY\_U8\_U8\_8x4
- mlib\_VideoInterpAveXY\_U8\_U8\_8x8
- mlib\_VideoInterpAveY\_U8\_U8
- mlib\_VideoInterpAveY\_U8\_U8\_16x16
- mlib\_VideoInterpAveY\_U8\_U8\_16x8
- mlib\_VideoInterpAveY\_U8\_U8\_8x16
- mlib\_VideoInterpAveY\_U8\_U8\_8x4
- mlib\_VideoInterpAveY\_U8\_U8\_8x8
- mlib\_VideoInterpX\_S16\_U8
- mlib\_VideoInterpX\_S16\_U8\_16x16
- mlib\_VideoInterpX\_S16\_U8\_16x8
- mlib\_VideoInterpX\_S16\_U8\_8x16
- mlib\_VideoInterpX\_S16\_U8\_8x4
- mlib\_VideoInterpX\_S16\_U8\_8x8
- mlib\_VideoInterpX\_U8\_U8
- mlib\_VideoInterpX\_U8\_U8\_16x16
- mlib\_VideoInterpX\_U8\_U8\_16x8
- mlib\_VideoInterpX\_U8\_U8\_8x16
- mlib\_VideoInterpX\_U8\_U8\_8x4
- mlib\_VideoInterpX\_U8\_U8\_8x8
- mlib\_VideoInterpXY\_S16\_U8
- mlib\_VideoInterpXY\_S16\_U8\_16x16
- mlib\_VideoInterpXY\_S16\_U8\_16x8
- mlib\_VideoInterpXY\_S16\_U8\_8x16
- mlib\_VideoInterpXY\_S16\_U8\_8x4
- mlib\_VideoInterpXY\_S16\_U8\_8x8
- mlib\_VideoInterpXY\_U8\_U8
- mlib\_VideoInterpXY\_U8\_U8\_16x16
- mlib\_VideoInterpXY\_U8\_U8\_16x8
- mlib\_VideoInterpXY\_U8\_U8\_8x16

- mlib\_VideoInterpXY\_U8\_U8\_8x4
- mlib\_VideoInterpXY\_U8\_U8\_8x8
- mlib\_VideoInterpX\_Y\_XY\_U8\_U8
- mlib\_VideoInterpY\_S16\_U8
- mlib\_VideoInterpY\_S16\_U8\_16x16
- mlib\_VideoInterpY\_S16\_U8\_16x8
- mlib\_VideoInterpY\_S16\_U8\_8x16
- mlib\_VideoInterpY\_S16\_U8\_8x4
- mlib\_VideoInterpY\_S16\_U8\_8x8
- mlib\_VideoInterpY\_U8\_U8
- mlib\_VideoInterpY\_U8\_U8\_16x16
- mlib\_VideoInterpY\_U8\_U8\_16x8
- mlib\_VideoInterpY\_U8\_U8\_8x16
- mlib\_VideoInterpY\_U8\_U8\_8x4
- mlib\_VideoInterpY\_U8\_U8\_8x8
- mlib\_VideoP64Decimate\_U8\_U8
- mlib\_VideoP64Loop\_S16\_U8
- mlib\_VideoP64Loop\_U8\_U8
- mlib\_VideoQuantizeInit\_S16
- mlib\_VideoQuantize\_S16
- mlib\_VideoReversibleColorRGB2YUV\_S16\_S16
- mlib\_VideoReversibleColorRGB2YUV\_S16\_U8
- mlib\_VideoReversibleColorRGB2YUV\_S32\_S16
- mlib\_VideoReversibleColorRGB2YUV\_U8\_U8
- mlib\_VideoReversibleColorYUV2RGB\_S16\_S16
- mlib\_VideoReversibleColorYUV2RGB\_S16\_S32
- mlib\_VideoReversibleColorYUV2RGB\_U8\_S16
- mlib\_VideoReversibleColorYUV2RGB\_U8\_U8
- mlib\_VideoSignMagnitudeConvert\_S16
- mlib\_VideoSignMagnitudeConvert\_S16\_S16
- mlib\_VideoSignMagnitudeConvert\_S32
- mlib\_VideoSignMagnitudeConvert\_S32\_S32
- mlib\_VideoSumAbsDiff
- mlib\_VideoUpSample420
- mlib\_VideoUpSample420\_Nearest
- mlib\_VideoUpSample420\_Nearest\_S16
- mlib\_VideoUpSample420\_S16
- mlib\_VideoUpSample422
- mlib\_VideoUpSample422\_Nearest
- mlib\_VideoUpSample422\_Nearest\_S16
- mlib\_VideoUpSample422\_S16
- mlib\_VideoWaveletForwardTwoTenTrans\_S16\_S16
- mlib\_VideoWaveletForwardTwoTenTrans\_S16\_U8
- mlib\_VideoWaveletForwardTwoTenTrans\_S32\_S16

- mlib\_VideoWaveletForwardTwoTenTrans\_S32\_S32
  - mlib\_VideoWaveletInverseTwoTenTrans\_S16\_S16
  - mlib\_VideoWaveletInverseTwoTenTrans\_S16\_S32
  - mlib\_VideoWaveletInverseTwoTenTrans\_S32\_S32
  - mlib\_VideoWaveletInverseTwoTenTrans\_U8\_S16
- Volume Imaging Functions
- mlib\_VolumeFindMaxBMask\_S16
  - mlib\_VolumeFindMaxBMask\_U8
  - mlib\_VolumeFindMaxCMask\_S16
  - mlib\_VolumeFindMaxCMask\_U8
  - mlib\_VolumeFindMax\_S16
  - mlib\_VolumeFindMax\_U8
  - mlib\_VolumeRayCast\_Blocked\_Divergent\_Nearest\_S16\_S16
  - mlib\_VolumeRayCast\_Blocked\_Divergent\_Nearest\_U8\_U8
  - mlib\_VolumeRayCast\_Blocked\_Divergent\_Trilinear\_S16\_S16
  - mlib\_VolumeRayCast\_Blocked\_Divergent\_Trilinear\_U8\_U8
  - mlib\_VolumeRayCast\_Blocked\_Parallel\_Nearest\_S16\_S16
  - mlib\_VolumeRayCast\_Blocked\_Parallel\_Nearest\_U8\_U8
  - mlib\_VolumeRayCast\_Blocked\_Parallel\_Trilinear\_S16\_S16
  - mlib\_VolumeRayCast\_Blocked\_Parallel\_Trilinear\_U8\_U8
  - mlib\_VolumeRayCast\_General\_Divergent\_Nearest\_S16\_S16
  - mlib\_VolumeRayCast\_General\_Divergent\_Nearest\_U8\_Bit
  - mlib\_VolumeRayCast\_General\_Divergent\_Nearest\_U8\_U8
  - mlib\_VolumeRayCast\_General\_Divergent\_Trilinear\_S16\_S16
  - mlib\_VolumeRayCast\_General\_Divergent\_Trilinear\_U8\_U8
  - mlib\_VolumeRayCast\_General\_Parallel\_Nearest\_S16\_S16
  - mlib\_VolumeRayCast\_General\_Parallel\_Nearest\_U8\_Bit
  - mlib\_VolumeRayCast\_General\_Parallel\_Nearest\_U8\_U8
  - mlib\_VolumeRayCast\_General\_Parallel\_Trilinear\_S16\_S16
  - mlib\_VolumeRayCast\_General\_Parallel\_Trilinear\_U8\_U8
  - mlib\_VolumeWindowLevel

**Files** /usr/lib/libmllib.so.2                      shared object  
 /usr/lib/64/libmllib.so.2                      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWmllib
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)  
[mediaLib User's Manual](#)

**Name** libmLib\_mt – multi-threaded mediaLib

**Synopsis** `cc [ flag... ] file... -lmLib_mt -lmLib [ library... ]  
#include <mLib.h>`

**Description** Interfaces in this library provide functions for multimedia processing. Multi-threaded (MT) mediaLib is a software layer developed on top of mediaLib using OpenMP. When it is used with a large data set on a multi-processor system, MT mediaLib will partition data into subsets and process the subsets in parallel, thus greatly improving performance of applications that use mediaLib.

**Interfaces** The shared object `libmLib_mt.so.2` provides the same public interfaces as those defined in [libmLib\(3LIB\)](#). See [Intro\(3\)](#) for additional information on shared object interfaces.

**Usage** There are two ways to use MT mediaLib.

1. Pre-load a multi-threaded mediaLib library during runtime by setting the `LD_PRELOAD` environment variable as follows before starting your application, in Bourne/Korn shell:

```
LD_PRELOAD=libmLib_mt.so  
export LD_PRELOAD
```

or in C shell:

```
setenv LD_PRELOAD libmLib_mt.so
```

In this way, you can take advantage of MT mediaLib without rebuilding your application.

2. Link your application with a multi-threaded mediaLib library directly as shown under SYNOPSIS. In this way, an MT mediaLib library is always used whenever your application is started.

The parallelization of MT mediaLib is controlled, in part, by the `PARALLEL` environment variable. You can change its setting to adjust the degree of parallelization before starting your application, in Bourne/Korn shell:

```
PARALLEL=n  
export PARALLEL
```

or in C shell:

```
setenv PARALLEL n
```

where `n` is a positive integer for number of threads. Note that other factors also affect the degree of parallelization in MT mediaLib.

**Files** `/usr/lib/libmLib_mt.so.2`      shared object  
`/usr/lib/64/libmLib_mt.so.2`    64-bit shared object



**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWmllib
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [libmllib\(3LIB\)](#), [attributes\(5\)](#)  
[mediaLib User's Manual](#)

**Name** libmms – Media Management System library

**Synopsis** `cc [ flag... ] file... -lmms [ library... ]`

**Description** Functions in this library provide access to the Media Management System (MMS).

The Media Management System (MMS) is a distributed removable media management system. It is based on IEEE 1244, Media Management System (MMS). Client applications request MMS to mount and unmount cartridges and process them after they are mounted. Applications use Media Management Protocol (MMP) commands to make requests. The Media Management System (MMS) client API provides basic functions that give an application the ability to connect to MMS, send commands to MMS, and interpret the responses to the commands.

For a client to establish a connection to MMS, it needs to first initialize a session and then establish the connection. There are two types of sessions:

**synchronous**      A synchronous connection means that the client waits for a response for each command that it sends to MMS.

**asynchronous**      An asynchronous connection means the client can continue to send commands to MMS without waiting for a response to the commands.

The type of session is specified with the choice of initialization function, either `mms_init()` or `mms_ainit()`.

The connection is established with the hello function, `mms_hello()`.

Within an asynchronous session, the client can also send synchronous commands.

If a client's instance is configured to allow multiple sessions, the client can create more than one session, in any combination of synchronous and asynchronous types. The client must manage which commands are sent over which session.

If the client's instance is not configured to allow multiple sessions and a second init function is called, the client's hello function receives an “unwelcome” response from MMS.

Any command sent using the asynchronous send function, `mms_send_acmd()`, specifies a callback routine that is invoked when the MMS API receives a response to the command. This callback routine is a client-specified function. A callback function can not issue other commands to MMS because the callback function is executed as part of the MMS API's reader thread.

An asynchronous session allows the client to also issue commands using the synchronous send function, `mms_send_cmd()`, waiting for a response before returning.

A client can receive notification of certain events that occur within MMS through the event notification mechanism.

Routines are provided by the API to help in the processing of responses to the client's commands.

For OpenSolaris platforms, libmms is released in shared object (.so) format, installed in /usr/lib/libmms.so.

The following table lists libmms library routines and indicates the type of connection that supports them and whether they are optional.

Routine	Availability	Required
mms_init()	synchronous	required for synchronous
mms_ainit()	asynchronous	required for asynchronous
mms_hello()	synchronous and asynchronous	required for both
mms_send_cmd()	synchronous and asynchronous	required for synchronous, optional for asynchronous
mms_send_acmd()	synchronous and asynchronous	required for asynchronous, optional for synchronous
mms_read_response()	synchronous and asynchronous	required for intermediate response to mms_send_cmd()
mms_free_rsp()	synchronous and asynchronous	required for both
mms_goodbye()	synchronous	required for synchronous
mms_agoodbye()	asynchronous	required for asynchronous

The following routines are used by a client to process the response to a MMS command.

mms_rsp_type()	Returns the type of response that was received for the command.
mms_handle_err_rsp()	Returns the error code and error message from an error response.
mms_get_tree()	Returns the parse tree of the response.
mms_get_attribute()	Obtains the value associated with a attribute name from a response in namevalue mode.

**Usage** To make a client application able to use MMS, build the client with access to the MMS API library routines and then configure the application.

1. Get a copy of the MMS source tree.
2. Include <mms\_api.h> and <mms\_sym.h> in the makefile. The path is the san-andreas/include/(OBJ\_DIR). For example, OBJ\_DIR is the obj/SunOS\_5.10\_sparc\_DEBUG.

3. Link the client to the mms library to get the MMS API. A client can link either statically or dynamically. To link the library statically, the path is `san-andreas/lib/$(OBJ_DIR)`. To link at runtime, MMS is installed in `/opt/SUNWsmms/lib/libmms.so`.
4. Link with either `libcommon.so` or `libcommon.a` depending on if the client is dynamically linked or statically linked.
5. Create the client's application name in MMS database. Client application instances must be created within MMS database in order for clients to establish a connection with MMS.
6. Use the MMS database password to connect to MMS. The default database password is a construction of the administrator password with the characters "dbadmin" appended.

**Interfaces** The shared object `libmms.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>mms_agoodbye</code>	<code>mms_ainit</code>
<code>mms_free_rsp</code>	<code>mms_get_attribute</code>
<code>mms_get_str</code>	<code>mms_get_tree</code>
<code>mms_goodbye</code>	<code>mms_handle_err_rsp</code>
<code>mms_hello</code>	<code>mms_init</code>
<code>mms_read_response</code>	<code>mms_rsp_type</code>
<code>mms_send_acmd</code>	<code>mms_send_cmd</code>

**Files** `/usr/lib/libmms.so.1` shared object  
`/usr/lib/64/libmms.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWmmsu
Interface Stability	Uncommitted
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [mms\\_init\(3MMS\)](#), [mms\\_rsp\\_type\(3MMS\)](#), [mms\\_send\\_cmd\(3MMS\)](#), [attributes\(5\)](#)

**Name** libmp – multiple precision library

**Synopsis** `cc [ flag... ] file... -lmp [ library... ]  
#include <mp.h>`

**Description** Functions in this library provide various multiple precision routines.

**Interfaces** The shared object `libmp.so.2` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>mp_gcd</code>	<code>mp_itom</code>
<code>mp_madd</code>	<code>mp_mcmp</code>
<code>mp_mdiv</code>	<code>mp_mfree</code>
<code>mp_min</code>	<code>mp_mout</code>
<code>mp_msqrt</code>	<code>mp_msub</code>
<code>mp_mtox</code>	<code>mp_mult</code>
<code>mp_pow</code>	<code>mp_rpow</code>
<code>mp_sdiv</code>	<code>mp_xtom</code>

**Files** `/lib/libmp.so.1` shared object for binary compatibility only  
`/lib/libmp.so.2` shared object  
`/lib/64/libmp.so.2` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [exp\(3M\)](#), [mp\(3MP\)](#), [attributes\(5\)](#)

**Name** libMPAPI, libmpapi – Common Multipath Management library

**Synopsis** `cc [ flag... ] file... -lMPAPI [ library... ]`  
`#include <mpapi.h>`  
`#include <mpapi_sun.h>`

**Description** The functions in this library allow a management application to administer the multipath devices and associated resources through standard interfaces, independent of a vendor-unique multipathing solution.

**Interfaces** The shared object `libMPAPI.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```
MP_AssignLogicalUnitToTPG
MP_CancelOverridePath
MP_CompareOIDs
MP_DeregisterForObjectPropertyChanges
MP_DeregisterForObjectVisibilityChanges
MP_DeregisterPlugin
MP_DisableAutoFailback
MP_DisableAutoProbing
MP_DisablePath
MP_EnableAutoFailback
MP_EnableAutoProbing
MP_EnablePath
MP_FreeOidList
MP_GetAssociatedPathOidList
MP_GetAssociatedPluginOid
MP_GetAssociatedTPGOidList
MP_GetDeviceProductOidList
MP_GetDeviceProductProperties
MP_GetInitiatorPortOidList
MP_GetInitiatorPortProperties
MP_GetLibraryProperties
MP_GetMPLLogicalUnitProperties
MP_GetMPLuOidListFromTPG
MP_GetMultipathLus
MP_GetObjectType
MP_GetPathLogicalUnitProperties
MP_GetPluginOidList
MP_GetPluginProperties
MP_GetProprietaryLoadBalanceOidList
MP_GetProprietaryLoadBalanceProperties
MP_GetTargetPortGroupProperties
MP_GetTargetPortOidList
```

```

MP_GetTargetPortProperties
MP_RegisterForObjectPropertyChanges
MP_RegisterForObjectVisibilityChanges
MP_RegisterPlugin
MP_SetFailbackPollingRate
MP_SetLogicalUnitLoadBalanceType
MP_SetOverridePath
MP_SetPathWeight
MP_SetPluginLoadBalanceType
MP_SetProbingPollingRate
MP_SetProprietaryProperties
MP_SetTPGAccess
Sun_MP_SendScsiCmd

```

**Usage** Client applications link with the Common Library (using `-lMPAPI`) to access the interfaces. The Common Library dynamically loads an individual vendor-provided plugin library that is available through `MP_RegisterPlugin(3MPAPI)` on the host system.

Using `libMPAPI` involves the following steps:

1. Optionally calling `MP_GetLibraryProperties()` to retrieve the properties of the Common Library.
2. Calling `MP_GetPluginOidList()` to retrieve the registered plugin libraries.
3. Optionally calling `MP_GetPluginProperties()` to retrieve the properties of the plugin library.
4. Retrieve discovery information and property information on multipath devices and associated resources by calling the following:
  - `MP_GetAssociatedPathOidList()`
  - `MP_GetAssociatedTPGOidList()`
  - `MP_GetDeviceProductOidList()`
  - `MP_GetDeviceProductProperties()`
  - `MP_GetInitiatorPortOidList()`
  - `MP_GetInitiatorPortProperties()`
  - `MP_GetMPLuOidListFromTPG()`
  - `MP_GetMPLLogicalUnitProperties()`
  - `MP_GetMultipathLus()`
  - `MP_GetPathLogicalUnitProperties()`
  - `MP_GetProprietaryLoadBalanceOidList()`
  - `MP_GetProprietaryLoadBalanceProperties()`
  - `MP_GetTargetPortGroupProperties()`
  - `MP_GetTargetPortOidList()`
  - `MP_GetTargetPortProperties()`
5. Register and deregister for property and visibility changes on multipath devices and associated resources by calling:

- MP\_RegisterForObjectPropertyChanges()
  - MP\_RegisterForObjectVisibilityChanges()
  - MP\_DeregisterForObjectPropertyChanges()
  - MP\_DeregisterForObjectVisibilityChanges()
6. Perform administrative operations on multipath devices and associated resources by calling:
- MP\_AssignLogicalUnitToTPG()
  - MP\_CancelOverridePath()
  - MP\_DisableAutoFailback()
  - MP\_DisableAutoProbing()
  - MP\_DisablePath()
  - MP\_EnableAutoFailback()
  - MP\_EnableAutoProbing()
  - MP\_EnablePath()
  - MP\_SetLogicalUnitLoadBalanceType()
  - MP\_SetOverridePath()
  - MP\_SetPathWeight()
  - MP\_SetPluginLoadBalanceType()
  - MP\_SetFailbackPollingRate()
  - MP\_SetProbingPollingRate()
  - MP\_SetProprietaryProperties()
  - MP\_SetTPGAccess()
  - Sun\_MP\_SendScsiCmd()

**Errors** Errors are generally returned from the underlying VSL and can include any of the following values:

**MP\_STATUS\_SUCCESS**

This status value is returned when the requested operation is successfully carried out.

**MP\_STATUS\_INVALID\_PARAMETER**

This status value is returned when parameters passed to an API are detected to be invalid or inappropriate for a particular API parameter. If the parameter is an object ID, this status indicates that the object type subfield is defined in this specification, but is not appropriate for this API

**MP\_STATUS\_UNKNOWN\_FN**

This status value is returned when a client function passed into the API is not a previously registered or known function.

**MP\_STATUS\_FAILED**

This status value is returned when the requested operation could not be carried out.

**MP\_STATUS\_INSUFFICIENT\_MEMORY**

This status value is returned when the API could [not] allocate the memory required to complete the requested operation.



**MP\_STATUS\_INVALID\_OBJECT\_TYPE**

This status value is returned when an object ID includes a type subfield that is not defined in this specification.

**MP\_STATUS\_OBJECT\_NOT\_FOUND**

This status value is returned when the object associated with the ID specified in the API could not be located, or has been deleted. Note that an invalid object type is covered by `MP_STATUS_INVALID_OBJECT_TYPE` so this status is limited to an invalid object owner identifier or sequence number.

**MP\_STATUS\_UNSUPPORTED**

This status value is returned when the implementation does not support the requested function.

**MP\_STATUS\_FN\_REPLACED**

This status value is returned when a client function passed into the API replaces a previously registered function.

**MP\_STATUS\_ACCESS\_STATE\_INVALID**

This status value is returned when a device processing `MP_SetTPGAccess` returns a status indicating that the caller is attempting to establish an illegal combination of access states.

**MP\_STATUS\_PATH\_NONOPERATIONAL**

This status is returned when communication cannot be established with the path selected by the caller.

**MP\_STATUS\_TRY\_AGAIN**

This status is returned when the plugin or driver is unable to complete the request, but might be able to complete it later.

**MP\_STATUS\_NOT\_PERMITTED**

The operation is not permitted in the current configuration, but might be permitted in other configurations.

**Files** `/usr/lib/libMPAPI.so` shared object  
`/usr/lib/64/libMPAPI.so` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWmpapir SUNWmpapi (Header file)
Interface Stability	Committed
MT-Level	Safe

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Standard	ANSI INCITS 412 Multipath Management API (except for Sun_MP_SendScsiCmd)

**See Also** [Intro\(3\)](#), [MP\\_RegisterPlugin\(3MPAPI\)](#), [attributes\(5\)](#)

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**Name** libmtmalloc – multi-threaded memory allocator library

**Synopsis** `cc [ flag... ] file... -lmtmalloc [ library... ]  
#include <mtmalloc.h>`

**Description** Functions in this library provide concurrent access to heap space.

**Interfaces** The shared object `libmtmalloc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>free</code>	<code>malloc</code>
<code>mallocctl</code>	<code>memalign</code>
<code>realloc</code>	<code>valloc</code>

**Files** `/usr/lib/libmtmalloc.so.1` shared object  
`/usr/lib/64/libmtmalloc.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [sbrk\(2\)](#), [Intro\(3\)](#), [malloc\(3C\)](#), [malloc\(3MALLOC\)](#), [mapmalloc\(3MALLOC\)](#), [mtmalloc\(3MALLOC\)](#), [attributes\(5\)](#)

**Name** libmvec – vector math library

**Synopsis** `cc [ flag... ] file... -lmvec [ library... ]`

**Description** This library contains function to evaluate common mathematical functions for several arguments at once. The argument values are specified by one or more vectors (arrays) of data, and the corresponding result values are stored in another vector.

**Interfaces** The shared object `libmvec.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>vatan_</code>	<code>vatanf_</code>
<code>vatan2_</code>	<code>vatan2f_</code>
<code>vc_abs_</code>	<code>vc_exp_</code>
<code>vc_log_</code>	<code>vc_pow_</code>
<code>vcos_</code>	<code>vcosf_</code>
<code>vcospi_</code>	<code>vcospif_</code>
<code>vexp_</code>	<code>vexpf_</code>
<code>vhypot_</code>	<code>vhypotf_</code>
<code>vlog_</code>	<code>vlogf_</code>
<code>vpow_</code>	<code>vpowf_</code>
<code>vrhypot_</code>	<code>vrhypotf_</code>
<code>vrsqrt_</code>	<code>vrsqrtf_</code>
<code>vsin_</code>	<code>vsinf_</code>
<code>vsincos_</code>	<code>vsincosf_</code>
<code>vsincospi_</code>	<code>vsincospif_</code>
<code>vsinpi_</code>	<code>vsinpif_</code>
<code>vsqrt_</code>	<code>vsqrtf_</code>
<code>vz_abs_</code>	<code>vz_exp_</code>
<code>vz_log_</code>	<code>vz_pow_</code>

**Files** `/lib/libmvec.so.1` shared object  
`/lib/64/libmvec.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWlibmsr
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [complex.h\(3HEAD\)](#), [libm\(3LIB\)](#), [attributes\(5\)](#)

**Name** libnls – network listener service library

**Synopsis** `cc [ flag... ] file... -lnls [ library... ]`

**Description** The functions in this library interact with the network listener daemon, [listen\(1M\)](#). The functions are provided for services invoked by the listener daemon and for clients that connect to the services using `listen`.

**Interfaces** The shared object `libnls.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

```
nlsgetcall          nlsprovider
nlsrequest
```

**Files** `/usr/lib/libnls.so.1` shared object  
`/usr/lib/64/libnls.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [listen\(1M\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libnsl – network services library

**Synopsis** `cc [ flag... ] file... -lnsl [ library... ]`

**Description** Functions in this library provide routines that provide a transport-level interface to networking services for applications, facilities for machine-independent data representation, a remote procedure call mechanism, and other networking services useful for application programs.

Some symbols are not intended to be referenced directly. Rather, they are exposed because they are used elsewhere through a private interface. One such example is the set of symbols beginning with the `_xti` prefix. Those symbols are used in implementing the X/Open Transport Interface (XTI) interfaces documented in [libxnet\(3LIB\)](#). See [libxnet\(3LIB\)](#).

**Interfaces** The shared object `libnsl.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__rpc_createerr</code>	<code>__t_errno</code>
<code>_nderror</code>	<code>_null_auth</code>
<code>_xti_accept</code>	<code>_xti_alloc</code>
<code>_xti_bind</code>	<code>_xti_close</code>
<code>_xti_connect</code>	<code>_xti_error</code>
<code>_xti_free</code>	<code>_xti_getinfo</code>
<code>_xti_getprotaddr</code>	<code>_xti_getstate</code>
<code>_xti_listen</code>	<code>_xti_look</code>
<code>_xti_open</code>	<code>_xti_optmgmt</code>
<code>_xti_rcv</code>	<code>_xti_rcvconnect</code>
<code>_xti_rcvdis</code>	<code>_xti_rcvrel</code>
<code>_xti_rcvreldata</code>	<code>_xti_rcvudata</code>
<code>_xti_rcvuderr</code>	<code>_xti_rcvv</code>
<code>_xti_rcvvudata</code>	<code>_xti_snd</code>
<code>_xti_snddis</code>	<code>_xti_sndrel</code>
<code>_xti_sndreldata</code>	<code>_xti_sndudata</code>
<code>_xti_sndv</code>	<code>_xti_sndvudata</code>
<code>_xti_strerror</code>	<code>_xti_sync</code>
<code>_xti_sysconf</code>	<code>_xti_unbind</code>

_xti_xns5_accept	_xti_xns5_snd
auth_destroy	authdes_create
authdes_getucred	authdes_lock
authdes_seccreate	authnone_create
authsys_create	authsys_create_default
callrpc	clnt_broadcast
clnt_call	clnt_control
clnt_create	clnt_create_timed
clnt_create_vers	clnt_create_vers_timed
clnt_destroy	clnt_dg_create
clnt_door_create	clnt_freeres
clnt_geterr	clnt_pcreateerror
clnt_perrno	clnt_perror
clnt_raw_create	clnt_screateerror
clnt_sperrno	clnt_sperror
clnt_tli_create	clnt_tp_create
clnt_tp_create_timed	clnt_vc_create
clntraw_create	clnttcp_create
clntudp_bufcreate	clntudp_create
dbmclose	dbminit
delete	des_setparity
dial	doconfig
endhostent	endnetconfig
endnetpath	endrpcent
fetch	firstkey
freehostent	freenetconfignt
get_myaddress	gethostbyaddr
gethostbyaddr_r	gethostbyname
gethostbyname_r	gethostent



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gethostent_r	getipnodebyaddr
getipnodebyname	getipsecalgbyname
getipsecalgbynum	getipsecprotobyname
getipsecprotobynum	getnetconfig
getnetconfigent	getnetname
getnetpath	getpublickey
getrpcbyname	getrpcbyname_r
getrpcbynumber	getrpcbynumber_r
getrpcent	getrpcent_r
getrpcport	getsecretkey
h_errno	host2netname
inet_addr	inet_netof
inet_ntoa	inet_ntoa_r
inet_ntop	inet_pton
key_decryptsession	key_encryptsession
key_gendes	key_secretkey_is_set
key_setsecret	maxbno
nc_perror	nc_sperror
netdir_free	netdir_getbyaddr
netdir_getbyname	netdir_options
netdir_perror	netdir_sperror
netname2host	netname2user
nextkey	
pmap_getmaps	pmap_getport
pmap_rmtcall	pmap_set
pmap_unset	registerrpc
rpc_broadcast	rpc_broadcast_exp
rpc_call	rpc_control
rpc_createerr	rpc_gss_get_error

rpc_gss_get_mech_info	rpc_gss_get_mechanisms
rpc_gss_get_principal_name	rpc_gss_get_versions
rpc_gss_getcred	rpc_gss_is_installed
rpc_gss_max_data_length	rpc_gss_mech_to_oid
rpc_gss_qop_to_num	rpc_gss_seccreate
rpc_gss_set_callback	rpc_gss_set_defaults
rpc_gss_set_svc_name	rpc_gss_svc_max_data_length
rpc_reg	rpcb_getaddr
rpcb_getmaps	rpcb_gettime
rpcb_rmtcall	rpcb_set
rpcb_unset	sethostent
setnetconfig	setnetpath
setrpcent	store
svc_auth_reg	svc_control
svc_create	svc_destroy
svc_dg_create	svc_dg_enablecache
svc_done	svc_door_create
svc_exit	svc_fd_create
svc_fdset	svc_freeargs
svc_get_local_cred	svc_getargs
svc_getreq	svc_getreq_common
svc_getreq_poll	svc_getreqset
svc_getrpccaller	svc_max_pollfd
svc_pollfd	svc_raw_create
svc_reg	svc_register
svc_run	svc_sendreply
svc_tli_create	svc_tp_create
svc_unreg	svc_unregister
svc_vc_create	svcerr_auth

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svcerr_decode	svcerr_noproc
svcerr_noprogram	svcerr_progvers
svcerr_systemerr	svcerr_weakauth
svcfd_create	svcrow_create
svctcp_create	svcudp_bufcreate
svcudp_create	t_accept
t_alloc	t_bind
t_close	t_connect
t_errno	t_error
t_free	t_getinfo
t_getname	t_getstate
t_listen	t_look
t_nerr	t_open
t_optmgmt	t_rcv
t_rcvconnect	t_rcvdis
t_rcvrel	t_rcvdata
t_rcvuderr	t_snd
t_snddis	t_sndrel
t_sndudata	t_strerror
t_sync	t_unbind
taddr2uaddr	uaddr2taddr
undial	user2netname
xdr_accepted_reply	xdr_array
xdr_authsys_parms	xdr_bool
xdr_bytes	xdr_callhdr
xdr_callmsg	xdr_char
xdr_destroy	xdr_double
xdr_enum	xdr_float
xdr_free	xdr_getpos

xdr_hyper	xdr_inline
xdr_int	xdr_int16_t
xdr_int32_t	xdr_int64_t
xdr_int8_t	xdr_long
xdr_longlong_t	xdr_opaque
xdr_opaque_auth	xdr_pointer
xdr_quadruple	xdr_reference
xdr_rejected_reply	xdr_replymsg
xdr_setpos	xdr_short
xdr_sizeof	xdr_string
xdr_u_char	xdr_u_hyper
xdr_u_int	xdr_u_long
xdr_u_longlong_t	xdr_u_short
xdr_uint16_t	xdr_uint32_t
xdr_uint64_t	xdr_uint8_t
xdr_union	xdr_vector
xdr_void	xdr_wrapstring
xdrmem_create	xdrrec_create
xdrrec_endofrecord	xdrrec_eof
xdrrec_readbytes	xdrrec_skiprecord
xdrstdio_create	xprt_register
xprt_unregister	yp_all
yp_bind	yp_first
yp_get_default_domain	yp_master
yp_match	yp_next
yp_order	yp_unbind
yp_update	yperr_string
ypprot_err	

The following interface is unique to the 32-bit version of this library:

---

`_new_svc_fdset`

**Files** `/lib/libnsl.so.1` shared object  
`/lib/64/libnsl.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe with exceptions

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [libxnet\(3LIB\)](#), [attributes\(5\)](#)

**Name** libnvpair – name-value pair library

**Synopsis** `cc [ flag... ] file... -lnvpair [ library... ]  
#include <libnvpair.h>`

**Description** The libnvpair library exports a set of functions for managing name-value pairs.

The library defines four opaque handles:

<code>nvpair_t</code>	handle to a name-value pair
<code>nvlist_t</code>	handle to a list of name-value pairs
<code>nv_alloc_t</code>	handle to a pluggable allocator
<code>nv_alloc_ops_t</code>	handle to pluggable allocator operations

The library supports the following operations:

- Allocate and free an `nvlist_t`.
- Specify the allocator to be used when manipulating an `nvlist_t`.
- Add and remove an `nvpair_t` from a list.
- Search `nvlist_t` for a specified name pair.
- Pack an `nvlist_t` into a contiguous buffer.
- Expand a packed `nvlist` into a searchable `nvlist_t`.

**Interfaces** The shared object `libnvpair.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>nvlist_add_boolean</code>	<code>nvlist_add_boolean_value</code>
<code>nvlist_add_boolean_array</code>	<code>nvlist_add_byte</code>
<code>nvlist_add_byte_array</code>	<code>nvlist_add_double</code>
<code>nvlist_add_int8</code>	<code>nvlist_add_int8_array</code>
<code>nvlist_add_int16</code>	<code>nvlist_add_int16_array</code>
<code>nvlist_add_int32</code>	<code>nvlist_add_int32_array</code>
<code>nvlist_add_int64</code>	<code>nvlist_add_int64_array</code>
<code>nvlist_add_nvlist</code>	<code>nvlist_add_nvlist_array</code>
<code>nvlist_add_nvpair</code>	<code>nvlist_add_string</code>
<code>nvlist_add_string_array</code>	<code>nvlist_add_uint8</code>
<code>nvlist_add_uint8_array</code>	<code>nvlist_add_uint16</code>
<code>nvlist_add_uint16_array</code>	<code>nvlist_add_uint32</code>

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<code>nvlist_add_uint32_array</code>	<code>nvlist_add_uint64</code>
<code>nvlist_add_uint64_array</code>	<code>nvlist_alloc</code>
<code>nvlist_dup</code>	<code>nvlist_exists</code>
<code>nvlist_free</code>	<code>nvlist_lookup_boolean</code>
<code>nvlist_lookup_boolean_value</code>	<code>nvlist_lookup_boolean_array</code>
<code>nvlist_lookup_byte</code>	<code>nvlist_lookup_byte_array</code>
<code>nvlist_lookup_double</code>	<code>nvlist_lookup_int8</code>
<code>nvlist_lookup_int8_array</code>	<code>nvlist_lookup_int16</code>
<code>nvlist_lookup_int16_array</code>	<code>nvlist_lookup_int32</code>
<code>nvlist_lookup_int32_array</code>	<code>nvlist_lookup_int64</code>
<code>nvlist_lookup_int64_array</code>	<code>nvlist_lookup_nvlist</code>
<code>nvlist_lookup_nvlist_array</code>	<code>nvlist_lookup_nv_alloc</code>
<code>nvlist_lookup_nvpair</code>	<code>nvlist_lookup_pairs</code>
<code>nvlist_lookup_string</code>	<code>nvlist_lookup_string_array</code>
<code>nvlist_lookup_uint8</code>	<code>nvlist_lookup_uint8_array</code>
<code>nvlist_lookup_uint16</code>	<code>nvlist_lookup_uint16_array</code>
<code>nvlist_lookup_uint32</code>	<code>nvlist_lookup_uint32_array</code>
<code>nvlist_lookup_uint64</code>	<code>nvlist_lookup_uint64_array</code>
<code>nvlist_merge</code>	<code>nvlist_next_nvpair</code>
<code>nvlist_pack</code>	<code>nvlist_remove</code>
<code>nvlist_remove_all</code>	<code>nvlist_size</code>
<code>nvlist_unpack</code>	<code>nvlist_xalloc</code>
<code>nvlist_xdup</code>	<code>nvlist_xpack</code>
<code>nvlist_xunpack</code>	<code>nvpair_name</code>
<code>nvpair_type</code>	<code>nvpair_value_boolean_array</code>
<code>nvpair_value_boolean_value</code>	<code>nvpair_value_byte</code>
<code>nvpair_value_byte_array</code>	<code>nvpair_value_double</code>
<code>nvpair_value_int8</code>	<code>nvpair_value_int8_array</code>
<code>nvpair_value_int16</code>	<code>nvpair_value_int16_array</code>

<code>nvpair_value_int32</code>	<code>nvpair_value_int32_array</code>
<code>nvpair_value_int64</code>	<code>nvpair_value_int64_array</code>
<code>nvpair_value_nvlist</code>	<code>nvpair_value_nvlist_array</code>
<code>nvpair_value_string</code>	<code>nvpair_value_string_array</code>
<code>nvpair_value_uint8</code>	<code>nvpair_value_uint8_array</code>
<code>nvpair_value_uint16</code>	<code>nvpair_value_uint16_array</code>
<code>nvpair_value_uint32</code>	<code>nvpair_value_uint32_array</code>
<code>nvpair_value_uint64</code>	<code>nvpair_value_uint64_array</code>
<code>nv_alloc_init</code>	<code>nv_alloc_fini</code>
<code>nv_alloc_reset</code>	

**Files** `/lib/libnvpair.so.1` shared object  
`/lib/64/libnvpair.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)



**Name** libpam – PAM (Pluggable Authentication Module) library

**Synopsis** `cc [ flag... ] file... -lpam [ library... ]  
#include <security/pam_appl.h>`

**Description** Functions in this library provide routines for the Pluggable Authentication Module (PAM).

**Interfaces** The shared object `libpam.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>pam_acct_mgmt</code>	<code>pam_authenticate</code>
<code>pam_chauthtok</code>	<code>pam_close_session</code>
<code>pam_end</code>	<code>pam_get_data</code>
<code>pam_get_item</code>	<code>pam_get_user</code>
<code>pam_getenv</code>	<code>pam_getenvlist</code>
<code>pam_open_session</code>	<code>pam_putenv</code>
<code>pam_set_data</code>	<code>pam_set_item</code>
<code>pam_setcred</code>	<code>pam_start</code>
<code>pam_strerror</code>	

<b>Files</b> <code>/lib/libpam.so.1</code>	shared object
<code>/etc/pam.conf</code>	configuration file
<code>/usr/lib/security/pam_dial_auth.so.1</code>	authentication management PAM module for dialups
<code>/usr/lib/security/pam_rhosts_auth.so.1</code>	authentication management PAM modules that use <code>ruserok()</code>
<code>/usr/lib/security/pam_sample.so.1</code>	sample PAM module

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
MT Level	MT-Safe with exceptions

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [pam\(3PAM\)](#), [pam.conf\(4\)](#), [attributes\(5\)](#), [pam\\_authtok\\_check\(5\)](#), [pam\\_authtok\\_get\(5\)](#), [pam\\_authtok\\_store\(5\)](#), [pam\\_dial\\_auth\(5\)](#), [pam\\_dhkeys\(5\)](#), [pam\\_passwd\\_auth\(5\)](#), [pam\\_rhosts\\_auth\(5\)](#), [pam\\_sample\(5\)](#), [pam\\_unix\\_account\(5\)](#), [pam\\_unix\\_auth\(5\)](#), [pam\\_unix\\_session\(5\)](#)

**Notes** The functions in `libpam` are MT-Safe only if each thread within the multithreaded application uses its own PAM handle.

The `pam_unix(5)` module is no longer supported. Similar functionality is provided by `pam_authok_check(5)`, `pam_authok_get(5)`, `pam_authok_store(5)`, `pam_dhkeys(5)`, `pam_passwd_auth(5)`, `pam_unix_account(5)`, `pam_unix_auth(5)`, and `pam_unix_session(5)`.

**Name** libpanel – panels library

**Synopsis** `cc [ flag... ] file... -lpanel [ library... ]`

**Description** Functions in this library provide panels using [libcurses\(3LIB\)](#) routines.

**Interfaces** The shared object `libpanel.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>bottom_panel</code>	<code>del_panel</code>
<code>hide_panel</code>	<code>move_panel</code>
<code>new_panel</code>	<code>panel_above</code>
<code>panel_below</code>	<code>panel_hidden</code>
<code>panel_userptr</code>	<code>panel_window</code>
<code>replace_panel</code>	<code>set_panel_userptr</code>
<code>show_panel</code>	<code>top_panel</code>
<code>update_panels</code>	

**Files** `/usr/lib/libpanel.so.1` shared object

`/usr/lib/64/libpanel.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libcurses\(3LIB\)](#), [attributes\(5\)](#)

**Name** libpapi – Free Standards Group Open Printing API (PAPI) library functions

**Synopsis** `cc [ flag|PO ] file|PO -lpapi [ library|PO ]  
#include <papi.h>`

**Description** Functions in this library provide an interface for interaction with print services as described in v1.0 of the Free Standards Group (FSG) Open Printing API (PAPI).

This particular implementation of the PAPI includes naming support as described in the [printers.conf\(4\)](#) and [printers\(4\)](#) manual pages. It also supplies support for interaction with local LP services, remote LPD services, and remote IPP services through the use of loadable modules that export the same interface. These modules should not be linked with directly, but can be used directly at runtime through the use of LD\_PRELOAD for debugging purposes.

**Interfaces** The shared object `libpapi.so.0` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

Attribute	<code>papiAttributeListAddBoolean</code>	<code>papiAttributeListAddCollection</code>
	<code>papiAttributeListAddDatetime</code>	<code>papiAttributeListAddInteger</code>
	<code>papiAttributeListAddMetadata</code>	<code>papiAttributeListAddRange</code>
	<code>papiAttributeListAddResolution</code>	<code>papiAttributeListAddString</code>
	<code>papiAttributeListAddValue</code>	<code>papiAttributeListDelete</code>
	<code>papiAttributeListFind</code>	<code>papiAttributeListFree</code>
	<code>papiAttributeListFromString</code>	<code>papiAttributeListGetBoolean</code>
	<code>papiAttributeListGetCollection</code>	<code>papiAttributeListGetDatetime</code>
	<code>papiAttributeListGetInteger</code>	<code>papiAttributeListGetMetadata</code>
	<code>papiAttributeListGetNext</code>	<code>papiAttributeListGetRange</code>
	<code>papiAttributeListGetResolution</code>	<code>papiAttributeListGetString</code>
	<code>papiAttributeListGetValue</code>	<code>papiAttributeListToString</code>
	Service	<code>papiServiceCreate</code>
<code>papiServiceGetAppData</code>		<code>papiServiceGetAttributeList</code>
<code>papiServiceGetEncryption</code>		<code>papiServiceGetPassword</code>
<code>papiServiceGetServiceName</code>		<code>papiServiceGetStatusMessage</code>
<code>papiServiceGetUserName</code>		<code>papiServiceSetAppData</code>

---

	papiServiceSetAuthCB	papiServiceSetEncryption
	papiServiceSetPassword	papiServiceSetUserName
<b>Printer</b>	papiPrinterAdd	papiPrinterDisable
	papiPrinterEnable	papiPrinterFree
	papiPrinterGetAttributeList	papiPrinterListFree
	papiPrinterListJobs	papiPrinterModify
	papiPrinterPause	papiPrinterPurgeJobs
	papiPrinterQuery	papiPrinterRemove
	papiPrinterResume	papiPrintersList
<b>Job</b>	papiJobCancel	papiJobFree
	papiJobGetAttributeList	papiJobGetId
	papiJobGetJobTicket	papiJobGetPrinterName
	papiJobHold	papiJobListFree
	papiJobModify	papiJobMove
	papiJobPromote	papiJobQuery
	papiJobRelease	papiJobRestart
	papiJobStreamClose	papiJobStreamOpen
	papiJobStreamWrite	papiJobSubmit
	papiJobSubmitByReference	papiJobValidate
<b>Miscellaneous</b>	papiLibrarySupportedCall	papiLibrarySupportedCalls
	papiStatusString	
<b>Files</b>	/usr/lib/libpapi.so.0	shared object
	/usr/lib/libpapi-common.so.0	private shared code
	/usr/lib/print/psm-lpd.so	private rfc1179 support
	/usr/lib/print/psm-lpsched.so	private LP support
	/usr/lib/print/psm-ipp.so	private IPP support
	/usr/lib/libipp-core.so	private IPP marshalling support

/usr/lib/libipp-listener.so      private IPP operations support

/usr/lib/libhttp-core.so      private HTTP support

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWpapi
Interface Stability	Volatile
MT-Level	Safe

**See Also** [Intro\(3\)](#), [printers\(4\)](#), [printers.conf\(4\)](#), [attributes\(5\)](#)

**Name** libpctx – process context library

**Synopsis** `cc [ flag... ] file... -lpctx [ library... ]`

**Description** Functions in this library provide a simple means to access the underlying facilities of [proc\(4\)](#) to allow a controlling process to manipulate the state of a controlled process.

This library is primarily for use in conjunction with the [libcpc\(3LIB\)](#) library. Used together, these libraries allow developers to construct tools that can manipulate CPU performance counters in other processes. The [cputrack\(1\)](#) utility is an example of such a tool.

**Interfaces** The shared object `libpctx.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>pctx_capture</code>	<code>pctx_create</code>
<code>pctx_release</code>	<code>pctx_run</code>
<code>pctx_set_events</code>	

**Files** `/usr/lib/libpctx.so.1` shared object  
`/usr/lib/64/libpctx.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcpcu (32-bit) SUNWcpcux (64-bit)
MT-Level	Safe

**See Also** [cputrack\(1\)](#), [Intro\(3\)](#), [cpc\(3CPC\)](#), [libcpc\(3LIB\)](#), [proc\(4\)](#), [attributes\(5\)](#)

**Name** libpicl – PICL library

**Synopsis** `cc [ flag... ] file... -lpicl [ library... ]  
#include <picl.h>`

**Description** Functions in this library are used to interface with the PICL daemon to access information from the PICL tree.

**Interfaces** The shared object `libpicl.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>picl_find_node</code>	<code>picl_get_first_prop</code>
<code>picl_get_frutree_parent</code>	<code>picl_get_next_by_col</code>
<code>picl_get_next_by_row</code>	<code>picl_get_next_prop</code>
<code>picl_get_node_by_path</code>	<code>picl_get_prop_by_name</code>
<code>picl_get_propinfo</code>	<code>picl_get_propinfo_by_name</code>
<code>picl_get_propval</code>	<code>picl_get_propval_by_name</code>
<code>picl_get_root</code>	<code>picl_initialize</code>
<code>picl_set_propval</code>	<code>picl_set_propval_by_name</code>
<code>picl_shutdown</code>	<code>picl_strerror</code>
<code>picl_wait</code>	<code>picl_walk_tree_by_class</code>

**Files** `/usr/lib/libpicl.so.1` shared object  
`/usr/lib/64/libpicl.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWpiclu (32-bit) SUNWpiclx (64-bit)
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [libpicl\(3PICL\)](#), [attributes\(5\)](#)



**Name** libpictree – PICL plug-in library

**Synopsis** `cc [ flag... ] file... -lpictree [ library... ]  
#include <pictree.h>`

**Description** Functions in this library are used to by PICL plug-in modules to register with the PICL daemon and to publish information in the PICL tree.

**Interfaces** The shared object `libpictree.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>picld_plugin_register</code>	<code>ptree_add_node</code>
<code>ptree_add_prop</code>	<code>ptree_add_row_to_table</code>
<code>ptree_create_and_add_node</code>	<code>ptree_create_and_add_prop</code>
<code>ptree_create_node</code>	<code>ptree_create_prop</code>
<code>ptree_create_table</code>	<code>ptree_delete_node</code>
<code>ptree_delete_prop</code>	<code>ptree_destroy_node</code>
<code>ptree_destroy_prop</code>	<code>ptree_find_node</code>
<code>ptree_get_first_prop</code>	<code>ptree_get_frutree_parent</code>
<code>ptree_get_next_by_col</code>	<code>ptree_get_next_by_row</code>
<code>ptree_get_next_prop</code>	<code>ptree_get_node_by_path</code>
<code>ptree_get_prop_by_name</code>	<code>ptree_get_propinfo</code>
<code>ptree_get_propval</code>	<code>ptree_get_propval_by_name</code>
<code>ptree_get_root</code>	<code>ptree_init_propinfo</code>
<code>ptree_post_event</code>	<code>ptree_register_handler</code>
<code>ptree_unregister_handler</code>	<code>ptree_update_propval</code>
<code>ptree_update_propval_by_name</code>	<code>ptree_walk_tree_by_class</code>

**Files** `/usr/lib/libpictree.so.1` shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWpiclu
Interface Stability	Evolving

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	MT-Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [libpicltree\(3PICLTREE\)](#), [attributes\(5\)](#)

**Name** libpkcs11 – PKCS#11 Cryptographic Framework library

**Synopsis** `cc [ flag... ] file... -lpkcs11 [ library... ]  
#include <security/cryptoki.h>  
#include <security/pkcs11.h>`

**Description** The `libpkcs11` library implements the RSA Security Inc. PKCS#11 Cryptographic Token Interface (Cryptoki), v2.20 specification by using plug-ins to provide the slots.

Each plug-in, which also implements RSA PKCS#11 v2.20, represents one or more slots.

The `libpkcs11` library provides a special slot called the meta slot. The meta slot provides a virtual union of capabilities of all other slots. When available, the meta slot is always the first slot provided by `libpkcs11`. The order of the rest of the slots is not guaranteed and may vary with every load of this library.

The meta slot feature can be configured either system-wide or by individual users. System-wide configuration for meta slot features is done with the `cryptoadm(1M)` utility. User configuration for meta slot features is performed with environment variables.

By default, the following is the system-wide configuration for meta slot. Meta slot is enabled. Meta slot provides token-based object support with the Software RSA PKCS#11 softtoken (`pkcs11_softtoken(5)`). Meta slot is allowed to move sensitive token objects to other slots if that is necessary to perform an operation.

Users can overwrite one or more system-wide configuration options for meta slot using these environment variables.

The `_${METASLOT_OBJECTSTORE_SLOT}` and `_${METASLOT_OBJECTSTORE_TOKEN}` environment variables are used to specify an alternate token object store. A user can specify either slot-description in `_${METASLOT_OBJECTSTORE_SLOT}` or token-label in `_${METASLOT_OBJECTSTORE_TOKEN}`, or both. Valid values for slot-description and token-label are available from output of the command:

