BS ISO/IEC 23360-4-2:2021

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Linux Standard Base (LSB)

Part 4-2: Core specification for AMD64 (X86-64) architecture

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The UK participation in its preparation was entrusted to Technical Committee IST/5, Programming languages, their environments and system software interfaces.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2022

ISBN 978 0 539 05258 9

ICS 35.080

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2022.

Amendments/corrigenda issued since publication

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INTERNATIONAL STANDARD

ISO/IEC 23360-4-2

First edition
2021-10

Linux Standard Base (LSB) —

Part 4-2: Core specification for AMD64 (X86-64) architecture

Reference number
ISO/IEC 23360-4-2:2021(E)

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Foreword

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This document was prepared by the Linux Foundation as Linux Standard Base (LSB): Core specification for AMD64 (X86-64) architecture and drafted in accordance with its editorial rules. It was assigned to Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*, and adopted by National Bodies.

This first edition of ISO/IEC 23360-4-2 cancels and replaces ISO/IEC 23360-4:2006, which has been technically revised.

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Introduction

The LSB defines a binary interface for application programs that are compiled and packaged for LSB-conforming implementations on many different hardware architectures. A binary specification must include information specific to the computer processor architecture for which it is intended. To avoid the complexity of conditional descriptions, the specification has instead been divided into generic parts which are augmented by one of several architecture-specific parts, depending on the target processor architecture; the generic part will indicate when reference must be made to the architecture part, and vice versa.

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:

1. The first number (`x`) is the major version number. Versions sharing the same major version number shall be compatible in a backwards direction; that is, a newer version shall be compatible with an older version. Any deletion of a library results in a new major version number. Interfaces marked as deprecated may be removed from the specification at a major version change.
2. The second number (`y`) is the minor version number. Libraries and individual interfaces may be added, but not removed. Interfaces may be marked as deprecated at a minor version change. Other minor changes may be permitted at the discretion of the LSB workgroup.
3. 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.

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I Introductory Elements

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1 Scope

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 part describing those parts of the interface that remain constant across all implementations of the LSB, and an architecture-specific part describing the parts of the interface that vary by processor architecture. Together, the common part and the relevant architecture-specific part for a single hardware architecture provide a complete interface specification for compiled application programs on systems that share a common hardware architecture.

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 provides 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.

This is the X86-64 architecture specific part of the Core module of the Linux Standard Base (LSB). This part supplements the common part of the LSB Core module with those interfaces that differ between architectures.

This part should be used in conjunction with LSB Core - Generic, the common part. Whenever a section of the common part is supplemented by architecture-specific information, the common part includes a reference to the architecture-specific part. This part may also contain additional information that is not referenced in the common part.

Interfaces described in this part of the LSB Core Specification are mandatory except where explicitly listed otherwise. Interfaces described in the LSB Core module are supplemented by other LSB modules. All other modules depend on the presence of LSB Core.

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2 References

2.1 Normative References

The following specifications are incorporated by reference into this specification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced specification (including any amendments) applies.

Note: Where copies of a referenced specification are available on the World Wide Web, a Uniform Resource Locator (URL) is given, for informative purposes only. Such URL might at any given time resolve to a more recent copy of the specification, or be out of date (not resolve). Reference copies of specifications at the revision level indicated may be found at the Linux Foundation's Reference Specifications (http://refspecs.linuxbase.org) site.

Table 2-1 Normative References

Name	Title	URL
LSB Core - Generic	Linux Standard Base - Core Specification - Generic	http://www.linuxbase.org/spec/
AMD64 Architecture Programmer's Manual, Volume 1	AMD64 Architecture Programmer's Manual, Volume 1: Application Programming 24592 3.08	http://www.amd.com/us-en/Processors/DevelopWithAMD/
AMD64 Architecture Programmer's Manual, Volume 2	AMD64 Architecture Programmer's Manual, Volume 2: System Programming 24593 3.08	http://www.amd.com/us-en/Processors/DevelopWithAMD/
AMD64 Architecture Programmer's Manual, Volume 3	AMD64 Architecture Programmer's Manual, Volume 3: General Purpose and System Instructions 24594 3.03	http://www.amd.com/us-en/Processors/DevelopWithAMD/
AMD64 Architecture Programmer's Manual, Volume 4	AMD64 Architecture Programmer's Manual, Volume 4: 128-bit Media Instructions 26568 3.04	http://www.amd.com/us-en/Processors/DevelopWithAMD/
AMD64 Architecture Programmer's Manual, Volume 5	AMD64 Architecture Programmer's Manual, Volume 5: 64-bit Media and x87 Floating-Point Instructions 26569 3.03	http://www.amd.com/us-en/Processors/DevelopWithAMD/
Filesystem Hierarchy Standard	Filesystem Hierarchy Standard (FHS) 3.0	http://refspecs.linuxbase.org/fhs
ISO C (1999)	ISO/IEC 9899:1999 - Programming Languages -- C	

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Name	Title	URL
ISO/IEC 14882: 2003 C++ Language	ISO/IEC 14882: 2003 Programming languages --C++	
Itanium™ C++ ABI	Itanium™ C++ ABI (Revision 1.86)	http://refspecs.linuxfoundation.org/cxxabi-1.86.html
Large File Support	Large File Support	http://www.UNIX-systems.org/version2/whatsnew/lfs20mar.html
Libncursesw API	Libncursesw API	http://invisible-island.net/ncurses/man/ncurses.3x.html
Libncursesw Placeholder	Libncursesw Specification Placeholder	http://refspecs.linux-foundation.org/libncursesw/libncurses.html
POSIX 1003.1-2001 (ISO/IEC 9945-2003)	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 -- Portable Operating System Interface (POSIX) -- Part 4: Rationale Including Technical Cor. 1: 2004	http://www.unix.org/version3/
POSIX 1003.1-2008 (ISO/IEC 9945-2009)	Portable Operating System Interface (POSIX®) 2008 Edition / The Open Group Technical Standard	http://www.unix.org/version4/

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Name	Title	URL
	Base Specifications, Issue 7	
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
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	http://refspecs.linuxfoundation.org/svid4/
System V ABI	System V Application Binary Interface, Edition 4.1	http://www.sco.com/developers/devspecs/gabi41.pdf
System V ABI Update	System V Application Binary Interface - DRAFT - 17 December 2003	http://www.sco.com/developers/gabi/2003-12-17/contents.html
System V Application Binary Interface AMD64 Architecture Processor Supplement	System V Application Binary Interface AMD64 Architecture Processor Supplement, Draft Version 0.95	http://refspecs.linux-foundation.org/elf/x86_64-abi-0.95.pdf
X/Open Curses, Issue 7	X/Open Curses, Issue 7 (ISBN: 1-931624-83-6, The Open Group, November 2009)	https://www2.opengroup.org/ogsys/catalog/C094

2.2 Informative References/Bibliography

The documents listed below provide essential background information to implementors of this specification. These references are included for information only, and do not represent normative parts of this specification.

Table 2-2 Other References

Name	Title	URL
DWARF Debugging Information Format, Version 4	DWARF Debugging Information Format, Version 4 (June 10, 2010)	http://www.dwarfstd.org/doc/DWARF4.pdf

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Name	Title	URL
IEC 60559/IEEE 754 Floating Point	IEC 60559:1989 Binary floating-point arithmetic for microprocessor systems	http://www.ieee.org/
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.openi18n.org/docs/html/LI18NUX-2000-amd4.htm
Linux Allocated Device Registry	LINUX ALLOCATED DEVICES	http://www.lanana.org/docs/device-list/devices-2.6+.txt
Linux Assigned Names And Numbers Authority	Linux Assigned Names And Numbers Authority	http://www.lanana.org/
Mozilla's NSS SSL Reference	Mozilla's NSS SSL Reference	http://www.mozilla.org/projects/security/pki/nss/ref/ssl/
NSPR Reference	Mozilla's NSPR Reference	http://refspecs.linuxfoundation.org/NSPR_API_Reference/NSPR_API.html
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 1833: Binding Protocols for ONC RPC Version 2	IETF RFC 1833: Binding Protocols for ONC RPC Version 2	http://www.ietf.org/rfc/rfc1833.txt

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Name	Title	URL
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 5531/4506 RPC & XDR	IETF RFC 5531 & 4506	http://www.ietf.org/
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 x86-64 Linux Standard Base systems, with the specified runtime names. These names override or supplement the names specified in the generic LSB (LSB Core - Generic) 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
libc	libc.so.6
libcrypt	libcrypt.so.1
libdl	libdl.so.2
libgcc_s	libgcc_s.so.1
libm	libm.so.6
libncurses	libncurses.so.5
libncursesw	libncursesw.so.5
libpthread	libpthread.so.0
libstdcxx	libstdc++.so.6
libutil	libutil.so.1
libz	libz.so.1
proginterp	/lib64/ld-lsb-x86-64.so.3

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 (LSB Core - Generic) and the relevant architecture specific part of the LSB Core Specification.

> **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 parts of the LSB Core Specification that supplement this specification for a given target processor architecture describe a minimum acceptable processor. The implementation shall provide all features of this processor, whether in hardware or through emulation transparent to the application.

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- The implementation shall be capable of executing compiled applications having the format and using the system interfaces described in this specification.
- The implementation shall provide libraries containing the interfaces specified by this specification, 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 specification.
- The map of virtual memory provided by the implementation shall conform to the requirements of this specification.
- 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 specification.
- 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 specification in the format defined here and in other documents normatively included by reference. All commands and utilities shall behave as required by this specification. The implementation shall also provide all mandatory components of an application's runtime environment that are included or referenced in this specification.
- 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 containing object files is necessarily architecture specific, and must conform to both the generic LSB Core specification (LSB Core - Generic) and the relevant architecture specific part of the LSB Core Specification. A conforming application which contains no object files may be architecture neutral. Architecture neutral applications shall conform only to the requirements of the generic LSB Core specification (LSB Core - Generic).

