Linux Standard Base Core Specification
for S390X 3.1
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Foreword

This is version 3.1 of the Linux Standard Base Core Specification for S390X. This specification is part of a family of specifications under the general title "Linux Standard Base". Developers of applications or implementations interested in using the LSB trademark should see the Free Standards Group Certification Policy for details.
Introduction

The LSB defines a binary interface for application programs that are compiled and packaged for LSB-conforming implementations on many different hardware architectures. Since a binary specification shall include information specific to the computer processor architecture for which it is intended, it is not possible for a single document to specify the interface for all possible LSB-conforming implementations. Therefore, the LSB is a family of specifications, rather than a single one.

This document should be used in conjunction with the documents it references. This document enumerates the system components it includes, but descriptions of those components may be included entirely or partly in this document, partly in other documents, or entirely in other reference documents. For example, the section that describes system service routines includes a list of the system routines supported in this interface, formal declarations of the data structures they use that are visible to applications, and a pointer to the underlying referenced specification for information about the syntax and semantics of each call. Only those routines not described in standards referenced by this document, or extensions to those standards, are described in the detail. Information referenced in this way is as much a part of this document as is the information explicitly included here.

The specification carries a version number of either the form x.y or x.y.z. This version number carries the following meaning:

- The first number (x) is the major version number. All versions with the same major version number should share binary compatibility. Any addition or deletion of a new library results in a new version number. Interfaces marked as deprecated may be removed from the specification at a major version change.

- The second number (y) is the minor version number. Individual interfaces may be added if all certified implementations already had that (previously undocumented) interface. Interfaces may be marked as deprecated at a minor version change. Other minor changes may be permitted at the discretion of the LSB workgroup.

- The third number (z), if present, is the editorial level. Only editorial changes should be included in such versions.

Since this specification is a descriptive Application Binary Interface, and not a source level API specification, it is not possible to make a guarantee of 100% backward compatibility between major releases. However, it is the intent that those parts of the binary interface that are visible in the source level API will remain backward compatible from version to version, except where a feature marked as "Deprecated" in one release may be removed from a future release.

Implementors are strongly encouraged to make use of symbol versioning to permit simultaneous support of applications conforming to different releases of this specification.
I Introductory Elements
1 Scope

1.1 General

The Linux Standard Base (LSB) defines a system interface for compiled applications and a minimal environment for support of installation scripts. Its purpose is to enable a uniform industry standard environment for high-volume applications conforming to the LSB.

These specifications are composed of two basic parts: A common specification ("LSB-generic" or "generic LSB") describing those parts of the interface that remain constant across all implementations of the LSB, and an architecture-specific supplement ("LSB-arch" or "archLSB") describing the parts of the interface that vary by processor architecture. Together, the LSB-generic and the architecture-specific supplement for a single hardware architecture provide a complete interface specification for compiled application programs on systems that share a common hardware architecture.

The LSB-generic document shall be used in conjunction with an architecture-specific supplement. Whenever a section of the LSB-generic specification shall be supplemented by architecture-specific information, the LSB-generic document includes a reference to the architecture supplement. Architecture supplements may also contain additional information that is not referenced in the LSB-generic document.

The LSB contains both a set of Application Program Interfaces (APIs) and Application Binary Interfaces (ABIs). APIs may appear in the source code of portable applications, while the compiled binary of that application may use the larger set of ABIs. A conforming implementation shall provide all of the ABIs listed here. The compilation system may replace (e.g. by macro definition) certain APIs with calls to one or more of the underlying binary interfaces, and may insert calls to binary interfaces as needed.

The LSB is primarily a binary interface definition. Not all of the source level APIs available to applications may be contained in this specification.

1.2 Module Specific Scope

This is the S390X architecture specific Core module of the Linux Standards Base (LSB). This module supplements the generic LSB Core module with those interfaces that differ between architectures.

Interfaces described in this module are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.


2 References

2.1 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Note: Where copies of a document are available on the World Wide Web, a Uniform Resource Locator (URL) is given for informative purposes only. This may point to a more recent copy of the referenced specification, or may be out of date. Reference copies of specifications at the revision level indicated may be found at the Free Standards Group's Reference Specifications (http://refs specs.freestandards.org) site.

Table 2-1 Normative References

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filesystem Hierarchy Standard</td>
<td>Filesystem Hierarchy Standard (FHS) 2.3</td>
<td><a href="http://www.pathname.com/fhs/">http://www.pathname.com/fhs/</a></td>
</tr>
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<td>Name</td>
<td>Title</td>
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<td>Itanium C++ ABI</td>
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</tr>
<tr>
<td>SVID Issue 4</td>
<td>System V Interface Definition,Fourth Edition</td>
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2 References

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<tr>
<th>Name</th>
<th>Title</th>
<th>URL</th>
</tr>
</thead>
</table>

2.2 Informative References/Bibliography

In addition, the specifications listed below provide essential background information to implementors of this specification. These references are included for information only.

Table 2-2 Other References

<table>
<thead>
<tr>
<th>Name</th>
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<td>DWARF Debugging Information Format, Revision 2.0.0 (July 27, 1993)</td>
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</tr>
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<td>DWARF Debugging Information Format, Revision 3.0.0 (Draft)</td>
<td>DWARF Debugging Information Format, Revision 3.0.0 (Draft)</td>
<td><a href="http://refspecs.freestandards.org/dwarf/">http://refspecs.freestandards.org/dwarf/</a></td>
</tr>
<tr>
<td>Linux Allocated Device Registry</td>
<td>LINUX ALLOCATED DEVICES</td>
<td><a href="http://www.lanana.org/docs/device-list/devices.txt">http://www.lanana.org/docs/device-list/devices.txt</a></td>
</tr>
<tr>
<td>PAM</td>
<td>Open Software Foundation, Request For Comments: 86.0 , October 1995, V. Samar &amp; R.Schemers (SunSoft)</td>
<td><a href="http://www.opengroup.org/tech/rfc/mirror-rfc/rfc86.0.txt">http://www.opengroup.org/tech/rfc/mirror-rfc/rfc86.0.txt</a></td>
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<td>RFC 1321: The MD5</td>
<td>IETF RFC 1321: The MD5</td>
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<tr>
<td>Message-Digest Algorithm</td>
<td>Message-Digest Algorithm</td>
<td>/rfc1321.txt</td>
</tr>
<tr>
<td>RFC 1831/1832 RPC &amp; XDR</td>
<td>IETF RFC 1831 &amp; 1832</td>
<td><a href="http://www.ietf.org/">http://www.ietf.org/</a></td>
</tr>
</tbody>
</table>
3 Requirements

3.1 Relevant Libraries

The libraries listed in Table 3-1 shall be available on S390X Linux Standard Base systems, with the specified runtime names. These names override or supplement the names specified in the generic LSB specification. The specified program interpreter, referred to as proginterp in this table, shall be used to load the shared libraries specified by `DT_NEED` entries at run time.

<table>
<thead>
<tr>
<th>Library</th>
<th>Runtime Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>libm</td>
<td>libm.so.6</td>
</tr>
<tr>
<td>libdl</td>
<td>libdl.so.2</td>
</tr>
<tr>
<td>libcrypt</td>
<td>libcrypt.so.1</td>
</tr>
<tr>
<td>libz</td>
<td>libz.so.1</td>
</tr>
<tr>
<td>libnscurses</td>
<td>libnscurses.so.5</td>
</tr>
<tr>
<td>libutil</td>
<td>libutil.so.1</td>
</tr>
<tr>
<td>libc</td>
<td>libc.so.6</td>
</tr>
<tr>
<td>libpthread</td>
<td>libpthread.so.0</td>
</tr>
<tr>
<td>proginterp</td>
<td>/lib64/ld-1b-s390x.so.3</td>
</tr>
<tr>
<td>libgcc_s</td>
<td>libgcc_s.so.1</td>
</tr>
</tbody>
</table>

These libraries will be in an implementation-defined directory which the dynamic linker shall search by default.

3.2 LSB Implementation Conformance

A conforming implementation is necessarily architecture specific, and must provide the interfaces specified by both the generic LSB Core specification and its relevant architecture specific supplement.

**Rationale:** An implementation must provide *at least* the interfaces specified in these specifications. It may also provide additional interfaces.

A conforming implementation shall satisfy the following requirements:

- A processor architecture represents a family of related processors which may not have identical feature sets. The architecture specific supplement to this specification for a given target processor architecture describes a minimum acceptable processor. The implementation shall provide all features of this processor, whether in hardware or through emulation transparent to the application.
- The implementation shall be capable of executing compiled applications having the format and using the system interfaces described in this document.
- The implementation shall provide libraries containing the interfaces specified by this document, and shall provide a dynamic linking mechanism that allows these
interfaces to be attached to applications at runtime. All the interfaces shall behave
as specified in this document.

- The map of virtual memory provided by the implementation shall conform to the
requirements of this document.
- The implementation's low-level behavior with respect to function call linkage,
system traps, signals, and other such activities shall conform to the formats
described in this document.
- The implementation shall provide all of the mandatory interfaces in their entirety.
- The implementation may provide one or more of the optional interfaces. Each
optional interface that is provided shall be provided in its entirety. The product
documentation shall state which optional interfaces are provided.
- The implementation shall provide all files and utilities specified as part of this
document in the format defined here and in other referenced documents. All
commands and utilities shall behave as required by this document. The
implementation shall also provide all mandatory components of an application's
runtime environment that are included or referenced in this document.
- The implementation, when provided with standard data formats and values at a
named interface, shall provide the behavior defined for those values and data
formats at that interface. However, a conforming implementation may consist of
components which are separately packaged and/or sold. For example, a vendor of
a conforming implementation might sell the hardware, operating system, and
windowing system as separately packaged items.
- The implementation may provide additional interfaces with different names. It
may also provide additional behavior corresponding to data values outside the
standard ranges, for standard named interfaces.

3.3 LSB Application Conformance

A conforming application is necessarily architecture specific, and must conform to
both the generic LSB Core specification and its relevant architecture specific
supplement.

A conforming application shall satisfy the following requirements:

- Its executable files shall be either shell scripts or object files in the format defined
for the Object File Format system interface.
- Its object files shall participate in dynamic linking as defined in the Program
Loading and Linking System interface.
- It shall employ only the instructions, traps, and other low-level facilities defined in
the Low-Level System interface as being for use by applications.
- If it requires any optional interface defined in this document in order to be
installed or to execute successfully, the requirement for that optional interface
shall be stated in the application's documentation.
- It shall not use any interface or data format that is not required to be provided by a
conforming implementation, unless:
  - If such an interface or data format is supplied by another application through
direct invocation of that application during execution, that application shall be
in turn an LSB conforming application.
3 Requirements

- The use of that interface or data format, as well as its source, shall be identified in the documentation of the application.

- It shall not use any values for a named interface that are reserved for vendor extensions.

A strictly conforming application shall not require or use any interface, facility, or implementation-defined extension that is not defined in this document in order to be installed or to execute successfully.
4 Definitions

For the purposes of this document, the following definitions, as specified in the ISO/IEC Directives, Part 2, 2001, 4th Edition, apply:

- can
  - be able to; there is a possibility of; it is possible to
- cannot
  - be unable to; there is no possibility of; it is not possible to
- may
  - is permitted; is allowed; is permissible
- need not
  - it is not required that; no...is required
- shall
  - is to; is required to; it is required that; has to; only...is permitted; it is necessary
- shall not
  - is not allowed [permitted] [acceptable] [permissible]; is required to be not; is required that...be not; is not to be
- should
  - it is recommended that; ought to
- should not
  - it is not recommended that; ought not to
5 Terminology

For the purposes of this document, the following terms apply:

archLSB
The architectural part of the LSB Specification which describes the specific parts of the interface that are platform specific. The archLSB is complementary to the gLSB.

Binary Standard
The total set of interfaces that are available to be used in the compiled binary code of a conforming application.

gLSB
The common part of the LSB Specification that describes those parts of the interface that remain constant across all hardware implementations of the LSB.

implementation-defined
Describes a value or behavior that is not defined by this document but is selected by an implementor. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence of the value or behavior. An application that relies on such a value or behavior cannot be assured to be portable across conforming implementations. The implementor shall document such a value or behavior so that it can be used correctly by an application.

Shell Script
A file that is read by an interpreter (e.g., awk). The first line of the shell script includes a reference to its interpreter binary.

Source Standard
The set of interfaces that are available to be used in the source code of a conforming application.

undefined
Describes the nature of a value or behavior not defined by this document which results from use of an invalid program construct or invalid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.

unspecified
Describes the nature of a value or behavior not specified by this document which results from use of a valid program construct or valid data input. The value or behavior may vary among implementations that conform to this document. An application should not rely on the existence or validity of the value or behavior. An application that relies on any particular value or behavior cannot be assured to be portable across conforming implementations.
Other terms and definitions used in this document shall have the same meaning as defined in Chapter 3 of the Base Definitions volume of ISO POSIX (2003).
6 Documentation Conventions

Throughout this document, the following typographic conventions are used:

- `function()`
  - the name of a function

- `command`
  - the name of a command or utility

- `CONSTANT`
  - a constant value

- `parameter`
  - a parameter

- `variable`
  - a variable

Throughout this specification, several tables of interfaces are presented. Each entry in these tables has the following format:

- `name`
  - the name of the interface

- `(symver)`
  - An optional symbol version identifier, if required.

- `[refno]`
  - A reference number indexing the table of referenced specifications that follows this table.

For example,

```
forkpty(GLIBC_2.0) [SUSv3]
```

refers to the interface named `forkpty()` with symbol version `GLIBC_2.0` that is defined in the `SUSv3` reference.

**Note:** Symbol versions are defined in the architecture specific supplements only.
II Executable and Linking Format (ELF)
7 Introduction

Executable and Linking Format (ELF) defines the object format for compiled applications. This specification supplements the information found in System V ABI Update and LINUX for zSeries Application Binary Interface Supplement, and is intended to document additions made since the publication of that document.
8 Low Level System Information

8.1 Machine Interface

8.1.1 Processor Architecture

The z/Architecture is specified by the following documents:

- LINUX for zSeries Application Binary Interface Supplement
- z/Architecture Principles of Operation

Only the non optional features of z/Architecture processor instruction set may be assumed to be present. An application should determine if any additional instruction set features are available before using those additional features. If a feature is not present, then a conforming application shall not use it.

Conforming applications shall not invoke the implementations underlying system call interface directly. The interfaces in the implementation base libraries shall be used instead.

**Rationale:** Implementation-supplied base libraries may use the system call interface but applications must not assume any particular operating system or kernel version is present.

Applications conforming to this specification must provide feedback to the user if a feature that is required for correct execution of the application is not present. Applications conforming to this specification should attempt to execute in a diminished capacity if a required instruction set feature is not present.

This specification does not provide any performance guarantees of a conforming system. A system conforming to this specification may be implemented in either hardware or software.

8.1.2 Data Representation

LSB-conforming applications shall use the data representation as defined in Chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.1.2.1 Byte Ordering

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.1.2.2 Fundamental Types

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.1.2.3 Aggregates and Unions

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.1.2.4 Bit Fields

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.2 Function Calling Sequence

LSB-conforming applications shall use the function calling sequence as defined in Chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.
8 Low Level System Information

8.2.1 Registers
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.2.2 Stack Frame
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.2.3 Parameter Passing
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.2.4 Variable Argument Lists
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.2.5 Return Values
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3 Operating System Interface
LSB-conforming applications shall use the Operating System Interfaces as defined in Chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.1 Virtual Address Space
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.2 Page Size
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.3 Virtual Address Assignments
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.4 Managing the Process Stack
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.5 Coding Guidelines
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.6 Processor Execution Mode
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.7 Exception Interface
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.8 Signal Delivery
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.3.8.1 Signal Handler Interface
See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.
8.4 Process Initialization

LSB-conforming applications shall use the Process Initialization as defined in Chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.4.1 Registers

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.4.2 Process Stack

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5 Coding Examples

LSB-conforming applications may implement fundamental operations using the Coding Examples as defined in Chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.1 Code Model Overview

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.2 Function Prolog and Epilog

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.3 Profiling

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.4 Data Objects

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.5 Function Calls

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.5.6 Dynamic Stack Space Allocation

See chapter 1 of the LINUX for zSeries Application Binary Interface Supplement.

8.6 Debug Information

The LSB does not currently specify the format of Debug information.
9 Object Format

9.1 Introduction
LSB-conforming implementations shall support an object file, called Executable and Linking Format (ELF) as defined by the System V ABI, System V ABI Update, LINUX for zSeries Application Binary Interface Supplement and as supplemented by the generic LSB and this document.

9.2 ELF Header

9.2.1 Machine Information
LSB-conforming applications shall use the Machine Information as defined in Chapter 2 of the LINUX for zSeries Application Binary Interface Supplement.

9.3 Sections
See chapter 2 of the LINUX for zSeries Application Binary Interface Supplement.

9.3.1 Special Sections
The following sections are defined in the LINUX for zSeries Application Binary Interface Supplement.

Table 9-1 ELF Special Sections

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>.got</td>
<td>SHT_PROGBITS</td>
<td>SHF_ALLOC+SHF_WRITE</td>
</tr>
<tr>
<td>.plt</td>
<td>SHT_PROGBITS</td>
<td>SHF_ALLOC+SHF_EXE CINSTR</td>
</tr>
</tbody>
</table>

.got
This section holds the global offset table

.plt
This section holds the procedure linkage table

9.3.2 Linux Special Sections
The following Linux S/390 specific sections are defined here.

Table 9-2 Additional Special Sections

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>.rela.dyn</td>
<td>SHT_RELA</td>
<td>SHF_ALLOC</td>
</tr>
<tr>
<td>.rela.plt</td>
<td>SHT_RELA</td>
<td>SHF_ALLOC</td>
</tr>
<tr>
<td>.sbss</td>
<td>SHT_PROGBITS</td>
<td>SHF_WRITE</td>
</tr>
</tbody>
</table>
.rela.dyn
This section holds RELA type relocation information for all sections of a shared library except the PLT.