```
cryptoadm list -v
```

The `_${METASLOT_ENABLED}` environment variable is used to specify whether the user wants to turn the metaslot feature on or off. Only two values are recognized. The value “true” means meta slot will be on. The value “false” means meta slot will be off.

The `_${METASLOT_AUTO_KEY_MIGRATE}` environment variable is used to specify whether the user wants sensitive token objects to move to other slots for cryptographic operations. Only two values are recognized. The value “true” means meta slot will migrate sensitive token objects to other slots if necessary. The value “false” means meta slot will not migrate sensitive token objects to other slots even if it is necessary.

When the meta slot feature is enabled, the slot that provides token-based object support is not shown as one of the available slots. All of its functionality can be used with the meta slot.

This library filters the list of mechanisms available from plug-ins based on the policy set by [cryptoadm\(1M\)](#).

This library provides entry points for all PKCS#11 v2.20 functions. See the RSA PKCS#11 v2.20 specification at <http://www.rsasecurity.com>.

Plug-ins are added to `libpkcs11` by the `pkcs11conf` class action script during execution of [pkgadd\(1M\)](#). The available mechanisms are administered by the [cryptoadm\(1M\)](#) utility.

Plug-ins must have all of their library dependencies specified, including [libc\(3LIB\)](#). Libraries that have unresolved symbols, including those from `libc`, will be rejected and a message will be sent to [syslog\(3C\)](#) for such plug-ins.

Due to U.S. Export regulations, all plug-ins are required to be cryptographically signed using the `elfsign` utility.

Any plug-in that is not signed or is not a compatible version of PKCS#11 will be dropped by `libpkcs11`. When a plug-in is dropped, the administrator is alerted by the [syslog\(3C\)](#) utility.

The `<security/pkcs11f.h>` header contains function definitions. The `<security/pkcs11t.h>` header contains type definitions. Applications can include either of these headers in place of `<security/pkcs11.h>`, which contains both function and type definitions.

**Interfaces** The shared object `libpkcs11.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

PKCS#11 Standard	<code>C_CloseAllSessions</code>	<code>C_CloseSession</code>
	<code>C_CopyObject</code>	<code>C_CreateObject</code>
	<code>C_Decrypt</code>	<code>C_DecryptDigestUpdate</code>
	<code>C_DecryptFinal</code>	<code>C_DecryptInit</code>
	<code>C_DecryptUpdate</code>	<code>C_DecryptVerifyUpdate</code>
	<code>C_DeriveKey</code>	<code>C_DestroyObject</code>
	<code>C_Digest</code>	<code>C_DigestEncryptUpdate</code>
	<code>C_DigestFinal</code>	<code>C_DigestInit</code>
	<code>C_DigestKey</code>	<code>C_DigestUpdate</code>
	<code>C_Encrypt</code>	<code>C_EncryptFinal</code>
	<code>C_EncryptInit</code>	<code>C_EncryptUpdate</code>
	<code>C_Finalize</code>	<code>C_FindObjects</code>
	<code>C_FindObjectsFinal</code>	<code>C_FindObjectsInit</code>

C_GenerateKey	C_GenerateKeyPair
C_GenerateRandom	C_GetAttributeValue
C_GetFunctionList	C_GetInfo
C_GetMechanismInfo	C_GetMechanismList
C_GetObjectSize	C_GetOperationState
C_GetSessionInfo	C_GetSlotInfo
C_GetSlotList	C_GetTokenInfo
C_InitPIN	C_InitToken
C_Initialize	C_Login
C_Logout	C_OpenSession
C_SeedRandom	C_SetAttributeValue
C_SetOperationState	C_SetPIN
C_Sign	C_SignEncryptUpdate
C_SignFinal	C_SignInit
C_SignRecover	C_SignRecoverInit
C_SignUpdate	C_UnwrapKey
C_Verify	C_VerifyFinal
C_VerifyInit	C_VerifyRecover
C_VerifyRecoverInit	C_VerifyUpdate
C_WaitForSlotEvent	C_WrapKey

SUNW Extensions    SUNW\_C\_GetMechSession                      SUNW\_C\_KeyToObject

**Files**    /usr/lib/libpkcs11.so.1            shared object  
             /usr/lib/64/libpkcs11.so.1    64-bit shared object

**Attributes**    See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	See below.
Standard	See below.

The SUNW Extension functions are MT-Safe. The PKCS#11 Standard functions are MT-Safe with exceptions. See Section 6.5.2 of RSA PKCS#11 v2.20.

The PKCS#11 Standard functions conform to PKCS#11 v2.20.

**See Also** [cryptoadm\(1M\)](#), [pkgadd\(1M\)](#), [Intro\(3\)](#), [SUNW\\_C\\_GetMechSession\(3EXT\)](#), [syslog\(3C\)](#), [attributes\(5\)](#), [pkcs11\\_kernel\(5\)](#), [pkcs11\\_softtoken\(5\)](#)

RSA PKCS#11 v2.20 <http://www.rsasecurity.com>

**Notes** If an application calls `C_WaitForSlotEvent()` without the `CKF_DONT_BLOCK` flag set, `libpkcs11` must create threads internally. If, however, `CKF_LIBRARY_CANT_CREATE_OS_THREADS` is set, `C_WaitForSlotEvent()` returns `CKR_FUNCTION_FAILED`.

The PKCS#11 library does not work with Netscape 4.x but does work with more recent versions of Netscape and Mozilla.

Because `C_Initialize()` might have been called by both an application and a library, it is not safe for a library or its plugins to call `C_Finalize()`. A library can be finished calling functions from `libpkcs11`, while an application might not.

**Name** libplot, lib300, lib300s, lib4014, lib450, libvt0 – graphics interface libraries

**Synopsis** `cc [ flag... ] file... -lplot [ library... ]`  
`#include <plot.h>`

**Description** Functions in this library generate graphics output.

**Interfaces** The shared object `libplot.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>arc</code>	<code>box</code>
<code>circle</code>	<code>closepl</code>
<code>closevt</code>	<code>cont</code>
<code>erase</code>	<code>label</code>
<code>line</code>	<code>linemod</code>
<code>move</code>	<code>openpl</code>
<code>openvt</code>	<code>point</code>
<code>space</code>	

**Files**

<code>/usr/lib/libplot.so.1</code>	shared object
<code>/usr/lib/64/libplot.so.1</code>	64-bit shared object
<code>/usr/lib/lib300.so.1</code>	shared object
<code>/usr/lib/64/lib300.so.1</code>	64-bit shared object
<code>/usr/lib/lib300s.so.1</code>	shared object
<code>/usr/lib/64/lib300s.so.1</code>	64-bit shared object
<code>/usr/lib/lib4014.so.1</code>	shared object
<code>/usr/lib/64/lib4014.so.1</code>	64-bit shared object
<code>/usr/lib/lib450.so.1</code>	shared object
<code>/usr/lib/64/lib450.so.1</code>	64-bit shared object
<code>/usr/lib/libvt0.so.1</code>	shared object
<code>/usr/lib/64/libvt0.so.1</code>	64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)



**Name** libpool – pool configuration manipulation library

**Synopsis** `cc [ flag... ] file... [ library... ]  
#include <pool.h>`

**Description** The functions in this library define the interface for reading and writing resource pools configuration files, as well as that for committing an existing configuration to becoming the running OS configuration (with respect to partitioning subsystems). The `<pool.h>` header provides type and function declarations for all library services.

The resource pools facility brings together process-bindable resources into a common abstraction called a pool. Processor sets and other entities can be configured, grouped, and labelled in a persistent fashion such that workload components can be associated with a subset of a system's total resources. The `libpool` library provides a C language API for accessing this functionality, while `pooladm(1M)`, `poolbind(1M)`, and `poolcfg(1M)` make this facility available through command invocations from a shell. Each of those manual pages describes aspects of the pools facility; this page describes the properties available to the various entities managed within the pools facility. These entities include the system, pools, and the pset resources for processor sets.

When the pools facility is enabled on a system, the behavior of the following functions is modified.

System Call	Error Value
<code>pset_assign(pset!=PS_QUERY)</code>	ENOTSUP
<code>pset_bind(pset!=PS_QUERY)</code>	ENOTSUP
<code>pset_create()</code>	ENOTSUP
<code>pset_destroy()</code>	ENOTSUP
<code>pset_setattr()</code>	ENOTSUP

Each active entity within the resource pools framework can have an arbitrary collection of named, typed properties associated with it. Properties supported by the pools framework are listed, with descriptions, under each entity below. In general, resource properties can be one of five types: boolean (`bool`), signed (`int64`) and unsigned (`uint64`) integers, floating point (`double`), and `string` values.

All entities and resources support a string property for commenting purposes; this property is available for use by management applications to record descriptions and other administrator oriented data. The comment field is not used by the default pools commands, except when a configuration is initiated by the `poolcfg` utility, in which case an informative message is placed in the `system.comment` property for that configuration.

System	Property name	Type	Description
	<code>system.allocate-method</code>	string	Allocation method to use when this configuration is instantiated
	<code>system.bind-default</code>	bool	If specified pool not found, bind to pool with 'pool.default' property set to true
	<code>system.comment</code>	string	User description of system
	<code>system.name</code>	string	User name for the configuration
	<code>system.version</code>	int64	libpool version required to manipulate this configuration
	<code>system.poold.log-level</code>	string	poold logging level
	<code>system.poold.log-location</code>	string	poold logging location
	<code>system.poold.history-file</code>	string	poold decision history location
	<code>system.poold.monitor-interval</code>	uint64	poold monitoring sample interval
	<code>system.poold.objectives</code>	string	poold objectives for a system.

The `system.allocate-method`, `system.bind-default`, `system.comment`, `system.name`, `system.poold.log-level`, `system.poold.log-location`, `system.poold.history-file`, `system.poold.monitor-interval`, and `system.poold.objectives` properties are writable; the `system.version` property is not.

The `system.allocate-method` property accepts only two values, “importance based” and “surplus to default”. The default value for this property is “importance based”. The property is optional and if it is not present the library will allocate resources as though it were present and had the default value. These strings are defined in `<pool.h>` as `POA_IMPORTANCE` and `POA_SURPLUS_TO_DEFAULT`.

If “importance based” allocation is defined, then during a commit the library will allocate resources to pools using an algorithm that observes minimum and maximum constraints for resources but favors those resources with greater importance.

If “surplus to default” is defined, then during a commit the library will allocate minimum resources to all resource sets apart from default which will receive any surplus.

The `system.bind-default` property defaults to true. This property interacts with the `project.pool` resource control to specify the binding behavior for processes associated with a project. If `project.pool` is not specified, then this property has no effect. If `project.pool` is specified and the specified pool exists, this property has no effect. If the specified pool does not exist, perhaps because of a reconfiguration, then this property controls the binding behavior for the project member. If `system.bind-default` is true, then the project member is bound to the default pool (identified as the pool for which `pool.default` is true); otherwise the project

member is refused access to the system. Care should be taken with the pools configuration if this property is set to false, so as to avoid denying users access to the system.

The various `pool`d properties are used to configure the operation of `pool`d(1M).

The `system.pool`d.`log-level` property is used to specify the level of detail provided in log messages. Valid values are: ALERT, CRIT, ERR, WARNING, NOTICE, INFO, and DEBUG.

ALERT provides the least level of detail, DEBUG the greatest. See `syslog`(3C) for more information about the meaning of these debug levels. If this property is not specified, the default value NOTICE is used.

The `system.pool`d.`log-location` property is used to specify the location of the logfiles generated by `pool`d. The special value of “`syslog`” indicates that logged messages should be written to `syslog()`. If this property is not specified, the default location `/var/log/pool` is used.

The `system.pool`d.`history-file` specifies the location of the decision history file which is used by `pool`d to improve the quality of its decision making over time. If this property is not specified, the default location `/var/adm/pool` is used.

The `system.pool`d.`monitor-interval` property specifies the monitoring interval (in milliseconds) to be used by `pool`d when sampling utilization statistics. If this property is not specified, the default value of 15 seconds is used.

The `system.pool`d.`objectives` property specifies any system wide objectives. An objectives property has the following syntax:

```
objectives = objective [; objective]*
objective = [n:] keyword [op] [value]
```

All objectives are prefixed with an optional importance. The importance acts as a multiplier for the objective and thus increases the significance of its contribution to the objective function evaluation. If no importance is specified, the default value is 1.

The “`wt-load`” objective is the only objective to which a system element can be set. This objective favors configurations that match resource allocations to resource utilization. A resource set that uses more resources will be given more resources when this objective is active. An administrator should use this objective when he is relatively satisfied with the constraints established using the minimum and maximum properties and would like the DRP to manipulate resources freely within those constraints.

Pools	Property name	Type	Description
	<code>pool.active</code>	<code>bool</code>	Mark this pool as active, if true.
	<code>pool.comment</code>	<code>string</code>	User description of pool.

---

Property name	Type	Description
<code>pool.default</code>	<code>bool</code>	Mark this pool as the default pool, if true; see <code>system.bind-default</code> property.
<code>pool.importance</code>	<code>int64</code>	Relative importance of this pool; for possible resource dispute resolution.
<code>pool.name</code>	<code>string</code>	User name for pool; used by <code>setproject(3PROJECT)</code> as value for 'project.pool' project attribute in <code>project(4)</code> database.
<code>pool.scheduler</code>	<code>string</code>	Scheduler class to which consumers of this pool will be bound. This property is optional and if not specified, the scheduler bindings for consumers of this pool are not affected.
<code>pool.sys_id</code>	<code>int64</code>	System-assigned pool ID.
<code>pool.temporary</code>	<code>bool</code>	Mark this pool as a temporary resource; if true, this pool can exist only in the dynamic configuration and cannot be committed to a configuration file.

---

The `pool.default`, `pool.sys_id`, and `pool.temporary` properties are not writable; all other listed properties are writable.

If `pool.scheduler` is specified, it must be set to the name of a valid scheduling class for the system. See the `-c` option for `priocntl(1)` for a list of valid class names.

#### Processor Sets

---

Property name	Type	Description
<code>pset.comment</code>	<code>string</code>	User description of resource.
<code>pset.default</code>	<code>bool</code>	Marks default processor set.
<code>pset.load</code>	<code>uint64</code>	The load for this processor set.
<code>pset.max</code>	<code>uint64</code>	Maximum number of CPUs permitted in this processor set.
<code>pset.min</code>	<code>uint64</code>	Minimum number of CPUs permitted in this processor set.
<code>pset.name</code>	<code>string</code>	User name for resource.
<code>pset.size</code>	<code>uint64</code>	Current number of CPUs in this processor set.
<code>pset.sys_id</code>	<code>int64</code>	System-assigned processor set ID.

---

Property name	Type	Description
<code>pset.temporary</code>	<code>bool</code>	Mark this processor set as a temporary resource; if true, this processor set can exist only in the dynamic configuration and cannot be committed to a configuration file.
<code>pset.type</code>	<code>string</code>	Names resource type; value for all processor sets is <code>pset</code> .
<code>pset.units</code>	<code>string</code>	Identifies meaning of size-related properties; value for all processor sets is <code>population</code> .
<code>pset.pool.d.objectives</code>	<code>string</code>	Specifies the pool.d objectives for a pset.

The `pset.comment`, `pset.max`, `pset.min`, `pset.name`, and `pset.pool.d.objectives` properties are writable; the `pset.default`, `pset.load`, `pset.size`, `pset.sys_id`, `pset.temporary`, `pset.type`, and `pset.units` properties are not.

The `pset.load` property represents the load on a processor set. The lowest value for this property is 0. The value of `pset.load` increases in a linear fashion with the load on the set, as measured by the number of jobs in the system run queue.

The `pset.pool.d.objectives` property specifies an objective which is specific to a particular pset. See the `system.pool.d.objectives` entry for the specification of this property's syntax.

There are two types of objectives that can be set on a pset:

<code>locality</code>	This objective influences the impact that locality, as measured by <code>lgroup</code> data, has upon the chosen configuration. This objective can take one of three values:
<code>tight</code>	If set, configurations that maximize resource locality are favored.
<code>loose</code>	If set, configurations that minimize resource locality are favored.
<code>none</code>	This is the default value for this objective. If set, configuration favorability is uninfluenced by resource locality.
<code>utilization</code>	This objective favors configurations that allocate resources to partitions that are failing to preserve the specified utilization objective.

These objectives are specified in terms of an operator and a value. The operators are

- < The "less than" operator is used to indicate that the specified value should be treated as a maximum target value.
- > The "greater than" operator is used to indicate that the specified value should be treated as a minimum target value.

~ The “about” operator is used to indicate that the specified value should be treated as a target value about which some fluctuation is acceptable.

Only one objective of each type of operator can be set. For example, if the ~ operator is set, the < and > operators cannot be set. It is possible to set a < and a > operator together; the values will be validated to ensure that they do not overlap.

Processors	Property name	Type	Description
	cpu.comment	string	User description of CPU.
	cpu.pinned	bool	CPU pinned to this processor set.
	cpu.status	int64	Processor status, on-line, offline or interrupts disabled.
	cpu.sys_id	int64	System-assigned processor ID.

The `cpu.comment`, `cpu.pinned`, and `cpu.status` properties are writeable.

The `cpu.status` property can be set only to the following values:

`off-line`    Set the CPU offline.  
`on-line`      Set the CPU online.  
`no-intr`     Disable interrupt processing on the CPU.

These values are defined in `<sys/processor.h>` as the `PS_OFFLINE`, `PS_ONLINE`, and `PS_NOINTR` macros.

**Interfaces** The shared object `libpool.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>pool_associate</code>	<code>pool_component_info</code>
<code>pool_component_to_elem</code>	<code>pool_conf_alloc</code>
<code>pool_conf_close</code>	<code>pool_conf_commit</code>
<code>pool_conf_export</code>	<code>pool_conf_free</code>
<code>pool_conf_info</code>	<code>pool_conf_location</code>
<code>pool_conf_open</code>	<code>pool_conf_remove</code>
<code>pool_conf_rollback</code>	<code>pool_conf_status</code>
<code>pool_conf_to_elem</code>	<code>pool_conf_update</code>

pool_conf_validate	pool_create
pool_destroy	pool_dissociate
pool_dynamic_location	pool_error
pool_get_binding	pool_get_owning_resource
pool_get_pool	pool_get_property
pool_get_resource	pool_get_resource_binding
pool_get_status	pool_info
pool_put_property	pool_query_components
pool_query_pool_resources	pool_query_pools
pool_query_resource_components	pool_query_resources
pool_resource_create	pool_resource_destroy
pool_resource_info	pool_resource_to_elem
pool_resource_transfer	pool_resource_type_list
pool_resource_xtransfer	pool_rm_property
pool_set_binding	pool_set_status
pool_static_location	pool_strerror
pool_to_elem	pool_value_alloc
pool_value_free	pool_value_get_bool
pool_value_get_double	pool_value_get_int64
pool_value_get_name	pool_value_get_string
pool_value_get_type	pool_value_get_uint64
pool_value_set_bool	pool_value_set_double
pool_value_set_int64	pool_value_set_name
pool_value_set_string	pool_value_set_uint64
pool_version	pool_walk_components
pool_walk_pools	pool_walk_properties
pool_walk_resources	

<b>Files</b>	/usr/lib/libpool.so.1	shared object
	/usr/lib/64/libpool.so.1	64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWpool (32-bit) SUNWpoolx (64-bit)
CSI	Enabled
Interface Stability	Unstable
MT-Level	Safe

**See Also** [Intro\(3\)](#), [pool\\_component\\_info\(3POOL\)](#), [pool\\_conf\\_open\(3POOL\)](#), [pool\\_conf\\_to\\_elem\(3POOL\)](#), [pool\\_create\(3POOL\)](#), [pool\\_error\(3POOL\)](#), [pool\\_get\\_binding\(3POOL\)](#), [pool\\_get\\_property\(3POOL\)](#), [pool\\_get\\_resource\(3POOL\)](#), [pool\\_resource\\_create\(3POOL\)](#), [pool\\_value\\_alloc\(3POOL\)](#), [pool\\_walk\\_pools\(3POOL\)](#), [attributes\(5\)](#), [smf\(5\)](#)

**Notes** Functions in `libpool` can be used to manipulate static configurations even when the pools facility is not enabled. See [pooladm\(1M\)](#) and [pool\\_set\\_status\(3POOL\)](#) for more information about enabling the pools facility. The pools facility must be enabled, however, to modify the dynamic configuration.

Since the Resource Pools facility is an [smf\(5\)](#) service, it can also be enabled and disabled using the standard Service Management Facility (SMF) interfaces.



**Name** libproject – project database access library

**Synopsis** `cc [ flag... ] file... -lproject [ library... ]  
#include <project.h>`

**Description** Functions in this library provide various interfaces to extract data from the [project\(4\)](#) database. The header provides structure and function declarations for all library interfaces.

**Interfaces** The shared object `libproject.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>endproject</code>	<code>fgetproject</code>
<code>getdefaultproj</code>	<code>getprojbyid</code>
<code>getprojbyname</code>	<code>getproject</code>
<code>getprojidbyname</code>	<code>inproj</code>
<code>project_walk</code>	<code>setproject</code>
<code>setproject</code>	

**Files** `/usr/lib/libproject.so.1` shared object  
`/usr/lib/64/libproject.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Evolving
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [getproject\(3PROJECT\)](#), [project\(4\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** libpthread – POSIX threads library

**Synopsis** `cc -mt [ flag... ] file... -lpthread [ -lrt library... ]`

**Description** Historically, functions in this library provided POSIX threading support. See [standards\(5\)](#). This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on `libc.so.1`. New application development needs to specify `-lpthread` only to obtain POSIX semantics for [fork\(2\)](#) that assumes the behavior of [fork1\(2\)](#) rather than the default behavior that forks all threads.

**Interfaces** The shared object `libpthread.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__pthread_cleanup_pop</code>	<code>__pthread_cleanup_push</code>
<code>pthread_attr_destroy</code>	<code>pthread_attr_getdetachstate</code>
<code>pthread_attr_getguardsize</code>	<code>pthread_attr_getinheritsched</code>
<code>pthread_attr_getschedparam</code>	<code>pthread_attr_getschedpolicy</code>
<code>pthread_attr_getscope</code>	<code>pthread_attr_getstackaddr</code>
<code>pthread_attr_getstacksize</code>	<code>pthread_attr_init</code>
<code>pthread_attr_setdetachstate</code>	<code>pthread_attr_setguardsize</code>
<code>pthread_attr_setinheritsched</code>	<code>pthread_attr_setschedparam</code>
<code>pthread_attr_setschedpolicy</code>	<code>pthread_attr_setscope</code>
<code>pthread_attr_setstackaddr</code>	<code>pthread_attr_setstacksize</code>
<code>pthread_cancel</code>	<code>pthread_cond_broadcast</code>
<code>pthread_cond_destroy</code>	<code>pthread_cond_init</code>
<code>pthread_cond_reltimedwait_np</code>	<code>pthread_cond_signal</code>
<code>pthread_cond_timedwait</code>	<code>pthread_cond_wait</code>
<code>pthread_condattr_destroy</code>	<code>pthread_condattr_getpshared</code>
<code>pthread_condattr_init</code>	<code>pthread_condattr_setpshared</code>
<code>pthread_create</code>	<code>pthread_detach</code>
<code>pthread_equal</code>	<code>pthread_exit</code>
<code>pthread_getconcurrency</code>	<code>pthread_getschedparam</code>

pthread_getspecific	pthread_join
pthread_key_create	pthread_key_delete
pthread_kill	pthread_mutex_consistent_np
pthread_mutex_destroy	pthread_mutex_getprioceiling
pthread_mutex_init	pthread_mutex_lock
pthread_mutex_setprioceiling	pthread_mutex_trylock
pthread_mutex_unlock	pthread_mutexattr_destroy
pthread_mutexattr_getprioceiling	pthread_mutexattr_getprotocol
pthread_mutexattr_getpshared	pthread_mutexattr_getrobust_np
pthread_mutexattr_gettype	pthread_mutexattr_init
pthread_mutexattr_setprioceiling	pthread_mutexattr_setprotocol
pthread_mutexattr_setpshared	pthread_mutexattr_setrobust_np
pthread_mutexattr_settype	pthread_once
pthread_rwlock_destroy	pthread_rwlock_init
pthread_rwlock_rdlock	pthread_rwlock_tryrdlock
pthread_rwlock_trywrlock	pthread_rwlock_unlock
pthread_rwlock_wrlock	pthread_rwlockattr_destroy
pthread_rwlockattr_getpshared	pthread_rwlockattr_init
pthread_rwlockattr_setpshared	pthread_self
pthread_setcancelstate	pthread_setcanceltype
pthread_setconcurrency	pthread_setschedparam
pthread_setspecific	pthread_sigmask
pthread_testcancel	

**Files** /lib/libpthread.so.1 a filter on /lib/libc.so.1  
 /lib/64/libpthread.so.1 a filter on /lib/64/libc.so.1

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit)

ATTRIBUTE TYPE	ATTRIBUTE VALUE
	SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [libc\\_db\(3LIB\)](#), [libthread\(3LIB\)](#), [attributes\(5\)](#), [standards\(5\)](#), [threads\(5\)](#)

**Name** libreparse – reparse point library

**Synopsis** `cc [ flag... ] file... -lreparse [ library... ]`  
`#include <sys/fs_reparse.h>`  
`#include <rp_plugin.h>`

**Description** The functions in this library perform operations related to “reparse points”, which are the basis of Microsoft DFS referrals and NFS referrals support on Solaris CIFS and NFS file servers. A service which offers namespace redirection can provide “plugins”, libraries which provide creation and interpretation services for reparse points.

**Interfaces** The shared object `libdl.so.1` provides the following public interfaces. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>reparse_add</code>	<code>reparse_create</code>
<code>reparse_delete</code>	<code>reparse_deref</code>
<code>reparse_free</code>	<code>reparse_init</code>
<code>reparse_parse</code>	<code>reparse_remove</code>
<code>reparse_unparse</code>	<code>reparse_validate</code>
<code>rp_plugin_init</code>	

The shared object “plugins” must each provide a versioned ops table of the form:

```
typedef struct reparse_plugin_ops {
    int      rpo_version;          /* version number */
    int      (*rpo_init)(void);
    void     (*rpo_fini)(void);
    char     (*rpo_svc_types)(void);
    boolean_t (*rpo_supports_svc)(const char *);
    char     (*rpo_form)(const char *, const char *, char *,
                        size_t *);
    int      (*rpo_deref)(const char *, const char *, char *,
                        size_t *);
} reparse_plugin_ops_t
```

For example,

```
reparse_plugin_ops_t reparse_plugin_ops = {
    REPARSE_PLUGIN_V1,
    nfs_init,
    nfs_fini,
    nfs_svc_types,
    nfs_supports_svc,
    nfs_form,
```

```

    nfs_deref
};

```

The version 1 ops table supports the following operations:

```
int (*rpo_init)(void);
```

This is a one-time initialization function that will be called by `libreparse.so` upon loading the plugin prior to any other operations. This provides the plugin with an opportunity to perform service specific initialization. This function must return zero on success or non-zero `errno` values to indicate an error.

```
void (*rpo_fini)(void);
```

This is a one-time termination function that will be called by `libreparse.so` prior closing the plugin. Once called, `libreparse.so` will not call any other operations on the plugin.

```
char *(*rpo_svc_types)(void);
```

Returns a pointer to a string containing a list of comma separated *svc\_types*. *svc\_type* names are case-insensitive and white space in the returned string is irrelevant and must be ignored by parsers.

```
boolean_t (*rpo_supports_svc)(const char *svc_type);
```

This function will return true if the plugin supports the specified service type, otherwise it must return false.

```
int (*rpo_form)(const char *svc_type, const char *string, char *buf, size_t *bufsize);
```

Formats a string with the appropriate service-specific syntax to create a reparse point of the given *svc\_type*, using the string from the `reparse_add(3REPARSE)` call as part of the string. The caller specifies the size of the buffer provided via *bufsize*; the routine will fail with `E_OVERFLOW` if the results will not fit in the buffer, in which case, *bufsize* will contain the number of bytes needed to hold the results.

```
int (*rpo_deref)(const char *svc_type, const char *svc_data, char *buf, size_t *bufsize);
```

Accepts the service-specific item from the reparse point and returns the service-specific data requested. The caller specifies the size of the buffer provided via *bufsize*; the routine will fail with `E_OVERFLOW` if the results will not fit in the buffer, in which case, *bufsize* will contain the number of bytes needed to hold the results.

**Files** /usr/lib/libreparse.so.1      shared object  
 /usr/lib/64/libreparse.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)

---

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [reparse\\_add\(3REPARSE\)](#), [attributes\(5\)](#)

**Name** libresolv – resolver library

**Synopsis** `cc [ flag... ] file... -lresolv -lsocket -lnsl [ library... ]`  
`#include <sys/types.h>`  
`#include <netinet/in.h>`  
`#include <arpa/nameser.h>`  
`#include <resolv.h>`  
`#include <netdb.h>`

**Description** Functions in this library provide for creating, sending, and interpreting packets to the Internet domain name servers.

**Interfaces** The shared object `libresolv.so.2` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__dn_skipname</code>	<code>__fp_query</code>
<code>__hostalias</code>	<code>__p_cdname</code>
<code>__p_class</code>	<code>__p_query</code>
<code>__p_time</code>	<code>__p_type</code>
<code>__putlong</code>	<code>_getlong</code>
<code>_getshort</code>	<code>_res</code>
<code>dn_comp</code>	<code>dn_expand</code>
<code>fp_resstat</code>	<code>h_errno</code>
<code>herror</code>	<code>hstrerror</code>
<code>inet_cidr_ntop</code>	<code>inet_cidr_ptop</code>
<code>ns_find_tsig</code>	<code>ns_sign</code>
<code>ns_sign_tcp</code>	<code>ns_sign_tcp_init</code>
<code>ns_verify</code>	<code>ns_verify_tcp</code>
<code>ns_verify_tcp_init</code>	<code>res_hostalias</code>
<code>res_init</code>	<code>res_mkquery</code>
<code>res_nclose</code>	<code>res_ninit</code>
<code>res_nmkquery</code>	<code>res_nquery</code>
<code>res_nquerydomain</code>	<code>res_nsearch</code>
<code>res_nsend</code>	<code>res_nsendsigned</code>
<code>res_query</code>	<code>res_querydomain</code>



```

res_search                                res_send
res_update

```

Programs are expected to use the aliases defined in `<resolv.h>` rather than calling the `"__"` prefixed procedures, as indicated in the following table. Use of the routines in the first column is discouraged.

FUNCTION REFERENCED	ALIAS TO USE
<code>__dn_skipname</code>	<code>dn_skipname</code>
<code>__fp_query</code>	<code>fp_query</code>
<code>__putlong</code>	<code>putlong</code>
<code>__p_cdname</code>	<code>p_cdname</code>
<code>__p_class</code>	<code>p_class</code>
<code>__p_time</code>	<code>p_time</code>
<code>__p_type</code>	<code>p_type</code>

**Files** `/lib/libresolv.so.1` shared object for backward compatibility only  
`/lib/64/libresolv.so.1` 64-bit shared object for backward compatibility only  
`/lib/libresolv.so.2` shared object  
`/lib/64/libresolv.so.2` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	Unsafe for deprecated interfaces; MT-Safe for all others
Standard	BIND 8.2.4

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [resolver\(3RESOLV\)](#), [attributes\(5\)](#)

**Name** librpcsvc – RPC services library

**Synopsis** `cc [ flag... ] file... -lrpcsvc [ library... ]`  
`#include <rpc/rpc.h>`  
`#include <rpcsvc/rstat.h>`

**Description** Functions in this library provide RPC services. See the manual pages in Section 3RPC for the individual functions.

**Interfaces** The shared object `librpcsvc.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>havedisk</code>	<code>rnusers</code>
<code>rstat</code>	<code>rusers</code>
<code>rwall</code>	<code>xdr_statstime</code>
<code>xdr_statsvar</code>	<code>xdr_utmpidlearr</code>

**Files** `/lib/librpcsvc.so.1` shared object  
`/lib/64/librpcsvc.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [rstat\(3RPC\)](#), [attributes\(5\)](#)

**Name** librsm – remote shared memory interface library

**Synopsis** `cc [ flag... ] file... -lrsm [ library... ]`  
`#include <rsmapi.h>`

**Description** The functions in this library provide an interface for OS bypass messaging for applications over high-speed interconnects, including facilities to set up low-latency, high-bandwidth interprocess communication mechanisms and to perform I/O.

**Interfaces** The shared object `librsm.so.2` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>rsm_create_localmemory_handle</code>	<code>rsm_free_interconnect_topology</code>
<code>rsm_free_localmemory_handle</code>	<code>rsm_get_controller</code>
<code>rsm_get_controller_attr</code>	<code>rsm_get_interconnect_topology</code>
<code>rsm_get_segmentid_range</code>	<code>rsm_intr_signal_post</code>
<code>rsm_intr_signal_wait</code>	<code>rsm_intr_signal_wait_pollfd</code>
<code>rsm_memseg_export_create</code>	<code>rsm_memseg_export_destroy</code>
<code>rsm_memseg_export_publish</code>	<code>rsm_memseg_export_rebind</code>
<code>rsm_memseg_export_republish</code>	<code>rsm_memseg_export_unpublish</code>
<code>rsm_memseg_get_pollfd</code>	<code>rsm_memseg_import_close_barrier</code>
<code>rsm_memseg_import_connect</code>	<code>rsm_memseg_import_destroy_barrier</code>
<code>rsm_memseg_import_disconnect</code>	<code>rsm_memseg_import_get</code>
<code>rsm_memseg_import_get16</code>	<code>rsm_memseg_import_get32</code>
<code>rsm_memseg_import_get64</code>	<code>rsm_memseg_import_get8</code>
<code>rsm_memseg_import_get_mode</code>	<code>rsm_memseg_import_getv</code>
<code>rsm_memseg_import_init_barrier</code>	<code>rsm_memseg_import_map</code>
<code>rsm_memseg_import_open_barrier</code>	<code>rsm_memseg_import_order_barrier</code>
<code>rsm_memseg_import_put</code>	<code>rsm_memseg_import_put16</code>
<code>rsm_memseg_import_put32</code>	<code>rsm_memseg_import_put64</code>
<code>rsm_memseg_import_put8</code>	<code>rsm_memseg_import_putv</code>
<code>rsm_memseg_import_set_mode</code>	<code>rsm_memseg_import_unmap</code>
<code>rsm_memseg_release_pollfd</code>	<code>rsm_release_controller</code>

**Files** /usr/lib/librsm.so.2      shared object  
/usr/lib/64/librsm.so.2      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWrsm (32-bit) SUNWrsmx (64-bit)
Interface Stability	Evolving
MT-Level	Safe

**See Also** [Intro\(2\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** librt, libposix4 – POSIX.1b Realtime Extensions library

**Synopsis** `cc [ flag... ] file... -lrt [ library... ]`

**Description** Historically, functions in this library provided many of the interfaces specified by the POSIX.1b Realtime Extension. See [standards\(5\)](#). This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on libc.so.1. New application development need not specify `-lrt`.

**Interfaces** The shared objects `librt.so.1` and `libposix4.so.1` provide the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>aio_cancel</code>	<code>aio_error</code>
<code>aio_fsync</code>	<code>aio_read</code>
<code>aio_return</code>	<code>aio_suspend</code>
<code>aio_waitn</code>	<code>aio_write</code>
<code>clock_getres</code>	<code>clock_gettime</code>
<code>clock_nanosleep</code>	<code>clock_settime</code>
<code>close</code>	<code>fdatasync</code>
<code>fork</code>	<code>lio_listio</code>
<code>mq_close</code>	<code>mq_getattr</code>
<code>mq_notify</code>	<code>mq_open</code>
<code>mq_receive</code>	<code>mq_reltimedreceive_np</code>
<code>mq_reltimedsend_np</code>	<code>mq_send</code>
<code>mq_setattr</code>	<code>mq_timedreceive</code>
<code>mq_timedsend</code>	<code>mq_unlink</code>
<code>nanosleep</code>	<code>sched_get_priority_max</code>
<code>sched_get_priority_min</code>	<code>sched_getparam</code>
<code>sched_getscheduler</code>	<code>sched_rr_get_interval</code>
<code>sched_setparam</code>	<code>sched_setscheduler</code>
<code>sched_yield</code>	<code>sem_close</code>
<code>sem_destroy</code>	<code>sem_getvalue</code>

sem_init	sem_open
sem_post	sem_reltimedwait_np
sem_timedwait	sem_trywait
sem_unlink	sem_wait
shm_open	shm_unlink
sigqueue	sigtimedwait
sigwaitinfo	timer_create
timer_delete	timer_getoverrun
timer_gettime	timer_settime

The following interfaces are unique to the 32-bit version of this library:

aio_cancel64	aio_error64
aio_fsync64	aio_read64
aio_return64	aio_suspend64
aio_wait64	aio_write64
lio_listio64	

**Files** /lib/librt.so.1 shared object  
 /lib/64/librt.so.1 64-bit shared object file  
 /lib/libposix4.so.1 shared object  
 /lib/64/libposix4.so.1 64-bit shared object file

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** librtld\_db – runtime linker debugging library

**Synopsis**