A conforming application shall satisfy the following requirements:

- Executable files shall be either object files in the format defined in the Object Format section of this specification, or script files in a scripting language where the interpreter is required by this specification.
- Object files shall participate in dynamic linking as defined in the Program Loading and Linking section of this specification.
- Object files shall employ only the instructions, traps, and other low-level facilities defined as being for use by applications in the Low-Level System Information section of this specification

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- If the application requires any optional interface defined in this specification in order to be installed or to execute successfully, the requirement for that optional interface shall be stated in the application's documentation.
- The application shall not use any interface or data format that is not required to be provided by a conforming implementation, unless such an interface or data format is supplied by another application through direct invocation of that application during execution. The other application must also be a conforming application, and the use of such interface or data format, as well as its source (in other words, the other conforming application), shall be identified in the documentation of the application.
- The application 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 not defined in this specification in order to be installed or to execute successfully.

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4 Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 2382, ISO 80000–2, and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4.1

archLSB

Some LSB specification documents have both a generic, architecture-neutral part and an architecture-specific part. The latter describes elements whose definitions may be unique to a particular processor architecture. The term archLSB may be used in the generic part to refer to the corresponding section of the architecture-specific part.

4.2

Binary Standard, ABI

The total set of interfaces that are available to be used in the compiled binary code of a conforming application, including the run-time details such as calling conventions, binary format, C++ name mangling, etc.

4.3

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.

4.4

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.

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4.5

Source Standard, API

The total set of interfaces that are available to be used in the source code of a conforming application. Due to translations, the Binary Standard and the Source Standard may contain some different interfaces.

4.6

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.

4.7

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.

In addition, for the portions of this specification which build on IEEE Std 1003.1-2001, the definitions given in *IEEE Std 1003.1-2001, Base Definitions, Chapter 3* apply.

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5 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) [SUSv4]

refers to the interface named `forkpty()` with symbol version `GLIBC_2.0` that is defined in the reference indicated by the tag `SUSv4`.

Note: For symbols with versions which differ between architectures, the symbol versions are defined in the architecture specific parts of of this module specification only. In the generic part, they will appear without symbol versions.

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II Executable and Linking Format (ELF)

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6 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 System V Application Binary Interface AMD64 Architecture Processor Supplement, and is intended to document additions made since the publication of that document.

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7 Low Level System Information

7.1 Machine Interface

7.1.1 Processor Architecture

The AMD64 Architecture is specified by the following documents

- AMD64 Architecture Programmer's Manual, Volume 1
- AMD64 Architecture Programmer's Manual, Volume 2
- AMD64 Architecture Programmer's Manual, Volume 3
- AMD64 Architecture Programmer's Manual, Volume 4
- AMD64 Architecture Programmer's Manual, Volume 5
- System V Application Binary Interface AMD64 Architecture Processor Supplement

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. In particular, applications should not rely on the availability of the 3DNow!™ technology. In addition, a conforming application shall not use any instruction from Table 7-1.

Note: While this specification carries the attribution "AMD64", it is intended to apply to the entire `x86_64` set of processors, including those based on Intel® 64 Architecture. However, this specification defers to the AMD64 architecture specifications listed above.

Table 7-1 Non Conforming Instructions

LAHF	SAHF
SYSCALL	SYSRET
SYSENTER	SYSEXIT
CMPXCHG16B	FFXSR

Conforming applications may use only instructions which do not require elevated privileges.

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.

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.

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7.1.2 Data Representation

7.1.2.1 Introduction

LSB-conforming applications shall use the data representation as defined in Section 3.1.2 of System V Application Binary Interface AMD64 Architecture Processor Supplement.

> **Note:** The System V Application Binary Interface AMD64 Architecture Processor Supplement specification is itself layered on top of the System V Application Binary Interface - Intel386™ Architecture Processor Supplement.

7.1.2.2 Byte Ordering

LSB-conforming applications shall use the byte ordering defined in Section 3.1.2 of System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.1.2.3 Fundamental Types

LSB-conforming applications shall use only the fundamental types described in Section 3.1.2 of System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.1.2.4 Aggregates and Unions

LSB-conforming applications shall use alignment for aggregates and unions as described in Section 3.1.2 of System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.1.2.5 Bit Fields

LSB-conforming applications utilizing bit-fields shall follow the requirements of Section 3.1.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.2 Function Calling Sequence

7.2.1 Introduction

LSB-conforming applications shall use only the following features of the function calling sequence as defined in Section 3.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.2.2 Registers

LSB-conforming applications shall use only the registers described in Section 3.2.1 (Registers and the Stack Frame) of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.2.3 Floating Point Registers

LSB-conforming applications shall use only the floating point registers described in Section 3.2.1 (Registers and the Stack Frame) of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

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7.2.4 Stack Frame

LSB-conforming applications shall use stack frames as described in Section 3.2.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.2.5 Arguments

LSB-conforming applications shall pass parameters to functions as described in Section 3.2.3 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.2.6 Return Values

Values are returned from functions as described in Section 3.3.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.3 Operating System Interface

LSB-conforming applications shall use only the following features of the Operating System Interfaces as defined in Section 3.3 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.3.1 Exception Interface

Synchronous and floating point or coprocessor exceptions shall behave as described in Section 3.3.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.3.2 Virtual Address Space

LSB-Conforming applications shall use only the virtual address space described in Section 3.3.2 and 3.3.4 of the System V Application Binary Interface AMD64 Architecture Processor Supplement. Virtual memory page sizes shall be subject to the limitations described in Section 3.3.3 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.4 Process Initialization

LSB-conforming applications shall use only the following features of the Process Initialization as defined in Section 3.4 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.4.1 Special Registers

During process initialization, the special registers shall be initalized as described in Section 3.4.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.4.2 Process Stack (on entry)

The process stack shall be initialized as described in Section 3.4.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.4.3 Auxiliary Vector

The auxiliary vector shall be initialized as described in Section 3.4.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

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7.5 Coding Examples

LSB-conforming applications may use the coding examples given in Section 3.5 of the System V Application Binary Interface AMD64 Architecture Processor Supplement to guide implemention of fundamental operations in the following areas.

7.5.1 Code Model Overview/Architecture Constraints

Section 3.5.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement describes a number of code models. LSB-Conforming applications may use any of these models except the Kernel and Large code models.

7.5.2 Position-Independent Function Prologue

LSB-conforming applications may follow the position-independent function prologue example in Section 3.5.3 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.5.3 Data Objects

LSB-conforming applications may follow the data objects examples in Section 3.5.4 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.5.4 Function Calls

LSB-conforming applications may follow the function call examples in Section 3.5.5 of the System V Application Binary Interface AMD64 Architecture Processor Supplement. See Chapter 3 of System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.5.5 Branching

LSB-conforming applications may follow the branching examples in Section 3.5.6 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.6 C Stack Frame

7.6.1 Variable Argument List

LSB-Conforming applications shall only use variable arguments to functions in the manner described in Section 3.5.7 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

7.7 Debug Information

LSB-Conforming applications may include DWARF debugging information. The DWARF Release Number and Register Number Mapping shall be as described in Section 3.6 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

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8 Object Format

8.1 Introduction

LSB-conforming implementations shall support the Executable and Linking Format (ELF) object file format, as defined by the following documents:

- System V ABI
- System V ABI Update
- System V Application Binary Interface AMD64 Architecture Processor Supplement
- LSB Core - Generic
- this document

8.2 ELF Header

8.2.1 Machine Information

LSB-conforming applications shall identify the Machine Information as defined in Section 4.1.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

8.3 Sections

8.3.1 Introduction

In addition to the requirements for ELF sections described in the generic LSB Core specification, conforming implementations shall support architecture specific sections as described below.

Note: The System V Application Binary Interface AMD64 Architecture Processor Supplement specifies some architecture specific section flags and section types that are not required by LSB-conforming systems.

8.3.2 Special Sections

The following architecture-specific sections are defined in the System V Application Binary Interface AMD64 Architecture Processor Supplement.

Table 8-1 ELF Special Sections

Name	Type	Attributes
.got	SHT_PROGBITS	SHF_AL-LOC+SHF_WRITE
.plt	SHT_PROGBITS	SHF_ALLOC+SHF_EX-ECINSTR

.got

This section holds the global offset table.

.plt

This section holds the procedure linkage table.

Note: Since LSB-conforming implementations are not required to support the large code model, it is not necessary for them to provide support for the additional special

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sections for the large code model described in the System V Application Binary Interface AMD64 Architecture Processor Supplement.

Also, the System V Application Binary Interface AMD64 Architecture Processor Supplement specifies a section `.eh_frame`, with a type of `SHT_AMD64_UNWIND`. This section is described in the generic LSB-Core specification, but with type `SHT_PROGBITS`. This specification does not require support for the `SHT_AMD64_UNWIND` section type.

8.3.3 Additional Special Sections

The following additional sections are defined here.

Table 8-2 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.

8.4 Symbol Table

LSB-conforming applications shall use Symbol Tables as defined in Section 4.3 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

8.5 Relocation

LSB-conforming implementation shall support the required relocation types defined in Section 4.4.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

Note: Since LSB-conforming implementations are not required to support the large code model, it is not necessary for them to provide support for the additional relocation types for the large code model described in the System V Application Binary Interface AMD64 Architecture Processor Supplement.

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9 Program Loading and Dynamic Linking

9.1 Introduction

LSB-conforming implementations shall support the object file information and system actions that create running programs as specified in the System V ABI , System V ABI Update , System V Application Binary Interface AMD64 Architecture Processor Supplement and as supplemented by the generic LSB specification and LSB Core - Generic.