.rela.plt
This section holds RELA type relocation information for the PLT section of a shared library or dynamically linked application.

.sbss
This section holds uninitialized data that contribute to the program's memory image. The system initializes the data with zeroes when the program begins to run.

### 9.4 Symbol Table
LSB-conforming applications shall use the Symbol Table as defined in Chapter 2 of the LINUX for zSeries Application Binary Interface Supplement.

### 9.5 Relocation
LSB-conforming applications shall use Relocations as defined in Chapter 2 of the LINUX for zSeries Application Binary Interface Supplement.

#### 9.5.1 Relocation Types
See chapter 2 of the LINUX for zSeries Application Binary Interface Supplement.
10 Program Loading and Dynamic Linking

10.1 Introduction

LSB-conforming implementations shall support the object file information and system actions that create running programs as specified in the System V ABI, System V ABI Update, LINUX for zSeries Application Binary Interface Supplement and as supplemented by the This Specification and this document.

10.2 Program Loading

See Chapter 3 of the LINUX for zSeries Application Binary Interface Supplement.

10.3 Dynamic Linking

See Chapter 3 of the LINUX for zSeries Application Binary Interface Supplement.

10.3.1 Dynamic Section

The following dynamic entries are defined in the LINUX for zSeries Application Binary Interface Supplement.

**DT_JMPREL**

This entry is associated with a table of relocation entries for the procedure linkage table. This entry is mandatory both for executable and shared object files.

**DT_PLTGOT**

This entry's d_ptr member gives the address of the first byte in the procedure linkage table.

10.3.2 Global Offset Table

See Chapter 3 of the LINUX for zSeries Application Binary Interface Supplement.

10.3.3 Function Addresses

See chapter 3 of the LINUX for zSeries Application Binary Interface Supplement.

10.3.4 Procedure Linkage Table

See chapter 3 of the LINUX for zSeries Application Binary Interface Supplement.
III Base Libraries
11 Libraries

An LSB-conforming implementation shall support base libraries which provide interfaces for accessing the operating system, processor and other hardware in the system.

Only those interfaces that are unique to the z/Architecture platform are defined here. This section should be used in conjunction with the corresponding section in the Linux Standard Base Specification.

11.1 Program Interpreter/Dynamic Linker

The Program Interpreter shall be /lib64/ld-1sb-s390x.so.3.

11.2 Interfaces for libc

Table 11-1 defines the library name and shared object name for the libc library

Table 11-1 libc Definition

<table>
<thead>
<tr>
<th>Library:</th>
<th>libc</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libc.so.6</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:

[LFS] Large File Support
[LSB] This Specification
[SUSv2] SUSv2
[SVID.3] SVID Issue 3
[SVID.4] SVID Issue 4

11.2.1 RPC

11.2.1.1 Interfaces for RPC

An LSB conforming implementation shall provide the architecture specific functions for RPC specified in Table 11-2, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-2 libc - RPC Function Interfaces

<table>
<thead>
<tr>
<th>authnone_create(GLIBC_2.2) [SVID.4]</th>
<th>clnt_create(GLIBC_2.2) [SVID.4]</th>
<th>clnt_pcreateerror(GLIBC_2.2) [SVID.4]</th>
<th>clnt_errno(GLIBC_2.2) [SVID.4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>clnt_perror(GLIBC_2.2) [SVID.4]</td>
<td>clnt_spcreateerror(GLIBC_2.2) [SVID.4]</td>
<td>clnt_sperrno(GLIBC_2.2) [SVID.4]</td>
<td>clnt_sperror(GLIBC_2.2) [SVID.4]</td>
</tr>
<tr>
<td>key_decryptsession(GLIBC_2.2) [SVID.3]</td>
<td>pmap_getport(GLIBC_2.2) [LSB]</td>
<td>pmap_set(GLIBC_2.2) [LSB]</td>
<td>pmap_unset(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>svc_getreqset(GLIBC_2.2)</td>
<td>svc_register(GLIBC_2.2)</td>
<td>svc_run(GLIBC_2.2)</td>
<td>svc_sendreply(GLIBC_2.2)</td>
</tr>
</tbody>
</table>
### 11.2.2 System Calls

#### 11.2.2.1 Interfaces for System Calls

An LSB conforming implementation shall provide the architecture specific functions for System Calls specified in Table 11-3, with the full mandatory functionality as described in the referenced underlying specification.

<table>
<thead>
<tr>
<th>Function</th>
<th>Module</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>__fxstat(2)</td>
<td>GLIBC_2.2</td>
<td>SVID.3</td>
</tr>
<tr>
<td>__getpgid(2)</td>
<td>GLIBC_2.2</td>
<td>SVID.3</td>
</tr>
<tr>
<td>__lxstat(2)</td>
<td>GLIBC_2.2</td>
<td>SVID.3</td>
</tr>
<tr>
<td>__xmknod(2)</td>
<td>GLIBC_2.2</td>
<td>SVID.3</td>
</tr>
<tr>
<td>__xstat(2)</td>
<td>GLIBC_2.2</td>
<td>SVID.3</td>
</tr>
<tr>
<td>access(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv3</td>
</tr>
<tr>
<td>acct(2)</td>
<td>GLIBC_2.2</td>
<td>LSB</td>
</tr>
<tr>
<td>alarm(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv3</td>
</tr>
<tr>
<td>brk(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv2</td>
</tr>
<tr>
<td>chdir(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv3</td>
</tr>
<tr>
<td>chmod(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv3</td>
</tr>
<tr>
<td>chown(2)</td>
<td>GLIBC_2.2</td>
<td>SUSv3</td>
</tr>
<tr>
<td>chroot(2)</td>
<td>GLIBC_2.2</td>
<td></td>
</tr>
<tr>
<td>clock(2)</td>
<td>GLIBC_2.2</td>
<td></td>
</tr>
<tr>
<td>close(2)</td>
<td>GLIBC_2.2</td>
<td></td>
</tr>
<tr>
<td>closedir(2)</td>
<td>GLIBC_2.2</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Libraries</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>creat(GLIBC_2.2) [SUSv2]</td>
<td>dup(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>dup(GLIBC_2.2) [SUSv3]</td>
<td>dup2(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>execl(GLIBC_2.2) [SUSv2]</td>
<td>execp(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>execvp(GLIBC_2.2) [SUSv3]</td>
<td>exit(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>fchdir(GLIBC_2.2) [SUSv3]</td>
<td>flock(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>fchown(GLIBC_2.2) [SUSv3]</td>
<td>fdatasync(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>fork(GLIBC_2.2) [SUSv3]</td>
<td>fcntl(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>ftruncate(GLIBC_2.2) [SUSv3]</td>
<td>fsync(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getcontext(GLIBC_2.2) [SUSv3]</td>
<td>getegid(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getgid(GLIBC_2.2) [SUSv3]</td>
<td>getgroups(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getpagesize(GLIBC_2.2) [SUSv2]</td>
<td>getpriority(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getpid(GLIBC_2.2) [SUSv3]</td>
<td>getrlimit(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getrusage(GLIBC_2.2) [SUSv3]</td>
<td>initgroups(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>ioctl(GLIBC_2.2) [LSB]</td>
<td>kill(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>link(GLIBC_2.2) [LSB]</td>
<td>lchown(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>mkfifo(GLIBC_2.2) [SUSv3]</td>
<td>mlock(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>mprotect(GLIBC_2.2) [SUSv3]</td>
<td>munlock(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>munmap(GLIBC_2.2) [SUSv3]</td>
<td>nanosleep(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>opendir(GLIBC_2.2) [SUSv3]</td>
<td>pathconf(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>poll(GLIBC_2.2) [SUSv3]</td>
<td>read(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>readdir(GLIBC_2.2) [SUSv3]</td>
<td>readdir(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sched_get_priority_max(GLIBC_2.2) [SUSv3]</td>
<td>sched_get_priority_min(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sched_getparam(GLIBC_2.2) [SUSv3]</td>
<td>sched_setscheduler</td>
<td></td>
</tr>
<tr>
<td>sched_getschedul</td>
<td>sched_rr_get_interval</td>
<td>sched_setparam</td>
</tr>
</tbody>
</table>
11 Libraries

<table>
<thead>
<tr>
<th>Function</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>sched_yield(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>select(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setcontext(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setegid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setgid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setpriority(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setregid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setrlimit(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setrlimit64(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setsid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>setuid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>sleep(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>statvfs(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>time(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>symlink(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>truncate(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>unlink(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>utime(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>utimes(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>vfork(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>wait(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>wait4(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>waitpid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>write(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
</tbody>
</table>

11.2.3 Standard I/O

11.2.3.1 Interfaces for Standard I/O

An LSB conforming implementation shall provide the architecture specific functions for Standard I/O specified in Table 11-4, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-4 libc - Standard I/O Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
<th>GLIBC_2.2 [SUSv3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>_IO_feof(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>_IO_getc(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>_IO_putchar(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>_IO_putc(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>asprintf(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>clearerr(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>ctermid(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>fclose(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>feof(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>ferror(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>fflush(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>fflush_unlocked(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>fgetwc_unlocked(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>flockfile(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>fgetws_unlocked(GLIBC_2.2)</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
<td>LSB</td>
</tr>
<tr>
<td>fileno(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>foent(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>fread(GLIBC_2.2)</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
<td>SUSv3</td>
</tr>
<tr>
<td>Function</td>
<td>Architecture Specific Functionality</td>
<td>Standard I/O Interfaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>freopen(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [LSB]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fscanf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fseek(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fseeko(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fsetpos(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ftell(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ftello(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fwrite(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>getc(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>getc_unlocked(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>getchar(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>getchar_unlocked(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>getw(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pclose(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>popen(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>printf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>putc(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>putc_unlocked(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>putchar(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>putchar_unlocked(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>puts(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>putw(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>remove(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rewind(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rewinddir(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>scanf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setbuf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setvbuf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sprintf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sscanf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>seekdir(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setbuffer(GLIBC_2.2)</td>
<td>GLIBC_2.2 [LSB]</td>
<td>GLIBC_2.2 [LSB]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>setvbuffer(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>snprintf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vsprintf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stdarg(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>strftime(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stdarg2(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>strftime2(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vsnprintf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vsprintf(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An LSB conforming implementation shall provide the architecture specific data interfaces for Standard I/O specified in Table 11-5, with the full mandatory functionality as described in the referenced underlying specification.

### Table 11-5 libc - Standard I/O Data Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Architecture Specific Functionality</th>
<th>Standard I/O Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>stderr(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>stdin(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>stdout(GLIBC_2.2)</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
</tbody>
</table>

### 11.2.4 Signal Handling

#### 11.2.4.1 Interfaces for Signal Handling

An LSB conforming implementation shall provide the architecture specific functions for Signal Handling specified in Table 11-6, with the full mandatory functionality as described in the referenced underlying specification.

### Table 11-6 libc - Signal Handling Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Architecture Specific Functionality</th>
<th>Standard I/O Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>__libc_current_sigrtmin</td>
<td>GLIBC_2.2 [LSB]</td>
<td>GLIBC_2.2 [LSB]</td>
</tr>
<tr>
<td>__libc_current_sigrtmax</td>
<td>GLIBC_2.2 [LSB]</td>
<td>GLIBC_2.2 [LSB]</td>
</tr>
<tr>
<td>__sigsetjmp</td>
<td>GLIBC_2.2 [LSB]</td>
<td>GLIBC_2.2 [LSB]</td>
</tr>
<tr>
<td>__sysv_signal</td>
<td>GLIBC_2.2 [LSB]</td>
<td>GLIBC_2.2 [LSB]</td>
</tr>
</tbody>
</table>
11 Libraries

<table>
<thead>
<tr>
<th>Function</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>bsd_signal(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>psignal(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>raise(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigaction(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigaddset(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigaltstack(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigandset(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>sigdelset(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigemptyset(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigfillset(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sighold(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigignore(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>siginterrupt(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigisemptyset(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>sigismember(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>siglongjmp(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>signal(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigorset(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>sigpause(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigpending(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigprocmask(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigqueue(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigrelse(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigreturn(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigset(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigsuspend(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigtimedwait(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigwait(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sigwaitinfo(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
</tbody>
</table>

An LSB conforming implementation shall provide the architecture specific data interfaces for Signal Handling specified in Table 11-7, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-7 libc - Signal Handling Data Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>_sys_siglist(GLIBC_2.3.3) [LSB]</td>
<td></td>
</tr>
</tbody>
</table>

11.2.5 Localization Functions

### 11.2.5.1 Interfaces for Localization Functions

An LSB conforming implementation shall provide the architecture specific functions for Localization Functions specified in Table 11-8, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-8 libc - Localization Functions Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>bind_textdomain_codeset(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>bindtextdomain(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>catclose(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>catgets(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>catopen(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>dgettext(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>dcgettext(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>dcngettext(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>dgettext(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>dngettext(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>gettext(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>gettext(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
<tr>
<td>iconv(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>iconv_close(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>localeconv(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>nl_langinfo(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>setlocale(GLIBC_2.2) [SUSv3]</td>
<td></td>
</tr>
<tr>
<td>textdomain(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
</tbody>
</table>
An LSB conforming implementation shall provide the architecture specific data interfaces for Localization Functions specified in Table 11-9, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-9 libc - Localization Functions Data Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>LSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>_nl_msg_cat_cntr(GLIBC_2.2)</td>
<td>[LSB]</td>
</tr>
</tbody>
</table>

### 11.2.6 Socket Interface

#### 11.2.6.1 Interfaces for Socket Interface

An LSB conforming implementation shall provide the architecture specific functions for Socket Interface specified in Table 11-10, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-10 libc - Socket Interface Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>SUSv3</th>
<th>LSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>accept(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>bind(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>bindresvport(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>connect(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>gethostid(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>gethostname(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getpeername(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getsockname(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>getsockopt(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>if_freenameindex(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>if_indextoname(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>if_nameindex(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>if_nametoindex(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>listen(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>recv(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>recvfrom(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>recvmsg(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>send(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sendmsg(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sendto(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>shutdown(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>sockatmark(GLIBC_2.2.4)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>socket(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>socketpair(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
</tbody>
</table>

### 11.2.7 Wide Characters

#### 11.2.7.1 Interfaces for Wide Characters

An LSB conforming implementation shall provide the architecture specific functions for Wide Characters specified in Table 11-11, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-11 libc - Wide Characters Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>SUSv3</th>
<th>LSB</th>
</tr>
</thead>
<tbody>
<tr>
<td>__wcstod_internal(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>__wcstof_internal(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>__wcstol_internal(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>__wcstold_internal(GLIBC_2.2)</td>
<td>[LSB]</td>
<td></td>
</tr>
<tr>
<td>btowc(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>fgetwc(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>fgetws(GLIBC_2.2)</td>
<td>[SUSv3]</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Library</td>
<td>Function</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td><code>fputwc(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>fputws(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>fwscanf(GLIBC_2.2)</code></td>
<td>[LSB]</td>
<td><code>getwc(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>mbrlen(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>mbrtowc(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>mbsrtowcs(GLIBC_2.2)</code></td>
<td>[LSB]</td>
<td><code>mbsinit(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>mbsrtowcs(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>mbsrtowcs(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>printf(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>putwc(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>swprintf(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>swscanf(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>tolower(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>toupper(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>vfwscanf(GLIBC_2.2)</code></td>
<td>[LSB]</td>
<td><code>vfwprintf(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcpcpy(GLIBC_2.2)</code></td>
<td>[LSB]</td>
<td><code>wcncpy(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcscasecmp(GLIBC_2.2)</code></td>
<td>[LSB]</td>
<td><code>wcscat(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcsncmp(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcsncpy(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcsftime(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcsnlen(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcsstr(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcstod(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcstok(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcstold(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcstombs(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcstoul(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wcsxfrm(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wcswcs(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wctype(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wctype(GLIBC_2.2)</code></td>
</tr>
<tr>
<td><code>wmemcpy(GLIBC_2.2)</code></td>
<td>[SUSv3]</td>
<td><code>wmemmove(GLIBC_2.2)</code></td>
</tr>
</tbody>
</table>
### 11.2.8 String Functions

#### 11.2.8.1 Interfaces for String Functions

An LSB conforming implementation shall provide the architecture specific functions for String Functions specified in Table 11-12, with the full mandatory functionality as described in the referenced underlying specification.

<table>
<thead>
<tr>
<th>Table 11-12 libc - String Functions Function Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>__mempcpy(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__rawmemchr(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strpcpy(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strdup(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtod_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtof_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtok_r(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtol_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtold_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtoll_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtoul_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>__strtoull_internal(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>bcmp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>bcopy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>bzero(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>ffs(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>index(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>memccpy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>memchr(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>memmove(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>memset(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>rindex(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>stpcpy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>stpncpy(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>strcoll(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strcpyp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strcmp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strcoll(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strerror(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strerror_r(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>strfmon(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strftime(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strlens(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strncasecmp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strncat(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strncasecmp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strlcat(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strndup(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>strsep(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strsignal(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strptime(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strstr(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtof(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtoimax(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtok(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtok_r(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtoq(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtoq(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>strtoq(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>strtoq(GLIBC_2.2) [LSB]</td>
</tr>
</tbody>
</table>
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11.2.9 IPC Functions

11.2.9.1 Interfaces for IPC Functions

An LSB conforming implementation shall provide the architecture specific functions for IPC Functions specified in Table 11-13, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-13 libc - IPC Functions Function Interfaces

| ftok(GLIBC_2.2) [SUSv3] | msgctl(GLIBC_2.2) [SUSv3] | msgget(GLIBC_2.2) [SUSv3] | msgsnd(GLIBC_2.2) [SUSv3] |
| msgsnd(GLIBC_2.2) [SUSv3] | semctl(GLIBC_2.2) [SUSv3] | semget(GLIBC_2.2) [SUSv3] | semop(GLIBC_2.2) [SUSv3] |
| shmat(GLIBC_2.2) [SUSv3] | shmat(GLIBC_2.2) [SUSv3] | shmdt(GLIBC_2.2) [SUSv3] | shmget(GLIBC_2.2) [SUSv3] |

11.2.10 Regular Expressions

11.2.10.1 Interfaces for Regular Expressions

An LSB conforming implementation shall provide the architecture specific functions for Regular Expressions specified in Table 11-14, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-14 libc - Regular Expressions Function Interfaces

| regcomp(GLIBC_2.2) [SUSv3] | regerror(GLIBC_2.2) [SUSv3] | regexec(GLIBC_2.3.4) [LSB] | regfree(GLIBC_2.2) [SUSv3] |

11.2.11 Character Type Functions

11.2.11.1 Interfaces for Character Type Functions

An LSB conforming implementation shall provide the architecture specific functions for Character Type Functions specified in Table 11-15, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-15 libc - Character Type Functions Function Interfaces

| _ctype_get_mb_cur_max(GLIBC_2.2) [LSB] | _tolower(GLIBC_2.2) [SUSv3] | _toupper(GLIBC_2.2) [SUSv3] | isalnum(GLIBC_2.2) [SUSv3] |
| isalpha(GLIBC_2.2) [SUSv3] | isascii(GLIBC_2.2) [SUSv3] | iscntrl(GLIBC_2.2) [SUSv3] | isdigit(GLIBC_2.2) [SUSv3] |
| isgraph(GLIBC_2.2) [SUSv3] | islower(GLIBC_2.2) [SUSv3] | isprint(GLIBC_2.2) [SUSv3] | ispunct(GLIBC_2.2) [SUSv3] |
| isspace(GLIBC_2.2) [SUSv3] | isupper(GLIBC_2.2) [SUSv3] | iswalnum(GLIBC_2.2) [SUSv3] | iswalpha(GLIBC_2.2) [SUSv3] |
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11.2.12 Time Manipulation

11.2.12.1 Interfaces for Time Manipulation

An LSB conforming implementation shall provide the architecture specific functions
for Time Manipulation specified in Table 11-16, with the full mandatory
functionality as described in the referenced underlying specification.