```
cc [ flag ... ] file ... -lrtld_db [ library ... ]
#include <proc_service.h>
#include <rtld_db.h>
```

**Description** Functions in this library are useful for building debuggers for dynamically linked programs. For a full description of these interfaces refer to the *Linker and Libraries Guide*.

To use librtld\_db, applications need to implement the interfaces documented in [ps\\_pread\(3PROC\)](#) and [proc\\_service\(3PROC\)](#).

**Interfaces** The shared object librtld\_db.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

rd_delete	rd_errstr
rd_event_addr	rd_event_enable
rd_event_getmsg	rd_init
rd_loadobj_iter	rd_log
rd_new	rd_objpad_enable
rd_plt_resolution	rd_reset

**Files** /lib/librtld\_db.so.1      shared object  
/lib/64/librtld\_db.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [ld.so.1\(1\)](#), [pvs\(1\)](#), [Intro\(3\)](#), [proc\\_service\(3PROC\)](#), [ps\\_pread\(3PROC\)](#), [rtld\\_db\(3EXT\)](#), [attributes\(5\)](#)

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**Name** libsasl – simple authentication and security layer library

**Synopsis** `cc [ flag... ] file... -lsasl [ library... ]`  
`#include <sasl/sasl.h>`  
`#include <sasl/prop.h>`  
`#include <sasl/saslutil.h>`

**Description** SASL is a security framework used by connection-oriented network applications primarily for authentication. Another way to describe SASL is that it is a glue layer between a network application and some security mechanisms that allow applications to authenticate each other and provide additional security services such as data encryption. As a glue layer, SASL hides the interface specifics of the security mechanism from the application, which allows greater portability and flexibility as new security mechanisms are implemented. SASL is similar to the GSS-API in that it provides a layer of abstraction between an application and one or more security mechanisms.

libsasl provides both an API for applications and an SPI for various plug-ins. To link with this library, specify `-lsasl` on the `cc` command line.

**Interfaces** The shared object `libsasl.so.1` and associated include files provide the public interfaces defined below. The `*_t` interfaces are function prototypes for callbacks that are defined in the public SASL header files. While libsasl provides default versions for some of the callbacks, this structure allows an application to define its own version of the some of the callback functions.

See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>prop_clear</code>	<code>prop_dispose</code>
<code>prop_dup</code>	<code>prop_erase</code>
<code>prop_format</code>	<code>prop_get</code>
<code>prop_getnames</code>	<code>prop_new</code>
<code>prop_request</code>	<code>prop_set</code>
<code>prop_setvals</code>	<code>sasl_authorize_t</code>
<code>sasl_auxprop</code>	<code>sasl_auxprop_add_plugin</code>
<code>sasl_auxprop_getctx</code>	<code>sasl_auxprop_request</code>
<code>sasl_canon_user_t</code>	<code>sasl_canonuser_add_plugin</code>
<code>sasl_chalprompt_t</code>	<code>sasl_checkapop</code>
<code>sasl_checkpass</code>	<code>sasl_client_add_plugin</code>
<code>sasl_client_init</code>	<code>sasl_client_new</code>



sasl_client_plug_init_t	sasl_client_start
sasl_client_step	sasl_decode
sasl_decode64	sasl_dispose
sasl_done	sasl_encode
sasl_encode64	sasl_encodev
sasl_erasebuffer	sasl_errdetail
sasl_errors	sasl_errstring
sasl_getcallback_t	sasl_getopt_t
sasl_getpath_t	sasl_getprop
sasl_getrealm_t	sasl_getsecret_t
sasl_getsimple_t	sasl_global_listmech
sasl_idle	sasl_listmech
sasl_log_t	sasl_server_add_plugin
sasl_server_init	sasl_server_new
sasl_server_plug_init_t	sasl_server_start
sasl_server_step	sasl_server_userdb_checkpass_t
sasl_server_userdb_setpass_t	sasl_set_alloc
sasl_set_mutex	sasl_seterror
sasl_setpass	sasl_setprop
sasl_utf8verify	sasl_verifyfile_t
sasl_version	

**Files** /usr/lib/libsas1.so.1 shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWlibsas1
Interface Stability	Evolving

**See Also** [Intro\(3\)](#), [attributes\(5\)](#),

**Name** libscf – service configuration facility library

**Synopsis** `cc [ flag... ] file... -lscf [ library... ]  
#include <libscf.h>`

**Description** Functions in this library define the interface for reading, writing, and manipulating service configurations.

**Interfaces** The shared object `libscf.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>scf_count_ranges_destroy</code>	<code>scf_entry_add_value</code>
<code>scf_entry_create</code>	<code>scf_entry_destroy</code>
<code>scf_entry_destroy_children</code>	<code>scf_entry_handle</code>
<code>scf_entry_reset</code>	<code>scf_error</code>
<code>scf_handle_bind</code>	<code>scf_handle_create</code>
<code>scf_handle_decode_fmri</code>	<code>scf_handle_decorate</code>
<code>scf_handle_destroy</code>	<code>scf_handle_get_scope</code>
<code>scf_handle_unbind</code>	<code>scf_instance_add_pg</code>
<code>scf_instance_create</code>	<code>scf_instance_delete</code>
<code>scf_instance_destroy</code>	<code>scf_instance_get_name</code>
<code>scf_instance_get_parent</code>	<code>scf_instance_get_pg</code>
<code>scf_instance_get_pg_composed</code>	<code>scf_instance_get_snapshot</code>
<code>scf_instance_handle</code>	<code>scf_instance_to_fmri</code>
<code>scf_int_ranges_destroy</code>	<code>scf_iter_create</code>
<code>scf_iter_destroy</code>	<code>scf_iter_handle</code>
<code>scf_iter_handle_scopes</code>	<code>scf_iter_instance_pgs</code>
<code>scf_iter_instance_pgs_composed</code>	<code>scf_iter_instance_pgs_typed_composed</code>
<code>scf_iter_instance_pgs_typed</code>	<code>scf_iter_instance_snapshots</code>
<code>scf_iter_next_instance</code>	<code>scf_iter_next_pg</code>
<code>scf_iter_next_property</code>	<code>scf_iter_next_scope</code>
<code>scf_iter_next_service</code>	<code>scf_iter_next_snapshot</code>
<code>scf_iter_next_value</code>	<code>scf_iter_pg_properties</code>

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scf_iter_property_values	scf_iter_reset
scf_iter_scope_services	scf_iter_service_instances
scf_iter_service_pgs	scf_iter_service_pgs_typed
scf_iter_snaplevel_pgs	scf_iter_snaplevel_pgs_typed
scf_limit	scf_myname
scf_pg_create	scf_pg_delete
scf_pg_destroy	scf_pg_get_flags
scf_pg_get_name	scf_pg_get_parent_instance
scf_pg_get_parent_service	scf_pg_get_parent_snaplevel
scf_pg_get_property	scf_pg_get_type
scf_pg_get_underlying_pg	scf_pg_handle
scf_pg_to_fmri	scf_pg_update
scf_property_create	scf_property_destroy
scf_property_get_name	scf_property_get_value
scf_property_handle	scf_property_is_type
scf_property_to_fmri	scf_property_type
scf_scope_add_service	scf_scope_create
scf_scope_destroy	scf_scope_get_name
scf_scope_get_service	scf_scope_handle
scf_scope_to_fmri	scf_service_add_instance
scf_service_add_pg	scf_service_create
scf_service_delete	scf_service_destroy
scf_service_get_instance	scf_service_get_name
scf_service_get_parent	scf_service_get_pg
scf_service_handle	scf_service_to_fmri
scf_simple_app_props_free	scf_simple_app_props_get
scf_simple_app_props_next	scf_simple_app_props_search
scf_simple_prop_free	scf_simple_prop_get
scf_simple_prop_name	scf_simple_prop_next_astring

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scf_simple_prop_next_boolean	scf_simple_prop_next_count
scf_simple_prop_next_integer	scf_simple_prop_next_opaque
scf_simple_prop_next_reset	scf_simple_prop_next_time
scf_simple_prop_next_ustring	scf_simple_prop_numvalues
scf_simple_prop_pgname	scf_simple_prop_type
scf_simple_walk_instances	scf_snaplevel_create
scf_snaplevel_destroy	scf_snaplevel_get_instance_name
scf_snaplevel_get_next_snaplevel	scf_snaplevel_get_parent
scf_snaplevel_get_pg	scf_snaplevel_get_scope_name
scf_snaplevel_get_service_name	scf_snaplevel_handle
scf_snapshot_create	scf_snapshot_destroy
scf_snapshot_get_base_snaplevel	scf_snapshot_get_name
scf_snapshot_get_parent	scf_snapshot_handle
scf_strerror	scf_string_to_type
scf_tmpl_error_pg	scf_tmpl_error_pg_tmpl
scf_tmpl_error_prop	scf_tmpl_error_prop_tmpl
scf_tmpl_error_source_fmri	scf_tmpl_error_type
scf_tmpl_error_value	scf_tmpl_errors_destroy
scf_tmpl_get_by_pg	scf_tmpl_get_by_pg_name
scf_tmpl_get_by_prop	scf_tmpl_iter_pgs
scf_tmpl_iter_props	scf_tmpl_next_error
scf_tmpl_pg_common_name	scf_tmpl_pg_create
scf_tmpl_pg_description	scf_tmpl_pg_destroy
scf_tmpl_pg_name	scf_tmpl_pg_required
scf_tmpl_pg_reset	scf_tmpl_pg_target
scf_tmpl_pg_type	scf_tmpl_prop_cardinality
scf_tmpl_prop_common_name	scf_tmpl_prop_create
scf_tmpl_prop_description	scf_tmpl_prop_destroy
scf_tmpl_prop_internal_seps	scf_tmpl_prop_name

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scf_tmpl_prop_required	scf_tmpl_prop_reset
scf_tmpl_prop_type	scf_tmpl_prop_units
scf_tmpl_prop_visibility	scf_tmpl_reset_errors
scf_tmpl_strerror	scf_tmpl_validate_fmri
scf_tmpl_value_common_name	scf_tmpl_value_count_range_choices
scf_tmpl_value_count_range_constraints	scf_tmpl_value_description
scf_tmpl_value_in_constraint	scf_tmpl_value_int_range_choices
scf_tmpl_value_int_range_constraints	scf_tmpl_value_name_choices
scf_tmpl_value_name_constraints	scf_tmpl_visibility_to_string
scf_transaction_commit	scf_transaction_create
scf_transaction_destroy	scf_transaction_destroy_children
scf_transaction_handle	scf_transaction_property_change
scf_transaction_property_change_type	scf_transaction_property_delete
scf_transaction_property_new	scf_transaction_reset
scf_transaction_reset_all	scf_transaction_start
scf_type_base_type	scf_type_to_string
scf_value_base_type	scf_value_create
scf_value_destroy	scf_value_get_as_string
scf_value_get_as_string_typed	scf_value_get_astring
scf_value_get_boolean	scf_value_get_count
scf_value_get_integer	scf_value_get_opaque
scf_value_get_time	scf_value_get_ustring
scf_value_handle	scf_value_is_type
scf_value_reset	scf_value_set_astring
scf_value_set_boolean	scf_value_set_count
scf_value_set_from_string	scf_value_set_integer
scf_value_set_opaque	scf_value_set_time
scf_value_set_ustring	scf_value_type
scf_values_destroy	smf_degrade_instance

smf\_disable\_instance                      smf\_enable\_instance  
smf\_get\_state                              smf\_maintain\_instance  
smf\_refresh\_instance                      smf\_restart\_instance  
smf\_restore\_instance

**Files** /usr/lib/libscf.so.1              shared object  
         /usr/lib/64/libscf.so.1        64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcslr
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#), [smf\(5\)](#)

**Name** libsctp – SCTP sockets library

**Synopsis** `cc [ flag... ] file... -lsctp [ library... ]`

**Description** Functions in this library provide the SCTP socket interface.

**Interfaces** The shared object `libsctp.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>sctp_bindx</code>	<code>sctp_freeladdr</code>
<code>sctp_freepaddr</code>	<code>sctp_getladdr</code>
<code>sctp_getpaddr</code>	<code>sctp_opt_info</code>
<code>sctp_peeloff</code>	<code>sctp_recvmsg</code>
<code>sctp_send</code>	<code>sctp_sendmsg</code>

**Files** `/usr/lib/libsctp.so.1` shared object  
`/usr/lib/64/libsctp.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Evolving
MT-Level	Safe

**See Also** [Intro\(2\)](#), [Intro\(3\)](#), [attributes\(5\)](#), [sctp\(7P\)](#)

**Name** libsec – File Access Control List library

**Synopsis** `cc [ flag... ] file... -lsec [ library... ]  
#include <sys/acl.h>`

**Description** Functions in this library provide comparison and manipulation of File Access Control Lists.

**Interfaces** The shared object `libsec.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>acl_check</code>	<code>acl_free</code>
<code>acl_fronntext</code>	<code>acl_get</code>
<code>acl_set</code>	<code>acl_strip</code>
<code>acl_totext</code>	<code>acl_trivial</code>
<code>aclcheck</code>	<code>aclfrommode</code>
<code>aclfromtext</code>	<code>aclsort</code>
<code>acltomode</code>	<code>acltotext</code>
<code>facl_get</code>	<code>facl_set</code>

**Files** `/lib/libsec.so.1` shared object  
`/lib/64/libsec.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)



**Name** libsecdb – security attributes database library

**Synopsis** `cc [ flag... ] file... -lsecdb [ library... ]`  
`#include <secdb.h>`  
`#include <user_attr.h>`  
`#include <prof_attr.h>`  
`#include <exec_attr.h>`  
`#include <auth_attr.h>`

**Description** Functions in this library provide routines for manipulation of security attribute databases.

**Interfaces** The shared object `libsecdb.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>chkauthattr</code>	<code>endauthattr</code>
<code>endexecattr</code>	<code>endprofattr</code>
<code>enduserattr</code>	<code>fgetuserattr</code>
<code>free_authattr</code>	<code>free_execattr</code>
<code>free_profattr</code>	<code>free_proflist</code>
<code>free_userattr</code>	<code>getauthattr</code>
<code>getauthnam</code>	<code>getexecattr</code>
<code>getexecprof</code>	<code>getexecuser</code>
<code>getprofattr</code>	<code>getproflist</code>
<code>getprofnam</code>	<code>getuserattr</code>
<code>getusernam</code>	<code>getuserid</code>
<code>kva_match</code>	<code>match_execattr</code>
<code>setauthattr</code>	<code>setexecattr</code>
<code>setprofattr</code>	<code>setuserattr</code>

**Files** `/lib/libsecdb.so.1` shared object  
`/lib/64/libsecdb.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)

ATTRIBUTE TYPE	ATTRIBUTE VALUE
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libsendfile – sendfile library

**Synopsis** `cc [ flag... ] file... -lsendfile [ library... ]`  
`#include <sys/sendfile.h>`

**Description** The functions in this library provide routines that enable files to be sent over sockets, buffers to be sent over sockets, files to be copied to files, and buffers to be copied to files.

**Interfaces** The shared object `libsendfile.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

`sendfile` `sendfilev`

The following interfaces are unique to the 32-bit version of this library:

`sendfile64` `sendfilev64`

**Files** `/lib/libsendfile.so.1` shared object  
`/lib/64/libsendfile.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [sendfile\(3EXT\)](#), [sendfilev\(3EXT\)](#), [attributes\(5\)](#)

**Name** libsip – Session Initiation Protocol (SIP) library

**Synopsis** `cc [ flag... ] file... -lsip [ library... ]  
#include <sip.h>`

**Description** SIP is a control protocol that can establish, modify, and terminate multimedia sessions, conferences, such as Internet telephony calls. Functions in libsip provide interfaces to write SIP components and applications.

**Interfaces** The shared object libsip.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

sip_add_accept	sip_add_accept_enc
sip_add_accept_lang	sip_add_alert_info
sip_add_allow	sip_add_allow_events
sip_add_authen_info	sip_add_author
sip_add_branchid_to_via	sip_add_call_info
sip_add_callid	sip_add_contact
sip_add_content	sip_add_content_disp
sip_add_content_enc	sip_add_content_lang
sip_add_content_type	sip_add_cseq
sip_add_date	sip_add_error_info
sip_add_event	sip_add_expires
sip_add_from	sip_add_header
sip_add_in_reply_to	sip_add_maxforward
sip_add_mime_version	sip_add_min_expires
sip_add_org	sip_add_param
sip_add_passertedid	sip_add_ppreferredid
sip_add_priority	sip_add_privacy
sip_add_proxy_authen	sip_add_proxy_author
sip_add_proxy_require	sip_add_rack
sip_add_record_route	sip_add_reply_to
sip_add_request_line	sip_add_require
sip_add_response_line	sip_add_retry_after

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<code>sip_add_route</code>	<code>sip_add_rseq</code>
<code>sip_add_server</code>	<code>sip_add_subject</code>
<code>sip_add_substate</code>	<code>sip_add_supported</code>
<code>sip_add_to</code>	<code>sip_add_tstamp</code>
<code>sip_add_unsupported</code>	<code>sip_add_user_agent</code>
<code>sip_add_via</code>	<code>sip_add_warning</code>
<code>sip_add_www_authen</code>	<code>sip_branchid</code>
<code>sip_clear_stale_data</code>	<code>sip_clone_msg</code>
<code>sip_conn_destroyed</code>	<code>sip_copy_all_headers</code>
<code>sip_copy_header</code>	<code>sip_copy_header_by_name</code>
<code>sip_copy_start_line</code>	<code>sip_create_dialog_req</code>
<code>sip_create_dialog_req_nocontact</code>	<code>sip_create_OKack</code>
<code>sip_create_response</code>	<code>sip_delete_dialog</code>
<code>sip_delete_header</code>	<code>sip_delete_header_by_name</code>
<code>sip_delete_start_line</code>	<code>sip_delete_value</code>
<code>sip_disable_counters</code>	<code>sip_disable_dialog_logging</code>
<code>sip_disable_trans_logging</code>	<code>sip_enable_counters</code>
<code>sip_enable_dialog_logging</code>	<code>sip_enable_trans_logging</code>
<code>sip_free_msg</code>	<code>sip_free_parsed_uri</code>
<code>sip_get_accept_enc</code>	<code>sip_get_accept_lang</code>
<code>sip_get_accept_sub_type</code>	<code>sip_get_accept_type</code>
<code>sip_get_alert_info_uri</code>	<code>sip_get_allow_events</code>
<code>sip_get_allow_method</code>	<code>sip_get_authen_info</code>
<code>sip_get_author_param</code>	<code>sip_get_author_scheme</code>
<code>sip_get_branchid</code>	<code>sip_get_call_info_uri</code>
<code>sip_get_callid</code>	<code>sip_get_callseq_method</code>
<code>sip_get_callseq_num</code>	<code>sip_get_contact_display_name</code>
<code>sip_get_contact_uri_str</code>	<code>sip_get_content_disp</code>
<code>sip_get_content_enc</code>	<code>sip_get_content_lang</code>

<code>sip_get_content_length</code>	<code>sip_get_content_sub_type</code>
<code>sip_get_content_type</code>	<code>sip_get_content</code>
<code>sip_get_counter_value</code>	<code>sip_get_cseq</code>
<code>sip_get_date_day</code>	<code>sip_get_date_month</code>
<code>sip_get_date_time</code>	<code>sip_get_date_timezone</code>
<code>sip_get_date_wkday</code>	<code>sip_get_date_year</code>
<code>sip_get_dialog_callid</code>	<code>sip_get_dialog_local_cseq</code>
<code>sip_get_dialog_local_tag</code>	<code>sip_get_dialog_local_uri</code>
<code>sip_get_dialog_local_contact_uri</code>	<code>sip_get_dialog_method</code>
<code>sip_get_dialog_msgcnt</code>	<code>sip_get_dialog_remote_cseq</code>
<code>sip_get_dialog_remote_tag</code>	<code>sip_get_dialog_remote_target_uri</code>
<code>sip_get_dialog_remote_uri</code>	<code>sip_get_dialog_route_set</code>
<code>sip_get_dialog_state</code>	<code>sip_get_dialog_type</code>
<code>sip_get_error_info_uri</code>	<code>sip_get_event</code>
<code>sip_get_expires</code>	<code>sip_get_from_display_name</code>
<code>sip_get_from_tag</code>	<code>sip_get_from_uri_str</code>
<code>sip_get_header</code>	<code>sip_get_header_value</code>
<code>sip_get_in_reply_to</code>	<code>sip_get_maxforward</code>
<code>sip_get_mime_version</code>	<code>sip_get_min_expires</code>
<code>sip_get_msg_len</code>	<code>sip_get_next_value</code>
<code>sip_get_num_via</code>	<code>sip_get_org</code>
<code>sip_get_param_value</code>	<code>sip_get_params</code>
<code>sip_get_passertedid_display_name</code>	<code>sip_get_passertedid_uri_str</code>
<code>sip_get_ppreferredid_display_name</code>	<code>sip_get_ppreferredid_uri_str</code>
<code>sip_get_priority</code>	<code>sip_get_priv_value</code>
<code>sip_get_proxy_authen_param</code>	<code>sip_get_proxy_authen_scheme</code>
<code>sip_get_proxy_author_param</code>	<code>sip_get_proxy_author_scheme</code>
<code>sip_get_proxy_require</code>	<code>sip_get_rack_cseq_num</code>
<code>sip_get_rack_method</code>	<code>sip_get_rack_resp_num</code>

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<code>sip_get_replyto_display_name</code>	<code>sip_get_replyto_uri_str</code>
<code>sip_get_request_method</code>	<code>sip_get_request_uri_str</code>
<code>sip_get_require</code>	<code>sip_get_resp_desc</code>
<code>sip_get_response_code</code>	<code>sip_get_response_phrase</code>
<code>sip_get_retry_after_cmts</code>	<code>sip_get_retry_after_time</code>
<code>sip_get_route_display_name</code>	<code>sip_get_route_uri_str</code>
<code>sip_get_rseq</code>	<code>sip_get_rseq_resp_num</code>
<code>sip_get_server</code>	<code>sip_get_sip_version</code>
<code>sip_get_subject</code>	<code>sip_get_substate</code>
<code>sip_get_supported</code>	<code>sip_get_to_display_name</code>
<code>sip_get_to_tag</code>	<code>sip_get_to_uri_str</code>
<code>sip_get_trans</code>	<code>sip_get_trans_branchid</code>
<code>sip_get_trans_conn_obj</code>	<code>sip_get_trans_method</code>
<code>sip_get_trans_orig_msg</code>	<code>sip_get_trans_resp_msg</code>
<code>sip_get_trans_state</code>	<code>sip_get_tstamp_delay</code>
<code>sip_get_tstamp_value</code>	<code>sip_get_unsupported</code>
<code>sip_get_uri_errflags</code>	<code>sip_get_uri_headers</code>
<code>sip_get_uri_host</code>	<code>sip_get_uri_opaque</code>
<code>sip_get_uri_params</code>	<code>sip_get_uri_parsed</code>
<code>sip_get_uri_password</code>	<code>sip_get_uri_path</code>
<code>sip_get_uri_port</code>	<code>sip_get_uri_query</code>
<code>sip_get_uri_regname</code>	<code>sip_get_uri_scheme</code>
<code>sip_get_uri_user</code>	<code>sip_get_user_agent</code>
<code>sip_get_via_sent_by_host</code>	<code>sip_get_via_sent_by_port</code>
<code>sip_get_via_sent_protocol_name</code>	<code>sip_get_via_sent_protocol_version</code>
<code>sip_get_via_sent_transport</code>	<code>sip_get_warning_agent</code>
<code>sip_get_warning_code</code>	<code>sip_get_warning_text</code>
<code>sip_get_www_authen_param</code>	<code>sip_get_www_authen_scheme</code>
<code>sip_guid</code>	<code>sip_hdr_to_str</code>

<code>sip_hold_dialog</code>	<code>sip_hold_msg</code>
<code>sip_hold_trans</code>	<code>sip_init_conn_object</code>
<code>sip_is_dialog_secure</code>	<code>sip_is_param_present</code>
<code>sip_is_sip_uri</code>	<code>sip_is_uri_teluser</code>
<code>sip_msg_is_request</code>	<code>sip_msg_is_response</code>
<code>sip_msg_to_str</code>	<code>sip_new_msg</code>
<code>sip_parse_uri</code>	<code>sip_process_new_packet</code>
<code>sip_register_sent_by</code>	<code>sip_release_dialog</code>
<code>sip_release_trans</code>	<code>sip_reqline_to_str</code>
<code>sip_respline_to_str</code>	<code>sip_sendmsg</code>
<code>sip_sent_by_to_str</code>	<code>sip_stack_init</code>
<code>sip_unregister_all_sent_by</code>	<code>sip_unregister_sent_by</code>
<code>sip_uri_errflags_to_str</code>	

**Files** `/lib/libsip.so.1` shared object  
`/lib/64/libsip.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for description of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	MT-Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)



**Name** libslp – service location protocol library

**Synopsis** `cc [ flag... ] file... -lslp [ library... ]`

**Description** Functions in this library provide routines that provide the Service Location Protocol C library.

**Interfaces** The shared object `libslp.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

SLPClose	SLPDelAttrs
SLPDereg	SLPEscape
SLPFindAttrs	SLPFindScopes
SLPFindSrvTypes	SLPFindSrvs
SLPFree	SLPGetProperty
SLPGetRefreshInterval	SLPOpen
SLPParseSrvURL	SLPReg
SLPSetProperty	SLPUnescape
slp_strerror	

**Files** `/usr/lib/libslp.so.1` shared object  
`/usr/lib/64/libslp.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWslpu

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libSMHBAAPI, libsmhbaapi, SMHBA\_GetAdapterAttributes, SMHBA\_GetAdapterPortAttributes, SMHBA\_GetBindingCapability, SMHBA\_GetBindingSupport, SMHBA\_GetDiscoveredPortAttributes, SMHBA\_GetFCPhyAttributes, SMHBA\_GetLUNStatistics, SMHBA\_GetNumberOfPorts, SMHBA\_GetPersistentBinding, SMHBA\_GetPhyStatistics, SMHBA\_GetPortAttributesByWWN, SMHBA\_GetPortType, SMHBA\_GetProtocolStatistics, SMHBA\_GetSASPhyAttributes, SMHBA\_GetTargetMapping, SMHBA\_GetVendorLibraryAttributes, SMHBA\_GetVersion, SMHBA\_GetWrapperLibraryAttributes, SMHBA\_RegisterForAdapterAddEvents, SMHBA\_RegisterForAdapterEvents, SMHBA\_RegisterForAdapterPhyStatEvents, SMHBA\_RegisterForAdapterPortEvents, SMHBA\_RegisterForAdapterPortStatEvents, SMHBA\_RegisterForTargetEvents, SMHBA\_RegisterLibrary, SMHBA\_RemoveAllPersistentBindings, SMHBA\_RemovePersistentBinding, SMHBA\_ScsiInquiry, SMHBA\_ScsiReadCapacity, SMHBA\_ScsiReportLuns, SMHBA\_SendECHO, SMHBA\_SendSMPPassThru, SMHBA\_SendTEST, SMHBA\_SetBindingSupport, SMHBA\_SetPersistentBinding – Common Storage Management HBA information library

**Synopsis** `cc [ flag|PO ] file|PO -lSMHBAAPI [ library|PO ]  
#include <smhbaapi.h>`

**Description** The functions in this library access Fibre Channel and/or Sereal Attached SCSI HBA data depending on vendor provided implementation underneath.

HBA information is provided through a standard interface in a vendor independent manner. This common interface provides access to the following information:

- Local HBA attributes
- Local HBA port attributes and statistics
- Mapping between discovered devices and operating system SCSI information
- Discovered devices port attributes
- SCSI commands for discovered devices (Report LUNS, Read Capacity, and Inquiry)
- Storage Management Protocol commands to discover Serial Attached SCSI configuration details
- Common Transport commands to discover Fibre Channel Fabric details

**Interfaces** The shared object `libSMHBAAPI.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

HBA_CloseAdapter	HBA_FreeLibrary
HBA_GetAdapterName	HBA_GetNumberOfAdapters
HBA_GetRRIDMgmtInfo	HBA_LoadLibrary

HBA_OpenAdapter	HBA_RefreshAdapterConfiguration
HBA_RefreshInformation	HBA_RegisterForLinkEvents
HBA_RemoveCallback	HBA_SendCTPassThruV2
HBA_SendLIRR	HBA_SendRLS
HBA_SendRNIDV2	HBA_SendRPL
HBA_SendRPS	HBA_SendSRL
HBA_SetRNIDMgmtInfo	SMHBA_GetAdapterAttributes
SMHBA_GetAdapterPortAttributes	SMHBA_GetBindingCapability
SMHBA_GetBindingSupport	SMHBA_GetDiscoveredPortAttributes
SMHBA_GetFCPhyAttributes	SMHBA_GetLUNStatistics
SMHBA_GetNumberOfPorts	SMHBA_GetPersistentBinding
SMHBA_GetPhyStatistics	SMHBA_GetPortAttributesByWWN
SMHBA_GetPortType	SMHBA_GetProtocolStatistics
SMHBA_GetSASPhyAttributes	SMHBA_GetTargetMapping
SMHBA_GetVendorLibraryAttributes	SMHBA_GetVersion
SMHBA_GetWrapperLibraryAttributes	SMHBA_RegisterForAdapterAddEvents
SMHBA_RegisterForAdapterEvents	SMHBA_RegisterForAdapterPhyStatEvents
SMHBA_RegisterForAdapterPortEvents	SMHBA_RegisterForAdapterPortStatEvents
SMHBA_RegisterForTargetEvents	SMHBA_RegisterLibrary
SMHBA_RemoveAllPersistentBindings	SMHBA_RemovePersistentBinding
SMHBA_ScsiInquiry	SMHBA_ScsiReadCapacity
SMHBA_ScsiReportLuns	SMHBA_SendECHO
SMHBA_SendSMPPassThru	SMHBA_SendTEST
SMHBA_SetBindingSupport	SMHBA_SetPersistentBinding

**Usage** Client applications link with the Common Library (using `-lSMHBAAPI`) to access the interfaces. The Common Library dynamically loads individual Vendor-Specific Libraries (VSL) listed in `/etc/smhba.conf` and described on [smhba.conf\(4\)](#).

Using the `libSMHBAAPI` involves the following steps:

1. Optionally determining the version of the library by calling `SMHBA_GetVersion()`.
2. Initializing the Common Library by calling `HBA_LoadLibrary()`.

3. Determine the number of HBAs known to the common library by calling `HBA_GetNumberOfAdapters()`.
4. Determine each HBA name in turn by calling `HBA_GetAdapterName()`.
5. Open each HBA in turn by calling `HBA_OpenAdapter()`.
6. Operate on a given HBA by calling the following:
  - `SMHBA_GetAdapterAttributes()`
  - `SMHBA_GetAdapterPortAttributes()`
  - `SMHBA_GetDiscoveredPortAttributes()`
  - `SMHBA_GetPortAttributesByWWN()`
  - `SMHBA_GetNumberOfPorts()`
  - `SMHBA_GetPortType()`
  - `SMHBA_GetProtocolStatistics()`
  - `SMHBA_GetPhyStatistics()`
  - `SMHBA_GetBindingCapability()`
  - `SMHBA_GetBindingSupport()`
  - `SMHBA_SetBindingSupport()`
  - `SMHBA_GetTargetMapping()`
  - `SMHBA_GetPersistentBinding()`
  - `SMHBA_SetPersistentBinding()`
  - `SMHBA_RemoveAllPersistentBindings()`
  - `SMHBA_GetLUNStatistics()`
  - `SMHBA_SendScsiInquiry()`
  - `SMHBA_SendReportLuns()`
  - `SMHBA_SendReadCapacity()`
  - `SMHBA_RegisterForAdapterAddEvents()`
  - `SMHBA_RegisterForAdapterEvents()`
  - `SMHBA_RegisterForAdapterPortEvents()`
  - `SMHBA_RegisterForAdapterPortStatEvents()`
  - `SMHBA_RegisterForAdapterPhyStatEvents()`
  - `SMHBA_RegisterForTargetEvents()`
  - `HBA_RegisterForLinkEvents()`
  - `HBA_RemoveCallback()`

#### For Serial Attached HBA

- `SMHBA_GetSASPhyAttributes()`
- `SMHBA_SendSMPPassThru()`

#### For Fibre Channle HBA

- `SMHBA_GetFCPhyAttributes()`
- `HBA_SendCTPassThruV2()`
- `HBA_SetRNIDMgmtInfo()`
- `HBA_GetRNIDMgmtInfo()`
- `HBA_SendRNIDV2()`

- HBA\_SendRPL()
  - HBA\_SendRPS()
  - HBA\_SendSRL()
  - HBA\_SendLIRR()
  - HBA\_SendRLS()
  - HBA\_SendTEST()
  - HBA\_SendECHO()
7. Close open HBAs by calling `HBA_CloseAdapter()`.
  8. Unload the library by calling `HBA_FreeLibrary()`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWsmhba, SUNWsmhbar
Interface Stability	Committed
MT-Level	MT-Safe
Standard	ANSI INCITS 428 Storage Management Host Bus Adapter Application Programming Interface (SM-HBA)

**See Also** [smhba.conf\(4\)](#), [attributes\(5\)](#)

**Name** libsocket – sockets library

**Synopsis** `cc [ flag... ] file... -lsocket [ library... ]`

**Description** Functions in this library provide the socket internetworking interface, primarily used with the TCP/IP protocol suite.

**Interfaces** The shared object `libsocket.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__xnet_bind</code>	<code>__xnet_connect</code>
<code>__xnet_getsockopt</code>	<code>__xnet_listen</code>
<code>__xnet_recvmsg</code>	<code>__xnet_sendmsg</code>
<code>__xnet_sendto</code>	<code>__xnet_socket</code>
<code>__xnet_socketpair</code>	<code>accept</code>
<code>bind</code>	<code>connect</code>
<code>endnetent</code>	<code>endprotoent</code>
<code>endservent</code>	<code>ether_aton</code>
<code>ether_hostton</code>	<code>ether_line</code>
<code>ether_ntoa</code>	<code>ether_ntohost</code>
<code>freeaddrinfo</code>	<code>gai_strerror</code>
<code>getaddrinfo</code>	<code>getnameinfo</code>
<code>getnetbyaddr</code>	<code>getnetbyaddr_r</code>
<code>getnetbyname</code>	<code>getnetbyname_r</code>
<code>getnetent</code>	<code>getnetent_r</code>
<code>getpeername</code>	<code>getprotobyname</code>
<code>getprotobyname_r</code>	<code>getprotobyname_r</code>
<code>getprotobyname_r</code>	<code>getprotoent</code>
<code>getprotoent_r</code>	<code>getservbyname</code>
<code>getservbyname_r</code>	<code>getservbyname_r</code>
<code>getservbyname_r</code>	<code>getservbyport</code>
<code>getservbyport_r</code>	<code>getservent</code>
<code>getservent_r</code>	<code>getsockname</code>
<code>getsockopt</code>	<code>htonl</code>

htons	if_freenameindex
if_indextoname	if_nameindex
if_nametoindex	in6addr_any
in6addr_loopback	inet_lnaof
inet_makeaddr	inet_network
listen	ntohl
ntohs	rcmd
rcmd_af	recv
recvfrom	recvmsg
rexec	rexec_af
rresvport	rresvport_af
ruserok	send
sendmsg	sendto
setnetent	setprotoent
setservent	setsockopt
shutdown	socket
socketpair	

**Files** /lib/libsocket.so.1      shared object  
 /lib/64/libsocket.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	See the manual page for each interface.

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [socket.h\(3HEAD\)](#), [attributes\(5\)](#)

**Name** libssagent – Sun Solstice Enterprise Agent library

**Synopsis** `cc [ flag... ] file... -lssagent [ library.. ]`

**Description** The `libssagent` library is a high level API library that is dependent on `libssasnmplib`. This library contains the starting point of the request-driven engine that always runs in the background within the subagent. It receives SNMP requests, evaluates variables, calls the appropriate functions, and sends the correct responses.

**Interfaces** The shared object `libssagent.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>SSAAgentIsAlive</code>	<code>SSAGetTrapPort</code>
<code>SSAMain</code>	<code>SSARegSubagent</code>
<code>SSARegSubtree</code>	<code>SSASubagentOpen</code>
<code>_SSASendTrap</code>	<code>_SSASendTrap2</code>
<code>_SSASendTrap3</code>	<code>callItem</code>
<code>numCallItem</code>	<code>numTrapElem</code>
<code>trapAnyEnterpriseInfo</code>	<code>trapBucket</code>
<code>trapEnterpriseInfo</code>	<code>trapTableMap</code>

**Files** `/usr/lib/libssagent.so.1` shared object  
`/usr/lib/64/libssagent.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWsasnm
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libssasnmplib\(3LIB\)](#), [attributes\(5\)](#)



**Name** libssasmp – Sun Solstice Enterprise SNMP library

**Synopsis** `cc [ flag... ] file... -lssasmp [ library... ]`

**Description** The libssasmp library provides low-level SNMP API functions.

- ASN.1 serialization (encoding/decoding) module
- SNMP PDU development routines
- SNMP session module
- Low level SNMP based API functions
- Error-handling module
- Trace (debugging) module

**Interfaces** The shared object libssasmp.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

SSAoidCmp	SSAoidCpy
SSAoidDup	SSAoidFree
SSAoidInit	SSAoidNew
SSAoidStrToOid	SSAoidString
SSAoidZero	SSAStringCpy
SSAStringInit	SSAStringToChar
SSAStringZero	

**Files** /usr/lib/libssasmp.so.1      shared object  
 /usr/lib/64/libssasmp.so.1    64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWsasnm
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libssagent\(3LIB\)](#), [attributes\(5\)](#)

**Name** libstmf – SCSI Target Mode Framework library

**Synopsis** `cc [ flag... ] file... -lstmf [ library... ]  
#include <libstmf.h>`

**Description** Functions in this library provide configuration management of the SCSI Target Mode Framework (STMF), allowing clients to manage the provisioning of logical units and targets to the initiator clients of the framework.

**Definitions** Host Group

A Host Group is a set of one or more initiator ports that are combined together for the purposes of applying access controls to a Logical Unit object and assigning a logical unit number to the Logical Unit. The assigned logical unit number will be reported to the members of that Host Group via the SCSI REPORT LUN command. Host Groups can contain initiator ports that are not visible to the SCSI Target Mode Framework. Initiator ports might not be a member in more than one group. A Host Group is associated with a given Logical Unit via a view entry. Host Group names are unique within the framework.

Logical Unit

A Logical Unit object is provided to the SCSI Target Mode Framework for the purposes of executing SCSI commands. Library clients can manage a Logical Unit object's accessibility to one or more SCSI initiator clients. `libstmf` library clients cannot add or remove Logical Unit objects from the system. Every Logical Unit object within the SCSI Target Mode Framework is owned by a logical unit provider whose identity is available via the properties on the Logical Unit object.

Logical Unit Number

A Logical Unit Number is the SCSI identifier of a logical unit within a target.

Target Port

A Target port object is provided to the SCSI Target Mode Framework for the purposes of receiving SCSI commands on a particular logical unit. Library clients can manage a Logical Unit object's availability to one or more Target port objects. Library clients cannot add or remove Target objects from the system. Every Target port object within the SCSI Target Mode Framework is owned by a Local Port provider whose identity is available via the properties on the Target port object.

Target Port Group

A Target Port Group is a set of one or more Target ports that are combined together for the purposes of applying availability to a Logical Unit object. A Target Port Group may be applied to any given Logical Unit via a view entry. Target ports may not be a member in more than one Target Port Group. Target Port Group names are unique within the framework.

View

A View is a list of logical units exposed to a list of initiator ports through a list of targets.

## View Entry

A View Entry object defines the association of an host group, a target group and a logical unit number with a specified logical unit. When a view entry is created for a logical unit, a caller can assign all targets and/or all initiator ports to the logical unit thus making the logical unit accessible to all target ports and/or all initiator ports. A logical unit may have one or more view entries associated with it. Any two view entries are considered to be in conflict when an attempt is made to duplicate the association of any given initiator port, target port and logical unit. Attempting this will result in an error returned from the call to `stmfAddViewEntry(3STMF)`.

**Interfaces** The shared object `libstmf.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>stmfAddToHostGroup</code>	<code>stmfAddToTargetGroup</code>
<code>stmfAddViewEntry</code>	<code>stmfClearProviderData</code>
<code>stmfCreateHostGroup</code>	<code>stmfCreateLu</code>
<code>stmfCreateLuResource</code>	<code>stmfCreateTargetGroup</code>
<code>stmfDeleteHostGroup</code>	<code>stmfDeleteLu</code>
<code>stmfDeleteTargetGroup</code>	<code>stmfDestroyProxyDoor</code>
<code>stmfDevidFromIscsiName</code>	<code>stmfDevidFromWwn</code>
<code>stmfFreeLuResource</code>	<code>stmfFreeMemory</code>
<code>stmfGetAluaState</code>	<code>stmfGetHostGroupList</code>
<code>stmfGetHostGroupMembers</code>	<code>stmfGetLogicalUnitList</code>
<code>stmfGetLogicalUnitProperties</code>	<code>stmfGetLuProp</code>
<code>stmfGetLuResource</code>	<code>stmfGetPersistMethod</code>
<code>stmfGetProviderData</code>	<code>stmfGetProviderDataProt</code>
<code>stmfGetState</code>	<code>stmfGetTargetGroupList</code>
<code>stmfGetTargetGroupMembers</code>	<code>stmfGetTargetList</code>
<code>stmfGetTargetProperties</code>	<code>stmfGetViewEntryList</code>
<code>stmfImportLu</code>	<code>stmfInitProxyDoor</code>
<code>stmfLuStandby</code>	<code>stmfModifyLu</code>
<code>stmfModifyLuByFname</code>	<code>stmfOfflineLogicalUnit</code>
<code>stmfOfflineTarget</code>	<code>stmfOnlineLogicalUnit</code>

stmfOnlineTarget	stmfPostProxyMsg
stmfRemoveFromHostGroup	stmfRemoveFromTargetGroup
stmfRemoveViewEntry	stmfSetAluaState
stmfSetLuProp	stmfSetPersistMethod
stmfSetProviderData	stmfSetProviderDataProt
stmfValidateView	

**Files** /lib/libstmf.so.1 shared object  
/lib/64/libstmf.so.1 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWstmf
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [stmfAddViewEntry\(3STMF\)](#), [attributes\(5\)](#)

**Name** libsys – system library

**Synopsis** `cc [ flag... ] file... -lsys [ library... ]`

**Description** Functions in this library provide basic system services. This library is implemented as a filter on the C library (see [libc\(3LIB\)](#)).

**Interfaces** The shared object `libsys.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__ctype</code>	<code>__huge_val</code>	<code>_access</code>
<code>_acct</code>	<code>_alarm</code>	<code>_altzone</code>
<code>_catclose</code>	<code>_catgets</code>	<code>_catopen</code>
<code>_chdir</code>	<code>_chmod</code>	<code>_chown</code>
<code>_chroot</code>	<code>_close</code>	<code>_closedir</code>
<code>_creat</code>	<code>_daylight</code>	<code>_dup</code>
<code>_environ</code>	<code>_execl</code>	<code>_execle</code>
<code>_execlp</code>	<code>_execv</code>	<code>_execve</code>
<code>_execvp</code>	<code>_exit</code>	<code>_fattach</code>
<code>_fchdir</code>	<code>_fchmod</code>	<code>_fchown</code>
<code>_fcntl</code>	<code>_fdetach</code>	<code>_fork</code>
<code>_fpathconf</code>	<code>_fstat</code>	<code>_fstatvfs</code>
<code>_fsync</code>	<code>_ftok</code>	<code>_getcontext</code>
<code>_getcwd</code>	<code>_getegid</code>	<code>_geteuid</code>
<code>_getgid</code>	<code>_getgrgid</code>	<code>_getgrnam</code>
<code>_getgroups</code>	<code>_getlogin</code>	<code>_getmsg</code>
<code>_getpgid</code>	<code>_getpgrp</code>	<code>_getpid</code>
<code>_getpmsg</code>	<code>_getppid</code>	<code>_getpwnam</code>
<code>_getpwuid</code>	<code>_getrlimit</code>	<code>_getsid</code>
<code>_gettxt</code>	<code>_getuid</code>	<code>_grantpt</code>
<code>_initgroups</code>	<code>_ioctl</code>	<code>_isastream</code>
<code>_kill</code>	<code>_lchown</code>	<code>_link</code>
<code>_lseek</code>	<code>_lstat</code>	<code>_makecontext</code>

_memcntl	_mkdir	_mknod
_mlock	_mmap	_mount
_mprotect	_msgctl	_msgget
_msgrcv	_msgsnd	_msync
_munlock	_munmap	_nice
_numeric	_open	_opendir
_pathconf	_pause	_pipe
_poll	_profil	_ptrace
_ptsname	_putmsg	_putpmsg
_read	_readdir	_readlink
_readv	_rename	_rewinddir
_rmdir	_seekdir	_semctl
_semget	_semop	_setcontext
_setgid	_setgroups	_setpgid
_setpgrp	_setrlimit	_setsid
_setuid	_shmat	_shmctl
_shmdt	_shmget	_sigaction
_sigaddset	_sigaltstack	_sigdelset
_sigemptyset	_sigfillset	_sighold
_sigignore	_sigismember	_siglongjmp
_sigpause	_sigpending	_sigprocmask
_sigrelse	_sigsend	_sigsendset
_sigset	_sigsetjmp	_sigsuspend
_stat	_statvfs	_stime
_swapcontext	_symlink	_sync
_sysconf	_telldir	_time
_times	_timezone	_ttyname
_tzname	_ulimit	_umask
_umount	_uname	_unlink

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_unlockpt	_utime	_wait
_waitid	_waitpid	_write
_writev	access	acct
alarm	atexit	calloc
catclose	catgets	catopen
chdir	chmod	chown
chroot	close	closedir
creat	daylight	dup
environ	execl	execle
execlp	execv	execve
execvp	exit	fattach
fchdir	fchmod	fchown
fcntl	fdetach	fork
fpathconf	free	fstat
fstatvfs	fsync	ftok
getcontext	getcwd	getegid
geteuid	getgid	getgrgid
getgrnam	getgroups	getlogin
getmsg	getpgid	getpgrp
getpid	getpmsg	getppid
getpwnam	getpwuid	getrlimit
getsid	gettxt	getuid
grantpt	initgroups	ioctl
isastream	kill	lchown
link	localeconv	lseek
lstat	makecontext	malloc
memcntl	mkdir	mknod
mlock	mmap	mount
mprotect	msgctl	msgget

msgrcv	msgsnd	msync
munlock	munmap	nice
open	opendir	pathconf
pause	pipe	poll
profil	ptrace	ptsname
putmsg	putpmsg	read
readdir	readlink	readv
realloc	remove	rename
rewinddir	rmdir	seekdir
semctl	semget	semop
setcontext	setgid	setgroups
setlocale	setpgid	setpgrp
setrlimit	setsid	setuid
shmat	shmctl	shmdt
shmget	sigaction	sigaddset
sigaltstack	sigdelset	sigemptyset
sigfillset	sighold	sigignore
sigismember	siglongjmp	signal
sigpause	sigpending	sigprocmask
sigrelse	sigsend	sigsendset
sigset	sigsetjmp	sigsuspend
stat	statvfs	stime
strcoll	strerror	strftime
strxfrm	swapcontext	symlink
sync	sysconf	system
telldir	time	times
timezone	ttyname	tzname
ulimit	umask	umount
uname	unlink	unlockpt



utime	wait	waitid
waitpid	write	writev

The following interfaces are unique to the SPARC version of this library:

.div	.mul	.rem
.stret1	.stret2	.stret4
.stret8	.udiv	.umul
.urem	_Q_add	_Q_cmp
_Q_cmpe	_Q_div	_Q_dtoq
_Q_feq	_Q_fge	_Q_fgt
_Q_fle	_Qflt	_Q_fne
_Q_itoq	_Q_mul	_Q_neg
_Q_qtod	_Q_qtoi	_Q_qtos
_Q_qtou	_Q_sqrt	_Q_stoq
_Q_sub	_Q_utoq	__dtou
__ftou		

The following interfaces are unique to the x86 version of this library:

__flt_rounds	_fp_hw	_fpstart
_fxstat	_lxstat	_nuname
_sbrk	_xmknod	_xstat
nuname	sbrk	

**Files** /usr/lib/libsys.so.1 shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

**Name** libsysevent – system event interface library

**Synopsis** `cc [ flag... ] file... -lsysevent [ library... ]  
#include <sysevent.h>`

**Description** Functions in this library extract specific identifier, publisher, and attribute information from a system event (sysevent) handle, defined as `sysevent_t`, and allow privileged user-level applications to queue system events for delivery to the system event daemon, [syseventd\(1M\)](#).

The `libsysevent` interfaces do not work at all in non-global zones.

