Linux Standard Base Core Specification for S390 3.1

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Foreword

This is version 3.1 of the Linux Standard Base Core Specification for S390. 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 S390 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://refspecs.freestandards.org) site.

Table 2-1 Normative References

Name	Title	URL
Enterprise Systems Architecture/390 Principles of Operation	Enterprise Systems Architecture/390 Principles of Operation	http://oss.software.ibm.com/linux390/documentation-2.2.shtml
Filesystem Hierarchy Standard	Filesystem Hierarchy Standard (FHS) 2.3	http://www.pathname.com/fhs/
IEC 60559/IEEE 754 Floating Point	IEC 60559:1989 Binary floating-point arithmetic for microprocessor systems	http://www.ieee.org/
ISO C (1999)	ISO/IEC 9899: 1999, Programming Languages --C	
ISO POSIX (2003)	ISO/IEC 9945-1:2003 Information technology -- Portable Operating System Interface (POSIX) -- Part 1: Base Definitions ISO/IEC 9945-2:2003 Information technology -- Portable Operating System Interface (POSIX) -- Part 2: System Interfaces ISO/IEC 9945-3:2003 Information technology -- Portable Operating System Interface (POSIX) -- Part 3: Shell and Utilities ISO/IEC 9945-4:2003 Information technology	http://www.unix.org/version3/

Name	Title	URL
	-- Portable Operating System Interface (POSIX) -- Part 4: Rationale Including Technical Cor. 1: 2004	
Large File Support	Large File Support	http://www.UNIX-systems.org/version2/whatsnew/lfs20mar.html
LINUX for S/390 ELF Application Binary Interface Supplement	LINUX for S/390 ELF Application Binary Interface Supplement	http://oss.software.ibm.com/linux390/documentation-2.2.shtml
SUSv2	CAE Specification, January 1997, System Interfaces and Headers (XSH),Issue 5 (ISBN: 1-85912-181-0, C606)	http://www.opengroup.org/publications/catalog/un.htm
SUSv2 Commands and Utilities	The Single UNIX® Specification(SUS) Version 2, Commands and Utilities (XCU), Issue 5 (ISBN: 1-85912-191-8, C604)	http://www.opengroup.org/publications/catalog/un.htm
SVID Issue 3	American Telephone and Telegraph Company, System V Interface Definition, Issue 3 ; Morristown, NJ, UNIX Press, 1989.(ISBN 0201566524)	
SVID Issue 4	System V Interface Definition,Fourth Edition	
System V ABI	System V Application Binary Interface, Edition 4.1	http://www.caldera.com/developers/devspecs/gabi41.pdf
System V ABI Update	System V Application Binary Interface - DRAFT - 17 December 2003	http://www.caldera.com/developers/gabi/2003-12-17/contents.html
X/Open Curses	CAE Specification, May 1996, X/Open Curses, Issue 4, Version 2 (ISBN: 1-85912-171-3, C610), plus Corrigendum U018	http://www.opengroup.org/publications/catalog/un.htm

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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

Name	Title	URL
DWARF Debugging Information Format, Revision 2.0.0	DWARF Debugging Information Format, Revision 2.0.0 (July 27, 1993)	http://refspecs.freestandards.org/dwarf/dwarf-2.0.0.pdf
DWARF Debugging Information Format, Revision 3.0.0 (Draft)	DWARF Debugging Information Format, Revision 3.0.0 (Draft)	http://refspecs.freestandards.org/dwarf/
ISO/IEC TR14652	ISO/IEC Technical Report 14652:2002 Specification method for cultural conventions	
ITU-T V.42	International Telecommunication Union Recommendation V.42 (2002): Error-correcting procedures for DCEs using asynchronous-to-synchronous conversionITUV	http://www.itu.int/rec/recommendation.asp?type=folders&lang=e&parent=T-REC-V.42
Li18nux Globalization Specification	LI18NUX 2000 Globalization Specification, Version 1.0 with Amendment 4	http://www.li18nux.org/docs/html/LI18NUX-2000-amd4.htm
Linux Allocated Device Registry	LINUX ALLOCATED DEVICES	http://www.lanana.org/docs/device-list/devices.txt
PAM	Open Software Foundation, Request For Comments: 86.0 , October 1995, V. Samar & R.Schemers (SunSoft)	http://www.opengroup.org/tech/rfc/mirror-rfc/rfc86.0.txt
RFC 1321: The MD5 Message-Digest Algorithm	IETF RFC 1321: The MD5 Message-Digest Algorithm	http://www.ietf.org/rfc/rfc1321.txt
RFC 1831/1832 RPC & XDR	IETF RFC 1831 & 1832	http://www.ietf.org/
RFC 1833: Binding Protocols for ONC RPC	IETF RFC 1833: Binding Protocols for ONC RPC	http://www.ietf.org/rfc/rfc1833.txt

Name	Title	URL
Version 2	Version 2	
RFC 1950: ZLIB Compressed Data Format Specication	IETF RFC 1950: ZLIB Compressed Data Format Specification	http://www.ietf.org/rfc/rfc1950.txt
RFC 1951: DEFLATE Compressed Data Format Specification	IETF RFC 1951: DEFLATE Compressed Data Format Specification version 1.3	http://www.ietf.org/rfc/rfc1951.txt
RFC 1952: GZIP File Format Specification	IETF RFC 1952: GZIP file format specification version 4.3	http://www.ietf.org/rfc/rfc1952.txt
RFC 2440: OpenPGP Message Format	IETF RFC 2440: OpenPGP Message Format	http://www.ietf.org/rfc/rfc2440.txt
RFC 2821:Simple Mail Transfer Protocol	IETF RFC 2821: Simple Mail Transfer Protocol	http://www.ietf.org/rfc/rfc2821.txt
RFC 2822:Internet Message Format	IETF RFC 2822: Internet Message Format	http://www.ietf.org/rfc/rfc2822.txt
RFC 791:Internet Protocol	IETF RFC 791: Internet Protocol Specification	http://www.ietf.org/rfc/rfc791.txt
RPM Package Format	RPM Package Format V3.0	http://www.rpm.org/max-rpm/s1-rpm-file-format-rpm-file-format.html
zlib Manual	zlib 1.2 Manual	http://www.gzip.org/zlib/

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3 Requirements

3.1 Relevant Libraries

The libraries listed in Table 3-1 shall be available on S390 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_NEEDED` entries at run time.

Table 3-1 Standard Library Names

Library	Runtime Name
libm	libm.so.6
libdl	libdl.so.2
libcrypt	libcrypt.so.1
libz	libz.so.1
libncurses	libncurses.so.5
libutil	libutil.so.1
libc	libc.so.6
libpthread	libpthread.so.0
proginterp	/lib/ld-lsb-s390.so.3
libgcc_s	libgcc_s.so.1

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.

    - 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 possibilty 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 S/390 ELF 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 ESA/390 Architecture is specified by the following documents

- LINUX for S/390 ELF Application Binary Interface Supplement
- Enterprise Systems Architecture/390 Principles of Operation

Only the features of ESA/390 processor instruction set and the following optional instructions may be assumed to be present:

- additional floating point facility
- compare and move extended facility
- immediate and relative instruction facility
- string instruction facility
- square-root facility

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 specfication 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 S/390 ELF Application Binary Interface Supplement.

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.1.2.1 Byte Ordering

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.1.2.2 Fundamental Types

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.1.2.3 Aggregates and Unions

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.1.2.4 Bit Fields

See chapter 1 of the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement.

8.2.1 Registers

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.2.2 Stack Frame

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.2.3 Parameter Passing

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.2.4 Variable Argument Lists

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.2.5 Return Values

See chapter 1 of the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement.

8.3.1 Virtual Address Space

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.1.1 Page Size

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.1.2 Virtual Address Assignments

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.1.3 Managing the Process Stack

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.1.4 Coding Guidleines

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.2 Processor Execution Mode

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.3.3 Exception Interface

See chapter 1 of the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement.

8.4.1 Registers

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.4.2 Process Stack

See chapter 1 of the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement.

8.5.1 Code Model Overview

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.5.2 Function Prolog and Epilog

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.5.3 Data Objects

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.5.4 Function Calls

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.5.5 Branching

See chapter 1 of the LINUX for S/390 ELF Application Binary Interface Supplement.

8.5.6 Dynamic Stack Space Allocation

See chapter 1 of the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement and as supplemented by the This Specification 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 S/390 ELF Application Binary Interface Supplement.

9.3 Sections

See chapter 2 of the LINUX for S/390 ELF Application Binary Interface Supplement.

9.3.1 Special Sections

The following sections are defined in the LINUX for S/390 ELF Application Binary Interface Supplement.

Table 9-1 ELF Special Sections

Name	Type	Attributes
.got	SHT_PROGBITS	SHF_ALLOC+SHF_WRITE
.plt	SHT_PROGBITS	SHF_ALLOC+SHF_EXECINSTR

.got

This section holds the global offset table

.plt

This section holds the Procedure Linkage Table

9.3.2 Addition Special Sections

The following additional sections are defined here.

Table 9-2 Additional Special Sections

Name	Type	Attributes
.rela.dyn	SHT_RELA	SHF_ALLOC
.rela.plt	SHT_RELA	SHF_ALLOC

.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

9.4 Symbol Table

LSB-conforming applications shall use the Symbol Table as defined in Chapter 2 of the LINUX for S/390 ELF Application Binary Interface Supplement.

9.5 Relocation

LSB-conforming applications shall use Relocations as defined in Chapter 2 of the LINUX for S/390 ELF Application Binary Interface Supplement.

9.5.1 Relocation Types

See chapter 2 of the LINUX for S/390 ELF 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 LINUX for S/390 ELF Application Binary Interface Supplement and as supplemented by the the generic LSB and this document. LSB-conforming implementations need not support tags related functionality. LSB-conforming applications must not rely on tags related funtionatliy.

10.2 Program Loading

See chapter 3 of the LINUX for S/390 ELF Application Binary Interface Supplement.

10.3 Dynamic Linking

See chapter 3 of the LINUX for S/390 ELF Application Binary Interface Supplement.

10.3.1 Dynamic Section

The following dynamic entries are defined in the LINUX for S/390 ELF 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 S/390 ELF Application Binary Interface Supplement.

10.3.3 Shared Object Dependencies

See chapter 3 of the LINUX for S/390 ELF Application Binary Interface Supplement.

10.3.4 Function Addresses

See chapter 3 of the LINUX for S/390 ELF Application Binary Interface Supplement.

10.3.5 Procedure Linkage Table

See chapter 3 of the LINUX for S/390 ELF 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 S390 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 `/lib/ld-lsb-s390.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

Library:	libc
SONAME:	libc.so.6

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

[LFS] Large File Support
[LSB] This Specification
[SUSv2] SUSv2
[SUSv3] ISO POSIX (2003)
[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

authnone_create(GLIBC_2.0) [SVID.4]	clnt_create(GLIBC_2.0) [SVID.4]	clnt_pcreateerror(GLIBC_2.0) [SVID.4]	clnt_perrno(GLIBC_2.0) [SVID.4]
clnt_perror(GLIBC_2.0) [SVID.4]	clnt_spcreateerror(GLIBC_2.0) [SVID.4]	clnt_sperrno(GLIBC_2.0) [SVID.4]	clnt_sperror(GLIBC_2.0) [SVID.4]
key_decryptsession(GLIBC_2.1) [SVID.3]	pmap_getport(GLIBC_2.0) [LSB]	pmap_set(GLIBC_2.0) [LSB]	pmap_unset(GLIBC_2.0) [LSB]
svc_getreqset(GLI	svc_register(GLIB	svc_run(GLIBC_2.	svc_sendreply(GL

BC_2.0) [SVID.3]	C_2.0) [LSB]	0) [LSB]	IBC_2.0) [LSB]
svcerr_auth(GLIBC_2.0) [SVID.3]	svcerr_decode(GLIBC_2.0) [SVID.3]	svcerr_noproc(GLIBC_2.0) [SVID.3]	svcerr_noprog(GLIBC_2.0) [SVID.3]
svcerr_progvers(GLIBC_2.0) [SVID.3]	svcerr_systemerr(GLIBC_2.0) [SVID.3]	svcerr_weakauth(GLIBC_2.0) [SVID.3]	svctcp_create(GLIBC_2.0) [LSB]
svcudp_create(GLIBC_2.0) [LSB]	xdr_accepted_reply(GLIBC_2.0) [SVID.3]	xdr_array(GLIBC_2.0) [SVID.3]	xdr_bool(GLIBC_2.0) [SVID.3]
xdr_bytes(GLIBC_2.0) [SVID.3]	xdr_callhdr(GLIBC_2.0) [SVID.3]	xdr_callmsg(GLIBC_2.0) [SVID.3]	xdr_char(GLIBC_2.0) [SVID.3]
xdr_double(GLIBC_2.0) [SVID.3]	xdr_enum(GLIBC_2.0) [SVID.3]	xdr_float(GLIBC_2.0) [SVID.3]	xdr_free(GLIBC_2.0) [SVID.3]
xdr_int(GLIBC_2.0) [SVID.3]	xdr_long(GLIBC_2.0) [SVID.3]	xdr_opaque(GLIBC_2.0) [SVID.3]	xdr_opaque_auth(GLIBC_2.0) [SVID.3]
xdr_pointer(GLIBC_2.0) [SVID.3]	xdr_reference(GLIBC_2.0) [SVID.3]	xdr_rejected_reply(GLIBC_2.0) [SVID.3]	xdr_replymsg(GLIBC_2.0) [SVID.3]
xdr_short(GLIBC_2.0) [SVID.3]	xdr_string(GLIBC_2.0) [SVID.3]	xdr_u_char(GLIBC_2.0) [SVID.3]	xdr_u_int(GLIBC_2.0) [LSB]
xdr_u_long(GLIBC_2.0) [SVID.3]	xdr_u_short(GLIBC_2.0) [SVID.3]	xdr_union(GLIBC_2.0) [SVID.3]	xdr_vector(GLIBC_2.0) [SVID.3]
xdr_void(GLIBC_2.0) [SVID.3]	xdr_wrapstring(GLIBC_2.0) [SVID.3]	xdrmem_create(GLIBC_2.0) [SVID.3]	xdrrec_create(GLIBC_2.0) [SVID.3]
xdrrec_eof(GLIBC_2.0) [SVID.3]			

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 11-3 libc - System Calls Function Interfaces

__fxstat(GLIBC_2.0) [LSB]	__getpgid(GLIBC_2.0) [LSB]	__lxstat(GLIBC_2.0) [LSB]	__xmknod(GLIBC_2.0) [LSB]
__xstat(GLIBC_2.0) [LSB]	access(GLIBC_2.0) [SUSv3]	acct(GLIBC_2.0) [LSB]	alarm(GLIBC_2.0) [SUSv3]
brk(GLIBC_2.0) [SUSv2]	chdir(GLIBC_2.0) [SUSv3]	chmod(GLIBC_2.0) [SUSv3]	chown(GLIBC_2.1) [SUSv3]
chroot(GLIBC_2.0	clock(GLIBC_2.0)	close(GLIBC_2.0)	closedir(GLIBC_2.