Table 11-16 libc - Time Manipulation Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>adjtime()</td>
<td>adjacent time</td>
<td>GLIBC_2.2 [LSB]</td>
<td>asctime()</td>
<td>asctime</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>asctime()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>asctime_r()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>difftime()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>gmtime()</td>
<td>gmtimest</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>localtime()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>localtime_r()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>localtime_r()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>mktime()</td>
<td>mktime</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>ualarm()</td>
<td></td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>daylight()</td>
<td>daylight</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
</tbody>
</table>

An LSB conforming implementation shall provide the architecture specific data
interfaces for Time Manipulation specified in Table 11-17, with the full mandatory
functionality as described in the referenced underlying specification.

Table 11-17 libc - Time Manipulation Data Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>__daylight()</td>
<td>daylight</td>
<td>GLIBC_2.2 [LSB]</td>
<td>__timezone()</td>
<td>timezone</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>__timezone()</td>
<td>timezone</td>
<td>GLIBC_2.2 [LSB]</td>
<td>__tzname()</td>
<td>tzname</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
<tr>
<td>__tzname()</td>
<td>tzname</td>
<td>GLIBC_2.2 [SUSv3]</td>
<td>daylight()</td>
<td>daylight</td>
<td>GLIBC_2.2 [SUSv3]</td>
</tr>
</tbody>
</table>

11.2.13 Terminal Interface Functions

11.2.13.1 Interfaces for Terminal Interface Functions

An LSB conforming implementation shall provide the architecture specific functions
for Terminal Interface Functions specified in Table 11-18, with the full mandatory
functionality as described in the referenced underlying specification.

Table 11-18 libc - Terminal Interface Functions Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
<th>Function</th>
<th>Description</th>
<th>Interface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>cfgetispeed()</td>
<td>cfgetispeed</td>
<td>GLIBC</td>
<td>cfgetospeed</td>
<td>cfgetispeed</td>
<td>GLIBC</td>
</tr>
<tr>
<td>cfmakeraw()</td>
<td>cfmakeraw</td>
<td>GLIBC</td>
<td>cfsetispeed</td>
<td>cfsetispeed</td>
<td>GLIBC</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>C_2.2) [SUSv3]</th>
<th>C_2.2) [SUSv3]</th>
<th>C_2.2) [LSB]</th>
<th>C_2.2) [SUSv3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>cfsetospeed(GLIBC_2.2) [SUSv3]</td>
<td>cfsetospeed(GLIBC_2.2) [SUSv3]</td>
<td>tcdrain(GLIBC_2.2) [SUSv3]</td>
<td>tcdrain(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>tcflush(GLIBC_2.2) [SUSv3]</td>
<td>tcgetattr(GLIBC_2.2) [SUSv3]</td>
<td>tcgetpgrp(GLIBC_2.2) [SUSv3]</td>
<td>tcgetsid(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>tcsetattr(GLIBC_2.2) [SUSv3]</td>
<td>tcsetattr(GLIBC_2.2) [SUSv3]</td>
<td>tcsetpgrp(GLIBC_2.2) [SUSv3]</td>
<td>tcsetpgrp(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>endgrent(GLIBC_2.2) [SUSv3]</td>
<td>endprotoent(GLIBC_2.2) [SUSv3]</td>
<td>endpwent(GLIBC_2.2) [SUSv3]</td>
<td>endservent(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>endutent(GLIBC_2.2) [SUSv2]</td>
<td>endutxent(GLIBC_2.2) [SUSv3]</td>
<td>getgrent(GLIBC_2.2) [SUSv3]</td>
<td>getgrgid(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>getgrent(GLIBC_2.2) [SUSv3]</td>
<td>getgrnam(GLIBC_2.2) [SUSv3]</td>
<td>getgrnam_r(GLIBC_2.2) [SUSv3]</td>
<td>getgrouplist(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>gethostbyaddr(GLIBC_2.2) [SUSv3]</td>
<td>gethostbyname(GLIBC_2.2) [SUSv3]</td>
<td>getprotobyname(GLIBC_2.2) [SUSv3]</td>
<td>getprotobynumber(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>getprotoent(GLIBC_2.2) [SUSv3]</td>
<td>getpwent(GLIBC_2.2) [SUSv3]</td>
<td>getpwnam(GLIBC_2.2) [SUSv3]</td>
<td>getpwnam_r(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>getpwuid(GLIBC_2.2) [SUSv3]</td>
<td>getpwuid_r(GLIBC_2.2) [SUSv3]</td>
<td>getservbyname(GLIBC_2.2) [SUSv3]</td>
<td>getservbyport(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>getgrouplist(GLIBC_2.2) [SUSv3]</td>
<td>getgrouplist(GLIBC_2.2) [SUSv3]</td>
<td>getutent(GLIBC_2.2) [LSB]</td>
<td>getutent_r(GLIBC_2.2) [LSB]</td>
</tr>
<tr>
<td>getutxid(GLIBC_2.2) [SUSv3]</td>
<td>getutxline(GLIBC_2.2) [SUSv3]</td>
<td>pututxline(GLIBC_2.2) [SUSv3]</td>
<td>setgrent(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>setgroups(GLIBC_2.2) [LSB]</td>
<td>setprotoent(GLIBC_2.2) [SUSv3]</td>
<td>setpwent(GLIBC_2.2) [SUSv3]</td>
<td>setservent(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>setutent(GLIBC_2.2) [LSB]</td>
<td>setutxent(GLIBC_2.2) [SUSv3]</td>
<td>utmpname(GLIBC_2.2) [LSB]</td>
<td></td>
</tr>
</tbody>
</table>

11.2.14 System Database Interface

11.2.14.1 Interfaces for System Database Interface

An LSB conforming implementation shall provide the architecture specific functions for System Database Interface specified in Table 11-19, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-19 libc - System Database Interface Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>C_2.2) [SUSv3]</th>
<th>C_2.2) [SUSv3]</th>
<th>C_2.2) [LSB]</th>
<th>C_2.2) [SUSv3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>endgrent</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>endprotoent</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>endpwent</td>
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<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<tr>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<td>setgroups</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
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<td>GLIBC_2.2) [SUSv3]</td>
<td>GLIBC_2.2) [SUSv3]</td>
</tr>
</tbody>
</table>

11.2.15 Language Support

11.2.15.1 Interfaces for Language Support

An LSB conforming implementation shall provide the architecture specific functions for Language Support specified in Table 11-20, with the full mandatory functionality as described in the referenced underlying specification.
11.2.16 Large File Support

11.2.16.1 Interfaces for Large File Support

An LSB conforming implementation shall provide the architecture specific functions for Large File Support specified in Table 11-21, with the full mandatory functionality as described in the referenced underlying specification.

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<thead>
<tr>
<th>Function</th>
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<tr>
<td>__fxstat64</td>
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<tr>
<td>__lxstat64</td>
<td>[LSB]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>__xstat64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>creat64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>fgetpos64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>fopen64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>freopen64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>fseeko64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>fsetpos64</td>
<td>[LFS]</td>
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<tr>
<td>fstatvfs64</td>
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<td>Function for Large File Support</td>
</tr>
<tr>
<td>ftell64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>ftw64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>getrlimit64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>lockf64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
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<tr>
<td>mkstemp64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
</tr>
<tr>
<td>mmap64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>nftw64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>readdir64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>statvfs64</td>
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<td>Function for Large File Support</td>
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<td>tmpfile64</td>
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<td>Function for Large File Support</td>
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<tr>
<td>truncate64</td>
<td>[LFS]</td>
<td>Function for Large File Support</td>
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</table>

11.2.17 Standard Library

11.2.17.1 Interfaces for Standard Library

An LSB conforming implementation shall provide the architecture specific functions for Standard Library specified in Table 11-22, with the full mandatory functionality as described in the referenced underlying specification.

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<thead>
<tr>
<th>Function</th>
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<td>_Exit</td>
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<td>__assert_fail</td>
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<td>Function for Standard Library</td>
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<td>__cxa_atexit</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>__errno_location</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>__fpending</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>__getpagesize</td>
<td>[LSB]</td>
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</tr>
<tr>
<td>__isinf</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>__isnan</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>__sysconf</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
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<td>[SUSv3]</td>
<td>Function for Standard Library</td>
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<td>[SUSv3]</td>
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<td>atoi</td>
<td>[SUSv3]</td>
<td>Function for Standard Library</td>
</tr>
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<td>atol</td>
<td>[LSB]</td>
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<tr>
<td>atoll</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>basename</td>
<td>[LSB]</td>
<td>Function for Standard Library</td>
</tr>
<tr>
<td>Library (GLIBC_2.2) [SUSv3]</td>
<td>Library (GLIBC_2.2) [SUSv3]</td>
<td>Library (GLIBC_2.2) [SUSv3]</td>
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<tr>
<td>-----------------------------</td>
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<tr>
<td>bsearch(GLIBC_2.2) [SUSv3]</td>
<td>calloc(GLIBC_2.2) [SUSv3]</td>
<td>closelog(GLIBC_2.2) [SUSv3]</td>
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<tr>
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<td>daemon(GLIBC_2.2) [LSB]</td>
<td>dirname(GLIBC_2.2) [SUSv3]</td>
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<tr>
<td>drand48(GLIBC_2.2) [SUSv3]</td>
<td>ecvt(GLIBC_2.2) [SUSv3]</td>
<td>erand48(GLIBC_2.2) [SUSv3]</td>
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<td>ftw(GLIBC_2.2) [SUSv3]</td>
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<tr>
<td>gcvt(GLIBC_2.2) [SUSv3]</td>
<td>getaddrinfo(GLIBC_2.2) [SUSv3]</td>
<td>getcwd(GLIBC_2.2) [SUSv3]</td>
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<tr>
<td>getenv(GLIBC_2.2)</td>
<td>getlogin(GLIBC_2.2) [SUSv3]</td>
<td>getlogin_r(GLIBC_2.2) [SUSv3]</td>
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<tr>
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<td>getopt_long(GLIBC_2.2) [LSB]</td>
<td>getopt_long_only(GLIBC_2.2) [LSB]</td>
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<td>gettimeofday(GLIBC_2.2) [SUSv3]</td>
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<td>glob64(GLIBC_2.2) [SUSv3]</td>
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<td>granpt(GLIBC_2.2) [SUSv3]</td>
<td>hcreate(GLIBC_2.2) [SUSv3]</td>
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<td>htonl(GLIBC_2.2) [SUSv3]</td>
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<td>inet_ntoa(GLIBC_2.2) [SUSv3]</td>
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<td>jrand48(GLIBC_2.2) [SUSv3]</td>
<td>j64a(GLIBC_2.2) [SUSv3]</td>
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<td>lfind(GLIBC_2.2) [SUSv3]</td>
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<td>mktemp(GLIBC_2.2) [SUSv3]</td>
<td>nftw(GLIBC_2.3.3) [SUSv3]</td>
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<td>ntolh(GLIBC_2.2) [SUSv3]</td>
<td>openlog(GLIBC_2.2) [SUSv3]</td>
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</table>
An LSB conforming implementation shall provide the architecture specific data interfaces for Standard Library specified in Table 11-23, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-23 libc - Standard Library Data Interfaces

<table>
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<tr>
<th>Function</th>
<th>Function</th>
<th>Function</th>
<th>Function</th>
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<tr>
<td>__environ(GLIBC_2.2) [LSB]</td>
<td>__environ(GLIBC_2.2) [LSB]</td>
<td>__sys_errlist(GLIBC_2.2) [LSB]</td>
<td>environ(GLIBC_2.2) [SUSv3]</td>
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<tr>
<td>getdate_err(GLIBC_2.2) [SUSv3]</td>
<td>optarg(GLIBC_2.2) [SUSv3]</td>
<td>opterr(GLIBC_2.2) [SUSv3]</td>
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<td>getopt(GLIBC_2.2) [SUSv3]</td>
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<td>optarg(GLIBC_2.2) [SUSv3]</td>
<td>optarg(GLIBC_2.2) [SUSv3]</td>
</tr>
</tbody>
</table>

11.3 Data Definitions for libc

This section defines global identifiers and their values that are associated with interfaces contained in libc. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an
interface is defined as requiring a particular system header file all of the data
definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to
repeat source interface definitions available elsewhere. System providers and
application developers should use this ABI to supplement - not to replace - source
interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming
language, and data definitions are specified in ISO C format. The C language is used
here as a convenient notation. Using a C language description of these data objects
does not preclude their use by other programming languages.

11.3.1 arpa/inet.h

extern uint32_t htonl(uint32_t);
extern uint16_t htons(uint16_t);
extern in_addr_t inet_addr(const char *);
extern char *inet_ntoa(struct in_addr);
extern const char *inet_ntop(int, const void *, char *, socklen_t);
extern int inet_pton(int, const char *, void *);
extern uint32_t ntohl(uint32_t);
extern uint16_t ntohs(uint16_t);

11.3.2 assert.h

extern void __assert_fail(const char *, const char *, unsigned int,
const char *);

11.3.3 ctype.h

extern int _tolower(int);
extern int _toupper(int);
extern int isalnum(int);
extern int isalpha(int);
extern int isascii(int);
extern int iscntrl(int);
extern int isdigit(int);
extern int isgraph(int);
extern int islower(int);
extern int isprint(int);
extern int ispunct(int);
extern int isspace(int);
extern int isupper(int);
extern int isxdigit(int);
extern int toascii(int);
extern int tolower(int);
extern int toupper(int);
extern int isblank(int);
extern const unsigned short **__ctype_b_loc(void);
extern const int32_t **__ctype_toupper_loc(void);
extern const int32_t **__ctype_tolower_loc(void);

11.3.4 dirent.h

extern void rewinddir(DIR *);
extern void seekdir(DIR *, long int);
extern long int telldir(DIR *);
11.3.5 err.h

extern void err(int, const char *, ...);
extern void errx(int, const char *, ...);
extern void warn(const char *, ...);
extern void warnx(const char *, ...);
extern void error(int, int, const char *, ...);

11.3.6 errno.h

#define EDEADLOCK  35

extern int *__errno_location(void);

11.3.7 fcntl.h

#define F_GETLK64       5
#define F_SETLK64       6
#define F_SETLKW64      7

extern int lockf64(int, int, off64_t);
extern int fcntl(int, int, ...);

11.3.8 fmtmsg.h

extern int fmtmsg(long int, const char *, int, const char *, const char *, const char *);

11.3.9 fnmatch.h

extern int fnmatch(const char *, const char *, int);

11.3.10 ftw.h

extern int ftw(const char *, __ftw_func_t, int);
extern int ftw64(const char *, __ftw64_func_t, int);
extern int nftw(const char *, __nftw_func_t, int, int);
extern int nftw64(const char *, __nftw64_func_t, int, int);

11.3.11 getopt.h

extern int getopt_long(int, char *const, const char *, const struct option *, int *);
extern int getopt_long_only(int, char *const, const char *, const struct option *, int *);
11.3.12 glob.h

extern int glob(const char *, int,
    int (*__errfunc) (const char *p1, int p2)
    , glob_t *);
extern int glob64(const char *, int,
    int (*__errfunc) (const char *p1, int p2)
    , glob64_t *);
extern void globfree(glob_t *);
extern void globfree64(glob64_t *);

11.3.13 grp.h

extern void endgrent(void);
extern struct group *getgrent(void);
extern struct group *getgrgid(gid_t);
extern struct group *getgrnam(char *);
extern int initgroups(const char *, gid_t);
extern void setgrent(void);
extern int setgroups(size_t, const gid_t *);
extern int getgrgid_r(gid_t, struct group *, char *, size_t,
    struct group **);
extern int getgrnam_r(const char *, struct group *, char *, size_t,
    struct group **);
extern int getgrouplist(const char *, gid_t, gid_t *, int *);

11.3.14 iconv.h

extern size_t iconv(iconv_t, char **, size_t *, char **, size_t *);
extern int iconv_close(iconv_t);
extern iconv_t iconv_open(char *, char *);

11.3.15 inttypes.h

typedef long int intmax_t;
typedef unsigned long int uintmax_t;
typedef unsigned long int uintptr_t;
typedef unsigned long int uint64_t;
extern intmax_t strtoimax(const char *, char **, int);
extern uintmax_t strtoumax(const char *, char **, int);
extern intmax_t wcstoumax(const wchar_t *, wchar_t **, int);
extern intmax_t wcstoumax(const wchar_t *, wchar_t **, int);
extern intmax_t imaxabs(intmax_t);
extern imaxdiv_t imaxdiv(intmax_t, intmax_t);