**Interfaces** The shared object `libsysevent.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>sysevent_bind_handle</code>	<code>sysevent_free</code>
<code>sysevent_get_attr_list</code>	<code>sysevent_get_class_name</code>
<code>sysevent_get_pid</code>	<code>sysevent_get_pub_name</code>
<code>sysevent_get_seq</code>	<code>sysevent_get_size</code>
<code>sysevent_get_subclass_name</code>	<code>sysevent_get_time</code>
<code>sysevent_get_vendor_name</code>	<code>sysevent_post_event</code>
<code>sysevent_subscribe_event</code>	<code>sysevent_unbind_handle</code>
<code>sysevent_unsubscribe_event</code>	

**Files** `/usr/lib/libsysevent.so.1` shared object  
`/usr/lib/64/libsysevent.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	MT-Safe

**See Also** [syseventd\(1M\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libtecla – interactive command line input library

**Synopsis** `cc [ flag... ] file... -ltecla [ library... ]`  
`#include <libtecla.h>`

**Description** This library provides programs with interactive command line editing facilities, similar to those of the UNIX `tcsh` shell. In addition to simple command-line editing, it supports recall of previously entered command lines, TAB completion of file names or other tokens, and in-line wildcard expansion of filenames. The internal functions that perform file-name completion and wild-card expansion are also available externally for optional use by the calling program.

**Thread Safety** The terminfo functions `setupterm(3CURSES)`, `tigetstr(3CURSES)`, `tigetnum(3CURSES)`, and `tputs(3CURSES)` are not reentrant. This condition, however, should not prevent use of this library in threaded applications, since few applications will want to interact with multiple terminals.

**Interfaces** The shared object `libtecla.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>cfc_file_start</code>	<code>cfc_literal_escapes</code>
<code>cfc_set_check_fn</code>	<code>cpl_add_completion</code>
<code>cpl_check_exe</code>	<code>cpl_complete_word</code>
<code>cpl_file_completions</code>	<code>cpl_last_error</code>
<code>cpl_list_completions</code>	<code>cpl_recall_matches</code>
<code>cpl_record_error</code>	<code>del_CplFileConf</code>
<code>del_ExpandFile</code>	<code>del_GetLine</code>
<code>del_PathCache</code>	<code>del_PcaPathConf</code>
<code>del_WordCompletion</code>	<code>ef_expand_file</code>
<code>ef_last_error</code>	<code>ef_list_expansions</code>
<code>gl_abandon_line</code>	<code>gl_append_history</code>
<code>gl_automatic_history</code>	<code>gl_bind_keyseq</code>
<code>gl_catch_blocked</code>	<code>gl_change_terminal</code>
<code>gl_clear_history</code>	<code>gl_completion_action</code>
<code>gl_configure_getline</code>	<code>gl_customize_completion</code>
<code>gl_display_text</code>	<code>gl_echo_mode</code>
<code>gl_erase_terminal</code>	<code>gl_error_message</code>

gl_get_line	gl_group_history
gl_handle_signal	gl_ignore_signal
gl_inactivity_timeout	gl_io_mode
gl_last_signal	gl_limit_history
gl_list_signals	gl_load_history
gl_lookup_history	gl_normal_io
gl_pending_io	gl_prompt_style
gl_query_char	gl_range_of_history
gl_raw_io	gl_read_char
gl_register_action	gl_replace_prompt
gl_resize_history	gl_return_status
gl_save_history	gl_set_term_size
gl_show_history	gl_size_of_history
gl_state_of_history	gl_terminal_size
gl_toggle_history	gl_trap_signal
gl_tty_signals	gl_watch_fd
libtecla_version	new_CplFileConf
new_ExpandFile	new_GetLine
new_PathCache	new_PcaPathConf
new_WordCompletion	pca_last_error
pca_lookup_file	pca_path_completions
pca_scan_path	pca_set_check_fn
ppc_file_start	ppc_literal_escapes

**Files** /usr/lib/libtecla.so.1      shared object  
 /usr/lib/64/libtecla.so.1      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** [enhance\(1\)](#), [Intro\(3\)](#), [cpl\\_complete\\_word\(3TECLA\)](#), [ef\\_expand\\_file\(3TECLA\)](#), [gl\\_get\\_line\(3TECLA\)](#), [gl\\_io\\_mode\(3TECLA\)](#), [pca\\_lookup\\_file\(3TECLA\)](#), [attributes\(5\)](#), [tecla\(5\)](#)

**Name** libthread – threads library

**Synopsis** `cc -mt [ flag... ] file... [ library... ]`

**Description** Historically, functions in `libthread` provided threading support. This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on `libc.so.1`. New application development need not specify `-lthread`.

**Interfaces** The shared object `libthread.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>cond_broadcast</code>	<code>cond_destroy</code>
<code>cond_init</code>	<code>cond_reltimedwait</code>
<code>cond_signal</code>	<code>cond_timedwait</code>
<code>cond_wait</code>	<code>mutex_destroy</code>
<code>mutex_init</code>	<code>mutex_lock</code>
<code>mutex_trylock</code>	<code>mutex_unlock</code>
<code>rw_rdlock</code>	<code>rw_tryrdlock</code>
<code>rw_trywrlock</code>	<code>rw_unlock</code>
<code>rw_wrlock</code>	<code>rwlock_destroy</code>
<code>rwlock_init</code>	<code>sema_destroy</code>
<code>sema_init</code>	<code>sema_post</code>
<code>sema_trywait</code>	<code>sema_wait</code>
<code>thr_continue</code>	<code>thr_create</code>
<code>thr_exit</code>	<code>thr_getconcurrency</code>
<code>thr_getprio</code>	<code>thr_getspecific</code>
<code>thr_join</code>	<code>thr_keycreate</code>
<code>thr_kill</code>	<code>thr_main</code>
<code>thr_min_stack</code>	<code>thr_self</code>
<code>thr_setconcurrency</code>	<code>thr_setprio</code>
<code>thr_setspecific</code>	<code>thr_sigsetmask</code>
<code>thr_stksegment</code>	<code>thr_suspend</code>

thr\_yield

**Files** /lib/libthread.so.1 a filter on libc.so.1  
/lib/64/libthread.so.1 a filter on 64/libc.so.1

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(2\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [libc\\_db\(3LIB\)](#), [libpthread\(3LIB\)](#), [attributes\(5\)](#), [threads\(5\)](#)



**Name** libtnfctl – TNF probe control library

**Synopsis** `cc [ flag... ] file.. -ltnfctl [ library... ]  
#include <tnf/tnfctl.h>`

**Description** Functions in this library provide TNF probe control routines for use by processes and the kernel.

**Interfaces** The shared object `libtnfctl.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>tnfctl_buffer_alloc</code>	<code>tnfctl_buffer_dealloc</code>
<code>tnfctl_check_libs</code>	<code>tnfctl_close</code>
<code>tnfctl_continue</code>	<code>tnfctl_exec_open</code>
<code>tnfctl_filter_list_add</code>	<code>tnfctl_filter_list_delete</code>
<code>tnfctl_filter_list_get</code>	<code>tnfctl_filter_state_set</code>
<code>tnfctl_indirect_open</code>	<code>tnfctl_internal_open</code>
<code>tnfctl_kernel_open</code>	<code>tnfctl_pid_open</code>
<code>tnfctl_probe_apply</code>	<code>tnfctl_probe_apply_ids</code>
<code>tnfctl_probe_connect</code>	<code>tnfctl_probe_disable</code>
<code>tnfctl_probe_disconnect_all</code>	<code>tnfctl_probe_enable</code>
<code>tnfctl_probe_state_get</code>	<code>tnfctl_probe_trace</code>
<code>tnfctl_probe_untrace</code>	<code>tnfctl_register_funcs</code>
<code>tnfctl_strerror</code>	<code>tnfctl_trace_attrs_get</code>
<code>tnfctl_trace_state_set</code>	

**Files** `/usr/lib/libtnfctl.so.1` shared object  
`/usr/lib/64/libtnfctl.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWtnfc (32-bit) SUNWtnfcx (64-bit)
MT-Level	MT-Safe with exceptions

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [libtnfctl\(3TNF\)](#), [tracing\(3TNF\)](#), [attributes\(5\)](#)

**Notes** This API is MT-Safe. Multiple threads can concurrently operate on independent `tnfctl` handles, which is the typical behavior expected. `libtnfctl` does not support multiple threads operating on the same `tnfctl` handle. If this is desired, it is the client's responsibility to implement locking to ensure that two threads that use the same `tnfctl` handle are not simultaneously present in a `libtnfctl` interface.

**Name** libtsalarm – Telco-Alarm library

**Synopsis** `cc [ flag... ] file... -ltsalarm [ library... ]  
#include <tsalarm.h>`

**Description** Functions in this library are used to interface with the service processor through telco-alarm LDC channel to get or set status of telco alarms.

**Interfaces** The shared object `libtsalarm.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

`tsalarm_get` `tsalarm_set`

**Files** `/usr/platform/`uname -i`/lib/libtsalarm.so.1`  
shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWkvmt200.v
Interface Stability	Uncommitted
MT-Level	Safe

**See Also** [tsalarm\\_get\(3EXT\)](#), [attributes\(5\)](#)

**Name** libtsnet – Solaris Trusted Extensions network library

**Synopsis** `cc [ flag... ] file... [ library... ]`  
`#include <libtsnet.h>`  
`#include <sys/tsol/tndb.h>`

**Description** Functions in this library provide programmatic access to Solaris Trusted Extensions features such as labels and Mandatory Access Policy (MAC). These functions are available on systems that are configured with Trusted Extensions software.

**Interfaces** The shared object `libtsnet.so.1` provides the public interfaces that are defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

`tsol_getrhtype`

**Files** `/lib/libtsnet.so.1` shared object  
`/lib/64/libtsnet.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
Interface Stability	Stable
MT-Level	Safe

**See Also** [Intro\(3\)](#), [libtsol\(3LIB\)](#), [attributes\(5\)](#)

**Name** libtsol – Solaris Trusted Extensions library

**Synopsis** `cc [flag...] file... -ltsol [library...]  
#include <tsol.h>`

**Description** Functions in this library provide programmatic access to Solaris Trusted Extensions features such as labels and Mandatory Access Policy (MAC) on systems that are configured with Trusted Extensions software.

**Interfaces** The shared object `libtsol.so.2` provides the public interfaces that are defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

Committed Functions	<code>bldominates</code>	<code>blequal</code>
	<code>blstrictdom</code>	<code>getpathbylabel</code>
	<code>getplabel</code>	<code>getdevicerange</code>
	<code>getuserange</code>	<code>getzoneidbylabel</code>
	<code>getzoneidbylabel</code>	<code>getzonerootbyid</code>
	<code>getzonerootbylabel</code>	<code>getzonerootbyname</code>
	<code>label_to_str</code>	<code>labelbuilder</code>
	<code>labelclipping</code>	<code>m_label_alloc</code>
	<code>m_label_dup</code>	<code>m_label_free</code>
	<code>setflabel</code>	<code>str_to_label</code>
	<code>tsol_lbuild_create</code>	<code>tsol_lbuild_destroy</code>
	<code>tsol_lbuild_get</code>	<code>tsol_lbuild_set</code>
	<code>Xbclearatos</code>	<code>Xbsltos</code>

**Obsolete Functions** The following functions are preserved to aid porting.

Function	Committed Replacement
<code>bcleartoh</code>	<code>label_to_str</code>
<code>bcleartoh_r</code>	<code>label_to_str</code>
<code>bclearatos</code>	<code>label_to_str</code>
<code>bltocolo</code>	<code>label_to_str</code>
<code>bltocolo_r</code>	<code>label_to_str</code>
<code>bsltoh</code>	<code>label_to_str</code>

Function	Committed Replacement
bsltoh_r	label_to_str
bsltos	label_to_str
h_alloc	label_to_str
h_free	label_to_str
htobclear	str_to_label
htobsl	str_to_label
sbcleartos	str_to_label
sbsltos	str_to_label
stobsl	str_to_label
stobclear	str_to_label

**Files** /lib/libtsol.so.2      shared object  
 /lib/64/libtsol.so.2      64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl
Interface Stability	See the manual pages for the individual functions.
MT-Level	Safe

**See Also** [Intro\(3\)](#), [libtsnet\(3LIB\)](#), [attributes\(5\)](#)

**Notes** The functionality described on this manual page is available only if the system has been configured with Trusted Extensions.

**Name** libumem – object-caching memory allocation library

**Synopsis** `cc [ flag... ] file... -lumem [ library... ]  
#include <umem.h>`

**Description** Functions in this library provide fast, scalable object-caching memory allocation with multithreaded application support. In addition to the standard `malloc(3C)` family of functions and the more flexible `umem_alloc(3MALLOC)` family, `libumem` provides powerful object-caching services as described in `umem_cache_create(3MALLOC)`.

The `libumem` library also provides extensive debugging support, including detection of memory leaks, buffer overruns, multiple frees, use of uninitialized data, use of freed data, and many other common programming errors. See `umem_debug(3MALLOC)`.

**Interfaces** The shared object `libumem.so.1` provides the public interfaces defined below. See `Intro(3)` for additional information on shared object interfaces.

<code>calloc</code>	<code>free</code>
<code>malloc</code>	<code>memalign</code>
<code>realloc</code>	<code>umem_alloc</code>
<code>umem_cache_alloc</code>	<code>umem_cache_create</code>
<code>umem_cache_destroy</code>	<code>umem_cache_free</code>
<code>umem_free</code>	<code>umem_nofail_callback</code>
<code>umem_zalloc</code>	<code>valloc</code>

**Files** `/usr/lib/libumem.so.1` shared object  
`/usr/lib/64/libumem.so.1` 64-bit shared object

**Attributes** See `attributes(5)` for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Evolving
MT-Level	MT-Safe

**See Also** `Intro(3)`, `malloc(3C)`, `umem_alloc(3MALLOC)`, `umem_cache_create(3MALLOC)`, `umem_debug(3MALLOC)`, `attributes(5)`

**Name** libusb – user-space USB device management library

**Synopsis** `cc [ flag... ] -I/usr/include file... -L/usr/lib \  
-R /usr/lib -lusb [ library... ]  
#include <usb.h>`

**Description** The libusb library contains interfaces for managing USB devices without a kernel driver. It is an open-source API supported on Linux, MacOS X, and NetBSD. See <http://libusb.sourceforge.net>.

The current implementation is version 0.1.8 of the libusb API.

Complete documentation for this library can be found at `/usr/share/doc/libusb/libusb.txt`.

**Interfaces** The shared object `libusb.so.1` provides the following public interfaces. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>usb_bulk_read</code>	<code>usb_bulk_write</code>
<code>usb_claim_interface</code>	<code>usb_clear_halt</code>
<code>usb_close</code>	<code>usb_control_msg</code>
<code>usb_find_busses</code>	<code>usb_find_devices</code>
<code>usb_get_busses</code>	<code>usb_get_descriptor_by_endpoint</code>
<code>usb_get_descriptor</code>	<code>usb_get_string</code>
<code>usb_get_string_simple</code>	<code>usb_init</code>
<code>usb_interrupt_read</code>	<code>usb_interrupt_write</code>
<code>usb_open</code>	<code>usb_release_interface</code>
<code>usb_reset</code>	<code>usb_resetep</code>
<code>usb_set_altinterface</code>	<code>usb_set_configuration</code>
<code>usb_set_debug</code>	<code>usb_strerror</code>

<b>Files</b> <code>/usr/lib/libusb.so.1</code>	shared object
<code>/usr/lib/64/libusb.so.1</code>	64-bit shared object
<code>/usr/libusb_plugins</code>	implementation-specific libusb modules
<code>/usr/bin/libusb-config</code>	script to determine linking environment



**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWlibusb, SUNWlibusb, SUNWlibugenusb
Interface Stability	External
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#)

<http://libusb.sourceforge.net>

**Name** libuuid – UUID library

**Synopsis** `cc [ flag... ] file... -luuid [ library... ]`  
`#include <uuid/uuid.h>`

**Description** The functions in this library perform operations on a universally unique identifier (UUID).

**Interfaces** The shared object `libuuid.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>uuid_clear</code>	<code>uuid_compare</code>
<code>uuid_copy</code>	<code>uuid_generate</code>
<code>uuid_generate_random</code>	<code>uuid_generate_time</code>
<code>uuid_is_null</code>	<code>uuid_parse</code>
<code>uuid_time</code>	<code>uuid_unparse</code>

**Files** `/lib/libuuid.so.1` shared object  
`/lib/64/libuuid.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Committed
MT-Level	Safe

**See Also** [Intro\(3\)](#), [uuid\\_clear\(3UUID\)](#), [attributes\(5\)](#)

**Name** libvolmgt – volume management library

**Synopsis** `cc [ flag... ] file... -lvolmgt [ library... ]  
#include <volmgt.h>`

**Description** Functions in this library provide access to the volume management services.

**Interfaces** The shared object `libvolmgt.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>media_findname</code>	<code>media_getattr</code>
<code>media_getid</code>	<code>media_setattr</code>
<code>volmgt_acquire</code>	<code>volmgt_check</code>
<code>volmgt_feature_enabled</code>	<code>volmgt_inuse</code>
<code>volmgt_ownspath</code>	<code>volmgt_release</code>
<code>volmgt_root</code>	<code>volmgt_running</code>
<code>volmgt_symdev</code>	<code>volmgt_symname</code>

**Files** `/usr/lib/libvolmgt.so.1` shared object  
`/usr/lib/64/libvolmgt.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe with exceptions

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [media\\_findname\(3VOLMGT\)](#), [attributes\(5\)](#)

**Notes** The MT-Level for this library of interfaces is Safe, except for [media\\_findname\(3VOLMGT\)](#), which is Unsafe.

**Name** libw – wide character library

**Synopsis** cc [ *flag...* ] *file...* [ *library...* ]  
#include <wchar.h>

**Description** Historically, functions in this library provided wide character translations. This functionality now resides in [libc\(3LIB\)](#).

This library is maintained to provide backward compatibility for both runtime and compilation environments. The shared object is implemented as a filter on libc.so.1. New application development need not specify -lw.

**Interfaces** The shared object libw.so.1 provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

fgetwc	fgetws	fputwc
fputws	getwc	getwchar
getws	isenglish	isideogram
isnumber	isphonogram	isspecial
iswalnum	iswalpha	iswcntrl
iswctype	iswdigit	iswgraph
iswlower	iswprint	iswpunct
iswspace	iswupper	iswxdigit
putwc	putwchar	putws
strtows	tolower	toupper
ungetwc	watoll	wscat
wcschr	wscmp	wscoll
wcscpy	wcscspn	wcsftime
wcslen	wcsncat	wcsncmp
wcsncpy	wcspbrk	wcsrchr
wcsspn	wctod	wcstok
wcstol	wcstoul	wcswcs
wcswidth	wcsxfrm	wctype
wcwidth	wscasecmp	wscat
wchr	wscmp	wscol

wscoll	wscopy	wscspn
wsdup	wslen	wsncasecmp
wscat	wsncmp	wsncpy
wspbrk	wsprintf	wsrchr
wsscand	wsspn	wstod
wstok	wstol	wstoll
wstostr	wsxfrm	

**Files** /lib/libw.so.1 a filter on libc.so.1  
 /lib/64/libw.so.1 a filter on 64/libc.so.1

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
MT-Level	Safe

**See Also** [pvs\(1\)](#), [Intro\(3\)](#), [libc\(3LIB\)](#), [attributes\(5\)](#)

**Name** libwsreg – product install registry library

**Synopsis** `cc [ flag... ] file... -lwsreg [ library... ]  
#include <wsreg.h>`

**Description** Functions in this library provide access to the product install registry.

**Interfaces** The shared object `libwsreg.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>wsreg_add_child_component</code>	<code>wsreg_add_compatible_version</code>
<code>wsreg_add_dependent_component</code>	<code>wsreg_add_display_name</code>
<code>wsreg_add_required_component</code>	<code>wsreg_can_access_registry</code>
<code>wsreg_clone_component</code>	<code>wsreg_components_equal</code>
<code>wsreg_create_component</code>	<code>wsreg_free_component</code>
<code>wsreg_free_component_array</code>	<code>wsreg_get</code>
<code>wsreg_get_all</code>	<code>wsreg_get_child_components</code>
<code>wsreg_get_compatible_versions</code>	<code>wsreg_get_data</code>
<code>wsreg_get_data_pairs</code>	<code>wsreg_get_dependent_components</code>
<code>wsreg_get_display_languages</code>	<code>wsreg_get_display_name</code>
<code>wsreg_get_id</code>	<code>wsreg_get_instance</code>
<code>wsreg_get_location</code>	<code>wsreg_get_parent</code>
<code>wsreg_get_required_components</code>	<code>wsreg_get_type</code>
<code>wsreg_get_uninstaller</code>	<code>wsreg_get_unique_name</code>
<code>wsreg_get_vendor</code>	<code>wsreg_get_version</code>
<code>wsreg_initialize</code>	<code>wsreg_query_create</code>
<code>wsreg_query_free</code>	<code>wsreg_query_get_id</code>
<code>wsreg_query_get_instance</code>	<code>wsreg_query_get_location</code>
<code>wsreg_query_get_unique_name</code>	<code>wsreg_query_get_version</code>
<code>wsreg_query_set_id</code>	<code>wsreg_query_set_instance</code>
<code>wsreg_query_set_location</code>	<code>wsreg_query_set_unique_name</code>
<code>wsreg_query_set_version</code>	<code>wsreg_register</code>
<code>wsreg_remove_child_component</code>	<code>wsreg_remove_compatible_version</code>

<code>wsreg_remove_dependent_component</code>	<code>wsreg_remove_display_name</code>
<code>wsreg_remove_required_component</code>	<code>wsreg_set_data</code>
<code>wsreg_set_id</code>	<code>wsreg_set_instance</code>
<code>wsreg_set_location</code>	<code>wsreg_set_parent</code>
<code>wsreg_set_type</code>	<code>wsreg_set_uninstaller</code>
<code>wsreg_set_unique_name</code>	<code>wsreg_set_vendor</code>
<code>wsreg_set_version</code>	<code>wsreg_unregister</code>

**Files** `/usr/lib/libwsreg.so.1` shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWwsr2
MT-Level	Unsafe

**See Also** [prodreg\(1M\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** libxnet – X/Open Networking library

**Synopsis** `cc [ flag... ] file... -lxnet [ library... ]`

**Description** Functions in this library provide networking interfaces which comply with the X/Open CAE Specification, Networking Services, Issue 4.

**Interfaces** The shared object `libxnet.so.1` provides the public interfaces defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>__t_errno</code>	<code>__xnet_bind</code>
<code>__xnet_connect</code>	<code>__xnet_getsockopt</code>
<code>__xnet_listen</code>	<code>__xnet_recvmsg</code>
<code>__xnet_sendmsg</code>	<code>__xnet_sendto</code>
<code>__xnet_socket</code>	<code>__xnet_socketpair</code>
<code>_xti_accept</code>	<code>_xti_alloc</code>
<code>_xti_bind</code>	<code>_xti_close</code>
<code>_xti_connect</code>	<code>_xti_error</code>
<code>_xti_free</code>	<code>_xti_getinfo</code>
<code>_xti_getprotaddr</code>	<code>_xti_getstate</code>
<code>_xti_listen</code>	<code>_xti_look</code>
<code>_xti_open</code>	<code>_xti_optmgmt</code>
<code>_xti_rcv</code>	<code>_xti_rcvconnect</code>
<code>_xti_rcvdis</code>	<code>_xti_rcvrel</code>
<code>_xti_rcvreldata</code>	<code>_xti_rcvudata</code>
<code>_xti_rcvuderr</code>	<code>_xti_rcvv</code>
<code>_xti_rcvvudata</code>	<code>_xti_snd</code>
<code>_xti_snddis</code>	<code>_xti_sndrel</code>
<code>_xti_sndreldata</code>	<code>_xti_sndudata</code>
<code>_xti_sndv</code>	<code>_xti_sndvudata</code>
<code>_xti_strerror</code>	<code>_xti_sync</code>
<code>_xti_sysconf</code>	<code>_xti_unbind</code>
<code>_xti_xns5_accept</code>	<code>_xti_xns5_snd</code>



---

accept	bind
connect	endhostent
endnetent	endprotoent
endservent	freeaddrinfo
gai_strerror	getaddrinfo
gethostbyaddr	gethostbyname
gethostent	gethostname
getnameinfo	getnetbyaddr
gethostname	getnetbyname
getnetbyname	getnetent
getpeername	getprotobyname
getprotobynumber	getprotoent
getservbyname	getservbyport
getservent	getsockname
getsockopt	h_errno
htonl	htons
if_freenameindex	if_indextoname
if_nameindex	if_nametoindex
inet_addr	inet_lnaof
inet_makeaddr	inet_netof
inet_network	inet_ntoa
inet_ntop	inet_pton
listen	ntohl
ntohs	recv
recvfrom	recvmsg
send	sendmsg
sendto	sethostent
setnetent	setprotoent
setservent	setsockopt

shutdown socketatmark  
socket socketpair  
t\_errno

**Files** /lib/libxnet.so.1 shared object  
/lib/64/libxnet.so.1 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl (32-bit) SUNWcslx (64-bit)
Interface Stability	Standard
MT-Level	Safe

**See Also** [Intro\(3\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** libXtsol, libxtsol – Trusted Extensions to X Windows Library

**Synopsis** `cc [flag...] file... -lX11 -lXtsol [library...]  
#include <X11/extensions/Xtsol.h>`

**Description** Functions in this library provide Trusted Extensions to the X windows library.

The functions in this library are available only if the system is configured with Trusted Extensions.

**Interfaces** The shared object `libXtsol.so.1` provides the public interfaces that are defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

<code>XTSOLIsWindowTrusted</code>	<code>XTSOLMakeTPWindow</code>
<code>XTSOLgetClientAttributes</code>	<code>XTSOLgetPropAttributes</code>
<code>XTSOLgetPropLabel</code>	<code>XTSOLgetPropUID</code>
<code>XTSOLgetResAttributes</code>	<code>XTSOLgetResLabel</code>
<code>XTSOLgetResUID</code>	<code>XTSOLgetSSHeight</code>
<code>XTSOLgetWorkstationOwner</code>	<code>XTSOLsetPolyInstInfo</code>
<code>XTSOLsetPropLabel</code>	<code>XTSOLsetPropUID</code>
<code>XTSOLsetResLabel</code>	<code>XTSOLsetResUID</code>
<code>XTSOLsetSSHeight</code>	<code>XTSOLsetSessionHI</code>
<code>XTSOLsetSessionLO</code>	<code>XTSOLsetWorkstationOwner</code>

**Files** `/lib/libXtsol.so.1` shared object  
`/lib/64/libXtsol.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWxwts
Interface Stability	Committed
MT-Level	Unsafe

**See Also** [Intro\(3\)](#), [libtsnet\(3LIB\)](#), [libtsol\(3LIB\)](#), [attributes\(5\)](#)

**Notes** The functionality described on this manual page is available only if the system has been configured with Trusted Extensions.

**Name** liby – yacc library

**Synopsis** `cc [ flag... ] file... -ly [ library... ]`

**Description** The function in this library provides a user interface to the [yacc\(1\)](#) library.

**Interfaces** The shared object `liby.so.1` provides the public interface defined below. See [Intro\(3\)](#) for additional information on shared object interfaces.

main yyerror

**Files** `/usr/lib/liby.so.1` shared object  
`/usr/lib/64/liby.so.1` 64-bit shared object

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Availability	SUNWcsl, SUNWbtool (32-bit) SUNWcslx (64-bit)
MT-Level	Unsafe

**See Also** [yacc\(1\)](#), [Intro\(3\)](#), [attributes\(5\)](#)

**Name** limits.h, limits – implementation-defined constants

**Synopsis** #include <limits.h>

**Description** The <limits.h> header defines various symbolic names. Different categories of names are described below.

The names represent various limits on resources that the implementation imposes on applications. Symbolic constant names beginning with `_POSIX` can be found in [unistd.h\(3HEAD\)](#).

Applications should not assume any particular value for a limit. An application wishing to avail itself of the full amount of a resource available on an implementation can make use of the value given in limits.h on that particular implementation by using the symbolic names listed below. Many of the listed limits are not invariant, and at runtime, the value of the limit might differ from those given in this header, for the following reasons:

- The limit is pathname-dependent.
- The limit differs between the compile and runtime machines.

For these reasons, an application can use the [fpathconf\(2\)](#), [pathconf\(2\)](#), and [sysconf\(3C\)](#) functions to determine the actual value of a limit at runtime.

Runtime Invariant Values (Possibly Indeterminate)	AIO_LISTIO_MAX	Maximum number of I/O operations in a single list I/O call supported by the implementation.
	AIO_MAX	Maximum number of outstanding asynchronous I/O operations supported by the implementation.
	AIO_PRIO_DELTA_MAX	The maximum amount by which a process can decrease its asynchronous I/O priority level from its own scheduling priority.
	ARG_MAX	Maximum length of argument to the <a href="#">exec(2)</a> functions including environment data.
	ATEXIT_MAX	Maximum number of functions that can be registered with <a href="#">atexit(3C)</a> .
	CHILD_MAX	Maximum number of simultaneous processes per real user ID.
	CLK_TCK	Number of clock ticks per second returned by the <a href="#">times(2)</a> function.
	DELAYTIMER_MAX	Maximum number of timer expiration overruns.
	HOST_NAME_MAX	Maximum length of a host name (not including the terminating null) as returned from the <a href="#">gethostname(3C)</a> function.

IOV_MAX	Maximum number of <code>iovec</code> structures that one process has available for use with <code>read(2)</code> or <code>write(2)</code> .
LOGIN_NAME_MAX	Maximum length of a login name.
MQ_OPEN_MAX	The maximum number of open message queue descriptors a process is allowed to hold.
LOGIN_NAME_MAX	Maximum length of a login name.
MQ_OPEN_MAX	The maximum number of open message queue descriptors a process is allowed to hold.
MQ_PRIO_MAX	The maximum number of message priorities supported by the implementation.
OPEN_MAX	Maximum number of files that one process can have open at any one time.
PAGESIZE	Size in bytes of a page.
PAGE_SIZE	Equivalent to <code>PAGESIZE</code> . If either <code>PAGESIZE</code> or <code>PAGE_SIZE</code> is defined, the other is defined with the same value.
PASS_MAX	The maximum number of significant bytes in a password, not including the terminating null.
PTHREAD_DESTRUCTOR_ITERATIONS	Maximum number of attempts made to destroy a thread's thread-specific data values on thread exit.
PTHREAD_KEYS_MAX	Maximum number of data keys that can be created by a process.
PTHREAD_STACK_MIN	Minimum size in bytes of thread stack storage.
PTHREAD_THREADS_MAX	Maximum number of threads that can be created per process.
RE_DUP_MAX	The number of repeated occurrences of a BRE permitted by the <code>regex(3C)</code> and <code>regcomp(3C)</code> functions when using the interval notation $\{(m,n)\}$ .
RTSIG_MAX	Maximum number of realtime signals reserved for application use in this implementation.
SEM_NSEMS_MAX	Maximum number of semaphores that a process can have.
SEM_VALUE_MAX	The maximum value a semaphore can have.

SIGQUEUE_MAX	Maximum number of queued signals that a process can send and have pending at the receiver(s) at any time.
SS_REPL_MAX	The maximum number of replenishment operations that may be simultaneously pending for a particular sporadic server scheduler.
STREAM_MAX	The number of streams that one process can have open at one time. If defined, it has the same value as FOPEN_MAX.
SYMLOOP_MAX	Maximum number of symbolic links that can be reliably traversed in the resolution of a pathname in the absence of a loop.
TIMER_MAX	Maximum number of timers per process supported by the implementation.
TRACE_EVENT_NAME_MAX	Maximum length of the trace event name.
TRACE_NAME_MAX	Maximum length of the trace generation version string or of the trace stream name.
TRACE_SYS_MAX	Maximum number of trace streams that may simultaneously exist in the system.
TRACE_USER_EVENT_MAX	Maximum number of user trace event type identifiers that may simultaneously exist in a traced process, including the predefined user trace event POSIX_TRACE_UNNAMED_USER_EVENT.
TTY_NAME_MAX	Maximum length of terminal device name.
TZNAME_MAX	Maximum number of bytes supported for the name of a timezone (not of the TZ variable).
Pathname Variable Values	The values in the following list can be constants within an implementation or can vary from one pathname to another. For example, file systems or directories can have different characteristics. The value supported for a specific pathname is provided by the <a href="#">pathconf(2)</a> function.
FILESIZEBITS	Minimum number of bits needed to represent, as a signed integer value, the maximum size of a regular file allowed in the specified directory.
LINK_MAX	Maximum number of links to a single file.
MAX_CANON	Maximum number of bytes in a terminal canonical input line.

MAX_INPUT	Minimum number of bytes for which space is available in a terminal input queue; therefore, the maximum number of bytes a conforming application may require to be typed as input before reading them.
NAME_MAX	Maximum number of bytes in a filename (not including terminating null).
PATH_MAX	Maximum number of bytes in a pathname, including the terminating null character.
PIPE_BUF	Maximum number of bytes that is guaranteed to be atomic when writing to a pipe.
POSIX_ALLOC_SIZE_MIN	Minimum number of bytes of storage actually allocated for any portion of a file.
POSIX_REC_INCR_XFER_SIZE	Recommended increment for file transfer sizes between the POSIX_REC_MIN_XFER_SIZE and POSIX_REC_MAX_XFER_SIZE values.
POSIX_REC_MAX_XFER_SIZE	Maximum recommended file transfer size.
POSIX_REC_MIN_XFER_SIZE	Minimum recommended file transfer size.
POSIX_REC_XFER_ALIGN	Recommended file transfer buffer alignment.
SYMLINK_MAX	Maximum number of bytes in a symbolic link.

Runtime Inceasable  
Values

The magnitude limitations in the following list are fixed by specific implementations. An application should assume that the value supplied by `<limits.h>` in a specific implementation is the minimum that pertains whenever the application is run under that implementation. A specific instance of a specific implementation can increase the value relative to that supplied by `<limits.h>` for that implementation. The actual value supported by a specific instance is provided by the `sysconf(3C)` function.

BC_BASE_MAX	Maximum obase values allowed by the <code>bc(1)</code> utility.
BC_DIM_MAX	Maximum number of elements permitted in an array by the <code>bc</code> utility.
BC_SCALE_MAX	Maximum scale value allowed by the <code>bc</code> utility.
BC_STRING_MAX	Maximum length of a string constant accepted by the <code>bc</code> utility.
CHARCLASS_NAME_MAX	Maximum number of bytes in a character class name.
COLL_WEIGHTS_MAX	Maximum number of weights that can be assigned to an entry of the <code>LC_COLLATE</code> order keyword in the locale definition file.
EXPR_NEST_MAX	Maximum number of expressions that can be nested within parentheses by the <code>expr(1)</code> utility.



	EXPR_NEST_MAX	Maximum number of expressions that can be nested within parentheses by the <code>expr</code> utility.
	LINE_MAX	Unless otherwise noted, the maximum length, in bytes, of a utility's input line (either standard input or another file), when the utility is described as processing text files. The length includes room for the trailing <code>&lt;newline&gt;</code> .
	NGROUPS_MAX	Maximum number of simultaneous supplementary group IDs per process.
	RE_DUP_MAX	Maximum number of repeated occurrences of a regular expression permitted when using the interval notation <code>\{m,n\}</code> .
Maximum Values	The symbolic constants in the following list are symbolic names for the most restrictive value for certain features on an implementation supporting the POSIX Timers option.	
	_POSIX_CLOCKRES_MIN	The resolution of the <code>CLOCK_REALTIME</code> clock, in nanoseconds.
Minimum Values	The symbolic constants in the following list are symbolic names for the most restrictive value for certain features on an implementation conforming to various POSIX and Single Unix Specification requirements. See <a href="#">standards(5)</a> .	
	_POSIX_AIO_LISTIO_MAX	The number of I/O operations that can be specified in a list I/O call.
	_POSIX_AIO_MAX	The number of outstanding asynchronous I/O operations.
	_POSIX_ARG_MAX	Maximum length of argument to the <code>exec(2)</code> functions including environment data.
	_POSIX_CHILD_MAX	Maximum number of simultaneous processes per real user ID.
	_POSIX_DELAYTIMER_MAX	The number of timer expiration overruns.
	_POSIX_HOST_NAME_MAX	Maximum length of a host name (not including the terminating null) as returned from the <code>gethostname(3C)</code> function.
	_POSIX_LINK_MAX	Maximum number of links to a single file.
	_POSIX_LOGIN_NAME_MAX	The size of the storage required for a login name, in bytes, including the terminating null.
	_POSIX_MAX_CANON	Maximum number of bytes in a terminal canonical input queue.
	_POSIX_MAX_INPUT	Maximum number of bytes allowed in a terminal input queue.

<code>_POSIX_MQ_OPEN_MAX</code>	The number of message queues that can be open for a single process.
<code>_POSIX_MQ_PRIO_MAX</code>	The maximum number of message priorities supported by the implementation.
<code>_POSIX_NAME_MAX</code>	Maximum number of bytes in a filename (not including terminating null).
<code>_POSIX_NGROUPS_MAX</code>	Maximum number of simultaneous supplementary group IDs per process.
<code>_POSIX_OPEN_MAX</code>	Maximum number of files that one process can have open at any one time.
<code>_POSIX_PATH_MAX</code>	Maximum number of bytes in a pathname.
<code>_POSIX_PIPE_BUF</code>	Maximum number of bytes that is guaranteed to be atomic when writing to a pipe.
<code>_POSIX_RE_DUP_MAX</code>	The number of repeated occurrences of a BRE permitted by the <code>regexec()</code> and <code>regcomp()</code> functions when using the interval notation $\{(m,n)\}$
<code>_POSIX_RTSIG_MAX</code>	The number of realtime signal numbers reserved for application use.
<code>_POSIX_SEM_NSEMS_MAX</code>	The number of semaphores that a process can have.
<code>_POSIX_SEM_VALUE_MAX</code>	The maximum value a semaphore can have.
<code>_POSIX_SIGQUEUE_MAX</code>	The number of queued signals that a process can send and have pending at the receiver(s) at any time.
<code>_POSIX_SSIZE_MAX</code>	The value that can be stored in an object of type <code>ssize_t</code> .
<code>_POSIX_STREAM_MAX</code>	The number of streams that one process can have open at one time.
<code>_POSIX_SS_REPL_MAX</code>	The number of replenishment operations that can be simultaneously pending for a particular sporadic server scheduler.
<code>_POSIX_SYMLINK_MAX</code>	The number of bytes in a symbolic link.

---

<code>_POSIX_SYMLINK_MAX</code>	The number of symbolic links that can be traversed in the resolution of a pathname in the absence of a loop.
<code>_POSIX_THREAD_DESTRUCTOR_ITERATIONS</code>	The number of attempts made to destroy a thread's thread-specific data values on thread exit.
<code>_POSIX_THREAD_KEYS_MAX</code>	The number of data keys per process.
<code>_POSIX_THREAD_THREADS_MAX</code>	The number of threads per process.
<code>_POSIX_TIMER_MAX</code>	The per-process number of timers.
<code>_POSIX_TRACE_EVENT_NAME_MAX</code>	The length in bytes of a trace event name.
<code>_POSIX_TRACE_NAME_MAX</code>	The length in bytes of a trace generation version string or a trace stream name.
<code>_POSIX_TRACE_SYS_MAX</code>	The number of trace streams that can simultaneously exist in the system.
<code>_POSIX_TRACE_USER_EVENT_MAX</code>	The number of user trace event type identifiers that may simultaneously exist in a traced process, including the predefined user trace event <code>POSIX_TRACE_UNNAMED_USER_EVENT</code> .
<code>_POSIX_TTY_NAME_MAX</code>	The size of the storage required for a terminal device name, in bytes, including the terminating null.
<code>_POSIX_TZNAME_MAX</code>	Maximum number of bytes supported for the name of a timezone (not of the <code>TZ</code> variable).
<code>_POSIX2_BC_BASE_MAX</code>	Maximum obase values allowed by the <code>bc</code> utility.
<code>_POSIX2_BC_DIM_MAX</code>	Maximum number of elements permitted in an array by the <code>bc</code> utility.
<code>_POSIX2_BC_SCALE_MAX</code>	Maximum scale value allowed by the <code>bc</code> utility.
<code>_POSIX2_BC_STRING_MAX</code>	Maximum length of a string constant accepted by the <code>bc</code> utility.
<code>_POSIX2_CHARCLASS_NAME_MAX</code>	Maximum number of bytes in a character class name.
<code>_POSIX2_COLL_WEIGHTS_MAX</code>	Maximum number of weights that can be assigned to an entry of the <code>LC_COLLATE</code> order keyword in the locale definition file.

<code>_POSIX2_EXPR_NEST_MAX</code>	Maximum number of expressions that can be nested within parentheses by the <code>expr</code> utility.
<code>_POSIX2_LINE_MAX</code>	Unless otherwise noted, the maximum length, in bytes, of a utility's input line (either standard input or another file), when the utility is described as processing text files. The length includes room for the trailing <newline>.
<code>_POSIX2_RE_DUP_MAX</code>	Maximum number of repeated occurrences of a regular expression permitted when using the interval notation $\{m,n\}$ .
<code>_XOPEN_IOV_MAX</code>	Maximum number of <code>iovec</code> structures that one process has available for use with <code>read(2)</code> or <code>write(2)</code> .
<code>_XOPEN_NAME_MAX</code>	Maximum number of bytes in a filename (not including the terminating null).
<code>_XOPEN_PATH_MAX</code>	Maximum number of bytes in a pathname.

**Numerical Limits** The values in the following lists shall be defined in `<limits.h>` and are constant expressions suitable for use in `#if` preprocessing directives. Moreover, except for `CHAR_BIT`, `DBL_DIG`, `DBL_MAX`, `FLT_DIG`, `FLT_MAX`, `LONG_BIT`, `WORD_BIT`, and `MB_LEN_MAX`, the symbolic names are defined as expressions of the correct type.

If the value of an object of type `char` is treated as a signed integer when used in an expression, the value of `CHAR_MIN` is the same as that of `SCHAR_MIN` and the value of `CHAR_MAX` is the same as that of `SCHAR_MAX`. Otherwise, the value of `CHAR_MIN` is 0 and the value of `CHAR_MAX` is the same as that of `UCHAR_MAX`.

<code>CHAR_BIT</code>	Number of bits in a type <code>char</code> .
<code>CHAR_MAX</code>	Maximum value of type <code>char</code> .
<code>CHAR_MIN</code>	Minimum value of type <code>char</code> .
<code>DBL_DIG</code>	Digits of precision of type <code>double</code> .
<code>DBL_MAX</code>	Maximum decimal value of a <code>double</code> .
<code>DBL_MIN</code>	Minimum decimal value of a <code>double</code> .
<code>FLT_DIG</code>	Digits of precision of type <code>float</code> .
<code>FLT_MAX</code>	Maximum decimal value of a <code>float</code> .
<code>FLT_MIN</code>	Minimum decimal value of a <code>float</code> .

INT_MIN	Minimum value of type <code>int</code> .
INT_MAX	Maximum value of an <code>int</code> .
LLONG_MIN	Minimum value of type <code>long long</code> .
LLONG_MAX	Maximum value of type <code>long long</code> .
LONG_BIT	Number of bits in a <code>long</code> .
LONG_MIN	Minimum value of type <code>long</code> .
LONG_MAX	Maximum value of a <code>long</code> .
MB_LEN_MAX	Maximum number of bytes in a character, for any supported locale.
SCHAR_MIN	Minimum value of type <code>signed char</code> .
SCHAR_MAX	Maximum value of type <code>signed char</code> .
SHRT_MIN	Minimum value of type <code>short</code> .
SHRT_MAX	Maximum value of type <code>short</code> .
SSIZE_MAX	Maximum value of an object of type <code>ssize_t</code> .
TMP_MAX	Minimum number of unique filename generated by <code>tmpnam(3C)</code> . Maximum number of times an application can call <code>tmpnam()</code> reliably.
UCHAR_MAX	Maximum value of type <code>unsigned char</code> .
UINT_MAX	Maximum value of type <code>unsigned</code> .
ULLONG_MAX	Maximum value of type <code>unsigned long long</code> .
ULONG_MAX	Maximum value of type <code>unsigned long</code> .
USHRT_MAX	Maximum value for a type <code>unsigned short</code> .
WORD_BIT	Number of bits in a word or type <code>int</code> .

Other Invariant Values The following constants are defined in `<limits.h>`.

CHARCLASS_NAME_MAX	Maximum number of bytes in a character class name.
LOGNAME_MAX	The maximum number of bytes supported in a user's login name.
NL_ARGMAX	Maximum value of digit in calls to the <code>printf(3C)</code> and <code>scanf(3C)</code> functions.
NL_LANGMAX	Maximum number of bytes in a LANG name.
NL_MSGMAX	Maximum message number.
NL_NMAX	Maximum number of bytes in an N-to-1 collation mapping.
NL_SETMAX	Maximum set number.

NL_TEXTMAX	Maximum number of bytes in a message string.
NZERO	Default process priority.

**See Also** [fpathconf\(2\)](#), [pathconf\(2\)](#), [sysconf\(3C\)](#), [standards\(5\)](#)

**Name** locale.h, locale – category macros

**Synopsis** #include <locale.h>

**Description** The <locale.h> header provides a definition for the `lconv` structure, which includes the following members. (See the definition of `LC_MONETARY` in [locale\(5\)](#).)