) [SUSv2]	[SUSv3]	[SUSv3]	0) [SUSv3]
creat(GLIBC_2.0) [SUSv3]	dup(GLIBC_2.0) [SUSv3]	dup2(GLIBC_2.0) [SUSv3]	execl(GLIBC_2.0) [SUSv3]
execle(GLIBC_2.0) [SUSv3]	execlp(GLIBC_2.0) [SUSv3]	execv(GLIBC_2.0) [SUSv3]	execve(GLIBC_2.0) [SUSv3]
execvp(GLIBC_2.0) [SUSv3]	exit(GLIBC_2.0) [SUSv3]	fchdir(GLIBC_2.0) [SUSv3]	fchmod(GLIBC_2. 0) [SUSv3]
fchown(GLIBC_2. 0) [SUSv3]	fcntl(GLIBC_2.0) [LSB]	fdatasync(GLIBC_ 2.0) [SUSv3]	flock(GLIBC_2.0) [LSB]
fork(GLIBC_2.0) [SUSv3]	fstatvfs(GLIBC_2. 1) [SUSv3]	fsync(GLIBC_2.0) [SUSv3]	ftime(GLIBC_2.0) [SUSv3]
ftruncate(GLIBC_ 2.0) [SUSv3]	getcontext(GLIBC _2.1) [SUSv3]	getegid(GLIBC_2. 0) [SUSv3]	geteuid(GLIBC_2. 0) [SUSv3]
getgid(GLIBC_2.0) [SUSv3]	getgroups(GLIBC _2.0) [SUSv3]	getitimer(GLIBC_ 2.0) [SUSv3]	getloadavg(GLIB C_2.2) [LSB]
getpagesize(GLIB C_2.0) [SUSv2]	getpgid(GLIBC_2. 0) [SUSv3]	getpgrp(GLIBC_2. 0) [SUSv3]	getpid(GLIBC_2.0) [SUSv3]
getppid(GLIBC_2. 0) [SUSv3]	getpriority(GLIBC _2.0) [SUSv3]	getrlimit(GLIBC_ 2.2) [SUSv3]	getrusage(GLIBC_ 2.0) [SUSv3]
getsid(GLIBC_2.0) [SUSv3]	getuid(GLIBC_2.0) [SUSv3]	getwd(GLIBC_2.0) [SUSv3]	initgroups(GLIBC _2.0) [LSB]
ioctl(GLIBC_2.0) [LSB]	kill(GLIBC_2.0) [LSB]	killpg(GLIBC_2.0) [SUSv3]	lchown(GLIBC_2. 0) [SUSv3]
link(GLIBC_2.0) [LSB]	lockf(GLIBC_2.0) [SUSv3]	lseek(GLIBC_2.0) [SUSv3]	mkdir(GLIBC_2.0) [SUSv3]
mkfifo(GLIBC_2.0) [SUSv3]	mlock(GLIBC_2.0) [SUSv3]	mlockall(GLIBC_2 .0) [SUSv3]	mmap(GLIBC_2.0) [SUSv3]
mprotect(GLIBC_ 2.0) [SUSv3]	msync(GLIBC_2.0) [SUSv3]	munlock(GLIBC_ 2.0) [SUSv3]	munlockall(GLIB C_2.0) [SUSv3]
munmap(GLIBC_ 2.0) [SUSv3]	nanosleep(GLIBC _2.0) [SUSv3]	nice(GLIBC_2.0) [SUSv3]	open(GLIBC_2.0) [SUSv3]
opendir(GLIBC_2. 0) [SUSv3]	pathconf(GLIBC_ 2.0) [SUSv3]	pause(GLIBC_2.0) [SUSv3]	pipe(GLIBC_2.0) [SUSv3]
poll(GLIBC_2.0) [SUSv3]	read(GLIBC_2.0) [SUSv3]	readdir(GLIBC_2. 0) [SUSv3]	readdir_r(GLIBC_ 2.0) [SUSv3]
readlink(GLIBC_2 .0) [SUSv3]	readv(GLIBC_2.0) [SUSv3]	rename(GLIBC_2. 0) [SUSv3]	rmdir(GLIBC_2.0) [SUSv3]
sbrk(GLIBC_2.0) [SUSv2]	sched_get_priorit y_max(GLIBC_2.0) [SUSv3]	sched_get_priorit y_min(GLIBC_2.0) [SUSv3]	sched_getparam(GLIBC_2.0) [SUSv3]
sched_getschedul	sched_rr_get_inte	sched_setparam(	sched_setschedule

er(GLIBC_2.0) [SUSv3]	rval(GLIBC_2.0) [SUSv3]	GLIBC_2.0) [SUSv3]	r(GLIBC_2.0) [SUSv3]
sched_yield(GLIBC_2.0) [SUSv3]	select(GLIBC_2.0) [SUSv3]	setcontext(GLIBC_2.0) [SUSv3]	setegid(GLIBC_2.0) [SUSv3]
seteuid(GLIBC_2.0) [SUSv3]	setgid(GLIBC_2.0) [SUSv3]	setitimer(GLIBC_2.0) [SUSv3]	setpgid(GLIBC_2.0) [SUSv3]
setpgrp(GLIBC_2.0) [SUSv3]	setpriority(GLIBC_2.0) [SUSv3]	setregid(GLIBC_2.0) [SUSv3]	setreuid(GLIBC_2.0) [SUSv3]
setrlimit(GLIBC_2.2) [SUSv3]	setrlimit64(GLIBC_2.1) [LFS]	setsid(GLIBC_2.0) [SUSv3]	setuid(GLIBC_2.0) [SUSv3]
sleep(GLIBC_2.0) [SUSv3]	statvfs(GLIBC_2.1) [SUSv3]	stime(GLIBC_2.0) [LSB]	symlink(GLIBC_2.0) [SUSv3]
sync(GLIBC_2.0) [SUSv3]	sysconf(GLIBC_2.0) [SUSv3]	time(GLIBC_2.0) [SUSv3]	times(GLIBC_2.0) [SUSv3]
truncate(GLIBC_2.0) [SUSv3]	ulimit(GLIBC_2.0) [SUSv3]	umask(GLIBC_2.0) [SUSv3]	uname(GLIBC_2.0) [SUSv3]
unlink(GLIBC_2.0) [LSB]	utime(GLIBC_2.0) [SUSv3]	utimes(GLIBC_2.0) [SUSv3]	vfork(GLIBC_2.0) [SUSv3]
wait(GLIBC_2.0) [SUSv3]	wait4(GLIBC_2.0) [LSB]	waitpid(GLIBC_2.0) [LSB]	write(GLIBC_2.0) [SUSv3]
writev(GLIBC_2.0) [SUSv3]			

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

_IO_feof(GLIBC_2.0) [LSB]	_IO_getc(GLIBC_2.0) [LSB]	_IO_putc(GLIBC_2.0) [LSB]	_IO_puts(GLIBC_2.0) [LSB]
asprintf(GLIBC_2.0) [LSB]	clearerr(GLIBC_2.0) [SUSv3]	ctermid(GLIBC_2.0) [SUSv3]	fclose(GLIBC_2.1) [SUSv3]
fdopen(GLIBC_2.1) [SUSv3]	feof(GLIBC_2.0) [SUSv3]	ferror(GLIBC_2.0) [SUSv3]	fflush(GLIBC_2.0) [SUSv3]
fflush_unlocked(GLIBC_2.0) [LSB]	fgetc(GLIBC_2.0) [SUSv3]	fgetpos(GLIBC_2.2) [SUSv3]	fgets(GLIBC_2.0) [SUSv3]
fgetwc_unlocked(GLIBC_2.2) [LSB]	fileno(GLIBC_2.0) [SUSv3]	flockfile(GLIBC_2.0) [SUSv3]	fopen(GLIBC_2.1) [SUSv3]
fprintf(GLIBC_2.0) [SUSv3]	fputc(GLIBC_2.0) [SUSv3]	fputs(GLIBC_2.0) [SUSv3]	fread(GLIBC_2.0) [SUSv3]

freopen(GLIBC_2.0) [SUSv3]	fscanf(GLIBC_2.0) [LSB]	fseek(GLIBC_2.0) [SUSv3]	fseeko(GLIBC_2.1) [SUSv3]
fsetpos(GLIBC_2.2) [SUSv3]	ftell(GLIBC_2.0) [SUSv3]	ftello(GLIBC_2.1) [SUSv3]	fwrite(GLIBC_2.0) [SUSv3]
getc(GLIBC_2.0) [SUSv3]	getc_unlocked(GLIBC_2.0) [SUSv3]	getchar(GLIBC_2.0) [SUSv3]	getchar_unlocked (GLIBC_2.0) [SUSv3]
getw(GLIBC_2.0) [SUSv2]	pclose(GLIBC_2.1) [SUSv3]	popen(GLIBC_2.1) [SUSv3]	printf(GLIBC_2.0) [SUSv3]
putc(GLIBC_2.0) [SUSv3]	putc_unlocked(GLIBC_2.0) [SUSv3]	putchar(GLIBC_2.0) [SUSv3]	putchar_unlocked (GLIBC_2.0) [SUSv3]
puts(GLIBC_2.0) [SUSv3]	putw(GLIBC_2.0) [SUSv2]	remove(GLIBC_2.0) [SUSv3]	rewind(GLIBC_2.0) [SUSv3]
rewinddir(GLIBC_2.0) [SUSv3]	scanf(GLIBC_2.0) [LSB]	seekdir(GLIBC_2.0) [SUSv3]	setbuf(GLIBC_2.0) [SUSv3]
setbuffer(GLIBC_2.0) [LSB]	setvbuf(GLIBC_2.0) [SUSv3]	snprintf(GLIBC_2.0) [SUSv3]	sprintf(GLIBC_2.0) [SUSv3]
sscanf(GLIBC_2.0) [LSB]	telldir(GLIBC_2.0) [SUSv3]	tempnam(GLIBC_2.0) [SUSv3]	ungetc(GLIBC_2.0) [SUSv3]
vasprintf(GLIBC_2.0) [LSB]	vdprintf(GLIBC_2.0) [LSB]	vfprintf(GLIBC_2.0) [SUSv3]	vprintf(GLIBC_2.0) [SUSv3]
vsnprintf(GLIBC_2.0) [SUSv3]	vsprintf(GLIBC_2.0) [SUSv3]		

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

stderr(GLIBC_2.0) [SUSv3]	stdin(GLIBC_2.0) [SUSv3]	stdout(GLIBC_2.0) [SUSv3]	

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

__libc_current_sigrtmax(GLIBC_2.1) [LSB]	__libc_current_sigrtmin(GLIBC_2.1) [LSB]	__sigsetjmp(GLIBC_2.0) [LSB]	__sysv_signal(GLIBC_2.0) [LSB]

bsd_signal(GLIBC_2.0) [SUSv3]	psignal(GLIBC_2.0) [LSB]	raise(GLIBC_2.0) [SUSv3]	sigaction(GLIBC_2.0) [SUSv3]
sigaddset(GLIBC_2.0) [SUSv3]	sigaltstack(GLIBC_2.0) [SUSv3]	sigandset(GLIBC_2.0) [LSB]	sigdelset(GLIBC_2.0) [SUSv3]
sigemptyset(GLIBC_2.0) [SUSv3]	sigfillset(GLIBC_2.0) [SUSv3]	sighold(GLIBC_2.1) [SUSv3]	sigignore(GLIBC_2.1) [SUSv3]
siginterrupt(GLIBC_2.0) [SUSv3]	sigisemptyset(GLIBC_2.0) [LSB]	sigismember(GLIBC_2.0) [SUSv3]	siglongjmp(GLIBC_2.0) [SUSv3]
signal(GLIBC_2.0) [SUSv3]	sigorset(GLIBC_2.0) [LSB]	sigpause(GLIBC_2.0) [SUSv3]	sigpending(GLIBC_2.0) [SUSv3]
sigprocmask(GLIBC_2.0) [SUSv3]	sigqueue(GLIBC_2.1) [SUSv3]	sigrelse(GLIBC_2.1) [SUSv3]	sigreturn(GLIBC_2.0) [LSB]
sigset(GLIBC_2.1) [SUSv3]	sigsuspend(GLIBC_2.0) [SUSv3]	sigtimedwait(GLIBC_2.1) [SUSv3]	sigwait(GLIBC_2.0) [SUSv3]
sigwaitinfo(GLIBC_2.1) [SUSv3]			

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

_sys_siglist(GLIBC_2.3.3) [LSB]			

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

bind_textdomain_codeset(GLIBC_2.2) [LSB]	bindtextdomain(GLIBC_2.0) [LSB]	catclose(GLIBC_2.0) [SUSv3]	catgets(GLIBC_2.0) [SUSv3]
catopen(GLIBC_2.0) [SUSv3]	dcgettext(GLIBC_2.0) [LSB]	dcngettext(GLIBC_2.2) [LSB]	dgettext(GLIBC_2.0) [LSB]
dngettext(GLIBC_2.2) [LSB]	gettext(GLIBC_2.0) [LSB]	iconv(GLIBC_2.1) [SUSv3]	iconv_close(GLIBC_2.1) [SUSv3]
iconv_open(GLIBC_2.1) [SUSv3]	localeconv(GLIBC_2.2) [SUSv3]	ngettext(GLIBC_2.2) [LSB]	nl_langinfo(GLIBC_2.0) [SUSv3]
setlocale(GLIBC_2.0) [SUSv3]	textdomain(GLIBC_2.0) [LSB]		

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

_nl_msg_cat_cntr(GLIBC_2.0) [LSB]			