11.3.16 langinfo.h

extern char *nl_langinfo(nl_item);

11.3.17 libgen.h

extern char *basename(const char *);
extern char *dirname(char *);
11 Libraries

11.3.18 libintl.h

```c
extern char *bindtextdomain(const char *, const char *
); extern char *dcgettext(const char *, const char *, int);
extern char *dgettext(const char *, const char *,
); extern char *gettext(const char *
); extern char *textdomain(const char *
); extern char *bind_textdomain_codeset(const char *, const char *
); extern char *dcngettext(const char *, const char *, const char *,
unsigned long int, int);
extern char *dngettext(const char *, const char *, const char *,
unsigned long int);
extern char *ngettext(const char *, const char *, unsigned long int);
```

11.3.19 limits.h

```c
#define ULONG_MAX 0xFFFFFFFFFFFFFFFUL
#define LONG_MAX 9223372036854775807L
#define CHAR_MIN 0
#define CHAR_MAX 255
#define PTHREAD_STACK_MIN 16384
```

11.3.20 locale.h

```c
extern struct lconv *localeconv(void);
extern char *setlocale(int, const char *
); extern locale_t uselocale(locale_t);
extern void freelocale(locale_t);
extern locale_t duplocale(locale_t);
extern locale_t newlocale(int, const char *, locale_t);
```

11.3.21 monetary.h

```c
extern ssize_t strfmon(char *, size_t, const char *, ...);
```

11.3.22 net/if.h

```c
extern void if_freenameindex(struct if_nameindex *
); extern char *if_indextoname(unsigned int, char *
); extern struct if_nameindex *if_nameindex(void);
extern unsigned int if_nametoindex(const char *
);```

11.3.23 netdb.h

```c
extern void endprotoent(void);
extern void endservent(void);
extern void freeaddrinfo(struct addrinfo *
); extern const char *gai_strerror(int);
extern int getaddrinfo(const char *, const char *, const struct addrinfo *
, struct addrinfo **);
extern struct hostent *gethostbyaddr(const void *, socklen_t, int);
extern struct hostent *gethostbyname(const char *
); extern struct protoent *getprotobyname(const char *
);```
extern struct protoent *getprotobynumber(int);

extern struct protoent *getprotoent(void);

extern struct servent *getservbyname(const char *, const char *);

extern struct servent *getservbyport(int, const char *);

extern struct servent *getservent(void);

extern void setprotoent(int);

extern void setservent(int);

extern int *__h_errno_location(void);

extern int bindresvport(int, struct sockaddr_in *);

/* This header is architecture neutral
 * Please refer to the generic specification for details */

extern int catclose(nl_catd);

extern char *catgets(nl_catd, int, int, const char *);

extern nl_catd catopen(const char *, int);

/* This header is architecture neutral
 * Please refer to the generic specification for details */

extern int poll(struct pollfd *, nfds_t, int);

/* This header is architecture neutral
 * Please refer to the generic specification for details */

extern int openpty(int *, int *, char *, struct termios *,
                   struct winsize *);

extern int forkpty(int *, char *, struct termios *, struct winsize *);

extern void endpwent(void);

extern struct passwd *getpwent(void);

extern void endpwent(void);

extern struct passwd *getpwent(void);
11 Libraries

extern struct passwd *getpwnam(char *);
extern struct passwd *getpwuid(uid_t);
extern void setpwent(void);
extern int getpwnam_r(char *, struct passwd *, char *, size_t,
                struct passwd **);
extern int getpwuid_r(uid_t, struct passwd *, char *, size_t,
                struct passwd **);

11.3.32 regex.h

extern int regcomp(regex_t *, const char *, int);
extern size_t regerror(int, const regex_t *, char *, size_t);
extern int regexec(const regex_t *, const char *, size_t, regmatch_t,
                int);
extern void regfree(regex_t *);

11.3.33 rpc/auth.h

extern struct AUTH *authnone_create(void);
extern int key_decryptsession(char *, union des_block *);
extern bool_t xdr_opaque_auth(XDR *, struct opaque_auth *);

11.3.34 rpc/clnt.h

extern struct CLIENT *clnt_create(const char *, const u_long, const
                u_long,
                const char *);
extern void clnt_pcreateerror(const char *);
extern void clnt_perrno(enum clnt_stat);
extern void clnt_perror(struct CLIENT *, const char *);
extern char *clnt_spcreateerror(const char *);
extern char *clnt_sperrno(enum clnt_stat);
extern char *clnt_sperror(struct CLIENT *, const char *);

11.3.35 rpc/pmap_clnt.h

extern u_short pmap_getport(struct sockaddr_in *, const u_long,
                const u_long, u_int);
extern bool_t pmap_set(const u_long, const u_long, int, u_short);
extern bool_t pmap_unset(u_long, u_long);

11.3.36 rpc/rpc_msg.h

extern bool_t xdr_callhdr(XDR *, struct rpc_msg *);

11.3.37 rpc/svc.h

extern void svc_getreqset(fd_set *);
extern bool_t svc_register(SVCXPRT *, rpcprog_t, rpcvers_t,
                __dispatch_fn_t, rpcprot_t);
extern void svc_run(void);
extern bool_t svc_sendreply(SVCXPRT *, xdrproc_t, caddr_t);
extern void svcerr_auth(SVCXPRT *, enum auth_stat);
extern void svcerr_decode(SVCXPRT *);
extern void svcerr_noproc(SVCXPRT *);
extern void svcerr_noprog(SVCXPRT *);
extern void svcerr_progvers(SVCXPRT *, rpcvers_t, rpcvers_t);
extern void svcerr_systemerr(SVCXPRT *);
extern void svcerr_weakauth(SVCXPRT *);
extern SVCXPRT *svctcp_create(int, u_int, u_int);
extern SVCXPRT *svcudp_create(int);

11.3.38 rpc/types.h

/*
 * This header is architecture neutral
 * Please refer to the generic specification for details
 */

11.3.39 rpc/xdr.h

extern bool_t xdr_array(XDR *, caddr_t *, u_int *, u_int, u_int, xdrproc_t);
extern bool_t xdr_bool(XDR *, bool_t *);
extern bool_t xdr_bytes(XDR *, char **, u_int *, u_int);
extern bool_t xdr_char(XDR *, char *);
extern bool_t xdr_double(XDR *, double *);
extern bool_t xdr_enum(XDR *, enum_t *);
extern bool_t xdr_float(XDR *, float *);
extern void xdr_free(xdrproc_t, char *);
extern bool_t xdr_int(XDR *, int *);
extern bool_t xdr_long(XDR *, long int *);
extern bool_t xdr_opaque(XDR *, caddr_t, u_int);
extern bool_t xdr_pointer(XDR *, char **, u_int, xdrproc_t);
extern bool_t xdr_reference(XDR *, caddr_t *, u_int, xdrproc_t);
extern bool_t xdr_short(XDR *, short *);
extern bool_t xdr_string(XDR *, char **, u_int);
extern bool_t xdr_u_char(XDR *, u_char *);
extern bool_t xdr_u_int(XDR *, u_int *);
extern bool_t xdr_u_long(XDR *, u_long *);
extern bool_t xdr_u_short(XDR *, u_short *);
extern bool_t xdr_union(XDR *, enum_t *, char *,
const struct xdr_discrim *, xdrproc_t);
extern bool_t xdr_vector(XDR *, char *, u_int, u_int, xdrproc_t);
extern bool_t xdr_void(void);
extern bool_t xdr_wrapstring(XDR *, char **);
extern void xdrmem_create(XDR *, caddr_t, u_int, enum xdr_op);
extern void xdrrec_create(XDR *, u_int, u_int, caddr_t,
int (*__readit) (char *p1, char *p2, int p3),
int (*__writeit) (char *p1, char *p2, int p3);
extern typedef int bool_t xdrrec_eof(XDR *);

11.3.40 sched.h

extern int sched_get_priority_max(int);
extern int sched_get_priority_min(int);
extern int sched_getparam(pid_t, struct sched_param *);
extern int sched_setscheduler(pid_t);
extern int sched_rr_get_interval(pid_t, struct timespec *);
extern int sched_setparam(pid_t, const struct sched_param *);
extern int sched_setscheduler(pid_t, int, const struct sched_param *);
extern int sched_yield(void);
11 Libraries

11.3.41 search.h

extern int hcreate(size_t);
extern ENTRY *hsearch(ENTRY, ACTION);
extern void insque(void *, void *);
extern void *lfind(const void *, const void *, size_t *, size_t,
                   __compar_fn_t);
extern void *lsearch(const void *, void *, size_t *, size_t,
                     __compar_fn_t);
extern void remque(void *);
extern void hdestroy(void);
extern void *tdelete(const void *, void **, __compar_fn_t);
extern void *tfind(const void *, void *const *, __compar_fn_t);
extern void *tsearch(const void *, void **, __compar_fn_t);
extern void twalk(const void *, __action_fn_t);

11.3.42 setjmp.h

typedef long int __jmp_buf[18];
extern int __sigsetjmp(jmp_buf, int);
extern void longjmp(jmp_buf, int);
extern void siglongjmp(sigjmp_buf, int);
extern void _longjmp(jmp_buf, int);
extern int _setjmp(jmp_buf);

11.3.43 signal.h

#define __NUM_ACRS 16
#define __NUM_FPRS 16
#define __NUM_GPRS 16

typed struct {
  unsigned long int mask;
  unsigned long int addr;
} __attribute__ ((aligned(8)))
_psw_t;
typed struct {
  _psw_t psw;
  unsigned long int gprs[16];
  unsigned int acrs[16];
} s390_regs_common;

#define SIGEV_PAD_SIZE ((SIGEV_MAX_SIZE/sizeof(int))-4)
#define SI_PAD_SIZE     ((SI_MAX_SIZE/sizeof(int))-4)

struct sigaction {
  union {
    sighandler_t _sa_handler;
    void (*_sa_sigaction) (int, siginfo_t *, void *);
  } __sigaction_handler;
  unsigned long int sa_flags;
  void (*sa_restorer) (void);
  sigset_t sa_mask;
};

#define MINSIGSTKSZ 2048
#define SIGSTKSZ     8192
typedef struct {
    unsigned int fpc;
    double fprs[__NUM_FPRS];
} _s390_fp_regs;

typedef struct {
    _s390_regs_common regs;
    _s390_fp_regs fregs;
} _sigregs;

struct sigcontext {
    unsigned long int oldmask;
    _sigregs *sregs;
};

extern int __libc_current_sigrtmax(void);
extern int __libc_current_sigrtmin(void);
extern sighandler_t __sysv_signal(int, sighandler_t);
extern char *const _sys_siglist(void);
extern int killpg(pid_t, int);
extern void psignal(int, const char *);
extern int raise(int);
extern int sigaddset(sigset_t *, int);
extern int sigandset(sigset_t *, const sigset_t *, const sigset_t *);
extern int sigdelset(sigset_t *, int);
extern int sigemptyset(sigset_t *);
extern int sigfillset(sigset_t *);
extern int sighold(int);
extern int sigignore(int);
extern int siginterrupt(int, int);
extern int sigissetemptyset(const sigset_t *);
extern int sigismember(const sigset_t *, int);
extern int sigorset(sigset_t *, const sigset_t *, const sigset_t *);
extern int sigpending(sigset_t *);
extern int sigprocmask(int, const sigset_t *, sigset_t *);
extern int sigreturn(struct sigcontext *);
extern int sigset(const sigset_t *, signal_t);
extern int sigsuspend(const sigset_t *);
extern int sigqueue(pid_t, int, const union sigval);
extern int sigwaitinfo(const sigset_t *, siginfo_t *);
extern int sigtimedwait(const sigset_t *, siginfo_t *,
        const struct timespec *);
extern sighandler_t bsd_signal(int, sighandler_t);

11.3.44 stddef.h

typedef unsigned long int size_t;
typedef long int ptrdiff_t;

11.3.45 stdio.h

#define __IO_FILE_SIZE 216

extern char *const _sys_errlist(void);
extern void clearerr(FILE *);
extern int fclose(FILE *);
extern FILE *fdopen(int, const char *);
extern int fflush_unlocked(FILE *);
extern FILE *fopen(const char *, const char *);
extern int fprintf(FILE *, const char *, ...);
extern int fputc(int, FILE *);
extern FILE *freopen(const char *, const char *, FILE *);
extern FILE *fopen64(const char *, const char *, FILE *);
extern int fscanf(FILE *, const char *, ...);
extern int fseek(FILE *, long int, int);
extern int fseeko(FILE *, off_t, int);
extern int fseeko64(FILE *, loff_t, int);
extern off_t ftello(FILE *);
extern loff_t ftello64(FILE *);
extern int getchar(void);
extern int getchar_unlocked(void);
extern int getw(FILE *);
extern int pclose(FILE *);
extern void perror(const char *);
extern FILE *popen(const char *, const char *);
extern int printf(const char *, ...);
extern int putc_unlocked(int, FILE *);
extern int putchar(int);
extern int putchar_unlocked(int);
extern int putw(int, FILE *);
extern int remove(const char *);
extern void rewind(FILE *);
extern int scanf(const char *, ...);
extern void setbuf(FILE *, char *);
extern int sprintf(char *, const char *, ...);
extern int sscanf(const char *, const char *, ...);
extern FILE *stderr(void);
extern FILE *stdin(void);
extern FILE *stdout(void);
extern char *tempnam(const char *, const char *);
extern FILE *tmpfile64(void);
extern FILE *tmpfile(void);
extern char *tmpnam(char *);
extern int vfprintf(FILE *, const char *, va_list);
extern int vprintf(const char *, va_list);
extern int feof(FILE *);
extern int ferror(FILE *);
extern int fflush(FILE *);
extern int fgetc(FILE *);
extern int fgetpos(FILE *, fpos_t *);
extern int fgets(char *, int, FILE *);
extern int fputs(const char *, FILE *);
extern int fread(void *, size_t, size_t, FILE *);
extern int fsetpos(FILE *, const fpos_t *);
extern long int ftell(FILE *);
extern int ungetc(int, FILE *);
extern int vsprintf(char *, const char *, va_list);
extern int vsnprintf(char *, size_t, const char *, va_list);
extern void flockfile(FILE *);
extern int asprintf(char **, const char *, ...);
extern int fgetpos64(FILE *, fpos64_t *);
extern FILE *fopen64(const char *, const char *);
extern int fsetpos64(FILE *, const fp64_t *);
extern void funlockfile(FILE *);
extern int getc_unlocked(FILE *);
extern int vasprintf(char **, const char *, va_list);
extern int vdprintf(int, const char *, va_list);
extern int vsnprintf(const char *, va_list);
extern int vsscanf(const char *, const char *, va_list);
extern int vasprintf(char **, const char *, va_list);
extern int __fpending(FILE *);

11.3.46 stdlib.h

extern double __strtod_internal(const char *, char **, int);
extern float __strtof_internal(const char *, char **, int);
extern long int __strtol_internal(const char *, char **, int, int);
extern long double __strtold_internal(const char *, char **, int);
extern long long int __strtoll_internal(const char *, char **, int, int);
extern unsigned long int __ strtoul_internal(const char *, char **, int, int);
extern unsigned long int __strtoull_internal(const char *, char **, int, int);
extern long int a64l(const char *);
extern void abort(void);
extern int abs(int);
extern double atof(const char *);
extern int atoi(char *);
extern long int atol(char *);
extern long long int atoll(const char *);
extern void *bsearch(const void *, const void *, size_t, size_t,
        __compar_fn_t);
extern div_t div(int, int);
extern double drand48(void);
extern char *ecvt(double, int, int *, int *);
extern double erand48(unsigned short);
extern void exit(int);
extern char *fcvt(double, int, int *, int *);
extern char *gctv(double, int, char *);
extern char *getenv(const char *);
extern char *getsubopt(char **, const char * const *, char **);
extern int grantpt(int);
extern long int jrand48(unsigned short);
extern char *l64a(long int);
extern long int labs(long int);
extern void lcong48(unsigned short);
extern ldiv_t ldiv(long int, long int);
extern long long int llabs(long long int);
extern long int lrand48(void);
extern int mblen(const char *, size_t);
extern size_t mbstowcs(wchar_t *, const char *, size_t);
extern int mbtowc(wchar_t *, const char *, size_t);
extern char *mktemp(char *
        __compar_fn_t);
extern div_t div(int, int);
extern double drand48(void);
extern char *ecvt(double, int, int *, int *);
extern double erand48(unsigned short);
extern void exit(int);
extern char *fcvt(double, int, int *, int *);
extern char *gctv(double, int, char *);
extern char *getenv(const char *);
extern char *getsubopt(char **, const char * const *, char **);
extern int grantpt(int);
extern long int jrand48(unsigned short);
extern char *l64a(long int);
extern long int labs(long int);
extern void lcong48(unsigned short);
extern ldiv_t ldiv(long int, long int);
extern long long int llabs(long long int);
extern long int lrand48(void);
extern int mblen(const char *, size_t);
extern size_t mbstowcs(wchar_t *, const char *, size_t);
extern int mbtowc(wchar_t *, const char *, size_t);
extern char *mktemp(char *
        __compar_fn_t);
extern div_t div(int, int);
extern double drand48(void);
extern char *ecvt(double, int, int *, int *);
extern double erand48(unsigned short);
extern void exit(int);
extern char *fcvt(double, int, int *, int *);
extern char *gctv(double, int, char *);
extern char *getenv(const char *);
extern char *getsubopt(char **, const char * const *, char **);
extern int grantpt(int);
extern long int jrand48(unsigned short);
extern char *l64a(long int);
extern long int labs(long int);
extern void lcong48(unsigned short);
extern ldiv_t ldiv(long int, long int);
extern long long int llabs(long long int);
extern long int lrand48(void);
extern int mblen(const char *, size_t);
extern size_t mbstowcs(wchar_t *, const char *, size_t);
extern int mbtowc(wchar_t *, const char *, size_t);
extern char *mktemp(char *
        __compar_fn_t);
11 Libraries

extern void srand48(long int);
extern int unlockpt(int);
extern size_t wcstombs(char *, const wchar_t *, size_t);
extern int wctomb(char *, wchar_t);
extern void *malloc(size_t);
extern void free(void *);
extern char *initstate(unsigned int, char *, size_t);
extern void *calloc(size_t, size_t);
extern void srand(unsigned int);
extern void srandom(unsigned int);
extern double strtod(char *, char **);
extern float strtof(const char *, char **);
extern long int strtol(char *, char **, int);
extern long double strtold(const char *, char **);
extern long long int strtoll(const char *, char **, int);
extern long long int strtoq(const char *, char **, int);
extern unsigned long int strtoul(const char *, char **, int);
extern unsigned long long int strtoull(const char *, char **, int);
extern void _Exit(int);
extern size_t __ctype_get_mb_cur_max(void);
extern char **environ(void);
extern char *realpath(const char *, char *);
extern int setenv(const char *, const char *, int);
extern int unsetenv(const char *);
extern int getloadavg(double, int);
extern int mkstemp64(char *);
extern int posix_memalign(void **, size_t, size_t);
extern int posix_openpt(int);