```
char    *currency_symbol
char    *decimal_point
char    frac_digits
char    *grouping
char    *int_curr_symbol
char    int_frac_digits
char    int_n_cs_precedes
char    int_n_sep_by_space
char    int_n_sign_posn
char    int_p_cs_precedes
char    int_p_sep_by_space
char    int_p_sign_posn
char    *mon_decimal_point
char    *mon_grouping
char    *mon_thousands_sep
char    *negative_sign
char    n_cs_precedes
char    n_sep_by_space
char    n_sign_posn
char    *positive_sign
char    p_cs_precedes
char    p_sep_by_space
char    p_sign_posn
char    *thousands_sep
```

The <locale.h> header defines `NULL` (as defined in <stddef.h>) and the following as macros:

```
LC_ALL
LC_COLLATE
LC_CTYPE
LC_MESSAGES
LC_MONETARY
LC_NUMERIC
LC_TIME
```

The preceding expand to distinct integer constant expressions, for use as the first argument to the `setlocale()` function. See [setlocale\(3C\)](#).

Additional macro definitions, beginning with the characters `LC_` and an uppercase letter, can also be specified here.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [setlocale\(3C\)](#), [localeconv\(3C\)](#), [stddef.h\(3HEAD\)](#), [attributes\(5\)](#), [locale\(5\)](#), [standards\(5\)](#)



**Name** math.h, math – mathematical declarations

**Synopsis** #include <math.h>

**Description** The <math.h> header includes definitions for the following types:

`float_t` A real-floating type at least as wide as `float`.

`double_t` A real-floating type at least as wide as `double`, and at least as wide as `float_t`.

If `FLT_EVAL_METHOD` equals 0, `float_t` and `double_t` are `float` and `double`, respectively. If `FLT_EVAL_METHOD` equals 1, they are both `double`. If `FLT_EVAL_METHOD` equals 2, they are both `long double`. Other values of `FLT_EVAL_METHOD` are implementation-defined.

The <math.h> header provides the following constants. The values are of type `double` and are accurate within the precision of the `double` type.

`M_E` The base of natural logarithms ( $e$ ).

`M_LOG2E` The base-2 logarithm of  $e$ .

`M_LOG10E` The base-10 logarithm of  $e$ .

`M_LN2` The natural logarithm of 2.

`M_LN10` The natural logarithm of 10.

`M_PI`  $\pi$ , the ratio of the circumference of a circle to its diameter.

`M_PI_2`  $\pi/2$ .

`M_PI_4`  $\pi/4$ .

`M_1_PI`  $1/\pi$ .

`M_2_PI`  $2/\pi$ .

`M_2_SQRTPI` 2 over the square root of  $\pi$ .

`M_SQRT2` The positive square root of 2.

`M_SQRT1_2` The positive square root of  $1/2$ .

The <math.h> header defines the following symbolic constants:

`MAXFLOAT` The maximum value of a non-infinite single-precision floating point number.

`HUGE_VAL` A positive `double` expression, not necessarily representable as a `float`. Used as an error value returned by the mathematics library. `HUGE_VAL` evaluates to +infinity on systems supporting IEEE Std 754-1985.

`HUGE_VALF` A positive `float` constant expression. Used as an error value returned by the mathematics library. `HUGE_VALF` evaluates to +infinity on systems supporting IEEE Std 754-1985.

<code>HUGE_VALL</code>	A positive long double constant expression. Used as an error value returned by the mathematics library. <code>HUGE_VALL</code> evaluates to +infinity on systems supporting IEEE Std 754-1985.
<code>INFINITY</code>	A constant expression of type <code>float</code> representing positive or unsigned infinity, if available; else a positive constant of type <code>float</code> that overflows at translation time.
<code>NAN</code>	A constant expression of type <code>float</code> representing a quiet NaN. This symbolic constant is only defined if the implementation supports quiet NaNs for the <code>float</code> type.

The following macros are defined for number classification. They represent the mutually-exclusive kinds of floating-point values. They expand to integer constant expressions with distinct values

```
FP_INFINITE
FP_NAN
FP_NORMAL
FP_SUBNORMAL
FP_ZERO
```

The following optional macros indicate whether the `fma()` family of functions are fast compared with direct code:

```
FP_FAST_FMA
FP_FAST_FMAF
FP_FAST_FMAL
```

The `FP_FAST_FMA` macro is defined to indicate that the `fma()` function generally executes about as fast as, or faster than, a multiply and an add of double operands. The other macros have the equivalent meaning for the `float` and long double versions.

The following macros expand to integer constant expressions whose values are returned by `ilogb(x)` if  $x$  is zero or NaN, respectively. The value of `FP_ILOGB0` is either `{INT_MIN}` or `-{INT_MAX}`. The value of `FP_ILOGBNAN` is either `{INT_MAX}` or `{INT_MIN}`.

```
FP_ILOGB0
FP_ILOGBNAN
```

The following macros expand to the integer constants 1 and 2, respectively:

```
MATH_ERRNO
MATH_ERREXCEPT
```

The following macro expands to an expression that has type `int` and the value `MATH_ERREXCEPT`:

```
math_errhandling
```

The value of the macro `math_errhandling` is constant for the duration of the program. If a macro definition is suppressed or a program defines an identifier with the name `math_errhandling`, the behavior is undefined.

The `<math.h>` header defines the following external variable:

```
extern int siggam;
```

The `<math.h>` header defines the structure and constants used by the [matherr\(3M\)](#) error-handling mechanisms.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [Intro\(3\)](#), [fenv.h\(3HEAD\)](#), [libm\(3LIB\)](#), [limits.h\(3HEAD\)](#), [matherr\(3M\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** mman.h, mman – memory management declarations

**Synopsis** #include <sys/mman.h>

**Description** The <sys/mman.h> header supports the following options:

- the Memory Mapped Files option
- the Shared Memory Objects option
- the Process Memory Locking option
- the Memory Protection option
- the Synchronized Input and Output option

For Memory Mapped Files and Shared Memory Objects options, the following protection options are defined:

PROT\_READ     Page can be read.  
PROT\_WRITE    Page can be written.  
PROT\_EXEC     Page can be executed.  
PROT\_NONE     Page cannot be accessed.

The following *flag* options are defined:

MAP\_SHARED    Share changes.  
MAP\_PRIVATE   Changes are private.  
MAP\_FIXED     Interpret *addr* exactly.

The flags immediately following are defined for `msync()`. See [msync\(3C\)](#).

MS\_ASYNC      Perform asynchronous writes.  
MS\_SYNC       Perform synchronous writes.  
MS\_INVALIDATE  Invalidate mappings.

The symbolic constants immediately following are defined for the `mlockall()` function. See [mlockall\(3C\)](#).

MCL\_CURRENT   Lock currently mapped pages.  
MCL\_FUTURE    Lock pages that become mapped.

The symbolic constant `MAP_FAILED` is defined to indicate a failure from the `mmap()` function. See [mmap\(2\)](#).

The `mode_t`, `off_t`, and `size_t` types are defined as described in <sys/types.h>. See [types\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [mmap\(2\)](#), [mprotect\(2\)](#), [munmap\(2\)](#), [madvise\(3C\)](#), [mlock\(3C\)](#), [mlockall\(3C\)](#), [msync\(3C\)](#), [shm\\_open\(3C\)](#), [shm\\_unlink\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** `monetary.h`, `monetary` – monetary types

**Synopsis** `#include <monetary.h>`

**Description** The `<monetary.h>` header defines the following types:

`size_t` As described in [stddef.h\(3HEAD\)](#).

`ssize_t` As described in [types.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [stddef.h\(3HEAD\)](#), [strfmon\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** mqueue.h, mqueue – message queues

**Synopsis** #include <mqueue.h>

**Description** The <mqueue.h> header defines the `mqd_t` type, which is used for message queue descriptors. This will not be an array type. A message queue descriptor may be implemented using a file descriptor, in which case applications can open up to at least `OPEN_MAX` file and message queues.

The <mqueue.h> header defines the `sigevent` structure (as described in <signal.h>, see [signal.h\(3HEAD\)](#)) and the `mq_attr` structure, which is used in getting and setting the attributes of a message queue. Attributes are initially set when the message queue is created. A `mq_attr` structure has the following members:

```
long    mq_flags      message queue flags
long    mq_maxmsg     maximum number of messages
long    mq_msgsize    maximum message size
long    mq_curmsgs    number of messages currently queued
```

Inclusion of the <mqueue.h> header may make visible symbols defined in the headers <fcntl.h>, <signal.h>, <sys/types.h>, and <time.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [fcntl.h\(3HEAD\)](#), [signal.h\(3HEAD\)](#), [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** msg.h, msg – message queue structures

**Synopsis** #include <sys/msg.h>

**Description** The <sys/msg.h> header defines the following data types through typedef:

msgqnum\_t      used for the number of messages in the message queue

msglen\_t      used for the number of bytes allowed in the message queue

These types are unsigned integer types that are able to store values at least as large as a type unsigned short.

The <sys/msg.h> header defines the following constant as a message operation flag:

MSG\_NOERROR    no error if big message

The msgid\_ds structure contains the following members:

struct ipc_perm	msg_perm	Operation permission structure.
msgqnum_t	msg_qnum	Number of messages currently on queue.
msglen_t	msg_qbytes	Maximum number of bytes allowed on queue.
pid_t	msg_lspid	Process ID of last msgsnd(2).
pid_t	msg_lrpid	Process ID of last msgrcv(2).
time_t	msg_stime	Time of last msgsnd().
time_t	msg_rtime	Time of last msgrcv().
time_t	msg_ctime	Time of last change.

The pid\_t, time\_t, key\_t, size\_t, and ssize\_t types are defined as described in <sys/types.h>. See [types\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [msgctl\(2\)](#), [msgget\(2\)](#), [msgrcv\(2\)](#), [msgsnd\(2\)](#), [ipc.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** ndbm.h, ndbm – definitions for ndbm database operations

**Synopsis** `#include <ndbm.h>`

**Description** The `<ndbm.h>` header defines the `datum` type as a structure that includes at least the following members:

```
void *dptr    /* pointer to the application's data */
size_t dsize  /* size of the object pointed to by dptr */
```

The `size_t` type is defined through `typedef` as described in `<stddef.h>`.

The `<ndbm.h>` header defines the `DBM` type through `typedef`.

The following constants are defined as possible values for the `store_mode` argument to `dbm_store()`:

```
DBM_INSERT    Insertion of new entries only.
DBM_REPLACE   Allow replacing existing entries.
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [ndbm\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** netdb.h, netdb – definitions for network database operations

**Synopsis** #include <netdb.h>

**Description** The <netdb.h> header defines the type `in_port_t` and the type `in_addr_t` as described in [in.h\(3HEAD\)](#).

The <netdb.h> header defines the `hostent` structure that includes the following members:

```
char *h_name          /* official name of the host */
char **h_aliases      /* pointer to an array of pointers to
                       alternative host names, terminated
                       by a null pointer */

int  h_addrtype       /* address type */
int  h_length         /* length, in bytes, of the address */
char **h_addr_list    /* pointer to an array of pointers to
                       network addresses (in network byte
                       order)for the host, terminated by a
                       null pointer */
```

The <netdb.h> header defines the `netent` structure that includes the following members:

```
char      *n_name      /* official, fully-qualified */
                       (including the domain) name
                       of the network */
char      **n_aliases /* pointer to an array of pointers to
                       alternative network names, terminated */
                       by a null pointer */
int       n_addrtype   /* the address type of the network */
in_addr_t n_net       /* the network number, in host byte order */
```

The <netdb.h> header defines the `protoent` structure that includes the following members:

```
char *p_name          /* official name of the protocol */
char **p_aliases      /* pointer to an array of pointers to
                       alternative protocol names, terminated
                       by a null pointer */
int  p_proto          /* protocol number */
```

The <netdb.h> header defines the `servent` structure that includes the following members:

```
char *s_name          /* official name of the service */
char **s_aliases      /* pointer to an array of pointers to
                       alternativeservice names, terminated by
                       a null pointer */
int  s_port           /* port number at which the service
                       resides, in network byte order */
char *s_proto         /* name of the protocol to use when
                       contacting the service */
```

The <netdb.h> header defines the macro `IPPORT_RESERVED` with the value of the highest reserved Internet port number.

The `<netdb.h>` header provides a declaration for `h_errno`:

```
extern int h_errno;
```

The `<netdb.h>` header defines the following macros for use as error values for `gethostbyaddr()` and `gethostbyname()`:

```
HOST_NOT_FOUND          NO_DATA
NO_RECOVERY             TRY_AGAIN
```

Inclusion of the `<netdb.h>` header may also make visible all symbols from [in.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [Intro\(3\)](#), [endhostent\(3NSL\)](#), [endhostent\(3XNET\)](#), [endnetent\(3SOCKET\)](#), [endnetent\(3XNET\)](#), [endprotoent\(3SOCKET\)](#), [endprotoent\(3XNET\)](#), [endservent\(3SOCKET\)](#), [endservent\(3XNET\)](#), [in.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** nl\_types.h, nl\_types – native language data types

**Synopsis** #include <nl\_types.h>

**Description** This header contains the following definitions:

nl_catd	Used by the message catalog functions catopen, catgets and catclose to identify a catalog.
nl_item	Used by nl_langinfo to identify items of langinfo data. Values for objects of type nl_item are defined in <langinfo.h>.
NL_SETD	Used by genocat when no \$set directive is specified in a message text source file. This constant can be used in subsequent calls to catgets as the value of the set identifier parameter.
NL_MSGSMAX	Maximum number of messages per set.
NL_SETMAX	Maximum number of sets per catalog.
NL_TEXTMAX	Maximum size of a message.

**See Also** [genocat\(1\)](#), [catgets\(3C\)](#), [catopen\(3C\)](#), [nl\\_langinfo\(3C\)](#), [langinfo.h\(3HEAD\)](#)

**Name** poll.h, poll – definitions for the `poll()` function

**Synopsis** `#include <poll.h>`

**Description** The `<poll.h>` header defines the `pollfd` structure, which includes the following members:

`int fd`                the following descriptor being polled

`short events`        the input event flags (see below)

`short revents`       the output event flags (see below)

The `<poll.h>` header defines the following type through typedef:

`nfds_t`     an unsigned integer type used for the number of file descriptors

The implementation supports one or more programming environments in which the width of `nfds_t` is no greater than the width of type `long`. The names of these programming environments can be obtained using the `confstr()` function or the `getconf` utility. See [confstr\(3C\)](#) and [getconf\(1\)](#).

The following symbolic constants are defined, zero or more of which can be OR'ed together to form the `events` or `revents` members in the `pollfd` structure:

`POLLIN`            Data other than high-priority data can be read without blocking.

`POLLRDNORM`      Normal data can be read without blocking.

`POLLRDBAND`      Priority data can be read without blocking.

`POLLPRI`           High priority data can be read without blocking.

`POLLOUT`           Normal data can be written without blocking.

`POLLWRNORM`      Equivalent to `POLLOUT`.

`POLLWRBAND`      Priority data can be written.

`POLLERR`           An error has occurred (`revents` only).

`POLLHUP`           Device has been disconnected (`revents` only).

`POLLNVAL`          Invalid `fd` member (`revents` only).

The significance and semantics of normal, priority, and high-priority data are file and device-specific.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getconf\(1\)](#), [poll\(2\)](#), [confstr\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** pthread.h, pthread – threads

**Synopsis** #include <pthread.h>

**Description** The <pthread.h> header defines the following symbols:

```

PTHREAD_BARRIER_SERIAL_THREAD
PTHREAD_CANCEL_ASYNCHRONOUS
PTHREAD_CANCEL_ENABLE
PTHREAD_CANCEL_DEFERRED
PTHREAD_CANCEL_DISABLE
PTHREAD_CANCELED
PTHREAD_COND_INITIALIZER
PTHREAD_CREATE_DETACHED
PTHREAD_CREATE_JOINABLE
PTHREAD_EXPLICIT_SCHED
PTHREAD_INHERIT_SCHED
PTHREAD_MUTEX_DEFAULT
PTHREAD_MUTEX_ERRORCHECK
PTHREAD_MUTEX_INITIALIZER
PTHREAD_MUTEX_NORMAL
PTHREAD_MUTEX_RECURSIVE
PTHREAD_MUTEX_ROBUST
PTHREAD_MUTEX_STALLED
PTHREAD_ONCE_INIT
PTHREAD_PRIO_INHERIT
PTHREAD_PRIO_NONE
PTHREAD_PRIO_PROTECT
PTHREAD_PROCESS_SHARED
PTHREAD_PROCESS_PRIVATE
PTHREAD_RWLOCK_INITIALIZER
PTHREAD_SCOPE_PROCESS
PTHREAD_SCOPE_SYSTEM

```

The types listed below are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

```

pthread_attr_t
pthread_barrier_t
pthread_barrierattr_t
pthread_cond_t
pthread_condattr_t
pthread_key_t
pthread_mutex_t
pthread_mutexattr_t
pthread_once_t
pthread_rwlock_t
pthread_rwlockattr_t
pthread_spinlock_t
pthread_t

```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [sched.h\(3HEAD\)](#), [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [pthread\\_attr\\_getguardsize\(3C\)](#), [pthread\\_attr\\_init\(3C\)](#), [pthread\\_attr\\_setscope\(3C\)](#), [pthread\\_cancel\(3C\)](#), [pthread\\_cleanup\\_pop\(3C\)](#), [pthread\\_cond\\_init\(3C\)](#), [pthread\\_cond\\_signal\(3C\)](#), [pthread\\_cond\\_wait\(3C\)](#), [pthread\\_condattr\\_init\(3C\)](#), [pthread\\_create\(3C\)](#), [pthread\\_detach\(3C\)](#), [pthread\\_equal\(3C\)](#), [pthread\\_exit\(3C\)](#), [pthread\\_getconcurrency\(3C\)](#), [pthread\\_getschedparam\(3C\)](#), [pthread\\_join\(3C\)](#), [pthread\\_key\\_create\(3C\)](#), [pthread\\_key\\_delete\(3C\)](#), [pthread\\_mutex\\_consistent\(3C\)](#), [pthread\\_mutex\\_init\(3C\)](#), [pthread\\_mutex\\_lock\(3C\)](#), [pthread\\_mutex\\_setprioceiling\(3C\)](#), [pthread\\_mutexattr\\_getrobust\(3C\)](#), [pthread\\_mutexattr\\_gettype\(3C\)](#), [pthread\\_mutexattr\\_getprotocol\(3C\)](#), [pthread\\_mutexattr\\_init\(3C\)](#), [pthread\\_once\(3C\)](#), [pthread\\_rwlock\\_init\(3C\)](#), [pthread\\_rwlock\\_rdlock\(3C\)](#), [pthread\\_rwlock\\_unlock\(3C\)](#), [pthread\\_rwlock\\_wrlock\(3C\)](#), [pthread\\_rwlockattr\\_getpshared\(3C\)](#), [pthread\\_rwlockattr\\_init\(3C\)](#), [pthread\\_self\(3C\)](#), [pthread\\_setcancelstate\(3C\)](#), [pthread\\_setspecific\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** pwd.h, pwd – password structure

**Synopsis** #include <pwd.h>

**Description** The <pwd.h> header provides a definition for struct passwd, which includes the following members:

```
char *pw_name      user's login name
uid_t pw_uid       numerical user ID
gid_t pw_gid       numerical group ID
char *pw_dir       initial working di rectory
char *pw_shell     program to use as shell
```

The gid\_t and uid\_t types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getpwnam\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** regex.h, regex – regular expression matching types

**Synopsis** #include <regex.h>

**Description** The <regex.h> header defines the structures and symbolic constants used by the `regcomp()`, `regexexec()`, `regerror()`, and `regfree()` functions. See [regcomp\(3C\)](#).

The structure type `regex_t` contains the following member:

```
size_t re_nsub      number of parenthesized subexpressions
```

The type `size_t` is defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

The type `regoff_t` is defined as a signed integer type that can hold the largest value that can be stored in either a type `off_t` or type `ssize_t`. The structure type `regmatch_t` contains the following members:

```
regoff_t rm_so      byte offset from start of string to start
                    of substring
regoff_t rm_eo      byte offset from start of string of the
                    first character after the end of substring
```

Values for the *cflags* parameter to the `regcomp` function are as follows:

```
REG_EXTENDED      use extended regular expressions
REG_ICASE          ignore case in match
REG_NOSUB         report only success or fail in regexexec()
REG_NEWLINE       change the handling of NEWLINE character
```

Values for the *eflags* parameter to the `regexexec()` function are as follows:

```
REG_NOTBOL        The circumflex character (^), when taken as a special character, does not
                    match the beginning of string.
REG_NOTEOL        The dollar sign ($), when taken as a special character, does not match the end
                    of string.
```

The following constants are defined as error return values:

```
REG_NOMATCH       regexexec() failed to match.
REG_BADPAT        Invalid regular expression.
REG_ECOLLATE      Invalid collating element referenced.
REG_ECTYPE        Invalid character class type referenced.
REG_EESCAPE       Trailing '\' in pattern.
REG_ESUBREG       Number in \\digit invalid or in error.
REG_EBRACK        “[ ]” imbalance.
```

REG_EPAREN	“\(\)” or “()” imbalance.
REG_EBRACE	“\{\}” imbalance.
REG_BADBR	Content of “\{\}” invalid: not a number, number too large, more than two numbers, first larger than second.
REG_ERANGE	Invalid endpoint in range expression.
REG_ESPACE	Out of memory.
REG_BADRPT	'?', '*', or '+' not preceded by valid regular expression.
REG_ENOSYS	Reserved.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [regcomp\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** resource.h, resource – definitions for resource operations

**Synopsis** #include <sys/resource.h>

**Description** The <sys/resource.h> header defines the symbolic constants listed below as possible values of the *which* argument of `getpriority()` and `setpriority()`. See [getpriority\(3C\)](#).

PRIO\_PROCESS identifies the *who* argument as a process ID  
 PRIO\_PGRP identifies the *who* argument as a process group ID  
 PRIO\_USER identifies the *who* argument as a user ID

The following type is defined through typedef:

`rlim_t` unsigned integer type used for limit values

The following symbolic constants are defined:

RLIM\_INFINITY a value of `rlim_t` indicating no limit  
 RLIM\_SAVED\_MAX a value of type `rlim_t` indicating an unrepresentable saved hard limit  
 RLIM\_SAVED\_CUR a value of type `rlim_t` indicating an unrepresentable saved soft limit

The symbolic constants listed below are defined as possible values of the *who* parameter of `getrusage()`. See [getrusage\(3C\)](#).

RUSAGE\_SELF returns information about the current process  
 RUSAGE\_CHILDREN returns information about children of the current process

The <sys/resource.h> header defines the `rlimit` structure, which includes the following members:

```
rlim_t rlim_cur /* the current (soft) limit */
rlim_t rlim_max /* the hard limit */
```

The <sys/resource.h> header defines the `rusage` structure, which includes the following members:

```
struct timeval ru_utime /* user time used */
struct timeval ru_stime /* system time used */
```

The `timeval` structure is defined as described in <sys/time.h>.

The symbolic constants listed below are defined as possible values for the *resource* argument of `getrlimit()` and `setrlimit()`. See [getrlimit\(2\)](#).

RLIMIT\_CORE limit on size of core dump file  
 RLIMIT\_CPU limit on CPU time per process  
 RLIMIT\_DATA limit on data segment size

RLIMIT_FSIZE	limit on file size
RLIMIT_NOFILE	limit on number of open files
RLIMIT_STACK	limit on stack size
RLIMIT_AS	limit on address space size

The `id_t` type is defined through `typedef` as described in `<sys/types.h>`. See [types.h\(3HEAD\)](#).

Inclusion of the `<sys/resource.h>` header can also make visible all symbols from `<sys/time.h>`. See [time.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getrlimit\(2\)](#), [getpriority\(3C\)](#), [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** sched.h, sched – execution scheduling

**Synopsis** #include <sched.h>

**Description** The <sched.h> header defines the sched\_param structure, which contains the scheduling parameters required for implementation of each supported scheduling policy. This structure contains the following member:

```
int    sched_priority    process execution scheduling priority
```

Each process is controlled by an associated scheduling policy and priority. Associated with each policy is a priority range. Each policy definition specifies the minimum priority range for that policy. The priority ranges for each policy may overlap the priority ranges of other policies.

The scheduling policies are indicated by the values of the following symbolic constants:

SCHED_OTHER	Processes are scheduled according to the traditional Time-Sharing Class (TS) policy as described in <a href="#">prctl(2)</a> .
SCHED_FIFO	Processes are scheduled in the Real-Time (RT) scheduling class, according to the First-In-First-Out (FIFO) policy. Processes scheduled to this policy, if not preempted by a higher priority or interrupted by a signal, will proceed until completion.
SCHED_RR	Processes are scheduled in the Real-Time (RT) scheduling class, according to the Round-Robin (RR) policy. Processes scheduled to this policy, if not preempted by a higher priority or interrupted by a signal, will execute for a time period, returned by <a href="#">sched_rr_get_interval(3C)</a> or by the system.
SCHED_IA	Processes are scheduled according to the Inter-Active Class (IA) policy as described in <a href="#">prctl(2)</a> .
SCHED_FSS	Processes are scheduled according to the Fair-Share Class (FSS) policy as described in <a href="#">prctl(2)</a> .
SCHED_FX	Processes are scheduled according to the Fixed-Priority Class (FX) policy as described in <a href="#">prctl(2)</a> .

The values of these constants are distinct.

Inclusion of the <sched.h> header will make visible symbols defined in the header <time.h>.

**See Also** [prctl\(2\)](#), [sched\\_get\\_priority\\_max\(3C\)](#), [sched\\_get\\_priority\\_min\(3C\)](#), [sched\\_rr\\_get\\_interval\(3C\)](#), [time.h\(3HEAD\)](#)

**Name** search.h, search – search tables

**Synopsis** #include <search.h>

**Description** The <search.h> header defines the ENTRY type for structure ent ry, which includes the following members:

```
char *key
void *data
```

and defines ACTION and VISIT as enumeration data types through type definitions as follows:

```
enum { FIND, ENTER } ACTION;
enum { preorder, postorder, endorder, leaf } VISIT;
```

The size\_t type is defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [hsearch\(3C\)](#), [insque\(3C\)](#), [lsearch\(3C\)](#), [tsearch\(3C\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** select.h, select – select types

**Synopsis** #include <sys/select.h>

**Description** The <sys/select.h> header defines the `timeval` structure, which includes the following members:

```
time_t      tv_sec      /* seconds */
suseconds_t tv_usec    /* microseconds */
```

The `time_t` and `suseconds_t` types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

The `sigset_t` type is defined as described in [signal.h\(3HEAD\)](#).

The `timespec` structure is defined as described in <time.h>. See [time.h\(3HEAD\)](#).

The <sys/select.h> header defines the `fd_set` type as a structure.

The following is defined as a macro:

`FD_SETSIZE` Maximum number of file descriptors in an `fd_set` structure.

Inclusion of the <sys/select.h> header can make visible all symbols from the headers <signal.h>, <sys/time.h>, and <time.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [select\(3C\)](#), [signal.h\(3HEAD\)](#), [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** semaphore.h, semaphore – semaphores

**Synopsis** #include <semaphore.h>

**Description** The <semaphore.h> header defines the `sem_t` type, used in performing semaphore operations. The semaphore can be implemented using a file descriptor, in which case applications are able to open up at least a total of `{OPEN_MAX}` files and semaphores. The symbol `SEM_FAILED` is defined (see [sem\\_open\(3C\)](#)).

Inclusion of the <semaphore.h> header can make visible symbols defined in the headers <fcntl.h> and <sys/types.h>. See [fcntl.h\(3HEAD\)](#) and [types.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [fcntl.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [sem\\_destroy\(3C\)](#), [sem\\_getvalue\(3C\)](#), [sem\\_init\(3C\)](#), [sem\\_open\(3C\)](#), [sem\\_post\(3C\)](#), [sem\\_timedwait\(3C\)](#), [sem\\_unlink\(3C\)](#), [sem\\_wait\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** sem.h, sem – semaphore facility

**Synopsis** #include <sys/sem.h>

**Description** The <sys/sem.h> header defines the following constants and structures.

Semaphore operation flags:

SEM\_UNDO     Set up adjust on exit entry.

Command definitions for the `semctl()` function are provided as listed below. See [semctl\(2\)](#).

GETNCNT     Get `semncnt`.

GETPID      Get `sempid`.

GETVAL      Get `semval`.

GETALL      Get all cases of `semval`.

GETZCNT     Get `semzcnt`.

SETVAL      Set `semval`.

SETALL      Set all cases of `semval`.

The `semid_ds` structure contains the following members:

```
struct ipc_perm sem_perm    /* operation permission structure */
unsigned short  sem_nsems   /* number of semaphores in set */
time_t         sem_otime    /* last semop() time */
time_t         sem_ctime    /* last time changed by semctl() */
```

The `pid_t`, `time_t`, `key_t`, and `size_t` types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

A semaphore is represented by an anonymous structure containing the following members:

```
unsigned short semval      /* semaphore value */
pid_t         sempid      /* process ID of last operation */
unsigned short semncnt    /* number of processes waiting for semval
                           to become greater than current value */
unsigned short semzcnt    /* number of processes waiting for semval
                           to become 0 */
```

The `sembuf` structure contains the following members:

```
unsigned short sem_num     /* semaphore number */
short         sem_op       /* semaphore operation */
short         sem_flg      /* operation flags */
```

All of the symbols from <sys/ipc.h> are defined when this header is included. See [ipc.h\(3HEAD\)](#).

---

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [semctl\(2\)](#), [semget\(2\)](#), [semop\(2\)](#), [ipc.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** setjmp.h, setjmp – stack environment declarations

**Synopsis** #include <setjmp.h>

**Description** The <setjmp.h> header defines the array types jmp\_buf and sigjmp\_buf. Applications must define the appropriate feature test macro to enable the visibility of the symbols in this header.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [\\_longjmp\(3C\)](#), [setjmp\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** shm.h, shm – shared memory facility

**Synopsis** #include <sys/shm.h>

**Description** The <sys/shm.h> header defines the following symbolic constants:

SHM\_RDONLY     attach read-only (else read-write)

SHM\_RND         round attach address to SHMLBA

The <sys/shm.h> header defines the following symbolic value:

SHMLBA     segment low boundary address multiple

The following data types are defined through typedef:

shmatt\_t     Unsigned integer used for the number of current attaches that must be able to store values at least as large as a type unsigned short.

The shmids structure contains the following members:

```
struct ipc_perm shm_perm     /* operation permission structure */
size_t           shm_segsz   /* size of segment in bytes */
pid_t            shm_lpid    /* process ID of last shared memory
                             operation */
pid_t            shm_cpid    /* process ID of creator */
shmatt_t        shm_nattch   /* number of current attaches */
time_t           shm_atime   /* time of last shmat() */
time_t           shm_dtime   /* time of last shmdt() */
time_t           shm_ctime   /* time of last change by shmctl() */
```

The pid\_t, time\_t, key\_t, and size\_t types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

In addition, all of the symbols from <sys/ipc.h> are defined when this header is included.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [shmctl\(2\)](#), [shmget\(2\)](#), [shmop\(2\)](#), [ipc.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** siginfo.h, siginfo – signal generation information

**Synopsis** #include <siginfo.h>

**Description** If a process is catching a signal, it might request information that tells why the system generated that signal. See [sigaction\(2\)](#). If a process is monitoring its children, it might receive information that tells why a child changed state. See [waitid\(2\)](#). In either case, the system returns the information in a structure of type `siginfo_t`, which includes the following information:

```
int          si_signo      /* signal number */
int          si_errno      /* error number */
int          si_code       /* signal code */
union sigval si_value      /* signal value */
```

`si_signo` contains the system-generated signal number. For the [waitid\(2\)](#) function, `si_signo` is always `SIGCHLD`.