9.2 Program Header

LSB-conforming implementations are not required to support the additional types and flags for this architecture as defined in Section 5.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

Note: The System V Application Binary Interface AMD64 Architecture Processor Supplement specification is itself layered on top of the System V Application Binary Interface - Intel386™ Architecture Processor Supplement. As such, the requirements of that specification are still requirements of this specification.

9.3 Program Loading

LSB-conforming implementations shall map file pages to virtual memory pages as described in Section 5.1 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

9.4 Dynamic Linking

9.4.1 Introduction

LSB-conforming implementations shall provide dynamic linking as specified in Section 5.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement, except as described in the following sections.

Note: Since LSB-conforming implementations are not required to support the large model, support for dynamic linking of large model code is not required.

9.4.2 Dynamic Section

Dynamic section entries give information to the dynamic linker. The following dynamic entry types shall be supported:

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

DT_RELACOUNT

The number of relative relocations in .rela.dyn

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9.4.3 Global Offset Table

LSB-conforming implementations shall support a Global Offset Table as described in Section 5.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

9.4.4 Function Addresses

Function addresses shall behave as described in Section 5.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

9.4.5 Procedure Linkage Table

LSB-conforming implementations shall support a Procedure Linkage Table as described in Section 5.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

9.4.6 Initialization and Termination Functions

LSB-conforming implementations shall support initialization and termination functions as specified in Section 5.2.2 of the System V Application Binary Interface AMD64 Architecture Processor Supplement.

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III Base Libraries

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10 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 interfaces and interface details which are unique to the X86-64 platform are defined here. This section should be used in conjunction with the corresponding section of LSB Core - Generic.

10.1 Program Interpreter/Dynamic Linker

The Program Interpreter shall be `/lib64/ld-lsb-x86-64.so.3`.

10.2 Interfaces for libc

Table 10-1 defines the library name and shared object name for the libc library

Table 10-1 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] LSB Core - Generic
[RPC + XDR] RFC 5531/4506 RPC & XDR
[SUSv2] SUSv2
[SUSv3] POSIX 1003.1-2001 (ISO/IEC 9945-2003)
[SUSv4] POSIX 1003.1-2008 (ISO/IEC 9945-2009)
[SVID.4] SVID Issue 4

10.2.1 RPC

10.2.1.1 Interfaces for RPC

An LSB conforming implementation shall provide the architecture specific functions for RPC specified in Table 10-2, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-2 libc - RPC Function Interfaces

authnone_create(GLIBC_2.2.5) [SVID.4]	callrpc(GLIBC_2.2.5) [RPC + XDR]	clnt_create(GLIBC_2.2.5) [SVID.4]	clnt_pcreateerror(GLIBC_2.2.5) [SVID.4]
clnt_perrno(GLIBC_2.2.5) [SVID.4]	clnt_perror(GLIBC_2.2.5) [SVID.4]	clnt_spcreateerror(GLIBC_2.2.5) [SVID.4]	clnt_sperrno(GLIBC_2.2.5) [SVID.4]
clnt_sperror(GLIBC_2.2.5) [SVID.4]	clntraw_create(GLIBC_2.2.5) [RPC + XDR]	clnttcp_create(GLIBC_2.2.5) [RPC + XDR]	clntudp_bufcreate(GLIBC_2.2.5) [RPC + XDR]

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clntudp_create(GLIBC_2.2.5) [RPC + XDR]	key_decryptsession(GLIBC_2.2.5) [SVID.4]	pmap_getport(GLIBC_2.2.5) [LSB]	pmap_set(GLIBC_2.2.5) [LSB]
pmap_unset(GLIBC_2.2.5) [LSB]	svc_getreqset(GLIBC_2.2.5) [SVID.4]	svc_register(GLIBC_2.2.5) [LSB]	svc_run(GLIBC_2.2.5) [LSB]
svc_sendreply(GLIBC_2.2.5) [LSB]	svcerr_auth(GLIBC_2.2.5) [SVID.4]	svcerr_decode(GLIBC_2.2.5) [SVID.4]	svcerr_noproc(GLIBC_2.2.5) [SVID.4]
svcerr_noprog(GLIBC_2.2.5) [SVID.4]	svcerr_progvers(GLIBC_2.2.5) [SVID.4]	svcerr_systemerr(GLIBC_2.2.5) [SVID.4]	svcerr_weakauth(GLIBC_2.2.5) [SVID.4]
svcfd_create(GLIBC_2.2.5) [RPC + XDR]	svcraw_create(GLIBC_2.2.5) [RPC + XDR]	svctcp_create(GLIBC_2.2.5) [LSB]	svcudp_create(GLIBC_2.2.5) [LSB]
xdr_accepted_reply(GLIBC_2.2.5) [SVID.4]	xdr_array(GLIBC_2.2.5) [SVID.4]	xdr_bool(GLIBC_2.2.5) [SVID.4]	xdr_bytes(GLIBC_2.2.5) [SVID.4]
xdr_callhdr(GLIBC_2.2.5) [SVID.4]	xdr_callmsg(GLIBC_2.2.5) [SVID.4]	xdr_char(GLIBC_2.2.5) [SVID.4]	xdr_double(GLIBC_2.2.5) [SVID.4]
xdr_enum(GLIBC_2.2.5) [SVID.4]	xdr_float(GLIBC_2.2.5) [SVID.4]	xdr_free(GLIBC_2.2.5) [SVID.4]	xdr_int(GLIBC_2.2.5) [SVID.4]
xdr_long(GLIBC_2.2.5) [SVID.4]	xdr_opaque(GLIBC_2.2.5) [SVID.4]	xdr_opaque_auth(GLIBC_2.2.5) [SVID.4]	xdr_pointer(GLIBC_2.2.5) [SVID.4]
xdr_reference(GLIBC_2.2.5) [SVID.4]	xdr_rejected_reply(GLIBC_2.2.5) [SVID.4]	xdr_replymsg(GLIBC_2.2.5) [SVID.4]	xdr_short(GLIBC_2.2.5) [SVID.4]
xdr_string(GLIBC_2.2.5) [SVID.4]	xdr_u_char(GLIBC_2.2.5) [SVID.4]	xdr_u_int(GLIBC_2.2.5) [LSB]	xdr_u_long(GLIBC_2.2.5) [SVID.4]
xdr_u_short(GLIBC_2.2.5) [SVID.4]	xdr_union(GLIBC_2.2.5) [SVID.4]	xdr_vector(GLIBC_2.2.5) [SVID.4]	xdr_void(GLIBC_2.2.5) [SVID.4]
xdr_wrapstring(GLIBC_2.2.5) [SVID.4]	xdrmem_create(GLIBC_2.2.5) [SVID.4]	xdrrec_create(GLIBC_2.2.5) [SVID.4]	xdrrec_endofrecord(GLIBC_2.2.5) [RPC + XDR]
xdrrec_eof(GLIBC_2.2.5) [SVID.4]	xdrrec_skiprecord(GLIBC_2.2.5) [RPC + XDR]	xdrstdio_create(GLIBC_2.2.5) [LSB]	

An LSB conforming implementation shall provide the architecture specific deprecated functions for RPC specified in Table 10-3, with the full mandatory functionality as described in the referenced underlying specification.

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

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Table 10-3 libc - RPC Deprecated Function Interfaces

key_decryptsession(GLIBC_2.2.5) [SVID.4]			

10.2.2 Epoll

10.2.2.1 Interfaces for Epoll

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

10.2.3 System Calls

10.2.3.1 Interfaces for System Calls

An LSB conforming implementation shall provide the architecture specific functions for System Calls specified in Table 10-4, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-4 libc - System Calls Function Interfaces

__fxstat(GLIBC_2.2.5) [LSB]	__getpgid(GLIBC_2.2.5) [LSB]	__lxstat(GLIBC_2.2.5) [LSB]	__xmknod(GLIBC_2.2.5) [LSB]
__xstat(GLIBC_2.2.5) [LSB]	access(GLIBC_2.2.5) [SUSv4]	acct(GLIBC_2.2.5) [LSB]	alarm(GLIBC_2.2.5) [SUSv4]
backtrace(GLIBC_2.2.5) [LSB]	backtrace_symbols(GLIBC_2.2.5) [LSB]	backtrace_symbols_fd(GLIBC_2.2.5) [LSB]	brk(GLIBC_2.2.5) [SUSv2]
chdir(GLIBC_2.2.5) [SUSv4]	chmod(GLIBC_2.2.5) [SUSv4]	chown(GLIBC_2.2.5) [SUSv4]	chroot(GLIBC_2.2.5) [SUSv2]
clock(GLIBC_2.2.5) [SUSv4]	close(GLIBC_2.2.5) [SUSv4]	closedir(GLIBC_2.2.5) [SUSv4]	creat(GLIBC_2.2.5) [SUSv4]
dup(GLIBC_2.2.5) [SUSv4]	dup2(GLIBC_2.2.5) [SUSv4]	execl(GLIBC_2.2.5) [SUSv4]	execle(GLIBC_2.2.5) [SUSv4]
execlp(GLIBC_2.2.5) [SUSv4]	execv(GLIBC_2.2.5) [SUSv4]	execve(GLIBC_2.2.5) [SUSv4]	execvp(GLIBC_2.2.5) [SUSv4]
exit(GLIBC_2.2.5) [SUSv4]	fchdir(GLIBC_2.2.5) [SUSv4]	fchmod(GLIBC_2.2.5) [SUSv4]	fchown(GLIBC_2.2.5) [SUSv4]
fcntl(GLIBC_2.2.5) [LSB]	fdatasync(GLIBC_2.2.5) [SUSv4]	fexecve(GLIBC_2.2.5) [SUSv4]	flock(GLIBC_2.2.5) [LSB]
fork(GLIBC_2.2.5) [SUSv4]	fstatfs(GLIBC_2.2.5) [LSB]	fstatvfs(GLIBC_2.2.5) [SUSv4]	fsync(GLIBC_2.2.5) [SUSv4]
ftime(GLIBC_2.2.5) [SUSv3]	ftruncate(GLIBC_2.2.5) [SUSv4]	getcontext(GLIBC_2.2.5) [SUSv3]	getdtablesize(GLIBC_2.2.5) [LSB]
getegid(GLIBC_2.2.5) [SUSv4]	geteuid(GLIBC_2.2.5) [SUSv4]	getgid(GLIBC_2.2.5) [SUSv4]	getgroups(GLIBC_2.2.5) [SUSv4]