11.3.47 string.h

extern void *__mempcpy(void *, const void *, size_t);
extern char *__stpcpy(char *, const char *);
extern char *__strtok_r(char *, const char *, char **);
extern void bcopy(void *, void *, size_t);
extern void *memchr(void *, int, size_t);
extern void *memcpy(void *, void *, size_t);
extern void *memmem(const void *, size_t, const void *, size_t);
extern void *memmove(void *, const void *, size_t);
extern char *strcat(char *, const char *);
extern char *strchr(char *, int);
extern int strcmp(char *, char *);
extern int strcoll(const char *, const char *);
extern char *strncpy(char *, char *, size_t);
extern char *strpbrk(const char *, const char *);
extern char *strrchr(char *, int);
extern char *strsignal(int);
extern size_t strspn(const char *, const char *);
extern char *strstr(char *, char *);
extern char *strtok(char *, const char *);
extern size_t strxfrm(char *, const char *, size_t);
extern int bcmp(void *, void *, size_t);
extern void bzero(void *, size_t);
extern int ffs(int);
extern char *index(char *, int);
extern void *memccpy(void *, const void *, int, size_t);
extern char *rindex(char *, int);
extern int strcasecmp(char *, char *);
extern char *strdup(char *);
extern int strncasecmp(char *, char *, size_t);
extern char *strndup(const char *, size_t);
extern size_t strnlen(const char *, size_t);
extern char *strsep(char **, const char *);
extern char *strerror_r(int, char *, size_t);
extern char *strtotime(char *, const char *, char **);
extern char *strcasestr(const char *, const char *);
extern char *stpcpy(char *, const char *);
extern char *stpncpy(char *, const char *, size_t);
extern void *memrchr(const void *, int, size_t);

11.3.48 sys/file.h

extern int flock(int, int);

11.3.49 sys/ioctl.h

#define TIOCGWINSZ 0x5413
#define FIONREAD 21531
#define TIOCNOTTY 21538

extern int ioctl(int, unsigned long int, ...);

11.3.50 sys/ipc.h

struct ipc_perm {
    key_t __key;
    uid_t uid;
    gid_t gid;
    uid_t cuid;
    gid_t cgid;
    mode_t mode;
    unsigned short __seq;
    unsigned short __pad2;
    unsigned long int __unused1;
    unsigned long int __unused2;
};

extern key_t ftok(char *, int);

11.3.51 sys/mman.h

#define MCL_CURRENT 1
#define MCL_FUTURE 2

extern int msync(void *, size_t, int);
extern int mlock(const void *, size_t);
extern int mlockall(int);
extern void *mmap(void *, size_t, int, int, int, off_t);
extern int mprotect(void *, size_t, int);
11 Libraries

extern int munlock(const void *, size_t);
extern int munlockall(void);
extern int munmap(void *, size_t);
extern void *mmap(void *, size_t, int, int, int, off64_t);
extern int shm_open(const char *, int, mode_t);
extern int shm_unlink(const char *);

11.3.52 sys/msg.h

typedef unsigned long int msgqnum_t;
typedef unsigned long int msglen_t;

struct msqid_ds {
    struct ipc_perm msg_perm;
    time_t msg_stime;
    time_t msg_rtime;
    time_t msg_ctime;
    unsigned long int __msg_cbytes;
    msgqnum_t msg_qnum;
    msglen_t msg_qbytes;
    pid_t msg_lspid;
    pid_t msg_lrpid;
    unused long int __unused4;
    unused long int __unused5;
};
extern int msgctl(int, int, struct msqid_ds *);
extern int msgget(key_t, int);
extern int msgrcv(int, void *, size_t, long int, int);
extern int msgsnd(int, const void *, size_t, int);

11.3.53 sys/param.h

/*
 * This header is architecture neutral
 * Please refer to the generic specification for details
 */

11.3.54 sys/poll.h

/*
 * This header is architecture neutral
 * Please refer to the generic specification for details
 */

11.3.55 sys/resource.h

extern int getpriority(__priority_which_t, id_t);
extern int getrlimit64(id_t, struct rlimit64 *);
extern int setpriority(__priority_which_t, id_t, int);
extern int setrlimit(__rlimit_resource_t, const struct rlimit *);
extern int setrlimit64(__rlimit_resource_t, const struct rlimit64 *);
extern int getrlimit(__rlimit_resource_t, struct rlimit *);
extern int getrusage(int, struct rusage *);

11.3.56 sys/sem.h

struct semid_ds {
    struct ipc_perm sem_perm;
};
11.3.57 sys/shm.h

```c
#define SHMLBA 4096

typedef unsigned long int shmatt_t;

struct shmid_ds {
    struct ipc_perm shm_perm;
    size_t shm_segsz;
    time_t shm_atime;
    time_t shm_dtime;
    time_t shm_ctime;
    pid_t shm_cpid;
    pid_t shm_lpid;
    shmatt_t shm_nattch;
    unsigned long int __unused4;
    unsigned long int __unused5;
};

typedef unsigned long int shmid_ds;

extern int __getpagesize(void);
extern void *shmat(int, const void *, int);
extern int shmdt(const void *);

extern int shmget(key_t, size_t, int);
```

11.3.58 sys/socket.h

```c
#define SO_RCVLOWAT 18
#define SO_SNDLOWAT 19
#define SO_RCVTIMEO 20
#define SO_SNDTIMEO 21

extern int bind(int, const struct sockaddr *, socklen_t);
extern int getnameinfo(const struct sockaddr *, socklen_t, char *,
    socklen_t, char *, socklen_t, unsigned int);
extern int getsockname(int, struct sockaddr *, socklen_t);
extern int listen(int, int);
extern int setsockopt(int, int, int, const void *, socklen_t);
extern int accept(int, struct sockaddr *, socklen_t *);
extern int connect(int, const struct sockaddr *, socklen_t);
extern ssize_t recv(int, void *, size_t, int);
extern ssize_t recvfrom(int, void *, size_t, int, struct sockaddr *,
    socklen_t *);
extern ssize_t recvmsg(int, struct msghdr *, int);
extern ssize_t send(int, const void *, size_t, int);
extern ssize_t sendmsg(int, const struct msghdr *, int);
extern ssize_t sendto(int, const void *, size_t, int,
    const struct sockaddr *, socklen_t);
extern int getpeername(int, struct sockaddr *, socklen_t);
extern int shutdown(int, int);
```
extern int socket(int, int, int);
extern int socketpair(int, int, int, int);
extern int socketatmark(int);

11.3.59 sys/stat.h

#define _STAT_VER 1

struct stat {
  dev_t st_dev;
  ino_t st_ino;
  nlink_t st_nlink;
  mode_t st_mode;
  uid_t st_uid;
  gid_t st_gid;
  int pad0;
  dev_t st_rdev;
  off_t st_size;
  struct timespec st_atim;
  struct timespec st_mtim;
  struct timespec st_ctim;
  blksize_t st_blksize;
  blkcnt_t st_blocks;
  long int __unused[3];
};

struct stat64 {
  dev_t st_dev;
  ino64_t st_ino;
  nlink_t st_nlink;
  mode_t st_mode;
  uid_t st_uid;
  gid_t st_gid;
  int pad0;
  dev_t st_rdev;
  off_t st_size;
  struct timespec st_atim;
  struct timespec st_mtim;
  struct timespec st_ctim;
  blksize_t st_blksize;
  blkcnt64_t st_blocks;
  long int __unused[3];
};

extern int __fxstat(int, int, struct stat *);
extern int __fxstat64(int, int, struct stat64 *);
extern int __lxstat(int, char *, struct stat *);
extern int __lxstat64(int, const char *, struct stat64 *);
extern int __xmknod(int, const char *, mode_t, dev_t *);
extern int __xstat(int, const char *, struct stat *);
extern int __xstat64(int, const char *, struct stat64 *);
extern int mkfifo(const char *, mode_t);
extern int chmod(const char *, mode_t);
extern int fchmod(int, mode_t);
extern int umask(mode_t);

11.3.60 sys/statvfs.h

struct statvfs {
  unsigned long int f_bsize;
  unsigned long int f_frsize;
  fsblkcnt64_t f_bsize;
  fsblckcnt64_t f_blocks;
  fsblckcnt64_t f_bfree;
11 Libraries

```c
    fsblkcnt64_t f_bavail;
    fsfilcnt64_t f_files;
    fsfilcnt64_t f_ffree;
    fsfilcnt64_t f_favail;
    unsigned long int f_fsid;
    unsigned long int f_flag;
    unsigned long int f_namemax;
    int __f_spare[6];
}

struct statvfs64 {
    unsigned long int f_bsize;
    unsigned long int f_frsize;
    fsblkcnt64_t f_blocks;
    fsblkcnt64_t f_bfree;
    fsblkcnt64_t f_bavail;
    fsfilcnt64_t f_files;
    fsfilcnt64_t f_ffree;
    fsfilcnt64_t f_favail;
    unsigned long int f_fsid;
    unsigned long int f_flag;
    unsigned long int f_namemax;
    int __f_spare[6];
}

extern int fstatvfs(int, struct statvfs *);
extern int fstatvfs64(int, struct statvfs64 *);
extern int statvfs(const char *, struct statvfs *);
extern int statvfs64(const char *, struct statvfs64 *);

11.3.61 sys/time.h

extern int getitimer(__itimer_which_t, struct itimerval *);
extern int setitimer(__itimer_which_t, const struct itimerval *,
    struct itimerval *);
extern int adjtime(const struct timeval *, struct timeval *);
extern int gettimeofday(struct timeval *, struct timezone *);
extern int utimes(const char *, const struct timeval *);

11.3.62 sys/timeb.h

extern int ftime(struct timeb *);

11.3.63 sys/times.h

extern clock_t times(struct tms *);

11.3.64 sys/types.h

typedef long int int64_t;
typedef int64_t ssize_t;
#define __FDSET_LONGS 16

11.3.65 sys/uio.h

extern ssize_t readv(int, const struct iovec *, int);
extern ssize_t writev(int, const struct iovec *, int);
```
11 Libraries

11.3.66 sys/un.h

/*
 * This header is architecture neutral
 * Please refer to the generic specification for details
 */

11.3.67 sys/utsname.h

extern int uname(struct utsname *);

11.3.68 sys/wait.h

extern pid_t wait(int *);
extern pid_t waitpid(pid_t, int *, int);
extern pid_t wait4(pid_t, int *, int, struct rusage *);

11.3.69 syslog.h

extern void closelog(void);
extern void openlog(const char *, int, int);
extern int setlogmask(int);
extern void syslog(int, const char *, ...);
extern void vsyslog(int, const char *, va_list);

11.3.70 termios.h

#define CR2     1024
#define CR3     1536
#define CRDLY   1536
#define VT1     16384
#define VTDLY   16384
#define OLCUC   2
#define TAB1    2048
#define NLDLY   256
#define FF1     32768
#define FFDLY   32768
#define ONLCR   4
#define XCASE   4
#define TAB2    4096
#define CR1     512
#define IUCUC   512
#define TAB3    6144
#define TABDLY  6144
#define BS1     8192
#define BSDLY   8192
#define VSUSP   10
#define VEOL    11
#define VREPRINT 12
#define VDISCARD 13
#define VWERASE 14
#define VEOL2   16
#define VMIN    6
#define VSWTC   7
#define VSTART  8
#define VSTOP   9
#define IXON 1024
#define IXOFF 4096
#define HUPCL 1024
#define CREAD 128
#define CS6 16
#define CLOCAL 2048
#define PARENB 256
#define CS7 32
#define CS8 48
#define CSIZE 48
#define VTIME 5
#define PARODD 512
#define CSTOPB 64
#define ISIG 1
#define ECHOPRT 1024
#define NOFLSH 128
#define ECHOE 16
#define PENDIN 16384
#define ICANON 2
#define ECHOKE 2048
#define TOSTOP 256
#define ECHOK 32
#define IEXTEN 32768
#define FLUSHO 4096
#define ECHOCTL 512
#define ECHONL 64

extern speed_t cfgetispeed(const struct termios *);
extern speed_t cfgetospeed(const struct termios *);
extern void cfmakeraw(struct termios *);
extern int cfsetispeed(struct termios *, speed_t);
extern int cfsetospeed(struct termios *, speed_t);
extern int cfsetspeed(struct termios *, speed_t);
extern int tcflow(int, int);
extern int tcflush(int, int);
extern pid_t tcgetsid(int);
extern int tcsendbreak(int, int);
extern int tcsetattr(int, int, const struct termios *);
extern int tcdrain(int);
extern int tcgetattr(int, struct termios *);

11.3.71 time.h

extern int __daylight(void);
extern long int __timezone(void);
extern char *__tzname(void);
extern char *__asctime(const struct tm *);
extern clock_t clock(void);
extern char *ctime(const time_t *);
extern clock_t clock(void);

11.3.71 time.h
11 Libraries

extern int daylight(void);
extern long int timezone(void);
extern char *tzname(void);
extern void tzset(void);
extern char *asctime_r(const struct tm *, char *);
extern struct tm *gmtime_r(const time_t *, struct tm *);
extern struct tm *localtime_r(const time_t *, struct tm *);
extern int clock_getcpuclockid(pid_t, clockid_t *);
extern int clock_getres(clockid_t, struct timespec *);
extern int clock_gettime(clockid_t, struct timespec *);
extern int clock_nanosleep(clockid_t, int, const struct timespec *,
struct timespec *);
extern int clock_settime(clockid_t, const struct timespec *);
extern int timer_create(clockid_t, struct sigevent *, timer_t *);
extern int timer_delete(timer_t);
extern int timer_getoverrun(timer_t);
extern int timer_gettime(timer_t, struct itimerspec *);
extern int timer_settime(timer_t, int, const struct itimerspec *,
struct itimerspec *);

11.3.72 ucontext.h

#define NGREG 27
typedef union {
  double d;
  float f;
} fpreg_t;
typedef struct {
  unsigned int fpc;
  fpreg_t fprs[16];
} fpregset_t;
typedef struct {
  _psw_t psw;
  unsigned long int gregs[16];
  unsigned int aregs[16];
  fpregset_t fpregs;
} mcontext_t;
typedef struct ucontext {
  unsigned long int uc_flags;
  struct ucontext *uc_link;
  stack_t uc_stack;
  mcontext_t uc_mcontext;
  sigset_t uc_sigmask;
} ucontext_t;
extern int getcontext(ucontext_t *);
extern int makecontext(ucontext_t *, void (*func) (void) , int, ...);
extern int setcontext(const struct ucontext *);
extern int swapcontext(ucontext_t *, const struct ucontext *);

11.3.73 ulimit.h

extern long int ulimit(int, ...);

11.3.74 unistd.h
extern char **__environ(void);
extern pid_t __getpgid(pid_t);
extern void _exit(int);
extern int acct(const char *);
extern int chown(const char *, uid_t, gid_t);
extern int chroot(const char *);
extern size_t confstr(int, char *, size_t);
extern int creat(const char *, mode_t);
extern int creat64(const char *, mode_t);
extern char *ctermid(char *);
extern char *cuserid(char *);
extern int daemon(int, int);
extern int execl(const char *, const char *, ...);
extern int execle(const char *, const char *, ...);
extern int execlp(const char *, const char *, ...);
extern int execv(const char *, char *const);
extern int execvp(const char *, char *const);
extern int fdatasync(int);
extern int ftruncate64(int, off64_t);
extern long int gethostid(void);
extern char *getlogin(void);
extern int getlogin_r(char *, size_t);
extern int getopt(int, char *const, const char *);
extern pid_t getpgrp(void);
extern pid_t getsid(pid_t);
extern char *getwd(char *);
extern int lockf(int, int, off_t);
extern int mkstemp(char *);
extern int nice(int);
extern int optarg(void);
extern int opterr(void);
extern int optind(void);
extern int sethostname(const char *, size_t);
extern int setpgrp(void);
extern void swab(const void *, void *, ssize_t);
extern void sync(void);
extern pid_t tcgetpgrp(int);
extern int tcsetpgrp(int, pid_t);
extern int truncate(const char *, off_t);
extern int truncate64(const char *, off64_t);
extern char *ttyname(int);
extern unsigned int ualarm(useconds_t, useconds_t);
extern int usleep(useconds_t);
extern int close(int);
extern int fsync(int);
extern off_t lseek(int, off_t, int);
extern int open(const char *, int, ...);
extern int pause(void);
extern ssize_t read(int, void *, size_t);
extern ssize_t write(int, const void *, size_t);
extern char *crypt(char *, char *);
extern void encrypt(char *, int);
extern void setkey(const char *);
11 Libraries

extern int fchdir(int);
extern int fchown(int, uid_t, gid_t);
extern pid_t fork(void);
extern gid_t getegid(void);
extern uid_t geteuid(void);
extern gid_t getgid(void);
extern int getgroups(int, gid_t);
extern int gethostname(char *, size_t);
extern pid_t getpgid(pid_t);
extern pid_t getpid(void);
extern uid_t getuid(void);
extern int lchown(const char *, uid_t, gid_t);
extern int link(const char *, const char *);
extern int mkdir(const char *, mode_t);
extern long int pathconf(const char *, int);
extern int pipe(int);
extern int readlink(const char *, char *, size_t);
extern int rmdir(const char *);
extern void *sbrk(ptrdiff_t);
extern int select(int, fd_set *, fd_set *, fd_set *, struct timeval *);
extern int setgid(gid_t);
extern int setpgid(pid_t, pid_t);
extern int setregid(gid_t, gid_t);
extern int setreuid(uid_t, uid_t);
extern pid_t setsid(void);
extern int setuid(uid_t);
extern unsigned int sleep(unsigned int);
extern int symlink(const char *, const char *);
extern long int sysconf(int);
extern int unlink(const char *);
struct utmpx {
    short ut_type;
    pid_t ut_pid;
    char ut_line[UT_LINESIZE];
    char ut_id[4];
    char ut_user[UT_NAMESIZE];
    char ut_host[UT_HOSTSIZE];
    struct exit_status ut_exit;
    long int ut_session;
    struct timeval ut_tv;
    int32_t ut_addr_v6[4];
    char __unused[20];
};

extern void endutxent(void);
extern struct utmpx *getutxent(void);
extern struct utmpx *getutxid(const struct utmpx *);
extern struct utmpx *getutxline(const struct utmpx *);
extern struct utmpx *pututxline(const struct utmpx *);
extern void setutxent(void);