If `si_errno` is non-zero, it contains an error number associated with this signal, as defined in `<errno.h>`.

`si_code` contains a code identifying the cause of the signal.

If the value of the `si_code` member is `SI_NOINFO`, only the `si_signo` member of `siginfo_t` is meaningful, and the value of all other members is unspecified.

**User Signals** If the value of `si_code` is less than or equal to 0, then the signal was generated by a user process (see [kill\(2\)](#), [\\_lwp\\_kill\(2\)](#), [sigqueue\(3C\)](#), [sigsend\(2\)](#), [abort\(3C\)](#), and [raise\(3C\)](#)) and the `siginfo` structure contains the following additional information:

```
pid_t       si_pid        /* sending process ID */
uid_t       si_uid        /* sending user ID */
ctid_t      si_ctid       /* sending contract ID */
zoneid_t    si_zoneid     /* sending zone ID */
```

If the signal was generated by a user process, the following values are defined for `si_code`:

<code>SI_USER</code>	The implementation sets <code>si_code</code> to <code>SI_USER</code> if the signal was sent by <a href="#">kill(2)</a> , <a href="#">sigsend(2)</a> , <a href="#">raise(3C)</a> or <a href="#">abort(3C)</a> .
<code>SI_LWP</code>	The signal was sent by <a href="#">_lwp_kill(2)</a> .
<code>SI_QUEUE</code>	The signal was sent by <a href="#">sigqueue(3C)</a> .
<code>SI_TIMER</code>	The signal was generated by the expiration of a timer created by <a href="#">timer_settime(3C)</a> .
<code>SI_ASYNCIO</code>	The signal was generated by the completion of an asynchronous I/O request.
<code>SI_MSGQ</code>	The signal was generated by the arrival of a message on an empty message queue. See <a href="#">mq_notify(3C)</a> .

`si_value` contains the application specified value, which is passed to the application's signal-catching function at the time of the signal delivery if `si_code` is any of `SI_QUEUE`, `SI_TIMER`, `SI_ASYNCIO`, or `SI_MESGQ`.

**System Signals** Non-user generated signals can arise for a number of reasons. For all of these cases, `si_code` contains a positive value reflecting the reason why the system generated the signal:

Signal	Code	Reason
SIGILL	ILL_ILLOPC	illegal opcode
	ILL_ILLOPN	illegal operand
	ILL_ILLADR	illegal addressing mode
	ILL_ILLTRP	illegal trap
	ILL_PRVOPC	privileged opcode
	ILL_PRIVREG	privileged register
	ILL_COPROC	co-processor error
	ILL_BADSTK	internal stack error
SIGFPE	FPE_INTDIV	integer divide by zero
	FPE_INTOVF	integer overflow
	FPE_FLTDIV	floating point divide by zero
	FPE_FLTOVF	floating point overflow
	FPE_FLTUND	floating point underflow
	FPE_FLTRES	floating point inexact result
	FPE_FLTINV	invalid floating point operation
SIGSEGV	SEGV_MAPERR	address not mapped to object
	SEGV_ACCERR	invalid permissions for mapped object
SIGBUS	BUS_ADRALN	invalid address alignment
	BUS_ADRERR	non-existent physical address
	BUS_OBJERR	object specific hardware error
SIGTRAP	TRAP_BRKPT	process breakpoint
	TRAP_TRACE	process trace trap

SIGCHLD	CLD_EXITED	child has exited
	CLD_KILLED	child was killed
	CLD_DUMPED	child terminated abnormally
	CLD_TRAPPED	traced child has trapped
	CLD_STOPPED	child has stopped
	CLD_CONTINUED	stopped child had continued
SIGPOLL	POLL_IN	data input available
	POLL_OUT	output buffers available
	POLL_MSG	input message available
	POLL_ERR	I/O error
	POLL_PRI	high priority input available
	POLL_HUP	device disconnected

Signals can also be generated from the resource control subsystem. Where these signals do not already possess kernel-level `siginfo` codes, the `siginfo` `si_code` will be filled with `SI_RCTL` to indicate a kernel-generated signal from an established resource control value.

Signal	Code	Reason
SIGXRES	SI_RCTL	resource-control generated signal
SIGHUP		
SIGTERM		

The uncatchable signals `SIGSTOP` and `SIGKILL` have undefined `siginfo` codes.

Signals sent with a `siginfo` code of `SI_RCTL` contain code-dependent information for kernel-generated signals:

Code	Field	Value
SI_RCTL	hr_time si_entity	process-model entity of control

In addition, the following signal-dependent information is available for kernel-generated signals:



Signal	Field	Value
SIGILL	caddr_t si_addr	address of faulting instruction
SIGFPE		
SIGSEGV	caddr_t si_addr	address of faulting memory reference
SIGBUS		
SIGCHLD	pid_t si_pid	child process ID
	int si_status	exit value or signal
SIGPOLL	long si_band	band event for POLL_IN, POLL_OUT, or POLL_MSG

**See Also** [\\_lwp\\_kill\(2\)](#), [kill\(2\)](#), [setrctl\(2\)](#), [sigaction\(2\)](#), [sigsend\(2\)](#), [waitid\(2\)](#), [abort\(3C\)](#), [aio\\_read\(3C\)](#), [mq\\_notify\(3C\)](#), [raise\(3C\)](#), [signal.h\(3HEAD\)](#), [sigqueue\(3C\)](#), [timer\\_create\(3C\)](#), [timer\\_settime\(3C\)](#)

**Notes** For SIGCHLD signals, if `si_code` is equal to `CLD_EXITED`, then `si_status` is equal to the exit value of the process; otherwise, it is equal to the signal that caused the process to change state. For some implementations, the exact value of `si_addr` might not be available; in that case, `si_addr` is guaranteed to be on the same page as the faulting instruction or memory reference.

**Name** signal.h, signal – base signals

**Synopsis** #include <signal.h>

**Description** A signal is an asynchronous notification of an event. A signal is said to be generated for (or sent to) a process when the event associated with that signal first occurs. Examples of such events include hardware faults, timer expiration and terminal activity, as well as the invocation of the `kill(2)` or `sigsend(2)` functions. In some circumstances, the same event generates signals for multiple processes. A process may request a detailed notification of the source of the signal and the reason why it was generated. See [siginfo.h\(3HEAD\)](#).

Signals can be generated synchronously or asynchronously. Events directly caused by the execution of code by a thread, such as a reference to an unmapped, protected, or bad memory can generate SIGSEGV or SIGBUS; a floating point exception can generate SIGFPE; and the execution of an illegal instruction can generate SIGILL. Such events are referred to as traps; signals generated by traps are said to be synchronously generated. Synchronously generated signals are initiated by a specific thread and are delivered to and handled by that thread.

Signals may also be generated by calling `kill()`, `sigqueue()`, or `sigsend()`. Events such as keyboard interrupts generate signals, such as SIGINT, which are sent to the target process. Such events are referred to as interrupts; signals generated by interrupts are said to be asynchronously generated. Asynchronously generated signals are not directed to a particular thread but are handled by an arbitrary thread that meets either of the following conditions:

- The thread is blocked in a call to `sigwait(2)` whose argument includes the type of signal generated.
- The thread has a signal mask that does not include the type of signal generated. See [pthread\\_sigmask\(3C\)](#). Each process can specify a system action to be taken in response to each signal sent to it, called the signal's disposition. All threads in the process share the disposition. The set of system signal actions for a process is initialized from that of its parent. Once an action is installed for a specific signal, it usually remains installed until another disposition is explicitly requested by a call to either `sigaction()`, `signal()` or `sigset()`, or until the process `execs()`. See [sigaction\(2\)](#) and [signal\(3C\)](#). When a process `execs`, all signals whose disposition has been set to catch the signal will be set to SIG\_DFL. Alternatively, a process may request that the system automatically reset the disposition of a signal to SIG\_DFL after it has been caught. See [sigaction\(2\)](#) and [signal\(3C\)](#).

**SIGNAL DELIVERY** A signal is said to be delivered to a process when a thread within the process takes the appropriate action for the disposition of the signal. Delivery of a signal can be blocked. There are two methods for handling delivery of a signal in a multithreaded application. The first method specifies a signal handler function to execute when the signal is received by the process. See [sigaction\(2\)](#). The second method uses `sigwait(2)` to create a thread to handle the receipt of the signal. The `sigaction()` function can be used for both synchronously and asynchronously generated signals. The `sigwait()` function will work only for asynchronously generated signals, as synchronously generated signals are sent to the thread that caused the event. The `sigwait()` function is the recommended for use with a multithreaded application.

**SIGNAL MASK** Each thread has a signal mask that defines the set of signals currently blocked from delivery to it. The signal mask of the main thread is inherited from the signal mask of the thread that created it in the parent process. The selection of the thread within the process that is to take the appropriate action for the signal is based on the method of signal generation and the signal masks of the threads in the receiving process. Signals that are generated by action of a particular thread such as hardware faults are delivered to the thread that caused the signal. See [pthread\\_sigmask\(3C\)](#) or [sigprocmask\(2\)](#). See [alarm\(2\)](#) for current semantics of delivery of SIGALRM. Signals that are directed to a particular thread are delivered to the targeted thread. See [pthread\\_kill\(3C\)](#). If the selected thread has blocked the signal, it remains pending on the thread until it is unblocked. For all other types of signal generation (for example, [kill\(2\)](#), [sigsend\(2\)](#), terminal activity, and other external events not ascribable to a particular thread) one of the threads that does not have the signal blocked is selected to process the signal. If all the threads within the process block the signal, it remains pending on the process until a thread in the process unblocks it. If the action associated with a signal is set to ignore the signal then both currently pending and subsequently generated signals of this type are discarded immediately for this process.

The determination of which action is taken in response to a signal is made at the time the signal is delivered to a thread within the process, allowing for any changes since the time of generation. This determination is independent of the means by which the signal was originally generated.

The signals currently defined by `<signal.h>` are as follows:

Name	Value	Default	Event
SIGHUP	1	Exit	Hangup (see <a href="#">termio(7I)</a> )
SIGINT	2	Exit	Interrupt (see <a href="#">termio(7I)</a> )
SIGQUIT	3	Core	Quit (see <a href="#">termio(7I)</a> )
SIGILL	4	Core	Illegal Instruction
SIGTRAP	5	Core	Trace or Breakpoint Trap
SIGABRT	6	Core	Abort
SIGEMT	7	Core	Emulation Trap
SIGFPE	8	Core	Arithmetic Exception
SIGKILL	9	Exit	Killed
SIGBUS	10	Core	Bus Error
SIGSEGV	11	Core	Segmentation Fault
SIGSYS	12	Core	Bad System Call

---

Name	Value	Default	Event
SIGPIPE	13	Exit	Broken Pipe
SIGALRM	14	Exit	Alarm Clock
SIGTERM	15	Exit	Terminated
SIGUSR1	16	Exit	User Signal 1
SIGUSR2	17	Exit	User Signal 2
SIGCHLD	18	Ignore	Child Status Changed
SIGPWR	19	Ignore	Power Fail or Restart
SIGWINCH	20	Ignore	Window Size Change
SIGURG	21	Ignore	Urgent Socket Condition
SIGPOLL	22	Exit	Pollable Event (see <a href="#">streamio(7I)</a> )
SIGSTOP	23	Stop	Stopped (signal)
SIGTSTP	24	Stop	Stopped (user) (see <a href="#">termio(7I)</a> )
SIGCONT	25	Ignore	Continued
SIGTTIN	26	Stop	Stopped (tty input) (see <a href="#">termio(7I)</a> )
SIGTTOU	27	Stop	Stopped (tty output) (see <a href="#">termio(7I)</a> )
SIGVTALRM	28	Exit	Virtual Timer Expired
SIGPROF	29	Exit	Profiling Timer Expired
SIGXCPU	30	Core	CPU time limit exceeded (see <a href="#">getrlimit(2)</a> )
SIGXFSZ	31	Core	File size limit exceeded (see <a href="#">getrlimit(2)</a> )
SIGWAITING	32	Ignore	Reserved
SIGLWP	33	Ignore	Reserved
SIGFREEZE	34	Ignore	Check point Freeze
SIGTHAW	35	Ignore	Check point Thaw
SIGCANCEL	36	Ignore	Reserved for threading support
SIGLOST	37	Exit	Resource lost (for example, record-lock lost)
SIGXRES	38	Ignore	Resource control exceeded (see <a href="#">setrctl(2)</a> )
SIGJVM1	39	Ignore	Reserved for Java Virtual Machine 1
SIGJVM2	40	Ignore	Reserved for Java Virtual Machine 2

---

Name	Value	Default	Event
SIGRTMIN	*	Exit	First real time signal
(SIGRTMIN+1)	*	Exit	Second real time signal
. . .			
(SIGRTMAX-1)	*	Exit	Second-to-last real time signal
SIGRTMAX	*	Exit	Last real time signal

The symbols SIGRTMIN through SIGRTMAX are evaluated dynamically to permit future configurability.

Applications should not use any of the signals marked “reserved” in the above table for any purpose, to avoid interfering with their use by the system.

**SIGNAL DISPOSITION** A process using a [signal\(3C\)](#), [sigset\(3C\)](#) or [sigaction\(2\)](#) system call can specify one of three dispositions for a signal: take the default action for the signal, ignore the signal, or catch the signal.

**Default Action: SIG\_DFL** A disposition of SIG\_DFL specifies the default action. The default action for each signal is listed in the table above and is selected from the following:

- Exit** When it gets the signal, the receiving process is to be terminated with all the consequences outlined in [exit\(2\)](#).
- Core** When it gets the signal, the receiving process is to be terminated with all the consequences outlined in [exit\(2\)](#). In addition, a “core image” of the process is constructed in the current working directory.
- Stop** When it gets the signal, the receiving process is to stop. When a process is stopped, all the threads within the process also stop executing.
- Ignore** When it gets the signal, the receiving process is to ignore it. This is identical to setting the disposition to SIG\_IGN.

**Ignore Signal: SIG\_IGN** A disposition of SIG\_IGN specifies that the signal is to be ignored. Setting a signal action to SIG\_IGN for a signal that is pending causes the pending signal to be discarded, whether or not it is blocked. Any queued values pending are also discarded, and the resources used to queue them are released and made available to queue other signals.

**Catch Signal: function address** A disposition that is a function address specifies that, when it gets the signal, the thread within the process that is selected to process the signal will execute the signal handler at the specified address. Normally, the signal handler is passed the signal number as its only argument. If the disposition was set with the [sigaction\(2\)](#) function, however, additional arguments can be requested. When the signal handler returns, the receiving process resumes execution at the

point it was interrupted, unless the signal handler makes other arrangements. If an invalid function address is specified, results are undefined.

If the disposition has been set with the `sigset()` or `sigaction()`, the signal is automatically blocked in the thread while it is executing the signal catcher. If a `longjmp()` is used to leave the signal catcher, then the signal must be explicitly unblocked by the user. See [setjmp\(3C\)](#), [signal\(3C\)](#) and [sigprocmask\(2\)](#).

If execution of the signal handler interrupts a blocked function call, the handler is executed and the interrupted function call returns `-1` to the calling process with `errno` set to `EINTR`. If the `SA_RESTART` flag is set, however, certain function calls will be transparently restarted.

Some signal-generating functions, such as high resolution timer expiration, asynchronous I/O completion, inter-process message arrival, and the [sigqueue\(3C\)](#) function, support the specification of an application defined value, either explicitly as a parameter to the function, or in a `sigevent` structure parameter. The `sigevent` structure is defined by `<signal.h>` and contains at least the following members:

Type	Name	Description
int	<code>sigev_notify</code>	Notification type
int	<code>sigev_signo</code>	Signal number
union <code>sigval</code>	<code>sigev_value</code>	Signal value
<code>void(*) (union sigval)</code>	<code>sigev_notify_function</code>	Notification function
<code>(pthread_attr_t *)</code>	<code>sigev_notify_attributes</code>	Notification attributes

The `sigval` union is defined by `<signal.h>` and contains at least the following members:

Type	Name	Description
int	<code>sival_int</code>	Integer signal value
void *	<code>sival_ptr</code>	Pointer signal value

The `sigev_notify` member specifies the notification mechanism to use when an asynchronous event occurs. The `sigev_notify` member may be defined with the following values:

<code>SIGEV_NONE</code>	No asynchronous notification is delivered when the event of interest occurs.
<code>SIGEV_SIGNAL</code>	A queued signal, with its value equal to <code>sigev_signo</code> , is generated when the event of interest occurs.

- SIGEV\_THREAD** The `sigev_notify_function` is called, with `sigev_value` as its argument, to perform notification when the asynchronous event occurs. The function is executed in an environment as if it were the start routine for a newly created thread with thread attributes `sigev_notify_attributes`. If `sigev_notify_attributes` is `NULL`, the thread runs as a detached thread with default attributes. Otherwise, the thread runs with the specified attributes, but as a detached thread regardless. The thread runs with all blockable signals blocked.
- SIGEV\_PORT** An asynchronous notification is delivered to an event port when the event of interest occurs. The `sigev_value.sival_ptr` member points to a `port_notify_t` structure defined in `<port.h>` (see [port\\_associate\(3C\)](#)). The event port identifier as well as an application-defined cookie are part of the `port_notify_t` structure.

The `sigev_signo` member contains the application-defined value to be passed to the signal-catching function (for notification type `SIGEV_SIGNAL`) at the time of the signal delivery as the `si_value` member of the `siginfo_t` structure, or as the argument to the notification function (for notification type `SIGEV_THREAD`) that is called when the asynchronous event occurs. For notification type `SIGEV_PORT`, `sigev_value.sival_ptr` points to a `port_notify_t` structure that specifies the port and an application-defined cookie.

The `sigev_value` member references the application defined value to be passed to the signal-catching function at the time of the signal delivery as the `si_value` member of the `siginfo_t` structure.

The `sival_int` member is used when the application defined value is of type `int`, and the `sival_ptr` member is used when the application defined value is a pointer.

When a signal is generated by [sigqueue\(3C\)](#) or any signal-generating function which supports the specification of an application defined value, the signal is marked pending and, if the `SA_SIGINFO` flag is set for that signal, the signal is queued to the process along with the application specified signal value. Multiple occurrences of signals so generated are queued in FIFO order. If the `SA_SIGINFO` flag is not set for that signal, later occurrences of that signal's generation, when a signal is already queued, are silently discarded.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [lockd\(1M\)](#), [Intro\(2\)](#), [alarm\(2\)](#), [exit\(2\)](#), [fcntl\(2\)](#), [getrlimit\(2\)](#), [ioctl\(2\)](#), [kill\(2\)](#), [pause\(2\)](#), [setrctl\(2\)](#), [sigaction\(2\)](#), [sigaltstack\(2\)](#), [sigprocmask\(2\)](#), [sigsend\(2\)](#), [sigsuspend\(2\)](#), [sigwait\(2\)](#), [port\\_associate\(3C\)](#), [pthread\\_create\(3C\)](#), [pthread\\_kill\(3C\)](#), [pthread\\_sigmask\(3C\)](#), [setjmp\(3C\)](#), [siginfo.h\(3HEAD\)](#), [signal\(3C\)](#), [sigqueue\(3C\)](#), [sigsetops\(3C\)](#), [ucontext.h\(3HEAD\)](#), [wait\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Notes** The dispositions of the SIGKILL and SIGSTOP signals cannot be altered from their default values. The system generates an error if this is attempted.

The SIGKILL, SIGSTOP, and SIGCANCEL signals cannot be blocked. The system silently enforces this restriction.

The SIGCANCEL signal cannot be directed to an individual thread using [pthread\\_kill\(3C\)](#), but it can be sent to a process using [kill\(2\)](#), [sigsend\(2\)](#), or [sigqueue\(3C\)](#).

Whenever a process receives a SIGSTOP, SIGTSTP, SIGTTIN, or SIGTTOU signal, regardless of its disposition, any pending SIGCONT signal are discarded.

Whenever a process receives a SIGCONT signal, regardless of its disposition, any pending SIGSTOP, SIGTSTP, SIGTTIN, and SIGTTOU signals is discarded. In addition, if the process was stopped, it is continued.

SIGPOLL is issued when a file descriptor corresponding to a STREAMS file has a “selectable” event pending. See [Intro\(2\)](#). A process must specifically request that this signal be sent using the `I_SETSIG` `ioctl` call. Otherwise, the process will never receive SIGPOLL.

If the disposition of the SIGCHLD signal has been set with `signal()` or `sigset()`, or with `sigaction()` and the `SA_NOCLDSTOP` flag has been specified, it will only be sent to the calling process when its children exit; otherwise, it will also be sent when the calling process's children are stopped or continued due to job control.

The name SIGCLD is also defined in this header and identifies the same signal as SIGCHLD. SIGCLD is provided for backward compatibility, new applications should use SIGCHLD.

The disposition of signals that are inherited as `SIG_IGN` should not be changed.

Signals which are generated synchronously should not be masked. If such a signal is blocked and delivered, the receiving process is killed.



**Name** socket.h, socket – Internet Protocol family

**Synopsis** #include <sys/socket.h>

**Description** The <sys/socket.h> header defines the unsigned integral type `sa_family_t` through typedef.

The <sys/socket.h> header defines the `sockaddr` structure that includes the following members:

```
sa_family_t  sa_family    /* address family */
char         sa_data[]    /* socket address (variable-length
                           data) */
```

**libxnet Interfaces** The <sys/socket.h> header defines the `msg_hdr` structure for libxnet interfaces that includes the following members:

```
void         *msg_name    /* optional address */
socklen_t    msg_namelen /* size of address */
struct iovec *msg_iov     /* scatter/gather array */
int          msg_iovlen  /* members in msg_iov */
void         *msg_control /* ancillary data, see below */
socklen_t    msg_controllen /* ancillary data buffer len */
int          msg_flags   /* flags on received message */
```

The <sys/socket.h> header defines the `cmsghdr` structure for libxnet that includes the following members:

```
socklen_t    cmsg_len     /* data byte count, including hdr */
int          cmsg_level   /* originating protocol */
int          cmsg_type    /* protocol-specific type */
```

Ancillary data consists of a sequence of pairs, each consisting of a `cmsghdr` structure followed by a data array. The data array contains the ancillary data message, and the `cmsghdr` structure contains descriptive information that allows an application to correctly parse the data.

The values for `cmsg_level` will be legal values for the level argument to the `getsockopt()` and `setsockopt()` functions. The `SCM_RIGHTS` type is supported for level `SOL_SOCKET`.

Ancillary data is also possible at the socket level. The <sys/socket.h> header defines the following macros for use as the `cmsg_type` values when `cmsg_level` is `SOL_SOCKET`.

**SCM\_RIGHTS** Indicates that the data array contains the access rights to be sent or received.

**SCM\_UCRED** Indicates that the data array contains a `ucred_t` to be received. The `ucred_t` is the credential of the sending process at the time the message was sent. This is a Sun-specific, Evolving interface. See [ucred\\_get\(3C\)](#).

The IPv4 data formats generally use the same values for data passed back in `cmsghdr` as for `setsockopt()` to enable the feature. The IPv4 data formats are listed below with the associated payload for each.

IPPROTO\_IP  
IP\_RECVSTADDR  
    ipaddr\_t, IP address

IPPROTO\_IP  
IP\_RECVOPTS  
    variable-length IP options, up to 40 bytes

IPPROTO\_IP  
IP\_RECVIF  
    uint\_t, ifIndex number

IPPROTO\_IP  
IP\_RECVSLLA  
    struct sockaddr\_dl, link layer address

IPPROTO\_IP  
IP\_RECVTTL  
    uint8\_t

SOL\_SOCKET  
SO\_RECVUCRED  
    ucred\_t — cmsghdr.cmsg\_type is SCM\_UCRED, not SO\_RECVUCRED

The IPv6 data formats use different values for enabling the option and for passing the value back to the application. The IPv6 data formats are listed below with the associated payload for each.

IPPROTO\_IPV6  
IPV6\_RECVPKTINFO  
    in\_pktinfo, cmsg\_type IPV6\_PKTINFO

IPPROTO\_IPV6  
IPV6\_RECVTCLASS  
    uint\_t, cmsg\_type IPV6\_TCLASS

IPPROTO\_IPV6  
IPV6\_RECVPATHMTU  
    ip6\_mtuinfo, cmsg\_type IPV6\_PATHMTU

IPPROTO\_IPV6  
IPV6\_RECVHOPLIMIT  
    uint\_t, cmsg\_type IPV6\_HOPLIMIT

IPPROTO\_IPV6  
IPV6\_RECVHOPOPTS  
    variable-length IPv6 options, cmsg\_type IPV6\_HOPOPTS

IPPROTO\_IPV6  
IPV6\_RECVDSTOPTS

variable-length IPv6 options, `msg_type IPV6_DSTOPTS`

`IPPROTO_IPV6`

`IPV6_RECVRTHDR`

variable-length IPv6 options, `msg_type IPV6_RTHDR`

`IPPROTO_IPV6`

`IPV6_RECVRTHDRDSTOPTS`

variable-length IPv6 options, `msg_type IPV6_DSTOPTS`

The `<sys/socket.h>` header defines the following macros to gain access to the data arrays in the ancillary data associated with a message header:

`MSG_DATA(msg)`

If the argument is a pointer to a `cmsghdr` structure, this macro returns an unsigned character pointer to the data array associated with the `cmsghdr` structure.

`MSG_NXTHDR(mhdr, msg)`

If the first argument is a pointer to a `msghdr` structure and the second argument is a pointer to a `cmsghdr` structure in the ancillary data, pointed to by the `msg_control` field of that `msghdr` structure, this macro returns a pointer to the next `cmsghdr` structure, or a null pointer if this structure is the last `cmsghdr` in the ancillary data.

`MSG_FIRSTHDR(mhdr)`

If the argument is a pointer to a `msghdr` structure, this macro returns a pointer to the first `cmsghdr` structure in the ancillary data associated with this `msghdr` structure, or a null pointer if there is no ancillary data associated with the `msghdr` structure.

`MSG_SPACE(len)`

Given the length of an ancillary data object, `MSG_SPACE()` returns the space required by the object and its `cmsghdr` structure, including any padding needed to satisfy alignment requirements. This macro can be used, for example, to allocate space dynamically for the ancillary data. This macro should not be used to initialize the `msg_len` member of a `cmsghdr` structure. Use the `MSG_LEN()` macro instead.

`MSG_LEN(len)`

Given the length of an ancillary data object, `MSG_LEN()` returns the value to store in the `msg_len` member of the `cmsghdr` structure, taking into account any padding needed to satisfy alignment requirements.

The `<sys/socket.h>` header defines the `linger` structure that includes the following members:

```
int  l_onoff /* indicates whether linger option is enabled */
int  l_linger /* linger time, in seconds */
```

The `<sys/socket.h>` header defines the following macros:

```
SOCK_DGRAM      Datagram socket
SOCK_STREAM     Byte-stream socket
```

SOCK\_SEQPACKET     Sequenced-packet socket

The `<sys/socket.h>` header defines the following macros for use as the *level* argument of `setsockopt()` and `getsockopt()`.

SO\_L\_SOCKET     Options to be accessed at the socket level, not the protocol level.

SO\_L\_ROUTE     Options to be accessed at the routing socket level, not the protocol level.

The `<sys/socket.h>` header defines the following macros for use as the *option\_name* argument of `getsockopt()` or `setsockopt()` calls:

SO\_DEBUG     Debugging information is being recorded.

SO\_ACCEPTCONN     Socket is accepting connections.

SO\_BROADCAST     Transmission of broadcast messages is supported.

SO\_REUSEADDR     Reuse of local addresses is supported.

SO\_KEEPAIVE     Connections are kept alive with periodic messages.

SO\_LINGER     Socket lingers on close.

SO\_OOBINLINE     Out-of-band data is transmitted in line.

SO\_SNDBUF     Send buffer size.

SO\_RCVBUF     Receive buffer size.

SO\_ERROR     Socket error status.

SO\_TYPE     Socket type.

SO\_RECVUCRED     Request the reception of user credential ancillary data. This is a Sun-specific, Evolving interface. See [ucred\\_get\(3C\)](#).

SO\_MAC\_EXEMPT     Mandatory Access Control (MAC) exemption for unlabeled peers. This option is available only if the system is configured with Trusted Extensions.

SO\_ALLZONES     Bypass zone boundaries (privileged).

The `<sys/socket.h>` header defines the following macros for use as the valid values for the `msg_flags` field in the `msghdr` structure, or the `flags` parameter in `recvfrom()`, `recvmsg()`, `sendto()`, or `sendmsg()` calls:

MSG\_TRUNC     Control data truncated.

MSG\_EOR     Terminates a record (if supported by the protocol).

MSG\_OOB     Out-of-band data.

MSG\_PEEK     Leave received data in queue.

MSG\_TRUNC      Normal data truncated.  
 MSG\_WAITALL    Wait for complete message.

The `<sys/socket.h>` header defines the following macros:

AF\_UNIX      UNIX domain sockets  
 AF\_INET      Internet domain sockets

The `<sys/socket.h>` header defines the following macros:

SHUT\_RD      Disables further receive operations.  
 SHUT\_WR      Disables further send operations.  
 SHUT\_RDWR   Disables further send and receive operations.

**libsocket Interfaces** The `<sys/socket.h>` header defines the `msg_hdr` structure for `libsocket` interfaces that includes the following members:

```
void          *msg_name      /* optional address */
socklen_t     msg_namelen   /* size of address */
struct iovec *msg_iov       /* scatter/gather array */
int           msg_iovlen    /* # elements in msg_iov */
caddr_t       msg_accrights  /* access rights sent/received */
```

The `msg_name` and `msg_namelen` parameters specify the destination address when the socket is unconnected. The `msg_name` can be specified as a NULL pointer if no names are desired or required. The `msg_iov` and `msg_iovlen` parameters describe the scatter-gather locations, as described in [read\(2\)](#). The `msg_accrights` parameter specifies the buffer in which access rights sent along with the message are received. The `msg_accrightslen` specifies the length of the buffer.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [accept\(3SOCKET\)](#), [accept\(3XNET\)](#), [bind\(3SOCKET\)](#), [bind\(3XNET\)](#), [connect\(3SOCKET\)](#), [connect\(3XNET\)](#), [getpeername\(3SOCKET\)](#), [getpeername\(3XNET\)](#), [getpeerucred\(3C\)](#), [getsockname\(3SOCKET\)](#), [getsockname\(3XNET\)](#), [getsockopt\(3SOCKET\)](#), [getsockopt\(3XNET\)](#), [libsocket\(3LIB\)](#), [listen\(3SOCKET\)](#), [listen\(3XNET\)](#), [recv\(3SOCKET\)](#), [recv\(3XNET\)](#), [recvfrom\(3SOCKET\)](#), [recvfrom\(3XNET\)](#), [recvmsg\(3SOCKET\)](#), [recvmsg\(3XNET\)](#), [send\(3SOCKET\)](#), [send\(3XNET\)](#), [sendmsg\(3SOCKET\)](#), [sendmsg\(3XNET\)](#), [sendto\(3SOCKET\)](#), [sendto\(3XNET\)](#),

setsockopt(3SOCKET), setsockopt(3XNET), shutdown(3SOCKET), shutdown(3XNET),  
socket(3SOCKET), socket(3XNET), socketpair(3SOCKET), socketpair(3XNET),  
ucred\_get(3C), attributes(5), standards(5)

**Name** spawn.h, spawn – spawn

**Synopsis** #include <spawn.h>

**Description** The <spawn.h> header defines the `posix_spawnattr_t` and `posix_spawn_file_actions_t` types used in performing spawn operations.

The <spawn.h> header defines the flags that can be set in a `posix_spawnattr_t` object using the `posix_spawnattr_setflags()` function:

```

POSIX_SPAWN_RESETIDS
POSIX_SPAWN_SETPGROUP
POSIX_SPAWN_SETSCHEDPARAM
POSIX_SPAWN_SETSCHEDULER
POSIX_SPAWN_SETSIGDEF
POSIX_SPAWN_SETSIGMASK

```

Inclusion of the <spawn.h> header can make visible symbols defined in the <sched.h>, <signal.h>, and <sys/types.h> headers.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [sched.h\(3HEAD\)](#), [semaphore.h\(3HEAD\)](#), [signal.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** stat.h, stat – data returned by stat system call

**Synopsis** #include <sys/types.h>  
#include <sys/stat.h>

**Description** The system calls `stat()`, `lstat()` and `fstat()` return data in a `stat` structure, which is defined in `<stat.h>`.

The constants used in the `st_mode` field are also defined in this file:

```
#define S_IFMT           /* type of file */
#define S_IAMB           /* access mode bits */
#define S_IFIFO          /* fifo */
#define S_IFCHR          /* character special */
#define S_IFDIR          /* directory */
#define S_IFNAM          /* XENIX special named file */
#define S_INSEM          /* XENIX semaphore subtype of IFNAM */
#define S_INSHD          /* XENIX shared data subtype of IFNAM */
#define S_IFBLK          /* block special */
#define S_IFREG          /* regular */
#define S_IFLNK          /* symbolic link */
#define S_IFSOCK         /* socket */
#define S_IFDOOR         /* door */
#define S_ISUID          /* set user id on execution */
#define S_ISGID          /* set group id on execution */
#define S_ISVTX          /* save swapped text even after use */
#define S_IREAD          /* read permission, owner */
#define S_IWRITE         /* write permission, owner */
#define S_IEXEC          /* execute/search permission, owner */
#define S_ENFMT          /* record locking enforcement flag */
#define S_IRWXU          /* read, write, execute: owner */
#define S_IRUSR          /* read permission: owner */
#define S_IWUSR          /* write permission: owner */
```



```

#define S_IXUSR          /* execute permission: owner */
#define S_IRWXG          /* read, write, execute: group */
#define S_IRGRP          /* read permission: group */
#define S_IWGRP          /* write permission: group */
#define S_IXGRP          /* execute permission: group */
#define S_IRWXO          /* read, write, execute: other */
#define S_IROTH          /* read permission: other */
#define S_IWOTH          /* write permission: other */
#define S_IXOTH          /* execute permission: other */

```

The following macros are for POSIX conformance (see [standards\(5\)](#)):

```

#define S_ISBLK(mode)    block special file
#define S_ISCHR(mode)    character special file
#define S_ISDIR(mode)    directory file
#define S_ISFIFO(mode)   pipe or fifo file
#define S_ISREG(mode)    regular file
#define S_ISSOCK(mode)   socket file

```

The following symbolic constants are defined as distinct integer values outside of the range [0, 999 999 999], for use with the `futimens()` and `utimensat()` functions:

```

#define UTIME_NOW        use the current time
#define UTIME_OMIT       no time change

```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [futimens\(2\)](#), [stat\(2\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** statvfs.h, statvfs – VFS File System information structure

**Synopsis** #include <sys/statvfs.h>

**Description** The <sys/statvfs.h> header defines the statvfs structure, which includes the following members:

```

unsigned long f_bsize      /* file system block
                           size */
unsigned long f_frsize    /* fundamental file system block
                           size */
fsblkcnt_t    f_blocks     /* total number of blocks on file
                           system in units of f_frsize */
fsblkcnt_t    f_bfree      /* total number of free blocks */
fsblkcnt_t    f_bavail     /* number of free blocks available
                           to non-privileged process */
fsfilcnt_t    f_files      /* total number of file serial
                           numbers */
fsfilcnt_t    f_ffree      /* total number of free file serial
                           numbers */
fsfilcnt_t    f_favail     /* number of file serial numbers
                           available to non-privileged
unsigned long f_fsid       /* process file system ID */
unsigned long f_flag       /* bit mask of f_flag values */
unsigned long f_namemax    /* maximum filename length */

```

The fsblkcnt\_t and fsfilcnt\_t types are defined as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

The following flags for the f\_flag member are defined:

```

ST_RDONLY     read-only file system
ST_NOSUID     does not support setuid()/setgid() semantics

```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [statvfs\(2\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** stdbool.h, stdbool – boolean type and values

**Synopsis** #include <stdbool.h>

**Description** The <stdbool.h> header defines the following macros:

bool	expands to _Bool
true	expands to the integer constant 1
false	expands to the integer constant 0
__bool_true_false_are_defined	expands to the integer constant 1

An application can undefine and then possibly redefine the macros bool, true, and false.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [attributes\(5\)](#), [standards\(5\)](#)

**Name** `stddef.h`, `stddef` – standard type definitions

**Synopsis** `#include <stddef.h>`

**Description** The `<stddef.h>` header defines the following macros:

<code>NULL</code>	Null pointer constant.
<code>offsetof(type, member-designator)</code>	Integer constant expression of type <code>size_t</code> , the value of which is the offset in bytes to the structure member ( <code>member-designator</code> ), from the beginning of its structure ( <code>type</code> ).

The `<stddef.h>` header defines the following types:

<code>ptrdiff_t</code>	Signed integer type of the result of subtracting two pointers.
<code>wchar_t</code>	Integer type whose range of values can represent distinct wide-character codes for all members of the largest character set specified among the locales supported by the compilation environment: the null character has the code value 0 and each member of the portable character set has a code value equal to its value when used as the lone character in an integer character constant.
<code>size_t</code>	Unsigned integer type of the result of the <code>sizeof</code> operator.

The implementation supports one or more programming environments in which the widths of `ptrdiff_t`, `size_t`, and `wchar_t` are no greater than the width of type `long`. The names of these programming environments can be obtained using the [confstr\(3C\)](#) function or the [getconf\(1\)](#) utility.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getconf\(1\)](#), [confstr\(3C\)](#), [types.h\(3HEAD\)](#), [wchar.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** `stdint.h`, `stdint` – integer types

**Synopsis** `#include <stdint.h>`

**Description** The `<stdint.h>` header declares sets of integer types having specified widths, and defines corresponding sets of macros. It also defines macros that specify limits of integer types corresponding to types defined in other standard headers.

The “width” of an integer type is the number of bits used to store its value in a pure binary system; the actual type can use more bits than that (for example, a 28-bit type could be stored in 32 bits of actual storage). An  $N$ -bit signed type has values in the range  $-2^{N-1}$  or  $1-2^{N-1}$  to  $2^{N-1}-1$ , while an  $N$ -bit unsigned type has values in the range 0 to  $2^N-1$ .

Types are defined in the following categories:

- integer types having certain exact widths
- integer types having at least certain specified widths
- fastest integer types having at least certain specified widths
- integer types wide enough to hold pointers to objects
- integer types having greatest width

Some of these types may denote the same type.

Corresponding macros specify limits of the declared types and construct suitable constants.

For each type described herein that the implementation provides, the `<stdint.h>` header declares that `typedef` name and defines the associated macros. Conversely, for each type described herein that the implementation does not provide, the `<stdint.h>` header does not declare that `typedef` name, nor does it define the associated macros. An implementation provides those types described as required, but need not provide any of the others (described as optional).

**Integer Types** When `typedef` names differing only in the absence or presence of the initial `u` are defined, they denote corresponding signed and unsigned types as described in the ISO/IEC 9899: 1999 standard, Section 6.2.5; an implementation providing one of these corresponding types must also provide the other.

In the following descriptions, the symbol  $N$  represents an unsigned decimal integer with no leading zeros (for example, 8 or 24, but not 04 or 048).

**Exact-width integer types**

The `typedef` name `int $N$ _t` designates a signed integer type with width  $N$ , no padding bits, and a two's-complement representation. Thus, `int8_t` denotes a signed integer type with a width of exactly 8 bits.

The `typedef` name `uint $N$ _t` designates an unsigned integer type with width  $N$ . Thus, `uint24_t` denotes an unsigned integer type with a width of exactly 24 bits.

The following types are required:

```
int8_t
int16_t
int32_t
uint8_t
uint16_t
uint32_t
```

If an implementation provides integer types with width 64 that meet these requirements, then the following types are required:

```
int64_t
uint64_t
```

In particular, this is the case if any of the following are true:

- The implementation supports the `_POSIX_V6_ILP32_OFFBIG` programming environment and the application is being built in the `_POSIX_V6_ILP32_OFFBIG` programming environment (see the Shell and Utilities volume of IEEE Std 1003.1-200x, c99, Programming Environments).
- The implementation supports the `_POSIX_V6_LP64_OFF64` programming environment and the application is being built in the `_POSIX_V6_LP64_OFF64` programming environment.
- The implementation supports the `_POSIX_V6_LPBIG_OFFBIG` programming environment and the application is being built in the `_POSIX_V6_LPBIG_OFFBIG` programming environment.

All other types of this form are optional.

#### Minimum-width integer types

The typedef name `int_leastN_t` designates a signed integer type with a width of at least  $N$ , such that no signed integer type with lesser size has at least the specified width. Thus, `int_least32_t` denotes a signed integer type with a width of at least 32 bits.

The typedef name `uint_leastN_t` designates an unsigned integer type with a width of at least  $N$ , such that no unsigned integer type with lesser size has at least the specified width. Thus, `uint_least16_t` denotes an unsigned integer type with a width of at least 16 bits.

The following types are required:

```
int_least8_t
int_least16_t
int_least32_t
int_least64_t
uint_least8_t
uint_least16_t
uint_least32_t
uint_least64_t
```

All other types of this form are optional.

### Fastest minimum-width integer types

Each of the following types designates an integer type that is usually fastest to operate with among all integer types that have at least the specified width.

The designated type is not guaranteed to be fastest for all purposes; if the implementation has no clear grounds for choosing one type over another, it will simply pick some integer type satisfying the signedness and width requirements.

The typedef name `int_fastN_t` designates the fastest signed integer type with a width of at least  $N$ . The typedef name `uint_fastN_t` designates the fastest unsigned integer type with a width of at least  $N$ .

The following types are required:

```
int_fast8_t
int_fast16_t
int_fast32_t
int_fast64_t
uint_fast8_t
uint_fast16_t
uint_fast32_t
uint_fast64_t
```

All other types of this form are optional.

### Integer types capable of holding object pointers

<code>intptr_t</code>	Designates a signed integer type with the property that any valid pointer to void can be converted to this type, then converted back to a pointer to void, and the result will compare equal to the original pointer.
<code>uintptr_t</code>	Designates an unsigned integer type with the property that any valid pointer to void can be converted to this type, then converted back to a pointer to void, and the result will compare equal to the original pointer.

On standard-conforming systems, the `intptr_t` and `uintptr_t` types are required; otherwise, they are optional.

### Greatest-width integer types

<code>intmax_t</code>	Designates a signed integer type capable of representing any value of any signed integer type.
<code>uintmax_t</code>	Designates an unsigned integer type capable of representing any value of any unsigned integer type.

These types are required.

Applications can test for optional types by using the corresponding limit macro from Limits of Specified-Width Integer Types.

Limits of  
Specified-Width  
Integer Types

The following macros specify the minimum and maximum limits of the types declared in the `<stdint.h>` header. Each macro name corresponds to a similar type name in Integer Types.