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getitimer(GLIBC_2.2.5) [SUSv4]	getloadavg(GLIBC_2.2.5) [LSB]	getpagesize(GLIBC_2.2.5) [LSB]	getpgid(GLIBC_2.2.5) [SUSv4]
getpgrp(GLIBC_2.2.5) [SUSv4]	getpid(GLIBC_2.2.5) [SUSv4]	getppid(GLIBC_2.2.5) [SUSv4]	getpriority(GLIBC_2.2.5) [SUSv4]
getrlimit(GLIBC_2.2.5) [LSB]	getrusage(GLIBC_2.2.5) [SUSv4]	getsid(GLIBC_2.2.5) [SUSv4]	getuid(GLIBC_2.2.5) [SUSv4]
getwd(GLIBC_2.2.5) [SUSv3]	initgroups(GLIBC_2.2.5) [LSB]	ioctl(GLIBC_2.2.5) [LSB]	ioperm(GLIBC_2.2.5) [LSB]
iopl(GLIBC_2.2.5) [LSB]	kill(GLIBC_2.2.5) [LSB]	killpg(GLIBC_2.2.5) [SUSv4]	lchown(GLIBC_2.2.5) [SUSv4]
link(GLIBC_2.2.5) [LSB]	lockf(GLIBC_2.2.5) [SUSv4]	lseek(GLIBC_2.2.5) [SUSv4]	mkdir(GLIBC_2.2.5) [SUSv4]
mkfifo(GLIBC_2.2.5) [SUSv4]	mlock(GLIBC_2.2.5) [SUSv4]	mlockall(GLIBC_2.2.5) [SUSv4]	mmap(GLIBC_2.2.5) [SUSv4]
mprotect(GLIBC_2.2.5) [SUSv4]	mremap(GLIBC_2.2.5) [LSB]	msync(GLIBC_2.2.5) [SUSv4]	munlock(GLIBC_2.2.5) [SUSv4]
munlockall(GLIBC_2.2.5) [SUSv4]	munmap(GLIBC_2.2.5) [SUSv4]	nanosleep(GLIBC_2.2.5) [SUSv4]	nice(GLIBC_2.2.5) [SUSv4]
open(GLIBC_2.2.5) [SUSv4]	opendir(GLIBC_2.2.5) [SUSv4]	pathconf(GLIBC_2.2.5) [SUSv4]	pause(GLIBC_2.2.5) [SUSv4]
pipe(GLIBC_2.2.5) [SUSv4]	poll(GLIBC_2.2.5) [SUSv4]	pread(GLIBC_2.2.5) [SUSv4]	pselect(GLIBC_2.2.5) [SUSv4]
ptrace(GLIBC_2.2.5) [LSB]	pwrite(GLIBC_2.2.5) [SUSv4]	read(GLIBC_2.2.5) [SUSv4]	readdir(GLIBC_2.2.5) [SUSv4]
readdir_r(GLIBC_2.2.5) [SUSv4]	readlink(GLIBC_2.2.5) [SUSv4]	readv(GLIBC_2.2.5) [SUSv4]	rename(GLIBC_2.2.5) [SUSv4]
rmdir(GLIBC_2.2.5) [SUSv4]	sbrk(GLIBC_2.2.5) [SUSv2]	sched_get_priority_max(GLIBC_2.2.5) [SUSv4]	sched_get_priority_min(GLIBC_2.2.5) [SUSv4]
sched_getparam(GLIBC_2.2.5) [SUSv4]	sched_getscheduler(GLIBC_2.2.5) [SUSv4]	sched_rr_get_interval(GLIBC_2.2.5) [SUSv4]	sched_setparam(GLIBC_2.2.5) [SUSv4]
sched_setscheduler(GLIBC_2.2.5) [LSB]	sched_yield(GLIBC_2.2.5) [SUSv4]	select(GLIBC_2.2.5) [SUSv4]	setcontext(GLIBC_2.2.5) [SUSv3]
setegid(GLIBC_2.2.5) [SUSv4]	seteuid(GLIBC_2.2.5) [SUSv4]	setgid(GLIBC_2.2.5) [SUSv4]	setitimer(GLIBC_2.2.5) [SUSv4]
setpgid(GLIBC_2.2.5) [SUSv4]	setpgrp(GLIBC_2.2.5) [SUSv4]	setpriority(GLIBC_2.2.5) [SUSv4]	setregid(GLIBC_2.2.5) [SUSv4]
setreuid(GLIBC_2.2.5) [SUSv4]	setrlimit(GLIBC_2.2.5) [LSB]	setrlimit64(GLIBC_2.2.5) [LFS]	setsid(GLIBC_2.2.5) [SUSv4]
setuid(GLIBC_2.2.5) [SUSv4]	sleep(GLIBC_2.2.5) [SUSv4]	statfs(GLIBC_2.2.5) [LSB]	statvfs(GLIBC_2.2.5) [SUSv4]

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stime(GLIBC_2.2.5) [LSB]	symlink(GLIBC_2.2.5) [SUSv4]	sync(GLIBC_2.2.5) [SUSv4]	sysconf(GLIBC_2.2.5) [LSB]
sysinfo(GLIBC_2.2.5) [LSB]	time(GLIBC_2.2.5) [SUSv4]	times(GLIBC_2.2.5) [SUSv4]	truncate(GLIBC_2.2.5) [SUSv4]
ulimit(GLIBC_2.2.5) [SUSv4]	umask(GLIBC_2.2.5) [SUSv4]	uname(GLIBC_2.2.5) [SUSv4]	unlink(GLIBC_2.2.5) [LSB]
utime(GLIBC_2.2.5) [SUSv4]	utimes(GLIBC_2.2.5) [SUSv4]	vfork(GLIBC_2.2.5) [SUSv3]	wait(GLIBC_2.2.5) [SUSv4]
wait4(GLIBC_2.2.5) [LSB]	waitid(GLIBC_2.2.5) [SUSv4]	waitpid(GLIBC_2.2.5) [SUSv4]	write(GLIBC_2.2.5) [SUSv4]
writev(GLIBC_2.2.5) [SUSv4]			

An LSB conforming implementation shall provide the architecture specific deprecated functions for System Calls specified in Table 10-5, with the full mandatory functionality as described in the referenced underlying specification.

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-5 libc - System Calls Deprecated Function Interfaces

fstatfs(GLIBC_2.2.5) [LSB]	getdtablesize(GLIBC_2.2.5) [LSB]	getpagesize(GLIBC_2.2.5) [LSB]	getwd(GLIBC_2.2.5) [SUSv3]
statfs(GLIBC_2.2.5) [LSB]			

10.2.4 Standard I/O

10.2.4.1 Interfaces for Standard I/O

An LSB conforming implementation shall provide the architecture specific functions for Standard I/O specified in Table 10-6, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-6 libc - Standard I/O Function Interfaces

_IO_feof(GLIBC_2.2.5) [LSB]	_IO_getc(GLIBC_2.2.5) [LSB]	_IO_putc(GLIBC_2.2.5) [LSB]	_IO_puts(GLIBC_2.2.5) [LSB]
__fprintf_chk(GLIBC_2.3.4) [LSB]	__printf_chk(GLIBC_2.3.4) [LSB]	__snprintf_chk(GLIBC_2.3.4) [LSB]	__sprintf_chk(GLIBC_2.3.4) [LSB]
__vfprintf_chk(GLIBC_2.3.4) [LSB]	__vprintf_chk(GLIBC_2.3.4) [LSB]	__vsnprintf_chk(GLIBC_2.3.4) [LSB]	__vsprintf_chk(GLIBC_2.3.4) [LSB]
asprintf(GLIBC_2.2.5) [LSB]	clearerr(GLIBC_2.2.5) [SUSv4]	clearerr_unlocked(GLIBC_2.2.5) [LSB]	ctermid(GLIBC_2.2.5) [SUSv4]
dprintf(GLIBC_2.2.5) [SUSv4]	fclose(GLIBC_2.2.5) [SUSv4]	fdopen(GLIBC_2.2.5) [SUSv4]	feof(GLIBC_2.2.5) [SUSv4]