11.3.78 wchar.h

extern double __wcstod_internal(const wchar_t *, wchar_t * *, int);
extern float __wcstof_internal(const wchar_t *, wchar_t * *, int);
extern long int __wcstol_internal(const wchar_t *, wchar_t * *, int, int);
extern long double __wcstold_internal(const wchar_t *, wchar_t * *, int);
extern unsigned long int __wcstoul_internal(const wchar_t *, wchar_t * *,
    int, int);
extern wchar_t *wcscat(wchar_t *, const wchar_t *);
extern wchar_t *wcschr(const wchar_t *, wchar_t *);
extern int wcsncmp(const wchar_t *, const wchar_t *, size_t);
extern int wcsncmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcsncpy(wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcsncpy(wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcsxfrm(wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern size_twcsxfrm(wchar_t *, wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern int wcscmp(const wchar_t *, const wchar_t *);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcscpy(wchar_t *, const wchar_t *);
extern wchar_t *wcpncpy(wchar_t *, const wchar_t *, size_t);
extern size_t wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern int wcswidth(wchar_t *);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern int wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
extern wchar_t *wmemchr(const wchar_t *, wchar_t, size_t);
extern size_t wmemcmp(const wchar_t *, const wchar_t *, size_t);
extern wchar_t *wcspbrk(const wchar_t *, const wchar_t *);
extern wchar_t *wcsrchr(const wchar_t *, wchar_t);
extern size_t wcsspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsstr(const wchar_t *, const wchar_t *);
extern wchar_t *wcstok(wchar_t *, const wchar_t *, wchar_t *);
extern size_t wcswidth(const wchar_t *, size_t);
const struct tm *

extern int wprintf(const wchar_t *, ...);
extern int wscanf(const wchar_t *, ...);

11.3.79 wctype.h

extern int iswblank(wint_t);
extern wint_t towlower(wint_t);
extern wint_t towupper(wint_t);
extern wctrans_t wctrans(const char *);
extern int iswalnum(wint_t);
extern int iswalpha(wint_t);
extern int iswcntrl(wint_t);
extern int iswctype(wint_t, wctype_t);
extern int iswdigit(wint_t);
extern int iswgraph(wint_t);
extern int iswlower(wint_t);
extern int iswprint(wint_t);
extern int iswpunct(wint_t);
extern int iswspace(wint_t);
extern int iswupper(wint_t);
extern int iswxdigit(wint_t);
extern wctype_t wctype(const char *);
extern wint_t towctrans(wint_t, wctrans_t);

11.3.80 wordexp.h

extern int wordexp(const char *, wordexp_t *, int);
extern void wordfree(wordexp_t *);

11.4 Interfaces for libm

Table 11-24 defines the library name and shared object name for the libm library

<table>
<thead>
<tr>
<th>Library:</th>
<th>libm</th>
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<tbody>
<tr>
<td>SONAME:</td>
<td>libm.so.6</td>
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</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:

[LSB] This Specification
[SUSv2] SUSv2

11.4.1 Math

11.4.1.1 Interfaces for Math

An LSB conforming implementation shall provide the architecture specific functions for Math specified in Table 11-25, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-25 libm - Math Function Interfaces

<p>| __finite(GLIBC_2) | __finitef(GLIBC_2) | __finitel(GLIBC_2) | __fpclassify(GLIBC_2) |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>[ISOC99]</th>
<th>[ISOC99]</th>
<th>[ISOC99]</th>
<th>[LSB]</th>
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<td>acosf(GLIBC_2.2) [SUSv3]</td>
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### Table 11-26 libm - Math Data Interfaces

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An LSB conforming implementation shall provide the architecture specific data interfaces for Math specified in Table 11-26, with the full mandatory functionality as described in the referenced underlying specification.

### 11.5 Data Definitions for libm

This section defines global identifiers and their values that are associated with interfaces contained in libm. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and
application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

11.5.1 complex.h

extern double cabs(double complex);
extern float cabsf(float complex);
extern long double cabsl(long double complex);
extern double complex cacos(double complex);
extern float complex cacosf(float complex);
extern double complex cacosh(double complex);
extern float complex cacoshf(float complex);
extern long double complex cacoshl(long double complex);
extern long double complex cacosl(long double complex);
extern double carg(double complex);
extern float cargf(float complex);
extern long double cargl(long double complex);
extern double complex casin(double complex);
extern float complex casinf(float complex);
extern double complex casinh(double complex);
extern float complex casinhf(float complex);
extern double complex casinhl(long double complex);
extern double complex casinl(long double complex);
extern double complex catan(double complex);
extern float complex catanf(float complex);
extern double complex catanh(double complex);
extern float complex catanhf(float complex);
extern long double complex catanhl(long double complex);
extern long double complex catanl(long double complex);
extern double complex ccos(double complex);
extern float complex ccosf(float complex);
extern double complex ccosh(double complex);
extern float complex ccoshf(float complex);
extern long double complex ccoshl(long double complex);
extern long double complex ccosl(long double complex);
extern double complex cexp(double complex);
extern float complex cexpf(float complex);
extern long double complex cexpl(long double complex);
extern double complex cimag(double complex);
extern float cimagf(float complex);
extern long double cimagl(long double complex);
extern double complex clog(double complex);
extern float complex clog10f(float complex);
extern long double complex clog10l(long double complex);
extern float complex clogf(float complex);
extern long double complex clogfl(long double complex);
extern double complex conj(double complex);
extern float complex conjf(float complex);
extern long double complex conjl(long double complex);
extern double complex cpow(double complex, double complex);
extern float complex cpowf(float complex, float complex);
extern long double complex cpowl(long double complex, long double complex);
extern double complex cproj(double complex);
extern float complex cprojf(float complex);
extern long double complex cprojl(long double complex);
extern double complex creal(double complex);
11 Libraries

extern float crealf(float complex);
extern long double creall(long double complex);
extern double complex csin(double complex);
extern float complex csinf(float complex);
extern double complex csinh(double complex);
extern float complex csinhl(long double complex);
extern long double complex csinl(long double complex);
extern double complex csqrt(double complex);
extern float complex csqrtf(float complex);
extern long double complex csqrtl(long double complex);
extern double complex ctan(double complex);
extern float complex ctanf(float complex);
extern double complex ctanh(double complex);
extern float complex ctanhf(float complex);
extern long double complex ctanhl(long double complex);
extern long double complex ctanl(long double complex);

11.5.2 fenv.h

#define FE_INEXACT 0x08
#define FE_UNDERFLOW 0x10
#define FE_OVERFLOW 0x20
#define FE_DIVBYZERO 0x40
#define FE_INVALID 0x80

#define FE_ALL_EXCEPT FE_INEXACT | FE_DIVBYZERO | FE_UNDERFLOW | FE_OVERFLOW | FE_INVALID

define FE_TONEAREST 0
#define FE_TOWARDZERO 0x1
#define FE_UPWARD 0x2
#define FE_DOWNWARD 0x3

typedef unsigned int fexcept_t;

typedef struct {
  fexcept_t fpc;
  void *ieee_instruction_pointer;
} fenv_t;

#define FE_DFL_ENV ((__const fenv_t *) -1)

define fpclassify(x) (sizeof (x) == sizeof (float) ? __fpclassifyf (x) : __fpclassify (x))

define signbit(x) }

11.5.3 math.h

#define fpclassifyf(x) __fpclassifyf(x)
#define signbitf(x) __signbitf(x)
11 Libraries

(sizeof (x) == sizeof (float)? __signbitf (x): __signbit (x))

#define FP_ILOGB0 -2147483647
#define FP_ILOGBNAN 2147483647

extern int __finite(double);
extern int __finitef(float);
extern int __finitel(long double);
extern int __isinf(double);
extern int __isinff(float);
extern int __isnan(double);
extern int __isnanf(float);
extern int __fpclassify(double);
extern int __fpclassifyf(float);
extern int __fpclassifyl(long double);
extern int signgam(void);
extern double copysign(double, double);
extern double frexp(double, int *);
extern double ldexp(double, int);
extern double modf(double, double *);
extern double acos(double);
extern double acosh(double);
extern double asinh(double);
extern double atanh(double);
extern double asin(double);
extern double atan(double);
extern double atan2(double, double);
extern double cbrt(double);
extern double ceil(double);
extern double cos(double);
extern double cosh(double);
extern double erf(double);
extern double erfc(double);
extern double exp(double);
extern double expm1(double);
extern double fabs(double);
extern double floor(double);
extern double fmod(double, double);
extern double gamma(double);
extern double hypot(double, double);
extern int ilogb(double);
extern double j0(double);
extern double j1(double);
extern double jn(int, double);
extern double lgamma(double);
extern double log(double);
extern double log10(double);
extern double log1p(double);
extern double logb(double);
extern double nextafter(double, double);
extern double pow(double, double);
extern double remainder(double, double);
extern double rint(double);
extern double scalb(double, double);
extern double sin(double);
extern double sinh(double);
extern double sqrt(double);
extern double tan(double);
extern double tanh(double);
extern double y0(double);
extern double y1(double);
extern float yn(int, double);
extern double copysignl(long double, long double);
extern int finitef(float);
extern int finitel(long double);
extern float frexpf(float, int *);
extern double frexpl(long double, int *);
extern float ldexpf(float, int);
extern double ldexpl(long double, int);
extern float modff(float, float *);
extern long double modfl(long double, long double *);
extern float scalblnf(float, long int);
extern long double scalblnl(long double, long int);
extern float scalbnf(float, int);
extern long double scalbnl(long double, int);
extern float acosl(long double);
extern long double acosl(long double);
extern float asinl(long double);
extern long double asinhl(long double);
extern float atanl(long double);
extern long double atanhl(long double);
extern float cbrtf(float);
extern long double cbrtl(long double);
extern float ceilf(float);
extern long double ceill(long double);
extern float expf(float);
extern long double expl(long double);
extern float expm1f(float);
extern long double expm1l(long double);
extern float fabsf(float);
extern long double fabsl(long double);
extern float fdimf(float, float);
extern long double fdiml(long double, double);
extern float floorf(float);
extern long double floorl(long double);
extern float frexpf(float, float);
extern double frexpl(long double, float *);
extern float ldexpf(float, float);
extern double ldexpl(long double, float *);
extern float modff(float, float);
extern long double modfl(long double, float *);
extern float scalblnf(float, float *);
extern long double scalblnl(long double, float *);
extern float scalbnf(float, float *);
extern long double scalbnl(long double, float *);
extern float acosl(float);
extern long double acosl(float);
extern float asinl(float);
extern long double asinhl(float);
extern float atanl(float);
extern long double atanhl(float);
extern float cbrtf(float);
extern long double cbrtl(float);
extern float ceilf(float);
extern long double ceill(float);
extern float expf(float);
extern long double expl(float);
extern float expm1f(float);
extern long double expm1l(float);
extern float fabsf(float);
extern long double fabsl(float);
extern float fdimf(float, float);
extern long double fdiml(float, double);
extern float floorf(float);
extern long double floorl(float);
extern double fma(double, double, double);
extern float fmaf(float, float, float);
extern long double fmal(long double, long double, long double);
extern double fmax(double, double);
extern float fmaxf(float, float);
extern long double fmaxl(long double, long double);
extern double fmin(double, double);
extern float fminf(float, float);
extern long double fminl(long double, long double);
extern float fmodf(float, float);
extern long double fmodl(long double, long double);
extern float gammaf(float);
extern long double gammal(long double);
extern float hypotf(float, float);
extern long double hypotl(long double, long double);
extern int ilogbf(float);
extern int ilogbl(long double);
extern float j0f(float);
extern long double j0l(long double);
extern float j1f(float);
extern long double j1l(long double);
extern float lgammaf(float);
extern long double lgammal(float);
extern float log10f(float);
extern long double log10l(long double);
extern float log1pf(float);
extern long double log1pl(long double);
extern double log2(double);
extern float log2f(float);
extern long double log2l(long double);
extern float logbf(float);
extern long double logbl(long double);
extern float logf(float);
extern long double logl(long double);
extern long int lrint(double);
extern long int lrintf(float);
extern long int lrintl(long double);
extern float nearbyint(float);
extern long double nearbyintl(long double);
extern float nextafterf(float, float);
extern long double nextafterl(long double, long double);
extern float nexttowardf(float, long double);
extern long double nexttowardl(long double, long double);
extern double pow10(double);
extern float pow10f(float);
extern long double pow10l(long double);
extern float powf(float, float);
11 Libraries

extern long double powl(long double, long double);
extern float remainderf(float, float);
extern long double remainderl(long double, long double);
extern double remquodouble(double, double, int *);
extern float remquof(float, float, int *);
extern long double remquol(long double, long double, int *);
extern float rintf(float);
extern long double rintl(long double);
extern double round(double);
extern float roundf(float);
extern long double roundl(long double);
extern float scalbf(float, float);
extern long double scalbl(long double, long double);
extern double significand(double);
extern float significandf(float);
extern long double significandl(long double);
extern void sincos(double, double *, double *);
extern void sincof(float, float *, float *);
extern void sincosl(long double, long double *, long double *);
extern float sinf(float);
extern float sinhf(float);
extern long double sinhl(long double);
extern long double sinl(long double);
extern float sqrtf(float);
extern long double sqrtl(long double);
extern float tanf(float);
extern float tanhf(float);
extern long double tanhl(long double);
extern long double tanl(long double);
extern double tgamma(double);
extern float tgammaf(float);
extern long double tgammal(long double);
extern double trunc(double);
extern float truncf(float);
extern long double trunc1(long double);
extern float y0f(float);
extern long double y0l(long double);
extern float ylf(float);
extern long double ylf(long double);
extern float ynf(int, float);
extern long double ynl(int, long double);
extern int __fpclassifyl(long double);
extern int __fpclassifyf(long double);
extern int __signbitl(long double);
extern int __signbitt(long double);
extern long double exp2l(long double);
extern long double exp2l(long double);
extern long double exp2l(long double);

11.6 Interfaces for libpthread

Table 11-27 defines the library name and shared object name for the libpthread library.

<table>
<thead>
<tr>
<th>Library:</th>
<th>libpthread</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libpthread.so.0</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:
11 Libraries

[LFS] Large File Support
[LSB] This Specification

11.6.1 Realtime Threads

11.6.1.1 Interfaces for Realtime Threads

An LSB conforming implementation shall provide the architecture specific functions for Realtime Threads specified in Table 11-28, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-28 libpthread - Realtime Threads Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pthread_attr_getinheritsched(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getschedpolicy(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getsizeof(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_setschedpolicy(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_getschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_setschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
</tbody>
</table>

11.6.2 Advanced Realtime Threads

11.6.2.1 Interfaces for Advanced Realtime Threads

No external functions are defined for libpthread - Advanced Realtime Threads in this part of the specification. See also the generic specification.

11.6.3 Posix Threads

11.6.3.1 Interfaces for Posix Threads

An LSB conforming implementation shall provide the architecture specific functions for Posix Threads specified in Table 11-29, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-29 libpthread - Posix Threads Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>_pthread_cleanup_pop(GLIBC_2.2)</td>
<td>[LSB]</td>
</tr>
<tr>
<td>_pthread_cleanup_push(GLIBC_2.2)</td>
<td>[LSB]</td>
</tr>
<tr>
<td>pthread_attr_destroy(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getdetachstate(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getguardsize(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_getacksize(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_setdetachstate(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_setguardsize(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_setschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_attr_setschedparam(GLIBC_2.2)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_cond_broadcast(GLIBC_2.3)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_cond_destroy(GLIBC_2.3)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_cond_init(GLIBC_2.3)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>pthread_cond_signal(GLIBC_2.3)</td>
<td>[SUSv3]</td>
</tr>
<tr>
<td>Function</td>
<td>Function</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>pthread_cond_timedwait(GLIBC_2.2) [SUSv3]</td>
<td>pthread_cond_wait(GLIBC_2.3.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_condattr_init(GLIBC_2.2) [SUSv3]</td>
<td>pthread_condattr_setpshared(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_equal(GLIBC_2.2) [SUSv3]</td>
<td>pthread_exit(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_join(GLIBC_2.2) [SUSv3]</td>
<td>pthread_key_create(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_mutex_destroy(GLIBC_2.2) [SUSv3]</td>
<td>pthread_mutex_init(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_mutex_unlock(GLIBC_2.2) [SUSv3]</td>
<td>pthread_mutexattr_destroy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_mutexattr_init(GLIBC_2.2) [SUSv3]</td>
<td>pthread_mutexattr_setpshared(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_destroy(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlock_init(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_unlock(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlockattr_destroy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlockattr_init(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlockattr_setpshared(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_destroy(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlock_init(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_unlock(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlockattr_destroy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_destroy(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlockattr_init(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_rwlock_create(GLIBC_2.2) [SUSv3]</td>
<td>pthread_rwlock_destroy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_self(GLIBC_2.2) [SUSv3]</td>
<td>pthread_setcancelstate(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>pthread_setconcurrency(GLIBC_2.2) [SUSv3]</td>
<td>pthread_setspecific(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>sem_close(GLIBC_2.2) [SUSv3]</td>
<td>sem_destroy(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>sem_open(GLIBC_2.2) [SUSv3]</td>
<td>sem_post(GLIBC_2.2) [SUSv3]</td>
</tr>
<tr>
<td>sem_unlink(GLIBC_2.2) [SUSv3]</td>
<td>sem_wait(GLIBC_2.2) [SUSv3]</td>
</tr>
</tbody>
</table>
11 Libraries

11.6.4 Thread aware versions of libc interfaces

11.6.4.1 Interfaces for Thread aware versions of libc interfaces

An LSB conforming implementation shall provide the architecture specific functions for Thread aware versions of libc interfaces specified in Table 11-30, with the full mandatory functionality as described in the referenced underlying specification.