Each instance of any defined macro is replaced by a constant expression suitable for use in `#if` preprocessing directives. This expression has the same type as would an expression that is an object of the corresponding type converted according to the integer promotions. Its implementation-defined value is equal to or greater in magnitude (absolute value) than the corresponding value given below, with the same sign, except where stated to be exactly the given value.

## Limits of exact-width integer types

- Minimum values of exact-width signed integer types:  
`{INTN_MIN}` Exactly  $-(2^{N-1})$
- Maximum values of exact-width signed integer types:  
`{INTN_MAX}` Exactly  $2^{N-1} - 1$
- Maximum values of exact-width unsigned integer types:  
`{UINTN_MAX}` Exactly  $2^N - 1$

## Limits of minimum-width integer types

- Minimum values of minimum-width signed integer types:  
`{INT_LEASTN_MIN}`  $-(2^{N-1} - 1)$
- Maximum values of minimum-width signed integer types:  
`{INT_LEASTN_MAX}`  $2^{N-1} - 1$
- Maximum values of minimum-width unsigned integer types:  
`{UINT_LEASTN_MAX}`  $2^N - 1$

## Limits of fastest minimum-width integer types

- Minimum values of fastest minimum-width signed integer types:  
`{INT_FASTN_MIN}`  $-(2^{N-1} - 1)$
- Maximum values of fastest minimum-width signed integer types:  
`{INT_FASTN_MAX}`  $2^{N-1} - 1$
- Maximum values of fastest minimum-width unsigned integer types:  
`{UINT_FASTN_MAX}`  $2^N - 1$

## Limits of integer types capable of holding object pointers

- Minimum value of pointer-holding signed integer type:  
`{INTPTR_MIN}`  $-(2^{15} - 1)$



- Maximum value of pointer-holding signed integer type:  
`{INTPTR_MAX}`     $2^{15} - 1$
- Minimum value of pointer-holding signed integer type:  
`{UINTPTR_MAX}`     $2^{16} - 1$

#### Limits of greatest-width integer types

- Minimum value of greatest-width signed integer type:  
`{INTMAX_MIN}`     $-(2^{63} - 1)$
- Maximum value of greatest-width signed integer type:  
`{INTMAX_MIN}`     $2^{63} - 1$
- Maximum value of greatest-width unsigned integer type:  
`{UINTMAX_MIN}`     $2^{64} - 1$

Limits of Other Integer Types    The following macros specify the minimum and maximum limits of integer types corresponding to types defined in other standard headers.

Each instance of these macros is replaced by a constant expression suitable for use in `#if` preprocessing directives. This expression has the same type as would an expression that is an object of the corresponding type converted according to the integer promotions. Its implementation-defined value is equal to or greater in magnitude (absolute value) than the corresponding value given below, with the same sign.

#### Limits of `ptrdiff_t`:

```
{PTRDIFF_MIN}    -65535
{PTRDIFF_MAX}    +65535
```

#### Limits of `sig_atomic_t`:

```
{SIG_ATOMIC_MIN}    See below.
{SIG_ATOMIC_MAX}    See below.
```

#### Limits of `size_t`:

```
{SIZE_MAX}    65535
```

#### Limits of `wchar_t`:

```
{WCHAR_MIN}    See below.
{WCHAR_MAX}    See below.
```

Limits of `wint_t`:

`{WINT_MIN}` See below.

`{WINT_MAX}` See below.

If `sig_atomic_t` (see the `<signal.h>` header) is defined as a signed integer type, the value of `{SIG_ATOMIC_MIN}` is no greater than -127 and the value of `{SIG_ATOMIC_MAX}` is no less than 127. Otherwise, `sig_atomic_t` is defined as an unsigned integer type, the value of `{SIG_ATOMIC_MIN}` is 0, and the value of `{SIG_ATOMIC_MAX}` is no less than 255.

If `wchar_t` (see the `<stddef.h>` header) is defined as a signed integer type, the value of `{WCHAR_MIN}` is no greater than -127 and the value of `{WCHAR_MAX}` is no less than 127. Otherwise, `wchar_t` is defined as an unsigned integer type, and the value of `{WCHAR_MIN}` is 0 and the value of `{WCHAR_MAX}` is no less than 255.

If `wint_t` (see the `<wchar.h>` header) is defined as a signed integer type, the value of `{WINT_MIN}` is no greater than -32767 and the value of `{WINT_MAX}` is no less than 32767. Otherwise, `wint_t` is defined as an unsigned integer type, and the value of `{WINT_MIN}` is 0 and the value of `{WINT_MAX}` is no less than 65535.

#### Macros for Integer Constant Expressions

The following macros expand to integer constant expressions suitable for initializing objects that have integer types corresponding to types defined in the `<stdint.h>` header. Each macro name corresponds to a similar type name listed under minimum-width integer types and greatest-width integer types.

Each invocation of one of these macros expands to an integer constant expression suitable for use in `#if` preprocessing directives. The type of the expression has the same type as would an expression that is an object of the corresponding type converted according to the integer promotions. The value of the expression is that of the argument. The argument in any instance of these macros is a decimal, octal, or hexadecimal constant with a value that does not exceed the limits for the corresponding type.

#### Macros for minimum-width integer constant expressions

The macro `INTN_C(value)` expands to an integer constant expression corresponding to the type `int_leastN_t`. The macro `UINTN_C(value)` expands to an integer constant expression corresponding to the type `uint_leastN_t`. For example, if `uint_least64_t` is a name for the type unsigned long long, then `UINT64_C(0x123)` might expand to the integer constant `0x123ULL`.

#### Macros for greatest-width integer constant expressions

The following macro expands to an integer constant expression having the value specified by its argument and the type `intmax_t`:

`INTMAX_C(value)`

The following macro expands to an integer constant expression having the value specified by its argument and the type `uintmax_t`:

UINTMAX\_C(*value*)

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [inttypes.h\(3HEAD\)](#), [signal.h\(3HEAD\)](#), [stddef.h\(3HEAD\)](#), [wchar.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** stdio.h, stdio – standard buffered input/output

**Synopsis** #include <stdio.h>

**Description** The <stdio.h> header defines the following macros as positive integer constant expressions:

BUFSIZ	size of <stdio.h> buffers
_IOFBF	input/output fully buffered
_IOLBF	input/output line buffered
_IONBF	input/output unbuffered
L_ctermid	maximum size of character array to hold ctermid() output
L_tmpnam	maximum size of character array to hold tmpnam() output
SEEK_CUR	seek relative to current position
SEEK_END	seek relative to end-of-file
SEEK_SET	seek relative to start-of-file

The following macros are defined as positive integer constant expressions that denote implementation limits:

{FILENAME_MAX}	Maximum size in bytes of the longest filename string that the implementation guarantees can be opened.
{FOPEN_MAX}	Number of streams that the implementation guarantees can be open simultaneously. The value is at least eight.
{TMP_MAX}	Minimum number of unique filenames generated by tmpnam(). Maximum number of times an application can call tmpnam() reliably. The value of {TMP_MAX} is at least 25. On XSI-conformant systems, the value of {TMP_MAX} is at least 10000.

The following macro name is defined as a negative integer constant expression:

EOF end-of-file return value

The following macro name is defined as a null pointer constant:

NULL null pointer

The following macro name is defined as a string constant:

P\_tmpdir default directory prefix for tmpnam()

The following is defined as expressions of type “pointer to FILE” point to the FILE objects associated, respectively, with the standard error, input, and output streams:

stderr standard error output stream

`stdin` standard input stream  
`stdout` standard output stream

The following data types are defined through typedef:

`FILE` structure containing information about a file  
`fpos_t` non-array type containing all information needed to specify uniquely every position within a file  
`va_list` as described in `<stdarg.h>`  
`size_t` as described in `<stddef.h>`

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [rename\(2\)](#), [ctermid\(3C\)](#), [fclose\(3C\)](#), [fdopen\(3C\)](#), [fflush\(3C\)](#), [fgetc\(3C\)](#), [fgetpos\(3C\)](#), [fgets\(3C\)](#), [flockfile\(3C\)](#), [fopen\(3C\)](#), [fputc\(3C\)](#), [fputs\(3C\)](#), [fputwc\(3C\)](#), [fread\(3C\)](#), [freopen\(3C\)](#), [fseek\(3C\)](#), [fsetpos\(3C\)](#), [ftell\(3C\)](#), [fwrite\(3C\)](#), [getwchar\(3C\)](#), [getopt\(3C\)](#), [perror\(3C\)](#), [popen\(3C\)](#), [printf\(3C\)](#), [remove\(3C\)](#), [rewind\(3C\)](#), [scanf\(3C\)](#), [setbuf\(3C\)](#), [stdio\(3C\)](#), [system\(3C\)](#), [tmpfile\(3C\)](#), [tmpnam\(3C\)](#), [ungetc\(3C\)](#), [vprintf\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** stdlib.h, stdlib – standard library definitions

**Synopsis** #include <stdlib.h>

**Description** The <stdlib.h> header defines the following macros:

EXIT\_FAILURE    Unsuccessful termination for `exit()`; evaluates to a non-zero value. See [exit\(3C\)](#).

EXIT\_SUCCESS    Successful termination for `exit()`; evaluates to 0.

NULL            Null pointer.

{RAND\_MAX}      Maximum value returned by `rand()`; at least 32767. See [rand\(3C\)](#).

{MB\_CUR\_MAX}    Integer expression whose value is the maximum number of bytes in a character specified by the current locale.

The following data types are defined through typedef:

div\_t            structure type returned by the `div()` function

ldiv\_t          structure type returned by the `ldiv()` function

lldiv\_t         structure type returned by the `lldiv()` function

size\_t          as described in <stddef.h>

wchar\_t         as described in <stddef.h>

See [div\(3C\)](#), which covers `div()`, `ldiv()`, and `lldiv()`, and [stddef.h\(3HEAD\)](#).

In addition, the symbolic names and macros listed below are defined as in <sys/wait.h>, for use in decoding the return value from `system()`. See [wait.h\(3HEAD\)](#) and [system\(3C\)](#).

WNOHANG  
WUNTRACED  
WEXITSTATUS  
WIFEXITED  
WIFSIGNALED  
WIFSTOPPED  
WSTOPSIG  
WTERMSIG

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** a64l(3C), abort(3C), abs(3C), atexit(3C), bsearch(3C), div(3C), drand48(3C), exit(3C), getenv(3C), getsuopt(3C), grantpt(3C), malloc(3C), mblen(3C), mbstowcs(3C), mbtowc(3C), mkstemp(3C), ptsname(3C), putenv(3C), qsort(3C), random(3C), realpath(3C), strtod(3C), strtol(3C), strtoul(3C), unlockpt(3C), wcstombs(3C), wctomb(3C), limits.h(3HEAD), math.h(3HEAD), stddef.h(3HEAD), types.h(3HEAD), wait.h(3HEAD), attributes(5), standards(5)

**Name** string.h, string – string operations

**Synopsis** #include <string.h>

**Description** The <string.h> header defines the following:

NULL        null pointer constant

size\_t      as described in <stddef.h>

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [memory\(3C\)](#), [strcoll\(3C\)](#), [string\(3C\)](#), [strxfrm\(3C\)](#), [stddef.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** strings.h, strings – string operations

**Synopsis** #include <strings.h>

**Description** The `size_t` type specified in `<strings.h>` is defined through typedef as described in `<stddef.h>`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [ffs\(3C\)](#), [string\(3C\)](#), [stddef.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** stropts.h, stropts – STREAMS interface (STREAMS)

**Synopsis** #include <stropts.h>

**Description** The <stropts.h> header defines the `bandinfo` structure, which includes the following members:

```
unsigned char bi_pri    /* priority band */
int          bi_flag    /* flushing type */
```

The <stropts.h> header defines the `strpeek` structure that includes the following members:

```
struct strbuf ctlbuf    /* control portion of the message */
struct strbuf databuf  /* data portion of the message */
t_uscalar_t  flags     /* RS_HIPRI or 0 */
```

The <stropts.h> header defines the `strbuf` structure that includes the following members:

```
int maxlen    /* maximum buffer length */
int len       /* length of data */
char *buf     /* pointer to buffer */
```

The <stropts.h> header defines the `strfdinsert` structure that includes the following members:

```
struct strbuf ctlbuf    /* control portion of the message */
struct strbuf databuf  /* data portion of the message */
t_uscalar_t  flags     /* RS_HIPRI or 0 */
int          fildes     /* file descriptor of the other stream */
int          offset     /* relative location of the stored value */
```

The <stropts.h> header defines the `strioctl` structure that includes the following members:

```
int ic_cmd     /* ioctl() command */
int ic_timeout /* timeout for response */
int ic_len     /* length of data */
char *ic_dp    /* pointer to buffer */
```

The <stropts.h> header defines the `strrecvfd` structure that includes the following members:

```
int fda    /* received file descriptor */
uid_t uid  /* UID of sender */
gid_t gid  /* GID of sender */
```

The `uid_t` and `gid_t` types are defined through typedef as described in <sys/types.h>. See [types.h\(3HEAD\)](#).

The <stropts.h> header defines the `t_scalar_t` and `t_uscalar_t` types, respectively, as signed and unsigned opaque types of equal length of at least 32 bits.

The `<stropts.h>` header defines the `str_list` structure that includes the following members:

```
int          sl_nmods          /* number of STREAMS module names */
struct str_list *sl_modlist    /* STREAMS module names */
```

The `<stropts.h>` header defines the `str_list` structure that includes the following member:

```
char l_name[FMNAMESZ+1]      a STREAMS module name
```

The following macros are defined for use as the request argument to `ioctl()`:

<code>I_PUSH</code>	Push a STREAMS module.
<code>I_POP</code>	Pop a STREAMS module.
<code>I_LOOK</code>	Get the top module name.
<code>I_FLUSH</code>	Flush a stream.
<code>I_FLUSHBAND</code>	Flush one band of a stream.
<code>I_SETSIG</code>	Ask for notification signals.
<code>I_GETSIG</code>	Retrieve current notification signals.
<code>I_FIND</code>	Look for a STREAMS module.
<code>I_PEEK</code>	Peek at the top message on a stream.
<code>I_SRDOPT</code>	Set the read mode.
<code>I_GRDOPT</code>	Get the read mode.
<code>I_NREAD</code>	Size the top message.
<code>I_FDINSERT</code>	Send implementation-defined information about another stream.
<code>I_STR</code>	Send a STREAMS <code>ioctl()</code> .
<code>I_SWROPT</code>	Set the write mode.
<code>I_GWROPT</code>	Get the write mode.
<code>I_SENDFD</code>	Pass a file descriptor through a STREAMS pipe.
<code>I_RECVFD</code>	Get a file descriptor sent via <code>I_SENDFD</code> .
<code>I_LIST</code>	Get all the module names on a stream.
<code>I_ATMARK</code>	Is the top message “marked”?
<code>I_CKBAND</code>	See if any messages exist in a band.
<code>I_GETBAND</code>	Get the band of the top message on a stream.

I_CANPUT	Is a band writable?
I_SETCLTIME	Set close time delay.
I_GETCLTIME	Get close time delay.
I_LINK	Connect two streams.
I_UNLINK	Disconnect two streams.
I_PLINK	Persistently connect two streams.
I_PUNLINK	Dismantle a persistent STREAMS link.

The following macro is defined for use with I\_LOOK:

FMNAMESZ     minimum size in bytes of the buffer referred to by the arg argument

The following macros are defined for use with I\_FLUSH:

FLUSHR	flush read queues
FLUSHW	flush write queues
FLUSHRW	flush read and write queues

The following macros are defined for use with I\_SETSIG:

S_RDNORM	A normal (priority band set to 0) message has arrived at the head of a stream head read queue.
S_RDBAND	A message with a non-zero priority band has arrived at the head of a stream head read queue.
S_INPUT	A message, other than a high-priority message, has arrived at the head of a stream head read queue.
S_HIPRI	A high-priority message is present on a stream head read queue.
S_OUTPUT	The write queue for normal data (priority band 0) just below the stream head is no longer full. This notifies the process that there is room on the queue for sending (or writing) normal data downstream.
S_WRNORM	Equivalent to S_OUTPUT.
S_WRBAND	The write queue for a non-zero priority band just below the stream head is no longer full.
S_MSG	A STREAMS signal message that contains the SIGPOLL signal reaches the front of the stream head read queue.
S_ERROR	Notification of an error condition reaches the stream head.
S_HANGUP	Notification of a hangup reaches the stream head.

**S\_BANDURG** When used in conjunction with **S\_RDBAND**, **SIGURG** is generated instead of **SIGPOLL** when a priority message reaches the front of the stream head read queue.

The following macro is defined for use with **I\_PEEK**:

**RS\_HIPRI** Only look for high-priority messages.

The following macros are defined for use with **I\_SRDOPT**:

**RNORM** Byte-stream mode, the default.

**RMSGD** Message-discard mode.

**RMSGN** Message-non-discard mode.

**RPROTNORM** Fail `read()` with `[EBADMSG]` if a message containing a control part is at the front of the stream head read queue.

**RPROTDAT** Deliver the control part of a message as data when a process issues a `read()`

**RPROTDIS** Discard the control part of a message, delivering any data part, when a process issues a `read()`

The following macro is defined for use with **I\_SWOPT**:

**SNDZERO** Send a zero-length message downstream when a `write()` of 0 bytes occurs.

The following macros are defined for use with **I\_ATMARK**:

**ANYMARK** Check if the message is marked.

**LASTMARK** Check if the message is the last one marked on the queue.

The following macro is defined for use with **I\_UNLINK**:

**MUXID\_ALL** Unlink all stream linked to the stream associated with `files`.

The following macros are defined for `getmsg()`, `getpmsg()`, `putmsg()`, and `putpmsg()`:

**MSG\_ANY** Receive any message.

**MSG\_BAND** Receive message from specified band.

**MSG\_HIPRI** Send/receive high-priority message.

**MORECTL** More control information is left in message.

**MOREDATA** More data is left in message.

The `<stropts.h>` header can make visible all of the symbols from `<unistd.h>`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [close\(2\)](#), [fcntl\(2\)](#), [getmsg\(2\)](#), [ioctl\(2\)](#), [open\(2\)](#), [pipe\(2\)](#), [poll\(2\)](#), [putmsg\(2\)](#), [read\(2\)](#), [write\(2\)](#), [signal\(3C\)](#), [types.h\(3HEAD\)](#), [unistd.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** syslog.h, syslog – definitions for system error logging

**Synopsis** #include <syslog.h>

**Description** The <syslog.h> header defines the following symbolic constants, zero or more of which can be OR'ed together to form the `logopt` option of `openlog()`:

LOG_PID	Log the process ID with each message.
LOG_CONS	Log to the system console on error.
LOG_NDELAY	Connect to syslog daemon immediately.
LOG_ODELAY	Delay open until <code>syslog()</code> is called.
LOG_NOWAIT	Do not wait for child processes.

The following symbolic constants are defined as possible values of the *facility* argument to `openlog()`:

LOG_KERN	reserved for message generated by the system
LOG_USER	message generated by a process
LOG_MAIL	reserved for message generated by mail system
LOG_NEWS	reserved for message generated by news system
LOG_UUCP	reserved for message generated by UUCP system
LOG_DAEMON	reserved for message generated by system daemon
LOG_AUTH	reserved for message generated by authorization daemon
LOG_CRON	reserved for message generated by clock daemon
LOG_LPR	reserved for message generated by printer system
LOG_LOCAL0	reserved for local use
LOG_LOCAL1	reserved for local use
LOG_LOCAL2	reserved for local use
LOG_LOCAL3	reserved for local use
LOG_LOCAL4	reserved for local use
LOG_LOCAL5	reserved for local use
LOG_LOCAL6	reserved for local use
LOG_LOCAL7	reserved for local use

The following is declared as a macro for constructing the *maskpri* argument to `setlogmask()`. The following macro expands to an expression of type `int` when the argument *pri* is an expression of type `int`:

`LOG_MASK(pri)` a mask for priority *pri*

The following constants are defined as possible values for the *priority* argument of `syslog()`:

`LOG_EMERG` A panic condition was reported to all processes.  
`LOG_ALERT` A condition that should be corrected immediately.  
`LOG_CRIT` A critical condition.  
`LOG_ERR` An error message.  
`LOG_WARNING` A warning message.  
`LOG_NOTICE` A condition requiring special handling.  
`LOG_INFO` A general information message.  
`LOG_DEBUG` A message useful for debugging programs.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [syslog\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** tar.h, tar – extended tar definitions

**Synopsis** #include <tar.h>

**Description** The <tar.h> header defines header block definitions as follows.

General definitions:

Name	Value	Description
TMAGIC	"ustar"	ustar plus null byte
TMAGLEN	6	length of the above
TVERSION	"00"	00 without a null byte
TVERSLEN	2	length of the above

Type flag field definitions:

Name	Value	Description
REGTYPE	'0'	regular file
AREGTYPE	'\0'	regular file
LNKTYPE	'1'	link
SYMTYPE	'2'	symbolic link
CHRTYPE	'3'	character special
BLKTYPE	'4'	block special
DIRTYPE	'5'	directory
FIFOTYPE	'6'	FIFO special
CONTTYPER	'7'	reserved

Mode field bit definitions (octal):

Name	Value	Description
TSUID	04000	set UID on execution
TSGID	02000	set GID on execution
TSVTX	01000	on directories, restricted deletion flag

Name	Value	Description
TUREAD	00400	read by owner
TUWRITE	00200	write by owner special
TUEXEC	00100	execute/search by owner
TGREAD	00040	read by group
TGWRITE	00020	write by group
TGEXEC	00010	execute/search by group
TOREAD	00004	read by other
TOWRITE	00002	write by other
TOEXEC	00001	execute/search by other

Types used in ancillary files:

Name	Value	Description
ACL_HDR	'A'	Access Control List
LBL_TYPE	'L'	Trusted Extensions file label
DIR_TYPE	'D'	Trusted Extensions directory label

Attribute types used in Trusted Solaris ancillary files that are interpreted by Trusted Extensions for backward compatibility:

Name	Value	Description
SLD_TYPE	'S'	Single-level directory component
PATH_TYPE	'P'	Path component
MLD_TYPE	'M'	Multi-level directory component
FILE_TYPE	'F'	Must handle files differently
APRIV_TYPE	'P'	Allowed privileges data type in file
FPRIV_TYPE	'p'	Forced privileges data type in file
COMP_TYPE	'C'	Path components, use for MLD
ATTR_FLAG_TYPE	'F'	File attribute flag bytes data type
LK_COMP_TYPE	'K'	Link data path component

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	See below.

The general definitions, the `typeflag` field definitions, and the `mode` field bit definitions are Standard. The types used in ancillary files and the attribute types used in Trusted Solaris ancillary files are Evolving.

**See Also** [pax\(1\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** tcp.h, tcp – definitions for the Internet Transmission Control Protocol (TCP)

**Synopsis** `#include <netinet/tcp.h>`

**Description** The `<netinet/tcp.h>` header defines the following macro for use as a socket option at the `IPPROTO_TCP` level:

`TCP_NODELAY`     Avoid coalescing of small segments.

The macro is defined in the header. The implementation need not allow the value of the option to be set with `setsockopt()` or retrieved with `getsockopt()`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getsockopt\(3XNET\)](#), [socket.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** termios.h, termios – define values for termios

**Synopsis** #include <termios.h>

**Description** The <termios.h> header contains the definitions used by the terminal I/O interfaces. See [termios\(3C\)](#) and [termio\(7I\)](#) for an overview of the terminal interface.

The termios Structure The following data types are defined through typedef:

```
cc_t          used for terminal special characters
speed_t      used for terminal baud rates
tcflag_t     used for terminal modes
```

The above types are all unsigned integer types.

The implementation supports one or more programming environments in which the widths of `cc_t`, `speed_t`, and `tcflag_t` are no greater than the width of type `long`. The names of these programming environments can be obtained using the [confstr\(3C\)](#) function or the [getconf\(1\)](#) utility.

The `termios` structure is defined and includes the following members:

```
tcflag_t c_iflag      /* input modes */
tcflag_t c_oflag      /* output modes */
tcflag_t c_cflag      /* control modes */
tcflag_t c_lflag      /* local modes */
cc_t     c_cc[NCCS]   /* control characters */
```

A definition is provided for:

`NCCS` size of the array `c_cc` for control characters

The following subscript names for the array `c_cc` are defined:

Subscript Usage	Subscript Usage	Description
Canonical Mode	Non-Canonical Mode	
VEOF		EOF character
VEOL		EOL character
VERASE		ERASE character
VINTR	VINTR	INTR character
VKILL		KILL character
	VMIN	MIN value

Subscript Usage	Subscript Usage	
Canonical Mode	Non-Canonical Mode	Description
VQUIT	VQUIT	QUIT character
VSTART	VSTART	START character
VSTOP	VSTOP	STOP character
VSUSP	VSUSP	SUSP character
	VTIME	TIME value

The subscript values are unique, except that the VMIN and VTIME subscripts can have the same values as the VEOF and VEOL subscripts, respectively.

The header file provides the flags described below.

Input Modes The `c_iflag` field describes the basic terminal input control:

BRKINT	Signal interrupt on break.
ICRNL	Map CR to NL on input.
IGNBRK	Ignore break condition.
IGNCR	Ignore CR.
IGNPAR	Ignore characters with parity errors.
INLCR	Map NL to CR on input.
INPCK	Enable input parity check.
ISTRIP	Strip character.
IXANY	Enable any character to restart output.
IXOFF	Enable start/stop input control.
IXON	Enable start/stop output control.
PARMRK	Mark parity errors.

Output Modes The `c_oflag` field specifies the system treatment of output:

OPOST	Post-process output.
ONLCR	Map NL to CR-NL on output.
OCRNL	Map CR to NL on output.
ONOCR	No CR output at column 0.
ONLRET	NL performs CR function.

OFILL	Use fill characters for delay.
NLDLY	Select newline delays:
	NL0    newline type 0
	NL1    newline type 1
CRDLY	Select carriage-return delays:
	CR0    carriage-return delay type 0
	CR1    carriage-return delay type 1
	CR2    carriage-return delay type 2
	CR3    carriage-return delay type 3
TABDLY	Select horizontal-tab delays:
	TAB0    horizontal-tab delay type 0
	TAB1    horizontal-tab delay type 1
	TAB2    horizontal-tab delay type 2
	TAB3    expand tabs to spaces
BSDLY	Select backspace delays:
	BS0    backspace-delay type 0
	BS1    backspace-delay type 1
VTDLY	Select vertical-tab delays:
	VT0    vertical-tab delay type 0
	VT1    vertical-tab delay type 1
FFDLY	Select form-feed delays:
	FF0    form-feed delay type 0
	FF1    form-feed delay type 1

**Baud Rate Selection** The input and output baud rates are stored in the `termios` structure. These are the valid values for objects of type `speed_t`. The following values are defined, but not all baud rates need be supported by the underlying hardware.

B0	Hang up
B50	50 baud
B75	75 baud
B110	110 baud

B134	134.5 baud
B150	150 baud
B200	200 baud
B300	300 baud
B600	600 baud
B1200	1 200 baud
B1800	1 800 baud
B2400	2 400 baud
B4800	4 800 baud
B9600	9 600 baud
B19200	19 200 baud
B38400	38 400 baud

**Control Modes** The `c_cflag` field describes the hardware control of the terminal; not all values specified are required to be supported by the underlying hardware:

CSIZE	Character size:
CS5	5 bits
CS6	6 bits
CS7	7 bits
CS8	8 bits
CSTOPB	Send two stop bits, else one.
CREAD	Enable receiver.
PARENB	Parity enable.
PARODD	Odd parity, else even.
HUPCL	Hang up on last close.
CLOCAL	Ignore modem status lines.

The implementation supports the functionality associated with the symbols CS7, CS8, CSTOPB, PARODD, and PARENB.

**Local Modes** The `c_lflag` field of the argument structure is used to control various terminal functions:

ECHO	Enable echo.
------	--------------



ECHOE	Echo erase character as error-correcting backspace.
ECHOK	Echo KILL.
ECHONL	Echo NL.
ICANON	Canonical input (erase and kill processing).
IEXTEN	Enable extended input character processing.
ISIG	Enable signals.
NOFLSH	Disable flush after interrupt or quit.
TOSTOP	Send SIGTTOU for background output.

Attribute Selection The following symbolic constants for use with `tcsetattr()` are defined:

TCSANOW	Change attributes immediately.
TCSADRAIN	Change attributes when output has drained.
TCSAFLUSH	Change attributes when output has drained; also flush pending input.

Line Control The following symbolic constants for use with `tcflush()` are defined:

TCIFLUSH	Flush pending input.
TCIOFLUSH	Flush both pending input and untransmitted output.
TCOFLUSH	Flush untransmitted output.

The following symbolic constants for use with `tcflow()` are defined:

TCIOFF	Transmit a STOP character, intended to suspend input data.
TCION	Transmit a START character, intended to restart input data.
TCOOFF	Suspend output.
TCOON	Restart output.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getconf\(1\)](#), [cfgetispeed\(3C\)](#), [cfsetispeed\(3C\)](#), [confstr\(3C\)](#), [tcdrain\(3C\)](#), [tcflow\(3C\)](#), [tcflush\(3C\)](#), [tcgetattr\(3C\)](#), [tcgetsid\(3C\)](#), [tcsendbreak\(3C\)](#), [tcsetattr\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** `tgmath.h`, `tgmath` – type-generic macros

**Synopsis** `#include <tgmath.h>`

**Description** The `<tgmath.h>` header includes the headers `<math.h>` and `<complex.h>` and defines several type-generic macros.

Of the functions contained within the `<math.h>` and `<complex.h>` headers without an `f` (float) or `l` (long double) suffix, several have one or more parameters whose corresponding real type is `double`. For each such function except `modf(3M)`, there is a corresponding type-generic macro. The parameters whose corresponding real type is `double` in the function synopsis are generic parameters. Use of the macro invokes a function whose corresponding real type and type domain are determined by the arguments for the generic parameters.

Use of the macro invokes a function whose generic parameters have the corresponding real type determined as follows:

- First, if any argument for generic parameters has type `long double`, the type determined is `long double`.
- Otherwise, if any argument for generic parameters has type `double` or is of integer type, the type determined is `double`.
- Otherwise, the type determined is `float`.

For each unsuffixed function in the `<math.h>` header for which there is a function in the `<complex.h>` header with the same name except for a `c` prefix, the corresponding type-generic macro (for both functions) has the same name as the function in the `<math.h>` header. The corresponding type-generic macro for `fabs()` and `cabs()` is `fabs()`.

<code>&lt;math.h&gt;</code> Function	<code>&lt;complex.h&gt;</code> Function	Type-Generic Macro
<code>acos()</code>	<code>cacos()</code>	<code>acos()</code>
<code>asin()</code>	<code>casin()</code>	<code>asin()</code>
<code>atan()</code>	<code>catan()</code>	<code>atan()</code>
<code>acosh()</code>	<code>cacosh()</code>	<code>acosh()</code>
<code>asinh()</code>	<code>casinh()</code>	<code>asinh()</code>
<code>atanh()</code>	<code>catanh()</code>	<code>atanh()</code>
<code>cos()</code>	<code>ccos()</code>	<code>cos()</code>
<code>sin()</code>	<code>csin()</code>	<code>sin()</code>
<code>tan()</code>	<code>ctan()</code>	<code>tan()</code>
<code>cosh()</code>	<code>ccosh()</code>	<code>cosh()</code>

<code>&lt;math.h&gt;</code> Function	<code>&lt;complex.h&gt;</code> Function	Type-Generic Macro
<code>sinh()</code>	<code>csinh()</code>	<code>sinh()</code>
<code>tanh()</code>	<code>ctanh()</code>	<code>tanh()</code>
<code>exp()</code>	<code>cexp()</code>	<code>exp()</code>
<code>log()</code>	<code>clog()</code>	<code>log()</code>
<code>pow()</code>	<code>cpow()</code>	<code>pow()</code>
<code>sqrt()</code>	<code>csqrt()</code>	<code>sqrt()</code>
<code>fabs()</code>	<code>cfabs()</code>	<code>fabs()</code>

If at least one argument for a generic parameter is complex, then use of the macro invokes a complex function; otherwise, use of the macro invokes a real function.

For each unsuffixed function in the `<math.h>` header without a `c`-prefixed counterpart in the `<complex.h>` header, the corresponding type-generic macro has the same name as the function. These type-generic macros are:

<code>atan2()</code>	<code>fma()</code>	<code>llround()</code>	<code>remainder()</code>
<code>cbrt()</code>	<code>fmax()</code>	<code>log10()</code>	<code>remquo()</code>
<code>ceil()</code>	<code>fmin()</code>	<code>log1p()</code>	<code>rint()</code>
<code>copysign()</code>	<code>fmod()</code>	<code>log2()</code>	<code>round()</code>
<code>erf()</code>	<code>frexp()</code>	<code>logb()</code>	<code>scalbn()</code>
<code>erfc()</code>	<code>hypot()</code>	<code>lrint()</code>	<code>scalbln()</code>
<code>exp2()</code>	<code>ilogb()</code>	<code>lround()</code>	<code>tgamma()</code>
<code>expm1()</code>	<code>ldexp()</code>	<code>nearbyint()</code>	<code>trunc()</code>
<code>fdim()</code>	<code>lgamma()</code>	<code>nextafter()</code>	
<code>floor()</code>	<code>llrint()</code>	<code>nexttoward()</code>	

If all arguments for generic parameters are real, then use of the macro invokes a real function; otherwise, use of the macro results in undefined behavior.

For each unsuffixed function in the `<complex.h>` header that is not a `c`-prefixed counterpart to a function in the `<math.h>` header, the corresponding type-generic macro has the same name as the function. These type-generic macros are:

```
carg()
cimag()
conj()
cproj()
creal()
```

Use of the macro with any real or complex argument invokes a complex function.

**Usage** Functions invoked by use of type-generic macros are invoked with the declarations listed below.

```
#include <tgmth.h>
int n;
float f;
double d;
long double ld;
float complex fc;
double complex dc;
long double complex ldc;
```

The following are the type-generic macros that invoke the functions that are invoked with the preceding declarations.

Macro	Use Invokes
<code>exp(n)</code>	<code>exp(n)</code> , the function
<code>acosh(f)</code>	<code>acoshf(f)</code>
<code>sin(d)</code>	<code>sin(d)</code> , the function
<code>atan(ld)</code>	<code>atanl(ld)</code>
<code>log(fc)</code>	<code>clogf(fc)</code>
<code>sqrt(dc)</code>	<code>csqrt(dc)</code>
<code>pow(ldc,f)</code>	<code>cpowl(ldc, f)</code>
<code>remainder(n,n)</code>	<code>remainder(n, n)</code> , the function
<code>nextafter(d,f)</code>	<code>nextafter(d, f)</code> , the function
<code>nexttoward(f,ld)</code>	<code>nexttowardf(f, ld)</code>
<code>copysign(n,ld)</code>	<code>copysignl(n, ld)</code>
<code>ceil(fc)</code>	undefined behavior
<code>rint(dc)</code>	undefined behavior
<code>fmax(ldc,ld)</code>	undefined behavior
<code>carg(n)</code>	<code>carg(n)</code> , the function
<code>cproj(f)</code>	<code>cprojf(f)</code>
<code>creal(d)</code>	<code>creal(d)</code> , the function
<code>cimag(ld)</code>	<code>cimagl(ld)</code>
<code>cabs(fc)</code>	<code>cabsf(fc)</code>

Macro	Use Invokes
carg(dc)	carg(dc), the function
cproj(ldc)	cproj(ldc)

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [modf\(3M\)](#), [complex.h\(3HEAD\)](#), [math.h\(3HEAD\)](#), [cabs\(3M\)](#), [fabs\(3M\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** timeb.h, timeb – additional definitions for date and time

**Synopsis** #include <sys/timeb.h>

**Description** The <sys/timeb.h> header defines the timeb structure, which includes the following members:

```
time_t      time      /* the seconds portion of the current time */
unsigned short millitm /* the milliseconds portion of the current time */
short       timezone  /* the local timezone in minutes west of Greenwich */
short       dstflag   /* TRUE if Daylight Savings Time is in effect */
```

The time\_t type is defined as described in <sys/types.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** time.h, time – time types

**Synopsis** #include <time.h>

**Description** The <time.h> header declares the structure tm, which includes the following members:

```
int tm_sec      /* seconds [0,60] */
int tm_min      /* minutes [0,59] */
int tm_hour     /* hour [0,23] */
int tm_mday     /* day of month [1,31] */
int tm_mon      /* month of year [0,11] */
int tm_year     /* years since 1900 */
int tm_wday     /* day of week [0,6] (Sunday =0) */
int tm_yday     /* day of year [0,365] */
int tm_isdst    /* daylight savings flag */
```

The value of tm\_isdst is positive if Daylight Saving Time is in effect, 0 if Daylight Saving Time is not in effect, and negative if the information is not available.

The <time.h> header defines the following symbolic names:

NULL	Null pointer constant.
CLOCKS_PER_SEC	A number used to convert the value returned by the clock() function into seconds. See clock(3C).
CLOCK_PROCESS_CPUTIME_ID	The identifier of the CPU-time clock associated with the process making a clock() or timer*() function call.
CLOCK_THREAD_CPUTIME_ID	The identifier of the CPU-time clock associated with the thread making a clock() or timer*() function call.

The <time.h> header declares the timespec structure, which has the following members:

```
time_t tv_sec    /* seconds */
long tv_nsec     /* nanoseconds */
```

The <time.h> header declares the itimerspec structure, which has the following members:

```
struct timespec it_interval /* timer period */
struct timespec it_value    /* timer expiration */
```

The following manifest constants are defined:

CLOCK_REALTIME	The identifier of the system-wide realtime clock.
TIMER_ABSTIME	Flag indicating time is absolute. For functions taking timer objects, this refers to the clock associated with the timer.
CLOCK_MONOTONIC	The identifier for the system-wide monotonic clock, which is defined as a clock whose value cannot be set with clock_settime() and that cannot have backward clock jumps. The maximum possible clock jump

is implementation-defined. See [clock\\_settime\(3C\)](#).

The `clock_t`, `size_t`, `time_t`, `clockid_t`, and `timer_t` types are defined as described in `<sys/types.h>`. See [types.h\(3HEAD\)](#).

Although the value of `CLOCKS_PER_SEC` is required to be 1 million on all standard-conforming systems, it can be variable on other systems, and it should not be assumed that `CLOCKS_PER_SEC` is a compile-time constant.

The `<time.h>` header provides a declaration for `getdate_err`.

The following are declared as variables:

```
extern int daylight;
extern long timezone;
extern char *tzname[];
```

Inclusion of the `<time.h>` header can make visible all symbols from the `<signal.h>` header.

**Usage** The range [0,60] for `tm_sec` allows for the occasional leap second.

`tm_year` is a signed value; therefore, years before 1900 can be represented.

To obtain the number of clock ticks per second returned by the `times()` function, applications should call `sysconf(_SC_CLK_TCK)`. See [times\(2\)](#) and [sysconf\(3C\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [time\(2\)](#), [utime\(2\)](#), [clock\(3C\)](#), [ctime\(3C\)](#), [difftime\(3C\)](#), [getdate\(3C\)](#), [mktime\(3C\)](#), [strftime\(3C\)](#), [strptime\(3C\)](#), [types.h\(3HEAD\)](#), [clock\\_settime\(3C\)](#), [nanosleep\(3C\)](#), [timer\\_create\(3C\)](#), [timer\\_delete\(3C\)](#), [timer\\_settime\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** times.h, times – file access and modification times structure

**Synopsis** #include <sys/times.h>

**Description** The <sys/times.h> header defines the structure tms, which is returned by times() and includes the following members:

```
clock_t tms_utime    /* user CPU time */
clock_t tms_stime    /* system CPU time */
clock_t tms_cutime   /* user CPU time of terminated
                    child processes */
clock_t tms_cstime   /* system CPU time of terminated
                    child processes */
```

The clock\_t type is defined as described in <sys/types.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [times\(2\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** types32.h, types32 – fixed-width data types

**Synopsis** #include <sys/types32.h>

**Description** The following fixed-width data types defined in <sys/types32.h> correspond to the sign and sizes of types in the 32-bit environment that can be used for compatibility and interoperability purposes in either the 32-bit or 64-bit environment.

---

typedef	int32_t	blkcnt32_t
typedef	uint32_t	caddr32_t
typedef	int32_t	clock32_t
typedef	int32_t	daddr32_t
typedef	uint32_t	dev32_t
typedef	uint32_t	fsblkcnt32_t
typedef	uint32_t	fsfilcnt32_t
typedef	int32_t	gid32_t
typedef	int32_t	id32_t
typedef	uint32_t	ino32_t
typedef	int32_t	key32_t
typedef	uint32_t	major32_t
typedef	uint32_t	minor32_t
typedef	uint32_t	mode32_t
typedef	uint32_t	nlink32_t
typedef	int32_t	pid32_t
typedef	uint32_t	rlim32_t
typedef	uint32_t	size32_t
typedef	int32_t	ssize32_t
typedef	time32_t	int32_t
typedef	uid32_t	int32_t

---

**Name** types.h, types – primitive system data types

**Synopsis** #include <sys/types.h>

**Description** The data types defined in <sys/types.h> are as follows:

32-bit Solaris The data types listed below are defined in <sys/types.h> for 32-bit Solaris.

```
typedef struct { int r[1]; } *physadr;
typedef long clock_t;
typedef long daddr_t;
typedef char * caddr_t;
typedef unsigned char uchar;
typedef unsigned short ushort;
typedef unsigned int uint;
typedef unsigned long ulong_t;
typedef unsigned long ino_t;
typedef long uid_t;
typedef long gid_t;
typedef ulong_t nlink_t;
typedef ulong_t mode_t;
typedef short cnt_t;
typedef long time_t;
typedef int label_t[10];
typedef ulong_t dev_t;
typedef long off_t;
typedef long pid_t;
typedef long paddr_t;
typedef int key_t;
typedef unsigned char use_t;
typedef short sysid_t;
typedef short index_t;
typedef short lock_t;
typedef unsigned int size_t;
typedef long clock_t;
typedef long pid_t;
```

64-bit Solaris The data types listed below are defined in <sys/types.h> for 64-bit Solaris.

```
typedef long blkcnt_t
typedef long clock_t
typedef long daddr_t
typedef ulong_t dev_t
typedef ulong_t fsblkcnt_t
typedef ulong_t fsfilcnt_t
typedef int gid_t
typedef int id_t
typedef long ino_t
typedef int key_t
typedef uint_t major_t
```

```

typedef      uint_t      minor_t
typedef      uint_t      mode_t
typedef      uint_t      nlink_t
typedef      int          pid_t
typedef      ptrdiff_t   intptr_t
typedef      ulong_t     rlim_t
typedef      ulong_t     size_t
typedef      uint_t      speed_t
typedef      long         ssize_t
typedef      long         suseconds_t
typedef      uint_t      tcflag_t
typedef      long         time_t
typedef      int          uid_t
typedef      int          wchar_t

```

**Preprocessor Symbols** For 32-bit programs, pointers and the C data types `int` and `long` are all 32-bit quantities. For 64-bit programs, pointers and the C data type `long` are defined as 64-bit quantities.