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

__h_errno_location(GLIBC_2.0) [LSB]	accept(GLIBC_2.0) [SUSv3]	bind(GLIBC_2.0) [SUSv3]	bindresvport(GLIBC_2.0) [LSB]
connect(GLIBC_2.0) [SUSv3]	gethostid(GLIBC_2.0) [SUSv3]	gethostname(GLIBC_2.0) [SUSv3]	getpeername(GLIBC_2.0) [SUSv3]
getsockname(GLIBC_2.0) [SUSv3]	getsockopt(GLIBC_2.0) [LSB]	if_freenameindex(GLIBC_2.1) [SUSv3]	if_indextoname(GLIBC_2.1) [SUSv3]
if_nameindex(GLIBC_2.1) [SUSv3]	if_nametoindex(GLIBC_2.1) [SUSv3]	listen(GLIBC_2.0) [SUSv3]	recv(GLIBC_2.0) [SUSv3]
recvfrom(GLIBC_2.0) [SUSv3]	recvmsg(GLIBC_2.0) [SUSv3]	send(GLIBC_2.0) [SUSv3]	sendmsg(GLIBC_2.0) [SUSv3]
sendto(GLIBC_2.0) [SUSv3]	setsockopt(GLIBC_2.0) [LSB]	shutdown(GLIBC_2.0) [SUSv3]	sockatmark(GLIBC_2.2.4) [SUSv3]
socket(GLIBC_2.0) [SUSv3]	socketpair(GLIBC_2.0) [SUSv3]		

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

__wcstod_internal(GLIBC_2.0) [LSB]	__wcstof_internal(GLIBC_2.0) [LSB]	__wcstol_internal(GLIBC_2.0) [LSB]	__wcstold_internal(GLIBC_2.0) [LSB]
__wcstoul_internal(GLIBC_2.0)	btowc(GLIBC_2.0) [SUSv3]	fgetwc(GLIBC_2.2) [SUSv3]	fgetws(GLIBC_2.2) [SUSv3]

[LSB]			
fputwc(GLIBC_2.2) [SUSv3]	fputws(GLIBC_2.2) [SUSv3]	fwide(GLIBC_2.2) [SUSv3]	fwprintf(GLIBC_2.2) [SUSv3]
fwscanf(GLIBC_2.2) [LSB]	getwc(GLIBC_2.2) [SUSv3]	getwchar(GLIBC_2.2) [SUSv3]	mblen(GLIBC_2.0) [SUSv3]
mbrlen(GLIBC_2.0) [SUSv3]	mbrtowc(GLIBC_2.0) [SUSv3]	mbsinit(GLIBC_2.0) [SUSv3]	mbsnrtowcs(GLIBC_2.0) [LSB]
mbsrtowcs(GLIBC_2.0) [SUSv3]	mbstowcs(GLIBC_2.0) [SUSv3]	mbtowc(GLIBC_2.0) [SUSv3]	putwc(GLIBC_2.2) [SUSv3]
putwchar(GLIBC_2.2) [SUSv3]	swprintf(GLIBC_2.2) [SUSv3]	swscanf(GLIBC_2.2) [LSB]	towctrans(GLIBC_2.0) [SUSv3]
towlower(GLIBC_2.0) [SUSv3]	towupper(GLIBC_2.0) [SUSv3]	ungetwc(GLIBC_2.2) [SUSv3]	vfwprintf(GLIBC_2.2) [SUSv3]
vfwscanf(GLIBC_2.2) [LSB]	vswprintf(GLIBC_2.2) [SUSv3]	vswscanf(GLIBC_2.2) [LSB]	vwprintf(GLIBC_2.2) [SUSv3]
vwscanf(GLIBC_2.2) [LSB]	wcpcpy(GLIBC_2.0) [LSB]	wcpncpy(GLIBC_2.0) [LSB]	wcrtomb(GLIBC_2.0) [SUSv3]
wcscasecmp(GLIBC_2.1) [LSB]	wcscat(GLIBC_2.0) [SUSv3]	wcschr(GLIBC_2.0) [SUSv3]	wcscmp(GLIBC_2.0) [SUSv3]
wcscoll(GLIBC_2.0) [SUSv3]	wcscpy(GLIBC_2.0) [SUSv3]	wcscspn(GLIBC_2.0) [SUSv3]	wcsdup(GLIBC_2.0) [LSB]
wcsftime(GLIBC_2.2) [SUSv3]	wcslen(GLIBC_2.0) [SUSv3]	wcsncasecmp(GLIBC_2.1) [LSB]	wcsncat(GLIBC_2.0) [SUSv3]
wcsncmp(GLIBC_2.0) [SUSv3]	wcsncpy(GLIBC_2.0) [SUSv3]	wcsnlen(GLIBC_2.1) [LSB]	wcsnrtombs(GLIBC_2.0) [LSB]
wcspbrk(GLIBC_2.0) [SUSv3]	wcsrchr(GLIBC_2.0) [SUSv3]	wcsrtombs(GLIBC_2.0) [SUSv3]	wcsspn(GLIBC_2.0) [SUSv3]
wcsstr(GLIBC_2.0) [SUSv3]	wcstod(GLIBC_2.0) [SUSv3]	wcstof(GLIBC_2.0) [SUSv3]	wcstoimax(GLIBC_2.1) [SUSv3]
wcstok(GLIBC_2.0) [SUSv3]	wcstol(GLIBC_2.0) [SUSv3]	wcstold(GLIBC_2.0) [SUSv3]	wcstoll(GLIBC_2.1) [SUSv3]
wcstombs(GLIBC_2.0) [SUSv3]	wcstoq(GLIBC_2.0) [LSB]	wcstoul(GLIBC_2.0) [SUSv3]	wcstoull(GLIBC_2.1) [SUSv3]
wcstoumax(GLIBC_2.1) [SUSv3]	wcstouq(GLIBC_2.0) [LSB]	wcswcs(GLIBC_2.1) [SUSv3]	wcswidth(GLIBC_2.0) [SUSv3]
wcsxfrm(GLIBC_2.0) [SUSv3]	wctob(GLIBC_2.0) [SUSv3]	wctomb(GLIBC_2.0) [SUSv3]	wctrans(GLIBC_2.0) [SUSv3]
wctype(GLIBC_2.0) [SUSv3]	wcwidth(GLIBC_2.0) [SUSv3]	wmemchr(GLIBC_2.0) [SUSv3]	wmemcmp(GLIBC_2.0) [SUSv3]
wmemcpy(GLIBC_2.0) [SUSv3]	wmemmove(GLIBC_2.0) [SUSv3]	wmemset(GLIBC_2.0) [SUSv3]	wprintf(GLIBC_2.2) [SUSv3]

wscanf(GLIBC_2.2) [LSB]			

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 11-12 libc - String Functions Function Interfaces

__mempcpy(GLIBC_2.0) [LSB]	__rawmemchr(GLIBC_2.1) [LSB]	__stpcpy(GLIBC_2.0) [LSB]	__strdup(GLIBC_2.0) [LSB]
__strtod_internal(GLIBC_2.0) [LSB]	__strtof_internal(GLIBC_2.0) [LSB]	__strtok_r(GLIBC_2.0) [LSB]	__strtol_internal(GLIBC_2.0) [LSB]
__strtold_internal(GLIBC_2.0) [LSB]	__strtoll_internal(GLIBC_2.0) [LSB]	__strtoul_internal(GLIBC_2.0) [LSB]	__strtoull_internal(GLIBC_2.0) [LSB]
bcmp(GLIBC_2.0) [SUSv3]	bcopy(GLIBC_2.0) [SUSv3]	bzero(GLIBC_2.0) [SUSv3]	ffs(GLIBC_2.0) [SUSv3]
index(GLIBC_2.0) [SUSv3]	memccpy(GLIBC_2.0) [SUSv3]	memchr(GLIBC_2.0) [SUSv3]	memcmp(GLIBC_2.0) [SUSv3]
memcpy(GLIBC_2.0) [SUSv3]	memmove(GLIBC_2.0) [SUSv3]	memrchr(GLIBC_2.2) [LSB]	memset(GLIBC_2.0) [SUSv3]
rindex(GLIBC_2.0) [SUSv3]	stpcpy(GLIBC_2.0) [LSB]	stpncpy(GLIBC_2.0) [LSB]	strcasecmp(GLIBC_2.0) [SUSv3]
strcasestr(GLIBC_2.1) [LSB]	strcat(GLIBC_2.0) [SUSv3]	strchr(GLIBC_2.0) [SUSv3]	strcmp(GLIBC_2.0) [SUSv3]
strcoll(GLIBC_2.0) [SUSv3]	strcpy(GLIBC_2.0) [SUSv3]	strcspn(GLIBC_2.0) [SUSv3]	strdup(GLIBC_2.0) [SUSv3]
strerror(GLIBC_2.0) [SUSv3]	strerror_r(GLIBC_2.0) [LSB]	strfmon(GLIBC_2.0) [SUSv3]	strftime(GLIBC_2.0) [SUSv3]
strlen(GLIBC_2.0) [SUSv3]	strncasecmp(GLIBC_2.0) [SUSv3]	strncat(GLIBC_2.0) [SUSv3]	strncmp(GLIBC_2.0) [SUSv3]
strncpy(GLIBC_2.0) [SUSv3]	strndup(GLIBC_2.0) [LSB]	strnlen(GLIBC_2.0) [LSB]	strpbrk(GLIBC_2.0) [SUSv3]
strptime(GLIBC_2.0) [LSB]	strrchr(GLIBC_2.0) [SUSv3]	strsep(GLIBC_2.0) [LSB]	strsignal(GLIBC_2.0) [LSB]
strspn(GLIBC_2.0) [SUSv3]	strstr(GLIBC_2.0) [SUSv3]	strtof(GLIBC_2.0) [SUSv3]	strtoimax(GLIBC_2.1) [SUSv3]
strtok(GLIBC_2.0) [SUSv3]	strtok_r(GLIBC_2.0) [SUSv3]	strtold(GLIBC_2.0) [SUSv3]	strtoll(GLIBC_2.0) [SUSv3]
strtoq(GLIBC_2.0) [LSB]	strtoull(GLIBC_2.0) [SUSv3]	strtoumax(GLIBC_2.1) [SUSv3]	strtouq(GLIBC_2.0) [LSB]

strxfrm(GLIBC_2.0) [SUSv3]	swab(GLIBC_2.0) [SUSv3]		

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_2.0) [SUSv3]	msgctl(GLIBC_2.2) [SUSv3]	msgget(GLIBC_2.0) [SUSv3]	msgrcv(GLIBC_2.0) [SUSv3]
msgsnd(GLIBC_2.0) [SUSv3]	semctl(GLIBC_2.2) [SUSv3]	semget(GLIBC_2.0) [SUSv3]	semop(GLIBC_2.0) [SUSv3]
shmat(GLIBC_2.0) [SUSv3]	shmctl(GLIBC_2.2) [SUSv3]	shmdt(GLIBC_2.0) [SUSv3]	shmget(GLIBC_2.0) [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_2.0) [SUSv3]	regerror(GLIBC_2.0) [SUSv3]	regexec(GLIBC_2.3.4) [LSB]	regfree(GLIBC_2.0) [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_2.0) [LSB]	_tolower(GLIBC_2.0) [SUSv3]	_toupper(GLIBC_2.0) [SUSv3]	isalnum(GLIBC_2.0) [SUSv3]
isalpha(GLIBC_2.0) [SUSv3]	isascii(GLIBC_2.0) [SUSv3]	iscntrl(GLIBC_2.0) [SUSv3]	isdigit(GLIBC_2.0) [SUSv3]
isgraph(GLIBC_2.0) [SUSv3]	islower(GLIBC_2.0) [SUSv3]	isprint(GLIBC_2.0) [SUSv3]	ispunct(GLIBC_2.0) [SUSv3]
isspace(GLIBC_2.0) [SUSv3]	isupper(GLIBC_2.0) [SUSv3]	iswalnum(GLIBC_2.0) [SUSv3]	iswalpha(GLIBC_2.0) [SUSv3]

iswblank(GLIBC_2.1) [SUSv3]	iswcntrl(GLIBC_2.0) [SUSv3]	iswctype(GLIBC_2.0) [SUSv3]	iswdigit(GLIBC_2.0) [SUSv3]
iswgraph(GLIBC_2.0) [SUSv3]	iswlower(GLIBC_2.0) [SUSv3]	iswprint(GLIBC_2.0) [SUSv3]	iswpunct(GLIBC_2.0) [SUSv3]
iswspace(GLIBC_2.0) [SUSv3]	iswupper(GLIBC_2.0) [SUSv3]	iswxdigit(GLIBC_2.0) [SUSv3]	isxdigit(GLIBC_2.0) [SUSv3]
toascii(GLIBC_2.0) [SUSv3]	tolower(GLIBC_2.0) [SUSv3]	toupper(GLIBC_2.0) [SUSv3]	

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

adjtime(GLIBC_2.0) [LSB]	asctime(GLIBC_2.0) [SUSv3]	asctime_r(GLIBC_2.0) [SUSv3]	ctime(GLIBC_2.0) [SUSv3]
ctime_r(GLIBC_2.0) [SUSv3]	difftime(GLIBC_2.0) [SUSv3]	gmtime(GLIBC_2.0) [SUSv3]	gmtime_r(GLIBC_2.0) [SUSv3]
localtime(GLIBC_2.0) [SUSv3]	localtime_r(GLIBC_2.0) [SUSv3]	mktime(GLIBC_2.0) [SUSv3]	tzset(GLIBC_2.0) [SUSv3]
ualarm(GLIBC_2.0) [SUSv3]			

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

__daylight(GLIBC_2.0) [LSB]	__timezone(GLIBC_2.0) [LSB]	__tzname(GLIBC_2.0) [LSB]	daylight(GLIBC_2.0) [SUSv3]
timezone(GLIBC_2.0) [SUSv3]	tzname(GLIBC_2.0) [SUSv3]		

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

cfgetispeed(GLIB	cfgetospeed(GLIB	cfmakeraw(GLIB	cfsetispeed(GLIB

C_2.0) [SUSv3]	C_2.0) [SUSv3]	C_2.0) [LSB]	C_2.0) [SUSv3]
cfsetospeed(GLIBC_2.0) [SUSv3]	cfsetspeed(GLIBC_2.0) [LSB]	tcdrain(GLIBC_2.0) [SUSv3]	tcflow(GLIBC_2.0) [SUSv3]
tcflush(GLIBC_2.0) [SUSv3]	tcgetattr(GLIBC_2.0) [SUSv3]	tcgetpgrp(GLIBC_2.0) [SUSv3]	tcgetsid(GLIBC_2.1) [SUSv3]
tcsendbreak(GLIBC_2.0) [SUSv3]	tcsetattr(GLIBC_2.0) [SUSv3]	tcsetpgrp(GLIBC_2.0) [SUSv3]	