<table>
<thead>
<tr>
<th>Function</th>
<th>Interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>lseek64(GLIBC_2.2) [LFS]</td>
<td>open64(GLIBC_2.2) [LFS]</td>
</tr>
<tr>
<td>pread(GLIBC_2.2) [SUSv3]</td>
<td>pread64(GLIBC_2.2) [LFS]</td>
</tr>
<tr>
<td>fwrite(GLIBC_2.2) [SUSv3]</td>
<td>fwrite64(GLIBC_2.2) [LFS]</td>
</tr>
</tbody>
</table>

11.7 Data Definitions for libpthread

This section defines global identifiers and their values that are associated with interfaces contained in libpthread. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

11.7.1 pthread.h

```c
extern void _pthread_cleanup_pop(struct _pthread_cleanup_buffer *, int);
extern void _pthread_cleanup_push(struct _pthread_cleanup_buffer *,
   void (*__routine) (void *)
   , void *);
extern int pthread_attr_destroy(pthread_attr_t *);
extern int pthread_attr_getdetachstate(const typedef struct {
   int __detachstate;
   int __schedpolicy;
   struct sched_param
   __schedparam;
   int __inheritsched;
   int __scope;
   size_t __guardsize;
   int __stackaddr_set;
   void *__stackaddr;
   unsigned long int __stacksize;}
   pthread_attr_t *, int *);
extern int pthread_attr_getinheritsched(const typedef struct {
   int __detachstate;
   int __schedpolicy;
   ```
struct sched_param

int __inheritsched;
int __scope;
size_t __guardsize;
int __stackaddr_set;
void *__stackaddr;
unsigned long int __stacksize;

extern int pthread_attr_t *, int *);

extern int pthread_attr_getschedparam(const typedef struct { int __detachstate;
int __schedpolicy;
struct sched_param __schedparam;
int __inheritsched;
int __scope;
size_t __guardsize;
int __stackaddr_set;
void *__stackaddr;
unsigned long int __stacksize;}
pthread_attr_t *, int *);

extern int pthread_attr_getschedpolicy(const typedef struct { int __detachstate;
int __schedpolicy;
struct sched_param __schedparam;
int __inheritsched;
int __scope;
size_t __guardsize;
int __stackaddr_set;
void *__stackaddr;
unsigned long int __stacksize;}
pthread_attr_t *, int *);

extern int pthread_attr_getscope(const typedef struct { int __detachstate;
int __schedpolicy;
struct sched_param __schedparam;
int __inheritsched;
int __scope;
size_t __guardsize;
int __stackaddr_set;
void *__stackaddr;
unsigned long int __stacksize;}
pthread_attr_t *, int *);

extern int pthread_attr_init(pthread_attr_t *);
extern int pthread_attr_setdetachstate(pthread_attr_t *, int);
extern int pthread_attr_setinheritsched(pthread_attr_t *, int);
extern int pthread_attr_setschedparam(pthread_attr_t *, const struct
sched_param {
int sched_priority;})

extern int pthread_attr_setschedpolicy(pthread_attr_t *, int);
extern int pthread_attr_setscopes(pthread_attr_t *, int);
extern int pthread_cancel(typedef unsigned long int pthread_t);
extern int pthread_cond_broadcast(pthread_cond_t *);
extern int pthread_cond_destroy(pthread_cond_t *);
extern int pthread_cond_init(pthread_cond_t *, const typedef struct {
int __dummy;}
11 Libraries

extern int pthread_rwlockattr_init(pthread_rwlockattr_t *, int);
extern int pthread_rwlockattr_setpshared(pthread_rwlockattr_t *, int);
extern typedef unsigned long int pthread_t pthread_self(void);
extern int pthread_setcancelstate(int, int *);
extern int pthread_setcanceltype(int, int *);
extern int pthread_setschedparam(pthread_t, const struct sched_param {
    int sched_priority;
});
extern void pthread_testcancel(void);
extern int pthread_attr_getguardsize(const pthread_attr_t *, size_t *);
extern int pthread_attr_setguardsize(pthread_attr_t *, size_t);
extern int pthread_attr_setstackaddr(pthread_attr_t *, void *);
extern int pthread_attr_getstackaddr(const pthread_attr_t *

typedef unsigned long int
extern int pthread_attr_setstacksize(pthread_attr_t *, void **);
extern int pthread_attr_setstacksize(const pthread_attr_t *

typedef unsigned long int
extern int pthread_mutexattr_gettype(const pthread_mutexattr_t *, int *);
extern int pthread_mutexattr_settype(pthread_mutexattr_t *, int);
extern int pthread_getconcurrency(void);
extern int pthread_setconcurrency(int);
extern int pthread_attr_getstack(const pthread_attr_t *

typedef unsigned long int
extern int pthread_attr_getstacksize(const pthread_attr_t *

typedef unsigned long int
extern int pthread_mutexattr_gettype(const pthread_mutexattr_t *, int *);
extern int pthread_mutexattr_settype(pthread_mutexattr_t *, int *);
extern int pthread_attr_getstack(const pthread_attr_t *

typedef unsigned long int
11 Libraries

struct sched_param __schedparam;
int __inheritsched;
int __scope;
size_t __guardsize;
int __stackaddr_set;
void *__stackaddr;
unsigned long int __stacksize;

extern int pthread_attr_setstack(pthread_attr_t *, void *,
typeflag unsigned long int size_t);

extern int pthread_attr_getinheritsched(pthread_attr_t *,
int);

extern int pthread_attr_getscope(pthread_attr_t *, int);

extern int pthread_attr_getstack(pthread_attr_t *, void *,
size_t *);

extern int pthread_attr_setscope(pthread_attr_t *, int);

extern int pthread_attr_setstack(pthread_attr_t *, void *,
size_t *);

typedef unsigned long int size_t;

extern int pthread_attr_setguardsize(pthread_attr_t *, size_t);

extern int pthread_attr_getguardsize(pthread_attr_t *, size_t);

extern int pthread_attr_setstackaddr(pthread_attr_t *, void *
stackaddr);

extern int pthread_attr_getstackaddr(pthread_attr_t *, void *);

extern int pthread_attr_getstacksize(pthread_attr_t *, size_t *);

extern int pthread_attr_setstacksize(pthread_attr_t *, size_t);

11.7.2 semaphore.h

extern int sem_close(sem_t *);
extern int sem_destroy(sem_t *);
extern int sem_getvalue(sem_t *, int *);
extern int sem_init(sem_t *, int, unsigned int);
extern sem_t *sem_open(const char *, int, ...);
extern int sem_post(sem_t *);
extern int sem_trywait(sem_t *);
extern int sem_unlink(const char *);
extern int sem_wait(sem_t *);
extern int sem_timedwait(sem_t *, const struct timespec *);

11.8 Interfaces for libgcc_s

Table 11-31 defines the library name and shared object name for the libgcc_s library

<table>
<thead>
<tr>
<th>Library:</th>
<th>libgcc_s</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libgcc_s.so.1</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:
11.8.1 Unwind Library

11.8.1.1 Interfaces for Unwind Library

An LSB conforming implementation shall provide the architecture specific functions for Unwind Library specified in Table 11-32, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-32 libgcc_s - Unwind Library Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>_Unwind_Backtrace(GCC_3.3)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_DeleteException(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_FindClosingFunction(GCC_3.3)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_FindFDE(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_ForcedUnwind(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetCFAgent(GCC_3.3)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetDataRelBase(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetIP(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetLanguageSpecificData(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetRegionStart(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_GetTextRelBase(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_RaiseException(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_Resume(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_Resume_or_Rethrow(GCC_3.0)</td>
<td>LSB</td>
</tr>
<tr>
<td>_Unwind_SetIP(GCC_3.0)</td>
<td>LSB</td>
</tr>
</tbody>
</table>

11.9 Data Definitions for libgcc_s

This section defines global identifiers and their values that are associated with interfaces contained in libgcc_s. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

11.9.1 unwind.h

extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
                                       _Unwind_Stop_Fn, void *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
11 Libraries

extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetLanguageSpecificData(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct _Unwind_Exception *);
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde *_Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *, _Unwind_Stop_Fn, void *);
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetLanguageSpecificData(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct _Unwind_Exception *);
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetLanguageSpecificData(struct
    _Unwind_Context  
    *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    )
    ;
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetLanguageSpecificData(void);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
extern void _Unwind_Resume(struct _Unwind_Exception *);
extern void _Unwind_SetGR(struct _Unwind_Context *, int, u_int64_t);
extern void _Unwind_SetIP(struct _Unwind_Context *, _Unwind_Ptr);
extern void _Unwind_DeleteException(struct _Unwind_Exception *);
extern fde * _Unwind_Find_FDE(void *, struct dwarf_eh_base *);
extern _Unwind_Ptr _Unwind_ForcedUnwind(struct _Unwind_Exception *,
    _Unwind_Stop_Fn, void *");
extern _Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context *);
extern _Unwind_Word _Unwind_GetGR(struct _Unwind_Context *, int);
extern _Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context *);
extern _Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_RaiseException(struct
    _Unwind_Exception 
    *
    );
11 Libraries

extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern void * _Unwind_FindEnclosingFunction(void *);
extern _Unwind_Word _Unwind_GetBSP(struct _Unwind_Context *);

11.10 Interface Definitions for libgcc_s

The interfaces defined on the following pages are included in libgcc_s and are defined by this specification. Unless otherwise noted, these interfaces shall be included in the source standard.

Other interfaces listed in Section 11.8 shall behave as described in the referenced base document.

__Unwind_DeleteException

Name

__Unwind_DeleteException — private C++ error handling method

Synopsis

void __Unwind_DeleteException(struct __Unwind_Exception * object);

Description

__Unwind_DeleteException() deletes the given exception object. If a given runtime resumes normal execution after catching a foreign exception, it will not know how to delete that exception. Such an exception shall be deleted by calling __Unwind_DeleteException(). This is a convenience function that calls the function pointed to by the exception_cleanup field of the exception header.
_Unwind_Find_FDE

Name

_Unwind_Find_FDE — private C++ error handling method

Synopsis

fde * _Unwind_Find_FDE(void * pc, struct dwarf_eh_bases * bases);

Description

_Unwind_Find_FDE() looks for the object containing pc, then inserts into bases.
**_Unwind_ForcedUnwind**

**Name**

_Unwind_ForcedUnwind — private C++ error handling method

**Synopsis**

```c
_Unwind_Reason_Code _Unwind_ForcedUnwind(struct _Unwind_Exception * object, _Unwind_Stop_Fn stop, void * stop_parameter);
```

**Description**

_Unwind_ForcedUnwind() raises an exception for forced unwinding, passing along the given exception object, which should have its exception_class and exception_cleanup fields set. The exception object has been allocated by the language-specific runtime, and has a language-specific format, except that it shall contain an _Unwind_Exception struct.

Forced unwinding is a single-phase process. stop and stop_parameter control the termination of the unwind process instead of the usual personality routine query. stop is called for each unwind frame, with the parameters described for the usual personality routine below, plus an additional stop_parameter.

**Return Value**

When stop identifies the destination frame, it transfers control to the user code as appropriate without returning, normally after calling _Unwind_DeleteException(). If not, then it should return an _Unwind_Reason_Code value.

If stop returns any reason code other than _URC_NO_REASON, then the stack state is indeterminate from the point of view of the caller of _Unwind_ForcedUnwind(). Rather than attempt to return, therefore, the unwind library should use the exception_cleanup entry in the exception, and then call abort().

- **_URC_NO_REASON**
  This is not the destination from. The unwind runtime will call frame's personality routine with the _UA_FORCE_UNWIND and _UA_CLEANUP_PHASE flag set in actions, and then unwind to the next frame and call the stop() function again.

- **_URC_END_OF_STACK**
  In order to allow _Unwind_ForcedUnwind() to perform special processing when it reaches the end of the stack, the unwind runtime will call it after the last frame is rejected, with a NULL stack pointer in the context, and the stop() function shall catch this condition. It may return this code if it cannot handle end-of-stack.

- **_URC_FATAL_PHASE2_ERROR**
  The stop() function may return this code for other fatal conditions like stack corruption.
_Unwind_GetDataRelBase

Name
_Unwind_GetDataRelBase — private IA64 C++ error handling method

Synopsis

_Unwind_Ptr _Unwind_GetDataRelBase(struct _Unwind_Context * context);

Description

_Unwind_GetDataRelBase() returns the global pointer in register one for context.

_Unwind_GetGR

Name
_Unwind_GetGR — private C++ error handling method

Synopsis

_Unwind_Word _Unwind_GetGR(struct _Unwind_Context * context, int index);

Description

_Unwind_GetGR() returns data at index found in context. The register is identified by its index: 0 to 31 are for the fixed registers, and 32 to 127 are for the stacked registers. During the two phases of unwinding, only GR1 has a guaranteed value, which is the global pointer of the frame referenced by the unwind context. If the register has its NAT bit set, the behavior is unspecified.

_Unwind_GetIP

Name
_Unwind_GetIP — private C++ error handling method

Synopsis

_Unwind_Ptr _Unwind_GetIP(struct _Unwind_Context * context);

Description

_Unwind_GetIP() returns the instruction pointer value for the routine identified by the unwind context.
_Unwind_GetLanguageSpecificData

Name

_Unwind_GetLanguageSpecificData — private C++ error handling method

Synopsis

_Unwind_Ptr _Unwind_GetLanguageSpecificData(struct _Unwind_Context * context, uint value);

Description

_Unwind_GetLanguageSpecificData() returns the address of the language specific data area for the current stack frame.

_Unwind_GetRegionStart

Name

_Unwind_GetRegionStart — private C++ error handling method

Synopsis

_Unwind_Ptr _Unwind_GetRegionStart(struct _Unwind_Context * context);

Description

_Unwind_GetRegionStart() routine returns the address (i.e., 0) of the beginning of the procedure or code fragment described by the current unwind descriptor block.

_Unwind_GetTextRelBase

Name

_Unwind_GetTextRelBase — private IA64 C++ error handling method

Synopsis

_Unwind_Ptr _Unwind_GetTextRelBase(struct _Unwind_Context * context);

Description

_Unwind_GetTextRelBase() calls the abort method, then returns.
**_Unwind_RaiseException**

**Name**

_Unwind_RaiseException — private C++ error handling method

**Synopsis**

```c
_Unwind_Reason_Code _Unwind_RaiseException(struct _Unwind_Exception * object);
```

**Description**

_Unwind_RaiseException() raises an exception, passing along the given exception `object`, which should have its `exception_class` and `exception_cleanup` fields set. The exception object has been allocated by the language-specific runtime, and has a language-specific format, exception that it shall contain an _Unwind_Exception.

**Return Value**

_Unwind_RaiseException() does not return unless an error condition is found. If an error condition occurs, an _Unwind_Reason_Code is returned:

- **_URC_END_OF_STACK**
  
  The unwinder encountered the end of the stack during phase one without finding a handler. The unwind runtime will not have modified the stack. The C++ runtime will normally call `uncaught_exception()` in this case.

- **_URC_FATAL_PHASE1_ERROR**
  
  The unwinder encountered an unexpected error during phase one, because of something like stack corruption. The unwind runtime will not have modified the stack. The C++ runtime will normally call `terminate()` in this case.

- **_URC_FATAL_PHASE2_ERROR**
  
  The unwinder encountered an unexpected error during phase two. This is usually a `throw`, which will call `terminate()`.

**_Unwind_Resume**

**Name**

_Unwind_Resume — private C++ error handling method

**Synopsis**

```c
void _Unwind_Resume(struct _Unwind_Exception * object);
```

**Description**

_Unwind_Resume() resumes propagation of an existing exception `object`. A call to this routine is inserted as the end of a landing pad that performs cleanup, but does not resume normal execution. It causes unwinding to proceed further.
11 Libraries

_Unwind_SetGR

Name

_Unwind_SetGR — private C++ error handling method

Synopsis

```c
void _Unwind_SetGR(struct _Unwind_Context * context, int index, uint value);
```

Description

_Unwind_SetGR() sets the value of the register indexed for the routine identified by the unwind context.

_Unwind_SetIP

Name

_Unwind_SetIP — private C++ error handling method

Synopsis

```c
void _Unwind_SetIP(struct _Unwind_Context * context, uint value);
```

Description

_Unwind_SetIP() sets the value of the instruction pointer for the routine identified by the unwind context.

11.11 Interfaces for libdl

Table 11-33 defines the library name and shared object name for the libdl library

Table 11-33 libdl Definition

<table>
<thead>
<tr>
<th>Library:</th>
<th>libdl</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libdl.so.2</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:

[LSB] This Specification

11.11.1 Dynamic Loader

11.11.1.1 Interfaces for Dynamic Loader

An LSB conforming implementation shall provide the architecture specific functions for Dynamic Loader specified in Table 11-34, with the full mandatory functionality as described in the referenced underlying specification.