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feof_unlocked(GLIBC_2.2.5) [LSB]	ferror(GLIBC_2.2.5) [SUSv4]	ferror_unlocked(GLIBC_2.2.5) [LSB]	fflush(GLIBC_2.2.5) [SUSv4]
fflush_unlocked(GLIBC_2.2.5) [LSB]	fgetc(GLIBC_2.2.5) [SUSv4]	fgetc_unlocked(GLIBC_2.2.5) [LSB]	fgetpos(GLIBC_2.2.5) [SUSv4]
fgets(GLIBC_2.2.5) [SUSv4]	fgets_unlocked(GLIBC_2.2.5) [LSB]	fgetwc_unlocked(GLIBC_2.2.5) [LSB]	fgetws_unlocked(GLIBC_2.2.5) [LSB]
fileno(GLIBC_2.2.5) [SUSv4]	fileno_unlocked(GLIBC_2.2.5) [LSB]	flockfile(GLIBC_2.2.5) [SUSv4]	fopen(GLIBC_2.2.5) [SUSv4]
fprintf(GLIBC_2.2.5) [SUSv4]	fputc(GLIBC_2.2.5) [SUSv4]	fputc_unlocked(GLIBC_2.2.5) [LSB]	fputs(GLIBC_2.2.5) [SUSv4]
fputs_unlocked(GLIBC_2.2.5) [LSB]	fputwc_unlocked(GLIBC_2.2.5) [LSB]	fputws_unlocked(GLIBC_2.2.5) [LSB]	fread(GLIBC_2.2.5) [SUSv4]
fread_unlocked(GLIBC_2.2.5) [LSB]	freopen(GLIBC_2.2.5) [SUSv4]	fscanf(GLIBC_2.2.5) [LSB]	fseek(GLIBC_2.2.5) [SUSv4]
fseeko(GLIBC_2.2.5) [SUSv4]	fsetpos(GLIBC_2.2.5) [SUSv4]	ftell(GLIBC_2.2.5) [SUSv4]	ftello(GLIBC_2.2.5) [SUSv4]
fwrite(GLIBC_2.2.5) [SUSv4]	fwrite_unlocked(GLIBC_2.2.5) [LSB]	getc(GLIBC_2.2.5) [SUSv4]	getc_unlocked(GLIBC_2.2.5) [SUSv4]
getchar(GLIBC_2.2.5) [SUSv4]	getchar_unlocked(GLIBC_2.2.5) [SUSv4]	getdelim(GLIBC_2.2.5) [SUSv4]	getline(GLIBC_2.2.5) [SUSv4]
getw(GLIBC_2.2.5) [SUSv2]	getwc_unlocked(GLIBC_2.2.5) [LSB]	getwchar_unlocked(GLIBC_2.2.5) [LSB]	pclose(GLIBC_2.2.5) [SUSv4]
popen(GLIBC_2.2.5) [SUSv4]	printf(GLIBC_2.2.5) [SUSv4]	putc(GLIBC_2.2.5) [SUSv4]	putc_unlocked(GLIBC_2.2.5) [SUSv4]
putchar(GLIBC_2.2.5) [SUSv4]	putchar_unlocked(GLIBC_2.2.5) [SUSv4]	puts(GLIBC_2.2.5) [SUSv4]	putw(GLIBC_2.2.5) [SUSv2]
putwc_unlocked(GLIBC_2.2.5) [LSB]	putwchar_unlocked(GLIBC_2.2.5) [LSB]	remove(GLIBC_2.2.5) [SUSv4]	rewind(GLIBC_2.2.5) [SUSv4]
rewinddir(GLIBC_2.2.5) [SUSv4]	scanf(GLIBC_2.2.5) [LSB]	seekdir(GLIBC_2.2.5) [SUSv4]	setbuf(GLIBC_2.2.5) [SUSv4]
setbuffer(GLIBC_2.2.5) [LSB]	setvbuf(GLIBC_2.2.5) [SUSv4]	snprintf(GLIBC_2.2.5) [SUSv4]	sprintf(GLIBC_2.2.5) [SUSv4]

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sscanf(GLIBC_2.2.5) [LSB]	telldir(GLIBC_2.2.5) [SUSv4]	tempnam(GLIBC_2.2.5) [SUSv4]	ungetc(GLIBC_2.2.5) [SUSv4]
vasprintf(GLIBC_2.2.5) [LSB]	vdprintf(GLIBC_2.2.5) [SUSv4]	vfprintf(GLIBC_2.2.5) [SUSv4]	vprintf(GLIBC_2.2.5) [SUSv4]
vsnprintf(GLIBC_2.2.5) [SUSv4]	vsprintf(GLIBC_2.2.5) [SUSv4]		

An LSB conforming implementation shall provide the architecture specific deprecated functions for Standard I/O specified in Table 10-7, with the full mandatory functionality as described in the referenced underlying specification.

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-7 libc - Standard I/O Deprecated Function Interfaces

tempnam(GLIBC_2.2.5) [SUSv4]			

An LSB conforming implementation shall provide the architecture specific data interfaces for Standard I/O specified in Table 10-8, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-8 libc- Standard I/O Data Interfaces

stderr(GLIBC_2.2.5) [SUSv4]	stdin(GLIBC_2.2.5) [SUSv4]	stdout(GLIBC_2.2.5) [SUSv4]	

10.2.5 Signal Handling

10.2.5.1 Interfaces for Signal Handling

An LSB conforming implementation shall provide the architecture specific functions for Signal Handling specified in Table 10-9, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-9 libc - Signal Handling Function Interfaces

__libc_current_sigrtmax(GLIBC_2.2.5) [LSB]	__libc_current_sigrtmin(GLIBC_2.2.5) [LSB]	__sigsetjmp(GLIBC_2.2.5) [LSB]	__sysv_signal(GLIBC_2.2.5) [LSB]
__xpg_sigpause(GLIBC_2.2.5) [LSB]	bsd_signal(GLIBC_2.2.5) [SUSv3]	psignal(GLIBC_2.2.5) [SUSv4]	raise(GLIBC_2.2.5) [SUSv4]
sigaction(GLIBC_2.2.5) [SUSv4]	sigaddset(GLIBC_2.2.5) [SUSv4]	sigaltstack(GLIBC_2.2.5) [SUSv4]	sigandset(GLIBC_2.2.5) [LSB]
sigdelset(GLIBC_2.2.5) [SUSv4]	sigemptyset(GLIBC_2.2.5) [SUSv4]	sigfillset(GLIBC_2.2.5) [SUSv4]	sighold(GLIBC_2.2.5) [SUSv4]
sigignore(GLIBC_2.2.5) [SUSv4]	siginterrupt(GLIBC_2.2.5) [SUSv4]	sigisemptyset(GLIBC_2.2.5) [LSB]	sigismember(GLIBC_2.2.5) [SUSv4]

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siglongjmp(GLIBC_2.2.5) [SUSv4]	signal(GLIBC_2.2.5) [SUSv4]	sigorset(GLIBC_2.2.5) [LSB]	sigpause(GLIBC_2.2.5) [LSB]
sigpending(GLIBC_2.2.5) [SUSv4]	sigprocmask(GLIBC_2.2.5) [SUSv4]	sigqueue(GLIBC_2.2.5) [SUSv4]	sigrelse(GLIBC_2.2.5) [SUSv4]
sigreturn(GLIBC_2.2.5) [LSB]	sigset(GLIBC_2.2.5) [SUSv4]	sigsuspend(GLIBC_2.2.5) [SUSv4]	sigtimedwait(GLIBC_2.2.5) [SUSv4]
sigwait(GLIBC_2.2.5) [SUSv4]	sigwaitinfo(GLIBC_2.2.5) [SUSv4]		

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

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-10 libc - Signal Handling Deprecated Function Interfaces

sigpause(GLIBC_2.2.5) [LSB]			

An LSB conforming implementation shall provide the architecture specific data interfaces for Signal Handling specified in Table 10-11, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-11 libc - Signal Handling Data Interfaces

_sys_siglist(GLIBC_2.3.3) [LSB]			

10.2.6 Localization Functions

10.2.6.1 Interfaces for Localization Functions

An LSB conforming implementation shall provide the architecture specific functions for Localization Functions specified in Table 10-12, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-12 libc - Localization Functions Function Interfaces

bind_textdomain_codeset(GLIBC_2.2.5) [LSB]	bindtextdomain(GLIBC_2.2.5) [LSB]	catclose(GLIBC_2.2.5) [SUSv4]	catgets(GLIBC_2.2.5) [SUSv4]
catopen(GLIBC_2.2.5) [SUSv4]	dcgettext(GLIBC_2.2.5) [LSB]	dcngettext(GLIBC_2.2.5) [LSB]	dgettext(GLIBC_2.2.5) [LSB]
dngettext(GLIBC_2.2.5) [LSB]	gettext(GLIBC_2.2.5) [LSB]	iconv(GLIBC_2.2.5) [SUSv4]	iconv_close(GLIBC_2.2.5) [SUSv4]
iconv_open(GLIBC_2.2.5) [SUSv4]	localeconv(GLIBC_2.2.5) [SUSv4]	ngettext(GLIBC_2.2.5) [LSB]	nl_langinfo(GLIBC_2.2.5) [SUSv4]

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setlocale(GLIBC_2.2.5) [SUSv4]	textdomain(GLIBC_2.2.5) [LSB]		

An LSB conforming implementation shall provide the architecture specific data interfaces for Localization Functions specified in Table 10-13, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-13 libc - Localization Functions Data Interfaces

_nl_msg_cat_cntr (GLIBC_2.2.5) [LSB]			

10.2.7 Posix Spawn Option

10.2.7.1 Interfaces for Posix Spawn Option

An LSB conforming implementation shall provide the architecture specific functions for Posix Spawn Option specified in Table 10-14, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-14 libc - Posix Spawn Option Function Interfaces

posix_spawn(GLIBC_2.15) [SUSv4]	posix_spawn_file_actions_addclose(GLIBC_2.2.5) [SUSv4]	posix_spawn_file_actions_adddup2(GLIBC_2.2.5) [SUSv4]	posix_spawn_file_actions_addopen(GLIBC_2.2.5) [SUSv4]
posix_spawn_file_actions_destroy (GLIBC_2.2.5) [SUSv4]	posix_spawn_file_actions_init(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_destroy(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_getflags(GLIBC_2.2.5) [SUSv4]
posix_spawnattr_getpgroup(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_getschedparam(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_getschedpolicy(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_getsigdefault(GLIBC_2.2.5) [SUSv4]
posix_spawnattr_getsigmask(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_init(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_setflags(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_setpgroup(GLIBC_2.2.5) [SUSv4]
posix_spawnattr_setschedparam(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_setschedpolicy(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_setsigdefault(GLIBC_2.2.5) [SUSv4]	posix_spawnattr_setsigmask(GLIBC_2.2.5) [SUSv4]
posix_spawnp(GLIBC_2.15) [SUSv4]			