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

endgrent(GLIBC_2.0) [SUSv3]	endprotoent(GLIBC_2.0) [SUSv3]	endpwent(GLIBC_2.0) [SUSv3]	endservent(GLIBC_2.0) [SUSv3]
endutent(GLIBC_2.0) [SUSv2]	endutxent(GLIBC_2.1) [SUSv3]	getgrent(GLIBC_2.0) [SUSv3]	getgrgid(GLIBC_2.0) [SUSv3]
getgrgid_r(GLIBC_2.1.2) [SUSv3]	getgrnam(GLIBC_2.0) [SUSv3]	getgrnam_r(GLIBC_2.1.2) [SUSv3]	getgrouplist(GLIBC_2.2.4) [LSB]
gethostbyaddr(GLIBC_2.0) [SUSv3]	gethostbyname(GLIBC_2.0) [SUSv3]	getprotobyname(GLIBC_2.0) [SUSv3]	getprotobynumber(GLIBC_2.0) [SUSv3]
getprotoent(GLIBC_2.0) [SUSv3]	getpwent(GLIBC_2.0) [SUSv3]	getpwnam(GLIBC_2.0) [SUSv3]	getpwnam_r(GLIBC_2.1.2) [SUSv3]
getpwuid(GLIBC_2.0) [SUSv3]	getpwuid_r(GLIBC_2.1.2) [SUSv3]	getservbyname(GLIBC_2.0) [SUSv3]	getservbyport(GLIBC_2.0) [SUSv3]
getservent(GLIBC_2.0) [SUSv3]	getutent(GLIBC_2.0) [LSB]	getutent_r(GLIBC_2.0) [LSB]	getutxent(GLIBC_2.1) [SUSv3]
getutxid(GLIBC_2.1) [SUSv3]	getutxline(GLIBC_2.1) [SUSv3]	pututxline(GLIBC_2.1) [SUSv3]	setgrent(GLIBC_2.0) [SUSv3]
setgroups(GLIBC_2.0) [LSB]	setprotoent(GLIBC_2.0) [SUSv3]	setpwent(GLIBC_2.0) [SUSv3]	setservent(GLIBC_2.0) [SUSv3]
setutent(GLIBC_2.0) [LSB]	setutxent(GLIBC_2.1) [SUSv3]	utmpname(GLIBC_2.0) [LSB]	

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.

Table 11-20 libc - Language Support Function Interfaces

__libc_start_main(GLIBC_2.0) [LSB]			

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.

Table 11-21 libc - Large File Support Function Interfaces

__fxstat64(GLIBC_2.2) [LSB]	__lxstat64(GLIBC_2.2) [LSB]	__xstat64(GLIBC_2.2) [LSB]	creat64(GLIBC_2.1) [LFS]
fgetpos64(GLIBC_2.2) [LFS]	fopen64(GLIBC_2.1) [LFS]	freopen64(GLIBC_2.1) [LFS]	fseeko64(GLIBC_2.1) [LFS]
fsetpos64(GLIBC_2.2) [LFS]	fstatvfs64(GLIBC_2.1) [LFS]	ftello64(GLIBC_2.1) [LFS]	ftruncate64(GLIBC_2.1) [LFS]
ftw64(GLIBC_2.1) [LFS]	getrlimit64(GLIBC_2.2) [LFS]	lockf64(GLIBC_2.1) [LFS]	mkstemp64(GLIBC_2.2) [LFS]
mmap64(GLIBC_2.1) [LFS]	nftw64(GLIBC_2.3.3) [LFS]	readdir64(GLIBC_2.2) [LFS]	statvfs64(GLIBC_2.1) [LFS]
tmpfile64(GLIBC_2.1) [LFS]	truncate64(GLIBC_2.1) [LFS]		

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.

Table 11-22 libc - Standard Library Function Interfaces

_Exit(GLIBC_2.1.1) [SUSv3]	__assert_fail(GLIBC_2.0) [LSB]	__cxa_atexit(GLIBC_2.1.3) [LSB]	__errno_location(GLIBC_2.0) [LSB]
__fpending(GLIBC_2.2) [LSB]	__getpagesize(GLIBC_2.0) [LSB]	__isinf(GLIBC_2.0) [LSB]	__isinff(GLIBC_2.0) [LSB]
__isinfl(GLIBC_2.0) [LSB]	__isnan(GLIBC_2.0) [LSB]	__isnanf(GLIBC_2.0) [LSB]	__isnanl(GLIBC_2.0) [LSB]
__sysconf(GLIBC_2.2) [LSB]	_exit(GLIBC_2.0) [SUSv3]	_longjmp(GLIBC_2.0) [SUSv3]	_setjmp(GLIBC_2.0) [SUSv3]
a64l(GLIBC_2.0) [SUSv3]	abort(GLIBC_2.0) [SUSv3]	abs(GLIBC_2.0) [SUSv3]	atof(GLIBC_2.0) [SUSv3]
atoi(GLIBC_2.0)	atol(GLIBC_2.0)	atoll(GLIBC_2.0)	basename(GLIBC

[SUSv3]	[SUSv3]	[SUSv3]	_2.0) [SUSv3]
bsearch(GLIBC_2.0) [SUSv3]	calloc(GLIBC_2.0) [SUSv3]	closelog(GLIBC_2.0) [SUSv3]	confstr(GLIBC_2.0) [SUSv3]
cuserid(GLIBC_2.0) [SUSv2]	daemon(GLIBC_2.0) [LSB]	dirname(GLIBC_2.0) [SUSv3]	div(GLIBC_2.0) [SUSv3]
drand48(GLIBC_2.0) [SUSv3]	ecvt(GLIBC_2.0) [SUSv3]	erand48(GLIBC_2.0) [SUSv3]	err(GLIBC_2.0) [LSB]
error(GLIBC_2.0) [LSB]	errx(GLIBC_2.0) [LSB]	fcvt(GLIBC_2.0) [SUSv3]	fmtmsg(GLIBC_2.1) [SUSv3]
fnmatch(GLIBC_2.2.3) [SUSv3]	fpathconf(GLIBC_2.0) [SUSv3]	free(GLIBC_2.0) [SUSv3]	freeaddrinfo(GLIBC_2.0) [SUSv3]
ftrylockfile(GLIBC_2.0) [SUSv3]	ftw(GLIBC_2.0) [SUSv3]	funlockfile(GLIBC_2.0) [SUSv3]	gai_strerror(GLIBC_2.1) [SUSv3]
gcvt(GLIBC_2.0) [SUSv3]	getaddrinfo(GLIBC_2.0) [SUSv3]	getcwd(GLIBC_2.0) [SUSv3]	getdate(GLIBC_2.1) [SUSv3]
getenv(GLIBC_2.0) [SUSv3]	getlogin(GLIBC_2.0) [SUSv3]	getlogin_r(GLIBC_2.0) [SUSv3]	getnameinfo(GLIBC_2.1) [SUSv3]
getopt(GLIBC_2.0) [LSB]	getopt_long(GLIBC_2.0) [LSB]	getopt_long_only(GLIBC_2.0) [LSB]	getsubopt(GLIBC_2.0) [SUSv3]
gettimeofday(GLIBC_2.0) [SUSv3]	glob(GLIBC_2.0) [SUSv3]	glob64(GLIBC_2.1) [LSB]	globfree(GLIBC_2.0) [SUSv3]
globfree64(GLIBC_2.1) [LSB]	grantpt(GLIBC_2.1) [SUSv3]	hcreate(GLIBC_2.0) [SUSv3]	hdestroy(GLIBC_2.0) [SUSv3]
hsearch(GLIBC_2.0) [SUSv3]	htonl(GLIBC_2.0) [SUSv3]	htons(GLIBC_2.0) [SUSv3]	imaxabs(GLIBC_2.1.1) [SUSv3]
imaxdiv(GLIBC_2.1.1) [SUSv3]	inet_addr(GLIBC_2.0) [SUSv3]	inet_ntoa(GLIBC_2.0) [SUSv3]	inet_ntop(GLIBC_2.0) [SUSv3]
inet_pton(GLIBC_2.0) [SUSv3]	initstate(GLIBC_2.0) [SUSv3]	insque(GLIBC_2.0) [SUSv3]	isatty(GLIBC_2.0) [SUSv3]
isblank(GLIBC_2.0) [SUSv3]	jrand48(GLIBC_2.0) [SUSv3]	l64a(GLIBC_2.0) [SUSv3]	labs(GLIBC_2.0) [SUSv3]
lcong48(GLIBC_2.0) [SUSv3]	ldiv(GLIBC_2.0) [SUSv3]	lfind(GLIBC_2.0) [SUSv3]	llabs(GLIBC_2.0) [SUSv3]
lldiv(GLIBC_2.0) [SUSv3]	longjmp(GLIBC_2.0) [SUSv3]	lrand48(GLIBC_2.0) [SUSv3]	lsearch(GLIBC_2.0) [SUSv3]
makecontext(GLIBC_2.1) [SUSv3]	malloc(GLIBC_2.0) [SUSv3]	memmem(GLIBC_2.0) [LSB]	mkstemp(GLIBC_2.0) [SUSv3]
mktemp(GLIBC_2.0) [SUSv3]	mrand48(GLIBC_2.0) [SUSv3]	nftw(GLIBC_2.3.3) [SUSv3]	nrand48(GLIBC_2.0) [SUSv3]
ntohl(GLIBC_2.0) [SUSv3]	ntohs(GLIBC_2.0) [SUSv3]	openlog(GLIBC_2.0) [SUSv3]	perror(GLIBC_2.0) [SUSv3]

posix_memalign(GLIBC_2.2) [SUSv3]	posix_openpt(GLIBC_2.2.1) [SUSv3]	ptsname(GLIBC_2.1) [SUSv3]	putenv(GLIBC_2.0) [SUSv3]
qsort(GLIBC_2.0) [SUSv3]	rand(GLIBC_2.0) [SUSv3]	rand_r(GLIBC_2.0) [SUSv3]	random(GLIBC_2.0) [SUSv3]
realloc(GLIBC_2.0) [SUSv3]	realpath(GLIBC_2.3) [SUSv3]	remque(GLIBC_2.0) [SUSv3]	seed48(GLIBC_2.0) [SUSv3]
setenv(GLIBC_2.0) [SUSv3]	sethostname(GLIBC_2.0) [LSB]	setlogmask(GLIBC_2.0) [SUSv3]	setstate(GLIBC_2.0) [SUSv3]
srand(GLIBC_2.0) [SUSv3]	srand48(GLIBC_2.0) [SUSv3]	srandom(GLIBC_2.0) [SUSv3]	strtod(GLIBC_2.0) [SUSv3]
strtol(GLIBC_2.0) [SUSv3]	strtoul(GLIBC_2.0) [SUSv3]	swapcontext(GLIBC_2.1) [SUSv3]	syslog(GLIBC_2.0) [SUSv3]
system(GLIBC_2.0) [LSB]	tdelete(GLIBC_2.0) [SUSv3]	tfind(GLIBC_2.0) [SUSv3]	tmpfile(GLIBC_2.1) [SUSv3]
tmpnam(GLIBC_2.0) [SUSv3]	tsearch(GLIBC_2.0) [SUSv3]	ttyname(GLIBC_2.0) [SUSv3]	ttyname_r(GLIBC_2.0) [SUSv3]
twalk(GLIBC_2.0) [SUSv3]	unlockpt(GLIBC_2.1) [SUSv3]	unsetenv(GLIBC_2.0) [SUSv3]	usleep(GLIBC_2.0) [SUSv3]
verrx(GLIBC_2.0) [LSB]	vfscanf(GLIBC_2.0) [LSB]	vscanf(GLIBC_2.0) [LSB]	vsscanf(GLIBC_2.0) [LSB]
vsyslog(GLIBC_2.0) [LSB]	warn(GLIBC_2.0) [LSB]	warnx(GLIBC_2.0) [LSB]	wordexp(GLIBC_2.1) [SUSv3]
wordfree(GLIBC_2.1) [SUSv3]			

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

__environ(GLIBC_2.0) [LSB]	_environ(GLIBC_2.0) [LSB]	_sys_errlist(GLIBC_2.3) [LSB]	environ(GLIBC_2.0) [SUSv3]
getdate_err(GLIBC_2.1) [SUSv3]	optarg(GLIBC_2.0) [SUSv3]	opterr(GLIBC_2.0) [SUSv3]	optind(GLIBC_2.0) [SUSv3]
optopt(GLIBC_2.0) [SUSv3]			

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 *);
extern int closedir(DIR *);
extern DIR *opendir(const char *);
extern struct dirent *readdir(DIR *);
extern struct dirent64 *readdir64(DIR *);
extern int readdir_r(DIR *, struct dirent *, struct dirent **);
```

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       EDEADLK

extern int *__errno_location(void);
```

11.3.7 fcntl.h

```

#define F_GETLK64       12
#define F_SETLK64       13
#define F_SETLKW64      14

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 unsigned long long int uint64_t;
typedef long long int intmax_t;
typedef unsigned long long int uintmax_t;
typedef unsigned int uintptr_t;

extern intmax_t strtoimax(const char *, char **, int);
extern uintmax_t strtoumax(const char *, char **, int);
extern intmax_t wcstoimax(const wchar_t *, wchar_t * *, int);
extern uintmax_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 *);
```

11.3.18 libintl.h

```
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

```
#define ULONG_MAX       0xFFFFFFFFUL
#define LONG_MAX        2147483647

#define CHAR_MIN        0
#define CHAR_MAX        255

#define PTHREAD_STACK_MIN       16384
```

11.3.20 locale.h

```
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

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

11.3.22 net/if.h

```
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

```
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);
```

11.3.24 netinet/in.h

```

extern int bindresvport(int, struct sockaddr_in *);
```

11.3.25 netinet/ip.h

```

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

11.3.26 netinet/tcp.h

```

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

11.3.27 netinet/udp.h

```

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

11.3.28 nl_types.h

```

extern int catclose(nl_catd);
extern char *catgets(nl_catd, int, int, const char *);
extern nl_catd catopen(const char *, int);
```

11.3.29 poll.h

```

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

11.3.30 pty.h

```

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

11.3.31 pwd.h

```

extern void endpwent(void);
extern struct passwd *getpwent(void);
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_getscheduler(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);
```

11.3.41 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 int __jmp_buf[14];