Table 11-34 libdl - Dynamic Loader Function Interfaces

| dladdr(GLIBC_2.2) [LSB] | dlclose(GLIBC_2.2) [SUSv3] | dlserror(GLIBC_2.2) [SUSv3] | dlopen(GLIBC_2.2) [LSB] |
This section defines global identifiers and their values that are associated with interfaces contained in libdl. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C format. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

### 11.12.1 dlfcn.h

```c
extern int dladdr(const void *, Dl_info *);
extern int dlclose(void *);
extern char *dlerror(void);
extern void *dlopen(char *, int);
extern void *dlsym(void *, char *);
```

### 11.13 Interfaces for libcrypt

Table 11-35 defines the library name and shared object name for the libcrypt library.

<table>
<thead>
<tr>
<th>Library:</th>
<th>libcrypt</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libcrypt.so.1</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:


### 11.13.1 Encryption

#### 11.13.1.1 Interfaces for Encryption

An LSB conforming implementation shall provide the architecture specific functions for Encryption specified in Table 11-36, with the full mandatory functionality as described in the referenced underlying specification.

<table>
<thead>
<tr>
<th>crypt(GLIBC_2.2) [SUSv3]</th>
<th>encrypt(GLIBC_2.2) [SUSv3]</th>
<th>setkey(GLIBC_2.2) [SUSv3]</th>
</tr>
</thead>
</table>

IV Utility Libraries
12 Libraries

An LSB-conforming implementation shall also support some utility libraries which are built on top of the interfaces provided by the base libraries. These libraries implement common functionality, and hide additional system dependent information such as file formats and device names.

12.1 Interfaces for libz

Table 12-1 defines the library name and shared object name for the libz library

<table>
<thead>
<tr>
<th>Library:</th>
<th>libz</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libz.so.1</td>
</tr>
</tbody>
</table>

12.1.1 Compression Library

12.1.1.1 Interfaces for Compression Library

No external functions are defined for libz - Compression Library in this part of the specification. See also the generic specification.

12.2 Data Definitions for libz

This section defines global identifiers and their values that are associated with interfaces contained in libz. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.

This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

12.2.1 zlib.h

```
extern int gzread(gzFile, voidp, unsigned int);
extern int gzclose(gzFile);
extern gzFile gzopen(const char *, const char *);
extern gzFile gzdopen(int, const char *);
extern int gzwrite(gzFile, voidpc, unsigned int);
extern int gzflush(gzFile, int);
extern const char *gzerror(gzFile, int *);
extern uLong adler32(uLong, const Bytef *, uInt);
extern int compress(Bytef *, uLongf *, const Bytef *, uLong);
extern int compress2(Bytef *, uLongf *, const Bytef *, uLong, int);
extern uLong crc32(uLong, const Bytef *, uInt);
extern int deflate(z_streamp, int);
```
12.3 Interfaces for libncurses

Table 12-2 defines the library name and shared object name for the libncurses library

<table>
<thead>
<tr>
<th>Library:</th>
<th>libncurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libncurses.so.5</td>
</tr>
</tbody>
</table>

12.3.1 Curses

12.3.1.1 Interfaces for Curses

No external functions are defined for libncurses - Curses in this part of the specification. See also the generic specification.

12.4 Data Definitions for libncurses

This section defines global identifiers and their values that are associated with interfaces contained in libncurses. These definitions are organized into groups that correspond to system headers. This convention is used as a convenience for the reader, and does not imply the existence of these headers, or their content. Where an interface is defined as requiring a particular system header file all of the data definitions for that system header file presented here shall be in effect.
This section gives data definitions to promote binary application portability, not to repeat source interface definitions available elsewhere. System providers and application developers should use this ABI to supplement - not to replace - source interface definition specifications.

This specification uses the ISO C (1999) C Language as the reference programming language, and data definitions are specified in ISO C. The C language is used here as a convenient notation. Using a C language description of these data objects does not preclude their use by other programming languages.

12.4.1 curses.h

```c
extern int addch(const chtype);
extern int addchnstr(const chtype *, int);
extern int addchstr(const chtype *);
extern int addnstr(const char *, int);
extern int addstr(const char *);
extern int attroff(int);
extern int atron(int);
extern int attrset(int);
extern int attr_get(attr_t *, short *, void *);
extern int attr_off(attr_t, void *);
extern int attr_on(attr_t, void *);
extern int attr_set(attr_t, short, void *);
extern int baudrate(void);
extern int beep(void);
extern int bkgd(chtype);
extern void bkgdset(chtype);
extern int border(chtype, chtype, chtype, chtype, chtype, chtype,
chtype);
extern int box(WINDOW *, chtype, chtype);
extern bool can_change_color(void);
extern int cbreak(void);
extern int chgat(int, attr_t, short, const void *);
extern int clear(void);
extern int clearok(WINDOW *, bool);
extern int clrtoeol(void);
extern int color_content(short, short *, short *, short *);
extern int color_set(short, void *);
extern int copywin(const WINDOW *, WINDOW *, int, int, int, int,
int, int);
extern int curs_set(int);
extern int def_prog_mode(void);
extern int def_shell_mode(void);
extern int delay_output(int);
extern int delch(void);
extern void delscreen(SCREEN *);
extern int delwin(WINDOW *);
extern int deleteIn(void);
extern WINDOW *derwin(WINDOW *, int, int, int, int);
extern int doupdate(void);
extern WINDOW *dupwin(WINDOW *);
extern int echo(void);
extern int echochar(const chtype);
extern int erase(void);
extern int endwin(void);
extern char erasechar(void);
extern void filter(void);
extern int flash(void);
```
12 Libraries

extern int flushinp(void);
extern chtype getbkgd(WINDOW *);
extern int getch(void);
extern int getnstr(char *, int);
extern int getstr(char *);
extern WINDOW *getwin(FILE *);
extern int halfdelay(int);
extern bool has_colors(void);
extern bool has_ic(void);
extern bool has_il(void);
extern int hline(chtype, int);
extern void idcok(WINDOW *, bool);
extern int idlok(WINDOW *, bool);
extern void immedok(WINDOW *, bool);
extern chtype inch(void);
extern int inchnstr(chtype *, int);
extern int inchstr(chtype *);
extern int hline(chtype, int);
extern int idcok(WINDOW *, bool);
extern int idlok(WINDOW *, bool);
extern void immedok(WINDOW *, bool);
extern chtype inch(void);
extern int inchnstr(chtype *, int);
extern int inchstr(chtype *);
extern int flushinp(void);
extern chtype getbkgd(WINDOW *);
extern int getch(void);
extern int getnstr(char *, int);
extern int getstr(char *);
extern WINDOW *getwin(FILE *);
extern int halfdelay(int);
extern bool has_colors(void);
extern bool has_ic(void);
extern bool has_il(void);
extern int hline(chtype, int);
extern void idcok(WINDOW *, bool);
extern int idlok(WINDOW *, bool);
extern void immedok(WINDOW *, bool);
extern chtype inch(void);
extern int inchnstr(chtype *, int);
extern int inchstr(chtype *);
extern int flushinp(void);
extern chtype getbkgd(WINDOW *);
extern int getch(void);
extern int getnstr(char *, int);
extern int getstr(char *);
extern WINDOW *getwin(FILE *);
extern int halfdelay(int);
extern bool has_colors(void);
extern bool has_ic(void);
extern bool has_il(void);
extern int hline(chtype, int);
extern void idcok(WINDOW *, bool);
extern int idlok(WINDOW *, bool);
extern void immedok(WINDOW *, bool);
extern chtype inch(void);
extern int inchnstr(chtype *, int);
extern int inchstr(chtype *);
12 Libraries

extern int mvwaddchstr(WINDOW *, int, int, const chtype *);
extern int mvwaddnstr(WINDOW *, int, int, const char *, int);
extern int mvwaddstr(WINDOW *, int, int, const char *);
extern int mvwchgat(WINDOW *, int, int, int, attr_t, short, const void *);
extern int mvwdelch(WINDOW *, int, int);
extern int mvwgetch(WINDOW *, int, int);
extern int mvwgetnstr(WINDOW *, int, int, char *, int);
extern int mvwgetstr(WINDOW *, int, int, char *);
extern int mvwhline(WINDOW *, int, int, chtype, int);
extern int mvwin(WINDOW *, int, int);
extern chtype mvwinch(WINDOW *, int, int);
extern int mvwinchnstr(WINDOW *, int, int, chtype *, int);
extern int mvwinchstr(WINDOW *, int, int, chtype *);
extern int mvwinnstr(WINDOW *, int, int, char *, int);
extern int mvwinsch(WINDOW *, int, int, chtype);
extern int mvwinsnstr(WINDOW *, int, int, const char *, int);
extern int mvwinstr(WINDOW *, int, int, char *, int);
extern int mvwprintw(WINDOW *, int, int, char *, ...);
extern int mvwscanw(WINDOW *, int, int, const char *, ...);
extern int mvwvline(WINDOW *, int, int, chtype, int);
extern int napms(int);
extern WINDOW *newpad(int, int);
extern SCREEN *newterm(const char *, FILE *, FILE *);
extern WINDOW *newwin(int, int, int, int);
extern int nl(void);
extern int nocbreak(void);
extern int nodelay(WINDOW *, bool);
extern int noecho(void);
extern int nonl(void);
extern void noqiflush(void);
extern int noraw(void);
extern int notimeout(WINDOW *, bool);
extern int overlay(const WINDOW *, WINDOW *);
extern int overwrite(const WINDOW *, WINDOW *);
extern int pair_content(short, short *, short *);
extern int pechochar(WINDOW *, chtype);
extern int pnoutrefresh(WINDOW *, int, int, int, int, int);
extern int prefresh(WINDOW *, int, int, int, int, int);
extern int printw(char *, ...);
extern int putwin(WINDOW *, FILE *);
extern void qiflush(void);
extern int raw(void);
extern int redrawwin(WINDOW *);
extern int refresh(void);
extern int resetty(void);
extern int reset_prog_mode(void);
extern int reset_shell_mode(void);
extern int ripoffline(int, int (*init) (WINDOW *, int));
extern int savetty(void);
extern int scanw(const char *, ...);
extern int scr_dump(const char *);
extern int scr_init(const char *);
extern int scrl(int);
extern int scroll(WINDOW *);
extern int scrollok(WINDOW *, typedef unsigned char bool);
extern int scr_restore(const char *);
extern int scr_set(const char *);
extern int setscrreg(int, int);
extern SCREEN *set_term(SCREEN *);
extern int slk_attroff(const typedef unsigned long int chtype);
extern int slk_attron(const typedef unsigned long int chtype);
extern int slk_attrset(const typedef unsigned long int chtype);
extern int slk_attr_set(const typedef chtype attr_t, short, void *);
extern int slk_clear(void);
extern int slk_color(short);
extern int slk_init(int);
extern char *slk_label(int);
extern int slk_noutrefresh(void);
extern int slk_refresh(void);
extern int slk_restore(void);
extern int slk_set(int, const char *, int);
extern int slk_touch(void);
extern int standout(void);
extern int standend(void);
extern int start_color(void);
extern WINDOW *subpad(WINDOW *, int, int, int, int);
extern WINDOW *subwin(WINDOW *, int, int, int, int);
extern int syncok(WINDOW *, typedef unsigned char bool);
extern typedef unsigned long int chtype termattrs(void);
extern char *termname(void);
extern void timeout(int);
extern int typeahead(int);
extern int ungetch(int);
extern int untouchwin(WINDOW *);
extern void use_env(typedef unsigned char bool);
extern int vidattr(typedef unsigned long int chtype);
extern int vidputs(typedef unsigned long int chtype, int (*vidputs_int) (int));
extern int vline(typedef unsigned long int chtype, int);
extern int vwprintw(WINDOW *, char *, typedef void *va_list);
extern int vw_printw(WINDOW *, const char *, typedef void *va_list);
extern int vwscanw(WINDOW *, const char *, typedef void *va_list);
extern int vw_scansw(WINDOW *, const char *, typedef void *va_list);
extern int waddch(WINDOW *, const typedef unsigned long int chtype);
extern int waddcnsstr(WINDOW *, const typedef unsigned long int chtype *);
extern int waddwnstr(WINDOW *, const char *, int);
extern int waddstr(WINDOW *, const char *);
extern int wattroff(WINDOW *, int);
extern int wattr_get(WINDOW *, attr_t *, short *, void *);
extern int wattr_on(WINDOW *, typedef chtype attr_t, void *);
extern int wattr_off(WINDOW *, typedef chtype attr_t, void *);
extern int wattr_set(WINDOW *, typedef chtype attr_t, short, void *);
extern int wbkgd(WINDOW *, typedef unsigned long int chtype);
extern void wbkgs(WINDOW *, typedef unsigned long int chtype);
extern void wbkgs(WINDOW *, typedef unsigned long int chtype);
extern int wborder(WINDOW *, typedef unsigned long int chtype,
  typedef unsigned long int chtype,
  typedef unsigned long int chtype,
  typedef unsigned long int chtype,
  typedef unsigned long int chtype,
  typedef unsigned long int chtype,
  typedef unsigned long int chtype);
extern void wcursyncup(WINDOW *);
extern int wdelch(WINDOW *);
extern int wechochar(WINDOW *, const typedef unsigned long int chtype);
extern int werase(WINDOW *);
extern int wgetch(WINDOW *);
extern int wgetnstr(WINDOW *, char *, int);
extern int wgetstr(WINDOW *, char *);
extern int whline(WINDOW *, typedef unsigned long int chtype, int);
extern typedef unsigned long int chtype winch(WINDOW *);
extern int winchnstr(WINDOW *, chtype *, int);
extern int winchstr(WINDOW *, chtype *);
extern int winsch(WINDOW *, typedef unsigned long int chtype);
extern int winsdelln(WINDOW *, int);
extern int winsertln(WINDOW *);
extern int winsnstr(WINDOW *, const char *, int);
extern int winsstr(WINDOW *, const char *);
extern int winstr(WINDOW *, char *);
extern int wmove(WINDOW *, int, int);
extern int wnoutrefresh(WINDOW *);
extern int wprintw(WINDOW *, char *, ...);
extern int wrefresh(WINDOW *);
extern int wscanw(WINDOW *, const char *, ...);
extern int wscrl(WINDOW *, int);
extern int wsetscrreg(WINDOW *, int, int);
extern int wstandout(WINDOW *);
extern int wstandend(WINDOW *);
extern void wsyncdown(WINDOW *);
extern void wsyncup(WINDOW *);
extern void wtimeout(WINDOW *, int);
extern int wtouchln(WINDOW *, int, int, int);
extern int wvline(WINDOW *, typedef unsigned long int chtype, int);
extern char *unctrl(typedef unsigned long int chtype);
extern int COLORS(void);
extern int COLOR_PAIRS(void);
extern chtype acs_map(void);
extern WINDOW *curscr(void);
extern WINDOW *stdscr(void);
extern int COLS(void);
extern int LINES(void);
extern int touchline(WINDOW *, int, int);
extern int touchwin(WINDOW *);

12.4.2 term.h

extern int putp(const char *);
extern int tigetflag(const char *);
extern int tigetnum(const char *);
extern char *tigetstr(const char *);
extern char *tparm(const char *, ...);
extern TERMINAL *set_curterm(TERMINAL *);
extern int del_curterm(TERMINAL *);
extern int restartterm(char *, int, int *);
extern int setupterm(char *, int, int *);
extern int tgetent(char *, const char *);
extern int tgetflag(char *);
extern int tgetnum(char *);
extern int tputstr(char *, int, int (*putcproc) (int));
12.5 Interfaces for libutil

Table 12-3 defines the library name and shared object name for the libutil library.

Table 12-3 libutil Definition

<table>
<thead>
<tr>
<th>Library:</th>
<th>libutil</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONAME:</td>
<td>libutil.so.1</td>
</tr>
</tbody>
</table>

The behavior of the interfaces in this library is specified by the following specifications:

[LSB] This Specification

12.5.1 Utility Functions

12.5.1.1 Interfaces for Utility Functions

An LSB conforming implementation shall provide the architecture specific functions for Utility Functions specified in Table 12-4, with the full mandatory functionality as described in the referenced underlying specification.

Table 12-4 libutil - Utility Functions Function Interfaces

<table>
<thead>
<tr>
<th>forkpty(GLIBC_2.2) [LSB]</th>
<th>login(GLIBC_2.2) [LSB]</th>
<th>login_tty(GLIBC_2.2) [LSB]</th>
<th>logout(GLIBC_2.2) [LSB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>logwtmp(GLIBC_2.2) [LSB]</td>
<td>openpty(GLIBC_2.2) [LSB]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
V Package Format and Installation
13 Software Installation

13.1 Package Dependencies

The LSB runtime environment shall provide the following dependencies.

lsb-core-s390x

This dependency is used to indicate that the application is dependent on features contained in the LSB-Core specification.

These dependencies shall have a version of 3.0.

Other LSB modules may add additional dependencies; such dependencies shall have the format lsb-module-s390x.

13.2 Package Architecture Considerations

All packages must specify an architecture of s390x. A LSB runtime environment must accept an architecture of s390 even if the native architecture is different.

The archnum value in the Lead Section shall be 0x000E.
Annex A Alphabetical Listing of Interfaces

A.1 libgcc_s

The behavior of the interfaces in this library is specified by the following Standards.

This Specification [LSB]

Table A-1 libgcc_s Function Interfaces

<table>
<thead>
<tr>
<th>Function</th>
<th>Function</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>_Unwind_Backtrace[LSB]</td>
<td>_Unwind_GetDataRelBase[LSB]</td>
<td>_Unwind_RaiseException[LSB]</td>
</tr>
<tr>
<td>_Unwind_Find_FDE[LSB]</td>
<td>_Unwind_GetLanguageSpecificData[LSB]</td>
<td>_Unwind_SetGR[LSB]</td>
</tr>
<tr>
<td>_Unwind_GetCFA[LSB]</td>
<td>_Unwind_GetTextRelBase[LSB]</td>
<td></td>
</tr>
</tbody>
</table>
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