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10.2.8 Posix Advisory Option

10.2.8.1 Interfaces for Posix Advisory Option

An LSB conforming implementation shall provide the architecture specific functions for Posix Advisory Option specified in Table 10-15, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-15 libc - Posix Advisory Option Function Interfaces

posix_fadvise(GLIBC_2.2.5) [SUSv4]	posix_fallocate(GLIBC_2.2.5) [SUSv4]	posix_madvise(GLIBC_2.2.5) [SUSv4]	posix_memalign(GLIBC_2.2.5) [SUSv4]

10.2.9 Socket Interface

10.2.9.1 Interfaces for Socket Interface

An LSB conforming implementation shall provide the architecture specific functions for Socket Interface specified in Table 10-16, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-16 libc - Socket Interface Function Interfaces

__h_errno_location(GLIBC_2.2.5) [LSB]	accept(GLIBC_2.2.5) [SUSv4]	bind(GLIBC_2.2.5) [SUSv4]	bindresvport(GLIBC_2.2.5) [LSB]
connect(GLIBC_2.2.5) [SUSv4]	gethostid(GLIBC_2.2.5) [SUSv4]	gethostname(GLIBC_2.2.5) [SUSv4]	getpeername(GLIBC_2.2.5) [SUSv4]
getsockname(GLIBC_2.2.5) [SUSv4]	getsockopt(GLIBC_2.2.5) [LSB]	if_freenameindex(GLIBC_2.2.5) [SUSv4]	if_indextoname(GLIBC_2.2.5) [SUSv4]
if_nameindex(GLIBC_2.2.5) [SUSv4]	if_nametoindex(GLIBC_2.2.5) [SUSv4]	listen(GLIBC_2.2.5) [SUSv4]	recv(GLIBC_2.2.5) [SUSv4]
recvfrom(GLIBC_2.2.5) [SUSv4]	recvmsg(GLIBC_2.2.5) [SUSv4]	send(GLIBC_2.2.5) [SUSv4]	sendmsg(GLIBC_2.2.5) [SUSv4]
sendto(GLIBC_2.2.5) [SUSv4]	setsockopt(GLIBC_2.2.5) [LSB]	shutdown(GLIBC_2.2.5) [SUSv4]	sockatmark(GLIBC_2.2.5) [SUSv4]
socket(GLIBC_2.2.5) [SUSv4]	socketpair(GLIBC_2.2.5) [SUSv4]		

An LSB conforming implementation shall provide the architecture specific data interfaces for Socket Interface specified in Table 10-17, with the full mandatory functionality as described in the referenced underlying specification.

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Table 10-17 libc - Socket Interface Data Interfaces

in6addr_any(GLIBC_2.2.5) [SUSv3]	in6addr_loopback(GLIBC_2.2.5) [SUSv3]		

10.2.10 Wide Characters

10.2.10.1 Interfaces for Wide Characters

An LSB conforming implementation shall provide the architecture specific functions for Wide Characters specified in Table 10-18, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-18 libc - Wide Characters Function Interfaces

__wcstod_internal(GLIBC_2.2.5) [LSB]	__wcstof_internal(GLIBC_2.2.5) [LSB]	__wcstol_internal(GLIBC_2.2.5) [LSB]	__wcstold_internal(GLIBC_2.2.5) [LSB]
__wcstoul_internal(GLIBC_2.2.5) [LSB]	btowc(GLIBC_2.2.5) [SUSv4]	fgetwc(GLIBC_2.2.5) [SUSv4]	fgetws(GLIBC_2.2.5) [SUSv4]
fputwc(GLIBC_2.2.5) [SUSv4]	fputws(GLIBC_2.2.5) [SUSv4]	fwide(GLIBC_2.2.5) [SUSv4]	fwprintf(GLIBC_2.2.5) [SUSv4]
fwscanf(GLIBC_2.2.5) [LSB]	getwc(GLIBC_2.2.5) [SUSv4]	getwchar(GLIBC_2.2.5) [SUSv4]	mblen(GLIBC_2.2.5) [SUSv4]
mbrlen(GLIBC_2.2.5) [SUSv4]	mbrtowc(GLIBC_2.2.5) [SUSv4]	mbsinit(GLIBC_2.2.5) [SUSv4]	mbsnrtowcs(GLIBC_2.2.5) [SUSv4]
mbsrtowcs(GLIBC_2.2.5) [SUSv4]	mbstowcs(GLIBC_2.2.5) [SUSv4]	mbtowc(GLIBC_2.2.5) [SUSv4]	putwc(GLIBC_2.2.5) [SUSv4]
putwchar(GLIBC_2.2.5) [SUSv4]	swprintf(GLIBC_2.2.5) [SUSv4]	swscanf(GLIBC_2.2.5) [LSB]	towctrans(GLIBC_2.2.5) [SUSv4]
towlower(GLIBC_2.2.5) [SUSv4]	towupper(GLIBC_2.2.5) [SUSv4]	ungetwc(GLIBC_2.2.5) [SUSv4]	vfwprintf(GLIBC_2.2.5) [SUSv4]
vfwscanf(GLIBC_2.2.5) [LSB]	vswprintf(GLIBC_2.2.5) [SUSv4]	vswscanf(GLIBC_2.2.5) [LSB]	vwprintf(GLIBC_2.2.5) [SUSv4]
vwscanf(GLIBC_2.2.5) [LSB]	wcpcpy(GLIBC_2.2.5) [SUSv4]	wcpncpy(GLIBC_2.2.5) [SUSv4]	wcrtomb(GLIBC_2.2.5) [SUSv4]
wcscasecmp(GLIBC_2.2.5) [SUSv4]	wcscat(GLIBC_2.2.5) [SUSv4]	wcschr(GLIBC_2.2.5) [SUSv4]	wcscmp(GLIBC_2.2.5) [SUSv4]
wcscoll(GLIBC_2.2.5) [SUSv4]	wcscpy(GLIBC_2.2.5) [SUSv4]	wcscspn(GLIBC_2.2.5) [SUSv4]	wcsdup(GLIBC_2.2.5) [SUSv4]
wcsftime(GLIBC_2.2.5) [SUSv4]	wcslen(GLIBC_2.2.5) [SUSv4]	wcsncasecmp(GLIBC_2.2.5) [SUSv4]	wcsncat(GLIBC_2.2.5) [SUSv4]

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wcsncmp(GLIBC_2.2.5) [SUSv4]	wcsncpy(GLIBC_2.2.5) [SUSv4]	wcsnlen(GLIBC_2.2.5) [SUSv4]	wcsnrtombs(GLIBC_2.2.5) [SUSv4]
wcspbrk(GLIBC_2.2.5) [SUSv4]	wcsrchr(GLIBC_2.2.5) [SUSv4]	wcsrtombs(GLIBC_2.2.5) [SUSv4]	wcsspn(GLIBC_2.2.5) [SUSv4]
wcsstr(GLIBC_2.2.5) [SUSv4]	wcstod(GLIBC_2.2.5) [SUSv4]	wcstof(GLIBC_2.2.5) [SUSv4]	wcstoimax(GLIBC_2.2.5) [SUSv4]
wcstok(GLIBC_2.2.5) [SUSv4]	wcstol(GLIBC_2.2.5) [SUSv4]	wcstold(GLIBC_2.2.5) [SUSv4]	wcstoll(GLIBC_2.2.5) [SUSv4]
wcstombs(GLIBC_2.2.5) [SUSv4]	wcstoq(GLIBC_2.2.5) [LSB]	wcstoul(GLIBC_2.2.5) [SUSv4]	wcstoull(GLIBC_2.2.5) [SUSv4]
wcstoumax(GLIBC_2.2.5) [SUSv4]	wcstouq(GLIBC_2.2.5) [LSB]	wcswcs(GLIBC_2.2.5) [SUSv3]	wcswidth(GLIBC_2.2.5) [SUSv4]
wcsxfrm(GLIBC_2.2.5) [SUSv4]	wctob(GLIBC_2.2.5) [SUSv4]	wctomb(GLIBC_2.2.5) [SUSv4]	wctrans(GLIBC_2.2.5) [SUSv4]
wctype(GLIBC_2.2.5) [SUSv4]	wcwidth(GLIBC_2.2.5) [SUSv4]	wmemchr(GLIBC_2.2.5) [SUSv4]	wmemcmp(GLIBC_2.2.5) [SUSv4]
wmemcpy(GLIBC_2.2.5) [SUSv4]	wmemmove(GLIBC_2.2.5) [SUSv4]	wmemset(GLIBC_2.2.5) [SUSv4]	wprintf(GLIBC_2.2.5) [SUSv4]
wscanf(GLIBC_2.2.5) [LSB]			

10.2.11 String Functions

10.2.11.1 Interfaces for String Functions

An LSB conforming implementation shall provide the architecture specific functions for String Functions specified in Table 10-19, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-19 libc - String Functions Function Interfaces