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

typedef struct {
    unsigned long int mask;
    unsigned long int addr;
} __attribute__ ((aligned(8)))
    _psw_t;
typedef struct {
    _psw_t psw;
    unsigned long int gprs[__NUM_GPRS];
    unsigned int acrs[__NUM_ACRS];
} _s390_regs_common;

#define SIGEV_PAD_SIZE  ((SIGEV_MAX_SIZE/sizeof(int))-3)

#define SI_PAD_SIZE     ((SI_MAX_SIZE/sizeof(int))-3)

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

#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 fpregs;
} _sigregs;

struct sigcontext {
    unsigned long int oldmask[2];
    _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 sigisemptyset(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 sigrelse(int);
extern sighandler_t sigset(int, sighandler_t);
extern int pthread_kill(pthread_t, int);
extern int pthread_sigmask(int, sigset_t *, sigset_t *);
extern int sigaction(int, const struct sigaction *, struct sigaction *);
extern int sigwait(sigset_t *, int *);
extern int kill(pid_t, int);
extern int sigaltstack(const struct sigaltstack *, struct sigaltstack
*);
extern sighandler_t signal(int, sighandler_t);
extern int sigpause(int);
extern int sigprocmask(int, const sigset_t *, sigset_t *);
extern int sigreturn(struct sigcontext *);
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 int ptrdiff_t;
```

11.3.45 stdio.h

```

#define __IO_FILE_SIZE  152

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 int fileno(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 *freopen64(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 char *fgets(char *, int, FILE *);
        extern int fputs(const char *, FILE *);
        extern size_t fread(void *, size_t, size_t, FILE *);
        extern int fsetpos(FILE *, const fpos_t *);
        extern long int ftell(FILE *);
        extern size_t fwrite(const void *, size_t, size_t, FILE *);
        extern int getc(FILE *);
        extern int putc(int, FILE *);
        extern int puts(const char *);
        extern int setvbuf(FILE *, char *, int, size_t);
        extern int snprintf(char *, size_t, const char *, ...);
        extern int ungetc(int, FILE *);
        extern int vsnprintf(char *, size_t, const char *, va_list);
        extern int vsprintf(char *, 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 fpos64_t *);
extern int ftrylockfile(FILE *);
extern void funlockfile(FILE *);
extern int getc_unlocked(FILE *);
extern void setbuffer(FILE *, char *, size_t);
extern int vasprintf(char **, const char *, va_list);
extern int vdprintf(int, const char *, va_list);
extern int vfscanf(FILE *, const char *, va_list);
extern int vscanf(const char *, va_list);
extern int vsscanf(const char *, const char *, va_list);
extern size_t __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 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 *gcvt(double, int, char *);
extern char *getenv(const char *);
extern int getsubopt(char **, 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 lldiv_t lldiv(long long int, 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 *);
extern long int mrand48(void);
extern long int nrand48(unsigned short);
extern char *ptsname(int);
extern int putenv(char *);
extern void qsort(void *, size_t, size_t, __compar_fn_t);
extern int rand(void);
extern int rand_r(unsigned int *);
extern unsigned short *seed48(unsigned short);
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 int system(const char *);
extern void *calloc(size_t, size_t);
extern void free(void *);
extern char *initstate(unsigned int, char *, size_t);
extern void *malloc(size_t);
extern long int random(void);
extern void *realloc(void *, size_t);
extern char *setstate(char *);
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 unsigned long long int strtouq(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 int memcmp(void *, void *, 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 void *memset(void *, int, 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 *strcpy(char *, char *);
extern size_t strcspn(const char *, const char *);
extern char *strerror(int);
extern size_t strlen(char *);
extern char *strncat(char *, char *, size_t);
extern int strncmp(char *, char *, size_t);
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 *strtok_r(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        0x541B
#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;
    uid_t cgid;
    unsigned short mode;
    unsigned short __pad1;
    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);
extern int munlock(const void *, size_t);
extern int munlockall(void);
extern int munmap(void *, size_t);
extern void *mmap64(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 msglen_t;
typedef unsigned long int msgqnum_t;

struct msqid_ds {
    struct ipc_perm msg_perm;
    time_t msg_stime;
    unsigned long int __unused1;
    time_t msg_rtime;
    unsigned long int __unused2;
    time_t msg_ctime;
    unsigned long int __unused3;
    unsigned long int __msg_cbytes;
    msgqnum_t msg_qnum;
    msglen_t msg_qbytes;
    pid_t msg_lspid;
    pid_t msg_lrpid;
    unsigned long int __unused4;
    unsigned 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;
    time_t sem_otime;
    unsigned long int __unused1;
    time_t sem_ctime;
    unsigned long int __unused2;
    unsigned long int sem_nsems;
    unsigned long int __unused3;
    unsigned long int __unused4;
};
extern int semctl(int, int, int, ...);
extern int semget(key_t, int, int);
extern int semop(int, struct sembuf *, size_t);
```

11.3.57 sys/shm.h

```

#define SHMLBA  (__getpagesize())

typedef unsigned long int shmatt_t;

struct shmid_ds {
    struct ipc_perm shm_perm;
    size_t shm_segsz;
    time_t shm_atime;
    unsigned long int __unused1;
    time_t shm_dtime;
    unsigned long int __unused2;
    time_t shm_ctime;
    unsigned long int __unused3;
    pid_t shm_cpid;
    pid_t shm_lpid;
    shmatt_t shm_nattch;
    unsigned long int __unused4;
    unsigned long int __unused5;
};
extern int __getpagesize(void);
extern void *shmat(int, const void *, int);
extern int shmctl(int, int, struct shmid_ds *);
extern int shmdt(const void *);
extern int shmget(key_t, size_t, int);
```

11.3.58 sys/socket.h

```

typedef uint32_t __ss_aligntype;

#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 getsockopt(int, int, int, void *, socklen_t *);
extern int shutdown(int, int);
extern int socket(int, int, int);
extern int socketpair(int, int, int, int);
extern int sockatmark(int);
```

11.3.59 sys/stat.h

```

#define _STAT_VER       3

struct stat {
    dev_t st_dev;
    unsigned int __pad1;
    ino_t st_ino;
    mode_t st_mode;
    nlink_t st_nlink;
    uid_t st_uid;
    gid_t st_gid;
    dev_t st_rdev;
    unsigned int __pad2;
    off_t st_size;
    blksize_t st_blksize;
    blkcnt_t st_blocks;
    struct timespec st_atim;
    struct timespec st_mtim;
    struct timespec st_ctim;
    unsigned long int __unused4;
    unsigned long int __unused5;
};
struct stat64 {
    dev_t st_dev;
    int __pad1;
    ino_t __st_ino;
    mode_t st_mode;
    nlink_t st_nlink;
    uid_t st_uid;
    gid_t st_gid;
    dev_t st_rdev;
    int __pad2;
    off64_t st_size;
    blksize_t st_blksize;
    blkcnt64_t st_blocks;
    struct timespec st_atim;
    struct timespec st_mtim;
    struct timespec st_ctim;
    ino64_t st_ino;
};

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 mode_t umask(mode_t);
```

11.3.60 sys/statvfs.h

```

struct statvfs {
    unsigned long int f_bsize;
    unsigned long int f_frsize;
    fsblkcnt_t f_blocks;
    fsblkcnt_t f_bfree;
    fsblkcnt_t f_bavail;
    fsfilcnt_t f_files;
    fsfilcnt_t f_ffree;
    fsfilcnt_t f_favail;
    unsigned long int f_fsid;
    int __f_unused;
    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;
    int __f_unused;
    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 long int int64_t;

typedef int32_t ssize_t;

#define __FDSET_LONGS   32
```

11.3.65 sys/uio.h

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

11.3.66 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 OLCUC   0000002
#define ONLCR   0000004
#define XCASE   0000004
#define NLDLY   0000400
#define CR1     0001000
#define IUCLC   0001000
#define CR2     0002000
#define CR3     0003000
#define CRDLY   0003000
#define TAB1    0004000
#define TAB2    0010000
#define TAB3    0014000
#define TABDLY  0014000
#define BS1     0020000
#define BSDLY   0020000
```

```
#define VT1     0040000
#define VTDLY   0040000
#define FF1     0100000
#define FFDLY   0100000

#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    0002000
#define IXOFF   0010000

#define CS6     0000020
#define CS7     0000040
#define CS8     0000060
#define CSIZE   0000060
#define CSTOPB  0000100
#define CREAD   0000200
#define PARENB  0000400
#define PARODD  0001000
#define HUPCL   0002000
#define CLOCAL  0004000
#define VTIME   5

#define ISIG    0000001
#define ICANON  0000002
#define ECHOE   0000020
#define ECHOK   0000040
#define ECHONL  0000100
#define NOFLSH  0000200
#define TOSTOP  0000400
#define ECHOCTL 0001000
#define ECHOPRT 0002000
#define ECHOKE  0004000
#define FLUSHO  0010000
#define PENDIN  0040000
#define IEXTEN  0100000

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 char *ctime_r(const time_t *, char *);
extern double difftime(time_t, time_t);
extern struct tm *getdate(const char *);
extern int getdate_err(void);
extern struct tm *gmtime(const time_t *);
extern struct tm *localtime(const time_t *);
extern time_t mktime(struct tm *);
extern int stime(const time_t *);
extern size_t strftime(char *, size_t, const char *, const struct tm *);
extern char *strptime(const char *, const char *, struct tm *);
extern time_t time(time_t *);
extern int nanosleep(const struct timespec *, struct timespec *);
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   36

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

```

typedef int intptr_t;

extern char **__environ(void);
extern pid_t __getpgid(pid_t);
extern void _exit(int);
extern int acct(const char *);
extern unsigned int alarm(unsigned int);
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 char *optarg(void);
extern int opterr(void);
extern int optind(void);
extern int optopt(void);
extern int rename(const char *, const char *);
extern int setegid(gid_t);
extern int seteuid(uid_t);
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 *);
extern int access(const char *, int);
extern int brk(void *);
extern int chdir(const char *);
extern int dup(int);
extern int dup2(int, int);
extern int execve(const char *, char *const, char *const);
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 *);
extern pid_t vfork(void);
extern ssize_t pread(int, void *, size_t, off_t);
extern ssize_t pwrite(int, const void *, size_t, off_t);
extern char **_environ(void);
extern long int fpathconf(int, int);
extern int ftruncate(int, off_t);
extern char *getcwd(char *, size_t);
extern int getpagesize(void);
extern pid_t getppid(void);
extern int isatty(int);
extern loff_t lseek64(int, loff_t, int);
extern int open64(const char *, int, ...);
extern ssize_t pread64(int, void *, size_t, off64_t);
extern ssize_t pwrite64(int, const void *, size_t, off64_t);
extern int ttyname_r(int, char *, size_t);
```

11.3.75 utime.h

```

extern int utime(const char *, const struct utimbuf *);
```

11.3.76 utmp.h

```

struct lastlog {
    time_t ll_time;
    char ll_line[UT_LINESIZE];
    char ll_host[UT_HOSTSIZE];
};

struct utmp {
    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 endutent(void);
extern struct utmp *getutent(void);
extern void setutent(void);
extern int getutent_r(struct utmp *, struct utmp **);
extern int utmpname(const char *);
extern int login_tty(int);
extern void login(const struct utmp *);
extern int logout(const char *);
extern void logwtmp(const char *, const char *, const char *);
```

11.3.77 utmpx.h

```

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 wcscmp(const wchar_t *, const wchar_t *);
extern int wcscoll(const wchar_t *, const wchar_t *);
extern wchar_t *wcscpy(wchar_t *, const wchar_t *);
extern size_t wcscspn(const wchar_t *, const wchar_t *);
extern wchar_t *wcsdup(const wchar_t *);
extern wchar_t *wcsncat(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 *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 int wcswidth(const wchar_t *, size_t);
extern size_t wcsxfrm(wchar_t *, const wchar_t *, size_t);
extern int wctob(wint_t);
extern int wcwidth(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 *wmemcpy(wchar_t *, const wchar_t *, size_t);
extern wchar_t *wmemmove(wchar_t *, const wchar_t *, size_t);
extern wchar_t *wmemset(wchar_t *, wchar_t, size_t);
extern size_t mbrlen(const char *, size_t, mbstate_t *);
extern size_t mbrtowc(wchar_t *, const char *, size_t, mbstate_t *);
extern int mbsinit(const mbstate_t *);
extern size_t mbsnrtowcs(wchar_t *, const char **, size_t, size_t,
                         mbstate_t *);
extern size_t mbsrtowcs(wchar_t *, const char **, size_t, mbstate_t *);
extern wchar_t *wcpcpy(wchar_t *, const wchar_t *);
extern wchar_t *wcpncpy(wchar_t *, const wchar_t *, size_t);
extern size_t wcrtomb(char *, wchar_t, mbstate_t *);
extern size_t wcslen(const wchar_t *);
extern size_t wcsnrtombs(char *, const wchar_t * *, size_t, size_t,
                         mbstate_t *);
extern size_t wcsrtombs(char *, const wchar_t * *, size_t, mbstate_t *);
extern double wcstod(const wchar_t *, wchar_t * *);
extern float wcstof(const wchar_t *, wchar_t * *);
extern long int wcstol(const wchar_t *, wchar_t * *, int);
extern long double wcstold(const wchar_t *, wchar_t * *);
extern long long int wcstoq(const wchar_t *, wchar_t * *, int);
extern unsigned long int wcstoul(const wchar_t *, wchar_t * *, int);
extern unsigned long long int wcstouq(const wchar_t *, wchar_t * *, int);
extern wchar_t *wcswcs(const wchar_t *, const wchar_t *);
extern int wcscasecmp(const wchar_t *, const wchar_t *);
extern int wcsncasecmp(const wchar_t *, const wchar_t *, size_t);
extern size_t wcsnlen(const wchar_t *, size_t);
extern long long int wcstoll(const wchar_t *, wchar_t * *, int);
extern unsigned long long int wcstoull(const wchar_t *, wchar_t * *, int);
extern wint_t btowc(int);
extern wint_t fgetwc(FILE *);
extern wint_t fgetwc_unlocked(FILE *);
extern wchar_t *fgetws(wchar_t *, int, FILE *);
extern wint_t fputwc(wchar_t, FILE *);
extern int fputws(const wchar_t *, FILE *);
extern int fwide(FILE *, int);
extern int fwprintf(FILE *, const wchar_t *, ...);
extern int fwscanf(FILE *, const wchar_t *, ...);
extern wint_t getwc(FILE *);
extern wint_t getwchar(void);
extern wint_t putwc(wchar_t, FILE *);
extern wint_t putwchar(wchar_t);
extern int swprintf(wchar_t *, size_t, const wchar_t *, ...);
extern int swscanf(const wchar_t *, const wchar_t *, ...);
extern wint_t ungetwc(wint_t, FILE *);
extern int vfwprintf(FILE *, const wchar_t *, va_list);
extern int vfwscanf(FILE *, const wchar_t *, va_list);
extern int vswprintf(wchar_t *, size_t, const wchar_t *, va_list);
extern int vswscanf(const wchar_t *, const wchar_t *, va_list);
extern int vwprintf(const wchar_t *, va_list);
extern int vwscanf(const wchar_t *, va_list);
extern size_t wcsftime(wchar_t *, size_t, const wchar_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 11-24 libm Definition