The preprocessor symbol `_ILP32`, made visible by the inclusion of `<sys/types.h>`, can be used with the preprocessor `#ifdef` construct to define sections of code that will be compiled only as part of a 32-bit version of a given C program.

The preprocessor symbol `_LP64` can be used in the same way to define sections of code that will be compiled only as part of a 64-bit version of a given C program. See `EXAMPLES`.

This header incorporates definitions of other preprocessor symbols that can be useful when keeping code portable between different instruction set architectures.

`_LITTLE_ENDIAN`

`_BIG_ENDIAN`

The natural byte order of the processor. A pointer to an `int` points to the least/most significant byte of that `int`.

`_STACK_GROWS_UPWARD`

`_STACK_GROWS_DOWNWARD`

The processor specific direction of stack growth. A push onto the stack increases/decreases the stack pointer, so it stores data at successively higher/lower addresses.

`_CHAR_IS_UNSIGNED`

`_CHAR_IS_SIGNED`

The C Compiler implements objects of type `char` as unsigned or signed respectively. This is really an implementation choice of the compiler, but it is specified in the ABI and tends to be uniform across compilers for an instruction set architecture.

`_CHAR_ALIGNMENT`

`_SHORT_ALIGNMENT`

`_INT_ALIGNMENT`

`_LONG_ALIGNMENT`

`_LONG_LONG_ALIGNMENT`

<code>_DOUBLE_ALIGNMENT</code>	
<code>_LONG_DOUBLE_ALIGNMENT</code>	
<code>_POINTER_ALIGNMENT</code>	
<code>_FLOAT_ALIGNMENT</code>	The ABI defines alignment requirements of each of the primitive object types. Some, if not all, might be hardware requirements as well. The values are expressed in bytes.
<code>_MAX_ALIGNMENT</code>	The most stringent alignment requirement as specified by the ABI. Equal to the maximum of all the above <code>_XXX_ALIGNMENT</code> values.
<code>_LONG_LONG_ALIGNMENT_32</code>	The 32-bit ABI supported by a 64-bit kernel may have different alignment requirements for primitive object types. The value of this identifier is expressed in bytes.

**Usage** The `daddr_t` type is used for disk addresses except in an inode on disk. Times are encoded in seconds since 00:00:00 UTC, January 1, 1970. The major and minor parts of a device code specify kind and unit number of a device and are installation-dependent. Offsets are measured in bytes from the beginning of a file.

The `label_t[ ]` types are used to save the processor state while another process is running.

**Examples** EXAMPLE 1 Use of preprocessor symbol `_LP64`.

In the following example, the preprocessor symbol `_LP64` defines sections of code that will be compiled only as part of a 64-bit version of the given C program.

```
#include <sys/types.h>
...

#ifdef _LP64
    printf("The data model is LP64 in this environment\n");
#else
#ifdef _ILP32
    printf("The data model is ILP32 in this environment\n");
#else
#error "Unknown data model!"
#endif
#endif
```

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Stable

**See Also** [types32.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** ucontext.h, ucontext – user context

**Synopsis** #include <ucontext.h>

**Description** The <ucontext.h> header defines the `ucontext_t` type as a structure that includes at least the following members:

```
ucontext_t  uc_link
sigset_t    uc_sigmask
stack_t     uc_stack
mcontext_t  uc_mcontext
```

The `uc_link` member is a pointer to the context that to be resumed when this context returns. If `uc_link` is equal to 0, this context is the main context and the process exits when this context returns.

The `uc_sigmask` member defines the set of signals that are blocked when this context is active. See [sigprocmask\(2\)](#).

The `uc_stack` member defines the stack used by this context. See [sigaltstack\(2\)](#).

The `uc_mcontext` member contains the saved set of machine registers and any implementation-specific context data. Portable applications should not modify or access `uc_mcontext`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getcontext\(2\)](#), [sigaction\(2\)](#), [sigaltstack\(2\)](#), [sigprocmask\(2\)](#), [makecontext\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** uio.h, uio – definitions for vector I/O operations

**Synopsis** `#include <sys/uio.h>`

**Description** The `<sys/uio.h>` header defines the `iovec` structure, which includes the following members:

```
void    *iov_base    /* base address of a memory region
                    for input or output */
size_t  iov_len      /* size of the memory pointed to by
                    iov_base */
```

The `<sys/uio.h>` header uses the `iovec` structure for scatter/gather I/O.

The `ssize_t` and `size_t` types are defined as described in `<sys/types.h>`.

**Usage** The symbol `{IOV_MAX}` defined in `<limits.h>` should always be used to learn about the limits on the number of scatter/gather elements that can be processed in one call, instead of assuming a fixed value.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [read\(2\)](#), [write\(2\)](#), [limits.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** ulimit.h, ulimit – ulimit commands

**Synopsis** #include <ulimit.h>

**Description** The <ulimit.h> header defines the following symbolic constants used by the `ulimit()` function.

UL\_GETFSIZE     Get maximum file size.

UL\_SETFSIZE     Set maximum file size.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [ulimit\(2\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** un.h, un – definitions for UNIX-domain sockets

**Synopsis** `#include <sys/un.h>`

**Description** The `<sys/un.h>` header defines the `sockaddr_un` structure that includes the following members:

```
sa_family_t  sun_family  /* address family */
char         sun_path[]  /* socket pathname */
```

The `sockaddr_un` structure is used to store addresses for UNIX domain sockets. Values of this type must be cast to `struct sockaddr` for use with the socket interfaces.

The `<sys/un.h>` header defines the type `sa_family_t` as described in [socket.h\(3HEAD\)](#).

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [bind\(3SOCKET\)](#), [bind\(3XNET\)](#), [socket.h\(3HEAD\)](#), [socket\(3SOCKET\)](#), [socket\(3XNET\)](#), [socketpair\(3SOCKET\)](#), [socketpair\(3XNET\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** unistd.h, unistd – standard symbolic constants and types

**Synopsis** #include <unistd.h>

**Description** The <unistd.h> header defines the symbolic constants and structures which are not already defined or declared in some other header. The contents of this header are shown below.

**Version Test Macros** The following symbolic constants are defined (with fixed values):

<code>_POSIX_VERSION</code>	Integer value indicating version of the POSIX standard (C language binding). See <a href="#">standards(5)</a> .
<code>_POSIX2_VERSION</code>	Integer value indicating version of the POSIX.2 standard (Commands).
<code>_POSIX2_C_VERSION</code>	Integer value indicating version of the POSIX.2 standard (C language binding).
<code>_XOPEN_VERSION</code>	Integer value indicating version of the XPG to which system conforms.
<code>_XOPEN_XCU_VERSION</code>	Integer value indicating the version of the XCU specification to which the implementation conforms. If this constant is not defined, use the <a href="#">sysconf(3C)</a> function to determine which features are supported. This constant is not defined for the SUSv3 environment.

**Mandatory Symbolic Constants** The following symbolic constants, if defined in <unistd.h>, have a value of -1, 0, or greater, unless otherwise specified below. If these are undefined, the [fpathconf\(2\)](#), [pathconf\(2\)](#), or [sysconf\(3C\)](#) functions can be used to determine whether the option is provided for a particular invocation of the application.

If a symbolic constant is defined with the value -1, the option is not supported. Headers, data types, and function interfaces required only for the option need not be supplied. An application that attempts to use anything associated only with the option is considered to be requiring an extension.

If a symbolic constant is defined with a value greater than zero, the option is always supported when the application is executed. All headers, data types, and functions are present and operate as specified.

If a symbolic constant is defined with the value zero, all headers, data types, and functions are present. The application can check at runtime to see whether the option is supported by calling `fpathconf()`, `pathconf()`, or `sysconf()` with the indicated *name* parameter.

Unless explicitly specified otherwise, the behavior of functions associated with an unsupported option is unspecified, and an application that uses such functions without first checking `fpathconf()`, `pathconf()`, or `sysconf()` is considered to be requiring an extension.

<code>_POSIX_ADVISORY_INFO</code>	Implementation supports the Advisory Information option.
<code>_POSIX_ASYNCHRONOUS_IO</code>	Implementation supports the Asynchronous Input and Output option.
<code>_POSIX_BARRIERS</code>	Implementation supports the Barriers option.
<code>_POSIX_CLOCK_SELECTION</code>	Implementation supports the Clock Selection option.
<code>_POSIX_CPUTIME</code>	Implementation supports the Process CPU-Time Clocks option.
<code>_POSIX_FSYNC</code>	Implementation supports the File Synchronisation option.
<code>_POSIX_IPV6</code>	Implementation supports the IPv6 option.
<code>_POSIX_JOB_CONTROL</code>	Implementation supports job control.
<code>_POSIX_MAPPED_FILES</code>	Implementation supports the Memory Mapped Files option.
<code>_POSIX_MEMLOCK</code>	Implementation supports the Process Memory Locking option.
<code>_POSIX_MEMLOCK_RANGE</code>	Implementation supports the Range Memory Locking option.
<code>_POSIX_MEMORY_PROTECTION</code>	Implementation supports the Memory Protection option.
<code>_POSIX_MESSAGE_PASSING</code>	Implementation supports the Message Passing option.
<code>_POSIX_MONOTONIC_CLOCK</code>	Implementation supports the Monotonic Clock option.
<code>_POSIX_PRIORITY_SCHEDULING</code>	Implementation supports the Process Scheduling option.
<code>_POSIX_RAW_SOCKETS</code>	Implementation supports the Raw Sockets option.
<code>_POSIX_READER_WRITER_LOCKS</code>	Implementation supports the Read-Write Locks option.
<code>_POSIX_REALTIME_SIGNALS</code>	Implementation supports the Realtime Signals Extension option.
<code>_POSIX_REGEX</code>	Implementation supports the Regular Expression Handling option.
<code>_POSIX_SAVED_IDS</code>	The <code>exec</code> functions (see <a href="#">exec(2)</a> ) save the effective user and group.

---

<code>_POSIX_SEMAPHORES</code>	Implementation supports the Semaphores option.
<code>_POSIX_SHARED_MEMORY_OBJECTS</code>	Implementation supports the Shared Memory Objects option.
<code>_POSIX_SHELL</code>	Implementation supports the POSIX shell.
<code>_POSIX_SPAWN</code>	Implementation supports the Spawn option.
<code>_POSIX_SPIN_LOCKS</code>	Implementation supports the Spin Locks option.
<code>_POSIX_SPORADIC_SERVER</code>	Implementation supports the Process Sporadic Server option.
<code>_POSIX_SYNCHRONIZED_IO</code>	Implementation supports the Synchronized Input and Output option.
<code>_POSIX_THREAD_ATTR_STACKADDR</code>	Implementation supports the thread stack address attribute option.
<code>_POSIX_THREAD_ATTR_STACKSIZE</code>	Implementation supports the thread stack size attribute option.
<code>_POSIX_THREAD_CPU_TIME</code>	Implementation supports the Thread CPU-Time Clocks option.
<code>_POSIX_THREAD_PROCESS_SHARED</code>	Implementation supports the process-shared synchronization option.
<code>_POSIX_THREAD_SAFE_FUNCTIONS</code>	Implementation supports the thread-safe functions option.
<code>_POSIX_THREAD_SPORADIC_SERVER</code>	Implementation supports the Thread Sporadic Server option.
<code>_POSIX_THREADS</code>	Implementation supports the threads option.
<code>_POSIX_TIMERS</code>	Implementation supports the Timers option.
<code>_POSIX_TIMEOUTS</code>	Implementation supports the Timeouts option.
<code>_POSIX_TRACE</code>	Implementation supports the Trace option.
<code>_POSIX_TRACE_EVENT_FILTER</code>	Implementation supports the Trace Event Filter option.
<code>_POSIX_TRACE_INHERIT</code>	Implementation supports the Trace Inherit option.
<code>_POSIX_TRACE_LOG</code>	Implementation supports the Trace Log option.
<code>_POSIX_TYPED_MEMORY_OBJECTS</code>	Implementation supports the Typed Memory Objects option.

---

<code>_POSIX_V6_ILP32_OFF32</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> , <code>long</code> , and <code>pointer</code> types and an <code>off_t</code> type using at least 64 bits.
<code>_POSIX_V6_ILP32_OFFBIG</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> , <code>long</code> , and <code>pointer</code> types and an <code>off_t</code> type using at least 64 bits.
<code>_POSIX_V6_LP64_OFF64</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> and 64-bit <code>long</code> , <code>pointer</code> , and <code>off_t</code> types.
<code>_POSIX_V6_LPBIG_OFFBIG</code>	Implementation provides a C-language compilation environment with an <code>int</code> type using at least 32 bits and <code>long</code> , <code>pointer</code> , and <code>off_t</code> types using at least 64 bits.
<code>_POSIX_XOPEN_STREAMS</code>	Implementation supports the XSI STREAMS Option Group.
<code>_POSIX2_C_BIND</code>	Implementation supports the C Language Binding option.
<code>_POSIX2_C_DEV</code>	Implementation supports the C Language Development Utilities option.
<code>_POSIX2_CHAR_TERM</code>	Implementation supports at least one terminal type.
<code>_POSIX2_LOCALEDEF</code>	Implementation supports the creation of locales by the <a href="#">localedef(1)</a> utility.
<code>_POSIX2_PBS</code>	Implementation supports the Batch Environment Services and Utilities option.
<code>_POSIX2_PBS_ACCOUNTING</code>	Implementation supports the Batch Accounting option.
<code>_POSIX2_PBS_CHECKPOINT</code>	Implementation supports the Batch Checkpoint/Restart option.
<code>_POSIX2_PBS_LOCATE</code>	Implementation supports the Locate Batch Job Request option.
<code>_POSIX2_PBS_MESSAGE</code>	Implementation supports the Batch Job Message Request option.
<code>_POSIX2_PBS_TRACK</code>	Implementation supports the Track Batch Job Request option.
<code>_POSIX2_SW_DEV</code>	Implementation supports the Software Development Utilities option.

<code>_POSIX2_UPE</code>	Implementation supports the User Portability Utilities option.
<code>_XBS5_ILP32_OFF32</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> , <code>long</code> , <code>pointer</code> and <code>off_t</code> types.
<code>_XBS5_ILP32_OFFBIG</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> , <code>long</code> and <code>pointer</code> types and an <code>off_t</code> type using at least 64 bits.
<code>_XBS5_LP64_OFF64</code>	Implementation provides a C-language compilation environment with 32-bit <code>int</code> and 64-bit <code>long</code> , <code>pointer</code> and <code>off_t</code> types.
<code>_XBS5_LPBIG_OFFBIG</code>	Implementation provides a C-language compilation environment with an <code>int</code> type using at least 32 bits and <code>long</code> , <code>pointer</code> and <code>off_t</code> types using at least 64 bits.
<code>_XOPEN_ENH_I18N</code>	Implementation supports the Issue 4, Version 2 Enhanced Internationalization Feature Group.
<code>_XOPEN_LEGACY</code>	Implementation supports the Legacy Feature Group.
<code>_XOPEN_REALTIME</code>	Implementation supports the X/Open Realtime Feature Group.
<code>_XOPEN_SHM</code>	Implementation supports the Issue 4, Version 2 Shared Memory Feature Group.
<code>_XOPEN_UNIX</code>	X/Open CAE Specification, January 1997, System Interfaces and Headers, Issue 5 (ISBN: 1-85912-181-0, C606).
<code>_XOPEN_XPG3</code>	X/Open Specification, February 1992, System Interfaces and Headers, Issue 3 (ISBN: 1-872630-37-5, C212); this specification was formerly X/Open Portability Guide, Issue 3, Volume 2, January 1989, XSI System Interface and Headers (ISBN: 0-13-685843-0, XO/XPG/89/003).
<code>_XOPEN_XPG4</code>	X/Open CAE Specification, July 1992, System Interfaces and Headers, Issue 4 (ISBN: 1-872630-47-2, C202).

Execution-time Symbolic Constants If any of the following constants are not defined in the header `<unistd.h>`, the value varies depending on the file to which it is applied.

If any of the following constants are defined to have value `-1` in the header `<unistd.h>`, the implementation will not provide the option on any file; if any are defined to have a value other than `-1` in the header `<unistd.h>`, the implementation will provide the option on all applicable files.

All of the following constants, whether defined in `<unistd.h>` or not, can be queried with respect to a specific file using the `pathconf()` or `fpathconf()` functions.

<code>_POSIX_ASYNC_IO</code>	Asynchronous input or output operations can be performed for the associated file.
<code>_POSIX_PRIO_IO</code>	Prioritized input or output operations can be performed for the associated file.
<code>_POSIX_SYNC_IO</code>	Synchronized input or output operations can be performed for the associated file.

Constants for Functions The following constant is defined:

`NULL` Null pointer.

The following symbolic constants are defined for the `access(2)` function:

<code>R_OK</code>	Test for read permission.
<code>W_OK</code>	Test for write permission.
<code>X_OK</code>	Test for execute (search) permission.
<code>F_OK</code>	Test for existence of file.

The constants `F_OK`, `R_OK`, `W_OK`, and `X_OK`, and the expressions `R_OK | W_OK`, `R_OK | X_OK`, and `R_OK | W_OK | X_OK` all have distinct values.

The following symbolic constants are defined for the `lockf(3C)` function:

<code>F_ULOCK</code>	Unlock a previously locked region.
<code>F_LOCK</code>	Lock a region for exclusive use.
<code>F_TLOCK</code>	Test and lock a region for exclusive use.
<code>F_TEST</code>	Test a region for other processes locks.

The following symbolic constants are defined for the `lseek(2)` and `fcntl(2)` functions (they have distinct values):

<code>SEEK_SET</code>	Set file offset to <i>offset</i> .
<code>SEEK_CUR</code>	Set file offset to current plus <i>offset</i> .
<code>SEEK_END</code>	Set file offset to EOF plus <i>offset</i> .



The following symbolic constants are defined for the `confstr(3C)` function for both SPARC and x86:

<code>_CS_LFS64_CFLAGS</code>	<code>_CS_LFS64_LDFLAGS</code>
<code>_CS_LFS64_LIBS</code>	<code>_CS_LFS64_LINTFLAGS</code>
<code>_CS_LFS_CFLAGS</code>	<code>_CS_LFS_LDFLAGS</code>
<code>_CS_LFS_LIBS</code>	<code>_CS_LFS_LINTFLAGS</code>
<code>_CS_PATH</code>	<code>_CS_POSIX_V6_ILP32_OFF32_CFLAGS</code>
<code>_CS_POSIX_V6_ILP32_OFF32_LDFLAGS</code>	<code>_CS_POSIX_V6_ILP32_OFF32_LIBS</code>
<code>_CS_POSIX_V6_ILP32_OFF32_LINTFLAGS</code>	<code>_CS_POSIX_V6_ILP32_OFFBIG_CFLAGS</code>
<code>_CS_POSIX_V6_ILP32_OFFBIG_LDFLAGS</code>	<code>_CS_POSIX_V6_ILP32_OFFBIG_LIBS</code>
<code>_CS_POSIX_V6_ILP32_OFFBIG_LINTFLAGS</code>	<code>_CS_POSIX_V6_WIDTH_RESTRICTED_ENV</code>
<code>_CS_XBS5_ILP32_OFF32_CFLAGS</code>	<code>_CS_XBS5_ILP32_OFF32_LDFLAGS</code>
<code>_CS_XBS5_ILP32_OFF32_LIBS</code>	<code>_CS_XBS5_ILP32_OFF32_LINTFLAGS</code>
<code>_CS_XBS5_ILP32_OFFBIG_CFLAGS</code>	<code>_CS_XBS5_ILP32_OFFBIG_LDFLAGS</code>
<code>_CS_XBS5_ILP32_OFFBIG_LIBS</code>	<code>_CS_XBS5_ILP32_OFFBIG_LINTFLAGS</code>

The following symbolic constants are defined for the `confstr()` function for SPARC only:

<code>_CS_POSIX_V6_LP64_OFF64_CFLAGS</code>	<code>_CS_POSIX_V6_LP64_OFF64_LDFLAGS</code>
<code>_CS_POSIX_V6_LP64_OFF64_LIBS</code>	<code>_CS_POSIX_V6_LP64_OFF64_LINTFLAGS</code>
<code>_CS_POSIX_V6_LPBIG_OFFBIG_CFLAGS</code>	<code>_CS_POSIX_V6_LPBIG_OFFBIG_LDFLAGS</code>
<code>_CS_POSIX_V6_LPBIG_OFFBIG_LIBS</code>	<code>_CS_POSIX_V6_LPBIG_OFFBIG_LINTFLAGS</code>
<code>_CS_XBS5_LP64_OFF64_CFLAGS</code>	<code>_CS_XBS5_LP64_OFF64_LDFLAGS</code>
<code>_CS_XBS5_LP64_OFF64_LIBS</code>	<code>_CS_XBS5_LP64_OFF64_LINTFLAGS</code>
<code>_CS_XBS5_LPBIG_OFFBIG_CFLAGS</code>	<code>_CS_XBS5_LPBIG_OFFBIG_LDFLAGS</code>
<code>_CS_XBS5_LPBIG_OFFBIG_LIBS</code>	<code>_CS_XBS5_LPBIG_OFFBIG_LINTFLAGS</code>

The following symbolic constants are defined for the `sysconf(3C)` function:

<code>_SC_2_C_BIND</code>	<code>_SC_2_C_DEV</code>
---------------------------	--------------------------

_SC_2_C_VERSION	_SC_2_FORT_DEV
_SC_2_FORT_RUN	_SC_2_LOCALEDEF
_SC_2_PBS	_SC_2_PBS_ACCOUNTING
_SC_2_PBS_CHECKPOINT	_SC_2_PBS_LOCATE
_SC_2_PBS_MESSAGE	_SC_2_PBS_TRACK
_SC_2_SW_DEV	_SC_2_UPE
_SC_2_VERSION	_SC_ADVISORY_INFO
_SC_AIO_LISTIO_MAX	_SC_AIO_MAX
_SC_AIO_PRIO_DELTA_MAX	_SC_ARG_MAX
_SC_ASYNCHRONOUS_IO	_SC_ATEXIT_MAX
_SC_AVPHYS_PAGES	_SC_BARRIERS
_SC_BC_BASE_MAX	_SC_BC_DIM_MAX
_SC_BC_SCALE_MAX	_SC_BC_STRING_MAX
_SC_CHILD_MAX	_SC_CLK_TCK
_SC_CLOCK_SELECTION	_SC_COLL_WEIGHTS_MAX
_SC_CPU_TIME	_SC_DELAYTIMER_MAX
_SC_EXPR_NEST_MAX	_SC_FSYNC
_SC_GETGR_R_SIZE_MAX	_SC_GETPW_R_SIZE_MAX
_SC_HOST_NAME_MAX	_SC_IOV_MAX
_SC_IPV6	_SC_JOB_CONTROL
_SC_LINE_MAX	_SC_LOGIN_NAME_MAX
_SC_LOGNAME_MAX	_SC_MAPPED_FILES
_SC_MEMLOCK	_SC_MEMLOCK_RANGE
_SC_MEMORY_PROTECTION	_SC_MESSAGE_PASSING
_SC_MONOTONIC_CLOCK	_SC_MQ_OPEN_MAX
_SC_MQ_PRIO_MAX	_SC_NGROUPS_MAX
_SC_NPROCESSORS_CONF	_SC_NPROCESSORS_ONLN
_SC_OPEN_MAX	_SC_PAGESIZE
_SC_PAGE_SIZE	_SC_PASS_MAX

---

_SC_PHYS_PAGES	_SC_PRIORITIZED_IO
_SC_PRIORITY_SCHEDULING	_SC_RAW_SOCKETS
_SC_READER_WRITER_LOCKS	_SC_REALTIME_SIGNALS
_SC_REGEX	_SC_RE_DUP_MAX
_SC_RTSIG_MAX	_SC_SAVED_IDS
_SC_SEMAPHORES	_SC_SEM_NSEMS_MAX
_SC_SEM_VALUE_MAX	_SC_SHARED_MEMORY_OBJECTS
_SC_SHELL	_SC_SIGQUEUE_MAX
_SC_SPAWN	_SC_SPIN_LOCKS
_SC_SPORADIC_SERVER	_SC_SS_REPL_MAX
_SC_STREAM_MAX	_SC_SYMLINK_MAX
_SC_SYNCHRONIZED_IO	_SC_THREAD_ATTR_STACKADDR
_SC_THREAD_ATTR_STACKSIZE	_SC_THREAD_CPUTIME
_SC_THREAD_DESTRUCTOR_ITERATIONS	_SC_THREAD_KEYS_MAX
_SC_THREAD_PRIO_INHERIT	_SC_THREAD_PRIO_PROTECT
_SC_THREAD_PRIORITY_SCHEDULING	_SC_THREAD_PROCESS_SHARED
_SC_THREAD_SPORADIC_SERVER	_SC_THREADS
_SC_THREAD_SAFE_FUNCTIONS	_SC_THREAD_STACK_MIN
_SC_THREAD_THREADS_MAX	_SC_TIMEOUTS
_SC_TIMER_MAX	_SC_TIMERS
_SC_TRACE	_SC_TRACE_EVENT_FILTER
_SC_TRACE_EVENT_NAME_MAX	_SC_TRACE_INHERIT
_SC_TRACE_LOG	_SC_TRACE_NAME_MAX
_SC_TRACE_SYS_MAX	_SC_TRACE_USER_EVENT_MAX
_SC_TTY_NAME_MAX	_SC_TYPED_MEMORY_OBJECTS
_SC_TZNAME_MAX	_SC_V6_ILP32_OFF32
_SC_V6_ILP32_OFFBIG	_SC_V6_LP64_OFF64
_SC_V6_LP64_OFFBIG	_SC_VERSION
_SC_XBS5_ILP32_OFF32	_SC_XBS5_ILP32_OFFBIG

<code>_SC_XBS5_LP64_OFF64</code>	<code>_SC_XBS5_LPBIG_OFFBIG</code>
<code>_SC_XOPEN_CRYPT</code>	<code>_SC_XOPEN_ENH_I18N</code>
<code>_SC_XOPEN_SHM</code>	<code>_SC_XOPEN_STREAMS</code>
<code>_SC_XOPEN_UNIX</code>	<code>_SC_XOPEN_VERSION</code>
<code>_SC_XOPEN_XCU_VERSION</code>	

The constants `_SC_PAGESIZE` and `_SC_PAGE_SIZE` can be defined to have the same value.

The following symbolic constants are defined for the `fpathconf(2)` function:

<code>_PC_2_SYMLINKS</code>	<code>_PC_ALLOC_SIZE_MIN</code>
<code>_PC_ASYNC_IO</code>	<code>_PC_CHOWN_RESTRICTED</code>
<code>_PC_FILESIZEBITS</code>	<code>_PC_LINK_MAX</code>
<code>_PC_MAX_CANON</code>	<code>_PC_MAX_INPUT</code>
<code>_PC_NAME_MAX</code>	<code>_PC_NO_TRUNC</code>
<code>_PC_PATH_MAX</code>	<code>_PC_PIPE_BUF</code>
<code>_PC_PRIO_IO</code>	<code>_PC_REC_INCR_XFER_SIZE</code>
<code>_PC_REC_MAX_XFER_SIZE</code>	<code>_PC_REC_MIN_XFER_SIZE</code>
<code>_PC_REC_XFER_ALIGN</code>	<code>_PC_SYMLINK_MAX</code>
<code>_PC_SYNC_IO</code>	<code>_PC_TIMESTAMP_RESOLUTION</code>
<code>_PC_VDISABLE</code>	<code>_PC_XATTR_ENABLED</code>
<code>_PC_XATTR_EXISTS</code>	

The following symbolic constants are defined for file streams:

<code>STDIN_FILENO</code>	File number (0) of <code>stdin</code> .
<code>STDOUT_FILENO</code>	File number (1) of <code>stdout</code> .
<code>STDERR_FILENO</code>	File number (2) of <code>stderr</code> .

The following pathnames are defined:

<code>GF_PATH</code>	Pathname of the group file.
<code>PF_PATH</code>	Pathname of the <code>passwd</code> file.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Committed
Standard	See <a href="#">standards(5)</a> .

**See Also** [access\(2\)](#), [exec\(2\)](#), [fcntl\(2\)](#), [fpathconf\(2\)](#), [lseek\(2\)](#), [confstr\(3C\)](#), [lockf\(3C\)](#), [sysconf\(3C\)](#), [termios\(3C\)](#), [group\(4\)](#), [passwd\(4\)](#), [attributes\(5\)](#), [standards\(5\)](#), [termio\(7I\)](#)

**Name** utime.h, utime – access and modification times structure

**Synopsis** #include <utime.h>

**Description** The <utime.h> header declares the structure `utimbuf`, which includes the following members:

```
time_t actime    /* access time */
time_t modtime  /* modification time */
```

The times are measured in seconds since the Epoch.

The type `time_t` is defined as described in <sys/types.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [utime\(2\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** utmpx.h, utmpx – user accounting database definitions

**Synopsis** #include <utmpx.h>

**Description** The <utmpx.h> header defines the utmpx structure, which includes the following members:

```
char          ut_user[]; /* user login name */
char          ut_id[];   /* unspecified initialization */
                /* process identifier */
char          ut_line[]; /* device name */
pid_t         ut_pid;    /* process ID */
short        ut_type;    /* type of entry */
```

for X/Open compilation environments:

```
struct ut_exit_status ut_exit; /* process termination/exit status*/
```

for all other compilation environments:

```
struct exit_status   ut_exit; /* process termination/exit status*/
struct timeval       ut_tv;    /* time entry was made */
int                  ut_session; /* session ID, used for windowing */
short                ut_syslen; /* significant length of ut_host */
                /* including terminating null */
char                 ut_host[]; /* remote host name */
```

The pid\_t type is defined through typedef as described in <sys/types.h>.

The timeval structure is defined as described in <sys/time.h>.

Inclusion of the <utmpx.h> header can also make visible all symbols from <sys/time.h>.

The following symbolic constants are defined as possible values for the ut\_type member of the utmpx structure:

EMPTY	No valid user accounting information.
BOOT_TIME	Identifies time of system boot.
OLD_TIME	Identifies time when system clock changed.
NEW_TIME	Identifies time after system clock changed.
USER_PROCESS	Identifies a process.
INIT_PROCESS	Identifies a process spawned by the init process.
LOGIN_PROCESS	Identifies the session leader of a logged-in user.
DEAD_PROCESS	Identifies a session leader who has exited.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [endutxent\(3C\)](#), [time.h\(3HEAD\)](#), [types.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)



**Name** `utsname.h`, `utsname` – system name structure

**Synopsis** `#include <sys/utsname.h>`

**Description** The `<sys/utsname.h>` header defines the structure `utsname`, which includes the following members:

```
char sysname[]    /* name of this implementation of the
                  operating system */
char nodename[]  /* name of this node within an
                  implementation-defined communications
                  network */
char release[]   /* current release level of this
                  implementation */
char version[]   /* current version level of this
                  release */
char machine[]   /* name of the hardware type on which
                  the system is running */
```

The character arrays are of unspecified size, but the data stored in them is terminated by a null byte.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [uname\(2\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** values.h, values – machine-dependent values

**Synopsis** `#include <values.h>`

**Description** This file contains a set of manifest constants, conditionally defined for particular processor architectures.

The model assumed for integers is binary representation (one's or two's complement), where the sign is represented by the value of the high-order bit.

<code>BITS ( type )</code>	The number of bits in a specified type (for example, <code>int</code> ).
<code>HIBITS</code>	The value of a short integer with only the high-order bit set.
<code>HIBITL</code>	The value of a long integer with only the high-order bit set.
<code>HIBITI</code>	The value of a regular integer with only the high-order bit set.
<code>MAXSHORT</code>	The maximum value of a signed short integer.
<code>MAXLONG</code>	The maximum value of a signed long integer.
<code>MAXINT</code>	The maximum value of a signed regular integer.
<code>MAXFLOAT, LN_MAXFLOAT</code>	The maximum value of a single-precision floating-point number, and its natural logarithm.
<code>MAXDOUBLE, LN_MAXDOUBLE</code>	The maximum value of a double-precision floating-point number, and its natural logarithm.
<code>MINFLOAT, LN_MINFLOAT</code>	The minimum positive value of a single-precision floating-point number, and its natural logarithm.
<code>MINDOUBLE, LN_MINDOUBLE</code>	The minimum positive value of a double-precision floating-point number, and its natural logarithm.
<code>FSIGNIF</code>	The number of significant bits in the mantissa of a single-precision floating-point number.
<code>DSIGNIF</code>	The number of significant bits in the mantissa of a double-precision floating-point number.

**See Also** [Intro\(3\) math.h\(3HEAD\)](#)

**Name** wait.h, wait – wait status

**Synopsis** #include <sys/wait.h>

**Description** When a process waits for status from its children using either the [wait\(3C\)](#) or [waitpid\(3C\)](#) function, the status returned can be evaluated with the following macros, defined in <sys/wait.h>. These macros evaluate to integral expressions. The *stat* argument to these macros is the integer value returned from `wait()` or `waitpid()`.

<code>WCOREDUMP(<i>stat</i>)</code>	If the value of <code>WIFSIGNALED(<i>stat</i>)</code> is non-zero, this macro evaluates to a non-zero value if a core image of the terminated child was created.
<code>WEXITSTATUS(<i>stat</i>)</code>	If the value of <code>WIFEXITED(<i>stat</i>)</code> is non-zero, this macro evaluates to the exit code that the child process passed to <code>_exit()</code> (see <a href="#">exit(2)</a> ) or <a href="#">exit(3C)</a> , or the value that the child process returned from <code>main</code> .
<code>WIFCONTINUED(<i>stat</i>)</code>	Evaluates to a non-zero value if status was returned for a child process that has continued.
<code>WIFEXITED(<i>stat</i>)</code>	Evaluates to a non-zero value if status was returned for a child process that terminated normally.
<code>WIFSIGNALED(<i>stat</i>)</code>	Evaluates to a non-zero value if status was returned for a child process that terminated due to the receipt of a signal.
<code>WIFSTOPPED(<i>stat</i>)</code>	Evaluates to a non-zero value if status was returned for a child process that is currently stopped.
<code>WSTOPSIG(<i>stat</i>)</code>	If the value of <code>WIFSTOPPED(<i>stat</i>)</code> is non-zero, this macro evaluates to the number of the signal that caused the child process to stop.
<code>WTERMSIG(<i>stat</i>)</code>	If the value of <code>WIFSIGNALED(<i>stat</i>)</code> is non-zero, this macro evaluates to the number of the signal that caused the termination of the child process.

The <sys/wait.h> header defines the symbolic constants listed below for use with [waitpid\(3C\)](#).

<code>WNOHANG</code>	Do not hang if no status is available; return immediately.
<code>WUNTRACED</code>	Report status of stopped child process.

The symbolic constants listed below are defined as possible values for the *options* argument to [waitid\(2\)](#).

<code>WEXITED</code>	Wait for processes that have exited.
<code>WSTOPPED</code>	Status is returned for any child that has stopped upon receipt of a signal.
<code>WCONTINUED</code>	Status is returned for any child that was stopped and has been continued.
<code>WNOHANG</code>	Return immediately if there are no children to wait for.

**WNOWAIT** Keep the process whose status is returned in `infop` in a waitable state.

The type `idtype_t` is defined as an enumeration type whose possible values include the following:

P\_ALL  
P\_PID  
P\_PGID

The `id_t` and `pid_t` types are defined as described in `<sys/types.h>`.

The `siginfo_t` type is defined as described in `<signal.h>`.

The `rusage` structure is defined as described in `<sys/resource.h>`.

Inclusion of the `<sys/wait.h>` header can also make visible all symbols from `<signal.h>` and `<sys/resource.h>`.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [exit\(2\)](#), [waitid\(2\)](#), [exit\(3C\)](#), [wait\(3C\)](#), [waitpid\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** wchar.h, wchar – wide-character handling

**Synopsis** #include <wchar.h>

**Description** The <wchar.h> header defines the following types:

wchar_t	As described in <stddef.h>.
wint_t	An integer type capable of storing any valid value of wchar_t or WEOF.
wctype_t	A scalar type of a data object that can hold values which represent locale-specific character classification.
mbstate_t	An object type other than an array type that can hold the conversion state information necessary to convert between sequences of (possibly multi-byte) characters and wide characters. If a codeset is being used such that an mbstate_t needs to preserve more than two levels of reserved state, the results are unspecified.
FILE	As described in <stdio.h>.
size_t	As described in <stddef.h>.
va_list	As described in <stdarg.h>.

The implementation supports one or more programming environments in which the width of wint\_t is no greater than the width of type long. The names of these programming environments can be obtained using the [confstr\(3C\)](#) function or the [getconf\(1\)](#) utility.

The <wchar.h> header defines the following macros:

WCHAR_MAX	The maximum value representable by an object of type wchar_t.
WCHAR_MIN	The minimum value representable by an object of type wchar_t.
WEOF	Constant expression of type wint_t that is returned by several WP functions to indicate end-of-file.
NULL	As described in <stddef.h>.

The tag tm is declared as naming an incomplete structure type, the contents of which are described in the header <time.h>.

Inclusion of the <wchar.h> header can make visible all symbols from the headers <ctype.h>, <string.h>, <stdarg.h>, <stddef.h>, <stdio.h>, <stdlib.h>, and <time.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [getconf\(1\)](#), [btowc\(3C\)](#), [confstr\(3C\)](#), [fgetwc\(3C\)](#), [getws\(3C\)](#), [fputwc\(3C\)](#), [fputws\(3C\)](#), [fwide\(3C\)](#), [fwprintf\(3C\)](#), [fwscanf\(3C\)](#), [getwc\(3C\)](#), [getwchar\(3C\)](#), [iswalph\(3C\)](#), [iswctype\(3C\)](#), [mbsinit\(3C\)](#), [mbrlen\(3C\)](#), [mbrtowc\(3C\)](#), [mbsrtowcs\(3C\)](#), [tolower\(3C\)](#), [toupper\(3C\)](#), [ungetwc\(3C\)](#), [vfwprintf\(3C\)](#), [wrtomb\(3C\)](#), [wcsrtombs\(3C\)](#), [wcstring\(3C\)](#), [wcsstr\(3C\)](#), [wcstod\(3C\)](#), [wcsoll\(3C\)](#), [wcsftime\(3C\)](#), [wcstol\(3C\)](#), [wcstoul\(3C\)](#), [wcswidth\(3C\)](#), [wcsxfrm\(3C\)](#), [wctob\(3C\)](#), [wctype\(3C\)](#), [wcwidth\(3C\)](#), [wmemchr\(3C\)](#), [wmemcmp\(3C\)](#), [wmemcpy\(3C\)](#), [wmemmove\(3C\)](#), [wmemset\(3C\)](#), [stdarg\(3EXT\)](#), [stddef.h\(3HEAD\)](#), [stdio.h\(3HEAD\)](#), [stdlib.h\(3HEAD\)](#), [string.h\(3HEAD\)](#), [time.h\(3HEAD\)](#), [wctype.h\(3HEAD\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** wctype.h, wctype – wide-character classification and mapping utilities

**Synopsis** #include <wctype.h>

**Description** The <wctype.h> header defines the following types:

wint\_t As described in <wchar.h>.

wctrans\_t A scalar type that can hold values that represent locale-specific character mappings.

wctype\_t As described in <wchar.h>.

The <wctype.h> header defines the following macro name:

WEOF Constant expression of type wint\_t that is returned by several MSE functions to indicate end-of-file.

For all functions described in this header that accept an argument of type wint\_t, the value is representable as a wchar\_t or equals the value of WEOF. If this argument has any other value, the behavior is undefined.

The behavior of these functions is affected by the LC\_CTYPE category of the current locale.

Inclusion of the <wctype.h> header can make visible all symbols from the headers <ctype.h>, <stdarg.h>, <stddef.h>, <stdio.h>, <stdlib.h>, <string.h>, <time.h>, and <wchar.h>.

**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [iswalphabet\(3C\)](#), [iswctype\(3C\)](#), [locale.h\(3HEAD\)](#), [setlocale\(3C\)](#), [stdarg\(3EXT\)](#), [stddef.h\(3HEAD\)](#), [stdio.h\(3HEAD\)](#), [stdlib.h\(3HEAD\)](#), [string.h\(3HEAD\)](#), [time.h\(3HEAD\)](#), [towctrans\(3C\)](#), [tolower\(3C\)](#), [toupper\(3C\)](#), [wctrans\(3C\)](#), [wctype\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

**Name** wordexp.h, wordexp – word-expansion types

**Synopsis** #include <wordexp.h>

**Description** The <wordexp.h> header defines the structures and symbolic constants used by the wordexp() and wordfree() functions. See [wordexp\(3C\)](#).

The structure type wordexp\_t contains the following members:

```
size_t we_wordc      /* count of words matched by words */
char   **we_wordv   /* pointer to list of expanded words */
size_t we_offs      /* slots to reserve at the beginning
                    of we_wordv */
```

The *flags* argument to the wordexp() function is the bitwise-inclusive OR of the following flags:

WRDE_APPEND	Append words to those previously generated.
WRDE_DOOFFS	Number of null pointers to prepend to we_wordv.
WRDE_NOCMD	Fail if command substitution is requested.
WRDE_REUSE	The pwordexp argument was passed to a previous successful call to wordexp(), and has not been passed to wordfree(). The result is the same as if the application had called wordfree() and then called wordexp() without WRDE_REUSE.
WRDE_SHOWERR	Do not redirect stderr to /dev/null.
WRDE_UNDEF	Report error on an attempt to expand an undefined shell variable.

The following constants are defined as error return values:

WRDE_BADCHAR	One of the unquoted characters—<newline>, ' ', '&', ';', '<', '>', '(', ')', '{', '}'—appears in words in an inappropriate context.
WRDE_BADVAL	Reference to undefined shell variable when WRDE_UNDEF is set in <i>flags</i> .
WRDE_CMDSUB	Command substitution requested when WRDE_NOCMD was set in <i>flags</i> .
WRDE_NOSPACE	Attempt to allocate memory failed.
WRDE_NOSYS	Reserved.
WRDE_SYNTAX	Shell syntax error, such as unbalanced parentheses or unterminated string.

The <wordexp.h> header defines the following type:

```
size_t    As described in <stddef.h>.
```



**Attributes** See [attributes\(5\)](#) for descriptions of the following attributes:

ATTRIBUTE TYPE	ATTRIBUTE VALUE
Interface Stability	Standard

**See Also** [wordexp\(3C\)](#), [attributes\(5\)](#), [standards\(5\)](#)