__mempcpy(GLIBC_2.2.5) [LSB]	__rawmemchr(GLIBC_2.2.5) [LSB]	__stpcpy(GLIBC_2.2.5) [LSB]	__strdup(GLIBC_2.2.5) [LSB]
__strtod_internal(GLIBC_2.2.5) [LSB]	__strtof_internal(GLIBC_2.2.5) [LSB]	__strtok_r(GLIBC_2.2.5) [LSB]	__strtol_internal(GLIBC_2.2.5) [LSB]
__strtold_internal(GLIBC_2.2.5) [LSB]	__strtoll_internal(GLIBC_2.2.5) [LSB]	__strtoul_internal(GLIBC_2.2.5) [LSB]	__strtoull_internal(GLIBC_2.2.5) [LSB]
__xpg_strerror_r(GLIBC_2.3.4) [LSB]	bcmp(GLIBC_2.2.5) [SUSv3]	bcopy(GLIBC_2.2.5) [SUSv3]	bzero(GLIBC_2.2.5) [SUSv3]
ffs(GLIBC_2.2.5) [SUSv4]	index(GLIBC_2.2.5) [SUSv3]	memccpy(GLIBC_2.2.5) [SUSv4]	memchr(GLIBC_2.2.5) [SUSv4]

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memcmp(GLIBC_2.2.5) [SUSv4]	memcpy(GLIBC_2.14) [SUSv4]	memmove(GLIBC_2.2.5) [SUSv4]	memrchr(GLIBC_2.2.5) [LSB]
memset(GLIBC_2.2.5) [SUSv4]	rindex(GLIBC_2.2.5) [SUSv3]	stpcpy(GLIBC_2.2.5) [SUSv4]	stpncpy(GLIBC_2.2.5) [SUSv4]
strcasecmp(GLIBC_2.2.5) [SUSv4]	strcasestr(GLIBC_2.2.5) [LSB]	strcat(GLIBC_2.2.5) [SUSv4]	strchr(GLIBC_2.2.5) [SUSv4]
strcmp(GLIBC_2.2.5) [SUSv4]	strcoll(GLIBC_2.2.5) [SUSv4]	strcpy(GLIBC_2.2.5) [SUSv4]	strcspn(GLIBC_2.2.5) [SUSv4]
strdup(GLIBC_2.2.5) [SUSv4]	strerror(GLIBC_2.2.5) [SUSv4]	strerror_r(GLIBC_2.2.5) [LSB]	strfmon(GLIBC_2.2.5) [SUSv4]
strftime(GLIBC_2.2.5) [SUSv4]	strlen(GLIBC_2.2.5) [SUSv4]	strncasecmp(GLIBC_2.2.5) [SUSv4]	strncat(GLIBC_2.2.5) [SUSv4]
strncmp(GLIBC_2.2.5) [SUSv4]	strncpy(GLIBC_2.2.5) [SUSv4]	strndup(GLIBC_2.2.5) [SUSv4]	strnlen(GLIBC_2.2.5) [SUSv4]
strpbrk(GLIBC_2.2.5) [SUSv4]	strptime(GLIBC_2.2.5) [LSB]	strrchr(GLIBC_2.2.5) [SUSv4]	strsep(GLIBC_2.2.5) [LSB]
strsignal(GLIBC_2.2.5) [SUSv4]	strspn(GLIBC_2.2.5) [SUSv4]	strstr(GLIBC_2.2.5) [SUSv4]	strtof(GLIBC_2.2.5) [SUSv4]
strtoimax(GLIBC_2.2.5) [SUSv4]	strtok(GLIBC_2.2.5) [SUSv4]	strtok_r(GLIBC_2.2.5) [SUSv4]	strtold(GLIBC_2.2.5) [SUSv4]
strtoll(GLIBC_2.2.5) [SUSv4]	strtoq(GLIBC_2.2.5) [LSB]	strtoull(GLIBC_2.2.5) [SUSv4]	strtoumax(GLIBC_2.2.5) [SUSv4]
strtouq(GLIBC_2.2.5) [LSB]	strxfrm(GLIBC_2.2.5) [SUSv4]	swab(GLIBC_2.2.5) [SUSv4]	

An LSB conforming implementation shall provide the architecture specific deprecated functions for String Functions specified in Table 10-20, with the full mandatory functionality as described in the referenced underlying specification.

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-20 libc - String Functions Deprecated Function Interfaces

strerror_r(GLIBC_2.2.5) [LSB]			

10.2.12 IPC Functions

10.2.12.1 Interfaces for IPC Functions

An LSB conforming implementation shall provide the architecture specific functions for IPC Functions specified in Table 10-21, with the full mandatory functionality as described in the referenced underlying specification.

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Table 10-21 libc - IPC Functions Function Interfaces

ftok(GLIBC_2.2.5) [SUSv4]	msgctl(GLIBC_2.2.5) [SUSv4]	msgget(GLIBC_2.2.5) [SUSv4]	msgrcv(GLIBC_2.2.5) [SUSv4]
msgsnd(GLIBC_2.2.5) [SUSv4]	semctl(GLIBC_2.2.5) [SUSv4]	semget(GLIBC_2.2.5) [SUSv4]	semop(GLIBC_2.2.5) [SUSv4]
shmat(GLIBC_2.2.5) [SUSv4]	shmctl(GLIBC_2.2.5) [SUSv4]	shmdt(GLIBC_2.2.5) [SUSv4]	shmget(GLIBC_2.2.5) [SUSv4]

10.2.13 Regular Expressions

10.2.13.1 Interfaces for Regular Expressions

An LSB conforming implementation shall provide the architecture specific functions for Regular Expressions specified in Table 10-22, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-22 libc - Regular Expressions Function Interfaces

regcomp(GLIBC_2.2.5) [SUSv4]	regerror(GLIBC_2.2.5) [SUSv4]	regexec(GLIBC_2.3.4) [LSB]	regfree(GLIBC_2.2.5) [SUSv4]

10.2.14 Character Type Functions

10.2.14.1 Interfaces for Character Type Functions

An LSB conforming implementation shall provide the architecture specific functions for Character Type Functions specified in Table 10-23, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-23 libc - Character Type Functions Function Interfaces

__ctype_get_mb_cur_max(GLIBC_2.2.5) [LSB]	_tolower(GLIBC_2.2.5) [SUSv4]	_toupper(GLIBC_2.2.5) [SUSv4]	isalnum(GLIBC_2.2.5) [SUSv4]
isalpha(GLIBC_2.2.5) [SUSv4]	isascii(GLIBC_2.2.5) [SUSv4]	iscntrl(GLIBC_2.2.5) [SUSv4]	isdigit(GLIBC_2.2.5) [SUSv4]
isgraph(GLIBC_2.2.5) [SUSv4]	islower(GLIBC_2.2.5) [SUSv4]	isprint(GLIBC_2.2.5) [SUSv4]	ispunct(GLIBC_2.2.5) [SUSv4]
isspace(GLIBC_2.2.5) [SUSv4]	isupper(GLIBC_2.2.5) [SUSv4]	iswalnum(GLIBC_2.2.5) [SUSv4]	iswalpha(GLIBC_2.2.5) [SUSv4]
iswblank(GLIBC_2.2.5) [SUSv4]	iswcntrl(GLIBC_2.2.5) [SUSv4]	iswctype(GLIBC_2.2.5) [SUSv4]	iswdigit(GLIBC_2.2.5) [SUSv4]
iswgraph(GLIBC_2.2.5) [SUSv4]	iswlower(GLIBC_2.2.5) [SUSv4]	iswprint(GLIBC_2.2.5) [SUSv4]	iswpunct(GLIBC_2.2.5) [SUSv4]
iswspace(GLIBC_2.2.5) [SUSv4]	iswupper(GLIBC_2.2.5) [SUSv4]	iswxdigit(GLIBC_2.2.5) [SUSv4]	isxdigit(GLIBC_2.2.5) [SUSv4]
toascii(GLIBC_2.2.5) [SUSv4]	tolower(GLIBC_2.2.5) [SUSv4]	toupper(GLIBC_2.2.5) [SUSv4]	

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10.2.15 Time Manipulation

10.2.15.1 Interfaces for Time Manipulation

An LSB conforming implementation shall provide the architecture specific functions for Time Manipulation specified in Table 10-24, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-24 libc - Time Manipulation Function Interfaces

adjtime(GLIBC_2.2.5) [LSB]	asctime(GLIBC_2.2.5) [SUSv4]	asctime_r(GLIBC_2.2.5) [SUSv4]	ctime(GLIBC_2.2.5) [SUSv4]
ctime_r(GLIBC_2.2.5) [SUSv4]	difftime(GLIBC_2.2.5) [SUSv4]	gmtime(GLIBC_2.2.5) [SUSv4]	gmtime_r(GLIBC_2.2.5) [SUSv4]
localtime(GLIBC_2.2.5) [SUSv4]	localtime_r(GLIBC_2.2.5) [SUSv4]	mktime(GLIBC_2.2.5) [SUSv4]	tzset(GLIBC_2.2.5) [SUSv4]
ualarm(GLIBC_2.2.5) [SUSv3]			

An LSB conforming implementation shall provide the architecture specific data interfaces for Time Manipulation specified in Table 10-25, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-25 libc - Time Manipulation Data Interfaces

__daylight(GLIBC_2.2.5) [LSB]	__timezone(GLIBC_2.2.5) [LSB]	__tzname(GLIBC_2.2.5) [LSB]	daylight(GLIBC_2.2.5) [SUSv4]
timezone(GLIBC_2.2.5) [SUSv4]	tzname(GLIBC_2.2.5) [SUSv4]		

10.2.16 Terminal Interface Functions

10.2.16.1 Interfaces for Terminal Interface Functions

An LSB conforming implementation shall provide the architecture specific functions for Terminal Interface Functions specified in Table 10-26, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-26 libc - Terminal Interface Functions Function Interfaces

cfgetispeed(GLIBC_2.2.5) [SUSv4]	cfgetospeed(GLIBC_2.2.5) [SUSv4]	cfmakeraw(GLIBC_2.2.5) [LSB]	cfsetispeed(GLIBC_2.2.5) [SUSv4]
cfsetospeed(GLIBC_2.2.5) [SUSv4]	cfsetspeed(GLIBC_2.2.5) [LSB]	tcdrain(GLIBC_2.2.5) [SUSv4]	tcflow(GLIBC_2.2.5) [SUSv4]
tcflush(GLIBC_2.2.5) [SUSv4]	tcgetattr(GLIBC_2.2.5) [SUSv4]	tcgetpgrp(GLIBC_2.2.5) [SUSv4]	tcgetsid(GLIBC_2.2.5) [SUSv4]
tcsendbreak(GLIBC_2.2.5) [SUSv4]	tcsetattr(GLIBC_2.2.5) [SUSv4]	tcsetpgrp(GLIBC_2.2.5) [SUSv4]	