Library:	libm
SONAME:	libm.so.6

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

[ISOC99] ISO C (1999)
[LSB] This Specification
[SUSv2] SUSv2
[SUSv3] ISO POSIX (2003)

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

__finite(GLIBC_2.1) [ISOC99]	__finitef(GLIBC_2.1) [ISOC99]	__finitel(GLIBC_2.1) [ISOC99]	__fpclassify(GLIBC_2.1) [LSB]
__fpclassifyf(GLIBC_2.1) [LSB]	acos(GLIBC_2.0) [SUSv3]	acosf(GLIBC_2.0) [SUSv3]	acosh(GLIBC_2.0) [SUSv3]
acoshf(GLIBC_2.0) [SUSv3]	acoshl(GLIBC_2.0) [SUSv3]	acosl(GLIBC_2.0) [SUSv3]	asin(GLIBC_2.0) [SUSv3]
asinf(GLIBC_2.0) [SUSv3]	asinh(GLIBC_2.0) [SUSv3]	asinhf(GLIBC_2.0) [SUSv3]	asinhl(GLIBC_2.0) [SUSv3]
asinl(GLIBC_2.0) [SUSv3]	atan(GLIBC_2.0) [SUSv3]	atan2(GLIBC_2.0) [SUSv3]	atan2f(GLIBC_2.0) [SUSv3]
atan2l(GLIBC_2.0) [SUSv3]	atanf(GLIBC_2.0) [SUSv3]	atanh(GLIBC_2.0) [SUSv3]	atanhf(GLIBC_2.0) [SUSv3]
atanhl(GLIBC_2.0) [SUSv3]	atanl(GLIBC_2.0) [SUSv3]	cabs(GLIBC_2.1) [SUSv3]	cabsf(GLIBC_2.1) [SUSv3]
cabsl(GLIBC_2.1) [SUSv3]	cacos(GLIBC_2.1) [SUSv3]	cacosf(GLIBC_2.1) [SUSv3]	cacosh(GLIBC_2.1) [SUSv3]
cacoshf(GLIBC_2.1) [SUSv3]	cacoshl(GLIBC_2.1) [SUSv3]	cacosl(GLIBC_2.1) [SUSv3]	carg(GLIBC_2.1) [SUSv3]
cargf(GLIBC_2.1) [SUSv3]	cargl(GLIBC_2.1) [SUSv3]	casin(GLIBC_2.1) [SUSv3]	casinf(GLIBC_2.1) [SUSv3]
casinh(GLIBC_2.1) [SUSv3]	casinhf(GLIBC_2.1) [SUSv3]	casinhl(GLIBC_2.1) [SUSv3]	casinl(GLIBC_2.1) [SUSv3]
catan(GLIBC_2.1) [SUSv3]	catanf(GLIBC_2.1) [SUSv3]	catanh(GLIBC_2.1) [SUSv3]	catanhf(GLIBC_2.1) [SUSv3]
catanhl(GLIBC_2.1) [SUSv3]	catanl(GLIBC_2.1) [SUSv3]	cbrt(GLIBC_2.0) [SUSv3]	cbrtf(GLIBC_2.0) [SUSv3]
cbrtl(GLIBC_2.0) [SUSv3]	ccos(GLIBC_2.1) [SUSv3]	ccosf(GLIBC_2.1) [SUSv3]	ccosh(GLIBC_2.1) [SUSv3]
ccoshf(GLIBC_2.1	ccoshl(GLIBC_2.1)	ccosl(GLIBC_2.1)	ceil(GLIBC_2.0)

) [SUSv3]	[SUSv3]	[SUSv3]	[SUSv3]
ceilf(GLIBC_2.0) [SUSv3]	ceill(GLIBC_2.0) [SUSv3]	cexp(GLIBC_2.1) [SUSv3]	cexpf(GLIBC_2.1) [SUSv3]
cexpl(GLIBC_2.1) [SUSv3]	cimag(GLIBC_2.1) [SUSv3]	cimagf(GLIBC_2.1) [SUSv3]	cimagl(GLIBC_2.1) [SUSv3]
clog(GLIBC_2.1) [SUSv3]	clog10(GLIBC_2.1) [ISOC99]	clog10f(GLIBC_2. 1) [ISOC99]	clog10l(GLIBC_2. 1) [ISOC99]
clogf(GLIBC_2.1) [SUSv3]	clogl(GLIBC_2.1) [SUSv3]	conj(GLIBC_2.1) [SUSv3]	conjf(GLIBC_2.1) [SUSv3]
conjl(GLIBC_2.1) [SUSv3]	copysign(GLIBC_ 2.0) [SUSv3]	copysignf(GLIBC_ 2.0) [SUSv3]	copysignl(GLIBC_ 2.0) [SUSv3]
cos(GLIBC_2.0) [SUSv3]	cosf(GLIBC_2.0) [SUSv3]	cosh(GLIBC_2.0) [SUSv3]	coshf(GLIBC_2.0) [SUSv3]
coshl(GLIBC_2.0) [SUSv3]	cosl(GLIBC_2.0) [SUSv3]	cpow(GLIBC_2.1) [SUSv3]	cpowf(GLIBC_2.1) [SUSv3]
cpowl(GLIBC_2.1) [SUSv3]	cproj(GLIBC_2.1) [SUSv3]	cprojf(GLIBC_2.1) [SUSv3]	cprojl(GLIBC_2.1) [SUSv3]
creal(GLIBC_2.1) [SUSv3]	crealf(GLIBC_2.1) [SUSv3]	creall(GLIBC_2.1) [SUSv3]	csin(GLIBC_2.1) [SUSv3]
csinf(GLIBC_2.1) [SUSv3]	csinh(GLIBC_2.1) [SUSv3]	csinhf(GLIBC_2.1) [SUSv3]	csinhl(GLIBC_2.1) [SUSv3]
csinl(GLIBC_2.1) [SUSv3]	csqrt(GLIBC_2.1) [SUSv3]	csqrtf(GLIBC_2.1) [SUSv3]	csqrtl(GLIBC_2.1) [SUSv3]
ctan(GLIBC_2.1) [SUSv3]	ctanf(GLIBC_2.1) [SUSv3]	ctanh(GLIBC_2.1) [SUSv3]	ctanhf(GLIBC_2.1) [SUSv3]
ctanhl(GLIBC_2.1) [SUSv3]	ctanl(GLIBC_2.1) [SUSv3]	dremf(GLIBC_2.0) [ISOC99]	dreml(GLIBC_2.0) [ISOC99]
erf(GLIBC_2.0) [SUSv3]	erfc(GLIBC_2.0) [SUSv3]	erfcf(GLIBC_2.0) [SUSv3]	erfcl(GLIBC_2.0) [SUSv3]
erff(GLIBC_2.0) [SUSv3]	erfl(GLIBC_2.0) [SUSv3]	exp(GLIBC_2.0) [SUSv3]	exp2(GLIBC_2.1) [SUSv3]
exp2f(GLIBC_2.1) [SUSv3]	expf(GLIBC_2.0) [SUSv3]	expl(GLIBC_2.0) [SUSv3]	expm1(GLIBC_2.0) [SUSv3]
expm1f(GLIBC_2. 0) [SUSv3]	expm1l(GLIBC_2. 0) [SUSv3]	fabs(GLIBC_2.0) [SUSv3]	fabsf(GLIBC_2.0) [SUSv3]
fabsl(GLIBC_2.0) [SUSv3]	fdim(GLIBC_2.1) [SUSv3]	fdimf(GLIBC_2.1) [SUSv3]	fdiml(GLIBC_2.1) [SUSv3]
feclearexcept(GLI BC_2.1) [SUSv3]	fegetenv(GLIBC_2 .1) [SUSv3]	fegetexceptflag(G LIBC_2.1) [SUSv3]	fegetround(GLIB C_2.1) [SUSv3]
feholdexcept(GLI BC_2.1) [SUSv3]	feraiseexcept(GLI BC_2.1) [SUSv3]	fesetenv(GLIBC_2 .1) [SUSv3]	fesetexceptflag(G LIBC_2.1) [SUSv3]

fesetround(GLIBC_2.1) [SUSv3]	fetestexcept(GLIBC_2.1) [SUSv3]	feupdateenv(GLIBC_2.1) [SUSv3]	finite(GLIBC_2.0) [SUSv2]
finitef(GLIBC_2.0) [ISOC99]	finitel(GLIBC_2.0) [ISOC99]	floor(GLIBC_2.0) [SUSv3]	floorf(GLIBC_2.0) [SUSv3]
floorl(GLIBC_2.0) [SUSv3]	fma(GLIBC_2.1) [SUSv3]	fmaf(GLIBC_2.1) [SUSv3]	fmal(GLIBC_2.1) [SUSv3]
fmax(GLIBC_2.1) [SUSv3]	fmaxf(GLIBC_2.1) [SUSv3]	fmaxl(GLIBC_2.1) [SUSv3]	fmin(GLIBC_2.1) [SUSv3]
fminf(GLIBC_2.1) [SUSv3]	fminl(GLIBC_2.1) [SUSv3]	fmod(GLIBC_2.0) [SUSv3]	fmodf(GLIBC_2.0) [SUSv3]
fmodl(GLIBC_2.0) [SUSv3]	frexp(GLIBC_2.0) [SUSv3]	frexpf(GLIBC_2.0) [SUSv3]	frexpl(GLIBC_2.0) [SUSv3]
gamma(GLIBC_2.0) [SUSv2]	gammaf(GLIBC_2.0) [ISOC99]	gammal(GLIBC_2.0) [ISOC99]	hypot(GLIBC_2.0) [SUSv3]
hypotf(GLIBC_2.0) [SUSv3]	hypotl(GLIBC_2.0) [SUSv3]	ilogb(GLIBC_2.0) [SUSv3]	ilogbf(GLIBC_2.0) [SUSv3]
ilogbl(GLIBC_2.0) [SUSv3]	j0(GLIBC_2.0) [SUSv3]	j0f(GLIBC_2.0) [ISOC99]	j0l(GLIBC_2.0) [ISOC99]
j1(GLIBC_2.0) [SUSv3]	j1f(GLIBC_2.0) [ISOC99]	j1l(GLIBC_2.0) [ISOC99]	jn(GLIBC_2.0) [SUSv3]
jnf(GLIBC_2.0) [ISOC99]	jnl(GLIBC_2.0) [ISOC99]	ldexp(GLIBC_2.0) [SUSv3]	ldexpf(GLIBC_2.0) [SUSv3]
ldexpl(GLIBC_2.0) [SUSv3]	lgamma(GLIBC_2.0) [SUSv3]	lgamma_r(GLIBC_2.0) [ISOC99]	lgammaf(GLIBC_2.0) [SUSv3]
lgammaf_r(GLIBC_2.0) [ISOC99]	lgammal(GLIBC_2.0) [SUSv3]	lgammal_r(GLIBC_2.0) [ISOC99]	llrint(GLIBC_2.1) [SUSv3]
llrintf(GLIBC_2.1) [SUSv3]	llrintl(GLIBC_2.1) [SUSv3]	llround(GLIBC_2.1) [SUSv3]	llroundf(GLIBC_2.1) [SUSv3]
llroundl(GLIBC_2.1) [SUSv3]	log(GLIBC_2.0) [SUSv3]	log10(GLIBC_2.0) [SUSv3]	log10f(GLIBC_2.0) [SUSv3]
log10l(GLIBC_2.0) [SUSv3]	log1p(GLIBC_2.0) [SUSv3]	log1pf(GLIBC_2.0) [SUSv3]	log1pl(GLIBC_2.0) [SUSv3]
log2(GLIBC_2.1) [SUSv3]	log2f(GLIBC_2.1) [SUSv3]	log2l(GLIBC_2.1) [SUSv3]	logb(GLIBC_2.0) [SUSv3]
logbf(GLIBC_2.0) [SUSv3]	logbl(GLIBC_2.0) [SUSv3]	logf(GLIBC_2.0) [SUSv3]	logl(GLIBC_2.0) [SUSv3]
lrint(GLIBC_2.1) [SUSv3]	lrintf(GLIBC_2.1) [SUSv3]	lrintl(GLIBC_2.1) [SUSv3]	lround(GLIBC_2.1) [SUSv3]
lroundf(GLIBC_2.1) [SUSv3]	lroundl(GLIBC_2.1) [SUSv3]	matherr(GLIBC_2.0) [ISOC99]	modf(GLIBC_2.0) [SUSv3]
modff(GLIBC_2.0)	modfl(GLIBC_2.0)	nan(GLIBC_2.1)	nanf(GLIBC_2.1)

[SUSv3]	[SUSv3]	[SUSv3]	[SUSv3]
nanl(GLIBC_2.1) [SUSv3]	nearbyint(GLIBC_2.1) [SUSv3]	nearbyintf(GLIBC_2.1) [SUSv3]	nearbyintl(GLIBC_2.1) [SUSv3]
nextafter(GLIBC_2.0) [SUSv3]	nextafterf(GLIBC_2.0) [SUSv3]	nextafterl(GLIBC_2.0) [SUSv3]	nexttoward(GLIBC_2.1) [SUSv3]
nexttowardf(GLIBC_2.1) [SUSv3]	nexttowardl(GLIBC_2.1) [SUSv3]	pow(GLIBC_2.0) [SUSv3]	pow10(GLIBC_2.1) [ISOC99]
pow10f(GLIBC_2.1) [ISOC99]	pow10l(GLIBC_2.1) [ISOC99]	powf(GLIBC_2.0) [SUSv3]	powl(GLIBC_2.0) [SUSv3]
remainder(GLIBC_2.0) [SUSv3]	remainderf(GLIBC_2.0) [SUSv3]	remainderl(GLIBC_2.0) [SUSv3]	remquo(GLIBC_2.1) [SUSv3]
remquof(GLIBC_2.1) [SUSv3]	remquol(GLIBC_2.1) [SUSv3]	rint(GLIBC_2.0) [SUSv3]	rintf(GLIBC_2.0) [SUSv3]
rintl(GLIBC_2.0) [SUSv3]	round(GLIBC_2.1) [SUSv3]	roundf(GLIBC_2.1) [SUSv3]	roundl(GLIBC_2.1) [SUSv3]
scalb(GLIBC_2.0) [SUSv3]	scalbf(GLIBC_2.0) [ISOC99]	scalbl(GLIBC_2.0) [ISOC99]	scalbln(GLIBC_2.1) [SUSv3]
scalblnf(GLIBC_2.1) [SUSv3]	scalblnl(GLIBC_2.1) [SUSv3]	scalbn(GLIBC_2.0) [SUSv3]	scalbnf(GLIBC_2.0) [SUSv3]
scalbnl(GLIBC_2.0) [SUSv3]	significand(GLIBC_2.0) [ISOC99]	significandf(GLIBC_2.0) [ISOC99]	significandl(GLIBC_2.0) [ISOC99]
sin(GLIBC_2.0) [SUSv3]	sincos(GLIBC_2.1) [ISOC99]	sincosf(GLIBC_2.1) [ISOC99]	sincosl(GLIBC_2.1) [ISOC99]
sinf(GLIBC_2.0) [SUSv3]	sinh(GLIBC_2.0) [SUSv3]	sinhf(GLIBC_2.0) [SUSv3]	sinhl(GLIBC_2.0) [SUSv3]
sinl(GLIBC_2.0) [SUSv3]	sqrt(GLIBC_2.0) [SUSv3]	sqrtf(GLIBC_2.0) [SUSv3]	sqrtl(GLIBC_2.0) [SUSv3]
tan(GLIBC_2.0) [SUSv3]	tanf(GLIBC_2.0) [SUSv3]	tanh(GLIBC_2.0) [SUSv3]	tanhf(GLIBC_2.0) [SUSv3]
tanhl(GLIBC_2.0) [SUSv3]	tanl(GLIBC_2.0) [SUSv3]	tgamma(GLIBC_2.1) [SUSv3]	tgammaf(GLIBC_2.1) [SUSv3]
tgammal(GLIBC_2.1) [SUSv3]	trunc(GLIBC_2.1) [SUSv3]	truncf(GLIBC_2.1) [SUSv3]	truncl(GLIBC_2.1) [SUSv3]
y0(GLIBC_2.0) [SUSv3]	y0f(GLIBC_2.0) [ISOC99]	y0l(GLIBC_2.0) [ISOC99]	y1(GLIBC_2.0) [SUSv3]
y1f(GLIBC_2.0) [ISOC99]	y1l(GLIBC_2.0) [ISOC99]	yn(GLIBC_2.0) [SUSv3]	ynf(GLIBC_2.0) [ISOC99]
ynl(GLIBC_2.0) [ISOC99]			

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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.

Table 11-26 libm - Math Data Interfaces

signgam(GLIBC_2.0) [SUSv3]			

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 long double complex casinhl(long double complex);
extern long 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 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 clogl(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 creal(double complex);
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 csinhf(float complex);
extern long double 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)

extern int feclearexcept(int);
extern int fegetenv(fenv_t *);
extern int fegetexceptflag(fexcept_t *, int);
extern int fegetround(void);
extern int feholdexcept(fenv_t *);
extern int feraiseexcept(int);
extern int fesetenv(const fenv_t *);
extern int fesetexceptflag(const fexcept_t *, int);
extern int fesetround(int);
extern int fetestexcept(int);
extern int feupdateenv(const fenv_t *);
```

11.5.3 math.h

```

#define fpclassify(x)   \
        (sizeof (x) == sizeof (float) ? __fpclassifyf (x) : __fpclassify
(x) )
#define signbit(x)      \
        (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 __isinfl(long double);
extern int __isnan(double);
extern int __isnanf(float);
extern int __isnanl(long double);
extern int __signbit(double);
extern int __signbitf(float);
extern int __fpclassify(double);
extern int __fpclassifyf(float);
extern int __fpclassifyl(long double);
extern int signgam(void);
extern double copysign(double, double);
extern int finite(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 double yn(int, double);
            extern float copysignf(float, float);
            extern long double copysignl(long double, long double);
            extern int finitef(float);
            extern int finitel(long double);
            extern float frexpf(float, int *);
            extern long double frexpl(long double, int *);
            extern float ldexpf(float, int);
            extern long double ldexpl(long double, int);
            extern float modff(float, float *);
            extern long double modfl(long double, long double *);
            extern double scalbln(double, long int);
            extern float scalblnf(float, long int);
            extern long double scalblnl(long double, long int);
            extern double scalbn(double, int);
            extern float scalbnf(float, int);
            extern long double scalbnl(long double, int);
            extern float acosf(float);
            extern float acoshf(float);
            extern long double acoshl(long double);
            extern long double acosl(long double);
            extern float asinf(float);
            extern float asinhf(float);
            extern long double asinhl(long double);
            extern long double asinl(long double);
            extern float atan2f(float, float);
            extern long double atan2l(long double, long double);
            extern float atanf(float);
            extern float atanhf(float);
            extern long double atanhl(long double);
            extern long double atanl(long double);
            extern float cbrtf(float);
            extern long double cbrtl(long double);
            extern float ceilf(float);
            extern long double ceill(long double);
            extern float cosf(float);
            extern float coshf(float);
            extern long double coshl(long double);
            extern long double cosl(long double);
```

```
        extern float dremf(float, float);
        extern long double dreml(long double, long double);
        extern float erfcf(float);
        extern long double erfcl(long double);
        extern float erff(float);
        extern long double erfl(long double);
        extern double exp2(double);
        extern float exp2f(float);
        extern long double exp2l(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 double fdim(double, double);
        extern float fdimf(float, float);
        extern long double fdiml(long double, long double);
        extern float floorf(float);
        extern long double floorl(long double);
        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 jnf(int, float);
        extern long double jnl(int, long double);
        extern double lgamma_r(double, int *);
        extern float lgammaf(float);
        extern float lgammaf_r(float, int *);
        extern long double lgammal(long double);
        extern long double lgammal_r(long double, int *);
        extern long long int llrint(double);
        extern long long int llrintf(float);
        extern long long int llrintl(long double);
        extern long long int llround(double);
        extern long long int llroundf(float);
        extern long long int llroundl(long double);
        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 long int lround(double);
            extern long int lroundf(float);
            extern long int lroundl(long double);
            extern int matherr(struct exception *);
            extern double nan(const char *);
            extern float nanf(const char *);
            extern long double nanl(const char *);
            extern double nearbyint(double);
            extern float nearbyintf(float);
            extern long double nearbyintl(long double);
            extern float nextafterf(float, float);
            extern long double nextafterl(long double, long double);
            extern double nexttoward(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);
            extern long double powl(long double, long double);
            extern float remainderf(float, float);
            extern long double remainderl(long double, long double);
            extern double remquo(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 sincosf(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 truncl(long double);
            extern float y0f(float);
            extern long double y0l(long double);
            extern float y1f(float);
            extern long double y1l(long double);
            extern float ynf(int, float);
            extern long double ynl(int, long double);
```

```
extern int __fpclassifyl(long double);
extern int __fpclassifyl(long double);
extern int __signbitl(long double);
extern int __signbitl(long double);
extern int __signbitl(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 11-27 libpthread Definition

Library:	libpthread
SONAME:	libpthread.so.0

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

[LFS] Large File Support
[LSB] This Specification
[SUSv3] ISO POSIX (2003)

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

pthread_attr_getinheritsched(GLIBC_2.0) [SUSv3]	pthread_attr_getschedpolicy(GLIBC_2.0) [SUSv3]	pthread_attr_getscope(GLIBC_2.0) [SUSv3]	pthread_attr_setinheritsched(GLIBC_2.0) [SUSv3]
pthread_attr_setschedpolicy(GLIBC_2.0) [SUSv3]	pthread_attr_setscope(GLIBC_2.0) [SUSv3]	pthread_getschedparam(GLIBC_2.0) [SUSv3]	pthread_setschedparam(GLIBC_2.0) [SUSv3]

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.

1865 **Table 11-29 libpthread - Posix Threads Function Interfaces**

_pthread_cleanup_pop(GLIBC_2.0) [LSB]	_pthread_cleanup_push(GLIBC_2.0) [LSB]	pthread_attr_destroy(GLIBC_2.0) [SUSv3]	pthread_attr_getdetachstate(GLIBC_2.0) [SUSv3]
pthread_attr_getguardsize(GLIBC_2.1) [SUSv3]	pthread_attr_getschedparam(GLIBC_2.0) [SUSv3]	pthread_attr_getstack(GLIBC_2.2) [SUSv3]	pthread_attr_getstackaddr(GLIBC_2.1) [SUSv3]
pthread_attr_getstacksize(GLIBC_2.1) [SUSv3]	pthread_attr_init(GLIBC_2.1) [SUSv3]	pthread_attr_setdetachstate(GLIBC_2.0) [SUSv3]	pthread_attr_setguardsize(GLIBC_2.1) [SUSv3]
pthread_attr_setschedparam(GLIBC_2.0) [SUSv3]	pthread_attr_setstackaddr(GLIBC_2.1) [SUSv3]	pthread_attr_setstacksize(GLIBC_2.1) [SUSv3]	pthread_cancel(GLIBC_2.0) [SUSv3]
pthread_cond_broadcast(GLIBC_2.3.2) [SUSv3]	pthread_cond_destroy(GLIBC_2.3.2) [SUSv3]	pthread_cond_init(GLIBC_2.3.2) [SUSv3]	pthread_cond_signal(GLIBC_2.3.2) [SUSv3]
pthread_cond_timedwait(GLIBC_2.3.2) [SUSv3]	pthread_cond_wait(GLIBC_2.3.2) [SUSv3]	pthread_condattr_destroy(GLIBC_2.0) [SUSv3]	pthread_condattr_getpshared(GLIBC_2.2) [SUSv3]
pthread_condattr_init(GLIBC_2.0) [SUSv3]	pthread_condattr_setpshared(GLIBC_2.2) [SUSv3]	pthread_create(GLIBC_2.1) [SUSv3]	pthread_detach(GLIBC_2.0) [SUSv3]
pthread_equal(GLIBC_2.0) [SUSv3]	pthread_exit(GLIBC_2.0) [SUSv3]	pthread_getconcurrency(GLIBC_2.1) [SUSv3]	pthread_getspecific(GLIBC_2.0) [SUSv3]
pthread_join(GLIBC_2.0) [SUSv3]	pthread_key_create(GLIBC_2.0) [SUSv3]	pthread_key_delete(GLIBC_2.0) [SUSv3]	pthread_kill(GLIBC_2.0) [SUSv3]
pthread_mutex_destroy(GLIBC_2.0) [SUSv3]	pthread_mutex_init(GLIBC_2.0) [SUSv3]	pthread_mutex_lock(GLIBC_2.0) [SUSv3]	pthread_mutex_trylock(GLIBC_2.0) [SUSv3]
pthread_mutex_unlock(GLIBC_2.0) [SUSv3]	pthread_mutexattr_destroy(GLIBC_2.0) [SUSv3]	pthread_mutexattr_getpshared(GLIBC_2.2) [SUSv3]	pthread_mutexattr_gettype(GLIBC_2.1) [SUSv3]
pthread_mutexattr_init(GLIBC_2.0) [SUSv3]	pthread_mutexattr_setpshared(GLIBC_2.2) [SUSv3]	pthread_mutexattr_settype(GLIBC_2.1) [SUSv3]	pthread_once(GLIBC_2.0) [SUSv3]
pthread_rwlock_destroy(GLIBC_2.1) [SUSv3]	pthread_rwlock_init(GLIBC_2.1) [SUSv3]	pthread_rwlock_rdlock(GLIBC_2.1) [SUSv3]	pthread_rwlock_timedrdlock(GLIBC_2.2) [SUSv3]
pthread_rwlock_timedwrlock(GLIBC_2.2) [SUSv3]	pthread_rwlock_tryrdlock(GLIBC_2.1) [SUSv3]	pthread_rwlock_trywrlock(GLIBC_2.1) [SUSv3]	pthread_rwlock_unlock(GLIBC_2.1) [SUSv3]
pthread_rwlock_	pthread_rwlockat	pthread_rwlockat	pthread_rwlockat

wrlock(GLIBC_2.1) [SUSv3]	tr_destroy(GLIBC_2.1) [SUSv3]	tr_getpshared(GLIBC_2.1) [SUSv3]	tr_init(GLIBC_2.1) [SUSv3]
pthread_rwlockattr_setpshared(GLIBC_2.1) [SUSv3]	pthread_self(GLIBC_2.0) [SUSv3]	pthread_setcancelstate(GLIBC_2.0) [SUSv3]	pthread_setcanceltype(GLIBC_2.0) [SUSv3]
pthread_setconcurrency(GLIBC_2.1) [SUSv3]	pthread_setspecific(GLIBC_2.0) [SUSv3]	pthread_sigmask(GLIBC_2.0) [SUSv3]	pthread_testcancel(GLIBC_2.0) [SUSv3]
sem_close(GLIBC_2.1.1) [SUSv3]	sem_destroy(GLIBC_2.1) [SUSv3]	sem_getvalue(GLIBC_2.1) [SUSv3]	sem_init(GLIBC_2.1) [SUSv3]
sem_open(GLIBC_2.1.1) [SUSv3]	sem_post(GLIBC_2.1) [SUSv3]	sem_timedwait(GLIBC_2.2) [SUSv3]	sem_trywait(GLIBC_2.1) [SUSv3]
sem_unlink(GLIBC_2.1.1) [SUSv3]	sem_wait(GLIBC_2.1) [SUSv3]		

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 11-30 libpthread - Thread aware versions of libc interfaces Function Interfaces

lseek64(GLIBC_2.2) [LFS]	open64(GLIBC_2.2) [LFS]	pread(GLIBC_2.2) [SUSv3]	pread64(GLIBC_2.2) [LFS]
pwrite(GLIBC_2.2) [SUSv3]	pwrite64(GLIBC_2.2) [LFS]		