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10.2.17 System Database Interface

10.2.17.1 Interfaces for System Database Interface

An LSB conforming implementation shall provide the architecture specific functions for System Database Interface specified in Table 10-27, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-27 libc - System Database Interface Function Interfaces

endgrent(GLIBC_2.2.5) [SUSv4]	endprotoent(GLIBC_2.2.5) [SUSv4]	endpwent(GLIBC_2.2.5) [SUSv4]	endservent(GLIBC_2.2.5) [SUSv4]
endutent(GLIBC_2.2.5) [LSB]	endutxent(GLIBC_2.2.5) [SUSv4]	getgrent(GLIBC_2.2.5) [SUSv4]	getgrent_r(GLIBC_2.2.5) [LSB]
getgrgid(GLIBC_2.2.5) [SUSv4]	getgrgid_r(GLIBC_2.2.5) [SUSv4]	getgrnam(GLIBC_2.2.5) [SUSv4]	getgrnam_r(GLIBC_2.2.5) [SUSv4]
getgrouplist(GLIBC_2.2.5) [LSB]	gethostbyaddr(GLIBC_2.2.5) [SUSv3]	gethostbyaddr_r(GLIBC_2.2.5) [LSB]	gethostbyname(GLIBC_2.2.5) [SUSv3]
gethostbyname2(GLIBC_2.2.5) [LSB]	gethostbyname2_r(GLIBC_2.2.5) [LSB]	gethostbyname_r(GLIBC_2.2.5) [LSB]	getprotobyname(GLIBC_2.2.5) [SUSv4]
getprotobyname_r(GLIBC_2.2.5) [LSB]	getprotobynumber(GLIBC_2.2.5) [SUSv4]	getprotobynumber_r(GLIBC_2.2.5) [LSB]	getprotoent(GLIBC_2.2.5) [SUSv4]
getprotoent_r(GLIBC_2.2.5) [LSB]	getpwent(GLIBC_2.2.5) [SUSv4]	getpwent_r(GLIBC_2.2.5) [LSB]	getpwnam(GLIBC_2.2.5) [SUSv4]
getpwnam_r(GLIBC_2.2.5) [SUSv4]	getpwuid(GLIBC_2.2.5) [SUSv4]	getpwuid_r(GLIBC_2.2.5) [SUSv4]	getservbyname(GLIBC_2.2.5) [SUSv4]
getservbyname_r(GLIBC_2.2.5) [LSB]	getservbyport(GLIBC_2.2.5) [SUSv4]	getservbyport_r(GLIBC_2.2.5) [LSB]	getservent(GLIBC_2.2.5) [SUSv4]
getservent_r(GLIBC_2.2.5) [LSB]	getutent(GLIBC_2.2.5) [LSB]	getutent_r(GLIBC_2.2.5) [LSB]	getutxent(GLIBC_2.2.5) [SUSv4]
getutxid(GLIBC_2.2.5) [SUSv4]	getutxline(GLIBC_2.2.5) [SUSv4]	pututxline(GLIBC_2.2.5) [SUSv4]	setgrent(GLIBC_2.2.5) [SUSv4]
setgroups(GLIBC_2.2.5) [LSB]	setprotoent(GLIBC_2.2.5) [SUSv4]	setpwent(GLIBC_2.2.5) [SUSv4]	setservent(GLIBC_2.2.5) [SUSv4]
setutent(GLIBC_2.2.5) [LSB]	setutxent(GLIBC_2.2.5) [SUSv4]	utmpname(GLIBC_2.2.5) [LSB]	

An LSB conforming implementation shall provide the architecture specific deprecated functions for System Database Interface specified in Table 10-28, with the full mandatory functionality as described in the referenced underlying specification.

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Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-28 libc - System Database Interface Deprecated Function Interfaces

gethostbyaddr(GLIBC_2.2.5) [SUSv3]	gethostbyaddr_r(GLIBC_2.2.5) [LSB]	gethostbyname(GLIBC_2.2.5) [SUSv3]	gethostbyname2(GLIBC_2.2.5) [LSB]
gethostbyname2_r(GLIBC_2.2.5) [LSB]	gethostbyname_r(GLIBC_2.2.5) [LSB]		

10.2.18 Language Support

10.2.18.1 Interfaces for Language Support

An LSB conforming implementation shall provide the architecture specific functions for Language Support specified in Table 10-29, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-29 libc - Language Support Function Interfaces

__libc_start_main(GLIBC_2.2.5) [LSB]			

10.2.19 Large File Support

10.2.19.1 Interfaces for Large File Support

An LSB conforming implementation shall provide the architecture specific functions for Large File Support specified in Table 10-30, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-30 libc - Large File Support Function Interfaces

__fxstat64(GLIBC_2.2.5) [LSB]	__lxstat64(GLIBC_2.2.5) [LSB]	__xstat64(GLIBC_2.2.5) [LSB]	creat64(GLIBC_2.2.5) [LFS]
fgetpos64(GLIBC_2.2.5) [LFS]	fopen64(GLIBC_2.2.5) [LFS]	freopen64(GLIBC_2.2.5) [LFS]	fseeko64(GLIBC_2.2.5) [LFS]
fsetpos64(GLIBC_2.2.5) [LFS]	fstatfs64(GLIBC_2.2.5) [LSB]	fstatvfs64(GLIBC_2.2.5) [LFS]	ftello64(GLIBC_2.2.5) [LFS]
ftruncate64(GLIBC_2.2.5) [LFS]	ftw64(GLIBC_2.2.5) [LFS]	getrlimit64(GLIBC_2.2.5) [LFS]	lockf64(GLIBC_2.2.5) [LFS]
lseek64(GLIBC_2.2.5) [LFS]	mkstemp64(GLIBC_2.2.5) [LSB]	mmap64(GLIBC_2.2.5) [LFS]	nftw64(GLIBC_2.3.3) [LFS]
open64(GLIBC_2.2.5) [LFS]	posix_fadvise64(GLIBC_2.2.5) [LSB]	posix_fallocate64(GLIBC_2.2.5) [LSB]	pread64(GLIBC_2.2.5) [LSB]
pwrite64(GLIBC_2.2.5) [LSB]	readdir64(GLIBC_2.2.5) [LFS]	readdir64_r(GLIBC_2.2.5) [LSB]	statfs64(GLIBC_2.2.5) [LSB]

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statvfs64(GLIBC_2.2.5) [LFS]	tmpfile64(GLIBC_2.2.5) [LFS]	truncate64(GLIBC_2.2.5) [LFS]	

An LSB conforming implementation shall provide the architecture specific deprecated functions for Large File Support specified in Table 10-31, with the full mandatory functionality as described in the referenced underlying specification.

Note: These interfaces are deprecated, and applications should avoid using them. These interfaces may be withdrawn in future releases of this specification.

Table 10-31 libc - Large File Support Deprecated Function Interfaces

fstatfs64(GLIBC_2.2.5) [LSB]	statfs64(GLIBC_2.2.5) [LSB]		

10.2.20 Inotify

10.2.20.1 Interfaces for Inotify

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

10.2.21 Standard Library

10.2.21.1 Interfaces for Standard Library

An LSB conforming implementation shall provide the architecture specific functions for Standard Library specified in Table 10-32, with the full mandatory functionality as described in the referenced underlying specification.

Table 10-32 libc - Standard Library Function Interfaces

_Exit(GLIBC_2.2.5) [SUSv4]	__assert_fail(GLIBC_2.2.5) [LSB]	__cxa_atexit(GLIBC_2.2.5) [LSB]	__cxa_finalize(GLIBC_2.2.5) [LSB]
__errno_location(GLIBC_2.2.5) [LSB]	__fpending(GLIBC_2.2.5) [LSB]	__getpagesize(GLIBC_2.2.5) [LSB]	__isinf(GLIBC_2.2.5) [LSB]
__isinff(GLIBC_2.2.5) [LSB]	__isinfl(GLIBC_2.2.5) [LSB]	__isnan(GLIBC_2.2.5) [LSB]	__isnanf(GLIBC_2.2.5) [LSB]
__isnanl(GLIBC_2.2.5) [LSB]	__sysconf(GLIBC_2.2.5) [LSB]	__xpg_basename(GLIBC_2.2.5) [LSB]	_exit(GLIBC_2.2.5) [SUSv4]
_longjmp(GLIBC_2.2.5) [SUSv4]	_setjmp(GLIBC_2.2.5) [SUSv4]	a64l(GLIBC_2.2.5) [SUSv4]	abort(GLIBC_2.2.5) [SUSv4]
abs(GLIBC_2.2.5) [SUSv4]	alphasort(GLIBC_2.2.5) [SUSv4]	alphasort64(GLIBC_2.2.5) [LSB]	argz_add(GLIBC_2.2.5) [LSB]
argz_add_sep(GLIBC_2.2.5) [LSB]	argz_append(GLIBC_2.2.5) [LSB]	argz_count(GLIBC_2.2.5) [LSB]	argz_create(GLIBC_2.2.5) [LSB]
argz_create_sep(GLIBC_2.2.5) [LSB]	argz_delete(GLIBC_2.2.5) [LSB]	argz_extract(GLIBC_2.2.5) [LSB]	argz_insert(GLIBC_2.2.5) [LSB]

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