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

```

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
__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_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 *, struct
sched_param {
                                      int sched_priority;}

                                      *);
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_setscope(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;}

                             pthread_condattr_t *);
extern int pthread_cond_signal(pthread_cond_t *);
extern int pthread_cond_timedwait(pthread_cond_t *, pthread_mutex_t *,
const struct timespec {
                                  time_t tv_sec; long int tv_nsec;}

                                  *);
extern int pthread_cond_wait(pthread_cond_t *, pthread_mutex_t *);
extern int pthread_condattr_destroy(pthread_condattr_t *);
extern int pthread_condattr_init(pthread_condattr_t *);
extern int pthread_create(pthread_t *, 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 *,
                          void *(*__start_routine) (void *p1)
                          , void *);
extern int pthread_detach(typedef unsigned long int pthread_t);
extern int pthread_equal(typedef unsigned long int pthread_t,
                         typedef unsigned long int pthread_t);
extern void pthread_exit(void *);
extern int pthread_getschedparam(typedef unsigned long int pthread_t,
                                 int *, struct sched_param {
                                 int sched_priority;}

                                 *);
extern void *pthread_getspecific(typedef unsigned int pthread_key_t);
extern int pthread_join(typedef unsigned long int pthread_t, void **);
extern int pthread_key_create(pthread_key_t *, void (*destr_func) (void
*)
    );
extern int pthread_key_delete(typedef unsigned int pthread_key_t);
extern int pthread_mutex_destroy(pthread_mutex_t *);
extern int pthread_mutex_init(pthread_mutex_t *, const typedef struct
{
                              int __mutexkind;}

                              pthread_mutexattr_t *);
extern int pthread_mutex_lock(pthread_mutex_t *);
extern int pthread_mutex_trylock(pthread_mutex_t *);
extern int pthread_mutex_unlock(pthread_mutex_t *);
extern int pthread_mutexattr_destroy(pthread_mutexattr_t *);
extern int pthread_mutexattr_init(pthread_mutexattr_t *);
extern int pthread_once(pthread_once_t *, void (*init_routine) (void)
    );
extern int pthread_rwlock_destroy(pthread_rwlock_t *);
extern int pthread_rwlock_init(pthread_rwlock_t *,
pthread_rwlockattr_t *);
extern int pthread_rwlock_rdlock(pthread_rwlock_t *);
extern int pthread_rwlock_tryrdlock(pthread_rwlock_t *);
extern int pthread_rwlock_trywrlock(pthread_rwlock_t *);
extern int pthread_rwlock_unlock(pthread_rwlock_t *);
extern int pthread_rwlock_wrlock(pthread_rwlock_t *);
extern int pthread_rwlockattr_destroy(pthread_rwlockattr_t *);
extern int pthread_rwlockattr_getpshared(const typedef struct {
                                         int __lockkind; int
__pshared;}
                                         pthread_rwlockattr_t *, int
*);
extern int pthread_rwlockattr_init(pthread_rwlockattr_t *);
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(typedef unsigned long int pthread_t,
int, const struct sched_param {
                                 int sched_priority;}

                                 *);
extern int pthread_setspecific(typedef unsigned int pthread_key_t,
                               const void *);
extern void pthread_testcancel(void);
extern int pthread_attr_getguardsize(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 *, size_t *);
extern int pthread_attr_setguardsize(pthread_attr_t *,
                                     typedef unsigned long int
size_t);
extern int pthread_attr_setstackaddr(pthread_attr_t *, void *);
extern int pthread_attr_getstackaddr(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 *, void **);
extern int pthread_attr_setstacksize(pthread_attr_t *,
                                    typedef unsigned long int
size_t);
extern int pthread_attr_getstacksize(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 *, size_t *);
extern int pthread_mutexattr_gettype(const typedef struct {
                                    int __mutexkind;}
                                    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 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 *, void **, size_t *);
extern int pthread_attr_setstack(pthread_attr_t *, void *,
                                typedef unsigned long int size_t);
extern int pthread_condattr_getpshared(const typedef struct {
                                      int __dummy;}
                                      pthread_condattr_t *, int *);
extern int pthread_condattr_setpshared(pthread_condattr_t *, int);
extern int pthread_mutexattr_getpshared(const typedef struct {
                                       int __mutexkind;}
                                       pthread_mutexattr_t *, int *);
extern int pthread_mutexattr_setpshared(pthread_mutexattr_t *, int);
extern int pthread_rwlock_timedrdlock(pthread_rwlock_t *, const struct
timespec {
                                     time_t tv_sec; long int
tv_nsec;}

                                     *);
extern int pthread_rwlock_timedwrlock(pthread_rwlock_t *, const struct
timespec {
                                     time_t tv_sec; long int
tv_nsec;}

                                     *);
extern int __register_atfork(void (*prepare) (void)
                            , void (*parent) (void)
                            , void (*child) (void)
                            , void *);
extern int pthread_setschedprio(typedef unsigned long int pthread_t,
int);
```

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 11-31 libgcc_s Definition

Library:	libgcc_s
SONAME:	libgcc_s.so.1

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

[LSB] This Specification

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

_Unwind_Backtrace(GCC_3.3) [LSB]	_Unwind_DeleteException(GCC_3.0) [LSB]	_Unwind_FindEnclosingFunction(GCC_3.3) [LSB]	_Unwind_Find_FDE(GCC_3.0) [LSB]
_Unwind_ForcedUnwind(GCC_3.0) [LSB]	_Unwind_GetCFA(GCC_3.3) [LSB]	_Unwind_GetDataRelBase(GCC_3.0) [LSB]	_Unwind_GetGR(GCC_3.0) [LSB]
_Unwind_GetIP(GCC_3.0) [LSB]	_Unwind_GetLanguageSpecificData(GCC_3.0) [LSB]	_Unwind_GetRegionStart(GCC_3.0) [LSB]	_Unwind_GetTextRelBase(GCC_3.0) [LSB]
_Unwind_RaiseException(GCC_3.0) [LSB]	_Unwind_Resume(GCC_3.0) [LSB]	_Unwind_Resume_or_Rethrow(GCC_3.3) [LSB]	_Unwind_SetGR(GCC_3.0) [LSB]
_Unwind_SetIP(GCC_3.0) [LSB]			

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);
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 _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(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_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 _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
extern _Unwind_Reason_Code _Unwind_Backtrace(_Unwind_Trace_Fn, void
*);
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 _Unwind_Reason_Code _Unwind_GetCFA(struct _Unwind_Context *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
extern _Unwind_Reason_Code _Unwind_Resume_or_Rethrow(struct

_Unwind_Exception *);
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 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

```
_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 parameteres 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

```
_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 returnd:

_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

```
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.

_Unwind_SetGR

Name

`_Unwind_SetGR` — private C++ error handling method

Synopsis

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

Description

`_Unwind_SetGR()` sets the *`value`* of the register *`index`*ed for the routine identified by the unwind *`context`*.

_Unwind_SetIP

Name

`_Unwind_SetIP` — private C++ error handling method

Synopsis

```
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

Library:	libdl
SONAME:	libdl.so.2

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

[LSB] This Specification
[SUSv3] ISO POSIX (2003)

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_2.0) [LSB]	dlclose(GLIBC_2.0) [SUSv3]	dlerror(GLIBC_2.0) [SUSv3]	dlopen(GLIBC_2.1) [LSB]

dlsym(GLIBC_2.0) [LSB]			

11.12 Data Definitions for libdl

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

```

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 11-35 libcrypt Definition

Library:	libcrypt
SONAME:	libcrypt.so.1

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

[SUSv3] ISO POSIX (2003)

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 11-36 libcrypt - Encryption Function Interfaces

crypt(GLIBC_2.0) [SUSv3]	encrypt(GLIBC_2.0) [SUSv3]	setkey(GLIBC_2.0) [SUSv3]	

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 12-1 libz Definition

Library:	libz
SONAME:	libz.so.1

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);
extern int deflateCopy(z_streamp, z_streamp);
extern int deflateEnd(z_streamp);
extern int deflateInit2_(z_streamp, int, int, int, int, int, const char
*,
                         int);
extern int deflateInit_(z_streamp, int, const char *, int);
extern int deflateParams(z_streamp, int, int);
extern int deflateReset(z_streamp);
extern int deflateSetDictionary(z_streamp, const Bytef *, uInt);
extern const uLongf *get_crc_table(void);
extern int gzeof(gzFile);
extern int gzgetc(gzFile);
extern char *gzgets(gzFile, char *, int);
extern int gzprintf(gzFile, const char *, ...);
extern int gzputc(gzFile, int);
extern int gzputs(gzFile, const char *);
extern int gzrewind(gzFile);
extern z_off_t gzseek(gzFile, z_off_t, int);
extern int gzsetparams(gzFile, int, int);
extern z_off_t gztell(gzFile);
extern int inflate(z_streamp, int);
extern int inflateEnd(z_streamp);
extern int inflateInit2_(z_streamp, int, const char *, int);
extern int inflateInit_(z_streamp, const char *, int);
extern int inflateReset(z_streamp);
extern int inflateSetDictionary(z_streamp, const Bytef *, uInt);
extern int inflateSync(z_streamp);
extern int inflateSyncPoint(z_streamp);
extern int uncompress(Bytef *, uLongf *, const Bytef *, uLong);
extern const char *zError(int);
extern const char *zlibVersion(void);
extern uLong deflateBound(z_streamp, uLong);
extern uLong compressBound(uLong);
```

12.3 Interfaces for libncurses

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

Table 12-2 libncurses Definition

Library:	libncurses
SONAME:	libncurses.so.5

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

```

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 attron(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,
                  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 clrtobot(void);
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,
                   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 deleteln(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);
```

```
        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 WINDOW *initscr(void);
        extern int init_color(short, short, short, short);
        extern int init_pair(short, short, short);
        extern int innstr(char *, int);
        extern int insch(chtype);
        extern int insdelln(int);
        extern int insertln(void);
        extern int insnstr(const char *, int);
        extern int insstr(const char *);
        extern int instr(char *);
        extern int intrflush(WINDOW *, bool);
        extern bool isendwin(void);
        extern bool is_linetouched(WINDOW *, int);
        extern bool is_wintouched(WINDOW *);
        extern const char *keyname(int);
        extern int keypad(WINDOW *, bool);
        extern char killchar(void);
        extern int leaveok(WINDOW *, bool);
        extern char *longname(void);
        extern int meta(WINDOW *, bool);
        extern int move(int, int);
        extern int mvaddch(int, int, const chtype);
        extern int mvaddchnstr(int, int, const chtype *, int);
        extern int mvaddchstr(int, int, const chtype *);
        extern int mvaddnstr(int, int, const char *, int);
        extern int mvaddstr(int, int, const char *);
        extern int mvchgat(int, int, int, attr_t, short, const void *);
        extern int mvcur(int, int, int, int);
        extern int mvdelch(int, int);
        extern int mvderwin(WINDOW *, int, int);
        extern int mvgetch(int, int);
        extern int mvgetnstr(int, int, char *, int);
        extern int mvgetstr(int, int, char *);
        extern int mvhline(int, int, chtype, int);
        extern chtype mvinch(int, int);
        extern int mvinchnstr(int, int, chtype *, int);
        extern int mvinchstr(int, int, chtype *);
        extern int mvinnstr(int, int, char *, int);
        extern int mvinsch(int, int, chtype);
        extern int mvinsnstr(int, int, const char *, int);
        extern int mvinsstr(int, int, const char *);
        extern int mvinstr(int, int, char *);
        extern int mvprintw(int, int, char *, ...);
        extern int mvscanw(int, int, const char *, ...);
        extern int mvvline(int, int, chtype, int);
        extern int mvwaddch(WINDOW *, int, int, const chtype);
        extern int mvwaddchnstr(WINDOW *, int, int, const chtype *, int);
        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 mvwinsstr(WINDOW *, int, int, const char *);
        extern int mvwinstr(WINDOW *, int, int, char *);
        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, int);
        extern int prefresh(WINDOW *, int, 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_scanw(WINDOW *, const char *, typedef void *va_list);
        extern int waddch(WINDOW *, const typedef unsigned long int chtype);
        extern int waddchnstr(WINDOW *, const typedef unsigned long int chtype
        *,
                              int);
        extern int waddchstr(WINDOW *, const typedef unsigned long int chtype
        *);
        extern int waddnstr(WINDOW *, const char *, int);
        extern int waddstr(WINDOW *, const char *);
        extern int wattron(WINDOW *, int);
        extern int wattroff(WINDOW *, int);
        extern int wattrset(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 wbkgdset(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,
                           typedef unsigned long int chtype);
        extern int wchgat(WINDOW *, int, typedef chtype attr_t, short,
                          const void *);
        extern int wclear(WINDOW *);
        extern int wclrtobot(WINDOW *);
        extern int wclrtoeol(WINDOW *);
        extern int wcolor_set(WINDOW *, short, void *);
```

```
extern void wcursyncup(WINDOW *);
extern int wdelch(WINDOW *);
extern int wdeleteln(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 winnstr(WINDOW *, char *, int);
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 wredrawln(WINDOW *, int, int);
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 char *tgetstr(char *, char **);
extern char *tgoto(const char *, int, int);
extern int tgetent(char *, const char *);
extern int tgetflag(char *);
extern int tgetnum(char *);
extern int tputs(const char *, int, int (*putcproc) (int)
    );
```

```
extern TERMINAL *cur_term(void);
```

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

Library:	libutil
SONAME:	libutil.so.1

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

forkpty(GLIBC_2.0) [LSB]	login(GLIBC_2.0) [LSB]	login_tty(GLIBC_2.0) [LSB]	logout(GLIBC_2.0) [LSB]
logwtmp(GLIBC_2.0) [LSB]	openpty(GLIBC_2.0) [LSB]		

1

V Package Format and Installation

13 Software Installation

13.1 Package Dependencies

The LSB runtime environment shall provde the following dependencies.

lsb-core-s390

> 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`*`-s390`.

13.2 Package Architecture Considerations

All packages must specify an architecture of `s390`. 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

_Unwind_Backtrace[LSB]	_Unwind_GetDataRelBase[LSB]	_Unwind_RaiseException[LSB]
_Unwind_DeleteException[LSB]	_Unwind_GetGR[LSB]	_Unwind_Resume[LSB]
_Unwind_FindEnclosingFunction[LSB]	_Unwind_GetIP[LSB]	_Unwind_Resume_or_Rethrow[LSB]
_Unwind_Find_FDE[LSB]	_Unwind_GetLanguageSpecificData[LSB]	_Unwind_SetGR[LSB]
_Unwind_ForcedUnwind[LSB]	_Unwind_GetRegionStart[LSB]	_Unwind_SetIP[LSB]
_Unwind_GetCFA[LSB]	_Unwind_GetTextRelBase[LSB]	

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